TECHNICAL PROGRAM

Complete Details on Technical Symposia, Sessions, and Individual Presentations Inside

Current as of February 3, 2020*

*Unexpected travel restrictions could cause changes to the program. See the TMS2020 App for updates on late cancellations and substitute presenters. See the back cover for TMS2020 app instructions.

LOOKING FOR MAPS, NETWORKING EVENTS, OR COMMITTEE MEETINGS?
See the Conference Guide you received at Registration.
This program is divided into two sections. The opening Program at a Glance pages present an overview of technical symposia and sessions planned for TMS2020. The full Technical Program, beginning on page 107, provides more complete program details, including paper titles, author names, and presentation times. Technical presentation information is also available through the TMS2020 App or can be downloaded as a PDF from www.tms.org/TMS2020.

NOTICE REGARDING TECHNICAL PROGRAM CANCELLATIONS:
Changing the times of presentations is disruptive to the program and may cause delegates to miss valuable presentations. We have asked symposium organizers and session chairs not to adjust presentation times in the event that a speaker is unable to deliver his or her talk due to international travel and/or visa issues resulting in late cancellation or “no show”.

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**Mechanics & Structural Reliability**

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**Deformation and Transitions at Grain Boundaries VII**

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**Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling**

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**Fracture Modeling of Composite Materials**

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**Understanding and Predicting Dynamic Behavior of Materials**

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# PROGRAM AT A GLANCE

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<td>Contributions of Taylan Altan, Wei Tsu Wu, Soo-Ik Oh, and Lee Semiatin</td>
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THE WORLD COMES HERE

TMS 2020

149th Annual Meeting & Exhibition

Current as of February 3, 2020*

*Due to unexpected travel restrictions for some of our scheduled presenters, there could be significant shifts in the program. For the latest news on cancellations and replacement speakers, please see the TMS2020 App.

TECHNICAL PROGRAM

The following pages present program details of the technical symposia and sessions planned for TMS2020.

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NOTICE REGARDING TECHNICAL PROGRAM CANCELLATIONS:

Changing the times of presentations is disruptive to the program and may cause delegates to miss valuable presentations. We have asked symposium organizers and session chairs not to adjust presentation times in the event that a speaker is unable to deliver his or her talk due to international travel and/or visa issues resulting in late cancellation or “no show”.

www.tms.org/TMS2020
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: Zhifei Peng, Central South University; Jian-Yang Hwang, Michigan Technological University; Jerome Downey, Montana Technological University; Dean Grgurek, RHI Magnesita; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinliklc, Attilim 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
12 | San Diego Convention Ctr

Session Chairs: Jian-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; Stefan Luidold; Christoph Wagner; Christoph Pichler; Alfred Spanring; Montanuniversitaet Leoben; RHI 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: Sifiso Sambo; Susanna Hockaday; Tumi Seodigeng; MINTEK; Vaal University of Technology

8:55 AM Hydraulic Model Study of Combined Blowing in 65t Electric Arc Furnace (EAF): Xuetao Wu; Rong Zhu; Guangsheng Wei; Kai Dong; Lingzhi Yang; University of Science and Technology, Beijing; Central South University

9:15 AM Predictive Modelling and Optimization of the Variant Combinations of Material Ratios in the Gasification-reduction Coupling Process: Yiru Yang; Lei Guo; Olipeng Bao; Zhancheng Guo; University 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
6D | San Diego Convention Ctr

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; Victoria University of Wellington

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

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

9:35 AM Break

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

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

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

Monday AM | February 24, 2020
7B | San Diego Convention Ctr

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; J. Brian Jordon; Luke Brewer; Kevin Doherty; University of Alabama; US Army Research Lab

8:30 AM Effect of Build Orientation and Post Machining on AM 316L Part Failure: Michael Heiden; Dan Tung; David Saiz; Bradley Jared; Sandia National Laboratories

8:50 AM Additive Manufacturing of Bulk Refractory High Entropy Alloys with Tailored Mechanical Properties: Jonathan Pegues; Michael Melia; Shaun Whetten; Nicolas Argibay; Sandia National Laboratories

9:10 AM Linking Porosity Characteristics to the Mechanical Properties of Additive Manufactured AISI10Mg and 316 Stainless Steel: Christopher Laursen; Jay Carroll; Philip Noell; David Moore; Sandia National Laboratories, Materials Mechanics and Tribology; Sandia National Laboratories, Nondestructive Evaluation and Experimental Mechanics

9:30 AM Break

9:50 AM Invited Mechanical Behavior of Induced Lack of Fusion Flaws in AISI10Mg: Brett Conner; John Lewandowski; Austin Ngo; Varhula De Silva Jayasekera; Griffin Jones; Kenneth Meinert; Youngstown State University; Case Western Reserve University; Pennsylvania 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 Rossini1; Marie-Agathe Charnape2; Brent Goodlet1; Chris Torbet1; Michael Groeber3; Bill Musinsky4; Jonathan Miller5; Stephen Smith6; Samantha Daly7; Tresa Pollock1; 1University of California, Santa Barbara; 2Air Force Research Laboratory; 3NASA Langley Research Center

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

Monday AM | February 24, 2020
7A | San Diego Convention Ctr

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 Klein1; Kyle Myers2; 1ExOne

8:20 AM
Multifunctional Binder for Binder Jet Additive Manufacturing: Dustin Gilmer1; Lu Han2; Michelle Lehmann2; Amy Elliott3; Tomonori Saito4; 1The University of Tennessee; 2Oak Ridge National Laboratory

8:40 AM
Multi-physics Modeling Framework of Binder Jetting Process: Wenda Tan5; 1University of Utah

9:00 AM
Evolution of Pore Distribution in the Binder Jetting of WC-Co: Paul Prichard1; 1Kennametal Inc.

9:20 AM
Effects of Printing Parameters on Green and Final Part Density of Binder Jet Printed WC-Co: Katerina Kimes1; Pierangelì Rodríguez De Vecchis2; Danielle Brunetta3; Drew Ethassid4; Markus Chmielus5; 1Univ of Pittsburgh; 2General Carbide Corporation

9:40 AM Break

10:00 AM
Processing Parameters for H13 Utilizing Binder Jet Additive Manufacturing: Dustin Gilmer1; Tomonori Saito1; Peeyush Nandwana3; Amy Elliott5; 1University of Tennessee Knoxville/Oak Ridge National Laboratory Bredeisen Center; 2Oak Ridge National Laboratory

10:20 AM
3D-printing and Consolidation of 316L Stainless Steel Powder Components: Iľenjichukwu Olumor1; Geuntak Lee2; Eugene Olevsky3; 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: Runko Jiang1; Lorenzo Monteillet1; Katerina Kimes2; Markus Chmielus3; 1University of Pittsburgh

11:00 AM The Effect of Sintering Condition on the Microstructure Evolution of Binder-Jet Printed IN625 Alloy: Amir Mostafaei1; Chuyuan Zheng1; Pierangelì Rodríguez2; Ian Nettleship3; Markus Chmielus4; 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 Mostafaei1; 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; Abieh 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 Spadaccini1; 1Lawrence Livermore National Laboratory

8:35 AM Keynote
Accelerated Development of Functional Materials via Additive Manufacturing: Ryan Ott1; Fanqiang Meng1; Emrah Simsek1; Ikenna Niededim1; Matthew Kramer1; 1AMES Laboratory/Cmi

9:05 AM
Development of Non-equilibrium Thermodynamic Tools for Additive Manufacturing: Kaisheng Wu1; Deepankar Pal1; 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 Brown1; 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 Hofmann1; 1NASA JPL/Caltech

10:30 AM Invited
Thinking Beyond the Prototypical ICME Approach: Alloy Design for Additive Manufacturing: Peter Collins1; Richard Lesar1; 1Iowa State University

10:55 AM Invited
Solidification Based Alloy Design for Metal Additive Manufacturing: Mark Easton1; Michael Benoît1; Duyao Zhang1; Dong Qiu1; David StJohn1; Milan Brandt1; 1RMIT University; 2University of Queensland

11:20 AM
Uncertainty Quantification in Additive Manufacturing from CALPHAD to ICME Models: Jiadong Gong1; 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
6E | San Diego Convention Ctr

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 Nag1; Neil Johnson1; Lee Kerwin1; Yiming Zhang1; Sathyaranarayan Raghavan1; Sreekar Karnati1; Eric MacDonald1; Alex Kitt1; Changjie Sun1; Genghis Khan1; Chris Williams1; Thomas Broderick1; Mark Benedict1; Dave Siddle1; 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 Paradise1; Mandar Shinde1; Sridhar Niverty1; Dhruv Bhat1; Nikhilshes Chawla1; 1Arizona State University

8:40 AM Selection of Process Parameters for Controlling Microstructural Properties in Additive Manufacturing: A Machine Learning Based Approach: Sudeepa Mondal1; Daniel Gwynn1; Asok Ray1; Amrita Basak1; 1Pennsylvania State University

9:00 AM P-V Process Optimization for Microstructure Homogeneity and Cracking Control of SLM-fabricated H13 Tool Steel: Yining He1; 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 Choi1; 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 Roehling1; 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 Khairallah1; 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 Brown1; Sneha Narra2; 1Worcester Polytechnic Institute; 2Worcester Polytechnic Institute
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 Clarke1; Benjamin Ellyson2; John Copley3; Francisco Couvy3; Jonath Klemm-Toole4; Yoafeng Guo1; Jinling Gao2; Chandler Becker3; Brian Milligan2; Christopher Finfrock1; Chlo Johnson4; Kester Clarke5; Wayne Chen6; Niranjan Parab7; Tao Sun5; Kamel Fezzaa1; Colorado School of Mines; Universidade Federal de São Carlos; Purdue University; Advanced Photon Source, Argonne National Laboratory

8:30 AM
A Critical Assessment of the Dual-TRIP Effect: Beneficial or Not?: Shaolou Wei1; Jinwoo Kim2; Cemal Tasan1; Massachusetts 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 Rav1; Diwaker Naragani2; Jun-Sang Park2; Kartik Kapoor2; Ryan Norasa3; Vasisht Venkatesh1; Jonathan Almer1; Michael Sangid2; Purdue University; Argonne National Laboratory; Pratt & Whitney

9:10 AM Invited
Simulations of Grain Boundary-dislocation Interactions in FCC Nickel: Eric Homer1; David Page2; Devin Adams3; Ricky Wyman4; David Fullwood5; Robert Wagoner6; Brigham Young University; Ohio State University

9:40 AM Break

10:00 AM Invited
Characterization of 3-D Slip Fields in Deforming Polycrystals: Darren Pagan1; Kelly Nygren2; Matthew Miller3; Cornell High Energy Synchrotron Source; Cornell University

10:30 AM
Slip and Hydrides in Zirconium: Siyang Wang1; Finn Giuliani2; Thomas Britton3; Imperial College London

10:50 AM
A Quantitative Study of Slip Band-Grain Boundary Interactions in Mg Alloys: Mohsen Taheri Andani1; Aaditya Lakshmanan2; Veera Sundararaghavan3; John Allison4; Amit Misra5; University of Michigan; Vacuumschmelze Gmbh

11:10 AM
Room Temperature Interface Sliding in TIMETAL-407: Zachary Kloenne1; Gopal Viswanathan1; Matt Thomas2; Michael Loretto2; Hamish Fraser1; Ohio State University; TIMET; University of Birmingham

11:40 AM
Reversible Phase Transformations in a Metastable Beta Titanium Alloy Resolved with Quantitative Electron Microscopy: Kui Du1; Lu Qi2; Chunjin Chen2; Yulin Hao3; Rui Yang3; Hengqiang Ye4; Institute of Metal Research

ENERGY & ENVIRONMENT


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

Monday AM | February 24, 2020
Del Mar | Marriott Marquis Hotel

Session Chair: Alex Leary, NASA Glenn Research Center

8:00 AM Invited
Metal Amorphous Nanocomposite (MANC) Soft Magnetic Materials (SMM) for Motor Applications: Michael McHenry1; Satoru Simizu1; Kevin Byerly2; Paul Ohodnicki3; Subhashish Bhattacharya4; Carnegie Mellon University; NETL; North Carolina State University

8:25 AM Invited
Strain Annealed Co-rich and Fe-rich Nanocrystalline Materials for Inductive Components: Christian Polak1; Vacuumschmelze Gmbh & Co. Kg

8:55 AM Invited
New Trends in the Amorphous and Nanocrystalline Soft Magnetic Ribbon Market: Eric Theisen1; Metglas Inc.

9:20 AM Invited
Processing and Advanced Characterization of Selectively Paramagnetized Laminates for Synchronous Reluctance Motors: Orlando Rios1; Hunter Henderson2; Min Zou3; Craig Bridges4; Michael Kesler5; Michael Brady5; Oak Ridge National Laboratory; GE Global Research

9:50 AM Break

10:05 AM Invited
Multi-objective Design of Permeability Engineered Soft Magnetic Metal Amorphous Nanocomposite Cores: Paul Ohodnicki1; Vinicius Cabral Do Nascimento2; Richard Beddington2; Kevin Byerly3; Seung-Ryu Moon4; Scott Sudhoff5; National Energy Technology Laboratory (presently at University of Pittsburgh); National Energy Technology Laboratory; Purdue University

10:25 AM
Dual Phase Soft Magnetic Laminates for Permanent Magnet Assisted Synchronous Reluctance Electric Machines: Shenyuan Huang1; Min Zou2; Wanning Zhang3; Joseph Zierer4; Anoop Jassal5; Vandanra Rallabandi1; Steve Buressi1; PR Subramanian1; GE Research; GE Global Research
10:45 AM
Continuous Strain Annal Processing of Amorphous Ribbons for Inductor Applications: Kevin Byerly; Paul Ohodnicki; Seungryul Moon; Byron Beddington; Satoru Simizu; Alex Leary; Vladimir Keylin; Eric Theisen; M.E. McHenry; National Energy Technology Laboratory; North Carolina State University; Carnegie Mellon University; NASA Glenn Research Center; Metglas, Inc.

11:05 AM
Designing High Efficiency, High Power Transformers with Metal Amorphous Nanocomposites: Richard Beddington; Subhashish Bhattacharya; Kevin Byerly; Seung Moon; Alex Leary; Ronald Noebe; Randy Bowman; Michael McHenry; Paul Ohodnicki; National Energy Technology Laboratories; North Carolina State University; Leidos, Contractor for National Energy Technology Laboratory; NASA Glenn Research Center; Carnegie Mellon University

11:25 AM
Tunable Power Inductors Utilizing Magnetoelectric PZT/Metglas Composites: Mark Nations; Paul Ohodnicki; Subhashish Bhattacharya; North Carolina State University

ENERGY & ENVIRONMENT

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; Surajit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Soumendu Basu, Boston University; Paul Ohodnicki, University of Pittsburgh

Monday AM | February 24, 2020
16B | San Diego Convention Ctr

Session Chairs: Soumendu 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 Carter; Connor Fear; Aashutosh Mistry; Partha Mukherjee; Corey Love; US Naval Research Laboratory; Purdue University

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

9:00 AM Keynote
Design, Fabrication and Performance of Thin-film Solid Oxide Fuel Cells: Nguyen Minh; Yoon Ho Lee; Tuyen Tran; Haowen Ren; Eric Fullerton; Eriku Wu; Ying Meng; Center for Energy Research, University of California, San Diego; Material Science and Engineering Program, University of California, San Diego; Department 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; University of Illinois

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

10:30 AM Keynote
Synthesis, Design and Fabrication of Oxide Thermoelectrics via Plasma Spray Technology: Sanjay Sampath; Felipe Caliari; Story Brook University

11:00 AM Invited
Alternative Spinel for Advanced Protective Layer for SOFC Stacks: Jung Pyung Choi; Jeffrey Stevenson; Pacific 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, University of Massachusetts Amherst; and others

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


8:00 AM Introductory Comments

8:05 AM
Synchrotron X-ray Study of Sn Electromigration, Sn Whisker Growth, and Residual Strain Evolution in A Bichle Structure: Pei-Tzu Lee; Wan-Zhen Hsieh; Cheng-Yu Lee; Xiao-Yun Li; Shao-Chin Tseng; Mau-Tsu Tang; Ching-Shun Ku; C. Robert Kao; Cheng-En Ho; National Taiwan University; National Synchrotron Radiation Research Center; Yuan Ze University

8:25 AM
Recrystallized Shallow Grains as the Whisker Growth Sites in Large-grain Sn-alloy Films: Wei-Hsuen Chen; Congying Wang; John Blendedell; Carol Handweker; ASML; Purdue University

8:45 AM
Using Applied Pressure to Make Tin Whiskers Grow: Measurements and Analysis: Nupur Jain; Piyush Jagtap; Allan Bower; Eric Chason; Brown University

9:05 AM
Tin Whisker Growth on Pb-Free, Bi-containing Solder Alloys after Ambient Temperature, High Humidity Storage: Andre Delhaise; Zohreh Bagheri; Stephan Meschter; Jeffrey Kennedy; Polina Snugovsky; Celestica; BAE Systems

9:25 AM Break

9:45 AM Invited
Micro Interconnect Mechanical Stability in Cryogenic Temperature Environments: Ande Kitamura; Ruben Contreras; Tae-Kyu Lee; Portland State University

10:05 AM Invited
Comparison of Corrosion Resistance between Electroless and Electroplating Ni/Pd/Au Surface Finish on PCB: Albert T. Wu; Yi-Ting Shen; Nico Li; Freeze Wang; Chih-Yuan Hsiao; National Central University; Taiwan Uyemura Co.
10:25 AM  Chlorination and Power Cycling Characteristics of Fine Au/Pd Coated Copper Wire: Che-Hao Chang1; Fei-Yi Hung2; 1National Cheng Kung University

10:45 AM  Electromigration in 2µm Nano-twinned Cu Redistribution Lines: Hung-Hsuan Li1; 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 Bodcort2; Greg Kennedy3; Min Zhou3; Naresh Thadhan3; 1Georgia Institute of Technology

8:40 AM Invited
Ultrafast Synchrotron X-ray Imaging Studies of Ultrasonic Processing of Structural and Functional Materials: Jiawei Mi1; 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 Koul1; Le Zhou2; Yongho Sohn3; Akihiro Kushima2; 1University of Central Florida

9:20 AM
Spatial and Time-dependent Uranium Oxidation Measurements using White-Light Interferometry: Yaxiok Idel1; 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 Su1; 1Southern University of Science and Technology

10:20 AM
The Mechanisms of Ultrasound Metrology in Metal Melt: Biting Wang1; Andrew Caldwell2; Antoine Allanore2; Douglas Kelley2; 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 Ortiz1; 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 Mishra1; 1University of North Texas

8:25 AM Invited
Linear Friction Welding of Ti Components:Investigation of Residual Stress and Fatigue Performance: Ritwik Bandyopadhyay1; Michael Sangid2; 1Purdue University

8:50 AM
Structure-Property Correlations in Friction Stir Welded 304L Stainless Steel: Madhumanti Bhattacharyya1; Arnab Kundu2; Indrajit Charit1; Krishnan Raja1; Jens Darsell1; Saumyadeep Jana2; 1University of Idaho; 2Pacific Northwest National Laboratory

9:10 AM
Investigation of Metastable Structure Evolution in Friction Consolidation: Mageshwari Komarasamy1; Xiao Li2; Scott Whalen1; Glenn Grant2; 1Pacific Northwest National Laboratory

9:30 AM
Joining Dissimilar Materials via Rotational Hammer Rivet Technique: Tianhao Wang1; Scott Whalen1; Woongjo Choi1; 1Pacific Northwest National Laboratory

9:50 AM Break

10:10 AM Invited
Recent Developments in Upscaling High Pressure Torsion: Anton Hohenwarter1; Reinhard Pippas1; 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 Yapiçi1; 1Ozyegin University

10:50 AM
Incremental Equal Channel Angular Pressing as a Tool for Manufacturing Large Ultra-fine Grained Copper Rods: Marta Ciemiorek1; 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 Stückler¹; Lukas Weissitsch¹; Stefan Wurster¹; Heinz Krenn²; Andrea Bachmaier¹; Erich 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; Nuguhealli 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 Introductory Comments

8:05 AM Invited
Progress on Porous Ceramics for Heat-insulation: Chang-An Wang¹; Tsinghua University

8:25 AM
Structure, Chemistry, Optical and Dielectric Properties of a New Pyrophosphate: LiGaP2O7: Mallesham Bandi¹; Ron Broner²; Samuel Arredondo³; Ramana Chintalapalle³; University of Texas at El Paso; University of California, Santa Barbara

8:45 AM
Application of Inorganic Adsorbents for Radwaste Water Treatment: Hsien-Ming Hsiao¹; Yun-Chung Shen²; Yi-Kuo Chang³; Tsinghua University

9:05 AM
Role of Anisometric Particles in Microstructure Evolution, Structural Stability and Compressive Mechanical Properties in Ice-templated Ceramics with Directional Porosity: Dipankar Ghosh¹; Mahesh Banda¹; Old Dominion University

9:25 AM Break

10:00 AM
Preparation of Abrasion & Erosion-resistant Ceramic Coating on Copper by Slurry Method: Zefei Zhang¹; Hao Bai¹; Ning Li²; Jian Zhang³; Huanmei Yuan³; University of Science and Technology Beijing

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

11:10 AM
Synthesis and Densification of Functional Metal-oxide Nano Bulk Composite with Far from Equilibrium State: Yasuhiro Kodera¹; A Volodchenkov²; Kyle Chan³; Takahito Imai³; Javier Garay³; University of California, San Diego; Ryukoku University

11:40 AM
Emergence of Shallow Energy Levels in B-doped Q-carbon: A high-temperature Superconductor: Ritesh Sachan¹; Jagdish Narayan²; Jordan Hachtel³; Juan Idrobo²; Oklahoma State University; North Carolina State University; Oak Ridge National Laboratory

10:00 AM
Preparation of Abrasion & Erosion-resistant Ceramic Coating on Copper by Slurry Method: Zefei Zhang¹; Hao Bai¹; Ning Li²; Jian Zhang³; Huanmei Yuan³; University 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 Mubarak, PPG; Rajeev Gupta, University of Akron; Sandip Harimkar, Oklahoma State University; Tanaji Paul, Florida International University

**Monday AM | February 24, 2020**

9 | San Diego Convention Ctr

**Session Chair:** Rajeev Gupta, University of Akron

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8:00 AM  Characterization of Precipitates Evolution in Laser Assisted Cold Spray of AA7050 and AA7075. Ning Zhu1; Luke Brewer2;  1University of Alabama Tuscaloosa

8:20 AM  Enhanced Bond Durability of 7xxx Automotive Alloy by Surface Modification. Theresa MacFarlane1; Tudor Piroteala1; Rashmi Monty2; Sazol Das1; Yudie Yuan1; Thomas Beck1; Lasitha Cumaratunge1;  1Novelis Inc

8:40 AM  Surface Chemistry and Subsurface Microstructure after Spot-by-spot laser-interference Processing of Al 2024-T3. Adrian Sabau1; Harry Meyer1; Donovan Leonard2;  1Oak Ridge National Laboratory

9:00 AM  Invited  Multilayer, Multifunctional Thermal Coatings Enabled by Layered Manufacturing. Sanjay Sampath1;  1Stony Brook University

9:40 AM  Break

10:00 AM  Laser Assisted Cold Spray Applied to Austenitic Stainless Steel. Venkata Satish Bhattiprolu1; Luke Brewer1;  1University of Alabama Tuscaloosa

10:20 AM  High Temperature Oxidation Behaviors of SiON Coated AISI 441 in Different Atmospheres. Kathy Lu1; Kaustubh Bawane2; Rajendra Bordia1;  1Virginia Polytechnic Institute and State University;  2Clemson University

10:40 AM  Contact Angle Measurement Comparisons of Common Additive Materials and Processes. Holly Martin1; Arthur Kasson2; Ibrahim Al Qanber3; Brett Conner4;  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 Auger1; Jean-Michaël Deschênes1; Alex Fraser1;  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 Bochichio, Pratt & Whitney; Kevin Bockenstedt, ATI Specialty Materials; Katerina Christofidou, University of Sheffield; James Coakley, University of Miami; Martin Detroit, 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

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8:00 AM  Invited  Performance of Gamma Prime Alloys Processed Through Electron Beam Melting. Michael Kirka1; Patxi Fernandez-Zela1; Donovan Lenord1; Obed Acevedo1; Peeyush Nandwana2; Andres Marquez Rossy3;  1Oak Ridge National Laboratory

8:30 AM  A Comparison of Creep Properties between Conventionally Cast and Additively Manufactured CMSX-4. David Bürger1; Alireza Parsa1; Markus Ramsperger1; Carolin Körner2; 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 Forsik1; Karl Heck1; Ning Zhou1;  1Carpenter Technology Corporation

9:20 AM  Microstructure and Mechanical Properties of a Co-base Superalloy Fabricated by Electron Beam Melting. Sean Murray1; Kira Pusch1; Andrew Polonsky1; Chris Torbet2; Peeyush Nandwana2; Michael Kirka1; Ryan Dehoff1; Ning Zhou1; Stéphane Forsik1; William Slye1; 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 Rainey1; Laura Dial1; Andrew Wessman1;  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 Heep1; Casper Schwalte2; Christoph Heinz1; Antonin Dlouhy1; Catherine Rae1; 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 Arnaud1; Clément Remacha2; Edward Romero1; Virginie Jaquet1; Frédéric Jenson1; Henry Proudhon2;  1SAFRAN;  2Centre des Matériaux Mines ParisTech
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; Garratt 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
San Diego Convention Ctr

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

8:00 AM Introductory Comments

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

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

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

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

9:45 AM Break

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

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

11:00 AM A First Principles Multi-cell Monte Carlo Method for Phase Prediction: You Rao; Changing Niu; Wolfgang Windl; Maryam Ghazisaedi; The Ohio State University; QuesTek Innovations LLC

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

BIOMATERIALS

Biodegradable Materials for Medical Applications II — Magnesium Implants

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

Program Organizers: Jaroslaw Drellich, 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 Drellich, 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: Ruqiang Hou; Frank Feyerabend; Regine Willumeit Romer; Helmholtz Center Geesthacht

8:40 AM Invited
Biodegradable Magnesium Implants — From Alloy Development to In Vivo Testing: Hans Maier; Peter Wriggers; Andrea Meyer-Lindenberg; Leibniz Universität Hannover; Ludwig-Maximilians-Universität München

9:05 AM Invited
An Mg-Zn-Ca-based Alloy and a Biocompatible Ceramic Coating Towards Resorbable Bone Fixation Devices: Hamdy Ibrahim; Alan Luo; David Dean; Rigoberto Advincula; Mohammad Elahinia; University of Tennessee at Chattanooga; Ohio State University; Case Western Reserve University; University of Toledo

9:30 AM Invited
In-Vivo and In-Vitro Performance of Bioabsorbable BioMg 250 Mg Alloy Implants: Jacob Edich; Raymond Decker; Stephen LeBeau; Nanomag LLC

9:55 AM Break

10:10 AM Hydrogen Sensors for Noninvasively Monitoring the Status of Bioreabsorbable Magnesium Implants: William Heineman; Daoli Zhao; University of Cincinnati

10:30 AM Invited
Current Development Status of Surgical Stapler and Clip Made of Mg Alloy in Kobe University: Takumi Fukumoto; Masahiro Kido; Naoko Ikeo; Toshiji Mukai; Kobe University

10:55 AM Influence of Solution Heat Treatment on Microstructure, Hardness and Corrosion Behavior of Extruded RESOLOY: Petra Maier; Benjamin Clausius; Norbert Hort; Stralsund University of Applied Sciences; Helmholtz-Zentrum Geesthacht

11:15 AM High Strength Rare Earth Free Mg Alloys with Controlled Degradation Behavior Through Microstructural Manipulation: Ehsan Mostaed; Malgorzata Sikora-Jasinska; Jaroslav W. Drellich; Michigan Technological University
BIOLOGICAL MATERIALS

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 Yangi; Haocheng Quani; Marc Meyersii; Robert Ritchieiii; 1University of California San Diego; 2University of California, Berkeley

8:30 AM
Collagen’s Role in the Dermal Armor of the Boxfish: 
Sean Garneii; Steven Nalewayiii; Maryam Hosseiniiv; Claire Acevedov; Eric Schablevi; Bernd Gludovatzv; Jae-Young Junvg; Joanna Mckittrickhi; Pablo Zavatterii; 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: 1Jose de Oliveira; 2UFES

9:10 AM Invited
Seeing is Believing - In-situ SEM Wear Experiments of Animal Teeth: Horacio Espinozas; Alireza Zaherii; Hoang Nguyeni; David Restrepoi; Michael Frankii; Joanna Mckittrick; 1Northwestern University; 2Northwestern University; 3University of Texas, San Antonio; 4University of California, San Diego

9:40 AM Break

9:55 AM Invited
Multiscale Architectures in the Exoskeletal Armor of a Crush Resistant Insect: Jesus Riveral; Maryam Hosseinii; Satoshi Muratai; Allison Picklei; Drago Vasili; David Restrepo; Atsushi Arakaki; Pablo Zavattieri; 1David Kisailus; 2University of California Riverside; 3Purdue University; 4University of Southern California

10:25 AM
Comparison of Diffraction Techniques for Texture Evaluation in Triaminotritrobenzene (TATB): Matthew Schmitti; Sven Vogeli; John Yeagerii; Ricardo Schwarzii; 1Los Alamos National Laboratory

8:05 AM
Auger Spectroscopy Analysis of Alpha Brass Fracture: Sergio Monteiroi; Fabio Garcia Filhi; Fernanda da Luzii; Ulisses Costa; Lucio Nascimento; 1Military Institute of Engineering - IME; 2Military Institute of Engineering

8:25 AM
Comparison of Diffraction Techniques for Texture Evaluation in Triaminotritrobenzene (TATB): Matthew Schmitti; Sven Vogeli; John Yeagerii; Ricardo Schwarzii; 1Los Alamos National Laboratory

8:45 AM
EBSD Characterization of Aluminum Magnesium Alloys: Karina Hemmendingeri; Joel Bahenii; Andrea Hodgeii; 1University of Southern California

9:05 AM
Comparison of Diffraction Techniques for Texture Evaluation in Triaminotritrobenzene (TATB): Matthew Schmitti; Sven Vogeli; John Yeagerii; Ricardo Schwarzii; 1Los Alamos National Laboratory

9:25 AM
On the Depth Resolution of Transmission Kikuchi Diffraction (TKD) Analysis: Junliang Liu; Sergio Lozano-Perez; Angus Wilkinsonii; Chris Grovenori; 1University of Oxford

9:45 AM Break

10:00 AM
Correlative Microscopy Studies of <c>Dislocations in a Hot-roll AZ31 Mg Alloy: Dixin Zhaoii; Xiaolong Maii; Kelvin Xieii; 1Texas A&M University

10:20 AM
Micromechanical Properties of Marginal Glass Forming Alloys: Ilkay Kalay; Tolga Han Ulucani; Sezer Özerıncii; Yunus Kalayii; Çankaya University; 1Middle East Technical University

10:40 AM
Case Study of A36 Steel Plate: Ramon Martinezii; Veronica Livescu; Jillian Bennett; Carl Cady; James Valdez; Carl Trujillo; 1Los Alamos National Laboratory

11:00 AM
In-situ Raman Microprobing and Ex-situ Raman Mapping of Indented Glasses: Yvonne Gerbi; Chris Michaels; 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; Chihpin Chuang; Dileep Singh; Jian Chen; Yong Chae Lim; Zhili Feng; ¹ Argonne National Laboratory; ² Oak 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: 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 Georgia Institute of Technology

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

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

9:35 AM Break

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

10:25 AM Invited
Advancement of Data Intensive Approaches in Materials Discovery and Design: David Elbert; Brian Schuster; Nick Carey; Connor Krill; Ali Rachidi; William Phelan; Tyrel McQueen; ¹ Johns Hopkins University; ² ARL

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 University of Chicago

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

9:00 AM
Active Learning Guided Polymer Space Exploration and Discovery: Huan Tran; Abhirup Patra; Deepak Kamal; Lihua Chen; Chiho Kim; Rampi Ramprasad; ¹ Georgia Institute of Technology

9:30 AM Break

9:50 AM Invited
Neural Network Potentials for Water-in-salt Electrolytes: Sarah Allec; Woochul Shin; P. Alex Greaney; Xiulei Ji; ¹ University of California Riverside; ² Oregon State University

10:20 AM
Computational Design of Fast Ion Conducting Materials for Solid-state Batteries: Yifei Mo; ¹ University Of Maryland College Park

10:40 AM
Frequency-dependent Dielectric Constant Prediction of Polymeric Dielectrics with Machine Learning: Lihua Chen; Rohit Batra; Chiho Kim; Tran Huan; Rampi Ramprasad; ¹ Georgia 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 Thornton3; Peter Voorhees4; 1University of Michigan; 2Northwestern University

**8:20 AM**

Phase Stability, Chemo-mechanics and Microstructure Space in TiAl2ZrN Ultra-hard Nanocoatings: Vahid Attar1; Raymundo Arroyave2; 1Texas A&M University

**8:40 AM**

Multiscale Modeling of Mass Transport in Transition Metal Carbides: Rofiques Salehin1; Xiaochuan Tang1; Gregory Thompson2; Christopher Weinberger2; 1Colorado State University; 2University of Alabama

**9:00 AM Invited**

Microstructure Formation from Atomic viewpoint: Yasushi Shibuta1; The University of Tokyo

**9:30 AM Break**

**9:50 AM Invited**

Phase Field Modeling and Simulation Study of Multiferroic Magnetoelastic Composite Materials: Yongmei Jin1; Liwei Geng1; Yu Wang1; 1Michigan Technological University

**10:20 AM**

Probing Solid-solid Interface Reactions in All-solid-state Batteries: Hanmei Tang1; Zhi Deng1; Abhik Banerjee1; Erik Wu1; Han Nguyen1; Zhuying Zhu1; 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 Chadwick1; David Dunand1; Peter Voorhees2; 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 Wang1; Yufeng Zheng1; Michael Mills1; Hamish Fraser1; Yunxi Wang1; 1The Ohio State University; 2Idaho National Laboratory; 3Xi’an Jiao Tong University

SPECIAL TOPICS


**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 Brueck1; 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 Pecharsky1; 1Ames Laboratory

**9:05 AM Invited**

Quantitative Identification of First-order Phase Transitions Using Magnetocaloric Studies: Jia Yan Law1; 1Sevilla University

**9:35 AM Break**

**9:55 AM Invited**

Synchrotron X-ray Studies on Magnetocaloric Materials: Niels Van Dijk1; 1Delft University of Technology

**10:25 AM Invited**

Structure, Magnetism and Spin Dynamics of Magnetocaloric Mn3-xFeSi Compounds: Karen Fries1; Nikolaos Biniskos1; Nora Marayta1; Paul Herig1; Yuri Skourski2; Andrzej Grzechnik3; Stephane Raymond4; Joerg Voigt1; Thomas Brueckel1; Karin Schmalzl1; 1Ruhr University Bochum; 2Max Planck Institute of Active Magnetic Regenerator Materials; 3Helmholtz Zentrum Dresden Rossendorf; 4RWTH Aachen University; 5Universite 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 Frenzel1; Philipp Hailersenbleben1; Felicitas Scholz1; Pascal Thome1; Gunther Eggelent1; 1Ruhr University Bochum
8:35 AM
In-situ Tomographic Investigation of Co-base Alloy Solidification Features: Tim Wigger1; Mohammed Azeem2; Shyamprasad Karagadda2; Zhipeng Guo3; Robert Atwood4; Nghia Vo5; Peter Lee6; 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 Jones1; Mark Jolly2; Anders Jarfors3; Mark Irwin4; 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: Hosssam Ibrahim1; Heinz Palkowski2; 1Clausthal University of Technology

9:35 AM Break

9:55 AM
Spatially Resolved Compositional and Isotopic Analysis of As-cast Metallic Nuclear Fuels: Elizabeth Kautz1; Vineet Joshi2; Curt Lavender3; Arun Devaraj4; 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 Dinda1; Prakash Sridharan2; Gour Gopal Roy3; 1Indian Institute of Technology Kharagpur; 2Warwick Manufacturing Group

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Transitions at Grain Boundaries, 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
SB | 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 Guo1; David Collins2; Edmund Tarleton3; Felix Hofmann4; Angus Wilkinson5; Ben Britton6; 1Imperial College London; 2Birmingham University; 3University of Oxford

8:20 AM
Continuum Dislocation Dynamics at Finite Deformation: Computational Modeling and Preliminary Results: Kyle Starkey1; Anter El-Azab2; 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 Hu1; Ge Zhao2; Baiyu Zhang3; Chaoming Yang4; Xiaofeng Qian5; Liang Qi6; 1University of Michigan; 2The Pennsylvania State University; 3Texas A&M University

9:00 AM
Twinning Nucleation Process at Grain Boundary in BCC Crystals: Scott Mao1; Jiangwei Wang2; 1University of Pittsburgh

9:20 AM
Unusual Size Effects from Tilted Twin Boundaries in Nano-twinned Metals: Caizhi Zhou1; Sixie Huang2; Irene Beyerlein3; 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: Pronay Chakraborty1; Tengfei Ma2; Abigail Hunter3; Yinan Cui4; Lei Cao5; 1Los Alamos National Laboratory; 2Tsinghua University

10:20 AM
The Evolution of Interfacial States in Nanocrystalline Al-Ni- Ce and their Influence on Mechanical Behavior and Thermal Stability: Glenn Balubs1; Yolita Eggeler2; Jung Ho Shin3; Fulin Wang4; Verena Maier-Kiener5; Daniel Kiener6; Daniel Gianola7; 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: Christopher Behler1; Christopher Marvel2; Jerry LaSalvia3; J. Dunn-Synowczyk1; S.D. Walck2; Martin Harmer3; 1CCDC Army Research Laboratory, SURVICE Engineering; 2Lehigh University; 3CCDC Army Research Laboratory

11:00 AM
Thick Amorphous Complexions Enabled by Compositional and Thermal Manipulation: Charlotte Grigorian1; Timothy Rupert2; 1University of California, Irvine

MATERIALS PROCESSING

Electrometallurgy 2020 — Hydrometallurgy

Sponsored by: TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy 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 Kenneecott 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; 1University of British Columbia
9:35 AM  
The Electrochemical Conversion of Chalcopyrite to Less Refractory Mineral Phases for Hydrometallurgical Processing: Jonathan Vardner; Campbell Donnelly; Zhengyan Zhang; Minghui Wang; Angela Ye; Scott Banta; Alan West.  
Columbia University

9:55 AM  
University 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, INL 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  
Griffith University

8:20 AM Invited  
Electrochemical Engineering of Graphene Oxide for Wearable Smart Devices: Yulin Zhong.  
Griffith University

8:45 AM Invited  
Queensland 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; Vikas Tomar; Thomas Adams; Corey Love; Vilas Pol.  
Purdue University; Naval Surface Warfare Center; U.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 Hochaday; Reiner Buck; Martina Neiseis-van Puttkamer; Willie Smit.  
MINTEK; DLR; Stellenbosch University

10:10 AM  
The Compatibility of Metallic Thermal Storage Materials and Housing Materials: A Computational Survey and Accelerated Reaction Experiment Results: Anthony Rawson; Tina Gläsel; Benedikt Nowak; David Boon; Veronika Stahl; Florian Kargl.  
Institute of Material Physics in Space, German Aerospace Centre (DLR); Institute of Vehicle Concepts, German Aerospace Centre (DLR)

10:30 AM  
Peking University; University 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  
Department of Energy - Basic Energy Sciences

8:35 AM Invited  
Mechanical Properties of Molecular Crystals—Connecting with Chemistry: Ramamurty Upadrasta.  
NTU

9:05 AM Invited  
Integrating Experiment, Data, and Computations to Accelerate the Design of Materials: Peter Voorhees; Greg Olson; Juan DePablo.  
Northwestern University; University of Chicago

9:35 AM Break

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

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

11:00 AM  
Regularization of Materials Failure Data for Damage Mechanism Categorization by Machine Learning: John Hasler; Keo-Yuan Wu; Rachel Wittman.  
Intertek; UCLA
MECHANICS & STRUCTURAL RELIABILITY
Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Fatigue Characterization Using Advanced Experimental Methods in 2D and 3D


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 Stinville1; Patrick Callahan2; M. P. Echlin1; Marie-Agate Charpaigne3; A.T. Polonsky1; Valery Valle1; J.J. Beyerlein4; T. M. Pollock5; 1University of California, Santa Barbara; 2Naval Research Laboratory; 3Institut P - UPR 3346, CNRNS - Université de Poitiers - ENSMA

8:40 AM
Unraveling Cyclic Deformation Mechanisms of a Precipitate-strengthened Magnesium Alloy using In-situ Neutron Diffraction: Di Xie1; Zongyang Lyu2; Ke An1; Yan Chen1; Peter Liaw3; Yanfei Gao4; 1the University of Tennesse; 2Oak Ridge National Laboratory

9:00 AM
Fatigue Behavior and Modeling of PEEK Polymer under Uniaxial and Multiaxial Loadings: Rabish Shrestha1; Jitima Simsrinwong1; Nima Shamsaei2; 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: Til Ho Aarihan1; Yuben Zhang1; Soren Faerster1; Jesper Hatlel1; Varvara Kouzentsova; 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 Tekereh1; Brian Wisner2; Antonios Kontsos3; 1Drexel University; 2Ohio University

10:20 AM
In-situ Characterization and Modelling of Cyclic Deformation in Rare-earth Magnesium Alloys: Duncan Greeley1; Mohammadreza Yaghooibi1; Darren Pagan2; Veera Sundararaghavan1; John Allison2; 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 Nygren1; Daniel Bancro2; Akhiide Nagao3; Shuai Wang4; Eric Miller5; Darren Pagan6; Cornell High Energy Synchrotron Source; 1Tufts University; 2JFE Steel Corporation; 3Southern University of Science and Technology

11:00 AM
Characterization of Fatigue Mechanisms in Nickel Microbeams: Alejandro Barrios1; Ebiakpo Kakandar2; Xavier Maeder3; Gustavo Castelluccio4; Olivier Pierron5; 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 Li1; Jun Cao2; Cyril Williams3; Thayer 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 Bayless1; Jerome Downey2; Peter Lucon3; Scott Cogulli4; 1Montana Technological University

8:50 AM
A Reactive Molecular Dynamics Study on the Mechanical Properties of Alumina/Hybrid Nanotube Composites: Yixin Su1; Yang Wang2; Narumasa Miyazaki3; Yusuke Ootani1; Nobuki Ozawa1; Monterey University

9:10 AM
Evaluation of Fracture Toughness of Cryogenically Treated High Nitrogen Martensitic Steel: Narendra Dhokey1; 1Government College of Engineering

9:30 AM Break

10:00 AM Invited
Developing a Virtual Damage Sensor Using a Multiscale Coupled Electro-mechanical FE Model of a Piezoelectric Material: Sonnath Ghosh1; Preetam Tarafder1; Saikat Dan1; 1Johns Hopkins University

10:30 AM
An Improved Fracture Mechanics-informed Multiscale Thermomechanical Damage Model for Ceramic Matrix Composites: Travis Skinner1; Jacob Schichtel1; Aditi Chattopadhyay2; 1Arizona State University

10:50 AM
Micromechanical Analysis of Matrix Crack-induced Delamination in Cross-ply Laminates Under Tension: Chen Fu1; 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

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 Ozkan1; 1University of California, Riverside

8:20 AM Invited
Design Nanostructured Anode Materials for Li-/Na-ion Batteries: Xiaolin Li1, 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 Wu1; 1Nasa Glenn Research Center

9:00 AM Invited
Interfacial Engineering of Energy Conversion and Storage Materials Using Atomic Layer Deposition: Robin Rodriguez1, Tae Cho1, M. Ravandi1, William LePage1, Mihaela Banu1, M. D. Thouless1, Neil Dasgupta1; 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 Bak1, 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 Kim1, Chang-Won Park1, Jung-Hun Lee1, Soo-Min Hwang1; 1Sungkyunkwan University

10:20 AM Invited
2D Materials for Energy Storage Applications: Reza Shahbazian-Yassar1; 1University of Illinois at Chicago

10:40 AM
Metal–organic Frameworks for Lithium–oxygen Batteries with Enhanced Cycling Performance: Xiaohui Zhang1, Panpan Dong1, Younghwan Cha1, Min-Kyu Song1; 1School of Mechanical and Materials Engineering, Washington State University

11:00 AM Invited
Engineered Si/SiOx Nanocomposites for Lithium Ion Battery: Hansu Kim1; 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 Kattner1; 1National Institute of Standards and Technology

8:50 AM Invited
Tomorrow fcc Ordering Model: Nathalie Dupin1; 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 Zhang1, 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 Selleby1; 1KTH Royal Institute of Technology

11:10 AM
The Third Generation of CALPHAD Descriptions: Case Studies on Al-C and W-C: Zhaoting He1, 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 Liaw1; 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 Liu2; 2City University Of Hong Kong

9:00 AM Invited
Element Effects of CoCrFeNi-based High-entropy Alloys on Low-cycle Fatigue: E-Wen Huang1; Che-Wei Tsai1; An-Chou Yeh2; Soo Yeol Lee2; Stefanus Harjo3; Peter Liaw4; Tu-Ngoc Lam4; You-Shiun Chou4; 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 Senkov1; Stephane Gorrse1; 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 George1; 1Oak Ridge National Laboratory

10:15 AM Invited
Mechanical Behavior of Transformative Complex Concentrated Alloys: Rajiv Mishra1; 1University of North Texas

10:35 AM Invited
Slip Avalanches in Amorphous and Crystalline Materials: Karin Dahmen1; 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. Brinkman3; Peter Liaw4; Karin Dahmen5; Jien-Wei Yeh6; 1National Tsing Hua University; 2The University of Tennessee-Knoxville; 3University of Illinois at Urbana-Champaign; 4University of Washington; 5National Tsing Hua University; 6The University of Tennessee-Knoxville

11:15 AM Invited
Modeling and Analysis of Serrated Flows in High Entropy Alloys: Past, Present, and Future: Jamieson Brechtli; Xie Xie; Shuying Chen; Chanhoo Lee; Yunzhu Shi; Haoyuan Diao; Zhong Wang; Yang Ren; Junwei Qiao; Peter Liaw; 1Oak Ridge National Laboratory; 2FCA US LLC; 3University of Tennessee; 4University of Science and Technology Beijing; 5Kaiser Aluminum; 6Taiyuan University of Technology; 7Argonne National Laboratory

**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-BMC Ionic Liquid at Low Temperature: Pravin Shinde1; Yuxiang Peng1; Ramana Reddy1; 1The University of Alabama

8:40 AM
Calciothermic Synthesis of Fine, Hydrogenated Ti- and Ti-Nb-powder: Inge Lindemann1; 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 Lu1; Takuya Ono1; Haochen Jiang1; Osamu Takeda1; Hongmin Zhu1; 1Tohoku University

9:20 AM
Cost-effective PM Ti Compositions and Processing: Leandro Bolzon1; 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 Thomas2; Nick Weston3; 1The University of Sheffield

10:35 AM
Aeration Leaching Process for Producing Synthetic Rutile in a Novel Gas-liquid-solid Reactor: Qiuyue Zhao1; 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 Tome1; M Anul Kumar1; John Graham1; Khanh Dang1; Yue Liu2; Pengzhang Tang1; Shujuan Wang1; Rodney McCabe1; Lauret Capolungo1; 1Los Alamos National Laboratory; 2Shanghai Jiao Tong University

8:55 AM Keynote
Hierarchically Structured Ultrafine Grained Magnesium Alloys: Rajiv Mishra1; 1University of North Texas

9:40 AM Break

10:00 AM Keynote
MultiStage Fatigue (MSF) Modeling of Magnesium in a Corrosion Environment: Mark Horstemeyer1; 1Liberty University

10:45 AM Keynote
Novel Texture Controlling of Mg Alloys: Bin Jiang1; Guangsheng Huang1; Fusheng Pan1; 1Chongqing University

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 Furrer1; Vasisht Venkatesh1; Jean Philippe Thomas1; 1Pratt & Whitney

8:35 AM Invited
Materials, Manufacturing, and Design: Perspectives on New and Nascent Techniques: Dennis Dimiduk1; Stephen Niezgoda1; Michael Groeber1; 1BlueQuartz Software LLC; 2The Ohio State University

9:05 AM Invited
Accelerated Materials Design Strategy for Additive Manufacturing at Access e.V.: Ulrike Hecht1; Michael Mathes1; Daniel Röhrens1; 1Access e.V.

9:35 AM Invited
Alloy Design Through Sequential Learning: James Saal1; 1Citrine Informatics

9:20 AM
Large-strain Cruciform Testing for Characterization of Macro- and Micro-scale Formability of Sheet Metals: Baran Guler1; Orhan Aytuna1; Mert Efe1; 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 Miyake1; 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 Nomura1; Toshihiko Kuwabara1; 1Tokyo University of Agriculture and Technology

10:40 AM
Multiscale Modeling of Self-piercing Riveting Process: Georges Ayoub1; 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 Upadhyay1; Jan Capek1; Tobias Panzner1; Toshihiko Kuwabara1; 1Tokyo University of Agriculture and Technology

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 C. C. Miller, University of Florida; Kester Clarke, Colorado School of Mines; Piyush Upadhyay, Pacific Northwest National Laboratory; John C. C. Miller, University of Florida; Kester Clarke, Colorado School of Mines; Piyush Upadhyay, Pacific Northwest National Laboratory

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 Stebner2; 1Colorado School of Mines; 2University of Michigan

8:40 AM Invited
Multi-directional Deformation Capabilities in the NIST Center for Automotive Lightweighting (NCAL): Adam Creuziger1; Mark Idicola1; Thomas Gnaupel-Herold1; William Luecke1; Tim Foecke1; Matthias MerzKirch1; Dilip Banerjee1; 1National Institute of Standards and Technology

8:05 AM Invited
Material and Process 4.0: Model-Based Material and Process Development: David Furrer1; Vasisht Venkatesh1; Jean Philippe Thomas1; 1Pratt & Whitney

8:35 AM Invited
Materials, Manufacturing, and Design: Perspectives on New and Nascent Techniques: Dennis Dimiduk1; Stephen Niezgoda1; Michael Groeber1; 1BlueQuartz Software LLC; 2The Ohio State University

9:05 AM Invited
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9:35 AM Invited
Alloy Design Through Sequential Learning: James Saal1; 1Citrine Informatics

9:20 AM
Large-strain Cruciform Testing for Characterization of Macro- and Micro-scale Formability of Sheet Metals: Baran Guler1; Orhan Aytuna1; Mert Efe1; 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 Miyake1; 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 Nomura1; Toshihiko Kuwabara1; 1Tokyo University of Agriculture and Technology

10:40 AM
Multiscale Modeling of Self-piercing Riveting Process: Georges Ayoub1; 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 Upadhyay1; Jan Capek1; Tobias Panzner1; Toshihiko Kuwabara1; 1Tokyo University of Agriculture and Technology

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 C. C. Miller, University of Florida; Kester Clarke, Colorado School of Mines; Piyush Upadhyay, Pacific Northwest National Laboratory; John C. C. Miller, University of Florida; Kester Clarke, Colorado School of Mines; Piyush Upadhyay, Pacific Northwest National Laboratory

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 Stebner2; 1Colorado School of Mines; 2University of Michigan

8:40 AM Invited
Multi-directional Deformation Capabilities in the NIST Center for Automotive Lightweighting (NCAL): Adam Creuziger1; Mark Idicola1; Thomas Gnaupel-Herold1; William Luecke1; Tim Foecke1; Matthias MerzKirch1; Dilip Banerjee1; 1National Institute of Standards and Technology
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, 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 Gruber1; Siddhartha Pathak2; Garritt Tucker3; Colorado School of Mines; 1University of Nevada, Reno

8:20 AM
Micromechanical Studies of Laser Surface Remelted Hypereutectic Al-20Si Alloy: Huai-Hsun Lien1; Amit Misra2; Jyoti Mazumder1; 1University of Michigan

8:40 AM
Stability of Nanotwinned Thin Metal Films: Shefford Baker1; Nathaniel Rogers1; Kenneth Shaughnessy1; Cornell University

9:00 AM Invited
Atomistic Simulation of Twinning Mediated Deformation and Plasticity in Au Nanowires: Chuanting Dong1; Frederic Sansoz1; Reza Rezaei2; 1University of Manitoba; 2University of Tehran

9:40 AM Break

10:00 AM
Mechanical Phase Mapping of Meteorites: Combining EDX and Nanoindentation: Jeffrey Wheeler1; 1ETH Zurich

10:20 AM
Role of Grain Boundaries on Plasticity and Fracture of Nanocrystalline MgAl2O4: Jessica Maita1; Jacob Davis1; James Wollmershauser1; Edward Gorzkowski1; Boris Feigelson1; 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 Hornebuch1; Steven Dean1; Xuyang Zhou1; Anit Giril1; Anthony Roberts1; Greg Thompson3; Kris Darling1; 1US Army Research Laboratory; 2University of Alabama

11:00 AM
Thermally Stable and High-strength Nanoporous Aluminum: Wei Yang1; Hai-Jun Jin1; 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 Goswami1; Alex Moser1; 1Naval Research Laboratory

8:30 AM
Microstructure Analysis and Modeling of the Effective Properties of Damaged Fe-TiB2 Metal Matrix Composites: Khoula Darhmi1; Kateri, Ordin1; Zehoua Hadjem-Hamouche1; Leo Morin1; Frederic Bonnet1; Jean-Pierre Chevalier1; 1PMM-ENSAM

8:55 AM
Effects of Interface Characteristics on High Volume Fraction Al/SiCp Composites under Compressive Stress: Taegyu Lee1; Donghyun Lee1; Hobyung Chae1; Soo Yeol Lee1; 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 Arya2; Srikrumar Banerjee2; 1Bhabha Atomic Research Centre; 2Homi Bhabha National Institute
8:50 AM
Sc-free Nanoprecipitate-strengthened Aluminum Alloys with Exceptional Creep Resistance: Richard Michi1; David Seidman1; David Dunand1; 1Northwestern University

9:10 AM
D022 • D022' Dual-phase Microstructure in As-cast Al-Mo-Ti Alloys: Andreas Leineweber1; Mario Kriegel2; Stefan Martin1; ShunLi Shang3; 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 Poplawsky1; Patrick Shower2; Lawrence Allard3; Matthew Chisholm4; Dongwon Shin5; Amrit Shyam6; 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 Knippling1; 1Naval Research Laboratory

11:00 AM
Impact of L12-phase Dispersoids on the Hardening Behavior of Multi-phase Strengthened Aluminum Alloys: Viktor Wessely1; Robin Schäublin1; Stephan Gerstl1; Stefan Pogatscher2; Peter Uggowitzer1; Jörg Löfler1; 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


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 Gregurek1; Katja Reinharter1; Jürgen Schmidt1; Alfred Spanring1; 1RHI Magnesita

11:05 AM
Slag Reduction Kinetics of a Lead Slag from a Secondary Lead Smelter: Stuart Nicol1; 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 Yao1; Cheng Liu1; Zeshang Dong1; 1China ENFI Engineering Corporation
MATERIALS PROCESSING

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


Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafig Alam, University of Saskatchewan; Joseph Gorgan, 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 Wilson²; Stephen Hughes¹; ‘Outotec Pty Ltd

11:05 AM
Production of SHG Zinc from 100% Recycled Materials: John Pusateri¹; Brandon Tirpak¹; J. R. de Wet¹; ‘American Zinc Recycling Corp.

11:25 AM
Recent Development of EAF Dust Treating at Shisaka Smelting Co., LTD: Satoru Takaya¹; Naoki Kubota¹; Hiroshi Watanabe¹; Takao Kudo¹; ‘Shisaka Smelting Co., LTD.

MATERIALS PROCESSING

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


Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafig Alam, University of Saskatchewan; Joseph Gorgan, 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 Moats¹; Timothy Hymer²; ‘Missouri 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 Asselin¹; ¹The University of British Columbia

11:25 AM
Optimizing Additive Ratios in Alkaline Zincate Electrodeposition: Margaret Scott¹; Michael Moats¹; ¹Missouri University of Science and Technology

11:45 AM
Current Efficiency Increase in Zinc Electrodereposition at Cajamarquilla Refinery: Juliano Alves de Lima¹; Eder Lucio Martins¹; Gian Gonzales¹; Tone Filho¹; ¹Nexa

ELECTRONIC MATERIALS


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

Program Organizers: Hiroshi Nishikawa, Osaka University; Shikang 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.SMd 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 CoB Metallization: Chao-hong Wang¹; 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 Lu¹; Ching-Hsun Chang¹; Hsien-Ming Hsiao¹; Satoshi Ikubo¹; Yee-Wen Yen¹; 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 Lee¹; Wei-Ling Chou¹; Ming-Kai Lu¹; Tsai-Tung Kuo¹; 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 Chen¹; 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 Tan¹; Hideyuki Yasuda¹; Stuart McDonald¹; Kazuhiro Nagita¹; 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 Haseeb1; Ee Lynn Lee1; Yi Sing Goh1; Y. H. Wong1; M. F. M. Sabri2; 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 Huang2; Po Hsun Wang3; Ming-Zer Lin3; 1National Chung Hsing University

10:40 AM
Learning from the Ni3Sn2 for Cu6Sn5: Andreas Leineweber1; Christian Wieser2; Werner Hügel3; 1TU Bergakademie Freiberg; 2Robert Bosch GmbH

11:00 AM
Zn Whisker Growth under High Temperature and Humidity Conditions: Eul Yong Chae1; 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 Levitas1; 1Iowa State University

8:20 AM
Phase-field Modeling of Precipitates in Multicomponent Alloys with Various Coherency States: Tianie Cheng2; Youhai Wen3; Jeffrey Hawk4; 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: Mira Verma1; Radip Mukherjee2; 1Indian Institute of Technology Kanpur

9:00 AM
Phase-field Simulation of Microstructure Evolution during Solidification in Metal Additive Manufacturing: Jiwon Park1; Chang-Seok Oh1; 1Korea Institute of Materials Science

9:20 AM
Multilayer Phase Modeling of Artificial Aging in a Multicomponent Aluminum Alloy based on the Subcritical Growth Theory: Daniel Larouche1; Tohid Naseri1; Rémi Martínez2; Francis Breton3; Denis Massinon4; 1Laval University; 2Linamar Corporation; 3Rio Tinto; 4Montupet Laigneville

10:40 AM
Modeling of Precipitates in Multicomponent Alloys: Various Coherency States: Christian Wieser1; Massinon2; 1TU Bergakademie Freiberg; 2Robert Bosch GmbH

10:00 AM
Mesoscale Models for Investigating Solid-state Phase Transformations in Metal Hydrides for Hydrogen Storage: Tae Wook Heo1; Xiaowang Zhou2; ShinYoung Kang1; Rongpei Shi3; Brandon Wood1; 1Lawrence Livermore National Laboratory; 2Sandia National Laboratories

10:20 AM
Atomistic modeling based on the Quasiparticle Approach of the Fcc-bcc Phase Transformations: Helena Zapolsky1; Mykola Lavrskiy2; Renaud Patte3; Olha Nakonechna1; Gilles Demange3; Frederic Danoy4; 1Qpm, Umr 6634

10:40 AM
Lattice Boltzmann Phase-field Modelling of Solidification Process for the Ni-Nb Binary-alloy: Xueqin Huang5; 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 Moser2; 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


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 Apelian1; 1Worcester Polytechnic Institute

8:40 AM Invited
10” Guillermo Aguilar2; 1University of California, Riverside

9:10 AM
Microstructurally Stable Nanocrystalline Mg Alloys: Suveen Mathaudhu1; 1University of California, Riverside

9:30 AM
Hetero-deformation Induced (HDI) Hardening in Heterostructured Materials: Yuntian Zhu3; Xiaolei Wu2; 1North Carolina State University; 2Institute of Mechanics
9:50 AM Break

10:10 AM Invited
Processing Pathways to Stabilized Nanocrystalline Structures: 
Christopher Schult1; 1Massachusetts Institute of Technology

10:40 AM Invited
Using High-pressure Torsion for the Processing of Ultra-strong Bulk Solids: Megumi Kawasaki2; Terence Langdon3; 2Oregon State University; 3University of Southampton

11:10 AM Invited
Recent Findings on Paradoxes of Severe Plastic Deformation: 
Ruslan Valiev2; 1UFA State Aviation Technical University

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 a l’Energie Atomic 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 Parish1; Daniel Morral1; Yutai Kato2; Arunodaya Bhattacharya3; Andrew Lupini3; Philip Edmondson3; Oak Ridge National Laboratory

8:30 AM
Depth-dependent Characterization and 3D Tomography of In-situ Ion Irradiated Microstructure: Wei-Ying Chen1; Meiimei Li2; Argonne National Laboratory

8:50 AM
Effect of Chemical Compositions on Precipitate Coherency Loss After In-situ Irradiations: Ling Wang1; Wei-Ying Chen2; David Martin2; Peter Baldo3; Meiimei Li2; Brian Wirth1; Steven Zinkle1; Argonne National Laboratory

9:10 AM
Probing Thermal Diffusivity Degradation and Point Defect Density in self-ion Implanted Tungsten with Transient Grating Spectroscopy: Mohamed Abdallah Reza1; Hongbing Yu1; Kenichiro Mizohata1; Felix Hofmann1; Department of Engineering Science, University of Oxford; Materials Physics, University of Helsinki

9:30 AM Break

9:50 AM Invited
Quantitative Analysis of Atomic Scale Defects in Irradiated Materials: Farida Selim1; Sahil Agarwall; Aaron Kohnert2; Jacob Cooper3; Nan Li4; Yongqiang Wang1; Djamel Kaoumi1; Danny Edwards4; Laurent Capolungo; Peter Hosmann; Blas Uberuagab; Bowling Green University; Los Alamos National Laboratory; North Carolina State University; Pacific NW National Laboratory; University of California, Berkeley

10:20 AM
Raman Signature of Point Defects in Boron Carbide: Guido Roma1; Gaëlle Gutierrez2; Kevin Gillet1; Dominique Gosset1; CEA

10:40 AM
Noble Gas Bubble Superlattice in bcc Metals under Irradiation: Cheng Sun1; D. Sprouster2; S. Gill3; M. Topsakal2; L. Ecker2; J. Gan1; Idaho National Laboratory; Brookhaven National Laboratory
11:00 AM
Study of Neutron Irradiation Damage of HT-UPS Steel Using Synchrotron X-ray Techniques: Sri Tapaswi Nori1; Alejandro Figueroa1; Jonova Thomas1; Gyuchul Park1; Walter Williams1; Hemant Sharma1; Jun-Sang Park1; Peter Kenesei2; Jonathan Almer2; Zhengrong Lee3; Mark Warren1; Jeff Terry3; Maria Okuniewski1; 1Purdue University; 1Argonne National Laboratory; 2Illinois Institute of Technology

11:20 AM
Ion Beam Synthesis of Nano-metallic Oxide Particles in High Purity FeCr: Stephanie Jublot-Leclerq1; Martin Owusu-Mensah1; Joël Ribis1; Vladimir Borodin2; Ryan Schoell2; Ce Zheng3; 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; Heojong 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
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Session Chairs: Gisele Azimi, University of Toronto; Kerstin Forsberg, KTH Royal Institute of Technology

8:00 AM Keynote
Development of a Physicochemical Model Combined with an Engineering Model for Predicting Solvent Extraction Performances within the Context of Lithium-ion Battery Recycling: Alexandre Chagnes1; 1GéoRessources, Université de Lorraine

8:30 AM
A Fundamental Investigation of Li2CO3 Crystallization from Li2SO4 System: Hongting Liu1; Gisele Azimi1; 1University of Toronto

8:50 AM
Recycling of End-of-life Lithium-ion Battery of Electric Vehicles: Ka Ho Chan1; 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 Poly Lithitionite Ore for Industrial Application: Omoniyi Israel1; Agaku Peter1; Baba Alafara1; 1Ahmadu Bello University; 1University of Ilorin

9:30 AM Break

9:45 AM
Selective Lithium Recovery from Brines Using Hydrothermally Treated Titania Slag: Raja Shektar Marthi1; York Smith1; 1University of Utah

10:05 AM
Review on Removal of Impurities from REE Processing Solutions: William Judge1; Gisele Azimi1; 1University of Toronto

10:25 AM
Molecular Recognition Approach to REE Extraction, Separation and Recycling: Gulaim Seisenbaeva1; 1SLU

10:45 AM
Production of Energy Saving Materials from the Waste Mixtures of REEs: Martina Petranikova1; Moufida Mansouri1; Cristian Tunsu1; Burcah Ebin1; 1Chalmers University of Technology

11:05 AM
Selective Recovery of Scandium from Nickel Laterite Ore by Acid Roasting - Water Leaching: John Anawati1; 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 Ay tug, Oak Ridge National Laboratory; Konstantinos Sierr os, 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 Panati1; 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 Cipollone1; Derek Doyle2; Konstantinos Sierr os3; 1West Virginia University; 2Air Force Research Laboratory

8:45 AM Invited
Multiscale Additive Manufacturing of Biomedical Electronics: Yong Lin Kong1; 1University of Utah

9:10 AM Invited
Evaluating Electro-mechanical Reliability of Polymer Supported Films Using In-situ Methods: Megan Cordill1; 1Erich Schmid Institute

9:35 AM Break

9:55 AM Invited
Towards the Next Generation of 3D Printable Energy Storage Devices: Konstantinos Sierr os1; 1West Virginia University

10:20 AM Invited
Multi-material Additive Manufacturing of Ionomeric Polymer Membranes with 3D Topologies: Kwang Kim1; Zakai Olsen2; 1University of Nevada, Las Vegas

10:45 AM
Electric Field Assisted Ultra-Fast R2R Printing Technology for High-Performance Skin-like Smart Sensors: Ying Zhong1; Long Wang2; Rui Kou3; 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 Arango1; 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; 4Technical 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 Maier1; Bernd-Arno Behrens2; 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; Anatoli Polyaniskii2; Peter Lee2; Thomas Bieler3; 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 Bieler1; 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 Croteau1; Eureka Pai Kulyadi2; Chaitanya Kale3; Di Kang3; Derek Siu4; Thomas Bieler4; Philip Eisenlohr4; Kiran Solanki5; Elisa Cantregiani5; Nicolas Jacques5; Daniel Balint5; Paul Hooper5; Said Atieh6; 1-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 Brady7; Eric Taleff8; 7University of Texas at Austin

9:20 AM Break

9:40 AM
Dynamic Grain Growth in Refractory Metals: Eric Taleff4; 4University of Texas at Austin

10:00 AM
Molybdenum Foil Tensile Testing: Brandon Kenny4; Gary Rozak5; 4Miami University; 5H.C. Starck Inc

10:20 AM
Thermally Activated Deformation Processes in W-Re Alloys: Verena Maier-Kiener1; 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 Han1; Ping-Jiong Yang2; 1Xi’an Jiaotong University

11:00 AM Invited
A Thermoelectrically Based approach to Reduce Adhesive Wear during Blanking: Markus Welm1; Philipp Tröber1; Hannes Alois Weiss1; Peter Demmel2; Roland Golle2; Wolfram Volk2; 1Technical University of Munich. Chair of Metal Forming and Casting; 2Technical University of Munich; 3MAN Truck and Bus AG
**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, Isra University; Neale Neelameggham, IND LLC

**Monday AM | February 24, 2020**

**Session Chair:** Shadia Ikhmayies, Isra University

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8:00 AM Introductory Comments

8:05 AM

Molten Salt Electrolysis Production of Solar Silicon from Natural Quartzite: *Aditya Moudgal*1; Sarat Buasal1; Alexander McMahon1; Yi Jie Wu1; Adam Powell1; Uday Pal1; Yu Zhong1; *Worcester Polytechnic Institute; Boston University*

8:25 AM

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

8:45 AM

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

9:05 AM

Combustion Synthesis of Nanostructured Silicon: *Sergio Cordova*1; Evgeny Shafrovich1; *University 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 Morita1; *The University of Tokyo*

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**PHYSICAL METALLURGY**


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

**Program Organizers:** Mohamed Elbakshwan, 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 Elbakshwan, UW-Madison; Tasnim Hassan, North Carolina State University; Mark Anderson, University of Wisconsin Madison

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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 Jang1; *Korea Advanced Institute of Science & Technology*

8:40 AM

Diffusion Bonding of Ag-Cu Bi-Layered Electrical Contacts: *Daudi Waryoba*2; Linsea Paradis1; *Pennsylvania State University*

9:00 AM

Diffusion Bonding of Ti-6Al-4V Alloy to Interstitial Free (IF) Steel Using Copper and Nickel Interlayers: Manil Raj1; M.J.N.V. Prasad1; K Narasimhan1; *IIIT 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 Langdon1; *Oregon State University; University of Southampton*

9:40 AM Break

10:10 AM

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

10:30 AM

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

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**PHYSICAL METALLURGY**


*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**

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

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8:00 AM Invited

Phonon Dispersion and Linewidth in ThO2 Measured by Neutron Scattering: *Matthew Bryan*1; Lyuwen Fu1; Matthew Mann1; Chris Marianetti1; Michael Manley1; *Oak Ridge National Laboratory; Columbia University; Air Force Research Laboratory*

8:30 AM Invited

Thermal Transport in ThO2: *Chris Marianetti*1; *Columbia University*

9:00 AM

Study of Thermal Transport Properties of Thorium Dioxide Single Crystals: *Narayan Poudel*1; Xiaxin Ding1; Matthew Mann1; Krzysztof Gofryk1; *Idaho National Laboratory; Air Force Research Laboratory*

9:20 AM

Lattice Dynamics and Thermodynamics of Strongly Anharmonic Solids via Bayesian Learning: *Taishan Zhu*1; Jeffrey Grossman1; *Massachusetts 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 Lacroix1; *University De Lorraine*

10:30 AM Invited

Advancing Insights into Phonon Thermal Transport with Theory/ experiment Interactions: *Lucas Lindsay*1; *Oak Ridge National Laboratory*
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 Lavermia, 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 Chair: 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 Ding; Qiang Li; Zhongxia Shang; Xinghang Zhang; 1Purdue University

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

8:40 AM
Properties of Ultrafine Grain Titanium Fabricated by Multimode Deformation Processing: Benjamin Ewing; Benjamin Davis; Lane Bailey; Jeffrey Stater; Mathew Hayne; Skyler Davis; Melina Endsley; Terry Lowe; Tamás Ungár; Fort Wayne Metals; Colorado School of Mines; 1Eötvös University

9:00 AM
Deformation Compatibility between Nanotwinned and Recrystallized Grains Enhances Resistance to Interface Cracking in Cyclic Loaded Stainless Steel: Qian Li; Fen Kai Yan; Nairong Tao; Ke Lu; 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 Davis; Adam Griebel; Jeremy Schaffer; Terry Lowe; Tamás Ungár; Colorado School of Mines; Fort Wayne Metals; 1Eötvös University

10:00 AM Invited
On the Fracture Toughness of Gradient Pure Nickel: Qin Yu; Ruqing Cao; Jie Pan; Yan Lin; Andrew Sweet; Yi Li; Robert Ritchie; Lawrence Berkeley National Laboratory; Shenyang 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; Wei Zhang; University 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; Malgorzata Lewandowska; 1Warsaw University of Technology

11:00 AM
Fatigue Properties and Cyclic Behavior of Tensile Pre-deformed Nanotwinned Cu: Qingsong Pan; Hafshe Zhou; Huajian Gao; Lei Lu; 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
SA | 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; Roger Minich; Lawrence Livermore National Laboratory

8:45 AM
Experimental Measurements and Modeling of Lattice Rotation around Inter and Transgranular Spall Voids in Shocked Copper Bicrystals: Elizabeth Fortin; Benjamin Shaffer; Saul Opie; Pedro Peralta; Arizona State University

9:05 AM
Understanding and Predicting Damage and Failure at Grain Boundaries in BCC Ta: Jie Chen; Eric Hahn; Avinash Dongare; Saryu Fensin; University of Connecticut; 2Los Alamos National Laboratory

9:25 AM
Application of X-ray Phase Contrast Imaging to Spall in Magnesium Alloy AZ31B: David Chapman; Lukasz Farbaniec; John Jonsson; Michael Rutherford; Liam Smith; Emilio Escauriza; Daniel Eakins; University of Oxford

9:45 AM Break

10:05 AM Invited
A Grain Level Investigation of Ductile Failure using High-energy X-ray Characterization: Diwaker Naragani; Jun-Sang Park; Peter Kenesei; Michael Sangid; Purdue University; Argonne 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; Avinash Dongare; University of Connecticut
11:05 AM  
**Shock Recompaction of Existing Spall Damage in Copper**: David Jones; Saryu Fensin; Robert Hixson; Los Alamos National Laboratory

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**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, Genoble Institute of Technology; MingXin Huang, University of Hong Kong; Amy Clarke, Colorado School of Mines; C. Tasin, Massachusetts Institute of Technology

**Monday AM | February 24, 2020**

**Mission Hills | Marriott Marquis Hotel**

**Session Chair:** Sebastien Allain, Institut Jean Lamour

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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; Joël Malaplate; Frédéric De Geuser; Denis Sornin; Alexis Deschamps; CEA Saclay; SIaMaP, 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; Niklas Pettersson; Lars Högland; Amer Malik; Jan Jonsson; Staffan Hertzman; Sten Wessman; Andreas Stark; David Lindell; Swerim 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 Benrabah; Z. Tournoud; Frédéric Bonnet; Frederic De Geuser; Alexis Deschamps; D. Huin; P. Donnadieu; Hugo Van Landeghem; Université Grenoble Alpes, CNRS, Grenoble INP, SIaMaP; Université Grenoble Alpes, CNRS, Grenoble INP, SIaMaP; ArcelorMittal; ArcelorMittal

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**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; Jian-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 Keskinlikilic, Attilim 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

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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; Nicholas Grundy; Ralf Rettig; Lina Kjellqvist; Johan Jeppsson; Ake Jansson; Johan Bratberg; Thermo-Calc Software Inc.; Thermo-Calc Software AB

**3:05 PM**  
**Mechanical Properties of a Laser Deposited Spherical Ti4822 Alloy:** Monnamme Tlotleng; Sisa Pityana; Samuel Skhosane; Council 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; Swerim 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; Tian Zhongliang; Shu Yang; Yanqing Lai; Central 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; Anjun Xu; Qi Zhang; Ji Li; University of Science and Technology Beijing; Northeastern University, China

**4:40 PM**  
**Effect of Magnetic Field on CaO-SiO2-CaF2 Mould Flux: New Insight from Molecular Dynamic Simulation:** Qi Jiang; Weitong Du; Yu Wang; Chongqing University

**5:00 PM**  
**Investigation of Crack Initiation and Propagation in Super Duplex Stainless Steel During Hot Working:** Weipeng Shen; Fuming Wang; Zhanbing Yang; Changrong Li; Ping Lin; Xiaojie Zhu; University of Science and Technology Beijing; TSINGSHAN
ADDITIVE TECHNOLOGIES

Additive Manufacturing Keynote Session

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizer: Ryan Dehoff, Oak Ridge National Laboratory

Monday PM | February 24, 2020
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 Furuhara; 1Tohoku University

3:05 PM Keynote
Microstructural Control for Additive Manufacturing—An Advanced Microscopy Approach: Simon Ringer; 1University of Sydney

3:35 PM Keynote
Texture and Anisotropy in Metals Additive Manufacturing: Anthony Rollett; 1University of Sydney

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; 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; 1Michigan State University; Aritra Chakraborty; 2Argonne National Laboratory; Pratheek Shanthraj; 3Max Planck Institut für Eisenforschung GmbH; Martin Diehl; 4Cornell University

3:00 PM
Microscratch-induced Deformation Twins in Mg Single Crystals: Kehang Yu; 1Xin Wang; 2Olivia Donaldson; Subhash Mahajan; 1Irene Beyerlein; 1Timothy Rupert; 1Julie Schoenung; 1Enrique Lavernia; 1University of California, Irvine; 2University of California, Davis; 3University of California, Santa Barbara

ENERGY & ENVIRONMENT

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

Monday PM | February 24, 2020
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 Makarov; 1Helmholtz-Zentrum Dresden-Rossendorf e.V.
2:55 PM Invited
Soft Magnetic Amorphous and Nanocrystalline Bilayer Ribbons for GMI Sensors: Ivan Storvareniæ; Frantisek Andrejkæ; Branislav Kuncaæ; Jozef Marcinæ; Peter Svecæ; ¹Institute of Experimental Physics Sas; ²Institute of Physics SAS

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

3:40 PM Invited

4:00 PM Break

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

4:45 PM Invited
Electrochemical Polishing of Thin Metallic Glass Ribbons: Ferenc Zamborszkyæ; Eva Fazakasæ; Elek Csizmadiaæ; Mark Kovacsæ; 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 Honkuraæ; S. Honkuraæ; ¹Magnedesign Corporation; ²Nanocor Incorporated

5:35 PM Invited
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 Xuæ; Yujuan Zhouæ; Yongpeng Maæ; Jintian Wuæ; Tao Jiangæ; 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

Monday PM | February 24, 2020
16B | San Diego Convention Ctr

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

2:30 PM Invited
Enhanced Photo Response by Oxygen Retreatment at Hetero-interface of Mo5S2/Si Solar Cells: Sangram Pradhanæ; Messaoud Bahouraæ; ¹Norfolk State University

2:50 PM Invited
Highly Stable and Efficient Perovskite Solar Cells with Functional Nanocomposites and Interface Engineering: Yoon-Bong Hahnæ; ¹Chonbuk National University

3:10 PM Life Cycle Analysis of Battery Materials: a Circular Economy Perspective: Qiang Daiæ; Olumide Winjobiæ; ¹Argonne National Laboratory

3:30 PM Invited
On the Design and Development of Lignin based Sustainable Materials: Surojit Guptaæ; ¹University of North Dakota

3:50 PM Break

4:10 PM Invited
Solar Water Oxidation at GaAs Absorbers Protected by Electrodeposited Alloys: Giovanni Zangariæ; Yin Xuæ; ¹University of Virginia

4:30 PM
MWCTNs/Al253 Heterostructure Decorated on NiCo Foam as a Highly Performance Cathode Material for Supercapacitors: Mutawara Mahmood Baigæ; Muhammad Taqi Mehranæ; Iftikhar Hussain Gultæ; 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 Courtay, Imperial College London; Kazuhiro Nagoya, University of Queensland; David Yan, San Jose State University; Mike Wolverton, Raytheon; Babak Arfaei, Ford Motor Company; Andre Delhaise, Celestica; Mehran Maalekian, Mat-Tech; Mohammad Salieh, Universiti Malaysia Perlis

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

Session Chairs: Albert Wu, National Central University, Taiwan; Fan-Yi OuYangæ, National TsingHua University, Taiwan
3:50 PM Break

4:10 PM
Fatigue and Creep Properties of Sintered Ag Paste from Room Temperature to High Temperature: Chuantong Chen1; Chanyang Choe1; Aiji Suetake1; Katsuaki Suganuma1; 3Osaka 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; Etloic Ferdinand1; Jacques Baillargeat1; Hadi Bahsoun1; Xavier Milhiet1; 2Prime Institute CNRS ENSLMA; 3Prime Institute CNRS Université Poitiers

4:50 PM
Low Temperature Cu-Cu Bonding by Copper-based Paste with Small Amount Sn Additive: Kuo-Shuo Huang1; 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-Chie Liu1; 1Chih Chen

CHARACTERIZATION

Advanced Real Time Imaging — Alloys

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

Program Organizers: Jinichiro Nakano, National Energy Technology Laboratory; David Alman, National Energy Technology Laboratory; II Sohn, Yonsei University; Hiroyuki Shibata, Imram; Tohoku University; Antoine Allanore, Massachusetts Institute of Technology; Candan Tamerler, University of Kansas; Noritaka Saito, Tohoku University; Antoine Allanore, Massachusetts Institute of Technology; Bryan Webler, Carnegie Mellon University; Anna Nakano, US Department of Energy National Energy Technology Laboratory

Monday PM | February 24, 2020
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 Li1; Long-Qing Chen1; 1Pennsylvania State University; 2Xian 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): Bernoull Andilab1; Comorondre Ravindran1; 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 Li1; Siriram Vijayan1; Carolin Fink1; Joerg Jinschek1; 1Ohio State University

3:30 PM
In-situ Observation of Hyperbranched Dendrite Growth: Tiberiu Stan1; 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 Webler1; 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 Gao1; 1Northeastern University

4:50 PM
Nanoscale 4D Microstructural Characterization of Corrosion in Aluminum Alloys using In-situ Transmission X-ray Microscopy (TXM): Snidhar Niverty1; Arun Singaravelu1; Xianghui Xiao1; Wah-Keat Lee1; Nikhil Shewal1; 1Arizona State University; 2Brookhaven National Laboratory

5:10 PM
Time-Resolved X-ray Tomography Studies of Dendritic Evolution in Al-Cu Alloys: Kate Elder1; Tiberiu Stan1; Yue Sun1; Xianghui Xiao1; 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 Hassanii, Cornell University

Monday PM | February 24, 2020
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 Levitas1; 1Iowa State University

2:55 PM Invited
Plastic Flow Instability, Surface Folding and a Mechanochemical Effect in Large Strain Deformation of Metals: Srinivasan Chandrasekar1; Anirudh Udupa1; Tatsuya Sugihara1; Koushik Viswanathan1; James Mann1; 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 Devarg1; Bharat Gwalani1; Tamás Varga1; Changyong Park2; Luciano Bergmann2; Jorge Santos2; Peter Staron2; Benjamin Klusemann2; 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 Reynolds1; Md. Reza-E-Rabby2; Xiao Li3; Komarasamy Mageshwari1; Jeffrey Holliday1; 1University of South Carolina; 2PNRL
4:00 PM Break

4:20 PM Invited
Hybrid Cutting-Extrusion for Sheet Metal Production with Exceptional Microstructure Control: Kevin Trumble; B. Sliven Puentes; Mohammed Issahah; Mojib Saei; Anirudh Udupa; James Mann; Srinivasan Chandrasekar; 1Purdue University; 2University of West Florida

4:45 PM
Microstructural Analysis and Modeling of Grain Refinement During Tribometric Surface Deformation: Aashish Rohatgi; Yulan Li; Bharat Gwalani; Shenyang Hu; Yang He; Arun Devaraj; Erin Barker; Tiffany Kaspar; Jinhui Tao; Chongmin Wang; Petr Sushko; Suveen Mathaudhu; 1Pacific Northwest National Laboratory; 2University of California Riverside

5:05 PM
Structural and Compositional Changes During Shear Assisted Processing of Materials: Bharat Gwalani; Matthew Olszta; Yang He; Jinhui Tao; Chongmin Wang; Tiffany Kaspar; Aashish Rohatgi; Peter Sushko; Arun Devaraj; 1Pacific Northwest National Laboratory

5:25 PM
Electrical Conductivity and Wear Properties of Pure Copper Processed by High Pressure Sliding: Evander Ramos; Takahiro Masuda; Yoichi Takizawa; Zenji Horita; Suveen Mathaudhu; 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; Vineet Joshi; Jens Darsell; Nicole Overman; Scott Whalen; Darrell Herling; 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; Nugeghalli Ravindra, New Jersey Institute of Technology

Monday PM | February 24, 2020
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 Cho; 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; Jagdish Narayan; 1North Carolina State University

3:25 PM
Understanding the Effects of Lattice Strain on MoS2 through Irradiation: Kory Burns; 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 Sakidija; Rajan Khadka; Nirmal Baishnab; George Opletal; 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

Monday PM | February 24, 2020
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; 1China University of Geosciences (Beijing)

2:55 PM
Effect of B,C Addition on (Hf,Zr)B Based Ultra High Temperature Ceramics: Shipra Bajpai; Sudhanshu Shekhar Singh; Kantesh Balani; 1IIT kanpur

3:15 PM
ICME-Based Design of Cermet Tool Material for Friction Stir Welding (FSW) of High-strength Materials: Amit Behera; Qiaofu Zhang; Greg Olson; Rajiv Mishra; 1QuesTek Innovations LLC; 2University of North Texas

3:35 PM
Structural and Dielectric Properties of InCr1-xTixO3+x/2 (x = 2/6, 2/7, and 2/8) Structural and Dielectric Properties of InCr1-xTixO3+x/2 (x = 2/6, 2/7, and 2/8): Victor Emmanuél Álvarez Montorao; Raul Escamilla; Francisco Brown; Subhash Sharma; Noboru Kimizuka; Alejandro Durán; 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; Matthew Duarte; Yasuhiro Kodera; Elias Penilla; Javier Garay; 1University of California San Diego

4:30 PM
Toughening Mechanism of ZTA-TiC-Fe Ceramic Materials Produced by High Gravity Combustion Synthesis: Hongwei Zhao; 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

Monday PM | February 24, 2020
9 | San Diego Convention Ctr

Session Chair: Tushar Borkar, Cleveland State University

2:30 PM
Electroplating Powder for Cold Spray Applications: Gwendolyn Bratcher; Madeline Scott; Elizabeth Hodges; Richard Berdos; Jeffery Rigali; Victor Champagne; Robert Hyers; University of Massachusetts; Raytheon; Pratt & Whitney; Cold Spray Innovations International; University 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; Santiago Vargas; Jessica Rojas; Carlos Castano; Reza Mohammadi; Virginia Commonwealth University

3:10 PM
Morphological Control of Tantalum Carbide through Surface Doping: Tianqi Ren; Richard Tran; Sebastian Lee; Aric Bandera; Manuel Herrera; Xiang-Guo Li; Shyue Ong; Olivia Graeve; University of California, San Diego; Universidad Nacional Autónoma de México

3:30 PM
Mitigation of Asphaltene Deposition on Pipeline Alloy Steel Using Low-temperature Pack Aluminization: Soheil Daryadel; Pralav Shetty; Velu Subramani; Paul Braun; Jessica Krogstad; University of Illinois at Urbana-Champaign; BP 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; Sourav Das; Sambedan Jena; Arijit Mitra; Siddhartha Das; Karabi Das; Department of Metallurgical and Materials Engineering, Indian Institute of Technology Kharagpur; School 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 CoNiCrAl Alloys: Liang Yang; Yu Zheng; Zhigang Yang; Tsinghua 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 Bochiochio, Pratt & Whitney; Kevin Bockenstedt, ATI Specialty Materials; Katerina Christofidou, University of Sheffield; James Oakley, 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 PM | February 24, 2020
11B | San Diego Convention Ctr

Session Chairs: Mario Bochiochio, Pratt & Whitney; Kinga Unocic, Oak Ridge National Laboratory

2:30 PM Invited
Environmental Effect Solutions for Superalloys Today and Tomorrow: Bruce Pint; Oak Ridge National Laboratory

3:00 PM
Enhancement of EB-PVD Thermal Barrier Coating Adhesion Strength by Laser Surface Texturing: Lucille Despres; Jonathan Cormier; Sophie Costil; Romain Carliou; Aurélien Joulla; Amar Saboundji; Institut Pprime; IC-B-LEMP; SAFRAN TECH

3:20 PM
Formation and Composition of Hot Corrosion Deposits on Model Ni-Cr-Al Alloys: Kevin Meisner; Elizabeth Opila; University of Virginia

3:40 PM
High-temperature Corrosion of Ni-based Superalloys in Impure CO2 Power Cycle Environments: Richard Oteksoak; Joseph Tylczak; Gordon Holcomb; Omer Dogan; National 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 Heuer; Brian Gleeson; Case Western Reserve University; University of Pittsburgh

4:50 PM
A Damage Model with Oxidation Effects: Jean-Briac le Graverend; Seungjun Lee; Texas 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; Sebastien Teysseyre; Jeffery Aguiar; Geogy Abraham; Vivekanand Kain; Vijay Vasudevan; University of Cincinnati; Canadian Nuclear Laboratories; Idaho National Laboratory; Bhabha Atomic Research Centre
Algorithm Development in Materials Science and Engineering — Interatomic Potential Developments and Atomistic Modeling I

**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; Garrick Tucker, Colorado School of Mines; Charudatta Phatak, Argonne National Laboratory; Bryan Wong, University of California, Riverside; Mikhail Mendelev, Ames Laboratory; Bryce Merejdig, 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 Mendelev, Ames Laboratory; Ebrahim Asadi, University of Memphis

**2:30 PM Invited**
Advancing Methods for Atomic-scale Modeling of Heterogeneous Systems: Susan Sinnott; 1 Pennsylvania State University

**3:00 PM**
The ReaxFF Force Field - application Overview and New Directions in Accelerated Dynamics, Ferroelectric Materials and Treatment of Explicit Electrons: Adrianus Van Duin; Yun Kyung Shin; 1 Penn State

**3:20 PM Invited**
Recent Interatomic Potential Development Activities at Sandia: Xiaowang Zhou; 1 Sandia 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 Pohang University of Science & Technology

**4:40 PM**
Development of a Modified Embedded-atom Potential for 2D Titanium Carbides (Ti_{n+1}C_n) MXenes: Ning Zhang; Yu Hong; Mohsen Asle Zaeem; 1 University of Alabama; 2 Colorado School of Mines

**5:00 PM**
MEAM-BO: Extension of MEAM to Include Bond Order for Polymer: Sungkwan Mun; Ric Carino; Andrew Bowman; Steven Gwaltney; Sasan Nouranian; Mark Horstemeyer; Michael Baskes; 1 Center for Advanced Vehicular Systems (CAVS); 2 University of Mississippi; 2 Liberty 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**
2 | San Diego Convention Ctr

**Session Chair:** Steve Healy, Consultant

**2:30 PM Introductory Comments**

**2:40 PM**
Keynote
The Alumina Technology Roadmap 4.0: Anne Duncan; 1 HATCH

**3:10 PM**
Effects of the Granular Properties of Bauxite Pisolites on the Solid/Liquid Separation in Liquid Fluidized Beds of Classifiers: Thomas Grillot; Guy Simard; Romain Chesnaux; Damien Boudeville; Lou Perrachon; 1 Université du Quebec à Chicoutimi; 2 Rio Tinto

**3:50 PM**
Mineralogical Assessment of the Solid Phase Obtained on Leaching of Brazilian Red Mud: Amilton Botelho Junior; Denise Espinosa; Jorge Tenório; 1 University of Sao Paulo

**4:10 PM Break**

**4:30 PM**
Inhibition of Kaolinite Dissolution in Bayer Liquor Through Addition of Lithium: Horace O’Gilvie; James Vaughan; Hong Peng; 1 University of Queensland

**4:50 PM**
Ionic Effect of NaCl and KCl on the Flotation of Diaspore and Kaolinite using Sodium Oleate as Collector: Chaojun Fang; Shichao Yu; Hong Peng; Xiaowei Dong; Jun Wang; 1 Henan Polytechnic University; 2 Central South University; 3 The University of Queensland
LIGHT METALS
Aluminum Alloys, Processing and Characterization — Characterization of Aluminum 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 Sediako1; Joshua Stroh1; Glenn Byczynski1; Anthony Lombardi1; Anna Paradowska2; 1University Of British Columbia; 2Nemak USA/CAN.

