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POSTERS

MATERIALS PROCESSING

11th International Symposium on High Temperature Metallurgical Processing — Simulation of High-Temperature Processes

Sponsored by: TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee

Program Organizers: Zhiwei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Tao Jiang, Central South University; Jesse White, Elkem Carbon AS; Morsi Mahmoud, King Fahd University of Petroleum And Mineral

Monday AM | February 24, 2020
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Session Chairs: Jiann-Yang Hwang, Michigan Technological University; Jesse White, Elkem Carbon AS

8:00 AM Introductory Comments

8:15 AM
Simulation Model for Slag/Refractory-corrosion in the Metallurgical Engineering: *Christoph Sagadin*¹; Stefan Luidold¹; Christoph Wagner²; Christoph Pichler²; Alfred Spanring²; ¹Montanuniversitaet Leoben; ²RHI Magnesita

8:35 AM
The Development of a Heat and Mass Transfer Model for a Shaft Kiln to Preheat Manganese Ore with Hot Air, Model Development Methodology:*Sifiso Sambo*¹;SusannaHockaday¹;TumiSeodigeng²; ¹MINTEK; ²Vaal University of Technology

8:55 AM
Hydraulic Model Study of Combined Blowing in 65t Electric Arc Furnace (EAF): *Xuetao Wu*¹; Rong Zhu¹; Guangsheng Wei¹; Kai Dong¹; Lingzhi Yang²; ¹University of Science and Technology, Beijing; ²Central South University

9:15 AM
Predictive Modelling and Optimization of the Variant Combinations of Material Ratios in the Gasification-reduction Coupling Process: *Yiru Yang*¹; Lei Guo¹; Qipeng Bao¹; Zhancheng

Guo¹; ¹University of Science and Technology Beijing

LIGHT METALS

2020 Light Metals Keynote Session — Attracting and Growing the Next Generation of Technical Talent for the Light Metals Industry

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Corleen Chesonis, Metal Quality Solutions, LLC

Monday AM | February 24, 2020
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Session Chair: Corleen Chesonis, Metal Quality Solutions LLC

8:00 AM Introductory Comments

8:05 AM Keynote
Feeding the Talent Pipeline: A New Zealand Perspective on Diversity in STEM: *Margaret Hyland*¹; ¹Victoria University of Wellington

8:35 AM Keynote
The Future of Light Metals Technology and Education: Opportunities and Challenges: *Alan Luo*¹; ¹The Ohio State University

9:05 AM Keynote
Strong Leaders, Strong Companies: A Structure to Create Your Future: *Robert Wagstaff*¹; ¹Oculatus Inc.

9:35 AM Break

9:55 AM Keynote
The Norwegian Perspective: *Nina Dahl*¹; ¹SINTEF Industry

10:25 AM Keynote
Talent Acquisition and Development from a Hatch Perspective: *Joe Lombard*¹; ¹Hatch

10:55 AM Panel Discussion

11:25 AM Concluding Comments

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture IV: Toward Confident Use in Critical Applications — Processing-Structure-Property-Performance I

Sponsored by: TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Nik Hrabe, National Institute of Standards and Technology; Steve Daniewicz, University of Alabama; Nima Shamsaei, Auburn University; John Lewandowski, Case Western Reserve University; Mohsen Seifi, ASTM International/Case Western Reserve University

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Session Chair: Mohsen Seifi, ASTM International

8:00 AM Invited
Performance of Recycled Metal Machine Chips and Strips Through Solid Phase Additive Manufacturing: *Paul Allison*¹; J. Brian Jordon¹; Luke Brewer¹; Kevin Doherty²; ¹University of Alabama; ²US Army Research Lab

8:30 AM
Effect of Build Orientation and Post Machining on AM 316L Part Failure: *Michael Heiden*¹; Dan Tung¹; David Saiz¹; Bradley Jared¹; ¹Sandia National Laboratories

8:50 AM
Additive Manufacturing of Bulk Refractory High Entropy Alloys with Tailored Mechanical Properties: *Jonathan Pegues*¹; Michael Melia¹; Shaun Whetten¹; Nicolas Argibay¹; ¹Sandia National Laboratories

9:10 AM
Linking Porosity Characteristics to the Mechanical Properties of Additive Manufactured AlSi10Mg and 316 Stainless Steel: *Christopher Laursen*¹; Jay Carroll¹; Philip Noell¹; David Moore²; ¹Sandia National Laboratories, Materials Mechanics and Tribology; ²Sandia National Laboratories, Nondestructive Evaluation and

9:30 AM Break

9:50 AM Invited

Mechanical Behavior of Induced Lack of Fusion Flaws in AlSi10Mg: *Brett Conner*¹; John Lewandowski²; Austin Ngo²; Varthula De Silva Jayasekera¹; Griffin Jones³; Kenneth Meinert³; ¹Youngstown State University; ²Case Western Reserve University; ³Pennsylvania State University Applied Research Lab

10:20 AM

Predicting the Integrity of Additively Manufactured Nickel Alloys: Quantifying the Evolution of Texture and Elastic Constants Using Resonant Ultrasound Spectroscopy: *Jeffrey Rossin*¹; Marie-Agathe Charpagne¹; Brent Goodlet¹; Chris Torbet¹; Michael Groeber²; Bill Musinski²; Jonathan Miller²; Stephen Smith³; Samantha Daly¹; Tresa Pollock¹; ¹University of California, Santa Barbara; ²Air Force Research Laboratory; ³NASA Langley Research Center

10:40 AM

Flaw Identification in Additively Manufactured Components: Capabilities and Limitations: Griffin Jones¹; Rachel Reed²; *Jayme Keist*¹; Veeraraghavan Sundar²; ¹Penn State; ²UES, Inc.

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques — Synchrotron, Neutron, and In Situ Techniques: Keynote

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Fan Zhang, National Institute of Standards and Technology; Tom Stockman, Los Alamos National Laboratory; Tao Sun, University of Virginia; Donald Brown, Los Alamos National Laboratory; Yan Gao, Ge Global Research; Amit Pandey, MicroTesting Solutions; Joy Gockel, Wright State University; Tim Horn, North Carolina State University; Sneha Prabha Narra, Worcester Polytechnic Institute; Judy Schneider, University of Alabama at Huntsville

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Session Chairs: Fan Zhang, National Institute of Standards and Technology; Tom Stockman, Los Alamos National Laboratory

8:00 AM Introductory Comments

8:10 AM Keynote

3D Printing, Porosity, Synchrotron Experiments and Machine Learning: *Anthony Rollett*¹; ¹Carnegie Mellon University

8:40 AM Keynote

Using High Energy X-ray Diffraction to Probe Additively Manufactured Metals over a Range of Length and Time Scales: *John Carpenter*¹; Donald Brown¹; Bjorn Clausen¹; Maria Strantza¹; Jason Cooley¹; Reeju Pokharel¹; Erik Watkins¹; ¹Los Alamos National Laboratory

9:10 AM Keynote

Utilization of Backscattered Electrons for Process Monitoring During Electron Beam Melting: *Carolin Korner*¹; Christopher Arnold¹; Christoph Breuning¹; ¹University of Erlangen-Nuremberg

9:40 AM Break

10:00 AM Keynote

The Important Contribution of Synchrotron X-ray and Neutron Measurements to Metal Additive Manufacturing Benchmarks: *Lyle Levine*¹; Fan Zhang¹; Thien Phan¹; Maria Strantza²; Bjorn Clausen³; Donald Brown³; Darren Pagan⁴; Andrew Allen¹; Jan Ilavsky⁵; ¹National Institute of Standards and Technology; ²Lawrence Livermore National Laboratory ; ³Los Alamos National Laboratory; ⁴Cornell High Energy Synchrotron Source; ⁵Advanced Photon Source

10:30 AM Keynote

Investigating the Mechanics of Additively Manufactured Materials Using Neutron Diffraction: *Allison Beese*¹; Zhuqing Wang²; Alexandru Stoica³; Dong Ma³; ¹Pennsylvania State University; ²Kennametal; ³Oak Ridge National Laboratory

11:00 AM Keynote

Sensor Enabled Material Optimization in Powder Bed Fusion Additive Manufacturing: *Justin Gambone*¹; Subhrajit Roychowdhury¹; Xiaohu Ping¹; ¹GE Research

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Alternative Processes (Beyond the Beam) — Binder Jetting

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Powder Materials Committee

Program Organizers: Paul Prichard, Kennametal Inc.; Matthew Dunstan, U.S. Army Research Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory; Nihan Tuncer, Desktop Metal; James Paramore, U.S. Army Research Laboratory

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Session Chair: Paul Prichard, Kennametal

8:00 AM
Material Property Comparison of Parts Produced Using Binder Jet 3D Printing with Water and Gas Atomized Powders: *Andrew Klein*¹; Kyle Myers¹; ¹ExOne

8:20 AM
Multifunctional Binder for Binder Jet Additive Manufacturing: Dustin Gilmer¹; Lu Han²; Michelle Lehmann¹; Amy Elliott²; *Tomonori Saito*²; ¹The University of Tennessee; ²Oak Ridge National Laboratory

8:40 AM
Multi-physics Modeling Fframework of Binder Jetting Process: *Wenda Tan*¹; ¹University of Utah

9:00 AM
Evolution of Pore Distribution in the Binder Jetting of WC-Co: *Paul Prichard*¹; ¹Kennametal Inc.

9:20 AM
Effects of Printing Parameters on Green and Final Part Density of Binder Jet Printed WC-Co: *Katerina Kimes*¹; Pierangeli Rodriguez De Vecchis¹; Danielle Brunetta¹; Drew Elhassid²; Markus Chmielus¹; ¹Univ of Pittsburgh; ²General Carbide Corporation

9:40 AM Break

10:00 AM
Processing Parameters for H13 Utilizing Binder Jet Additive Manufacturing: *Dustin Gilmer*¹; Tomonori Saito¹; Peeyush Nandwana²; Amy Elliott²; ¹University of Tennessee Knoxville/Oak Ridge National Laboratory Bredesen Center; ²Oak Ridge National Laboratory

10:20 AM

3D-printing and Consolidation of 316L Stainless Steel Powder Components: *Ifeanyichukwu Olumor*¹; Geuntak Lee¹; Eugene Olevsky¹; ¹Mechanical Engineering, San Diego State University

10:40 AM

Effect of Print Parameters on Dimensional Accuracy and Sintering Behavior of Binder Jet 3D Printed Water and Gas Atomized Inconel 625: Runbo Jiang¹; Lorenzo Monteil¹; *Katerina Kimes*¹; Markus Chmielus¹; ¹University of Pittsburgh

11:00 AM

The Effect of Sintering Condition on the Microstructure Evolution of Binder-jet Printed IN625 Alloy: Amir Mostafaei¹; *Chuyuan Zheng*²; Pierangeli Rodriguez²; Ian Nettleship²; Markus Chmielus²; ¹Carnegie Mellon University; ²University of Pittsburgh

11:20 AM

Effect of Print Processing Parameters on the Green Part Properties and Densification Behavior in Binder Jet 3D Printed Co-Cr Biomaterials: *Amir Mostafaei*¹; Anthony Rollett¹; ¹Carnegie Mellon University

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development II — Fundamentals of Alloy Design

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Orlando Rios, Oak Ridge National Laboratory; Hunter Martin, HRL Laboratories; Atieh Moridi, Cornell University

**Monday AM | February 24, 2020
6F | San Diego Convention Ctr**

Session Chair: Behrang Poorganji, GE Additive

8:00 AM Introductory Comments Behrang Poorganji

8:05 AM Keynote

Additive Manufacturing and Architected Materials: New Process Developments and Materials: *Christopher Spadaccini*¹; ¹Lawrence Livermore National Laboratory

8:35 AM Keynote

Accelerated Development of Functional Materials via Additive Manufacturing: *Ryan Ott*¹; Fanqiang Meng¹; Emrah Simsek¹; Ikenna Nlodedim¹; Matthew Kramer¹; ¹Ames Laboratory/Cmi

9:05 AM

Development of Non-equilibrium Thermodynamic Tools for Additive Manufacturing: *Kaisheng Wu*¹; Deepankar Pal²; Adam Hope¹; Paul Mason¹; ¹Thermo-Calc Software Inc; ²ANSYS Inc.

9:25 AM

Alloy Development For Additive Manufacturing For High Volume Automotive Applications: Anil Sachdev¹; *Tyson Brown*¹; ¹General Motors Global Research & Development

9:45 AM Break

10:00 AM Keynote

An Overview of Metal Alloy Development Needs and Activities at NASA JPL: *Douglas Hofmann*¹; ¹NASA JPL/Caltech

10:30 AM Invited

Thinking Beyond the Prototypical ICME Approach: Alloy Design for Additive Manufacturing: *Peter Collins*¹; Richard LeSar¹; ¹Iowa State University

10:55 AM Invited

Solidification Based Alloy Design for Metal Additive Manufacturing:*Mark Easton*¹; Michael Benoit¹; Duyao Zhang¹; Dong Qiu¹; David StJohn²; Milan Brandt¹; ¹RMIT University; ²University of Queensland

11:20 AM

Uncertainty Quantification in Additive Manufacturing from CALPHAD to ICME Models:*Jiadong Gong*¹; Changning Niu¹; Abhinav Saboo¹; Jason Sebastian¹; Greg Olson¹; ¹QuesTek Innovations LLC

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Processing Effects on Microstructure and Material Performance — Process Variables I

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Eric Lass, University of Tennessee, Knoxville; Joy Gockel, Wright State University; Emma White, Ames Laboratory; Richard Fonda, Naval Research Laboratory; Monnamme Tlotleng, University of Johannesburg; Jayme Keist, Pennsylvania State University; Hang Yu, Virginia Polytechnic Institute and State University

Monday AM | February 24, 2020
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Session Chairs: Eric Lass, The University of Tennessee, Knoxville; Joy Gockel, Wright State University

8:00 AM

Towards Accelerated Maturation of Additive Titanium Alloys: *Soumya Nag*¹; Neil Johnson¹; Lee Kerwin²; Yiming Zhang¹; Sathyanarayanan Raghavan¹; Sreekar Karnati¹; Eric MacDonald³; Alex Kitt²; Changjie Sun¹; Genghis Khan¹; Chris Williams⁴; Thomas Broderick⁵; Mark Benedict⁵; Dave Siddle⁶; ¹GE Research; ²EWI - Buffalo Manufacturing Works; ³Youngstown State University; ⁴GE Aviation; ⁵Air Force Research Laboratory; ⁶America Makes

8:20 AM

Process-structure-property Relationships for As-built Inconel 718 Thin Walls Manufactured with the Laser Powder Bed Fusion Process: *Paul Paradise*¹; Mandar Shinde¹; Sridhar Niverty¹; Dhruv Bhate¹; Nikhilesh Chawla¹; ¹Arizona State University

8:40 AM

Selection of Process Parameters for Controlling Microstructural Properties in Additive Manufacturing: A Machine Learning Based Approach: Sudeepta Mondal¹; Daniel Gwynn¹; Asok Ray¹; *Amrita Basak*¹; ¹Pennsylvania State University

9:00 AM

P-V Process Optimization for Microstructure Homogeneity and Cracking Control of SLM-fabricated H13 Tool Steel: *Yining He*¹; Nicholas Jones¹; Ming Zhong¹; Bryan Webler¹; Jack Beuth¹; ¹Carnegie Mellon Univ

9:20 AM

Experimental and Numerical Studies on Melt Pools of Single Tracks Processed by Laser Powder Bed Fusion: *Yoon Suk Choi*¹; Jaewoong Kim¹; Seulbi Lee¹; ¹Pusan National University

9:40 AM Break

10:00 AM

Laser Beam Shaping for the Additive Manufacturing of Metal Components with Reduced Texture and Equiaxed Grains: *Tien Roehling*¹; John Roehling¹; Rongpei Shi¹; Saad Khairallah¹; Gabe Guss¹; Joseph McKeown¹; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory

10:20 AM

Tailoring Microstructure Through Beam Shaping: *Saad Khairallah*¹; Rongpei Shi¹; Tien Roehling¹; Tae Wook Heo¹; Joseph Mckeown¹; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory

10:40 AM

A Comparison Between Multi-scale Area Analysis and ISO Surface Roughness Parameters for Characterizing Additively Manufactured Surfaces: Nathaniel Rutkowski¹; Christopher Brown²; *Sneha Narra*²; ¹Worcester Polytechnic Institute; ²Worcester Polytechnic Institute

11:00 AM

Origin of Dislocation Structures in Additively Manufactured Austenitic Stainless Steel: *Kaila Bertsch*¹; Gabriel Meric de Bellefon¹; Bailey Kuehl¹; Dan Thoma¹; ¹University of Wisconsin-Madison

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Phase Transformation Plasticity, Grain Boundaries, and Interfaces

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Shaping and Forming Committee, TMS: Materials Characterization Committee

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Marko Knezevic, University of New Hampshire; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; M Arul Kumar, Los Alamos National Laboratory

Monday AM | February 24, 2020
Theater A-2 | San Diego Convention Ctr

Session Chairs: Eric Homer, Brigham Young University; Amy Clarke, Colorado School of Mines

8:00 AM Invited

TRIP/TWIP of Structural Metallic Alloys for Performance in Extreme Environments: *Amy Clarke*¹; Benjamin Ellyson¹; John Copley¹; Francisco Coury²; Jonah Klemm-Toole¹; Yaofeng Guo¹; Jinling Gao³; Chandler Becker¹; Brian Milligan¹; Christopher Finfrock¹; Chloe Johnson¹; Kester Clarke¹; Wayne Chen³; Niranjana Parab⁴; Tao Sun⁴; Kamel Fezzaa⁴; ¹Colorado School of Mines; ²Universidade Federal de São Carlos; ³Purdue University; ⁴Advanced Photon Source, Argonne National Laboratory

8:30 AM

A Critical Assessment of the Dual-TRIP Effect: Beneficial or Not?: *Shaolou Wei*¹; Jinwoo Kim¹; Cemal Tasan¹; ¹Massachusetts Institute of Technology

8:50 AM

Investigating the Microstructure and Mechanical Behavior Relationship of Advanced Titanium Alloys Using High-energy Diffraction In-situ Tensile Testing: *Priya Ravi*¹; Diwakar Naragani¹; Jun-Sang Park²; Kartik Kapoor¹; Ryan Noraas³; Vasisht Venkatesh³; Jonathan Almer²; Michael Sangid¹; ¹Purdue University; ²Argonne National Laboratory; ³Pratt & Whitney

9:10 AM Invited

Simulations of Grain Boundary-dislocation Interactions in FCC Nickel: *Eric Homer*¹; David Page¹; Devin Adams¹; Ricky Wyman¹; David Fullwood¹; Robert Wagoner²; ¹Brigham Young University; ²Ohio State University

9:40 AM Break

10:00 AM Invited

Characterization of 3-D Slip Fields in Deforming Polycrystals: *Darren Pagan*¹; Kelly Nygren¹; Matthew Miller²; ¹Cornell High Energy Synchrotron Source; ²Cornell University

10:30 AM

Slip and Hydrides in Zirconium: Siyang Wang¹; Finn Giuliani¹; Thomas Britton¹; ¹Imperial College London

10:50 AM

A Quantitative Study of Slip Band-Grain Boundary Interactions in Mg Alloys: *Mohsen Taheri Andani*¹; Aaditya Lakshmanan¹; Veera Sundararaghavan¹; John Allison¹; Amit Misra¹; ¹University of Michigan

11:10 AM
Room Temperature Interface Sliding in TIMETAL-407: *Zachary Kloenne*¹; Gopal Viswanathan¹; Matt Thomas²; Michael Loretto³; Hamish Fraser¹; ¹Ohio State University; ²TIMET; ³University of Birmingham

11:40 AM
Reversible Phase Transformations in a Metastable Beta Titanium Alloy Resolved with Quantitative Electron Microscopy: *Kui Du*¹; Lu Qi¹; Chunjin Chen¹; Yulin Hao¹; Rui Yang¹; Hengqiang Ye¹; ¹Institute of Metal Research

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Application of Advanced Soft Magnetic Materials in Power Electronics and Motors

Sponsored by: TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Daniel Salazar, BCMaterials; Alex Leary, Nasa Glenn Research Center; Markus Chmielus, University of Pittsburgh; Ryan Ott, Ames Laboratory/Cmi; Arcady Zhukov, UPV/EHU, and Ikerbasque, Basque Foundation for Science

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Session Chair: Alex Leary, NASA Glenn Research Center

8:00 AM Invited
Metal Amorphous Nanocomposite (MANC) Soft Magnetic Materials (SMM) for Motor Applications.: *Michael McHenry*¹; Satoru Simizu¹; Kevin Byerly²; Paul Ohodnicki²; Subhashish Bhattacharya³; ¹CarnegieMellonUniversity; ²NETL; ³NorthCarolinaStateUniversity

8:25 AM Invited
Strain Annealed Co-rich and Fe-rich Nanocrystalline Materials for Inductive Components: *Christian Polak*¹; ¹Vacuumschmelze Gmbh & Co. Kg

8:55 AM Invited
New Trends in the Amorphous and Nanocrystalline Soft Magnetic Ribbon Market: *Eric Theisen*¹; ¹Metglas Inc.

9:20 AM Invited

Processing and Advanced Characterization of Selectively Paramagnetized Laminates for Synchronous Reluctance Motors: *Orlando Rios*¹; Hunter Henderson¹; Min Zou²; Craig Bridges¹; Michael Kesler¹; Michael Brady¹; ¹Oak Ridge National Laboratory; ²GE Global Research

9:50 AM Break

10:05 AM Invited

Multi-objective Design of Permeability Engineered Soft Magnetic Metal Amorphous Nanocomposite Cores: *Paul Ohodnicki*¹; Vinicius Cabral Do Nascimento²; Richard Beddingfield²; Kevin Byerly²; Seung-Ryul Moon²; Scott Sudhoff³; ¹National Energy Technology Laboratory (presently at University of Pittsburgh); ²National Energy Technology Laboratory; ³Purdue University

10:25 AM

Dual Phase Soft Magnetic Laminates for Permanent Magnet Assisted Synchronous Reluctance Electric Machines: Shenyan Huang¹; *Min Zou*²; Wanming Zhang¹; Joseph Zierer¹; Anoop Jassal¹; Vandana Rallabandi¹; Steve Buresh¹; PR Subramanian¹; ¹GE Research; ²GE Global Research

10:45 AM

Continuous Strain Anneal Processing of Amorphous Ribbons for Inductor Applications: *Kevin Byerly*¹; Paul Ohodnicki¹; Seungryul Moon¹; Byron Beddingfield²; Satoru Simizu³; Alex Leary⁴; Vladimir Keylin⁴; Eric Theisen⁵; M.E. McHenry³; ¹National Energy Technology Laboratory; ²North Carolina State University; ³Carnegie Mellon University; ⁴NASA Glenn Research Center; ⁵Metglas, Inc.

11:05 AM

Designing High Efficiency, High Power Transformers with Metal Amorphous Nanocomposites: *Richard Beddingfield*¹; Subhashish Bhattacharya²; Kevin Byerly³; Seung Moon³; Alex Leary⁴; Ronald Noebe⁴; Randy Bowman⁴; Michael McHenry⁵; Paul Ohodnicki¹; ¹National Energy Technology Laboratories; ²North Carolina State University; ³Leidos, Contractor for National Energy Technology Laboratory; ⁴NASA Glenn Research Center; ⁵Carnegie Mellon University

11:25 AM

Tunable Power Inductors Utilizing Magnetoelectric PZT/Metglas Composites: *Mark Nations*¹; Paul Ohodnicki¹; Subhashish Bhattacharya¹; ¹North Carolina State University

Advanced Materials for Energy Conversion and Storage VI —
Energy Conversion and Storage I

Sponsored by: TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

Program Organizers: Jung Pyung Choi, Pacific Northwest National Laboratory; Amit Pandey, MicroTesting Solutions; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh

Monday AM | February 24, 2020
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Session Chairs: Soumendra Basu, Boston University; Partha Mukherjee, Purdue University

8:00 AM Keynote
Isolating the Thermophysical and Electrochemical Signatures of Internal Faults within an Intensively Coupled System, Lithium-ion Batteries: Rachel Carter¹; Connor Fear²; Aashutosh Mistry²; Partha Mukherjee²; *Corey Love*¹; ¹US Naval Research Laboratory; ²Purdue University

8:30 AM Keynote
Challenges for Future Electric Vehicle Battery System: *Koichiro Aotani*¹; ¹Nissan Motor Co., Ltd.

9:00 AM Keynote
Design, Fabrication and Performance of Thin-film Solid Oxide Fuel Cells: *Nguyen Minh*¹; Yoon Ho Lee¹; Tuyen Tran¹; Haowen Ren²; Eric Fullerton²; Erik Wu³; Ying Meng³; ¹Center for Energy Research, University of California, San Diego; ²Material Science and Engineering Program, University of California, San Diego; ³Department of Nanoengineering, University of California San Diego

9:30 AM Break

9:50 AM Invited
Flexible Multimodal In-situ Characterization Approaches for Understanding Battery Electrode Cycling: *Shen Dillon*¹; ¹University of Illinois

10:10 AM Invited
Rare-earth Nickelate Cathodes for Air Independent Operation of Solid Oxide Fuel Cell Systems: Jane Banner¹; *Srikanth Gopalan*¹; ¹Boston University

10:30 AM Keynote
Synthesis, Design and Fabrication of Oxide Thermoelectrics via Plasma Spray Technology: *Sanjay Sampath*¹; Felipe Caliari¹; ¹Stony Brook University

11:00 AM Invited
Alternative Spinel for Advanced Protective Layer for SOFC Stacks: *Jung Pyung Choi*¹; Jeffry Stevenson¹; ¹Pacific Northwest National Laboratory

ELECTRONIC MATERIALS

Advanced Microelectronic Packaging, Emerging Interconnection Technology and Pb-free Solder — Quality and Reliability of Advanced Microelectronic Packaging

Sponsored by: TMS Functional Materials Division, TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Christopher Gourlay, Imperial College London; Kazuhiro Nogita, University of Queensland; David Yan, San Jose State University; Mike Wolverton, Raytheon; Babak Arfaei, Ford Motor Company; Andre Delhaise, Celestica; Mehran Maalekian, Mat-Tech; Mohd Arif Salleh, Universiti Malaysia Perlis

Monday AM | February 24, 2020
Palomar | Marriott Marquis Hotel

Session Chairs: Andre Delhaise , Celestica Inc.; Luke Wentlent, Universal Instruments

8:00 AM Introductory Comments

8:05 AM
Synchrotron X-ray Study of Sn Electromigration, Sn Whisker Growth, and Residual Strain Evolution in A Blech Structure: *Pei-Tzu Lee*¹; Wan-Zhen Hsieh²; Cheng-Yu Lee³; Xiao-Yun Li²; Shao-Chin Tseng²; Mau-Tsu Tang²; Ching-Shun Ku²; C. Robert Kao¹; Cheng-En Ho³; ¹National Taiwan University; ²National Synchrotron Radiation Research Center; ³Yuan Ze University

8:25 AM
Recrystallized Shallow Grains as the Whisker Growth Sites in Large-grain Sn-alloy Films: *Wei-Hsun Chen*¹; *Congying Wang*²; John Blendell²; Carol Handwerker²; ¹ASML; ²Purdue University

8:45 AM

UsingAppliedPressuretoMakeTinWhiskersGrow:Measurements and Analysis: Nupur Jain¹; *Piyush Jagtap*¹; Allan Bower¹; Eric Chason¹; ¹Brown University

9:05 AM

Tin Whisker Growth on Pb-Free, Bi-containing Solder Alloys after Ambient Temperature, High Humidity Storage: *Andre Delhaise*¹; Zohreh Bagheri¹; Stephan Meschter²; Jeffrey Kennedy¹; Polina Snugovsky¹; ¹Celestica; ²BAE Systems

9:25 AM Break

9:45 AM Invited

Micro Interconnect Mechanical Stability in Cryogenic Temperature Environments: Ande Kitamura¹; Ruben Contreras¹; *Tae-Kyu Lee*¹; ¹Portland State University

10:05 AM Invited

Comparison of Corrosion Resistance between Electroless and Electroplating Ni/Pd/Au Surface Finish on PCB: *Albert T. Wu*¹; Yi-Ting Shen¹; Nico Li²; Freeze Wang²; Chih-Yuan Hsiao²; ¹National Central University; ²Taiwan Uyemura Co.

10:25 AM

Chlorination and Power Cycling Characteristics of Fine Au/Pd Coated Copper Wire: *Che-Hao Chang*¹; Fei-Yi Hung¹; ¹National Cheng Kung University

10:45 AM

Electromigration in 2µm Nano-twinned Cu Redistribution Lines: *Hung-Hsuan Li*¹; Chih Chen¹; ¹National Chiao Tung University

CHARACTERIZATION

Advanced Real Time Imaging — Emerging Techniques

Sponsored by: TMS Functional Materials Division, TMS:
Advanced Characterization, Testing, and Simulation Committee,
TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, National Energy
Technology Laboratory; David Alman, National Energy
Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki
Shibata, Imram, Tohoku University; Antoine Allanore,
Massachusetts Institute of Technology; Candan Tamerler,
University of Kansas; Noritaka Saito, Kyushu University; Neslihan
Dogan, McMaster University; Zuotai Zhang, Southern University
of Science and Technology; Bryan Webler, Carnegie Mellon
University; Anna Nakano, US Department of Energy National
Energy Technology Laboratory

Monday AM | February 24, 2020
Theater A-4 | San Diego Convention Ctr

Session Chair: Jinichiro Nakano, National Energy Technology
Laboratory

8:00 AM Keynote
**X-ray Phase Contrast Imaging of Dynamic Compression
of Additively Manufactured High-solids-loaded Polymer
Composites:** Karla Wagner¹; Andrew Boddorff¹; Greg Kennedy¹;
Min Zhou¹; *Naresh Thadhani*¹; ¹Georgia Institute of Technology

8:40 AM Invited
**Ultrafast Synchrotron X-ray Imaging Studies of Ultrasonic
Processing of Structural and Functional Materials:** *Jiawei Mi*¹;
¹School of Engineering University of Hull

9:00 AM
**In-situ TEM Analysis of Mechanical Behavior of the 3D Printed
Alloys Exposed to High Temperature:** *Supriya Koul*¹; Le Zhou¹;
Yongho Sohn¹; Akihiro Kushima¹; ¹University of Central Florida

9:20 AM
**Spatial and Time-dependent Uranium Oxidation Measurements
using White-Light Interferometry:** *Yaakov Idell*¹; Mark Wall¹;
Wigbert Siekhaus¹; Kerri Blobaum¹; William McLean¹; ¹Lawrence
Livermore National Laboratory

9:40 AM Break

10:00 AM Invited
**Observing the Growth of Hydrated Crystalline Calcium Carbonate
by In-situ Liquid Cell Transmission Electron Microscopy:** *Yiping
Su*¹; ¹Southern University of Science and Technology

10:20 AM

The Mechanisms of Ultrasound Metrology in Metal Melt: *Bitong Wang*¹; Andrew Caldwell²; Antoine Allanore²; Douglas Kelley¹; ¹University of Rochester; ²Massachusetts Institute of Technology

10:40 AM

An Investigation of the Impact Experimental Equipment Parameters Have on Synthesis Slag Behaviors in an Oxidative Environment Using a Confocal Laser Microscope: *Carlos Ortiz*¹; Jinichiro Nakano²; Anna Nakano²; James Bennett³; ¹Oak Ridge Institute for Science and Education ; ²Leidos Research Support Team; ³U.S. Department of Energy National Energy Technology Laboratory

ADVANCED MATERIALS

Advanced Solid Phase Processing Symposium — Advanced Friction Processing and Severe Plastic Deformation

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee, TMS: Shaping and Forming Committee

Program Organizers: Suveen Mathaudhu, University of California, Riverside; Cynthia Powell, Pacific Northwest National Laboratory; Kester Clarke, Colorado School of Mines; Anthony Reynolds, University of South Carolina; Mostafa Hassani, Cornell University

Monday AM | February 24, 2020
Balboa | Marriott Marquis Hotel

Session Chairs: Suveen Mathaudhu, UC Riverside; Mageshwari Komarasamy, Pacific Northwest National Laboratory

8:00 AM Invited

Thermally Stable Nanostructured Immiscible Alloys via Friction Stir Processing: *Rajiv Mishra*¹; ¹University of North Texas

8:25 AM Invited

Linear Friction Welding of Ti Components:linvestigation of ResidualStressandFatiguePerformance:*RitwikBandyopadhyay*¹; *Michael Sangid*¹; ¹Purdue University

8:50 AM

Structure-Property Correlations in Friction Stir Welded 304L Stainless Steel: *Madhumanti Bhattacharyya*¹; Arnab Kundu¹;

Indrajit Charit¹; Krishnan Raja¹; Jens Darsell²; Saumyadeep Jana²;
¹University of Idaho; ²Pacific Northwest National Laboratory

9:10 AM

Investigation of Metastable Structure Evolution in Friction Consolidation: *Mageshwari Komarasamy*¹; Xiao Li¹; Scott Whalen¹; Glenn Grant¹; ¹Pacific Northwest National Laboratory

9:30 AM

Joining Dissimilar Materials via Rotational Hammer Rivet Technique: *Tianhao Wang*¹; Scott Whalen¹; Woongjo Choi¹; ¹Pacific Northwest National Laboratory

9:50 AM Break

10:10 AM Invited

Recent Developments in Upscaling High Pressure Torsion: *Anton Hohenwarter*¹; Reinhard Pippan²; ¹University of Leoben; ²Erich Schmid Institute of Materials Science, Austrian Academy of Sciences

10:30 AM

Thermo-mechanical Processing of ZK Series Magnesium Alloys for Improved Low Temperature Performance: *Guney Yapici*¹; ¹Ozyegin University

10:50 AM

Incremental Equal Channel Angular Pressing as a Tool for Manufacturing Large Ultra-fine Grained Copper Rods: *Marta Ciemiorek*¹; Piotr Bartkowski¹; Witold Chrominski²; Lech Olejnik¹; Malgorzata Lewandowska¹; ¹Warsaw University Of Technology; ²Warsaw University of Technology

11:10 AM

Tailoring the Magnetic Properties of Nanostructured Alloys by Severe Plastic Deformation: Martin Stücker¹; Lukas Weissitsch¹; Stefan Wurster¹; Heinz Krenn²; *Andrea Bachmaier*¹; ¹Erich Schmid Institute, Austrian Academy of Sciences; ²Institute of Physics, University of Graz

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Advances and Discoveries in Non-equilibrium Driven Nanomaterials and Thin Films — Non-equilibrium Nanostructures

Sponsored by: TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

Program Organizers: Ritesh Sachan, Oklahoma State University; Srinivasa Rao Singamaneni, University of Texas at El Paso; Amit Pandey, MicroTesting Solutions; Nuggehalli Ravindra, New Jersey Institute of Technology

Monday AM | February 24, 2020
Solana | Marriott Marquis Hotel

Session Chairs: Ritesh Sachan, Oklahoma State University; Amit Pandey, Ansys

8:00 AM Keynote

Discoveries of Q-carbon and Q-BN and Direct Conversion of Carbon into Diamond and h-BN into c-BN: *Jagdish Narayan*¹; Ritesh Sachan²; ¹North Carolina State University; ²Oklahoma State University

8:40 AM Invited

Quasi-one-dimensional Mo Chains for Efficient Hydrogen Evolution Reaction: Yong Pei¹; Bingan Lu²; *Rao Apparao*³; ¹Xiangtan University; ²Hunan University; ³Clemson University

9:10 AM Invited

Laser Processing in the Transmission Electron Microscope: *Gerd Duscher*¹; Chenze Liu¹; Yu-Chuan Lin²; Yueying Wu¹; Philip Rack¹; Mathew Chisholm²; Alexander Puretzky²; David Geohegan²; ¹University of Tennessee; ²Oak Ridge National Laboratory

9:40 AM Break

10:00 AM Invited

Emergence of Shallow Energy Levels in B-doped Q-carbon: A high-temperature Superconductor: *Ritesh Sachan*¹; Jagdish Narayan²; Jordan Hachtel³; Juan Idrobo³; ¹Oklahoma State University; ²North Carolina State University; ³Oak Ridge National Laboratory

10:30 AM

Controlling Nanoscale Eutectic Microstructures in Directionally Laser Melted Al-Cu Alloyed Thin Films: *Eli Sullivan*¹; John Tomko¹; Jonathan Skelton¹; Patrick Hopkins¹; James Fitz-Gerald¹; Jerrold Floro¹; ¹University of Virginia

10:55 AM

Fabrication of Nanodiamond and Q-carbon by Ultrafast Quenching of Carbon Structures for Electron Field Emission Devices: *Ariful Haque*¹; Ritesh Sachan¹; Jagdish Narayan¹; ¹North

Carolina State University

11:20 AM

Microstructure Morphology and Concentration Modulation of Bicontinuous Nanocomposite Thin-films during Physical Vapor Deposition: James Stewart¹; *Remi Dingreville*¹; ¹Sandia National Laboratories

11:40 AM

Synthesis and Densification of Functional Metal-oxide Nano Bulk Composite with Far from Equilibrium State: *Yasuhiro Koda*¹; A Volodchenkov¹; Kyle Chan¹; Takahito Imai²; Javier Garay¹; ¹University of California, San Diego; ²Ryukoku University

CHARACTERIZATION

Advances in Powder and Ceramic Materials Science — Structure Design and Processing

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Shefford Baker, Cornell University; Huazhang Zhai, Beijing Institute of Technology; Sergio Monteiro, Military Institute of Engineering; Rajiv Soman, Eurofins EAG Materials Science LLC; Faqin Dong, Southwest University of Science and Technology; Jinhong Li, China University of Geosciences (Beijing); Ruigang Wang, The University of Alabama

Monday AM | February 24, 2020
Theater A-6 | San Diego Convention Ctr

Session Chairs: Jinhong Li, China University of Geosciences (Beijing); Rajiv Soman, Eurofins EAG Materials Science, LLC

8:00 AM Introductory Comments

8:05 AM Invited

Progress on Porous Ceramics for Heat-insulation: *Chang-An Wang*¹; ¹Tsinghua University

8:25 AM

Structure, Chemistry, Optical and Dielectric Properties of a New Pyrophosphate: LiGaP2O7: *Mallesham Bandi*¹; Ron Broner²; Samuel Arredondo¹; Ramana Chintalapalle¹; ¹University of Texas at El Paso; ²University of California, Santa Barbara

8:45 AM
Application of Inorganic Adsorbents for Radwaste Water Treatment: *Hsien-Ming Hsiao*¹; Yun-Chung Shen¹; Yi-Kuo Chang¹; Hsien-Te Hsieh¹; Hong-Ping Lin¹; ¹Institute of Nuclear Energy Research

9:05 AM
Role of Anisometric Particles in Microstructure Evolution, Structural Stability and Compressive Mechanical Properties in Ice-templated Ceramics with Directional Porosity: *Dipankar Ghosh*¹; Mahesh Banda¹; ¹Old Dominion University

9:25 AM Break

9:40 AM
Sintering Process and Characteristics of Glass-Ceramics from Coal Fly Ash: Hongjuan Sun¹; *Li Zeng*¹; ¹Southwest University of Science and Technology

10:00 AM
Preparation of Abrasion & Erosion-resistant Ceramic Coating on Copper by Slurry Method: Zefei Zhang¹; *Hao Bai*¹; Ning Li¹; Jian Zhang¹; Huanmei Yuan¹; ¹University of Science and Technology Beijing

MATERIALS PROCESSING

Advances in Surface Engineering II — Session I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Surface Engineering Committee

Program Organizers: Tushar Borkar, Cleveland State University; Arif Mubarok, PPG; Rajeev Gupta, University of Akron; Sandip Harimkar, Oklahoma State University; Tanaji Paul, Florida International University

Monday AM | February 24, 2020
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Session Chair: Rajeev Gupta, University of Akron

8:00 AM
Characterization of Precipitates Evolution in Laser Assisted Cold Spray of AA7050 and AA7075: *Ning Zhu*¹; Luke Brewer¹; ¹University of Alabama Tuscaloosa

8:20 AM
Enhanced Bond Durability of 7xxx Automotive Alloy by Surface Modification: *Theresa MacFarlane*¹; *Tudor Piroteala*¹; *Rashmi Monty*¹; *Sazol Das*¹; *Yudie Yuan*¹; *Thomas Beck*¹; *Lasitha Cumaranatunge*¹; ¹Novelis Inc

8:40 AM
Surface Chemistry and Subsurface Microstructure after Spot-by-spot laser-interference Processing of Al 2024-T3: *Adrian Sabau*¹; *Harry Meyer*¹; *Donovan Leonard*¹; ¹Oak Ridge National Laboratory

9:00 AM Invited
Multilayer, Multifunctional Thermal Coatings Enabled by Layered Manufacturing: *Sanjay Sampath*¹; ¹Stony Brook University

9:40 AM Break

10:00 AM
Laser Assisted Cold Spray Applied to Austenitic Stainless Steel: *Venkata Satish Bhattiprolu*¹; *Luke Brewer*¹; ¹University of Alabama

10:20 AM
High Temperature Oxidation Behaviors of SiON Coated AISI 441 in Different Atmospheres: *Kathy Lu*¹; *Kaustubh Bawane*¹; *Rajendra Bordia*²; ¹Virginia Polytechnic Institute and State University; ²Clemson University

10:40 AM
Contact Angle Measurement Comparisons of Common Additive Materials and Processes: *Holly Martin*¹; *Arthur Kasson*²; *Ibrahim Al Qanber*¹; *Brett Conner*¹; ¹Youngstown State University; ²KRUSS USA

11:00 AM
Investigation on the Laser Surface Treatment of Steel and Aluminum with a Single Mode Pulsed Fiber Laser Source: *Quentin Perry Auger*¹; *Jean-Michaël Deschênes*¹; *Alex Fraser*¹; ¹Laserax Inc

MECHANICS & STRUCTURAL RELIABILITY

Advancing Current and State-of-the-Art Application of Ni- and Co-based Superalloys — Alternate Processes

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Chantal Sudbrack, Northwestern University Center for Atom-Probe Tomography; Mario Bochiechio, Pratt & Whitney; Kevin Bockenstedt, ATI Specialty Materials; Katerina Christofidou, University of Sheffield; James Coakley, University of Miami; Martin Detrois, National Energy Technology Laboratory; Laura Dial, GE Global Research; Bij-Na Kim, Carpenter Additive; Victoria Miller, University of Florida; Kinga Unocic, Oak Ridge National Laboratory

Monday AM | February 24, 2020
11B | San Diego Convention Ctr

Session Chairs: Laura Dial, GE Global Research; Bij-Na Kim, Carpenter Additive / Lancaster University

8:00 AM Invited
Performance of Gamma Prime Alloys Processed Through Electron Beam Melting: *Michael Kirka*¹; Patxi Fernandez-Zelai¹; Donovan Lenord¹; Obed Acevedo¹; Peeyush Nandwana¹; Andres Marquez Rossy¹; ¹Oak Ridge National Laboratory

8:30 AM
A Comparison of Creep Properties between Conventionally Cast and Additive Manufactured CMSX-4: *David Bürger*¹; Alireza Parsa¹; Markus Ramsperger²; Carolin Körner³; Gunther Eggeler¹; ¹Ruhr-Universität Bochum; ²GE Additive; ³Friedrich Alexander Universität Erlangen Nürnberg

8:50 AM Invited
Innovation in Ni- and Co-base Superalloys at Carpenter Technology Corporation: *Stephane Forsik*¹; Karl Heck¹; Ning Zhou¹; ¹Carpenter Technology Corporation

9:20 AM
Microstructure and Mechanical Properties of a CoNi-base Superalloy Fabricated by Electron Beam Melting: *Sean Murray*¹; Kira Pusch¹; Andrew Polonsky¹; Chris Torbet¹; Peeyush Nandwana²; Michael Kirka²; Ryan Dehoff²; Ning Zhou³; Stéphane Forsik³; William Slye³; Tresa Pollock¹; ¹University of California, Santa Barbara; ²Oak Ridge National Laboratory; ³Carpenter Technology Corporation

9:40 AM Break

10:00 AM Invited

Advancing Alternate Processing of Rene 65 with Additive Manufacturing: *Kelsey Rainey*; Laura Dial¹; Andrew Wessman²; ¹GE Global Research; ²University of Arizona

10:30 AM

Analysis of the APB Energy in an Additive Manufactured Polycrystalline Ni-based Superalloy with High γ' Volume Fraction: *Larissa Heep*¹; Casper Schwalbe²; Christoph Heinze³; Antonin Dlouhy⁴; Catherine Rae²; Gunther Eggeler¹; ¹Ruhr-Uni-Bochum; ²Cambridge University; ³Siemens AG; ⁴The Czech Academy of Sciences

10:50 AM

Development of a New High Energy X-ray Diffraction NDT for High Pressure Turbine Blades: *Alexiane Arnaud*¹; Clément Remacha¹; Edward Romero¹; Virginie Jaquet¹; Frédéric Jenson¹; Henry Proudhon²; ¹SAFRAN; ²Centre des Matériaux Mines Paristech

11:10 AM

Ni-based Superalloy Design Exploration by the High-throughput Hot-isostatic-pressing Micro-synthesis Method: *Lei Zhao*¹; Liang Jiang²; Zaiwang Huang³; Lixia Yang¹; Hui Wang¹; Haizhou Wang¹; ¹China Iron & Steel Research Institute Group; ²Yantai University; ³Central South University

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Electronic Scale Calculations and Machine Learning

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Charudatta Phatak, Argonne National Laboratory; Bryan Wong, University of California, Riverside; Mikhail Mendelev, Ames Laboratory; Bryce Meredig, Citrine Informatics; Ebrahim Asadi, University of Memphis; Francesca Tavazza, National Institute of Standards and Technology

Monday AM | February 24, 2020
31C | San Diego Convention Ctr

Session Chairs: Mohsen Asle Zaeem, Colorado School of Mines; Bryan Wong, University of California, Riverside

8:00 AM Introductory Comments Mohsen Asle Zaeem

8:05 AM Invited
High-throughput Computational Design of Organic-inorganic Hybrid Halide Semiconductors Beyond Perovskites: *Kesong Yang*¹; Yuheng Li¹; ¹University of California, San Diego

8:35 AM Invited
Stochastic Exchange for Efficient Long-range-hybrid-DFT for Thousands of Electrons and More: *Daniel Neuhauser*¹; ¹UCLA

9:05 AM
Machine Learning Approaches for Improving Density Functional Tight Binding Models of Reactive Materials: Application to Astrobiolgical Materials and Surface Chemistry: *Nir Goldman*¹; ¹Lawrence Livermore National Laboratory

9:25 AM
Uncertainty Quantification for Machine Learning Methods Applied to Material Properties: Kamal Choudhary¹; *Francesca Tavazza*²; ¹University of Maryland(National Institute of Standards and Technology; ²Umcp/Nist

9:45 AM Break

10:00 AM Invited
Unraveling Exciton Dynamics in 2D Van der Waals Heterostructures: Junyi Liu¹; Xu Zhang¹; *Gang Lu*¹; ¹California State University Northridge

10:30 AM Invited
Isolated Dislocation Core Energy from First Principles Energy Density Method: Yang Dan¹; *Dallas Trinkle*¹; ¹University of Illinois at Urbana-Champaign

11:00 AM
A First Principles Multi-cell Monte Carlo Method for Phase Prediction: *You Rao*¹; Changning Niu²; Wolfgang Windl¹; Maryam Ghazisaeidi¹; ¹The Ohio State University; ²QuesTek Innovations LLC

11:20 AM
Boosting the CALPHAD Modeling of Multi-component Systems by ab initio Calculations: Selected Case Studies: *Giancarlo Trimarchi*¹; Qing Chen¹; ¹Thermo-Calc Software AB

BIOMATERIALS

Biodegradable Materials for Medical Applications II — Magnesium Implants

Sponsored by: TMS Functional Materials Division, TMS: Biomaterials Committee

Program Organizers: Jaroslaw Drelich, Michigan Technological University; Ehsan Mostaed, Michigan Technological University; Malgorzata Sikora-Jasinska, Michigan Technological University; Jan-Marten Seitz, Syntellix AG; Petra Maier, Stralsund University of Applied Sciences; Norbert Hort, Helmholtz-Zentrum Geesthacht; Huinan Liu, University of California, Riverside

Monday AM | February 24, 2020
Vista | Marriott Marquis Hotel

Session Chairs: Jaroslaw Drelich, Michigan Technological University; Jan-Martin Seitz, Syntellix AG

8:00 AM Introductory Comments

8:05 AM Keynote
Proteins and Flow Conditions: How They Influence the Degradation of Mg: Ruiqing Hou¹; Frank Feyerabend¹; *Regine Willumeit Romer*¹; ¹Helmholtz Center Geesthacht

8:40 AM Invited
Biodegradable Magnesium Implants – From Alloy Development to In Vivo Testing: *Hans Maier*¹; Peter Wriggers¹; Andrea Meyer-Lindenberg²; ¹Leibniz Universität Hannover; ²Ludwig-Maximilians-Universität München

9:05 AM Invited
An Mg-Zn-Ca-based Alloy and a Biocompatible Ceramic Coating Towards Resorbable Bone Fixation Devices: Hamdy Ibrahim¹; Alan Luo²; David Dean²; Rigoberto Advincula³; *Mohammad Elahinia*⁴; ¹University of Tennessee at Chattanooga; ²Ohio State University; ³Case Western Reserve University; ⁴University of Toledo

9:30 AM Invited
In-Vivo and In-Vitro Performance of Bioabsorbable BioMg 250 Mg Alloy Implants: *Jacob Edick*¹; Raymond Decker¹; Stephen LeBeau¹; ¹Nanomag LLC

9:55 AM Break

10:10 AM

Hydrogen Sensors for Noninvasively Monitoring the Status of Bioresorbable Magnesium Implants: *William Heineman*¹; Daoli Zhao¹; ¹University of Cincinnati

10:30 AM Invited

Current Development Status of Surgical Stapler and Clip Made of Mg Alloy in Kobe University: *Takumi Fukumoto*¹; Masahiro Kido¹; Naoko Ikeo¹; Toshiji Mukai¹; ¹Kobe University

10:55 AM

Influence of Solution Heat Treatment on Microstructure, Hardness and Corrosion Behavior of Extruded RESOLOY: *Petra Maier*¹; Benjamin Clausius¹; Norbert Hort²; ¹Stralsund University of Applied Sciences; ²Helmholtz-Zentrum Geesthacht

11:15 AM

High Strength Rare Earth Free Mg Alloys with Controlled Degradation Behavior Through Microstructural Manipulation: *Ehsan Mostaed*¹; Malgorzata Sikora-Jasinska¹; Jaroslaw W. Drelich¹; ¹Michigan Technological University

BIOMATERIALS

Biological Materials Science — Biological and Natural Materials I

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Steven Naleway, University of Utah; Jing Du, Penn State University; Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); David Restrepo, University of Texas at San Antonio

Monday AM | February 24, 2020
Leucadia | Marriott Marquis Hotel

Session Chairs: Steven Naleway, University of Utah; David Restrepo, University of Texas at San Antonio

8:00 AM Invited

Arapaima Fish Scale: One of the Toughest Flexible Biological Materials: *Wen Yang*¹; Haocheng Quan¹; Marc Meyers¹; Robert Ritchie²; ¹University of California San Diego; ²University of California, Berkeley

8:30 AM

Collagen's Role in the Dermal Armor of the Boxfish: *Sean Garner*¹; Steven Naleway²; Maryam Hosseini³; Claire Acevedo²; Eric Schaible⁴; Bernd Gludovatz⁵; Jae-Young Jung¹; Joanna McKittrick¹; Pablo Zavattieri³; ¹Univ of California San Diego; ²University of Utah; ³Purdue University; ⁴Lawrence Berkeley National Laboratory; ⁵University of New South Wales

8:50 AM

Characterization of Timbers of Paubrasilia Echinata Lam. from Reforestation and Natural Forest for Violin Bows: *Sinval Marques*; José de Oliveira¹; ¹UFES

9:10 AM Invited

Seeing is Believing - In-situ SEM Wear Experiments of Animal Teeth: *Horacio Espinosa*¹; Alireza Zaheri¹; Hoang Nguyen¹; David Restrepo²; Michael Frank³; Joanna McKittrick³; ¹Northwestern University; ²University of Texas, San Antonio; ³University of California, San Diego

9:40 AM Break

9:55 AM Invited

Multiscale Architectures in the Exoskeletal Armor of a Crush Resistant Insect: Jesus Rivera¹; Maryam Hosseini²; Satoshi Murata³; Allison Pickle¹; Drago Vasile¹; David Restrepo⁴; Atsushi Arakaki³; Pablo Zavattieri²; *David Kisailus*¹; ¹University of California Riverside; ²Purdue University; ³Tokyo University of Agriculture and Technology; ⁴University of Texas San Antonio

10:25 AM Invited

Role of the Inner Architecture of a Naturally-occurring Interlocking Interface Found in the Diabolical Ironclad Beetle: Maryam Hosseini¹; Jesus Rivera²; David Restrepo³; David Kisailus²; *Pablo Zavattieri*¹; ¹Purdue University; ²University of California, Riverside; ³Purdue University/University of Texas San Antonio

10:55 AM

Structure-property Relation of Arapaima Gigas Scales as Structural Material: *Henry Colorado*¹; Sergio Neves Monteiro²; ¹Universidad de Antioquia; ²Military Institute of Engineering, IME

11:15 AM

Structure and Behavior of Viper Snake Fangs: Susana Estrada¹; Juan Arredondo¹; J Pereañez²; Sean Ghods³; Dwayne Arola³; *Alex Ossa*¹; ¹Universidad Eafit; ²Universidad de Antioquia; ³University of Washington

CHARACTERIZATION

Characterization of Minerals, Metals and Materials — Advances in Characterization Methods I

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Shadia Ikhmayies, Al Isra University; Yunus Kalay, Middle East Technical University; Jiann-Yang Hwang, Michigan Technological University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Army Research Laboratory

Monday AM | February 24, 2020
Theater A-5 | San Diego Convention Ctr

Session Chairs: Mingming Zhang, ArcelorMittal Global R&D; Kelvin Xie, Texas A&M University

8:00 AM Introductory Comments

8:05 AM
Auger Spectroscopy Analysis of Alpha Brass Fracture: *Sergio Monteiro*¹; Fabio Garcia Filho¹; Fernanda da Luz¹; Ulisses Costa²; Lucio Nascimento¹; ¹Military Institute of Engineering - IME; ²Military Institute of Engineering

8:25 AM
Comparison of Diffraction Techniques for Texture Evaluation in Triaminotrinitrobenzene (TATB): *Matthew Schmitt*¹; Sven Vogel¹; John Yeager¹; Ricardo Schwarz¹; ¹Los Alamos National Laboratory

8:45 AM
EBSD Characterization of Aluminum Magnesium Alloys: *Karina Hemmendinger*¹; Joel Bahena¹; Andrea Hodge¹; ¹University of Southern California

9:05 AM
Using the New Rotation Vector Base Line Electron Back Scatter Diffraction (RVB-EBSD) Method to Characterize Single Crystal Cast Microstructures: *Pascal Thome*¹; Setareh Medgalchi¹; Felicitas Scholz¹; Gunther Eggeler¹; Jan Frenzel¹; ¹Ruhr-Universität-Bochum

9:25 AM

On the Depth Resolution of Transmission Kikuchi Diffraction (TKD)

Analysis: *Junliang Liu*¹; Sergio Lozano-Perez¹; Angus Wilkinson¹; Chris Grovenor¹; ¹University of Oxford

9:45 AM Break

10:00 AM

Correlative Microscopy Studies of <c+a> Dislocations in a Hot-

roll AZ31 Mg Alloy: *Dexin Zhao*¹; Xiaolong Ma¹; Kelvin Xie¹; ¹Texas A&M University

10:20 AM

Micromechanical Properties of Marginal Glass Forming Alloys:

*Ilkay Kalay*¹; Tolga Han Ulucan²; Sezer Özerinç²; Yunus Kalay²; ¹Çankaya University; ²Middle East Technical University

10:40 AM

Case Study of A36 Steel Plate: *Ramon Martinez*¹; Veronica Livescu¹;

Jillian Bennett¹; Carl Cady¹; James Valdez¹; Carl Trujillo¹; ¹Los Alamos National Laboratory

11:00 AM

In-situ Raman Microprobing and Ex-situ Raman Mapping of

Indented Glasses: *Yvonne Gerbig*¹; Chris Michaels¹; ¹National Institute of Standards and Technology (NIST)

11:20 AM

Synchrotron X-ray Diffraction and Computed Tomography

Studies of Ultrasonic Welding Dissimilar Mg-Fe Metals: *Lianghua*

*Xiong*¹; Chihpin Chuang¹; Dileep Singh¹; Jian Chen²; Yong Chae Lim²; Zhili Feng²; ¹Argonne National Laboratory; ²Oak Ridge National Laboratory

CHARACTERIZATION

Characterization: Structural Descriptors, Data-Intensive Techniques, and Uncertainty Quantification — Structural Descriptors Enabling PSP Linkages

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Extraction and Processing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Materials Characterization Committee

Program Organizers: Shawn Coleman, CCDC Army Research Laboratory; Tomoko Sano, U.S. Army Research Laboratory; James Hogan, University of Alberta; Srikanth Patala, North Carolina State University; Oliver Johnson, Brigham Young University; Francesca Tavazza, National Institute of Standards and Technology

Monday AM | February 24, 2020
Theater A-3 | San Diego Convention Ctr

Session Chairs: Srikanth Patala, North Carolina State University; Shawn Coleman, CCDC Army Research Laboratory

8:00 AM **Introductory Comments**

8:05 AM **Invited**
Feature Engineering of Material Structure for Extracting Process-structure-property Linkages: *Surya Kalidindi*¹; ¹Georgia Institute of Technology

8:35 AM **Invited**
Integrated Structural Methods Addressing Aviation Challenges in Composites: Andrew Makeev¹; *Sarvenaz Ghaffari*¹; ¹University of Texas Arlington

9:05 AM **Invited**
Investigations of Microstructural Effects on Porosity Evolution: *Nathan Barton*¹; ¹Lawrence Livermore National Laboratory

9:35 AM **Break**

9:55 AM **Invited**
Large Scale Microstructure Synthesis Using LEGOMAT: Application to Additive Manufacturing: *Veera Sundararaghavan*¹; Iman Javaheri¹; ¹University Of Michigan

10:25 AM **Invited**
Advancement of Data Intensive Approaches in Materials Discovery and Design: *David Elbert*¹; Brian Schuster²; Nick Carey¹; Connor Krill¹; Ali Rachidi¹; William Phelan¹; Tyrel McQueen¹; ¹Johns Hopkins University; ²ARL

MATERIALS DESIGN

Computational Discovery and Design of Emerging Materials — Session I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Arunima Singh, Arizona State University; Houlong Zhuang, Arizona State University; Sugata Chowdhury, National Institute of Standards and Technology; Arun Kumar Mannodi Kanakkithodi, Argonne National Laboratory

Monday AM | February 24, 2020
32B | San Diego Convention Ctr

Session Chair: Sugata Chowdhury, National Institute of Standards and Technology

8:00 AM Invited
Sorting through Messy Materials with First Principles Calculations: *Giulia Galli*¹; ¹University of Chicago

8:30 AM
Accelerated Discovery of Materials with Programmable Decomposition in Flow Batteries via Machine Learning: *Hieu Doan*¹; Garvit Agarwal¹; Rajeev Assary¹; ¹Argonne National Laboratory

8:50 AM
Active Learning Guided Polymer Space Exploration and Discovery: *Huan Tran*¹; Abhirup Patra¹; Deepak Kamal¹; Lihua Chen¹; Chiho Kim¹; Rampi Ramprasad¹; ¹Georgia Institute of Technology

9:10 AM
Neural Network Potentials for Water-in-salt Electrolytes: *Sarah Allec*¹; Woochul Shin²; P. Alex Greaney¹; Xiulei Ji²; ¹University of California Riverside; ²Oregon State University

9:30 AM Break

9:50 AM Invited
Computation Accelerated Design of Fast Ion Conducting Materials for Solid-state Batteries: *Yifei Mo*¹; ¹University Of Maryland College Park

10:20 AM
Computational Design of Non-Precious Transition Metal/ Nitrogen Doped Carbon Electrocatalysts for Sustainable Energy Technology: *Guofeng Wang*¹; Boyang Li¹; ¹University of Pittsburgh

10:40 AM
Frequency-dependent Dielectric Constant Prediction of Polymeric Dielectrics with Machine Learning: *Lihua Chen*¹; Rohit Batra¹; Chiho Kim¹; Tran Huan¹; Rampi Ramprasad¹; ¹Georgia Institute of Technology

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Microstructural Evolution and Phase Stability I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Jorge Munoz, University of Texas at El Paso; Sara Kadkhodaei, University of Illinois at Chicago; Vahid Attari, Texas A&M University; James Morris, Ames Laboratory

Monday AM | February 24, 2020
33C | San Diego Convention Ctr

Session Chairs: Alexander Chadwick, Northwestern University; Christopher Weinberger, Colorado State University

8:00 AM Invited
The Evolution of Bicontinuous Structures by Interfacial and Bulk Diffusion: W. Beck Andrews¹; Kate Elder²; Katsuyo Thornton¹; *Peter Voorhees*²; ¹University of Michigan; ²Northwestern University

8:20 AM
Phase Stability, Chemo-mechanics and Microstructure Space in TiAlZrN Ultra-hard Nanocoatings: *Vahid Attari*¹; Raymundo Arroyave¹; ¹Texas A&M University

8:40 AM
Multiscale Modeling of Mass Transport in Transition Metal Carbides: Rofiques Salehin¹; Xiaochuan Tang¹; Gregory Thompson²; *Christopher Weinberger*¹; ¹Colorado State University; ²University of Alabama

9:00 AM Invited
Microstructure Formation from Atomistic Viewpoint: *Yasushi Shibuta*¹; ¹The University of Tokyo

9:30 AM Break

9:50 AM Invited

Phase Field Modeling and Simulation Study of Multiferroic Magnetoelectric Composite Materials: *Yongmei Jin*¹; Liwei Geng¹; Yu Wang¹; ¹Michigan Technological University

10:20 AM

Probing Solid-solid Interfacial Reactions in All-solid-state Batteries: Hanmei Tang¹; Zhi Deng¹; Abhik Banerjee¹; Erik Wu¹; Han Nguyen¹; *Zhuoying Zhu*¹; Shirley Meng¹; Shyue Ping Ong¹; ¹University of California, San Diego

10:40 AM

Phase-field Model of Kirkendall Porosity Formation During Ti/Ni Interdiffusion to Form NiTi Microwires: *Alexander Chadwick*¹; David Dunand¹; Peter Voorhees¹; ¹Northwestern University

11:00 AM Invited

Localized Phase Equilibria and Dynamic Phase Transformations at Extended Defects – a New Alloy Design Strategy for Unprecedented Properties: Longsheng Feng¹; Yipeng Gao²; Dong Wang³; Yufeng Zheng¹; Michael Mills¹; Hamish Fraser¹; *Yunzhi Wang*¹; ¹The Ohio State University; ²Idaho National Laboratory; ³Xi'an Jiao Tong University

SPECIAL TOPICS

Current Trends in Magnetocaloric Materials: An FMD Symposium in Honor of Ekkes Brueck — Characterization of Structure and Magnetic Properties of Magnetocaloric Materials

Sponsored by: TMS Functional Materials Division

Program Organizers: Victorino Franco, Universidad de Sevilla; Frank Johnson, Niron Magnetics, Inc.

Monday AM | February 24, 2020
Marina Ballroom F | Marriott Marquis Hotel

Session Chair: Durga Paudyal, Ames Laboratory

8:00 AM Introductory Comments

8:05 AM Invited

Fe2P an Intriguing Binary Alloy: *Ekkes Brueck*¹; ¹TU Delft

8:35 AM Invited

CaloriSMART – A New Tool for Rapid Experimental Evaluation of Active Magnetic Regenerator Materials: Lucas Griffith¹; Agata Czernuszewicz¹; Julie Slaughter¹; *Vitalij Pecharsky*¹; ¹Ames Laboratory

9:05 AM Invited

Quantitative Identification of First-order Phase Transitions Using Magnetocaloric Studies: *Jia Yan Law*¹; ¹Sevilla University

9:35 AM Break

9:55 AM Invited

Synchrotron X-ray Studies on Magnetocaloric Materials: *Niels Van Dijk*¹; ¹Delft University of Technology

10:25 AM Invited

Structure, Magnetism and Spin Dynamics of Magnetocaloric $\text{Mn}_{5-x}\text{Fe}_x\text{Si}_3$ Compounds: *Karen Friese*¹; Nikolaos Biniskos¹; Nour Maraytta¹; Paul Hering¹; Yuri Skourski²; Andrzej Grzechnik³; Stephane Raymond⁴; Joerg Voigt¹; Thomas Brueckel¹; Karin Schmalzl¹; ¹Research Centre Jülich GmbH; ²Helmholtz Zentrum Dresden Rossendorf; ³RWTH Aachen University; ⁴Universite des Alpes

MATERIALS PROCESSING

Defects and Properties of Cast Metals — Defects I - Molten Metal and Inclusions

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Solidification Committee

Program Organizers: Lang Yuan, University of South Carolina; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Charles Monroe, University of Alabama at Birmingham

Monday AM | February 24, 2020
17B | San Diego Convention Ctr

Session Chairs: Mark Jolly, Cranfield University; Jan Frenzel, Ruhr University Bochum

8:00 AM Introductory Comments

8:05 AM Invited

Crystal Mosaicity in Single Crystal Ni-based Superalloys: *Jan Frenzel*¹; Philipp Hallensleben¹; Felicitas Scholz¹; Pascal Thome¹; Gunther Eggeler¹; ¹Ruhr University Bochum

8:35 AM

In-situ Tomographic Investigation of Co-base Alloy Solidification Features: *Tim Wigger*¹; Mohammed Azeem²; Shyamprasad Karagadde³; Zhipeng Guo⁴; Robert Atwood⁵; Nghia Vo⁵; Peter Lee¹; ¹University College London; ²University of Leicester; ³Indian Institute of Technology Bombay; ⁴Tsinghua University; ⁵Diamond Light Source Ltd

8:55 AM

An Experimental Characterization of Thermophysical Properties of a Porous Ceramic Shell Used in the Investment Casting Process:*Christopher Jones*¹; Mark Jolly¹; Anders Jarfors²; Mark Irwin³; ¹Cranfield University; ²Jonkoping University; ³TPC Components AB

9:15 AM

Influence of Casting Conditions on Crack Sensitivity of Micro-alloyed Steel Slabs During Continuous Casting: *Hossam Ibrahim*¹; Heinz Palkowski¹; ¹Clausthal University of Technology

9:35 AM Break

9:55 AM

Spatially Resolved Compositional and Isotopic Analysis of As-cast Metallic Nuclear Fuels: *Elizabeth Kautz*¹; Vineet Joshi¹; Curt Lavender¹; Arun Devaraj¹; ¹Pacific Northwest National Laboratory - PNNL

10:15 AM

Defects Comparison between Single and Double-sided Electron Beam Welded Dissimilar DP600 Steel to 5754 Al Alloy Joints: X-ray Tomography Study: *Soumitra Dinda*¹; Prakash Srirangam²; Gour Gopal Roy¹; ¹Indian Institute of Technology Kharagpur; ²Warwick Manufacturing Group

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Transitions at Grain Boundaries VII — Grain Boundary Structure: Disconnections, Complexions, Twins

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Shen Dillon, University of Illinois; Douglas Spearot, University of Florida; Jian Luo, University of California, San Diego; Jennifer Carter, Case Western Reserve University

Monday AM | February 24, 2020
5B | San Diego Convention Ctr

Session Chairs: Yi Guo, Imperial College London; Saryu Fensin, Los Alamos National Laboratory

8:00 AM Invited
Dislocation Density Distribution at Slip Band-grain Boundary Intersections: *Yi Guo*¹; David Collins²; Edmund Tarleton³; Felix Hofmann³; Angus Wilkinson³; Ben Britton¹; ¹Imperial College London; ²Birmingham University; ³University of Oxford

8:20 AM
Continuum Dislocation Dynamics at Finite Deformation: Computational Modeling and Preliminary Results: *Kyle Starkey*¹; Anter El-Azab¹; Grethe Winther²; ¹Purdue University; ²Technical University of Denmark

8:40 AM
Predictions of Grain Boundary Segregation in bcc Refractory Metals based on Electronic Descriptors: *Yong-Jie Hu*¹; Ge Zhao²; Baiyu Zhang³; Chaoming Yang¹; Xiaofeng Qian³; Liang Qi¹; ¹University of Michigan; ²The Pennsylvania State University; ³Texas A&M University

9:00 AM
Twinning Nucleation Process at Grain Boundary in BCC Crystals: *Scott Mao*¹; Jiangwei Wang¹; ¹University of Pittsburgh

9:20 AM
Unusual Size Effects from Tilted Twin Boundaries in Nano-twinned Metals: *Caizhi Zhou*¹; Sixie Huang¹; Irene Beyerlein²; ¹Missouri University of Science and Technology; ²University of California at Santa Barbara

9:40 AM Break

10:00 AM

Dislocation Interactions and the Formation of Low-angle Grain Boundary: *Pranay Chakraborty*¹; Tengfei Ma¹; Abigail Hunter²; Yinan Cui³; Lei Cao¹; ¹University of Nevada; ²Los Alamos National Laboratory; ³Tsinghua University

10:20 AM

The Evolution of Interfacial States in Nanocrystalline Al-Ni-Ce and their Influence on Mechanical Behavior and Thermal Stability: *Glenn Balbus*¹; Yolita Eggeler¹; Jungho Shin¹; Fulin Wang¹; Verena Maier-Kiener²; Daniel Kiener²; Daniel Gianola¹; ¹University of California, Santa Barbara; ²Montanuniversität Leoben

10:40 AM

Effect of Silica and Rare Earth Oxides on the Grain Boundary Chemistries in Hot-pressed Boron suboxide (B₆O) and the Observance of Nanolayer Films: *Kristopher Behler*¹; Christopher Marvel²; Jerry LaSalvia³; J. Dunn-Synowczynski³; S.D. Walck¹; Martin Harmer²; ¹CCDC Army Research Laboratory, SURVICE Engineering; ²Lehigh University; ³CCDC Army Research Laboratory

11:00 AM

Thick Amorphous Complexions Enabled by Compositional and Thermal Manipulation: *Charlette Grigorian*¹; Timothy Rupert¹; ¹University of California, Irvine

MATERIALS PROCESSING

Electrometallurgy 2020 — Hydrometallurgy

Sponsored by: TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee

Program Organizers: Antoine Allanore, Massachusetts Institute of Technology; Michael Free, University of Utah; Georges Houlachi, Hydro-Quebec; Hojong Kim, Pennsylvania State University; Takanari Ouchi, The University of Tokyo; Shijie Wang, Rio Tinto Kennecott Utah Copper Corp

Monday AM | February 24, 2020
14A | San Diego Convention Ctr

Session Chairs: Michael Free, University of Utah; Georges Houlachi, Hydro-Quebec

8:00 AM Introductory Comments

8:05 AM Keynote

Future Prospects for Copper Leaching, Solvent Extraction and Electrowinning Technology: *David Dreisinger*¹; ¹University of British Columbia

8:35 AM

Effective Copper Diffusion Coefficients in CuSO₄ – H₂SO₄ Electrowinning Electrolytes: *Joseph Bauer*¹; Michael Moats¹; ¹Missouri University of Science and Technology

8:55 AM

Theories of Electrodeposition, Beings-of-reason, and Reality: *Peter Adcock*¹; Cora Masterlark²; ¹PalaTeck Scientific LLC,; South Dakota School of Mines & Technology; ²South Dakota School of Mines & Technology

9:20 AM Break

9:35 AM

The Electrochemical Conversion of Chalcopyrite to Less Refractory Mineral Phases for Hydrometallurgical Processing: *Jonathan Vardner*¹; Campbell Donnelly¹; Zhengyan Zhang¹; Minghui Wang¹; Angela Ye¹; Scott Banta¹; Alan West¹; ¹Columbia University

9:55 AM

Modeling Nickel and Zinc Electrowinning Based on Ion Mass Transport and Electrode Reaction Kinetics: *Zongliang Zhang*¹; Michael Free¹; ¹University of Utah

ENERGY & ENVIRONMENT

Energy Technologies and CO2 Management Symposium — Session I

Sponsored by: TMS Extraction and Processing Division, TMS: Energy Committee

Program Organizers: Xiaobo Chen, RMIT University; Yulin Zhong, Griffith University; Lei Zhang, University of Alaska Fairbanks; John Howarter, Purdue University; Alafara Baba, University of Ilorin; Neale Neelameggham, IND LLC; Cong Wang, Northeastern University; Ziqi Sun, Queensland University of Technology

Monday AM | February 24, 2020
17A | San Diego Convention Ctr

Session Chairs: Shanqing Zhang, Griffith University; Yulin Zhong, Griffith University

8:00 AM Keynote

Oxygen Vacancy for Energy Conversion and Storage Devices?: *Shanqing Zhang*¹; ¹Griffith University

8:20 AM Invited

Electrochemical Engineering of Graphene Oxide for Wearable Smart Devices: *Yulin Zhong*¹; ¹Griffith University

8:45 AM Invited

Bio-inspired Superhydrophobic and Superhydrophilic Materials: *Ziqi Sun*¹; ¹Queensland University of Technology

9:10 AM

Integrated Sensor Network and Battery Management System for State of Health Estimation and Safety Control of Lithium-ion Batteries: *Bing Li*¹; Vikas Tomar¹; Thomas Adams²; Corey Love³; Vilas Pol¹; ¹Purdue University; ²Naval Surface Warfare Center; ³U.S. Naval Research Laboratory

9:30 AM Break

9:50 AM

The Impact of Solar Thermal Resource Characteristics on Solar Thermal Pre-heating of Manganese Ores: *Susanna Hockaday*¹; Reiner Buck²; Martina Neiseis-van Puttkamer²; Willie Smit³; ¹MINTEK; ²DLR; ³Stellenbosch University

10:10 AM

The Compatibility of Metallic Thermal Storage Materials and Housing Materials: A Computational Survey and Accelerated Reaction Experiment Results: *Anthony Rawson*¹; Tina Gläsel¹; Benedikt Nowak¹; David Boon¹; Veronika Stahl²; Florian Kargl¹; ¹Institute of Material Physics in Space, German Aerospace Centre (DLR); ²Institute of Vehicle Concepts, German Aerospace Centre (DLR)

10:30 AM

Optimization and Management of On-site Power Plants Under Time-of-use Power Price: A Case Study in Steel Mill: Xiancong Zhao¹; Huanmei Yuan²; *Zefei Zhang*²; Hao Bai²; ¹Peking university; ²University of Science and Technology Beijing

SPECIAL TOPICS

Expanding the Boundaries of Materials Science:
Unconventional Collaborations — Multidisciplinary Research

Program Organizers: Sourabh Kadambi, North Carolina State University; Alex Hsain, North Carolina State University; Brady Dowdell, North Carolina State University; Benjamin Anthony, University of Florida

Monday AM | February 24, 2020
4 | San Diego Convention Ctr

Session Chairs: Alex Hsain, North Carolina State University; Sourabh Kadambi, North Carolina State University

8:00 AM Introductory Comments

8:05 AM Invited
Innovation in Materials Research Collaborations: DOE Basic Energy Sciences: *Linda Horton*¹; ¹Department of Energy - Basic Energy Sciences

8:35 AM Invited
Mechanical Properties of Molecular Crystals--Connecting with Chemistry: *Ramamurty Upadrasta*¹; ¹NTU

9:05 AM Invited
Integrating Experiment, Data, and Computations to Accelerate the Design of Materials: *Peter Voorhees*¹; Greg Olson¹; Juan DePablo²; ¹Northwestern University; ²University of Chicago

9:35 AM Break

10:00 AM Invited
Convergence: Supporting Multidisciplinary Research at the National Science Foundation: *Alexis Lewis*¹; ¹National Science Foundation

10:30 AM Invited
Machine Learning for Materials Design and Discovery: *Bryce Meredig*¹; ¹Citrine Informatics

11:00 AM
Regularization of Materials Failure Data for Damage Mechanism Categorization by Machine Learning: *John Hasier*¹; Keo-Yuan Wu²; Rachel Wittman¹; ¹Intertek; ²UCLA

MECHANICS & STRUCTURAL RELIABILITY

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Fatigue Characterization Using Advanced Experimental Methods in 2D and 3D

Sponsored by: TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Garrett Pataky, Clemson University; Ashley Spear, University of Utah; Jean-Briac le Graverend, Texas A&M University; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University

Monday AM | February 24, 2020
11A | San Diego Convention Ctr

Session Chair: Antonios Kontsos, Drexel University

8:00 AM Invited

Fatigue Damage Initiation in Nickel Superalloys by Slip Localization and Redistribution: *Jean-Charles Stinville*¹; Patrick Callahan²; M. P. Echlin¹; Marie-Agathe Charpagne¹; A.T. Polonsky¹; Valery Valle³; I.J. Beyerlein¹; T. M. Pollock¹; ¹University of California, Santa Barbara; ²Naval Research Laboratory; ³Institut P' - UPR 3346, CNRS - Université de Poitiers - ENSMA

8:20 AM

Multiscale Analysis of Fatigue Crack Initiation in Stainless Steel 316L: *Pragna Bhaskar*¹; Josh Kacher¹; ¹Georgia Tech

8:40 AM

Unraveling Cyclic Deformation Mechanisms of a Precipitate-strengthened Magnesium Alloy using In-situ Neutron Diffraction: *Di Xie*¹; Zongyang Lyu¹; Ke An²; Yan Chen²; Peter Liaw¹; Yanfei Gao¹; ¹the University of Tennessee; ²Oak Ridge National Laboratory

9:00 AM

Fatigue Behavior and Modeling of PEEK Polymer under Uniaxial and Multiaxial Loadings: *Rakish Shrestha*¹; Jutima Simsiriwong²; Nima Shamsaei¹; ¹Auburn University; ²University of North Florida

9:20 AM

Experimental-numerical Analysis of the Correlation Between the Stress & Strain Fields Induced by the Graphite Particles and the Crack Nucleation and Propagation Path in Ductile Cast Iron: *Tito Andriollo*¹; Yubin Zhang¹; Søren Fæster¹; Jesper Hattel¹; Varvara Kouznetsova²; ¹Technical University of Denmark; ²Eindhoven

University of Technology

9:40 AM Break

10:00 AM

Microstructure-sensitive Evaluation of the Cyclic Behavior of Additively Manufactured Metals: *Emine Tekerek*¹; Brian Wisner²; Antonios Kontsos¹; ¹Drexel University; ²Ohio University

10:20 AM

In-situ Characterization and Modelling of Cyclic Deformation in Rare-earth Magnesium Alloys: *Duncan Greeley*¹; Mohammadreza Yaghoobi¹; Darren Pagan²; Veera Sundararaghavan¹; John Allison¹; ¹University of Michigan; ²Cornell High Energy Synchrotron Source

10:40 AM

Capturing the Spatial Field of Deformation Ahead of a Fatigue Crack in Hydrogen-charged 316L Stainless Steel using High Energy X-ray Diffraction: *Kelly Nygren*¹; Daniel Banco²; Akihide Nagao³; Shuai Wang⁴; Eric Miller²; Darren Pagan¹; ¹Cornell High Energy Synchrotron Source; ²Tufts University; ³JFE Steel Corporation; ⁴Southern University of Science and Technology

11:00 AM

Characterization of Fatigue Mechanisms in Nickel Microbeams: *Alejandro Barrios*¹; Ebiakpo Kakandar²; Xavier Maeder³; Gustavo Castelluccio²; Olivier Pierron¹; ¹Georgia Institute of Technology; ²Cranfield University; ³Empa, Swiss Federal Laboratories for Materials Science and Technology

MECHANICS & STRUCTURAL RELIABILITY

Fracture Modeling of Composite Materials — Fracture Modeling of Composite Materials

Program Organizers: Yan Li, Dartmouth College; Saurabh Puri, Microstructure Engineering

Monday AM | February 24, 2020
10 | San Diego Convention Ctr

Session Chairs: Yan Li, California State University, Long Beach; Saurabh Puri, Microstructure Engineering

8:00 AM Invited

An Integrated Computational and Experimental Framework to Understand the Competing Failure Mechanisms in Metal Matrix Composites: *Yan Li*¹; Jun Cao²; Cyril Williams³; ¹Thayer School of

Engineering, Dartmouth College; ²California State University, Long Beach; ³US Army Research Laboratory

8:30 AM

Computational Polyethylene-ceramic Composite Plate Design and Optimization: *Trenin Bayless*¹; Jerome Downey¹; Peter Lucon¹; Scott Coguill¹; ¹Montana Technological University

8:50 AM

A Reactive Molecular Dynamics Study on the Mechanical Properties of Alumina/Carbon Nanotube Composites: *Yixin Su*¹; Yang Wang¹; Narumasa Miyazaki¹; Yusuke Ootani¹; Nobuki Ozawa¹; Momoji Kubo¹; ¹Tohoku University

9:10 AM

Evaluation of Fracture Toughness of Cryogenically Treated High Nitrogen Martensitic Steel: *Narendra Dhokey*¹; ¹Government College of Engineering

9:30 AM Break

10:00 AM Invited

Developing a Virtual Damage Sensor Using a Multiscale Coupled Electro-mechanical FEModel of a Piezoelectric Material: *Somnath Ghosh*¹; Preetam Tarafder¹; Saikat Dan¹; ¹Johns Hopkins University

10:30 AM

An Improved Fracture Mechanics-informed Multiscale Thermomechanical Damage Model for Ceramic Matrix Composites: *Travis Skinner*¹; Jacob Schichtel¹; Aditi Chattopadhyay¹; ¹Arizona State University

10:50 AM

Micromechanical Analysis of Matrix Crack-induced Delamination in Cross-ply Laminates Under Tension: *Chen Fu*¹; Xi Wang²; ¹School of Mechanical, Electronic and Control Engineering, Beijing Jiaotong University,; ²School of Mechanical, Electronic and Control Engineering, Beijing Jiaotong University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Functional Nanomaterials 2020: Translating Innovation into Pioneering Technologies — Translating Innovation into Pioneering Technologies I

Sponsored by: TMS Functional Materials Division, TMS:
Nanomaterials Committee

Program Organizers: Simona Hunyadi Murph, Savannah River National Laboratory; Huanyu Cheng, Pennsylvania State University; Yong Lin Kong, University of Utah; Min Kyu Song, Washington State University; Ning Zhang, University of Alabama

Monday AM | February 24, 2020
Point Loma | Marriott Marquis Hotel

Session Chairs: Min-Kyu Song, Washington State University; Nasrin Hooshmand, Georgia Tech

8:00 AM Invited
Nano-carbon Materials for Advanced Energy Storage: *Cengiz Ozkan*¹; ¹University of California, Riverside

8:20 AM Invited
Design Nanostructured Anode Materials for Li-/Na-ion Batteries: *Xiaolin Li*¹; Haiping Jia¹; Jiguang Zhang¹; David Reed¹; Vincent Sprenkle¹; ¹Pacific Northwest National Laboratory

8:40 AM Invited
Development of Solid-State Li/Sulfur-Selenium as Safe and High Capacity Batteries: *James Wu*¹; ¹Nasa Glenn Research Center

9:00 AM Invited
Interfacial Engineering of Energy Conversion and Storage Materials Using Atomic Layer Deposition: Robin Rodríguez¹; Tae Cho¹; M. Ravandi¹; William LePage¹; Mihaela Banu¹; M. D. Thouless¹; *Neil Dasgupta*¹; ¹University of Michigan, Ann Arbor

9:20 AM Break

9:40 AM Invited
Multi-modal, Multi-length-scale Characterization of Composition Graded Ni-rich Layered Oxide Cathode Materials: *Seongmin Bak*¹; Xiao-Qing Yang¹; Youngho Shin²; ¹Brookhaven National Laboratory; ²Argonne National Laboratory

10:00 AM Invited
Graphene Coating on Ni-rich Cathode Materials to Improve Energy Density of Electrode for Lithium-ion Battery: *Young-Jun Kim*¹; Chang-Won Park¹; Jung-Hun Lee¹; Soo-Min Hwang¹; ¹Sungkyunkwan University

10:20 AM Invited

2D Materials for Energy Storage Applications: *Reza Shahbazian-Yassar*¹; ¹University of Illinois at Chicago

10:40 AM

Metal–organic Frameworks for Lithium–oxygen Batteries with Enhanced Cycling Performance: *Xiahui Zhang*¹; Panpan Dong¹; Younghwan Cha¹; Min-Kyu Song¹; ¹School of Mechanical and Materials Engineering, Washington State University

11:00 AM Invited

Engineered Si/SiO_x Nanocomposites for Lithium Ion Battery: *Hansu Kim*¹; ¹Hanyang University

MATERIALS DESIGN

Hume-Rothery Symposium: Thermodynamics, Phase Equilibria and Kinetics for Materials Design and Engineering — Opening Session

Sponsored by: TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Carelyn Campbell, National Institute of Standards and Technology; Michael Gao, National Energy Technology Laboratory; Wei Xiong, University of Pittsburgh

Monday AM | February 24, 2020
32A | San Diego Convention Ctr

Session Chairs: Carelyn Campbell, National Institute of Standards and Technology; Wei Xiong, University of Pittsburgh

8:00 AM Introductory Comments

8:10 AM Invited

William Hume-Rothery Award Lecture: Phase Diagrams, Computational Thermodynamics and CALPHAD: *Ursula Kattner*¹; ¹National Institute of Standards and Technology

8:50 AM Invited

Tomorrow fcc Ordering Model: *Nathalie Dupin*¹; ¹Calcul Thermodynamique

9:30 AM Break

9:50 AM Invited

Materials Property Databases Developed by the CALPHAD Approach and Their Applications in Materials Design: *Fan Zhang*¹; Jun Zhu¹; Chuan Zhang¹; Duchao Lv¹; Shuanglin Chen¹; Weisheng Cao¹; ¹CompuTherm LLC

10:30 AM Invited

On the Next Generation of Thermodynamic CALPHAD Databases: *Malin Selleby*¹; ¹KTH Royal Institute of Technology

11:10 AM

The Third Generation of CALPHAD Descriptions: Case Studies on Al-C and W-C: *Zhangting He*¹; Malin Selleby¹; ¹KTH Royal Institute of Technology

ADVANCED MATERIALS

Innovations in High Entropy Alloys and Bulk Metallic Glasses: An SMD & FMD Symposium in Honor of Peter K. Liaw — High Entropy Alloys: Mechanical Properties

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee

Program Organizers: Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Yanfei Gao, University of Tennessee - Knoxville; Robert Maass, University of Illinois at Urbana-Champaign; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Soo Yeol Lee, Chungnam National University; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center; Liang Jiang, Yantai University

Monday AM | February 24, 2020
Marina Ballroom G | Marriott Marquis Hotel

Session Chairs: Michael Gao, National Energy Technology Lab; E-Wen Huang, National Chiao Tung University

8:00 AM Introductory Comments

8:10 AM Invited

Research on Bulk Metallic Glasses and High Entropy Alloys: *Peter Liaw*¹; ¹University of Tennessee

8:35 AM Invited

Structures and Mechanical Properties of Multiphase High-entropy Alloys at Room and Elevated Temperatures: Tao Yang¹; Boxuan Cao¹; *Chain Tsuan Liu*¹; ¹City University Of Hong Kong

9:00 AM Invited

Element Effects of CoCrFeNi-based High-entropy Alloys on Low-cycle Fatigue: *E-Wen Huang*¹; Che-Wei Tsai²; An-Chou Yeh²; Soo Yeol Lee³; Stefanus Harjo⁴; Peter Liaw⁵; Tu-Ngoc Lam¹; You-Shiun Chou¹; ¹National Chiao Tung University; ²National Tsing Hua University; ³Chungnam National University; ⁴J-PARC Center, Japan Atomic Energy Agency; ⁵University of Tennessee

9:20 AM Invited

High Temperature Strength of Refractory Complex Concentrated Alloys: *Oleg Senkov*¹; Stephane Gorsse²; Daniel Miracle¹; ¹United States Air Force Research Laboratory; ²Universite de Bordeaux, CNRS

9:40 AM Break

9:55 AM Invited

Tensile Behavior of BCC Refractory High-entropy Alloys: *Easo George*¹; ¹Oak Ridge National Laboratory

10:15 AM Invited

Mechanical Behavior of Transformative Complex Concentrated Alloys: *Rajiv Mishra*¹; ¹University of North Texas

10:35 AM Invited

Slip Avalanches in Amorphous and Crystalline Materials: *Karin Dahmen*¹; ¹University of Illinois

10:55 AM Invited

Portevin-Le Chatelier Mechanism in Face-Centered-Cubic Metals from Low to High Entropy: Che-Wei Tsai¹; Chi Lee¹; Po-Ting Lin¹; Xie Xie²; Shuying Chen²; Robert Carroll³; Michael LeBlanc³; Braden A. W. Brinkman⁴; Peter Liaw⁵; Karin Dahmen³; *Jien-Wei Yeh*¹; ¹National Tsing Hua University; ²The University of Tennessee-Knoxville; ³University of Illinois at Urbana-Champaign; ⁴University of Washington; ⁵National Tsing Hua University; The University of Tennessee-Knoxville

11:15 AM Invited

Modeling and Analysis of Serrated Flows in High Entropy Alloys: Past, Present, and Future: *Jamieson Brecht*¹; Xie Xie²; Shuying Chen³; Chanhoo Lee³; Yunzhu Shi⁴; Haoyan Diao⁵; Zhong Wang⁶; Yang Ren⁷; Junwei Qiao⁶; Peter Liaw³; ¹Oak Ridge National Laboratory; ²FCA US LLC; ³University of Tennessee; ⁴University of Science and Technology Beijing ; ⁵Kaiser Aluminum; ⁶Taiyuan University

MATERIALS PROCESSING

Low-cost Titanium: ‘Affordable Ti’ — Session I

Sponsored by: TMS Structural Materials Division, TMS: Titanium Committee, TMS: Powder Materials Committee

Program Organizers: Ramana Reddy, University of Alabama; M. Ashraf Imam, George Washington University

Monday AM | February 24, 2020
Theater A-8 | San Diego Convention Ctr

Session Chairs: Ashraf Imam, George Washington University; Ramana Reddy, The University of Alabama

8:00 AM Invited
Electrodeposition of Titanium Aluminide (TiAl) Alloy from AlCl3-BMIC Ionic Liquid at Low Temperature: *Pravin Shinde*¹; Yuxiang Peng¹; Ramana Reddy¹; ¹The University of Alabama

8:40 AM
Calciothermic Synthesis of Fine, Hydrogenated Ti- and Ti-Nb-powder: *Inge Lindemann*¹; Patrick Langhelm¹; Margitta Uhlemann¹; Annett Gebert¹; ¹Leibniz Institute for Solid State and Materials Research Dresden

9:00 AM
Production of Fine Titanium and Titanium Alloy Powders by the Shuttle of Disproportion Reaction in Molten Salt: *Xin Lu*¹; Takuya Ono¹; Haochen Jiang¹; Osamu Takeda¹; Hongmin Zhu¹; ¹Tohoku University

9:20 AM
Cost-effective PM Ti Compositions and Processing: *Leandro Bolzoni*¹; ¹The University of Waikato

9:40 AM Break

9:55 AM Invited
Fast Step 3- Titanium Swarf to Engine Parts in 3 Steps: Martin Jackson¹; Ben Thomas¹; *Nick Weston*¹; ¹The University of Sheffield

10:35 AM
Aeration Leaching Process for Producing Synthetic Rutile in a Novel Gas-liquid-solid Reactor: *Qiuyue Zhao*¹; Maoyuan Li¹; Zimu

Zhang¹; Zhang Tingan¹; ¹Northeastern University

LIGHT METALS

Magnesium Technology 2020 — Keynote Session

Sponsored by: TMS Light Metals Division, TMS: Magnesium Committee

Program Organizers: J. Brian Jordon, University of Alabama; Victoria Miller, University of Florida; Vineet Joshi, Pacific Northwest National Laboratory; Neale Neelameggham, IND LLC

Monday AM | February 24, 2020
6C | San Diego Convention Ctr

Session Chairs: J. Brian Jordon, University of Alabama; Victoria Miller, University of Florida

8:00 AM Introductory Comments

8:10 AM Keynote
Twin Transmission Across Grain Boundaries in Mg: *Carlos Tome*¹; M Arul Kumar¹; John Graham¹; Khanh Dang¹; Yue Liu²; Pengzhang Tang²; Shujuan Wang¹; Rodney McCabe¹; Laurent Capolungo¹; ¹Los Alamos National Laboratory; ²Shanghai Jiao Tong University

8:55 AM Keynote
Hierarchically Structured Ultrafine Grained Magnesium Alloys: *Rajiv Mishra*¹; ¹University of North Texas

9:40 AM Break

10:00 AM Keynote
MultiStage Fatigue (MSF) Modeling of Magnesium in a Corrosion Environment: *Mark Horstemeyer*¹; ¹Liberty University

10:45 AM Keynote
Novel Texture Controlling of Mg Alloys: *Bin Jiang*¹; Guangsheng Huang¹; Fusheng Pan¹; ¹Chongqing University

CHARACTERIZATION

Material Behavior Characterization via Multi-Directional Deformation of Sheet Metal — Session I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

Program Organizers: Daniel Coughlin, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Piyush Upadhyay, Pacific Northwest National Laboratory; John Carsley, Novelis, Inc.

Monday AM | February 24, 2020
Theater A-1 | San Diego Convention Ctr

Session Chair: Daniel Coughlin, Los Alamos National Laboratory

8:00 AM Invited
Measuring the Multiaxial Nature of Thermomechanical Constitutive Relationships of Crystalline Materials: Garrison Hommer¹; Ashley Bucsek²; Harshad Paranjape¹; Zachary Brunson¹; Jinesh Dahal¹; *Aaron Stebner*¹; ¹Colorado School of Mines; ²University of Michigan

8:40 AM Invited
Multi-directional Deformation Capabilities in the NIST Center for Automotive Lightweighting (NCAL): *Adam Creuziger*¹; Mark Iadicola¹; Thomas Gnaupel-Herold¹; William Luecke¹; Tim Foecke¹; Matthias Merz Kirch¹; Dilip Banerjee¹; ¹National Institute of Standards and Technology

9:20 AM
Large-strain Cruciform Testing for Characterization of Macro- and Micro-scale Formability of Sheet Metals: Baran Guler¹; Orhan Aytuna¹; *Mert Efe*¹; ¹Middle East Technical University

9:40 AM Break

10:00 AM
High Precision Material Modeling of 5000 Series Aluminum Alloy Sheet Using Biaxial Tensile Tests and Hole Expansion Simulation: *Noa Miyake*¹; Toshihiko Kuwabara¹; ¹Tokyo University of Agriculture and Technology

10:20 AM
Material Modeling in Biaxial Stress Field and Hole Expansion Simulation of Hot-rolled Steel Sheets: *Shunya Nomura*¹; Toshihiko Kuwabara¹; ¹Tokyo University of Agriculture and Technology

10:40 AM
Multiscale Modeling of Self-piercing Riveting Process: *Georges Ayoub*¹; Andrey Ilinich²; ¹University of Michigan; ²Ford Motor Company

11:00 AM
Microstructural Response of Stainless Steel Subjected to Biaxial Load Path Changes: In-situ Neutron Diffraction and Multi-scale Modeling: *Manas Upadhyay*¹; Jan Capek²; Tobias Panzner²; Helena Van Swygenhoven²; ¹École Polytechnique; ²Paul Scherrer Institute

MATERIALS DESIGN

Materials Design Approaches and Experiences V — Alloy Design Strategy and Tools

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Akane Suzuki, GE Research; Ji-Cheng Zhao, University of Maryland; Michael Fahrmann, Haynes International; Qiang Feng, University of Science and Technology Beijing; Michael Titus, Purdue University

Monday AM | February 24, 2020
33A | San Diego Convention Ctr

Session Chairs: Ji-Cheng Zhao, University of Maryland; Akane Suzuki, GE Research

8:00 AM Introductory Comments

8:05 AM Invited
Material and Process 4.0: Model-Based Material and Process Development: *David Furrer*¹; Vasisht Venkatesh¹; Jean Philippe Thomas¹; ¹Pratt & Whitney

8:35 AM Invited
Materials, Manufacturing, and Design: Perspectives on New and Nascent Techniques: *Dennis Dimiduk*¹; Stephen Niezgoda²; Michael Groeber²; ¹BlueQuartz Software LLC; ²The Ohio State University

9:05 AM Invited
Accelerated Materials Design Strategy for Additive Manufacturing at Access e.V.: *Ulrike Hecht*¹; Michael Mathes¹; Daniel Röhrens¹; ¹Access e.V.

9:35 AM Break

9:55 AM Invited

Alloy Design Through Sequential Learning: *James Saal*¹; ¹Citrine Informatics

10:25 AM Invited

Further Developments of CALPHAD Based Tools for Accelerating Alloy Design: *Paul Mason*¹; Adam Hope¹; Kaisheng Wu¹; Qing Chen²; Hai-Lin Chen²; Jiayi Yan²; Ralf Rettig²; Johan Jeppsson²; Anders Engstrom²; ¹Thermo-Calc Software Inc.; ²Thermo-Calc Software AB

10:55 AM Invited

High-throughput CALPHAD Calculation for Accelerated Materials Design: *Fan Zhang*¹; Chuan Zhang¹; Weisheng Cao¹; Jun Zhu¹; Duchao Lv¹; Shuanglin Chen¹; ¹CompuTherm LLC

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale V — Microstructure Effects

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Christopher Weinberger, Colorado State University; Megan Cordill, Erich Schmid Institute; Garritt Tucker, Colorado School of Mines; Wendy Gu, Stanford University; Scott Mao, University of Pittsburgh; Yu Zou, University of Toronto

Monday AM | February 24, 2020
Santa Rosa | Marriott Marquis Hotel

Session Chairs: Garritt Tucker, Colorado School of Mines; Chuang Deng, University of Manitoba

8:00 AM

Improved Strength and Toughness in Metal-MAX Nanolaminates Through Nanoscale Mechanistic Competition: *Jacob Gruber*¹; Siddhartha Pathak²; Garritt Tucker¹; ¹Colorado School of Mines; ²University of Nevada, Reno

8:20 AM

Micromechanical Studies of Laser Surface Remelted Hypereutectic Al-20Si Alloy: *Huai-Hsun Lien*¹; Amit Misra¹; Jyoti Mazumder¹; ¹University of Michigan

8:40 AM
Stability of Nanotwinned Thin Metal Films: *Shefford Baker*¹; Nathaniel Rogers¹; Kenneth Shaughnessy¹; ¹Cornell University

9:00 AM Invited
Atomistic Simulation of Twinning Mediated Deformation and Plasticity in Au Nanowires: *Chuang Deng*¹; Frederic Sansoz²; Reza Rezaei³; ¹University of Manitoba; ²University of Vermont; ³University of Tehran

9:40 AM Break

10:00 AM
Mechanical Phase Mapping of Meteorites: Combining EDX and Nanoindentation: *Jeffrey Wheeler*¹; ¹ETH Zurich

10:20 AM
Role of Grain Boundaries on Plasticity and Fracture of Nanocrystalline MgAl2O4: *Jessica Maita*¹; Jacob Davis²; James Wollmershauser³; Edward Gorzkowski³; Boris Feigelson³; Seok-Woo Lee¹; ¹University of Connecticut; ²University of Massachusetts Amherst; ³U.S. Naval Research Laboratory

10:40 AM
Deformation Mechanisms in a Nanocrystalline CuTa alloys under Shock Loading Conditions: *Billy Hornbuckle*¹; Steven Dean¹; Xuyang Zhou²; Anit Giri¹; Anthony Roberts¹; Greg Thompson²; Kris Darling¹; ¹US Army Research Laboratory; ²University of Alabama

11:00 AM
Thermally Stable and High-strength Nanoporous Aluminum: *Wei Yang*¹; *Hai-Jun Jin*¹; ¹Institute of Metal Research, CAS

MATERIALS DESIGN

Metal-Matrix Composites: Analysis, Modeling, Observations and Interpretations — Marvels of Microstructure

Sponsored by: TMS Structural Materials Division, TMS: Composite Materials Committee

Program Organizers: Srivatsan Tirumalai, The University of Akron; Yuzheng Zhang, Gamma Alloys; William Harrigan, Gamma Alloys

Monday AM | February 24, 2020
31A | San Diego Convention Ctr

Session Chair: William Harrigan, Gamma Alloys

8:00 AM Invited

Microstructure, Interfaces and Mechanical Properties of Nano Composites Manufactured in Solid State: *Ramasis Goswami*¹; Alex Moser¹; ¹Naval Research Laboratory

8:30 AM

Microstructure Analysis and Modeling of the Effective Properties of Damaged Fe-TiB2 Metal Matrix Composites: *Khaoula Dorhmi*¹; Katell Derrien¹; Zehoua Hadjem-Hamouche¹; Leo Morin¹; Frederic Bonnet¹; Jean-Pierre Chevalier¹; ¹PIMM-ENSAM

8:55 AM

Effects of Interface Characteristics on High Volume Fraction Al/SiCp Composites under Compressive Stress: *Taegyu Lee*¹; Donghyun Lee²; Hobyung Chae³; Soo Yeol Lee³; Ho Jin Ryu¹; ¹Korea Advanced Institute of Science and Technology; ²Korea Institute of Materials Science; ³Chungnam National University

MATERIALS DESIGN

Microstructural Template Consisting of a Face-Centered Cubic Matrix with Ordered Precipitates: Microstructural Evolution and Properties — Al Base Alloys

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

Program Organizers: Rajarshi Banerjee, University of North Texas; Eric Lass, University of Tennessee, Knoxville; Ashley Paz Y Puente, University of Cincinnati; Tushar Borkar, Cleveland State University; Keith Knipling, Naval Research Laboratory; Sophie Primig, University of New South Wales

Monday AM | February 24, 2020
30D | San Diego Convention Ctr

Session Chair: Rajarshi Banerjee, University of North Texas

8:00 AM Introductory Comments

8:10 AM Keynote

Evolution of Ordered Intermetallic Phases in Alloys Through Concomitant Clustering and Ordering Processes: Rumu Halder Banerjee¹; Ashok Arya¹; *Srikumar Banerjee*¹; ¹Bhabha Atomic Research Centre; Homi Bhabha National Institute

8:50 AM

Sc-free Nanoprecipitate-strengthened Aluminum Alloys with Exceptional Creep Resistance: *Richard Michi*¹; David Seidman¹; David Dunand¹; ¹Northwestern University

9:10 AM

D022 + D022' Dual-phase Microstructure in As-cast Al-Mo-Ti Alloys: *Andreas Leineweber*¹; Mario Kriegel¹; Stefan Martin¹; ShunLi Shang²; Zi-Kui Liu²; ¹TU Bergakademie Freiberg; ²Pennsylvania State University

9:30 AM Break

10:00 AM Invited

High Temperature Microstructural Stability Mechanisms Revealed by Microscopy in Al-Cu-Mn-Zr Alloys: *Jonathan Poplawsky*¹; Patrick Shower²; Lawrence Allard¹; Matthew Chisholm¹; Dongwon Shin²; Amit Shyam²; ¹The Center for Nanophase Materials Sciences, Oak Ridge National Laboratory; ²Materials Science and Technology Division, Oak Ridge National Laboratory

10:30 AM Invited

Nanoscale Precipitation-strengthened Al-Er-Sc-Zr-(V,Nb,Ta) Alloys: *Keith Knipling*¹; ¹Naval Research Laboratory

11:00 AM

Impact of L1₂-phase Dispersoids on the Hardening Behavior of Multi-phase Strengthened Aluminum Alloys: *Viktor Wessely*¹; Robin Schäublin¹; Stephan Gerstl¹; Stefan Pogatscher²; Peter Uggowitzer¹; Jörg Löffler¹; ¹Laboratory of Metal Physics and Technology, Department of Materials; ²Nonferrous Metallurgy, Montanuniversität Leoben

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Lead and Zinc Future Outlook: Plenary Session

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Monday AM | February 24, 2020
15A | San Diego Convention Ctr

Session Chair: Joseph Grogan, Gopher Resource

8:00 AM Introductory Comments

8:15 AM Plenary
EPD Distinguished Lecture: “Around the Lead and Zinc Metallurgical World in Eighty Days” A Virtual Tour of World Lead and Zinc Operations and Technologies: *Phillip Mackey*¹; ¹P.J. Mackey Technology Inc.

8:45 AM Plenary
Evolution of Global Secondary Lead Production: *Huw Roberts*¹; ¹CHR Metals Limited

9:15 AM Plenary
A Review of Zinc Smelting and Refining in North and South America: *Stephen James*¹; E. R. Hamilton²; ¹Nyrstar ; ²Limpect International

9:45 AM Question and Answer Period

10:15 AM Break

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — PbZn Process Fundamentals I

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Monday AM | February 24, 2020
14B | San Diego Convention Ctr

Session Chair: Shafiq Alam, University of Saskatchewan

10:45 AM
Refractory Challenges in Lead and Zinc Furnaces: *Dean Gregurek*¹; KatjaReinharter¹; JürgenSchmidl¹; AlfredSpanring¹; ¹RHIMagnesita

11:05 AM
Slag Reduction Kinetics of a Lead Slag from a Secondary Lead Smelter: *Stuart Nicol*¹; Joseph Grogan¹; Boyd Davis²; Trevor Lebel²; ¹Gopher Resource; ²Kingston Process Metallurgy

11:25 AM
Numerical Simulation of Gas-liquid Flow Mixing Effect in Bottom-blown Bath: Dongbo Li¹; Peng Li¹; *Xin Yao*¹; Cheng Liu¹; Zeshang Dong¹; ¹China ENFI Engineering Corporation

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Secondary Zinc I

Sponsored by: The Mining and Materials Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resource and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Monday AM | February 24, 2020
15A | San Diego Convention Ctr

Session Chair: Ulrich Kerney, Recylex

10:45 AM

A New Era in Smelting Sustainability - Intensification of the Outotec® Ausmelt Top Submerged Lance (TSL) Process for Zinc Production: Jacob Wood¹; *David Wilson*¹; Stephen Hughes¹; ¹Outotec Pty Ltd

11:05 AM

Production of SHG Zinc from 100% Recycled Materials: *John Pusateri*¹; Brandon Tirpak¹; J. R. de Wet¹; ¹American Zinc Recycling Corp.

11:25 AM

Recent Development of EAF Dust Treating at Shisaka Smelting Co., Ltd: *Satoru Takaya*¹; Naoki Kubota¹; Hiroshi Watanabe¹; Takao Kudo¹; ¹Shisaka Smelting Co., LTD.

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Zinc Electrowinning

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Monday AM | February 24, 2020
15B | San Diego Convention Ctr

Session Chair: Georges Houlachi, Hydro-Quebec

10:45 AM

To Polarize or Not to Polarize: Practical Advice on How to Control Zinc Electrodeposition: *Michael Moats*¹; Timothy Hymer²; ¹Missouri University of Science and Technology; ²The Doe Run Company

11:05 AM

Evaluation of Anodic Oxygen Evolution Activity and Durability of MnOx Electrodeposited Catalysts for Zinc Electrowinning: Sheida Arfania¹; *Edouard Asselin*¹; ¹The University of British Columbia

11:25 AM

Optimizing Additive Ratios in Alkaline Zincate Electrodeposition: Margaret Scott¹; *Michael Moats*¹; ¹Missouri University of Science and Technology

11:45 AM

Current Efficiency Increase in Zinc Electrodeposition at Cajamarquilla Refinery: Juliano Alves de Lima¹; Eder Lúcio Martins¹; Gian Gonzales¹; *Tone Filho*¹; ¹Nexa

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XIX — Interfacial Reaction of Electronic Materials

Sponsored by: TMS Functional Materials Division, TMS: Alloy Phases Committee

Program Organizers: Hiroshi Nishikawa, Osaka University; Shi-Kang Lin, National Cheng Kung University; Chao-Hong Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology, CAS; Ming-Tzer Lin, National Chung Hsing University; Dajian Li, Karlsruhe Institute of Technology; Yu Zhong, Worcester Polytechnic Institute; Yee-wen Yen, National Taiwan University of Science and Technology; Song-Mao Liang, Clausthal University of Technology; A.S.Md Abdul Haseeb, University of Malaya; Ligang Zhang, Central South University; Sehoon Yoo, KITECH

Monday AM | February 24, 2020
Marina Ballroom E | Marriott Marquis Hotel

Session Chairs: A S Md Abdul Haseeb, University of Malaya; Hiroshi Nishikawa, Osaka University

8:00 AM
Interfacial Reactions between Lead-free Solders and Electroless Co(B) Metallization: *Chao-hong Wang*¹; Yu-bin Guo¹; ¹National Chung Cheng University

8:20 AM
Interfacial Reaction in the Lead-free Solder/Cu-2.0Be (Alloy 25) Couples: *Yu-Chun Li*¹; Ching-Hsun Chang¹; Hsien-Ming Hsiao²; Satoshi Ikubo³; Yee-Wen Yen⁴; ¹Department of Materials Science and Engineering, National Taiwan University of Science and Technology; ²Institute of Nuclear Energy Research; ³Graduate School of Life Science and Systems Engineering, Kyushu Institute of Technology; ⁴National Taiwan University of Science and Technology

8:40 AM
Effects of Pd(P) Thickness on the Interfacial Reaction and Mechanical Properties of the Sn-3.5Ag/Au/Pd(P)/Ni(P) Microelectronic Joints: *Cheng-Yu Lee*¹; Wei-Ling Chou¹; Ming-Kai Lu¹; Tsai-Tung Kuo²; Cheng-En Ho¹; ¹Yuan Ze University; ²Taiwan Uyemura Limited Company

9:00 AM
Effects of Copper Electroplating Parameters on the Copper-based Solder Joint Reactions: *Chih Ming Chen*¹; Hsuan Lee¹; ¹National Chung Hsing University

9:20 AM

Real-time Observation of the Accelerated Growth of (Cu,Ni)₆Sn₅ on Cu-xNi Current Collectors: *Xin Tan*¹; Hideyuki Yasuda²; Stuart McDonald¹; Kazuhiro Nogita¹; ¹The University of Queensland; ²Kyoto University

9:40 AM Break

10:00 AM

In-situ Study of Electrochemical Migration of Tin in Presence of Contaminants: *A.S.Md Abdul Haseeb*¹; Ee Lynn Lee¹; Yi Sing Goh¹; Y. H. Wong¹; M. F. M. Sabri¹; B. Y. Low¹; ¹University of Malaya

10:20 AM

Study on Electromigration of Cu-Sn IMC Formation Due to Currents Stress and Temperature: Chao-Chi Huang¹; Po Hsun Wang¹; *Ming-Tzer Lin*¹; ¹National Chung Hsing University

10:40 AM

Learning from the Ni₃Sn₂ for Cu₆Sn₅: *Andreas Leineweber*¹; Christian Wieser²; Werner Hügel²; ¹TU Bergakademie Freiberg; ²Robert Bosch GmbH

11:00 AM

Zn Whisker Growth under High Temperature and Humidity Conditions: *Eul Yong Chae*¹; Keun Soo Kim²; ¹Hyundai Motor Company; ²Hoseo University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Modeling and Simulation

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

Program Organizers: Yufeng Zheng, University of Nevada, Reno; Rongpei Shi, Lawrence Livermore National Laboratory; Stoichko Antonov, University of Science and Technology Beijing; Yipeng Gao, Idaho National Laboratory; Rajarshi Banerjee, University of North Texas; Yongmei Jin, Michigan Technological University

Monday AM | February 24, 2020
33B | San Diego Convention Ctr

Session Chairs: Rongpei Shi, Lawrence Livermore National Laboratory; Tae Wook Heo, Lawrence Livermore National Laboratory

8:00 AM

Interaction between Phase Transformations and Dislocation Evolution: Phase Field Approaches: *Valery Levitas*¹; ¹Iowa State University

8:20 AM

Phase-field Modeling of Precipitates in Multicomponent Alloys with Various Coherency States: *Tianle Cheng*¹; *Youhai Wen*²; *Jeffrey Hawk*²; ¹U.S. Department of Energy, National Energy Technology Laboratory / LRST; ²U.S. Department of Energy, National Energy Technology Laboratory

8:40 AM

Phase-Field Simulation of Grain Growth in Porous Materials: *Miral Verma*¹; *Rajdip Mukherjee*¹; ¹Indian Institute of Technology Kanpur

9:00 AM

Phase-field Simulation of Microstructure Evolution during Solidification in Metal Additive Manufacturing: *Jiwon Park*¹; *Chang-Seok Oh*¹; ¹Korea Institute of Materials Science

9:20 AM

Multiphase Modeling of Artificial Aging in a Multicomponent Aluminum Alloy based on the Subcritical Growth Theory: *Daniel Larouche*¹; *Tohid Naseri*¹; *Rémi Martinez*²; *Francis Breton*³; *Denis Massinon*⁴; ¹Laval University; ²Linamar Corporation; ³Rio Tinto; ⁴Montupet Laigneville

9:40 AM Break

10:00 AM

Mesoscale Models for Investigating Solid-state Phase Transformations in Metal Hydrides for Hydrogen Storage: *Tae Wook Heo*¹; *Xiaowang Zhou*²; *ShinYoung Kang*¹; *Rongpei Shi*¹; *Brandon Wood*¹; ¹Lawrence Livermore National Laboratory; ²Sandia National Laboratories

10:20 AM

Atomistic modeling based on the Quasiparticle Approach of the Fcc-bcc Phase Transformations: *Helena Zapolsky*¹; *Mykola Lavrskyi*¹; *Renaud Patte*¹; *Olha Nakonechna*¹; *Gilles Demange*¹; *Frederic Danoix*¹; ¹Gpm, Umr 6634

10:40 AM

Lattice Boltzmann Phase-field Modelling of Solidification Process for the Ni-Nb Binary-alloy: *Xueqin Huang*¹; ¹Texas A&M University

11:00 AM
Beyond Modified Mean Field: A Case for a Stochastic Grain Growth Model in the Short Time Limit: Chandra Pande¹; *Alex Moser*¹; ¹Naval Research Laboratory

ADVANCED MATERIALS

Progress towards Understanding the Synthesis and Behavior of Metals Far from Equilibrium: A SMD Symposium Honoring Enrique Lavernia on the Occasion of His 60th Birthday — Overview and Nanostructured Metals I

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Composite Materials Committee

Program Organizers: Haiming Wen, Missouri University of Science and Technology; Suveen Mathaudhu, University of California, Riverside; Yuntian Zhu, North Carolina State University; Manoj Gupta, National University of Singapore; Kaka Ma, Colorado State University; Troy Topping, California State University, Sacramento; Yizhang Zhou, University of California, Irvine; Joshua Yee, Sandia National Laboratories; Dalong Zhang, Pacific Northwest National Laboratory; Yaojun Lin, Wuhan University of Technology; Fei Chen, Wuhan University of Technology

Monday AM | February 24, 2020
31B | San Diego Convention Ctr

Session Chair: Haiming Wen, Missouri University of Science and Technology

8:00 AM Introductory Comments

8:10 AM Invited
Enrique J. Lavernia – A Retrospective View of his Accomplishments and Contributions: *Diran Apelian*¹; ¹Worcester Polytechnic Institute

8:40 AM Invited
“10”: *Guillermo Aguilar*¹; ¹University of California, Riverside

9:10 AM
Microstructurally Stable Nanocrystalline Mg Alloys: *Suveen Mathaudhu*¹; ¹University of California, Riverside

9:30 AM
Hetero-deformation Induced (HDI) Hardening in Heterostructured Materials: *Yuntian Zhu*¹; *Xiaolei Wu*²; ¹North Carolina State University; ²Institute of Mechanics

9:50 AM Break

10:10 AM Invited
Processing Pathways to Stabilized Nanocrystalline Structures: *Christopher Schuh*¹; ¹Massachusetts Institute of Technology

10:40 AM Invited
Using High-pressure Torsion for the Processing of Ultra-strong Bulk Solids: *Megumi Kawasaki*¹; *Terence Langdon*²; ¹Oregon State University; ²University of Southampton

11:10 AM Invited
Recent Findings on Paradoxes of Severe Plastic Deformation: *Ruslan Valiev*¹; ¹UFA State Aviation Technical University

MATERIALS DESIGN

Purveyors of Processing Science and ICME: A SMD Symposium to Honor the Many Contributions of Taylan Altan, Wei Tsu Wu, Soo-Ik Oh, and Lee Semiatin — Superalloys

Sponsored by: TMS Structural Materials Division, TMS: Shaping and Forming Committee, TMS: Titanium Committee

Program Organizers: Adam Pilchak, US Air Force Research Laboratory; Ayman Salem, MRL Materials Resources LLC; Viola Acoff, University of Alabama; Nathan Levkulich, UES; Michael Glavicic, Rolls-Royce; Yufeng Zheng, University of Nevada, Reno; John Rotella, Purdue University

Monday AM | February 24, 2020
30E | San Diego Convention Ctr

Session Chairs: Tresa Pollock, UCSB; Paul Jablonski, National Energy Technology Laboratory

8:00 AM Introductory Comments: Adam L. Pilchak

8:10 AM Invited
Directional Recrystallization Processing: *Ian Baker*¹; ¹Dartmouth College

8:40 AM Invited

The Operation of a Research Scale ESR Furnace and its Impact on Trace Elements: *Paul Jablonski*¹; Martin Detrois¹; ¹National Energy Technology Laboratory

9:10 AM Invited

Microstructure Control of Nickel based Superalloy Forgings: a Focus onto Post-dynamic Evolutions: *Nathalie Bozzolo*¹; Marc Bernacki¹; ¹MINES ParisTech

9:40 AM Break

10:00 AM Invited

Annealing Twins in Wrought Polycrystalline Superalloys: Marie-Agathe Charpagne¹; Jean-Charles Stinville¹; Will Lenthe¹; McLean Echlin¹; *Tresa Pollock*¹; ¹University of California, Santa Barbara

10:30 AM Invited

Towards Rapid Throughout Measurement of Grain Boundary Properties: Jin Zhang¹; *Peter Voorhees*¹; Henning Poulsen²; ¹Northwestern University; ²Technical University of Denmark

11:00 AM Invited

Enhancing the Properties of Ni-based Superalloys via Mesoscale Engineering: *Sammy Tin*¹; ¹Illinois Institute of Technology

NUCLEAR MATERIALS

Radiation Effects in Metals and Ceramics — Advanced Techniques of Radiation Damage Characterization

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Djamel Kaoumi, North Carolina State University; Thak Sang Byun, Oak Ridge National Laboratory; Dane Morgan, University of Wisconsin-Madison; Maria Okuniewski, Purdue University; Mahmood Mamivand, Boise State University; Geoffrey Beausoleil, Idaho National Laboratory; Philip Edmondson, Oak Ridge National Laboratory; Khalid Hattar, Sandia National Laboratories; Aurelie Gentils, Université Paris-Saclay; Joel Ribis, Commissariat à l'Energie Atomique CEA

Monday AM | February 24, 2020

Theater A-7 | San Diego Convention Ctr

Session Chairs: Djamel Kaoumi, North Carolina State University; Aurelie Gentils, universite Paris Saclay

8:00 AM Invited
Applications of Advanced Electron Microscopy to Understand Irradiation Damage of Fusion and Fission Materials: *Chad Parish*¹; Daniel Morrall¹; Yutai Katoh¹; Arunodaya Bhattacharya¹; Andrew Lupini¹; Philip Edmondson¹; ¹Oak Ridge National Laboratory

8:30 AM
Depth-dependent Characterization and 3D Tomography of In-situ Ion Irradiated Microstructure: *Wei-Ying Chen*¹; Meimei Li¹; ¹Argonne National Laboratory

8:50 AM
Effect of Chemical Compositions on Precipitate Coherency Loss After In-situ Irradiations: *Ling Wang*¹; Wei-Ying Chen²; David Martin¹; Peter Baldo²; Meimei Li²; Brian Wirth¹; Steven Zinkle¹; ¹University of Tennessee; ²Argonne National Laboratory

9:10 AM
Probing Thermal Diffusivity Degradation and Point Defect Density in self-ion Implanted Tungsten with Transient Grating Spectroscopy: *Mohamed Abdallah Reza*¹; Hongbing Yu¹; Kenichiro Mizohata²; Felix Hofmann¹; ¹Department of Engineering Science, University of Oxford; ²Materials Physics, University of Helsinki

9:30 AM Break

9:50 AM Invited
Quantitative Analysis of Atomic Scale Defects in Irradiated Materials: *Farida Selim*¹; Sahil Agarwal¹; Aaron Kohnert²; Jacob Cooper³; Nan Li²; Yongqiang Wang²; Djamel Kaoumi³; Danny Edwards⁴; Laurent Capolungo⁴; Peter Hosmann⁵; Blas Uberuaga²; ¹Bowling Green State University; ²Los Alamos National Laboratory; ³North Carolina State University; ⁴Pacific Northwest National Laboratory; ⁵ University of Califorina, Berkeley

10:20 AM
Raman Signature of Point Defects in Boron Carbide: *Guido Roma*¹; Gaëlle Gutierrez¹; Kevin Gillet¹; Dominique Gosset¹; ¹CEA

10:40 AM
Noble Gas Bubble Superlattice in bcc Metals under Irradiation: *Cheng Sun*¹; D. Sprouster²; S. Gill²; M. Topsakal²; L. Ecker²; J. Gan¹; ¹Idaho National Laboratory; ²Brookhaven National Laboratory

11:00 AM
Study of Neutron Irradiation Damage of HT-UPS Steel Using Synchrotron X-ray Techniques: *Sri Tapaswi Nori*¹; Alejandro Figueroa¹; Jonova Thomas¹; Gyuchul Park¹; Walter Williams¹; Hemant Sharma²; Jun-Sang Park²; Peter Kenesei²; Jonathan Almer²;

Zhengrong Lee³; Mark Warren³; Jeff Terry³; Maria Okuniewski¹;
¹Purdue University; ²Argonne National Laboratory; ³Illinois Institute of Technology

11:20 AM

Ion Beam Synthesis of Nano-metallic Oxide Particles in High Purity FeCr: *Stephanie Jublot-Leclerc*¹; Martin Owusu-Mensah¹; Joël Ribis²; Vladimir Borodin³; Ryan Schoell⁴; Ce Zheng⁴; Djamel Kaoumi⁴; Aurélie Gentils¹; ¹CSNSM, Univ Paris-Sud and CNRS, Université Paris-Saclay; ²DEN, SRMA, CEA, Université Paris-Saclay; ³NRC “Kurchatov Institute”, and National Research Nuclear University MEPhI, Moscow; ⁴Department of Nuclear Materials, North Carolina State University

MATERIALS PROCESSING

Rare Metal Extraction & Processing — Lithium, Cobalt, Rare Earth Metals

Sponsored by: TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee

Program Organizers: Gisele Azimi, University of Toronto; Takanari Ouchi, The University of Tokyo; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Kerstin Forsberg, KTH Royal Institute of Technology; Alafara Baba, University of Ilorin

Monday AM | February 24, 2020
13 | San Diego Convention Ctr

Session Chairs: Gisele Azimi, University of Toronto; Kerstin Forsberg, KTH Royal Institute of Technology

8:00 AM Keynote

Development of a Physiochemical Model Combined with an Engineering Model for Predicting Solvent Extraction Performances within the Context of Lithium-ion Battery Recycling: *Alexandre Chagnes*¹; ¹GéoRessources, Université de Lorraine

8:30 AM

A Fundamental Investigation of Li₂CO₃ Crystallization from Li₂SO₄ System: *Hongting Liu*¹; Gisele Azimi¹; ¹University of Toronto

8:50 AM

Recycling of End-of-life Lithium-ion Battery of Electric Vehicles: *Ka Ho Chan*¹; Monu Malik¹; John Anawati¹; Gisele Azimi¹; ¹Department of Chemical Engineering and Applied Chemistry, University of

Toronto

9:10 AM

Optimal Hydrometallurgical Extraction Conditions for Lithium from a Nigerian Polylithionite Ore for Industrial Application: *Omoniyi Israel*¹; Agaku Peter¹; Baba Alafara²; ¹Ahmadu Bello University; ²University of Ilorin

9:30 AM Break

9:45 AM

Selective Lithium Recovery from Brines Using Hydrothermally Treated Titania Slag: *Raja Shekhar Marthi*¹; York Smith¹; ¹University of Utah

10:05 AM

Review on Removal of Impurities from REE Processing Solutions: *William Judge*¹; Gisele Azimi¹; ¹University of Toronto

10:25 AM

Molecular Recognition Approach to REE Extraction, Separation and Recycling: *Gulaim Seisenbaeva*¹; ¹SLU

10:45 AM

Production of Energy Saving Materials from the Waste Mixtures of REEs: *Martina Petranikova*¹; Moufida Mansouri¹; Cristian Tunsu¹; Burcak Ebin¹; ¹Chalmers University of Technology

11:05 AM

Selective Recovery of Scandium from Nickel Laterite Ore by Acid Roasting - Water Leaching: *John Anawati*¹; Runlin Yuan¹; Jihye Kim¹; Gisele Azimi¹; ¹University of Toronto

ELECTRONIC MATERIALS

Recent Advances in Functional Materials and 2D/3D Processing for Sensors and Electronic Applications — Printed Electronics Advances

Sponsored by: TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Pooran Joshi, Oak Ridge National Laboratory; Ravindra Nuggehalli, New Jersey Institute of Technology; Anming Hu, University of Tennessee; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Yong Lin Kong, University of Utah; Mariappan Paranthaman, Oak Ridge National Laboratory

Monday AM | February 24, 2020
Carlsbad | Marriott Marquis Hotel

Session Chairs: Pooran Joshi, Oak Ridge National Laboratory; Ravindra Nuggehalli, New Jersey Institute of Technology

8:00 AM Invited

AerosolJet 3D Printed Sensors: *Rahul Panat*¹; Md. Taibur Rahman¹; Matthew Schrandt²; Michael Renn²; Chintalapalle Ramana³; ¹Carnegie Mellon University; ²Optomec Inc.; ³University of Texas at El Paso

8:25 AM

Direct Ink Writing of Soft Robotics with Embedded Sensors: *Domenic Cipollone*¹; Derek Doyle²; Konstantinos Sierros¹; ¹West Virginia University; ²Air Force Research Laboratory

8:45 AM Invited

Multiscale Additive Manufacturing of Biomedical Electronics: *Yong Lin Kong*¹; ¹University of Utah

9:10 AM Invited

Evaluating Electro-mechanical Reliability of Polymer Supported Films Using In-situ Methods: *Megan Cordill*¹; ¹Erich Schmid Institute

9:35 AM Break

9:55 AM Invited

Towards the Next Generation of 3D Printable Energy Storage Devices: *Konstantinos Sierros*¹; ¹West Virginia University

10:20 AM Invited

Multi-material Additive Manufacturing of Ionomeric Polymer Membranes with 3D Topologies: *Kwang Kim*¹; Zakai Olsen¹; ¹University of Nevada, Las Vegas

10:45 AM

Electric Field Assisted Ultra-Fast R2R Printing Technology for High-Performance Skin-like Smart Sensors: *Ying Zhong*¹; Long Wang²; Rui Kou²; ¹University of South Florida; ²University of California at San Diego

11:05 AM Invited

Understanding 3D-printing Processes through Operando X-ray Photon Correlation Spectroscopy: *Maria Torres Arango*¹; Yugang Zhang¹; Gregory Doerk²; Ruipeng Li¹; Chonghang Zhao³; Yu-chen Karen Chen-Wiegarth⁴; Andrei Fluerașu¹; Lutz Wiegart¹; ¹National Synchrotron Light Source II, Brookhaven National Laboratory; ²Center for Functional Nanomaterials, Brookhaven National Laboratory; ³Stony Brook University; ⁴National Synchrotron Light Source II, Brookhaven National Laboratory. Stony Brook University.

BIOMATERIALS

Recent Developments in Biological, Structural and Functional Thin Films and Coatings — Lubricant-free Forming Processes

Sponsored by: TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Adele Carrado, IPCMS - CNRS; Heinz Palkowski, Clausthal University of Technology; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Ramana Chintalapalle, University of Texas at El Paso; Nuggehalli Ravindra, New Jersey Institute of Technology; Nancy Michael, University of Texas at Arlington; Vikas Tomar, Purdue University

Monday AM | February 24, 2020
Oceanside | Marriott Marquis Hotel

Session Chair: Heinz Palkowski, TU Clausthal

8:00 AM Keynote

Coated and Structured Tool Surfaces for Lubricant Free Forming Processes: *Thomas Seefeldt*¹; Adrian Ditsche¹; ¹BIAS - Bremer Institut für angewandte Strahltechnik GmbH

8:40 AM Invited

Deposition of Nanoscopic Smooth DLC tool Coatings for Dry Forming of Aluminum Sheets: *Tim Abraham*¹; Ingmar Bialuch¹; Günter Bräuer¹; Felix Flegler²; Peter Groche²; ¹Fraunhofer-Institute for Surface Engineering and Thin Films; ²Darmstadt University of Technology, Institute for Production Engineering and Forming Machines

9:10 AM Invited
Impact of Peak Material Volume of Polycrystalline CVD-diamond Coatings on Dry Friction against Aluminum: Markus Prieske¹; *Annika Bohlen*¹; Frank Vollertsen¹; ¹BIAS - Bremer Institut für angewandte Strahltechnik GmbH

9:40 AM Break

10:00 AM Invited
Dry Deep Drawing of Aluminium and the Role of Sheet Metal Roughness: *Felix Flegler*¹; Peter Groche¹; Tim Abraham²; Günter Bräuer²; ¹TU Darmstadt Institute for Production Engineering and Forming Machines; ²Fraunhofer Institute of Surface Engineering and Thin Films IST

10:30 AM Invited
Advances in Dry Metal Forming using Volatile Lubricants Injected through Laser Drilled Microholes: Gerd Reichardt¹; *Manuel Henn*²; Mathias Liewald¹; Rudolf Weber²; Thomas Graf²; ¹Institute for Metal Forming Technology; ²Institut fuer Strahlwerkzeuge

11:00 AM Invited
A Thermoelectrically Based approach to Reduce Adhesive Wear during Blanking: *Markus Welm*¹; Philipp Tröber²; Hannes Alois Weiss¹; Peter Demmel³; Roland Golle¹; Wolfram Volk¹; ¹Technical University of Munich, Chair of Metal Forming and Casting; ²Technical University of Munich; ³MAN Truck and Bus AG

11:30 AM Keynote
Selective Oxidation of Tool Surfaces – An Approach to Reduce Friction and Wear in Dry Metal Forming: *Hans Maier*¹; Bernd-Arno Behrens¹; ¹Leibniz Universität Hannover

ADVANCED MATERIALS

Refractory Metals 2020 — Nb Processing and Applications; Mechanical Behaviors of Refractory Metals

Sponsored by: TMS Structural Materials Division, TMS: Refractory Metals Committee

Program Organizers: Eric Taleff, University of Texas at Austin; Gary Rozak, H.C. Starck Inc; Todd Leonhardt, Rhenium Alloys Inc.

Monday AM | February 24, 2020
Cardiff | Marriott Marquis Hotel

Session Chairs: Eric Taleff, University of Texas at Austin; Gary Rozak, H.C. Starck Inc.

8:00 AM

Effect of Dislocations and Grain Boundaries on Magnetic Flux Trapping in High-purity Niobium used for Superconducting Radio Frequency Cavities: Mingmin Wang¹; Shreyas Balachandran²; Santosh Chetri²; Anatolii Polyanskii²; Peter Lee²; *Thomas Bieler*¹; ¹Michigan State University; ²National High Magnetic Field Laboratory

8:20 AM

The Influence of Dislocation Density on Thermal Conductivity in Pure Niobium from 2-9K: Peng Xu¹; *Thomas Bieler*¹; Neil Wright¹; ¹Michigan State University

8:40 AM

Effect of Strain Rate on the Anisotropic Tensile Mechanical Properties of High Purity Niobium Single Crystals: *Jean-Francois Croteau*¹; Eureka Pai Kulyadi²; Chaitanya Kale³; Di Kang²; Derek Siu⁴; Thomas Bieler²; Philip Eisenlohr²; Kiran Solanki³; Elisa Cantergiani¹; Nicolas Jacques⁵; Daniel Balint⁴; Paul Hooper⁴; Said Atieh⁶; ¹I-Cube Research; ²Michigan State University; ³Arizona State University; ⁴Imperial College; ⁵ENSTA Bretagne; ⁶CERN

9:00 AM

Static and Dynamic Grain Growth in Niobium at 1200 to 1500: *Emily Brady*¹; Eric Taleff¹; ¹University of Texas at Austin

9:20 AM Break

9:40 AM

Dynamic Grain Growth in Refractory Metals: *Eric Taleff*¹; ¹University of Texas at Austin

10:00 AM

Molybdenum Foil Tensile Testing: *Brandon Kenny*¹; Gary Rozak²; ¹Miami University; ²H.C. Starck Inc

10:20 AM

Thermally Activated Deformation Processes in W-Re Alloys: *Verena Maier-Kiener*¹; Johann Kappacher¹; Daniel Kiener¹; Helmut Clemens¹; ¹Montanuniversität Leoben

10:40 AM

Mechanism of Hardening and Damage Initiation in Oxygen Embrittlement of Body-Centred-Cubic Niobium: *Weizhong Han*¹; Ping-Jiong Yang¹; ¹Xi'an Jiaotong University

ELECTRONIC MATERIALS

Solar Cell Silicon — Synthesis, Production, and Refining

Sponsored by: TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee, TMS: Materials Characterization Committee

Program Organizers: Shadia Ikhmayies, Al Isra University; Neale Neelameggham, IND LLC

Monday AM | February 24, 2020
Miramar | Marriott Marquis Hotel

Session Chair: Shadia Ikhmayies, Isra University

8:00 AM Introductory Comments

8:05 AM
Molten Salt Electrolysis Production of Solar Silicon from Natural Quartzite: *Aditya Moudgal*¹; *Sarat Buasai*¹; *Alexander McMahon*¹; *Yi Jie Wu*¹; *Adam Powell*¹; *Uday Pal*²; *Yu Zhong*¹; ¹Worcester Polytechnic Institute; ²Boston University

8:25 AM
Phase Diagrams of the Si-P Binary System: *Shadia Ikhmayies*¹; ¹Al Isra University

8:45 AM
Thermo-calc Determination of the Phase Diagram of Si-B Binary System: *Shadia Ikhmayies*¹; ¹Al Isra University

9:05 AM
Combustion Synthesis of Nanostructured Silicon: *Sergio Cordova*¹; *Evgeny Shafirovich*¹; ¹University of Texas at El Paso

9:25 AM
Zr Addition for Enhanced B Removal from Si by Si-Cu Solvent Refining: *Yongsheng Ren*¹; *Kazuki Morita*¹; ¹The University of Tokyo

PHYSICAL METALLURGY

Solid State Diffusion Bonding of Metals and Alloys — Solid State Diffusion Bonding of Metals and Alloys I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Mohamed Elbakhshwan, University of Wisconsin Madison; Mark Anderson, University of Wisconsin Madison; Todd Allen, University of Michigan ; Tasnim Hassan, North Carolina State University

**Monday AM | February 24, 2020
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Session Chairs: Mohamed Elbakhshwan, UW-Madison; Tasnim Hassan, North Carolina State University; Mark Anderson, University of Wisconsin Madison

8:00 AM Introductory Comments

8:10 AM Invited
Effect of Diffusion Bonding Parameters on Joint Efficiency of Fe- and Ni-base Alloys: Sung Hwan Kim¹; Ji-Hwan Cha¹; *Changheui Jang*¹; ¹Korea Advanced Institute of Science & Technology

8:40 AM
Diffusion Bonding of AgC-Cu Bi-Layered Electrical Contacts: *Daudi Waryoba*¹; Linsea Paradis¹; ¹Pennsylvania State University

9:00 AM
Diffusion Bonding of Ti-6Al-4V Alloy to Interstitial Free (IF) Steel Using Copper and Nickel Interlayers: *Manil Raj*¹; M.J.N.V. Prasad¹; K Narasimhan¹; ¹IIT Bombay. MEMS Dept.

9:20 AM
Bulk-state Reaction for Synthesizing Bulk Hybrid Alloys through High-pressure Torsion: *Megumi Kawasaki*¹; Jae-Kyung Han¹; Terence Langdon²; ¹Oregon State University; ²University of Southampton

9:40 AM Break

10:10 AM
Mechanical Characterization of Diffusion Bonded Alloy 800H: *Heramb Mahajan*¹; Tasnim Hassan¹; ¹North Carolina State University

10:30 AM
Interfacial Recrystallization and Element Diffusion during the Hot Compression-bonding of Ti-6321 to TC4: Bijun Xie¹; *Mingyue Sun*¹; Bin Xu¹; Dianzhong Li¹; ¹Institute of Metal Research, Chinese Academy of Sciences

PHYSICAL METALLURGY

Thermal Transport in Crystalline and Non-crystalline Solids: Theory and Experiments — Fundamentals of Phonon Mediated Thermal Transport

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Marat Khafizov, Ohio State University; Michael Manley, Oak Ridge National Laboratory; Krzysztof Gofryk, Idaho National Laboratory; Aleksandr Chernatynskiy, Missouri Science and Technology University

**Monday AM | February 24, 2020
18 | San Diego Convention Ctr**

Session Chairs: Marat Khafizov, Ohio State University; Michael Manley, Oak Ridge National Laboratory

8:00 AM Invited
Phonon Dispersion and Linewidth in ThO₂ Measured by Neutron Scattering: *Matthew Bryan*¹; *Lyuwen Fu*²; *Matthew Mann*³; *Chris Marianetti*²; *Michael Manley*¹; ¹Oak Ridge National Laboratory; ²Columbia University; ³Air Force Research Laboratory

8:30 AM Invited
Thermal Transport in ThO₂: *Chris Marianetti*¹; ¹Columbia University

9:00 AM
Study of Thermal Transport Properties of Thorium Dioxide Single Crystals: *Narayan Poudel*¹; *Xiaxin Ding*¹; *Matthew Mann*²; *Krzysztof Gofryk*¹; ¹Idaho National Laboratory; ²Air Force Research Laboratory

9:20 AM
Lattice Dynamics and Thermodynamics of Strongly Anharmonic Solids via Bayesian Learning: *Taishan Zhu*¹; *Jeffrey Grossman*¹; ¹Massachusetts Institute of Technology

9:40 AM Break

10:00 AM Invited
Multi Scale Modeling of the Thermal Conductivity: Combining First Principle Calculations with Monte Carlo: *Laurent Chaput*¹; *David Lacroix*¹; ¹University De Lorraine

10:30 AM Invited
Advancing Insights into Phonon Thermal Transport with Theory/ experiment Interactions: *Lucas Lindsay*¹; ¹Oak Ridge National Laboratory

11:00 AM Invited
Lattice Thermal Conductivity of Quartz at High Pressure and Temperature from the Boltzmann Transport Equation: Xue Xiong¹; Eugene Ragasa²; Aleksandr Chernatynskiy³; DaWei Tang⁴; *Simon Phillpot*²; ¹Chinese Academy of Sciences; ²University of Florida; ³Missouri University of Science and Technology; ⁴Dalian University of Technology

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XI) — Microstructure & Property

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Caizhi Zhou, Missouri University of Science and Technology; Megumi Kawasaki, Oregon State University; Enrique Lavernia, University of California, Irvine; Terry Lowe, Colorado School of Mines; Suveen Mathaudhu, University of California, Riverside; Ruslan Valiev, UFA State Aviation Technical University; Yuntian Zhu, North Carolina State University

Monday AM | February 24, 2020
Marina Ballroom D | Marriott Marquis Hotel

Session Chairs: Qin Yu, University of California, Berkeley; Paulo Branicio, University of Southern California; Xinghang Zhang, Purdue University; Terry Lowe, Colorado School of Mines

8:00 AM Invited
Mechanical Behavior of Structurally Gradient Alloys: Jie Ding¹; Qiang Li¹; Zhongxia Shang¹; *Xinghang Zhang*¹; ¹Purdue University

8:20 AM Invited
Deformation and Failure of Gradient Metallic Nanoglasses: *Paulo Branicio*¹; ¹University of Southern California

8:40 AM
Properties of Ultrafine Grain Titanium Fabricated by Multimode Deformation Processing: *Benjamin Ewing*¹; Benjamin Davis¹; Lane Bailey¹; Jeffrey Slater¹; Mathew Hayne²; Skyler Davis²; Melina Endsley²; Terry Lowe²; Tamás Ungár³; ¹Fort Wayne Metals;

²Colorado School of Mines; ³Eötvös University

9:00 AM

Deformation Compatibility between Nanotwinned and Recrystallized Grains Enhances Resistance to Interface Cracking in Cyclic Loaded Stainless Steel: *Qian Li*¹; Fen Kai Yan¹; Nairong Tao¹; Ke Lu¹; ¹Institute of Metal Research, Chinese Academy of Sciences

9:20 AM Break

9:40 AM

Deformation Induced Microstructures in Ultrafine Grain Magnesium Fabricated by ECAP-C: Casey Davis¹; *Adam Griebel*²; Jeremy Schaffer²; Terry Lowe¹; Tamás Ungár³; ¹Colorado School of Mines; ²Fort Wayne Metals; ³Eötvös University

10:00 AM Invited

On the Fracture Toughness of Gradient Pure Nickel: *Qin Yu*¹; Ruqing Cao²; Jie Pan²; Yan Lin²; Andrew Sweet¹; Yi Li²; Robert Ritchie¹; ¹Lawrence Berkeley National Laboratory; ²Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences

10:20 AM Invited

Fracture Strain and Forging Limit Analysis of Polycrystalline Alloys at Elevated Temperatures: *Yanfei Gao*¹; Wei Zhang¹; ¹University of Tennessee - Knoxville

10:40 AM

Heterogeneities in Plastic Deformation Mechanisms in UFG Aluminum Studied by In-situ TEM Straining and Bulk Deformation: *Witold Chrominski*¹; Malgorzata Lewandowska¹; ¹Warsaw University of Technology

11:00 AM

Fatigue Properties and Cyclic Behavior of Tensile Pre-deformed Nanotwinned Cu: *Qingsong Pan*¹; Haofei Zhou²; Huajian Gao³; Lei Lu¹; ¹Institute of Metal Research, Chinese Academy of Sciences; ²Zhejiang University; ³Brown University

MECHANICS & STRUCTURAL RELIABILITY

Understanding and Predicting Dynamic Behavior of Materials – Spall Fracture in Metals -- Modeling and Experiments

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Marc Meyers, University of California San Diego; George Gray, Los Alamos National Laboratory

Monday AM | February 24, 2020
5A | San Diego Convention Ctr

Session Chair: Saryu Fensin, Los Alamos National Laboratory

8:00 AM Introductory Comments

8:05 AM Invited
Influence of Grain Boundary Crystallography on Dynamic Failure (Spall): *Mukul Kumar*¹; Roger Minich¹; ¹Lawrence Livermore National Laboratory

8:45 AM
Experimental Measurements and Modeling of Lattice Rotation around Inter and Transgranular Spall Voids in Shocked Copper Bicrystals: Elizabeth Fortin¹; Benjamin Shaffer¹; Saul Opie¹; *Pedro Peralta*¹; ¹Arizona State University

9:05 AM
Understanding and Predicting Damage and Failure at Grain Boundaries in BCC Ta: *Jie Chen*¹; Eric Hahn²; Avinash Dongare¹; Saryu Fensin²; ¹University of Connecticut; ²Los Alamos National Laboratory

9:25 AM
Application of X-ray Phase Contrast Imaging to Spall in Magnesium Alloy AZ31B: *David Chapman*¹; Lukasz Farbaniec¹; John Jonsson¹; Michael Rutherford¹; Liam Smith¹; Emilio Escauriza¹; Daniel Eakins¹; ¹University of Oxford

9:45 AM Break

10:05 AM Invited
A Grain Level Investigation of Ductile Failure using High-energy X-ray Characterization: Diwakar Naragani¹; Jun-Sang Park²; Peter Kenesei²; *Michael Sangid*¹; ¹Purdue University; ²Argonne National Laboratory

10:45 AM

Role of Shock Loading Orientation and Shock Velocity on the Shock Compression and Spall Behavior of Iron at Atomic Scales:

*Ke Ma*¹; Avinash Dongare¹; ¹University of Connecticut

11:05 AM

Shock Recompression of Existing Spall Damage in Copper:

*David Jones*¹; Saryu Fensin¹; Robert Hixson¹; ¹Los Alamos National Laboratory

ADVANCED MATERIALS

Use of Large Scale Facilities to Understand the Physical Metallurgy of Fe-based Alloys — Session I

Sponsored by:

Program Organizers: Sebastien Allain, Institut Jean Lamour; Alexis Deschamps, Grenoble Institute of Technology; MingXin Huang, University of Hong Kong; Amy Clarke, Colorado School of Mines; C. Taran, Massachusetts Institute of Technology

Monday AM | February 24, 2020

Mission Hills | Marriott Marquis Hotel

Session Chair: Sébastien Allain, Institut Jean Lamour

10:00 AM

Precipitation Kinetics and Chemistry Evolution of Oxide Dispersion Strengthened Steels throughout their Consolidation Process Evaluated by In-situ Anomalous Small-angle X-ray Scattering:

*Gabriel Spartacus*¹; Joël Malaplate¹; Frédéric De Geuser²; Denis Sornin¹; Alexis Deschamps²; ¹CEA Saclay; ²SIMaP, Grenoble Alpes University

10:20 AM

Nucleation and Evolution of Sigma Phase and Nitrides during Heat Treatment and Welding of Duplex Stainless Steels:

*Shirin Nouhi*¹; Niklas Pettersson; Lars Höglund¹; Amer Malik¹; Jan Jonsson¹; Staffan Hertzman¹; Sten Wessman¹; Andreas Stark¹; David Lindell¹; ¹Swerim AB

10:40 AM Invited

HEXRD and SAXS to Unveil the Dynamics of Phase Transformation in Steels: From Carbide-free Bainite To Mapping of Compositionally Graded Samples:

Imad-Eddine Benrabah¹; Z. Tournoud²; Frédéric Bonnet³; Frederic De Geuser¹; *Alexis Deschamps*¹; D. Huin³; P. Donnadiou¹; Hugo Van Landeghem¹; ¹Université Grenoble Alpes,

CNRS, Grenoble INP, SIMaP; ²Université Grenoble Alpes, CNRS, Grenoble INP, SIMaP; ArcelorMittal; ³ArcelorMittal

MATERIALS PROCESSING

11th International Symposium on High Temperature Metallurgical Processing — Energy Efficient Clean Metallurgical Technologies

Sponsored by: TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee

Program Organizers: Zhiwei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Tao Jiang, Central South University; Jesse White, Elkem Carbon AS; Morsi Mahmoud, King Fahd University of Petroleum And Mineral

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Session Chairs: Zhiwei Peng, Central South University; Dean Gregurek, RHI Magnesita

2:30 PM Introductory Comments

2:45 PM
The Application of an Effective Equilibrium Reaction Zone Model Based on CALPHAD Thermodynamics to Steel Making: *Paul Mason*¹; Nicholas Grundy²; Ralf Rettig²; Lina Kjellqvist²; Johan Jeppsson²; Ake Jansson²; Johan Bratberg²; ¹Thermo-Calc Software Inc.; ²Thermo-Calc Software AB

3:05 PM
Mechanical Properties of a Laser Deposited Spherical Ti4822 Alloy: *Monnamme Tlotleng*¹; Sisa Pityana¹; Samuel Skhosane¹; ¹Council for Science & Industrial Research

3:25 PM
Technology Advances in Pyrometallurgy with Focus on Recent Development of Sustainable Processes – Experiences of Swerim Pilot Plant Activities: *Guozhu Ye*¹; ¹Swerim AB

3:45 PM Break

4:00 PM

Effects of Electrolytic Parameters on the Deposition of Boron at the Cathode during the Molten Salt Electrolysis of Silicon: *Tao Wang*¹; Tian Zhongliang¹; Shu Yang¹; Yanqing Lai¹; ¹Central South University

4:20 PM

Study on the Relationship Between Process Reconstruction and Energy Saving of Iron and Steel Manufacturing Process in China: *Shuangping Wu*¹; Anjun Xu¹; Qi Zhang²; Ji Li¹; ¹University of Science and Technology Beijing; ²Northeastern University,China

4:40 PM

Effect of Magnetic Field on CaO-SiO2-CaF2 Mould Flux:New Insight from Molecular Dynamic Simulation: *Qi Jiang*¹; Weitong Du¹; Yu Wang¹; ¹Chongqing University

5:00 PM

Investigation of Crack Initiation and Propagation in Super Duplex Stainless Steel During Hot Working: *Wei Shen*¹; Fuming Wang¹; Zhanbing Yang¹; Changrong Li¹; Ping Lin²; Xiaojie Zhu²; ¹University of Science and Technology Beijing; ²TSINGSHAN

ADDITIVE TECHNOLOGIES

Additive Manufacturing Keynote Session

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizer: Ryan Dehoff, Oak Ridge National Laboratory

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6A | San Diego Convention Ctr

2:30 PM Introductory Comments

2:35 PM Keynote

Roles of Thermal Cycles in The Microstructure and Property Controls in Low-alloy High Strength Steels: *Tadashi Furuhashi*¹; ¹Tohoku University

3:05 PM Keynote

Microstructural Control for Additive Manufacturing—An Advanced Microscopy Approach: *Simon Ringer*¹; ¹University of Sydney

3:35 PM Keynote
Texture and Anisotropy in Metals Additive Manufacturing: *Anthony Rollett*¹; Joseph Pauza¹; ¹Carnegie Mellon University

4:05 PM Break

4:25 PM Keynote
TMS Young Innovator in the Materials Science of Additive Manufacturing Award: Innovation in Additive Manufacturing: A Perspective on an Early Career in Metal Alloy Development: *Douglas Hofmann*¹; ¹NASA Jet Propulsion Laboratory/California Institute of Technology

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Deformation Twinning

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Shaping and Forming Committee, TMS: Materials Characterization Committee

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Marko Knezevic, University of New Hampshire; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; M Arul Kumar, Los Alamos National Laboratory

Monday PM | February 24, 2020
Theater A-2 | San Diego Convention Ctr

Session Chairs: Shujuan Wang, Los Alamos National Laboratory; Philip Eisenlohr, Michigan State University

2:30 PM Invited
More than Crystal Plasticity: Multiphysics in DAMASK: *Philip Eisenlohr*¹; Aritra Chakraborty²; Pratheek Shanthraj³; Martin Diehl⁴; Darren Pagan⁵; Thomas Bieler¹; ¹Michigan State University; ²Argonne National Laboratory; ³University of Manchester; ⁴Max Planck Institut für Eisenforschung GmbH; ⁵Cornell University

3:00 PM
Microscratch-induced Deformation Twins in Mg Single Crystals: *Kehang Yu*¹; Xin Wang¹; Olivia Donaldson¹; Subhash Mahajan²; Irene Beyerlein³; Timothy Rupert¹; Julie Schoenung¹; Enrique Lavernia¹;

¹University of California, Irvine; ²University of California, Davis;
³University of California, Santa Barbara

3:20 PM

Study of the Interplay of Basal Slip Activities and Double Twinning Mechanism in Magnesium Using SEM In-situ Tensile Tests Concurrently with HR-EBSD: *Nicolo Maria della Ventura*¹; Xavier Maeder¹; Szilvia Kalácska¹; Thomas Edwards¹; Daniele Casari¹; Johann Jakob Schwiedrzik¹; Johann Michler¹; ¹Empa

3:40 PM

In-situ Mapping of Twin Related Local Stress Fields in HCP Titanium: *M Arul Kumar*¹; Laurent Capolungo¹; Rodney McCabe¹; Wenjun Liu²; Jon Tischler²; Carlos Tome¹; ¹Los Alamos National Laboratory; ²Argonne National Laboratory

4:00 PM Break

4:20 PM

Three-dimensional Faceted Boundaries of Different Twin Modes in hcp Metals: *Shujuan Wang*¹; Khanh Dang¹; Rodney McCabe¹; Laurent Capolungo¹; Carlos Tome¹; ¹Los Alamos National Laboratory

4:40 PM

{10-12} Twin Boundary Segregation of Y in Mg Alloys: *Xin Wang*¹; Yang Hu¹; Kehang Yu¹; Subhash Mahajan²; Irene Beyerlein³; Enrique Lavernia¹; Timothy Rupert¹; Julie Schoenung¹; ¹University of California Irvine; ²University of California, Davis; ³University of California, Santa Barbara

5:00 PM

Micron-scale Characterization of Twinning and Dislocation Slip in Magnesium Single-crystals by Advanced In-situ Techniques: *Kristián Máthis*¹; Dávid Ugi²; Petr Hrcuba¹; Michal Knapek¹; František Chmelík¹; Péter Ispánovity²; István Groma²; ¹Charles University; ²Eötvös Loránd University

5:20 PM

Antitwinning in Nanoscale Tungsten: *Jiangwei Wang*¹; Ting Zhu²; ¹Zhejiang University; ²Georgia Institute of Technology

5:40 PM

Quantifying Elastic Strain Near Twin Interface in Magnesium with Nanometric Resolution: *Jinsong Chen*¹; Yue Liu¹; Jian Wang²; Carlos Tomé³; ¹Shanghai Jiao Tong University; ²University of Nebraska-Lincoln; ³Los Alamos National Laboratory

Advanced Magnetic Materials for Energy and Power Conversion Applications — Developments in Magnetic Materials for Sensors and Data Storage

Sponsored by: TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Daniel Salazar, BCMaterials; Alex Leary, Nasa Glenn Research Center; Markus Chmielus, University of Pittsburgh; Ryan Ott, Ames Laboratory/Cmi; Arcady Zhukov, UPV/EHU, and Ikerbasque, Basque Foundation for Science

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Del Mar | Marriott Marquis Hotel

Session Chairs: Paul Ohodnicki, University of Pittsburgh; Ivan Skorvanek, Institute of Experimental Physics SAS

2:30 PM Invited
From Shapeable Magnetoelectronics to Soft Robotics with Embedded Magnetic Cognition: Denys Makarov¹; ¹Helmholtz-Zentrum Dresden-Rossendorf e.V.

2:55 PM Invited
Soft Magnetic Amorphous and Nanocrystalline Bilayer Ribbons for GMI Sensors: Ivan Skorvanek¹; Frantisek Andrejka¹; Branislav Kunca¹; Jozef Marcin¹; Peter Svec²; ¹Institute of Experimental Physics Sas; ²Institute of Physics SAS

3:20 PM
Ferromagnetic Transition Metal Selenides for Spintronics: Pierre Poudeu¹; ¹University of Michigan

3:40 PM
Engineering of Magnetic Properties of Co-rich Microwires by Post-processing: Lorena Gonzalez-Legarreta¹; Valentina Zhukova¹; Paula Corte-Leon²; Mihail Ipatov¹; Juan Blanco³; Arcady Zhukov⁴; ¹Dept. Phys.Mater, Univ. Basque Country; ²University. Basque Country; ³Dept. Appl. Phys., Univ. Basque Country; ⁴UPV/EHU, and Ikerbasque, Basque Foundation for Science

4:00 PM Break

4:20 PM Invited
High-performance Amorphous Wire Magneto-impedance Sensor for Biomagnetic Field Detection: Tsuyoshi Uchiyama¹; Jiaju Ma¹; ¹Nagoya University

4:45 PM Invited

Electrochemical Polishing of Thin Metallic Glass Ribbons:

*Ferenc Zamborszky*¹; Eva Fazakas²; Elek Csizmadia¹; Mark Kovacs¹;

¹Magnetec-Ungarn Kft.; ²Budapest University of Technology and Economics

5:10 PM Invited

The Invention of On-ASIC Type GSR Sensor Excited by GHz

Pulse Current: *Yoshinobu Honkura*¹; S. Honkura²; ¹Magnedesign Corporation; ²Nanocoil Incorporation

5:35 PM

A Study of Processing High-grade Magnetite Concentrates by Combination of Magnetic Separation and Reverse Flotation Separation to Prepare Raw Materials for Ferrite Magnet:

Bin Xu¹; *Yujuan Zhou*¹; Yongpeng Ma¹; Jintian Wu¹; Tao Jiang¹; ¹Central South University

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VI — Sustainability Materials

Sponsored by: TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

Program Organizers: Jung Pyung Choi, Pacific Northwest National Laboratory; Amit Pandey, MicroTesting Solutions; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh

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16B | San Diego Convention Ctr

Session Chairs: Surojit Gupta, University of North Dakota; George Nelson, University of Alabama in Huntsville

2:30 PM

Enhanced Photo Response by Oxygen Retreatment at Hetero-interface of MoS₂/Si Solar Cells:

*Sangram Pradhan*¹; Messaoud Bahoura¹; ¹Norfolk State University

2:50 PM Invited

Highly Stable and Efficient Perovskite Solar Cells with Functional Nanocomposites and Interface Engineering:

*Yoon-Bong Hahn*¹; ¹Chonbuk National University

3:10 PM

Life Cycle Analysis of Battery Materials: a Circular Economy Perspective: *Qiang Dai*¹; Olumide Winjobi¹; ¹Argonne National Laboratory

3:30 PM Invited

On the Design and Development of Lignin based Sustainable Materials: *Surojit Gupta*¹; ¹University of North Dakota

3:50 PM Break

4:10 PM Invited

Solar Water Oxidation at GaAs Absorbers Protected by Electrodeposited Alloys: *Giovanni Zangari*¹; Yin Xu¹; ¹University of Virginia

4:30 PM

MWCNTs/Al₂S₃ Heterostructure Decorated on NiCo Foam as a Highly Performance Cathode Material for Supercapacitors: Mutawara Mahmood Baig¹; *Muhammad Taqi Mehran*¹; Iftikhar Hussain Gul¹; ¹National University of Sciences and Technology, Islamabad

ELECTRONIC MATERIALS

Advanced Microelectronic Packaging, Emerging Interconnection Technology and Pb-free Solder — Advanced Microelectronic Packaging Materials

Sponsored by: TMS Functional Materials Division, TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Christopher Gourlay, Imperial College London; Kazuhiro Nogita, University of Queensland; David Yan, San Jose State University; Mike Wolverton, Raytheon; Babak Arfaei, Ford Motor Company; Andre Delhaise, Celestica; Mehran Maalekian, Mat-Tech; Mohd Arif Salleh, Universiti Malaysia Perlis

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Palomar | Marriott Marquis Hotel

Session Chairs: Albert Wu, National Central University, Taiwan; Fan-Yi OuYang, National TsingHua University, Taiwan

2:30 PM Invited

Pressureless Silver Sintering of SiC MOSFET Power Module for Vehicle: *Won Sik Hong*¹; Mi-Song Kim¹; Chulmin Oh¹; ¹Korea Electronics Technology Institute

2:50 PM

Si and Ag Particles Sintering Technology For Die Attach: *Minoru Ueshima*¹; Motoharu Haga¹; Tomoaki Mototsuji²; Yusuke Isono²; ¹Daicel Corp.; ²Osaka University

3:10 PM

Bonding and High-temperature Storage Performance of Die Attachment with Ag Paste Sintering on Bare Direct Bonding Aluminum (DBA) Substrate: *Zheng Zhang*¹; Chuantong Chen¹; Shijo Nagao¹; Katsuaki Suganuma¹; ¹Osaka University, Institute of Scientific and Industrial Research

3:30 PM

Die-bonding Performance and Mechanism of Ag Micron Paste with Pressure-less Sintering: *Tetsu Takemasa*¹; Shingo Ishihara²; Junya Kano²; Katsuaki Suganuma³; ¹Department of Adaptive Machine Systems, Graduate School of Engineering, Osaka University; ²Institute of Multidisciplinary Research for Advanced Materials, Tohoku University; ³Institute of Scientific and Industrial Research, Osaka University

3:50 PM Break**4:10 PM**

Fatigue and Creep Properties of Sintered Ag Paste from Room Temperature to High Temperature: *Chuantong Chen*¹; Chanyang Choe¹; Aiji Suetake¹; Katsuaki Suganuma¹; ¹Osaka University

4:30 PM

On the Adhesion of a Sintered Ag Joint on a Cu Substrate using Laser Shocks Influence of Aging: Anna Gordun Peiro¹; Thibaut De Resseguier¹; Loic Signor¹; Eloic Ferdinand¹; Jacques Baillargeat¹; Hadi Bahsoun²; *Xavier Milhet*¹; ¹Prime Institute CNRS ENSMA; ²Prime Institute CNRS Université Poitiers

4:50 PM

Low Temperature Cu-Cu Bonding by Copper-based Paste with Small Amount Sn Additive: *Kuo-Shuo Huang*¹; Wei Liu¹; Albert T. Wu¹; ¹National Central University

5:10 PM

Low Temperature Polyimide-to-polyimide Direct Bonding with Low Curing Temperature Polyimide Films: *Hong-Che Liu*¹; ¹Chih Chen

CHARACTERIZATION

Advanced Real Time Imaging — Alloys

Sponsored by: TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, National Energy Technology Laboratory; David Alman, National Energy Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki Shibata, Imram, Tohoku University; Antoine Allanore, Massachusetts Institute of Technology; Candan Tamerler, University of Kansas; Noritaka Saito, Kyushu University; Neslihan Dogan, McMaster University; Zuotai Zhang, Southern University of Science and Technology; Bryan Webler, Carnegie Mellon University; Anna Nakano, US Department of Energy National Energy Technology Laboratory

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Theater A-4 | San Diego Convention Ctr

Session Chair: Bryan Webler, Carnegie Mellon University

2:30 PM Invited
Computational Real Time Imaging and Understanding of Microstructure Evolution: Bo Wang¹; Xiaoxing Cheng¹; Tiannan Yang¹; Fei Li²; *Long-Qing Chen*¹; ¹Pennsylvania State University; ²Xi'an Jiaotong University

2:50 PM
In-situ Analysis of Incipient Melting in a Novel High Strength Al-Cu Cast Alloy using Laser Scanning Confocal Microscopy (LSCM): Bernoulli Andilab¹; *Comondore Ravindran*¹; Neslihan Dogan²; ¹Ryerson Univ; ²McMaster University

3:10 PM
In-situ Heating S/TEM Observations of Weld Microstructure Evolution in Ni-30Cr Alloy with Tantalum and Molybdenum Additions: *Cheng-Han Li*¹; Sriram Vijayan¹; Carolin Fink¹; Joerg Jinschek¹; ¹Ohio State University

3:30 PM
In-situ Observation of Hyperbranched Dendrite Growth: *Tiberiu Stan*¹; Kate Elder¹; Xianghui Xiao²; Peter Voorhees¹; ¹Northwestern University; ²Brookhaven National Laboratory

3:50 PM
In-situ Measurements of Dissolution of TiN in Liquid Cobalt: Ming Zhong¹; Chris Pistorius¹; *Bryan Webler*¹; ¹Carnegie Mellon University

4:10 PM Break

4:30 PM Invited

In-situ Diagnosis and Modeling of Disorder Trapping in Rapid Solidification of Intermetallic Compound: *Jianrong Gao*¹; ¹Northeastern University

4:50 PM

Nanoscale 4D Microstructural Characterization of Corrosion in Aluminum Alloys using In-situ Transmission X-ray Microscopy (TXM):*Sridhar Niverty*¹;Arun Singaravelu¹;Xianghui Xiao²;Wah-Keat Lee²; Nikhilesh Chawla¹; ¹Arizona State University; ²Brookhaven National laboratory

5:10 PM

Time-Resolved X-ray Tomography Studies of Dendritic Evolution in Al-Cu Alloys: *Kate Elder*¹; Tiberiu Stan¹; Yue Sun¹; Xianghui Xiao²; Peter Voorhees¹; ¹Northwestern University; ²Brookhaven National Laboratory

ADVANCED MATERIALS

Advanced Solid Phase Processing Symposium — Fundamental Deformation Mechanisms

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee, TMS: Shaping and Forming Committee

Program Organizers: Suveen Mathaudhu, University of California, Riverside; Cynthia Powell, Pacific Northwest National Laboratory; Kester Clarke, Colorado School of Mines; Anthony Reynolds, University of South Carolina; Mostafa Hassani, Cornell University

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Balboa | Marriott Marquis Hotel

Session Chairs: Anthony Reynolds, University of South Carolina; Bharat Gwalani, Pacific Northwest National Laboratory

2:30 PM Invited

Phase Transformations Induced by Large Plastic Deformations under High Pressure: Four-Scale Theory and in Situ Experiments: *Valery Levitas*¹; ¹Iowa State University

2:55 PM Invited

Plastic Flow Instability, Surface Folding and a Mechanochemical Effect in Large Strain Deformation of Metals: *Srinivasan Chandrasekar*¹; Anirudh Udupa¹; Tatsuya Sugihara²; Koushik Viswanathan³; James Mann⁴; ¹Purdue University; ²Osaka University; ³Indian Institute of Science; ⁴University of West Florida

3:20 PM

Multimodal Analysis of Microstructural Evolution of Metallic Alloys under Shear Deformation: *Arun Devaraj*¹; Bharat Gwalani¹; Tamas Varga¹; Changyong Park²; Luciano Bergmann³; Jorge Santos³; Peter Staron³; Benjamin Klusemann³; Tiffany Kaspar¹; Peter Sushko¹; Suveen Mathaudhu¹; Cynthia Powell¹; ¹Pacific Northwest National Laboratory; ²High Pressure Collaborative Access Team; ³Helmholtz-Zentrum Geesthacht

3:40 PM

Strain in Friction Extrusion: *Tony Reynolds*¹; Md. Reza-E-Rabby²; Xiao Li²; Komarasamy Mageshwari²; Jeffrey Holliday¹; ¹University of South Carolina; ²PNNL

4:00 PM Break

4:20 PM Invited

Hybrid Cutting-Extrusion for Sheet Metal Production with Exceptional Microstructure Control: *Kevin Trumble*¹; B. Stiven Puentes¹; Mohammed Issahaq¹; Mojib Saei¹; Anirudh Udupa¹; James Mann²; Srinivasan Chandrasekar¹; ¹Purdue University; ²University of West Florida

4:45 PM

Microstructural Analysis and Modeling of Grain Refinement During Tribometric Surface Deformation: *Aashish Rohatgi*¹; Yulan Li¹; Bharat Gwalani¹; Shenyang Hu¹; Yang He¹; Arun Devaraj¹; Erin Barker¹; Tiffany Kaspar¹; Jinhui Tao¹; Chongmin Wang¹; Petr Sushko¹; Suveen Mathaudhu²; ¹Pacific Northwest National Laboratory; ²University of California Riverside

5:05 PM

Structural and Compositional Changes During Shear Assisted Processing of Materials: *Bharat Gwalani*¹; Matthew Olszta¹; Yang He¹; Jinhui Tao¹; Chongmin Wang¹; Tiffany Kaspar¹; Aashish Rohatgi¹; Peter Sushko¹; Arun Devaraj¹; ¹Pacific Northwest National Laboratory

5:25 PM

Electrical Conductivity and Wear Properties of Pure Copper Processed by High Pressure Sliding: *Evander Ramos*¹; Takahiro Masuda²; Yoichi Takizawa³; Zenji Horita²; Suveen Mathaudhu¹; ¹University of California Riverside; ²Kyushu University; ³Nagano

Forging Co.

5:45 PM

Simultaneously Reducing Mechanical Anisotropy and Enhancing Ductility in Mg Alloys by Advanced Solid Phase Processing: *Dalong Zhang*¹; Vineet Joshi¹; Jens Darsell¹; Nicole Overman¹; Scott Whalen¹; Darrell Herling¹; ¹Pacific Northwest National Laboratory

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Advances and Discoveries in Non-equilibrium Driven Nanomaterials and Thin Films — 2-dimensional Materials and Thin Films

Sponsored by: TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

Program Organizers: Ritesh Sachan, Oklahoma State University; Srinivasa Rao Singamaneni, University of Texas at El Paso; Amit Pandey, MicroTesting Solutions; Nuggehalli Ravindra, New Jersey Institute of Technology

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Solana | Marriott Marquis Hotel

Session Chairs: Amit Pandey, Ansys; Ritesh Sachan, Oklahoma State University

2:30 PM Invited

Tunable 2D Materials from Synthesis to Applications: *Wonbong Choi*¹; ¹University of North Texas

3:00 PM Invited

Formation of Reduced Graphene Oxide/amorphous Carbon P-N Junctions via Highly Nonequilibrium Route of Nanosecond Laser Irradiation: *Siddharth Gupta*¹; Jagdish Narayan¹; ¹North Carolina State University

3:25 PM

Understanding the Effects of Lattice Strain on MoS2 through Irradiation: *Kory Burns*¹; ¹University of Florida

3:50 PM

Development of Reactive Molecular Dynamics (MD) and Hybrid Reverse Monte Carlo (HRMC) Modeling to Synthesize Amorphous Boron Carbide: *Ridwan Sakidja*¹; Rajan Khadka¹; Nirmal Baishnab¹; George Opletal²; ¹Missouri State University; ²CSIRO

CHARACTERIZATION

Advances in Powder and Ceramic Materials Science — Advanced Ceramics and Processes

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Shefford Baker, Cornell University; Huazhang Zhai, Beijing Institute of Technology; Sergio Monteiro, Military Institute of Engineering; Rajiv Soman, Eurofins EAG Materials Science LLC; Faqin Dong, Southwest University of Science and Technology; Jinhong Li, China University of Geosciences (Beijing); Ruigang Wang, The University of Alabama

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Theater A-6 | San Diego Convention Ctr

Session Chairs: Shefford Baker, Cornell University; Hongjuan Sun, Southwest University of Science and Technology

2:30 PM **Introductory Comments**

2:35 PM **Invited**
Design of Cell-windows Structure Macroporous Ceramics Derived from Particle-stabilized Emulsions: *Jinhong Li*¹; ¹China University of Geosciences (Beijing)

2:55 PM
Effect of B₄C Addition on (Hf,Zr)B₂ Based Ultra High Temperature Ceramics: *Shipra Bajpai*; Sudhanshu Shekhar Singh¹; Kantesh Balani¹; ¹IIT kanpur

3:15 PM
ICME-Based Design of Cermet Tool Material for Friction Stir Welding (FSW) of High-strength Materials: *Amit Behera*¹; Qiaofu Zhang¹; Greg Olson¹; Rajiv Mishra²; ¹QuesTek Innovations LLC; ²Univeristy of North Texas

3:35 PM
Structural and Dielectric Properties of InCr_{1-x}Ti_xO_{3+x/2} (x = 2/6, 2/7, and 2/8): *Victor Emmanuel Alvarez Montaña*¹; Raul Escamilla²; Francisco Brown¹; Subhash Sharma²; Noboru Kimizuka¹; Alejandro Durán²; ¹Universidad de Sonora; ²Universidad Nacional Autonoma de México

3:55 PM Break

4:10 PM

Microstructure-processing Relationships in Rare Earth Doped Alumina Ceramics for Lighting/laser Applications: *Xingzhong Wu*¹; Matthew Duarte¹; Yasuhiro Kodera¹; Elias Penilla¹; Javier Garay¹; ¹University of California San Diego

4:30 PM

Toughening Mechanism of ZTA-TiC-Fe Ceramic Materials Produced by High Gravity Combustion Synthesis: *Hongwei Zhao*¹; ¹China Iron and Steel Research Institute Group

MATERIALS PROCESSING

Advances in Surface Engineering II — Session II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Surface Engineering Committee

Program Organizers: Tushar Borkar, Cleveland State University; Arif Mubarok, PPG; Rajeev Gupta, University of Akron; Sandip Harimkar, Oklahoma State University; Tanaji Paul, Florida International University

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Session Chair: Tushar Borkar, Cleveland State University

2:30 PM

Electroplating Powder for Cold Spray Applications: *Gwendolyn Bracker*¹; Madeline Scott¹; Elizabeth Hodges¹; Richard Berdos²; Jeffery Rigali³; Victor Champagne⁴; Robert Hyers⁵; ¹University of Massachusetts; ²Raytheon ; ³Pratt & Whitney; ⁴Cold Spray Innovations International; ⁵University of Massachusetts

2:50 PM

Surface Characterization and Mechanical Properties of Cr-coated Zr-4 Accident Tolerant Fuels Cladding Prepared using Different Coating Techniques: *Rajnikant Umretiya*¹; Santiago Vargas¹; Jessika Rojas¹; Carlos Castano¹; Reza Mohammadi¹; ¹Virginia Commonwealth University

3:10 PM

Morphological Control of Tantalum Carbide through Surface Doping: Tianqi Ren¹; *Richard Tran*¹; Sebastian Lee¹; Aric Bandera¹; Manuel Herrera²; Xiang-Guo Li¹; Shyue Ong¹; Olivia Graeve¹;

¹University of California, San Diego; ²Universidad Nacional Autónoma de México

3:30 PM

Mitigation of Asphaltene Deposition on Pipeline Alloy Steel Using Low-temperature Pack Aluminization: *Soheil Daryadel*¹;

Pralav Shetty¹; Velu Subramani²; Paul Braun¹; Jessica Krogstad¹;

¹University of Illinois at Urbana-Champaign; ²BP Products North America, Inc

3:50 PM Break

4:10 PM

Pulse Potentiostatic Deposition of Fe-Zn based Intermetallic Coatings and Evaluation of its Catalytic Activity for Hydrogen Evolution Reaction: *Srija Biswas*¹;

Sourav Das¹; Sambedan Jena²; Arijit Mitra¹; Siddhartha Das¹; Karabi Das¹;

¹Department of Metallurgical and Materials Engineering, Indian Institute of Technology Kharagpur; ²School of Nano Science and Technology, Indian Institute of Technology Kharagpur

4:30 PM

Effects of Ti and Y Addition on the Scale Spalling Resistance of CoNiCrAlAlloys: *Liang Yang*¹;

Yu Zheng¹; Zhigang Yang¹; ¹Tsinghua University

MECHANICS & STRUCTURAL RELIABILITY

Advancing Current and State-of-the-Art Application of Ni- and Co-based Superalloys — Environmental Damage and Protection

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Chantal Sudbrack, Northwestern University Center for Atom-Probe Tomography; Mario Bochiechio, Pratt & Whitney; Kevin Bockenstedt, ATI Specialty Materials; Katerina Christofidou, University of Sheffield; James Coakley, University of Miami; Martin Detrois, National Energy Technology Laboratory; Laura Dial, GE Global Research; Bij-Na Kim, Carpenter Additive; Victoria Miller, University of Florida; Kinga Unocic, Oak Ridge National Laboratory

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11B | San Diego Convention Ctr

Session Chairs: Mario Bochiechio, Pratt & Whitney; Kinga Unocic, Oak Ridge National Laboratory

2:30 PM Invited
Environmental Effect Solutions for Superalloys Today and Tomorrow: *Bruce Pint*¹; ¹Oak Ridge National Laboratory

3:00 PM
Enhancement of EB-PVD Thermal Barrier Coating Adhesion Strength by Laser Surface Texturing: *Lucille Despres*¹; Jonathan Cormier¹; Sophie Costil²; Romain Cariou³; Aurélien Joulia³; Amar Saboundji³; ¹Institut Pprime; ²ICB-LERMPS; ³SAFRAN TECH

3:20 PM
Formation and Composition of Hot Corrosion Deposits on Model Ni-Cr-Al Alloys: *Kevin Meisner*¹; Elizabeth Opila¹; ¹University of Virginia

3:40 PM
High-temperature Corrosion of Ni-based Superalloys in Impure CO₂ Power Cycle Environments: *Richard Oleksak*¹; Joseph Tylczak¹; Gordon Holcomb¹; Omer Dogan¹; ¹National Energy Technology Laboratory

4:00 PM Break

4:20 PM Invited
New Insights on Al₂O₃-Scale Growth on Ni-Based Alloys and the Influence of Reactive Elements: Arthur Heuer¹; *Brian Gleeson*²; ¹Case Western Reserve University; ²University of Pittsburgh

4:50 PM
A Damage Model with Oxidation Effects: *Jean-Briac le Graverend*¹; Seungjun Lee¹; ¹Texas A&M University

5:10 PM
A Comparative Study of the Effects of Surface Treatments and Finishes on the High Temperature Oxidation Behavior of Alloy 800 in a 400 °C Steam Environment: *Richard Chiang*¹; Sebastien Teyseyre²; Jeffery Aguiar³; Geogy Abraham⁴; Vivekanand Kain⁴; Vijay Vasudevan¹; ¹University of Cincinnati; ²Canadian Nuclear Laboratories; ³Idaho National Laboratory; ⁴Bhabha Atomic Research Centre

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Interatomic Potential Developments and Atomistic Modeling



Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Charudatta Phatak, Argonne National Laboratory; Bryan Wong, University of California, Riverside; Mikhail Mendeleev, Ames Laboratory; Bryce Meredig, Citrine Informatics; Ebrahim Asadi, University of Memphis; Francesca Tavazza, National Institute of Standards and Technology

Monday PM | February 24, 2020
31C | San Diego Convention Ctr

Session Chairs: Mikhail Mendeleev, Ames Laboratory; Ebrahim Asadi, University of Memphis

2:30 PM Invited
AdvancingMethodsforAtomic-scaleModelingofHeterogeneous Systems: *Susan Sinnott*¹; ¹Pennsylvania State University

3:00 PM
TheReaxFFForceField-applicationOverviewandNewDirections in Accelerated Dynamics, Ferroelectric Materials and Treatment of Explicit Electrons: Adrianus Van Duin¹; *Yun Kyung Shin*¹; ¹Penn State

3:20 PM Invited
Recent Interatomic Potential Development Activities at Sandia: *Xiaowang Zhou*¹; ¹Sandia National Laboratories

3:40 PM Break

4:10 PM Invited
Second Nearest-neighbor Modified Embedded-atom Method Potential: Development, Validation and Challenges: *Byeong-Joo Lee*¹; ¹Pohang University of Science & Technology

4:40 PM
DevelopmentofaModifiedEmbedded-atomMethodInteratomic Potential for 2D Titanium Carbides (Tin+1Cn) MXenes: *Ning Zhang*¹; Yu Hong²; Mohsen Asle Zaeem²; ¹University of Alabama; ²Colorado School of Mines

5:00 PM

MEAM-BO: Extension of MEAM to Include Bond Order for Polymer: *Sungkwang Mun*¹; Ric Carino¹; Andrew Bowman¹; Steven Gwaltney²; Sasan Nouranian³; Mark Horstemeyer⁴; Michael Baskes²; ¹Center for Advanced Vehicular Systems (CAVS); ²Mississippi State University; ³University of Mississippi; ⁴Liberty University

LIGHT METALS

Alumina and Bauxite — Bauxite, Impurities and Alternative Processes

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: James Vaughan, University of Queensland

Monday PM | February 24, 2020
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Session Chair: Steve Healy, Consultant

2:30 PM Introductory Comments

2:40 PM Keynote
The Alumina Technology Roadmap 4.0.: *Anne Duncan*¹; ¹HATCH

3:10 PM
Impacts of Mineralogy on Soluble Phosphorus Concentrations During Low Temperature Processing of Jamaican Bauxites: *Michael Coley*¹; Anthony Greenaway¹; Khadeen Henry-Herah¹; ¹University of the West Indies

3:30 PM
Effects of the Granular Properties of Bauxite Pisolites on the Solid/Liquid Separation in Liquid Fluidized Beds of Classifiers: *Thomas Grillo*¹; Guy Simard¹; Romain Chesnaux¹; Damien Boudeville²; Lou Perrachon²; ¹Université du Quebec à Chicoutimi; ²Rio Tinto

3:50 PM
Mineralogical Assessment of the Solid Phase Obtained on Leaching of Brazilian Red Mud: *Amilton Botelho Junior*¹; Denise Espinosa¹; Jorge Tenório¹; ¹University of Sao Paulo

4:10 PM Break

4:30 PM

Inhibition of Kaolinite Dissolution in Bayer Liquor Through Addition of Lithium: Horace OGilvie¹; James Vaughan¹; *Hong Peng*¹; ¹University of Queensland

4:50 PM

Ionic Effect of NaCl and KCl on the Flotation of Diaspore and Kaolinite using Sodium Oleate as Collector: Chaojun Fang¹; *Shichao Yu*²; Hong Peng³; Xiaowei Deng¹; Jun Wang²; ¹Henan Polytechnic University; ²Central South University; ³The University of Queensland

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Characterization of Aluminium Alloys

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Dmitry Eskin, Brunel University

Monday PM | February 24, 2020
1A | San Diego Convention Ctr

Session Chair: Dmitry Eskin, Brunel University London

2:30 PM Introductory Comments

2:40 PM Invited

Stress Characterization of Bore-chilled Sand Cast Aluminum Engine Blocks in As-cast and T7 Condition with Application of Neutron Diffraction: *Dimitry Sediako*¹; Joshua Stroh¹; Glenn Byczynski²; Anthony Lombardi³; Anna Paradowska⁴; ¹University Of British Columbia; ²Nemak USA/CAN; ³Nemak Canada Corporation; ⁴Australia’s Nuclear Science and Technology Organisation

3:05 PM Invited

Molecular Dynamics Simulations of the Solidification of Pure Aluminium: *Michail Papanikolaou*¹; Konstantinos Salonitis¹; Mark Jolly¹; ¹Cranfield University

3:30 PM

Nanoindentation and Cavitation-induced Fragmentation Study of Primary Al₃Zr Intermetallics Formed in Al Alloys: *Abhinav Priyadarshi*¹; Tungky Subroto²; Marcello Conte³; Koulis Pericelous⁴;

Dmitry Eskin²; Paul Prentice⁵; Iakovos Tzanakis¹; ¹Oxford Brookes University; ²Brunel University London; ³Anton Paar TriTec SA; ⁴University of Greenwich; ⁵University of Glasgow

3:55 PM

In-situ Neutron Diffraction Solidification Analyses of Rare Earth Reinforced Hypoeutectic and Hypereutectic Aluminum-silicon Alloys: *Joshua Stroh*¹; Dimitry Sediako¹; David Weiss²; Vanessa Peterson³; ¹University of British Columbia Okanagan; ²Eck Industries; ³ANSTO

4:20 PM Break

4:35 PM

Influence of TiB₂ Particles on Modification of Mg₂Si Eutectic Phase in Al-Zn-Si-Mg-Cu Cast Alloys: *Byung Joo Kim*¹; Sung Su Jung¹; Yong Ho Park²; Young Cheol Lee¹; ¹Korea institute of industrial technology; ²Pusan National University

5:00 PM

A Statistical Analysis to Study the Effect of Silicon Content, Surface Roughness, Droplet Size and Elapsed Time on Wettability of Hypoeutectic Cast Aluminum-silicon Alloys: *Amir Kordijazi*¹; Swaroop Behera¹; Omid Akbarzadeh²; Marco Povolo³; Pradeep Rohatgi¹; ¹University of Wisconsin, Milwaukee; ²University of Malaya; ³University of Bologna

5:25 PM

Aluminum Trace Elements Analyses using Epsilon 1 Meso EDXRF Technique: *Al Halwachi Hussain*¹; ¹Aluminium Bahrain (Alba)

LIGHT METALS

Aluminum Reduction Technology — Modelling

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Jayson Tessier, Alcoa

Monday PM | February 24, 2020
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Session Chair: André Felipe Schneider, Hatch

2:30 PM Introductory Comments

2:35 PM

Comparison Between Different Laminated Aluminum Busbars Expansion Joints in Terms of Mechanical Performance and Relative Costs: *Andre-Felipe Schneider*¹; Daniel Richard¹; David Leroux²; Olivier Charette¹; Francis Quintal¹; ¹Hatch Ltd.; ²Canmec Industriel, Inc.

2:55 PM

Demo Retrofit Study of a Chinese Inspired Cell Technology: *Marc Dupuis*¹; Valdis Bojarevics²; ¹GeniSim Inc.; ²University of Greenwich

3:15 PM

MassTransport by Waves on the Bath Metal Interface in Electrolysis Cell: *Lovatiana Rakotondramanana*¹; László Kiss¹; Sándor Poncsák¹; Sébastien Guérard²; Jean-François Bilodeau²; ¹Université du Québec à Chicoutimi; ²Rio Tinto Aluminium

BIOMATERIALS

Biodegradable Materials for Medical Applications II — Magnesium Implants II

Sponsored by: TMS Functional Materials Division, TMS: Biomaterials Committee

Program Organizers: Jaroslaw Drelich, Michigan Technological University; Ehsan Mostaed, Michigan Technological University; Malgorzata Sikora-Jasinska, Michigan Technological University; Jan-Marten Seitz, Syntellix AG; Petra Maier, Stralsund University of Applied Sciences; Norbert Hort, Helmholtz-Zentrum Geesthacht; Huinan Liu, University of California, Riverside

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Vista | Marriott Marquis Hotel

Session Chairs: Petra Maier, University of Applied Sciences Stralsund; Norbert Hort, Helmholtz-Zentrum Geesthacht

2:30 PM Keynote

Are those Biproducts of Bidegradable Metals Deleterious to Bone Healing?: *Kelvin Yeung*¹; ¹The University of Hong Kong

3:05 PM Invited

On Contributors to Fracture in Absorbable Metals: *Adam Griebel*¹; Jeremy Schaffer¹; ¹Fort Wayne Metals

3:30 PM

Non Invasive Degradation Tracking of Mg Implants in Humans:

*Jan-Marten Seitz*¹; Patrick Varady¹; Tim Vockensohn¹; ¹Syntellix AG

3:50 PM

Tailoring Degradation Behavior of Mg-5Nd Alloy by Intermetallic

Distribution: *Yaping Zhang*¹; Yuanding Huang¹; Frank Feyerabend¹;

Karl Ulrich Kainer¹; Norbert Hort¹; ¹Helmholtz-Zentrum Geesthacht

4:10 PM Break

4:25 PM

Microstructure and Biodegradation Behavior of Additively

Manufactured Magnesium: *Leila Sorkhi*¹; James Tomich¹; Joshua

Hammel¹; Grant Crawford¹; ¹South Dakota School of Mines and

Technology

4:45 PM

In-vitro Corrosion and Mechanical Performance of Mg Alloy

WE43 Processed by Spark Plasma Sintering: *Julie Soderlind*¹;

Subhash Risbud¹; Joerg Loeffler²; ¹University of California, Davis;

²ETH Zurich

5:05 PM

Evaluation of in vitro Fatigue Property of Grain Refined Mg-Ca

Alloy: *Naoya Kawamura*¹; Taichi Uemura¹; Naoko Ikeo¹; Toshiji

Mukai¹; ¹Kobe University

5:25 PM

Effect of Secondary Processing on Microstructure, Mechanical

and Corrosion Response of a Biodegradable Mg1Zn2Ca Alloy:

Diksha Matta¹; *Gururaj Parande*²; Sravya Tekumalla²; Manoj Gupta²;

¹Vellore Institute of Technology; ²National University of Singapore

BIOMATERIALS

Biological Materials Science — Biomimetic and Bioinspired Materials

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Steven Naleway, University of Utah; Jing Du, Penn State University; Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); David Restrepo, University of Texas at San Antonio

Monday PM | February 24, 2020

Leucadia | Marriott Marquis Hotel

Session Chairs: Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); Maryam Hosseini, Purdue University

2:30 PM Invited
TheConvergenceofBiologyandMaterialsThroughBioinspiration: *Marc Meyers*¹; ¹University of California San Diego

3:00 PM
Density Control in Wood-templated Epoxy-silicon Carbide Composites: *Albert Matsushita*¹; Daniel Kupor¹; Joanna McKittrick¹; ¹Univ of California San Diego

3:20 PM
Energy Absorbing and Toughening Strategies in Reinforced Tubule Architectures: *Audrey Hogan*¹; Marc Meyers¹; ¹University of California San Diego

3:40 PM Invited
Bioinspired Design of Multi-scale Structures: From the Nano- to the Micro- and Macro-Scales: *Winston Soboyejo*¹; ¹Worcester Polytechnic Institute

4:10 PM Break

4:25 PM Invited
Bioinspired Design of Next Generation Structural and Thermal Materials: *Nima Rahbar*¹; ¹Worcester Polytechnic Institute

4:55 PM
Bioinspired Porous Materials Through Ice and Ultrasound Templating:*Max Mroz*¹; Taylor Ogden¹; Isaac Nelson¹; Milo Prisbrey¹; Bart Raeymaekers¹; Steven Naleway¹; ¹University of Utah

5:15 PM Invited
MechanicsofSegmentedProtectioninNatureandinEngineering: A Rich Landscape for Tunability and Performance: *Francois Barthelat*¹; Ali Shafiei²; ¹University of Colorado Boulder; ²McGill University

5:45 PM
Fabricating Bioinspired Helical and Bouligand Scaffolds using a Tri-axial Nested Helmholtz Coils-based Freeze-casting Setup: *Isaac Nelson*¹; Paul Wadsworth¹; Max Mroz¹; Owen Kingstedt¹; Jamie Kruzic²; Steven Naleway¹; ¹University of Utah; ²UNSW Sydney

LIGHT METALS

Cast Shop Technology — EHS and Cast House Products

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Johannes Morscheiser, Aleris Rolled Products Germany GmbH

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1B | San Diego Convention Ctr

Session Chair: Jean-Francois Desmeules, Dynamic Concept

2:30 PM Introductory Comments

2:45 PM
Hands-free-casting at AMAG Casting GmbH – It is Possible!:
*Bernd Prillhofer*¹; Rudolf Dobler¹; Thomas Mrnik¹; ¹AMAG casting GMBH

3:05 PM
User-friendly Surveillance Tools to Prevent Bleed-out During Cast Start: Mark Badowski¹; *Daniel Krings*¹; Gerd-Ulrich Gruen¹; Werner Droste¹; Philip Meslage²; Benjamin Jaroni¹; ¹Hydro Aluminium Rolled Products; ²Aluminium Norf GmbH

3:25 PM
Beryllium Reduction Potential in AlMg Cast Alloys: *Jan Steglich*¹; Alexandra Basa¹; Anne Kvithyld²; Nichloas Smith²; Ines Zerbin¹; ¹Trimet Aluminium Se; ²SINTEF

3:45 PM
Accurate Real-time Elemental (LIBS) Analysis of Molten Aluminum and Aluminum Alloys: Sveinn Hinrik Gudmundsson¹; Jon Matthiasson²; *Kristjan Leosson*¹; ¹DT Equipment; ²Innovation Center Iceland

4:05 PM Break

4:20 PM
Industrial Verification of Two Rotor Fluxing in Large Crucibles:
*Terje Haugen*¹; Arild Hakonsen¹; Vegard Innerdal¹; ¹Hycast AS

4:40 PM
Dynafeed: An Improved Crucible Transfer System: Jean Francois Desmeules¹; *André Tremblay*¹; Martin Dubois¹; ¹Dynamic Concept

5:00 PM

Metal Transfer from Furnace to Furnace – A Case Study: *Olivier Dion-Martin*¹; Jean Francois Desmeules¹; Pierre Jeanroy¹; ¹Dynamic Concept

5:20 PM

Heavily Loaded Areas in Aluminum Melting Furnaces and Possible Refractory Solutions: *Thomas Schemmel*¹; Rüdiger Pfaar¹; Uwe Kremer²; ¹Refratechnik Steel Gmbh; ²Trimet Aluminium S.E.