3:05 PM Invited
Molecular Dynamics Simulations of the Solidification of Pure Aluminum. Mohammad Hossaini1; Konstantinos Salontis1; Mark Jolly2; 1Cranfield University

3:30 PM
Nanoindentation and Cavitation-induced Fragmentation Study of Primary Al,Zr Intermetallics Formed in Al Alloys. Abhinav Priyadarshi1; Tungky Subroto1; Marcello Conte1; Koulis Pericelous2; Dmitry Eskin3; Paul Prentice4; Iakovos Tzanakis5; 1University Of British Columbia; 2Brunel University London; 3Anton Paar TriTec SA; 4University of Greenwich; 5University of Glasgow

4:20 PM Break

4:35 PM
In-situ Neutron Diffraction Solidification Analyses of Rare Earth Reinforced Hypoeutectic and Hypereutectic Aluminum-silicon Alloys. Joshua Stroh1; Dimitry Sediako1; David Weiss2; Vanessa Peterson3; 1University of British Columbia Okanagan; 2Eck Industries; 3ANSTO

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 Kordijazi1; Swaroop Behera1; Omid Akbarzadeh2; Marco Povolo1; 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 Hussain1; 1Aluminium Bahrain (Alba)

BIOMATERIALS
Biodegradable Materials for Medical Applications II — Magnesium Implants II

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

Program Organizers: Jaroslav Drellich, 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

Program Organizers: Jaroslav Drellich, 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 PM | February 24, 2020
Vista | Marriott Marquis Hotel

Session Chairs: Petra Maier, University of Applied Sciences; Norbert Hort, Helmholtz-Zentrum Geesthacht

2:30 PM Keynote
Are those Biproducts of Bidegradable Metals Deleterious to Bone Healing? Kelvin Yeung1; 1The University of Hong Kong

3:05 PM Invited
On Contributors to Fracture in Absorbable Metals. Adam Griebel1; Jeremy Schaffer2; 1Fort Wayne Metals

3:30 PM
Non Invasive Degradation Tracking of Mg Implants in Humans: Jan-Marten Seitz1; Patrick Varady2; Tim Vockensohn3; 1Syntellix AG

3:50 PM
Tailoring Degradation Behavior of Mg-5Nd Alloy by Intermetallic Distribution. Yaping Zhang1; Yuanding Huang2; Frank Feyerabend3; 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; James Tomich; Joshua Hammel; Grant Crawford; South 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 Soderlund; Subhash Risbud; Joerg Loeffler; University of California, Davis; ETH Zurich

5:05 PM

Evaluation of In vitro Fatigue Property of Grain Refined Mg-Ca Alloy: Naoya Kawamura; Taichi Uemura; Naoko Ieko; Toshiji Muka; Kobe University

5:25 PM

Effect of Secondary Processing on Microstructure, Mechanical and Corrosion Response of a Biodegradable Mg1Zn2Ca Alloy: Diksha Matta; Gururaj Parande; Sravya Tekumalla; Manoj Gupta; Vellore Institute of Technology; National University of Singapore

BIOIMATERIALS

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

The Convergence of Biology and Materials Through Bioinspiration: Marc Meyers; University of California San Diego

3:00 PM

Density Control in Wood-templated Epoxy-silicon Carbide Composites: Albert Matsushita; Daniel Kupor; Joanna Mckittrick; University of California San Diego

3:20 PM

Energy Absorbing and Toughening Strategies in Reinforced Tubule Architectures: Audrey Hogan; Marc Meyers; University 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; Worcester Polytechnic Institute

4:10 PM Break

4:25 PM Invited

Bioinspired Design of Next Generation Structural and Thermal Materials: Nima Rahbar; Worcester Polytechnic Institute

4:55 PM

Bioinspired Porous Materials Through Ice and Ultrasound Templating: Max Mroz; Taylor Ogden; Isaac Nelson; Milo Prisbrey; Bart Raeymaekers; Steven Naleway; University of Utah

5:15 PM Invited

Mechanics of Segmented Protection in Nature and in Engineering: A Rich Landscape for Tunability and Performance: Francois Barthet; Ali Shafei; University of Colorado Boulder; McGill University

5:45 PM

Fabricating Bioinspired Helical and Bouligand Scaffolds using a Tri-axial Nest Helmholtz Coils-based Freeze-casting Setup: Isaac Nelson; Paul Wadsworth; Max Mroz; Owen Kingstedt; Jamie Kruzic; Steven Naleway; University of Utah; UNSW 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

Monday PM | February 24, 2020
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 Prilothofer; Rudolf Dobler; Thomas Mrnik; AMAG casting GMBH

3:05 PM

User-friendly Surveillance Tools to Prevent Bleed-out During Cast Start: Mark Badowski; Daniel Krings; Gerd-Ulrich Gruen; Werner Droste; Philip Meslage; Benjamin Jaroni; Hydro Aluminium Rolled Products; Aluminium Norf GmbH

3:25 PM

Beryllium Reduction Potential in AlMg Cast Alloys: Jan Stegich; Alexandra Basa; Anne Kwithyld; Nichloas Smith; Ines Zerbin; Trimet Aluminium Se; SINTEF

3:45 PM

Accurate Real-time Elemental (LIBS) Analysis of Molten Aluminum and Aluminum Alloys: Svinn Hinrik Gudmundsson; Jon Matthiasson; Kristjan Leossorn; DT Equipment; Innovation Center Iceland

4:05 PM Break

4:20 PM

Industrial Verification of Two Rotor Fluxing in Large Crucibles: Terje Haugen; Arild Hakonsen; Vegard innerdal; Hycast AS

4:40 PM

Dynafeed: An Improved Crucible Transfer System: Jean Francois Desmeules; Andre Tremblay; Martin Dubois; Dynamic Concept

5:00 PM

Metal Transfer from Furnace to Furnace – A Case Study: Olivier Dion-Martin; Jean Francois Desmeules; Pierre Jeanroy; Dynamic Concept

5:20 PM

Heavily Loaded Areas in Aluminum Melting Furnaces and Possible Refractory Solutions: Thomas Schiemel; Rudiger Pfarr; Uwe Kremer; Refratechnik Steel Gmbh; Trimet 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

Monday PM | February 24, 2020
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; Raquel Alonso-Perez; Michelle Espy; Cort Gautier; Adrian Losko; John Rakovan; Frank Kehsch; Los Alamos National Laboratory; Harvard University; Miami 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; Oleandr Grydin; Mirko Schaper; Department of Materials Science, Paderborn University

3:10 PM
Unconventional Sodium Chloride in Graphene Liquid Cell: Jaeyoung Hong; Jee-Hwan Bae; Hee-Young Park; Sehyun Lee; Juyoung Kim; Sung Jong Yoo; Dong Won Chon; Korea Institute of Science and Technology

3:30 PM
A Fully Integrated In-Situ Solution for Materials Testing in Sem: Fang Zhou; Carl Zeiss Microscopy GmbH

3:50 PM
Analysis and Detection of Road Surface Defects Using Multiple Sensing Methods: Jeongguk Kim; Korea Railroad Research Institute

4:10 PM Break

4:25 PM
Autonomous Light Optical Microscopy for Quality Control Screening: Andrew Kitahara; Elizabeth Holm; Carnegie Mellon University

4:45 PM
The Influence of Microstructure in Stress Relaxation Cracking: Dafni Daskalaki Mountanou; Tom McCauliffe; Chris Bilsland; Alex Foden; Thomas Britton; Imperial College London

5:05 PM
Austenite Stability Under Focused Ion Beam Milling: Jian Li; Pei Liu; CanmetMATERIALS

5:25 PM
Optical Characterization of Grain Orientation by Directional Reflectance Microscopy: Bernard Gaskey; Ludwig Hendri; Xiaogang Wang; Matteo Seita; Nanyang Technological University

5:45 PM
Accurate Determination of EBSD Pattern Centers with Applications in Resolving Pseudosymmetry: Edward Pang; Peter Larsen; Christopher Schuh; Massachusetts 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

Monday PM | February 24, 2020
8 | San Diego Convention Ctr

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; Marcelo Andrade; ArcelorMittal Global R&D

2:50 PM
Effect of Pre-Treatment During Leaching of High Iron, Cobalt Containing Ore: Yotaro Hara; Douglas Musowwa; Golden Kaluba; Choolwe Muchindu; Haggag Simfuwke; Copperbelt University

3:10 PM
Effects of Sintering Temperature and Time on Preparation of Refractory Materials from Ferronickel Slag under Microwave Irradiation: Huimin Tang; Zhiwei Peng; Foquan Gu; Lei Yang; Ziming Liu; Quanie Leng; Weiguang Tian; Mingjun Rao; Guanghui Li; Tao Jiang; Central South University

3:30 PM
Non-isothermal Carbothermic Reduction Kinetics of Calcium Ferrite: Gang Li; Xuewei Lv; Yuanming Zhou; Guishang Pei; Guibao Qi; Chongqing 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; Xuangeng Zhou; Zhongci Liu; Xuewei Lv; Chongqing University

4:25 PM
Gasifying Defosphorization During the Carbothermic Reduction of Medium Phosphorus Iron Ore Concentrate in Presence of Na2CO3 and SiO2: Jing Zhang; Guoping Luo; Yanbiao Chen; Wenbin Xin; Jianguo Zhu; Inner Mongolia University of Science and Technology

4:45 PM
Non-isothermal Reduction Kinetics of Roasted High Alumina Iron Ore Pellets: Zuoliang Zhang; Ren Chen; Liaoning Institute of Science and Technology

5:05 PM
Kinetics of Coke Gasification Reaction Catalyzed by Alkali Carbonates: Yunpeng Fang; Shengfu Zhang; Cheng Yin; Yuan Zhu; Rongjin Zhu; Yang Li; Chongqing University
TMS 2020 Technical Program

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

Session Chairs: James Hogan, University of Alberta; Tomoko Sano, CCDC Army Research Laboratory

2:30 PM Invited Identification of 11 New Solid Lithium-ion Conductors with Promise for Batteries using Data Science Approaches: Austin Sendek1; Evan Reed2; 1Stanford University

3:00 PM Predicting Organic Ligands Mechanical Behavior with Deep Neural Network and Understanding the Mechanism: Weiyi Zhang1; Chengxi Yang2; Alan Fern3; Matthew Campbell2; P. Alex Greaney4; 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 An5; Alessandro Fortunelli6; William Goddard7; 5University of Nevada, Reno; 6CNR-ICTOM,THC2-Lab, Consiglio Nazionale delle Ricerche; 7Caltech

3:40 PM Machine-learning based Discovery of Novel Scintillator Chemistries: Anjana Talapatra1; Bias Uberuaga2; Chris Stanek3; Ghanshyam Pilania4; 1Los Alamos National Laboratory

4:00 PM A General Machine Learning Framework for Impurity Level Prediction in Semiconductors: Arun Kumar Mannodi Kanakkithodi1; Michael Toriyama2; FathlMustafa2; Michael Davis3; Robert Klie4; Maria Chan5; 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: Ismaïla Dabo1; 1Pennsylvania State University

5:10 PM Machine Learning Guided Search for Single Phase High Entropy Oxides: Shrubha Gangopadhyay1; Prasanna Balachandran2; 1University of Virginia

5:30 PM Use of Atomistic-based Modeling and Materials Informatics to Design and Synthesize Ultra-thin Tunnel Junctions: Ridwan Shahid1; Devon Romine2; Jagaran Acharya3; Ryan Goul4; Judy Wu5; 1Missouri State University; 2The University of Kansas

5:50 PM Designing High Glass Transition Temperature Polymers using Machine Learning: Chiho Kim1; Rohit Batra2; Lihua Chen3; Huan Tran4; Rampi Ramprasad5; 1Georgia Institute of Technology

**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: 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 PM | February 24, 2020
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 Holm1; 1Carnegie Mellon University

3:05 PM Invited Methods for the Correction of Epistemic Resolution Error through Data Collection Process Simulations: Lori Graham-Brady1; Noah Wade1; 1Johns Hopkins University

3:35 PM Determination of Representative Volume Elements for Small Cracks in Heterogeneous Domains via Convolutional Neural Networks: Karen DeMille1; Ashley Spear1; 1University of Utah

3:55 PM Break

4:15 PM Machine Learning Approaches to Image Segmentation of Large Materials Science Datasets: Tiberiu Stan1; Zachary Thompson1; Bo Lei1; Elizabeth Holm2; Peter Voorhees3; 1Northwestern University; 2Carnegie Mellon University

4:35 PM Predicting Crack Location Using a Radial Distribution Function as a Unique Descriptor of Pore Networks: John Erickson1; 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 Gupta1; Gregory Thompson1; Garrett 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 Han1; 1Lawrence Livermore National Lab

5:35 PM Utilizing Convolutional Neural Networks for Prediction of Process and Material Parameters from Microstructural Images: Richard Couperthwaite1; Levi McClenny1; Jaylen James1; Vahid Attari1; Raymundo Arroyave1; 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; Houloung Zhuang, Arizona State University; Sugata Chowdhury, National Institute of Standards and Technology; Arun Kumar Mannodi Kanakkithodi, Argonne National Laboratory

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

**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 Reed2; 1Stanford University

3:00 PM Predicting Organic Ligands Mechanical Behavior with Deep Neural Network and Understanding the Mechanism: Weiyi Zhang1; Chengxi Yang2; Alan Fern3; Matthew Campbell2; P. Alex Greaney4; 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 An5; Alessandro Fortunelli6; William Goddard7; 5University of Nevada, Reno; 6CNR-ICTOM,THC2-Lab, Consiglio Nazionale delle Ricerche; 7Caltech

3:40 PM Machine-learning based Discovery of Novel Scintillator Chemistries: Anjana Talapatra1; Bias Uberuaga2; Chris Stanek3; Ghanshyam Pilania4; 1Los Alamos National Laboratory

4:00 PM A General Machine Learning Framework for Impurity Level Prediction in Semiconductors: Arun Kumar Mannodi Kanakkithodi1; Michael Toriyama2; Fatih Sen2; Michael Davis3; Robert Klie4; Maria Chan5; 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: Ismaïla Dabo1; 1Pennsylvania State University

5:10 PM Machine Learning Guided Search for Single Phase High Entropy Oxides: Shrubha Gangopadhyay1; Prasanna Balachandran2; 1University of Virginia

5:30 PM Use of Atomistic-based Modeling and Materials Informatics to Design and Synthesize Ultra-thin Tunnel Junctions: Ridwan Shahid1; Devon Romine2; Jagaran Acharya3; Ryan Goul4; Judy Wu5; 1Missouri State University; 2The University of Kansas

5:50 PM Designing High Glass Transition Temperature Polymers using Machine Learning: Chiho Kim1; Rohit Batra2; Lihua Chen3; Huan Tran4; Rampi Ramprasad5; 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

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

**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 Bellon1; Qun Li 1; Robert Averback1; 1University of Illinois at Urbana-Champaign

3:00 PM
Computing Grain Boundary Diagrams: Chongze Hu1; 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: Anjil Roy1; Pil-Ryung Cha1; 1Kookmin University

3:40 PM
Simulating Precipitation of Detrimental Boron Nitrides in Microalloyed Steels Based on Experimental Elemental Distributions: Daniela Wipp1; Maximilian Weiss2; Andreas Limbeck2; Tomasz Wojcik3; Sabine Zamberger2; Matthew Galler1; Erwin Povoden-Karadeniz1; 1Christian Doppler Laboratory for Interfaces and Precipitation Engineering CDL-IFE, Institute of Materials Science and Technology, TU Wien; 2Institute of Chemical Technologies and Analytics, TU Wien; 3Institute of Materials Science and Technology, TU Wien; 1voestalpine Forschungsservicegesellschaft Donawitz GmbH; 2voestalpine Wire Rod Austria GmbH

4:00 PM Break

4:20 PM Invited
CALPHAD for Complex Concentrated Alloy Development: New Opportunities: Wei Xiong1; 1University of Pittsburgh

4:50 PM Invited
Thermodynamics, Structure, and the 3D Geometry of Bendable 2D Materials: Joel Berry1; 1Lawrence Livermore National Laboratory

5:20 PM
Thermodynamic Assessment of Actinide Alloys: the Pu-U-Al-Fe-Ga-Ni System: Emily Moore1; Alexander Landa1; Aurélien Perron1; 1Lawrence Livermore National Laboratory

5:40 PM
Theoretical Calculation of Atomic Size in a Solid Solution: Tetsuo Mohri1; 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.

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

**Session Chair:** Luana Caron, Bielefeld University

2:30 PM Invited
Ferromagnetic Shape Memory Heuslers: from Bulk to Nano: Franco Albertini1; Francesca Casoli1; Simone Fabbrici1; Milad Takhsha Ghafrarokhi1; Riccardo Cabassi2; Lucia Nasi2; Cecilia Bennati2; Massimo Solzi2; Francesco Cugini3; Paola Tiberto3; Federica Celegato3; 1IMEM-CNR; 2Universita di Parma; 3INRIM

3:00 PM Invited
Magnetocaloric Effect in Heusler-type Magnetic Shape Memory Materials: Volodymyr Chemenko1; 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 Paudyal1; 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 Gruner1; 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 Fujita1; 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 Ni Nickel Alloys to Processing Parameters Through Classic Solidification Criteria: Kevin Chaput1; Matthew Krug1; Edwin Schwalbach1; ‘Air Force Research Laboratory

3:00 PM
Controlling Freckle Defect Formation Using Magnetic Fields: Andrew Kao1; Ivars Krastins1; Natalia Shevchenko2; Sven Eckert3; Koulis Pericleous1; ‘University of Greenwich; ‘HZDR

3:20 PM
The Prediction of Solidification Defects: A Multi-defects Modeling Jun Li1; Hongbiao Dong1; ‘University 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 Farkas1; ‘Virginia Polytechnic Institute

2:50 PM
Anisotropic Mobility in Faceted 111 110 tilt FCC Grain Boundaries and the Effect of Subsequent Doping: Megan McCarthy2; Timothy Rupert3; ‘University of California, Irvine

3:10 PM
Interplay of Chemistry and Faceting at Grain Boundaries in an Al-alloy: Huan Zhao1; Liam Huber1; Wenjun Lu1; Nicolas Peter1; Dayong An1; Frédéric De Geuser1; Dirk Ponge1; Baptiste Gault1; Dierk Raabe1; ‘Max-Planck-Institut Fur Eisenforschung G

3:30 PM
Quantifying and Predicting a “local” Stacking Fault Energy in Multi-principal Element Alloys: Carlryn LaRosa1; Maryam Ghazisaeidi1; ‘Ohio State University

3:50 PM Invited
Simulating Grain Boundary Structures with DFT Accuracy Through Active Learning of Interatomic Potentials: Tolga Akiner1; Srikanth Patala2; ‘North Carolina State University

4:10 PM Break

4:30 PM
Study on Effect of Symmetric Tilt Grain Boundaries on Twin Nucleation in Ti: Deepesh Giri1; Christopher Barrett1; Haitham El Kadiri1; ‘Mississippi State University

4:50 PM
Vacancy-mediated Solute/Twin Boundary Interactions in HCP Alloys: Mohammad Shahrivar Hooshmand1; Maryam Ghazisaeidi1; ‘Ohio State University

5:10 PM
The Role of Microstructure and Loading Parameters on Deformation Twinning in Nanocrystalline Mg at High Strain Rates: Sergey Golitskiy1; Garvit Agarwal1; Avinash Dongare1; ‘University of Connecticut; ‘Argonne National Laboratory

5:30 PM
Database and Predictive Model of Grain Boundary Properties of Elemental Metals: Hui Zheng1; Xiang-Guo Li1; Richard Tran1; Chi Chen1; Matthew Horton1; Donny Winston1; Kristin Persson1; Shyue Ping Ong1; ‘University of California, San Diego; ‘Lawrence 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 Welch1; ‘Welbank Consulting

3:05 PM Keynote
10 Years of Anode Research and Development: Alcoa & Université Laval Experience: Jayson Tessier1; Julien Lauzon-Gauthier2; Mario Fafard2; Housshang Alamdari1; Carl Duchesne1; Louis Gosselin2; ‘Alcoa; ‘REGAL

3:30 PM Invited
Carbon Anode Raw Materials — Where is the Cutting Edge?: Les Edwards1; ‘Rain Carbon Inc.

3:55 PM Break

4:10 PM Invited
4:35 PM Invited  
How to Improve the Environmental Efficiency of the Hall-Heroult Process While Producing and Using Carbon Anodes?: Antti Koulumies\textsuperscript{1}; Ana Maria Becerra\textsuperscript{2}; Lasse Piechowiak\textsuperscript{2}; Paul Merlin\textsuperscript{3}; Martin Zapke\textsuperscript{1}; \textsuperscript{1}Outotec GMBH & CO KG; \textsuperscript{2}Outotec Canada Ltd

5:00 PM Invited  
Trends in Carbon Anode Production. Derek Santangelo\textsuperscript{1}; \textsuperscript{1}Hatch

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; Takanori Ouchi, The University of Tokyo

2:30 PM Keynote  
A Key Role for Electrometallurgy in Climate Change Mitigation: Adam Powell\textsuperscript{1}; \textsuperscript{1}Worcester Polytechnic Institute

3:00 PM  
Capital Cost Estimation for Electrochemical Processes: Caspar Stinn\textsuperscript{1}; Antoine Allanore\textsuperscript{1}; \textsuperscript{1}Massachusetts Institute of Technology

3:20 PM  
Electrolytic Extraction of Liquid Copper and Iron from Chalcoprylite Ore: Lucas Rush\textsuperscript{1}; Caspar Stinn\textsuperscript{1}; Antoine Allanore\textsuperscript{1}; \textsuperscript{1}Massachusetts Institute of Technology

3:40 PM  
Development of a Magnesium Metal Production Process Using North Korean Magnesite: Junsghin Kang\textsuperscript{1}; Tae-Hyuk Lee\textsuperscript{1}; Young Min Kim\textsuperscript{1}; Jin-Young Lee\textsuperscript{1}; \textsuperscript{1}Korea Institute of Geoscience and Mineral Resources, \textsuperscript{2}Korea 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\textsuperscript{1}; Young Min Kim\textsuperscript{1}; Jin-Young Lee\textsuperscript{1}; Junsghin Kang\textsuperscript{1}; \textsuperscript{1}Korea Institute of Geoscience and Mineral Resources, \textsuperscript{2}Korea 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\textsuperscript{1}; Laurentiu Nastac\textsuperscript{2}; Ramana Reddy\textsuperscript{2}; \textsuperscript{1}University of Alabama

4:55 PM  
Enhanced Aluminum Electrorefining Process from Aluminum Alloy Scraps via Surface Engineering: Yifan Wang\textsuperscript{1}; Ruigang Wang\textsuperscript{1}; \textsuperscript{1}University of Alabama

5:15 PM  
Electrorefining of Molten Iron: William Judge\textsuperscript{1}; Gisele Azimi\textsuperscript{2}; \textsuperscript{1}University of Toronto

5:35 PM  
Aluminum Extraction by Al-Si-Fe Alloy Electrolysis: Huan Shuxing\textsuperscript{1}; \textsuperscript{1}Northeastern 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\textsuperscript{1}; Kefeng Xiao\textsuperscript{1}; Huabo Liu\textsuperscript{1}; Jiaxing Liang\textsuperscript{1}; \textsuperscript{1}UnSW Sydney

2:50 PM  
Cerium Ion Adsorption on Ultrathin Graphitic Carbon Nitride and Its Photocatalytic Application: Saikat Kuila\textsuperscript{1}; Tarun Kundu\textsuperscript{1}; \textsuperscript{1}Indian Institute of Technology Kharagpur

3:10 PM  
Economic Metals Rescue from Spent Zinc-carbon Batteries for Industrial Value Additions: Alafara Baba\textsuperscript{1}; Folahan Adekola\textsuperscript{1}; Raufi Bale\textsuperscript{1}; Abdul Alabi\textsuperscript{2}; Mustapha Raji\textsuperscript{1}; \textsuperscript{1}University of Ilorin; \textsuperscript{2}Kwara 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\textsuperscript{1}; \textsuperscript{1}RMIT University

3:50 PM Break

4:10 PM  
Transient Thermal Modeling of Aluminum Cells for Renewable Energy Integration: Gustavo Ospina\textsuperscript{1}; Mohamed Hassan\textsuperscript{1}; Sgouris Sgouris\textsuperscript{1}; Ali Bouabid\textsuperscript{1}; \textsuperscript{1}Khalifa University of Science and Technology

4:30 PM  
Discussion on the Application of Rooftop Photovoltaic Power Plant in the Steel Enterprise: Xiancong Zhao\textsuperscript{1}; Huanmei Yuan\textsuperscript{2}; Yuzhao Han\textsuperscript{1}; Zefei Zhang\textsuperscript{1}; Hao Bai\textsuperscript{1}; \textsuperscript{1}Peking university; \textsuperscript{2}University of Science and Technology Beijing

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\textsuperscript{1}; Neale Neelameggham\textsuperscript{2}; Jing Leng\textsuperscript{1}; Jianxue Liu\textsuperscript{1}; \textsuperscript{1}Beihang University; \textsuperscript{2}IND LLC
2:30 PM Creating the Next-Generation Materials Genome Initiative: Proposals for Functional Fatigue and Fatigue-crack Initiation in Rare-earth Magnesium Alloy WE43 using High Energy X-ray Diffraction Microscopy: Duncan Greeley1; Jacob Adams2; Peter Kenesie3; Ashley Spear4; John Allison5; 1University of Michigan; 2Argonne National Laboratory; 3University of Utah

2:40 PM Panel Discussion - Best practices on effective communication and strategies for making the most of interdisciplinary research collaborations. Panel members are select speakers from the symposium.

2:50 PM Microstructure-interacting Short Crack Growth in Blocky Alpha Zircaloy-4: Weifeng Wany; Fionn Dunne2; 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. Porter1; 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 Adams2; Peter Kenesie3; Ashley Spear4; John Allison5; 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 Shaban1; Garrett Pataky2; Paul Jablonski3; 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 Heckman1; Christopher Barr1; Khalid Hattar2; David Adams3; Timothy Furnish4; Brad Boyce5; 1Sandia National Laboratories

4:50 PM Volumetric Defect Quantification of Pure Aluminum During Fatigue: Lutz Morsdorf1; David Mayweg2; Yujiao Li3; 1University of Illinois Urbana-Champaign; 2Boston College; 3Sandia National Laboratories

5:10 PM Proposals for Functional Fatigue and Fatigue-crack Initiation in Shape Memory Alloys: Ahmedsaneertham Mohammed1; Huseyin Sehitoglu2; 1University of Illinois Urbana-Champaign; 2University of Alabama, Huntsville; 3Lawrence Livermore National Laboratory

5:30 PM Moving Cracks Form White Etching Areas During Rolling Contact Fatigue in Bearings: Lutz Morsdorf1; David Mayweg2; Yujiao Li3; 1University of Illinois Urbana-Champaign; 2Boston College; 3Sandia National Laboratories

5:50 PM Nanomaterials Functional Nanomaterials 2020: Translating Innovation into Pioneering Technologies II: Joseph Intlecake1; Jefferson Cuadra2; 1Sandia National Laboratories; 2Lawrence Livermore National Laboratory

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 Kim1; Young Hwan Kim2; Byung Hoon Park3; Yeon Jun Choi; Geon Woo Lee3; 1Yonsei University
2:50 PM Invited
**Stress Relaxation and Battery.** Hangqing Jiang\(^1\); Arizona State University

3:30 PM Invited
**Photophysical and Electrochemical Properties of Fullerene and Closo-borane based Materials.** Joseph Toporovich\(^1\); California State University, Northridge

3:30 PM
**Strain Engineering of Two-dimensional Semiconductors.** SungWoo Nam\(^1\); University of Illinois, Urbana-Champaign

3:50 PM Break

4:10 PM Invited
**New Materials and Devices Beyond Silicon and Field-effect Transistors.** Qing Cao\(^2\); University of Illinois at Urbana-Champaign

4:30 PM Invited
**Understanding Nanoscale Evolution of Materials and Interfaces in Batteries.** Matthew McDowell\(^3\); Georgia Tech

4:50 PM Invited
**High Throughput Screening of Nano Catalysts for PEMFC/AEMFC and Machine Learning Prediction of Chemisorption.** Soonho Kwon\(^4\); Jung Woo Choi\(^5\); Hyuch Mo Lee\(^6\); CALTECH; KAIST

5:10 PM Invited
**2D Conjugated Polymer Nanosheets for Photocatalytic Overall Water Splitting.** Hangxun Xu\(^1\); University of Science and Technology of China

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**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 Walle\(^1\); Ruoshi Sun\(^2\); Qijun Hong\(^1\); Julian Sabisch\(^1\); Andrew Minor\(^1\); Mark Asta\(^1\); Brown University; Sandia National Laboratory; University of California, Berkeley

3:10 PM Invited
**First-principles Thermodynamics of Refractory Alloys and their Oxides.** Anton Van Der Ven\(^1\); Naga Sri Gunda\(^1\); Anirudh Natarajan\(^1\); University 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 Talapatra\(^1\); Thien Duong\(^1\); Miladin Radovic\(^1\); Texas A&M University; Los Alamos National Laboratory; Argonne National Laboratory

4:30 PM Break

4:50 PM Invited
**Thermodynamic Modeling of Precipitates of Topologically Close-packed Phases.** Thomas Hammerschmidt\(^2\); ICAMS Ruhr-University Bochum

5:30 PM Invited
**Alloys, Processing, Applications, Models and Software: The Wide Domain of Gibbs Energy Sets Giving Impulse to Invention.** Suzana Fries\(^1\); Sara Catalina Pineda Heresi\(^1\); Daniela Ivanova\(^1\); Uzair Rehman\(^1\); Silvana Tumminietto\(^1\); Ruhr-Universität Bochum; German Aerospace Center

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**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 Maas, University of Illinois at Urbana-Champaign; Hahn Choo, University of Pennsylvania; Yunfeng Shi, Rensselaer Polytechnic Institute; Soo Yeol Lee, Chungnam National University; Xie Xie, FUA 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 Suzuki\(^1\); Shenyang Huang\(^1\); Doug Konitzer\(^1\); GE Research; GE Aviation

2:50 PM Invited
**A Grain-growth-resistant High-entropy Alloy for Forging Applications.** Zhi Tang\(^1\); Chuan Zhang\(^2\); Oleg Senkov\(^1\); Jonathan Poplawsky\(^1\); Fan Zhang\(^1\); Michael Gao\(^1\); Peter Liaw\(^1\); University of Tennessee; Arconic Engines; CompuTherm LLC; Air Force Research Laboratory; Oak Ridge National Laboratory; National Energy Technology Laboratory; University of Tennessee

3:10 PM Invited
**Metastability Engineering in Aged Non-equiaxial High Entropy Alloys with Heterogenous Structure Towards Superior Strength-Ductility Synergy.** Cheng Zhang\(^1\); Chaoyi Zhu\(^1\); Xin Wang\(^1\); Fan Ye\(^1\); Kevin Kaufman\(^1\); Penghui Cao\(^1\); Xiaoqing Pan\(^1\); Julie Schoenung\(^1\); Kenneth Vecchio\(^1\); Enrique Lavernia\(^1\); Department of Materials Science and Engineering, University of California Irvine; University of California San Diego

3:30 PM Invited
**Manipulating Structures/Properties of Bulk Metallic Glasses and High-entropy Alloys by Severe Plastic Deformation.** Koichi Tsukiyama\(^1\); International Center for Young Scientists; National Institute for Materials Science

3:50 PM Invited
**Ductility Improvement Methodologies in Metallic Glasses and High Entropy Alloys.** Yanfei Gao\(^1\); Hongbin Bei\(^1\); University 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 Lee1; You Sub Kim2; Hobyung Choe1; Wanchuck Woo3; Dong-Kyu Hu4; E-Wen Huang1; Takuro Kawasaki1; 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 4:45 PM Invited: Takayuki Tanaka1; Shota Kariya1; Junko Umeda1; 1Central Iron & Steel: Lei Zhao1; 1Central Iron & Steel; 2Korea Atomic Energy Research Institute; 3University of Ulsan; 4National Chiao Tung University; 5Japan Atomic Energy Agency

4:50 PM Invited

Improvement of Lattice Distortion by Addition of Zr Element in Nb Ta TiV Refractory High-entropy Alloy: Shiteng Zhao1; Mark Asta1; Daryl Chrzan2; Andrew Minor1; 1University of Tennessee; 2National Chiao Tung University; 3University of Tennessee; 4Central Iron & Steel; 5Japan Atomic Energy Agency

5:05 PM Invited

Elements Fabricated by Powder Metallurgy: Takuro Kawasaki5; Stefanus Harjo5; 1Chungnam National University; 2Korea Atomic Energy Research Institute; 3University of Tennessee; 4Central Iron & Steel; 5Japan Atomic Energy Agency

5:10 PM Invited

Making Affordable Titanium with Wrought-like Mechanical Properties from Sintering Low-Cost Titanium Powder: Wei Chen1; George Kim1; Gian Song1; Michael C. Gao2; Ge An1; Chuan Zhang1; Wei Chen1; Jonathan D. Poplawsky1; Yi-Chia Chou2; Peter K. Lai1; 1University of Tennessee; 2National Chiao Tung University; 3University of California, Berkeley; 4Central Iron & Steel; 5Japan Atomic Energy Agency

5:20 PM Invited

Slip Transition in Model Ti-O Alloys: Shiteng Zhao1; Ruopeng Zhang1; Shiteng Zhao1; Mark Asta2; Daryl Chrzan3; Andrew Minor1; 1University of California, Berkeley; 2University of California, Berkeley; 3University of California, Berkeley

5:25 PM Invited

High Strength and Ductility Titanium Materials with Cheap Alloying Elements Fabricated by Powder Metallurgy: Katsuyoshi Kondoh1; Takayuki Tanaka1; Shota Kariya1; Junko Umeda1; 1Osaka University

5:30 PM Break

2:30 PM Invited

Making Affordable Titanium Alloy with Wrought-like Mechanical Properties from Sintering Low-Cost Titanium Powder: Pei Sun1; Z Zak Fang1; 1University of Utah

3:10 PM Invited

A Systematic Experimental Investigation of the Planar-to-wavy Slip Transition in Model Ti-O Alloys: Yan Chong1; Ruopeng Zhang1; Shi-Teng Zhao1; Mark Asta2; Daryl Chrzan3; Andrew Minor1; 1University of California, Berkeley; 2University of California, Berkeley

3:30 PM Invited

Effect of Gd and Nd Additions on the Thermo-mechanical Response of a MgMn Alloy: Domonkos Tolnai1; Seraf Gavras1; Pere Barriobero-Vila2; Andreas Stark1; Norbert Schell1; 1Institute of High Performance Computing; 2Helmholtz-Zentrum Geesthacht; 3DLR

4:00 PM Invited

Development of Ultra Lightweight, Corrosion Resistant Mg Alloys: Taylor Cain1; Joseph Labukas1; 1US Army Research Laboratory

4:20 PM Break

4:40 PM Poster Pitches

LIGHT METALS

Magnesium Technology 2020 — Alloy Development

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

Program Organizers: J. Brian Jordon, University of Alabama; Ashraf Imam, George Washington University; Ramana Reddy, University of Alabama

Monday PM | February 24, 2020
Theater A-8 | 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 Curtis1; Rasool Ahmada1; Bingluin Yin1; Xiaoxuan Wu1; 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 Shi1; Bruce Williams2; 1University of Michigan; 2CanmetMATERIALS, Natural Resources Canada

3:30 PM

A Die-cast Magnesium Alloy for Applications at Elevated Temperatures: Xi Li1; Eric Nyberg1; 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 Tolnai1; Seraf Gavras1; Pere Barriobero-Vila2; Andreas Stark1; Norbert Schell1; 1Institute of High Performance Computing; 2Helmholtz-Zentrum Geesthacht; 3DLR

4:00 PM

Development of Ultra Lightweight, Corrosion Resistant Mg Alloys: Taylor Cain1; 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

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:30 PM</td>
<td>Invited Evolution of Local Formability Concepts for Advanced High Strength Steels (AHSS)</td>
<td>Brandon Hance¹; U. S. Steel</td>
</tr>
<tr>
<td>3:10 PM</td>
<td>Invited Industry Perspective on the Mechanical Characterization of Next Generation Steels</td>
<td>Erik Pavlino¹; Jun Hu²; Kavesary Raghavan¹; AK Steel</td>
</tr>
<tr>
<td>3:50 PM</td>
<td>An Investigation into Improved Elongation-to-fracture in AHSS via Continuous Bending Under Tension</td>
<td>Rishabh Sharma¹; Camille Poulin¹; Marko Knezevic¹; Michael Miles¹; David Fullwood²; Brigham Young University; University of New Hampshire</td>
</tr>
<tr>
<td>4:10 PM</td>
<td>Break</td>
<td></td>
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<tr>
<td>4:35 PM</td>
<td>Development of a Lean Duplex TRIP Steel with a Superior Formability</td>
<td>Peijun Hou¹; Yuan Li¹; Jun-Sang Park²; Dongchul Chae³; Chanho Lee³; Yang Ren³; Ke An³; Hahn Choo³; University of Tennessee; Argonne National Laboratory; Oak Ridge National Laboratory</td>
</tr>
<tr>
<td>4:55 PM</td>
<td>Experimental Studies into the Role of Cyclic Bending during Stretching of Dual-phase Steel Sheets</td>
<td>Marko Knezevic¹; Camille Poulin¹; University of New Hampshire</td>
</tr>
<tr>
<td>5:15 PM</td>
<td>Damage Detection of Sheet Metal via Multi-directional Deformation</td>
<td>Brahmananda Pramanik²; John Becker¹; Jared Schmidlin¹; Wednesday Rehm¹; Montana Tech</td>
</tr>
</tbody>
</table>

## 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 Fahrmann, Haynes International; Qiang Feng, University of Science and Technology Beijing; Michael Titus, Purdue University

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

**Session Chairs:** Yunzhi Wang, The Ohio State University; Qiang Feng, University of Science and Technology Beijing

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speakers</th>
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</thead>
<tbody>
<tr>
<td>2:30 PM</td>
<td>Invited Design of Cobalt Base Single Crystal Superalloys</td>
<td>Sean Murray¹; Colin Stewart¹; Robert Rhein¹; Carlos Levi¹; Anton Van Der Ven¹; Tresa Pollock¹; University of California, Santa Barbara</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>Improved 3rd Generation Single Crystal Superalloy CMSX-4® Plus (SLS) – a Study of Evolutionary Alloy Development</td>
<td>Jacqueline Wahl¹; Ken Harris¹; Cannon-Muskegon Corp</td>
</tr>
<tr>
<td>3:20 PM</td>
<td>Development of Ni-based Alloys For Transportation Applications</td>
<td>Govindarajan Muralidharan¹; John Chiles¹; Dean Pierce¹; Lawrence Allard¹; Donovan Leonard¹; Jonathan Poplawsky¹; Oak Ridge National Laboratory</td>
</tr>
<tr>
<td>3:40 PM</td>
<td>Designing for Local Phase Transformation Strengthening in Nickel Based Superalloys</td>
<td>Ashton Egan¹; Lola Lilensten²; Paraskexas Kontis²; Sammy Tin²; Michael Mills¹; Max-Planck-Institut für Eisenforschung GmbH; Illinois Institute of Technology</td>
</tr>
<tr>
<td>4:00 PM</td>
<td>Break</td>
<td></td>
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<tr>
<td>4:20 PM</td>
<td>Invited New Alloy Design Strategy via Non-conventional Phase Transformation Pathways</td>
<td>Longsheng Feng¹; Tianlong Zhang²; Dong Wang³; Yipeng Gao³; Yufeng Zheng³; Michael Mills¹; Hamish Fraser¹; Yunzhi Wang²; The Ohio State University; City University of Hong Kong; Xi’an Jiao Tong University; Idaho National Laboratory</td>
</tr>
<tr>
<td>4:50 PM</td>
<td>Equilibrium Segregation and Localized Phase Transition at Stacking Faults in Ni-based Superalloys</td>
<td>Longsheng Feng¹; You Rao¹; Ashton Egan¹; Michael Mills¹; Maryam Ghazisaeidi¹; Yunzhi Wang²; The Ohio State University</td>
</tr>
<tr>
<td>5:10 PM</td>
<td>Precipitate-mediated Dislocation Transformer in Ni-base Superalloys</td>
<td>Longsheng Feng¹; Michael Mills¹; Yunzhi Wang²; The Ohio State University</td>
</tr>
</tbody>
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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 Motalebbzadeh2; 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 Berlia1; Paul Rasmussen1; Santhosh Rajarajan1; Jagannathan Ragopalan1; 1Arizona State University

3:10 PM
Size Effect of NiTi-based Shape Memory Nanoparticles on Recoverable Strain: Ji Young Kim1; So Yeon Kim2; Jin Woo Kim2; Won Seok Ko2; 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 Lassnig1; 1Erich Schmid Institute of Materials Science

4:10 PM Break

4:30 PM
Tension-compression Asymmetry in Plasticity of Nanoporous Gold: Hansol Jeon1; Eun-Ji Gwak1; Hangeul Kim1; Ju-Young Kim1; 1UNIST

4:50 PM
Fracture Properties of Ultrafinegrain Chromium at RT: Dislocations Processes and Toughening Mechanisms: Inas Issa1; Anton Hohenwarter1; Reinhard Fritz2; Daniel Kiener1; 1Montanuniversitat Leoben

5:10 PM
Studying the Anisotropic Deformation of Sapphire in Different Crystallographic Orientations using Nanoindentation and Micropillar Compression: Anugraha Thayagur Kidigannappar1; Alex Montagne2; Xavier Maeder1; Johann Michler1; Veronica Trabade1; Fatemeh Saeidi1; M. P. B. W. W. Ong2; Kilian Wasmier2; 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; 4Institute of Nuclear Physics, Polish Academy of Sciences

5:30 PM
Exploring Small-scale Quasicrystal Plasticity in Unknown Temperature Regimes: Yu Zou1; 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

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

**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 Gupta1; 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 Koldre1; Andris Bojarevics1; 1University of Latvia

3:25 PM
Investigation of Friction Stir Spot Welding of Aluminium Alloys using Zinc as an Interlayer: Pragya Rai1; Sushanta Panda1; Jinu Paul1; 1IIIT 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 Kim1; 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: Harinaran Sirirat1; Kamal Kadirvel1; Rongpei Shi1; Longsheng Feng1; Michael Mills1; Yunzhi Wang1; 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 Theis1; Vitor Rielii2; Keita Nomoto3; Flora Godor4; Bernd Oberwinkler4; Aleksandar Stanjevic5; Simon Ringer5; Sophie Primag1; 1University of New South Wales Sydney; 2The University of Sydney; 3voselalpine 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 Krogstad2; 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 Mannava3; Vijay Vasudevan3; 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 Carter2; 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 Pedrazzini1; Noel Glaenzer2; Mark Hardy2; Paul Mignanelli3; T. William Clyne3; Howard Stone3; 1Imperial College London; 2University of California, Santa Barbara; 3University of British Columbia; 2LSP Technologies; 3Rolls-Royce plc

MATERIALS PROCESSING

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


Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafig 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 Dreisinger1; Ken Baxter2; Andrew Worland2; Tom Cooper2; Nick Waters2; 1University of British Columbia; 2LeadFX Inc.; 3Rosslyn Hill Mining Limited

2:50 PM
Complex Lead and Zinc Feed Treatment through Combining ISASMELT™ and Albion Process™: Stanko Nikolic1; Paul Voigt1; Ben Hogg1; Mike Hourn1; 1Glencore Technology

3:10 PM
Recent Operation at Hachinohe Smelter: Shojiro Mataoka1; Ushio Enomoto2; Kanzhiko Nishina1; 1Hachinohe Smelting Company Limited

3:30 PM
Kinetic Aspects of an Innovative Technology for the Reprocessing of ISF Slag: Walter Schatzmann1; Juergen Antrekowitsch1; 1Montanuniversität Leoben

3:50 PM Break

4:10 PM
Evaluation and Certification Strategies for Lead-zinc Bearing Residues: Juergen Antrekowitsch1; G Hanke1; 1University of Leoben

4:30 PM
Increasing Plant Efficiency & Capacity: Daniel Jackson1; 1Pyrotek

MATERIALS PROCESSING

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


Program Organizers: Andreas Siegmund, LanMetCon LLC; Shafig 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
Lead Metal Production at Paroo Station Mine Using Leach-electrowinning Process in Methane Sulfonic Acid Solution: David Dreisinger1; Ken Baxter2; Andrew Worland2; Tom Cooper2; Nick Waters2; 1University of British Columbia; 2LeadFX Inc.; 3Rosslyn Hill Mining Limited

2:50 PM
Complex Lead and Zinc Feed Treatment through Combining ISASMELT™ and Albion Process™: Stanko Nikolic1; Paul Voigt1; Ben Hogg1; Mike Hourn1; 1Glencore Technology

3:10 PM
Recent Operation at Hachinohe Smelter: Shojiro Mataoka1; Ushio Enomoto2; Kanzhiko Nishina1; 1Hachinohe Smelting Company Limited

3:30 PM
Kinetic Aspects of an Innovative Technology for the Reprocessing of ISF Slag: Walter Schatzmann1; Juergen Antrekowitsch1; 1Montanuniversität Leoben

3:50 PM Break

4:10 PM
Evaluation and Certification Strategies for Lead-zinc Bearing Residues: Juergen Antrekowitsch1; G Hanke1; 1University of Leoben

4:30 PM
Increasing Plant Efficiency & Capacity: Daniel Jackson1; 1Pyrotek
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 Behrmann2; 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 Doganov1; 1KCM AD

5:10 PM
Application of CSC Technology in Nonferrous Metallurgy: Xiaosong Wu1; 1CINF Engineering Co., Ltd.

MATERIALS PROCESSING

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


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: Somant Nagraj1; Mathias Chintinne2; Muxing Guo2; Bart Blanpain2; 1Metallo Belgium NV; 2KU Leuven

2:50 PM
Start-up and Improvements of the New Electrolysis Plant at Annaka Refinery: Taihukyo Yamaguchi1; 1Toho Zinc Co., Ltd.

3:10 PM
ZnSO4.H2O Thermal Decomposition in the Presence of Reducing Agent (S2) and Catalyst (Pd): Rodrigo Souza1; Gabriela Kurban1; Nathalli Mello1; Rogério Navarro1; Eduardo Brocchi1; 1Pontificia Universidade Catolica do Rio de Janeiro

3:30 PM
Characterization and Processing of Residues from Hydrometallurgical Zinc Smelters: Juergen Antretkowitsch1; 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 Dias1; 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 Kim1; Jae-chun Lee1; Min-seuk Kim1; Kyeong Woo Chung1; 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 Liang1; Ma Shaobin2; 1China ENFI Engineering Corporation

5:10 PM
A Critical Review on Generation, Characteristics, and Utilization of Zinc Slag: Yan Song1; Weiguo Wu1; Liang Xu1; Xiangqiang Chen1; Ge Zhang1; 1China ENFI Engineering Corporation

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 PM | February 24, 2020
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 Feng1; Yu Ting Huang1; Wei-Ting Wang1; Zeyang Zhang1; Mingyang Zhang1; Wei-Ting Yeh1; 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 Zhu1; 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 Lee1; Cheng-Yi Liu1; 1National Central University

3:50 PM
Electropolishing of Rhodium using Pulse Current Plating Method: Seo-Hyang Lee1; Jaeho Lee1; 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; Nikhilsh Chawla1; Kumar Ankit1; 1Arizona State University

4:50 PM
Electromigration Effect Upon Single-phase and Two-phase Ag-Cu Alloy: an In-situ Study: Yu-chen Liu1; Yung-si Yu1; Shih-kang Lin1; Shang-Jui Chiu1; 1National Cheng Kung University; 2National Synchrotron Radiation Research Center
Revisit the Blech Critical Product: Lattice Strain Induces Electromigration Effect: Kuan-Hsueh Lin; Yu-chen Liu; Shih-kang Lin; Ching-Shun Ku; Shang-Jui Chiu; National Cheng Kung University; National 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

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

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; Yu Wang; Armen Khachaturyan; Michigan Technological University; Rutgers University

2:50 PM
Concurrent Modeling of Martensitic Transformation and Crack Growth in Shape Memory Ceramics: Ehsan Moshteiqosh; Mahmoud Marmivand; Boise State University

3:10 PM
The Effects of Quenching Medium and Cooling Rates on the Phase Transformation of Fe4N to Achieve Iron Nitride Martensite: Bin Mao; Guannuo Guo; Jian-Ping Wang; University 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; Zhangxi Feng; Milovan Zecic; University of New Hampshire; Los Alamos National Laboratory

3:50 PM
The Effect of Interface Compatibility and Grain Constraint in ZrO2-based Shape-memory Ceramics: Edward Pang; Christopher Schuh; Massachusetts 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: Xiaoxing Pan; Takeshi Kanomata; Ryosuke Kainuma; Tohoku University; Tohoku Gakuin University

5:00 PM
Effect of Precipitates on Martensitic Transformation in NiTiHf Shape Memory Alloys: Taiwu Yu; Yipeng Gao; Peter Anderson; Michael Mills; Yunzhi Wang; Ohio State University; Idaho National Laboratory

5:20 PM
Martensitic Transformation in a Rapidly-quenched Interstitial-free Steel using a Gleeble 3800 Thermo-mechanical Simulator: Minmoy Sinha; Sadhan Ghosh; B. Syed; IIT Roorkee; R&D Division, Tata Steel, Jamshedpur, India

5:40 PM
Critical Defect Concentration for Strain Glass Transition in Doped Ferroelastics: Chuanxin Liang; Dong Wang; Yunzhi Wang; Xi An Jiaotong University; The 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


Program Organizers: Haiming Wen, Missouri University of Science and Technology; Suveen Mathaudhu, University of California, Riverside; Yuntian Zhu, North Carolina State University; Manej 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 Hemler; Johns Hopkins University

3:00 PM Invited
Tridomalous Composites: An Overview: Julie Schoenung; University of California, Irvine

3:30 PM Invited
Real Space Charge Density Imaging with Sub-Å Resolution by 4D STEM: Xiaochun Li; University of California, Irvine

4:00 PM Break

4:20 PM Invited
Nanotechnology Enabled Metallurgy for New Age of Metals: Xiaochun Li; University of California, Los Angeles

4:50 PM Invited
Targeted Processing of Nanocrystalline Alloys to Elicit Nonequilibrium Interfacial States: Glenn Balbus; Zhitong Bui; McLean Echlin; Tresa Pollock; Yue Fan; Daniel Gianola; University of California, Santa Barbara; University of Michigan

5:20 PM Invited
Moving Closer to Equilibrium but Maintaining the Defects (and the Properties): Timothy Rupert; University of California, Irvine
5:50 PM
Targeting Specific Nanotwin Configurations in Sputter Deposited Alloys to Enable Systematic Investigation of Dislocation-twin Interactions: Francisco Andrade Chávez1; Órcun Koray Celebi2; Huseyin Sehiltoglu1; Jessica Krogsstad1; 1University of Illinois at Urbana-Champaign

6:10 PM
Ultrafine-grained and Nanocrystalline Steels for Enhanced Mechanical Properties and Irradiation Resistance: Haiming Wen1; Andrew Hoffman1; Jiaqi Duan1; Maalavan Arivu1; 1University 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

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

Session Chairs: Ayman Salem, MRL Materials Resources LLC; Pete Collins, Iowa State University

2:30 PM Invited
An (incomplete) ICME Framework for Modeling Additive Manufacturing: Peter Collins1; Thomas Ales2; Andrew Baker3; Yunzhi Wang1; D. Harlow4; Hamish Fraser5; 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 Nastasc1; Edwin Schwabach1; Kevin Chaput1; Todd Butler2; 1University of Alabama; 2Air Force Research Laboratory

3:30 PM
Mesoscale Simulations of Processing-microstructure Linkages during Additive Manufacturing: Bala Radhakrishnan1; Younggil Song1; Sarma Gorti1; John Turner2; Ranadip Acharya2; Lyle Levine2; 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 Babu1; 1University of Tennessee, Knoxville

4:50 PM Invited
Optimizing Metals Additive Manufacturing: Aaron Stebner1; 1Colorado School of Mines

5:20 PM
Metallic Alloy Microstructure Selection during Rapid Solidification and Additive Manufacturing: Amy Clarke1; Joseph McKeown2; Jonah Klemm-Toole3; Alec Saville1; Chandler Becker1; Benjamin Ellyson1; Yaofeng Guo2; Chloé Johnson1; Brian Milligan1; Andrew Polonsky2; Kira Pusch2; Kester Clarke1; Hunter Martin1; Damien Tourret1; Alain Karma1; Sven Vogel1; Niranjani Parab1; Tao Sun2; Kamel Fezzaa2; Tresa Pollock3; Colorado School of Mines; 1Lawrence Livermore National Laboratory; 2University of California, Santa Barbara; 3HRL Laboratories; 1MDEA Materials; 2Northeastern University; 3Los Alamos National Laboratory; 4Advanced 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 Okunevskii, Purdue University; Mahmood Mamiand, 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 Ribus, Commissariat a l’Energie Atomic 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 Uberuaga1; 1Los Alamos National Laboratory

3:00 PM
Design and Results of the Irradiation Corrosion Experiment (ICE): Franziska Schmidt1; Yongqiang Wang2; Peter Hosemann2; 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 Metal-ionic Phase Reactions in Molten Salt ionic Liquids: Xiongqian Wang1; Peter Hosemann2; 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 Taylor1; Timothy Lach1; Matthew Olsza1; Karen Kruska1; Danny Edwards1; Thak Sang Byun1; Daniel Schreiber2; 1Pacific Northwest National Laboratory

4:00 PM Break

4:20 PM
Microstructure and Microchemistry Characterization of Neutron Irradiated M5® and X2® Fuel Cladding: Zefeng Yu1; Kory Linton1; Menglong He1; Mukesh Bachhav1; Xiang Liu2; 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 He1; Junliang Liu1; Anne Callow1; Jing Hu2; Mir Anamul Haq3; Sergio Lozano-Perez4; 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 Howland1; Richard Smith1; Bruce Kammenzind1; Mikael Christensen1; 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 Chan1; Paul Binks1; Douglas Rishe1; Aliakashd Bairak1; 1Wood; 2Naval Nuclear Laboratory; 3Dalton Cumbrian Facility

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 Sierras, West Virginia University; Yong Lin Kong, University of Utah; Mariappan Paranatham, Oak Ridge National Laboratory

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

Session Chairs: Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierras, West Virginia University

2:30 PM Invited
Laser Welding Nanowires for Smart Sensing: Yongchao Xu1; 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 Cheng1; 1Purdue University

3:20 PM
Highly Sensitive and Selective Room Temperature Ammonia Sensor: Shivani Sharma1; 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: Bairaaj Mani1; Tyler Brunstein-Ellenbogen1; Kevin Nino1; Jaime Siquenza1; Tien See Chow2; Nuggehalli Ravindra2; 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 Ohodnic1; Ki-Joong Kim1; Jeffrey Culp2; Tao Hong1; 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 Fratto1; Jirui Wang1; Brendan Lucas1; Hongwei Sun1; Zhiyong Gu1; 1University of Massachusetts, Lowell
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

**Monday PM | February 24, 2020**
**16A | San Diego Convention Ctr**

**Session Chairs:** Mingming Zhang, ArcelorMittal; John Howarter, Purdue University; Chengguang Bai, Chongqing University; Mark Strauss, Idaho National Laboratory

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2:30 PM Introductory Comments

2:35 PM Invited
Recycling Research in the Kroll Institute for Extractive Metallurgy: *Patrick Taylor*;
1 Colorado School of Mines

3:00 PM
Recycling of Waste Neodymium Magnet trough Electrorefining of Molten Salt: *Xin Lu*;
Xinyuan Zhang; Aketagawa Mayu; Osamu Takeda; Hongmin Zhu;
2 Tohoku University

3:20 PM
Recycling of Metallurgical Slag for Electromagnetic Waves Interference Functions: *Yong Fan*;
1 Institut fur Eisen- und Stahntechnologie

3:40 PM Break

4:00 PM
Towards 100% Recycling of Steelmaking Offgas Solid Wastes by Reallocating Zinc-bearing Materials: *Naiyang Ma*;
1 Arcelor Mittal

4:20 PM
Extraction and Processing of Crystalline Metallurgical-Grade Silicon prepared from Rice Husk Byproduct: *Iyen Cookey*;
1 Benedict Ayomanor; Vitalis Mbah;
2 Federal University Wukari; Federal Polytechnic Nasarawa

4:40 PM
A Review of Iron and Steel Scrap Recycling in Ironmaking and Steelmaking Processes: *Mingming Zhang*;
1 ArcelorMittal Global R&D

5:00 PM
Recovery Nickel-ferous Compound from Nickel-bearing Secondary Resources: *Oui Ju*;
1 Shanghai University

5:20 PM
Separation and Recovery of Copper from Copper-bearing Pyrite Cinder via an Acid Leaching Process: *Yikang Tu*;
1 Manman Lu; Zijian Su; Yuanbo Zhang; Yuming Fang; Ying Yu;
2 Chongqing University

5:40 PM
Granulation and Carbonization Process of Titanium-bearing Blast furnace Slag: *Mingrui Yang*;
Gangqiang Fan; Feifei Pan; Jie Dang; Xuewei Lv; Chenguang Bai;
1 Chongqing 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 Knowles¹; 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 Galetz¹; Anke Ulrich¹; Petra Pfützenmaier¹; Uwe Glatzel¹; ¹DEHEMA-Forschungsinstitut; ¹University Bayreuth

3:10 PM
Development of Refractory Complex Concentrated Alloys RCCAs Using Diffusion Couple Approach: Vivek Verma¹; Michael Titus²; David Johnson³; Kustubh 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 Mudanyi¹; Corson Cramer¹; Amy Elliott¹; 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 Marshall¹; Sharvan Kumar²; Xiang Yu²; Alex Jackson³; ¹Imaging Systems Technology; ²Brown University

4:10 PM Break

4:30 PM
Microstructure, Microhardness and Oxidation Behavior of Mo-Si-B alloys in the Mo-Mo2B-Mo5SiB2 Three Phase Region: Longfei Liu¹; John Perpezko¹; ¹University of Wisconsin, Madison

4:50 PM
Magnetic Field Effects on the Compression Properties of Pure Tantalum: Hitesh Adhikari¹; 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 Kanakkithodi¹; Rishi Kumar²; David Fenning²; Maria Chan³; ¹Argonne National Laboratory; ²University of California, San Diego

2:55 PM
Thermodynamic Properties of Si-P Binary System: Shadia Ikhmayies¹; ¹Al Isra University

3:15 PM
Using Thermo-calc Software to Deduce the Thermodynamic Properties of Si-B Binary System: Shadia Ikhmayies¹; 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 Hatem¹; 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

Monday PM | February 24, 2020
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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 Rozman¹; W. Pratte²; Thaddeus Rahn²; Brian Fronk²; Brian Paul²; Ömer Dogan³; 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 Hsieh¹; Chih Chen¹; ¹National Chiao Tung University
3:20 PM  
Microstructural Characterizations and Mechanical Properties of Diffusion Bonded Stainless Steel 316H and Inconel 800H: Mohamed Elbakhshwan1; Ian Jentz2; Collin Magnin1; Andrew Brittan1; Mark Anderson1; Todd Allen1; 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 S1; Pragatheswaran T1; Kavitha S1; Balasubramanian V1; Vijay Petley2; Shweta Verma1; 1Annamalai University; 2Gas Turbine Research Establishment (GTER)

4:00 PM  
Break

4:30 PM  
Modeling Strength of Diffusion Bonded Interface Using Phase-Field Recrystallization and Creep-Damage Models: Aritra Chakraborty1; Andrea Rovinelli1; 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 Aucott2; 2United Kingdom Atomic Energy Authority

5:10 PM  
Solid State Joining of Dissimilar Ni-based Superalloys Using Field Assisted Sintering Technology: Charis Lin1; Namiko Yamamoto1; Derek King2; Jogender Singh1; 1The Pennsylvania State University; 2UES Inc.

5:30 PM  
Break

5:40 PM  
Thermal Transport in Crystalline Solids with Irradiation-Induced Defects: Computational Modeling and Experiments: Anter El-Azab1; 1Purdue University

6:00 PM  
Invited  
Multi-scale Thermal Transport Characterization of Nuclear Fuels: Zilong Hua1; Robert Schley1; Amey Khanolkar1; Austin Fleming1; Colby Jensen1; David Hurley1; 1Idaho National Laboratory

6:20 PM  
Impact of Irradiation Induced Nanoscale Defects on Optical and Thermal Properties of Cerium Dioxide: Vinay Chauhan1; Lingfeng He2; Janne Pakarinen3; David Hurley2; Marat Khafizov1; 1The Ohio State University; 2Idaho National Laboratory; 3Belgian Nuclear Research Centre (SCK-CEN)

SPECIAL TOPICS

TMS Annual Meeting & Exhibition — All-Conference Plenary

Monday PM | February 24, 2020
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12:00 PM  Introductory Comments

12:05 PM  Invited  
Leveraging Materials Innovation to Drive Industrial Gas Turbine Performance and Secure a Sustainable Future: John Mason1; 1Solar Turbines Incorporated

12:45 PM  Question and Answer Period

12:55 PM  Concluding Comments
TMS2020 TECHNICAL PROGRAM
MONDAY PM

MONDAY PM

TECHNICAL PROGRAM

2:30 PM Invited
Heterogeneous Pore Architecture Achieved by Spark Plasma Sintering: Alexander Preston1; Yuchen Lin1; Kaka Ma2; 1Colorado State University

2:50 PM
Cu-Ta FCC-BCC Metal Composites Fabricated via Powder Consolidation by Equal Channel Angular Extrusion: Zachary Levin2; Michael Demkowicz2; 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: Hamideze Torbati-Sarrafi1; Seyed Alireza Torbati Sarraf2; Terence Langdon3; 1University of Vienna; 2State University of Leoben; 3University of Technology Vienna; 4Helmholtz-Zentrum Geesthacht

3:30 PM
Hierarchical Structures in Ti-6Al-4V by Thermohydrogen Refinement of Microstructure: Brady Butler1; Laura Moody1; David Kittell1; Mitchell Wood1; 1Los Alamos National Laboratory; 2Lawrence Livermore National Laboratory; 3Lawrence Livermore National Laboratory

3:50 PM Invited
Grain Refinement-induced Plasticity in Heterostructured Brass: Xiaolei Wu1; Ion Powell2; Matthew Dunstan1; James Paramore1; 1United States Army Research Laboratory; 2Texas A&M University

4:10 PM Break

4:30 PM Invited
Nanostructures and Properties of Rapid Directional Solidification of Al Alloys: Mohsen Asle Zaeem1; 1Colorado School of Mines

4:50 PM
Atomistic Analysis of the Effect of Internal Defects on the Deformation of Nanocrystalline Metals: Caizhi Zhou1; Sixie Huang1; 1Missouri University of Science and Technology

5:10 PM
In-situ Synchrotron X-ray Profile Analysis during High Pressure Torsion: Erhard Schaffer1; Michael Kerber1; Florian Spieckermann1; Roman Schuster1; Torben Fischer1; 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 Bazarnik1; Barbara Romelczyk-Baishya2; Jiayuan Dai2; Yi Huang3; Małgorzata Lewandowska3; 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 Wang1; 1Nanjing University of Science & Technology

MECHANICS & STRUCTURAL RELIABILITY

Understanding and Predicting Dynamic Behavior of Materials — Behavior of High Explosives

2:30 PM Invited
Dynamic Measurements of Solid Carbon Cluster Growth and Morphology in High Explosives Detonation Products: Dana Dottelbaum1; Erik Watkins1; Kirill Velizhanin2; Rachel Huber2; Rick Gustavsen2; Tariq Aslam2; Millie Firestone2; Bryan Ringstrøm2; Trevor Willey and Team2; Nicholas Sinclair2; Paulo Rigg2; 1Los Alamos National Laboratory; 2Washington State University

3:10 PM
Anisotropic Damage Model for Cyclotrimethylene Trinitramine (RDX) under Impact: Nisha Mohan1; 1Los Alamos National Laboratory

3:30 PM
Controlled Fragment Impact Experiments for Initiation Response of PBXs: Patrick Bowden1; Andrew Schmalzer1; John Yeager1; Joseph Lichhardt1; 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 Morrow1; Francis Addessio2; Christopher Meredith2; Kyle Ramos2; Cheng Liu2; Carl Cady3; Clarissa Yablinsky3; 1Los Alamos National Laboratory; 2U.S. Army Research Laboratory

4:10 PM Break
2:30 PM
Carbide-free Bainite Transformations in Non-isothermal Conditions Investigated by In-situ High-energy X-ray Diffraction Experiments: Cécile Römpelberg1; Guillaume Geandier1; Sébastien Allain2; Steve Gaudez3; Frederic Danovx3; Michel Soier4; Mohamed Goune4; 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 Geandier1; Sébastien Allain2; Steve Gaudez3; Frederic Danovx3; Michel Soier4; Mohamed Goune4; 1Institut Jean Lamour; 2Ascometal

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 Moreno5; Guillaume Geandier1; Julien Teixeira2; Jean-Christophe Hell2; Frédéric Bonnet2; Sébastien Allain1; 1Institut Jean Lamour; 2ArcelorMittal Maizières Research SA; 3Institut de Chimie de la Matière Condensée de Bordeaux

3:30 PM
In-situ Synchrotron X-ray Diffraction Stress Analysis during Laser Surface Line Hardening of Samples with Specific Geometric Features: Dominik Kiefer6; Jens Gibmeier7; Fabian Wild8; Felix Beckmann9; 1Karlsruhe Institute of Technology - Institute for Applied Materials; 2Helmholtz-Zentrum Geesthacht - Institute of Technical Physics

4:10 PM
4:30 PM
Stress Tensor Determination during Phase Transformation of a Metal Matrix Composite using In situ High Energy X-ray Diffraction: Guillaume Geandier1; Lilian Vautrot1; Benoit Denand1; Sabine Denis1; 1Institut Jean Lamour
## 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

**Tuesday AM | February 25, 2020**
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**Session Chair:** John Lewandowski, Case Western Reserve University

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 AM</td>
<td>Tailoring the Microstructures of AM Metals for Enhanced Fracture Toughness and Fatigue Resistance: Ramamurthy Upadrashta; NTU</td>
<td></td>
</tr>
<tr>
<td>9:00 AM</td>
<td>High Strain Rate Fracture Properties of Additively Manufactured (AM) Stainless Steel: Kevin Lamb; Josh Kacher; Katie Koube; University of Tennessee–Knoxville; Georgia Institute of Technology</td>
<td></td>
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<tr>
<td>9:20 AM</td>
<td>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 Frye; Muztahid Muhammad; Jutima Sinsirivong; Nima Shamsaei; University of North Florida; Auburn University</td>
<td></td>
</tr>
<tr>
<td>9:40 AM</td>
<td>Static and Dynamic Mechanical Properties of Selective Laser Melted Ti-6Al-4V Solid Material Printed with Optimized Argon Flow: Oscar Quintana; Robert Rybolt; William Relue; DePuy Synthes Joint Reconstruction</td>
<td></td>
</tr>
<tr>
<td>10:00 AM</td>
<td>Optimization of Additively Manufactured Low Carbon Steels for Fatigue-critical Applications: Matthew Ryder; Colt Montgomery; Michael Brand; Robin Pacheco; John Carpenter; Peggy Jones; Diana Lados; Worcester Polytechnic Institute, Integrative Materials Design Center; Los Alamos National Laboratory; General Motors Powertrain</td>
<td></td>
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<tr>
<td>11:10 AM</td>
<td>Fatigue Crack Growth Behavior of DED Type 304L Stainless Steel: Christine Smudde; Christopher San Marchi; Christopher D’Elia; Michael Hill; Jeffery Gibling; University of California, Davis; Sandia National Laboratory, Livermore</td>
<td></td>
</tr>
<tr>
<td>11:30 AM</td>
<td>Effect of Laser Shock Peening Processing Parameters on the Microstructure, Residual Stress, and Fatigue Behavior of Additive Manufactured CoCrMo Alloy: Micheal Kattoura; Boetang Twum Donkor; Jie Song; Jan Kaufman; Seetha Ramaiah Mannava; Vijay Vasudevan; LSP Technologies Inc.; University of Cincinnati; Institute of Physics of the Czech Academy of Sciences</td>
<td></td>
</tr>
</tbody>
</table>
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; Jan 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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**Session Chair:** Tao Sun, Argonne National Laboratory

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8:30 AM Invited
Capturing Pore Formation during Laser Blown Powder Directed Energy Deposition: **Peter Lee**; Yunhui Chen; Lorna Sinclair; CL Alex Leung; Samuel Clark; Sebastian Marussi; Robert Atwood; Martyn Jones; Gavin Baxter; University College London; Diamond Light Source; Rolls-Royce plc

8:50 AM Invited
Porosity Formation and Entrapment in Directed Energy Deposition Through High-speed In-situ Imaging: **Samantha Webster**; Kornel Ehmann; Jian Cao; Northwestern 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**; Yuan Li; Tao Sun; Sudarsanam Babu; Hahn Choo; University of Tennessee Knoxville; Argonne National Laboratory; University of Tennessee, Knoxville

9:30 AM
Microstructure Development in Laser Powder Bed Fusion of Superalloys via Synchrotron Radiography and TriBeam Tomography: **Andrew Polonsky**; Kira Pusch; Toby Francis; McLean Echlin; Jonah Klemm-Tooze; Alec Saville; Chandler Becker; Benjamin Ellyson; Yaofeng Guo; Chloe Johnson; Brian Milligan; Niranjan Parab; Kamel Fezzaa; Tao Sun; Amy Clarke; Tresa Pollock; University of California, Santa Barbara; Colorado School of Mines; Argonne 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**; Aiden Martin; Joshua Hammons; Michael Nielsen; Manyalibo Matthews; Trevor Willey; Jonathan Lee; Lawrence 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: **Chihiphun Chuang**; Peter Kenesei; Jun-Sang Park; Tao Sun; Cang Zhao; Niranjan Dilip Parab; Yan Gao; Xuan Zhang; Anthony Rollett; Jonathan Almer; Argonne National Laboratory; GE Global Research; Carnegie 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**; University of Wisconsin-Madison

11:10 AM
Multi-physics Modeling of Fluid and Powder Dynamics in Laser Powder Bed Fusion: **Xuxiao Li**; Wenda Tan; Cang Zhao; Niranjan Parab; Tao Sun; University of Utah; Argonne National Laboratory

11:30 AM

11:50 AM
Quantification of the Effects of Deposition Parameters and Particle Size Distribution on Spatter Formation in Laser Powder Bed Fusion: **Yao Xu**; Joe Pauza; Anthony Rollett; Sneha Narra; Worcester Polytechnic Institute; Carnegie Mellon University

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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

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**Session Chair:** Nihan Tuncer, Desktop Metals

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8:30 AM
Characterization of 17-4 PH Processed via Bound Metal Deposition (BMD): **Alexander Watson**; John Belding; Brett Ellis; University of Maine

8:50 AM
Development of Tuned Composites Based on Metallic Particles for Advanced 3D-printing by Fused Deposition Modeling: **Ester Palmero**; Daniel Casaleiz; Javier de Vicente; Juan Hernandez-Vicen; Silvia Lopez-Vidal; Emilio Ramiro; Alberto Bollero;IMEDEA Nanoscience; RAMEMA S.A.

9:10 AM
Additive Manufacturing of High-value Metal Parts Through Shaping-debinding-sintering: **Peter Felfer**; Yvonne Thompson; Joamin Gonzalez - Gutierrez; Christian Kukla; Fau Erlangen-Nurnberg; Montanuniversität Leoben

9:30 AM
Topoogy Optimization-based Design Customized for Alternative AM Processes: **Julia Carroll**; Hak Yong Lee; James Guest; Johns 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: **Nesma Aboullakh**; Marco Simonelli; Mark East; Richard Hague; University of Nottingham
10:30 AM
3D-printing Bulk Metallic Glass Alloys with Ultrasonic Additive Manufacturing: Adam Hehr1; Mark Norfolk1; Evelina Vogli2; 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
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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 Shapiro1; 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 Chen1; Long-Qing Chen1; 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 Jung2; 1Postech; 2Seoul National University

10:20 AM Break

10:45 AM Invited
ICM and Additive Manufacturing Research in NSF's Advanced Manufacturing Program: Khershed Cooper1; 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 Lewis1; 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’Mara1; 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 Aluminum Alloy 7150 with Rare Earth Additions: Michael Benoît1; Suming Zhu1; Trevor Abbott1; 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 Martin1; Julie Miller1; Brennan Yahata1; Jacob Hundley1; Justin Mayer1; 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 Aluminum: Nesma Aboutkair1; Marco Simonelli1; Ehab Salama1; Graham Rance1; Nigel Neate1; Christopher Tuck1; Amal Esawi1; 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 Zhou1; Holden Hyer1; Sharon Park1; George Benson1; Yongho Sohn1; 1University of Central Florida

11:45 AM
A20X and AlSi10Mg Aluminium Alloys: A Comparison: Richard Sélo1; Ian Maskery1; Ian Ashcroft1; Christopher Tuck1; 1University of Nottingham
12:05 PM
Prospects of Application of New Aluminum Alloys for Selective Laser Melting: Dara Daubaryte1; Mann Viktor1; Alexander Krokhin1; Dmitry Ryabov2; Vakhromov Roman2; Korolev Vladimir3; Alexander Severyan3; 1:Light Materials and Technologies Institute; 2:RUSAL 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 Heikkenen1; Sudarasanam Babu4; 1:The University of Tennessee

8:50 AM
Phase Field Modeling of Alloy Microstructure Formation in Rapidly Solidifying Melt Pools: Joel Berry1; Aurelien Perron2; Jean-Luc Fattebert2; Saad Khairallah3; Joseph McKeown1; Manyalibo Matthews1; 1:Lawrence Livermore National Laboratory; 2:Oak Ridge National Laboratory

9:10 AM
Phase-field Solidification Texture Model for Understanding the Microstructure in L-PBF Process: kamalinath kadiret1; Guiltherme Abreu Faria1; Xuesong Gao1; Antonio Rameriz1; Wei Zhang1; Yunzhi Wang1; 1:Ohio State University

9:30 AM
Phase Field Simulation of Solidification Behavior of ALSi10Mg Alloys Manufactured Through Direct Metal Laser Sintering: Hossein Azizi1; Alireza Ebrahim1; Nana Ofori-Opoku2; Michael Greenwood3; Nikoas Provatas4; Mohsen Mohammadi5; 1:University of New Brunswick; 2:Canadian Nuclear Laboratories; 3:Natural Resources of Canada; 4:McGill University

9:50 AM
Multiscale Modeling of Metal Additive Manufacturing: Linking of Continuum Scale CFD and Mesoscale Phase-field Models: Patrick O’Toole1; Milan Patel1; Paulus Lahr1; Dayalan Gunasegaram1; Anthony Murphy1; Ivan Cole1; Chao Tamg2; Ming Gan3; Chee Wong3; 1:CSIRO; 2:RMIT University; 3:Nanyang Technological University

10:10 AM Break

10:30 AM
Integrated Simulation Framework for Additively Manufactured Metallic Alloys: Rongpei Shi1; Saad Khairallah2; Tae Wook Hoo3; Tien Roehling3; John Roehling3; Joseph McKeown1; Manyalibo Matthews1; 1:Lawrence Livermore National Laboratory

10:50 AM
Directional Solidification Microstructure of Inconel 718 Manufactured by Electron Beam Additive Manufacturing: Chang-woo Lee1; E. Lee2; Hyung Giun Kim1; Gun Hee Kim1; 1:‘Ki Tech

11:10 AM
Microstructural Evolution of Additively Manufactured Inconel 718: Laura Farris1; E. Lee2; Judy Schneider2; 1:University of Alabama in Huntsville

11:30 AM
Solidification and Grain Formation During Additive Manufacturing Process: A Grandpotential Based Phase Field Study: Sudipta Biswas1; Larry Aagesen1; 1:Idaho 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: Benoît 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 Li1; Xuan Zhang1; Jonathan Almer1; Jun-Sang Park2; Peter Kenesei1; 1:Argonne National Laboratory

9:00 AM
Simulated STEM-DCI Imaging of Dislocations in High-entropy Alloys: Joseph Tressmer1; Mullaine Shih1; Marc De Graef1; 1:University of California, Santa Barbara; 2:Argonne National Laboratory

9:20 AM
Influence of Plastic Deformation on the Disorder Order Transformation in 18 Carat Gold Alloys Studied by In-situ High-energy X-ray Diffraction: Marina Garcia Gonzalez1; Steven Van Petegem2; Nadine Baluc1; Fanny Lalire3; Helena Van Swygenhoven1; 1:Paul Scherrer Institut; 2:Ecole Polytechnique Fédérale de Lausanne; 3:Université de Franche-Comté

9:40 AM
Avalanche Statistics and the Intermittent-to-smooth-transition in Microplasticity: Gregory Sparks1; Yinan Cui2; Giacomo Po3; Quentin Rizzardi4; Jaime Marian1; Robert Maass2; 1:University of Illinois at Urbana-Champaign; 2:University 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 Merle1; 1:University Erlangen (Fau)
10:50 AM
Solute Interaction with Dislocation Cores in α-iron: an Atom Scale Experimental Study: Maxime Vallet1; Estelle Meslin1; Michael Walls2; Lisa Ventelon1; 1CEA - Saclay; 2Laboratoire de Physique des Solides

11:10 AM
Size Effects in Dislocation-mediated Pore Growth: Ashley Roach1; Fulin Wang1; Jungho Shin1; Gyuseok Kim2; Irene Beyerlein1; Lisa Ventelon1; 1CEA - Saclay; 2Laboratoire de Physique des Solides

TUESDAY AM

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 Kwok1; Xin Xu1; David Dye1; 1Imperial College London

8:50 AM
Annealing Time Dependence of Tensile Properties of 8 wt% Mn Steel: Xin Xu1; Thomas Kwok1; David Dye1; 1Dept of Materials, Imperial College London

9:10 AM
Microstructural Origins of Lüders Banding in Medium Manganese Steels: Rama Srinivas Varanasi1; Dirk Ponge1; Dierk Raabe1; 1Max Planck Institute for Iron Research

9:30 AM
TBF Steels Produced by Partial Austenitization: Ersoy Erisir1; Oguz Gurkan Bilir1; Yunus Emre Sözer2; Ozge 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: Miklu Watanabe1; Goro Miyamoto1; Tadashi Furuhara1; 1Tohoku University

10:10 AM Break

10:30 AM
Improving Microstructure of Ferritic-bainitic Steel used in Automotive Industry: Mostafa Tawfeek1; Ayman Fathy1; Ahmed Abdelaziz2; 1German University in Cairo

10:50 AM
End to End Simulation and Genetic Optimization for the Design of Medium Mn Steels: John Aristeidakis1; Gregory Hadjemenopoulos2; 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 Li1; Haiwen Luo2; 1University of Science and Technology Beijing

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — High-energy Product 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

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 Hirotsuru1; 1National Institute for Materials Science

9:00 AM Invited
Computational Design of Bulk Permanent Magnets: Thomas Schrefl1; Johann Fischbacher1; Alexander Kovacs1; 1Danube University Krems

9:30 AM
Effects of Grain Size on Magnetic and Mechanical Properties of NdFeB Sintered Magnets: Wei Tang1; Gaoynan Ouyang2; Baozhi Cui1; Matt Kramer1; Jun Cui1; Iver Anderson1; 1Ames Lab; 2Iowa State University

9:50 AM
Mechanically Strengthened Heterogeneous Sm-Co Sintered Magnets: Baozhi Cui1; 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 Ithenra Niebedim1; 1Ames Laboratory

11:00 AM Invited
Additive Manufacturing of Hard Magnets for Tailored Magnetic Fields: Christian Huber1; Martin Groenefeld2; Dieter Susi3; 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 Paudyal1; 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 Reisert1; Ashish Aphaile2; Yoed Tsur2; Prabhakar Singh3; 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 Basu1; 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 Austenitic Steels: Zhipeng Zeng1; Lingfeng Zhou1; Yukinori Yamamoto2; Michael Brady3; Xingbo Liu4; 1West Virginia University; 2Oak Ridge National Laboratory; 3Technion

9:30 AM
Phase Field Simulation of Ni Coarsening in SOFC Anodes under Operating Conditions: Yinhai Lei1; Tianie 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 Zhu2; Srikanth Gopalan3; Soumendra Basu4; Uday Pal5; 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 Pandey2; Jung Pyung Choi3; Rajeev Gupta4; 1The University of Akron; 2Pacific Northwest National Laboratory

10:50 AM Invited
Protonic Ceramic Fuel Cells: Materials and Device Development: Kyle Brinkman1; 1Clemson University

11:10 AM Invited
Catalytic Activity of Cobalt-containing Oxides for the Cathodic Reaction of IT-SOFC: Hitoshi Takamura1; 1Tohoku University

11:30 AM Invited
Rational Design of Diffusion-blocking Layer to Suppress Chemical Degradation of Solid Oxide Fuel Cells: Kyung Joong Yoon1; 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 Wolerton, Raytheon; Babak Arfaei, Ford Motor Company; Andre Dethaise, 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 Cotts1; Mohammed Genanu2; Faramarz Hadian3; 1Binghamton University

8:50 AM
A Model Study of Bi Diffusion and Intermetallic Growth in Sn-Bi Low Temperature Soldering Systems: Yaohui Fan1; Yifan Wu2; John Blendell3; Nilesh Badwe4; Carol Handwerker5; 1Purdue University; 2Intel Corporation

9:10 AM
Reliability Behavior of Surface Mount Devices Assembled with Bismuth Bearing Low-melt Solder Pastes: Luke Wentlent1; Michael Mellunas2; Jim Wilcox3; 1Universal Instruments Corp.

9:30 AM
Influence of Indium Addition on Microstructural Properties of Sn-rich Solder Joints: Aranav Das1; 1West Virginia 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 Wang2; Jenq Gong Duh3; 1National Tsing Hua University

10:30 AM
Development of Low Temperature Sn-Bi based Solder Alloys: Mehran Maalekian1; Aranav Das2; Ludo Krassenburg3; Co van Veen4; 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: Jinchiro 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: Nontaka 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 Dippenaar1; 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 Sohn1; 1Yonsei University

9:10 AM
In-situ High Temperature Confocal Laser Scanning Microscopy Study during Heat Treatment of Duplex Stainless Steels: Wangzhong Mu1; Niklas Pettersson1; Sohee Sukenaga2; Hiroyuki Shibata1; Peter Hedstrom1; 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: Zhiang Pan1; Lejun Zhou1; Wanlin Wang1; 1Central South University

9:50 AM Break

10:10 AM Invited
MgO Dissolution Phenomena by Using Hot Thermocouple Technique: Yongsu Kang1; 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 Sun1; Zuotai Zhang1; 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 Fuchs1; Christian Bernhard1; Susanne Michel1; 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 Dai1; 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 Clarke, Colorado School of Mines

8:30 AM Invited
Impulse for Solid-State Processing: Glenn Daehn1; Anupam Vivek1; Brian Thurston1; Bhuvi Nirudhodhi1; 1Ohio State University

8:55 AM Invited
Structure-property Relationships in Solid Phase Processing and Emerging Applications: Glenn Grant1; Scott Whalen1; Vineet Joshi2; Xiaofei 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 Kappagantula1; Jens Darsell1; Rajib Kalsar1; Nicole Overman2; Scott Whalen1; Glenn Grant1; Darrell Herling1; Vineet Joshi2; 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; Panagioti Kitsopoulou2; Varun Gupta3; Piyush Upadhyay4; Tianhao Wang5; Erin Barker1; Darrell Herling1; 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 Sushko1; Brianna Collins1; Tiffany Kaspar1; Junhui Tao1; Bharat Gavali1; Arun Devaraj1; Tamas Varga1; Yang He1; Chongmin Wang1; Aashish Rohatgi1; Cynthia Powell1; Suveen Mathaudhu2; 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 Li1; Shenyang Hu1; Erin Barker1; Suveen Mathaudhu2; 1Pacific Northwest National Laboratory; 2Pacific Northwest National Laboratory; University of California, Riverside

11:05 AM
MD Simulations of Deformation Mechanisms and Sub-grain Formation in Al-Si Alloys Under High Shear Deformation: Shenyang Hu1; 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**

**Session Chairs**: Srinivasa Rao, University of Texas, El Paso; Ravindra Nuggehalli, NJIT

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**8:30 AM Invited**

Controlling Functional Properties in Oxide Nanocomposites via Strain, Defects and Interfaces: *Aiping Chen*: Los Alamos National Laboratory

**9:00 AM Invited**

Stabilization of High-temperature Polymorphs of SrSnO$_3$ at Room Temperature via Epitaxy: *Bharat Jalan*: University of Minnesota

**9:20 AM Invited**

Effect of Interfacial Strain on the Point-defect Energetics in LaNiO$_x$: *Kanishk Rawat*, Dillon Fong*; Dilpuneet Aidhy*: University of Wyoming; *Dillon Fong*: Argonne National Laboratory

**9:50 AM**


**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: *Ashutos Tiwari*, Shrikant Saini*, Paolo Mele*: University of Utah; *Shibaure Institute of Technology*

**11:30 AM**


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**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**

**Session Chairs**: Ruigang Wang, University of Alabama; Sergio Monteiro, Military Institute of Engineering

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**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*, Yashhiro Kodera*, Javier Garay*: University of California, San Diego

**8:55 AM**

Preparation of Rare Earth Stabilized Nanocrystalline Zirconia with Tunable Optical/mechanical Properties: *Gottlieb Uahengo*, Javier Garay*, Yashhiro Kodera*: University of California, San Diego

**9:15 AM**

Pressure-less Processing of Ceramics with Deliberate Elongated Grain Orientation and Size: *Hortense Le Ferrand*: Nanyang Technological University

**9:35 AM**


**9:55 AM**

Development of Shape-Controlled Oxide Nanopowders as Support Materials in Emission Control Catalysts: *Zhongqi Liu*, Ruigang Wang*: The 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 Bochichio, 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; Jeffrey Hawk1; 1National Energy Technology Laboratory

9:45 AM
Creep Resistant Cast INCONEL Alloy 740H using an Alternative Casting Technique: Martin Detroit1; 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 Bozzola1; Marc Bernacki1; 1MINES ParisTech

10:55 AM
On the Formation of Heating and Cooling Precipitates from a Superalloy Powder: David Collins1; 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 Sasaki1; Akihiro Suzuki2; Motoki Okuno2; Daisuke Nagahama3; Masato Ohnuma4; Kazuhiro Hono4; 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 Papadaki1; 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 Mendeleev, Ames Laboratory; Bryce Mereidig, 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 Mishin1; 1National Institute of Standards and Technology; 2George Mason University; 3National Institute of Airospace

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 Gubaev1; Alexander Shapeev1; Livia Parlay1; Noam Bernstein1; Gabor Csanyi1; 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; Sandia 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

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**8:30 AM Introductory Comments**

**8:35 AM Invited**

**ZT Enhancement in Thermoelectric Nanowires:** Yang-Yuan Chen; Academia Sinica

**8:55 AM Invited**

**Novel Thermoelectric Materials for Power Generation:** Yaniv Gelbstein; Ben-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 Caillat; Chen-Kuo Huang; Jong-Ah Paik; Ike Chi; Stanley Pinkowski; Jet Propulsion Laboratory

9:35 AM Invited

Approaches to Manipulate p-n Conduction Transition and High Thermoelectric Performance inGa-incorporated Bi2Te3: Hsin-Jay Wu; Chun-han Lin; Wan-ting Yen; National Chiao Tung University

9:55 AM Break

**10:15 AM Invited**

Intrinsic Cu Vacancy Leading to High Thermoelectric Performance in CuBi3Se5: Jian Wang; Wichita State University

10:35 AM

Enhanced Averaged zT in n-type Bi3Te3 via Solubility Control: Wan-Ting Yen; Hsin-jay Wu; Pai-chun Wei; National Chiao Tung University; King Abdullah University of Science and Technology

10:55 AM

Improving the Thermoelectric Properties of Atomized BiSbTe Alloy by Electroless Copper Coating: Pathan Sharief; Madavali Babu; Youhan Sohn; Jun-Hyun Han; Soon-Jik Hong; Kongju National University; Chungnam National University

11:15 AM

Minor Ga Addition in ZnSb, Leads to Major Enhancement in Thermoelectric Performance: I-Lun Jen; Hsin-Jay Wu; National Chiao Tung University

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**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

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**8:30 AM Introductory Comments**

**8:40 AM**

Quantifying the Effect of Seeds on Gibbsite Crystallization – Mathematical Modelling of Particle Size Distribution: Thiago Franco; Marcelo Seckler; CBA; Sao Paulo University

**9:00 AM**

Application of Advanced Oxidative Process for Organic Compounds Removal from Bayer Liqueur: Miguel Soplin; Amilton Botelho Junior; Jorge Tenorio; Marcela Baltazar; Denise Espinosa; Universidade de Sao Paulo

**9:20 AM**

Disc Magnetic Separator Applied to the Extraction of Magnetite in Bauxite Residue: Yoann Robert; Guy Simard; Sebastien Fortin; Universite du Quebec a Chicoutimi; Rio 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; Yan Liu; Xiaolong Li; Zhang Tiantian; Northeastern University

10:00 AM Break

**10:20 AM**

A Review of Comprehensive Utilization of High-iron Red Mud of China: Zhang Tiantian; Kun Wang; Yan Liu; Guozhi Lv; Xiaofei Li; Xin Chen; Northeastern University

**10:40 AM**

Conversion Behavior of Iron-containing Minerals in the Process of Dissolving High-iron Bauxite by Starch Hydrothermal Method: Yongfei He; Yiyong Wang; Jidong Li; Xingyuan Wan; Zhe Ning; University of Science and Technology Liaoning

11:00 AM

Recovery of Iron from High-iron Bayer Red Mud by Smelting Reduction: Kun Wang; Yan Liu; Guozhi Lv; Xiaofei Li; Xin Chen; Northeastern University
**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizer:** Dmitry Eskin, Brunel University

**Tuesday AM | February 25, 2020**

**Session Chair:** Shouxun Ji, Brunel University London

8:30 AM **Introductory Comments**

8:35 AM **Effect of Cooling Rate During Solidification of Aluminium-cerium Alloy:** Gautham Murthysamy; Samuel Wagstaff; Antoine Allano; Massachusetts Institute of Technology; Novelis 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 Kotiladis; Adam Zimmer; Abdallah Elsayed; Eli Vandensluis; C. Ravindran; University of Guelph; Ryerson University

9:25 AM **The Efficacy of Replacing Metallic Cerium in Aluminum-cerium Alloys with LREE Mischmetal:** Zachary Sims; David Weiss; Orlando Rios; Hunter Henderson; Michael Kesler; Scott McCall; Michael Thompson; Aurelien Perron; Emily Moore; University of Tennessee; Eck Industries; Oak Ridge National Laboratory; Lawrence Livermore National Laboratory

9:50 AM **Effects of Sc and Y on the As-cast Microstructure of AA6086:** Sandi Zist; Varuzan Kevorkijan; Matej Steinacher; Franc Zupanic; Irena Paulin; Impol d.o.o.; Faculty of Mechanical Engineering; Institute for Metals and Technology

10:15 AM **Break**

10:30 AM **Ternary Interactions and Implications for Third Element Alloying Potency in Al-Fe-Based Alloys:** Hunter Henderson; David Weiss; Zachary Sims; Michael Thompson; Emily Moore; Aurelien Perron; Fanqiang Meng; Ryan Ott; Orlando Rios; Oak Ridge National Laboratory; Eck Industries, Inc.; University of Tennessee, Knoxville; Lawrence Livermore National Laboratory; Ames Laboratory

10:55 AM **Development and Analysis of Al7075 Alloy Materials using Press and Sinter Processing:** Steven Johnson; Corey Clark; Jason Alvarez; Central Connecticut State University

11:20 AM **Retrogression Forming and Reaging of AA7075-T6 Alclad to Produce Stampings with Peak Strength:** Katherine Rader; Louis Hector; Jon Carter; Eric Taleff; University of Texas at Austin; General Motors
Biodegradable Materials for Medical Applications II — Polymers and Ceramics

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

**Program Organizers:** Jaroslav 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, Helmholz-Zentrum Geesthacht; Huinan Liu, University of California at Riverside

**Tuesday AM | February 25, 2020**

**Vista | Marriott Marquis Hotel**

**Session Chairs:** Huinan Liu, University of California at Riverside; Jaroslav Drelich, Michigan Technological University

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**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 Sea1; Changlu Xu1; Jiajia Lin1; Edgar Villafana1; Hector Jimenez2; 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 Tamboril1; Augusto Ducati Luchessi1; Eder Socrates Najar Lopes1; Luis Pellizzer Gabriel1; 1University of Campinas

**9:45 AM**

**Synthesis of Absorbable and Non-absorbable Sutures for Surgical Incisions and Wounds:** Muhammad Shoaib Butt1; 1National University of Science and Technology

**10:05 AM**

**Break**

**10:20 AM**

**Ceramic Composites as Bone Tissue Scaffolds:** Caitlin Guzzo1; John Nycho1; 1University of Alberta

**10:40 AM**

**Biocompatibility Study of Luminescent Hydroxyapatite:** Fabian Martinez1; Ekaterina Novitskaya1; Manuel Herrera1; Karla Juarez-Moreno1; 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 Guan1; Sujun Wu1; 1Beihang University

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**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

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**8:30 AM**

**Novel Architectured Materials for Treating Heart Disease:** David Restrepo1; 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 Thomas1; 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 Howard1; Levi Gardner1; Zahra Saifee1; Isaac Nelson1; John Colombo1; Steven Naleway1; Krista Carlson1; Aladdin Gelei1; 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 Katti1; 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 Cabrera1; Kaela Wong1; Victor Bourgin1; Win-Ying Zhao1; Patricia Castillo1; Connie Gear1; Pegah Bagheri1; Bryn Henning1; KiAsia Lawson1; 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 Rosenberg1; Ursula Ebert1; Stephan Zeiter1; Vincent Stadelmann1; Claire Acevedo1; 1University of Utah; 2AO Research Institute Davos; 3AO Research Institute Davos, Schultths Klinik

**10:45 AM**

**Biomechanical Behaviors of Gingival-derived Mesenchymal Stem Cells (GMSCs) Treated Arthritis Mice Tibia:** Yuxiao Zhou1; Junlong Dang1; Ye Chen1; Song Guo Zheng1; Jing Du1; 1Pennsylvania State University; 2Sun Yat-sen University; 3Ohio State University

**11:05 AM Invited**

**Mechanical Properties of Tough, Mechanochemically Active Hydrogels:** Jamie Kruzi1; Yuwan Haung1; Bhakti 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 Cordill1; 1Wagstaff
9:00 AM  Continuous Monitoring of Butt Curl Development During DC Casting — Development and Application: Gerd-Ulrich Gruen1; Werner Droste1; Daniel Klings1; Mark Badowski1; Markus Hagen1; 1Hydro Aluminium Rolled Products GmbH
9:25 AM  Constellium’s Mold Technology for Al Alloy Slab DC Casting: Philippe Jury1; Olivier Ribaudo1; Laurent Jouët-Pastré1; 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 Guthrie1; Mihaela 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 Pan1; 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 Solberg1; Magnus Skramstad1; Thomas Kvande1; Johannes Lodin1; Nicholas Smith1; Martin Svyertsen1; Anne Kvithyld1; 1Granges; 2Alcoa; 3NTNU; 4Hydro; 5Linde; 6SINTEF
11:20 AM Study of the Oxidation of an Al-SMg Alloy in Various Industrial Melting Furnace Atmospheres: Johannes Lodin1; Martin Svyertsen1; Anne Kvithyld1; Anders Johansson1; Egil Solberg1; Thomas Kvande1; 1Linde; 2SINTEF; 3Granges 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 Madison1; Thomas Ivanoff1; Alex Hickman1; 1Sandia National Laboratories
8:50 AM In-Situ X-ray Tomography of Vapor Phase Alloying of Ni Wires via Pack Titaniazation: Arun Bhattacherjee1; Ashley Paz y Puente2; Dinc Erdeniz2; David Dunand1; 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 Cook1; 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 Kessler1; Sarah Gladding1; Aric Harper1; 1Colorado Mesa University
9:50 AM Mapping Grain Morphology and Orientations by Laboratory Diffraction Contrast Tomography: Hrishikesh Bate1; Jun Sun1; Jette Oddershede1; Erik Lauridsen1; 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 Collins1; 1Iowa State University
10:45 AM Pore Network Modelling Analysis of 3D SEM Images of Nanoporous Gold: S. Ali Shojaee1; 1Thermo Fisher Scientific
11:05 AM Automated Serial Sectioning as a Method to 3D Map Inclusions in Structural Metals: Veeraraghavan Sundar1; Rachel Reed1; 1UES Inc.
11:25 AM 3D Characterization of the Evolution of Crystal Mosaicty During Solidification of Single Crystal Ni-based Superalloys: Felicitas Scholz2; Daniel Kotzem2; Pascal Thome1; Jan Frenzel1; Gunther Eggeler1; 1Ruhr-Universitaet Bochum
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 Ikhmayes, 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 Yunqing1; Qing Gele1; 1Research Institute of Technology, Shougang Group Corporation

**8:50 AM**
Nano-particle Products Extracted from the Low-grade Laterite Minerals: Qiuju Li1; Minerals Nano-particle Products Extracted from the Low-grade Laterite, Institute of Technology, Shougang Group Corporation

**9:10 AM**
Study on the Influence of Limestone and Hydrated Lime on Pelletizing. Gele Gele1; Zhixing Zhao1; Minge Zhao1; Yunqing Tian1; Li Ma1; 1Shougang Group

**9:30 AM**
Leaching of Platinum Group Metals from Automobile Spent Catalyst: Sujun Lu1; Dalin Chen1; Peng Zhang1; Guojie Chen1; Yan Zhang1; Yujian Pan1; Ruikang Wang1; Jinxie Qiao1; Xintao Sun1; Aliang Chen1; 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 Liu1; Rujie 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 Wang1; Zijian Su1; Mamnan 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: Jinxie Qiao1; Aliang Chen1; Xintao Sun1; Zhen Qian1; Yan Zhang1; Yutian Ma1; 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

**11:15 AM**
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 Homer1; Derek Hensley2; 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 Patala1; Jeremy Mason2; 1North Carolina State University; 2University of California, Davis

**9:25 AM**
Microstructural Evolution Along Geodesics: Ian Chesser1; Toby Francis1; 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 Francis1; Ian Chesser2; Saransh Singh1; Tresa Pollock1; Elizabeth Holm1; Marc De Graef1; 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 Johnson1; Sterling Baird2; Christian Kurniawan1; David Fullwood1; Eric Homer3; 1Brigham Young University; 2Carnegie Mellon University

**10:45 AM**
Higher Order Spectral Terms in Grain Boundary Networks: Christopher Adair1; Oliver Johnson1; 1Brigham Young University

**11:05 AM**
Investigating the Atomic Nature of Grain Boundary Failure: Jacob Taverner1; Christopher Weinberger1; Shawn Coleman1; Garrit 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 Atomic Techniques: Matthew Guziewski1; Dennis Trujillo2; Srikanth Patala3; Shawn Coleman1; 1US Army Research Laboratory; 2University of Connecticut; 3North Carolina State University

**www.tms.org/TMS2020**
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 Qian1; 1Texas A&M University

9:00 AM
Effect of Spin-orbit Coupling on Magnetic Phase Transition of Anti-ferromagnetic Weyl-Semimetal: Sugata Chowdhury1; Kevin Garrity2; Angela Hight Walker3; Cindi Dennis1; Albert Davydov1; Francesca Tavazza1; 1National Institute of Standards and Technology; 2University of Florida, Department of Materials Science and Engineering; 3University 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 Tavazza1; 1University of Maryland(National Institute of Standards and Technology); 2Umcp/Nist

10:00 AM
High Throughput Exploration of Two-dimensional Topological Artificial Lattices: Srilok Srinivasan1; 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 Bansil1; 1Northeastern University

11:05 AM
Two-dimensional Functional Materials with Pentagonal Structure: Lei Liu1; Immanuella Kankam1; Houlong Zhuang1; 1Arizona State University

11:25 AM
Computational Synthesis of 2D Materials: A High-throughput Approach to Materials Design: Tara Boland1; 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 Wilhelm1; Nathan Wilson1; Tahir Cagin1; Raymundo Arroyave1; Ruth Pachter1; 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: Dilipneet 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 Szlufarska1; Jianqi Xi1; Cheng Liu1; Dane Morgan1; 1University of Wisconsin-Madison

9:10 AM
Influence of Coordination Numbers on Representing Molten Salts for Nuclear Reactor Applications Using the Modified Quasi-Chemical Model (MQM): Matthew Christian1; Theodore Besmann1; 1University of South Carolina

9:50 AM
Amorphous Zirconia: a Host for Excess Oxygen in Cladding Barrier Oxides?: Simon Middleburgh1; 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 Marian1; Qianran Yu1; Peng Wang1; Michael Reyes1; Asghar Aryanfar1; Gary Was1; 1UCLA; 2University of Michigan; 3Bahcesehir University

11:10 AM
Atomistic Studies of Nuclear Materials with Temperature: Uranium Nitride and Thermocouples: Ember Sikorski1; Lan Li1; 1Boise State University

11:30 AM
Stabilizing Gamma Hydrides in Zr through Mechanical Stress: Jake Bair1; 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*  
33C | San Diego Convention Ctr

*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 Takaki1; 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 Todorova1; 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 Zaeem1; 1Colorado School of Mines

9:50 AM  
Molecular Dynamics Simulations of Heterogeneous Nucleation from Undercooled Melt: Takuya Fujinaga1; 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 Pusztai1; 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 Lindemann1; Ashwin Shahani1; 1Department of Materials Science and Engineering, University of Michigan

SPECIAL TOPICS


*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 Moya1; 1University of Cambridge

9:00 AM Invited  
Under Pressure: Probing Magneto-structural Coupling in MCE Materials: Luana Caron1; Sanjay Singh2; Ekkes Brueck3; Claudia Felser4; 1Bielefeld University; 2Indian Institute of Technology (Banaras Hindu University), Varanasi; 3TUDelft; 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 Tartillo2; António dos Santos2; Jamie Molaison3; Rafal Kulmaczewski3; Antonin Chapoy4; Pezhanman Ahmadi5; Malcolm Halcrow6; Karl Sandeman1; 1Bielefeld University; 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 Wäsche1; Dzekan2; Bruno Neumann2; Dietmar Berger1; Kai Sellschopp2; Alexander Stork2; Kornelius Nielsch3; Sebastian Fähler2; 1Bundesanstalt für Materialforschung; 2Techische Universität Hamburg

10:50 AM Invited  
Materials for Thermomagnetic Harvesting of Low Temperature Waste Heat: Daniel Dzekan1; Anja Wäske1; Kornelius Nielsch3; Sebastian Fähler2; 1Leibniz IFW Dresden; 2Bundesanstalt für Materialforschung und -prüfung (BAM)

11:20 AM Invited  
Rare-earth-free Permanent Magnets: The Past and Future: J.Ping Liu1; 1University of Texas at Arlington

11:50 AM Concluding Comments
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 Todaro; Mark Easton; David StJohn; Ma Qian; 1RMIT University; 2University of Queensland

9:00 AM Invited
Modification of Al-Si Alloys with Rare Earth Elements: Prakash Srirangam; Wmg, 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; Laurentiu Nastac; University of Alabama

9:50 AM Ti Fading Effect in Primer and Seconder A356 Alloys and Melt Quality: Ozen Gursoy; Eray Erzi; Derya Dispinar; 1ITU; 2Istanbul University

10:30 AM Tensile Properties Limits of A356 Alloy by Porosity: Ozkan Kesen; Selim Temel; Okan Aydin; Furkan Tezer; Ozen Gursoy; Derya Dispinar; 1ITU; 2Istanbul University

10:50 AM Effect of Zr Additions on Microstructural and Mechanical Properties of Gravity Die Cast AlSi7Mg0.4 Alloys: Yunxiang Zhang; Haidong Zhao; Changhai Li; Lin Zhu; 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; Shrinath Solanki, Arizona State University; Shrinath Solanki, Michigan State 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; University of Pittsburgh

8:50 AM Adsorption and Equilibrium Metal-ceramic Orientation Relationships: Hadar Nahori; Ting Mao; Wayne Kaplan; Technion - Israel Institute of Technology

9:10 AM Ab Initio Study of a Highly Asymmetric Grain Boundary Superstructure in WC: Chongze Hu; Zhiyang Yu; Jian Luo; University of California San Diego; Fuzhou University

9:30 AM A Crystal Plasticity Model with Enhanced Interface Physics: Jason Mayeur; University of Alabama in Huntsville

9:50 AM Invited
Critical Assessment of Grain Boundary Role on the Magnetic Flux Trapping in Niobium: P Garg; Thomas Bieler; Kiran Solanki; Arizona State University; Michigan State University

10:10 AM Break

10:30 AM Mechanistic Transitions Underpinning Grain Boundary Segregation Strengthening in Nanocrystalline Alloys: Jason Trelewicz; Stony Brook University

10:50 AM Screw Dislocation Transmission Across the S3{112} Twin Boundary in Face Centered Cubic Copper: Tengfei Ma; Nithin Mathew; Lei Cao; Abigail Hunter; University of Nevada, Reno; Los Alamos National Laboratory

11:10 AM Evolution of Grain Boundary’s Metastability in Metallic Nanocrystals Under External Stimuli: Zhitong Bai; Yue Fan; University of Michigan

11:30 AM Multiscale Simulation of the Dislocation-interface Reactions: Methodology, Mechanisms, and Applications: Liming Xiong; Youping Chen; Iowa State University; University 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; Carl Duchesne; Eric Poulin; Julien Lauzon-Gauthier; Laval University; Alcoa Primary Metals Smelting Center of Excellence

9:00 AM Diffusion Measurements of CO₂ within Carbon Anodes for Aluminium Smelting: Epma Putri; Geoffrey Brooks; Graeme Snook; Lorentz Lossius; Ingo Eick; CSIRO, Swinburne University of Technology; Swinburne University of Technology; CSIRO; Hydro Aluminium

9:25 AM Testing of SERMA Technology on Industrial Anodes for Quality Control in Aluminum Production: Yasar Kocaefe; Duygu Kocaefe; Dipankar Bhattacharyya; Abderrahmane Benzaoui; Jean-François Desmeules; University of Quebec at Chicoutimi

9:50 AM Modelling of Gas Injection on Anode Baking Furnace and Application to Operations: Sandra Besson; Solène Bache; Arnaud Bourgier; Jean-Philippe Schneider; Thierry Conte; Rio Tinto

10:15 AM Break

10:30 AM Higher Baking and Production Levels in Anode Baking Furnaces and Associated Challenges: Syed Arif Ali; Charles Lebel-Tremblay; Pierre-Yves Brisson; Alexandre Gagnon; Rio 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; Arnaud Bourgier; Mytilineos Metallurgy Business Unit, Agios Nikolaos; Rio 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 Houachi, Hydro-Quebec; Hojong Kim, Pennsylvania State University; Takanori 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; Xi’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; Wuhan University of Technology

9:10 AM Study on High-temperature Liquid Lithium Battery with LiFePO₄ Electrolyte: Hao Yu; Huimin Lu; Neale Neelameggham; Beihang University; IND 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; Northeastern University

9:00 AM Invited
Achieving Controlled Surface Roughness of Ultra-thin Al Foils as Current Collector: Lihong Su; University of Wollongong

9:25 AM
Phytocatalytic Hydrolysis to Convert Lignin-derivatives to Phenol Under Ambient Conditions: Yun-Chung Shen; Jeffrey Wu; Institute of Nuclear Energy Research; National Taiwan University

9:45 AM
Molecular Dynamics Simulation of CO₂ Absorption Behavior in Hydrotalcite and its Derived Oxides: Hao Zhang; Univ of Alberta
10:05 AM Break

10:25 AM
Improved Physical Solvents for Pre-combustion CO₂ Capture: Jeffrey Culp; Robert Thompson; Wei Shi; Surya Tiwari; Kevin Rosnik; Nicholas Siebert; David Hopkinson; National Energy Technology Laboratory / LRST; National Energy Technology Laboratory

10:45 AM
Hydrogen as a Fuel and Ramifications: Ashok Khandkar; Neole Neelameggham; University of Utah; IND 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; Rong Zhu; Guangsheng Wei; Chao Feng; Jianfeng Dong; University of Science and Technology Beijing; University of Science and Technology, Beijing

11:45 AM
Environmental 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; Drew Johnson; Diana Farkas; University of Michigan; Virginia Tech

9:10 AM
Effect of Triaxial Stress State on PWSCC Initiation Behavior of Nickel-based Alloy in Nuclear Power Plants: Seung Chang Yoo; Kyoung Joon Choi; Il Soon Hwang; Ji Hyun Kim; UNIST; Korea Atomic Energy Research Institute; Sejong University

9:30 AM
Determining Reliability Over Time for Stainless Steels Susceptible to Chloride-induced Stress Corrosion Cracking: Consuelo Guzman-leong; Joseph Cluever; Stephen Gosselin; LPI, 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; John Scully; James Burns; University of Virginia

10:50 AM
Sensitization, Loading Frequency, and Electrochemical Potential Effects on Corrosion Fatigue Kinetics of AA5456-H116: David Schrocht; Jennifer (Warner) Locke; The Ohio State University

11:10 AM
Evaluating Stress Corrosion Cracking Performance of 5083 H116 Aluminum as a Function of Material Microstructure: William Golumbfskie; Matthew McMahon; Emily Holcombe; Mitra Taheri; Naval Surface Warfare Center - Carderock; Drexel University

11:30 AM
Stress Corrosion Cracking of Welded AA5059 Alloy: Rajesh Yadav; Gajanan Chaudhari; Indian 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: Mechanical Behavior of Materials 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; Lehigh University

9:10 AM
Fatigue Crack Growth in Structural Cast Aluminum Alloys: Microstructural Mechanisms, Modeling Strategies, and Integrated Design: Anthony Spangenberger; Diana Lados; Worcester Polytechnic Institute

9:30 AM
Marked 2-point Spatial Correlations of Microstructure Neighborhoods Surrounding Fatigue Hot-spots in Ti-6Al-4V: Adrienne Muth; Surya Kalidindi; Reji John; Adam Pilchak; David McDowell; Georgia Institute of Technology; Air 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; Shravan Kotha; Somnath Ghosh; Johns 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 Durmaz; Thomas Straub; Chris Eberl; Fraunhofer IWM

10:50 AM
Probabilistic Dwell Fatigue Life Prediction of Microtextured Ti-6Al-4V: Sushant Jha; James Larsen; Reji John; Adam Pilchak; University of Dayton Research Institute; US Air Force Research Laboratory

11:10 AM
Variable Amplitude Fatigue Analysis Through an Approach based in the Equivalent Number of Cycles: Hernan Pinto; Paola Moraga; Matias Valenzuela; Alvaro Pena; Jose Garcia; Pontificia Universidad Catolica de Valparaiso
TECHNICAL PROGRAM
TMS2020 TECHNICAL PROGRAM

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 Vermaak1; 1Lehigh University

8:50 AM Invited
Multiscale/Level Design of Materials and Structures: H Alicia Kim1; 1University of California San Diego

9:30 AM Invited
Topology Optimization for Additive Manufacturing: Albert To1; 1University of Pittsburgh

10:10 AM Break

10:30 AM Invited
Nonlinear Composite Materials Design through Multi-material Topology Optimization Frameworks: X. Shelly Zhang1; 1University of Illinois at Urbana Champaign

11:10 AM Invited
Materials, Design and Emerging Objects: Virginia San Fratello1; 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 Lu1; 1George Washington University

8:50 AM
On the Design of Novel 2D Particulates from MAB Phases: Surojit Gupta1; 1University of North Dakota

9:10 AM Invited
Study on Photocatalytic Performance of Bi2MoO6/Ag3PO4 z-scheme Composites: Jaeyun Moon1; Kaleab Ayalew1; 1University of Nevada Las Vegas

9:30 AM Keynote
Tailored Nanomaterials for Advanced Environmental Processes: Sherine Obare1; 1UNC Greensboro

10:10 AM Break

10:30 AM Invited
Biomimetic Composites with Self-organized Aramid Nanofibers: Lizhi Xu1; 1The University of Hong Kong

10:50 AM Invited
Biogenic Nanoparticles on Exoelectrogens: Seokheun Choi1; 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 Ulrich1; Learnmore Tanaka Shenjie1; 1University of Georgia

11:30 AM Invited
Self-healable, Fully Recyclable and Malleable Electronic Skin based on Dynamic Covalent Thermost Nanocomposite: Jianliang Xiao1; 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 Furrer1; 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 Lindwall1; 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 Levi1; 1University of California, Santa Barbara

10:30 AM Break

10:50 AM Invited
Phase Equilibria in High-entropy and Complex-concentrated Alloys: Daniel Miracle1; 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; Takeshi Egami; William Weber; Oak Ridge National Laboratory; The University of Tennessee

8:50 AM Invited
Radiation Effects in High Entropy Alloys and Bulk Metallic Glasses: Steven Zinkle; Congyi Li; Tengfei Yang; James Brechtl; University of Tennessee

9:10 AM Invited
Energy Dissipation and Damage Evolution in Irradiated Concentrated Solid Solution Alloys: William Weber; Eva Zarkadoulia; Yanwen Zhang; University of Tennessee; Oak Ridge National Laboratory

9:30 AM Invited
High Entropy Alloys as Filler Metals: Zhenzhen Yu; Benjamin Schneiderman; Abdelrahman Abdelmotagaly; Chihpin Chuang; Jianxun Hu; Colorado School of Mines; Argonne National Laboratory; Honda 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; University of Tennessee

10:10 AM Break

10:25 AM Invited
Tracer Diffusion in High-entropy Alloys: the Impact of Constituents and Composition: Gerhard Wilde; University of Muenster

10:45 AM Invited
High-throughput Predicting and Machine-learning Solid-solution Formation: Michael Gao; Zongrui Pei; Junqi Yin; Jeffrey Hawk; David Alman; National Energy Technology Laboratory; Oak Ridge National Laboratory

11:05 AM Invited
Microstructure Evolution with Temperature in the Al-rich High-entropy Alloys: Louis Santodonato; Advanced Research Systems

11:25 AM Invited
Nature of Metallic Bonding in Bulk Metallic Glasses and High Entropy Alloys: Wai-Yim Ching; University of Missouri

11:45 AM Invited
Local Structure in Controlling Microstructure and Property of Lightweight High-entropy Alloys: Rui Feng; Chuan Zhang; Michael Gao; Zongrui Pei; Yan Chen; Dong Ma; Ke An; Jonathan Poplawsky; Fan Zhang; Jeffery Hawk; Peter Liaw; University of Tennessee; Computherm, LLC; National Energy Technology Laboratory; Oak Ridge National Laboratory

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; Avik Mahata; Colorado School of Mines; Missouri University of Science and Technology

9:00 AM
CALPHAD Modeling and Microstructure Investigation of Mg-Gd-Y-Zn Alloys: Janet Meier; Joshua Caris; Alan Luo; The Ohio State University; Terves LLC

9:20 AM
Intermetallic Phase Formation in Mg-Ag-Nd (QE) and Mg-Ag-Nd-Zn (QEZ) Alloys: Rainer Schmid-Fetzer; Jian-Feng Nie; Xiaojun Zhao; Houwen Chen; Clausthal University of Technology; Monash University; Chongqing University

9:40 AM
Recrystallization Effects on the Forming Behaviour of Magnesium Alloy Sheets with Varied Calcium Concentration: Jan Bohlen; Hua Chanh Trinh; Klaus Rätzke; Sangbong Yi; Dietmar Letzig; Magic-Magnesium Innovation Ctr; Christian-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; Mohsen Asle Zaeem; Mihriban Pekguleryuz; Mining 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; Taisuke Sasaki; Kazuhiro Hono; Mingzhe Bian; Taiki Nakata; Shigeharu Kamado; Yu Yoshida; Nozomu Kawabe; NIMS

11:00 AM
Two-Stage Settling Approach to Purify Mg Alloy: Yuan Yuan; Jiawei Liu; Tao Chen; Jiajia Wu; Li Yang; Aitao Tang; Fusheng Pan; Chongqing University
11:20 AM

Investigation of the Microstructure and Mechanical Properties of Mg–Gd–Nd Ternary Alloys: Yuling Xu; Lixiang Yang; Weili Liu; Jingli Sun; Lu Xiao; Xianquan Jiang; Norbert Hort; Chongqing Academy of Science and Technology; Shanghai Jiaotong University; Shanghai Spaceflight Precision Machinery Institute; Helmholtz-Zentrum Geesthacht

11:40 AM

Design of Heat Dissipating Mg–La–Zn Alloys based on Thermodynamic Calculations: Hui Shi; Qun Luo; Qian Li; Jieyu Zhang; Kuo-Chih Chou; State 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; Shanghai University

CHARACTERIZATION

Material Behavior Characterization via Multidirectional 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; Hongjin Choi; Jinwoo Lee; Hyuk Jong Bong; Seoul National University; Korea Institute of Materials Science

9:10 AM Invited

Modeling of Hole-expansion of Prestrained Sheets Using Distortional Hardening: Yannis Korkolis; Jinjin Ha; Ohio State University

9:50 AM

Effects of Y Concentration on Mechanical Response of Mg-Y Alloys: Xin Wang; Jiaxiang Wang; Kehang Yu; Timothy Rupert; Subhash Mahajan; Enrique Lavernia; Irene Beyerlein; Julie Schoenung; University of California Irvine; University of California, Santa Barbara; University 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; Colorado School of Mines

10:50 AM

Microstructure Control for Enhanced Multi-step Formability: Menglei Jiang; Cemal Cem Tasan; Massachusetts Institute of Technology

11:10 AM

Production of Commercially Pure Aluminum Strips via a Single-Step, Machining-based Technique: Mohammed Naziru Issahaq; Kevin Trumble; Srinivasan Chandrasekar; Purdue 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: Ankit Faisal; Christopher Weinberger; Colorado State University

8:50 AM

Uncovering the Nanoscale Mechanisms Governing Thermomechanical Properties in Solute-stabilized Nanocrystalline Alloys: Ankit Gupta; Gregory Thompson; Garritt Tucker; Colorado School of Mines; University of Alabama

9:10 AM

Strong Strain Hardening in Ultrafast Melt-quenched Nanocrystalline Cu: the Role of Fivefold Twins: Amir Hassan Zahiri; Pranay Chakraborty; Yan Wang; Lei Cao; University of Nevada Reno

9:30 AM

Investigating the Mechanical Behavior of Nano-architected Materials via Multiscale Discrete Defect Element Method: Phu Cuong Nguyen; III Ryu; University of Texas at Dallas

9:50 AM

Dislocation-twinning Competitions in Body-centered Cubic Metallic Nanowires: Chaoming Yang; Liang Qi; University of Michigan

10:10 AM Break

10:30 AM Invited

Atomistic Study of Ceramic Grain Boundary Deformation: Shawn Coleman; Qi An; Matthew Guziewski; CCDC Army Research Laboratory; University of Nevada, Reno

11:10 AM

Superelasticity and Superplasticity in Shape Memory Ceramic Nanoparticles: Ning Zhang; Mohsen Asle Zaeem; University of Alabama; Colorado School of Mines

11:30 AM

Failure Mechanisms of Core-shell Nanostructures: Raghu Ram Santhaparam; Arun Nair; University 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; Dhiren 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 Micromaterials: Mostafa Omar1; Steven Lavenstein1; Jaafer El-Awady2; 1Johns Hopkins University

9:10 AM
A Novel Fracture Observation in SiC-based Ceramics Through In-situ Double Torsion Testing: Pania Newell1; 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 Kienel1; Markus Alfreider2; Stefan Kolitsch3; Otmar Kolodnik4; 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 Lovinger3; G Ravichandran4; Narasimhan Ramarathinam5; 1Indian Institute of Science; 2Beijing Institute of Technology; 3University of California, Los Angeles; 4G.V. Kurdyumov Institute for Metal Physics NAS of Ukraine; 5University of California, Irvine

10:10 AM
10:30 AM Keynote
Fracture Across Length Scales in Tungsten: A Combined Experimental and Predictive Approach: Kevin Schmalbach1; Rajaprakash Ramachandramoorthy2; Manish Jain3; Siddharta Pathak4; Johann Michler5; William Gerberich6; Nathan Mara7; 1University of Minnesota; 2Empa-Thun; 3University of Nevada-Reno

11:10 AM
Development of TiAl Alloys for High Temperature Applications: Seong-Woong Kim8; Jae-Kwon Kim9; Jong-Hoon Kim10; Ji Young Kim11; Seung-Hwa Ryu12; Dongchan Jang13; Jae Keun Hong14; Seung Eon Kim15; 8Korea Institute of Materials Science; 9Korea Advanced Institute of Science and Technology

11:30 AM
In-situ Micromechanical Characterization of Metallic Glass Microwires Under Torsional Loading: Sufeng Fan16; Yang Lu17; 16City University of Hong Kong
**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; Ashley Paz Y Puente, University of Cincinnati; 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

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8:30 AM Keynote
Elevated Temperature Microstructure Evolution and Properties of an Equiatomic CrCoNi Superalloy Containing ALTI: Connor Slone1; Easo George2; Michael Mills1; 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 Couzinie1; Thomas Rieger1; Jean-Marc Joubert1; Mathilde Laurent-Brocq2; Guy Dirras3; 1Université Paris Est, ICMPE (UMR 7182) CNRS-UPEC; 2Université Paris 13, Sorbonne Paris Cité, LSPEM (UPR 3407) CNRS

9:40 AM
Novel Microstructural Template Based on Ordered Intermetallic Precipitation in FCC Based Complex Concentrated Alloys: Sriswaroop Dasari1; 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 Rieger1; Mathilde Laurent-Brocq2; Ivan Guillot1; Jean-Marc Joubert1; Loïc Perrière1; Didier Locq1; Zhao Huvelin1; Azziz Hocini2; Guy Dirras3; 1Université Paris Est, ICMPE (UMR 7182) CNRS-UPEC; 2Université Paris 13, Sorbonne Paris Cité, LSPEM (UPR 3407) CNRS

10:50 AM
A Nickel-based Superalloy Dual-reinforced by L12 Ni3Al and DO22 Ni3V Ordered-fcc Precipitates: Alexander Knowles1; Lucy Reynolds1; Vassili Vorontsov2; David Dye3; 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 Xue1; Dingwen Chung2; Eric Lass2; David Seidman3; David Dunand1; 1Northwestern University; 2Imperial College London; 3University of Strathclyde

**MATERIALS PROCESSING**

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — By-product Recovery I


*Program Organizers:* Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recyclex; 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

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11:00 AM
Hydrometallurgical Recovery of Tin from Harris Dross: Ryosuke Sato1; Koichiro Hirata1; Fumito Tanaka1; 1Mitsubishi Materials Corporation

11:20 AM
Pb & Other Impurities Recovery from Cu Smelting Residues in JX Nippon Mining & Metals: Nobuaki Oka1; Takuma Takei1; Shojoir 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 Daehn2; Antoine Allaire3; Elsa Olivetti4; 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; 1Dongying Fangyuan Nonferrous Metals Co. Ltd; 2University of Queensland
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 Camp; Elien Haccouria; Tom Hennebel; Christina Meskers; *Umicore

9:00 AM Plenary
Material Stewardship for Zinc: Sabina Grund; Eric Van Genderen; *International Zinc Association (IZA)

9:30 AM Plenary
Lead and Zinc Smelting Technology in China under Green Development: Liu Cheng; *China ENFI Engineering Corporation

10:00 AM Question and Answer Period

10:30 AM Break

11:00 AM Smelting Jarosite and Sulphur Residue in a Plasma Furnace: Justin Salminen; Jens Nyberg; Matej Imris; Bror Heegaard; *Boliden Kokkola; *Boliden Smelters; *ScanArc

11:20 AM Simulation of an Alternative Direct Leaching Process for High Iron Content Zinc Concentrates: Caio Oliveira; Daniel Pereira; *Nexa Resources

11:40 AM The Process Improvement Researches for Zinc in China: Haibei Wang; Kaixi Jiang; Yufang Wang; Sanping Liu; Chaozhen Zheng; Shuchen Qin; *BGRIMM Technology Group

12:00 PM Application of Hematite Iron Removal Process in Zinc Smelting Production: Qin Mingxiao; Dai Jianghong; *China ENFI Engineering Corporation

11:00 AM Resource Efficiency Evaluation of Pyrometallurgical Solutions to Minimize Iron-rich Residues in the Roast-leach-electrowinning Process: Alejandro Abadias Llamas; Neill Bartie; Magdalena Heiböck; Michael Stelter; Markus Reuter; *TU Bergakademie Freiberg; *Helmholtz Institute Freiberg for Resource Technology

MATERIALS PROCESSING
PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Lead and Zinc Current Challenges and Opportunities: Plenary Session


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

11:20 AM Zinc Plant Expansion and Modification for Increased Metals Recovery: Björn Saxen; Florentino Estrada; Maciej Wrobel; Marko Lahtinen; *Outotec; *Met-Mex Peñoles

11:40 AM Experience with Digital Process Optimization of Zinc Roasting Plants: Robert Schiemann; Steffen Haus; Marcus Runkel; Jörg Hammerschmidt; *Outotec

12:00 PM Bulk Zn / Pb Concentrate Treatment with the Albion Process™ at Nordenham Zinc Refinery: Paul Voigt; *Glencore Technology

MATERIALS PROCESSING
PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Zinc Leaching & Fe-control I


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; Jens Nyberg; Matej Imris; Bror Heegaard; *Boliden Kokkola; *Boliden Smelters; *ScanArc

11:20 AM Simulation of an Alternative Direct Leaching Process for High Iron Content Zinc Concentrates: Caio Oliveira; Daniel Pereira; *Nexa Resources

11:40 AM The Process Improvement Researches for Zinc in China: Haibei Wang; Kaixi Jiang; Yufang Wang; Sanping Liu; Chaozhen Zheng; Shuchen Qin; *BGRIMM Technology Group

12:00 PM Application of Hematite Iron Removal Process in Zinc Smelting Production: Qin Mingxiao; Dai Jianghong; *China ENFI Engineering Corporation
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

Tuesday AM | February 25, 2020
Marina Ballroom E | Marriott Marquis Hotel

Session Chairs: Shih-Kang Lin, National Cheng Kung University; Shien Peng Feng, The University of Hong Kong

8:30 AM
Full Battery Design for Li-ion Batteries Using CALPHAD Technique: Dajian Li1; 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 Fels1; Thomas Reichmann2; Hans Flandorfer3; Hans Seifert4; 1Karlsruhe Institute of Technology; 2University 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 Chen1; Ngoc Thanh Thuy Tran1; Shih-kang Lin2; 1National Cheng Kung University

9:30 AM
Thermodynamic Modeling of the Cu-Mg-Si-Sn Quaternary System and Interpretation of M(g(Si0.75Sn0.25))/Cu Thermoelectric Interconnections: Silvana Tumminello1; Sahar Ayachi2; Suzana Fries2; Eckhard Müller1; Johannes de Boor1; 1German Aerospace Center (DLR); 2ICAMS-G-Technology GmbH; 3University of Vienna

9:50 AM Break

10:20 AM
CALPHAD-assisted Analyses of BOF Slag Modification and Reduction: Han-Yu Wang1; Wan-Yu Huang2; Yung-Chang Liu2; Kuan-Ju Lin3; Shih-kang Lin4; 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 Yan1; Hao-che Wang2; Shih-kang Lin3; 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 Tan2; Libin Liu3; Ligang Zhang4; 1Central South University

11:20 AM
Effects of Ge/Sb Intermixing on the Local Structures and Optical Properties of GeTe-Sb2Te3 Superlattice: Gang Han1; Furong Liu2; 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
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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 Ae3 Temperature: Clodualdo Arano1; Samuel Rodrigues2; Fábio Ricciardi3; 1University of New Brunswick; 2Federal Institute of Maranhao; 3Dynamic Systems Inc; 4McGill University

8:50 AM
Crystalllographic Characteristics of γ'-Fe4N Formation Upon Nitriding of α-Fe: Helge Schumann1; Gunther Richter2; Andreas Leineweber2; 1TU Bergakademie Freiberg; 2Max Planck Institute for Intelligent Systems

9:10 AM
Atomic Structures and Processes in Al-Cu alloys: Matthew Chisholm1; Dongwon Shin2; Gerd Duscher3; Lawrence Allard4; Amit Shyam5; 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 Chen1; 1National Chiao Tung University

9:50 AM
Morphological and Structural Instability of Iron-rich Precipitates in Cu-Fe-Co Alloys: Gilles Demange1; Kaixuan Chen2; Helena Zapolsky2; Renaud Patte3; Z.D. Wang4; 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 Genda1; Kim Knight2; Zurong Dai3; 1Lawrence Livermore National Laboratory; 2Texas A&M University; 3Peking University

10:50 AM
Oscillated Cooling Method as an Alternative Crystal Growth Route to Control the Microstructure during Peritectic Solidification: Babak Alnejad1; Alberto Castelliero2; Marcello Baricco1; 1Barcelona Supercomputing Center; 2National Institute of Technology

www.tms.org/TMS2020
11:10 AM Nanostructure of Fe0.65Cr0.35 Close to the Upper Limit of the Miscibility Gap: Frederic Danovik; Alexander Dahlstrom; Peter Hedstrom; Joakim Odqvist; Helena Zapolsky; 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; Rahul Raghavan; Kumar Ankit; 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


Program Organizers: Haiming Wen, Missouri University of Science and Technology; Suven Mathaudhu, University of California, Riverside; Yuntian Zhu, North Carolina State University; Manej 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; 1University of California, San Diego

9:00 AM Invited
High-strength and Thermal Stability of Nanotwinned Al Alloys: Qiang Li; Sichuang Xue; Yifan Zhang; Jian Wang; Haiyan Wang; Xinghang Zhang; 1Purdue University; 2University of Nebraska, Lincoln

9:30 AM Review of Thermal Stability of Nano crystalline and Nanostructured Materials and Methods how to Control it: Lilia Kurmanaeva; 1INT, KIT (Germany); MSE, University of California, Davis (USA)

9:50 AM Thermal Stability of Nanostructured Ferritic and Austenitic Stainless Steels: Maalavan Arivu; Andrew Hoffman; Jiaqi Duan; Haiming Wen; 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; 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; Lei Cao; Wei Zeng; Wenjing Wang; Jiamiao Liang; Enrique Lavernia; 1Northeastern University; 2Shanghai Jiao Tong University; 3University of California, Irvine

11:30 AM Electrodeposition of Nanostructured Nickel Foils: Alan Jankowski; Maalavan Arivu; Haiming Wen; 1University of California, San Francisco; 2Sandia National Laboratories

11:50 AM Severe Plastic Deformation Enhanced Segregation and Precipitation in Nanostructured Steels: Andrew Hoffman; Maalavan Arivu; Haiming Wen; 1University of California, San Francisco; 2Sandia National Laboratories

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; 1The Ohio State University

9:00 AM Invited
The Evolution of Abnormal Grain Structures during Beta Annealing of Ti-64 Wrought Products: Nicholas Byres; Pratheek Shanthraj; Benjamin Dod; Jack Donoghue; Alec Davis; Joao Quinta da Fonseca; Philip Prangnell; 1University of Manchester; 2Airbus; 3The University of Manchester

9:30 AM Martensitic Variant Selection Under Applied Stress: A New Approach Applied to the ß 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; James Paramore; Z. Zak Fang; Pei Sun; 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; 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: Jooa Quinta da Fonseca1; Chi-Toan Nguyen1; Christopher Daniel1; Philip Prangnell2; Pratheek Shanthraj3; Benjamin Dod1; Peter Honniball1; 1University Of Manchester; 2Airbus; 3Rolls-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 Mizak2; Adam Pilchak3; Victoria Miller4; 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 Edmondson, Oak Ridge National Laboratory

8:30 AM Invited
Separate Effects to Integral Effects - All Things Radiation effects in FeCrAl: Kevin Field1; Maxim Gussevi2; Xiang Chen1; Caleb Massey2; Dalong Zhang3; 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 Xiu1; 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 Massey1; 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 Pachauri1; Sanjoy Mazumder1; George Warren1; Giacomo Po3; Janelle Wharry1; Anter El-Azabi1; 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 Zhong1; 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 Ulmer4; Arthur Motta1; 1The Pennsylvania State University

11:00 AM
Microstructural Investigation of Flux effect on Neutron-irradiated RPV Steels: Auriane Etienne1; 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 Ayanoglu1; Christopher Ulmer4; 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 Shang1; Cuncui Fan1; Sichuan Xue1; Jie Ding1; Jin Li1; Thomas Voisin1; Yimin Wang1; 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; Shafig Alam, University of Saskatchewan; Kerstin Forsberg, KTH Royal Institute of Technology; Alafara Baba, University of Ilorin

Tuesday AM | February 25, 2020
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Session Chairs: Hojong Kim, Pennsylvania State University; Gisele Azimi, University of Toronto

8:30 AM Keynote
Electrodialysis in Hydrometallurgical Processes: Odda Burheim1; Lijuan Deng2; Kerstin Forsberg2; Øivind Wilhelmlsen3; Pauline Zimmermann1; 1Norwegian University of Science and Technology; 2KTH
9:00 AM
Leaching of Eudialyte –The Silicic Acid Challenge: Dag Eriksten1; 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)2SCF from Strip Liquors by Anti-solvent Crystallization: Edward Peters1; Carsten Dittrich2; Bengi Yagmurlu3; Kerstin Forsberg2; 1KTH Royal Institute of Technology; 2MEAB Chemie Technik GmbH
9:40 AM
Impurity Uptake during Cooling Crystallization of Nickel Sulfate: Ina Beate Jenssen1; Seniz Ucar1; Oluf Beckman1; Ole Morten Dotterud2; Jens-Petter Andreassen3; 1Norwegian University of Science and Technology; 2Glencore Nikkelverk AS
10:00 AM
Potential of a Nigerian Cassiterite Ore for Industrial Steel Coatings: Aishat Abdulkareem1; Abdul Alabi2; Kuranga Ayinla1; Abdullah Ibrahim1; Christianah Adegemi1; Mustapha Raji1; Sadisu Girigusi1; Rasaki Gbadamosi1; Aishat Abdulkareem1; 1University of Ilorin; 2Kwara State University, Malete; 4Federal Polytechnic Offa; 1National 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 Steinlechner1; Lukas Höber2; 1Montanuniversitaet Leoben

10:55 AM
Recovery of Platinum Group Metals from Secondary Sources by Selective Chlorination from Molten Salt Media: Ana Maria Martinez1; Karen Osen2; Anne Store3; ‘Sintef

11:15 AM
Reclamation of Precious Metals from Small Electronic Components of Computer Hard Disks: Rekha Panda1; Manish Kumar Jha1; Om Shankar Dinkar1; Devendra Deo Pathak2; ‘CSIR-National Metallurgical Laboratory; 2Indian Institute of Technology (ISM) Hober1; 1Montanuniversitaet Leoben

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 Sierrros, West Virginia University; Yong Lin Kong, University of Utah; Mariappan Paranatham, 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 Estrada1; ‘Boise State University

8:55 AM Invited
Hybrid Nanomanufacturing for Wearable Intelligence: Wenzhou Wu1; ‘Purdue University

9:20 AM Invited
Direct-write & Precise Patterning of Functional Nanofibers on Non-planar Substrate: Jiyoung Chang1; ‘University of Utah

9:45 AM
Materials and Process Development for Passive and Active Gas Sensors: Lydia Sholrood1; Pooran Joshi1; Ilia Ivanov1; Eric Muckley1; Andrew Lupini1; Timothy McKnight1; Timothy McIntyre2; Christine Fisher1; Tolga Aytug1; ‘Oak Ridge National Laboratory

10:05 AM Break

10:25 AM
Fully Printed CNT-FET on a Flexible Substrate: Yongchao Yu1; Justine Valka1; Anming Hu1; Nance Ericson1; Pooran Joshi2; ‘University of Tennessee; ‘Oak Ridge National Laboratory

10:45 AM Invited
Screen Printing to 3D Printing of Solar Cells- An Overview: Vishal Mehta1; Nuggehalli Ravindra1; ‘Ohio Northern University; ‘New Jersey Institute of Technology

11:10 AM
Peel-and-Stick Inkjet Printed Polyaniline Sensors for Ammonia Gas Sensing: Christine Fisher1; Pooran Joshi1; Vishaldeep Sharma2; Yongchao Yu2; Kai Li1; Tolga Aytug1; ‘Oak Ridge National Laboratory; ‘University of Tennessee, Knoxville

11:30 AM
Controlled Modulation of Gas Sensing in Printed Graphene Nanoparticle Nucleation and Defect Engineering in Exfoliated Graphene Flakes: Harrison Loh1; Konstantinos Sierrros1; ‘West Virginia University

11:50 AM
Self-Assembled Monolayer on Liquid-Liquid Interface: Kinnari Shah1; Nuggehalli Ravindra2; ‘LaGuardia Community College–City University of New York; ‘New 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 Rinnert1; ‘Institut Jean Lamour - Université de Lorraine

9:10 AM Invited
3D Design of Multifunctional Plasmonic Nanoparticles Assemblies Embedded in Dielectrics: Caroline Bonafos1; Nicolas Chery1; Clément Majorel1; Meiling Zhang1; Nicolas Mallet2; Patrick Benzo2; Maxime Bayle2; Alessandro Pugliara2; Kremena Makasheva2; Béatrice Pécausso2; Enrique Navarro2; Christian Girard1; Anne-Sophie Royel2; Pablo Acosta Alba1; Sébastien Kerdilés2; Yohann Spiegel1; Frank Torregrosa1; Guilhem Larrieu1; Filadelfo Cristiano1; Hervé Rinnert1; Fabrice Gourbilleau2; Robert Carles1; Vincent Paillard1; ‘CEMES-CNRS, ‘LAAS-CNRS, ‘Université de Nantes; ‘UMS Raimond Castraing; ‘Université de Toulouse; ‘IPE-CSIC, ‘CEA-LETI; ‘IBS, ‘Université de Nancy; ‘CIMAP

9:40 AM
ZnSnO Thin Films as a Good Candidate for Transparent and Conducting Oxides (TCO) Applications: Gerald Ferblantier1; Karima Bouras2; Abdellilah Slaoui1; Guy Schmerber2; ‘Icube Laboratory - University of Strasbourg - IUT Louis Pasteur de Schiltigheim; ‘Icube Laboratory - Strasbourg University; ‘IPCMS-Strasbourg University

10:00 AM Break

10:30 AM
Elaboration and Characterization of Thin Films of SIP Lamellar Alloys: Mathieu Stoffel1; Sébastien Geiskopf1; Alix Valdenaire1; Xavier Devaux1; Erwan André1; Cedric Carteret1; Alexandre Bouché1; Michel Vergnè1; Hervé Rinnert1; ‘Université de Lorraine/Institut Jean Lamour
Technology

1; Patricia Popoola 2; Olawale Popoola 2; Abraham Adeleke Recovery of Copper as Oxide of Nanoparticles from a Copper Dust: hydrometallurgical-precipitation Reaction Technology for Experimentation, Modeling and Optimum Conditions of Pyro-

8:35 AM A Novel Method for Extracting Cobalt, Lithium, Nickel and Manganese from Recycled Lithium-iron Batteries using Electrochemistry: Mark Strauss; Luis Aldana; David Reed; Tedd Lister; Idaho National Laboratory

9:20 AM Thermal Disengagement Technology: the Perspective of Micromachining of Polymer-metal Multilayer Packaging Materials: Md. Abdullah Al Mahmood; Rumana Hossain; Veena Sahajwalla; University of New South Wales

9:40 AM A Potential Hydrometallurgical Treatment for Valuable Metal Recovery from E-waste: Bromine Leaching: Hao Cui; Corby Anderson; Colorado School of Mines

10:00 AM Break

10:20 AM A Recycling System for Sustainable Management of Waste Solar Photovoltaic Panels in Taiwan: Esther Hsu; Chen-Ming Kuo; National Taipei University; 1-1 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 Adeleke; Patricia Popoola; Olawale Popoola; Daniel Olanigbe; Obafemi Awolowo University; Tshwane University of Technology

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
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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-iron Batteries using Electrochemistry: Mark Strauss; Luis Aldana; David Reed; Tedd Lister; Idaho National Laboratory

9:00 AM Recycling of Crystalline Silicon Solar (PV) Panels: Technological Challenges, Economical Feasibility and Environmental Impact: Jan-Philipp Mai; Neda Resay; York Smith; JPM Technologies; University of Utah

9:20 AM Thermal Disengagement Technology: the Perspective of Micromachining of Polymer-metal Multilayer Packaging Materials: Md. Abdullah Al Mahmood; Rumana Hossain; Veena Sahajwalla; University of New South Wales

9:40 AM A Potential Hydrometallurgical Treatment for Valuable Metal Recovery from E-waste: Bromine Leaching: Hao Cui; Corby Anderson; Colorado School of Mines

10:00 AM Break

10:20 AM A Recycling System for Sustainable Management of Waste Solar Photovoltaic Panels in Taiwan: Esther Hsu; Chen-Ming Kuo; National Taipei University; 1-1 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 Adeleke; Patricia Popoola; Olawale Popoola; Daniel Olanigbe; Obafemi Awolowo University; Tshwane 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; Xingyu Li; Lin Zhang; Ju Li; Massachusetts Institute of Technology; University of Science and Technology, Beijing

8:50 AM Direct Production of Ta Powders: Jawad Haidar; Kinaltek Pty Ltd.

9:10 AM Modifying Grain Boundary Cohesion in Ultra-fine Grained Tungsten and Tungsten-based Nanocomposites through Systematic Doping: Michael Wurmshuber; Simon Doppermann; Stefan Wurster; Reinhard Pippan; Daniel Kiener; Department of Materials Science, Montanuniversitat Leoben; Erich Schmid Institute, Austrian Academy of Sciences

9:30 AM Mechanical Testing of Tungsten-Steel Laminate Composites for use in Fusion Applications: Sara Wonner; Lauren Garrison; University of Tennessee, Knoxville; Oak Ridge National Laboratory

9:50 AM Refractory Alloys 3D Printing for Missile and Space Applications: Youping Gao; John Porter; Noah Philips; Omar Mireles; Castheon Inc; ATI Specialty Alloys and Components; NASA Marshall Space Flight Center

10:10 AM Break

10:30 AM Hot Isostatic Pressing of WC-3009 Niobium-Based Refractory Alloy: Calvin Mikler; Benjamin Georgin; Brian Welk; Gopal Viswanathan; Kevin Chaput; Hamish Fraser; The Ohio State University; Air Force Research Laboratory

10:50 AM Performance of Niobium and Molybdenum Alloys for High Temperature Sensing Applications: Scott Riley; Beck Perrine; Ember Sikorski; Lan Li; Richard Skifforn; Brian Jaques; Boise State University; Idaho National Laboratory

11:10 AM Dislocation Multiplication from a Frank-Read Source in Six Body-centered Cubic Refractory Metals: Shuozhi Xu; Yangqing Su; Irene Beyerlein; University of California, Santa Barbara
PHYSICAL METALLURGY


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

Program Organizers: Mohamed Elbakshwan, 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 Elbakshwan, 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 Cheng1; Xiaohua Hu1; Xin Sun2; Vivek Anupam1; Glenn Daehn1; David Cullen1; 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 Kalsar1; Yong Chae Lim2; Hahn Choo1; Suhong Zhang1; Anming Hu1; Scott A Rose3; Zhili Feng2; 1University of Tennessee, Knoxville; 2National Chiao Tung University; 3Oak Ridge National Laboratory; 4Los Alamos National Laboratory; 5University of Tennessee, Knoxville

9:20 AM
Microstructural Evolution and Mechanical Properties of Lap-jointed Ti-6Al-4V Plates by Pin-less Friction Stir Spot Welding: Hyojin Park1; Rajiv Prasanna1; Hye-Young Lee1; Yong-Min Lee1; 1Hanyang University; 2National Chiao Tung University; 3Oak Ridge National Laboratory

9:40 AM
MTI Low Force Friction Welding: Simon Jones1; 1MTI

10:00 AM Break

10:30 AM
Instant Copper Direct Bonding Using <111>-oriented Nanotwinned Cu Microbumps: Kai Cheng Shie1; 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 Rozman1; Venkata Saranam2; Brian Paul1; Omer Dogan1; 1National Energy Technology Laboratory; 2Oregon State University

PHYSICAL METALLURGY


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: Krzysztof Gofryk, Idaho National Laboratory; Firoza Kabir, University of Central Florida

8:30 AM Invited
Enhanced Thermoelectric Performance of Heavy-fermion Compounds YbTM2Zn8/3 (TM = Co, Rh, Ir) at Low Temperatures: Ryan Baumbach1; Kaya Wei1; 1National High Magnetic Field Laboratory

9:00 AM
Thermal Transport Properties of Uranium Aluminides by First-principles: Zhi-Gang Mei1; Abdellatif Yacout2; 1Argonne National Laboratory

9:20 AM
Non-linear Thermal Resistance Trend with Increasing Bilayer Density: Zachary McClure1; Christopher Saltonstall2; Michael Abere1; David Guzman3; Samuel Reeve4; Alejandro Strachan1; David Adams5; 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 Szpunar1; 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 Gd3Sb4Te7: Firoza Kabir1; Md. Mofazfel Hosen1; Gyanendra Dhakal1; Xiaxin Ding1; Narayan Poudel1; Arjun Pathak1; Yong Liu1; Jianxin Zhu1; Krzysztof Gofryk1; 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 Manley1; Olle Hellman2; Nina Shulumba3; Andrew May1; Michael Manley1; Paul Stonaha1; Jeffrey Lynn1; Vasile Garlea1; Ahmed Alatas1; Raphael Hermann1; Hsin Wang1; Brian Sales1; Austin Minnich1; 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 Ding1; 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

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Marina Ballroom D | Marriott Marquis Hotel

Session Chairs: Ruslan Valiev, UFA State Aviation Technical University; Lei Li, 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 Zhu1; Yin Zhang2; 1Georgia Institute of Technology

8:50 AM
Deformation Behavior and Strengthening Mechanisms of Ultrafine-Grained Al-2.5mass%Mg Alloy. Xiaodong Lan1; Si Gao2; Myeong-heeom Park3; Akinobu Shibata4; Nobuhiro Tsuji1; 1Kyoto University; 2J-PARC Center, Japan Atomic Energy Agency

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 Gao1; Wenzhi Mao1; Wu Gong2; Stefanus Harjo3; Akinobu Shibata4; Nobuo Tsuji1; 1Kyoto University; 2J-PARC Center, Japan Atomic Energy Agency

9:30 AM
Size Dependent Strengthening in High Strength Nanotwinned Al/Ti Multilayers. Yifan Zhang1; Sichuang Xue1; Qing Li1; Xin Zhou1; Jinling Gao3; Kester Clarke1; Benjamin Ellyson1; 1University of Nebraska-Lincoln; 2Universidade Federal de São Carlos; 3Argonne National Laboratory

10:10 AM Break

10:30 AM Invited
Understanding Deformation Behaviors of Laminated AL2Cu Eutectic Alloy. Jian Wang1; 1University of Nebraska-Lincoln

10:50 AM
Effect of Interface Type on the Deformation Behavior of Nanostructured Metals. Oliver Renk1; Verena Maier-Kiener2; Daniel Kiener2; Reinhard Pippahn3; 1Erich Schmid Institute; 2Montanuniversität Leoben; 3Technische Universität München

11:10 AM Invited
Stabilizing Nano Grains of Pure Cu with Rapidly Heating Induced Grain Boundary Relaxation. Xiuyan Li1; Xin Zhou2; Ke Lu2; 1Institute of Metal Research, Chinese Academy of Sciences

11:30 AM
Grain Boundary Design of Nanostructured Metals with Superior Multifunctional Properties. Ruslan Valiev1; Nariman Enikeev2; Maxim Murashkin1; 1UFA State Aviation Technical University

11:50 AM Invited
Incompatible Plastic Deformation of Dual Gradient Nanotwinned Cu. Lei Lu1; 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

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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 Lind1; A.K. Robinson2; M. Neims3; Nathan Barton2; Mukul Kumar4; 1Lawrence Livermore National Laboratory

9:10 AM
Predicting Dynamic Strain Rate Response using Model Reification: Jaylen James1; Manny Gonzales1; Eric Payton2; Raymundo Arroyave2; Douglas Allaire3; 1Texas A&M University; 2Air Force Research Laboratory; 3Texas A&M University

9:30 AM
Calibrating Empirical and Micromechanical Constitutive Models beyond 10^6 s^-1. Xuchen Wang1; Mostafa Hassan1; 1Cornell University

9:50 AM
Effects of Strain Rate on the Mechanical Properties and Fracture Mechanisms of AHSS Dual Phase Steels. Sukanya Sharma1; Shrikanth Bhat2; Arun Gokhale3; Naresh Thadhalli4; 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 Copley1; Francisco Curay2; Jonah Klemm-Toole1; Yaofeng Guo1; Jinling Gao1; Kester Clarke2; Benjamin Ellyson1; Chandler Becker1; Brian Milligan2; Christopher Finnock3; Niranjali Parab1; Camel Fezzaa2; Tao Sun2; Wayne Chen3; Amy Clarke4; 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 Nagarajan1; Nilesh Gaur1; Venkitanarayanan Parameswaran1; 1Indian Institute of Technology Kanpur

11:10 AM
Brittle-ductile Failure Transition of Low-symmetry HCP Metal Beryllium under Dynamic Compression. Nilin Daphatiapurkar1; Darby Luscher1; William Blumenthal2; Abigail Hunter2; 1Los Alamos National Laboratory

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**TECHNICAL PROGRAM**

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**TMS2020 TECHNICAL PROGRAM**

**TUESDAY PM**

**TECHNICAL PROGRAM**

**Xiaodong Ma**; **Chunfa Liao**

*Upgrading Pilot-scale Facility at MINTEK to Evaluate the Effect of Pre-heating on Smelter Operations*

**2:55 PM**

**Rotary Cup Preparation of Expanded Slag Ball with Blast Furnace Slag by Technology of Refractories and Metallurgy, Wuhan University of Science and Technology**

**4:10 PM**

**Influence of Atmosphere on Melting Behaviour of Synthetic Slags from Ta Recycling**

**3:35 PM**

**3:40 PM Break**

**3:50 PM**

**Non-isothermal Kinetics of Carbothermic Reduction of Fayalite: Zhi Li; Guojun Ma; Xiang Zhang; Wei Zhang; 1; State 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; Xuewei Lv; Wenchao He; Guishang Pei; 1; ChongQing 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; Rong Zhu; Huxiang Yu; Kai Dong; Qiang Feng; Yixing Tang; 1; University 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

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**Session Chair:** Assel Aitkaliyeva, University of Florida

**2:00 PM**

**Alpha Self-Irradiation of Archive and Irradiated Fast Reactor Fuels: Thierry Wiss; Oliver Dieste; Emanuele De Bona; Dragos Staičiu; 1; European Commission - Jrc**

**2:20 PM**

**Comparison of Radial Microstructural Changes in Fast Reactor MOX Fuels Across Varying Burnup Profiles: Riley Parish; Assel Aitkaliyeva; 1; Sandia National Laboratory; 2; University of Florida**

**2:40 PM**

**Synthesis of Intermetallic UZr2+x and Its Phase Transformation: Tianhai Yao; Michael Benson; Jason Harp; Lingfeng He; Jian Gan; 1; Idaho National Laboratory**

**3:00 PM**

**Testing of Nuclear Fuels and Materials in the Advanced Fuels Campaign: Geoffery Beausoleil; Christopher Petrie; 1; Sandia National Laboratory; 2; University of Florida**

**3:20 PM**

**In-situ Neutron Characterization of Advanced Nuclear Fuels - The Road to a New Neutron Irradiation Testing Capability: Edward Obbard; Claudia Gasparri; Patrick Burr; Kyle Johnson; Denise Lopes; Clara Anghel; Simon Middleburgh; Daniel Gregg; Klaus Dieter Liss; Grant Griffiths; Nicholas Scales; Gordon Thorogood; Greg Lumpkin; 1; UNSW Sydney; 2; Kungliga Tekniska Hogskolan (KTH); 3; Westinghouse Electric Sweden AB; 4; ANSTO**

**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; Brandon Miller; Jan-Fong Jue; Adam Robinson; Kelley Verner; 1; Idaho National Laboratory**

**4:15 PM**

**In-situ Observation of Radiation-induced Phase Transformation in U-Mo: Bei Ye; Weijing Chen; Yinbin Miao; Abdellatif Yacout; Yipeng Gao; 1; Argonne National Laboratory; 2; Idaho National Laboratory**

**4:35 PM**

**Impact of Ionization Effects and Defect Trapping on Microstructure Evolution in Light Ion Irradiated Uranium Dioxide: Marat Khaltzov; Yuzhou Wang; M Riyad; Janne Pakarinen; Lingfeng He; Anter El-Azab; David Hurley; 1; Ohio State University; 2; Belgian Nuclear Research Center (SCK-CEN); 3; Idaho National Laboratory; 4; Purdue University**
4:55 PM
Diffusion Analysis of Metallic Fission Products in Tristructural-isotropic Coated Fuel Using Representative Diffusion Couples: Rachel Seibert1; 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 Fu1; Lingfeng He2; Xiang Liu2; Isabella van Rooyen2; Yong Yang2; 1University of Florida; 2Idaho National Laboratory

SPECIAL TOPICS
Acta Materialia Symposium — Acta Materialia Award Session

Program Organizer: Carolyn Hansson, University of Waterloo

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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 Lavernia1; 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

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 Brewer1; William Story1; Benjamin White1; J Jordan1; 1University of Alabama

2:30 PM
Expedited Optimization of AM Materials Using Miniaturized Testing: Jonathan Torres1; Ali Gordon1; 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 Nezhadfar1; 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): Nihil Hrabě1; Jake Benzing2; John Yu3; Timothy Quinn1; Lucas Koepe2; Jolene Splett3; 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 Kruzic1; Halsey Ostergaard2; 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 Bonini1; Ho Mei Leung1; Kevin Knight1; Bruno La Razer1; Magnus Ahlfors2; 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 Benzing1; Nikolas Hrabě1; Tim Quinn1; Enrico Luccon1; 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 Elkhatteeb1; Yung Shin1; 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 Pityana1; 1CSIR Main Campus

2:30 PM
Multi-physics Simulation to Model Melt Pool in Directed Energy Deposition Process for Nuclear Fuels: Wen Jiang1; Jeong-Hoon Song1; 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 Dong1; Sara Messina1; Matthew Begley3; 1University of California, Santa Barbara

3:10 PM
Active Force Regimes in Powder Spreading: Nicholas Cunningham1; Noah Phillips2; Yifei Ma2; T. Matthew Evans3; 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 Gunasegaram1; Anthony Murphy2; Patrick O’Toole3; 1CSIRO

4:10 PM
Numerical Simulation and High-speed Photography Characterization of Powder Delivery During LENS® Additive Manufacturing for Metal Matrix Composites: Sen Jiang1; Badong Zheng1; James Haley2; Bingqing Chen3; Jiayu Liang1; Shuai Huang1; Enrique Lavernia3; 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 Paudel1; Mohammad Masoom2; 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 Johnson1; Donald Brown2; Bjorn Clausen2; Phillip Reu1; Paul Farias1; Christopher D’Elia2; Michael Hill1; Michael Prime1; Bradley Jared1; Shaun Whetten1; Joseph Bishop2; 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 Capek1; Efthymios Polatidis1; Manuel Morgan1; Pavel Třtík1; Markus Strobl1; 1Paul Scherrer Institute

2:50 PM
Thermomechanical Model Residual Stress Prediction Assessment for Stainless Steel 316L Laser Powder Bed Fusion Components: Nicholas Bachus1; Donald Brown2; Robert Ferencz2; Rishi Ganeriwala1; Michael Hill1; Neil Hodge1; 1University of California Davis; 2Los Alamos National Laboratory; 3Lawrence Livermore National Laboratory

3:10 PM
Geometric Influences on Residual Stresses in Components Manufactured by Direct Energy Deposition: Christopher D’Elia1; Michael Hill2; Nicholas Bachus1; Michael Stender1; Christopher San Marchi1; 1University of California, Davis
3:00 PM Break

3:30 PM Invited
Residual Stress Characterization of Additively Manufactured IN625 and 15-5SS Using Energy Dispersive X-ray Diffraction: Maria Strantz3; Nicholas Bachus3; Bjorn Clauser3; Thienn Phan3; Lyle Levine3; Darren Pagan3; John Okasinski3; Donald Brown3; Lawrence Livermore National Laboratory; 4Los Alamos National Laboratory; 2National Institute of Standards and Technologies; 3Cornell High Energy Synchrotron Source; 1Advanced Photon Source

4:20 PM Advanced Techniques for Characterization of SLM Manufactured Alumina: Małgorzata Mohowska3; Kevin Florio3; Stefan Pfeiffer3; Thomas Graule3; Konrad Wegener3; Federica Marone3; Dario Ferreira Sanchez3; Nicola Casati3; Helena Van Swygenhoven3; 1PSI; 2ETH Zurich; 3Empa - Swiss Federal Laboratories for Materials Science and Technology

4:40 PM Microscale Residual Stresses in Additively Manufactured Stainless Steel: Yin Zhang2; Ting Zhu2; Wen Chen2; Morris Wang2; 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 Ravri3; Diwakar Naragani3; Jun-Sang Park3; Peter Kenesei3; Michael Sangid3; 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 Dunstan, 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 Torresara2; Randall German2; Eugene Olevsky2; 1San Diego State University

2:20 PM Sintering Kinetics of Particle-based Ink Extrusion 3D Printed Nickel Scaffolds: Safa Khodabakhsh2; Ashley Paz y Puente2; 1University of Cincinnati

2:40 PM Selective Sintering-based Fabrication of Fully Dense Complex Shape Parts: Geuntak Lee2; Charles Maniere2; Maricruz Carrillo2; Eugene Olevsky2; 1San Diego State University

3:00 PM Development and Validation of Sub-scale Tensile Tests for Characterization of Additively Manufactured Metals: Laura Moody3; Ion Powell3; Daniel Lewis3; Brady Butler3; Ankit Srivastava3; Lara Draelos3; James Paramore3; 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: Dereck Thomas1; Paul Shesottle1; 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 Yoozbashizadeh3; 1California State University Long Beach

4:20 PM Additive Manufacturing of Photocatalytic Materials for Solar Water Disinfection: Andrey Vyatshikh3; Kai Liu3; Carlos Portela3; Akira Kudo3; Stephane Delalande3; Michael Hoffmann3; Julia Greer3; 1California Institute of Technology; 2PSA Group

4:40 PM Portland 3D Printing of Portland Cement Pastes with Additions of Kaolin, Superplasticificant, and Calcium Carbonate: Luis Vergara3; Henry Colorado3; 1Universidad de Antioquia

5:00 PM Beyond the Powder-bed: Fabricating Micorscale Three-dimensional Metallic Structures Without Support Using Nanoparticle 3D Printing: Mohammad Sadeq Saleh2; Rahul Panat2; 1Carnegie Mellon University

5:20 PM Powder Casting: Producing Bulk Metal Components from Powder without Compaction: James Paramore3; Matthew Dunstan3; Brady Butler3; 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 Horton3; John Vetrao3; 1US Department of Energy, Office of Basic Energy Sciences

2:40 PM Invited
Making Metal Additive Manufacturing Practical – What’s Missing?: Lyle Levine2; Carolyn Campbell2; Mark Stoudt2; Greta Lindwall2; Eric Lass3; Fan Zhang3; Brandon Lane3; 1National Institute of Standards and Technology; 2KTH

3:15 PM Invited
Challenges to Predict the Microstructure and Properties of metallic AM components: Carolin Korner3; Matthias Markl3; Matthias Kopp3; Alexander Rausch3; Zerong Yang3; 1University of Erlangen-Nuremberg
3:50 PM Break

4:15 PM Invited
CALPHAD-based ICME Design for Additive Manufacturing: Successes and Challenges. Wei Xiong; University of Pittsburgh

4:50 PM Invited
Efficient Mechanistic Modeling of Additive Manufacturing (AM) Processes. Sergei Burlatsky; David Furrer; United Technologies Research Center; Pratt & 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 McCull; Alexander Baker; Hunter Henderson; Zachary Sims; Orlando Rios; David Weiss; Corby Anderson; Lawrence Livermore National Laboratory; Eck Industries; Colorado School of Mines

2:30 PM
Additive Manufacturing of Al-10Ce Alloys by Laser Powder Bed Fusion of Gas Atomized Powders. Le Zhou; Holden Hyer; Sharon Park; Thinh Huynh; Brandon McWilliams; Kyu Cho; Yongho Sohn; University of Central Florida; US Army Research Laboratory

2:50 PM
CALPHAD Aided Design of Aluminum Alloys for Additive Manufacturing. Emily Moore; Zachary Sims; Orlando Rios; Scott McCull; Aurélien Perron; Lawrence Livermore National Laboratory; Oakridge National Laboratory

3:10 PM
Design of Al-Fe-Si-based Additively Manufactured High Temperature Light Weight Alloys. Sujey Soto-Medina; Biswas Rijal; Lilong Zhu; Richard Hennig; Michele Manuél; University of Florida

3:30 PM Break

3:45 PM Invited
Additive Manufacturing of Advanced Aluminum-cerium Alloys. David Weiss; Orlando Rios; Justen Schaefer; Jessica Orr; Hunter Henderson; Zachary Sims; Scott McCull; Ryan Ott; ECX Industries Inc.; Oak Ridge National Laboratory; University of Dayton Research Institute; Lawrence Livermore National Laboratory; Ames Laboratory

4:10 PM
Selective Laser Melting and Mechanical Properties of Al- Ce-X Alloys. Alex Plotkowski; Ryan Dehoff; Kevin Sisco; Amit Shyam; Sumit Bahl; Andres Rossy; Oak Ridge National Laboratory; University of Tennessee

4:30 PM
Additive Manufacturing of Immiscible Alloy Systems. Brennan Yahata; Julie Miller; Justen Mayer; Stan Dudinski; Eric Clough; Toby Schaedler; Hunter Martin; Jacob Hundley; Tresa Pollock; HRL Laboratories, LLC; HRL Laboratories, LLC; University of California, Santa Barbara

4:50 PM
Nano-structured NiAl-Cr(Mo) In-situ Composites Processed by Additive Manufacturing. Andreas Förner; Steffen Neumeier; Abdullah Jamjoom; Carolin Körner; Mathias Göken; Friedrich-Alexander-Universität Erlangen

5:10 PM
Nitrogen Solid-solution Strengthened Titanium Materials Fabricated by SLM Process. Katsuyoshi Kondo; Ammarueda Issariyapant; Patama Visuttipitukul; Tingting Song; Junko Umeda; Ma Qian; Osaka University; Chulalongkorn University; RMIT

ADDITIVE TECHNOLOGIES
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 Tiotleng, University of Johannesburg; Jayme Keist, Pennsylvania State University; Hang Yu, Virginia Polytechnic Institute and State University

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Session Chair: Monnamme Tiotleng, University of Johannesburg

2:00 PM
Microstructural Influence on AM 316L Mechanical Properties and Corrosion Behavior. Richard Fonda; Jerry Feng; Krystaufeux Williams; Naval Research Laboratory

2:20 PM
Correlative Atomic-scale Analysis of Nano-scale Precipitate Evolution in Additively Manufactured Maraging Steel. Pradeep Konda Gokul dos; Indian Institute of Technology Madras

2:40 PM
Carburization Heat Treatment of Selective Laser Melted 20MnCr5 Steel. Mei Yang; Richard Sisson; Worcester Ploytechnic Institute

3:00 PM
Towards an Additively Manufactured, Wrought-comparable Precipitation-hardening Martensitic Stainless Steel. Fan Zhang; Eric Lass; Mark Stoudt; Carenly Campbell; Souzan Hammad; Greta Lindwall; Lyle Levine; National Institute of Standards and Technology; University of Tennessee Knoxville; KTH Royal Institute of Technology

3:20 PM
Effects of Thermal Processing on the Microstructure and Mechanical Properties of Additively Manufactured AlSi10Mg Parts. John Fite; Suhas Prameela; John Siotwinski; Timothy Weihs; Johns Hopkins University Applied Physics Laboratory; Johns Hopkins University
3:40 PM Break

4:00 PM
Microstructural Development in Additively Manufactured and Heat-Treated IN625: Holden Hyer1; Ryan Newell1; Daniel Matejczyk1; Sinarh Hsie2; Mason Anthony2; Le Zhou2; Catherine Kammerer2; Yongho Sohn1; 1University of Central Florida; 2Aerojet Rocketdyne - WBP. 3Aerog waste. 3Aerojet Rocketdyne - CP

3:40 PM

4:20 PM
Stimulating the Evolution of γ/γ’ Precipitates in the Inter-dendritic Regions of Additively Manufactured IN718 Due to Post-processing Heat Treatments: Younggil Song1; Bala Radhakrishnan1; Ranadip Acharya1; 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 McLaugh1; Julian Lohser1; David Witkin1; Glenn Bean1; Rafael Zaldívar1; 1The Aerospace Corporation

5:00 PM
Study of Deformation Mechanisms in Hot-Treated AM-IN718 Using Transmission Electron Microscopy: Thomas Galtmeyer1; Jack Dale2; Behnam Aminahmadi3; 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 Kim1; Myeong-Se Kim2; Kee-Ahn Lee2; 1Inha University; 2Auratech Co. Ltd.

3:10 PM
Cyclic Deformation in Tension and Compression of Pure Aluminium Monitored In-situ by High-resolution Reciprocal Space Mapping: Annika Diederichs1; Ulrich Lienert1; Wolfgang Pantleon2; 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 Kim1; Haoyue Yan3; S. Mohadeseh Taheri-Mousavi3; 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 Nygren1; Jean-Charles Strinville1; Marie-Agathe Charpagne1; 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; Dixin Zhao2; Dinakar Sagaparam2; Kelvin Xie1; 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 Bahr1; 1Purdue University

5:10 PM
A Continuum Mechanics Description of EBSD Misorientation Mapping: Shao-Shi Rui1; Shaolu Wei1; Hui-Ji Shi1; Cemal Tasan1; 1Massachusetts Institute of Technology; 2Tsinghua University

3:10 PM
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

Tuesday PM | February 25, 2020
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 Hufnagel1; A.F.T. Leong1; Vignesh Kannan1; Kaliat Ramesh1; 1Johns Hopkins University

2:30 PM
The Critical Microstructural Conditions for Void Nucleation During Ductile Rupture: Dislocation Structures and Vacancy Condensation: Philip Noell1; Julian Sabisch2; Douglas Medlin1; Brad Boyce1; 1Sandia National Laboratories

2:50 PM
3D Maps of Geometrically Necessary Dislocation Densities in FCC Polycrystalline IN718: Wyatt Witzen1; Andrew Polonsky1; Tresa Pollock1; Irene Beyerlein1; 1University of California Santa Barbara

2:00 PM
In-situ Quantitative Assessment of the Role of Silicon During the Quenching and Partially of a 0.2C Steel: Pierre Hugo1; Sylvain Dépinoy1; Cedric Georges1; Matteo Caruso1; Stephane Godet1; 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 Araujo1; Jun Hu1; Erik Pavlina1; 1AK Steel Research and Innovation Center

2:40 PM
Influence of Prior Processing on the Response to Quenching & Partitioning: Casey Gilliams1; John Speer1; Kip Findley1; Richard Thiessen1; 1Colorado School of Mines; 2ThyssenKrupp Steel

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TMS2020 TECHNICAL PROGRAM

Tuesday PM | February 25, 2020

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Session Chairs: Jung Pyung Choi, Pacific Northwest National Laboratory; Sanjay Sampath, Stony Brook University


c

ENERGY & ENVIRONMENT

Advanced Magnetic 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 Pittsburgh; Boston University; Paul Ohodnicki, University of Pittsburgh

Tuesday PM | February 25, 2020
Del Mar | Marriott Marquis Hotel

Session Chairs: Daniel Salazar, BCMaterials; Senentxu Lanceros-Mendez, BCMaterials

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

Tuesday PM | February 25, 2020
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; 1Boise State University

2:30 PM Invited
Recent Developments in NiMn-based Martensitic Materials for Actuation and Energy: Volodymyr Chernenko; 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; Emily Levin; Fulin Wang; Ram Seshadri; Tresa Pollock; Daniel Gianola; 1University of California, Santa Barbara

3:00 PM Invited
Magnetically Active Composites for All-printed Electronics Applications: Ana Catarina Lima; Nikola Perinka; Nelson Pereira; Vitor Correia; Pedro Martins; Senentxu Lanceros-Mendez; 1University of Minho; 2BCMترال

3:15 PM Invited
Magnetically Active Composites for All-printed Electronics Applications: Ana Catarina Lima; Nikola Perinka; Nelson Pereira; Vitor Correia; Pedro Martins; Senentxu Lanceros-Mendez; 1University of Minho; 2BCMترال

3:45 PM Break

4:05 PM Invited
Generating Electricity from Waste Heat using Magneto-structural Materials: Ekkes Bruech; 1Delft University of Technology

4:30 PM
Industrial Development of La-Fe-Si Magnetocaloric Alloys for Energy Conversion: Alexander Barcz; Christian Polaha; 1Vacuumschmelze GmbH & Co. KG

5:00 PM Invited
Magnetic Domains in Magnetostrictive Fe-Ga Alloys: Yongmei Jin; Matthew Tianen; 1Michigan Technological University
3:20 PM
Electrophoretic Deposition: A Promising Strategy for Fabricating Alkali-ion Rechargeable Cell Electrodes with Superior Electrochemical Properties: Debasish Das1; 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: Volery Belousov1; 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 Ghosh1; Rohan Parai1; Tessa Walters1; Sashanka Akurat1; Justine Marine1; Gary Koenig1; 1Old Dominion University; 2University of Virginia

4:40 PM
Utilizing Reversible Martensitic Transformations for the Mitigation of Thermal Transients: Asher Left1; Jacob Wright1; Jack Brody1; Adam Wilson1; Darin Sharar1; 1CCDC Army Research Laboratory

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 Si via under Annealing and Thermal Cyclic Loading Conditions: Dipali Sonawane1; 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 Chen1; Chih Chen1; 1National Chiao Tung University

2:40 PM
Formation of Cu-Cu Direct Bonding by Green Synthesized Approaches: Wei Liu1; 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 Jalilvand1; 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 Song3; Jenq Gong Duah4; 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 Chang1; Jason Silberman2; Danny Ventura2; Kyle Dodge3; David Yan2; 1San Jose State University

4:20 PM
Thermal Management through Networks of Highly Purified Boron Nitride Nanotubes: Mahmoud Amin1; David Kranbueh1; Hannes Schniepp5; 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: Jiaoqiao Wang1; 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 Allano, 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 Weber, 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 Ladan1; Koushik Paul2; 1Arizona State University

2:20 PM
New Biomarkers of Prostate and Breast Cancer Metastasis to Bone: Kalpana Katti1; 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 Dahanayake1; Vinod Radhakrishnan1; James Soulek1; 1Anton Paar USA

3:00 PM
Inkjet Printed Electrochemical Apatosensor for Detection of Hg2+ in Organic Solvents: Susana Diaz-Amaya; Li-Kai Lin; Renee DiNino1; Carlos Ostos2; Lia Stanciu2; 1Purdue University; 2Universidad de Antioquia

3:20 PM
Tunable Self Assembled Supramolecular Nanoprobes to Decipher Biomedical Events: Mathew Jaeschke1; 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 Hazl1; Mamoun Fellahi2; Alex Montagne3; Alan Iost2; Aleksie Obrosof4; Sabine Wiess4. 1Abbes Laghrour Khemchela 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 Mehta2; Shriyati Chugh3; Anupama Kaul4. 1University of North Texas

4:35 PM Designer Additive Manufacturing Powders for Solid State Additive Manufacturing Processing. Kyle Tsaknopoulos1; Jack Grubbs2; Danielle Cote3; 3Worcester Polytechnic Institute

4:55 PM Laser Assisted Cold Spray of AISI 4340. Dallin Barton1; Venkata Satish Bhattiprolu1; Clio Batalii1; Gregory Thompson5; Luke Brewer5. 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 Seal1; Tamil Selvan Sakhivel1; Jennifer Bustillos2; Pranjal Nautiyal1; Aravind Agarwal1; 1University of Central Florida; 2Florida International University

2:30 PM Enhanced Field Emission of CNT-W Nanowire Hierarchical Emitters. Narasimha Pulagara1; Gurjinder Kaur2; Indranil Lahiri3. 1IIT Roorkee

3:00 PM Metastable Silicon Nanocomposites via Plasma Synthesis and Spark Plasma Sintering. Steven Herzberg1; Devin Coleman1; Christian Roach1; Sabah Bux1; 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 Lohaus1; Michel Johnson2; Peter Ahn1; Mary Anne White2; Brent Fultz1; 1California Institute of Technology; 2Dalhousie University

2:25 PM Invited Smoothed Particle Hydrodynamic Simulations of Solid-phase AA6061 Additive Friction Stir Depositions. George Stubblefield1; Kirk Fraser2; B. J. Phillips3; D. Z. Avery4; N. Zhu5; Luke Brewer6; J. Brian Jordon7; Paul Allison1. 1University of Alabama

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 Somaiya3; Benjamin Sutton4; Nicholas Mohr5; Seetha Mannava2; Matthew Steiner2; Vijay Vasudevan2; 1Lulea University of Technology; 2University of Alabama; 3National Research Council Canada

3:10 PM Advances in Deformation and Microstructure Evolution Understanding in Additive Friction Stir Deposition. Robert Griffiths1; Mackenzie Perry2; David Garcia3; Jenny Sielins3; Yunhui Zhu4; Hang Yu5; 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 Cordero1; Austin Ward1. 1Rice University

4:15 PM In-situ Studies of Impact-Induced Deformation and Solid-State Bonding in Cold Spray. Mostafa Hassan1; David Veysset1; Keith Nelson2; Christopher Schuh1. 1Cornell University; 2Massachusetts Institute of Technology
2:00 PM Introductory Comments

2:05 PM
Microstructural Characteristics and Effective Applications of Andalusite-Mullite Phase Transformation: Bowen Li; Minsheng He; Huaguang Wang; Guoxun Sun; 1; 1Hubei Key Laboratory of Mineral of Technology; Universidad Autonoma de San Luis Potosi; Weihai Mineral Resources Processing and Environment; Wuhan University

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; Hongyu Gong; Yujun Zhang; Jianqiang Bi; Yurun Feng; Shan Wang; 1; 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; Ling Xia; Shaoxian Song; 1; 1Hubei Key Laboratory of Mineral Resources Processing and Environment; Wuhan University of Technology; Universidad Autonoma de San Luis Potosi; Weihai Ocean Vocational College; 1; 1Hubei Key Laboratory of Mineral Resources Processing and Environment; Wuhan University of Technology

4:00 PM
Mechanical Properties of Boron Nitride Nanosheets(BNNs) Reinforced Si3N4 Composites: Guandong Liang; Jianqiang Bi; Guoxun Sun; Yafei Chen; Weili Wang; 1; 1Shandong University

4:20 PM
Is the Carbon Content Really an Issue for the LCF Durability of Forged γ′-Ni-based Disk Alloys?: Adele Govaere; Anne-Laure Rouffilé; Florence Hamon; Patrick Villechaize; Jean-Michel Franchet; Alexandre Devaux; Coraline Crozet; Paraskaves Kontis; Jonathan Cormier; 1; 1Ensa / Pprime Institute - UPR CNRS 3346; 1; 1Max-Planck-Institut für Eisenforschung GmbH; 1; 1SAFRAN Tech

4:40 PM
Investigating Deformation Mechanisms in a Coarsening Resistant Ni-based Superalloy with “Compacted” γ′-γ Coprecipitates: Semanti Mukhopadhyay; Hariharan Sriram; Richard DiDomizio; Robert Hayes; Christopher Zenki; G.B. Vishwanathan; Yunzhi Wang; Michael Mills; 1; 1Ohio State University; 1; 1GE Global Research Center, USA; 1; 1Materials Testing Inc. USA
5:00 PM
Microstructure and Mechanical Properties of a Cast Ni-based Alloy: Goavindarajan Muralidharan; Jonathan Charleston; Donovan Leonard; Jim Myers; 1Oak Ridge National Laboratory; 2MetalTek International

5:20 PM
Evolution of Microstructure in Net-shape HIP IN718 with Improved Fatigue Performance: Benjamin Georgi; Victor Samarov; Hamish Fraser; 1The Ohio State University; 2LNT

MATERIALS DESIGN
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 Santaranaranayan; 1Argonne National Laboratory

2:30 PM
Designing High-strength Carbon-nanotube Polymer Composites using Machine Learning Algorithms Integrated with Molecular Dynamics Simulations: Aarabin Rahman; Prathamesh Deshpande; Matthew Radue; Michael Czabaj; S Gowtham; Susanta Ghosh; Gregory Odegard; Ashley Spear; 1University of Utah; 2Michigan Technological University

2:50 PM
Monte Carlo Study of Paired-spin Kagome Artificial Spin Ice Lattices: David Friedman; Frank Barrows; Yue Li; Charudatta Phatak; 1University of Illinois, Urbana-Champaign; 2Argonne National Laboratory

3:10 PM
Functional Uncertainty Propagation with Bayesian Ensembles in Molecular Dynamics: Saaketh Desai; Sam Reeve; Alejandro Strachan; 1Purdue University; Lawrence Livermore National Laboratory

3:30 PM
Nudged Elastic Band Method for Solid-solid Transition Under Finite Deformation: Wei Gao; 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; P. Alex Greaney; 1University of California, Riverside

4:25 PM
Reduced-order Atomistic Method for Simulating Radiation Effects in Metals: Elton Chen; Chaitanya Deo; Remi Dingreville; 1Sandia National Laboratories; 2Georgia Institute of Technology

4:45 PM
An Atomistic Framework to Understand Solute Grain Boundary Segregation in a Polycrystal: Malik Wagih; Christopher Schuh; 1Massachusetts Institute of Technology

5:05 PM
Quasiparticle Approach to Study Solute Segregation at Tilt grain Boundaries in Bcc Iron: Helena Zapolsky; Antoine Vaugeois; Renaud Patte; 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, Eniscen University of Caen; Philippe Jund, Montpellier University; Yoshihito 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; Yoshihito Kimura, Tokyo Institute of Technology

2:00 PM Invited
Gradient Composition Layered Microstructure Development in Thermoelectric Mg(Si,Sn) Alloys Based on Phase Equilibrium: Yoshihito Kimura; Narumi Sakamoto; Zhifang Zhou; Yaw Wang Chai; Yu Ikuta; Yonghoon Lee; 1Tokyo Institute of Technology; 2KELK Ltd.