CHARACTERIZATION

Characterization of Minerals, Metals and Materials — Advances in Characterization Methods II

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Shadia Ikhmayies, Al Isra University; Yunus Kalay, Middle East Technical University; Jiann-Yang Hwang, Michigan Technological University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Army Research Laboratory

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Theater A-5 | San Diego Convention Ctr

Session Chairs: Jian Li, CanmetMATERIALS; Mingsheng He, Wuhan Iron & Steel Co

2:30 PM

Characterization of the World's Finest Gold at LANL: *Sven Vogel*¹; Raquel Alonso-Perez²; Michelle Espy¹; Cort Gautier¹; Adrian Losko¹; John Rakovan³; Frank Keutsch²; ¹Los Alamos National Laboratory; ²Harvard University; ³Miami University, Ohio

2:50 PM

Phase Transformation Characterization by Means of High Temperature Digital Image Correlation for Graded Thermo-mechanical Processing of Steel Sheet Parts: *Alexander Reitz*¹; Olexandr Grydin¹; Mirko Schaper¹; ¹Department of Materials Science, Paderborn University

3:10 PM

Unconventional Sodium Chloride in Graphene Liquid Cell:

Jaeyoung Hong¹; Jee-Hwan Bae¹; Hee-Young Park¹; Sehyun Lee¹; Juyoung Kim¹; Sung Jong Yoo¹; *Dong Won Chun*¹; ¹Korea Institute of Science and Technology

3:30 PM

A Fully Integrated In-Situ Solution for Materials Testing in Sem:

*Fang Zhou*¹; ¹Carl Zeiss Microscopy GmbH

3:50 PM

Analysis and Detection of Road Surface Defects Using Multiple

Sensing Methods: *Jeongguk Kim*¹; ¹Korea Railroad Research Institute

4:10 PM Break

4:25 PM

Autonomous Light Optical Microscopy for Quality Control

Screening: *Andrew Kitahara*¹; Elizabeth Holm¹; ¹Carnegie Mellon University

4:45 PM

The Influence of Microstructure in Stress Relaxation Cracking:

*Dafni Daskalaki Mountanou*¹; Tom McAuliffe¹; Chris Bilsland¹; Alex Foden¹; Thomas Britton¹; ¹Imperial College London

5:05 PM

Austenite Stability Under Focused Ion Beam Milling: *Jian Li*¹; Pei

Liu¹; ¹CanmetMATERIALS

5:25 PM

Optical Characterization of Grain Orientation by Directional

Reflectance Microscopy: *Bernard Gaskey*¹; Ludwig Hendl¹; Xiaogang Wang¹; Matteo Seita¹; ¹Nanyang Technological University

5:45 PM

Accurate Determination of EBSD Pattern Centers with

Applications in Resolving Pseudosymmetry: *Edward Pang*¹; Peter Larsen¹; Christopher Schuh¹; ¹Massachusetts Institute of Technology

CHARACTERIZATION

Characterization of Minerals, Metals and Materials — Mineral Processing and Analysis I

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Shadia Ikhmayies, Al Isra University; Yunus Kalay, Middle East Technical University; Jiann-Yang Hwang, Michigan Technological University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Army Research Laboratory

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Session Chairs: Bowen Li, Michigan Technological University; Chenguang Bai, Chongqing University

2:30 PM
Characterization of Iron Ore Sinter Samples by Automated SEM:
*Mingming Zhang*¹; Marcelo Andrade¹; ¹ArcelorMittal Global R&D

2:50 PM
Effect of Pre-Treatment During Leaching of High Iron, Cobalt Containing Ore: *Yotamu Hara*¹; Douglas Musowoya¹; Golden Kaluba¹; Choolwe Muchindu¹; Haggai Simfukwe¹; ¹Copperbelt University

3:10 PM
Effects of Sintering Temperature and Time on Preparation of Refractory Materials from Ferronickel Slag under Microwave Irradiation: Huimin Tang¹; *Zhiwei Peng*¹; Foquan Gu¹; Lei Yang¹; Ziming Liu¹; Quanle Leng¹; Weiguang Tian¹; Mingjun Rao¹; Guanghui Li¹; Tao Jiang¹; ¹Central South University

3:30 PM
Non-isothermal Carbothermic Reduction Kinetics of Calcium Ferrite: Gang Li¹; Xuwei Lv¹; *Xuangeng Zhou*¹; Guishang Pei¹; Guibao Qiu¹; ¹Chongqing University

3:50 PM Break

4:05 PM
Solid State Reaction Behavior of Calcium Ferrite and TiO2 at Temperature Range of 1423K to 1623K: *Mingrui Yang*¹; Xuangeng Zhou¹; Zhongci Liu¹; Xuwei Lv¹; ¹Chongqing University

4:25 PM

Gasificating Dephosphorization During the Carbothermic Reduction of Medium Phosphorus Iron Ore Concentrate in Presence of Na₂CO₃ and SiO₂: *Jing Zhang*¹; Guoping Luo¹; Yanbiao Chen¹; Wenbin Xin¹; Jianguo Zhu¹; ¹Inner Mongolia University of Science and Technology

4:45 PM

Non-isothermal Reduction Kinetics of Roasted High Alumina Iron Ore Pellets: *Zuoliang Zhang*; Ren Chen¹; ¹Liaoning Institute of Science and Technology

5:05 PM

Kinetics of Coke Gasification Reaction Catalyzed by Alkali Carbonates: *Yunpeng Fang*¹; Shengfu Zhang¹; Cheng Yin¹; Yuhan Zhu¹; Rongjin Zhu¹; Yang Li¹; ¹Chongqing University

CHARACTERIZATION

Characterization: Structural Descriptors, Data-Intensive Techniques, and Uncertainty Quantification — Structural Descriptors Enabling PSP Linkages

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Extraction and Processing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Materials Characterization Committee

Program Organizers: Shawn Coleman, CCDC Army Research Laboratory; Tomoko Sano, U.S. Army Research Laboratory; James Hogan, University of Alberta; Srikanth Patala, North Carolina State University; Oliver Johnson, Brigham Young University; Francesca Tavazza, National Institute of Standards and Technology

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Theater A-3 | San Diego Convention Ctr

Session Chairs: James Hogan, University of Alberta; Tomoko Sano, CCDC Army Research Laboratory

2:30 PM Introductory Comments

2:35 PM Invited

Artificial Intelligence Approaches to Microstructural Science: *Elizabeth Holm*¹; ¹Carnegie Mellon University

3:05 PM Invited
Methods for the Correction of Epistemic Resolution Error through Data Collection Process Simulations: *Lori Graham-Brady*¹; Noah Wade¹; ¹Johns Hopkins University

3:35 PM
Determination of Representative Volume Elements for Small Cracks in Heterogeneous Domains via Convolutional Neural Networks: *Karen DeMille*¹; Ashley Spear¹; ¹University of Utah

3:55 PM Break

4:15 PM
Machine Learning Approaches to Image Segmentation of Large Materials Science Datasets: *Tiberiu Stan*¹; Zachary Thompson¹; Bo Lei²; Elizabeth Holm²; Peter Voorhees¹; ¹Northwestern University; ²Carnegie Mellon University

4:35 PM
Predicting Crack Location Using a Radial Distribution Function as a Unique Descriptor of Pore Networks: *John Erickson*¹; Ashley Spear¹; Aowabin Rahman¹; ¹University of Utah

4:55 PM
Investigating the Effect of Solute Segregation to Grain Boundaries in Nanocrystalline Alloys Toward Stability and Strengthening: *Ankit Gupta*¹; Gregory Thompson²; Garritt Tucker¹; ¹Colorado School of Mines; ²University of Alabama

5:15 PM
Predicting Compressive Strength of Consolidated Solids from Features Extracted from SEM Images: *T. Yong Han*¹; ¹Lawrence Livermore National Lab

5:35 PM
Utilizing Convolutional Neural Networks for Prediction of Process and Material Parameters from Microstructural Images: *Richard Couperthwaite*¹; Levi McClenny¹; Jaylen James¹; Vahid Attari¹; Raymundo Arróyave¹; Ulisses Braga Neto¹; ¹Texas A&M University

MATERIALS DESIGN

Computational Discovery and Design of Emerging Materials — Session II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Arunima Singh, Arizona State University; Houlong Zhuang, Arizona State University; Sugata Chowdhury, National Institute of Standards and Technology; Arun Kumar Mannodi Kanakkithodi, Argonne National Laboratory

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Session Chair: Sugata Chowdhury, National Institute of Standards and Technology

2:30 PM Invited

Identification of 11 New Solid Lithium-ion Conductors with Promise for Batteries using Data Science Approaches: Austin Sendek¹; *Evan Reed*¹; ¹Stanford University

3:00 PM

Predicting Organic Ligands Mechanical Behavior with Deep Neural Network and Understanding the Mechanism: *Wei Yi Zhang*¹; Chengxi Yang¹; Alan Fern²; Matthew Campbell²; P. Alex Greaney¹; ¹UC, Riverside; ²Oregon State University

3:20 PM

Haber–Bosch Reaction Mechanism and Kinetics on Highly Reactive Iron Surface and Hierarchical High-throughput in Silico Screening Catalyst Design: *Qi An*¹; Alessandro Fortunelli²; William Goddard³; ¹University of Nevada, Reno; ²CNR-ICCOM, ThC2-Lab, Consiglio Nazionale delle Ricerche; ³Caltech

3:40 PM

Machine-learning based Discovery of Novel Scintillator Chemistries: *Anjana Talapatra*¹; Blas Uberuaga¹; Chris Stanek¹; Ghanshyam Pilania¹; ¹Los Alamos National Laboratory

4:00 PM

A General Machine Learning Framework for Impurity Level Prediction in Semiconductors: *Arun Kumar Mannodi Kanakkithodi*¹; Michael Toriyama¹; Fatih Sen¹; Michael Davis¹; Robert Klie²; Maria Chan¹; ¹Argonne National Laboratory; ²University of Illinois Chicago

4:20 PM Break

4:40 PM Invited

High-Throughput Screening and Synthesis of Semiconductor Electrodes for Photocatalytic Water Splitting: *Ismaila Dabo*¹;

¹Pennsylvania State University

5:10 PM

Machine Learning Guided Search for Single Phase High Entropy Oxides: *Shruba Gangopadhyay*¹; Prasanna Balachandran¹;

¹University of Virginia

5:30 PM

Use of Atomistic-based Modeling and Materials Informatics to Design and Synthesize Ultra-thin Tunnel Junctions: *Ridwan Sakidja*¹; Devon Romine¹; Jagaran Acharya²; Ryan Goul²; Judy Wu²;

¹Missouri State University; ²The University of Kansas

5:50 PM

Designing High Glass Transition Temperature Polymers using Machine Learning: *Chiho Kim*¹; Rohit Batra¹; Lihua Chen¹; Huan Tran¹; Rampi Ramprasad¹; ¹Georgia Institute of Technology

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Microstructural Evolution and Phase Stability II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Jorge Munoz, University of Texas at El Paso; Sara Kadkhodaei, University of Illinois at Chicago; Vahid Attari, Texas A&M University; James Morris, Ames Laboratory

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Session Chairs: Emily Moore, Lawrence Livermore National Laboratory; Daniela Wipp, TU Wien

2:30 PM Invited

Nonequilibrium Nanoscale Patterns and Negative Effective Interface Energy: A Phase Field Approach: *Pascal Bellon*¹; Qun Li¹; Robert Averback¹; ¹University of Illinois at Urbana-Champaign

3:00 PM

Computing Grain Boundary Diagrams: *Chongze Hu*¹; Jian Luo¹;

¹University of California San Diego

3:20 PM
Formation of Conducting Filament due to the Electrochemical Changes in the Memresistive Systems: a Phase Field Study: *Arijit Roy*¹; Pil-Ryung Cha¹; ¹Kookmin University

3:40 PM
Simulating Precipitation of Detrimental Boron Nitrides in Microalloyed Steels Based on Experimental Elemental Distributions: *Daniela Wipp*¹; Maximilian Weiss²; Andreas Limbeck²; Tomasz Wojcik³; Sabine Zamberger⁴; Matthew Galler⁵; Erwin Povoden-Karadeniz¹; ¹Christian Doppler Laboratory for Interfaces and Precipitation Engineering CDL-IPE, Institute of Materials Science and Technology, TU Wien; ²Institute of Chemical Technologies and Analytics, TU Wien; ³Institute of Materials Science and Technology, TU Wien; ⁴voestalpine Forschungsservicegesellschaft Donawitz GmbH; ⁵voestalpine Wire Rod Austria GmbH

4:00 PM Break

4:20 PM Invited
CALPHAD for Complex Concentrated Alloy Development: New Opportunities: *Wei Xiong*¹; ¹University of Pittsburgh

4:50 PM Invited
Thermodynamics, Structure, and the 3D Geometry of Bendable 2D Materials:*Joel Berry*¹; ¹Lawrence Livermore National Laboratory

5:20 PM
Thermodynamic Assessment of Actinide Alloys: the Pu-U-Al-Fe-Ga-Ni System: *Emily Moore*¹; Alexander Landa¹; Aurélien Perron¹; ¹Lawrence Livermore National Laboratory

5:40 PM
Theoretical Calculation of Atomic Size in a Solid Solution: *Tetsuo Mohri*¹; ¹Tohoku University

SPECIAL TOPICS

Current Trends in Magnetocaloric Materials: An FMD Symposium in Honor of Ekkes Brueck — Phase Equilibria and Magnetic Structure of Magnetocaloric Materials

Sponsored by: TMS Functional Materials Division

Program Organizers: Victorino Franco, Universidad de Sevilla; Frank Johnson, Niron Magnetics, Inc.

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Marina Ballroom F | Marriott Marquis Hotel

Session Chair: Luana Caron, Bielefeld University

2:30 PM Invited

Ferromagnetic Shape Memory Heuslers: from Bulk to Nano: *Franca Albertini*¹; Francesca Casoli¹; Simone Fabbrici¹; Milad Takhsha Ghahfarokhi¹; Riccardo Cabassi¹; Lucia Nasi¹; Cecilia Bennati¹; Massimo Solzi²; Francesco Cugini²; Paola Tiberto³; Federica Celegato³; ¹IMEM-CNR; ²Università di Parma; ³INRIM

3:00 PM Invited

Magnetocaloric Effect in Heusler-type Magnetic Shape Memory Materials: *Volodymyr Chernenko*¹; Victor L´vov²; Eduard Cesari³; Jose Manuel Barandiaran¹; ¹BCMaterials & University of the Basque Country(UPV/EHU); ²Taras Shevchenko National University of Kyiv, Kyiv, Ukraine; ³Universitat de les Illes Balears, Palma de Mallorca, Spain

3:30 PM Invited

Unprecedented Magnetism, Magneto-crystalline Anisotropy, and Magneto-structural Phase Transformation in Rare Earth Containing Materials: *Durga Paudyal*¹; Renu Choudhary¹; ¹Ames Laboratory

4:00 PM Break

4:20 PM Invited

The Interplay of Electronic, Magnetic and Lattice Degrees of Freedom in La-Fe-Si-based Magnetocaloric Materials: *Markus Gruner*¹; ¹University of Duisburg, Essen

4:50 PM Invited

Itinerant-electron Magnetism, Spin-fluctuations, and Magnetocaloric Effect in La(Fe,Si)₁₃-based Magnetocaloric Compounds: *Asaya Fujita*¹; ¹National Institute of Advanced Industrial Science and Technology

MATERIALS PROCESSING

Defects and Properties of Cast Metals — Defects II & Properties I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Solidification Committee

Program Organizers: Lang Yuan, University of South Carolina; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Charles Monroe, University of Alabama at Birmingham

Monday PM | February 24, 2020
17B | San Diego Convention Ctr

Session Chairs: Alex Plotkowski, Oak Ridge National Laboratory; Matthew Krug, Air Force Research Laboratory

2:30 PM Invited
Coupling Hot-tearing of High ' Nickel Alloys to Processing Parameters Through Classic Solidification Criteria: Kevin Chaput¹; *Matthew Krug*¹; Edwin Schwalbach¹; ¹Air Force Research Labroatory

3:00 PM
Controlling Freckle Defect Formation Using Magnetic Fields: *Andrew Kao*¹; Ivars Krastins¹; Natalia Shevchenko²; Sven Eckert²; Koulis Pericleous¹; ¹University of Greenwich; ²HZDR

3:20 PM
The Prediction of Solidification Defects: A Multi-defects Modeling: *Jun Li*¹; Hongbiao Dong¹; ¹University of Leicester

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Transitions at Grain Boundaries VII — Grain Boundary Structure: FCC and Hexagonal

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Shen Dillon, University of Illinois; Douglas Spearot, University of Florida; Jian Luo, University of California, San Diego; Jennifer Carter, Case Western Reserve University

Monday PM | February 24, 2020
5B | San Diego Convention Ctr

Session Chairs: Srikanth Patala, North Carolina State University;
Shen Dillon, University of Illinois

2:30 PM

Structure, Deformation Response and Diffusion in Random [110] Tilt Grain Boundaries in FCC Alloys: *Diana Farkas*¹; ¹Virginia Polytechnic Institute

2:50 PM

Anisotropic Mobility in Faceted $\Sigma 11 \langle 110 \rangle$ tilt FCC Grain Boundaries and the Effect of Subsequent Doping: *Megan McCarthy*¹; Timothy Rupert¹; ¹University of California, Irvine

3:10 PM

Interplay of Chemistry and Faceting at Grain Boundaries in an Al-alloy: *Huan Zhao*¹; Liam Huber¹; Wenjun Lu¹; Nicolas Peter¹; Dayong An¹; Frédéric De Geuser¹; Dirk Ponge¹; Baptiste Gault¹; Dierk Raabe¹; ¹Max-Planck-Institut Fur Eisenforschung G

3:30 PM

Quantifying and Predicting a “local” Stacking Fault Energy in Multi-principal Element Alloys: *Carlyn LaRosa*¹; Maryam Ghazisaeidi¹; ¹Ohio State University

3:50 PM Invited

Simulating Grain Boundary Structures with DFT Accuracy Through Active Learning of Interatomic Potentials: *Tolga Akiner*¹; *Srikanth Patala*¹; ¹North Carolina State University

4:10 PM Break

4:30 PM

Study on Effect of Symmetric Tilt Grain Boundaries on Twin Nucleation in Ti: *Deepesh Giri*¹; Christopher Barrett¹; Haitham El Kadiri¹; ¹Mississippi State University

4:50 PM

Vacancy-mediated Solute/Twin Boundary Interactions in HCP Alloys: *Mohammad Shahriar Hooshmand*¹; Maryam Ghazisaeidi¹; ¹Ohio State University

5:10 PM

The Role of Microstructure and Loading Parameters on Deformation Twinning in Nanocrystalline Mg at High Strain Rates: *Sergey Galitskiy*¹; Garvit Agarwal²; Avinash Dongare¹; ¹University of Connecticut; ²Argonne National Laboratory

5:30 PM

Database and Predictive Model of Grain Boundary Properties of Elemental Metals: *Hui Zheng*¹; Xiang-Guo Li¹; Richard Tran¹; Chi Chen¹; Matthew Horton²; Donny Winston²; Kristin Persson²; Shyue Ping Ong¹; ¹University of California, San Diego; ²Lawrence Berkeley National Laboratory

LIGHT METALS

Electrode Technology for Aluminum Production — Carbon Anode Development and Production - Where is the Cutting Edge?

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Duygu Kocaefe, University of Quebec at Chicoutimi

**Monday PM | February 24, 2020
3 | San Diego Convention Ctr**

Session Chair: Barry Sadler, Net Carbon Consulting Pty Ltd

2:30 PM Introductory Comments

2:35 PM Keynote

The Development of Anode Shape, Size and Assembly Designs - Past Present and Future Needs: *Barry Welch*¹; ¹Welbank Consulting

3:05 PM Keynote

10 Years of Anode Research and Development: Alcoa & Université Laval Experience: *Jayson Tessier*¹; Julien Lauzon-Gauthier¹; Mario Fafard²; Houshang Alamdari²; Carl Duchesne²; Louis Gosselin²; ¹Alcoa; ²REGAL

3:30 PM Invited

Carbon Anode Raw Materials – Where is the Cutting Edge?: *Les Edwards*¹; ¹Rain Carbon Inc.

3:55 PM Break

4:10 PM Invited

Solids Flow Considerations and their Impact in Smelter Carbon Plant Operations and Product Quality: Brian Pittenger¹; *Andrés Orlando*¹; ¹Jenike & Johanson, Inc.

4:35 PM Invited
How to Improve the Environmental Efficiency of the Hall-Heroult Process While Producing and Using Carbon Anodes?: *Antti Koulumies*¹; Ana Maria Becerra¹; Lasse Piechowiak¹; Paul Merlin²; Martin Zapke¹; ¹Outotec GMBH & CO KG; ²Outotec Canada Ltd

5:00 PM Invited
Trends in Carbon Anode Production: *Derek Santangelo*¹; ¹Hatch

5:25 PM Panel Discussion

MATERIALS PROCESSING

Electrometallurgy 2020 — Molten Salts

Sponsored by: TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee

Program Organizers: Antoine Allanore, Massachusetts Institute of Technology; Michael Free, University of Utah; Georges Houlachi, Hydro-Quebec; Hojong Kim, Pennsylvania State University; Takanari Ouchi, The University of Tokyo; Shijie Wang, Rio Tinto Kennecott Utah Copper Corp

Monday PM | February 24, 2020
14A | San Diego Convention Ctr

Session Chairs: Antoine Allanore, MIT; Hojong Kim, Penn State; Takanari Ouchi, The University of Tokyo

2:30 PM Keynote
A Key Role for Electrometallurgy in Climate Change Mitigation: *Adam Powell*¹; ¹Worcester Polytechnic Institute

3:00 PM
Capital Cost Estimation for Electrochemical Processes: *Caspar Stinn*¹; Antoine Allanore¹; ¹Massachusetts Institute of Technology

3:20 PM
Electrolytic Extraction of Liquid Copper and Iron from Chalcopyrite Ore: Lucas Rush¹; Caspar Stinn¹; Andrew Caldwell¹; Mary Elizabeth Wagner¹; Ryohei Yagi¹; *Katrin Daehn*¹; Antoine Allanore¹; ¹Massachusetts Institute of Technology

3:40 PM

Development of a Magnesium Metal Production Process Using North Korean Magnesite: *Jungshin Kang*¹; Tae-Hyuk Lee¹; Young Min Kim²; Jin-Young Lee¹; ¹Korea Institute of Geoscience and Mineral Resources; ²Korea Institute of Materials Science

4:00 PM

Development of a Novel Magnesium Metal Production Process by Electrolysis of Magnesium Oxide Using a Tin Metal Cathode: *Tae-Hyuk Lee*¹; Young Min Kim²; Jin-Young Lee¹; Jungshin Kang¹; ¹Korea Institute of Geoscience and Mineral Resources; ²Korea Institute of Materials Science

4:20 PM Break

4:35 PM

A 3-D Numerical Model to Predict Low Temperature Aluminum Electrochemical Process Using Ionic Liquids as Electrolytes at Different Boundary Conditions: *Aqi Dong*¹; Laurentiu Nastac¹; Ramana Reddy¹; ¹University of Alabama

4:55 PM

Enhanced Aluminum Electrorefining Process from Aluminum Alloy Scraps via Surface Engineering: *Yifan Wang*¹; Ruigang Wang¹; ¹University of Alabama

5:15 PM

Electrorefining of Molten Iron: William Judge¹; *Gisele Azimi*¹; ¹University of Toronto

5:35 PM

Aluminum Extraction by Al-Si-Fe Alloy Electrolysis: *Huan Shuxing*¹; ¹Northeastern University

ENERGY & ENVIRONMENT

Energy Technologies and CO2 Management Symposium — Session II

Sponsored by: TMS Extraction and Processing Division, TMS: Energy Committee

Program Organizers: Xiaobo Chen, RMIT University; Yulin Zhong, Griffith University; Lei Zhang, University of Alaska Fairbanks; John Howarter, Purdue University; Alafara Baba, University of Ilorin; Neale Neelameggham, IND LLC; Cong Wang, Northeastern University; Ziqi Sun, Queensland University of Technology

Monday PM | February 24, 2020
17A | San Diego Convention Ctr

Session Chairs: Ziqi Sun, Queensland University of Technology; Xiaobo Chen, RMIT University

2:30 PM
Electrified Layered Organic-inorganic Hybrids for Capacitive Storage: *Da-Wei Wang*¹; Kefeng Xiao¹; Huabo Liu¹; Jiaxing Liang¹; ¹UNSW Sydney

2:50 PM
Cerium Ion Adsorption on Ultrathin Graphitic Carbon Nitride and its Photocatalytic Application: *Saikat Kuila*¹; Tarun Kundu¹; ¹Indian Institute of Technology Kharagpur

3:10 PM
Economic Metals Rescue from Spent Zinc-carbon Batteries for Industrial Value Additions: *Alafara Baba*¹; Folahan Adekola¹; Rafiu Bale¹; Abdul Alabi²; Mustapha Raji¹; ¹University of Ilorin; ²Kwara State University, Malete

3:30 PM
Improving In-vitro and In-vivo Antibacterial Functionality of Mg Alloys Through Micro-alloying with Sr and Ga: *Xiaobo Chen*¹; ¹RMIT University

3:50 PM Break

4:10 PM
Transient Thermal Modeling of Aluminum Cells for Renewable Energy Integration: Gustavo Ospina¹; *Mohamed Hassan*¹; Sgouris Sgouridis¹; Ali Bouabid¹; ¹Khalifa University of Science and Technology

4:30 PM
Discussion on the Application of Rooftop Photovoltaic Power Plant in the Steel Enterprise: Xiancong Zhao¹; *Huanmei Yuan*²; Yuzhao Han²; Zefei Zhang²; Hao Bai²; ¹Peking university; ²University

4:50 PM

Performance of Anodes with Proper Active Metal Elements Added to the Al-0.16wt%In in Alkaline Electrolyte for Al-air Batteries: *Huimin Lu*¹; Neale Neelameggham²; Jing Leng¹; Jianxue Liu¹; ¹Beihang University; ²IND LLC

SPECIAL TOPICS

Expanding the Boundaries of Materials Science: Unconventional Collaborations — Unconventional Collaborations

Program Organizers: Sourabh Kadambi, North Carolina State University; Alex Hsain, North Carolina State University; Brady Dowdell, North Carolina State University; Benjamin Anthony, University of Florida

Monday PM | February 24, 2020
4 | San Diego Convention Ctr

Session Chairs: Benjamin Anthony, North Carolina State University; Brady Dowdell, North Carolina State University

2:30 PM

Creating the Next-Generation Materials Genome Initiative Workforce: *David McDowell*¹; ¹Georgia Institute of Technology

3:00 PM Invited

Accelerating Materials Design Through Community, Open Data and Collaboration: *Matthew Horton*¹; Kristin Persson²; ¹Lawrence Berkeley National Lab; ²Lawrence Berkeley National Lab and University of California, Berkeley

3:30 PM

Additive Manufacturing for Novel Thermal Devices: *Scott Roberts*¹; Ben Furst¹; Stefano Cappucci¹; Takuro Daimaru¹; Eric Sunada¹; ¹Jet Propulsion Laboratory

4:00 PM Break

4:20 PM Panel Discussion - Best practices on effective communication and strategies for making the most out of interdisciplinary research collaborations. Panel members are

select speakers from the symposium.

4:50 PM Concluding Comments

MECHANICS & STRUCTURAL RELIABILITY

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Crack Initiation Mechanisms and Crack Growth Behavior

Sponsored by: TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Garrett Pataky, Clemson University; Ashley Spear, University of Utah; Jean-Briac le Graverend, Texas A&M University; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University

Monday PM | February 24, 2020
11A | San Diego Convention Ctr

Session Chair: Garrett Pataky, Clemson University

2:30 PM Invited
Dislocation Patterns and Crack Initiation in Fatigued Nickel Single Crystal Microcrystals: Micro-Scale In-situ Scanning Electron Experiments: Steven Lavenstein¹; Jaafar El-Awady¹; ¹Johns Hopkins University

2:50 PM
Microstructure-interacting Short Crack Growth in Blocky Alpha Zircaloy-4: Weifeng Wan¹; Fionn Dunne¹; ¹Imperial College London

3:10 PM
Mission Loading Effects on Small Crack Growth in an Alpha+Beta Titanium Alloy: Reji John¹; Patrick Golden¹; Sushant Jha²; W. Porter²; ¹Air Force Research Laboratory; ²University of Dayton Research Institute

3:30 PM
Characterization of Fatigue Short Crack Growth in Rare-earth Magnesium Alloy WE43 using High Energy X-ray Diffraction Microscopy: Duncan Greeley¹; Jacob Adams¹; Peter Kenesei²; Ashley Spear³; John Allison¹; ¹University of Michigan; ²Argonne National Laboratory; ³University of Utah

3:50 PM
Characterization of Fatigue Crack Growth Behavior in CrCoFeNi High Entropy Alloy: Wm Williams¹; Mitra Shabani¹; *Garrett Pataky*¹; Paul Jablonski²; ¹Clemson University; ²National Energy Technology Laboratory

4:10 PM Break

4:30 PM Invited
Watching High-cycle Fatigue in Nanocrystalline Pt and Pt-Au: *Nathan Heckman*¹; Christopher Barr¹; Khalid Hattar¹; David Adams¹; Timothy Furnish¹; Brad Boyce¹; ¹Sandia National Laboratories

4:50 PM
Volumetric Defect Quantification of Pure Aluminum During Fatigue Loading Below the Yield Stress: *Joseph Indeck*¹; Jefferson Cuadra²; Kavan Hazeli¹; ¹University of Alabama, Huntsville; ²Lawrence Livermore National Laboratory

5:10 PM
Propositions for Functional Fatigue and Fatigue-crack Initiation in Shape Memory Alloys: *Ahmed sameerkhan Mohammed*¹; Huseyin Sehitoglu¹; ¹University of Illinois Urbana-Champaign

5:30 PM
Moving Cracks Form White Etching Areas During Rolling Contact Fatigue in Bearings: Lutz Morsdorf¹; David Mayweg¹; Yujiao Li²; Annika Diederichs³; Dierk Raabe¹; *Michael Herbig*¹; ¹Max-Planck-Institute fuer Eisenforschung; ²Ruhr University Bochum; ³Denmark Technical University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Functional Nanomaterials 2020: Translating Innovation into Pioneering Technologies — Translating Innovation into Pioneering Technologies II

Sponsored by: TMS Functional Materials Division, TMS: Nanomaterials Committee

Program Organizers: Simona Hunyadi Murph, Savannah River National Laboratory; Huanyu Cheng, Pennsylvania State University; Yong Lin Kong, University of Utah; Min Kyu Song, Washington State University; Ning Zhang, University of Alabama

Monday PM | February 24, 2020
Point Loma | Marriott Marquis Hotel

Session Chairs: Joseph Teprovich, California State University;
Min-Kyu Song, Washington State University

2:30 PM Invited
Compact Graphene Powders with High Volumetric Capacitance: Microspherical Assembly of Graphene via Surface Modification using Cyanamide: *Kwang-Bum Kim*¹; Young Hwan Kim¹; Byung Hoon Park¹; Yeon Jun Choi¹; Geon Woo Lee¹; ¹Yonsei University

2:50 PM Invited
Stress Relaxation and Battery: *Hanqing Jiang*¹; ¹Arizona State University

3:10 PM Invited
Photophysical and Electrochemical Properties of Fullerene and Closo-borane based Materials: *Joseph Teprovich*¹; ¹California State University, Northridge

3:30 PM
Strain Engineering of Two-dimensional Semiconductors: *SungWoo Nam*¹; ¹University of Illinois, Urbana-Champaign

3:50 PM Break

4:10 PM Invited
New Materials and Devices Beyond Silicon and Field-effect Transistors: *Qing Cao*¹; ¹University of Illinois at Urbana-Champaign

4:30 PM Invited
Understanding Nanoscale Evolution of Materials and Interfaces in Batteries: *Matthew McDowell*¹; ¹Georgia Tech

4:50 PM Invited
HighThroughputScreeningofNanoCatalystsforPEMFC/AEMFC and Machine Learning Prediction of Chemisorption: Soonho Kwon¹; Jung Woo Choi²; *Hyuck Mo Lee*²; ¹CALTECH; ²KAIST

5:10 PM Invited
2D Conjugated Polymer Nanosheets for Photocatalytic Overall WaterSplitting:*HangxunXu*¹; ¹UniversityofScienceandTechnology of China

MATERIALS DESIGN

Hume-Rothery Symposium: Thermodynamics, Phase Equilibria and Kinetics for Materials Design and Engineering — CALPHAD and First Principles

Sponsored by: TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Carelyn Campbell, National Institute of Standards and Technology; Michael Gao, National Energy Technology Laboratory; Wei Xiong, University of Pittsburgh

Monday PM | February 24, 2020
32A | San Diego Convention Ctr

Session Chairs: Michael Gao, National Energy Technology Laboratory; Raymundo Arroyave, Texas A&M University

2:30 PM Invited
A Hexagonal Close Packed Multi-principal-element Alloy Identified Computationally: Axel van de Walle¹; Ruoshi Sun¹; Qijun Hong¹; Julian Sabisch²; Andrew Minor³; *Mark Asta*³; ¹Brown University; ²Sandia National Laboratory; ³University of California, Berkeley

3:10 PM Invited
First-principles Thermodynamics of Refractory Alloys and their Oxides: *Anton Van Der Ven*¹; Naga Sri Gunda¹; Anirudh Natarajan¹; ¹University of California, Santa Barbara

3:50 PM Invited
On the Intrinsic Alloying Behavior in the A and M Sublattices of MAX Phases: *Raymundo Arroyave*¹; Anjana Talapatra²; Thien Duong³; Miladin Radovic¹; ¹Texas A&M University; ²Los Alamos National Laboratory; ³Argonne National Laboratory

4:30 PM Break

4:50 PM Invited
Thermodynamic Modeling of Precipitates of Topologically Close-packed Phases: *Thomas Hammerschmidt*¹; ¹ICAMS Ruhr-University Bochum

5:30 PM Invited
Alloys, Processing, Applications, Models and Software: The Wide Domain of Gibbs Energies Sets Giving Impulse to Invention: *Suzana Fries*¹; Sara Catalina Pineda Heresi¹; Daniela Ivanova¹; Uzair Rehman¹; Silvana Tumminello²; ¹Ruhr-Universität Bochum; ²German Aerospace Center

ADVANCED MATERIALS

Innovations in High Entropy Alloys and Bulk Metallic Glasses:
An SMD & FMD Symposium in Honor of Peter K. Liaw — High
Entropy Alloys: Alloy Design and Processing

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee

Program Organizers: Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Yanfei Gao, University of Tennessee - Knoxville; Robert Maass, University of Illinois at Urbana-Champaign; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Soo Yeol Lee, Chungnam National University; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center; Liang Jiang, Yantai University

Monday PM | February 24, 2020
Marina Ballroom G | Marriott Marquis Hotel

Session Chairs: Liang Jiang, Yantai University ; Soo Yeol Lee, Chungnam National University

2:30 PM Invited
Alloying Effects on Mechanical Properties of CoCrFeNi-based \947'-Strengthened Multi-principal Element Alloys for Elevated Temperature Applications: Akane Suzuki¹; *Shenyan Huang*¹; Doug Konitzer²; ¹GE Research; ²GE Aviation

2:50 PM Invited
A Grain-growth-resistant High-entropy Alloy for Forging Applications: *Zhi Tang*¹; Chuan Zhang²; Oleg Senkov³; Jonathan Poplawsky⁴; Fan Zhang²; Michael Gao⁵; Peter Liaw⁶; ¹University of Tennessee; Arconic Engines; ²CompuTherm LLC; ³Air Force Research Laboratory; ⁴Oak Ridge National Laboratory; ⁵National Energy Technology Laboratory; ⁶University of Tennessee

3:10 PM Invited
Metastability Engineering in Aged Non-equiatomic High Entropy Alloys with Heterogenous Structure Towards Superior Strength-ductility Synergy: *Cheng Zhang*¹; Chaoyi Zhu²; Xin Wang¹; Fan Ye¹; Kevin Kaufman²; Penghui Cao¹; Xiaoqing Pan¹; Julie Schoenung¹; Kenneth Vecchio²; Enrique Lavernia¹; ¹Department of Materials Science and Engineering, University of California Irvine; ²University of California San Diego

3:30 PM Invited
Manipulating Structures/Properties of Bulk Metallic Glasses and High-entropy Alloys by Severe Plastic Deformation: *Koichi Tsuchiya*¹; ¹International Center for Young Scientists; National

3:50 PM Invited

Ductility Improvement Methodologies in Metallic Glasses and High Entropy Alloys: *Yanfei Gao*¹; Hongbin Bei¹; ¹University of Tennessee - Knoxville

4:10 PM Break

4:25 PM Invited

Mechanical Behavior of Additive Manufactured CoCrNi High Entropy Alloy at 298K and 210K: *Soo Yeol Lee*¹; You Sub Kim¹; Hobyung Chae¹; Wanchuck Woo²; Dong-Kyu Kim³; E-Wen Huang⁴; Takuro Kawasaki⁵; Stefanus Harjo⁵; ¹Chungnam National University; ²Korea Atomic Energy Research Institute; ³University of Ulsan; ⁴National Chiao Tung University; ⁵Japan Atomic Energy Agency

4:45 PM Invited

High-throughput Hot-isostatic-pressing Micro-synthesis for Accelerating Studies of High Entropy Alloys: Lei Zhao¹; *Liang Jiang*²; Lixia Yang¹; Bin Liu³; Hui Wang¹; Haizhou Wang¹; ¹Central Iron & Steel Research Institute; ²Yantai University; ³Central South University

5:05 PM Invited

Improvement of Lattice Distortion by Addition of Zr Element in NbTaTiV Refractory High-entropy Alloy: *Chanho Lee*¹; Yi Chou²; George Kim³; Gian Song⁴; Michael C. Gao⁵; Ke An⁶; Chuan Zhang⁷; Wei Chen³; Jonathan D. Poplawsky⁶; Yi-Chia Chou²; Peter K. Liaw¹; ¹University of Tennessee; ²National Chiao Tung University; ³Illinois Institute of Technology; ⁴Kongju National University; ⁵National Energy Technology Laboratory; ⁶Oak Ridge National Laboratory; ⁷Computherm, LLC

MATERIALS PROCESSING

Low-cost Titanium: ‘Affordable Ti’ — Session II

Sponsored by: TMS Structural Materials Division, TMS: Titanium Committee, TMS: Powder Materials Committee

Program Organizers: Ramana Reddy, University of Alabama; M. Ashraf Imam, George Washington University

Monday PM | February 24, 2020
Theater A-8 | San Diego Convention Ctr

Session Chairs: Ashraf Imam, George Washington University; Z. Zak Fang, University of Utah

2:30 PM Invited

Making Affordable Titanium Alloy with Wrought-like Mechanical Properties from Sintering Low-Cost Titanium Powder: *Pei Sun*¹; Z. Zak Fang¹; ¹University of Utah

3:10 PM

A Systematic Experimental Investigation of the Planar-to-wavy Slip Transition in Model Ti-O Alloys: *Yan Chong*¹; Ruopeng Zhang¹; Shiteng Zhao¹; Mark Asta¹; Daryl Chrzan²; Andrew Minor¹; ¹University of California, Berkeley; ²University of California, Berkeley

3:30 PM

High Strength and Ductility Titanium Materials with Cheap Alloying Elements Fabricated by Powder Metallurgy: *Katsuyoshi Kondoh*¹; Takayuki Tanaka¹; Shota Kariya¹; Junko Umeda¹; ¹Osaka University

3:50 PM Break

4:05 PM

Electroplastic Effects in a Dilute Ti-Al Alloy: *Shiteng Zhao*¹; Ruopeng Zhang¹; Andrew Minor¹; ¹University of California, Berkeley

4:25 PM

Machine Learning Assisted Discovery of Affordable Biomedical Ti Alloy: *ChunTe Wu*¹; Hsiao-Tzu Chang²; Shi-Wei Chen³; Sih-Ying Huang¹; Yeong-Tsuen Pan²; Joshua Chou⁴; Hung-Wei Yen¹; ¹National Taiwan University; ²China Steel Corporation; ³National Synchrotron Radiation Research Center; ⁴University of Technology, Sydney

4:45 PM

Low-cost Titanium Extraction Process: Molten Salt Electrolysis with Titanium Oxycarbide (TiC_xO_{1-x}) as Soluble Anode: *Jiusan Xiao*¹; Hongmin Zhu²; Shuqiang Jiao¹; Jun Zhu³; ¹Univ of Science and Technology Beijing; ²Tohoku University; ³University of Science and Technology Beijing

5:05 PM

Preparation of Ti-6Al-4V Alloy Powder by Aluminothermic Reduction: *Wang Tian*¹; Wang Yaowu¹; ¹Northeast University

LIGHT METALS

Magnesium Technology 2020 — Alloy Development

Sponsored by: TMS Light Metals Division, TMS: Magnesium Committee

Program Organizers: J. Brian Jordon, University of Alabama; Victoria Miller, University of Florida; Vineet Joshi, Pacific Northwest National Laboratory; Neale Neelameggham, IND LLC

Monday PM | February 24, 2020
6C | San Diego Convention Ctr

Session Chairs: Norbert Hort, MagIC - Helmholtz Zentrum Geesthacht; Neale Neelameggham, IND LLC

2:30 PM Invited
Design of Ductile Rare-earth-free Magnesium Alloys: *William Curtin*¹; Rasool Ahmada¹; Binglun Yin¹; Zhaoxuan Wu²; ¹Institute of Mechanical Engineering, École Polytechnique Fédérale de Lausanne; ²Institute of High Performance Computing

3:00 PM
Microstructure Evolution and Precipitation Strengthening in Ca-containing Mg-rare Earth Alloys: *Qianying Shi*¹; Bruce Williams²; JohnAllison¹; ¹University of Michigan; ²CanmetMATERIALS, Natural Resources Canada

3:20 PM
A Die-cast Magnesium Alloy for Applications at Elevated Temperatures: *Xixi Dong*¹; Eric Nyberg²; Shouxun Ji¹; ¹Brunel University London; ²Tungsten Parts Wyoming

3:40 PM
Effect of Gd and Nd Additions on the Thermo-mechanical Response of a MgMn Alloy: *Domonkos Tolnai*¹; Serge Gavras¹; Pere Barriobero-Vila²; Andreas Stark¹; Norbert Schell¹; ¹Helmholtz-Zentrum Geesthacht; ²DLR

4:00 PM
Development of Ultra Lightweight, Corrosion Resistant Mg Alloys: *Taylor Cain*¹; Joseph Labukas¹; ¹US Army Research Laboratory

4:20 PM Break

4:40 PM Poster Pitches

CHARACTERIZATION

Material Behavior Characterization via Multi-Directional Deformation of Sheet Metal — Session II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

Program Organizers: Daniel Coughlin, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Piyush Upadhyay, Pacific Northwest National Laboratory; John Carsley, Novelis, Inc.

Monday PM | February 24, 2020
Theater A-1 | San Diego Convention Ctr

Session Chair: Kester Clarke, Colorado School of Mines

2:30 PM Invited
Evolution of Local Formability Concepts for Advanced High Strength Steels (AHSS): *Brandon Hance*¹; ¹U. S. Steel

3:10 PM Invited
Industry Perspective on the Mechanical Characterization of Next Generation Steels: *Erik Pavlina*¹; Jun Hu¹; Kavesary Raghavan¹; ¹AK Steel

3:50 PM
An Investigation into Improved Elongation-to-fracture in AHSS via Continuous Bending Under Tension: *Rishabh Sharma*¹; Camille Poulin²; Marko Knezevic²; Michael Miles¹; David Fullwood¹; ¹Brigham Young University; ²University of New Hampshire

4:10 PM Break

4:35 PM
Development of a Lean Duplex TRIP Steel with a Superior Formability: *Peijun Hou*¹; Yuan Li¹; Jun-Sang Park²; Dongchul Chae³; Chanhoo Lee¹; Yang Ren²; Ke An⁴; Hahn Choo¹; ¹University of Tennessee; ²Argonne National Laboratory; ³POSCO Technical Research Laboratory; ⁴Oak Ridge National Laboratory

4:55 PM
Experimental Studies into the Role of Cyclic Bending during Stretching of Dual-phase Steel Sheets: *Marko Knezevic*¹; Camille Poulin¹; ¹University of New Hampshire

5:15 PM
Damage Detection of Sheet Metal via Multi-directional Deformation: *Brahmananda Pramanik*¹; John Becker¹; Jared Schmidlin¹; Wednesday Rehm¹; ¹Montana Tech

MATERIALS DESIGN

Materials Design Approaches and Experiences V — Superalloys

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Akane Suzuki, GE Research; Ji-Cheng Zhao, University of Maryland; Michael Fahrman, Haynes International; Qiang Feng, University of Science and Technology Beijing; Michael Titus, Purdue University

Monday PM | February 24, 2020
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Session Chairs: Yunzhi Wang, The Ohio State University; Qiang Feng, University of Science and Technology Beijing

2:30 PM Invited

Design of Cobalt Base Single Crystal Superalloys: Sean Murray¹; Colin Stewart¹; Robert Rhein¹; Carlos Levi¹; Anton Van Der Ven¹; Tresa Pollock¹; ¹University of California, Santa Barbara

3:00 PM

Improved 3rd Generation Single Crystal Superalloy CMSX-4® Plus (SLS) – a Study of Evolutionary Alloy Development: Jacqueline Wahl¹; Ken Harris¹; ¹Cannon-Muskegon Corp

3:20 PM

Development of Ni-based Alloys For Transportation Applications: Govindarajan Muralidharan¹; John Chiles¹; Dean Pierce¹; Lawrence Allard¹; Donovan Leonard¹; Jonathan Poplawsky¹; ¹Oak Ridge National Laboratory

3:40 PM

Designing for Local Phase Transformation Strengthening in Nickel Based Superalloys: Ashton Egan¹; Lola Lilensten²; Paraskevas Kontis²; Sammy Tin³; Michael Mills¹; ¹Ohio State University; ²Max-Planck-Institut für Eisenforschung GmbH; ³Illinois Institute of Technology

4:00 PM Break

4:20 PM Invited

New Alloy Design Strategy via Non-conventional Phase Transformation Pathways: Longsheng Feng¹; Tianlong Zhang²; Dong Wang³; Yipeng Gao⁴; Yufeng Zheng¹; Michael Mills¹; Hamish Fraser¹; Yunzhi Wang¹; ¹The Ohio State University; ²City University of

Hong Kong; ³Xi'an Jiao Tong University; ⁴Idaho National Laboratory

4:50 PM

Equilibrium Segregation and Localized Phase Transition at Stacking Faults in Ni-based Superalloys: *Longsheng Feng*¹; You Rao¹; Ashton Egan¹; Michael Mills¹; Maryam Ghazisaeidi¹; Yunzhi Wang¹; ¹The Ohio State University

5:10 PM

Precipitate-mediated Dislocation Transformer in Ni-base Superalloys: *Longsheng Feng*¹; Michael Mills¹; Yunzhi Wang¹; ¹The Ohio State University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale V — Size Effects

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Christopher Weinberger, Colorado State University; Megan Cordill, Erich Schmid Institute; Garritt Tucker, Colorado School of Mines; Wendy Gu, Stanford University; Scott Mao, University of Pittsburgh; Yu Zou, University of Toronto

Monday PM | February 24, 2020
Santa Rosa | Marriott Marquis Hotel

Session Chairs: Yu Zou, University of Toronto; Alice Lassnig, Austrian Academy of Sciences

2:30 PM

Mechanical Behavior of Metallic Glass-HCP Crystalline Nanolayers: Mohammad Abboud¹; Amir Motallebzadeh²; Sezer Ozerinc¹; ¹Middle East Technical University; ²Koç University

2:50 PM

Effect of Layer Spacing on Mechanical Properties of Cu/Co Nanolaminates Through Tensile Testing: *Rohit Berlia*¹; Paul Rasmussen¹; Santhosh Rajarajan¹; Jagannathan Rajagopalan¹; ¹Arizona State University

3:10 PM

Size Effect of NiTi-based Shape Memory Nanoparticles on Recoverable Strain: *Ji Young Kim*¹; So Yeon Kim²; Jin Woo Kim²; Won Seok Ko³; Eun Soo Park¹; ¹Seoul National University; ²Seoul

National University; Massachusetts Institute of Technology; ³Ulsan University

3:30 PM Invited

Grain Size Effect on Thin Film Adhesion: *Alice Lassnig*¹; ¹Erich Schmid Institute of Materials Science

4:10 PM Break

4:30 PM

Tension-compression Asymmetry in Plasticity of Nanoporous Gold: *Hansol Jeon*¹; Eun-Ji Gwak¹; Hangeul Kim¹; Ju-Young Kim¹; ¹UNIST

4:50 PM

Fracture Properties of Ultrafine grain Chromium at RT: Dislocation Processes and Toughening Mechanisms: *Inas Issa*¹; Anton Hohenwarter¹; Reinhard Fritz¹; Daniel Kiener¹; ¹Montanuniversitat Leoben

5:10 PM

Studying the Anisotropic Deformation of Sapphire in Different Crystallographic Orientations using Nanoindentation and Micropillar Compression: *Anugraha Thyagatur Kidigannappa*¹; Alex Montagne²; Xavier Maeder²; Johann Michler²; Veronica Trabadelo³; Fatemeh Saeidi²; M. Parlinska-Wojtan⁴; Kilian Wasmer²; Siddhartha Pathak¹; ¹university of Nevada Reno; ²EMPA – Swiss Federal Laboratories for Materials Testing and Research; ³Mohammed VI Polytechnic University, Materials Science and Nano-engineering Department; ⁴ Institute of Nuclear Physics, Polish Academy of Sciences

5:30 PM

Exploring Small-scale Quasicrystal Plasticity in Unknown Temperature Regimes: *Yu Zou*¹; ¹University of Toronto

MATERIALS DESIGN

Metal-Matrix Composites: Analysis, Modeling, Observations and Interpretations — Processing - Microstructure - Performance

Sponsored by: TMS Structural Materials Division, TMS:
Composite Materials Committee

Program Organizers: Srivatsan Tirumalai, The University of Akron; Yuzheng Zhang, Gamma Alloys; William Harrigan, Gamma Alloys

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Session Chair: Ramasis Goswami, Naval Research Laboratory

2:30 PM Invited
Role of Matrix Microstructure on the Mechanical Behavior and Corrosion Response of Two Magnesium Metal Matrix Composites: Jayalakshmi S¹; Arvind Singh R¹; Xizhang Chen¹; Sergey Konovalov²; *Srivatsan T.S.*³; Seshan Sambasivam⁴; Manoj Gupta⁵; ¹Wenzhou University; ²Samara National Research University; ³The University of Akron; ⁴Indian Institute of Science; ⁵National University of Singapore

3:00 PM
Simultaneously Applied Electromagnetic and Mechanical Ultrasound for Particle Dispersion in Liquid Metals: *Imants Kaldre*¹; Andris Bojarevics¹; ¹University of Latvia

3:25 PM
Investigation of Friction Stir Spot Welding of Aluminium Alloys using Zinc as an Interlayer: *Pragya Rai*¹; Sushanta Panda¹; Jinu Paul¹; ¹IIT Kharagpur

3:50 PM
Effect of Reinforced Materials Size on Wear Behavior of Cu/B4C Metal Matrix Composites Fabricated by Friction Stir Processing: *Jae-Ha Kim*¹; Hyun-Joon Park¹; Choong-Jae Lee¹; Jinho Joo¹; Seung-Boo Jung¹; ¹Sungkyunkwan University

MATERIALS DESIGN

Microstructural Template Consisting of a Face-Centered Cubic Matrix with Ordered Precipitates: Microstructural Evolution and Properties — Ni Base Superalloys

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

Program Organizers: Rajarshi Banerjee, University of North Texas; Eric Lass, University of Tennessee, Knoxville; Ashley Paz Y Puente, University of Cincinnati; Tushar Borkar, Cleveland State University; Keith Knipling, Naval Research Laboratory; Sophie Primig, University of New South Wales

Monday PM | February 24, 2020
30D | San Diego Convention Ctr

Session Chair: Sophie Primig, University of New South Wales

2:30 PM Keynote

Precipitation and Deformation Mechanisms of γ'/γ Co-precipitates in Alloy 718: Hariharan Sriram¹; Kamal Kadirvel¹; Rongpei Shi¹; Longsheng Feng¹; Michael Mills¹; *Yunzhi Wang*¹; ¹The Ohio State University

3:10 PM Invited

Correlative High-resolution Characterization of the Early Stages of Precipitation During Direct Aging of Alloy 718: *Felix Theska*¹; Vitor Rielli¹; Keita Nomoto²; Flora Godor³; Bernd Oberwinkler³; Aleksandar Stanojevic³; Simon Ringer²; Sophie Primig¹; ¹University of New South Wales Sydney; ²The University of Sydney; ³voestalpine BÖHLER Aerospace GmbH & Co KG

3:40 PM

In-situ Transmission Electron Microscopy Investigation of Continuous Precipitation of Ni₃Mo in a Ni-25Mo-8Cr Alloy Formed by Direct Current Magnetron Sputtering: Megan Emigh¹; *Jessica Krogstad*²; ¹University of California, Santa Barbara; ²University of Illinois at Urbana-Champaign

4:00 PM Break

4:30 PM Invited

Ordered Precipitates and Mechanical Properties of Nickel-base Superalloys Studied by Analytical Scanning and Transmission Electron Microscopy: Micheal Kattoura¹; Jie Song²; Anurag Sharma²; Seetha Mannava²; *Vijay Vasudevan*²; ¹LSP Technologies; ²University of Cincinnati

5:00 PM Invited

The Quantitative Model for Heat Treatment Parameters and Gamma Prime Variations on Nickel-base Superalloys: Nishan Senanayake¹; *Jennifer Carter*¹; ¹Case Western Reserve University

5:30 PM Invited

Alloying for Corrosion Resistance: the Effect of Manganese and Silicon on a Polycrystalline Nickel-based Superalloy: *Stella Pedrazzini*¹; Noel Glaenger²; Mark Hardy³; Paul Mignanelli³; T. William Clyne²; Howard Stone²; ¹Imperial College London; ²University of Cambridge; ³Rolls-Royce plc

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — PbZn Process Technologies

Sponsored by: The Mining and Materials Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resource and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Monday PM | February 24, 2020
15B | San Diego Convention Ctr

Session Chair: Camille Fleuriault, Gopher Resource

2:30 PM

Contributions of Non-ferrous Smelters to Metal Resource Circulation in Japan: *Etsuro Shibata*¹; ¹Institute of Multidisciplinary Research for Advanced Materials, Tohoku University

2:50 PM

Complex Lead and Zinc Feed Treatment through Combining ISASMELT™ and Albion Process™: *Stanko Nikolic*¹; Paul Voigt¹; Ben Hogg¹; Mike Hourn¹; ¹Glencore Technology

3:10 PM

Recent Operation at Hachinohe Smelter: *Shojiro Mataoka*¹; Ushio Enomoto¹; Kazuhiko Nishina¹; ¹Hachinohe Smelting Company Limited

3:30 PM
Kinetic Aspects of an Innovative Technology for the Reprocessing of ISF Slag: *Walter Schatzmann*¹; Juergen Antrekowitsch¹; ¹Montanuniversität Leoben

3:50 PM Break

4:10 PM
Evaluation and Certification Strategies for Lead-zinc Bearing Residues: *Juergen Antrekowitsch*¹; G Hanke¹; ¹University of Leoben

4:30 PM
Increasing Plant Efficiency & Capacity: *Daniel Jackson*¹; ¹Pyrotek

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Primary Lead

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Monday PM | February 24, 2020
14B | San Diego Convention Ctr

Session Chair: Dean Gregurek, RHI Magnesita

2:30 PM
Lead Metal Production at Paroo Station Mine Using Leach-electrowinning Process in Methane Sulfonic Acid Solution: *David Dreisinger*¹; Ken Baxter²; Andrew Worland²; Tom Cooper³; Nick Waters²; ¹University of British Columbia; ²LeadFX Inc.; ³Rosslyn Hill Mining Limited

2:50 PM

Lead Plant Transformations: A Liu¹; *Michael Reed*¹; R. Close¹; L Thompson¹; ¹Worley Services Pty Ltd

3:10 PM

Long Service Life of Removable Roof at Hindustan Zinc: *Allan MacRae*¹; Sanjay Pal²; ¹Macrae Technologies, Inc.; ²Hingustan Zinc Limited

3:30 PM

Reduction of Lead Rich Slags with Coke in the Lead Blast Furnace: *Robin Vanparys*¹; Geoffrey Brooks¹; M. Akbar Rhamdhani¹; Tijl Crivits²; ¹Swinburne University of Technology; ²Umicore

3:50 PM Break

4:10 PM

Research and Application of Oxygen-enriched Side-blowing Continuous Smelting Technology for Lead-antimony-silver Complex Materials: *Jian Ping Yang*¹; ¹Changsha Engineering and Research Institute Ltd. of Nonferrous Metallurgy

4:30 PM

Installation of a Brown Field Slag Reduction Furnace: State of the Art Off-gas Treatment with Dry Gas Cleaning for SO2 Capture: Peter Weber¹; *Dirk Behrmann*¹; Thomas Breuer¹; ¹Küttner GmbH & Co. KG

4:50 PM

KCM – Innovator in the Pb Metal Production through Ausmelt Technology and Variable SO2 Concentration Off-gas Utilization: Nikolay Starev¹; *Georgi Doganov*¹; ¹KCM AD

5:10 PM

Application of CSC Technology in Nonferrous Metallurgy: *Xiaosong Wu*¹; ¹CINF Engineering Co., Ltd.

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Primary Zinc I

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Monday PM | February 24, 2020
15A | San Diego Convention Ctr

Session Chair: Etsuro Shibata, IMRAM, Tohoku University

2:30 PM
A Dynamic Model of a Submerged Plasma Slag Fuming Process: *Samant Nagraj*¹; Mathias Chintinne¹; Muxing Guo²; Bart Blanpain²; ¹Metallo Belgium N.V.; ²KU Leuven

2:50 PM
Start-up and Improvements of the New Electrolysis Plant at Annaka Refinery: *Takuhiro Yamaguchi*¹; ¹Toho Zinc Co., Ltd.

3:10 PM
ZnSO4.H2O Thermal Decomposition in the Presence of Reducing Agent (S2) and Catalyst (Pd): *Rodrigo Souza*¹; Gabriela Kurban¹; Nathalli Mello¹; Rogério Navarro¹; Eduardo Brocchi¹; ¹Pontifícia Universidade Católica do Rio de Janeiro

3:30 PM
Characterization and Processing of Residues from Hydrometallurgical Zinc Smelters: *Juergen Antrekowitsch*¹; G. Hanke¹; ¹University of Leoben

3:50 PM Break

4:10 PM
Increase in Zinc Recovery from a Silicate Concentrate by Pre Neutralization Process: *Maria Dias*¹; Daniel Pereira¹; Mateus Araujo¹; Caio Oliveira¹; Adelson Souza¹; ¹Nexa Resources

4:30 PM

Recovery of Lead from Zinc Plant Residue by Alkaline Leaching Process Followed by Cementation: *Jonghyun Kim*¹; Jae-chun Lee¹; Min-seuk Kim¹; Kyeong Woo Chung²; K Kurniawan¹; ¹Korea University of Science and Technology / Korea Institute of Geoscience and Mineral Resources; ²Korea Institute of Geoscience and Mineral Resources

4:50 PM

Zinc Residue Fuming Process in Side-submerged Combustion Furnace + Fuming Furnace: *Xu Liang*¹; Ma Shaobin¹; ¹China ENFI Engineering Corporation

5:10 PM

A Critical Review on Generation, Characteristics, and Utilization of Zinc Slag: *Yan Song*¹; Weiguo Wu¹; Liang Xu¹; Xiangqiang Chen¹; Ge Zhang¹; ¹China ENFI Engineering Corporation

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XIX — Advanced Electronic Materials

Sponsored by: TMS Functional Materials Division, TMS: Alloy Phases Committee

Program Organizers: Hiroshi Nishikawa, Osaka University; Shi-Kang Lin, National Cheng Kung University; Chao-Hong Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology, CAS; Ming-Tzer Lin, National Chung Hsing University; Dajian Li, Karlsruhe Institute of Technology; Yu Zhong, Worcester Polytechnic Institute; Yee-wen Yen, National Taiwan University of Science and Technology; Song-Mao Liang, Clausthal University of Technology; A.S.Md Abdul Haseeb, University of Malaya; Ligang Zhang, Central South University; Sehoon Yoo, KITECH

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Marina Ballroom E | Marriott Marquis Hotel

Session Chairs: Jaeho Lee, Hongik University; Chih-Ming Chen, National Chung Hsing University

2:30 PM Invited

Nanotwinned Copper Composite with High Strength and High Tensile Ductility: *Shien Ping Feng*¹; Yu Ting Huang¹; Wei-Ting Wang¹;

Zeyang Zhang¹; Mingyang Zhang¹; Wei-Ting Yeh²; ¹University of Hong Kong; ²High Performance Solution Co. Ltd.

3:00 PM Invited

Facile and Scalable Fabrication of Copper Nanoparticles with Superior Antioxidative Properties, Improved Sinterability and their Applications in Electronics: *Pengli Zhu*¹; Gang Li¹; Rong Sun¹;

¹Shenzhen Institutes of Advanced Technology Chinese Academy of Sciences

3:30 PM

The Effect of the Cu Preferred Orientation on the Adhesion between Cu and LCP in FCCL: *Chia-Hung Lee*¹; Cheng-Yi Liu¹;

¹National Central University

3:50 PM

Electroplating of Rhodium using Pulse Current Plating Method: Seo-Hyang Lee¹; *Jaeho Lee*¹; ¹Hongik University

4:10 PM Break

4:30 PM

4D Characterization of Electromigration-induced Grain Boundary Damage of Cu Interconnects: X-ray Tomography Experiments and Phase-field Simulations: William Farmer¹; Amey Luktuke¹; Marion Branch Kelly¹; Nikhilesh Chawla¹; *Kumar Ankit*¹; ¹Arizona State University

4:50 PM

Electromigration Effect Upon Single-phase and Two-phase Ag-Cu Alloy: an In-situ Study: *Yu-chen Liu*¹; Yung-si Yu¹; Shih-kang Lin¹; Shang-Jui Chiu²; ¹National Cheng Kung University; ²National Synchrotron Radiation Research Center

5:10 PM

Revisit the Blech Critical Product: Lattice Strain Induces Electromigration Effect: *Kuan-Hsueh Lin*¹; Yu-chen Liu¹; Shih-kang Lin¹; Ching-Shun Ku²; Shang-Jui Chiu²; ¹National Cheng Kung University; ²National Synchrotron Radiation Research Center

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Martensitic Transformation

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

Program Organizers: Yufeng Zheng, University of Nevada, Reno; Rongpei Shi, Lawrence Livermore National Laboratory; Stoichko Antonov, University of Science and Technology Beijing; Yipeng Gao, Idaho National Laboratory; Rajarshi Banerjee, University of North Texas; Yongmei Jin, Michigan Technological University

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Session Chairs: Yongmei Jin, Michigan Technological University; Deep Choudhuri, New Mexico Institute of Mining and Technology

2:30 PM
Macroscopic Energy Barrier and Rate-independent Hysteresis in Martensitic Transformations: *Yongmei Jin*¹; Yu Wang¹; Armen Khachaturyan²; ¹Michigan Technological University; ²Rutgers University

2:50 PM
Concurrent Modeling of Martensitic Transformation and Crack Growth in Shape Memory Ceramics: *Ehsan Moshkelgosha*¹; Mahmood Mamivand¹; ¹Boise State University

3:10 PM
The Effects of Quenching Medium and Cooling Rates on the Phase Transformation of γ -Fe₄N to Achieve Iron Nitride Martensite: *Bin Ma*¹; Guannan Guo¹; Jian-Ping Wang¹; ¹University of Minnesota

3:30 PM
A Martensitic Transformation Kinetics Law Sensitive to Stress State Implemented in Crystal Plasticity for Modeling of Strain and Stress Driven Austenite to Martensite Transformation: *Marko Knezevic*¹; Zhangxi Feng¹; Milovan Zecevic²; ¹University of New Hampshire; ²Los Alamos National Laboratory

3:50 PM
The Effect of Interface Compatibility and Grain Constraint in ZrO₂-based Shape-memory Ceramics: *Edward Pang*¹; Christopher Schuh¹; ¹Massachusetts Institute of Technology

4:10 PM Break

4:30 PM Invited
Young Leaders International Scholar – JIM: Co-based Heusler Alloys with Reentrant Martensitic Transformation Behavior:

Fundamentals and Application Possibilities: *Xiao Xu*¹; Takeshi Kanomata²; Ryosuke Kainuma¹; ¹Tohoku University; ²Tohoku Gakuin University

5:00 PM

Effect of Precipitates on Martensitic Transformation in NiTiHf Shape Memory Alloys: *Taiwu Yu*¹; Yipeng Gao²; Peter Anderson²; Michael Mills²; Yunzhi Wang²; ¹ Ohio State University; ²Idaho National Laboratory

5:20 PM

Martensitic Transformation in a Rapidly-quenched Interstitial-free Steel using a Gleeble 3800 Thermo-mechanical Simulator: *Mrinmoy Sinha*¹; Sadhan Ghosh¹; B. Syed²; ¹IIT Roorkee; ²R&D Division, Tata Steel, Jamshedpur, India

5:40 PM

Critical Defect Concentration for Strain Glass Transition in Doped Ferroelastics: *Chuanxin Liang*¹; Dong Wang¹; Yunzhi Wang²; ¹Xi'An Jiaotong University; ²The Ohio State University

ADVANCED MATERIALS

Progress towards Understanding the Synthesis and Behavior of Metals Far from Equilibrium: A SMD Symposium Honoring Enrique Lavernia on the Occasion of His 60th Birthday — Nanostructured Metals II

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Composite Materials Committee

Program Organizers: Haiming Wen, Missouri University of Science and Technology; Suveen Mathaudhu, University of California, Riverside; Yuntian Zhu, North Carolina State University; Manoj Gupta, National University of Singapore; Kaka Ma, Colorado State University; Troy Topping, California State University, Sacramento; Yizhang Zhou, University of California, Irvine; Joshua Yee, Sandia National Laboratories; Dalong Zhang, Pacific Northwest National Laboratory; Yaojun Lin, Wuhan University of Technology; Fei Chen, Wuhan University of Technology

**Monday PM | February 24, 2020
31B | San Diego Convention Ctr**

Session Chairs: Suveen Mathaudhu, University of California, Riverside; Yuntian Zhu, North Carolina State University

2:30 PM Invited
Sputter Deposited Nanotwinned NiMoW Alloys with Impressive Properties and Stability: *Kevin Hemker*¹; ¹Johns Hopkins University

3:00 PM Invited
Trimodal Composites: An Overview: *Julie Schoenung*¹; ¹University of California, Irvine

3:30 PM Invited
Real Space Charge Density Imaging with Sub-Å Resolution by 4D STEM: *Xiaoqing Pan*¹; ¹University of California, Irvine

4:00 PM Break

4:20 PM Invited
Nanotechnology Enabled Metallurgy for New Age of Metals: *Xiaochun Li*¹; ¹University of California, Los Angeles

4:50 PM Invited
Targeted Processing of Nanocrystalline Alloys to Elicit Nonequilibrium Interfacial States: Glenn Balbus¹; Zhitong Bai²; McLean Echlin¹; Tresa Pollock¹; Yue Fan²; *Daniel Gianola*¹; ¹University of California, Santa Barbara; ²University of Michigan

5:20 PM Invited
Moving Closer to Equilibrium but Maintaining the Defects (and the Properties): *Timothy Rupert*¹; ¹University of California, Irvine

5:50 PM
Targeting Specific Nanotwin Configurations in Sputter Deposited Alloys to Enable Systematic Investigation of Dislocation-twin Interactions: Francisco Andrade Chavez¹; Orcun Koray Celebi¹; Huseyin Sehitoglu¹; *Jessica Krogstad*¹; ¹University of Illinois at Urbana-Champaign

6:10 PM
Ultrafine-grained and Nanocrystalline Steels for Enhanced Mechanical Properties and Irradiation Resistance: *Haiming Wen*¹; Andrew Hoffman¹; Jiaqi Duan¹; Maalavan Arivu¹; ¹Missouri University of Science and Technology

MATERIALS DESIGN

Purveyors of Processing Science and ICME: A SMD Symposium to Honor the Many Contributions of Taylan Altan, Wei Tsu Wu,

Soo-Ik Oh, and Lee Semiatin — Additive Manufacturing

Sponsored by: TMS Structural Materials Division, TMS: Shaping and Forming Committee, TMS: Titanium Committee

Program Organizers: Adam Pilchak, US Air Force Research Laboratory; Ayman Salem, MRL Materials Resources LLC; Viola Acoff, University of Alabama; Nathan Levkulich, UES; Michael Glavicic, Rolls-Royce; Yufeng Zheng, University of Nevada, Reno; John Rotella, Purdue University

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30E | San Diego Convention Ctr

Session Chairs: Aymn Salem, MRL Materials Resources LLC; Pete Collins, Iowa State University

2:30 PM Invited
An (incomplete) ICME Framework for Modeling Additive Manufacturing:*Peter Collins*¹; Thomas Ales¹; Andrew Baker²; Yunzhi Wang³; D. Harlow⁴; Hamish Fraser³; ¹Iowa State University; ²The Boeing Company; ³The Ohio State University; ⁴Lehigh University

3:00 PM
Modeling of the Solidification Structure Evolution of Ti-6Al-4V Processed via Electron Beam Powder Bed Fusion: *Laurentiu Nastac*¹; Edwin Schwalbach²; Kevin Chaput²; Todd Butler²; ¹University of Alabama; ²Air Force Research Laboratory

3:30 PM
Mesoscale Simulations of Processing-microstructure Linkages during Additive Manufacturing: *Bala Radhakrishnan*¹; Younggil Song¹; Sarma Gorti¹; John Turner¹; Ranadip Acharya²; Lyle Levine³; ¹Oak Ridge National Laboratory; ²United Technologies Research Center; ³National Institute of Standards and Technology

4:00 PM Break

4:20 PM Invited
Role of Thermo-mechanical-chemical Transients: Relevance to Welding and Additive Manufacturing of Structural Metals: *Sudarsanam Babu*¹; ¹University of Tennessee, Knoxville

4:50 PM Invited
Optimizing Metals Additive Manufacturing: *Aaron Stebner*¹; ¹Colorado School of Mines

5:20 PM

Metallic Alloy Microstructure Selection during Rapid Solidification and Additive Manufacturing: *Amy Clarke*¹; Joseph McKeown²; Jonah Klemm-Toole¹; Alec Saville¹; Chandler Becker¹; Benjamin Ellyson¹; Yaofeng Guo¹; Chloe Johnson¹; Brian Milligan¹; Andrew Polonsky³; Kira Pusch³; Kester Clarke¹; Hunter Martin⁴; Damien Turret⁵; Alain Karma⁶; Sven Vogel⁷; Niranjana Parab⁸; Tao Sun⁸; Kamel Fezzaa⁸; Tresa Pollock³; ¹Colorado School of Mines; ²Lawrence Livermore National Laboratory; ³University of California, Santa Barbara; ⁴HRL Laboratories; ⁵IMDEA Materials; ⁶Northeastern University; ⁷Los Alamos National Laboratory; ⁸Advanced Photon Source, Argonne National Laboratory

NUCLEAR MATERIALS

Radiation Effects in Metals and Ceramics — Synergy of Irradiation and Corrosion Processes

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Djamel Kaoumi, North Carolina State University; Thak Sang Byun, Oak Ridge National Laboratory; Dane Morgan, University of Wisconsin-Madison; Maria Okuniewski, Purdue University; Mahmood Mamivand, Boise State University; Geoffrey Beausoleil, Idaho National Laboratory; Philip Edmondson, Oak Ridge National Laboratory; Khalid Hattar, Sandia National Laboratories; Aurelie Gentils, Université Paris-Saclay; Joel Ribis, Commissariat a l'Energie Atomique CEA

Monday PM | February 24, 2020
Theater A-7 | San Diego Convention Ctr

Session Chairs: Djamel Kaoumi, North Carolina State University; T. S. Byun, Oak Ridge National Laboratory

2:30 PM Invited

Future: Fundamental Understanding of Transport Under Reactor Extremes: *Blas Uberuaga*¹; ¹Los Alamos National Laboratory

3:00 PM

Design and Results of the Irradiation Corrosion Experiment (ICE): *Franziska Schmidt*¹; Yongqiang Wang²; Peter Hosemann¹; ¹University of California, Berkeley; ²Los Alamos National Laboratory

3:20 PM

Metal-ionic Phase Reactions in Molten Salt ionic Liquids: Experimental, Thermodynamic and Kinetic Analysis of the

Alteration of Preformed-oxides on Fe-Cr and Ni-Cr Alloys:
*Marlene Wartenberg*¹; Junsoo Han¹; Peter Hosemann²; Nan Li³; John Scully¹; ¹University of Virginia; ²University of California, Berkeley; ³Los Alamos National Laboratory

3:40 PM
Structural and Chemical Heterogeneities at the Nanoscale affecting Passive Film Formation during Irradiation and Corrosion:
*Sandra Taylor*¹; Timothy Lach¹; Matthew Olszta¹; Karen Kruska¹; Danny Edwards¹; Thak Sang Byun¹; Daniel Schreiber¹; ¹Pacific Northwest National Laboratory

4:00 PM Break

4:20 PM
Microstructure and Microchemistry Characterization of Neutron Irradiated M5® and X2® Fuel Cladding: *Zefeng Yu*¹; Kory Linton²; Lingfeng He³; Mukesh Bachhav³; Xiang Liu³; Adrien Couet¹; ¹University of Wisconsin; ²Oak Ridge National Laboratory; ³Idaho National Laboratory

4:40 PM
Neutron Radiation Damage of β Phase and its Impact on In-core Corrosion of Zr-Nb alloy: *Guanze He*¹; Junliang Liu¹; Anne Callow¹; Jing Hu²; Mir Anamul Haq³; Sergio Lozano-Perez¹; Chris Grovenor¹; ¹Department of Materials. University of Oxford; ²Argonne National Laboratory ; ³University of Huddersfield

5:00 PM
Influence of Zircaloy Alloying Elements and Impurities on Point Defects Formation in ZrO2 Corrosion Films and Resultant Zircaloy Corrosion Rate: *William Howland*¹; Richard Smith¹; Bruce Kammenzind¹; Mikael Christensen²; Volker Eyert²; Erich Wimmer²; ¹Naval Nuclear Laboratory; ²Materials Design, Inc.

5:20 PM
Understanding the Effect of Gamma Radiation on the Corrosion of Zirconium Alloys: *Choen May Chan*¹; Paul Binks¹; Douglas Rishel²; Aliaksandr Baidak³; ¹Wood; ²Naval Nuclear Laboratory; ³Dalton Cumbrian Facility

MATERIALS PROCESSING

Rare Metal Extraction & Processing — Rare Earth Metals

Sponsored by: TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee

Program Organizers: Gisele Azimi, University of Toronto; Takanari Ouchi, The University of Tokyo; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Kerstin Forsberg, KTH Royal Institute of Technology; Alafara Baba, University of Ilorin

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Session Chairs: Shafiq Alam, University of Saskatchewan; Takanari Ouchi, The University of Tokyo

2:30 PM Keynote
Supercritical Fluid Extraction of Rare Earth Elements from Waste Fluorescent Lamp: Jiakai Zhang¹; *Gisele Azimi*¹; ¹University of Toronto

3:00 PM
Supercritical Fluid Extraction of Rare Earth Elements from a Canadian Ore: *Jiakai Zhang*¹; Kimberly Watada¹; Nattana Kunanusont¹; Maziar Sauber²; Gisele Azimi¹; ¹University of Toronto; ²CanmetMINING, Natural Resources Canada

3:20 PM
Optimizing Zr and REE Recovery from Zircon through a Better Understanding of the Mechanisms Governing its Decomposition in Alkali Media: *Yves Thibault*¹; Joanne Gamage McEvoy¹; Dominique Duguay¹; ¹Natural Resources Canada

3:40 PM
An Innovative Process for Extracting Scandium from Nickeliferous Laterite Ore: *Jihye Kim*¹; Gisele Azimi¹; ¹University of Toronto

4:00 PM
Recovery of Strategic Materials from Canadian Bauxite Residue by Smelting Followed by Acid Baking – Water Leaching: *John Anawati*¹; Gisele Azimi¹; ¹University of Toronto

4:20 PM Break

4:35 PM Keynote
The Dynamics of the Circular Economy of Rare Earth Elements: *Fiseha Tesfaye*¹; Joseph Hamyuni²; Daniel Lindberg³; Pekka Taskinen³; Leena Hupa¹; ¹Abo Akademi University; ²Outotec (Finland) Oy; ³Aalto University

5:05 PM

Application of Microwave Pretreatment for Rare Earth Element Recovery from Phosphogypsum: *Adrian Lambert*¹; John Anawati¹; Mugdha Walawalkar¹; Jason Tam¹; Gisele Azimi¹; ¹University of Toronto

5:25 PM

Separation of Neodymium and Dysprosium by Molten Salt Electrolysis Using an Alloy Diaphragm: *Tetsuo Oishi*¹; Miki Yaguchi¹; Yumi Katasho¹; Toshiyuki Nohira¹; ¹AIST

ELECTRONIC MATERIALS

Recent Advances in Functional Materials and 2D/3D Processing for Sensors and Electronic Applications — Printed Electronics I: Functional Materials and Devices

Sponsored by: TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Pooran Joshi, Oak Ridge National Laboratory; Ravindra Nuggehalli, New Jersey Institute of Technology; Anming Hu, University of Tennessee; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Yong Lin Kong, University of Utah; Mariappan Paranthaman, Oak Ridge National Laboratory

Monday PM | February 24, 2020
Carlsbad | Marriott Marquis Hotel

Session Chairs: Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University

2:30 PM Invited

Laser Welding Nanowires for Smart Sensing: *Yongchao Yu*¹; Lingyue Zhang¹; Pooran Joshi²; Anming Hu¹; ¹University of Tennessee; ²Oak Ridge National laboratory

2:55 PM Invited

Large Scale Laser Direct Manufacturing of Functional Structures for Electro–optical Applications: *Gary Cheng*¹; ¹Purdue University

3:20 PM

Highly Sensitive and Selective Room Temperature Ammonia Sensor: *Shivani Sharma*¹; Rajan Saini²; Sandeep Sharma³; ¹Guru Nanak Dev University; ²Rutgers The State University of New Jersey; ³Guru Nanak Dev University, Punjab

3:40 PM

Applications of Magnetic Augmented Rotation System (MARS) – Prototypes Via 3-D Printing: *Balraj Mani*¹; Tyler Brunstein-Ellenbogen¹; Kevin Nino¹; Jaime Siguenza¹; Tien See Chow²; Nuggehalli Ravindra¹; ¹New Jersey Institute of Technology; ²Energy Technology Development Inc.

4:00 PM Break**4:20 PM Invited**

Microporous Metal-organic Framework and Polymer Sensing Layers for Energy Infrastructure Monitoring Applications: *Paul Ohodnicki*¹; Ki-Joong Kim²; Jeffrey Culp²; Tao Hong²; ¹National Energy Technology Laboratory (presently at University of Pittsburgh); ²National Energy Technology Laboratory

4:45 PM

Site-selective Synthesis of Core-Shell Nanowires for Nanoelectronics Assembly and Soldering: *Edward Fratto*¹; Jirui Wang¹; Brendan Lucas¹; Hongwei Sun¹; Zhiyong Gu¹; ¹University of Massachusetts, Lowell

5:05 PM

3D Printed Magnetic Augmented Rotation System - Design, Fabrication & Performance: *Navjot Panchi*¹; Jonathan Martinez¹; Linus Garcia¹; Tien See Chow²; Nuggehalli Ravindra¹; ¹New Jersey Institute of Technology; ²ETD Inc.

5:25 PM

Laser Scripted Graphene and Metal-nanostructures for Flexible Microwave Devices: *Ruozhou Li*¹; Jing Yan¹; Yuming Fang¹; Ying Yu¹; ¹Nanjing University of Posts and Telecommunications

5:45 PM

Multi-scale Modeling Method of Laser Selective Melting: *Ze-Chen Fang*¹; Zhi-Lin Wu¹; Chen-Wu Wu²; ¹Nanjing University of Science and Technology; ²Institute of Mechanics, Chinese Academy of Sciences

BIOMATERIALS

Recent Developments in Biological, Structural and Functional Thin Films and Coatings — Biomedical and Polymeric Applications

Sponsored by: TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Adele Carrado, IPCMS - CNRS; Heinz Palkowski, Clausthal University of Technology; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Ramana Chintalapalle, University of Texas at El Paso; Nuggehalli Ravindra, New Jersey Institute of Technology; Nancy Michael, University of Texas at Arlington; Vikas Tomar, Purdue University

Monday PM | February 24, 2020
Oceanside | Marriott Marquis Hotel

Session Chairs: Adele Carradò, CNRS IPCMS UNISTRA; Nancy Michael, University of Texas Arlington

2:30 PM Keynote
Functionalization of Polymers and Surfaces: a Way to Get Specific and Controlled Host Response towards Implantable Medical Devices: *Véronique Migonney*¹; ¹University of Paris

3:10 PM Invited
Surface Color on Demand: Chameleon effect: *Karine Mougín*¹; Hendrik Hoelscher²; ¹IS2M-CNRS; ²KIT

3:40 PM Break

4:00 PM Keynote
Sono-electrodeposition Approach for Biomimetic Calcium-deficient Hydroxyapatite Coating on Carbon Fiber Cloth: *Sylvie Bonnamy*¹; Florian Olivier¹; Sandrine Delpeux¹; Jérôme Chancolon¹; Vincent Sarou-Kanian²; Franck Fayon²; Nathalie Rochet³; ¹CNRS/University of Orleans; ²CNRS; ³CNRS/INSERM

4:40 PM Invited
Determining the Effects of Surface Treatments on the Surface Energy of Titanium in an Effort to Bond a Bioactive Coating: *Holly Martin*¹; Patrick McWhorter¹; Ibrahim Al Qanber¹; Arthur Kasson¹; Snjezana Balaz¹; ¹Youngstown State University

5:10 PM
Poly(methyl methacrylate) Brushes on Titanium Sheets: Characterization of the Polymer Chains: Martial Morin¹; Abdoulaye Ouattara¹; Wenjia He¹; Patrick Masson¹; Geneviève Pourroy¹; Heinz Palkowski²; *Adele Carrado*¹; ¹IPCMS - CNRS; ²Clausthal University of Technology

ENERGY & ENVIRONMENT

Recycling of Secondary, Byproduct Materials and Energy — Recycling of Ferrous and Non-ferrous Materials

Sponsored by: TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Mingming Zhang, ArcelorMittal Global R&D; John Howarter, Purdue University; Elsa Olivetti, Massachusetts Institute of Technology; Alan Luo, Ohio State University; Adam Powell, Worcester Polytechnic Institute; Ziqi Sun, Queensland University of Technology

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16A | San Diego Convention Ctr

Session Chairs: Mingming Zhang, ArcelorMittal; John Howarter, Purdue University; Chengguang Bai, Chongqing University; Mark Strauss, Idaho National Laboratory

2:30 PM Introductory Comments

2:35 PM Invited
Recycling Research in the Kroll Institute for Extractive Metallurgy: *Patrick Taylor*¹; ¹Colorado School of Mines

3:00 PM
Recycling of Waste Neodymium Magnet through Electrorefining of Molten Salt: *Xin Lu*¹; Xinyuan Zhang¹; Aketagawa Mayu¹; Osamu Takeda¹; Hongmin Zhu¹; ¹Tohoku University

3:20 PM
Recycling of Metallurgical Slag for Electromagnetic Waves Interference Functions: *Yong Fan*¹; ¹Institut für Eisen- und Stahltechnologie

3:40 PM Break

4:00 PM
Towards 100% Recycling of Steelmaking Offgas Solid Wastes by Reallocating Zinc-bearing Materials: *Naiyang Ma*¹; ¹Arcelor Mittal

4:20 PM
Extraction and Processing of Crystalline Metallurgical-Grade Silicon prepared from Rice Husk Byproduct: *Iyen Cookey*¹; Benedict Ayomanor²; Vitalis Mbah²; ¹Federal University Wukari; ²Federal Polytechnic Nasarawa

4:40 PM

A Review of Iron and Steel Scrap Recycling in Ironmaking and Steelmaking Processes: *Mingming Zhang*¹; ¹ArcelorMittal Global R&D

5:00 PM

Recovery Nickel-ferous Compound from Nickel-bearing Secondary Resources: *Qiuju Li*¹; ¹Shanghai University

5:20 PM

Separation and Recovery of Copper from Copper-bearing Pyrite Cinder via an Acid Leaching Process: *Yikang Tu*¹; Manman Lu¹; Zijian Su¹; Yuanbo Zhang¹; Tao Jiang¹; ¹Central South University

5:40 PM

Granulation and Carbonization Process of Titanium-bearing Blast furnace Slag: Mingrui Yang¹; Gangqiang Fan¹; Feifei Pan¹; Jie Dang¹; Xuewei Lv¹; *Chenguang Bai*¹; ¹Chongqing University

ADVANCED MATERIALS

Refractory Metals 2020 — Refractory Metal Alloys, Silicides, and Composites

Sponsored by: TMS Structural Materials Division, TMS: Refractory Metals Committee

Program Organizers: Eric Taleff, University of Texas at Austin; Gary Rozak, H.C. Starck Inc; Todd Leonhardt, Rhenium Alloys Inc.

Monday PM | February 24, 2020
Cardiff | Marriott Marquis Hotel

Session Chairs: Eric Taleff, University of Texas; Todd Leonhardt, Rhenium Alloys

2:30 PM Invited

Intermetallic Precipitate Reinforced Refractory Metal Alloys toward ‘bcc-superalloys’: *Alexander Knowles*¹; Chris Hardie²; David Dye³; ¹University of Birmingham; ²Culham Centre for Fusion Energy; ³Imperial College London

2:50 PM

Alloying for Precipitation Hardening in Chromium: *Mathias Galetz*¹; Anke Ulrich¹; Petra Pfitzenmaier²; Uwe Glatzel²; ¹DECHEMA-Forschungsinstitut; ²University Bayreuth

3:10 PM

Development of Refractory Complex Concentrated Alloys RCCAs Using Diffusion Couple Approach: *Vivek Verma*¹; Michael Titus²; David Johnson²; Kaustubh Kulkarni³; ¹Department of Materials Science and Engineering, Indian Institute of Technology; ²School of Materials Engineering, Purdue University; ³Department of Materials Science and Engineering, Indian Institute of Technology, Kanpur

3:30 PM

ZrC-W Composites Prepared by Reactive Melt Infiltration of Zr₂Cu Alloy into Binder-jet Printed WC Preforms: *Rina Mudanyi*¹; Corson Cramer²; Amy Elliott²; Dhananjay Kumar¹; ¹North Carolina A & T State University; ²Oak Ridge National Laboratory

3:50 PM

Seeking Toughness in Mo-Si-B: Composites of Stable Oxides: *Peter Marshall*¹; Sharvan Kumar²; Xiang Yu²; Alex Jackson¹; ¹Imaging Systems Technology; ²Brown University

4:10 PM Break

4:30 PM

Microstructure, Microhardness and Oxidation Behavior of Mo-Si-B alloys in the Moss+Mo₂B+Mo₅SiB₂ Three Phase Region: *Longfei Liu*¹; John Perepezko¹; ¹University of Wisconsin, Madison

4:50 PM

Magnetic Field Effects on the Compression Properties of Pure Tantalum: *Hitesh Adhikari*¹; Rajiv Mishra¹; ¹University of North Texas

ELECTRONIC MATERIALS

Solar Cell Silicon — Properties, Photovoltaics, and Other Applications

Sponsored by: TMS Extraction and Processing Division, TMS; Recycling and Environmental Technologies Committee, TMS; Materials Characterization Committee

Program Organizers: Shadia Ikhmayies, Al Isra University; Neale Neelameggham, IND LLC

Monday PM | February 24, 2020
Miramar | Marriott Marquis Hotel

Session Chair: Shadia Ikhmayies, Isra University

2:30 PM Introductory Comments

2:35 PM

First Principles Modeling of Water-induced Polymer Encapsulant Degradation in Silicon Modules: *Arun Kumar Mannodi Kanakkithodi*¹; Rishi Kumar²; David Fenning²; Maria Chan¹; ¹Argonne National Laboratory; ²University of California, San Diego

2:55 PM

Thermodynamic Properties of Si-P Binary System: *Shadia Ikhmayies*¹; ¹Al Isra University

3:15 PM

Using Thermo-calc Software to Deduce the Thermodynamic Properties of Si-B Binary System: *Shadia Ikhmayies*¹; ¹Al Isra University

3:35 PM

Dislocation-based Thermodynamic Models of V-pits Formation and Strain Relaxation in InGaN/GaN Epilayers on Si Substrates: Khaled Khafagy¹; *Tarek Hatem*²; Salah Bedair¹; ¹North Carolina State University; ²The British University in Egypt

PHYSICAL METALLURGY

Solid State Diffusion Bonding of Metals and Alloys — Solid State Diffusion Bonding of Metals and Alloys II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Mohamed Elbakhshwan, University of Wisconsin Madison; Mark Anderson, University of Wisconsin Madison; Todd Allen, University of Michigan ; Tasnim Hassan, North Carolina State University

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Session Chairs: Tasnim Hassan, North Carolina State University; Heramb Heramb Mahajan , North Carolina State University

2:30 PM Invited

Tensile Performance of Diffusion Bonded Haynes 230 Alloy for use in a Compact Heat Exchanger: *Kyle Rozman*¹; W. Pratte²; Thaddeus Rahn²; Brian Fronk²; Brian Paul²; Ömer Dogan¹; ¹National Energy Technology Laboratory; ²Oregon State University

3:00 PM

Anisotropic Grain Growth in Cu Joints at Low Temperatures by <111>-oriented Nanotwinned Copper Films: *Chang Chih Hsieh*¹; Chih Chen¹; ¹National Chiao Tung University

3:20 PM

Microstructural Characterizations and Mechanical Properties of Diffusion Bonded Stainless Steel 316H and Inconel 800H: *Mohamed Elbakhshwan*¹; Ian Jentz¹; Collin Magnin¹; Andrew Brittan²; Mark Anderson¹; Todd Allen³; ¹University of Wisconsin, Madison; ²Oregon State University; ³University of Michigan

3:40 PM

Microstructure Evolution and Mechanical Properties of Diffusion Bonded Ti6Al4V Alloy Joints for Aerospace Applications: *Rajakumar S*¹; Pragatheswaran T¹; Kavitha S¹; Balasubramanian V¹; Vijay Petley²; Shweta Verma²; ¹Annamalai University; ²Gas Turbine Research Establishment (GTRE)

4:00 PM Break

4:30 PM

Modeling Strength of Diffusion Bonded Interface Using Phase-Field Recrystallization and Creep-Damage Models.: Aritra Chakraborty¹; *Andrea Rovinelli*¹; Mark Messner¹; T.L. Sham¹; ¹Argonne National Laboratory

4:50 PM

Solid-state Diffusion Bonding of Glass-metal for the International Thermonuclear Experimental Reactor (ITER) Diagnostic Windows: *Lee Aucott*¹; ¹United Kingdom Atomic Energy Authority

5:10 PM

Solid State Joining of Dissimilar Ni-based Superalloys Using Field Assisted Sintering Technology: *Charis Lin*¹; Namiko Yamamoto¹; Derek King²; Jogender Singh¹; ¹The Pennsylvania State University; ²UES Inc.

PHYSICAL METALLURGY

Thermal Transport in Crystalline and Non-crystalline Solids: Theory and Experiments — Multiscale Thermal Transport

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Marat Khafizov, Ohio State University; Michael Manley, Oak Ridge National Laboratory; Krzysztof Gofryk, Idaho National Laboratory; Aleksandr Chernatynskiy, Missouri Science and Technology University

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Session Chairs: Miaomiao Jin, Idaho National Laboratory; Michael Tonks, University of Florida

2:30 PM Invited
Determining the Impact of Material Microstructure on the Effective Thermal Conductivity Using Mesoscale Simulation and Modeling: *Michael Tonks*¹; ¹University of Florida

3:00 PM Invited
The Degradation of the Thermal Conductivity of Oxide Nuclear Fuel: *Michael Cooper*¹; Ben Liu¹; Chris Stanek¹; David Andersson¹; ¹Los Alamos National Laboratory

3:30 PM
Mesoscale Modeling of Thermal Conductivity of a UO2 and BeO Composite Nuclear Fuel: *Karim Ahmed*¹; Sean Mcdeavitt¹; ¹Texas A&M University

3:50 PM
Influence of Irradiation-induced Microstructural Defects on the Thermal Conductivity of Single Crystal Thorium Dioxide: *Amey Khanolkar*¹; Zilong Hua¹; Marat Khafizov²; Vinay Chauhan²; Yuzhou Wang²; Tiankai Yao¹; Lingfeng He²; J. Matthew Mann³; Anter El-Azab⁴; Jian Gan¹; David Hurley¹; ¹Idaho National Laboratory; ²The Ohio State University; ³Air Force Research Laboratory; ⁴Purdue University

4:10 PM Break

4:30 PM Invited
Thermal Transport in Crystalline Solids with Irradiation-Induced Defects: Computational Modeling and Experiments: *Anter El-Azab*¹; ¹Purdue University

5:00 PM Invited
Multi-scale Thermal Transport Characterization of Nuclear Fuels: *Zilong Hua*¹; Robert Schley¹; Amey Khanolkar¹; Austin Fleming¹; Colby Jensen¹; David Hurley¹; ¹Idaho National Laboratory

5:30 PM

Impact of Irradiation Induced Nanoscale Defects on Optical and Thermal Properties of Cerium Dioxide: *Vinay Chauhan*¹; Lingfeng He²; Janne Pakarinen³; David Hurley²; Marat Khafizov¹; ¹The Ohio State University; ²Idaho National Labratory; ³Belgian Nuclear Research Centre (SCK·CEN)

SPECIAL TOPICS

TMS Annual Meeting & Exhibition — All-Conference Plenary

Monday PM | February 24, 2020
6A | San Diego Convention Ctr

12:00 PM Introductory Comments

12:05 PM Invited
Leveraging Materials Innovation to Drive Industrial Gas Turbine Performance and Secure a Sustainable Future: *John Mason*¹;
¹Solar Turbines Incorporated

12:45 PM Question and Answer Period

12:55 PM Concluding Comments

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XI) — Processing & Microstructure I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Caizhi Zhou, Missouri University of Science and Technology; Megumi Kawasaki, Oregon State University; Enrique Lavernia, University of California, Irvine; Terry Lowe, Colorado School of Mines; Suveen Mathaudhu, University of California, Riverside; Ruslan Valiev, UFA State Aviation Technical University; Yuntian Zhu, North Carolina State University

Monday PM | February 24, 2020
Marina Ballroom D | Marriott Marquis Hotel

Session Chairs: Mohsen Zaeem, Colorado School of Mines; Jingtao Wang, Nanjing University of Science and Technology; Erhard Schafler, University Of Vienna; Kaka Ma, Colorado State University

2:30 PM Invited
Heterogeneous Pore Architecture Achieved by Spark Plasma Sintering: Alexander Preston¹; Yuchen Lin¹; *Kaka Ma*¹; ¹Colorado State University

2:50 PM
Cu-Ta FCC-BCC Metal Composites Fabricated via Powder Consolidation by Equal Channel Angular Extrusion: *Zachary Levin*¹; Michael Demkowicz¹; K. Hartwig¹; ¹Department of Material Science and Engineering, Texas A&M University

3:10 PM
Effect of High-pressure Torsion on Corrosion Behavior of a Magnesium ZK60 Alloy in 0.1M NaCl: *Hamidreza Torbati-Sarraf*¹; Seyed Alireza Torbati Sarraf²; Terence Langdon³; ¹Clemson University; ²University of Southern California; ³University of Southampton

3:30 PM
Hierarchical Structures in Ti-6Al-4V by Thermohydrogen Refinement of Microstructure: *Brady Butler*¹; Laura Moody²; Daniel Lewis²; Ion Powell²; Matthew Dunstan¹; James Paramore¹; ¹United States Army Research Laboratory; ²Texas A&M University

3:50 PM Invited
Grain Refinement-induced Plasticity in Heterostructured Brass: *Xiaolei Wu*¹; Yuntian Zhu²; ¹Laboratory of Nonlinear Mechanics, Chinese Academy of Sciences; ²North Carolina State University

4:10 PM Break

4:30 PM Invited
Nanostructures and Properties of Rapid Directional Solidification of Al Alloys: *Mohsen Asle Zaeem*¹; ¹Colorado School of Mines

4:50 PM
Atomistic Analysis of the Effect of Internal Defects on the Deformation of Nanocrystalline Metals: *Caizhi Zhou*¹; Sixie Huang¹; ¹Missouri University of Science and Technology

5:10 PM
In-situ Synchrotron X-ray Profile Analysis during High Pressure Torsion: *Erhard Schafler*¹; Michael Kerber¹; Florian Spieckermann²; Roman Schuster³; Torben Fischer⁴; ¹University of Vienna; ²University

of Leoben; ³University of Technology Vienna; ⁴Helmholtz-Zentrum Geesthacht

5:30 PM

Mechanical Properties and Microstructure Evolution of Multilayered Al-Cu Hybrid Materials Produced by High-pressure Torsion: *Piotr Bazarnik*¹; Barbara Romelczyk-Baishya¹; Jiaoyan Dai²; Yi Huang³; Malgorzata Lewandowska¹; Terence Langdon³; ¹Warsaw University of Technology; ²Institute of Materials, Ningbo University of Technology; ³University of Southampton

5:50 PM Invited

Kinetic Path Dependent Thermal Stability of Copper after Severe Plastic Deformation: *Jing Tao Wang*¹; ¹Nanjing University of Science & Technology

MECHANICS & STRUCTURAL RELIABILITY

Understanding and Predicting Dynamic Behavior of Materials – Behavior of High Explosives

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Marc Meyers, University of California San Diego; George Gray, Los Alamos National Laboratory

Monday PM | February 24, 2020
5A | San Diego Convention Ctr

Session Chair: John Yeager, Los Alamos National Laboratory

2:30 PM Invited

Dynamic Measurements of Solid Carbon Cluster Growth and Morphology in High Explosives Detonation Products: *Dana Dattelbaum*¹; Erik Watkins¹; Kirill Velizhanin¹; Rachel Huber¹; Rick Gustavsen¹; Tariq Aslam¹; Millie Firestone¹; Bryan Ringstrand¹; Trevor Willey and Team²; Nicholas Sinclair³; Paulo Rigg³; ¹Los Alamos National Laboratory; ²Lawrence Livermore National Laboratory; ³Washington State University

3:10 PM
Anisotropic Damage Model for Cyclotrimethylene Trinitramine (RDX) under Impact: *Nisha Mohan*¹; ¹Los Alamos National Laboratory

3:30 PM
Controlled Fragment Impact Experiments for Initiation Response of PBXs: *Patrick Bowden*¹; Andrew Schmalzer¹; John Yeager¹; Joseph Lichthardt¹; Alexander Mueller¹; ¹Los Alamos National Laboratory

3:50 PM
Experiments and Modeling to Explore Dynamic Behavior of Materials via Kolsky Bar at Equilibrium and Beyond: *Benjamin Morrow*¹; Francis Addessio¹; Christopher Meredith²; Kyle Ramos¹; Cheng Liu¹; Carl Cady¹; Clarissa Yablinsky¹; ¹Los Alamos National Laboratory; ²U.S. Army Research Laboratory

4:10 PM Break

4:30 PM
One Dimensional Shock Initiation of the HMX- based Explosive PBX-9012: *Malcolm Burns*¹; ¹Los Alamos National Laboratory

4:50 PM
Multiscale Modeling to Study Effects of Microstructure in Shocked Hexanitrostilbene: *Judith Brown*¹; David Kittell¹; Mitchell Wood¹; Aidan Thompson¹; Dan Bolintineanu¹; ¹Sandia National Laboratories

5:10 PM
Single Crystal Plasticity for the High Rate Deformation of an HMX-based Plastic Bonded Explosive: *Milovan Zecevic*¹; Marc Cawkwell¹; Kyle Ramos¹; Darby Luscher¹; ¹Los Alamos National Laboratory

ADVANCED MATERIALS

Use of Large Scale Facilities to Understand the Physical Metallurgy of Fe-based Alloys — Session II

Sponsored by:

Program Organizers: Sebastien Allain, Institut Jean Lamour; Alexis Deschamps, Grenoble Institute of Technology; MingXin Huang, University of Hong Kong; Amy Clarke, Colorado School of Mines; C. Tasan, Massachusetts Institute of Technology

Monday PM | February 24, 2020
Mission Hills | Marriott Marquis Hotel

Session Chairs: Mingxin Huang, The University of Hong Kong;
Alexis Deschamps, SIMAP

2:30 PM

Carbide-free Bainite Transformations in Non-isothermal Conditions Investigated

by In-situ High-energy X-ray Diffraction Experiments: *Cécile Rampelberg*¹; Guillaume Geandier¹; Julien Teixeira¹; Thomas Sourmail²; Sébastien Allain¹; ¹Institut Jean Lamour; ²Ascometal

2:50 PM

Carbon Heterogeneities in Austenite during Quenching & Partitioning (Q&P) Process Revealed by In Situ High Energy X-ray Diffraction (HEXRD) Experiments:

*Guillaume Geandier*¹; Sebastien Allain¹; Steve Gaudez¹; Frederic Danoix²; Michel Soler³; Mohamed Goune⁴; ¹Institut Jean Lamour; ²Normandie Université , UNIROUEN, INSA Rouen, CNRS; ³Maizières Automotive Products, Arcelormittal Maizières Research SA; ⁴Institut de Chimie de la Matière Condensée de Bordeaux

3:10 PM

Real-time Investigation of Recovery, Recrystallization and Austenite Transformation during Annealing of a Cold-rolled Steel Using High Energy X-ray Diffraction (HEXRD):

Marc Moreno¹; Guillaume Geandier¹; Julien Teixeira¹; Jean-Christophe Hell²; Frédéric Bonnet²; *Sebastien Allain*¹; ¹Institut Jean Lamour; ²ArcelorMittal Maizières Research SA

3:30 PM

In-situ Synchrotron X-ray Diffraction Stress Analysis during Laser Surface Line Hardening of Samples with Specific Geometric Features:

Dominik Kiefer¹; *Jens Gibmeier*¹; Fabian Wilde²; Felix Beckmann²; ¹Karlsruhe Institute of Technology - Institute for Applied Materials; ²Helmholtz-Zentrum Geesthacht - Institute of Materials Research

3:50 PM

In situ HEXRD Determination and Numerical Simulation of Internal Stresses during HeatTreatment of Carburized and Carbonitrided Low-alloyed Steels:

Karthikeyan Jeyabalan¹; *Julien Teixeira*¹; Sabine Denis¹; Guillaume Geandier¹; Jacky Dulcy¹; Benoît Denand¹; Grégory Michel²; Simon Catteau³; Marc Courteaux⁴; ¹Institute Jean Lamour; ²IRT-M2P; ³Ascometal - CREAS; ⁴Groupe PSA - Centre Technique de Belchamp

4:10 PM Break

4:30 PM

Stress Tensor Determination during Phase Transformation of a Metal Matrix Composite using In situ High Energy X-ray Diffraction: *Guillaume Geandier*¹; Lilian Vautrot¹; Benoît Denand¹; Sabine Denis¹; ¹Intitut Jean Lamour

4:50 PM

Microstructure Evolution and Phase Transformations during Deformation of Metastable Austenitic CrMnNi Steel as Revealed by In situ Synchrotron Radiation X-ray Diffraction: *Christiane Ullrich*¹; Stefan Martin¹; Christian Schimpf¹; Andreas Stark²; Norbert Schell²; David Rafaja¹; ¹TU Bergakademie Freiberg; ²Helmholtz-Zentrum Geesthacht

5:10 PM

In situ Quantitative Study of Retained Austenite Mechanical Stability in 3rd Generation TRIP-aided Steels by High-Energy X-ray Diffraction on Synchrotron Beamline: *Mathias Lamari*¹; Sebastien Allain¹; Guillaume Geandier¹; Julien Teixeira¹; Astrid Perlade²; Kangying Zhu²; ¹Institut Jean Lamour; ²ArcelorMittal Maizières Research SA, Product Center

5:30 PM

Combining Interrupted Hopkinson Bar Tensile Tests with Synchrotron XRD to Study Work Hardening Behavior of Q&P Steels at High Strain Rates: Ming Wang¹; *MingXin Huang*¹; ¹University of Hong Kong

MATERIALS PROCESSING

11th International Symposium on High Temperature Metallurgical Processing — Fundamentals of Metallurgical Processes

Sponsored by: TMS Extraction and Processing Division, TMS; Pyrometallurgy Committee

Program Organizers: Zhiwei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atılım University; Tao Jiang, Central South University; Jesse White, Elkem Carbon AS; Morsi Mahmoud, King Fahd University of Petroleum And Mineral

Tuesday AM | February 25, 2020

Session Chairs: Baojun Zhao, University of Queensland; Morsi Mahmoud, King Fahd University of Petroleum and Mineral

8:30 AM Introductory Comments

8:45 AM

Phase Equilibria in the System $\text{Al}_2\text{O}_3\text{-MnO-SiO}_2$: Thermodynamic and Application: Yunhui Hua¹; *Baojun Zhao*¹; ¹University of Queensland

9:05 AM

Thermodynamic Analysis of Chlorination of Zinc-bearing Phases in Pyrite Cinder: Deqing Zhu¹; *Dingzheng Wang*¹; Congcong Yang¹; Jian Pan¹; Hongyu Tian¹; Yuxiao Xue¹; ¹Central South University

9:25 AM

Numerical Simulation Study of Arrangement Height and Angle of Rotary Hearth Furnace Burner: *Yang Wang*¹; ¹Chongqing University

9:45 AM

Estimation of Thermodynamic Properties of Sodium Magnesium Silicates by Polyhedron Method: Zhongping Zhu¹; *Jinxiang You*¹; Xin Zhang¹; Jian Wang¹; Jiaoyang Duan¹; Tao Zhang¹; Zhiwei Peng¹; T Jiang¹; Mingjun Rao¹; ¹Central South University

10:05 AM

Effect of Al and Ca Content on the Behavior of the Inclusion in High Grade 304 Type Stainless Steel: *Tongsheng Zhang*¹; Hualong Zhang¹; Wanlin Wang¹; Liwen Xue¹; Shifan Dai¹; Guomin Ying¹; ¹Central South University

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture IV: Toward Confident Use in Critical Applications — Processing-Structure-Property-Performance II

Sponsored by: TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Nik Hrabe, National Institute of Standards and Technology; Steve Daniewicz, University of Alabama; Nima Shamsaei, Auburn University; John Lewandowski, Case Western Reserve University; Mohsen Seifi, ASTM International/Case Western Reserve University

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Session Chair: John Lewandowski, Case Western Reserve University

8:30 AM Invited
Tailoring the Microstructures of AM Metals for Enhanced Fracture Toughness and Fatigue Resistance: *Ramamurty Upadrasta*¹; ¹NTU

9:00 AM
High Strain Rate Fracture Properties of Additively Manufactured (AM) Stainless Steel: *Kevin Lamb*¹; Josh Kacher²; Katie Koube²; ¹University of Tennessee-Knoxville; ²Georgia Institute of Technology

9:20 AM
Surface Roughness and Layer Orientation Effects on Fatigue Behavior of LB-PBF Inconel 718 in the High Cycle and Very High Cycle Fatigue Regimes: Palmer Frye¹; Muztahid Muhammad²; *Jutima Simsiriwong*¹; Nima Shamsaei²; ¹University of North Florida; ²Auburn University

9:40 AM
Static and Dynamic Mechanical Properties of Selective Laser Melted Ti-6Al-4V Solid Material Printed with Optimized Argon Flow: *Oscar Quintana*¹; Robert Rybolt¹; William Relue¹; ¹DePuy Synthes Joint Reconstruction

10:00 AM Break

10:20 AM Invited
Microstructure Design for Optimizing Mechanical Performance of Additive Manufactured Metallic Alloys: *Ayman Salem*¹; Daniel Satko¹; ¹MRL Materials Resources LLC

10:50 AM
Optimization of Additively Manufactured Low Carbon Steels for Fatigue-critical Applications: *Matthew Ryder*¹; Colt Montgomery²; Michael Brand²; Robin Pacheco²; John Carpenter²; Peggy Jones³;

DianaLados¹; ¹WorcesterPolytechnicInstitute, Integrative Materials Design Center; ²Los Alamos National Laboratory; ³General Motors Powertrain

11:10 AM

Fatigue Crack Growth Behavior of DED Type 304L Stainless Steel: *Christine Smudde*¹; Christopher San Marchi²; Christopher D'Elia¹; Michael Hill¹; Jeffery Gibeling¹; ¹University of California, Davis; ²Sandia National Laboratory, Livermore

11:30 AM

Effect of Laser Shock Peening Processing Parameters on the Microstructure, Residual Stress, and Fatigue Behavior of Additive Manufactured CoCrMo Alloy: *Micheal Kattoura*¹; Boetang Twum Donkor²; Jie Song²; Jan Kaufman³; Seetha Ramaiah Mannava²; Vijay Vasudevan²; ¹LSP Technologies Inc.; ²University of Cincinnati; ³Institute of Physics of the Czech Academy of Sciences

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications II — Qualification, Intensification and Up-scaling

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Charit, University of Idaho; Michael Kirka, Oak Ridge National Laboratory

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Session Chairs: Isabella van Rooyen, Idaho National Laboratory; Edward Herderick, Ohio State University

8:30 AM Invited

The Intensification and Scale-up of Electric Field Assisted Sintering Techniques (FAST) for the Net-shape Production of Complex Materials and Components: *Robert O'Brien*¹; Richard Martineau¹; Troy Holland¹; Derek Gaston¹; David Hansinger²; Robert Aalund²; ¹Idaho National Laboratory; ²Thermal Technology LLC

9:00 AM

Process-related Cyclic Properties of Additively Manufactured Structures: *Matilde Scurria*¹; Rainer Wagener¹; Benjamin Möller¹; Tobias Melz¹; ¹Fraunhofer Lbf

9:20 AM
A High-throughput Alloy Development Strategy for Corrosion Resistant Materials via Directed Energy Deposition: *Phalgun Nelaturu*¹; Michael Moorehead¹; Bonita Goh¹; Dan Thoma¹; Adrien Couet¹; Kumar Sridharan¹; ¹University of Wisconsin

9:40 AM
In-situ Monitoring to Inform Process Optimization and Microstructure Control: *Glenn Bean*¹; David Witkin¹; Tait McLouth¹; Alison Kremer¹; ¹The Aerospace Corporation

10:00 AM Break

10:20 AM
Influence of Wire Arc Additive Manufacturing on Mechanical Properties of Ti-64 for Large Scale Aviation Parts: *Daniel Elitzer*¹; Heinz Höppel¹; Mathias Göken¹; Daniel Baier²; Christina Fuchs²; Heinz Bähr³; Thomas Meyer⁴; Andreas Gallasch⁵; Markus Manger⁶; ¹Friedrich-Alexander University Erlangen-Nürnberg; ²Technical University Munich; ³Aircraft Philipp GmbH & CO. KG; ⁴HEGGEMANN AG; ⁵Software Factory GmbH; ⁶Fronius International GmbH

10:40 AM
Probabilistic Component Acceptance Method as an Additive Manufacturing Qualification Approach: *George Griffith*¹; Isabella van Rooyen¹; ¹Idaho National Laboratory

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques — High Speed X-ray Imaging and Diffraction

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Fan Zhang, National Institute of Standards and Technology; Tom Stockman, Los Alamos National Laboratory; Tao Sun, University of Virginia; Donald Brown, Los Alamos National Laboratory; Yan Gao, Ge Global Research; Amit Pandey, MicroTesting Solutions; Joy Gockel, Wright State University; Tim Horn, North Carolina State University; Sneha Prabha Narra, Worcester Polytechnic Institute; Judy Schneider, University of Alabama at Huntsville

Tuesday AM | February 25, 2020
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8:30 AM Invited

Capturing Pore Formation During Laser Blown Powder Directed Energy Deposition: *Peter Lee*¹; Yunhui Chen¹; Lorna Sinclair¹; CL Alex Leung¹; Samuel Clark¹; Sebastian Marussi¹; Robert Atwood²; Martyn Jones³; Gavin Baxter³; ¹University College London; ²Diamond Light Source; ³Rolls-Royce plc

8:50 AM Invited

Porosity Formation and Entrapment in Directed Energy Deposition Through Highspeed In-situ Imaging: *Samantha Webster*¹; Kornel Ehmann¹; Jian Cao¹; ¹Northwestern University

9:10 AM

Correlation of Melt Strategy Parameters to Solidification Variables During Laser Fusion Processing of Ti-6Al-4V Alloy: An In-situ Dynamic Synchrotron X-ray Radiography Study: *Rakesh Kamath*¹; Yuan Li¹; Tao Sun²; Sudarsanam Babu¹; Hahn Choo³; ¹University of Tennessee Knoxville; ²Argonne National Laboratory; ³University of Tennessee, Knoxville

9:30 AM

Microstructure Development in Laser Powder Bed Fusion of Superalloys via Synchrotron Radiography and TriBeam Tomography: *Andrew Polonsky*¹; Kira Pusch¹; Toby Francis¹; McLean Echlin¹; Jonah Klemm-Toole²; Alec Saville²; Chandler Becker²; Benjamin Ellyson²; Yaofeng Guo²; Chloe Johnson²; Brian Milligan²; Niranjana Parab³; Kamel Fezzaa³; Tao Sun³; Amy Clarke²; Tresa Pollock¹; ¹University of California, Santa Barbara; ²Colorado School of Mines; ³Argonne National Laboratory

9:50 AM

The Influence of Laser Modulation on Melt Pool Behavior in Laser Powder Bed Fusion Probed with In-situ X-ray Imaging: *Nicholas Calta*¹; Aiden Martin¹; Joshua Hammons¹; Michael Nielsen¹; Manyalibo Matthews¹; Trevor Willey¹; Jonathan Lee¹; ¹Lawrence Livermore National Laboratory

10:10 AM Break

10:30 AM Invited

In-situ Characterization of Laser Additive Manufacturing Process Using High-speed Synchrotron X-ray Diffraction: *Chihpin Chuang*¹; Peter Kenesei¹; Jun-Sang Park¹; Tao Sun¹; Cang Zhao¹; Niranjana Dilip Parab¹; Yan Gao²; Xuan Zhang¹; Anthony Rollett³; Jonathan Almer¹; ¹Argonne National Laboratory; ²GE Global Research; ³Carnegie Mellon University

10:50 AM Invited
Quantitatively Revealing the Dynamics of Laser Powder Bed Fusion Additive Manufacturing Process by In-situ High-speed X-ray Imaging and Diffraction: *Lianyi Chen*¹; ¹University of Wisconsin-Madison

11:10 AM
Multi-physics Modeling of Fluid and Powder Dynamics in Laser Powder Bed Fusion Process: *Xuxiao Li*¹; Wenda Tan¹; Cang Zhao²; Niranjan Parab²; Tao Sun²; ¹University of Utah; ²Argonne National Laboratory

11:30 AM
Study of Gas Entrapment and Its Effects on Porosity in 17-4 PH Atomized Powder Laser Powder Bed Fusion (LPBF) Parts: *Ziheng Wu*¹; Debomita Basu¹; Robin Kuo¹; Jack Beuth¹; Anthony Rollett¹; ¹Carnegie Mellon University

11:50 AM
Quantification of the Effects of Deposition Parameters and Particle Size Distribution on Spatter Formation in Laser Powder Bed Fusion: *Yao Xu*¹; Joe Pauza²; Anthony Rollett²; Sneha Narra¹; ¹Worcester Polytechnic Institute; ²Carnegie Mellon University

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Alternative Processes (Beyond the Beam) — Emerging Additive Processes

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Powder Materials Committee

Program Organizers: Paul Prichard, Kennametal Inc.; Matthew Dunstan, U.S. Army Research Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory; Nihan Tuncer, Desktop Metal; James Paramore, U.S. Army Research Laboratory

Tuesday AM | February 25, 2020
7A | San Diego Convention Ctr

Session Chair: Nihan Tuncer, Desktop Metals

8:30 AM
Characterization of 17-4 PH Processed via Bound Metal Deposition (BMD): Alexander Watson¹; John Belding¹; *Brett Ellis*¹; ¹University of Maine

8:50 AM

Development of Tuned Composites Based on Metallic Particles for Advanced 3D-printing by Fused Deposition Modeling: *Ester Palmero*¹; Daniel Casaleiz¹; Javier de Vicente¹; Juan Hernández-Vicen²; Silvia López-Vidal²; Emilio Ramiro²; Alberto Bollero¹; ¹IMDEA Nanoscience; ²RAMEM S.A.

9:10 AM

Additive Manufacturing of High-value Metal Parts Through Shaping-debinding-sintering: *Peter Felfer*¹; Yvonne Thompson¹; Joamin Gonzalez - Gutierrez²; Christian Kukla²; ¹Fau Erlangen-Nurnberg; ²Montanuniversität Leoben

9:30 AM

Topology Optimization-based Design Customized for Alternative AM Processes: Julia Carroll¹; Hak Yong Lee¹; *James Guest*¹; ¹Johns Hopkins University

9:50 AM Break

10:10 AM

On the Interaction and Forms of Adhesion Between Various Substrate Materials and Molten Metal Droplets Produced by the Drop-on-demand Technology Metal Jet: *Nesma Aboulkhair*¹; Marco Simonelli¹; Mark East¹; Richard Hague¹; ¹University of Nottingham

10:30 AM

3D-printing Bulk Metallic Glass Alloys with Ultrasonic Additive Manufacturing: Adam Hehr¹; Mark Norfolk¹; *Evelina Vogli*²; Scott Roberts³; ¹Fabrisonic LLC; ²LM Group Holdings, Inc.; ³Jet Propulsion Laboratory, California Institute of Technology

ADDITIVE TECHNOLOGIES

Additive Manufacturing: ICME Gap Analysis — Session I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Dongwon Shin, Oak Ridge National Laboratory; Richard Otis, Jet Propulsion Laboratory; Xin Sun, Oak Ridge National Laboratory; Greta Lindwall, KTH Royal Institute of Technology; Mei Li, Ford Motor Company; David Furrer, Pratt & Whitney

Tuesday AM | February 25, 2020
7B | San Diego Convention Ctr

Session Chairs: Dongwon Shin, Oak Ridge National Laboratory; Richard Otis, Jet Propulsion Laboratory

8:30 AM Introductory Comments

8:35 AM Invited
The Future of Additive Manufacturing, a Vision for NASA's Jet Propulsion Laboratory: *Andrew Shapiro*¹; R. Peter Dillon¹; Bryan McEnerney¹; ¹Jet Propulsion Laboratory

9:10 AM Invited
Challenges in Modeling Microstructure Evolution During Additive Manufacturing Based on Phase-field Method: Yanzhou Ji¹; Zhuo Wang²; Lei Chen²; *Long-Qing Chen*¹; ¹Pennsylvania State University; ²Mississippi State University

9:45 AM Invited
Utilization of Non-metallic Inclusion and Optimization of Alloy Compositions for AM Process: Jung-Wook Cho¹; *In-Ho Jung*²; ¹Postech; ²Seoul National University

10:20 AM Break

10:45 AM Invited
ICME and Additive Manufacturing Research in NSF's Advanced Manufacturing Program: *Khershed Cooper*¹; Ralph Wachter¹; ¹National Science Foundation

11:20 AM Invited
Challenges in Integration and Validation of a Coupled FEM and Phase Field Approach for Modeling Additive Manufacturing: *Daniel Lewis*¹; Antoinette Maniatti¹; ¹Rensselaer Polytechnic Institute

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development II — Alloy Design- Aluminum Alloys

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Orlando Rios, Oak Ridge National Laboratory; Hunter Martin, HRL Laboratories; Atieh Moridi, Cornell University

Tuesday AM | February 25, 2020
6F | San Diego Convention Ctr

Session Chair: Hunter Martin, HRL Laboratories

8:30 AM Invited
Inoculant Enabled Alloy Design for High Strength Aluminum: *Mark O’Masta¹; Julie Miller¹; Jacob Hundley¹; Brennan Yahata¹; Tobias Schaedler¹; John Martin¹; ¹HRL Laboratories LLC*

9:00 AM
Evaluation of Hot Tearing During Laser Surface Melting of Aluminium Alloy 7150 with Rare Earth Additions: *Michael Benoit¹; Suming Zhu²; Trevor Abbott³; Mark Easton¹; ¹School of Engineering, RMIT University; ²RMIT University; ³Magontec Ltd*

9:20 AM
Enabling Additive Manufacturing of High Temperature Aluminum Alloys Utilizing Grain Refiners: *Julie Miller¹; ¹HRL Laboratories LLC*

9:40 AM
Development of High Thermal Conductivity Aluminum Alloys Suitable for Additive Manufacturing: *Andrew Bobel¹; John Martin²; Julie Miller²; Brennan Yahata²; Jacob Hundley²; Justin Mayer²; ¹General Motors; ²HRL Laboratories*

10:00 AM
Addition of Nano-particles During Additive Manufacturing of AlSi10Mg Alloy: *Catherine Dolly Clement¹; Abu Syed Kabir¹; ¹Carleton University*

10:20 AM Break

10:35 AM Invited
Selective Laser Melting of Elemental Powder Blends to Manufacture Precipitation and Oxide-dispersion Strengthened Al Alloys: *Jennifer Glerum¹; Christoph Kenel¹; David Dunand¹; ¹MSE, Northwestern University*

11:05 AM

Feedstock Material Composition Modifications for Improved Processability by Laser Powder-bed Fusion: A Case Study on Aluminium: *Nesma Aboulkhair*¹; Marco Simonelli¹; Ehab Salama²; Graham Rance¹; Nigel Neate¹; Christopher Tuck¹; Amal Esawi²; Richard Hague¹; ¹University of Nottingham; ²The American University in Cairo

11:25 AM

Effect of Zr Alloying Content on the Printability and Property of Laser Powder Bed Fused Aluminum 5083 Alloys: *Le Zhou*¹; Holden Hyer¹; Sharon Park¹; George Benson¹; Yongho Sohn¹; ¹University of Central Florida

11:45 AM

A20X and AlSi10Mg Aluminium Alloys: A Comparison: *Richard Sélo*¹; Ian Maskery¹; Ian Ashcroft¹; Christopher Tuck¹; ¹University of Nottingham

12:05 PM

Prospects of Application of New Aluminum Alloys for Selective Laser Melting: *Daria Daubarayte*¹; Mann Viktor²; Alexander Krokhin²; Dmitriy Ryabov²; Vakhromov Roman¹; Korolev Vladimir¹; Alexander Seferyan¹; ¹Light Materials and Technologies Institute; ²RUSAL Management

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Processing Effects on Microstructure and Material Performance — Solidification

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Eric Lass, University of Tennessee, Knoxville; Joy Gockel, Wright State University; Emma White, Ames Laboratory; Richard Fonda, Naval Research Laboratory; Monnamme Tlotleng, University of Johannesburg; Jayme Keist, Pennsylvania State University; Hang Yu, Virginia Polytechnic Institute and State University

**Tuesday AM | February 25, 2020
6E | San Diego Convention Ctr**

Session Chairs: Richard Fonda, Naval Research Laboratory; Amrita Basak, Pennsylvania State University

8:30 AM

Applying Computational Modeling to Non-equilibrium Solidification: *Eric Heikkenen*¹; Sudarsanam Babu¹; ¹The University of Tennessee

8:50 AM

Phase Field Modeling of Alloy Microstructure Formation in Rapidly Solidifying Melt Pools: *Joel Berry*¹; Aurelien Perron¹; Jean-Luc Fattebert²; Saad Khairallah¹; Joseph McKeown¹; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory; ²Oak Ridge National Laboratory

9:10 AM

Phase-field Solidification Texture Model for Understanding the Microstructure in L-PBF Process: *Kamalnath Kadirvel*¹; Guilherme Abreu Faria¹; Xuesong Gao¹; Antonio Rameriz¹; Wei Zhang¹; Yunzhi Wang¹; ¹Ohio State University

9:30 AM

Phase Field Simulation of Solidification Behavior of AlSi10Mg Alloys Manufactured Through Direct Metal Laser Sintering: Hossein Azizi¹; Alireza Ebrahimi¹; Nana Ofori-Opoku²; Michael Greenwood³; Nikoas Provatas⁴; *Mohsen Mohammadi*¹; ¹University of New Brunswick; ²Canadian Nuclear Laboratories; ³Natural Resources of Canada; ⁴McGill University

9:50 AM

Multiscale Modeling of Metal Additive Manufacturing: Linking of Continuum Scale CFD and Mesoscale Phase-field Models: *Patrick O’Toole*¹; Milan Patel²; Paulus Lahur¹; Dayalan Gunasegaram¹; Anthony Murphy¹; Ivan Cole²; Chao Tamg³; Ming Gan³; Chee Wong³; ¹CSIRO; ²RMIT University; ³Nanyang Technological University

10:10 AM Break

10:30 AM

Integrated Simulation Framework for Additively Manufactured Metallic Alloys: *Rongpei Shi*¹; Saad Khairallah¹; Tae Wook Heo¹; Tien Roehling¹; John Roehling¹; Joseph Mckeown¹; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory

10:50 AM

Directional Solidification Microstructure of Inconel 718 Manufactured by Electron Beam Additive Manufacturing: *Chang-woo Lee*¹; Byoung Soo Lee¹; Hyung Giun Kim¹; Gun Hee Kim¹; ¹Ki Tech

11:10 AM

Microstructural Evolution of Additively Manufactured Inconel 718: *Laura Farris*¹; E. Lee¹; Judy Schneider¹; ¹University of Alabama

in Huntsville

11:30 AM

Solidification and Grain Formation During Additive Manufacturing Process: A Grandpotential Based Phase Field Study: *Sudipta Biswas*¹; Larry Aagesen¹; ¹Idaho National Laboratory

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Dislocations and Planar Faults

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Shaping and Forming Committee, TMS: Materials Characterization Committee

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Marko Knezevic, University of New Hampshire; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; M Arul Kumar, Los Alamos National Laboratory

Tuesday AM | February 25, 2020
Theater A-2 | San Diego Convention Ctr

Session Chairs: Benoit Merle, University Erlangen-Nuremberg (FAU); Meimei Li, Argonne National Laboratory

8:30 AM Invited

Deformation Mechanisms in Irradiated Materials Revealed by in situ High Energy Synchrotron X-rays: *Meimei Li*¹; Xuan Zhang¹; Jonathan Almer¹; Jun-Sang Park¹; Peter Kenesei¹; ¹Argonne National Laboratory

9:00 AM

Simulated STEM-DCI Imaging of Dislocations in High-entropy Alloys: *Joseph Tessmer*¹; Mulaine Shih²; Marc De Graef¹; ¹Carnegie Mellon University; ²The Ohio State University

9:20 AM

Influence of Plastic Deformation on the Disorder Order Transformation in 18 Carat Red Gold Alloys Studied by In-situ High-energy X-ray Diffraction: Marina Garcia Gonzales¹; Steven Van Petegem¹; Nadine Baluc²; Fanny Lalire³; Helena Van Swygenhoven¹; ¹Paul Scherrer Institut; ²Ecole Polytechnique Fédérale de Lausanne; ³Varinor S.A.

9:40 AM

Avalanche Statistics and the Intermittent-to-smooth-transition in Microplasticity: Gregory Sparks¹; Yinan Cui²; Giacomo Po²; Quentin Rizzardi¹; Jaime Marian²; *Robert Maass*¹; ¹University of Illinois at Urbana-Champaign; ²University of California Los Angeles

10:00 AM Break

10:20 AM Invited

Influence of Grain Boundary Mediated Deformation on the Ductility of Freestanding Metallic Thin Films: *Benoit Merle*¹; ¹University Erlangen (Fau)

10:50 AM

Solute Interaction with Dislocation Cores in α -iron: an Atom Scale Experimental Study: *Maxime Vallet*¹; Estelle Meslin¹; Michael Walls²; Lisa Ventelon¹; ¹CEA - Saclay; ²Laboratoire de Physique des Solides

11:10 AM

Size Effects in Dislocation-mediated Pore Growth: *Ashley Roach*¹; Fulin Wang¹; Jungho Shin¹; Gyuseok Kim²; Irene Beyerlein¹; Daniel Gianola¹; Darby Luscher³; ¹UC Santa Barbara Materials Department; ²University of Pennsylvania; ³Los Alamos National Laboratory

11:30 AM

Revisiting the Wilkens Function: a Discrete Dislocation Dynamics-based Study of Strain Broadening in Diffraction Profiles: *Aaron Tallman*¹; Darshan Bamney²; Douglas Spearot²; Laurent Capolungo¹; ¹Los Alamos National Laboratory; ²University of Florida

ADVANCED MATERIALS

Advanced High Strength Steels IV — Session I

Sponsored by: TMS Structural Materials Division, TMS: Steels Committee

Program Organizers: Ana Luiza Araujo, AK Steel Research and Innovation Center; Mary O'Brien, Colorado School of Mines; Tilmann Hickel, Max Planck Institut für Eisenforschung; Amy Clarke, Colorado School of Mines; Kester Clarke, Colorado School of Mines; C. Tasan, Massachusetts Institute of Technology; MingXin Huang, University of Hong Kong

Tuesday AM | February 25, 2020
Mission Hills | Marriott Marquis Hotel

Session Chairs: Amy Clarke, Colorado School of Mines; Rachael Stewart, AK Steel

8:30 AM

An Energy Absorbing Medium Mn Steel for Industry: *Thomas Kwok*¹; Xin Xu¹; David Dye¹; ¹Imperial College London

8:50 AM

Annealing Time Dependence of Tensile Properties of 8 wt% Mn Steel: *Xin Xu*¹; Thomas Kwok¹; David Dye¹; ¹Dept of Materials, Imperial College London

9:10 AM

Microstructural Origins of Lüders Banding in Medium Manganese Steels: *Rama Srinivas Varanasi*¹; Dirk Ponge¹; Dierk Raabe¹; ¹Max Planck Institute for Iron Research

9:30 AM

TBF Steels Produced by Partial Austenitization: *Ersoy Erisir*¹; Oguz Gürkan Bilir¹; Yunus Emre Sözer²; Özge Ararat¹; ¹Kocaeli University; ²Erdemir (Eregli Iron and Steel Works Co)

9:50 AM

Effects of Prior Austenite Grain Size on Microstructure of Bainite and Retained Austenite in TRIP Steel: *Miku Watanabe*¹; Goro Miyamoto¹; Tadashi Furuhashi¹; ¹Tohoku University

10:10 AM Break

10:30 AM

Improving Microstructure of Ferritic-bainitic Steel used in Automotive Industry: *Mostafa Tawfeek*¹; Ayman Fathy¹; Ahmed Abdelaziz¹; ¹German University in Cairo

10:50 AM

End to End Simulation and Genetic Optimization for the Design of Medium Mn Steels: *John Aristeidakis*¹; Gregory Haidemenopoulos¹; ¹University of Thessaly, Department of Mechanical Engineering

11:10 AM

A Novel High-strength Oxidization-resistant Press Hardening Steel Sheet Requiring No Al-Si Coating: *Shuoshuo Li*¹; Haiwen Luo¹; ¹University of Science and Technology Beijing

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — High-energy Product Permanent

Sponsored by: TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Daniel Salazar, BCMaterials; Alex Leary, Nasa Glenn Research Center; Markus Chmielus, University of Pittsburgh; Ryan Ott, Ames Laboratory/Cmi; Arcady Zhukov, UPV/EHU, and Ikerbasque, Basque Foundation for Science

Tuesday AM | February 25, 2020
Del Mar | Marriott Marquis Hotel

Session Chairs: Matthew Kramer, AMES Laboratory; Alberto Bollero, IMDEA Nanociencia

8:30 AM Invited
Controlling and Describing Coercivity of Rare Earth Permanent Magnets: *Satoshi Hirosawa*¹; ¹National Institute for Materials Science

9:00 AM Invited
Computational Design of Bulk Permanent Magnets: *Thomas Schrefl*¹; Johann Fischbacher¹; Alexander Kovacs¹; ¹Danube University Krems

9:30 AM
Effects of Grain Size on Magnetic and Mechanical Properties of NdFeB Sintered Magnets: *Wei Tang*¹; Gaoyuan Ouyang¹; Baozhi Cui¹; Matt Kramer¹; Jun Cui²; Iver Anderson¹; ¹Ames Lab; ²Iowa State University

9:50 AM
Mechanically Strengthened Heterogeneous Sm-Co Sintered Magnets: *Baozhi Cui*¹; Jun Cui¹; ¹Ames Laboratory

10:10 AM Break

10:30 AM Invited
Application of Systems Level Modeling for Addressing Criticality in Rare Earth Magnets: *Cajetan Ikenna Nlebedim*¹; ¹Ames Laboratory

11:00 AM Invited
Additive Manufacturing of Hard Magnets for Tailored Magnetic Fields: *Christian Huber*¹; Martin Groenefeld²; Dieter Suess¹; ¹University of Vienna; Christian Doppler Laboratory for Advanced Magnetic Sensing and Materials; ²Magnetfabrik Bonn GmbH

11:30 AM
Anisotropy and Orbital Moment in Rare Earth - Cobalt Permanent Magnets: *Durga Paudyal*¹; Renu Choudhary¹; Ralph Skomski²; ¹Ames Laboratory; ²University of Nebraska

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VI — Energy Conversion with Emphasis on SOFC

Sponsored by: TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

Program Organizers: Jung Pyung Choi, Pacific Northwest National Laboratory; Amit Pandey, MicroTesting Solutions; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh

Tuesday AM | February 25, 2020
16B | San Diego Convention Ctr

Session Chairs: Jung Pyung Choi, Pacific Northwest National Laboratory; Hitoshi Takamura, Tohoku University

8:30 AM Invited
Preformed Oxide Scale Chemistry and Its Influence on Local Metal Loss during Dual Atmosphere Corrosion: *Michael Reisert*¹; Ashish Aphale¹; Yoed Tsur²; Prabhakar Singh¹; ¹University of Connecticut; ²Technion – Israel Institute of Technology

8:50 AM Invited
Enhancing Anodic Catalytic Activity in Solid Oxide Fuel Cells by Liquid Phase Infiltration: *Soumendra Basu*¹; Yanchen Lu¹; Paul Gasper¹; Boshan Mo¹; Srikanth Gopalan¹; Uday Pal¹; ¹Boston University

9:10 AM Invited
Minimizing Cr-evaporation from Balance of Plant Components by Utilizing Cost-Effective Alumina-Forming Austensic Steels: Zhipeng Zeng¹; Lingfeng Zhou¹; Yukinori Yamamoto²; Michael Brady²; *Xingbo Liu*¹; ¹West Virginia University; ²Oak Ridge National Laboratory

9:30 AM
Phase Field Simulation of Ni Coarsening in SOFC Anodes under Operating Conditions: *Yinkai Lei*¹; Tianle Cheng¹; Harry Abernathy¹; Gregory Hackett¹; Youhai Wen¹; ¹National Energy Technology

Laboratory

9:50 AM Invited

Reversal of Chromium Poisoning in Solid Oxide Fuel Cell Cathodes:

Michelle Sugimoto¹; Zhikuan Zhu¹; Srikanth Gopalan¹; Soumendra Basu¹; *Uday Pal*¹; ¹Boston University

10:10 AM Break

10:30 AM Invited

Effect of Aluminizing on the High-temperature Oxidation Behavior of an Alumina-forming Austenitic Stainless Steel and a Chromia-forming Ni Based Alloy:

Sedigheh Rashidi¹; Amit Pandey¹; Jung Pyung Choi²; *Rajeev Gupta*¹; ¹The University of Akron; ²Pacific Northwest National Laboratory

10:50 AM Invited

Protonic Ceramic Fuel Cells: Materials and Device Development:

*Kyle Brinkman*¹; ¹Clemson University

11:10 AM Invited

Catalytic Activity of Cobalt-containing Oxides for the Cathodic Reaction of IT-SOFC:

*Hitoshi Takamura*¹; ¹Tohoku University

11:30 AM Invited

Rational Design of Diffusion-blocking Layer to Suppress Chemical Degradation of Solid Oxide Fuel Cells:

*Kyung Joong Yoon*¹; ¹Korea Institute of Science and Technology

ELECTRONIC MATERIALS

Advanced Microelectronic Packaging, Emerging Interconnection Technology and Pb-free Solder — Pb-free Solder Alloys I

Sponsored by: TMS Functional Materials Division, TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Christopher Gourlay, Imperial College London; Kazuhiro Nogita, University of Queensland; David Yan, San Jose State University; Mike Wolverton, Raytheon; Babak Arfaei, Ford Motor Company; Andre Delhaise, Celestica; Mehran Maalekian, Mat-Tech; Mohd Arif Salleh, Universiti Malaysia Perlis

Tuesday AM | February 25, 2020

Palomar | Marriott Marquis Hotel

Session Chair: Mike Wolverton, Raytheon Company

8:30 AM Invited
The Relation Between the Microstructure and Properties of SnAgCu/SnBiAg Mixed Assemblies, and Thermal History: *Eric Cotts*¹; Mohammed Genanu¹; Faramarz Hadian¹; ¹Binghamton University

8:50 AM
A Model Study of Bi Diffusion and Intermetallic Growth in Sn-Bi Low Temperature Soldering Systems: *Yaohui Fan*¹; Yifan Wu¹; John Blendell¹; Nilesch Badwe²; Carol Handwerker¹; ¹Purdue University; ²Intel Corporation

9:10 AM
Reliability Behavior of Surface Mount Devices Assembled with Bismuth Bearing Low-melt Solder Pastes: *Luke Wentlent*¹; Michael Meilunas¹; Jim Wilcox¹; ¹Universal Instruments Corp.

9:30 AM
Influence of Indium Addition on Microstructural Properties of Sn-rich Solder Joints: *Amey Luktuke*¹; Kumar Ankit¹; Nikhilesh Chawla¹; ¹Arizona State University

9:50 AM Break

10:10 AM Invited
Achieving Collapse-free Joint in 3D-package by Hybrid Solder Alloy with Reducing Thermal Budget Usage: Tzu-Ting Chou¹; Yu-Ching Wang¹; *Jenq Gong Duh*¹; ¹National Tsing Hua University

10:30 AM
Development of Low Temperature Sn-Bi based Solder Alloys: *Mehran Maalekian*¹; Aranav Das¹; Ludo Krassenburg¹; Co van Veen¹; Mo Biglari¹; ¹Mat-Tech

CHARACTERIZATION

Advanced Real Time Imaging — Iron & Steelmaking

Sponsored by: TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, National Energy Technology Laboratory; David Alman, National Energy Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki Shibata, Imram, Tohoku University; Antoine Allanore, Massachusetts Institute of Technology; Candan Tamerler, University of Kansas; Noritaka Saito, Kyushu University; Neslihan Dogan, McMaster University; Zuotai Zhang, Southern University of Science and Technology; Bryan Webler, Carnegie Mellon University; Anna Nakano, US Department of Energy National Energy Technology Laboratory

Tuesday AM | February 25, 2020
Theater A-4 | San Diego Convention Ctr

Session Chair: Il Sohn, Yonsei University

8:30 AM Invited
Development of HT-LSCM Techniques for the In-situ Study of the Peritectic Phase Transition: *Rian Dippenaar*¹; Dominic Phelan¹; Mark Reid¹; Stefan Griesser²; Suk-Chun Moon¹; Dasith Liyanage¹; ¹University of Wollongong; ²Inteco

8:50 AM
Observation of Spinel Growth for Application in High Al-containing Steel Mold Fluxes: *Il Sohn*¹; ¹Yonsei University

9:10 AM
In-situ High Temperature Confocal Laser Scanning Microscopy Study during Heat Treatment of Duplex Stainless Steels: *Wangzhong Mu*¹; Niklas Pettersson¹; Sohei Sukenaga²; Hiroyuki Shibata²; Peter Hedström¹; ¹KTH Royal Institute of Technology; ²Tohoku University

9:30 AM Invited
Study on the Interaction Process between Mold Flux and TiN/TiO2 by Sessile Drop Method: *Zihang Pan*¹; Lejun Zhou¹; Wanlin Wang¹; ¹Central South University

9:50 AM Break

10:10 AM Invited
MgO Dissolution Phenomena by Using Hot Thermocouple Technique: *Yongsug Chung*¹; Youngjo Kang²; ¹Korea Polytechnic University; ²Dong-A University

10:30 AM Invited

Investigation on the Titanium Extraction from Ti-bearing Slags based on Crystallization Modifications: *Yongqi Sun*¹; *Zuotai Zhang*²; ¹University of Queensland; ²Southern University of Science and Technology

10:50 AM

HT-LSCM as a Tool for Indirect Determination of Precipitates by Real Time Grain Growth Observations: *Nora Fuchs*¹; Christian Bernhard¹; Susanne Michelic¹; Rian Dippenaar²; ¹University of Leoben; ²University of Wollongong

11:10 AM

Real-time Imaging of Melting and Crystallization of Synthetic Ferronickel Slags with Varying B₂O₃ Content: *Shifan Dai*¹; Wanlin Wang¹; Lejun Zhou¹; Tongsheng Zhang¹; Jie Yu¹; ¹Central South University

ADVANCED MATERIALS

Advanced Solid Phase Processing Symposium — Advanced Applications and Modeling

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee, TMS: Shaping and Forming Committee

Program Organizers: Suveen Mathaudhu, University of California, Riverside; Cynthia Powell, Pacific Northwest National Laboratory; Kester Clarke, Colorado School of Mines; Anthony Reynolds, University of South Carolina; Mostafa Hassani, Cornell University

Tuesday AM | February 25, 2020

Balboa | Marriott Marquis Hotel

Session Chairs: Cynthia Powell, Pacific Northwest National Laboratory; Kester Clark, Colorado School of Mines

8:30 AM Invited

Impulse for Solid-State Processing: *Glenn Daehn*¹; Anupam Vivek¹; Brian Thurston¹; Bhuvi Nirudhoddi¹; ¹Ohio State University

8:55 AM Invited

Structure-property Relationships in Solid Phase Processing and Emerging Applications: *Glenn Grant*¹; Scott Whalen¹; Vineet Joshi¹; Xiao Li¹; Mageshwari Komarasami¹; Jorge Dos Santos²; ¹Pacific Northwest National Laboratory; ²Helmholtz-Zentrum Geesthacht

GmbH; Pacific Northwest National Laboratory

9:20 AM

Shear Assisted Solid Phase Processing of Aluminum Alloys: *Keerti Kappagantula*¹; Jens Darsell¹; Rajib Kalsar¹; Nicole Overman¹; Scott Whalen¹; Glenn Grant¹; Darrell Herling¹; Vineet Joshi¹; ¹Pacific Northwest National Laboratory

9:40 AM

A Computational Approach with Experimental Support to Study the Effect of Interfacial Characteristics on The Performance of Dissimilar Joints via Friction Stir Scribe Technique: Daniel Ramirez¹; Panagiota Kitsopoulou²; *Varun Gupta*³; Piyush Upadhyay³; Tianhao Wang³; Erin Barker³; Darrell Herling³; ¹University of Texas, San Antonio; ²Case Western Reserve University; ³Pacific Northwest National Laboratory

10:00 AM Break

10:20 AM Invited

Shear-induced Diffusion and Intermixing: Atomic-level Perspective from Molecular Dynamics Simulations: *Peter Sushko*¹; Brianna Collins²; Tiffany Kaspar¹; Junhui Tao¹; Bharat Gwalani¹; Arun Devaraj¹; Tamas Varga¹; Yang He¹; Chongmin Wang¹; Aashish Rohatgi¹; Cynthia Powell¹; Suveen Mathaudhu³; ¹Pacific Northwest National Laboratory; ²Pacific Northwest National Laboratory; University of Minnesota ; ³Pacific Northwest National Laboratory; University of California, Riverside

10:45 AM

Dynamic Recrystallization Model Under Large Deformation During Solid Phase Processing: *Yulan Li*¹; Shenyang Hu¹; Erin Barker¹; Suveen Mathaudhu²; ¹Pacific Northwest National Laboratory; ²University of California-Riverside

11:05 AM

MD Simulations of Deformation Mechanisms and Sub-grain Formation in Al-Si Alloys Under High Shear Deformation: *Shenyang Hu*¹; Suveen Mathaudhu²; Nanjun Chen¹; ¹Pacific Northwest National Laboratory; ²University of California, Riverside

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Advances and Discoveries in Non-equilibrium Driven Nanomaterials and Thin Films — Metal Oxide Thin Films

Sponsored by: TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

Program Organizers: Ritesh Sachan, Oklahoma State University; Srinivasa Rao Singamaneni, University of Texas at El Paso; Amit Pandey, MicroTesting Solutions; Nuggehalli Ravindra, New Jersey Institute of Technology

Tuesday AM | February 25, 2020
Solana | Marriott Marquis Hotel

Session Chairs: Srinivasa Rao, University of Texas, El Paso; Ravindra Nuggehalli, NJIT

8:30 AM Invited
Controlling Functional Properties in Oxide Nanocomposites via Strain, Defects and Interfaces: *Aiping Chen*¹; ¹Los Alamos National Laboratory

9:00 AM Invited
Stabilization of High-temperature Polymorphs of SrSnO₃ at Room Temperature via Epitaxy: *Bharat Jalan*¹; ¹University of Minnesota

9:20 AM Invited
Effect of Interfacial Strain on the Point-defect Energetics in LaNiOx: Kanishk Rawat¹; Dillon Fong²; *Dilpuneet Aidhy*¹; ¹University of Wyoming; ²Argonne National Laboratory

9:50 AM
Dynamically Evolving Metastability in an Atomic Hourglass: Temporal Control of the Metal-insulator Transition of VO² by a Mobile Dopant: *Erick Braham*¹; Diane Sellers¹; Ruben Villarreal¹; Raymundo Arroyave¹; Patrick Shamberger¹; Sarbajit Banerjee¹; ¹Texas A&M University

10:10 AM Break

10:30 AM Invited
In-situ and Real Time Chemical Analysis of Complex Oxide Thin Film Surfaces using Pulsed Laser Deposition: *Jayakanth Ravichandran*

11:00 AM Invited
Recent Advances in Thin Film Thermoelectrics: SnSe and Beyond: *Ashutosh Tiwari*¹; Shrikant Saini¹; Paolo Mele²; ¹University of Utah; ²Shibaura Institute of Technology

11:30 AM

Morphological Evolution of Phase-separated Domains in Vapor-deposited Polycrystalline Alloy Films: *Rahul Raghavan*¹; William Farmer¹; Kumar Ankit¹; ¹Arizona State University

CHARACTERIZATION

Advances in Powder and Ceramic Materials Science — Ceramic Nanoparticles and Powder

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Shefford Baker, Cornell University; Huazhang Zhai, Beijing Institute of Technology; Sergio Monteiro, Military Institute of Engineering; Rajiv Soman, Eurofins EAG Materials Science LLC; Faqin Dong, Southwest University of Science and Technology; Jinhong Li, China University of Geosciences (Beijing); Ruigang Wang, The University of Alabama

Tuesday AM | February 25, 2020

Theater A-6 | San Diego Convention Ctr

Session Chairs: Ruigang Wang, University of Alabama ; Sergio Monteiro , Military Institute of Engineering

8:30 AM Introductory Comments

8:35 AM

High Densification Rates (10^{-3} s^{-1}) in Nanocrystalline Oxides by CAPAD Processing: Effects of Water Absorption and Grain Size: *Darren Dewitt*¹; Yasuhiro Kodera¹; Javier Garay¹; ¹University of California, San Diego

8:55 AM

Preparation of Rare Earth Stabilized Nanocrystalline Zirconia with Tunable Optical/mechanical Properties: *Gottlieb Uahengo*¹; Javier Garay¹; Yasuhiro Kodera¹; ¹University of California, San Diego

9:15 AM

Pressure-less Processing of Ceramics with Deliberate Elongated Grain Orientation and Size: *Hortense Le Ferrand*¹; ¹Nanyang Technological University

9:35 AM

Compressive Properties of Micro-spherical SiO_2 Particles: *Niko Hellsten*¹; Antti Karttunen¹; Charlotta Engblom²; Alexander

Reznichenko²; Erika Rantala²; ¹Aalto University; ²Borealis Polymers Oy

9:55 AM

Development of Shape-Controlled Oxide Nanopowders as Support Materials in Emission Control Catalysts: Zhongqi Liu¹; Ruigang Wang¹; ¹The University of Alabama

MECHANICS & STRUCTURAL RELIABILITY

Advancing Current and State-of-the-Art Application of Ni- and Co-based Superalloys — Processing – Casting, Forging, Heat Treatment

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Chantal Sudbrack, Northwestern University Center for Atom-Probe Tomography; Mario Bochiechio, Pratt & Whitney; Kevin Bockenstedt, ATI Specialty Materials; Katerina Christofidou, University of Sheffield; James Coakley, University of Miami; Martin Detrois, National Energy Technology Laboratory; Laura Dial, GE Global Research; Bij-Na Kim, Carpenter Additive; Victoria Miller, University of Florida; Kinga Unocic, Oak Ridge National Laboratory

Tuesday AM | February 25, 2020
11B | San Diego Convention Ctr

Session Chairs: Chantal Sudbrack, Consultant; Martin Detrois, National Energy Technology Laboratory

8:30 AM Introductory Comments

8:35 AM Keynote

Advancing The State of the Art of Superalloys by Balancing Performance with Repairability: Eric Huron¹; ¹GE Aircraft Engines

9:15 AM Invited

Considerations for Homogenizing Alloys: Paul Jablonski¹; Jeffery Hawk¹; ¹National Energy Technology Laboratory

9:45 AM

Creep Resistant Cast INCONEL Alloy 740H using an Alternative Casting Technique: Martin Detrois¹; Kyle Rozman¹; Paul Jablonski¹; Jeffrey Hawk¹; ¹National Energy Technology Laboratory

10:05 AM Break

10:25 AM Invited

Experimental Assessment and Numerical Simulation of Recrystallization Phenomena in Nickel based Superalloy Forgings: *Nathalie Bozzolo*¹; Marc Bernacki¹; ¹MINES ParisTech

10:55 AM

On the Formation of Heating and Cooling Precipitates from a Superalloy Powder: *David Collins*¹; Neil D'Souza²; Chinnapat Panwisawas³; Paraskevas Kontis⁴; ¹University of Birmingham; ²Rolls-Royce plc; ³University of Oxford; ⁴Max-Planck-Institut für Eisenforschung GmbH

11:15 AM

Microstructure Evolution in a P/M Ni-based Super Alloy: *Taisuke Sasaki*¹; Akihiro Suzuki²; Motoki Okuno³; Daisuke Nagahama³; Masato Ohnuma²; Kazuhiro Hono¹; ¹National Institute for Materials Science; ²Hokkaido University; ³Honda R&D Co.,Ltd.

11:35 AM

Optimising Creep Resistance of a Powder Metallurgy Nickel Superalloy via Tailoring of Precipitates Using Different Heat Treatments: *Chrysanthi Papadaki*¹; Wei Li²; Alexander Korsunsky¹; ¹University of Oxford; ²Rolls-Royce plc

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Interatomic Potential Developments and Atomistic Modeling II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Charudatta Phatak, Argonne National Laboratory; Bryan Wong, University of California, Riverside; Mikhail Mendelev, Ames Laboratory; Bryce Meredig, Citrine Informatics; Ebrahim Asadi, University of Memphis; Francesca Tavazza, National Institute of Standards and Technology

**Tuesday AM | February 25, 2020
31C | San Diego Convention Ctr**

Session Chairs: Mohsen Asle Zaeem, Colorado School of Mines; Mikhail Mendeleev, Ames Laboratory

8:30 AM Invited

Interatomic Potentials as Physically-informed Artificial Neural Networks: James Hickman¹; Ganga P. Purja Pun²; Vesselin Yamakov³; Yuri Mishin²; ¹National Institute of Standards and Technology; ²George Mason University; ³National Institute of Aerospace

9:00 AM

Development and Validation of Interatomic Potential for Tantalum using Physically-informed Artificial Neural Networks: Yi-Shen Lin¹; Ganga Purja Pun¹; Yuri Mishin¹; ¹George Mason University

9:20 AM Invited

Machine-learned Interatomic Potentials for Alloy Modeling and Phase Diagrams: Gus Hart¹; Conrad Rosenbrock¹; Konstantin Gubaev²; Alexander Shapeev²; Livia Pártay³; Noam Bernstein⁴; Gábor Csányi⁵; ¹Brigham Young University; ²Skolkovo Institute of Science and Technology; ³University of Reading; ⁴Naval Research Laboratory; ⁵Cambridge University

9:50 AM

Physically-motivated Requirements of Machine Learning Potentials: Jared Stimac¹; Jeremy Mason¹; ¹University of California, Davis

10:10 AM Break

10:30 AM Invited

Molecular Simulations You Can Trust and Reproduce: the OpenKIM Framework: Ellad Tadmor¹; Ryan Elliott¹; ¹University of Minnesota

11:00 AM

Scale Bridging from DFT to MD with Machine Learning: Mitchell Wood¹; Mary Alice Cusentino¹; Aidan Thompson¹; ¹Sandia National Laboratories

11:20 AM

An Active Learning Approach for the Generation of Force Fields from DFT Calculations: Nathan Wilson¹; Yang Yang²; Raymundo Arroyave¹; Xiaofeng Qian¹; ¹Texas A&M University; ²Xi'an Jiaotong

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications VIII — Session I

Sponsored by: TMS Functional Materials Division, TMS: Alloy Phases Committee

Program Organizers: Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Ensicaen University of Caen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Lan Li, Boise State University; Takao Mori, National Institute for Materials Science; Hsin-jay Wu, National Chiao-tung University; Tiejun Zhu, Zhejiang University

Tuesday AM | February 25, 2020
Miramar | Marriott Marquis Hotel

Session Chairs: Hsin-jay Wu, National Chiao-tung University; Sinn-wen Chen, National Tsing Hua University

8:30 AM Introductory Comments

8:35 AM Invited
ZT Enhancement in Thermoelectric Nanowires: *Yang-Yuan Chen*¹; ¹Academia Sinica

8:55 AM Invited
Novel Thermoelectric Materials for Power Generation: *Yaniv Gelbstein*¹; ¹Ben-Gurion University of Negev

9:15 AM
Current Progress on Fabrication and Life Testing of Advanced Skutterudite Thermoelectric Materials in a Proposed Enhanced Multi-mission Radioisotope Thermoelectric Generator (eMMRTG) for Space Power Applications: Thierry Caillat¹; Chen-Kuo Huang¹; Jong-Ah Paik¹; *Ike Chi*¹; Stanley Pinkowski¹; ¹Jet Propulsion Laboratory

9:35 AM Invited
Approaches to Manipulate p-n Conduction Transition and High Thermoelectric Performance in Ga-incorporated Bi₂Te₃: *Hsin-Jay Wu*¹; Chun-han Lin¹; Wan-ting Yen¹; ¹National Chiao Tung University

9:55 AM Break

10:15 AM Invited
Intrinsic Cu Vacancy Leading to High Thermoelectric Performance in CuBi₃Se₅: *Jian Wang*¹; ¹Wichita State University

10:35 AM

Enhanced Averaged zT in n-type Bi_2Te_3 via Solubility Control: *Wan-Ting Yen*¹; Hsin-jay Wu¹; Pai-chun Wei²; ¹National Chiao Tung University; ²King Abdullah University of Science and Technology

10:55 AM

Improving the Thermoelectric Properties of Atomized BiSbTe Alloy by Electroless Copper Coating: *Pathan Sharief*¹; Madavali Babu¹; Youhan Sohn²; Jun-Hyun Han²; Soon-Jik Hong¹; ¹Kongju National University; ²Chungnam National University

11:15 AM

Minor Ga Addition in $\beta\text{-Zn}_4\text{Sb}_3$ Leads to Major Enhancement in Thermoelectric Performance: *I-Lun Jen*¹; Hsin-Jay Wu¹; ¹National Chiao Tung University

LIGHT METALS

Alumina and Bauxite — Bayer Process and Iron

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: James Vaughan, University of Queensland

Tuesday AM | February 25, 2020
2 | San Diego Convention Ctr

Session Chair: Hong Peng, University of Queensland

8:30 AM Introductory Comments

8:40 AM

Quantifying the Effect of Seeds on Gibbsite Crystallization – Mathematical Modelling of Particle Size Distribution: *Thiago Franco*¹; Marcelo Seckler²; ¹CBA; ²São Paulo University

9:00 AM

Application of Advanced Oxidative Process for Organic Compounds Removal from Bayer Liquor: Miguel Soplin¹; *Amilton Botelho Junior*¹; Jorge Tenorio¹; Marcela Baltazar¹; Denise Espinosa¹; ¹Universidade de Sao Paulo

9:20 AM

Disc Magnetic Separator Applied to the Extraction of Magnetite in Bauxite Residue: *Yoann Robert*¹; Guy Simard¹; Sebastien Fortin²; ¹Université du Quebec à Chicoutimi; ²Rio Tinto

9:40 AM

Experimental Study on Flow Field Characteristics in Seed Precipitation Tank and Influence on Physical Properties of Al(OH)3 Products: *Xiangyu Zou*¹; Yan Liu¹; Xiaolong Li¹; Zhang Tingan¹; ¹Northeastern University

10:00 AM Break

10:20 AM

A Review of Comprehensive Utilization of High-iron Red Mud of China: *Zhang Tingan*¹; Kun Wang¹; Yan Liu¹; Guozhi Lv¹; Xiaofei Li¹; Xin Chen¹; ¹Northeastern University

10:40 AM

Conversion Behavior of Iron-containing Minerals in the Process of Dissolving High-iron Bauxite by Starch Hydrothermal Method: *Yongfei He*¹; Yiyong Wang¹; Jidong Li¹; Xingyuan Wan¹; Zhe Ning¹; ¹University of Science and Technology Liaoning

11:00 AM

Recovery of Iron from High-iron Bayer Red Mud by Smelting Reduction: *Kun Wang*¹; Yan Liu¹; Guozhi Lv¹; Xiaofei Li¹; Xin Chen¹; Zhang Tingan¹; ¹Northeastern University

LIGHT METALS

Aluminum Alloys, Processing and Characterization — New and Optimized Aluminium Alloys I

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Dmitry Eskin, Brunel University

Tuesday AM | February 25, 2020
1A | San Diego Convention Ctr

Session Chair: Shouxun Ji, Brunel University London

8:30 AM Introductory Comments

8:35 AM

Effect of Cooling Rate During Solidification of Aluminium-chromium Alloy: *Gautham Muthusamy*¹; Samuel Wagstaff²; Antoine Allanore¹; ¹Massachusetts Institute of Technology; ²Novelis Inc.

9:00 AM
Effects of Si Content on the Conductivity, Microhardness, Microstructure and Hot Tearing of Al-0.8Fe-0.5Mg-0.4Ni Alloys: *Stephanie Kotiadis*¹; Adam Zimmer¹; Abdallah Elsayed¹; Eli Vandersluis²; C. Ravindran²; ¹University of Guelph; ²Ryerson University

9:25 AM
The Efficacy of Replacing Metallic Cerium in Aluminum-cerium Alloys with LREE Mischmetal: *Zachary Sims*¹; David Weiss²; Orlando Rios³; Hunter Henderson³; Michael Kesler³; Scott McCall⁴; Michael Thompson¹; Aurelien Perron⁴; Emily Moore⁴; ¹University of Tennessee; ²Eck Industries; ³Oak Ridge National Laboratory; ⁴Lawrence Livermore National Laboratory

9:50 AM
Effects of Sc and Y on the As-cast Microstructure of AA6086: Sandi Zist¹; Varuzan Kevorkijan¹; Matej Steinacher¹; Franc Zupanic²; *Irena Paulin*³; ¹Impol d.o.o.; ²Faculty of Mechanical Engineering; ³Institute for Metals and Technology

10:15 AM Break

10:30 AM
Ternary Interactions and Implications for Third Element Alloying Potency in Al-Ce-Based Alloys: *Hunter Henderson*¹; David Weiss²; Zachary Sims¹; Michael Thompson³; Emily Moore⁴; Aurélien Perron⁴; Fanqiang Meng⁵; Ryan Ott⁵; Orlando Rios¹; ¹Oak Ridge National Laboratory; ²Eck Industries, Inc.; ³University of Tennessee, Knoxville; ⁴Lawrence Livermore National Laboratory; ⁵Ames Laboratory

10:55 AM
Development and Analysis of Al7075 Alloy Materials using Press and Sinter Processing: *Steven Johnson*¹; Corey Clark¹; Jason Alvarez¹; ¹Central Connecticut State University

11:20 AM
Retrogression Forming and Reaging of AA7075-T6 Alclad to Produce Stampings with Peak Strength: *Katherine Rader*¹; Louis Hector²; Jon Carter²; Eric Taleff¹; ¹University of Texas at Austin; ²General Motors

LIGHT METALS

Aluminum Reduction Technology — Reduction Cell Operation and Process Control

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Jayson Tessier, Alcoa

Tuesday AM | February 25, 2020
6D | San Diego Convention Ctr

Session Chair: Ali Jassim Banjab, Emirates Global Aluminium

8:30 AM Introductory Comments

8:35 AM
Study of Heat Distribution due to Acd Variations For Anode Setting: *Choon-Jie Wong*¹; Yuchen Yao¹; Jie Bao¹; Maria Skyllas-Kazacos¹; Barry Welch¹; Ali Jassim²; ¹University of New South Wales; ²Emirates Global Aluminum

8:55 AM
Anodic Incident Detection Through Multivariate Monitoring of Individual Anode Current Signals: *David LaJambe*¹; Éric Poulin¹; Carl Duchesne¹; Jayson Tessier²; ¹Laval University; ²Alcoa Primary Metals Smelting Center of Excellence

9:15 AM
Fault Detection and Diagnosis of Alumina Feeding System using Individual Anode Current Measurement: Yuchen Yao¹; Jie Bao¹; Maria Skyllas-Kazacos¹; Barry Welch¹; Ali Jassim²; *Choon Jie Wong*¹; ¹University of New South Wales; ²Emirates Global Aluminum

9:35 AM
Change of Anode Operation Pattern from Single to Double Staircase at Albras: Camila Silva¹; *Vanderlei Fernandes*¹; Nilton Nagem¹; Ivar Sousa¹; ¹Albras - Alumínio Brasileiro S/A

9:55 AM
An Advanced Nonlinear Control Approach for Aluminum Reduction Process: *Jing Shi*¹; Yuchen Yao¹; Jie Bao¹; Maria Skyllas-Kazacos¹; Barry Welch¹; Ali Jassim²; ¹University of New South Wales; ²Emirates Global Aluminum

10:15 AM Break

10:30 AM
Model Based Approach for Online Monitoring of Aluminium ProductionProcess:*Lucas Jose Da Silva Moreira*¹; Gildas Besancon¹; Francesco Ferrante¹; Mirko Fiacchini¹; Hervé Roustan²; ¹University Grenoble Alpes, CNRS, Grenoble INP*, GIPSA-lab; ²Rio Tinto

10:50 AM

Predictive Analytics for Enhancing Productivity of Reduction Cells: *Shanmukh Rajgire*¹; Abhijeet Vichare²; Amit Gupta¹; Devendra Pathe³; ¹Abstcpl; ²Presently affiliated with Meritus Interlytics Private limited; ³Hindalco Industries Limited

11:10 AM

Restart of Shutdown Pots - Troubles, Solutions and Comparison with Normal Pots to Improve Results: *Ved Prakash Rai*¹; Vibhav Upadhyay²; ¹Hindalco Industries Limited; ²Hindalco Industries Limited

BIOMATERIALS

Biodegradable Materials for Medical Applications II — Polymers and Ceramics

Sponsored by: TMS Functional Materials Division, TMS: Biomaterials Committee

Program Organizers: Jaroslaw Drelich, Michigan Technological University; Ehsan Mostaed, Michigan Technological University; Malgorzata Sikora-Jasinska, Michigan Technological University; Jan-Marten Seitz, Syntellix AG; Petra Maier, Stralsund University of Applied Sciences; Norbert Hort, Helmholtz-Zentrum Geesthacht; Huinan Liu, University of California, Riverside

Tuesday AM | February 25, 2020
Vista | Marriott Marquis Hotel

Session Chairs: Huinan Liu, University of California at Riverside; Jaroslaw Drelich, Michigan Technological University

8:30 AM Keynote**Fixing Broken Hearts:**

Biodegradable Cardiovascular Implants: *Subbu Venkatraman*¹; ¹Nanyang Technological University

9:05 AM

3D-printed Nanocomposites for Bone Repair: Chaoxing Zhang¹; Catherine Seo¹; Changlu Xu¹; Jiajia Lin¹; Edgar Villafana¹; Hector Jimenez¹; Huinan Liu¹; ¹University of California at Riverside

9:25 AM

Production of PLLA Membranes Incorporated with Antimicrobial Nanoparticles of Curcumin and Zinc Oxide for Medical Applications: Karla de Abreu Barbosa¹; Isabella Caroline Pereira Rodrigues¹; Leticia Tamborlim¹; Augusto Ducati Luchessi¹; Éder

Sócrates Najar Lopes¹; *Lais Pellizzer Gabriel*¹; ¹University of Campinas

9:45 AM

Synthesis of Absorable and Non-absorbable Sutures for Surgical Incisions and Wounds: *Muhammad Shoaib Butt*¹; ¹National University of Science and Technology

10:05 AM Break

10:20 AM

Ceramic Composites as Bone Tissue Scaffolds: Caitlin Guzzo¹; *John Nychka*¹; ¹University of Alberta

10:40 AM

Biocompatibility Study of Luminescent Hydroxyapatite: *Fabian Martinez*¹; Ekaterina Novitskaya¹; Manuel Herrera²; Karla Juarez-Moreno²; Olivia Graeve¹; ¹University of California, San Diego; ²Universidad Nacional Autónoma de México

11:00 AM

Tuning the Structure and Property of Silk Fibroin Scaffold for Optimized BMSC Behavior in Cartilage Repair: Zhinan Mao¹; *Juan Guan*¹; Sujun Wu¹; ¹Beihang University

BIOMATERIALS

Biological Materials Science — Biomaterials I

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Steven Naleway, University of Utah; Jing Du, Penn State University; Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); David Restrepo, University of Texas at San Antonio

Tuesday AM | February 25, 2020
Leucadia | Marriott Marquis Hotel

Session Chairs: Jing Du, Penn State University; Steven Naleway, University of Utah

8:30 AM

Novel Architected Materials for Treating Heart Disease: *David Restrepo*¹; Juan Rincon¹; Hai-Chao Han¹; ¹University of Texas at San Antonio

8:50 AM

Organic Plasma Processing (OPP) for Bio-interfacing Soft-matter Surfaces: *Vinoy Thomas*¹; Vineeth Vijayan¹; Bernabe Tucker¹; Yogesh Vohra¹; ¹University of Alabama at Birmingham

9:10 AM

Quick Setting Dental Pulp Capping Materials Made from Sodium Silicate and Calcium Phosphate Glasses: *Jerry Howard*¹; Levi Gardner¹; Zahra Saifee¹; Isaac Nelson¹; John Colombo²; Steven Naleway¹; Krista Carlson¹; Aladdin Geleil¹; ¹University of Utah; ²University of Las Vegas, Nevada

9:30 AM

Bone Growth at Breast Cancer Metastasis Evaluated using an In-vitro Cancer Metastasis Model: *Kalpana Katti*¹; Sumanta Kar¹; Haneesh Jasuja¹; Dinesh Katti¹; ¹North Dakota State University

9:50 AM Break

10:05 AM

Structural Analysis of Additively Manufactured Prosthetic Sockets using 360 Degree 3D-Digital Image Correlation: *Isaac Cabrera*¹; Kaela Wong¹; Victor Bourgin²; Win-Ying Zhao¹; Patricia Castillo¹; Connie Gean¹; Pegah Bagheri¹; Bryn Henning¹; KiAsia Lawson³; Joseph Martin¹; Samantha Fong¹; Ramesh Rao¹; Albert Lin¹; Joanna McKittrick¹; ¹University of California San Diego; ²Imperial College London; ³North Carolina A&T State University

10:25 AM

Long-term in vivo Cyclic Loading Upregulates the Effects of Osteoporosis Treatment: *James Rosenberg*¹; Ursula Eberli²; Stephan Zeiter²; Vincent Stadelmann³; Claire Acevedo¹; ¹University of Utah; ²AO Research Institute Davos; ³AO Research Institute Davos, Schuttlthess Klinik

10:45 AM

Biomechanical Behaviors of Gingival-derived Mesenchymal Stem Cells (GMSCs) Treated Arthritis Mice Tibia: *Yuxiao Zhou*¹; Junlong Dang²; Ye Chen³; Song Guo Zheng³; Jing Du¹; ¹Pennsylvania State University; ²Sun Yat-sen University; ³Ohio State University

11:05 AM Invited

Mechanical Properties of Tough, Mechanochemically Active Hydrogels: *Jamie Kruzic*¹; Yuwan Haung¹; Bhakthi Jayathilaka¹; Kristopher Kilian¹; ¹University of New South Wales

LIGHT METALS

Cast Shop Technology — Melting and Casting

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Johannes Morscheiser, Aleris Rolled Products Germany GmbH

**Tuesday AM | February 25, 2020
1B | San Diego Convention Ctr**

Session Chair: Samuel Wagstaff, Novelis

8:30 AM Introductory Comments

8:35 AM
Mold Shape Control for Direct Chill Ingot Casting: *Craig Cordill*¹; ¹Wagstaff

9:00 AM
Continuous Monitoring of Butt Curl Development During DC Casting – Development and Application: Gerd-Ulrich Gruen¹; *Werner Droste*¹; Daniel Krings¹; Mark Badowski¹; Markus Hagen¹; ¹Hydro Aluminium Rolled Products GmbH

9:25 AM
Constellium’s Mold Technology for Al Alloy Slab DC Casting: *Philippe Jarry*¹; Olivier Ribaud¹; Laurent Jouët-Pastré²; Emmanuel Waz¹; Pascal Delaire¹; Pierre-Yves Menet¹; Marc Bertherat¹; Pierre Celle¹; ¹Constellium C-TEC; ²Constellium Neuf-Brisach

9:50 AM
Fluid Flow Analyses and Meniscus Behavior during the Horizontal Single Belt Casting (HSBC) of Aluminum Alloy AA6111 Strips: *Roderick Guthrie*¹; Mihaiela Isac¹; ¹McGill Metals Processing Centre

10:15 AM Break

10:30 AM
Effect of Water Flow Distribution on the Performance of Aluminum Small-form Ingot Continuous Castings: *Lei Pan*¹; Eric Laplante¹; Francis Breton¹; ¹Rio Tinto

10:55 AM
Small Scale Oxidation Experiments on AlMg Alloys in Various Gas Fired Furnace Atmospheres: Anders Johansson¹; Egil Solberg²; Magnus Skramstad³; Thomas Kvande⁴; Johannes Lodin⁵; *Nicholas Smith*⁶; Martin Syvertsen⁶; Anne Kvithyld⁶; ¹Granges; ²Alcoa; ³NTNU; ⁴Hydro; ⁵Linde; ⁶SINTEF

11:20 AM
Study of the Oxidation of an Al-5Mg Alloy in Various Industrial Melting Furnace Atmospheres:*Johannes Lodin*¹; Martin Syvertsen²; Anne Kvithyld²; Anders Johansson³; Egil Solberg⁴; Thomas Kvande⁵; ¹Linde; ²SINTEF; ³Gränges AB; ⁴Alcoa; ⁵Hydro Aluminium

CHARACTERIZATION

Characterization of Minerals, Metals and Materials — 3D Characterization

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Shadia Ikhmayies, Al Isra University; Yunus Kalay, Middle East Technical University; Jiann-Yang Hwang, Michigan Technological University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Army Research Laboratory

Tuesday AM | February 25, 2020
Theater A-5 | San Diego Convention Ctr

Session Chairs: Yunus Kalay, Middle East Technical University; Tomoko Sano, U.S. Army Research Laboratory

8:30 AM
From Fundamental Research to Engineered Components: Application to 3D Materials Science: *Jonathan Madison*¹; Thomas Ivanoff¹; Alex Hickman¹; ¹Sandia National Laboratories

8:50 AM
In-Situ X-ray Tomography of Vapor Phase Alloying of Ni Wires via Pack Titanization: *Arun Bhattacharjee*¹; Ashley Paz y Puente¹; Dinc Erdeniz²; David Dunand³; ¹University of Cincinnati; ²Marquette University; ³Northwestern University

9:10 AM
Introducing 3D-LIBS, a Powerful Rapid Chemical Mapping Tool for Trace Elements in Complex Materials: *Carys Cook*¹; Rajiv Soman¹; Karol Putyera¹; ¹EAG Eurofins

9:30 AM
Modeling the Anisotropic Mechanical Properties of Fused Deposition Modeling ABS using an Artificial Neural Network -

Part 2: *Brian Kessler*¹; Sarah Gladding¹; Aric Harper¹; ¹Colorado Mesa University

9:50 AM

Mapping Grain Morphology and Orientations by Laboratory Diffraction Contrast Tomography: *Hrishikesh Bale*¹; Jun Sun²; Jette Oddershede²; Erik Lauridsen²; ¹Carl Zeiss Microscopy Inc.; ²Xnovo Technology ApS

10:10 AM Break

10:25 AM

A New Characterization Tool for 3D Orientation Microscopy at Mesostructure Length Scales: Thomas Ales¹; *Peter Collins*¹; ¹Iowa State University

10:45 AM

Pore Network Modelling Analysis of 3D SEM Images of Nanoporous Gold: *S. Ali Shojae*¹; ¹Thermo Fisher Scientific

11:05 AM

Automated Serial Sectioning as a Method to 3D Map Inclusions in Structural Metals: *Veeraraghavan Sundar*¹; Rachel Reed¹; ¹UES Inc.

11:25 AM

3D Characterization of the Evolution of Crystal Mosaicity During Solidification of Single Crystal Ni-based Superalloys: *Felicitas Scholz*¹; Daniel Kotzem¹; Pascal Thome¹; Jan Frenzel¹; Gunther Eggeler¹; ¹Ruhr-Universitaet Bochum

11:45 AM

Using Convolutional Neural Networks to Visualize Large Serial Sectioning Datasets: *Zach Thompson*¹; Tiberiu Stan¹; Peter Voorhees¹; ¹Northwestern University

CHARACTERIZATION

Characterization of Minerals, Metals and Materials — Minerals Processing and Analysis II

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Shadia Ikhmayies, Al Isra University; Yunus Kalay, Middle East Technical University; Jiann-Yang Hwang, Michigan Technological University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Army Research Laboratory

Tuesday AM | February 25, 2020
Theater A-8 | San Diego Convention Ctr

Session Chairs: Zhiwei Peng, Central South University; Chenguang Bai, Chongqing University

8:30 AM
Experimental Research on Pellet Production with Boron-containing Concentrate: *Tian Yunqing*¹; Qing Gele¹; ¹Research Institute of Technology, Shougang Group Corporation

8:50 AM
Nano-particle Products Extracted from the Low-grade Laterite Minerals: *Qiuju Li*¹; ¹Shanghai University

9:10 AM
Study on the Influence of Limestone and Hydrated Lime on Pelletizing: *Gele Qing*¹; Zhixing Zhao¹; Minge Zhao¹; Yunqing Tian¹; Li Ma¹; ¹Shougang Group

9:30 AM
Leaching of Platinum Group Metals from Automobile Spent Catalyst: *Sujun Lu*¹; Dalin Chen¹; Peng Zhang¹; Guoju Chen¹; Yan Zhang¹; Yujun Pan²; Ruikang Wang²; Jinxi Qiao²; Xintao Sun²; Ailiang Chen²; ¹State Key Laboratory of Nickel and Cobalt Resources Comprehensive Utilization;Jinchuan Group Co. Ltd; ²Central South University

9:50 AM
Characterization on the Behaviors of Ca and Si Constituents during the Consolidation of Ferruginous Manganese Ores: *Bingbing Liu*¹; Ruijie Li¹; Shengpeng Su¹; Yuanbo Zhang²; ¹Zhengzhou University; ²Central South University

10:10 AM Break

10:30 AM

Pb(II) Removal from Acid Wastewater by Magnetic Manganese Ferrites Synthesized from Ferromanganese Ores: *Jia Wang*¹; Zijian Su¹; Manman Lu¹; Juan Wang¹; Yuanbo Zhang¹; ¹Central South University

10:50 AM

Recovery of Valuable Metals from the Leaching Tailings from the Arsenic-Nickel/Cobalt-residue: *Jinxi Qiao*¹; Ailiang Chen¹; Xintao Sun¹; Zhen Qian²; Yan Zhang³; Yutian Ma³; Yalin Ma¹; ¹Central South University; ²Changsha Research Institute of Mining Metallurgy Co.Ltd; ³State Key Laboratory of Nickel and Cobalt Resources Comprehensive Utilization;Jinchuan Group Co. Ltd

CHARACTERIZATION

Characterization: Structural Descriptors, Data-Intensive Techniques, and Uncertainty Quantification — Grain Boundary Descriptors

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Extraction and Processing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Materials Characterization Committee

Program Organizers: Shawn Coleman, CCDC Army Research Laboratory; Tomoko Sano, U.S. Army Research Laboratory; James Hogan, University of Alberta; Srikanth Patala, North Carolina State University; Oliver Johnson, Brigham Young University; Francesca Tavazza, National Institute of Standards and Technology

Tuesday AM | February 25, 2020
Theater A-3 | San Diego Convention Ctr

Session Chairs: Oliver Johnson, Brigham Young University; Srikanth Patala, North Carolina State University

8:30 AM Introductory Comments

8:35 AM Invited

Characterizing GB Atomic Structures at Multiple Scales: *Eric Homer*¹; Derek Hensley¹; Conrad Rosenbrock¹; Andrew Nguyen¹; Jonathan Priedeman¹; Gus Hart¹; ¹Brigham Young University

9:05 AM

Basis Functions for Quantifying Grain Boundary Texture in Polycrystalline Microstructures: *Srikanth Patala*¹; Jeremy Mason²; ¹North Carolina State University; ²University of California, Davis

9:25 AM

Microstructural Evolution Along Geodesics: *Ian Chesser*¹; Toby Francis²; Marc DeGraef¹; Elizabeth Holm¹; ¹Carnegie Mellon University; ²University of California Santa Barbara

9:45 AM

The Grain Boundary Octonion: Metrics, Paths, and Fundamental Zones: *Toby Francis*¹; Ian Chesser²; Saransh Singh³; Tresa Pollock¹; Elizabeth Holm²; Marc De Graef²; ¹University of California, Santa Barbara; ²Carnegie Mellon University; ³Lawrence Livermore National Laboratory

10:05 AM Break

10:25 AM

GB Property Localization: Inference and Uncertainty Quantification of Grain Boundary Structure-property Models: *Oliver Johnson*¹; Sterling Baird¹; Christian Kurniawan²; David Fullwood¹; Eric Homer¹; ¹Brigham Young University; ²Carnegie Mellon University

10:45 AM

Higher Order Spectral Terms in Grain Boundary Networks: *Christopher Adair*¹; Oliver Johnson¹; ¹Brigham Young University

11:05 AM

Investigating the Atomistic Nature of Grain Boundary Failure: *Jacob Tavenner*¹; Christopher Weinberger²; Shawn Coleman³; Garritt Tucker¹; ¹Colorado School of Mines; ²Colorado State University; ³Army Research Laboratory

11:25 AM

Characterizing the Energetics and Structural Configurations of Silicon Carbide Grain Boundaries Using High-throughput Atomistic Techniques: *Matthew Guziewski*¹; Dennis Trujillo²; Srikanth Patala³; Shawn Coleman¹; ¹US Army Research Laboratory; ²University of Connecticut; ³North Carolina State University

MATERIALS DESIGN

Computational Discovery and Design of Emerging Materials — Session III

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Arunima Singh, Arizona State University; Houlong Zhuang, Arizona State University; Sugata Chowdhury, National Institute of Standards and Technology; Arun Kumar Mannodi Kanakkithodi, Argonne National Laboratory

Tuesday AM | February 25, 2020
32B | San Diego Convention Ctr

Session Chair: Arun Kumar Mannodi Kanakkithodi, Argonne National Laboratory

8:30 AM Invited
First-principles Theory of Nonlinear Optical Responses in 2D Materials and Topological Materials: *Xiaofeng Qian*¹; ¹Texas A&M University

9:00 AM
Effect of Spin-orbit Coupling on Magnetic Phase Transition of Anti-ferromagnetic Weyl-Semimetal: *Sugata Chowdhury*¹; Kevin Garrity¹; Angela Hight Walker¹; Cindi Dennis¹; Albert Davydov¹; Francesca Tavazza¹; ¹National Institute of Standards and Technology

9:20 AM
Data-driven Discovery of the Functional Form of the Superconducting Critical Temperature: Stephen Xie¹; Gregory Stewart²; James Hamlin²; Peter Hirschfeld²; *Richard Hennig*¹; ¹University of Florida, Department of Materials Science and Engineering; ²University of Florida, Department of Physics

9:40 AM
High-throughput Discovery of Topologically Non-trivial Materials using Spin-orbit Spillage: Kamal Choudhary¹; Kevin Garrity²; *Francesca Tavazza*²; ¹University of Maryland (National Institute of Standards and Technology); ²Umcp/Nist

10:00 AM
High Throughput Exploration of Two-dimensional Topological Artificial Lattices: *Srilok Srinivasan*¹; Mathew Cherukara¹; Subramanian Sankaranarayanan¹; Pierre Darancet¹; ¹Argonne National Laboratory

10:20 AM Break

10:35 AM Invited

Towards a First-principles Description of Stronger Correlations: Novel Superconductors to Topological Materials: *Arun Bansil*¹; ¹Northeastern University

11:05 AM

Two-dimensional Functional Materials with Pentagonal Structure: *Lei Liu*¹; Immanuella Kankam¹; Houlong Zhuang¹; ¹Arizona State University

11:25 AM

Computational Synthesis of 2D Materials: A High-throughput Approach to Materials Design: *Tara Boland*¹; Arunima Singh¹; ¹Arizona State University

11:45 AM

Exploring Van der Waals 2D Heterostructures using a Combined Machine Learning and Density Functional Theory Approach: *Daniel Willhelm*¹; Nathan Wilson¹; Tahir Cagin¹; Raymundo Arroyave¹; Ruth Pachter²; Xiaofeng Qian¹; ¹Texas A&M University; ²Air Force Research Laboratory

ENERGY & ENVIRONMENT

Computational Materials Science and Engineering of Materials in Nuclear Reactors — Chemical Interactions and Modeling

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Dilpuneet Aidhy, University of Wyoming; Michael Tonks, University of Florida; Mahmood Mamivand, Boise State University; Giovanni Bonny, Belgian Nuclear Research Center

Tuesday AM | February 25, 2020
Theater A-9 | San Diego Convention Ctr

Session Chairs: Jaime Marian, UCLA; Mike Tonks, University of Florida

8:30 AM Invited

Corrosion of Silicon Carbide in Nuclear Environments: *Izabela Szlufarska*¹; Jianqi Xi¹; Cheng Liu¹; Dane Morgan¹; ¹University of Wisconsin-Madison

9:10 AM

Modeling of Interface Evolution during Zirconium Alloy Corrosion:

*Natalia Tymiak Carlson*¹; Richard Smith¹; Bruce Kammenzind¹;

¹Naval Nuclear Laboratory, Bettis Site

9:30 AM

Influence of Coordination Numbers on Representing Molten Salts for Nuclear Reactor Applications Using the Modified Quasi-Chemical Model (MQM): *Matthew Christian*¹; Theodore Besmann¹;

¹University of South Carolina

9:50 AM

Amorphous Zirconia: a Host for Excess Oxygen in Cladding Barrier Oxides?: *Simon Middleburgh*¹; Michael Rushton¹; Iuliia Ipatova¹; Lee

Evitts¹; William Lee¹; ¹Nuclear Futures Institute

10:10 AM Break

10:30 AM Invited

A Physical Model of Zircaloy Corrosion in Water for Simulating Nuclear Reactor Clad Response: *Jaime Marian*¹; Qianran Yu¹;

Peng Wang²; Michael Reyes¹; Asghar Aryanfar³; Gary Was²; ¹UCLA; ²University of Michigan; ³Bahçesehir University

11:10 AM

Atomistic Studies of Nuclear Materials with Temperature: Uranium Nitride and Thermocouples: *Ember Sikorski*¹; Lan Li¹;

¹Boise State University

11:30 AM

Stabilizing Gamma Hydrides in Zr through Mechanical Stress: *Jake*

*Bair*¹; Nicole Overman¹; Shawn Riechers¹; Ewa Ronnebro¹; David Collins¹; David Abrecht¹; ¹Pacific Northwest National Laboratory

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Solid-Liquid Transformations and Properties

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Jorge Munoz, University of Texas at El Paso; Sara Kadkhodaei, University of Illinois at Chicago; Vahid Attari, Texas A&M University; James Morris, Ames Laboratory

Tuesday AM | February 25, 2020

Session Chairs: Gilles Demange, University of Rouen; Nana Ofori-Opoku, Canadian Nuclear Laboratories

8:30 AM Invited
Phase-field Lattice Boltzmann Simulations of Dendrite Growth with Melt Flow: *Tomohiro Takaki*¹; Shinji Sakane¹; Munekazu Ohno²; Yasushi Shibuta³; ¹Kyoto Institute of Technology; ²Hokkaido University; ³The University of Tokyo

9:00 AM
Thermodynamics and Kinetics of Electrochemical Solid/Liquid Interfaces: Role of the Solvent: *Mira Todorova*¹; Suhyun Yoo¹; Sudarsan Surendralal¹; Joerg Neugebauer¹; ¹Max Planck Institut fur Eisenforschung

9:20 AM Invited
Bridging Multi Scales for Predicting Structures and Properties in Solidification of Metals and Alloys: *Mohsen Asle Zaeem*¹; ¹Colorado School of Mines

9:50 AM
Molecular Dynamics Simulations of Heterogeneous Nucleation from Undercooled Melt: *Takuya Fujinaga*¹; Yasushi Shibuta¹; ¹The University of Tokyo

10:10 AM Break

10:30 AM Invited
Modeling Nucleation in the Phase-field and Phase-field Crystal Models: *Tamás Pusztai*¹; Frigyes Podmaniczky¹; Gyula Tóth²; László Gránásy¹; ¹Wigner Research Centre For Physics; ²Loughborough University

11:00 AM
Calculating the Eutectic Coupled Zone in a Ternary System via Genetic Optimization: *George Lindemann*¹; Ashwin Shahani¹; ¹Department of Materials Science and Engineering, University of Michigan

SPECIAL TOPICS

Current Trends in Magnetocaloric Materials: An FMD Symposium in Honor of Ekkes Brueck — Strain Enhanced Magnetocaloric, Barocaloric Materials, and Thermomagnetic Generators

Sponsored by: TMS Functional Materials Division

Program Organizers: Victorino Franco, Universidad de Sevilla; Frank Johnson, Niron Magnetics, Inc.

Tuesday AM | February 25, 2020
Marina Ballroom F | Marriott Marquis Hotel

Session Chair: Konstantin Skokov, TU Darmstadt

8:30 AM Invited
Tuning Magnetocaloric Materials with Stress: *Xavier Moya*¹;
¹University of Cambridge

9:00 AM Invited
Under Pressure: Probing Magneto-structural Coupling in MCE Materials: *Luana Caron*¹; Sanjay Singh²; Ekkes Brueck³; Claudia Felser⁴; ¹Bielefeld University; ²Indian Institute of Technology (Banaras Hindu University), Varanasi; ³TU Delft; ⁴Max Planck Institute for Chemical Physics of Solids

9:30 AM Invited
Giant Barocaloric Effect at the Spin Crossover Transition of a Molecular Crystal: Steven Vallone¹; Anthony Tantillo¹; *António dos Santos*²; Jamie Molaison²; Rafal Kulmaczewski³; Antonin Chapoy⁴; Pezhman Ahmadi⁴; Malcolm Halcrow³; Karl Sandeman¹; ¹The City University Of New York; ²Oak Ridge National Laboratory; ³University of Leeds; ⁴Heriot-Watt University

10:00 AM Break

10:20 AM Invited
Energy Harvesting Using Thermomagnetic Generators with Magnetocaloric Materials: *Anja Waske*¹; Dzekan²; Bruno Neumann²; Dietmar Berger²; Kai Sellschopp³; Alexander Stork²; Kornelius Nielsch²; Sebastian Fähler²; ¹Bundesanstalt für Materialforschung; ²IFW Dresden; ³Technische Universität Hamburg

10:50 AM Invited
Materials for Thermomagnetic Harvesting of Low Temperature Waste Heat: Daniel Dzekan¹; Anja Waske²; Kornelius Nielsch¹; *Sebastian Fähler*¹; ¹Leibniz IFW Dresden; ²Bundesanstalt für Materialforschung und -prüfung (BAM)

11:20 AM Invited
Rare-earth-free Permanent Magnets: The Past and Future: *J. Ping Liu*¹; ¹University of Texas at Arlington

MATERIALS PROCESSING

Defects and Properties of Cast Metals — Properties II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Solidification Committee

Program Organizers: Lang Yuan, University of South Carolina; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Charles Monroe, University of Alabama at Birmingham

Tuesday AM | February 25, 2020
17B | San Diego Convention Ctr

Session Chairs: Peter Lee, University College London; Mark Easton, RMIT University

8:30 AM Invited
Refinement of Coarse Intermetallics in Hypereutectic Al-Si Alloys with High Fe, Mn Contents: Carmelo Todaro¹; *Mark Easton*¹; David StJohn²; Ma Qian¹; ¹RMIT University; ²University of Queensland

9:00 AM Invited
Modification of Al-Si Alloys with Rare Earth Elements: *Prakash Srirangam*¹; ¹Wmg, University of Warwick

9:30 AM
The Influence of Ultrasound on the Microstructure Formation During the Solidification of A356 Ingots Processed via a 2-Zone Induction Melting Furnace:*Aqi Dong*¹; Laurentiu Nastac¹; ¹University of Alabama

9:50 AM
Ti Fading Effect in Primer and Seconder A356 Alloys and Melt Quality: *Ozen Gursoy*¹; Eray Erzi²; Derya Dispinar²; ¹ITU; ²Istanbul University

10:10 AM Break

10:30 AM
Tensile Properties Limits of A356 Alloy by Porosity: Ozkan Kesen¹; Selim Temel¹; Okan Aydin¹; Furkan Tezer¹; Ozen Gursoy¹; *Derya Dispinar*²; ¹ITU; ²Istanbul University

10:50 AM
Effect of Zr Additions on Microstructure and Mechanical Properties of Gravity Die Cast AlSi7Mg0.4 Alloys: Yunxiang Zhang¹; Haidong Zhao¹; Changhai Li²; Lin Zhu²; ¹South China University of Technology; ²CITIC Dicastal Co.,Ltd.