2:20 PM Invited
Thermoelectric Properties of Amorphous ZnO:N, Thin Films at Room Temperature: Yasushi Hirose; Masato Tsushima; Kei Shim gamatsu; Yohei Kakefuda; Takao Mori; Tetsuya Hasegawa; 1University of Tokyo; 2Tokyo Tech.; 3NIMS

2:40 PM
Heat Stability of Mg2Si1-xSnx as Affected by Heat Treatment Temperature and Duration: Mahdi Mejri; Yohan Thimon; Benoit Malard; Claude Estournes; 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; Geoffrey Gregory; Kristopher Davis; 1University of Central Florida

3:20 PM Break

3:40 PM Invited
Thermoelectric Properties of p-type Mg Doped CuM2O2 Delafossite Thin Films and Modules: Yohan Thimon; Inthuka Sinnarasa; Antoine Barnabe; Philippe Tailhades; Lionel Presmanes; 1CIRIMAT, Université de Toulouse, CNRS, Université Toulouse 3 Paul Sabatier

4:00 PM Invited
Interfacial Reactions Between Bi2Te3 Substrate with Cu, In, Sn and Ni: Sinn-wen Chen; How-wei Shih; Wei Wang; 1National Tsing Hua University
4:20 PM Invited
3D Printing of High-performance and Flexible Thermoelectric Materials and Devices using 2D Colloidal Nanocrystals: Yanliang Zhang1; 1University of Notre Dame

4:40 PM
Assessment of Interface in Bi2Te3 and Sb2Te3 Thin Film Thermoelectric Modules: Zhen-Wei Sun1; Kai-Wen Cheng1; Albert T. Wu1; 1National Central University

5:00 PM Invited
Synthesis, Processing and Characterizations of Functional Materials for Industrial Applications: David Bertheboud2; 2LINK (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 Huang2; 2National 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

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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 Araujo1; Patricia Silva2; Andre do Carmo2; Fernando Gomes2; Alex dos Santos2; Adriano Lucheta2; Raphael Da Costa2; Caio de Melo2; Marcelo Montini3; 1SENAl Innovation Institute; 2SENAl Innovation Institute; 3Norsk Hydro Brasil

2:30 PM
Bayer Process Towards the Circular Economy — Soil Conditioners from Bauxite Residue: Roseanne Holanda1; Patricia Silva1; Andre do Carmo1; Alice Cardoso1; Adriano Lucheta2; Raphael da Costa2; Caio de Melo2; Marcelo Montini3; 1SENAl Innovation Institute; 2SENAl Innovation Institute; 3Norsk Hydro Brasil

2:50 PM
Brazilian Bauxite Residue Physical-chemical Characterization and Acidic Neutralization Potential: Patricia Silva1; Andre do Carmo1; Roseanne Holanda1; Fernando Gomes2; Emanuela Nogueira3; Adriano Lucheta2; Raphael da Costa2; Caio de Melo2; Marcelo Montini3; 1SENAl Innovation Institute; 2SENAl 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 Chao1; Zhang Tingan1; Guozhi Lv4; Yang Chen1; 1Northeastern University

3:50 PM
Comprehensive Utilization of Red Mud Through the Recovery of Valuable Metals and Reuse of the Residue: Fei Lyu1; Li Wang1; Jiande Gao1; Honghu Tang1; Wei Sun1; Yuehua Hu1; Runqing Liu1; Lei Sun1; 1Central South University
Biodegradable Materials for Medical Applications II — Zinc and Iron Implants

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

Program Organizers: Jaroslav Drellich, 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; Peking University

2:35 PM Invited
Surface Engineering on Zinc for Better Biocompatibility: Donghui Zhu; Stony Brook University

3:00 PM Invited
Fe-based Alloys with Extreme Properties for Thinner Absorbable Devices: Sergio Loffredo; Carlo Paternoster; Nicolas Gigueres; Maurizio Vedani; Diego Montavani; Laval University; Quebec Metallurgy Center; Politecnico of Milan

3:25 PM Invited
Additive Manufacturing of Biodegradable Fe-alloys for Orthopedic Applications: Ali Gokhan Demir; Laval University; Quebec Metallurgy Center; Politecnico di Milano; University of Queensland

3:50 PM Break

4:05 PM
Different Approaches to Achieving the Appropriate Biodegradability for the Fe-Mn Alloy: Matjaz Godec; Irena Paulin; Crtomir Donik; Jaka Burja; Matej Hocevar; Peter Gregorcic; Politecnico di Milano; University of California, San Diego; Laval University; Michigan Technological University

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; Ehsan Mostaed; Roger J. Guillory II; Jeremy Goldman; Jaroslav W. Drellich; Michigan Technological University

4:45 PM
Novel Zn-Fe Matrix Nanocomposite as Biodegradable Material: Zeyi Guan; Jingke Liu; Xiaochun Li; University of California, Los Angeles

5:05 PM Concluding Comments
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 Bohns1; 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 Morschaiser, 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 Rame1; Guido Beretta2; Pierre-Yves Menet2; Jocelyn Prigent2; Pierre Le Brun2; 1Constellium C-TEC; 2Constellium Neuf-Brisach

2:30 PM
Benchmark and Practical Application of State of the Art Hydrogen Monitoring: Arnis Peišs1; Johannes Morschiser1; Sebastian Radwitz2; Jens Kremer1; Andreas Gilles1; 1Aleris Rolled Products Germany GmbH

2:55 PM
Molten Aluminum Quality Evaluations for Thin Foil Products: Ali Ulus1; Čisem Doğan2; Ali Ulas Malçioglu2; Anıl Özsayı2; Eren Toraman1; 1Asas Aluminium

3:20 PM
Industrial Verification of One- and Two-chamber Siphon Degassing: Arild Hakensø1; Terje Haugen1; 1Hycast AS

3:45 PM Break

4:00 PM
Evaluation of CFF and BPF in Pilot Scale Filtration Tests: Martin Svynser1; Inge Johansen2; Anne Kvithyld3; Britt Elin Gihleengen1; Shahid Akhtar1; Are Berg1; Anders Johannson1; 1SINTEF Industry; 2Hydro Aluminium; 3Hycast

4:25 PM
Dynaprime Filtration Technology Experience at Alcoa Baie-Comeau: Jean Francois Desmeules1; Francis Caron2; 1Dynamic Concept; 2Alcoa

4:50 PM
Improving Ultrasonic Melt Treatment Efficiency Through Flow Management: Acoustic Pressure Measurements and Numerical Simulations: Tungphly Subrato1; Dmitry Eskin2; Christopher Beckwith2; Iakovos Tzanakis4; Georgi Djambazov5; Koutis Pericleous4; 1Brunel University; 2University of Greenwich; 3Oxford Brookes University

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 Ikhamayies, Al Isra University; Yunus Kalay, Middle East Technical University; Jiann-Yang Wang, 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 Laws2; Juan Escobedo-Diaz3; Hongxu Wang1; Zongjun Li3; 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 Fudger1; Tom Luckenbaugh2; A.J. Roberts3; Chad Vornbuckle1; Franklin Kellogg1; 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: Virginia M. Bertolo1; Quanxin Jiang3; Carey L. Walters1; 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 Trofimov1; Hsin Wang1; Thomas Watkins1; Thomas Muth1; Sudarsanam Babu1; Gary Cola1; 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 Rajnovic1; 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
Connecting Dynamic Strain Aging to Deformation Processing in Magnesium-calcium-based Alloys: Wesley Cuadrado-Castillo1; Michele Manuel1; 1University of Florida
4:35 PM
Microstructure Evolution During Tensile Deformation of Polycrystalline Cobalt: Frantisek Chmelik1; Michal Knapel1; Patrik Dobron1; Mayerling Martinez2; Eric Hug3; 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 Knapel1; Patrik Dobron1; Frantisek Chmelik1; 1Charles University

5:15 PM
Determining Bulk Elastic Properties of Transversely Isotropic Aluminum Using Resonant Ultrasound Spectroscopy: Jordan Evans1; Blake Sturtevant1; Fedor Balakirev1; Albert Migliori1; Boris Maiorov1; 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; Srikant 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 Hogan1; 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 Deallyloying Zn-Cu Alloys: Qingshu Meng1; Kai Wang1; Changhang Zhao2; Lijie Zou2; Yibin Ren2; Mingyuan Ge3; Xianghui Xiao4; Wahi-Keat Lee4; Yu-chen Karen Chen-Wiegart4; 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 Loveland1; 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: Matthew Cherukara1; Henry Chan1; Subramanian Sankaranarayanan2; Youssef Nashed2; Ross Harder2; 1Argonne National Laboratory

3:25 PM
Uncertainty Quantification of Far-field HEDM Measurements: Rachel Lim1; Joel Bernier2; Anthony Rollett3; Paul Shade4; 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 Sobotka1; John McFarland1; 1Southwest Research Institute

4:25 PM
Uncertainty Propagation in a Multiscale CALPHAD-reinforced Elastochemical Phase-field Model: Vahid Attari1; Pejman Honarmand2; Thien Duong3; Daniel Sauced4; Douglas Allaire; Dan Raymundo Arroyave2; 1Texas A&M University

4:45 PM
Machine Learning Reinforced Crystal Plasticity Modeling of Titanium-Aluminum Alloys under Uncertainty: Pinar Acar1; 1Virginia Tech

5:05 PM
Predicting Microstructure-sensitive Fatigue-crack Path in 3D Using a Machine Learning Framework: Kyle Pierson1; Aowabin Rahman2; Ashley Spear3; 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 Zhang, 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 Ganesh1; 1Oak Ridge National Laboratory

2:30 PM
The Relationship Between Compositional Mixing and Phase Stability of Metal-halide Perovskites: Theoretical Study: Ki-Ha Hong1; 1Johns Hopkins University/Department of Materials Science and Engineering

2:50 PM
First-principles-based Hybrid Perovskite Materials Design for Memristor: Donghwa Lee1; Seong Hun Kim1; 1Pohang University of Science and Technology (POSTECH)

3:10 PM
Discovery and Characterization of 1D Inorganic Polymers Through Datamining and Density Functional Theory: Joshua Paul1; Janet Lu1; Sohum Shah2; Stephen Xie2; Richard Hennig2; 1University Of Florida

3:30 PM Break

3:50 PM Invited
Toward Rational Design and Discovery of Metastable Materials: Vladas Stevanovic1; 1Colorado School Of Mines
4:20 PM
Predicting the Properties of Crystals with High Accuracy Using Deep Learning: Weili Ye1; Chi Chen1; Zhenbin Wang1; Iek-Heng Chu1; Yunxing Zuo1; Chen Zheng2; Shyue Ping Ong3; 1University of California San Diego

4:40 PM
Introducing the MEAM Interatomic Potential for NiTiHf Shape Memory Alloys: Meghnath Jaish1; Garritt 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: Mukhi V. Ayyasamy1; 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 Middburgh, Bangor University

2:00 PM Invited
Exploration of Fundamental Radiation Effects Phenomena in Materials: Steven Zinkle1; 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 Xiao1; Axel Seoane1; Xian-Ming Bai1; Lingfeng He1; 1Virginia Tech; 2Idaho National Laboratory

3:00 PM
Molecular Dynamics Simulations of Phosphorus Migration in a Grain Boundary of α-Iron: Ken-Ichi Ebihara1; Tomoaki Suzudo1; 1Jaea

3:20 PM
The Effect of Minor Additives on Radiation Induced Segregation in Austenitic Steel Alloys: Yongfeng Zhang1; Anus Manzoor1; Dilpuneet Aidhy1; Miao Song1; Xiaoyuan Lou1; 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 Andersson1; 1Los Alamos National Laboratory

4:40 PM
A First-principles Investigation on the Co-segregation Energetics of Chromium-helium at Grain Boundaries in α-Fe: Sainyam Nagar1; Pulkit Garg1; Nitin Muthegowda1; Mehut Bhabha1; Ilaksh Adlakha1; Kiran Solanki1; 1Arizona State University

5:00 PM
DFT+U Point Defect Calculations of Uranium Mononitride: Bryant Jerome1; Dilpuneet Aidhy1; 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

Tuesday PM | February 25, 2020
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 Xu1; Lipeng Zhang2; Valentino Cooper3; Paul Kent1; 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 Jiang1; Velimir Radmilovic2; Julian Sabisch3; Liang Qi4; Andrew Minor5; Daryl Chrzan2; 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 Mendelev1; Valery Borovikov2; 1Ames Laboratory

3:20 PM
Temperature-dependent Kinetic Pathways for Jog-pair Nucleation in FCC Metals: Anas Abu-Oude1; Maeva Coutura2; 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 Abdeljawad1; 1Clemson University

4:25 PM Invited
Structure and Properties of Ni-doped MoS2: Phase Diagrams, Raman Spectra, and Solid Lubrication: David Strubbe1; 1University of California, Merced

4:55 PM
A Phase-field Method for Modeling Solute Segregation at Interphase Boundary in Binary and Ternary Alloys: Sourabh Kadombi1; Srikanth Patala1; 1North Carolina State University

5:15 PM
Revisiting the Early Stages of Precipitation in Al-Cu Alloys: Kang Wang1; William Sofla1; 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 Leung1; Sebastian Marussi2; Lorna Sinclair1; Samuel Clark2; Yunhui Chen1; Leigh Stanger1; Jon Willmott1; Robert Atwood1; Andrew Bodey2; Margie Olbinado1; Alexander Rack3; Peter Lee2; 1University College London; 2University of Sheffield; 3Diamond Light Source Ltd; 4European Synchrotron Radiation Facility

2:30 PM
Assessment of Grain Refinement on Hot-tearing of New Multicomponent Al-Cu Alloys: Adrian Sabau1; Seyed Mirmiran1; Christopher Glaspie1; Shimin Li1; Diran Apelian3; Amit Shyam1; Andres Rodriguez3; J. Haynes3; 1Oak Ridge National Laboratory; 2Fiat Chrysler Automobiles (FCA) North America, LLC.; 3Polytechnic Institute; 4of Akron

2:50 PM
How to Prevent Gas Porosity Defects in Castings of Stator Housing in Grey Cast Iron: Izudin Dugic1; 1Linnaeus University

3:10 PM
Bubble Induced Convection During Dendritic Solidification: Seyed Amin Nabavizadeh1; Mohsen Eshraghi1; 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 Abomossaes1; 1EZZ Dekhila Steel company

4:10 PM
Deformation Induced Crack Growth in Semi-solid Die Cast Aluminum Alloys: Shishira Bhagavathi1; Zhixuan Gong2; Sara Nonni1; Tim Wigger2; Saurabh Shah1; Sebastian Marussi1; Neeraj Srivastava1; Shyamprasad Karagaddi1; 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 Srolovitz2; 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 Abdeljawad1; 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 Agrawal2; 1University of Colorado Colorado Springs; 2Auburn University

3:00 PM
An Atomistic Survey of Grain Boundary Migration Mechanisms in BCC Fe: Ian Chesser1; Sutach Ratanapahan1; Brandon Runnels2; Elizabeth Holm3; 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 Devarg1; Libor Kovarik1; Elizabeth Kautz1; Bharat Gwalani2; Aashish Rohatgi2; Wenbo Wang1; Jason Trelewicz1; 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 Chen3; 1Guangdong Techinon-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 Woryk1; Jaime Marian1; Blas Uberuaga4; David Srolovitz5; Mitra Taheri1; 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 Dang1; Shujuan Wang1; Mingyu Gong1; Carlos Tomé2; Rodney McCabe3; Jian Wang3; 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 Taupin\(^2\); Khanh Dang\(^3\); Laurent Capolungo\(^4\); \(^1\)University of Florida; \(^2\)University de Lorraine CNRS; \(^3\)Los Alamos National Laboratory

5:20 PM
Coarsening of Ferrite Lamellae Grains in Heavily Cold Drawn Pure Iron Wire: Hanchen Feng\(^3\); \(^3\)Southeast University
2:40 PM Macrozones and Dwell Fatigue Failure on a Near-a Titanium Alloy: Beatriz Fernandez-Silva1; Bradley Wynne1; Martin Jackson1; Matthew Thomas1; 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 Harr1; Samantha Daly1; Adam Pilchak1; 1University of Michigan; 2University of California, Santa Barbara; 3Air Force Research Laboratory

3:20 PM Oxygen, α2, Macrozones and Dwell Fatigue Initiation in α-Ti: Felicity Dear1; Paraskenas Kontis2; Baptiste Gault3; Jan Ilavsky3; Joel Bernier1; David Rugg1; David Dye1; 1Imperial College London; 2Max-Planck-Institut fur 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 Nivety2; Sudhanshu Singh3; Tyler Stannard4; Xianghui Xiao1; Nikhilitesh Chawla1; 1Arizona State University; 2Brookhaven National Laboratory

4:20 PM Some Hardening and Softening Antagonist Processes Induced by Hydrogen on Cyclic Behavior of Nickel Singe Crystal: Guillaume Hachet1; Arnaud Metsue1; Abdelali Oudriss1; Feaugas Xavier1; 1University Of La Rochelle - Lasie; 2TIMET UK Limited; 3Air Force Research Laboratory

4:40 PM Mechanical and Actuation Fatigue in Ni-Rich NiTiHf High Temperature Shape Memory Alloys: Behrouz Haghighouyan1; Benjamin Young1; Ibrahim Karaman2; Dimitris Lagoudas3; 1Texas A&M University

5:00 PM Creep-fatigue Behavior of an Advanced Austenitic Stainless Steel (Alloy 709): Zeinab Alsmadi1; 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
4 | San Diego Convention Ctr

2:00 PM Invited Topology Optimization for Architected Materials: James Guest1; 1Johns Hopkins University

2:40 PM Invited Sustainable Fashion Design, 3D and 4D Printing, and The New Age Lab: Julia Daviy1; 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

Tuesday PM | February 25, 2020
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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 To1; 1University of Pittsburgh Part-Scale Support Structure Optimization for Minimizing Residual Stress for Laser Powder Bed Fusion Additive Manufacturing: Albert To1; 1University of Pittsburgh Large Scale Level Set Topology Optimization: Sandilya Kambampati1; H Alicia Kim1; 1University of California San Diego; 2University of California, San Diego Topology Optimization of the Fast Heat Responsive Structures via a Level-set Method: Jaeyub Hyun1; H Alicia Kim1; 1University of California San Diego; 2University of California, San Diego Topology Optimization of Load Carrying Heat Exchangers and Battery Packs: Sandilya Kambampati1; H Alicia Kim1; 1University of California, San Diego Level Set Topology Optimization with the Reproducing Kernel Particle Method: Andreas Neofytou1; H Alicia Kim1; 1University of California, San Diego Multiscale Design Optimization for Integrated Structural-material Systems: Carolina Jauregui1; 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 Jang1; Nanshu Lu1; 1University of Texas at Austin

2:20 PM  Invited
Multiscale 3D Printing of Nanomaterials-based Biomedical and Functional Devices: Yong Lin Kong1; 1University of Utah

2:40 PM  Invited
Plasmonic Biosensors for Resource-limited Settings: Limei Tian1; 1Texas A&M University

3:00 PM  Invited
Soft, Spongy, and Conductive Materials for Human Motion Monitoring: Zhengtao Zhu1; 1South Dakota School of Mines and Technology

3:20 PM  Invited
Carbon Nanotube Nanoelectronics and Macroelectronics: Chongwu Zhou1; 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 Xu1; 1University of California, San Diego

4:20 PM  Invited
Bioinspired Freeze-cast Nanostructured Materials Templated by Energized Fields: Steven Naleway1; Isaac Nelson1; Tony Yin1; Debora Lyn Porter1; Taylor Ogden1; Max Mroz1; Paul Wadsworth1; 1University of Utah

4:40 PM  Invited
Mask-less Direct-write Lithography Using Functional Micro/nanofibers on Flexible Substrate: Jonghyun Kim1; Dongwoon Shin1; Jiyoung Chang1; 1University of Utah

5:00 PM  Invited
Rubbery Electronics: Electronics Fully Made Out of Rubbery Materials: Cunjiang Yu1; 1University of Houston
2:00 PM Invited
Thermodynamics at Equilibrium and Non-equilibrium – Genomic Tools for Materials Design: John Agren1; 1Royal Institute of Technology

2:40 PM Invited
Phase Equilibria and Interfacial Migration in Stressed Solids: Nicholas Weadock2; Peter Voorhees3; Brent Fultz2; 2California Institute of Technology; 3Northwestern University

3:20 PM Invited
Interaction of Moving Grain Boundaries with Solutes in Alloys: Yuri Mishin1; 1George Mason University

4:00 PM Break

4:20 PM Invited
Computational Thermodynamics in Microstructure Modelling and Beyond: Georg Schnitz2; 1Access E V

5:00 PM Invited
How Can the CALPHAD Method Do Better?: Zi-Kui Liu3; 1Pennsylvania State University

2:25 PM Invited
Glass Formation with Monodisperse Colloids: Frans Spaepen2; 2Harvard University

2:50 PM Invited
Structure Modulation for Plasticity Enhancement of Metallic Glasses: Jurgen Eckert2; 1Erich Schmid Institute of Materials Science; Montanuniversitat Leoben

3:10 PM Invited
Serrated Flow and Beyond: Strain Localization in Metallic Glasses: Robert Maass1; 1University of Illinois at Urbana-Champaign

3:30 PM Invited
The Structure and Deformation Behaviors of Annealed Cu-Zr Metallic Glasses: Cang Fan2; Xingxing Yue2; P. K. Liaw3; 1YMT Simulations LLC; 2Nanjing University of Science & Technology; 3University of Tennessee

3:50 PM Break

4:05 PM Invited
Metallurgical Glasses: From Coatings to Their First-ever Nanotube Arrays: Jinn Chu1; 1National Taiwan University of Science and Technology

4:25 PM Invited
Rejuvenation by Fatigue: Takeshi Egami2; 1University of Tennessee

4:45 PM Invited
Mechanical Modeling and Plasticity of Bulk Metallic Glasses: Hyoung Seop Kim3; 1Pohang University of Science and Technology

5:05 PM Invited
Serrated Yielding in an Iron-chromium-aluminum (FeCrAl) Alloy Tubing: Mahmoud Hawary2; Abdullah Alomari3; K. Murty1; 1North Carolina State University

5:25 PM Invited
Creep Resistance of a Hierarchical-precipitate-strengthened Ferritic Alloy: Gian Song1; Soon Jik Hong1; Jin Kyu Lee2; Sung Ho Song1; Sung Hwan Hong1; Ki Buem Kim1; Yanfei Gao2; Zhiqian Sun2; 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 Bhattacharyya2; Ricardo Lebendorf3; Sean Agnew2; 1University of Virginia; 2Los Alamos National Laboratory
2:00 PM Invited
Deviations from Theoretical Orientation Relationship Along Tensile Twin Boundaries in Magnesium: Brandon Leu1; M Arul Kumar2; Yue Liu3; Irene Beyerlein1; 1University of California Santa Barbara; 2Los Alamos National Laboratory; 3Shanghai Jiao Tong University

2:30 PM Invited
Challenges in Developing Accurate Data on Magnesium Alloys: Karl Sofinowski1; 1Mississippi State University

2:50 PM Invited
The Role of Faceting in [0102] Twin Nucleation: Christopher Barrett1; 1Mississippi State University

3:10 PM Invited
In-situ TEM Investigation of <c+a> Dislocations in Magnesium: Boyu Li1; Fei Li2; Bin LF3; Jian-Feng Nie4; Zhi-Wei Shan5; 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 Paudel1; Christopher Barrett2; Haitham EI KadrIn; 1Mississippi State University

4:00 PM Invited
An Analysis of the Tensile Deformation Behavior of Commercial Die-cast Magnesium-aluminum-based Alloys: Mark Easton1; Hua Qian Ang2; Suming Zhu3; Trevor Abbott4; 1RMIT University; 2Magontec Ltd

5:00 PM Invited
On the Load Multiaxiality Effect on the Cyclic Behaviour of Magnesium Alloys: A. Gryguc1; A. Karparvar2; D. Toscano3; Ali A. Roostaei4; Sugrib Shaha5; Behzad Behravesh6; Hamid Jahed7; 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, Novels, Inc.

Tuesday PM | February 25, 2020
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 Coughlin1; Rodney McCabe2; Carolus Osborn3; 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 Petegem2; Jan Capek3; Helena Van Suygenhoven4; 1Paul Scherrer Institut

2:40 PM
Strain Localization and Damage in a α+β Titanium Alloy: A Study of Microstructure Heterogeneity and Strain Path Effects: Jiyun Kang1; Ikuho Nakahata2; C. Cem Tasan3; 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; Ashoktuku Chakraborty; 1Indian Institute of Technology (IIT) Kharagpur

3:20 PM
Grain Refinement and Texture Modification of thin Mg-3Al-1Zn Sheets by ECAB Method: Ming Cheng1; Shi-hong Zhang2; 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

Tuesday PM | February 25, 2020
14A | San Diego Convention Ctr

Session Chair: 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; 1Korea Research Institute of Standards and Science

2:30 PM
Multiple Crystallization Pathways on Highly Supersaturated Aqueous Solutions: Yong Chan Cho1; Geun Woo Lee2; Sooheyoung Lee3; Yun-Hee Lee4; 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 Shen1; Chunyu Li2; Alejandro Strachan3; 1Purdue University

3:00 PM
De-mineralization of a High Ash Coal in Acidic Salt Solution: Adewale Adeleke1; Lateef Jimoh2; Simeon Ibitoye3; 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. Ridley1; Erick Alvarado; Victor R. Vasquez2; Olivia Graeve3; 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. Ridley1; James P. Kelly2; Hoornshad Fathi-Kelly3; Victor R. Vasquez4; Olivia Graeve5; 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 Wang1; Jianrong Gao2; Ashwin Shahani3; 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 Tian; Zhu Miaoyong; 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 Flanagan1; Benjamin Bedard2; Avnish Dongare1; Harold Brody1; Aaron Nardi1; Victor Champagne2; Seok-Woo Lee1; 1University of Connecticut; 2Army Research Laboratory

2:20 PM
Small Scale Mechanical Testing of Nanoporous Tungsten: Mingyue Zhao1; Inas Issa2; Manuel Pfeifenberger1; 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 Bahr1; 1Purdue University

3:00 PM
Intrinsic Deformation and Failure Response of Single Crystal MAX Phases: Zhiqiang Zhan1; Hemant Rathod1; Miladin Radovic1; Ankit Srivastava1; 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 Ovri1; Erica Lilleoedden1; 1Helmholtz Zentrum Geesthacht

4:20 PM
Characterizing Near-surface Plasticity in Aluminum-carbon Hybrid Materials: Christopher Shumeyko1; Andrew Palughk1; Daniel Cole1; Christopher Klingshim1; Xiaoxiao Ge2; Lourdes Salamanca-Riba; 1U.S. Army Research Laboratory; 2Texas A&M University; 1University of Maryland

4:40 PM
Bending Dominated Plasticity and Hardening in Au-Ag Nanoboxes: Radhika Patil1; David Doan2; Zachary Atkerson2; Chen Shuai2; Mehrdad Kiani1; Yong-Wei Zhang1; 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 Yu1; Christian Roach2; Khalid Hattar2; Kiran Solanki1; 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 Bhattacharya, 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
33A | San Diego Convention Ctr
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 Liu1; Fei Liu2; Bin Li3; Jian-Feng Nie4; 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 Chatterjee1; 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 Composites at Different Strain Rates: Dhriti Bhattacharya1; Alan Xu1; Chao Yang1; Gordon Thorogood1; 1Australian Nuclear Science and Technology Organization; 2Australian 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 Rao1; Adam Pilchak2; Christopher Woodward2; 1Ues Inc.; 2Air Force Research Laboratory

4:30 PM
Ab-initio Predictions of Plastic Anisotropy in BCC Metals: Lucile Dezerald1; Antoine Krach2; Emmanuel Clouet1; Bassam Ben Yahia1; Lisa Ventelon1; Francois Willaime1; David Rodney1; 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 Mao1; 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 Harrigan1; *Gamma Alloys

2:30 PM Invited
4D X-ray Tomography and Correlative Microscopy of Composite Materials: Nikhil Chawla1; *Arizona State University

3:00 PM
Synthesis and Characterization of In-situ Formed TiB2 Particulate Reinforced Al-Si Alloy Composites: Jimmy Karloopia1; Shaik Mozammil1; Pradeep Jha1; *Indian Institute of Technology Roorkee

3:30 PM Break

3:50 PM
Processing and Microstructural Characterization of Novel Invar Syntactic Foams: Justin Whetten1; Arun Sundar2; Jason Williams3; Scott Roberts4; Nikhil Chawla5; *Center for 4D Materials Science, Arizona State University; *NASA/JPL

4:15 PM
Design of Steel Microstructures by Manipulation of Reinforcement Precipitates using Finite Element Methods: Samuel Schwarm1; *Naval Surface Warfare Center Carderock Division

4:40 PM
Mechanical Testing of Steel and Tungsten Fibers for Use in Composites for Fusion Applications: Matthew Weinstein1; Lauren Garrison2; Maxim Gussev3; Carol Lin4; Johann Riesch5; *University of Wisconsin-Madison; *Oak Ridge National Laboratory; *University of Illinois Urbana-Champaign; *Max-Planck-Institut für Plasmaphysik

5:05 PM
Lightweight Radiation Shielding Using Metal Matrix Composites: Andrew O’Connor1; Wesley Bolch1; Michele Manuel1; *University 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
Novel fcc-Cu Matrix Based High Temperature Alloys Strengthened by Ordered Precipitates: Suman Sarkar1; Prafull Pandey1; Surendra Kumar Makineni1; Kamalio Chattopadhyay1; *Indian 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 Bahl1; Jiahao Cheng1; Eric Hoar1; Xiaohua Hu1; Allen Haynes1; Amit Shyam1; *Oak Ridge National Laboratory

2:50 PM
Stress Induced Sensitization in HAZ of 304 LN Austenitic Stainless Steel: Nikhdi Barta1; Sourav Das1; *IIT Roorkee

3:10 PM Break

3:40 PM
Thermodynamic Simulation and Experimental Validation of Phase Stability in Ni-based Superalloys: Kyle Ventura1; David Beaudry1; Alex Aviles1; Gerhard Fuchs1; *University of Florida

4:00 PM
Enhanced Creep Resistance via Strain-induced Massive Nanoprecipitation in Alumina-forming Austenitic Stainless Steels: Zhao Wuxin1; Zhaoping Lu1; *University of Science and Technology Beijing

4:20 PM
Site Preferential of the Alloying Additions on Mechanical Properties of L12 Ni3Co Alloys: Peng Liu1; Dengfu Chen1; Pei Xu1; Mujun Long1; Huamei Duan1; *Chongqing University, China
### MATERIALS PROCESSING

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


**Program Organizers:** Andreas Siegmund, LanMetCon LLC; Shaqff Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, RecycleX; 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

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<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:00 PM</td>
<td>An Overview of Technology Developments in Zinc Processing Around the World</td>
<td>R. Warner¹, A.E.M. Warner², Phillip Mackey³, ¹Nyrstar Sales &amp; Marketing AG; ²Worley; ³PJ Mackey Technology Inc.</td>
</tr>
<tr>
<td>2:20 PM</td>
<td>Lead and Zinc Extractive Metallurgy Research in the Kroll Institute for Extractive Metallurgy</td>
<td>Patrick Taylor¹, Colorado School of Mines</td>
</tr>
<tr>
<td>2:40 PM</td>
<td>Leaching of Turkish Oxidized Pb-Zn Flotation Tails by Inorganic and Organic Acids</td>
<td>Muammer Kaya¹, Sait Kursunoglu¹, Shokrullah Hussaini¹, Erkan Gul¹, Osmangazi University; ²Abdullah Gul University</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>Characterization of Phase Equilibria and Thermodynamics with Integrated Experimental and Modelling Approach for Complex Lead Primary and Recycling Processing</td>
<td>Evgueni Jakh¹, Maksym Shevchenko¹, Denis Shishin¹, Tatuq Hidayat², Peter Hayes³, Pyrosearch, The University of Queensland; ²Formerly: Pyrometallurgy Innovation Centre, The University of Queensland; ³Currently: Department of Metallurgical Engineering, Bandung University of Science and Technology</td>
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<td>3:20 PM</td>
<td>Break</td>
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<td>3:40 PM</td>
<td>Effect of Alumina Ceramics Surface Condition on the Wetting of Liquid Lead</td>
<td>Zhen Qi¹, Yuan Fu¹, University of Science and Technology Beijing</td>
</tr>
<tr>
<td>4:00 PM</td>
<td>Performance and Mechanism of Chlorine Removal in Wastewater by Combination of CuSO4 and Zero-valent Copper</td>
<td>Yongguang Luo¹, Hongtao Ou¹, Yunhao Xi², Jingtian Zou¹, Te Zhang¹, Jing Li², Tianqi Liao¹, Libo Zhang², Kunming University of Science and Technology; ²National 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</td>
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### MATERIALS PROCESSING

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


**Program Organizers:** Andreas Siegmund, LanMetCon LLC; Shaqff Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, RecycleX; 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)

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<th>Time</th>
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<th>Authors</th>
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<tr>
<td>2:00 PM</td>
<td>Effect of Deposit Types, Mine Development and Industry Structure on Primary Lead and Zinc Economics in Australia, North America and Europe</td>
<td>Hendrik Reemeyer¹, Resourceful Paths Consulting</td>
</tr>
<tr>
<td>2:20 PM</td>
<td>Processing Technology of Zn-Al Alloys into Wires for Thermal Spray Applications</td>
<td>Piotr Osuch¹, Monika Walkowicz¹, Pawel Strzepek¹, Beata Smyrak¹, Andrzej Mamala¹, Tadeusz Knych¹, Tomasz Napiora¹, Radoslaw Sokol², Stanislaw Pawlica³, AGH University of Science and Technology; ²ZM Silesia SA</td>
</tr>
<tr>
<td>2:40 PM</td>
<td>Opportunities for Concentrating Solar Thermal Energy in Pb and Zn Flowsheets</td>
<td>Susanna Hochrady³, Aphelele Sithole¹, MINTEK</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>Break</td>
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**MATERIALS PROCESSING**

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


**Program Organizers:** Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recyclex; 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 Ellis1; 1RSR Technologies

- **2:20 PM**
  Refractory Solutions by Laboratory Tests and Fieldworks for Lead Recycling Applications: Katja Reinharter1; Dean Gregurek2; Alfred Spanning3; Camille Fleuriault1; Joe Grogan1; 1RHI Magnesita; 2Gopher Resource

- **2:40 PM**
  Influence of Minor Elements in Waste Lead Battery Recycling: Yusuke Sakata1; Shinichi Ito1; Shinji Abe1; Nozomu Hasegawa1; 1Hosokura Metal Mining Co. LTD.

- **3:00 PM**
  The FAST Pb Process and Its Impact on Secondary Lead Production: Massimo Maccagni1; Edoardo Guerrini1; 1Engitec Technologies

- **3:20 PM**
  Break

- **3:40 PM**
  Recent Improvements at Hosokura Lead Smelter and Refinery: Hironobu Nattano1; Shinichi Ito1; Shinji Abe1; Nozomu Hasegawa1; 1Hosokura Metal Mining Co. LTD.

- **4:00 PM**
  Refractory Corrosion Comparison through a Rotary Drum Furnace Slag Test for the Lead Industry: Daniela Mancini Fonseca1; Alfred Spanning1; 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 Ge1; Yongfeng Qi1; 1China ENFI Engineering Corporation

**MATERIALS PROCESSING**

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


**Program Organizers:** Andreas Siegmund, LanMetCon LLC; Shafiq Alam, University of Saskatchewan; Joseph Grogan, Gopher Resource; Ulrich Kerney, Recyclex; 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: Mariho Shinoda1; Toyoshi Yamaguchi1; Ryota Mural1; 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 Hirsi1; Björn Saxen1; 1Outotec

- **4:20 PM**
  Refining of Zinc Chloride by the Combination of Cementation Reaction and Vacuum Distillation: Gen Kamimura1; Hiroyuki Matsuura1; 1University of Tokyo

- **4:40 PM**
  Increasing Current Efficiency To 93% In Jumbo Cellhouse At Vedanta’s HZL Tank House: Pankaj Sharma1; Chandru Chendurpandian1; Armeet Matlikarjun 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 Sun1; Yuehua Hu1; 1Central South University

- **5:20 PM**
  The Mass Transfer Characteristics of Ozone Oxidation of Rare Scattered Metal Impurities in Zinc Sulfate Solution: Zhang Lihua1; Luo Yaoya1; Wang Tian1; Qu Hongtao2; Zhang Jiale1; Libo Zhang1; Luo Yongguang1; 1Key Laboratory of Unconventional Metallurgy/Kunming University of Science and Technology; 2Yunnan Chihong Zn & Ge Co., LTD; 1Key Laboratory of Unconventional Metallurgy/Kunming University of Science and Technology/Yunnan Chihong Zn & Ge Co., LTD
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 Liu, 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

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### 2:00 PM Invited

**Wafer Level SLID Bonding - Formation and Evolution of Microstructures:** Vesa Vuorinen

**Layers for Automotive Power Semiconductor:** Dong-Yuri Yu

**A Transient Liquid Phase Bonding Process Using Sn/Cu Multiple Layers for Automotive Power Semiconductor:** Dong-Yuri Yu

**Interfacial Stability between High-temperature Lead-free Solders and Substrates:** Shih-Kang Lin

**Interfacial Stability between High-temperature Lead-free Solders and Substrates:** Shih-Chen Li

**Microstructure of Cu/Cu Joints using Sn-Coated Cu Particle Paste for High-temperature Application:** Hiroshi Nishikawa

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### 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

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**2:00 PM Linear Complexion Formation and their Effect on the Strength of Metallic Alloys:** Vladislav Turlo

**Understanding the Role of Microwave Heating on the Crystalization Behavior, Microstructure Formation and Mechanical Response of ZrO2-Containing SiO2 – MgO – Al2O3 – K2O – B2O3 – F mica Glass-ceramics:** Shibayan Roy

**Mechanical Property Variation and Microstructure Evolution of Inconel Alloy Induced by Electric Current Stressing:** Wen-Jung Li

**Effect of Zirconium Addition to Wrought Al-Mg-Si Alloys on Microstructure:** Florian Schmid

**Nitride Precipitation Induced by Nitrogen-solute Clustering in Ferrous Alloys:** Goro Miyamoto

**Precipitate Nucleation Enhanced by Deformation through Dislocations in Mg-Al Alloys:** Michael Falk

**Precipitate Nucleation Enhanced by Deformation through Dislocations in Mg-Al Alloys:** Michael Falk

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**2:40 PM Interphase Boundary Anisotropy Effects on the Microstructure Evolution in Three Phase ß(In) – In, Bi – (Sn) Eutectic System:** Samira Mohagheghi

**Interphase Boundary Anisotropy Effects on the Microstructure Evolution in Three Phase ß(In) – In, Bi – (Sn) Eutectic System:** Samira Mohagheghi

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**3:00 PM Mechanical Property Variation and Microstructural Evolution in Inconel Alloy Induced by Electric Current Stressing:** Wen-Jung Li

**Effect of Zirconium Addition to Wrought Al-Mg-Si Alloys on Microstructure:** Florian Schmid

**Nitride Precipitation Induced by Nitrogen-solute Clustering in Ferrous Alloys:** Goro Miyamoto

**Nitride Precipitation Induced by Nitrogen-solute Clustering in Ferrous Alloys:** Goro Miyamoto

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**3:20 PM Nitride Precipitation Induced by Nitrogen-solute Clustering in Ferrous Alloys:** Goro Miyamoto

**Precipitate Nucleation Enhanced by Deformation through Dislocations in Mg-Al Alloys:** Peng Yi

**Precipitate Nucleation Enhanced by Deformation through Dislocations in Mg-Al Alloys:** Peng Yi

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**3:40 PM Break**

**4:00 PM Precipitate Nucleation Enhanced by Deformation through Dislocations in Mg-Al Alloys:** Peng Yi

**4:20 PM Precipitate Nucleation Enhanced by Deformation through Dislocations in Mg-Al Alloys:** Peng Yi
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


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: 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 Seidman1; 1Northwestern University

2:30 PM Invited
New Electron Microscopy Techniques for Determination of Local Structural Features during Plastic Deformation: Andrew Minor1; 1University of California, Berkeley

3:00 PM Invited
Structural and Chemical Disorder Towards Advanced Materials: Horst Hahn1; 1Karlsruhe Institute of Technology

3:30 PM Break

3:50 PM Invited
Materials Genomics: Designing Systems Far from Equilibrium: Gregory Olson1; 1Northwestern University

4:20 PM Invited
A Precise DSC-based Methodology to Pinpoint In Situ Crystallinity Percent in Amorphous Systems: Olivia Graeve1; 1Northwestern University; Arash Yazdani1; 1Northwestern University; Günther W.H. Höhne1; 1Northwestern University; Darren Dewitt1; 1Northwestern University; Javier E. Garay1; 1Northwestern University

4:50 PM Invited
Hot Corrosion Degradation of Gas Turbine Materials Subject to Mixed-mode Thermal Exposures and Emerging Complex Corrosion Environments: Kiah Soto Leytan1; 1Wuhan University of Technology; Kunthea Deng1; 1Wuhan University of Technology; Maryam Zahir Azer1; 1Wuhan University of Technology; Daniel Mumm1; 1University of California, Irvine

5:20 PM Invited
Time-Resolved Characterization of Far-from-equilibrium Microstructure Evolution During Rapid Solidification: Joseph McKeown1; 1University of Alabama; John Roehling1; 1University of Alabama; Tian Li1; 1University of Alabama; Alexander Baker1; 1University of Alabama; Scott McCull1; 1University of Alabama; Kati Zweelacker1; 1University of Alabama; Amy Clarke1; 1University of Alabama; Jörg Wiedeck1; 1University of Alabama; Lawrence Livermore National Laboratory; Empa, Swiss Federal Laboratories for Materials Science and Technology; Colorado School of Mines; University of Pittsburgh

5:40 PM Invited
Computed Tomography: A New Frontier for Material Characterization: Chen Da1; 1VJ Technologies

6:00 PM
3D Morphological Evolution of Bimodal Porous Copper Characterized by X-ray Nano-tomography: Fei Chen1; 1Wuhan University of Technology; Hao Wang1; 1Wuhan University of Technology; Mingyuan Ge1; 1Wuhan University of Technology; Chonghao Zhao1; 1Wuhan University of Technology; Wah-Keat Lee1; 1Wuhan University of Technology; Karen Wiegart1; 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 Acott, University of Alabama; Nathan Levkulich, UES; Michael Glavicic, Rolls-Royce; Yufeng Zheng, University of Nevada, Reno; John Rotella, Purdue University

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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; 1Northwestern University; Wei-Tsu Wu1; 1Northwestern University; BK Chun1; 1Northwestern University; Jaebong Yang1; 1Northwestern University; Jun Yong Oh1; 1Northwestern University; Tim Hanes1; 1Northwestern University; ‘Scientific Forming Technologies Corporation

3:00 PM Invited
Application of the CALPHAD Method in the Framework of ICME: Fan Zhang1; 1Northwestern University; Shuanglin Chen1; 1Northwestern University; Weisheng Cao1; 1Northwestern University; Dachao Lv1; 1Northwestern University; Jun Zhu1; 1Northwestern University; ‘CompuTherm 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; 1Northwestern University; Austin Gerlt1; 1Northwestern University; Matthew Krug1; 1Northwestern University; Katelun Wertz1; 1Northwestern University; ‘Air Force Research Laboratory

3:50 PM Break

4:10 PM Invited
Integrated Approaches to Alloy Industrialization Using Numerical Simulation and Physical Modeling: Bruce Antolovich1; 1University of Tennessee; John Foltz1; 1Air Force Research Laboratory; Ramesh Minisandram1; 1Air Force Research Laboratory; Nathan Levkulich1; 1Air Force Research Laboratory; Michael Glavicic1; 1Air Force Research Laboratory; ‘Air Force Research Laboratory

4:30 PM Invited
Hierarchical Multiscale Modeling of Microtextured Regions in Ti-6242 during Alpha/beta Processing: Timothy Truster1; 1University of Tennessee

5:00 PM
Modeling Beta Phase Texture Evolution during Alpha+BetaForging to Understand Precursors to Coarse (“Abnormal”) Grain Formation: Adam Pilchak1; 1Northwestern University; Austin Gerlt1; 1Northwestern University; Eric Payton1; 1Northwestern University; ‘Air Force Research Laboratory

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## 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 Gentilis, Université Paris-Saclay; Joel Ribis, Commissariat a l’Energie Atomique CEA

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**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*
*Lisa Belkacemi*
*Brigitte Décamps*
*Marie Loyer-Prost*
*Maylise Nastar*

1. University of Tennessee
2. University of Lille
3. Université Paris-Saclay, Laboratoire d’Analyse Microstructurale des Matériaux
4. CNRS, IN2P3, CSNSM
5. ETH Zürich
6. CNRS UMR 8247-Institut de Recherche de Chimie Paris

### 2:20 PM

**Enhanced Austenite Stability in Nanostructured Steels During Ion Irradiation**
*Andrew Hoffman*
*Maalavan Arivu*
*Haiming Wen*

1. Missouri University of Science and Technology

### 2:40 PM

**Solute Stabilization of Two-phase Microstructures in Irradiated Alloys**
*Soumyajit Jana*
*Pascal Bellon*
*Robert Averback*

1. University of Illinois Urbana Champaign

### 3:00 PM

**Alpha-alpha’ Decomposition at Grain Boundaries in Annealed and Irradiated ODS Steels**
*Joel Ribis*
*Amal Issaoui*
*Joel Malaplate*
*Alexandre Legris*

1. Commissariat a l’Energie Atomique CEA
2. University 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*
*Arunodaya Bhattacharya*
*Philip Edmondson*
*Caleb Massey*
*Jean Henry*
*Steven Zinkle*

1. University of Tennessee
2. Oak Ridge National Laboratory
3. CEA, DEN, Service de Recherches Métallurgiques Appliquées, Laboratoire d’Analyse Microstructurale des Matériaux, Université Paris-Saclay

### 3:40 PM Break

**The Effect of Point Defects on the Thermodynamics and Kinetics of Irradiated Materials**
*Thomas Schuler*
*Maylise Nastar*

1. DEN, 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*
*Kan Ma*
*Brigitte Décamps*
*Robin Schaebaubl*
*Frederic Prima*

1. DEN, Service de Recherches de Métallurgie Physique, CEA
2. CNRS IN2P3, CSNSM
3. ETH Zürich
4. CNRS 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 Rodiguet*
*Milan Konstantinovic*
*Philippe Pareige*

1. University Of Rouen
2. CCK-CEN

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### 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*
*Christopher Race*

1. University of Manchester

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### 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*
*Alexandra Leader*
*Eric Williams*
*Saptarshi Das*

1. Alfred University
2. Rochester Institute of Technology

### 2:20 PM

**Indian Coal Ash: a Potential Alternative Resource for Rare Earth Metals (REMs)**
*Archana Kumari*
*Manis Kumar Jha*
*Devendra Deo Pathak*

1. CSIR-National Metallurgical Laboratory
2. Indian Institute of Technology (Indian School of Mines), Dhanbad, India

### 2:40 PM

**Recovery of Manganese and Cobalt from Discarded Batteries of Toys**
*C. Choubey*
*Manis Kumar Jha*
*Devendra Deo Pathak*

1. CSIR-National Metallurgical Laboratory
2. Indian 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*
*Kyeong Woo Chung*
*Chul-Joo Kim*
*Ho-Sung Yoon*

1. Korea 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**
*Dana-Qie Li*
*Yang Yang*
*Hong-Yi Li*

1. Chongqing University

### 3:40 PM Break

**Mechanism of Extraction of Vanadium from Vanadium Slag with MgO using an Alkaline Leaching Process**
*Kyungwoo Chung*
*Chul-Joo Kim*
*Ho-Sung Yoon*

1. Korea Institute of Geoscience & Mineral Resources (KIGAM)

### 4:15 PM

**Study on Vanadium Phase Evolution Law in Vanadium Slag during the Interface Reaction Process of Sodium Roasting**
*Dan-Qing Li*
*Yi-Heng Yuan*
*Bing Xie*
*Hong-Yi Li*

1. Chongqing University

### 4:35 PM

**Phosphate-intensified Alkali Leaching to Recover Molybdenum from a Volatilizing Residue**
*Xiong Xiao*
*Shengfu Zhang*
*Guibao Qiu*
*Yuntao Race*

1. Central South University

### 4:55 PM

**Effect of Sulfuric Acid Concentration on Marmatite Dissolution in the Presence of Cupric Ions**
*Xiaoyu Meng*

1. Central South University
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 Sierras, 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

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**ELECTRONIC MATERIALS**

2:00 PM Invited
Novel Wide Bandgap Gallium Oxide (Ga2O3) Based Power Electronic Devices: Mariappan Paranthaman1; 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 Bird2; Elbert Caravaca2; Joseph Laquidara3; Keith Luhmann3; 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 Mahato1; Digvijay Singh1; 1National Institute of Technology, Patna

3:10 PM
Structural and Magnetic Properties of CoPd Alloys for Spintronic Applications: Subhadra Gupta1; Joseph Abugri1; Billy Clark2; Pieter Visscher2; 1University of Alabama; 2Intel Corporation

3:30 PM Break

3:50 PM
Coarsening of TiO2 Foams and its Effects on 3D Printing: Iole Pecora1; Konstantinos A. Sierras1; 1West Virginia University

4:10 PM
Ultrafast X-ray Imaging Study of Ultrasonic Liquid Phase Exfoliation of 2D Advanced Functional Materials: Ling Qin1; 1University of Hull

4:30 PM
Using In-situ X-ray Scattering to Identify the Mechanical Properties and Piezoelectric Properties of Electrospun PVDF-TrFE Nanofibers: Chia-Yin Ma1; Tu-Ngoc Lam1; Chun-Chieh Wang2; Wen-Ching Ko1; Wei-Tsung Chuang1; Chun-Jen Su1; Jyh-Ming Wu1; Sz-Nian Lai2; Mao-Yuan Lo2; 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 Photosensitive and Photoluminescence Properties for Optoelectronic Device/Sensor Application: Sourav Sarkar1; Unmesha Ray2; Dipnotil Banerjee2; Kalyan Kumar Chattopadhyay3; Jadavpur University; 3Indian Institute of Technology, Kharagpur; 2Indian Institute of Engineering Science and Technology

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**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 Paikowski, 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 PM | February 25, 2020**
**Oceanside | Marriott Marquis Hotel**

**Session Chair:** Ravindra Nuggehalli, New Jersey Institute of Technology

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2:00 PM Keynote
3D X-ray Tomography Studies on In-situ Al-Cu-TiB2 Metal Matrix Composites: Prakash Sirigamani1; 1Wmg, University of Warwick

2:30 PM
Bi-continuous Pattern Formation in Thin Films via Solid-State Interfacial Dealloying: Chonghong Zhao1; Kim Kisslinger1; Xianjing Huang2; Ming Lu2; Fernando Camino2; Cheng-Hung Lin2; Hanfei Yan2; Evgeny Nazaretski2; Yong Chu2; Bruce Pavel2; Mingzhao Liu2; Yuchen Karen Chen-Wiegart2; 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 Abedrabbo1; Anthony Fioy2; 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 Finkenauer1; James Kelly1; Bonnee Rubinfeld2; 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 Jones1; Shawn Putnam1; Lirong Sun2; Cynthia Bowers9; Jake Carter2; Nanthakishore Makeswaran1; Ramana Chintalapalle2; Augustine Urbas1; 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 Raveendran1; Ramana Chintalapalle1; 1University of Texas at El Paso

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4:40 PM Invited
Magnetoelectric Coupling in Multiferroic NiTiO3 Thin Films: Tamas Varga1; Pacific Northwest National Laboratory

5:10 PM
Optical Properties of Multilayered Thin Films: Jessy Nemati1; Jonathan Martinez2; Serlly Vega1; Deva Craig1; Nugehelli Ravindra1; 1New Jersey Institute of Technology

5:30 PM
Oxidation Kinetics of Palladium: Stephen Rubin1; Nugehelli 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 Howard, 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 Cinkilik1; Colin Ridgeway2; Xinyan Yan2; Alan Luo3; Ohio State University; The Ohio State University; Alcoa Technical Center

2:30 PM Invited
Low Cost Metal Recovery from E-Waste: Michael Free1; Prashant Saraswat1; University of Utah

3:00 PM Invited
Sorting and Impurity Removal to Improve the Recycling of Steel Scrap from Auto Shredders: Patrick Taylor1; Sridhar Seetharaman1; Erik Spiller1; Zhijiang Gao1; Colorado 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 Ordoñez1; Henry Colorado1; Universidad de Antioquia

3:50 PM Break

4:05 PM Invited
Carbon Black from Waste Tires: Purification Strategies and Recycle Potential: York Smith1; Marshall Boyton1; University of Utah

4:35 PM
Effects of Correlated Disorder on Phonon Transport across Random Interfaces: Taishan Zhu1; Giuseppe Romano1; Jeffrey Grossman1; 1Massachusetts Institute of Technology

4:55 PM
Recycling Technologies of Zn-C batteries: Review and Challenges for a Circular Economy in Colombia: Natalia Cardona Vivas1; Mauricio Correa1; Henry Colorado1; Universidad de Antioquia

5:15 PM
Thermodynamic Process Simulation for The Recovery of Spent Pot Linings (SPL) from Aluminum Production: Burcak Ebin1; Martina Petranikova1; Dusan Klinar2; Mateja Kosir3; Panagiotis Angelopoulos4; Karsten Grossman5; Roeland Geurts6; Miroslav Halilovic7; Chalmers University of Technology; Scientific Research Center BISTRA; Slovenian National Building and Civil Engineering Institute; National Technical University of Athens; UVR-FIA GmbH; VITO; University 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 Chen1; University 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 Wang1; Lei Cao1; University of Nevada, Reno

2:50 PM
Effects of Correlated Disorder on Phonon Transport across Random Interfaces: Taishan Zhu1; Giuseppe Romano1; Jeffrey Grossman1; University of California, San Diego

3:10 PM
Nano- and Micro-scale Thermal Transport in Swift heavy Ion Irradiated Oxides: Azat Abdullaev1; Vinay Chauhan2; Jacques O’Connel3; Vladimir Skuratov4; Arno van Vuuren5; Marat Khafizov6; Zhandos Utegulov1; Nazarbayev University; Ohio State University; Nelson Mandela University; National Research Nuclear University

3:30 PM
Nanomaterials for High-Performance Thermoelectric Devices: Sivaranjan Reddy Gopal1; Sergey Kovalchuk1; 1Ohio State University

3:50 PM Break

4:15 PM Invited
Quantum-mechanical Effects of Correlated Disorder on Phonon Transport in Random Nanostructures: Ting Chen1; 1University of California, San Diego

4:45 PM
Thermal Transport in Nanostructured Crystalline and Disordered Materials: Renkun Chen1; University of California, San Diego

5:15 PM
Thermal Transport in Nanostructured Crystalline and Disordered Materials: Renkun Chen1; University of California, San Diego

5:45 PM
Thermal Transport in Nanostructured Crystalline and Disordered Materials: Renkun Chen1; University of California, San Diego

6:15 PM
Thermal Transport in Nanostructured Crystalline and Disordered Materials: Renkun Chen1; University of California, San Diego
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 Mathadu, University of California, Riverside; Ruslan Valiev, UFA State Aviation Technical University; Yuntian Zhu, North Carolina State University

Tuesday PM | February 25, 2020
Marina Ballroom D | Marriott Marquis Hotel

Session Chairs: Zenji Horita, Kyushu Institute of Technology; Hyoung 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 Kumar1; Ajay Rijal1; Shobhit Singh1; Jae-Kyung Han1; 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. Hyong Seop Kim1; 1; 1Pohang University of Science and Technology

3:00 PM Invited
Mechanical Properties of Nanocrystalline High-entropy Alloys Produced By High-pressure Torsion. Benjamin Schuh1; 1Erich Schmid Institute of Materials Science

3:20 PM Invited
Microstructures and Mechanical Properties of Supersaturated Al-Mg Alloys Produced by Powder Consolidation using High-pressure Torsion. Yongpeng Tang1; Takahiro Masuda2; Shoichi Hirotsawa2; Zenji Horita1; Yuji Higo1; Yoshinori Tange1; Yasuo Ohishi1; 1Kyushu University; 2Yokohama National University; 3Kyushu Institute of Technology; 4Japan Synchrotron Radiation Research Institute

3:40 PM Invited
In-situ Observation of Ultrafine-grained Heterostructured Pure Titanium under Severe Plastic Deformation under High Pressure: Zenji Horita1; Daisuke Maruno1; Yukimasa Ikekda2; Keisuke Matsu6; Makoto Arita1; Yuji Higo1; Yoshinori Tange1; Yasuo Ohishi1; 1Kyushu Institute of Technology; 2Kyushu University; 3JASRI

4:20 PM Invited
Microstructure Evolution in CuZr Alloy and cp Ti Processed by a Novel Technique of Rotational Free Bending. Tomáš Krajinčík1; Miloš Janécek1; Petr Hrcuba2; Peter Minář1; Cinhia Corrêa1; Jakub Cížek1; Arsenyi Raab1; Georgy Raab1; 1Charles University; 2Ufa State Aviation Technical University

4:40 PM Invited
Heterostructured Titanium with Superior Tensile Properties through Hybridisation of Microstructures by Selective Laser Melting. Kenong Xia1; 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. Avinash Mishra1; Ke Ma1; Marco Echeverria1; Avinash Dongare1; 1University of Connecticut

2:20 PM
High-throughput Atomistic Investigations of Dynamic Defect responses in Crystalline Materials. Lucas Hale1; 1National Institute of Standards and Technology

3:00 PM
Thermodynamic Theory of Crystal Plasticity – Formulation and Application to fcc Copper. Charles Lieou1; Curt Bronkhorst1; 1Los Alamos National Laboratory; 1University of Wisconsin-Madison

3:20 PM
Break

3:40 PM
 Structure / Property (Constitutive and Dynamic Strength / Damage)
Characterization of Additively Manufactured (AM) 316L SS. George Gray1; 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 Masina1; 1Council for Scientific and Industrial Research

4:20 PM
Mesoscale Modeling of Shock Loading Induced Twinning/De-twinning and Spall Failure Behavior of Ta Microstructures. Sergey Galitsky1; Avinash Dongare1; 1University of Connecticut

4:40 PM
Experimental Study on the Dynamic Behavior of Ti6AL4V ELI. Tshifihiwa Maimela1; Madindwa Mashinini1; Monnamme Tlotleng1; Bathusile Masina1; 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; Orupalaup Yucel, Istanbul Technical University; Ender Keskinlikilic, Attilim 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 Keskinlikilic 2; Mustafa Varol 1; Yavuz Topkaya 2; Ahmet Geveci 1; Agri Ibrahim Cenec University; 1Attilim University; 2Middle East Technical University

9:05 AM
Solid-state Reduction Studies for Recovery of Iron from Red Mud: Ender Keskinlikilic 1; Saeid Pourmarder 1; Ahmet Geveci 2; Yavuz Topkaya 2; Agri Ibrahim Cenec University; 1Middle East Technical University

9:25 AM
Recovery of Chromium from Ferronickel Slag via Alkaline Roasting Followed by Water Leaching: Effect of Roasting Atmosphere: Guangfen Liang 1; Xiangyong Lv 1; Yandong Li 1; Huamei Duan 1; Dengfu Chen 1; Mujun Long 1; Song Xu 1; College of Materials Science and Engineering; 2College of Materials Science and Engineering, Yangtze Normal University; 3Bekaert (Asia) R&D Center

NUCLEAR MATERIALS


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

Program Organizers: Assel Altikaliyeva, 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 Saleh 1; Alan Xu 1; Zain Zaidi 1; Christopher Hurt 1; Mikhail Ionescu 1; Australian 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 Valdez 2; Calvin Lear 1; Cheng Liu 1; Benjamin Eftink 1; Tarik Saleh 1; Stuart Maloy 1; Los 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 Hosemann 1; University of California, Berkeley

9:30 AM
Multiple Scale Mechanical Testing of Neutron Irradiated FeCrAl Alloys: Benjamin Eftink 1; David Frazer 1; Todd Steckley 1; Matthew Quintana 1; Paul Caccamise 1; Tobias Romero 1; Stuart Maloy 1; Tarik Saleh 1; Los Alamos National Laboratory

9:50 AM
In-situ Studies on the Mechanical Properties of He Ion Irradiated Nanotwinned Ag: Tongjun Niu 1; Jin Li 1; Jie Ding 1; Yifan Zhang 1; Ruizhe Su 1; Jaehun Cho 1; Sichuang Xue 1; Zhongxia Shang 1; Di Chen 1; Yongqiang Wang 1; Haiyan Wang 1; Xinghang Zhang 1; Los Alamos National Laboratory

10:10 AM Break

10:20 AM
Self-reduction of Core-shell EAF Dust-biochar Composite Pellets under Microwave Irradiation: Liancheng Wang 1; Zhiwei Peng 1; Lei Yang 1; Leixia Zheng 1; Jie Wang 1; Wenhui Wang 1; Anton Anzulevich 1; Mingjun Rao 1; Guanghui Li 1; Tao Jiang 1; Central South University; Chelyabinsk State University

10:40 AM
Study of Properties and Mineralization of Cu-Ni Bearing Industry Sludge: Mudan Lü 1; Yong Liu 1; Zhiquiang Chen 1; Haozi Lv 1; Bo Li 1; Guangdong 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 Lv 1; Shiyuan Liu 1; Junyi Xiang 1; Xuewei Lv 1; Yindong Yang 1; Chongqing University; 1University of Toronto

11:20 AM
Separation of Vanadium from Iron in Vanadium-rich molten Iron: Guangfen Liang 1; Xiangyong Lv 1; Yandong Li 1; Huamei Duan 1; Dengfu Chen 1; Mujun Long 1; Song Xu 1; College of Materials Science and Engineering; 2College of Materials Science and Engineering, Yangtze Normal University; 3Bekaert (Asia) R&D Center

8:45 AM
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9:25 AM
Recovery of Chromium from Ferronickel Slag via Alkaline Roasting Followed by Water Leaching: Effect of Roasting Atmosphere: Guangfen Liang 1; Xiangyong Lv 1; Yandong Li 1; Huamei Duan 1; Dengfu Chen 1; Mujun Long 1; Song Xu 1; College of Materials Science and Engineering; 2College of Materials Science and Engineering, Yangtze Normal University; 3Bekaert (Asia) R&D Center

8:30 AM
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10:10 AM Break

10:20 AM
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10:40 AM
Study of Properties and Mineralization of Cu-Ni Bearing Industry Sludge: Mudan Lü 1; Yong Liu 1; Zhiquiang Chen 1; Haozi Lv 1; Bo Li 1; Guangdong 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
11:05 AM Mechanical Characterization of Three Neutron Irradiated HT-9 Heats (ORNL, LANL and EBR II) at LWR and Fast Reactor Relevant Temperatures: Ramparsadh Prabhakaran1; Mychalio 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 Hirt1; 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 Ferry1; Cody Dennett2; Angus Wylie2; 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 Smith1; Tomio Ohtsuki1; 1Carnegie Mellon University

9:00 AM Cyclic Material Behavior of Additively Manufactured Inconel 718 Produced Under Different Oxygen Concentrations: Matilde Scuinri1; Benjamin Möller1; Rainer Wagener1; Thilo Bein1; Kai Dietrich1; Dominik Bauer1; 1Fraunhofer Lbt; 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 Rindler1; Edward Herderick1; David Schick1; Connor Stone1; Antonio Ramirez2; 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 Conner1; John Rapp1; Ken Meinert1; Jim Dobbs1; 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 Niendorf1; 1Universitaet Kassel

10:50 AM The Role of Surface Condition in High-cycle Fatigue Behavior in Laser Powder Bed Fusion Materials: David Within1; Thomas Albright1; Dhruv Patel1; Tait McLouth1; Glenn Beart1; 1The Aerospace Corporation

11:10 AM Improving Fatigue Life by Decreasing Roughness of Additively Manufactured Parts: Thomas Kozmet1; 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 Cutolo1; Chola Elangeswaran1; Nicolas Lammens2; Honor Erdely1; Gokula Muralidharan1; 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 Gärstam1; Jonas Olsson1; Uta Klement1; Shrikant Joshi1; 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 Echols1; Lauren Garrison1; Elizabeth Ellis1; Yutai Katoh1; Michael Kirck1; Ryan Dehoff1; Timothy Horn1; Christopher Rock1; Christopher Ledford1; Sillivan Figurskey1; 1Oak Ridge National Laboratory; 2North Carolina State University

9:10 AM Mechanical Testing of 3D Printed Materials: Nicole Wagner1; Dika Handayani1; Victor Okhuysen1; Kyle Garibaldi1; Michael Seitz2; 1California State Polytechnic University, Pomona

9:30 AM Study Of Transition In Mechanical Properties Of A356/316L Additively Manufactured Interpenetrating Phase Composites: Jiahao Cheng1; 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 Architectured Cellular Structures: Alya Alhammadi1; Kamran Khan1; Oraib Al-Ketan1; Mohamed Hassan1; 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 Zhong1; Lizhen Tan1; Kevin Field2; Niyanth Sridharan3; Ying Yang3; Kurt Terrani4; 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 Thakur2; Xiangyang Dong3; 1Missouri University of Science and Technology

11:10 AM Additive Manufacturing of YSZ Ceramics by Laser Engineered Net Shaping: Xueliang Yan1; Yan Chen2; Fei Wang3; Cody Kanger4; Michael Sealy5; Bai Cui6; 1University of Nebraska-Lincoln; 2Oak Ridge National Laboratory

ADDITIVE TECHNOLOGIES


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
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Session Chair: Sneha Narra, Worcester Polytechnic Institute

8:30 AM Invited 3D Printed Lithium Ion Batteries and Other Functional Devices: Mohammad Sadeq Saleh1; Jie Li1; Jonghyun Park1; Rahul Pandit2; 1Carnegie Mellon University; 2Missouri University of Science and Technology

9:00 AM High Performance Zn-ion Batteries by Additive Manufacturing: Sanket Bhoiyate1; Marcus Young2; Wonbong Choi3; 1University of North Texas

9:20 AM Multiscale-controlled Three-dimensional Electrodes for Lithium-ion Batteries: Jonghyun Park1; 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 Acord1; Alexander Dupuy2; Umberto Scipioni Bertoli3; Baolong Zheng4; William West4; Qian Chen5; Andrew Shapiro4; Julie Schoenburg1; 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 Leblanc1; Haidong Zhang2; Ryan Welch3; George Nolas4; Yohann Thimont5; 1Haidong Zhang; 2Ryan Welch; 3George Nolas; 4Yohann Thimont; 5George Washington University; 6University of South Florida; 7Universite Paul SABATTIER CIRIMAT

10:50 AM Invited 3D Ink Printing of Thermoelectric Materials: Christoph Kenel1; David Dunand2; 1Northwestern University

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, MicroTestting 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: 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 Bobel1; Louis Hector2; Benjamin Gould3; Sarah Wolf4; 1General Motors; 2Argonne National Laboratory

8:55 AM Invited Practical Use of Neutron Facility VULCAN and NRSF2 for Residual Stress Analysis of Additively Manufactured Large Automobile Parts: Tomohiro Ikeda1; Satoshi Hirose2; Hisao Uozumi3; Ke An4; Chen Yan5; Andrew Payzant1; Jeffrey Bunn6; Christopher Fancher7; Alan Seid8; 1Honda R&D Co., Ltd.; 2Oak Ridge National Laboratory; 3Oak Ridge National Laboratory; 4Honda 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 Koerner1; 1Air Force Research Laboratory

9:45 AM 4D Nanoscale Imaging of Powder Feedstock Processing for Additive Manufacturing: Stephen Kelly1; Kyle Tsaknopoulos2; Jordan Kone1; Danielle Cote3; 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 (ICMU).
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
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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 Yu1; 1Virginia Polytechnic Institute and State University

8:50 AM Additive Manufacturing of Aluminium Using Friction Stir Deposition: Mohamed Ahmed1; Ebtesam Elshfawy2; Mohamed Elsayed Selman3; Abdelrahman Abdelmotagaly4; 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 Griffith1; David Garcia2; Hang Yu3; 1Virginia Polytechnic Institute

9:30 AM Impacts of Friction Stir Processing on Microstructure and Corrosion Properties of DMLS-AISI10Mg: Mehran Rafieazad1; Mohsen Mohammadi2; Adrian Gerlich3; Ali Nasiri4; 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 Zhu1; Dustin Avery2; Brandon Phillips3; Ryan Kinser4; Paul Allison5; James Jordan6; Luke Brewer1; 1University of Alabama Tuscaloosa

10:10 AM Break

10:30 AM Effects of Counter-gravity 3D Printing on PLA Interlayer Fracture Energy: Hadi Noon1; 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 Carrillo1; Geuntak Lee2; Eugene Olevsky3; 1San Diego State University

11:10 AM Effects of Zener-Hollomon Parameter and Strain on the Heterogeneous Microstructural Evolution of Cold-sprayed Coatings: Yu Zou1; Hongze Wang2; Zhiying Liu3; Michel Hache4; Eric Iriousse5; 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 Porgani, 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 Moridi2; 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 Xie1; 1University of Melbourne

9:20 AM High Entropy Alloy Design and Selection for Additive Manufacturing & Extreme Environment Applications: Emma White1; Duane Johnson; Nikolai Zarkevich; Andrew Kustas2; Nicolas Argibay3; Michael Chandross4; Iver Anderson5; 1Aames Laboratory; 2Sandia National Laboratories

9:40 AM Alloy Design of Promising Highly Alloyed Metals by Using Elemental Powders in Laser Powder Bed Fusion: Simon Ewald1; 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 Pusch1; Sean Murray2; Andrew Polonsky3; Chris Torbel1; Peeyush Nandwana6; Michael Kirka6; Ryan Dephoff; Ning Zhou; Stephane Forsik6; William Slye2; Tresa Pollock7; 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 Lass1; Michael Katz2; Richard Ricker3; 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-Toole1; Alec Saville2; Chandler Becker3; Benjamin Ellyson3; Yaofeng Guo3; Chloe Johnson4; Brian Milligan5; Andrew Polonsky6; Kira Pusch6; Kester Clarke7; Niranjan Parab8; 1IMDEA Materials Institute; 2University of California Santa Barbara; 3Advanced Photon Source; 4CITRIC Materials Institute
11:25 AM
Understanding Printability of Steels from Computational Modeling of Microstructural Evolution: Jiayi Yan1; Hamed Ravash1; Martin Walbrüht1; Ida Berglund1; 1QuesTek Europe AB

11:45 AM
Site-specific Alloying of Low Carbon Steel Through Binder Jet Additive Manufacturing: Karl Davidson1; Po-Ju Chiang1; Liuhua Zhao2; Matteo Seita1; 1HP-NTU Digital Manufacturing Corporate Lab; 2HP Labs for 3D Printing and Digital Manufacturing

ADDITIONAL 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 Dicus1; 1Carpenter Technology

8:50 AM
Eliminating Micro-cracking in Inconel 713ELC Fabricated by a Powder-bed-fusion Additive Manufacturing with Electron Beam: Yuchao Lei1; Kenta Aoyagi1; Dong-Soo Kang2; Kosuke Kuwabara3; Kinya Aota3; Akihiko Chiba3; 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: Roiyan Seede1; David Shoukri1; Bing Zhang1; Austin Whitt1; Sean Gibbons1; Philip Flater2; Alaa Elwany3; Raymundo Arroyave4; Ibrahim Karaman5; 1Texas A&M University; 2Air Force Research Laboratory

9:30 AM
Surface Roughness of Hastelloy-X Components Manufactured by Selective Laser Melting: Yang Tian1; Dacian Tomus2; Aijun Huang3; Xinhua Wu4; 1Monash University

9:50 AM
Gas Atomization and Powder Bed Fusion Optimization Studies for the A110SiMg Alloy: Sharon Park1; 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 Hu1; Andrzej Nycz1; Yousub Lee1; Benjamin Shassere2; Srdjan Simunovic3; Mark Noakes1; Yang Ren2; Xin Sun2; 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 Elambesseril1; Ma Qian1; Edward Lui1; Ting ting Song1; Sanka Mendis2; Milan Brandt3; 1RMIT University

11:10 AM
3D Characterization of Alpha Phase Morphology and Variant Selection in EBM Ti-6Al-4V: Ryan DeMott1; Phillip Stephenson2; Peter Collins3; Nima Haghbadadi4; Xiaozhou Liao1; Simon Ringer3; Sophie Primigi1; 1UNSW Sydney; 2Iowa State University; 3University of Tennessee

11:30 AM
Study the Effect of Thermal Signatures on Microstructural Variation of EBM Additively Manufactured Ti-6Al-4V: Mei Yue Shao1; Chris Blackwell1; Siram Vijayan2; Sabina Kumar2; Sudarsanam Babu2; Joerg Jinschek3; 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 Gao1; Deliang Zhang2; 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 Stinville1; Patrick Callahan2; M. P. Echlin3; Marie-Agathe Charpagne4; Patrick Villechaize5; Jonathan Cormier6; D. Texier7; Valery Valle8; T. M. Pollock9; 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 Yan1; Jinwoo Kim2; Kenshiro Ichii3; Motomichi Koyama1; 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 Fullwood1; Ryan Sperry1; Josh Tsal1; Landon Hansen1; Eric Homer2; Robert Wagoner3; 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 Bucshel1; 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: Tony Francis1; Jean-Charles Stinville2; Marie-Agathe Charpaigne3; Andrew Polonsky4; McLean Echlin5; Jonathan Hestroffer6; Valéry Valle2; Irene Beyerlein; Tresa Pollock1; 1Institut Jean Lamour; 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 Purushottam2; Céline Gerard3; Loïc Signor4; Atul H. Chokshi5; 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 Johnson1; Kris Matheson1; Jayden Plumb2; Peter Kenesei3; Hemant Sharma4; Jun-Sang Park5; Ashley Spear6; 1University of California, Santa Barbara; 2Université de Poitiers

11:10 AM
Effect of Creep Deformation on the Strain Heterogeneities Localization inside Complex Microstructures Found within Centrifugally Cast HP40Nb Reformer Tubes: Thibaut Dessolier1; Wouter Hamer2; Martin Church3; Ben Britton4; 1Imperial College London; 2Shell

11:30 AM
Evaluation of the Serration Behavior Characterized as Strain Localization in High-Mn Austenitic Steel: Sukyoung Hwang1; Myeong-Heom Park2; Yu Bai3; Akinobu Shibata4; Nobuhiro Tsuji5; 1Gyeongsang National University; 2POSCO/Technical Research Laboratories; 3Ductility of Ni Microwires by In-situ Synchrotron X-ray Diffraction; 4The Ohio State University; 5University of New Hampshire

8:50 AM
Effect of High Temperature Processes on Dual Phase Steel Manufacture: Bharath Bandi1; Joost Kreete2; Sukalpan Nandi3; Prakash Srirangam4; 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; 1Middle East Technical University; 2Atılım 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 Knezevic2; 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 Sung2; Jehyun Lee3; Sangshik Kim4; 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 Erisir2; Kemal Davut3; 1Kocaeli University; 2Atılım University, Metal Forming Centre of Excellence, Gölbaşı, 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 Haidemenopoulos2; 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 Chen2; Songyuan Ai3; Pingmei Tang4; Mujun Long5; Jie Yang6; 1Chongqing University; 2University of Warwick; 3Tata Steel, Research and Development; 4Imperial College London; 5Kocaeli University; 6Thermo Fisher Scientific

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 Teixeira2; Sébastien Allain3; Carla Oberbilia4; Frédéric Bonnet5; 1Institute Jean Lamour; 2ArcelorMittal Global Research and Development

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
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 Ohodnicki1; Kevin Byerly2; John Baltrus2; Ruishu Wright2; James Egbus3; Natan Aronhime3; Yuval Krimer3; Michael McHenry3; Elizabeth Kautz3; Arun Devaraj3; 1National Energy Technology Laboratory (presently at University of Pittsburgh); 2National Energy Technology Laboratory; 3Pacific Northwest National Laboratory

9:00 AM
Structure and Magnetic Properties of Novel High-magnetization Fe-Mn Powders Synthesized by Hydrogen Reduction of Nanoferrites: Tatsuya Kond1; Nobuyoshi Imaoka2; Kimihiro Ozaki2; 1National Institute of Advanced Industrial Science and Technology (AIST)

9:30 AM
Tunable Magnetic Properties in High-entropy FeCoNiAlxSix (0.2 < x < 0.5) Alloys: Kathem Bazzi1; Ramasis Goswami2; Tanjore Jayaraman2; 1University of Michigan-Dearborn; 2Naval Research Laboratory, US

9:40 AM
Production of Strips of Low-loss Soft Magnetic Alloys by Cutting Processes: B. Stiven Puente3; James Mann4; Srinivasan Chandrasekara5; Kevin Trumble1; 1Purdue University; 2University of West Florida

10:20 AM
Impact of Inter-particle Interactions on Electrochemical Performance of Lithium-ion Battery Electrodes: Scott Roberts1; Dan Bolintineanu2; Mark Ferraro3; Jeremy Lechman4; David Noble5; Ishan Srivastava6; Bradley Trembacki7; 1Sandia National Laboratories

10:40 AM
Mesoscale Separator Design to Mitigate Dendrite Formation in Lithium Batteries: Emily Ryan1; Andrew Cannon1; 1Boston University

11:00 AM
A Durable, Inexpensive Oxygen Reduction Reaction Electrocatalyst: Rohan Mishra1; Sung Cho2; Cheng He3; Arashdeep Thind3; Shrihari Sankarasubramanian4; Vijay Ramani5; 1Washington University in St. Louis; 2Korea Institute of Ceramic Engineering and Technology
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 Jiang1; Richard Todd2; Angus Willthinson3; 1University of Oxford

8:50 AM
Micropillar Compression Test of Tin-solder Microstructural Units to Reveal Slip Activity: Tianhong Gu1; Finn Giuliani2; Ben Britton3; 1Imperial College London

9:10 AM
Determination of ß-tin Slip Properties using Micro-pillar Tests and Crystal Plasticity Modelling: Yiun Xu1; Tianhong Gu1; Ben Britton3; Fionn Dunne3; 1Imperial College London

9:30 AM
Molecular Dynamics Study of the Effect of Ultrasonic Vibration on Evolution of Crystal Defects: Milad Khojehvand1; Henri Seppänen2; Panthea Sepehrband2; 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 Coyler1; Babak Arfaei1; Christopher Gourlay2; Sergey Belyakov2; Keith Sweatman2; Keith Howell3; 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 Delhaise1; Juan Tupac-Yupanqui Cardoso2; Fae Azhari2; Doug Perovic2; 1Celestica; 2University of Toronto

10:50 AM
Modification of Traditional Pb-free Solders with Bi, Sb and In for Improved Reliability: Sergey Belyakov1; Tetsuo Nishimura1; Keith Sweatman1; Jingwei Xian1; Christopher Gourlay2; 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 Delhaise1; Peter Banh2; Dian Yu3; Hong Ran Wang3; Jason Tam3; Jane Howe3; Doug Perovic2; 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; Ii Sohn, Yonsei University; Hiroyuki Shibata, Imram, Tohoku University; Antoine Alainore, Massachusetts Institute of Technology; Candan Tamerler, University of Kansas; Noritaka Saio, 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: Mosaki Tanaka1; 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 Mara1; Youxing Chen2; Justin Cheng2; Kevin Schmalbach2; Zhao Wang1; Nan Li2; Jon Baldwin3; R. Lee Penn2; David Poerschke2; Andreas Stein4; William Gerberich3; 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 Bate1; Aly Badran2; David Marshall2; Robert Ritchie2; 1Carl Zeiss Microscopy Inc.; 2University of Colorado Boulder; 2University of California Berkeley

9:30 AM
Real Time Imaging of Deformation Mechanisms in Boron Nitride Nanotube-metal Matrix Composites at Multiple Length Scales: Pranjal Nautiyal1; Benjamin Boesch1; Arvind Agarwal1; 1Florida International University

9:50 AM Invited
In Situ TEM Characterizations on Mechanical Properties and Deformation of Metals: Qian Yu1; Xiaoqing Fu1; Qingqing Ding1; 1Central South University

10:10 AM Break

10:30 AM Invited
Non-destructive Multi-property Determination under Extreme Conditions with Transient Grating Spectroscopy: Cody Dennett1; 1Massachusetts Institute of Technology

10:50 AM
Using the Digital Image Correlation Technique in Non-traditional Ways: Carl Cady1; Cheng Liu1; 1Los Alamos National Laboratory
MECHANICS & STRUCTURAL RELIABILITY


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 Bojchiech, Pratt & Whitney; Kevin Bockenstedt, ATI Specialty Materials; Katerina Christofidou, University of Sheffield; James Coakley, University of Miami; Martin Detroit, 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 Feng1; Wendao Li1; Song Lu1; Longfei Li1; Stoichko Antonov1; 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 McAuliffe1; Alex Foden1; Chris Bilsland1; Dafni Daskalaki Mountanou1; David Dye1; Thomas Britton1; 1Imperial College London

9:20 AM
Grain Boundary Chemistry and Mechanical Properties of a Multicomponent Co-based L12-ordered Intermetallic Alloy Fracture: Long1; Sung Il Baik1; Dong Wen Chung1; Fei Xue1; Eric Lass2; David Seidman1; David Dunand1; 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 Hausmann1; Cecilia Solís1; Lisa Freund1; Andre Heinemann1; Mathias Göken1; Ralph Gilles1; Steffen Neumeier1; 1Department Werkstoffwissenschaften W2, 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 Neumeier1; Mathias Göken1; 1University of Erlangen-Nürnberg

10:50 AM
Very High Cycle Fatigue of a Polycrystalline Co-base Superalloy: Alice Cerellon1; 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 Wen1; Sae Matsunaga1; Michael Titus1; 1Purdue University

11:30 AM
Deformation Mechanisms of Co-Cr-W-Ni Alloys at Ambient Temperature: Shaolou Wei1; Sabrina Hernandez1; Matt Bender1; Andy Martinez1; Cemal Tasan1; 1Massachusetts Institute of Technology; 1ATI 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 Mereidig, 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 Gu1; Chun-Teh Chen1; 1University of California, Berkeley

8:50 AM
Development of an Evolutionary Deep Neural Net for Materials Research: Nirupam Chakraborty1; Swagata Roy1; 1Indian Institute Of Technology

9:10 AM
Persistent Homology: Unveiling the Topological Features in Materials Data: Chaitali Patil1; 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 Yabansu1; Almambet Iskakov1; Anna Kapustina1; Sudhir Rajagopalan1; 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 Rivera1; 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 Weaver1; Abigail Hunter1; Anil Kumar1; Irene Beyertie1; 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 Bhamney1; Khanh Dang1; Laurent Capolungo1; Douglas Searce1; 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 Lebensohn1; 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 Ghosh²; Maxwell Pinz²; 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 Gascoign, Ensicaen University of Caen; Philippe Jund, Montpellier University; Yoshishito 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 Dasmathapatra¹; Loredana Daqa¹; Antti Karttunen¹; Silvia Casassa¹; ¹University of Toronto; 2Aalto University

9:10 AM Invited
Defect Formation Energies and Effective Masses in the Mg2Si(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. Harter²; Devin Coleman²; Francesco Tavazza³; ¹University of Maryland (National Institute of Standards and Technology); ²Umpc/National Institute of Standards and Technology; ³Oregon State University

9:50 AM
Accelerated Discovery of Efficient Solar-cell Materials using Quantum and Machine-learning Methods: Kamal Choudhary¹; Francesca Tavazza³; ¹University of Maryland (National Institute of Standards and Technology); ³Oregon State University

10:10 AM Break

10:30 AM Invited
Utilizing Magnetism and Dilute Magnetic Semiconductors to Enhance Thermoelectric Performance: Takao Mori¹; ¹National Institute for Materials Science

10:50 AM Invited
Multi-band Electronic and Thermal Transport in Fe2VAl Based Full Heusler Thin Films: Ernst Bauer¹; Bernhard Hinterleitner¹; Alexander Riss¹; Takao Mori¹; Xingqiu Chen¹; 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 Poon¹; ¹University of Virginia

**LIGHT METALS**
Aluminum Alloys, Processing and Characterization — New and Optimized Aluminium Alloys II

**Sponsored by:** TMS Light Metals Division, TMS: Aluminium 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 A15 (Fe, Mn) Phase Die-cast Al-Mg Alloys: Xiangzheng Zhu¹; Shouxun Ji²; ¹Brunel University London

9:00 AM
Spark Plasma Sintering of Graphene Nanoplatelets Reinforced Aluminium 6061 Alloy Composites: Mahmood Khan¹; Rafi Ud Din²; Abdul Wadood²; Shahid Akhtar³; Syed Wilayat Hussain³; Raghnai Aune³; 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 Shu¹; 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 Sokoluk²; Gongcheng Yao³; Shuaihang Pan³; Xiaochun Li³; ¹Department of Materials Science and Engineering, University of California Los Angeles; ²Department of Mechanical and Aerospace Engineering, University of California Los Angeles; 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 Kim¹; 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 Jung¹; Soo Been Hwang¹; Byung Joo Kim¹; Yong Ho Park²; Young Cheol Lee³; ¹KITECH(Korea Institute of Industrial Technology); ²Pusan National University
**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:** Gurudun Arnbjorg Saevarsdottir, Reykjavik University

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**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; Sai Krishna Padamata; Peter Polyakov; Aleksandr Samolyo; Andrey Suzdaltsve; Andrey Nikolaev; Siberian Federal University; Institute of High-Temperature Electrochemistry, UB RAS

**8:55 AM**

Alumina Concentration Measurements in Cryolite Melts: Luis Bracamonte; Espen Sandnes; Christian Rosenkilde; Karoline Nilsen; Norwegian University of Science and Technology; Hydro Aluminium

**9:15 AM**

The Influence of Polarization on the Wetting of Graphite in Cryolite-alumina Melts: Henrik Asheim; Ingrid Andersen Eidsvaag; Asbjorn Solheim; Henrik Gudbrandsen; Geir Haarberg; Espen Sandnes; Norwegian University of Science and Technology, NTNU; SINTEF Industry, Metal Production and Processing

**9:35 AM**

Electrolysis of Low-temperature Suspensions: an Update: Andrey Yasinskiy; Andrey Suzdaltsve; Sai Krishna Padamata; Petr Polyakov; Yuriy Zaikov; Siberian Federal University; Institute 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: Ruan Meirbekova; Omar Awaysa; Geir Haarberg; Gurudun Saevarsdottir; Reykjavik University; Norwegian University of Science and Technology

**10:30 AM**

Oxidation Study of Zinc sulphite on the Removal of Sulfur Dioxide from Aluminum Electrolysis Fluor Gas by Zinc Oxide: Xuejiao Cao; Zhang Tingan; Yan Liu; Weiguang Zhang; Simin Li; Northeastern University

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**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

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**8:30 AM Invited**

A Review of Atom Probe Tomography Technology: The Present and Future: David Larson; CAMECA Instruments Inc.

**9:00 AM Invited**

APT for Atomic-scale Insights to the Origins of Materials Properties: Michael Moody; Paul Bagot; Tom Lapington; David Tweddle; Benjamin Jenkins; University of Oxford

**9:30 AM Invited**

Atom Probe Characterisation of Hydrogen in Iron and Steels: Peter Felfer; Valentin Dalbauer; Fau Erlangen-Nurnberg

**10:00 AM Break**

**10:15 AM Invited**

Nanoparticle Sample Preparation for Atom Probe Tomography: Chemical Fixation and Cryo-Fixation: Leigh Stephenson; Se-Ho Kim; Joohyun Lim; Olga Kasiian; Pyuck-Pa Choi; Christina Scheu; Dierk Raabe; Baptiste Gault; Max Planck Institut Iron & Steel Research; Helmholtz Zentrum Berlin; KAIST

**10:45 AM Invited**

Compositional Dependencies of Ni- and Fe-oxides to Experimental Parameters in Atom Probe Tomography: Daniel Schreiber; Ann Chiaromonti; Karen Kruska; Pacific Northwest National Laboratory; National Institute of Standards and Technology

**11:15 AM Invited**

Morphological Classification of Dense Objects in Atom Probe Tomography Data: Iman Ghamarian; Emmanuelle Marquis; University of Michigan

**11:45 AM**

Quantifying Compositional Uncertainty Arising from Peak Overlaps: Andrew London; UK Atomic Energy Authority

**12:05 PM**

Post-morten Selected Area Analysis for Optimized Statistical Analysis of APT Data: Frederic Daroit; Alexander Dahlstrom; Begonia Gomez Ferrer; Cristelle Pareige; Cnrs; KTH Royal Institute of Technology; Normandy 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; Nottingham Trent University

9:00 AM
Molecular Mechanisms in Metal Oxide Nanoparticle Interactions with Biomolecules: Vadim Kessler; SLU

9:30 AM Keynote
Enabling Manufacturing at the Bio-Nano Interface using Gyratory Forming: Mohan Edirisinghe; Ayda Afshar; University College London

10:00 AM Break

10:15 AM Invited
Chiral Inorganic Nanostructures: Nicholas Kotov; University of Michigan

10:45 AM Invited
Biological Crystallization of Ultrahard Teeth and Translation to Multi-functional Materials: Anna Pohli; Taifeng Wang; Wei Huang; Michiko Nemoto; David Kisailus; University of California Riverside; Okayama University

11:15 AM Invited
Monitoring Interaction of Nanomaterials with Biomolecules and Their Dosimetry at Single Cell Level: T. Venus; T. Meyer; J. Böttner; C. Merker; V. Calcagno; J. Keller; R. Landsiedel; D. Schwoitzer; O. Creutzenberg; M. Moro; S. Moya; J. P. Longo; L. Muehlmann; Irina Estrella-Lopis; University Leipzig; BASF SE; Fraunhofer Institute ITEM; CIC biomagUNE; University 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; Joseph Martin; Samantha Fong; Kasia Lawson; Ramesh Rao; Albert Lin; Joanna McKittrick; University of California San Diego; North 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; Donata Kuczynska-Zemla; Halina Garbacz; Warsaw University of Technology

9:10 AM
Micro-scratch of Irradiated Compression Molded Ultra High Molecular Weight Polyethylene (UHMWPE) based Nanocomposites: Chinmayee Nayak; Arihara S; Vamsi Krishna Bhalla; Kantesh Balani; Indian Institute of Technology, Kanpur; Indian Institute of Technology Madras; University of Louisville

9:30 AM
Processing, Microstructure Characterization and Biological Response of Cold Sprayed Biocomposite Coatings: Eden Bhatta; Grant Crawford; South Dakota School of Mines and Technology

9:50 AM Invited
Decussation Patterns in Mammalian Teeth Across Bite Force Regimes: Dwayne Arola; Juliana Fernandez-Arteaga; Cameron Renteria; Carli Marsico; E. Alex Ossa; University of Washington; Universidad Eafit

10:20 AM Break

10:35 AM
In-situ AFM Identification of Mechanical Properties of Collagen Fibrils and Extracellular Matrix in Bone: Wei Gao; Xiaodu Wang; Heber Barron; University of Texas at San Antonio

10:55 AM
Rate and Stress-state Dependent Calibration of FlexiForce Sensors for Injury Biomechanics Research: Andrew Brown; Alexandra Vest; Karin Rafaels; U.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 Nair; Zita Zachariah; Alfonso Fischer; David Mayweg; Markus Wimmer; Dierk Raabe; Markus Herbig; Max-Planck-Institut fuer Eisenforschung; Rush 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

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8:30 AM

Aluminum Bronze Cast Khopesh: Megan Burrill1; Kathy Ho1; 1Illinois Institute of Technology

8:50 AM

Fabrication of A Historical Seax Using Historical Methods: Austin Hernandez2; Charles Meyer2; Hugo Heredia2; Stephen Stafford2; Christopher Bradley2; 1University of Texas, El Paso

9:10 AM

The University of Texas at Austin’s ASME Design Team Bowie Knife Proposal Abstract: Grace Young1; 1UT ASME Design

9:30 AM

Forging the Future: Albert Ostlind1; 1New Mexico Institute of Mining & Technology

9:50 AM

Boridized AISI 1045 Carbon Steel for “MortuarySword” Bladesmithing: David Flores1; Karen Miroslava1; Orlando Castro1; Gerardo Salinas1; Enrique Duque1; Simon De La Rosa1; José Mariano Flores Herrera1; 1Universidad Autónoma de Nuevo León

10:10 AM Break

10:30 AM

Titanium Bonding to High Carbon Steel through Vanadium for Bladesmithing: Ryan Mier1; 1Los Alamos National Laboratory

10:50 AM

Comparing Mechanical and Microstructural Properties of a Damascus Steel Forge Welded with and without Flux: Al Medrano1; 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 Capellini1; 1University of Florida

11:30 AM

Investigating Chemical and Mechanical Inhomogeneity in Pattern Welded Steel: Cullen Pearson1; 1University of Tennessee-Knoxville

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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 Liao, 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; Marcos Demetriou, Glassimetal Technology

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8:30 AM Invited

Rapid Discharge Forming of Metallic Glasses: A Novel Metals Manufacturing Platform: Marcos 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; Marcos Demetriou1; Brent Fultz2; 1Swarthmore College; 2California Institute of Technology

11:10 AM Invited

Glass-forming Liquids Processed Under Ultrahigh Gravitational Accelerations: Mihai Stoica1; Jörg Löffler1; 1ETH Zurich

11:30 AM Invited

Catalytic Metallic Glasses for Clean Energy Applications: Vahid Hasannaemi1; Shristy Jha1; Maryam Sadeghilaridjani1; Sundeep Mukherjee1; 1University of North Texas

11:50 AM Invited

Studying Phase Transitions in Slow Motion: Ultrafast-calorimetry Experiments on Bulk Metallic Glasses: Jörg Löffler1; 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

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**8:30 AM** Introductory Comments

**8:35 AM** Constellium R&D Approach in Recycling from Lab to Industrial Scale: Anne Pichat1; Alain Vassell1; 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 Wilner1; Helmut Antrekowitsch1; Barbara Falkensammer1; 1Montanuniversitaet Leoben; 2Hütte Klein-Reichenbach

**9:15 AM** Recycling of Aluminium Waste from Mixed Household Waste: Sigvart Eggen1; Kurt Sandaunet1; Leiv K Kolbeinsen1; Anne Kvitlyld1; 1NTNU; 2SINTEF

**9:35 AM** An Assessment of Recyclability of Used Aluminium Coffee Capsules: Susanna Venditti1; Dmitry Eskin1; Alain Jacot1; 1Bcast Brunel University

**10:10 AM** Fractional Solidification for Purification of Recycled Aluminium Alloys: Susanna Venditti1; Dmitry Eskin1; Alain Jacot1; 1Bcast Brunel University

**10:30 AM** A Rapid Method of Determining Salt Flux Melting Point and Composition: Ray Peterson1; 1Real Alloy

**10:50 AM** Automatic Skimming Procedure for Reducing Aluminium Losses and Maintaining the Uniform Quality of the Molten Metal: Varuzan Kevorkjian1; Uros Kovacec1; Sandi Zist1; Matjaz Godec1; 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 Solen1; Kai Erik Ekstrøm1; Gabriella Tranell1; Ragnhild Aune1; 1Norwegian University of Science and Technology (NTNU)

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**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 Ikhamayies, 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:** Jian-Yang Hwang, Michigan Technological University; Andrew Brown, Army Research Laboratory

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**8:30 AM** Effect of Acidic Attack on the Structural Characteristics of Sepiolite from Nevada, USA: Huaguang Wang1; Bowen Li1; 1Michigan Technological University

**8:50 AM** Leaching of Copper, Cobalt and Nickel from Complex Ore: Yotamu Hard2; Douglas Musowoya3; Golden Kaluba3; Choolwe Muchindu3; Haggai Simfukwe1; Kennedy Kennedy1; Stephen Parirenyatwa1; Dinah Chanda1; 1Copperbelt University

**9:10 AM** Preparation and Photocatalytic Properties of Mo-doped TiO₂@fly Ash Cenospheres for Degradation of Methylen Blue: Yongfeng Cai2; 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 Sun1; Jinni Qiao1; Zhen Qian1; Yan Zhang1; Yutian Ma1; Zhiqiang Liu1; Liuxie Shi1; 1Central South University; 2State Key Laboratory of Nickel and Cobalt Resources Comprehensive Utilization; 3Jinchuan Group Co. Ltd; 4Chongqing University

**9:50 AM** Characterization of Minerals, Metals and Materials — Mineral Processing and Analysis III

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**10:10 AM** Activated Carbon Prepared from Bituminous Coal/poplar Blends by Direct KOH Activation: Xiaohu Zhou1; 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 Yang1; Zhiwei Peng1; Yawen Huang1; 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 Diffactogram Width Analyses for Nanocrystalline Materials: Cody Kunkel1; Brad Boyce1; Stephen Foiles1; Remi Dingreville1; Sandia National Laboratories

8:55 AM
Machine Learning Approach for On-the-fly Crystal System Classification from Powder X-ray Diffraction Pattern: Yuta Suzuki1; Hideo Sato1; Takafumi Hawai1; Kotaro Saito1; Kanta Ono1; High Energy Accelerator Research Organization; The Institute of Statistical Mathematics; Paul Scherrer Institute

9:15 AM
Indexing of Electron Back-Scatter Diffraction Patterns Using a Convolutional Neural Network: Zichao Ding1; Elena Pascal1; Marc De Graef1; Carnegie Mellon University

9:35 AM Invited
Parametric Models for Crystallographic Texture: Estimation and Uncertainty Quantification: Stephen Niezgoda1; James Matuk1; Oksana Chkrebtii1; The Ohio State University

10:05 AM Break

10:25 AM Invited
Large-scale Defect Contrast Simulations for Scanning and Transmission Electron Microscopy: Marc De Graef1; Carnegie Mellon University

10:55 AM
Machine Learning and Electron Backscatter Diffraction: Alessandro Previore1; Guillaume de Certaines1; Alex Foden1; Thomas Britton1; Imperial College London

11:15 AM Invited
A New Crystallographic Defect Quantification Workflow via Advanced-microscopy-based Deep Learning: Yuanyuan Zhu1; Graham Roberts1; Rajat Saini1; Colin Ophus1; Brian Hutchinson1; Danny Edwards1; Mychailo Toloczko1; University of California, Los Angeles; Lawrence Berkeley National Laboratory; Western Washington University; Pacific 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 Mubarok, PPG; Raul Rebak, GE Global Research; Rajeev Gupta, University of Akron; Tushar Borkar, Cleveland State University; Brian Ökser, 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 Ke1; Pin Lu2; Christopher Taylor1; The Ohio State University; QuesTek

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 Chiang1; Harsha Naralasetty1; Seetha Mannava1; Matthew Steiner1; Vijay Vasudevan1; University of Cincinnati

9:10 AM
Contact Resistance and Corrosion Response of Non-chromate Passivations on ZnNi Coatings: Kevin Foster1; William Fahrenholtz1; Matthew O’Keeffe1; James Claypool1; Missouri University of Science and Technology; The University of Mississippi

9:30 AM
Corrosion Phenomena in Powder-processed Icosahedral-phase-strengthened Aluminum Alloys: Sarshad Rommelf1; Hannah Leonard1; Mingxuan Li1; Thomas Watson1; Tod Policandriotes1; Mark Window1; University of Connecticut; Pratt & Whitney; Collins Aerospace

9:50 AM
Effect of Surface Coating on Corrosion Product Deposition Behavior in PWR Fuel Cladding: Junhyuk Ham1; Yunju Lee2; Seung Chang Yoo1; Ji Hyun Kim1; UNIST

10:10 AM Break

10:25 AM
Electrochemical Impedance Spectroscopic Study of Oxide Scales on Pure Iron in Liquid Lead-bismuth Eutectic: Jie Qiu1; Peter Hosemann1; Digby MacDonald1; John Scully1; University 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 Policastro1; Rachel Anderson1; Carlos Hangarter1; Naval 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 Umretiya1; Jessika Raja1; Mark Anderson1; Barret Elward1; Raul Rebak1; Sama Bilbao y Leon1; Virginia Commonwealth University; University of Wisconsin-Madison; GE Global Research

11:25 AM
Elucidating the Degradation Mechanisms of Ti-6Al-4V Dental Implants: Xin Chen1; Kumar Shah1; Shiqi Dong1; Lars Peterson1; Erika La Plante1; Gaurav Sant1; University of California, Los Angeles
ENERGY & ENVIRONMENT

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

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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 Andersson¹; Yongfeng Zhang¹; ¹Idaho National Laboratory; ²Los Alamos National Laboratory

9:50 AM
Diffusion and Interaction of Prismatic Dislocation Loops in Stochastic Dislocation Dynamics: **Yang Li**¹; **Max Boleininger**²; Christian Robertson²; Laurent Dupuy²; Sergei Dudarev²; ¹DEN-Serve 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**²; **Ali Hamedani**²; Jesper Byggmästar²; Flyura Djurabekova²; ¹University of Helsinki

11:10 AM
Molecular Dynamics Simulations of Mixed Materials in Tungsten: **Mary Alice Cusentino**²; Mitchell Wood²; Aidan Thompson²; ¹Sandia National Laboratories

11:30 AM
Plasticity of Zirconium Hydrides: an Edge and Screw Planar Dislocation Model: **Luca Reali**¹; Daniel Balint¹; Mark Wenman¹; Adrian Sutton¹; ¹Imperial College London

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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

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8:30 AM Invited
Where do Thermodynamics and Transport Kinetics Meet?: **Zi-Kui Liu**²; Yi Wang³; Irina Belova⁴; Graeme Murch⁴; ²Pennsylvania State University; ³University of Newcastle

9:00 AM
Free Energy Calculation of Mechanically Unstable but Dynamically Stabilized Phases: **Sara Kadkhodaei**²; 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’Connell**¹; Chelsey Hargather¹; 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 Bélond²; 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**²; ¹The University of Texas at El Paso

11:20 AM
The Temperature Dependence of Electron-phonon Interactions in Vanadium: **Brent Fultz**²; Fred Yang²; Olle Hellman²; ²California Institute of Technology

11:40 AM
Thermal Properties of Disordered Alloys from Density Functional Theory Calculations: **Pavel Kozhavyt**³; ³KTH 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 Wigger3; Tito Andriollo1; Samuel Clark1; Zhixuan Gong3; Robert Atwood3; Peter Lee3; Niels Tiedje1; 1Technical University of Denmark; 2University of Leicester; 3University College London

9:10 AM
The 3D Correlation of Si Segregation to Nodules Size, Nodules Spatial Distribution and Local Mechanical Strain in Ductile Cast Iron: Chaoling Xu1; Tito Andriollo1; Yubin Zhang1; Fengxiang Lin2; Juan-Carlos Hernandez1; Jesper Hattel1; Niels Tiedje1; 1Technical University of Denmark; 2University of Leicester; 3University College London

9:30 AM
Influence of Composition on the Solidification and Weldability of Cast Austenitic Stainless Steels: Sean Ozrolek1; John DuPont3; 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

8:50 AM
Inhibiting Twin Transfer in Magnesium Alloys with Grain Boundary Particles: Benjamin Anthony1; 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 Hu1; Vladyslav Turto1; Irene Beyerlein2; Subhash Mahajan3; Enrique Laverna4; Julie Schoenung5; Timothy Rupert6; 1University of California, Irvine; 2University of California, Santa Barbara; 3University of Michigan; 4Carnegie Mellon University; 5Argonne National Laboratory

9:50 AM Invited
Interactions Between Slip Bands and Grain Boundaries in Ti-6Al-4V: Samuel Hemery1; Christophe Thomas2; Patrick Villechaise3; 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; Chen Zhang3; Ruqing Xu4; Philip Eisenlohr5; Martin Crimp6; Carl Boehlert7; 1Michigan State University; 2Carnegie Mellon University; 3Diamond Light Source

11:00 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 Llorca5; 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: Ahmedsameer Khan Mohammed1; Huseyin Sehitoglu2; 1University of Illinois Urbana-Champaign

11:30 AM Quantifying the Plastic Deformation Behavior of Grain Boundaries in Additive Manufactured Ta: Nan Li1; jordan Weaver2; Yuchi Cui3; David Jones4; Nathan Marais5; Saryu Fensin6; Curt Bronkhorst7; Amit Misra8; Rusty Gray9; 1Los Alamos National Laboratory; 2National Institute of Standards and Technology; 3University of Michigan; 4Ann Arbor; 5University of Minnesota-Twin Cities; 6University of Wisconsin - Madison

11:50 AM Investigation of Dislocation Interactions in a Bicrystalline Micropillar Through an Atomistically-informed Discrete Dislocation Dynamics Model: Nicole Aragon1; Jamie Gravell2; Ill Ryu3; 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 Berends3, W. Abdal-Fadeel4, G.T Abdel-Jaber5, 1Aluminium company 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 Upadhyay2, 1Hindalco Industries Limited

9:30 AM Ready-to-Use Cathodes for the Hall-Héroult Process: Markus Pfeffer1, Louis Bugnion2, Laure Von Kaenel2, Oscar Vera Garcia3, 1COBEX GmbH; 2NOVALUM

9:55 AM Break

10:15 AM High Temperature Creep Behaviour of Carbon-based Cathode Material for Aluminum Electrolysis: Wei Wang1, 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 Li1, Hongliang Zhang1, Jingkun Wang2, Yunrui Wang2, 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 Chawla1, 1Arizona State University

9:10 AM Invited Relating Corrosion Susceptibility to Microstructure via Multiscale Electron Microscopy: Josh Kacher1, 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 Kim1, 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 Brittan1, Camila Toledo Torres2, Peter Beck3, Lucas Teeter1, Samuel Briggs4, Guillaume Mignot1, Sebastien Teyssyeure2, Julie Tucker3, 1Oregon State University; 2Canadian Nuclear Laboratories

10:50 AM Invited History and Future of In-situ Transmission Electron Microscopy Corrosion Experiments: Khalid Hattar1, 1Sandia National Laboratories

11:30 AM Combinatorial Studies of Stress Corrosion Sensitivity of Alloy Films: Kewei Gao1, Youpeng Song1, 1Beijing University of Science and Technology
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 Sehitoglu¹; ¹University of Illinois

**8:50 AM**

**3D Discrete Dislocation Dynamic Modeling on Cyclic Behavior of Cu:** Fanshi Meng²; Marc Fivel³; Emilie Ferrie³; Christophe Depres²; ¹University Grenoble Alpes, CNRS, Grenoble INP, 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:** Orcun Koray Celebi¹; Ahmed Sameer Khan Mohammed¹; Francisco Andrade Chavez¹; Jessica Anne Krogstad¹; Huseyin Sehitoglu¹; ¹University of Illinois at Urbana Champaign

**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 Stopka¹; David McDowell¹; ¹Georgia Institute of Technology

**9:50 AM**

**Exploring the Fundamental Role of Dislocation-twin Boundary Interactions in Fatigue:** Oscar Koray Celebi¹; 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 Tar¹; Michael Fitzka¹; Herwig Mayer¹; 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 Sobotka¹; 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 Prastil²; 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 Liu¹; 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 Fang¹; Kyung Jin Seo¹; ¹Northeastern University

**8:50 AM Invited**

**Metallic Nanoparticle Assemblies for Tunable Nanoscale Sensors:** Nasrin Hooshmand²; ²Georgia Institute of Technology

**9:30 AM Invited**

**Developing Nanomaterials for Separations That Improve Biomass Processing to Biofuels/Chemicals:** Michael Hu¹; 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 Subramanian¹; Kim Kisslinger¹; Ming Lu¹; Jiyoung Kim¹; Aaron Stein¹; Chang-Yong Nam¹; ¹Brookhaven National Laboratory; ²Stony Brook University; ³University of Texas at Dallas

**10:30 AM**

**Engineering Mesoporous Silica for Superior Optical and Thermal Properties:** Danielle Butts¹; Patricia McNeil¹; Sarah Tolbert¹; Yongjie Hu¹; Laurent Pilon¹; 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 Feng¹; ¹University of Illinois at Urbana-Champaign
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 Trumalal, The University of Akron; Xie Xie, PCA 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; 1University of Bradford

8:50 AM Invited
High Entropy Alloys for Magnetocaloric Effect Applications: Michael McHenry; Alice Perrin; 1Carnegie Mellon University

9:10 AM
Designing Ductile Refractory High-entropy Alloys Guided by Natural Mixing: Shao lou Wu; Sang Jun Kim; Yongjie Zhang; Goro Miyamoto; Tadashi Furuhara; Eun Soo Park; Cemal Tasan; 1Massachusetts Institute of Technology; 2Seoul National University; 3Tohoku University

9:30 AM Invited
Latest Developments in High Entropy Brasses & Bronzes: Kevin Laws; Peter Nicholson; Patrick Conway; David Miskovic; Lori Bassman; Warren McKenzie; 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; 1Air Force Research Laboratory

10:10 AM Break

10:30 AM Invited
How High are the Entropies of High Entropy Alloys?: Kaituo Huo; Qikai Li; Mo Li; 1University of Science and Technology Beijing; 2Georgia Institute of Technology; 3University of Science and Technology Beijing.

10:50 AM
Decoding Early Candidy of High Entropy Alloys for Nuclear Application using the Advanced Test Reactor through Predictive Methods: Geoffrey Beausoleil; Jeffrey Aguiar; Seongtae Kwon; Eric Eyerman; 1Idaho National Laboratory; 2California Nanotechnologies

11:10 AM
Design of High-strength and Ductile High-entropy Steels: Zhangwei Wang; Wenjun Lu; Huan Zhao; Dirk Penge; Dierk Raabe; Zhiming Li; 1Max-Planck-Institut für Eisenforschung

11:30 AM Invited
High-Entropy Ceramics: Selected Recent Studies and Future Opportunities: Jian Luo; 1University of California, San Diego

11:50 AM
Latest Developments in High Entropy Brasses & Bronzes: Kevin Laws; Peter Nicholson; Patrick Conway; David Miskovic; Lori Bassman; Warren McKenzie; 1University of New South Wales; 2Jönköping University; 3Harvey Mudd College; 4Advanced Alloy Holdings

12:10 PM Invited
Phenomenological Approach to multi-principal-element Structural Materials: Joseph Poon; Qi Jie; John Scully; Sean Agnew; 1University of Virginia

MATERIALS DESIGN


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; Benedikt Distl; Zakria Kahrobaei; Martin Palm; Katja Hauschildt; Marcus Ralke; Florian Pyczak; Svea Mayer; Yang Yang; Hai-Lin Chen; Anders Engström; 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; 1Austrian Foundry Research Institute

9:50 AM Break

10:20 AM Invited
The Application of Metastable Equilibria in the Analysis of Transformation Behavior: John Perezeko; 1University of Wisconsin-Madison

11:00 AM Invited
Selected Observations of Microstructural Development in Additively Manufactured Metallic Alloys: Yongho Sohn; Le Zhou; 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**

**3D | San Diego Convention Ctr**

**Session Chairs:** Raymundo Arroyave, Texas A&M; James Saal, Citrine Informatics

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8:30 AM *Invited*

**The MGI and ICME:**

*James Warren*: 1National Institute of Standards and Technology

9:10 AM *Invited*

**Polymer Informatics: Current Status & Critical Next Steps:**

*Rampi Ramprasad*: 1Chihio Kim: 1Georgia Institute of Technology

9:50 AM

**Artificial Intelligence for Material and Process Design:**


10:10 AM *Break*

10:30 AM *Invited*

**Gaps, Limitations, and Pitfalls of Materials Informatics:**

*Taylor Sparks*: 1University of Utah

11:10 AM *Invited*

**View on Data Ecosystem of Materials:**

*Zi-Kui Liu*: 1Pennsylvania State University

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LIGHT METALS

Magnum 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

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8:30 AM *Invited*

**Deformation Driven Precipitation in Binary Magnesium Alloys:**

*Timothy Weihs*: 1Suhas Eswarappa Prameela: 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*: 1Peng Yi: 1Vance Liu: 1Beatriz Medeiros: 1Laszlo Kecskes: 1Michael Falk: 1Timothy Weihs: 1Johns Hopkins University

9:20 AM

**Relating Texture and Thermomechanical Processing Variables in Mg-Zn-Ca Alloys:**

*Tracy Berman*: 1John Allison: 1University of Michigan

9:40 AM

**Variation of Extrusion Process Parameter for the Magnesium Alloy ME21:**

*Gerit Kurz*: 1Maria Niemender: 1Jan Bohlen: 1Dietmar Letzig: 1Kainer Karl Ulrich: 1Magic-Magnesium Innovation Centre

**10:00 AM Break**

10:20 AM *Invited*

Fundamental Deformation Mechanisms During Solid Phase Processing of Mg Alloys:

*Suveen Mathaudhu*: 1University of California, Riverside

10:50 AM

**Asymmetric Rolling of TZ73 Magnesium Alloy to Improve Its Ductility:**

*Krishna Verma*: 1Satyam Suwas: 1Subodh Kumar: 1Indian Institute of Science

11:30 AM

**Friction Stir Processing of Magnesium Alloy with Spiral Tool Path Strategy:**

*Abishek Kumar*: 1Aarush Sood: 1Nikhil Gofawala: 1Sushil Mishra: 1Amber Shrivastava: 1Indian Institute of Technology Bombay

11:30 AM *Invited*

**Joining Dissimilar Materials via Rotational Hammer Riveting Technique:**

*Tianhao Wang*: 1Scott Whalen: 1Piyush Upadhyay: 1Keerti Kappagantula: 1Pacific Northwest National Laboratory

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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-8 | San Diego Convention Ctr**

**Session Chair:** Michael Short, Massachusetts Institute of Technology

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8:30 AM *Invited*

**The Department of Energy Molten Salt Reactor Development Overview:**

*Lou Qualls*: 1Oak Ridge National Laboratory

9:00 AM

**Investigation of the Mechanism Behind Proton Irradiation Decelerated Corrosion in Molten Fluorides:**

*Weiuye Zhou*: 1Yang Yang: 1Lingfeng He: 1Andrew Minor: 1Michael Short: 1Massachusetts Institute of Technology: 2Lawrence Berkeley National Laboratory: 2Idaho National Laboratory

9:20 AM

**Effect of Salt Additives and Impurities on Flowing Commercial Chloride Salt Compatibility:**

*Bruce Flint*: 1Dino Sulejmanovic: 1J Kurley: 1Oak Ridge National Laboratory
9:40 AM  
**Effects of Ionizing Radiation on Molten Chloride Salts:**  Ruchi Gakhar; Gregory Horne; Jay LaVerne; James Wishart; Simon Pimblott;  
\(^1\)Idaho National Laboratory;  \(^2\)University of Notre Dame;  \(^3\)Brookhaven National Laboratory

10:00 AM  
**Europium Induced Alloy Corrosion and Cracking in Molten Chloride Salt:**  Shaoqiang Guo; Jinsoo Zhang;  
\(^1\)Virginia Polytechnic Institute and State University

10:20 AM:  Break

10:40 AM  
**Salt Processing for Corrosion Mitigation in Concentrated Solar Power Systems:**  Jicheng Guo; Nathaniel Hoyt; Mark Williamson;  
\(^1\)Argonne National Laboratory

11:00 AM  
**Performance of Corrosion Resistant Claddings on 316H Stainless Steel in Molten Fluoride Salt:**  Adrien Coutet; William Doniger; Cody Falconer; Evan Buxton; Mohamed Elbakshwan; Chuan Zhang; Cem Topbas; Kumar Sridharan;  
\(^1\)University of Wisconsin-Madison;  \(^2\)Computherm, LLC;  \(^3\)Electric Power Research Institute

11:20 AM  
**Molten Chloride Salt Corrosion in Ni based Vs Fe based Alloys:**  Brendan Dsouza; Weiqian Zhuo; Jinsoo Zhang;  
\(^1\)Virginia Polytechnic Institute and State University

11:40 AM  
**Controlling Alloy Corrosion in Molten Chloride Salts: What Matters and What Doesn’t?:**  Stephen Rainham; Dino Sulejmanovic; Bruce Pint; Jake McMurray; Richard Mayes; Kristian Myhre; Matt Kurley; William Ponder; Jacob Sturt;  
\(^1\)Oak Ridge National Laboratory;  \(^2\)University of Tennessee;  \(^3\)Georgia Institute of Technology

10:00 AM  
**Design of Ni-Co-Ru Multi-principal Elements Alloys:**  Marie-Agathe Charpagne; K. Vamsi; Carolina Frey; Yolita Eggeler; Sean Murray; Tresa Pollock;  
\(^1\)University of California, Santa Barbara

10:20 AM:  Break

10:40 AM:  Invited  
**Development of HAYNES® 233® Alloy:**  Lee Pike; S. Srivastava;  
\(^1\)Haynes International

11:10 AM  
**Accelerated Design of High-temperature Alloys with Data Analytics and Supercomputing:**  Jian Peng; Andrew Williams; Sangkeun Lee; Yukinori Yamamoto; J. Haynes; Dongwon Shin;  
\(^1\)Oak Ridge National Laboratory;  \(^2\)Cornell University

11:30 AM  
**Materials Discovery and Design using Heritage Data:**  Amit Verma; Jeffrey Hawk; Vyacheslav Romanov; Jennifer Carter;  
\(^1\)Case Western Reserve University;  \(^2\)National Energy Technology Laboratory, Albany;  \(^3\)National Energy Technology Laboratory, Pittsburgh

11:50 AM  
**Application of Computational Tools in Designing Ni-base Single-crystal Superalloys:**  Akane Suzuki; Chen Shen; Natarajan Chennimalai Kumar;  
\(^1\)GE Research

**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 Fahrmann, Haynes International; Qiang Feng, University of Science and Technology Beijing; Michael Titus, Purdue University

**Wednesday AM | February 26, 2020**

**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;  
\(^1\)Air Force Research Laboratory

**9:00 AM Invited**

**Oxidation Resistant Refractory Metal High Entropy Alloys for Ultrahigh Temperature Structural Applications:**  Bronislava Gorr; Steven Schellert; Franz Mueller; Stephan Laube; Hans Chen; Alexander Kauffmann; Hans-Juergen Christ; Martin Heilmaier;  
\(^1\)University of Siegen;  \(^2\)KIT Karlsruhe

**9:30 AM Invited**

**Materials Parameters in Designing FCC High-entropy Alloys:**  Haruyuki Inui; Koukal Niitsu; Kyosuke Kishida; Easo George;  
\(^1\)Kyoto University;  \(^2\)University of Tennessee

**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;  
Eric Palmiere; Andrew Barrow; Jason Swan; Grace Burke;  
\(^1\)The University of Manchester;  \(^2\)The University of Sheffield;  \(^3\)Rolls-Royce

**8:50 AM**  
**Observation of Recrystallization Behavior of Nb-microalloyed Wide Flange Beams during Hot Rolling:**  Bon Seung Koo;  
Jae Chang Song;  
\(^1\)Hyundai Steel

**9:10 AM**  
**Hot Deformation Behavior and Processing Maps of 9Cr1Mo Rotor Steel:**  Sumit Kumar; Sumeer Nath;  
\(^1\)IIT Roorkee

**9:30 AM**  
**Teaching Metal-forming Processes Using a Laboratory Micro-extrusion Press:**  Adil Benartzy; Snir Ben Ze’ev; Nahum Frager;  
\(^1\)Ben Guriyon University
9:50 AM Break

10:10 AM
Investigation and Numerical Modeling of Aluminum Alloys Depending on Different Thermomechanical Processes: Bedirhan Güraydin; Metehan Dincer; Sadik Kaan İpek; Halenur Konbul; Derya Dispnar; Ahmet Karaaslan; 1; YTU; 2; Teknik Alüminyum NPD (New Product Development) and Process Development Department; 1; TEI; 2; TU

10:30 AM
The Impact of Inclusions on the Formability of Multiphase Hot-rolled Advanced High Strength Steels: Samaneh Allbeigia; Emmanuel Lucas; 1; Global R&D, ArcelorMittal Malizières-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: Yoo Òui; Ruishan Xin; Jianbin Luo; Qingxian Ma; 1; Tsinghua University; 2; HBIS Group Technology Research Institute

11:10 AM
Coarsening of Ferrite Lamella in Heavily Cold Drawn Pearlitic Steel Wire: Feng Fang; Lichu Zhou; Jianku Shang; Jianqing Jiang; 1; Southeast University; 2; University of Illinois at Urbana-Champaign

11:40 AM
Modelling Liquid Droplet Oscillation and Laminar Damping in Reduced Gravity Conditions: Valdis Bajarevics; 1; University 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
Space for Science: ESA’s Microgravity Research Programme on Materials Science: Wilhelmus Sillekens; 1; European Space Agency

8:55 AM
Current and Future Experiment Capabilities On-board the ISS for Materials Sciences: Douglas Matson; 1; Tufts University

9:20 AM
Experiment Preparation and Operation of the Electromagnetic Levitator EML on the ISS: Stephan Schneider; 1; Mitja Beckers; Angelika Diefenbach; 1; DLR Institut für Materialphysik im Weltraum; 2; DLR MUSC

9:45 AM
Thermophysical Property Measurements of High Temperature Melts Using the Electrostatic Levitation Furnace in the ISS: Takehiko Ishikawa; Chihiro Koyama; Hideki Saruwatari; Hirohisa Oda; 1; JAXA

10:10 AM Break

10:40 AM
Surface Oscillation of Molten Oxides Under Microgravity Using Electrostatic Levitation Furnace in ISS: Masahito Watanabe; 1; Gakushuin University

10:50 AM
Effects of Oxygen Partial Pressure on the Surface Tension of Liquid Aerospace Alloys: Michael Sansoucie; 1; Walter Bracker; Elizabeth Hodges; Madeline Scott; Robert Hyers; 1; NASA MSFC; 2; University of Massachusetts

11:20 AM
Thermophysical Properties of Bulk Metallic Glasses Measured in the Liquid Phase on Board the International Space Station: Markus Mohr; 1; Rainer Wunderlich; Hans Fecht; 2; Ulm University

10:10 AM
Surface Oscillation of Molten Oxides Under Microgravity Using Electrostatic Levitation Furnace in ISS: Masahito Watanabe; 1; Gakushuin University

10:40 AM
Effects of Oxygen Partial Pressure on the Surface Tension of Liquid Aerospace Alloys: Michael Sansoucie; 1; Walter Bracker; Elizabeth Hodges; Madeline Scott; Robert Hyers; 1; NASA MSFC; 2; University of Massachusetts

11:20 AM
Thermophysical Properties of Bulk Metallic Glasses Measured in the Liquid Phase on Board the International Space Station: Markus Mohr; 1; Rainer Wunderlich; Hans Fecht; 2; Ulm University
10:10 AM Break

10:30 AM
Extending the Range of Constant Strain Rate Nanoindentation Testing: Benoit Merle1; George Pharr1; 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 Su1; Dajia Neffati2; Jaehun Cho1; Qiang Li1; Jie Ding1; Hailyan 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 Chen1; Nan Li1; Satyesh Yadav1; Xiang-yang Lu1; Jian Wang1; Nathan Mara1; 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 Randall1; Damian Frey1; Jean-Marc Breguet1; Rajaprakash Ramachandramoorthy1; Jakob Schwiedrzik2; Johann Michler1; 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; Jederesa Lertthanasarn, Imperial College London

8:30 AM Keynote
Microstructure-driven Mechanical Properties of Explosives Quantified with In-situ Tomography: John Yeager1; Brian Patterson1; Lindsey Kueettner1; Amanda Duque1; Virgina Manner1; Caitlin Woznick1; Darla Thompson1; David Walters1; 1Los Alamos National Laboratory

9:10 AM Keynote
A Novel X-ray Diffraction Simulation Framework for Rapid Thermomechanical Processes: Darren Pagan1; Thien Phan1; Joel Bernier1; 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 Jain1; Rajaprakash Ramachandramoorthy2; Marko Knezevic2; Nenad Velisavljevic3; Nathan Mara1; Irene Beyertlein1; 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 Jalal1; Praveen Kumar1; Vikram Jayaram2; 1Indian Institute of Science; 2ISM; 3Rolls-Royce

11:10 AM
Quantifying Deformation Mechanics of High Temperature Alloys using In-situ and Digital Imaging Correlation (DIC) Testing Techniques: James Parkin1; Soran Brosca2; 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 Asl 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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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 Wang1; Stoichko Antonov1; Dipankar Banerjee1; Rajarshi Banerjee1; Yunzhi Wang1; Hamish Fraser1; 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 Ellyson1; Amy Clarke1; Jonah Klemm-Toole1; Kester Clarke1; Yoafeng Guo1; 1Colorado School of Mines
WEDNESDAY AM

10:00 AM  Precipitation Kinetics and Mechanical Behavior of Oxygen-stabilized Metastable Beta Ti-Nb Alloys: Kathleen Chou1; Emmanuelle Marquis1; 1University of Michigan

10:20 AM  Break

10:40 AM  The Intrinsic Coupling Between Twinning Plasticity and Transformation Plasticity in Metastable B Titanium Alloys: Yipeng Gao1; 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 Dumas1; Benjamin Hary1; Guilhem Martin2; Fan Sun1; Charlotte de Formanoir1; Frédéric Prima2; Stéphane Godel1; 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 Ballor1; Elizabeth Kautz2; Bharat Gwalani3; Masahiko Ikeda4; Jane Howe5; Takeshi Sunaoshi6; Arun Devara7; Carl Boehlert1; 1Michigan State University; 2Pacific Northwest National Laboratory; 3Kansai University; 4Tokyo University; 5Hitachi

11:40 AM  Shape Memory Response of High Temperature NiTiHfPd: Soheil Saedi1; Guher Pelin Toker1; Ehsan Saghaian2; Dipak Banerjee2; Haluk Karaca3; 1University of California Los Angeles; 2University of Kentucky

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
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8:30 AM Keynote
Nix Award Lecture: Damage Tolerance in Materials: Robert Ritchie1; 1University of California Berkeley and Lawrence Berkeley National Laboratory

9:30 AM Invited
Mechanical Properties of High Entropy Alloys: Easo George1; 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 Dauskardt1; 1Stanford University and the Stanford School of Medicine

11:00 AM Invited
Amorphization: A New Dislocationless Deformation Mechanism?: Marc Meyers1; S Zhao2; Eric Hahn1; Boya Li2; Bruce Remington3; Chris Wehrenberg2; Hye-Sook Park3; 1University of California San Diego; 2Lawrence Berkeley National Laboratory; 3Lawrence Livermore National Laboratory

11:30 AM Invited
Toughening Materials with Air?: Brad Boyce1; K. Conway1; Ben White1; Anthony Garland1; 1Sandia National Laboratories
MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — By-product Recovery II


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
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Session Chair: Joshua Montenegro, Gopher Resource

11:00 AM
The Importance of Lead in the Supply Chain of Antimony: Hilde Goovaerts1; Campine

11:20 AM
Studies on the Formation of Intermetallic Compound Layers in Co(W)-Zn Diffusion Couples: Tamara Ebner1; Nadine Körbler1; Stefan Luidold1; Christoph Czettli2; Christian Storf2; CDL-TM Montanuniversitaet Leoben; CERATIZIT Austria GmbH

11:40 AM
Effect of Oxidation of Zinc Powder on Purification of High-Cobalt and High-Germanium Zinc Sulfate Solutions: Leixia Zheng1; Zhiwei Peng1; Liancheng Wang1; Lei Yang1; Tie Wang1; Wenxing Shang1; Mingjun Rao1; Guanghui Li1; Tao Jiang1; Central South University

MATERIALS PROCESSING

PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Environmental & Safety Practices


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
IL TEC Technology – New Pathways Towards Safe and Effective Cooling: Andreas Filzwieser1; Martina Hanel2; Hans-Jörg Krassnig3; Rolf Degel4; Tim Lux5; Alexander Bergs5; Mettop GmbH/PolyMet Solutions GmbH; PolyMet Solutions GmbH; PolyMet Solutions GmbH; SMS Group GmbH

11:20 AM
CORE™ – Advances in Sulfuric Acid Technology: Herbert Lee1; Claudia Araya1; Chemetics Inc.

11:40 AM
Review of Waste Water Treatment Technologies Used in Lead Recycling: James Dahlstrom1; Joseph Grogan1; Benjamin Rodriguez1; Gopher Resource

12:00 PM
Optimization of Arsenic Removal Process in Waste Acid from Zinc Smelting Plant Based on Orthogonal Experiment: Tianqi Liao1; Yongguang Luo2; Hongtao Qu1; Te Zhang1; Jing Li1; Yunhao Xi1; Jingtian Zou1; Libo Zhang1; Kaihui Cui1; Kunming 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; Kunming 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; Kunming 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
WEDNESDAY AM

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; 1International Lead and Zinc Study Group

9:00 AM Plenary
Developing a Sustainable Global Lead Battery Value Chain: Andy Bush; 1International Lead Association

9:30 AM Plenary
Regional Changes in Refined Zinc Output and Demand: Claire Hassall; 2CHR Metals Ltd

10:00 AM Question and Answer Period

10:30 AM Break

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 Yang; 1Likun Shuo; 2Hongtao Qu; 2Yongguang Luo; 2Libo Zhang; 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 Wang; 1Runqing Liu; 1Wei Sun; 2Yuehua Hu; 2Zhangyuan Ni; 2Central South University

11:40 AM
Review on (bio)Hydrometallurgy of Sphalerite: Xiaoyu Meng; 1Xin Lv; 2Central 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 Zhang; 1Zhiyong Gao; 1Yuehua Hu; 2Jian Cao; 1Wei Sun; 2Central South University
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**

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**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*; Younggil Song; Gary Cola; Oak Ridge National Laboratory; SFP Works, LLC

**9:30 AM**
Novel Alloy Design Strategies for High Strength Car Body Parts Manufactured by Superplastic Forming: *Lukas Stemper*; Paul Oberhauser; Peter Uggowitzer; Stefan Pogatscher; Montanuniversitaet Leoben; AMAG Rolling GmbH

**9:40 AM**
Analysis by Dilatometry and Nanoindentation in an Experimental Medium-carbon Steel during the Martensite Isothermal Tempering: *Elithu Barrera-Villatoro*; Octavio Vázquez-Gómez; Perla Díaz-Villaseñor; Héctor Vergara-Hernández; Bernardo Campillo-Illanes; Tecnológico Nacional de México / I.T. Morelia; Universidad Nacional Autónoma de México

**10:30 AM**
Energy Concentration Joining of Nuclear-grade SiC/SiC Composites for Next Generation Nuclear Reactors: *Geuntah Lee*; Shirley Chan; Eugene Olevsky; San Diego State University

**11:20 AM**
Fabrication of Complex Shape Components by Spark-plasma Sintering Utilizing 3D-printed Controllable Interface: *Elisa Torresani*; Charles Maniere; Eugene Olevsky; San Diego State University / Laboratoire CRISMAT

**11:40 AM**
Superelastic Zirconia Powder for Shockwave Dissipation in Energy Infrastructure: Hunter Rauch; Hang Yu; Virginia 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 Ortiz1; 1LAO Consulting

8:55 AM Invited
Electrolytic Metals/Alloys for Liquid Metal Batteries: Xianyang Li1; 1Northeastern University

9:15 AM Invited
Fluid Mechanics of Liquid Metal Batteries: Overview and Outlook: Douglas Kelley1; 1University of Rochester

9:35 AM Invited
Liquid Metal Batteries: From Concept to Commercialization: David Bradwell1; 1Ambri Inc.

9:55 AM Break

10:10 AM Invited
Know Your Audience: Four Decades of Educational Innovation: Elsa Olivetti1; 1Massachusetts Institute of Technology

10:30 AM Invited
Lithium Metal Battery for Future Energy Storage: Y. Shirley Meng1; 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 Zhu1; 1Shanghai University; Shuqiang Jiao2; Jun Zhu3; Jiusan Xiao4; 1; 2University of Science and Technology; 3University of Rochester; 4University 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 Pal1; 1Paul Gasper; 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


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
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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 Thoma1; 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; 1Maryam Azaei; Diran Apelian1; Daniel Mummm1; Lorenzo Valdevit1; Jasper Zebulon Lienhard1; Christopher Schuh1; 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 Ladani1; 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 Eliaz1; 1Tel-Aviv University

10:50 AM Invited
Microstructure-property Development During Directed Energy Deposition of Austenitic Stainless Steels: Chris San Marchi1; 1Thale Smith2; Josh Sugar2; Julie Schoenung2; 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 Hwa2; Joshua Yee3; Nancy Yang1; 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 Bingqin1; 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
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Session Chairs: Rongpei Shi, Lawrence Livermore National Laboratory; Nathan Levkulich, UES

8:30 AM Invited
Engineered Residual Stress Optimization and Utilization: David Furrer1; Robert Goetz2; Jean Philippe Thomas2; Vasishth Venkatesh1; 1Pratt & Whitney

9:00 AM Invited
Heterogeneous Deformation during Forming of Pure Niobium and its Influence on Superconducting Radio Frequency Cavity Performance: Thomas Bieler1; Mingmin Wang1; Di Kang1; Mengge Zhao1; Kaige Zheng1; Maria Terol; Ricardo Rodriguez2; Eureka Pai1; Philip Eisenlohr2; 1Colorado School of Mines; 2AK Steel

9:50 AM Invited
Pushing the Performance Limits of Metallic Alloys through Severe Plastic Deformation Processing: Rajiv Mishra1; 1University of North Texas

10:20 AM Break

10:40 AM Invited
Processing Heterostructured Materials for Superior Mechanical Properties: Yuntian Zhu1; Hao Zhou2; Yusheng Li3; Xiaolei Wu1; Xiaolei Wu1; 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 Yapi2; 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 Cocks2; 1University of Oxford

9:00 AM
Three Dimensional Rate Theory Models of Radiation Damage with Mechanical Fields: Aaron Kohner1; Laurent Capolungo2; 2Los 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 Tarleton3; Felix Hofmann3; 1University of Oxford; 2University of Helsinki

9:40 AM
Nanoscale Characterisation of Re/Os Precipitation and Mechanical Degradation In Neutron Irradiated Tungsten: Matthew Llloyd1; Duc Nguyen1; Michael Moody1; Paul Bagot1; Robert Abernethy2; David Armstrong3; 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 Frazier1; 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 Saleh1; Alan Xu1; Paul Munroe2; Dhirri Bhattacharyya3; 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 Lach1; Shawn Riechers1; David Collins2; William Frazier3; Arun Devaraj1; Emily Barkley1; Thak Sang Byun2; 1Pacific Northwest National Laboratory

11:30 AM
Mechanical Properties of Irradiated Cladding Material from BOR-60 Irradiations: Tarik Saleh1; Benjamin Efthim1; Stuart Malay2; Gary Was3; 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 Ajantiwaly1; 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 Li1; 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 II

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

Program Organizers: Adele Carrado, IPCMS - CNRS; Heinz Palkowski. Claustral 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 Hattar1; 1Sandia National Laboratories

9:10 AM
Tailoring Optical and Structural Properties of Metal-dielectric Composite Thin Films: Lirong Sun1; 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 Haubert2; Ramana Chintalapalle1; 1University of Texas; 2University of Southern California

9:50 AM Break

10:10 AM
Sputtered Coating Optimization for Architectured Structures: Alina Garcia Taormina1; 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 Zade1; 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

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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 Raw Materials in Extreme Conditions – European Union Perspective and Challenges: Dragom Rajnović1; 1University of Novi Sad, Faculty of Technical Sciences, Serbia

8:55 AM
Mechanical Beneficiation of End-of-Life Lithium-Ion Battery Components: Haruka Pinegar1; York Smith1; 1University of Utah

9:15 AM
Engineered Carbon Products from Sustainable Lignin Feedstocks for Energy Applications: Valerie García-Negron1; 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: Chuhunmuwite Iloeje1; Yusra Khalid1; Joe Cresko2; Diane Graziano3; 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 Hassan1; Rifat Farzana2; Veena Sahajwalla3; 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 Ebin1; 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 Viry1; 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 Zhang1; Gangqiang Fan2; Mingbo Song3; 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 Stramala, MPI Intelligent Systems

8:30 AM

Mechanical Properties Optimization via Microstructural Control of a Metastable B-type Ti-Nb Gum Metal: Sumin Shin; Kenneth Vecchio; 1University of California, San Diego

8:50 AM

SPD-induced Synthesis of Archimat: a New Paradigm in Materials Design: Roman Kulagin; Yan Beygelzimer; Yuri Estrin; Brigitte Baretzky; 1Karlsruhe Institute of Technology (KIT); 2Karlsruhe Institute of Nanotechnology (INT); 3Donetsk Institute for Physics and Engineering; 4Monash University / The University of Western Australia

9:10 AM

Strain Partitioning by Recurrent Shear Localization during Equal-channel Angular Pressing: Philipp Frink; Martin Wagner; 1Institute of Materials Science and Engineering, Technische Universität Chemnitz

9:30 AM Invited

Slip Transmission in Ultra Fine Grain Materials: Katerina Aifantis; Fei Shuang; 1University of Florida

9:50 AM Invited

Making Strong, Tough, Thermally-stable, and Radiation Tolerant Nanocrystalline Materials in Bulk Form: Timothy Rupert; 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 Kim; Jennifer Bustillos; Alih Moridi; 1Cornell University

10:50 AM

Size-dependent Dislocation-twin Interactions: Jiangwei Wang; Guang Cao; Ze Zhang; Frederic Sansoz; 2Zhejiang University; 2The University of Vermont

11:10 AM

Evaluation of Misorientation and Local Deformation in Bimodal Heterostructured Stainless Steel by Hybrid Imagings of Diffraction and Refraction Contrast Using Synchrotron Radiation X-ray: Yoshikazu Nakata; Shoichi Kikuchi; Daiki Shiozawa; Kenji Nonaka; Takumi Hase; Yuki Nakagawa; Kei Ameysama; 1Kobe University; 2Shizuoka University; 3Ritsumeikan University

11:30 AM Invited

Mesoscale Modeling of Deformation and Failure Behavior of Metallic Ultrafine-grained Microstructures: Avinash Dongare; 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**

5A | San Diego Convention Ctr

**Session Chair:** David Jones, Los Almos National Laboratory

8:30 AM

A Non-RMI Source of Substantial Quantities of Ejecta Mass Due to Cavitation Bubble Collapse: Garry Mostofy; Saryu Fensin; Thomas Hartsfield; Gerald Stevens; Brandon La Lone; Dale Turley; 1Los Alamos National Laboratory; 2Mission Support and Test Services

9:10 AM

The Role of Heterogeneities in Ejecta Production via MD Simulations: Rachel Flanagan; Timothy Hermann; Marc Meyers; Saryu Fensin; 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; Alison Saunders; Camela Stan; Hye-Sook Park; Suzanne Ali; Jon Eggert; 1Lawrence Livermore National Laboratory

9:50 AM

On Design Of High-throughput Compact High-explosive Ejecta Source Platform: Fady Najjar; Jose Sinibaldi; 1Lawrence Livermore National Laboratory

10:10 AM Break

10:30 AM Invited

A Continuum Mesoscale Perspective of the Dynamic Response of Metals and Explosives: Dorby Luscher; Cindy Bolme; Marc Cawkwell; Saryu Fensin; Abigail Hunter; Nisha Mohan; Thao Nguyen; Kyle Ramos; R. Scharff; Justin Wilkerson; Milovan Zecевич; 1Los Alamos National Laboratory; 2Texas A&M University; 3Nevada National Security Site

11:10 AM

Mechanisms of Deformation and Fracture in Solids with Defects under Dynamic and Shock Wave Loading: Yuriy Bayandin; Natalia Saveleva; Dmitry Bilakov; Oleg Naimark; 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: Zhwei Peng, Central South University; Jian-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, Atlim University; Tao Jiang, Central South University; Jesse White, Elkem Carbon AS; Morsi Mahmoud, King Fahd University of Petroleum And Mineral

Wednesday PM | February 26, 2020
12 | San Diego Convention Ctr
Session Chairs: Baojun Zhao, University of Queensland; Ender Keskinkilic, Atlim University

2:00 PM Introductory Comments

2:15 PM
Parameters Affecting on the Phosphorus Distribution Between Slag and Liquid Metal in BOF: Abdelrham Hassouni; 1Tabbin Institute for Metallurgical Studies

2:35 PM
Research on the Database Construction of Furnace Material Consumption in EAF Steelmaking Process: Botao Xue; Lingzhi Yang; Yufeng Guo; Feng Chen; Fu-qiang Zheng; Jinlai Zhang; Hongguo Yao; Xiaolei Hou; 2Central South University

2:55 PM
Experimental Study on Water Model of Continuous Smelting Reduction Reactor: Haijuan Li; Yan Liu; Xiaolong Li; Zhang Tingan; 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; Hongpo Wang; Silu Jiang; Lifeng Sun; Yu Wang; 1Chongqing University

3:50 PM
Precipitation Behavior of B2O3 Addition on CaO-Al2O3-Sc2O3 Slag System Through in-situ Observation: Fei Wang; Wenke Zhi; Ling Zhang; Zhuangzhuan Liu; Bin Yang; Muxing Guo; 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; 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 Housemann, 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; Luca Capirotti; Tiankai Yao; Jason Harp; Lingfeng He; 1Idaho National Laboratory

2:20 PM
Development of Advanced Low N-12Cr (wt.%) Ferritic/Martensitic Steel for Reactor Applications: Connor Rietema; 2Tarki Saleh; Benjamin Eftink; Stuart Maloy; Osman Anderoglu; Md Mehdai Hassan; Amy Clarke; Kester Clarke; 3Colorado 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; Thomas Whiting; Mark Wenman; 1Imperial College London

3:00 PM
Temperature Shift Evaluation for G-phase Clustering in Ferritic-martensitic Alloys: Matthew Swenson; Saheeda Adisa; 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; Ming Liu; Mohammad Shahin; Myles Stapelberg; So Yeon Kim; Michael Short; Ju Li; 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; 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; Saryu Fensin; 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; Stuart Maloy; 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\textsuperscript{1}; Michael Moorehead\textsuperscript{1}; Mohamed Elbakshwan\textsuperscript{1}; Jing Hu\textsuperscript{2}; Wei-Ying Chen\textsuperscript{2}; Kumar Sridharan\textsuperscript{1}; Adrien Couet\textsuperscript{1}; 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\textsuperscript{1}; Hao Chen\textsuperscript{1}; 1Tsinghua University

ADDITIVE TECHNOLOGIES

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications II — Nuclear Additive Manufacturing Committee, TMS: Nuclear Materials Committee

2:00 PM Invited
Printing In-pile Instrumentations for Nuclear Test Reactors: Kunal Mondal\textsuperscript{1}; David Estrada\textsuperscript{2}; Kiyo Fujimoto\textsuperscript{2}; Yanliang Zhang\textsuperscript{2}; Troy Unruh\textsuperscript{2}; Michael McMurtrey\textsuperscript{3}; 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\textsuperscript{2}; Michael Kirka\textsuperscript{1}; John Echoles\textsuperscript{1}; Lauren Garrison\textsuperscript{1}; Christopher Ledford\textsuperscript{2}; Sullivan Figurskey\textsuperscript{2}; Chris Rock\textsuperscript{2}; Timothy Horn\textsuperscript{2}; Yutai Katch\textsuperscript{2}; Ryan Dehoff\textsuperscript{2}; 1Oak Ridge National Laboratory; 2North Carolina State University

3:30 PM
Performance Analysis of a Novel Radiation Hard Temperature Sensor: Al-Amin Ahmed Simon\textsuperscript{1}; Shah Mohammad Rahmot Ullah\textsuperscript{1}; Lyle Jones\textsuperscript{1}; Bahareh Badamchi\textsuperscript{1}; Isabella Van Rooyen\textsuperscript{1}; Harish Subbaraman\textsuperscript{1}; Maria Mitkova\textsuperscript{1}; 1Boise State University

3:50 PM Invited
Transforming Nuclear Reactor Core Manufacturing via Additive Techniques: Kurt Terrani\textsuperscript{1}; 1Oak Ridge National Laboratory

4:20 PM
Manufacturing Oxide Dispersion Strengthened (ODS) Steel Fuel Cladding Tubes by Cold Spray Technology: Hwasung Yeom\textsuperscript{1}; Tyler Dabney\textsuperscript{2}; Jeff Graham\textsuperscript{2}; Peter Hosemann\textsuperscript{2}; David Hoelzer\textsuperscript{2}; Stuart Maloy\textsuperscript{2}; Kumar Sridharan\textsuperscript{3}; 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\textsuperscript{1}; Cheng Sun\textsuperscript{1}; Michael McMurtrey\textsuperscript{1}; Randall Scott\textsuperscript{1}; Robert O’Brien\textsuperscript{1}; 1Idaho National Laboratory
### ADDITIVE TECHNOLOGIES

**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

**Wednesday PM | February 26, 2020**

7B | San Diego Convention Ctr

**Session Chairs:** Sneha Prabha Narra, Worcester Polytechnic Institute; Biswadeep Saha, Intel Corporation

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>2:00 PM</td>
<td>Invited Additive Manufacturing of NiTi Shape Memory Materials: Steven Stock1; Morgan Trexler1; Andrew Lennon1; Ian McCue1; Tim Montalbano1; Douglas Trigg1; Ryan Carter1; Johns Hopkins Applied Physics Laboratory</td>
</tr>
<tr>
<td>2:30 PM</td>
<td>Additive Manufacturing of Nitinol with Post Heat Treatment Characteristics: Jeongwoon Lee1; Yung Shin1; Purdue University</td>
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<tr>
<td>2:50 PM</td>
<td>Microstructure-property Correlations of LENS Processed NiTi: Sujith S1; Lakhindra Marrandi1; Mitun Das1; Indrani Sen1; Academic; Government National Research Laboratory</td>
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<tr>
<td>3:10 PM</td>
<td>Fabrication and Functional Properties of Selectively Laser Melted NiTi Lattice Structures Using Point Scanning Strategies: Tobias Gustmann1; Hannes Korn1; Peter Koch1; Ralph Stelzer1; Welf-Guntram Drossel1; Fraunhofer IWU; TU Dresden</td>
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<tr>
<td>3:30 PM</td>
<td>Break</td>
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<tr>
<td>3:50 PM</td>
<td>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; Colorado School of Mines; NASA Glenn Research Center</td>
</tr>
<tr>
<td>4:20 PM</td>
<td>Invited Complexity and Opportunities in Additive Manufactured NiTi-based Shape Memory Alloys: Ibrahim Karaman1; Lei Xue1; Bing Zhang1; Kadri Atl1; Alaa Elwany1; Raymundo Arroyave1; Texas A&amp;M University</td>
</tr>
<tr>
<td>4:50 PM</td>
<td>Selective Laser Melting of Co-Ni-Ga Shape Memory Alloys: Philipp Krooss1; Christian Lauhoff1; Julia Richter1; Florian Brenne1; Thomas Niendorf1; University of Kassel</td>
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### 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

**Wednesday PM | February 26, 2020**

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**Session Chair:** Fan Zhang, National Institute of Standards and Technology

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<tr>
<th>Time</th>
<th>Session</th>
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<tr>
<td>2:00 PM</td>
<td>Invited Non-destructive Quality Evaluation of Additively Manufactured Metal Components: Sam Yang1; Leon Prentice1; Tony Murphy1; Sherry Mayo1; Clement Chu1; Anna Paradowska1; CSIRO; ANSTO</td>
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<tr>
<td>2:25 PM</td>
<td>Invited Unsupervised Learning of Dislocation Motion: Darren Pagan1; Thien Pham1; Jordan Weaver1; Austin Benson1; Armand Beaudoin1; Cornell High Energy Synchrotron Source; National Institute of Standards and Technology; Cornell University</td>
</tr>
<tr>
<td>2:50 PM</td>
<td>In Operando X-ray Diffraction during Laser 3D Printing: Samy Hocine1; Helena Van Swygenhoven1; Steven Van Petegem1; Cynthia Sin Ting Chang1; Tuerdi Maimaitiyili1; Gemma Tinti1; Dario Ferreira Sanchez1; Daniel Grolmus1; Nicola Casati1; Paul Scherrer Institut</td>
</tr>
<tr>
<td>3:10 PM</td>
<td>In-situ TEM Heating Experiments to Study the Effect of Thermal Gradients on Additively Manufactured Ti-6Al-4V Builds: Sriram Vijayan1; Meiyue Shao1; Charlie Blackwell1; Sabina Kumor1; Sudarsanam Babu1; Joerg Jinschek1; The Ohio State University; University of Tennessee, Knoxville</td>
</tr>
<tr>
<td>3:30 PM</td>
<td>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 Ahmed1; Samuel Clark1; Chu Lun Alex Leung1; Yunhui Chen1; Lorna Sinclair1; Sebastian Marussi1; Veijo Honkimaki1; Noel Haynes1; Peter Lee1; Hatem Zurob1; Andre Phillion1; McMaster University; University College London; European Synchrotron Radiation Facility; Collins Aerospace</td>
</tr>
<tr>
<td>3:50 PM</td>
<td>Invited Combining Atom-probe Tomography and Synchrotron Methods to Investigate In-situ Precipitation in AM-produced Alloys: Eric Jaegle1; Philipp Kürnsteiner1; Pere Barriobero-Vila1; Markus Wilms1; Frederic De Geuser1; Dierk Raabe1; Max-Planck-Institut Eisenforschung; German Aerospace Center DLR; Fraunhofer-Institute for Laser Technology; SIMAP - University Grenoble Alpes</td>
</tr>
<tr>
<td>4:35 PM</td>
<td>In-situ TEM Thermal Cycling of AM Steel: Manas Upadhyay1; Eva Heriprê1; Luis Cardona1; Alexandre Tanguy1; Simon Hallais1; Sylvain Durbecq1; Thien-Nga Lê1; Ecole Polytechnique; CentraleSupélec</td>
</tr>
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4:55 PM
Detection of Early Crack Formation of Fatigued, Additively Manufactured Stainless Steel Using Neutron Dark-field Imaging: Adam Brooks1; Daniel Hussey2; Hong Yao3; Ali Haghshenas3; Jumao Yuan4; Jacob LaManna2; David Jacobson2; Caroline Lowery3; Shengmin Guo3; Michael Khonsari5; Leslie Butler6; 1National Institute of Standards and Technology; 2Cornell University; 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 Pham2; Darren Pagan2; 1National Institute of Standards and Technology; 2Cornell University

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; Aliieh Moridi, Cornell University

Wednesday PM | February 26, 2020
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Session Chair: James Saal, Citrine Informatics

2:00 PM Invited
Additive Manufacturing of Commercially Available Metastable B-Ti Alloys: Mohan Sai Kiran Kumar Yadav Nartu1; David Flannery1; Eugene Ivanov2; Srinivas Aditya Mantri3; Rajarshi Banerjee4; 1University of North Texas; 2Tosoh SMD Inc.

2:30 PM
Rapid Exploration of Compositionally Complex Alloys via Additive Manufacturing and Molecular Dynamics: Andrew Kustas1; Michael Melia1; Eric Schindelholz2; Shaun Whetten3; Joseph Michael1; Nicolas Argibay2; Michael Chandross3; 1Sandia National Laboratories

2:50 PM
Selective Laser Melting of Beta-type Ti-Nb Alloys for Bone Implants: Stefan Pilz1; Holger Schwab1; Patrick Langhelm2; Uta Kühn3; Annett Gebert1; 1Institute for Complex Materials, Leibniz IFW Dresden; 2Institute of Medical Engineering, University of Erlangen-Nuremberg; 3Tosoh SMD Inc.

3:10 PM
Ti-Nb Alloy with Location-dependent Properties Using Laser Additive Approach: Wenhao Lin1; Ji Ma1; 1University of Virginia/MSE Department

3:30 PM
Design of New Titanium Alloy for Additive Manufacturing with the CALPHAD Method: Zhi Liang1; Richard Ricker2; Ursula Kattner3; Carelyn Campbell4; 1University of California, Berkeley; 2Argonne National Laboratory; 3National 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 Ringer1; 1University of Sydney

4:35 PM
Development of New Ti-64 Modified Alloys for Additive Manufacturing with Columnar to Equiaxed Transition: Nevin Taylor1; Hamish Fraser1; Brian Welk1; Zachary Kloenne1; Andrew Baker1; 1Ohio State University; 2Boeing

4:55 PM
Application of a Thermodynamics-informed Materials Design Simulator for Microstructure Control During AM: Aurelien Perron1; John Roehling1; Tien Roehling2; Nicholas Calta3; Bye Vrancken3; Joel Berry1; Thejaswi Tumkur Umanath1; Patrice Turchi1; Vincenzo Lordi1; Joseph McKeown2; Manyalibbo Matthews2; 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 Davis1; Cameron Breheyne2; Jonathon Fellowes2; Uzoma Nwankpa3; Filomeno Martina3; Jialuo Ding2; Thays Machry3; Philip Prangnell1; 1The University of Manchester; 2Cranfield University; 3Airbus
3:40 PM Break

4:00 PM
Selective Laser Melting (SLM) Additive Repair of Duramold-2 Substrate Using AlSi10Mg: Edward Cyr1; Amir Hadadzadeh1; Babak Shalchi Amirkhiz2; Joshua Kelly3; Mohsen Mohammadi4; 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: Robbert Minnen1; Claudia Rawl2; Sudarsanam Babu3; Michael Haines4; 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 Wang1; Zhiguang Zhu2; Hansheng Chen3; Sharon Mui Ling Nai4; Rongkun Zheng5; Sophie Primag6; Sudarsanam Babu7; Simon Ringer8; Xiaohou Liu9; 1School of Aerospace, Mechanical and Mechatronic Engineering, The University of Sydney; 2Singapore Institute of Manufacturing Technology; 3School of Physics, The University of Sydney; 8School of Materials Science & Engineering, UNSW; 9Department 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 Mohammadizadeh1; Ismail Fidan1; 1Tennessee Technological University

5:20 PM
Ultrahigh-properties TiNi Shape Memory Alloys by 4D Printing: Haizhou Lu1; 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
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Session Chair: Hang Yu, Virginia Polytechnic Institute and State University

2:00 PM Interface Textured Development of Additively Manufactured Materials: David Rowenhorst1; Aerial Murphy-Leonard2; Richard Fonda3; 1U.S. Naval Research Laboratory

2:20 PM Grain Boundary Engineering of Additively Manufactured Stainless Steel: Gao Shubo1; Hu Zhengu1; Chen Kai Siang2; Song Xu3; Matteo Seita4; 1Nanyang Technological University; 2Singapore Institute of Manufacturing Technology

2:40 PM Crystallographic Texture Control in Additively Manufactured Stainless Steel: Sudharshan Raman1; Bernard Gaskey2; Eka Jain3; Shubo Gao4; Kishore Venkatesan5; David Ritchie6; Darren Fraser7; Sri Lathabai1; Matteo Seita4; 1Nanyang Technological University; 2CSIRO

3:00 PM Crystallographic Texture Evolution in Additively Manufactured Metals as a Function of Build Height and Strategy: Alec Saville1; Jonah Klemm-Toole2; Sven Vogel2; Adam Creuziger3; Sudarsanam Babu4; Amy Clarke5; 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 Roehling1; William Smith1; Tien Roehling2; Gabriel Guss3; Bey Vrancken4; Joseph McKeown5; Michael Hill6; Manyalibo Matthews7; 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 Capek1; Efthymios Polatidis2; Robert Pederson3; Christophe Lyphyt4; 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 Dantini1; Matthew Priddy2; 1Mississippi State University

4:40 PM
Evaluation of Additively Manufactured Functionally Graded Titanium Alloys Tailored for Thermal Expansion Applications: Skyler Hibburn1; Timothy Simpson2; Todd Palmer3; 1Pennsylvania State University

5:00 PM
Residual Stress Prediction in Metal Additive Manufacturing: Numerical Simulation and Experimental Validation: Tao Wu1; 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

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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 Mara1; Youxing Chen2; Eric Hintsala3; Bartosz Nowakowski1; Douglas Stauffer1; 1University of Minnesota; 2University of North Carolina, Charlotte; 3Bruker Nano Surfaces Division
2:30 PM
Microstructural Characterization Using the XFEL at LCLS-2: Sven Vogel\textsuperscript{1}; Cindy Bolme\textsuperscript{1}; Donald Brown\textsuperscript{1}; Ellen Cerreta\textsuperscript{1}; Joseph Mang\textsuperscript{1}; Benjamin Morrow\textsuperscript{1}; Kyle Ramos\textsuperscript{2}; Igor Usos\textsuperscript{3}; Suzanne Ali\textsuperscript{4}; Damien Swift\textsuperscript{4}; Eric Gattier\textsuperscript{1}; Arianna Gleason\textsuperscript{1}; Eduardo Granados\textsuperscript{1}; Amy Lazicki\textsuperscript{1}; Philip Heimann\textsuperscript{1}; Despina Milathianaki\textsuperscript{1}; Bob Nagler\textsuperscript{1}; Luca Lutterotti\textsuperscript{1}; Los Alamos National Laboratory; \textsuperscript{2}Lawrence Livermore National Laboratory; \textsuperscript{3}SLAC; \textsuperscript{4}Universita di Trento

2:50 PM
Combining X-ray Diffraction Contrast Tomography and Tomography to Study In-situ the Mechanics of Polycrystalline Materials: Henry Proudhon\textsuperscript{1}; Wolfgang Ludwig\textsuperscript{2}; Jean-Charles Stinvil\textsuperscript{3}; Patrick Callahan\textsuperscript{3}; Mines Paristech Centre Des Materiaux: \textsuperscript{1}Univrsite de Lyon; \textsuperscript{2}University of California Santa Barbara

3:10 PM
Investigation of Residual Stress Using High Resolution XRD and Localized Lattice Rotation Under Fatigue Loading: Ramasis Goswami\textsuperscript{4}; Zhiyuan Liang\textsuperscript{1}; Whitney Heimann\textsuperscript{1}; Donald Brown\textsuperscript{1}; Ellen Cerreta\textsuperscript{1}; Joseph Mang\textsuperscript{1}; Benjamin Morrow\textsuperscript{1}; Kyle Ramos\textsuperscript{2}; Igor Usos\textsuperscript{3}; Suzanne Ali\textsuperscript{4}; Damien Swift\textsuperscript{4}; Eric Gattier\textsuperscript{1}; Arianna Gleason\textsuperscript{1}; Eduardo Granados\textsuperscript{1}; Amy Lazicki\textsuperscript{1}; Philip Heimann\textsuperscript{1}; Despina Milathianaki\textsuperscript{1}; Bob Nagler\textsuperscript{1}; Luca Lutterotti\textsuperscript{1}; Los Alamos National Laboratory; \textsuperscript{2}Lawrence Livermore National Laboratory; \textsuperscript{3}SLAC; \textsuperscript{4}Universita di Trento

3:30 PM
Break

3:50 PM Invited
Measurement of Power Law Creep Parameters by Nanoindentation: George Pharr\textsuperscript{1}; Zhiyuan Liang\textsuperscript{1}; \textsuperscript{1}Texas A&M University

4:20 PM
Measurement of the Thermal Expansion of Ti-7Al Using High Energy X-ray Diffraction Microscopy: Rachel Lim\textsuperscript{1}; Darren Pagan\textsuperscript{1}; Joel Bernier\textsuperscript{2}; JY Peter Ko\textsuperscript{1}; Anthony Rollett\textsuperscript{1}; Carnegie Mellon University; \textsuperscript{1}Cornell High Energy Synchrotron Source; \textsuperscript{2}Lawrence Livermore National Laboratory

4:40 PM
Effects of the Orientation of the $\alpha$ $\beta$ Interphase on the Time-dependent Fatigue Behavior of Ti-6Al-4V: Kartik Kapoor\textsuperscript{1}; Priya Ravi\textsuperscript{1}; Jn-Sang Park\textsuperscript{2}; Ryan Noraas\textsuperscript{3}; Vasisht Venkatesh\textsuperscript{2}; Michael Sangid\textsuperscript{2}; Purdue University; \textsuperscript{1}Argonne National Laboratory; \textsuperscript{2}Pratt & 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\textsuperscript{1}; George Pharr\textsuperscript{1}; \textsuperscript{1}Texas 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 f"ur 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: Zhongwei Wang\textsuperscript{1}; Wenjun Lu\textsuperscript{1}; Junyang He\textsuperscript{1}; Dirk Ponge\textsuperscript{1}; Dirk Raabe\textsuperscript{2}; Zhiming Li\textsuperscript{1}; \textsuperscript{1}Max-Planck-Institut für Eisenforschung

2:20 PM
Understanding the Effect of Nickel on the Microstructure of Low Density FeMnAl Steels: Laura Bartlett\textsuperscript{1}; Michael Piston\textsuperscript{1}; Ronald O’Malley\textsuperscript{1}; Krista Limmer\textsuperscript{1}; Daniel Field\textsuperscript{1}; \textsuperscript{1}Missouri University of Science & Technology; \textsuperscript{2}CC DEVCOM Army Research Laboratory

2:40 PM
Low-Density Steels: Microstructure Evolution and Tensile Behavior in Novel Fe-Mn-Al-C Steels: Tomas Scuserra\textsuperscript{1}; Kelcey Garza\textsuperscript{2}; Dean Pierce\textsuperscript{3}; Amanda Gill\textsuperscript{4}; Erik Pavlina\textsuperscript{5}; Jerry Arnold\textsuperscript{5}; Amy Clarke\textsuperscript{5}; Kester Clarke\textsuperscript{5}; Omar Garcia\textsuperscript{5}; Fred Fletcher\textsuperscript{5}; Colorado School of Mines; \textsuperscript{2}AK Steel; \textsuperscript{3}Oak Ridge National Laboratory; \textsuperscript{4}Ternium; \textsuperscript{5}Arcelor Mittal

3:00 PM
Improvement of Hydrogen Induced Cracking Resistance by Tempering of an X65 Pipeline Steel for Sour Service: Mary O’Brien\textsuperscript{1}; Kip Findley\textsuperscript{1}; Colorado School of Mines

3:20 PM
Effect of Composition on Properties of Age-hardenable Fe-Mn-Al-C Alloys: Krista Limmer\textsuperscript{1}; Daniel Field\textsuperscript{1}; Laura Bartlett\textsuperscript{1}; Katherine Sebeck\textsuperscript{1}; CCDC Army Research Laboratory; \textsuperscript{2}Missouri S&T; \textsuperscript{3}CCDC 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 Kontsevov\textsuperscript{1}; Gregory Olson\textsuperscript{1}; \textsuperscript{1}Northwestern University

4:20 PM
Development of Hot-rolled TRIP Steel: Hung-Wei Yen\textsuperscript{1}; \textsuperscript{1}National Taiwan University

4:40 PM
TRIP-Marking Nanolaminate Stainless Steel: Hyunseok Oh\textsuperscript{1}; Shaolou Wei\textsuperscript{1}; Jaclyn Leigh Cann\textsuperscript{1}; Cemal Cem Tasan\textsuperscript{1}; \textsuperscript{1}Massachusetts Institute of Technology

5:00 PM
Multi-scale Modeling of Hydrogen Embrittlement in High-strength Steels: Tarek Hatem\textsuperscript{1}; \textsuperscript{1}The 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

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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 Cui\textsuperscript{1}; \textsuperscript{1}Iowa State University

2:30 PM Invited
Magnetic Properties, Microstructure and Phase Formation in Rare Earth Free MnAl-C Alloys: Thomas G. Woodcock\textsuperscript{1}; \textsuperscript{1}IFW Dresden
3:00 PM Invited
In-situ X-ray Absorption Studies of Transition Metal Layered Structures for Zn-ion Batteries: Christopher Patridge; D’Youville College

3:20 PM Invited
In-situ Measurement of Stresses and their Effect on Diffusion in High Energy Density Electrode Materials: Siva Nadimpalli; New 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; Lin Wang; University of Pennsylvania

4:20 PM Invited
Synchrotron X-ray Science to Understand Structural and Physical Transformations in Solid State Batteries: Kelsey Hatzell; Marm Dixit; Vanderbilt 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 Wolvertor, Raytheon; Babak Arfaei, Ford Motor Company; Andre Delhaise, Celestica; Mehran Maalekian, Mat-Tech; Mohd Arif Salleh, Universiti Malaysia Perlis

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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 Kelly; Nihilesh Chawla; Arizona State University

2:20 PM
Effect of Solder Joint Failure on Electromigration Failure Mechanism in Micro Solder Joint: Hossein Madanipour; Yi Ram Kim; Allison Osmanson; Choong-Un Kim; University of Texas, Arlington

2:40 PM
Modeling and Simulation of Pore Electromigration in Tin Solders: Zachary Morgan; Yongmei Jin; Vahid Attari; Raymundo Arroyave; Michigan Technological University; Texas 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; Yi Ram Kim; Hossein Madanipour; Choong-Un Kim; Patrick Thompson; Qiao Chen; University of Texas at Arlington; Texas 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 Kim1; Allison Osman2; Hossein Madanipour2; Choong-Un Kim2; Patrick Thompson2; Qiao Chen2; 1University of Texas at Dallas; 2Texas Instruments, Inc.