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Transitions at Grain Boundaries VII — Grain Boundary Effects at the Nanoscale

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Shen Dillon, University of Illinois; Douglas Spearot, University of Florida; Jian Luo, University of California, San Diego; Jennifer Carter, Case Western Reserve University

Tuesday AM | February 25, 2020
5B | San Diego Convention Ctr

Session Chairs: Jason Trelewicz, Stony Brook University; Jian Luo, University of California, San Diego

8:30 AM
Disconnection Mediated Grain Boundary Migration: *Scott Mao*¹; ¹University of Pittsburgh

8:50 AM
Adsorption and Equilibrium Metal-ceramic Orientation Relationships: Hadar Nahor¹; Ting Mao¹; *Wayne Kaplan*¹; ¹Technion - Israel Institute of Technology

9:10 AM
Ab Initio Study of a Highly Asymmetric Grain Boundary Superstructure in WC: *Chongze Hu*¹; Zhiyang Yu²; Jian Luo¹; ¹University of California San Diego; ²Fuzhou University

9:30 AM
A Crystal Plasticity Model with Enhanced Interface Physics: *Jason Mayeur*¹; ¹University of Alabama in Huntsville

9:50 AM Invited
Critical Assessment of Grain Boundary Role on the Magnetic Flux Trapping in Niobium: P Garg¹; Thomas Bieler²; *Kiran Solanki*¹;

¹Arizona State University; ²Michigan State University

10:10 AM Break

10:30 AM

Mechanistic Transitions Underpinning Grain Boundary Segregation Strengthening in Nanocrystalline Alloys: *Jason Trelewicz*¹; ¹Stony Brook University

10:50 AM

Screw Dislocation Transmission Across the S3{112}Twin Boundary in Face Centered Cubic Copper: *Tengfei Ma*¹; Nithin Mathew²; Lei Cao¹; Abigail Hunter²; ¹University of Nevada, Reno; ²Los Alamos National Laboratory

11:10 AM

Evolution of Grain Boundary’s Metastability in Metallic Nanocrystals Under External Stimuli: *Zhitong Bai*¹; *Yue Fan*¹; ¹University of Michigan

11:30 AM

Multiscale Simulation of the Dislocation-interface Reactions: Methodology, Mechanisms, and Applications: *Liming Xiong*¹; Youping Chen²; ¹Iowa State University; ²University of Florida

LIGHT METALS

Electrode Technology for Aluminum Production — Anode Production

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Duygu Kocaefe, University of Quebec at Chicoutimi

Tuesday AM | February 25, 2020
3 | San Diego Convention Ctr

Session Chair: Claude Lavoie, RTA

8:30 AM Introductory Comments

8:35 AM

Development of a Soft Sensor for Detecting Overpitched Green Anodes: *Adéline Paris*¹; Carl Duchesne¹; Éric Poulin¹; Julien Lauzon-Gauthier²; ¹Laval University; ²Alcoa Primary Metals Smelting Center of Excellence

9:00 AM

Diffusion Measurements of CO₂ within Carbon Anodes for Aluminium Smelting: Epma Putri¹; *Geoffrey Brooks*²; Graeme Snook³; Lorentz Lossius⁴; Ingo Eick⁴; ¹CSIRO, Swinburne University of Technology; ²Swinburne University of Technology; ³CSIRO; ⁴Hydro Aluminium

9:25 AM

Testing of SERMA Technology on Industrial Anodes for Quality Control in Aluminum Production: *Yasar Kocaefe*¹; Duygu Kocaefe¹; Dipankar Bhattacharyay¹; Abderrahmane Benzaoui¹; Jean-François Desmeules¹; ¹University of Quebec at Chicoutimi

9:50 AM

Modelling of Gas Injection on Anode Baking Furnace and Application to Operations: Sandra Besson¹; *Solène Bache*¹; Arnaud Bourgier¹; Jean-Philippe Schneider¹; Thierry Conte¹; ¹Rio Tinto

10:15 AM Break

10:30 AM

Higher Baking and Production Levels in Anode Baking Furnaces and Associated Challenges: *Syed Arif Ali*¹; Charles Lebel-Tremblay¹; Pierre-Yves Brisson¹; Alexandre Gagnon¹; ¹Rio Tinto Aluminium

10:55 AM

Major Reconstruction of Central Casing of Open Top Baking Furnace with a View to Increase Its Lifespan and Reduce the Total Costs Comparing to Full Reconstruction: *Christos Zarganis*¹; Arnaud Bourgier²; ¹Mytilineos Metallurgy Business Unit, Agios Nikolaos Viotia; ²Rio Tinto Aluminium

MATERIALS PROCESSING

Electrometallurgy 2020 — Applications to Battery or Materials Synthesis

Sponsored by: TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee

Program Organizers: Antoine Allanore, Massachusetts Institute of Technology; Michael Free, University of Utah; Georges Houlachi, Hydro-Quebec; Hojong Kim, Pennsylvania State University; Takanari Ouchi, The University of Tokyo; Shijie Wang, Rio Tinto Kennecott Utah Copper Corp

Tuesday AM | February 25, 2020
14A | San Diego Convention Ctr

Session Chair: Hojong Kim, Pennsylvania State University

8:30 AM
A Low-cost Intermediate Temperature Molten Salt Battery for Grid-scale Energy Storage: *Xiaohui Ning*¹; ¹Xi'an Jiao Tong University

8:50 AM
High-performance Composite Electrolyte Enhanced by Solid Plasticizer and Conductive Ceramic Filler for All-Solid-State Lithium Battery: *Fei Chen*¹; ¹Wuhan University of Technology

9:10 AM
Study on High-temperature Liquid Lithium Battery with Lil-KI Electrolyte: Hao Yu¹; Huimin Lu¹; *Neale Neelameggham*²; ¹Beihang University; ²IND LLC

ENERGY & ENVIRONMENT

Energy Technologies and CO2 Management Symposium — Session III

Sponsored by: TMS Extraction and Processing Division, TMS: Energy Committee

Program Organizers: Xiaobo Chen, RMIT University; Yulin Zhong, Griffith University; Lei Zhang, University of Alaska Fairbanks; John Howarter, Purdue University; Alafara Baba, University of Ilorin; Neale Neelameggham, IND LLC; Cong Wang, Northeastern University; Ziqi Sun, Queensland University of Technology

Tuesday AM | February 25, 2020
17A | San Diego Convention Ctr

Session Chairs: Cong Wang, Northeastern University; Lihong Su, University of Wollongong

8:30 AM Keynote
An Overall Assessment of Welding Fluxes Geared Towards High Heat Input Applications: *Cong Wang*¹; ¹Northeastern University

9:00 AM Invited
Achieving Controlled Surface Roughness of Ultra-thin Al Foils as Current Collector: *Lihong Su*¹; ¹University of Wollongong

9:25 AM
Photocatalytic Hydrogenolysis to Convert Lignin-derivatives to Phenol Under Ambient Conditions: *Yun-Chung Shen*¹; Jeffrey Wu²; ¹Institute of Nuclear Energy Research; ²National Taiwan University

9:45 AM
Molecular Dynamics Simulation of CO₂ Absorption Behavior in Hydrotalcite and its Derived Oxides: *Hao Zhang*¹; ¹Univ of Alberta

10:05 AM Break

10:25 AM
Improved Physical Solvents for Pre-combustion CO₂ Capture: *Jeffrey Culp*¹; Robert Thompson¹; Wei Shi¹; Surya Tiwari¹; Kevin Resnik¹; Nicholas Siefert²; David Hopkinson²; ¹National Energy Technology Laboratory / LRST; ²National Energy Technology Laboratory

10:45 AM
Hydrogen as a Fuel and Ramifications: Ashok Khandkar¹; *Neale Neelameggham*²; ¹University of Utah; ²IND LLC

11:05 AM
Theoretical and Experimental Research on the Mass Changes of Elements in Molten Steel with CO₂ Used as RH Lifting Gas: *Baochen Han*¹; Rong Zhu²; Guangsheng Wei¹; Chao Feng¹; Jianfeng Dong¹; ¹University of Science and Technology Beijing; ²University of Science and Technology, Beijing

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Stress Corrosion Cracking I

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Bai Cui, University of Nebraska-Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Jenifer Locke, Ohio State University

Tuesday AM | February 25, 2020
Theater A-10 | San Diego Convention Ctr

Session Chairs: Gary Was, University of Michigan; John Scully, University of Virginia

8:30 AM Invited
Insights into Factors Controlling IASCC of Stainless Steels: *Gary Was*¹; *Drew Johnson*¹; *Diana Farkas*²; ¹University of Michigan; ²Virginia Tech

9:10 AM
Effect of Triaxial Stress State on PWSCC Initiation Behavior of Nickel-based Alloy in Nuclear Power Plants: *Seung Chang Yoo*¹; *Kyoung Joon Choi*²; *Jong-Sung Kim*³; *Il Soon Hwang*¹; *Ji Hyun Kim*¹; ¹UNIST; ²Korea Atomic Energy Research Institute; ³Sejong University

9:30 AM
Determining Reliability Over Time for Stainless Steels Susceptible to Chloride-induced Stress Corrosion Cracking: *Consuelo Guzman-leong*¹; *Joseph Cluever*¹; *Stephen Gosselin*¹; ¹LPI, Inc.

9:50 AM Break

10:10 AM Invited
Mitigation of Intergranular Stress Corrosion Cracking in Al-Mg Alloys Through the Electrochemical and Chemical Effects of Metal Rich Primer Coatings Near Stationary and Propagating Cracks: *Matthew McMahon*¹; *John Scully*¹; *James Burns*¹; ¹University of Virginia

10:50 AM
Sensitization, Loading Frequency, and Electrochemical Potential Effects on Corrosion Fatigue Kinetics of AA5456-H116: *David Schrock*¹; *Jenifer (Warner) Locke*¹; ¹The Ohio State University

11:10 AM
Evaluating Stress Corrosion Cracking Performance of 5083 H116 Aluminum as a Function of Material Microstructure: *William Golumbfskie*¹; *Matthew McMahon*¹; *Emily Holcombe*¹; *Mitra Taheri*²;

¹Naval Surface Warfare Center - Carderock; ²Drexel University

11:30 AM

Stress Corrosion Cracking of Welded AA5059 Alloy: Rajesh Yadav¹; *Gajanan Chaudhari*¹; ¹Indian Institute of Technology

MECHANICS & STRUCTURAL RELIABILITY

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Data-Driven Investigations of Fatigue

Sponsored by: TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Garrett Pataky, Clemson University; Ashley Spear, University of Utah; Jean-Briac le Graverend, Texas A&M University; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University

Tuesday AM | February 25, 2020
11A | San Diego Convention Ctr

Session Chair: Ashley Spear, University of Utah

8:30 AM Break

8:50 AM Invited

Statistical Modeling of Censored Life Data: *D. Gary Harlow*¹; ¹Lehigh University

9:10 AM

Fatigue Crack Growth in Structural Cast Aluminum Alloys: Microstructural Mechanisms, Modeling Strategies, and Integrated Design: *Anthony Spangenberg*¹; *Diana Lados*¹; ¹Worcester Polytechnic Institute

9:30 AM

Marked 2-point Spatial Correlations of Microstructure Neighborhoods Surrounding Fatigue Hot-spots in Ti-6Al-4V: *Adrienne Muth*¹; *Surya Kalidindi*¹; *Reji John*²; *Adam Pilchak*²; *David McDowell*¹; ¹Georgia Institute of Technology; ²Air Force Research Laboratory

9:50 AM

Multi-scale Modeling and Uncertainty Quantification of Fatigue Crack Nucleation in Titanium Alloys with Parametrically Homogenized Constitutive Models: *Deniz Ozturk*¹; Shravan Kotha¹; Somnath Ghosh¹; ¹Johns Hopkins University

10:10 AM Break

10:30 AM Invited

A Machine Learning Approach to Predict Fatigue Damage and Crack Initiation Sites in a BCC Steel Microstructure: Ali Riza Durmaz¹; *Thomas Straub*¹; Chris Eberl¹; ¹Fraunhofer IWM

10:50 AM

Probabilistic Dwell Fatigue Life Prediction of Microtextured Ti-6Al-4V: *Sushant Jha*¹; James Larsen²; Reji John²; Adam Pilchak²; ¹University of Dayton Research Institute; ²US Air Force Research Laboratory

11:10 AM

Variable Amplitude Fatigue Analysis Through an Approach based in the Equivalent Number of Cycles: *Hernan Pinto*¹; Paola Moraga¹; Matias Valenzuela¹; Alvaro Pena¹; Jose Garcia¹; ¹Pontificia Universidad Catolica de Valparaiso

SPECIAL TOPICS

Frontiers of Materials Award Symposium: Leveraging Materials in Topology Optimization — Session I

Program Organizer: Natasha Vermaak, Lehigh University

Tuesday AM | February 25, 2020
4 | San Diego Convention Ctr

8:30 AM Invited

Leveraging Materials in Topology Optimization: *Natasha Vermaak*¹; ¹Lehigh University

8:50 AM Invited

Multiscale/Level Design of Materials and Structures: *H Alicia Kim*¹; ¹University of California San Diego

9:30 AM Invited

Topology Optimization for Additive Manufacturing: *Albert To*¹; ¹University of Pittsburgh

10:10 AM Break

10:30 AM Invited

Nonlinear Composite Materials Design through Multi-material Topology Optimization Frameworks: *X. Shelly Zhang*¹; ¹University of Illinois at Urbana Champaign

11:10 AM Invited

Materials, Design and Emerging Objects: *Virginia San Fratello*¹; ¹San Jose State University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Functional Nanomaterials 2020: Translating Innovation into Pioneering Technologies — Translating Innovation into Pioneering Technologies III

Sponsored by: TMS Functional Materials Division, TMS: Nanomaterials Committee

Program Organizers: Simona Hunyadi Murph, Savannah River National Laboratory; Huanyu Cheng, Pennsylvania State University; Yong Lin Kong, University of Utah; Min Kyu Song, Washington State University; Ning Zhang, University of Alabama

Tuesday AM | February 25, 2020
Point Loma | Marriott Marquis Hotel

Session Chairs: Nasrin Hooshmand, Georgia Tech; Jaeyun Moon, University of Nevada Las Vegas

8:30 AM Invited

Multifunctional Flexible Optoelectronic Systems for Bio-interfacing: *Luyao Lu*¹; ¹George Washington University

8:50 AM

On the Design of Novel 2D Particulates from MAB Phases: *Surojit Gupta*¹; ¹University of North Dakota

9:10 AM Invited

Study on Photocatalytic Performance of Bi2MoO6/Ag3PO4 z-scheme Composites: *Jaeyun Moon*¹; *Kaleab Ayalew*¹; ¹University of Nevada Las Vegas

9:30 AM Keynote

Tailored Nanomaterials for Advanced Environmental Processes: *Sherine Obare*¹; ¹UNC Greensboro

10:10 AM Break

10:30 AM Invited

Biomimetic Composites with Self-organized Aramid Nanofibers: *Lizhi Xu*¹; ¹The University of Hong Kong

10:50 AM Invited

Biogenic Nanoparticles on Exoelectrogens: *Seokheun Choi*¹; ¹State University of New York at Binghamton

11:10 AM Invited

Carrier Lifetime Dependence on Annealing Conditions in CuxOy Thin Films: A Transient Absorption Study: *Susanne Ullrich*¹; Learnmore Tanaka Shenje¹; ¹University of Georgia

11:30 AM Invited

Self-healable, Fully Recyclable and Malleable Electronic Skin based on Dynamic Covalent Thermoset Nanocomposite: *Jianliang Xiao*¹; ¹University of Colorado Boulder

MATERIALS DESIGN

Hume-Rothery Symposium: Thermodynamics, Phase Equilibria and Kinetics for Materials Design and Engineering — Applications

Sponsored by: TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Carelyn Campbell, National Institute of Standards and Technology; Michael Gao, National Energy Technology Laboratory; Wei Xiong, University of Pittsburgh

**Tuesday AM | February 25, 2020
32A | San Diego Convention Ctr**

Session Chairs: Carelyn Campbell, National Institute of Standards and Technology; Greta Lindwall, KTH Royal Institute of Technology

8:30 AM Invited

Industrial Applications of Thermodynamic and Kinetics Modeling: *David Furrer*¹; Dmitri Novikov¹; Xuan Liu¹; Sergei Burlatsky²; ¹Pratt & Whitney; ²United Technologies Research Center

9:10 AM Invited

Application of Calphad-based Computational Tools to Alloy Development for Additive Manufacturing: *Greta Lindwall*¹; Durga Ananthanarayana¹; Chia-Ying Chou¹; Niklas Holländer Pettersson¹; ¹KTH Royal Institute of Technology

9:50 AM Invited

Calphad Applications and Challenges in Gas Turbine Coatings: *Carlos Levi*¹; ¹University of California, Santa Barbara

10:30 AM Break

10:50 AM Invited

Phase Equilibria in High-entropy and Complex-concentrated Alloys: *Daniel Miracle*¹; ¹Air Force Research Laboratory

11:30 AM Invited

Recent Progress in Constellium's Thermodynamic & Kinetics Simulation Approach: Christophe Sigli¹; ¹Constellium Technology Center

ADVANCED MATERIALS

Innovations in High Entropy Alloys and Bulk Metallic Glasses: An SMD & FMD Symposium in Honor of Peter K. Liaw — High Entropy Alloys: Other Properties and Modeling

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee

Program Organizers: Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Yanfei Gao, University of Tennessee - Knoxville; Robert Maass, University of Illinois at Urbana-Champaign; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Soo Yeol Lee, Chungnam National University; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center; Liang Jiang, Yantai University

Tuesday AM | February 25, 2020

Marina Ballroom G | Marriott Marquis Hotel

Session Chairs: Veerle Keppens, University of Tennessee; Yanfei Gao, University of Tennessee

8:30 AM Invited

Defect Dynamics and Microstructure Evolution in High Entropy Alloys: *Yanwen Zhang*¹; Takeshi Egami²; William Weber²; ¹Oak

Ridge National Laboratory; ²The University of Tennessee

8:50 AM Invited

Radiation Effects in High Entropy Alloys and Bulk Metallic Glasses: *Steven Zinkle*¹; Congyi Li¹; Tengfei Yang¹; James Brecht¹; ¹University of Tennessee

9:10 AM Invited

Energy Dissipation and Damage Evolution in Irradiated Concentrated Solid Solution Alloys: *William Weber*¹; Eva Zarkadoula²; Yanwen Zhang²; ¹University of Tennessee; ²Oak Ridge National Laboratory

9:30 AM Invited

High Entropy Alloys as Filler Metals: *Zhenzhen Yu*¹; Benjamin Schneiderman¹; Abdelrahman Abdelmotagaly¹; Chihpin Chuang²; Jianxun Hu³; ¹Colorado School of Mines; ²Argonne National Laboratory; ³Honda R&D Americas, Inc.

9:50 AM Invited

Expanding High-entropy to Ceramics: Identifying High Entropy Oxides with Perovskite, Spinel, or Pyrochlore Structure: *Veerle Keppens*¹; ¹University of Tennessee

10:10 AM Break

10:25 AM Invited

Tracer Diffusion in High-entropy Alloys: the Impact of Constituents and Composition: *Gerhard Wilde*¹; ¹University of Muenster

10:45 AM Invited

High-throughput Predicting and Machine-learning Solid-solution Formation: *Michael Gao*¹; Zongrui Pei¹; Junqi Yin²; Jeffrey Hawk¹; David Alman¹; ¹National Energy Technology Laboratory; ²Oak Ridge National Laboratory

11:05 AM Invited

Microstructure Evolution with Temperature in the Al-rich High-entropy Alloys: *Louis Santodonato*¹; ¹Advanced Research Systems

11:25 AM Invited

Nature of Metallic Bonding in Bulk Metallic Glasses and High Entropy Alloys: *Wai-Yim Ching*¹; ¹University of Missouri

11:45 AM Invited

Local Structure in Controlling Microstructure and Property of Lightweight High-entropy Alloys: *Rui Feng*¹; Chuan Zhang²; Michael Gao³; Zongrui Pei³; Yan Chen⁴; Dong Ma⁴; Ke An⁴; Jonathan Poplawsky⁴; Fan Zhang²; Jeffery Hawk³; Peter Liaw¹; ¹University of Tennessee; ²Computherm, LLC; ³National Energy Technology

LIGHT METALS

Magnesium Technology 2020 — Alloy Design and Solidification

Sponsored by: TMS Light Metals Division, TMS: Magnesium Committee

Program Organizers: J. Brian Jordon, University of Alabama; Victoria Miller, University of Florida; Vineet Joshi, Pacific Northwest National Laboratory; Neale Neelameggham, IND LLC

Tuesday AM | February 25, 2020
6C | San Diego Convention Ctr

Session Chairs: Mark Easton, RMIT University; Matthew Kasemer, The University of Alabama

8:30 AM Invited
Insights on Solidification of Mg and Mg-Al Alloys by Large Scale Atomistic Simulations: *Mohsen Asle Zaeem*¹; Avik Mahata²; ¹Colorado School of Mines; ²Missouri University of Science and Technology

9:00 AM
CALPHAD Modeling and Microstructure Investigation of Mg-Gd-Y-Zn Alloys: *Janet Meier*¹; Joshua Caris²; Alan Luo¹; ¹The Ohio State University; ²Terves LLC

9:20 AM
Intermetallic Phase Formation in Mg-Ag-Nd (QE) and Mg-Ag-Nd-Zn (QEZ) Alloys: *Rainer Schmid-Fetzer*¹; Jian-Feng Nie²; Xiaojun Zhao³; Houwen Chen³; ¹Clausthal University of Technology; ²Monash University; ³Chongqing University

9:40 AM
Recrystallization Effects on the Forming Behaviour of Magnesium Alloy Sheets with Varied Calcium Concentration: *Jan Bohlen*¹; Huu Chanh Trinh²; Klaus Rätzke²; Sangbong Yi¹; Dietmar Letzig¹; ¹Magic-Magnesium Innovation Ctr; ²Christian-Albrechts-University

10:00 AM
Towards the Development of High Ductility Mg-Al Based Alloys Through Second-phase Refinement with Trace Yttrium Additions: *Konstantinos Korgiopoulos*¹; Mihriban Pekguleryuz¹; ¹Mining and Materials Engineering, McGill University

10:20 AM Break

10:40 AM

Effects of Zn Additions on the Room Temperature Formability and Strength in Mg-1.2Al-0.5Ca-0.4Mn Alloy Sheets: *Zehao Li*¹; Taisuke Sasaki¹; Kazuhiro Hono¹; Mingzhe Bian¹; Taiki Nakata; Shigeharu Kamado¹; Yu Yoshida¹; Nozomu Kawabe¹; ¹NIMS

11:00 AM

Two-Stage Settling Approach to Purify Mg Alloy: *Yuan Yuan*¹; Jiawei Liu¹; Tao Chen¹; Jiajia Wu¹; Li Yang¹; Aitao Tang¹; Fusheng Pan¹; ¹Chongqing University

11:20 AM

Investigation of the Microstructure and Mechanical Properties of Mg–Gd–Nd Ternary Alloys: *Yuling Xu*¹; Lixiang Yang²; Weili Liu³; Jingli Sun; Lu Xiao³; Xianquan Jiang¹; Norbert Hort⁴; ¹Chongqing Academy of Science and Technology; ²Shanghai Jiaotong University; ³Shanghai Spaceflight Precision Machinery Institute; ⁴Helmholtz Zeetrum Geesthacht

11:40 AM

Design of Heat Dissipating Mg–La–Zn Alloys based on Thermodynamic Calculations: *Hui Shi*¹; Qun Luo¹; Qian Li¹; Jieyu Zhang¹; Kuo-Chih Chou²; ¹State Key Laboratory of Advanced Special Steel & Shanghai Key Laboratory of Advanced Ferrometallurgy & School of Materials Science and Engineering, Shanghai University & Shanghai Institute of Materials Genome & Materials Genome Institute; ²Shanghai University

CHARACTERIZATION

Material Behavior Characterization via Multi-Directional Deformation of Sheet Metal — Session III

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

Program Organizers: Daniel Coughlin, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Piyush Upadhyay, Pacific Northwest National Laboratory; John Carsley, Novelis, Inc.

Tuesday AM | February 25, 2020
Theater A-1 | San Diego Convention Ctr

Session Chair: John Carsley, Novelis, Inc.

8:30 AM Invited

Modeling Anisotropic Plasticity Under Complex Loading Conditions: Effects of Loading Path Changes on Flow Stress, Springback and Formability of Sheet Metals: *Myoung-Gyu Lee*¹; Hongjin Choi¹; Jinwoo Lee²; Hyuk Jong Bong²; ¹Seoul National University; ²Korea Institute of Materials Science

9:10 AM Invited

Modeling of Hole-expansion of Prestrained Sheets Using Distortional Hardening: *Yannis Korkolis*¹; Jinjin Ha¹; ¹Ohio State University

9:50 AM

EffectsofYConcentrationonMechanicalResponseofMg-YAlloys: *Xin Wang*¹; Jiaxiang Wang²; Kehang Yu¹; Timothy Rupert¹; Subhash Mahajan³; Enrique Lavernia¹; Irene Beyerlein²; Julie Schoenung¹; ¹University of California Irvine; ²University of California, Santa Barbara; ³University of California, Davis

10:10 AM Break

10:30 AM

A New Yield Criterion Accounting for Anisotropy and Anisotropic Asymmetry from Near Isotropy to Triclinicity: *Zachary Brunson*¹; Aaron Stebner¹; ¹Colorado School of Mines

10:50 AM

Microstructure Control for Enhanced Multi-step Formability: *Menglei Jiang*¹; Cemal Cem Tasan¹; ¹Massachusetts Institute of Technology

11:10 AM

Production of Commercially Pure Aluminum Strips via a Single-Step, Machining-based Technique: *Mohammed Naziru Issahaq*¹; Kevin Trumble¹; Srinivasan Chandrasekar¹; ¹Purdue University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale V — Modeling

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Christopher Weinberger, Colorado State University; Megan Cordill, Erich Schmid Institute; Garritt Tucker, Colorado School of Mines; Wendy Gu, Stanford University; Scott Mao, University of Pittsburgh; Yu Zou, University of Toronto

Tuesday AM | February 25, 2020
Santa Rosa | Marriott Marquis Hotel

Session Chairs: Christopher Weinberger, Colorado State University; Shawn Coleman, Army Research Laboratory

8:30 AM
Modeling Deformation Twinning in BCC Transition Metals: *Anik Faisal*¹; Christopher Weinberger¹; ¹Colorado State University

8:50 AM
Uncovering the Nanoscale Mechanisms Governing Thermomechanical Properties in Solute-stabilized Nanocrystalline Alloys: Ankit Gupta¹; Gregory Thompson²; *Garritt Tucker*¹; ¹Colorado School of Mines; ²University of Alabama

9:10 AM
Strong Strain Hardening in Ultrafast Melt-quenched Nanocrystalline Cu: the Role of Fivefold Twins: *Amir Hassan Zahiri*¹; Pranay Chakraborty¹; Yan Wang¹; Lei Cao¹; ¹University of Nevada Reno

9:30 AM
Investigating the Mechanical Behavior of Nano-architected Materials via Multiscale Discrete Defect Element Method: *Phu Cuong Nguyen*¹; Ill Ryu¹; ¹University of Texas at Dallas

9:50 AM
Dislocation-twinning Competitions in Body-centered Cubic Metallic Nanowires: Chaoming Yang¹; *Liang Qi*¹; ¹University of Michigan

10:10 AM Break

10:30 AM Invited
Atomistic Study of Ceramic Grain Boundary Deformation: *Shawn Coleman*¹; Qi An²; Matthew Guziewski¹; ¹CCDC Army Research Laboratory; ²University of Nevada, Reno

11:10 AM

Superelasticity and Superplasticity in Shape Memory Ceramic Nanoparticles: *Ning Zhang*¹; Mohsen Asle Zaeem²; ¹University of Alabama; ²Colorado School of Mines

11:30 AM

Failure Mechanisms of Core-shell Nanostructures: *Raghuram Santhapuram*¹; Arun Nair¹; ¹University of Arkansas

MATERIALS DESIGN

Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling — Session I

Sponsored by: TMS Structural Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, MicroTesting Solutions; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Jagannathan Rajagopalan, Arizona State University; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Robert Wheeler, Microtesting Solutions LLC; Shailendra Joshi, University of Houston

Tuesday AM | February 25, 2020
33A | San Diego Convention Ctr

Session Chairs: Robert Wheeler, Microtesting Solutions LLC; Dongchan Jang, KAIST

8:30 AM Keynote

Acoustic Emission Measurements During In-situ Scanning Electron Microscopy Experiments to Quantifying Damage Accumulation and Crack Initiation in Microcrystals: Mostafa Omar¹; Steven Lavenstein¹; *Jaafar El-Awady*¹; ¹Johns Hopkins University

9:10 AM

A Novel Fracture Observation in SiC-based Ceramics Through In-situ Double Torsion Testing: *Pania Newell*¹; Robert Wheeler²; Matthew Dickerson³; ¹The University of Utah; ²Microtesting Solutions LLC; ³Air Force Research Laboratory

9:30 AM

Assessing Crack Propagation Along Brittle/Ductile Interfaces: *Daniel Kiener*¹; Markus Alfreider¹; Stefan Kolitsch²; Otmar Kolednik²;

¹University of Leoben; ²Erich Schmid Institute

9:50 AM

Effect of Loading Rate on Fracture Behavior of Magnesium Alloys: *Arjun Sreedhar S¹; Suraj Ravindran²; Zev Lovinger²; G Ravichandran²; Narasimhan Ramarathinam¹; ¹Indian Institute of Science; ²California Institute of Technology*

10:10 AM Break

10:30 AM Keynote

Fracture Across Length Scales in Tungsten: A Combined Experimental and Predictive Approach: *Kevin Schmalbach¹; Rajaprakash Ramachandramoorthy²; Manish Jain³; Siddharta Pathak³; Johann Michler²; William Gerberich¹; Nathan Mara¹; ¹University of Minnesota; ²Empa-Thun; ³University of Nevada-Reno*

11:10 AM

Development of TiAl Alloys for High Temperature Applications: *Seong-Woong Kim¹; Jae-Kwon Kim¹; Jong-Hoon Kim¹; Ji Young Kim¹; Seung-Hwa Ryu²; Dongchan Jang²; Jae Keun Hong¹; Seung Eon Kim¹; ¹Korea Institute of Materials Science; ²Korea Advanced Institute of Science and Technology*

11:30 AM

In-situ Micromechanical Characterization of Metallic Glass Microwires Under Torsional Loading: *Sufeng Fan¹; Yang Lu¹; ¹City University of Hong Kong*

MATERIALS DESIGN

Metal-Matrix Composites: Analysis, Modeling, Observations and Interpretations — Mechanical Properties and Performance

Sponsored by: TMS Structural Materials Division, TMS: Composite Materials Committee

Program Organizers: Srivatsan Tirumalai, The University of Akron; Yuzheng Zhang, Gamma Alloys; William Harrigan, Gamma Alloys

Tuesday AM | February 25, 2020
31A | San Diego Convention Ctr

Session Chair: Nikhilesh Chawla, Arizona State University

8:30 AM Invited

In-situ Synthesis of Al/Al₂O₃ Nanocomposites via Spark Plasma Sintering of Nano-sized Al Powders: *Yaojun Lin*¹; Zhigang Yan²; Zhibo Liu¹; Fei Chen¹; Enrique Lavernia³; ¹Wuhan University of Technology; ²Yanshan University; ³University of California, Irvine

9:00 AM Invited

The Microstructure and Mechanical Properties of Magnesium-based Composites: Role of Reinforcement and Processing: Sankaranarayanan Seetharaman¹; Jayalakshmi Subramanian²; Arvind Singh²; *Srivatsan Tirumalai. S.*³; Manoj Gupta³; ¹Ansys Inc; ²Wenzhou University; ³The University of Akron

9:30 AM

The Effect of Solution Treatment Aging on Hardness Improvement of Ti-6Al-4V/TiC Metal Matrix Composite: *James Penney*¹; Sergey Prikhodko¹; Pavlo Markovsky²; Dmytro Savvakyn²; Olek Stasuik²; ¹University of California, Los Angeles; ²G.V. Kurdyumov Institute for Metal Physics NAS of Ukraine

9:55 AM Break

10:15 AM

Mechanical Properties of Al-based Metal Matrix Composites Produced by Constrained High Pressure Torsion: *Galina Korznikova*¹; Rinat Kabirov¹; Konstantin Nazarov¹; Rinat Khisamov¹; Radik Mulyukov¹; ¹IMSP RAS

10:40 AM Invited

A 3D Multiple-Slip Crystal Plasticity Model for Precipitate Hardening in Additively Manufactured High-Strength Steels: Moustafa AbdelHamid¹; *Tarek Hatem*²; ¹Nile University; ²The British University in Egypt

11:05 AM

Effect of Prestrain on Tensile Property of TiNi/Mg Composite: *Chenri Jin*¹; Suyuan Yang¹; Yuyang He¹; Dan Guo¹; Xingwang Cheng¹; ¹Beijing Institute of Technology

MATERIALS DESIGN

Microstructural Template Consisting of a Face-Centered Cubic Matrix with Ordered Precipitates: Microstructural Evolution and Properties — Complex Concentrated Alloys/High Entropy Alloys

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

Program Organizers: Rajarshi Banerjee, University of North Texas; Eric Lass, University of Tennessee, Knoxville; Ashley Paz Y Puente, University of Cincinnati; Tushar Borkar, Cleveland State University; Keith Knipling, Naval Research Laboratory; Sophie Primig, University of New South Wales

Tuesday AM | February 25, 2020
30D | San Diego Convention Ctr

Session Chair: Eric Lass, University of Tennessee

8:30 AM Keynote

Elevated Temperature Microstructure Evolution and Properties of an Equiatomic CrCoNi Superalloy Containing Al,Ti: Connor Slone¹; Easo George²; *Michael Mills*¹; ¹The Ohio State University; ²Oak Ridge National Laboratory; University of Tennessee

9:10 AM Invited

FCC High-entropy Alloys Strengthened with L1₂ Precipitates: Alloying Strategies and Highlights: *Jean-Philippe Couzinie*¹; Thomas Rieger¹; Jean-Marc Joubert¹; Mathilde Laurent-Brocq¹; Guy Dirras²; ¹Université Paris Est, ICMPE (UMR 7182) CNRS-UPEC; ²Université Paris 13, Sorbonne Paris Cité, LSPM (UPR 3407) CNRS

9:40 AM

Novel Microstructural Template Based on Ordered Intermetallic Precipitation in FCC Based Complex Concentrated Alloys: *Sriswaroop Dasari*¹; Vishal Soni¹; Abhinav Jagetia¹; Rajarshi Banerjee¹; ¹University of North Texas

10:00 AM Break

10:30 AM

Coarsening Kinetics and Mechanical Properties of fcc Compositionally Complex Alloys Strengthened by L1₂ Precipitates: *Thomas Rieger*¹; Mathilde Laurent-Brocq¹; Ivan Guillot¹; Jean-Marc Joubert¹; Loïc Perrière¹; Didier Locq²; Zhao Huvelin²; Azziz Hocini³; Guy Dirras³; Jean-Philippe Couzinié¹; ¹ICMPE, UMR 7182, CNRS - UPEC, F-94320, Thiais, France; ²ONERA, Université Paris Saclay, F-92322 Châtillon – France; ³Université Paris 13, LSPM (UPR 3407), F-93430 Villetaneuse, France

10:50 AM

A Nickel-based Superalloy Dual-reinforced by L1₂ Ni₃Al and DO₂₂ Ni₃V Ordered-fcc Precipitates: *Alexander Knowles*¹; Lucy Reynolds²; Vassili Vorontsov³; David Dye²; ¹University of Birmingham; ²Imperial

College London; ³University of Strathclyde

11:10 AM

Coarsening and Creep Behavior of Co-Ni-Al-W-Ti-Ta-B Superalloy with High ' Solvus Temperature: *Fei Xue*¹; Dingwen Chung¹; Eric Lass²; David Seidman¹; David Dunand¹; ¹Northwestern University; ²The University of Tennessee

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — By-product Recovery I

Sponsored by: The Mining and Materials Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resources and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Tuesday AM | February 25, 2020
14B | San Diego Convention Ctr

Session Chair: James Dahlstrom, Gopher Resource

11:00 AM

Hydrometallurgical Recovery of Tin from Harris Dross: *Ryosuke Sato*¹; Koichiro Hirata¹; Fumito Tanaka¹; ¹Mitsubishi Materials Corporation

11:20 AM

Pb & Other Impurities Recovery from Cu Smelting Residues in JX Nippon Mining & Metals: *Nobuaki Okajima*¹; Takuma Takei¹; Shojiro Usui¹; ¹JX Nippon Mining & Metals Corporation

11:40 AM

Improving the Byproduct Availability in Zinc Production: an Alternative Extraction Process for Indium: Xinkai Fu¹; Katrin Daehn¹; Antoine Allanore¹; *Elsa Olivetti*¹; ¹Massachusetts Institute

of Technology

12:00 PM

Pyrometallurgical Recovery of Valuable Metals from Flue Dusts of Copper Smelter through Lead Alloy: Wenzhao Cui¹; Mao Chen²; Baojun Zhao²; ¹Dongying Fangyuan Nonferrous Metals Co. Ltd; ²University of Queensland

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Lead and Zinc Current Challenges and Opportunities: Plenary Session

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Tuesday AM | February 25, 2020
15A | San Diego Convention Ctr

Session Chair: Ulrich Kerney, Recylex

8:30 AM Plenary

Our Common Future in Metallurgy: Maurits Van Camp¹; Elien Haccuria¹; Tom Hennebel¹; Christina Meskers¹; ¹Umicore

9:00 AM Plenary

Material Stewardship for Zinc: Sabina Grund¹; Eric Van Genderen¹; ¹International Zinc Association (IZA)

9:30 AM Plenary

Lead and Zinc Smelting Technology in China under Green Development: Liu Cheng¹; ¹China ENFI Engineering Corporation

10:00 AM Question and Answer Period

10:30 AM Break

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Primary Zinc II

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Tuesday AM | February 25, 2020
15A | San Diego Convention Ctr

Session Chair: Andreas Siegmund, LanMetCon LLC

11:00 AM
Resource Efficiency Evaluation of Pyrometallurgical Solutions to Minimize Iron-rich Residues in the Roast-leach-electrowinning Process: Alejandro Abadias Llamas¹; Neill Bartie²; Magdalena Heibeck²; Michael Stelter¹; *Markus Reuter*²; ¹TU Bergakademie Freiberg; ²Helmholtz Institute Freiberg for Resource Technology

11:20 AM
Zinc Plant Expansion and Modification for Increased Metals Recovery: *Björn Saxen*¹; Florentino Estrada²; Maciej Wrobel¹; Marko Lahtinen¹; ¹Outotec; ²Met-Mex Peñoles

11:40 AM
Experience with Digital Process Optimization of Zinc Roasting Plants: Robert Schiemann¹; Steffen Haus¹; *Marcus Runkel*¹; Jörg Hammerschmidt¹; ¹Outotec

12:00 PM
Bulk Zn / Pb Concentrate Treatment with the Albion Process™
at Nordenham Zinc Refinery: *Paul Voigt*¹; ¹Glencore Technology

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Zinc Leaching & Fe-control I

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Tuesday AM | February 25, 2020
15B | San Diego Convention Ctr

Session Chair: Shafiq Alam, University of Saskatchewan

11:00 AM
Smelting Jarosite and Sulphur Residue in a Plasma Furnace: *Justin Salminen*¹; *Jens Nyberg*²; *Matej Imris*³; *Bror Heegaard*³; ¹Boliden Kokkola; ²Boliden Smelters; ³ScanArc

11:20 AM
Simulation of an Alternative Direct Leaching Process for High Iron Content Zinc Concentrates: *Caio Oliveira*¹; *Daniel Pereira*¹; ¹Nexa Resources

11:40 AM
The Process Improvement Researches for Zinc in China: *Haibei Wang*¹; *Kaixi Jiang*¹; *Yufang Wang*¹; *Sanping Liu*¹; *Chaozhen Zheng*¹; *Shuchen Qin*¹; ¹BGRIMM Technology Group

12:00 PM
Application of Hematite Iron Removal Process in Zinc Smelting Production: *Qin Mingxiao*¹; *Dai Jianghong*¹; ¹China ENFI Engineering

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XIX — Phase Stability of Energy Materials

Sponsored by: TMS Functional Materials Division, TMS: Alloy Phases Committee

Program Organizers: Hiroshi Nishikawa, Osaka University; Shi-Kang Lin, National Cheng Kung University; Chao-Hong Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology, CAS; Ming-Tzer Lin, National Chung Hsing University; Dajian Li, Karlsruhe Institute of Technology; Yu Zhong, Worcester Polytechnic Institute; Yee-wen Yen, National Taiwan University of Science and Technology; Song-Mao Liang, Clausthal University of Technology; A.S.Md Abdul Haseeb, University of Malaya; Ligang Zhang, Central South University; Sehoon Yoo, KITECH

Tuesday AM | February 25, 2020
Marina Ballroom E | Marriott Marquis Hotel

Session Chairs: Shih-Kang Lin, National Cheng Kung University; Shien Ping Feng, The University of Hong Kong

8:30 AM
Full Battery Design for Li-ion Batteries Using CALPHAD Technique: *Dajian Li*¹; Song-Mao Liang²; Yuan Yuan³; Weibin Zhang⁴; ¹Karlsruhe Institute of Technology; ²University of Wisconsin Madison; ³Chongqing University; ⁴Shandong University

8:50 AM
Challenges and Solutions for Experimental Investigation of Air and Moisture Sensitive Li Alloys: *Joel Fels*¹; Thomas Reichmann²; Hans Flandorfer³; Hans Seifert¹; ¹Karlsruhe Institute of Technology; ²G-Technology GmbH; ³University of Vienna

9:10 AM
An Ab-initio Study on the Structural and Electrochemical Properties of Na₃V₂(PO₄)₂F₃ as Cathode Materials for Hybrid-ion Batteries: *Kuei-Hsi Chen*¹; Ngoc Thanh Thuy Tran¹; Shih-kang Lin¹; ¹National Cheng Kung University

9:30 AM

Thermodynamic Modeling of the Cu-Mg-Si-Sn Quaternary System and Interpretation of $\text{Mg}_2(\text{Si}_{0.3}\text{Sn}_{0.7})/\text{Cu}$ Thermoelectric Interconnections: *Silvana Tumminello*¹; Sahar Ayachi¹; Suzana Fries²; Eckhard Müller¹; Johannes de Boor¹; ¹German Aerospace Center (DLR); ²ICAMS-Ruhr University Bochum

9:50 AM Break

10:20 AM

CALPHAD-assisted Analyses of BOF Slag Modification and Reduction: *Han-Yu Wang*¹; Wan-Yu Huang¹; Yung-Chang Liu²; Kuan-Ju Lin²; Shih-kang Lin¹; ¹National Cheng Kung University; ²China Steel Corporation

10:40 AM

High-throughput CALPHAD-type Calculation in Design of Coherent Precipitate-strengthening AlCuFeNiTi Multi-principal Element Alloys: *Shao-Yu Yen*¹; Hao-che Wang¹; Shih-kang Lin¹; ¹National Cheng-Kung University

11:00 AM

Study on the Phase Diagrams of Bi-Te Binary and Bi-Te-RE (Yb, La, Ce, Nd, Sm, Tb, Er) Ternary Systems: Cun Mao¹; Mingyue Tan¹; Libin Liu¹; *Ligang Zhang*¹; ¹Central South University

11:20 AM

Effects of Ge/Sb Intermixing on the Local Structures and Optical Properties of GeTe-Sb₂Te₃ Superlattice: *Gang Han*¹; Furong Liu¹; ¹Beijing University of Technology

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Microstructure and Precipitation I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

Program Organizers: Yufeng Zheng, University of Nevada, Reno; Rongpei Shi, Lawrence Livermore National Laboratory; Stoichko Antonov, University of Science and Technology Beijing; Yipeng Gao, Idaho National Laboratory; Rajarshi Banerjee, University of North Texas; Yongmei Jin, Michigan Technological University

**Tuesday AM | February 25, 2020
33B | San Diego Convention Ctr**

Session Chairs: Stoichko Antonov, University of Science and Technology Beijing; Duyao Zhang, RMIT University

8:30 AM

In-situ X-ray Diffraction Measurement during Deformation of Austenite above the A_{e_3} Temperature: *Clodualdo Aranas*¹; Samuel Rodrigues²; Fulvio Siciliano³; John Jonas⁴; ¹University of New Brunswick; ²Federal Institute of Maranhao; ³Dynamic Systems Inc; ⁴McGill University

8:50 AM

Crystallographic Characteristics of γ' -Fe₄N Formation Upon Nitriding of α -Fe: *Helge Schumann*¹; Gunther Richter²; Andreas Leineweber¹; ¹TU Bergakademie Freiberg; ²Max Planck Institute for Intelligent Systems

9:10 AM

Atomic Structures and Processes in Al-Cu alloys: *Matthew Chisholm*¹; Dongwon Shin¹; Gerd Duscher²; Lawrence Allard¹; Amit Shyam¹; ¹Oak Ridge National Laboratory; ²University of Tennessee-Knoxville

9:30 AM

Controlling Microstructure of Nanotwinned Cu by Tuning the Electroplating Temperatures and Chemical Additives: *Kuan-Ju Chen*¹; ¹National Chiao Tung University

9:50 AM

Morphological and Structural Instability of Iron-rich Precipitates in Cu-Fe-Co Alloys: *Gilles Demange*¹; Kaixuan Chen²; Helena Zapolsky¹; Renaud Patte¹; Z.D. Wang³; ¹University Of Rouen; ²School of Materials Science and Engineering, University of Science and Technology Beijing; ³School of Materials Science and Engineering, University of Science and Technology Beijing

10:10 AM Break

10:30 AM

Iron-rich Microstructures in Post-Detonation Nuclear Debris: *Timothy Genda*¹; Kim Knight²; Zurong Dai²; Bethany Goldblum¹; Peter Hosemann¹; ¹University of California, Berkeley; ²Lawrence Livermore National Laboratory

10:50 AM

Oscillated Cooling Method as an Alternative Crystal Growth Route to Control the Microstructure during Peritectic Solidification: *Babak Alinejad*¹; Alberto Castellero²; Marcello Baricco²; ¹Ibaraki University; ²Turin University

11:10 AM

Nanostructure of Fe_{0.65}Cr_{0.35} Close to the Upper Limit of the Miscibility Gap: *Frederic Danoix*¹; Alexander Dahlstrom²; Peter Hedstrom²; Joakim Odqvist²; Helena Zapolsky³; ¹CNRS; ²KTH Royal Institute of Technology; ³Normandy University

11:30 AM

Morphological Evolution Mechanisms in Phase-separating Polycrystalline Alloy Films Exposed to a Vapor Phase: *William Farmer*¹; Rahul Raghavan¹; Kumar Ankit¹; ¹Arizona State University

ADVANCED MATERIALS

Progress towards Understanding the Synthesis and Behavior of Metals Far from Equilibrium: A SMD Symposium Honoring Enrique Lavernia on the Occasion of His 60th Birthday — Nanostructured Metals III

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Composite Materials Committee

Program Organizers: Haiming Wen, Missouri University of Science and Technology; Suveen Mathaudhu, University of California, Riverside; Yuntian Zhu, North Carolina State University; Manoj Gupta, National University of Singapore; Kaka Ma, Colorado State University; Troy Topping, California State University, Sacramento; Yizhang Zhou, University of California, Irvine; Joshua Yee, Sandia National Laboratories; Dalong Zhang, Pacific Northwest National Laboratory; Yaojun Lin, Wuhan University of Technology; Fei Chen, Wuhan University of Technology

**Tuesday AM | February 25, 2020
31B | San Diego Convention Ctr**

Session Chairs: Timothy Rupert, University of California – Irvine; Jessica Krogstad, University of Illinois, Urbana-Champaign

8:30 AM Invited

Controlling Grain Boundaries (GBs) in Processing and Properties: From Computing GB Diagrams to Understanding Embrittlement and Stabilizing Nanoalloys: *Jian Luo*¹; ¹University of California, San Diego

9:00 AM Invited

High-strength and Thermal Stability of Nanotwinned Al Alloys: Qiang Li¹; Sichuang Xue¹; Yifan Zhang¹; Jian Wang²; Haiyan Wang¹; *Xinghang Zhang*¹; ¹Purdue University; ²University of Nebraska, Lincoln

9:30 AM

Review of Thermal Stability of Nanocrystalline and Nanostructured Materials and Methods how to Control it: *Lilia Kurmanaeva*¹; ¹INT, KIT (Germany); MSE, University of California, Davis (USA)

9:50 AM

Thermal Stability of Nanostructured Ferritic and Austenitic Stainless Steels: *Maalavan Arivu*¹; Andrew Hoffman¹; Jiaqi Duan¹; Haiming Wen¹; ¹Missouri University of Science and Technology

10:10 AM Break

10:30 AM Invited

Novel Microstructures from Non-equilibrium Processing of Metal Powder: *Kenong Xia*¹; ¹University of Melbourne

11:00 AM Invited

Microstructures and Tensile Mechanical Properties of Ultrafine Grained Al and Cu Matrix Nanocomposites Fabricated by High Energy Mechanical Milling and Thermomechanical Powder Consolidation: *Deliang Zhang*¹; Lei Cao²; Wei Zeng²; Wenjing Wang²; Jiamiao Liang²; Enrique Lavernia³; ¹Northeastern University; ²Shanghai Jiao Tong University; ³University of California, Irvine

11:30 AM

Electrodeposition of Nanostructured Nickel Foils: *Alan Jankowski*¹; ¹Sandia National Laboratories

11:50 AM

Severe Plastic Deformation Enhanced Segregation and Precipitation in Nanostructured Steels: *Andrew Hoffman*¹; Maalavan Arivu¹; Haiming Wen¹; ¹Missouri University of Science and Technology

MATERIALS DESIGN

Purveyors of Processing Science and ICME: A SMD Symposium to Honor the Many Contributions of Taylan Altan, Wei Tsu Wu, Soo-Ik Oh, and Lee Semiatin — Titanium Alloys

Sponsored by: TMS Structural Materials Division, TMS: Shaping and Forming Committee, TMS: Titanium Committee

Program Organizers: Adam Pilchak, US Air Force Research Laboratory; Ayman Salem, MRL Materials Resources LLC; Viola Acoff, University of Alabama; Nathan Levkulich, UES; Michael Glavicic, Rolls-Royce; Yufeng Zheng, University of Nevada, Reno; John Rotella, Purdue University

Tuesday AM | February 25, 2020
30E | San Diego Convention Ctr

Session Chairs: Adam Pilchak, Air Force Research Laboratory; Matthew Dunstan, US Army

8:30 AM Invited
Regulating Plastic Deformation by Structural Phase Transformations and Cice Vesa for Unprecedented Mechanical Properties: *Yunzhi Wang*¹; ¹The Ohio State University

9:00 AM Invited
The Evolution of Abnormal Grains Structures during Beta Annealing of Ti-64 Wrought Products: Nicholas Byres¹; Pratheek Shanthraj¹; Benjamin Dod²; Jack Donoghue³; Alec Davis¹; Joao Quinta da Fonseca¹; *Philip Prangnell*¹; ¹University of Manchester; ²Airbus; ³The University of Manchester

9:30 AM
Martensitic Variant Selection Under Applied Stress: A New Approach Applied to the β Transformation in Titanium: Zachary Brunson¹; Adam Pilchak²; Eric Payton²; Aaron Stebner¹; ¹Colorado School of Mines; ²United States Air Force Research Laboratory

9:50 AM
Manipulation of Microstructure and Microstructural Gradients through Dehydrogenation of Hydrogen-sintered Ti-6Al-4V: *Matthew Dunstan*¹; James Paramore¹; Z. Zak Fang²; Pei Sun²; ¹United States Army Research Laboratory; ²University of Utah

10:10 AM Break

10:30 AM Invited
Transformations, Recrystallization, Microtexture and Plasticity in Titanium Alloys: *Dipankar Banerjee*¹; ¹Indian Institute of Science

11:00 AM Invited
The Effects of Alpha-beta Interaction on the Texture Development of Zr and Ti Alloys during Hot Working: *Joao Quinta da Fonseca*¹; Chi-Toan Nguyen¹; Christopher Daniel²; Philip Prangnell²; Pratheek Shanthraj²; Benjamin Dod³; Peter Honniball⁴; ¹University Of

Manchester; ²University of Manchester; ³Airbus; ⁴Rolls-Royce

11:30 AM Invited

The Role of Plastic Rotation in the Breakdown of Colony Microstructures in Two Phase Titanium Alloys: S. Keith Markham¹; Mayo Mizak¹; Adam Pilchak²; *Victoria Miller*³; ¹North Carolina State University; ²Air Force Research Laboratory; ³University of Florida

NUCLEAR MATERIALS

Radiation Effects in Metals and Ceramics — Irradiation of Fe-based Systems

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Djamel Kaoumi, North Carolina State University; Thak Sang Byun, Oak Ridge National Laboratory; Dane Morgan, University of Wisconsin-Madison; Maria Okuniewski, Purdue University; Mahmood Mamivand, Boise State University; Geoffrey Beausoleil, Idaho National Laboratory; Philip Edmondson, Oak Ridge National Laboratory; Khalid Hattar, Sandia National Laboratories; Aurelie Gentils, Université Paris-Saclay; Joel Ribis, Commissariat a l'Energie Atomic CEA

Tuesday AM | February 25, 2020
Theater A-7 | San Diego Convention Ctr

Session Chairs: Joel Ribis, Commissariat a l'Energie Atomic CEA; Phil Edmonson, Oak Ridge National Laboratory

8:30 AM Invited

Separate Effects to Integral Effects - All Things Radiation effects in FeCrAl: *Kevin Field*¹; Maxim Gussev¹; Xiang Chen¹; Caleb Massey¹; Dalong Zhang²; Samuel Briggs³; Janelle Wharry⁴; Kurt Terrani¹; ¹Oak Ridge National Laboratory; ²Pacific Northwest National Laboratory; ³Oregon State University; ⁴Purdue University

9:00 AM

Effects of Radiation Parameters on Defect Evolution in FeCrAl Alloys under Single-, Dual- and Triple-Ion Beam Irradiation: *Pengyuan Xiu*¹; Li Jiang¹; Chao Ye¹; Lumin Wang¹; ¹Department of Nuclear Engineering and Radiological Sciences, University of Michigan

9:20 AM

Irradiation Enhanced Alpha Prime Precipitation in 2nd Gen. FeCrAl Alloys After Neutron Irradiation to 7 dpa: *Caleb Massey*¹; Kevin

Field¹; Philip Edmondson¹; Steven Zinkle²; ¹Oak Ridge National Laboratory; ²University of Tennessee

9:40 AM

Data-driven Discrete Dislocation Dynamics Modeling of Yielding Behavior of Irradiated FeCrAl Steel: *Yash Pachaury*¹; Sanjoy Mazumder¹; George Warren¹; Giacomo Po²; Janelle Wharry¹; Anter El-Azab¹; ¹Purdue University; ²University of Miami

10:00 AM Break

10:20 AM

Radiation Response of Grade 92 Ferritic-martensitic Steel Irradiated up to 14.63 dpa at ~700°C: *Weicheng Zhong*¹; Lizhen Tan¹; ¹Oak Ridge National Laboratory

10:40 AM

Comparison of the Irradiated Microstructure Formed in 800H After Neutron Irradiation and Dual Beam Ion Irradiation: *Christopher Ulmer*¹; Arthur Motta¹; ¹The Pennsylvania State University

11:00 AM

Microstructural Investigation of Flux effect on Neutron-irradiated RPV Steels: *Auriane Etienne*¹; Andreas Ulbricht²; Bertrand Radiguet¹; ¹University Of Rouen; ²Helmholtz-Zentrum Dresden-Rossendorf

11:20 AM

Influence of Alloying Elements on Microstructure Evolution in 21Cr32Ni Model Alloy Microstructure after In-situ Ion Irradiation: *Muhammet Ayanoglu*¹; Christopher Ulmer¹; Arthur Motta¹; ¹The Pennsylvania State University

11:40 AM

Response of Solidification Cellular Structures in Additively Manufactured 316 Stainless Steel to Heavy Ion Irradiation: an In situ Study: *Zhongxia Shang*¹; Cuncai Fan¹; Sichuang Xue¹; Jie Ding¹; Jin Li¹; Thomas Voisin²; Yinmin Wang²; Haiyan Wang¹; Xinghang Zhang¹; ¹Purdue University; ²Lawrence Livermore National Laboratory

MATERIALS PROCESSING

Rare Metal Extraction & Processing — PGM, Zn, V, Ti, U, Th, In, Ag, Fe

Sponsored by: TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee

Program Organizers: Gisele Azimi, University of Toronto; Takanari Ouchi, The University of Tokyo; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Kerstin Forsberg, KTH Royal Institute of Technology; Alafara Baba, University of Ilorin

**Tuesday AM | February 25, 2020
13 | San Diego Convention Ctr**

Session Chairs: Hojong Kim, Pennsylvania State University; Gisele Azimi, University of Toronto

8:30 AM Keynote

Electrodialysis in Hydrometallurgical Proceses: *Odne Burheim*¹; Liyuan Deng¹; Kerstin Forsberg²; Øivind Wilhelmsen¹; Pauline Zimmermann¹; ¹Norwegian University of Science and Technology; ²KTH

9:00 AM

Leaching of Eudialyte –The Silicic Acid Challenge: *Dag Eriksen*¹; Kurt Forrester¹; Mark Saxon¹; ¹Primus.inter.pares AS

9:20 AM

Co-precipitation of Impurity (Ti, Fe, Al, Zr, U, Th) Phases during the Recovery of (NH₄)₃ScF₆ from Strip Liquors by Anti-solvent Crystallization: *Edward Peters*¹; Carsten Dittrich²; Bengi Yagmurlu²; Kerstin Forsberg¹; ¹KTH Royal Institute of Technology; ²MEAB Chemie Technik GmbH

9:40 AM

Impurity Uptake during Cooling Crystallization of Nickel Sulfate: *Ina Beate Jenssen*¹; Seniz Ucar¹; Oluf Bøckman²; Ole Morten Dotterud²; Jens-Petter Andreassen¹; ¹Norwegian University of Science and Technology; ²Glencore Nikkelverk AS

10:00 AM

Potential of a Nigerian Cassiterite Ore for Industrial Steel Coatings: *Alafara Baba*¹; Abdulrasheed Yusuf¹; Folahan Adekola¹; Abdul Alabi²; Kuranga Ayinla¹; Abdullah Ibrahim¹; Christianah Adeyemi³; Mustapha Raji¹; Sadisu Girigisu³; Rasaki Gbadamosi¹; Aishat Abdulkareem⁴; ¹University of Ilorin; ²Kwara State University, Malete; ³Federal Polytechnic Offa; ⁴National Mathematical Centre, Sheda-Kwali

10:20 AM Break

10:35 AM

The Iron Precipitate from Primary Zinc Production – A Potential Future Source for Indium and Silver: *Stefan Steinlechner*¹; Lukas Höber¹; ¹Montanuniversitaet Leoben

10:55 AM

Recovery of Platinum Group Metals from Secondary Sources by Selective Chlorination from Molten Salt Media: *Ana Maria Martinez*¹; Karen Osen¹; Anne Støre¹; ¹Sintef

11:15 AM

Reclamation of Precious Metals from Small Electronic Components of Computer Hard Disks: *Rekha Panda*¹; Manis Kumar Jha¹; Om Shankar Dinkar¹; Devendra Deo Pathak²; ¹CSIR-National Metallurgical Laboratory; ²Indian Institute of Technology (ISM)

ELECTRONIC MATERIALS

Recent Advances in Functional Materials and 2D/3D Processing for Sensors and Electronic Applications — Printed Electronics II: Functional Materials and Devices

Sponsored by: TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Pooran Joshi, Oak Ridge National Laboratory; Ravindra Nuggehalli, New Jersey Institute of Technology; Anming Hu, University of Tennessee; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Yong Lin Kong, University of Utah; Mariappan Paranthaman, Oak Ridge National Laboratory

Tuesday AM | February 25, 2020
Carlsbad | Marriott Marquis Hotel

Session Chairs: Anming Hu, The University of Tennessee, Knoxville; Yong Lin Kong, University of Utah

8:30 AM Invited

Nanomaterial Ink Development for Additive Manufacturing of Sensors: *David Estrada*¹; ¹Boise State University

8:55 AM Invited

Hybrid Nanomanufacturing for Wearable Intelligence: *Wenzhuo Wu*¹; ¹Purdue University

9:20 AM Invited
Direct-write & Precise Patterning of Functional Nanofibers on Non-planar Substrate: *Jiyoung Chang*¹; ¹University of Utah

9:45 AM
Materials and Process Development for Passive and Active Gas Sensors: *Lydia Skolrood*¹; Pooran Joshi¹; Ilia Ivanov¹; Eric Muckley¹; Andrew Lupini¹; Timothy McKnight¹; Timothy McIntyre¹; Christine Fisher¹; Tolga Aytug¹; ¹Oak Ridge National Laboratory

10:05 AM Break

10:25 AM
Fully Printed CNT-FET on a Flexible Substrate: Yongchao Yu¹; Justine Valka²; Anming Hu¹; Nance Ericson²; *Pooran Joshi*²; ¹University of Tennessee; ²Oak Ridge National Laboratory

10:45 AM Invited
Screen Printing to 3D Printing of Solar Cells- An Overview: *Vishal Mehta*¹; Nuggehalli Ravindra²; ¹Ohio Northern University; ²New Jersey Institute of Technology

11:10 AM
Peel-and-Stick Inkjet Printed Polyaniline Sensors for Ammonia Gas Sensing: *Christine Fisher*¹; Pooran Joshi¹; Vishaldeep Sharma¹; Yongchao Yu²; Kai Li¹; Tolga Aytug¹; ¹Oak Ridge National Laboratory; ²University of Tennessee, Knoxville

11:30 AM
Controlled Modulation of Gas Sensing in Printed Graphene: Nanoparticle Nucleation and Defect Engineering in Exfoliated Graphene Flakes: *Harrison Loh*¹; Konstantinos Sierros¹; ¹West Virginia University

11:50 AM
Self-Assembled Monolayer on Liquid-Liquid Interface: *Kinnari Shah*¹; Nuggehalli Ravindra²; ¹LaGuardia Community College–City University of New York; ²New Jersey Institute of Technology

BIOMATERIALS

Recent Developments in Biological, Structural and Functional Thin Films and Coatings — Functional Films and Coatings

Sponsored by: TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Adele Carrado, IPCMS - CNRS; Heinz Palkowski, Clausthal University of Technology; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Ramana Chintalapalle, University of Texas at El Paso; Nuggehalli Ravindra, New Jersey Institute of Technology; Nancy Michael, University of Texas at Arlington; Vikas Tomar, Purdue University

Tuesday AM | February 25, 2020
Oceanside | Marriott Marquis Hotel

Session Chair: Gerald Ferblantier, Icube Laboratory UNISTRA

8:30 AM Keynote
Growth and Characterization of Doped-silicon-based Nanomaterials for Optical Applications: *Hervé Rinnert*¹; ¹Institut Jean Lamour - Université de Lorraine

9:10 AM Invited
3D Design of Multifunctional Plasmonic Nanoparticles Assemblies Embedded in Dielectrics: *Caroline Bonafos*¹; Nicolas Chery¹; Clément Majorel¹; Meiling Zhang¹; Nicolas Mallet²; Patrick Benzo¹; Maxime Bayle³; Alessandro Pugliara⁴; Kremena Makasheva⁵; Béatrice Pécassou¹; Enrique Navarro⁶; Christian Girard¹; Anne-Sophie Royet⁷; Pablo Acosta Alba⁷; Sébastien Kerdilès⁷; Yohann Spiegel⁸; Frank Torregrosa⁸; Guilhem Larrieu²; Filadelfo Cristiano²; Hervé Rinnert⁹; Fabrice Gourbilleau¹⁰; Robert Carles¹; Vincent Paillard¹; ¹CEMES-CNRS; ²LAAS-CNRS; ³Université de Nantes; ⁴UMS Raimond Castaing; ⁵Université de Toulouse; ⁶IPE-CSIC; ⁷CEA-LETI; ⁸IBS; ⁹Université de Nancy; ¹⁰CIMAP

9:40 AM
ZnSnO Thin Films as a Good Candidate for Transparent and Conducting Oxides (TCO) Applications: Gerald Ferblantier¹; Karima Bouras²; Abdelillah Slaoui²; Guy Schmerber³; ¹Icube Laboratory - University of Strasbourg - IUT Louis Pasteur de Schiltigheim; ²Icube Laboratory - Strasbourg University; ³IPCMS-Strasbourg University

10:00 AM Break

10:30 AM
Elaboration and Characterization of Thin Films of SiP Lamellar Alloys: *Mathieu Stoffel*¹; Sebastien Geiskopf¹; Alix Valdenaire¹; Xavier Devaux¹; Erwan André¹; Cedric Carteret¹; Alexandre Bouché¹; Michel Vergnat¹; Hervé Rinnert¹; ¹Université de Lorraine/Institut Jean Lamour

10:50 AM

Influence of Interface Chemistry on the Adhesion between Metallic Films and Polymer Substrates: *Megan Cordill*¹; Marian Kennedy²; ¹Erich Schmid Institute; ²Department of Materials Science and Engineering, Clemson University

ENERGY & ENVIRONMENT

Recycling of Secondary, Byproduct Materials and Energy — Recycling of E-Waste

Sponsored by: TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Mingming Zhang, ArcelorMittal Global R&D; John Howarter, Purdue University; Elsa Olivetti, Massachusetts Institute of Technology; Alan Luo, Ohio State University; Adam Powell, Worcester Polytechnic Institute; Ziqi Sun, Queensland University of Technology

Tuesday AM | February 25, 2020
16A | San Diego Convention Ctr

Session Chairs: Elsa Olivetti, Massachusetts Institute of Technology; Ziqi Sun, Queensland University of Technology; Michael Free, University of Utah; Mark Strauss, Idaho National Laboratory

8:30 AM Introductory Comments

8:35 AM

A Novel Method for Extracting Cobalt, Lithium, Nickel and Manganese from Recycled Lithium-ion Batteries using Electrochemistry: *Mark Strauss*¹; Luis Aldana¹; David Reed¹; Tedd Lister¹; ¹Idaho National Laboratory

9:00 AM

Recycling of Crystalline Silicon Solar (PV) Panels: Technological Challenges, Economical Feasibility and Environmental Impact: *Jan-Philipp Mai*¹; Neda Resay¹; York Smith²; ¹JPM Technologies; ²University of Utah

9:20 AM

Thermal Disengagement Technology: the Perspective of Microrecycling of Polymer-metal Multilayer Packaging Materials: *Md. Abdullah Al Mahmood*¹; Rumana Hossain¹; Veena Sahajwalla¹; ¹University of New South Wales

9:40 AM

A Potential Hydrometallurgical Treatment for Valuable Metal Recovery from E-waste: Bromine Leaching: *Hao Cui*¹; Corby Anderson¹; ¹Colorado School of Mines

10:00 AM Break

10:20 AM

A Recycling System for Sustainable Management of Waste Solar Photovoltaic Panels in Taiwan: *Esher Hsu*¹; Chen-Ming Kuo²; ¹National Taipei University; ²I-Shou University

10:40 AM

Experimentation, Modeling and Optimum Conditions of Pyro-hydrometallurgical-precipitation Reaction Technology for Recovery of Copper as Oxide of Nanoparticles from a Copper Dust: Abraham Adeleke¹; Patricia Popoola²; Olawale Popoola²; *Daniel Okanigbe*²; ¹Obafemi Awolowo University ; ²Tshwane University of Technology

ADVANCED MATERIALS

Refractory Metals 2020 — Refractory Metals Production and Processing

Sponsored by: TMS Structural Materials Division, TMS: Refractory Metals Committee

Program Organizers: Eric Taleff, University of Texas at Austin; Gary Rozak, H.C. Starck Inc; Todd Leonhardt, Rhenium Alloys Inc.

Tuesday AM | February 25, 2020
Cardiff | Marriott Marquis Hotel

Session Chairs: Gary Rozak, H.C. Starck; Todd Leonhardt, Rhenium Alloys

8:30 AM

Pressureless Sintering and Microstructure Evolution of Ultrafine-grained Tungsten: *Yanhao Dong*¹; Xingyu Li²; Lin Zhang²; Ju Li¹; ¹Massachusetts Institute of Technology; ²University of Science and Technology, Beijing

8:50 AM

Direct Production of Ta Powders: *Jawad Haidar*¹; ¹Kinaltek Pty Ltd.

9:10 AM

Modifying Grain Boundary Cohesion in Ultra-fine Grained Tungsten and Tungsten-based Nanocomposites through Systematic Doping: *Michael Wurmshuber*¹; Simon Doppermann¹; Stefan Wurster²; Reinhard Pippan²; Daniel Kiener¹; ¹Department of Materials Science, Montanuniversität Leoben; ²Erich Schmid Institute, Austrian Academy of Sciences

9:30 AM

Mechanical Testing of Tungsten-Steel Laminate Composites for use in Fusion Applications: *Sara Wonner*¹; Lauren Garrison²; ¹University of Tennessee, Knoxville; ²Oak Ridge National Laboratory

9:50 AM

Refractory Alloys 3D Printing for Missile and Space Applications: *Youping Gao*¹; John Porter¹; Noah Philips²; Omar Mireles³; ¹Castheon Inc.; ²ATI Specialty Alloys and Components; ³NASA Marshall Space Flight Center

10:10 AM Break

10:30 AM

Hot Isostatic Pressing of WC-3009 Niobium-Based Refractory Alloy: *Calvin Mikler*¹; Benjamin GeorGIN¹; Brian Welk¹; Gopal Viswanathan¹; Kevin Chaput²; Hamish Fraser¹; ¹The Ohio State University; ²Air Force Research Laboratory

10:50 AM

Performance of Niobium and Molybdenum Alloys for High Temperature Sensing Applications: *Scott Riley*¹; Beck Perrine¹; Ember Sikorski¹; Lan Li¹; Richard Skifton²; Brian Jaques¹; ¹Boise State University; ²Idaho National Laboratory

11:10 AM

Dislocation Multiplication from a Frank-Read Source in Six Body-centered Cubic Refractory Metals: *Shuozhi Xu*¹; Yanqing Su¹; Irene Beyerlein¹; ¹University of California, Santa Barbara

PHYSICAL METALLURGY

Solid State Diffusion Bonding of Metals and Alloys — Solid State Diffusion Bonding of Metals and Alloys III

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Mohamed Elbakhshwan, University of Wisconsin Madison; Mark Anderson, University of Wisconsin Madison; Todd Allen, University of Michigan ; Tasnim Hassan, North Carolina State University

**Tuesday AM | February 25, 2020
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Session Chairs: Mohamed Elbakhshwan, UW-Madison; Tasnim Hassan, North Carolina State University; Heramb Mahajan, North Carolina State University

**8:30 AM Invited
Multi-Scale Study Of Bonding Mechanism Between Immiscible Mg/Steel Alloys:** *Jiahao Cheng*¹; Xiaohua Hu²; Xin Sun²; Vivek Anupam³; Glenn Daehn³; David Cullen³; ¹Oak Ridge National Laboratory; ²Oak Ridge National Laboratory; ³The Ohio State University

**9:00 AM
The Role of Interface Microstructure and Chemistry on the Bond Strength of Aluminum 6061 HIP-bonded Samples:** *Rajib Kalsar*¹; Brady McBride²; Rick Shimskey¹; Kester Clarke¹; Nicole Overman¹; Curt Lavender¹; Kenneth Johnson¹; Vineet Joshi¹; ¹Pacific Northwest National Laboratory; ²Colorado School of Mines

**9:20 AM
Microstructural Evolution and Mechanical Properties of Lap-jointed Ti-6Al-4V Plates by Pin-less Friction Stir Spot Welding:** *Hyojin Park*¹; Yong Chae Lim²; Hahn Choo¹; Suhong Zhang¹; Anming Hu¹; Scott A Rose³; Zhili Feng²; ¹University of Tennessee, Knoxville; ²Oak Ridge National Laboratory; ³Boeing

**9:40 AM
MTI Low Force Friction Welding:** *Simon Jones*¹; ¹MTI

10:00 AM Break

**10:30 AM
Instant Copper Direct Bonding Using <111>-oriented Nanotwinned Cu Microbumps:** *Kai Cheng Shie*¹; Jing-Ye Juang¹; Chih Chen¹; ¹National Chiao Tung University

10:50 AM
Mechanical Performance of Diffusion Bonded 316 Stainless Steel for use in a Hybrid Compact Heat Exchanger: *Kyle Rozman*¹; Venkata Saranam²; Brian Paul²; Ömer Dogan¹; ¹National Energy Technology Laboratory; ²Oregon State University

PHYSICAL METALLURGY

Thermal Transport in Crystalline and Non-crystalline Solids: Theory and Experiments — Electron Mediated Transport and Thermoelectrics

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Marat Khafizov, Ohio State University; Michael Manley, Oak Ridge National Laboratory; Krzysztof Gofryk, Idaho National Laboratory; Aleksandr Chernatynskiy, Missouri Science and Technology University

Tuesday AM | February 25, 2020
18 | San Diego Convention Ctr

Session Chairs: Krzysztof Gofryk, Idaho National Laboratory; Firoza Kabir, University of Central Florida

8:30 AM Invited
Enhanced Thermoelectric Performance of Heavy-fermion Compounds $\text{YbTM}_2\text{Zn}_{20}$ ($\text{TM} = \text{Co, Rh, Ir}$) at Low Temperatures: *Ryan Baumbach*¹; Kaya Wei¹; ¹National High Magnetic Field Laboratory

9:00 AM
Thermal Transport Properties of Uranium Aluminides by First-principles: *Zhi-Gang Mei*¹; Abdellatif Yacout¹; ¹Argonne National Laboratory

9:20 AM
Non-linear Thermal Resistance Trend with Increasing Bilayer Density: *Zachary McClure*¹; Christopher Saltonstall²; Michael Abere²; David Guzman³; Samuel Reeve⁴; Alejandro Strachan¹; David Adams²; Thomas Beechem²; ¹Purdue University; ²Sandia National Laboratory; ³Brookhaven National Laboratory; ⁴Lawrence Livermore National Laboratory

9:40 AM
Investigations of the Thermal Conductivity of UN: *Barbara Szpunar*¹; Linu Malakkal¹; J.I. Ranasinghe¹; J.A. Szpunar¹; ¹University Of Saskatchewan

10:00 AM Break

10:20 AM

Electronic Structure and Thermal Transport Measurement of $\text{Gd}_x\text{Sb}_{2-x}\text{Te}_3$: *Firoza Kabir*¹; Md. Mofazzel Hosen¹; Gyanendra Dhakal¹; Xiaxin Ding²; Narayan Poudel²; Arjun Pathak³; Yong Liu³; Jianxin Zhu⁴; Krzysztof Gofryk²; Madhab Neupane¹; ¹University of Central Florida; ²Idaho National Laboratory; ³Ames Laboratory; ⁴Los Alamos National Laboratory

10:40 AM

Nonlinear Stopping of Phonons in Thermoelectric Crystal PbSe: *Michael Manley*¹; Olle Hellman²; Nina Shulumba³; Andrew May¹; Paul Stonaha⁴; Jeffrey Lynn⁵; Vasile Garlea¹; Ahmet Alatas⁶; Raphael Hermann¹; Hsin Wang¹; Brian Sales¹; Austin Minnich³; ¹Oak Ridge National Laboratory; ²Linköping University; ³Caltech; ⁴Idaho State University; ⁵National Institute of Technology and Standards; ⁶Argonne National Laboratory

11:00 AM

Structural, Transport, Magnetic, and Thermodynamic Studies of Delta-phase of Uranium: *Xiaxin Ding*¹; Narayan Poudel¹; Tiankai Yao¹; Jason Harp¹; Krzysztof Gofryk¹; ¹Idaho National Laboratory

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XI) — Fundamentals

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Caizhi Zhou, Missouri University of Science and Technology; Megumi Kawasaki, Oregon State University; Enrique Lavernia, University of California, Irvine; Terry Lowe, Colorado School of Mines; Suveen Mathaudhu, University of California, Riverside; Ruslan Valiev, UFA State Aviation Technical University; Yuntian Zhu, North Carolina State University

Tuesday AM | February 25, 2020

Marina Ballroom D | Marriott Marquis Hotel

Session Chairs: Ruslan Valiev, UFA State Aviation Technical University; Lei Lu, Institute of Metal Research, Chinese Academy of Sciences; Nobuhiro Tsuji, Kyoto University; Xiaoxu Huang, Chongqing University

8:30 AM Invited

Unravelling the Strengthening Effects of Strain Gradient and Back Stress on Heterogeneous Materials: *Ting Zhu*¹; Yin Zhang¹;

¹Georgia Institute of Technology

8:50 AM

Deformation Behavior and Strengthening Mechanisms of Ultrafine-Grained Al-2.5mass%Mg Alloy: *Xiaodong Lan*¹; Si Gao¹;

Myeong-heom Park¹; Akinobu Shibata¹; Nobuhiro Tsuji¹; ¹Kyoto University

9:10 AM

In-situ Neutron Diffraction Study on the Tensile Deformation of an Ultrafine-grained Fe-Ni-Al-C steel Including B2 Phase: *Si Gao*¹;

Wenqi Mao¹; Wu Gong¹; Stefanus Harjo²; Akinobu Shibata¹; Nobuhiro Tsuji¹; ¹Kyoto University; ²J-PARC Center, Japan Atomic Energy Agency

9:30 AM

Size Dependent Strengthening in High Strength Nanotwinned Al/Ti Multilayers: *Yifan Zhang*¹; Sichuang Xue¹; Qiang Li¹; Jin Li¹; Jie Ding¹;

Tongjun Niu¹; Ruizhe Su¹; Haiyan Wang¹; Xinghang Zhang¹; ¹Purdue University

9:50 AM Invited

Enhanced Strength and Thermal Stability of Cu/Fe Nanolaminates: *Mathias Goken*¹; Maher Ghanem¹; Heinz Werner Höppel¹;

Benoit Merle¹; ¹Friedrich-Alexander-Universität Erlangen-Nürnberg

10:10 AM Break

10:30 AM Invited

Understanding Deformation Behaviors of Laminated Al-AL2Cu Eutectic Alloy: *Jian Wang*¹; ¹University of Nebraska-Lincoln

10:50 AM

Effect of Interface Type on the Deformation Behavior of Nanostructured Metals: *Oliver Renk*¹; Verena Maier-Kiener²;

Daniel Kiener²; Reinhard Pippan¹; ¹Erich Schmid Institute; ²Montanuniversität Leoben

11:10 AM Invited

Stabilizing Nano Grains of Pure Cu with Rapidly Heating Induced Grain Boundary Relaxation: *Xiuyan Li*¹; Xin Zhou¹; Ke Lu¹; ¹Institute of Metal Research, Chinese Academy of Sciences

11:30 AM

Grain Boundary Design of Nanostructured Metals with Superior Multifunctional Properties: *Ruslan Valiev*¹; Nariman Enikeev¹;

Maxim Murashkin¹; ¹UFA State Aviation Technical University

11:50 AM Invited

Incompatible Plastic Deformation of Dual Gradient Nanotwinned Cu: *Lei Lu*¹; ¹Institute of Metal Research, Chinese Academy of Sciences

MECHANICS & STRUCTURAL RELIABILITY

**Understanding and Predicting Dynamic Behavior of Materials
— Strength in Metals**

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Marc Meyers, University of California San Diego; George Gray, Los Alamos National Laboratory

**Tuesday AM | February 25, 2020
5A | San Diego Convention Ctr**

Session Chair: Avinash Dongare, University of Connecticut

8:30 AM Invited

Informing Flow Stress Models at High Strain-rates Through In-situ Imaging of Hole Closure under Dynamic Compression: *Jonathan Lind*¹; A.K. Robinson¹; M. Nelms¹; Nathan Barton¹; Mukul Kumar¹; ¹Lawrence Livermore National Laboratory

9:10 AM

Predicting Dynamic Strain Rate Response using Model Reification: *Jaylen James*¹; Manny Gonzales¹; Eric Payton¹; Raymundo Arroyave²; Douglas Allaire²; ¹Texas A&M University/Air Force Research Laboratory; ²Texas A&M University

9:30 AM

Calibrating Empirical and Micromechanical Constitutive Models beyond 10⁶ s⁻¹: Xuchen Wang¹; *Mostafa Hassani*¹; ¹Cornell University

9:50 AM

Effects of Strain Rate on the Mechanical Properties and Fracture Mechanisms of AHSS Dual Phase Steels: Sukanya Sharma¹;

Shrikant Bhat²; Arun Gokhale¹; *Naresh Thadhan*¹; ¹Georgia Institute of Technology; ²ArcelorMittal

10:10 AM Break

10:30 AM

Alloying and Strain Rate Effects on the Deformation Mechanisms of CoCrNi MPEAs: *John Copley*¹; Francisco Coury²; Jonah Klemm-Toole¹; Yaofeng Guo¹; Jinling Gao³; Kester Clarke¹; Benjamin Ellyson¹; Chandler Becker¹; Brian Milligan¹; Christopher Finfrock¹; Niranjana Parab⁴; Kamel Fezzaa⁴; Tao Sun⁴; Wayne Chen³; Amy Clarke¹; ¹Colorado School of Mines; ²Universidade Federal de São Carlos; ³Purdue University; ⁴Argonne National Laboratory

10:50 AM

Characteristics of Texture Development in Al-Mg Alloy under High Strain Rate Tension: *Srinivasan Nagarajan*¹; Nilesh Gurao¹; Venkitanarayanan Parameswaran¹; ¹Indian Institute of Technology Kanpur

11:10 AM

Brittle-ductile Failure Transition of Low-symmetry HCP Metal Beryllium under Dynamic Compression: *Nitin Daphalapurkar*¹; Darby Luscher¹; William Blumenthal¹; Abigail Hunter¹; ¹Los Alamos National Laboratory

MATERIALS PROCESSING

11th International Symposium on High Temperature Metallurgical Processing — High-Temperature Processing

Sponsored by: TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee

Program Organizers: Zhiwei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Tao Jiang, Central South University; Jesse White, Elkem Carbon AS; Morsi Mahmoud, King Fahd University of Petroleum And Mineral

Tuesday PM | February 25, 2020
12 | San Diego Convention Ctr

Session Chairs: Tao Jiang, Central South University; Ender Keskinilic, Atilim University

2:00 PM Introductory Comments

2:15 PM

Control of the Distribution of Vacuum Arcs within Vacuum Arc Remelting with Externally Applied Magnetic Fields: *Paul King*¹; Matthew Cibula¹; Joshua Motley¹; ¹Ampere Scientific

2:35 PM

High Temperature Processing of Tungsten Slag: Xu Wang¹; Xiaodong Ma²; Chunfa Liao¹; *Baojun Zhao*²; ¹Jiangxi University of Science and Technology; ²University of Queensland

2:55 PM

Upgrading Pilot-scale Facility at MINTEK to Evaluate the Effect of Pre-heating on Smelter Operations: *Joalet Steenkamp*¹; Glen Denton¹; Tertius Pieters²; ¹MINTEK; ²Allied Furnace Consultants

3:15 PM

Influence of Atmosphere on Melting Behaviour of Synthetic Slags from Ta Recycling: *Dominik Hofer*¹; Stefan Luidold¹; ¹Montanuniversitaet Leoben

3:35 PM Break

3:50 PM

Non-isothermal Kinetics of Carbothermic Reduction of Fayalite: *Zhi Li*¹; Guojun Ma¹; Xiang Zhang¹; Wei Zhang¹; ¹State Key Laboratory of Refractories and Metallurgy, Wuhan University of Science and Technology

4:10 PM

Preparation of Expanded Slag Ball with Blast Furnace Slag by Rotary Cup: *Feifei Pan*¹; Xuewei Lv¹; Wenchao He¹; Guishang Pei¹; ¹ChongQing University

4:30 PM

Study of the Influence of the Angle Between the Bottom Blowing Elements on the Dynamic Conditions of the 300t Converter: *Liujie Yao*¹; Rong Zhu¹; Huixiang Yu¹; Kai Dong¹; Qiang Feng¹; Yixing Tang¹; ¹University of Science and Technology Beijing

NUCLEAR MATERIALS

Accelerated Materials Evaluation for Nuclear Applications Utilizing Irradiation and Integrated Modeling — Current and Advanced Nuclear Fuels

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Assel Aitkaliyeva, University of Florida; Peter Hosemann, University of California - Berkeley; Samuel Briggs, Oregon State University; David Frazer, Los Alamos National Laboratory

Tuesday PM | February 25, 2020
Theater A-8 | San Diego Convention Ctr

Session Chair: Assel Aitkaliyeva, University of Florida

2:00 PM
Alpha Self-Irradiation of Archive and Irradiated Fast Reactor Fuels: *Thierry Wiss*¹; *Oliver Dieste*¹; *Emanuele De Bona*¹; *Dragos Staicu*¹; ¹European Commission - Jrc

2:20 PM
Comparison of Radial Microstructural Changes in Fast Reactor MOX Fuels Across Varying Burnup Profiles: *Riley Parrish*¹; Assel Aitkaliyeva²; ¹Sandia National Laboratory; ²University of Florida

2:40 PM
Synthesis of Intermetallic UZr2+x and Its Phase Transformation: *Tiankai Yao*¹; *Michael Benson*¹; *Jason Harp*¹; *Lingfeng He*¹; *Jian Gan*¹; ¹Idaho National Laboratory

3:00 PM
Testing of Nuclear Fuels and Materials in the Advanced Fuels Campaign:*Geoffery Beausoleil*¹; *Christopher Petrie*²; *Walt Williams*³; ¹Idaho National Laboratory; ²Oakridge National Laboratory; ³Purdue University

3:20 PM
In-situ Neutron Characterization of Advanced Nuclear Fuels - The Road to a New Neutron Irradiation Testing Capability:*Edward Obbard*¹; *Claudia Gasparini*¹; *Patrick Burr*¹; *Kyle Johnson*²; *Denise Lopes*²; *Clara Anghel*³; *Simon Middleburgh*³; *Daniel Gregg*⁴; *Klaus Dieter Liss*⁴; *Grant Griffiths*⁴; *Nicholas Scales*⁴; *Gordon Thorogood*⁴; *Greg Lumpkin*⁴; ¹UNSW Sydney; ²Kungliga Tekniska Hogskolan (KTH); ³Westinghouse Electric Sweden AB; ⁴ANSTO

3:40 PM Break

3:55 PM
Changes in the Starting Microstructures of U-Mo Fuels due to the Effects of Neutron Irradiation: *Dennis Keiser*¹; *Brandon Miller*¹; *Jan-Fong Jue*¹; *Adam Robinson*¹; *Kelley Verner*¹; ¹Idaho National

Laboratory

4:15 PM

In-situ Observation of Radiation-induced Phase Transformation in U-Mo: *Bei Ye*¹; Weiyang Chen¹; Yinbin Miao¹; Abdellatif Yacout¹; Yipeng Gao²; ¹Argonne National Laboratory; ²Idaho National Laboratory

4:35 PM

Impact of Ionization Effects and Defect Trapping on Microstructure Evolution in Light Ion Irradiated Uranium Dioxide: *Marat Khafizov*¹; Yuzhou Wang¹; M Riyadh¹; Janne Pakarinen²; Lingfeng He³; Anter El-Azab⁴; David Hurley³; ¹Ohio State University; ²Belgian Nuclear Research Center (SCK•CEN); ³Idaho National Laboratory; ⁴Purdue University

4:55 PM

Diffusion Analysis of Metallic Fission Products in Tristructural-isotropic Coated Fuel Using Representative Diffusion Couples: *Rachel Seibert*¹; Tyler Gerczak¹; ¹Oak Ridge National Laboratory

5:15 PM

Microstructural and Micro-chemical Characterization of Safety Tested TRISO UCO Fuel Kernels Irradiated in the Advanced Test Reactor
: *Zhenyu Fu*¹; Lingfeng He²; Xiang Liu²; Isabella van Rooyen²; Yong Yang¹; ¹University of Florida; ²Idaho National Laboratory

SPECIAL TOPICS

Acta Materialia Symposium — Acta Materialia Award Session

Program Organizer: Carolyn Hansson, University of Waterloo

Tuesday PM | February 25, 2020
6D | San Diego Convention Ctr

Session Chair: Carolyn Hansson, University of Waterloo

3:00 PM Introductory Comments

3:10 PM Presentation of Acta Student Awards

3:30 PM Invited

Acta Materialia Gold Medal Lecture: Materials via Non-equilibrium Processing: *Enrique Lavernia*¹; ¹University of California, Irvine

3:50 PM Question and Answer Period

4:00 PM Invited

Acta Materialia Silver Medal Lecture: Integrative Materials Design and Additive Manufacturing in the Context of Industry

4.0: Diana Lados¹; ¹Worcester Polytechnic Institute

4:20 PM Question and Answer Period

4:30 PM Invited

Acta Materialia Hollomon Award for Materials and Society: Reflections on Materials and Society - An Acceptance Speech:

Lynnette Madsen¹; ¹National Science Foundation

4:50 PM Question and Answer Period

5:00 PM Wine and Cheese Reception with Posters: Student Award Winners in Acta Materialia Symposium:

***Nisar Ahmed* - Development of Scintillation Sensors for Cryothermometry;**

***Jae Wung Bae* - A Metallurgical Pathway to the Design of High-Performance Multicomponent Alloys;**

***Yanhao Dong* - Electronic Perspective of a Thought Purely Ionic Conductor: Thermodynamics and Kinetics in Zirconia;**

***Bo Huang* - Esterase from a Cariogenic Bacterium Hydrolyzes Dental Resins and Its Gene Expression and Protein Synthesis Are Affected by the Resin Biodegradation By-Product;**

***Shashank Kaira* - Microstructural Evolution and Deformation Behavior of Al-Cu Alloys;**

***William Kelley* - PEGylation of Model Drug Carriers Enhances Phagocytosis by Primary Human Neutrophils;**

***Yageng Li* - Additively Manufactured Biodegradable Porous Metal;**

***Fabián Ruiz* - Mechanochemically Obtained Palladium-based Binary Nanostructured Alloys;**

***Jan Schultheiss* - Sequence of Polarization Switching Events in Polycrystalline Perovskite Ferroelectrics;**

***Mallikarjuna Heggadadevanapura Thammaiah* - The Role of Composition and Microstructure on the Cyclic Oxidation Kinetics of IN738LC, N5 and Rene 80;**

***Logan Ware* - Grain Boundary Control Through Additive Manufacturing;**

***Huan Zhao* - Grain Boundary Segregation and Precipitation in a Model Al-Zn-Mg-Cu Alloy**

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture IV: Toward

Confident Use in Critical Applications — Processing-Structure-Property-Performance III

Sponsored by: TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Nik Hrabe, National Institute of Standards and Technology; Steve Daniewicz, University of Alabama; Nima Shamsaei, Auburn University; John Lewandowski, Case Western Reserve University; Mohsen Seifi, ASTM International/Case Western Reserve University

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Session Chair: Mohsen Seifi, ASTM International

2:00 PM Invited
Fatigue and Interfacial Fracture Behavior of Cold Spray Deposited Material for Additive Repair: *Luke Brewer*¹; William Story¹; Benjamin White¹; J Jordon¹; ¹University of Alabama

2:30 PM
Expedited Optimization of AM Materials Using Miniaturized Testing: *Jonathan Torres*¹; Ali Gordon²; ¹Bucknell University; ²University of Central Florida

2:50 PM
Fatigue Behavior and Failure Mechanisms of Laser Beam Directed Energy Deposited Inconel 718: Rakish Shrestha¹; Alexander Johnson²; *Pooriya Nezhadfar*¹; Nima Shamsaei¹; ¹Auburn University; ²Trivector Services Inc

3:10 PM
Effects of Internal Porosity and Crystallographic Texture on Fatigue Crack Growth Rate of Electron Beam Melted (EBM) Titanium Alloy (Ti-6Al-4V): *Nik Hrabe*¹; Jake Benzing¹; Timothy Quinn¹; Lucas Koepke¹; Jolene Splett¹; ¹National Institute of Standards and Technology - Boulder

3:30 PM Break

3:50 PM Invited
Fatigue Crack Growth Properties of Selective Laser Melting Produced Nickel and Titanium Based Alloys: *Jamie Kruzic*¹; Halsey Ostergaard¹; Tarik Hasib¹; ¹University of New South Wales

4:20 PM
Fatigue Properties of Additively Manufactured Ti-6Al-4V-ELI Material Hot Isostatically Pressed at Temperatures Above the Material’s Beta Transus Temperature:*Julius Bonini*¹; Ho Mei Leung¹; Kevin Knight²; Bruno La Razer³; Magnus Ahlfors⁴; ¹Lucideon; ²JTL America, Inc.; ³Zenith Tecnica; ⁴Quintus Technologies

4:40 PM
Implementing Processing and Post-processing Strategies to Control Microstructure, Defect Content and Mechanical Properties of Electron Beam Melted Ti-6Al-4V: *Jake Benzing*¹; Nikolas Hrabe¹; Tim Quinn¹; Enrico Lucon¹; Magnus Ahlfors²; ¹National Institute of Standards and Technology; ²Quintus Technologies

5:00 PM
Prediction of Mechanical Properties of Additively Manufactured Ti6Al4V Based on the Microstructure and Porosity Distribution: Mohamed Elkhateeb¹; *Yung Shin*¹; ¹Purdue University

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications II — Modelling

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Charit, University of Idaho; Michael Kirka, Oak Ridge National Laboratory

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Session Chairs: Indrajit Charit, University of Idaho; Wen Jiang, Idaho National Laboratory

2:00 PM Invited
Progress in Additive Manufacturing in South Africa: *Sisa Pityana*¹; ¹CSIR Main Campus

2:30 PM
Multi-physics Simulation to Model Melt Pool in Directed Energy Deposition Process for Nuclear Fuels: *Wen Jiang*¹; Jeong-Hoon Song²; Isabella Rooyen¹; ¹Idaho National Laboratory; ²University of Colorado Boulder

2:50 PM

Mechanical Response and Reduced-order Simulations of Additively Manufactured Metallic Lattice Structures: *Connie Dong*¹; Sara Messina¹; Matthew Begley¹; ¹University of California, Santa Barbara

3:10 PM

Active Force Regimes in Powder Spreading: *Nicholas Cunningham*¹; Noah Philips¹; Yifei Ma²; T. Matthew Evans²; ¹Ati Specialty Alloys And Components; ²Oregon State University

3:30 PM Break

3:50 PM

Digital Twins of Additive Manufacturing Processes for the Optimization and Control of Builds: *Dayalan Gunasegaram*¹; Anthony Murphy¹; Patrick O'Toole¹; ¹CSIRO

4:10 PM

Numerical Simulation and High-speed Photography Characterization of Powder Delivery During LENS® Additive Manufacturing for Metal Matrix Composites: *Sen Jiang*¹; Baolong Zheng¹; James Haley¹; Bingqing Chen²; Jiayu Liang²; Shuai Huang²; Enrique Lavernia¹; Julie Schoenung¹; ¹University of California, Irvine; ²Beijing Institute of Aeronautical Materials

4:30 PM

Design of Efficient Additive-manufactured Heat Sinks via Conjugate Heat Transfer Modeling and Topology Optimization: *Basil Paudel*¹; Mohammad Masoomi²; Scott Thompson³; ¹Auburn University; ²ANSYS Inc.; ³Kansas State University

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques — Residual Stress: Neutron, X-ray, and Other Measurements

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Fan Zhang, National Institute of Standards and Technology; Tom Stockman, Los Alamos National Laboratory; Tao Sun, University of Virginia; Donald Brown, Los Alamos National Laboratory; Yan Gao, Ge Global Research; Amit Pandey, MicroTesting Solutions; Joy Gockel, Wright State University; Tim Horn, North Carolina State University; Sneha Prabha Narra, Worcester Polytechnic Institute; Judy Schneider, University of Alabama at Huntsville

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Session Chair: Donald Brown, Los Alamos National Laboratory

2:00 PM Invited
Toward Validation of Residual Stress Predictions in Additively Manufactured Parts: Destructive and Non-destructive Characterization: *Kyle Johnson*¹; Donald Brown²; Bjorn Clausen²; Phillip Reu¹; Paul Farias¹; Christopher D’Elia³; Michael Hill³; Michael Prime³; Bradley Jared¹; Shaun Whetten¹; Joseph Bishop¹; ¹Sandia National Laboratories; ²Los Alamos National Laboratory; ³University of California Davis

2:30 PM
Neutron-based Research on Additive Manufactured Materials at the Paul Scherrer Institute: *Jan Capek*¹; Efthymios Polatidis¹; Manuel Morgano¹; Pavel Trtik¹; Markus Strobl¹; ¹Paul Scherrer Institute

2:50 PM
Thermomechanical Model Residual Stress Prediction Assessment for Stainless Steel 316L Laser Powder Bed Fusion Components: *Nicholas Bachus*¹; Donald Brown²; Robert Ferencz³; Rishi Ganeriwala³; Michael Hill¹; Neil Hodge³; ¹University of California Davis; ²Los Alamos National Laboratory; ³Lawrence Livermore National Laboratory

3:10 PM
Geometric Influences on Residual Stresses in Components Manufactured by Directed Energy Deposition: *Christopher D’Elia*¹; Michael Hill¹; Nicholas Bachus¹; Michael Stender¹; Christopher San Marchi¹; ¹University of California, Davis

3:30 PM Break

3:50 PM Invited

Residual Strain Characterization of Additively Manufactured IN625 and 15-5SS Using Energy Dispersive X-ray Diffraction: *Maria Strantz*¹; Nicholas Bachus²; Bjorn Clausen²; Thien Phan³; Lyle Levine³; Darren Pagan⁴; John Okasinski⁵; Donald Brown²; ¹Lawrence Livermore National Laboratory; ²Los Alamos National Laboratory; ³National Institute of Standards and Technologies; ⁴Cornell High Energy Synchrotron Source; ⁵Advanced Photon Source

4:20 PM

Advanced Techniques for Characterization of SLM Manufactured Alumina: *Malgorzata Makowska*¹; Kevin Florio²; Stefan Pfeiffer³; Thomas Graule³; Konrad Wegener²; Federica Marone¹; Dario Ferreira Sanchez¹; Nicola Casati¹; Helena Van Swygenhoven¹; ¹PSI; ²ETH Zurich; ³Empa - Swiss Federal Laboratories for Materials Science and Technology

4:40 PM

Microscale Residual Stresses in Additively Manufactured Stainless Steel: *Yin Zhang*¹; Ting Zhu¹; Wen Chen²; Morris Wang³; ¹Georgia Institute of Technology; ²University of Massachusetts, Amherst; ³Lawrence Livermore National Laboratory, Livermore

5:00 PM

Investigating Local Microstructural Response During Short Fatigue Crack Growth in SLM IN718 Subjected to High Cycle Fatigue Loading: *Priya Ravi*¹; Diwakar Naragani¹; Jun-Sang Park²; Peter Kenesei²; Michael Sangid²; ¹Purdue University; ²Argonne National Laboratory

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Alternative Processes (Beyond the Beam) — Sintering and Novel Processes

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Powder Materials Committee

Program Organizers: Paul Prichard, Kennametal Inc.; Matthew Dunstan, U.S. Army Research Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory; Nihan Tuncer, Desktop Metal; James Paramore, U.S. Army Research Laboratory

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Session Chair: James Paramore, US Army Research Laboratory

2:00 PM

Gravity Influence on Sintering of 3D-printed Components: *Elisa Torresani*¹; Randall German¹; Eugene Olevsky¹; ¹San Diego State University

2:20 PM

Sintering Kinetics of Particle-based Ink Extrusion 3D Printed Nickel Scaffolds: *Safa Khodabakhsh*¹; Ashley Paz y Puente¹; ¹University of Cincinnati

2:40 PM

Selective Sintering-based Fabrication of Fully Dense Complex Shape Parts: *Geuntak Lee*¹; Charles Manière¹; Maricruz Carrillo¹; Eugene Olevsky¹; ¹San Diego State University

3:00 PM

Development and Validation of Sub-scale Tensile Tests for Characterization of Additively Manufactured Metals: *Laura Moody*¹; Ion Powell¹; Daniel Lewis²; Brady Butler¹; Ankit Srivastava²; Lara Draelos²; James Paramore¹; ¹United States Army Research Laboratory; ²Texas A&M University

3:20 PM

Experimental Demonstration of Additive Manufacturing and Assembly in Space by Thermal Vacuum Testing: *Derek Thomas*¹; Paul Shestople¹; Michael Snyder¹; ¹Made In Space, Inc.

3:40 PM Break

4:00 PM

Novel Method in Additive Manufacturing of Metal Matrix Composites Reinforced by Carbon Particles: *Mahdi Yoozbashizadeh*¹; ¹California State University Long Beach

4:20 PM

Additive Manufacturing of Photocatalytic Materials for Solar Water Disinfection: *Andrey Vyatskikh*¹; Kai Liu¹; Carlos Portela¹; Akira Kudo¹; Stephane Delalande²; Michael Hoffmann¹; Julia Greer¹; ¹California Institute of Technology; ²PSA Group

4:40 PM

Portland 3D Printing of Portland Cement Pastes with Additions of Kaolin, Superplastificant, and Calcium Carbonate: Luis Vergara¹; Henry Colorado¹; ¹Universidad de Antioquia

5:00 PM

Beyond the Powder-bed: Fabricating Microscale Three-dimensional Metallic Structures Without Support Using Nanoparticle 3D Printing: Mohammad Sadeq Saleh¹; *Rahul Panat*¹; ¹Carnegie Mellon University

5:20 PM

Powder Casting: Producing Bulk Metal Components from Powder without Compaction: *James Paramore*¹; Matthew Dunstan¹; Brady Butler¹; ¹U.S. Army Research Laboratory

ADDITIVE TECHNOLOGIES

Additive Manufacturing: ICME Gap Analysis — Session II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Dongwon Shin, Oak Ridge National Laboratory; Richard Otis, Jet Propulsion Laboratory; Xin Sun, Oak Ridge National Laboratory; Greta Lindwall, KTH Royal Institute of Technology; Mei Li, Ford Motor Company; David Furrer, Pratt & Whitney

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Session Chairs: Greta Lindwall, KTH Royal Institute of Technology; David Furrer, Pratt & Whitney

2:00 PM Introductory Comments

2:05 PM Invited

Overview of DOE-BES Research and Strategic Planning: *Linda Horton*¹; John Vetrano¹; ¹US Department of Energy, Office of Basic Energy Sciences

2:40 PM Invited

Making Metal Additive Manufacturing Practical – What’s Missing?: *Lyle Levine*¹; Carelyn Campbell¹; Mark Stoudt¹; Greta Lindwall²; Eric Lass¹; Fan Zhang¹; Brandon Lane¹; ¹National Institute of Standards and Technology; ²KTH

3:15 PM Invited

Challenges to Predict the Microstructure and Properties of metallic AM components: *Carolyn Korner*¹; Matthias Markl¹; Johannes Köpf¹; Alexander Rausch¹; Zerong Yang¹; ¹University of

Erlangen-Nuremberg

3:50 PM Break

4:15 PM Invited

CALPHAD-based ICME Design for Additive Manufacturing: Successes and Challenges: Wei Xiong¹; ¹University of Pittsburgh

4:50 PM Invited

Efficient Mechanistic Modeling of Additive Manufacturing (AM) Processes: *Sergei Burlatsky*¹; David Furrer²; ¹United Technologies Research Center; ²Pratt & Whitney

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development II — Alloy Design-Aluminum Alloys and Composites

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Orlando Rios, Oak Ridge National Laboratory; Hunter Martin, HRL Laboratories; Atieh Moridi, Cornell University

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Session Chair: Orlando Rios, Oak Ridge National Laboratory

2:00 PM Invited

Application of Direct Aluminothermic Reduction to the Production of Al-Ce-based Alloys for Additive Manufacturing: *Scott McCall*¹; Alexander Baker¹; Hunter Henderson²; Zachary Sims²; Orlando Rios²; David Weiss³; Corby Anderson⁴; ¹Lawrence Livermore National Laboratory; ²Oak Ridge National Laboratory; ³Eck Industries; ⁴Colorado School of Mines

2:30 PM

Additive Manufacturing of Al-10Ce Alloys by Laser Powder Bed Fusion of Gas Atomized Powders: *Le Zhou*¹; Holden Hyer¹; Sharon Park¹; Thinh Huynh¹; Brandon McWilliams²; Kyu Cho²; Yongho Sohn¹; ¹University of Central Florida; ²US Army Research Laboratory

2:50 PM

CALPHAD Aided Design of Aluminum Alloys for Additive Manufacturing: *Emily Moore*¹; Zachary Sims²; Orlando Rios²; Scott McCall¹; Aurélien Perron¹; ¹Lawrence Livermore National Laboratory; ²Oakridge National Laboratory

3:10 PM

Design of Al-Fe-Si-based Additively Manufactured High Temperature Light Weight Alloys: *Sujeily Soto-Medina*¹; Biswas Rijal¹; Lilong Zhu¹; Richard Hennig¹; Michele Manuel¹; ¹University of Florida

3:30 PM Break

3:45 PM Invited

Additive Manufacturing of Advanced Aluminum-cerium Alloys: *David Weiss*¹; Orlando Rios²; Justen Schaefer³; Jessica Orr³; Hunter Henderson²; Zachary Sims²; Scott McCall⁴; Ryan Ott⁵; ¹ECK Industries Inc.; ²Oak Ridge National Laboratory; ³University of Dayton Research Institute; ⁴Lawrence Livermore National Laboratory; ⁵Ames Laboratory

4:10 PM

Selective Laser Melting and Mechanical Properties of Al-Ce-X Alloys: *Alex Plotkowski*¹; Ryan Dehoff¹; Kevin Sisco²; Amit Shyam¹; Sumit Bahl¹; Andres Rossy¹; ¹Oak Ridge National Laboratory; ²University of Tennessee

4:30 PM

Additive Manufacturing of Immiscible Alloy Systems: *Brennan Yahata*¹; Julie Miller¹; Justin Mayer¹; Stan Dudinski¹; Eric Clough²; Toby Schaedler¹; Hunter Martin¹; Jacob Hundley¹; Tresa Pollock³; ¹HrlLaboratories,Llc;²HRLLaboratories,Llc;³UnivesityofCalifornia, Santa Barbara

4:50 PM

Nano-structured NiAl-Cr(Mo) In-situ Composites Processed by Additive Manufacturing: *Andreas Förner*¹; Steffen Neumeier¹; Abdullah Jamjoom¹; Carolin Körner¹; Mathias Göken¹; ¹Friedrich-Alexander-Universität Erlangen

5:10 PM

Nitrogen Solid-solution Strengthened Titanium Materials Fabricated by SLM Process: *Katsuyoshi Kondoh*¹; Ammarueda Issariyapat¹; Patama Visuttiwitkul²; Tingting Song³; Junko Umeda¹; Ma Qian³; ¹Osaka University; ²Chulalongkorn University; ³RMIT

Additive Manufacturing: Processing Effects on Microstructure and Material Performance — Post Processing

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Eric Lass, University of Tennessee, Knoxville; Joy Gockel, Wright State University; Emma White, Ames Laboratory; Richard Fonda, Naval Research Laboratory; Monnamme Tlotleng, University of Johannesburg; Jayme Keist, Pennsylvania State University; Hang Yu, Virginia Polytechnic Institute and State University

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Session Chair: Monnamme Tlotleng, University of Johannesburg

2:00 PM
Microstructural Influence on AM 316L Mechanical Properties and Corrosion Behavior: Richard Fonda¹; Jerry Feng¹; Krystaufeux Williams¹; ¹Naval Research Laboratory

2:20 PM
Correlative Atomic-scale Analysis of Nano-scale Precipitate Evolution in Additively Manufactured Maraging Steel: Pradeep Konda Gokuldoss¹; ¹Indian Institute of Technology Madras

2:40 PM
Carburization Heat Treatment of Selective Laser Melted 20MnCr5 Steel: Mei Yang¹; Richard Sisson¹; ¹Worcester Polytechnic Institute

3:00 PM
Towards an Additively Manufactured, Wrought-comparable Precipitation-hardening Martensitic Stainless Steel: Fan Zhang¹; Eric Lass²; Mark Stoudt¹; Carelyn Campbell¹; Souzan Hammadi³; Greta Lindwall³; Lyle Levine¹; ¹National Institute of Standards and Technology; ²University of Tennessee Knoxville ; ³KTH Royal Institute of Technology

3:20 PM
Effects of Thermal Processing on the Microstructure and Mechanical Properties of Additively Manufactured AlSi10Mg Parts: John Fite¹; Suhas Prameela²; John Slotwinski¹; Timothy Weihs²; ¹Johns Hopkins University Applied Physics Laboratory; ²Johns Hopkins University

3:40 PM Break

4:00 PM

Microstructural Development in Additively Manufactured and Heat Treated IN625: *Holden Hyer*¹; Ryan Newell²; Daniel Matejczyk³; Sinsar Hsie²; Mason Anthony²; Le Zhou¹; Catherine Kammerer²; Yongho Sohn¹; ¹University of Central Florida; ²Aerojet Rocketdyne - WPB; ³Aerojet Rocketdyne - CP

4:20 PM

Stimulating the Evolution of 'y/y" Precipitates in the Inter-dendritic Regions of Additively Manufactured IN718 Due to Post-processing Heat Treatments: *Younggil Song*¹; Bala Radhakrishnan¹; Ranadip Acharya²; ¹Oak Ridge National Laboratory; ²United Technologies Research Center

4:40 PM

Modified Post-processing Thermal Treatments Designed to Relieve Notch Sensitivity in SLM Inconel 718: *Tait McLouth*¹; Julian Lohser¹; David Witkin¹; Glenn Bean¹; Rafael Zaldivar¹; ¹The Aerospace Corporation

5:00 PM

Study of Deformation Mechanisms in Various Heat-treated AM-IN718 Using Transmission Electron Microscopy: *Thomas Gallmeyer*¹; Jack Dale¹; Behnam Aminahmadi¹; Aaron Stebner¹; ¹Colorado School of Mines

5:20 PM

Effects of Post-heat Treatments on the Microstructure Evolutions, High Temperature Oxidation and Mechanical Properties of IN738LC Fabricated by Selective Laser Melting: *Kyu-Sik Kim*¹; Myeong-Se Kim²; Kee-Ahn Lee¹; ¹Inha University; ²Auratech Co. Ltd.

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Local Strain / Misorientation I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Shaping and Forming Committee, TMS: Materials Characterization Committee

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Marko Knezevic, University of New Hampshire; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; M Arul Kumar, Los Alamos National Laboratory

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Theater A-2 | San Diego Convention Ctr

Session Chairs: Wolfgang Pantleon, Technical University of Denmark; Todd Hufnagel, Johns Hopkins University

2:00 PM Invited
Quantitative X-ray Phase Contrast Imaging of Granular Media under Dynamic Impact: *Todd Hufnagel*¹; A.F.T. Leong¹; Vignesh Kannan¹; Kalia Ramesh¹; ¹Johns Hopkins University

2:30 PM
The Critical Microstructural Conditions for Void Nucleation During Ductile Rupture: Dislocation Structures and Vacancy Condensation: *Philip Noell*¹; Julian Sabisch¹; Douglas Medlin¹; Brad Boyce¹; ¹Sandia National Laboratories

2:50 PM
3D Maps of Geometrically Necessary Dislocation Densities in FCC Polycrystalline IN718: *Wyatt Witzen*¹; Andrew Polonsky¹; Tresa Pollock¹; Irene Beyerlein¹; ¹University of California Santa Barbara

3:10 PM
Cyclic Deformation in Tension and Compression of Pure Aluminium Monitored In-situ by High-resolution Reciprocal Space Mapping: Annika Diederichs¹; Ulrich Lienert²; *Wolfgang Pantleon*¹; ¹Department of Mechanical Engineering, Technical University of Denmark; ²DESY Photon Science, Deutsches Elektronen Synchrotron

3:30 PM Break

3:50 PM
In situ Synchrotron and EBSD Study of H-induced Local Stresses: *Jinwoo Kim*¹; Haoxue Yan¹; S. Mohadeseh Taheri-Mousavi¹; C. Cem Tasan¹; ¹Massachusetts Institute of Technology

4:10 PM

Connecting the Evolution of Grain-scale Stresses and Intragranular Lattice Orientations to Slip System Activity in a Deforming Ti-7Al Alloy Using High Energy X-ray Diffraction: *Kelly Nygren*¹; Jean-Charles Stinville²; Marie-Agathe Charpagne²; Tresa Pollock²; Matthew Miller³; ¹Cornell High Energy Synchrotron Source; ²University of California, Santa Barbara; ³Cornell University

4:30 PM

Hierarchical Microstructure in Shear Bands of Pure Titanium: Xiaolong Ma¹; Dexin Zhao¹; Dinakar Sagapuram¹; *Kelvin Xie*¹; ¹Texas A&M University

4:50 PM

Characterizing Residual Stress Gradients Due to Shot Peening: Comparison Between X-ray and Nanoindentation Techniques: Siavash Ghanbari¹; *David Bahr*¹; ¹Purdue University

5:10 PM

A Continuum Mechanics Description of EBSD Misorientation Mapping: *Shao-Shi Ru*¹; Shaolou Wei¹; Hui-Ji Shi²; Cemal Tasan¹; ¹Massachusetts Institute of Technology; ²Tsinghua University

ADVANCED MATERIALS

Advanced High Strength Steels IV — Session II

Sponsored by: TMS Structural Materials Division, TMS: Steels Committee

Program Organizers: Ana Luiza Araujo, AK Steel Research and Innovation Center; Mary O'Brien, Colorado School of Mines; Tilmann Hickel, Max Planck Institut fur Eisenforschung; Amy Clarke, Colorado School of Mines; Kester Clarke, Colorado School of Mines; C. Tasan, Massachusetts Institute of Technology; MingXin Huang, University of Hong Kong

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Mission Hills | Marriott Marquis Hotel

Session Chairs: Ana Araujo, AK Steel; Kester Clarke, Colorado School of Mines

2:00 PM

In-situ Quantitative Assessment of the Role of Silicon During the Quenching and Partitioning of a 0.2C Steel: Pierre Huyghe¹; Sylvain Dépinoy²; Cedric Georges³; Matteo Caruso⁴; *Stephane Godet*²; ¹AGC Research Center; ²Université Libre de Bruxelles;

³CRM Group; ⁴Engie Laborelec

2:20 PM

Austenite Stability of an 1180 MPa Quenched-and-partitioned Steel: *Ana Luiza Araujo*¹; Jun Hu¹; Erik Pavlina¹; ¹AK Steel Research and Innovation Center

2:40 PM

Influence of Prior Processing on the Response to Quenching & Partitioning: *Casey Gilliams*¹; John Speer¹; Kip Findley¹; Richard Thiessen²; ¹Colorado School of Mines; ²ThyssenKrupp Steel

3:00 PM

Toughening Mechanisms of Quenching and Partitioning Steels by Carbon Management: Zhou Wang¹; *MingXin Huang*¹; ¹University of Hong Kong

3:20 PM

The Influence of Transformation Induced Plasticity on Damage Development in Third Generation Advanced High Strength Steels: Javad Samei¹; *Concetta Pelligra*¹; David Wilkinson¹; ¹McMaster University

3:40 PM Break

4:00 PM

Effect of Strain Path on the Deformation Characteristics of Austenite-containing Advanced High Strength Steels: *Melissa Thrun*¹; Amy Clarke¹; Magnus Ahlfors²; Christopher Finfrock¹; Kester Clarke¹; ¹Colorado School of Mines; ²Quintus Technologies

4:20 PM

Crystal Plasticity Finite Element Simulations of the Planar Anisotropy of Q&P Steels: *Deepika Tirumalasetty*¹; Sankaran S¹; Anand Kanjarla¹; ¹Indian Institute of Technology Madras

4:40 PM

Development of Quenching and Partitioning Plate Steel Intended For Wear and Toughness Applications: *Travis Marsh*¹; John Speer¹; Rainer Fechte-Heinen²; Fred Fletcher³; Cory Alexander⁴; ¹Colorado School of Mines; ²thyssenkrupp Steel Europe AG; ³ArcelorMittal; ⁴Deere & Company

5:00 PM

Dual Effects of Retained Austenite for Third Generation Advanced High Strength Steels: *Xuejun Jin*¹; Lianbo Luo¹; Wei Li¹; Yu Gong¹; Qi Lu²; Charles Enloe³; Jason Coryell³; Jeff Wang²; ¹Shanghai Jiao Tong University; ²General Motors China; ³General Motors

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Magnetocalorics and Energy Harvesting

Sponsored by: TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Daniel Salazar, BCMaterials; Alex Leary, Nasa Glenn Research Center; Markus Chmielus, University of Pittsburgh; Ryan Ott, Ames Laboratory/Cmi; Arcady Zhukov, UPV/EHU, and Ikerbasque, Basque Foundation for Science

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Del Mar | Marriott Marquis Hotel

Session Chairs: Daniel Salazar, BCMaterials; Senentxu Lanceros-Mendez, BCMaterials

2:00 PM Invited
Magnetic Shape Memory: Magnetomechanics – MSM Design – Microfluidics – Markets: *Peter Mullner*¹; ¹Boise State University

2:30 PM Invited
Recent Developments in NiMn-based Martensitic Materials for Actuation and Energy: *Volodymyr Chernenko*¹; ¹BCMaterials & University of the Basque Country (UPV/EHU)

2:55 PM
Engineering Built-in strain Gradients to Tune Magnetism in Two-phase Heusler Intermetallics: *Yolita Eggeler*¹; Emily Levin¹; Fulin Wang¹; Ram Seshadri¹; Tresa Pollock¹; Daniel Gianola¹; ¹University of California, Santa Barbara

3:15 PM Invited
Magnetically Active Composites for All-printed Electronics Applications: Ana Catarina Lima¹; Nikola Perinka²; Nelson Pereira¹; Vitor Correia¹; Pedro Martins¹; *Senentxu Lanceros-Mendez*²; ¹University of Minho; ²BCMaterials

3:45 PM Break

4:05 PM Invited
Generating Electricity from Waste Heat using Magneto-structural Materials: *Ekkes Brueck*¹; ¹Delft University of Technology

4:30 PM

Industrial Development of La-Fe-Si Magnetocaloric Alloys for Energy Conversion: Alexander Barcza¹; *Christian Polak*¹; ¹Vacuumschmelze GmbH & Co. KG

5:00 PM Invited

Magnetic Domains in Magnetostrictive Fe-Ga Alloys: *Yongmei Jin*¹; Matthew Tianen¹; ¹Michigan Technological University

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VI — Functional Materials for Energy

Sponsored by: TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

Program Organizers: Jung Pyung Choi, Pacific Northwest National Laboratory; Amit Pandey, MicroTesting Solutions; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh

Tuesday PM | February 25, 2020
16B | San Diego Convention Ctr

Session Chairs: Jung Pyung Choi, Pacific Northwest National Laboratory; Sanjay Sampath, Stony Brook University

2:00 PM

Density Functional Theory Calculations of ZnO Nanopyramids: Crystal Growth and Improved Performance in Water Splitting: *Pegah Mirabedini*¹; Taehoon Lim¹; Alfredo Martinez-Morales¹; P. Alex Greaney¹; ¹University of California, Riverside

2:20 PM

Activated Alumina as Value-added Byproduct from the Hydrolysis of Hierarchical Nanoporous Aluminum with Pure Water to Generate Hydrogen Fuel: *Timothy Lee*¹; Jintao Fu¹; John Corsi¹; Eric Detsi¹; ¹University of Pennsylvania

2:40 PM Invited

Au-nanoparticle Incorporated Perovskites for Optical Sensing in High Temperature Gas Streams: *Paul Ohodnicki*¹; Jeffrey Wuenschell²; Youngseok Jee²; Harry Abernathy²; Shiwoo Lee²; Gregory Hackett²; ¹National Energy Technology Laboratory (presently at University of Pittsburgh); ²National Energy Technology Laboratory

3:00 PM

Coupled Anelastic and Dielectric Relaxations in Doped Binary Oxides with Fluorite Structure: *Miladin Radovic*¹; Peipei Gao¹; Goran Brankovic²; Amy Bolon¹; Zorica Brankovic²; Ke An³; Andrew Payzant³; ¹Texas A&M University; ²University of Belgrade; ³Oak Ridge National Laboratory

3:20 PM

Electrophoretic Deposition: A Promising Strategy for Fabricating Alkali-ion Rechargeable Cell Electrodes with Superior Electrochemical Properties: *Debasish Das*¹; Arijit Mitra²; Sambedan Jena¹; Saptarshi Das³; Subhasish Basu Majumder³; ¹School of Nano Science and Technology, Indian Institute of Technology Kharagpur; ²Department of Metallurgical and Materials Engineering, Indian Institute of Technology Kharagpur; ³Materials Science Centre, Indian Institute of Technology Kharagpur

3:40 PM Break

4:00 PM

Highly Selective Liquid Oxide Membranes: Properties and Prospects: *Valery Belousov*¹; ¹Baikov Institute of Metallurgy and Materials Science

4:20 PM

Ice-templated Sintered Metal Oxides with Directional Porosity and Characterization of Compressive Mechanical Properties: *Dipankar Ghosh*¹; Rohan Parai¹; Tessa Walters¹; Sashanka Akurati¹; Justine Marine¹; Gary Koenig²; ¹Old Dominion University; ²University of Virginia

4:40 PM

Utilizing Reversible Martensitic Transformations for the Mitigation of Thermal Transients: *Asher Leff*¹; Jacob Wright¹; Jack Brody¹; Adam Wilson¹; Darin Sharar¹; ¹CCDC Army Research Laboratory

ELECTRONIC MATERIALS

Advanced Microelectronic Packaging, Emerging Interconnection Technology and Pb-free Solder — 3D Microelectronic Packaging and Emerging Interconnects I

Sponsored by: TMS Functional Materials Division, TMS:
Electronic Packaging and Interconnection Materials Committee

Program Organizers: Christopher Gourlay, Imperial College London; Kazuhiro Nogita, University of Queensland; David Yan, San Jose State University; Mike Wolverton, Raytheon; Babak Arfaei, Ford Motor Company; Andre Delhaise, Celestica; Mehran Maalekian, Mat-Tech; Mohd Arif Salleh, Universiti Malaysia Perlis

Tuesday PM | February 25, 2020
Palomar | Marriott Marquis Hotel

Session Chairs: David Yan, San Jose State University; Babak Arfaei, Ford Motor Co.

2:00 PM
Mechanical Reliability of Cu-filled Through Sivia under Annealing and Thermal Cyclic Loading Conditions: *Dipali Sonawane*¹; Praveen Kumar¹; ¹Indian Institute of Science

2:20 PM
Different Electroplating Temperature Affecting on Mechanical Strength of Highly (111) Preferred Orientated Nanotwinned Copper (TMS 2020): *Fu Chian Chen*¹; Chih Chen¹; ¹National Chiao Tung University

2:40 PM
Formation of Cu-Cu Direct Bonding by Green Synthesized Approaches: *Wei Liu*¹; Kuo-Shuo Huang¹; Wen-Chih Lin¹; Jim Wang²; Albert T. Wu¹; ¹National Central University; ²SHENMAO Technology Inc.

3:00 PM
Effect of a Metallic Cap Layer on the Magnitude, Statistical Variation and Mechanism of Through-Silicon Via Extrusion: *Golareh Jalilvand*¹; Tengfei Jiang¹; ¹University of Central Florida

3:20 PM Break

3:40 PM
Reducing Interfacial Voids in Cu/In/Cu Microbump with In-Sn-Cu Solder Alloy: *Rui Wen Song*¹; Jenq Gong Duh¹; ¹National Tsing Hua University

4:00 PM
Investigation to Micro Friction Stir Spot Welding Al and Cu Sheets to Foils for Automotive Lithium-ion Battery Cells Assembly: *Harry Chang*¹; Jason Silberman¹; Danny Ventura¹; Kylie Dodge¹; David Yan¹; ¹San Jose State University

4:20 PM
Thermal Management through Networks of Highly Purified Boron Nitride Nanotubes: Mahmoud Amin¹; David Kranbuehl¹; *Hannes Schniepp*¹; ¹The College of William & Mary

4:40 PM
Effect of Sn3.0 Ag 0.5Cu and Sn58Bi Solder Alloys on Through Silicon Via under Thermal Conditions: *Jiaojiao Wang*¹; Limin Ma¹; Fu Guo¹; Yishu Wang¹; Jianyu Feng¹; ¹Beijing University of Technology

CHARACTERIZATION

Advanced Real Time Imaging — Bio-Nano Interfaces and Engineering Applications (Joint Session)

Sponsored by: TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, National Energy Technology Laboratory; David Alman, National Energy Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki Shibata, Imram, Tohoku University; Antoine Allanore, Massachusetts Institute of Technology; Candan Tamerler, University of Kansas; Noritaka Saito, Kyushu University; Neslihan Dogan, McMaster University; Zuotai Zhang, Southern University of Science and Technology; Bryan Webler, Carnegie Mellon University; Anna Nakano, US Department of Energy National Energy Technology Laboratory

Tuesday PM | February 25, 2020
Theater A-4 | San Diego Convention Ctr

Session Chairs: Candan Tamerler, University of Kansas; Jinichiro Nakano, National Energy Technology Laboratory

2:00 PM
Micro-scale Imaging of Cancerous Tissues using High Frequency Ultrasound: Leila Ladani¹; *Koushik Paul*¹; ¹Arizona State University

2:20 PM
New Biomarkers of Prostate and Breast Cancer Metastasis to Bone:*Kalpana Katti*¹; Sumanta Kar¹; Haneesh Jasuja¹; MD Shahjahan Molla¹; Dinesh Katti¹; ¹North Dakota State University

2:40 PM

Particle Size and Zeta Potential of CBD/THC Nano-emulsions Present in Commercial Beverages: *Vidumin Dahanayake*¹; Vinod Radhakrishnan¹; James Soulek¹; ¹Anton Paar USA

3:00 PM

Inkjet Printed Electrochemical Aptasensor for Detection of Hg²⁺ in Organic Solvents: *Susana Diaz-Amaya*¹; Li-Kai Lin¹; Renee DiNino¹; Carlos Ostos²; Lia Stanciu¹; ¹Purdue University; ²Universidad de Antioquia

3:20 PM

Tunable Self Assembled Supramolecular Nanoprobes to Decipher Biomedical Events: *Mathew Jaeschke*¹; Sarah VanOosten¹; Philip Elrod¹; Esra Yuca¹; Candan Tamerler¹; ¹University of Kansas

3:40 PM Break

4:00 PM

Removal of Chromium (VI) from Water onto Activated Carbon by Adsorption in Dynamic Mode: *Naouel Hezil*¹; Mamoun Fellah¹; Alex Montagne²; Alain Iost³; Aleksei Obrosova⁴; Sabine Wiess⁴; ¹Abbes Laghrour Khenchela University, Algeria; ²Ecole d'arts et metiers; ³Ecole d'arts et metiers; ⁴Department of Physical Metallurgy and Materials Technology, Brandenburg Technical University

4:20 PM

Sc₃N@C₈₀ and La@C₈₂ doped Graphene Photodetectors: Kishan Jayanand¹; *Ravindra Mehta*¹; Srishti Chugh¹; Anupama Kaul¹; ¹University of North Texas

ADVANCED MATERIALS

Advanced Solid Phase Processing Symposium — Additive Approaches

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee, TMS: Shaping and Forming Committee

Program Organizers: Suveen Mathaudhu, University of California, Riverside; Cynthia Powell, Pacific Northwest National Laboratory; Kester Clarke, Colorado School of Mines; Anthony Reynolds, University of South Carolina; Mostafa Hassani, Cornell University

Tuesday PM | February 25, 2020
Balboa | Marriott Marquis Hotel

Session Chairs: Mostafa Hassani, Cornell University; Paul Allison, University of Alabama

2:00 PM Invited
Fatigue Mechanisms of Aluminum Alloys Fabricated by Additive Friction Stir Deposition: Ben Ruthford¹; Dustin Avery¹; Luke Brewer¹; Paul Allison¹; *J. Brian Jordon*¹; ¹University of Alabama

2:25 PM Invited
Smoothed Particle Hydrodynamic Simulations of Solid-phase AA6061 Additive Friction Stir Depositions: George Stubblefield¹; Kirk Fraser²; B. J. Phillips¹; D. Z. Avery¹; N. Zhu¹; Luke Brewer¹; J. Brian Jordon¹; *Paul Allison*¹; ¹University of Alabama; ²National Research Council Canada

2:50 PM
Microstructure and Mechanical Properties of Solid-State Additive Friction Stir Processed Alloy 600 on 304L Stainless Steel: Biswajit Dalai¹; Jie Song²; Syeda Somaiya²; Benjamin Sutton³; Nicholas Mohr³; Seetha Mannava²; Matthew Steiner²; *Vijay Vasudevan*²; ¹Lulea University of Technology; ²University of Cincinnati; ³EPRI

3:10 PM
Advances in Deformation and Microstructure Evolution Understanding in Additive Friction Stir Deposition: *Robert Griffiths*¹; Mackenzie Perry¹; David Garcia¹; Jenny Sietins²; Yunhui Zhu¹; Hang Yu¹; ¹Virginia Polytechnic Institute; ²Army Research Laboratories

3:30 PM Break

3:50 PM Invited
Elucidating the Role of Flash Heating in Ultrasonic Consolidation of Powder and Foils: *Zachary Cordero*¹; Austin Ward¹; ¹Rice University

4:15 PM
In-situ Studies of Impact-Induced Deformation and Solid-State Bonding in Cold Spray: *Mostafa Hassani*¹; David Veysset²; Keith Nelson²; Christopher Schuh²; ¹Cornell University; ²Massachusetts Institute of Technology

4:35 PM
Designer Additive Manufacturing Powders for Solid State Additive Manufacturing Processing: *Kyle Tsaknopoulos*¹; Jack Grubbs¹; Danielle Cote¹; ¹Worcester Polytechnic Institute

4:55 PM
Laser Assisted Cold Spray of AISI 4340: *Dallin Barton*¹; Venkata Satish Bhattiprolu¹; Clio Batali¹; Gregory Thompson¹; Luke Brewer¹;

¹University of Alabama

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Advances and Discoveries in Non-equilibrium Driven Nanomaterials and Thin Films — Nanocomposites

Sponsored by: TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

Program Organizers: Ritesh Sachan, Oklahoma State University; Srinivasa Rao Singamaneni, University of Texas at El Paso; Amit Pandey, MicroTesting Solutions; Nuggehalli Ravindra, New Jersey Institute of Technology

Tuesday PM | February 25, 2020
Solana | Marriott Marquis Hotel

Session Chair: Srinivasa Rao, University of Texas, El Paso

2:00 PM Invited
Surface Chemistry Evolution in Ti-BNNT System Processed by SPS and its Correlation to Physico-chemical and Mechanical Properties: *Sudipta Seal*¹; Tamil Selvan Sakthivel¹; Jenniffer Bustillos²; Pranjal Nautiyal²; Aravind Agarwal²; ¹University of Central Florida; ²Florida International University

2:30 PM
Enhanced Field Emission of CNT-W Nanowire Hierarchical Emitters: *Narasimha Pulagara*¹; Gurjinder Kaur¹; Indranil Lahiri¹; ¹IIT Roorkee

3:00 PM
Metastable Silicon Nanocomposites via Plasma Synthesis and Spark Plasma Sintering: *Steven Herzberg*¹; Devin Coleman¹; Christian Roach¹; Sabah Bux²; Suveen Mathaudhu¹; Lorenzo Mangolini¹; ¹University of California, Riverside; ²Jet Propulsion Laboratory/California Institute of Technology

3:20 PM
Heat Capacity and Free Energy of Ni-Fe Nanocrystals: *Stefan Lohaus*¹; Michel Johnson²; Peter Ahnn¹; Mary Anne White²; Brent Fultz¹; ¹California Institute of Technology; ²Dalhousie University

CHARACTERIZATION

Advances in Powder and Ceramic Materials Science —

Ceramic-based Composite Materials

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Shefford Baker, Cornell University; Huazhang Zhai, Beijing Institute of Technology; Sergio Monteiro, Military Institute of Engineering; Rajiv Soman, Eurofins EAG Materials Science LLC; Faqin Dong, Southwest University of Science and Technology; Jinhong Li, China University of Geosciences (Beijing); Ruigang Wang, The University of Alabama

Tuesday PM | February 25, 2020
Theater A-6 | San Diego Convention Ctr

Session Chairs: Huazhang Zhai, Beijing Institute of Technology; Bowen Li, Michigan Technological University

2:00 PM Introductory Comments

2:05 PM
Microstructural Characteristics and Effective Applications of Andalusite-Mullite Phase Transformation: *Bowen Li*¹; Minsheng He²; Huaguang Wang¹; ¹Michigan Technological University; ²R&D Center of Wuhan Iron & Steel Co

2:25 PM
Investigating Solid Solutions of Tungsten in Molybdenum Aluminium Boride MAB Phase Ceramics, for Use in Extreme Environments: *Peter Richardson*¹; ¹University of Newcastle

2:45 PM
Microwave Absorption Properties of Polymer-derived SiCN(Fe)/Si3N4 Ceramics: *Xiao Lin*¹; *Hongyu Gong*¹; Yujun Zhang¹; Jianqiang Bi¹; Yurun Feng¹; Shan Wang¹; ¹Shandong University, China

3:05 PM
High-temperature Microwave Dielectric Properties of Boron Nitride Polycrystalline Ceramics without Additives: *Huazhang Zhai*¹; ¹Beijing Institute of Technology

3:25 PM Break

3:40 PM
Evaluation of a Three-chamber Algae-cathode Microbial Fuel Cell for Bioelectrochemical Recovery of Energy and Lead Metal: *Yinta Li*¹; *Ling Xia*²; Shaoxian Song²; ¹Hubei Key Laboratory of Mineral Resources Processing and Environment; Wuhan University

of Technology; Universidad Autonoma de San Luis Potosi; Weihai Ocean Vocational College; ²Hubei Key Laboratory of Mineral Resources Processing and Environment; Wuhan University of Technology

4:00 PM
Mechanical Properties of Boron Nitride Nanosheets(BNNSs) Reinforced Si3N4 Composites: Guandong Liang¹; *Jianqiang Bi*¹; Guoxun Sun¹; Yafei Chen¹; Weili Wang¹; ¹Shandong University

MECHANICS & STRUCTURAL RELIABILITY

Advancing Current and State-of-the-Art Application of Ni- and Co-based Superalloys — Ni-based Superalloys – Structure & Properties

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Chantal Sudbrack, Northwestern University Center for Atom-Probe Tomography; Mario Bochiechio, Pratt & Whitney; Kevin Bockenstedt, ATI Specialty Materials; Katerina Christofidou, University of Sheffield; James Coakley, University of Miami; Martin Detroids, National Energy Technology Laboratory; Laura Dial, GE Global Research; Bij-Na Kim, Carpenter Additive; Victoria Miller, University of Florida; Kinga Unocic, Oak Ridge National Laboratory

Tuesday PM | February 25, 2020
11B | San Diego Convention Ctr

Session Chairs: Katerina Christofidou, The University of Manchester; James Coakley, University of Miami

2:00 PM Invited
Design Approaches for Advanced High Temperature Structural Materials: *Sammy Tin*¹; ¹Illinois Institute of Technology

2:30 PM
On the Effects of Chemistry Variations in New Nickel-based Superalloys for Industrial Gas Turbine Applications: *Sabin Sulzer*¹; Hideyuki Murakami²; Roger Reed¹; ¹University of Oxford; ²National Institute for Materials Science

2:50 PM
Effect of Stacking Fault Segregation and Local Phase Transformations on Creep Strength in Ni-base Superalloys:

*Timothy Smith*¹; Brian Good¹; Tim Gabb¹; Bryan Esser²; Ashton Egan²; Laura Evans¹; David McComb²; Michael Mills²; ¹NASA Glenn Research Center; ²The Ohio State University

3:10 PM

Segregation at Planar Defects in Model NiCo-based Superalloys: *Sae Matsunaga*¹; Dongsheng Wen¹; Michael Titus¹; ¹Purdue University

3:30 PM Break

3:50 PM Invited

Factors Controlling VHCF Life of Ni-based Single Crystal Superalloys: Alice Cervellon¹; Luciana Maria Bortoluci Ormastroni¹; Satoshi Utada¹; Phillipp Kürnsteiner²; Paraskevas Kontis²; Lorena Mataveli Suave³; Samuel Hemery¹; Patrick Villechaise¹; *Jonathan Cormier*¹; ¹ENSMA - Institut Pprime - UPR CNRS 3346; ²Max-Planck-Institut für Eisenforschung GmbH; ³SAFRAN Tech

4:20 PM

Is the Carbon Content Really an Issue for the LCF Durability of Forged γ/γ' Ni-based Disk Alloys?: *Adele Govaere*¹; Anne-Laure Rouffié²; Florence Hamon³; Patrick Villechaise³; Jean-Michel Franchet²; Alexandre Devaux⁴; Coraline Crozet⁴; Paraskevas Kontis⁵; Jonathan Cormier³; ¹Ensma / Pprime Institute - Safran Tech; ²Safran Tech; ³Pprime Institute; ⁴Aubert & Duval; ⁵Max Planck Institute

4:40 PM

Investigating Deformation Mechanisms in a Coarsening Resistant Ni-base Superalloy with “Compact” $\gamma'-\gamma$ Coprecipitates: *Semanti Mukhopadhyay*¹; Hariharan Sriram¹; Richard DiDomizio²; Robert Hayes³; Christopher Zenk¹; G.B. Vishwanathan¹; Yunzhi Wang¹; Michael Mills¹; ¹Ohio State University; ²GE Global Research Center, USA; ³Materials Testing Inc, USA

5:00 PM

Microstructure and Mechanical Properties of a Cast Ni-based Alloy: *Govindarajan Muralidharan*¹; Jonathan Charleston¹; Donovan Leonard¹; Jim Myers²; ¹Oak Ridge National Laboratory; ²MetalTek International

5:20 PM

Evolution of Microstructure in Net-shape HIP IN718 with Improved Fatigue Performance: *Benjamin Georgin*¹; Victor Samarov²; Hamish Fraser¹; ¹The Ohio State University; ²LNT

Algorithm Development in Materials Science and Engineering
— Machine Learning and Atomistic Algorithms

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Charudatta Phatak, Argonne National Laboratory; Bryan Wong, University of California, Riverside; Mikhail Mendelev, Ames Laboratory; Bryce Meredig, Citrine Informatics; Ebrahim Asadi, University of Memphis; Francesca Tavazza, National Institute of Standards and Technology

Tuesday PM | February 25, 2020
31C | San Diego Convention Ctr

Session Chairs: Garritt Tucker, Colorado School of Mines; Bryce Meredig, Citrine Informatics

2:00 PM Invited
Bridging the Electronic, Atomistic and Mesoscopic Scales using Machine Learning: *Subramanian Sankaranarayanan*¹; ¹Argonne National Laboratory

2:30 PM
Designing High-strength Carbon-nanotube Polymer Composites using Machine Learning Algorithms Integrated with Molecular Dynamics Simulations: *Aowabin Rahman*¹; Prathamesh Deshpande²; Matthew Radue²; Michael Czabaj¹; S Gowtham²; Susanta Ghosh²; Gregory Odegard²; Ashley Spear¹; ¹University of Utah; ²Michigan Technological University

2:50 PM
Monte Carlo Study of Paired-spin Kagome Artificial Spin Ice Lattices: David Friedman¹; Frank Barrows²; Yue Li²; *Charudatta Phatak*²; ¹University of Illinois, Urbana-Champaign; ²Argonne National Laboratory

3:10 PM
Functional Uncertainty Propagation with Bayesian Ensembles in Molecular Dynamics: *Saaketh Desai*¹; Sam Reeve²; Alejandro Strachan¹; ¹Purdue University; ²Lawrence Livermore National Laboratory

3:30 PM

Nudged Elastic Band Method for Solid-solid Transition Under Finite Deformation: *Wei Gao*¹; ¹University of Texas at San Antonio

3:50 PM Break

4:05 PM

Applying Machine Learning to Identifying Packing Defects in Amorphous Materials: *Tina Mirzaei*¹; P.Alex Greaney¹; ¹University of California, Riverside

4:25 PM

Reduced-order Atomistic Method for Simulating Radiation Effects in Metals: Elton Chen¹; Chaitanya Deo²; *Remi Dingreville*¹; ¹Sandia National Laboratories; ²Georgia Institute of Technology

4:45 PM

An Atomistic Framework to Understand Solute Grain Boundary Segregation in a Polycrystal: *Malik Wagih*¹; Christopher Schuh¹; ¹Massachusetts Institute of Technology

5:05 PM

Quasiparticle Approach to Study Solute Segregation at Tilt grain Boundaries in Bcc Iron: *Helena Zapolsky*¹; Antoine Vaugeois¹; Renaud Patte¹; ¹Gpm, Umr 6634

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications VIII — Session II

Sponsored by: TMS Functional Materials Division, TMS: Alloy Phases Committee

Program Organizers: Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Ensicaen University of Caen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Lan Li, Boise State University; Takao Mori, National Institute for Materials Science; Hsin-jay Wu, National Chiao-tung University; Tiejun Zhu, Zhejiang University

Tuesday PM | February 25, 2020
Miramar | Marriott Marquis Hotel

Session Chairs: Albert Wu, National Central University; Yoshisato Kimura, Tokyo Institute of Technology

2:00 PM Invited
Gradient Composition Layered Microstructure Development in Thermoelectric Mg₂(Si,Sn) Alloys Based on Phase Equilibrium: *Yoshisato Kimura*¹; *Narumi Sakamoto*¹; *Zhifang Zhou*¹; *Yaw Wang Chai*¹; *Yu Ikuta*²; *Yonghoon Lee*²; ¹Tokyo Institute of Technology; ²KELK Ltd.

2:20 PM Invited
Thermoelectric Properties of Amorphous ZnO_xN_y Thin Films at Room Temperature: *Yasushi Hirose*¹; *Masato Tsuchii*¹; *Kei Shigematsu*²; *Yohei Kakefuda*³; *Takao Mori*³; *Tetsuya Hasegawa*¹; ¹University of Tokyo; ²Tokyo Tech.; ³NIMS

2:40 PM
Heat Stability of Mg₂Si_{1-x}Sn_x as Affected by Heat Treatment Temperature and Duration: *Mahdi Mejri*¹; *Yohan Thimont*¹; *Benoit Malard*²; *Claude Estournes*¹; ¹CIRIMAT, Université de Toulouse, CNRS; ²CIRIMAT, Université de Toulouse, CNRS, INP-ENSIACET

3:00 PM
Transmission Electron Microscopy Study of Hole-selective Contacts Employed in Silicon Solar Cells: *Haider Ali*¹; *Geoffrey Gregory*¹; *Kristopher Davis*¹; ¹University of Central Florida

3:20 PM Break

3:40 PM Invited
Thermoelectric Properties of p-type Mg Doped CuMO₂ Delafossite Thin Films and Modules: *Yohan Thimont*¹; *Inthuga Sinnarasa*¹; *Antoine Barnabé*¹; *Philippe Tailhades*¹; *Lionel Presmanes*¹; ¹CIRIMAT, Universite de Toulouse, CNRS, Universite Toulouse 3 Paul Sabatier

4:00 PM Invited
Interfacial Reactions Between Bi₂Te₃ Substrate with Cu, In, Sn and Ni: *Sinn-wen Chen*¹; *How-wei Shih*¹; *Wei Wang*¹; ¹National Tsing Hua University

4:20 PM Invited
3D Printing of High-performance and Flexible Thermoelectric Materials and Devices using 2D Colloidal Nanocrystals: *Yanliang Zhang*¹; ¹University of Notre Dame

4:40 PM
Assessment of Interface in Bi₂Te₃ and Sb₂Te₃ Thin Film Thermoelectric Modules: *Zhen-Wei Sun*¹; *Kai-Wen Cheng*¹; *Albert T. Wu*¹; ¹National Central University

5:00 PM Invited

Synthesis, Processing and Characterizations of Functional Materials for Industrial Applications: *David Berthebaud*¹; ¹LINK (CNRS - Saint Gobain - NIMS)

5:20 PM

High Reliability Package of Perovskite Solar Cell by SiNx Passivation Layer with Sn-Bi-In Low-melting Solder: *Chun Kai Huang*¹; ¹National Central University

LIGHT METALS

Alumina and Bauxite — Residue Reuse and Remediation

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: James Vaughan, University of Queensland

Tuesday PM | February 25, 2020
2 | San Diego Convention Ctr

Session Chair: Michael Coley, The University of the West Indies

2:00 PM Introductory Comments

2:10 PM

Bayer Process Towards the Circular Economy – Metal Recovery from Bauxite Residue: Paula Araújo¹; Patrícia Silva²; Andre do Carmo²; Fernando Gomes²; Alex dos Santos²; *Adriano Lucheta*²; Raphael Da Costa³; Caio de Melo³; Marcelo Montini³; ¹SENAI Innovation Institute ; ²SENAI Innovation Institute; ³Norsk Hydro Brasil

2:30 PM

Bayer Process Towards the Circular Economy – Soil Conditioners from Bauxite Residue: Roseanne Holanda¹; Patrícia Silva²; Andre do Carmo²; Alice Cardoso²; *Adriano Lucheta*²; Raphael da Costa³; Caio de Melo³; Marcelo Montini³; ¹SENAI Innovation Institute ; ²SENAI Innovation Institute; ³Norsk Hydro Brasil

2:50 PM

Brazilian Bauxite Residue Physical-chemical Characterization and Acidic Neutralization Potential: Patrícia Silva¹; Andre do Carmo²; Roseanne Holanda²; Fernando Gomes²; Emanuela Nogueira²; *Adriano Lucheta*²; Raphael da Costa³; Caio de Melo³; Marcelo Montini³; ¹SENAI Innovation Institute ; ²SENAI Innovation Institute; ³Norsk Hydro Brasil

3:10 PM Break

3:30 PM

Effect of Concentrations and Pressures of CO2 on Calcification-Carbonation Treatment of Bauxite residue: *Xi Chao*¹; Zhang Tingan¹; Guozhi Lv¹; Yang Chen¹; ¹Northeastern University

3:50 PM

Comprehensive Utilization of Red Mud Through the Recovery of Valuable Metals and Reuse of the Residue: *Fei Lyu*¹; Li Wang¹; Jiande Gao¹; Honghu Tang¹; Wei Sun¹; Yuehua Hu¹; Runqing Liu¹; Lei Sun¹; ¹Central South University

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Properties of Aluminium Alloys I

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Dmitry Eskin, Brunel University

Tuesday PM | February 25, 2020
1A | San Diego Convention Ctr

Session Chair: Samuel Wagstaff, Novelis

2:00 PM Introductory Comments

2:05 PM

High Cycle Fatigue Properties of the Zr-modified Al-Si-Cu-Mg Alloy at Elevated Temperatures: *Shouxun Ji*¹; Guangyu Liu¹; Paul Blake²; ¹Brunel University London; ²Jaguar Land Rover

2:30 PM

Effect of Mo on Elevated-temperature Low-cycle Fatigue Behavior of Al-Si 356 Cast Alloy: Sinan Chen¹; *Kun Liu*¹; X Grant Chen¹; ¹University of Quebec at Chicoutimi

2:55 PM

State Parameter-based Simulation of Temperature- and Strain Rate Dependent Flow Curves of Al-alloys: *Bernhard Viernstein*¹; Philipp Schumacher²; Benjamin Milkereit²; Ernst Kozeschnik¹; ¹Institute of Materials Science and Technology, TU Wien; ²University of Rostock

3:20 PM

Coarsening-resistance of a Severely Deformed Al-0.2wt% Sc Alloy: *Yan Huang*¹; ¹Brunel University London

3:45 PM Break

4:00 PM

The Effect of Modified Strain-induced Melt Activation (Modified SIMA) Process on the Microstructure and Mechanical Properties of Al-7Si Alloy: *Chandan Choudhary*¹; Durbadal Mandal¹; Kanai Sahoo²; ¹National Institute of Technology, Durgapur; ²CSIR-National Metallurgical Laboratory, Jamshedpur

4:25 PM

Effect of Mg on Flow Behavior of Al-Mg Alloys and Its Constitutive Modelling Using Finite Element Analysis: *Shahin Ahmad*¹; Vilas Tathavadkar¹; Alankar Alankar²; K. Narasimhan²; ¹Aditya Birla Science & Technology Co. Pvt. Ltd.; ²Indian Institute of Technology, Bombay

4:50 PM

Influence of Thermal Treatment and Design Parameters on the Fatigue Life of Automotive Control Arm Fabricated from A357 Semi-solid Alloy: *Mohamed Attia*¹; Khaled Ragab¹; Mohamed Bouazara¹; X Grant Chen¹; ¹Universite du Quebec a Chicoutimi

BIOMATERIALS

Biodegradable Materials for Medical Applications II — Zinc and Iron Implants

Sponsored by: TMS Functional Materials Division, TMS: Biomaterials Committee

Program Organizers: Jaroslaw Drelich, Michigan Technological University; Ehsan Mostaed, Michigan Technological University; Malgorzata Sikora-Jasinska, Michigan Technological University; Jan-Marten Seitz, Syntellix AG; Petra Maier, Stralsund University of Applied Sciences; Norbert Hort, Helmholtz-Zentrum Geesthacht; Huinan Liu, University of California, Riverside

Tuesday PM | February 25, 2020
Vista | Marriott Marquis Hotel

Session Chairs: Ehsan Mostaed, Michigan Technological University; Malgorzata Sikora-Jasinska, Michigan Technological University

2:00 PM Keynote
Advances in Zinc and its Alloys as Biodegradable Metals for Medical Applications: *Yufeng Zheng*¹; ¹Peking University

2:35 PM Invited
Surface Engineering on Zinc for Better Biocompatibility: *Donghui Zhu*¹; ¹Stony Brook University

3:00 PM Invited
Fe-based Alloys with Extreme Properties for Thinner Absorbable Devices: Sergio Loffredo¹; Carlo Paternoster¹; Nicolas Giguere²; Maurizio Vedani³; *Diego Mantovani*¹; ¹Laval University; ²Quebec Metallurgy Center; ³Mechanics, Polytechnic of Milan

3:25 PM Invited
Additive Manufacturing of Biodegradable Fe-alloys for Orthopedic Applications: *Ali Gokhan Demir*¹; Danilo Carluccio²; Chun Xu²; Qingsong Ye²; Matthew Dargusch²; Barbara Previtali¹; ¹Politecnico di Milano; ²University of Queensland

3:50 PM Break

4:05 PM
Different Approaches to Achieving the Appropriate Biodegradability for the Fe-Mn Alloy: *Matjaz Godec*¹; Irena Paulin¹; Crtomir Donik¹; Jaka Burja¹; Matej Hocevar¹; Peter Gregorcic²; Aleksandra Kocijan¹; ¹Institute of Metals and Technology; ²Faculty of Mechanical Engineering

4:25 PM
Thermal Treatment of Zn-based Alloys for Vascular Stenting – Effect of Microstructure on Degradation Behavior and In-vivo Response: *Malgorzata Sikora-Jasinska*¹; Ehsan Mostaed¹; Roger J. Guillory II¹; Jeremy Goldman¹; Jaroslaw W. Drelich¹; ¹Michigan Technological University

4:45 PM
Novel Zn-Fe Matrix Nanocomposite as Biodegradable Material: *Zeyi Guan*¹; Jingke Liu¹; Xiaochun Li¹; ¹University of California, Los Angeles

5:05 PM Concluding Comments

BIOMATERIALS

Biological Materials Science — Biological and Natural Materials II

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Steven Naleway, University of Utah; Jing Du, Penn State University; Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); David Restrepo, University of Texas at San Antonio

Tuesday PM | February 25, 2020
Leucadia | Marriott Marquis Hotel

Session Chairs: Wei Huang, University of California, Riverside; Maryam Hosseini, Purdue University; Jing Du, Penn State University

2:00 PM Invited

Hooves and Horns – How Do They Avoid Impact Damage?: Wei Huang¹; Alireza Zaheri²; Nicholas Yaraghi¹; Wen Yang³; Jae-Young Jung³; Zezhou Li⁴; Horacio Espinosa²; Robert Ritchie⁴; David Kisailus¹; Susan Stover⁵; *Joanna McKittrick*³; ¹University of California, Riverside; ²Northwestern University; ³University of California, San Diego; ⁴University of California, Berkeley; ⁵University of California, Davis

2:30 PM

Bioinspired Routes to Damage Tolerant Materials: Unique Microstructure and Fracture Properties of Enamel in the Mammal-like Grinding Dentition of a the Hadrosaurid Dinosaur: *Soumya Varma*¹; Manish Jain¹; Yi Teng Lee¹; Shane Johnson¹; B. A. Krick²; G. M. Erickson³; Daniele Casari⁴; Johann Michler⁴; Jakob Schwiedrzik⁴; Shraddha Vachhani⁵; Sid Pathak¹; ¹University of Nevada, Reno; ²Lehigh University; ³Florida State University and National High Magnet Field Laboratory; ⁴EMPA - Swiss Federal Laboratories for Materials Science and Technology; ⁵Bruker Nano Surfaces

2:50 PM

The Cholla Cactus: a New Model for Torsional Resilience in Biological Materials: *Albert Matsushita*¹; Luca Devivo¹; Daniel Kupor¹; Josue Luna¹; Doheon Lee¹; Falko Kuester¹; Joanna McKittrick¹; ¹University of California, San Diego

3:10 PM

On the Strength Across the Hair Species and the Evolution of Hair Fracture: *Wen Yang*¹; Robert Ritchie²; Marc Meyers¹; ¹University of California, San Diego; ²University of California, Berkeley

3:30 PM Break

3:45 PM

Toughness Enhancing 1-dimensional Metamaterials in the Webs of the Recluse Spider: Ben Skopic¹; *Hannes Schniepp*¹; ¹The College of William & Mary

4:05 PM

Impact-resistant Biological Coatings on the Mantis Shrimp Dactyl Club: *Wei Huang*¹; Nicolas Guarin-Zapata²; Pablo Zavattieri²; David Kisailus¹; ¹University of California Riverside; ²Purdue University

4:25 PM

Structure and Mechanical Behavior of Regenerated Fish Scales: Sean Ghods¹; Sarah Waddell¹; Emily Weller¹; Cameron Renteria¹; H-Y Jiang²; SS Mao³; JM Janak⁴; Timothy Linley⁴; *Dwayne Arola*¹; ¹University of Washington; ²Southest University; ³Shanghai University; ⁴Pacific Northwest National Laboratory

4:45 PM

The Boxfish Carapace, a Simple Architecture to Control Crack Propagation: Maryam Hosseini¹; Sean Garner²; Steven Naleway³; Joanna McKittrick²; *Pablo Zavattieri*¹; ¹Purdue University; ²University of California San Diego; ³University of Utah

5:05 PM Invited

Multi-scale Elemental, Structural and Mechanical Characterization of the Influence of Different Medicines on the de novo Mineralization of Zebrafish Caudal Fin: Po-Yu Chen¹; *Fabio Bohns*¹; Yang-Rong Shih¹; ¹National Tsing Hua University

LIGHT METALS

Cast Shop Technology — Melt Treatment

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Johannes Morscheiser, Aleris Rolled Products Germany GmbH

Tuesday PM | February 25, 2020
1B | San Diego Convention Ctr

Session Chair: Mark Badowski, Hydro

2:00 PM Introductory Comments

2:05 PM

Batscan, Constellium In-melt Ultrasonic Inclusion Detector: Industrial Performance: Jean-Louis Achard¹; Nicolas Ramel²; Guido Beretta¹; Pierre-Yves Menet¹; Jocelyn Prigent¹; *Pierre Le Brun*¹; ¹Constellium C-TEC; ²Constellium Neuf-Brisach

2:30 PM

Benchmark and Practical Application of State of the Art Hydrogen Monitoring: *Arnis Pelss*¹; Johannes Morscheiser¹; Sebastian Radwitz¹; Jens Kremer¹; Andreas Gilles¹; ¹Aleris Rolled Products Germany GmbH

2:55 PM

Molten Aluminum Quality Evaluations for Thin Foil Products: *Ali Ulus*¹; Çisem Dogan¹; Ali Ulas Malcioglu¹; Anil Özkaya¹; Eren Toraman¹; ¹Asas Aluminium

3:20 PM

Industrial Verification of One- and Two-chamber Siphon Degassing: *Arild Hakonsen*¹; Terje Haugen¹; ¹Hycast AS

3:45 PM Break

4:00 PM

Evaluation of CFF and BPF in Pilot Scale Filtration Tests: *Martin Syvertsen*¹; Inge Johansen²; Anne Kvithyld¹; Britt Elin Gihleengen³; Shahid Akhtar²; Are Bergin²; Anders Johansson⁴; ¹SINTEF Industry; ²Hydro Aluminium; ³Hycast; ⁴Gränges

4:25 PM

Dynaprime Filtration Technology Experience at Alcoa Baie-Comeau: Jean Francois Desmeules¹; *Francis Caron*²; ¹Dynamic Concept; ²Alcoa

4:50 PM

Improving Ultrasonic Melt Treatment Efficiency Through Flow Management: Acoustic Pressure Measurements and Numerical Simulations: *Tungky Subroto*¹; Dmitry Eskin¹; Christopher Beckwith²; Iakovos Tzanakis³; Georgi Djambazov²; Koulis Pericleous²; ¹Brunel University; ²University of Greenwich; ³Oxford Brookes University

CHARACTERIZATION

Characterization of Minerals, Metals and Materials —
Characterization of Mechanical Properties I

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Shadia Ikhmayies, Al Isra University; Yunus Kalay, Middle East Technical University; Jiann-Yang Hwang, Michigan Technological University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Army Research Laboratory

Tuesday PM | February 25, 2020
Theater A-5 | San Diego Convention Ctr

Session Chairs: Rajiv Soman, Eurofins EAG Materials Science LLC; Donato Firrao, Politecnico di Torino

2:00 PM
Dynamic Mechanical Behavior and Microstructure Evolution of Quinary Cu-Mn-Ni-Zn-Al Alloys: John Lauria¹; Kevin Laws¹; *Juan Escobedo-Diaz*¹; Hongxu Wang¹; Zongjun Li¹; Ali Ameri¹; ¹University of New South Wales

2:20 PM
Temperature, Pressure, and Current Effects on Densification and Mechanical Properties of Nano-grained FeNiZr Consolidated via the Field Assisted Sintering Technology: *Sean Fudger*¹; Tom Luckenbaugh²; A.J. Roberts¹; Chad Hornbuckle¹; Franklin Kellogg³; Chris Haines¹; Kris Darling¹; ¹U.S. Army Research Laboratory; ²Bowhead Total Enterprise Solutions, LLC; ³SURVICE Engineering Company

2:40 PM
Effect of Microstructure on Cleavage Fracture of Thick Section Quenched and Tempered S690 High Strength Steel: *Virgínia M. Bertolo*¹; Quanxin Jiang¹; Carey L. Walters²; Vera Popovich¹; ¹Delft University of Technology, Department of Materials Science and Engineering; ²TNO, Structural Dynamics

3:00 PM
***In-situ* Investigation of Thermal Characteristics of Novel Flash Processing Technique for Production of Advanced High Strength Steel (AHSS):** *Artem Trofimov*¹; Hsin Wang¹; Thomas Watkins¹; Thomas Muth¹; Sudarsanam Babu²; Gary Cola³; ¹Materials Science & Technology Division, Oak Ridge National Laboratory; ²Department of Mechanical, Aerospace, and Biomedical Engineering, University of Tennessee; ³SFP Works LLC

3:20 PM

Tensile Characterization of Austempered Ductile Iron in Aquatic and Gaseous Environments: *Dragan Rajnovic*¹; Olivera Eric Cekic²; Leposava Sidjanin¹; ¹University of Novi Sad, Faculty of Technical Sciences, Serbia; ²University of Belgrade, Faculty of Mechanical Engineering, Innovation Centre, Serbia

3:40 PM Break

3:55 PM

Effect of Thermal Aging on Impact Toughness of Electron Beam Welded AISI 316 Stainless Steel: Arun Kumar¹; *Sandeep Singh Sandhu*¹; Beant Singh²; ¹Quest Engineering College; ²PCET Ialru

4:15 PM

Connecting Dynamic Strain Aging to Deformation Processing in Magnesium-calcium-based Alloys: *Wesley Cuadrado-Castillo*¹; Michele Manuel¹; ¹University of Florida

4:35 PM

Microstructure Evolution During Tensile Deformation of Polycrystalline Cobalt: *Frantisek Chmelik*¹; Michal Knapek¹; Patrik Dobron¹; Mayerling Martinez²; Eric Hug²; ¹Charles University; ²Normandy University

4:55 PM

Deformation Behavior of Hexagonal Metals Investigated by the In-situ Acoustic Emission and Digital Image Correlation Techniques: *Michal Knapek*¹; Patrik Dobron¹; Frantisek Chmelik¹; ¹Charles University

5:15 PM

Determining Bulk Elastic Properties of Transversely Isotropic Aluminum Using Resonant Ultrasound Spectroscopy: *Jordan Evans*¹; Blake Sturtevant¹; Fedor Balakirev¹; Albert Migliori¹; Boris Maierov¹; ¹Los Alamos National Laboratory

CHARACTERIZATION

Characterization: Structural Descriptors, Data-Intensive Techniques, and Uncertainty Quantification — 3D Microstructure Descriptors & Uncertainty

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Extraction and Processing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Materials Characterization Committee

Program Organizers: Shawn Coleman, CCDC Army Research Laboratory; Tomoko Sano, U.S. Army Research Laboratory; James Hogan, University of Alberta; Srikanth Patala, North Carolina State University; Oliver Johnson, Brigham Young University; Francesca Tavazza, National Institute of Standards and Technology

Tuesday PM | February 25, 2020
Theater A-3 | San Diego Convention Ctr

Session Chairs: Francesca Tavazza, National Institute of Standards and Technology; James Hogan, University of Alberta

2:00 PM Introductory Comments

2:05 PM

X-Ray Computed Tomography of 3D Crack Lattices in Advanced Ceramics and their Effect on Mechanical Response: *James Hogan*¹; Calvin Lo¹; Haoyang Li¹; Brendan Koch¹; Tomoko Sano²; ¹University of Alberta; ²CCDEVCOM Army Research Laboratory

2:25 PM

3D Morphological Characterization of Porous Cu by Vapor Phase Dealloying Zn-Cu Alloys: *Qingkun Meng*¹; Kai Wang¹; Changhang Zhao²; Lijie Zou²; Yibin Ren³; Mingyuan Ge⁴; Xianghui Xiao⁴; Wah-Keat Lee⁴; Yu-chen Karen Chen-Wiegart²; ¹China University of Mining and Technology; ²Stony Brook University; ³Shenyang Ligong University; ⁴Brookhaven National Laboratory

2:45 PM

Automated Anomaly Detection in Unlabeled Computed Tomography Images: *Donald Loveland*¹; Hyojin Kim¹; T. Yong-Jin Han¹; ¹Lawrence Livermore National Laboratory

3:05 PM

Deep Convolutional Networks for Image Reconstruction from 3D Coherent X-ray Diffraction Imaging Data: *Mathew Cherukara*¹; Henry Chan¹; Subramanian Sankaranarayanan¹; Youssef Nashed¹; Ross Harder¹; ¹Argonne National Laboratory

3:25 PM

Uncertainty Quantification of Far-field HEDM Measurements: *Rachel Lim*¹; Joel Bernier²; Anthony Rollett¹; Paul Shade³; ¹Carnegie Mellon University; ²Lawrence Livermore National Laboratory; ³Air

Force Research Laboratory

3:45 PM Break

4:05 PM

Uncertainty Quantification Techniques Applied to Ductile Damage Predictions in the 3rd Sandia Fracture Challenge: *James Sobotka*¹; John McFarland¹; ¹Southwest Research Institute

4:25 PM

Uncertainty Propagation in a Multiscale CALPHAD-reinforced Elastochemical Phase-field Model: *Vahid Attari*¹; Pejman Honarmandi¹; Thien Duong¹; Daniel Saucedo¹; Douglas Allaire¹; Raymundo Arroyave¹; ¹Texas A&M University

4:45 PM

Machine Learning Reinforced Crystal Plasticity Modeling of Titanium-Aluminum Alloys under Uncertainty: *Pinar Acar*¹; ¹Virginia Tech

5:05 PM

Predicting Microstructure-sensitive Fatigue-crack Path in 3D Using a Machine Learning Framework: Kyle Pierson¹; *Aowabin Rahman*¹; Ashley Spear¹; ¹University of Utah

MATERIALS DESIGN

Computational Discovery and Design of Emerging Materials — Session IV

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Arunima Singh, Arizona State University; Houlong Zhuang, Arizona State University; Sugata Chowdhury, National Institute of Standards and Technology; Arun Kumar Mannodi Kanakkithodi, Argonne National Laboratory

Tuesday PM | February 25, 2020
32B | San Diego Convention Ctr

Session Chair: Arunima Singh, Arizona State University

2:00 PM Invited

Predicting Functional Defects by Design in Energy and Quantum Materials: *Panchapakesan Ganesh*¹; ¹Oak Ridge National Laboratory

2:30 PM

The Relationship Between Compositional Mixing and Phase Stability of Metal-halide Perovskites: Theoretical Study: *Ki-Ha Hong*¹; ¹Hanbat National Univeristy/Department of Materials Science and Engineering

2:50 PM

First-principles-based Hybrid Perovskite Materials Design for Memristor: *Donghwa Lee*¹; Seong Hun Kim¹; ¹Pohang University of Science and Technology (POSTECH)

3:10 PM

Discovery and Characterization of 1D Inorganic Polymers Through Data Mining and Density Functional Theory: *Joshua Paul*¹; Janet Lu¹; Sohum Shah¹; Stephen Xie¹; Richard Hennig¹; ¹University Of Florida

3:30 PM Break

3:50 PM Invited

Toward Rational Design and Discovery of Metastable Materials: *Vladan Stevanovic*¹; ¹Colorado School Of Mines

4:20 PM

Predicting the Properties of Crystals with High Accuracy Using Deep Learning: *Weike Ye*¹; Chi Chen¹; Zhenbin Wang¹; Iek-Heng Chu¹; Yunxing Zuo¹; Chen Zheng¹; Shyue Ping Ong¹; ¹University of California San Diego

4:40 PM

Introducing the MEAM Interatomic Potential for NiTiHf Shape Memory Alloys: *Meghnath Jaishi*¹; Garitt Tucker¹; Aaron Stebner¹; ¹Colorado School of Mines

5:00 PM

Density Functional Theory and Machine Learning Guided Prediction of Thermal Properties of Rare-earth Disilicates: *Mukil V. Ayyasamy*¹; Prasanna Balachandran¹; ¹University of Virginia

ENERGY & ENVIRONMENT

Computational Materials Science and Engineering of Materials in Nuclear Reactors — Microstructure and Atomistic Simulations

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Dilpuneet Aidhy, University of Wyoming; Michael Tonks, University of Florida; Mahmood Mamivand, Boise State University; Giovanni Bonny, Belgian Nuclear Research Center

Tuesday PM | February 25, 2020
Theater A-9 | San Diego Convention Ctr

Session Chairs: Izabela Szlufarska, University of Wisconsin; Simon Middleburgh, Bangor University

2:00 PM Invited
Exploration of Fundamental Radiation Effects Phenomena in Materials: *Steven Zinkle*¹; Ling Wang¹; Yan-Ru Lin¹; Yajie Zhao¹; Arunodaya Bhattacharya¹; ¹University of Tennessee

2:40 PM
First Principle Studies of Effects of Solute Segregation on Grain Boundary Strength in Ni-based X-750 Alloy: *Ziqi Xiao*¹; Axel Seoane¹; Xian-Ming Bai¹; Lingfeng He²; ¹Virginia Tech; ²Idaho National Laboratory

3:00 PM
Molecular Dynamics Simulations of Phosphorus Migration in a Grain Boundary of α -iron: *Ken-Ichi Ebihara*¹; Tomoaki Suzudo¹; ¹Jaea

3:20 PM
The Effect of Minor Additives on Radiation Induced Segregation in Austenitic Steel Alloys: *Yongfeng Zhang*¹; Anus Manzoor¹; Dilpuneet Aidhy²; Miao Song³; Xiaoyuan Lou⁴; lingfeng He¹; ¹Idaho National Laboratory; ²University of Wyoming ; ³University of Michigan ; ⁴Auburn University

3:40 PM Break

4:00 PM Invited
DFT Calculations for Modeling Point Defect and Fission Gas Behavior in Nuclear Fuels: *David Andersson*¹; ¹Los Alamos National Laboratory

4:40 PM
A First-principles Investigation on the Co-segregation Energetics of Chromium-helium at Grain Boundaries in a-Fe: *Sainyam Nagar*¹; Pulkit Garg¹; Nitin Muthegowda¹; Mehul Bhatia¹; Ilaksh Adlakha¹; Kiran Solanki¹; ¹Arizona State University

5:00 PM
DFT+U Point Defect Calculations of Uranium Mononitride: Bryant Jerome¹; *Dilpuneet Aidhy*¹; ¹University of Wyoming

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Defects and Kinetics

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Jorge Munoz, University of Texas at El Paso; Sara Kadkhodaei, University of Illinois at Chicago; Vahid Attari, Texas A&M University; James Morris, Ames Laboratory

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33C | San Diego Convention Ctr

Session Chairs: David Strubbe, University of California, Merced; Haixuan Xu, University of Tennessee

2:00 PM Invited
Thermodynamics and Kinetics of Defects in Perovskite Oxide Superlattices: *Haixuan Xu*¹; Lipeng Zhang²; Valentino Cooper³; Paul Kent³; ¹University of Tennessee; ²Beijing University of Chemical Technology; ³Oak Ridge National Laboratory

2:30 PM
{11-21} Twin Nucleation in HCP Rhenium from < c+a > Edge Dislocations: *Lu Jiang*¹; Velimir Radmilovic²; Julian Sabisch³; Liang Qi⁴; Andrew Minor¹; Daryl Chrzan¹; Mark Asta¹; ¹University of California, Berkeley; ²University of Belgrade; ³Sandia National Laboratories; ⁴University of Michigan

2:50 PM Invited
Molecular Dynamics Simulation of Diffusion, Dislocation and Grain Boundary Migration in Austenitic Steels: *Mikhail Mendelev*¹; Valery Borovikov¹; ¹Ames Laboratory

3:20 PM
Temperature-dependent Kinetic Pathways for Jog-pair Nucleation in FCC Metals: *Anas Abu-Odeh*¹; Maeva Cottura²; Mark Asta¹; ¹University of California, Berkeley; ²Institut Jean Lamour, CNRS

3:40 PM Break

3:55 PM Invited

Atomistic and Mesoscale Modeling of Nanoscale Sintering: Applications to Additive Manufacturing: Maher Alghalayini¹; *Fadi Abdeljawad*¹; ¹Clemson University

4:25 PM Invited

Structure and Properties of Ni-doped MoS₂: Phase Diagrams, Raman Spectra, and Solid Lubrication: *David Strubbe*¹; ¹University of California, Merced

4:55 PM

A Phase-field Method for Modeling Solute Segregation at Interphase Boundary in Binary and Ternary Alloys: *Sourabh Kadambi*¹; Srikanth Patala¹; ¹North Carolina State University

5:15 PM

Revisiting the Early Stages of Precipitation in Al-Cu Alloys: *Kang Wang*¹; William Soffa¹; Bi-Cheng Zhou¹; ¹University of Virginia

MATERIALS PROCESSING

Defects and Properties of Cast Metals — Porosity & Cracking

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Solidification Committee

Program Organizers: Lang Yuan, University of South Carolina; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Charles Monroe, University of Alabama at Birmingham

Tuesday PM | February 25, 2020

17B | San Diego Convention Ctr

Session Chairs: Lang Yuan, University of South Carolina; Chu Lun Alex Leung, University College London

2:00 PM Invited

Resolving Pore Evolution Mechanisms During Laser Powder Bed Fusion Additive Manufacturing by Multi-modal Imaging: *Chu Lun Alex Leung*¹; Sebastian Marussi¹; Lorna Sinclair¹; Samuel Clark²; Yunhui Chen¹; Leigh Stanger³; Jon Willmott³; Robert Atwood⁴; Andrew Bodey⁴; Margie Olbinado⁵; Alexander Rack⁵; Peter Lee¹; ¹University College London; ²University College, London;

³University of Sheffield; ⁴Diamond Light Source Ltd; ⁵European Synchrotron Radiation Facility

2:30 PM

Assessment of Grain Refinement on Hot-tearing of New Multicomponent Al-Cu Alloys: *Adrian Sabau*¹; Seyed Mirmiran²; Christopher Glaspie²; Shimin Li³; Diran Apelian³; Amit Shyam¹; Andres Rodriguez⁴; J. Haynes¹; ¹Oak Ridge National Laboratory; ²Fiat Chrysler Automobiles (FCA) North America, LLC.; ³Worcester Polytechnic Institute; ⁴Nemak Monterrey

2:50 PM

How to Prevent Gas Porosity Defects in Castings of Stator Housing in Grey Cast Iron: *Izudin Dugic*¹; ¹Linnaeus University

3:10 PM

Bubble Induced Convection During Dendritic Solidification: *Seyed Amin Nabavizadeh*¹; Mohsen Eshraghi²; Sergio Felicelli¹; ¹University of Akron; ²Department of Mechanical Engineering, California State University

3:30 PM Break

3:50 PM

Breakouts During Casting (The Big Casting Monster): Magdy Feshar¹; *Mohmaed Abomossaes*¹; ¹EZZ Dekhila Steel company

4:10 PM

Deformation Induced Crack Growth in Semi-solid Die Cast Aluminum Alloys: Shishira Bhagavath¹; *Zhixuan Gong*²; Sara Nonni²; Tim Wigger²; Saurabh Shah²; Sebastian Marussi²; Neeraj Srivastava¹; Shyamprasad Karagadde¹; Peter Lee²; ¹Indian Institute of Technology Bombay, India; ²University College London

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Transitions at Grain Boundaries VII — Grain Boundary Evolution

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Shen Dillon, University of Illinois; Douglas Spearot, University of Florida; Jian Luo, University of California, San Diego; Jennifer Carter, Case Western Reserve University

Tuesday PM | February 25, 2020
5B | San Diego Convention Ctr

Session Chairs: Mitra Taheri, Johns Hopkins University; Douglas Spearot, University of Florida

2:00 PM Invited

Phase Transitions in Grain Boundary Dynamics: Kongtao Chen¹; Jian Han¹; *David Srolovitz*²; ¹University of Pennsylvania; ²City University of Hong Kong

2:20 PM Invited

Grain Boundary Spinodals: The Role of the Interface Stiffness in Grain Boundary Dynamical Processes: *Fadi Abdeljawad*¹; Robert Moore¹; Timothy Beecroft¹; ¹Clemson University

2:40 PM

A New Approach to Modeling Grain Boundary Motion with Strongly Anisotropic Boundary Energy: Brandon Runnels¹; *Vinamra Agrawal*²; ¹University of Colorado Colorado Springs; ²Auburn University

3:00 PM

An Atomistic Survey of Grain Boundary Migration Mechanisms in BCC Fe: *Ian Chesser*¹; Sutach Ratanaphan²; Brandon Runnels³; Elizabeth Holm¹; ¹Carnegie Mellon University; ²King Mongkut's University of Technology Thonburi; ³University of Colorado Colorado Springs

3:20 PM

Interrelationship Between How Grain Boundary Solute Segregation Influence Grain Coarsening, Initiation of Phase Transformations, and Impact Deformation Mechanisms of Metallic Alloys: *Arun Devaraj*¹; Libor Kovarik¹; Elizabeth Kautz¹; Bharat Gwalani¹; Aashish Rohatgi¹; Wenbo Wang²; Jason Trelewicz²; Vineet Joshi¹; Curt Lavender¹; ¹Pacific Northwest National Laboratory; ²Stony Brook University

3:40 PM Break

4:00 PM Invited

Pinning of a Grain Boundary Migration by Coherent Second Phase Particles: Nan Wang¹; Youhai Wen²; *Long-Qing Chen*³; ¹Guangdong Technion-Israel Institute of Technology; ²NETL; ³Pennsylvania State University

4:20 PM Invited

Linking Atomic and Mesoscale Descriptions of Grain Boundaries for Insight into Metastable Structures: James Nathaniel¹; Cassandra Pate¹; Larissa Woryk²; Jaime Marian³; Blas Uberuaga⁴; David Srolovitz²; *Mitra Taheri*¹; ¹Johns Hopkins University; ²University of Pennsylvania; ³University of California, Los Angeles; ⁴Los Alamos National Laboratory

4:40 PM

Stress State Dependence of Basal-prismatic Facet Structures in Mg: *Khanh Dang*¹; Shujuan Wang¹; Mingyu Gong²; Carlos Tomé¹; Rodney McCabe¹; Jian Wang²; Laurent Capolungo¹; ¹Los Alamos National Laboratory; ²University of Nebraska-Lincoln

5:00 PM

Structure and Kinetics of Three-dimensional Defects on the {10-12} Twin Boundary in Magnesium: Atomistic and Phase-field Simulations: *Douglas Spearot*¹; Vincent Taupin²; Khanh Dang³; Laurent Capolungo³; ¹University of Florida; ²University de Lorraine CNRS; ³Los Alamos National Laboratory

5:20 PM

Coarsening of Ferrite Lamellae Grains in Heavily Cold Drawn Pure Iron Wire: *Hanchen Feng*¹; ¹Southeast University

LIGHT METALS

Electrode Technology for Aluminum Production — Spent Pot Lining (SPL) -Joint session with Aluminum Reduction Technology Symposium

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Duygu Kocaefe, University of Quebec at Chicoutimi

Tuesday PM | February 25, 2020
3 | San Diego Convention Ctr

Session Chairs: Kinnor Chattopadhyay, University of Toronto;
Pernelle Nunez, International Aluminium Institute

2:00 PM Introductory Comments

2:05 PM
Sustainable Spent Pot Lining Management Guidance: *Pernelle Nunez*¹; ¹International Aluminium Institute

2:30 PM
Purification of Graphite by Thermal Vacuum Treatment of Spent Potlining: *Kristin Sundby*¹; Ulf Sjöström²; Ellen Myrvold³; Morten Isaksen¹; ¹Hydro Aluminium; ²Swerim; ³Alcoa Mosjøen

2:55 PM
The LCL&L Process: A Sustainable Solution for the Treatment and Recycling of Spent Potlining: *Laurent Birry*¹; Stephane Poirier¹; ¹Rio Tinto

3:20 PM Break

3:40 PM
Environmental Benefits of Using Spent Pot Lining (SPL) in Cement Production:*Mohammad AlJawi*¹; Chun Man Chow²; Srinivasa Pujari²; Michael Pan²; Tanvi Kulkarni²; Mohamed Mahmoud¹; Heba Akasha¹; Salman Abdulla¹; ¹Emirates Global Aluminium; ²Massachusetts Institute of Technology

4:05 PM
Characteristic Analysis of Hazardous Waste from Aluminum Reduction Industry: *Mingzhuang Xie*¹; Han Lv¹; Tingting Lu¹; Hongliang Zhao¹; Rongbin Li¹; Fengqin Liu¹; ¹University of Science and Technology Beijing

4:30 PM Panel Discussion

ENERGY & ENVIRONMENT

Energy Technologies and CO2 Management Symposium — Session IV

Sponsored by: TMS Extraction and Processing Division, TMS: Energy Committee

Program Organizers: Xiaobo Chen, RMIT University; Yulin Zhong, Griffith University; Lei Zhang, University of Alaska Fairbanks; John Howarter, Purdue University; Alafara Baba, University of Ilorin; Neale Neelameggham, IND LLC; Cong Wang, Northeastern University; Ziqi Sun, Queensland University of Technology

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Session Chairs: Ziqi Sun, Queensland University of Technology; Xiaobo Chen, RMIT University

2:00 PM Invited
Low Dimensional Nanomaterials and their Hybrids: Theoretical Study: *Ting Liao*¹; ¹Queensland University of Technology

2:25 PM
Multifunctional Ga-containing Binary Conversion Coatings on Mg Alloys for Biomedical Applications: *Mingshi Song*¹; Xiaobo Chen¹; Ivan Cole¹; ¹RMIT University

2:45 PM
Applying Biochar Composite Briquette for Energy Saving in Blast Furnace Ironmaking: *Huiqing Tang*¹; ¹University of Science and Technology Beijing

3:05 PM
Properties and Microstructure of Copper and/or Nickel Supported on GO, rGO and NGO: Xiangyong Lv¹; *Guangfen Liang*¹; Yandong Li²; Huamei Duan¹; Dengfu Chen¹; Mujun Long¹; ¹College of Materials Science and Engineering; ²Laboratory of Extraordinary Bond Engineering and Advanced Materials Technology

3:25 PM
Investigation of H2 Addition Effects on CO/CO2/H2-air Flames by a Combustion Diagnostic System Based on TDLAS: *Yu Liu*¹; Jingsong Wang¹; Haibin Zuo¹; Qingguo Xue¹; ¹University of Science and Technology Beijing

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Hydrogen Embrittlement I

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Bai Cui, University of Nebraska-Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Jenifer Locke, Ohio State University

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Theater A-10 | San Diego Convention Ctr

Session Chairs: Reiner Kirchheim, Georg-August-Universität Göttingen; Ting Zhu, Georgia Institute of Technology

2:00 PM Invited
Accelerating Diffusion, Plasticity, Grain Growth and Crack Propagation by Hydrogen and Carbon: *Reiner Kirchheim*¹;
¹University of Goettingen

2:40 PM
Effects of the Microstructure and Hydrogen Mobility on the Mechanical Behavior of Tempered Martensitic Steels: Livia Cupertino-Malheiros¹; *Abdelali Oudriss*¹; Daniella Guedes²; Stéphane Cohendoz¹; Florent Decultieux²; Michel Piette²; Florian Thébault²; Jamaa Bouhattate¹; Juan Creus¹; Xavier Feaugas¹;
¹Université de La Rochelle - Lasie; ²Vallourec Research Center France

3:00 PM
Influence of Hydrogen on Mechanical Properties of Pure Titanium Alloys Under Cathodic Polarization in Artificial Seawater: A Local Approach to Fracture: Alexandre Poloni¹; Abdelali Oudriss¹; Juan Creus¹; Egle Conforto¹; Stéphane Cohendoz¹; Jamaa Bouhattate¹; Simon Frappart²; Aude Mathis²; Thierry Millot²; *Feaugas Xavier*¹;
¹University of La Rochelle - Lasie; ²Naval Group

3:20 PM Break

3:40 PM Invited
Multiscale Modeling of Hydrogen Embrittlement in Stainless Steel: *Ting Zhu*¹; David McDowell¹; ¹Georgia Institute of Technology

4:20 PM
Two-way Coupled Microstructure-sensitive Crystal Plasticity and Hydrogen Diffusion Near a Blunted Crack-tip for FCC Metals: *Tang Gu*¹; Gustavo Castelluccio²; Ting Zhu¹; David McDowell¹;
¹Georgia Institute of Technology; ²Cranfield University

4:40 PM

Influence of Hydrogen Partitioning on Deformation and Fracture Behavior in Al-Zn-Mg Alloys: *Kazuyuki Shimizu*¹; Hiroyuki Toda¹; Kyosuke Hirayama¹; Hiro Fujihara¹; Kentaro Uesugi²; Akihisa Takeuchi²; ¹Kyushu University; ²JASRI

5:00 PM

Hydrogen Trapping and Bubble Formation in Nanovoids in BCC Metals: A Predictive Model: *Jun Song*¹; Jie Hou¹; ¹McGill University

MECHANICS & STRUCTURAL RELIABILITY

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Multi-mechanical Interactions during Extreme Environment Fatigue Loading

Sponsored by: TMS Structural Materials Division, TMS; Computational Materials Science and Engineering Committee, TMS; Integrated Computational Materials Engineering Committee, TMS; Mechanical Behavior of Materials Committee

Program Organizers: Garrett Pataky, Clemson University; Ashley Spear, University of Utah; Jean-Briac le Graverend, Texas A&M University; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University

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Session Chair: Brian Wisner, Ohio University

2:00 PM Invited

The Effect of Molecular Transport on the Environmentally Assisted Fatigue Crack Growth Behavior of Aerospace Al-alloys in High Altitude Environments: *James Burns*¹; Adam Thompson¹; Luke Brown¹; ¹University of Virginia

2:20 PM

A Multi-scale Characterization of the Effects of High Altitude Environments on the Damage Structure Evolution during Fatigue Loading of AA7075-T651: *Adam Thompson*¹; Zachary Harris¹; James Burns¹; ¹University of Virginia

2:40 PM

Macrozones and Dwell Fatigue Failure on a Near-a Titanium Alloy: *Beatriz Fernandez-Silva*¹; Bradley Wynne¹; Martin Jackson¹; Matthew Thomas²; Katharine Fox³; ¹University of Sheffield; ²TIMET

UK Limited; ³Rolls Royce plc

3:00 PM

Impact of Temperature and Microstructure on Dwell Fatigue in Near-alpha Titanium Alloys: *Michelle Harr*¹; Samantha Daly²; Adam Pilchak³; ¹University of Michigan; ²University of California, Santa Barbara; ³Air Force Research Laboratory

3:20 PM

Oxygen, α_2 , Macrozones and Dwell Fatigue Initiation in α -Ti: *Felicity Dear*¹; Paraskevas Kontis²; Baptiste Gault²; Jan Ilavsky³; Joel Bernier⁴; David Rugg⁵; David Dye¹; ¹Imperial College London; ²Max-Planck-Institut für Eisenforschung; ³Argonne National Laboratory; ⁴Lawrence Livermore National Laboratory; ⁵Rolls-Royce plc

3:40 PM Break

4:00 PM Invited

In-situ X-ray Microtomography to Elucidate Corrosion-fatigue Mechanisms in Aluminum Alloys: Arun Sundar¹; Jason Williams¹; Harsh Goyal¹; Sridhar Niverty¹; Sudhanshu Singh¹; Tyler Stannard¹; Xianghui Xiao²; *Nikhilesh Chawla*¹; ¹Arizona State University; ²Brookhaven National Laboratory

4:20 PM

Some Hardening and Softening Antagonist Processes Induced by Hydrogen on Cyclic Behavior of Nickel Single Crystal: Guillaume Hachet¹; Arnaud Metsue¹; Abdelali Oudriss¹; *Feaugas Xavier*¹; ¹University Of La Rochelle - Lasie

4:40 PM

Mechanical and Actuation Fatigue in Ni-Rich NiTiHf High Temperature Shape Memory Alloys: *Behrouz Haghighouyan*¹; Benjamin Young¹; Ibrahim Karaman¹; Dimitris Lagoudas¹; ¹Texas A&M University

5:00 PM

Creep-fatigue Behavior of an Advanced Austenitic Stainless Steel (Alloy 709): *Zeinab Alsmadi*¹; K.L. Murty¹; ¹North Carolina State University

SPECIAL TOPICS

Frontiers of Materials Award Symposium: Leveraging Materials in Topology Optimization — Session II

Program Organizer: Natasha Vermaak, Lehigh University

Tuesday PM | February 25, 2020

2:00 PM Invited
Topology Optimization for Architected Materials: *James Guest*¹;
¹Johns Hopkins University

2:40 PM Invited
Sustainable Fashion Design, 3D and 4D Printing, and The New Age Lab: *Julia Daviy*¹; ¹The New Age Lab

3:20 PM Panel Discussion Leveraging Materials in TO Panel Discussion

Prof. Vermaak and the invited speakers from the ‘Leveraging Materials in Topology Optimization’ symposium will host a panel discussion and question and answer period.

3:40 PM Break

4:00 PM Poster Previews: The invited speakers from the “Leveraging Materials in Topology Optimization” symposium will give overviews of their posters featured in the follow-on poster-session.

SPECIAL TOPICS

Frontiers of Materials Award Symposium: Leveraging Materials in Topology Optimization — Poster Session

Program Organizer: Natasha Vermaak, Lehigh University

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4:20 PM Poster Session

All of the invited speakers from the “Leveraging Materials in Topology Optimization” symposium will present posters highlighting their work. Some of the posters include those listed below.