4:00 PM
Microstructure Evolution and Interfacial Growth of Intermetallic Compound for Cu/In/Cu Structure under Thermomigration: Chen-Wei Lee1; Jou Hsuan Lee1; Fan-Yi Ouyang3; 1National Tsing Hua University

4:20 PM
Role of Grain Boundaries in Electromigration and Thermomigration Related Failure: A Phase Field Simulation Study: Supriyo Chakraborty1; Praveen Kumar2; Abhik Choudhury3; 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; Nortaka 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 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 Liu1; 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-Atwar1; Stuart Maloy2; 1Los Alamos National Laboratory

2:40 PM Invited
In-operando Investigation on Sequential Stages for Redox-triggered Phase Transformation of Natural Hematite Particles: Anna Nakano1; Jinichiro Nakano2; James Bennett3; 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


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 Bochichio, Pratt & Whitney; Kevin Bockenstedt, ATI Specialty Materials; Katerina Christofidou, University of Sheffield; James Coakley, University of Miami; Martin Detroit, 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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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 Vorontsov1; Hikmatyar Hasani2; Peter Haynes3; 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 Graverend1; Rajendran Harikrishnan2; 1Texas A&M University

2:40 PM
Modeling the Dependence of Microstructural Evolution on the Crystallographic Orientation in Ni-based Single Crystal Superalloys: Harikrishnan Rajendran1; 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 Bergsma1; Fionn Dunne2; 1Imperial College London

3:20 PM
Competing Mode of Failure Predictions in a Ni-based Superalloy using Crystal Plasticity Finite Element Simulations: Ritwik Bandypadhyay1; Michael Sangid2; 1Purdue University

3:40 PM Break

4:00 PM
On the Temperature Limits of Ni-based Superalloys: Daniel Barba1; Ashton Egan2; Michael Mills3; Roger Reed4; 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 Egan1; Lola Lilenstein2; Paraskevas Kontis3; Sammy Tin3; Michael Mills2; 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 Meher1; Larry Aagesen2; 1Idaho National Laboratory
Eshraghi

János Tomán 1; 2
1University of Debrecen; 2University of Rouen

A New Phase-field Model with Anisotropic Interface Width for Ni-based Superalloy: Yong Zhang 1; Shengyun Yuan 1; Zhihao Jiang 1; Ji Li 1; Yinze Tang 2; 1Nanjing University of Science and Technology; 2Shanghai University

2:00 PM

“Sintering” Models and Measurements: Data Assimilation for Microstructure Prediction of Nylon Component SLS Additive Manufacturing: William Rosenthal 1; Francesca Grogan 1; Yulan Li 1; Erin Barker 1; 1Joseph Christ 1; Timothy Pope 1; Tamas Varga 1; Chris Barrett 1; Mathew Thomas 1; 1Noah Oblath 1; Kevin Fox 1; Malachi Schram 1; Marvin Warner 1; Amra Peles 1; 1Pacific Northwest National Laboratory

2:20 PM

Multi-scale Modeling of Solidification Microstructure during Powder Bed Fusion: Ryan Lenart 1; Antonio Magana 1; Mohsen Eshraghi 1; 1California State University; 2Los Angeles; 3Mohammadreza Yaghoobi, University of Michigan

2:40 PM

Large Scale 3D Phase-field Sintering Simulations: Robert Termuhlen 1; 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 Barker 1; William Rosenthal 1; Francesca Grogan 1; Amra Peles 1; 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 Patte 1; Helena Zapolsky 1; 1University Of Rouen

3:40 PM Break

4:00 PM

Direct Consideration of Vacancies in CALPHAD Modelling of Zirconium Carbide: Theresa Davey 1; Ying Chen 1; 1Tohoku University

4:20 PM

Multi-scale Modelling of Coarsening Process in the Ag-Cu Alloy: Bence Gajdics 1; Helena Zapolsky 1; Zoltán Erdélyi 1; Gilles Demange 1; János Tóth 1; 1University of Debrecen; 2University of Rouen
4:20 PM
Realizing the Compositional Homogeneity in GeTe-based Thermoelectric Materials and Phase Transition Behavior: Yi-Fen Tsai1; Pai-chun Wei2; Hsin-Jay Wu2; 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 Bourgès1; Isao Ohkubo1; Naohito Tsuji1; 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 Rogn1; Ernst Bauer1; Michael Zehetbauer1; Peter Rogn1; 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

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Session Chair: Kumar Sundaram, Novelsis

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 Miroux2; Christian Bollmann2; Chengchao Yu2; 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-Jena1; Joachim Becker1; Tobias Beyer1; Thomas Hentschel1; Marcel Rosefort1; Andreas Stieben1; Daniela Zander1; 1RWTH Aachen University; 2Otto Fuchs KG; 3TRIMET Aluminium SE; 4Hydro Aluminium Rolled Products GmbH

2:55 PM
Evolution of Grain Refinement in AS5083 Sheet Metal Processed by ECAP: Christoph Igel1; Philipp Frint2; Maximilian Gruber2; Wolfram Volk2; Martin Wagner2; 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 Sokoluk1; Gongcheng Yao1; Shuahang Pan1; Chezheng 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 Aluminium - Magnesium Alloys in Automotive Industry Applications: Ali Ulus1; Görkem Demiri2; Ali Ulas Malcioglu2; Sümbele Sagdic2; 1Asas Aluminium

4:25 PM
Plastic Flow of AA6013-T6 at Elevated Temperatures and Subsequent Reaging to Regain Full Strength: Katherine Rader1; Louis Hector1; Jon Carter2; Eric Taleff2; 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

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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 Engzelius1; Åste Heggdol Follo1; Henrik Gudbrandset1; Asbjørn Solheim1; Kristian Etienne Einarsrud1; 1Norwegian University of Science and Technology; 2SINTEF Industry

2:25 PM
Mass- and Heat Transfer During Dissolution of Alumina: Asbjørn Solheim1; Egil Skybakmoen1; 1SINTEF Industry

2:45 PM
The Rate of HF Formation during Addition of Alumina to Cryolite Melts: Karen Osen1; Dian Mughnil Felicia2; Christian Rosenkilde3; Camilla Sommerseth4; Ole Kjos4; 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 Alarie1; Thomas Roger1; László Kiss1; Sándor Ponsáck1; Sébastien Guérard2; Jean-François Bilodeau2; 1University of Quebec at Chicoutimi; 2Río Tinto

3:25 PM
Development of a Mathematical Model to Simulate Raft Formation: Thomas Roger1; Laszio Kiss1; Sander Poncsak1; Kirk Fraser1; Sébastien Guérard2; Jean-François Bilodeau2; 1Université Du Québec A Chicoutimi; 2National Research Council Canada; 3Río Tinto Aluminium

3:45 PM Break

4:00 PM
Efficient Alumina Handling: Arne Hilck1; Jan Paepeche1; 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 Clos1; Petter Nekså2; 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 Yang1; Xiaojuan Pang2; Junfeng Qi1; Wenji Tao1; Zhaowen Wang1; Fengguo Liu1; Aimin Liu1; Jiangyu Yu1; Bingliang Gao1; Zhongning Shi2; 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 Bo1; 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

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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 Norouzi2; Lutz Morsdorf1; Alfons Fischer1; Dierk Raabe1; Michael Herbig1; 1Max-Planck-Institut fuer Eisenforschung

2:30 PM
Elucidating Solute Clustering and Precipitation of Al-Cu-Mg-Ag-Si Model Alloys: Jiehua Li1; Zhiheng An2; Fredrik Hage3; Quentin Ramasse3; Gang Sha3; 1University of Leoben; 2University of Science and Technology; 3SuperSTEM Laboratory

2:50 PM
Atom Probe Tomography of Refractory High Entropy Alloys: Patrick Callahan1; 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 Banerjee1; 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 Kautz1; 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: Madalvan Arivu1; 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 Song Shin1; Kyo Jin Hwang1; Dong-Hyuk Jung1; Yoon-Jun Kim1; 1Inha University

5:00 PM
APT-based Stoichiometry Measurements of Single Crystal ThO2: Amita Sen1; Mukesh Bachhav2; Janelle Wharry2; 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

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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 Narayan1; 1University of North Carolina

2:30 PM Invited
Bioinspired Mineralization of Natural Polymers for Biomedical Applications: Conrado Aparicio1; 1University of Minnesota

3:00 PM Invited
Biomimetic Nanointerface Functionalized Microchip for Highly Selective and Efficient Enrichment of Circulating Tumor Cells: Chaoyong Yang1; Lingling Wu2; 1Xiamen University; 2Shanghai Jiao Tong University

3:30 PM Break

3:45 PM Invited
Cancer Cell Mechanics: The Role of Actin: Dinesh Katti1; Sharad Jaswandkar1; H M Nasrullah Faisal1; Kalpana Katti1; 1North Dakota State University

4:15 PM Invited
The Internal Nano-interfaces of Spider Silk: Finding the Molecular-scale Origins of its Strength: Qijue Wang1; Hannes Schniepp2; 1The College of William & Mary

4:45 PM Invited
Engineering Peptides for Nanomaterials: Handan Acar1; 1University of Oklahoma

5:15 PM
Molecular Recognition and Assembly of Biomaterials: Computational and Data Science Tools for Property Predictions: Hendrik Heinz1; 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

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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: Derekh Goss1; Clint Penick2; Alex Grishin3; Sridhar Niverty4; Dhruv Bhate5; Nikhillesh Chawla6; 1Arizona State University; 2Kennesaw State University; 3Phoenix Analysis & Design Technologies, Inc.

2:20 PM
Hierarchical Architecture in Jamming Technology for Soft Robotics: Albert Matushita1; Luis Garcia2; Zida Liu3; Jennifer Doan4; Joanna MicKlirick5; 1University of California, San Diego

2:40 PM
Characterization of Soft Actuation Through Ultrasonic Atomization: Han-Joo Lee1; Kenneth Loh2; 1University of California, San Diego

3:00 PM
Microstructure and Nano-mechanical Properties of the Ironclad Beetle’s Exoskeleton: Nayeon Lee1; Vina Nguyen2; Parker Berthelson3; Robert Mose4; Raj Prabhu5; 1Mississippi State University; 2Engineer Research and Development Center

3:20 PM
Active Metamaterial Skins for Friction Coefficient Control: Yujin Park1; Kenneth Loh2; 1University of California, San Diego

3:40 PM Break

3:55 PM
Electrochemical Studies of Titanium Alloys for Dental Implants: Joewan Bae1; Jacob Benoun2; Vilupanur Rav3; 1California State Polytechnic University, Pomona

4:15 PM
Biocorrosion and Biocompatibility of Advanced Titanium Alloys: Vilupanur Rav3; 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 Jak8; Samuel Zelinka1; Christopher Hunt2; Peter Ciesielski3; Charles Frihart4; Danielle Yelle5; Leandro Passarini6; Sophie-Charlotte Gleiber7; David Vine8; Stefan Vogt9; 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 and Various Amount of Several Beta Stabilizing Elements: Dalibor Preisler1; Josef Strasky2; Jiri Kozlik3; Tereza Kretkova4; Lucie Bodnarova5; Michaela Janovska6; Milos Janecek7; 1Charles University; 2Czech Academy of Sciences

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

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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 Eckert1; 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 Upadrasta1; 1NTU

2:40 PM Invited
Toward Tunable Superelastic Bulk Metallic Glass Composite: Wook Ha Ryu1; Hyun Seok Oh2; Ji Young Kim3; Eun Soo Park4; 1Seoul National University

3:00 PM Invited
Stress Breaks Universal Aging Behavior in a Metallic Glass: Amlan Das1; 1University of Illinois at Urbana-Champaign; 2Paul Scherrer Institute; 3Argonne National Laboratory

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

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Session Chair: David Sapiro, Naval Surface Warfare Center

2:00 PM
Crucible Steel Processing Methods: Neha John1; Maddox Dockins2; Spencer Gellerup3; Bryce Freeman3; Jordyn Ward3; Marcus Young3; 1University of North Texas

2:20 PM
SDS&T Bladesmithing — British Infantry Sword — Historical Aspects: Austin Holmes1; Isaac Hammer2; Jack Carpenter3; George Bernard4; Cody Marshall5; 1SDS&T

2:40 PM
A Look into a Hirazukuri Tanto, Forged from W2 Steel, Following Differential and Cryogenic Hardening: Evan Raeker1; 1University of Michigan
3:20 PM Invited
Behaviors of Disordered Alloys Under Various Temperatures and Pressures: Jianzhong Jiang1; X.D. Wang1; Q.P. Cao2; D.Z. Zhang3; 1Zhejiang University

3:40 PM Break

4:00 PM Invited
Small-scale Mechanical Behavior of Metallic Glasses and Their Composites: Shristi Jha1; Nandita Ghodki2; Vahid Hasannaeimi2; Maryam Sadeghianjani1; Sundeepr Muthiree2; 1University of North Texas

4:20 PM
Evolution of Material Properties in Fragile Bulk Metallic Glasses: Sydney Corona1; Jong Hyun Na2; William Johnson3; 1California Institute of Technology; 2Glassmetal Technology

4:40 PM Invited
Anelastic Relaxation as a Probe of Structural Evolution of Metallic Glasses: Michael Atzmon4; Tianjiao Lei5; 1University of Michigan

5:00 PM Invited
Structural Modifications and their Effect on the Mechanical Properties of a Zr-based Metallic Glass: Bernd Gludovatz6; Lisa Krämer7; Bosong Li8; Amir Monfared9; Keita Nomoto10; Anna Ceguerra11; Christoph Gammer12; Anton Hohenwarter13; Simon Ringer14; Jürgen Eckert15; Jamie Kruzic16; 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 B-Ti: Long Zhang1; Haifeng Zhang2; 1Institute of Metal Research, Chinese Academy of Sciences

2020 TMS TECHNICAL PROGRAM
Wednesday PM | February 26, 2020
Theater A-5 | San Diego Convention Ctr

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 Refinement Effectiveness: Akhihiro Minagawa1; 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-Jaoude6; 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 Kostin1; Aleksander Krokhin1; Viktor Frolov4; Aleksy Starstev1; Sergei Bochvar2; Igor Bobkov3; 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 Sundaram1; Jocie Crocrto1; Robert Wagstaff2; 1Novelis

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 Ilkhmayies, Al Isra University; Yunus Kalay, Middle East Technical University; Jiang-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 PM | February 26, 2020
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 Lee1; 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 Shahi1; Bikash Malhotra2; 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: Oluwale Fatobor1; Esther Akinlabi2; Stephen Akinlabi2; Fedricke 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 Doyle1; Takaki Koyanagi1; Caen Ang1; Yutai Kato2; Steven Zinkle1; David Carpenter3; Stephen Raiman2; 1University of California, San Diego; 2Los Alamos National Laboratory; 3University of Tennessee; 4Oak Ridge National Laboratory; 5Massachusetts 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 Zhao1; Matthew Wingert1; Yasuhiro Kodera1; Stephen Obrey2; Javier Garany3; 1University of California, San Diego; 2Los Alamos National Laboratory

3:55 PM
Investigation of Stress Corrosion Crack Initiation Sites in Alloy 600 using 3D EBSD and Local Model: Naganand Saravanan2; Phani Karamched1; Theo Simonet1; Emilien Burger2; Thierry Couver3; Sergio Lozano-Perez4; 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: Materials Characterization Committee, 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 PM | February 26, 2020
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

2:35 PM Application of Machine Learning to Microstructure Quantification and Understanding. Ryan Norras; Greg Levan; Asa Fry; Iuliana Cernatescu; Pratt & Whitney

2:55 PM Adversarial Networks for Microstructure Generation and Modeling. Wufei Ma; Elizabeth Kautz; Arun Devaraj; Saumyadeep Jana; Vineet Joshi; Daniel Lewis; Bulent Yener; Pacific 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 Brady, PPG Industries

Wednesday PM | February 26, 2020
19 | San Diego Convention Ctr

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; Jiheon Jun; Jian Chen; Michael Brady; Donovan Leonard; Charles Warren; Zhili Feng; Oak Ridge National Laboratory

2:20 PM Corrosion Challenges in Dissimilar Joint Structures for Automotive Lightweighting. Hyun Wooh Ro; Egle Puodziukynaitė; Lobnua Pagnotti; Fuduo Ma; Brian Okerberg; Coating 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; Chen Jian; Yong Chae Lim; Michael Brady; Donovan Leonard; Zhili Feng; Oak Ridge National Laboratory

3:00 PM Invited
First-principles Search for Alloying Elements that Increase Corrosion Resistance of Mg with Transition Metal Impurities. Mingfei Zhang; Louis Hector Jr.; Yang Guo; Ming Liu; Liang Qi; University of Michigan; GM Global Technical Center; General 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; Sarbajit Banerjee; Texas 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; Jessika Rojas; Mark Anderson; Barret Eward; Raul Rebak; Sama Bilbao y Leoni; Virginia Commonwealth University; University of Wisconsin-Madison; GE Global Research

4:15 PM Ceramic Oxide Coatings for Water Reactors: Corrosion Protection in High Temperature Pressurized Water. Mattia Gabrioli; Erkka Frankenberg; Matteo Vanazzi; Koba Van Loon; Jef Vliegels; Konstantina Lambrinou; Fabio Di Fonzo; Center for Nano Science and Technology @Polimi, Istituto Italiano di Tecnologia; KU Leuven, Department of Materials Engineering; KU Leuven, Department of Materials Engineering; SCK-CEN

4:35 PM Fatigue Corrosion Behavior of NiTi Shape Memory Alloy. Mahdi Mohajeri; Dimitris C Lagoudas; Homero Castaneda; Texas A&M University

4:55 PM Can Proteins Secreted by Barnacles Corrode Marine-grade Steel? Vinod Kumar Murugan; Harini Mohanaram; Maja Budanovic; Avind Latchou; Richard Webster; Enrico Marsili; Ali Misere; Matteo Seita; Nanyang Technological University; Nazarbayev 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 Equilbria (CALPHAD) Modeling of Nuclear Fuel Materials: A Constant in Reactor Development. Theodore Besmann; University of South Carolina
2:40 PM
Recent Development of Thermochimica for Simulations of Nuclear Materials: Max Poschmann 1; Bernard Fitzpatrick 1; Srdjan Simunovic 2; Markus Piro 1; 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 Veliseck-Carolan 1; Conor Galvin 1; Edward Obbard 1; Michael Cooper 2; Patrick Burr 1; 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 Galvin 1; Patrick Burr 2; Michael Cooper 3; Paul Fossati 1; Robin Grimes 2; 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 Xie 1; Thien Duong 1; Emmeline Sheu 1; Michael Demkowicz 2; Kelvin Xie 1; 1Texas A&M University

4:40 PM
Analyzing U-Zr Experimental Data Using Quantitative Phase-field Simulation and Sensitivity Analysis: Michael Tanks 1; Jacob Hirschhorn 2; Assel Altkalivaya 1; Cynthia Adkins 2; 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 Mcdavitt 2; Mitchell Meyer 3; 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 Smith 2; Brent Fultz 3; 1California Institute of Technology; 2Swarthmore College

MATERIALS PROCESSING

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 Liang 1; Hamed Ola 1; Lipsa Das 1; Brian Thomas 1; 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 Subasić 1; Alexander Gußfeld 2; Daniela Zander 1; 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 Moore²; Xiang Zhou¹; Haibo Ma¹; Armin Silaen¹; Chenh Zhou¹; Ricardo Lebensohn²; Tresa Pollock¹; Irene Beyerlein¹; ¹Purdue University Northwest

4:00 PM
Numerical Simulation of Macrosegregation Behavior of Billet During Continuous Casting: Yaoguang Li¹; Yanhui Sun²; 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. Hassan¹; I. Mohamed³; 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 Parida¹; Jie Chen¹; Avinash Dongare¹; ¹University of Connecticut

2:40 PM
Understanding the Evolution of Defects Under Extreme Conditions in BCC Tantalum: Sumit Suresh¹; Avinash Dongare¹; ¹University of Connecticut

3:00 PM
Modeling Growth of Voids in Various Grain Neighborhoods Using Crystal Plasticity Theory: Paul Christodoulou¹; Toby Francis¹; Ricardo Lebensohn¹; 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 Kacher¹; Yung Suk Jeremy Yoo¹; Saazol Das¹; 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 Duong¹; Daniel Bufford¹; Nathan Heckman¹; Michael Demkowicz²; Khalid Hattar¹; Brad Boyce¹; ¹Sandia National Laboratories; ²Texas A&M University

4:20 PM
In-situ Investigation of Intergranular Crack Initiation in Hydrogen Embrittled Inconel 725: Mengying Liu¹; Lai Jiang¹; Emmeline Sheu¹; Michael Demkowicz²; 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 Seoane¹; 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 Edwards¹; ¹Rain Carbon Inc.

2:35 PM
Influence of Particle Shape and Porosity on the Bulk Density of Anode Grade Petroleum Coke: Frank Cannova¹; Mike Davidson¹; 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: Geril Jarhsergente¹; Hannah Wells³; Camilla Sommerseth³; Arne Petter Ratvik³; Lorentz Petter Lossius³; Katie Sizeland³; Peter Kappen³; Ann Mari Svensson¹; Richard Haverkamp³; 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 Bureau¹; Armita Rastegari¹; Duygu Kocaefe¹; Yasar Kocaefe¹; Hans Darmstadt²; ¹University of Quebec at Chicoutimi; ²Río Tinto

4:10 PM
Charcoal and Use of Green Binder for Use in Carbon Anodes in the Aluminium Industry: Camilla Sommerseth¹; Ove Darell¹; Barte Øye¹; Anne Støre¹; Stein Rørvik¹; ¹SINTEF Industry

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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 Terrani1; Oak Ridge National Laboratory

2:35 PM Invited
Segregation and Microstructural Factors Affecting the Oxidation Behavior of IN 625 Made by Additive Manufacturing: Brian Gleeson1; Grace Venessa de Leon Nope1; Guofeng Wang1; University of Pittsburgh

3:00 PM
High Temperature Air Oxidation Behavior of Haynes 282 Processed by Electron Beam Melting (EBM): Marie Ramedenne1; Rishi Pillai1; Sebastien Dryepondt1; Padraig Stack1; Oak Ridge National Laboratory; Akron University

3:20 PM
High Temperature Corrosion of Additively Manufactured Inconel 625: Gouri Bhasale1; Aarush Sood1; Shashi Singh1; Amit Pandey1; Amber Shrivastava1; Indian Institute of Technology Bombay; Ansys Inc.

3:40 PM Break

4:00 PM
High Temperature Oxidation Behavior of Additively Manufactured Inconel 625 Superalloy in Two Directions: Sedigheh Rashidi1; Amit Pandey2; Rajeev Kumar Gupta1; University of Akron; Ansys, Inc.

4:20 PM Invited
High Temperature Oxidation and Phase Transformations in TiAl Produced by Additive Manufacturing: Radoslaw Swadzba1; Research Network LUKASIEWICZ Institute for Ferrous Metallurgy, Poland

4:45 PM
Improving the Corrosion Performance of Additively Manufactured 316L via Optimized SLM Processing Parameters: Joseph Sopciak1; Steven Storck1; Rengaswamy Srinivasan1; Morgan Trexler1; 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 Liang1; Xi’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 Harris1; Keiko Amino1; Patrick Steiner1; James Burns1; University of Virginia

2:20 PM
Understanding the Effect of Anodic Polarization on SCC Resistance of AA6111-T8 used for Automotive Applications: Katrina Colledge1; Mark Nichols2; Gerald Frankel1; Jenifer (Warner) Locke1; Ohio State University; Ford Research and Advanced Engineering

2:40 PM
Modeling of Corrosion Damage, Crack Dynamics and Fracture using a Physics-based Meshless Peridynamics Approach: Srujan Rokkam1; Masoud Behzadinasab1; Max Gunzburger2; Nam Phan1; Sachin Shanbhag2; Kishan Goel2; Def-Aero, Advanced Cooling Technologies Inc; Florida State University; Naval Air Systems Command

3:00 PM
Stress Corrosion Cracking Behavior of Austenitic Stainless Steel SS304 for Dry Storage Canisters in Simulated Sea-water: Nilesh Kumar1; Leonard Tjayadi2; Korukonda Murty2; University of Alabama, Tuscaloosa; North Carolina State University

3:20 PM Break

3:40 PM Invited
Cracking of Reactor Core Internal Materials in LWR Environments: Yiren Chen1; Argonne 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 Kim2; Chang-Young Oh2; Ji Hyun Kim2; Sang-Woo Song1; Korea Institute of Materials Science; Ulсан 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 Steiner1; James Burns1; University of Virginia
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

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**2:00 PM Invited**
Metastable Phase Transformation and Defomation Twinning Induced Hardening-stiffening Mechanism in Silicon Nanoparticles: Yu Hong; Ning Zhang; Mohsen Asle Zaeem; Colorado School of Mines; University of Alabama

**2:20 PM**
Synthesis of Micro-encapsulated Phase Change Materials using Chain Transfer Agent via Emulsion Polymerization and its Induced Hardening-stiffening Mechanism in Silicon Nanoparticles: Sun Choi

**2:40 PM**
The Microstructural Evolution of Nanotwinned Nickel Superalloys: Joel Bahena; Andrea Hodge; University of Southern California

**3:00 PM**
Synthesis of Tailored Nanostructures: Andrea Hodge; University of Southern California

**3:20 PM**
Break

**3:40 PM**
Programmable Self-Assembly of 3D Printed Particles: David Doan; Xun Gu; Stanford 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 Subramaniam; Gregory Doerk; Kim Kisslinger; Daniel Yi; Robert Grubbs; Chang-Yong Nam; Stony Brook University; Brookhaven National Laboratory

**4:20 PM**
Synthesis and Growth Mechanism of Bismuth Nanoflowers and Their Application for Electrochemical Sensing: Edward Fratto; Mary Joens; Jirui Wang; Zhiyong Gu; University of Massachusetts Lowell

**4:40 PM**
Trade of Technological Advances in the Field of Nanomaterials: Shah Ashraf; NIT Srinagar

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**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 Shiffer, 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; Chia-Ming Kuo; National Tsing Hua University

**2:20 PM Invited**
Phase Stability and Deformation Behaviors of CrFeCoNiMox (x=0-0.3) High-entropy Alloys: M Naem; Haiyan He; Bing Wang; Xun-lying Wang; City University of Hong Kong

**2:40 PM Invited**
Non-equiaxial, Multi-phase TRIP/TWIP Multi-principal Element Alloys: Amy Clarke; Francisco Couvy; John Copley; Yaofeng Guo; Mohamed Elbahishwani; Michael Moorehead; Calvin Parkin; Bo-Shuan Lii; David Armstrong; Angus Wilkinson; Xuan Zhang; Chuan Zhang; Kumar Sridharan; Adrien Couet; University of Wisconsin Madison; University of Oxford; Argonne National Laboratory; CompuTherm LLC; University of Wisconsin Madison

**3:00 PM**
Microstructural Characterizations and Mechanical Properties of CrFeNiMn and NbTaTiV High Entropy Alloys: Mohamed Elbahishwani; Michael Moorehead; Calvin Parkin; Bo-Shuan Lii; David Armstrong; Angus Wilkinson; Xuan Zhang; Chuan Zhang; Kumar Sridharan; Adrien Couet; University of Wisconsin Madison; University of Oxford; Argonne National Laboratory; CompuTherm LLC; University of Wisconsin Madison

**3:20 PM Invited**
Development of CuFeMnNi-based High Entropy Alloys Using CALPHAD Approach and Thermomechanical Processing: Xuejun Huang; Jiashi Miao; Alan Luo; Ohio 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; Hurn Soek Oh; Eun Soo Park; Robert Ritchie; UNSW Sydney; The University of New South Wales; Lawrence Berkeley National Laboratory

**4:20 PM Invited**
Dynamic Behavior of CrMnFeCoNi High-entropy Alloy: Marc Meyers; Xezhou Li; Shileng Zhao; Carlos Ruestes; Bingfeng Wang; Yong Liu; Peter Liaw; Wen Yang; Robert Ritchie; University of California San Diego; Lawrence Berkeley Laboratory; CONICET & Universidad Nacional de Cuyo; Mount Saint Mary's University; University of Tennessee

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2:00 PM Invited
Developing CALPHAD Databases for Thermophysical Properties of Metals and Alloys: Hai Lin¹; Masoomeh Ghasemi²; Qing Chen¹; ¹Thermo-Calc Software AB

2:40 PM Invited
Development of a Comprehensive Diffusion (mobility) Database for Lightweight Magnesium Alloys: Wei Zhong¹; Ji-Cheng Zhao¹; ¹University of Maryland

3:20 PM Invited
Thermodynamic Assessment of the Fe-B and Fe-B-C- Systems: Katsunari Oikawa¹; Nobufumi Ueshima¹; ¹Tohoku University

4:00 PM Break

4:20 PM Invited
CALPHAD Databases for Co-based Alloys: Peisheng Wang¹; Ursula Kattner²; Carelyn Campbell²; Gregory Olson²; ²Northwestern University; ¹National Institute for Standards and Technology

5:00 PM Invited
Diffusion Mobilities in Co-Ni-Al-Cr System: Kil-Won Moon¹; 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 McDowell¹; ¹Georgia Institute of Technology

2:40 PM Invited
Combining Machine Learning and ICME for Alloy Development: Bryce Meredig¹; ¹Citrein Informatics

3:20 PM
Magicmat (Materials Genome and Integrated Computational Materials Toolkit) and Its Application for Thermoelectric Materials Design: Changning Niu¹; Ramya Gurunathan¹; Abhinav Saboo¹; Jiadong Gong¹; ¹OusTek Innovations LLC

3:40 PM Break

4:00 PM Invited
A Bayesian Framework for Materials Knowledge Systems: Surya Kalidindi¹; ¹Georgia Institute of Technology

4:40 PM Invited
Deep Materials Informatics: Illustrative Applications of Deep Learning in Materials Science: Ankit Agrawal¹; 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 Geestacht

2:00 PM Invited
Anomalous Hydrogen Evolution on Magnesium: Aline Gabbardo¹; Aline Gabbardo¹; 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**; Pulkit Garg; Vineet Joshi; Kiran Solanki; 1Arizona State University; 2Pacific Northwest National Laboratory

2:50 PM
The Corrosion Behavior of High Purity Mg According to Process History: Sang Kyu Woo; Byeong-Chan Suh; Nam Ryong Kim; Ha Sik Kim; Chang Dong Yin; 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; Bilal Mansoori; Matthew Vaughan; Ibrahim Karaman; 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; Boyu Liu; Zhiwei Shan; 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; 1University of Windsor

4:30 PM
Al8Mn5 Particle Clustering on Oxide Films in Liquid AZ80 Magnesium Alloys: Liqing Peng; Te-Cheng Su; Kazuhiro Nogita; Hideyuki Yasuda; Christopher Gourlay; 1Imperial College London; 2The University of Queensland; 3Kyoto University

4:50 PM
Study of In-vitro Biodegradation Behavior of Mg-2.5Zn-xES Composite: Srivinayan Murugan; Paul Okonkwo; Ahmed Bahgat; Gururaj Parande; Aboubakr M. Abdullah; Manoj Gupta; 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 Invited
Microstructural Design for Advanced Aluminium and Magnesium Alloys: Jian-Feng Nie; 1Monash University

2:30 PM
Strength Prediction in a Quaternary Mg Alloy System Using a Multi-scale Optimization Framework: Stephen Dewitt; Brian Puchala; Qianying Shi; Anirudh Raju Natarajan; Chaoming Yang; Anton Van der Ven; Liang Qi; John Allison; 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; 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 Liu; Ioannis Papadimitriou; Bábara Bellón; Hong Liu; Gustavo Esteban-Manzanares; Rodrigo Santos-Güemes; Javier Llorca; 1IMDEA Materials Institute; 2IMDEA Materials Institute & Technical University of Madrid; 3Katholieke Universiteit Leuven

**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 Fahrmann, Haynes International; Qiang Feng, University of Science and Technology Beijing; Michael Titus, Purdue University

**Wednesday PM | February 26, 2020**
**33A | San Diego Convention Ctr**

**Session Chairs:** Amit Shyam, Oak Ridge National Laboratory; Michael Titus, Purdue University

2:00 PM Invited
In-situ Spectro-electrochemistry of Molten Chloride Salts: Ruchi Gakhar; William Phillips; Steven Frank; 1Idaho National Laboratory

2:20 PM
Thermophysical-Properties Characterization of a Quaternary Novel Salt based on Na+/K+/ and NO3-/Cl- System: Matías Castro; Daniel Faundez; Carlos Lopez; Alvaro Videla; 1Pontificia Universidad Católica de Chile; 2Salmag, Albemarle
4:10 PM
Non-equilibrium Interfacial Solute Segregation as a Thermal Stabilization Mechanism in Al-Cu Alloys: Amit Shyam; Dongwon Shin; Jonathan Poplawsky; James Morris; Patrick Shower; Lawrence Allard; Matthew Chisholm; Thomas Watkins; Sumit Bahl; Allen Haynes; Oak Ridge National Laboratory; Ames Laboratory; GE Global Research

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; Sauron McFadden, Ulster University; Jonghyun Lee, Iowa State University; Wilhelmus Sillekens, European Space Agency; Takehiko Ishikawa, JAXA

Wednesday PM | February 26, 2020
18 | San Diego Convention Ctr

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; Sabine Bottin-Rousseau; Silvère Akamatsu; Melis Sereroglu; Victor Witusiewicz; Access e.V.; Sorbonne University; Koc University

2:20 PM
Nucleation Fronts Growing in Al-Ni Melts Under Reduced Gravity: Marcus Reinarz; Stefan Burggraf; Matthias Kolbe; Peter Galenko; Dieter M. Herlach; Markus Rettenmayr; Friedrich Schiller University Jena; German 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 Tabrizi; Chih-Hung Chen; Alain Karma; Northeastern University; National Taiwan University

3:00 PM
In-situ Dynamics of Hybrid Eutectic Growth Front Morphologies: the Transparent Alloys Project: Sabine Bottin-Rousseau; Victor Witusiewicz; Ulrike Hecht; Access e.V.

3:20 PM
Chill-cooling of D2 Tool Steel Under Reduced Gravity Conditions: Jonas Valloton; Thomas Voilkmann; Hani Henein; University of Alberta; Deutsches Zentrum für Luft- und Raumfahrt (DLR)

3:40 PM
Break

4:00 PM
An Overview of a Proposed NASA Flight Experiment on W-heavy Glass-forming Alloy Composites: Douglas Hofmann; Scott Roberts; NASA JPL/Caltech

4:30 PM
Kinetics of Solidification in Glass Forming Alloys Under Microgravity Conditions: Stefanie Koch; Manoel da Silva Pinto; Gerhard Wilde; Peter Galenko; University Jena; University Muenster

4:50 PM
Metastable Phase Formation in Peritectic Systems Under Terrestrial and Reduced Gravity Conditions: Olga Shuleshova; Wolfgang Löser; Thomas Volkmann; Douglas Matson; IFW Dresden, Germany; Institute of Materials Physics in Space, DLR, Germany; Tufts University

5:10 PM
Effect of Convection on Co-Si Solidification Pathway: Insights from Advanced Photon Source Synchrotron XRD: Evan Baker; Sangho Jeon; Douglas Matson; Tufts 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

Wednesday PM | February 26, 2020
Santa Rosa | Marriott Marquis Hotel

Session Chairs: Gregory Thompson, University of Alabama; Scott Mao, University of Pittsburgh

2:00 PM Invited Talk
Influence of Mechanical Loading on Nanocrystalline Stabilized Alloys: Gregory Thompson1; Jonathan Priedeman2; Thomas Koenig3; Xuyang Zhou4; B. Chad Hornbuckle5; Kris Darling6; Sean Fudger7; Ankita Gupta8; Garritt Tucker9; University 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 Gu1; Qianying Guo2; Gregory Thompson3; Lin Li4; University of Alabama

3:00 PM Probing the Deformation Mechanisms of Al-matrix Composites with Small-scale Mechanical Testing: Olivia Donaldson1; Jenna Wardini2; Timothy Rupert3; University of California, Irvine

3:20 PM Effects of Microstructures on Superelasticity of CaFe2As2 Single Crystal: Shuyang Xiao1; John Sypek2; Srimat Vijayan3; Paul Canfield4; Mark Aindow5; Seok-Woo Lee6; 1University of Nevada, Reno; 2Los Alamos National Laboratory; 3University of Houston; 4University of Connecticut; 5Auburn University

3:40 PM Break

4:00 PM Ductile Deformation of Nearly Monoatomic Metallic Glass: Mehrdad Kiani1; Wendy Gu2; Stanford University

4:20 PM Microstructure Characterization and Micro-mechanical Properties of 14YWT Processed With Different Methods: Cayla Harvey1; Osman El-Atwani2; Stuart Maloy3; Sid Pathak4; 1University of Nevada, Reno; 2University of Pittsburgh; 3University of Alabama; 4University of Alabama

4:40 PM Small-Scaled Plasticity in Reversed Hall-patch Region: Scott Mao1; Xiang Wang2; 1University of Pittsburgh; 2University of Alabama

5:00 PM Extraordinary Tension-compression Asymmetry in Submicron-sized Amorphous Silicon: Yuecun Wang1; Lin Tian2; Evan Ma3; Zhiwei Shan4; 1Center for Advancing Materials Performance from the Nanoscale; 2Xian Jiaotong University; 3Institute of Materials Physics, University of Göttingen; 4Department 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; Dhirendra Bhattacharya, 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 PM | February 26, 2020
32B | San Diego Convention Ctr

Session Chairs: Shailendra Joshi, University of Houston; Dhirendra Bhattacharya, 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 Joshi1; 1University of Houston

2:50 PM Microstructure and Micromechanical Field Evolution During Dynamic Recrystallization: A Crystal Plasticity-phase Field Simulation Study: Supriyo Chakraborty1; Chaitali Patil2; Yunzhi Wang3; Stephen Niezgoda4; 1Ohio State University; 2Louisiana State University; 4Ohio State University

3:10 PM Shape Fidelity and Mechanical Response in Micro Pattern Replication by Molding: Bin Zhang1; Mohammad Dodaran2; Shuai Shao1; Junseo Choi2; Sunggook Park3; Wenjin Meng4; 1Louisiana State University; 2Auburn University; 3University of California, Irvine; 4University of Houston

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 Genve1; Stephane Berbenni2; Nathalie Gey3; Julien Guyon4; Frederic Bonnet3; 1Laboratoire d’Etude des Microstructures et de Meccanique des Matériaux (LEM3), UMR 7239, CNRS / Université de Lorraine; 2Laboratory of Excellence DAMAS, Design of Alloy Metals for low-mAss Structures; 3Laboratoire de Microstructures et de Meccanique des Matériaux (LEM3), UMR 7239, CNRS / Université de Lorraine; 4Laboratory of Excellence DAMAS, Design of Alloy Metals for low-mAss Structures

4:30 PM Multiscale Modeling to Determine Bulk Material Property from Miniature Specimen Testing: Farhan Rahman1; Tasnim Hassan2; 1North Carolina State University; 2Army Research Laboratory

4:50 PM Experimental and Numerical Investigation into Mechanical Degradation of Polymers and Polymer Composites: Vinamra Agrawal1; Asha-Dee Celestine2; Brandon Runnels3; 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
31A | San Diego Convention Ctr

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 Hector¹; General Motors R&D Laboratories

2:30 PM
Resetting Mechanical Property of 9Cr Steel by Segregation Engineering: Min Seok Kim¹; Sang Jun Kim¹; Ji Won Kim¹; Eun Soo Park¹; Seoul National University; Case Western Reserve University

2:50 PM
Deformation Mechanisms in Metastable Fcc Alloys: Mulaine Shih¹; Maryam Ghazisaeidi¹; Ohio State University

3:30 PM Invited
Modeling of Metastable Phase Formation for Sputtered Ti1-xAlxN Thin Films: Sida Liu¹; Keke Chang¹; Stanislav Mráz²; Xiang Chen³; Marcus Hans¹; Denis Music¹; Daniel Priemetzhofer²; Jochen Schneider³; RWTH Aachen University; RWTH Aachen University; NIMTE, Chinese Academy of Sciences; Uppsala University

3:40 PM Break

4:00 PM
Thermal Decomposition of Quasicrystals in Powder-processed Icosahedral-phase-strengthened Aluminum Alloys: Hannah Leonard¹; Sarshad Rommel¹; Mingxuan Li¹; Thomas Watson¹; Tod Policandriotes³; Mark Aindow¹; University of Connecticut; Pratt & Whitney; Collins Aerospace

4:20 PM
Pseudo-in situ Characterization of Phase Transformation in an Al-Cu-Mn-Zr Alloy using Atom Probe Tomography: Bharat Gwalani²; Elizabeth Kautz²; Amit Shayam³; Jonathan Poplawska³; Arun Devaraj³; Pacific Northwest National Laboratory; Oak Ridge National Laboratory

4:40 PM
Harnessing the Stability of Al2Cu at Unprecedented High Temperatures: Dongwon Shin¹; Amit Shayam³; Larry Allard¹; Matthew Chisholm¹; Jon Poplawska³; J. Haynes¹; Oak Ridge National Laboratory

5:00 PM
Formation of Metastable Spiral Patterns during Directional Eutectic Solidification: Saman Monirí¹; Ashwin Shahan²; University 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

Wednesday PM | February 26, 2020
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 Subramanian¹; Arvind Singh²; Srivatsan Tirumalai³; Manoj Gupta⁴; Ansys Inc²; Wenzhou University²; The University of Akron³; National University of Singapore⁴

2:30 PM Invited
The Mechanical and Thermal Response of Shape Memory Alloy-reinforced Aluminum Nanocomposites: Penchal Reddy Matli¹; Vyasaraj Manakari¹; Gururaj Parande¹; RA Shakoor²; S. Srivatsan³; Manoj Gupta¹; National University of Singapore²; Qatar University³; University of Akron¹

3:00 PM
Electrical Performance of Bulk Al-ZrB2 Nanocomposites from 2K to 300K: Shuaihang Yao¹; Gongcheng Yao¹; Jie Yuan¹; Xiaochun Li¹; University 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 Prasadh¹; Vyasaraj Manakari¹; Gururaj Parande¹; Srivatsan Tirumalai³; Raymond Wong¹; Manoj Gupta¹; National University of Singapore²; University of Akron³

4:15 PM
Hierarchical 3D Nanolayered Duplex-phase Zr with High Strength, Strain Hardening, and Ductility: Jie-Wen Zhang¹; Wei-Zhong Han¹; Xi’an Jiaotong University
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

Wednesday PM | February 26, 2020
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 Seetharaman; Jayalakshmi Subramanian; Arvind Singh; Srivatsan Tirumalai; Manoj Gupta; Ansys Inc.

2:30 PM Invited
The Mechanical and Thermal Response of Shape Memory Alloy-reinforced Aluminum Nanocomposites: Penchal Reddy Matli; Vyasaraj Manakari; Gururaj Parande; RA Shakoor; T. S. Srivatsan; Manoj Gupta; National University of Singapore; Qatar University

3:00 PM
Electrical Performance of Bulk Al-ZrB2 Nanocomposites from 2K to 300K: Shuaihang Pan; Gongcheng Yao; Jie Yuan; Xiaochun Li; University 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 Prasanthi; Vyasaraj Manakari; Gururaj Parande; Srivatsan Tirumalai; Raymond Wong; Manoj Gupta; National University of Singapore; The University of Akron

4:15 PM
Hierarchical 3D Nanolayered Duplex-phase Zr with High Strength, Strain Hardening, and Ductility: Jie-Wen Zhang; Wei-Zhong Han; Xi’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

Wednesday PM | February 26, 2020
4 | San Diego Convention Ctr

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; Benoit Merle; Warren Oliver; George Pharr; International Advanced Research Centre for Powder Metallurgy and New Materials (ARC); Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU); Nanomechanics, Inc.; Texas 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; Shiteng Zhao; Yan Chong; Max Poschmann; Eric Rothchild; Colin Ophus; John Morris; Daryl Chrzan; Mark Asta; Andrew Minor; University of California Berkeley and Lawrence Berkeley National Laboratory; University of California Berkeley; Lawrence Berkeley National Laboratory

3:00 PM Break

3:30 PM Invited
The Dynamics of Precipitate Shearing in fcc/L12 Alloys: Jean-Charles Stinville; Michael Titus; Daniel Gianola; Tresa Pollock; University of California Santa Barbara

4:00 PM Invited
Early Nanoscale Dislocation Processes and Two Creep Rate Minima in SX Ni-base Superalloys: Gunther Eggler; Ruhr-University Bochum
TMS2020 TECHNICAL PROGRAM

284

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


**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**

14B | San Diego Convention Ctr

**Session Chair:** Joseph Grogan, Gopher Resource

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:00 PM</td>
<td>Driving Innovation in Lead Batteries: The Focus of the Consortium of Battery Innovation</td>
<td>Matthew Raiford, CBI</td>
</tr>
<tr>
<td>2:20 PM</td>
<td>The Removal of Arsenic from Lead Bullion via Vacuum Distillation</td>
<td>Evody Tshijik Karumb, Patrick Taylor, Colorado School of Mines</td>
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<tr>
<td>2:40 PM</td>
<td>New Technology for Copper Removal from Lead by Application of Aluminium: Practical Problems</td>
<td>Andrzej Cybulski, LUKASIEWICZ Research Network - Institute of Non-Ferrous Metals Gliwice</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>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</td>
<td>Christoph Zschiesche, Ino Bauer, Aurubis AG</td>
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<tr>
<td>3:20 PM</td>
<td>Break</td>
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<tr>
<td>3:40 PM</td>
<td>Tin Treatment in Kosaka Lead Smelting</td>
<td>Kohei Miwa, Eiji Yamaguchi, Shigeki Satoh, Kosaka Smelting &amp; Refining Co., Ltd.</td>
</tr>
<tr>
<td>4:00 PM</td>
<td>True Traceability Enabled by In-line Laser Marking of Lead and Zinc Ingots</td>
<td>Alex Fraser, Jean-Michaël Deschênes, Laserax Inc</td>
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<tr>
<td>4:20 PM</td>
<td>Advanced Technologies Reliant on the Properties of Lead</td>
<td>Timothy Ellis, RSR Technologies</td>
</tr>
<tr>
<td>4:40 PM</td>
<td>Nucleation and Growth of Lead Sulfate Nanoparticles</td>
<td>Michael Wall, Jesse Smith, Marcus Young, Tim Ellis, University of North Texas</td>
</tr>
</tbody>
</table>

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


**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**

15A | San Diego Convention Ctr

**Session Chair:** Etsuro Shibata, IMRAM, Tohoku University

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<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:00 PM</td>
<td>The EZINEX® Process for Secondary Zinc Bearing Materials</td>
<td>Massimo Maccagni, Edoardo Guerrini, Engitec Technologies</td>
</tr>
<tr>
<td>2:20 PM</td>
<td>Technologies for Treatment of Zinc-containing Waste from Metallurgy in KCM AD</td>
<td>Stefan Stoychev, Emil Minchev, Alexander Kyurkchiev, Georgi Radonov, Ivan Dobrev, KCM AD</td>
</tr>
<tr>
<td>2:40 PM</td>
<td>Zinc Reduction/ Vaporization Behavior from Metallurgical Wastes</td>
<td>Timothy Kerry, Alexander Peters, Evangelos Georgakopoulos, Ashkan Hosseini, Erik Offerman, Yongxiang Yang, TU Delft</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>Recycling of Zinc from Galvanized Steel Scrap</td>
<td>Shafiq Alam, V.I. Lakshmanan, R. Sridhar, University of Saskatchewan, Process Research ORTECH Inc.</td>
</tr>
<tr>
<td>3:20 PM</td>
<td>Break</td>
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<tr>
<td>3:40 PM</td>
<td>Shape and Size Modification of Galvanized Steel Scrap for Introduction to the “HIsarna” Furnace</td>
<td>Evangelos Georgakopoulos, Timothy Kerry, Ashkan Hosseini, Erik Offerman, Yongxiang Yang, TU Delft</td>
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<tr>
<td>4:00 PM</td>
<td>Two Step Dust Recycling – A Modern Recycling Technology for High Zinc Containing EAF-dusts</td>
<td>Michael Auer, Juergen Antrekowitsch, Montanuniversität Leoben</td>
</tr>
<tr>
<td>4:20 PM</td>
<td>Effect of Reducing Agent on Zinc Recovery from Primary Battery Waste in High Temperature Recycling Process</td>
<td>Burcak Ebin, Martina Petranikova, Britt-Marie Steenari, Christian Ekberg, Chalmers University of Technology</td>
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<tr>
<td>4:40 PM</td>
<td>Production and Application of Comprehensive Recovery Process of Regenerated Zinc</td>
<td>Zhao Pengfei, Dai Jianghong, China ENFI Engineering Corporation</td>
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</tbody>
</table>
**MATERIALS PROCESSING**

**PbZn 2020: The 9th International Symposium on Lead and Zinc Processing — Zinc Leaching & Fe-control II**


**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
15B | San Diego Convention Ctr

**Session Chair:** Stephen James, Nyrstar Clarksville, Inc.

- **2:00 PM**
  - A New Route for Treating Neutral Leaching Residue: Caio Oliveira¹; Daniel Pereira¹; Felipe Mendes¹; ¹Nexa Resources

- **2:20 PM**
  - Recent Operational Improvements of Hematite Plant at Akita Zinc Co., Ltd: Dai Matsuura¹; Yasuo Usami¹; Kenji Ichiyia¹; ¹Akita Zinc Co., Ltd

- **2:40 PM**
  - Zinc Extraction from Industrial Waste Residue by Conventional Acid Leaching: Tingfang Xie¹; Chenyu Sun¹; Yongguang Luo²; Guojiang Li³; Aliuan Ma⁴; ¹Yunnan Chihong Zn & Ge Co., Ltd; ²Kunming University of Science and Technology; Yunnan Chihong Zn & Ge Co., Ltd; ³Lupanshui Normal University

- **3:00 PM**
  - Study of a Novel Chloride Volatilization Process for the Treatment of Jarosite Residue: Haibei Wang¹; ¹BGRIMM Technology Group

- **3:20 PM** Break

- **3:40 PM**
  - Magnetic Separation of Iron Ion from Leaching Solution by Magnetic Seeding in Hydrometallurgy: Tong Yue¹; 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 Wang¹; ¹BGRIMM Technology Group

- **4:20 PM**
  - Separation of Zinc from Metallurgical Residue in NH3–(NH4)2SO4–H2O System: Ma Aiyuan¹; Chenyu Sun¹; Yongguang Luo²; Guojiang Li³; Tingfang Xie¹; Xuebei Zheng¹; ¹Lupanshui Normal University; ²Kunming University of Science and Technology; Yunnan Chihong Zn & Ge Co., Ltd; ³Yunnan Chihong Zn & Ge Co., Lt

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**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 Ackerman¹; Benjamin Savitzky²; Colin Ophus³; Mohsen Danalie⁴; Phani Karchamched⁵; Angus Wilkinson⁶; David Rugg⁷; David Dye⁸; ¹Imperial College, London; ²National Center for Electron Microscopy; ³Electron Physical Sciences Imaging Centre (ePSIC); ⁴University of Oxford; ⁵Rolls-Royce plc.

- **2:20 PM**
  - Structural Phase Transformation in Single Crystal Titanium during Dynamic Loading: Curt Bronkhorst¹; 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: Rituparna Sahoo¹; Abu Syed Kabir¹; ¹Carleton University

- **3:00 PM**
  - Effect of Alloying Content on the Discontinuous Precipitation of d 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: Xiaqian Fu¹; Qian Yu¹; ¹Zhejiang University
<table>
<thead>
<tr>
<th>TIME</th>
<th>SESSION</th>
<th>PRESENTERS</th>
<th>TOPIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:00 PM</td>
<td>Invited</td>
<td>Flash Sintering: From Fundamental Science to Energy-saving Materials Processing</td>
<td>Jian Luo, University of California, San Diego</td>
</tr>
<tr>
<td>2:30 PM</td>
<td>Cold Spray Deposition of 304L Stainless-steel Powder on Used Fuel Dry Dask Storage Systems to Control Potential Stress Corrosion Cracking</td>
<td>Hwasung Yeom, University of California, San Diego</td>
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<td>2:50 PM</td>
<td>Effect of Particle Spreading Dynamics on Powder Bed Quality</td>
<td>Yousub Lee, University of California, San Diego; Kate Gurnon, Oak Ridge National Laboratory; Olivia Graeve, GE Global Research</td>
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<tr>
<td>3:10 PM</td>
<td>Fabrication of Uniform-sized Hemispherical Mesopores on Gold-coated Silver Nanocubes for Enzyme Immobilization</td>
<td>Seongcheol Choi, University of California, San Diego; Olivia Graeve, GE Global Research</td>
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<td>3:30 PM</td>
<td>Influence of Powder Microstructure on Cold Spray Deposited Cr Coatings for High Temperature Oxidation Resistance</td>
<td>Tyler Dabney, Hwasung Yeom, Greg Johnson, Mia Lenting, Kumar Sridharan, University of Wisconsin Madison</td>
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<tr>
<td>3:50 PM</td>
<td>Break</td>
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<tr>
<td>4:10 PM</td>
<td>Toward New Flash and Energy Efficient Fabrication Processes based on Sintering</td>
<td>Charles Maniere, Geuntak Lee, Elisa Torresani, Sylvain Mariné, Lise Durand, Claude Estournès, Eugene A. Olevsky, CRISMAT Laboratory; Powder Technology Laboratory; CEMES; CRIMAT</td>
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<tr>
<td>4:40 PM</td>
<td>Investigation of the Powder Processing of Near-final Shape AlNiCo Magnets for Eventual Use in Electric Drive Motors</td>
<td>Emily Rinko, Iver Anderson, Emma White, Wei Tang, Lin Zhou, Matthew Kramer, Iowa State University; Ames Laboratory</td>
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<td>2:00 PM</td>
<td>Introductory Comments</td>
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<tr>
<td>2:05 PM</td>
<td>Application of Electronically Mediated Metallothermic Reductions in Molten Salts to Nuclear Materials</td>
<td>Michael Simpson, Prashant Bagri, Jarom Chamberlain, University of Utah; Oak Ridge National Laboratory</td>
<td></td>
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<tr>
<td>2:25 PM</td>
<td>Development of a New Electrodeposition Process based on Liquid Metal Electrochemical Technologies in Molten Salt Electrolytes</td>
<td>Takanari Ouchi, Shuang Wu, Toru Okabe, The University of Tokyo</td>
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<tr>
<td>2:45 PM</td>
<td>Electrodeposition of Titanium from Alkali Fluoride-Chloride Molten Salts</td>
<td>Yutaro Norikawa, Makoto Unoki, Kouji Yasuda, Koma Numata, Mitsuyasu Ogawa, Masatoshi Majima, Toshiyuki Nojiri, Kyoto University; Sumitomo Electric Industries, Ltd.</td>
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<tr>
<td>3:05 PM</td>
<td>History of Inventions and Innovations for Aluminum Production</td>
<td>Michel Reverdy, Vinko Potocnik Consultant Inc</td>
<td></td>
</tr>
<tr>
<td>3:25 PM</td>
<td>Open-circuit Explosions and Basement Thermite Fires Threaten Aluminum Potlines</td>
<td>Alton Tabereaux, Consultant</td>
<td></td>
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<tr>
<td>4:05 PM</td>
<td>Study on Electronically Mediated Reaction (EMR), and What I Learned from Professor Sadoway</td>
<td>Toru Okabe, University of Tokyo</td>
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<tr>
<td>4:25 PM</td>
<td>Thermodynamics of Electrode Reactions for Energy Storage, Separation, and Corrosion</td>
<td>Hojong Kim, Pennsylvania State University</td>
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<tr>
<td>4:45 PM</td>
<td>Trends and Challenges for Electrowinning of Aluminium and Magnesium from Molten Salt Electrolytes</td>
<td>Geir-Martin Haarberg, Norwegian University of Science &amp; Technology</td>
<td></td>
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<tr>
<td>5:05 PM</td>
<td>Extraction of Magnesium from Aluminum Scrap Melts by Molten Salt Electrorefining</td>
<td>John Hryn, Subodh Das, Boyd Davis, Argonne National Laboratory; Phinix; Kingston Process Metallurgy</td>
<td></td>
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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


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: 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 Liaw²; Raymond Unocic³; Hongbin Bei³; James Morris¹; 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 Mishra¹; ¹University of North Texas

3:00 PM
Microstructural Evolution and Mechanical Behavior of an AlCoCrCuFeNi High Entropy Alloy during Non-equilibrium Powder Metallurgical Processing: Baolong Zheng¹; 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; Tirumala S. Srinivasan²; Amit Kumar³; Manoj Gupta³; 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 Abbaschian¹; Nicholas Derimow²; Benjamin MacDonald³; Enrique Lavernia¹; ¹University of California

4:30 PM AlFeNiTi Compositionally Complex Alloys: Daniel Goodelman¹; Andrea Hodge¹; ¹University of Southern California

4:50 PM Microstructure and Mechanical Properties of a Nanostructured High Entropy Alloy Processed via Cryogenic Rolling: Yoojun Lin¹; Zhigang Yan¹; 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

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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 Morgan, University of Wisconsin

2:00 PM Invited
Irradiation Effects in Weld Repairs of Irradiated Stainless Steel
Janelle Wharry: 1; Benjamin Eftink: 1; Stu Maloy: 1; Thomas Lienert: 2; 1Los Alamos National Laboratory; 2T.J. Lienert Consulting, LLC

2:10 PM Invited
Reassessment of TRIM Simulations for Damage Production in Materials
Velisa Liss: 1; Jun Ding1; Ruopeng Zhang2; Colin Ophus1; Mark Asta1; Robert Ritchie1; Andrew Minor1; 1Lawrence Berkeley National Laboratory; 2University of California, Berkeley

2:00 PM Invited
Role of UFG-shell Network on Improving Mechanical Properties in Harmonic Structure Materials
Kei Ameyama1; 1Ritsumeikan University

5:10 PM
Advanced Electron Microscopy Characterization of Ion Radiation Damage in Bulk Metallic Glass and High Entropy Alloys
Yang Yang1; 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 Shao3; Yaqiao Wu4; Michael Nastasi1; Bai Cui1; 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

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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
Testing Old & New Ideas to Address Unresolved Questions in UFGs
Elias Aifantis1; 1Aristotle University of Thessaloniki

2:40 PM
Fracture and Ductility of Nanostructured Molybdenum–copper Composites
Anton Hohenwarter1; Katharina Schwarz2; Julian Rosalie3; Stefan Wurster4; Reinhard Pippan5; 1University of Leoben; 2Erich Schmid Institute of Materials Science, Austrian Academy of Sciences

3:00 PM
Strain-Rate Dependence of Stress Fluctuation in High entropy Alloys
Takahiro Kunimine1; Si Gao1; Ryoichi Monzen2; Nobuhiro Tsuji3; 1Kanazawa University; 2Kyoto University

3:20 PM Break

4:00 PM Invited
Synchrotron X-ray and Neutron Diffraction – Opportunities for Ultrafine-grained and Hetero-structured Materials
Klaus-Dieter Liss1; 1Guangdong Technion - Israel Institute of Technology (GTITI)

4:00 PM
Synthesis of an Ultrafine-grained Metastable Al Alloy through Mechanical Bonding by High-pressure Torsion
Yaozhou Wang1; Jae-Kyung Han2; Terence Langdon2; 1Oregon State University; 2University of Southampton
4:20 PM
The Influence of Surface Plastic Deformation on Phase Transformations in a Metastable Beta Titanium Alloy Ti55Mo: Milos Janacek1; Kristina Bartha1; Josef Strasky1; Anna Veverkova1; Pere Barriberro Vila1; Jozef Vesely1; Peter Minarik1; Jakub Cizek1; Irina Semenova1; Veronika Poljakova1; 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; Yu Shi; 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

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Session Chair: Jie Chen. Los Alamos National Laboratory

2:00 PM
Low-stress Shock Hugoniot of Additively Manufactured 304L Stainless Steel: Sarah Thomas2; M. Cameron Hawkins2; Robert Hixson2; 1MSTs

2:20 PM Invited
Meso-scale Topology Effects on the Shock Compression Response of Reactive Powder Mixtures: Manny Gonzales1; Lauren Poole1; Austin Gerlt1; Zachary Cordero1; 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 Eastmond1; Elizabeth Fortin1; Zak Wilde1; Kirk Bohlen1; Jay Oswald1; Pedro Peraalta1; 1Arizona State University; 2Los Alamos National Laboratory; 3Arizona State University

3:00 PM
Observation of Metal Particle Deformation inside a Shock Compressed Polymer: David Bober1; 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 Meredith1; 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 Lu1; 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 Scholze1; Philipp Frint1; Sven Winter1; 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 Polyethylene glycol Diacyrylate Hydrogels at High Shear Strain Rates: Ke Luo1; Kshitiz Upadhyay1; Ghatu Subhash1; Douglas Spearat1; 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: Zhiiwei 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 Kesinkiklic, Attilm 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
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Session Chairs: Onuralp Yucel, 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 Haro1; Shadreck Chama1; Stephen Parrenyatwa1; 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 Benzseki1; Ahmet Turan2; Onuralp Yucel1; 1Istanbul Technical University; 2Yalova University

9:25 AM
Effect of Intercritical Heat Treatment on Microstructure and Mechanical Properties of Sn Bearing 33MnCrB5 Steel: Lijuan Sun1; 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 Liao1; 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 Liu1; 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: Zhizei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, University of Queensland; Onurul Yucel, Istanbul Technical University; Ender Keskinlikilic, Atılım 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: Xiaolong Li1; Xuejiao Cao1; Zhang Tingan1; 1 Central South University; 2 University; 3 Korea University; 4 Guangdong Provincial Key Laboratory

8:50 AM
Preparation of Metallized Pellets from Blast Furnace Dust and Electric Arc Furnace Dust Based on Microwave Impedance Matching: Lei Ye1; Zhifei Peng1; Qing Ye1; Liancheng Wang1; Robin Augustine2; Lee Joonho2; Yong Liu2; Mudan Liu2; Mingjun Rao2; Guanghui Li2; Tao Jiang2; 1 Central South University; 2 Korea University; 3 Guangdong 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: Xing Zhongci Liu1; Xiangeng Zhou1; Gang Li1; Shanshan Wu1; Xuwei Lv1; 1 Chongqing University

10:05 AM
Reduction Behavior of In-flight Fine Hematite Ore Particles by CO-H2 Mixtures in a High-temperature Drop Tube Furnace: Shijun Zhao1; 1 City University of Hong Kong

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: Xianxiang Hu1; Wei Tang2; Kurt Terrani3; 1 Oak 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 Rooyen2; Chao Jiang3; 1 Idaho National Laboratory

9:10 AM
Three-dimensional Analysis of the IPyC/SiC Interface in Irradiated TRISO Fuel Particles: Tyler Gerczak1; Rachel Seibert2; 1 Oak Ridge National Laboratory

9:30 AM
Fabrication and Characterization of High Burnup Nuclear Fuel Surrogate for the Anlysis of Fuel Fragmentation Phenomenon: Jaejoon Kim1; Ho Jin Ryu2; 1 KAIST

9:50 AM
Microstructural Changes and Corrosion of Proton-pre-irradiated Hastelloy N in FLiNaK Molten Salt: Madhavan Radhakrishnan1; Lingfeng He2; Ruchi Gakhar2; Yachun Wang3; Adam Gabriel4; Lin Shao5; 1 Texas A&M University; 2 Idaho National Laboratory; 3 Rensselaer Polytechnic Institute

10:10 AM Break

10:25 AM
On the Role of Heterogeneity in Concentrated Solid-solution Alloys in Enhancing their Irradiation Resistance: Shijun Zhao1; 1 City University of Hong Kong

10:45 AM
Diffusion of Fission Products in Virgin Nuclear Graphite: Kevin Graydon1; Mikhail Klimov2; Edward Dein3; Kevin Coffey4; Yongho Sohn5; 1 University of Central Florida

11:05 AM
Irradiation Behavior of Mechanically Processed Zr-Nb Multilayers at Very High Doses: Madhavan Radhakrishnan1; Daniel Savage2; Marko Knezevic2; John Watt3; Yongqiang Wang4; Katherine Jungjohann5; Nathan Mara6; Osman Anderoglu7; 1 University of New Mexico; 2 University of New Hampshire; 3 Los Alamos National Laboratory; 4 Sandia National Laboratory; 5 University of Minnesota
11:25 AM
High-Throughput Synthesis and Ion Irradiation of High-Entropy Alloys using Additive Manufacturing: Michael Moorehead; Michael Niezgoda; Calvin Parkin; Chuan Zhang; Phalgun Nelaturi; Mohamed Elbakshwan; Kumar Sridharan; Dan Thoma; Adrien Couet; 1University of Wisconsin - Madison; 2Computherr LLC

11:45 AM
Kinetic Study on the Evolution of Nano-ceramic Coatings Under Heavy Ions Irradiation: Matteo Vanazzi; Luca Ceseracciu; Gaelle Gutierrez; Celine Cabet; Marco G. Beghi; Fabio Di Fonzo; 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

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Session Chair: Nima Shamsaei, Auburn University

8:30 AM Invited
Fatigue and Fracture Analysis of Additive Manufactured Metals for Critical Applications: Ali Fatemi; 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; Jan Johannsen; TSZ Tung Chan; Mohamed Merghany; Claus Emmelmann; Frank Walther; 1Department of Materials Test Engineering (WPT), TU Dortmund University; 2Fraunhofer Research Institute 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; Peeyush Nandwana; Ankit Srivastava; 1Texas A&M University; 2Oak Ridge National Laboratory

9:40 AM
A Zone-based, Probabilistic Damage Tolerance Framework for AM Components: James Sobotta; R. Craig McClung; Michael Enright; Jonathan Moody; Yi-Der Lee; Vikram Bhamidipati; 1Southwest Research Institute

10:00 AM Break

10:20 AM Invited
A Fatigue Life Approach for Additively Manufactured Structures: Rainer Wagner; Benjamin Möller; Matilde Scuria; Thilo Bein; 1Fraunhofer Lbf

10:50 AM
Additive Manufacturing of Fatigue Resistant Austenitic Stainless Steel: Jonathan Pegues; Michael Roach; Nima Shamsaei; 1Auburn University; 2University of Mississippi Medical Center

11:10 AM
Deriving the Structural Fatigue Behavior of Additive Manufactured Components: Rainer Wagner; Matthias Hell; Matilde Scuria; Thilo Bein; 1Fraunhofer Lbf

11:30 AM
Additive Manufacturing-enhanced Durability Prediction Supported by a Machine-learning Based Material Model: Nicolas Lammens; Matthias Schulz; Stefan Straesser; Honor Erdelyi; 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 Chariit, University of Idaho; Michael Kirka, Oak Ridge National Laboratory

Thursday AM | February 27, 2020
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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; 1Northern Illinois University

9:00 AM
Additive Manufacturing of Heat Pipes for Microreactor Applications: Donna Guillen; Clayton Turner; Adrian Wagner; Patrick Moo; 1Idaho National Laboratory

9:20 AM Invited
Joining Technologies for Metal Additive Manufacturing in the Energy Industry: Edward Herderick; Jacob Rindler; David Schick; Nate Ames; 1Ohio State University; 2Proto Precision Additive

9:50 AM
High-temperature Mechanical Behavior of Additively-manufactured Mini-channel-embedded Inconel 718 Specimens: Scott Thompson; Aref Yadollahi; Jasmin Ahmed; 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; Hao Wang; Vikas Tomar; 1Purdue University

10:50 AM
Fatigue Strength Prediction of As-built Ti-6Al-4V Components, Produced by Electron Beam Melting (EBM) Technology: Jamal Man; Leila Ladani; 1Arizona State University

11:10 AM
Additive Manufacturing Research for the Energy Sector: Hani Henein; Ahmed Qureshi; Tonya Wolfe; 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 Salazar1; 2BCMaterials

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 Laitinen1; Alexei Sozinov1; Andrey Saren1; Antti Salminen1; Kari Ullakko1; 1LUT University

9:20 AM
Advanced Additive Manufacturing for Functional Magnetic Materials: Markus Chmielus1; Pierangelí Rodríguez De Vecchis2; Aaron Aciero1; 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 Xu1; Sneha Narra1; 1Worcester Polytechnic Institute

10:00 AM Break

10:20 AM
Additive Manufacturing of Rare Earth Bonded Permanent Magnets: Prospects and Challenges. Mariappon Paranthaman1; 2Oak Ridge National Laboratory

10:40 AM
Microstructural Characterization of Alnico Alloy Fabricated by Selective Laser Melting. Paul Rottmann1; Andrew Polonsky1; McLean Echlin1; Michael Krispin1; Gotthard Rieger1; Stefan Lampenscherf1; Tresa Pollock1; Carlos Levi1; 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 Martins1; Rita Policía1; Ana Catarina Lima1; Nelson Pereira1; Esther Calle1; Manuel Vázquez1; Senetru Lanceros-Mendez1; 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 Nartu1; Varun Chaudhary1; Sriswaroop Dasari1; Srinivas Aditya Mantri1; Raju Ramanujan1; Rajarshi Banerjee1; 1University of North Texas; 2Nanyang Technological University

ADDITIVE TECHNOLOGIES

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, MicroTest 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 Nassar1; Christopher Stutzman1; Edward Reutzel1; Dustin Seltzer1; Jeffrey Schiano1; 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 Sinclair1; Yunhui Chen1; Sebastian Marussi1; Samuel Clark1; Chu Lun Alex Leung1; Saurabh Shah1; Robert Atwood1; Thomas Connolley1; Martyn Jones1; Gavin Baxter1; Peter Lee1; 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 Clark1; Yunhui Chen1; Lorna Sinclair1; Chu Lun Alex Leung1; Sebastian Marussi1; Robert Atwood1; Martyn Jones1; Gavin Baxter1; Peter Lee1; 1University College London; 3Diamond Light Source Ltd; 4Rolls-Royce plc

9:35 AM Invited
In-situ Process Monitoring and Diagnosis via Machine Learning of Thermal Imaging Streams. Linktan Biao1; 1Mississippi State University

10:00 AM
In-situ and Operando X-ray Imaging of the Laser Blown Powder Directed Energy Deposition Process: Yunhui Chen1; Samuel Clark1; Lorna Sinclair1; Chu Lun Alex Leung1; Sebastian Marussi1; Robert Atwood1; Martyn Jones1; Gavin Baxter1; Peter Lee1; 1University College London; 3Diamond Light Source Ltd; 4Rolls-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 Haley1; Brian Jordan1; Ross Cortino1; Ryan Dehoff1; Vincent Paquet1; 1Oak Ridge National Laboratory

11:05 AM
In-process Monitoring of Porosity in Additive Manufacturing: Bin Zhang1; Shunyu Liu1; Yung Shin1; 1Purdue University
In-situ Synchrotron Measurements of Microstructure Development at Fusion Boundary in Wire Feed AM of Ti-6Al-4V: Nathan Johnson; Donald Brown; John Carpenter; Aaron Stebner; Colorado School of Mines; Los Alamos National Laboratory

High-speed X-ray Imaging of Powder Deposition of Composite Materials in Additive Manufacturing: Sarah Wolff; Niranan Parabi; Benjamin Aronson; Benjamin Gould; Aaron Greco; Tao Sun; Argonne National Laboratory; Penn State University

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 Poornganj, GE Additive; James Saal, Citrine Informatics; Orlando Rios, Oak Ridge National Laboratory; Hunter Martin, HRL Laboratories; Ateieh 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; Dierk Raabe; Max-Planck-Institut für Eisenforschung

9:00 AM  A Rapid Screening Benchmark Test Methodology for Accelerated AM Alloy Design: Ralph Napolitano; Timothy Prost; Shubhra Jain; Emma White; Iver Anderson; Iowa State University; Ames Laboratory

9:20 AM  Accelerated Development of Alloys via Direct Laser Metal Deposition: Husam Alrehaili; Praveen Sreeramagiri; Ajay Bhagavatam; Guru Dinda; Wayne 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; Steven Storck; Ian McCue; Joseph Socpicak; Morgan Trexler; JHU/APL

10:00 AM  Modeling Hot Cracking in Metal Additive Manufacturing: Eric Clough; Brennan Yahata; Mark O’Masta; Hunter Martin; Matthew Begley; HRL Laboratories; University of California, Santa Barbara

10:20 AM  Break

10:35 AM  Invited
Assessing the Printability of Metal Alloys for Additive Manufacturing: Raymundo Arroyave; Luke Johnson; Rajian Seeede; Mohammad Mahmoudi; Bing Zhang; Alaa Elwany; Ibrahim Karaman; Texas A&M University

11:00 AM  Composition Control in Laser Powder Bed Fusion Additive Manufacturing Through Differential Evaporation: Meelad Rangiefar; Ibrahim Karaman; Alaa Elwany; Raymundo Arroyave; Texas A&M University
9:10 AM
Micromechanical Characterization of Single-crystalline Silicon at Elevated Temperature: Kosuke Takagai; Yoji Mine; Jun Fujise; Bonggyun Ko; Toshiaki Ono; Kazuki Takashima; Kumamoto University; SUMCO Corporation

9:30 AM
Low Strain Grain Boundary Deformation and Damage: Veronica Livescu; Ramon Martinez; Cheng Liu; George Gray III; Los Alamos National Laboratory

9:50 AM
Discrete Dislocation Dynamics Investigation of Partial Dislocation Interaction with Precipitates in Nickel- and Cobalt-based Superalloy: Dylan Madisetti; Jaafar El-Awady; Johns Hopkins University

10:10 AM Break

10:30 AM
Strain Hardening of Al-Cu Alloys Investigated with In-situ Neutron Diffraction: Brian Milligan; Dong Ma; Amit Shyam; Amy Clarke; Colorado School of Mines; Oak Ridge National Laboratory

10:50 AM
Characterization of Transient State Deformation in Crystals Produced by Modulation-assisted machining: Indrani Biswas; James Mann; Srivivasan Chandrasekar; Kevin Trumble; Purdue University; University of West Florida

11:10 AM
Grain - Scale Mechanical Characterization of Alpha-Titanium Using Spherical Indentation Stress-Strain Protocols: Natalia Millennium-Espitia; Soumya Mohan; Adam Pilchak; Surya Kalidindi; Georgia Institute of Technology; Air Force Research Laboratory

11:30 AM
The Effects of Defects on the Mechanical Properties of Au Microparticles: Tyler Flanagan; Oleg Kovalenko; Eugene Babkin; Seek-Woo Lee; University of Connecticut; Technion-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; Adam Thompson; James Burns; University 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 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

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: Amarnjeet Kumar Singh; K Narasimhan; IIT Bombay
8:50 AM

**Flash Stamping by Using Multistep Partitioning:** Oguz Gurkan Bilir¹; Ersoy Erisir²; ¹Kocaeli University

9:10 AM

**Microscale Insight into Deformation and Fracture of Ultra-high Strength Martensitic Steels:** Xinzhu Zheng¹; Hassan Ghassemi-Armaki¹; Ankshu 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 Polatidis¹; Miroslav Smid²; Helena Svygenhoven³; William Curtin¹; 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 Silva¹; 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 Allain¹; Marc Moreno¹; Julien Teixeira¹; Guillaume Geandier¹; Hatem Zurob¹; Frederic Bonnet¹; ¹Institut Jean Lamour; ²McMaster University; ³ArcelorMittal Maizieres Research SA

10:50 AM

**Nanoscale Investigation of Austenite/Ferrite Interfaces in Medium Carbon Fe-Mn-C Steels at Different Inter-critical Temperatures:** Olha Nakonechna¹; Mohamed Gouné²; Didier Huin²; Nicolas Charbonnier²; Helena Zapolsky³; Frederic Danoi²; 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 Zhang¹; Chrysoula Loannidou²; Johannes Tjepkema¹; Winfried Kranendonk¹; Jean Campaniello²; Robert M. Dalgliesh¹; 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 Kramer¹; A.C. Chaung²; Iver Anderson¹; Pratik Ray¹; E.M.H. White²; T. Prost²; E. Rinko¹; ¹Ames Laboratory; ²Argonne National Laboratory; ³Indian Institute of Technology Ropar

9:00 AM Invited

**Optimizing the Magnetic Performance of Tetragonal ReFe12-xMx Phases using ab initio Computational Methods:** Heike Herper¹; Olga Vekilova¹; ¹Uppsala University

9:30 AM

**Cerium-based Gap Magnets Recent Advances in Understanding and Optimization:** Andriy Palasyuk¹; 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 Jürries¹; Kornelius Nielsch¹; Thomas Woodcock¹; ¹Leibniz IFW Dresden

10:10 AM Break

10:30 AM Invited

**Low-dimensional Hard Magnetic Materials:** J. Ping Liu¹; 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 Wang¹; 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 Suzuki¹; Kentaro Toyoki¹; Tetsuya Nakamura¹; 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; Surajit 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 Mahapatra1; Mark King2; 1University of Alabama at Birmingham

8:50 AM
Solid State Modification via Activated Reactive Consolidation for Fabrication of Mg2Si Thermoelectric Generators: Babak Alinejad2; Yuma Yamamoto3; 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 Zhang1; Jesse Ko1; Partha Paul2; Natalie Seitzman2; Ryan DeBlock3; Bruce Dunn4; Johanna Nelson Weker1; 1SLAC National Accelerator Laboratory; 2Colorado School of Mines; 3University of California, Los Angeles; 4Ibaraki University

9:50 AM
Toward Multivalent Zinc-ion Batteries: A Look at Zinc and NaV2(PO4)2: Jesse Ko1; Partha Paul2; Natalie Seitzman2; Ryan DeBlock3; Bruce Dunn4; Johanna Nelson Weker1; 1SLAC National Accelerator Laboratory; 2Colorado School of Mines; 3University of California, Los Angeles; 4Ibaraki University

10:10 AM Break

10:30 AM Invited
Leveraging Reversible Chemistry for Materials Sustainability in Energy Storage: Zheng Chen1; 1University of California, San Diego

10:50 AM
Mechanistic Understanding of Ion Intercalation and Phase Transformation Behavior in layered Materials at Atomic Scales: ShayanParida1; Jie Chen1; Hetal Patel1; Awanish Mishra1; Arthur Dobley1; Barry Carter1; Avinash Dongare1; 1University of Connecticut: 1EaglePicherTechnologies LLC; 1Sandia National Laboratories

11:10 AM
Study on Oxygen Lance Injection Technology of High Nickel Ternary Cathode Material Roasting Process in Roller Hearth Furnace: Zheng-Ling (Rocky) Wei1; Joachim Von Scheele2; Zhang Gang3; Qian Xu2; 1Linde Technology & Innovation Asia Pacific; 2Zhongtian Energy Materials Co., Ltd.
TECHNICAL PROGRAM

THURSDAY AM | February 27, 2020
Palomar | Marriott Marquis Hotel

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 Xian1; Sergey Belyakov2; 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 Mehreen1; 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 Yaeger1; Travis Dale1; Ganesh Subbarayan1; John Blended2; Carol Handwerker1; 1Purdue University

9:30 AM
Intermetallic Compound Analyses Provide Interfacial Reliability for Solder Connections in Electronics: Mike Wolverton1; 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 Nogita2; Mohd Izrul Izwan Raml1; Flora Somdin2; Yasuda Hideyuki2; 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 Raml1; Mohd Arif Anuar Mohd Salleh1; Hideyuki Yasuda2; Kazuhiro Nogita1; 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 Krishnamoorthy1; Zhengyi Zhang2; Changxue Xu3; 1Texas Tech University; 2Huazhong University of Science and Technology

8:50 AM
Additively Manufactured Functionally Graded Biodegradable Porous Zinc: Yageng Li1; Prathyusha Pavanram2; Jie Zhou1; Karel Lietzert3; Marius Lee3; Holger Jahn4; 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 Barbo1; Roger Reed1; Enrique Alabort2; 1University of Oxford; 2OxMet Technologies

9:30 AM
Biomimetic 3D printed Chitosan-hydroxyapatite Scaffold for Bone Tissue Engineering: Wei Huang1; Julian Cutler1; David Kisa1; 1University of California Riverside

9:50 AM
Effects of Photoinitiators on Cell Viability in 3D Bioprinting: Jazzmin Casillas1; Heqi Xu1; Changxue Xu3; 1Texas Tech University

10:10 AM Break

10:30 AM
Investigating of Cell Sedimentation in Inkjet-based Bioprinting of Cell-Laden Bioink: Heqi Xu1; Jazzmin Casillas1; Srikumar Krishnamoorthy1; Changxue Xu3; 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. Popovich1; 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 Bochichio, Pratt & Whitney; Kevin Bockenstedt, ATI Specialty Materials; Katerina Christofidou, University of Sheffield; James Coakley, University of Miami; Martin Detroit, 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
1IB | San Diego Convention Ctr

Session Chairs: Martin Detroit, National Energy Technology Laboratory; Chantal Sudbrack, Consultant

8:30 AM Invited
Welding and Weldability Assessment of Ni-based Superalloys
Joel Andersson1; 1University West

9:00 AM Invited
Recent Advances in Inertia Friction Welding of Dissimilar Ni-base Superalloys: Oleq Senkov2; David Mahaffey3; S. Lee Semiatin4; 1Air Force Research Laboratory

9:30 AM
Structural and Chemical Features of Borides Precipitated within the Transient Liquid (TLP) Bonded Superalloys: Xiaobing Hu1; Vinayak Dravid1; 1Northwestern University

9:50 AM
On the Rejuvenation of Crept Ni-base Single Crystal Superalloys (SX) by Hot Isostatic Pressing (HIP): Oliver Horst1; Benjamin Ruttet1; David Bürger2; Larisa Heep2; Hongcai Wang3; Antonin Dlouhy2; 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 Song1; Anurag Sharma2; Boateng Twum Donkor2; 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 (SCCO2) Environment: Richard Chiang1; Sebastien Teyssere1; Jeffery Aguia2; Lucas Teeter3; Julie Tucker3; 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: Valerie Pauly1; Carter Tesch1; Joseph Kemi2; Malcolm Clark2; David Grierson1; Oyelayo Ajayi3; Dileeep Singh1; Kumar Sridharan1; 1University of Wisconsin-Madison; 2Argonne National Laboratory

11:30 AM
Friction Stir Welding of Inconel 825 Alloy: Hirshikesh Das1; Mounarik Mondal2; Jiwoo Lee2; Hoon-Hwe Cho2; Sung-Tae Hong2; 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

Thursday AM | February 27, 2020
31C | San Diego Convention Ctr

Session Chairs: Noah Paulson, Argonne National Laboratory; Vahid Tari, Eaton Corporation Research & Technology

8:30 AM
Monte Carlo Studies of EBSPs Spectroscopy: Elena Pascal1; 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 Petruzza1; Attila Gyulassy2; 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 Le1; Elizabeth Holm1; 1Carnegie Mellon University

9:30 AM
Development of Virtual Resonant Ultrasound Spectroscopy Methods for use in Quantifying Defect Content: John Graham1; Ricardo Lebensohn2; Boris Maiorov1; Paul Lafourcade1; 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 Rodgers1; 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: Anurumugan Senthinathan1; Pinar Acar2; Marc De Graef1; 1Virginia Tech; 2Carnegie Mellon University

10:50 AM
Real-time Analysis of Diffraction Data for Enabling In-situ Measurements: Anup Pandey1; John Andrew Redwig Castillo2; Surya Khalidindi1; Reju Pokharal1; 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 Bartkowiski1; Robert Zalewski1; 1Warsaw University of Technology
11:30 AM
Machine Learning Exploration and Optimization of Flame Spray Pyrolysis: Noah Paulson1; Joseph Libera2; Marius Stan3; 1Argonne National Laboratory

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Processing of Aluminum 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 Wimmer1; 1Neuman Aluminium

9:00 AM
Hot Deformation and Die-quenching of 6000-series Alloys - the Effect of Quench-interruption Temperature: Tanja Pettersen1; Benedikte Jørgensen Myrøld2; Calin Marioara1; Ola Jensrud3; 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 Paulin2; 1Impol 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 Güner1; Cem Mehmetalioğlu2; Osman Halil Çelik3; Murat Kona4; Gökrem Özcêlik5; 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 Kuelper2; Brahmananda Pramanik3; 1Montana Technological University

10:55 AM
Current Efficiency for Direct Production of an Aluminium-titanium Alloy by Electrolysis in a Laboratory Cell: Omar Awaysso1; Rauan Meirbekova2; Gudrun Sævarsdottir3; Gudjon Atlú Audunsson4; Geir Martin Haarberg5; 1Norwegian University of Science and Technology; 2Reykjavik University; 3The University of Auckland

11:20 AM
Simulation Study on Equal Channel Right Angular Extrusion Process of Aluminum Alloy 6061: Wenhuan Jiang1; 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 Sævarsdottir1; Halvor Kvande2; Barry Welch2; 1Reykjavik University; 2Consultant

8:55 AM
Measurement System for Fugitive Emissions in Primary Aluminium Electrolysis: Håkon Myklebust1; Thor Anders Aarhaug2; Gabriella Tranell2; 1Norwegian University of Science & Technology; 2SINTEF

9:15 AM
Validation of QCL CF4 Gas Analyzer for Sensitivity and Selectivity: Thor Anders Aarhaug1; 1SINTEF

9:35 AM
A Laboratory Study of the HF Generation Potential of Particulate Fluorides from Cell Emissions: Jenny Hung1; James Metson2; Eliezer Batista3; 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-Nava1; Christine Dubois1; Eliezer Batista2; 1Alcoa Technical Center; 2Alcoa Deschambault

10:15 AM Break

10:30 AM
Update on SO2 Scrubbing Applied in Primary Aluminium Smelters: Stephan Broek1; 1Hatch Ltd.

10:50 AM
Optimization of a Gas Treatment Center Equipped with Extended Surface Bag Filters: Julie Doniguy1; Stephan Broek2; Mario Dion2; Raymond Emond3; Philippe Martineau4; 1Hatch Ltd.; 2Rio Tinto; 3Fives Solios

11:10 AM
Update on the Abart Gas Treatment and Alumina Handling at the Karmøy Technology Pilot: Anders Sorhus1; Sivert Ose2; Eivind Holmejford1; Hävard Olsen1; Bent Nilsen2; 1GE Power
BIO-MATERIALS

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: Canard Aparicio 1; Dhiraj Kumar 2; George Chiu 1; Hyacinthe Randriamahazaka 1

Technology Research Institute; 2Bourassin1; Marc Baaden 1; 1Laboratoire de Biochimie Théorique, ITODYS Laboratory; 4Université de Paris - Mines & Technology; 2Moya

Degradation and Nanomaterial Dose In-vitro and In-vivo: Biological Fate of Engineered Nanomaterials: Tracing Aggregation/Mechanisms:

9:20 AM: Application of Titanium Dioxide Nanotubes and Lattice Light-sheet Microscopy in Establishing Early-stage Cellular Response Mechanisms: Jevin Meyerink 1; Scott Wood 2; Jeremy Mercuri 2; Robert Anderson 1; Brandon Scott 1; Grant Crawford 1; 1South Dakota School of Mines & Technology; 2Clemson University

9:40 AM: Nano-engineered DNA based Hydrogel as a New Injectable Drug Delivery Platform: Arghya Paul 1; Sayantani Basu 2; Settimo Pacelli 2; 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 Chen 1; 1Industrial Technology Research Institute; 2National Tsing Hua University

10:45 AM: Biological Fate of Engineered Nanomaterials: Tracing Aggregation/ degradation and Nanomaterial Dose In-vitro and In-vivo: Sergio Moya 1; 1CIC biomaGUNE

11:15 AM: Enzymes Grafted on Electrodes for Biofuel Cells: Lessons from Multiscale Modeling Approaches: Sophie Sacquin-Mora 1; Nicolas Bourassini 1; Marc Baaden 1; 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-Amayo 1; Min Zhao 1; Li-Kai Lin 1; Carlos Ostos 1; Jan Allebach 1; George Chiu 1; Amanda Deering 1; Lia Stanciu 1; 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 Tefanov 1; Harsha Marakat 1; Wim Sillekens 2; David Browne 2; 1University College Dublin; 2European Space Agency

8:50 AM: Invited Atomic Dynamics Evidence for Configuration Memory in Metallic Glasses: Xiaodong Wang 1; Tianding Xu 1; Qing Yu 1; Qingping Cao 1; Jianzhong Jiang 1; 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 Chang 1; Danny Ventura 1; Kylie Dodge 1; David Yan 1; 1San Jose State University

9:30 AM: Measuring Metallic Glass Viscosities Over Wide Composition Ranges: Sebastian Alexander Kube 1; Will Polsky 1; Rodrigo Miguel Ojeda Mota 1; Kevin Ryan 1; Jan Schroers 1; 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 Miskovic 1; Kevin Law 1; 1University of New South Wales

10:30 AM: Metallic Glasses for Space Mechanism Applications: Andrew Murphy 1; Rik Stewart 1; Zahari Zlatev 2; Martin Humphries 1; Andrew Norman 2; David Browne 2; 1University College Dublin; 2Reliance Precision Limited; 2SpaceMech; 2European Space Agency

10:50 AM: Invited Nuclearization of Shear Bands in Al-based Metallic Glasses and Their Composites: Wan Kim 1; Guen Hoon Yoo 1; Eun Soo Park 1; John Perepeko 1; 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

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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 Park1; Jinwoo Huang3; 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 Li3; 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 An1; William Johnson2; Konrad Samwer3; Sydney Corona4; William Goddard2; 1University of Nevada, Reno; 2Caltech; 3University of Goettingen; 4California Institute of Technology

9:30 AM
Molecular Dynamics Simulations of Iron-based Metallic Glasses during Spark Plasma Sintering: Jordan Campbell1; Carlos Ruestes2; Tod Pascal3; Olivia Greave3; 1University of California, San Diego; 2National University of Cuyo

9:50 AM Invited
Pressure Induced Amorphization in Alloys: Hongbo Lou1; Qiaoshi Zeng2; 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 Mirzaei1; Zhichao Yu2; Jamie J.Kruzic3; PAlex Greaney3; 1Oregon State University; 2UNSW

10:50 AM
The Intriguing Structure of Marginal Glass Forming Alloys: Tolga Han Ulucam1; Ilkay Kalay2; Yunus Kalay2; 1Middle East Technical University; 2Çankaya University

11:10 AM
Effect of Ni-Nb Metallic Glass on Moderating the Shock Damage in Crystalline Ni-amorphous Ni52Nb38 Nanocomposite Structure: A Molecular Dynamics Study: K Vijay Reddy1; Snehashu Pal1; 1National Institute of Technology Rourkela

11:30 AM
Local Structural Signature Underlying Thermally Activated Events in Metallic Glasses: Jun Ding1; 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
302  TMS2020 TECHNICAL PROGRAM

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

**Session Chairs:** Shadia Ikhmayies, Al Isra University; Andrew Brown, Army Research Laboratory

**Thursday AM | February 27, 2020**
**Theater A-5 | San Diego Convention Ctr**

**8:30 AM**
Using Thermo-Calc Software to Produce the Phase Diagram of Zn-Te System: Shadia Ikhmayies;
1 Al Isra University

**8:50 AM**
Epsilon to Tau Phase Transformation in MnAl Alloys: Ozgun Acari;
Merve Genc Unalan; Ilkay Kalay; Yunus Kalay;
2 Middle East Technical University; 3Çankaya University

**9:10 AM**
Structural and Magnetic Characterization of Magnetic Nanostructures in C$_{60}$ Thin Films Exhibiting the Anisotropic Dzyaloshinskii-Moriya Interaction: Michael Kitcher;
Tim Mewes;
Claudia Mewes;
Marc De Graef;
Vincent Sokalski;
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 Thotakura;
Ramasri Goswami;
1Old Dominion University

**9:50 AM Break**

**10:05 AM**
Precipitate Characterization and Evolution in Grain Oriented Electrical Steel During High Temperature Coil Annealing: Xuhai Zhang;
Jamo Momand;
Stefan Melzer;
Winfried Kranendonk;
Gert H. ten Brink;
Bart J. Kooi;
1University of Groningen;
2Tata Steel, I.Jmuiden

**10:25 AM**
Bending Fatigue Testing for Electronic Connectors: David Snyder;
Larry Wojnicz;
Michael Gedeon;
Chad Finkbeiner;
Chen Jidong;
1Molex LLC; 2Materion Corp.; 3Ningbo Powerway Alloy Material Co.

**10:45 AM**
Phase Diagram of In-P Binary System: Shadia Ikhmayies;
1Al Isra University

**11:05 AM**
Temperature Dependence of Elastic Properties of Beryllium: Boris Maiorov;
Jon Betts;
Sky Sjue;
Angus Lawson;
Albert Migliori;
1Los Alamos National Laboratory

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

**Session Chairs:** Sergio Monteiro, Military Institute of Engineering; Bowen Li, Michigan Technological University

**Thursday AM | February 27, 2020**
**Theater A-4 | San Diego Convention Ctr**

**8:30 AM**
Quasi-plastic Zone Characterization of Regular and Si-doped Boron Carbide: Sisi Xiang;
Kelvin Xie;
1Texas A&M University

**8:50 AM**
Pavel Nilitnin;
Alexander Vorozhtsov;
Maxim Boldin;
1Tomsk State University; 2Lobachovsky State University of Nizhni Novgorod

**9:10 AM**
Microstructure Evolution of Additively Manufactured TiC Reinforced Graded Metal Matrix Composite: Jianshen Wang;
Juan Escobedo-Diaz;
Evgeny Morozov;
Daniel East;
Kun Yang;
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;
Sashanka Akural;
Justine Marine;
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;
Esperidiana Moura;
1Nuclear and Energy Research Institute

**10:25 AM**
Evaluation of Biodiesel Obtained from Waste Cooking Oil Purified with A Modified Clay: Cristiano Gianesi Bastos Andrade;
Melissa Rigue Shimba;
Gabriela Souza Freitas;
Leticia Mayumi Kobayashi;
Samuel Marcio Toffoli;
Francisco Rolando Valenzuela Diaz;
1Polytechnic School - University of Sao Paulo
**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 Ikhamayies, 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 Firrao1; Enrico Morgano2; Graziano Ubertalli2; Angelo Brunelli2; Davide Sabena3; 1Politecnico di Torino; 2Centro Ricerche Fiat; 3Tra.Ind

8:50 AM  Unloading Analysis for Indentation Fracture in Molecular Crystals: Alexandra Burch1; John Yeager1; David Bahr1; 1Purdue University; 2Los Alamos National Laboratory

9:10 AM  Growth and Characterization of Metal Nanowhiskers: Gunther Richter1; Wenting Huang1; 1Max Planck Institute for Intelligent Systems

9:30 AM  Three-Dimensional Characterization of Microstructure and Elemental Segregation of Thermal Spray Coatings: Thomas Ivanoff1; 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 Enamelled Steels: Yi-Ting Lin1; 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 Consuelos1; 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 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

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 Wang1; Xi Wang1; Siva Palani2; Alan Rose3; 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 Glover1; Mary Lyn Lim2; John Scully2; 1University of Virginia; 2PPG Industries

9:10 AM Invited  Improved Corrosion Resistance of a Commercial Mg Alloy through Laser Assisted Surface Processing: Saumyadeep Jana1; Zihua Zhu1; Mark Engelhardt1; Danny Edwards2; 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 Collins1; 1CSIRO Manufacturing

9:50 AM  Understanding the Impact of Pigment Selection on the Properties of Electrodeposited Coatings: Kevin Sylvestre1; Corey DeDomenic1; Egle Puodziukynaite1; Fu duo Ma1; 1PPG Industries

10:10 AM Break

10:25 AM Invited  Phase-Field Modeling of Microstructural Effects on the Corrosion of Mg Alloys: David Montiel1; Stephen DeWitt1; Alexander Chadwick1; Katsuyo Thornton1; 1University of Michigan; 2Northwestern University

10:45 AM  Oxidation Behavior of TiAlAlloys and its Optimization by Deposition of Al-rich Coatings via Pack Aluminizing: Lukas Mengis1; Anke Ulrich1; Alexander Donchev1; Mathias Galetz1; 1DEHEMA 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 Yeom1; Benjamin Maier1; Greg Johnson1; Tyler Dabney1; Mia Lenting1; Kumar Sridharan1; 1University of Wisconsin Madison
**TECHNICAL PROGRAM**

**304**

**TMS2020 TECHNICAL PROGRAM**

**THURSDAY AM | February 27, 2020**

**Session 3B | San Diego Convention Ctr**

**Session Chair:** Houlong Zhuang, Arizona State University

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**8:30 AM Invited**


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**9:00 AM**

From Pentagonal Geometries to Two-dimensional Materials: *Richard Hennig*; 1University of Florida; 2National Institute of Standards and Technology; 3Arun Kumar Mannodi Kanakkithodi, Argonne National Laboratory

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**9:20 AM**

First-principles Investigation of Dopants, Defects, and Defect Complexes in 2D Transition Metal Dichalcogenides: *Eric Fonseca*; Daniel Rodriguez; 1University of Florida; 2Richard Hennig; 1University of Florida

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**9:40 AM**

First-principles Study of Mn(taa) Spin Crossover Complexes in 2D Transition Metal Dichalcogenides: *Henry Chan*; Mathew Cherukara; Badri Narayanan; 1Subramanian Sankaranarayanan; 1Argonne National Laboratory; 2University of Louisville

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**10:00 AM**

Machine Learned Models for Transition Metal Dichalcogenide: *Houlong Zhuang*; Lei Liu; Duo Wang; 1Arizona State University

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**10:10 AM Invited**

Electron-phonon Coupling Effects in Ion Irradiation of Metallic Systems: *Eva Zarkadoula*; Geram Samolyuk; William Weber; 1Oak Ridge National Laboratory; 2University of Tennessee

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**9:00 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*; Kailan Luo; 1Mark Wemman; 2Imperial College London

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**9:30 AM**

First-principles Cluster Expansion Study of Fe and Mo Effects on Atomic Ordering in Ni-Cr Alloys: *Jia-Hong Ke*; Julie D. Tucker; 1Oregon State University

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**10:00 AM Break**

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**10:30 AM Invited**

First Principles Modelling of the Role of Electrons in Collision Cascades in Solids: *Artur Tamm*; Magdalena Caro; A. Caro; 1Alfredo Correa; 1University of Helsinki; 2Lawrence Livermore National Laboratory

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**11:00 AM**

A Machine Learning Approach to Thermal Conductivity Modelling of Irradiated Nuclear Fuels: *Elizabeth Kautz*; Alexander Hagen; Jesse Johns; Douglas Burkes; 1Pacific Northwest National Laboratory - PNNL

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**11:30 AM**

Phase-field Simulation of Intergranular Fission Gas Bubble Growth in Uranium Silicide: *Larry Aagesen*; David Andersson; Benjamin Beeleer; Michael Cooper; Kyle Gamble; Yinbin Miao; Giovanni Pastore; Cody Permatt; Michael Tonks; 1Idaho National Laboratory; 2Los Alamos National Laboratory; 3Argonne National Laboratory; 1University 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; Texas 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 Ohno; Yukimi Oka; Shinji Sakane; Tomohiro Takah; Yasushi Shibuta; Hokkaido University; Kyoto Institute of Technology; University of Tokyo

9:20 AM

Thermal Phenomena in Covalently Bonded Systems Modeled via Physically Informed Neural Network Potentials: James Hichman; Ganga Purja Pun; Francesco Tavazza; Yuri Mishin; National Institute of Standards and Technology; George Mason University

9:40 AM Invited

Materials Design in High Dimensional Chemical and Structural Configuration Spaces: Joerg Neugebauer; Jan Janssen; Liam Huber; Yuji Ikeda; Fritz Koermann; Blazej Grabowski; Tilman Hickel; Alexander Shapoval; Max-Planck-Institut fuer Eisenforschung; University of Stuttgart; Skoltech

10:10 AM Break

10:25 AM Invited

Multi Cell Monte Carlo Method for Phase Prediction: Maryam Ghasiaseidi; You Rao; Wolfgang Windl; Changning Niu; Ohio State University; Questek Innovations LLC

10:55 AM

Prediction of Formable Apatites using Machine Learning and Density Functional Theory: Timothy Hartnett; Mukul Ayyasamy; Prasanna Balachandran; University of Virginia

11:15 AM

First-principles Methods to Elucidate the High-temperature Thermodynamics of Multicomponent Alloys: Anirudh Raju Narasajra; Pavel Dolin; Anton van der Ven; University of California, Santa Barbara

11:35 AM Invited

MS-CRADLE: A Tool for Developing Corrosion Resistant HEAs for Molten Salt Technologies: Thien Duong; Xiaoqi Yan; Santanu Chaudhuri; Argonne National Laboratory; University 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 Cordero; Logan Ware; Rice University

8:50 AM

Characterization of Strain at Twin Boundaries in Ni-base Superalloys via Dark Field X-ray Microscopy: Sven Gustafson; Wolfgang Ludwig; Paul Shade; Diwakar Naragani; Darren Pagan; Michael Sangid; Purdue University; European Synchrotron Radiation Facility; Air Force Research Laboratory; Cornell High Energy Synchrotron Source

9:10 AM

Slip bands in Ni-base Superalloys: A Crystal Plasticity Study Informed by Digital Image Correlation: Marat Latypov; Jean-Charles Stinville; Jonathan Hestroffer; Marie-Agathe Charpaigne; Tresa Pollock; Irene Beyerlein; University of California, Santa Barbara

9:30 AM

Relationship Between Microstructure and Mechanical Properties of Super Duplex Stainless Steel: Mohammed Ali Lakhdari; Hugo Van-Landexhem; Florent Kraiczar; Guilhem Martin; Laurent Delannay; Jean-Denis Mithieux; Muriel Veron; Aperam; SIMaP; Aperam; Université 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; J. Sabisch; C. San Marchi; J. Ronevich; Sandia 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; Severin Jakob; Helmut Clemens; Reinhard Pippard; Montanuniversität Leoben; Austrian 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; Kristoffer Matheson; Brian Phung; Michael Czabaj; Ashley Spear; University of Utah
11:10 AM
A Multiphysics, Mesoscale Framework to Predict the Creep-fatigue Life of Engineering Polycrystalline Alloys: Andrea Rovinelli1; 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 Efe1; 1Middle East Technical University

11:50 AM
Anisotropy Grading Effects on Strength and Ductility: Soheil Taheri-Mousavi1; Dingshun Yan2; C. Em Tasan3; 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 Burns1; Trevor Shoemaker1; 1University of Virginia

8:55 AM
Stress Corrosion Cracking Growth Behavior of Additively Manufactured Alloy 800H in High Temperature Water: Jingfan Yang1; Miao Song2; Raul Rebak3; Xiaoyuan Lou1; 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 Chasse1; Preet Singh1; Jamshad Mahmood1; Crosby Owens1; Michael Van Order1; Northrop 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: Abdelatif Oudrit1; Simon Puydebois2; Pierre Bernard2; Laurent Briot2; Xavier Feuagas2; 1Université de la Rochelle - Lasie; 2CEA LITEN; 3ArianeGroup

9:55 AM
Environmental Effects on the Stress Corrosion Cracking Behavior of an Additively Manufactured Stainless Steel: Jonathan Pegues1; Michael Roach1; Nima Shamsaei1; 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 Mcmurtrey1; 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 Sridharan1; Theresa Mary Green2; Stephen Taller3; 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 Song1; Li Jiang2; Youxing Chen3; Xiaoyuan Lou4; 1University of Michigan; 2University of North Carolina, Charlotte; 3Auburn University
10:50 AM
Environmental Assisted Deterioration Modeling of Large Glass Fiber Reinforced Polymer Composite Structures/Systems: Zhiye Li\textsuperscript{1}; Michael Lepech\textsuperscript{1}; \textsuperscript{1}Stanford University

11:10 AM
Stress Corrosion Cracking Assisted by Oxygen Embrittlement in Ti-6246: Yitong Shi\textsuperscript{1}; Sudha Joseph\textsuperscript{1}; Paraskevas Kontis\textsuperscript{2}; Yanhong Chang\textsuperscript{2}; Baptiste Gault\textsuperscript{2}; David Dye\textsuperscript{3}; \textsuperscript{1}Imperial College London; \textsuperscript{2}Max Planck Institute for Iron Research

11:30 AM
Corrosion and Interstitial Triggered Grain Boundary Embrittlement of Al Alloys: Quanmei Guan\textsuperscript{1}; Jing Sun\textsuperscript{1}; Haisheng Wang\textsuperscript{1}; Chengxiong Zou\textsuperscript{2}; William Yi Wang\textsuperscript{2}; Jijun Ma\textsuperscript{1}; \textsuperscript{1}China Research and Development Center of Tangshan; \textsuperscript{2}Naval Nuclear Laboratory; \textsuperscript{3}Northwestern 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: Seyyedehzahra Hosseinisarani\textsuperscript{1}; Mohsen Dadfarnia\textsuperscript{2}; Masanobu Kubota\textsuperscript{3}; Akhide Nagao\textsuperscript{4}; Brian Somerday\textsuperscript{5}; Petros Sofronis\textsuperscript{6}; Robert Ritchie\textsuperscript{7}; \textsuperscript{1}Kyushu University; \textsuperscript{2}University of California, Berkeley; \textsuperscript{3}University at Buffalo- the State University of New York; \textsuperscript{4}Seattle University; \textsuperscript{5}Northwestern Polytechnical University; \textsuperscript{6}Kyushu University; \textsuperscript{7}University of California, Berkeley

9:10 AM
First-principles Investigation of Hydrogen Trapping in Chemistry Dependent Vacancies of Fe Cr Ni Alloys: Patrick Thomas\textsuperscript{1}; Benjamin Sikora\textsuperscript{1}; \textsuperscript{1}Honeywell

9:30 AM
Crystal Plasticity Modeling of Hydrogen Concentration Ahead of a Crack Tip in FCC Steel: Theodore Zirhle\textsuperscript{1}; Tang Gu\textsuperscript{2}; Ben Anglin\textsuperscript{1}; Clint Geller\textsuperscript{1}; David McDowell\textsuperscript{1}; \textsuperscript{1}Georgia Tech; \textsuperscript{2}Naval Nuclear Laboratory; \textsuperscript{3}Naval Nuclear Laboratory

9:50 AM
Elucidating the Loading Rate Dependence of Hydrogen Environment-assisted Cracking Behavior in a Ni-Cu Superalloy: Zachary Harris\textsuperscript{1}; Erin Dubas\textsuperscript{1}; Allison Popernack\textsuperscript{1}; Brian Somerday\textsuperscript{1}; James Burns\textsuperscript{1}; \textsuperscript{1}University of Virginia; \textsuperscript{2}Independent 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\textsuperscript{1}; Kenichi Taka\textsuperscript{2}; Satoshi Mizokami\textsuperscript{2}; Mitsugi Fukahori\textsuperscript{2}; \textsuperscript{1}Sophia University; \textsuperscript{2}Mazda Motor Corporation

10:50 AM
Comparison Study on the Hydrogen Embrittlement Susceptibility of High Hardness Steels: William Williams\textsuperscript{1}; David Salley\textsuperscript{1}; Haley Doude\textsuperscript{1}; Wilburn Whittington\textsuperscript{1}; David Wipf\textsuperscript{2}; Krista Limmer\textsuperscript{2}; Daniel Field\textsuperscript{2}; Kevin Doherty\textsuperscript{3}; Hongjoo Rhee\textsuperscript{3}; \textsuperscript{1}Center for Advanced Vehicular Systems; \textsuperscript{2}Mississippi State University; \textsuperscript{3}US Army Research Lab

11:10 AM
Crack Initiation and Propagation Analyses of Hydrogen-related Fracture Surfaces of Tempered Martensitic Steel: Takahiro Chiba\textsuperscript{1}; Takashi Yasukawa\textsuperscript{1}; Kenichi Takai\textsuperscript{2}; \textsuperscript{1}Sophia University

11:30 AM
Effect of Local Austenite-to-martensite Transformation on Hydrogen Embrittlement of Cold-rolled Medium Mn Steel: Jun Zhang\textsuperscript{1}; Zhiqiang Yang\textsuperscript{1}; Chi Zhang\textsuperscript{1}; Hao Chen\textsuperscript{1}; Tsinghua 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\textsuperscript{1}; \textsuperscript{1}University of Virginia

9:10 AM Invited
Unraveling Hierarchical Materials using Autonomous Research Systems: Keith Brown\textsuperscript{1}; \textsuperscript{1}Boston University

9:50 AM Break

10:10 AM Invited
Combining Simulation and Autonomous Experimentation for Mechanical Design: Aldair Gongora\textsuperscript{1}; \textsuperscript{1}Boston University

10:50 AM Invited
Closing the Loop in Autonomous Materials Development: Kristofer Reyes\textsuperscript{1}; \textsuperscript{1}University 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\textsuperscript{1}; \textsuperscript{1}University of Colorado Boulder

www.tms.org/TMS2020
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; Liubin Xu; Jaswanth Bommidil; 1University of Tennessee Knoxville

8:50 AM Invited
Machine-learning Driven Efficient Exploration of the High Entropy Alloy Phase Space: Raymundo Arroyave; 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; Satish Rao; Jaafar El-Awady; 1Johns Hopkins University

9:30 AM
Origins of Excellent Passivation in Multiple Principle Element Alloys: John Scully; Angela Gerard; Carol Glover; Kang Wang; Bi-Cheng Zhou; Prasanna Balachandran; Gerald Frankel; Pin Lu; James Saal; Daniel Schreiber; Joseph Poon; Sean Agnew; 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 Foley; James Hart; Elf Alber; Robert Ritchie; Andrew Minor; Mark Asta; Flynn Walsh; Michael Titus; Jean-Philippe Couzinie; Mitra Taheri; 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; S. Sina Moeini-Ardakan; Ryan Penny; Ju Li; A. John Hart; 1Massachusetts Institute of Technology

10:50 AM
Nanoscale Deformation Twinning in CrCoNi Medium-entropy Alloy Investigated by Molecular Dynamics Simulation: Jun Ding; Mark Asta; Robert Ritchie; Xi’an Jiaotong University; 2University of California, Berkeley

11:10 AM Invited
Materials Fingerprint Classification: Vasileios Maroulas; Adam Spannaus; David Keffer; Kody Law; Farzana Nasrin; Cassie Micucci; Peter Liaw; Piotr Luszczek; Louis Santodonato; 1University of Tennessee; 2University of Manchester; Advanced Research Systems, Inc.

11:30 AM Invited
Machine Learning for Accelerating the Design of Additively-manufactured Turbine Blades Yielding Ultra-high Energy Efficiency: Xuesong Fan; Baldur Steingrimsson; Duckbong Kim; Peter Liaw; 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; George Kim; Chano Lee; Peter Liaw; 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 Hargatter; Joshua Strother; 1New Mexico Institute of Mining and Technology

8:50 AM Invited
Compositional Design and Deformation Behavior in Ni-based Concentrated/HEA Alloys: Ridwan Sadidja; Wai-Yim Ching; 1Missouri State University; 2University of Missouri-Kansas City

9:10 AM Invited
Emerging Computational Tools for Exploring the Refractory Compositionally Complex Alloys: Christopher Woodward; Satish Rao; Edwin Antillon; Brahim Akdim; Triplicane Parthasarathy; Daniel Miracle; Oleg Senkov; 1Air Force Research Laboratory; 2UES Inc.

9:30 AM Invited
Ab Initio Phase Stabilities of High Entropy and Chemically Complex Alloys: Yuji Ikeda; Prashanth Srinivasan; Biswanath Dutta; Jörg Neugebauer; Blazej Grabowski; Tatiana Kostiuchenko; Alexander Shapeev; Fritz Koehmann; 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: Denghe Chen; Yin Zhang; Hao Wang; Xiaozhou Liao; Ting Zhu; 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 Muskeri; Vahid Hasannaeimi; Maryam Sadeghilaridjani; Sundeep Multherjee; 1University of North Texas
10:50 AM Invited
Stability of Al-Li-Ti-Sc-Mg High Entropy Alloys from Monte Carlo Simulations: James Morris; Eva Zarhadoulia; M. Claudia Troparevsky; Andreas Kolkovits; Ames Laboratory; Oak Ridge National Laboratory; Arcconic 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; National Taiwan University

11:30 AM Invited
Data-driven Design of High-entropy Alloys: Houlang Zhuang; Wenjiang Huang; Duo Wang; Arizona State University

11:50 AM Invited
The Stacking Fault Energies of FCC High-entropy Alloys: An ab initio Study: Zongru Pei; Jeffrey Hawk; David Alman; Michael Gao; National Energy Technology Laboratory

10:30 AM Invited
Electroplating Nanocrystalline Medium and High-entropy Alloys: Lianbo Wang; Michel Hache; Yu Zou; University of Toronto

10:50 AM Invited
Thermal Transport Calculation of High Entropy Alloys for Thermoelectric Applications: Seungha Shin; Md Abdullah Al Hasan; Jiachi Wang; Yu-Kai Weng; Dustin Gilbert; University of Tennessee

11:10 AM Invited
Theory of Formation of High Entropy Alloys for Biomedical Applications: Wai-Yim Ching; Saro San; Jameson Brecht; Ridwan Sakidja; Miqin Zhang; Peter Liaw; University of Missouri; University of Tennessee; Missouri State University; University of Washington; University of Tennessee

MATERIALS DESIGN
ICME Gap Analysis in Materials Informatics: Databases, Machine Learning, and Data-Driven Design — Session III

Sponsored by: TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials 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; Rishi Pillai; Jian Peng; Marie Romedenne; Bruce Pint; J. Haynes; Oak Ridge National Laboratory

9:10 AM Invited
Discovering and Navigating Gaps and Connections in Data for Materials Design: Krishna Rajan; University at Buffalo - State University of New York

9:50 AM Invited
Machine Learning for Materials Science: Open, Online Tools in NanoHUB: Juan Verduzco; Saaketh Desai; Alejandro Strachan; Tanya Faltens; Purdue University

10:10 AM Break

10:30 AM Invited
Automated Data Curation for Electron Microscopy Using the Materials Data Facility: Charudatta Phatak; Jonathon Gaff; Ian Foster; Ben Blaiszik; Argonne National Laboratory; University of Chicago

10:50 AM Invited
Uncertainty Quantification and Propagation in ICME Enabled by ESPEL: Brandon Bochlund; Richard Otis; Zi-Kui Liu; Pennsylvania State University; Jet Propulsion Laboratory, California Institute of Technology

11:10 AM
Computational Classification, Generation and Time-evolution Prediction of Alloy Microstructures with Deep Learning: Fei Zhou; Lawrence Livermore National Laboratory

11:30 AM
Predicting Electronic Density of States of Nanoparticles by Principal Component Analysis and Crystal Graph Convolutional Neural Network: Kihoon Bang; Byung Chul Yeo; Doosun Hong; Donghun Kim; Sang Soo Han; Hyuck Mo Lee; Korea Advanced Institute of Science and Technology; Korea 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 Jordan, 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 Zhang¹; 'Central South University

9:00 AM
Investigation and Modeling of the Influence of Cooling Rates on the Microstructure of AZ91 Alloys: Jiao Li¹; Zhi-Wei Shan¹; ¹The University of Queensland; ²Magontec Ltd.; The University of Queensland

9:20 AM
The Independent Effects of Cooling Rate and Na Addition on Hydrogen Storage Properties in Hypo-eutectic Mg Alloys: Zonghui Ji¹; Zhihe Dou¹; ¹The University of Queensland; ²Magontec Ltd.; The University of Queensland

9:40 AM
Producing High Purity Magnesium (99.99%) Directly by Pidgeon Process: Bo Yang¹; Fei Liu¹; Bo-Yu Liu¹; Zhi-Min Chang¹; Lu-Yao Mao¹; Jiao Li¹; Zhi-Wei Shan¹; ¹Xi’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 Guo¹; Zhang Tingan¹; Daxue Fu¹; Jibiao Han¹; Zonghui Ji¹; Zhihe Dou¹; ¹Northeastern University

10:40 AM
Producing Pure Magnesium Through Silicothermic under the Atmospheric Pressure: Fei Liu¹; Bo Yang¹; Bo-Yu Liu¹; Jiao Li¹; Zhi-Min Chang¹; Zhi-Wei Shan¹; ¹Xi’an Jiaotong University

11:00 AM
Effect of Temperature on Magnesium Vapor Condensation in Inert Carrier Gas: Jibiao Han¹; Zhang Tingan¹; Daxue Fu¹; Junhua Guo¹; Zonghui Ji¹; Zhihe Dou¹; ¹Northeastern University

11:20 AM
Thermodynamic Descriptions of the Quaternary Mg-Al-Zn-Sn System and Their Experimental Validation: Ting Cheng¹; Lijun Zhang¹; ¹Central 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 Kruizenga¹; 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 Sulejmanovic¹; Stephen Raiman¹; James Kurley²; ²Oak Ridge National Laboratory

9:20 AM
Non-galvanic Mass Transport in Molten Fluoride Salt Isothermal Corrosion Cells: Cody Falconer¹; 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 Start²; Stephen Raiman¹; Chaitanya Deo¹; ¹Georgia Institute Of Technology; ²Oak Ridge National Laboratory

10:00 AM
Advanced Characterization of Corrosion Behavior of Metals in Molten Chloride Salts: Lingfeng He¹; Arthur Ronne¹; Simerjeet Gill¹; Kotoro Sasaki¹; Yi Xie¹; Yachun Wang¹; Phillip Halstenberg¹; Dmitriy Dolzhnikov¹; Yu-chen Karen Chen-Wiegart¹; Shannon Mahurin¹; Idaho National Laboratory; ¹Stony Brook University; ²Brookhaven National Laboratory; ³Oak 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 Oskay¹; Tobias Meißner¹; Benjamin Grégoire¹; Alexander Bonk²; Mathias Galetz²; ¹DEHEMA-Forschungsinstitut; ²German Aerospace Center (DLR)

11:00 AM
First Steps Towards Predicting the Corrosion Rates of Structural Materials in Molten Salts: Rishi Pillai¹; Stephen Raiman¹; Bruce Pint¹; ¹Oak Ridge National Laboratory

11:20 AM
Mechanistic Understanding of Molten Salt Corrosion Using Electron Paramagnetic Resonance: James Kurley¹; Juho Lehmusto¹; 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: 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

8:30 AM Invited
Genomic Materials Design: Making CyberSteels Fly: Gregory Olson

9:00 AM Invited
Development of Cast Alumina-forming Austenitic Stainless Steels and their Implementation In High Temperature Industrial Applications: Govindarajan Muralidharan; Yukinori Yamamoto; Michael Brady; Donovan Leonard; Roman Pankiw; Jim Myers; Tanya Ross; Stanley Fauske; Ben Church; Oak Ridge National Laboratory; Duraloy Technologies; Metaltek International; Arcelor Mittal Global R & D; Arcelor Mittal Coatesville; University of Wisconsin-Milwaukee

9:30 AM
Synergistic Nano precipitation in Mn stabilized Austenitic Steels: Colin Stewart; Richard Fonda; Keith Knipling; National Research Council Associate at the U.S. Naval Research Laboratory; U.S. Naval Research Laboratory

9:50 AM Strong and Ductile Steel Designed by Dislocation Engineering: MingXin Huang; University of Hong Kong

10:10 AM Invited
Interface based Alloy Design: Matthias Militzer; Mariana Mendes; Ayush Suhane; Nicolas Romualdi; Hariharan Umashankar; University 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; Kevin Yokota; Raj Kumar Rachapudi; Mohammed Shahid Islam; Alberto Ricciulli; Khaled Morsi; SDSU

8:50 AM Numerical Simulation of Heat Transfer Between Roller and Slab during Medium Thickness Slab Continuous Casting: Shuang Liu; Mujun Long; Pei Xu; Pingmei Tang; Dengfu Chen; Huamei Du; Chongqing University

9:10 AM Mathematical Modeling of Strip Slipping on Bridle Roll of Skin Pass Mill During Speed-up Process: Yangqiang Wang; Yanglong Li; Hui Wang; Wei Guo; Jie Wen; Meng Yu; Research 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: Process Technology and Modeling Committee

Program Organizers: Robert Hyers, University of Massachusetts; Douglas Matson, Tufts University; Michael Sansouceci, 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, Utm University

8:30 AM Effect of External Force on Surface Oscillation Damping of Levitated High-temperature Droplet: Masahito Watanabe; Gakushuin University

8:50 AM Viscosity Measurement of Liquid Alloys in Microgravity and Experiment Parameters Optimization: Xiao Xiao; Douglas Matson; DLR; Tufts 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 Mohr1; Rainer Wunderlich1; Hans Fecht1; 1Ulm University

9:30 AM  Modeling Magnetohydrodynamics in Microgravity Electromagnetic Levitation Experiments: Gwendolyn Bracher1; Robert Hyers3; 1University of Massachusetts

9:50 AM  Effect of Inert Gas Atmosphere on Evaporation Losses and Density Measurement for Electromagnetically Levitated Superalloys: Jannatun Nawer1; Stéphane Gossé2; Michael SanSoucie2; Douglas Matson1; 1Tufts University; 2CEA Saclay

10:10 AM  Break

10:40 AM  Thermo-physical Properties of SiGe Melts Measured on Board the ISS: Yeuansu Luo; Bernd Damaschke; Georg Lohöfer; Konrad Samwer; 1Physics Institute University Goettingen; 2Institut für Materialphysik im Weltraum. Deutsches Zentrum für Luft- und Raumfahrt (DLR), D-S1170 Cologne, Germany

11:00 AM  Thermo-physical Properties of Fe-Si Alloys under Microgravity: Antonia Betzou1; Markus Mohr2; Rainer Wunderlich2; Begona Santillana3; Hans Fecht3; Sridhar Seetharaman2; Prakash Srinagaram2; 1Wmg, University Of Warwick; 2University of Ulm; 3University of California, Santa Barbara; 4Colorado School of Mines

11:20 AM  Computational Fluid Dynamics Modeling of Oscillation Damping of Compound Liquid Droplets: Ali Rabeh1; Makrand Khanwale1; Baskar Ganapathysubramanian1; Robert Hyers2; Jonghyun Lee2; 1Iowa State University; 2University of Massachusetts

9:30 AM  An Experimental-numerical Approach to Investigate Hydrogen Enhanced Localized Plasticity (HELP): S. Mohadeseh Taheri-Mousavi1; Motomichi Koyama2; Haxoue Yan1; Jinwoo Kim3; Benjamin Cameron4; S. Sina Moeni-Ardakani1; Ju Li5; C. Cem Tasan6; 1Massachusetts Institute of Technology; 2Tohoku University

9:50 AM  Theory of Dislocation-precipitate Bypass: Ben Szajewska1; Joshua Crone1; Jaroslav Knap2; 3Army Research Laboratory

10:10 AM  Break

10:30 AM  Influence of Laser Machining on the Nanomechanical Behavior of Nickel Titania Shape Memory Alloy: Albert Lin1; Kevin Schmalbach2; Kacï Gwilt1; Julia Hoffmann1; Dhiraj Catoor2; Markus Reiterer2; Nathan Mara2; 1University of Minnesota - Twin Cities; 2Medtronic

10:50 AM  Atomistic Calculations of the Peierls Stress in Nb-Based Multi-principal Element Alloys: Shuozhi Xu1; Emily Hwang2; Jun Xu2; Yanqing Su3; Irene Beyerlein2; 4University of California, Santa Barbara; 5Harvey Mudd College; 6University of Pennsylvania

11:10 AM  Dislocation Nucleation-mediated Plasticity of FCC Defect-scarce Nanowires: JungHo Shin1; Zhoucheng Xie2; Gunther Richter2; Erik Bitzek2; Daniel Giona1; 1University of California, Santa Barbara; 2Friedrich-Alexander Universität Erlangen-Nürnberg; 3MPI IS Stuttgart

11:30 AM  Dislocation Dominated Plasticity at the Nanometer: Darcy Hughes1; 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 Bhattacharya, 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 Pighiome, Imperial College London

8:30 AM  Keynote: Microtensile Testing of (fcc) Copper and (hcp) Titanium at Elevated Temperatures: Robert Wheeler1; Adam Shiveley2; Amit Pandey3; Jiashi Miao4; Michael Mills5; 1Microtesting Solutions LLC; 2Shiveley Technologies; 3Ansys Inc.; 4The Ohio State University

8:50 AM  A Novel Experimental Methodology and Theoretical Framework for Enabling Macroscopic-like Deformation at the Microscale: Hi Vo1; Evan Still2; Kiet Lam2; Aljaž Dnovec3; Laurent Capolungo4; Stuart Maloy5; Peter Chou6; Peter Houseman7; 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 Daryadeh1; Majid Miny1; 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 Dhiman1; Hao Wang1; Vikas Tomar1; 1Purdue University

10:10 AM  Break

10:30 AM  Keynote

Nanopillar Compression Testing with In-situ Raman Spectroscopy to Study Plastic Deformation in Vitreous Silica: Shefford Baker1; Zachary Rouse1; Praveena Manimunda1; Nicole Wiles1; S.A. Syed-Asif1; 1Cornell University; 2Bruker Nano Surfnces

11:10 AM  Temperature Effects in the Microscale Deformability of Yttria Stabilized Zirconia Prepared by Spark Plasma Sintering: Jaehun Cho1; Jin Li1; Qiang Li1; Jie Ding1; Han Wang1; Sichuang Xue1; Amiya Mukherjee1; Haiyan Wang1; Xinghang Zhang1; 1Purdue University; 2University of California, Davis

11:30 AM  Synchronized Indentation and Raman Spectroscopy for Crystal Engineering: Praveena Manimunda1; Manish Kumar Mishra2; Syed Asif3; 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 Seetharaman1; Xizhong Chen1; Sergey Konovalov3; Srivatsan T.S.4; Manoj Gupta5; 1Wenzhou University; 2ANSYS Software Private Ltd; 3Savama 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 Murph1; 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 “Etekemsh”: Alexander Manulyk1; 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 Manakari1; Gururaj Parande2; Mrityunjay Doaddamani1; Ashish Mallick1; Manoj Gupta2; 1Indian Institute of Technology (Indian School of Mines), Dhanbad; 2National University of Singapore; 3National Institute of Technology Karnakata

10:15 AM  Break

10:35 AM  Ordered Colloidal Crystals Fabrication and Studies on the Properties of Poly(Sterene-Butyl-Acrylate-Acrylic Acid) and Polystyrene Latexes: ikhazuangbe Ifjen1; Esther Ikuhoria1; Stanley Omorogbe1; Aireguamen Aigbodion2; 1Rubber Research Institute of Nigeria; 2University of Benin, Benin City, Nigeria

11:00 AM  Magnetic Field-assisted Electrodeposition of Nickel Composite Coatings: Denise Yin1; Heather Murdoch1; Efrain Hernandez-Rivera2; Anit Giri1; 1CCDC Army Research Laboratory

11:25 AM  Nanomechanical and Tribocorrosion Performance of Al-based Multilayered Thin Films: Wenbo Wang1; Wenjun Ca1; 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
33B | San Diego Convention Ctr

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 Larouche1; Francis Breton1; Rémi Martinez2; X Grant Chen3; Denis Massinon4; 1Laval University; 2Linamar Corporation; 3University of Quebec at Chicoutimi; 4Monturop 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 Peterson1; Daniel Malta2; Saumyaadeep Jana3; Vineet Joshi1; 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 Iruela1; Yannick Champion1; Annie Antoni-Zdziobek2; Fabien Volpi1; Christine Bourda2; Vincent Jarry1; 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 Zhang1; Ashley Paz y Puente1; 1University of Cincinnati
9:50 AM
Exploring Phase Transformations in the Au-Zn-Al System: Taylor Jacobs¹; Seth Imhoff²; 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; Jeff J. Hoyt; ¹Los Alamos National Laboratory; ²McMaster University

10:50 AM
Formation and Stability of Ni-Y Clusters in Mg85Y9Ni6 Alloys: Hiroshi Okuda; 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 Shi; Dong Wang; 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 Misiolek; ¹Lehigh University

9:00 AM Invited
Novel Additive Manufacturing Process Design for U3Si2 Fuel: Isabella Van Rooyen; ¹Idaho National Laboratory

9:30 AM
Microstructural Evolution of a Nanostructured Ferritic Alloy Composite during In-situ Ion Irradiation: Kathy Lu; Kaustubh Bawane; David Bai; Jing Hu; Meimei Li; 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 Maloy²; Ben Eftink³; Tarik Salehi; Osman El-Atwani; John Carpenter; Eda Aydogan; Thomas Liemert³; Mychalio Toloczko³; Thak Sang Byun³; Curt Lavender³; George Odette³; David Hoelzer³; 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 Byun³; David Hoelzer³; ¹Oak Ridge National Laboratory

11:10 AM
Microstructural Evolution of NFA and CrC@SiC-NFA Composite during Ion Irradiation: Kathy Lu; Kaustubh Bawane; David Bai; Meimei Li; 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; Krishnan Biswas; Sudhanshu Singh; 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; Yusrihiro Fukunaka, JAXA/Waseda University

Thursday AM | February 27, 2020
14A | San Diego Convention Ctr

Session Chairs: Antoine Allanore, Massachusetts Institute of Technology; Yusrihiro Fukunaka, JAXA/Waseda University

8:30 AM Introductory Comments

8:35 AM Invited
Electrochemical Processing under Extreme Conditions: Yusrihiro Fukunaka; ¹Kyoto University

8:55 AM Invited
The Application of the FFG Molten Salt Cycle on the Separation of the Refractory Metals: Georges Kipouros; ¹Dalhousie University

9:15 AM Invited
Innovative Ways to Chemically Process Rare-earth Waste Materials: Prabhat Tripathy³; ¹Batelle Energy Alliance (Idaho National Laboratory)

9:35 AM
Metallic Inert Anodes for Molten Carbonates Electrolysis Process: Kaifa Du; Peilin Wang; Dihua Wang; ¹Wuhan University

9:55 AM Break

10:10 AM Invited
Recovery of Metal Values from Wastes: Aida Abbasalizadeh; Rajiv Shekhar; Seshadri Seetharaman; ¹TATA Steel, Imuijden, 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 (MSSC-ET) Process: Dihua Wang; ¹Wuhan University
ADVANCED MATERIALS

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


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; Tony 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 Meyers1; Shiteng Zhao2; Bruce Remington3; Chris Wehrenberg3; Hye-Sook Park4; Eric Hahn1; 1University of California, San Diego; 2University of California, San Diego; 3Lawrence Berkeley National Laboratory; 4Lawrence Livermore National Laboratory; *Los Almos National Laboratory

9:00 AM Invited Design, Fabrication and Characterization of FeAl-based Metallic-Intermetallic Composite (MIL) Composites: Haoren Wang1; Kenneth Vecchio1; 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 Park1; Keunho Lee2; Seok Bong Kim2; LeeJu Park2; Seong Lee2; 1Hanbat National University; 2Agency for Defense Development

10:00 AM Nanomechanical Testing of Spark Plasma Sintered Stainless Steel Parts: Alexander Preston1; Kaka Ma1; 1Colorado State University

10:20 AM Break

10:35 AM Invited Fabrication of Oxides and Semiconductors with Non Equilibrium Phase Content: A. Y. Feng1; G Uahengo2; Y Kodera3; Javier Garay4; 1University of California, San Diego

11:05 AM An Advanced MCrAlY with TGO Self Repair Ability: Jianhong He1; 1Oerlikon Metco

11:25 AM A Novel Processing Route for Fe-TiB2 High Modulus Steel by Nano-treating and Regular Casting: Shiqi Zheng1; Xiaochun Li1; 1University of California, Los Angeles

11:45 AM Achieving Ultrahigh Hardness in Electrodeposited Nanograined Ni-based Binary Alloys: Yinong Shi1; Xiangui Zheng1; Jian Hu1; Jiongxin Li1; 1Imr Cas; 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 Altikaliyeva, University of Florida

8:30 AM Microstructural Changes in Graphite and the Corresponding Bulk Property Evolution: Anne Campbell1; José Arregui-Mena2; 1Oak Ridge National Laboratory

8:50 AM Microstructural Characterization of Nuclear Graphite Irradiated at Temperatures below 230°C: Jose Arregui-Mena1; Wenjing Li2; Lori Walters3; Philip Edmondson1; Cristian Contescu2; 1Oak Ridge National Laboratory; 2Canadian Nuclear Laboratories

9:10 AM Near-surface Disorder in 4H-SiC Induced by MeV light Ion Irradiation: John Demaree1; Noel Guardala2; Zois Tsina2; Eman Karim3; Mohamed Al-Sheikly4; 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 Gao1; Benjamin Beeler1; Yongfeng Zhang2; 1Idaho National Laboratory

9:50 AM Break

10:10 AM Invited Investigation of High Burnup Ceramic Fuel Microstructure at Idaho National Laboratory: Fabiola Cappia1; Geoffrey Beausoleil1; Alex Winslow1; Daniel Murray1; Brandon Miller1; LingFeng He2; Fei Teng3; 1Idaho National Laboratory

10:40 AM Neutron Irradiation Induced Intergranular Fission Product Precipitation in SiC Layer of TRISO Fuel: Isabella Van Rooyen1; Subhashish Meher1; Thomas Lillo1; 1Idaho National Laboratory

11:00 AM Three Dimensional Radiation Effects in Neutron Irradiated Uranium–Molybdenum Fuel: Maria Okuniewski1; Alejandro Figueroa2; Janova Thomas3; Sri Tapaswi Nori3; Peter Keneseki3; Jonathan Almer2; 1Purdue University; 2Argonne National Laboratory

11:20 AM Invited Radiation Effects on Phonon Transport in UO2 and ThO2: Tiankai Yao1; Vinay Chauhan1; Manisha Singh2; Armei Khanolkar1; Zilong Hua1; Matar Khashifov3; Matthew Mann1; Thierry Wiss3; Anter El-Azab1; Jian Gan1; David Hurley1; LingFeng He2; 1Idaho National Laboratory; 2The Ohio State University; 3Purdue University; Air Force Research Laboratory; 4European 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-Mousavii1; Haofei Zhou1; Guijin Zou1; Huajian Gao1; 1Massachusetts Institute of Technology; 2Brown University

8:50 AM
Tailoring Strength of 6082 Aluminium Alloy via Combination of Rolling and Heat Treatment: Witold Chrominski1; Malgorzata Lewandowska1; 1Warsaw University of Technology

9:10 AM
Bulk nc-Dissolvable Alloys Enable Design of Retrievable Sensors for Oil & Gas: Ting Roy1; Indranil Roy1; Ram Shenoy1; Jing Zhou1; 1SET Laboratories; 2WellDiver; 3Rice University

9:30 AM
Heterogeneous Materials under Shear:Interlinking Surface Deformation Mechanisms and Friction: Xiang Chen1; Zhong Han2; Xiuyan Li3; Christian Greiner1; Peter Gumbsch1; Ke Lu1; 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, Microstructural and Mechanical Properties of Heterogeneous Structured Al: Deliang Zhang1; Lei Cao2; Jiamiao Liang1; 1Northeastern University; 2Shanghai Jiao Tong University

10:10 AM Break

10:30 AM Invited
Heterogeneous High-entropy Alloys: A Review: Rui Feng1; Peter Liu1; 1University of Tennessee

10:50 AM
Ultra-uniformity in Nanocrystalline Materials: Implications from Generalized LSW Growth Theory and Validations: Yanhao Dong1; Hongbing Yang2; Jiangong Li1; I-Wei Chen1; Ju Li1; 1Massachusetts Institute of Technology; 2Lanzhou University; 3University of Pennsylvania

11:10 AM
Magnesium Based Composites Produced through HPT: Moara Castro1; 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 Lewandowska1; Marta Ciemiorek1; Witold Chrominski1; Lech Olejnik1; 1Warsaw University of Technology

11:40 AM
Searching for the Optimized Design in Heterogeneous Structure: Jie Pan1; 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 Magagnosc1; Andrew Tonge1; 1US Army Research Laboratory

8:50 AM
Observation and Analysis of Amorphization-induced Fragmentation in Boron Carbide: Jerry LaSalvia1; 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 Zhao1; Marc Meyers1; 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 Subhash1; Amnaya Awasthi1; Matthew DeVries1; 1University of Florida

9:50 AM
Sub-surface Observations and Analysis of Indented Polycrystalline Hot-pressed Boron Suboxide (B2O3): Krishander Behler1; 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 Ferrand1; 1Nanyang Technological University
10:50 AM

Mechanical Response and Deformation Modes during High-rate Loading of Multiphase Metal Materials: Avery Samuel1; Zachary Levin2; Carl Trujillo2; Saryu Fensin2; Tresa Pollock3; Irene Beyerlein2; Frank Zok2; 1University of California, Santa Barbara; *Texas A&M University; 2Los Alamos National Laboratory; 3University 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; Jian-Jing Yang, Michigan Technological University; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesia; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinkilic, Atılım 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 Mo,C on an Activated Carbon Matrix: Grant Wallace1; Jerome Downey2; Jannette Chorney3; Katie Schumacher1; 1Montana Technological University

2:35 PM
FactSage-based Design Calculations for the Production of High Carbon Ferromanganese on Pilot-scale: Joalet Steenkamp1; 1MINTEK

2:55 PM
Influences of Li2O on the Properties of Ultrahigh-basicity Mold Fluxes for Continuous Casting of Perlitic Steel: Min Li1; Yuan Bing Wu1; Sheng Ping He1; Qiang Qiang Wang1; Qian Wang1; 1Chongqing University

3:15 PM
Effect of Refining Slag Composition on the Cleanliness of 25Cr2Ni4MoV Rotor Steel: Chao Zhao1; 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 Gu1; Anjun Xu2; Dongfeng He3; Hongbing Wang3; Kai Feng3; 1University of Science and Technology Beijing

4:10 PM
Numerical Simulation and Optimization of Temperature Field in the Baking of RH Vessel: Fei Yuan1; Peiling Zhou1; Xiao Sun1; Shuai Deng1; 1University of Science and Technology Beijing; *Tsinghua 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
10 | San Diego Convention Ctr*

*Session Chairs:* Nik Hrabe, National Institute of Standards and Technology; Jake Benzing, National Institute of Standards and Technology

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2:00 PM Invited
Fatigue Behavior of Additive Manufactured Ni and Ti Alloys Through Coupled Modeling and In-situ Experiments: *Michael Sangid*; 1Purdue University

2:30 PM
Maximizing the Fatigue Lifetime by Choosing the Best Build Orientation: *Amin S. Azar*; 1Magnus Reiersen; 2Even W. Hovig; 3Mikkeli M. Pedersen; 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*; 1Matt Lindroos; 1Tatu Pinomaa; 2Tom Andersson; 2Tomi Suhonen; 3VTT Technical Research Center of Finland

3:30 PM
Microstructure-based Fatigue Performance Analysis and Prediction of Additively Manufactured 316L Stainless Steel Subjected to Different Heat Treatments: *Chola Elangeswaran*; 1Antonio Cutolo; 1Charlotte de Formanoir; 1Gokula Krishna Muralidharan; 2Brecht Van Hooreweder; 1KU Leuven; 3D Systems Leuven

3:50 PM Invited
Surface Morphology, Stress Concentrations, Micromechanical Modeling and Fatigue Life in 3D Printed Metals: *Anthony Rollett*; 1Christopher Kantzos; 2Carnegie Mellon University

4:20 PM
Prediction of Fatigue Life of Flight-critical Metallic Components Fabricated by Additive Manufacturing: *Xuesong Fan*; 1Baldur Steingrimsen; 1Duckbong Kim; 2Peter Liaw; 3University of Tennessee; 4Imagers LLC; Portland State University; 5Tennessee Tech University

4:40 PM
Coupling Damage Models to Multiscale Modeling of the Selective Laser Melting Process for Metals: *Patcharapit Prompoppatum*; 1Sabeur Msolli; 2Jerry Siu Sin; 3Mark Jhon; 1Institute of High Performance Computing

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ADDITIVE TECHNOLOGIES
Additive Manufacturing for Energy Applications II — Characterization II

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

*Program Organizers:* Isabella Van Roooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Chariit, University of Idaho; Michael Kirka, Oak Ridge National Laboratory

*Thursday PM | February 27, 2020
9 | San Diego Convention Ctr*

*Session Chairs:* Subhashish Meher, Idaho National Laboratory; Bharat Gwalani, Pacific Northwest National Laboratory

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2:00 PM
Sensitization of Alloy 800H Made by Laser Powder Bed Fusion: *Jingfan Yang*; 1Xiang Liu; 2Miao Song; 3Lingfeng He; 4Bart Prorok; 5Xiaoyuan Lou; 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*; 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*; 1Al-Amin Ahmed Simon; 1Henri Kunold; 2Lyle Jones; 3Maria Mitkova; 1Boise State University

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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

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2:00 PM
Polycrystal-inspired Hierarchical Lattice Materials: *Jedsada Lertthanasarn*; 1Chen Liu; 2Everth Hernández-Nava; 2Iain Todd; 3Minhson Pham; 1Imperial College London; 2The University of Sheffield

2:20 PM
Development of an Austenitic/Martensitic Gradient Steel by Additive Manufacturing: *Flore Villaret*; 1Xavier Boulnat; 2Pascal Aubry; 3Damien Fabregue; 3Yann de Carlan; 1CEA; 2Université de Lyon, INSA de Lyon

2:40 PM
3D Printed Nanocomposites of Silicon Elastomer and Multiferroic Nanoparticles: *Felicia Horne*; 1Naga Srinivas Korivi; 2Vijay Rangari; 1Tuskegee University
3:00 PM
Energy Absorbing Functional Composites with Negative Stiffness: Al-ZrO2 Fabricated by Additive Friction Stir Deposition. Hunter Rauch1; Hang Yu1; Virginia Polytechnic Institute and State University

3:20 PM
3D Printed Polymer Multiferroic Composites: Emery Utterback1; Naga Srivinas Korivi1; Vijay Rangari1; Tuskegee University

3:40 PM
Break

4:00 PM
Additive Manufacturing of Multifunctional Continuous Carbon Fiber Composites via Coextrusion: Aditya Thakur1; Xiangyang Dong1; Missouri 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 Wu1; Michael Wu1; Gary Chung3; C.Y. Ma3; Feng Xu1; Kinnor Chattopadhyay1; University of Toronto; Solar Applied Materials Technology Corporation; Farsoon Technologies Corporation

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**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; Smsha 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

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2:00 PM
A Machine-Agnostic Approach to Layer-wise Process Monitoring and Control of Powder Bed Additive Manufacturing Technologies: Luke Scime1; Derek Siddel1; Vincent Paquit1; Oak Ridge National Laboratory

2:30 PM
Rapid Characterization of AM Components for Alloy Design and Process Optimization: Ryan Dehoff1; Alex Plotkowski1; Kevin Sisco1; Paul Brackman1; Pradeep Bhattad1; Curtis Frederick1; Andres Rossy1; Amit Shyam1; Oak Ridge National Laboratory; University of Tennessee; Zeiss AG

2:50 PM
Simultaneous High-speed Measurements of Laser Absorptance and Melt Pool Geometry in Metal Powder Bed Systems: Brian Simonds1; Jack Tanner1; Paul Williams1; Niranjani Parab1; Cang Zhao1; Tao Sun1; National Institute of Standards and Technology; Argonne National Laboratory

3:10 PM
High Speed Video of the Influence of Preheating on Tungsten Microcracking During Laser Scanning: Bey Vrenchen1; Rishi Ganelivalara1; Aidan Martin1; Manyalibo Matthews1; Lawrence 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 Ramirez1; Ohio State University

3:50 PM
Break

4:10 PM
Invited
Quantifying Defect Signatures in Metal Additive Manufacturing Using In-situ Diagnostics: Manyalibo Matthews1; Bradley Jared1; John Carpenter1; Elena Garte1; Benjamin Brown1; Lawrence Livermore National Laboratory; Sandia National Laboratories; Los Alamos National Laboratory; Y-12 National Security Complex; Kansas City National Security Campus

4:40 PM
Unsupervised Learning Applied to Powder Metals for Additive Manufacturing: Ryan Cohn1; Andrew Kitahara1; Srujana Rao Yarasi1; Elizabeth Holm1; Carnegie Mellon University

5:00 PM
Coherent Scanning Interferometry for Characterization of Recycled Metal Powder and Reusability Assessment in Additive Manufacturing: Susana Castillo1; Anna Hayes1; Rongguang Liang1; Gregory Colvin1; Krishna Muralidharan1; Douglas Loy1; Barrett Potter1; Christopher Shanon1; University of Arizona

5:20 PM
In-line Powder Packing Density Analysis During Selective Laser Melting: Tan-Phuc Le1; Karl Davidson1; Bernard Gaskey1; Po-Ju Chang1; Matteo Seita1; Nanyang Technological University

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**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; Abish Moridi, Cornell University

**Thursday PM | February 27, 2020**

**6F | San Diego Convention Ctr**

**Session Chair:** Behrang Poorganji, GE Additive

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2:00 PM
The Synthesis of Ti based Bulk Metallic Glass Alloys for Additive Manufacturing: Hai-Jun Kim1; Yeon-Joo Lee1; Young-Sin Choi1; KITECH

2:30 PM
Additive Manufacturing of Bulk Metallic Glass Composites with Improved Mechanical Properties: Shunyu Liu1; Abhijeet Dhiman1; Yung Shin1; Vikas Tomar1; Samuel Zhang1; Purdue University

2:50 PM
Additive Manufacturing of Crack-free W-base Refractory Materials: Ian McCue1; Michael Presley1; Michael Brupbach1; Morgan Trelx1; Johns Hopkins University Applied Physics Lab

3:10 PM
A Novel Titanium Alloy for Additively Manufactured Orthopaedic Implants: Enrique Alabort1; Alvaro De Diego1; Maria Vega Aguine-Cebrian1; Daniel Barba1; Roger Reed1; OxMet Technologies; Universidad Politecnica de Madrid; University of Oxford

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3:30 PM
Additive Manufacturing of Wear Resistant Metallic Glass Components for Space Exploration: Punнathat Bordeenithikasem1; Samad Firdosy2; Andre Pate3; John Paul Borgonia3; 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 Karaman1; Raiyan Seede1; Bing Zhang1; David Shoukr1; Alaa Eltwany1; Raymundo Arroyave2; 1Texas A&M University

4:25 PM
Material Design for Additive Manufacturing of Soft Magnetic Materials for Permanent Magnet Synchronous Machine Rotors: Lennart Tasche1; Florian Hengsbach1; Kai-Peter Hoyer1; Sebastian Magerkohi1; Stefan Urbanek1; Bernd Porick1; Detmar Zimmer2; Mirko Schaper3; 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 Heikkenen1; Sudarsanam Babu1; 1The University of Tennessee

5:15 PM
Development of Prediction Tools for Incorporation of Cooling Rate Dependent Solute Drag Based Thermal-physical Properties in Additive Manufacturing: A Sensitivity Study: Deepankar Pal1; Kaisheng Wu1; Dave Conover1; 1ANSYS; 2Thermocalc

5:35 PM
Towards an ICME Framework of Designing Post-process for Additively Manufactured Ti6Al4V: Shengyen Li1; Kirby Matthews1; 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 Zheng1; Xin Wang1; Sen Jiang1; Bingqing Chen2; Jiayu Liang1; Shuai Huang1; Yizhang Zhou1; Enrique Lavernia1; Julie Schoenung2; 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 Lindroos1; Samuel Forest2; Tatu Pinomaa3; 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 Diepol1; Steffen Neumeier2; Mathias Goken1; 1FAU Erlangen-Nuremberg

3:00 PM
Effect of Build Size to the Final Microstructures in Ti6Al4V After Selective Laser Melting: Sinting Cynthia Chang1; Samy Hocine1; Steven Van Petegem1; Tuerdi Maimaitiyili1; Dario Ferreira Sanchez1; Daniel Grolimund1; Helena Van Swaygenhoven1; 1Paul Scherrer Institute

3:20 PM
Role of Thermal Gradients in the Microstructure Evolution in EBM Ti6Al4V Builds: Sabina Kumar1; 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 Mian1; Jafar Razmi1; Leila Ladani1; 1Arizona State University

4:20 PM
Simulating Microstructure in Metallic Materials Applied for Additive Manufacturing Processes: Javed Akram1; Thaddeus Low1; 1ANSYS

4:40 PM
Metastable Cellular Microstructure in Selective Laser Melted Maraging Steel: Yingjie Yao1; 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 Luo1; 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 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

**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 Choi1; Junghoon Lee2; Hyunbin Nam3; Namhyun Kang4; Myung-Hyun Kim5; Dae-Won Cho5; Dae-Geun Nam6; Seunghwan Lee7; 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 Sreekala8; Poulumi Dey9; Tilmann Hickel10; Jörg Neugebauer11; 8Max-Planck-Institut für Eisenforschung GmbH; 9Technische Universität Delft

2:40 PM
Interstitial-free Bake Hardening Realized by Epsilon-martensite Reverse Transformation: Shaolou Wei1; Menglei Jiang1; Cemal Tasan1; 1Massachusetts Institute of Technology

3:00 PM
Strength and Toughness of Nano-structured Pearlite: Kushal Mishra1; Vaibhav Khiratkar1; Aparna Singh1; 1Metallurgical Engineering and Materials Science, IIT Bombay, Mumbai

3:20 PM
Martensite Transformation Induced Unprecedented Strength in Pure Iron: Hongwang Zhang1; 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; 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 Baker1; 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 Palermo1; Daniel Casaleiz2; Javier Rial3; Javier de Vicente3; Alberto Bollero3; 1MDEA Nanoscience

2:40 PM Invited
Additive Manufacturing of NiZnCu-ferrite Soft Magnetic Composites: Caleb Andrews1; Kathryn Small1; Megan Chatham2; Samantha Dorman3; Mitra Taheri1; 1Johns Hopkins University; 2Drexel University

3:05 PM Invited
Composite Magnetic Filaments for Additive Manufacturing: A Novel Procedure for Laboratory Scale Production: Victorino Franco1; Álvaro Díaz-García1; Ana Bellido-Correa1; Agustin Cota1; Joaquín Ramirez-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 Paranthaman1; Corson Cramer1; Peeyush Nandwana1; Jiaqiang Yan1; Samuel Evans1; Amy Elliott1; Chins Chinnsamy1; 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 Firdosy1; Peter Dillon1; John Paul Borgonia1; Ryan Conversano1; Bryan McEnery1; Andrew Shapiro1; 1Jet Propulsion Laboratory

4:30 PM
Low Temperature Additive Manufacturing of Metamagnetic Shape Memory Alloys for Magnetocaloric Applications: Bosco Rodriguez1; Daniel Salazar1; 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; Surajit 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:** Ashutosh Mistry, Argon National Laboratory; Megan Butala, University of Florida

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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*²; *Yaocai Bai*³; *David Wood Ill*³; *Iliaj Belharouak*²; *Jianlin Li*²; ²Oak Ridge National Laboratory

2:40 PM
Cathode Modification by Dielectric Materials and Their Performance in Li-ion Battery: *Shintaro Yasui*¹; *Soo Yasuha*²; *Takashi Teranishi*³; *Yumi Yoshikawa*²; *Tomoyasu Taniyama*²; *Mitsuru Itoh*²; ²Tokyo Institute of Technology; ³Okayama University; ¹Nagoya 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 Tian*¹; *Brian Tarroja*¹; *Oladele Ogusenitan*¹; *Scott Samuelsen*¹; *Julie Schoenung*¹; ¹University of California, Irvine

3:20 PM
A Study on Charge-discharge Characteristics of Dipping Ga-Sn Electrode: *Hsien-Ching Liao*¹; *Fei-Yi Hung*¹; 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 Kawaguchi*¹; *Masatsugu Morimitsu*¹; ¹Doshisha University

4:20 PM
Improvement in Rechargeability of Zinc Electrode for Aqueous Secondary Batteries: *Tatuya Okumura*¹; *Kenji Kawaguchi*¹; *Masatsugu Morimitsu*¹; ¹Doshisha University

4:40 PM
Metal Enhancements to Porous Carbon Materials for Hydrogen Storage: *Hillary Smith*¹; *Cullen Quine*¹; *Channing Ahn*²; *David Boyd*²; *Brent Fultz*²; ¹Swarthmore College; ²Caltech

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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 Tjonnael Wefring, Hydro Aluminium

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2:00 PM Introductory Comments

2:05 PM
The Australian Energy Crisis: Its Impact on Domestic Aluminium Smelting and Potential Solutions: *David Wong*²; *Alton Tabereaux*²; *Mark Dorreen*³; ¹University of Auckland; ²Consultant

2:25 PM
Recycling of the Flue Gas from Aluminium Electrolysis Cells: *Asbjorn Solheim*¹; *Samuel Senanu*¹; ¹SiTEF Industry

2:45 PM
Utilization of Waste Heat for Pre-heating of Anodes: *Martin Grimstad*¹; *Kim Ronny Elstad*¹; *Asbjørn Solheim*¹; *Kristian Etienne Einarsrud*¹; ¹Norwegian University of Science and Technology; ²Alcoa Mosjøen; ¹SiTEF Industry

3:05 PM
Toward Minimizing the of Co-evolution of PFC Emission in EGA Smelter: *Najeeba Al Jabri*¹; *Ali Jassim*¹; *Daniel Whitfield*¹; *Sergey Akhmetov*¹; *Barry Welch*¹; ¹EGA; ²Welback Consulting Ltd

3:25 PM Break

3:40 PM
Development and Application of GP500+ Energy Saving Aluminum Reduction Cell: *Zhuojun Xie*¹; *Song He*¹; *Hongmin Ao*¹; ¹GAMI

4:00 PM
Research and Application of Direct Welding Technology on Super Large Section Conductor: *Xudong Wang*¹; *Xiaoqiang Feng*¹; *Yingwu Li¹; ¹Zhengzhou Jingwei Technology

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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

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2:00 PM Invited
Effects of Testing Temperature and Sample-size on Tensile Deformation of Metallic Glass: *Chandra Meduri*¹; *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 Kurtuluş; Jörg Löffler; Laboratory 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; Arash Yazdani; Darren Dewitt; Javier E. Garay; Olivia Graeve; University of California, San Diego

3:00 PM
Crystallization during Welding of Bulk Metallic Glasses: Martin Dickey; Cody Bowman; Timothy Pickle; Kayode Oyedemi; Anthony Slater; Nicholas Hutchinson; Richard Baumer; Newport News Shipbuilding; Colorado School of Mines; ARCTEQ; Cambridge Vacuum Engineering; Eutectix; Letourneau University

3:20 PM Break

3:40 PM Invited
Shear Band Nucleation Kinetics in Metallic Glasses: Meng Gao; John Perepezko; Junqiang Wang; University of Wisconsin-Madison; Ningbo 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; Iowa State University

4:20 PM Invited
The Effect of Thermal and Mechanical Cycling on Atomic Structure and Fracture Toughness of Metallic Glasses: Jittisa Kettheew; Sebastian Kube; Derek Kuldinow; Hui Wang; Wojciech Dmowski; Takeshi Egami; Yale University; Frontier Research Institute of Interdisciplinary Science (FRIS), Tohoku University; University of Tennessee; Oak Ridge National Laboratory

4:40 PM
Nanoscale Heterogeneity on Mechanical Performance of Cu-Zr-Al Thin Film Metallic Glasses: Xiao Han; Yucong Gu; Feng Yan; Lin Li; University 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; Stanislaw Gierlotka; Geunhee Yoo; Hui Wang; Yoshihiko Yokoyama; Eun Soo Park; Takeshi Egami; University of Tennessee; Polish Academy of Science; Seoul National University; Tohoku University; Oak Ridge National Laboratory

2:20 PM Invited
Microstructural, Mechanical and Thermal Characterization of Mg65Ni25Y5M (M = Si, B, La) Amorphous Alloy by Melt Spinning: Celal Kuruş; Dan Thoma; John Perepezko; University of Wisconsin, Madison

2:40 PM Invited
Role of Heterogeneous Microstructure Modifications in Affecting Fracture Toughness of Zr-based Bulk Metallic Glasses: Jamie Kruzic; Bosong Li; Bernd Gludovatz; Anna Cegeuerra; Keita Nomoto; Simon Ringer; Shenhui Xie; Sergio Scudino; University of New South Wales; University of Sydney; Shenzhen University; IFW Dresden

3:00 PM
X-ray Diffraction Study of the Local Topological Rearrangement and Plasticity of Bulk Metallic Glasses: Hui Wang; Wojciech Dmowski; Zengquan Wang; Yoshihiko Yokoyama; Hongbin Bei; Takeshi Egami; University of Tennessee; Tohoku University; Oak Ridge National Laboratory

3:20 PM Break

3:40 PM
Local Dynamics in Metallic Liquids Studied by Inelastic Neutron Scattering: Zengquan Wang; Wojciech Dmowski; Hui Wang; Takeshi Egami; University of Tennessee

4:00 PM
Mechanical Deformation of Iron-based In Situ Metallic Glass Matrix Composites: Arash Yazdani; Darren Dewitt; Wei Huang; Günther W.H. Höhne; Scott T. Misture; Javier E. Garay; David Kisailus; Olivia Graeve; University of California, San Diego; University of California, Riverside; Utm University; Alfred University

4:20 PM Invited
Atomic Structural Features Hidden in Structure Factor of Metallic Alloy Liquids: Chae Woo Ryu; Wojciech Dmowski; Takeshi Egami; University of Tennessee

4:40 PM
Glass-forming Ability and Atomic Packing Structure of Al-TM-RE Amorphous Alloys: Jinfu Li; Shanghai 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 Ikhamayes, Al Isra University; Yunus Kalay, Middle East Technical University; Jann-Yang Huang, 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; Daria Drozdenko; Michal Knapěk; Jan Bohlen; Frantisek Chmelik; Charles University; Helmholtz-Zentrum Geesthacht
2:00 PM  
Investigation of Impact Toughness of Electron Beam Welded AISI 321 SS at Cryogenic Temperatures: Sandeep Singh Sandhu\textsuperscript{1}; Ajay Sharma\textsuperscript{1}; Vineet Prabhakar\textsuperscript{2}; \textsuperscript{1}Quest Engineering College; \textsuperscript{2}SUS Engineering College, Tangor

2:40 PM  
The Influence Irradiation Conditions on the Microstructural Evolution of Irradiated U-Mo Fuels: Charlyne Smith\textsuperscript{1}; Dennis Keiser\textsuperscript{2}; Brandon Miller\textsuperscript{2}; Assel Aitkaliyeva\textsuperscript{1}; \textsuperscript{1}University of Florida; \textsuperscript{2}Idaho National Laboratory

3:00 PM  
Microstructural Evolution of \textsuperscript{2}Ni,\textsuperscript{1}Al Precipitates Affecting Mechanical Properties of Nickel-based Superalloys: Rasim Erzi\textsuperscript{2}; M. Vedat Akdeniz\textsuperscript{1}; Amdulla O. Mekhrabov\textsuperscript{2}; \textsuperscript{1}Middle East Technical University

3:20 PM  
Influence of PWHT on Impact Toughness of Electron Beam Welded AISI 409 Stainless Steel: Akash Doorna\textsuperscript{1}; Sandeep Singh Sandhu\textsuperscript{1}; Beant Singh\textsuperscript{2}; \textsuperscript{1}Quest Engineering College; \textsuperscript{2}PCET Lalru

3:40 PM  
Break

3:55 PM  
Calibrating Yield Criteria in 6 Dimensions: A Collection of Analytic and Experimental Case Studies: Zachary Brunson\textsuperscript{1}; Aaron Stebner\textsuperscript{2}; \textsuperscript{1}Colorado School of Mines

4:15 PM  
The Evolution of Precipitates in a Novel Heat-resistant Martensitic Steel During Creep: Pengyu Wen\textsuperscript{1}; Haiwen Luo\textsuperscript{1}; Zhengdong Liu\textsuperscript{2}; Zhengzong Chen\textsuperscript{1}; \textsuperscript{1}University of Science and Technology Beijing; \textsuperscript{2}China Irons & Steel Research Institute Group

2:40 PM  
Modeling and Characterization of Reflection, Absorption, and Scattering in Polycrystalline Materials: Meir Shachar\textsuperscript{1}; Gottlieb Uahengo\textsuperscript{1}; Elias Penilla\textsuperscript{1}; Matthew Duarte\textsuperscript{1}; Yasuhiro Kodera\textsuperscript{1}; Javier Garay\textsuperscript{1}; \textsuperscript{1}University of California, San Diego

3:00 PM  
Characterization of Brazilian Peat, Clay and Diatomite Blends for Use as Organic Compounds Adsorbents: Tatiana Costa\textsuperscript{1}; Francisco Valenzuela-Diaz\textsuperscript{2}; Maria das Graças Da Silva-Valenzuela\textsuperscript{2}; Jéssica Arjona\textsuperscript{1}; \textsuperscript{1}Universidade De Sao Paulo; \textsuperscript{2}USP

3:20 PM  
Break

3:35 PM  
Microstructure Dependent Thermal Conductivity Measurement of Zircaloy-4 Using an Extended Raman Thermometry Method: Hao Wang\textsuperscript{1}; Abhijeet Dhiman\textsuperscript{1}; Vikas Tomar\textsuperscript{1}; \textsuperscript{1}Purdue University

3:55 PM  
Preparation and Characterization of Modified Polymer Fibers Membrane with β-cyclodextrin and its Adsorption Properties: Aiyang Zhang\textsuperscript{1}; Xiang Wang\textsuperscript{1}; Jiale Yang\textsuperscript{1}; Ning Gao\textsuperscript{1}; Zengguo Feng\textsuperscript{2}; \textsuperscript{1}School of Materials Science and Engineering, Beijing Institute of Technology; \textsuperscript{2}Beijing Institute of Technology

4:15 PM  
Fabrication of Ultra-high Molecular Weight Polyethylene Membrane and Evaluation of Physical Characteristics for Wastewater Treatment: Shanshan Xie\textsuperscript{1}; Zhangfu Yuan\textsuperscript{1}; Yuan Tao Shí\textsuperscript{1}; \textsuperscript{1}University 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:** Jeongguk Kim, Korea Railroad Research Institute; Zhiwei Peng, Central South University

**2:00 PM Invited**  
Electronic Excitations and Ultrafast Dynamics: Pushing Towards Materials Engineering and Design: Andre Schliefe\textsuperscript{1}; \textsuperscript{1}University 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\textsuperscript{1}; Andrey Kistanov\textsuperscript{1}; Salavat Khadiullin\textsuperscript{1}; \textsuperscript{1}Russian Academy of Sciences; \textsuperscript{2}Ufa State Aviation Technical University

**2:50 PM**  
Accelerating the Genetic Algorithm for Structure Prediction in 2D Materials using Machine Learning: Stephen Xie\textsuperscript{1}; Shreyas Honrado\textsuperscript{2}; Anne Marie Tan\textsuperscript{1}; Richard Hennig\textsuperscript{1}; \textsuperscript{1}University of Florida Department of Materials Science and Engineering; \textsuperscript{2}NASA Ames Research Center

**3:10 PM**  
Tunability of Martensitic Transformation in Mg-Sc Shape Memory Alloys: a DFT Study: Shivam Tripathi\textsuperscript{1}; Karthik Guda Vishnu\textsuperscript{1}; Michael Titus\textsuperscript{1}; Alejandro Strachan\textsuperscript{1}; \textsuperscript{1}Purdue University
3:30 PM Break

3:50 PM Invited
Computational Discovery of Strongly Correlated Quantum Matter through Downfolding: Hitesh Changlani1; 1Florida State University

4:20 PM
Influence of Strain on Mesoscopic 2D Film Growth from Phase Field Methods: Tara Boland2; Arunima Singh1; 1Arizona State University

4:40 PM
Predicting Polymer Crystallinity Using Multi-fidelity Information Fusion with Machine Learning: Shruti Venkatram1; Lihua Chen1; Rampi Ramprasad2; 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: Dilpuneet 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; Dilpuneet 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 Chen1; Michael Cooper1; Ziqi Xiao1; David Andersson1; 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 Gupta1; Yulan Li1; Shenyang Hu1; Arun Devaraj1; David Senor1; 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 Soulami1; Aaron Fortier1; Curt Lavender1; Vineet Joshi1; 1Pacific Northwest National Laboratory; 2RWTH Aachen

3:00 PM
Reduced Order Modeling of Thermal Creep in 316H Stainless Steel: Aaron Tallman1; 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 Che1; Korouch Shirvan1; 1Massachusetts Institute of Technology

4:00 PM
Zirconium Alloy Cladding Burst Mechanisms under LOCA with Burnup Extension: Jianguo Yu1; Cole Blakely1; Hongbin Zhang1; 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 Kadhodaei, 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: Prayush 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 Talapatra1; Raymundo Arroyave2; Shahin Boluki3; 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 Aidhy1; 1University of Wyoming

2:50 PM Invited
Autonomous Scanning Droplet Cell for On-demand Alloy Electrodeposition and Characterization: Brian DeCost1; Howie Joress4; Stephen Ambrozik1; Trevor Braun2; Zachary Trautt2; Aaron Kusne3; Jason Hatrick-Simpers4; 1National Institute of Standards and Technology

3:20 PM
Bond-order Bond Energy Model for Alloys: Wolfgang Windl1; Christian Oberdorfer2; Maryam Ghazisaeidi1; 1Ohio State University

3:40 PM Break

4:00 PM Invited
Efficient Navigation of the Search Space for Accelerated Materials Discovery: Prasanna Balachandran1; 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 Tiwary1; 1University of Maryland

5:00 PM
Using Machine-learning Potentials for Free Energy Calculations of Multicomponent Alloys: Prashanth Srinivasan1; Yujie Ikeda1; Blazej Grabowski1; Jan Janssen2; Alexander Shapeev3; Jörg Neugebauer3; Fritz Körnmann3; 1Delft University of Technology; 2Max-Planck-Institut für Eisenforschung; 3University of Stuttgart; 4Skolkovo Institute of Science and Technology
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; Jennifer 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

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2:00 PM
Cyclic Oxidation Behavior in Air at 950°C of Hastelloy X Fabricated by Selective Laser or Electron Beam Melting: Sebastien Dryepondt; Marie Romedenne; Matthew Kuner; Rishi Pillai; Oak Ridge National Laboratory; Georgia Institute of Technology

2:20 PM
Understanding the Anomalous Corrosion Behavior of Additively Manufactured Stainless Steels through Multi-modal Synchrotron Techniques: Jason Trelewicz; David Sprouster; Gary Halada; Hanfei Yan; Yong Chu; Eric Dooryhee; Ghuaprasanna Manogharan; Stony Brook University; Brookhaven National Laboratory; The 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-Sarraf; Seyed Alireza Torbati Sarraf; Amir Poursaeae; Clemson University; University of Southern California

3:00 PM
Issues in Localized Corrosion of Selective Laser Melted 316L Stainless Steel: Greg Nigon; O. Burkan Isgor; Somayeh Pasebani; Oregon State University

3:20 PM
Corrosion Properties of Additively Manufactured Duplex Stainless Steel: Greg Nigon; O. Burkan Isgor; Somayeh Pasebani; Oregon 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 Melia; Rebecca Schaller; Jesse Duran; Jeffrey Rodelas; Sandia National Laboratories

4:25 PM
Interaction between Additive Manufacturing Defects, Powder Contamination, and Two Corrosive Environments: Holly Martin; Daniel Bogen; Jeremy McNight; Brett Conner; Youngstown 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; Menachem Bamberger; Technion, Israel Institute of Technology

5:05 PM
Corrosion Behavior of 304L Stainless Steel Produced by Laser Powder Bed Fusion: Christopher Faraj; Jacob Benoun; Ho Lun Chan; Vilupanar Ravith; Zachary Hilton; Joseph Newkirk; California Polytechnical University, Pomona; Missouri University of Science and Technology

5:25 PM
Corrosion Behavior of Newly Developed High Toughness Mixed-phase Steels: Neetu Verma; S. Sangal; K. Mondal; IIT Kanpur

5:45 PM
The Effects of Solution Chemistry on the Corrosion Behavior of Cold Sprayed AA7075: Ozymandias Agar; Nicholas D’Attilio; Luke Brewer; University of Alabama

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**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; Jennifer 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

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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; Seetharaman Sivaprasad; Soumitro Tarafder; John Ade Ajayi; Covenant University; CSIR-National Metallurgical Laboratory; Federal University of Technology, Akure

2:20 PM
Effects of Chromium and Molybdenum on Hydrogen Absorption Behavior in Iron: Vanadis Yussalla; Kenichi Takai; Tomohiko Omura; Sophia University; Nippon Steel Corporation

2:40 PM
Evidence of Vacancy Generation During Grain Boundary Corrosion of Steel: Denizhan Yavas; Thanh Phan; Liming Xiong; Kurt Hebert; Ashraf Bastawros; Iowa State University

3:00 PM
Predicting the Tribocorrosion Behavior of Aluminum Alloys Using Finite Element Based Multiphysics Modeling: Kaifeen Wang; Wenjun Cai; Virginia 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 Altman; David Schrock; Jennifer (Warner) Locke; The Ohio State University

4:00 PM
Phase Field Modeling of Galvanic Corrosion in Magnesium-aluminum Joints: Kobra Karayagiz; Adam Powell; Qingli Ding; Brajendra Mishra; Worcester Polytechnic Institute
4:20 PM
Microstructural Aspects of Hydrogen Induced Stress Cracking in Various Carbon Steel Welds: Hanji Park¹; Cheolho Park²; Myeonghyun Kim¹; Yangdo Kim¹; Namhyun Kang¹; 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

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**2:00 PM Invited**

Autonomous Research Systems for Materials Development: Benji Maruyama¹; Rahul Rao¹; Ahmad Islam¹; Jennifer Carpena¹; Michael Susner¹; Kristofer Reyes¹; Jay Myung¹; Mark Pitt¹; 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 Gupta¹; ¹GE Research

**3:10 PM Invited**

Design of Halide Perovskites via Physics-informed Machine-learning: Shijing Sun¹; 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 DeCost¹; ¹National Institute of Standards and Technology

**4:40 PM Invited**

Turning Statistical Mechanics Models into Materials Design Engines: Marc Miskin¹; ¹University of Pennsylvania

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**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; 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 Ritchie¹; Andrew Minor¹; Mark Asta¹; Jun Ding¹; Ruopeng Zhang²; 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 Gwalani¹; Elizabeth Kautz¹; Sten Lambeets¹; Libor Kovarik¹; Arun Devaraja¹; ¹Pacific Northwest National Laboratory

**3:00 PM Invited**

Interpreting APT Data Containing He-bubbles in Irradiated Single-phase Concentrated Solid-solution Alloys (SP-CSAs): Jonathan Poplawsky¹; Xing Wang¹; Constantinos Hatzouflou²; Ke Jin³; Hongbin Bei³; Yongqiang Wang³; William Weber³; Yanwen Zhang³; Francois Vurpillot³; Karren More³; 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, Los Alamos National Laboratory; ⁵Department of Materials Science and Engineering, University of Tennessee-Knoxville

**3:20 PM Break**

**3:40 PM Invited**

Metastability Engineering of HIgh Entropy Alloys: Hyoung Seop Kim¹; Jae Wung Bae¹; ¹Pohang University of Science and Technology

**4:00 PM Invited**

In Situ TEM Characterizations on the Dual Phase High Entropy Alloy: Sijing Chen¹; Qian Yu¹; ¹Zhejiang University

**4:20 PM Invited**

Welding Metallurgy and Weld Properties of High Entropy Alloys: Alexander Martin¹; Carolin Fink¹; ¹Ohio State University

**4:40 PM**

Pitting Corrosion Behavior of Ni38Fe20Crx(MnCo)42-x High Entropy Alloys: Sarita Sahu¹; Orion Swanson¹; Tianshu Li²; Angela Gerard²; John Scully²; Pin Lu²; James Saal²; Gerald Frankel²; ¹The Ohio State University; ²University of Virginia; ³Questek
High Entropy Alloys VIII — Structures and Modeling

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 Polytchnical University

2:00 PM Invited
Effect of Solute-solute Interactions on Yield Strength in HEAs: William Curtin1; Shankha Nagi1; 1Épft StI lgm Lamm

2:20 PM Invited
Simulation Studies of Grain Boundary Diffusion in a Model HEA Alloy: Axel Seoane1; Diana Farkas1; 1Virginia Polytechnic Institute

2:40 PM Invited
ICME for Ultra-high Temperature Refractory High Entropy Materials: William Yi Wang1; Haoxuan Wang1; Deye Lin1; Jun Wang1; Shun-Li Shang1; Jiangwei Wang1; Chengxiong Zou1; Bin Tang1; Hongchao Kou1; Haifeng Song1; Chuang Dong1; Xi-Dong Hu1; Yiguang Wang1; Peter K Liaw1; Jinshan Li1; Zi-Kui Liu1; 1Northwestern Polytchnical University; 2Northwestern Polytchnical University; 3Pennsylvania State University; 4University of Science and Technology Beijing; 5University of Pennsylvania; 6University of Pittsburgh; 7University of Rochester

3:00 PM Invited
Monte Carlo Study on Atomic Arrangement Around Crystal Defect in Multi-principal Element Alloys: Shuhei Shinzato1; Rodrigo Campos1; Shinobu Ogata1; 1Osaka University

3:20 PM Invited
Density Functional Theory Calculations of Generalized Stacking Fault Energies in Equal-molar MoNbTi Multi-principal Element Alloys: Yangqing Su1; 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 Li1; William Yi Wang1; Jun Wang1; Shun-Li Shang1; Yi Wang1; Xi-Dong Hu1; Peter K Liaw1; Zi-Kui Liu1; 1Northwestern Polytchnical University; 2Northwestern Polytchnical University; 3Pennsylvania State University; 4University of Science and Technology Beijing; 5University of Tennessee

4:20 PM Simulations and Modeling of the High Temperature Yield Behavior of Chemically Complex Concentrated BCC Alloys: Satish Rao1; Brahim Akdim1; Edwin Antilllon1; Christopher Woodward2; Oleg Senkov3; 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 Wang1; Zhenyu Liu1; 1University of Pittsburgh

2:00 PM Invited
Development and Application of Phase-based Data Repository via CALPHAD Method in the HEA Discovery: Chuan Zhang1; Rui Feng1; Song-Mao Liang1; Michael Gao2; Fan Zhang2; 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 Wang1; Glenn Babus1; Jungho Shin1; Paul Rottmann1; Jean-Charles Stivinville1; 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: Chuanye Wang1; Sebastian Kube1; Jan Schroers1; 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 Sadeghilaridjar1; Sundeeep Mukherjee1; 1University of North Texas

3:20 PM Invited
High Entropy Alloy Effect on Stability of Potential Permanent Magnets: Ying Chen1; Arkpal 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 Dolinseln1; Jožef Stefan Institute & University of Ljubljana

4:20 PM Invited
Phase Stability in Refractory High Entropy Alloys: German Samolyuk1; Yuri Osetsky1; G. Malcolm Stocks1; James Morris2; 1Oak Ridge National Laboratory; 2Ares Laboratory

4:40 PM Design of HEAs Strengthened by Ll2 Precipitates using High Throughput Thermodynamic Calculations: Thomas Rieger1; Jean-Marc Joubert1; Mathilde Laurent-Brocq1; Jean-Philippe Couzinié1; 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 Thomas1; Srikanth Palatala1; 1North Carolina State 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
3D | 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 Lee1; 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 Groeber1; Karthik Giriprasad1; 1The Ohio State University

2:40 PM
Relating Microstructure Features to Response Using Convolutional Neural Networks: Sean Donegan2; Navneet Kumar3; 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 Kim1; Hyoeye Jee 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: Thresa Davey1; Brandon Bocklund2; Zi-Kui Liu1; 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 Roslyakova1; Setareh Zomorodpoosh1; Mansur Ahmed1; Abdulmonem Obaied1; Ingo Steinbach1; 1ICAMS, Ruhr-University Bochum

4:20 PM
Steel Development and Optimization Using Response Surface Models: Jun Hu1; Rachael Stewart1; Erik Pavlina1; Grant Thomas1; Alexander Duggan1; Roel Van De Velde1; 1AK Steel; 2ESTECO

4:40 PM
Utilizing the Statistical Machine Learning Approaches to Design New NiTiHF High Temperature Shape Memory Alloys: Tejus Umadevi1; 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 Brahimi1; Junsang Cho1; Kristel Forlano1; Raymundo Arroyave1; Sarbjit 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 Joshi2; 1National University of Singapore; 2University of Houston

2:20 PM
Cold Formability of Extruded Magnesium Bands: Maria Nienaber1; Jan Bohlen1; Jose Victoria-Hernandez1; Sangbong Yi1; Karl Ulrich Kainer1; Dietmar Letzgig1; 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 Nicola1; Baoqi Guo2; Mihirban Pegkuleryuz2; Mert Celikin1; Konstantinos Korgiopoulos2; 1University College Dublin; 2McGill University

3:00 PM
Experimental Investigation of Raster Tool Path Strategy for Friction Stir Processing of Magnesium Alloy: Abhishek Kumar1; Nikhil Gotawala1; Arush 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: Jun Sik Suh1; Byeong-Chan Suh2; Jun Ho Bae3; Sang Eun Lee3; Byoung-Gi Moon3; Young Min Kim1; 1Helmholtz-Zentrum Geesthacht; 2Quattrone Nanofabrication Facility, University of Pennsylvania

3:40 PM Break

4:00 PM
On the Influence of Twinning and Dettwinning on the Deformation of Mg at the Micron Scale: Mohammadhadi Maghsoudi1; 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 Cheng1; Jian-hua Zhao1; Yao Tang1; Jingting Shangguan1; 1Chongqing University
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 Williamson1; 1Argonne National Laboratory

2:30 PM
X-ray Absorption Studies to Elucidate Structure and Speciation of Metals in Molten Salt Systems: Samirjeet Gill2; Jiahao Huang2; Julia Mausz2; Kotaro Sasaki2; Mehmet Topsakal1; Ruchi Gakhar2; William Phillips1; Lingfeng He3; Shannon Maharun3; Phillips Halstenberg3; Lynne Ecker3; 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 Doniger2; Cody Falconer3; 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 Moorehead3; 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 Willitt1; Mark Williamson1; 1Argonne National Laboratory

5:10 PM
Catholic Behavior of Moisture in LiCl-KCl Eutectic Melt: Applications to Pyroprocessing: Litun Swain1; Gurudas Pakhui2; Sudhassattwa Ghosh1; Bandi Prabhakara Reddy; 1Indira Gandhi Centre for Atomic Research, Kalpakkam

5:30 PM
Electrochemical Corrosion of Zircaloy-2 in Molten LiCl: William Ebert2; Evan Wu1; Vineeth Kumar Gattu1; James Willitt1; 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 Fahrmann, 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 Fahrmann, 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 Webler1; 1Carnegie Mellon University

2:30 PM
Development of Nuclear Grade Wrought FeCrAl Alloys for Accident Tolerant Fuel Cladding: Yukinori Yamamoto2; Kevin Field3; Bruce Pint1; Kurt Terrani1; Raul Rebak3; Russ Favcett2; 1Oak Ridge National Laboratory; 2GE Global Research; 3Global Nuclear Fuel

2:50 PM
The FaMUS Methodology for Quantifying Materials Understanding and its Application to the NSUF Research Portfolio: Simon Pimblott1; Rory Kennedy1; 1Idaho National Laboratory

3:10 PM Break

3:30 PM Invited
Discovery of Maraging Steel: Machine Learning vs. Physical Metallurgical Models: Chenguang Shen1; Chenchong Wang1; Xiaolu Wei1; Wei Xu1; 1Northeastern University

4:00 PM
Domain-guided ML Tool for Designing New Fe-9Cr Steels: Vyacheslav Romanov1; 1National Energy Technology Laboratory