Topology Optimization Design of Negative Stiffness and Stretchable Metamaterial via Bezier-based Explicit Density

Representation Algorithm: *Albert To*¹; ¹University of Pittsburgh

Part-Scale Support Structure Optimization for Minimizing Residual Stress for Laser Powder Bed Fusion Additive Manufacturing: *Albert To*¹; ¹University of Pittsburgh

Large Scale Level Set Topology Optimization: *Sandilya Kambampati*¹; H Alicia Kim²; ¹University of California San Diego; ²University of California, San Diego

Topology Optimization of the Fast Heat Responsive Structures via a Level-set Method: *Jaeyub Hyun*¹; H Alicia Kim²; ¹University of California San Diego; ²University of California, San Diego

Topology Optimization of Load Carrying Heat Exchangers and Battery Packs: *Sandilya Kambampati*¹; H Alicia Kim¹; ¹University of California, San Diego

Level Set Topology Optimization with the Reproducing Kernel Particle Method: *Andreas Neofytou*¹; H Alicia Kim¹; ¹University of California, San Diego

Multiscale Design Optimization for Integrated Structural-material Systems: *Carolina Jauregui*¹; Lei Li¹; H Alicia Kim¹; ¹University of California, San Diego

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Functional Nanomaterials 2020: Translating Innovation into Pioneering Technologies — Translating Innovation into Pioneering Technologies IV

Sponsored by: TMS Functional Materials Division, TMS: Nanomaterials Committee

Program Organizers: Simona Hunyadi Murph, Savannah River National Laboratory; Huanyu Cheng, Pennsylvania State University; Yong Lin Kong, University of Utah; Min Kyu Song, Washington State University; Ning Zhang, University of Alabama

Tuesday PM | February 25, 2020
Point Loma | Marriott Marquis Hotel

Session Chairs: Nasrin Hooshmand, Georgia Tech; Yong Lin Kong, University of Utah

2:00 PM Invited
2D-Materials-based Epidermal and Implantable Bioelectronics: *Hongwoo Jang*¹; Nanshu Lu¹; ¹University of Texas at Austin

2:20 PM
Multiscale 3D Printing of Nanomaterials-based Biomedical and Functional Devices: *Yong Lin Kong*¹; ¹University of Utah

2:40 PM Invited
Plasmonic Biosensors for Resource-limited Settings: *Limei Tian*¹; ¹Texas A&M University

3:00 PM Invited
Soft, Spongy, and Conductive Materials for Human Motion Monitoring: *Zhengtao Zhu*¹; ¹South Dakota School of Mines and Technology

3:20 PM Invited
Carbon Nanotube Nanoelectronics and Macroelectronics: *Chongwu Zhou*¹; ¹University of Southern California

3:40 PM Break

4:00 PM Invited
Adding a New Sensing Dimension to Soft Electronics: from the Skin to Below the Skin: *Sheng Xu*¹; ¹University of California, San Diego

4:20 PM Invited
Bioinspired Freeze-cast Nanostructured Materials Templated by Energized Fields: *Steven Naleway*¹; Isaac Nelson¹; Tony Yin¹; Debora Lyn Porter¹; Taylor Ogden¹; Max Mroz¹; Paul Wadsworth¹; ¹University of Utah

4:40 PM
Mask-less Direct-write Lithography Using Functional Micro/nanofibers on Flexible Substrate: Jonghyun Kim¹; Dongwoon Shin¹; *Jiyoung Chang*¹; ¹University of Utah

5:00 PM Invited
Rubbery Electronics: Electronics Fully Made Out of Rubbery Materials: *Cunjiang Yu*¹; ¹University of Houston

MATERIALS DESIGN

Hume-Rothery Symposium: Thermodynamics, Phase Equilibria and Kinetics for Materials Design and Engineering — CALPHAD Future Directions

Sponsored by: TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Carelyn Campbell, National Institute of Standards and Technology; Michael Gao, National Energy Technology Laboratory; Wei Xiong, University of Pittsburgh

Tuesday PM | February 25, 2020
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Session Chairs: Fan Zhang, CompuTherm LLC; Peisheng Wang, Central South University

2:00 PM Invited
Thermodynamics at Equilibrium and Non-equilibrium – Genomic Tools for Materials Design: *John Agren*¹; ¹Royal Institute of Technology

2:40 PM Invited
Phase Equilibria and Interfacial Migration in Stressed Solids: Nicholas Weadock¹; *Peter Voorhees*²; Brent Fultz¹; ¹California Institute of Technology; ²Northwestern University

3:20 PM Invited
Interaction of Moving Grain Boundaries with Solutes in Alloys: *Yuri Mishin*¹; ¹George Mason University

4:00 PM Break

4:20 PM Invited
Computational Thermodynamics in Microstructure Modelling and Beyond: *Georg Schmitz*¹; ¹Access E V

5:00 PM Invited
How Can the CALPHAD Method Do Better?: *Zi-Kui Liu*¹; ¹Pennsylvania State University

ADVANCED MATERIALS

Innovations in High Entropy Alloys and Bulk Metallic Glasses: An SMD & FMD Symposium in Honor of Peter K. Liaw — Bulk Metallic Glasses and Other Materials

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee

Program Organizers: Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Yanfei Gao, University of Tennessee - Knoxville; Robert Maass, University of Illinois at Urbana-Champaign; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Soo Yeol Lee, Chungnam National University; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center; Liang Jiang, Yantai University

Tuesday PM | February 25, 2020
Marina Ballroom G | Marriott Marquis Hotel

Session Chairs: Robert Maass, University of Illinois at Urbana-Champaign; Xie Xie, FCA US LLC

2:00 PM Invited
Melting of Metallic Glasses in the Limit of Ultra-high Liquid Fragility: *William Johnson*¹; ¹California Institute of Technology

2:25 PM Invited
Glass Formation with Monodisperse Colloids: *Frans Spaepen*¹; ¹Harvard University

2:50 PM Invited
Structure Modulation for Plasticity Enhancement of Metallic Glasses: *Jurgen Eckert*¹; ¹Erich Schmid Institute of Materials Science; Montanuniversität Leoben

3:10 PM Invited
Serrated Flow and Beyond: Strain Localization in Metallic Glasses: *Robert Maass*¹; ¹University of Illinois at Urbana-Champaign

3:30 PM Invited
The Structure and Deformation Behaviors of Annealed Cu-Zr Metallic Glasses: *Cang Fan*¹; Xingxing Yue²; P. K. Liaw³; ¹YMT Simulations LLC; ²Nanjing University of Science & Technology; ³University of Tennessee

3:50 PM Break

4:05 PM Invited
Metallic Glasses: From Coatings to Their First-ever Nanotube Arrays: *Jinn Chu*¹; ¹National Taiwan University of Science and Technology

4:25 PM Invited
Rejuvenation by Fatigue: *Takeshi Egami*¹; ¹University of Tennessee

4:45 PM Invited
Mechanical Modeling and Plasticity of Bulk Metallic Glasses: *Hyoung Seop Kim*¹; ¹Pohang University of Science and Technology

5:05 PM Invited
Serrated Yielding in an Iron-chromium-aluminum (FeCrAl) Alloy Tubing: *Mahmoud Hawary*¹; Abdullah Alomari¹; K. Murty¹; ¹North Carolina State University

5:25 PM Invited
Creep Resistance of a Hierarchical-precipitate-strengthened Ferritic Alloy: *Gian Song*¹; Soon Jik Hong¹; Jin Kyu Lee¹; Sung Ho Song¹; Sung Hwan Hong²; Ki Buem Kim²; Yanfei Gao³; Zhiqian Sun³; Peter Liaw³; ¹KongJu National University; ²Sejong University; ³University of Tennessee

LIGHT METALS

Magnesium Technology 2020 — Fundamentals, Mechanical Behavior, Twinning, Plasticity, and Texture I

Sponsored by: TMS Light Metals Division, TMS: Magnesium Committee

Program Organizers: J. Brian Jordon, University of Alabama; Victoria Miller, University of Florida; Vineet Joshi, Pacific Northwest National Laboratory; Neale Neelameggham, IND LLC

Tuesday PM | February 25, 2020
6C | San Diego Convention Ctr

Session Chairs: Mohsen Asle Zaeem, Colorado School of Mines; Dmytro Orlov, Lund University

2:00 PM Invited
An Investigation into the Role of Dislocation Climb During Intermediate Temperature Flow of Mg Alloys: Michael Ritzo¹; Jishnu Bhattacharyya¹; Ricardo Lebensohn²; *Sean Agnew*¹; ¹University of Virginia; ²Los Alamos National Laboratory

2:30 PM Invited
Deviations from Theoretical Orientation Relationship Along Tensile Twin Boundaries in Magnesium: *Brandon Leu*¹; M Arul Kumar²; Yue Liu³; Irene Beyerlein¹; ¹University of California Santa Barbara; ²Los Alamos National Laboratory; ³Shanghai Jiao Tong

University

2:50 PM Invited

The Role of Faceting in {1012} Twin Nucleation: *Christopher Barrett*¹; ¹Mississippi State University

3:10 PM Invited

In-situ TEM Investigation of <c+a> Dislocations in Magnesium: *Boyu Liu*¹; *Fei Liu*¹; *Bin Li*²; *Jian-Feng Nie*³; *Zhi-Wei Shan*¹; ¹Xi'an Jiaotong University; ²University of Nevada; ³Monash University

3:30 PM Break

3:50 PM Invited

Full-field Crystal Plasticity Modeling of {10-12} Twin Nucleation: *YubRaj Paudel*¹; *Christopher Barrett*¹; *Haitham El Kadiri*¹; ¹Mississippi State University

4:20 PM Invited

The Incorporation of Discrete Deformation Twins in a Crystal Plasticity Finite Element Framework: *Matt Kasemer*¹; *Paul Dawson*²; ¹University of Alabama; ²Cornell University

4:40 PM Invited

An Analysis of the Tensile Deformation Behavior of Commercial Die-cast Magnesium-aluminum-based Alloys: *Mark Easton*¹; *Hua Qian Ang*¹; *Suming Zhu*¹; *Trevor Abbott*²; ¹RMIT University; ²Magontec Ltd

5:00 PM Invited

On the Load Multiaxiality Effect on the Cyclic Behaviour of Magnesium Alloys: *A. Gryguc*¹; *A. Karparvar*¹; *D. Toscano*¹; *Ali A. Roostaei*¹; *Sugrib Shaha*¹; *Behzad Behraves*¹; *Hamid Jahed*¹; ¹University of Waterloo

CHARACTERIZATION

Material Behavior Characterization via Multi-Directional Deformation of Sheet Metal — Session IV

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

Program Organizers: Daniel Coughlin, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Piyush Upadhyay, Pacific Northwest National Laboratory; John Carsley, Novelis, Inc.

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Theater A-1 | San Diego Convention Ctr

Session Chair: Piyush Upadhyay, Pacific Northwest National Laboratory

2:00 PM

Formability of Textured Anisotropic Uranium Plate: Ryan Mier¹; *Daniel Coughlin*¹; Rodney McCabe¹; Carolus Osborn¹; ¹Los Alamos National Laboratory

2:20 PM

In-situ Neutron Diffraction of Strain Path Change Effects in Cold-rolled MgAZ31B Sheet: Karl Sofinowski¹; *Steven Van Petegem*¹; Jan Capek¹; Helena Van Swygenhoven¹; ¹Paul Scherrer Institut

2:40 PM

Strain Localization and Damage in a $\alpha+\beta$ Titanium Alloy: A Study of Microstructure Heterogeneity and Strain Path Effects: *Jiyun Kang*¹; Ikuho Nakahata²; C. Cem Tasan¹; ¹Massachusetts Institute of Technology; ²Tokyo Institute of Technology

3:00 PM

The Effect of Texture on the Deformation Behavior of Cold Rolled Aluminium Under Shear-compression Loading: *Shibayan Roy*¹; Ashoktaru Chakraborty¹; ¹Indian Institute of Technology (IIT) Kharagpur

3:20 PM

Grain Refinement and Texture Modification of thin Mg-3Al-1Zn Sheets by ECAB Method: *Ming Cheng*¹; Shi-hong Zhang¹; ¹Institute of Metal Research, Chinese Academy of Sciences

MATERIALS PROCESSING

Materials Processing Fundamentals — Nucleation, Crystallization, and Solidification

Sponsored by: TMS Extraction and Processing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Jonghyun Lee, Iowa State University; Guillaume Lambotte, Boston Metal; Sam Wagstaff, Novelis Inc.; Antoine Allanore, Massachusetts Institute of Technology; Fiseha Tesfaye, Abo Akademi University

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14A | San Diego Convention Ctr

Session Chairs: Fiseha Tesfaye, Åbo Akademi University;
Jonghyun Lee, Iowa State University

2:00 PM Invited
Structural Study of a Levitated Salt Solution Using a Containerless Scattering Method: *Geun Woo Lee*¹; ¹Korea Research Institute of Standards and Science

2:30 PM
Multiple Crystallization Pathways on Highly Supersaturated Aqueous Solutions: *Yong Chan Cho*¹; Geun Woo Lee¹; Sooheyong Lee¹; Yun-Hee Lee¹; ¹Korea Research Institute of Standards and Science

2:50 PM
Non-crystallographic Branching in Polymer Crystallization: a Molecular Picture of the Onset of Spherulite Formation: *Tongtong Shen*¹; Chunyu Li¹; Alejandro Strachan¹; ¹Purdue University

3:10 PM
De-mineralization of a High Ash Coal in Acidic Salt Solution: *Adewale Adeleke*¹; Lateef Jimoh¹; Simeon Ibitoye¹; ¹Obafemi Awolowo University

3:30 PM
Investigating Short-chain Alcohol Based Microemulsions as Viable Nanoparticle Synthesis Systems: Do Reverse Micelles Form in Ethanol/AOT/*n*-Heptane Systems?: *Robyn E. Ridley*¹; Erick Alvarado¹; Victor R. Vasquez²; Olivia Graeve¹; ¹University of California, San Diego; ²University of Nevada, Reno

3:50 PM Break

4:10 PM
Modified Gouy-Chapman-Stern Model of the Aqueous Na-AOT Reverse Micelle Sub-structure with the Addition of Salts: *Robyn E. Ridley*¹; James P. Kelly²; Hoorshad Fathi-Kelly²; Victor R. Vasquez³; Olivia Graeve¹; ¹University of California, San Diego; ²Alfred University; ³University of Nevada, Reno

4:30 PM
Effects of Al Substitution for Zn on the Non-equilibrium Solidification Behavior of Zn-3Mg Alloys: *Yeqing Wang*¹; Jianrong Gao¹; Ashwin Shahani²; ¹Northeastern University; ²University of Michigan

4:50 PM
The Effect of Undercooling on the Nucleation and Growth of Large-size TiC of High Titanium Low Alloy Steel via In-situ

Observation: *Ji Cheng*; Chen Tianci¹; Zhu Miaoyong¹; ¹Northeastern University School of Metallurgy

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale V — Deformation

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Christopher Weinberger, Colorado State University; Megan Cordill, Erich Schmid Institute; Garritt Tucker, Colorado School of Mines; Wendy Gu, Stanford University; Scott Mao, University of Pittsburgh; Yu Zou, University of Toronto

Tuesday PM | February 25, 2020
Santa Rosa | Marriott Marquis Hotel

Session Chairs: Heny Ovri, Helmholtz Zentrum Geesthacht; Christopher Shumeyko, Army Research Laboratory

2:00 PM
The Effects of Supersonic Impacts on the Micromechanical Properties of Al6061 Cold Spray Deposits: *Tyler Flanagan*¹; Benjamin Bedard¹; Avinash Dongare¹; Harold Brody¹; Aaron Nardi²; Victor Champagne²; Seok-Woo Lee¹; ¹University of Connecticut; ²Army Research Laboratory

2:20 PM
Small Scale Mechanical Testing of Nanoporous Tungsten: *Mingyue Zhao*¹; Inas Issa¹; Manuel Pfeifenberger²; Michael Wurmshuber¹; Daniel Kiener¹; ¹University of Leoben; ²Erich Schmid Institute of Materials Science

2:40 PM
Nanotwins and Grain Boundaries: Competing Roles on the Nucleation and Propagation of Dislocations Probed via Nanoindentation: Raheleh Rahimi¹; Sichuang Xue¹; Siavash Ghanbari¹; Xinghang Zhang¹; *David Bahr*¹; ¹Purdue University

3:00 PM
Intrinsic Deformation and Failure Response of Single Crystal MAX Phases: Zhiqiang Zhan¹; Hemant Rathod¹; Miladin Radovic¹; *Ankit Srivastava*¹; ¹Texas A&M University

3:20 PM Break

3:40 PM Invited

On the Estimation of Thermal Activation Parameters for Portevin-Le Chatelier Effect from Nanoindentation Data: *Henry Ovrî*¹; Erica Lilleodden¹; ¹Helmholtz Zentrum Geesthacht

4:20 PM

Characterizing Near-surface Plasticity in Aluminum-carbon Hybrid Materials: *Christopher Shumeyko*¹; Andrew Palughi²; Daniel Cole¹; Christopher Klingshirn³; Xiaoxiao Ge³; Lourdes Salamanca-Riba³; ¹U.S. Army Research Laboratory; ²Texas A&M University; ³University of Maryland

4:40 PM

Bending Dominated Plasticity and Hardening in Au-Ag Nanoboxes: *Radhika Patil*¹; David Doan¹; Zachary Aitken²; Chen Shuai²; Mehrdad Kiani¹; Yong-Wei Zhang²; Wendy Gu¹; ¹Stanford University; ²Institute of High Performance Computing

5:00 PM

Fundamental Investigation of Fatigue Behavior in Microstructurally-stable Nanocrystalline Cu-Ta Alloys: *Anqi Yu*¹; Christian Roach¹; Khalid Hattar²; Kiran Solanki³; Suveen Mathaudhu¹; ¹University of California Riverside; ²Sandia National Laboratories; ³Arizona State University

MATERIALS DESIGN

Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling — Session II

Sponsored by: TMS Structural Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, MicroTesting Solutions; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Jagannathan Rajagopalan, Arizona State University; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Robert Wheeler, Microtesting Solutions LLC; Shailendra Joshi, University of Houston

**Tuesday PM | February 25, 2020
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Session Chairs: Josh Kacher, Georgia Institute of Technology;
Jedsada Lertthanasarn, Imperial College London

2:00 PM Introductory Comments

2:10 PM Invited
In-situ TEM Investigation on Pyramidal Dislocations in Magnesium:
*Boyu Liu*¹; Fei Liu¹; Bin Li²; Jian-Feng Nie³; Zhi-Wei Shan¹; ¹Xi'an Jiaotong University; ²University of Nevada; ³Monash University

2:40 PM
Deformation Behavior of Additively Manufactured Cu-Fe Composites at Different Strain Rates: *Arya Chatterjee*¹; Ethan Sprague¹; Benjamin Derby¹; Jyoti Mazumder¹; Amit Misra¹; ¹University of Michigan

3:00 PM Invited
Investigating Bulk Mechanical Properties on a Micro-scale: Micro-tensile Testing of Ultrafine Grained Ni-SiC Composite to Determine its Fracture Mechanism and Strain Rate Sensitivity:
*Dhriti Bhattacharyya*¹; Alan Xu¹; Chao Yang¹; Gordon Thorogood¹; ¹Australian Nuclear Science and Technology Organization

3:30 PM Break

3:50 PM Keynote
Core Structure and Mobility of <c+a> Dislocations in Alpha-Ti:
*Satish Rao*¹; Adam Pilchak²; Christopher Woodward²; ¹Ues Inc.; ²Air Force Research Laboratory

4:30 PM
Ab-initio Predictions of Plastic Anisotropy in BCC Metals: *Lucile Dezerald*¹; Antoine Kraych²; Emmanuel Clouet³; Bassem Ben Yahia¹; Lisa Ventelon³; Francois Willaime³; David Rodney²; ¹Institut Jean Lamour; ²Institut Lumiere Matiere; ³CEA Saclay

4:50 PM
Combined In-situ Lattice Imaging and MD Modeling on Dislocation and Twinning Nucleation: *Scott Mao*¹; ¹University of Pittsburgh

MATERIALS DESIGN

Metal-Matrix Composites: Analysis, Modeling, Observations and Interpretations — Analysis and Characterization Techniques

Sponsored by: TMS Structural Materials Division, TMS:
Composite Materials Committee

Program Organizers: Srivatsan Tirumalai, The University of Akron; Yuzheng Zhang, Gamma Alloys; William Harrigan, Gamma Alloys

Tuesday PM | February 25, 2020
31A | San Diego Convention Ctr

Session Chair: Tirumalai Srivatsan, The University of Akron

2:00 PM Invited
Volume Fraction Analysis of Alumina Reinforced Aluminum Composites: *William Harrigan*¹; ¹Gamma Alloys

2:30 PM Invited
4D X-ray Tomography and Correlative Microscopy of Composite Materials: *Nikhilesh Chawla*¹; ¹Arizona State University

3:00 PM
Synthesis and Characterization of In-situ Formed TiB₂ Particulate Reinforced Al-Si Alloy Composites: *Jimmy Karloopia*¹; Shaik Mozammil¹; Pradeep Jha¹; ¹Indian Institute of Technology Roorkee

3:30 PM Break

3:50 PM
Processing and Microstructural Characterization of Novel Invar Syntactic Foams: *Justin Whetten*¹; Arun Sundar¹; Jason Williams¹; Scott Roberts²; Nikhilesh Chawla¹; ¹Center for 4D Materials Science, Arizona State University; ²NASA/JPL

4:15 PM
Design of Steel Microstructures by Manipulation of Reinforcement Precipitates using Finite Element Methods: *Samuel Schwarm*¹; ¹Naval Surface Warfare Center Carderock Division

4:40 PM
Mechanical Testing of Steel and Tungsten Fibers for Use in Composites for Fusion Applications: *Matthew Weinstein*¹; Lauren Garrison²; Maxim Gussev²; Carol Lin³; Johann Riesch⁴; ¹University of Wisconsin-Madison; ²Oak Ridge National Laboratory; ³University of Illinois Urbana-Champaign; ⁴Max-Planck-Institut für Plasmaphysik

5:05 PM
Lightweight Radiation Shielding Using Metal Matrix Composites: *Andrew O'Connor*¹; Wesley Bolch¹; Michele Manuel¹; ¹University of Florida

MATERIALS DESIGN

Microstructural Template Consisting of a Face-Centered Cubic Matrix with Ordered Precipitates: Microstructural Evolution and Properties — Other FCC Based Alloys

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

Program Organizers: Rajarshi Banerjee, University of North Texas; Eric Lass, University of Tennessee, Knoxville; Ashley Paz Y Puente, University of Cincinnati; Tushar Borkar, Cleveland State University; Keith Knipling, Naval Research Laboratory; Sophie Primig, University of New South Wales

Tuesday PM | February 25, 2020
30D | San Diego Convention Ctr

Session Chair: Tushar Borkar, Cleveland State University

2:00 PM Invited
Novelfcc-CuMatrixBasedHighTemperatureAlloysStrengthened by Ordered Precipitates: Suman Sarkar¹; Prafull Pandey¹; Surendra Kumar Makineni¹; *Kamanio Chattopadhyay*¹; ¹Indian Institute of Science, Bangalore

2:30 PM
Mapping the Mechanical Property Space of Al-Cu-Mn-Zr (ACMZ) Cast Aluminum Alloys with Superior Microstructural Stability: *Sumit Bahl*¹; Jiahao Cheng¹; Eric Hoar¹; Xiaohua Hu¹; Allen Haynes¹; Amit Shyam¹; ¹Oak Ridge National Laboratory

2:50 PM
StressInducedSensitizationinHAZof304LNAusteniticStainless Steel: *Nikki Barla*¹; Sourav Das¹; ¹IIT Roorkee

3:10 PM Break

3:40 PM
Thermodynamic Simulation and Experimental Validation of Phase Stability in Ni-based Superalloys: *Kyle Ventura*¹; David Beaudry¹; Alex Aviles¹; Gerhard Fuchs¹; ¹University of Florida

4:00 PM
Enhanced Creep Resistance via Strain-induced Massive Nanoprecipitation in Alumina-forming Austenitic Stainless Steels: *Zhao Wuxin*¹; Zhaoping Lu¹; ¹University of Science and

4:20 PM

Site Preference of the Alloying Addition on Mechanical Properties of L1₂ Ni₃Co Alloys: *Peng Liu*¹; Dengfu Chen¹; Pei Xu¹; Mujun Long¹; Huamei Duan¹; ¹Chongqing University, China

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — PbZn Process Fundamentals II

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Tuesday PM | February 25, 2020
14B | San Diego Convention Ctr

Session Chair: Alexandra Anderson, Gopher Resource

2:00 PM

An Overview of Technology Developments in Zinc Processing Around the World: R. Warner¹; A.E.M. Warner²; *Phillip Mackey*³; ¹Nyrstar Sales & Marketing AG; ²Worley; ³P J Mackey Technology Inc.

2:20 PM

Lead and Zinc Extractive Metallurgy Research in the Kroll Institute for Extractive Metallurgy: *Patrick Taylor*¹; ¹Colorado School of Mines

2:40 PM

Leaching of Turkish Oxidized Pb-Zn Flotation Tails by Inorganic and Organic Acids: *Muammer Kaya*¹; Sait Kursunoglu²; Shokrullah Hussaini¹; Erkan Gul¹; ¹Osmangazi University; ²Abdullah Gul

University

3:00 PM

Characterization of Phase Equilibria and Thermodynamics with Integrated Experimental and Modelling Approach for Complex Lead Primary and Recycling Processing: *Evgueni Jak*¹; Maksym Shevchenko¹; Denis Shishin¹; Taufiq Hidayat²; Peter Hayes¹; ¹Pyrosearch, The University of Queensland; ²Formerly: Pyrometallurgy Innovation Centre, The University of Queensland; Currently: Department of Metallurgical Engineering, Bandung University of Science and Technology

3:20 PM Break

3:40 PM

Effect of Alumina Ceramics Surface Condition on the Wetting of Liquid Lead: *Zhen Qi*¹; Yuan Fu¹; ¹University of Science and Technology Beijing

4:00 PM

Performance and Mechanism of Chlorine Removal in Wastewater by Combination of CuSO₄ and Zero-valent Copper: Yongguang Luo¹; Hongtao Qu¹; Yunhao Xi²; Jingtian Zou³; Te Zhang¹; *Jing Li*²; Tianqi Liao²; Libo Zhang²; ¹Kunming University of Science and Technology/Yunnan Chihong Zn&Ge Co., Ltd.; ²Kunming University of Science and Technology/National Local Joint Laboratory of Engineering Application of Microwave Energy and Equipment Technology/Key Laboratory of Unconventional Metallurgy, Ministry of Education; ³Kunming University of Science and Technology; National Local Joint Laboratory of Engineering Application of Microwave Energy and Equipment Technology; Key Laboratory of Unconventional Metallurgy; Ministry of Education

4:20 PM

New Ideas for the Design of Green Smelting Project of Domestic Lead and Zinc Resources: *Cui Chen*¹; Hua Hua¹; Min He¹; ¹CINF Engineering Co., Ltd

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — PbZn Sustainability

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Tuesday PM | February 25, 2020
15A | San Diego Convention Ctr

Session Chair: Sabina Grund, International Zinc Association (IZA)

2:00 PM
Effect of Deposit Types, Mine Development and Industry Structure on Primary Lead and Zinc Economics in Australia, North America and Europe: *Hendrik Reemeyer*¹; ¹Resourceful Paths Consulting

2:20 PM
Processing Technology of Zn-Al Alloys into Wires for Thermal Spray Applications: *Piotr Osuch*¹; *Monika Walkowicz*¹; *Pawel Strzepek*¹; *Beata Smyrak*¹; *Andrzej Mamala*¹; *Tadeusz Knych*¹; *Tomasz Napiora*²; *Radoslaw Sokol*²; *Stanislaw Pawlicha*²; ¹AGH University of Science and Technology; ²ZM Silesia SA

2:40 PM
Opportunities for Concentrating Solar Thermal Energy in Pb and Zn Flowsheets: *Susanna Hockaday*¹; *Aphelele Sithole*¹; ¹MINTEK

3:00 PM Break

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Secondary Lead

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

**Tuesday PM | February 25, 2020
15B | San Diego Convention Ctr**

Session Chair: Stuart Nicol, Gopher Resource

2:00 PM
Operational Overview of RSR North America Corp.: *Timothy Ellis*¹;
¹RSR Technologies

2:20 PM
Refractory Solutions by Laboratory Tests and Fieldworks for Lead Recycling Applications: *Katja Reinharter*¹; Dean Gregurek¹; Alfred Spanring¹; Camille Fleuriault²; Joe Grogan²; ¹RHI Magnesita; ²Gopher Resource

2:40 PM
Influence of Minor Elements in Waste Lead Battery Recycling: *Yusuke Sakata*¹; ¹Chigirishima Refinery, Toho Zinc Co., Ltd.

3:00 PM
TheFASTPbProcessandItsImpactonSecondaryLeadProduction: *Massimo Maccagni*¹; Edoardo Guerrini¹; ¹Engitec Technologies

3:20 PM Break

3:40 PM
Recent Improvements at Hosokura Lead Smelter and Refinery: *Hironobu Nakano*¹; Shinichi Ito¹; Shinji Abe¹; Nozomu Hasegawa¹; ¹Hosokura Metal Mining Co. LTD.

4:00 PM
RefractoryCorrosionComparisonthroughaRotaryDrumFurnace Slag Test for the Lead Industry: *Daniela Mancini Fonseca*¹; Alfred

Spanring¹; Felipe Terra Elias¹; Geraldo Eduardo Gonçalves¹; ¹RHI Magnesita GmbH

4:20 PM

Side Submerged Combustion Bath Smelting Technology ——A New Process for Recovering Lead from Lead Paste of Waste Lead-acid Battery: *Zhang Ge*¹; Yongfeng Qi¹; ¹China ENFI Engineering Corporation

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Zinc Hydrometallurgy

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Tuesday PM | February 25, 2020
15A | San Diego Convention Ctr

Session Chair: Li Bing, ENFI

3:40 PM

Development of the New Zinc-separation Process for the Blast Furnace Dust: *Mariko Shinoda*¹; Toyoshi Yamaguchi¹; Ryota Murai¹; Goro Okuyama¹; Ikuhiro Sumi²; ¹JFE Steel Corporation; ²JFE Holdings, Inc.

4:00 PM

Outotec Gypsum Removal Circuit and Outotec Cooling Tower Performance in Neutral Solution Cooling: *Tuomas Hirsī*¹; Björn Saxen¹; ¹Outotec

4:20 PM
Refining of Zinc Chloride by the Combination of Cementation Reaction and Vacuum Distillation: *Gen Kamimura*¹; Hiroyuki Matsuura¹; ¹University of Tokyo

4:40 PM
Increasing Current Efficiency To 93% In Jumbo Cellhouse At Vedanta’s HZL Tank House: *Pankaj Sharma*¹; Chandru Chendurpandian¹; Ameet Mallikarjun Wali¹; Ravi Ravada¹; Lokesh Gurjar¹; Leeladhar Patidar¹; ¹Hindustan Zinc Limited

5:00 PM
Purification and Comprehensive Recovery Metal Values from Zinc Hydrometallurgical Solution: Yue Yang¹; Shaole Song¹; Honghu Tang¹; Li Wang¹; *Wei Sun*¹; Yuehua Hu¹; ¹Central South University

5:20 PM
The Mass Transfer Characteristics of Ozone Oxidation of Rare Scatted Metal Impurities in Zinc Sulfate Solution: Zhang Lihua¹; Luo Yaoyao¹; Wang Tian¹; Qu Hongtao²; Zhang Jiale¹; *Libo Zhang*¹; Luo Yongguang³; ¹Key Laboratory of Unconventional Metallurgy/ Kunming University of Science and Technology; ²Yunnan Chihong Zn & Ge Co., LTD; ³Key Laboratory of Unconventional Metallurgy/ Kunming University of Science and Technology/ Yunnan Chihong Zn & Ge Co., LTD

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XIX — Advanced Electronic Interconnection

Sponsored by: TMS Functional Materials Division, TMS: Alloy Phases Committee

Program Organizers: Hiroshi Nishikawa, Osaka University; Shi-Kang Lin, National Cheng Kung University; Chao-Hong Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology, CAS; Ming-Tzer Lin, National Chung Hsing University; Dajian Li, Karlsruhe Institute of Technology; Yu Zhong, Worcester Polytechnic Institute; Yee-wen Yen, National Taiwan University of Science and Technology; Song-Mao Liang, Clausthal University of Technology; A.S.Md Abdul Haseeb, University of Malaya; Ligang Zhang, Central South University; Sehoon Yoo, KITECH

Tuesday PM | February 25, 2020
Marina Ballroom E | Marriott Marquis Hotel

Session Chairs: Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology, CAS; Yee-Wen Yen, National Taiwan University of Science and Technology

2:00 PM Invited
Wafer Level SLID Bonding - Formation and Evolution of Microstructures: *Vesa Vuorinen*¹; Glenn Ross¹; Joseph Hotskiss¹; Jani Pöllänen¹; Mervi Paulasto-Kröckel¹; ¹Aalto University

2:30 PM
A Transient Liquid Phase Bonding Process Using Sn/Cu Multiple Layers for Automotive Power Semiconductor: *Dong-Yurl Yu*¹; Junhyuk Son¹; Yong-Ho Ko¹; Sehoon Yoo¹; Dongjin Byun²; JungHwan Bang¹; ¹Korea Institute Of Industrial Technology; ²Korea University

2:50 PM
Interfacial Stability between High-temperature Lead-free Solders and Substrates: *Shih-Kang Lin*¹; Chih-han Yang¹; Ming-yueh Tsai¹; Bo-hsun Hsu¹; ¹Department of Materials Science and Engineering, National Cheng Kung University

3:10 PM
Microstructure of Cu/Cu Joints using Sn-Coated Cu Particle Paste for High-temperature Application: *Hiroshi Nishikawa*¹; Xiangdong Liu¹; ¹Osaka University

3:30 PM Break

3:50 PM Invited
Fabrication of Highly Reliable Joint Based on Cu@Ni@Sn Double-layer Powder for High Temperature Application: *Ju Xu*¹; Hongyan Xu¹; ¹Institute of Electrical Engineering, Chinese Academy of Sciences

4:20 PM
Investigation of Metal Filament Formation: *Chung-Yu Chiu*¹; Cheng-Yi Liu¹; ¹National Central University

4:40 PM
Direct Bonding of Pure Al Die to Al Substrate with Ag Flake Paste: *Cai-Fu Li*¹; Hao Zhang²; Zhi-Quan Liu³; Katsuaki Suganuma²; ¹Sun Yat-sen University; ²Osaka University; ³Shenzhen Institutes of Advanced Technology, CAS

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution —

Microstructure and Precipitation II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

Program Organizers: Yufeng Zheng, University of Nevada, Reno; Rongpei Shi, Lawrence Livermore National Laboratory; Stoichko Antonov, University of Science and Technology Beijing; Yipeng Gao, Idaho National Laboratory; Rajarshi Banerjee, University of North Texas; Yongmei Jin, Michigan Technological University

Tuesday PM | February 25, 2020
33B | San Diego Convention Ctr

Session Chairs: Yipeng Gao, Idaho National Laboratory; Yijia Gu, Missouri University of Science and Technology

2:00 PM
Linear Complexion Formation and their Effect on the Strength of Metallic Alloys: *Vladyslav Turlo*¹; Timothy Rupert¹; ¹University of California, Irvine

2:20 PM
Understanding the Role of Microwave Heating on the Crystallization Behavior, Microstructure Formation and Mechanical Response of ZrO2-Containing SiO2 – MgO - Al2O3 – K2O – B2O3 – F mica Glass-ceramics: *Shibayan Roy*¹; Mrinmoy Garai¹; ¹Indian Institute of Technology (IIT) Kharagpur

2:40 PM
Interphase Boundary Anisotropy Effects on the Microstructure Evolution in Three Phase $\beta(\text{In})$ – In_2Bi – (Sn) Eutectic System: Samira Mohagheghi¹; *Melis Serefoglu*¹; ¹Koc University

3:00 PM
Mechanical Property Variation and Microstructure Evolution of Inconel Alloy Induced by Electric Current Stressing: *Wen-Jung Li*¹; Kwang-Lung Lin¹; ¹Department of Materials Science and Engineering, National Cheng Kung University

3:20 PM
Effect of Zirconium Addition to Wrought Al-Mg-Si Alloys on Microstructure: *Florian Schmid*¹; Thomas Ebner²; Peter J. Uggowitzer³; Stefan Pogatscher¹; ¹Christian Doppler Laboratory for Advanced Aluminum Alloys; ²AMAG rolling GmbH; ³Montanuniversitaet Leoben

3:40 PM Break

4:00 PM

Nitride Precipitation Induced by Nitrogen-solute Clustering in Ferrous Alloys: *Goro Miyamoto*¹; Meng Zhu¹; Yasuhiro Tateyama¹; Tadashi Furuhashi¹; ¹Tohoku University

4:20 PM

Precipitate Nucleation Enhanced by Deformation through Dislocations in Mg-Al Alloys: *Peng Yi*¹; Michael Falk¹; ¹Johns Hopkins University

4:40 PM

(Al,Zn)3Zr Dispersoid-assisted ' Precipitation in a Model Al-Zn-Mg-Cu-Zr Alloy: *Huan Zhao*¹; Yiqiang Chen¹; Surendra K. Makineni¹; Baptiste Gault¹; Dirk Ponge¹; Dierk Raabe¹; ¹Max-Planck-Institut Fur Eisenforschung G

ADVANCED MATERIALS

Progress towards Understanding the Synthesis and Behavior of Metals Far from Equilibrium: A SMD Symposium Honoring Enrique Lavernia on the Occasion of His 60th Birthday — Materials Design and Advanced Characterization

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Composite Materials Committee

Program Organizers: Haiming Wen, Missouri University of Science and Technology; Suveen Mathaudhu, University of California, Riverside; Yuntian Zhu, North Carolina State University; Manoj Gupta, National University of Singapore; Kaka Ma, Colorado State University; Troy Topping, California State University, Sacramento; Yizhang Zhou, University of California, Irvine; Joshua Yee, Sandia National Laboratories; Dalong Zhang, Pacific Northwest National Laboratory; Yaojun Lin, Wuhan University of Technology; Fei Chen, Wuhan University of Technology

Tuesday PM | February 25, 2020
31B | San Diego Convention Ctr

Session Chairs: Fei Chen, Wuhan University of Technology; Josh Yee, Sandia National Laboratory

2:00 PM Invited
Phase Separation in a Ni-Al-Cr-Re Alloy: Kinetics and Thermodynamics Coupled with Atom-probe Tomography: *David Seidman*¹; ¹Northwestern University

2:30 PM Invited
New Electron Microscopy Techniques for Determination of Local Structural Features during Plastic Deformation: *Andrew Minor*¹; ¹University of California, Berkeley

3:00 PM Invited
Structural and Chemical Disorder Towards Advanced Materials: *Horst Hahn*¹; ¹Karlsruhe Institute of Technology

3:30 PM Break

3:50 PM Invited
Materials Genomics: Designing Systems Far from Equilibrium: *Gregory Olson*¹; ¹Northwestern University

4:20 PM Invited
A Precise DSC-based Methodology to Pinpoint *In Situ* Crystallinity Percent in Amorphous Systems: *Olivia Graeve*¹; Arash Yazdani¹; Günther W.H. Höhne²; Darren Dewitt¹; Javier E. Garay¹; ¹University of California, San Diego; ²Ulm University

4:50 PM Invited
Hot Corrosion Degradation of Gas Turbine Materials Subject to Mixed-mode Thermal Exposures and Emerging Complex Corrosion Environments: Kliah Soto Leytan¹; Kunthea Deng¹; Maryam Zahiri Azar¹; *Daniel Mumm*¹; ¹University of California, Irvine

5:20 PM
Time-Resolved Characterization of Far-from-equilibrium Microstructure Evolution During Rapid Solidification: *Joseph McKeown*¹; John Roehling¹; Tian Li¹; Alexander Baker¹; Scott McCall¹; Kai Zweiacker²; Amy Clarke³; Jörg Wiezorek⁴; ¹Lawrence Livermore National Laboratory; ²Empa, Swiss Federal Laboratories for Materials Science and Technology; ³Colorado School of Mines; ⁴University of Pittsburgh

5:40 PM
Computed Tomography: A New Frontier for Material Characterization: *Chen Dai*¹; ¹Vj Technologies

6:00 PM
3D Morphological Evolution of Bimodal Porous Copper Characterized by X-ray Nano-tomography: *Fei Chen*¹; Lijie Zou¹; Hao Wang¹; Mingyuan Ge²; Chonghang Zhao³; Wah-Keat Lee²; Xianghui Xiao²; Karen Wiegart³; ¹Wuhan University Of Technology; ²National

Synchrotron Light Source-II, Brookhaven National Laboratory;
³School of Materials Science and Chemical Engineering, The State University of New York at Stony Brook

MATERIALS DESIGN

Purveyors of Processing Science and ICME: A SMD Symposium to Honor the Many Contributions of Taylan Altan, Wei Tsu Wu, Soo-Ik Oh, and Lee Semiatin — Modeling

Sponsored by: TMS Structural Materials Division, TMS: Shaping and Forming Committee, TMS: Titanium Committee

Program Organizers: Adam Pilchak, US Air Force Research Laboratory; Ayman Salem, MRL Materials Resources LLC; Viola Acoff, University of Alabama; Nathan Levkulich, UES; Michael Glavicic, Rolls-Royce; Yufeng Zheng, University of Nevada, Reno; John Rotella, Purdue University

Tuesday PM | February 25, 2020
30E | San Diego Convention Ctr

Session Chairs: Marko Knezevic, University of New Hampshire; Michael Glavicic, Rolls Royce

2:00 PM Invited
Genomic Materials Design: Science-based Engineering: Gregory Olson¹; ¹Northwestern University

2:30 PM Invited
A Road Map of Four Decade Journey to Modeling Thermo-mechanical Processes and Microstructure Evolution: Ravi Shankar¹; Wei-Tsu Wu¹; BK Chun¹; Jaebong Yang¹; Jin Yong Oh¹; Tim Hanes¹; ¹Scientific Forming Technologies Corporation

3:00 PM Invited
Application of the CALPHAD Method in the Framework of ICME: Fan Zhang¹; Shuanglin Chen¹; Weisheng Cao¹; Chuan Zhang¹; Duchao Lv¹; Jun Zhu¹; ¹CompuTherm LLC

3:30 PM
Development and Calibration of Numerical Meso-scale Models of Microstructure Evolution for Concurrent Recovery, Recrystallization, and Grain Growth with Zener Pinning: Eric Payton¹; Austin Gerlt¹; Matthew Krug¹; Katelun Wertz¹; ¹Air Force Research Laboratory

3:50 PM Break

4:10 PM Invited

Integrated Approaches to Alloy Industrialization Using Numerical Simulation and Physical Modeling: *Bruce Antolovich*¹; John Foltz¹; Ramesh Minisandram¹; John Mantione¹; ¹ATI Specialty Materials

4:40 PM

Hierarchical Multiscale Modeling of Microtextured Regions in Ti-6242 during Alpha/beta Processing: *Timothy Truster*¹; ¹University of Tennessee

5:00 PM

Modeling Beta Phase Texture Evolution during Alpha+Beta Forging to Understand Precursors to Coarse (“Abnormal”) Grain Formation: *Adam Pilchak*¹; Austin Gerlt¹; Eric Payton¹; ¹Air Force Research Laboratory

NUCLEAR MATERIALS

Radiation Effects in Metals and Ceramics — Chemical and Phase Stability under Irradiation

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Djamel Kaoumi, North Carolina State University; Thak Sang Byun, Oak Ridge National Laboratory; Dane Morgan, University of Wisconsin-Madison; Maria Okuniewski, Purdue University; Mahmood Mamivand, Boise State University; Geoffrey Beausoleil, Idaho National Laboratory; Philip Edmondson, Oak Ridge National Laboratory; Khalid Hattar, Sandia National Laboratories; Aurelie Gentils, Université Paris-Saclay; Joel Ribis, Commissariat a l'Energie Atomique CEA

Tuesday PM | February 25, 2020
Theater A-7 | San Diego Convention Ctr

Session Chairs: Mahmood Mamivand, Boise State University; Djamel Kaoumi, North Carolina State University

2:00 PM

BCC-FCC Interface Leading to Ni Precipitation under Irradiation in a FeNi Alloy: *Estelle Meslin*¹; Lisa Belkacémi¹; Brigitte Décamps²; Marie Loyer-Prost¹; Maylise Nastar¹; ¹CEA; ²CSNSM Orsay University

2:20 PM

Enhanced Austenite Stability in Nanostructured Steels During Ion Irradiation: *Andrew Hoffman*¹; *Maalavan Arivu*¹; *Haiming Wen*¹; ¹Missouri University of Science and Technology

2:40 PM

Solute Stabilization of Two-phase Microstructures in Irradiated Alloys: *Soumyajit Jana*¹; *Pascal Bellon*¹; *Robert Averback*¹; ¹University of Illinois Urbana Champaign

3:00 PM

Alpha-alpha' Decomposition at Grain Boundaries in Annealed and Irradiated ODS Steels: *Joel Ribis*¹; *Amal Issaoui*¹; *Joel Malaplate*¹; *Marie Loyer-Prost*¹; *Alexandre Legris*²; ¹Commissariat à l'Energie Atomique CEA; ²University of Lille

3:20 PM

Dose Rate and Temperature Effect on the Stability of Alpha Prime Precipitates in Ultra-high Purity Fe-Cr Alloys: *Yajie Zhao*¹; *Arunodaya Bhattacharya*²; *Philip Edmondson*²; *Caleb Massey*²; *Jean Henry*³; *Steven Zinkle*¹; ¹University of Tennessee; ²Oak Ridge National Laboratory; ³CEA, DEN, Service de Recherches Métallurgiques Appliquées, Laboratoire d'Analyse Microstructurale des Matériaux, Université Paris-Saclay

3:40 PM Break

4:00 PM Invited

The Effect of Point Defects on the Thermodynamics and Kinetics of Irradiated Materials: *Thomas Schuler*¹; *Maylise Nastar*¹; ¹DEN-Service de Recherches de Métallurgie Physique, CEA, Université Paris-Saclay, F-91191 Gif-sur-Yvette, France

4:30 PM

Influence of an Addition of Titanium and Carbon on the Microstructural Evolution under Irradiation of Nickel as Model Alloy for Austenitic Steels: *Marie Loyer-Prost*¹; *Kan Ma*¹; *Brigitte Décamps*²; *Robin Schaeublin*³; *Frédéric Prima*⁴; ¹DEN-Service de Recherches de Métallurgie Physique, CEA; ²CNRS, IN2P3, CSNSM; ³ETH Zürich; ⁴CNRS UMR 8247-Institut de Recherche de Chimie Paris

4:50 PM

Investigation of the Stability of Irradiation Induced MnNi Clusters by Post Irradiation Annealing: *Bertrand Radiguet*¹; *Milan Konstantinovic*²; *Philippe Pareige*¹; ¹University Of Rouen; ²SCK-CEN

5:10 PM
Investigating the Influence of Cu Rich Precipitates (CRPs) on the Formation of Complex Mn-Ni-Si Rich Precipitate Phases using Density Functional Theory (DFT): *Alexander Garrett*¹; Christopher Race¹; ¹University of Manchester

MATERIALS PROCESSING

Rare Metal Extraction & Processing — V, Mn, Co, Zn, Mo, Cu, REEs

Sponsored by: TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee

Program Organizers: Gisele Azimi, University of Toronto; Takanari Ouchi, The University of Tokyo; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Kerstin Forsberg, KTH Royal Institute of Technology; Alafara Baba, University of Ilorin

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Session Chairs: Alafara Baba, University of Ilorin; Kerstin Forsberg, KTH Royal Institute of Technology

2:00 PM Keynote
Secondary and Byproduct Sources of Rare Earth Metals: *Gabrielle Gaustad*¹; Alexandra Leader²; Eric Williams²; Saptarshi Das²; ¹Alfred University; ²Rochester Institute of Technology

2:20 PM
Indian Coal Ash: a Potential Alternative Resource for Rare Earth Metals (REMs): *Archana Kumari*¹; Manis Kumar Jha¹; Devendra Deo Pathak²; ¹CSIR-National Metallurgical Laboratory; ²Indian Institute of Technology (Indian School of Mines), Dhanbad, India

2:40 PM
Recovery of Manganese and Cobalt from Discarded Batteries of Toys: *Pankaj Choubey*¹; Manis Kumar Jha¹; Devendra Deo Pathak²; ¹CSIR-National Metallurgical Laboratory; ²Indian Institute of Technology (Indian School of Mines), Dhanbad, India

3:00 PM
Recovery of Rare Earths from Waste Permanent Magnets Leach Liquors: *Rajesh Kumar Jyothi*¹; Kyeong Woo Chung¹; Chul-Joo Kim¹; Ho-Sung Yoon¹; ¹Korea Institute of Geoscience & Mineral Resources (KIGAM)

3:20 PM

Study on Vanadium Phase Evolution Law in Vanadium Slag during the Interface Reaction Process of Sodium Roasting: *Dan-Qing Li*¹; Yang Yang¹; Bing Xie¹; Hong-Yi Li¹; ¹Chongqing University

3:40 PM Break

3:55 PM

Phosphate-intensified Alkali Leaching to Recover Molybdenum from a Volatilizing Residue: *Dapeng Shi*¹; Li Guanghui¹; Hu Sun¹; Jun Luo¹; Tao Jiang¹; ¹Central South University

4:15 PM

Extraction of Rare and High-valued Metals from Blast Furnace Dust: *Xiong Xiao*¹; Shengfu Zhang¹; Hua Zhang¹; Guibao Qiu¹; Yuntao Xin¹; Jintao Wang¹; ¹Chongqing university

4:35 PM

Mechanism of Extraction of Vanadium from Vanadium Slag with MgO: *Cheng-Jie Wang*¹; Yi-Heng Yuan¹; Bing Xie¹; Hong-Yi Li¹; ¹Chongqing University

4:55 PM

Effect of Sulfuric Acid Concentration on Marmatite Dissolution in the Presence of Cupric Ions: *Xiaoyu Meng*¹; ¹Central South University

ELECTRONIC MATERIALS

Recent Advances in Functional Materials and 2D/3D Processing for Sensors and Electronic Applications — Printed Electronics III: Functional Materials and Devices

Sponsored by: TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Pooran Joshi, Oak Ridge National Laboratory; Ravindra Nuggehalli, New Jersey Institute of Technology; Anming Hu, University of Tennessee; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Yong Lin Kong, University of Utah; Mariappan Paranthaman, Oak Ridge National Laboratory

Tuesday PM | February 25, 2020
Carlsbad | Marriott Marquis Hotel

Session Chairs: Pooran Joshi, Oak Ridge National Laboratory;
Tolga Aytug, Oak Ridge National Laboratory

2:00 PM Invited

Novel Wide Bandgap Gallium Oxide (Ga₂O₃) Based Power Electronic Devices: *Mariappan Paranthaman*¹; Mihee Ji¹; Tolga Aytug¹; Fred List¹; Pooran Joshi¹; Ivan Kravchenko¹; Burak Ozpineci¹; ¹Oak Ridge National Laboratory

2:25 PM Invited

Formulation of UV Curable Resins Utilized in Vat Photo Polymerization for the Additive Manufacturing of Gun Propulsion Charge in 3d Printers (An Update): *David Bird*¹; Elbert Caravaca²; Joseph Laquidara¹; Ketih Luhmann¹; Nuggehalli Ravindra³; ¹United States Army ARDEC; ²United States Army ARDEC; ³New Jersey Institute of Technology

2:50 PM

Rare Earth Based Multifunctional Perovskite Ceramic Materials for Electronic and Magnetic Applications: *Dev Mahato*¹; Digvijay Singh¹; ¹National Institute of Technology, Patna

3:10 PM

Structural and Magnetic Properties of CoPd Alloys for Spintronic Applications: *Subhadra Gupta*¹; Joseph Abugri¹; Billy Clark²; Pieter Visscher¹; ¹University of Alabama; ²Intel Corporation

3:30 PM Break

3:50 PM

Coarsening of TiO₂ Foams and its Effects on 3D Printing: *Iole Pecora*¹; Konstantinos A. Sierros¹; ¹West Virginia University

4:10 PM

Ultrafast X-ray Imaging Study of Ultrasonic Liquid Phase Exfoliation of 2D Advanced Functional Materials: *Ling Qin*¹; ¹University of Hull

4:30 PM

Using In-situ X-ray Scattering to Identify the Mechanical Properties and Piezoelectric Properties of Electrospun P(VDF-TrFE) Nanofibers: *Chia-Yin Ma*¹; Tu-Ngoc Lam¹; Chun-Chieh Wang²; Wen-Ching Ko¹; Wei-Tsung Chuang²; Chun-Jen Su²; Jyh-Ming Wu³; Sz-Nian Lai³; Mao-Yuan Lo¹; Ying-Jhih Wang¹; E-Wen Huang¹; ¹National Chiao Tung University; ²National Synchrotron Radiation Research Center; ³National Tsing Hua University

4:50 PM

Synthesis of Silicon Nanowire and Crystalline Carbon Quantum Dot Hybrid Structures and Study of its Photoresponse and Photoluminescence Properties for Optoelectronic Device/ Sensor Application: *Sourav Sarkar*¹; Unmesha Ray²; Diptonil Banerjee³; Kalyan Kumar Chattopadhyay¹; ¹Jadavpur University; ²Indian Institute of Technology, Kharagpur; ³ Indian Institute of Engineering Science and Technology

BIOMATERIALS

Recent Developments in Biological, Structural and Functional Thin Films and Coatings — Functional Thin Films and Coatings I

Sponsored by: TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Adele Carrado, IPCMS - CNRS; Heinz Palkowski, Clausthal University of Technology; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Ramana Chintalapalle, University of Texas at El Paso; Nuggehalli Ravindra, New Jersey Institute of Technology; Nancy Michael, University of Texas at Arlington; Vikas Tomar, Purdue University

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Oceanside | Marriott Marquis Hotel

Session Chair: Ravindra Nuggehalli, New Jersey Institute of Technology

2:00 PM Keynote

3D X-ray Tomography Studies on In-situ Al-Cu-TiB₂ Metal Matrix Composites: *Prakash Srirangam*¹; ¹Wmg, University of Warwick

2:30 PM

Bi-continuous Pattern Formation in Thin Films via Solid-State Interfacial Dealloying: *Chonghang Zhao*¹; Kim Kisslinger²; Xiaojing Huang²; Ming Lu²; Fernando Camino²; Cheng-Hung Lin¹; Hanfei Yan²; Evgeny Nazaretski²; Yong Chu²; Bruce Ravel³; Mingzhao Liu²; Yu-chen Karen Chen-Wiegart¹; ¹Stony Brook University; ²Brookhaven National Laboratory; ³National Institute of Standards and Technology

2:50 PM Invited

Comparative Study of Surface and Bulk Interfacial Stresses Effect on Radiative Recombination Emission in Silicon: *Sufian Abedrabbo*¹; Anthony Fiory²; Nuggehalli Ravindra²; ¹Khalifa

University; ²New Jersey Institute of Technology

3:10 PM

Electrospun Nanofibers: Exploring the Production of Polymer Nanofiber Thin Films and their Applications for Biomedical Uses, Sensing and Filtration: *Lauren Finkenauer*¹; James Kelly¹; Bonnee Rubinfeld¹; Mathew Lyman¹; Jeffery Haslam¹; ¹Lawrence Livermore National Laboratory

3:30 PM Keynote

Engineering Nonlinear Optical Materials by Magnetron Sputtering with In situ Ellipsometry, Optical Emission Spectroscopy and Machine Learning: *John Jones*¹; Shawn Putnam²; Lirong Sun³; Cynthia Bowers⁴; Jake Carter²; Nanthakishore Makeswaran⁵; Ramana Chintalapalle⁵; Augustine Urbas⁵; ¹Air Force Research Laboratory; ²University of Central Florida; ³Azimuth Corporation; ⁴Wright State University; ⁵University of Texas at El Paso

4:00 PM Break

4:20 PM

Fabrication and Characterization of Mo-Ga Alloy Thin Films: *Nivedita Lalitha Raveendran*¹; Ramana Chintalapalle¹; ¹University of Texas

4:40 PM Invited

Magnetoelectric Coupling in Multiferroic NiTiO3 Thin Films: *Tamas Varga*¹; ¹Pacific Northwest National Laboratory

5:10 PM

Optical Properties of Multilayered Thin Films: *Jessy Nemat*¹; Jonathan Martinez¹; Serlly Vega¹; Deva Craig¹; Nuggehalli Ravindra¹; ¹New Jersey Institute of Technology

5:30 PM

Oxidation Kinetics of Palladium: *Stephen Rubin*¹; Nuggehalli Ravindra¹; ¹New Jersey Institute of Technology

ENERGY & ENVIRONMENT

Recycling of Secondary, Byproduct Materials and Energy — Reducing Embodied-energy and Decreasing Emissions (REMADE)

Sponsored by: TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Mingming Zhang, ArcelorMittal Global R&D; John Howarter, Purdue University; Elsa Olivetti, Massachusetts Institute of Technology; Alan Luo, Ohio State University; Adam Powell, Worcester Polytechnic Institute; Ziqi Sun, Queensland University of Technology

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Session Chair: Alan Luo, The Ohio State University

2:00 PM Invited
Thermodynamic Modeling and Experimental Validation of Iron-Containing Intermetallic Phase Formation in Recycled Cast Aluminum Alloys: Emre Cinkilic¹; Colin Ridgeway²; Xinyan Yan³; *Alan Luo*²; ¹Ohio State University; ²The Ohio State University; ³Alcoa Technical Center

2:30 PM Invited
Low Cost Metal Recovery from E-Waste: Michael Free¹; *Prashant Sarswat*¹; ¹University of Utah

3:00 PM Invited
Sorting and Impurity Removal to Improve the Recycling of Steel Scrap from Auto Shredders: *Patrick Taylor*¹; Sridhar Seetharaman¹; Erik Spiller¹; Zhijiang Gao¹; ¹Colorado School of Mines

3:30 PM
Additive Manufacturing via the Direct Ink Writing Technique of Kaolinite-based Clay with Electric Arc Furnace Steel Dust (EAF dust): *Edisson Ordoñez*¹; Henry Colorado¹; ¹Universidad de Antioquia

3:50 PM Break

4:05 PM Invited
Carbon Black from Waste Tires: Purification Strategies and Recycle Potential: *York Smith*¹; Marshall Boyton¹; ¹University of Utah

4:35 PM
An Environmental Impact and Economic Evaluation of using Alternative Feedstock Powders in Metal Additive Manufacturing: *Christopher Glaubenskle*¹; Haoyang He¹; Parnian Kiani¹; Kaka Ma²; Julie Schoenung¹; ¹University of California, Irvine; ²Colorado State University

4:55 PM
Recycling Technologies of Zn-Cbatteries: Review and Challenges for a Circular Economy in Colombia: *Natalia Cardona Vivas*¹; Mauricio Correa¹; Henry Colorado¹; ¹Universidad de Antioquia

5:15 PM
Thermodynamic Process Simulation for The Recovery of Spent Pot Linings (SPL) from Aluminum Production: *Burcak Ebin*¹; Martina Petranikova¹; Dusan Klinar²; Mateja Kosir³; Panagiotis Angelopoulos⁴; Karsten Grossman⁵; Roeland Geurts⁶; Miroslav Halilovic⁷; ¹Chalmers University of Technology; ²Scientific Research Center BISTRA; ³Slovenian National Building and Civil Engineering Institute; ⁴Natinoal Technical University of Athens; ⁵UVR-FIA GmbH; ⁶VITO; ⁷University of Ljubljana

PHYSICAL METALLURGY

Thermal Transport in Crystalline and Non-crystalline Solids: Theory and Experiments — Interfaces

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Marat Khafizov, Ohio State University; Michael Manley, Oak Ridge National Laboratory; Krzysztof Gofryk, Idaho National Laboratory; Aleksandr Chernatynskiy, Missouri Science and Technology University

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Session Chair: Cody Dennett, Idaho National Laboratory

2:00 PM Invited
Thermal Transport in Nanostructured Crystalline and Disordered Materials: *Renkun Chen*¹; ¹University of California, San Diego

2:30 PM
Physics-guided Machine-Learning Design of Aperiodic Superlattices with Maximum Localization of Coherent Phonons: Pranay Chakraborty¹; Tengfei Ma¹; *Yan Wang*¹; Lei Cao¹; ¹University of Nevada, Reno

2:50 PM
Effects of Correlated Disorder on Phonon Transport across Random Interfaces: *Taishan Zhu*¹; Giuseppe Romano¹; Jeffrey Grossman¹; ¹Massachusetts Institute of Technology

3:10 PM

Nano- and Micro-scale Thermal Transport in Swift heavy Ion Irradiated Oxides: *Azat Abdullaev*¹; Vinay Chauhan²; Jacques O'Connel³; Vladimir Skuratov⁴; Arno van Vuuren³; Marat Khafizov²; Zhandos Utegulov¹; ¹Nazarbayev University; ²The Ohio State University; ³Nelson Mandela University; ⁴National Research Nuclear University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XI) — Processing & Microstructure II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Caizhi Zhou, Missouri University of Science and Technology; Megumi Kawasaki, Oregon State University; Enrique Lavernia, University of California, Irvine; Terry Lowe, Colorado School of Mines; Suveen Mathaudhu, University of California, Riverside; Ruslan Valiev, UFA State Aviation Technical University; Yuntian Zhu, North Carolina State University

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Marina Ballroom D | Marriott Marquis Hotel

Session Chairs: Zenji Horita, Kyushu Institute of Technology; Hyoungh Kim, Pohang University of Science and Technology; Kenong Xia, University of Melbourne; Megumi Kawasaki, Oregon State University

2:00 PM Invited

Effect of High-pressure Torsion on a Few Mechanical and Electrical Behaviors of Commercially Pure Cu: *Praveen Kumar*¹; Ajay Rijal¹; Shobhit Singh¹; Jae-Kyung Han²; Megumi Kawasaki²; ¹Indian Institute of Science; ²Oregon State University

2:20 PM Invited

Mechanical Properties and Residual Stress of Copper Processed using Ultrasonic-nanocrystalline Surface Modification: *Hyoungh Seop Kim*¹; ¹Pohang University of Science and Technology

2:40 PM

Mechanical Properties of Nanocrystalline High-entropy Alloys Produced By High-pressure Torsion: *Benjamin Schuh*¹; ¹Erich Schmid Institute of Materials Science

3:00 PM

Microstructures and Mechanical Properties of Supersaturated Al-Mg Alloys Produced by Powder Consolidation using High-pressure Torsion: *Yongpeng Tang*¹; Takahiro Masuda²; Shoichi Hirose²; Zenji Horita³; Yuji Higo⁴; Yoshinori Tange⁴; Yasuo Ohishi⁴; ¹Kyushu University; ²Yokohama National University; ³Kyushu Institute of Technology; ⁴Japan Synchrotron Radiation Research Institute

3:20 PM Break

3:40 PM Invited

Microstructure and Microtexture of Gradient Metals Processed by Asymmetric Rolling: *Alexander Zhilyaev*¹; Hailiang Yu²; Alexander Pesin³; ¹Magnitogorsk State Technical University; Institute for Metals Superplasticity Problems of Russian Academy of Science; ²Central South University; ³Magnitogorsk State Technical University

4:00 PM Invited

***In-situ* Observation of Ultrafine-grained Heterostructured Pure Titanium by Severe Plastic Deformation under High Pressure:** *Zenji Horita*¹; Daisuke Maruno²; Yukimasa Ikeda²; Keisuke Matsuo²; Makoto Arita²; Yuji Higo³; Yoshinori Tange³; Yasuo Ohishi³; ¹Kyushu Institute Technology; ²Kyushu University; ³JASRI

4:20 PM

Microstructure Evolution in CuZr Alloy and cp Ti Processed by a Novel Technique of Rotational Free Bending: *Tomáš Krajnák*¹; Miloš Janeček¹; Petr Hrcuba¹; Peter Minárik¹; Cinthia Corrêa¹; Jakub Cížek¹; Arsenyi Raab²; Georgy Raab²; ¹Charles University; ²Ufa State Aviation Technical University

4:40 PM

Heterostructured Titanium with Superior Tensile Properties through Hybridisation of Microstructures by Selective Laser Melting: *Kenong Xia*¹; ¹University of Melbourne

MECHANICS & STRUCTURAL RELIABILITY

Understanding and Predicting Dynamic Behavior of Materials — Deformation in Metals

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Marc Meyers, University of California San Diego; George Gray, Los Alamos National Laboratory

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Session Chair: Darby Luscher, Los Alamos National Laboratory

2:00 PM
Slip vs Twinning vs Phase Transformations in Metallic Materials under Shock Loading Conditions: *Avanish Mishra*¹; Ke Ma¹; Marco Echeverria¹; Avinash Dongare¹; ¹University of Connecticut

2:20 PM
High-throughput Atomistic Investigations of Dynamic Defect responses in Crystalline Materials: *Lucas Hale*¹; ¹National Institute of Standards and Technology

2:40 PM
Twinning/Detwinning Behavior of Cu-Ta Trilayer Under Shock Loading Conditions at The Atomic Scale: *Marco Echeverria*¹; Avinash Dongare¹; ¹University of Connecticut

3:00 PM
Thermodynamic Theory of Crystal Plasticity – Formulation and Application to fcc Copper: *Charles Lieou*¹; Curt Bronkhorst²; ¹Los Alamos National Laboratory; ²University of Wisconsin-Madison

3:20 PM Break

3:40 PM
Structure / Property (Constitutive and Dynamic Strength / Damage)
Characterization of Additively Manufactured (AM) 316LSS: *George Gray*¹; David Jones¹; Veronica Livescu¹; Colt Montgomery¹; Daniel Martinez¹; Michael Brand¹; Saryu Fensin¹; ¹Los Alamos National Laboratory

4:00 PM
Laser Shock Wave Induced Mechanical Response on an Additive Manufacturing Ti6Al4V Alloy: *Bathusile Masina*¹; ¹Council for

4:20 PM

Mesoscale Modeling of Shock Loading Induced Twinning/De-twinning and Spall Failure Behavior of Ta Microstructures: *Sergey Galitskiy*¹; Avinash Dongare¹; ¹University of Connecticut

4:40 PM

Experimental Study on the Dynamic Behavior of Ti6AL4V ELI: Tshifhiwa Maimela¹; Madindwa Mashinini¹; Monnamme Tlotleng²; *Bathusile Masina*²; ¹University of Johannesburg; ²CSIR

MATERIALS PROCESSING

11th International Symposium on High Temperature Metallurgical Processing — Extraction and Recovery of Metals

Sponsored by: TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee

Program Organizers: Zhiwei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinkilic, Atilim University; Tao Jiang, Central South University; Jesse White, Elkem Carbon AS; Morsi Mahmoud, King Fahd University of Petroleum And Mineral

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Session Chairs: Zhiwei Peng, Central South University; Morsi Mahmoud, King Fahd University Of Petroleum and Mineral

8:30 AM Introductory Comments

8:45 AM

A Study on Recovery of Iron from Red Mud by Solid State Reduction Followed by Magnetic Separation: *Said Eray*¹; Ender Keskinkiliç²; Mustafa Varol¹; Yavuz Topkaya³; Ahmet Geveci³; ¹Agri Ibrahim Çeçen University; ²Atilim University; ³Middle East Technical University

9:05 AM

Solid-state Reduction Studies for Recovery of Iron from Red Mud: *Ender Keskinkilic*¹; Saeid Pournaderi²; Ahmet Geveci³; Yavuz A. Topkaya³; ¹Atilim University; ²Agri Ibrahim Cecen University;

³Middle East Technical University

9:25 AM

Recovery of Chromium from Ferronickel Slag via Alkaline Roasting Followed by Water Leaching: Effect of Roasting Atmosphere: Foquan Gu¹; Yuanbo Zhang¹; Zhiwei Peng¹; Huimin Tang¹; Manman Lu¹; Shuo Liu¹; Zijian Su¹; Mingjun Rao¹; Guanghui Li¹; Tao Jiang¹;

¹Central South University

9:45 AM

Effect of P₂O₅ on the Recovery of Ti from Ti-bearing Blast Furnace Slag by Super-gravity: Yu Du¹; Jintao Gao¹; Xi Lan¹; Zhancheng Guo¹; ¹University of Science and Technology Beijing

10:05 AM Break

10:20 AM

Self-reduction of Core-shell EAF Dust-biochar Composite Pellets under Microwave Irradiation: Liancheng Wang¹; Zhiwei Peng¹; Lei Yang¹; Leixia Zheng¹; Jie Wang¹; Wenxing Shang¹; Anton Anzulevich²; Mingjun Rao¹; Guanghui Li¹; Tao Jiang¹; ¹Central South University; ²Chelyabinsk State University

10:40 AM

Study of Properties and Mineralization of Cu-Ni Bearing Industry Sludge: Mudan Liu¹; Yong Liu¹; Zhiqiang Chen¹; Haozi Lv¹; Bo Li¹; ¹Guangdong Institute of Resource Comprehensive Utilization; State Key Laboratory of Separation and Comprehensive Utilization of Rare Metals; Key Laboratory for Mineral Resources R&D and Comprehensive Utilization of Guangdong

11:00 AM

Effect of Additives on Semi-molten State Reduction for Titanium Slag Production from Ilmenite Concentrate: Wei Lv¹; Shiyuan Liu¹; Junyi Xiang¹; Xuwei Lv¹; Yindong Yang²; ¹Chongqing University; ²University of Toronto

11:20 AM

Separation of Vanadium from Iron in Vanadium-rich molten Iron: Guangfen Liang¹; Xiangyong Lv¹; Yandong Li²; Huamei Duan¹; Dengfu Chen¹; Mujun Long¹; Songxu³; ¹College of Materials Science and Engineering; ²College of Materials Science and Engineering, Yangtze Normal University; ³Bekaert (Asia) R&D Center

NUCLEAR MATERIALS

Accelerated Materials Evaluation for Nuclear Applications Utilizing Irradiation and Integrated Modeling — Accelerated Materials Evaluation

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Assel Aitkaliyeva, University of Florida; Peter Hosemann, University of California - Berkeley; Samuel Briggs, Oregon State University; David Frazer, Los Alamos National Laboratory

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Session Chair: Samuel Briggs, Oregon State University

8:30 AM
A Comparative Study of Two Nanoindentation Approaches for Assessing Mechanical Properties of Ion-irradiated Stainless Steel 316: *Dhriti Bhattacharyya*¹; Michael Saleh¹; Alan Xu¹; Zain Zaidi²; Christopher Hurt²; Mihail Ionescu¹; ¹Australian Nuclear Science and Technology Organization; ²University of New South Wales

8:50 AM
A Comparison of Ring Pull and Axial Tensile Tests of HT-9 and 14YWT Thin-walled Tubes: *Thomas Nizolek*¹; James Valdez¹; Calvin Lear¹; Cheng Liu¹; Benjamin Eftink¹; Tarik Saleh¹; Stuart Maloy¹; ¹Los Alamos National Laboratory

9:10 AM
Small Scale Mechanical Testing of Ceramic Interfaces in Nuclear Materials: Characterizing the Impact of Elastic Mismatch on Stress Intensity and Property Extraction: *Joseph Kabel*¹; Peter Hosemann¹; ¹University of California, Berkeley

9:30 AM
Multiple Scale Mechanical Testing of Neutron Irradiated FeCrAl Alloys: *Benjamin Eftink*¹; David Frazer¹; Todd Steckley¹; Matthew Quintana¹; Paul Caccamise¹; Tobias Romero¹; Stuart Maloy¹; Tarik Saleh¹; ¹Los Alamos National Laboratory

9:50 AM
In-situ Studies on the Mechanical Properties of He Ion Irradiated Nanotwinned Ag: *Tongjun Niu*¹; Jin Li¹; Jie Ding¹; Yifan Zhang¹; Ruizhe Su¹; Jaehun Cho¹; Sichuang Xue¹; Zhongxia Shang¹; Di Chen²; Yongqiang Wang³; Haiyan Wang¹; Xinghang Zhang¹; ¹Purdue University; ²University of Houston; ³Los Alamos National Laboratory

10:10 AM Break

10:25 AM

A Virtual Experiment Approach to Positron Annihilation Spectroscopy: *Aaron Kohnert*¹; Laurent Capolungo¹; ¹Los Alamos National Laboratory

10:45 AM

Rapid Investigation of Irradiation Temperature Sensitivity Using Charged Particles: *Andrew London*¹; Chris Hardie¹; Joven Lim¹; Tonci Tadic²; ¹UK Atomic Energy Authority; ²Ruder Boškovic Institute, Croatia

11:05 AM

Mechanical Characterization of Three Neutron Irradiated HT-9 Heats (ORNL, LANL and EBR II) at LWR and Fast Reactor Relevant Temperatures: *Ramprashad Prabhakaran*¹; Mychailo Toloczko¹; Kumar Sridharan²; ¹Pacific Northwest National Laboratory; ²University of Wisconsin-Madison

11:25 AM

Direct Measurement of Radiation Damage Through the Energy Stored in Defects: Simulations and Experiments: *Charles Hirst*¹; Penghui Cao²; Michael Short¹; ¹Massachusetts Institute of Technology; ²University of California, Irvine

11:45 AM

Recent Applications of Ex-situ Transient Grating Spectroscopy to the Study of Radiation-induced Degradation of Nuclear Materials: *Sara Ferry*¹; Cody Dennett²; Angus Wylie¹; Pär Olsson³; Michael Short¹; ¹Massachusetts Institute of Technology; ²Idaho National Laboratory; ³KTH Royal Institute of Technology

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture IV: Toward Confident Use in Critical Applications — Processing-Structure-Property-Performance IV

Sponsored by: TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Nik Hrabe, National Institute of Standards and Technology; Steve Daniewicz, University of Alabama; Nima Shamsaei, Auburn University; John Lewandowski, Case Western Reserve University; Mohsen Seifi, ASTM International/Case Western Reserve University

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Session Chairs: Nik Hrabe, National Institute of Standards and Technology; Jake Benzing, National Institute of Standards and Technology

8:30 AM Invited
Processing and Performance: Oxide Formation in AlSi10Mg and IN718 Builds: P. Chris Pistorius¹; *Lonnie Smith*¹; Tomio Ohtsuki¹; ¹Carnegie Mellon University

9:00 AM
Cyclic Material Behavior of Additively Manufactured Inconel 718 Produced Under Different Oxygen Concentrations: *Matilde Scurria*¹; Benjamin Möller¹; Rainer Wagener¹; Thilo Bein¹; Kai Dietrich²; Dominik Bauer³; ¹Fraunhofer Lbf; ²Linde Aktiengesellschaft, Universität Duisburg-Essen; ³Linde Aktiengesellschaft

9:20 AM
The Impact of Multi-laser Stitching on the High Cycle Fatigue Performance of Metal Alloys Printed Using LPBF: *Jacob Rindler*¹; Edward Herderick¹; David Schick²; Connor Slone¹; Antonio Ramirez¹; Michael Groeber¹; ¹The Ohio State University; ²Proto Precision Additive

9:40 AM
Fracture and Fatigue Behavior of Laser Powder Bed Fusion of AlSi10Mg Using a Common Process Specification: *Brett Conner*¹; John Rapp¹; Ken Meinert²; Jim Dobbs³; ¹Youngstown State University; ²Pennsylvania State University Applied Research Laboratory; ³Boeing

10:00 AM Break

10:20 AM Invited
Structural Integrity of Fe- and Ni-base Alloys Processed by Additive Manufacturing – On The Impact of Microstructure: *Thomas Niendorf*¹; ¹Universitaet Kassel

10:50 AM

The Role of Surface Condition in High-cycle Fatigue Behavior in Laser Powder Bed Fusion Materials: *David Witkin*¹; Thomas Albright¹; Dhruv Patel¹; Tait McLouth¹; Glenn Bean¹; ¹The Aerospace Corporation

11:10 AM

Improving Fatigue Life by Decreasing Roughness of Additively Manufactured Parts: *Thomas Kozmel*¹; Abhinav Saboo¹; ¹QuesTek Innovations LLC

11:30 AM

On the Effect of the Applied Stress-ratio on the Fatigue Properties of Ti6Al4V Specimens Produced by Laser Powder Bed Fusion: *Antonio Cutolo*¹; Chola Elangeswaran¹; Nicolas Lammens²; Hunor Erdelyi²; Gokula Muralidharan³; Brecht Van Hooreweder¹; ¹KU Leuven; ²Siemens Industry Software NV; ³3D Systems Leuven

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications II — Characterization I

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Charit, University of Idaho; Michael Kirka, Oak Ridge National Laboratory

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Session Chairs: Subhashish Meher, Idaho National Laboratory; Bharat Gwalani, Pacific Northwest National Laboratory

8:30 AM Invited

Influence of Prior EBM Alloy 718 Microstructure on Build Properties after Varied Thermal Post-treatments: Sneha Goel¹; Johannes Gårdstam²; Jonas Olsson¹; Uta Klement³; *Shrikant Joshi*¹; ¹University West; ²Quintus Technologies AB; ³Chalmers University of Technology

8:50 AM

Mechanical and Thermal Properties of Electron Beam Melting Additively Manufactured Tungsten for Fusion Energy Applications:

*John Echols*¹; Lauren Garrison¹; Elizabeth Ellis¹; Yutai Katoh¹; Michael Kirck¹; Ryan Dehoff¹; Timothy Horn²; Christopher Rock²; Christopher Ledford²; Sullivan Figurskey²; ¹Oak Ridge National Laboratory; ²North Carolina State University

9:10 AM

Mechanical Testing of 3D Printed Materials: *Nicole Wagner*¹; Dika Handayani¹; Victor Okhuysen¹; Kyle Garibaldi¹; Michael Seitz¹; ¹California State Polytechnic University, Pomona

9:30 AM

Study Of Transition In Mechanical Properties Of A356/316L Additively Manufactured Interpenetrating Phase Composites: *Jiahao Cheng*¹; Xiaohua Hu¹; Maxim Gussev¹; Derek Splitter¹; Amit Shyam¹; ¹Oak Ridge National Laboratory

9:50 AM Break

10:10 AM

Microstructural Characterization and Thermomechanical Behavior of Additively Manufactured AlSi10Mg Material and Architected Cellular Structures: Alya Alhammadi¹; Kamran Khan¹; Oraib Al-Ketan¹; *Mohamed Hassan*¹; Reza Rowshan²; Rashid Abu Al-Rub¹; ¹Khalifa University of Science and Technology; ²New York University - Abu Dhabi

10:30 AM

Microstructure of the Ferritic-martensitic Steels From Simulated Additive Manufacturing Heat Treatment: *Weicheng Zhong*¹; Lizhen Tan¹; Kevin Field²; Niyanth Sridharan¹; Ying Yang¹; Kurt Terrani¹; ¹Oak Ridge National Laboratory; ²University of Michigan, Ann Arbor

10:50 AM

Tailoring Laser Direct Deposited High Purity Alumina Ceramics via Dopants: John Pappas¹; Aditya Thakur¹; *Xiangyang Dong*¹; ¹Missouri University of Science and Technology

11:10 AM

Additive Manufacturing of YSZ Ceramics by Laser Engineered Net Shaping: Xueliang Yan¹; Yan Chen²; Fei Wang¹; Cody Kanger¹; Michael Sealy¹; *Bai Cui*¹; ¹University of Nebraska-Lincoln; ²Oak Ridge National Laboratory

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Functional and Energy Materials — Energy Materials

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Sneha Prabha Narra, Worcester Polytechnic Institute; Markus Chmielus, University of Pittsburgh; Mohammad Elahinia, University of Toledo; Reginald Hamilton, Pennsylvania State University

Wednesday AM | February 26, 2020
7B | San Diego Convention Ctr

Session Chair: Sneha Narra, Worcester Polytechnic Institute

8:30 AM Invited
3D Printed Lithium Ion Batteries and Other Functional Devices: Mohammad Sadeq Saleh¹; Jie Li²; Jonghyun Park²; *Rahul Panat*¹; ¹Carnegie Mellon University; ²Missouri University of Science and Technology

9:00 AM
High Performance Zn-ion Batteries by Additive Manufacturing: *Sanket Bhoyate*¹; Marcus Young¹; Wonbong Choi¹; ¹University of North Texas

9:20 AM
Multiscale-controlled Three-dimensional Electrodes for Lithium-ion Batteries: *Jonghyun Park*¹; ¹Missouri University of Science and Technology

9:40 AM
Porous Lithium Ion Battery Cathodes Prepared Using Selective Laser Sintering Exhibit Complex Microstructure and Dual Phase State: *Katherine Acord*¹; Alexander Dupuy¹; Umberto Scipioni Bertoli¹; Baolong Zheng¹; William West²; Qian Chen²; Andrew Shapiro²; Julie Schoenung¹; ¹Department of Materials Science and Engineering, University of California, Irvine, CA; ²Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

10:00 AM Break

10:20 AM Invited
Laser Processing of Bismuth Telluride Thermoelectric Materials for Solid-State Energy Conversion: *Saniya Leblanc*¹; Haidong Zhang¹; Ryan Welch¹; George Nolas²; Yohann Thimont³; ¹George Washington University; ²University of South Florida; ³Universite Paul SABATIER CIRIMAT

10:50 AM Invited
3D Ink Printing of Thermoelectric Materials: Christoph Kenel¹; *David Dunand*¹; ¹Northwestern University

11:20 AM

Solid-state Additively Manufactured Thermal Energy Storage Materials: *Darin Sharar*¹; Asher Leff¹; Adam Wilson¹; Kadri Atli¹; Alaa Elwany²; Ibrahim Karaman²; ¹US Army Research Laboratory; ²Texas A&M

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques — Industrial Applications and Perspectives

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Fan Zhang, National Institute of Standards and Technology; Tom Stockman, Los Alamos National Laboratory; Tao Sun, University of Virginia; Donald Brown, Los Alamos National Laboratory; Yan Gao, Ge Global Research; Amit Pandey, MicroTesting Solutions; Joy Gockel, Wright State University; Tim Horn, North Carolina State University; Sneha Prabha Narra, Worcester Polytechnic Institute; Judy Schneider, University of Alabama at Huntsville

Wednesday AM | February 26, 2020
8 | San Diego Convention Ctr

Session Chairs: Yan Gao, GE Global Research; Amit Pandey, ANSYS

8:30 AM Invited

In-situ X-ray, IR, and Diffraction Measurements of Automotive Grade Steel During Laser Powder Bed Fusion: *Andrew Bobel*¹; Louis Hector¹; Benjamin Gould²; Sarah Wolff²; ¹General Motors; ²Argonne National Laboratory

8:55 AM Invited

Practical Use of Neutron Facility VULCAN and NRSF2 for Residual Stress Analysis of Additive Manufactured Large Automobile Parts: *Tomohiro Ikeda*¹; Satoshi Hirose¹; Hisao Uozumi¹; Ke An²; Chen Yan²; Andrew Payzant²; Jeffrey Bunn²; Christopher Fancher²; Alan Seid³; ¹Honda R&D Co., Ltd.; ²Oak Ridge National Laboratory; ³Honda R&D Americas Inc.

9:20 AM Invited

In Operando Characterization of 3D Printed Composite Resins via X-ray Photon Correlation Spectroscopy and SAXS: *Hilmar Koerner*¹; ¹Air Force Research Laboratory

9:45 AM

4D Nanoscale Imaging of Powder Feedstock Processing for Additive Manufacturing:*Stephen Kelly*¹; *Kyle Tsaknopoulos*²; *Jordan Kone*¹; *Danielle Cote*²; ¹Carl Zeiss X-ray Microscopy; ²Worcester Polytechnic Institute

10:05 AM Break

10:25 AM Panel Discussion: The panelists are experts from industry, national labs and university, including Thomas Broderick (AFRL), Ed Glaessgen (NASA), Lyle Levine (NIST), Ade Makinde (GE), and Tony Rollett (CMU).

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Alternative Processes (Beyond the Beam) — Solid State Processes

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Powder Materials Committee

Program Organizers: Paul Prichard, Kennametal Inc.; Matthew Dunstan, U.S. Army Research Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory; Nihan Tuncer, Desktop Metal; James Paramore, U.S. Army Research Laboratory

Wednesday AM | February 26, 2020
7A | San Diego Convention Ctr

Session Chair: Peeyush Nandwana, Oak Ridge National Laboratory

8:30 AM

Additive Friction Stir Deposition for Solid-state Additive Manufacturing of Metals and Metal Matrix Composites: *Hang Yu*¹; ¹Virginia Polytechnic Institute and State University

8:50 AM

Additive Manufacturing of Aluminium Using Friction Stir Deposition: *Mohamed Ahmed*¹; *Ebtessam Elfishawy*²; *Mohamed Elsayed Seleman*³; *Abdelrahman Abdelmotagaly*⁴; ¹The British University in Egypt; ²The American University in Egypt; ³Suez University; ⁴Colorado School of Mines

9:10 AM
Additive Friction Stir Deposition: Microstructural Control Sensitivity: *Robert Griffiths*¹; David Garcia¹; Hang Yu¹; ¹Virginia Polytechnic Institute

9:30 AM
Impacts of Friction Stir Processing on Microstructure and Corrosion Properties of DMLS-ALSi10Mg: Mehran Rafieazad¹; Mohsen Mohammadi²; Adrian Gerlich³; *Ali Nasiri*¹; ¹Memorial University of Newfoundland; ²Marine Additive Manufacturing Centre of Excellence (MAMCE), University of New Brunswick; ³Centre for Advanced Materials Joining, Department of Mechanical and Mechatronics Engineering, University of Waterloo

9:50 AM
Mechanical Property and Characterization of Anodized AA6061 After Additive Friction Stir-deposition: *Ning Zhu*¹; Dustin Avery¹; Brandon Phillips¹; Ryan Kinser¹; Paul Allison¹; James Jordon¹; Luke Brewer¹; ¹University of Alabama Tuscaloosa

10:10 AM Break

10:30 AM
Effect of Counter-gravity 3D Printing on PLA Interlayer Fracture Energy: *Hadi Noori*¹; Cole Lytle²; ¹Oklahoma State University; ²Tinker Air Force Base

10:50 AM
3D-printing via Binder Jetting and Consolidation of Nano Alumina Bone Scaffold Prototypes:*Maricruz Carrillo*¹; Geuntak Lee¹; Eugene Olevsky¹; ¹San Diego State University

11:10 AM
Effects of Zener-Hollomon Parameter and Strain on the Heterogeneous Microstructural Evolution of Cold-sprayed Coatings: *Yu Zou*¹; Hongze Wang¹; Zhiying Liu¹; Michel Hache¹; Eric Irissou²; ¹University of Toronto; ²National Research Council Canada (NRC)

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development II — Alloy Design-High Temperature and Fe based Alloys

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Orlando Rios, Oak Ridge National Laboratory; Hunter Martin, HRL Laboratories; Atieh Moridi, Cornell University

Wednesday AM | February 26, 2020
6F | San Diego Convention Ctr

Session Chair: Atieh Moridi, Cornell University

8:30 AM Invited
Design of “Dynamic Alloys” for Additive Manufacturing: Jinyeon Kim¹; *Atieh Moridi*¹; ¹Cornell University

9:00 AM
Hybrid Ti with High Work Hardening Rate and Ductile Martensitic Ti: Novel Alloy Concepts Delivered by Selective Laser Melting: *Kenong Xia*¹; ¹University of Melbourne

9:20 AM
High Entropy Alloy Design and Selection for Additive Manufacturing & Extreme Environment Applications: *Emma White*¹; Duane Johnson; Nikolai Zarkevich¹; Andrew Kustas²; Nicolas Argibay²; Michael Chandross²; Iver Anderson¹; ¹Ames Laboratory; ²Sandia National Laboratories

9:40 AM
Alloy Design of Promising Highly Alloyed Metals by Using Elemental Powders in Laser Powder Bed Fusion: *Simon Ewald*¹; Fabian Kies²; Johannes Schleifenbaum³; ¹RWTH Aachen University - Digital Additive Production; ²RWTH Aachen University - Steel Institute; ³RWTH Aachen University - Digital Additive Production, Fraunhofer Institute for Laser Technology

10:00 AM
Laser Powder Bed Fusion of a CoNi-base Superalloy for Advanced Components in Extreme Environments: *Kira Pusch*¹; Sean Murray¹; Andrew Polonsky¹; Chris Torbet¹; Peeyush Nandwana²; Michael Kirka²; Ryan Dehoff²; Ning Zhou³; Stephane Forsik³; William Slye³; Tresa Pollock¹; ¹University of California, Santa Barbara; ²Oak Ridge National Laboratory; ³Carpenter Technology

10:20 AM Break

10:35 AM Keynote

ICME-based Design of γ' -strengthened Co-based Superalloys for Additive Manufacturing: *Eric Lass*¹; Michael Katz²; Richard Ricker²; ¹University of Tennessee, Knoxville; ²National Institute of Standards and Technology

11:05 AM

Understanding Microstructure Development of Additively Manufactured Ni-based Superalloys by Combining In-situ/Ex-situ Characterization and Computational Modeling: *Jonah Klemm-Toole*¹; Alec Saville¹; Chandler Becker¹; Benjamin Ellyson¹; Yaofeng Guo¹; Chloe Johnson¹; Brian Milligan¹; Andrew Polonsky²; Kira Pusch²; Kester Clarke¹; Niranjan Parab³; Kamel Fezzaa³; Tao Sun³; Damien Tourret⁴; Tresa Pollock²; Amy Clarke¹; ¹Colorado School of Mines; ²University of California Santa Barbara; ³Advanced Photon Source; ⁴IMDEA Materials Institute

11:25 AM

Understanding Printability of Steels from Computational Modeling of Microstructural Evolution: Jiayi Yan¹; Hamed Ravash¹; Martin Walbrühl¹; *Ida Berglund*¹; ¹QuesTek Europe AB

11:45 AM

Site-specific Alloying of Low Carbon Steel Through Binder Jet Additive Manufacturing: *Karl Davidson*¹; Po-Ju Chiang¹; Lihua Zhao²; Matteo Seita¹; ¹HP-NTU Digital Manufacturing Corporate Lab; ²HP Labs for 3D Printing and Digital Manufacturing

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Processing Effects on Microstructure and Material Performance — Process Variables II

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Eric Lass, University of Tennessee, Knoxville; Joy Gockel, Wright State University; Emma White, Ames Laboratory; Richard Fonda, Naval Research Laboratory; Monnamme Tlotleng, University of Johannesburg; Jayme Keist, Pennsylvania State University; Hang Yu, Virginia Polytechnic Institute and State University

Wednesday AM | February 26, 2020
6E | San Diego Convention Ctr

Session Chair: Joy Gockel, Wright State University

8:30 AM
Additive Manufacturing of Crack-prone Materials: A Process-and material-based Approach to Parameter Development: *Austin Dicus*¹; ¹Carpenter Technology

8:50 AM
Eliminating Micro-cracking in Inconel 713ELC Fabricated by a Powder-bed-fusion Additive Manufacturing with Electron Beam: *Yuchao Lei*¹; Kenta Aoyagi¹; Dong-Soo Kang²; Kosuke Kuwabara²; Kinya Aota²; Akihiko Chiba¹; ¹Institute for Materials Research, Tohoku University; ²Global Research & Innovative Technology Center (GRIT), Hitachi Metals, Ltd.

9:10 AM
Selective Laser Melting Fabrication of Ultra-high Strength Martensitic Steel:*Raiyan Seede*¹; David Shoukr¹; Bing Zhang¹; Austin Whitt¹; Sean Gibbons²; Philip Flater²; Alaa Elwany¹; Raymundo Arroyave¹; Ibrahim Karaman¹; ¹Texas A&M University; ²Air Force Research Laboratory

9:30 AM
Surface Roughness of Hastelloy-X Components Manufactured by Selective Laser Melting: *Yang Tian*¹; Dacian Tomus¹; Aijun Huang¹; Xinhua Wu¹; ¹Monash University

9:50 AM
Gas Atomization and Powder Bed Fusion Optimization Studies for the Al10SiMg Alloy: *Sharon Park*¹; George Benson¹; Thinh Huynh¹; Holden Hyer¹; Le Zhou¹; Edward Dein¹; Yongho Sohn¹; ¹University of Central Florida

10:10 AM Break

10:30 AM
Towards an Integrated Experimental and Computational Framework for Large-scale Metal Additive Manufacturing: *Xiaohua Hu*¹; Andrzej Nycz¹; Yousub Lee¹; Benjamin Shassere¹; Srdjan Simunovic¹; Mark Noakes¹; Yang Ren²; Xin Sun¹; ¹Oak Ridge National Laboratory; ²Argonne National Laboratory

10:50 AM
Quantification of Powder Packing Density in the Powder Bed and its Influence on As-built Quality and Tensile Properties of Ti-6Al-4V by Selective Laser Melting: Joe Elambasseril¹; *Ma Qian*¹; Edward Lui¹; Tingting Song¹; Sanka Mendis¹; Milan Brandt¹; ¹RMIT University

11:10 AM

3D Characterization of Alpha Phase Morphology and Variant Selection in EBM Ti-6Al-4V: *Ryan DeMott*¹; Phillip Stephenson¹; Peter Collins²; Nima Haghdadi¹; Xiaozhou Liao³; Simon Ringer³; Sophie Primig¹; ¹UNSW Sydney; ²Iowa State University; ³University of Sydney

11:30 AM

Study the Effect of Thermal Signatures on Microstructural Variation of EBM Additively Manufactured Ti-6Al-4V Builds: *Meiyue Shao*¹; Chris Blackwell¹; Sriram Vijayan¹; Sabina Kumar²; Sudarsanam Babu²; Joerg Jinschek¹; ¹The Ohio State University; ²University of Tennessee

11:50 AM

The Microstructures and Mechanical Properties at Different Forming Positions of A Box-shaped Ti-6Al-4V Alloy Part Fabricated by Selective Laser Melting: *Jingbo Gao*¹; Deliang Zhang^{*1}; ¹Northeastern University

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Local Strain / Misorientation II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Shaping and Forming Committee, TMS: Materials Characterization Committee

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Marko Knezevic, University of New Hampshire; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; M Arul Kumar, Los Alamos National Laboratory

Wednesday AM | February 26, 2020
Theater A-2 | San Diego Convention Ctr

Session Chair: C. Cem Tasan, Massachusetts Institute of Technology

8:30 AM

Elastic and Plastic Field Measurement During Deformation of Polycrystalline Metallic Materials by Heaviside Digital Image Correlation: *Jean-Charles Stinville*¹; Patrick Callahan²; M. P. Echlin¹; Marie-Agathe Charpagne¹; Patrick Villechaise³; Jonathan Cormier³;

D. Texier⁴; Valery Valle⁵; T. M. Pollock¹; ¹University of California, Santa Barbara; ²Naval Research Laboratory; ³Institut P' - UPR 3346, CNRS - Université de Poitiers - ENSMA; ⁴Institut Clément Ader - UMR CNRS 5312; ⁵Université de Poitiers

8:50 AM

Integrating Thermal Desorption Spectroscopy and Scanning Electron Microscopy: *Haoxue Yan*¹; Jinwoo Kim¹; Kenshiro Ichii²; Motomichi Koyama²; C. Cem Tasan¹; ¹Massachusetts Institute of Technology; ²Kyushu University

9:10 AM

Combined EBSD and HRDIC Study of Strain Gradients in the Presence of Grain Boundaries: *David Fullwood*¹; Ryan Sperry¹; Josh Tsai¹; Landon Hansen¹; Eric Homer¹; Robert Wagoner¹; Joao Quinta da Fonseca¹; ¹Brigham Young University

9:30 AM

Understanding Functional Fatigue with 3D In-situ Grain Map Reconstructions Using High-energy Diffraction Microscopy: *Ashley Bucsek*¹; Lee Casalena²; Darren Pagan³; Michael Mills⁴; Aaron Stebner⁵; ¹University of Michigan; ²Thermo Fisher Scientific; ³Cornell High Energy Synchrotron Source; ⁴The Ohio State University; ⁵Colorado School of Mines

9:50 AM

3D Statistics of Slip Localization: Analysis of Dual HR-DIC / 3D-EBSD Experiments: *Toby Francis*¹; Jean-Charles Stinville¹; Marie-Agathe Charpagne¹; Andrew Polonsky¹; McLean Echlin¹; Jonathan Hestroffer¹; Valéry Valle²; Irene Beyerlein; Tresa Pollock¹; ¹University of California, Santa Barbara; ²Université de Poitiers

10:10 AM Break

10:30 AM

Revealing the Role of Microstructure Architecture on Strength and Ductility of Ni Microwires by In-situ Synchrotron X-ray Diffraction: Ludovic Thilly¹; Ravi Purushottam¹; *Céline Gerard*²; Loic Signor³; Atul H. Chokshi⁴; ¹University of Poitiers; ²CNRS - Institut Pprime; ³ENSMA - Institut Pprime; ⁴IISc - Bangalore

10:50 AM

3D In-situ Characterization of the Deformation of Open-cell Aluminum Foam Using High Energy X-ray Diffraction Microscopy and Micro-Computed Tomography: *Quinton Johnson*¹; Kris Matheson¹; Jayden Plumb¹; Peter Kenesei²; Hemant Sharma²; Jun-Sang Park²; Ashley Spear¹; ¹University of Utah; ²Argonne National Laboratory

11:10 AM

Effect of Creep Deformation on the Strain Heterogeneities Localization Inside Complex Microstructures Found within Centrifugally Cast HP40Nb Reformer Tubes: *Thibaut Dessolier*¹; Wouter Hamer²; Martin Church²; Ben Britton¹; ¹Imperial College London; ²Shell

11:30 AM

Evaluation of the Serration Behavior Characterized as Strain Localization in High-Mn Austenitic Steel: *Sukeyoung Hwang*¹; Myeong-Heom Park²; Yu Bai¹; Akinobu Shibata¹; Nobuhiro Tsuji¹; ¹Kyoto university; ²Elements Strategy Initiative for Structural Materials (ESISM), Kyoto University

ADVANCED MATERIALS

Advanced High Strength Steels IV — Session III

Sponsored by: TMS Structural Materials Division, TMS: Steels Committee

Program Organizers: Ana Luiza Araujo, AK Steel Research and Innovation Center; Mary O'Brien, Colorado School of Mines; Tilmann Hickel, Max Planck Institut fur Eisenforschung; Amy Clarke, Colorado School of Mines; Kester Clarke, Colorado School of Mines; C. Tasan, Massachusetts Institute of Technology; MingXin Huang, University of Hong Kong

Wednesday AM | February 26, 2020
Balboa | Marriott Marquis Hotel

Session Chairs: Tilmann Hickel, Max Planck Institute; Cem Tasan, Massachusetts Institute of Technology

8:30 AM

Austenitization of a Cold-rolled Dual-phase Steel: Interaction with Recrystallization and Influence of Cementite Composition: Marc Moreno¹; *Julien Teixeira*¹; Sébastien Allain¹; Carla Oberbillig²; Frédéric Bonnet²; ¹Institute Jean Lamour; ²ArcelorMittal Global Research and Development

8:50 AM

Effect of High Temperature Processes on Dual Phase Steel Manufacture: *Bharath Bandi*¹; Joost Krevel²; Sukalpan Nandi³; Prakash Srirangam¹; ¹Warwick Manufacturing Group (WMG), University of Warwick; ²Tata Steel, Research and Development; ³Vellore Institute of Technology

9:10 AM

Increased Damage in Dual Phase Steels under Dynamic Strain Aging Conditions: Merve Cobanoglu¹; Rasim Ertan²; Caner Simsir²; Mert Efe¹; ¹Middle East Technical University; ²Atilim University

9:30 AM

High-performance Full-field Crystal Plasticity with Dislocation-based Hardening and Slip System Backstress Laws: Application to Modeling Deformation of Dual-phase Steels: Adnan Eghtesad¹; Marko Knezevic¹; ¹University of New Hampshire

9:50 AM

Effect of Pre-straining on High Cycle Fatigue and Fatigue Crack Propagation Behaviors of CP (Complex Phase) Steel: Sumin Kim¹; Taejin Song²; Hyokyung Sung¹; Jehyun Lee³; Sangshik Kim¹; ¹Gyeongsang National University; ²POSCO/Technical Research Laboratories; ³Changwon National University

10:10 AM Break

10:30 AM

Examination of Cementite+Austenite+Ferrite Multiphase Steel Produced by ART Annealing: Oguz Gurkan Bilir¹; Ersoy Erisir¹; Kemal Davut²; ¹Kocaeli University; ²Atilim University, Metal Forming Centre of Excellence, Golbasi, Ankara, Turkey

10:50 AM

Process Design and Genetic Optimization of HSLA Steels Using Mean-field and Multi-phase Field Modeling: Maria-Ioanna Tzini¹; Gregory Haidemenopoulos¹; ¹University of Thessaly

11:10 AM

Mechanisms of Embrittlement and Recovery in Cast HY-80 High-strength Low-alloy Steel: Matthew Draper¹; Sreeramamurthy Ankem²; ¹US Navy; ²University of Maryland

11:30 AM

In-situ Observation of the Peritectic Reaction and Transformation in a Commercial HSLA Steel: Tao Liu¹; Dengfu Chen¹; Songyuan Ai¹; Pingmei Tang¹; Mujun Long¹; Jie Yang¹; ¹Chongqing University

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Structures and Modelling of Soft Magnetic Materials

Sponsored by: TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Daniel Salazar, BCMaterials; Alex Leary, Nasa Glenn Research Center; Markus Chmielus, University of Pittsburgh; Ryan Ott, Ames Laboratory/Cmi; Arcady Zhukov, UPV/EHU, and Ikerbasque, Basque Foundation for Science

Wednesday AM | February 26, 2020
Del Mar | Marriott Marquis Hotel

Session Chairs: Hunter Henderson, Oak Ridge National Laboratory; Michael McHenry, Carnegie Mellon University

8:30 AM

Characterization of Surface Oxidation and Multi-phase Nanocrystallization in Soft Magnetic FeNi-based Metal Amorphous Nanocomposite Alloys: *Paul Ohodnicki*¹; Kevin Byerly²; John Baltrus²; Ruishu Wright²; James Egbu²; Natan Aronhime³; Yuval Krimer³; Michael McHenry³; Elizabeth Kautz⁴; Arun Devaraj⁴; ¹National Energy Technology Laboratory (presently at University of Pittsburgh); ²National Energy Technology Laboratory; ³Carnegie Mellon University; ⁴Pacific Northwest National Laboratory

8:50 AM

Preparation of Fe-NC Soft Magnetic Material (Minnealloy) in Bulk Form with High Saturation Magnetization, Low Coercivity, and High Electrical Resistivity: *Guannan Guo*¹; Jinming Liu¹; Bin Ma¹; Jian-Ping Wang¹; ¹University of Minnesota

9:10 AM

Structure and Magnetic Properties of Novel High-magnetization Fe-Mn Powders Synthesized by Hydrogen Reduction of Nanoferrites: *Tatsuya Kon*¹; Nobuyoshi Imaoka¹; Kimihiro Ozaki¹; ¹National Institute of Advanced Industrial Science and Technology (AIST)

9:30 AM

Tunable Magnetic Properties in High-entropy FeCoNiAl_xSi_{6-x} (0.2 < x < 0.5) Alloys: Kathem Bazzi¹; Ramasis Goswami²; *Tanjore Jayaraman*¹; ¹University of Michigan-Dearborn; ²Naval Research Laboratory, US

9:50 AM Break

10:05 AM

Prediction of Good Glass Forming Ability in Amorphous Soft Magnetic Alloys by Thermocalc Simulation and Experimental Validation: *Yuval Krimer*¹; Natan Aronhime²; Paul Ohodnicki³;

Michael McHenry¹; ¹Carnegie Mellon University; ²Carpenter Technologies; ³National Energy Technology Laboratory

10:25 AM

Electronic Structure of Nano-crystalline and Amorphous Soft Magnetic Materials: A Computational Methodology: *Minyeong Choi*¹; Yang-Ki Hong¹; Hoyun Won¹; Woncheol Lee²; Seok Bae³; Dong-Hyeok Choi³; Seong-Gon Kim⁴; ¹The University of Alabama; ²Samsung Electro-Mechanics; ³LG Innotek; ⁴Mississippi State University

10:45 AM

Thermal stability, Crystallization and Magnetic Properties of High Induction Metallic Ribbons Fe67Co20B13: *Przemyslaw Zackiewicz*¹; Lukasz Hawelek¹; Patryk Włodarczyk¹; Marek Hreczka¹; Magdalena Steczkowska-Kempka¹; Aleksandra Kolano-Burian¹; ¹Lukasiewicz Research Network - Insitute of Non-Ferrous Metals

11:05 AM

Production of Strips of Low-loss Soft Magnetic Alloys by Cutting Processes: *B. Stiven Puentes*¹; James Mann²; Srinivasan Chandrasekar¹; Kevin Trumble¹; ¹Purdue University; ²University of West Florida

11:25 AM

Low Temperature Synthesis of Superparamagnetic Fe3O4 Morphologies Tuned Using Oleic Acid as Crystal Growth Modifier: Stanley Omorogbe¹; Aireguamen Aigbodion¹; Hilary Ifijen¹; Nosa Ogbeide-Ihama²; Aline Simo³; *Esther Ikhuoria*⁴; ¹Rubber Research Institute of Nigeria; ²Guinness Nigeria PLC ; ³iThemba Labs; ⁴University of Benin

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VI — Energy Storage with Emphasis on Batteries I

Sponsored by: TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

Program Organizers: Jung Pyung Choi, Pacific Northwest National Laboratory; Amit Pandey, MicroTesting Solutions; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh

Wednesday AM | February 26, 2020
16B | San Diego Convention Ctr

Session Chairs: Partha Mukherjee, Purdue University; Daiwon Choi, Pacific Northwest National Laboratory

8:30 AM Invited
Stochasticity at Scales Leads to Thermo-electrochemical Extremes: *Partha Mukherjee*¹; Venkatesh Kabra¹; Mukul Parmananda¹; ¹Purdue University

8:50 AM Invited
Multiscale Modeling of Graphite Microstructures to Understand the Limitations of Fast Charge of Lithium Ion Batteries: *Srikanth Allu*¹; ¹Oak Ridge National Laboratory

9:10 AM Keynote
Predicting the Influence of Manufacturing Parameters on Lithium Ion Battery Performance: the ARTISTIC Project: *Alejandro Franco*¹; ¹Universite de Picardie Jules Verne - LRCS - CNRS

9:40 AM Invited
Stress-enhanced Reaction Non-uniformity in Lithium Intercalation Compounds: Kaiqi Yang¹; Youtian Zhang¹; Fan Wang¹; *Ming Tang*¹; ¹Rice University

10:00 AM Break

10:20 AM Invited
Impact of Inter-particle Interactions on Electrochemical Performance of Lithium-ion Battery Electrodes: *Scott Roberts*¹; Dan Bolintineanu¹; Mark Ferraro¹; Jeremy Lechman¹; David Noble¹; Ishan Srivastava¹; Bradley Trembacki¹; ¹Sandia National Laboratories

10:40 AM Invited
Mesoscale Separator Design to Mitigate Dendrite Formation in Lithium Batteries: *Emily Ryan*¹; Andrew Cannon¹; ¹Boston University

11:00 AM Invited
A Durable, Inexpensive Oxygen Reduction Reaction Electrocatalyst: *Rohan Mishra*¹; Sung Cho²; Cheng He¹; Arashdeep Thind¹; Shrihari Sankarasubramanian¹; Vijay Ramani¹; ¹Washington University in St. Louis; ²Korea Institute of Ceramic Engineering and Technology

11:20 AM Invited
Reliability Testing of Li-ion Batteries for Stationary Application: *Daiwon Choi*¹; Alasdair Crawford¹; Vilayanur Viswanathan¹; Nimat Shamim¹; Edwin Thomsen¹; David Reed¹; Vincent Sprenkle¹; ¹Pacific Northwest National Laboratory

11:40 AM Invited

Sulfide Based Solid Electrolyte for Lithium-sulfur Batteries:
*Dongping Lu*¹; *Zhaoxin Yu*¹; *Jie Xiao*¹; *Jun Liu*¹; ¹Pacific Northwest
National Laboratory

ELECTRONIC MATERIALS

**Advanced Microelectronic Packaging, Emerging
Interconnection Technology and Pb-free Solder — Pb-free
Solder Alloys II**

Sponsored by: TMS Functional Materials Division, TMS:
Electronic Packaging and Interconnection Materials Committee

Program Organizers: Christopher Gourlay, Imperial College
London; Kazuhiro Nogita, University of Queensland; David Yan,
San Jose State University; Mike Wolverton, Raytheon; Babak
Arfaei, Ford Motor Company; Andre Delhaise, Celestica; Mehran
Maalekian, Mat-Tech; Mohd Arif Salleh, Universiti Malaysia Perlis

Wednesday AM | February 26, 2020
Palomar | Marriott Marquis Hotel

Session Chairs: Nilesh Badwe, Intel Corporation; Mehran
Maalekian, Mat-Tech, Netherlands

8:30 AM Invited

**Micro-mechanical Testing of Grain Boundary Sliding in a Tin
Alloy:** *Junnan Jiang*¹; *Richard Todd*¹; *Angus Wilkinson*¹; ¹University
of Oxford

8:50 AM

**Micropillar Compression Test of Tin-solder Microstructural Units
to Reveal Slip Activity:** *Tianhong Gu*¹; *Finn Giuliani*¹; *Ben Britton*¹;
¹Imperial College London

9:10 AM

**Determination of β -tin Slip Properties using Micro-pillar Tests
and Crystal Plasticity Modelling:** *Yilun Xu*¹; *Tianhong Gu*¹; *Ben
Britton*¹; *Fionn Dunne*¹; ¹Imperial College London

9:30 AM

**Molecular Dynamics Study of the Effect of Ultrasonic Vibration on
Evolution of Crystal Defects:** *Milad Khajehvand*¹; *Henri Seppä*²; *Panthea Sepehrband*¹; ¹Santa Clara University; ²Kulicke & Soffa
Industries, Inc.

9:50 AM Break

10:10 AM Invited

Effects of Bismuth, Antimony, and Indium Alloying Elements on Microstructure of High Reliability Pb-Free Solders Alloys: *Richard Coyle*¹; *Babak Arfaei*²; *Christopher Gourlay*³; *Sergey Belyakov*³; *Keith Sweatman*⁴; *Keith Howell*⁴; ¹Nokia Bell Laboratories; ²Binghamton University; ³Imperial College London; ⁴Nihon Superior, Co. Ltd.

10:30 AM

Compression Creep Behavior of Sn-Ag-Cu-Bi Pb-Free Solder Alloy: *Andre Delhaise*¹; *Juan Tupac-Yupanqui Cardoso*²; *Fae Azhari*²; *Doug Perovic*²; ¹Celestica; ²University of Toronto

10:50 AM

Modification of Traditional Pb-free Solders with Bi, Sb and In for Improved Reliability: *Sergey Belyakov*¹; *Tetsuro Nishimura*²; *Keith Sweatman*²; *Jingwei Xian*¹; *Christopher Gourlay*¹; ¹Imperial College London; ²Nihon Superior Co., Ltd

11:10 AM

A Preliminary Study of the Dissolution of Bi in β -Sn Using *In Situ* Scanning Electron Microscopy: *Andre Delhaise*¹; *Peter Banh*²; *Dian Yu*²; *Hong Ran Wang*²; *Jason Tam*²; *Jane Howe*²; *Doug Perovic*²; ¹Celestica; ²University of Toronto

CHARACTERIZATION

Advanced Real Time Imaging — Mechanical

Sponsored by: TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, National Energy Technology Laboratory; David Alman, National Energy Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki Shibata, Imram, Tohoku University; Antoine Allanore, Massachusetts Institute of Technology; Candan Tamerler, University of Kansas; Noritaka Saito, Kyushu University; Neslihan Dogan, McMaster University; Zuotai Zhang, Southern University of Science and Technology; Bryan Webler, Carnegie Mellon University; Anna Nakano, US Department of Energy National Energy Technology Laboratory

Wednesday AM | February 26, 2020
Theater A-4 | San Diego Convention Ctr

Session Chair: Zuotai Zhang, Southern University of Science and Technology

8:30 AM Invited
In-situ Observation of Plastic Deformation for Crystalline Materials: *Masaki Tanaka*¹; ¹Kyushu University

8:50 AM Invited
In-situ Imaging of Nanocomposite Deformation: The influence of 3-D Interfacial Structure and Morphology on Mechanical Response: *Nathan Mara*¹; Youxing Chen²; Justin Cheng¹; Kevin Schmalbach¹; Zhao Wang¹; Nan Li³; Jon Baldwin³; R. Lee Penn¹; David Poerschke¹; Andreas Stein¹; William Gerberich¹; Irene Beyerlein⁴; ¹University of Minnesota, Twin Cities; ²University of North Carolina, Charlotte; ³Los Alamos National Laboratory; ⁴University of California, Santa Barbara

9:10 AM
In-situ Synchrotron 3D X-ray Imaging of Damage Initiation in CMC's Due to Oxidation Corrosion at High Temperature: *Hrishikesh Bale*¹; Aly Badran²; David Marshall²; Robert Ritchie³; ¹Carl Zeiss Microscopy Inc.; ²University of Colorado Boulder; ³University of California Berkeley

9:30 AM
Real Time Imaging of Deformation Mechanisms in Boron Nitride Nanotube-metal Matrix Composites at Multiple Length Scales: *Pranjal Nautiyal*¹; Benjamin Boesl¹; Arvind Agarwal¹; ¹Florida International University

9:50 AM Invited
In Situ TEM Characterizations on Mechanical Properties and Deformation of Metals: *Qian Yu*¹; Xiaoqing Fu¹; Qingqing Ding¹; ¹Zhejiang University

10:10 AM Break

10:30 AM Invited
Non-destructive Multi-property Determination under Extreme Conditions with Transient Grating Spectroscopy: *Cody Dennett*¹; ¹Massachusetts Institute of Technology

10:50 AM
Using the Digital Image Correlation Technique in Non-traditional Ways: *Carl Cady*¹; Cheng Liu¹; ¹Los Alamos National Laboratory

MECHANICS & STRUCTURAL RELIABILITY

Advancing Current and State-of-the-Art Application of Ni- and Co-based Superalloys — Co-based Superalloys – Structure & Properties

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Chantal Sudbrack, Northwestern University Center for Atom-Probe Tomography; Mario Bochiechio, Pratt & Whitney; Kevin Bockenstedt, ATI Specialty Materials; Katerina Christofidou, University of Sheffield; James Coakley, University of Miami; Martin Detrois, National Energy Technology Laboratory; Laura Dial, GE Global Research; Bij-Na Kim, Carpenter Additive; Victoria Miller, University of Florida; Kinga Unocic, Oak Ridge National Laboratory

Wednesday AM | February 26, 2020
11B | San Diego Convention Ctr

Session Chairs: Kevin Bockenstedt, ATI Specialty Materials; Katerina Christofidou, The University of Manchester

8:30 AM Invited
Understanding of Alloying Element Effects for the Design of Multicomponent 'strengthened Co-based Superalloys: *Qiang Feng*¹; *Wendao Li*¹; *Song Lu*¹; *Longfei Li*¹; *Stoichko Antonov*¹; ¹University of Science & Technology Beijing (USTB)

9:00 AM
Advancing Characterization of Co/Ni-based Superalloys with Statistics using Correlative Electron Diffraction and X-ray Spectroscopy: *Tom McAuliffe*¹; *Alex Foden*¹; *Chris Bilsland*¹; *Dafni Daskalaki Mountanou*¹; *David Dye*¹; *Thomas Britton*¹; ¹Imperial College London

9:20 AM
Grain Boundary Chemistry and Mechanical Properties of a Multicomponent Co-based L12-ordered Intermetallic Alloy: *Francesca Long*¹; *Sung Il Baik*¹; *Ding Wen Chung*¹; *Fei Xue*¹; *Eric Lass*²; *David Seidman*¹; *David Dunand*¹; ¹Northwestern University; ²The University of Tennessee

9:40 AM
Optimising the γ/γ' Microstructure and Increasing the High Temperature Strength of a Co-base Superalloy: *Daniel Hausmann*¹; *Cecilia Solís*²; *Lisa Freund*¹; *Andre Heinemann*²; *Mathias Göken*¹; *Ralph Gilles*²; *Steffen Neumeier*¹; ¹Department Werkstoffwissenschaften WW1; ²Forschungs-Neutronenquelle

Heinz Maier-Leibnitz (FRM II)

10:00 AM Break

10:20 AM Invited

From Co-Al-W-alloys to Advanced CoNi-base Superalloys: *Steffen Neumeier*¹; Mathias Göken¹; ¹University of Erlangen-Nürnberg

10:50 AM

Very High Cycle Fatigue of a Polycrystalline Co-base Superalloy: *Alice Cervellon*¹; Sean Murray¹; Chris Torbet¹; Tresa Pollock¹; ¹University of California Santa Barbara

11:10 AM

First-principles Study of Displacive-diffusive Phase Transformations during High Temperature Creep: from Ni- to Co-based Superalloys: *Dongsheng Wen*¹; Sae Matsunaga¹; Michael Titus¹; ¹Purdue University

11:30 AM

Deformation Mechanisms of Co-Cr-W-Ni Alloys at Ambient Temperature: *Shaolou Wei*¹; Sabrina Hernandez¹; Matt Bender²; Andy Martinez²; Cemal Tasan¹; ¹Massachusetts Institute of Technology; ²ATI Flat Rolled Products

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Algorithms and Machine Learning Approaches for Microscale

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Charudatta Phatak, Argonne National Laboratory; Bryan Wong, University of California, Riverside; Mikhail Mendelev, Ames Laboratory; Bryce Meredig, Citrine Informatics; Ebrahim Asadi, University of Memphis; Francesca Tavazza, National Institute of Standards and Technology

Wednesday AM | February 26, 2020
31C | San Diego Convention Ctr

Session Chairs: David Rivera, Lawrence Livermore National Laboratory; Grace Gu, University of California, Berkeley

8:30 AM

Generative Deep Neural Networks for Inverse Materials Design using Backpropagation and Adaptive Learning: *Grace Gu*¹; Chun-Teh Chen¹; ¹University of California, Berkeley

8:50 AM

Development of an Evolutionary Deep Neural Net for Materials Research: *Nirupam Chakraborti*¹; Swagata Roy¹; ¹Indian Institute Of Technology

9:10 AM

Persistent Homology: Unveiling the Topological Features in Materials Data: *Chaitali Patil*¹; Lucas Magee¹; Supriyo Chakraborty¹; Yusu Wang¹; Stephen Niezgoda¹; ¹The Ohio State University

9:30 AM

Inverse Solutions Based on Reduced-order Process-structure-property Linkages Using Markov Chain Monte Carlo Sampling Algorithms: *Yuksel Yabansu*¹; Almambet Iskakov¹; Anna Kapustina²; Sudhir Rajagopalan³; Surya Kalidindi¹; ¹Georgia Institute of Technology; ²Siemens AG; ³Siemens Corporate Technology

9:50 AM

Calibrating Strength Model Parameters using Multiple Types of Data: Jeffrey Florando¹; Jason Bernstein¹; Amanda Muyskens¹; Matthew Nelms¹; *David Rivera*¹; Kathleen Schmidt¹; Nathan Barton¹; Ana Kupresanin¹; ¹Lawrence Livermore National Laboratory

10:10 AM Break

10:30 AM

Advances in a Phase Field Dislocation Dynamics Model to Account for Various Gamma-surfaces of Hexagonal Close Packed Crystallography: *Claire Weaver*¹; Abigail Hunter²; Anil Kumar²; Irene Beyerlein¹; ¹University of California, Santa Barbara; ²Los Alamos National Laboratory

10:50 AM

Hierarchical Integration of Atomistically-derived Dislocation Mobility Laws into Discrete Dislocation Dynamics Simulations: *Darshan Bamney*¹; Khanh Dang²; Laurent Capolungo²; Douglas Spearot¹; ¹University of Florida; ²Los Alamos National Laboratory

11:10 AM

A Multi-GPU Implementation of a Full-field Crystal Plasticity Solver for Efficient Modeling of High-resolution Microstructures:

Adnan Eghtesad¹; Kai Germaschewski¹; Ricardo A Lebensohn²; Marko Knezevic¹; ¹University of New Hampshire; ²Los Alamos national laboratory

11:30 AM

A Self-consistent Parametric Homogenization Framework for Fatigue in Ni-based Superalloys: George Weber¹; Somnath Ghosh¹; Maxwell Pinz¹; ¹Johns Hopkins University

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications VIII — Session III

Sponsored by: TMS Functional Materials Division, TMS: Alloy Phases Committee

Program Organizers: Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Ensicaen University of Caen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Lan Li, Boise State University; Takao Mori, National Institute for Materials Science; Hsin-jay Wu, National Chiao-tung University; Tiejun Zhu, Zhejiang University

Wednesday AM | February 26, 2020
Miramar | Marriott Marquis Hotel

Session Chairs: Takao Mori, National Institute for Materials Science; Philippe Jund, Université de Montpellier

8:30 AM Invited

Ab initio Calculations of Thermoelectric Materials: Laurent Chaput¹; ¹University De Lorraine

8:50 AM Invited

Ab-initio Study of TiMSn (M= Ni, Pt, Pd) Alloys using the CRYSTAL Ab-initio Package.: Lorenzo Maschio¹; Atreyi Dasmahapatra¹; Loredana Daga¹; Antti Karttunen²; Silvia Casassa¹; ¹University of Torino; ²Aalto University

9:10 AM Invited

Defect Formation Energies and Effective Masses in the Mg2(Si,Sn) Solid Solutions via DFT Calculations: Philippe Jund¹; Alexandre Berche¹; Johannes de Boor²; ¹Montpellier University; ²DLR Köln

9:30 AM

Using Energy Filtering to Change the Thermoelectric Design Paradigm: Seyed Aria Hosseini¹; Jackson R. Harter,²; Devin

Coleman¹; Lorenzo Mangolini¹; *Alex Greaney*¹; ¹University of California, Riverside; ²Oregon State University

9:50 AM

Accelerated Discovery of Efficient Solar-cell Materials using Quantum and Machine-learning Methods: *Kamal Choudhary*¹; Francesca Tavazza²; ¹University of Maryland (National Institute of Standards and Technology); ²NIST/National Institute of Standards and Technology

10:10 AM Break

10:30 AM Invited

Utilizing Magnetism and Dilute Magnetic Semiconductors to Enhance Thermoelectric Performance: *Takao Mori*¹; ¹National Institute for Materials Science

10:50 AM Invited

Multi-band Electronic and Thermal Transport in Fe₂VAl Based Full Heusler Thin Films: *Ernst Bauer*¹; Bernhard Hinterleitner¹; Alexander Riss¹; Takao Mori²; Xingqiu Chen³; ¹Vienna University of Technology; ²National Institute for Materials Science, Tsukuba; ³Shenyang National Laboratory for Materials Science, Shenyang

11:10 AM

Portable Nanostructured Magneto-Thermoelectric Bi-Sb Alloys at Cryogenic Temperatures: *Joseph Poon*¹; ¹University of Virginia

11:30 AM

Phase Diagrams of Ag-Cu-Te Ternary System and Ag₂Te/Cu Interfacial Reaction: *Yohanes Hutabalian*¹; Sinn-wen Chen¹; ¹National Tsing Hua University

11:50 AM

Optimization of Thermoelectric Performance of Nitrogen- and Boron-doped Carbon Nanotubes: *Manaho Matsubara*¹; Kenji Sasaoka¹; Takahiro Yamamoto¹; ¹Tokyo University of Science

12:10 PM

Thermoelectric Films Deposited by Pulsed Magnetron Sputtering: *Elzbieta Godlewska*¹; Krzysztof Mars¹; Kinga Majewska-Zawadzka¹; Wojciech Sznajder¹; ¹AGH UST

LIGHT METALS

Aluminum Alloys, Processing and Characterization — New and Optimized Aluminium Alloys II

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Dmitry Eskin, Brunel University

Wednesday AM | February 26, 2020
1A | San Diego Convention Ctr

Session Chairs: Mehdi Lalpoor, Aleris; Alexis Miroux, Aleris

8:30 AM Introductory Comments

8:35 AM Invited
The Formation of Al₆ (Fe, Mn) Phase Die-cast Al-Mg Alloys: Xiangzhen Zhu¹; *Shouxun Ji*¹; ¹Brunel University London

9:00 AM
Spark Plasma Sintering of Graphene Nanoplatelets Reinforced Aluminium 6061 Alloy Composites: Mahmood Khan¹; Rafi Ud Din²; Abdul Wadood¹; Shahid Akhtar³; Syed Wilayat Husain¹; *Ragnhild Aune*⁴; ¹Institute of Space Technology, Islamabad; ²Pakistan Institute of Science and Technology; ³Norsk Hydro, Karmøy Primary Production; ⁴Norwegian University of Science and Technology (NTNU)

9:25 AM
Effects of Mn and Mo Micro-additions on Al-Zr-Sc-Er-Si Mechanical Properties: *Shipeng Shu*¹; Anthony De Luca¹; David Seidman¹; David Dunand¹; ¹Northwestern University

9:50 AM
Nanotreating High-zinc Al-Zn-Mg-Cu Alloy by TiC Nanoparticles: Jie Yuan¹; Min Zuo²; Maximilian Sokoluk³; Gongcheng Yao¹; Shuaihang Pan³; *Xiaochun Li*³; ¹Department of Materials Science and Engineering, University of California Los Angeles; ²University of Jinan; ³Department of Mechanical and Aerospace Engineering, University of California Los Angeles

10:15 AM Break

10:30 AM
Microstructure and Mechanical Response of Artificially Aged Al-Mg-Si Alloys: Experiments and Modeling: *Yoojin Kim*¹; Sharvan Kumar¹; ¹Brown University

10:55 AM
Effect of Zn Additions on the Mechanical Properties of High Strength Al-Si-Mg-Cu Alloys: *Sung su Jung*¹; Soo Been Hwang¹; Byung Joo Kim¹; Yong Ho Park²; Young Cheol Lee¹; ¹KITECH(Korea

Institute of Industrial Technology); ²Pusan National University

11:20 AM

Utilization of 3D Printed Materials in Expendable Pattern Casting Process: *Dika Handayani*¹; Nicole Wagner¹; Victor Okhuysen¹; Michael Seitz¹; Kyle Garibaldi¹; ¹Cal Poly Pomona

LIGHT METALS

Aluminum Reduction Technology — Fundamental

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Jayson Tessier, Alcoa

Wednesday AM | February 26, 2020
6D | San Diego Convention Ctr

Session Chair: Gurdun Arnbjorg Saevarsdottir, Reykjavik University

8:30 AM Introductory Comments

8:35 AM

Electrochemical Behavior of Cu-Al Oxygen-evolving Anodes in Low-temperature Fluoride Melts and Suspensions: *Andrey Yasinskiy*¹; Sai Krishna Padamata¹; Peter Polyakov¹; Aleksandr Samoilo¹; Andrey Suzdaltsev²; Andrey Nikolaev²; ¹Siberian Federal University; ²Institute of High-Temperature Electrochemistry, UB RAS

8:55 AM

Alumina Concentration Measurements in Cryolite Melts: *Luis Bracamonte*¹; Espen Sandnes¹; Christian Rosenkilde²; Karoline Nilsen¹; ¹Norwegian University of Science and Technology; ²Hydro Aluminium

9:15 AM

The Influence of Polarization on the Wetting of Graphite in Cryolite-alumina Melts: Henrik Åsheim¹; Ingrid Andersen Eidsvaag¹; Asbjørn Solheim²; Henrik Gudbrandsen²; Geir Haarberg¹; *Espen Sandnes*¹; ¹Norwegian University of Science and Technology, NTNU; ²SINTEF Industry, Metal Production and Processing

9:35 AM

Electrolysis of Low-temperature Suspensions: an Update: *Andrey Yasinskiy*¹; Andrey Suzdaltsev²; Sai Krishna Padamata¹; Petr

Polyakov¹; Yuriy Zaikov²; ¹Siberian Federal University; ²Institute of High-Temperature Electrochemistry UB RAS

9:55 AM Break

10:10 AM

Adapting Modern Industrial Operation Parameters in a Standardized Laboratory Cell for Measuring Current Efficiency for Aluminium Deposition, Unexpected Challenges and Lessons Learned: Rauan Meirbekova¹; Omar Awayssa²; Geir Haarberg²; *Gudrun Saevarsdottir*¹; ¹Reykjavik University; ²Norwegian University of Science and Technology

10:30 AM

Oxidation Study of Zinc sulfite on the Removal of Sulfur Dioxide from Aluminum Electrolysis Flue Gas by Zinc Oxide: *Xuejiao Cao*¹; Zhang Tingan¹; Yan Liu¹; Weiguang Zhang¹; Simin Li¹; ¹Northeastern University

CHARACTERIZATION

Atom Probe Tomography for Advanced Characterization of Metals, Minerals and Materials III — General Methods and Development

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Phase Transformations Committee

Program Organizers: Haiming Wen, Missouri University of Science and Technology; David Seidman, Northwestern University; Keith Knipling, Naval Research Laboratory; Gregory Thompson, University of Alabama; Simon Ringer, University of Sydney; Arun Devaraj, Pacific Northwest National Laboratory; Gang Sha, Nanjing University of Science and Technology

Wednesday AM | February 26, 2020
Theater A-1 | San Diego Convention Ctr

Session Chairs: David Seidman, Northwestern University; Haiming Wen, Missouri University of Science and Technology

8:30 AM Invited

A Review of Atom Probe Tomography Technology: The Present and Future: *David Larson*¹; ¹CAMECA Instruments Inc.

9:00 AM Invited
APT for Atomic-scale Insights to the Origins of Materials Properties: *Michael Moody*¹; Paul Bagot¹; Tom Lapington¹; David Tweddle¹; Benjamin Jenkins¹; ¹University of Oxford

9:30 AM Invited
Atom Probe Characterisation of Hydrogen in Iron and Steels: *Peter Felfer*¹; Valentin Dalbauer¹; ¹Fau Erlangen-Nurnberg

10:00 AM Break

10:15 AM Invited
Nanoparticle Sample Preparation for Atom Probe Tomography: Chemical Fixation and Cryo-Fixation: Leigh Stephenson¹; Se-Ho Kim¹; Joohyun Lim¹; Olga Kasian²; Pyuck-Pa Choi³; Christina Scheu¹; Dierk Raabe¹; *Baptiste Gault*¹; ¹Max Planck Institut Iron & Steel Research; ²Helmholtz Zentrum Berlin; ³KAIST

10:45 AM Invited
Compositional Dependencies of Ni- and Fe-oxides to Experimental Parameters in Atom Probe Tomography: *Daniel Schreiber*¹; Ann Chiaramonti²; Karen Kruska¹; ¹Pacific Northwest National Laboratory; ²National Institute of Standards and Technology

11:15 AM Invited
Morphological Classification of Dense Objects in Atom Probe Tomography Data: *Iman Ghamarian*¹; Emmanuelle Marquis¹; ¹University of Michigan

11:45 AM
Quantifying Compositional Uncertainty Arising from Peak Overlaps: *Andrew London*¹; ¹UK Atomic Energy Authority

12:05 PM
Post-mortem Selected Area Analysis for Optimized Statistical Analysis of APT Data: *Frederic Danoix*¹; Alexander Dahlstrom²; Begonia Gomez Ferrer³; Cristelle Pareige³; ¹Cnrs; ²KTH Royal Institute of Technology; ³Normandy University

BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces I

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines; Po-Yu Chen, National Tsing Hua University

Wednesday AM | February 26, 2020
Vista | Marriott Marquis Hotel

Session Chairs: Candan Tamerler, University of Kansas; Hendrik Heinz, University of Colorado Boulder

8:30 AM Keynote
Peptides as Modulators of Materials Properties: Case Study MOFS and Composites based on ZnO: *Carole Perry*¹; ¹Nottingham Trent University

9:00 AM
Molecular Mechanisms in Metal Oxide Nanoparticle Interactions with Biomolecules: *Vadim Kessler*¹; ¹SLU

9:30 AM Keynote
Enabling Manufacturing at the Bio-Nano Interface using Gyrotory Forming: *Mohan Edirisinghe*¹; *Ayda Afshar*¹; ¹University College London

10:00 AM Break

10:15 AM Invited
Chiral Inorganic Nanostructures: *Nickolas Kotov*¹; ¹University of Michigan

10:45 AM Invited
Biological Crystallization of Ultrahard Teeth and Translation to Multi-functional Materials: *Anna Pohl*¹; *Taifeng Wang*¹; *Wei Huang*¹; *Michiko Nemoto*²; *David Kisailus*¹; ¹University of California Riverside; ²Okayama University

11:15 AM Invited
Monitoring Interaction of Nanomaterials with Biomolecules and Their Dosimetry at Single Cell Level: *T. Venus*¹; *T. Meyer*¹; *J. Böttner*¹; *C. Merker*¹; *V. Calcagno*¹; *J. Keller*²; *R. Landsiedel*²; *D. Schwotzer*³; *O. Creutzenberg*³; *M. Moro*⁴; *S. Moya*⁴; *J. P. Longo*⁵; *L. Muehlmann*⁵; *Irina Estrela-Lopis*¹; ¹University Leipzig; ²BASF SE; ³Fraunhofer Institute ITEM; ⁴CIC biomaGUNE; ⁵University of Brasilia

BIOMATERIALS

Biological Materials Science — Biomaterials II

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Steven Naleway, University of Utah; Jing Du, Penn State University; Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); David Restrepo, University of Texas at San Antonio

Wednesday AM | February 26, 2020
Leucadia | Marriott Marquis Hotel

Session Chairs: David Restrepo, University of Texas at San Antonio; Claire Acevedo, University of Utah

8:30 AM

Reinforcement of Low Cost Additively Manufactured Prosthetic Sockets to Create Resilient Laminate Materials: *Isaac Cabrera*¹; Joseph Martin¹; Samantha Fong¹; KiAsia Lawson²; Ramesh Rao¹; Albert Lin¹; Joanna McKittrick¹; ¹University of California San Diego; ²North Carolina A&T State University

8:50 AM

Corrosion Behaviour of Modern Ti-based Biomedical Materials in the Simultaneous Presence of Albumin and Hydrogen Peroxide: *Agata Sotniczuk*¹; Donata Kuczynska-Zemla¹; Halina Garbacz¹; ¹Warsaw University of Technology

9:10 AM

Micro-scratch of Irradiated Compression Molded Ultra High Molecular Weight Polyethylene (UHMWPE) based Nanocomposites: *Chinmayee Nayak*¹; Ariharan S²; Vamsi Krishna Bhalla³; Kantesh Balani¹; ¹Indian Institute of Technology, Kanpur; ²Indian Institute of Technology Madras; ³University of Louisville

9:30 AM

Processing, Microstructure Characterization and Biological Response of Cold Sprayed Biocomposite Coatings: *Eden Bhatta*¹; Grant Crawford¹; ¹South Dakota School of Mines and Technology

9:50 AM Invited

Decussation Patterns in Mammalian Teeth Across Bite Force Regimes: *Dwayne Arola*¹; Juliana Fernández-Arteaga²; Cameron Renteria¹; Carli Marsico¹; E. Alex Ossa²; ¹University of Washington; ²Universidad Eafit

10:20 AM Break

10:35 AM

In-situ AFM Identification of Mechanical Properties of Collagen Fibrils and Extrafibrillar Matrix in Bone: *Wei Gao*¹; Xiaodu Wang¹; Heber Barron¹; ¹University of Texas at San Antonio

10:55 AM

Rate and Stress-state Dependent Calibration of FlexiForce Sensors for Injury Biomechanics Research: *Andrew Brown*¹; Alexandra Vest¹; Karin Rafaels¹; ¹U.S. Army Research Laboratory

11:15 AM

Mechanisms of Co-ion Release from Titanium-cobalt Hip Implants Revealed by Atomic Scale Correlative Microscopy: Shanoob Balachandran Nair¹; Zita Zachariah¹; Alfons Fischer¹; David Mayweg¹; Markus Wimmer²; Dierk Raabe¹; *Michael Herbig*¹; ¹Max-Planck-Institut fuer Eisenforschung; ²Rush University Medical Center

SPECIAL TOPICS

Bladesmithing 2020 — Session I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

Program Organizers: Michael West, South Dakota School of Mines & Technology; Roxana Ruxanda, Emerson Climate Technologies Inc.; David Sapiro, Naval Surface Warfare Center

Wednesday AM | February 26, 2020
2 | San Diego Convention Ctr

Session Chair: Michael West, South Dakota School of Mines & Technology

8:30 AM

Aluminum Bronze Cast Khopesh: *Megan Burrill*¹; Kathy Ho¹; ¹Illinois Institute of Technology

8:50 AM

Fabrication of A Historical Seax Using Historical Methods: *Austin Hernandez*¹; Charles Meyer¹; Hugo Heredia¹; Stephen Stafford¹; Christopher Bradley¹; ¹University of Texas, El Paso

9:10 AM
The University of Texas at Austin’s ASME Design Team Bowie Knife Proposal Abstract: *Grace Young*¹; ¹UT ASME Design

9:30 AM
Forging the Future: *Albert Ostlind*¹; ¹New Mexico Institute of Mining & Technology

9:50 AM
Boridized AISI 1045 Carbon Steel for “MortuarySsword” Bladesmithing: David Flores¹; Karen Miroslava¹; Orlando Castro¹; Gerardo Salinas¹; Enrique Duque¹; Simon De La Rosa¹; *José Mariano Flores Herrera*¹; ¹Universidad Autónoma de Nuevo León

10:10 AM Break

10:30 AM
Titanium Bonding to High Carbon Steel through Vanadium for Bladesmithing: *Ryan Mier*¹; ¹Los Alamos National Laboratory

10:50 AM
Comparing Mechanical and Microstructural Properties of a DamascusSteelForgeWeldedwithandwithoutFlux: *Al Medrano*¹; Fernando Robledo¹; Jason Lin¹; Sam Lee¹; Jordan Tran¹; Natalie Wu-Woods¹; Calvin Belcher¹; Tucker Parris¹; ¹University of California, Irvine

11:10 AM
Decapigator: Devin Ritter¹; *Brandon Capellini*¹; ¹University of Florida

11:30 AM
Investigating Chemical and Mechanical Inhomogeneity in Pattern Welded Steel: *Cullen Pearson*¹; ¹University of Tennessee Knoxville

ADVANCED MATERIALS

Bulk Metallic Glasses XVII — Alloy Development and Application I

Sponsored by: TMS Structural Materials Division, TMS:
Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee - Knoxville; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Robert Maass, University of Illinois at Urbana-Champaign; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Wednesday AM | February 26, 2020
Cardiff | Marriott Marquis Hotel

Session Chairs: William Johnson, California Institute of Technology; Marios Demetriou, Glassimetal Technology

8:30 AM Invited
Rapid Discharge Forming of Metallic Glasses: A Novel Metals Manufacturing Platform: *Marios Demetriou¹; Kyung Hee Han¹; Jong Hyun Na¹; Maximilien Launey¹; William Johnson¹; ¹Glassimetal Technology*

8:50 AM Invited
Structure-property-processing Relationships in Bulk Metallic Glasses Suggest a High, but Narrow Path to Success: *Jan Schroers¹; ¹Yale University*

9:10 AM Invited
An Overview of BMG Additive Manufacturing Activities and Future Directions at NASA JPL: *Douglas Hofmann¹; Punnathat Bordeenithikasem¹; ¹NASA JPL/Caltech*

9:30 AM Invited
Synthesis and Properties of BMG Type Nanoglasses by Thin Film Vapour Deposition: *Hans Fecht¹; ¹Ulm University*

9:50 AM Invited
Research Progress in Ti-based Bulk Metallic Glasses: *Ke-Fu Yao¹; Jia-Lun Gu¹; ¹Tsinghua University*

10:10 AM Break

10:30 AM Invited
Formation of New Metallic Glass States by Melt-quenching Under High Pressure: *Qiaoshi Zeng¹; ¹Hpstar*

10:50 AM Invited
Comparison of Excess Entropy in Strong and Fragile Glasses: *Hillary Smith¹; Marios Demetriou²; Brent Fultz²; ¹Swarthmore College; ²California Institute of Technology*

11:10 AM Invited

Glass-forming Liquids Processed Under Ultrahigh Gravitational Accelerations: *Mihai Stoica*¹; Jörg Löffler¹; ¹ETH Zurich

11:30 AM Invited

Catalytic Metallic Glasses for Clean Energy Applications: Vahid Hasannaeimi¹; Shristy Jha¹; Maryam Sadeghilaridjani¹; *Sundeeep Mukherjee*¹; ¹University of North Texas

11:50 AM Invited

Studying Phase Transitions in Slow Motion: Ultrafast-calorimetry Experiments on Bulk Metallic Glasses: *Jörg Löffler*¹; ¹ETH Zurich

LIGHT METALS

Cast Shop Technology: Recycling and Sustainability Joint Session — Recycling and Sustainability Joint Session

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Johannes Morscheiser, Aleris Rolled Products Germany GmbH

Wednesday AM | February 26, 2020
1B | San Diego Convention Ctr

Session Chair: Mertol Gökelma, NTNU Trondheim

8:30 AM Introductory Comments

8:35 AM

Constellium R&D Approach in Recycling from Lab to Industrial Scale: *Anne Pichat*¹; Alain Vassel¹; Pierre-Yves Menet¹; Laurent Jouët-Pastre²; ¹Constellium Technology Center; ²Constellium Neuf Brisach plant

8:55 AM

Representative Sampling, Fractionation and Melting of Al-scrap: *Stefan Wibner*¹; Helmut Antrekowitsch¹; Barbara Falkensammer²; ¹Montanuniversitaet Leoben; ²Hütte Klein-Reichenbach

9:15 AM

Recycling of Aluminium Waste from Mixed Household Waste: Sigvart Eggen¹; Kurt Sandaunet²; Leiv K Kolbeinsen¹; *Anne Kvithyld*¹; ¹NTNU; ²SINTEF

9:35 AM

An Assessment of Recyclability of Used Aluminium Coffee Capsules: *Mertol Gökelma*¹; Fabian Diaz²; Ilayda Elif Öner³; Bernd Friedrich²; Gabriella Tranell¹; ¹Norwegian University of Science and Technology; ²RWTH Aachen University; ³Istanbul Technical University

9:55 AM Break

10:10 AM

Fractional Solidification for Purification of Recycled Aluminium Alloys: *Susanna Venditti*¹; Dmitry Eskin¹; Alain Jacot¹; ¹Bcast Brunel University

10:30 AM

A Rapid Method of Determining Salt Flux Melting Point and Composition: *Ray Peterson*¹; ¹Real Alloy

10:50 AM

Automatic Skimming Procedure for Reducing Aluminium Losses and Maintaining the Uniform Quality of the Molten Metal: Varuzan Kevorkijan¹; Uroš Kovacec²; Sandi Žist¹; *Matjaz Godec*³; ¹Impol R in R d.o.o.; ²Impol LLT d.o.o.; ³Institute of Metals and Technology

11:10 AM

Evaluation of the Effect of CO₂ Cover Gas on the Rate of Oxidation of an AlMgSi Alloy: *Cathrine Solem*¹; Kai Erik Ekstrøm¹; Gabriella Tranell¹; Ragnhild Aune¹; ¹Norwegian University of Science and Technology (NTNU)

CHARACTERIZATION

Characterization of Minerals, Metals and Materials — Mineral Processing and Analysis III

Sponsored by: TMS Extraction and Processing Division, TMS; Materials Characterization Committee

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Shadia Ikhmayies, Al Isra University; Yunus Kalay, Middle East Technical University; Jiann-Yang Hwang, Michigan Technological University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Army Research Laboratory

Wednesday AM | February 26, 2020
Theater A-5 | San Diego Convention Ctr

Session Chairs: Jiann-Yang Hwang, Michigan Technological University; Andrew Brown, Army Research Laboratory

8:30 AM

Effect of Acidic Attack on the Structural Characteristics of Sepiolite from Nevada, USA: *Huaguang Wang*¹; Bowen Li¹; ¹Michigan Technological University

8:50 AM

Leaching of Copper, Cobalt and Nickel from Complex Ore: *Yotamu Hara*¹; Douglas Musowoya¹; Golden Kaluba¹; Choolwe Muchindu¹; Haggai Simfukwe¹; Kennedy Kennedy¹; Stephen Parirenyatwa¹; Tinah Chanda¹; ¹Copperbelt University

9:10 AM

Preparation and Photocatalytic Properties of Mo-doped TiO₂@fly Ash Cenospheres for Degradation of Methylene Blue: *Yongfeng Cai*¹; Bin Xu¹; Li Guanghui¹; Min Li¹; Mingjun Rao¹; Jun Luo¹; Zhiwei Peng¹; Pengxu Cao¹; ¹Central South University

9:30 AM

Removing Arsenic from the NiSO₄ Solution Using Modified D301 Resin: Ailiang Chen¹; *Xintao Sun*¹; Jinxi Qiao¹; Zhen Qian¹; Yan Zhang²; Yutian Ma³; Zhiqiang Liu⁴; Lixue Shi¹; ¹Central South University; ²State Key Laboratory of Nickel and Cobalt Resources Comprehensive Utilization; ³State Key Laboratory of Nickel and Cobalt Resources Comprehensive Utilization;Jinchuan Group Co. Ltd; ⁴Guangdong Research Institute of Rare Metals;State Key Laboratory of Rare Metals Separation and Comprehensive Utilization

9:50 AM Break

10:10 AM

Activated Carbon Prepared from Bituminous Coal/poplar Blends by Direct KOH Activation: *Xiaohu Zhou*¹; Shengfu Zhang¹; Yuyang Wei¹; Xiong Xiao¹; Weiyi Chen¹; ¹Chongqing University

10:30 AM

Preparation of Thermal Insulation Materials from Ferronickel Slag with Addition of Fly Ash Cenosphere: *Lei Yang*¹; Zhiwei Peng¹; Yawen Huang²; Liancheng wang¹; Leixia Zheng¹; Mingjun Rao¹; Guanghui Li¹; Tao Jiang¹; ¹Central South University; ²School of Materials Science and Engineering, Southwest University of Science and Technology

CHARACTERIZATION

Characterization: Structural Descriptors, Data-Intensive Techniques, and Uncertainty Quantification — Diffraction, Microscopy & Machine Learning

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Extraction and Processing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Materials Characterization Committee

Program Organizers: Shawn Coleman, CCDC Army Research Laboratory; Tomoko Sano, U.S. Army Research Laboratory; James Hogan, University of Alberta; Srikanth Patala, North Carolina State University; Oliver Johnson, Brigham Young University; Francesca Tavazza, National Institute of Standards and Technology

Wednesday AM | February 26, 2020
Theater A-3 | San Diego Convention Ctr

Session Chairs: Shawn Coleman, CCDC Army Research Laboratory; Tomoko Sano, CCDC Army Research Laboratory

8:30 AM Introductory Comments

8:35 AM
100 Years of Scherrer Modifications: Demystifying Diffractogram Width Analyses for Nanocrystalline Materials: *Cody Kunka*¹; Brad Boyce¹; Stephen Foiles¹; Remi Dingreville¹; ¹Sandia National Laboratories

8:55 AM
Machine Learning Approach for On-the-fly Crystal System Classification from Powder X-ray Diffraction Pattern: *Yuta Suzuki*¹; Hideitsu Hino²; Takafumi Hawai¹; Kotaro Saito³; Kanta Ono¹; ¹High Energy Accelerator Research Organization; ²The Institute of Statistical Mathematics; ³Paul Scherrer Institute

9:15 AM
Indexing of Electron Back-Scatter Diffraction Patterns Using a Convolutional Neural Network: *Zihao Ding*¹; Elena Pascal¹; Marc De Graef¹; ¹Carnegie Mellon University

9:35 AM Invited
Parametric Models for Crystallographic Texture: Estimation and Uncertainty Quantification: *Stephen Niezgoda*¹; James Matuk¹; Oksana Chkrebtii¹; ¹The Ohio State University

10:05 AM Break

10:25 AM Invited

Large-scale Defect Contrast Simulations for Scanning and Transmission Electron Microscopy: *Marc De Graef*¹; ¹Carnegie Mellon University

10:55 AM

Machine Learning and Electron Backscatter Diffraction: Alessandro Previero¹; Guillaume de Certaines¹; Alex Foden¹; *Thomas Britton*¹; ¹Imperial College London

11:15 AM Invited

A New Crystallographic Defect Quantification Workflow via Advanced-microscopy-based Deep Learning: *Yuanyuan Zhu*¹; Graham Roberts¹; Rajat Sainju¹; Colin Ophus²; Brian Hutchinson³; Danny Edwards⁴; Mychailo Toloczko⁴; ¹University of Connecticut; ²Lawrence Berkeley National Laboratory; ³Western Washington University; ⁴Pacific Northwest National Laboratory

CORROSION

Coatings and Surface Engineering for Environmental Protection II — Corrosion Control Session I

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Arif Mubarak, PPG; Raul Rebak, GE Global Research; Rajeev Gupta, University of Akron; Tushar Borkar, Cleveland State University; Brian Okerberg, PPG Industries; Michael Mayo, PPG Industries

Wednesday AM | February 26, 2020
19 | San Diego Convention Ctr

Session Chairs: Rajeev Gupta, University of Akron; Tushar Borkar, Cleveland State University

8:30 AM Invited

Chloride Susceptibility Index (CSI) : An Ab initio Based Corrosion Resistance Indicator: *Huibin Ke*¹; Pin Lu²; Christopher Taylor¹; ¹The Ohio State University; ²QuesTek

8:50 AM

A Study of the Effects of Laser Shock Peening (LSP) on the Susceptibility of Sensitized 304L Stainless Steel to Intergranular Corrosion: *Richard Chiang*¹; Harsha Naralasetty¹; Seetha Mannava¹;

Matthew Steiner¹; Vijay Vasudevan¹; ¹University of Cincinnati

9:10 AM

Contact Resistance and Corrosion Response of Non-chromate Passivations on ZnNi Coatings: *Kevin Foster*¹; William Fahrenholtz¹; Matthew O’Keefe²; James Claypool¹; ¹Missouri University of Science and Technology; ²The University of Mississippi

9:30 AM

Corrosion Phenomena in Powder-processed Icosahedral-phase-strengthened Aluminum Alloys: *Sarshad Rommel*¹; Hannah Leonard¹; Mingxuan Li¹; Thomas Watson²; Tod Policandriotes³; Mark Aindow¹; ¹University of Connecticut; ²Pratt & Whitney; ³Collins Aerospace

9:50 AM

Effect of Surface Coating on Corrosion Product Deposition Behavior in PWR Fuel Cladding: *Junhyuk Ham*¹; Yunju Lee¹; Seung Chang Yoo¹; Ji Hyun Kim¹; ¹UNIST

10:10 AM Break

10:25 AM

Electrochemical Impedance Spectroscopic Study of Oxide Scales on Pure Iron in Liquid Lead-bismuth Eutectic: *Jie Qiu*¹; Peter Hosemann¹; Digby Macdonald¹; John Scully¹; ¹University of California at Berkeley

10:45 AM

Estimating the Effect that Interactions between Chemical Reactions and Environmental Influences Have on the Corrosivity of the Electrolyte: *Steven PolICASTRO*¹; Rachel Anderson¹; Carlos Hangarter¹; ¹Naval Research Laboratory

11:05 AM

Evaluation of Surface Characteristics of Cr-coated Zr-4 Accident Tolerant Fuel Cladding Material after Critical Heat Flux Testing under Atmospheric Pressure: *Rajnikant Umretiya*¹; Jessika Rojas¹; Mark Anderson²; Barret Elward²; Raul Rebak³; Sama Bilbao y Leon¹; ¹Virginia Commonwealth University; ²University of Wisconsin-Madison; ³GE Global Research

11:25 AM

Elucidating the Degradation Mechanisms of Ti-6Al-4V Dental Implants: *Xin Chen*¹; Kumar Shah¹; Shiqi Dong¹; Lars Peterson¹; Erika La Plante¹; Gaurav Sant¹; ¹University of California, Los Angeles

THE WORLD COMES HERE
TMS 2020
145th Annual Meeting & Exhibition

Computational Materials Science and Engineering of Materials
in Nuclear Reactors — Defects and Modeling

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Dilpuneet Aidhy, University of Wyoming; Michael Tonks, University of Florida; Mahmood Mamivand, Boise State University; Giovanni Bonny, Belgian Nuclear Research Center

Wednesday AM | February 26, 2020
Theater A-9 | San Diego Convention Ctr

Session Chairs: Kai Nordlund, University of Helsinki; Mike Tonks, University of Florida

8:30 AM Invited
The Use of Molecular Dynamics Simulations for Modeling Gas - Point Defect Interaction Behavior in Nuclear Materials: *Brian Wirth*¹; ¹University of Tennessee

9:10 AM
Density Functional Theory Study of He/H Effect in W-Ni-Fe Composite for Plasma Facing Material: *Wahyu Setyawan*¹; ¹Pacific Northwest National Laboratory

9:30 AM
Ab-initio Molecular Dynamics Simulations of bcc U and U-Zr Alloys: *Benjamin Beeler*¹; David Andersson²; Yongfeng Zhang¹; ¹Idaho National Laboratory; ²Los Alamos National Laboratory

9:50 AM
Diffusion and Interaction of Prismatic Dislocation Loops in Stochastic Dislocation Dynamics: Yang Li¹; *Max Boleininger*²; Christian Robertson¹; Laurent Dupuy¹; Sergei Dudarev²; ¹DEN-Service de Recherches Métallurgiques Appliquées; ²Culham Centre for Fusion Energy

10:10 AM Break

10:30 AM Invited
Development and Testing of Machine Learning Interatomic Potentials for Radiation Damage Calculations: *Kai Nordlund*¹; Ali Hamedani¹; Jesper Byggmästar¹; Flyura Djurabekova¹; ¹University of Helsinki

WEDNESDAY AM

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MOBILE-FRIENDLY TECHNICAL PROGRAM

TMS
WEBSITE

11:10 AM
Molecular Dynamics Simulations of Mixed Materials in Tungsten: *Mary Alice Cusentino*¹; Mitchell Wood¹; Aidan Thompson¹; ¹Sandia National Laboratories

11:30 AM
Plasticity of Zirconium Hydrides: an Edge and Screw Planar Discrete Dislocation Model: *Luca Realì*¹; Daniel Balint¹; Mark Wenman¹; Adrian Sutton¹; ¹Imperial College London

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Diffusion, Excitations and Rare Events I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Jorge Munoz, University of Texas at El Paso; Sara Kadkhodaei, University of Illinois at Chicago; Vahid Attari, Texas A&M University; James Morris, Ames Laboratory

Wednesday AM | February 26, 2020
33C | San Diego Convention Ctr

Session Chairs: Marco Bernardi, California Institute of Technology; Chelsey Hargather, New Mexico Institute of Mining and Technology

8:30 AM Invited
Where do Thermodynamics and Transport Kinetics Meet?: *Zi-Kui Liu*¹; Yi Wang¹; Irina Belova²; Graeme Murch²; ¹Pennsylvania State University; ²University of Newcastle

9:00 AM
Free Energy Calculation of Mechanically Unstable but Dynamically Stabilized Phases: *Sara Kadkhodaei*¹; Axel van de Walle²; ¹University of Illinois at Chicago; ²Brown University

9:20 AM
A First-principles Investigation of the Importance of Various Calculation Parameters on Self-diffusion Coefficient Calculations in FCC Metals: John O'Connell¹; *Chelsey Hargather*¹; ¹New Mexico Institute of Mining and Technology

9:40 AM Invited

Features of Defects Diffusion in Concentrated Alloys: Percolation, Sluggish and Chemically Biased Atomic Transport: *Osetskiy Yury*¹; Alexander Barashev²; Laurent Béland³; Yanwen Zhang¹; ¹Oak Ridge National Laboratory; ²University of Michigan; ³Queen's University

10:10 AM Break

10:30 AM Invited

Advances in Computing Charge Carrier Dynamics and Electron Interactions from First Principles: *Marco Bernardi*¹; ¹California Institute of Technology

11:00 AM

State-dependent Force Constants for Anharmonicity: *Jorge Munoz*¹; ¹The University of Texas at El Paso

11:20 AM

The Temperature Dependence of Electron-phonon Interactions in Vanadium: *Brent Fultz*¹; Fred Yang¹; Olle Hellman¹; ¹California Institute of Technology

11:40 AM

Thermal Properties of Disordered Alloys from Density Functional Theory Calculations: *Pavel Korzhavyi*¹; ¹KTH Royal Institute of Technology, Stockholm, Sweden

MATERIALS PROCESSING

Defects and Properties of Cast Metals — Cast Iron & Steel

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Solidification Committee

Program Organizers: Lang Yuan, University of South Carolina; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Charles Monroe, University of Alabama at Birmingham

**Wednesday AM | February 26, 2020
17B | San Diego Convention Ctr**

Session Chair: Charles Monroe, The University of Alabama at Birmingham

8:30 AM

In-situ Synchrotron Examination of the Evolution and Transition of Nodular, Compacted and Laminar Graphite During Solidification of Cast Iron: Chaoling Xu¹; Mohammed Azeem²; *Tim Wigger*³; Tito Andriollo¹; Samuel Clark⁴; Zhixuan Gong²; Zhixuan Gong³; Robert Atwood⁵; Peter Lee³; Niels Tiedje¹; ¹Technical University of Denmark; ²University of Leicester; ³University College London; ⁴University College, London; ⁵Diamond Light Source

8:50 AM

The 3D Correlation of Si Segregation to Nodules Size, Nodules Spatial Distribution and Local Mechanical Strain in Ductile Cast Iron: Chaoling Xu¹; *Tito Andriollo*¹; Yubin Zhang¹; Fengxiang Lin²; Juan-Carlos Hernando²; Jesper Hattel¹; Niels Tiedje¹; ¹Technical University of Denmark; ²Jönköping University

9:10 AM

Influence of Composition on the Solidification and Weldability of Cast Austenitic Stainless Steels: *Sean Orzolek*¹; John DuPont¹; ¹Lehigh University

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Transitions at Grain Boundaries VII — Grain Boundary-Dislocation Interactions

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Shen Dillon, University of Illinois; Douglas Spearot, University of Florida; Jian Luo, University of California, San Diego; Jennifer Carter, Case Western Reserve University

**Wednesday AM | February 26, 2020
5B | San Diego Convention Ctr**

Session Chairs: Samuel Hemery, Institute Prime - Ensma; Samantha Daly, University of California, Santa Barbara

8:30 AM Invited

Atomistic Simulations of Grain Boundary-dislocation Interactions in Mg and Mg Alloys: *Liang Qi*¹; Chaoming Yang¹; Mingfei Zhang¹; Yong-Jie Hu¹; ¹University of Michigan

8:50 AM

Inhibiting Twin Transfer in Magnesium Alloys with Grain Boundary Particles: *Benjamin Anthony*¹; Brandon Leu²; Wai Tse³; Zhenhuan Wang⁴; Irene Beyerlein²; Victoria Miller¹; ¹University of Florida; ²University of California Santa Barbara; ³University of New South Wales Sydney; ⁴North Carolina State University

9:10 AM

Manipulating Twin Morphology in Mg Alloys by Varying Solute Concentration: *Yang Hu*¹; Vladyslav Turlo¹; Irene Beyerlein²; Subhash Mahajan³; Enrique Lavernia¹; Julie Schoenung¹; Timothy Rupert¹; ¹University of California, Irvine; ²University of California, Santa Barbara; ³University of California, Davis

9:30 AM

Estimation of Misfit Dislocation Density in Hexagonal Titanium Using Microbeam X-Ray Diffraction and the Frank Bilby Equation: *Harsha Phukan*¹; Thomas Bieler¹; Chen Zhang²; Ruqing Xu³; Philip Eisenlohr¹; Martin Crimp¹; Carl Boehlert¹; ¹Michigan State University; ²Carnegie Mellon University; ³Argonne National Laboratory

9:50 AM Invited

Interactions Between Slip Bands and Grain Boundaries in Ti-6Al-4V: *Samuel Hemery*¹; Christophe Tromas²; Patrick Villechaise¹; ¹Institut Pprime - ISAE-ENSMA; ²Institut Pprime - Université de Poitiers

10:10 AM Break

10:30 AM Invited

Grain Boundary Sliding and Slip Transmission in High Purity Aluminum: Marissa Linne¹; Thomas Bieler²; *Samantha Daly*³; ¹University of Michigan; ²Michigan State University; ³University of California, Santa Barbara

10:50 AM Invited

On the Effect of Slip Transfer and Grain Boundary Sliding on the Deformation Mechanisms of FCC Polycrystals: Eugenia Nieto¹; Sarra Haouala²; Alberto Orozco-Caballero³; Thomas Bieler⁴; *Javier Llorca*¹; ¹IMDEA Materials Institute & Technical University of Madrid; ²IMDEA Materials Institute; ³Technical University of Madrid; ⁴Michigan State University

11:10 AM

Fatigue-induced Slip from Type II Twin Boundary Motion of Shape Memory Alloys: *Ahmedsameerkhan Mohammed*¹; Huseyin Sehitoglu¹; ¹University of Illinois Urbana-Champaign

11:30 AM

Quantifying the Plastic Deformation Behavior of Grain Boundaries in Additive Manufactured Ta: *Nan Li*¹; Jordan Weaver²; Yuchi Cui³; David Jones¹; Nathan Mara⁴; Saryu Fensin¹; Curt Bronkhorst⁵; Amit Misra³; Rusty Gray¹; ¹Los Alamos National Laboratory; ²National Institute of Standards and Technology; ³University of Michigan, Ann Arbor; ⁴University of Minnesota-Twin Cities; ⁵University of Wisconsin - Madison

11:50 AM

Investigation of Dislocation Interactions in a Bicrystalline Micropillar Through an Atomistically-informed Discrete Dislocation Dynamics Model: *Nicole Aragon*¹; Jamie Gravell¹; Ill Ryu¹; ¹University of Texas at Dallas

LIGHT METALS

Electrode Technology for Aluminum Production — Anode Assembly and Cathodes

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Duygu Kocaefe, University of Quebec at Chicoutimi

Wednesday AM | February 26, 2020
3 | San Diego Convention Ctr

Session Chair: Houshang Darvishi Alamdari, Laval University

8:30 AM Introductory Comments

8:40 AM

Energy Saving in Hall-Héroult Cell by Optimization of Anode Assembly Design: AbdulMageed Shamroukh¹; S. A. Salman²; *William Berends*³; W. Abdel-Fadeel⁴; G.T Abdel-Jaber⁵; ¹Aluminium compny of Egypt (Egyptalum); ²Mining and Metallurgy Engineering Division, Faculty of Engineering, Al-Azhar University, Cairo, Egypt; ³AluCellTech Inc. Canada; ⁴Faculty of Energy Engineering, Aswan, Egypt; ⁵Faculty of Engineering, Mechanical Design and Production Dept. South Valley University, Egypt

9:05 AM

Redesigning of Current Carrying Conductor - The Energy Reduction Initiative in Low Amperage Hall-Héroult Cell: Ved Prakash Rai¹; *Vibhav Upadhyay*¹; ¹Hindalco Industries Limited

9:30 AM

Ready-to-Use Cathodes for the Hall-Hérout Process: *Markus Pfeffer*¹; Louis Bugnion²; Laure Von Kaenel²; Oscar Vera Garcia¹; ¹COBEX GmbH; ²NOVALUM

9:55 AM Break

10:15 AM

High Temperature Creep Behaviour of Carbon-based Cathode Material for Aluminum Electrolysis: *Wei Wang*¹; Kai Sun¹; ¹Henan University of Science and Technology

10:40 AM

Mechanism Understanding of Sodium Penetration into Anthracite Cathodes: A Perspective from Diffusion Coefficients: *Jiaqi Li*¹; Hongliang Zhang¹; Jingkun Wang¹; Yunrui Wang¹; ¹Central South University

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Innovative Techniques in Corrosion Research

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Bai Cui, University of Nebraska-Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Jenifer Locke, Ohio State University

Wednesday AM | February 26, 2020
Theater A-10 | San Diego Convention Ctr

Session Chairs: Khalid Hattar, Sandia National Laboratories; Nikhilesh Chawla, Arizona State University

8:30 AM Invited

Probing Mechanisms of Corrosion Damage in Aluminum Alloys by Correlative Tomography and Microscopy: *Nikhilesh Chawla*¹; ¹Arizona State University

9:10 AM Invited

Relating Corrosion Susceptibility to Microstructure via Multiscale Electron Microscopy: *Josh Kacher*¹; Jordan Key¹; Jahnavi Desai¹; ¹Georgia Institute of Technology

9:50 AM

***In situ* Study of Room Temperature Hydride Formation in Ti6Al4V and its Effect on Damage Mechanisms:** *Jinwoo Kim*¹; C. Cem Tasan¹; ¹Massachusetts Institute of Technology

10:10 AM Break

10:30 AM

Quantifying Environmentally-assisted Cracking In-situ in Ar and s-CO₂ Environments: *Andrew Brittan*¹; Camila Toledo Torres¹; Peter Beck¹; Lucas Teeter¹; Samuel Briggs¹; Guillaume Mignot¹; Sebastien Teyseyre²; Julie Tucker¹; ¹Oregon State University; ²Canadian Nuclear Laboratories

10:50 AM Invited

History and Future of In-situ Transmission Electron Microscopy Corrosion Experiments: *Khalid Hattar*¹; ¹Sandia National Laboratories

11:30 AM

Combinatorial Studies of Stress Corrosion Sensitivity of Alloy Films: *Kewei Gao*¹; Youpeng Song¹; ¹Beijing University of Science and Technology

MECHANICS & STRUCTURAL RELIABILITY

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Multiscale Modeling Approaches to Improve Fatigue Predictions

Sponsored by: TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Garrett Pataky, Clemson University; Ashley Spear, University of Utah; Jean-Briac le Graverend, Texas A&M University; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University

**Wednesday AM | February 26, 2020
11A | San Diego Convention Ctr**

Session Chair: Jean-Briac le Graverend, Texas A&M University

8:30 AM Invited

Advances in Modeling of Fatigue Thresholds: *Huseyin Sehitoglu*¹; ¹University of Illinois

8:50 AM

3D Discrete Dislocation Dynamic Modeling on Cyclic Behavior of Cu: *Fanshi Meng*¹; Marc Fivel¹; Emilie Ferrie¹; Christophe Depres²; ¹UniversityGrenobleAlpes,CNRS,GrenobleINP,SIMaP;²Laboratory SYMME, Université de Savoie, Annecy-Le-Vieux Cedex

9:10 AM

Atomistic and Dislocation Dynamics Simulations of The Interaction of Dislocations with Twin Boundaries in FCC Alloys: *Satish Rao*¹; Maxime Dupraz²; Jafaar El-Awady³; Christopher Woodward⁴; ¹Ues Inc.; ²European Synchrotron Radiation Facility; ³Johns Hopkins University; ⁴Air Force Research Laboratory

9:30 AM

Effects of Surface Roughness on Microstructure-sensitive Computations of Fatigue Crack Formation Driving Force in Duplex Ti-6Al-4V and Al 7075-T6: *Krzysztof Stopka*¹; David McDowell¹; ¹Georgia Institute of Technology

9:50 AM

Exploring the Fundamental Role of Dislocation-twin Boundary Interactions in Fatigue: *Orcun Koray Celebi*¹; Ahmed Sameer Khan Mohammed¹; Francisco Andrade Chavez¹; Jessica Anne Krogstad¹; Huseyin Sehitoglu¹; ¹University of Illinois at Urbana Champaign

10:10 AM Break

10:30 AM

Micromechanical Modeling of Copper under Very High Cycle Fatigue: *Vahid Tari*¹; Michael Fitzka²; Herwig Mayer²; Jason W. Carroll¹; ¹Eaton Corporation Research & Technology; ²University of Natural Resource and Life Science

10:50 AM

Micromechanics-based Effect of Defects Models for Ellipsoidal Anomalies: *James Sobotka*¹; R. Craig McClung¹; Michael Enright¹; ¹Southwest Research Institute

11:10 AM

The Dislocation Configurational Energy for the Prediction of Fatigue Crack Nucleation: An Integrated Experimental and Computational Study: *Nikoletta Prastiti*¹; Fionn Dunne¹; Daniel Balint¹; ¹Imperial College London

11:30 AM

Quantitative Characterization and Multi-scale Modeling of the Effects of Porosity on Fatigue Life in Ni-based Single Crystal Superalloys: *Keli Liu*¹; Junsheng Wang¹; ¹Beijing Institute of Technology

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Functional Nanomaterials 2020: Translating Innovation into Pioneering Technologies — Translating Innovation into Pioneering Technologies V

Sponsored by: TMS Functional Materials Division, TMS: Nanomaterials Committee

Program Organizers: Simona Hunyadi Murph, Savannah River National Laboratory; Huanyu Cheng, Pennsylvania State University; Yong Lin Kong, University of Utah; Min Kyu Song, Washington State University; Ning Zhang, University of Alabama

Wednesday AM | February 26, 2020
Point Loma | Marriott Marquis Hotel

Session Chairs: Yong Lin Kong, University of Utah; Nasrin Hooshmand, Georgia Tech

8:30 AM Invited
From Functional Nanomeshes to Advanced Soft Microsystems: *Hui Fang*¹; Kyung Jin Seo¹; ¹Northeastern University

8:50 AM Invited
Metallic Nanoparticle Assemblies for Tunable Nanoscale Sensors: *Nasrin Hooshmand*¹; ¹Georgia Institute of Technology

9:10 AM Invited
Materials and Mechanics for 3D Stretchable Structures and Electronics: *Xueju Wang*¹; ¹University of Missouri-Columbia

9:30 AM Invited
Developing Nanomaterials for Separations That Improve Biomass Processing to Biofuels/Chemicals: *Michael Hu*¹; ¹Oak Ridge National Laboratory

9:50 AM Break

10:10 AM Invited
Vapor-phase Infiltration Synthesis of Organic-inorganic Hybrid Nanocomposite Resists for Next Generation Lithography: Nikhil Tiwale¹;Ashwanth Subramanian²; Kim Kisslinger¹; Ming Lu¹; Jiyoung Kim³; Aaron Stein¹; *Chang-Yong Nam*¹; ¹Brookhaven National Laboratory; ²Stony Brook University; ³University of Texas at Dallas

10:30 AM

Engineering Mesoporous Silica for Superior Optical and Thermal Properties: *Danielle Butts*¹; Patricia McNeil¹; Sarah Tolbert²; Yongjie Hu³; Laurent Pilon³; Bruce Dunn¹; ¹Department of Materials Science and Engineering, University of California, Los Angeles; ²Department of Chemistry and Biochemistry, University of California, Los Angeles; ³Department of Mechanical and Aerospace Engineering, University of California, Los Angeles

10:50 AM Invited

Flash NanoPrecipitation as a Continuous and Scalable Platform for the Production of Functional Nanocolloids: *Jie Feng*¹; ¹University of Illinois at Urbana-Champaign

11:30 AM

Strain Induced Cyclic Phase Transitions in Fatigue-tolerant 2D Elastocaloric/thermoelastic Materials for Future Cooling and Refrigeration Technologies: *Zhewen Yin*¹; Sankha Mukherjee²; Yunjo Jeong¹; MdRubayat-E Tanjil¹; Chandra Veer Singh²; Michael Cai Wang¹; ¹University of South Florida; ²University of Toronto

11:10 AM Invited

In-situ Grown Metal Nanoparticle Catalysts: Properties and Control: *Tae-Sik Oh*¹; ¹Auburn University

ADVANCED MATERIALS

High Entropy Alloys VIII — Alloy Development and Applications

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Wednesday AM | February 26, 2020
Mission Hills | Marriott Marquis Hotel

Session Chairs: Peter Liaw, University of Tennessee; Michael Bakas, Army Research Office

8:30 AM Invited

Multicomponent and High-entropy Cantor Alloys: *Brian Cantor*¹; ¹University of Bradford

8:50 AM Invited

High Entropy Alloys for Magnetocaloric Effect Applications: *Michael McHenry*¹; Alice Perrin¹; ¹Carnegie Mellon University

9:10 AM

Designing Ductile Refractory High-entropy Alloys Guided by Natural Mixing: *Shaolou Wei*¹; Sang Jun Kim²; Yongjie Zhang³; Goro Miyamoto³; Tadashi Furuhashi³; Eun Soo Park²; Cemal Tasan¹; ¹Massachusetts Institute of Technology; ²Seoul National University; ³Tohoku University

9:30 AM Invited

Latest Developments in High Entropy Brasses & Bronzes: *Kevin Laws*¹; Peter Nicholson¹; Patrick Conway²; David Miskovic¹; Lori Bassman³; Warren McKenzie⁴; ¹University of New South Wales; ²Jönköping University; ³Harvey Mudd College; ⁴Advanced Alloy Holdings

9:50 AM Invited

High-throughput Experiments for Structural Materials – a Current Status: *Daniel Miracle*¹; ¹Air Force Research Laboratory

10:10 AM Break

10:30 AM Invited

How High are the Entropies of High Entropy Alloys?: Kaituo Huo¹; Qikai Li¹; *Mo Li*²; ¹University of Science and Technology Beijing; ²Georgia Institute of Technology; University of Science and Technology Beijing,

10:50 AM

Decoding Early Candidacy of High Entropy Alloys for Nuclear Application using the Advanced Test Reactor through Predictive Methods: *Geoffery Beausoleil*¹; Jeffrey Aguiar¹; Seongtae Kwon¹; Eric Eyerman²; ¹Idaho National Laboratory; ²California Nanotechnologies

11:10 AM

Design of High-strength and Ductile High-entropy Steels: *Zhangwei Wang*¹; Wenjun Lu¹; Huan Zhao¹; Dirk Ponge¹; Dierk Raabe¹; Zhiming Li¹; ¹Max-Planck-Institut für Eisenforschung

11:30 AM Invited

High-Entropy Ceramics: Selected Recent Studies and Future Opportunities: *Jian Luo*¹; ¹University of California, San Diego

11:50 AM

Nanomolding Far and Close to Equilibrium: *Naijia Liu*¹; Sungwoo Sohn¹; Jan Schroers¹; Arindam Raj¹; Guannan Liu¹; ¹Yale University

12:10 PM Invited
Phenomenological Approach to Multi-principal-element Structural Materials: *Joseph Poon*¹; Qi Jie¹; John Scully¹; Sean Agnew¹; ¹University of Virginia

MATERIALS DESIGN

Hume-Rothery Symposium: Thermodynamics, Phase Equilibria and Kinetics for Materials Design and Engineering — Building CALPHAD Databases: Essential Experiments

Sponsored by: TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Carelyn Campbell, National Institute of Standards and Technology; Michael Gao, National Energy Technology Laboratory; Wei Xiong, University of Pittsburgh

Wednesday AM | February 26, 2020
32A | San Diego Convention Ctr

Session Chairs: Michael Gao, National Energy Technology Laboratory; Yongho Sohn, University of Central Florida

8:30 AM Invited
Improvement of a CALPHAD Database for the Development of Next Generation TiAl Alloys by Targeted Key Experiments on High-temperature Phase Equilibria – The EU Project Advance: *Frank Stein*¹; Benedikt Distl¹; Zahra Kahrobaee¹; Martin Palm¹; Katja Hauschildt²; Marcus Rackel²; Florian Pyczak²; Svea Mayer³; Yang Yang⁴; Hai-Lin Chen⁴; Anders Engström⁴; ¹Max-Planck-Institut fuer Eisenforschung; ²Helmholtz-Zentrum Geesthacht; ³Montanuniversität Leoben; ⁴Thermo-Calc Software AB

9:10 AM Invited
Measurements of Thermophysical Properties of Metals and Alloys as Input for Computational Thermodynamics: *Erhard Kaschnitz*¹; ¹Austrian Foundry Research Institute

9:50 AM Break

10:20 AM Invited
The Application of Metastable Equilibria in the Analysis of Transformation Behavior: *John Perepezko*¹; ¹University of Wisconsin-Madison

11:00 AM Invited
Selected Observations of Microstructural Development in Additively Manufactured Metallic Alloys: *Yongho Sohn*¹; *Le Zhou*¹;
¹University of Central Florida

MATERIALS DESIGN

ICME Gap Analysis in Materials Informatics: Databases, Machine Learning, and Data-Driven Design — Session I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: James Saal, Citrine Informatics; Carelyn Campbell, National Institute of Standards and Technology; Raymundo Arroyave, Texas A&M University

Wednesday AM | February 26, 2020
30D | San Diego Convention Ctr

Session Chairs: Raymundo Arroyave, Texas A&M; James Saal, Citrine Informatics

8:30 AM Invited
The MGI and ICME: *James Warren*¹; ¹National Institute of Standards and Technology

9:10 AM Invited
Polymer Informatics: Current Status & Critical Next Steps: Rampi Ramprasad¹; *Chiho Kim*; ¹Georgia Institute of Technology

9:50 AM
Artificial Intelligence for Material and Process Design: *Marius Stan*¹; Noah Paulson¹; Elise Jennings¹; Joseph Libera¹; Richard Otis²; Brandon Bocklund³; Aaron Kusne⁴; James Warren⁴; Zi-Kui Liu³; Gregory Olson⁵; ¹Argonne National Laboratory; ²Jet Propulsion Laboratory; ³Pennsylvania State University; ⁴National Institute of Standards and Technology; ⁵QuesTek Innovations LLC

10:10 AM Break

10:30 AM Invited
Gaps, Limitations, and Pitfalls of Materials Informatics: *Taylor Sparks*¹; ¹University of Utah

11:10 AM Invited

View on Data Ecosystem of Materials: *Zi-Kui Liu*¹; ¹Pennsylvania State University

LIGHT METALS

Magnesium Technology 2020 — Thermomechanical Processing

Sponsored by: TMS Light Metals Division, TMS: Magnesium Committee

Program Organizers: J. Brian Jordon, University of Alabama; Victoria Miller, University of Florida; Vineet Joshi, Pacific Northwest National Laboratory; Neale Neelameggham, IND LLC

Wednesday AM | February 26, 2020
6C | San Diego Convention Ctr

Session Chairs: Christopher Barrett, Mississippi State University; Vineet Joshi, Pacific Northwest National Laboratory

8:30 AM Invited

Deformation Driven Precipitation in Binary Magnesium Alloys: *Timothy Weihs*¹; Suhas Eswarappa Prameela¹; ¹Johns Hopkins University

9:00 AM

Effect of Second Phase Particle Size on the Recrystallized Microstructure of Mg-Al Alloys Following ECAE Processing: *Suhas Eswarappa Prameela*¹; Peng Yi¹; Vance Liu¹; Beatriz Medeiros¹; Laszlo Kecskes¹; Michael Falk¹; Timothy Weihs¹; ¹Johns Hopkins University

9:20 AM

Relating Texture and Thermomechanical Processing Variables in Mg-Zn-Ca Alloys: *Tracy Berman*¹; John Allison¹; ¹University of Michigan

9:40 AM

Variation of Extrusion Process Parameter for the Magnesium Alloy ME21: *Gerrit Kurz*¹; Maria Nienaber¹; Jan Bohlen¹; Dietmar Letzig¹; Kainer Karl Ulrich¹; ¹Magic-Magnesium Innovation Centre

10:00 AM Break

10:20 AM Invited

Fundamental Deformation Mechanisms During Solid Phase Processing of Mg Alloys: *Suveen Mathaudhu*¹; ¹University of California, Riverside

10:50 AM

Asymmetric Rolling of TZ73 Magnesium Alloy to Improve Its Ductility: Krishna Verma¹; Satyam Suwas¹; *Subodh Kumar*¹; ¹Indian Institute of Science

11:10 AM

Friction Stir Processing of Magnesium Alloy with Spiral Tool Path Strategy: *Abhishek Kumar*¹; Aarush Sood¹; Nikhil Gotawala¹; Sushil Mishra¹; Amber Shrivastava¹; ¹Indian Institute of Technology Bombay

11:30 AM Invited

Joining Dissimilar Materials via Rotational Hammer Riveting Technique: Tianhao Wang¹; Scott Whalen¹; Piyush Upadhyay¹; *Keerti Kappagantula*¹; ¹Pacific Northwest National Laboratory

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — Corrosion I

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Stephen Raiman, Oak Ridge National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Michael Short, Massachusetts Institute of Technology; Kumar Sridharan, University of Wisconsin-Madison; Nathaniel Hoyt, Argonne National Laboratory

Wednesday AM | February 26, 2020
Theater A-6 | San Diego Convention Ctr

Session Chair: Michael Short, Massachusetts Institute of Technology

8:30 AM Invited

The Department of Energy Molten Salt Reactor Development Overview: *Lou Qualls*¹; ¹Oak Ridge National Laboratory

9:00 AM

Investigation of the Mechanism Behind Proton Irradiation Decelerated Corrosion in Molten Fluorides: *Weiyue Zhou*¹; Yang Yang²; Lingfeng He³; Andrew Minor²; Michael Short¹; ¹Massachusetts Institute of Technology; ²Lawrence Berkeley National Laboratory; ³Idaho National Laboratory

9:20 AM

Effect of Salt Additives and Impurities on Flowing Commercial Chloride Salt Compatibility: *Bruce Pint*¹; Dino Sulejmanovic¹; J Kurley¹; ¹Oak Ridge National Laboratory

9:40 AM

Effects of Ionizing Radiation on Molten Chloride Salts: Ruchi Gakhar¹; Gregory Horne¹; Jay LaVerne²; James Wishart³; *Simon Pimblott*¹; ¹Idaho National Laboratory; ²University of Notre Dame; ³Brookhaven National Laboratory

10:00 AM

Europium Induced Alloy Corrosion and Cracking in Molten Chloride Salt: Shaoqiang Guo¹; *Jinsuo Zhang*¹; ¹Virginia Polytechnic Institute and State University

10:20 AM Break**10:40 AM**

Salt Processing for Corrosion Mitigation in Concentrated Solar Power Systems: *Jicheng Guo*¹; Nathaniel Hoyt¹; Mark Williamson¹; ¹Argonne National Laboratory

11:00 AM

Performance of Corrosion Resistant Claddings on 316H Stainless Steel in Molten Fluoride Salt: *Adrien Couet*¹; William Doniger¹; Cody Falconer¹; Evan Buxton¹; Mohamed Elbakhshwan¹; Chuan Zhang²; Cem Topbasi³; Kumar Sridharan¹; ¹University of Wisconsin-Madison; ²Computherm, LLC; ³Electric Power Research Institute

11:20 AM

Molten Chloride Salt Corrosion in Ni based Vs Fe based Alloys: *Brendan Dsouza*¹; Weiqian Zhuo¹; Jinsuo Zhang¹; ¹Virginia Polytechnic Institute and State University

11:40 AM

Controlling Alloy Corrosion in Molten Chloride Salts: What Matters and What Doesn't?: *Stephen Raiman*¹; Dino Sulejmanovic¹; Bruce Pint¹; Jake McMurray¹; Richard Mayes¹; Kristian Myhre¹; Matt Kurley¹; William Ponder²; Jacob Startt³; ¹Oak Ridge National Laboratory; ²University of Tennessee; ³Georgia Institute of Technology

MATERIALS DESIGN

Materials Design Approaches and Experiences V — High Entropy Alloys and High Temperature Alloys

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Akane Suzuki, GE Research; Ji-Cheng Zhao, University of Maryland; Michael Fahrman, Haynes International; Qiang Feng, University of Science and Technology Beijing; Michael Titus, Purdue University

Wednesday AM | February 26, 2020
33A | San Diego Convention Ctr

Session Chairs: Martin Heilmaier, Karlsruhe Institute of Technology; Akane Suzuki, GE Research

8:30 AM Invited
Design Principles for Complex, Concentrated Alloys (CCAs): *Daniel Miracle*¹; ¹Air Force Research Laboratory

9:00 AM Invited
Oxidation Resistant Refractory Metal High Entropy Alloys for Ultrahigh Temperature Structural Applications: Bronislava Gorr¹; Steven Schellert¹; Franz Mueller¹; Stephan Laube²; Hans Chen²; Alexander Kauffmann²; Hans-Juergen Christ¹; *Martin Heilmaier*²; ¹University of Siegen; ²KIT Karlsruhe

9:30 AM Invited
Materials Parameters in Designing FCC High-entropy Alloys: *Haruyuki Inui*¹; Koudai Niitsu¹; Kyosuke Kishida¹; Easo George²; ¹Kyoto University; ²University of Tennessee

10:00 AM
Design of Ni-Co-Ru Multi-principal Elements Alloys: *Marie-Agathe Charpagne*¹; K. Vamsi¹; Carolina Frey¹; Yolita Eggeler¹; Sean Murray¹; Tresa Pollock¹; ¹University of California, Santa Barbara

10:20 AM Break

10:40 AM Invited
Development of HAYNES® 233® Alloy: *Lee Pike*¹; S. Srivastava¹; ¹Haynes International

11:10 AM

Accelerated Design of High-temperature Alloys with Data Analytics and Supercomputing: *Jian Peng*¹; Andrew Williams²; Sangkeun Lee¹; Yukinori Yamamoto¹; J. Haynes¹; Dongwon Shin¹; ¹Oak Ridge National Laboratory; ²Cornell University

11:30 AM

Materials Discovery and Design using Heritage Data: *Amit Verma*¹; Jeffrey Hawk²; Vyacheslav Romanov³; Jennifer Carter¹; ¹Case Western Reserve University; ²National Energy Technology Laboratory, Albany; ³National Energy Technology Laboratory, Pittsburgh

11:50 AM

Application of Computational Tools in Designing Ni-base Single-crystal Superalloys: *Akane Suzuki*¹; Chen Shen¹; Natarajan Chennimalai Kumar¹; ¹GE Research

MATERIALS PROCESSING

Materials Processing Fundamentals — Thermomechanical Processing

Sponsored by: TMS Extraction and Processing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Jonghyun Lee, Iowa State University; Guillaume Lambotte, Boston Metal; Sam Wagstaff, Novelis Inc.; Antoine Allanore, Massachusetts Institute of Technology; Fiseha Tesfaye, Abo Akademi University

Wednesday AM | February 26, 2020
13 | San Diego Convention Ctr

Session Chairs: Yunbo Wang, Caterpillar Inc.; Samuel Wagstaff, Novelis Inc.

8:30 AM

The Effect of Thermomechanical Processing on the Microstructural Evolution of Nickel-based Alloy 625: *Christopher Martin*¹; Eric Palmiere²; Andrew Barrow³; Jason Swan³; Grace Burke¹; ¹The University of Manchester; ²The University of Sheffield; ³Rolls-Royce

8:50 AM

Observation of Recrystallization Behavior of Nb-microalloyed Wide Flange Beams during Hot Rolling: *Bon Seung Koo*¹; Jae Chang Song¹; ¹Hyundai Steel

9:10 AM**Hot Deformation Behavior and Processing Maps of 9Cr1Mo Rotor Steel:** *Sumit Kumar*¹; Sumeer Nath¹; ¹IIT Roorkee**9:30 AM****Teaching Metal-forming Processes Using a Laboratory Micro-extrusion Press:** *Adi Benartzy*¹; Snir Ben Ze'ev¹; Nahum Frage¹; ¹Ben Guriyon University**9:50 AM Break****10:10 AM****Investigation and Numerical Modeling of Aluminum Alloys Depending on Different Thermomechanical Processes:** *Bedirhan Guraydin*¹; Metehan Dincer¹; Sadik Kaan Ipek²; Halenur Konbul³; Derya Dispnar⁴; Ahmet Karaaslan¹; ¹YTU; ²Teknik Alüminyum NPD (New Product Development) and Process Development Department; ³TEI; ⁴ITU**10:30 AM****The Impact of Inclusions on the Formability of Multiphase Hot-rolled Advanced High Strength Steels:** *Samaneh Alibeigi*¹; Emmanuel Lucas¹; ¹Global R&D, ArcelorMittal Maizières-Les-Metz, France**10:50 AM****Effects of Heat Treatment Method on Microstructure and Mechanical Properties of Internal Crack Healing in SA 508-3 Steel:** *Yao Qiu*¹; Ruishan Xin²; Jianbin Luo¹; Qingxian Ma¹; ¹Tsinghua University; ²HBIS Group Technology Research Institute**11:10 AM****Coarsening of Ferrite Lamella in Heavily Cold Drawn Pearlitic Steel Wire:** *Feng Fang*¹; Lichu Zhou¹; Jianku Shang²; Jianqing Jiang¹; ¹Southeast University; ²University of Illinois at Urbana-Champaign

MATERIALS PROCESSING

Materials Research in Reduced Gravity — Programmatics and Facility Status; Thermophysical Properties I

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Robert Hyers, University of Massachusetts; Douglas Matson, Tufts University; Michael Sansoucie, NASA MSFC; Shaun McFadden, Ulster University; Jonghyun Lee, Iowa State University; Wilhelmus Sillekens, European Space Agency; Takehiko Ishikawa, JAXA

Wednesday AM | February 26, 2020
18 | San Diego Convention Ctr

Session Chairs: Michael SanSoucie, NASA MSFC; Takehiko Ishikawa, JAXA

8:30 AM
Space for Science: ESA’s Microgravity Research Programme on Materials Science: *Wilhelmus Sillekens*¹; ¹European Space Agency

8:55 AM
Current and Future Experiment Capabilities On-board the ISS for Materials Sciences: *Douglas Matson*¹; ¹Tufts University

9:20 AM
Experiment Preparation and Operation of the Electromagnetic Levitator EML on the ISS: *Stephan Schneider*¹; Mitja Beckers¹; Angelika Diefenbach²; ¹DLR Institut für Materialphysik im Weltraum; ²DLR MUSC

9:45 AM
Thermophysical Property Measurements of High Temperature Melts Using the Electrostatic Levitation Furnace in the ISS: *Takehiko Ishikawa*¹; Chihiro Koyama¹; Hideki Saruwatari¹; Hirohisa Oda¹; ¹JAXA

10:10 AM Break

10:40 AM
Surface Oscillation of Molten Oxides Under Microgravity Using Electrostatic Levitation Furnace in ISS: *Masahito Watanabe*¹; ¹Gakushuin University

11:00 AM
Effects of Oxygen Partial Pressure on the Surface Tension of Liquid Aerospace Alloys: *Michael Sansoucie*¹; Gwendolyn Bracker²; Elizabeth Hodges²; Madeline Scott²; Robert Hyers²; ¹NASA MSFC; ²University of Massachusetts

11:20 AM

Thermophysical Properties of Bulk Metallic Glasses Measured in the Liquid Phase on Board the International Space Station: Markus Mohr¹; Rainer Wunderlich¹; *Hans Fecht*¹; ¹Ulm University

11:40 AM

Modelling Liquid Droplet Oscillation and Laminar Damping in Reduced Gravity Conditions: *Valdis Bojarevics*¹; ¹University of Greenwich

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale V — In-Situ Testing I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Christopher Weinberger, Colorado State University; Megan Cordill, Erich Schmid Institute; Garritt Tucker, Colorado School of Mines; Wendy Gu, Stanford University; Scott Mao, University of Pittsburgh; Yu Zou, University of Toronto

Wednesday AM | February 26, 2020
Santa Rosa | Marriott Marquis Hotel

Session Chairs: Ben Beake, Micro Materials; Khalid Hattar, Sandia National Laboratories

8:30 AM

Ductile-to-Brittle Transition of Micron-sized Niobium at Cryogenic Temperature: *Gyuho Song*¹; Seok-Woo Lee¹; ¹University of Connecticut

8:50 AM

Nanomechanical Properties of Pristine and Heavy Ion Irradiated Nanocrystalline Tungsten: *Jonathan Gigax*¹; Osman El-Atwani¹; Matthew Chancey¹; Jon Baldwin¹; Stuart Maloy¹; ¹Los Alamos National Laboratory

9:10 AM Invited

What Controls Damage Tolerance in Repetitive Nano- and Micro-scale Impact Testing of Thin Films?: *Ben Beake*¹; Sam McMaster²; Luis Isern³; Tomasz Liskiewicz⁴; Jose Endrino³; ¹Micro Materials Ltd.; ²University of Leeds; ³Cranfield University; ⁴Manchester Metropolitan University

9:50 AM

Exploring the Extremes of Mechanical Behavior Through In-situ Electron Microscopy: *Khalid Hattar*¹; Christopher Barr¹; Gowtham Jawaharram²; Nathan Heckman¹; Brad Boyce¹; Shen Dillon²; ¹Sandia National Laboratories; ²Univeristy of Illinois

10:10 AM Break

10:30 AM

Extending the Range of Constant Strain Rate Nanoindentation Testing: *Benoit Merle*¹; George Pharr²; ¹University Erlangen-Nuremberg (FAU); ²Texas A&M University

10:50 AM

Phase Transformation Induced Plasticity in High-strength Hexagonal Close Packed Co with Stacking Faults: *Ruizhe Su*¹; Dajla Neffati²; Jaehun Cho¹; Qiang Li¹; Jie Ding¹; Haiyan Wang¹; Yashashree Kulkarni²; Xinghang Zhang¹; ¹Purdue University; ²University of Houston

11:10 AM

Improving Ductility of Magnesium Through Reversible Phase Transformation in bcc Mg/Nb Nanolaminates: *Youxing Chen*¹; Nan Li²; Satyesh Yadav³; Xiang-yang Liu²; Jian Wang⁴; Nathan Mara⁵; ¹University of North Carolina at Charlotte; ²Los Alamos National Laboratory; ³Indian Institute of Technology Madras; ⁴University of Nebraska, Lincoln; ⁵University of Minnesota, Twin Cities

11:30 AM

Recent Innovation in In-situ Extreme Mechanics at the Micro and Nanoscale: *Nicholas Randall*¹; Damian Frey¹; Jean-Marc Breguet¹; Rajaprakash Ramachandramoorthy²; Jakob Schwiedrzik²; Johann Michler²; ¹Alemnis AG; ²EMPA

MATERIALS DESIGN

Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling — Session III

Sponsored by: TMS Structural Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, MicroTesting Solutions; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Jagannathan Rajagopalan, Arizona State University; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Robert Wheeler, Microtesting Solutions LLC; Shailendra Joshi, University of Houston

Wednesday AM | February 26, 2020
32B | San Diego Convention Ctr

Session Chairs: Dongchan Jang, KAIST; Jedsada Lertthanasarn, Imperial College London

8:30 AM Keynote

Microstructure-driven Mechanical Properties of Explosives Quantified with In-situ Tomography: *John Yeager*¹; Brian Patterson¹; Lindsey Kuettner¹; Amanda Duque¹; Virginia Manner¹; Caitlin Woznick¹; Darla Thompson¹; David Walters¹; ¹Los Alamos National Laboratory

9:10 AM Keynote

A Novel X-ray Diffraction Simulation Framework for Rapid Thermo-mechanical Processes: *Darren Pagan*¹; Thien Phan²; Joel Bernier³; ¹Cornell High Energy Synchrotron Source; ²National Institute of Standards and Technology; ³Lawrence Livermore National Laboratory

9:50 AM

Understanding Pseudomorphic bcc Mg Under Extreme Conditions of Pressure, Temperature and High Strain Rates: *Manish Jain*¹; Rajaprakash Ramachandramoorthy²; Marko Knezevic³; Nenad Velisavljevic⁴; Nathan Mara⁵; Irene Beyerlein⁶; Johann Michler²; Siddhartha Pathak¹; ¹University of Nevada Reno; ²EMPA; ³University of New Hampshire; ⁴Argonne National Laboratory; ⁵University of Minnesota, Minneapolis; ⁶University of California, Santa Barbara

10:10 AM Break

10:30 AM

High Throughput Creep Data Acquisition by Cantilever Bending Coupled to Digital Image Correlation: *Syed Jalali*¹; Praveen Kumar¹; Vikram Jayaram¹; ¹Indian Institute of Science

10:50 AM
Mixed-mode Fracture Behavior of Magnesium Alloys: *Vaishakh K V¹*; Rajvardhan Vilasrao Sarnobat¹; Narasimhan Ramarathinam¹; Satyam Suwas¹; ¹Indian Institute of Science

11:10 AM
Quantifying Deformation Mechanics of High Temperature Alloys using In-situ and Digital Imaging Correlation (DIC) Testing Techniques: *James Parkin¹*; Soran Birozca¹; Ross Buckingham²; ¹ISM; ²Rolls-Royce

11:30 AM
Dislocation-grain Boundary Interaction Investigations Using In-situ DIC and EBSD: *Joshua Tsai¹*; ¹Brigham Young University

MATERIALS DESIGN

Metastable Phases and Phase Equilibria: Towards Designing the Next Generation of Alloys — Session I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

Program Organizers: Bij-Na Kim, Carpenter Additive; Rajarshi Banerjee, University of North Texas; Gregory Thompson, University of Alabama; Eric Lass, University of Tennessee, Knoxville; Mohsen Asle Zaeem, Colorado School of Mines; Mark Aindow, University of Connecticut; Peeyush Nandwana, Oak Ridge National Laboratory; Dinc Erdeniz, Marquette University; Andrew Bobel, General Motors

Wednesday AM | February 26, 2020
31A | San Diego Convention Ctr

Session Chairs: Bij-Na Kim, Carpenter Additive; Raj Banerjee, University of North Texas; Peeyush Nandwana, Oak Ridge National Laboratory

8:30 AM Keynote
New Strain-transformable Titanium Alloys Displaying Unprecedented Combination of Mechanical Properties: from Design Approaches to Deformation Mechanisms: *Frederic Prima¹*; ¹Chimie ParisTech

9:10 AM Invited
Exploration of Nano-scaled Metastable Phases in Metastable Beta Titanium Alloys Using Advanced Electron Microscopy and Atom Probe Tomography: *Yufeng Zheng¹*; Dong Wang²; Stoichko

Antonov³; Dipankar Banerjee⁴; Rajarshi Banerjee⁵; Yunzhi Wang⁶; Hamish Fraser⁶; ¹University of Nevada, Reno; ²Xi'an Jiaotong University; ³University of Science and Technology Beijing; ⁴Indian Institute of Science; ⁵University of North Texas; ⁶Ohio State University

9:40 AM

Tuning Strength in TRIP Titanium alloys: *Benjamin Ellyson*¹; Amy Clarke¹; Jonah Klemm-Toole¹; Kester Clarke¹; Yoafeng Guo¹; ¹Colorado School of Mines

10:00 AM

Precipitation Kinetics and Mechanical Behavior of Oxygen-stabilized Metastable Beta Ti-Nb Alloys: *Kathleen Chou*¹; Emmanuelle Marquis¹; ¹University of Michigan

10:20 AM Break

10:40 AM

The Intrinsic Coupling Between Twinning Plasticity and Transformation Plasticity in Metastable β Titanium Alloys: *Yipeng Gao*¹; Yufeng Zheng¹; Yunzhi Wang¹; ¹The Ohio State University

11:00 AM

Towards Work-hardenability of Ti-6Al-4V Through a Quenching and Partitioning Approach: *Odeline Dumas*¹; Benjamin Hary¹; Guilhem Martin²; Fan Sun³; Charlotte de Formanoir⁴; Frédéric Prima³; Stéphane Godet¹; ¹Université Libre de Bruxelles - 4MAT; ²SIMaP - CNRS; ³Chimie ParisTech-CNRS, Institut de Recherche de Chimie Paris, Université de recherche PSL; ⁴KU Leuven, Department of Mechanical Engineering

11:20 AM

Composition, Processing, and Property Relationships in Fe and Al Modified Ti-12Cr Alloys: *Joann Ballor*¹; Elizabeth Kautz²; Bharat Gwalani³; Masahiko Ikeda⁴; Jane Howe⁵; Takeshi Sunaoshi⁶; Arun Devaraj²; Carl Boehlert¹; ¹Michigan State University; ²Pacific Northwest National Laboratory; ³Pacific Northwest National Lab; ⁴Kansai University; ⁵Toronto University; ⁶Hitachi

11:40 AM

Shape Memory Response of High Temperature NiTiHfPd: Soheil Saedi¹; *Guher Pelin Toker*²; Ehsan Saghaian²; Dipak Banerjee¹; Haluk Karaca²; ¹University of Arkansas Little Rock; ²University of Kentucky

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Nanocomposites VI: Nanoscience and Nanotechnology in

Advanced Composites — Processing and Fabrication of Nanocomposites

Sponsored by: TMS Structural Materials Division, TMS: Composite Materials Committee

Program Organizers: Srivatsan Tirumalai, The University of Akron; Manoj Gupta, National University of Singapore

Wednesday AM | February 26, 2020
Solana | Marriott Marquis Hotel

Session Chair: Srivatsan Tirumalai, The University of Akron

8:30 AM Invited
Processing, Properties and Potential Applications of Magnesium Alloy-based Nanocomposites: A Review: Sravya Tekumalla¹; Manoj Gupta¹; ¹Department of Mechanical Engineering

9:00 AM
Nanoparticle-enabled Phase Modification (Nano-Treating) of CuZrSi Pseudo-binary Alloy: Gongcheng Yao¹; Shuihang Pan¹; Chezheng Cao¹; Maximilian Sokoluk¹; Xiaochun Li¹; ¹University of California Los Angeles

9:25 AM
In-situ Mechanical Tests of Aluminum-carbon Nanotubes Composite Under Transmission Electron Microscopy: Kangpyo So¹; Michael Short¹; Ju Li¹; Sidney Yip¹; ¹Massachusetts Institute of Technology

9:50 AM Break

10:10 AM
Nanolayered Metallic Glass-crystalline Composites with High Strength and Wear Resistance: Sezer Ozerinc¹; ¹Middle East Technical University

10:35 AM
Facile Low-temperature Sintering of Nano-bio-ceramic Composite with 2D Reinforcement: Muhmood ul Hassan¹; Ahmad Raza¹; S.C. Yoo¹; Ho Jin Ryu¹; ¹Kaist

SPECIAL TOPICS

Nix Award and Lecture Symposium: Mechanistic Understanding of Mechanical Behavior Across Length Scales — Session I

Program Organizers: Michael Mills, Ohio State University; Kevin Hemker, Johns Hopkins University

Wednesday AM | February 26, 2020
4 | San Diego Convention Ctr

Session Chairs: Michael Mills, Ohio State University; Deborah Yaney

8:30 AM Keynote
Nix Award Lecture: Damage Tolerance in Materials: *Robert Ritchie*¹; ¹University of California Berkeley and Lawrence Berkeley National Laboratory

9:30 AM Invited
Mechanical Properties of High Entropy Alloys: *Easo George*¹; ¹Oak Ridge National Laboratory and University of Tennessee

10:00 AM Break

10:30 AM Invited
Hybrid Nanocomposites at the Extreme Limits of Molecular-scale Confinement: *Reinhold Dauskardt*¹; ¹Stanford University and the Stanford School of Medicine

11:00 AM Invited
Amorphization: A New Dislocationless Deformation Mechanism?: *Marc Meyers*¹; *S Zhao*²; *Eric Hahn*¹; *Boya Li*¹; *Bruce Remington*³; *Chris Wehrenberg*³; *Hye-Sook Park*³; ¹University of California San Diego; ²Lawrence Berkeley National Laboratory; ³Lawrence Livermore National Laboratory

11:30 AM Invited
Toughening Materials with Air?: *Brad Boyce*¹; *K. Conway*¹; *Ben White*¹; *Anthony Garland*¹; ¹Sandia National Laboratories

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — By-product Recovery II

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Wednesday AM | February 26, 2020
15A | San Diego Convention Ctr

Session Chair: Joshua Montenegro, Gopher Resource

11:00 AM
The Importance of Lead in the Supply Chain of Antimony: *Hilde Goovaerts*¹; ¹Campine

11:20 AM
Studies on the Formation of Intermetallic Compound Layers in Co(W)-Zn Diffusion Couples: *Tamara Ebner*¹; Nadine Körbler¹; Stefan Luidold¹; Christoph Czettl²; Christian Storf²; ¹CDL-TM Montanuniversitaet Leoben; ²CERATIZIT Austria GmbH

11:40 AM
Effect of Oxidation of Zinc Powder on Purification of High-Cobalt and High-Germanium Zinc Sulfate Solutions:*Leixia Zheng*¹; Zhiwei Peng¹; Liancheng Wang¹; Lei Yang¹; Jie Wang¹; Wenxing Shang¹; Mingjun Rao¹; Guanghui Li¹; Tao Jiang¹; ¹Central South University

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Environmental & Safety Practices

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Wednesday AM | February 26, 2020
15B | San Diego Convention Ctr

Session Chair: Christina Meskers

11:00 AM

ILTEC Technology – New Pathways Towards Safe and Effective Cooling: *Andreas Filzwieser*¹; *Martina Hanel*²; *Hans-Jörg Krassnig*³; *Rolf Degel*⁴; *Tim Lux*⁵; *Alexander Bergs*⁵; ¹Mettop GmbH/PolyMet Solutions GmbH; ²Mettop GmbH; ³PolyMet Solutions GmbH; ⁴SMS Group GmbH/PolyMet Solutions GmbH; ⁵SMS Group GmbH

11:20 AM

CORE™ – Advances in Sulfuric Acid Technology: *Herbert Lee*¹; *Claudia Araya*¹; ¹Chemetics Inc.

11:40 AM

Review of Waste Water Treatment Technologies Used in Lead Recycling: *James Dahlstrom*¹; *Joseph Grogan*¹; *Benjamin Rodrigue*¹; ¹Gopher Resource

12:00 PM

Optimization of Arsenic Removal Process in Waste Acid from Zinc Smelting Plant Based on Orthogonal Experiment: *Tianqi Liao*¹; *Yongguang Luo*²; *Hongtao Qu*²; *Te Zhang*²; *Jing Li*¹; *Yunhao Xi*¹; *Jingtian Zou*³; *Libo Zhang*¹; *Kaihui Cui*¹; ¹Kunming University of Science and Technology/National Local Joint Laboratory of Engineering Application of Microwave Energy and Equipment Technology/Key Laboratory of Unconventional Metallurgy, Ministry of Education; ²Kunming University of Science and Technology/Yunnan Chihong Zn&Ge Co., Ltd; ³Kunming University of Science and Technology; National Local Joint Laboratory of Engineering Application of Microwave Energy and Equipment

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Lead and Zinc Sustainability and Social License: Plenary Session

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Wednesday AM | February 26, 2020
15A | San Diego Convention Ctr

Session Chair: Andreas Siegmund, LanMetCon LLC

8:30 AM Plenary
The Global Zinc Market - Facts, Forecasts and Fundamentals: *Paul White*¹; ¹International Lead and Zinc Study Group

9:00 AM Plenary
Developing a Sustainable Global Lead Battery Value Chain: *Andy Bush*¹; ¹International Lead Association

9:30 AM Plenary
Regional Changes in Refined Zinc Output and Demand: *Claire Hassall*¹; ¹CHR Metals Ltd

10:00 AM Question and Answer Period

10:30 AM Break

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Mineral Processing

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Wednesday AM | February 26, 2020
14B | San Diego Convention Ctr

Session Chair: Haisheng Han, Central South University

11:00 AM

Recovery of Zinc From Oxide-sulphide Zinc Ore through Oxidation and Chelation: Kun Yang¹; Likun Shuo²; Hongtao Qu²; Yongguang Luo²; *Libo Zhang*¹; ¹Kunming University of Science and Technology/National Local Joint Laboratory of Engineering Application of Microwave Energy and Equipment Technology; ²Kunming University of Science and Technology/Yunnan Chihong Zn&Ge CO., LTD

11:20 AM

A New Innovative Method of Flotation Separation for High Sulfur Lead–zinc Sulfide Ore: Changtao Wang¹; Runqing Liu¹; Wei Sun¹; *Yuehua Hu*¹; Zhangyuan Ni¹; ¹Central South University

11:40 AM

Review on (bio)Hydrometallurgy of Sphalerite: Xiaoyu Meng¹; *Xin Lv*¹; ¹Central South University

12:00 PM

A Novel Collector 5-(butylthio)-1,3,4-thiadiazole-2-thiol: Synthesis and Improved Flotation of Galena and Sphalerite from Pyrite: Wanjia Zhang¹; *Zhiyong Gao*¹; Yuehua Hu¹; Jian Cao¹; Wei Sun¹; ¹Central South University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Phase Transformations in Ferrous Alloys

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

Program Organizers: Yufeng Zheng, University of Nevada, Reno; Rongpei Shi, Lawrence Livermore National Laboratory; Stoichko Antonov, University of Science and Technology Beijing; Yipeng Gao, Idaho National Laboratory; Rajarshi Banerjee, University of North Texas; Yongmei Jin, Michigan Technological University

Wednesday AM | February 26, 2020
33B | San Diego Convention Ctr

Session Chairs: Hao Chen, Tsinghua University; Cong Wang, Northeastern University

8:30 AM

Coupled Grain Structure and Carbide Evolution during Rapid Thermal Cycling of an Fe-Cr-C Steel: *Bala Radhakrishnan*¹; Younggil Song¹; Gary Cola²; ¹Oak Ridge National Laboratory; ²SFP Works, LLC

8:50 AM

Pearlite in Multicomponent Steels: Phenomenological Steady-state Modeling: Jiayi Yan¹; John Ågren¹; Johan Jeppsson¹; *Kaisheng Wu*²; ¹Thermo-Calc Software AB; ²Thermo-Calc Software Inc

9:10 AM

Novel Alloy Design Strategies for High Strength Car Body Parts Manufactured by Superplastic Forming: *Lukas Stemper*¹; Paul Oberhauser²; Peter Uggowitzer¹; Stefan Pogatscher¹; ¹Montanuniversitaet Leoben; ²AMAG Rolling GmbH

9:30 AM

Microstructural and Mechanical Characterization of Cast Austenitic Stainless Steel Alloyed with Si: *Prince Setia*¹; R Sarvesha¹; Aditya Gokhale²; Thomas Tharrian³; T Venkateswaran³; Sudhanshu Shekhar Singh¹; Shashank Shekhar¹; ¹Indian Institute of Technology Kanpur; ²Indian Institute of Technology Delhi; ³Indian Space Research Organization

9:50 AM Break

10:10 AM

Rapid Solidification of Austenitic Stainless Steels by Splat Quenching: *Sydney Morales*¹; Zachary Hasenbusch¹; Luke Brewer¹; Laurentiu Nastac¹; Andrew Deal²; Ben Brown²; ¹University of Alabama Tuscaloosa; ²Kansas City National Security Campus

10:30 AM

Analysis by Dilatometry and Nanoindentation in an Experimental Medium-carbon Steel during the Martensite Isothermal Tempering: *Eliuth Barrera-Villatoro*¹; Octavio Vázquez-Gómez¹; Perla Díaz-Villaseñor¹; Alexis Gallegos-Perez¹; Héctor Vergara-Hernández¹; Bernardo Campillo-Illanes²; ¹Tecnológico Nacional de México / I.T. Morelia; ²Universidad Nacional Autónoma de México

10:50 AM

Formation of Retained Delta-ferrite and Martensite in the Coarse Grained Heat-affected Zone of P91 Heat-resistant Steel: *Yang Shen*¹; Cong Wang¹; ¹Northeastern University

11:10 AM

Divergent Pearlite Growth in Fe-Mn-C Steel: *Leslie Mushongera*¹; P.G. Gideon Kubendran²; Britta Nestler²; ¹University of Nevada, Reno; ²Karlsruhe Institute of Technology

ENERGY & ENVIRONMENT

Powder Materials for Energy Applications — Ceramic Powder Materials

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Powder Materials Committee

Program Organizers: Kathy Lu, Virginia Polytechnic Institute and State University; Eugene Olevsky, San Diego State University; Somayeh Pasebani, Oregon State University; Hang Yu, Virginia Polytechnic Institute and State University

Wednesday AM | February 26, 2020

17A | San Diego Convention Ctr

Session Chairs: Kathy Lu, Virginia Tech; Eugene Olevsky, San Diego State University

8:30 AM

Advanced Skutterudite-based Thermoelectric Unicouples by Near Net Shape Powder-based Fabrication for Future Space Power Applications: Michell Aranda¹; *Sutinee Sujittosakul*¹; George Nakatsukasa¹; Vilupanur Ravi²; Ike Chi¹; ¹Jet Propulsion Laboratory (NASA/JPL); ²California State Polytechnic University, Pomona

8:50 AM Invited

Bulk Supercrystalline Nanocomposites with Enhanced Mechanical Properties for Multifunctional Applications: *Diletta Giuntini*¹; Elisa Torresani²; Kyle Chan³; Lucien Saviot⁴; Büsra Bor¹; Berta Domènech¹; Malte Blankenburg⁵; Meir Shachar³; Martin Müller⁵; Eugene Olevsky²; Javier Garay³; Gerold Schneider¹; ¹Hamburg University of Technology; ²San Diego State University; ³University of California San Diego; ⁴Laboratoire Interdisciplinaire Carnot de Bourgogne - Université de Bourgogne - Franche Comté; ⁵Helmholtz-Zentrum Geesthacht

9:20 AM

Cubic Sub-micron BiFeO₃ Powders for Improved Electrical Properties: *Jenna Metera*¹; Olivia Graeve¹; ¹University of California, San Diego

9:40 AM

Energy Concentration Joining of Nuclear-grade SiC/SiC Composites for Next Generation Nuclear Reactors: *Geuntak Lee*¹; Shirley Chan¹; Eugene Olevsky¹; ¹San Diego State University

10:00 AM Invited

As-sintered Long Porous Inconel 625 Tubes for Hot Gas Filtration for the Production of High-purity Silicon: Qiang Bing Wang¹; Hui Ping Tang¹; *Ma Qian*²; ¹State Key Laboratory of Porous Metal Materials, Northwest Institute for Nonferrous Metal Research; ²Royal Melbourne Institute of Technology

10:30 AM Break**10:50 AM Invited**

Synthesis, Sintering, and Electrochemical Properties of Lithium Conducting Garnets from Molten Salt Fluxes for All-Solid-State Lithium Batteries: *Jon Weller*¹; Candace Chan¹; ¹Arizona State University

11:20 AM

Fabrication of Complex Shape Components by Spark-plasma Sintering Utilizing 3D-printed Controllable Interface: *Elisa Torresani*¹; Charles Maniere²; Eugene Olevsky¹; ¹San Diego State University; ²Laboratoire CRISMAT

11:40 AM
Superelastic Zirconia Powder for Shockwave Dissipation in Energy Infrastructure: *Hunter Rauch*¹; Hang Yu¹; ¹Virginia Polytechnic Institute and State University

MATERIALS PROCESSING

Process Metallurgy and Electrochemistry of Molten Salts, Liquid Metal Batteries, and Extra-terrestrial Materials Processing: An EPD Symposium in Honor of Don Sadoway — Prof. Sadoway Honorary Session I

Sponsored by: TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee

Program Organizers: Antoine Allanore, Massachusetts Institute of Technology; Hojong Kim, Pennsylvania State University; Takanari Ouchi, The University of Tokyo; Yasuhiro Fukunaka, JAXA/Waseda University

Wednesday AM | February 26, 2020
14A | San Diego Convention Ctr

Session Chairs: Antoine Allanore, Massachusetts Institute of Technology; Yasuhiro Fukunaka, JAXA/Waseda University

8:30 AM **Introductory Comments**

8:35 AM **Invited**
Better Living through Electrochemistry: A Career of Scientific Solutions and Pragmatism: *Luis Ortiz*¹; ¹LAO Consulting

8:55 AM **Invited**
Electrolytic Metals/Alloys for Liquid Metal Batteries: Xianyang Li¹; *Huayi Yin*; ¹Northeastern University

9:15 AM **Invited**
Fluid Mechanics of Liquid Metal Batteries: Overview and Outlook: *Douglas Kelley*¹; ¹University of Rochester

9:35 AM **Invited**
Liquid Metal Batteries: From Concept to Commercialization: *David Bradwell*¹; ¹Ambri Inc.

9:55 AM Break

10:10 AM Invited

Know Your Audience: Four Decades of Educational Innovation: *Elsa Olivetti*¹; ¹Massachusetts Institute of Technology

10:30 AM Invited

Lithium Metal Battery for Future Energy Storage: *Y. Shirley Meng*¹; ¹University of California, San Diego

10:50 AM Invited

Titanium Extraction from Industrial Raw Material to Metal through Carbothermic Reduction and Molten Salts Electrolysis: *Hongmin Zhu*¹; Shuqiang Jiao²; Jun Zhu²; Jiusan Xiao²; ¹Thohoku University; ²University of Science and Technology, Beijing

11:10 AM Invited

Study of Electrode Performance Improvement with Infiltration of Electronic and Mixed-conducting Nanoparticles Employing Electrochemical Impedance Spectroscopy and I-V Measurements: *Uday Pal*¹; Paul Gasper¹; Yanchen Lu¹; Srikanth Gopalan¹; Soumendra Basu¹; ¹Boston University

ADVANCED MATERIALS

Progress towards Understanding the Synthesis and Behavior of Metals Far from Equilibrium: A SMD Symposium Honoring Enrique Lavernia on the Occasion of His 60th Birthday — Additive Manufacturing

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Composite Materials Committee

Program Organizers: Haiming Wen, Missouri University of Science and Technology; Suveen Mathaudhu, University of California, Riverside; Yuntian Zhu, North Carolina State University; Manoj Gupta, National University of Singapore; Kaka Ma, Colorado State University; Troy Topping, California State University, Sacramento; Yizhang Zhou, University of California, Irvine; Joshua Yee, Sandia National Laboratories; Dalong Zhang, Pacific Northwest National Laboratory; Yaojun Lin, Wuhan University of Technology; Fei Chen, Wuhan University of Technology

Wednesday AM | February 26, 2020
31B | San Diego Convention Ctr

Session Chairs: Noam Eliaz, Tel-Aviv University; Lorenzo Valdevit, University of California – Irvine

8:30 AM Invited
High-throughput Alloy Design of Advanced Materials Using Additive Manufacturing: *Dan Thoma*¹; ¹University of Wisconsin, Madison

9:00 AM Invited
Compositional and Structural Evolution of Passivation Layers in Heat- and Humidity-treated Aluminum Powder for Cold Spray Applications: Cameron Crook¹; Maryam Azar¹; Diran Apelian²; Daniel Mumm¹; *Lorenzo Valdevit*¹; Jasper Zebulon Lienhard³; Christopher Schuh³; ¹University of California, Irvine; ²University of California, Irvine; Worcester Polytechnic Institute; ³Massachusetts Institute of Technology

9:30 AM Invited
Micro-structure and Mechanical Behavior of Metallic Parts Made using Powder Bed Process Additive Manufacturing: *Leila Ladan*¹; ¹Arizona State University

10:00 AM Break

10:20 AM Invited
Formation of Non-Equilibrium Phases by Electrodeposition and a Novel Additive Manufacturing Process of Meniscus-confined Electrodeposition: *Noam Eliaz*¹; ¹Tel-Aviv University

10:50 AM Invited
Microstructure-property Development During Directed Energy Deposition of Austenitic Stainless Steels: *Chris San Marchi*¹; Thale Smith²; Josh Sugar¹; Julie Schoenung³; ¹Sandia National Laboratories; ²Nanocore 3D; ³University of California, Irvine

11:20 AM
Microstructure of Additively Manufactured and Laser Melted 316L Stainless Steel: Thomas Devine¹; *Yoon Hwa*²; Joshua Yee³; Nancy Yang³; ¹University of California; ²University of California, Berkeley; ³Sandia National Laboratories

11:40 AM Invited
Research on Laser Additive Manufacturing Technology of TiC Particles Reinforced Inconel 718 Composites: *Chen Bingqing*¹; ¹Beijing Institute of Aeronautical Materials

MATERIALS DESIGN

Purveyors of Processing Science and ICME: A SMD Symposium to Honor the Many Contributions of Taylan Altan, Wei Tsu Wu, Soo-Ik Oh, and Lee Semiatin — Enhanced Properties via Thermomechanical Processing

Sponsored by: TMS Structural Materials Division, TMS: Shaping and Forming Committee, TMS: Titanium Committee

Program Organizers: Adam Pilchak, US Air Force Research Laboratory; Ayman Salem, MRL Materials Resources LLC; Viola Acoff, University of Alabama; Nathan Levkulich, UES; Michael Glavicic, Rolls-Royce; Yufeng Zheng, University of Nevada, Reno; John Rotella, Purdue University

Wednesday AM | February 26, 2020
30E | San Diego Convention Ctr

Session Chairs: Rongpei Shi, Lawrence Livermore National Laboratory; Nathan Levkulich, UES

8:30 AM Invited
Engineered Residual Stress Optimization and Utilization: *David Furrer*¹; Robert Goetz¹; Jean Philippe Thomas¹; Vasisht Venkatesh¹; ¹Pratt & Whitney

9:00 AM Invited
Heterogeneous Deformation during Forming of Pure Niobium and its Influence on Superconducting Radio Frequency Cavity Performance: *Thomas Bieler*¹; Mingmin Wang¹; Di Kang¹; Mengge Zhao¹; Kaige Zheng¹; Maria Terol; Ricardo Rodriguez²; Eureka Pai¹; Philip Eisenlohr²; ¹Michigan State University; ²Universidad Polytechnica Madrid

9:30 AM
Austenite Transformation Behavior during Tensile Deformation of Quenched and Partitioned Steels: Christopher Finfrock¹; Chandler Becker¹; Trevor Ballard¹; Grant Thomas²; Amy Clarke¹; *Kester Clarke*¹; ¹Colorado School of Mines; ²AK Steel

9:50 AM Invited
Pushing the Performance Limits of Metallic Alloys through Severe Plastic Deformation Processing: *Rajiv Mishra*¹; ¹University of North Texas

10:20 AM Break

10:40 AM Invited
Processing Heterostructured Materials for Superior Mechanical Properties: *Yuntian Zhu*¹; Hao Zhou²; Yusheng Li²; Xiaolei Wu;

Xiaolei Wu³; ¹North Carolina State University; ²Nanjing University of Science and Technology; ³Institute of Mechanics, CAS

11:10 AM

On the Mechanical Behavior of Keyhole-free Friction Stir Welded Copper-Aluminum Spot Joints: Isam Jabbar Ibrahim¹; Guney Yapici¹; ¹Ozyegin University

NUCLEAR MATERIALS

Radiation Effects in Metals and Ceramics — Mechanical Assessment of Irradiated Microstructures

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Djamel Kaoumi, North Carolina State University; Thak Sang Byun, Oak Ridge National Laboratory; Dane Morgan, University of Wisconsin-Madison; Maria Okuniewski, Purdue University; Mahmood Mamivand, Boise State University; Geoffrey Beausoleil, Idaho National Laboratory; Philip Edmondson, Oak Ridge National Laboratory; Khalid Hattar, Sandia National Laboratories; Aurelie Gentils, Université Paris-Saclay; Joel Ribis, Commissariat a l'Energie Atomic CEA

Wednesday AM | February 26, 2020
Theater A-7 | San Diego Convention Ctr

Session Chairs: Peter Hosemann, University of California Berkeley; Maria Okuniewski, Purdue University

8:30 AM Invited

A New Numerical Method to Simulate Dislocation Self-climb: Fengxian Liu¹; Edmund Tarleton¹; Alan Cocks¹; ¹University of Oxford

9:00 AM

Three Dimensional Rate Theory Models of Radiation Damage with Mechanical Fields: Aaron Kohnert¹; Laurent Capolungo¹; ¹Los Alamos National Laboratory

9:20 AM

Characterizing Self-ion Irradiated Tungsten: Nano-indentation, Multi-technique Microscopy and Crystal-plasticity Modeling: Suchandrima Das¹; Hongbing Yu¹; Kenichiro Mizohata²; Edmund Tarleton¹; Felix Hofmann¹; ¹University of Oxford; ²University of Helsinki

9:40 AM

Nanoscale Characterisation of Re/Os Precipitation and Mechanical Degradation In Neutron Irradiated Tungsten: Matthew LLoyd¹; Duc Nguyen¹; Michael Moody¹; Paul Bagot¹; Robert Abernethy¹; *David Armstrong*¹; ¹University of Oxford

10:00 AM Break

10:20 AM Invited

High Temperature Small Scale Mechanical Testing and Nanoindentation of Advanced Accident Tolerant Fuels: *David Frazer*¹; Joshua White¹; Tarik Saleh¹; Darrin Byler¹; ¹Los Alamos National Laboratory

10:50 AM

Studies of High dpa Ion Beam Irradiation fcc-bcc Duplex Steel 2205: Micromechanical Testing and Nanoindentation Examination of Hardness Variations: *Michael Saleh*¹; Alan Xu¹; Paul Munroe²; Dhriti Bhattacharyya¹; ¹ANSTO; ²School of Material Science and Engineering, University of NSW

11:10 AM

Comprehensive Evaluation of the Degradation of Duplex Stainless Steels in Light Water Reactor Systems: *Timothy Lach*¹; Shawn Riechers¹; David Collins¹; William Frazier¹; Arun Devaraj¹; Emily Barkley¹; Thak Sang Byun¹; ¹Pacific Northwest National Laboratory

11:30 AM

Mechanical Properties of Irradiated Cladding Material from BOR-60 Irradiations: *Tarik Saleh*¹; Benjamin Eftink¹; Stuart Maloy¹; Gary Was²; ¹Los Alamos National Laboratory; ²University of Michigan

11:50 AM

Comparison of In-situ Micro- and Ex-situ Meso-scale Tensile Testing of As-fabricated HT-9 Steels: *Tanvi Ajantiwalay*¹; Assel Aitkaliyeva¹; Peter Hosemann²; ¹University of Florida; ²University of California, Berkeley

12:10 PM

Effects of Irradiation Defect and Strain on the Morphology and Kinetics Evolution of Nanoscale Phase: *Yongsheng Li*¹; Zhengwei Yan¹; Xinwen Tong¹; Dong Wang¹; ¹Nanjing University of Science and Technology, Nanjing

BIOMATERIALS

Recent Developments in Biological, Structural and Functional Thin Films and Coatings — Functional Thin Films and Coatings



Sponsored by: TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Adele Carrado, IPCMS - CNRS; Heinz Palkowski, Clausthal University of Technology; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Ramana Chintalapalle, University of Texas at El Paso; Nuggehalli Ravindra, New Jersey Institute of Technology; Nancy Michael, University of Texas at Arlington; Vikas Tomar, Purdue University

Wednesday AM | February 26, 2020
Oceanside | Marriott Marquis Hotel

Session Chairs: Ravindra Nuggehalli, New Jersey Institute of Technology; Ramana Chintalapalle, University of Texas at El Paso

8:30 AM Keynote
Tailoring the Thermal, Mechanical, and Acoustic Properties of Sub-surfaces through Ion Beam Modification: *Khalid Hattar*¹; ¹Sandia National Laboratories

9:10 AM
Tailoring Optical and Structural Properties of Metal-dielectric Composite Thin Films: *Lirong Sun*¹; John Grant¹; John Jones¹; Neil Murphy¹; Jonathan Vernon¹; ¹Air Force Research Laboratory

9:30 AM
Structure, Morphology and Electrical Properties of Nanocrystalline Niobium Films: Nivedita Lalitha Raveendran¹; *Avery Haubert*²; Ramana Chintalapalle¹; ¹University of Texas; ²University of California, Santa Barbara

9:50 AM Break

10:10 AM
Sputtered Coating Optimization for Architected Structures: *Alina Garcia Taormina*¹; Chantal Kurpiers²; Ruth Schwaiger²; Andrea Hodge¹; ¹University of Southern California; ²Karlsruhe Institute of Technology

10:30 AM
Pulsed-Laser Deposition and Characterization of β -Ga₂O₃ Thin Films: *Vishal Zade*¹; Mallesham Bandi¹; Ramana Chintalapalle¹; ¹University of Texas at El Paso

ENERGY & ENVIRONMENT

Recycling of Secondary, Byproduct Materials and Energy — Environmental and Energy Aspects

Sponsored by: TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Mingming Zhang, ArcelorMittal Global R&D; John Howarter, Purdue University; Elsa Olivetti, Massachusetts Institute of Technology; Alan Luo, Ohio State University; Adam Powell, Worcester Polytechnic Institute; Ziqi Sun, Queensland University of Technology

Wednesday AM | February 26, 2020
16A | San Diego Convention Ctr

Session Chairs: Adam Powell, Worcester Polytechnic Institute; Ziqi Sun, Queensland University of Technology; Chengguang Bai, Chongqing University

8:30 AM Introductory Comments

8:35 AM
To Recycle or not to Recycle – Critical Row Materials in Extreme Conditions – European Union Perspective and Challenges: *Dragan Rajnovic*¹; ¹University of Novi Sad, Faculty of Technical Sciences, Serbia

8:55 AM
Mechanical Beneficiation of End-of-Life Lithium-Ion Battery Components: *Haruka Pinegar*¹; York Smith¹; ¹University of Utah

9:15 AM
Engineered Carbon Products from Sustainable Lignin Feedstocks for Energy Applications: *Valerie Garcia-Negron*¹; David Harper¹; David Keffer²; Orlando Rios³; ¹Center for Renewable Carbon; ²University of Tennessee, Knoxville; ³Oak Ridge National Laboratory

9:35 AM
Assessing the Techno-economic Feasibility of Solvent-based, Critical Material Recovery from Uncertain, End-of-life Battery Feedstock: *Chukwunwike Iloeje*¹; Yusra Khalid¹; Joe Cresko²; Diane Graziano¹; ¹Argonne National Laboratory; ²United States Department of Energy

9:55 AM
Thermal Route of Synthesis of Different Metal Oxide Nanoparticles from Spent Zn-C Battery and its Application as a Catalysts

in Internet of Things: *Kamrul Hassan*¹; Rifat Farzana¹; Veena Sahajwalla¹; ¹SMaRT@UNSW

10:15 AM Break

10:30 AM

Metal Extraction from Municipal Solid Waste Incineration Fly Ash and Immobilization of Toxic Metals in Residue: *Burcak Ebin*¹; Britt-Marie Steenari¹; ¹Chalmers University of Technology

10:50 AM

Development of a Carbo-granulation Process for the Manufacture of Artificial Aggregates using Mining Residues and Carbon Dioxide: *Elisabeth Viry*¹; Lan Huong Tran¹; Jean-François Blais¹; Guy Mercier¹; Louis-César Pasquier¹; ¹INRS - ETE

11:10 AM

Thermodynamic Analysis and Reduction of Anosovite with Methane at Low Temperature: *Run Zhang*¹; Gangqiang Fan¹; Mingbo Song¹; Chaowen Tan¹; Jie Dang²; ¹College of Materials Science and Engineering, Chongqing University; ²State Key Laboratory of Advanced Processing and Recycling of Non-ferrous Metals, Lanzhou University of Technology

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XI) — Processing, Microstructure & Property

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Caizhi Zhou, Missouri University of Science and Technology; Megumi Kawasaki, Oregon State University; Enrique Lavernia, University of California, Irvine; Terry Lowe, Colorado School of Mines; Suveen Mathaudhu, University of California, Riverside; Ruslan Valiev, UFA State Aviation Technical University; Yuntian Zhu, North Carolina State University

Wednesday AM | February 26, 2020
Carlsbad | Marriott Marquis Hotel

Session Chairs: Xiuyan Li, Institute of Metal Research, Chinese Academy of Sciences; Timothy Rupert, University of California, Irvine; Kenneth Vecchio, University of California, San Diego; Boris Straumal, MPI Intelligent Systems

8:30 AM
Mechanical Properties Optimization via Microstructural Control of a Metastable β -type Ti-Nb Gum Metal: Sumin Shin¹; *Kenneth Vecchio*¹; ¹University of California, San Diego

8:50 AM
SPD-induced Synthesis of Archimats: a New Paradigm in Materials Design: *Roman Kulagin*¹; Yan Beygelzimer²; Yuri Estrin³; Brigitte Baretzky¹; ¹Karlsruhe Institute of Technology (KIT) Institute of Nanotechnology (INT); ²Donetsk Institute for Physics and Engineering; ³Monash University / The University of Western Australia

9:10 AM
Strain Partitioning by Recurrent Shear Localization during Equal-channel Angular Pressing: *Philipp Frint*¹; Martin Wagner¹; ¹Institute of Materials Science and Engineering, Technische Universität Chemnitz

9:30 AM Invited
Slip Transmission in Ultra Fine Grain Materials: *Katerina Aifantis*¹; Fei Shuang¹; ¹University of Florida

9:50 AM Invited
Making Strong, Tough, Thermally-stable, and Radiation Tolerant Nanocrystalline Materials in Bulk Form: *Timothy Rupert*¹; ¹University of California, Irvine

10:10 AM Break

10:30 AM Invited
Hierarchical Microstructure in Additively Manufactured Ti-6Al-4V and its Effect on Mechanical Properties: Jinyeon Kim¹; Jenniffer Bustillos¹; *Atieh Moridi*¹; ¹Cornell University

10:50 AM
Size-dependent Dislocation-twin Interactions: *Jiangwei Wang*¹; Guang Cao¹; Ze Zhang¹; Frederic Sansoz²; ¹Zhejiang University; ²The University of Vermont

11:10 AM
Evaluation of Misorientation and Local Deformation in Bimodal Harmonic Structured Stainless Steel by Hybrid Imagings of Diffraction and Refraction Contrast Using Synchrotron Radiation X-ray: *Yoshikazu Nakai*¹; Shoichi Kikuchi²; Daiki Shiozawa¹; Kenji Nonaka¹; Takumi Hase¹; Yuki Nakagawa¹; Kei Ameyama³; ¹Kobe University; ²Shizuoka University; ³Ritsumeikan University

11:30 AM Invited
Mesoscale Modeling of Deformation and Failure Behavior of Metallic Ultrafine-grained Microstructures: *Avinash Dongare*¹;
¹University of Connecticut

MECHANICS & STRUCTURAL RELIABILITY

**Understanding and Predicting Dynamic Behavior of Materials
— Metals/HE Interactions -- ejecta and frag**

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Marc Meyers, University of California San Diego; George Gray, Los Alamos National Laboratory

Wednesday AM | February 26, 2020
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Session Chair: David Jones, Los Alamos National Laboratory

8:30 AM
A Non-RMI Source of Substantial Quantities of Ejecta Mass Due to Cavitation Bubble Collapse: *Garry Maskaly*¹; Saryu Fensin¹; Thomas Hartsfield¹; Gerald Stevens²; Brandon La Lone²; Dale Turley²; ¹Los Alamos National Laboratory; ²Mission Support and Test Services

9:10 AM
The Role of Heterogeneities in Ejecta Production via MD Simulations: *Rachel Flanagan*¹; Timothy Germann²; Marc Meyers¹; Saryu Fensin³; ¹University of California, San Diego; ²T-1, Los Alamos National Laboratory; ³MST-8, Los Alamos National Laboratory

9:30 AM
Experimental and Computational Studies of Laser-driven Shocks through Metal Surface Perturbations and Planar Grooves: *Fady Najjar*¹; Alison Saunders¹; Camelia Stan¹; Hye-Sook Park¹; Suzanne Ali¹; Jon Eggert¹; ¹Lawrence Livermore National Laboratory

9:50 AM
On Design Of High-throughput Compact High-explosive Ejecta Source Platform: *Fady Najjar*¹; *Jose Sinibaldi*¹; ¹Lawrence Livermore

A Continuum Mesoscale Perspective of the Dynamic Response of Metals and Explosives: *Darby Luscher*¹; Cindy Bolme¹; Marc Cawkwell¹; Saryu Fensin¹; Abigail Hunter¹; Nisha Mohan¹; Thao Nguyen²; Kyle Ramos¹; R Scharff³; Justin Wilkerson²; Milovan Zecevic¹; ¹Los Alamos National Laboratory; ²Texas A&M University; ³Nevada National Security Site

Mechanisms of Deformation and Fracture in Solids with Defects under Dynamic and Shock Wave Loading: *Yuriy Bayandin*¹; Natalia Saveleva¹; Dmitry Bilalov¹; Oleg Naimark¹; ¹Institute of Continuous Media Mechanics UB RAS

MATERIALS PROCESSING

11th International Symposium on High Temperature Metallurgical Processing — Process Optimization

Sponsored by: TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee

Program Organizers: Zhiwei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Tao Jiang, Central South University; Jesse White, Elkem Carbon AS; Morsi Mahmoud, King Fahd University of Petroleum And Mineral

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Session Chairs: Baojun Zhao, University of Queensland; Ender Keskinilic, Atilim University

Parameters Affecting on the Phosphorus Distribution Between Slag and Liquid Metal in BOF: *Abdelrhman Hassan*¹; ¹Tabbin Institute for Metallurgical Studies

2:35 PM
Research on the Database Construction of Furnace Material Consumption in EAF Steelmaking Process: *Botao Xue*¹; Lingzhi Yang¹; Yufeng Guo¹; Feng Chen¹; Fu-qiang Zheng¹; Jinlai Zhang¹; Hongguo Yao¹; Xiaolei Hou¹; ¹Central South University

2:55 PM
Experimental Study on Water Model of Continuous Smelting Reduction Reactor: *Haijuan Li*¹; Yan Liu¹; Xiaolong Li¹; Zhang Tingan¹; ¹Northeastern University

3:15 PM Break

3:30 PM
Theoretical Analysis and Experimental Verification of Formation of As-bearing Rare Earth Inclusions in Steel: *Bin Bai*¹; Hongpo Wang¹; Silu Jiang¹; Lifeng Sun¹; Yu Wang¹; ¹Chongqing University

3:50 PM
Precipitation Behavior of B2O3 Addition on CaO-Al2O3-Sc2O3 Slag System Through In-situ Observation: *Fei Wang*¹; Wenke Zhi¹; Ling Zhang²; Zhuangzhuang Liu²; Bin Yang¹; Muxing Guo²; ¹Kunming University of Science and Technology; ²KU Leuven

SPECIAL TOPICS

2020 Institute of Metals Lecture/Robert Franklin Mehl Award — 2020 Institute of Metals Lecture/Robert Franklin Mehl Award

Wednesday PM | February 26, 2020
Carlsbad | Marriott Marquis Hotel

12:15 PM Introductory Comments

12:20 PM Keynote
Heterostructured Materials: A New Paradigm for Superior Mechanical Properties: *Yuntian Zhu*¹; ¹North Carolina State University; Nanjing University of Science and Technology

NUCLEAR MATERIALS

Accelerated Materials Evaluation for Nuclear Applications Utilizing Irradiation and Integrated Modeling — Current and Advanced Structural Materials I

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Assel Aitkaliyeva, University of Florida; Peter Hosemann, University of California - Berkeley; Samuel Briggs, Oregon State University; David Frazer, Los Alamos National Laboratory

Wednesday PM | February 26, 2020
Theater A-8 | San Diego Convention Ctr

Session Chair: David Frazer, Los Alamos National Laboratory

2:00 PM
Microstructure of HT-9 Cladding After fuel-cladding Chemical Interaction with an Annular U-10Zr Fuel Irradiated to 3.3% FIMA: *Xiang Liu*¹; Luca Capriotti¹; Tiankai Yao¹; Jason Harp¹; Lingfeng He¹; ¹Idaho National Laboratory

2:20 PM
Development of Advanced Low N-12Cr (wt.%) Ferritic/Martensitic Steel for Reactor Applications: *Connor Rietema*¹; Tarik Saleh²; Benjamin Eftink²; Stuart Maloy²; Osman Anderoglu³; Md Mehadi Hassan³; Amy Clarke¹; Kester Clarke¹; ¹Colorado School of Mines; ²Los Alamos National Laboratory; ³University of New Mexico

2:40 PM
Promotion and Suppression of the G-phase in Steels: *Daniel King*¹; Thomas Whiting¹; Mark Wenman¹; ¹Imperial College London

3:00 PM
Temperature Shift Evaluation for G-phase Clustering in Ferritic-martensitic Alloys: *Matthew Swenson*¹; Saheed Adisa¹; ¹University of Idaho

3:20 PM
Effective Defect Sinks in Metallic Composite with Nanodispersoids: In situ Ion Radiation Transmission Electron Microscopy and Position Annihilation Lifetime Spectroscopy: *Kangpyo So*¹; Ming Liu²; Mohammad Shahin¹; Myles Stapelberg¹; So Yeon Kim¹; Michael Short¹; Ju Li¹; ¹Massachusetts Institute of Technology; ²North Carolina State University

3:40 PM Break

3:55 PM
On a Theory Based Accelerated Testing Methodology for Swelling: *Michael Fluss*¹; ¹University of California, Berkeley, Department of Nuclear Engineering

4:15 PM

Controlling Helium Morphology in Pure Metals: Toward Uniform Samples for the Accelerated Measurement of Bulk Irradiated Properties: *Calvin Lear*¹; Saryu Fensin¹; ¹Los Alamos National Laboratory

4:35 PM

Defect Evolution and Radiation Resistance of Advanced Fusion Materials Under Heavy Ion and Low Energy Helium Irradiation: *Osman El-Atwani*¹; Stuart Maloy¹; ¹Los Alamos National Laboratory

4:55 PM

In-situ Heavy Ion Irradiation of FCC and BCC High-entropy Alloys at Cryogenic and High Temperatures: *Calvin Parkin*¹; Michael Moorehead¹; Mohamed Elbakhshwan¹; Jing Hu²; Wei-Ying Chen²; Kumar Sridharan¹; Adrien Couet¹; ¹University of Wisconsin, Madison; ²Argonne National Laboratory

5:15 PM

Interphase Distribution Behavior of Oxide Nanoparticles Triggered by Isothermal Ferrite Transformation in 9Cr ODS Steels: *Xiaosheng Zhou*¹; Hao Chen¹; ¹Tsinghua University

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture IV: Toward Confident Use in Critical Applications — Joint Session with Fatigue in Materials Symposium - Microstructure-based Fatigue Studies on Additive-Manufactured Materials

Sponsored by: TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Nik Hrabe, National Institute of Standards and Technology; Steve Daniewicz, University of Alabama; Nima Shamsaei, Auburn University; John Lewandowski, Case Western Reserve University; Mohsen Seifi, ASTM International/Case Western Reserve University

**Wednesday PM | February 26, 2020
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Session Chairs: Garrett Pataky, Clemson University; Nik Hrabe, National Institute of Standards and Technology

2:00 PM Invited
Fracture and Fatigue Issues for (Metal) Additive Manufacturing:
*John Lewandowski*¹; ¹Case Western Reserve University

2:30 PM Invited
Fatigue Crack Growth Mechanisms and Design-qualification Considerations in Ti-6Al-4V Alloys Fabricated by Three Powder-based Additive Manufacturing Technologies: Yuwei Zhai¹; Haize Galarraga¹; Robert Warren¹; *Diana Lados*¹; ¹Worcester Polytechnic Institute

3:00 PM Invited
Microstructure-oriented Studies of Fatigue Damage in Additive Manufacturing Using Combined Enhanced Measurement Techniques: *Frank Walther*¹; ¹TU Dortmund University

3:30 PM Break

3:50 PM Invited
Relating Additive Manufacturing Processing Conditions to Surface Roughness, Porosity and Microstructure Influencing Fatigue Life: *Joy Gockel*¹; Luke Sheridan²; Eric Tatman¹; Dino Celli²; Wesley Eidt¹; ¹Wright State University; ²Air Force Research Laboratory

4:20 PM Invited
An Investigation into Property-performance Relationships in Additive Manufacturing: *Nima Shamsaei*¹; ¹Auburn University

4:50 PM Invited
“Lessons Learned” for Structural Alloys and Implications for MetalAM Fatigue and Damage Tolerance Considerations: *Michael Gorelik*¹; ¹Federal Aviation Administration (FAA)

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications II — Nuclear

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Charit, University of Idaho; Michael Kirka, Oak Ridge National Laboratory

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Session Chairs: Nilesch Kumar, University of Alabama; Indrajit Charit, University of Idaho

2:00 PM Invited

Printing In-pile Instrumentations for Nuclear Test Reactors: *Kunal Mondal*¹; David Estrada²; Kiyo Fujimoto²; Yanliang Zhang³; Troy Unruh¹; Michael McMurtrey¹; ¹Idaho National Laboratory; ²Boise State University; ³University of Notre Dame

2:30 PM

Texture Management in EBM Tungsten Plasma-facing Components for Fusion Reactors: *Elizabeth Ellis*¹; Michael Kirka¹; John Echols¹; Lauren Garrison¹; Christopher Ledford²; Sullivan Figurskey²; Chris Rock²; Timothy Horn²; Yutai Katoh¹; Ryan Dehoff¹; ¹Oak Ridge National Laboratory; ²North Carolina State University

2:50 PM

Performance Analysis of a Novel Radiation Hard Temperature Sensor: *Al-Amin Ahmed Simon*¹; Shah Mohammad Rahmot Ullah¹; Lyle Jones¹; Bahareh Badamchi¹; Isabella Van Rooyen¹; Harish Subbaraman¹; Maria Mitkova¹; ¹Boise State University

3:10 PM

Design and Evaluation of an Additively Manufactured Plastic Scintillation Detector: Bradford Baker¹; *Peter Joyce*¹; Marshall Millett¹; ¹US Naval Academy

3:30 PM Break

3:50 PM Invited

Transforming Nuclear Reactor Core Manufacturing via Additive Techniques: *Kurt Terrani*¹; ¹Oak Ridge National Laboratory

4:20 PM

Manufacturing Oxide Dispersion Strengthened (ODS) Steel Fuel Cladding Tubes by Cold Spray Technology: *Hwasung Yeom*¹; Mia Lenling¹; Tyler Dabney¹; Jeff Graham²; Peter Hosemann²; David Hoelzer³; Stuart Maloy⁴; Kumar Sridharan¹; ¹University of Wisconsin Madison; ²University of California-Berkeley; ³Oak Ridge National Laboratory; ⁴Los Alamos National Laboratory

4:40 PM

Irradiation Damage of 316L Stainless Steel Fabricated by Directed Energy Deposition: *Ching-Heng Shiau*¹; Cheng Sun¹; Michael McMurtrey¹; Randall Scott¹; Robert O'Brien¹; ¹Idaho National Laboratory

Additive Manufacturing of Functional and Energy Materials — Shape Memory Alloys

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Sneha Prabha Narra, Worcester Polytechnic Institute; Markus Chmielus, University of Pittsburgh; Mohammad Elahinia, University of Toledo; Reginald Hamilton, Pennsylvania State University

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Session Chairs: Sneha Prabha Narra, Worcester Polytechnic Institute; Biswadeep Saha, Intel Corporation

2:00 PM Invited

Additive Manufacturing of NiTi Shape Memory Materials: Steven Storck¹; Morgan Trexler¹; Andrew Lennon¹; Ian McCue¹; Tim Montalbano¹; Douglas Trigg¹; Ryan Carter¹; ¹Johns Hopkins Applied Physics Laboratory

2:30 PM

Additive Manufacturing of Nitinol with Post Heat Treatment Characteristics: Jeongwoo Lee¹; Yung Shin¹; ¹Purdue University

2:50 PM

Microstructure-property Correlations of LENS Processed NiTi: Sujith S¹; Lakhindra Marandi¹; Mitun Das²; Indrani Sen¹; ¹Academic; ²Government National Research Laboratory

3:10 PM

Fabrication and Functional Properties of Selectively Laser Melted NiTi Lattice Structures Using Point Scanning Strategies: Tobias Gustmann¹; Hannes Korn¹; Peter Koch²; Ralph Stelzer²; Welf-Guntram Drossel¹; ¹Fraunhofer IWU; ²TU Dresden

3:30 PM Break

3:50 PM Invited

The Next Generation of NiTi-based Shape Memory Alloys: Developed for Additive Manufacturing: Behnam Amin-Ahmadi¹; Sen Liu¹; Sean Mills¹; Branden Kappes¹; Ronald Noebe²; Aaron Stebner¹; ¹Colorado School of Mines; ²NASA Glenn Research Center

4:20 PM Invited

Complexity and Opportunities in Additive Manufactured NiTi-based Shape Memory Alloys: Ibrahim Karaman¹; Lei Xue¹; Bing

Zhang¹; Kadri Atli¹; Alaa Elwany¹; Raymundo Arroyave¹; ¹Texas A&M University

4:50 PM

Selective Laser Melting of Co-Ni-Ga Shape Memory Alloys: *Philipp Krooss*¹; Christian Lauhoff¹; Julia Richter¹; Florian Brenne¹; Thomas Niendorf¹; ¹University of Kassel

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques – Structure and Microstructure

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Fan Zhang, National Institute of Standards and Technology; Tom Stockman, Los Alamos National Laboratory; Tao Sun, University of Virginia; Donald Brown, Los Alamos National Laboratory; Yan Gao, Ge Global Research; Amit Pandey, MicroTesting Solutions; Joy Gockel, Wright State University; Tim Horn, North Carolina State University; Sneha Prabha Narra, Worcester Polytechnic Institute; Judy Schneider, University of Alabama at Huntsville

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Session Chair: Fan Zhang, National Institute of Standards and Technology

2:00 PM Invited

Non-destructive Quality Evaluation of Additively Manufactured Metal Components: Sam Yang¹; *Leon Prentice*¹; Tony Murphy¹; Sherry Mayo¹; Clement Chu¹; Anna Paradowska²; ¹CSIRO; ²ANSTO

2:25 PM Invited

Unsupervised Learning of Dislocation Motion: *Darren Pagan*¹; Thien Phan²; Jordan Weaver²; Austin Benson³; Armand Beaudoin¹; ¹Cornell High Energy Synchrotron Source; ²National Institute of Standards and Technology; ³Cornell University

2:50 PM

In Operando X-ray Diffraction during Laser 3D Printing: *Samy Hocine*¹; Helena Van Swygenhoven¹; Steven Van Petegem¹; Cynthia Sin Ting Chang¹; Tuerdi Maimaitiyili¹; Gemma Tinti¹; Dario Ferreira Sanchez¹; Daniel Grolimund¹; Nicola Casati¹; ¹Paul Scherrer Institut

3:10 PM

In-situ TEM Heating Experiments to Study the Effect of Thermal Gradients on Additively Manufactured Ti-6Al-4V Builds: *Sriram Vijayan*¹; Meiyue Shao¹; Chris Blackwell¹; Sabina Kumar²; Sudarsanam Babu²; Joerg Jinschek¹; ¹The Ohio State University; ²University of Tennessee, Knoxville

3:30 PM

Observing the Phase Evolution During Selective Laser Melting of a High-Fe β -Ti Alloy from Elemental Powders via In-Situ Synchrotron X-Ray Diffraction: *Farheen Ahmed*¹; Samuel Clark²; Chu Lun Alex Leung²; Yunhui Chen²; Lorna Sinclair²; Sebastian Marussi²; Veijo Honkimaki³; Noel Haynes⁴; Peter Lee²; Hatem Zurob¹; André Phillion¹; ¹McMaster University; ²University College London; ³European Synchrotron Radiation Facility; ⁴Collins Aerospace

3:50 PM Break

4:10 PM Invited

Combining Atom-probe Tomography and Synchrotron Methods to Investigate In-situ Precipitation in AM-produced Alloys: *Eric Jaegle*¹; Philipp Kürsteiner¹; Pere Barriobero-Vila²; Markus Wilms³; Frederic De Geuser⁴; Dierk Raabe¹; ¹Max-Planck-Institut fuer Eisenforschung; ²German Aerospace Center DLR; ³Fraunhofer-Institute for Laser Technology; ⁴SIMAP - University Grenoble Alpes

4:35 PM

In-situ TEM Thermal Cycling of AM Steel: *Manas Upadhyay*¹; Eva Héripré²; Lluís Cardona²; Alexandre Tanguy¹; Simon Hallais¹; Sylvain Durbecq¹; Thien-Nga Lê¹; ¹École Polytechnique; ²CentraleSupélec

4:55 PM

Detection of Early Crack Formation of Fatigued, Additively Manufactured Stainless Steel Using Neutron Dark-field Imaging: Adam Brooks¹; *Daniel Hussey*²; Hong Yao³; Ali Haghshenas³; Jumao Yuan³; Jacob LaManna²; David Jacobson²; Caroline Lowery³; Shengmin Guo³; Michael Khonsari³; Leslie Butler³; ¹EWI; ²National Institute of Standards and Technology; ³Louisiana State University

5:15 PM

Machine Learning Applications for In-situ Synchrotron X-ray Diffraction Measurements of Thermo-Mechanical Behaviors of Additively Manufactured 17-4 Stainless Steel: *Thien Phan*¹; Darren Pagan²; ¹National Institute of Standards and Technology; ²Cornell High Energy Synchrotron Source

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy

Development II — Alloy Design- Titanium Alloys

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Orlando Rios, Oak Ridge National Laboratory; Hunter Martin, HRL Laboratories; Atieh Moridi, Cornell University

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Session Chair: James Saal, Citrine Informatics

2:00 PM Invited
Additive Manufacturing of Commercially Available Metastable β -Ti Alloys: Mohan Sai Kiran Kumar Yadav Nartu¹; David Flannery¹; Eugene Ivanov²; Srinivas Aditya Mantri¹; *Rajarshi Banerjee*¹; ¹University of North Texas; ²Tosoh SMD Inc.

2:30 PM
Rapid Exploration of Compositionally Complex Alloys via Additive Manufacturing and Molecular Dynamics: *Andrew Kustas*¹; Michael Melia¹; Eric Schindelholz¹; Shaun Whetten¹; Joseph Michael¹; Nicolas Argibay¹; Michael Chandross¹; ¹Sandia National Laboratories

2:50 PM
Selective Laser Melting of Beta-type Ti-Nb Alloys for Bone Implants: *Stefan Pilz*¹; Holger Schwab¹; Patrick Langhelm¹; Uta Kühn¹; Annett Gebert¹; ¹Institute for Complex Materials, Leibniz IFW Dresden

3:10 PM
Ti-Nb Alloy with Location-dependent Properties Using Laser Additive Approach: *Wenhao Lin*¹; Ji Ma¹; ¹University of Virginia/ MSE Department

3:30 PM
Design of New Titanium Alloy for Additive Manufacturing with the CALPHAD Method: *Zhi Liang*¹; Richard Ricker¹; Ursula Kattner¹; Carelyn Campbell¹; ¹National Institute of Standards and Technology

3:50 PM Break

4:05 PM Invited
Microstructural Control for Additive Manufacturing of Metal Alloys—an Advanced Microscopy Approach: *Simon Ringer*¹;

¹University of Sydney

4:35 PM

Development of New Ti-64 Modified Alloys for Additive Manufacturing with Columnar to Equiaxed Transition: *Nevin Taylor*¹; Hamish Fraser¹; Brian Welk¹; Zachary Kloenne¹; Andrew Baker²; ¹Ohio State University; ²Boeing

4:55 PM

Application of a Thermodynamics-informed Materials Design Simulator for Microstructure Control During AM: *Aurelien Perron*¹; John Roehling¹; Tien Roehling¹; Nicholas Calta¹; Bey Vrancken¹; Joel Berry¹; Thejaswi Tumkur Umanath¹; Patrice Turchi¹; Vincenzo Lordi¹; Joseph McKeown¹; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory

5:15 PM

Alloy-dilution Effects and Mechanical Response in Wire-arc Additively-manufactured Alloy-alloy Composites Built Using Ti-6Al-4V and Commercially-pure Titanium: *Alec Davis*¹; Cameron Breheny¹; Jonathon Fellowes¹; Uzoma Nwankpa²; Filomeno Martina²; Jialuo Ding²; Thays Machry³; Philip Prangnell¹; ¹The University of Manchester; ²Cranfield University; ³Airbus

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Processing Effects on Microstructure and Material Performance — Al-alloys and Other Materials

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Eric Lass, University of Tennessee, Knoxville; Joy Gockel, Wright State University; Emma White, Ames Laboratory; Richard Fonda, Naval Research Laboratory; Monnamme Tlotleng, University of Johannesburg; Jayme Keist, Pennsylvania State University; Hang Yu, Virginia Polytechnic Institute and State University

Wednesday PM | February 26, 2020
11A | San Diego Convention Ctr

Session Chairs: Hang Yu, Virginia Polytechnic Institute and State University; Emma White, Ames Laboratory

2:00 PM

Phase Transformations in Al-Ce-X Alloys: *Kevin Sisco*¹; Alex Plotkowski²; Kurt Sickafus¹; Claudia Rawn¹; Ryan Dehoff²; Lawrence Allard²; Sumit Bahl²; Amit Shyam²; Andres Rossy²; Sudarsanam

Babu¹; ¹University of Tennessee; ²Oak Ridge National Laboratory

2:20 PM

Directed Energy Deposition of AlSi10Mg: Single Track Nonscalability and Bulk Properties: *Parnian Kiani*¹; Alexander Dupuy¹; Kaka Ma²; Julie Schoenung¹; ¹University of California, Irvine; ²Colorado State University

2:40 PM

Low Surface Roughness Additively Manufactured AlSi10Mg: The Impacts on Corrosion and Water Repellency Properties: Parisa Fathi¹; Mohsen Mohammadi²; *Ali Nasiri*¹; ¹Memorial University of Newfoundland; ²Marine Additive Manufacturing Centre of Excellence (MAMCE), University of New Brunswick

3:00 PM

Fabrication Defects and Limitations in Additive Manufacturing of AlSi10Mg Lattice Structures: *Enrico Ossola*¹; Andre Pate²; Samad Firdosy²; Andrew Shapiro²; Scott Roberts²; Eugenio Brusa¹; Raffaella Sesana¹; ¹Politecnico di Torino; ²Jet Propulsion Laboratory, California Institute of Technology

3:20 PM

Microstructure and Micro-mechanical Property Evolution of Cold Sprayed Al 6061 Coatings with Isothermal Heat-treatment: *Benjamin Bedard*¹; Tyler Flanagan¹; Aaron Nardi²; Avinash Dongare¹; Harold Brody¹; Victor Champagne²; Seok-Woo Lee¹; Mark Aindow¹; ¹University of Connecticut; ²U.S. Army Research Laboratory, Weapons and Materials Research Directorate

3:40 PM Break

4:00 PM

Selective Laser Melting (SLM) Additive Repair of Duramold-2 Substrate Using AlSi10Mg: *Edward Cyr*¹; Amir Hadadzadeh¹; Babak Shalchi Amirkhiz¹; Joshua Kelly¹; Mohsen Mohammadi¹; ¹Marine Additive Manufacturing Centre of Excellence

4:20 PM

Microstructure Distribution, Phase Identification, and Texture of Selective Laser Melted GRCop-84 in As-built and HIPed Conditions: *Robert Minneci*¹; Claudia Rawn¹; Sudarsanam Babu¹; Michael Haines¹; Jeffrey Bunn¹; ¹University of Tennessee

4:40 PM

Effect of Cyclic Rapid Thermal Loadings on the Microstructural Evolution of a Cantor Alloy During Selective Laser Melting Processes: *Hao Wang*¹; Zhiguang Zhu²; Hansheng Chen¹; Sharon Mui Ling Nai²; Rongkun Zheng³; Sophie Primig⁴; Sudarsanam Babu⁵; Simon Ringer¹; Xiaozhou Liao¹; ¹School of Aerospace, Mechanical

andMechatronicEngineering,TheUniversityofSydney;²Singapore Institute of Manufacturing Technology; ³School of Physics, The University of Sydney; ⁴School of Materials Science & Engineering, UNSW; ⁵Department of Mechanical, Aerospace and Biomedical Engineering, The University of Tennessee, Knoxville

5:00 PM
Experimental Evaluation of Additively Manufactured Continuous Fiber Reinforced Nylon Composites: *Mahdi Mohammadizadeh*¹; Ismail Fidan¹; ¹Tennessee Technological University

5:20 PM
Ultrahigh-properties TiNi Shape Memory Alloys by 4D Printing: *Haizhou Lu*¹; Chao Yang¹; ¹South China University of Technology

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Processing Effects on Microstructure and Material Performance — Residual Stress and Texture

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Eric Lass, University of Tennessee, Knoxville; Joy Gockel, Wright State University; Emma White, Ames Laboratory; Richard Fonda, Naval Research Laboratory; Monnamme Tlotleng, University of Johannesburg; Jayme Keist, Pennsylvania State University; Hang Yu, Virginia Polytechnic Institute and State University

Wednesday PM | February 26, 2020
6E | San Diego Convention Ctr

Session Chair: Hang Yu, Virginia Polytechnic Institute and State University

2:00 PM
Interface Texture Development of Additively Manufactured Materials: *David Rowenhorst*¹; Aerial Murphy-Leonard¹; Richard Fonda¹; ¹U.S. Naval Research Laboratory

2:20 PM
GrainBoundaryEngineeringofAdditivelyManufacturedStainless Steel: *Gao Shubo*¹; Hu Zhiheng²; Chin Kai Siang¹; Song Xu²; Matteo Seita¹; ¹Nanyang Technological University; ²Singapore Institute of Manufacturing Technology

2:40 PM

Crystallographic Texture Control in Additively Manufactured Stainless Steel: *Sudharshan Raman*¹; Bernard Gaskey¹; Ekta Jain¹; Shubo Gao¹; Kishore Venkatesan²; David Ritchie²; Darren Fraser²; Sri Lathabai²; Matteo Seita¹; ¹Nanyang Technological University; ²CSIRO

3:00 PM

Crystallographic Texture Evolution in Additive Manufactured Metals as a Function of Build Height and Strategy: *Alec Saville*¹; Jonah Klemm-Toole¹; Sven Vogel²; Adam Creuziger³; Sudarsanam Babu⁴; Amy Clarke¹; ¹Colorado School of Mines; ²Los Alamos National Laboratory; ³National Institute of Standards and Technology; ⁴Oak Ridge National Laboratory/University of Tennessee-Knoxville

3:20 PM

Controlling Residual Stress and Phase Transformations during Laser Powder Bed Fusion through large-area Surface Heating: *John Roehling*¹; William Smith¹; Tien Roehling¹; Gabriel Guss¹; Bey Vrancken¹; Joseph McKeown¹; Michael Hill²; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory; ²University of California, Davis

3:40 PM Break

4:00 PM

Influence of Selective Laser Melting Strategies and Post Treatment on the Residual Stresses and Microstructure of Alloy 718: *Jan Capek*¹; Efthymios Polatidis¹; Robert Pederson²; Christophe Lyphout³; Markus Strobl¹; ¹Paul Scherrer Institute; ²University West; ³Research Institute of Sweden

4:20 PM

Residual Stress and Distortion Modeling of a LENS Ti-6Al-4V Thin Wall Using the Evolving Microstructural Model of Inelasticity: *Matthew Dantin*¹; Matthew Priddy¹; ¹Mississippi State University

4:40 PM

Evaluation of Additively Manufactured Functionally Graded Titanium Alloys Tailored for Thermal Expansion Applications: *Skyler Hilburn*¹; Timothy Simpson¹; Todd Palmer¹; ¹Pennsylvania State University

5:00 PM

Residual Stress Prediction in Metal Additive Manufacturing: Numerical Simulation and Experimental Validation: *Tao Wu*¹; Thomas Niendorf¹; ¹University of Kassel

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Plasticity Modeling / Experiments

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Shaping and Forming Committee, TMS: Materials Characterization Committee

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Marko Knezevic, University of New Hampshire; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; M Arul Kumar, Los Alamos National Laboratory

Wednesday PM | February 26, 2020
Theater A-2 | San Diego Convention Ctr

Session Chairs: Nathan Mara, University of Minnesota; George Pharr, Texas A&M University

2:00 PM Invited
High-throughput Elevated Temperature Nanomechanical Mapping of Fe-based Alloys: *Nathan Mara*¹; Youxing Chen²; Eric Hintsala³; Bartosz Nowakowski³; Douglas Stauffer³; ¹University of Minnesota; ²University of North Carolina, Charlotte; ³Bruker Nano Surfaces Division

2:30 PM
Microstructure Evolution During Dynamic Compression in Titanium Characterized with the XFEL at LCLS-2: *Sven Vogel*¹; Cindy Bolme¹; Donald Brown¹; Ellen Cerreta¹; Joseph Mang¹; Benjamin Morrow¹; Kyle Ramos¹; Igor Usov¹; Suzanne Ali²; Damian Swift²; Eric Galtier³; Arianna Gleason³; Eduardo Granados³; Amy Lazicki²; Philip Heimann³; Despina Milathianaki³; Bob Nagler³; Luca Lutterotti⁴; ¹Los Alamos National Laboratory; ²Lawrence Livermore National Laboratory; ³SLAC; ⁴Universita di Trento

2:50 PM
Combining X-ray Diffraction Contrast Tomography and Topo-tomography to Study In-situ the Mechanics of Polycrystalline Materials: *Henry Proudhon*¹; Wolfgang Ludwig²; Jean-Charles Stinville³; Patrick Callahan³; ¹Mines Paristech Centre Des Materiaux; ²Université de Lyon; ³University of California Santa Barbara

3:10 PM
Investigation of Residual Stress Using High Resolution XRD and Localized Lattice Rotation Under Fatigue Loading: *Ramasis*

Goswami¹; ¹Naval Research Laboratory

3:30 PM Break

3:50 PM Invited

Measurement of Power Law Creep Parameters by Nanoindentation: *George Pharr*¹; Zhiyuan Liang¹; ¹Texas A&M University

4:20 PM

Measurement of the Thermal Expansion of Ti-7Al Using High Energy X-ray Diffraction Microscopy: *Rachel Lim*¹; Darren Pagan²; Joel Bernier³; JY Peter Ko²; Anthony Rollett¹; ¹Carnegie Mellon University; ²Cornell High Energy Synchrotron Source; ³Lawrence Livermore National Laboratory

4:40 PM

Effects of the Orientation of the α β Interphase on the Time-dependent Fatigue Behavior of Ti-6Al-4V: Kartik Kapoor¹; Priya Ravi¹; Jun-Sang Park²; Ryan Noraas³; Vasisht Venkatesh³; *Michael Sangid*¹; ¹Purdue University; ²Argonne National Laboratory; ³Pratt & Whitney

5:00 PM

Measurement of Strain Rate Sensitivity by the Constant Load and Hold Indentation Method: A Case Study in Calcium Fluoride: *Zhiyuan Liang*¹; George Pharr¹; ¹Texas A&M University

ADVANCED MATERIALS

Advanced High Strength Steels IV — Session IV

Sponsored by: TMS Structural Materials Division, TMS: Steels Committee

Program Organizers: Ana Luiza Araujo, AK Steel Research and Innovation Center; Mary O'Brien, Colorado School of Mines; Tilmann Hickel, Max Planck Institut fur Eisenforschung; Amy Clarke, Colorado School of Mines; Kester Clarke, Colorado School of Mines; C. Tasan, Massachusetts Institute of Technology; MingXin Huang, University of Hong Kong

Wednesday PM | February 26, 2020
Balboa | Marriott Marquis Hotel

Session Chairs: Mary O'Brien, Colorado School of Mines; MingXin Huang, University of Hong Kong

2:00 PM

Effect of Si on Microstructure and Mechanical Properties of FeMnAlC Lightweight Steels: *Zhangwei Wang*¹; Wenjun Lu¹; Junyang He¹; Dirk Ponge¹; Dierk Raabe¹; Zhiming Li¹; ¹Max-Planck-Institut für Eisenforschung

2:20 PM

Understanding the Effect of Nickel on the Microstructure of Low Density FeMnAl Steels: Laura Bartlett¹; *Michael Piston*¹; Ronald O'Malley¹; Krista Limmer²; Daniel Field²; ¹Missouri University of Science & Technology; ²CC DEVCOM Army Research Laboratory

2:40 PM

Low-Density Steels: Microstructure Evolution and Tensile Behavior in Novel FE-MN-AL-C Steels: *Tomas Scuseria*¹; Kelcey Garza²; Dean Pierce³; Amrinder Gill²; Erik Pavlina²; Jerry Arnold²; AmyClarke¹; KesterClarke¹; OmarGarcia⁴; FredFletcher⁵; ¹Colorado School of Mines; ²AK Steel; ³Oak Ridge National Laboratory; ⁴Ternium; ⁵Arcelor Mittal

3:00 PM

Improvement of Hydrogen Induced Cracking Resistance by Tempering of an X65 Pipeline Steel for Sour Service:*Mary O'Brien*¹; Kip Findley¹; ¹Colorado School of Mines

3:20 PM

Effect of Composition on Properties of Age-hardenable Fe-Mn-Al-C Alloys: *Krista Limmer*¹; Daniel Field¹; Laura Bartlett²; Katherine Sebeck³; ¹CCDC Army Research Laboratory; ²Missouri S&T; ³CCDC Ground Vehicle Systems Center

3:40 PM Break

4:00 PM

Effect of Alloying on Adhesive Strength of Interfaces Between Matrix and Transition Metal Carbide and Nitride Precipitates in Austenitic Steels: First-principles Approach: *Oleg Kontsevoi*¹; Gregory Olson¹; ¹Northwestern University

4:20 PM

Development of Hot-rolled TRIP Steel: *Hung-Wei Yen*¹; ¹National Taiwan University

4:40 PM

TRIP-Maraging Nanolaminate Stainless Steel: *Hyunseok Oh*¹; Shaolou Wei¹; Jaclyn Leigh Cann¹; Cemal Cem Tasan¹; ¹Massachusetts Institute of Technology

5:00 PM
Multi-scale Modeling of Hydrogen Embrittlement in High-strength Steels: *Tarek Hatem*¹; ¹The British University in Egypt

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Developments in Rare-earth Free Permanent Magnets

Sponsored by: TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Daniel Salazar, BCMaterials; Alex Leary, Nasa Glenn Research Center; Markus Chmielus, University of Pittsburgh; Ryan Ott, Ames Laboratory/Cmi; Arcady Zhukov, UPV/EHU, and Ikerbasque, Basque Foundation for Science

Wednesday PM | February 26, 2020
Del Mar | Marriott Marquis Hotel

Session Chairs: Thomas Schrefl, Danube University Krems; Cajetan Ikenna Nlebedim, AMES Laboratory

2:00 PM Invited
A Brief Review of MnBi-based Hard Magnetic Materials: *Jun Cu*¹; ¹Iowa State University

2:30 PM Invited
Magnetic Properties, Microstructure and Phase Formation in Rare Earth Free MnAl-C Alloys: *Thomas G. Woodcock*¹; ¹IFW Dresden

3:00 PM
The Effect of Ti and Zr Additions on the Magnetic Properties and Microstructure of MnAl-C Alloys: *Le Feng*¹; Kornelius Nielsch¹; Thomas Woodcock¹; ¹Leibniz IFW Dresden

3:20 PM
Investigation of the Long-Term Thermal Stability of the L1₀ Phase in Ternary Mn-Al-Ga Alloys: *Torsten Mix*¹; Thomas Woodcock¹; ¹Leibniz IFW Dresden

3:40 PM Break

4:00 PM Invited
Mn-based Permanent Magnets: from Thin Film Micromagnets to Bulk Magnets Obtained by Hot-pressing of Gas-atomized Powder: *Carla Muñoz-Rodríguez*¹; Melek Villanueva¹; Le Feng²;

Elena H. Sánchez³; Javier Rial¹; Julio Camarero¹; Cristina Navío¹; Ester M. Palmero¹; Torsten Mix²; Thomas Woodcock²; Peter S. Normile³; José A. De Toro³; *Alberto Bollero*¹; ¹IMDEA Nanociencia; ²IFW Dresden, Institute of Metallic Materials; ³Instituto Regional de Investigación Científica Aplicada (IRICA) and Departamento de Física Aplicada, Universidad de Castilla-La Mancha

4:30 PM Invited
Development of Enhanced Magnetic and Mechanical Properties of Alnico as a Rare Earth-free Permanent Magnet by Final-shape Powder Processing: *Iver Anderson*¹; Emily Rinko¹; Emma White¹; Aaron Kassen²; Wei Tang¹; Lin Zhou¹; Timothy Prost¹; Matthew Kramer¹; ¹Iowa State University / Ames Laboratory; ²Carpenter Technology Corporation

5:00 PM Invited
Processing and Calorimetry of Alnico in High Magnetic Fields: *Michael Kesler*¹; Xubo Liu²; Ikenna Nlebedim²; Matthew Kramer²; Orlando Rios¹; Michael Mcguire¹; ¹Oak Ridge National Laboratory; ²Ames Laboratory

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VI — Energy Storage with Emphasis on Batteries II

Sponsored by: TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

Program Organizers: Jung Pyung Choi, Pacific Northwest National Laboratory; Amit Pandey, MicroTesting Solutions; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh

Wednesday PM | February 26, 2020
16B | San Diego Convention Ctr

Session Chairs: Eric Detsi, University of Pennsylvania; Corey Love, US Naval Research Laboratory

2:00 PM Invited
Structure-property-performance Relationship and Durability of Advanced Lithium-ion Electrode Architectures: *David Wood*¹; Marissa Wood¹; Ritu Sahore¹; Jianlin Li¹; Zhijia Du¹; Ilias Belharouak¹; ¹Oak Ridge National Laboratory

2:20 PM Invited
X-ray Imaging of Metallic Anodes for Lithium Ion Batteries and Beyond: Hernando Gonzalez Malabet¹; *George Nelson*¹; ¹University of Alabama in Huntsville

2:40 PM Invited
Mechanics of Metallic Lithium and Sodium Anodes: *Matt Pharr*¹; Cole Fincher¹; ¹Texas A&M University

3:00 PM Invited
In-situ X-ray Absorption Studies of Transition Metal Layered Structures for Zn-ion Batteries: *Christopher Patridge*¹; ¹D'Youville College

3:20 PM Invited
In-situ Measurement of Stresses and their Effect on Diffusion in High Energy Density Electrode Materials: *Siva Nadimpalli*¹; ¹New Jersey Institute of Technology

3:40 PM Break

4:00 PM Invited
Long Cycle-life and High-rate Magnesium-ion Battery Anode Enabled By Self-healing Through Near-room-temperature Solid-liquid Phase Transition: *Eric Detsi*¹; Lin Wang¹; ¹University of Pennsylvania

4:20 PM Invited
Synchrotron X-ray Science to Understand Structural and Physical Transformations in Solid State Batteries: *Kelsey Hatzell*¹; Marm Dixit¹; ¹Vanderbilt University

ELECTRONIC MATERIALS

Advanced Microelectronic Packaging, Emerging Interconnection Technology and Pb-free Solder — 3D Microelectronic Packaging and Emerging Interconnects II

Sponsored by: TMS Functional Materials Division, TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Christopher Gourlay, Imperial College London; Kazuhiro Nogita, University of Queensland; David Yan, San Jose State University; Mike Wolverton, Raytheon; Babak Arfaei, Ford Motor Company; Andre Delhaise, Celestica; Mehran Maalekian, Mat-Tech; Mohd Arif Salleh, Universiti Malaysia Perlis

Wednesday PM | February 26, 2020
Palomar | Marriott Marquis Hotel

Session Chairs: Chris Gourlay, Imperial College London;
Tianhong Gu, Imperial College London

2:00 PM Invited

Mechanisms of Electromigration in Bicrystal Sn Solder Joint by Correlative X-ray Tomography and Microscopy: Marion Branch Kelly¹; *Nikhilesh Chawla*¹; ¹Arizona State University

2:20 PM

Effect of Solder Joint Geometry on Electromigration Failure Mechanism in Micro Solder Joint: *Hossein Madanipour*¹; Yi Ram Kim¹; Allison Osmonson¹; Choong-Un Kim¹; ¹University of Texas, Arlington

2:40 PM

Modeling and Simulation of Pore Electromigration in Tin Solders: *Zachary Morgan*¹; Yongmei Jin¹; Vahid Attari²; Raymundo Arroyave²; ¹Michigan Technological University; ²Texas A&M University

3:00 PM

A Comprehensive Approach on Understanding Electromigration Failure Kinetics with Varying UBM Thickness and Joint Geometry in WCSP Solder Interconnects: *Allison Osmanson*¹; Yi Ram Kim¹; Hossein Madanipour¹; Choong-Un Kim¹; Patrick Thompson²; Qiao Chen²; ¹University of Texas at Arlington; ²Texas Instruments

3:20 PM Break

3:40 PM

Study on the UBM Thickness and Current Flow Configuration Effects on Electromigration Failure Mechanism in Solder Interconnects: *Yi Ram Kim*¹; Allison Osmanson¹; Hossein Madanipour¹; Choong-Un Kim¹; Patrick Thompson²; Qiao Chen²; ¹University of Texas at Arlington; ²Texas Instruments, Inc.

4:00 PM

Microstructure Evolution and Interfacial Growth of Intermetallic Compound for Cu/In/Cu Structure under Thermomigration: *Chen-Wei Lee*¹; Jou Hsuan Lee¹; Fan-Yi Ouyang; ¹National Tsing Hua University

4:20 PM

Role of Grain Boundaries in Electromigration and Thermomigration Related Failure: A Phase Field Simulation Study: *Supriyo Chakraborty*¹; Praveen Kumar²; Abhik Choudhury²; ¹Ohio State University; ²Indian Institute of Science

CHARACTERIZATION

Advanced Real Time Imaging — Energy & Environment

Sponsored by: TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, National Energy Technology Laboratory; David Alman, National Energy Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki Shibata, Imram, Tohoku University; Antoine Allanore, Massachusetts Institute of Technology; Candan Tamerler, University of Kansas; Noritaka Saito, Kyushu University; Neslihan Dogan, McMaster University; Zuotai Zhang, Southern University of Science and Technology; Bryan Webler, Carnegie Mellon University; Anna Nakano, US Department of Energy National Energy Technology Laboratory

Wednesday PM | February 26, 2020
Theater A-4 | San Diego Convention Ctr

Session Chairs: Anna Nakano, US Department of Energy National Energy Technology Laboratory; Jinichiro Nakano, National Energy Technology Laboratory

2:00 PM Invited
In-operando Non-invasive Optical Visualization of Battery Reactions and Processes: *Nian Liu*¹; Yutong Wu¹; Yamin Zhang¹; ¹Georgia Institute of Technology

2:20 PM Invited
In-situ Transmission Electron Microscopy Characterization of Advanced Nuclear Materials during Single and Dual Beam Irradiation: *Osman El-Atwani*¹; Stuart Maloy¹; ¹Los Alamos National Laboratory

2:40 PM
In-operando Investigation on Sequential Stages for Redox-triggered Phase Transformation of Natural Hematite Particles: *Anna Nakano*¹; Jinichiro Nakano¹; James Bennett²; ¹U.S. Department of Energy National Energy Technology Laboratory/ Leidos Research Support Team; ²US Department of Energy National Energy Technology Laboratory

3:00 PM Concluding Comments

MECHANICS & STRUCTURAL RELIABILITY

Advancing Current and State-of-the-Art Application of Ni- and Co-based Superalloys — Ni-based Superalloys – Modeling Structure & Properties

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Chantal Sudbrack, Northwestern University Center for Atom-Probe Tomography; Mario Bochiechio, Pratt & Whitney; Kevin Bockenstedt, ATI Specialty Materials; Katerina Christofidou, University of Sheffield; James Coakley, University of Miami; Martin Detrois, National Energy Technology Laboratory; Laura Dial, GE Global Research; Bij-Na Kim, Carpenter Additive; Victoria Miller, University of Florida; Kinga Unocic, Oak Ridge National Laboratory

Wednesday PM | February 26, 2020
11B | San Diego Convention Ctr

Session Chairs: James Coakley, University of Miami; Victoria Miller, University of Florida

2:00 PM
Revisiting Precipitation Hardening in Ni- and Co-based Superalloys: Compositional and Microstructural Effects: *Vassili Vorontsov*¹; Hikmatyar Hasan²; Peter Haynes²; ¹University of Strathclyde Glasgow; ²Imperial College London

2:20 PM
Phase-field-informed Modeling of ' Rafting in 3D during High-temperature Creep in Ni-based Single Crystal Superalloys: *Jean-Briac le Graverend*¹; Rajendran Harikrishnan¹; ¹Texas A&M University

2:40 PM
Modeling the Dependence of Microstructural Evolution on the Crystallographic Orientation in Ni-based Single Crystal Superalloys: *Harikrishnan Rajendran*¹; Jean- Briac le Graverend¹; ¹Texas A&M University

3:00 PM
Competitive Mechanisms of Fatigue Crack Initiation Around Non-metallic Inclusions of a Polycrystalline Ni-base Superalloy: *Alexander Bergsmo*¹; Fionn Dunne¹; ¹Imperial College London

3:20 PM

Competing Mode of Failure Predictions in a Ni-based Superalloy using Crystal Plasticity Finite Element Simulations: *Ritwik Bandyopadhyay*¹; Michael Sangid¹; ¹Purdue University

3:40 PM Break

4:00 PM

On the Temperature Limits of Ni-based Superalloys: *Daniel Barba*¹; Ashton Egan²; Michael Mills²; Roger Reed¹; ¹University of Oxford; ²Ohio State University

4:20 PM

Probing Effects of Alloying Additions and Local Phase Transformation Strengthening on Creep Deformation in Nickel Based Superalloys: *Ashton Egan*¹; Lola Lilensten²; Paraskevas Kontis²; Sammy Tin³; Michael Mills¹; ¹Ohio State University; ²Max-Planck-Institut für Eisenforschung GmbH; ³Illinois Institute of Technology

4:40 PM

The Origin and Stability of Nanostructural Hierarchy in Nickel-base Superalloys: *Subhashish Meher*¹; Larry Aagesen¹; ¹Idaho National Laboratory

5:00 PM

Numerical Calculation of Antiphase Boundary Energy of Ni-superalloys: *Mohammad Dodaran*¹; Ali Hemmasian Ettefagh¹; Shengmin Guo¹; Shuai Shao¹; ¹Louisiana State University

5:20 PM

Nano-twinning in a γ Precipitate Strengthened Ni-based Superalloy: *Yong Zhang*¹; Shengyun Yuan¹; Zhihao Jiang¹; Jizi Liu¹; Yizhe Tang²; ¹Nanjing University of Science and Technology; ²Shanghai University

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Models and Algorithms for Microscale

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Charudatta Phatak, Argonne National Laboratory; Bryan Wong, University of California, Riverside; Mikhail Mendeleev, Ames Laboratory; Bryce Meredig, Citrine Informatics; Ebrahim Asadi, University of Memphis; Francesca Tavazza, National Institute of Standards and Technology

Wednesday PM | February 26, 2020
31C | San Diego Convention Ctr

Session Chairs: Mohsen Eshraghi, California State University, Los Angeles; Mohammadreza Yaghoobi, University of Michigan

2:00 PM

“Sintering” Models and Measurements: Data Assimilation for Microstructure Prediction of Nylon Component SLS Additive Manufacturing: *William Rosenthal*¹; Francesca Grogan¹; Yulan Li¹; Erin Barker¹; Josef Christ¹; Timothy Pope¹; Tamas Varga¹; Chris Barrett¹; Mathew Thomas¹; Noah Oblath¹; Kevin Fox¹; Malachi Schram¹; Marvin Warner¹; Amra Peles¹; ¹Pacific Northwest National Laboratory

2:20 PM

Multi-scale Modeling of Solidification Microstructure during Powder Bed Fusion: Ryan Lenart¹; Antonio Magana¹; *Mohsen Eshraghi*¹; ¹California State University, Los Angeles

2:40 PM

Large Scale 3D Phase-field Sintering Simulations: Robert Termuhlen¹; *Hui-Chia Yu*¹; ¹Michigan State University

3:00 PM

Phase Field Modeling of Microstructure Evolution During Selective Laser Sintering and Post Aging: *Yulan Li*¹; Erin Barker¹; William Rosenthal¹; Francesca Grogan¹; Amra Peles¹; ¹Pacific Northwest National Laboratory

3:20 PM

A New Phase-field Model with Anisotropic Interface Width for the Highly Anisotropic Growth of Ice Dendrites: *Gilles Demange*¹; Renaud Patte¹; Helena Zapolsky¹; ¹University Of Rouen

3:40 PM Break

4:00 PM

Direct Consideration of Vacancies in CALPHAD Modelling of Zirconium Carbide: *Theresa Davey*¹; Ying Chen¹; ¹Tohoku University

4:20 PM

Multi-scale Modelling of Coarsening Process in the Ag-Cu Alloy: Bence Gajdics¹; Helena Zapolsky²; Zoltán Erdélyi¹; *Gilles Demange*²; János Tomán¹; ¹University of Debrecen; ²University of Rouen

4:40 PM

PRISMS-Plasticity: An Open-source Crystal Plasticity Finite Element Software: *Mohammadreza Yaghoobi*¹; Sriram Ganesan²; Srihari Sundar²; Aaditya Lakshmanan²; Aerial Murphy-Leonard¹; Shiva Rudraraju³; John Allison¹; Veera Sundararaghavan²; ¹Materials Science and Engineering, University of Michigan, Ann Arbor; ²Aerospace Engineering, University of Michigan, Ann Arbor; ³Mechanical Engineering, University of Michigan, Ann Arbor

5:00 PM

Robust and Accurate Self-consistent Homogenization of Elasto-viscoplastic Polycrystals: *Miroslav Zecevic*¹; Ricardo Lebensohn¹; ¹Los Alamos National Laboratory

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications VIII — Session IV

Sponsored by: TMS Functional Materials Division, TMS: Alloy Phases Committee

Program Organizers: Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Ensicaen University of Caen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Lan Li, Boise State University; Takao Mori, National Institute for Materials Science; Hsin-jay Wu, National Chiao-tung University; Tiejun Zhu, Zhejiang University

Wednesday PM | February 26, 2020
Miramar | Marriott Marquis Hotel

Session Chairs: Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Ensicaen University of Caen

2:00 PM Invited

Thermoelectric Half Heusler Systems {Nb,Ta}FeSb - Ti_{1+x}Fe_{1.33-x}Sb: *Peter Rogl*¹; Andrij Grytsiv²; Vitaliy Romaka²; Ali Tavassoli²; Gerda Rogl²; Ernst Bauer²; ¹Institute of Materials Chemistry, Universitaet Wien; ²Universitaet Wien

2:20 PM Invited

Polar Tintermetallics as High Temperature Thermoelements: *Franck Gascoin*¹; ¹CRISMAT-UNICAEN-CNRS

2:40 PM Invited

Thermal Storage Effect on Thermoelectric Module: *Albert T. Wu*¹; Chun-Hsien Wang¹; Yu-Chien Wang¹; ¹National Central University

3:00 PM

Black Phosphorus and Semiconducting Transition Metal Dichalcogenides in Contact with Transparent Conductive Oxides for High Efficiency Solar Cells: *Ravindra Mehta*¹; Avra Bandyopadhyay¹; Anupama Kaul¹; ¹University of North Texas

3:20 PM Invited

Laser Additive Manufacturing of Bismuth Telluride and Silicide Thermoelectric Materials: *Saniya Leblanc*¹; Haidong Zhang¹; Ryan Welch¹; George Nolas²; Yohann Thimont³; ¹George Washington University; ²University of South Florida; ³Universite Paul SABATIER CIRIMAT

3:40 PM Break

4:00 PM Invited

Lattice Hardening Due to Vacancy Diffusion in (GeTe)_mSb₂Te₃ Alloys: *Alexandra Zevalkink*¹; Wanyue Peng¹; David Smiadak¹; Michael Boehlert¹; Spencer Mathers¹; Jared Williams¹; Donald Morelli¹; ¹Michigan State University

4:20 PM

Realizing the Compositional Homogeneity in GeTe-based Thermoelectric Materials and Phase Transition Behavior: *Yi-Fen Tsaï*¹; Pai-chun Wei²; Hsin-Jay Wu¹; ¹National Chiao-Tung University; ²Computer, Electrical, and Mathematical Sciences and Engineering Division, King Abdullah University of Science and Technology (KAUST)

4:40 PM

Optimizing Power Factor in Rare Earth-free CoSb₃-Skutterudite Thin Films: *Cédric Bourgès*¹; Isao Ohkubo¹; Naohito Tsujii¹; Takao Mori¹; ¹NIMS

5:00 PM

Severe Plastic Deformation (SPD) via High Pressure Torsion (HPT) a Perfect Tool not Only to Enhance ZT of Thermoelectric Materials but Also to Produce Them: *Gerda Rogl*¹; Ernst Bauer²; Michael Zehetbauer³; Peter Rogl³; ¹CDL University of Vienna; ²TU Wien; ³University of Vienna

5:20 PM Concluding Comments

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Properties of Aluminum Alloys II

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Dmitry Eskin, Brunel University

Wednesday PM | February 26, 2020
1A | San Diego Convention Ctr

Session Chair: Kumar Sundaram, Novelis

2:00 PM Introductory Comments

2:05 PM

Hemming Evolution of 6xxx Aluminum Alloys in the Course of Natural Aging Following the Continuous Annealing: Mehdi Lalpoor¹; Ellen Lambrechts²; *Alexis Miroux*¹; Christian Bollmann³; Chengchao Yu⁴; ¹Aleris Aluminum Duffel BVBA; ²Gent University; ³Aleris Rolled Products Germany GmbH; ⁴RWTH Aachen University

2:30 PM

The Effect of Deformation Mode and Microstructure on the IGC Susceptibility of Al Mg Si Cu Alloys for Automotive Applications: *Roland Mueller-Jena*¹; Joachim Becker²; Tobias Beyer³; Thomas Hentschel⁴; Marcel Rosefort³; Andreas Stieben²; Daniela Zander¹; ¹RWTH Aachen University; ²Otto Fuchs KG; ³TRIMET Aluminium SE; ⁴Hydro Aluminium Rolled Products GmbH

2:55 PM

Evolution of Grain Refinement in AA5083 Sheet Metal Processed by ECAP: *Christian Illgen*¹; Philipp Frint¹; Maximilian Gruber²; Wolfram Volk²; Martin Wagner¹; ¹Institute of Materials Science and Engineering, Technische Universität Chemnitz; ²Chair of Metal Forming and Casting, Technische Universität München

3:20 PM

High Strength Nanotreated Filler Material for TIG Welding of AA6061: *Maximilian Sokoluk*¹; Gongcheng Yao¹; Shuaihang Pan¹; Chezhenɡ Cao¹; Xiaochun Li¹; ¹University of California Los Angeles

3:45 PM Break

4:00 PM

Optimization of Thermo-mechanical Processes for Continuous Casting Products Using High Aluminum - Magnesium Alloys in Automotive Industry Applications: *Ali Ulus*¹; Görkem Demir¹; Ali Ulas Malcioglu¹; Sümbüle Sagdiç¹; ¹Asas Aluminium

4:25 PM

Plastic Flow of AA6013-T6 at Elevated Temperatures and Subsequent Reaging to Regain Full Strength: *Katherine Rader*¹; Louis Hector²; Jon Carter²; Eric Taleff¹; ¹University of Texas at Austin; ²General Motors

LIGHT METALS

Aluminum Reduction Technology — Alumina: Transport Systems, Feeding and Dissolution

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Jayson Tessier, Alcoa

Wednesday PM | February 26, 2020
6D | San Diego Convention Ctr

Session Chair: Kristian Etienne Einarsrud, Norwegian University of Science and Technology

2:00 PM Introductory Comments

2:05 PM

Lab Scale Experiments on Alumina Raft Formation: *Sindre Engzelius Gylver*¹; Åste Heggli Follo¹; Henrik Gudbrandsen²; Asbjørn Solheim²; Kristian Etienne Einarsrud¹; ¹Norwegian University of Science and Technology; ²SINTEF Industry

2:25 PM

Mass- and Heat Transfer During Dissolution of Alumina: *Asbjorn Solheim*¹; Egil Skybakmoen¹; ¹SINTEF Industry

2:45 PM

The Rate of HF Formation during Addition of Alumina to Cryolite Melts: *Karen Osen*¹; Dian Mughni Felicia²; Christian Rosenkilde³; Camilla Sommerseth⁴; Ole Kjos¹; ¹Sintef; ²Tenth of November Institute of Technology; ³Norsk Hydro ASA; ⁴SINTEF Helgeland

3:05 PM

Validation of the Gravimetric Method to Properly Follow Alumina Dissolution in Cryolithic Bath: *Jonathan Alarie*¹; Thomas Roger¹; László Kiss¹; Sándor Ponsáck¹; Sébastien Guérard²; Jean-François Bilodeau²; ¹University of Quebec at Chicoutimi; ²Rio Tinto

3:25 PM

Development of a Mathematical Model to Simulate Raft Rormation: *Thomas Roger*¹; Laszlo Kiss¹; Sandor Poncsak¹; Kirk Fraser²; Sébastien Guérard³; Jean-François Bilodeau³; ¹Universite Du Quebec A Chicoutimi; ²National Research Council Canada; ³Rio Tinto Aluminium

3:45 PM Break

4:00 PM

Efficient Alumina Handling: Arne Hilck¹; *Jan Paepcke*¹; Michael Altmann-Rinck¹; Andrej Meinhardt¹; ¹Claudius Peters Projects GmbH

4:20 PM

The Effect of Hard Grey Scale Deposition on the Wall Heat Flux of a Cold Finger: *Daniel Clos*¹; Petter Neksa²; Sverre Johnsen³; Ragnhild Aune¹; ¹Norwegian University of Science and Technology; ²SINTEF Energy; ³SINTEF Industry

4:40 PM

Status Analysis of Particle Size Distribution and Attrition Index of the Smelter Grade Alumina: *Youjian Yang*¹; Xiaojuan Pang¹; Junfeng Qi¹; Wenju Tao¹; Zhaowen Wang¹; Fengguo Liu¹; Aimin Liu¹; Jiangyu Yu¹; Bingliang Gao¹; Zhongning Shi¹; Xin Shu²; ¹Northeastern University; ²Hunan Aerospace TianLu Advanced Material Testing Co., Ltd.

5:00 PM

The Application of the Intelligent Breaking & Feeding Technology for Aluminum Pot Line: *Hong Bo*¹; Tian Qinghong¹; Chen Zhiyang¹; Tan Xiaotian¹; Yu Shiping¹; ¹Guiyang Aluminum Magnesium Design & Research Institute Co Ltd

CHARACTERIZATION

Atom Probe Tomography for Advanced Characterization of

Metals, Minerals and Materials III — Applications in Alloys and Ceramics

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Phase Transformations Committee

Program Organizers: Haiming Wen, Missouri University of Science and Technology; David Seidman, Northwestern University; Keith Knipling, Naval Research Laboratory; Gregory Thompson, University of Alabama; Simon Ringer, University of Sydney; Arun Devaraj, Pacific Northwest National Laboratory; Gang Sha, Nanjing University of Science and Technology

Wednesday PM | February 26, 2020
Theater A-1 | San Diego Convention Ctr

Session Chairs: Keith Knipling, U.S. Naval Research Laboratory; Arun Devaraj, Pacific Northwest National Laboratory

2:00 PM Invited
Material Alterations in Intense Mechanical and Chemical Contacts: Shanoob Balachandran Nair¹; David Mayweg¹; Yu Qin¹; Ebrahim Norouzi¹; Lutz Morsdorf¹; Alfons Fischer¹; Dierk Raabe¹; *Michael Herbig*¹; ¹Max-Planck-Institut fuer Eisenforschung

2:30 PM
Elucidating Solute Clustering and Precipitation of Al-Cu-Mg-Ag-Si Model Alloys: *Jiehua Li*¹; Zhiehng An²; Fredrik Hage³; Quentin Ramasse³; Gang Sha²; ¹University of Leoben; ²Nanjing University of Science and Technology; ³SuperSTEM Laboratory

2:50 PM
AtomProbeTomographyofRefractoryHighEntropyAlloys:*Patrick Callahan*¹; David Beaudry¹; Noah Philips²; Keith Knipling¹; ¹Naval Research Laboratory; ²ATI Specialty Alloys and Components

3:10 PM Invited
Coupled APT and TEM Investigation of Cu Assisted Nucleation of L12 Precipitates in FCC-based High Entropy Alloys: Bharat Gwalani¹; Sriswaroop Dasari¹; Vishal Soni¹; *Rajarshi Banerjee*¹; ¹University of North Texas

3:40 PM Break

4:00 PM
Understanding Early Stages of Nanoscale Hydriding and Oxidation Mechanisms in Metallic Systems via Atom Probe Tomography and Multimodal Chemical Imaging:*Elizabeth Kautz*¹;

Sten Lambeets¹; Bharat Gwalani¹; Daniel Perea¹; Daniel Schreiber¹; Arun Devaraj¹; ¹Pacific Northwest National Laboratory

4:20 PM

Atom Probe Tomography Study of Fission Products in Neutron Irradiated U-Mo Fuel: *Maalavan Arivu*¹; Andrew Hoffman¹; Haiming Wen¹; ¹Missouri University of Science and Technology

4:40 PM

Characterization of Mechanical Properties of the A356 Cast Aluminum Alloy in Accordance with the Cluster Formation Behaviors at Different Aging Temperatures: *Won Sang Shin*¹; Kyo Jin Hwang¹; Dong-Hyuk Jung¹; Yoon-Jun Kim¹; ¹Inha University

5:00 PM

APT-based Stoichiometry Measurements of Single Crystal ThO₂: *Amrita Sen*¹; Mukesh Bachhav²; Janelle Wharry¹; ¹Purdue University; ²Idaho National Laboratory

BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces II

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines; Po-Yu Chen, National Tsing Hua University

**Wednesday PM | February 26, 2020
Vista | Marriott Marquis Hotel**

Session Chairs: Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University

2:00 PM Keynote

Advances in Printing of Polymers at Small Length Scales: *Roger Narayan*¹; ¹University of North Carolina

2:30 PM Invited

Bioinspired Mineralization of Natural Polymers for Biomedical Applications: *Conrado Aparicio*¹; ¹University of Minnesota

3:00 PM Invited

Biomimetic Nanointerface Functionalized Microchip for Highly Selective and Efficient Enrichment of Circulating Tumor Cells: *Chaoyong Yang*¹; *Lingling Wu*²; ¹Xiamen University; ²Shanghai Jiao Tong University

3:30 PM Break

3:45 PM Invited

Cancer Cell Mechanics: The Role of Actin: *Dinesh Katti*¹; *Sharad Jaswandkar*¹; *H M Nasrullah Faisal*¹; *Kalpana Katti*¹; ¹North Dakota State University

4:15 PM Invited

The Internal Nano-interfaces of Spider Silk: Finding the Molecular-scale Origins of its Strength: *Qijue Wang*¹; *Hannes Schniepp*¹; ¹The College of William & Mary

4:45 PM Invited

Engineering Peptides for Nanomaterials: *Handan Acar*¹; ¹University of Oklahoma

5:15 PM

Molecular Recognition and Assembly of Biomaterials: Computational and Data Science Tools for Property Predictions: *Hendrik Heinz*¹; ¹University of Colorado Boulder

BIOMATERIALS

Biological Materials Science — Bioenabled Materials

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Steven Naleway, University of Utah; Jing Du, Penn State University; Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); David Restrepo, University of Texas at San Antonio

Wednesday PM | February 26, 2020
Leucadia | Marriott Marquis Hotel

Session Chairs: Claire Acevedo, University of Utah; Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); Isaac Nelson, Sandia National Laboratory

2:00 PM

Biomimetic Design Principles for Honeycomb Design: A Comparative Study of Honeybee and Wasp Nest Geometry: *Derek Goss*¹; *Clint Penick*²; *Alex Grishin*³; *Sridhar Niverty*¹; *Dhruv Bhate*¹; *Nikhilesh Chawla*¹; ¹Arizona State University; ²Kennesaw State University; ³Phoenix Analysis & Design Technologies, Inc.

2:20 PM

Hierarchical Architecture in Jamming Technology for Soft Robotics: *Albert Matsushita*¹; *Luis Garcia*¹; *Zida Liu*¹; *Jennifer Doan*¹; *Joanna McKittrick*¹; ¹University of California, San Diego

2:40 PM

Characterization of Soft Actuation Through Ultrasonic Atomization: *Han-Joo Lee*¹; *Kenneth Loh*¹; ¹University of California, San Diego

3:00 PM

Microstructure and Nanomechanical Properties of the Ironclad Beetle's Exoskeleton: *Nayeon Lee*¹; *Vina Nguyen*¹; *Parker Berthelson*¹; *Robert Moser*²; *Raj Prabhu*¹; ¹Mississippi State University; ²Engineer Research and Development Center

3:20 PM

Active Metamaterial Skins for Friction Coefficient Control: *Yujin Park*¹; *Kenneth Loh*¹; ¹University of California, San Diego

3:40 PM Break

3:55 PM

Electrochemical Studies of Titanium Alloys for Dental Implants: *Jaewan Bae*¹; *Jacob Benoun*¹; *Vilupanur Ravi*¹; ¹Cal Poly Pomona

4:15 PM

Biocorrosion and Biocompatibility of Advanced Titanium Alloys: *Vilupanur Ravi*¹; ¹California State Polytechnic University, Pomona

4:35 PM

Measurement of Moisture-dependent Ion Diffusion Constants in Wood Cell Wall Layers Using Time-lapse Micro X-ray Fluorescence Microscopy: *Joseph Jakes*¹; *Samuel Zelinka*¹; *Christopher Hunt*¹; *Peter Ciesielski*²; *Charles Frihart*¹; *Danielle Yelle*¹; *Leandro Passarini*¹; *Sophie-Charlotte Gleber*³; *David Vine*³; *Stefan Vogt*³; ¹USDA FS Forest Products Laboratory; ²National Renewable Energy Laboratory; ³Advanced Photon Source, Argonne National Laboratory

4:55 PM

Phase Stability and Mechanical Properties of the Metastable Beta Ti Alloys with High Oxygen Content and Various Amount

of Several Beta Stabilizing Elements: *Dalibor Preisler*¹; Josef Strasky¹; Jiri Kozlik¹; Tereza Kretkova¹; Lucie Bodnarova²; Michaela Janovska²; Milos Janecek¹; ¹Charles University; ²Czech Academy of Sciences

SPECIAL TOPICS

Bladesmithing 2020 — Session II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

Program Organizers: Michael West, South Dakota School of Mines & Technology; Roxana Ruxanda, Emerson Climate Technologies Inc.; David Sapiro, Naval Surface Warfare Center

Wednesday PM | February 26, 2020
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Session Chair: David Sapiro, Naval Surface Warfare Center

2:00 PM

Crucible Steel Processing Methods: *Neha John*¹; Maddox Dockins¹; Spencer Gellerup¹; Bryce Freeman¹; Jordyn Ward¹; Marcus Young¹; ¹University of North Texas

2:20 PM

SDSM&T Bladesmithing – British Infantry Sword – Historical Aspects: Austin Holmes¹; Isaac Hammer¹; *Jack Carpenter*¹; George Bernard¹; Cody Marshall¹; ¹SDSM&T

2:40 PM

A Look into a Hirazukuri Tanto, Forged from W2 Steel, Following Differential and Cryogenic Hardening: *Evan Raeker*¹; ¹University of Michigan

ADVANCED MATERIALS

Bulk Metallic Glasses XVII — Structures and Mechanical Properties

Sponsored by: TMS Structural Materials Division, TMS:
Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee - Knoxville; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Robert Maass, University of Illinois at Urbana-Champaign; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Wednesday PM | February 26, 2020
Cardiff | Marriott Marquis Hotel

Session Chairs: Jurgen Eckert, Erich Schmid Institute of Materials Science; Ramamurty Upadrasta, NTU

2:00 PM Invited
Relaxation Phenomena in Severely Deformed Bulk Metallic Glasses: *Jurgen Eckert*¹; ¹Erich Schmid Institute of Materials Science; Montanuniversität Leoben

2:20 PM Invited
A Quantitative Connection Between Shear Band Mediated Plasticity and Fracture Initiation Toughness of Metallic Glasses: *Ramamurty Upadrasta*¹; ¹NTU

2:40 PM Invited
Toward Tunable Superelastic Bulk Metallic Glass Composite: Wook Ha Ryu¹; Hyun Seok Oh¹; Ji Young Kim¹; *Eun Soo Park*¹; ¹Seoul National University

3:00 PM Invited
Stress Breaks Universal Aging Behavior in a Metallic Glass: Amlan Das¹; Peter Derlet²; Chaoyang Liu¹; Eric Dufresne³; *Robert Maass*¹; ¹University of Illinois at Urbana-Champaign; ²Paul Scherrer Institute; ³Argonne National Laboratory

3:20 PM Invited
Behaviors of Disordered Alloys Under Various Temperatures and Pressures: *Jianzhong Jiang*¹; X.D. Wang¹; Q.P. Cao¹; D.Z. Zhang¹; ¹Zhejiang University

3:40 PM Break

4:00 PM Invited
Small-scale Mechanical Behavior of Metallic Glasses and Their Composites: Shristy Jha¹; Nandita Ghodki¹; Vahid Hasannaeimi¹; Maryam Sadeghilaridjani¹; *Sundeeep Mukherjee*¹; ¹University of North Texas

4:20 PM

Evolution of Material Properties in Fragile Bulk Metallic Glasses: *Sydney Corona*¹; Jong Hyun Na²; William Johnson¹; ¹California Institute of Technology; ²Glassimetal Technology

4:40 PM Invited

Anelastic Relaxation as a Probe of Structural Evolution of Metallic Glasses: *Michael Atzmon*¹; Tianjiao Lei¹; ¹University of Michigan

5:00 PM Invited

Structural Modifications and their Effect on the Mechanical Properties of a Zr-based Metallic Glass: *Bernd Gludovatz*¹; Lisa Krämer²; Bosong Li¹; Amir Monfared¹; Keita Nomoto³; Anna Ceguerra³; Christoph Gammer⁴; Anton Hohenwarter²; Simon Ringer³; Jürgen Eckert⁴; Jamie Kruzic¹; ¹UNSW Sydney; ²University of Leoben; ³The University of Sydney; ⁴ESI-Leoben

5:20 PM

Microstructural Optimization and Tensile Properties of Ti-based Bulk Metallic Glass Composites Containing Metastable β -Ti: *Long Zhang*¹; Haifeng Zhang¹; ¹Institute of Metal Research, Chinese Academy of Sciences

LIGHT METALS

Cast Shop Technology — Grain Refinement and Cast Structure

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Johannes Morscheiser, Aleris Rolled Products Germany GmbH

Wednesday PM | February 26, 2020
1B | San Diego Convention Ctr

Session Chair: Philippe Jarry, Constellium

2:00 PM Introductory Comments

2:05 PM

Impact of TiB2 Particle Size Distribution on Grain Refining Effectiveness: *Akihiro Minagawa*¹; ¹UACJ Corporation /National Institute of Advanced Industrial Science and Technology(AIST)

2:30 PM

Effect of Nucleant Particle Size Distribution on the Grain Refining Efficiency of 7xxx Alloys: *Georges Salloum-Abou-Jaoude*¹; Philippe

Jarry¹; Pierre Celle¹; Emmanuelle Sarrazin¹; ¹Constellium C-Tec

2:55 PM

Application Ultrasonic Technology Processing for Aluminum Treatment While Casting Slabs on Industrial Equipment of UC RUSAL: *Igor Kostin*¹; Aleksander Krokhin¹; Viktor Frolov¹; Aleksey Startsev¹; Sergei Bochvar²; Igor Bobkov¹; Nikita Lashchukhin¹; ¹UC RUSAL; ²IMET RAS

3:20 PM

Influence of Liquid Jet Stirring and In-situ Homogenization on the Intermetallics Formation During DC Casting of a 6xxx Al Alloy Rolling Ingot: *Kumar Sundaram*¹; Jocie Cracroft¹; Robert Wagstaff¹; ¹Novelis

CHARACTERIZATION

Characterization of Minerals, Metals and Materials —
Characterization of Corrosion Resistance

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Shadia Ikhmayies, Al Isra University; Yunus Kalay, Middle East Technical University; Jiann-Yang Hwang, Michigan Technological University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Army Research Laboratory

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Theater A-5 | San Diego Convention Ctr

Session Chairs: Ramasis Goswami, Naval Research Laboratory; Donato Firrao, Politecnico di Torino

2:00 PM

Characterization of Corrosion Product Deposits on Fuel Cladding Surface Under Various Heat Flux Conditions: *Yunju Lee*¹; Junhyuk Ham¹; Seung Chang Yoo¹; Ji Hyun Kim¹; ¹UNIST

2:20 PM

Effect of Dual-phase Stabilization via Varying Ti/Nb Ratios on the Pitting Behavior of AISI 347 Welds: *Amandeep Shahi*¹; Dikshant Malhotra¹; ¹SLIET, Longowal

2:40 PM

Effects of Cooling Rate and Ti Addition on Microstructure, Mechanical Properties and Corrosion Characteristics of Laser Deposited Ti-6Al-4V Alloy: *Olawale Fatoba*¹; Esther Akinlabi²; Stephen Akinlabi²; Fredeick Mwema²; ¹Kent State University; ²University of Johannesburg

3:00 PM

The Effect of Radiation Damage and Radiolysis on the Corrosion of SiC with and without Corrosion-mitigation Coatings: *Peter Doyle*¹; Takaaki Koyanagi²; Caen Ang¹; Yutai Kato²; Steven Zinkle¹; David Carpenter³; Stephen Raiman²; ¹University of Tennessee; ²Oak Ridge National Laboratory; ³Massachusetts Institute of Technology

3:20 PM Break

3:35 PM

Measuring the Thermal Conductivity of Molten Salts Using a Frequency-domain Hot-wire Technique: *Andrew Zhao*¹; Matthew Wingert¹; Yasuhiro Kodera¹; Stephen Obrey²; Javier Garary¹; ¹University of California, San Diego; ²Los Alamos National Laboratory

3:55 PM

Investigation of Stress Corrosion Crack Initiation Sites in Alloy 600 using 3DEBSD and Local Model: *Naganand Saravanan*¹; Phani Karamched¹; Theo Simonet²; Emilien Burger²; Thierry Couvant²; Sergio Lozano-Perez¹; ¹Department of Materials, University of Oxford; ²EDF

CHARACTERIZATION

Characterization: Structural Descriptors, Data-Intensive Techniques, and Uncertainty Quantification — Microscopy & Machine Learning

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Extraction and Processing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Materials Characterization Committee

Program Organizers: Shawn Coleman, CCDC Army Research Laboratory; Tomoko Sano, U.S. Army Research Laboratory; James Hogan, University of Alberta; Srikanth Patala, North Carolina State University; Oliver Johnson, Brigham Young University; Francesca Tavazza, National Institute of Standards and Technology

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Theater A-3 | San Diego Convention Ctr

Session Chairs: Oliver Johnson, Brigham Young University; Francesca Tavazza, National Institute of Standards and Technology

2:00 PM Introductory Comments

2:05 PM Invited

Neural Networks for Real-time Processing of Scanning Transmission Electron Microscopy Data: *James LeBeau*¹; ¹Massachusetts Institute of Technology

2:35 PM

Application of Machine Learning to Microstructure Quantification and Understanding: *Ryan Noraas*¹; Greg Levan¹; Asa Fry¹; Iuliana Cernatescu¹; ¹Pratt & Whitney

2:55 PM

Adversarial Networks for Microstructure Generation and Modeling Phase Transformation Kinetics: *Wufei Ma*¹; Elizabeth Kautz²; Arun Devaraj²; Saumyadeep Jana²; Vineet Joshi²; Daniel Lewis¹; Bulent Yener¹; ¹Rensselaer Polytechnic Institute; ²Pacific Northwest National Laboratory

CORROSION

Coatings and Surface Engineering for Environmental Protection II — Corrosion Control Session II

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Arif Mubarok, PPG; Raul Rebak, GE Global Research; Rajeev Gupta, University of Akron; Tushar Borkar, Cleveland State University; Brian Okerberg, PPG Industries; Michael Mayo, PPG Industries

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Session Chairs: Arif Mubarok, PPG; Raul Rebak, GE Global Research

2:00 PM Invited

Corrosion Study on CFRP-AZ31B Spot Joined by Friction Self-pierce Rivet: *Yong Chae Lim*¹; Jiheon Jun¹; Jian Chen¹; Michael

Brady¹; Donovan Leonard¹; Charles Warren¹; Zhili Feng¹; ¹Oak Ridge National Laboratory

2:20 PM

Corrosion Challenges in Dissimilar Joint Structures for Automotive Lightweighting: *Hyun Wook Ro*¹; Egle Puodziukynaite¹; Loubna Pagnotti¹; Fuduo Ma¹; Brian Okerberg¹; ¹Coating Innovation Center, PPG Industries Inc.

2:40 PM Invited

Corrosion Behavior of Ultrasonic-welded AZ31B and Dual-phase Steel with and without Galvanized Layer: *Jiheon Jun*¹; Chen Jian¹; Yong Chae Lim¹; Michael Brady¹; Donovan Leonard¹; Zhili Feng¹; ¹Oak Ridge National Laboratory

3:00 PM Invited

First-principles Search for Alloying Elements that Increase Corrosion Resistance of Mg with Transition Metal Impurities: Mingfei Zhang¹; Louis Hector Jr.²; Yang Guo³; Ming Liu³; *Liang Qi*¹; ¹University of Michigan; ²GM Global Technical Center; ³General Motors R&D China Science Laboratory

3:20 PM

Mechanisms of Corrosion Inhibition Afforded by Exfoliated Graphite Nanocomposites: Can Exfoliated Graphite Compete with Graphene?: *Rachel Davidson*¹; Sarbajit Banerjee¹; ¹Texas A&M University

3:40 PM Break

3:55 PM

Surface Characterization of FeCrAl Accident Tolerant Fuel Cladding Material After Flow Boiling Testing Under Atmospheric Pressure: *Rajnikant Umretiya*¹; Jessika Rojas¹; Mark Anderson²; Barret Elward²; Raul Rebak³; Sama Bilbao y Leon¹; ¹Virginia Commonwealth University; ²University of Wisconsin-Madison; ³GE Global Research

4:15 PM

Ceramic Oxide Coatings for Water Reactors: Corrosion Protection in High Temperature Pressurized Water: *Mattia Cabrioli*¹; Erkka Frankberg¹; Matteo Vanazzi¹; Koba Van Loo²; Jef Vleugels³; Konstantina Lambrinou⁴; Fabio Di Fonzo¹; ¹Center for Nano Science and Technology @PoliMi, Istituto Italiano di Tecnologia; ²KU Leuven, Department. of Materials Engineering; ³KU Leuven, Department of Materials Engineering; ⁴SCK•CEN

4:35 PM

Fatigue Corrosion Behavior of NiTi Shape Memory Alloy: *Mahdi Mohajeri*¹; Dimitris C Lagoudas¹; Homero Castaneda¹; ¹Texas A&M

University

4:55 PM

Can Proteins Secreted by Barnacles Corrode Marine-grade Steel?:

*Vinod kumar Murugan*¹; Harini Mohanaram¹; Maja Budanovic¹; Arvind Latchou¹; Richard Webster¹; Enrico Marsili²; Ali Miserez¹; Matteo Seita¹; ¹Nanyang Technological University; ²Nazarbayev University

ENERGY & ENVIRONMENT

Computational Materials Science and Engineering of Materials in Nuclear Reactors — Thermomechanical Properties and Modeling

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Dilpuneet Aidhy, University of Wyoming; Michael Tonks, University of Florida; Mahmood Mamivand, Boise State University; Giovanni Bonny, Belgian Nuclear Research Center

Wednesday PM | February 26, 2020
Theater A-9 | San Diego Convention Ctr

Session Chairs: Mahmood Mamivand, Boise State; Kelvin Xe, TAMU; Patrick Burr, UNSW

2:00 PM Invited

Thermochemical and Phase Equilibria (CALPHAD) Modeling of Nuclear Fuel Materials: A Constant in Reactor Development:
*Theodore Besmann*¹; ¹University of South Carolina

2:40 PM

Recent Development of Thermochemica for Simulations of Nuclear Materials: *Max Poschmann*¹; Bernard Fitzpatrick¹; Srdjan Simunovic²; Markus Piro¹; ¹University of Ontario Institute of Technology; ²Oak Ridge National Laboratory

3:00 PM

Thermodynamic Properties at the Rim in High Burnup UO₂ Fuels: *Dillon Frost*¹; Jessica Veliscek-Carolan²; Conor Galvin¹; Edward Obbard¹; Michael Cooper³; Patrick Burr¹; ¹UNSW; ²ANSTO; ³Los Alamos National Laboratory

3:20 PM

Atypical Melting Behaviour of (Th,U)O₂, (Th,Pu)O₂ and (Pu,U)O₂ Mixed Oxides: Conor Galvin¹; *Patrick Burr*²; Michael Cooper³; Paul Fossati⁴; Robin Grimes⁵; ¹UNSW + Imperial; ²UNSW Sydney; ³Los Alamos National Laboratory; ⁴CEA Gif-sur-Yvette; ⁵Imperial College London

3:40 PM Break

4:00 PM Invited

Developing Capabilities to Investigate the Effect of Curvature on the Radiation Response of Solid-state Interfaces: Sisi Xiang¹; Thien Duong¹; Emmeline Sheu¹; Michael Demkowicz¹; *Kelvin Xie*¹; ¹Texas A&M University

4:40 PM

Analyzing U-Zr Experimental Data Using Quantitative Phase-field Simulation and Sensitivity Analysis: *Michael Tonks*¹; Jacob Hirschhorn¹; Assel Aitkaliyeva¹; Cynthia Adkins²; ¹University of Florida; ²Idaho National Laboratory

5:00 PM

Mesoscale Modeling and Experiments for Predicting the Thermal Conductivity of UZr Fuels: *Karim Ahmed*¹; Sean Mcdeavitt¹; Mitchell Meyer²; ¹Texas A&M University; ²Idaho National Laboratory

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Diffusion, Excitations and Rare Events II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Jorge Munoz, University of Texas at El Paso; Sara Kadkhodaei, University of Illinois at Chicago; Vahid Attari, Texas A&M University; James Morris, Ames Laboratory

Wednesday PM | February 26, 2020
33C | San Diego Convention Ctr

Session Chairs: Claire Saunders, California Institute of Technology; Camille Bernal, California Institute of Technology

2:00 PM Invited

Thermodynamics of Solids with Chemical, Magnetic and Displacive Degrees of Freedom: *Anton Van Der Ven*¹; ¹University of California, Santa Barbara

2:30 PM

Anharmonicity in BCC Chromium: *Camille Bernal*¹; Hillary Smith²; Brent Fultz¹; ¹California Institute of Technology; ²Swarthmore College

2:50 PM

An Exact Formalism for Thermotransport in Liquid and Solid Alloys: *Graeme Murch*¹; Irina Belova¹; Tanvir Ahmed¹; Rafal Kozubski²; Zi-Kui Liu³; William Wang⁴; Andreas Meyer⁵; ¹University of Newcastle; ²Jagiellonian University; ³Pennsylvania State University; ⁴Northwestern Polytechnical University; ⁵German Aerospace Center

3:10 PM Invited

Direct Solution to the Space-time Dependent Peierls-Boltzmann Transport Equation using an Eigendecomposition Method: *Chengyun Hua*¹; Lucas Lindsay¹; Austin Minnich²; ¹Oak Ridge National Laboratory; ²California Institute of Technology

3:40 PM Break

4:00 PM Invited

Non-equilibrium Molecular Dynamics Studies of Shock-induced Phase Transitions: *Ramon Ravelo*¹; ¹University of Texas El Paso

4:30 PM

Phonons at High Pressure in FeTi: *Bethuel Khamala*¹; Jorge Munoz¹; Brent Fultz²; ¹The University of Texas at El Paso; ²California Institute of Technology

4:50 PM

Interplay Between Chemical Bonding and Anharmonicity in Cu₂O: *Claire Saunders*¹; Dennis Kim²; Olle Hellman³; Hillary Smith⁴; Douglas Abernathy⁵; Brent Fultz¹; ¹California Institute of Technology; ²University of California, Los Angeles; ³Linköping University; ⁴Swarthmore College; ⁵Oak Ridge National Laboratory

5:10 PM

The Anharmonic Origin of the Large Thermal Expansion of NaBr: *Yang Shen*¹; Claire Saunders¹; Camille Bernal¹; Douglas Abernathy²; Michael Manley²; Brent Fultz¹; ¹California Institute Of Technology; ²Oak Ridge National Laboratory

Defects and Properties of Cast Metals — Continuous Casting

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Solidification Committee

Program Organizers: Lang Yuan, University of South Carolina; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Charles Monroe, University of Alabama at Birmingham

Wednesday PM | February 26, 2020
17B | San Diego Convention Ctr

Session Chairs: Brian Thomas, Colorado School of Mines; Pavel Ramirez Lopez, SWERIM AB

2:00 PM Invited
Advances on Inspection and Numerical Modelling of Surface Defects During Continuous Casting of Steel: *Pavel Ernesto Ramirez Lopez*¹; ¹SWERIM AB

2:30 PM Invited
Multiphase Flow-related Defects in Continuous Casting of Steel Slabs: *Seong-Mook Cho*¹; Mingyi Liang¹; Hamed Olia¹; Lipsa Das¹; Brian Thomas¹; ¹Colorado School of Mines

3:00 PM
Influence of Various Cast Defects in Fe-Al-Cr-Zr Intermetallics on the High Temperature Oxidation Behavior: *René Pütz*¹; Emir Subašić²; Alexander Gußfeld²; Daniela Zander¹; ¹RWTH Aachen University; ²Access e.V.

3:20 PM Break

3:40 PM
Analysis of Solidification and Thermal-mechanical Behaviors in Continuous Casting: John Lawrence¹; Matthew Moore¹; Xiang Zhou¹; Haibo Ma¹; Armin Silaen¹; *Chenn Zhou*¹; ¹Purdue University Northwest

4:00 PM
Numerical Simulation of Macrosegregation Behavior of Billet During Continuous Casting: *Yaoguang Li*¹; Yanhui Sun¹; Xuesong Bai¹; Ruimei Chen¹; Xinxin Lu¹; ¹University of Science & Technology Beijing

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Transitions at Grain Boundaries VII — Grain Boundary Decohesion and Fracture

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Shen Dillon, University of Illinois; Douglas Spearot, University of Florida; Jian Luo, University of California, San Diego; Jennifer Carter, Case Western Reserve University

Wednesday PM | February 26, 2020
5B | San Diego Convention Ctr

Session Chairs: Josh Kacher, Georgia Institute of Technology; Jennifer Carter, Case Western Reserve University

2:00 PM
Microstructural Predictions of Thermo-mechanical Fracture of Hydrided HCP Alloys: *T. Hassan*¹; I. Mohamed¹; Mohammed Zikry¹; ¹North Carolina State University

2:20 PM
Atomic Scale Modeling of Microstructure Effects on the Nucleation, Growth of Voids During Spall Failure of Nanocrystalline Ta: *Shayani Parida*¹; Jie Chen¹; Avinash Dongare¹; ¹University of Connecticut

2:40 PM
Understanding the Evolution of Defects Under Extreme Conditions in BCC Tantalum: *Sumit Suresh*¹; Avinash Dongare¹; ¹University of Connecticut

3:00 PM
Modeling Growth of Voids in Various Grain Neighborhoods Using Crystal Plasticity Theory: *Paul Christodoulou*¹; Toby Francis¹; Ricardo Lebensohn²; Tresa Pollock¹; Irene Beyerlein¹; ¹University of California, Santa Barbara; ²Los Alamos National Laboratory

3:20 PM Invited
Understanding Fracture Initiation Under Bending Conditions in AA6451 Using a Multiscale and Multimodal Electron Microscopy Approach: *Josh Kacher*¹; Yung Suk Jeremy Yoo¹; Sazol Das²; ¹Georgia Institute of Technology; ²Novelis

3:40 PM Break

4:00 PM Invited

Fatigue-crack Healing in Pure Nanocrystalline Pt Enabled by Boundary Evolution: Christopher Barr¹; Ta Duong²; Daniel Bufford¹; Nathan Heckman¹; Michael Demkowicz²; Khalid Hattar¹; *Brad Boyce*¹; ¹Sandia National Laboratories; ²Texas A&M University

4:20 PM

In-situ Investigation of Intergranular Crack Initiation in Hydrogen Embrittled Inconel 725: *Mengying Liu*¹; Lai Jiang¹; Emmeline Sheu¹; Michael Demkowicz¹; ¹Texas A&M University

4:40 PM

Atomistic Modeling of Effects of Alloy Element and Impurity Segregation on Grain Boundary Embrittlement in BCC Fe: *Axel Seoane*¹; Ziqi Xiao¹; Xian-Ming Bai¹; ¹Virginia Polytechnic Institute and State University

LIGHT METALS

Electrode Technology for Aluminum Production — Raw Materials

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Duygu Kocaefe, University of Quebec at Chicoutimi

Wednesday PM | February 26, 2020
3 | San Diego Convention Ctr

Session Chair: Maia Hunt, Rain Carbon

2:00 PM Introductory Comments

2:10 PM

Anhydrous Carbon Pellets – An Engineered CPC Raw Material: *Les Edwards*¹; ¹Rain Carbon Inc.

2:35 PM

Influence of Particle Shape and Porosity on the Bulk Density of Anode Grade Petroleum Coke: Frank Cannova¹; *Mike Davidson*¹; Barry Sadler²; ¹BP; ²Net Carbon Consulting Pty Ltd

3:00 PM

An EXAFS and XANES Study of V, Ni, and Fe Speciation in Cokes for Anodes Used in Aluminum Production: *Gøril Jahrsengene*¹; Hannah Wells²; Camilla Sommerseth³; Arne Petter Ratvik³; Lorentz Petter Lossius⁴; Katie Sizeland⁵; Peter Kappen⁵; Ann Mari Svensson¹; Richard Haverkamp²; ¹Norwegian University of Science and Technology; ²Massey University - School of Engineering and Advanced Technology; ³SINTEF Industry; ⁴Hydro Aluminium AS, Primary Metal, Technology; ⁵ANSTO

3:25 PM Break

3:45 PM

Additive Selection for Coal Tar Pitch Modification in Aluminum Industry: *Julie Bureau*¹; Armita Rastegari¹; Duygu Kocaefe¹; Yasar Kocaefe¹; Hans Darmstadt²; ¹University of Quebec at Chicoutimi; ²Rio Tinto

4:10 PM

Charcoal and Use of Green Binder for Use in Carbon Anodes in the Aluminium Industry: *Camilla Sommerseth*¹; Ove Darell¹; Barte Øye¹; Anne Støre¹; Stein Rørvik¹; ¹SINTEF Industry

CORROSION

Environmental Degradation of Additively Manufactured Alloys — Perspective, Challenges and Opportunities of Additively Manufactured Alloys in Corrosive Environments / High Temperature Oxidation and Corrosion

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Kinga Unocic, Oak Ridge National Laboratory; Luke Brewer, University of Alabama; Sebastien Dryepondt, Oak Ridge National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Jenifer Locke, Ohio State University; Xiaoyuan Lou, Auburn University

Wednesday PM | February 26, 2020
7A | San Diego Convention Ctr

Session Chairs: Kinga Unocic, Oak Ridge National Laboratory; Sebastien Dryepondt, Oak Ridge National Laboratory

2:00 PM Keynote

Examples of and Opportunities for Tailoring Corrosion Behavior of Materials via Additive Manufacturing: *Kurt Terrani*¹; ¹Oak Ridge

2:35 PM Invited

Segregation and Microstructural Factors Affecting the Oxidation Behavior of IN625 Made by Additive Manufacturing: *Brian Gleeson*¹; Grace Venessa de Leon Nope¹; Guofeng Wang¹; ¹University of Pittsburgh

3:00 PM

High Temperature Air Oxidation Behavior of Haynes 282 Processed by Electron Beam Melting (EBM): *Marie Romedenne*¹; Rishi Pillai¹; Sebastien Dryepondt¹; Padraig Stack²; ¹Oak Ridge National Laboratory; ²Akron University

3:20 PM

High Temperature Corrosion of Additively Manufactured Inconel 625: Gouri Bhasale¹; *Aarush Sood*¹; Shashi Singh¹; Amit Pandey²; Amber Shrivastava¹; ¹Indian Institute of Technology Bombay; ²Ansys Inc.

3:40 PM Break

4:00 PM

High Temperature Oxidation Behavior of Additively Manufactured Inconel 625 Superalloy in Two Directions: *Sedigheh Rashidi*¹; Amit Pandey²; Rajeev Kumar Gupta¹; ¹University of Akron; ²Ansys, Inc

4:20 PM Invited

High Temperature Oxidation and Phase Transformations in -TiAl Produced by Additive Manufacturing: *Radoslaw Swadzba*¹; ¹Research Network LUKASIEWICZ Institute for Ferrous Metallurgy, Poland

4:45 PM

Improving the Corrosion Performance of Additively Manufactured 316L via Optimized SLM Processing Parameters: *Joseph Sopcisak*¹; Steven Storck¹; Rengaswamy Srinivasan¹; Morgan Trexler¹; ¹The Johns Hopkins University Applied Physics Laboratory

5:05 PM

High Temperature Oxidation Behavior of 316L Austenitic Stainless Steel Manufactured by the Selective Laser Melting: *Zhyuan Liang*¹; ¹Xi'an Jiaotong University

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Stress Corrosion Cracking II

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Bai Cui, University of Nebraska-Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Jenifer Locke, Ohio State University

Wednesday PM | February 26, 2020
Theater A-10 | San Diego Convention Ctr

Session Chairs: Yiren Chen, Argonne National Laboratory; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc

2:00 PM
On the Stress Corrosion Cracking Behavior of a Precipitation-hardened Martensitic Stainless Steel under Atmospheric Exposure Conditions: *Zachary Harris*¹; *Keiko Amino*¹; *Patrick Steiner*¹; *James Burns*¹; ¹University of Virginia

2:20 PM
Understanding the Effect of Anodic Polarization on SCC Resistance of AA6111-T8 used for Automotive Applications: *Katrina Catledge*¹; *Mark Nichols*²; *Gerald Frankel*¹; *Jenifer (Warner) Locke*¹; ¹The Ohio State University; ²Ford Research and Advanced Engineering

2:40 PM
Modeling of Corrosion Damage, Crack Dynamics and Fracture using a Physics-based Meshless Peridynamics Approach: *Srujan Rokkam*¹; *Masoud Behzadinasab*¹; *Max Gunzburger*²; *Nam Phan*³; *Sachin Shanbhag*²; *Kishan Goel*³; ¹Def-Aero, Advanced Cooling Technologies Inc; ²Florida State University; ³Naval Air Systems Command

3:00 PM
Stress Corrosion Cracking Behavior of Austenitic Stainless Steel SS304 for Dry Storage Canisters in Simulated Sea-water: *Nilesh Kumar*¹; *Leonardi Tjayadi*²; *Korukonda Murty*²; ¹University of Alabama, Tuscaloosa; ²North Carolina State University

3:20 PM Break

3:40 PM Invited
Cracking of Reactor Core Internal Materials in LWR Environments: *Yiren Chen*¹; ¹Argonne National Laboratory

4:20 PM
Pitting Corrosion Analysis on Austenitic Stainless Steel Welds in Brine for Understanding of Chloride-induced Stress Corrosion

Cracking of Spent Nuclear Fuel Dry Storage Canisters: Seunghyun Kim¹; *Gidong Kim*¹; Chang-Young Oh¹; Ji Hyun Kim²; Sang-Woo Song¹; ¹Korea Institute of Materials Science; ²Ulsan National Institute of Science and Technology

4:40 PM
Mechanistic Studies of Intergranular Stress Corrosion Cracking in Al-Mg Alloys under Atmospheric Exposure Conditions: *Patrick Steiner*¹; James Burns¹; ¹University of Virginia

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Functional Nanomaterials 2020: Translating Innovation into Pioneering Technologies — Translating Innovation into Pioneering Technologies VI

Sponsored by: TMS Functional Materials Division, TMS: Nanomaterials Committee

Program Organizers: Simona Hunyadi Murph, Savannah River National Laboratory; Huanyu Cheng, Pennsylvania State University; Yong Lin Kong, University of Utah; Min Kyu Song, Washington State University; Ning Zhang, University of Alabama

Wednesday PM | February 26, 2020
Point Loma | Marriott Marquis Hotel

Session Chairs: Ning Zhang, University of Alabama; Jaeyun Moon, University of Nevada Las Vegas

2:00 PM Invited
Metastable Phase Transformation and Deformation Twinning Induced Hardening-stiffening Mechanism in Silicon Nanoparticles: Yu Hong¹; *Ning Zhang*²; Mohsen Asle Zaeem¹; ¹Colorado School of Mines; ²University of Alabama

2:20 PM
Synthesis of Micro-encapsulated Phase Change Materials using Chain Transfer Agent via Emulsion Polymerization and its Chemical, Optical and Thermal Characterization: *Sun Choi*¹; ¹KIST

2:40 PM
The Microstructural Evolution of Nanotwinned Nickel Superalloys: *Joel Bahena*¹; Andrea Hodge¹; ¹University of Southern California

3:00 PM
Synthesis of Tailored Nanostructures: *Andrea Hodge*¹; ¹University of Southern California

3:20 PM Break

3:40 PM

Programmable Self-Assembly of 3D Printed Particles: *David Doan*¹; Xun Gu¹; ¹Stanford University

4:00 PM

Electrically Functional Three-dimensional ZnO Nanomesh Architectures Directly Derived from Vapor-phase Infiltration of ZnO in Hierarchically Self-assembled Block Copolymer Thin Film Templates: *Ashwanth Subramanian*¹; Gregory Doerk²; Kim Kisslinger²; Daniel Yi¹; Robert Grubbs¹; Chang-Yong Nam²; ¹Stony Brook University; ²Brookhaven National Laboratory

4:20 PM

Synthesis and Growth Mechanism of Bismuth Nanoflowers and Their Application for Electrochemical Sensing: *Edward Fratto*¹; Mary Joens¹; Jirui Wang¹; Zhiyong Gu¹; ¹University of Massachusetts Lowell

4:40 PM

Trade of Technological Advances in the Field of Nanomaterials: *Shah Ashraf*¹; ¹NIT Srinagar

ADVANCED MATERIALS

High Entropy Alloys VIII — Structures and Mechanical Properties

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Wednesday PM | February 26, 2020
Mission Hills | Marriott Marquis Hotel

Session Chairs: David Shifler, Office of Naval Research; Marc Meyers, University of California San Diego

2:00 PM Invited

Microstructure and Mechanical Property of FCC HEA with L12-strengthened Between Cryogenic and Elevated Temperatures: *Che-Wei Tsai*¹; Chia-Ming Kuo¹; ¹National Tsing Hua University

2:20 PM Invited

Phase Stability and Deformation Behaviors of CrFeCoNiMox (x=0 – 0.3) High-entropy Alloys: M Naeem¹; Haiyan He¹; Bing Wang¹; *Xun-li Wang*¹; ¹City University of Hong Kong

2:40 PM Invited

Non-equiatomic, Multi-phase TRIP/TWIP Multi-principal Element Alloys: *Amy Clarke*¹; Francisco Coury²; John Copley¹; Yaofeng Guo¹; Jonah Klemm-Toole¹; Benjamin Ellyson¹; Jinling Gao³; Chandler Becker¹; Brian Milligan¹; Christopher Finfrock¹; Chloe Johnson¹; Kester Clarke¹; Wayne Chen³; Niranjana Parab⁴; Tao Sun⁴; Kamel Fezzaa⁴; Michael Kaufman¹; ¹Colorado School of Mines; ²Universidade Federal de São Carlos; ³Purdue University; ⁴Advanced Photon Source, Argonne National Laboratory

3:00 PM

Microstructural Characterizations and Mechanical Properties of CrFeNiMn and NbTaTiV High Entropy Alloys: *Mohamed Elbakhshwan*¹; Michael Moorehead¹; Calvin Parkin¹; Bo-Shiuan Li²; David Armstrong²; Angus Wilkinson²; Xuan Zhang³; Chuan Zhang⁴; Kumar Sridharan¹; Adrien Couet⁵; ¹University of Wisconsin Madison; ²University of Oxford; ³Argonne National Laboratory; ⁴CompuTherm LLC.; ⁵University of Wisconsin- Madison

3:20 PM Invited

Development of CuFeMnNi-based High Entropy Alloys Using CALPHAD Approach and Thermomechanical Processing: Xuejun Huang¹; Jiashi Miao¹; *Alan Luo*¹; ¹Ohio State University

3:40 PM Break

4:00 PM Invited

On the Damage Tolerance of TRIP, TWIP and Dual-phase High-entropy Alloys: *Bernd Gludovatz*¹; Hyun Seok Oh²; Eun Soo Park²; Robert Ritchie³; ¹UNSW Sydney; ²Seoul National University; ³Lawrence Berkeley National Laboratory

4:20 PM Invited

Dynamic Behavior of CrMnFeCoNi High-entropy Alloy: *Marc Meyers*¹; Zezhou Li¹; Shiteng Zhao²; Carlos Ruestes³; Bingfeng Wang⁴; Yong Liu⁴; Peter Liaw⁵; Wen Yang¹; Robert Ritchie²; ¹University of California San Diego; ²Lawrence Berkeley Laboratory; ³CONICET & Universidad Nacional de Cuyo; ⁴Central South University; ⁵The University of Tennessee

4:40 PM

Unique Elastic and Plastic Deformation Behavior of a Ductile Refractory High-entropy Alloy at Room and Elevated Temperatures: Chanhoo Lee¹; Gian Song²; Yi Chou³; George Kim⁴; Wei Chen⁴; Ke An⁵; Yi-Chia Chou³; *Peter K. Liaw*¹; ¹University of Tennessee; ²Kongju National University; ³National Chiao Tung University; ⁴Illinois Institute of Technology; ⁵Oak Ridge National Laboratory

5:00 PM Invited

Studies on Microstructure, Hardness and Corrosion Behavior of the Cu-Fe-Ti-Zr-Nix High Entropy Alloys: *Po-Cheng Kuo*¹; William Yu¹; Hsien-Ming Hsiao²; Satoshi Iikubo³; Yee-Wen Yen⁴; ¹Department of Materials Science and Engineering, National Taiwan University of Science and Technology; ²Institute of Nuclear Energy Research; ³Graduate School of Life Science and Systems Engineering, Kyushu Institute of Technology; ⁴National Taiwan University of Science and Technology

5:20 PM Invited

Integrating Theory and Experiment in the Design of Multiprincipal Element Alloys: Mu Li¹; Zhaohan Zhang¹; Arashdeep Thind¹; Rohan Mishra¹; *Katharine Flores*¹; ¹Washington University in St. Louis

MATERIALS DESIGN

Hume-Rothery Symposium: Thermodynamics, Phase Equilibria and Kinetics for Materials Design and Engineering — CALPHAD Thermodynamic and Diffusion Database Development

Sponsored by: TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Carelyn Campbell, National Institute of Standards and Technology; Michael Gao, National Energy Technology Laboratory; Wei Xiong, University of Pittsburgh

**Wednesday PM | February 26, 2020
32A | San Diego Convention Ctr**

Session Chairs: Wei Xiong, University of Pittsburgh; Qing Chen, Thermo-Calc Software AB

2:00 PM Invited

Developing CALPHAD Databases for Thermophysical Properties of Metals and Alloys: Hailin Chen¹; Masoomah Ghasemi¹; *Qing Chen*¹; ¹Thermo-Calc Software AB

2:40 PM Invited
Development of a Comprehensive Diffusion (mobility) Database for Lightweight Magnesium Alloys: *Wei Zhong*¹; Ji-Cheng Zhao¹; ¹University of Maryland

3:20 PM Invited
Thermodynamic Assessment of the Fe-B and Fe-B-C- Systems: *Katsunari Oikawa*¹; Nobufumi Ueshima¹; ¹Tohoku University

4:00 PM Break

4:20 PM Invited
CALPHAD Databases for Co-based Alloys: *Peisheng Wang*¹; Ursula Kattner²; Carelyn Campbell²; Gregory Olson¹; ¹Northwestern University; ²National Institute for Standards and Technology

5:00 PM Invited
Diffusion Mobilities in Co-Ni-Al-Cr System: *Kil-Won Moon*¹; Carelyn Campbell¹; ¹National Institute of Standards and Technology

MATERIALS DESIGN

ICME Gap Analysis in Materials Informatics: Databases, Machine Learning, and Data-Driven Design — Session II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: James Saal, Citrine Informatics; Carelyn Campbell, National Institute of Standards and Technology; Raymundo Arroyave, Texas A&M University

Wednesday PM | February 26, 2020
30D | San Diego Convention Ctr

Session Chairs: Carelyn Campbell, National Institute for Standards and Technology; James Saal, Citrine Informatics

2:00 PM Invited
Gaps and Barriers to the Successful Integration and Adoption of Practical Materials Informatics Tools and Workflows: *David McDowell*¹; ¹Georgia Institute of Technology

2:40 PM Invited

Combining Machine Learning and ICME for Alloy Development:

*Bryce Meredig*¹; ¹Citrine Informatics

3:20 PM

Magicmat (MAterials Genome and Integrated Computational MAterials Toolkit) and Its Application for Thermoelectric

Materials Design: *Changning Niu*¹; Ramya Gurunathan¹; Abhinav Saboo¹; Jiadong Gong¹; ¹QuesTek Innovations LLC

3:40 PM Break

4:00 PM Invited

A Bayesian Framework for Materials Knowledge Systems: *Surya*

*Kalidindi*¹; ¹Georgia Institute of Technology

4:40 PM Invited

Deep Materials Informatics: Illustrative Applications of Deep Learning in Materials Science: *Ankit Agrawal*¹; ¹Northwestern University

LIGHT METALS

Magnesium Technology 2020 — Corrosion

Sponsored by: TMS Light Metals Division, TMS: Magnesium Committee

Program Organizers: J. Brian Jordon, University of Alabama; Victoria Miller, University of Florida; Vineet Joshi, Pacific Northwest National Laboratory; Neale Neelameggham, IND LLC

Wednesday PM | February 26, 2020

6C | San Diego Convention Ctr

Session Chairs: Bin Li, University of Nevada; Domonkos Tolnai, Helmholtz-Zentrum Geesthacht

2:00 PM Invited

Anomalous Hydrogen Evolution on Magnesium: Aline Gabbardo¹;

*Gerald Frankel*¹; ¹Ohio State University

2:30 PM

Numerical Investigation of Micro-galvanic Corrosion in Mg Alloys: Role of the Cathodic Intermetallic Phase Size and Spatial

Distributions: *Vikrant Beura*¹; Pulkit Garg¹; Vineet Joshi²; Kiran Solanki¹; ¹Arizona State University; ²Pacific Northwest National Laboratory

2:50 PM

The Corrosion Behavior of High Purity Mg According to Process History: Sang Kyu Woo¹; Byeong-Chan Suh²; Nam Ryong Kim¹; Ha Sik Kim²; *Chang Dong Yim*²; ¹University of Science and Technology; ²Korea Institute of Materials Science

3:10 PM

Effect of 2 wt % Ag Addition on Corrosion Properties of ZK40 for Biodegradable Applications: *Marwa AbdelGawad*¹; Bilal Mansoor¹; Matthew Vaughan²; Ibrahim Karaman²; ¹Texas A&M University at Qatar; ²Texas A&M University

3:30 PM Break

3:50 PM

Design of the Magnesium Composite with High Corrosion Resistance and High Deformability: *Yuecun Wang*¹; Boyu Liu¹; Zhiwei Shan¹; ¹Center for Advancing Materials Performance from the Nanoscale, Xian Jiaotong University

4:10 PM

Corrosion Behavior of Squeeze Cast Mg Alloy AM60-based Hybrid Nanocomposite: *Hongfa Hu*¹; ¹University of Windsor

4:30 PM

Al8Mn5 Particle Clustering on Oxide Films in Liquid AZ80 Magnesium Alloys: Liuqing Peng¹; Te-Cheng Su¹; Kazuhiro Nogita²; Hideyuki Yasuda³; *Christopher Gourlay*¹; ¹Imperial College London; ²The University of Queensland; ³Kyoto University

4:50 PM

Study of In-vitro Biodegradation Behavior of Mg-2.5Zn-xES Composite: *Srinivasan Murugan*¹; Paul Okonkwo¹; Ahmed Bahgat²; Gururaj Parande³; Aboubakr M. Abdullah²; Manoj Gupta³; ¹Dhofar University; ²Qatar University; ³National University of Singapore

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — Salt Properties and Fundamental Science

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Stephen Raiman, Oak Ridge National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Michael Short, Massachusetts Institute of Technology; Kumar Sridharan, University of Wisconsin-Madison; Nathaniel Hoyt, Argonne National Laboratory

Wednesday PM | February 26, 2020
Theater A-6 | San Diego Convention Ctr

Session Chair: Jinsuo Zhang, Virginia Polytechnic Institute and State University

2:00 PM
In-situ Spectro-electrochemistry of Molten Chloride Salts: *Ruchi Gakhar*¹; William Phillips¹; Steven Frank¹; ¹Idaho National Laboratory

2:20 PM
Thermophysical-properties Characterization of a Quaternary Novel Salt based on Na⁺/K⁺ and NO₃⁻/Cl⁻ System: *Matias Castro*¹; Daniel Faundez¹; Carlos Lopez²; Alvaro Videla¹; ¹Pontificia Universidad Católica de Chile; ²Salmag, Albemarle

2:40 PM
Kinetic Properties of Fe²⁺/Fe, Ni²⁺/Ni, Cr²⁺/Cr and Cr³⁺/Cr Reactions in Molten MgCl₂-KCl-NaCl Salt: *Qiufeng Yang*¹; Jinsuo Zhang¹; ¹Virginia Tech

3:00 PM
Molten Salt Property Determination and Corrosion Characterization Using Transient Grating Spectroscopy: *Sean Robertson*¹; Michael Short¹; ¹Massachusetts Institute of Technology

3:20 PM Break

3:40 PM
Thermochemical Modeling and Development of the MSTDB Database for Simulating Molten Salt Reactors: *Theodore Besmann*¹; Kaitlin Johnson¹; Johnathan Ard¹; Jacob Yingling¹; Vancho Kocevski¹; Matthew Christian¹; Jacob McMurray²; Stephen Utlak²; Markus Piro³; ¹University of South Carolina; ²Oak Ridge National Laboratory; ³Ontario Tech

4:10 PM
Development of Experimental Vehicle Technology for the Versatile Test Reactor to Investigate the Effects of Fast Neutron

Irradiation on Molten Salts: *Adam Burak*¹; Sheng Zhang¹; Xiaodong Sun¹; ¹University of Michigan

MATERIALS DESIGN

Materials Design Approaches and Experiences V — Light Metals

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Akane Suzuki, GE Research; Ji-Cheng Zhao, University of Maryland; Michael Fahrman, Haynes International; Qiang Feng, University of Science and Technology Beijing; Michael Titus, Purdue University

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Session Chairs: Amit Shyam, Oak Ridge National Laboratory; Michael Titus, Purdue University

2:00 PM Invited
Microstructural Design for Advanced Aluminium and Magnesium Alloys: *Jian-Feng Nie*¹; ¹Monash University

2:30 PM
Strength Prediction in a Quaternary Mg Alloy System Using a Multi-scale Optimization Framework: *Stephen Dewitt*¹; Brian Puchala¹; Qianying Shi¹; Anirudh Raju Natarajan²; Chaoming Yang¹; Anton Van der Ven²; Liang Qi¹; John Allison¹; ¹University of Michigan; ²University of California, Santa Barbara

2:50 PM Invited
Titanium Alloy and Process Design: Gaining Insights Through Multi-scale Computation and Comparison with Experiments: *Yang Rui*¹; ¹Institute of Metal Research Ca

3:20 PM Break

3:40 PM Invited
On the Use of Multiscale Modeling Strategies to Design Precipitation-hardened Al Alloys: Sha Liu¹; Ioannis Papadimitriou¹; Bárbara Bellón²; Hong Liu³; Gustavo Esteban-Manzanares¹; Rodrigo Santos-Güemes²; *Javier Llorca*²; ¹IMDEA Materials Institute; ²IMDEA Materials Institute & Technical University of Madrid; ³Katholieke Universiteit Leuven

4:10 PM

Non-equilibrium Interfacial Solute Segregation as a Thermal Stabilization Mechanism in Al-Cu Alloys: *Amit Shyam*¹; Dongwon Shin¹; Jonathan Poplawsky¹; James Morris²; Patrick Shower³; Lawrence Allard¹; Matthew Chisholm¹; Thomas Watkins¹; Sumit Bahl¹; Allen Haynes¹; ¹Oak Ridge National Laboratory; ²Ames Laboratory; ³GE Global Research

MATERIALS PROCESSING

Materials Processing Fundamentals — Thermodynamic Modeling

Sponsored by: TMS Extraction and Processing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Jonghyun Lee, Iowa State University; Guillaume Lambotte, Boston Metal; Sam Wagstaff, Novelis Inc.; Antoine Allanore, Massachusetts Institute of Technology; Fiseha Tesfaye, Abo Akademi University

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Session Chairs: Guillaume Lambotte, Boston Metal; Fiseha Tesfaye, Åbo Akademi University

2:00 PM Invited

Thermodynamic Modeling of as Oxide in the Na₂O-CaO-MgO-SiO₂ System and its Application to as Oxide Stabilization Process using Glass Formation: Jun-hyung Lee¹; Sunyong Kwon¹; Pierre Hudon¹; *In-Ho Jung*²; ¹McGill University; ²Seoul National University

2:40 PM

Structure-thermodynamics Interrelation for the GeO₂ and PdO Containing MgO-saturated Ferrous Calcium Silicate (FCS) Slag Relevant to E-waste Processing: Mohammad Hasan¹; *M Akbar Rhamdhani*¹; Mohammad Shuva²; Geoffrey Brooks¹; ¹Swinburne University of Technology; ²PF Metals

3:00 PM

Thermodynamic Modeling of Metal Distribution in Electrolytic Extraction: *Mary Elizabeth Wagner*¹; Antoine Allanore¹; ¹Massachusetts Institute of Technology

3:20 PM Break

3:40 PM

Printed Circuit Board Leached Residue as a Substitute Reducing Agent in Pyrometallurgical Processes: *Desmond Attah-Kyei*¹; Guven Akdogan²; Daniel Lindberg¹; Christie Dorfling²; ¹Aalto University; ²Stellenbosch University

4:00 PM

The Chemical Stability of MoS₂ in Chloride Eutectic Molten Salt: *Cheng Lv*¹; Jianxun Song¹; Yusi Che¹; Yongchun Shu¹; Jilin He¹; ¹Zhengzhou University

MATERIALS PROCESSING

Materials Research in Reduced Gravity — Solidification I

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Robert Hyers, University of Massachusetts; Douglas Matson, Tufts University; Michael Sansoucie, NASA MSFC; Shaun McFadden, Ulster University; Jonghyun Lee, Iowa State University; Wilhelmus Sillekens, European Space Agency; Takehiko Ishikawa, JAXA

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Session Chairs: Olga Shuleshova, IFW Dresden; Douglas Matson, Tufts University

2:00 PM

Pattern Formation in Bulk Al-Al₂Cu Eutectics: Results from a Recent Microgravity Experiment: *Ulrike Hecht*¹; Sabine Bottin-Rousseau²; Silvère Akamatsu²; Melis Serefoglu³; Victor Witusiewicz¹; ¹Access e.V.; ²Sorbonne University; ³Koc University

2:20 PM

Nucleation Fronts Growing in Al-Ni Melts Under Reduced Gravity: *Marcus Reinartz*¹; Stefan Burggraf²; Matthias Kolbe²; Peter Galenko¹; Dieter M. Herlach²; Markus Rettenmayr¹; ¹Friedrich Schiller University Jena; ²German Aerospace Center (DLR)

2:40 PM

Numerical Modeling of Columnar to Equiaxed Transition During Directional Solidification of Al-7wt%Si Alloys in Reduced Gravity:

Amirhossein Tabrizi¹; Chih-Hung Chen²; *Alain Karma*¹; ¹Northeastern University; ²National Taiwan University

3:00 PM

In-situ Dynamics of Hybrid Eutectic Growth Front Morphologies: the Transparent Alloys Project: *Silvere Akamatsu*¹; Sabine Bottin-Rousseau²; Victor Witusiewicz³; Ulrike Hecht³; ¹Cnrs; ²Sorbonne University; ³Access e.V.

3:20 PM

Chill-cooling of D2 Tool Steel Under Reduced Gravity Conditions: *Jonas Valloton*¹; Thomas Volkmann²; Hani Henein¹; ¹University of Alberta; ²Deutsches Zentrum für Luft- und Raumfahrt (DLR)

3:40 PM Break

4:10 PM

An Overview of a Proposed NASA Flight Experiment on W-heavy Glass-forming Alloy Composites: *Douglas Hofmann*¹; Scott Roberts¹; ¹NASA JPL/Caltech

4:30 PM

Kinetics of Solidification in Glass Forming Alloys Under Microgravity Conditions: Stefanie Koch¹; Manoel da Silva Pinto²; Gerhard Wilde²; *Peter Galenko*¹; ¹University Jena; ²University Muenster

4:50 PM

Metastable Phase Formation in Peritectic Systems Under Terrestrial and Reduced Gravity Conditions: *Olga Shuleshova*¹; Wolfgang Löser¹; Thomas Volkmann²; Douglas Matson³; ¹IFW Dresden, Germany; ²Institute of Materials Physics in Space, DLR, Germany; ³Tufts University

5:10 PM

Effect of Convection on Co-Si Solidification Pathway: Insights from Advanced Photon Source Synchrotron XRD: *Evan Baker*¹; Sangho Jeon¹; Douglas Matson¹; ¹Tufts University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale V — In-Situ Testing II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Christopher Weinberger, Colorado State University; Megan Cordill, Erich Schmid Institute; Garritt Tucker, Colorado School of Mines; Wendy Gu, Stanford University; Scott Mao, University of Pittsburgh; Yu Zou, University of Toronto

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Santa Rosa | Marriott Marquis Hotel

Session Chairs: Gregory Thompson, University of Alabama; Scott Mao, University of Pittsburgh

2:00 PM Invited

Influence of Mechanical Loading on Nanocrystalline Stabilized Alloys: *Gregory Thompson*¹; Jonathan Priedeman¹; Thomas Koenig¹; Xuyang Zhou¹; B. Chad Hornbuckle²; Kris Darling²; Sean Fudger²; Ankit Gupta³; Garritt Tucker³; ¹University of Alabama; ²Army Research Laboratory; ³Colorado School of Mines

2:40 PM

Quantitative Analysis on Deformation of a Cu/Cu45Zr55 Multilayered Structure Combining In-Situ Transmission Electron Microscopy and a Finite Element Model: *Yucong Gu*¹; Qianying Guo¹; Gregory Thompson¹; Lin Li¹; ¹University of Alabama

3:00 PM

Probing the Deformation Mechanisms of Al-matrix Composites with Small-scale Mechanical Testing: *Olivia Donaldson*¹; Jenna Wardini¹; Timothy Rupert¹; ¹University of California, Irvine

3:20 PM

Effects of Microstructures on Superelasticity of CaFe2As2 Single Crystal: *Shuyang Xiao*¹; John Sypek¹; Sriram Vijayan¹; Paul Canfield²; Mark Aindow¹; Seok-Woo Lee¹; ¹University of Connecticut; ²Ames Laboratory & Department of Physics and Astronomy

3:40 PM Break

4:00 PM

Ductile Deformation of Nearly Monoatomic Metallic Glass: *Mehrdad Kiani*¹; Wendy Gu¹; ¹Stanford University

4:20 PM

Microstructure Characterization and Micro-mechanical Properties of 14YWT Processed With Different Methods: *Cayla Harvey*¹; Osman El-Atwani²; Stuart Maloy²; Sid Pathak¹; ¹University

of Nevada, Reno; ²Los Alamos National Laboratory

4:40 PM

Small Scaled Plasticity in Reversed Hall-patch Region: *Scott Mao*¹; *Xiang Wang*¹; ¹University of Pittsburgh

5:00 PM

Extraordinary Tension-compression Asymmetry in Submicron-sized Amorphous Silicon: *Yuecun Wang*¹; *Lin Tian*²; *Evan Ma*³; *Zhiwei Shan*¹; ¹Center for Advancing Materials Performance from the Nanoscale, Xian Jiaotong University; ²Institute of Materials Physics, University of Göttingen; ³Department of Materials Science and Engineering, Johns Hopkins University

MATERIALS DESIGN

Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling — Session IV

Sponsored by: TMS Structural Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, MicroTesting Solutions; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Jagannathan Rajagopalan, Arizona State University; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Robert Wheeler, Microtesting Solutions LLC; Shailendra Joshi, University of Houston

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Session Chairs: Shailendra Joshi, University of Houston; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

2:00 PM Introductory Comments

2:10 PM Keynote

On Crystallographic and Material Hardening Aspects in Ductile Damage of Hexagonal Close Packed Metals: *Shailendra Joshi*¹; ¹University of Houston

2:50 PM

Microstructure and Micromechanical Field Evolution During Dynamic Recrystallization: A Crystal Plasticity-phase Field

Simulation Study: *Supriyo Chakraborty*¹; Chaitali Patil¹; Yunzhi Wang¹; Stephen Niezgoda¹; ¹Ohio State University

3:10 PM

Shape Fidelity and Mechanical Response in Micro Pattern Replication by Molding: Bin Zhang¹; *Mohammad Dodaran*¹; Shuai Shao¹; Junseo Choi¹; Sunggook Park¹; Wenjin Meng¹; ¹Louisiana State University

3:30 PM Break

3:50 PM Keynote

Numerical Study of Plastic Deformation Mechanisms in a New Generation Fe-TiB2 Steel Composite Using a FFT-based Model: *Julien Genee*¹; Stephane Berbenni¹; Nathalie Gey¹; Julien Guyon¹; Frederic Bonnet²; ¹Laboratoire d'Étude des Microstructures et de Mécanique des Matériaux (LEM3), UMR 7239, CNRS / Université de Lorraine; Laboratory of Excellency DAMAS, Design of Alloy Metals for low-mAss Structures; ²Research & Development Automotive Products, AcelorMittal Maizières

4:30 PM

Multiscale Modeling to Determine Bulk Material Property from Miniature Specimen Testing: *Farhan Rahman*¹; Tasnim Hassan¹; ¹North Carolina State University

4:50 PM

Experimental and Numerical Investigation into Mechanical Degradation of Polymers and Polymer Composites: *Vinamra Agrawal*¹; Asha-Dee Celestine¹; Brandon Runnels²; ¹Auburn University; ²University of Colorado Colorado Springs

MATERIALS DESIGN

Metastable Phases and Phase Equilibria: Towards Designing the Next Generation of Alloys — Session II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

Program Organizers: Bij-Na Kim, Carpenter Additive; Rajarshi Banerjee, University of North Texas; Gregory Thompson, University of Alabama; Eric Lass, University of Tennessee, Knoxville; Mohsen Asle Zaeem, Colorado School of Mines; Mark Aindow, University of Connecticut; Peeyush Nandwana, Oak Ridge National Laboratory; Dinc Erdeniz, Marquette University; Andrew Bobel, General Motors

Wednesday PM | February 26, 2020

Session Chairs: Mohsen Zaeem, Colorado School of Mines; Andrew Bobel, General Motors; Dinc Erdeniz, Marquette University

2:00 PM Invited
Deformation Mode, Strain Path, and Strain Rate Effects on Austenite to Martensite Transformation in Gen 3 Steels: *Louis Hector*¹; ¹General Motors R&D Laboratories

2:30 PM
Resetting Mechanical Property of 9Cr Steel by Segregation Engineering: *Min Seok Kim*¹; Sang Jun Kim¹; Ji Won Kim²; Eun Soo Park¹; ¹Seoul National University; ²Case Western Reserve University

2:50 PM
Deformation Mechanisms in Metastable Fcc Alloys: *Mulaine Shih*¹; Maryam Ghazisaeidi¹; ¹Ohio State University

3:10 PM Invited
Modeling of Metastable Phase Formation for Sputtered Ti1-xAlxN Thin Films: Sida Liu¹; Keke Chang²; Stanislav Mráz¹; Xiang Chen¹; Marcus Hans¹; Denis Music¹; Daniel Primetzhofer³; *Jochen Schneider*¹; ¹RWTH Aachen University; ²RWTH Aachen University; NIMTE, Chinese Academy of Sciences; ³Uppsala University

3:40 PM Break

4:00 PM
Thermal Decomposition of Quasicrystals in Powder-processed Icosahedral-phase-strengthened Aluminum Alloys: *Hannah Leonard*¹; Sarshad Rommel¹; Mingxuan Li¹; Thomas Watson²; Tod Policandriotes³; Mark Aindow¹; ¹University of Connecticut; ²Pratt & Whitney; ³Collins Aerospace

4:20 PM
Pseudo-in situ Characterization of Phase Transformation in an Al-Cu-Mn-Zr Alloy using Atom Probe Tomography: *Bharat Gwalani*¹; Elizabeth Kautz¹; Amit Shyam²; Jonathan Poplawsky²; Arun Devaraj¹; ¹Pacific Northwest National Laboratory; ²Oak Ridge National Laboratory

4:40 PM
Harnessing the Stability of γ -Al₂Cu at Unprecedented High Temperatures: Dongwon Shin¹; Amit Shyam¹; Larry Allard¹; Matthew Chisholm¹; Jon Poplawsky¹; J. Haynes¹; ¹Oak Ridge National Laboratory

5:00 PM
Formation of Metastable Spiral Patterns during Directional Eutectic Solidification: Saman Moniri¹; *Ashwin Shahani*¹; ¹University of Michigan

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Nanocomposites VI: Nanoscience and Nanotechnology in Advanced Composites — Microstructure and Properties of Nanocomposites

Sponsored by: TMS Structural Materials Division, TMS: Composite Materials Committee

Program Organizers: Srivatsan Tirumalai, The University of Akron; Manoj Gupta, National University of Singapore

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Solana | Marriott Marquis Hotel

Session Chair: Manoj Gupta, National University of Singapore

2:00 PM Invited
On the Role of Processing on Microstructural Development and Mechanical Response of Magnesium-based Nanocomposites: Sankaranarayanan Seetharaman¹; Jayalakshmi Subramanian²; Arvind Singh²; *Srivatsan Tirumalai. S.*³; Manoj Gupta⁴; ¹Ansys Inc; ²Wenzhou University; ³The University of Akron; ⁴National University of Singapore

2:30 PM Invited
The Mechanical and Thermal Response of Shape Memory Alloy-reinforced Aluminum Nanocomposites: *Penchal Reddy Matl*¹; Vyasaraj Manakari¹; Gururaj Parande¹; RA Shakoor²; T. S. Srivatsan³; Manoj Gupta¹; ¹National University of Singapore; ²Qatar University; ³The University of Akron

3:00 PM
Electrical Performance of Bulk Al-ZrB2 Nanocomposites from 2K to 300K: *Shuaihang Pan*¹; Gongcheng Yao¹; Jie Yuan¹; Xiaochun Li¹; ¹University of California-Los Angeles

3:25 PM Break

3:45 PM Invited
Bioresorbable Nano Hydroxyapatite Reinforced Magnesium Alloplastic Bone Substitute for Biomedical Applications: A Study:

*Somasundaram Prasad*¹; *Vyasaraj Manakari*¹; *Gururaj Parande*¹; *Srivatsan Tirumalai*²; *Raymond Wong*¹; *Manoj Gupta*¹; ¹National University of Singapore; ²The University of Akron

4:15 PM
Hierarchical 3D Nanolayered Duplex-phase Zr with High Strength, Strain Hardening, and Ductility: *Jie-Wen Zhang*¹; *Wei-Zhong Han*¹; ¹Xi'an Jiaotong University

SPECIAL TOPICS

Nix Award and Lecture Symposium: Mechanistic Understanding of Mechanical Behavior Across Length Scales — Session II

Program Organizers: Michael Mills, Ohio State University; Kevin Hemker, Johns Hopkins University

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Session Chairs: Seung Min Han, Korea Advanced Institute of Science and Technology; Wendelin Wright, Bucknell University

2:00 PM Invited
Measurement of Mechanical Properties by Nanoindentation: Recent Innovations in Testing Methodology: *P Phani*¹; *Benoit Merle*²; *Warren Oliver*³; *George Pharr*⁴; ¹International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI); ²Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU); ³Nanomechanics, Inc.; ⁴Texas A&M University

2:30 PM Invited
The Role of Solutes and Short Range Order (SRO) in the Deformation of α -Ti Alloys: *Ruopeng Zhang*¹; *Shiteng Zhao*¹; *Yan Chong*¹; *Max Poschmann*²; *Eric Rothchild*²; *Colin Ophus*³; *John Morris*²; *Daryl Chrzan*¹; *Mark Asta*²; *Andrew Minor*¹; ¹University of California Berkeley and Lawrence Berkeley National Laboratory; ²University of California Berkeley; ³Lawrence Berkeley National Laboratory

3:00 PM Break

3:30 PM Invited
The Dynamics of Precipitate Shearing in fcc/L1₂ Alloys: *Jean-Charles Stinville*¹; *Michael Titus*¹; *Daniel Gianola*¹; *Tresa Pollock*¹; ¹University of California Santa Barbara

4:00 PM Invited
Early Nanoscale Dislocation Processes and Two Creep Rate Minima in SX Ni-base Superalloys: *Gunther Eggler*¹; ¹Ruhr-University Bochum

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Lead Refining

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

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Session Chair: Joseph Grogan, Gopher Resource

2:00 PM
Driving Innovation in Lead Batteries: The Focus of the Consortium of Battery Innovation: *Matthew Raiford*¹; ¹CBI

2:20 PM
The Removal of Arsenic from Lead Bullion via Vacuum Distillation: *Evody Tshijik Karumb*¹; Patrick Taylor¹; ¹Colorado School of Mines

2:40 PM
New Technology for Copper Removal from Lead by Application of Aluminium: Practical Problems: *Andrzej Cybulski*¹; ¹LUKASIEWICZ Research Network - Institute of Non-Ferrous Metals Gliwice

3:00 PM
Processing of Polymetallic Materials Requires Flexible and Capable Downstream Refining Technology: Aurubis Lead Refinery as Economic, Modern and Well Integrated Plant at the

Site Hamburg: *Christoph Zschiesche*¹; Ino Bauer¹; ¹Aurubis AG

3:20 PM Break

3:40 PM

Tin Treatment in Kosaka Lead Smelting: *Kohei Miwa*¹; Eiji Yamaguchi¹; Shigeki Satoh¹; ¹Kosaka Smelting & Refining Co., Ltd.

4:00 PM

True Traceability Enabled by In-line Laser Marking of Lead and Zinc Ingots: *Alex Fraser*¹; Jean-Michaël Deschênes¹; ¹Laserax Inc

4:20 PM

Advanced Technologies Reliant on the Properties of Lead: *Timothy Ellis*¹; ¹RSR Technologies

4:40 PM

Nucleation and Growth of Lead Sulfate Nanoparticles: *Michael Wall*¹; Jesse Smith¹; Marcus Young¹; Tim Ellis²; ¹University of North Texas; ²RSRT

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Secondary Zinc II

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

Wednesday PM | February 26, 2020
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Session Chair: Etsuro Shibata, IMRAM, Tohoku University

2:00 PM

The EZINEX® Process for Secondary Zinc Bearing Materials: Massimo Maccagni¹; *Edoardo Guerrini*¹; ¹Engitec Technologies

2:20 PM

Technologies for Treatment of Zinc-containing Waste from Metallurgy in KCMAD: Stefan Stoychev¹; Emil Minchev¹; Alexander Kyurkchiev¹; *Georgi Radonov*¹; Ivan Dobrev¹; ¹KCM AD

2:40 PM

Zinc Reduction/ Vaporization Behavior from Metallurgical Wastes: *Timothy Kerry*¹; Alexander Peters¹; Evangelos Georgakopoulos¹; Ashkan Hosseini¹; Erik Offerman¹; Yongxiang Yang¹; ¹TU Delft

3:00 PM

Recycling of Zinc from Galvanized Steel Scrap: *Shafiq Alam*¹; V.I. Lakshmanan²; R. Sridhar²; ¹University of Saskatchewan; ²Process Research ORTECH Inc.

3:20 PM Break

3:40 PM

Shape and Size Modification of Galvanized Steel Scrap for Introduction to the “Hlsarna” Furnace: *Evangelos Georgakopoulos*¹; Timothy Kerry¹; Ashkan Hosseini¹; Erik Offerman¹; Yongxiang Yang¹; ¹TU Delft

4:00 PM

Two Step Dust Recycling – A Modern Recycling Technology for High Zinc Containing EAF-dusts: *Michael Auer*¹; Juergen Antrekowitsch¹; ¹Montanuniversität Leoben

4:20 PM

Effect of Reducing Agent on Zinc Recovery from Primary Battery Waste in High Temperature Recycling Process: *Burcak Ebin*¹; Martina Petranikova¹; Britt-Marie Steenari¹; Christian Ekberg¹; ¹Chalmers University of Technology

4:40 PM

Production and Application of Comprehensive Recovery Process of Regenerated Zinc: *Zhao Pengfei*¹; Dai Jianghong¹; ¹China ENFI Engineering Corporation

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Zinc Leaching & Fe-control II

Sponsored by: The Mining and Materails Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resourcce and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

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Session Chair: Stephen James, Nyrstar Clarksville, Inc.

2:00 PM
A New Route for Treating Neutral Leaching Residue: *Caio Oliveira*¹; Daniel Pereira¹; Felipe Mendes¹; ¹Nexa Resources

2:20 PM
Recent Operational Improvements of Hematite Plant at Akita Zinc Co.,Ltd: *Dai Matsuura*¹; Yasuo Usami¹; Kenji Ichiya¹; ¹Akita Zinc Co.,Ltd

2:40 PM
Zinc Extraction from Industrial Waste Residue by Conventional Acid Leaching: *Tingfang Xie*¹; Chenyu Sun²; Yongguang Luo²; Guojiang Li¹; Aiyuan Ma³; ¹Yunnan Chihong Zn & Ge Co., Ltd; ²Kunming University of Science and Technology,Yunnan Chihong Zn & Ge Co., Ltd; ³Liupanshui Normol University

3:00 PM
Study of a Novel Chloride Volatilization Process for the Treatment of Jarosite Residue: *Haibei Wang*¹; ¹BGRIMM Technology Group

3:20 PM Break

3:40 PM
Magnetic Separation of Iron Ion from Leaching Solution by Magnetic Seeding in Hydrometallurgy: *Tong Yue*¹; Haisheng Han¹; Wei Sun¹; Yuehua Hu¹; ¹Central South University

4:00 PM
Experimental Study on Pressure Leaching of Zinc Sulfide Concentrate and Discussion on the Latest Relevant Progress:
*Haibei Wang*¹; ¹BGRIMM Technology Group

4:20 PM
Separation of Zinc from Metallurgical Residue in NH3–(NH4)2SO4–H2O System: *Ma Aiyuan*¹; Chenyu Sun²; Yongguang Luo²; Guojiang Li³; Tingfang Xie³; Xuemei Zheng¹; ¹Liupanshui Normol University; ²Kunming University of Science and Technology,Yunnan Chihong Zn & Ge Co., Ltd; ³Yunnan Chihong Zn & Ge Co., Lt

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Phase Transformations in Non-Ferrous Alloys

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

Program Organizers: Yufeng Zheng, University of Nevada, Reno; Rongpei Shi, Lawrence Livermore National Laboratory; Stoichko Antonov, University of Science and Technology Beijing; Yipeng Gao, Idaho National Laboratory; Rajarshi Banerjee, University of North Texas; Yongmei Jin, Michigan Technological University

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Session Chairs: Yufeng Zheng, University of Nevada, Reno; Leslie Mushongera, University of Nevada, Reno

2:00 PM
Defect Assisted Growth of Fine Scale Alpha in Titanium Alloys:
*Abigail Ackerman*¹; Benjamin Savitzky²; Colin Ophus²; Mohsen Danaie³; Phani Karamched⁴; Angus Wilkinson⁴; David Rugg⁵; David Dye¹; ¹Imperial College, London; ²National Center for Electron Microscopy; ³Electron Physical Sciences Imaging Centre (ePSIC); ⁴University of Oxford; ⁵Rolls-Royce plc.

2:20 PM
StructuralPhaseTransformationinSingleCrystalTitaniumduring Dynamic Loading: *Curt Bronkhorst*¹; Biao Feng²; Benjamin Morrow³; Ellen Cerreta³; ¹University of Wisconsin, Madison; ²Kimberly-Clark Corporation; ³Los Alamos National Laboratory

2:40 PM

Effect of Heat Treatments on Microstructures and Mechanical Properties of Ti-5553 Alloy: Ritupurna Sahoo¹; Abu Syed Kabir¹; ¹Carleton University

3:00 PM

Effect of Alloying Content on the Discontinuous Precipitation of δ Phase in Ni-base Superalloys: Stoichko Antonov¹; Qiang Feng¹; ¹University of Science and Technology Beijing

3:20 PM Break

3:40 PM

The Impact of the Cooling Rate on Controlling the Grain Boundary Morphology and the Mechanical Properties of Nickel-based Superalloys: Bader Alabbad¹; Sammy Tin¹; ¹Illinois Institute of Technology

4:00 PM

In-situ Investigation of Phase Transformation in Ti-Mo Alloy: Xiaoqian Fu¹; Qian Yu¹; ¹Zhejiang University

ENERGY & ENVIRONMENT

Powder Materials for Energy Applications — Metal Powder Systems

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Powder Materials Committee

Program Organizers: Kathy Lu, Virginia Polytechnic Institute and State University; Eugene Olevsky, San Diego State University; Somayeh Pasebani, Oregon State University; Hang Yu, Virginia Polytechnic Institute and State University

Wednesday PM | February 26, 2020
17A | San Diego Convention Ctr

Session Chairs: Hang Yu, Virginia Tech; Somayeh Pasebani, Oregon State University

2:00 PM Invited

Flash Sintering: From Fundamental Science to Energy-saving Materials Processing: Jian Luo¹; ¹University of California, San Diego

2:30 PM

Cold Spray Deposition of 304L Stainless-steel Powder on Used Fuel Dry Cask Storage Systems to Control Potential Stress

Corrosion Cracking: *Hwasung Yeom*¹; Kenneth Ross²; John Kessler³; Gary Cannell⁴; Jay Rozzi⁵; Frank Pfefferkorn¹; Kumar Sridharan¹; ¹University of Wisconsin Madison; ²Pacific Northwest Research Laboratory; ³J Kessler and Associates; ⁴Fluor Corporation; ⁵Creare LLC

2:50 PM
Effect of Particle Spreading Dynamics on Powder Bed Quality: *Yousub Lee*¹; Kate Gurnon²; Srdjan Simunovic¹; ¹Oak Ridge National Laboratory; ²GE Global Research

3:10 PM
Fabrication of Uniform-sized Hemispherical Mesopores on Gold-coated Silver Nanocubes for Enzyme Immobilization: *Seongcheol Choi*¹; Olivia Graeve¹; ¹University of California, San Diego

3:30 PM
Influence of Powder Microstructure on Cold Spray Deposited Cr Coatings for High Temperature Oxidation Resistance: *Tyler Dabney*¹; Hwasung Yeom¹; Greg Johnson¹; Ben Maier¹; Mia Lenling¹; Kumar Sridharan¹; ¹University of Wisconsin Madison

3:50 PM Break

4:10 PM Invited
Toward New Flash and Energy Efficient Fabrication Processes based on Sintering: *Charles Maniere*¹; Geuntak Lee²; Elisa Torresani²; Sylvain Marinel¹; Lise Durand³; Claude Estournès⁴; Eugene A. Olevsky²; ¹CRISMAT Laboratory; ²Powder Technology Laboratory; ³CEMES; ⁴CIRIMAT

4:40 PM
Investigation of the Powder Processing of Near-final Shape AlNiCo Magnets for Eventual Use in Electric Drive Motors: *Emily Rinko*¹; Iver Anderson²; Emma White²; Wei Tang²; Lin Zhou²; Matthew Kramer²; ¹Iowa State University; ²Ames Laboratory

MATERIALS PROCESSING

Process Metallurgy and Electrochemistry of Molten Salts, Liquid Metal Batteries, and Extra-terrestrial Materials Processing: An EPD Symposium in Honor of Don Sadoway — Prof. Sadoway Honorary Session II

Sponsored by: TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee

Program Organizers: Antoine Allanore, Massachusetts Institute of Technology; Hojong Kim, Pennsylvania State University; Takanari Ouchi, The University of Tokyo; Yasuhiro Fukunaka, JAXA/Waseda University

Wednesday PM | February 26, 2020
14A | San Diego Convention Ctr

Session Chairs: Hojong Kim, Pennsylvania State University; Takanari Ouchi, The University of Tokyo

2:00 PM Introductory Comments

2:05 PM
Application of Electronically Mediated Metallothermic Reductions in Molten Salts to Nuclear Materials: *Michael Simpson*¹; Prashant Bagri²; Jarom Chamberlain¹; ¹University of Utah; ²Oak Ridge National Laboratory

2:25 PM Invited
Development of a New Electrodeposition Process based on Liquid Metal Electrochemical Technologies in Molten Salt Electrolytes: *Takanari Ouchi*¹; Shuang Wu¹; Toru Okabe¹; ¹The University of Tokyo

2:45 PM Invited
Electrodeposition of Titanium from Alkali Fluoride-Chloride Molten Salts: Yutaro Norikawa¹; Makoto Unoki¹; Kouji Yasuda¹; Koma Numata²; Mitsuyasu Ogawa²; Masatoshi Majima²; *Toshiyuki Nohira*¹; ¹Kyoto University; ²Sumitomo Electric Industries, Ltd.

3:05 PM Invited
History of Inventions and Innovations for Aluminum Production: *Michel Reverdy*¹; Vinko Potocnik²; ¹Emirates Global Aluminium; ²Vinko Potocnik Consultant Inc

3:25 PM Break

3:45 PM Invited
Open-circuit Explosions and Basement Thermite Fires Threaten Aluminum Potlines: *Alton Tabereaux*¹; ¹Consultant

4:05 PM Invited
Study on Electronically Mediated Reaction (EMR), and What I Learned from Professor Sadoway: *Toru Okabe*¹; ¹University of

Tokyo

4:25 PM Invited

Thermodynamics of Electrode Reactions for Energy Storage, Separation, and Corrosion: *Hojong Kim*¹; ¹Pennsylvania State University

4:45 PM Invited

Trends and Challenges for Electrowinning of Aluminium and Magnesium from Molten Salt Electrolytes: *Geir-Martin Haarberg*¹; ¹Norwegian University of Science & Technology

5:05 PM Invited

Extraction of Magnesium from Aluminum Scrap Melts by Molten Salt Electrorefining: *John Hryn*¹; *Subodh Das*²; *Boyd Davis*³; ¹Argonne National Laboratory; ²Phinix; ³Kingston Process Metallurgy

ADVANCED MATERIALS

Progress towards Understanding the Synthesis and Behavior of Metals Far from Equilibrium: A SMD Symposium Honoring Enrique Lavernia on the Occasion of His 60th Birthday — High-entropy Alloys

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Composite Materials Committee

Program Organizers: Haiming Wen, Missouri University of Science and Technology; Suveen Mathaudhu, University of California, Riverside; Yuntian Zhu, North Carolina State University; Manoj Gupta, National University of Singapore; Kaka Ma, Colorado State University; Troy Topping, California State University, Sacramento; Yizhang Zhou, University of California, Irvine; Joshua Yee, Sandia National Laboratories; Dalong Zhang, Pacific Northwest National Laboratory; Yaojun Lin, Wuhan University of Technology; Fei Chen, Wuhan University of Technology

Wednesday PM | February 26, 2020
31B | San Diego Convention Ctr

Session Chairs: Haiming Wen, Missouri University of Science and Technology; Yaojun Lin, Wuhan University of Technology

2:00 PM Invited
Predictive Multiphase Evolution in Al-containing High-entropy Alloys: Louis Santodonato¹; *Peter Liaw*²; Raymond Unocic³; Hongbin Bei³; James Morris⁴; ¹Advanced Research Systems; ²The University of Tennessee; ³Oak Ridge National Laboratory; ⁴Ames Laboratory

2:30 PM Invited
Hierarchical Microstructural Paradigms for Simultaneous Enhancement of Strength and Ductility: *Rajiv Mishra*¹; ¹University of North Texas

3:00 PM
Microstructural Evolution and Mechanical Behavior of an AlCoCrCuFeNiHighEntropyAlloyduringNon-equilibriumPowder Metallurgical Processing: *Baolong Zheng*¹; Benjamin MacDonald¹; Zhiqiang Fu¹; Yizhang Zhou¹; Enrique Lavernia¹; ¹University of California, Irvine

3:20 PM
Development of New Magnesium Based Medium Entropy Alloys: Microstructure and Mechanical Properties: Khin Tun¹; *Tirumalai S. Srivatsan*²; Amit Kumar³; Manoj Gupta¹; ¹National University of Singapore (NUS); ²The University of Akron; ³Glocal University

3:40 PM Break

4:00 PM Invited
Experimental Observations of CALPHAD Predicted Phases in High-entropy Alloys: *Reza Abbaschian*¹; Nicholas Derimow¹; Benjamin MacDonald¹; Enrique Lavernia¹; ¹University of California

4:30 PM
AlFeNiTi Compositionally Complex Alloys: *Daniel Goodelman*¹; Andrea Hodge¹; ¹University of Southern California

4:50 PM
Microstructure and Mechanical Properties of a Nanostructured High Entropy Alloy Processed via Cryogenic Rolling: *Yaojun Lin*¹; Zhigang Yan²; Fei Chen¹; ¹Wuhan University of Technology; ²Yanshan University

MATERIALS DESIGN

Purveyors of Processing Science and ICME: A SMD Symposium to Honor the Many Contributions of Taylan Altan, Wei Tsu Wu, Soo-Ik Oh, and Lee Semiatin — Advances and Challenges in ICME

Sponsored by: TMS Structural Materials Division, TMS: Shaping and Forming Committee, TMS: Titanium Committee

Program Organizers: Adam Pilchak, US Air Force Research Laboratory; Ayman Salem, MRL Materials Resources LLC; Viola Acoff, University of Alabama; Nathan Levkulich, UES; Michael Glavicic, Rolls-Royce; Yufeng Zheng, University of Nevada, Reno; John Rotella, Purdue University

Wednesday PM | February 26, 2020
30E | San Diego Convention Ctr

Session Chairs: Viola Acoff, University of Alabama; Noah Phillips, ATI

2:00 PM Invited
Microstructure Underpins Processing: *Anthony Rollett¹*; ¹Carnegie Mellon University

2:30 PM Invited
The Challenges of Refractory Alloy Processing: A Case Study in a Refractory Complex Concentrated Alloy: *Noah Philips¹*; ¹ATI

3:00 PM
Zoning Thermomechanical Process History Data Using Unsupervised Machine Learning: *Sean Donegan¹*; Dennis Dimiduk²; Michael Groeber²; ¹Air Force Research Laboratory; ²The Ohio State University

3:30 PM Invited
Modeling Pore Closure in Titanium Alloys: *Michael Gram¹*; ¹Titanium Metals Corporation, Henderson, NV

4:00 PM Concluding Comments

NUCLEAR MATERIALS

Radiation Effects in Metals and Ceramics — Irradiation of Welds & Irradiation of High Entropy Alloys

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Djamel Kaoumi, North Carolina State University; Thak Sang Byun, Oak Ridge National Laboratory; Dane Morgan, University of Wisconsin-Madison; Maria Okuniewski, Purdue University; Mahmood Mamivand, Boise State University; Geoffrey Beausoleil, Idaho National Laboratory; Philip Edmondson, Oak Ridge National Laboratory; Khalid Hattar, Sandia National Laboratories; Aurelie Gentils, Université Paris-Saclay; Joel Ribis, Commissariat a l'Energie Atomic CEA

Wednesday PM | February 26, 2020
Theater A-7 | San Diego Convention Ctr

Session Chairs: Khalid Hattar, Sandia National Laboratory; Dane Morgane, University of Wisconsin

2:00 PM Invited
Irradiation Effects in Weld Repairs of Irradiated Stainless Steel: *Janelle Wharry*¹; Keyou Mao¹; Emmanuel Perez²; Yaqiao Wu³; Aaron French⁴; Paula Freyer⁵; Lin Shao⁴; Frank Garner⁴; ¹Purdue University; ²Idaho National Laboratory; ³Boise State University; ⁴Texas A&M University; ⁵Westinghouse Electric Company, LLC

2:30 PM
Microstructural Characterization of the Through-wall Thickness Pressure Vessel Weldment of the Zion NPP: *Philip Edmondson*¹; Thomas Rosseel¹; Mikhail Sokolov¹; ¹Oak Ridge National Laboratory

2:50 PM
Irradiation of 14YWT Solid State Capacitive Discharge Welds: *Calvin Lear*¹; Benjamin Eftink¹; Stu Maloy¹; Thomas Lienert²; ¹Los Alamos National Laboratory; ²T.J. Lienert Consulting, LLC

3:10 PM Invited
Reassessment of TRIM Simulations for Damage Production in Materials: *William Weber*¹; Yanwen Zhang²; ¹University of Tennessee; ²Oak Ridge National Laboratory

3:40 PM Break

4:00 PM Invited
High Irradiation Resistance of Nanocrystalline W-based High Entropy Alloy: *Enrique Martinez Saez*¹; Osman El-Atwani¹; Duc Nguyen-Manh²; Matthew Schneider¹; Nan Li¹; Meimei Li³; Arun Devaraj⁴; Kevin Baldwin¹; Damian Sobieraj⁵; Jan Wrobel⁵; Stuart Maloy¹; ¹Los Alamos National Laboratory; ²CCFE; ³Argonne National Laboratory; ⁴Pacific Northwest National Laboratory;

⁵Warsaw University of Technology

4:30 PM

Suppressing Void Swelling in NiCoFeCr-based High Entropy Alloys via Selective Doping: *Zhe Fan*¹; Yang Tong¹; Shijun Zhao¹; Gihan Velisa¹; Fuxiang Zhang¹; Hongbin Bei¹; Yanwen Zhang¹; ¹Oak Ridge National Laboratory

4:50 PM

Effects of Chemical Complexity and Radiation Parameters on Defect Evolution in Nickel-based Concentrated Solid Solution Alloys: *Pengyuan Xiu*¹; Li Jiang¹; Yanwen Zhang²; Lumin Wang¹; ¹Department of Nuclear Engineering and Radiological Sciences, University of Michigan, Ann Arbor; ²Materials Science and Technology Division, Oak Ridge National Laboratory

5:10 PM

Advanced Electron Microscopy Characterization of Ion Radiation Damage in Bulk Metallic Glass and High Entropy Alloys: *Yang Yang*¹; Qin Yu¹; Jun Ding¹; Ruopeng Zhang²; Colin Ophus¹; Mark Asta¹; Robert Ritchie¹; Andrew Minor¹; ¹Lawrence Berkeley National Laboratory; ²University of California, Berkeley

5:30 PM

Irradiation Damage Behavior in Novel High-entropy Carbide Ceramics: Fei Wang¹; Xueliang Yan¹; Tianyao Wang²; Lin Shao²; Yaqiao Wu³; Michael Nastasi¹; *Bai Cui*¹; ¹University of Nebraska-Lincoln; ²Texas A&M University; ³Center for Advanced Energy Studies

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XI) — Fundamentals & Processing

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Caizhi Zhou, Missouri University of Science and Technology; Megumi Kawasaki, Oregon State University; Enrique Lavernia, University of California, Irvine; Terry Lowe, Colorado School of Mines; Suveen Mathaudhu, University of California, Riverside; Ruslan Valiev, UFA State Aviation Technical University; Yuntian Zhu, North Carolina State University

Wednesday PM | February 26, 2020
Carlsbad | Marriott Marquis Hotel

Session Chairs: Kei Ameyama, Ritsumeikan University; Anton Hohenwarter, University of Leoben; Klaus-Dieter Liss, Guangdong Technion - Israel Institute of Technology; Megumi Kawasaki, Oregon State University

2:00 PM Invited
Role of UFG-shell Network on Improving Mechanical Properties in Harmonic Structure Materials: *Kei Ameyama*¹; ¹Ritsumeikan University

2:20 PM Invited
Testing Old & New Ideas to Address Unresolved Questions in UFGs: *Elias Aifantis*¹; ¹Aristotle University of Thessaloniki

2:40 PM
Fracture and Ductility of Nanostructured Molybdenum–copper Composites: *Anton Hohenwarter*¹; Katharina Schwarz²; Julian Rosalie²; Stefan Wurster²; Reinhard Pippan²; ¹University of Leoben; ²Erich Schmid Institute of Materials Science, Austrian Academy of Sciences

3:00 PM
Strain-Rate Dependence of Flow Stress Hardened by Annealing and Softened by Deformation in Nanostructured Aluminum Processed by Accumulative Roll-Bonding: *Takahiro Kunimine*¹; Si Gao²; Ryoichi Monzen¹; Nobuhiro Tsuji²; ¹Kanazawa University; ²Kyoto University

3:20 PM Break

3:40 PM Invited
Synchrotron X-ray and Neutron Diffraction – Opportunities for Ultrafine-grained and Hetero-structured Materials: *Klaus-Dieter Liss*¹; ¹Guangdong Technion - Israel Institute of Technology (GTIIT)

4:00 PM
Synthesis of an Ultrafine-grained Metastable Al Alloy through Mechanical Bonding by High-pressure Torsion: *Megumi Kawasaki*¹; Jae-Kyung Han¹; Terence Langdon²; ¹Oregon State University; ²University of Southampton

4:20 PM
The Influence of Severe Plastic Deformation on Phase Transformations in a Metastable Beta Titanium Alloy Ti15Mo: *Milos Janecek*¹; Kristina Bartha¹; Josef Strasky¹; Anna Veverkova²; Pere Barrioberro Vila³; Jozef Vesely¹; Peter Minarik¹; Jakub Cizek¹; Irina Semenova²; Veronika Polyakova²; ¹Charles University; ²Ufa State Aviation Technical University; ³German Aerospace Center

4:40 PM
Heterogeneous Lamella Phases Make 2205 Stainless Steel with Superior Strength and Ductility: *Peiqing La*¹; Yu Shi¹; ¹Lanzhou University of Technology

MECHANICS & STRUCTURAL RELIABILITY

Understanding and Predicting Dynamic Behavior of Materials — Equation of State

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Marc Meyers, University of California San Diego; George Gray, Los Alamos National Laboratory

Wednesday PM | February 26, 2020
5A | San Diego Convention Ctr

Session Chair: Jie Chen, Los Almos National Laboratory

2:00 PM
Low-stress Shock Hugoniot of Additively Manufactured 304L Stainless Steel: *Sarah Thomas*¹; M. Cameron Hawkins¹; Robert Hixson¹; ¹MSTS

2:20 PM Invited
Meso-scale Topology Effects on the Shock Compression Response of Reactive Powder Mixtures: *Manny Gonzales*¹; Lauren Poole²; Austin Gerlt³; Zachary Cordero⁴; ¹U.S. Air Force Research Laboratory; ²University of California, Santa Barbara; ³UES, Inc.; ⁴Rice University

2:40 PM
Determination of Equation of State in Polyurea Elastomers via Reverberation and Hydrodynamic Instability Experiments: *Tyler Eastmond*¹; Elizabeth Fortin¹; Zak Wilde²; Kirk Bohlen¹; Jay Oswald¹; Pedro Peralta¹; ¹Arizona State University; ²Los Alamos National Laboratory/Arizona State University

3:00 PM
Observation of Metal Particle Deformation inside a Shock Compressed Polymer: *David Bober*¹; Moono Rhee¹; Nathan Barton¹;

Mukul Kumar¹; ¹Lawrence Livermore National Laboratory

3:20 PM

Mechanical Behavior and Deformation Mechanisms of Mg in Shear Using In-situ Synchrotron Radiation X-Ray Diffraction: *Christopher Meredith*¹; Jeffrey Lloyd¹; Daniel Magagnosc¹; ¹Army Research Laboratory

3:40 PM Break

4:00 PM

Effect of Heat Treatment on Adiabatic Shear Band Microstructures and Internal Strains using HR-EBSD in Segmented Ti-6Al-4V Chips from Turning: *Jiawei Lu*¹; Thomas Bieler¹; Patrick Kwon¹; ¹Michigan State University

4:20 PM

On the Evolution of Adiabatic Shear Bands in the Beta Titanium Alloy Ti-10V-2Fe-3Al: *Mario Scholze*¹; Philipp Frint¹; Sven Winter²; Martin Wagner¹; ¹Institute of Materials Science and Engineering, Technische Universität Chemnitz; ²Fraunhofer Institute for Machine Tools and Forming Technology

4:40 PM

Transient State Rheological Behavior of Poly(ethylene glycol) Diacrylate Hydrogels at High Shear Strain Rates: Ke Luo¹; Kshitiz Upadhyay¹; Ghatu Subhash¹; *Douglas Spearot*¹; ¹University of Florida

MATERIALS PROCESSING

11th International Symposium on High Temperature Metallurgical Processing — Preparation of Alloys and Materials

Sponsored by: TMS Extraction and Processing Division, TMS; Pyrometallurgy Committee

Program Organizers: Zhiwei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Tao Jiang, Central South University; Jesse White, Elkem Carbon AS; Morsi Mahmoud, King Fahd University of Petroleum And Mineral

**Thursday AM | February 27, 2020
12 | San Diego Convention Ctr**

Session Chairs: Onuralp Yücel, Istanbul Technical University;
Xuewei Lv, Chongqing University

8:30 AM Introductory Comments

8:45 AM

Production of a Cobalt-Nickel-Iron Alloy from Low Grade Ore: *Yotamu Hara*¹; Shadreck Chama¹; Stephen Parirenyatwa¹; Kennedy Chikontwe¹; Douglas Musowoya¹; Haggai Simfukwe¹; Choolwe Muchindu¹; Golden Kaluba¹; ¹Copperbelt University

9:05 AM

A New Approach for the Production of Li₄SiO₄ Powder: Kagan Benzesik¹; Ahmet Turan²; *Onuralp Yücel*¹; ¹Istanbul Technical University; ²Yalova University

9:25 AM

Effect of Intercritical Heat Treatment on Microstructure and Mechanical Properties of Sn Bearing 33MnCrB5 Steel: *Lijuan Sun*¹; Fuming Wang¹; Zhanbing Yang¹; Changrong Li¹; Wei Shen¹; Shuai Liu¹; ¹University of Science and Technology Beijing

9:45 AM

Combining Discrete Element Method and Artificial Neural Network to Predict the Particle Segregation Behaviors at Bell-less Top Blast Furnace: *Zhehan Liao*¹; Chengfeng Sun¹; Yang Xu¹; Muyang Wu¹; Yizhang Yang¹; Chao Wang¹; Jian Xu¹; ¹Chongqing University

10:05 AM

Preparation of Transition Metal Nitrides via Reduction-nitridation with Ammonia: *Yongjie Liu*¹; Yu Zhang¹; Zhixiong You¹; Xuewei Lv¹; ¹Chongqing University

MATERIALS PROCESSING

11th International Symposium on High Temperature Metallurgical Processing — Sintering and Pelletizing

Sponsored by: TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee

Program Organizers: Zhiwei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinkilic, Atilim University; Tao Jiang, Central South University; Jesse White, Elkem Carbon AS; Morsi Mahmoud, King Fahd University of Petroleum And Mineral

Thursday AM | February 27, 2020
16A | San Diego Convention Ctr

Session Chairs: Guanghui Li, Central South University; Mingming Zhang, ArcelorMittal Global R&D

8:30 AM Introductory Comments

8:45 AM
Magnetite Carbon-free Sintering Process Based on Electromagnetic Induction: *Xuangeng Zhou*¹; *Xuwei lv*¹; *Zhongci Liu*¹; *Mingrui Yang*¹; *Gang Li*¹; *Zihang Deng*¹; *Yongda Li*¹; *Linpei Li*¹; ¹ChongQing University

9:05 AM
Preparation of Metallized Pellets from Blast Furnace Dust and Electric Arc Furnace Dust Based on Microwave Impedance Matching: *Lei Ye*¹; *Zhiwei Peng*¹; *Qing Ye*¹; *Liancheng Wang*¹; *Robin Augustine*²; *Lee Joonho*³; *Yong Liu*⁴; *Mudan Liu*⁴; *Mingjun Rao*¹; *Guanghui Li*¹; *Tao Jiang*¹; ¹Central South University; ²Uppsala University; ³Korea University; ⁴Guangdong Provincial Key Laboratory of Development and Comprehensive Utilization of Mineral Resources

9:25 AM
Effect of Distributor Structure on the Uniformity of Multiphase System in Fluidized Ironmaking Process: *Tao Wang*¹; *Yan Liu*¹; *Xiaolong Li*¹; *Xuejiao Cao*¹; *Zhang Tingan*¹; ¹Northeastern University

9:45 AM
Prediction of Iron Ore Sinter Strength Using Statistical Technique: *Zhongci Liu*¹; *Xuangeng Zhou*¹; *Gang Li*¹; *Shanshan Wu*¹; *Xuwei Lv*¹; ¹Chongqing University

10:05 AM
Reduction Behavior of In-flight Fine Hematite Ore Particles by CO+H2 Mixtures in a High-temperature Drop Tube Furnace: *Liyong*

Xing¹; Yingxia Qu¹; Fanchao Meng¹; Chunsong Wang¹; Zongshu Zou¹; ¹Northeastern University

NUCLEAR MATERIALS

Accelerated Materials Evaluation for Nuclear Applications Utilizing Irradiation and Integrated Modeling — Current and Advanced Structural Materials II

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Assel Aitkaliyeva, University of Florida; Peter Hosemann, University of California - Berkeley; Samuel Briggs, Oregon State University; David Frazer, Los Alamos National Laboratory

Thursday AM | February 27, 2020
Theater A-8 | San Diego Convention Ctr

Session Chair: Peter Hosemann, University of California - Berkeley

8:30 AM
Fabrication and Characterization of Massive Crack-free Delta Phase-zirconium Hydride for High-performance Moderator Application: Xunxiang Hu¹; Wei Tang¹; Kurt Terrani¹; ¹Oak Ridge National Laboratory

8:50 AM
Neutron Irradiation Damage and Fission Product Transport in the SiC Layer of TRISO Fuel Particles: Subhashish Meher¹; Isabella van Rooyen¹; Chao Jiang¹; ¹Idaho National Laboratory

9:10 AM
Three-dimensional Analysis of the IPyC/SiC Interface in Irradiated TRISO Fuel Particles: Tyler Gerczak¹; Rachel Seibert¹; ¹Oak Ridge National Laboratory

9:30 AM
Fabrication and Charaterization of High Burnup Nuclear Fuel Surrogate for the Anlysis of Fuel Fragmentation Phenomenon: Jaejoon Kim¹; Ho Jin Ryu¹; ¹KAIST

9:50 AM
Microstructural Changes and Corrosion of Proton-pre-irradiated Hastelloy N in FLiNaK Molten Salt: Andres Morell-Pacheco¹; Lingfeng He²; Ruchi Gakhar²; Yachun Wang³; Adam Gabriel¹;

Lin Shao¹; ¹Texas A&M University; ²Idaho National Laboratory; ³Rensselaer Polytechnic Institute

10:10 AM Break

10:25 AM

On the Role of Heterogeneity in Concentrated Solidsolution Alloys in Enhancing their Irradiation Resistance: *Shijun Zhao*¹; ¹City University of Hong Kong

10:45 AM

Diffusion of Fission Products in Virgin Nuclear Graphite: *Kevin Graydon*¹; Mikhail Klimov¹; Edward Dein¹; Kevin Coffey¹; Yongho Sohn¹; ¹University of Central Florida

11:05 AM

Irradiation Behavior of Mechanically Processed Zr-Nb Multilayers at Very High Doses: *Madhavan Radhakrishnan*¹; Daniel Savage²; Marko Knezevic²; John Watt³; Yongqiang Wang³; Katherine Jungjohann⁴; Nathan Mara⁵; Osman Anderoglu¹; ¹University of New Mexico; ²University of New Hampshire; ³Los Alamos National Laboratory; ⁴Sandia National Laboratory; ⁵University of Minnesota

11:25 AM

High-Throughput Synthesis and Ion Irradiation of High-Entropy Alloys using Additive Manufacturing: *Michael Moorehead*¹; Michael Niezgoda¹; Calvin Parkin¹; Chuan Zhang²; Phalgun Nelaturu¹; Mohamed Elbakhshwan¹; Kumar Sridharan¹; Dan Thoma¹; Adrien Couet¹; ¹University of Wisconsin - Madison; ²Computherm LLC

11:45 AM

Kinetic Study on the Evolution of Nano-ceramic Coatings Under Heavy Ions Irradiation: *Matteo Vanazzi*¹; Luca Ceseracciu²; Gaelle Gutierrez³; Celine Cabet³; Marco G. Beghi⁴; Fabio Di Fonzo¹; ¹Center for Nano Science and Technology (CNST) - IIT; ²IIT; ³CEA; ⁴Politecnico di Milano

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture IV: Toward Confident Use in Critical Applications — Property Prediction I

Sponsored by: TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Nik Hrabe, National Institute of Standards and Technology; Steve Daniewicz, University of Alabama; Nima Shamsaei, Auburn University; John Lewandowski, Case Western Reserve University; Mohsen Seifi, ASTM International/Case Western Reserve University

**Thursday AM | February 27, 2020
10 | San Diego Convention Ctr**

Session Chair: Nima Shamsaei, Auburn University

8:30 AM Invited
Fatigue and Fracture Analysis of Additive Manufactured Metals for Critical Applications: *Ali Fatemi*¹; ¹University of Memphis

9:00 AM
Improvement of Fatigue Strength in Lightweight Selective Laser Melted Alloys By In-situ and Ex-situ Composition and Heat Treatment: *Mustafa Awd*¹; Jan Johannsen²; TSZ Tung Chan³; Mohamed Merghany³; Claus Emmelmann²; Frank Walther¹; ¹Department of Materials Test Engineering (WPT), TU Dortmund University; ²Fraunhofer Research Institution for Additive Manufacturing Technologies (IAPT); ³TU Dortmund University

9:20 AM
Microscale Analysis of the Synergistic Effects of Notch and Post-processed Microstructures in AM Ti-6Al-4V: *Lara Draelos*¹; Peeyush Nandwana²; Ankit Srivastava¹; ¹Texas A&M University; ²Oak Ridge National Laboratory

9:40 AM
A Zone-based, Probabilistic Damage Tolerance Framework for AM Components: *James Sobotka*¹; R. Craig McClung¹; Michael Enright¹; Jonathan Moody¹; Yi-Der Lee¹; Vikram Bhamidipati¹; ¹Southwest Research Institute

10:00 AM Break

10:20 AM Invited
A Fatigue Life Approach for Additively Manufactured Structures: *Rainer Wagener*¹; Benjamin Möller¹; Matilde Scurria¹; Thilo Bein¹; ¹Fraunhofer Lbf

10:50 AM
Additive Manufacturing of Fatigue Resistant Austenitic Stainless Steel: *Jonathan Pegues*¹; Michael Roach²; Nima Shamsaei¹; ¹Auburn University; ²University of Mississippi Medical Center

11:10 AM
Deriving the Structural Fatigue Behavior of Additive Manufactured Components: *Rainer Wagener*¹; Matthias Hell¹; Matilde Scurria¹; Thilo Bein¹; ¹Fraunhofer Lbf

11:30 AM
Additive Manufacturing-enhanced Durability Prediction Supported by a Machine-learning Based Material Model: *Nicolas Lammens*¹; Matthias Schulz¹; Stefan Straesser¹; Hunor Erdelyi¹; ¹Siemens Industry Software NV

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications II — Heat Transfer Components and Joining

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Charit, University of Idaho; Michael Kirka, Oak Ridge National Laboratory

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Session Chairs: Michael Kirka, Oakridge National Laboratory; Tim Horn, North Carolina State University

8:30 AM Invited
In-situ Qualification of AM 316L for Energy Applications: *Federico Sciammarella*¹; ¹Northern Illinois University

9:00 AM
Additive Manufacturing of Heat Pipes for Microreactor Applications: *Donna Guillen*¹; Clayton Turner¹; Adrian Wagner¹; Patrick Moo¹; ¹Idaho National Laboratory

9:20 AM Invited
Joining Technologies for Metal Additive Manufacturing in the Energy Industry: *Edward Herderick*¹; Jacob Rindler¹; David Schick²; Nate Ames¹; ¹Ohio State University; ²Proto Precision Additive

9:50 AM
High-temperature Mechanical Behavior of Additively-manufactured Mini-channel-embedded Inconel 718 Specimens: *Scott Thompson*¹; Aref Yadollahi²; Jasmin Ahmed³; ¹Kansas State University; ²Mississippi State University; ³Auburn University

10:10 AM Break

10:30 AM
Mechanical Properties of Additively Manufactured Inconel 718 at High-temperature: *Abhijeet Dhiman*¹; Hao Wang¹; Vikas Tomar¹; ¹Purdue University

10:50 AM
Fatigue Strength Prediction of As-built Ti-6Al-4V Components, Produced by Electron Beam Melting (EBM) Technology: *Jamal Mian*¹; Leila Ladani¹; ¹Arizona State University

11:10 AM
Additive Manufacturing Research for the Energy Sector: *Hani Henein*¹; Ahmed Qureshi¹; Tonya Wolfe²; ¹University of Alberta; ²InnoTech Alberta

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Functional and Energy Materials — Magnetic Materials

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Sneha Prabha Narra, Worcester Polytechnic Institute; Markus Chmielus, University of Pittsburgh; Mohammad Elahinia, University of Toledo; Reginald Hamilton, Pennsylvania State University

Thursday AM | February 27, 2020
7B | San Diego Convention Ctr

Session Chair: Markus Chmielus, University of Pittsburgh

8:30 AM Invited
When Additive Manufacturing Meets Magnetic Materials: Advanced Processing for Green Technologies: *Daniel Salazar*¹; ¹BCMaterials

9:00 AM
Effect of Post-process Heat Treatment on Microstructure and Properties of a Ni-Mn-Ga Alloy Deposited Using Laser Powder Bed Fusion: *Ville Laitinen*¹; Alexei Sozinov¹; Andrey Saren¹; Antti Salminen¹; Kari Ullakko¹; ¹LUT University

9:20 AM
Advanced Additive Manufacturing for Functional Magnetic Materials: *Markus Chmielus*¹; Pierangeli Rodriguez De Vecchis¹; Aaron Acierno¹; Danielle Brunetta¹; Tyler Paplham¹; Runbo Jiang¹; Katerina Kimes¹; Erica Stevens¹; Jakub Toman¹; ¹University of Pittsburgh

9:40 AM
Experimental Investigation of Melt Pool Geometry, Microstructure, and Texture in NiMnGa Fabricated via Laser Powder Bed Fusion: *Yao Xu*¹; Sneha Narra¹; ¹Worcester Polytechnic Institute

10:00 AM Break

10:20 AM
Additive Manufacturing of Rare Earth Bonded Permanent Magnets: Prospects and Challenges: *Mariappan Paranthaman*¹; ¹Oak Ridge National Laboratory

10:40 AM
Microstructural Characterization of Alnico Alloy Fabricated by Selective Laser Melting: *Paul Rottmann*¹; Andrew Polonsky²; McLean Echlin²; Michael Krispin³; Gotthard Rieger³; Stefan Lampenscherf³; Tresa Pollock²; Carlos Levi²; ¹University of Kentucky; ²University of California, Santa Barbara; ³Siemens AG, Corporate Technology

11:00 AM
Additive Manufacturing of Magnetic Materials for Advanced and Transparent Electronic Applications: *Pedro Martins*¹; Rita Policia¹; Ana Catarina Lima¹; Néelson Pereira¹; Esther Calle²; Manuel Vázquez²; Senetxu Lanceros-Mendez³; ¹Universidade do Minho; ²Instituto de Ciencia de Materiales de Madrid; ³BCMaterials, Basque Center for Materials, Applications and Nanostructures

11:20 AM
Additive Manufacturing of Soft Magnetic Alloys: *Mohan Sai Kiran Nartu*¹; Varun Chaudhary²; Sriswaroop Dasari¹; Srinivas Aditya Mantri¹; Raju Ramanujan²; Rajarshi Banerjee¹; ¹University of North Texas; ²Nanyang Technological University

Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques — In Situ Monitoring and Diagnostics: Directed Energy Deposition

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Fan Zhang, National Institute of Standards and Technology; Tom Stockman, Los Alamos National Laboratory; Tao Sun, University of Virginia; Donald Brown, Los Alamos National Laboratory; Yan Gao, Ge Global Research; Amit Pandey, MicroTesting Solutions; Joy Gockel, Wright State University; Tim Horn, North Carolina State University; Sneha Prabha Narra, Worcester Polytechnic Institute; Judy Schneider, University of Alabama at Huntsville

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Session Chair: Sneha Narra, Worcester Polytechnic Institute

8:30 AM Invited

On In-situ Monitoring of Geometry, Temperature, and Plume Behavior in Laser-based, Powder-blown Directed Energy Deposition Additive Manufacturing: *Abdalla Nassar*¹; Christopher Stutzman¹; Edward Reutzel¹; Dustin Seltzer²; Jeffrey Schiano²; Stephen Brown¹; Wesley Mitchell¹; ¹Applied Research Lab at Penn State; ²Pennsylvania State University

8:55 AM

In-situ Synchrotron X-ray Imaging of Titanium Alloy Powder Sintering during Laser Blown Powder Directed Energy Deposition: *Lorna Sinclair*¹; Yunhui Chen²; Sebastian Marussi²; Samuel Clark¹; Chu Lun Alex Leung²; Saurabh Shah²; Robert Atwood³; Thomas Connolley³; Martyn Jones⁴; Gavin Baxter⁴; Peter Lee²; ¹University College, London; ²University College London; ³Diamond Light Source Ltd.; ⁴Rolls-Royce plc.

9:15 AM

Capturing Marangoni Flow via Synchrotron Imaging of Laser Blown Powder Directed Energy Deposition: *Samuel Clark*¹; Yunhui Chen¹; Lorna Sinclair¹; Chu Lun Alex Leung¹; Sebastian Marussi¹; Robert Atwood²; Martyn Jones³; Gavin Baxter³; Peter Lee¹; ¹University College London; ²Diamond Light Source Ltd; ³Rolls-Royce plc

9:35 AM Invited
In-situ Process Monitoring and Diagnosis via Machine Learning of Thermal Imaging Streams: *Linkan Bian*¹; ¹Mississippi State University

10:00 AM
In-situ and Operando X-ray Imaging of the Laser Blown Powder Directed Energy Deposition Process: *Yunhui Chen*¹; Samuel Clark¹; Lorna Sinclair¹; Chu Lun Alex Leung¹; Sebastian Marussi¹; Robert Atwood²; Martyn Jones³; Gavin Baxter³; Peter Lee¹; ¹University College London; ²Diamond Light Source; ³Rolls-Royce plc

10:20 AM Break

10:40 AM Invited
In-situ 3D Digital Image Correlation and Thermal Imaging for Process Monitoring in Laser Directed Energy Deposition (L-DED): *James Haley*¹; Brian Jordan¹; Ross Cortino¹; Ryan Dehoff¹; Vincent Paquit¹; ¹Oak Ridge National Laboratory

11:05 AM
In-process Monitoring of Porosity in Additive Manufacturing: Bin Zhang¹; Shunyu Liu¹; *Yung Shin*¹; ¹Purdue University

11:25 AM
In-situ Synchrotron Measurements of Microstructure Development at Fusion Boundary in Wire Feed AM of Ti-6Al-4V: *Nathan Johnson*¹; Donald Brown²; John Carpenter²; Aaron Stebner¹; ¹Colorado School of Mines; ²Los Alamos National Laboratory

11:45 AM
High-speed X-ray Imaging of Powder Deposition of Composite Materials in Additive Manufacturing: *Sarah Wolff*¹; Niranjana Parab¹; Benjamin Aronson²; Benjamin Gould¹; Aaron Greco¹; Tao Sun¹; ¹Argonne National Laboratory; ²Penn State University

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development II — Alloy Design-Accelerated Development and Modeling

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Orlando Rios, Oak Ridge National Laboratory; Hunter Martin, HRL Laboratories; Atieh Moridi, Cornell University

Thursday AM | February 27, 2020
6F | San Diego Convention Ctr

Session Chair: Hunter Martin, HRL Laboratories

8:30 AM Keynote
Alloy Prototyping Techniques for Powder-based Additive Manufacturing: *Eric Jaegle*¹; Dierk Raabe¹; ¹Max-Planck-Institut Fuer Eisenforschung

9:00 AM
A Rapid Screening Benchmark Test Methodology for Accelerated AM Alloy Design: *Ralph Napolitano*¹; Timothy Prost²; Shubhra Jain¹; Emma White²; Iver Anderson²; ¹Iowa State University; ²Ames Laboratory

9:20 AM
Accelerated Development of Alloys via Direct Laser Metal Deposition: *Husam Alrehaili*¹; Praveen Sreeramagiri¹; Ajay Bhagavatam¹; Guru Dinda¹; ¹Wayne State University

9:40 AM
Efficient Material and Processing Parameter Optimization in Laser Powder Bed Fusion through Novel Amalgamation of Computational Modeling, Non-destructive Evaluation, and Material Characterization: *Chris Peitsch*¹; Steven Storck¹; Ian McCue¹; Joseph Sopcisak¹; Morgan Trexler¹; ¹JHU/APL

10:00 AM
Modeling Hot Cracking in Metal Additive Manufacturing: *Eric Clough*¹; Brennan Yahata¹; Mark O'Masta¹; Hunter Martin¹; Matthew Begley²; ¹HRL Laboratories; ²University of California, Santa Barbara

10:20 AM Break

10:35 AM Invited
Assessing the Printability of Metal Alloys for Additive Manufacturing: *Raymundo Arroyave*¹; Luke Johnson¹; Raiyan Seede¹; Mohamad Mahmoudi¹; Bing Zhang¹; Alaa Elwany¹; Ibrahim Karaman¹; ¹Texas A&M University

11:00 AM

Composition Control in Laser Powder Bed Fusion Additive Manufacturing Through Differential Evaporation: *Meelad Ranaiefar*¹; Ibrahim Karaman¹; Alaa Elwany¹; Raymundo Arroyave¹; ¹Texas A&M University

11:20 AM

Computational Design of Compositionally Graded Alloys for Monotonic Property Gradients: *Tanner Kirk*¹; Olga Eliseeva¹; Richard Malak¹; Raymundo Arroyave¹; Ibrahim Karaman¹; ¹Texas A&M University

11:40 AM

Microsegregation Analysis, Modeling, and Correlation to Cracking Behaviors in AM: *Timothy Prost*¹; Emma White¹; Shubhra Jain²; Ralph Napolitano²; Iver Anderson²; ¹Ames Laboratory; ²Ames Laboratory/Iowa State University

12:00 PM

Rapid Process Parameter Discovery for Functionally Graded Heterogeneous Materials Using Machine Learning and High Throughput Experiments: *Behzad Rankouhi*¹; Salman Jahani¹; Ankur Agrawal¹; Gabriel Meric de Bellefon¹; Dan Thoma¹; Frank Pfefferkorn¹; ¹University of Wisconsin-Madison

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Processing Effects on Microstructure and Material Performance — Porosity

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Eric Lass, University of Tennessee, Knoxville; Joy Gockel, Wright State University; Emma White, Ames Laboratory; Richard Fonda, Naval Research Laboratory; Monnamme Tlotleng, University of Johannesburg; Jayme Keist, Pennsylvania State University; Hang Yu, Virginia Polytechnic Institute and State University

**Thursday AM | February 27, 2020
6E | San Diego Convention Ctr**

Session Chairs: Emma White, Ames Laboratory; Jayme Keist, Pennsylvania State University

8:30 AM

Synchrotron Validated Simulations of Pore Formation During Laser Powder Bed Fusion of Nickel Superalloys: *Chu Lun Alex Leung*¹; Dawid Luczyniec²; Enyu Guo³; Sebastian Marussi¹; Robert Atwood⁴; Benjamin Saunders²; Peter Lee¹; ¹University College London; ²Rolls Royce plc.; ³Dalian University of Technology; ⁴Diamond Light Source Ltd

8:50 AM

Effect of Process Parameters on the Porosity of IN718 Produced by Laser Powder Bed Fusion: *Lonnie Smith*¹; P. Chris Pistorius¹; ¹Carnegie Mellon University

9:10 AM

Effect of Static Magnetic Field on the Porosity and Microstructure of Selective Laser Melting Inconel 718 Alloys: *Dafan Du*¹; Anping Dong²; Da Shu²; Baode Sun²; Enrique Lavernia³; ¹Shanghai Jiao Tong University; University of California, Irvine; ²Shanghai Jiao Tong University; ³University of California, Irvine

9:30 AM

Optimization of Pore-free Additive Manufacturing of Composites Utilizing Selective Laser Melting: *Eugene Olevsky*¹; Andrey Maximenko¹; ¹San Diego State University

9:50 AM

Physics and Comparison of Complex Melt Flow and Defect Formation During Pulsed and Continuous Selective Laser Melting: *Ian McCue*¹; Steven Storck¹; Morgan Trexler¹; ¹Johns Hopkins University Applied Physics Laboratory

10:10 AM Break

10:30 AM

Quantification of Porosity and Topology Influences on the Mechanical Behavior of Additively Manufactured Metallic Lattice Structures: *Behzad Bahrami Babamiri*¹; Joe Indeck¹; Kavan Hazeli¹; ¹University of Alabama in Huntsville

10:50 AM

Directed Energy Deposition of Al 5xxx Alloy Using Laser Engineered Net Shaping (LENS®): *David Svetlizky*¹; Baolong Zheng²; Tali Buta¹; Yizhang Zhou²; Oz Golan³; Uri Breiman¹; Rami Haj-Ali¹; Julie Schoenung²; Enrique Lavernia²; Noam Eliaz¹; ¹Tel Aviv University; ²University of California, Irvine; ³Afeka – Tel-Aviv Academic College of Engineering

11:10 AM

Microstructure and Mechanical Properties of Porous Mg Scaffolds Fabricated by Additive Manufacturing for Biomedical

Applications: Muzi Li¹; Thomas Derra²; Alexander Kopp²; Jon M. Molina-Aldareguía¹; *Javier Llorca*³; ¹IMDEA Materials Institute; ²Meotec; ³IMDEA Materials Institute & Technical University of Madrid

11:30 AM

From Single Scan Tracks to 3D Samples: Effect of Process Parameters on Quality of Ti-6Al-4V Produced by Means of Direct Energy Deposition: *Alessandro Carrozza*¹; *Alberta Aversa*¹; *Federico Mazzucato*²; *Abdollah Saboori*¹; *Giulio Marchese*¹; *Anna Valente*²; *Mariangela Lombardi*¹; *Paolo Fino*¹; *Sara Biamino*¹; ¹Politecnico di Torino; ²SUPSI

11:50 AM

Study on Multiple Beam Interaction for Laser Powder Bed Fusion: *Wenxuan Zhang*¹; *Luc Deike*¹; *Craig Arnold*¹; ¹Princeton University

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Deformation

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Shaping and Forming Committee, TMS: Materials Characterization Committee

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Marko Knezevic, University of New Hampshire; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; M Arul Kumar, Los Alamos National Laboratory

Thursday AM | February 27, 2020
Theater A-2 | San Diego Convention Ctr

Session Chairs: M Arul Kumar, Los Alamos National Laboratory; Rodney McCabe, Los Alamos National Laboratory

8:30 AM

Advanced Analysis of Acoustic Emission Response of the Main Deformation Mechanisms in Mg: *Daria Drozdenko*¹; *Jan Bohlen*²; *Alexei Vinogradov*³; *Petr Hrcuba*⁴; *František Chmelík*⁴; *Pavel Lukác*⁴; *Patrik Dobron*⁵; ¹Charles University; Nuclear Physics Institute, CAS; ²Helmholtz-Zentrum Geesthacht; ³Norwegian University of Science and Technology - NTNU; ⁴Charles University; ⁵1 Charles University; 2 Nuclear Physics Institute, CAS

8:50 AM

4D Integrated X-ray Imaging and Modeling of Nanoscale Dynamics: *Mathew Cherukara*¹; Kiran Sasikumar²; Subramanian Sankaranarayanan¹; Ross Harder¹; ¹Argonne National Laboratory; ²Avant-garde Materials Simulation

9:10 AM

Micromechanical Characterization of Single-crystalline Silicon at Elevated Temperature: *Kosuke Takagi*¹; Yoji Mine¹; Jun Fujise²; Bonggyun Ko²; Toshiaki Ono²; Kazuki Takashima¹; ¹Kumamoto University; ²SUMCO Corporation

9:30 AM

Low Strain Grain Boundary Deformation and Damage: *Veronica Livescu*¹; Ramon Martinez¹; Cheng Liu¹; George Gray III¹; ¹Los Alamos National Laboratory

9:50 AM

Discrete Dislocation Dynamics Investigation of Partial Dislocation interaction with Precipitates in Nickel- and Cobalt-based Superalloy: *Dylan Madisetti*¹; Jaafar El-Awady¹; ¹Johns Hopkins University

10:10 AM Break

10:30 AM

Strain Hardening of Al-Cu Alloys Investigated with In-situ Neutron Diffraction: *Brian Milligan*¹; Dong Ma²; Amit Shyam²; Amy Clarke¹; ¹Colorado School of Mines; ²Oak Ridge National Laboratory

10:50 AM

Characterization of Transient State Deformation in Chips Produced by Modulation-assisted machining: *Indrani Biswas*¹; James Mann²; Srinivasan Chandrasekar¹; Kevin Trumble¹; ¹Purdue University; ²University of West Florida

11:10 AM

Grain - Scale Mechanical Characterization of Alpha-Titanium Using Spherical Indentation Stress-Strain Protocols: *Natalia Millan-Espitia*¹; Soumya Mohan¹; Adam Pilchak²; Surya Kalidindi¹; ¹Georgia Institute of Technology; ²Air Force Research Laboratory

11:30 AM

The Effects of Defects on the Mechanical Properties of Au Microparticles: *Tyler Flanagan*¹; Oleg Kovalenko²; Eugen Rabkin²; Seok-Woo Lee¹; ¹University of Connecticut; ²Technion-Israel Institute of Technology

11:50 AM

Assessing the Variation in Localized Deformation During Hydrogen Environment-assisted Cracking in Peak-aged Monel K-500: *Zachary Harris*¹; Adam Thompson¹; James Burns¹; ¹University of Virginia

ADVANCED MATERIALS

Advanced High Strength Steels IV — Session V

Sponsored by: TMS Structural Materials Division, TMS: Steels Committee

Program Organizers: Ana Luiza Araujo, AK Steel Research and Innovation Center; Mary O'Brien, Colorado School of Mines; Tilmann Hickel, Max Planck Institut für Eisenforschung; Amy Clarke, Colorado School of Mines; Kester Clarke, Colorado School of Mines; C. Tasan, Massachusetts Institute of Technology; MingXin Huang, University of Hong Kong

Thursday AM | February 27, 2020
Balboa | Marriott Marquis Hotel

Session Chairs: Ana Araujo, AK Steel; Rachael Stewart, AK Steel

8:30 AM

Effect of Strain Rate on Thinning and Failure Behavior of 22MnB5 Steel During Hot Stamping Condition: *Amarjeet Kumar Singh*¹; K Narasimhan¹; ¹IIT Bombay

8:50 AM

Flash Stamping by Using Multistep Partitioning: *Oguz Gurkan Bilir*¹; Ersoy Erisir¹; ¹Kocaeli University

9:10 AM

Microscale Insight into Deformation and Fracture of Ultra-high Strength Martensitic Steels: *Xinzhu Zheng*¹; Hassan Ghassemi-Armaki²; Ankit Srivastava¹; ¹Texas A&M University; ²ArcelorMittal Global R&D - East Chicago

9:30 AM

Measurement and Prediction of the Transformation Strain in High Strength Steels: Francesco Maresca¹; Efthymios Polatidis²; Miroslav Smid²; Helena Van Swygenhoven²; *William Curtin*¹; ¹Ecole Polytechnique Federale de Lausanne (EPFL); ²Paul Scherrer Institut (PSI)

9:50 AM

The Relevance of Interfacial Segregation for Controlling Second Phase Precipitation in Advanced High Strength Steels: *Alisson Da Silva*¹; Ponge Dirk¹; Baptiste Gault¹; Dierk Raabe¹; ¹Max-Planck Institut Fur Eisenforschung

10:10 AM Break

10:30 AM

Physically-based Model for Coupled Recovery and Recrystallization of Ferritic Steels: *Sebastien Allain*¹; Marc Moreno¹; Julien Teixeira¹; Guillaume Geandier¹; Hatem Zurob²; Frédéric Bonnet³; ¹Institut Jean Lamour; ²McMaster University; ³ArcelorMittal Maizières Research SA

10:50 AM

Nanoscale Investigation of Austenite/Ferrite Interfaces in Medium Carbon Fe-Mn-C Steels at Different Inter-critical Temperatures: *Olha Nakonechna*¹; Mohamed Gouné²; Didier Huin³; Nicolas Charbonnier³; Helena Zapolsky¹; Frederic Danoix¹; ¹University of Rouen Normandy; ²ICMCB, UPR CNRS 9048, University of Bordeaux; ³ArcelorMittal research SA, voie romaine, 57 280 Maizières Les Metz

11:10 AM

Investigation of Simultaneous Precipitation and Recrystallization Behavior in Isothermally Annealed Cold Rolled Ti-V High Strength Low Alloy Steel: *Xukai Zhang*¹; Chrysoula Loannidou²; Johannes Tjepkema¹; Winfried Kranendonk³; Jean Campaniello³; Robert M. Dalgliesh⁴; Gert H. ten Brink¹; S. Erik Offerman²; Bart J. Kooi¹; ¹University of Groningen; ²Delft University of Technology; ³Tata Steel, IJmuiden; ⁴ISIS, Rutherford Appleton Laboratory

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Advances in Characterization and Design of Emerging Permanent Magnetic Materials

Sponsored by: TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Daniel Salazar, BCMaterials; Alex Leary, Nasa Glenn Research Center; Markus Chmielus, University of Pittsburgh; Ryan Ott, Ames Laboratory/Cmi; Arcady Zhukov, UPV/EHU, and Ikerbasque, Basque Foundation for Science

Thursday AM | February 27, 2020
Del Mar | Marriott Marquis Hotel

Session Chairs: Konstantin Skokov, Technische Universität Darmstadt; Satoshi Hirosawa, National Institute for Materials Science

8:30 AM Invited
***In-Situ* and *Ex-Situ* Observations of Phase Selection in Magnet Alloys:** *Matthew Kramer*¹; A.C. Chaung²; Iver Anderson¹; Pratik Ray³; E.M.H. White¹; T. Prost¹; E. Rinko¹; ¹Ames Laboratory; ²Argonne National Laboratory; ³Indian Institute of Technology Ropar

9:00 AM Invited
Optimizing the Magnetic Performance of Tetragonal $\text{ReFe}_{12-x}\text{M}_x$ Phases using *ab initio* Computational Methods: *Heike Herper*¹; Olga Vekilova¹; ¹Uppsala University

9:30 AM
Cerium-based Gap Magnets Recent Advances in Understanding and Optimization: *Andriy Palasyuk*¹; Savannah Downing²; Olena Palasyuk¹; Tae-Hoon Kim¹; Matthew Lynn¹; Lin Zhou¹; Matthew Kramer¹; Sergey Bud'ko¹; Paul Canfield¹; ¹Ames Laboratory; ²Iowa State University

9:50 AM
The Mechanical and Magnetic Properties of Mn-Al-C-Cu Alloys: *Florian Jürries*¹; Kornelius Nielsch¹; Thomas Woodcock¹; ¹Leibniz IFW Dresden

10:10 AM Break

10:30 AM Invited
Low-dimensional Hard Magnetic Materials: *J.Ping Liu*¹; ¹University of Texas at Arlington

11:00 AM Invited
Synthesis of a-Fe₁₆N₂ Foils for Bulk Rare-earth-free a-Fe₁₆N₂ Permanent Magnet and its Potential Applications: *Jian-Ping Wang*¹; ¹University of Minnesota, Twin Cities

11:30 AM Invited
Visualizing the 2D and 3D Magnetic Domain Evolution Processes in Nd-Fe-B Sintered Magnet by Advanced X-ray Microscopy: *Motohiro Suzuki*¹; Kentaro Toyoki¹; Tetsuya Nakamura²; ¹JASRI; ²ESICMM

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VI —

Energy Conversion and Storage III

Sponsored by: TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

Program Organizers: Jung Pyung Choi, Pacific Northwest National Laboratory; Amit Pandey, MicroTesting Solutions; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh

Thursday AM | February 27, 2020
16B | San Diego Convention Ctr

Session Chairs: Zheng Chen, University of California, San Diego; Steven DeCaluwe, Colorado School of Mines

8:30 AM
Oxidation of Nickel Coated AISI 430 Alloy for High Temperature Electrochemical Systems: *Manoj Mahapatra*¹; Mark King¹;
¹University of Alabama at Birmingham

8:50 AM
Solid State Modification via Activated Reactive Consolidation for Fabrication of Mg2Si Thermoelectric Generators: *Babak Alinejad*¹; Yuma Yamamoto¹; Teruyuki Ikeda¹; ¹Ibaraki University

9:10 AM
Toward Multivalent Zinc-ion Batteries: A Look at Zinc and Na₃V₂(PO₄)₃: *Jesse Ko*¹; Partha Paul¹; Natalie Seitzman²; Ryan DeBlock³; Bruce Dunn³; Johanna Nelson Weker¹; ¹SLAC National Accelerator Laboratory; ²Colorado School of Mines; ³University of California, Los Angeles

9:30 AM
Understand Behavior of Spinel Cathodes using Thermodynamic Modelling Technique: *Weibin Zhang*¹; *Dajian Li*²; Keke Chang³; Yuan Yuan⁴; Hans Seifert²; ¹Shandong University; ²Karlsruhe Institute of Technology; ³Ningbo Institute of Materials Technology and Engineering; ⁴Chongqing University

9:50 AM
Alloying Iron Foams with Nickel to Mitigate Kirkendall Microporosity Formation during Redox Cycling at 800°C: *Stephen Wilke*¹; Andrew Geltmacher²; Patrick Callahan²; David Rowenhorst²; David Dunand¹; ¹Northwestern University; ²U.S. Naval Research Laboratory

10:10 AM Break

10:30 AM Invited

Leveraging Reversible Chemistry for Materials Sustainability in Energy Storage: *Zheng Chen*¹; ¹University of California, San Diego

10:50 AM

Mechanistic Understanding of Ion Intercalation and Phase Transformation Behavior in layered Materials at Atomic Scales: *Shayani Parida*¹; Jie Chen¹; Hetal Patel¹; Avanish Mishra¹; Arthur Doble²; Barry Carter³; Avinash Dongare¹; ¹University of Connecticut; ²EaglePicher Technologies LLC; ³Sandia National Laboratories

11:10 AM

Study on Oxygen Lance Injection Technology of High Nickel Ternary Cathode Material Roasting Process in Roller Hearth Furnace: *Zhong-Ling (Rocky) Wei*¹; Joachim Von Scheele¹; Zhang Gang²; Qian Xu²; ¹Linde Technology & Innovation Asia Pacific; ²Zhongtian Energy Materials Co., Ltd.

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VI — Young Investigator and Energy Conversion and Storage II

Sponsored by: TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

Program Organizers: Jung Pyung Choi, Pacific Northwest National Laboratory; Amit Pandey, MicroTesting Solutions; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh

Thursday AM | February 27, 2020
17B | San Diego Convention Ctr

Session Chairs: Partha Mukherjee, Purdue University; Amit Pandey, Granta Design / ANSYS

8:30 AM Keynote

Structuring Oxides from Atomistic to Mesoscale Dimensions to Mitigate Diffusion Limitations: Perspectives for Li-ion and “Beyond Li” Energy Storage: *Sarbajit Banerjee*¹; ¹Texas A&M University

9:00 AM Invited
Understanding Heterogeneous Electrocatalysis of Lithium Polysulfides: *Leela Arava*¹; ¹Wayne State University

9:20 AM Invited
Uncovering Structure-composition-property Relationships in Early Transition Metal Oxides for High Rate Energy Storage: *Megan Butala*¹; ¹Materials Science & Engineering

9:40 AM Invited
Analytical Transport Network Theory for the Characterization and Design of Materials for Energy Storage Applications: *Alex Cocco*¹; *Kyle Grew*¹; ¹U.S. Army Combat Capabilities Development Command

10:00 AM Invited
Crystallographic Engineering of Battery Materials: *Ananya Renuka Balakrishna*¹; ¹University of Minnesota

10:20 AM Break

10:40 AM Invited
Fast Charging of Li-ion Batteries: Aging and Diagnostics: *Marco Rodrigues*¹; *Daniel Abraham*¹; ¹Argonne National Laboratory

11:00 AM Invited
On Spatiotemporal Nonuniformity of Lithium Electrodeposition: *Aashutosh Mistry*¹; *Venkat Srinivasan*¹; ¹Argonne National Laboratory

11:20 AM Invited
Solid-state Divalent Ion Conductivity: *Kimberly See*¹; *Andrew Martinolich*¹; ¹Caltech

ELECTRONIC MATERIALS

Advanced Microelectronic Packaging, Emerging Interconnection Technology and Pb-free Solder — Solder Joint Intermetallics

Sponsored by: TMS Functional Materials Division, TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Christopher Gourlay, Imperial College London; Kazuhiro Nogita, University of Queensland; David Yan, San Jose State University; Mike Wolverton, Raytheon; Babak Arfaei, Ford Motor Company; Andre Delhaise, Celestica; Mehran Maalekian, Mat-Tech; Mohd Arif Salleh, Universiti Malaysia Perlis

Thursday AM | February 27, 2020

Palomar | Marriott Marquis Hotel

Session Chairs: Kazuhiro Nogita, The University of Queensland; Sergey Belyakov, Imperial College London

8:30 AM

The Growth and Coarsening Kinetics of Ag3Sn in SAC305 Solders: *Jingwei Xian*¹; Sergey Belyakov¹; Christopher Gourlay¹; ¹Imperial College London

8:50 AM

Potential for Improving Sn-Cu Alloys as High-temperature Solders by the Suppression of Cu3Sn Phase: *Syeda Umama Mehreen*¹; Kazuhiro Nogita¹; Stuart McDonald¹; David StJohn¹; Hideyuki Yasuda²; ¹The University of Queensland; ²Kyoto University

9:10 AM

Effects of Secondary Reflow on Solder Joint Microstructure and Lifetime: *Alyssa Yaeger*¹; Travis Dale¹; Ganesh Subbarayan¹; John Blendell¹; Carol Handwerker¹; ¹Purdue University

9:30 AM

Intermetallic Compound Analyses Provide Interfacial Reliability for Solder Connections in Electronics: *Mike Wolverton*¹; ¹Raytheon

9:50 AM Break

10:10 AM

Influence of Substrates and Microalloying Additions on the Primary Intermetallic Growth of Lead-free Solder Joints: Mohd Arif Mohd Salleh¹; *Kazuhiro Nogita*²; Mohd Izrul Izwan Ramli¹; Flora Somidin²; Yasuda Hideyuki³; ¹Universiti Malaysia Perlis; ²University of Queensland; ³Kyoto University

10:30 AM

Effect of Bi and Zn Addition to the Properties of Sn-0.7Cu and Sn-0.7Cu-0.05Ni Solder Coating: Mohd Izrul Izwan Ramli¹; Mohd Arif Anuar Mohd Salleh¹; Hideyuki Yasuda²; *Kazuhiro Nogita*³; ¹Universiti Malaysia Perlis; ²Kyoto University; ³University of Queensland

BIOMATERIALS

Advances in Biomaterials for 3D Printing — Advances in Biomaterials for 3D Printing

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Biomaterials Committee

Program Organizers: Changxue Xu, Texas Tech University; Jun Yin, Zhejiang University; Zhengyi Zhang, Huazhong University of Science and Engineering; Yifei Jin, University of Florida

Thursday AM | February 27, 2020
Oceanside | Marriott Marquis Hotel

Session Chairs: Changxue Xu, Texas Tech University; Yifei Jin, University of Nevada, Reno

8:30 AM
Guided Cell Migration on a Graded Micropillar Substrate: *Srikumar Krishnamoorthy*¹; Zhengyi Zhang²; Changxue Xu¹; ¹Texas Tech University; ²Huazhong University of Science and Technology

8:50 AM
Additively Manufactured Functionally Graded Biodegradable Porous Zinc: *Yageng Li*¹; Prathyusha Pavanram²; Jie Zhou¹; Karel Lietaert³; Marius Leeﬂang¹; Holger Jahr²; Amir Zadpoor¹; ¹Delft University of Technology; ²University Hospital RWTH Aachen; ³3D Systems - LayerWise NV

9:10 AM
Design of Metallic Lattices for Bone Implants by Additive Manufacturing: *Daniel Barba*¹; Roger Reed¹; Enrique Alabort²; ¹University of Oxford; ²OxMet Technologies

9:30 AM
Biomimetic 3D printed Chitosan-hydroxyapatite Scaffold for Bone Tissue Engineering: *Wei Huang*¹; Julian Cutler¹; David Kisailus¹; ¹University of California Riverside

9:50 AM
Effects of Photoinitiators on Cell Viability in 3D Bioprinting: *Jazzmin Casillas*¹; Heqi Xu¹; Changxue Xu¹; ¹Texas Tech University

10:10 AM Break

10:30 AM
Investigation of Cell Sedimentation in Inkjet-based Bioprinting of Cell-Laden Bioink: *Heqi Xu*¹; Jazzmin Casillas¹; Srikumar Krishnamoorthy¹; Changxue Xu¹; ¹Texas Tech University

10:50 AM
From Microstructural Design to Surface Engineering: A Tailored Approach for Improving Fatigue Life of Additively Manufactured

Lattice Titanium: *V. A. Popovich*¹; S.M. Ahmadi²; ¹Delft University of Technology; ²Amber Implants

MECHANICS & STRUCTURAL RELIABILITY

Advancing Current and State-of-the-Art Application of Ni- and Co-based Superalloys — Welding, Joining, Rejuvenation, Surface Treatment

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Chantal Sudbrack, Northwestern University Center for Atom-Probe Tomography; Mario Bochiechio, Pratt & Whitney; Kevin Bockenstedt, ATI Specialty Materials; Katerina Christofidou, University of Sheffield; James Coakley, University of Miami; Martin Detrois, National Energy Technology Laboratory; Laura Dial, GE Global Research; Bij-Na Kim, Carpenter Additive; Victoria Miller, University of Florida; Kinga Unocic, Oak Ridge National Laboratory

**Thursday AM | February 27, 2020
11B | San Diego Convention Ctr**

Session Chairs: Martin Detrois, National Energy Technology Laboratory; Chantal Sudbrack, Consultant

8:30 AM Invited
Welding and Weldability Assessment of Ni-based Superalloys: *Joel Andersson*¹; ¹University West

9:00 AM Invited
Recent Advances in Inertia Friction Welding of Dissimilar Ni-base Superalloys: *Oleg Senkov*¹; David Mahaffey¹; S. Lee Semiatin¹; ¹Air Force Research Laboratory

9:30 AM
Structural and Chemical Features of Borides Precipitated within the Transient Liquid (TLP) Bonded Superalloys: *Xiaobing Hu*¹; Vinayak Dravid¹; ¹Northwestern University

9:50 AM
On the Rejuvenation of Crept Ni-base Single Crystal Superalloys (SX) by Hot Isostatic Pressing (HIP): *Oliver Horst*¹; Benjamin Ruttert¹; David Bürger¹; Larissa Heep¹; Hongcai Wang¹; Antonín Dlouhý²; Werner Theisen¹; Gunther Eggeler¹; ¹Ruhr-Universitaet Bochum; ²Academy of Sciences of the Czech Republic

10:10 AM Break

10:30 AM

Heat Treatment Behavior and Microstructure Evolution of Ni-Cr-Mo-W (Haynes 244) Alloy after Surface Treatment by Ultrasonic Nanocrystalline Surface Modification (UNSM) and Laser Shock Peening (LSP): *Jie Song*¹; Anurag Sharma¹; Boateng Twum Donkor¹; Vijay Vasudevan¹; ¹University of Cincinnati

10:50 AM

Effect of Ultrasonic Nanocrystalline Surface Modification (UNSM) on the Oxidation Behavior of Alloy 800HT in a Supercritical Carbon Dioxide (SCO₂) Environment: *Richard Chiang*¹; Sebastien Teyseyre²; Jeffery Aguiar³; Lucas Teeter⁴; Julie Tucker⁴; Vijay Vasudevan¹; ¹University of Cincinnati; ²Canadian Nuclear Laboratories; ³Idaho National Laboratory; ⁴Oregon State University

11:10 AM

Elevated Temperature Tribological Behavior of Alloys 800HT and 617 for High Temperature Gas-cooled Reactor Applications: Valentin Pauly¹; Carter Tesch¹; Joseph Kern¹; Malcolm Clark¹; David Grierson¹; Oyelayo Ajayi²; Dileep Singh²; *Kumar Sridharan*¹; ¹University of Wisconsin-Madison; ²Argonne National Laboratory

11:30 AM

Friction Stir Welding of Inconel 825 Alloy: Hrishikesh Das¹; Mounarik Mondal¹; Jiwoo Lee²; Hoon-Hwe Cho²; *Sung-Tae Hong*¹; ¹University of Ulsan; ²Hanbat National University

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Microscale Experiments and Machine Learning

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Charudatta Phatak, Argonne National Laboratory; Bryan Wong, University of California, Riverside; Mikhail Mendelev, Ames Laboratory; Bryce Meredig, Citrine Informatics; Ebrahim Asadi, University of Memphis; Francesca Tavazza, National Institute of Standards and Technology

Session Chairs: Noah Paulson, Argonne National Laboratory; Vahid Tari, Eaton Corporation Research & Technology

8:30 AM

Monte Carlo Studies of EBSPs Spectroscopy: *Elena Pascal*¹; Patrick Callahan²; Saransh Singh³; Marc De Graef¹; ¹Carnegie Mellon University; ²Naval Research Laboratory; ³Lawrence Livermore National Laboratory

8:50 AM

New Workflow for High-throughput Feature Extraction of Deforming Open Cell Foams: *Steve Petruzza*¹; Attila Gyulassy¹; Samuel Leventhal¹; John Baglino¹; Michael Czabaj¹; Ashley Spear¹; Valerio Pascucci¹; ¹University of Utah

9:10 AM

Microstructure Image Analysis using Deep Convolutional Neural Networks: *Bo Lei*¹; Elizabeth Holm¹; ¹Carnegie Mellon University

9:30 AM

Development of Virtual Resonant Ultrasound Spectroscopy Methods for use in Quantifying Defect Content: *John Graham*¹; Ricardo Lebensohn¹; Boris Maiorov¹; Paul Lafourcade²; Laurent Capolungo¹; ¹Los Alamos National Laboratory; ²Commissariat a l'Energie Atomique

9:50 AM

Relating 2D Experimental Information to 3D Simulations using Surface Structure Conserving 3D Microstructure Generation: *Theron Rodgers*¹; Coleman Alleman¹; Hojun Lim¹; ¹Sandia National Laboratories

10:10 AM Break

10:30 AM

Microstructure Reconstruction of Additive Manufactured Metallic Materials with Markov Random Fields: *Arulmurugan Senthilnathan*¹; Pinar Acar¹; Marc De Graef²; ¹Virginia Tech; ²Carnegie Mellon University

10:50 AM

Real-time Analysis of Diffraction Data for Enabling In-situ Measurements: *Anup Pandey*¹; John Andrew Redwig Catillo Castilo²; Surya Khalidindi²; Reeju Pokharel¹; ¹Los Alamos National Laboratory; ²Georgia Tech

11:10 AM
Material Parameters Identification, Modeling and Experimental Verification of the New Smart Material Vacuum Packed Particles:
*Piotr Bartkowski*¹; Robert Zalewski¹; ¹Warsaw University of Technology

11:30 AM
Machine Learning Exploration and Optimization of Flame Spray Pyrolysis: *Noah Paulson*¹; Joseph Libera¹; Marius Stan¹; ¹Argonne National Laboratory

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Processing of Aluminium Alloys

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Dmitry Eskin, Brunel University

Thursday AM | February 27, 2020
1A | San Diego Convention Ctr

Session Chair: Dimitry Sediako, University of British Columbia

8:30 AM Introductory Comments

8:35 AM
Influence of Chemical Composition and Pre-deformation on The Age-hardening Response of Al-Mg-Si Alloys: *Alexander Wimmer*¹;
¹Neuman Aluminium

9:00 AM
Hot Deformation and Die-quenching of 6000-series Alloys - the Effect of Quench-interruption Temperature: *Tanja Pettersen*¹;
 Benedikte Jørgensen Myrold²; Calin Marioara¹; Ola Jensrud²;
¹SINTEF Industry; ²SINTEF Manufacturing

9:25 AM
Descriptors and Predictors: New Tools for the Predictive Modelling of Production Paths and the Properties of Aluminum-based End-products: Varuzan Kevorkijan¹; *Irena Paulin*²; ¹Impol R in R d.o.o.; ²Institute for Metals and Technology

9:50 AM

Effects of Extrusion Parameters on Microstructural and Mechanical Properties of EN AW 6063: *Mehmet Güner*¹; Cem Mehmetalioglu¹; Osman Halil Çelik¹; Murat Konar¹; Görkem Özçelik¹; ¹ASAS Aluminium

10:15 AM Break

10:30 AM

Characterization of Dynamic Material Property of AlSi10Mg Aluminum Alloy Under High Strain Rate Compressive Loading: Md Salah Uddin¹; Kristofer Kuelper¹; *Brahmananda Pramanik*¹; ¹Montana Technological University

10:55 AM

Current Efficiency for Direct Production of an Aluminium-titanium Alloy by Electrolysis in a Laboratory Cell: *Omar Awayssa*¹; Rauan Meirbekova²; Gudrun Saevarsdottir²; Gudjon Atli Audunsson³; Geir Martin Haarberg¹; ¹Norwegian University of Science and Technology; ²Reykjavik University; ³Innovation Center Iceland

11:20 AM

Simulation Study on Equal Channel Right Angular Extrusion Process of Aluminum Alloy 6061: *Wenhuan Jiang*¹; Liangying Wen¹; Huan Yang¹; Jiahuan Jiang¹; ¹Chongqing University

LIGHT METALS

Aluminum Reduction Technology — Environment

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Jayson Tessier, Alcoa

Thursday AM | February 27, 2020
6D | San Diego Convention Ctr

Session Chair: David Wong, Light Metals Research Centre

8:30 AM Introductory Comments

8:35 AM

Reducing the Carbon Footprint: Aluminum Smelting with Changing Energy Systems and the Risk of Carbon Leakage: *Gudrun Saevarsdottir*¹; Halvor Kvande²; Barry Welch³; ¹Reykjavik University; ²Consultant; ³The University of Auckland

8:55 AM
Measurement System for Fugitive Emissions in Primary Aluminium Electrolysis: *Håkon Myklebust*¹; Thor Anders Aarhaug²; Gabriella Tranell¹; ¹Norwegian University of Science & Technology; ²SINTEF

9:15 AM
Validation of QCL CF4 Gas Analyzer for Sensitivity and Selectivity: *Thor Anders Aarhaug*¹; ¹SINTEF

9:35 AM
A Laboratory Study of the HF Generation Potential of Particulate Fluorides from Cell Emissions: *Jenny Hung*¹; James Metson²; ¹Light Metals Research Centre; ²School of Chemical Sciences, University of Auckland

9:55 AM
Method Development to Estimate Total Low Voltage and High Voltage PFC Emissions: *Luis Espinoza-Nava*¹; Christine Dubois²; Eliezer Batista¹; ¹Alcoa Technical Center; ²Alcoa Deschambault

10:15 AM Break

10:30 AM
Update on SO2 Scrubbing Applied in Primary Aluminium Smelters: *Stephan Broek*¹; ¹Hatch Ltd.

10:50 AM
Optimization of a Gas Treatment Center Equipped with Extended Surface Bag Filters: *Julie Dontigny*¹; Stephan Broek¹; Mario Dion²; Raymond Emond²; Philippe Martineau³; ¹Hatch Ltd.; ²Rio Tinto; ³Fives Solios

11:10 AM
Update on the Abart Gas Treatment and Alumina Handling at the Karmøy Technology Pilot: *Anders Sorhuus*¹; Sivert Ose¹; Eivind Holmefjord¹; Håvard Olsen¹; Bent Nilsen¹; ¹GE Power

BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces III

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines; Po-Yu Chen, National Tsing Hua University

Thursday AM | February 27, 2020
Vista | Marriott Marquis Hotel

Session Chairs: Kalpana Katti, North Dakota State University; Terry Lowe, Colorado School of Mines

8:30 AM Invited
Functional Nanomaterials and Their Applications in the Therapy of Cancer and Infectious Diseases: Hanene Belkahlac¹; Rym Boudjemaab²; John Lomas³; Olivier Micheauc¹; Claire Wilhelm⁴; Hyacinthe Randriamahazaka³; *Miryana Hemadi*³; ¹Université de Bourgogne Franche-Comté; ²Abbelight; ³Université de Paris - ITODYS Laboratory; ⁴Université de Paris

9:00 AM
AMP-loaded Mesoporous Strontium Silicates with Improved Bioactivity and Antibacterial Capability: *Isha Mutreja*¹; Kami Hogan¹; Dhiraj Kumar²; Conrado Aparicio¹; ¹Minnesota Dental Research Center for Biomaterials and Biomechanics; ²Division of Pediatric Dentistry, University of Minnesota

9:20 AM
Application of Titanium Dioxide Nanotubes and Lattice Light-sheet Microscopy in Establishing Early-stage Cellular Response Mechanisms: *Jevin Meyerink*¹; Scott Wood¹; Jeremy Mercuri²; Robert Anderson¹; Brandon Scott¹; Grant Crawford¹; ¹South Dakota School of Mines & Technology; ²Clemson University

9:40 AM Invited
Nano-engineered DNA based Hydrogel as a New Injectable Drug Delivery Platform: *Arghya Paul*¹; Sayantani Basu²; Settimio Pacelli²; ¹The University of Western Ontario; ²University of Kansas

10:10 AM Break

10:25 AM
Attachment Surface Energy as an Indicator for Adhesion of Nitrifying Bacteria: *Ting-Ting Chang*¹; Po-Yu Chen²; ¹Industrial Technology Research Institute; ²National Tsing Hua University

10:45 AM Invited
Biological Fate of Engineered Nanomaterials: Tracing Aggregation/degradation and Nanomaterial Dose In-vitro and In-vivo: *Sergio Moya*¹; ¹CIC biomaGUNE

11:15 AM Invited
Enzymes Grafted on Electrodes for Biofuel Cells: Lessons from Multiscale Modeling Approaches: *Sophie Sacquin-Mora*¹; Nicolas Bourassin¹; Marc Baaden¹; ¹Laboratoire de Biochimie Théorique, CNRS UPR9080; Institut de Biologie Physico-Chimique-Fondation Edmond de Rothschild, PSL Research University

11:45 AM
Inkjet Printed Nano-patterned Aptamer-based Sensors for Improved Optical Detection of Foodborne Pathogens: *Susana Diaz-Amaya*¹; Min Zhao¹; Li-Kai Lin¹; Carlos Ostos²; Jan Allebach¹; George Chiu¹; Amanda Deering¹; Lia Stanciu¹; ¹Purdue University; ²Universidad de Antioquia

ADVANCED MATERIALS

Bulk Metallic Glasses XVII — Alloy Development and Application II

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee - Knoxville; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Robert Maass, University of Illinois at Urbana-Champaign; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday AM | February 27, 2020
Cardiff | Marriott Marquis Hotel

Session Chairs: Jianzhong Jiang, Zhejiang University; Jan Schroers, Yale University

8:30 AM Invited
Thin Film Metallic Glass Broad-spectrum Mirror Coatings: Tatiana Tefanov¹; Harsha Maraka¹; Wim Sillekens²; *David Browne*¹; ¹University College Dublin; ²European Space Agency

8:50 AM Invited
Atomic Dynamics Evidence for Configuration Memory in Metallic Glasses: *Xiaodong Wang*¹; Tianding Xu¹; Qing Yu¹; Qingping Cao¹; Jianzhong Jiang¹; ¹Zhejiang University

9:10 AM

Effect of Tool Speeds on Joint Characteristics in Friction Stir Spot Joining Zr-based BMG to Al Alloy: *Jason Silberman*¹; Harry Chang¹; Danny Ventura¹; Kylie Dodge¹; David Yan¹; ¹San Jose State University

9:30 AM Invited

Measuring Metallic Glass Viscosities Over Wide Composition Ranges: *Sebastian Alexander Kube*¹; Will Polsky¹; Rodrigo Miguel Ojeda Mota¹; Kevin Ryan¹; Jan Schroers¹; ¹Yale University

9:50 AM Break

10:10 AM Invited

Solvent-rich Magnesium-based Bulk Metallic Glasses in the Mg–Pd–Ca and Mg–Pd–Yb Alloy Systems: *Sidra Jilani*¹; David Miskovic¹; Kevin Laws¹; ¹University of New South Wales

10:30 AM

Metallic Glasses for Space Mechanism Applications: *Andrew Murphy*¹; Rik Stewart²; Zahari Zlatev²; Martin Humphries³; Andrew Norman⁴; David Browne¹; ¹University College Dublin; ²Reliance Precision Limited; ³SpaceMech; ⁴European Space Agency

10:50 AM Invited

Nucleation of Shear Bands in Al-based Metallic Glasses and Their Composites: *Wan Kim*¹; Guen Hee Yoo¹; Eun Soo Park¹; John Perepezko²; ¹Seoul National University; ²University of Wisconsin-Madison

11:10 AM

Near-net Forming Complex Shaped Zr-based Bulk Metallic Glasses by High Pressure Die Casting: *LeHua Liu*¹; ¹South China University of Technology

ADVANCED MATERIALS

Bulk Metallic Glasses XVII — Structures and Modeling

Sponsored by: TMS Structural Materials Division, TMS:
Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee - Knoxville; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Robert Maass, University of Illinois at Urbana-Champaign; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday AM | February 27, 2020
Marina Ballroom G | Marriott Marquis Hotel

Session Chairs: Mo Li, Georgia Institute of Technology; Eun Soo Park, Seoul National University

8:30 AM Invited
Correlating Structural Heterogeneity to Properties of Metallic Glasses using Mesoscale Deformation Simulation Incorporating 4D-STEM: Pengyang Zhao¹; Soohyun Im¹; Geun Hee Yoo²; Eun Soo Park²; *Jinwoo Hwang*¹; Yunzhi Wang¹; ¹The Ohio State University; ²Seoul National University

8:50 AM Invited
Theoretical Strength and Prediction of Structural Defects in Metallic Glasses: Zhukun Zhou¹; Hao Wang²; *Mo Li*³; ¹Central South University; Georgia Institute of Technology; ²Shenzhen University; ³Georgia Institute of Technology,

9:10 AM Invited
The Physics of an Elemental Ag Glass: First Order Glass Transition and Melting: *Qi An*¹; William Johnson²; Konrad Samwer³; Sydney Corona⁴; William Goddard²; ¹University of Nevada, Reno; ²Caltech; ³University of Goettingen; ⁴California Institutue of Technology

9:30 AM
Molecular Dynamics Simulations of Iron-based Metallic Glasses during Spark Plasma Sintering: *Jordan Campbell*¹; Carlos Ruestes²; Tod Pascal¹; Olivia Graeve¹; ¹University of California, San Diego; ²National University of Cuyo

9:50 AM Invited
Pressure Induced Amorphization in Alloys: *Hongbo Lou*¹; Qiaoshi Zeng¹; ¹Center for High Pressure Science and Technology Advanced Research

10:10 AM Break

10:30 AM

Is Atomic Size-mismatch a Sufficient Condition to Yield Fragility in Bulk Metallic Glass Forming Liquids?: *Tina Mirzaei*¹; Zhichao Yu²; Jamie J.Kruzic³; P.Alex Greaney¹; ¹University of California, Riverside; ²Oregon State University; ³UNSW

10:50 AM

The Intriguing Structure of Marginal Glass Forming Alloys: *Tolga Han Ulucan*¹; Ilkay Kalay²; Yunus Kalay¹; ¹Middle East Technical University; ²Çankaya University

11:10 AM

Effect of Ni-Nb Metallic Glass on Moderating the Shock Damage in Crystalline Ni-amorphous Ni62Nb38 Nanocomposite Structure: A Molecular Dynamics Study: *K Vijay Reddy*¹; Snehanshu Pal¹; ¹National Institute of Technology Rourkela

11:30 AM

Local Structural Signature Underlying Thermally Activated Events in Metallic Glasses: *Jun Ding*¹; Mark Asta²; Robert Ritchie²; ¹Xi'an Jiaotong University; ²University of California, Berkeley

LIGHT METALS

Cast Shop Technology — Virtual Cast Shop and Specialties

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Johannes Morscheiser, Aleris Rolled Products Germany GmbH

Thursday AM | February 27, 2020
1B | San Diego Convention Ctr

Session Chair: Arnis Pelss, Aleris

8:30 AM Introductory Comments

8:35 AM

Digital Manufacturing for Foundries 4.0: Prateek Saxena¹; *Michail Papanikolaou*¹; Emanuele Pagone¹; Konstantinos Salonitis¹; Mark Jolly¹; ¹Cranfield University

9:00 AM
Integrating Fluid Simulation with Virtual Die Casting Machine for Industry 4.0 and Operator Training: *John Moreland*¹; John Estrada¹; Edwin Mosquera¹; Kyle Toth¹; Armin Silaen¹; Chenn Zhou¹; ¹Purdue University Northwest

9:25 AM
Numerical Simulation of Wire Rod Casting of AA1370 and AA6101 Alloys: *Dag Lindholm*¹; Shahid Akhtar²; Dag Mortensen¹; ¹Institute for Energy Technology; ²Hydro Aluminium

9:50 AM
Influence of Nozzle Shape on Near-surface Segregation Formation During Twin-roll Casting of Aluminum Strips: *Olexandr Grydin*¹; Mykhailo Stolbchenko¹; Mirko Schaper¹; ¹Materials Science, Paderborn University

10:15 AM
Influence of Alloying Additives on the Electrochemical Behavior of Cast Al-5Zn Alloy: Mohamed Moussa¹; Hoda Hussien¹; *Shimaa El-Hadad*¹; Madiha Shoeib¹; ¹Cmr di -Central Metallurgical Research Inst.

CHARACTERIZATION

Characterization of Minerals, Metals and Materials —
 Characterization of Electronic and Magnetic Materials

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Shadia Ikhmayies, Al Isra University; Yunus Kalay, Middle East Technical University; Jiann-Yang Hwang, Michigan Technological University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Army Research Laboratory

Thursday AM | February 27, 2020
Theater A-5 | San Diego Convention Ctr

Session Chairs: Shadia Ikhmayies, Al Isra University; Andrew Brown, Army Research Laboratory

8:30 AM

Using Thermo-Calc Software to Produce the Phase Diagram of Zn-Te System: *Shadia Ikhmayies*¹; ¹Al Isra University

8:50 AM

Epsilon to Tau Phase Transformation in MnAl Alloys: Ozgun Acar¹; Merve Genc Unalan¹; Ilkay Kalay²; *Yunus Kalay*¹; ¹Middle East Technical University; ²Çankaya University

9:10 AM

Structural and Magnetic Characterization of Magnetic Nanostructures in C_{2v} Thin Films Exhibiting the Anisotropic Dzyaloshinskii-Moriya Interaction: *Michael Kitcher*¹; Tim Mewes²; Claudia Mewes²; Marc De Graef¹; Vincent Sokalski¹; ¹Department of Materials Science and Engineering, Carnegie Mellon University; ²MINT Center/Department of Physics & Astronomy, University of Alabama

9:30 AM

Influence on the Structural and Magnetic Properties of the Pre-alloyed Gas-atomized Maraging Steel Powder During Mechanical Milling: Ganesh Varma Thotakura¹; Ramasis Goswami²; *Tanjore Jayaraman*¹; ¹University of Michigan-Dearborn; ²Naval Research Laboratory, US

9:50 AM Break

10:05 AM

Precipitate Characterization and Evolution in Grain Oriented Electrical Steel During High Temperature Coil Annealing: *Xukai Zhang*¹; Jamo Momand¹; Stefan Melzer²; Winfried Kranendonk²; Gert H. ten Brink¹; Bart J. Kooi¹; ¹University of Groningen; ²Tata Steel, IJmuiden

10:25 AM

Bending Fatigue Testing for Electronic Connectors: *David Snyder*¹; Larry Wojnicz¹; Michael Gedeon²; Chad Finkbeiner²; Chen Jidong³; ¹Molex LLC; ²Materion Corp.; ³Ningbo Powerway Alloy Material Co.

10:45 AM

Phase Diagram of In-P Binary System: *Shadia Ikhmayies*¹; ¹Al Isra University

11:05 AM

Temperature Dependence of Elastic Properties of Beryllium: *Boris Maiorov*¹; Jon Betts¹; Sky Sjue¹; Angus Lawson¹; Albert Migliori¹; ¹Los Alamos National Laboratory

Characterization of Minerals, Metals and Materials — Characterization of Polymers and Composites I

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Shadia Ikhmayies, Al Isra University; Yunus Kalay, Middle East Technical University; Jiann-Yang Hwang, Michigan Technological University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Army Research Laboratory

Thursday AM | February 27, 2020
Theater A-4 | San Diego Convention Ctr

Session Chairs: Sergio Monteiro, Military Institute of Engineering; Bowen Li, Michigan Technological University

8:30 AM
Quasi-plastic Zone Characterization of Regular and Si-doped Boron Carbide: Sisi Xiang¹; *Kelvin Xie*¹; ¹Texas A&M University

8:50 AM
Synthesis and Characterization of Ultra-hard Ceramic AlMgB14-based Materials Obtained from AlxMgy Intermetallic Powder and Boron Powder by the Spark Plasma Sintering: Ilya Zhukov¹; *Pavel Nikitin*¹; Alexander Vorozhtsov¹; Maxim Boldin²; ¹Tomsk State University; ²Lobachevsky State University of Nizhni Novgorod

9:10 AM
Microstructure Evolution of Additively Manufactured TiC Reinforced Graded Metal Matrix Composite: *Jianshen Wang*¹; Juan Escobedo-Diaz¹; Evgeny Morozov¹; Daniel East²; Kun Yang²; ¹University of New South Wales; ²Commonwealth Scientific and Industrial Research Organisation (CSIRO)

9:30 AM
Compressive Response of Ice-templated Ceramic-polymer Composites in Relation to Composition, Microstructure and Loading Orientation: *Dipankar Ghosh*¹; Sashanka Akurati¹; Justine Marine¹; ¹Old Dominion University

9:50 AM Break

10:05 AM

A Bibliometric Analysis of the Strategy and Performance Measurement of the Polymer Matrix Nanomaterials Development Scenario Globally and the Participation of Brazil: *Robson Costa*¹; *Esperidiana Moura*¹; ¹Nuclear and Energy Research Institute

10:25 AM

Evaluation of Biodiesel Obtained from Waste Cooking Oil Purified with A Modified Clay: *Christiano Giancesi Bastos Andrade*¹; *Melissa Rigue Shimba*¹; *Gabriela Souza Freitas*¹; *Leticia Mayumi Kobayashi*¹; *Samuel Marcio Toffoli*¹; *Francisco Rolando Valenzuela Diaz*¹; ¹Polytechnic School - University of Sao Paulo

CHARACTERIZATION

Characterization of Minerals, Metals and Materials — Characterization of Surface, Thin Films and Coatings

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Shadia Ikhmayies, Al Isra University; Yunus Kalay, Middle East Technical University; Jiann-Yang Hwang, Michigan Technological University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Army Research Laboratory

Thursday AM | February 27, 2020

11A | San Diego Convention Ctr

Session Chairs: Pasquale Spena, Politecnico di Torino; John Carpenter, Los Alamos National Laboratory

8:30 AM

Fatigue Resistance of Low Pressure Nitrided Cr-Mo Low Alloy Steels: *Donato Firrao*¹; *Enrico Morgano*²; *Graziano Ubertalli*¹; *Angelo Brunelli*³; *Davide Sabena*³; ¹Politecnico di Torino; ²Centro Ricerche Fiat; ³Tra.Ind

8:50 AM

Unloading Analysis for Indentation Fracture in Molecular Crystals: *Alexandra Burch*¹; *John Yeager*²; *David Bahr*¹; ¹Purdue University; ²Los Alamos National Laboratory

9:10 AM
Growth and Characterization of Metal Nanowhiskers: *Gunther Richter*¹; Wenting Huang¹; ¹Max Planck Institute for Intelligent Systems

9:30 AM
Three-Dimensional Characterization of Microstructure and Elemental Segregation of Thermal Spray Coatings: *Thomas Ivanoff*¹; Jonathan Madison¹; Nathan Moore¹; Aaron Olson¹; ¹Sandia National Laboratories

9:50 AM Break

10:05 AM
Advanced Approach in Investigating the Effects of Hydrogen Trapping on Fish-scaling Resistance of Enameled Steels: *Yi-Ting Lin*¹; Hung-Wei Yen¹; Lung-Ren Chiang²; ¹National Taiwan University; ²Iron and Steel R&D Department, China Steel Corporation

10:25 AM
A Differential Scanning Calorimetry Study of the Combustion Synthesis of Metal Hexaborides: *C. Ingram Vargas Consuelos*¹; Felix Monge¹; Arash Yazdani¹; Olivia Graeve¹; ¹University of California, San Diego

CORROSION

Coatings and Surface Engineering for Environmental Protection II — Corrosion Control Session III

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Arif Mubarak, PPG; Raul Rebak, GE Global Research; Rajeev Gupta, University of Akron; Tushar Borkar, Cleveland State University; Brian Okerberg, PPG Industries; Michael Mayo, PPG Industries

Thursday AM | February 27, 2020
19 | San Diego Convention Ctr

Session Chairs: Brian Okerberg, PPG Industries; Rajeev Gupta, University of Akron

8:30 AM Invited
Microstructure and Electrochemistry of Al-Rich Primer: *Shanshan Wang*¹; Xi Wang¹; Siva Palani²; Alan Rose²; Gerald Frankel¹; ¹The

Ohio State University; ²Corrdesa

8:50 AM Invited

The Effect of Surface Treatment on the Performance of a Zirconium-based Conversion Coating on AA7075 Automotive Alloys for Protection Against Filiform Corrosion: *Carol Glover*¹; Mary Lyn Lim²; John Scully¹; ¹University of Virginia; ²PPG Industries

9:10 AM Invited

Improved Corrosion Resistance of a Commercial Mg Alloy through Laser Assisted Surface Processing: *Saumyadeep Jana*¹; Zihua Zhu¹; Mark Engelhard¹; Danny Edwards¹; Aashish Rohatgi¹; Hongtao Ding²; ¹Pacific Northwest National Laboratory; ²The University of Iowa

9:30 AM Invited

Towards Designing and Discovering Novel Corrosion Inhibitors for Solution and Coating Applications: *Gavin Collis*¹; ¹CSIRO Manufacturing

9:50 AM

Understanding the Impact of Pigment Selection on the Properties of Electrodeposited Coatings: *Kevin Sylvester*¹; Corey DeDomenic¹; Egle Puodziukynaite¹; Fuduo Ma¹; ¹PPG Industries

10:10 AM Break

10:25 AM Invited

Phase-Field Modeling of Microstructural Effects on the Corrosion of Mg Alloys: *David Montiel*¹; Stephen DeWitt¹; Alexander Chadwick²; Katsuyo Thornton¹; ¹University of Michigan; ²Northwestern University

10:45 AM

Oxidation Behavior of TiAl Alloys and its Optimization by Deposition of Al-rich Coatings via Pack Aluminizing: *Lukas Mengis*¹; Anke Ulrich¹; Alexander Donchev¹; Mathias Galetz¹; ¹DECHEMA Research Institute

11:05 AM

Oxidation Behavior of Cold Spray Chromium Coatings on Zircaloy-4 in Steam Environments in 1100 °C to 1300 °C Temperature Range: *Hwasung Yeom*¹; Benjamin Maier¹; Greg Johnson¹; Tyler Dabney¹; Mia Lenling¹; Kumar Sridharan¹; ¹University of Wisconsin Madison

MATERIALS DESIGN

Computational Discovery and Design of Emerging Materials — Session V

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Arunima Singh, Arizona State University; Houlong Zhuang, Arizona State University; Sugata Chowdhury, National Institute of Standards and Technology; Arun Kumar Mannodi Kanakkithodi, Argonne National Laboratory

Thursday AM | February 27, 2020
32B | San Diego Convention Ctr

Session Chair: Houlong Zhuang, Arizona State University

8:30 AM Invited
Design of Metastable Materials: Heterostructural Alloys and Novel Nitrides: *Stephan Lany*¹; ¹National Renewable Energy Laboratory

9:00 AM
From Pentagonal Geometries to Two-dimensional Materials: *Houlong Zhuang*¹; *Lei Liu*¹; *Duo Wang*¹; ¹Arizona State University

9:20 AM
Computational Methodological Study of Mn(taa) Spin Crossover Compound: *Eric Fonseca*¹; *Daniel Rodriguez*¹; *Samuel Trickey*¹; *Richard Hennig*¹; ¹University of Florida

9:40 AM
First-principles Investigation of Dopants, Defects, and Defect Complexes in 2D Transition Metal Dichalcogenides: *Anne Marie Tan*¹; *Christoph Freysoldt*²; *Richard Hennig*¹; ¹University of Florida; ²Max-Planck-Institut für Eisenforschung GmbH

10:00 AM
Machine Learned Models for Transition Metal Dichalcogenide: *Henry Chan*¹; *Mathew Cherukara*¹; *Badri Narayanan*²; *Subramanian Sankaranarayanan*¹; ¹Argonne National Laboratory; ²University of Louisville

10:20 AM Break

10:35 AM Invited
Predicting Physical Properties of SiO2-based Glasses by Machine Learning: *Yong-Jie Hu*¹; *Ge Zhao*²; *Bo Liu*¹; *Yang Chen*¹; *Kerby Shedden*¹; *Liang Qi*¹; ¹University of Michigan; ²Pennsylvania State University

11:05 AM

Stable Structures of 2D Materials, Thin Films, and Surface Reconstructions on Substrates using an Evolutionary Algorithm Approach: *V S Chaitanya Kolluru*¹; Pushkar Ghanekar²; Jeffrey Greeley²; Richard Hennig¹; ¹University of Florida; ²Purdue University

11:25 AM

Landscape Study of Deformation Effects (cleave/shear) and Vacancies on the Structural Electronic and Mechanical Properties of MAX Phase Alloys: *Daniel Saucedo*¹; Prashant Singh¹; Raymundo Arroyave¹; ¹Texas A&M University

11:45 AM

Tuning Mechanical Behavior of Graphene: From Microscopic Defect Modeling to Macroscopic Property Prediction: *Bowen Zheng*¹; Grace Gu¹; ¹University of California, Berkeley

ENERGY & ENVIRONMENT

Computational Materials Science and Engineering of Materials in Nuclear Reactors — Multiscale Modeling I

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Dilpuneet Aidhy, University of Wyoming; Michael Tonks, University of Florida; Mahmood Mamivand, Boise State University; Giovanni Bonny, Belgian Nuclear Research Center

Thursday AM | February 27, 2020
Theater A-9 | San Diego Convention Ctr

Session Chairs: Alfredo Correa, Lawrence Livermore National Laboratory; Dilpuneet Aidhy, University of Wyoming

8:30 AM Invited

Electron-phonon Coupling Effects in Ion Irradiation of Metallic Systems: *Eva Zarkadoula*¹; German Samolyuk¹; William Weber²; ¹Oak Ridge National Laboratory; ²University of Tennessee

9:10 AM

First Principles Modeling of Ion Ranges in Self-irradiated Tungsten: *Andrea Sand*¹; *Rafi Ullah*²; Alfredo Correa²; ¹University of Helsinki; ²Lawrence Livermore National Laboratory

9:30 AM
First-principles Cluster Expansion Study of Fe and Mo Effects on Atomic Ordering in Ni-Cr Alloys: *Jia-Hong Ke*¹; Julie D. Tucker¹; ¹Oregon State University

9:50 AM
Modeling the Fracture of Zirconium at an Atomic Level and Analyzing the Effects of Temperature and Strain Rate on the Deformation Mechanisms: *Vlad Podgurschi*¹; Kailan Luo¹; Mark Wenman¹; ¹Imperial College London

10:10 AM Break

10:30 AM Invited
First Principles Modelling of the Role of Electrons in Collision Cascades in Solids: Artur Tamm¹; Magdalena Caro²; A. Caro³; *Alfredo Correa*¹; ¹Lawrence Livermore National Laboratory; ²Virginia Tech; ³George Washington University

11:10 AM
A Machine Learning Approach to Thermal Conductivity Modelling of Irradiated Nuclear Fuels: *Elizabeth Kautz*¹; Alexander Hagen¹; Jesse Johns¹; Douglas Burkes¹; ¹Pacific Northwest National Laboratory - PNNL

11:30 AM
Phase-field Simulation of Intergranular Fission Gas Bubble Growth in Uranium Silicide: *Larry Aagesen*¹; David Andersson²; Benjamin Beeler¹; Michael Cooper²; Kyle Gamble¹; Yinbin Miao³; Giovanni Pastore¹; Cody Permann¹; Michael Tonks⁴; ¹Idaho National Laboratory; ²Los Alamos National Laboratory; ³Argonne National Laboratory; ⁴University of Florida

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Data and High Throughput Methods I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Jorge Munoz, University of Texas at El Paso; Sara Kadkhodaei, University of Illinois at Chicago; Vahid Attari, Texas A&M University; James Morris, Ames Laboratory

Thursday AM | February 27, 2020
33C | San Diego Convention Ctr

Session Chair: Timothy Hartnett, University of Virginia

8:30 AM Invited

Exploring 2D Materials using Machine Learning Force Fields: *Xiaofeng Qian*¹; ¹Texas A&M University

9:00 AM

Bayesian Interference of Solid-liquid Interface Properties Out of Equilibrium Based on Phase-field and Molecular Dynamics Simulations: Munekazu Ohno¹; Yukimi Oka¹; Shinji Sakane²; *Tomohiro Takaki*²; Yasushi Shibuta³; ¹Hokkaido University; ²Kyoto Institute of Technology; ³The University of Tokyo

9:20 AM

Thermal Phenomena in Covalently Bonded Systems Modeled via Physically Informed Neural Network Potentials: *James Hickman*¹; Ganga Purja Pun²; Francesca Tavazza¹; Yuri Mishin²; ¹National Institute of Standards and Technology; ²George Mason University

9:40 AM Invited

Materials Design in High Dimensional Chemical and Structural Configuration Spaces: *Joerg Neugebauer*¹; Jan Janssen¹; Liam Huber¹; Yuji Ikeda¹; Fritz Koermann¹; Blazej Grabowski²; Tilmann Hickel¹; Alexander Shapeev³; ¹Max-Planck-Institut fuer Eisenforschung; ²University of Stuttgart; ³Skoltech

10:10 AM Break

10:25 AM Invited

Multi Cell Monte Carlo Method for Phase Prediction: *Maryam Ghazisaeidi*¹; You Rao¹; Wolfgang Windl¹; Changning Niu²; ¹Ohio State University; ²QuesTek Innovations LLC

10:55 AM

Prediction of Formable Apatites using Machine Learning and Density Functional Theory: *Timothy Hartnett*¹; Mukil Ayyasamy¹; Prasanna Balachandran¹; ¹University of Virginia

11:15 AM

First-principles Methods to Elucidate the High-temperature Thermodynamics of Multicomponent Alloys: *Anirudh Raju Natarajan*¹; Pavel Dolin¹; Anton Van der Ven¹; ¹University of California, Santa Barbara

11:35 AM Invited

MS-CRADLE: A Tool for Developing Corrosion Resistant HEAs for Molten Salt Technologies: *Thien Duong*¹; Xiaoli Yan²; Santanu Chaudhuri¹; ¹Argonne National Laboratory; ²University of Illinois

at Chicago

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Transitions at Grain Boundaries VII — Mesoscale Characterization and Simulation of Polycrystal Deformation

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Shen Dillon, University of Illinois; Douglas Spearot, University of Florida; Jian Luo, University of California, San Diego; Jennifer Carter, Case Western Reserve University

Thursday AM | February 27, 2020
5B | San Diego Convention Ctr

Session Chairs: Zachary Cordero, Rice University; Thomas Bieler, Michigan State University

8:30 AM
Bridging the Gap Between Grain Boundary Experiments and Simulations via Engineered Oligocrystals: Zachary Cordero¹; Logan Ware¹; ¹Rice University

8:50 AM
Characterization of Strain at Twin Boundaries in Ni-base Superalloys via Dark Field X-ray Microscopy: Sven Gustafson¹; Wolfgang Ludwig²; Paul Shade³; Diwakar Naragani¹; Darren Pagan⁴; Michael Sangid¹; ¹Purdue University; ²European Synchrotron Radiation Facility; ³Air Force Research Laboratory; ⁴Cornell High Energy Synchrotron Source

9:10 AM
Slip bands in Ni-base Superalloys: A Crystal Plasticity Study Informed by Digital Image Correlation: Marat Latypov¹; Jean-Charles Stinville¹; Jonathan Hestroffer¹; Marie-Agathe Charpagne¹; Tresa Pollock¹; Irene Beyerlein¹; ¹University of California, Santa Barbara

9:30 AM
Relationship Between Microstructure and Mechanical Properties of Super Duplex Stainless Steel: Mohammed Ali Lakhdari¹; Hugo Van-landeghem²; Florent Krajcarz³; Guilhem Martin²; Laurent

Delanny⁴; Jean-Denis Mithieux³; Muriel Veron²; ¹Aperam / SIMaP; ²SIMaP; ³Aperam; ⁴Université catholique de louvain

9:50 AM

Strain Localization and Martensitic Transformations at Shear Bands in a Low Stacking Fault Energy Austenitic Stainless Steel: *Douglas Medlin*¹; J. Sabisch¹; C. San Marchi¹; J. Ronevich¹; ¹Sandia National Laboratories

10:10 AM Break

10:30 AM

Influence of Crystal Orientation and Berkovich Tip Rotation on the Mechanical Characterization of Grain Boundaries in Molybdenum: *Verena Maier-Kiener*¹; Severin Jakob¹; Helmut Clemens¹; Reinhard Pippan²; ¹Montanuniversität Leoben; ²Austrian Academy of Sciences

10:50 AM

A Crystal-plasticity Modeling Framework to Study Effect of Grain Size on Mechanical Response of Open-cell Aluminum Foam: *Dongfang Zhao*¹; Kristoffer Matheson¹; Brian Phung¹; Michael Czabaj¹; Ashley Spear¹; ¹University of Utah

11:10 AM

A Multiphysics, Mesoscale Framework to Predict the Creep-fatigue Life of Engineering Polycrystalline Alloys: *Andrea Rovinelli*¹; Mark Messner¹; David Parks²; T.L. Sham¹; ¹Argonne National Laboratory; ²Massachusetts Institute of Technology

11:30 AM

Characterization and Modeling of the Microstructure-scale Strain Distributions in an Aluminum Alloy Under Multiple Strain Paths: Baran Guler¹; Ulke Simsek¹; Tuncay Yalcinkaya¹; *Mert Efe*¹; ¹Middle East Technical University

11:50 AM

Anisotropy Grading Effects on Strength and Ductility: *S. Mohadeseh Taheri-Mousavi*¹; Dingshun Yan²; C. Cem Tasan¹; ¹Massachusetts Institute of Technology; ²Chinese Academy of Sciences

CORROSION

Environmental Degradation of Additively Manufactured Alloys — Environmental Assisted Cracking, Material Degradation in Irradiated Environments

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Kinga Unocic, Oak Ridge National Laboratory; Luke Brewer, University of Alabama; Sebastien Dryepondt, Oak Ridge National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Jenifer Locke, Ohio State University; Xiaoyuan Lou, Auburn University

**Thursday AM | February 27, 2020
7A | San Diego Convention Ctr**

Session Chairs: Michael Kirka, Oak Ridge National Laboratory; Xiaoyuan Lou, Auburn University

8:30 AM Invited
Stress Corrosion Cracking and Corrosion-fatigue Behavior of Additively Manufactured 17-4PH: *James Burns*¹; *Trevor Shoemaker*¹;
¹University of Virginia

8:55 AM
Stress Corrosion Cracking Growth Behavior of Additively Manufactured Alloy 800H in High Temperature Water: *Jingfan Yang*¹; *Miao Song*²; *Raul Rebak*³; *Xiaoyuan Lou*¹; ¹Auburn University; ²University of Michigan Ann Arbor; ³GE Global Research

9:15 AM
Stress Corrosion Cracking Susceptibility of Additively Manufactured 2xxx-series Aluminum Alloys Produced by Selective Laser Melting (SLM): *Kevin Chasse*¹; *Preet Singh*²; *Jamshad Mahmood*²; *Crosby Owens*¹; *Michael Van Order*¹; ¹Northrop Grumman Systems Corporation; ²Georgia Institute of Technology

9:35 AM
On the Implication of Strain Localization on the Fatigue Crack Propagation Under Hydrogen Pressure of LBM Inconel 718: *Abdelali Oudriss*¹; *Simon Puydebois*²; *Pierre Bernard*³; *Laurent Briottet*²; *Xavier Feaugas*¹; ¹Université de La Rochelle - Lasie; ²CEA LITEN; ³Ariane Group

9:55 AM
Environmental Effects on the Stress Corrosion Cracking Behavior of an Additively Manufactured Stainless Steel: *Jonathan Pegues*¹; *Michael Roach*²; *Nima Shamsaei*¹; ¹Auburn University; ²University of Mississippi Medical Center

10:15 AM Break

10:35 AM Invited

SCC and IASCC of Printed 316L for Use in the Nuclear Industry: *Michael Mcmurtrey*¹; Xiaoyuan Lou²; Gary Was³; ¹Idaho National Laboratory; ²Auburn University; ³University of Michigan

11:00 AM Invited

Additive Manufacturing (AM) of Steels for Extreme Environments- Opportunities and Challenges: *Niyanth Sridharan*¹; Theresa Mary Green²; Stephen Taller²; Kevin Field¹; ¹Oak Ridge National Laboratory; ²University of Michigan Ann arbor

11:25 AM

Comparison of Voids Swelling in Additively Manufactured and Cold-worked 316L SSs After Self-ion Irradiations at Elevated Temperatures: *Miao Song*¹; Li Jiang¹; Youxing Chen²; Xiaoyuan Lou³; ¹University of Michigan; ²University of North Carolina, Charlotte; ³Auburn University

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Environmental Embrittlement, Fracture, and Fatigue

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Bai Cui, University of Nebraska-Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Jenifer Locke, Ohio State University

Thursday AM | February 27, 2020
2 | San Diego Convention Ctr

Session Chairs: Jenifer Locke, The Ohio State University; Matthew Steiner, University of Cincinnati

8:30 AM Invited

Effects of Complex Atmospheric Environments on the Corrosion Fatigue of AA7085-T7451: Brandon Free¹; Sarah Galyon Dorman²; Jason Niebuhr²; *Jenifer Locke*¹; ¹Fontana Corrosion Center, The Ohio State University; ²SAFE Inc.

9:10 AM

Microstructural Relationships to both Directional and Bulk Sensitization Responses in 5XXX Series Aluminum Alloys: *Matthew*

Steiner¹; Likun Sun¹; ¹University of Cincinnati

9:30 AM

Tribocorrosion Resistance of Aluminum Alloys: The Effects of Scratching Frequency and Anodic Polarization: *Jia Chen*¹; Wenjun Cai¹; ¹Virginia Polytechnic Institute and State University

9:50 AM

Role of Chloride on the Fracture Behaviour of Micro-alloyed Steel in E20 Simulated Fuel Ethanol Environment: *Olufunmilayo Joseph*¹; John Ade Ajayi²; Cleophas Loto¹; Seetharaman Sivaprasad³; Himadri Bar³; ¹Covenant University; ²Federal University of Technology, Akure; ³CSIR-National Metallurgical Laboratory

10:10 AM Break

10:30 AM

Microstructure Dependent Penetration and Recrystallization of Zinc by Gallium Based Liquid Metal Alloys: *Justin Norkett*¹; Alec Chu²; Courtney Wiley²; Kit Manchette²; Victoria Miller¹; ¹University of Florida; ²North Carolina State University

10:50 AM

Environmental Assisted Deterioration Modeling of Large Glass Fiber Reinforced Polymer Composite Structures/Systems: *Zhiye Li*¹; Michael Lepech¹; ¹Stanford University

11:10 AM

Stress Corrosion Cracking Assisted by Oxygen Embrittlement in Ti-6246: *Yitong Shi*¹; Sudha Joseph¹; Paraskevas Kontis²; Yanhong Chang²; Baptiste Gault²; David Dye¹; ¹Imperial College London; ²Max Planck Institute for Iron Research

11:30 AM

Corrosion and Interstitial Triggered Grain Boundary Embrittlement of Al Alloys: *Quanmei Guan*¹; Jing Sun¹; Haisheng Wang¹; Chengxiong Zou²; William Yi Wang²; Jijun Ma¹; ¹CRRC Tangshan Co.; ²Northwestern Polytechnical University

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Hydrogen Embrittlement II

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Bai Cui, University of Nebraska-Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Jenifer Locke, Ohio State University

Thursday AM | February 27, 2020
Theater A-10 | San Diego Convention Ctr

Session Chairs: Joshua Kacher, Georgia Institute of Technology; Kaila Bertsch, Lawrence Livermore National Laboratory

8:30 AM Invited
Mechanistic Model for Fatigue Crack Growth in the Presence of Hydrogen: *Seyedehzahra Hosseinisarani*¹; Mohsen Dadfarnia²; Masanobu Kubota³; Akihide Nagao³; Brian Somerday³; Petros Sofronis¹; Robert Ritchie⁴; ¹Kyushu University; University of Illinois at Urbana-Champaign; ²Kyushu University; Seattle University; ³Kyushu University; ⁴Kyushu University; University of California, Berkeley

9:10 AM
First-principles Investigation of Hydrogen Trapping in Chemistry Dependent Vacancies of FeCrNiAlloys: *Patrick Thomas*¹; Benjamin Sikora¹; ¹Honeywell

9:30 AM
Crystal Plasticity Modeling of Hydrogen Concentration Ahead of a Crack Tip in FCC Steel: *Theodore Zirkle*¹; Tang Gu¹; Ben Anglin²; Clint Geller³; David McDowell¹; ¹Georgia Tech; ²Naval Nuclear Laboratory; ³Naval Nuclear Laboratory

9:50 AM
Elucidating the Loading Rate Dependence of Hydrogen Environment-assisted Cracking Behavior in a Ni-Cu Superalloy: *Zachary Harris*¹; Erin Dubas¹; Allison Popernack¹; Brian Somerday²; James Burns¹; ¹University of Virginia; ²Independent Consultant

10:10 AM Break

10:30 AM
Comparison of Fracture Morphologies and Hydrogen States Present in Vicinity of Fracture Surface Obtained by Different Methods of Evaluating Hydrogen Embrittlement of DP and TRIP Steels: *Daichi Asari*¹; Kenichi Takai¹; Satoshi Mizokami²; Mitsugi Fukahori²; ¹Sophia University; ²Mazda Motor Corporation

10:50 AM
Comparison Study on the Hydrogen Embrittlement Susceptibility of High Hardness Steels: *William Williams*¹; David Salley¹; Haley Doude¹; Wilburn Whittington¹; David Wipf²; Krista Limmer³; Daniel Field³; Kevin Doherty³; Hongjoo Rhee¹; ¹Center for Advanced Vehicular Systems; ²Mississippi State University; ³US Army Research Lab

11:10 AM
Crack Initiation and Propagation Analyses of Hydrogen-related Fracture Surfaces of Tempered Martensitic Steel: *Takahiro Chiba*¹; Takashi Yasukawa¹; Kenichi Takai¹; ¹Sophia University

11:30 AM
Effect of Local Austenite-to-martensite Transformation on Hydrogen Embrittlement of Cold-rolled Medium Mn Steel: *Jun Zhang*¹; Zhigang Yang¹; Chi Zhang¹; Hao Chen¹; ¹Tsinghua University

SPECIAL TOPICS

Frontiers of Materials Award Symposium: Machine Learning and Autonomous Researchers for Materials Discovery and Design — Session I

Program Organizer: Keith Brown, Boston University

Thursday AM | February 27, 2020
4 | San Diego Convention Ctr

Session Chair: Brian DeCost, National Institute of Standards and Technology

8:30 AM Invited
Adaptive Machine Learning for Efficient Navigation of Materials Space: *Prasanna Balachandran*¹; ¹University of Virginia

9:10 AM Invited
Unraveling Hierarchical Materials using Autonomous Research Systems: *Keith Brown*¹; ¹Boston University

9:50 AM Break

10:10 AM Invited
Combining Simulation and Autonomous Experimentation for Mechanical Design: *Aldair Gongora*¹; ¹Boston University

10:50 AM Invited
Closing the Loop in Autonomous Materials Development: *Kristofer Reyes*¹; ¹University at Buffalo- the State University of New York

11:30 AM Invited
Bayesian Methods for Concrete Creep Prediction and Learning Optimized Concrete Microstructure Design: *Mija Helena Hubler*¹; ¹University of Colorado Boulder

ADVANCED MATERIALS

High Entropy Alloys VIII — Modeling and Machine Learning

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday AM | February 27, 2020
Marina Ballroom E | Marriott Marquis Hotel

Session Chairs: Wei Chen, Illinois Institute of Technology; Baldur Steingrimsson, Imagars LLC

8:30 AM Invited
Atomistic Simulations of Dislocations and Deformation in FCC Ni-based Binary Concentrated Alloys: *Haixuan Xu*¹; Liubin Xu¹; Jaswanth Bommidi¹; ¹University of Tennessee Knoxville

8:50 AM Invited
Machine-learning Driven Efficient Exploration of the High Entropy Alloy Phase Space: *Raymundo Arroyave*¹; ¹Texas A&M University

9:10 AM Invited
Characteristics of Edge Dislocations and their Glide in FCC NiCoFe and NiCoFeCu Equiatomic Solid Solution Alloys: *Wei Li*¹; Satish Rao¹; Jaafar El-Awady¹; ¹Johns Hopkins University

9:30 AM
Origins of Excellent Passivation in Multiple Principle Element Alloys: *John Scully*¹; Angela Gerard¹; Carol Glover¹; Kang Wang¹; Bi-Cheng Zhou¹; Prasanna Balachandran¹; Gerald Frankel²; Pin Lu³; James Saal³; Daniel Schreiber⁴; Joseph Poon¹; Sean Agnew¹;

¹University of Virginia; ²Ohio State University; ³QuesTek Innovations LLC; ⁴Pacific Northwest National Laboratory

9:50 AM Invited

Connecting Chemical and Structural Order in High Entropy Alloys: Daniel Foley¹; James Hart¹; Elaf Anber²; Robert Ritchie³; Andrew Minor³; Mark Asta³; Flynn Walsh³; Michael Titus⁴; Jean-Philippe Couzinie⁵; *Mitra Taheri*¹; ¹Johns Hopkins University; ²Drexel University; ³University of California, Berkeley/Lawrence Berkeley National Laboratory; ⁴Purdue University; ⁵University Paris-Est Créteil (UPEC)

10:10 AM Break

10:30 AM

Unravelling Sluggish Diffusion of High-entropy Alloys through Machine Learning Methods: *S. Mohadeseh Taheri-Mousavi*¹; S. Sina Moeini-Ardakani¹; Ryan Penny¹; Ju Li¹; A. John Hart¹; ¹Massachusetts Institute of Technology

10:50 AM

Nanoscale Deformation Twinning in CrCoNi Medium-entropy Alloy Investigated by Molecular Dynamics Simulation: *Jun Ding*¹; Mark Asta²; Robert Ritchie²; ¹Xi'an Jiaotong University; ²University of California, Berkeley

11:10 AM Invited

Materials Fingerprint Classification: *Vasileios Maroulas*¹; Adam Spannaus¹; David Keffer¹; Kody Law²; Farzana Nasrin¹; Cassie Micucci¹; Peter Liaw¹; Piotr Luszczek¹; Louis Santodonato³; ¹University of Tennessee; ²University of Manchester; ³Advanced Research Systems, Inc.

11:30 AM Invited

Machine Learning for Accelerating the Design of Additively-manufactured Turbine Blades Yielding Ultra-high Energy Efficiency: Xuesong Fan¹; *Baldur Steingrimsen*²; Duckbong Kim³; Peter Liaw¹; ¹University of Tennessee; ²Imagars LLC; Portland State University; ³Tennessee Tech University

11:50 AM Invited

Quantifying Short-range Ordering in Refractory High-entropy Alloys: *Wei Chen*¹; George Kim¹; Chanhoo Lee²; Peter Liaw²; ¹Illinois Institute of Technology; ²University of Tennessee

ADVANCED MATERIALS

High Entropy Alloys VIII — Structures and Modeling I

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday AM | February 27, 2020
Mission Hills | Marriott Marquis Hotel

Session Chairs: Michael Gao, National Energy Technology Laboratory; James Morris, Ames Laboratory

8:30 AM Invited
First-principles Methods of Calculating Stacking Fault Energies in Refractory BCC High-entropy Alloys: *Chelsey Hargather*¹; Joshua Strother¹; ¹New Mexico Institute of Mining and Technology

8:50 AM Invited
Compositional Design and Deformation Behavior in Ni-based Concentrated/HEA Alloys: *Ridwan Sakidja*¹; Wai-Yim Ching²; ¹Missouri State University; ²University of Missouri-Kansas City

9:10 AM Invited
Emerging Computational Tools for Exploring the Refractory Compositionally Complex Alloys: *Christopher Woodward*¹; Satish Rao²; Edwin Antillon²; Brahim Akdim²; Triplicane Parthasarathy²; Daniel Miracle¹; Oleg Senkov²; ¹Air Force Research Laboratory; ²UES Inc.

9:30 AM Invited
Ab Initio Phase Stabilities of High Entropy and Chemically Complex Alloys: Yuji Ikeda¹; Prashanth Srinivasan²; Biswanath Dutta²; Jörg Neugebauer¹; Blazej Grabowski³; Tatiana Kostuchenko⁴; Alexander Shapeev⁴; *Fritz Koermann*²; ¹Max-Planck-Institut für Eisenforschung GmbH; ²Tu Delft; ³University of Stuttgart; ⁴Skoltech

9:50 AM
Deformation-induced Crystalline to Amorphous Phase Transformation in High-entropy Alloys: *Dengke Chen*¹; Yin Zhang¹; Hao Wang²; Xiaozhou Liao²; Ting Zhu¹; ¹Georgia Institute of Technology; ²The University of Sydney

10:10 AM Break

10:30 AM Invited

Small-scale Mechanical Behavior of Single Phase and Complex High Entropy Alloys: Saideep Muskeri¹; Vahid Hasannaeimi¹; Maryam Sadeghilaridjani¹; *Sundeep Mukherjee*¹; ¹University of North Texas

10:50 AM Invited

Stability of Al-Li-Ti-Sc-Mg High Entropy Alloys from Monte Carlo Simulations: James Morris¹; *Eva Zarkadoulas*²; M. Claudia Troparevsky²; Andreas Kulovits³; ¹Ames Laboratory; ²Oak Ridge National Laboratory; ³Arconic Inc.

11:10 AM Invited

Atomistic Simulations of the fcc-to-hcp Phase Transformation in the Equiatomic CoCrFeMnNi Alloy under High Compression: *Chin-Lung Kuo*¹; ¹National Taiwan University

11:30 AM Invited

Data-driven Design of High-entropy Alloys: *Houlong Zhuang*¹; Wenjiang Huang¹; Duo Wang¹; ¹Arizona State University

11:50 AM Invited

The Stacking Fault Energies of FCC High-entropy Alloys: An ab initio Study: *Zongrui Pei*¹; Jeffrey Hawk¹; David Alman¹; Michael Gao¹; ¹National Energy Technology Laboratory

ADVANCED MATERIALS

High Entropy Alloys VIII — Synthesis and Alloy Development

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday AM | February 27, 2020

Marina Ballroom F | Marriott Marquis Hotel

Session Chairs: William Curtin, Epfl Sti Igm Lammm; Wai-Yim Ching, University of Missouri

8:30 AM Invited
Theory for Yield Strength of BCC HEAs: *William Curtin*¹; Francesco Maresca¹; ¹Epfl Sti Igm Lammm

8:50 AM Invited
High Entropy Alloy Nanomaterials as Filler Materials for Brazing Ni-based Superalloys: *Anming Hu*¹; Benjamin Nielsen¹; Denzel Bridges¹; Raymond Xu¹; Zhili Feng¹; Peter Liaw¹; ¹University of Tennessee

9:10 AM Invited
Electronic Descriptors for Designs of Chemically Complex Transition-metal Alloys: Yong-Jie Hu¹; Xiaofeng Qian²; *Liang Qi*¹; ¹University of Michigan; ²Texas A&M University

9:30 AM Invited
Formability Enhancement of High-entropy Alloy by Manipulation of Stacking Fault Energy: Jeong-Won Yeh¹; Chanyang Kim¹; Kook Noh Yoon¹; Hyun Seok Oh¹; Myoung-Gyu Lee¹; *Eun Soo Park*¹; ¹Seoul National University

9:50 AM Invited
Exceptional Strength-ductility Combination in an FCC Based High Entropy Alloy: *Bharat Gwalani*¹; Sriswaroop Dasari²; Vishal Soni²; Shivakant Shukla²; Abhinav Jagetia²; Priyanshi Agrawal²; Rajiv Mishra²; Rajarshi Banerjee²; ¹Pacific Northwest National Laboratory; ²University of North Texas

10:10 AM Break

10:30 AM Invited
Electroplating Nanocrystalline Medium and High-entropy Alloys: Lianbo Wang¹; Michel Hache¹; *Yu Zou*¹; ¹University of Toronto

10:50 AM Invited
Thermal Transport Calculation of High Entropy Alloys for Thermoelectric Applications: *Seungha Shin*¹; Md Abdullah Al Hasan¹; Jiaqi Wang¹; Yu-Kai Weng¹; Dustin Gilbert¹; ¹University of Tennessee

11:10 AM Invited
Theory of Formation of High Entropy Alloys for Biomedical Applications: *Wai-Yim Ching*¹; Saro San¹; Jamieson Brecht²; Ridwan Sakidja³; Miqin Zhang⁴; Peter Liaw²; ¹University of Missouri; ²University of Tennessee; ³Missouri State University; ⁴University of Washington; ⁵University of Tennessee

ICME Gap Analysis in Materials Informatics: Databases, Machine Learning, and Data-Driven Design — Session III

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: James Saal, Citrine Informatics; Carelyn Campbell, National Institute of Standards and Technology; Raymundo Arroyave, Texas A&M University

Thursday AM | February 27, 2020
30D | San Diego Convention Ctr

Session Chair: James Saal, Citrine Informatics

8:30 AM Invited
Machine Learning to Predict Oxidation Behavior of High-temperature Alloys: *Dongwon Shin*¹; Rishi Pillai¹; Jian Peng¹; Marie Romedenne¹; Bruce Pint¹; J. Haynes¹; ¹Oak Ridge National Laboratory

9:10 AM Invited
Discovering and Navigating Gaps and Connections in Data for Materials Design: *Krishna Rajan*¹; ¹University at Buffalo- State University of New York

9:50 AM
Machine Learning for Materials Science: Open, Online Tools in NanoHUB: *Juan Verduzco*¹; Saaketh Desai¹; Alejandro Strachan¹; Tanya Faltens¹; ¹Purdue University

10:10 AM Break

10:30 AM
Automated Data Curation for Electron Microscopy Using the Materials Data Facility: *Charudatta Phatak*¹; Jonathon Gaff²; Ian Foster¹; Ben Blaiszik²; ¹Argonne National Laboratory; ²University of Chicago

10:50 AM
Uncertainty Quantification and Propagation in ICME Enabled by ESPEI: *Brandon Bocklund*¹; Richard Otis²; Zi-Kui Liu¹; ¹Pennsylvania State University; ²Jet Propulsion Laboratory, California Institute of Technology

11:10 AM

Computational Classification, Generation and Time-evolution Prediction of Alloy Microstructures with Deep Learning: *Fei Zhou*¹; ¹Lawrence Livermore National Laboratory

11:30 AM

Predicting Electronic Density of States of Nanoparticles by Principal Component Analysis and Crystal Graph Convolutional Neural Network: Kihoon Bang¹; Byung Chul Yeo²; Doosun Hong¹; Donghun Kim²; Sang Soo Han²; *Hyuck Mo Lee*¹; ¹Korea Advanced Institute of Science and Technology; ²Korea Institute of Science and Technology

LIGHT METALS

Magnesium Technology 2020 — Solidification and Production of Magnesium

Sponsored by: TMS Light Metals Division, TMS: Magnesium Committee

Program Organizers: J. Brian Jordon, University of Alabama; Victoria Miller, University of Florida; Vineet Joshi, Pacific Northwest National Laboratory; Neale Neelameggham, IND LLC

Thursday AM | February 27, 2020
6C | San Diego Convention Ctr

Session Chairs: Neale Neelameggham, IND LLC; Yuan Yuan, Chongqing University

8:30 AM Invited

Thermodynamic Description and Thermophysical Properties of Mg-Gd Alloys and Quantitative Phase-field Simulation of their Solidification Process: *Lijun Zhang*¹; ¹Central South University

9:00 AM

Investigation and Modeling of the Influence of Cooling Rates on the Microstructure of AZ91 Alloys: Sarkis Gavras¹; Muhammad Umer Bilal¹; Domonkos Tolnai¹; *Norbert Hort*¹; ¹Magic, Helmholtz-Zentrum Geesthacht

9:20 AM

The Independent Effects of Cooling Rate and Na Addition on Hydrogen Storage Properties in Hypo-eutectic Mg Alloys: *Manjin Kim*¹; Yahia Ali¹; Stuart McDonald¹; Trevor Abbott²; Kazuhiro Nogita¹; ¹The University of Queensland; ²Magontec Ltd.; The University of Queensland

9:40 AM

Producing High Purity Magnesium (99.99%) Directly by Pidgeon Process: *Bo Yang*¹; *Fei Liu*¹; *Bo-Yu Liu*¹; *Zhi-Min Chang*¹; *Lu-Yao Mao*¹; *Jiao Li*¹; *Zhi-Wei Shan*¹; ¹*Xi'an Jiaotong University*

10:00 AM Break

10:20 AM

Research on Properties of Prefabricated Pellets of Silicothermic Process After Calcination in Flowing Argon Atmosphere: *Junhua Guo*¹; *Zhang Tingan*¹; *Daxue Fu*¹; *Jibiao Han*¹; *Zonghui Ji*¹; *Zhihe Dou*¹; ¹*Northeastern University*

10:40 AM

Producing Pure Magnesium Through Silicothermic under the Atmospheric Pressure: *Fei Liu*¹; *Bo Yang*¹; *Bo-Yu Liu*¹; *Jiao Li*¹; *Zhi-Min Chang*¹; *Zhi-Wei Shan*; ¹*Xi'an Jiaotong University*

11:00 AM

Effect of Temperature on Magnesium Vapor Condensation in Inert Carrier Gas: *Jibiao Han*¹; *Zhang Tingan*¹; *Daxue Fu*¹; *Junhua Guo*¹; *Zonghui Ji*¹; *Zhihe Dou*¹; ¹*Northeastern University*

11:20 AM

Thermodynamic Descriptions of the Quaternary Mg-Al-Zn-Sn System and Their Experimental Validation: *Ting Cheng*¹; *Lijun Zhang*¹; ¹*Central South University*

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — Corrosion II

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Stephen Raiman, Oak Ridge National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Michael Short, Massachusetts Institute of Technology; Kumar Sridharan, University of Wisconsin-Madison; Nathaniel Hoyt, Argonne National Laboratory

Thursday AM | February 27, 2020

Theater A-6 | San Diego Convention Ctr

Session Chair: Kumar Sridharan, University of Wisconsin-Madison

8:30 AM Invited
Materials and Chemistry Research for Fluoride Cooled High Temperature Reactors: *Alan Kruizenga*¹; Micah Hackett¹; George Young¹; Michael Hanson¹; Augustus Merwin¹; Francesco Carotti¹; ¹Kairos Power

9:00 AM
Effect of Europium Fission Product on Chromium Solubility in Molten KCl-MgCl₂ Salt: *Dino Sulejmanovic*¹; Stephen Raiman¹; James Kurley¹; ¹Oak Ridge National Laboratory

9:20 AM
Non-galvanic Mass Transport in Molten Fluoride Salt Isothermal Corrosion Cells: *Cody Falconer*¹; William Doniger¹; Evan Buxton¹; Mohamed Elbakshwan¹; Kumar Sridharan¹; Adrien Couet¹; ¹University of Wisconsin - Madison

9:40 AM
First Principles Investigation of Surface Behavior in Ni-Cr Alloy in Molten Salt Systems: *Jacob Startt*¹; Stephen Raiman²; Chaitanya Deo¹; ¹Georgia Insitiute Of Technology; ²Oak Ridge National Laboratory

10:00 AM
Advanced Characterization of Corrosion Behavior of Metals in Molten Chloride Salts: *Lingfeng He*¹; Arthur Ronne²; Simerjeet Gill³; Kotaro Sasaki³; Yi Xie¹; Yachun Wang¹; Phillip Halstenberg⁴; Dmitriy Dolzhenikov⁴; Yu-chen Karen Chen-Wiegart²; Shannon Mahurin⁴; ¹Idaho National Laboratory; ²Stony Brook University; ³Brookhaven National Laboratory; ⁴Oak Ridge National Laboratory

10:20 AM Break

10:40 AM
Improving the Corrosion Resistance of Ferritic-martensitic Steels in Molten Nitrate Salt via Diffusion Coatings for Concentrated Solar Power Applications: *Ceyhun Oskay*¹; Tobias Meißner¹; Benjamin Grégoire¹; Alexander Bonk²; Mathias Galetz¹; ¹DECHEMA-Forschungsinstitut; ²German Aerospace Center (DLR)

11:00 AM
First Steps Towards Predicting the Corrosion Rates of Structural Materials in Molten Salts: *Rishi Pillai*¹; Stephen Raiman¹; Bruce Pint¹; ¹Oak Ridge National Laboratory

11:20 AM
Mechanistic Understanding of Molten Salt Corrosion Using Electron Paramagnetic Resonance: *James Kurley*¹; Juho Lehmusto²; Dino Sulejmanovic¹; James Keiser¹; Stephen Raiman¹; ¹Oak Ridge National Laboratory; ²Abo Akademi University

MATERIALS DESIGN

Materials Design Approaches and Experiences V — Ferrous Alloys I

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Akane Suzuki, GE Research; Ji-Cheng Zhao, University of Maryland; Michael Fahrmann, Haynes International; Qiang Feng, University of Science and Technology Beijing; Michael Titus, Purdue University

Thursday AM | February 27, 2020
33A | San Diego Convention Ctr

Session Chairs: Matthias Militzer, University of British Columbia; Govindarajan Muralidharan, Oak Ridge National Laboratory

8:30 AM Invited
Genomic Materials Design: Making CyberSteels Fly: *Gregory Olson*¹; ¹Northwestern University

9:00 AM Invited
Development of Cast Alumina-forming Austenitic Stainless Steels and their Implementation In High Temperature Industrial Applications: *Govindarajan Muralidharan*¹; Yukinori Yamamoto¹; Michael Brady¹; Donovan Leonard¹; Roman Pankiw²; Jim Myers³; Tanya Ros⁴; Stanley Fauske⁵; Ben Church⁶; ¹Oak Ridge National Laboratory; ²Duraloy Technologies; ³Metaltek International; ⁴Arcelor Mittal Global R & D; ⁵Arcelor Mittal Coatesville; ⁶University of Wisconsin-Milwaukee

9:30 AM
Synergistic Nano-precipitation in Mn-stabilized Austenitic Steels: *Colin Stewart*¹; Richard Fonda²; Keith Knipling²; ¹National Research Council Associate at the U.S. Naval Research Laboratory; ²U.S. Naval Research Laboratory

9:50 AM
Strong and Ductile Steel Designed by Dislocation Engineering: *MingXin Huang*¹; ¹University of Hong Kong

10:10 AM Invited
Interface based Alloy Design: *Matthias Militzer*¹; Mariana Mendes¹; Ayush Suhane¹; Nicolas Romualdi¹; Hariharan Umashankar¹;

¹University of British Columbia

MATERIALS PROCESSING

Materials Processing Fundamentals — Steelmaking Process Modeling and Composites

Sponsored by: TMS Extraction and Processing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Jonghyun Lee, Iowa State University; Guillaume Lambotte, Boston Metal; Sam Wagstaff, Novelis Inc.; Antoine Allanore, Massachusetts Institute of Technology; Fiseha Tesfaye, Abo Akademi University

Thursday AM | February 27, 2020
13 | San Diego Convention Ctr

Session Chairs: Allie Anderson, Gopher Resource; Jonghyun Lee, Iowa State University

8:30 AM
Preliminary Research into the Effects of Electric Field & Current on Reactive Processing of Ni 3 Al-CNT Composites: *Crystal Gama*¹; Kevin Yokota¹; Raj Kumar Rachapudi¹; Mohammed Shahid Islam¹; Alberto Ricciulli¹; Khaled Morsi¹; ¹SDSU

8:50 AM
Numerical Simulation of Heat Transfer Between Roller and Slab during Medium Thickness Slab Continuous Casting: *Shuang Liu*¹; Mujun Long¹; Pei Xu¹; Pingmei Tang¹; Dengfu Chen¹; Huamei Duan¹; ¹Chongqing University

9:10 AM
Mathematical Modeling of Strip Slipping on Bridle Roll of Skin Pass Mill During Speed-up Process: *Yongqiang Wang*¹; Yanglong LI¹; Hui Wang¹; Wei Guo¹; Jie Wen¹; Meng Yu¹; ¹Research Institute of Technology of Shougang Group Co., Ltd.

MATERIALS PROCESSING

Materials Research in Reduced Gravity — Thermophysical Properties II

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Robert Hyers, University of Massachusetts; Douglas Matson, Tufts University; Michael Sansoucie, NASA MSFC; Shaun McFadden, Ulster University; Jonghyun Lee, Iowa State University; Wilhelmus Sillekens, European Space Agency; Takehiko Ishikawa, JAXA

Thursday AM | February 27, 2020
18 | San Diego Convention Ctr

Session Chairs: Jonghyun Lee, Iowa State University; Markus Mohr, Ulm University

8:30 AM
Effect of External Force on Surface Oscillation Damping of Levitated High-temperature Droplet: *Masahito Watanabe*¹; ¹Gakushuin University

8:50 AM
Viscosity Measurement of Liquid Alloys in Microgravity and Experiment Parameters Optimization: *Xiao Xiao*¹; Douglas Matson²; ¹DLR; ²Tufts University

9:10 AM
Containerless Measurement of Thermophysical Properties of Ni-based Superalloys LEK94, MC2 and CMSX-10 in the Liquid Phase on Board the International Space Station: *Markus Mohr*¹; Rainer Wunderlich¹; Hans Fecht¹; ¹Ulm University

9:30 AM
Modeling Magnetohydrodynamics in Microgravity Electromagnetic Levitation Experiments: *Gwendolyn Bracker*¹; Robert Hyers¹; ¹University of Massachusetts

9:50 AM
Effect of Inert Gas Atmosphere on Evaporation Losses and Density Measurement for Electromagnetically Levitated Superalloys: *Jannatun Nawer*¹; Stéphane Gossé²; Michael SanSoucie²; Douglas Matson¹; ¹Tufts University; ²CEA Saclay

10:10 AM Break

10:40 AM
Thermophysical Properties of SiGe Melts Measured on Board the ISS: *Yuansu Luo*¹; Bernd Damaschke¹; Georg Lohöfer²; Konrad Samwer¹; ¹I. Physics Institute University Goettingen; ²Institut für

Materialphysik im Weltraum, Deutsches Zentrum für Luft- und Raumfahrt (DLR), D-51170 Cologne, Germany

11:00 AM

Thermo-physical Properties of Fe-Si Alloys under Microgravity:

*Antonia Betzou*¹; Markus Mohr²; Rainer Wunderlich²; Begona Santillana³; Hans Fecht²; Sridhar Seetharaman⁴; Prakash Srirangam¹;

¹Wmg, University Of Warwick; ²University of Ulm; ³TaTa Steel Europe; ⁴Colorado School of Mines

11:20 AM

Computational Fluid Dynamics Modeling of Oscillation Damping of Compound Liquid Droplets:

Ali Rabeh¹; Makrand Khanwale¹; Baskar Ganapathysubramian¹; Robert Hyers²; *Jonghyun Lee*¹; ¹Iowa State University; ²University of Massachusetts

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale V — Dislocations

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Christopher Weinberger, Colorado State University; Megan Cordill, Erich Schmid Institute; Garritt Tucker, Colorado School of Mines; Wendy Gu, Stanford University; Scott Mao, University of Pittsburgh; Yu Zou, University of Toronto

Thursday AM | February 27, 2020
Santa Rosa | Marriott Marquis Hotel

Session Chairs: Limeng Xiong, Iowa State University; Megan Cordill, Austrian Academy of Sciences

8:30 AM Invited

Examining the Kink-controlled Dislocation Dynamics in High-Peierls-barrier Materials from the Atomistic to the Microscale:

*Liming Xiong*¹; ¹Iowa State University

9:10 AM

c+a Dislocation Glide in Zirconium: *Thomas Soye*¹; Emmanuel Clouet¹; Fabien Onimus¹; ¹CEA Saclay

9:30 AM

An Experimental-numerical Approach to Investigate Hydrogen Enhanced Localized Plasticity (HELP): *S. Mohadeseh Taheri-*

*Mousavi*¹; Motomichi Koyama²; Haxoue Yan¹; Jinwoo Kim¹; Benjamin Cameron¹; S. Sina Moeini-Ardakani¹; Ju Li¹; C. Cem Tasan¹; ¹Massachusetts Institute of Technology; ²Tohoku University

9:50 AM

Theory of Dislocation-precipitate Bypass: *Ben Szajewski*¹; Joshua Crone¹; Jaroslaw Knap¹; ¹Army Research Laboratory

10:10 AM Break

10:30 AM

Influence of Laser Machining on the Nanomechanical Behavior of Nickel Titanium Shape Memory Alloy: *Albert Lin*¹; Kevin Schmalbach¹; Kaci Gwilt¹; Julia Hoffmann¹; Dhiraj Catoor²; Markus Reiterer²; Nathan Mara¹; ¹University of Minnesota - Twin Cities; ²Medtronic

10:50 AM

Atomistic Calculations of the Peierls Stress in Nb-Based Multi-principal Element Alloys: *Shuozhi Xu*¹; Emily Hwang²; Jun Xu³; Yanqing Su¹; Irene Beyerlein¹; ¹University of California, Santa Barbara; ²Harvey Mudd College; ³University of Pennsylvania

11:10 AM

Dislocation Nucleation-mediated Plasticity of FCC Defect-scarce Nanowires: *Jungho Shin*¹; Zhuocheng Xie²; Gunther Richter³; Erik Bitzek²; Daniel Gianola¹; ¹University of California, Santa Barbara; ²Friedrich-Alexander Universität Erlangen-Nürnberg; ³MPI IS Stuttgart

11:30 AM

Dislocation Dominated Plasticity at the Nanometer: *Darcy Hughes*¹; ¹Sandia National Laboratory (ret.)

MATERIALS DESIGN

Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling — Session V

Sponsored by: TMS Structural Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, MicroTesting Solutions; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Jagannathan Rajagopalan, Arizona State University; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Robert Wheeler, Microtesting Solutions LLC; Shailendra Joshi, University of Houston

Thursday AM | February 27, 2020
32A | San Diego Convention Ctr

Session Chairs: Robert Wheeler, Microtesting Solutions LLC; Alessandro Piglione, Imperial College London

8:30 AM Keynote
Microtensile Testing of (fcc) Copper and (hcp) Titanium at Elevated Temperatures: *Robert Wheeler*¹; Adam Shiveley²; Amit Pandey³; Jiashi Miao⁴; Michael Mills⁴; ¹Microtesting Solutions LLC; ²Shiveley Technologies; ³Ansys Inc.; ⁴The Ohio State University

9:10 AM
A Novel Experimental Methodology and Theoretical Framework for Enabling Macroscopic-like Deformation at the Microscale: *Hi Vo*¹; Evan Still¹; Kiet Lam¹; Aljaž Drnovšek²; Laurent Capolungo³; Stuart Maloy³; Peter Chou⁴; Peter Hosemann¹; ¹University of California, Berkeley; ²Jožef Stefan Institute; ³Los Alamos National Laboratory; ⁴Electric Power Research Institute

9:30 AM
Fabrication of Microscale Specimens via Additive Manufacturing for In-situ Mechanical Testing: *Soheil Daryadel*¹; Majid Minary²; ¹University of Illinois at Urbana-Champaign; ²University of Texas at Dallas

9:50 AM
In-situ Dynamic Stress Field Detection using 2D Mechanical Raman Spectroscopy: *Abhijeet Dhiman*¹; Hao Wang¹; Vikas Tomar¹; ¹Purdue University

10:10 AM Break

10:30 AM Keynote
Micropillar Compression Testing with In-situ Raman Spectroscopy to Study Plastic Deformation in Vitreous Silica: *Shefford Baker*¹; Zachary Rouse¹; Praveena Manimunda²; Nicole Wiles¹; S.A. Syed-

Asif²; ¹Cornell University; ²Bruker Nano Surfaces

11:10 AM

Temperature Effects in the Microscale Deformability of Yttria Stabilized Zirconia Prepared by Spark Plasma Sintering: *Jaehun Cho*¹; Jin Li¹; Qiang Li¹; Jie Ding¹; Han Wang¹; Sichuang Xue¹; Amiya Mukherjee²; Haiyan Wang¹; Xinghang Zhang¹; ¹Purdue University; ²University of California, Davis

11:30 AM

Synchronized Indentation and Raman Spectroscopy for Crystal Engineering: *Praveena Manimunda*¹; Manish Kumar Mishra²; Syed Asif¹; ¹Bruker; ²University of Minnesota

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Nanocomposites VI: Nanoscience and Nanotechnology in Advanced Composites — Processing-Properties-Performance of Nanocomposites

Sponsored by: TMS Structural Materials Division, TMS: Composite Materials Committee

Program Organizers: Srivatsan Tirumalai, The University of Akron; Manoj Gupta, National University of Singapore

Thursday AM | February 27, 2020
Solana | Marriott Marquis Hotel

Session Chair: Simona Murph, Savannah River National Laboratory

8:30 AM Invited

Investigating and Understanding the Mechanical and Tribological Properties of A Magnesium Hybrid Metal-ceramic Nanocomposite: Arvind Singh R¹; Jayalakshmi Subramanian¹; Sankaranarayanan Seetharaman²; Xizhang Chen¹; Sergey Konovalov³; *Srivatsan T.S.*⁴; Manoj Gupta⁵; ¹Wenzhou University; ²ANSYS Software Private Ltd; ³Samara National Research University; ⁴The University of Akron; ⁵National University of Singapore

9:00 AM

State-of-the-Art NanoMaterials at SRNL: From Innovation to Marketplace; Fabrication of Silver-rhodium Nanomaterials for Chemical Sensing Applications: *Simona Hunyadi Murph*¹; ¹Savannah River National Laboratory / University of Georgia

9:25 AM

New Electron Beam Equipment and Technologies for Production of Advanced Materials Using Vacuum Melting and Evaporation Methods Developed in SPE “Eltekmash”: *Alexander Manulyk*¹; Nikolayi Grechanyuk¹; Pavel Kucherenko¹; Alexey Melnik¹; ¹Synergy Antech Services Inc.

9:50 AM

Role of Rare Earth Oxide Reinforcements in Enhancing the Mechanical, Damping and Ignition Resistance of Magnesium: Milli Suchita Kujur¹; Vyasaraj Manakari²; Gururaj Parande²; Mrityunjay Doaddamani³; Ashis Mallick¹; *Manoj Gupta*²; ¹Indian Institute of Technology (Indian School of Mines), Dhanbad; ²National University of Singapore; ³National Institute of Technology Karnataka

10:15 AM Break

10:35 AM

Ordered Colloidal Crystals Fabrication and Studies on the Properties of Poly(Styrene-Butyl-Acrylate-Acrylic Acid) and Polystyrene Latexes: Ikhazuagbe Ifijen¹; Esther Ikhuoria²; Stanley Omorogbe¹; *Aireguamen Aigbodion*¹; ¹Rubber Research Institute of Nigeria; ²University of Benin, Benin City, Nigeria

11:00 AM

Magnetic Field-assisted Electrodeposition of Nickel Composite Coatings: *Denise Yin*¹; Heather Murdoch¹; Efrain Hernández-Rivera¹; Anit Giri¹; ¹CCDC Army Research Laboratory

11:25 AM

Nanomechanical and Tribocorrosion Performance of Al-based Multilayered Thin Films: *Wenbo Wang*¹; Wenjun Cai¹; ¹Virginia Polytechnic Institute and State University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — General Topics I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

Program Organizers: Yufeng Zheng, University of Nevada, Reno; Rongpei Shi, Lawrence Livermore National Laboratory; Stoichko Antonov, University of Science and Technology Beijing; Yipeng Gao, Idaho National Laboratory; Rajarshi Banerjee, University of North Texas; Yongmei Jin, Michigan Technological University

Thursday AM | February 27, 2020

Session Chairs: Pankaj Kumar, University of Nevada, Reno; Fulin Wang, University of California, Santa Barbara

8:30 AM

Precipitation Kinetics and Evaluation of the Interfacial Mobility of Precipitates in an AlSi7Cu0.5Mg0.3 Cast Alloy: Pierre Heugue¹; *Daniel Larouche*¹; Francis Breton²; Rémi Martinez³; X Grant Chen⁴; Denis Massinon⁵; ¹Laval University; ²Rio Tinto; ³Linamar Corporation; ⁴University of Quebec at Chicoutimi; ⁵Montupet Laigneville

8:50 AM

Neutron Diffraction-based Assessment of Eutectoid Phase Transformation Kinetics in U-10Mo Alloys with Minor Ternary Alloying Additions of Cr, Co, and Ni: *Nathan Peterson*¹; Daniel Malta¹; Saumyadeep Jana²; Vineet Joshi²; Sean Agnew¹; ¹University of Virginia; ²Pacific Northwest National Laboratory

9:10 AM

Thermodynamic and Kinetic Study of the fcc-B2 Phase Transformation and Consecutive Microstructural Evolution in the Ag-Cu-Pd System: *Solène Iruela*¹; Yannick Champion¹; Annie Antoni-Zdziobek¹; Fabien Volpi¹; Christine Bourda²; Vincent Jarry²; ¹SIMaP; ²Metalor Technologies Electrotechnics France

9:30 AM

Fabrication of Gamma Prime Strengthened Ni-Cr-Al-Ti Microtubes via Gas-phase Deposition and the Kirkendall Effect: *Haozhi Zhang*¹; Ashley Paz y Puente¹; ¹University of Cincinnati

9:50 AM

Exploring Phase Transformations in the Au-Zn-Al System: *Taylor Jacobs*¹; Seth Imhoff¹; Meghan Gibbs¹; Clarissa Yablinsky¹; ¹Los Alamos National Laboratory

10:10 AM Break

10:30 AM

Barrier-free Nucleation at Grain-boundary Triple Junctions during Solid-state Phase Transformations: *Huajing Song*¹; Jeff.J. Hoyt²; ¹Los Alamos National Laboratory; ²McMaster University

10:50 AM

Formation and Stability of Ni-Y Clusters in Mg85Y9Ni6 Alloys: *Hiroshi Okuda*¹; Mikito Ito¹; Michiaki Yamasaki²; Yoshihito Kawamura²; ¹Kyoto University; ²Kumamoto University

11:10 AM
Kinetics Evolution of L12-typed 'Co3(Al, W) Phase in a Medium Supersaturation Co-Al-W Alloy: *Yongsheng Li*; Shujing Shi¹; Dong Wang¹; ¹Nanjing University of Science and Technology

ENERGY & ENVIRONMENT

Powder Materials for Energy Applications — Additive Manufacturing and Harsh Environment Materials

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Powder Materials Committee

Program Organizers: Kathy Lu, Virginia Polytechnic Institute and State University; Eugene Olevsky, San Diego State University; Somayeh Pasebani, Oregon State University; Hang Yu, Virginia Polytechnic Institute and State University

Thursday AM | February 27, 2020
17A | San Diego Convention Ctr

Session Chairs: Somayeh Pasebani, Oregon State University; Kathy Lu, Virginia Tech

8:30 AM Invited
Is Additive Manufacturing a Competition or Complimentary Technology to Current Processing of Metals?: *Wojciech Misiolak*¹; ¹Lehigh University

9:00 AM Invited
Novel Additive Manufacturing Process Design for U3Si2 Fuel: *Isabella Van Rooyen*¹; ¹Idaho National Laboratory

9:30 AM
Microstructural Evolution of a Nanostructured Ferritic Alloy Composite during In-situ Ion Irradiation: *Kathy Lu*¹; Kaustubh Bawane¹; David Bai¹; Jing Hu²; Meimei Li²; ¹Virginia Polytechnic Institute and State University; ²Argonne National Laboratory

9:50 AM Break

10:10 AM Invited
Materials for Nuclear Applications Produced by Powder-based Techniques: *Stuart Maloy*¹; Ben Eftink¹; Tarik Saleh¹; Osman El-Atwani¹; John Carpenter¹; Eda Aydogan²; Thomas Lienert³; Mychailo Toloczko⁴; Thak Sang Byun⁴; Curt Lavender⁴; George Odette⁵; David Hoelzer⁶; ¹Los Alamos National Laboratory; ²Sabanci University; ³Optomec Corporation; ⁴Pacific Northwest National Laboratory;

⁵University of California, Santa Barbara; ⁶Oak Ridge National Laboratory

10:40 AM Invited
Processing and Characteristics of Nanostructured Ferritic Alloys for Nuclear Reactor Applications: *Thak Sang Byun*¹; David Hoelzer¹;
¹Oak Ridge National Laboratory

11:10 AM
Microstructural Evolution of NFA and Cr₃C₂@SiC-NFA Composite during Ion Irradiation: *Kathy Lu*¹; Kaustubh Bawane¹; David Bai¹; Meimei Li²; ¹Virginia Polytechnic Institute and State University; ²Argonne National Laboratory

11:30 AM
Synthesis and Characterization of Lanthana Based ODS Steel for Nuclear Reactor Applications: *Ashwani Kumar*¹; Krishanu Biswas¹; Sudhanshu Singh¹; ¹IIT Kanpur

MATERIALS PROCESSING

Process Metallurgy and Electrochemistry of Molten Salts, Liquid Metal Batteries, and Extra-terrestrial Materials Processing: An EPD Symposium in Honor of Don Sadoway — Prof. Sadoway Honorary Session III

Sponsored by: TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee

Program Organizers: Antoine Allanore, Massachusetts Institute of Technology; Hojong Kim, Pennsylvania State University; Takanari Ouchi, The University of Tokyo; Yasuhiro Fukunaka, JAXA/Waseda University

Thursday AM | February 27, 2020
14A | San Diego Convention Ctr

Session Chairs: Antoine Allanore, Massachusetts Institute of Technology; Yasuhiro Fukunaka, JAXA/Waseda University

8:30 AM Introductory Comments

8:35 AM Invited
Electrochemical Processing under Extreme Conditions: *Yasuhiro Fukunaka*¹; ¹Kyoto University

8:55 AM Invited

The Application of the FFG Molten Salt Cycle on the Separation of the Refractory Metals: *Georges Kipouros*¹; ¹Dalhousie University

9:15 AM Invited

Innovative Ways to Chemically Process Rare-earth Waste Materials: *Prabhat Tripathy*¹; ¹Batelle Energy Alliance (Idaho National Laboratory)

9:35 AM

Metallic Inert Anodes for Molten Carbonates Electrolysis Process: *Kaifa Du*¹; *Peilin Wang*¹; *Dihua Wang*¹; ¹Wuhan University

9:55 AM Break

10:10 AM Invited

Recovery of Metal Values from Wastes: *Aida Abbasalizadeh*¹; *Rajiv Shekhar*²; *Seshadri Seetharaman*³; ¹TATA Steel, Imuiden, Holland; ²Indian Institute of Technology (Indian School of Mines), Dhanbad; ³Royal Institute of Technology

10:30 AM Invited

Study on the Molten Salt CO₂ Capture and Electrochemical Transformation (MSCC-ET) Process: *Dihua Wang*¹; ¹Wuhan University

ADVANCED MATERIALS

Progress towards Understanding the Synthesis and Behavior of Metals Far from Equilibrium: A SMD Symposium Honoring Enrique Lavernia on the Occasion of His 60th Birthday — Synthesis and Mechanical Behavior

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Composite Materials Committee

Program Organizers: Haiming Wen, Missouri University of Science and Technology; Suveen Mathaudhu, University of California, Riverside; Yuntian Zhu, North Carolina State University; Manoj Gupta, National University of Singapore; Kaka Ma, Colorado State University; Troy Topping, California State University, Sacramento; Yizhang Zhou, University of California, Irvine; Joshua Yee, Sandia National Laboratories; Dalong Zhang, Pacific Northwest National Laboratory; Yaojun Lin, Wuhan University of Technology; Fei Chen, Wuhan University of Technology

Thursday AM | February 27, 2020
31B | San Diego Convention Ctr

Session Chairs: Kaka Ma, Colorado State University; Kyung-Tae Park, Hanbat National University

8:30 AM Invited
Amorphization of Covalently-bonded Solids in Laser-induced Shock: A New Deformation Mechanism in Extreme Loading: *Marc Meyers*¹; *Shiteng Zhao*²; *Bruce Remington*³; *Chris Wehrenberg*³; *Hye-Sook Park*³; *Eric Hahn*⁴; ¹University of California, San Diego; ²Lawrence Berkeley National Laboratory; ³Lawrence Livermore National Laboratory; ⁴Los Almos National Laboratory

9:00 AM Invited
Design, Fabrication and Characterization of FeAl-based Metallic-Intermetallic Laminate (MIL) Composites: *Haoren Wang*¹; *Kenneth Vecchio*¹; ¹University of California, San Diego

9:30 AM Invited
Effects of Processing and Grain size on Very High Strain Rate Deformation of Cu: *Kyung-Tae Park*¹; *Keunho Lee*²; *Seok Bong Kim*²; *LeeJu Park*²; *Seong Lee*²; ¹Hanbat National University; ²Agency for Defense Development

10:00 AM
Nanomechanical Testing of Spark Plasma Sintered Stainless Steel Parts: *Alexander Preston*¹; *Kaka Ma*¹; ¹Colorado State University

10:20 AM Break

10:35 AM Invited

Fabrication of Oxides and Semiconductors with Non Equilibrium Phase Content: A. Y. Fong¹; G Uahengo¹; Y Kodera¹; *Javier Garay*¹; ¹University of California, San Deigo

11:05 AM

An Advanced MCrAlY with TGO Self Repair Ability: *Jianhong He*¹; ¹Oerlikon Metco

11:25 AM

A Novel Processing Route for Fe-TiB2 High Modulus Steel by Nano-treating and Regular Casting: *Shiqi Zheng*¹; Xiaochun Li¹; ¹University of California, Los Angles

11:45 AM

Achieving Ultrahigh Hardness in Electrodeposited Nanograined Ni-based Binary Alloys: *Yinong Shi*¹; Xiangui Zheng¹; Jian Hu²; JiongxianLi¹; ¹ImrCas; ²School of Materials Science and Engineering, East China JiaoTong University

NUCLEAR MATERIALS

Radiation Effects in Metals and Ceramics — Irradiation of Ceramics and Uranium Fuels

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Djamel Kaoumi, North Carolina State University; Thak Sang Byun, Oak Ridge National Laboratory; Dane Morgan, University of Wisconsin-Madison; Maria Okuniewski, Purdue University; Mahmood Mamivand, Boise State University; Geoffrey Beausoleil, Idaho National Laboratory; Philip Edmondson, Oak Ridge National Laboratory; Khalid Hattar, Sandia National Laboratories; Aurelie Gentils, Université Paris-Saclay; Joel Ribis, Commissariat a l'Energie Atomic CEA

Thursday AM | February 27, 2020
Theater A-7 | San Diego Convention Ctr

Session Chairs: Geoffrey Beausoleil, Idaho National Laboratory; Assel Aitkaliyeva, University of Florida

8:30 AM

Microstructural Changes in Graphite and the Corresponding Bulk Property Evolution: *Anne Campbell*¹; José Arregui-Mena¹;

¹Oak Ridge National Laboratory

8:50 AM

Microstructural Characterization of Nuclear Graphite Irradiated at Temperatures below 230°C: *Jose Arregui-Mena*¹; Wenjing Li²; Lori Walters²; Philip Edmondson¹; Cristian Contescu¹; ¹Oak Ridge National Laboratory; ²Canadian Nuclear Laboratories

9:10 AM

Near-surface Disorder in 4H-SiC Induced by MeV light Ion Irradiation: *John Demaree*¹; Noel Guardala²; Zois Tsinas³; Eaman Karim³; Mohamad Al-Sheikhly³; ¹CCDC Army Research Laboratory; ²The George Washington University; ³University of Maryland

9:30 AM

Defects Generation during Irradiation-induced Alpha/gamma Phase Transformation in Uranium Alloys: *Yipeng Gao*¹; Benjamin Beeler¹; Yongfeng Zhang¹; ¹Idaho National Laboratory

9:50 AM Break

10:10 AM Invited

Investigation of High Burnup Ceramic Fuel Microstructure at Idaho National Laboratory: *Fabiola Cappia*¹; Geoffrey Beausoleil¹; Alex Winston¹; Daniel Murray¹; Brandon Miller¹; LingFeng He¹; Fei Teng¹; ¹Idaho National Laboratory

10:40 AM

Neutron Irradiation Induced Intergranular Fission Product Precipitation in SiC Layer of TRISO Fuel: *Isabella Van Rooyen*¹; Subhashish Meher¹; Thomas Lillo¹; ¹Idaho National Laboratory

11:00 AM

Three Dimensional Radiation Effects in Neutron Irradiated Uranium-Molybdenum Fuel: *Maria Okuniewski*¹; Alejandro Figueroa¹; Jonova Thomas¹; Sri Tapaswi Nori¹; Peter Kenesei²; Jonathan Almer²; ¹Purdue University; ²Argonne National Laboratory

11:20 AM Invited

Radiation Effects on Phonon Transport in UO2 and ThO2: Tiankai Yao¹; Vinay Chauhan²; Maniesha Singh³; Amey Khanolkar¹; Zilong Hua¹; Marat Khafizov²; Matthew Mann⁴; Thierry Wiss⁵; Anter El-Azab³; Jian Gan¹; David Hurley¹; *Lingfeng He*¹; ¹Idaho National Laboratory; ²The Ohio State University; ³Purdue University; ⁴Air Force Research Laboratory; ⁵European Commission, Joint Research Centre

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XI) —

Processing & Property

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Caizhi Zhou, Missouri University of Science and Technology; Megumi Kawasaki, Oregon State University; Enrique Lavernia, University of California, Irvine; Terry Lowe, Colorado School of Mines; Suveen Mathaudhu, University of California, Riverside; Ruslan Valiev, UFA State Aviation Technical University; Yuntian Zhu, North Carolina State University

Thursday AM | February 27, 2020
Carlsbad | Marriott Marquis Hotel

Session Chairs: Huajian Gao, Brown University; Yi Li, Institute of Metal Research, Chinese Academy of Sciences; Deliang Zhang, Northeastern University; Caizhi Zhou, Missouri University of Science and Technology

8:30 AM
Transition from Source- to Stress-controlled Plasticity in Nanotwinned Materials below a Softening Temperature: *S. Mohadeseh Taheri-Mousavi*¹; Haofei Zhou²; Guijin Zou²; Huajian Gao²; ¹Massachusetts Institute of Technology; ²Brown University

8:50 AM
Tailoring Strength of 6082 Aluminium Alloy via Combination of Rolling and Heat Treatment: *Witold Chrominski*¹; Malgorzata Lewandowska¹; ¹Warsaw University of Technology

9:10 AM
Bulk nc-Dissolvable Alloys Enable Design of Retrievable Sensors for Oil & Gas: *Ting Roy*¹; Indranil Roy²; Ram Shenoy²; Jing Zhou³; ¹SET Laboratories; ²WellDiver; ³Rice University

9:30 AM
Heterogeneous Materials under Shear:Interlinking Surface Deformation Mechanisms and Friction: *Xiang Chen*¹; Zhong Han²; Xiuyan Li²; Christian Greiner³; Peter Gumbsch³; Ke Lu²; ¹Nanjing University of Science and Technology; ²Institute of Metal Research, Chinese Academy of Sciences; ³Karlsruhe Institute of Technology

9:50 AM Invited
Powder Metallurgy Fabrication, Microstructure and Mechanical Properties of Heterogeneous Structured Al: *Deliang Zhang*¹; Lei Cao²; Jiamiao Liang²; ¹Northeastern University; ²Shanghai Jiao Tong University

10:10 AM Break

10:30 AM Invited

Heterogeneous High-entropy Alloys: A Review: Rui Feng¹; *Peter Liaw*¹; ¹University of Tennessee

10:50 AM

Ultra-uniformity in Nanocrystalline Materials: Implications from Generalized LSW Growth Theory and Validations: *Yanhao Dong*¹; Hongbing Yang²; Jiangong Li²; I-Wei Chen³; Ju Li¹; ¹Massachusetts Institute of Technology; ²Lanzhou University; ³University of Pennsylvania

11:10 AM

Magnesium Based Composites Produced through HPT: *Moara Castro*¹; Megumi Kawasaki²; Roberto Figueiredo¹; ¹Universidade Federal de Minas Gerais; ²Oregon State University

11:20 AM

Ultrafine Grained 3003 Aluminium Alloy Plates with Low Anisotropy and the Capabilities to Deep Drawing: *Malgorzata Lewandowska*¹; Marta Ciemiorek¹; Witold Chrominski¹; Lech Olejnik¹; ¹Warsaw University of Technology

11:40 AM

Searching for the Optimized Design in Heterogeneous Structure: *Jie Pan*¹; Yan Lin¹; Ruqing Cao¹; Xiaoyi Cuan¹; Yunli Lu¹; Yi Li¹; ¹Institute of Metal Research, Chinese Academy of Sciences

MECHANICS & STRUCTURAL RELIABILITY

Understanding and Predicting Dynamic Behavior of Materials — Composites and Brittle Materials

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Marc Meyers, University of California San Diego; George Gray, Los Alamos National Laboratory

**Thursday AM | February 27, 2020
5A | San Diego Convention Ctr**

Session Chair: Benjamin Morrow, Los Alamos National Laboratory

8:30 AM

Micromechanical Methods for Parameterizing Ceramic Failure Models: *Daniel Magagnosc*¹; Andrew Tonge¹; ¹US Army Research Laboratory

8:50 AM

Observation and Analysis of Amorphization-induced Fragmentation in Boron Carbide: *Jerry LaSalvia*¹; C. Marvel¹; Kristopher Behler¹; M.P. Harmer¹; ¹ARL (SURVICE Engineering)

9:10 AM

On the Structural Characterization of Amorphous Phase Recovered from Laser Shock Compression: *Shiteng Zhao*¹; Marc Meyers²; ¹University of California, Berkeley; ²University of California, San Diego

9:30 AM

Thermodynamics of Pressure-induced Amorphization in Boron Carbide- Unraveling the Mystery through Molecular Dynamic Simulations: *Ghatu Subhash*¹; Amnaya Awasthi¹; Matthew DeVries¹; ¹University of Florida

9:50 AM

Sub-surface Observations and Analysis of Indented Polycrystalline Hot-pressed Boron Suboxide (B₆O): *Kristopher Behler*¹; Jerry LaSalvia¹; C.J. Marvel¹; S.D. Walck¹; M.P. Harmer¹; ¹ARL (SURVICE Engineering)

10:10 AM Break

10:30 AM

Modelling the Effect of Microstructure on Elastic Wave Propagation in Platelet-reinforced Composites and Ceramics: *Hortense Le Ferrand*¹; ¹Nanyang Technological University

10:50 AM

Mechanical Response and Deformation Modes during High-rate Loading of Multiphase Metal Materials: *Avery Samuel*¹; Zachary Levin²; Carl Trujillo³; Saryu Fensin³; Tresa Pollock¹; Irene Beyerlein¹; Frank Zok⁴; ¹University Of California, Santa Barbara; ²Texas A&M University; ³Los Alamos National Laboratory; ⁴University of California, Santa Barbara

MATERIALS PROCESSING

11th International Symposium on High Temperature Metallurgical Processing – Ironmaking and Steelmaking

Sponsored by: TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee

Program Organizers: Zhiwei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Tao Jiang, Central South University; Jesse White, Elkem Carbon AS; Morsi Mahmoud, King Fahd University of Petroleum And Mineral

Thursday PM | February 27, 2020
16A | San Diego Convention Ctr

Session Chairs: Onuralp Yücel, Istanbul Technical University; Zhongliang Tian, Central South University

2:00 PM Introductory Comments

2:15 PM

Optimization of Process Parameters for the Synthesis of Mo₂C on an Activated Carbon Matrix: *Grant Wallace*¹; Jerome Downey¹; Jannette Chorney¹; Katie Schumacher¹; ¹Montana Technological University

2:35 PM

FactSage-based Design Calculations for the Production of High Carbon Ferromanganese on Pilot-scale: *Joalet Steenkamp*¹; ¹MINTEK

2:55 PM

Influences of Li₂O on the Properties of Ultrahigh-basicity Mold Fluxes for Continuous Casting of Peritectic Steel: *Min Li*¹; Yuan Bing Wu¹; Sheng Ping He¹; Qiang Qiang Wang¹; Qian Wang¹; ¹Chong Qing University

3:15 PM

Effect of Refining Slag Composition on the Cleanliness of 25Cr2Ni4MoV Rotor Steel: *Chao Zhuo*¹; Yimin Zhang¹; Yanhui Sun¹; Ruimei Chen¹; Sicheng Song¹; ¹University of Science and Technology Beijing

3:35 PM Break

3:50 PM

Prediction Model of End-point Molten Steel Temperature in RH Refining Based on PCA-CBR: *Maoqiang Gu*¹; Anjun Xu¹; Dongfeng He¹; Hongbing Wang¹; Kai Feng¹; ¹University of Science and Technology Beijing

4:10 PM

Numerical Simulation and Optimization of Temperature Field in the Baking of RH Vessel: *Fei Yuan*¹; Peiling Zhou²; Xiao Sun¹; Shuai Deng¹; ¹University of Science and Technology Beijing; ²Tsinghua University

MATERIALS PROCESSING

11th International Symposium on High Temperature Metallurgical Processing — Utilization of Complex Ores

Sponsored by: TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee

Program Organizers: Zhiwei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Tao Jiang, Central South University; Jesse White, Elkem Carbon AS; Morsi Mahmoud, King Fahd University of Petroleum And Mineral

Thursday PM | February 27, 2020
12 | San Diego Convention Ctr

Session Chairs: Jerome Downey, Montana Technological University; Jiann-Yang Hwang, Michigan Technological University

2:00 PM Introductory Comments

2:15 PM

Ni Recovery from Nickeliferous Pyrrhotite Concentrates via a Thermal Concentration Process: Effects of Heat Treatment Time: *Feng Liu*¹; Mansoor Barati¹; ¹University of Toronto

2:35 PM

Method to Quantify the Effect of Temperature and Rotational Speed on the Decrepitation of South African Manganese Ores in

a Rotary Kiln: *Samuel Moholwa*¹; Joalet Steenkamp¹; Hillary Rutto²; ¹Mintek; ²Vaal University of Technology

2:55 PM

Production of High Carbon Ferrochromium by Carbothermal Reduction of Vanadium Extraction Tailings with High Chromium Content: *Gaung Wang*¹; Jiang Diao¹; Liang Liu¹; Bing Xie¹; ¹Chongqing University

3:15 PM

Utilization of Ground Sinter Feed for Oxidized Pellet Production and Its Effect on Pellet Consolidation and Metallurgical Properties: *Hongyu Tian*¹; Jian Pan¹; Deqing Zhu¹; Dingzheng Wang¹; Yuxiao Xue¹; ¹Central South University

3:35 PM

Strengthening Sintering of Limonitic Nickel Laterite by Substituting Ferronickel Tailings for Sintering Fluxes: *Yuxiao Xue*¹; Deqing Zhu¹; Jian Pan¹; Congcong Yang¹; Hongyu Tian¹; Dingzheng Wang¹; Zhengqi Guo¹; ¹Central South University

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture IV: Toward Confident Use in Critical Applications — Property Prediction II

Sponsored by: TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Nik Hrabe, National Institute of Standards and Technology; Steve Daniewicz, University of Alabama; Nima Shamsaei, Auburn University; John Lewandowski, Case Western Reserve University; Mohsen Seifi, ASTM International/Case Western Reserve University

**Thursday PM | February 27, 2020
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Session Chairs: Nik Hrabe, National Institute of Standards and Technology; Jake Benzing, National Institute of Standards and Technology

2:00 PM Invited

Fatigue Behavior of Additive Manufactured Ni and Ti Alloys Through Coupled Modeling and In-situ Experiments: *Michael Sangid*¹; ¹Purdue University

2:30 PM

Maximizing the Fatigue Lifetime by Choosing the Best Build Orientation: *Amin S. Azar*¹; Magnus Reiersen²; Even W. Hovig³; Mikkel M. Pedersen⁴; ¹SINTEF; ²University of Oslo; ³Norwegian University of Science and Technology (NTNU); ⁴Aarhus University

2:50 PM

Micromechanical Modeling Driven Design of Fatigue Resistant Metal Additive Manufacturing Solutions: *Anssi Laukkanen*¹; Matti Lindroos¹; Tatu Pinomaa¹; Tom Andersson¹; Tomi Suhonen¹; ¹VTT Technical Research Center of Finland

3:10 PM

Microstructure-based Fatigue Performance Analysis and Prediction of Additively Manufactured 316L Stainless Steel Subjected to Different Heat Treatments: *Chola Elangeswaran*¹; Antonio Cutolo¹; Charlotte de Formanoir¹; Gokula Krishna Muralidharan²; Brecht Van Hooreweder¹; ¹KU Leuven; ²3D Systems Leuven

3:30 PM Break

3:50 PM Invited

Surface Morphology, Stress Concentrations, Micromechanical Modeling and Fatigue Life in 3D Printed Metals: *Anthony Rollett*¹; Christopher Kantzos¹; ¹Carnegie Mellon University

4:20 PM

Prediction of Fatigue Life of Flight-critical Metallic Components Fabricated by Additive Manufacturing: Xuesong Fan¹; *Baldur Steingrims*²; Duckbong Kim³; Peter Liaw¹; ¹University of Tennessee; ²Imagars LLC; Portland State University; ³Tennessee Tech University

4:40 PM

Coupling Damage Models to Multiscale Modeling of the Selective Laser Melting Process for Metals: *Patcharapit Promoppatum*¹; Sabeur Msolli¹; Jerry Siu Sin¹; Mark Jhon¹; ¹Institute of High Performance Computing

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications II — Characterization II

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Charit, University of Idaho; Michael Kirka, Oak Ridge National Laboratory

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Session Chairs: Subhashish Meher, Idaho National Laboratory; Bharat Gwalani, Pacific Northwest National Laboratory

2:00 PM
Sensitization of Alloy 800H Made by Laser Powder Bed Fusion: *Jingfan Yang*¹; *Xiang Liu*²; *Miao Song*³; *Lingfeng He*²; *Bart Prorok*¹; *Xiaoyuan Lou*¹; ¹Auburn University; ²Idaho National Laboratory; ³University of Michigan Ann Arbor

2:20 PM
Influence of Nickel Particle Sizes on the Spark Plasma Sintered NiCrCoTiAlW-Ta Superalloy Powder: *Olugbenga Ogunbiyi*¹; ¹Tshwane University of Technology

2:40 PM
Structural and Material Changes of Inkjet Printed Ge-Se based Chalcogenide Glasses under UV Irradiation: *Shah Mohammad Rahmot Ullah*¹; *Al-Amin Ahmed Simon*¹; *Henri Kunold*¹; *Lyle Jones*¹; *Maria Mitkova*¹; ¹Boise State University

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Functional and Energy Materials — Novel Applications

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Sneha Prabha Narra, Worcester Polytechnic Institute; Markus Chmielus, University of Pittsburgh; Mohammad Elahinia, University of Toledo; Reginald Hamilton, Pennsylvania State University

Thursday PM | February 27, 2020
7B | San Diego Convention Ctr

Session Chair: Amir Mostafaei, Illinois Institute of Technology

2:00 PM

Polycrystal-inspired Hierarchical Lattice Materials: *Jedsada Lertthanasarn*¹; Chen Liu¹; Everth Hernández-Nava²; Iain Todd²; Minh-Son Pham¹; ¹Imperial College London; ²The University of Sheffield

2:20 PM

Development of an Austenitic/Martensitic Gradient Steel by Additive Manufacturing: *Flore Villaret*¹; Xavier Boulnat²; Pascal Aubry¹; Damien Fabrègue²; Yann de Carlan¹; ¹CEA; ²Université de Lyon, INSA de Lyon

2:40 PM

3D Printed Nanocomposites of Silicon Elastomer and Multiferroic Nanoparticles: *Felicia Horne*¹; Naga Srinivas Korivi¹; Vijay Rangari¹; ¹Tuskegee University

3:00 PM

Energy Absorbing Functional Composites with Negative Stiffness: Al-ZrO2 Fabricated by Additive Friction Stir Deposition: *Hunter Rauch*¹; Hang Yu¹; ¹Virginia Polytechnic Institute and State University

3:20 PM

3D Printed Polymer Multiferroic Composites: *Emery Utterback*¹; Naga Srinivas Korivi¹; Vijay Rangari¹; ¹Tuskegee University

3:40 PM Break

4:00 PM

Additive Manufacturing of Multifunctional Continuous Carbon Fiber Composites via Coextrusion: Aditya Thakur¹; *Xiangyang Dong*¹; ¹Missouri University of Science and Technology

4:20 PM

Characterization of as Selected Laser Melting Built and Vacuum Heat Treated NiTa Alloy for Hard Disc Applications: *Cheng-Tse Wu*¹; Michael Wu²; Gary Chung²; C.Y. Ma²; Feng Xu³; Kinnor Chattopadhyay¹; ¹University of Toronto; ²Solar Applied Materials Technology Corporation; ³Farsoon Technologies Corporation

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques — In Situ Monitoring and Diagnostics: Powder Bed

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Fan Zhang, National Institute of Standards and Technology; Tom Stockman, Los Alamos National Laboratory; Tao Sun, University of Virginia; Donald Brown, Los Alamos National Laboratory; Yan Gao, Ge Global Research; Amit Pandey, MicroTesting Solutions; Joy Gockel, Wright State University; Tim Horn, North Carolina State University; Sneha Prabha Narra, Worcester Polytechnic Institute; Judy Schneider, University of Alabama at Huntsville

Thursday PM | February 27, 2020
8 | San Diego Convention Ctr

Session Chair: Joy Gockel, Wright State University

2:00 PM Invited
A Machine-Agnostic Approach to Layer-wise Process Monitoring and Control of Powder Bed Additive Manufacturing Technologies: *Luke Scime*¹; Derek Siddel¹; Vincent Paquit¹; ¹Oak Ridge National Laboratory

2:30 PM
Rapid Characterization of AM Components for Alloy Design and Process Optimization: *Ryan Dehoff*¹; Alex Plotkowski¹; Kevin Sisco²; Paul Brackman³; Pradeep Bhattad³; Curtis Frederick³; Andres Rossy¹; Amit Shyam¹; ¹Oak Ridge National Laboratory; ²University of Tennessee; ³Zeiss AG

2:50 PM
Simultaneous High-speed Measurements of Laser Absorptance and Melt Pool Geometry in Metal Powder Bed Systems: *Brian Simonds*¹; Jack Tanner¹; Paul Williams¹; Niranjan Parab²; Cang Zhao²; Tao Sun²; ¹National Institute of Standards and Technology; ²Argonne National Laboratory

3:10 PM
High Speed Video of the Influence of Preheating on Tungsten Microcracking During Laser Scanning: *Bey Vrancken*¹; Rishi Ganeriwala¹; Aiden Martin¹; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory

3:30 PM
In-situ Measurement of the Kinetics of Homogenization and Aging Treatments in A205 Alloy Produced Through Additive Manufacturing: Guilherme Faria¹; *Antonio Ramirez*¹; ¹Ohio State University

3:50 PM Break

4:10 PM Invited

Quantifying Defect Signatures in Metal Additive Manufacturing Using In-situ Diagnostics: *Manyalibo Matthews*¹; Bradley Jared²; John Carpenter³; Elena Garlea⁴; Benjamin Brown⁵; ¹Lawrence Livermore National Laboratory; ²Sandia National Laboratories; ³Los Alamos National Laboratory; ⁴Y-12 National Security Complex; ⁵Kansas City National Security Campus

4:40 PM

Unsupervised Learning Applied to Powder Metals for Additive Manufacturing: *Ryan Cohn*¹; Andrew Kitahara¹; Srujana Rao Yarasi¹; Elizabeth Holm¹; ¹Carnegie Mellon University

5:00 PM

Coherent Scanning Interferometry for Characterization of Recycled Metal Powder and Reusability Assessment in Additive Manufacturing: Susana Castillo¹; *Anna Hayes*¹; Rongguang Liang¹; Gregory Colvin¹; Krishna Muralidharan¹; Douglas Loy¹; Barrett Potter¹; Christopher Shanor¹; ¹University of Arizona

5:20 PM

In-line Powder Packing Density Analysis During Selective Laser Melting: *Tan-Phuc Le*¹; Karl Davidson¹; Bernard Gaskey¹; Po-Ju Chang¹; Matteo Seita¹; ¹Nanyang Technological University

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development II — Alloy Design-Functional Materials

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Orlando Rios, Oak Ridge National Laboratory; Hunter Martin, HRL Laboratories; Atieh Moridi, Cornell University

Thursday PM | February 27, 2020
6F | San Diego Convention Ctr

Session Chair: Behrang Poorganji, GE Additive

2:00 PM Invited

The Synthesis of Ti based Bulk Metallic Glass Alloys for Additive Manufacturing: *Hwi-Jun Kim*¹; Yeon-Joo Lee¹; Young-Sin Choi¹; ¹KITECH

2:30 PM

Additive Manufacturing of Bulk Metallic Glass Composites with Improved Mechanical Properties: Shunyu Liu¹; Abhijeet Dhiman¹; *Yung Shin*¹; Vikas Tomar¹; Samuel Zhang¹; ¹Purdue University

2:50 PM

Additive Manufacturing of Crack-free W-base Refractory Materials: *Ian McCue*¹; Michael Presley¹; Michael Brupbacher¹; Morgan Trexler¹; ¹Johns Hopkins University Applied Physics Lab

3:10 PM

A Novel Titanium Alloy for Additively Manufactured Orthopaedic Implants: *Enrique Alabort*¹; Alvaro De Diego²; Maria Vega Aguirre-Cebrián²; Daniel Barba²; Roger Reed³; ¹OxMet Technologies; ²Universidad Politecnica de Madrid; ³University of Oxford

3:30 PM

Additive Manufacturing of Wear Resistant Metallic Glass Components for Space Exploration: *Punnathat Bordeenithikasem*¹; Samad Firdosy¹; Andre Pate¹; John Paul Borgonia¹; Douglas Hofmann¹; ¹NASA Jet Propulsion Laboratory

3:50 PM Break

4:05 PM Invited

A Parameter Optimization Framework for Defect-free Metal Additive Manufacturing Using Laser Powder Bed Fusion: *Ibrahim Karaman*¹; Raiyan Seede¹; Bing Zhang¹; David Shoukr¹; Alaa Elwany¹; Raymundo Arroyave¹; ¹Texas A&M University

4:35 PM

Material Design for Additive Manufacturing of Soft Magnetic Materials for Permanent Magnet Synchronous Machine Rotors: *Lennart Tasche*¹; Florian Hengsbach¹; Kai-Peter Hoyer¹; Sebastian Magerkohl²; Stefan Urbanek³; Bernd Ponick⁴; Detmar Zimmer⁵; Mirko Schaper¹; ¹Paderborn University Department of Material Science; ²Paderborn University Chair of Design and Drive Technology; ³University of Hannover Institute for Drive Systems and Power Electronics; ⁴University of Hannover Institute for Drive Systems and Power Electronics ; ⁵Paderborn University

4:55 PM

Novel Alloy Development Using Laser Directed Energy Deposition: *Eric Heikkenen*¹; Sudarsanam Babu¹; ¹The University of Tennessee

5:15 PM

Development of Prediction Tools for Incorporation of Cooling Rate Dependent Solute Drag Based Thermo-physical Properties in Additive Manufacturing: A Sensitivity Study: *Deepankar Pal*¹; Kaisheng Wu²; Dave Conover¹; ¹ANSYS; ²Thermocalc

5:35 PM

Towards an ICME Framework of Designing Post-process for Additively Manufactured Ti-6Al-4V: *Shengyen Li*¹; Kirby Matthew¹; James Sobotka¹; ¹Southwest Research Institute

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Processing Effects on Microstructure and Material Performance — Microstructure and Mechanical Properties

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Eric Lass, University of Tennessee, Knoxville; Joy Gockel, Wright State University; Emma White, Ames Laboratory; Richard Fonda, Naval Research Laboratory; Monnamme Tlotleng, University of Johannesburg; Jayme Keist, Pennsylvania State University; Hang Yu, Virginia Polytechnic Institute and State University

**Thursday PM | February 27, 2020
6E | San Diego Convention Ctr**

Session Chairs: Eric Lass, The University of Tennessee, Knoxville; Monnamme Tlotleng, University of Johannesburg

2:00 PM

Micro-mechanical Characterization of Directed Energy Deposited 316L Stainless Steel with Hierarchical Microstructure: *Baolong Zheng*¹; Xin Wang¹; Sen Jiang¹; Bingqing Chen²; Jiayu Liang²; Shuai Huang²; Yizhang Zhou¹; Enrique Lavernia¹; Julie Schoenung¹; ¹University of California, Irvine; ²Beijing Institute of Aeronautical Materials

2:20 PM

Micromechanical Modeling of Length-scale Effects and Performance of SLM Stainless Steel Microstructures: *Matti Lindroos*¹; Samuel Forest²; Tatu Pinomaa¹; Anssi Laukkanen¹; ¹VTT Research Centre of Finland; ²MINES ParisTech

2:40 PM

Influence of Microstructure, Texture and Heat Treatments on the Mechanical Properties of Additively Manufactured Hastelloy X: *Benedikt Diepold*¹; Steffen Neumeier¹; Mathias Göken¹; ¹FAU Erlangen-Nuremberg

3:00 PM

Effect of Build Size to the Final Microstructures in Ti6Al4V After Selective Laser Melting: *Sinting Cynthia Chang*¹; Samy Hocine¹; Steven Van Petegem¹; Tuerdi Maimaityili¹; Dario Ferreira Sanchez¹; Daniel Grolimund¹; Helena Van Swygenhoven¹; ¹Paul Scherrer Institute

3:20 PM

Role of Thermal Gradients in the Microstructure Evolution in EBM Ti-6Al-4V Builds: *Sabina Kumar*¹; Benjamin Stump²; Sudarsanam Babu¹; ¹University of Tennessee; ²Manufacturing Demonstration Facility

3:40 PM Break

4:00 PM

High Temperature Anisotropic Mechanical Behavior of E-beam Ti6Al4V Material: *Jamal Mian*¹; Jafar Razmi¹; Leila Ladani¹; ¹Arizona State University

4:20 PM

Simulating Microstructure in Metallic Materials Applied for Additive Manufacturing Processes: *Javed Akram*¹; Thaddeus Low¹; ¹ANSYS

4:40 PM

Metastable Cellular Microstructure in Selective Laser Melted Maraging Steel: *Yingjie Yao*¹; Zhigang Yang¹; Chi Zhang¹; Hao Chen¹; ¹Key Laboratory for Advanced Materials of Ministry of Education, School of Materials Science and Engineering, Tsinghua University

5:00 PM

A Biomedical Titanium Alloy Manufactured by Selective Laser Melting (SLM): *Xuan Luo*¹; Chao Yang¹; Yuanyuan Li¹; ¹South China University of Technology

ADVANCED MATERIALS

Advanced High Strength Steels IV — Session VI

Sponsored by: TMS Structural Materials Division, TMS: Steels Committee

Program Organizers: Ana Luiza Araujo, AK Steel Research and Innovation Center; Mary O'Brien, Colorado School of Mines; Tilmann Hickel, Max Planck Institut für Eisenforschung; Amy Clarke, Colorado School of Mines; Kester Clarke, Colorado School of Mines; C. Tasan, Massachusetts Institute of Technology; MingXin Huang, University of Hong Kong

Thursday PM | February 27, 2020
Balboa | Marriott Marquis Hotel

Session Chairs: Mary O'Brien, Colorado School of Mines; Kester Clarke, Colorado School of Mines

2:00 PM

Cryogenic Tensile and Microstructural Behaviors of High Manganese Steel Welds: *Myeonghwan Choi*¹; Junghoon Lee¹; Hyunbin Nam¹; Namhyun Kang¹; Myung-Hyun Kim¹; Dae-Won Cho²; Dae-Geun Nam³; Seunghwan Lee⁴; ¹Pusan National University; ²Busan Machinery Research Center; ³Korea Institute of Industrial Technology; ⁴Korea Aerospace University

2:20 PM

Impact of Cr and Mn on the Hydrogen-carbide Interaction in High-strength Steels: *Lekshmi Sreekala*¹; Poulumi Dey²; Tilmann Hickel¹; Jörg Neugebauer¹; ¹Max-Planck-Institut für Eisenforschung GmbH; ²Technische Universiteit Delft

2:40 PM

Interstitial-free Bake Hardening Realized by Epsilon-martensite Reverse Transformation: *Shaolou Wei*¹; Menglei Jiang¹; Cemal Tasan¹; ¹Massachusetts Institute of Technology

3:00 PM

Strength and Toughness of Nano-structured Pearlite: Kushal Mishra¹; Vaibhav Khiratkar¹; *Aparna Singh*¹; ¹Metallurgical Engineering and Materials Science, IIT Bombay, Mumbai

3:20 PM

Martensite Transformation Induced Unprecedented Strength in Pure Iron: *Hongwang Zhang*¹; ¹Yanshan University

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Additive Manufacturing of

Magnetic Materials

Sponsored by: TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Daniel Salazar, BCMaterials; Alex Leary, Nasa Glenn Research Center; Markus Chmielus, University of Pittsburgh; Ryan Ott, Ames Laboratory/Cmi; Arcady Zhukov, UPV/EHU, and Ikerbasque, Basque Foundation for Science

Thursday PM | February 27, 2020
Del Mar | Marriott Marquis Hotel

Session Chairs: Orlando Rios, Oak Ridge National Laboratory; Kevin Byerly, National Energy Technology Laboratory

2:00 PM

Have it Your Way: Manufacturing of Permanent Magnets by Laser Powder-bed Fusion, Cold Spray, Extrusion: *Alexander Baker*¹; Matt Worthington¹; Sarah Baker¹; Christine Orme¹; Scott McCall¹; ¹Lawrence Livermore National Laboratory

2:20 PM

Understanding the Role of Particle Size in the Development of Flexible Permanent Magnet-polymer Filaments: *Ester Palmero*¹; Daniel Casaleiz¹; Javier Rial¹; Javier de Vicente¹; Alberto Bollero¹; ¹IMDEA Nanoscience

2:40 PM Invited

Additive Manufacturing of NiZnCu-ferrite Soft Magnetic Composites: Caleb Andrews¹; Kathryn Small¹; Megan Chatham²; Samantha Dorman²; *Mitra Taheri*¹; ¹Johns Hopkins University; ²Drexel University

3:05 PM Invited

Composite Magnetic Filaments for Additive Manufacturing: A Novel Procedure for Laboratory Scale Production: *Victorino Franco*¹; Álvaro Díaz-García¹; Ana Bellido-Correa¹; Agustín Cota¹; Joaquín Ramírez-Rico¹; Jia Yan Law¹; ¹Universidad de Sevilla

3:30 PM Break

3:50 PM

Additive Manufacturing Method to Fabricate Crack-free Highly Dense Fe-6 wt.% Si Soft Magnets: *Mariappan Paranthaman*¹; Corson Cramer¹; Peeyush Nandwana¹; Jiaqiang Yan¹; Samuel Evans¹; Amy Elliott¹; Chins Chinnasamy²; ¹Oak Ridge National Laboratory; ²Carpenter Technology Corporation

4:10 PM
Advances in Directed Energy Deposition (DED) of Fe-Co Based Alloys and Functional Gradients: *Samad Firdosy*¹; Peter Dillon¹; John Paul Borgonia¹; Ryan Conversano¹; Bryan McEnerney¹; Andrew Shapiro¹; ¹Jet Propulsion Laboratory

4:30 PM
Low Temperature Additive Manufacturing of Metamagnetic Shape Memory Alloys for Magnetocaloric Applications: Bosco Rodriguez¹; *Daniel Salazar*¹; Volodymyr Chernenko¹; ¹BCMaterials

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VI — Energy Conversion and Storage IV

Sponsored by: TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

Program Organizers: Jung Pyung Choi, Pacific Northwest National Laboratory; Amit Pandey, MicroTesting Solutions; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh

Thursday PM | February 27, 2020
16B | San Diego Convention Ctr

Session Chairs: Aashutosh Mistry, Argon National Laboratory; Megan Butala, University of Florida

2:00 PM Invited
Operando Observation and Detailed Chemical Modeling of the Bilayer Solid Electrolyte Interphase: *Steven DeCaluwe*¹; ¹Colorado School of Mines

2:20 PM
Engineering Routes Towards Synthesis of Layered Oxide Materials for High-performance Sodium-ion Batteries: *Mengya Li*¹; Yaocai Bai¹; David Wood III¹; Ilias Belharouak¹; Jianlin Li¹; ¹Oak Ridge National Laboratory

2:40 PM
Cathode Modification by Dielectric Materials and Their Performance in Li-ion Battery: *Shintaro Yasui*¹; Sou Yasuhara¹; Takashi Teranishi²; Yumi Yoshikawa²; Tomoyasu Taniyama³; Mitsuru Itoh¹; ¹Tokyo Institute of Technology; ²Okayama University; ³Nagoya University

3:00 PM
Life Cycle Analysis on Battery Energy Storage Systems: A Case Study on Flow Batteries and Lithium-ion Batteries: *Haoyang He*¹; Shan Tian¹; Brian Tarroja¹; Oladele Ogunseitan¹; Scott Samuelson¹; Julie Schoenung¹; ¹University of California, Irvine

3:20 PM
A Study on Charge-discharge Characteristics of Dipping Ga-Sn Electrode: *Hsien-Ching Liao*¹; Fei-Yi Hung¹; ¹National Cheng Kung University

3:40 PM Break

4:00 PM
Charge-discharge Performance of Metal Hydride/Air Secondary Battery Using Modified Air Electrode by PDL Method: *Tatsuya Fukumoto*¹; Kenji Kawaguchi¹; Masatsugu Morimitsu¹; ¹Doshisha University

4:20 PM
Improvement in Rechargeability of Zinc Electrode for Aqueous Secondary Batteries: *Takuya Okumura*¹; Kenji Kawaguchi¹; Masatsugu Morimitsu¹; ¹Doshisha University

4:40 PM
Metal Enhancements to Porous Carbon Materials for Hydrogen Storage: Hillary Smith¹; *Cullen Quine*²; Channing Ahn²; David Boyd²; Brent Fultz²; ¹Swarthmore College; ²Caltech

LIGHT METALS

Aluminum Reduction Technology — Reduction Cell Technology and Development

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Jayson Tessier, Alcoa

Thursday PM | February 27, 2020
6D | San Diego Convention Ctr

Session Chair: Espen Tjonneland Wefring, Hydro Aluminium

2:00 PM Introductory Comments

2:05 PM

The Australian Energy Crisis: Its Impact on Domestic Aluminium Smelting and Potential Solutions: *David Wong*¹; Alton Tabereaux²; Mark Dorreen¹; ¹University of Auckland; ²Consultant

2:25 PM

Recycling of the Flue Gas from Aluminium Electrolysis Cells: *Asbjorn Solheim*¹; Samuel Senanu¹; ¹SINTEF Industry

2:45 PM

Utilization of Waste Heat for Pre-heating of Anodes: Martin Grimstad¹; Kim Ronny Elstad²; Asbjørn Solheim³; *Kristian Etienne Einarsrud*¹; ¹Norwegian University of Science and Technology; ²Alcoa Mosjøen; ³SINTEF Industry

3:05 PM

Toward Minimizing the of Co-evolution of PFC Emission in EGA Smelter: Najeeba Al Jabri¹; *Ali Jassim*¹; Daniel Whitfield¹; Sergey Akhmetov¹; Barry Welch²; ¹EGA; ²Welbank Consulting Ltd

3:25 PM Break

3:40 PM

Development and Application of GP500+ Energy Saving Aluminum Reduction Cell: *Zhuojun Xie*¹; Song He¹; Hongmin Ao¹; ¹GAMI

4:00 PM

Research and Application of Direct Welding Technology on Super Large Section Conductor: *Xudong Wang*¹; Xiaoqiang Feng¹; Yingwu Li¹; ¹Zhengzhou Jingwei Technology

ADVANCED MATERIALS

Bulk Metallic Glasses XVII — Mechanical and Other Properties

Sponsored by: TMS Structural Materials Division, TMS; Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee - Knoxville; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Robert Maass, University of Illinois at Urbana-Champaign; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday PM | February 27, 2020
Cardiff | Marriott Marquis Hotel

Session Chairs: Jörg Löffler, ETH Zurich; Golden Kumar, The University of Texas at Dallas

2:00 PM Invited

Effects of Testing Temperature and Sample-size on Tensile Deformation of Metallic Glass: Chandra Meduri¹; *Golden Kumar*²; ¹Texas Tech University; ²The University of Texas at Dallas

2:20 PM

Effect of Thermal History on Crystallization Kinetics of a Bulk Glass-forming Liquid: *Güven Kurtuldu*¹; Jörg Löffler¹; ¹Laboratory of Metal Physics and Technology, Department of Materials, ETH Zürich

2:40 PM

Corrosion Behavior of SAM2×5 Amorphous Steel / Crystalline *In Situ* Composite: *Nada F. Qari*¹; Arash Yazdani¹; Darren Dewitt¹; Javier E. Garay¹; Olivia Graeve¹; ¹University of California, San Diego

3:00 PM

Crystallization during Welding of Bulk Metallic Glasses: Martin Dickey¹; Cody Bowman¹; Timothy Pickle²; Kayode Oyedemi³; Anthony Slater⁴; Nicholas Hutchinson⁵; *Richard Baumer*⁶; ¹Newport News Shipbuilding; ²Colorado School of Mines; ³ARCOTEQ; ⁴Cambridge Vacuum Engineering; ⁵Eutectix; ⁶LeTourneau University

3:20 PM Break

3:40 PM Invited

Shear Band Nucleation Kinetics in Metallic Glasses: *Meng Gao*¹; John Perepezko¹; Junqiang Wang²; ¹University Of Wisconsin-Madison; ²Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences

4:00 PM

Characterization of Failure Mechanisms in a Metallic/Bulk Metallic Glass Composite: *Ashraf Bastawros*¹; ¹Iowa State University

4:20 PM Invited

The Effect of Thermal and Mechanical Cycling on Atomic Structure and Fracture Toughness of Metallic Glasses: *Jittisa Ketkaew*¹; Sebastian Kube¹; Derek Kuldinow¹; Rui Yamada²; Hui Wang³; Wojciech Dmowski³; Takeshi Egami⁴; Jan Schroers¹; ¹Yale University; ²Frontier Research Institute of Interdisciplinary Science (FRIS), Tohoku University; ³University of Tennessee; ⁴University of Tennessee, Oak Ridge National Laboratory

4:40 PM

Nanoscale Heterogeneity on Mechanical Performance of Cu-Zr-Al Thin Film Metallic Glasses: *Xiao Han*¹; Yucong Gu¹; Feng Yan¹; Lin Li¹; ¹University of Alabama

ADVANCED MATERIALS

Bulk Metallic Glasses XVII — Structures and Characterization

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee - Knoxville; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Robert Maass, University of Illinois at Urbana-Champaign; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday PM | February 27, 2020
Marina Ballroom G | Marriott Marquis Hotel

Session Chairs: Takeshi Egami, University of Tennessee; Jamie Kruzic, University of New South Wales

2:00 PM Invited

High Pressure Quenched Metallic Glasses: *Wojciech Dmowski*¹; Stanislaw Gierlotka²; Geunhee Yoo³; Hui Wang¹; Yoshihiko Yokoyama⁴; EunSooPark³; TakeshiEgami⁵; ¹UniversityofTennessee; ²Polish Academy of Science; ³Seoul National University; ⁴Tohoku University; ⁵Oak Ridge National Laboratiry

2:20 PM Invited

Microstructural, Mechanical and Thermal Characterization of Mg65Ni25Y5M5 (M= Si, B, La) Amorphous Alloy by Melt Spinning: *Celal Kursun*¹; Dan Thoma¹; John Perepezko¹; ¹University of Wisconsin, Madison

2:40 PM Invited

Role of Heterogeneous Microstructure Modifications in Affecting Fracture Toughness of Zr-based Bulk Metallic Glasses: *Jamie Kruzic*¹; Bosong Li¹; Bernd Gludovatz¹; Anna Ceguerra²; Keita Nomoto¹; SimonRinger²; ShenghuiXie³; SergioScudino⁴; ¹University of New South Wales; ²University of Sydney; ³Shenzhen University; ⁴IFW Dresden

3:00 PM

X-ray Diffraction Study of the Local Topological Rearrangement and Plasticity of Bulk Metallic Glasses: *Hui Wang*¹; Wojciech

Dmowski¹; Zengquan Wang¹; Yoshihiko Yokoyama²; Hongbin Bei³; Takeshi Egami¹; ¹University of Tennessee; ²Tohoku University; ³Oak Ridge National Laboratory

3:20 PM Break

3:40 PM

Local Dynamics in Metallic Liquids Studied by Inelastic Neutron Scattering: *Zengquan Wang¹*; Wojciech Dmowski¹; Hui Wang¹; Takeshi Egami¹; ¹University of Tennessee

4:00 PM

Mechanical Deformation of Iron-based *In Situ* Metallic Glass Matrix Composites: *Arash Yazdani¹*; Darren Dewitt¹; Wei Huang²; Günther W.H. Höhne³; Scott T. Mixture⁴; Javier E. Garay¹; David Kisailus²; Olivia Graeve¹; ¹University of California, San Diego; ²University of California, Riverside; ³Ulm University; ⁴Alfred University

4:20 PM Invited

Atomic Structural Features Hidden in Structure Factor of Metallic Alloy Liquids: *Chae Woo Ryu¹*; Wojciech Dmowski¹; Takeshi Egami¹; ¹University of Tennessee

4:40 PM

Glass-forming Ability and Atomic Packing Structure of Al-TM-RE Amorphous Alloys: *Jinfu Li¹*; ¹Shanghai Jiao Tong University

CHARACTERIZATION

Characterization of Minerals, Metals and Materials — Characterization of Mechanical Properties II

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Shadia Ikhmayies, Al Isra University; Yunus Kalay, Middle East Technical University; Jiann-Yang Hwang, Michigan Technological University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Army Research Laboratory

Thursday PM | February 27, 2020
Theater A-5 | San Diego Convention Ctr

Session Chairs: Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory

2:00 PM

Deformation Behavior of Mg-Al-Mn Sheets: *Patrik Dobron*¹; Daria Drozdenko¹; Michal Knapek¹; Jan Bohlen²; Frantisek Chmelik¹; ¹Charles University; ²Helmholtz-Zentrum Geesthacht

2:20 PM

Investigation of Impact Toughness of Electron Beam Welded AISI 321 SS at Cryogenic Temperatures: *Sandeep Singh Sandhu*¹; Ajay Sharma¹; Vineet Prabhakar²; ¹Quest Engineering College; ²SUS Engineering College, Tangori

2:40 PM

The Influence Irradiation Conditions on the Microstructural Evolution of Irradiated U-Mo Fuels: *Charlyne Smith*¹; Dennis Keiser²; Brandon Miller²; Assel Aitkaliyeva¹; ¹University of Florida; ²Idaho National Laboratory

3:00 PM

Microstructural Evolution of γ -Ni₃Al Precipitates Affecting Mechanical Properties of Nickel-based Superalloys: *Rasim Eris*¹; M. Vedat Akdeniz¹; Amdulla O. Mekhrabov¹; ¹Middle East Technical University

3:20 PM

Influence of PWHT on Impact Toughness of Electron Beam Welded AISI 409 Stainless Steel: *Akash Doomra*¹; *Sandeep Singh Sandhu*¹; Beant Singh²; ¹Quest Engineering College; ²PCET Lalru

3:40 PM Break

3:55 PM

Calibrating Yield Criteria in 6 Dimensions: A Collection of Analytic and Experimental Case Studies: *Zachary Brunson*¹; Aaron Stebner¹; ¹Colorado School of Mines

4:15 PM

The Evolution of Precipitates in a Novel Heat-resistant Martensitic Steel During Creep: *Pengyu Wen*¹; Haiwen Luo¹; Zhengdong Liu²; Zhengzong Chen²; ¹University of Science and Technology Beijing; ²China Irons & Steel Research Institute Group

CHARACTERIZATION

Characterization of Minerals, Metals and Materials — Characterization of Polymers and Composites II

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Shadia Ikhmayies, Al Isra University; Yunus Kalay, Middle East Technical University; Jiann-Yang Hwang, Michigan Technological University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Army Research Laboratory

Thursday PM | February 27, 2020
Theater A-4 | San Diego Convention Ctr

Session Chairs: Jeongguk Kim, Korea Railroad Research Institute; Zhiwei Peng, Central South University

2:00 PM
Mechanical Behavior of Thermoplastic Filaments Fabricated with the Fused Modeling Deposition Technique: *Edisson Ordoñez¹*; Henry Colorado¹; ¹Universidad de Antioquia

2:20 PM
Particle Size Effects on Mechanical Properties of Polymer Bonded Composites for Non-hazardous High Explosive Surrogates: *Matthew Herman¹*; Amanda Duque¹; John Yeager¹; ¹Los Alamos National Laboratory

2:40 PM
Modeling and Characterization of Reflection, Absorption, and Scattering in Polycrystalline Materials: *Meir Shachar¹*; Gottlieb Uahengo¹; Elias Penilla¹; Matthew Duarte¹; Yasuhiro Kodera¹; Javier Garay¹; ¹University of California, San Diego

3:00 PM
Characterization of Brazilian Peat, Clay and Diatomite Blends for Use as Organic Compounds Adsorbents: *Tatiana Costa¹*; Francisco Valenzuela-Diaz²; Maria das Graças Da Silva-Valenzuela²; Jéssica Arjona²; ¹Universidade De Sao Paulo; ²USP

3:20 PM Break

3:35 PM
Microstructure Dependent Thermal Conductivity Measurement of Zircaloy-4 Using an Extended Raman Thermometry Method: Hao Wang¹; *Abhijeet Dhiman¹*; Vikas Tomar¹; ¹Purdue University

3:55 PM

Preparation and Characterization of Modified Polymer Fibers Membrane with β -cyclodextrin and its Adsorption Properties:

*Aiying Zhang*¹; Xiang Wang¹; Jiale Yang¹; Ning Gao¹; Zengguo Feng²;

¹School of Materials Science and Engineering, Beijing Institute of Technology; ²Beijing Institute of Technology

4:15 PM

Fabrication of Ultra-high Molecular Weight Polyethylene Membrane and Evaluation of Physical Characteristics for Wastewater Treatment:

*Shanshan Xie*¹; Zhangfu Yuan¹; Yuantao Shi¹;

¹University of Science and Technology, Beijing

MATERIALS DESIGN

Computational Discovery and Design of Emerging Materials — Session VI

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Arunima Singh, Arizona State University; Houlong Zhuang, Arizona State University; Sugata Chowdhury, National Institute of Standards and Technology; Arun Kumar Mannodi Kanakkithodi, Argonne National Laboratory

Thursday PM | February 27, 2020

32B | San Diego Convention Ctr

Session Chair: Houlong Zhuang, Arizona State University

2:00 PM Invited

Electronic Excitations and Ultrafast Dynamics: Pushing Towards Materials Engineering and Design:

*Andre Schleife*¹; ¹University of Illinois at Urbana-Champaign

2:30 PM

Analysis of Chemical Activity of Bismuthene in the Presence of Environment Gas Molecules by Means of Ab-initio Calculations:

*Elena Korznikova*¹; Andrey Kistanov¹; Salavat Khadiullin²;

¹Russian Academy of Sciences; ²Ufa State Aviation Technical University

2:50 PM

Accelerating the Genetic Algorithm for Structure Prediction in 2D Materials using Machine Learning:

*Stephen Xie*¹; Shreyas Honrao²; Anne Marie Tan¹; Richard Hennig¹;

¹University of Florida Department of Materials Science and Engineering; ²NASA Ames

Research Center

3:10 PM

Tunability of Martensitic Transformation in Mg-Sc Shape Memory Alloys: a DFT Study: *Shivam Tripathi*¹; Karthik Guda Vishnu¹; Michael Titus¹; Alejandro Strachan¹; ¹Purdue Univeristy

3:30 PM Break

3:50 PM Invited

Computational Discovery of Strongly Correlated Quantum Matter through Downfolding: *Hitesh Changlani*¹; ¹Florida State University

4:20 PM

Influence of Strain on Mesoscopic 2D Film Growth from Phase Field Methods: *Tara Boland*¹; Arunima Singh¹; ¹Arizona State University

4:40 PM

Predicting Polymer Crystallinity Using Multi-fidelity Information Fusion with Machine Learning: *Shruti Venkatram*¹; Lihua Chen¹; Rampi Ramprasad¹; ¹Georgia Institute of Technology

ENERGY & ENVIRONMENT

Computational Materials Science and Engineering of Materials in Nuclear Reactors — Multiscale Modeling II

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Dillpuneet Aidhy, University of Wyoming; Michael Tonks, University of Florida; Mahmood Mamivand, Boise State University; Giovanni Bonny, Belgian Nuclear Research Center

Thursday PM | February 27, 2020

Theater A-9 | San Diego Convention Ctr

Session Chairs: Eva Zarkadoula, Oak Ridge National Laboratory; Dillpuneet Aidhy, University of Wyoming

2:00 PM

Molecular Dynamics Studies of Thermal Conductivity Degradation of UO₂ due to Dispersed Xe Atoms and Xe Bubbles: *Weiming Chen*¹; Michael Cooper²; Ziqi Xiao¹; David Andersson²; Xian-Ming Bai¹; ¹Virginia Polytechnic Institute and State University; ²Los Alamos National Laboratory

2:20 PM

A Micromechanics-based Modeling Approach to Predict the Mechanical Properties of Zircaloy with Hydride Precipitates:

*Varun Gupta*¹; Yulan Li¹; Shenyang Hu¹; Arun Devaraj¹; David Senior¹;

¹Pacific Northwest National Laboratory

2:40 PM

Microstructure-based Finite Element Model to Investigate the Effect of Grain Size and Homogenization on Hot-rolled U-10Mo:

*Ayoub Soulami*¹; Aaron Fortier²; Curt Lavender¹; Vineet Joshi¹;

¹Pacific Northwest National Laboratory; ²RWTH Aachen

3:00 PM

Reduced Order Modeling of Thermal Creep in 316H Stainless Steel:

*Aaron Tallman*¹; M Arul Kumar¹; Laurent Capolungo¹; ¹Los

Alamos National Laboratory

3:20 PM Break

3:40 PM

Application of Variational Bayesian Monte Carlo Method for Improved Prediction of Doped UO₂ Fuel Performance:

*Yifeng Che*¹; Koroush Shirvan¹; ¹Massachusetts Institute of Technology

4:00 PM

Zirconium Alloy Cladding Burst Mechanisms under LOCA with Burnup Extension:

Jianguo Yu¹; Cole Blakely¹; *Hongbin Zhang*¹;

¹Idaho National Laboratory

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Data and High Throughput Methods II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Jorge Munoz, University of Texas at El Paso; Sara Kadkhodaei, University of Illinois at Chicago; Vahid Attari, Texas A&M University; James Morris, Ames Laboratory

Thursday PM | February 27, 2020

33C | San Diego Convention Ctr

Session Chairs: Praytush Tiwary, University of Maryland; Maryam Ghazisaeidi, Ohio State University

2:00 PM Invited

Autonomous Efficient Experiment Design for Materials Discovery: A Case Study on MAX Phases: *Anjana Talapatra*¹; Raymundo Arroyave²; Shahin Boluki²; Xiaoning Qian²; Edward Dougherty²; ¹Los Alamos National Laboratory; ²Texas A&M University

2:30 PM

Artificial Intelligence for Predicting Phase Stability on High Entropy Alloys: Anus Manzoor¹; *Dilpuneet Aidhy*¹; ¹University of Wyoming

2:50 PM Invited

Autonomous Scanning Droplet Cell for On-demand Alloy Electrodeposition and Characterization: *Brian DeCost*¹; Howie Joress¹; Stephen Ambrozik¹; Trevor Braun¹; Zachary Trautt¹; Aaron Kusne¹; Jason Hattrick-Simpers¹; ¹National Institute of Standards and Technology

3:20 PM

Bond-order Bond Energy Model for Alloys: *Wolfgang Windl*¹; Christian Oberdorfer¹; Maryam Ghazisaeidi¹; ¹Ohio State University

3:40 PM Break

4:00 PM Invited

Efficient Navigation of the Search Space for Accelerated Materials Discovery: *Prasanna Balachandran*¹; ¹University of Virginia

4:30 PM Invited

From Molecular Dissociation to Crystal Nucleation: Next Generation Methods for Sampling Rare Events in All-atom Resolution: *Pratyush Tiwary*¹; ¹University of Maryland

5:00 PM

Using Machine-learning Potentials for Free Energy Calculations of Multicomponent Alloys: *Prashanth Srinivasan*¹; Yuji Ikeda²; Blazej Grabowski³; Jan Janssen²; Alexander Shapeev⁴; Jörg Neugebauer²; Fritz Körmann²; ¹Delft University of Technology; ²Max-Planck-Institut für Eisenforschung; ³University of Stuttgart; ⁴Skolkovo Institute of Science and Technology

CORROSION

Environmental Degradation of Additively Manufactured Alloys — Aqueous Corrosion

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Kinga Unocic, Oak Ridge National Laboratory; Luke Brewer, University of Alabama; Sebastien Dryepondt, Oak Ridge National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Jenifer Locke, Ohio State University; Xiaoyuan Lou, Auburn University

Thursday PM | February 27, 2020
7A | San Diego Convention Ctr

Session Chairs: Jennifer Locke, Ohio State University; Luke Brewer, University of Alabama

2:00 PM
Cyclic Oxidation Behavior in Air at 950°C of Hastelloy X Fabricated by Selective Laser or Electron Beam Melting: *Sebastien Dryepondt*¹; Marie Romedenne¹; Matthew Kuner²; Rishi Pillai¹; ¹Oak Ridge National Laboratory; ²Georgia Institute of Technology

2:20 PM
Understanding the Anomalous Corrosion Behavior of Additively Manufactured Stainless Steels through Multi-modal Synchrotron Techniques: *Jason Trelewicz*¹; David Sprouster¹; Gary Halada¹; Hanfei Yan²; Yong Chu²; Eric Dooryhee²; Guhaprasanna Manogharan³; ¹Stony Brook University; ²Brookhaven National Laboratory; ³The Pennsylvania State University

2:40 PM
Effect of Surface Contouring on Corrosion of 6061-RAM2 Produced by Laser-based Powder Bed Fusion Additive Manufacturing: Hamidreza Torbati-Sarraf¹; *Seyed Alireza Torbati Sarraf*²; Amir Poursaee¹; ¹Clemson University; ²University of Southern California

3:00 PM
Issues in Localized Corrosion of Selective Laser Melted 316L: *Duane Armell Macatangay*¹; Jonathan Skelton¹; Wenhao Lin¹; Robert Kelly¹; Ji Ma¹; ¹University of Virginia

3:20 PM
Corrosion Properties of Additively Manufactured Duplex Stainless Steel: *Greg Nigon*¹; O. Burkan Isgor¹; Somayeh Pasebani¹; ¹Oregon State University

3:40 PM Break

4:00 PM Invited

Role of Microstructure and Surface Finish on the Corrosion of Selective Laser Melted 304 and 316 Stainless Steel: *Eric Schindelholz*; Michael Melia¹; Rebecca Schaller¹; Jesse Duran¹; Jeffrey Rodelas¹; ¹Sandia National Laboratories

4:25 PM

Interaction between Additive Manufacturing Defects, Powder Contamination, and Two Corrosive Environments: *Holly Martin*¹; Daniel Bogen¹; Jeremy McKnight¹; Brett Conner¹; ¹Youngstown State University

4:45 PM

Corrosion and Protection (Conversion Coating and Plasma Electrolytic Oxidation) of Ti6Al4V Processed by Powder Bed Fusion – Additive Manufacturing Electrochemical and EIS Study: *Joseph Hazan*¹; Menachem Bamberger¹; ¹Technion, Israel Institute of Technology

5:05 PM

Corrosion Behavior of 304L Stainless Steel Produced by Laser Powder Bed Fusion: Christopher Faraj¹; Jacob Benoun¹; *Ho Lun Chan*¹; Vilupanur Ravi¹; Zachary Hilton²; Joseph Newkirk²; ¹California Polytechnical University, Pomona; ²Missouri University of Science and Technology

5:25 PM

Corrosion Behavior of Newly Developed High Toughness Mixed-phase Steels: *Neetu Verma*¹; S. Sangal¹; K. Mondal¹; ¹IIT Kanpur

5:45 PM

The Effects of Solution Chemistry on the Corrosion Behavior of Cold Sprayed AA7075: *Ozymandias Agar*¹; Nicholas D'Attilio¹; Luke Brewer¹; ¹University of Alabama

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Corrosion and Fracture in Harsh Environments

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Bai Cui, University of Nebraska-Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Jenifer Locke, Ohio State University

Thursday PM | February 27, 2020
Theater A-10 | San Diego Convention Ctr

Session Chairs: Wenjun Cai, Virginia Tech; Ashraf Bastawros, Iowa State University

2:00 PM
Comparative Assessment of the Fracture Behaviour of API-5L X65 and Micro-alloyed Steels in E80 Simulated Fuel Ethanol Environment: *Olufunmilayo Joseph*¹; Seetharaman Sivaprasad²; Soumitro Tarafder²; John Ade Ajayi³; ¹Covenant University; ²CSIR-National Metallurgical Laboratory; ³Federal University of Technology, Akure

2:20 PM
Effects of Chromium and Molybdenum on Hydrogen Absorption Behavior in Iron: *Vanadia Yussalla*¹; Kenichi Takai¹; Tomohiko Omura²; ¹Sophia University; ²Nippon Steel Corporation

2:40 PM
Evidence of Vacancy Generation During Grain Boundary Corrosion of Steel: Denizhan Yavas¹; Thanh Phan¹; Liming Xiong¹; Kurt Hebert¹; *Ashraf Bastawros*¹; ¹Iowa State University

3:00 PM
Predicting the Tribocorrosion Behavior of Aluminum Alloys Using Finite Element Based Multiphysics Modeling: *Kaiwen Wang*¹; Wenjun Cai¹; ¹Virginia Polytechnic Institute and State University

3:20 PM Break

3:40 PM
Investigation of Laboratory versus In-service Sensitization Effects on Corrosion Fatigue Performance of AA5456-H116: *Allison Akman*¹; David Schrock¹; Jenifer (Warner) Locke¹; ¹The Ohio State University

4:00 PM
Phase Field Modeling of Galvanic Corrosion in Magnesium-aluminum Joints: *Kübra Karayagiz*¹; Adam Powell¹; Qingli Ding¹; Brajendra Mishra¹; ¹Worcester Polytechnic Institute

4:20 PM
Microstructural Aspects of Hydrogen Induced Stress Cracking in Various Carbon Steel Welds: *Hanji Park*¹; *Cheolho Park*²; *Myeonghyun Kim*¹; *Yangdo Kim*¹; *Namhyun Kang*¹; ¹Pusan National University; ²Korea Atomic Energy Research Institute

SPECIAL TOPICS

Frontiers of Materials Award Symposium: Machine Learning and Autonomous Researchers for Materials Discovery and Design — Session II

Program Organizer: Keith Brown, Boston University

Thursday PM | February 27, 2020
4 | San Diego Convention Ctr

Session Chair: Keith Brown, Boston University

2:00 PM Invited
Autonomous Research Systems for Materials Development: *Benji Maruyama*¹; *Rahul Rao*²; *Ahmad Islam*²; *Jennifer Carpena*²; *Michael Susner*²; *Kristofer Reyes*³; *Jay Myung*⁴; *Mark Pitt*⁴; ¹US Air Force; ²UES Inc.; ³University at Buffalo, The State University of New York; ⁴The Ohio State University

2:40 PM Invited
Application of Machine Learning and Federated Big Data Storage & Analytics for Accelerated Additive Process and Parameter Development: *Vipul Gupta*¹; ¹GE Research

3:10 PM Invited
Design of Halide Perovskites via Physics-informed Machine-learning: *Shijing Sun*¹; ¹Massachusetts Institute of Technology, Photovoltaics Research Laboratory

3:40 PM Break

4:00 PM Invited
Autonomous Systems for Alloy Design: Towards Robust Closed-loop Alloy Deposition and Characterization: *Brian DeCost*¹; ¹National Institute of Standards and Technology

4:40 PM Invited
Turning Statistical Mechanics Models into Materials Design Engines: *Marc Miskin*¹; ¹University of Pennsylvania

ADVANCED MATERIALS

High Entropy Alloys VIII — Structures and Characterization

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday PM | February 27, 2020
Marina Ballroom F | Marriott Marquis Hotel

Session Chairs: Hyoung Seop Kim, Pohang University of Science and Tech; Ke An, Oak Ridge National Laboratory

2:00 PM Invited
Roles of Martensitic Phase Fractions in Mechanical Behavior of TRIP-HEA: Sichao Fu¹; Dunji Yu¹; Yan Chen¹; *Ke An*¹; ¹Oak Ridge National Laboratory

2:20 PM Invited
On the Exceptional Mechanical Properties and Effect of Local Order in CrCoN-based High-entropy Alloys: *Robert Ritchie*¹; Andrew Minor¹; Mark Asta¹; Jun Ding²; Ruopeng Zhang¹; Shiteng Zhou²; Qin Yu²; ¹University of California, Berkeley; ²Lawrence Berkeley National Laboratory

2:40 PM Invited
In Situ Atom Probe Tomography of Oxidation Mechanism in High Entropy Alloys: *Bharat Gwalani*¹; Elizabeth Kautz¹; Sten Lambeets¹; LiborKovarik¹;ArunDevaraj¹; ¹PacificNorthwestNationalLaboratory

3:00 PM Invited
InterpretingAPTDataContainingHe-bubblesinIrradiatedSingle-phase Concentrated Solid-solution Alloys (SP-CSAs): *Jonathan Poplawsky*¹; Xing Wang¹; Constantinos Hatzougrou²; Ke Jin³; Hongbin Bei³; Yongqiang Wang⁴; William Weber⁵; Yanwen Zhang³; Francois Vurpillot²; Karren More¹; ¹The Center for Nanophase Materials Sciences, Oak Ridge National Laboratory; ²Normandie Université, UNIROUEN, INSA Rouen, CNRS, Groupe de Physique des Matériaux; ³Materials Science and Technology Division, Oak Ridge National Laboratory; ⁴Materials Science and Technology Division, LosAlamosNationalLaboratory; ⁵DepartmentofMaterials

Science and Engineering, University of Tennessee-Knoxville

3:20 PM Break

3:40 PM Invited

Metastability Engineering of High Entropy Alloys: *Hyoung Seop Kim*¹; *Jae Wung Bae*¹; ¹Pohang University of Science and Technology

4:00 PM Invited

In Situ TEM Characterizations on the Dual Phase High Entropy Alloy: *Sijing Chen*¹; *Qian Yu*¹; ¹Zhejiang University

4:20 PM Invited

Welding Metallurgy and Weld Properties of High Entropy Alloys: *Alexander Martin*¹; *Carolyn Fink*¹; ¹Ohio State University

4:40 PM

Pitting Corrosion Behavior of Ni₃₈Fe₂₀Cr_x(MnCo)_{42-x} High Entropy Alloys: *Sarita Sahu*¹; *Orion Swanson*¹; *Tianshu Li*¹; *Angela Gerard*²; *John Scully*²; *Pin Lu*³; *James Saal*³; *Gerald Frankel*¹; ¹The Ohio State University; ²University of Virginia; ³Questek

ADVANCED MATERIALS

High Entropy Alloys VIII — Structures and Modeling II

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday PM | February 27, 2020
Mission Hills | Marriott Marquis Hotel

Session Chairs: Diana Farkas, Virginia Polytechnic Institute; William Yi Wang, Northwestern Polytechnical University

2:00 PM Invited

Effect of Solute-solute Interactions on Yield Strength in HEAs: *William Curtin*¹; *Shankha Nag*¹; ¹Epfl Sti Igm Lammm

2:20 PM Invited
Simulation Studies of Grain Boundary Diffusion in a Model HEA Alloy: *Axel Seoane*¹; Diana Farkas¹; ¹Virginia Polytechnic Institute

2:40 PM Invited
ICME for Ultra-high Temperature Refractory High Entropy Materials: *William Yi Wang*¹; Haoxuan Wang¹; Deye Lin²; Jun Wang¹; Shun-Li Shang³; Jiangwei Wang⁴; Chengxiong Zou¹; Bin Tang¹; Hongchao Kou¹; Haifeng Song²; Chuang Dong⁵; Xi-Dong Hui⁶; Yiguang Wang¹; Peter K Liaw⁷; Jinshan Li¹; Zi-Kui Liu³; ¹Northwestern Polytechnical University; ²Institute of Applied Physics and Computational Mathematics, Beijing; ³Pennsylvania State University; ⁴Zhejiang University; ⁵Dalian University of Technology; ⁶University of Science and Technology Beijing; ⁷University of Tennessee

3:00 PM Invited
Monte Carlo Study on Atomic Arrangement Around Crystal Defect in Multi-principal Element Alloys: *Shuhei Shinzato*¹; Rodrigo Campos¹; Shigenobu Ogata¹; ¹Osaka University

3:20 PM Invited
Density Functional Theory Calculations of Generalized Stacking Fault Energies in Equal-molar MoNbTi Multi-principal Element Alloys: *Yanqing Su*¹; Irene Beyerlein¹; ¹University of California, Santa Barbara

3:40 PM Break

4:00 PM Invited
Atomic and Electronic Basis for the Serration Behavior of High Entropy Alloys and Metallic Glasses: *Jinshan Li*¹; William Yi Wang¹; Jun Wang¹; Shun-Li Shang²; Yi Wang²; Xi-Dong Hui³; Peter K Liaw⁴; Zi-Kui Liu²; ¹Northwestern Polytechnical University; ²Pennsylvania State University; ³University of Science and Technology Beijing; ⁴University of Tennessee

4:20 PM
Simulations and Modeling of the High Temperature Yield Behavior of Chemically Complex Concentrated BCC Alloys: *Satish Rao*¹; Brahim Akdim¹; Edwin Antillon¹; Christopher Woodward²; Oleg Senkov¹; ¹Ues Inc.; ²Air Force Research Laboratory

4:40 PM Invited
Atomistic Modeling of the Structures of High Entropy Alloy Nanoparticles from Carbothermal Shock Synthesis: *Guofeng Wang*¹; Zhenyu Liu¹; ¹University of Pittsburgh

High Entropy Alloys VIII — Thermal and Other Properties

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday PM | February 27, 2020
Marina Ballroom E | Marriott Marquis Hotel

Session Chairs: Chuan Zhang, CompuTherm LLC; Jianxun Hu, Honda R&D Americas

2:00 PM Invited
Development and Application of Phase-based Data Repository via CALPHAD Method in the HEA Discovery: *Chuan Zhang*¹; Rui Feng²; Song-Mao Liang³; Michael Gao⁴; Fan Zhang¹; Peter Liaw²; ¹CompuTherm LLC; ²University of Tennessee; ³University of Wisconsin-Madison; ⁴National Energy Technology Laboratory

2:20 PM Invited
Dislocation Dynamics in a BCC Refractory Multi-Principal Element Alloy MoNbTi: *Fulin Wang*¹; Glenn Balbus¹; Jungho Shin¹; Paul Rottmann¹; Jean-Charles Stinville¹; Leah Mills¹; Oleg Senkov²; Tresa Pollock¹; Daniel Gianola¹; ¹Materials Department, University of California, Santa Barbara; ²Air Force Research Laboratory, Materials and Manufacturing Directorate

2:40 PM Invited
Comparison of High-throughput Experimental Results with Thermodynamic Calculations for more than 2000 HEAs: *Chuangye Wang*¹; Sebastian Kube²; Jan Schroers²; Ji-Cheng Zhao¹; ¹University of Maryland; ²Yale University

3:00 PM Invited
Corrosion, Wear, and Surface Degradation Behavior of High Entropy Alloys: Mayur Pole¹; Chaitanya Mahajan¹; Maryam Sadeghilaridjani¹; *Sundeep Mukherjee*¹; ¹University of North Texas

3:20 PM Invited
High Entropy Alloy Effect on Stability of Potential Permanent Magnets: *Ying Chen*¹; Arkapol Saengdeejing¹; ¹Tohoku University

3:40 PM Break

4:00 PM Invited

Speromagnetism and Asperomagnetism as the Ground States of the Tb-Dy-Ho-Er-Tm “Ideal” High-entropy Alloy: *Janez Dolinsek*¹;

¹Jožef Stefan Institute & University of Ljubljana

4:20 PM Invited

Phase Stability in Refractory High Entropy Alloys: German Samolyuk¹; Yuri Osetsky¹; G. Malcolm Stocks¹; *James Morris*²; ¹Oak Ridge National Laboratory; ²Ames Laboratory

4:40 PM

Design of HEAs Strengthened by L₁₂ Precipitates using High Throughput Thermodynamic Calculations: Thomas Rieger¹; Jean-Marc Joubert¹; Mathilde Laurent-Brocq¹; *Jean-Philippe Couzinié*¹;

¹ICMPE, UMR 7182, CNRS - UPEC, F-94320, Thiais, France

5:00 PM

Quantifying the Effect of Randomness on Vacancy Diffusivity in High Entropy Alloys: *Spencer Thomas*¹; Srikanth Patala¹; ¹North Carolina State University

5:20 PM Invited

High Temperature Phase Stability and Mechanical Behavior of Face-centered Cubic High Entropy Alloys: Min-Gu Jo¹; *Jin-Yoo Suh*¹; Jae-Hyeok Shim¹; Heung Nam Han²; Woo-Sang Jung¹; ¹Korea Institute of Science and Technology; ²Seoul National University

MATERIALS DESIGN

ICME Gap Analysis in Materials Informatics: Databases, Machine Learning, and Data-Driven Design — Session IV

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: James Saal, Citrine Informatics; Carelyn Campbell, National Institute of Standards and Technology; Raymundo Arroyave, Texas A&M University

Thursday PM | February 27, 2020

30D | San Diego Convention Ctr

Session Chair: James Saal, Citrine Informatics

2:00 PM

Improved Performance of Automatic Characterization of Steel Microstructure by Machine Learning Architecture: *JongHyuk Lee*¹; Seonghwan Kim¹; Nam Hoon Goo¹; ¹Hyundai Steel

2:20 PM

Training Data-driven Machine Learning Models Using Physics Simulations: Predicting Local Thermal Histories in Additive Manufactured Components: *Michael Groeber*¹; Karthik Giriprasad¹; ¹The Ohio State University

2:40 PM

Relating Microstructure Features to Response Using Convolutional Neural Networks: *Sean Donegan*¹; Navneet Kumar²; Michael Groeber²; ¹Air Force Research Laboratory; ²The Ohio State University

3:00 PM

Prediction of Steel Micro-structure by Deep Learning Using Database of Thermo-dynamics and Phase Field Model: *Seonghwan Kim*¹; Hyeok Jae Jeong¹; Jong Hyuk Lee¹; Nam Hoon Goo¹; ¹Hyundai Steel Company

3:20 PM

Reduction of Uncertainty in a First-principles-based CALPHAD-type Phase Diagram via Sequential Learning of Phase Equilibrium Data: *Theresa Davey*¹; Brandon Bocklund²; Zi-Kui Liu²; Ying Chen¹; ¹Tohoku University; ²Pennsylvania State University

3:40 PM Break

4:00 PM

Artificial Materials Intelligence (AMI) to Accelerate Discovery of Novel Superalloys: *Irina Roslyakova*¹; Setareh Zomorodpoosh¹; Mansur Ahmed¹; Abdulmonem Obaied¹; Ingo Steinbach¹; ¹ICAMS, Ruhr-University Bochum

4:20 PM

Steel Development and Optimization Using Response Surface Models: *Jun Hu*¹; Rachael Stewart¹; Erik Pavlina¹; Grant Thomas¹; Alexander Duggan²; Roel Van De Velde²; ¹AK Steel; ²ESTECO

4:40 PM

Utilizing the Statistical Machine Learning Approaches to Design New NiTiHf High Temperature Shape Memory Alloys: *Tejas Umale*¹; Shahin Boluki¹; Xiaoning Qian¹; Raymundo Arroyave¹; Ibrahim Karaman¹; ¹Texas A&M University

5:00 PM
Machine Learning-directed Navigation of Synthetic Design Space: A Statistical Learning Approach to Controlling the Synthesis of Perovskite Halide Nanoplatelets in the Quantum-confined Regime: *Erick Braham*¹; Junsang Cho¹; Kristel Forlano¹; Raymundo Arroyave¹; Sarbajit Banerjee¹; ¹Texas A&M University

LIGHT METALS

Magnesium Technology 2020 — Fundamentals, Mechanical Behavior, Twinning, Plasticity, and Texture II

Sponsored by: TMS Light Metals Division, TMS: Magnesium Committee

Program Organizers: J. Brian Jordon, University of Alabama; Victoria Miller, University of Florida; Vineet Joshi, Pacific Northwest National Laboratory; Neale Neelameggham, IND LLC

Thursday PM | February 27, 2020
6C | San Diego Convention Ctr

Session Chairs: Tracy Berman, University of Michigan; Keerti Kappagantula, Pacific Northwest National Laboratory

2:00 PM
Mapping Anisotropy and Triaxiality Effects in Magnesium Alloys: Padmeya Indurkar¹; Shahmeer Baweja²; Robert Perez²; Amol Vuppuluri²; *Shailendra Joshi*²; ¹National University of Singapore; ²University of Houston

2:20 PM
Cold Formability of Extruded Magnesium Bands: Maria Nienaber¹; Jan Bohlen¹; Jose Victoria-Hernández¹; Sangbong Yi¹; Karl Ulrich Kainer¹; *Dietmar Letzig*¹; ¹Helmholtz-Zentrum Geesthacht

2:40 PM
The Effect of Plastic Deformation on the Precipitation Hardening Behavior of Biodegradable Mg-Sr-Ca-Zn Based Alloys: Matteo Nicolasi¹; Baoqi Guo²; Mihriban Pekguleryuz²; Mert Celikin¹; *Konstantinos Korgiopoulos*²; ¹University College Dublin; ²McGill University

3:00 PM
Experimental Investigation of Raster Tool Path Strategy for Friction Stir Processing of Magnesium Alloy: *Abhishek Kumar*¹; Nikhil Gotawala¹; Aarush Sood¹; Sushil Mishra¹; Amber Shrivastava¹; ¹Indian Institute of Technology Bombay

3:20 PM
Quantitative Relationship Analysis of Mechanical Properties with Microstructure and Texture Evolution in AZ Series Alloys: *Joung Sik Suh*¹; Byeong-Chan Suh¹; Jun Ho Bae¹; Sang Eun Lee¹; Byoung-Gi Moon¹; Young Min Kim¹; ¹Korea Institute of Materials Science

3:40 PM Break

4:00 PM
On the Influence of Twinning and Detwinning on the Deformation of Mg at the Micron Scale: *Mohammadhadi Maghsoudi*¹; Gyuseok Kim²; Markus Ziehmer¹; Erica T. Lilleodden¹; ¹Helmholtz-Zentrum Geesthacht; ²Quattrone Nanofabrication Facility, University of Pennsylvania

4:20 PM
An Investigation on the Microstructure and Mechanical Properties of Hot-dip-aluminized-Q235/AZ91D Bimetallic Material Produced by Solid-liquid Compound Casting: *Jun Cheng*¹; Jian-hua Zhao¹; Yao Tang¹; Jingjing Shangguan¹; ¹Chongqing University

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — Electrochemistry

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Stephen Raiman, Oak Ridge National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Michael Short, Massachusetts Institute of Technology; Kumar Sridharan, University of Wisconsin-Madison; Nathaniel Hoyt, Argonne National Laboratory

Thursday PM | February 27, 2020
Theater A-6 | San Diego Convention Ctr

Session Chair: Nathaniel Hoyt, Argonne National Laboratory

2:00 PM Invited
Application of Molten Salts in Nuclear Energy: *Mark Williamson*¹; ¹Argonne National Laboratory

2:30 PM
X-ray Absorption Studies to Elucidate Structure and Speciation of Metals in Molten Salt Systems: *Simerjeet Gill*¹; Jiahao Huang²; Julia

Mausz³; Kotaro Sasaki¹; Mehmet Topsakal¹; Ruchi Gakhar⁴; William Phillips⁴; Lingfeng He⁴; Shannon Mahurin⁵; Phillips Halstenberg⁶; Lynne Ecker¹; Anatoly Frenkel²; ¹Brookhaven National Laboratory; ²Stony Brook University; ³University of Montpellier; ⁴Idaho National Laboratory; ⁵Oak Ridge National Laboratory; ⁶The University of Tennessee

2:50 PM

Application of Voltammetry for Investigation of Materials Corrosion in LiF-NaF-KF (FLiNaK): *William Doniger¹; Cody Falconer¹; Evan Buxton¹; Mohamed Elbakshwan¹; Adrien Couet¹; Kumar Sridharan¹; ¹University of Wisconsin, Madison*

3:10 PM

Redox Potential Measurement of Ni²⁺/Ni in MgCl₂-KCl-NaCl Molten Salt using Chronopotentiometry Method: *Mingyang Zhang¹; Jianbang Ge¹; Jinsuo Zhang¹; ¹Virginia Polytechnic Institute and State University*

3:30 PM

Multifunctional Voltammetry Sensors for Long-duration Process Monitoring and Control of Molten Salt Equipment: *Nathaniel Hoyt¹; Jicheng Guo¹; Elizabeth Stricker¹; Mark Williamson¹; ¹Argonne National Laboratory*

3:50 PM Break

4:10 PM Invited

Determining Redox Potentials of Liquid Metal Electrodes for Recovery of Fission Products from Molten Salts: *Hojong Kim¹; ¹Pennsylvania State University*

4:30 PM

High-throughput Electrochemical Methods Development to Accelerate Molten Salt Corrosion Resistant Alloy Design: *Bonita Goh¹; William Doniger¹; Phalgun Nelaturu¹; Michael Moorehead¹; Dimitris Papailiopoulos¹; Dan Thoma¹; Kumar Sridharan¹; Adrien Couet¹; ¹University of Wisconsin, Madison*

4:50 PM

Understanding the Effects of Operating Conditions on UO₂ Electroreduction: *Krista Hawthorne¹; Augustus Merwin¹; James Willit¹; Mark Williamson¹; ¹Argonne National Laboratory*

5:10 PM

Cathodic Behavior of Moisture in LiCl-KCl Eutectic Melt: Applications to Pyroprocessing: *Litun Swain¹; Gurudas Pakhui¹; Suddhasattwa Ghosh¹; Bandi Prabhakara Reddy¹; ¹Indira Gandhi Centre for Atomic Research, Kalpakkam*

5:30 PM

Electrochemical Corrosion of Zircaloy-2 in Molten LiCl: *William Ebert*¹; Evan Wu¹; Vineeth Kumar Gattu¹; James Willit¹; ¹Argonne National Laboratory

MATERIALS DESIGN

Materials Design Approaches and Experiences V — Ferrous Alloys II

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Akane Suzuki, GE Research; Ji-Cheng Zhao, University of Maryland; Michael Fahrman, Haynes International; Qiang Feng, University of Science and Technology Beijing; Michael Titus, Purdue University

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Session Chairs: Bryan Webler, Carnegie Mellon University; Michael Fahrman, Haynes International

2:00 PM Invited

Microstructure and Cracking Susceptibility of Continuously Cast Slabs of 3rd Generation Advanced High Strength Steels: Rafael Coura Giacomini¹; *Bryan Webler*¹; ¹Carnegie Mellon University

2:30 PM

Development of Nuclear Grade Wrought FeCrAl Alloys for Accident Tolerant Fuel Cladding: *Yukinori Yamamoto*¹; Kevin Field¹; Bruce Pint¹; Kurt Terrani¹; Raul Rebak²; Russ Fawcett³; ¹Oak Ridge National Laboratory; ²GE Global Research; ³Global Nuclear Fuel

2:50 PM

The FaMUS Methodology for Quantify Materials Understanding and its Application to the NSUF Research Portfolio: *Simon Pimblott*¹; Rory Kennedy¹; ¹Idaho National Laboratory

3:10 PM Break

3:30 PM Invited

Discovery of Maraging Steel: Machine Learning vs. Physical Metallurgical Models: Chunguang Shen¹; Chenchong Wang¹; Xiaolu Wei¹; *Wei Xu*¹; ¹Northeastern University

4:00 PM
Domain-guided ML Tool for Designing New Fe-9Cr Steels:
*Vyacheslav Romanov*¹; ¹National Energy Technology Laboratory

4:20 PM
Effect of Vibration on Residual Stress of a Stiffened Steel Plate During Welding: A Numerical Study: *Rururaja Pradhan*¹; Mohammed Sunny²; Arunjyoti Sarkar¹; ¹Department of Ocean Engineering and Naval Architecture; ²Department of Aerospace Engineering, Indian Institute of Technology, Kharagpur

MATERIALS PROCESSING

Materials Processing Fundamentals — Molten Metal Processing

Sponsored by: TMS Extraction and Processing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Jonghyun Lee, Iowa State University; Guillaume Lambotte, Boston Metal; Sam Wagstaff, Novelis Inc.; Antoine Allanore, Massachusetts Institute of Technology; Fiseha Tesfaye, Abo Akademi University

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Session Chairs: Samuel Wagstaff, Novelis Inc.; Allie Anderson, Gopher Resource

2:00 PM
Numerical Modelling of Additive Manufactured Ti-Al-Si-Cu/Ti-6Al-4V Composite by Direct Laser Metal Deposition (DLMD) Technique: *Olawale Fatoba*¹; Stephen Akinlabi²; Esther Akinlabi²; Lester Naidoo²; ¹Kent State University; ²University of Johannesburg

2:20 PM
Influence of Laser Intensity and Speed of Scanning on the Ultimate Tensile Strength and Metallurgical Properties of Laser Cladded Ti-6Al-4V+Ni/Ti-6Al-4V Composite Coating: *Olawale Fatoba*¹; *Esther Akinlabi*²; Stephen Akinlabi²; ¹Kent State University; ²University of Johannesburg

2:40 PM
A Quantitative Study of Microsegregation Mechanisms in Aluminum Binary Alloys: *Zhenjie Yao*¹; Yang Huo²; Mei Li²; John Allison¹; ¹University of Michigan; ²Ford Motor Company

3:00 PM

Contactless Ultrasound in Copper and Nickel Melts: *Catherine Tonry*¹; Christopher Beckwith¹; Valdis Bojarevics¹; Georgi Djambazov¹; Koulis Pericleous¹; ¹University of Greenwich

3:20 PM Break

3:40 PM

The Effect of Side Arcs on Current Distributions in Submerged Arc Furnaces for Silicon Production: *Yonatan Tesfahunegn*¹; Thordur Magnusson²; Merete Tangstad³; Gudrun Saevarsdottir¹; ¹Reykjavik University; ²Stakksberg; ³Norwegian University of Science and Technology

4:00 PM

Empirical Study of Laser Cleaning of Rust, Paint and Mill Scale from Steel Surface: *Jean-Michaël Deschênes*¹; Alex Fraser¹; ¹Laserax Inc

4:20 PM

Heterogeneous Microstructure Induced Mechanical Responses in the Welded Joint of EH420 Shipbuilding Steel under High Heat Input Electro-gas Welding: *Xie Xu*¹; Wang Cong¹; ¹Northeastern University

MATERIALS PROCESSING

Materials Research in Reduced Gravity — Solidification II

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Robert Hyers, University of Massachusetts; Douglas Matson, Tufts University; Michael Sansoucie, NASA MSFC; Shaun McFadden, Ulster University; Jonghyun Lee, Iowa State University; Wilhelmus Sillekens, European Space Agency; Takehiko Ishikawa, JAXA

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Session Chairs: Sonja Steinbach, DLR; Peter Galenko, University of Jena

2:00 PM

Dendrite Orientation Transition of fcc-Al in Bulk Al-Ge Alloys: *Sonja Steinbach*¹; Matthias Kolbe¹; Sebastian Wirth²; Laszlo Sturz³;

Gerhard Zimmermann³; Florian Kargl¹; Maike Becker⁴; ¹DLR; ²RWTH Aachen; ³ACCESS e.V.; ⁴IM2NP

2:20 PM

Comparison of Three-dimensional *In Situ* Observations and Phase-field Simulations of Microstructure Formation during Directional Solidification of Transparent Alloys Aboard the ISS: *Kaihua Ji*¹; Fatima Mota²; Younggil Song¹; Jorge Pereda²; Trevor Lyons³; Louise Strutzenberg⁴; Rohit Trivedi³; Nathalie Bergeon²; Alain Karma¹; ¹Northeastern University; ²Aix-Marseille Université and CNRS; ³Iowa State University; ⁴Marshall Space Flight Center

2:40 PM

Crystallizations Kinetics of Glass-forming ZrCu-based Alloys: *Peter Galenko*¹; Stefanie Koch¹; Markus Rettenmayr¹; Vladimir Ankudinov²; Josef Slowik¹; ¹University of Jena; ²Udmurt State University

3:00 PM

Effects of Bi on the Interface Layer between Sn-based Alloy and Cu Substrate under Microgravity Conditions: *Rongyue Wang*¹; Zhangfu Yuan¹; Yuhui Hao¹; ¹University of Science and Technology, Beijing

3:20 PM Break

3:50 PM Panel Discussion

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale V — Deformation and Failure

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Christopher Weinberger, Colorado State University; Megan Cordill, Erich Schmid Institute; Garritt Tucker, Colorado School of Mines; Wendy Gu, Stanford University; Scott Mao, University of Pittsburgh; Yu Zou, University of Toronto

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Santa Rosa | Marriott Marquis Hotel

Session Chairs: Jiangwei Wang, Zhejiang University; Wendy Gu, Stanford University

2:00 PM Invited
Interface-dominated Plasticity in Metallic Nanostructured Materials: *Jiangwei Wang*¹; Qi Zhu¹; Siyuan Wei¹; Chuang Deng²; Scott X. Mao³; Frederic Sanzoz⁴; ¹Zhejiang University; ²The University of Manitoba; ³University of Pittsburgh; ⁴The University of Vermont

2:40 PM
The Influence of 3D Interfaces on the Mechanical Behavior of Nanoscale Metallic Multilayers: *Justin Cheng*¹; Kevin Baldwin²; Youxing Chen³; Nan Li²; Irene Beyerlein⁴; Nathan Mara¹; ¹University of Minnesota, Twin Cities; ²Los Alamos National Laboratory; ³University of North Carolina, Charlotte; ⁴University of California, Santa Barbara

3:00 PM
Nanomechanical Studies of Dual-phase Titanium Alloys Made by Additive Manufacturing: *Zhiying Liu*¹; Yu Zou¹; ¹University of Toronto

3:20 PM
Cu-graphene Multilayer Composite for Robust Electronic Interconnect Material: *Wonsik Kim*¹; Sang-Min Kim²; Byungil Hwang³; Seung Min Han¹; ¹Korea Advanced Institute of Science and Technology; ²Korea Institute of Machinery and Materials; ³Chung-Ang University

3:40 PM Break

4:00 PM
Investigation of Crack Nucleation and Propagation During Nanoindentation of Silicate Glasses: *Yvonne Dieudonné*¹; George Pharr¹; ¹Texas A&M University

4:20 PM
Comparison of Intergranular Fracture Behavior Between Sulfur Doped Nickel Grain Boundaries: *Doruk Aksoy*¹; Rémi Dingreville²; Douglas E. Spearot¹; ¹University of Florida; ²Sandia National Laboratories

MATERIALS DESIGN

Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling — Session VI

Sponsored by: TMS Structural Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, MicroTesting Solutions; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Jagannathan Rajagopalan, Arizona State University; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Robert Wheeler, Microtesting Solutions LLC; Shailendra Joshi, University of Houston

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Session Chair: Alessandro Piglione, Imperial College London

2:00 PM Keynote

Examination of Local Microscale-microsecond Temperature Rise in HMX-HTPB Energetic Material under Impact Loading: Ayotomi Olokun¹; *Bing Li*¹; Chandra Prakash²; Zhiwei Men³; Dana Dlott³; Vikas Tomar¹; ¹Purdue University; ²Johns Hopkins University; ³University of Illinois Urbana-Champaign

2:40 PM Keynote

Impact of the Architecture / Texture on the Mechanical Behavior of Ni-microwires: How to Drive the Strength and Ductility: Ravi Raj Purohit Purushottam Raj Purohit¹; Alla Ndiaye Dieng¹; *Celine Gerard*²; Loic Signor³; Abhinav Arya⁴; Girish Bojjawar⁴; Satyam Suwas⁴; Atul H. Chokshi⁴; Ludovic Thilly¹; ¹Pprime Institute - Poitiers University; ²Pprime Institute - CNRS; ³Pprime Institute - ENSMA; ⁴Indian Institute of Science

3:20 PM

In-situ TEM Investigation of the Electroplasticity Phenomenon in Metals: *Xiaoqing Li*¹; John Turner²; Karen Bustillo²; Rohan Dhall²; Andrew Minor¹; ¹University of California, Berkeley; ²Lawrence Berkeley National Laboratory

3:40 PM Break

4:00 PM

In-situ Mechano-electrochemical Coupling of Structural Supercapacitor Electrodes: *Dimitrios Loufakis*¹; James Boyd¹; Zachary Powell¹; Alejandro Martinez¹; Jodie Lutkenhaus¹; Dimitris Lagoudas¹; ¹Texas A&M University

4:20 PM
A Novel Approach to Join Large Coefficient of Thermal Expansion (CTE) Mismatched Thermoelectric (TE) Materials for High Temperature Applications: *Michell Aranda*¹; Ike Chi¹; Ravi Vilupanur¹; Obed Villapando¹; Brooke Singleton¹; Fivos Drymiotis¹; Billy Li¹; Jean-Pierre Fleurial¹; ¹Jet Propulsion Laboratory

4:40 PM
Synthesis and Mechanical Behavior of Freestanding NiTi Films with Varying Grain Sizes: *Paul Rasmussen*¹; Jagannathan Rajagopalan¹; ¹Arizona State University

5:00 PM Concluding Comments

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Nanocomposites VI: Nanoscience and Nanotechnology in Advanced Composites — Polymer and Other Nanocomposites

Sponsored by: TMS Structural Materials Division, TMS: Composite Materials Committee

Program Organizers: Srivatsan Tirumalai, The University of Akron; Manoj Gupta, National University of Singapore

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Solana | Marriott Marquis Hotel

Session Chair: Efosa Obazee, Rubber Research Institute of Nigeria

2:00 PM Invited
Facile, Large Scale Synthesis of Water Soluble Aginse2/Zns Quantum Dots and Its Cell Viability Assessment on Different Cell Lines: *Samuel Oluwafemi*¹; ¹University of Johannesburg

2:30 PM Invited
Surface Modification of Bio Derived Carbon with Low Temperature Plasma Treatment for Polymer Composite Filler Applications: *Vijaya Rangari*¹; Zaheeruddin Mohammed¹; Shaik Jeelani¹; ¹Tuskegee University

3:00 PM
Continuous Flow Process for Removal and Recovery of Water Contaminants with Magnetic Nanocomposites: *Teagan Leitzke*¹; Jerome Downey¹; David Hutchins¹; Brian St. Clair¹; ¹Montana Technological University

3:25 PM Break

3:45 PM

An Electrochemical Sensing Platform based on Bimetal-telluride Nanorods Decorated Reduced Graphene Oxide Nanocomposite for Highly Sensitive Voltammetric Detection of Food Toxic Roxarsone in Meat Samples: Govindasamy Mani¹; *Sea-Fue Mani*¹; ¹National Taipei University of Technology

4:10 PM

Chronoamperometric Approach for Detection of H2O2 Adulteration in Milk using Ag/TiO2 Nanoparticles: *Bharti Sharma*¹; ¹Guru Jambheshwar University Science and Technology

4:35 PM

Comparative Cytotoxicity and Photothermal Study of Graphene Oxide (Go), Graphene Quantum Dots (Gqds) And Gqds/Go-Gold Nanorod Conjugates Against Different Cancer Cell Lines: *Samuel Oluwafemi*¹; Thabang Lebepe¹; Tetsuya Kodama²; ¹University of Johannesburg; ²Tohoku University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — General Topics II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

Program Organizers: Yufeng Zheng, University of Nevada, Reno; Rongpei Shi, Lawrence Livermore National Laboratory; Stoichko Antonov, University of Science and Technology Beijing; Yipeng Gao, Idaho National Laboratory; Rajarshi Banerjee, University of North Texas; Yongmei Jin, Michigan Technological University

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Session Chairs: Bharat Gwalani, Pacific Northwest National Laboratory; Zhi Liang, National Institute of Standards and Technology

2:00 PM

Molecular Dynamic Study the Role of the Kinetic Factor during Nucleation of Stoichiometric Compounds from Liquid: *Huajing Song*¹; Y Sun²; F Zhang²; C.Z. Wang²; K.M. Ho³; M.I. Mendelev²; ¹Los Alamos National Laboratory; ²Ames Laboratory; ³Iowa State University

2:20 PM
Predictably Tuning Transformation Temperatures in Thin Epitaxial Films: *Ashley Bucsek*¹; Ananya Renuka Balakrishna²; Abhinav Prakash²; Bharat Jalan²; Richard James²; ¹University of Michigan; ²University of Minnesota

2:40 PM
(S)TEM Investigation of a Passivating Alumina Layer Formed During Air Annealing of CVD-Grown Hf_(1-x)Al_xB₂ Coatings: *Carly Romnes*¹; Kinsey Canova¹; Zoë Tucker¹; Zhejun Zhang¹; John Abelson¹; Jessica Krogstad¹; ¹University of Illinois at Urbana-Champaign

3:00 PM
Analysis of the Grain Growth Rate on the Voxel-based Microstructural Representation: *Hyeonho Kim*¹; Kunok Chang¹; ¹Kyung Hee University

3:20 PM
Comparison of Phase Transformations in Binary Ti-Mo and Zr-Nb Alloys: *Anna Veverková*¹; Petr Harcuba¹; Jana Šmilauerová¹; Josef Stráský¹; ¹Charles University

3:40 PM Break

4:00 PM
The Validity of Additivity Rule for Pearlite Transformation in Eutectoid Steels: *Jeong Min Kim*¹; Kyung Jong Lee¹; ¹Hanyang University

4:20 PM
XRD and Synchrotron-based XRD Study of Chalcopyrite Leaching Catalyzed by Silver Ions: *Rui Liao*¹; Jun Wang¹; Shitong Liu¹; Hao Lin¹; Mo Lin¹; Shichao Yu¹; ¹Central South University

ENERGY & ENVIRONMENT

Powder Materials for Energy Applications — Novel Materials and Processes

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Powder Materials Committee

Program Organizers: Kathy Lu, Virginia Polytechnic Institute and State University; Eugene Olevsky, San Diego State University; Somayeh Pasebani, Oregon State University; Hang Yu, Virginia Polytechnic Institute and State University

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Session Chairs: Eugene Olevsky, San Diego State University; Hang Yu, Virginia Tech

2:00 PM Invited
Powder Metal Technology for High-performance Materials with Harmonic-structure: Dmytro Orlov¹; *Kei Ameyama*²; ¹Lund University; ²Ritsumeikan University

2:30 PM
Peltier Effect during Spark Plasma Sintering of Boron Carbide: *Joseph Sambasene Diatta*¹; Andrey Maximenko²; Ifeanyichukwu Donald Olumor³; Geuntak Lee³; Eugene A. Olevsky³; ¹Assane Seck University, SENEGAL; ²National Academy of Sciences; ³San Diego State University

2:50 PM
Next Stage Development of Iron-based GARS Alloy Powders for Cold Spray Deposition of ODS Structural Materials for Extreme Environments: *Rebecca Whitesell*¹; Timothy Prost²; Emma White²; Stuart Maloy³; Osman El Atwani³; Glenn Grant⁴; Iver Anderson²; ¹Iowa State University; ²Ames Laboratory; ³Los Alamos National Laboratory; ⁴Pacific Northwest National Laboratory

3:10 PM
Miscibility Gap Alloy Thermal Storage Materials: *Mark Copus*¹; ¹The University of Newcastle, Australia

3:30 PM
Preparation of Zinc Carbonate Hydroxide Microparticles via Deamination Precipitation by Heating: *Yan Zeng*¹; Yongbin Yang¹; Wei Gao¹; Qianqian Duan¹; Jiaming Qin¹; ¹Central South University

MATERIALS PROCESSING

Process Metallurgy and Electrochemistry of Molten Salts, Liquid Metal Batteries, and Extra-terrestrial Materials Processing: An EPD Symposium in Honor of Don Sadoway —

Prof. Sadoway Honorary Session IV

Sponsored by: TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee

Program Organizers: Antoine Allanore, Massachusetts Institute of Technology; Hojong Kim, Pennsylvania State University; Takanari Ouchi, The University of Tokyo; Yasuhiro Fukunaka, JAXA/Waseda University

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14A | San Diego Convention Ctr

Session Chairs: Hojong Kim, Pennsylvania State University; Takanari Ouchi, The University of Tokyo

2:00 PM Introductory Comments

2:05 PM Invited
Are the Metallic Iron Inclusions Exist on the Surface of the Moon?: *Ramana Reddy*¹; ¹University of Alabama

2:25 PM Invited
Getting the Most from Models in High-Temperature Materials Processing: *Robert Hyers*¹; ¹University of Massachusetts

2:45 PM
Molten Oxide Electrolysis for the Production of Ferroalloys and Steel: *Guillaume Lambotte*¹; Richard Bradshaw¹; Tadeu Carneiro¹; ¹Boston Metal

3:05 PM
Thermodynamic and Kinetic Modelling of Molten Oxide Electrolysis Cells: *William Judge*¹; Gisele Azimi¹; ¹University of Toronto

3:25 PM Break

3:40 PM Invited
Insights into the Oxidation Behavior of Cr_{1-x}Fe_x Anodes for Molten Oxide Electrolysis: *Antoine Allanore*¹; Mohsen Esmaily²; ¹Massachusetts Institute of Technology; ²Massachusetts Institute of Technology; Monash University

4:00 PM Invited
Hybrid Processes in Refining of Silicon: *Mansoor Barati*¹; ¹University of Toronto

ADVANCED MATERIALS

Progress towards Understanding the Synthesis and Behavior of Metals Far from Equilibrium: A SMD Symposium Honoring Enrique Lavernia on the Occasion of His 60th Birthday — Light-weight Alloys

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Composite Materials Committee

Program Organizers: Haiming Wen, Missouri University of Science and Technology; Suveen Mathaudhu, University of California, Riverside; Yuntian Zhu, North Carolina State University; Manoj Gupta, National University of Singapore; Kaka Ma, Colorado State University; Troy Topping, California State University, Sacramento; Yizhang Zhou, University of California, Irvine; Joshua Yee, Sandia National Laboratories; Dalong Zhang, Pacific Northwest National Laboratory; Yaojun Lin, Wuhan University of Technology; Fei Chen, Wuhan University of Technology

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Session Chairs: Dalong Zhang, Pacific Northwestern National Laboratory; Yaojun Lin, Wuhan University of Technology

2:00 PM Invited
Annual Progress Report on Magnesium and Magnesium Alloys (2019): *Fusheng Pan*¹; Jiangfeng Song¹; ¹Chongqing University

2:30 PM Invited
Characterization of Twin-twin Interactions in Mg: *Yanqing Su*¹; M. Kumar²; Xin Wang³; Yang Hu³; Kehang Yu³; Jiaxiang Wang¹; Subhash Mahajan⁴; Enrique Lavernia³; Tim Rupert³; Julie Schoenung³; Irene Beyerlein¹; ¹University of California, Santa Barbara; ²Los Alamos National Laboratory; ³University of California, Irvine; ⁴University of California, Davis

3:00 PM
From Far-from-Equilibrium Fabrication to Far-from-Equilibrium Investigation – a Case Study for Mg/Mg Alloys at EJL Lab and Beyond: *Dalong Zhang*¹; Lin Jiang²; Xin Wang³; Irene Beyerlein⁴; Andrew Minor⁵; Julie Schoenung³; Subhash Mahajan⁶; Enrique Lavernia³; ¹Pacific Northwest National Laboratory; ²Thermo Fisher

Scientific; ³University of California, Irvine; ⁴University of California, Santa Barbara; ⁵University of California, Berkeley; Lawrence Berkeley National Laboratory; ⁶University of California, Davis

3:20 PM

Role of Laser Surface Modification on Microstructure and Response of a Magnesium Alloy: Bupesh Raja V.K.¹; Shaik. Abdul Adil¹; Shaik.Mohammed Afridi¹; Gururaj Parande²; Sravya Tekumalla²; *T. S. Srivatsan*³; Manoj Gupta²; ¹Sathyabama Institute of Science and Technology; ²National University of Singapore; ³The University of Akron

3:40 PM Break

4:00 PM

Disintegrable Mg/Al Metal Matrix Composites for Oilfield Applications: *Zhihui Zhang*¹; Zhiyue Xu¹; ¹Baker Hughes, a GE Company

4:20 PM

Microstructure and Texture in Cryomilled and Sintered Ti Grade 2: *Jiri Kozlik*¹; Petr Harcuba¹; Josef Strasky¹; Hanka Becker²; Tomas Chraska³; Milos Janecek¹; ¹Charles University; ²TU Bergakademie Freiberg; ³Czech Academy of Sciences

4:40 PM

Cryogenic Milling and Spark Plasma Sintering of Commercially Pure Ti and Metastable Beta Ti15Mo Alloy: Josef Strasky¹; *Jiri Kozlik*¹; Anna Veverková¹; Petr Harcuba¹; Hanka Becker²; Tomas Chraska³; ¹Charles University; ²TU Freiberg; ³Institute of Plasma Physics

5:00 PM

Tracer Impregnated nc-materials and Dissolvable Solids for Controlled & Bulk Release Machinable into Downhole Tools for Sensing and Characterization: *Indranil Roy*¹; Ting Roy²; Jing Zhou³; ¹DAMORPHE; ²SET Laboratory; ³Rice University

5:20 PM

Research on Microstructure and Mechanical Properties of High Strength Duplex Mg-Li-Al-X Alloys: *Yan Yang*¹; Xiaodong Peng¹; ¹Chongqing University

5:40 PM

Overview of Advancement and Development Trend on Magnesium Alloys based on Bibliometric Analysis: *Xiaodong Peng*¹; Yan Yang¹; Tiancai Xu¹; ¹Chongqing University

Radiation Effects in Metals and Ceramics — Irradiation of Zircinium, Tungsten and Copper Systems

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Djamel Kaoumi, North Carolina State University; Thak Sang Byun, Oak Ridge National Laboratory; Dane Morgan, University of Wisconsin-Madison; Maria Okuniewski, Purdue University; Mahmood Mamivand, Boise State University; Geoffrey Beausoleil, Idaho National Laboratory; Philip Edmondson, Oak Ridge National Laboratory; Khalid Hattar, Sandia National Laboratories; Aurelie Gentils, Université Paris-Saclay; Joel Ribis, Commissariat a l'Energie Atomic CEA

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Session Chairs: Khalid Hattar, Sandia National Laboratory; Chad Parish, Oak Ridge National Laboratory

2:00 PM
Atom Probe Examinations of Zircaloy Irradiated at Nominally 410C: Brian Cockeram¹; Phil Edmondson²; ¹Naval Nuclear Bettis Laboratory; ²Oak Ridge National Laboratory

2:20 PM
Study of Niobium Clustering in Zr-1.0%Nb Alloy Irradiated with Kr2+ Ions or Neutrons to ~9 dpa at 310 °C: Saheed Adisa¹; Matthew Swenson¹; Jing Hu²; ¹University of Idaho; ²Argonne National Laboratory

2:40 PM
Analysis of Neutron Irradiation Induced Element Redistribution in Ceramic and Metallic Alloy TPBAR Components: Arun Devaraj¹; Bethany Mathews¹; Bruce Arey¹; Elizabeth Kautz¹; Danny Edwards¹; GarySevigny¹; DavidSenor¹; ¹Pacific Northwest NationalLaboratory

3:00 PM
Dual Beam Irradiation of Tungsten Materials: Synergistic Effects and Comparison with Sequential and Single Beam Irradiation: Osman El-Atwani¹; William Cunningham²; Jason Trelewicz²; Wei-Ying Chen³; Meimei Li³; Stuart Maloy¹; ¹Los Alamos National Laboratory; ²Stony Brook University; ³Argonne NationalLaboratory

3:20 PM
Microstructure and Mechanical Properties of Neutron Irradiated Tungsten Fibers for Fusion Applications: Lauren Garrison¹; Chad

Parish¹; Maxim Gussev¹; John Echols¹; Johann Riesch²; ¹Oak Ridge National Laboratory; ²Max-Planck-Institut für Plasmaphysik

3:40 PM Break

4:00 PM

Coupled Irradiation Induced Grain Growth and Damage Evolution in Solute Stabilized Nanocrystalline Tungsten: *Streit Cunningham*¹; Khalid Hattar²; Jason Trelewicz¹; ¹Stony Brook University; ²Sandia National Laboratories

4:20 PM

Atomistic Modeling of Radiation Resistance in Concentrated Alloys: Craig Daniels¹; *Pascal Bellon*¹; Robert Averback¹; ¹University of Illinois

4:40 PM

Elucidating Atomistic Mechanisms for Interface- and Grain Boundary-mediated Radiation Defects Annihilation: *Penghui Cao*¹; Miaomiao Jin²; Kangpyo So²; Ju Li²; Michael Short²; ¹University of California, Irvine; ²Massachusetts Institute of Technology

5:00 PM

Defect-Interface Interactions in Irradiated Cu/Ag Nanocomposites: Interface Vacancy Pump Effect: *Weizhong Han*¹; Min Wang¹; ¹Xi'an Jiaotong University

MECHANICS & STRUCTURAL RELIABILITY

Understanding and Predicting Dynamic Behavior of Materials — Materials in Extremes

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Marc Meyers, University of California San Diego; George Gray, Los Alamos National Laboratory

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5A | San Diego Convention Ctr

Session Chair: Nitin Daphalapurker, Los Almos National Laboratory

2:00 PM Invited

Dynamics of Necking and Fracture in Ductile Porous Materials:
*Ankit Srivastava*¹; ¹Texas A&M University

2:40 PM

In-situ Measurement of Dynamic Stress due to Hyper-velocity Impact Using Nanosecond Resolved Raman Spectroscopy:
*Abhijeet Dhiman*¹; Hao Wang¹; Vikas Tomar¹; ¹Purdue University

3:00 PM

What Happens to a Microstructurally Stable Nanocrystalline Alloy after Undergoing Shock Loading?: *Billy Hornbuckle*¹; Xuyang Zhou²; Cyril Williams¹; Steven Dean¹; Anit Giri¹; Anthony Roberts¹; Greg Thompson²; Kiran Solanki³; Kris Darling¹; ¹US Army Research Laboratory; ²The University of Alabama; ³Arizona State University

3:20 PM Break

3:40 PM

Investigating the Mesoscale Evolution of Microstructure during Cold Spray Single Particle Impact of BCC Metallic Powders:
*Sumit Suresh*¹; Seok-Woo Lee¹; Mark Aindow¹; Harold Brody¹; Aaron Nardi²; Victor Champagne²; Avinash Dongare¹; ¹University of Connecticut; ²U.S. Army Research Laboratory

4:00 PM

Influence of Microstructure on The Dynamic Tensile Extrusion of Tantalum: *Carl Trujillo*¹; Michael Burkett¹; George Gray¹; Saryu Fensin¹; Shuh Rong Chen¹; ¹Los Alamos National Laboratory

POSTER SESSIONS

The poster sessions are divided into two separate presentation times and grouped by topic area.

Poster presenters should stand by their poster during their designated presentation time.

POSTER SESSION I

Monday, February 24

5:30 to 7:00 p.m.

- Additive Technologies
- Biomaterials
- Corrosion
- Electronic Materials
- Energy & Environment
- Light Metals
- Mechanics and Structural Reliability
- Nuclear Materials

POSTER SESSION II

Tuesday, February 25

5:30 to 7:00 p.m.

- Advanced Materials
- Characterization
- Materials Design
- Materials Processing
- Nanostructured & Heterostructured Materials
- Physical Metallurgy

SPECIAL TOPICS

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SPG-1: An X-ray Spectromicroscopy Study of the Calcium Mineralization in the JEB Tailings Management Facility at McClean Lake, Saskatchewan: *Arthur Situm*¹; Jeremiah Beam¹; Kebbi Hughes²; John Rowson²; Joseph Essilfie-Dughan²; Andrew Crawford¹; Andrew Grosvenor¹; ¹University of Saskatchewan; ²Orano Canada

SPG-2: Arsenic Removal from Arsenic-containing Copper and Cobalt Slag Using Alkaline Leaching Technology and MgNH₄AsO₄ Precipitation: *Xingfei Zhang*¹; Jia Tian¹; Haisheng Han¹; Wei Sun¹; Yuehua Hu¹; ¹Central South University

SPG-3: Composition and Abrasiveness of Biomass Extrinsic and Intrinsic Inorganic Compounds: *Kyungjun Lee*¹; Sougata Roy¹; Ercan Cakmak¹; Jeffrey Lacey¹; Thomas Watkins¹; Harry Meyer III¹; Vicki Thompson¹; James Keiser¹; Jun Qu¹; ¹Oak Ridge National Laboratory

SPG-4: Microwave Drying of a Nickel Laterite Ore: *Wei Lv*¹; Xuwei Lv²; Yindong Yang³; Alexander McLean³; Mansoor Barati³; ¹Chongqing University; University of Toronto; ²Chongqing University; ³University of Toronto

SPG-5: Review of Coating Removal Techniques from Metal Substrates: *Akanksha Gupta*¹; Brajendra Mishra¹; ¹Worcester Polytechnic Institute

SPECIAL TOPICS

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SPG-7: A Novel Zinc Oxide (ZnO) Nanostructured Layer Coated onto Medical Grade Polyurethane for Controlled Surface Degradation: *Maren Fossum*¹; Muhammad Ibrahim¹; Zozan Tunc¹; Javier Sanchez²; Emma Strömberg³; Gunilla Björling⁴; Ragnhild Aune¹; ¹Norwegian University of Science and Technology; ²Danderyd Hospital at Karolinska Institute ; ³KTH - Royal Institute of Technology; ⁴The Swedish Red Cross University College

SPG-8: Additive Manufacturing of Transparent, Stretchable and Strain-insensitive Touch Sensing Matrix: *Dace Gao*¹; Jiangxin Wang¹; Kaixuan Ai²; Jiaqing Xiong¹; Shaohui Li¹; Pooi See Lee¹; ¹Nanyang Technological University; ²University of Electronic Science and Technology of China

SPG-9: An Ab Initio Study on the Development of Co-free Layered Oxides as Cathode Materials in Li-ion Batteries: *Che-an Lin*¹; Ralph Nasara¹; Shih-kang Lin¹; ¹National Cheng Kung University

SPG-10: Boosting Oxygen Evolution Reaction with Incoordinate Sulfur Activated Metallic Cobalt Sulfide Electrocatalyst: *Jiahao Zhang*¹; Hao Jiang¹; Chunzhong Li¹; ¹East China University of Science and Technology

SPG-11: Efficient Photoelectrochemical Water Oxidation by Graphene-decorated WO₃/Nb:SrTiO₃ Heterostructures: Taekjib Choi¹; *Ayoung Cho*¹; ¹Sejong University

SPG-12: Electrical Characterization of Reduced Graphene Oxide According to Thermal Reduction: *Soomook Lim*¹; Ji Won Suk¹; ¹Sungkyunkwan University

SPG-13: Healable Transparent Supramolecular Polymer Nanocomposites-based Energy Storage Device for Wearables and Robotics: *Gurunathan Thangavel*¹; Sangbaek Park¹; Kaushik Parida¹; Shaohui Li¹; Pooi See Lee¹; ¹Nanyang Technological University

SPG-14: High-temperature Oxidation Behavior of Al-Cr-Nb-Si-Zr Nitride Thin Films under Air Atmosphere Environment: *Ching-Nien Tsai*¹; Jian-Jie Wang¹; Fan-Yi Ouyang¹; Shou-Yi Chang²;

¹Department of Engineering and System Science, National Tsing Hua University; ²Department of Material Science and Engineering, National Tsing Hua University

SPG-15: Impact of Cryogenic Temperature Cycling on Single Solder Joint Shear Stability: *Ande Kitamura*¹; Timothy Mathews¹; Ruben Contreras¹; Tae-Kyu Lee¹; ¹Portland State University

SPG-16: Impact of Isothermal Aging on Single Solder Joint Shear: Cu Depletion Zone Effect: *Naveen Weerasekera*¹; Ande Kitamura¹; Chelsea Morand¹; Tae-Kyu Lee¹; ¹Portland State University

SPG-17: Imprinting of $\text{Ti}_{35}\text{Zr}_{15}\text{Ni}_{35}\text{Cu}_{15}$ Metallic Glass with Superelasticity by Changing the Thermoplastic Forming Process: *Yongjoo Kim*¹; Yoonjae Choi¹; Woochul Kim¹; Wontae Kim²; Dohyang Kim¹; ¹Yonsei University; ²Cheongju University

SPG-18: Influence of Nanotube Loading on Self-healing Composites: Molecular Dynamics Study: *Gurmeet Singh*¹; Veera Sundararaghavan¹; ¹University of Michigan

SPG-19: *In-Vitro* Prediction of Material Performance of Central Venous Catheters (CVCs) Exposed *In-Vivo*: *Maren Fossum*¹; Zozan Tunc¹; Javier Sanchez²; Cristoph Burgstaller³; Emma Strömberg⁴; Gunilla Björling⁵; Ragnhild Aune¹; ¹Norwegian University of Technology (NTNU); ²Danderyd Hospital at Karolinska Institute (DS KI); ³TCKT-Transfercenter für Kunststofftechnik GmbH; ⁴KTH Royal Institute of Technology; ⁵The Swedish Red Cross University College

SPG-20: Magnetic Activation of Ferromagnetic Fibre Network for Bone Regeneration: *Galit Katarivas Levy*¹; Mark Birch²; Roger Brooks²; Athina Markaki¹; ¹Department of Engineering, University of Cambridge; ²Division of Trauma and Orthopaedic Surgery, Department of Surgery, University of Cambridge

SPG-21: MgO-based ReRAM for Neuromorphic Computing: *Muhammad Izzat Bin Abdul Aziz*¹; Lee Pooi See¹; ¹Nanyang Technological University

SPG-22: Microstructural Evolution of High (111)-oriented Nanotwinned Copper during Direct Bonding Process: *Jen-Hsuan Tsai*¹; Yung-Ting Tai¹; Fan-Yi Ouyang¹; ¹Department of Engineering and System Science, National Tsing Hua University

SPG-23: Mo-triggered Amorphous Ni_3S_2 Nanosheets as Efficient and Durable Electrocatalysts for Water Splitting: *Haoxuan Zhang*¹; Hao Jiang¹; Chunzhong Li¹; ¹East China University of Science and

Technology

SPG-24: Prevention of Crack Propagation in Fe-Ni Base Superalloy based on Spontaneous Precipitation of Metallic Boride: *Chamil Kim*¹; Jaeik Hyun¹; Woochul Kim¹; Jeongsoo Kim¹; Yongjoo Kim¹; Wontae Kim²; Dohyang Kim¹; ¹Yonsei University; ²Cheongju University

SPG-25: Structural and Electrochemical Properties of Na₃V₂(PO₄)₂F₃ as Cathode Materials for Hybrid-ion Batteries using First Principles Calculation: *Kuei-Hsi Chen*¹; Ngoc Thanh Thuy Tran¹; Shih-Kang Lin¹; ¹National Cheng Kung University

SPG-26: Substrate Texture Dependent Graphene Growth on Cu Rich Cu-Ni Alloy Substrates: *Gurjinder Kaur*¹; K.S. Suresh¹; Indranil Lahiri¹; ¹Department of Metallurgical and Materials Engineering, Indian Institute of Technology, Roorkee

SPG-28: Thermopower Measurement of Graphene-based Materials: *Seungwon Kim*¹; Ji Won Suk¹; ¹Sungkyunkwan University

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SPU-1: Development of an All Solid- state Printed Carbon Electrode Utilizing Nickel Oxide/oxyhydroxide for Phosphate Detection: Sotoudeh Sedaghat¹; Sookyong Jeong¹; Armin Zareei¹; Samuel Peana¹; Nicholas Glassmaker¹; Rahim Rahimi¹; ¹Purdue University

SPU-2: Electrochromic Phase Transition in Sn-based Mixed Halide Perovskite: *Ryan Hawks*¹; Zhizhong Chen¹; Jian Shi¹; ¹Rensselaer Polytechnic Institute

SPU-4: Facile Route to Fabricate Binder Free Ni(OH)₂/RGO Core-shell Structure for Supercapacitors: *Yusuf Khan*¹; Palash Chandra Maity¹; Akansha R. Urade¹; Spandan Choudhary¹; Indranil Lahiri¹;

¹Indian Institute of Technology Roorkee

SPU-6: Surface, Interface, and Temperature Effects on the Phase Separation and Nanoparticle Self Assembly of Bi-Metallic Ni_{0.5}Ag_{0.5}: A Molecular Dynamics Study: *Reece Emery*¹; Philip Rack¹; Ryan Allaire²; Abhijeet Dhakane³; P Ganesh³; Lou Kondic²; Linda Cummings²; Miguel Fuentes-Cabrera³; ¹University of Tennessee, Knoxville; ²New Jersey Institute of Technology; ³Oak Ridge National Laboratory

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SPG-29: Comparing Traditional and Designer Alloy Feedstock Powders for Additive Manufacturing: *Jack Grubbs*¹; Kyle Tsaknopoulos¹; Danielle Cote¹; ¹Worcester Polytechnic Institute

SPG-30: Effect of Mechanical Milling and Cryomilling on Synthesis of CNT Reinforced 6082 Al Matrix Nanocomposites: *Rajat Gupta*¹; Yagnesh Shadangi¹; Kausik Chattopadhyay¹; Anil Chaubey²; Nilay Mukhopadhyay¹; ¹Indian Institute of Technology IIT-BHU; ²AMT Department, CSIR- IMMT

SPG-31: Effect of Processing Parameters on Additively Manufactured WE43 Mg Alloy: *Leila Sorkhi*¹; Joshua Hammell¹; Grant Crawford¹; ¹South Dakota School of Mines and Technology

SPG-32: Effects of Mg and Si Additions to Novel Al-Ce base Alloys for Aerospace Applications: *Manny de Jesus-Lopez*¹; Ramon Padin-Monroig¹; Oscar Suarez¹; ¹University of Puerto Rico, Mayaguez

SPG-33: Enhancement of Mechanical Properties by Large Strain Extrusion Machining of Aluminum Alloy: *Vagish Mishra*¹; Karthik Palaniappan¹; Balkrishna Rao¹; Murthy H.¹; ¹Indian Institute of Technology Madras

SPG-34: Impact of Cold Metal Transfer Arc Mode on Additive

Manufactured Aluminum Alloy Multilayered Structure:
*Mohammad Sharif Poor*¹; Nicholas Sheldon¹; Yeonjin Baek¹; Tae-Kyu Lee¹; ¹Portland State university

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SPU-7: Corrosion Study on the Al-Ce Eutectic Alloys in NaOH and HCl Aqueous Solutions: *Kenneth Silva-Reyes*¹; Oscar Suarez¹; ¹University of Puerto Rico, Mayaguez

SPU-8: Effect of Thermomagnetic Processing on the Properties and Microstructure of Aluminum Alloys: *Michael Thompson*¹; David Weiss²; Bart Murphy³; Hunter Henderson³; Orlando Rios³; Gerard Ludtka³; Aurelien Perron⁴; Michael Kesler³; ¹The University of Tennessee; ²Eck Industries; ³Oak Ridge National Laboratory; ⁴Lawrence Livermore National Laboratory

SPU-9: Effects of Mg+Si Additions on the Microstructure and Mechanical Properties of Al-Ce-Sr based Alloys: *Ramon Padin*¹; Manny de Jesus¹; Oscar Marcelo Suarez¹; ¹University of Puerto Rico at Mayaguez

SPECIAL TOPICS

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SPG-36: An Investigation on Internal Oxidation of FeCrAlY Alloys in Selective Laser Melting: *Saereh Mirzababaei*¹; Milad Ghayoor¹; Somayeh Pasebani¹; ¹Oregon State University

SPG-37: Automatically Quantifying Phase Information from HRTEM for Additively Manufactured Materials: *Sen Liu*¹; Behnam Amin-Ahmadi¹; Branden Kappes¹; Aaron Stebner¹; Xiaoli Zhang¹; ¹Colorado School of Mines

SPG-38: Characterization of the Corrosion of Nanostructured 17-4PH Stainless Steel by Surface Mechanical Attrition Treatment (SMAT): *Temitope Olugbade*¹; Jian Lu¹; ¹City University of Hong Kong

SPG-39: Effect of Microtopography on Guided Cell Migration on a Graded Micropillar Substrate: *Srikumar Krishnamoorthy*¹; Changxue Xu¹; ¹Texas Tech University

SPG-40: Elucidation of Solidification Kinetics in Laser Spot-fusion Processing of Ti-6Al-4V Alloy Using In-situ X-ray Synchrotron Radiography: *Rakesh Kamath*¹; Logan White¹; Ryan Heldt¹; Yuan Li¹; Tao Sun²; Sudarsanam Babu³; Hahn Choo⁴; ¹University of Tennessee Knoxville; ²Argonne National Laboratory; ³Oak Ridge National Laboratory; ⁴University of Tennessee, Knoxville

SPG- 41: Evaluation of Two Novel Techniques to Characterize the Bond Strengths of Cold Sprayed Single Particle Impacts: *Matthew Gleason*¹; ¹Worcester Polytechnic Institute

SPG-42: Exploring the Structure-processing Relationship: Direct Ink Writing of Functionally Graded Carbides: *Joshua Pelz*¹; Nicholas Ku²; Samuel Figueroa¹; Marc Meyers¹; Lionel Vargas Gonzalez²; ¹University of California, San Diego; ²US Army Research Laboratory

SPG-43: Helium Bubble Induced Surface Blistering Study of Grain Boundary Engineered Tungsten under Helium Implantation: *Tianyao Wang*¹; ¹Texas A&M University

SPG-44: Modeling and Predicting Longitudinal Defect Mechanisms in Steel Continuous Casting: *Matthew Zappulla*¹; Brian Thomas¹; ¹Colorado School of Mines

SPG-45: Optimization of Heat-treatment on Recycled Stainless Steel Powder for Cold Spray Applications: *Christopher Massar*¹; Kyle Tsaknopoulos¹; Bryer Sousa¹; Danielle Cote¹; ¹Worcester

Polytechnic Institute

SPG-46: Spark Plasma Sintering of Mechanically Alloyed In-situ Ni-Ti-C Nanocomposites: *Amit Patil*¹; ¹Cleveland State University

SPG-47:The Effect ofTiC Content and SPS Processing Parameters on Ni-TiC Composites: *Ganesh Walunj*¹; Anthony Bearden¹; ¹Cleveland State University

SPG-49: Thermal Stability of Yttrium Oxide Nanoparticles in 304 ODS Alloy Additively Manufactured via Selective Laser Melting: *Milad Ghayoor*¹; Kijoon Lee¹; Yujuan He¹; Chih-Hung Chang¹; Brian K. Paul¹; Somayeh Pasebani¹; ¹Oregon State University

SPG-51: Understanding Thermal Signatures using Infrared Monitoring of Laser Powder Bed Fusion (L-PBF): *Sujana Chandrasekar*¹; Jamie Coble¹; Amy Godfrey¹; Serena Beauchamp¹; Caitlin Hensley¹; Travis Mcfalls²; Fred List³; Keith Carver³; Ryan Dehoff³; Vincent Paquit³; Sudarsanam Babu¹; ¹University of Tennessee, Knoxville; ²BWX Technologies; ³Oak Ridge National Laboratory

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SPU-10: An In-situ X-ray Synchrotron Radiography Approach to Relating Melt-strategy Parameters to Solidification Dynamics in Laser Fusion Processing of Ti-6Al-4V: *Logan White*¹; Rakesh Kamath¹; Ryan¹; Yuan Li¹; Tao Sun²; Sudarsanam Babu³; Hahn Choo²; ¹University of Tennessee, Knoxville; ²Argonne National Laboratory; ³Oak Ridge National Laboratory

SPU-11: Designing Microscale Tests to Validate the Macroscale Plastic Response in Lightweight Aluminum and Magnesium: *Skye Supakul*¹; Tolin Skov-Black¹; Keenan O'Neill¹; Scout Garrison¹;

Josiah Dowell¹; Job Rodriguez¹; ¹University of Nevada, Reno

SPU-12: Embrittlement of Fe-based FINEMET Ribbons: Nickolaus Bruno¹; Ronald Noebe²; *Jonah Sayre*¹; Thomas Trautman¹; ¹South Dakota School of Mines and Technology; ²NASA Glenn Research Center

SPU-13: Impact of Surfactant Concentration and Type on Bilge Water Emulsions During Static and Dynamic Ageing: *Rina Sabatello*¹; ¹Purdue University

SPU-14: Low Density, High-temperature Syntactic Foam for Additive Manufacturing: *Samantha Maness*¹; Brett Compton¹; ¹University of Tennessee, Knoxville

SPU-15: Overcoming Oxidation of CMSX-4 to Determine the Thermophysical Properties in the Liquid State: *Zane Smith*¹; ¹Purdue University

SPECIAL TOPICS

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SPG-52: Atomistic Oxide Structures and Stoichiometry of Chromium Steel by Grand Canonical Monte Carlo Simulations with ReaxFF Potential: *Qian Chen*¹; Chang Liu¹; Yang Wang¹; Narumasa Miyazaki¹; Yusuke Ootani¹; Nobuki Ozawa¹; Momoji Kubo¹; ¹Tohoku University

SPG-53: Deformation Mechanisms in Immm-Ni₂(Cr,Mo,W)-containing Haynes® 244® Superalloy: *Thomas Mann*¹; Michael Farhmann²; Michael Titus¹; ¹Purdue University; ²Haynes International

SPG-54: Dependence of Crystallographic Orientation on the Microstructural Evolution of Ni-based Single Crystal Superalloys-A Synergistic Experimental-computational Analysis: *Harikrishnan Rajendran*¹; Jean- Briac le Graverend¹; ¹Texas A&M

University

SPG-55: Combinatorial and High-throughput Experiments on Ni-based Alloy Thin Films: *Taeyeop Kim*¹; Donghyun Park¹; Euimin Cheong¹; Daegun You¹; Hehsang Ahn²; Eun Soo Park²; Dongwoo Lee¹; ¹Sungkyunkwan University; ²Seoul National University

SPG-56: Core Effect of Local Atomic Configuration and Design Principles in Al_xCoCrFeNi High-entropy Alloys: *Yu-Chia Yang*¹; Cuixia Liu²; Chun-Yu Lin¹; Zhenhai Xia¹; ¹University of North Texas; ²Xi'an Technological University

SPG-57: Cycling Corrosion Testing of Bi-metallic Joints Between Al And Mg Alloys: *Qingli Ding*¹; Brajendra Mishra¹; Kubra Karayagiz¹; Adam C Powell¹; ¹Worcester Polytechnic Institute

SPG-58: Effect of Annealing and Partitioning Temperature of 10 wt pct. Mn steel in RT Q&P Process: *Dong Hwi Kim*¹; Jee-Hyun Kang²; Joo Hyun Ryu³; Sung-Joon Kim¹; ¹POSTECH; ²Yeungnam University; ³POSCO

SPG-59: Effect of Replacing Ni by Cu on Hydrogen Embrittlement in Austenitic Stainless Steel: *Hyung-Jun Cho*¹; Sung-Joon Kim¹; ¹POSTECH, Korea

SPG-60: Effects of Pore Geometry and Location on the Material Properties of Additively Manufactured Ti-64: *Tracy Varney*¹; Nicholas Telesz¹; Robert Quammen¹; John Balk¹; Andrew Wessman²; Paul Rottmann¹; ¹University of Kentucky; ²University of Arizona

SPG-61: Evaluation of the Magnitude and Directionality of Residual Stress on SUS316L using Instrumented Indentation Test: *Kyungyul Lee*¹; Jong-hyoung Kim¹; Junsang Lee¹; Byungchul Kim²; Michael Prime³; Dongil Kwon¹; ¹Seoul National University; ²FRONTICS Inc.; ³Los Alamos National Laboratory

SPG-62: Experimental and Thermodynamic Modelling of Binary Phase Diagrams Under Pressure: *Moran Emuna*¹; Aviva Melchior²; Eyal Yahel²; Guy Makov³; ¹Ben Gurion University and NRCN; ²NRCN; ³Ben Gurion University

SPG-63: Experimental Investigations and Thermodynamic Modeling of the Mo-Nb-Re Ternary System: *Shao-Yu Yen*¹; Shu-chang Wu¹; Muhammad Anshar Makhraja¹; Kai-chi Lo²; An-chou Yeh²; Kyosuke Yoshimi³; Chuan Zhang⁴; Shih-kang Lin¹; ¹National Cheng-Kung University; ²National Tsing Hua University; ³Tohoku University; ⁴CompuTherm LLC

SPG-64: First-principles Calculations of Non-dilute Solute Diffusion Coefficients in the Ag-Au System: *Kristin Mackowski*¹;

Chelsey Hargather¹; ¹New Mexico Institute of Mining & Technology

SPG-65: Hydrogen Effect on 15Cr-15Mn-4Ni based Stable Austenitic Stainless Steels with Carbon or Nitrogen: *Kyung-Shik Kim*¹; Jee-Hyun Kang²; Sung-Joon Kim¹; ¹POSTECH; ²Yeungnam University

SPG-66: Improvement on Anisotropy and Mechanical Behaviors of IN718 Processed by Selective Laser Melting by CoAl₂O₄ Inoculant Addition: *I-Ting Ho*¹; Tzu-Hou Hsu²; Yao-Jen Chang²; Chen-Wei Li³; Kai-Chun Chang²; Sammy Tin¹; Koji Kakehi³; An-Chou Yeh²; ¹Illinois Institute of Technology; ²National Tsing Hua University; ³Tokyo Metropolitan University

SPG-67: In-situ Mechanical Characterization of Micro-scale NiTi Shape Memory Alloy Tensile Bars: *Injong Oh*¹; Ho Jang Kim¹; Won Seok Choi²; Hosun Jun³; Pyuck-Pa Choi³; Wael Zaki⁴; Gi-Dong Sim¹; ¹Department of Mechanical Engineering, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Republic of Korea; ²Department of Materials Science and Engineering, Korea Advanced Institute of Science and Technology (KAIST); ³Department of Materials Science and Engineering, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Republic of Korea; ⁴Department of Mechanical Engineering, Khalifa University, Abu Dhabi, UAE

SPG-68: Investigation into the Occurrence of Electromigration for Aluminum: Microstructure and In-situ XRD Study: *Kuan-Hsueh Lin*¹; Yu-chen Liu¹; Ching-Shun Ku²; Shang-Jui Chiu²; Shih-kang Lin¹; ¹National Cheng Kung University; ²National Synchrotron Radiation Research Center

SPG-70: Irradiation Cluster Defect Distribution on Fe Nanoparticle by MD Simulation: *Mohammad Khan*¹; ¹University of Idaho

SPG-71: Kinetic Evolution of Metastable Grain Boundaries under Non-equilibrium Processing: *Zhitong Bai*¹; Glenn Balbus²; Daniel Gianola²; Yue Fan²; ¹University of Michigan, Ann Arbor; ²University of California, Santa Barbara

SPG-72: Mechanical Behavior of NiTi Shape Memory Alloy Thin Films: *Ji-Young Kim*¹; Injong Oh¹; Abdul Rehman¹; Yu Hyun Park¹; Wael Zaki²; Gi-Dong Sim¹; ¹Department of Mechanical Engineering, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Republic of Korea; ²Department of Mechanical Engineering, Khalifa University, Abu Dhabi, UAE

SPG-73: Mechanical, Electrical, and Structural Properties of Combinatorially Synthesized W-based Alloy Thin Films under Helium Irradiation: *Haechan Jo*¹; Injun Oh¹; Sanghun Park¹; Euimin

Cheong¹; Daegun You¹; Dongwoo Lee¹; ¹Sungkyunkwan University

SPG-74: Microstructural and Plastic Deformation Study of a TRIP Dual-phase High-entropy Alloy Fe₅₀Mn₃₀Co₁₀Cr₁₀: *Monowar Hossain*¹; Nilesch Kumar¹; ¹University of Alabama, Tuscaloosa

SPG-75: Negative Poisson's Ratio in Heusler-type Cu-Al-Mn-based Shape Memory Alloys: *Sheng Xu*¹; Ryota Tsukuda¹; Mi Zhao¹; Xiao Xu¹; Toshihiro Omori¹; Kyosuke Yoshimi¹; Ryosuke Kainuma¹; ¹Tohoku University

SPECIAL TOPICS

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SPU-17: Computational Indicators of Ductility in Compositionally-complex B2 Alloys: *Emily Hwang*¹; Emma Cuddy¹; Julianne Lin¹; Aurora Pribram-Jones²; Jonas Kaufman³; Kevin Laws⁴; Lori Bassman¹; ¹Harvey Mudd College; ²University of California, Davis; ³University of California, Santa Barbara; ⁴University of New South Wales

SPU-18: Design of a Novel Complex Concentrated Alloy for Orthopedic Implant Applications: *Jose Dominic*¹; Gopinath Perumal¹; Harpreet Arora¹; Harpreet Grewal¹; ¹Shiv Nadar University

SPU-19: Elimination of the Sigma Phase in a Compositionally Complex Fe-Cr-based System: *Stephanie Blankley*¹; Holly Frank¹; Jackson Baker¹; Natalie Krieger¹; Douglas Raigosa¹; Patrick Conway²; Kevin Laws²; Lori Bassman¹; ¹Harvey Mudd College; ²University of New South Wales

SPU-20: Fracture Toughness Determination Using Single Edge Notch Wire (SENW) Specimen: *Hrushikesh Sahasrabuddhe*¹; A. K. Mishra¹; Kevin Jacob¹; B.N Jaya¹; ¹IIT-Bombay, Mumbai, India

SPU-21: Strengthening Mechanisms of Ultra-strong Fe-Zr Solid Solution Alloys: *Sidharth Krishnamoorthi*¹; Ruizhe Su¹; Yifan Zhang¹;

NUCLEAR MATERIALS

Accelerated Materials Evaluation for Nuclear Applications
Utilizing Irradiation and Integrated Modeling — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Assel Aitkaliyeva, University of Florida; Peter Hosemann, University of California - Berkeley; Samuel Briggs, Oregon State University; David Frazer, Los Alamos National Laboratory

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Session Chair: Assel Aitkaliyeva, University of Florida

H-1 (Invited): Modeling the Uranium-Silicon Phase Equilibria: *Tashiema Ulrich*¹; Sven Vogel¹; Joshua White¹; Theodore Besmann²; ¹Los Alamos National Laboratory; ²University of South Carolina

H-2: Characterization of Helium Implanted Single Crystal Titanium: *Sarah Stevenson*¹; Mehdi Balooch¹; Andrew Scott¹; Peter Hosemann¹; Frances Allen¹; Saryu Fensin²; ¹University of California, Berkeley; ²Los Alamos National Laboratory

H-3: Damage Mitigation Strategies for Femtosecond Laser Machining of Micro-tensile Bars: *Sebastian Lam*¹; Peter Hosemann¹; Jonathan Gregory Gigax²; Quinn McCulloch²; ¹University of California, Berkeley; ²Los Alamos National Laboratory

H-4: Direct Compaction of Dispersion Fuels Using a Matrix Deposition on the Fuel Particles: *Sunghwan Kim*¹; Kyu Hong Lee¹; Won Jae So¹; Yong Jin Jeong¹; Kinam Kim¹; Jong Man Park¹; ¹Korea Atomic Energy Research Institute

H-5: Effects of Helium Ion Irradiation on Single Crystal Vanadium: *Andrew Scott*¹; Peter Hosemann¹; Mehdi Balooch¹; Marco Sebastiani²; Muhammad Mughal²; Sarah Stevenson¹; ¹University of California, Berkeley; ²Università degli studi Roma Tre

H-6: Fabrication of Low-enriched Uranium Dispersion Targets with a High Uranium Density for Mo-99 Production: Kinam Kim¹; Jong Hwan Kim¹; Tae Won Cho¹; Sunghwan Kim¹; Kyuhong Lee¹; Yong Jin Jeong¹; Jong Man Park¹; ¹Korea Atomic Energy Research

Institute

H-8: Mechanical Properties of Ion Irradiated and Helium Implanted HT9 Micropillars: *Ryan Schoell*¹; Ce Zheng¹; Khalid Hattar²; Djamel Kaoumi¹; ¹North Carolina State University; ²Sandia National Laboratory

H-9: Microstructure and Mechanical Behavior of Directed Energy Deposition Laser Additively Manufactured T-91: *Jack Peterson*¹; Adi Benartzy¹; Stuart Maloy²; Thomas Lienert²; Peter Hosemann¹; ¹University of California, Berkeley; ²Los Alamos National Laboratory

H-10: Radiation Response of HT9 Ferritic/Martensitic Alloys as a Function of Interstitial Content: *Eda Aydogan*¹; Jonathan Gigax²; Scott Parker²; Benjamin Eftink²; Yongqiang Wang²; Stuart Maloy²; ¹Sabanci University; ²Los Alamos National Laboratory

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture IV: Toward Confident Use in Critical Applications — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Nik Hrabe, National Institute of Standards and Technology; Steve Daniewicz, University of Alabama; Nima Shamsaei, Auburn University; John Lewandowski, Case Western Reserve University; Mohsen Seifi, ASTM International/Case Western Reserve University

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Session Chair: Nik Hrabe, National Institute of Standards and Technology

A-1: As the Delamination Fracture Behavior in the AlSi10Mg DMLS Parts Built in Different Orientations: Roberto Seno¹; *Eder Najar Lopes*²; ¹CBA; ²Unicamp

A-4: Effect of Post Heat-treatment on the Microstructure, Tensile and Fatigue Properties of AlSi10Mg Alloy Manufactured by Selective Laser Melting: *Tae-Hyun Park*¹; Min-Seok Baek¹; Yongho Sohn²; Kee-Ahn Lee¹; ¹Inha University; ²University of Central Florida

A-6: Fatigue Life Prediction of Additive Manufactured IN718

Superalloys: *Wenye Ye*¹; Pankaj Kumar¹; Leslie Mushongera¹;
¹University of Nevada, Reno

A-9: Microstructure, High-temperature Tensile and Fatigue Properties of IN625 Manufactured by Selective Laser Melting: *Tae-Hoon Kang*¹; Kyu-Sik Kim¹; Michael Kassner²; Kwang-Tae Son²; Kee-Ahn Lee¹; ¹Inha University; ²University of Southern California

A-10: Microstructure, Mechanical Properties, and Fatigue Damage Mechanisms in Laser Powder Bed Al-10Si-0.4Mg Alloys: *Timothy Piette*¹; Robert Warren¹; Edward Hummelt²; Diana Lados¹;
¹Worcester Polytechnic Institute; ²Eaton Corporation

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications II — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Charit, University of Idaho; Michael Kirka, Oak Ridge National Laboratory

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Session Chair: Michael Kirka, Oakridge National Laboratory

A-11: Characterization of Cold-spray Based Additively Manufactured Thick Copper Deposits: Danish Verma¹; *Surinder Singh*²; Harpreet Singh²; ¹Punjab Engineering College Chandigarh; ²Indian Institute of Technology Ropar (IIT Ropar)

A-12: Evaluation of Cold-sprayed 14YWT: *Jeffrey Graham*¹; Mia Lenling²; Hwasung Yeom²; Peter Hosemann¹; Kumar Sridharan²;
¹University of California, Berkeley; ²University of Wisconsin

A-13 Microstructure and Mechanical Properties of ODS Eurofer Steel Produced by Selective Laser Melting: *J. Fu*¹; I.M. Richardson¹; M.J.M. Hermans¹; ¹Delft University of Technology

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Functional and Energy Materials — Poster Session

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Sneha Prabha Narra, Worcester Polytechnic Institute; Markus Chmielus, University of Pittsburgh; Mohammad Elahinia, University of Toledo; Reginald Hamilton, Pennsylvania State University

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A-16 (Digital): Quantitative Microstructure Study of Binder-jet Printed and Sintered Ni-Mn-Ga Alloy: *Chuyuan Zheng*¹; Amir Mostafaei²; Pierangeli Rodriguez¹; Erica Stevens¹; Ian Nettleship¹; Markus Chmielus¹; ¹University of Pittsburgh; ²Carnegie Mellon University

A-17: Layered Binder Jet Printing of Functional Ni-Mn-Ga Alloys: *Katerina Kimes*¹; Erica Stevens¹; Jeffrey Martin¹; Pierangeli Rodriguez De Vecchis¹; Danielle Brunetta¹; Markus Chmielus¹; ¹University of Pittsburgh

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques — Poster Session

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Fan Zhang, National Institute of Standards and Technology; Tom Stockman, Los Alamos National Laboratory; Tao Sun, University of Virginia; Donald Brown, Los Alamos National Laboratory; Yan Gao, Ge Global Research; Amit Pandey, MicroTesting Solutions; Joy Gockel, Wright State University; Tim Horn, North Carolina State University; Sneha Prabha Narra, Worcester Polytechnic Institute; Judy Schneider, University of Alabama at Huntsville

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A-18: HEX, A New High Energy Beamline in the Making: *Michael Drakopoulos*¹; Zhong Zhong¹; Andy Broadbent¹; ¹Brookhaven

A-19(Invited): The Effects of Chemical Composition on Precipitate Evolution in an Additively Manufactured Nickel Base Superalloy: *James Zuback*¹; ¹Pennsylvania State University

A-20: Accessing Nano-scale Structure and Dynamics During 3D-Printing by Operando X-Ray Photon Correlation Spectroscopy: *Maria Torres Arango*¹; Yugang Zhang¹; Gregory Doerk²; Ruipeng Li¹; Chonghang Zhao³; Yu-chen Karen Chen-Wiegart⁴; Andrei Fluerasu¹; Lutz Wiegart¹; ¹National Synchrotron Light Source II, Brookhaven National Laboratory; ²Center for Functional Nanomaterials, Brookhaven National Laboratory; ³Stony Brook University; ⁴National Synchrotron Light Source II, Brookhaven National Laboratory. Stony Brook University.

A-21: Building a Novel Heat Exchanger with Haynes 230 Alloy and Using Data Science to Characterize Rheological and Microstructural Properties in Additive Manufacturing: *Srujana Rao Yarasi*¹; Andrew Kitahara¹; Ziheng Wu¹; Anthony Rollett¹; Elizabeth Holm¹; ¹Carnegie Mellon University

A-22: Characterizing the Deformation in Single Cell Ti-5553 Lattice Structures: *Maria Strantza*¹; Nathan Johnson²; Donald Brown²; Jenny Wang¹; Jefferson Cuadra¹; David Macknelly¹; John Carpenter²; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory; ²Los Alamos National Laboratory

A-23: Creep Behavior of a AlSiMg Alloy Produced by Additive Manufacturing: *Chiara Paoletti*¹; Stefano Spigarelli¹; Marcello Cabibbo¹; Emanuela Cerri²; ¹Università Politecnica delle Marche; ²Università di Parma

A-24: Effect of Laser-matter Interaction on Molten Pool Flow and Keyhole Dynamics: *Nadia Kouraytem*¹; Xuxiao Li¹; Ross Cunningham²; Cang Zhao³; Niranjana Parab³; Tao Sun³; Anthony Rollett²; Ashley Spear¹; Wenda Tan¹; ¹University of Utah; ²Carnegie Mellon University; ³Argonne National Laboratory

A-25: Evaluating the Effectiveness of Compliant Substructures at Controlling Residual Stress in Additively Manufactured Components: *Donald Brown*¹; Maria Strantza²; Bjorn Clausen¹; Rishi Ganeriwala²; Lyle Levine³; Thien Phan³; Wayne King²; ¹Los Alamos National Laboratory; ²Livermore National Laboratory; ³National Institute of Standards and Technology

A-26: High Speed X-ray Diffraction: Niranjana Parab¹; Seunghee Oh²; Joseph Aroh²; Joseph Pauza²; Sidi Feng²; Rachel Lim²; Christopher Kantzos²; Robert Suter²; Chihpin Chuang¹; Cang Zhao¹; Tao Sun¹; Anthony Rollett²; ¹Argonne National Laboratory; ²Carnegie Mellon

A-27: Identifying the Formation of Laser Powder Bed Fusion Defects In-situ by Coupling High Speed X-ray and Infra-red Imaging: *Benjamin Gould*¹; Sarah Wolff²; Niranjana Parab¹; Cang Zhao¹; Aaron Greco¹; Tao Sun¹; ¹Argonne National Laboratory; ²Texas A&M University

A-28: In-situ Characterization and Quantification of Melt Pool Variation Under Constant Input Energy Density in Laser Powder-bed Fusion Additive Manufacturing Process: *Qilin Guo*¹; Cang Zhao²; Minglei Qu¹; Lianghua Xiong¹; Luis I. Escano¹; S. Mohammad H. Hojjatzadeh¹; Niranjana D. Parab²; Kamel Fezzaa²; Wes Everhart³; Tao Sun²; Lianyi Chen¹; ¹Missouri University of Science and Technology; ²Argonne National Laboratory; ³Honeywell FM&T

A-29: In-situ Full-field Mapping of Melt Flow Dynamics in Laser Metal Additive Manufacturing: *Qilin Guo*¹; Cang Zhao²; Minglei Qu¹; Lianghua Xiong¹; Luis I. Escano¹; S. Mohammad H. Hojjatzadeh¹; Niranjana D. Parab²; Kamel Fezzaa²; Tao Sun²; Lianyi Chen¹; ¹Missouri University of Science and Technology; ²Argonne National Laboratory

A-30: In-situ X-ray Characterization of Keyhole Dynamics in Laser-based Additive Manufacturing of Aluminium Alloys: Hongze Wang¹; Yu Zou¹; ¹University of Toronto

A-31: Influence of Alloy Composition on Cell Formation in Additively Manufactured Stainless Steels: *Joseph Aroh*¹; Seunghee Oh¹; Rachel Lim¹; Chihpin Chuang¹; Niranjana Parab¹; Cang Zhao¹; Tao Sun¹; P. Pistorius¹; Anthony Rollett¹; ¹Carnegie Mellon University

A-32: Influence of Powder Recyclability on the Defect Density of Components Fabricated with Nickel-based Alloys Characterized with Micro X-ray CT: *Curtis Frederick*¹; Edson Santos¹; Michael Kirka²; Pradeep Bhattad¹; Paul Brackman¹; ¹Carl Zeiss; ²Oak Ridge National Laboratory

A-33: Investigating the Behavior of Ti-5553 Octet Lattice Wedges Under Compression: *Jenny Wang*¹; David Macknelly²; Stephen Knaus¹; Kyle Klein¹; Mary LeBlanc¹; Jeffrey Florando¹; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory; ²Atomic Weapons Establishment

A-34: Laser Additive Manufacturing of Dissimilar Metals: *Xuan Zhang*¹; Wei-Ying Chen¹; Cang Zhao¹; Chihpin Chuang¹; Tao Sun¹; Meimei Li¹; ¹Argonne National Laboratory

A-35: Measurements and Predictions of Residual Stresses in AM Ti-6Al-4V NIST Challenge Specimens: *James Sobotka*¹; Matthew

Kirby¹; Sheng-yen Li¹; ¹Southwest Research Institute

A-36: Microstructural Development and Mechanical Properties of Selective Laser Melted Co-Cr-W Dental Alloy: Leonhard Hitzler¹; *Jonas Von Kobylinski*¹; Robert Lawitzki²; Christian Krempaszky¹; Ewald Werner³; ¹Technical University Munich; ²University of Stuttgart; ³Technical University, Munich

A-37: Real Time Observation of Binder Jetting Printing Process Using High-speed X-ray Imaging: *Niranjan Parab*¹; John Barnes²; Cang Zhao¹; Ross Cunningham³; Kamel Fezzaa¹; Anthony Rollett³; Tao Sun¹; ¹Argonne National Laboratory; ²The Barnes Group Advisors; ³Carnegie Mellon University

A-38: Residual Strain Gradients in Thin Walled Additively Manufactured Stainless Steel Pressure Vessels: *Bjorn Clausen*¹; Rishi Ganeriwala²; Donald Brown¹; Robert Ferencz²; John Carpenter¹; ¹Los Alamos National Laboratory; ²Lawrence Livermore National Laboratory

A-39: Residual Stress Measurement Techniques for Additive Manufacturing Parts: *Adi Benartzy*¹; Kahraman Demir¹; Jack Peterson¹; Grace Gu¹; Peter Hosemann¹; ¹University of California, Berkeley

A-40: Strengthening Effect and Thermal Stability of Sub-grain Solidification Structures in L-PBF Stainless Steel 316L: *Thomas Voisin*¹; Jean-Baptiste Forien¹; Y. Morris Wang¹; ¹Lawrence Livermore National Laboratory

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Alternative Processes (Beyond the Beam) — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Powder Materials Committee

Program Organizers: Paul Prichard, Kennametal Inc.; Matthew Dunstan, U.S. Army Research Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory; Nihan Tuncer, Desktop Metal; James Paramore, U.S. Army Research Laboratory

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A-41: Fabrication of Sub-microscale Metallic Glass Particles and Wires via High Pressure Atomization: *Wan Kim*¹; Chae Woo Ryu¹; Eun Soo Park¹; Koji Nakayama²; ¹Seoul National University; ²Tohoku University

A-43: Production of Teaching Materials Through 3D Printing as Support for Educational Processes Related to the Sciences, Heritage and Culture: *Henry Colorado*¹; David Mendoza¹; Fernando León Valencia¹; Juan Manuel Perdomo¹; ¹Universidad de Antioquia

A-44: Surface Characterization of IN718 Powder Stock and Influence on Net-shape HIP Microstructure: *Benjamin Georgin*¹; Victor Samarov²; Hamish Fraser¹; ¹The Ohio State University; ²LNT

A-45: Temperature Dependent Thermal Conductivity of Metallic Powder Alloys for Additive Manufacturing: *Faiyaz Ahsan*¹; Leila Ladani¹; ¹Arizona State University

A-46: Thermal Analysis of Wire Arc Additive Manufacturing (WAAM): *Lauriane Guilmois*¹; Philippe Le Masson²; Pascal Paillard³; ¹Institut de Recherche Technologique (IRT) Jules Verne; ²Institut de Recherche Dupuy de Lôme (IRDL); ³Institut des Matériaux Jean Rouxel (IMN)

A-47: Understanding Mechanisms Behind Morphological Changes in Gas Atomized Powders After Laser Irradiation: *Jonathan Skelton*¹; Jerry Floro¹; James Fitz-Gerald¹; ¹University of Virginia

A-48: Wire+arc Additive Manufacturing for Fabrication of Bimetallic Additively Manufactured Structures: *Rumman Ul Ahsan*¹; A. N. M. Tanvir¹; Gi-Jeong Seo¹; Changwook Ji²; P. K. Liaw³; Duck Bong Kim¹; ¹Tennessee Technological University; ²Korea Institute of Industrial Technology; ³The University of Tennessee, Knoxville

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development II — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Orlando Rios, Oak Ridge National Laboratory; Hunter Martin, HRL Laboratories; Atieh Moridi, Cornell University

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A-49 (Invited): Additions of Iron to Grain Refine Ti Alloys during Laser Powder Bed Fusion:*Marco Simonelli*¹; Nesma Aboulkhair¹; Yau Yau Tse²; Adam Clare¹; Richard Hague¹; ¹University of Nottingham; ²Loughborough University

A-50 (Invited): Alloy Development Feeder for Accelerated Materials Development: Kevin Luo¹; *Melanie Lang*¹; Jeff Riemann¹; ¹FormAlloy

A-51: Additive Manufacturing of Atomized Ti-1Al-8V-5Fe by Laser Powder Bed Fusion: *Eugene Ivanov*¹; Eduardo del Rio¹; Aaron Marshall²; Vivian Hogan²; Daniel Satco³; Ayman Salem³; ¹Tosoh SMD Inc; ²Materials Resources, LLC; ³Material Resources LLC

A-52: Advancing Printability of Materials through Laser Metal Additive Manufacturing: *Sofia Sheikh*¹; Raymundo Arroyave¹; ¹Texas A&M University

A-53: Automatically Quantifying Phase Information from HRTEM for Additively Manufactured Inconel 718: *Sen Liu*¹; Behnam Aminahmadi¹; Branden Kappes¹; Aaron Stebner¹; Xiaoli Zhang¹; ¹Colorado School of Mines

A-54: Ball-milled CoCr + X (X=WC or SiC) Composite Powders for Additive Applications: *Madelyn Madrigal Camacho*¹; Suveen Mathaudhu¹; Guillermo Aguilar¹; ¹University of California, Riverside

A-55: Cold Spray Deposition of Aluminum onto Polymer and Composite Substrates: *Reza Rokni*¹; Po-Lun Feng¹; Steve Nutt¹; ¹University of Southern California

A-56: Compression Behavior of Additively Manufactured High Entropy Alloy with Transformation Induced Plasticity: *Saket Thapliyal*¹; Saurabh Nene¹; Priyanshi Agrawal¹; Rajiv Mishra¹;

¹University of North Texas

A-57: Design of Easy-to-Use Structural Alloy Feedstocks for Additive Manufacturing Using Machine Learning Methods: *Akansha Singh*¹; Ben Rafferty²; Jeremy Iten²; Jacob Nuechterlein²; Branden Kappes¹; Sridhar Seetharaman¹; Aaron Stebner¹; ¹Colorado School of Mines; ²Elementum 3D

A-58: Development of Laser Parameters for Pure Copper with Parts Fabricated from Laser Powder Bed Fusion (PBF): *Michael Brand*¹; Colt Montgomery¹; Robin Pacheco¹; Amber Black¹; Ryan Mier¹; ¹Los Alamos National Laboratory

A-59: Development of Metallic Glass Micro-wires for the Direct Laser Melting Deposition Process: Song-Yi Kim¹; A-Young Lee¹; Hanuel Jang¹; Hwi-Jun Kim¹; Chang-Woo Lee¹; *Min-Ha Lee*¹; ¹KITECH

A-60: Effect of Laser Glazing on Quasicrystals in Powder-processed Icosahedral-phase-strengthened Aluminum Alloys: *Mingxuan Li*¹; Hannah Leonard¹; Sarshad Rommel¹; Thomas Watson²; Tod Policandriotes³; Mark Aindow¹; ¹University of Connecticut; ²Pratt & Whitney; ³Collins Aerospace

A-61: Exploring Rapid Solidification in Additive Manufacturing through Splat Quenching: *Zachary Hasenbusch*¹; Sydney Morales¹; Luke Brewer¹; Laurentiu Nastac¹; Andy Deal²; Ben Brown²; ¹University of Alabama; ²Kansas City National Security Campus

A-62: High-temperature Compressive and Creep Properties of Equiatomic CoCrFeMnNi High-entropy Alloy Manufactured by Selective Laser Melting: *Kee-Ahn Lee*¹; Young-Kyun Kim¹; Sangsun Yang²; ¹Inha University; ²Korea Institute of Materials Science

A-63: Hybrid Additive Manufacturing of MS1-H13 Steels via Direct Metal Laser Sintering: Sajad Shakerin¹; *Mohsen Mohammadi*¹; ¹Marine Additive Manufacturing Centre of Excellence (MAMCE)

A-64: Investigating Solidification and Liquation Cracking in AA7075 Electron Beam Freeform Fabrication Deposits: *Cecilia Mulvaney*¹; James Fitz-Gerald¹; Marcia Domack²; Karen Taminger²; ¹University of Virginia; ²National Aeronautics and Space Administration

A-65: Isotropic Microstructure and Mechanical Properties of Additively Manufactured Ti-based Alloy: *Gwanghyo Choi*¹; Won Seok Choi¹; Pyuck-Pa Choi¹; ¹Korea Advanced Institute of Science and Engineering (KAIST)

A-66: Laser Powder Bed Fusion of a High Entropy Alloy Enabled with Transformation Induced Plasticity: *Priyanshi Agrawal*¹; Saket

Thapliyal¹; Rajiv Mishra¹; ¹University of North Texas

A-67: Nickel Free Stainless Steels Powders Designed for Laser Based Powder Bed Fusion Intended for Implantable Devices:

Bernice Gatrell¹; Colton Steiner¹; Ron Aman²; *Nader Dariavach*¹; Jason Lehrer³; ¹Johnson & Johnson; ²Carpenter Technology Corp.; ³Carpenter Technologies Corp.

A-68: On The Effect of Building Direction on the Microstructure and Grain Morphology of a Selective Laser Melted Maraging Stainless Steel:

*Mehdi Sanjari*¹; Amir Hadadzadeh¹; Ayda Shahriari²; Saeed Tamimi³; Hadi Pirgazi⁴; Babak Shalchi Amirkhiz⁵; Leo Kestens⁴; Mohsen Mohammadi²; ¹University of New Brunswick; CanmetMATERIALS; ²University of New Brunswick; ³AFRC-University of Strathclyde; ⁴Ghent University; ⁵CanmetMATERIALS; University of New Brunswick

A-69: Origin and How to Reduce Splatter in Powder Bed Fusion:

Hans-Wilfried Mindt¹; *Mustafa Megahed*¹; ¹Esi Group

A-70: Performance of Wire-arc Additive Manufactured Ti-6Al-4V and Ti-5Al-5Mo-5V-3Cr Dissimilar Alloy-alloy Composite Interfaces:

*Jacob Kennedy*¹; Alec Davis¹; Armando Caballero²; Ed Pickering¹; Stewart Williams²; Phil Prangnell¹; ¹University of Manchester; ²Cranfield University

A-71: Powder Bed Additive Manufacturing of Cu / 17-4 PH Layered Structures:

*Alexis Ernst*¹; Rainer Hebert¹; Mark Aindow¹; ¹University of Connecticut

A-72: Predicting Phase Morphologies in AM Titanium:

*Ian Bakst*¹; ¹Honeywell FM&T

A-73: Simulation of Part-scale Grain Structure Development During Additive Manufacturing Solidification:

*Matthew Rolchigo*¹; Jim Belak¹; Benjamin Stump²; Alex Plotkowski²; Robert Carson¹; Neil Carlson³; Matt Bement³; ¹Lawrence Livermore National Laboratory; ²Oak Ridge National Laboratory; ³Los Alamos National Laboratory

A-74: Synchrotron Imaging of the Influence of TiB₂ on Cracking Phenomena During Laser Powder Bed Fusion of Al2139:

*David Rees*¹; Chu Lun Alex Leung¹; Joe Elambasseril²; Sebastian Marussi¹; Saurabh Shah¹; Shashidhara Marathe³; Milan Brandt²; Mark Easton²; Peter Lee¹; ¹UCL Mechanical Engineering; ²RMIT University; ³Diamond Light Source Ltd

A-75: Tailoring Grain Structures for Metallic Additive Manufacturing:

*Yijia Gu*¹; Arezoo Emdadi¹; ¹Missouri University of

Science and Technology

A-76: Towards Grain Refinement of Titanium Alloys for Laser Powder-bed Fusion: *Marco Simonelli*¹; Nesma Aboulkhair¹; Yau Yau Tse²; Adam Clare¹; Richard Hague¹; ¹University of Nottingham; ²Loughborough University

A-77: Understanding Cellular Structures in Additively Manufactured 316L: *Richard Fonda*¹; Joseph Aroh²; Jerry Feng¹; David Rowenhorst¹; ¹Naval Research Laboratory; ²Carnegie Mellon University

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Processing Effects on Microstructure and Material Performance — Poster Session

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Eric Lass, University of Tennessee, Knoxville; Joy Gockel, Wright State University; Emma White, Ames Laboratory; Richard Fonda, Naval Research Laboratory; Monnamme Tlotleng, University of Johannesburg; Jayme Keist, Pennsylvania State University; Hang Yu, Virginia Polytechnic Institute and State University

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A-78 (Digital): Microstructure Control in Microscale Additive Manufacturing of Copper by Localized Electrodeposition: *Soheil Daryadel*¹; Majid Minary²; ¹University of Illinois at Urbana-Champaign; ²University of Texas at Dallas

A-79 (Digital): The Influence of Porosity and Defects on Fatigue Behavior in Additive Manufactured 316L Stainless Steel Using In-Situ X-Ray Computed Tomography: *Ariel Murphy-Leonard*¹; David Rowenhorst¹; ¹Naval Research Laboratory

A-80: β Phase Evolution Process in Selective Laser Melting Titanium-tantalum Continuous Gradient Alloy: *Baicheng Zhang*¹; Xuanhui Qu¹; ¹USTB

A-81: 3D X-ray Tomography Analysis of the Effect of Process Parameters on Porosity Formation in Selective Laser Melting of Ti-6Al-4V Parts: Mohamed Goune¹; Stephane Gorsse¹; *Guillaume*

Aubert¹; Sylvie Bordère¹; ¹Icmcb

A-82: 3D Printing Ceramics Using Stereolithography: Peter Evans¹; Digvijay Yadav¹; Brady Butler¹; *Kelvin Xie*¹; ¹Texas A&M University

A-83: Additive Friction Stir-deposition of Copper: *Jonathan Priedeman*¹; Brandon Phillips¹; Billy Hornbuckle²; Kristopher Darling²; Paul Allison¹; Gregory Thompson¹; ¹University of Alabama; ²Army Research Lab

A-84: Additive Manufacturing Simulation Comparison Using Commercial Tools: *Charles Fisher*¹; Adam Gershen¹; John Michopoulos²; Athanasios Iliopoulos²; John Steuben²; Andrew Birnbaum²; ¹Naval Surface Warfare Center - Carderock; ²Naval Research Laboratory

A-85: Alpha Variant Selection in Additively Manufactured Ti-6Al-4V: Philip Stephenson¹; *Ryan Demott*¹; Nima Haghdadi¹; Xiaozhou Liao²; Simon Ringer²; Sophie Primig¹; ¹UNSW Sydney; ²The University of Sydney

A-86: An Investigation into the Recyclability of AlSi10Mg Powder in LENS®: *Al Medrano*¹; Parnian Kiani¹; Kaka Ma²; Julie Schoenung¹; ¹University of California, Irvine; ²Colorado State University

A-87: Annealing of Additively Manufactured Inconel 625: *Nakul Ghate*¹; Amit Pandey²; Amber Shrivastava¹; ¹Indian Institute of Technology Bombay; ²Ansys Inc.

A-89: Banded Heat Affected Zone (HAZ) and Post Build Ageing Microstructure Interactions in LBP-DED IN718: *Ioannis Bellos*¹; Ed Pickering¹; Chris Heason²; Philip Prangnell¹; ¹The University of Manchester; ²Rolls-Royce, plc

A-90: Characterization and Integration of the Anisotropy of Additively Manufactured Titanium in the Topology Optimization of Light-weight Structures: *Matthew Vaughn*¹; Justin Unger¹; Alberto Torres¹; Andrew Gaynor²; Brandon McWilliams²; James Guest¹; Kevin Hemker¹; ¹Johns Hopkins University; ²US Army Research Laboratory

A-91: Controlling Microstructural Evolution in Metal Additive Manufacturing Using Bessel Beams: *Thejaswi Tumkur*¹; Sheldon Wu¹; Tien Roehling¹; John Roehling¹; Saad Khairallah¹; Sullivan Figskey¹; Devon Courtwright¹; Michael Crumb¹; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory

A-92: Creep Deformation Study of Heat-treated Nickel Alloy 718: *Alejandro Hinojos*¹; Hyeyun Song²; Alber Sadek²; Wei Zhang¹; Michael Mills¹; ¹The Ohio State University; ²The Edison Welding

Institute

A-93: Critical Quenching Rates After Solution Annealing: Peculiarities of Aluminum-silicon Alloys Fabricated by Laser Powder-Bed Fusion: Stephan Hafenstein¹; Leonhard Hitzler¹; Enes Sert²; Andreas Öchsner²; Markus Merkel³; Ewald Werner¹; *Jonas Von Kobylinski*¹; ¹Technical University Munich; ²Esslingen University of Applied Sciences; ³Aalen University of Applied Sciences

A-94: Dendrite Orientation Transition in Laser Remelted Titanium Alloys: Phase Field Simulation and Experiment Validation: Yujian Wang¹; *Yu Zou*¹; ¹University of Toronto

A-95: Direct Laser Metal Deposition of René 108 Single Crystal: *Praveen Sreeramagiri*¹; Ajay Bhagavatam¹; Husam Alrehaili¹; Guru Dinda¹; ¹Wayne State University

A-96: Effect of Partitioning Treatment on the Mechanical Behavior of an Additively Manufactured Ti-6Al-4V Alloy: *Kenta Yamanaka*¹; Manami Mori²; Yusuke Onuki³; Shigeo Sato³; Akihiko Chiba¹; ¹Tohoku University; ²National Institute of Technology, Sendai College; ³Ibaraki University

A-97: Effect of Scanning Strategy on Additively Manufactured Ti6Al4V: *Nakul Ghate*¹; Bhanupratap Gaur¹; Amber Shrivastava¹; ¹Indian Institute of Technology Bombay

A-98: Effect of Semi-solid Treatment on Microstructure and Mechanical Properties Additive Manufactured Inconel 625: *Lukasz Rogal*¹; Damian Kalita¹; Karol Janusz¹; Jan Dutkiewicz¹; Marek Weglowski¹; ¹Institute of Metallurgy and Materials Science

A-99: Effect of Temperature Dependent Properties on the Accuracy of Physics-based Surrogate Models for Powder Bed Fusion Additive Manufacturing: *Alexander Wolfer*¹; Richard Otis²; Brian Weston³; Saad Khairallah³; Andy Anderson³; Andrew Shapiro²; Jean-Pierre Delplanque¹; ¹University of California, Davis; ²Jet Propulsion Laboratory, California Institute of Technology; ³Lawrence Livermore National Laboratory

A-100: Effect of Thermal History on Elastic Strain and Microstructural Evolution in Additive Manufacturing: *Kathryn Small*¹; Michael Groeber²; Mitra Taheri¹; ¹Johns Hopkins University; ²Ohio State University

A-101: Effects of Laser-energy Density and Build Orientation on the Defect Structure, Microstructure and Tensile Properties of Laser Powder Bed Fused Inconel 718: *Dillon Watring*¹; Jake Benzing²; Nik Hrabe²; Ashley Spear¹; ¹University of Utah; ²National

Institute of Standards and Technology (NIST)

A-102: Effects of Nano-scale TiC on Defects and Mechanical Properties of IN738LC Manufactured by Selective Laser Melting: *Zhengrong Yu*¹; *Xiaogang Hu*¹; *Qiang Zhu*¹; *Hui Ding*²; ¹Southern University of Science and Technology; ²Southeast University

A-103: Effects of Process Parameters on Microstructure and Mechanical Properties of Wire Arc Additive Manufactured Al-Mg-Si Alloy: *Gautier Doumenc*¹; *David Gloaguen*¹; *Bruno Courant*²; *Pascal Paillard*³; *Laurent Couturier*³; *Alexandre Benoit*⁴; ¹IRT-GeM-IMN; ²GeM - Research Institute in Civil and Mechanical Engineering; ³IMN - Nantes Materials Institute; ⁴IRT Jules Verne - French Institute in Research and Technology in Advanced Manufacturing

A-104: Effects of the Energy Density and Building Angle on the Tensile Properties of SLM Ti-6Al-4V Alloys: *Jungsub Lee*¹; *Woojin An*¹; *Imdoo Jung*²; *Jusik Kim*³; *Sangshik Kim*¹; *Hyokyung Sung*¹; ¹Gyeongsang National University; ²3D Printing Center, Korea Institute of Materials Science; ³ANH structure

A-105: Evolution of Dislocation Cell Substructure and its Effect on Precipitation Behavior in AM-IN718: *Thomas Gallmeyer*¹; *Jack Dale*¹; *Behnam Aminahmadi*¹; *Aaron Stebner*¹; ¹Colorado School Of Mines

A-106: Experimental Study on the Laser Cladding of T15 Coating for 42CrMo Steel: *Yingtao Zhang*¹; *Meng Jiang*¹; *Gang Wang*¹; *Xiulin Ji*¹; ¹College of Mechanical & Electrical Engineering, Hohai University

A-107: Fabrication of γ/γ' -strengthened Co-Al-W Alloys by Direct Laser Deposition: *Pyuck-Pa Choi*¹; *Boryung Yoo*¹; ¹KAIST

A-108: Gamma-titanium Intermetallic Alloy Produced by Selective Laser Melting Using Mechanically Alloyed and Plasma Spheroidized Powders: *Igor Polozov*¹; *V. A. Popovich*²; *Nikolay Razumov*¹; *Tagir Makhmutov*¹; *Anatoliy Popovich*¹; ¹Peter the Great St. Petersburg Polytechnic University; ²Delft University of Technology

A-109: Heat Treatment of Wire+Arc Additively Manufactured Bimetallic Structures: *Rumman Ul Ahsan*¹; *Jae-Deuk Kim*²; *Gi-Jeong Seo*¹; *Changwook Ji*²; *P. K. Liaw*³; *Duck Bong Kim*¹; *A. N. M. Tanvir*¹; ¹Tennessee Technological University; ²Korea Institute of Industrial Technology; ³The University of Tennessee, Knoxville

A-110: Influence of Print Orientation on Microstructure and Mechanical Performance of Selective Laser Sintered Polyamide-12: *Anil Krishna Battu*¹; *Tamas Varga*¹; *Josef Christ*¹;

Zachary Kennedy¹; Wenbin Kuang¹; Christopher Barrett¹; ¹Pacific Northwest National Laboratory

A-111: Influence of the Partial Pressure on the 316L Stainless Steel fusion with the Selective Laser Melting Process: *Alicia Annovazzi*¹; Nouredine Fenineche²; Benjamin Vayre³; ¹LERMPS-UTBM-AddUp; ²LERMPS-UTBM; ³AddUp

A-112: Influence of the Process Parameters on the Densification and Microstructure of Ni-based Superalloys with Different Amount of Former Alloying Elements Processed by Laser Powder Bed Fusion: Giulio Marchese¹; Simone Parizia¹; *Antonio Sivo*¹; Emilio Bassini¹; Flaviana Calignano²; Sara Biamino¹; Daniele Ugues¹; ¹Department of Applied Science and Technology, Politecnico di Torino; ²Department of Management and Production Engineering, Politecnico di Torino

A-113: Investigation of Martensite a' Phase Transformation during Heat Treatment of High Speed Selective Laser Melted Ti6Al4V Components: *Paul Lekoadi*¹; Nthabiseng Maledi²; Monnamme Tlotleng¹; Bathusile Masina¹; ¹CSIR; ²University of Witwatersrand

A-114: Investigation of the Effect of Beam Scan Strategies on the Microstructure of EBM Additively Manufactured Inconel 738 Builds: *Chris Blackwell*¹; Meiyue Shao¹; Sriram Vijayan¹; Sabina Kumar²; Sudarsanam Babu³; Joerg Jinschek¹; ¹Ohio State University; ²University of Tennessee; ³Oak Ridge National Laboratory

A-115: Investigation of the Effect of Process Parameters on the Microstructural Evolution and Mechanical Properties of Inconel 718 Additively Manufactured in Direct Metal Laser Melting (DMLM) Process: *Nicholas Barta*¹; Satya Ganti¹; Navin Sakthivel¹; Jim Overstreet¹; Anjani Achanta¹; Chad Yates¹; Joshua Snitkoff¹; Thomas Dobrowolski¹; ¹Baker Hughes, a GE Company

A-116: Joint Characteristics of Additively Manufactured 316L Stainless Steel Using Vacuum Brazing: *Gidong Kim*¹; Dong-jin Oh¹; Yongjoon Kang¹; So-young Park¹; Sang-woo Song¹; ¹Korea Institute of Materials Science

A-117: Laser Powder Bed Fusion Parametric Investigation of Binary Al-Si Alloys: *Holden Hyer*¹; Le Zhou¹; Joshua Haupt¹; Sharon Park¹; Brandon McWilliams²; Kyu Cho²; Yongho Sohn¹; ¹University of Central Florida; ²US Army Research Laboratory

A-118: Lattice Manufacturability Using Electron Beam Powder Bed Fusion: *Paul Korinko*¹; Dale Hitchcock¹; John Bobbitt¹; Spencer Scott¹; ¹Savannah River National Laboratory

A-119: Localized Plastic Deformation in Thin-walled Selective

Laser Melted IN718 Specimens: *Sara Messina*¹; Chris Torbet¹; Chase Joslin²; Michael Kirka²; Matthew Begley¹; Tresa Pollock¹; ¹University of California, Santa Barbara; ²Oak Ridge National Laboratory

A-120: Machine Learning Approach for Process Optimization of Pure Cu in a Powder Bed Fusion Additive Manufacturing with Electron Beam: *Kenta Aoyagi*¹; Tadashi Kii²; Nobuyuki Sasaki²; Hirofumi Watanabe³; Yoshitaka Shibuya³; Kenji Sato³; Akihiko Chiba¹; ¹Institute for Materials Research, Tohoku University; ²Japan Additive Manufacturing & Processing Technology (JAMPT) Corporation; ³JX Nippon Mining & Metals Corporation

A-121: Mechanical Properties of AlSi10Mg Processed by Laser Powder Bed Fusion at Elevated Temperature: *Even Hovig*¹; Amin Azar²; Mohammed Mhamdi²; Knut Sørby¹; ¹Norwegian University of Science and Technology; ²SINTEF Industry

A-122: Mechanical, Thermal and Corrosion Properties of Cu-10Sn Alloy Prepared by Selective Laser Melting: *Congyuan Zeng*¹; Bin Zhang¹; Ali Hemmasian Ettefagh¹; Hao Wen¹; Hong Yao¹; Wenjin Meng¹; Jonathan Raush²; Shengmin Guo¹; ¹Louisiana State University; ²University of Louisiana at Lafayette

A-123: Microstructural Characteristics of Stainless Steel 316L Processed by Selective Laser Melting Technology: *Ismat Ara*¹; X. W. Tangpong¹; Fardad Azarmi¹; ¹North Dakota State University (NDSU)

A-124: Microstructural Characterization of Ni-based Multilayer Coating After Laser Cladding on Cast Iron Substrate: *Fazati Bourahima*¹; Michel Rege¹; Christophe Lafarge¹; Abderazak Khenafi¹; ¹CHPOLANSKY

A-125: Microstructure and Mechanical Properties of AISI420 Stainless Steel Produced by Wire Arc Additive Manufacturing: *Jonas Lunde*¹; Mostafa Kazemipour¹; Salar Salahi¹; Ali Nasiri¹; ¹Memorial University of Newfoundland

A-126: Microstructure and Mechanical Properties of Direct Laser Metal Deposited GRCo-84 Alloy: *Ajay Bhagavatam*¹; Praveen Sreeramagiri¹; Asit Biswas²; Dean Baker²; Guru Dinda¹; ¹Wayne State University; ²Advanced Powder Solutions

A-127: Microstructure and Mechanical Properties of In 718 Alloy Manufactured by Several Different Process: *Seungmun Jung*¹; Suk Hoon Kang¹; Chang-Kyu Rhee¹; ¹KAERI

A-128: Microstructure and Mechanical Properties of Ti/TiC Composite Coatings Fabricated by Laser Engineered Net Shaping: *Madhavan Radhakrishnan*¹; Zeynel Guler¹; Md Mehadi

Hassan¹; Thomas Lienert²; Osman Anderoglu¹; ¹University of New Mexico; ²Optomec Inc

A-129: Nonlinear Coupling Effect Analysis of Material Properties, Processing Parameters and Part Geometry in Metal Additive Manufacturing by Full-scale Layerwise Additive Manufacturing Simulation Tool: *Jinquan Cheng*¹; ¹CS3DM

A-130: Numerical Prediction of Microstructures by a Coupled Model (CA-FE) for Laser Beam Melting of Single-track 316L Stainless Steel: *Anaïs Baumard*¹; Danièle Ayrault¹; Olivier Fandeur¹; Anne-Laure Vételé¹; Cyril Bordreuil²; Frédéric Deschaux-Beaume²; ¹Den-SERVICE d'études Mécaniques et Thermiques (SEMT), CEA; ²LMGC, University Montpellier, CNRS

A-131: On the Heat Treatment of AlSi10Mg Alloy Fabricated by Selective Laser Melting Process: Catherine Dolly Clement¹; Julie Masson²; *Abu Syed Kabir*¹; ¹Carleton University; ²Institut Supérieur de l'Aéronautique et de l'Espace

A-132: On the Influence of Nitrogen on the Performance of Austenitic Stainless Steel 316L Processed by SLM: *Julia Richter*¹; Thomas Niendorf¹; ¹University of Kassel, Institute of Materials Engineering - Metallic Materials

A-133: On the Microstructure and Corrosion Behavior of Wire Arc Additively Manufactured AISI 420 Stainless Steel: Mostafa Kazemipour¹; *Jonas Lunde*¹; Salar Salahi¹; Ali Nasiri¹; ¹Memorial University of Newfoundland

A-134: On the Role of Defects in the Dynamic Response of AM SLM 316L: *Liam Smith*¹; David Chapman¹; Paul Hooper²; Daniel Eakins¹; ¹University of Oxford; ²Imperial College London

A-135: On the Size Effects in Additively Manufactured Titanium and the Implications in AM Components: *Daniel Barba*¹; Carles Alabort²; Roger Reed¹; Enrique Alabort³; ¹University of Oxford; ²Universidad Politecnica de Valencia; ³OxMet Technologies

A-136: Phase Transformation Kinetic Pathway in Heat Treatment of Ti-6Al-4V Manufactured by Selective Laser Melting: *Dang Khoa Do*¹; Peifeng Li¹; ¹University of Glasgow

A-137: Phase-field Method for Grain Evolution During Additive Manufacturing: *Alexander Chadwick*¹; Peter Voorhees¹; ¹Northwestern University

A-138: Powder Flowability Measurements: Statistical Correlations Between Powder Characteristics and Flowability Behavior: *Parnian Kiani*¹; Umberto Scipioni Bertoli¹; Alexander Dupuy¹; Kaka

Ma²; Julie Schoenung¹; ¹University Of California, Irvine; ²Colorado State University

A-139: Precipitation Behavior and Its Strengthening Effect of Maraging Steel in Laser Cladding Remanufacturing: Ke Ren¹; Yiming Rong¹; Shaopeng Wei²; Wei Xing¹; Gang Wang²; ¹Harbin Institute of Technology; Southern University of Science and Technology; ²Tsinghua University

A-141: Process Plateaus, Not Peaks, in Laser-powder Bed Fusion: Bradley Jared¹; Josh Koepke¹; Jarrett Tigges¹; Michael Heiden¹; David Saiz¹; ¹Sandia National Laboratories

A-142: Processing Parameters Optimization on Additively Manufacturing Pure Magnesium for Quality Improvement: Experiments and Simulations: Jinquan Cheng¹; Bandar AlMangour²; ¹CS3DM; ²Saudi Arabia Basic Industries Corporation

A-143: Residual Stress Mitigation in Metal Additive Manufacturing Using Compositional Engineering: Aleksandra Vyatskikh¹; Baolong Zheng¹; Umberto Scipioni Bertoli¹; Enrique Lavernia²; Julie Schoenung¹; ¹Department of Materials Science and Engineering, University of California, Irvine; ²Department of Materials Science and Engineering, University of California

A-144: Residual Stress Mitigation in Selective Laser Melting Through Laser Scan Strategy Optimization Using Machine Learning: Kahraman Demir¹; Charles Yang¹; Adi Ben-Artzy¹; Jack Peterson¹; Grace Gu¹; Peter Hosemann¹; ¹University of California, Berkeley

A-145: Simultaneously Improved Thermophysical and Mechanical Properties of Additively Manufactured Cu-Ni-Sn-P Alloy Through Aging Heat Treatment: Young-Kyun Kim¹; Dong-Hoon Yang¹; Sun-Hong Park²; Kee-Ahn Lee¹; ¹Inha University; ²Research Institute of Industrial Science and Technology

A-147: Strain-age Cracking of Nickel-base Superalloys Processed by Laser Beam Melting: David Grange¹; Bruno Macquaire¹; Jean-Dominique Bartout¹; Christophe Colin¹; ¹Safran SA

A-148: Tailoring Hierarchical Material Performance Through Process Manipulation: Bradley Jared¹; David Saiz¹; Michael Heiden¹; Matthew Roach¹; Anthony Garland¹; Brad Boyce¹; Ben White¹; David Moore¹; ¹Sandia National Laboratories

A-149: The Effect of Support Structures on Microstructure in LPBF and EBM: Sandra Megahed¹; Vadim Aniko¹; Maximilian Voshage¹; Johannes Henrich Schleifenbaum²; ¹Chair of Digital Additive Production, RWTH Aachen University; ²Chair of Digital Additive

A-150: The Effects of Alloy Composition on Microstructure and Mechanical Properties of Duplex Stainless Steel Produced by Additive Manufacturing:*Andrew Iams*¹; *Todd Palmer*¹; ¹Pennsylvania State University

A-151: The Effects of LENS Process Parameters on the Behavior of 17-4 PH Stainless steel: *Ipfi Mathoho*¹; *Esther Akinlabi*²; *Nana Arthur*¹; *Monnamme Tlotleng*¹; ¹CSIR Pretoria; ²University of Johannesburg

A-152: The Process Parameters Extended Criterion for Laser Engineered Net Shaping of Inconel 738: *Yang Zhou*¹; *Zhaoyang Liu*¹; *Chuan Guo*¹; *Guowei Ye*¹; *Xin Li*¹; *Qiang Zhu*¹; ¹Southern University of Science and Technology

A-153: The Significance of Length Scales and Segregation in Strengthening Selective Laser Melted Stainless Steel Microstructures: *Tatu Pinomaa*¹; *Matti Lindroos*¹; *Martin Walbrühl*²; *Nikolas Provatas*³; *Anssi Laukkanen*¹; ¹VTT Technical Research Centre of Finland; ²Royal Institute of Technology (KTH); ³McGill University

A-154: Thermodynamic Calculation and Characterization of Carbide Precipitation in Laser-deposited Material for High Speed Steel Alloy: *Ali Jammal*¹; *Gang Wang*¹; *Songge Yang*²; *Yu Zhong*²; *Yiming Rong*³; ¹Tsinghua University; ²WPI; ³Southern University of Science and Technology

A-155: Thermoelectric Magnetohydrodynamic Effects in Laser Additive Manufacturing: Coupled Macro-microscale Numerical Modelling: *Andrew Kao*¹; *Teddy Gan*¹; *Catherine Tonry*¹; *Ivars Krastins*¹; *Koulis Pericleous*¹; ¹University of Greenwich

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Poster Session

Sponsored by: TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Daniel Salazar, BCMaterials; Alex Leary, Nasa Glenn Research Center; Markus Chmielus, University of Pittsburgh; Ryan Ott, Ames Laboratory/Cmi; Arcady Zhukov, UPV/EHU, and Ikerbasque, Basque Foundation for Science

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Session Chair: Arkady Zhukov, UPV/EHU and Ikerbasque

E-1 (Invited): Core Losses in Co-rich Inductors with Tunable Permeability: *Alex Leary*¹; Vladimir Keylin¹; Ron Noebe¹; Randy Bowman¹; Grant Feichter¹; Kevin Byerly²; Paul Ohodnicki²; Michael McHenry³; ¹Nasa Glenn Research Center; ²NETL; ³Carnegie Mellon University

E-3: Magnetic Flux Density Dispersion on the Gaps of the FeSiNbCuB Nanocrystalline Block Core: *Aleksandra Kolano-Burian*¹; Roman Kolano¹; Przemysław Zackiewicz¹; Marek Hreczka¹; ¹Lukasiewicz Research Network – Institute of Non-Ferrous Metals

E-4: Processing and Properties of Low Porosity Cast SMCCores: *Piotr Blyskun*¹; Grzegorz Lukaszewicz¹; Grzegorz Cieslak²; Aleksandra Kolano-Burian³; Maciej Kowalczyk¹; ¹Faculty of Materials Science and Engineering, Warsaw University of Technology; ²Warsaw University of Technology; ³Institute of Non-ferrous Metals

E-5: Structure and Properties Evolution in Rapidly Annealed Fe₆₇Co₂₀B₁₃ Amorphous Material: *Maciej Kowalczyk*¹; Jarosław Ferenc¹; Anna Wójcik²; Aleksandra Kolano-Burian³; Tadeusz Kulik¹; Piotr Blyskun¹; ¹Warsaw University of Technology; ²Polish Academy of Sciences; ³Lukasiewicz Research Network

E-6: Transition Metal Based Nanostructured Hard Magnet: *Kinjal Gandha*¹; Ikenna C. Nlebedim¹; ¹Ames Laboratory

E-7: Tuning of Second Order Phase Transition of NiMnGa Heusler-type Glass-coated Microwires: Carlos Garcia¹; Valentina Zhukova²; Sergei Shevyrtalov³; Mihail Ipatov²; Paula Corte-Leon⁴; Arcady Zhukov⁵; ¹Universidad Técnica Federico Santa María, Valparaíso, Chile; ²University Basque Country, UPV/EHU; ³Immanuel Kant Baltic Federal University; ⁴University Basque Country, UPV/EHU; ⁵UPV/EHU, and Ikerbasque, Basque Foundation for Science

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VI — Poster Session

Sponsored by: TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

Program Organizers: Jung Pyung Choi, Pacific Northwest National Laboratory; Amit Pandey, MicroTesting Solutions; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh

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Session Chairs: Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University

E-8 (Digital): Improving Wetting of Silver (Ag) on Oxide Surface with Patterned Nickel (Ni)-particles: *Jiyeon Park*¹; Jason Nicholas¹; Yue Qi¹; ¹Michigan State University

E-9 (Invited): Protective Coatings for Solid Oxide Fuel Cell Stacks: *Jung Pyung Choi*¹; John Hardy¹; ¹Pacific Northwest National Laboratory

E-10: A BiVO₄-RGO Bilayer Electrode based Photoelectrochemical Supercapacitor: Anirban Roy¹; *Pavel Majumdar*²; Krishnendu Pramanik³; Hiranmay Saha⁴; ¹University of Tennessee, Knoxville; ²University of Utah; ³University of Calcutta; ⁴Indian Institute of Engineering Science and Technology

E-11: A Critical Evaluation of Internal Temperature Sensors Implanted in the Lithium-ion Batteries: Mihit Parekh¹; *Bing Li*¹; Vikas Tomar¹; Vilas Pol¹; ¹Purdue University

E-12: A Method for Efficient Lithium Desorption in Ni-rich Layered Structure Cathode Materials for Lithium Resource Regeneration: Seon-jin Lee¹; Ji-woong Shin¹; Sang-yong Oh¹; Yun-chae Nam¹; Bonkeup Koo²; *Jong-tae Son*¹; ¹Korea National University of Transportation; ²Hanbat National University

E-13: A Novel Class of High-ionic Conductivity, Stable Electrolyte for Li-ion All-Solid-State Batteries: Chunhu Tan¹; Shuyi Chen¹; Daniel Lin¹; Tianyu Meng¹; Jessica Lin¹; Kevin Zanjani¹; *Tim Lin*¹; ¹Bioenno Tech

E-15: Development of Platinum Electrocatalysts with Preferential

Crystal Orientation for Energy Conversion Systems: *Silvina Gabriela Ramos*¹; Gustavo Andreassen²; Alicia Ares¹; Walter E. Triaca²; ¹Instituto de Materiales de Misiones (IMAM)-CONICET, UNaM; ²Instituto de Investigaciones Fisicoquímicas Teóricas y Aplicadas (INIFTA), UNLP

E-16: Enhanced Stability of B-site W Doped Pr_{0.6}Sr_{0.4}Fe_{1-x}W_xO_{3-d} Ceramic Membranes for Water Splitting: *Yanbo Liu*¹; Hongwei Cheng¹; Xiaofang Xu¹; Qiangchao Sun¹; Chaoyun Liu¹; Qian Xu¹; Xionggang Lu¹; ¹Shanghai University

E-17: Enhancement of Metal Surface Mechanical Property by High Energy Beam Injection: *Sangwoo Kim*¹; DongEung Kim¹; Changhyun Jin²; ¹Korea Institute of Industrial Tech; ²Yonsei University

E-18: Fe₂O₃ Nano-particles Grown on Carbon Fabric as a Freestanding Anode for High-performance Lithium-ion Batteries: *Yang Jun*¹; ¹University of Science and Technology Beijing

E-19: Finding Efficient Growth Parameters for Carbon Nanotube Growth: *Tyler Knapp*¹; Jud Ready¹; ¹Georgia Tech Research Institute

E-20: Linking Nanoscale Grain Boundary Composition and Energetic Properties in Ceramic Oxides: *Tara Boland*¹; Arunima Singh¹; Peter Rez¹; Peter Crozier¹; ¹Arizona State University

E-21: Mechanistic Elucidation of Electrodeposition Stability at Metal-Solid Electrolyte Interfaces: *Ankit Verma*¹; Partha Mukherjee¹; ¹Purdue University

E-22: Microwave Dielectric Properties of Isovalent and Aliovalent Ions Doped Ca₄(La₄Pr₂)(SiO₄)₄(PO₄)₂O₂ Ceramics: *Sea Fue Wang*¹; Yung Jen Lin²; Bo Cheng Lai¹; Hong Bo Yang²; Jia Min Chen²; ¹National Taipei University of Technology; ²Tatung University

E-23: Nanotwinned Copper Films Retaining High Strength and Moderate Elongation after Low Temperature Annealing: *Hsiang-Yuan Cheng*¹; Chih Chen¹; ¹National Chiao Tung University

E-24: Preparation of Porous Carbon Materials and Its Application in Supercapacitors: XiaoMeng Yang¹; PengFei Tang¹; WeiJun Peng¹; Ibrar Zahid¹; GuiHong Han¹; *Zhang YongSheng*¹; ¹Zhengzhou University

E-25: Raman Spectroscopy Study of Amorphous MnO₂ and a-MnO₂ Cathodes in Rechargeable Zn-metal Batteries: *Michael Kindle*¹; Samantha Robillard¹; John McCloy¹; Min-Kyu Song¹; ¹Washington State University

E-26: Solid State Phase Change Materials for Energy Storage:

Developing a Database: Xiaochuan Tang¹; *Christopher Weinberger*¹;
¹Colorado State University

E-27: Strategies for the Viability of Li-S Rechargeable Batteries by Using Nanotechnology: Eunho Cha¹; *Sanket Bhoyate*¹; Wonbong Choi¹; ¹University of North Texas

E-28: Synthesis of Nanoencapsulated Phase Change Materials with Ag Shell for Thermal Energy Storage: Huanmei Yuan¹; *Hao Bai*¹; Jian Zhang¹; Zefei Zhang¹; ¹University of Science and Technology Beijing

E-29: Theoretical Prediction of Intercalation Compounds Formed by Co-Intercalation of Mg Ions with Diamine into Graphite Anodes for Mg-Ion Batteries: *Pegah Mirabedini*¹; P. Alex Greaney¹;
¹University of California, Riverside

E-30: Thermal Cycling of Room Temperature Ionic Liquid-based Supercapacitors for Aerospace Applications: *Julia Allen*¹; Jud Ready¹; ¹Georgia Tech Research Institute

E-31: Understanding Dendritic Growth in Mg-based Batteries and Design of Metallic Anodes: *Rachel Davidson*¹; Sarbajit Banerjee¹;
¹Texas A&M University

ELECTRONIC MATERIALS

Advanced Microelectronic Packaging, Emerging Interconnection Technology and Pb-free Solder — Poster Session

Sponsored by: TMS Functional Materials Division, TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Christopher Gourlay, Imperial College London; Kazuhiro Nogita, University of Queensland; David Yan, San Jose State University; Mike Wolverton, Raytheon; Babak Arfaei, Ford Motor Company; Andre Delhaise, Celestica; Mehran Maalekian, Mat-Tech; Mohd Arif Salleh, Universiti Malaysia Perlis

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Session Chair: Chris Gourlay, Imperial College London

D-1 (Invited): Effects of Materials and Package Design on Warpage Control of Semiconductor Devices: *Richard Chung*¹; Hala Shaba¹;

¹San Jose State University

D-2: A Novel Class of Multiscale Nanomaterials-based Thermal Interface Materials for High Temperatures, High Power Density Electronics: Chunhu Tan¹; Shuyi Chen¹; *Tim Lin*¹; ¹Aegistech Technology Inc

D-3: Study of Pore Structure of Nano-silver Paste Sintered Interconnect under Current-stressing: *Ingann Chen*¹; Chiaming Yang¹; Pocheng Su¹; Potsung Hsieh¹; Steve Lienchung Hsu¹; ¹National Cheng Kung University

MECHANICS & STRUCTURAL RELIABILITY

Advancing Current and State-of-the-Art Application of Ni- and Co-based Superalloys — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Chantal Sudbrack, Northwestern University Center for Atom-Probe Tomography; Mario Bochiechio, Pratt & Whitney; Kevin Bockenstedt, ATI Specialty Materials; Katerina Christofidou, University of Sheffield; James Coakley, University of Miami; Martin Detrois, National Energy Technology Laboratory; Laura Dial, GE Global Research; Bij-Na Kim, Carpenter Additive; Victoria Miller, University of Florida; Kinga Unocic, Oak Ridge National Laboratory

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G-1 (Invited): The Role of Heteroepitaxial Recrystallization in the Determination of the Grain Size Distribution during Thermomechanical Processing of Ni Base Superalloys: Cameron Hale¹; Eric Payton²; *Victoria Miller*¹; ¹University of Florida; ²Air Force Research Laboratory

G-2: Application of Computed Tomography as Non-destructive Test in Development Process of Aircraft Ni Superalloys Castings: *Dorota Wyrobek*¹; Rafal Cygan¹; Grzegorz Labaj¹; ¹Consolidated Precision Products Poland

G-3: Evaluating the Hydrogen Environment-assisted Cracking Susceptibility of a Next-generation Co-Ni Alloy for Marine Fastener Applications: *Zachary Harris*¹; Charles Demarest¹; Brendy

Rincon Troconis²; John Scully¹; James Burns¹; ¹University of Virginia;
²University of Texas at San Antonio

G-6: Phase-field Informed DDD Study: Dependence of Microstructural Evolution on the Crystallographic Orientations in Ni-based Single Crystal Superalloys: *Harikrishnan Rajendran*¹; Jean-Briac le Graverend¹; Amine Benzerga¹; ¹Texas A&M University

G-7: The Role of Microstructural Homogenization on Tensile and Stress-rupture Behavior of Selective Laser Melted Nickel Based 718 Alloy: *Shahzad Salam*¹; Ichiro Mitama¹; Takuma Sakata¹; ¹Sumitomo Heavy Industries LTD.

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications VIII — Student Poster Session

Sponsored by: TMS Functional Materials Division, TMS: Alloy Phases Committee

Program Organizers: Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Ensicaen University of Caen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Lan Li, Boise State University; Takao Mori, National Institute for Materials Science; Hsin-jay Wu, National Chiao-tung University; Tiejun Zhu, Zhejiang University

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Session Chair: Sinn-wen Chen, National Tsing Hua University

D-4: Assessment of Co-P Diffusion Barrier for Bismuth Telluride-based Thermoelectric Materials: *Zhen-Wei Sun*¹; Chun-Hsien Wang¹; Albert T. Wu¹; ¹National Central University

D-5: Mass Production of Highly Performing BiSbTe Thermoelectric Materials Through Powder Metallurgy: *Pathan Sharief*¹; Suk-Min Yoon¹; May Likha Lwin¹; Chul-Hee Lee¹; Peyala Dharmaiah¹; Babu Madavali¹; Soon-Jik Hong¹; ¹Kongju National University

D-6: Phase Diagram of Bi-Cu-Te and Thermoelectric Properties of Cu Doped Bi₂Te₃ Alloys: *Wan-Ting Yen*¹; Hsin-Jay Wu¹; ¹National Chiao Tung University

D-7: Phase Diagrams of Ag-Pb-Sn-Te System: Sinn-wen Chen¹; Jia-yu Du¹; *Yohanes Hutabalian*¹; Aleš Kroupa²; ¹National Tsing Hua

University; ²Czech Academy of Sciences

D-8: Realizing the Microstructure in GeTe-based Thermoelectric Materials and Phase Transition Behavior: *Yi-Fen Tsai*¹; Pai-Chun Wei²; Hsin-Jay Wu¹; ¹National Chiao-Tung University; ²Computer, Electrical, and Mathematical Sciences and Engineering Division King Abdullah University of Science and Technology (KAUST)

D-9: Thermoelectric Properties of Multiply Doped Mg₃(Sb, Bi)₂: *Yasuo Shibata*¹; Yuji Ohishi¹; Hiroaki Muta¹; ¹Osaka University

LIGHT METALS

Alumina and Bauxite — Poster Session

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: James Vaughan, University of Queensland

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F-1: A Review of Research on Alumina Extraction from High-alumina Fly Ash and a New Method for Preparing Alumina by Electrotransformation: *Xiuxiu Han*¹; Zhang Tingan¹; Guozhi Lv¹; Xijuan Pan¹; Daxue Fu¹; ¹Northeastern University

F-2: Effect of Sodium Alkali Concentration on Calcification-carbonization Process: *Yang Chen*¹; Zhang Tingan¹; Guozhi Lv¹; Xi Chao¹; ¹Northeastern University

F-3: Flow field Characteristics in Self-stirring Reactor based on PIV Technology: *Zimu Zhang*¹; Qiuyue Zhao¹; Shuai Zhu¹; Zhang Tingan¹; ¹Northeastern University

F-4: Investigation on Heat Resisting Cast Iron Produced Through Carbothermic Reduction of Alumina Residue (Bayer Red Mud): *Jianmin Zeng*¹; Ke Zhu¹; Zimeng Tan¹; Aoping He¹; ¹Guangxi University

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Poster Session

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Dmitry Eskin, Brunel University

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F-5: Aluminum Nanocomposites Made via In-situ Metal-based Pyrolysis: Processing and Microstructure: *Aaron Gladstein*¹; Alan Taub¹; ¹University of Michigan

F-6: Analysis of Microhardness of Al-Si Alloys Directionally Solidified: Roberto Rozicki¹; *Alicia Ares*²; ¹Programa de Materiales y Fisicoquímica (ProMyF). Facultad de Ciencias Exactas, Químicas y Naturales (FCEQyN). Universidad Nacional de Misiones (UNaM); ²Universidad Nacional De Misiones

F-7: Corrosion Inhibition Effect of Aloe Saponaria Gel on the Corrosion Resistance of Aluminum: Malena Friedrich¹; Mariana Schreiner¹; *Alicia Ares*²; Claudia Méndez²; ¹Programa de Materiales y Fisicoquímica (ProMyF). Facultad de Ciencias Exactas, Químicas y Naturales (FCEQyN). Universidad Nacional de Misiones (UNaM); ²IMAM (CONICET-UNaM)

F-8: Development of Two Cavities' Large Wheel Forming Process Using Semi-solid Forging Technology: *Min Seok Moon*¹; Myeong Han Yoo¹; Kee Won Kim²; Jong Dae Yoon²; Joon Hyuk Song¹; Sang Youp Oh¹; ¹Korea Institute of Carbon Convergence Technology; ²RheoForge Co., Ltd.

F-9: Effect of Nano α -Al(Fe,Mn)Si Particles on the Microstructure and Mechanical Properties of Extruded Al-Si-Mg-based Alloy with ZnO Addition: *Sangjun Lee*¹; Donghyun Bae¹; ¹Yonsei University

F-10: Effect of Si Modification on the Mechanical and Tribological Properties of an Al-Si Hyper-eutectic Alloy: *Jeheon Jeon*¹; Donghyun Bae¹; ¹Yonsei University

F-11: Effect of Transition Metals Micro-Additions on Microstructure and Mechanical Properties Al-Si-Mg Alloy: *Lukasz Rogal*¹; Wojciech Maziarz¹; Karol Janus¹; Aneta Wilczek²; Piotr Bobrowski¹; ¹Institute of Metallurgy and Materials Science; ²Limatherm S.A.

F-12: Effects of Cu Contents on Electric and Mechanical Properties of Al-Zn-Mg based Alloys: *Yong-Ho Kim*¹; Sang-Su Na¹; Hyeon-

Taek Son¹; ¹Korea Institute of Industrial Technology

F-13: Effects of Filtration Paper and Bleaching Earth on Rolling Mill Oil Performance: *Ali Ulus*¹; Serpil Fidan¹; Çisem Dogan¹; Eda Özkaya¹; Canan Inel¹; ¹Asas Aluminium

F-15: Effects of Trace Elements on Thermal Conductivity and Formability of the Extruded Al-RE Alloy Systems: *Hyeon-Taek Son*¹; Yong-Ho Kim¹; Sang-Soo Na¹; ¹Korea Institute of Industrial Technology

F-16: Experimental Investigation of MgAl₂O₄ Spinel Formation in Oxidation of Al-Mg Alloys: *Young-Ok Yoon*¹; Seong-Ho Ha¹; Bong-Hwan Kim¹; Hyun-Kyu Lim¹; Shae K. Kim¹; ¹Korea Institute of Industrial Technology

F-17: Heat Treatment Effect and Mechanical Properties of Modified A7075 Alloy for Improved Extrudability: *Jaehyuck Shin*¹; Sehoon Kim¹; Jinpyeong Kim¹; Siyoung Sung¹; Beomsuck Han¹; ¹Korea Automotive Technology Institute

F-18: Hybrid Aluminum Sheets with Improved Mechanical Properties by Repeated Roll-bonding Process: *ChaYong Lim*¹; Seunghee Lee²; ¹Korea Institute of Materials Science; ²Mokpo National University

F-19: Impact of Dispersion Hardening by Alumina Nano Particles on Mechanical Properties of Al 1100: Ilya Zhukov¹; Alexander Kozuluin¹; *Anton Khrustalev*¹; Evgeny Moskvichev²; Alexander Vorozhtsov¹; Dmitry Lychagin¹; ¹Tomsk State University; ²Institute of Strength Physics and Materials Science of the Siberian Branch of the Russian Academy of Sciences

F-21: Laser Joining of Aluminium and Steel Thin Sheets: *Besabakhe Skhosane*¹; Sisa Pityana¹; Monnamme Tlotleng¹; ¹Council for Scientific and Industrial Research

F-22: Microstructure Analysis of Graded Interface Layers in a Model Multilayer Al/Al-Zn/Al by Scanning Microbeam Small-angle X-ray Scattering Measurements: *Shan Lin*¹; Hiroshi Okuda¹; Higashino Yukihiro¹; Katsushi Matsumoto²; Kazufumi Sato³; ¹Kyoto University; ²Kobe Steel, Ltd.; ³Kobelco Research Institute, Inc.

F-23: Self-healing Aluminium Alloys: *Irena Paulin*¹; Crtomir Donik¹; Matjaž Godec¹; ¹Institut for Metals and Technology

F-25: Synergistic Effects of Cu and Zr V on Microstructure and Mechanical Properties of Al-Si-Mg Cast Alloy: *Mingshan Zhang*¹;

Junsheng Wang¹; ¹Beijing Institute of Technology

F-26: The Effect of Initial Precipitates on Shear Deformation in 6061 Aluminium Alloy: *Wonkee Chae*¹; JunHyun Han¹; ¹Chungnam National University

F-27: The Effect of Profile Shape on Crystallographic Texture of Extruded 6xxx High Strength Aluminium Alloy: *Chrysoula Tzileroglou*¹; Isaac Chang¹; ¹Brunel University London

F-28: The Effect of Zinc Addition on Corrosion Resistance and Mechanical Properties of Recycled Aluminium Cans: *Ademola Agbeleye*¹; Atinuke Oladoye¹; Babatunde Bolasodun¹; ¹University of Lagos

F-29: The Evaluaion of Forged Aluminum Heat Sink for LED Headlight of Automobile: *Young-Sek Yang*¹; Geun Woo Lee¹; Chang Ho Yoon¹; ¹Foosung Precision Ind. Co., Ltd.

F-30: The Role of In-situ Stacking Faults and Twins in the Deformation Behavior of New Al Alloys: *Miran Joo*¹; Jeheon Jeon¹; Donghyun Bae¹; ¹Yonsei University

BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Poster Session

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines; Po-Yu Chen, National Tsing Hua University

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B-26: Fabrication of Nanogenerator and Its Potential Application in Implantable Biomedical Devices: *Siddharth Sharma*¹; Indranil Lahiri¹; Partha Roy¹; Debrupa Lahiri¹; ¹IIT Roorkee

BIOMATERIALS

Biodegradable Materials for Medical Applications II — Poster

Sponsored by: TMS Functional Materials Division, TMS: Biomaterials Committee

Program Organizers: Jaroslaw Drelich, Michigan Technological University; Ehsan Mostaed, Michigan Technological University; Malgorzata Sikora-Jasinska, Michigan Technological University; Jan-Marten Seitz, Syntellix AG; Petra Maier, Stralsund University of Applied Sciences; Norbert Hort, Helmholtz-Zentrum Geesthacht; Huinan Liu, University of California, Riverside

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Session Chairs: Jaroslaw Drelich, Michigan Technological University; Ehsan Mostaed, Michigan Technological University; Malgorzata Sikora-Jasinska, Michigan Technological University; Jan-Marten Seitz, Syntellix AG; Petra Maier, University of Applied Sciences Stralsund; Norbert Hort, Helmholtz-Zentrum Geesthacht; Huinan Liu, University of California at Riverside

B-1: Bilayer Coated Magnesium Weaves as Degradable Bioscaffolds: *Ju Xue*¹; Cristina Romany¹; Bowen Chen¹; Lawrence Langan¹; James Guest¹; Timothy Weihs¹; ¹Johns Hopkins University

B-2: Corrosion Products of Zinc Implant Degradation Suppress Neointimal Hyperplasia: *Roger Guillory*¹; Timothy Kolesar¹; Jaroslaw Drelich¹; Jeremy Goldman¹; ¹Michigan Technological University

B-3: Deformation Localization of Zn-Cu-Mn-Mg Alloys Designed for Bioresorbable Medical Implants: *Morteza Shaker Ardakani*¹; Ehsan Mostaed¹; Stephen Kampe¹; Jaroslaw Drelich¹; ¹Michigan Technological University

B-4: Discovery of Alloying Elements and Processing Parameters that Impart Improved Biocompatibility of Zinc-based Medical Implants: *Lea Morath*¹; Alexander Oliver¹; Katie Flom¹; Roger Guillory¹; Jeremy Goldman¹; Eshan Mostaed¹; Jaroslaw Drelich¹; ¹Michigan Technological University

B-5: Effect of Compressive Strain on Biodegradability in Pure Magnesium: *Shun Yorifuji*¹; Naoko Ikeo¹; Toshiji Mukai¹; ¹Kobe University

B-6: Evaluation of Electrospinning Parameters for Fabrication of Biodegradable Drug Carrier Silk Fibers: *Babak Jahani*¹; Sahar Tabatabaei²; Salimeh Yasaei Sekeh³; Long Jiang¹; ¹North Dakota

State University; ²Pharmascience; ³University of Maine

B-8: Long Term Inflammatory Response to Zinc Materials in Murine Arteries: *Alexander Oliver*¹; Roger Guillory¹; Timothy Kolesar¹; Lea Morath¹; Katie Flom¹; Ehsan Mostaed¹; Jaroslaw Drelich¹; Jeremy Goldman¹; ¹Michigan Technological University

B-9: Mechanical and Wear Behaviour of Mg-Ca Alloys for Orthopaedic Implant Applications: *Asmaa Elmaghraby*¹; Ahmed Aziz¹; ¹German University (GUC) in Cairo

B-10: New Approach in Development of Biodegradable FeMn Alloys: *Crtomir Donik*¹; Irena Paulin¹; Aleksandra Kocijan¹; Matjaž Godec¹; ¹Institute of Metals and Technology

B-11: Novel Method for Increasing Mechanical Properties of Biodegradable Zinc: *Anna Jarzebska*¹; Magdalena Bieda-Niemiec¹; Lukasz Maj¹; Martyna Strag¹; Daniel Wojtas²; Robert Chulist³; Jan Guspiel¹; Wacław Pachla⁴; Krzysztof Sztwiertnia¹; ¹Institute of Metallurgy and Materials Science, Polish Academy of Sciences, Krako; ²AGH University of Science and Technology Faculty of Physics and Applied Computer Science; ³Polish Academy of Sciences, Krako; ⁴Institute of High Pressure Physics, Polish Academy of Sciences, Warszawa, Poland

B-12: Research on Zn-Ag-Mg Alloy as a Potential Biodegradable Implant Material: *Maria Watroba*¹; Wiktor Bednarczyk¹; Jakub Kawalko¹; Krzysztof Mech¹; Gabriela Boelter²; Manuel Banzhaf²; Piotr Bala¹; ¹AGH University of Science and Technology; ²University of Birmingham

BIOMATERIALS

Biological Materials Science — Poster Session

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Steven Naleway, University of Utah; Jing Du, Penn State University; Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); David Restrepo, University of Texas at San Antonio

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Session Chairs: Steven Naleway, University of Utah; Jing Du, Pennsylvania State University; Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); David Restrepo, University of Texas at San Antonio

B-22: Fabrication and Shape Memory Characteristics of Non-toxic Ti-Zr-Nb-Sn Biomaterials: *Yeon-wook Kim*¹; Tae-hyun Nam²; Myunghwan Byun¹; ¹Keimyung University; ²Gyeongsang National University

B-23: Mechanical, Physical, and Morphological Characterization of a Composite Made from Luffa Cylindrica and EVA Copolymer: *Alejandro Restrepo Carmona*¹; Henry Colorado¹; ¹University Of Antioquia

B-24: Quantitative Study of Banana Green Peel Tannins for Preparing a Bioma Terial: Elisângela Ferreira¹; *Veronica Candido*¹; Rafaela Pinheiro¹; Alisson Silva¹; Sergio Monteiro²; Samara Marques¹; ¹Universidade Federal do Pará; ²Federal University of Rio De Janeiro

B-25: Radiopacifying Bismuth Oxide-based Composite Powder Prepared by High Energy Ball Milling: *Pee-Yew Lee*¹; ¹National Taiwan Ocean University

BIOMATERIALS

Biological Materials Science — Student Poster Competition

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

Program Organizers: Steven Naleway, University of Utah; Jing Du, Penn State University; Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); David Restrepo, University of Texas at San Antonio

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Session Chairs: Steven Naleway, University of Utah; Jing Du, Pennsylvania State University; Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); David Restrepo, University of Texas at San Antonio

B-13: 3D Printed Models of the Arrangement of Components in Two-phase Composites: Frances Su¹; Fereshteh Sabet²; *Katherine*

*Tang*¹; Sean Garner¹; Michael Tolley¹; Iwona Jasiuk²; Joanna McKittrick¹; ¹University of California, San Diego; ²University of Illinois at Urbana-Champaign

B-14: Biodegradable 3D Fibrous Scaffold with Co-axially Aligned Carbon Nanotubes for Directional Regeneration of Peripheral Nerves: *Souvik Ghosh*¹; Swati Haldar¹; Sumeet Gupta²; Ankita Bish¹; Samrat Chauhan²; Partha Roy¹; Debrupa Lahiri¹; ¹Indian Institute of Technology, Roorkee; ²Maharshi Markandeshwar University

B-15: Electrochemical Evaluation of Novel Titanium Alloys: *Thu Nguyen*¹; Jacob Giacom¹; Vilupanur Ravi¹; ¹California Polytechnical State University, Pomona

B-16: Fracture Mechanisms of Epoxy-alumina Composites: Jiacheng Gao¹; Ruyi Man¹; Yuyang Wang¹; *Yichun Tang*¹; Kangning Su¹; Michael Hillman¹; Jing Du¹; ¹Penn State University

B-17: Microsphere Calcium Phosphate Cements to Improve Injectability and 3D-printability of Dental Biomaterials: *Tony Yin*¹; Krista Carlson¹; Steven Naleway¹; ¹University of Utah

B-18: Modulation of Neurogenic Differentiation by Reinforcement of Polymeric Scaffolds with Different Carbon Nanofillers: *Souvik Ghosh*¹; Swati Haldar¹; Viney Kumar¹; Partha Roy¹; Debrupa Lahiri¹; ¹Indian Institute of Technology, Roorkee

B-19: Structural and Mechanical Characterization of Quasi-indestructible *Armillaria ostoyae* Rhizomorphs: *Debora Lyn Porter*¹; Alexander Bradshaw²; Bryn Dentinger²; Steven Naleway¹; ¹The University of Utah Department of Mechanical Engineering; ²The University of Utah Department of Biology

B-20: The Effect of the Addition of Cobalt Powder on Compressive Properties of Porous Titanium as Bone Substitute Materials: *Feng Zhang*¹; Guibao Qiu¹; Hanghang Zhou¹; Tengfei Lu¹; ¹Chongqing University

B-21: Using Microspheres to Understand the Effect of Particle Geometry in Freeze Casting: *Sierra Freitas*¹; Lauren Kochaver¹; Krista Carlson¹; Steven Naleway¹; ¹University of Utah

LIGHT METALS

Cast Shop Technology — Poster Session

Sponsored by: TMS Light Metals Division, TMS: Aluminum Committee

Program Organizer: Johannes Morscheiser, Aleris Rolled Products Germany GmbH

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F-31: Effect of Electromagnetic Stirring on Morphology of α -Al Phase in Near Eutectic Al-Si Alloy: *Yuichiro Murakami*¹; Kazutaka Suzuki¹; Isao Matsui¹; Naoki Omura¹; ¹National Institute of Advanced Industrial Science and Technology

F-32: Furnace Lining Degradation by 5xxx Aluminum Alloys: *Athanasia Flampouri*¹; Theofani Tzevelekou¹; Sofia Papadopoulou¹; Spyros Pinis²; Nikolaos Sgourdakis²; ¹ELKEME S.A.; ²ElvalHalcor S.A.

F-33: Microsegregation Mechanisms in Aluminum Binary Alloys of Different Casting Techniques: a Quantitative study: *Zhenjie Yao*¹; Yang Huo²; Mei Li²; John Allison¹; ¹University of Michigan; ²Ford Motor Company

F-34: Numerical Simulation of Temperature Field in 6061 Aluminum Alloy Vertical Twin-roll Casting Process: *Chaopan Xie*¹; Xiaoping Liang¹; Yu Wang¹; ¹ChongQing University

CORROSION

Coatings and Surface Engineering for Environmental Protection II — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Arif Mubarok, PPG; Raul Rebak, GE Global Research; Rajeev Gupta, University of Akron; Tushar Borkar, Cleveland State University; Brian Okerberg, PPG Industries; Michael Mayo, PPG Industries

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Session Chairs: Arif Mubarok, PPG; Raul Rebak, GE Global Research; Tushar Borkar, Cleveland State University

C-1: Advanced Coating and Surface Modification Technologies for SiC-SiCf Composites for Hydrothermal Corrosion Protection in LWRs: *Kyle Quillin*¹; Hwasung Yeom¹; Tyler Dabney¹; John Lacy¹; Peng Xu²; Kumar Sridharan¹; ¹University of Wisconsin, Madison; ²Westinghouse Electric Company

C-2: Anti-Corrosive Properties and Theoretical Studies of Some Thiosemicarbazide Compounds on Mild Steel Corrosion in Hydrochloric Acid: *Esra Sezer*¹; Emel Bayol¹; A. Ali Gürten²; Fatma Kandemirli³; Yusuf Akkaya¹; ¹Nigde Ömer Halisdemir University; ²Osmaniye Korkut Ata University; ³Kastamonu University

C-3: Corrosion Resistance and Electrochemical Corrosion Characteristics of Stainless Steel for Seawater Desalination Evaporator: *Yangang Zhang*¹; Liang Liao¹; Zhangfu Yuan¹; Chunhong Shi¹; ¹University of Science and Technology Beijing

C-4: Development of Corrosion Barrier Coatings for U3Si2 Nuclear Fuel Pellets for Light Water Reactors: *John Lacy*¹; Hwasung Yeom¹; Lu Cai²; Kathryn Metzger²; Edward Lahoda²; Kumar Sridharan¹; ¹University of Wisconsin, Madison; ²Westinghouse Electric Company

C-5: Establishment of a Lead Loop Facility to Support Lead Cooled Fast Reactor Design: *Osman Anderoglu*¹; Cemal Cakez¹; Shuprio Ghosh¹; Khaled Talaat¹; Sang Lee¹; Youho Lee²; Keith Woloshun³; Seung Kim³; Stuart Maloy³; Cetin Unal³; Michael Ickes⁴; Paolo Ferroni⁴; ¹University of New Mexico; ²Seoul National University; ³Los Alamos National Laboratory; ⁴Westinghouse Electric Company

C-6: Microstructure Characteristics after Combustion and Fireproof Mechanism of TiAl-based Alloys: *Peixuan Ouyang*¹; Guangbao Mi²; Peijie Li³; Shuting Zhang⁴; ¹North China University of Technology; Tsinghua University; ²AECC Beijing Institute of Aeronautical Materials; ³Tsinghua University; ⁴North China University of Technology

C-7: Nanoceramic Coatings for Heavy Liquid Metal Applications: Boris Paladino¹; *Matteo Vanazzi*¹; Daniele Iadicicco¹; Serena Bassini²; Marco Utili²; Fabio Di Fonzo¹; ¹Istituto Italiano di Tecnologia (IIT); ²ENEA

C-8: Pitting Corrosion in Ferritic Stainless Steels: Orlando Ledezma Villa¹; *Emmanuel Sanchez Aguilar*¹; ¹Universidad Autonoma de Nuevo Leon

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Dilpuneet Aidhy, University of Wyoming; Michael Tonks, University of Florida; Mahmood Mamivand, Boise State University; Giovanni Bonny, Belgian Nuclear Research Center

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E-33 (Invited): Development of a New Thermochemistry Solver for Multiphysics Simulations of Nuclear Materials: *Parikshit Bajpai*¹; Max Poschmann¹; David Andrs²; Chaitanya Bhave³; Michael Tonks³; Markus Piro¹; ¹Ontario Tech University; ²Idaho National Laboratory; ³University of Florida

E-34: Ab-initio Modelling of Iodine Defects in Strained Zirconium and Ordered Zirconium-oxygen Suboxides: *Vlad Podgurschi*¹; Daniel King¹; Jana Smutna¹; Mark Wenman¹; ¹Imperial College London

E-36: ICME Modeling of U-10%wt Mo Alloys: A Linkage between Microstructure Evolution and Process Modeling: Chao Wang¹; Zhijie Xu¹; William Frazier¹; *Ayoub Soulami*¹; Saumyadeep Jana¹; Kyoo Sil Choi¹; Curt Lavender¹; Vineet Joshi¹; ¹Pacific Northwest National Laboratory

E-37: Machine Learning-assisted Risk-informed Sensitivity Analysis for ATF Under SBO: *Jianguo Yu*¹; Cole Blakely¹; Hongbin Zhang¹; ¹Idaho National Laboratory

E-38: Mesoscale Modeling of High Burn-up Structure (HBS) Formation and Evolution in U-Mo Alloys: *Karim Ahmed*¹; Daniel Schwen²; Yongfeng Zhang²; ¹Texas A&M University; ²Idaho National Laboratory

E-39: Molecular Dynamics and Phase-field Study of Anisotropic Grain Growth Behavior in UO₂: *Jarin French*¹; Yipeng Gao²; Xian-Ming Bai¹; ¹Virginia Tech; ²Idaho National Laboratory

E-40: Origin of Hardening in Spinodally-decomposed Fe-Cr Binary Alloys: *Tomoaki Suzudo*¹; Takeshi Toyama²; Yoshiyasu

Nagai²; ¹Japan Atomic Energy Agency; ²Tohoku University

E-41: Recrystallization and Grain Growth Simulations for Multiple-pass Rolling and Annealing of U-10Mo: *William Frazier*¹; Chao Wang¹; Shenyang Hu¹; Zhijie Xu¹; Vineet Joshi¹; ¹Pacific Northwest National Laboratory

E-43: Shape and Stability of Voids and Fission Gas Bubbles in UO₂: Conor Galvin¹; Michael Rushton²; Michael Cooper³; David Andersson³; Robin Grimes⁴; *Patrick Burr*⁵; ¹UNSW + Imperial; ²Bangor University; ³Los Alamos National Laboratory; ⁴Imperial College London; ⁵UNSW Sydney

E-44: The Contribution of Li Vacancies to the Evolution of Thermal Conductivity in Irradiate LiAlO₂: Seyed Aria Hosseini¹; Tina Mirzae¹; Eric Peraza²; *Alex Greaney*¹; ¹University of California, Riverside; ²Pacific Northwest National Laboratory

E-45: Thermodynamics of Hydrogen Pickup in Zr Alloys: *Vidur Tuli*¹; Christopher Jones²; Katie Moore²; Michael Preuss²; Magnus Limback³; Antoine Claisse³; Patrick Burr¹; ¹The University of New South Wales; ²University of Manchester; ³Westinghouse Electric Sweden AB

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Transitions at Grain Boundaries VII — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Shen Dillon, University of Illinois; Douglas Spearot, University of Florida; Jian Luo, University of California, San Diego; Jennifer Carter, Case Western Reserve University

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G-8 (Invited): Novel X-ray Tools to Study Size Effects on Nanocrystalline Materials: *Anastasios Pateras*¹; Jonathan Gigax¹; Kevin Baldwin¹; Wonsuk Cha²; Ross Harder²; Richard Sandberg³; Saryu Fensin¹; Reeju Pokharel¹; ¹Los Alamos National Laboratory;

²Argonne National Laboratory; ³Brigham Young University

G-9: Deformation Nanomechanics and Dislocation Quantification at Atomic Scale in Nanocrystalline Pure-metal Magnesium: *Md Shahrier Hasan*¹; *Wenwu Xu*²; ¹San Diego State University and University of California, San Diego; ²San Diego State University

G-10: Investigation of Grain Boundary and Dislocation Interactions Through In-situ TEM MEMS-based Tensile Nanomechanical Testing of Ultrafine Grained Gold Thin Films: *Sandra Stangebye*¹; *Saurabh Gupta*¹; *Yin Zhang*¹; *Joshua Kacher*¹; *Olivier Pierron*¹; *Ting Zhu*¹; ¹Georgia Institute of Technology

G-11: The Chemical Effect on the Potential Energy Landscape of Grain Boundary: *Sam Garretson*¹; *Liang Tian*¹; *Lin Li*¹; ¹The University of Alabama

ENERGY & ENVIRONMENT

Energy Technologies and CO₂ Management Symposium — Poster Session

Sponsored by: TMS Extraction and Processing Division, TMS: Energy Committee

Program Organizers: Xiaobo Chen, RMIT University; Yulin Zhong, Griffith University; Lei Zhang, University of Alaska Fairbanks; John Howarter, Purdue University; Alafara Baba, University of Ilorin; Neale Neelameggham, IND LLC; Cong Wang, Northeastern University; Ziqi Sun, Queensland University of Technology

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E-46 (Invited): Return of Manmade CO₂ to Earth: *Neale Neelameggham*¹; *Huimin Lu*²; ¹IND LLC; ²Beihang University

E-47: Advanced Skutterudite-based Unicouples for A Proposed Enhanced Multi-mission Radioisotope Thermoelectric Generator: *Brian Phan*¹; ¹Jet Propulsion Laboratory

E-48: CaO Poisoning on Mn-Ce/AC Catalyst for Selective Catalytic Reduction of NO with NH₃ at Low Temperature: *Zenghui Su*¹; *Shan Ren*¹; *Jie Yang*¹; *Tianshi Zhang*¹; *Zelong Cai*¹; *Lin Chen*¹; *Ming Kong*¹;

Qingcai Liu¹; Jian Yang¹; Jiangling Li¹; ¹ChongQing University

E-49: Enabling Corrosion-resistant Magnesium Through Cross-linking Polymerized Inorganic Sol Coatings: *Wei Wang*¹; Xiaona Yang¹; Yong Fan¹; Xiaobo Chen²; ¹Jilin University; ²RMIT University

E-50: MnO_x-decorated Fe-Zr Based Nano-catalysts for Low Temperature NH₃-SCR: Improvement of Catalytic Activity: *Chen Yang*¹; Jian Yang¹; Qingrui Jiao¹; Yuanmeng Tian¹; Qingcai Liu¹; Shan Ren¹; Jiangling Li¹; ¹ChongQing University

E-51: Modeling the Rate of Heat Loss from the Stack of a Natural Gas Pressure Reducing Station Heater: *Amin Kazemi*; Ali Kianifar¹; ¹Ferdowsi University of Mashhad

CORROSION

Environmental Degradation of Additively Manufactured Alloys — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Kinga Unocic, Oak Ridge National Laboratory; Luke Brewer, University of Alabama; Sebastien Dryepondt, Oak Ridge National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Jenifer Locke, Ohio State University; Xiaoyuan Lou, Auburn University

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C-9: Contrasting Corrosion and Cracking Behavior of Additively Manufactured and Wrought 17-4PH Stainless Steel: *Trevor Shoemaker*¹; James Burns¹; ¹University of Virginia

C-10: Localized Corrosion of Selective Laser Melted Stainless Steel316L:*Duane Armell Macatangay*¹; Jonathan Skelton¹; Wenhao Lin¹; Robert Kelly¹; Ji Ma¹; ¹University of Virginia

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Bai Cui, University of Nebraska-Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Jenifer Locke, Ohio State University

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Session Chair: Bai Cui, University of Nebraska-Lincoln

C-11 (Invited): Corrosion is Metallurgy’s Waterloo: *Raul Rebak*¹;
¹GE Research

C-12: Fracture Failure Analysis on 20MnTiB Steel High-strength Bolt Used in Bridge: *Lan Liu*¹; Juan Wen²; QingCai Liu¹; Lin Chen¹;
¹Chongqing University; ²Chongqing Cheng Tou Road and Bridge Administration Co.Ltd

C-13: Fracture Failure Analysis on 35VB Steel High-strength Bolt Used in Bridge: *Lin Chen*¹; Juan Wen²; Qingcai Liu¹; Lan Liu¹;
¹Chongqing University; ²Chongqing Cheng Tou Road and Bridge Administration Co.Ltd

MECHANICS & STRUCTURAL RELIABILITY

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Garrett Pataky, Clemson University; Ashley Spear, University of Utah; Jean-Briac le Graverend, Texas A&M University; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University

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Session Chair: Garrett Pataky, Clemson University

G-12 (Invited): Fatigue Crack Growth Behavior in Al-7075 under In-plane Biaxial Loading with Mixed-mode Overloads: *Abhay Singh*¹; S. Datta¹; A. Chattopadhyay¹; N. Phan²; ¹Arizona State University; ²US Naval Air Systems Command

G-13: A Microstructural Mechanism for Low-cycle Fatigue in NiTi Shape Memory Alloy: *Harshad Paranjape*¹; Thomas Duerig¹; ¹Confluent Medical Technologies

G-14: Analysis of Fatigue Crack Evolution Using In-situ Testing: Susheel Dharmadhikari¹; Asok Ray¹; *Amrita Basak*¹; ¹Pennsylvania State University

G-15: Assessing the Influence of Different Forging Process Parameters on the Local Fatigue Properties of a Precipitation Hardening Ferritic-pearlitic Steel: Matthias Hell¹; *Rainer Wagener*¹; Tobias Melz¹; ¹Fraunhofer Institute for Structural Durability and System Reliability LBF

G-16: Bauschinger Effect and Strain Hardening of Polygonal Ferrite and Granular Bainite Occurring during Pipe-forming of Linepipe Steels: *Dae Woong Kim*¹; Wan-Keun Kim²; Jin-ho Bae²; Hyoungh Seop Kim¹; Sunghak Lee¹; ¹Postech; ²POSCO

G-17: Deformation Mechanism of Nickel-titanium-hafnium Alloys Subjected to Rolling Contact Fatigue Experiments: *Behnam Aminahmadi*¹; Sean Mills¹; Christopher Dellacorte²; Ronald Noebe²; Aaron Stebner¹; ¹Colorado School of Mines; ²NASA Glenn Research Center

G-18: Development and Validation of an Accelerated Fatigue Test Method Using Model Dental-composite Restoration: *Wondwosen Aregawi*¹; Anqi Zhang¹; José Antonio Olivares Treviño²; Ruoqiong Chen³; Conrado Aparicio¹; Joel Rudney³; Alex Fok¹; ¹Minnesota Dental Research Center for Biomaterials and Biomechanics, School of Dentistry, University of Minnesota, United States; ²Facultad de Ingenieria Mecanica Y Electrica, Universidad Autónoma de Nuevo León, Mexico; ³Department of Diagnostic and Biological Sciences, School of Dentistry, University of Minnesota

G-20: Effect of Machining and Surface Microstructure in Fatigue Life for Aerospace Titanium Alloys: *Daniel Suarez Fernandez*¹; Bradley Wynne¹; Pete Crawforth²; Katharine Fox³; Martin Jackson¹; ¹The University of Sheffield; ²Advanced Manufacturing Research Centre; ³Rolls-Royce plc.

G-21: Elucidating the Effect of High Altitude Environments on the Fatigue Life of 7075-T651 Aluminum Alloy Determined by

using AFGROW Modeling: *Luke Brown*¹; ¹University of Virginia

G-22: Fatigue Behavior and Analysis of Heavy Duty Riveted Steel Grating: *Warda Abdulla*¹; Craig Menzemer¹; ¹The University of Akron

G-23: Fatigue Crack Growth Behavior in Al-7075 under In-plane Biaxial Loading with Mixed-mode Overloads: *Abhay Singh*¹; Siddhant Datta¹; Aditi Chattopadhyay¹; Nam Phan²; ¹Arizona State University; ²US Naval Air Systems Command

G-24: Influence of the Loading Frequency on the Fatigue Behavior of Different Steels: *Karl-Heinz Lang*¹; Steffen Becker¹; ¹Karlsruhe Institute of Technology (KIT)

G-25: Low-cycle Fatigue Modeling of Aluminum Landing Mat Connection System: *Nolan Hoffman*¹; ¹U.S. Army ERDC

G-26: Quasi-in-situ Analysis of the Microstructure Evolution of AZ31B Alloy during Cyclic Deformation: *Rong Shi*¹; ¹Chongqing University

G-27: Review of Surface Deformation Strengthening on the Fatigue Behavior of Metal Material: Hongyun Zhang; Shuangwu Xia; Shoudong Chen; *Jinbiao Zhang*¹; ¹Tongling University

ADDITIVE TECHNOLOGIES

General Poster Session — Additive Technologies

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A-157: Effect of Process Parameters on Plasma Transferred Arc Additive Manufactured 17-4PH Using the Taguchi Method: *Sandy El Moghazi*¹; Jose Mercado Rojas¹; Tonya Wolfe²; Hani Henein¹; Ahmed Qureshi¹; ¹University of Alberta; ²Innotech Alberta

A-158: Effect of Scanning Strategy and Energy Density on Mechanical and Microstructural Properties of 316L Stainless Steel Processed via Selective Laser Melting: *Taban Larimian*; Manigandan Kannan¹; Dariusz Grzesiak²; Bandar Almangour³; Tushar Borkar⁴; ¹the University of Akron; ²West Pomeranian University of Technology; ³Saudi Arabia Basic Industries Corporation; ⁴Cleveland State University

A-159: Effects of Bi in Rapid Solidification of a Hypoeutectic Al-

Si Alloy: *José Marcelino Dias*¹; Abdoul-Aziz Bogno²; Jose Spinelli³; Amauri Garcia⁴; Hani Henein²; ¹University of Campinas and University of Alberta; ²University of Alberta; ³Federal University of São Carlos; ⁴University of Campinas

A-160: Effects of Photoinitiators on Biomechanical Properties of Gelatin Methacrylate Hydrogels and Cell Viability in 3D Bioprinting: *Heqi Xu*¹; Jazzmin Casillas¹; Changxue Xu¹; ¹Texas Tech University

A-161: Microstructure and Mechanical Properties of 410 Stainless Steel via Metal Big Area Additive Manufacturing: *Sougata Roy*¹; Benjamin Shassere²; Jake Yoder³; Andrzej Nycz¹; Mark Noakes¹; Niyanth Sridharan¹; ¹Oak Ridge National Laboratory; ²MS Technology, Inc.; ³Virginia Tech

A-162: Microstructure and Mechanical Properties of Ti-6Al-4V Additively Manufactured with Electron Beam Freeform Fabrication: *Samuel Present*¹; Karen Taminger²; Kevin Hemker¹; ¹Johns Hopkins University; ²NASA Langley Research Center

A-163: Properties and Microstructure of Additive Manufactured Carbon Steel: *Shifeng Liu*¹; ¹Xi'an University of Architecture and Technology

BIOMATERIALS

General Poster Session — Biomaterials

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B-33: Zn-0.8Li Alloy with Superior Mechanical Properties and Ideal Degradation Rate for Biomedical Stents: *Lu-Ning Wang*¹; ¹University of Science and Technology Beijing

CORROSION

General Poster Session — Corrosion

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C-14: Development of Ni-based Amorphous Coating for the

Prevention of Hydrogen Embrittlement in Line Pipe Grade Steels: *Santigopal Samanta*¹; Charu Singh¹; Kallol Mondal²; Amar Bhagat¹; Monojit Dutta¹; Shiv Brat Singh³; ¹Tata Steel Limited; ²Indian Institute of Technology Kanpur; ³Indian Institute of Technology Kharagpur

C-15: Enhanced Passivation Layer by Cr Diffusion of 301 Stainless Steel Facilitated by SMAT: *Temitope Olugbade*¹; Chang Liu¹; Jian Lu¹; ¹City University of Hong Kong

C-16: Mechanical Testing and Tomography of Crack Development in 5XXX Aluminum Service Material: *Benjamin Palmer*¹; Visweswara Gudla²; John Lewandoski¹; ¹Case Western Reserve University; ²University of Manchester

C-17: Replicating Corrosion in Gas Turbine Engines: *Abigail Ackerman*¹; Ben Wood¹; Stella Pedrazzini¹; ¹Imperial College, London

C-18: The Role of Composition and Microstructure on the Cyclic Oxidation Kinetics of IN738LC, N5 and Rene 80: *Mallikarjuna Heggadadevanapura Thammaiah*¹; Norman Richards¹; William Caley¹; ¹University of Manitoba

ELECTRONIC MATERIALS

General Poster Session — Electronic Materials

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D-30: Facile Microwave Synthesis of Size-tunable CdSe Quantum Dots for Industry and Solar Cell Applications: *Jacob Strimaitis*¹; Taliya Gunawansa¹; Sangram Pradhan¹; Messaoud Bahoura¹; ¹Norfolk State University

ENERGY & ENVIRONMENT

General Poster Session — Energy & Environment

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E-66: Effect of Additives on the Electrochemical Performance of the Cathodes based on Pure Oxygen Redox Reaction: *Yong Joon*

*Park*¹; Si Yeol Lee¹; ¹Kyonggi University

E-67: Numerical Modeling of an Active Magnetic Regenerator Device for the Assessment of Promising Magnetic Refrigerants: *Huseyin Ucar*¹; Durga Paudyal²; ¹California State Polytechnic University, Pomona; ²Ames Laboratory

E-68: Simulation of Heating Profiles of Various Magnetic Fluids in Alternating Magnetic Fields: *Brittany Williams*¹; Huseyin Ucar¹; Durga Paudyal²; ¹Californial Polytechnic State University, Pomona; ²Iowa State University

E-69: Sound Wave Induced Agglomeration of Ultra-fine Particles for Efficient Filtering: *Hyo-Soo Lee*¹; Hai-Joong Lee¹; ¹Korea Institute of Industrial Technology

E-70: Synthesis of Ni-Zn-B MAB Phases and an Investigation on their Electrochemical Properties: *Amir Ardalan Rezaie*¹; Boniface Fokwa¹; Juchen Guo¹; ¹University of California, Riverside

LIGHT METALS

General Poster Session — Light Metals

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F-62: Effect of Heat Treatment on Bending Performance of Extruded 6082 Aluminum Alloy T Profiles: *Mehmet Güner*¹; Osman Halil Çelik¹; Mert Altay¹; Cem Mehmetalioglu¹; ¹ASAS Aluminium

F-65: Screw Gradient Continuous Casting and High-Throughput Characterization: *Jingyuan Li*¹; ¹University of Science and Technology Beijing

F-64: Pyramidal \60c+a\62 Cross-slip Mediated Ductility in Mg Alloys: *Rasool Ahmad*¹; Zhaoxuan Wu²; William Curtin¹; ¹EPFL; ²City University of Hong Kong

MECHANICS & STRUCTURAL RELIABILITY

General Poster Session — Mechanics & Structural Reliability

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G-31: Grain Boundaries Energy Measurements in Bicrystals and Polycrystals of Uranium Dioxide: *Amani Ksibi*¹; ¹Cea Cadarache

G-32: On the Computational Solution of Continuum Dislocation Dynamics: A Comparison of Two Stress Update Algorithms: Peng Lin¹; Ben Anglin²; Clint Geller²; Anter El-Azab¹; *Vignesh Vivekanandan*¹; ¹Purdue University; ²Naval Nuclear Laboratory

NUCLEAR MATERIALS

General Poster Session — Nuclear Materials

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H-67: Deformation Studies on Highly Irradiated RPV Steels using Advanced Instrumented Technique: *Mikhail Sokolov*¹; Maxim Gussev¹; Robert Odette¹; ¹Oak Ridge National Laboratory

H-68: Influence of Grain Size and Precipitates on Tellurium Corrosion Behaviors of GH3535 Alloy: *Li Jiang*¹; Zhi Jun Li¹; ¹Shanghai Institute Of Applied Physics

H-69: Systematic Analysis on the Primary Radiation Damage in Th1-xUxO2 Fluorite Systems: *Miaoimao Jin*¹; Chao Jiang¹; ¹Idaho National Laboratory

H-70: The Interaction between the Oxidation and Tellurium Corrosion in the Ni-based Superalloy: *Zhijun Li*¹; ¹SINAP

LIGHT METALS

Magnesium Technology 2020 — Poster Session

Sponsored by: TMS Light Metals Division, TMS: Magnesium Committee

Program Organizers: J. Brian Jordon, University of Alabama; Victoria Miller, University of Florida; Vineet Joshi, Pacific Northwest National Laboratory; Neale Neelameggham, IND LLC

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Session Chairs: Wim Sillekens, European Space Agency; Neale Neelameggham, IND LLC

F-35 (Invited): Magnesium Industries in 2020: *Neale Neelameggham*¹; Robert E. Brown²; ¹IND LLC; ²Magnesium Assistance Group Inc.

F-36: Analysis of Deposition Path of Solid State Additive Manufacturing of AZ31 Mg Alloy: *Malcolm Williams*¹; Thomas Robinson¹; Paul Allison¹; J. Brian Jordon¹; ¹University of Alabama

F-37: Application of Three-phase Miscibility Gap Formation Mechanisms in Mg Alloys: *Shuanglin Chen*¹; John Morral²; ¹CompuTherm LLC; ²The Ohio State University

F-39: Effect of Annealing on Microstructure and Mechanical Properties of Mg-6Al Alloy Plates Processed by Differential Speed Rolling: *Honglin Zhang*¹; Zhigang Xu¹; Sergey Yarmolenko¹; Laszlo Kecskes²; Qiuming Wei³; Jag Sankar¹; ¹North Carolina A&T State University; ²Johns Hopkins University; ³UNCC

F-40: Effect of Gradient Nanostructure on Microstructure and Mechanical Properties of AZ31 Magnesium Alloy under High Strain Rate: *Yong Liu*¹; Meng Duan¹; ¹Key Laboratory of Lightweight and High Strength Structural Materials of Jiangxi Province, School of Mechatronics Engineering, Nanchang University

F-41: Effect of Tension on Edge Crack of AZ31 Magnesium Alloys Sheets Prepared by On-line Heating Rolling: *Jiangfeng Song*¹; ¹Chongqing University

F-42: Effect of Zinc on Solidification and Aging Behaviour of Magnesium Alloys Containing Rare Earths: *Amjad Javaid*¹; Frank Czerwinski¹; ¹Natural Resources Canada

F-43: Effect of ZnO Nano-particle Addition and High Shear Process on Grain Refinement in the As-cast Magnesium: *Kwangmin Choi*¹; Donghyun Bae¹; ¹Yonsei University

F-45: Grain Refinement Technology of Mg Alloy for Road Wheel Application: *Jun Ho Bae*¹; Young Hoon Moon¹; Bong Sun You¹; Ha Sik Kim¹; ¹Korea Institute Of Materials Science

F-46: Improvement of Mechanical Properties of Mg Alloys Through Confined Rolling: *Pavitra Krishnan*¹; Zhigang Xu²; Sergey Yarmolenko²; Jagannathan Sankar²; Laszlo Kecskes³; Qiuming Wei¹; ¹University of North Carolina at Charlotte; ²North Carolina

A&T State University; ³HEMI, Johns Hopkins University

F-47: Influence of Ag Additions on Formability and Strength of a Mg-Zn-Zr Alloy Subjected to Severe Plastic Deformation via Equal Channel Angular Pressing: *Matthew Vaughan*¹; Bilal Mansoor²; Robert Barber¹; Ibrahim Karaman¹; Rainer Eifler³; H.J. Maier³; ¹Texas A&M University; ²Texas A&M University at Qatar; ³Leibniz Universität Hannover

F-48: Influence of Manganese on Deformation Behavior of Magnesium Under Dynamic Loading: *Ryutaro Goeda*¹; Masatake Yamaguchi²; Tatsuya Nakatsuji¹; Naoko Ikeo¹; Toshiji Mukai¹; ¹Kobe University; ²Japan Atomic Energy Agency

F-50: In-vivo Performance of Bioabsorbable BioMg 250 Mg Alloy Implants: *Raymond Decker*¹; Jake Edick¹; Steve LeBeau¹; ¹nanoMag LLC

F-51: Microstructure and Hardness of Porous Magnesium Processed by Powder Metallurgy Using Polystyrene as the Space Holder: Ning Zou¹; *Qizhen Li*¹; ¹Washington State University

F-52: Microstructure and Mechanical Properties of Mg-6Sn Alloy Processed by Differential Speed Rolling: *Kamil Majchrowicz*¹; Zbigniew Pakiela¹; Pawel Józwik²; Zbigniew Bojar²; ¹Warsaw University of Technology, Faculty of Materials Science and Engineering; ²Military University of Technology, Faculty of Advanced Technologies and Chemistry

F-53: Novel Low-cost Magnesium Alloys with High Yield Strength and Plasticity: *Peng Peng*¹; ¹Chongqing University

F-55: Preparing Magnesium Alloys for Electron Backscatter Diffraction: *Tracy Berman*¹; ¹University of Michigan

F-56: Quantifying Dislocation Behavior in Mg Using a Phase Field Dislocation Dynamics Model Multiple Active Slip Planes: *Claire Weaver*¹; Abigail Hunter²; Shuozhi Xu¹; Anil Kumar²; Irene Beyerlein¹; ¹University of California, Santa Barbara; ²Los Alamos National Laboratory

F-57: Sol-gel Based Lanthanum Phosphate Coating on Magnesium Alloys for Corrosion Resistance: *Jithu Jayaraj*¹; Ashitha P. P²; Suja P¹; A Srinivasan¹; K. G. Raghu¹; U. T. S Pillai¹; ¹CSIR-National Interdisciplinary Institute for Science and Technology; ²Indian Institute of Science Education and Research

F-58: Study on Creep Behavior and Microstructure Evolution of T6 State Mg-15Gd Metal Mold Casting Alloy: *Shuxia Ouyang*¹;

¹Northwestern Polytechnical University

F-59: The Application of Hydrogen-containing Phase Diagram Calculations on the Design of Mg-RE Hydrogen Storage Alloy:

*Qun Luo*¹; *Qian Li*¹; *Kuo-Chih Chou*²; ¹State Key Laboratory of Advanced Special Steel & Shanghai Key Laboratory of Advanced Ferrometallurgy & School of Materials Science and Engineering, Shanghai University & Materials Genome Institute, Shanghai University; ²Shanghai University

F-60: The Study of Galvanic Corrosion of Magnesium Alloy from the Perspective of Work Functions:

*Chen Tao*¹; *Yuan Yuan*¹; *Pan Sheng*¹; ¹Chongqing University

F-61: Thermomechanical Processing of Dilute Mg-Zn-Ca Alloys:

*Jenna Krynicki*¹; *Laszlo Kecskes*²; *Suhas Eswarappa Prameela*¹; *Zhigang Xu*³; *Timothy Weihs*¹; ¹Johns Hopkins University; ²MATSYS, Inc.; ³North Carolina A&T State University

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Stephen Raiman, Oak Ridge National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Michael Short, Massachusetts Institute of Technology; Kumar Sridharan, University of Wisconsin-Madison; Nathaniel Hoyt, Argonne National Laboratory

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H-11 (Invited): The Chemistry of Graphite in FHRs and MSRs:

*Raluca Scarlat*¹; ¹University of California, Berkeley

H-12: Ab-initio Thermodynamics of Molten Salts:

*Nicholas Winner*¹; *Mark Asta*¹; ¹University of California, Berkeley

H-13: Characterization of LiCl-KCl Eutectic and LiCl-KCl+H₂O Mixtures Using Electrochemical Impedance Spectroscopy:

*Litun Swain*¹; *Gurudas Pakhui*¹; *Suddhasattwa Ghosh*¹; *Bandi Prabhakara Reddy*¹; ¹Indira Gandhi Centre for Atomic Research, Kalpakkam,

H-14: Effect of Mn and Zn Inhibitors on the Corrosion of Incoloy 800H in the MgCl₂-KCl Molten Salt: *Yuxiang Peng*¹; Ramana Reddy¹; ¹University of Alabama

H-15: Electrochemical Impedance Spectroscopic Study of Oxide Scales on 316L Stainless Steel in Molten FLiNaK Salt: *Jie Qiu*¹; Peter Hosemann¹; Digby Macdonald¹; John Scully¹; ¹University of California, Berkeley

H-16: Hot Corrosion Behavior of Ni Based Inconel 939 Superalloy in Molten Salt: *Ali Hemmasian Ettefagh*¹; Congyuan Zeng¹; Shengmin Guo¹; ¹Louisiana State University

H-17: LIBS Investigation of Molten Salt Corrosion: *William Ponder*¹; Kristian Myhre²; Stephen Raiman²; ¹University of Tennessee Department of Nuclear Engineering; ²Oak Ridge National Laboratory

H-18: Maximization of Reduction Cell Efficiency for Spent Uranium Oxide Fuel: *Jarom Chamberlain*¹; Michael Simpson¹; ¹University of Utah

H-19: Molten Salt Electrolysis of Alkaline-earth Elements Using Liquid Metal and Alloy Electrodes: *Thomas Nigl*¹; Timothy Lichtenstein¹; Yuran Kong¹; Hojong Kim¹; ¹Pennsylvania State University

H-20: Multimodal Characterization of the Morphological and Chemical Evolution of Ni and Ni-20Cr Microwires in Purified Molten KCl:MgCl₂: *Arthur Ronne*¹; Yi Xie²; Phillip Halstenberg³; Mingyuan Ge⁴; Xianghui Xiao⁵; Yachun Wang²; Wah-Keat Lee⁴; Lingfeng He²; Shannon Mahurin³; Yu-Chen Karen Chen-Wiegar⁶; ¹Department of Materials Science and Chemical Engineering, Stony Brook University; ²Advanced Characterization Department, Idaho National Laboratory; ³Chemical Sciences Division, Oak Ridge National Laboratory; ⁴National Synchrotron Light Source - II, Brookhaven National Laboratory; ⁵National Synchrotron Light Source - II, Brookhaven National Laboratory; ⁶National Synchrotron Light Source - II, Brookhaven National Laboratory and Department of Materials Science and Chemical Engineering, Stony Brook University

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XIX — Poster Session

Sponsored by: TMS Functional Materials Division, TMS: Alloy Phases Committee

Program Organizers: Hiroshi Nishikawa, Osaka University; Shi-Kang Lin, National Cheng Kung University; Chao-Hong Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology, CAS; Ming-Tzer Lin, National Chung Hsing University; Dajian Li, Karlsruhe Institute of Technology; Yu Zhong, Worcester Polytechnic Institute; Yee-wen Yen, National Taiwan University of Science and Technology; Song-Mao Liang, Clausthal University of Technology; A.S.Md Abdul Haseeb, University of Malaya; Ligang Zhang, Central South University; Sehoon Yoo, KITECH

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Session Chairs: Hiroshi Nishikawa, Osaka University; Shih-Kang Lin, National Cheng Kung University

D-10: A Switching Model of Phase-change Memory by Combining Electrothermal and Phase-field Models: Hwanwook Lee¹; Minkyu Shin¹; Yongwoo Kwon¹; ¹Hongik University

D-11: CALPHAD-assisted Analyses of BOF Slag Recovery: Han-Yu Wang¹; Wan-Yu Huang¹; Yung-Chang Liu²; Kuan-Ju Lin²; Shih-kang Lin¹; ¹National Cheng Kung University; ²China Steel Corporation

D-12: Comparison of Oxide Reduction Temperature between Highly <111>-Oriented Nanotwinned Cu and Regular Cu Films: Wei-You Hsu¹; Cheng-Syuan Wu¹; Chi-Shen Lee¹; Chih Chen¹; ¹National Chiao Tung University

D-13: Effects of Current Stressing on Mechanical Property and Microstructure of an Fe-Ni Alloy at Ambient Temperature: Jun-Jia Huang¹; Kwang-Lung Lin¹; ¹National Cheng Kung University

D-14: Effects of Plating Current Density on the Microstructure of Cu Pillars and Its Solderability: Pei-Tzu Lee¹; Ying-Syuan Wu²; Cheng-Yu Lee²; Wei-Ling Chou²; Hung-Cheng Liu³; Cheng-En Ho²; ¹National Taiwan University; ²Yuan Ze University; ³Kinsus Interconnect Technology Corporation

D-15: Effects of Surface Finish on the Interfacial Cu₆Sn₅ Morphology and Mechanical Characteristics in Solder Joints: Wei-Ling Chou¹; Shu-Ping Yang¹; Cheng-Yu Lee¹; Tsai-Tung Kuo²; Cheng-En Ho¹; ¹Yuan Ze University; ²Taiwan Uyemura Limited

D-16: From Electric Current-induced Lattice Strain to Electromigration Occurrence: an In-situ Study: *Kuan-Hsueh Lin*¹; Yu-chen Liu¹; Shih-kang Lin¹; Ching-Shun Ku²; Shang-Jui Chiu²; ¹National Cheng Kung University; ²National Synchrotron Radiation Research Center

D-17: Interfacial Reaction of Au-xAg/Al Couples: *Chiao-Yi Yang*¹; Kuo-Jung Chen²; Hsien-Ming Hsiao³; Yee-Wen Yen⁴; ¹Department of Materials Science and Engineering, National Taiwan University of Science and Technology; ²Department of Materials Science and Engineering, National Taiwan University of Science and Technology; ³Institute of Nuclear Energy Research; ⁴National Taiwan University of Science and Technology

D-18: Interfacial Reactions in the Au/Sn-xZn/Cu Sandwich Couples: *Yi-Show Lin*¹; Yi-Pin Wu¹; Yee-Wen Yen¹; ¹National Taiwan University of Science and Technology

D-19: Interfacial Reactions in the Cu/Sn/Ni Sandwich Couples: *Cheng-Han Lee*¹; Shih-Jung Chai¹; Yee-Wen Yen¹; ¹National Taiwan University of Science and Technology

D-20: Interfacial Reactions in the Sn/Au-xCu Couples: *Po-Cheng Kuo*¹; Chia-Yi Yeh¹; Hsien-Ming Hsiao²; Yee-Wen Yen³; ¹Department of Materials Science and Engineering, National Taiwan University of Science and Technology, Taipei.; ²Institute of Nuclear Energy Research, Taoyuan; ³National Taiwan University of Science and Technology

D-21: Interfacial Reactions of Ag-Au-xPd Alloys Wire Bonding with Al: *Chiao-Yi Yang*¹; Kuo-Jung Chen¹; Wallace Chuang²; Eckart Schellkes²; Yee-Wen Yen¹; ¹National Taiwan University of Science and Technology; ²Robert Bosch Taiwan Co. Ltd. Automotive Electronics Division

D-22: Mechanisms of Abnormal Grain Growth of Al Bonding Wires under Annealing Process: *Jen-Hsuan Tsai*¹; Fan-Yi Ouyang¹; ¹National Tsing Hua University

NUCLEAR MATERIALS

Radiation Effects in Metals and Ceramics — Poster Session I

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Djamel Kaoumi, North Carolina State University; Thak Sang Byun, Oak Ridge National Laboratory; Dane Morgan, University of Wisconsin-Madison; Maria Okuniewski, Purdue University; Mahmood Mamivand, Boise State University; Geoffrey Beausoleil, Idaho National Laboratory; Philip Edmondson, Oak Ridge National Laboratory; Khalid Hattar, Sandia National Laboratories; Aurelie Gentils, Université Paris-Saclay; Joel Ribis, Commissariat a l'Energie Atomique CEA

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H-21 (Digital): Evidence of Radiation Enhanced Diffusion via In-situ Ion Irradiation of Ytria Stabilized Zirconia Nanoparticles: *Nathan Madden*¹; Khalid Hattar²; Jessica Krogstad¹; ¹University of Illinois at Urbana-Champaign; ²Sandia National Laboratories

H-22 (Digital): Helium Irradiation Induced Ultra-high Strength Nanotwinned Cu with Nanovoids: *Cuncaí Fan*¹; Qiang Li¹; Jie Ding¹; Yanxiang Liang²; Zhongxia Shang¹; Jin Li¹; Ruizhe Su¹; Jaehun Cho¹; Di Chen³; Yongqiang Wang⁴; Jian Wang²; Haiyan Wang¹; Xinghang Zhang¹; ¹Purdue University; ²University of Nebraska, Lincoln; ³University of Houston; ⁴Los Alamos National Laboratory

H-23: Coupled Electronic and Nuclear Stopping Effects on Damage Accumulation in SiC: *Lauren Nuckols*¹; Miguel Crespillo¹; ChenXu¹; YanwenZhang²; WilliamWeber¹; ¹University of Tennessee, Knoxville; ²Oak Ridge National Laboratory

H-24: Damage Evolution in Apatite Irradiated with Alpha Emitters: Dee Jay Cerico¹; Frederico Garrido¹; Cécile Gautheron²; Lech Nowicki³; Cyril Bachelet¹; Jérôme Bourçois¹; Sandrine Picard¹; *Aurelie Gentils*¹; ¹CSNSM, Université Paris-Sud-CNRS; ²Géosciences Paris-Sud, Université Paris-Sud-CNRS; ³National Centre for Nuclear Research

H-25: Deep Ion Implantation at the 88-Inch Cyclotron: *Sarah Stevenson*¹; Peter Hosemann¹; Lee Bernstein¹; Andrew Voyles²; Saryu Fensin³; ¹University of California, Berkeley; ²Lawrence Berkeley National Laboratory; ³Los Alamos National Laboratory

H-26: Defect Clustering in Irradiated Alpha Uranium: Cluster Dynamics Modeling and Ion Irradiation Experiments: Fabia Farlin Athena¹; Sanjoy Majumder¹; Tiankai Yao²; Lingfeng He²; *Anter El-*

Azab¹; ¹Purdue University; ²Idaho National Laboratory

H-27: Defect Ordering in Yttria Stabilized Zirconia under 45 MeV Ion Irradiation: Nathan Madden¹; Eric Lang¹; Shannon Murray¹; Jean Paul Allain¹; Daniel Shoemaker¹; Khalid Hattar²; *Jessica Krogstad*¹; ¹University of Illinois at Urbana-Champaign; ²Sandia National Laboratories

H-28: Effect of Ion Beam Irradiation on Microstructure Evolution of a Multi-metallic Layer Composite Material for Accident Tolerant Fuel Cladding Development: *Taeyong Kim*¹; Jeonghyun Lee¹; Ji Hyun Kim¹; ¹Ulsan National Institute of Science and Technology

H-29: Electronic Effects in Molecular Dynamics Simulations of Ion Irradiation of SiC: *Eva Zarkadoula*¹; German Samolyuk¹; Yanwen Zhang¹; William Weber²; ¹Oak Ridge National Laboratory; ²University of Tennessee

H-30: Equilibrium and Irradiation-induced Point-defect Disorder in ThO₂ and U-doped ThO₂: Modeling and Ion Irradiation Experiments: Maniesha Singh¹; Tiankai Yao²; Lingfeng He²; *Anter El-Azab*¹; ¹Purdue University; ²Idaho National Laboratory

H-31: Gamma-radiation Induced Corrosion of Copper: *Inna Soroka*¹; Mats Jonsson¹; ¹KTH

H-32: Ionization Induced Changes in Carbon Bonding of Graphite: *John Demaree*¹; Lenore Miller²; Zhiping Luo²; Daryush Ila²; ¹CCDC Army Research Laboratory; ²Fayetteville State University

H-33: Irradiation Behavior of Piezoelectric Materials for Nuclear Reactor Sensors Applications: *Maha Yazbeck*¹; Gaofeng Sha¹; Joel Hatch¹; Cole Harlow¹; Aleksandr Chernatynskiy²; Joshua Daw³; Marat Khafizov¹; ¹The Ohio State University; ²Missouri University of Science & Technology; ³Idaho National Laboratory

H-34: Meso-, Micro-, and Nano-scale Characterization of Neutron Irradiated U-10Zr Metallic Fuels via Synchrotron μ-CT and Electron Microscopy: *Jonova Thomas*¹; Alejandro Figueroa¹; Lingfeng He²; Xiang Liu²; Daniel Murray²; Peter Kenesei³; Jonathan Almer³; Jason Harp²; Maria Okuniewski¹; ¹Purdue University; ²Idaho National Laboratory; ³Argonne National Laboratory

H-35: XCT Characterization of Neutron Irradiated SiC-SiC Composites: *Jose Arregui-Mena*¹; Takaaki Koyanagi¹; Gyanender Singh¹; Christian Deck¹; Yutai Katoh¹; ¹Oak Ridge National Laboratory

Radiation Effects in Metals and Ceramics — Poster Session II

Sponsored by: TMS Structural Materials Division, TMS: Nuclear Materials Committee

Program Organizers: Djamel Kaoumi, North Carolina State University; Thak Sang Byun, Oak Ridge National Laboratory; Dane Morgan, University of Wisconsin-Madison; Maria Okuniewski, Purdue University; Mahmood Mamivand, Boise State University; Geoffrey Beausoleil, Idaho National Laboratory; Philip Edmondson, Oak Ridge National Laboratory; Khalid Hattar, Sandia National Laboratories; Aurelie Gentils, Université Paris-Saclay; Joel Ribis, Commissariat a l'Energie Atomic CEA

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H-36: Combined se of In-situ Ion Irradiation and In-situ Nanomechanical Testing for Characterizing Helium Pre-implanted 304 Stainless Steel: *Ce Zheng*¹; David Frazer²; Peter Hosemann²; Djamel Kaoumi¹; ¹North Carolina State University; ²University of California, Berkeley

H-37: Coupled Bulk and Grain Boundary Compositional Patterning in Binary Immiscible Alloy under Irradiation: A Phase Field Modeling Study: *Qun Li*¹; Pascal Bellon¹; Robert Averback¹; ¹University of Illinois at Urbana–Champaign

H-39: Doppler Broadening Positron Annihilation Spectroscopy for Understanding Void Formation in Neutron Irradiated Fe-Cr Alloys: *Carly Romnes*¹; Ming Liu²; James Stubbins¹; ¹University of Illinois at Urbana-Champaign; ²North Carolina State University

H-40: Effect of Ordered Helium Bubbles on the Deformation and Fracture Behavior in Zr: *Liu Simian*¹; Han Weizhong¹; ¹Xi'an Jiaotong University

H-41: Elucidating the Role of Dispersoids on the Bulk and Nano-mechanical Properties of Dispersion-strengthened W Alloys Following Ion Irradiation with In-situ Characterization: *Eric Lang*¹; Quentin Rizzardi¹; Robert Maass²; Jean Paul Allain³; ¹University of Illinois; ²University of Illinois at Urbana Champaign; ³The Pennsylvania State University

H-42: Evaluation of Bubble Layers in Single- and Poly-crystal Tungsten after Helium Exposure: *Daniel Morrall*¹; Cierra DellaRova²; Russell Doerner³; Matthew Baldwin³; Chad Parish¹; ¹Oak Ridge National Laboratory; ²Colorado School of Mines; ³University of

California, San Diego

H-43: Exploring Stability of Nanocrystalline Metals with Competing Solute Effects under High Temperature Irradiation: *Christopher Barr*¹; Patrick Price¹; Nathan Heckman¹; Brad Boyce¹; Khalid Hattar¹; ¹Sandia National Laboratories

H-44:Generalized Dislocation Mobility Law for BCC FeCrAlAlloys: Sanjoy Mazumder¹; Raven Maccione¹; *Yash Pachaury*¹; Janelle Wharry¹; Anter El-Azab¹; Tomohisa Kumagai²; ¹Purdue University; ²Central Research Institute of Electric Power Industry, Japan

H-46:HowtoImproveanIrradation-simulationTestbed:Younggak Shin¹; Sanghyuk Yoo²; Keonwook Kang²; *Byeongchan Lee*¹; ¹Kyung Hee University; ²Yonsei University

H-48: Influence of Grain Size and the Presence of Nano Oxides on the Radiation Resistance of a FeCrW Alloy: *Bertrand Radiguet*¹; AurianeEtienne¹;CristellePareige¹;NarimanEnikeev²;Constantinos Hatzoglou¹; Maria Vrellou¹; Julia Ivanisenko³; ¹University Of Rouen; ²Ufa State Aviation Technical University; ³Karlsruhe Institute of Technology

H-49: Investigating Radiation Damage in Metallic and Ceramic Materials for Advanced Nuclear Systems Using JANNuS Multiple Ion Beams: *Aurelie Gentils*¹; Celine Cabet²; ¹CSNSM, Univ Paris-Sud and CNRS/IN2P3, Université Paris-Saclay; ²DEN, Service de Recherches de Metallurgie Physique, CEA, Université Paris-Saclay

H-50: Ion-irradiation-induced Structural Disorder and Thermal Conductivity Changes of Intermetallic Compounds: *Shradha Agarwal*¹; Andy Nelson²; Steven Zinkle³; ¹University of Tennessee andOakRidgeNationalLaboratory;²OakRidgeNationalLaboratory;³University of Tennessee

H-51: Ion Irradiation Effects on the Microstructure of PM-HIP Inconel 625: *Caleb Clement*¹; Janelle Wharry¹; Xiang Liu²; Megha Dubey³; David Gandy⁴; ¹Purdue University; ²Idaho National Laboratory; ³Boise State University, Center for Advanced Energy Studies; ⁴Electric Power Research Institute

H-52: Irradiation Induced Damage Evolution in Tungsten: *Trevor Clark*¹; Suveen Mathaudhu²; Samuel Briggs³; Robert Dowding⁴; Jason Trelewicz⁵; Khalid Hattar¹; ¹Sandia National Laboratories; ²University of California, Riverside; ³Oregon State University; ⁴United States Army Research Laboratory; ⁵Stony Brook University

H-53: Material Irradiation and Investigation Capabilities at

TRIUMF: *Ferran Boix Pamies*¹; Alexander Gottberg¹; ¹TRIUMF

H-54: Mechanical Response of FeCr Alloys under Thermal Aging and Irradiation: *Pengcheng Zhu*¹; Yajie Zhao¹; Shradha Agarwal¹; Steven Zinkle²; ¹The University of Tennessee, Knoxville; ²The University of Tennessee

H-55: Microstructural Response of FeCr/Y₂O₃ Bilayer System to He/H Implantation: Olga Emelianova¹; *Aurelie Gentils*²; Maria Ganchenkova³; Amir Gumarov⁴; Igor Yanilkin⁴; Iskander Vakhitov⁴; Igor Golovchanskiy⁵; Igor Shchetinin⁵; Lenar Tagirov⁶; Vladimir Borodin⁷; ¹CSNSM, Univ Paris-Sud, CNRS/IN2P3, Université Paris-Saclay and National Research Nuclear University MEPhI; ²CSNSM, Univ Paris-Sud, CNRS/IN2P3, Université Paris-Saclay; ³National Research Nuclear University MEPhI; ⁴Kazan Federal University; ⁵National University of Science and Technology MISIS; ⁶Zavoisky Physical-Technical Institute, FRC Kazan Scientific Center of RAS; ⁷NRC Kurchatov Institute and National Research Nuclear University MEPhI

H-56: Modeling Slip-induced Crack Initiation in Nickel Containing Nano-scale Helium Bubbles: *Tung Yan Liu*¹; Michael Demkowicz¹; ¹Texas A&M University

H-57: Molecular Dynamics Simulation of Irradiation Damage in Disordered Alloys with Ordered Precipitation: *Shijun Zhao*¹; ¹City University of Hong Kong

H-58: Neutron Radiation Induced Patterning of Fe-Cr System: A Phase-field Approach: *Bohyun Yoon*¹; Jeongwhan Lee¹; Kunok Chang¹; ¹Kyung Hee University

H-60: Radiation Damage Mechanisms in the Oxides Formed on Zr Alloys: *Junliang Liu*¹; Guanze He¹; Anamul Mir²; Jing Hu³; Stephen Donnelly²; Meimei Li³; Sergio Lozano-Perez¹; Chris Grovenor¹; ¹University of Oxford; ²University of Huddersfield; ³Argonne National Laboratory

H-61: Radiation Tolerance in Stabilized Alumina Coatings: an In-situ Irradiation Study: *Matteo Vanazzi*¹; Davide Loiacono²; Wei-Ying Chen³; Meimei Li³; Marco G. Beghi²; Fabio Di Fonzo¹; ¹Center for Nano Science and Technology (CNST) - IIT; ²Politecnico di Milano; ³Argonne National Laboratory

H-62: Radiation Tolerance of Gradient Grain-structured Copper: *Heather Salvador*¹; Yiwei Sun¹; Trevor Clark²; Khalid Hattar²; Sina Shahrezaei³; Suveen Mathaudhu¹; ¹University of California, Riverside; ²Sandia National Laboratories; ³Pacific Northwest

National Laboratory

H-63: Small Scale Tensile Testing of Grain Boundary Strength of Pristine and Neutron Irradiated Ni Based X-750 Alloy: *Yachun Wang*¹; Xiang Liu¹; Daniel Murray¹; Fei Teng¹; Mukesh Bachhav¹; Wen Jiang¹; Lingfeng He¹; Cheng Sun¹; Ziqi Xiao²; Xian-Ming Bai²; John Jackson¹; Robert Carter³; ¹Idaho National Laboratory; ²Virginia Polytechnic Institute and State University; ³Electric Power Research Institute, Inc

H-65: Tungsten Transmutation Products from Mixed Spectrum Neutron Irradiation: *Nathan Reid*¹; Lauren Garrison²; Yutai Katoh²; Jean Paul Allain¹; ¹University of Illinois at Urbana-Champaign; ²Oak Ridge National Laboratory

ELECTRONIC MATERIALS

Recent Advances in Functional Materials and 2D/3D Processing for Sensors and Electronic Applications — Poster Session

Sponsored by: TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Pooran Joshi, Oak Ridge National Laboratory; Ravindra Nuggehalli, New Jersey Institute of Technology; Anming Hu, University of Tennessee; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Yong Lin Kong, University of Utah; Mariappan Paranthaman, Oak Ridge National Laboratory

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Session Chair: Pooran Joshi, Oak Ridge National Laboratory

D-23: A Novel Electrochemical Sensor for Determination of DNA Damage Biomarkers in Biological Fluids using Two-dimensional (2D) Layered Nanomaterial (Mxene) Covered Binary Metal Sulfide Nanocomposite: *Sea-Fue Wang*¹; Govindasamy Mani¹; ¹National Taipei University Of Technology

D-24: Hierarchical Porous Graphene Microsphere Ink for Printed Microsupercapacitors: Quanhong Chang¹; *Lei Huang*¹; ¹Shanghai Normal University

D-25: Printed Flexible Sensors Functionalized with TiO₂ Nanowires for Room Temperature CO₂ Gas Sensing: *Lingyue*

*Zhang*¹; Anming Hu¹; Yongchao Yu¹; ¹University of Tennessee, Knoxville

D-26: Processing of Bistable Composites with Embedded Mechano-electrical Transduction for Filtered Mechanosensing: *Hortense Le Ferrand*¹; ¹Nanyang Technological University

D-27: Relation between Temperature Dependence of Gate Insulator and Magnetic Energy Effect of Thin Film Transistor without Channel Layer: Teresa Oh¹; ¹Cheongju University

D-28: Wave Propagation in Optical Waveguides: *Jonathan Martinez*¹; Samiha Hossain¹; Jessy Nemati¹; Nuggehalli Ravindra¹; ¹New Jersey Institute of Technology

BIOMATERIALS

Recent Developments in Biological, Structural and Functional Thin Films and Coatings — Poster Session

Sponsored by: TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

Program Organizers: Adele Carrado, IPCMS - CNRS; Heinz Palkowski, Clausthal University of Technology; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Ramana Chintalapalle, University of Texas at El Paso; Nuggehalli Ravindra, New Jersey Institute of Technology; Nancy Michael, University of Texas at Arlington; Vikas Tomar, Purdue University

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B-27:CharacterizationofRubberSeedOilModifiedforBiolubricant Feedstock Application: *Farouk Mohammed*¹; Isiaka Bakare¹; Felix Okieimen²; ¹Rubber Research Institute of Nigeria; ² University of Benin

B-29: Effect of Post-Deposition Annealing on the Structural and Optical Properties of Sputter-Deposited Ga2O3 Thin Films: *Nanthakishore Makeswaran*¹; Anil Krishna Battu¹; C.V. Ramana¹; ¹University Of Texas, El Paso

B-30: Fabrication and Characterization of BiCuSeO Epitaxial Films as the Bottom Electrode of All-oxide Spin Valve: *Che Ming*

Lin¹; Kin Hou Lao¹; ¹Department of MSE, NCKU

B-31: Nanotubular Oxide Layers Enhancing Biological Potential of β Titanium Alloys for Biomedical Application: *Anna Majchrowicz*¹; Agata Roguska²; Malgorzata Lewandowska¹; ¹Warsaw University of Technology; ²Institute of Physical Chemistry of the Polish Academy of Sciences

B-32: Preparation and Uniformity Analysis of Sol-Gel TiO₂ Thin Films: *Jihui Luo*¹; Lijuan Xiang¹; Ruyi Yang¹; Yang Li¹; ¹Yangtze Normal University

ENERGY & ENVIRONMENT

Recycling of Secondary, Byproduct Materials and Energy — Poster Session

Sponsored by: TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Mingming Zhang, ArcelorMittal Global R&D; John Howarter, Purdue University; Elsa Olivetti, Massachusetts Institute of Technology; Alan Luo, Ohio State University; Adam Powell, Worcester Polytechnic Institute; Ziqi Sun, Queensland University of Technology

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Session Chair: Mingming Zhang, ArcelorMittal

E-52: Characterization of Wasted LEDs from Tubular Lamps Focused on Recycling Process by Hydrometallurgy: Rafael Oliveira¹; *Amilton Botelho Júnior*¹; Denise Espinosa¹; ¹University of São Paulo

E-53: Comprehensive Utilization of Vanadium Extraction Tailings: A Brief Review: *Xin Wang*¹; Junyi Xiang¹; Jiawei Ling¹; Qingyun Huang²; Xuwei Lv¹; ¹College of Materials Science and Engineering, Chongqing University; ²College of Metallurgical and Materials Engineering, Chongqing University of Science and Technology

E-54: Crystallization and Carbonization of TiO₂-CaO-SiO₂ Ternary Slag: *Gangqiang Fan*¹; Jundan Tan¹; Run Zhang¹; Jie Dang¹; Chenguang Bai¹; Chaowen Tan; Huxu Lei¹; ¹Chongqing University

E-55: Gravity Separation of Zinc Mine Tailing Using Wilfley Shaking Table to Concentrate Hematite.: Jonathan Tenório Vinhal¹; Raquel

Hungaro Costa²; *Amilton Botelho Junior*²; Jorge Tenório¹; Denise Espinosa¹; ¹University of Sao Paulo; ²USP

E-56: Hydrothermal Regeneration of Cycled LiFePO₄ Cathode Material from Spent Lithium Ion Batteries: *Qiankun Jing*¹; Yubo Liu¹; Bao Liu¹; Jialiang Zhang¹; Chengyan Wang¹; ¹University of Science and Technology, Beijing

E-57: Minimization of Copper Contamination in Steel Scrap: *Hyunsoo Jin*¹; Brajendra Mishra¹; ¹Worcester Polytechnic Institute

E-58: Recycling Corrugated Cardboard: Boon-Chai Ng¹; *Joshua Lim*¹; ¹Andrews University

E-59: Recycling of Blast Furnace Flue Dust with In-flight Reduction Technology: Reduction Behavior and Kinetic Analysis: *Jin Xu*¹; Nan Wang¹; Min Chen¹; Haiyang Yu¹; ¹Northeastern University

E-60: Recycling of Used Quartz Crucible and Parts Using Acid Leaching and Hot Chlorination Process: *Kim Jong Ho*¹; ¹RIST

E-61: Residual Quarry Sludge Stabilization to Prefabricate Sustainable Building Elements.: *Andres Felipe Restrepo Ramirez*¹; Nicolas Zapata Perez¹; Juan Carlos Ochoa Botero¹; Yhan Paul Arias Jaramillo¹; ¹Universidad Nacional de Colombia

E-62: : Selective Recovery of Lithium from Ternary Spent Lithium-ion Batteries using Sulfate Roasting-water Leaching Process: *Di Chang*¹; ¹Central South University

E-63: Separation and Recovery of Zinc and Cobalt from Zinc Plant Residue by Alkali Leaching: Guihong Han¹; Yangbo Geng¹; *Yukun Huang*¹; Zuoqi Ma¹; Yanfang Huang¹; Weijun Peng¹; ¹Zhengzhou University

E-64: Study on Mineral Phase Composition and Viscosity of Hot Metal Pretreatment Desulfurization Slag Based on Factsage: *Tengfei Ma*¹; Wufeng Jiang¹; Suju Hao¹; Yuzhu Zhang¹; ¹North China University of Science and Technology

E-65: Study on Oxidation Roasting Process of Cathode Sheets from Spent Lithium Ion Batteries: *Yan Xi*¹; ¹Central South University

MECHANICS & STRUCTURAL RELIABILITY

Understanding and Predicting Dynamic Behavior of Materials
— Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Saryu Fensin, Los Alamos National Laboratory; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Marc Meyers, University of California San Diego; George Gray, Los Alamos National Laboratory

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G-29: Laser Induced Shock Compression of Covalently Bonded Planetary Materials: *Boya Li*¹; ¹University of California, San Deigo

G-30: Iron Response in Extreme Compression and Tension Regimes: Complementary NIF and Janus Experiments: *Gaia Righi*¹; ¹University of California, San Diego

MATERIALS PROCESSING

11th International Symposium on High Temperature Metallurgical Processing — Poster Session

Sponsored by: TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee

Program Organizers: Zhiwei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Tao Jiang, Central South University; Jesse White, Elkem Carbon AS; Morsi Mahmoud, King Fahd University of Petroleum And Mineral

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Session Chairs: Ender Keskinilic, Atilim University; Jesse White, Elkem Carbon AS

M-1: A Multi-zone Equilibrium Model for Using Secondary Raw Materials in the Silicon Furnace: *Kai Erik Ekstroem*¹; Gabriella

Tranell¹; ¹Norwegian University of Science and Technology

M-2: A Novel Method to Determine the Bubble Dynamics of the Bath in a Pilot-scale Top Submerged Lance Furnace: *Avinash Kandalam*¹; Jörg Kleeberg¹; Michael Stelter¹; Markus Reuter²; ¹TU BergakademieFreiberg;²HelmholtzInstituteFreibergforResource Technology

M-5: Analysis of Post-combustion Behavior on O2 Gas Injection in Converter Process: *Ji-A Lee*¹; Jae-Hong Kwon¹; Kyeong-Uk Lee¹; Chang-Su Ha²; Jeong-Whan Han¹; ¹Inha University; ²POSCO

M-6: Characterization and Treatment of Electric Arc Furnace Dusts Generated During Steel Production in Peruvian Industries: *Mery Gomez-Marroquin*¹; José Carlos D´Abreu²; Roberto de Aviliez²; Sonia Letichevsky²; ¹Universidad Nacional de Ingenieria; ²Puc-rio

M-7: Comprehensive Mathematical Model of Adding Scrap Steel to Blast Furnace: Yingchao Liu¹; Jingbin Wang²; Yanjun Liu²; Cong Li¹; *Xuefeng She*¹; Jingsong Wang¹; Qingguo Xue¹; ¹University of Science and Technology, Beijing; ²Delong Steel Limited

M-8: Drying Characteristic of Artificial Magnetite Pellet: *Hanquan Zhang*¹; Chengxin Liu¹; Hong Yu¹; ¹Wuhan Institute of Technology

M-10: Effect of Plastic-coal Mixed Carbonization Reducing Agent on Direct Reduction Behavior of Carbon-bearing Pellets: *Jianhao Dong*¹; Guang Wang¹; Hao Zhang¹; Jingsong Wang¹; Qingguo Xue¹; ¹University of Science And Technology, Beijing

M-11: Effect of Slag-conglomerating Agent on Melting Properties of Desulfurized Slag in Hot Metal Pretreatment: *Wufeng Jiang*¹; Tengfei Ma¹; Suju Hao¹; Yuzhu Zhang¹; ¹North China University of Science and Technology

M-12: Effect of Steel–slag Reaction on Physicochemical Properties of Low-reactivity Mold Fluxes: *Xiaobo Yan*¹; Yuanbing Wu¹; Qiangqiang Wang¹; Shengping He¹; Qian Wang¹; ¹Chongqing University

M-14: Experimental Research on Gasification Dephosphorization with Coke Powder Reducing Converter Molten Slag: *Chenxiao Li*¹; Shuhuan Wang¹; Ding Guo Zhao¹; Yuekai Xue¹; ¹North China University of Science and Technology

M-15; Experimental Study of CO2 for Vanadium Extraction by Segmented Combined Blowing in Converter: *Pan Li*¹; Yu Wang¹; Zheng lei Guo¹; ¹Chongqing University

M-16: Extraction of Metallic Tin and Regeneration of Calcium

Oxide from Waste Calcium Stannate by Reducing Roasting: *Dixiu Wu*¹; Junwei Han¹; Wei Liu¹; Wenqing Qin¹; Fen Jiao¹; ¹Central South University

M-17: Feasibility Research of Steel Scrap Melting in Multifunctional Hot Metal Ladle: *Shuai Deng*¹; Anjun Xu¹; Fei Yuan¹; ¹University of Science and Technology Beijing

M-18: Fundamental Research on Preparation of High-speed Railway Grounding Line by Continuous Pouring Process for Clad: *Chenglin Li*¹; Zhang Tingan¹; Yan Liu¹; Peilin Chen¹; ¹Northeastern University

M-19: Gasification Behaviors of Biomass with Vanadium Titanomagnetite as Oxygen Carrier: *Wei Cai*¹; Zhucheng Huang¹; Lingyun Yi¹; Ronghai Zhong¹; Xiong Jiang¹; Baizhou Tian¹; Chengfei Hu¹; Yunyun Jin¹; ¹Central South University

M-20: High-melting-point Phase Precipitates in Hot Metal and Simulation of the Frozen Process of the Hot Metal: *Yan Li*¹; Pengjie Liu¹; Tingfang Jian¹; Leizhang Gao¹; Meilong Hu¹; ¹Chongqing University

M-22: Influence of Process Parameters on the Metal Quality at Electron Beam Melting of Molybdenum: Katia Vutova¹; Vania Vassileva¹; *Vladislava Stefanova*²; Maria Naplatanova¹; ¹Institute Of Electronics, Bas; ²University of Chemical Technology and Metallurgy

M-23: Influence of Rotation Speed and Temperature on Dissolution Rate of Cr₂O₃ in Ti-bearing Blast Furnace Slag: *Feng Zhang*¹; Guibao Qiu¹; Ding Yang¹; Jiang Wang¹; ¹Chongqing University

M-24: In-situ Electrical Conductivity Measurements During Slag Cooling: *Ling Zhang*¹; Annelies Malfliet¹; Bart Blanpain¹; Muxing Guo¹; ¹KU Leuven

M-25: In-situ Investigation of Iron Ore Stock Pile during Its Stacking and Reclaiming Process: *Wen Pan*¹; Zhi-peng Kang²; Xia Zhao³; Yao-sheng Luo²; Shao-guo Chen¹; ¹Beijing Key Lab of Green Recyclable Process for Iron & Steel Production Tech; ²Shougang Jingtang United Iron & Steel Co.,Ltd.; ³Shougang Institute of Technology, Beijing

M-26: Numerical Simulation on the Sedimentation and Interaction Behavior of Liquid Iron Droplets during Smelting Reduction of Converter Slag: Meile He¹; *Min Chen*¹; Nan Wang¹; ¹Northeastern University

M-28: Preparing Cuspidine Glass-ceramics from Iron-removed

Stainless Steel Pickling Sludge: Guanghui Li¹; *Jian Wang*¹; Jing Chen¹; Jing Xiang You¹; Tao Zhang¹; Jiao Yang Duan¹; Qing Ye¹; Zhiwei Peng¹; Mingjun Rao¹; Tao Jiang¹; ¹Central South University

M-29: Pyrolysis of Waste Steel Tailings and Iron Recovery: *Na Wang*¹; Wei Liu¹; Junwei Han¹; Xun Wang¹; Zihan Li¹; Wenqing Qin¹; ¹Central South University

M-32: Reduction Kinetics of Oxidized Magnetite Briquettes in Co-atmosphere: *Bayaraa Saraatanbazar*¹; Guanghui Li¹; ¹Central South University

M-34: Research of Gas-liquid Multiphase Flow in Oxygen-enriched Bottom Blowing Copper Smelting Furnace: Dongbo Li¹; *Zeshang Dong*¹; Xin Yao¹; Cheng Liu¹; Tianyu Guo¹; Bing Li¹; Peng Li¹; ¹China ENFI Engineering Corporation

M-37: Sinter Iron Ores and Titanium Ores Used in Pelletizing: *Yan Zhang*¹; Xiaojiang Wu¹; Gele Qing¹; Yunqing Tian¹; Haoyu Cai¹; ¹Shougang Group

M-39: Study on Coal Injection Evaluation Method in Blast Furnace: *Dongqing Wang*¹; ¹Shougang Group

M-40: Study on Distribution of Sulfur Element in Blast Furnace Process with Different Pellet Ratios: *Wenxiang Deng*¹; Lingling Zhang¹; Daqiang Cang¹; ¹University of Science and Technology Beijing

M-41: Study on Tuyere Coke Deterioration in the Super Large Blast Furnaces: *Weichun Zhu*¹; ¹Shougang Group

M-42: Super-gravity Field Enrichment of Silver and Antimony Contained in Pb-Ag-Sb Melts: *Xiaochun Wen*¹; Lei Guo¹; Qipeng Bao¹; Jintao Gao¹; Zhancheng Guo¹; ¹University of Science and Technology Beijing

M-43: Synthesis of Ni-MgO Composite through Sulfates Reductive and Catalytic Decomposition: *Rodrigo Souza*¹; Joao Vidal¹; Nathalli Mello¹; Eduardo Brocchi¹; ¹Pontifical Catholic Universidade of Rio De Janeiro

M-44: Synthesis of Porous Graphite by Dealloying of Silicon Carbide: *Gina Greenidge*¹; Jonah Erlebacher¹; ¹Johns Hopkins University

M-47: Thermochemical Processing of Exothermic Metallic Systems - Direct Production of Metal Alloy Powders: *Jawad*

Haidar¹; ¹Kinaltek Pty Ltd.

M-48: Thermodynamic Analysis of Preparation of Cermet with Zinc Kiln Slag: Ning Wang¹; *Hongyan Yan*¹; Chao Luo²; Hui Li¹; Jinglong Liang¹; ¹College of Metallurgy and Energy, North China University of Science and Technology; ²School of Materials and Metallurgy, Inner Mongolia University of Science and Technology

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Shaping and Forming Committee, TMS: Materials Characterization Committee

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; Thomas Bieler, Michigan State University; Marko Knezevic, University of New Hampshire; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; M Arul Kumar, Los Alamos National Laboratory

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K-1 (Digital): Computational Polarized Light Microscopy for Large Area Orientation Determination of Uniaxial Materials: *Ke-Wei Jin*¹; Marc De Graef¹; ¹Carnegie Mellon University

K-2 (Digital): Propagating Uncertainty through ICME Modules and Machine Learning Towards Quicker and Accurate Distortion and Residual Stress Predictions: Brijesh Kumar¹; Piyush Ranade¹; Alonso Peralta¹; *Mustafa Megahed*²; ¹Honeywell Aerospace; ²Esi Group

K-3: 3D Characterization of Nano-scale Precipitates in Shape-memory Alloys: *Dexin Zhao*¹; Tejas Umale¹; Jobin Joy¹; Ibrahim Karaman¹; Dimitris Lagoudas¹; Kelvin Xie¹; ¹Texas A&M University

K-4: Characterization of Defects in As-transformed and Hot-deformed t-MnAl-C Alloys Using TEM: *Panpan Zhao*¹; Kornelius Nielsch¹; Thomas Woodcock²; ¹IFW Dresden, Institute for Metallic

Materials; TU Dresden, Institute of Materials Science; ²IFW Dresden

K-5: Characterization of Metal Powders for Spreadability and Flow Modeling: *Taher Abu-Lebdeh*¹; Tobi Kalejaiye¹; Sameer Hamoush¹; Vincent Lamberti¹; ¹North Carolina A&T State University

K-6: Characterizing the Influence of Microstructure on Twin Nucleation in Ferroelastic Ceramics: *Charles Smith*¹; Jessica Krogstad¹; ¹University of Illinois Urbana-Champaign

K-7: Comparative Analysis of Bulk and Local State of Thin Film Viscoelastic Material on a MEMS Device Using Dynamic Nanomechanical Characterization: *Hasan Faisal*¹; Milosh Mededovic¹; Patrick O'Hara¹; ¹Anton Paar USA

K-8: Determination of Strains in Clear Teeth Aligners for Orthodontics: *Ning Ye*¹; Susan Mantell¹; Alex Fok¹; ¹University of Minnesota

K-9: Ex-situ and In-situ X-ray Studies of Crystal Structure and Microstructure Evolution in Metallic Alloys Under Extreme Environments: *Tamas Varga*¹; Bharat Gwalani¹; Arun Devaraj¹; ¹Pacific Northwest National Laboratory

K-10: Imaging Microplasticity Events by Combining High Energy Diffractive Microscopy and Bragg Coherent Diffractive Imaging: *Matthew Wilkin*¹; Anthony Rollett¹; ¹Carnegie Mellon University

K-11: Precipitation of Tetragonal τ -MnAl in a Twinned Rhombohedral Al_8Mn_5 Matrix: an EBSD Study: *Thomas G. Woodcock*¹; Florian Bittner¹; ¹IFW Dresden

K-14: Slip and Twinning of Commercial Pure Titanium during In-situ Tensile Test: *Joo-Hee Kang*¹; Hye In Jung²; Ji Hoon Kim²; Chang-Seok Oh¹; ¹Korea Institute of Materials Science; ²Pusan National University

K-15: Thermal Corrections for Gleeble Right Circular Cylinder Compression Tests: *Kevin Severs*¹; Ravi Shah¹; Vikas Saraf¹; ¹Allegheny Technologies Incorporated (Ati)

K-16: Thermo-mechanical Simulation of Steam Turbine Blade with Spark Plasma Sintering Developed NiCrCoTiAlW-Ta Superalloy Properties: *Olugbenga Ogunbiyi*¹; ¹Tshwane University of Technology

K-17: Transient Texture Evolution during Friction Stir Processing of a Mg Alloy Revealed by In-situ Neutron Diffraction: *Yuan Li*¹; Ke An²; Zhili Feng²; Hahn Choo¹; ¹University of Tennessee; ²Oak

Ridge National Laboratory

K-18: Understanding Deformation Mechanisms in a Low Ni/Co Alloy: Bharat Gwalani¹; Govindarajan Muralidharan²; Dean Pierce²; Jonathan Poplawsky²; Donovan Leonard²; Libor Kovarik¹; *Arun Devaraj*¹; ¹Pacific Northwest National Laboratory; ²Oak Ridge National Laboratory

K-19: Understanding the Deformation Mechanisms and Phase Transformations in High Alloy Metastable Austenitic Steels: *Stefan Martin*¹; Christiane Ullrich¹; Mykhaylo Motylenko¹; David Rafaja¹; ¹TU Bergakademie Freiberg

ADVANCED MATERIALS

Advanced High Strength Steels IV — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: Steels Committee

Program Organizers: Ana Luiza Araujo, AK Steel Research and Innovation Center; Mary O'Brien, Colorado School of Mines; Tilmann Hickel, Max Planck Institut für Eisenforschung; Amy Clarke, Colorado School of Mines; Kester Clarke, Colorado School of Mines; C. Tasan, Massachusetts Institute of Technology; MingXin Huang, University of Hong Kong

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J-1: Electrochemical Characterization of Advanced High Strength Steel DP 780 MPa: *Abraham Escalona Gómez*¹; Marisol Delgado Espino¹; Maria del Refugio Lara Banda¹; Facundo Almeraya Calderón¹; ¹Universidad Autonoma de Nuevo Leon

J-2: Excellent Strength-ductility Combination of Austenitic-hadfield/martensitic-hot-press-forming Clad Steel Sheet: *Min Cheol Jo*¹; Jaeyeong Park¹; Seok Su Sohn²; Taejin Song³; Hyoung Seop Kim¹; Sunghak Lee¹; ¹Pohang Inst of Sci & Tech (POSTECH); ²Korea University; ³POSCO

J-4: Producing a 1200 MPa Complex-phase Advanced High Strength Steel: *Renan Lima*¹; Kester Clarke²; Amy Clarke²; F.T.F Tolomelli³; Fernando Rizzo¹; ¹Pontifícia Universidade Católica do Rio de Janeiro (PUC-RIO); ²Colorado School of Mines; ³Companhia

J-5: Solutions to Hydrogen Embrittlement of Ultra-high Strength Press-hardened Steel for Automotive Application: *Lawrence Cho*¹; P.E. Bradley¹; Matthew Connolly¹; M.L. Martin¹; D.S. Lauria¹; Frank Delrio¹; A.J. Slifka¹; E.J. Seo²; K.R. Jo³; S.W. Kim⁴; ¹National Institute of Standards and Technology; ²Colorado School of Mines; ³Pohang University of Science and Technology; ⁴POSCO

J-6: The Effect of Alloy Elements on the Peritectic Range of Low-carbon Steels: Thermodynamic Calculation and High Temperature DSC Measurement: *Qingqiang Ren*¹; Sung Il Baik¹; Bruce Krakauer²; David Seidman¹; ¹Northwestern University; ²AO Smith Corporate

J-7: Transformation Kinetics in a Trip Steel during the Plastic Deformation by Tension and Compression: *Jose Pacheco*¹; Pedro Garnica²; Yadira Solana²; Leslie Espino³; Jorge Navarro²; ¹DICIM UASLP; ²TecNM, Instituto Tecnológico de Morelia, División de Estudios de Posgrado e Investigación; ³TecNM, Instituto Tecnológico de Morelia, Departamento de Ingeniería en Materiales

CHARACTERIZATION

Advanced Real Time Imaging — Poster Session

Sponsored by: TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, National Energy Technology Laboratory; David Alman, National Energy Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki Shibata, Imram, Tohoku University; Antoine Allanore, Massachusetts Institute of Technology; Candan Tamerler, University of Kansas; Noritaka Saito, Kyushu University; Neslihan Dogan, McMaster University; Zuotai Zhang, Southern University of Science and Technology; Bryan Webler, Carnegie Mellon University; Anna Nakano, US Department of Energy National Energy Technology Laboratory

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K-20: In-situ Observation of Aluminum Intermetallics Melts: *Jonathan Paras*¹; Antoine Allanore¹; ¹Massachusetts Institute of

ADVANCED MATERIALS

Advanced Solid Phase Processing Symposium — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee, TMS: Shaping and Forming Committee

Program Organizers: Suveen Mathaudhu, University of California, Riverside; Cynthia Powell, Pacific Northwest National Laboratory; Kester Clarke, Colorado School of Mines; Anthony Reynolds, University of South Carolina; Mostafa Hassani, Cornell University

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J-8: Mechanical and Microstructural Properties of Lightweight Laminates Manufactured by Explosive Welding: *Marta Orlowska*¹; Piotr Bazarnik¹; Zygmunt Szulc²; Malgorzata Lewandowska¹; ¹Warsaw University of Technology; ²ZTW Explomet GALKA, SZULC S.J.

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Advances and Discoveries in Non-equilibrium Driven Nanomaterials and Thin Films — Poster Session

Sponsored by: TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

Program Organizers: Ritesh Sachan, Oklahoma State University; Srinivasa Rao Singamaneni, University of Texas at El Paso; Amit Pandey, MicroTesting Solutions; Nuggehalli Ravindra, New Jersey Institute of Technology

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Session Chair: Ritesh Sachan, Oklahoma State University

N-1: In-situ Analysis of IR Laser Radiation Damage on Nano-

structured MoS₂: *Kory Burns*¹; ¹University of Florida

N-2: Scalable Synthesis of Graphene Quantum Dots and Its Application in Bioimaging: *Vijayesh Kumar*¹; Abhay Sachdev¹; ¹CSIO-CSIR Chandigarh India

N-3: Synthesis of Mesoporous Metal-Silicates via Silicate-Exfoliation on Metal Hydroxides: Hong-Ping Lin¹; *Hsien-Ming Hsiao*¹; Yun-Chung Shen¹; ¹Department of Chemistry, National Cheng Kung University

CHARACTERIZATION

Advances in Powder and Ceramic Materials Science — Poster Session

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Shefford Baker, Cornell University; Huazhang Zhai, Beijing Institute of Technology; Sergio Monteiro, Military Institute of Engineering; Rajiv Soman, Eurofins EAG Materials Science LLC; Faqin Dong, Southwest University of Science and Technology; Jinhong Li, China University of Geosciences (Beijing); Ruigang Wang, The University of Alabama

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Session Chairs: Bowen Li, Michigan Technological University; Jinhong Li, China University of Geosciences (Beijing)

K-21 (Invited): Enhanced Stability and Carrier Transport Quality of a-CsPbI₃ Perovskite Nanocrystals with Reduced Graphene Oxide: *Hong Lin*¹; Qi Zhang¹; ¹Tsinghua University

K-22: Bioinspired Ceramic Monoliths from Freeze-Casting for Filtration Applications: *Sean Garner*¹; Zhixiong Li¹; Doheon Lee¹; Dimitri Deheyn¹; Joanna McKittrick¹; ¹University of California, San Diego

K-23: Evaluation of the Incorporation of Marble and Granite Residue in Coating Mortars: *Euzebio Zanelato*¹; Jonas Alexandre¹; Afonso Azevedo²; Markssuel Marvila³; Gustavo Xavier¹; Sergio Monteiro⁴; ¹UENF; ²UFF; ³UCAM; ⁴IME

K-24: Influence of Construction and Demolition Waste

Incorporation in Concrete: Antônio Macedo¹; Euzebio Zanelato²; André Manhães¹; Afonso Azevedo³; Markssuel Marvila¹; Jonas Alexandre²; *Sergio Monteiro*⁴; Lucio Petrucci¹; ¹UCAM; ²UENF; ³UFF; ⁴IME

K-25: Manufacturing and Characterization of Ceramics Made of Kaolinite Clay and Sewage Sludge from the Anodizing Industry: *Andrés Ramírez*¹; Mauricio Correa¹; Henry Colorado¹; ¹Universidad de Antioquia

K-26: Microstructure Characterization of Annealed Polycrystalline YIG Samples Prepared from the Sol-gel Method Using 2d EBSD: *Minji Kim*¹; Minsun Jang¹; Youngkyun Son¹; Kisuk Lee¹; Sukbin Lee¹; ¹Ulsan National Institute of Science and Technology

K-27: Polymer Fibers from Waste Tires and Sugar Cane Molasses for Soil Improving: *Juan Jimenez-Hoyos*¹; Henry Colorado¹; ¹Universidad de Antioquia

K-28: Preparation of Lithium and Terbium Doped Yttrium Borate: *Xiaoling Tan*¹; ¹Qinghai University

K-29: Preparation of Na₄V₂O₇ Powder by Solid-state Reaction: *Guishang Pei*¹; Junyi Xiang¹; Zhongci Liu¹; Dapeng Zhong¹; Feifei Pan¹; Xuewei Lv¹; ¹Chongqing University

K-30: Preparation of YBO₃:Ce³⁺ Film via Impregnation-lifting Method and Its Photoluminescence Property: *Hongen Nian*¹; ¹Qinghai Institute of Salt Lakes, Chinese Academy of Sciences

K-31: Process Optimization of Foaming Ceramics Made from Blast Furnace Slag and Fly Ash: *Sheng Kai Tao*¹; ¹Northeastern University

K-32: Synthesis of Silicate Zinc Bioceramic via Mechanochemical Technique: Sorour Sadeghzade¹; Rahmatollah Emadi²; *Fariborz Tavangarian*¹; ¹Pennsylvania State University, Harrisburg; ²Isfahan University of Technology

K-33: The Hardystonite/PA66 Composite for Using as the Intervertebral Fusion Cage: *Fariborz Tavangarian*¹; Sorour Sadeghzade¹; Rahmatollah Emadi²; ¹Pennsylvania State University, Harrisburg; ²Isfahan University of Technology

MATERIALS PROCESSING

Advances in Surface Engineering II — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Surface Engineering Committee

Program Organizers: Tushar Borkar, Cleveland State University; Arif Mubarak, PPG; Rajeev Gupta, University of Akron; Sandip Harimkar, Oklahoma State University; Tanaji Paul, Florida International University

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M-49: Comparison of Reduced Graphene Oxide Membranes by Spray and Vacuum Filtration for Use in Water Desalination: *Wagner Pinheiro*¹; Anthony Oliveira¹; Andreza Lima¹; ¹Military Institute of Engineering

M-50: The Synchronous Suppression - Reinforced Dispersion Behaviors of Regulators on Micro Fine Ilmenite and Titanaugite: *Gui-xia Fan*¹; Taojin Wang¹; Shi-Xiong Zhang¹; Yi-Jun Cao¹; Peng Li¹; ¹Zhengzhou University

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Charudatta Phatak, Argonne National Laboratory; Bryan Wong, University of California, Riverside; Mikhail Mendelev, Ames Laboratory; Bryce Meredig, Citrine Informatics; Ebrahim Asadi, University of Memphis; Francesca Tavazza, National Institute of Standards and Technology

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Session Chair: Mohsen Asle Zaeem, Colorado School of Mines

L-1 (Digital): Machine Learning and Computer Vision on Classification of Carbon Nanotube and Nanofiber Structures

for TEM Dataset: *Qixiang Luo*¹; Elizabeth Holm¹; Chen Wang²;
¹Carnegie Mellon University; ²National Institute for Occupational
Safety and Health, Centers for Disease Control and Prevention

**L-2 (Invited): Multi-Scale Modelling and Defect Engineering
in Boron Carbon-Nitride van der Waals Heterostructures:** *Siby
Thomas*¹; Mohsen Asle Zaeem¹; ¹Colorado School of Mines

**L-3: An Improved Collocation Method to Treat Traction-free
Surfaces in Dislocation Dynamics Simulations:** *Abu Bakar
Siddique*¹; Tariq Khraishi¹; ¹University of New Mexico

**L-4: Classifying Atomic Environments by the Gromov-Wasserstein
Distance:** *Sakura Kawano*¹; Jeremy Mason¹; ¹University of California,
Davis

**L-5: Coupled Light Capture and Lattice Boltzmann Model of
TiO2 Micropillars Array for Water Purification:** *Pegah Mirabedini*¹;
Agnieszka Truskowska²; Duncan Ashby¹; Masaru P. Rao¹; P.
Alex Greaney¹; ¹University of California, Riverside; ²Rensselaer
Polytechnic Institute

**L-6: Investigation of Fe-O and Fe-N and H-O Bond Formation
Process by the Molecular Dynamics Simulations:** Jianxin Zhu¹;
*Guannan Guo*¹; Jian-Ping Wang¹; ¹University of Minnesota

**L-7: Machine Learning Driven Functionally Graded Material
Designs for Mitigation of Thermally Induced Stress:** *Zhizhou
Zhang*¹; Zeqing Jin¹; Kahraman Demir¹; Grace Gu¹; ¹Department of
Mechanical Engineering, University of California, Berkeley

**L-8: Methods to Simulate Grain Boundary Diffusion in Bicrystals
and Polycrystals:** *David Page*¹; Katie Varela¹; Oliver Johnson¹; David
Fullwood¹; Eric Homer¹; ¹Brigham Young University

**L-9: Numerical Simulation for Microstructural Evolution in
Solidification Process using CFD-CA (Cellular Automata) Coupled
Method:** *Wonjoo Lee*¹; Yuhyeong Jeong¹; Chanhee Won¹; Jae-Wook
Lee²; Howon Lee²; Seong-hoon Kang²; Johnhun Yoon¹; ¹Hanyang
University; ²Korea Institute of Materials Science

**L-10: PyMob: Software for Automated Assessment of Atomic
Mobilities:** *Katrin Abrahams*¹; Irina Roslyakova¹; Ingo Steinbach¹;
¹Ruhr University Bochum

**L-11: Randomness at Scale: Properties of Bulk Nanostructured
Materials from Stochastic Representative Volume Elements:**
*Skylar Mays*¹; Katherine Moody¹; Mujan Seif¹; John Balk¹; Matthew

Beck¹; ¹University of Kentucky

L-12: Simulation of Compressive Stress-strain Curve for Additive Manufactured Ti6Al4V Cuboctahedron Cellular Structure:

Dhinakar Annadurai¹; *Chen Jhewn-Kuang*¹; ¹Institute of Material Science and Engineering, National Taipei University of Technology

L-13: Three-dimensional Modeling of Growth and Motion of Dendrites under Thermosolutal Convection:

*Seyed Amin Nabavizadeh*¹; Mohsen Eshraghi²; Sergio Felicelli¹; ¹University of Akron; ²Department of Mechanical Engineering, California State University

L-14: Uncertainty Propagation in CalPhaD Calculations:

*Nicholas Ury*¹; Richard Otis²; Vilupanur Ravi¹; ¹California State Polytechnic University, Pomona; ²Jet Propulsion Laboratory

ADVANCED MATERIALS

Bulk Metallic Glasses XVII — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee - Knoxville; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Robert Maass, University of Illinois at Urbana-Champaign; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

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J-9: Atomic Structure and Properties of Co-Ta-B Bulk Metallic Glasses:

*Ivan Kaban*¹; Pál Jóvári²; Ju Wang¹; Mark Adam Webb³; Ning Chen³; Jacques Darpentigny⁴; ¹IFW Dresden, Germany; ²Wigner Research Centre for Physics, Budapest, Hungary; ³Canadian Light Source, Saskatoon, Canada; ⁴Laboratoire Léon Brillouin, CEA-Saclay, France

J-10: Competitive Formation of Metallic Glasses in Ternary Eutectic Systems:

*Dong Ma*¹; ¹Oak Ridge National Laboratory

J-11: Effect of Ce Additive on Magnetic Properties and Glass Forming Ability of Fe-Si-B-P Amorphous Alloys:

*Youngsin Choi*¹; Sun-Yeoung Ki¹; Joo Hyun Park²; Hwi-Jun Kim¹; ¹Korea Institute of Industrial Technology / Liquid Processing & Casting R&D Group;

²Department of Materials Science and Chemical Engineering, Hanyang University

J-12: High Saturation Magnetic Flux Density of New Nanocomposite Materials Annealed in Various Temperatures: Seoyeon Kwon¹; *Haein Yim*¹; ¹Sookmyung Women's University

J-13: Shear Transformation Zone Properties from Nonlinear Anelastic Deformation: *Tianjiao Lei*¹; Michael Atzmon¹; ¹University of Michigan

J-14: The Effect of Severe Plastic Deformation on the Relaxation Dynamics of a Bulk Metallic Glass Studied by X-ray Photon Correlation Spectroscopy: *Hongbo Zhou*¹; Gerhard Wilde¹; ¹University of Muenster

CHARACTERIZATION

Characterization of Minerals, Metals and Materials — Poster Session

Sponsored by: TMS Extraction and Processing Division, TMS: Materials Characterization Committee

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Shadia Ikhmayies, Al Isra University; Yunus Kalay, Middle East Technical University; Jiann-Yang Hwang, Michigan Technological University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Army Research Laboratory

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Session Chairs: Yunus Kalay, Middle East Technical University; Rajiv Soman, Eurofins EAG Materials Science LLC

K-34 (Invited): Ballistic Tests in Multilayered Armor Systems Using Natural Lignicellulosic Fibers Reinforced Polymer Composites: *Sergio Monteiro*¹; Fernanda da Luz¹; Fabio Garcia Filho¹; Artur Camposo Pereira¹; Michelle Oliveira¹; Ulisses Oliveira Costa¹; Luana Demosthenes¹; Wendell Bruno Almeida Bezerra¹; Raphael Reis¹; Lucio Nascimento¹; ¹Military Institute of Engineering

K-35: A Comparison between Graphene Oxide and Reduced Graphene Oxide as Reinforcement Agents in Polypropylene

Nanocomposite Using Irradiated Polypropylene as Compatibilizer: Carlos Soares¹; Julyana Santana¹; Olgun Guven²; Esperidiana Moura¹; ¹Nuclear and Energy Research Institute; ²Hacettepe University

K-36: A New Method to Obtain Cellulose Nanofiber from Wood: Miguel Sanchez Junior¹; *Leila Miranda*¹; ¹Universidade Presbiteriana Mackenzie

K-37: Aluminum Foam as Promising Materials for Ballistic Protection Application: *Fabio Garcia Filho*¹; Fernanda Luz¹; Artur Pereira¹; Luana Demosthenes¹; Michelle Oliveira¹; Ulisses Costa¹; Wendell Bezerra¹; Sergio Monteiro¹; ¹Military Institute of Engineering

K-38: Analysis of Nanoscale Iron Oxide Morphology: *Tianhao Sun*¹; Suju Hao¹; Wufeng Jiang¹; Yuzhu Zhang¹; ¹North China University of Science and Technology

K-39: Analysis of β' (Cu₄Ti) Precipitation during Isothermal Aging of a Cu-4wt.%Ti Alloy: *Victor Lopez-Hirata*¹; Felipe Hernandez-Santiago¹; Maribel Saucedo-Muñoz¹; Jose Villegas-Cardenas²; Erika Avila-Davila³; ¹Instituto Politecnico Nacional-ESIQIE; ²Universidad Politécnica del Valle de México; ³Tecnológico Nacional de México/ Instituto Tecnológico de Pachuca

K-40: Analysis of The Effect of Marine Salinity in Durability of Red Ceramics Calcinated In Different Temperatures: Markssuel Marvila¹; Afonso Azevedo¹; Mairyanne Souza¹; Euzébio Zanelato¹; Jonas Alexandre¹; Gustavo Xavier¹; *Sergio Monteiro*²; Carlos Maurício Vieira¹; Geovana Delaqua¹; ¹Universidade Estadual do Norte Fluminense Darcy Ribeiro; ²Instituto Militar de Engenharia

K-41: Analysis of The Elasto-Plastic Behavior of Structural Steels Subjected to Cyclic Loads: Victor Barbosa De Souza¹; Amanda Camerini¹; *Afonso Garcez*¹; ¹Uni Redentor

K-42: Analysis of the Performance of Applied Tire Residues in Concrete Pavements: *Luana Demosthenes*¹; Michelle Oliveira¹; Fabio Garcia¹; Fernanda Luz¹; Fábio Braga¹; Leandro Demosthenes²; Lucio Nascimento¹; Sergio Monteiro¹; ¹Instituto Militar de Engenharia; ²UFAM

K-43: Application of Nanoparticles of ZnO and ZnO-doped-Ag in Polymeric Blend of HMSPP/SEBS for Biocide Activity: *Luiz Komatsu*¹; Washington Oliani¹; Camila Oliveira¹; Vijaya Rangari²; Duclerc Parra¹; ¹Nuclear and Energy Research Institute; ²Tuskegee University

K-44: Ballistic Behavior of Walnut Shell Composite: Larissa

Nunes¹; Raphael Henrique Reis¹; *Michelle Oliveira*¹; Sergio Monteiro¹;
¹Military Institute of Engineering

K-45: Ballistic Evaluation of Reinforced Composites with Mauve / Jute Hybrid Fabric for Ballistic Armor: *Luana Demosthenes*¹; Michelle Oliveira¹; Fabio Garcia¹; Artur Pereira¹; Fernanda Luz¹; Wendell Bezerra¹; Ulisses Costa¹; Sergio Monteiro¹; Lucio Nascimento¹; ¹Instituto Militar de Engenharia

K-46: Ballistic Test of Multilayered Armor with Intermediate Polyester Composite Reinforced with High Concentration of Figue Fabric: *Artur Camposo Pereira*¹; *Fernanda da Luz*¹; *Fabio Garcia Filho*¹; Ulisses Costa¹; Michelle Oliveira¹; Luana Demosthenes¹; Wendell Bezerra¹; Sergio Monteiro¹; ¹Military Institute of Engineering

K-47: Characterization and Metallurgical Performance of Titangarnet: Gang Li¹; Xuwei Lv¹; *Xuangeng Zhou*¹; Guibao Qiu¹;
¹Chongqing University

K-48: Characterization by FTIR of Oxidized Pyrargyrite with Sodium Sulfide: *Yessica Paulina Gómez Espinosa*¹; M Reyes Perez¹; Elia Guadalupe Palacios Beas²; J. C. Juarez Tapia¹; M Pérez Labra¹; Ivan A. Reyes Domínguez³; Mizraim Uriel Flores Guerrero⁴; Victor Esteban Reyes Cruz¹; ¹Universidad Autonoma del Estado de Hidalgo; ²Instituto Politécnico Nacional; ³Universidad Autónoma de San Luis Potosí; ⁴Universidad Tecnológica de Tulancingo.

K-49: Characterization by FTIR of Sphalerite Obtained in the Flotation without Collector in the Presence of Ferric Iron: *José Antonio Granados Oliver*¹; M Reyes Perez¹; Aislinn Michelle Teja Ruiz¹; Francisco Raúl Barrientos Hernández¹; M. Pérez-Labra¹; J. C. Juárez Tapia¹; José Angel Cobos-Murcia¹; Elia Guadalupe Palacios Beas²; ¹Universidad Autonoma del Estado de Hidalgo; ²Instituto Politécnico Nacional

K-50: Characterization of a Brazilian Kaolin for Its Use in the Controlled Release of Isoniazid: *Maria Valenzuela*¹; Jessica Arjona¹; Bianca Michel¹; Tatiana Costa¹; Thamyres Cardoso¹; Gilmar Pinheiro¹; Margarita Bobadilla¹; Roberto Neves²; Francisco Valenzuela¹; ¹Escola Politecnica Da U De Sao Paulo; ²Universidade Federal do Para

K-51: Characterization of Bentonite Beneficiation Residue for Use in Structural Ceramics: Larissa Maia dos Santos¹; Vinícius Macedo Brito Medeiros¹; *Maria das Graças Silva Valenzuela*²; Francisco Rolando Valenzuela Diaz²; Orley Magalhães de Oliveira¹; ¹IFBA - Instituto Federal da Bahia; ²Politécnica da Universidade de São Paulo

K-52: Characterization of Clay Mix with Incorporation of Granite

Waste to Produce Ceramic Tiles: *Afonso Azevedo*¹; Daiane Cecchin¹; Náíade Luiz¹; Vasco Cruz²; Markssuel Marvila³; Euzébio Zanelato³; Sergio Monteiro⁴; Gabriela Morais³; Jonas Alexandre³; ¹Fluminense Federal University; ²Universidade de Évora; ³UENF; ⁴IME

K-53: Characterization of Composites formed by Low Density Polyethylene (LDPE) and Natural Bamboo Fibers, by Differential Exploration Calorimetry (DSC), Tensile Strength, and Hardness: *Nilson Pereira*¹; Miriam Lucia Machado²; Suzan Casarin³; Leonardo Silva¹; Mauro Alves²; ¹Instituto De Pesquisas Energéticas E Nucleares - IPEN; ²Universidade Presbiteriana Mackenzie; ³Asser Porto Ferreira

K-54: Characterization of Hydrogels for Release of Cosmetic Assets Containing Nanoemulsions Of Mandelic Acid in Different Concentrations of Pseudoboehmite: *Leila Miranda*¹; Isabella Tereza Barbosa¹; Terezinha Masson¹; Antonio Munhoz Junior¹; Leonardo Andrade e Silva²; Aleksandra Aparecida Gonçalves¹; ¹Universidade Presbiteriana Mackenzie; ²Instituto de Pesquisas Energéticas e Nucleares - IPEN/CNEN

K-55: Characterization of STP Effects on Encapsulation Process and How to Attenuate It to Produce PLA, PLA/MMT.K and PLA/O-MMT.K Microcapsules: *Bianca Bottega Michel*¹; Francisco Valenzuela-Díaz¹; Maria das Graças Silva-Valenzuela¹; Wang Hui¹; Jessica Arjona¹; ¹Polytechnic School - Usp

K-56: Izod Impact Test Of Epoxy Composites Reinforced with Arapaima Scales: Wendell Bruno Almeida Bezerra¹; Ulisses Oliveira Costa¹; *Fernanda Santos da Luz*¹; Michelle Souza Oliveira¹; Luana Cristyne Da Cruz Demosthenes¹; Fabio Da Costa Garcia Filho¹; Sergio Neves Monteiro¹; ¹Instituto Militar de Engenharia

K-57: Chemical and Mineralogical Characterization of a Cuprite-myargyrite Ore and Proposal of Elimination of Semimetals by Alkaline Bath: *Aislinn Teja Ruiz*¹; Kinardo Flores Castro²; M. Perez Labra²; Martin Reyes Perez²; Elia G. Palacios Beas¹; Victor Esteban Reyes Cruz²; Julio Cesar Juárez Tapia²; ¹Instituto Politécnico Nacional; ²Universidad Autonoma del Estado de Hidalgo

K-58: Chemical Characterization and Mineralogical Analysis of Mining-metallurgical Tailing from the State of Morelos: Iván Martínez Soto¹; Aislinn Michelle Teja R.¹; Martín Reyes Pérez¹; M. Pérez-Labra¹; Víctor Reyes Cruz¹; José Angel Cobos-Murcia¹; Gustavo Urbano Reyes¹; *Julio Cesar Juárez T.*¹; ¹Universidad Autónoma del Estado de Hidalgo

K-60: Crystallization Kinetics and Mechanical Properties of Zr-Cu-Al-Sm Metallic Glasses and Their Nanocomposites: Huseyin

Cerci¹; *Ilkay Kalay*¹; ¹Cankaya University

K-61: Determination of Trace and Ultra-trace Level Contaminants in Advanced Materials Using Electrothermal Vaporization ICP-OES: *Abbas Fahami*¹; Karol Putyera¹; ¹Eurofins EAG Materials Science LLC

K-62: Development and Characterization of a Luminescent Coating for Asphalt Pavements: *Elkin Gutierrez*¹; Henry Colorado²; ¹Universidad Antonio Nariño; ²Universidad de Antioquia

K-63: Development and Characterization of CoCrCuFeNi(TiAl) High Entropy Alloys: *Ilkay Kalay*¹; Huseyin Cerci¹; ¹Cankaya University

K-64: Development of Non-equiatomic High Entropy Alloys for High Temperature Applications: *Ilkay Kalay*¹; Ayberk Ayrenk¹; ¹Cankaya University

K-65: Effect of Alloying Elements on Age Hardening and Coarsening of Beta Precipitates in Isothermally Aged Fe-Ni-Al Based Alloys: *Victor Lopez-Hirata*¹; Hector Dorantes-Rosales¹; Maribel Saucedo-Muñoz¹; Nicolas Cayetano-Castro¹; Erika Avila-Davila²; ¹Instituto Politecnico Nacional-ESIQIE; ²Tecnológico Nacional de México/Instituto Tecnológico de Pachuca

K-66: Effect of Antioxidant on Resistance to Ammonia Erosion of Carbon Sleeve in Continuous Annealing Furnace for Low Temperature Grain-oriented Silicon Steel Production: *He Mingsheng*¹; Jing Zhang²; Xuecheng Gong²; Yong Lei²; Shengjin Li²; ¹R&D Center of Wuhan Iron & Steel Co., Ltd; ²Silicon Steel Division of Wuhan Iron & Steel Co., Ltd.

K-67: Effect of Different Ti-Sn Intermetallic Compounds Addition on Synthesis of Ti₂SnC by Self-propagating High-temperature Combustion Technique: *Hongyan Sun*¹; Xin Kong¹; Guiyang Liu¹; ¹Honghe University

K-68: Effect of Martensite Reorientation Deformation on the Evolutions of Crystallographic Textures and Lattice Strains of NiTi Wire: *Xiangguang Kong*¹; Shijie Hao¹; Hong Yang²; Zhen Sun¹; Yinong Liu²; Yang Ren³; Changfeng Chen¹; Lishan Cui¹; ¹China University of Petroleum - Beijing; ²The University of Western Australia, Perth; ³X-ray Science Division, Argonne National Laboratory

K-69: Dynamic Mechanical Behaviour of Lean Duplex Stainless Steel 2101: Eng Yeo¹; Ali Ameri¹; *Juan Escobedo-Diaz*¹; ¹University of New South Wales

K-70: Evaluation of Energy Absorption of the Epoxy Matrix

Composite Reinforced with Tucum Fiber Through Izod Impact Test and Ballistic Impact of Ammunition .22: *Fernanda da Luz*¹; Fabio Garcia Filho¹; Luana Demosthenes¹; Michelle Oliveira¹; Ulisses Costa¹; Wendell Bezerra¹; Artur Pereira¹; Sergio Monteiro¹; ¹Military Institute of Engineering, IME

K-71: Evaluation of Shock Impedance of Multilayered Armor Systems with Epoxy Composite Reinforced with Fique Fabric: *Michelle Oliveira*¹; Luana Demosthenes¹; Fabio Garcia Filho¹; Fernanda da Luz¹; Ulisses Costa¹; Wendell Bezerra¹; Artur Pereira¹; Sergio Monteiro¹; ¹Instituto Militar de Engenharia

K-72: Evaluation of Structural Differences Among Modified Brazilian Clay by Ammonium Quaternary Salts: *Jessica Arjona*¹; Maria das Graças Silva-Valenzuela¹; Bianca Michel¹; Tatiana Costa¹; Gilmar Pinheiro¹; Thamyres Cardoso¹; Francisco Valenzuela-Diaz¹; ¹Universidade De Sao Paulo

K-73: Capillary Absorption Evaluation of Different Mortars Applied in Civil Construction: Afonso Azevedo¹; *Markssuel Marvila*²; Juliana Pessanha³; Euzébio Zanelato²; André Manhães²; Sergio Monteiro⁴; Leonardo Pedroti⁵; Beatryz Mendes⁵; Niander Cerqueira²; Victor Souza¹; ¹Fluminense Federal University; ²UENF; ³UCAM; ⁴IME; ⁵UFV

K-74: Evaluation of the Impedance of Shock of Multilayer Armoring with Epoxy Matrix Composite Reinforced with Fibers of Mallow and Hybrid Fabric of Jute and Mallow: Lucio Nascimento¹; Sergio Monteiro¹; Ulisses Costa¹; *Fernanda Luz*¹; Michelle Oliveira¹; Fabio Garcia Filho¹; Luana Demosthenes¹; ¹Military Institute of Engineering

K-75: Evaluation of the Mechanical Behavior of Polymeric Composites Reinforced with Oil Palm Fibers: Edwillson Oliveira Filho¹; *Veronica Candido*¹; Roberto Fujiyama¹; Jean Rodrigues²; Sérgio Monteiro³; Alisson da Silva¹; ¹UFPA; ²IFPA; ³IME-RJ

K-76: Evaluation of the Morphological, Thermal and Mechanical Properties of the Epoxy Composite Reinforced with Brazil Nut Shell: *Michelle Oliveira*¹; Larissa Nunes¹; Luana Demosthenes¹; Wendell Bezerra¹; Sergio Monteiro¹; ¹Instituto Militar de Engenharia

K-77: Evaluation on the Design of Guaruman Fiber Reinforcement Polyester Matrix Composite for Ballistic Application: *Raphael Reis*¹; Larissa Nunes¹; Lucio Nascimento¹; Sergio Monteiro¹; ¹Military Institute of Engineering

K-78: Experimental Validation of Molecular Dynamics Simulation Results of Copper Single Crystal in Oriented Torsion: *Sergio Monteiro*¹; Fabio Garcia Filho¹; Fernanda da Luz¹; ¹Military Institute

of Engineering

K-79: Fique Fabric with Surface Reinforcements Produced from Natural Graphite: *Michelle Oliveira*¹; Fabio Garcia Filho; Fernanda da Luz¹; Artur Pereira¹; Wagner Pinheiro¹; Sergio Monteiro¹; ¹Instituto Militar de Engenharia

K-80: Functionalization of Curauá Fibers with Graphene Oxide: *Ulisses Costa*¹; Lucio Fabio Nascimento¹; Julianna Magalhães Garcia¹; Fabio Garcia Filho¹; Fernanda Santos da Luz¹; Sergio Neves Monteiro¹; Wagner Anacleto Pinheiro¹; Wendell Bruno Almeida Bezerra¹; ¹Military Institute of Engineering

K-81: Functionalization of Piassava Fibers with Graphene Oxide: *Fernanda da Luz*¹; Fabio Garcia Filho¹; Ulisses Costa¹; Michelle Oliveira¹; Luana Demosthenes¹; Artur Pereira¹; Wendell Bezerra¹; Sergio Monteiro¹; ¹Military Institute of Engineering, IME

K-82: Fundamental Study on Wettability of Pure Metal by Liquid Sodium: *Jun-Ichi Saito*¹; Hideo Shibutani²; Yohei Kobayashi³; ¹Japan Atomic Energy Agency; ²Kurume Institute of Technology; ³National Institute of Technology, Maizuru College

K-83: Graphene Oxide Functionalization in Curaua Fiber/Epoxy Composites: Toward Tensile Properties: *Ulisses Costa*¹; Lucio Fabio Nascimento¹; Julianna Magalhães Garcia¹; Fernanda Santos da Luz¹; Fabio Garcia Filho¹; Wendell Bruno Almeida Bezerra¹; Wagner Anacleto Pinheiro¹; Sergio Neves Monteiro¹; ¹Military Institute of Engineering

K-84: High Strain Rate Nanoindentation of Single Crystalline Metals: *Wesley Higgins*¹; George Pharr¹; ¹Texas A&M University

K-85: How Small Molecules Can Trigger the One-way Effect in Shape Memory Polymers: *Axel Marquardt*¹; Klaus Neuking¹; Gunther Eggeler¹; ¹Ruhr University Bochum

K-86: How to Measure High-temperature Heat Capacity Reliably by Drop Calorimetry: *Guishang Pei*¹; Junyi Xiang¹; Xuewei Lv¹; Lilian Yang¹; Gang Li¹; Dapeng Zhong¹; Feifei Pan¹; ¹Chongqing University

K-87: Improvement Properties of Polypropylene by Graphene Oxide Incorporation: Tatiane Tatei¹; *Marcio Andrade*¹; Eric Fontes¹; Renan Moreira¹; Rene Oliveira¹; Francisco Valenzuela-Diaz²; Vijaya Rangari³; Esperidiana Moura¹; ¹Nuclear and Energy Research Institute; ²University of Sao Paulo; ³Tuskegee University

K-88: Incorporation of Coke Dust Gas (FGD) in Reds Ceramics: Victor Barbosa De Souza¹; *Daniel Gallo*¹; Niander Cerqueira¹; ¹Uni

Redentor

K-89: Incorporation of the Light Green Clay into Textile Polyamide Residues Properties: *Mariana Sartori*¹; Dione Castro¹; Francisco Valenzuela-Diaz²; Leonardo Silva¹; ¹Nuclear and Energy Research Institute; ²Escola Politécnica

K-90: Influence of Adiabatic Shear Bands on the Ballistic Resistance of High Hardness Armor Steel: *Suzane Oliveira*¹; Ricardo Weber¹; Anderson de Paula¹; Sérgio Monteiro¹; Elson Souza¹; Pedro Passaline¹; João Miguez Suarez¹; ¹IME

K-91: Influence of Pmma Chemical Degradation in Ethanol: *Karollyne Monsores*¹; Géssica Nicolau¹; Anderson Oliveira¹; Suzane Oliveira¹; Ricardo Weber¹; ¹Instituto Militar de Engenharia

K-92: Influence of Sealing Mortar in the Strength of Compression of the Structural Masonry Ceramic: Markssuel Marvila¹; Afonso Azevedo¹; Jonas Alexandre¹; Rafael Oliveira²; Michel Oliveira³; Euzébio Zanelato¹; *Sergio Monteiro*⁴; ¹Universidade Estadual do Norte Fluminense Darcy Ribeiro; ²IFF; ³UFES; ⁴IME

K-93: Influence of the Reduced Graphene Oxide Incorporation on Properties of Acrylonitrile Butadiene Styrene (ABS): Bianca Santos¹; *Robson Costa*¹; Andre Inácio¹; Suellen Bartolomei¹; Karina Carmo¹; Taise Silva¹; Rene Oliveira¹; Esperidiana Moura¹; ¹Nuclear and Energy Research Institute

K-94: Influence of UV Radiation in a Composite of Epoxidic Matrix Reinforced with Hybrid Fabric of Mallow/jute: *Ulisses Costa*¹; Lucio Fabio¹; Julianna Magalhães Garcia¹; Michelle Souza Oliveira¹; Fabio Garcia Filho¹; Fernanda Santos da Luz¹; Sergio Neves Monteiro¹; Luana Demosthenes¹; Wendell Bruno Almeida Bezerra¹; ¹Military Institute of Engineering

K-95: Influence of UV Radiation in The Ballistic Behavior of a Composite of Epoxydic Matrix Reinforced with Hybrid Mallow/Jute Fabric: *Ulisses Costa*¹; Lucio Fabio Nascimento¹; Fabio Garcia Filho¹; Fernanda Santos da Luz¹; Julianna Magalhães Garcia¹; Anderson Oliveira da silva¹; André Ben-Hur Figueiredo¹; Michelle Souza Oliveira¹; Sergio Neves Monteiro¹; ¹Military Institute of Engineering

K-96: Inhibition of Flame Propagation in Nanocomposites with Expanded Polystyrene Recycled, Clay, Gypsum and Titanium Dioxide: Suellen Bartolomei¹; *Robson Costa*²; Esperidiana Moura²; Helio Wiebeck¹; ¹University of Sao Paulo; ²Ipen

K-97: In-situ Annealing and Orientation Mapping Studies of Deformed Multiphase Materials: *Magdalena Bieda-Niemiec*¹;

Anna Jarzebska¹; Marek Faryna¹; Krzysztof Sztwiertnia¹; ¹Institute of Metallurgy and Materials Science, Polish Academy of Sciences, Krakow

K-98: Investigating the Effect of Sintering Temperature on Structural and Tribological Properties of a Nanostructured Ti–20Nb–13Zr Alloy for Biomedical Applications: *Fellah Mamoun*¹; Naouel Hezil¹; Karima Abderrahim²; Mohamed Abdul Samad³; Alex Montagne⁴; Alberto Mejias⁴; Alain Lost⁴; Stephania Kosman⁴; Timofey Chekalkin⁵; Sabine Weiss⁶; Aleskei Obrosof⁶; ¹Abbes Laghrour University; ²Surface Engineering Laboratory (L.I.S), Badji Mokhtar University; ³KFUPM; ⁴Arts et Metiers ParisTech; ⁵Research Institute of Medical Materials, Tomsk State University; ⁶Department of Physical Metallurgy and Materials Technology, Brandenburg Technical University

K-99: Investigation on Mechanical and Thermal Behaviors of PBAT/PLA Blend Reinforced with Reduced Graphene Oxide Nanosheets: Marcio Bartolomei¹; *Robson Costa*¹; Karina Carmo¹; Bianca Santos¹; Suellen Bartolomei¹; Rene Oliveira¹; Esperidiana Moura¹; ¹Nuclear and Energy Research Institute

K-100: Investigations on Flotation Separation of Scheelite from Calcite and Fluorite Using ZT as Depressant: Tiantian Wang¹; Hongxin Zhang²; *Yanfang Huang*¹; Guihong Han¹; Jiongtian Liu¹; ¹Zhengzhou University; ²Zhengzhou Institute of Multipurpose Utilization of Mineral Resources

K-101: Iron Ore Fines Granulation in a New High-speed Mixing Granulator: *Shanshan Wu*¹; Xuewei Lv¹; Zhongci Liu¹; ¹Chongqing University

K-102: Leaching of Pre-oxidized Pyrargyrite With Na₂S₂O₅: Vicente González Martínez¹; *Isabel Hernández Martínez*¹; M Reyes Perez¹; M. Pérez Labra¹; J. C. Juárez Tapia¹; Ivan A. Reyes Dominguez²; Mizraim Uriel Flores Guerrero³; Gustavo Urbano Reyes¹; ¹Universidad Autonoma del Estado de Hidalgo; ²Universidad Autónoma de San Luis Potosí, Instituto de Metalurgia; ³Universidad Tecnológica de Tulancingo. Área de Electromecánica Industrial

K-103: Magnetic and Microstructure Properties of Co-doped Rapidly Solidified Ni₅₀Mn₂₅-xCo_xGa₂₅ Heusler Alloys: *Imaddin Al-Omari*¹; K. Meghana²; D. K. Satapathy²; T. Adhikary²; S. Aich²; ¹Sultan Qaboos University; ²Indian Institute of Technology

K-104: Mechanical and Morphological Properties of Hybrid Composites Based on Recycled LDPE/EVA Blend Reinforced with Clay and Babassu Fiber Residues: Caroline Tamura¹; *Marcio Andrade*¹; Mariana Arantes¹; Karina Carmo¹; Bianca Santos¹; Rene Oliveira¹; Esperidiana Moura¹; ¹Nuclear and Energy Research

Institute

K-105: Mechanical Behavior of the Multidirectional Natural Hybrid Fabric with Surface Treatment Application Incorporated into the Epoxy Matrix: *Michelle Oliveira*¹; Ulisses Costa¹; Clara Caminha¹; Fábio Braga¹; Lucio Nascimento¹; Sergio Monteiro¹; ¹Instituto Militar de Engenharia

K-106: Microstructural Characterization of a Metallic Armor: *Suzane Oliveira*¹; Karollyne Monsores¹; Anderson da Silva¹; Géssica Nicolau¹; Pedro Passaline¹; Débora Alves¹; Ricardo Weber¹; ¹IME

K-107: Microstructural Transformations in a High Hardness Armor Steel, After Ballistic Test with a 7.62 AP: *Suzane Oliveira*¹; Karollyne Monsores¹; Anderson da Silva¹; Géssica Nicolau¹; Ricardo Weber¹; ¹IME

K-108: Observation of Topological Defects in Synthetic Antiferromagnets with Inverted Dzyaloshinskii-moriya Interaction: *Nisrit Pandey*¹; Maxwell Li¹; Marc De Graef¹; Vincent Sokalski¹; ¹Carnegie Mellon University

K-109: Orientation-induced Variability Range in Indentation-measured Elastic Modulus of Molecular Crystals: *Alexandra Burch*¹; John Yeager²; David Bahr¹; ¹Purdue University; ²Los Alamos National Laboratory

K-110: PALF Reinforced Epoxy Composite Applied in a Rigid Armor System: *Fernanda da Luz*¹; Fabio Garcia Filho¹; Michelle Oliveira¹; Ulisses Costa¹; Luana Demosthenes¹; Artur Pereira¹; Wendell Bezerra¹; Sergio Monteiro¹; ¹Military Institute of Engineering, IME

K-111: Preparation of Lithium Ion Battery Anode Materials from Precipitation Flotation Product: Huanhuan Miao¹; Wenjuan Wang¹; Yanfang Huang¹; *Guihong Han*¹; ¹Zhengzhou University

K-112: Preparation of Vanadium Powder by Thermal Reduction: A Review: *Dapeng Zhong*¹; Xuwei Lv¹; Junyi Xiang¹; Zhongci Liu¹; Guishang Pei¹; Wuan Gu²; ¹Chongqing University; ²Sichuan University

K-113: Processing and Characterization of Polyethylene-AgNPs Films – Biocide Effect: *Washington Oliani*¹; Luiz Komatsu¹; Ademar Lugao¹; Vijaya Rangari²; Duclerc Parra¹; ¹Nuclear Energy Research Inst – IPEN/USP; ²Department of Materials Science and Engineering Tuskegee University, USA

K-114: Production and Characterization of PBAT Reinforced with Clay and Graphene Oxide Nanosheets - A Comparative Study: *Marcio Andrade*¹; Robson Costa¹; Danielle Araujo¹; Rene Oliveira¹;

Vijaya Rangari¹; Francisco Valenzuela-Diaz²; Esperidiana Moura¹;
¹Nuclear and Energy Research Institute; ²University of São Paulo

K-115: Reducing and Restoring the Strength of Rocks with Periodic Mechanical Effects: *Maksim Krasilov*¹; Anastasia Tyutcheva¹;
¹National University of Science and Technology "MISIS"

K-116: Resistance and Durability of Pressed and Burned Blocks of Red Ceramics with Humidity Variation: *Niander Cerqueira*¹; Afonso Azevedo²; Victor Souza³; Daniel Gallo³; ¹Universidade Estadual do Norte Fluminense; ²UFF; ³UniRedentor

K-117: Self-compacting Concrete with Addition of Polymeric Residues of High Density Polyethylene, a Study of the Mechanical Behavior with Different Dosages: *Niander Cerqueira*¹; *Victor Souza*²;
¹Universidade Estadual do Norte Fluminense; ²UniRedentor

K-118: Simulation and Additive-manufacturing of the Smallest Flute: Design and Fabrication of an Acoustic Sensor to Measure Flow Parameters: *Zeqing Jin*¹; Xi-Cheng Zhang¹; ¹University of Rochester

K-119: Solder Cup Wire Insertion Study: *Shelley Williams*¹; Lisa Deibler¹; Rebecca Wheeling¹; ¹Sandia National Laboratories

K-120: Statistical Analysis Applied to Ceramic Pellets Produced with (Al₂O₃ + Nb₂O₅ + LiF) at Different Temperatures with Different Watermills: *Luana Demosthenes*¹; Fabio Garcia¹; Michelle Oliveira¹; Fernanda Luz¹; Leandro Demosthenes²; Sergio Monteiro¹;
¹Instituto Militar de Engenharia; ²UFAM

K-121: Study of Fe-doped- KNN Ceramic as Multifunctional Material: *Fernando Badillo*¹; Henry Colorado¹; Alvaro Herrera¹; Sebastian Amaya¹; Adriana Echavarria¹; ¹Universidad de Antioquia

K-122: Study of Styrene Effect on Non-radiation Grafting of Vinyl Benzyl Chloride on to Polyethylene-based Anion Exchange Membrane: *Di Huang*¹; Jiann-Yang Hwang¹; Zhichao Chen²;
¹Michigan Technological University; ²Fitianbao Environmental Protection Company

K-123: Study of Thermal and Mechanical Properties of Geopolymers: *Alisson Silva*¹; Verônica Candido¹; Sérgio Monteiro²;
¹Universidade Federal do Pará; ²Military Engineering Institute

K-124: Study on the Effect of Ultraviolet Radiation on Interfacial Resistance Between Polyaramide Thermoset Resin: *Anderson da Silva*¹; Karollyne Monsorens¹; Suzane Oliveira¹; Géssica Nicolau¹; Pedro Passalini¹; Ricardo Weber¹; Sérgio Monteiro¹; ¹Military

Institute Engineering

K-125: Study on the Separation of Zinc and Iron in Electric Arc Furnace Baghouse Dusts and Its Kinetics: Zhaoran Wang¹; Chengcheng Huo¹; Yuhong Zha¹; *Canhua Li*¹; ¹Anhui University of Technology

K-126: Synthesis and Characterization of Batio₃ Doped with Eu³⁺ by the Reaction Solid State Method: *Juan Pablo Hernandez Lara*¹; Miguel Pérez Labra¹; Francisco Raúl Barrientos Hernández¹; José Antonio Romero Serrano²; Aurelio Hernández Ramírez²; Martín Reyes Pérez¹; Julio Cesar Juárez Tapia¹; Aislin Michelle Teja Ruiz¹; Víctor Esteban Reyes Cruz¹; Jaret del Carmen Ramírez Castellanos¹; ¹Aactym-Uaeh; ²ESIQIE-IPN.

K-127: Synthesis and Characterization on Copper Oxide Anode of Lithium-Ion Battery: Xuechun Han¹; Shuzhen Yang¹; Huina Sun¹; Yanfang Huang¹; *Guihong Han*¹; ¹Zhengzhou University

K-128: Synthesis of a Synthetic Clay for the Use of Controlled Isoniazid Release Systems: *Thamyres de Carvalho*¹; Pinheiro Gilmar¹; Arjona Jessica¹; Valenzuela Maria das Graças¹; Hildebrando Edemariino¹; Neves Roberto¹; Valenzuela-Diaz Francisco¹; ¹Polytechnic School of the University of São Paulo

K-129: The Experimental Study on Combustibility of Semi-coke and Pulverized Coals Injected in Blast Furnace: Guangsheng Suo¹; Yang Li¹; Xiong Xiao¹; Guishang Pei¹; ¹Chongqing University

K-130: Thermal and Mechanical Properties of Iron-actinides Intermetallic Compounds Existed in Metallic Phase of Fuel Debris: *Daisuke Okada*¹; Yuji Ohishi¹; Hiroaki Muta¹; Ken Kurosaki²; ¹Osaka University; ²Kyoto University

K-131: Thermal Behavior of Epoxydic Matrix Composites Reinforced with Graphene Oxide Functionalized Curauá Fibers: *Ulisses Costa*¹; Lucio Fabio Nascimento¹; Julianna Magalhães Garcia¹; Wagner Anacleto Pinheiro¹; Fernanda Santos da Luz¹; Fabio Garcia Filho¹; Sergio Neves Monteiro¹; Wendell Bruno Almeida Bezerra¹; ¹Military Institute of Engineering

K-132: Thermal Characterization of Human Hair: *Débora Alves*¹; Ricardo Weber¹; ¹Military Institute of Engineering

K-133: Thermal Characterization of Polymer Composites Reinforced with Sugarcane Bagasse Fiber: *Verônica Scarpini Candido*¹; Alisson Rios da Silva¹; Sergio Neves Monteiro²; ¹Universidade Federal do Pará; ²Military Engineering Institute

K-134: Viscosity Determination of Liquid Soaps Based on MMT:

*Maria das Graças da Silva-Valenzuela*¹; Jéssica Arjona¹; Bianca Michel¹; Gilmar Pinheiro¹; Tatiana Costa¹; Francisco Valenzuela-Díaz¹; ¹Polytechnique School of University of Sao Paulo Metallurgy and Materials Engineering Department

K-135: Weibull Analysis of Tensile Strength of High-performance Epoxy Matrix Composites Reinforced with Curaua Natural Fibers: Noan Simonassi¹; *Fabio Garcia Filho*¹; Sergio Monteiro¹; ¹Military Institute of Engineering

K-136: Wettability of Liquid Phase Caesium Compounds Against Metal Oxides Including UO₂ and ThO₂: *Hiroto Ishii*¹; Yuji Ohishi¹; Hiroaki Muta¹; Masayoshi Uno²; Ken Kurosaki³; ¹Osaka University; ²University of Fukui; ³Kyoto University

MATERIALS DESIGN

Computational Discovery and Design of Emerging Materials — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Arunima Singh, Arizona State University; Houlong Zhuang, Arizona State University; Sugata Chowdhury, National Institute of Standards and Technology; Arun Kumar Mannodi Kanakkithodi, Argonne National Laboratory

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L-15: Discovery of Rare-earth-free Magnetic Materials Using Adaptive Genetic Algorithm and First-principles Calculations: Zejin Yang¹; Kai-Ming Ho²; *Cai-Zhuang Wang*²; ¹Zhejiang University of Technology and Iowa State University; ²Iowa State University

L-16: Machine Learning Models for the Lattice Thermal Conductivity Prediction of Inorganic Materials: *Lihua Chen*¹; ¹Georgia Institute of Technology

L-17: Searching for Electrical Conductivity Tunable Organic Molecules for Single-molecule Electronics: *Weiye Zhang*¹; Peter Greaney¹; ¹University of California, Riverside

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Jorge Munoz, University of Texas at El Paso; Sara Kadkhodaei, University of Illinois at Chicago; Vahid Attari, Texas A&M University; James Morris, Ames Laboratory

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Session Chairs: Yongmei Jin, Michigan Tech. University; Mohsen Asle Zaeem, Colorado School of mines; Pascal Bellon, University of Illinois; Fadi Abdeljawad, Clemson University; Anton Van der Ven, UC Santa Barbara; Zi-Kui Liu, Penn State University

O-1 (Invited): Computational Simulation of Precipitation during Continuous Cooling of 6xxx Al-alloys: *Bernhard Miesenberger*¹; Ernst Kozeschnik²; Benjamin Milkereit³; Erwin Povoden-Karadeniz¹; ¹Christian Doppler Laboratory for Interfaces and Precipitation Engineering CDL-IPE; ²Institute of Materials Science and Technology; ³Mechanical Engineering and Marine Technology, University of Rostock

O-2: A Model Fusion Approach to Modeling Microstructure Development during Heat Treatment: *Richard Couperthwaite*¹; Raymundo Arróyave¹; Ankit Srivastava¹; Douglas Allaire¹; Ibrahim Karaman¹; ¹Texas A&M University

O-3: Atomistic Modeling of Austenite-ferrite Transformation Interface: *Olha Nakonechna*¹; Helena Zapolsky¹; Frederic Danoix¹; Mohamed Gouné²; Didier Huin³; Nicolas Charbonnier³; ¹University of Rouen Normandy; ²ICMCB, UPR CNRS 9048, University of Bordeaux; ³ArcelorMittal research SA, voie romaine, 57 280 Maizières Les Metz

O-5: Computational and Experimental Thermodynamics of Fe-Cr-Al-O Quaternary System: *Can Agca*¹; Jake McMurray²; Joerg Neuefeind²; Alexandra Navrotsky¹; ¹University of California, Davis; ²Oak Ridge National Laboratory

O-6: Computational Study of the Structure and Thermodynamics of GP Zones in Mg Alloys: Kang Wang¹; Du Cheng¹; *Bi-Cheng Zhou*¹;

¹University of Virginia

O-8: Effect of Free Surface on Grain Growth by Monte Carlo Potts Model: *Sokyun Hong*¹; Kyung Jong Lee¹; ¹Hanyang University

O-9: Engineering Improved Electron-emitting Materials: Examining the Desorption and Diffusion Behavior of Scandate Cathodes at Operating Temperature: *Mujan Seif*¹; Sydney Kolnsberg¹; Kerry Baker¹; Thomas Balk¹; Matthew Beck¹; ¹University of Kentucky

O-10: First-principles Study of Substitutional Solute Diffusion along a Screw Dislocation in fcc Ni: *Luke Wirth*¹; Amir Farajian¹; Christopher Woodward²; ¹Wright State University; ²Air Force Research Laboratory

O-11: Experimental and Modeling Studies Using Fe₂O₃ Doped Coke: *Ziming Wang*¹; Kejiang Li¹; Jianliang Zhang¹; Minmin Sun¹; Chunhe Jiang¹; Hongtao Li¹; ¹University of Science and Technology Beijing

O-13: Kinetic Monte Carlo Simulations of Effect of Grain Boundary Variability on Forming Times of RRAM Conductive Filaments: *Yang Hao Lau*¹; Zhun Yong Ong¹; Hiroyo Kawai¹; Liling Zhang¹; Gang Wu¹; Bharathi Madurai Srinivasan¹; David Wu¹; ¹Institute Of High Performance Computing

O-14: Kinetics of Scrap Melting in Iron-carbon Bath: *Mengke Liu*¹; Guojun Ma¹; Xiang Zhang¹; ¹Key Laboratory for Ferrous Metallurgy and Resources Utilization of Ministry of Education, Wuhan University of Science and Technology; Hubei Provincial Key Laboratory of New Processes of Ironmaking and Steelmaking, Wuhan University of Science and Technology; State Key Laboratory of Refractories and Metallurgy, Wuhan University of Science and Technology, Hubei Wuhan, China

O-15: Mesoscopic Model of Free Surface Behavior in the Continuous Casting Mold: *Peng Zhao*¹; Bin Yang²; Liang Li²; Yinhe Lin³; ¹Kunming University of Science and Technology; Panzhihua University; ²Kunming University of Science and Technology; ³Yangtze Normal University

O-16: Multi-phase-field Modeling and Simulations of Polycrystalline Microstructure with Grain Boundary Phase: *Aoshi Nakai*¹; Eisuke Miyoshi¹; Tomohiro Takaki¹; ¹Kyoto Institute of Technology

O-17: Multi-phase-field Modeling for Interaction of Moving Dendritic Particles: *Namito Yamanaka*¹; Tomohiro Takaki¹; Shinji Sakane¹; Yasushi Shibuta²; Munekazu Ohno³; ¹Kyoto Institute of

Technology; ²The University of Tokyo; ³Hokkaido University

O-19: Phase-field Simulation Study of Crystallization of Polymer Droplets on Surfaces: *Yang Xia*¹; Jason Liu¹; Rodney Priestley¹; Craig Arnold¹; Mikko Haataja¹; ¹Princeton University

O-20: Phase-field Study on the Transformation of Lath Martensite in Steel: *Mingyu Cho*¹; Pilryung Cha¹; ¹Kookmin University

O-21: Phase Field Modeling of Grain Boundary Grooving and Migration due to Electric Field and Thermal Gradient: *Supriyo Chakraborty*¹; Praveen Kumar²; Abhik Choudhury²; ¹Ohio State University; ²Indian Institute of Science

O-23: Predicting the Enthalpy of Hydrogen Dissolution in Niobium Using First Principles: *Arvind Ramachandran*¹; Houlong Zhuang¹; Klaus Lackner¹; ¹Arizona State University

O-24: Prediction of Permeability Tensor for Columnar Dendritic Structures: Phase-field and Lattice Boltzmann Simulations: *Yasumasa Mitsuyama*¹; Tomohiro Takaki¹; Shinji Sakane¹; Yasushi Shibuta²; Munekazu Ohno³; ¹Kyoto Institute of Technology; ²The University of Tokyo; ³Hokkaido University

O-25: Probing the Interactions Between Interstitial Hydrogen Atoms in Niobium Through Density Functional Theory Calculations: *Arvind Ramachandran*¹; Houlong Zhuang¹; Klaus Lackner¹; ¹Arizona State University

O-26: Reduction Kinetics Analysis of Fe₂O₃ in the Case of Carbon Precipitation: Yangxin Chen¹; Liangying Wen¹; Shengfu Zhang¹; Jiao Cao¹; ¹Chongqing University

O-27: Role of Defects, Interfaces in FCC-BCC Massive Transformation in Iron Using Molecular Dynamics Simulation: *Pawan Tripathi*¹; Somnath Bhowmick¹; ¹Indian Institute of Technology, Kanpur, India

O-28: Solute Partition at Solid-liquid Interface of Binary Alloy by Molecular Dynamics Simulation: *Kensho Ueno*¹; Yasushi Shibuta¹; ¹The University of Tokyo

O-29: Study of Drying during Straight Grate Process and Its Factors - Analysis with CFD: *Feng Cao*¹; ¹Central South University

O-30: Studying the Nb-H System Using Density Functional Theory Calculations: *Arvind Ramachandran*¹; Houlong Zhuang¹; Klaus Lackner¹; ¹Arizona State University

O-31: Surface Diffusion in Metallic Glasses Using Atomistic

Simulations: *Ajay Annamareddy*¹; Paul Voyles¹; John Perepezko¹; Dane Morgan¹; ¹University of Wisconsin

O-32: Thermodynamic Stability and Kinetics of Nb₃Ge, Nb₃Al, and Nb₃Ga A15 Phases: *Ajinkya Hire*¹; Hannah Bayard¹; Chris Orozco¹; Biswas Rijal¹; Lilong Zhu¹; Ryan Porter²; Zeming Sun²; Matthias Liepe²; Michele Manuel¹; Richard Hennig¹; ¹University of Florida; ²Cornell University

MATERIALS PROCESSING

Defects and Properties of Cast Metals — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Solidification Committee

Program Organizers: Lang Yuan, University of South Carolina; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Charles Monroe, University of Alabama at Birmingham

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M-51: Component Analysis of Defects in Secondary Special Brass Alloy: *Liu Wei*; Xing Peng¹; Zhao Hongliang¹; Wang Chengyan¹; Chen Yongqiang¹; Guo Shumei²; Liu Fengqin¹; Huang Teng²; ¹University of Science and Technology Beijing; ²Ningbo Wave Vibration Copper Co., Ltd.

M-52: Microstructure Evolution and Chemical Composition in Continuous Directional Solidification Cu–P–Sn Alloy: *Jihui Luo*¹; Xinxin Deng¹; Li Zhang¹; Suliang Wang¹; Zhongfang Xie¹; Xianye Ren¹; ¹Yangtze Normal University

M-53: Ni/Mn Replacement in High-Ni Austenitic Stainless Cast Steels used for Turbo-charger: *Jisung Yoo*¹; Won-Mi Choi¹; Byeong-Joo Lee¹; Yong-Jun Oh²; Gi-Yong Kim³; Sunghak Lee¹; ¹Pohang Institute of Science & Technology, POSTECH; ²Hanbat National University; ³Key Yang Precision

M-54: Synchrotron Validated Modelling of Pore Formation During High Pressure Die Casting: *Zhixuan Gong*¹; Shishira Bhagavath²; Tim Wigger¹; Saurabh Shah¹; Sebastian Marussi¹; Shashidar Marathe³; Shyamprasad Karagadde²; Peter Lee¹; ¹University College London; ²Indian Institute of Technology Bombay; ³Diamond Light Source

Ltd

M-55: The Optical and Electronic Features of HgSiX₂ (X=P, As) Chalcopyrite Materials: A First Principle Calculations: *Khalid Shah*¹; Guiwu Lu¹; ¹China University of Petroleum-Beijing

MATERIALS PROCESSING

Electrometallurgy 2020 — Poster Session

Sponsored by: TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee

Program Organizers: Antoine Allanore, Massachusetts Institute of Technology; Michael Free, University of Utah; Georges Houlachi, Hydro-Quebec; Hojong Kim, Pennsylvania State University; Takanari Ouchi, The University of Tokyo; Shijie Wang, Rio Tinto Kennecott Utah Copper Corp

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M-56 (Digital): Electron Beam Refinery and Purification in Newly Constructed Production Units with Gas Discharged Electron Beam Guns: *Alexander Manulyk*¹; Nikolayi Grechanyuk¹; Pavel Kucherenko¹; Alexey Melnik¹; ¹Synergy Antech Services INC

M-57: Effects of Precursor Concentration on the Surface Morphology and Electrocatalytic Performance of Ti/IrO₂-RuO₂-SiO₂ Anode for Oxygen Evolution Reaction: *Bao Liu*¹; Shuo Wang¹; Qiankun Jing¹; Chengyan Wang¹; ¹University of Science and Technology Beijing

M-58: Electrochemical Behavior of Fe₂O₃ in Electro-deoxygenation in NaCl-CaCl₂ Molten Salt System: Lei Jia¹; Hui Li¹; Zongying Cai¹; Jinglong Liang¹; ¹North China University of Science and Technology

M-59: Reduction Mechanism of Metal Cobalt from Cathode Material of Waste Lithium Cobalt Oxide Battery: Jing Wang¹; Jinglong Liang¹; Hui Li¹; Jie Xu¹; ¹North China University of Science And Technology

M-60: Review on the Bio-oxidation of Pyrite: Implications for

Mining Industry: *Xin Lv*¹; ¹Central South University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Functional Nanomaterials 2020: Translating Innovation into Pioneering Technologies — Poster Session I

Sponsored by: TMS Functional Materials Division, TMS: Nanomaterials Committee

Program Organizers: Simona Hunyadi Murph, Savannah River National Laboratory; Huanyu Cheng, Pennsylvania State University; Yong Lin Kong, University of Utah; Min Kyu Song, Washington State University; Ning Zhang, University of Alabama

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Session Chair: Simona Hunyadi Murph, SRNL and UGA

N-45 (Invited): Functional Anisotropic Nanostructures - Correlation between Their Shape and Properties: *Simona Hunyadi Murph*¹; ¹Savannah River National Laboratory; University of Georgia

N-46: 3D Printing of Conductive Epoxy-carbon Nanotube Composite: *Masoud Kasraie*¹; Parisa Pour Shahid Saeed Abadi¹; ¹Michigan Tech University

N-47: Effect of Lithium Concentration-dependent Material Properties on Diffusion Induced Stresses of Sn Anode: *Chung Su Hong*¹; Nadeem Qaiser¹; Hyeon Gyun Nam¹; Seung Min Han¹; ¹KAIST

N-48: Flexible Honeycombed Nanoporous/glassy Hybrid for Efficient Electrocatalytic Hydrogen Generation: *Rui Li*¹; K.C. Chan¹; Xiongjun Liu²; Z.P. Lu²; ¹Hong Kong Polytechnic University; ²University of Science & Technology Beijing

N-49: Nano-engineered Hybrid Flywheels for High Energy Density and High Power Density: *Jamshid Kavosi*¹; Mohammad Naraghi¹; Terry Creasy¹; Alan Palazzolo¹; ¹Texas A&M University

N-50: Novel VS4 Nanorods Synthesized by a Facile Solvothermal Method for High Performance Electrochemical Capacitor Electrode: *Jun-Kai Feng*¹; Jie Huang¹; Hong-Yi Li¹; Bing Xie¹; ¹Chongqing University

N-51: Solid-state Electrolytes for Lithium–selenium Disulfide

Batteries with Enhanced Safety: *Panpan Dong*¹; Xiahui Zhang¹; Younghwan Cha¹; Min-Kyu Song¹; ¹School of Mechanical and Materials Engineering, Washington State University

N-53: Surface Composition of Cu@Ag Bimetallic Nanoparticles Tuned for Enhanced Oxygen Reduction Reaction: *Youngtae Park*¹; Changsoo Lee¹; Hyuck Mo Lee¹; ¹KAIST

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Functional Nanomaterials 2020: Translating Innovation into Pioneering Technologies — Poster Session II

Sponsored by: TMS Functional Materials Division, TMS: Nanomaterials Committee

Program Organizers: Simona Hunyadi Murph, Savannah River National Laboratory; Huanyu Cheng, Pennsylvania State University; Yong Lin Kong, University of Utah; Min Kyu Song, Washington State University; Ning Zhang, University of Alabama

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Session Chair: Simona Hunyadi Murph, SRNL and UGA

N-55: High-performance Piezoelectric Nanogenerator Based on Electrospun Polymer for Powering Smart Wearables: *Siddharth Sharma*¹; Indranil Lahiri¹; Partha Roy¹; Debrupa Lahiri¹; ¹IIT Roorkee

N-56: Interfacial Surface Chemistry Effect on Thermal and Electrical Conductivity of Carbon Nanotube-copper Composites: *Farhad Daneshvar*¹; Atif Aziz²; Tan Zhang¹; Hung-Jue Sue¹; Mark Welland²; ¹Texas A&M University; ²University of Cambridge

N-57: Optimized Optical Properties and Mechanical Assessment of AlN/SiO₂ Nanomultilayers: *Chelsea Appleget*¹; Andrea Hodge¹; ¹University of Southern California

N-58: Study of pH Influence in The Synthesis of Copper Nanoparticles Using Ascorbic Acid as Reducing and Stabilizing Agent: *Thamiris Martins*¹; *Botelho Junior*¹; Viviane de Moraes²; Denise Espinosa¹; ¹USP; ²Mauá Institute of Technology

N-59: The Effect of a Ripening Step in the Early Stages of WSe₂ Synthesis by Molecular Beam Epitaxy: *Peter Litwin*¹; Costel Constantin²; Stephen McDonnell¹; ¹University of Virginia; ²James

N-60: Thermal Stability of Hafnium Zirconium Oxide on Transition Metal Dichalcogenides: *Maria Gabriela Sales*¹; Shelby Fields¹; Samantha Jaszewski¹; Sean Smith²; Jon Ihlefeld¹; Stephen McDonnell¹; ¹Department of Materials Science and Engineering, University of Virginia; ²Sandia National Laboratories

ADVANCED MATERIALS

General Poster Session — Advanced Materials

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J-137: Advanced Manufacturing of High Density Reactive Materials: *Chris Haines*¹; Matthew Beyard²; ¹US Army CCDC - Army Research Laboratory; ²Office of Naval Research - Code 35

J-138: Developing Continuous and Multi-step Strain-annealing Processes for Fe-based Amorphous Magnetically-soft Inductor Cores: *Nickolaus Bruno*¹; Ronald Noebe²; Alex Leary²; Vladimir Keylin²; Grant Feichter²; ¹South Dakota School of Mines and Technology; ²NASA Glenn Research Center

J-139: Effect of Mechanical Alloying parameters on Fienemet Alloys Processed by Spark Plasma Sintering: *Taban Larimian*; Rajeev Kumar Gupta¹; Varun Chaudhary²; Raju Ramanujan³; ¹The University of Akron; ²School of Materials Science & Engineering, Nanyang Technological University; ³Nanyang Technological University

J-140:InfluenceofSolutionHeatTreatmentontheMicrostructures and Mechanical Properties of TC4 Alloy Prepared by SLM: *Shifeng Liu*¹; Zhichang Zhang¹; ¹Xi'an University of Architecture and Technology

J-141: Modelling and Neutron Diffraction Characterization of the Interface Bond Integrity of Spray Formed Dissimilar Steel Clad Systems: *Tung Lik Lee*¹; J. Mi²; S. Ren³; S. Zhao³; J. Fan³; S. Kabra¹; P. Grant⁴; ¹UK Research and Innovation (STFC); ²University of Hull; ³Baosteel; ⁴University of Oxford

CHARACTERIZATION

General Poster Session — Characterization

Tuesday PM | February 25, 2020
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K-138: Automated Reconstruction of Spherical Kikuchi Maps: *Chaoyi Zhu*¹; Kevin Kaufmann¹; Kenneth Vecchio¹; ¹University of California, San Diego

K-140 In-situ Measurement of Thin Film Moduli and Yield Stress via Confined Compression: *Owen Brazil*¹; ¹Texas A&M

K-141: Investigation of Strain Rate Sensitivity with Novel High Strain Rate Nanoindentation: *Christopher Walker*¹; George Pharr¹; ¹Texas A&M University

K-143: The Effects of Aging on Mechanical Properties on Ni-base Superalloy Casting Alloys for A-USC Power Generation Application: Jaihyun Park¹; Jieun Kim¹; Kyongwoon Lee²; Keeyoung Lee³; ¹RIST; ²DOOSAN; ³KPCM

K-144: Wear Characteristics of Aluminum-quartz-barite Composites: Emmanuel Akpan¹; Torti Uwaike²; Oluwashina Gbenebor²; Oluwaseyi Taiwo²; *Samson Adeosun*²; Samuel Olaleye²; ¹Institut fur Verbundwerkstoffe ; ²University of Lagos

MATERIALS DESIGN

General Poster Session — Materials Design

Tuesday PM | February 25, 2020
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L-30: An Investigation on Improvement of the Mechanical Properties and Fatigue Life of Steel Cardan Shafts: *Mehmet Kelestemur*¹; Mehmet Tasdelen; ¹Arkansas Tech University

L-31: Density Functional Theory Calculations Based on Investigation of Interaction between Multiple Hydroxyamide Ligands and La³⁺ Ion: *Anindita Pati*¹; Tarun Kundu¹; Snehanshu Pal²; ¹Indian Institute of Technology Kharagpur; ²NIT Rourkela

L-32: High-throughput Screening of Hydrogen Evolution Reaction for MXenes by Single Metal Atom Doping: *Jun Jiang*¹; Xiaoxu Wang¹; Caiqun Wang¹; Liutao Zhao¹; ¹Beijing Computing

L-33: Integrated Study of First-principles Calculations and Experimental Measurements for Hydrogen Effect on FCC to HCP Martensitic Transformation: *Satoshi Ikubo*¹; Kenji Hirata²; Yui Kuroki¹; Shoya Kawano¹; Hiroshi Ohtani³; Motomichi Koyama³; Kaneaki Tsuzaki⁴; ¹Kyushu Institute of Technology; ²National Institute of Advanced Industrial Science and Technology; ³Tohoku University; ⁴Kyushu University

L-34: Prediction of Aluminum Alloy Mechanical Properties with Bayesian Neural Network: *Shimpei Takemoto*¹; Yoshishige Okuno¹; Kenji Nagata²; Junya Inoue³; Manabu Enoki³; ¹Showa Denko; ²NIMS; ³The University of Tokyo

L-35: Text Data Mining Analysis on Changes in the Number of Doctoral Degree Holders in Computational Materials Science in Japan during the Last 50 Years: *Yayoi Terada*¹; Tetsuo Mohri¹; ¹IMR, Tohoku University

MATERIALS PROCESSING

General Poster Session — Materials Processing

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M-83: Influence of Al₂O₃ on the Liquid Phase Fluidity and the Consolidation Strength of Sintered Body Formed by Iron Ore Fines: Heping Li¹; Zhibin Hong¹; Shengli Wu¹; Heng Zhou¹; Mingyin Kou¹; ¹University of Science and Technology Beijing

M-84: Material Surface Metallurgy By Double-glow-discharge Plasma Technology --- Xu-Tec Process: Zhong Xu¹; *Frank Xiong*²; ¹Taiyuan University of Technology; ²Heaptech

M-85: Microstructural and Mechanical Properties of Pinch Rolls Fabricated by Horizontal Centrifugal Casting: *Kyeongsoon Park*¹; G.W. Jung¹; H.Y. Hong¹; D.H. Kim¹; N.K. Yi²; C.K. Kim²; ¹Sejong University; ²S.M Metal

M-86: Simulation of Microstructure Evolution during Magnetic Field Assisted Manufacturing: *Omar Betancourt*¹; Mahmood Mamivand¹; ¹Boise State University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

General Poster Session — Nanostructured and Heterostructured Materials

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N-61: Confined Laser Shock Detonation to Form Nanodiamonds with Nitrogen-vacancy Center: *Qiong Nian*¹; Rui Dai¹; ¹Arizona State University

N-62: Monodisperse Polystyrene Spheres: Studies on the Effects of Reaction Parameters on Particle Diameter and Colloidal Stability: Ikhazuagbe Ifijen¹; *Esther Ikhuoria*²; Aireguamen Aigbodion¹; Stanley Omorogbe¹; ¹Rubber Research Institute of Nigeria; ²University of Benin

N-65: The Unusual Effect of Alloying Elements on Microstructure and Texture Development during HPT in Single Phase Zn-alloys: *Wiktor Bednarczyk*¹; Maria Watroba¹; Jakub Kawalko¹; Nong Gao²; Marco Starink²; Piotr Bala¹; Terence Langdon²; ¹AGH University of Science and Technology; ²University of Southampton

N-66: Wallpapering-inspired Approach to Create Wrinkles in a Single-layer Graphene: *Won Il Park*; Sang Il Lee¹; Jae Hyung Lee¹; Dong Won Yang¹; Jae Hyeok Shin¹; Won Jun Chang¹; ¹Hanyang University

PHYSICAL METALLURGY

General Poster Session — Physical Metallurgy

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O-52 (Digital): Explaining the Martensitic Transformation by Optimizing the Strain:*Félix Therrien*¹; Vladan Stevanovic¹; ¹Colorado School of Mines

O-53: Interaction between Cu and Cr Coadsorption on MnS Inclusions in Low Alloy Steel and Study of the Interfaces Between α -Fe and MnS: *Wenting Lv*¹; Luchun Yan¹; Xiaolu Pang¹; Huisheng Yang¹; Lijie Qiao¹; Yanjing Su¹; Kewei Gao¹; ¹University of Science

O-54: Optimization of Oxidation Resistance and Mechanical Properties of Refractory High-entropy Alloys-futuristic Strategy: *Saad Sheikh*¹; Hideyuki Murakami¹; ¹National Institute for Materials Science, Japan

ADVANCED MATERIALS

High Entropy Alloys VIII — Poster Session I

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

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J-15 (Digital): Atomistic Modeling of Dislocations in a Random High-entropy Alloy: *Diana Farkas*¹; Roberto Pasianot²; ¹Virginia Polytechnic Institute; ²Atomic Energy Comission, Argentina

J-16 (Invited): Stability of the Stress-induced Phase in a TiZrHfNb0.3 Refractory High-entropy Alloy: *Xuesong Fan*¹; Michael Gao²; Xiehang Chen³; Zongyang Lyu¹; Yan Chen⁴; Ke An⁴; Eran Greenberg⁵; Vatali Prakapenka⁵; Qiaoshi Zeng³; Peter Liaw¹; ¹The University of Tennessee; ²National Energy Technology Laboratory; ³Center for High Pressure Science & Technology Advanced Research; ⁴Oak Ridge National Laboratory; ⁵Argonne National Laboratory

J-17: A Rapid Simulation Method of Single Phase High-entropy Alloys via CALPHAD-based High-throughput Calculation: *Peiyong Chen*¹; Chanhoo Lee¹; Xuesong Fan¹; Chuan Zhang²; Jim Hu³; Peter Liaw¹; ¹University Of Tennessee; ²CompuTherm LLC; ³Honda R&D

J-18: Ab Initio Modeling of Peierls Potential of Screw Dislocations in bcc High-entropy Alloys: *Sheng Yin*¹; Jun Ding²; Mark Asta²; Robert Ritchie²; ¹University of California, Berkeley; ²Lawrence

J-19: An Investigation into the Link Between Microstructure and Pitting Corrosion of Novel Alloy FBB8+Ti: *Mark Wischhusen*¹; Carol Glover¹; John Scully¹; Peter Liaw²; Sean Agnew¹; ¹University of Virginia - Department of Materials Science and Engineering; ²University of Tennessee, Knoxville

J-20: Anisotropic Lattice Distortion Induced by Hydrogen in CoCrFeMnNi High-entropy Alloy: *Hung-Wei Yen*¹; Shi-Wei Chen²; Yu-Ting Mai¹; Yi-Ting Lin¹; ¹National Taiwan University; ²National Synchrotron Radiation Research Center

J-21: Antiphase Boundaries in the B2 Matrix of the Al-Co-Cr-Fe-Ni High Entropy Alloy: Louisa Meshi¹; Lior Natovitz¹; *Guy Hillel*¹; Yatir Linden¹; Shai Salhov²; Malki Pinkas²; ¹Ben Gurion University of the Negev; ²Nuclear Research Center Negev

J-22: Atomic Scale Modeling of Hydrogen Accommodation and Transport in BCC Refractory High Entropy Alloys: *Simon Middleburgh*¹; Daniel King²; ¹Nuclear Futures Institute; ²Imperial College London

J-23: Combinatorial Exploration of High Entropy Alloys: *Sebastian Alexander Kube*¹; Sungwoo Sohn¹; David Uhl²; Amit Datye¹; Apurva Mehta³; Jan Schroers¹; ¹Yale University; ²Southern Connecticut State University; ³SLAC National Accelerator Laboratory

J-25: Concurrent TWIP-TRIP, Short-range Order and Strain Localization in Single-crystal NiCrCo Medium Entropy Alloy Drives Exceptional Mechanical Behavior: *Sezer Picak*¹; Prashant Singh²; Aayush Sharma²; Yuri I. Chumlyakov³; Duane D. Johnson²; Raymundo Arroyave¹; Ibrahim Karaman¹; ¹Texas A&M University; ²Lowa State University; ³Siberian Physical Technical Institute

J-26: Corrosion Behavior of Selected High Entropy Alloys: *Elzbieta Godlewska*¹; Marzena Mitoraj-Krolikowska¹; Jakub Czerski¹; Monika Jawanska¹; Sergej Gein²; Ulrike Hecht²; ¹AGH UST; ²Access e.V.

J-29: Deformation Mechanisms of Two Stable Face Centered Cubic High Entropy Alloys at Cryogenic Temperature: *Feng He*¹; Shaolou Wei²; Zhijun Wang³; C. Cem Tasan²; ¹City University of Hong Kong; ²Massachusetts Institute of Technology; ³Northwestern Polytechnical University

J-30: Design of Non-equiatomic Refractory High Entropy Alloys through Combination of Various Strengthening Mechanisms Towards Strength-ductility Synergy: *Cheng Zhang*¹; Benjamin MacDonald¹; Fengwei Guo²; Yongwang Kang²; Xiaochang Xie²; Zhiqiang Fu¹; Yizhang Zhou¹; Enrique Lavernia¹; ¹Department of

Materials Science and Engineering, University of California, Irvine;
²AECC Beijing Institute of Aeronautical Materials

J-31: Designing New Corrosion Resistant High Entropy Alloys with Exceptional Strength-ductility Synergy and Good Weldability: *Saurabh Nene*¹; Sanya Gupta¹; Rajiv Mishra¹; ¹University of North Texas

J-32: Direct Production of High Entropy Alloy Powders: *Jawad Haidar*¹; ¹Kinaltek Pty Ltd.

J-34: Effect of Al on Microstructure, Hardness, and Corrosion Performance of Al-Cr-Fe-Mn Alloys: *Jarrold Gesualdi*¹; Cameron Blanchard¹; Hojong Kim¹; ¹The Pennsylvania State University

J-35: Effect of Heat Treatment on the Microstructure and Mechanical Properties of AlCrFeNiCu High Entropy Alloy: *Nicholus Malatji*¹; Rudolf Kanyane¹; Thabo Lengopeng¹; Patricia Popoola¹; Sisa Pityana¹; ¹Tshwane University of Technology

J-36: Effect of Mn in CrCoFeNiMn High Entropy Alloy on Creep Performance: *Kyle Rozman*¹; Martin Detrois¹; Paul Jablonski¹; Michael Gao¹; Jeffrey Hawk¹; ¹National Energy Technology Laboratory

J-37: Electronic Properties and Characterization of Passive Films Formed on CrMnFeCoNi and CrFeCoNi Multiple Principal Element Alloys in a 0.1M NaOH Solution: *Hamidreza Torbati-Sarrafi*¹; Mitra Shabani¹; Garrett Pataky¹; Paul Jablonski¹; Amir Poursaee¹; ¹Clemson University

J-38: Engineering Atomic-level Complexity in Complex Concentrated Alloys: *Hyunseok Oh*¹; Khorgolkhuu Odbadrakh²; Sang Jun Kim³; Wook Ha Ryu³; Kook Noh Yoon³; Sai Mu⁴; Fritz Körmann⁵; Yuji Ikeda⁵; Cemal Cem Tasan¹; Dierk Raabe⁵; Takeshi Egami⁴; Eun Soo Park³; ¹Massachusetts Institute of Technology; ²University of Tennessee and Oak Ridge National Laboratory; ³Seoul National University; ⁴Oak Ridge National Laboratory; ⁵Max-Planck-Institut für Eisenforschung

J-39: Enhanced Irradiation Resistance Through Phase Transformation in NiFeCoCrCu HEA Film: *Li Jiang*¹; Yuan Xiu¹; Wen Zhang¹; Min Wang¹; ¹University of Michigan

J-40: Evaluation of Microstructural and Mechanical Properties of Al_xCrFeMnNi High Entropy Alloys: Nicholus Malatji¹; *Khumo Masemola*¹; Patricia Popoola¹; ¹Tshwane University of Technology

J-41: Evolution of Texture during Thermo-mechanical Processing of High Entropy Alloy (HEA): *Shi Hoon Choi*¹; Min-seong Kim¹; Lalit

Kaushik¹; Jaiveer Singh¹; ¹Sunchon National University

J-43: Friction Stir Processing: A Microstructural Modification Technique for Complex Concentrated Alloys: *Anumat Sittiho*¹; Jadzia Graves¹; Madhumanti Bhattacharyya¹; Indrajit Charit¹; Rajiv Mishra²; ¹University of Idaho; ²University of North Texas

J-44: Grain Size Dependent Entropy-driven Phase Transformation in High Entropy Oxides: *Alexander Dupuy*¹; Xin Wang¹; Julie Schoenung¹; ¹University of California, Irvine

J-45: Impact of Interstitial Alloying on Stacking-fault Energies in High-entropy Alloys from First Principles: *Yuji Ikeda*¹; Jörg Neugebauer¹; Fritz Körmann¹; ¹Max-Planck-Institut für Eisenforschung GmbH

J-46: Interdiffusion, Solubility Limit and Role of Enthalpy and Entropy in Senary FCC Al-Co-Cr-Fe-Ni-Mn High Entropy Alloy: *Abhishek Mehta*¹; Yongho Sohn¹; ¹University of Central Florida

J-47: Internal Oxidation of Refractory MoWTaTiZr HEA Using Periodic DFT and Atomistic Thermodynamic Modeling: *Eric Osei-Agyemang*¹; Ganesh Balasubramanian¹; ¹Lehigh University

J-48: Low Cycle Fatigue Behavior and Cyclic Plastic Response of Equiatomic CrCoNi Medium-entropy Alloy with Partially and Fully Recrystallized Microstructures: *Milan Heczko*¹; Connor Slone²; Veronika Mazanova¹; Ivo Kubena¹; Easo George³; Tomas Kruml¹; Jaroslav Polak¹; Michael Mills²; ¹Institute of Physics of Materials CAS; ²The Ohio State University; ³Oak Ridge National Laboratory

J-49: Mechanical Properties and Tribocorrosion Behaviors of TiNbTaZr-based High-entropy Alloys for Biomedical Applications: *Shih-Chieh Chao*¹; Kuan-Cheng Lai¹; Po-Yu Chen¹; ¹National Tsing Hua University

J-50: Mechanical Properties of CoCrFeMnNiMox High Entropy Alloy Films: *Tzu-Hsuan Huang*¹; Chia-Lin Li¹; Chun-Hway Hsueh¹; ¹National Taiwan University

J-51: Micro- and Mesoscale Mechanical Properties of a FeCrMnNi High Entropy Alloy Subject to Large Strain Extrusion Machining: *Jonathan Gigax*¹; Osman El-Atwani¹; Quinn McCulloch¹; Berk Aytuna²; Mert Efe²; Saryu Fensin¹; Stuart Maloy¹; Nan Li¹; ¹Los Alamos National Lab; ²Middle East Technical University

J-53: Microstructure Evolution and Mechanical Behavior of Nitrogen Interstitial CoCrFeMnNi High-entropy Alloys: *Jing Zhang*¹; Min Seok Kim²; Kook Noh Yoon²; Heh Sang Ahn²; Eun Soo Park²; ¹Jiangsu University of Science and Technology; ²Seoul

J-54: Multi-component Intermetallic Precipitation in FCC based Complex Concentrated Alloys: *Sriswaroop Dasari*¹; Vishal Soni¹; Abhinav Jagetia¹; Rajarshi Banerjee¹; ¹University of North Texas

J-55: Origin of High Cr Cation Fractions in Passive Oxide of Ni₃₈Fe₂₀Cr_xMn_{21-0.5x}Co_{21-0.5x} High Entropy Alloys: *Junsoo Han*¹; Angela Gerard¹; Xuejie Li²; James Saal³; Pin Lu³; Wolfgang Windl⁴; Kevin Ogle²; Gerald Frankel⁴; John Scully¹; ¹University of Virginia; ²Chimie ParisTech; ³Questek; ⁴The Ohio State University

J-56: Passivation Phenomena in Highly Corrosion Resistant High Entropy Alloys: An Evaluation of the Role of Chromium Content: *Angela Gerard*¹; Junsoo Han¹; Stephen McDonnell¹; Dan Schreiber²; Pin Lu³; James Saal³; Wolfgang Windl⁴; Gerald Frankel⁴; John Scully¹; ¹University of Virginia; ²Pacific Northwest National Laboratory; ³Questek Innovations; ⁴Ohio State University

J-57: Phase Inversion in Refractory High Entropy Alloys: *Vishal Soni*¹; Sriswaroop Dasari¹; Bharat Gwalani¹; Talukder Alam¹; Oleg Senkov²; Daniel Miracle³; Rajarshi Banerjee¹; ¹University of North Texas; ²UES Inc.; ³Air Force Research Laboratory

J-58: Phase Stability of B2-ordered High Entropy Alloy: Yonghua Meng¹; Fenghui Duan¹; Jie Pan¹; Yi Li¹; ¹Shenyang National Laboratory for Materials Science, Institute of Metal Research

J-60: Second-phase of 29Fe15Al18Cr27Ni High Entropy Alloy: *Jintao Wang*¹; Shouping Liu¹; Xiong Xiao¹; Xiaoyu Han¹; ¹Chongqing University

J-61: Size Effects and the Hall-Petch Relationship in the Mn₁₇Fe₂₂Co₂₄Ni₂₄Cu₁₃ System: Artashes Ter-Isahakyan¹; *John Balk*¹; ¹University of Kentucky

J-62: Static and Dynamic Mechanical Performance of Non-equiatomic CoCrFeMnNi HEA: *Kyle Rozman*¹; Paul Jablonski¹; Jeffrey Hawk¹; Michael Gao¹; ¹National Energy Technology Laboratory

J-63: Strengthening of Transformation-induced Plasticity-assisted High Entropy Alloy via Interstitial Nitrogen: *Kenta Yamanaka*¹; Manami Mori²; Yusuke Onuki³; Shigeo Sato³; Akihiko Chiba¹; ¹Tohoku University; ²National Institute of Technology, Sendai College; ³Ibaraki University

J-64: Synthesis of High Entropy Metal Carbides by a Solvothermal Process: *Ved Vakharia*¹; Olivia Graeve¹; ¹University of California,

San Diego

J-65: Tailoring Multi-principal Element (MPE) Alloy Compositions based on Competing Deformation Mechanisms: *KVVamsi*¹; Marie-Agathe Charpagne¹; Anton Van der Ven¹; Tresa Pollock¹; ¹University of California

J-66: The Controlled Large-area Synthesis of Two Dimensional Metals: *Tianyu Wang*¹; Quanfeng He¹; Jingyang Zhang¹; Zhaoyi Ding¹; Fucheng Li¹; Yong Yang¹; ¹City University of Hong Kong

J-67: The Prediction of Enthalpy and Elastic Properties of Fe-Cr-Co-Ni High Entropy Alloys by Using First Principles Methods: *Songge Yang*¹; Mohammad Asadikiya¹; Vadym Drozd²; Yu Zhong¹; ¹Worcester Polytechnic Institute; ²Florida International University

J-68: Thermal Expansion of Refractory MoW-TaTiZr High Entropy Alloy: *Eric Osei-Agyemang*¹; Ganesh Balasubramanian¹; ¹Lehigh University

J-69: Ultrahigh Strength and Thermal Stability of Nanocrystalline High-entropy Alloys Made by Electrodeposition: *Michel Hache*¹; Uwe Erb¹; Yu Zou¹; ¹University of Toronto

J-70: Ultrastrong VCoNi Medium-entropy Alloy Enabled by Severe Lattice Distortion: *Seok Su Sohn*¹; Alisson Kwiatkowski da Silva²; Yuji Ikeda²; Fritz Körmann²; Wenjun Lu²; Won Seok Choi³; Baptiste Gault²; Dirk Ponge²; Jörg Neugebauer²; Dierk Raabe²; ¹Korea University; ²Max-Planck-Institut für Eisenforschung; ³Korea Advanced Institute of Science and Technology

ADVANCED MATERIALS

High Entropy Alloys VIII — Poster Session II

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

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J-71: A Cuboidal B2-enhanced Dual-phase CrMnFeCoNiAl_{0.75} High-entropy Alloy with Excellent High-temperature Strength: *Lijing Lin*¹; Zhihong Zhong¹; Peter Liaw²; ¹Hefei University of Technology; ²University of Tennessee, Knoxville

J-72: A Machine Learning Model for Alloy Design: *Zhaohan Zhang*¹; Mu Li¹; Katharine Flores¹; Rohan Mishra¹; ¹Washington University in St. Louis

J-73: A Strategy for Designing Heterogeneous Medium-entropy Alloys with Excellent Tensile Properties: *Jongun Moon*¹; Jeong Min Park¹; Jae Wung Bae¹; Hyoung Seop Kim¹; ¹POSTECH

J-74: Ab Initio Modeling of Large Defects in γ , γ' , and γ'' Superalloys: *Saro San*¹; Wai-Yim Ching¹; ¹University of Missouri, Kansas City

J-75: Analysis of Irradiation Resistance of Tungsten-based Reduced Activation Alloy for Fusion Plasma Applications: Owais Waseem¹; *Ho Jin Ryu*¹; ¹KAIST, Korea

J-76: Analysis of Strengthening due to Grain Boundaries and Annealing Twin Boundaries in the CrCoNi Medium-entropy Alloy: *Mike Schneider*¹; Easo George²; Tomáš Zálezák³; Antonín Dlouhý³; Gunther Eggeler¹; Guillaume Laplanche¹; ¹Ruhr-Universität Bochum; ²Oak Ridge National Laboratory; ³Institute of Physics of Materials

J-77: Atom Probe Tomography Study of a Fe₂₅Ni₂₅Co₂₅Ti₁₅Al₁₀ High-entropy Alloy: *Zhiqiang Fu*¹; Andrew Hoffman²; Benjamin MacDonald¹; Maalavan Arivu²; Haiming Wen²; Enrique Lavernia¹; ¹University of California, Irvine; ²Missouri University of Science and Technology

J-78: Atomic Diffusion in Melts of Refractory HEAs: *Ankit Roy*¹; Ganesh Balasubramanian¹; ¹Lehigh University

J-79: CALPHAD Aided Design of MoNbTiZr-based High Entropy Alloys: *Benjamin MacDonald*¹; Cheng Zhang¹; Zhiqiang Fu¹; Fengwei Guo²; Yongwang Kang²; Xiaochang Xie²; Yizhang Zhou¹; Enrique Lavernia¹; ¹University of California, Irvine; ²AECC Beijing Institute of Aeronautical Materials

J-80: Composition Design of Coherent Precipitate-strengthening AlCuFeNiTi Multi-principal Element Alloys by High-throughput CALPHAD-type Calculation: *Shao-Yu Yen*¹; Hao-che Wang¹; Shih-kang Lin¹; ¹National Cheng-Kung University

J-81: Compositional Effects of Stacking Fault Energies in Ni-based FCC Concentrated Alloys: *Liubin Xu*¹; Luis Casillas-Trujillo²; Yanfei

Gao¹; Haixuan Xu¹; ¹The University of Tennessee, Knoxville; ²The University of Tennessee, Knoxville (now at Linköping University, Sweden)

J-82: Deformation Behavior of the Al_{0.3}CoCrFeNi High-entropy Alloy during Low-cycle Fatigue by In-situ Neutron Diffraction: *Zongyang Lyu*¹; Rui Feng¹; Di Xie¹; Yan Chen²; Ke An²; Yanfei Gao¹; Peter Liaw¹; ¹The University of Tennessee; ²Spallation Neutron Source, Oak Ridge National Laboratory

J-83: Deformation-induced Short-range Ordering and Its Impact on Cryogenic Deformation in Boron-doped High-Entropy Alloys: *Jae Bok Seol*¹; Jae Wung Bae¹; Zhiming Li²; Won-Seok Ko³; Hyoung Seop Kim¹; ¹POSTECH; ²Max-Planck-Institut für Eisenforschung GmbH, Max-Planck-Straße; ³University of Ulsan

J-84: Determination of Young's Modulus and Phase Prediction using Classical Molecular Dynamics in Refractory HEAs: *Ankit Roy*¹; Ganesh Balasubramanian¹; ¹Lehigh University

J-85: Developing Non-equiatomic Refractory BCC HEAs with Improved Mechanical Properties Using Combinatorial Screening: *Taohid Bin Nur Tuhser*¹; Ian Winter²; Daryl Chrzan²; Andrew Minor²; Mark Asta²; Thomas Balk¹; ¹University of Kentucky; ²Lawrence Berkeley National Laboratory

J-86: Development of Metastable Nanolaminate High Entropy Alloy Overcoming Strength-ductility Trade-off: *Min Seok Kim*¹; Kook Noh Yoon¹; Hyun Seok Oh²; Eun Soo Park¹; ¹Seoul National University; ²Massachusetts Institute of Technology

J-87: Development of TiVNbTaW High Entropy Alloy with TRIPLEX Nanostructure: *Sangjun Kim*¹; Jinyeon Kim¹; Da Hye Song²; Jin Kyu Lee²; Eun Soo Park¹; ¹Seoul Nation University; ²Kongju National University

J-88: Ductility of Quaternary Refractory Medium Entropy Alloys with Body-centered Cubic Structure: *Qian He*¹; Shuhei Yoshida¹; Tilak Bhattacharjee¹; Nobuhiro Tsuji¹; ¹Kyoto University

J-89: Effect of Sputtering Parameter on Structure and Mechanical Properties of TiZrHfNiCuCo High Entropy Alloy Films: *Ki Buem Kim*¹; Young Seok Kim¹; Taekjip Choi¹; Jin Kyu Lee²; Hyo Soo Lee³; ¹Sejong University; ²Kongju National University; ³Korea Institute of Industrial Technology (KITECH)

J-90: Enhanced Mechanical Properties by Nitrogen Addition in N-CoCrNi and N-CoCrFeMnNi Compositionally Complex Alloy: Dennis Jodi¹; Choi Nuri²; Joohyun Park²; Nokeun Park¹; *Timothy*

Alexander Listyawan¹; ¹Yeungnam University; ²Hanyang University

J-91: Fabricate and Mechanical Properties of Non-equiatomic High Entropally Reinforced 6082 al Matrix Nanocomposite: Anoushka Pal¹; ¹Indian Institute of Technology

J-92: Fabrication and Hardness Behavior of High Entropy Alloys: Modupeola Dada¹; Patricia Popoola¹; Ntombi Mathe²; Sisa Pityana²; Samson Adeosun³; Thabo lengopeng²; ¹Tshwane University of Technology; ²Council for Scientific and Industrial Research; ³University of Lagos, Akoka

J-93: Formation and Mechanical Properties of TaNbVTiW High Entropy Alloys Prepared by Powder Metallurgy: Da Hye Song¹; Sangjun Kim²; Eun Soo Park²; Jin Kyu Lee¹; ¹Kongju National University; ²Seoul National University

J-94: Formation Zone Prediction of the Al-Co-Fe-Ni-Ti t High Entropy Alloys by High-throughput Calculation (HTC) Technique: Yu-Chun Li¹; Chu-Hsuan Wang¹; Hsien-Ming Hsiao²; Satoshi Ikubo³; Chuan Zhang⁴; Yee-Wen Yen⁵; ¹Department of Materials Science and Engineering, National Taiwan University of Science and Technology; ²Institute of Nuclear Energy Research; ³Graduate School of Life Science and Systems Engineering, Kyushu Institute of Technology; ⁴CompuTherm LLC; ⁵National Taiwan University of Science and Technology

J-95: Generalized Planar Fault Energies and Twinning in NbMoTaW BCC High Entropy Alloy: A First-principles Study: Abu Anand¹; Chandra Singh¹; ¹University of Toronto

J-97: High Temperature Creep Behavior of AlZrCrMoNbTi High Entropy Alloy Using the Spark Plasma Sintering (SPS) System: Faris Sweidan¹; Ho Jin Ryu¹; ¹KAIST, Korea

J-98: Homogenous Structure Formation in FeCoNiCrMo High Entropy Alloy: Ismael Hidalgo¹; Lin Li²; Feng Yan²; Xiao Han²; ¹University of Puerto Rico at Mayagüez; ²University of Alabama

J-99: Imaging Short Range Order in The CrCoNi Medium Entropy Alloy: Ruopeng Zhang¹; Shiteng Zhao¹; Jun Ding²; Yan Chong¹; Qin Yu²; Colin Ophus²; Mark Asta²; Robert Ritchie²; Andrew Minor²; ¹University of California, Berkeley; ²Lawrence Berkeley National Laboratory

J-101: Influence of Compositional Complexity on Helium Accumulation and Bubble Formation in Concentrated Solid Solution Alloys: Shaofei Liu¹; Da Chen¹; Ji-jung Kai¹; ¹City University

of Hong Kong

J-102: In-situ Neutron Diffraction Study on Stress-induced Phase Transformation in TiZrHfNbx Refractory High-entropy Alloys: *Xuesong Fan*¹; Yan Chen²; Ke An²; Peter Liaw¹; ¹University of Tennessee; ²Oak Ridge National Laboratory

J-103: Investigating BCC Refractory Multi-principal Element Alloys by Heaviside Digital Image Correlation: *Leah Mills*¹; Jean-Charles Stinville¹; Marie-Agathe Charpagne¹; Valery Valle²; Noah Philips³; Oleg Senkov⁴; Tresa Pollock¹; ¹University of California, Santa Barbara; ²Institut PPrime; ³ATI Specialty Materials and Components; ⁴Air Force Research Laboratory

J-104: Mechanical and Biocompatibility Evaluation of MoxNbTaxTiZr High and Medium Entropy Alloys for Biomedical Implants: Muhammad Akmal¹; *Ho Jin Ryu*¹; ¹KAIST, Korea

J-105: Mechanical Properties and Deformation Behavior of NiTi-Based Low-, Medium- and High-Entropy Intermetallic Compounds at Different Temperatures: *Cheng-Yuan Tsai*¹; Chi-Huan Tung¹; Shou-Yi Chang¹; ¹National Tsing Hua University

J-106: Mechanical Properties and Discrete Slip Events in Conventional Alloys and High-entropy Alloys at Different Temperatures: *Chun-Yi Chen*¹; Chi-Huan Tung¹; Shou-Yi Chang¹; ¹National Tsing Hua University

J-107: Mechanical Properties and Thermal Stability of Single-Target Deposited Ta-Ti-Zr-Based Quinary High-Entropy Alloy and Nitride Coatings: *Chin-Chun Chang*¹; Chia-Ying Yeh¹; Hsiang-Ming Lai¹; Yu-Ting Hsiao¹; Shou-Yi Chang¹; ¹National Tsing Hua University

J-108: Microalloying Technology: an Attractive Strategy for the Design of High-entropy Alloys: *Wenyi Huo*¹; Feng Fang¹; Jianku Shang²; Jianqing Jiang¹; ¹Southeast University; ²University of Illinois at Urbana-Champaign

J-109: Microstructure and Magnetic Behavior of FeCoNi(Mn–Si)_x (x=0.5,0.75,1.0) High-entropy Alloys: *Priyanka Sahu*¹; Suresh Solanki²; Sheetal Dewangan¹; Vinod Kumar¹; ¹Indian Institute of Technology Indore; ²Global Institute of Technology, Jaipur, India

J-110: Microstructure and Mechanical Properties of an Equiatomic CoCrFeMnNi High Entropy Alloys Fabricated by Gas Atomization: *Cheenepalli Nagarjuna*¹; Kwang Yong Jeong¹; Hyeon Jeong You¹; Gian Song¹; Jin Kyu Lee¹; Soon Jik Hong¹; ¹Kongju National University

J-111: Microstructure and Mechanical Properties of Non-

equiatomic Fe-Mn-Ni-Cr-Co-Al-Ti Septenary High Entropy Alloy: *S. Varalakshmi*¹; Yagnesh Shadangi¹; R. Manna¹; N. K. Mukhopadhyay¹;
¹Indian Institute of Technology (BHU) Varanasi

J-112: Microstructure and Tribological Behavior of Non-equiatomic Ti-Zr-Cr-Al-Si-V and Ti-Zr-Cr-Al-Si-V-Nb Refractory High Entropy Alloys: *Harsh Jain*¹; Yagnesh Shadangi¹; Vikas Shivam¹; Nilay Mukhopadhyay¹; Devendra Kumar¹; ¹IIT BHU

J-113: Microstructure Characterization of Oxide Dispersion Strengthened CoCrFeMnNi High Entropy Alloy Synthesized by Cryo-milling and Spark Plasma Sintering: *SeungHyeok Chung*¹; Bin Lee²; Soo Yeol Lee³; Ho Jin Ryu¹; ¹KAIST; ²KITECH; ³CNU

J-114: Microstructure Evolution and Enhanced Strength in CoCrFeMnNi Alloy through High Speed Shear Loading: *Toru Murata*¹; Nobuhiro Imakura¹; Alok Singh²; Ivan Gutierrez-Urrutia²; Koichi Tsuchiya²; Naoko Ikeo¹; Toshiji Mukai¹; ¹Department of Mechanical Engineering, Graduate School of Engineering, Kobe University; ²National Institute for Materials Science (NIMS)

J-115: New Approaches for Exploration of Refractory Multi-principal Element Alloys: *Carolina Frey*¹; Chris Borg²; James Saal²; Bryce Meredig²; Daniel Miracle³; Tresa Pollock¹; ¹University of California, Santa Barbara; ²Citrine Informatics; ³Air Force Research Laboratory

J-116: On the Phase Transformation and Dynamic Stress-strain Partitioning of Ferrous Medium-entropy Alloy Using Integrated Analysis: *Jae Wung Bae*¹; Jaimyun Jung¹; Jung Gi Kim²; Jeong Min Park¹; Stefanus Harjo³; Takuro Kawasaki³; Hyoung Seop Kim¹; ¹POSTECH; ²Gyeongsang National University; ³Japan Proton Accelerator Research Complex

J-117: Overcoming Strength-ductility Trade-off in Additively Manufactured 1%C-CoCrFeMnNi High-entropy Alloy Induced by Hierarchically Heterogeneous Microstructure: *Jeong Min Park*¹; Jung Gi Kim²; Jungho Choe³; Jae Wung Bae¹; Jongun Moon¹; Ji-Hun Yu³; Hyoung Seop Kim¹; ¹POSTECH; ²Gyeongsang National University; ³Korea Institute of Materials Science

J-118: Oxidation Behavior of Al₄Co₃Cr₂₅Cu₁₀Fe₂₅Ni₃₃ at High Temperature: *Ching-Nien Tsai*¹; Feng-Yi Cho¹; Fan-Yi Ouyang¹;
¹National Tsing Hua University

J-119: Partitioning Behavior Based Design of BCC / B2 Dual-phase Refractory Multi-principal Element Alloys: *Hosun Jun*¹; Pyuck-Pa Choi¹; Zhiming Li²; Dierk Raabe²; ¹Korea Advanced Institute of Science and Engineering (KAIST); ²Max-Planck-Institut

für Eisenforschung GmbH

J-120: Phase Field Dislocation Dynamics Modeling of Refractory High Entropy Alloys: *Lauren Smith*¹; Shuozhi Xu¹; Yanqing Su¹; Abigail Hunter²; Irene Beyerlein¹; ¹University of California, Santa Barbara; ²Los Alamos National Laboratory

J-121: Phase Stability and Defect Properties of fcc FeCrMnNi HEAs: *Mark Fedorov*¹; Jan Wróbel¹; Antonio Fernández-Caballero²; Krzysztof Kurzydłowski³; Duc Nguyen-Manh⁴; ¹Faculty of Materials Engineering, Warsaw University of Technology; ²EPSRC Centre for Doctoral Training in Materials for Demanding Environments, Faculty of Science and Engineering, University of Manchester; ³Faculty of Mechanical Engineering, Bialystok University of Technology; ⁴Culham Centre for Fusion Energy, United Kingdom Atomic Energy Authority

J-122: Phase Stability and Microstructural Evolution in Refractory High Entropy Superalloy: *Sangjun Kim*¹; Hyunseok Oh¹; Kook Noh Yoon¹; Eun Soo Park¹; ¹Seoul Nation University

J-123: Phase Stability of a Group of fcc-structured Medium-entropy Alloys Under High Pressure and High Temperature: *Fei Zhang*¹; Hongbo Lou¹; Yuan Wu²; Zhaoping Lu²; Qiaoshi Zeng¹; ¹Center for High Pressure Science & Technology Advanced Research; ²University of Science and Technology Beijing (USTB)

J-124: Physical Origin of Mechanical Behavior of NbTaTiV(Zr) High Entropy Alloy from First-principles Simulations: *Qi An*¹; Jing Zhang¹; Hongwei Wang¹; Chan-Ho Lee²; Peter Liaw²; ¹University of Nevada, Reno; ²The University of Tennessee

J-125: Preparation of CoCrFeNi High-entropy Alloy via Electro-deoxidation of Metal Oxides: *Yu Yang*¹; Tongxiang Ma¹; Mengjun Hu¹; Pengjie Liu¹; Liangying Wen¹; Liwen Hu¹; Meilong¹; ¹Chongqing University

J-126: Significance of Grain Refinement in HfNbTiZr and CoCrFeNi High-entropy Alloys: *Wenrui Zhao*¹; Jae-Kyung Han¹; Megumi Kawasaki¹; ¹Oregon state Univesity

J-127: Solute and Self-diffusion in HCP High Entropy Alloys: *Sandipan Sen*¹; Mayur Vaidya¹; Xi Zhang²; Lukasz Rogal³; Blazej Grabowski⁴; Gerhard Wilde¹; Sergiy Divinski¹; ¹University of Münster; ²Max-Planck-Institut für Eisenforschung GmbH; ³Institute of Metallurgy and Materials Science of the Polish Academy of Sciences; ⁴University of Stuttgart

J-128: Stress Corrosion Cracking Mechanism of FCC Type High-entropy Alloys Structural Materials under High Temperature

Pressurized Water Environment by Molecular Dynamics Simulation: *Chang Liu*¹; Qian Chen¹; Yang Wang¹; Narumasa Miyazaki¹; Yusuke Ootani¹; Nobuki Ozawa¹; Momoji Kubo¹; ¹Tohoku University

J-129: Structural Evolution and Thermal Stability of Nanocrystalline High Entropy Alloy through Cryomilling: *Harshavardhan Saragadam*¹; Yagnesh Shadangi¹; Bhaskar Majumdar²; Nilay Krishna Mukhopadhyay¹; ¹IIT(BHU)-VARANASI; ²Defence Metallurgical Research Laboratory, Hyderabad

J-130: Synthesis and Phase Stability of High-entropy Nitrides and Carbonitrides: *Olivia Dippo*¹; Tyler Harrington¹; Neda Mesgarzadeh¹; Kenneth Vecchio¹; ¹University of California, San Diego

J-131: Temperature Dependence of Structural and Magnetic Properties of Single-crystal CoCrFeNiMn-based Alloys: *Guo-Yu Hung*¹; Yao-Jen Chang²; Chi-Hung Lee³; Yi-Jia Chen⁴; Uwe Glatzel⁵; An-Chou Yeh²; Wen-Hsien Li³; Ssu-Yen Huang⁴; Nadya Mesti¹; Bo-Hong Lai¹; Tu-Ngoc Lam¹; E-Wen Huang¹; ¹National Chiao Tung University; ²National Tsing Hua University; ³National Central University; ⁴National Taiwan University; ⁵University Bayreuth, Bayreuth

J-132: The Development of High Performance Hybrid High Entropy Alloys(HEAs): *Weicheng Heng*¹; Daixiu Wei¹; Hidemi Kato¹; Akihiko Chiba¹; ¹Institute of Materials Research, Tohoku University

J-133: Theoretical and Experimental Investigation of Phase Structure and Mechanical Property Dependence on Composition in Nb-Ti-V-Zr Multi-principal Element Alloys: *Mu Li*¹; Zhaohan Zhang¹; Arashdeep Thind¹; Rohan Mishra¹; Katharine Flores¹; ¹Washington University in St. Louis

J-134: Tuning Microstructure of Refractory High-entropy Alloys via Controlling Cooling Rates: *Hailong Huang*¹; Zhaoping Lu¹; ¹University of Science and Technology Beijing

J-135: Wire +Arc Additive Manufacturing of AlCoCrFeNi High Entropy Alloy: *Rumman Ul Ahsan*¹; Gi-Jeong Seo¹; A. N. M. Tanvir¹; Yousub Lee²; P. K. Liaw³; Duck Bong Kim¹; ¹Tennessee Technological University; ²Oak Ridge National Laboratory; ³The University of Tennessee, Knoxville

MATERIALS DESIGN

ICME Gap Analysis in Materials Informatics: Databases, Machine Learning, and Data-Driven Design — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: James Saal, Citrine Informatics; Carelyn Campbell, National Institute of Standards and Technology; Raymundo Arroyave, Texas A&M University

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L-18 (Invited): Multi-fidelity Surrogate Assisted Framework for Prediction and Control of Meltpool Geometry in Additive Manufacturing Processes: Sudeepta Mondal¹; Daniel Gwynn¹; Asok Ray¹; *Amrita Basak*¹; ¹Pennsylvania State University

L-19: Data-driven Hard-magnetic Materials Selection for AC Applications by Multiple Attribute Decision Making: Sunny Pinnam¹; Alex Paul¹; *Tanjore Jayaraman*¹; ¹University of Michigan-Dearborn

L-20: Data Driven Prediction of Crystallographic Attributes of Small Molecules Using Various Molecular Fingerprints: *Piyush Karande*¹; Peggy Li¹; Soo Kim¹; Joanne Kim¹; Hyojin Kim¹; Donald Loveland¹; T. Yong-Jin Han¹; ¹Lawrence Livermore National Laboratory

L-21: Deep learning Image Analysis for Lattice Material Qualification: Ben White¹; *Anthony Garland*¹; Brad Boyce¹; Bradley Jared¹; David Saiz¹; Michael Heiden¹; Matthew Roach¹; David Moore¹; ¹Sandia National Laboratories

L-22: Effect of Microtextured Regions on the Deformation Behavior of Titanium Alloys Submitted to Monotonic and Cyclic Loadings Investigated using FFT-EVP Simulations: *Azdine Nait-Ali*¹; Samuel Hemery¹; ¹Ensma

L-23: Identification of Fatigue Crack Nucleation Mechanics Using Bayesian Inference: *Maxwell Pinz*¹; George Weber¹; Somnath Ghosh¹; ¹Johns Hopkins University

L-24: Mapping Depletion Zone of High Nitrogen Stainless Steel Cr2N Using STEM-EDS: An Application of Multi-variate Statistical Analysis: *Juyoung Kim*¹; Jee-Hwan Bae²; Hong Kyu Kim²; Jaeyoung Hong²; Gyeung Ho Kim²; Kyu Hyoung Lee¹; Dong Won Chun²;

¹Yonsei University; ²Korea Institute of Science and Technology

L-25: Multi-class Inclusion Identification via Machine Learning of Multilevel Image Features: *Nan Gao*¹; Mohammad Abdulsalam¹; Bryan Webler¹; Elizabeth Holm¹; ¹Carnegie Mellon University

L-26: Prediction of Temperature After Cooling in Coils Using Machine Learning and Finite Element Method: *Hyeok Jae Jeong*¹; Seonghwan Kim¹; Nam Hoon Goo¹; ¹Hyundai steel

L-27: Uncertainty Quantification in Metallic Additive Manufacturing Through Physics-informed Data-driven Modeling with Experimental Validation: *Lei Chen*¹; Zhuo Wang²; Zhen Hu¹; Sankaran Mahadevan³; ¹University of Michigan-Dearborn; ²Mississippi State University; ³Vanderbilt University

MATERIALS PROCESSING

Low-cost Titanium: 'Affordable Ti' — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: Titanium Committee, TMS: Powder Materials Committee

Program Organizers: Ramana Reddy, University of Alabama; M. Ashraf Imam, George Washington University

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Session Chairs: Ashraf Imam, George Washington University; Ramana Reddy, The University of Alabama

M-62: Direct Fabrication of Strong and Ductile Ti-6Al-4V Alloy by Hot Pressing of the Machining Swarf: *Fei Yang*¹; ¹Waikato University

M-63: Effect of Sintering Temperature on Mechanical and Tribological Behavior of Ti-Ni Alloy for Biomedical Applications: *Fellah Mamoun*¹; Hezil Naouel¹; Touhami Mohammed Zine²; Mohamed Abdrabou Hussein³; Alex Montagne⁴; Alberto Mejias⁴; Alain Iost⁴; Stephania Kosman⁴; Timofey Chekalkin⁵; Aleskei Obrosoy⁶; Sabine Wiess⁶; ¹Abbes Laghrour University; ²Tribology and Materials Group, Laboratory of Foundry, BADJI Mokhtar University BO; ³KFUPM; ⁴LABO MSMP Ecole Nationale Supérieure Arts et Métiers Paris Tech Lille; ⁵Research Institute of Medical Materials, Tomsk State University; ⁶Department of Physical Metallurgy and Materials Technology, Brandenburg Technical

University

M-64: Powder Metallurgy Fabrication, Microstructures and Tensile Mechanical Properties of Low Cost and High Performance Ti and Ti-6Al-4V Alloy Parts and Structural Members: *Deliang Zhang*¹; Yifeng Zheng²; Rui Wang¹; Junkun Yue¹; Yifei Luo²; Hongzhi Niu¹; Jiamiao Liang²; ¹Northeastern University; ²Shanghai Jiao Tong University

M-65: Refinement of PEG/PMMA Binder Systems for Metal Injection Molding of Titanium: *Peng Cao*¹; Muhammed Hayat¹; ¹University of Auckland

CHARACTERIZATION

Material Behavior Characterization via Multi-Directional Deformation of Sheet Metal — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

Program Organizers: Daniel Coughlin, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Piyush Upadhyay, Pacific Northwest National Laboratory; John Carsley, Novelis, Inc.

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K-137 (Invited): Understanding Room Temperature Softening Behavior in AA5182: Atish Ray¹; *John Carsley*¹; DaeHoon Kang¹; ¹Novelis Inc.

MATERIALS DESIGN

Materials Design Approaches and Experiences V — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Akane Suzuki, GE Research; Ji-Cheng Zhao, University of Maryland; Michael Fahrmann, Haynes International; Qiang Feng, University of Science and Technology Beijing; Michael Titus, Purdue University

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L-28 (Invited): Integrated Study of First-principles Calculations and Experimental Measurements for Hydrogen Effect on FCC to HCP Martensitic Transformation: *Satoshi Iikubo*¹; Kenji Hirata¹; Y. Kuroki¹; Shoya Kawano¹; Hiroshi Ohtani¹; Motomichi Koyama¹; Kaneaki Tsuzaki¹; ¹Kyushu Institute of Technology

MATERIALS PROCESSING

Materials Processing Fundamentals — Poster Session

Sponsored by: TMS Extraction and Processing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Jonghyun Lee, Iowa State University; Guillaume Lambotte, Boston Metal; Sam Wagstaff, Novelis Inc.; Antoine Allanore, Massachusetts Institute of Technology; Fiseha Tesfaye, Abo Akademi University

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Session Chair: Jonghyun Lee, Iowa State University

M-66:EffectsofWeldingConditionsandPostWeldHeatTreatment on Precipitation ofWidmanstätten-austenite of Duplex Stainless Steels: *Yunxing Xia*¹; Xiaofu Zhang¹; Fumikau Miyasaka¹; Hiroaki Mori¹; ¹Osaka University

M-67: Evaluation of Mechanical Properties of Welded Zn-Coated Steel Using Tandem MAG Welding Process: *Jaesoo Lee*¹; Jong-Deok Seo¹; Dong-Yoon Kim²; Munjin Kang²; ¹Shin Young Co., Ltd.; ²Korea Institute of Industrial Technology

M-68: Experimental and Numerical Investigation on Surface

Damage of Cold Rolled Sheet Caused by Inclusion Movement: *Xin Li*¹; ¹University of Science and Technology Beijing

M-69: Heterogeneous Grain Microstructure Reducing/ Eliminating Edge Breaks in Low Carbon Steels: *Tihe Zhou*¹; Hatem Zurob²; Peng Zhang³; Sang Hyun Cho³; ¹Stelco Inc.; ²McMaster University; ³Algoma Inc.

M-70: Investigation on the Flow Field of Molten Steel in Ultrahigh-speed Billet Continuous Casting Mold: *Pei Xu*¹; *Dengfu Chen*¹; Peng Liu¹; Qinzheng Wang¹; Mujun Long¹; Huamei Duan¹; Jie Yang¹; Qimin Wang¹; ¹Chongqing University

M-71: Machine Learning Approaches for Prediction Mechanical Properties of Austenitic Stainless Steels: *Liping Yang*¹; Sen Liu²; ¹Sichuan University of Arts and Science; ²Other

M-72: Morphological and Thermal Analysis of Peruvian Residues from a Sludge Site of an Integrated Steel Plant: *Mery Gomez-Marroquin*¹; Kim Phatti - Satto²; Abraham Terrones - Ramírez²; ¹APMMM/UNI; ²UNI

M-73: Numerical Study of Inclusion Removal in Gas Stirred and Electromagnetically Stirred Ladles: *Xipeng Guo*¹; Joshua Vandenoever¹; Nicholas Walla¹; Armin Silaen¹; *Chenn Zhou*¹; ¹Purdue University Northwest

M-74: Ordered Arrangements of BaTiO₃ Powders of Cubic Morphologies: *Maritza Sanchez*¹; Olivia Graeve¹; ¹University of California, San Diego

M-76: Roll Forming of Aluminum 7075-T6 Alloy for an Automotive Bumper Beam: *Taekyung Kim*¹; Geun-Ho Kim¹; Sang-Kyo Lee²; Seogou Choi²; Jongsup Lee²; ¹Asan Co., Ltd.; ²Korea Institute of Industrial Technology

M-77: Thermodynamic Properties of Layered Tetradymite-like Compounds of the Ag–Ge–Sb–Te System: *Mykola Moroz*¹; *Fiseha Tesfaye*²; Pavlo Demchenko³; Myroslava Prokhorenko⁴; Daniel Lindberg⁵; Oleksandr Reshetnyak³; Leena Hupa²; ¹National University of Water and Environmental Engineering; ²Åbo Akademi University; ³Ivan Franko National University of Lviv; ⁴Lviv Polytechnic National University; ⁵Aalto University

M-78: Weld Quality Prediction by a Pattern Recognition Neural Network of the External Appearance Image in the 3rd Generation AHSS Steel Sheets: *Munjin Kang*¹; In-sung Hwang¹; Young-Min Kim¹; Dongcheol Kim¹; ¹Korea Institute of Industrial Technology

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale V — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee, TMS: Nanomechanical Materials Behavior Committee

Program Organizers: Christopher Weinberger, Colorado State University; Megan Cordill, Erich Schmid Institute; Garritt Tucker, Colorado School of Mines; Wendy Gu, Stanford University; Scott Mao, University of Pittsburgh; Yu Zou, University of Toronto

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Session Chair: Christopher Weinberger, Colorado State University

N-4 (Digital): Interface Diffusion and Thermodynamics Measured via High Temperature In-situ Mechanical Testing: *Shen Dillon*¹; ¹University of Illinois

N-5: A Novel Bimodal Microstructure for Improved Fatigue Resistance: *Wenwu Xu*¹; Ken Ramirez¹; Rachell Lee¹; Sharier Hasan¹; ¹San Diego State University

N-6: Atomistic Modeling of Fundamental Deformation Mechanisms in MAX Phases: *Gabriel Plummer*¹; Garritt Tucker¹; ¹Colorado School of Mines

N-7: Effect of Additional Elements on Deformation Mechanism of -TiAl: *Ji Young Kim*¹; Jong-hun Kim²; Jae-Kwon Kim²; Taegu Lee³; Seung-Hwa Ryu³; Dong-chan Jang³; Eun Soo Park⁴; Seong-Woong Kim²; Seung-Eon Kim²; ¹Korea Institute of Materials Science; Seoul National University; ²Korea Institute of Materials Science; ³Korea Advanced Institute of Science and Technology; ⁴Seoul National University

N-9: Grain Boundary Engineering Leading to Enhanced Mechanical Properties of Superhard Boron Carbide: *Qi An*¹; Dezhou Guo¹; Kolan Reddy²; ¹University of Nevada, Reno; ²Shanghai Jiao Tong University

N-10: Highly-impermeable and Stretchable Encapsulation with Wavy Structure: *Hangeul Kim*¹; Na-Hyang Kim¹; Hansol Jeon¹; Han Gi Chae¹; Ju-Young Kim¹; ¹UNIST

N-11: In-situ Tensile Test in TEM for High Precision Measurement

of Mechanical Behavior and Quantitative Dislocation Motion Correlation with Single Crystal Ni: *Xiaoqing Li*¹; John Turner²; Karen Bustillo²; Rohan Dhall²; Andrew Minor¹; ¹University of California, Berkeley; ²Lawrence Berkeley National Laboratory

N-12: Interfacial Mechanics and Reconstruction on Graphene-metal Surfaces: *Kaihao Zhang*¹; Mitisha Surana¹; Ganesh Ananthakrishnan¹; Matthew Poss¹; Pascal Pochet²; Harley Johnson¹; Sameh Tawfick¹; ¹University of Illinois Urbana Champaign; ²Institute for Nanoscience and Cryogenics

N-13: Mechanical Properties of Electrochemically Lithiated Tin: *Chung Su Hong*¹; Seung Min Han¹; ¹KAIST

N-14: Microstructural Analysis and Mechanical Behavior of Ultrafine-grained Ni-Y-Zr Alloys: *Shruti Sharma*¹; Samuel Moehring¹; Pedro Peralta¹; ¹Arizona State University

N-16: Pseudoelastic Response and Shape Memory Behavior in Ceramic Materials: *Hamed Hosseini-Toudeshki*¹; Steven Herrera²; David Kisailus²; Olivia Graeve¹; ¹University of California, San Diego; ²University of California, Riverside

N-17: Role of Tantalum Concentration and Processing Temperature on Tensile Behavior of Nanocrystalline Copper-tantalum Alloys: *Soundarya Srinivasan*¹; Chaitanya Kale¹; Scott Turnage¹; Billy Hornbuckle²; Kris Darling²; Kiran Solanki¹; ¹Arizona State University; ²US Army Research Laboratory

N-18: Strength Recovery in Self-healed Nanoporous Gold: Eun-Ji Gwak¹; *Hansol Jeon*¹; Ju-Young Kim¹; ¹UNIST

N-19: Stress-strain Responses from Small Scale Testing (Nanoindentation, In-situ Micro-compression, Micro-tension) in Pure Magnesium: *Skye Supakul*¹; Tolin Skov-Black¹; Keenan O'Neill¹; Scout Garrison¹; Job Rodriguez¹; Josiah Dowell¹; ¹University of Nevada, Reno

N-20: Thickness-dependent Elastic Deformation Limit of Thermally-grown SiO₂ Thin Films: *Na-Hyang Kim*¹; Hangeul Kim¹; Ju-Young Kim¹; ¹Ulsan National Institute of Science and Technology

N-21: Ultra-strong and Ductile Nb-nanowire/NiTi-based-matrix Nanocomposite via Strain Induced Transformation: *Yuxuan Chen*¹; Kaiyuan Yu¹; Lishan Cui¹; ¹China University of Petroleum Beijing

MATERIALS DESIGN

Metastable Phases and Phase Equilibria: Towards Designing

the Next Generation of Alloys — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

Program Organizers: Bij-Na Kim, Carpenter Additive; Rajarshi Banerjee, University of North Texas; Gregory Thompson, University of Alabama; Eric Lass, University of Tennessee, Knoxville; Mohsen Asle Zaeem, Colorado School of Mines; Mark Aindow, University of Connecticut; Peeyush Nandwana, Oak Ridge National Laboratory; Dinc Erdeniz, Marquette University; Andrew Bobel, General Motors

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L-29: A New Metastable Ti Alloys with High Elastic Admissible Strain and Enhanced Ductility for Orthopaedic Application: Yidong Xu¹; Junheng Gao¹; Yuhe Huang¹; Mark Rainforth¹; ¹University of Sheffield

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Poster Session

Sponsored by: The Mining and Materials Processing Institute of Japan, Nonferrous Metals Society of China, GDMB: The Society for Mining, Metallurgy Resources and Environmental Technology, Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy & Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recylex; Cheng Liu, China Enfi Engineering Corporation; Etsuro Shibata, IMRAM, Tohoku University

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M-79: Reaction Mechanism on A Novel Enhanced Smelting Technique for Lead-acid Battery Paste Recycling: *Wei Jin*¹;
¹Central South University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

Program Organizers: Yufeng Zheng, University of Nevada, Reno; Rongpei Shi, Lawrence Livermore National Laboratory; Stoichko Antonov, University of Science and Technology Beijing; Yipeng Gao, Idaho National Laboratory; Rajarshi Banerjee, University of North Texas; Yongmei Jin, Michigan Technological University

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O-33 (Invited): HyMARC Multiscale Modeling Approaches for Investigating Thermodynamic and Kinetic Phase Behaviors of Metal Hydrides: *Tae Wook Heo*¹; *ShinYoung Kang*¹; *Xiaowang Zhou*²; *Rongpei Shi*¹; *Brandon Wood*¹; ¹Lawrence Livermore National Laboratory; ²Sandia National Laboratories

O-34: Abnormal Temperature Dependence of Critical Transition Stress in Nanocrystalline NiTi Shape Memory Alloys: *Taotao Wang*¹; *Kaiyuan Yu*¹; *Lishan Cui*¹; ¹China University of Petroleum, Beijing

O-35: Bainite Formation during Zinc Galvanizing on Steel: *Bong-Kyu Kim*¹; *Jun Hyun Han*¹; ¹Chungnam National University

O-36: Carbon and Microstructure Effects on the Magnetic Properties of Fe-CN Soft Magnetic Materials (Minnealloy): *Guannan Guo*¹; *Jinming Liu*¹; *Jian-Ping Wang*¹; ¹University of Minnesota

O-37: Carbonation Behavior of Calcium Aluminate Cements with Additions of Silica: *John Zapata*¹; *Henry Colorado*¹; ¹Univ De Antioquia

O-38: Dealloyed High-strength Metallic Coatings: *Bernard Gaskey*¹; *Ian McCue*²; *Michael Brupbacher*²; *Jonah Erlebacher*³; ¹Nanyang Technological University; ²Johns Hopkins University

Applied Physics Laboratory; ³Johns Hopkins University

O-39: Dilatometric Analysis of the Martensite Decomposition by Stages during Continuous Heating: *Perla Díaz-Villaseñor*¹; Octavio Vázquez-Gómez¹; Eliuth Barrera-Villatoro¹; Héctor Vergara-Hernández¹; Edgar López-Martínez²; Bernardo Campillo-Illanes³; ¹Tecnológico Nacional de México / I.T. Morelia; ²Universidad del Istmo; ³Universidad Nacional Autónoma de México

O-40: Enhanced Chalcopyrite Bioleaching by Combined Catalysis of Activated Carbon and Visible Light: *Mo Lin*¹; Shitong Liu¹; Hao Lin¹; Baojun Yang¹; Jun Wang¹; Guanzhou Qiu¹; ¹Central South University

O-41: Enhanced Toughness of Nanograined Metallic Thin Films on Flexible NiTi Shape Memory Alloy Substrates: *Gan Zhang*¹; Kaiyuan Yu¹; Taotao Wang¹; ¹China University of Petroleum-Beijing

O-42: Hierarchical Microstructure Enhanced Comprehensive Mechanical Properties in Ti-Alloys: *Mengyuan Hao*¹; Dong Wang¹; Qiaoyan Sun¹; Pei Li¹; Tianlong Zhang¹; Yunzhi Wang¹; ¹Xi'an Jiaotong University

O-43: High-pressure Synthesis of HCP Nickel from a Metallic Glass: *Abhinav Parakh*¹; Mehrdad Kiani¹; David Doan¹; X. Wendy Gu¹; ¹Stanford University

O-45: JMA Model Application to Elucidate the Kinetic Parameters in a Silicon Steel during Continuous Heating: *Alexis Gallegos-Pérez*¹; Octavio Vázquez-Gómez¹; José López-Soria¹; Héctor Vergara-Hernández¹; Pedro Garnica-González¹; ¹Tecnológico Nacional de México / I.T. Morelia

O-46: Microstructural Evolution during Solidification of Ternary Eutectic Al-Cu-Mg: *Dominic Ezemenaka*¹; Amber Genau¹; Christian Patino¹; ¹University of Alabama, Birmingham

O-47: Quasi-linear Superelasticity with Ultralow Modulus Induced by Nanoscaled Martensitic Phase Transition: *Shuangshuang Zhao*¹; Qianglong Liang¹; Chuanxin Liang¹; Dong Wang¹; Yuanchao Ji¹; Yu Wang¹; Xiaobing Ren¹; Yunzhi Wang¹; ¹Xi'an Jiaotong University

O-48: The Interaction of Point Defects with Stress Fields Generated by Persistent Slip Bands in f.c.c. Nickel: *Leslie Mushongera*¹; Pankaj Kumar¹; Michael Sangid²; ¹University of Nevada, Reno; ²Purdue University

Progress towards Understanding the Synthesis and Behavior of Metals Far from Equilibrium: A SMD Symposium Honoring Enrique Lavernia on the Occasion of His 60th Birthday — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Composite Materials Committee

Program Organizers: Haiming Wen, Missouri University of Science and Technology; Suveen Mathaudhu, University of California, Riverside; Yuntian Zhu, North Carolina State University; Manoj Gupta, National University of Singapore; Kaka Ma, Colorado State University; Troy Topping, California State University, Sacramento; Yizhang Zhou, University of California, Irvine; Joshua Yee, Sandia National Laboratories; Dalong Zhang, Pacific Northwest National Laboratory; Yaojun Lin, Wuhan University of Technology; Fei Chen, Wuhan University of Technology

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J-136: Microstructure and Mechanical Properties of 6082 Al based Hybrid Nanocomposites Reinforced with CNTs and Al-Cu-Fe Quasicrystals: *Sakshi Sharma*¹; Ketan Ganne²; Yagnesh Shadangi¹; Bhaskar Majumdar³; Nilay Mukhopadhyay⁴; ¹Department of Metallurgical Engineering Indian Institute of Technology (Banaras Hindu University); ²Department of Metallurgical Engineering Indian Institute of Technology (Banaras Hindu University); Applied Materials India, Pvt Ltd, Bangalore, India; ³Defence Metallurgical Research Laboratory, Hyderabad, India; ⁴Department of Metallurgical Engineering Indian Institute of Technology (Banaras Hindu University)

MATERIALS PROCESSING

Rare Metal Extraction & Processing — Poster Session

Sponsored by: TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee

Program Organizers: Gisele Azimi, University of Toronto; Takanari Ouchi, The University of Tokyo; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Kerstin Forsberg, KTH Royal Institute of Technology; Alafara Baba, University of Ilorin

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Session Chairs: Gisele Azimi, University of Toronto; Kerstin Forsberg, KTH Royal Institute of Technology

M-80: A Novel Depressant of Sodium Polyacrylate for Magnesite Flotation: *Hongwei Cheng*¹; Changmiao Liu¹; Dong Dong¹; Zihu Lv¹; Fei Yang¹; ¹Zhengzhou Institute of Multipurpose Utilization of Mineral Resources CAGS

M-81: Dissolution Behavior of Calcium Vanadates and Magnesium Vanadates in Sulfuric Acid: *Xin Wang*¹; Junyi Xiang¹; Qingyun Huang²; Xuewei Lv¹; ¹College of Materials Science and Engineering, Chongqing University; ²College of Metallurgical and Materials Engineering, Chongqing University of Science and Technology

M-82: PRICE - PProcess Industries in the Circular Economy: *Dag Eriksen*¹; ¹University of Oslo, Norway

PHYSICAL METALLURGY

Solid State Diffusion Bonding of Metals and Alloys — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Mohamed Elbakhshwan, University of Wisconsin Madison; Mark Anderson, University of Wisconsin Madison; Todd Allen, University of Michigan ; Tasnim Hassan, North Carolina State University

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Session Chairs: Mohamed Elbakhshwan, UW-Madison; Heramb Mahajan, North Carolina State University

O-49: Joining of 14YWT Ferritic ODS Alloys by Spark Plasma Technique: *Madhavan Radhakrishnan*¹; Elisa Torresani²; Eugene Olevsky²; Stuart Maloy³; Osman Anderoglu¹; ¹University of New Mexico; ²San Diego State University; ³Los Alamos National Laboratory

O-50: Optimization and Prediction of Bond Characteristics of Ti6Al4V Diffusion Bonded Joints through RSM: *Pragatheswaran T*¹; Rajakumar S¹; Balasubramanian V¹; Vijay Petley²; Shweta Verma²; ¹Annamalai University; ²Gas Turbine Research Establishment

O-51: Solid State Diffusion Bonding of ODS Eurofer Steel by Spark Plasma Sintering: *J. Fu*¹; J.C. Brouwer¹; I.M. Richardson¹; M.J.M. Hermans¹; ¹Delft University of Technology

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XI) — Poster Session I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Caizhi Zhou, Missouri University of Science and Technology; Megumi Kawasaki, Oregon State University; Enrique Lavernia, University of California, Irvine; Terry Lowe, Colorado School of Mines; Suveen Mathaudhu, University of California, Riverside; Ruslan Valiev, UFA State Aviation Technical University; Yuntian Zhu, North Carolina State University

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N-22: A Comparative Study of Cu/Ta and Ti/Ta Multilayer Composites Processed by Accumulative Roll Bonding: *Liya Semenchenko*¹; Ryan Mier²; Michael Demkowicz¹; ¹Texas A&M University; ²Los Alamos National Laboratory

N-23: Bulk High Strength Ultrafine Grained Silver Alloys via Powder Metallurgical Approaches: *Erik Sease*¹; Evander Ramos¹; Vladilen Gaisina²; Suveen Mathaudhu¹; ¹University of California

Riverside; ²QuesTek

N-24: Deformation Induced Grain Boundary Segregation in Nanolaminated Al-Cu Alloy: *Wei Xu*¹; XiaoChun Liu¹; XiuYan Li¹; Ke Lu¹; ¹Institute of Metal Research Chinese Academy of Sciences

N-25: Deformation Mechanism and Mechanical Properties of Nano/Ultrafine Grained and Heterogeneous Fe-17Cr-6Ni Austenitic Steel: *Xiangtao Deng*¹; Chengshuai Lei¹; Zhaodong Wang¹; ¹Northeastern University

N-27: Effect of Severe Plastic Deformation on Mechanical Properties of Al6061: *Vagish Mishra*¹; Karthik Palaniappan¹; Balkrishna Rao¹; Murthy H.¹; ¹Indian Institute of Technology Madras

N-28: Enhanced Mechanical Properties of Nano/Ultrafine-grained Structure Formed by Martensite Reversion in 18Cr-8Ni Austenitic Stainless Steel: *Jia Liu*¹; Xiangtao Deng¹; Zhaodong Wang¹; ¹Northeastern University

N-29: Evolution in Mechanical Response, Phase Transformation and Texture of Titanium Aluminide Processed by High-Pressure Torsion: *Jae-Kyung Han*¹; Xi Li²; Rian Dippenaar²; Klaus-Dieter Liss³; Megumi Kawasaki¹; ¹Oregon State University; ²University of Wollongong; ³Guangdong Technion - Israel Institute of Technology

N-30: In-situ Study of Strain Distribution and Crystal Rotation of Aluminum with Tailored Grain Size Distribution: *Wenqiang Gao*¹; Godfrey Andrew William¹; ¹Tsinghua University

N-31: Investigations on the Microstructure and Properties of Ultrafine-grained Cu-Al Materials Jointed with Friction Stir Welding: Yue Zhang; *Hongyang Yu*¹; Dongbo LIU¹; Xiaoguang Yuan¹; ¹Shenyang University of Technology

N-32: Joining of Ultrafine Grained Aluminium by Friction Stir Welding – processing, Microstructure and Properties of Similar and Dissimilar Welds: *Marta Orłowska*¹; Lech Olejnik¹; Andreas Huetter²; Norbert Enzinger²; Malgorzata Lewandowska¹; ¹Warsaw University of Technology; ²Graz University of Technology

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XI) — Poster Session II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Caizhi Zhou, Missouri University of Science and Technology; Megumi Kawasaki, Oregon State University; Enrique Lavernia, University of California, Irvine; Terry Lowe, Colorado School of Mines; Suveen Mathaudhu, University of California, Riverside; Ruslan Valiev, UFA State Aviation Technical University; Yuntian Zhu, North Carolina State University

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N-34: Measurement of Strain Effects on Electrical Conductivity and Wear Properties in Materials Processed by High Pressure Torsion: *Evander Ramos*¹; *Takahiro Masuda*²; *Sina Shahrezaei*¹; *Zenji Horita*²; *Suveen Mathaudhu*³; ¹University of California Riverside; ²Kyushu University; ³University of California, Riverside

N-35: Mechanical and Electrical Properties of an Ultrafine Grained Al-0.7Fe-0.1Si-0.2Er Alloy Processed by ECAP: *Xingchi He*¹; *Yue Zhang*¹; *Xiaoguang Yuan*¹; *Fuyu Dong*¹; *Ruichun Wang*¹; *Weiqi Wang*¹; ¹School of Material Science and Engineering, Shenyang University of Technology

N-36: Microstructure and Tensile Behavior of Nanostructured Gradient TWIP Steel: *Jie Ding*¹; *Zhongxia Shang*¹; *Jin Li*¹; *H. Wang*¹; *Xinghang Zhang*¹; ¹Purdue University

N-37: Nucleation, Growth and Coarsening of Precipitates in Immiscible Alloys during Low-temperature Severe Plastic Deformation: Gibbs-Thomson Behavior: *Nirab Pant*¹; *Yinon Ashkenazy*²; *Nisha Verma*¹; *Robert Averback*¹; ¹University of Illinois, Urbana-Champaign; ²Hebrew University of Jerusalem

N-38: Optimization of Mechanical Properties and Corrosion Resistance of Ultra-fine Grained Titanium By Low-temperature Annealing: *Agata Sotniczuk*¹; *Krzysztof Topolski*¹; *Halina Garbacz*¹; ¹Warsaw University of Technology

N-39: Pressure Effects during High Pressure Torsion of Dilute Magnesium-Yttrium: *Christian Roach*¹; *Kiran Solanki*²; *Suveen Mathaudhu*¹; ¹University of California, Riverside; ²Arizona State University

N-40: Size-dependent Strengthening and Conductivity of Highly-textured Cu/BN Multilayers: *Naiqi Chen*¹; *Houyu Ma*¹; *Yue*

Liu¹; Tongxiang Fan¹; ¹Shanghai Jiao Tong University

N-41: Stress Transfer in Heterogeneous Nanostructured Single-phase High Manganese Steel Investigated by In Situ Synchrotron Radiation: *Xing Fang*¹; Kaiyuan Yu¹; ¹China University of Petroleum, Beijing

N-42: Studying on the Role of Heterogeneous Interface in Graphene/Metal Composites for Enhancing the Irradiation Tolerance: *Kunming Yang*¹; Yue Liu¹; Houyu Ma¹; Di Chen¹; Tongxiang Fan¹; ¹Shanghai Jiao Tong University

N-43: Synchrotron-based High-resolution Reciprocal Space Mapping to Understand Elasto-plastic Transition in Harmonic Structured Materials: *Elis Sjogren*¹; Wolfgang Pantleon²; Ulrich Lienert³; Zoltan Hegedüs³; Kei Ameyama⁴; Dmytro Orlov¹; ¹Lund University; ²Technical University of Denmark; ³Deutsches Elektronen Synchrotron; ⁴Ritsumeikan University

N-44: Synthesis and Mechanical Characterization of Metallic Films with Highly Controlled Heterogeneous Microstructures: *Rohit Berlia*¹; Jagannathan Rajagopalan¹; ¹Arizona State University