4:20 PM
Effect of Vibration on Residual Stress of a Stiffened Steel Plate During Welding: A Numerical Study: Rururaja Pradhan1; 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 Fatoba1; 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 Fatoba1; Esther Akinlabi2; Stephen Akinlabi2; 1Kent State University; 2University of Johannesburg

2:40 PM
A Quantitative Study of Microsegregation Mechanisms in Aluminum Binary Alloys: Zhenjie Yao1; Yang Huo2; Mei Li2; John Allison1; 1University of Michigan; 2Ford Motor Company

3:00 PM
Contactless Ultrasound in Copper and Nickel Melts: Catherine Tony1; 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 Tesfahunegn1; Thordur Magnusson2; Merete Tangstad3; Gudrun Saevardottir1; 1Reykjavik University; 2Staksborg; 3Norwegian University of Science and Technology

4:00 PM
Empirical Study of Laser Cleaning of Rust, Paint and Mill Scale from Steel Surface: Jean-Michel Deschênes1; 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 Xu1; Wang Cong1; 1Northeastern University

TMS2020 TECHNICAL PROGRAM

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 Steinbach1; Matthias Kolbe2; Sebastian Wirth2; Laszlo Sturz3; Gerhard Zimmermann3; Florian Kargl4; Maike Becker5; 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 Ji1; Fatima Mota2; Younggil Song3; Jorge Pereda4; Trevor Lyons5; Louise Stratzenberg1; Rohit Trivedi1; 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 Galenko1; Stefanie Koch1; Markus Rettenmayr2; Vladimir Ankudinov3; 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 Wang1; 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

Thursday PM | February 27, 2020
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 Wang1; Qi Zhi2; Siyuan Wei3; Chuang Deng3; Scott X. Mao4; Frederic Sansoz5; 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 Cheng1; Kevin Baldwin2; Youxing Chen3; Nan Li4; Irene Beyerlein4; Nathan Mara5; 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 Liu1; Yu Zou1; 1University of Toronto

3:20 PM Cu-graphene Multilayer Composite for Robust Electronic Interconnect Material: Wonsik Kim1; Sang-Min Kim2; Byungil Hwang3; Seung Min Han4; 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 Dieudonné1; George Pharr1; 1Texas A&M University

4:20 PM Comparison of Intergranular Fracture Behavior Between Sulfur Doped Nickel Grain Boundaries: Dorothé Alsos1; Rémi Dingreville1; 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, Nanostructure Engineering: Amit Pandey, Microtesting Solutions; Dhiril Bhattacharjya, 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 Pigni, Imperial College London

2:00 PM Keynote Examination of Local Microscale-microsecond Temperature Rise in HMX-HTPB Energetic Material under Impact Loading: Ayotomi Olotun1; Bing Li2; Chandra Prakash3; Zhiwei Men4; Dana Dlott5; Vikas Tomar6; 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 Purohit1; Purushottam Raj Purohit1; Alla Ndlaye Dieng1; Celine Gerard2; Loic Signor3; Abhinav Arya4; Girish Bojjawar5; Satyam Suwas6; Atul H. Chokshi7; Ludovic Thilly8; 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 Li1; John Turner1; Karen Bustillo2; Rohan Dhall3; Andrew Minor4; 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 Loufathi1; James Boyd2; Zachary Powell3; Alejandro Martinez2; Jodie Lutkenhaus3; Dimitris Lagoudas4; 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: Michelle Aranda1; Ike Chi2; Ravi Vilupanur1; Obed Villapando2; Brooke Singleton2; Fivos Drymiotis3; Billy Li4; Jean-Pierre Fleurial1; 1Jet Propulsion Laboratory

4:40 PM Synthesis and Mechanical Behavior of Freestanding NiTi Films with Varying Grain Sizes: Paul Rasmussen1; 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

**Thursday PM | February 27, 2020**

Solana | Marriott Marquis Hotel

**Session Chair:** Efosa Obazee, Rubber Research Institute of Nigeria

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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 Oluwafemi1; 1University of Johannesburg

2:30 PM Invited
Surface Modification of Bio Derived Carbon with Low Temperature Plasma Treatment for Polymer Composite Filler Applications: Vijaya Rangari1; Zaheeruddin Mohammed1; Shaik Jeelani1; 1Tuskegee University

3:00 PM
Continuous Flow Process for Removal and Recovery of Water Contaminants with Magnetic Nanocomposites: Teagan Leitzke1; 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 Mani1; 1National Taipei University of Technology

4:10 PM
Chronoamperometric Approach for Detection of H2O2 Adulteration in Milk using Ag/TiO2 Nanoparticles: Bharti Sharma1; 1Guru Jambeshwar 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 Oluwafemi1; Thabang Lebepe1; Tetsuya Kodama1; 1University of Johannesburg; 2Tohoku University

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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

**Thursday PM | February 27, 2020**

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**Session Chairs:** Bharat Gwalani, Pacific Northwest National Laboratory; Zhi Liang, National Institute of Standards and Technology

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2:00 PM
Molecular Dynamic Study the Role of the Kinetic Factor during Nucleation of Stoichiometric Compounds from Liquid: Huajing Song1; 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 Bucsek1; 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)AlxB2 Coatings: Carly Romnes1; 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 Kim1; Kunok Chang1; 1Kyung Hee University

3:20 PM
Comparison of Phase Transformations in Binary Ti-Mo and Zr-Nb Alloys: Anna Veverková1; 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 Kim1; Kyung Jong Lee1; 1Hanyang University

4:20 PM
XRD and Synchrotron-based XRD Study of Chalcopyrite Leaching Catalyzed by Silver Ions: Rui Liao1; Jun Wang1; Shitong Liu1; Hao Lin1; Mo Lin1; Shichao Yu1; 1Central South University

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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

Thursday PM | February 27, 2020
17A | San Diego Convention Ctr

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 Orlov, Kei Ameyama; 1Lund University; 2Ritsumeikan University

2:30 PM
Peltier Effect during Spark Plasma Sintering of Boron Carbide: Joseph Sambasene Diatta, Andrey Maximenko, Ifeanyichukwu Donald Olumor, Geuntak Lee, Eugene A. Olevsky, Assane Seck University, SENEGAL; National Academy of Sciences; San 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, Timothy Prost, Emma White, Stuart Maloy, Osman El Atwani, Glenn Grant, Iver Anderson; Iowa State University; Ames Laboratory; Los Alamos National Laboratory; Pacific Northwest National Laboratory

3:10 PM
Miscibility Gap Alloy Thermal Storage Materials: Mark Copus, The University of Newcastle, Australia

3:30 PM
Preparation of Zinc Carbonate Hydroxide Microparticles via Deamination Precipitation by Heating: Yan Zeng, Yongbin Yang, Wei Gao, Qianqian Duan, Jiaming Qin, Central 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

Thursday PM | February 27, 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 Invited
Are the Metallic Iron Inclusions Exist on the Surface of the Moon?: Ramana Reddy, University of Alabama

2:25 PM Invited
Getting the Most from Models in High-Temperature Materials Processing: Robert Hyers, University of Massachusetts

2:45 PM
Molten Oxide Electrolysis for the Production of Ferroalloys and Steel: Guillaume Lambotte, Richard Bradshaw, Tadeu Carneiro; Boston Metal

3:05 PM
Thermodynamic and Kinetic Modelling of Molten Oxide Electrolysis Cells: William Judge, Gisele Azimi, University of Toronto

3:25 PM Break

3:40 PM Invited
Insights into the Oxidation Behavior of Cr1-xFex Anodes for Molten Oxide Electrolysis: Antoine Allanore, Moennes Esmaily; Massachusetts Institute of Technology; Massachusetts Institute of Technology; Monash University

4:00 PM Invited
Hybrid Processes in Refining of Silicon: Mansoor Barati, University 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


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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31B | San Diego Convention Ctr

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 Pan1; Jiangfeng Song1; Chongqing University

2:30 PM Invited Characterization of Twin-twin Interactions in Mg: Yanqing Su1; M. Kumar1; Xin Wang1; Yang Hu2; Kehang Yu1; Jiaxiang Wang1; Subhash Mahajan1; Enrique Lavernia1; Tim Rupert1; Julie Schoenung3; Irene Beyerlein3; 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 Zhang1; Lin Jiang1; Xin Wang1; Irene Beyerlein1; Andrew Minor1; Julie Schoenung3; Subhash Mahajan1; Enrique Lavernia1; 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. Srivatsan2; Manoj Gupta3; Sathyabama Institute of Science and Technology; 4National University of Singapore; 5The University of Akron

3:40 PM Break

4:00 PM Disintegrable Mg/Al Metal Matrix Composites for Oilfield Applications: Zhihui Zhang1; Zhiyue Xu1; 1Baker Hughes, a GE Company

4:20 PM Microstructure and Texture in Cryomilled and Sintered Ti Grade 2: Jiri Kozlik1; Petr Harcuba2; Josef Strasky1; Hanka Becker2; Tomas Chraska1; 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 Kozlik1; Anna Veverková1; Petr Harcuba2; Hanka Becker2; Tomas Chraska2; 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: Indrandi Roy1; Ting Roy2; Jing Zhou2; 1DAMORPHE; 2SET Laboratory; 3Rice University

5:20 PM Research on Microstructure and Mechanical Properties of High Strength Duplex Mg-Li-Al-X Alloys: Yan Yang1; Xiaodong Peng1; Chongqing University

5:40 PM Overview of Advancement and Development Trend on Magnesium Alloys based on Bibliometric Analysis: Xiaodong Peng1; Yan Yang1; Tiancai Xu1; Chongqing University

NUCLEAR MATERIALS

Radiation Effects in Metals and Ceramics — Irradiation of Zirconium, 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; Mamood 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 PM | February 27, 2020
Theater A-7 | San Diego Convention Ctr

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 Cocherram1; Phil Edmondson1; 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 Kautz2; Danny Edwards1; Gary Sevigny3; David Soner3; 1Pacific Northwest National Laboratory

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 Chen1; Meimei Li3; Stuart Maloy1; 1Los Alamos National Laboratory; 2Stony Brook University; 3Argonne National Laboratory
3:20 PM
Microstructure and Mechanical Properties of Neutron Irradiated Tungsten Fibers for Fusion Applications: Lauren Garrison1; Chad Parish1; Maxim Gussev2; 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 Cunningham1; Khalid Hattar2; Jason Trelewicz3; Stony Brook University; 1Sandia National Laboratories

4:20 PM
Atomistic Modeling of Radiation Resistance in Concentrated Alloys: Craig Daniels1; Pascal Bellon2; Robert Averback3; 1University of Illinois

4:40 PM
Elucidating Atomistic Mechanisms for Interface- and Grain Boundary-mediated Radiation Defects Annihilation: Penghui Cao1; Miaomiao Jin2; Kangpyo So3; Ju Li4; Michael Short5; 1University of California, Irvine; 2Massachusetts Institute of Technology

5:00 PM
Defect-Interface Interactions in Irradiated Cu/Ag Nanocomposites: Interface Vacancy Pump Effect: Weizhong Han1; Min Wang2; 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

Thursday PM | February 27, 2020
5A | San Diego Convention Ctr

Session Chair: Nitin Daphalapurker, Los Alamos National Laboratory

2:00 PM Invited
Dynamics of Necking and Fracture in Ductile Porous Materials: Ankit Srivastava1; 1Texas A&M University

2:40 PM
In-situ Measurement of Dynamic Stress due to Hyper-velocity Impact Using Nanosecond Resolved Raman Spectroscopy: Abhijeet Dhiman1; Hao Wang2; Vikas Tomar1; 1Purdue University

3:00 PM
What Happens to a Microstructurally Stable Nanocrystalline Alloy after Undergoing Shock Loading?: Billy Hornbuckle1; Xuyang Zhou1; Cyril Williams1; Steven Dean1; Anit Giri1; Anthony Roberts1; Greg Thompson1; Kiran Solanki1; Kris Darling2; 1US Army Research Laboratory; 2The University of Alabama; 1Arizona 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 Suresh1; Seok-Woo Lee2; Mark Aindow1; Harold Brody2; Aaron Nardi3; 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 Trujillo1; Michael Burkett2; 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

2020 Technical Division Student Poster Contest — EPD 2020 Technical Division Graduate Student Poster Contest

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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 Sitrum; Jeremiah Beam; Kebbi Hughes; John Rowson; Joseph Essilfie-Dughan; Andrew Crawford; Andrew Grosvenor; 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; 1Jia Tian; Haisheng Han; 1Wei Sun; Yuehua Hu; 1Central South University

SPG-3: Composition and Abrasiveness of Biomass Extrinsic and Intrinsic Inorganic Compounds: Kiyungjin Lee; 1Sougata Roy; 1Erkan Cakmak; Jeffrey Lacey; 1Thomas Watkins; 1Harry Meyer III; 1Vicki Thompson; 1James Keiser; 1Jun Qu; 1Oak Ridge National Laboratory

SPG-4: Microwave Drying of a Nickel Laterite Ore: Wei Lv; 1Xuewei Lv; 1Yinong Yang; 2Alexander McLean; 1Mansoor Barati; 1Chongqing University; 2University of Toronto; 1Chongqing University; 1University of Toronto

SPG-5: Review of Coating Removal Techniques from Metal Substrates: Arkanksa Gupta; 1Brajendra Mishra; 1Worcester Polytechnic Institute

SPECIAL TOPICS

2020 Technical Division Student Poster Contest — FMD 2020 Technical Division Graduate Student Poster Contest

Sponsored by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

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SPG-7: A Novel Zinc Oxide (ZnO) Nanocoated Layer Coated onto Medical Grade Polyurethane for Controlled Surface Degradation: Maren Fossum; 1Muhammad Ibrahim; 1Zozan Tunc; 1Javier Sanchez; 1Emma Strömberg; 1Gunilla Björling; 1Ragnhild Aune; 1Norwegian University of Science and Technology; 2Danderyd Hospital at Karolinska Institute; 1KTH - Royal Institute of Technology; 1The Swedish Red Cross University College

SPG-8: Additive Manufacturing of Transparent, Stretchable and Strain-insensitive Touch Sensing Matrix: Dace Gao; 1Jiangxin Wang; 1Kaixuan Ai; 1Jiaqing Xiong; 1Shaohui Li; 1Pool See Lee; 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; 1Ralph Nasara; 1Shih-kang Lin; 1National Cheng Kung University

SPG-10: Boosting Oxygen Evolution Reaction with Incoordinate Sulfur Activated Metallic Cobalt Sulfide Electrocatalyst: Jiuhao Zhang; 1Hao Jiang; 1Chunzhong Li; 1East China University of Science and Technology

SPG-11: Efficient Photoelectrochemical Water Oxidation by Graphene-decorated WO3/Nb:SnTiO3 Heterostructures: Taekjib Choi; 1Ayoung Cho; 1Sejong University

SPG-12: Electrical Characterization of Reduced Graphene Oxide According to Thermal Reduction: Soomook Lim; 1Ji Won Suh; 1Sungkyunkwan University

SPG-13: Heable Transparent Supramolecular Polymer Nanocomposites-based Energy Storage Device for Wearables and Robotics: Gurunathan Thangavel; 1Sangbaek Park; 1Kaushik Parida; 1Shaohui Li; 1Pool See Lee; 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; 1Jian-Jie Wang; 1Fan-Yi Ouyang; 1Shou-Yi Chang; 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; 1Timothy Mathews; 1Ruben Contreras; 1Tae-Kyu Lee; 1Portland State University

SPG-16: Impact of Isothermal Aging on Single Solder Joint Shear: Cu Depletion Zone Effect: Naveen Weerasekhera; 1Ande Kitamura; 1Chelsea Morand; 1Tae-Kyu Lee; 1Portland State University

SPG-17: Imprinting of Ti,Zr,Ni,Cu, Metal Glass with Superelasticity by Changing the Thermoplastic Forming Process: Yongjoo Kim; 1Yoonjae Choi; 1Woohul Kim; 1Wantae Kim; 1Dohyang Kim; 1Yonsei University; 1Cheongju University

SPG-18: Influence of Nanotube Loading on Self-healing Composites: Molecular Dynamics Study: Gurneet Singh; 1Veera Sundararaghavan; 1University of Michigan

SPG-19: In-Vitro Prediction of Material Performance of Central Venous Catheters (CVCs) Exposed In-Vivo: Maren Fossum; 1Zozan Tunc; 1Javier Sanchez; 3Cristoph Burgstaller; 1Emma Strömberg; 1Gunilla Björling; 1Ragnhild Aune; 1Norwegian University of Technology (NTNU); 2Danderyd Hospital at Karolinska Institute (DS KI); 3TCKT-Transfercenter für Kunststofftechnik GmbH; 1KTH Royal Institute of Technology; 1The Swedish Red Cross University College

SPG-20: Magnetic Activation of Ferromagnetic Fibre Network for Bone Regeneration: Galit Katarivas Levy; 1Mark Birch; 2Roger Brooks; 1Athina Markaki; 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; 1Lee Pooi See; 1Nanyang Technological University

SPG-22: Microstructural Evolution of High (111)-oriented Nanotwinned Copper during Direct Bonding Process: Jen-Hsuan Tsai; 1Yung-Ting Tai; 2Fan-Yi Ouyang; 1Department of Engineering and System Science, National Tsing Hua University

SPG-23: Mo-triggered Amorphous Ni3O4 Nanosheets as Efficient and Durable Electrocatalysts for Water Splitting: Haoxuan Zhang; 1Hao Jiang; 1Chunzhong Li; 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; Jaeik Hyun; Woochul Kim; Jeongsoo Kim; Yongjoo Kim; Wontae Kim; Dohyang Kim; 1Yonsei University; 2Cheonju 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; Ngoc Thanh Thuy Tran; Shih-Kang Lin; 1National Cheng Kung University

SPG-26: Substrate Texture Dependent Graphene Growth on Cu Rich Cu-Ni Alloy Substrates: Gurjinder Kaur; K.S. Suresh; Indranil Lahiri; 1Department of Metallurgical and Materials Engineering, Indian Institute of Technology, Roorkee

SPG-28: Thermopower Measurement of Graphene-based Materials: Seungwon Kim; Ji Won Suk; 1Sungkyunkwan University

SPECIAL TOPICS

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SPG-29: Comparing Traditional and Designer Alloy Feedstock Powders for Additive Manufacturing: Jack Grubbs; Kyle Tsaknopoulos; Danielle Cote; 1Worcester Polytechnic Institute

SPG-30: Effect of Mechanical Milling and Cryomilling on Synthesis of CNT Reinforced 6082 Al Matrix Nanocomposites: Rajat Gupta; Yagnesh Shadangi; Kausik Chattopadhayay; Anil Chauhney; Nilay Mukhopadhyay; 1Indian Institute of Technology IIT-BHU; 2AMT Department, CSIR-IMMT

SPG-31: Effect of Processing Parameters on Additively Manufactured WE43 Mg Alloy: Leila Sorphi; Joshua Hammell; Grant Crawford; 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; Ramon Padin-Monroig; Oscar Suarez; 1University of Puerto Rico, Mayaguez

SPG-33: Enhancement of Mechanical Properties by Large Strain Extrusion Machining of Aluminum Alloy: Vagish Mishra; Karthik Palaniappan; Balkrisna Rao; Murthy H; 1Indian Institute of Technology Madras

SPG-34: Impact of Cold Metal Transfer Arc Mode on Additive Manufactured Aluminum Alloy Multilayered Structure: Mohammad Sharif Poor; Nicholas Sheldon; Yeonjin Baek; Tae-Kyu Lee; 1Portland State university

SPECIAL TOPICS

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SPU-1: Development of an All Solid state Printed Carbon Electrode Utilizing Nickel Oxide/oxyhydroxide for Phosphate Detection: Sotoudeh Sedaghat; Sookyong Jeong; Armin Zareei; Samuel Peana; Nicholas Glassmaker; Rahim Rahimi; 1Purdue University

SPU-2: Electrochromic Phase Transition in Sn-based Mixed Halide Perovskite: Ryan Hawks; Zhizhong Chen; Jian Shi; 1Rensselaer Polytechnic Institute

SPU-4: Facile Route to Fabricate Binder Free Ni(OH)2/RGO Core-shell Structure for Supercapacitors: Yusuf Khan; Palash Chandra Maity; Akansha R. Urade; Spandan Choudhary; Indranil Lahiri; 1Indian Institute of Technology Roorkee

SPU-6: Surface, Interface, and Temperature Effects on the Phase Separation and Nanoparticle Self Assembly of Bi-Metallic Ni0.5Ag0.5: A Molecular Dynamics Study: Reece Emery; Philip Rack; Ryan Allaire; Abhijeet Dhakane; P Ganesh; Lou Kondic; Linda Cummings; Miguel Fuentes-Cabrera; 1University of Tennessee, Knoxville; 2New Jersey Institute of Technology; 3Oak Ridge National Laboratory
SPU-9: Effects of Mg+Si Additions on the Microstructure and Mechanical Properties of Al-Fe-Ce-Sr based Alloys: Ramon Padin\(^1\); Manny de Jesus\(^1\); Oscar Marcelo Suarez\(^2\); \(^1\)University of Puerto Rico at Mayaguez

SPECIAL TOPICS

2020 Technical Division Student Poster Contest — MPMD 2020 Technical Division Graduate Student Poster Contest

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SPG-36: An Investigation on Internal Oxidation of FeCrAlY Alloys in Selective Laser Melting: Saeheh Mirzababaei\(^1\); Milad Ghayoor\(^1\); Somayeh Pasebani\(^2\); \(^1\)Oregon State University

SPG-37: Automatically Quantifying Phase Information from HRTEM for Additively Manufactured Materials: Sen Liu\(^2\); Behnam Amin-Ahmadi\(^1\); Branden Kappes\(^1\); Aaron Stebner\(^1\); Xiaoli Zhang\(^1\); \(^1\)Colorado 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 Lu\(^1\); \(^1\)City University of Hong Kong

SPG-39: Effect of Microtopography on Guided Cell Migration on a Graded Micropillar Substrate: Srikumar Krishnamoorthy\(^1\); Changxue Xu\(^1\); \(^1\)Texas 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: Rajesh Kamath\(^1\); Logan White\(^1\); Ryan Heldt\(^1\); Yuan Li\(^1\); Tao Sun\(^1\); Sudarsanam Babu\(^2\); Hahn Choo\(^3\); \(^1\)University of Tennessee, Knoxville; \(^2\)Argonne National Laboratory; \(^3\)Oak Ridge National Laboratory

SPG-41: Evaluation of Two Novel Techniques to Characterize the Bond Strengths of Cold Sprayed Single Particle Impacts: Matthew Gleason\(^1\); \(^1\)Worcester Polytechnic Institute

SPG-42: Exploring the Structure-processing Relationship: Direct Ink Writing of Functionally Graded Carbides: Joshua Pelz\(^1\); Nicholas Ku\(^2\); Samuel Figueroa\(^2\); Marc Meyers\(^2\); Lionel Vargas Gonzalez\(^2\); \(^1\)University of California, San Diego; \(^2\)US Army Research Laboratory

SPG-43: Helium Bubble Induced Surface Blistering Study of Grain Boundary Engineered Tungsten under Helium Implantation: Tianyao Wang\(^1\); \(^1\)Texas A&M University

SPG-44: Modeling and Predicting Longitudinal Defect Mechanisms in Steel Continuous Casting: Matthew Zappulla\(^1\); Brian Thomas\(^1\); \(^1\)Colorado School of Mines

SPG-45: Optimization of Heat-treatment on Recycled Stainless Steel Powder for Cold Spray Applications: Christopher Massar\(^1\); Kyle Tsaknopoulos\(^1\); Bryer Sousa\(^1\); Danielle Cote\(^1\); \(^1\)Worcester Polytechnic Institute

SPG-46: Spark Plasma Sintering of Mechanically Alloyed In-situ Ni-Ti-C Nanocomposites: Amit Patil\(^1\); \(^1\)University of Tennessee, Knoxville

SPG-47: The Effect of TiC Content and SPS Processing Parameters on Ni-TiC Composites: Ganesh Walunj\(^1\); Anthony Bearden\(^1\); \(^1\)Cleveland State University

SPG-48: Understanding Thermal Signatures using Infrared Radiography of Laser Fusion Processing of Ti-6Al-4V: Logan White\(^1\); Rakesh Kamath\(^1\); Ryan\(^1\); Yuan Li\(^1\); Tao Sun\(^1\); Sudarsanam Babu\(^2\); Hahn Choo\(^3\); \(^1\)University of Tennessee, Knoxville; \(^2\)Argonne National Laboratory; \(^3\)Oak Ridge National Laboratory

SPG-49: Thermal Stability of Yttrium Oxide Nanoparticles in 304 ODS Alloy Additively Manufactured via Selective Laser Melting: Milad Ghayoor\(^1\); Kijoon Lee\(^1\); Yuyuan He\(^1\); Chih-Hung Chang\(^1\); Brian K. Paul\(^1\); Somayeh Pasebani\(^2\); \(^1\)Oregon State University

SPG-50: Overcoming Oxidation of CMSX-4 to Determine the Thermophysical Properties in the Liquid State: Zane Smith\(^1\); \(^1\)Purdue University

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 Kamath\(^1\); Ryan\(^1\); Yuan Li\(^1\); Tao Sun\(^1\); Sudarsanam Babu\(^2\); Hahn Choo\(^3\); \(^1\)University of Tennessee, Knoxville; \(^2\)Argonne National Laboratory; \(^3\)Oak Ridge National Laboratory

SPU-11: Designing Microscale Tests to Validate the Macroscale Plastic Response in Lightweight Aluminum and Magnesium: Shye Supakul\(^1\); Tolin Skov-Black\(^1\); Keenan O’Neill\(^1\); Scout Garrison\(^1\); Josiah Dowell\(^1\); Job Rodriguez\(^1\); \(^1\)University of Nevada, Reno

SPU-12: Embrittlement of Fe-based FINEMET Ribbons: Nickolaus Bruno\(^1\); Ronald Noebe\(^1\); Jonath Sayre\(^1\); Thomas Trautman\(^1\); \(^1\)South Dakota School of Mines and Technology; \(^2\)NASA Glenn Research Center

SPU-13: Impact of Surfactant Concentration and Type on Bilge Water Emulsions During Static and Dynamic Ageing: Rina Sabatella\(^1\); \(^1\)Purdue University

SPU-14: Low Density, High-temperature Syntactic Foam for Additive Manufacturing: Samantha Maness\(^1\); Brett Compton\(^1\); \(^1\)University of Tennessee, Knoxville

SPU-15: Overcoming Oxidation of CMSX-4 to Determine the Thermophysical Properties in the Liquid State: Zane Smith\(^1\); \(^1\)Purdue University
SPECIAL TOPICS

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**POSTERS**

**SPG-52:** Atomatic Oxide Structures and Stoichiometry of Chromium Steel by Grand Canonical Monte Carlo Simulations with ReaxFF Potential: Qian Chen1; Chang Liu1; Yang Wang1; Narumasa Miyazaki2; Yusuke Ootani1; Nobuki Ozawa1; Momoyo Kubo1; 1Tohoku University

**SPG-53:** Deformation Mechanisms in Immn-Ni2(Cr,Mo,W)-containing Haynes® 244® Superalloy: Thomas Mann1; Michael Farhmann1; Michael Titus2; 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: Hariririshkahan Rajendran1; Jean-Briac le Graverend1; 1Texas A&M University

**SPG-55:** Combinatorial and High-throughput Experiments on Ni-based Alloy Thin Films: Taejeop Kim1; Donghyun Park1; Eui-min Cheong1; Daegun You1; Hehsang Ahn1; Eun Soo Park1; Dongwoo Lee1; 1Sungkyunkwan University; 2Seoul National University

**SPG-56:** Core Effect of Local Atomic Configuration and Design Principles in AlCoCrFeNi High-entropy Alloys: Cuixia Liu1; Chun-Yu Lin1; Zhenhai Xia1; 1University of North Texas; 2.Xi’an Technological University

**SPG-57:** Cycling Corrosion Testing of Bi-metallic Joints Between Al And Mg Alloys: Qingli Ding1; Gajendra Mishra1; Kubra Karayagiz2; 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 Kim1; Jee-Hyun Kang1; Joo Hyun Ryu1; Sung-Joon Kim1; 1POSTECH; 2Yeungnam University

**SPG-59:** Effect of Replacing Ni by Cu on Hydrogen Embrittlement in Austenitic Stainless Steel: Hyung-Jun Cho1; Sung-Joon Kim1; 1POSTECH, Korea

**SPG-60:** Effects of Pore Geometry and Location on the Material Properties of Additively Manufactured Ti-64: Tracy Varney1; Nicholas Telesz2; Robert Quammen1; John Balk1; Andrew Wessman1; Paul Rottmann2; 1University of Kentucky; 2University of Arizona

**SPG-61:** Evaluation of the Magnitude and Directionality of Residual Stress on SUS316L using Instrumented Indentation Test: Kyungyul Lee1; Jong-hyong Kim1; Junsang Lee1; Byungchul Kim1; Michael Prime1; Dongil Kwon1; 1Seoul National University; 2FRONTICS Inc.; 3Los Alamos National Laboratory

**SPG-62:** Experimental and Thermodynamic Modelling of Binary Phase Diagrams Under Pressure: Moran Emundo1; Aviva Melchior2; Eyal Yahel1; Guy Makov3; 1Ben Gurion University and NRCN; 2NRNC; 3Ben Gurion University

**SPG-63:** Experimental and Thermodynamic Modeling of the Mo-Nb-Re Ternary System: Shao-Yu Yen1; Shuchang Wu1; Muhammad Anshar Makhraj1; Kai-qi Lo2; An-chou Yeh3; Kyosuke Yoshimi1; Chuan Zhang1; 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 Machowshi1; 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-Shift Kim1; Jee-Hyun Kang1; Sung-Joon Kim1; 1POSTECH; 2Yeungnam University

**SPG-66:** Improvement on Anisotropy and Mechanical Behaviors of IN718 Processed by Selective Laser Melting by CoAL204 Inoculant Addition: I-Ting Ho1; Tzu-Hou Hsu2; Yao-Jen Chang3; Chen-Wei Li3; Kai-Chun Chang3; Sammy Tin1; Koji Kakehi1; An-Chou Yeh3; 1 Illinois 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 Oh1; Ho Jang Kim1; Won Seok Choi1; Hosun Jun2; Pyuck-Pa Choi2; Wael Zak1; 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), Daejeon, Republic of Korea; 3Department of Mechanical Engineering, Khalifa University, Abu Dhabi, UAE

**SPG-68:** Investigation into the Occurrence of Electromigration for Al-SiInum: Microstructure and In-situ XRD Study: Kuan-Hseuh Lin1; Yu-chien Liu1; Ching-Shun Ku1; Shang-Jui Chiu1; 1National Cheng Kung University; 2National Synchrotron Radiation Research Center

**SPG-70:** Irradiation Cluster Defect Distribution on Fe Nanoparticle by MD Simulation: Mohammad Khan1; 1University of Idaho

**SPG-71:** Kinetic Evolution of Metastable Grain Boundaries under Non-equilibrium Processing: Zhitong Bai1; Glenn Balbus2; Daniel Gianotta2; Yue Fan3; 1University of Michigan, Ann Arbor; 2University of California, Santa Barbara

**SPG-72:** Mechanical Behavior of NiTi Shape Memory Alloy Thin Films: Ji-Young Kim1; Injong Oh1; Abdul Rehman1; Yu Hyun Park1; Wael Zak1; 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 Jo1; Injun Oh1; Sanghun Park1; Eui-min Cheong1; Daegun You1; Dongwoo Lee1; 1Sungkyunkwan University

**SPG-74:** Microstructural and Plastic Deformation Study of a TRIP Dual-phase High-entropy Alloy Fe50Mn30Co10Cr10: Manowar Hossain1; Nilesah Kumar2; 1University of Alabama, Tuscaloosa

**SPG-75:** Negative Poisson’s Ratio in Heusler-type Cu-Al-Mn-based Shape Memory Alloys: Sheng Xu1; Ryota Tsukuda1; Mi Zhao2; Xiao Xu1; Toshhiro Omori1; Kyosuke Yoshimi2; Ryosuke Kainuma1; 1Tohoku University
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SPU-17: Computational Indicators of Ductility in Compositionally-complex B2 Alloys: Emily Huang; Emma Cuddy; Julianne Lin; Aurora Pribram-Jones; Jonas Kaufman; Kevin Laws; Lori Bassman; Harvey Mudd College; University of California, Davis; University of California, Santa Barbara; University of New South Wales

SPU-18: Design of a Novel Complex Concentrated Alloy for Orthopedic Implant Applications: Jose Dominici; Gopinath Perumal; Harpreet Arora; Harpreet Grewal; Shiv Nadar University

SPU-19: Elimination of the Sigma Phase in a Compositionally Complex Fe-Cr-based System: Stephanie Blankley; Holly Frank; Jackson Baker; Natalie Krieger; Douglas Raigoza; Patrick Conway; Kevin Laws; Lori Bassman; Harvey Mudd College; University of New South Wales

SPU-20: Fracture Toughness Determination Using Single Edge Notch Wire (SENW) Specimen: Hrushikesh Sathasivabuddhe; A. K. Mishra; Kevin Jacob; B.N Jaya; IIIT-Bombay, Mumbai, India

SPU-21: Strengthening Mechanisms of Ultra-strong Fe-Zr Solid Solution Alloys: Sidharth Krishnamoorthy; Ruizhe Su; Yifan Zhang; Xinghang Zhang; Purdue University

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 Altikaliyeva, 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 Altikaliyeva, University of Florida

H-1 (Invited): Modeling the Uranium-Silicon Phase Equilibria: Tashiema Urlrich; Sven Vogel; Joshua White; Theodore Besmann; Los Alamos National Laboratory; University of South Carolina

H-2: Characterization of Helium Implanted Single Crystal Titanium: Sarah Stevenson; Mehdi Balooch; Andrew Scott; Peter Hosemann; Frances Allen; Saryu Fensin; University of California, Berkeley; Los Alamos National Laboratory

H-3: Damage Mitigation Strategies for Femtosecond Laser Machining of Micro-tensile Bars: Sebastian Lani; Peter Hosemann; Jonathan Gregory Gigax; Quinn Mcculloch; University of California, Berkeley; Los Alamos National Laboratory

H-4: Direct Compaction of Dispersion Fuels Using a Matrix Deposition on the Fuel Particles: Sungwhan Kim; Kyu Hong Lee; Won Jae Soi; Yong Jin Jeong; Junyong Park; Korea Atomic Energy Research Institute

H-5: Effects of Helium Ion Irradiation on Single Crystal Vanadium: Andrew Scott; Peter Hosemann; Mehdi Balooch; Marco Sebastiani; Muhammad Mughal; Sarah Stevenson; University of California, Berkeley; Università degli studi Roma Tre

H-6: Fabrication of Low–enriched Uranium Dispersion Targets with a High Uranium Density for Mo–99 Production: Kinam Kim; Jong Hwan Kim; Tae Won Cho; Sungwhan Kim; Kyu Hong Lee; Yong Jin Jeong; Jong Man Park; Korea Atomic Energy Research Institute

H-8: Mechanical Properties of Ion Irradiated and Helium Implanted HT9 Micropillars: Ryan Schoell; Ce Zheng; Khalid Hattar; Djamel Kaouni; North Carolina State University; Sandia National Laboratory

H-9: Microstructure and Mechanical Behavior of Directed Energy Deposition Laser Additively Manufactured T-91: Jack Peterson; Adi Benartzy; Stuart Maloy; Thomas Lienert; Peter Hosemann; University of California, Berkeley; Los Alamos National Laboratory

H-10: Radiation Response of HT9 Ferritic/Martensitic Alloys as a Function of Intertitial Content: Eda Aydogan; Jonathan Gigax; Scott Parker; Benjamin Eftink; Yongqiang Wang; Stuart Maloy; Sabanci University; Los Alamos National Laboratory

ADDITIONAL 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 Seno; Eder Najara Lopes; CBAA; Unicamp

A-4: Effect of Post-heat-treatment on the Microstructure, Tensile and Fatigue Properties of AISi10Mg Alloy Manufactured by Selective Laser Melting: Tae-Hyun Park; Min-Seok Baek; Yongho Sohn; Kee-Ahn Lee; Inha University; University of Central Florida

A-6: Fatigue Life Prediction of Additive Manufactured IN718 Superalloys: Wenye Ye; Pankaj Kumar; Leslie Mushongera; University of Nevada, Reno

A-9: Microstructure, High-temperature Tensile and Fatigue Properties of IN625 Manufactured by Selective Laser Melting: Tae-Hoon Kang; Kyu-Sik Kim; Michael Kassner; Kwang-Tae Son; Kee-Ahn Lee; Inha University; University of Southern California
A-11: Characterization of Cold-spray Based Additively Manufactured Thick Copper Deposits: Danish Verma; Suinder Singh; Harpreet Singh; 1Punjabi Engineering College Chandigarh; 2Indian Institute of Technology Ropar (IIT Ropar)

A-12: Evaluation of Cold-sprayed 14YWT 454: Jeffrey Graham; Mia Lentling; Hwasung Yeom; Peter Housemann; Kumar Sridharan; 1University of California, Berkeley; 2University of Wisconsin

A-13 Microstructure and Mechanical Properties of ODS Eurofer Steel Produced by Selective Laser Melting: J. Fu; I.M. Richardson; M.J.M. Hermans; 1Delft University of Technology

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 Kirk, Oak Ridge National Laboratory

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Session Chair: Michael Kirk, Oakridge National Laboratory

A-14: High-Temperature Fatigue and Rupture of Additively Manufactured Ni-based Superalloys: Roberto M. Cabibbo; 1University of Utah; 2Carnegie Mellon University; 3Los Alamos National Laboratory

A-15: Fatigue and Fracture Behavior of Additively Manufactured Ni-based Superalloys: Will Oliphant; 1University of Utah; 2Carnegie Mellon University; 3Los Alamos National Laboratory

A-16 (Digital): Quantitative Microstructure Study of Binder-jet Printed and Sintered Ni-Mn-Ga Alloy: Chuyuan Zheng; Amir Mostafaei; Pierangeli Rodriguez; Erica Stevens; Ian Nettleship; Markus Chmielus; 1University of Pittsburgh; 2Carnegie Mellon University

A-17: Layered Binder Jet Printing of Functional Ni-Mn-Ga Alloys: Katerina Kimes; Erica Stevens; Jeffrey Martin; Pierangeli Rodriguez; De Vecchis; Daniella Brunetta; Markus Chmielus; 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-26: High Speed X-ray Diffraction: Niranjan Parab; Seunghee Oh; Joseph Aroh; Joseph Pauza; Sidi Feng; Rachel Lim; Christopher Kantzios; Robert Suter; Chhipin Chuang; Cang Zhao; Tao Sun; Anthony Rollett; Anthony Rollett: Carnegie Mellon University

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; Sarah Wolff; Niranjan Parab; Cang Zhao; Aaron Greco; Tao Sun; Argonne National Laboratory; Texas A&M University

A-28: In-situ Characterization and Manufacturing Process of Oiltin Gao: Cang Zhao; Minglei Qu; Lianhua Xiong; Louis I. Esccano; S. Mohammad H. Hojatadzeh; Niranjan D. Parab; Kamel Fezzaa; Wes Everhart; Tao Sun; Lianyi Chen; Missouri University of Science and Technology; Argonne National Laboratory; Honeywell FM&T

A-29: In-situ Full-field Mapping of Melt Flow Dynamics in Laser Metal Additive Manufacturing: Oiltin Gao; Cang Zhao; Minglei Qu; Lianhua Xiong; Luis I. Escano; S. Mohammad H. Hojatadzeh; Niranjan D. Parab; Kamel Fezzaa; Tao Sun; Lianyi Chen; Missouri University of Science and Technology; Argonne National Laboratory

A-30: In-situ X-ray Characterization of Keyhole Dynamics in Laser-based Additive Manufacturing of Aluminium Alloys: Hongze Wang; Yu Zou; University of Toronto

A-31: Influence of Alloy Composition on Cell Formation in Additively Manufactured Stainless Steels: Joseph Aroh; Seunghee Oh; Rachel Lim; Chhipin Chuang; Niranjan Parab; Cang Zhao; Tao Sun; P. Pistorius; Anthony Rollett; Carnegie 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 Frederich; Edson Santos; Michael Kirka; Pradeep Bhattad; Paul Brackman; Carl Zeiss; Oak Ridge National Laboratory

A-33: Investigating the Behavior of Ti-5553 Octet Lattice Wedges Under Compression: Jenny Wang; David Macknelly; Stephen Knaus; Kyle Klein; Mary LeBlanc; Jeffrey Florando; Manyalibho Matthews; Lawrence Livermore National Laboratory; Atomic Weapons Establishment

A-34: Laser Additive Manufacturing of Dissimilar Metals: Xuan Zhang; Wei-Ying Chen; Cang Zhao; Chhipin Chuang; Tao Sun; Meimei Li; Argonne National Laboratory

A-35: Measurements and Predictions of Residual Stresses in AM Ti-6Al-4V NIST Challenge Specimens: James Sobotta; Matthew Kirby; Sheng-yen Lii; Southwest Research Institute

A-36: Microstructural Development and Mechanical Properties of Selective Laser Melted Co-Cr-W Dental Alloy: Leonhard Hitzler; Jonas Von Kobylinska; Robert Lawnitzki; Christian Kempsaksky; Ewald Werner; Technical University Munich; University of Stuttgart; Technical University Munich

A-37: Real Time Observation of Binder Jetting Printing Process Using High-speed X-ray Imaging: Niranjan Parab; John Barnes; Cang Zhao; Ross Cunningham; Kamel Fezzaa; Anthony Rollett; Tao Sun; Argonne National Laboratory; The Barnes Group Advisors; Carnegie Mellon University

A-38: Residual Strain Gradients in Thin Walled Additively Manufactured Stainless Steel Pressure Vessels: Bjorn Clausen; Rishi Ganeriwal; Donald Brown; Robert Ferencz; John Carpenter; Los Alamos National Laboratory; Lawrence Livermore National Laboratory

A-39: Residual Stress Measurement Techniques for Additive Manufacturing Parts: Adi Benartzy; Kahraman Demir; Jack Peterson; Grace Gu; Peter Hosemann; University of California, Berkeley

A-40: Strengthening Effect and Thermal Stability of Sub-grain Solidification Structures in L-PBF Stainless Steel 316L: Thomas Voisin; Jean-Baptiste Forien; Y. Morris Wang; Lawrence 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; Chae Woo Ryu; Eun Soo Park; Koji Nakayama; Seoul National University; Tohoku University

A-43: Production of Teaching Materials Through 3D Printing as Support for Educational Processes Related to the Sciences, Heritage and Culture: Henry Colorado; David Mendoza; Fernando Leon Valencia; Juan Manuel Perdomo; Universidad de Antioquia

A-44: Surface Characterization of IN718 Powder Stock and Influence on Net-shape HIP Microstructure: Benjamin Georgi; Victor Samarov; Hamish Fraser; The Ohio State University; LNT

A-45: Temperature Dependent Thermal Conductivity of Metallic Powder Alloys for Additive Manufacturing: Faiyaz Ahsan; Leiladanadi; Arizona State University

A-46: Thermal Analysis of Wire Arc Additive Manufacturing (WAAM): Lauriane Guilmois; Philippe Le Masson; Pascal Paillard; Institut de Recherche Technologique (IRT) Jules Verne; Institut de Recherche Dupuy de Lôme (IRDL); Institut des Matériaux Jean Rouxel (IMN)

A-47: Understanding Mechanisms Behind Morphological Changes in Gas Atomized Powders After Laser Irradiation: Jonathan Shelton; Jerry Floro; James Fitz-Gerald; University of Virginia

A-48: Wire-arc Additive Manufacturing for Fabrication of Bimetallic Additively Manufactured Structures: Rumman Ul Ahsan; A. N. M. Tanvir; Gi-Jeong Seo; Changwook Ji; P. K. Liaw; Duck Bong Kim; Tennessee Technological University; Korea Institute of Industrial Technology; University of Tennessee, Knoxville
A-49 (Invited): Additions of Iron to Grain Refine Ti Alloys during Laser Powder Bed Fusion: Marco Simonetti; Nesma Aboulkhair; Yau Tse; Adam Clare; Richard Hague; 1University of Nottingham; 2Loughborough University

A-50 (Invited): Alloy Development Feeder for Accelerated Materials Development: Kevin Luo; Melanie Lang; Jeff Riemann; 1FormAlloy

A-51: Additive Manufacturing of Atomized Ti-1Al-8V-5Fe by Laser Powder Bed Fusion: Eugene Ivanov; Eduardo del Rio; Aaron Marshall; Vivian Hogan; Daniel Satco; Ayman Salem; Tosoh SMD Inc.; 1Materials Resources, LLC; 2Material Resources LLC

A-52: Advancing Printability of Materials through Laser Metal Additive Manufacturing: Sofia Sheikh; Raymundo Arroyave; 1Texas A&M University

A-53: Automatically Quantifying Phase Information from HRTEM for Additively Manufactured Inconel 718: Sen Li; Behnam Aminahmadi; Branden Kappes; Aaron Stebner; Xiaoli Zhang; 1Colorado School of Mines

A-54: Ball-milled CoCr + X (X=W or SiC) Composite Powders for Additive Applications: Madelyn Madrigal Camacho; Suveen Mathaudhu; Guillermo Aguilar; 1University of California, Riverside

A-55: Cold Spray Deposition of Aluminum onto Polymer and Composite Substrates: Reza Rohni; Po-Lun Feng; Steve Nutt; 1University of Southern California

A-56: Compression Behavior of Additively Manufactured High Entropy Alloy with Transformation Induced Plasticity: Saket Thapliyal; Saurabh Nene; Priyanshi Agrawal; Rajiv Mishra; 1University of North Texas

A-57: Design of Easy-to-Use Structural Alloy Feedstocks for Additive Manufacturing Using Machine Learning Methods: Akansha Singh; Ben Rafferty; Jeremy Iten; Jacob Nuechterlein; Saurabh Nene; Priyanshi Agrawal; Rajiv Mishra; 1University of North Texas

A-58: Development of Laser Parameters for Pure Copper with Parts Fabricated from Laser Powder Bed Fusion (PBF): Michael Brand; Colt Montgomery; Robin Pacheco; Amber Black; Ryan Mier; 1Los Alamos National Laboratory

A-59: Development of Metallic Glass Micro-wires for the Direct Laser Melting Deposition Process: Song-Yi Kim; A-Young Lee; Hanuel Jang; Hwi-Jun Kim; Chang-Woo Lee; Min-Ho Lee; 1KITECH

A-60: Effect of Laser Glazing on Quasicrystals in Powder-processed Icosahedral-phase-strengthened Aluminum Alloys: Mingxuan Li; Hannah Leonard; Sarshad Rommel; Thomas Watson; Tod Policandrileos; Mark Window; 1University of Connecticut; 2Pratt & Whitney; 3Collins Aerospace

A-61: Exploring Rapid Solidification in Additive Manufacturing through Splat Quenching: Zachary Hasenbusch; Sydney Morales; Luke Brewer; Laurentiu Nastac; Andy Deal; Ben Brown; 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; Young-Kyun Kim; Sangsun Yang; 1Inha University; 2Korea Institute of Materials Science

A-63: Hybrid Additive Manufacturing of MS1-H13 Steels via Direct Metal Laser Sintering: Sajad Shakerin; Mohsen Mohammadi; 1Marine Additive Manufacturing Centre of Excellence (MAMCE)

A-64: Investigating Solidification and Liqueation Cracking in AA7075 Electron Beam Freeform Fabrication Deposits: Cecilia Mulvaney; James Fitz-Gerald; Marcia Domack; Karen Taminger; 1University of Virginia; 2National Aeronautics and Space Administration

A-65: Isotropic Microstructure and Mechanical Properties of Additively Manufactured Ti-based Alloy: Gwanghyo Choi; Won Seok Choi; Pyuck-Pa Choi; 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; Saket Thapliyal; Rajiv Mishra; 1University of North Texas

A-67: Nickel Free Stainless Steels Powders Designed for Laser Based Powder Bed Fusion Intended for Implantable Devices: Bernice Gatrell; Colton Steiner; Ron Aman; Nader Darivand; Jason Lehre; 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: Mehrd Sarjari; Amir Hadadzadeh; Ayda Shahriri; Saeed Tamimi; Hadi Pirgazi; Babak Shalchi Amirikhi; Leo Kestens; Mohsen Mohammadi; 1University of New Brunswick; 2CanmetMATERIALS; 3University of New Brunswick; 4AFRC-University of Strathclyde; 5Ghent University; 6CanmetMATERIALS; 7University of New Brunswick

A-69: Origin and How to Reduce Splatter in Powder Bed Fusion: Hans-Wilfried Mindt; Mustafa Megahed; Eisi 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; Alec Davis; Armando Caballero; Ed Pickering; Stewart Williams; Phil Prangnell; 1University of Manchester; 2Cranfield University

A-71: Powder Bed Additive Manufacturing of Cu / 17-4 PH Layered Structures: Alexis Ernst; Rainer Hebert; Mark Aindow; 1University of Connecticut

A-72: Predicting Phase Morphologies in AM Titanium Structures: Ian Bakst; 1Honeywell FM&T

A-73: Simulation of Part-scale Grain Structure Development During Additive Manufacturing Solidification: Matthew Robichgo; Jim Belak; Benjamin Stump; Alex Plotkowski; Robert Carson; Neil Carlson; Matt Bement; 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; Chu Lun Alex Leung; Joe Elambasseril; Sebastian Marussi; Saurabh Shah; Shashidhara Marathe; Milan Brandt; Mark Easton; Peter Lee; 1UCL Mechanical Engineering; 2RMIT University; 3Diamond Light Source Ltd

A-75: Tailoring Grain Structures for Metallic Additive Manufacturing: Yijia Gu; Arezoo Emdadi; 1Missouri University of Science and Technology

A-76: Exploring Rapid Solidification in Additive Manufacturing through Splat Quenching: Zachary Hasenbusch; Sydney Morales; Luke Brewer; Laurentiu Nastac; Andy Deal; Ben Brown; 1University of Alabama; 2Kansas City National Security Campus

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A-73: Simulation of Part-scale Grain Structure Development During Additive Manufacturing Solidification: Matthew Robichgo; Jim Belak; Benjamin Stump; Alex Plotkowski; Robert Carson; Neil Carlson; Matt Bement; 1Lawrence Livermore National Laboratory; 2Oak Ridge National Laboratory; 3Los Alamos National Laboratory

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A-75: Tailoring Grain Structures for Metallic Additive Manufacturing: Yijia Gu; Arezoo Emdadi; 1Missouri University of Science and Technology
A-76: Towards Grain Refinement of Titanium Alloys for Laser Powder-bed Fusion: Marco Simonelli1; Nesma Aboulihai1; Yau Yau Tse2; Adam Clare2; Richard Hague1; 1University of Nottingham; 2Loughborough University

A-77: Understanding Cellular Structures in Additively Manufactured 316L: Richard Fonda1; Joseph Arch2; Jerry Feng2; 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; Monnammie Tlottleng, University of Johannesburg; Jayme Keist, Pennsylvania State University; Hang Yu, Virginia Polytechnic Institute and State University

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A-80: β Phase Evolution Process in Selective Laser Melting Titanium-tantalum Continuous Gradient Alloy: Baicheng Zhang1; 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 Gorse1; Guillaume Aubert1; Sylvie Boret1; 1Icmcb

A-83: Additive Friction Stir-deposition of Copper: Jonathan Priedeman1; Brandon Phillips1; Billy Hombuckle1; Kristopher Darling1; Paul Allison1; Gregory Thompson1; 1University of Alabama; 2Army Research Lab

A-84: Additive Manufacturing Simulation Comparison Using Commercial Tools: Charles Fisher1; Adam Gershen1; John Michopoulos1; Athanasios Iliopoulos1; John Steuben1; Andrew Birnbaum1; 1Naval Surface Warfare Center – Carderock; 2Naval Research Laboratory

A-85: Alpha Variant Selection in Additively Manufactured Ti-6Al-4V: Philip Stephenson1; Ryan Demott2; Nima Haghdadi1; Xiaozhou Liao2; Simon Ringer1; Sophie Primig1; 1UNSW Sydney; 2The University of Sydney

A-86: An Investigation into the Recyclability of ALS10Mg Powder in LENS®: Almedro1; Parnian Kiani1; Kaka Ma1; Julie Schoenung1; 1University of California, Irvine; 2Colorado State University

A-87: Annealing of Additively Manufactured Inconel 625: Natul Ghat1; Amit Pandey1; Amber Shrvastav1; 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 Bello2; Ed Pickering1; Chris Heason1; 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 Vaughn1; Justin Unger1; Alberto Torres2; 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: Thjassaw Tumtum1; Sholden Wu1; Tien Roehling1; John Roehling1; Saad Kahtallah1; Sullivan Figurskey1; Devon Courtwright1; Michael Cumb1; Manyalibo Matthews1; 1Lawrence Livermore National Laboratory

A-92: Creep Deformation Study of Heat-treated Nickel Alloy 718: Alejandro Hinojos1; Hyeyun Song1; Alber Sadek1; 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 Sert1; Andreas Ochsner1; Markus Merkel1; Ewald Werner1; Jonas Von Kobylinski1; 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 Zou1; 1University of Toronto

A-95: Direct Laser Metal Deposition of René 108 Single Crystal: Praveen Sreramagiri1; 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. Kento Yamamoto1; Manami Mori1; Yusuke Onuki1; Shigeo Sato1; Akihiko Chiba1; 1Tohoku University; 2National Institute of Technology, Sendai College; 3Ibaraki University

A-97: Effect of Scanning Strategy on Additively Manufactured Ti6Al4V: Natul Ghat1; Bhanupratap Gaur1; Amber Shrvastav1; 1Indian Institute of Technology Bombay

A-98: Effect of Semi-solid Treatment on Microstructure and Mechanical Properties Additive Manufactured Inconel 625: Lukasz Rogol1; 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 Wolfen1; Richard Otis2; Brian Weston1; Saad Kahtallah2; Andy Anderson2; Andrew Shapiro2; Jean-Pierre Delplaques2; 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 Small1; 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 Wattr1; Jake Benzinger1; Nick Hrabe1; 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 Yu1; Xiaoang Hu1; Qing Zhu1; Hui Ding1; 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 Doumenq; David Glaguen; Bruno Courant; Pascal Paillard; Laurent Couturier; Alexandre Benoît; 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: Jungsuh Lee; Woonjin An; Imdoo Jung; Jusik Kim; Sangshik Kim; Hyokyong Sung; 1Gyeongsang National University; 23D Printing Center, Korea Institute of Materials Science; 3ANH structure


A-106: Experimental Study on the Laser Cladding of Ti5 Coating for 42CrMo Steel: Yingtao Zhang; Meng Jiang; Gang Wang; Xiulin Ji; 1College of Mechanical & Electrical Engineering, Hohai University

A-107: Fabrication of γ/γ′-strengthened Co-Al-W Alloys by Direct Laser Deposition: Pyuch-Pa Choi; Boryung Yoo; 1KAIST

A-108: Gamma-titanium Intermetallic Alloy Produced by Selective Laser Melting Using Mechanically Aligned and Plasma Spheroidized Powders: Igor Polozov; V. A. Popovich; Nikolay Razumov; Tagir Makhmutov; Anatoly Popovich; 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; Jae-Deuk Kim; Gi-Jeong Seo; Changhai Wu; P. K. Liaw; Duck Bong Kim; 1A. N. M. Tanvir; 2Teesside University, Middlesbrough

A-110: Influence of Print Orientation on Microstructure and Mechanical Performance of Selective Laser Sintered Polymide-12: Anil Krishna Battu; Tamas Varga; Josep Christ; Zachary Kennedy; Wenbin Kuang; Christopher Barrett; 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; Nouredine Fenineche; 1Benjamin Vayre; 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 Marchese; Simone Parizia; Antonio Sivo; Emilio Bassini; Flaviana Calignano; Saria Biancho; Daniele Ugues; 1Department of Applied Science and Technology, Politecnico di Torino; 2Department of Management and Production Engineering, Politecnico di Torino

A-113: Investigation of Martensite α’ Phase Transformation during Heat Treatment of High Speed Selective Laser Melted Ti6Al4V Components: Paul Letiard; Nthabiseng Maleli; Monnamme Tiotleng; Bathusile Masina; 1CSIR; 2University of Witwatersrand

A-114: Investigation of the Effect of Beam Scan Strategies on the Microstructure of EBM Additively Manufactured Inconel 738 Bolts: Chris Blackwell; Meiyue Shao; Sriram Vijayan; Sabina Kumar; Sudarsanam Babu; Joerg Jinschek; 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; Satya Ganti; Navin Sakhivel; Jim Overstreet; Anjani Achanta; Chad Yates; Joshua Snitkoff; 1Baker Hughes, a GE Company

A-116: Joint Characteristics of Additively Manufactured 316L Stainless Steel Using Vacuum Brazing: Gidong Kim; Dong-jin Oh; Yongjoon Kang; So-young Park; Sang-woo Song; 1Korea Institute of Materials Science

A-117: Laser Powder Bed Fusion Parametric Investigation of Binary Al-Si Alloys: Holden Hyer; Le Zhou; Joshua Haupt; Sharon Park; Brandon McWilliams; Kyu Cho; Yongho Sohn; 1University of Central Florida; 2US Army Research Laboratory

A-118: Lattice Manufacturability Using Electron Beam Powder Bed Fusion: Paul Korinthe; Dale Hitchcock; John Bobbitt; Spencer Scott; 1Savannah River National Laboratory

A-119: Localized Plastic Deformation in Thin-walled Selective Laser Melted IN718 Specimens: Sara Messina; Chris Torbet; Chase Joslin; Michael Kirka; Matthew Begley; Tresa Pollock; 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; Tadasahi Kii; Nobuyuki Sasaki; Hirofumi Watanabe; Yoshitaka Shibuya; Kenji Sato; Akihiko Chiba; 1Institute for Materials Research, Tohoku University; 2Japan Additive Manufacturing & Processing Technology (JAMPT) Corporation; 3JX Nippon Mining & Metals Corporation

A-121: Mechanical Properties of AISI1040 Processed by Laser Powder Bed Fusion at Elevated Temperature: Even Høvig; Amin Azar; Mohammed Hmami; Knut Sorby; 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; Bin Zhang; Ali Hemmasian Ettefaq; Hao Wen; Hong Yao; Wenjin Meng; Jonathan Rausch; Shengmin Guo; 1Louisiana State University; 2University of Louisiana at Lafayette

A-123: Microstructural Characteristics of Stainless Steel 316L Processed by Selective Laser Melting Technology: Ismat Araf; X. W. Tangpong; Farjad Azarmi; 1North Dakota State University (NDSU)

A-124: Microstructural Characterization of Ni-based Multilayer Coating After Laser Cladding on Cast Iron Substrate: Fazati Boshiru; Michel Rege; Christophe Lafarge; Abderazak Khenafi; 1CHPOLANSKY

A-125: Microstructure and Mechanical Properties of AISI420 Stainless Steel Produced by Wire Arc Additive Manufacturing: Jonas Lunde; Mostafa Kazemipour; Salar Salahi; Ali Nasiri; 1Memorial University of Newfoundland

A-126: Microstructure and Mechanical Properties of Direct Laser Metal Deposited GRCop-84 Alloy: Ajay Bhagavatam; Praveen Sreramagiri; Asit Biswas; Dean Baker; Guru Dinda; 1Wayne State University; 2Advanced Powder Solutions

A-127: Microstructure and Mechanical Properties of In 718 Alloy Manufactured by Several Different Process: Seungmun Jung; Suk Hoon Kang; Chang-Kyu Rhee; 1KAERI

A-128: Microstructure and Mechanical Properties of Ti/TiC Composite Coatings Fabricated by Laser Engineered Net Shaping: Madhovan Radhakrishnan; Zeynel Guler; Md Mehadi Hassan; Thomas Lienert; Osman Anderoglu; 1University of New Mexico; 2Oak Ridge National Laboratory

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; 1CS3DM
A-130: Numerical Prediction of Microstructures by a Coupled Model (CA-FE) for Laser Beam Melting of Single-track 316L Stainless Steel. Anais Baumard1; Danièle Ayrault1; Olivier Fandeur1; Anne-Laure Vétele1; Cyril Bordreuil1; Frédéric Deschaux-Beaume2; 1Den-Servic 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 Masson1; Abu Syed Kabir1; 1University of Kassel, Institute of Materials Engineering - Metallic Materials

A-132: On the Influence of Nitrogen on the Performance of Austenitic Stainless Steel 316L Processed by SLM. Julia Richter1; Thomas Niendorf1; 1University of Kassel, Institute of Materials Engineering - Metallic Materials

A-133: On the Microstructure and Corrosion Behavior of Wire Arc Additively Manufactured AlSi 420 Stainless Steel. Mostafa Kazemipour1; Jonas Lunde1; Salar Salahi1; Ali Nasiri1; 1Memorial University of Newfoundland

A-134: On the Role of Defects in the Dynamic Response of AM SLM 316L. Liam Smith1; David Chapman1; Paul Hooper1; 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 Barbo1; Carles Alabort1; Roger Reed1; Enrique Alabert1; 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. Dong Khoa Do1; Peifeng Li1; 1University of Glasgow

A-137: Phase-field Method for Grain Evolution During Additive Manufacturing. Alexander Chadwick1; Peter Voorhees1; 1Northwestern University

A-138: Powder Flowability Measurements: Statistical Correlations Between Powder Characteristics and Flowability Behavior. Parnian Kiani1; Umberto Scipioni Bertoli1; Alexander Dupuy1; Kaka Ma1; 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 Wei1; Wei Xing1; Gang Wang1; 1Harbin Institute of Technology; 2Southern University of Science and Technology; 3Tsinghua University

A-141: Process Plateaus, Not Peaks, in Laser-powder Bed Fusion. Bradley Jared1; Josh Koepe1; Jarrett Tigges1; Michael Heiden1; David Saiz2; 2Sandia 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 Vyatkikh1; Baolong Zheng1; Umberto Scipioni Bertoli1; Enrique Lavernia1; 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 Hoeffnann1; 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; 2Safran SA

A-148: Tailoring Hierarchical Material Performance Through Process Manipulation. Bradley Jared1; David Saiz2; Michael Heiden1; Matthew Roach1; Anthony Garland1; Brad Boyce1; Ben White1; David Moore2; 1Sandia National Laboratories

A-149: The Effect of Support Structures on Microstructure in LPBF and EBM. Sandra Megahed1; Vadim Aniko1; Maximilian Voshage1; Johannes Henrich Schleifenbaum1; 2Chair of Digital Additive Production, RWTH Aachen University; 3Chair of Digital Additive Production, RWTH Aachen University; 4Fraunhofer-Institute for Laser Technology ILT

A-150: The Effects of Alloy Composition on Microstructure and Mechanical Properties of Duplex Stainless Steel Produced by Additive Manufacturing. Andrew Lams1; Todd Palmer1; 2Pennsylvania State University

A-151: The Effects of LENS Process Parameters on the Behavior of 17-4 PH Stainless steel. Ipfi Mathoha1; Esther Akinlabi1; Nana Arthur1; Monnamme Tlotleng1; 1CSIR Pretoria; 2University of Johannesburg

A-152: The Process Parameters Extended Criterion for Laser Engineered Net Shaping of Inconel 738. Yang Zhou1; Zhaoyang Liu1; Chuan Guo1; Guowei Ye1; Xin Li1; Qiang Zhu1; 1Southern University of Science and Technology

A-153: The Significance of Length Scales and Segregation in Strengthening Selective Laser Melted Stainless Steel Microstructures. Tatu Pinomaa1; Matti Lindroos1; Martin Walbrühl1; Nikolaos Provatas1; Anssi Laukkanen1; 1VTT Technical Research Centre of Finland; 2Royal Institute of Technology (KTH); 3McGill University

A-154: Thermodynamic Calculation and Characterization of Carbine Precipitation in Laser-deposited Material for High Speed Steel Alloy. Ali Jammal1; Gang Wang1; Songge Yang1; Yu Zhong1; Yiming Rong1; 1Tsinghua University; 2WPI; 3Southern University of Science and Technology

A-155: Thermoelectric Magnetohydrodynamic Effects in Laser Additive Manufacturing: Coupled Macro-microscale Numerical Modelling. Andrew Kao1; Teddy Gar1; Catherine Tony1; Ivars Krakstins1; Kouki Periclescu1; 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:** Arcady Zhukov, UPV/EHU and Ikerbasque

E-1 (Invited): Core Losses in Co-rich Inductors with Tunable Permeability
**Alex Leary:** 1; Vladimir Keylin:** 2; Ron Nobe:** 2; Randy Bowman:** 1; Grant Feichter:** 1; Kevin Byerly:** 2; Paul Ohodnicki:** 2; Michael McHenry:** 2; 1Nasa Glenn Research Center; 2NETL; 3Carnegie Mellon University

E-3: Magnetic Flux Density Dispersion on the Gaps of the FeSiNbCuB Nanocrystalline Block Core
**Piotr Blyskun:** 1; Roman Kolano:** 1; Przemyslaw Zackiewicz:** 1; Marek Hreczka:** 1; 1Lukasiewicz Research Network – Institute of Non-Ferrous Metals

E-4: Processing and Properties of Low Porosity Cast SMC Cores
**Gandha:** 1; 1Lukasiewicz Research Network – Institute of Non-Ferrous Metals

E-5: Structure and Properties Evolution in Rapidly Annealed Fe\textsubscript{2}Co\textsubscript{3}B\textsubscript{1} Amorphous Material
**Maciej Kowalczyk:** 1; Jaroslaw Ferenc:** 1; Anna Wójcik:** 2; Aleksandra Kolano-Burian:** 1; Tadeusz Kulik:** 1; Piotr Błyskun:** 1; 1Warsaw University of Technology; 2Polish Academy of Sciences; 3Lukasiewicz Research Network

E-6: Transition Metal Based Nanostructured Hard Magnet
**Kinjal Gandhi:** 1; Ikenna C. Nlebedim:** 1; 1Ames Laboratory

E-7: Tuning of Second Order Phase Transition of NiMnGa Heusler-type Glass-coated Microwires
**Carlos Garcia:** 1; Valentina Zhukova:** 2; Sergei Shevyrtalov:** 1; Mikhail Ipatov:** 1; Paula Corte-Leon:** 1; Arcady Zhukov:** 1; 1Universidad Técnica Federico Santa Maria, Valparaiso, Chile; 2University Basque Country, UPV/EHU; 3Immanuel Kant Baltic Federal University; 4University Basque Country, UPV/EHU; 5UPV/EHU, and Ikerbasque, Basque Foundation for Science

E-8 (Digital): Improving Wetting of Silver (Ag) on Oxide Surface with Patterned Nickel (Ni)-particles
**Jiyun Park:** 1; Jason Nicholas:** 1; Yue Qi:** 1; Michigan State University

E-9 (Invited): Protective Coatings for Solid Oxide Fuel Cell Stacks
**John Hardy:** 1; 1Pacific Northwest National Laboratory

E-10: A BiVO\textsubscript{4}-RGO Bilayer Electrode based Photoelectrochemical Supercapacitor
**Anirban Roy:** 1; Pavel Majumdar:** 2; Krishnendu Pramanik:** 1; Hiranmay Saha:** 1; 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 Parekh:** 1; Bing Li:** 1; Vikas Tomar:** 1; Vilas Pot:** 1; 1Purdue University

**Seon-jin Lee:** 1; Ji-wong Shin:** 1; Sang-yong Oh:** 1; Yun-chae Nam:** 1; Bonkeup Koo:** 1; 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 Tan:** 1; Shuyi Chen:** 1; Daniel Lin:** 1; Tianyu Meng:** 1; Jessica Lin:** 1; Kevin Zanjani:** 1; 1Bioenno Tech

E-15: Development of Platinum Electrocatalsysts with Preferential Crystal Orientation for Energy Conversion Systems: Silvina Gabriela Ramos:** 1; Gustavo Andreassen:** 1; Alicia Ares:** 1; Walter E. Triaca:** 1; 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 Pr0.6Sr0.4Fe1-xWxO3-d Ceramic Membranes for Water Splitting
**Yanbo Liu:** 1; Hongwei Cheng:** 1; Xiaofang Xu:** 1; Qianyu Liu:** 1; Qian Xu:** 1; Xionggang Lu:** 1; 1Shanghai University

E-17: Enhancement of Metal Surface Mechanical Property by High Energy Beam Injection
**Sangwoo Kim:** 1; DongEung Kim:** 2; Changhyun Jin:** 2; 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 Ready:** 1; 1Georgia Tech Research Institute

E-20: Linking Nanoscale Grain Boundary Composition and Energetic Properties in Ceramic Oxides
**Tara Boland:** 1; Arunima Singh:** 1; Peter Rez:** 1; Peter Crozier:** 1; 1Arizona State University
E-21: Mechanistic Elucidation of Electrodeposition Stability at Metal-Solid Electrolyte Interfaces: Anhkit Verma; Partha Mukherjee; 1Purdue University

E-22: Microwave Dielectric Properties of Isovalent and Aliovalent Ions Doped Ca4(La4Pr2)(SiO4)4(PO4)2O2 Ceramics: Sea Fue Wng; Chung Jen Lin; Bo Cheng Lai; Hong Bo Yang; Jia Min Chen; 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; Chih Chen; 1National Chiao Tung University

E-24: Preparation of Porous Carbon Materials and Its Application in Supercapacitors: Xiaomeng Yang; PengFei Tang; WeiJun Peng; Ibrar Zahid; GuiHong Han; Zhang YongSheng; 1Zhengzhou University

E-25: Raman Spectroscopy Study of Amorphous MnO2 and a-MnO2 Cathodes in Rechargeable Zn-metal Batteries: Michael Kindle; Samantha Robillard; John McCoy; Min-Kyu Song; 1Washington State University

E-26: Solid State Phase Change Materials for Energy Storage: Developing a Database: Xiaochuan Tang; Christopher Weinberger; 1Colorado State University

E-27: Strategies for the Viability of Li-S Rechargeable Batteries by Using Nanotechnology: Eunho Cha; Sanjib Bhoyare; Wompong Choi; 1University of North Texas

E-28: Synthesis of Nanoencapsulated Phase Change Materials with Ag Shell for Thermal Energy Storage: Huamei Yuan; Hao Bai; Jian Zhang; Zefei Zhang; 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; P. Alex Greaney; 1University of California, Riverside

E-30: Thermal Cycling of Room Temperature Ionic Liquid-based Supercapacitors for Aerospace Applications: Julia Allen; Jud Ready; 1Georgia Tech Research Institute

E-31: Understanding Dendritic Growth in Mg-based Batteries and Design of Metallic Anodes: Rachel Davidson; Sarbajit Banerjee; 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 Nagita, University of Queensland; David Yan, San Jose State University; Mike Wulvorton, 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; Hala Shaba; 1San Jose State University

D-2: A Novel Class of Multiscale Nanomaterials-based Thermal Interface Materials for High Temperatures, High Power Density Electronics: Chunhu Tan; Shuyi Chen; Tim Lin; 1Aegistech Technology Inc

D-3: Study of Pore Structure of Nano-silver Paste Sintered Interconnect under Current-stressing: Ingann Chen; Chiaming Yang; Pocheng Su; Potsung Hsieh; Steve Liencheng Hsu; 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 Bochicchio, Pratt & Whitney; Kevin Bockenstedt, ATI Specialty Materials; Katerina Christofidou, University of Sheffield; James Coakley, University of Miami; Martin Detrios, National Energy Technology Laboratory; Laura Dial, GE Global Research; Bij-Na Kim, Carpenter Additive; Victoria Miller, University of Florida; Kinga Unoci, 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 Hale; Eric Payton; Victoria Miller; 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; Rafał Cygan; Grzegorz Labaj; 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; Charles Demarest; Brendy Rincon Troconis; John Scully; James Burns; 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; Jean-Briac le Graverend; Amine Benzeraga; 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; Ichiro Mitama; Takuma Sakata; 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 Sun1; Chun-Hsien Wang1; Albert T. Wu2; 1National Central University

D-5: Mass Production of Highly Performing Bi2SbTe3 Thermoelectric Materials Through Powder Metallurgy: Pathan Sharih1; Suk-Min Yoon1; May Liha Lwin1; Chul-Hee Lee1; Peyala Dharmahai1; Babu Madavalli1; Soo-Jin Hong1; 1Kongju National University

D-6: Phase Diagram of Bi-Cu and Thermoelectric Properties of Cu Doped Bi2Te3 Alloys: Wan-Ting Yen1; Hsin-Jay Wu1; 1National Chiao Tung University

D-7: Phase Diagrams of Ag-Pb-Sn System: Sinn-wen Chen1; Jia-yu Du1; Yohanes Hutabalian1; Aleš Kroupa1; 1National Tsing Hua University; 2Czech Academy of Sciences

D-8: Realizing the Microstructure in Ge-based Thermoelectric Materials and Phase Transition Behavior: Yi-Fen Tsai1; Pai-Chun Wei1; 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 Mg3Sb2, Bi2Yasuo Shibata1; Yuji Ohishi1; Hiroaki Muta1; 1Osaka 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-1: A Review of Research on Alumina Extraction from High-alumina Fly Ash and a New Method for Preparing Alumina by Electrotransformation: Xixiu Han1; Zhang Tingan1; Guozhi Lv1; Xijuan Pan2; Daxue Fu2; 1Northeastern University

F-2: Effect of Sodium Alkali Concentration on Calcification-carbonization Process: Yang Chen1; Zhang Tingan1; Guozhi Lv1; Xi Chiao1; 1Northeastern University

F-3: Flow field Characteristics in Self-stirring Reactor based on PIV Technology: Zimu Zhang1; Qiyue 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 Zeng1; Ke Zhu1; Zimeng Tan1; Aoping He1; 1Guangxi University

F-5: Aluminum Nanocomposites Made via In-situ Metal-based Pyrolysis: Processing and Microstructure: Aaron Gladstein1; Alan Taub1; 1University of Michigan

F-6: Analysis of Microhardness of Al-Si Alloys Directionally Solidified: Roberto Rozicki1; Alicia Ares2; 1Programa de Materiales y Fisicoquímica (ProMyF). Facultad de Ciencias Exactas, Quimicas y Naturales (FCECyN). 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 Ares2; Claudia Méndez2; 1Programa de Materiales y Fisicoquímica (ProMyF). Facultad de Ciencias Exactas, Quimicas y Naturales (FCECyN). 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 Moon1; Myoeng Han Yoo1; Kee Won Kim1; Jong Dae Yoon1; Joon Hyuk Song1; Sang Youp Oh1; 1Korea Institute of Carbon Convergence Technology; 2RheoForge Co., Ltd.

F-9: Effect of Nano a-Al(Fe,Mn)Si Particles on the Microstructure and Mechanical Properties of Extruded Al-Si-Mg-based Alloy with ZnO Addition: Sangjun Lee1; Donghyun Bae1; 1Yonsei University

F-10: Effect of Si Modification on the Mechanical and Tribological Properties of an Al-Si Hyper-eutectic Alloy: Jeheon Jeon1; Donghyun Bae1; 1Yonsei University

F-11: Effect of Transition Metals Micro-Additions on Microstructure and Mechanical Properties Al-Si-Mg Alloy: Lluksaz Rogat1; Wojciech Maziarz2; Karol Janus3; Aneta Wilczek2; Piotr Bobrowski3; 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 Kim1; 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 Ulus1; Serpil Fidan1; Cişem Doğan1; Eda Özkkaya1; Canan Inel1; 1Asas Aluminium

F-14: Effects of Trace Elements on Thermal Conductivity and Formability of the Extruded Al-RE Alloy Systems: Hyeon-Taek Son1; Yong-Ho Kim1; Sang-Soo Na1; 1Korea Institute of Industrial Technology

F-15: Experimental Investigation of MgAl2O4 Spinel Formation in Oxidation of Al-Mg Alloys: Young-Ok Yoon1; 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 Shin1; Sehoon Kim1; Jinkyeong Kim1; Siyoung Sung1; Beomsuck Han1; 1Korea Automotive Technology Institute

F-18: Hybrid Aluminum Sheets with Improved Mechanical Properties by Repeated Roll-bonding Process. ChaYong Lim1; 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 Khrustalev1; Evgeny Moskvichev1; 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. Besabakhte Skhosane1; Sisa Pityana1; Monnamme Tlou1; 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 Lin1; Hiroshi Okuda1; Higashino Yukihiro1; Katsushi Matsumoto1; Kazufumi Sato1; 1Kyoto University; 2Kobe Steel, Ltd.; 3Kobelco Research Institute, Inc.

F-23: Self-healing Aluminium Alloys. Irena Paulin1; 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 Zhang1; Wonkee Chae1; JunHyun Han1; 1Chungnam National University

F-26: The Effect of Initial Precipitates on Shear Deformation in 6061 Aluminium Alloy. Wonkee Chat1; JunHyun Han1; 1Chungnam National University

F-27: The Effect of Profile Shape on Crystallographic Texture of Extruded 6xxx High Strength Aluminium Alloy. Chryssoula Tzileroglou1; Isaac Chang1; 1Brunel University London

F-28: The Effect of Zinc Addition on Corrosion Resistance and Mechanical Properties of Recycled Aluminium Cans. Ademola Agbeleye1; Atinuke Oladoye1; Babatunde Bolasodun1; 1University of Lagos

F-29: The Evaluation of Forged Aluminium Heat Sink for LED Headlight of Automobile. Young-Seh Yang1; Geun Woo Lee1; Chang Ho Yoon1; 1Fosung Precision Ind. Co., Ltd.

F-30: The Role of In-situ Stacking Faults and Twins in the Deformation Behavior of New Al Alloys. Miran Joo1; Jeheon Jeon1; Donghyun Bae1; 1Yonsei University

BIMATERIALS

Biomaterials for Medical Applications I — 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-2: Corrosion Products of Zinc Implant Degradation Suppress Neointimal Hyperplasia. Roger Guillory1; Timothy Kolesar1; Jaroslav Drellich1; Jeremy Goldman1; 1Michigan Technological University

B-3: Deformation Localization of Zn-Cu-Mn-Mg Alloys Designed for Bioreabsorible Medical Implants. Morteza Shaker Ardakani1; Ehsan Mostaedi1; Stephen Kampe1; Jaroslav Drellich1; 1Michigan Technological University

B-4: Discovery of Alloying Elements and Processing Parameters that Impart Improved Biocompatibility of Zinc-based Medical Implants. Lea Morath1; Alexander Oliver1; Katie Flom1; Roger Guillory1; Jeremy Goldman1; Ehsan Mostaedi1; Jaroslav Drellich1; 1Michigan Technological University

B-5: Effect of Compressive Strain on Biodegradability in Pure Magnesium. Shun Yorifuji1; Naoko Ikeoi1; Toshiji Mukai1; 1Kobe University
B-6: Evaluation of Electrospinning Parameters for Fabrication of Biodegradable Drug Carrier Silk Fibers: Babah Johani; Sahar Tabatabaee; Salimeh Yasaei Sekeh; Long Jiang

1 North Dakota State University; 2 Pharmascience; 3 University of Maine

B-8: Long Term Inflammatory Response to Zinc Materials in Murine Arteries: Alexander Oliver; Roger Guillory; Timothy Kolesar; Lea Morath; Katie Flom; Ehsan Mostaeid; Jaroslav Drelich; Jeremy Goldman

1 Michigan Technological University

B-9: Mechanical and Wear Behaviour of Mg-Ca Alloys for Orthopaedic Implant Applications: Asmaa Elmaghraby; Ahmed Aziz

1 German University (GUC) in Cairo

B-10: New Approach in Development of Biodegradable FeMn Alloys: Crtomir Donilk; Irena Paulin; Aleksandra Kocjan; Matjaž Godec

1 Institute of Metals and Technology, Slovenia

B-11: Novel Method for Increasing Mechanical Properties of Biodegradable Zinc: Anna Jarzewska; Magdalena Bieda-Niemiec; Lukasz Maj; Martyna Stragi; Daniel Wojtas; Robert Chulist; Jan Guspiew; Wacław Pachla; Krzysztof Sztwiertnia

1 AGH University of Science and Technology, Krakow

B-12: Research on Zn-Ag-Mg Alloy as a Potential Biodegradable Implant Material: Maria Watroba; Witkoł Bednarczyk; Jakub Kawałko; Krzysztof Mech; Gabriela Boelter; Manuel Banzer; Piotr Bala

1 AGH University of Science and Technology; 2 University of Birmingham

B-13: 3D Printed Models of the Arrangement of Components in Two-phase Composites: Frances Su; Fereshete Sabet; Katherine Tang; Sean Garner; Michael Tolley; Iwona Jasiuk; Joanna McKittrick; 1 University of California, San Diego; 2 University 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; Swati Haldar; Sumeet Gupta; Ankita Bisth; Samrat Chauhan; Partha Roy; Debrupa Lahiri; 1 Indian Institute of Technology, Roorkee; 2 Maharshi Markandeshwar University

B-15: Electrochemical Evaluation of Novel Titanium Alloys: Thu Nguyen; Jacob Giacomi; Vilupanur Ravi; 1 California Polytechnical State University, Pomona

B-16: Fracture Mechanisms of Epoxy-alumina Composites: Jiacheng Gao; Ruyi Man; Yuyang Wang; Yichun Tong; Kangning Su; Michael Hillman; Jing Du; 1 Penn State University

B-17: Microsphere Calcium Phosphate Cements to Improve Injectableability and 3D-printability of Dental Biomaterials: Tony Yin; Krisa Carlson; Steven Naleway; 1 University of Utah

B-18: Modulation of Neurogenic Differentiation by Reinforcement of Polymeric Scaffolds with Different Carbon Nanofillers: Souvik Ghosh; Swati Haldar; Vinay Kumar; Partha Roy; Debrupa Lahiri; 1 Indian Institute of Technology, Roorkee

B-19: Structural and Mechanical Characterization of Quasi-indestructible Armillaria ostoyae Rhizomorphs: Debora Lyn Porter; Alexander Bradshaw; Bryn Dentinger; Steven Naleway; 1 The University of Utah Department of Mechanical Engineering; 2 The 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; Guibao Qiu; Hanghang Zhou; Tengfei Lu; 1 Chongqing University

B-21: Using Microspheres to Understand the Effect of Particle Geometry in Freeze Casting: Sierra Freitas; Lauren Kochaver; Krista Carlson; Steven Naleway; 1 University of Utah

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-22: Fabrication and Shape Memory Characteristics of Nontoxic Ti-Zr-Nb-Sn Biomaterials: Yeon-wool Kim; Taehyun Nam; Myungwhwan Byun

1 Keimyung University; 2 Gyeongsang National University

B-23: Mechanical, Physical, and Morphological Characterization of a Composite Made from Luffa Cylindrica and EVA Copolymer: Alejandro Restrepo Carmona; Henry Colorado

1 University of Antioquia

B-24: Quantitative Study of Banana Green Peel Tannins for Preparing a Bioma Terial: Elisângela Ferreira; Veronica Candido; Rafaela Pinheiro; Alisson Silva; Sergio Monteiro; Samara Marques

1 Universidade Federal do Pará; 2 Federal University of Rio De Janeiro


1 National Taiwan Ocean University
**TECHNICAL PROGRAM**

**TMS2020 TECHNICAL PROGRAM**

**POSTERS**

**C-3: Corrosion Resistance and Electrochemical Corrosion Characteristics of Stainless Steel for Seawater Desalination**

**Evaporator Characteristics of Stainless Steel for Seawater Desalination**

**C-2: Anti-Corrosive Properties and Theoretical Studies of Some Hydrochloric Acid Thiosemicarbazide Compounds on Mild Steel Corrosion in**

**C-1: Advanced Coating and Surface Modification Technologies for SIC-SiC Composites for Hydrothermal Corrosion Protection**

**F-34: Numerical Simulation of Temperature Field in 6061 Aluminum Alloy Vertical Twin-roll Casting Process**

**F-3: Effect of Electromagnetic Stirring on Morphology of α-Al Phase in Near Eutectic Al-Si Alloy**

**F-2: Furnace Lining Degradation by 5xxx Aluminum Alloys: Athanasia Flamouri; Theofani Tzevelekou; Sofia Papadopoulou; Spyros Pinis; Nikolaos SGoudarakis; ELEKME S.A.; ElvalHalcor S.A.**

**F-1: Microsegregation Mechanisms in Aluminum Binary Alloys of Different Casting Techniques: a Quantitative study**

**F-4: Cast Shop Technology — Poster Session**

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

**Program Organizer:** Johannes Morschreiser, Aleral Rolled Products Germany GmbH

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**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-SiC Composites for Hydrothermal Corrosion Protection in LWRs**

**C-2: Anti-Corrosive Properties and Theoretical Studies of Some Thiosemicarbazide Compounds on Mild Steel Corrosion in Hydrochloric Acid**

**C-3: Corrosion Resistance and Electrochemical Corrosion Characteristics of Stainless Steel for Seawater Desalination Evaporator**

**F-31: Effect of Electromagnetic Stirring on Morphology of α-Al Phase in Near Eutectic Al-Si Alloy**

**F-32: Furnace Lining Degradation by 5xxx Aluminum Alloys: Athanasia Flamouri; Theofani Tzevelekou; Sofia Papadopoulou; Spyros Pinis; Nikolaos SGoudarakis; ELEKME S.A.; ElvalHalcor S.A.**

**F-33: Microsegregation Mechanisms in Aluminum Binary Alloys of Different Casting Techniques: a Quantitative study: Zhenjie Yao; Yang Huo; Mei Li; John Allison; University of Michigan; Ford Motor Company**

**F-34: Numerical Simulation of Temperature Field in 6061 Aluminum Alloy Vertical Twin-roll Casting Process: Chaopan Xie; Xiaoping Liang; Yu Wang; ChongQing University**

**E-33 (Invited): Development of a New Thermochemistry Solver for Multiphysics Simulations of Nuclear Materials: Parikshit Baijap; Max Poschmann; David Andrés; Chaitanya Bhave; Michael Tonks; Markus Piro; Ontario Tech University; Idaho National Laboratory; University of Florida**

**E-34: Ab-initio Modelling of Iodine Defects in Strained Zirconium and Ordered Zirconium-oxygen Suboxides: Vlad Podgurschi; Daniel King; Jana Smutna; Mark Wrenman; Imperial College London**

**E-35: IMC Modeling of U-10%wt Mo Alloys: A Linkage between Microstructure Evolution and Process Modeling: Chao Wang; Zhijie Xu; William Frazier; Ayoub Soulami; Saumsyadeep Jana; Kyoo Sil Choi; Curt Lavender; Vineet Joshi; Pacific Northwest National Laboratory**

**E-36: ICME Modeling of U-10%wt Mo Alloys: A Linkage between Microstructure Evolution and Process Modeling: Chao Wang; Zhijie Xu; William Frazier; Ayoub Soulami; Saumsyadeep Jana; Kyoo Sil Choi; Curt Lavender; Vineet Joshi; Pacific Northwest National Laboratory**

**E-37: Machine Learning-assisted Risk-informed Sensitivity Analysis for ATF Under SBO: Jinrui Yu; Cole Blakely; Hongbin Zhang; Idaho National Laboratory**

**E-38: Mesoscale Modeling of High Burn-up Structure (HBS) Formation and Evolution in U-Mo Alloys: Karim Ahmed; Daniel Schwem; Yongfeng Zhang; Texas A&M University; Idaho National Laboratory**

**E-39: Molecular Dynamics and Phase-field Study of Anisotropic Grain Growth Behavior in UO: Jiarin French; Yipeng Gao; Xin-Ming Bai; Virginia Tech; Idaho National Laboratory**
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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**ENERGY & ENVIRONMENT**

**E-46 (Invited): Return of Manmade CO2 to Earth:** Neale Neelameggham; Huijin Lu; IND LLC; Beihang University

**E-47: Advanced Skutterudite-based Unicouples for A Proposed Enhanced Multi-mission Radioisotope Thermoelectric Generator:** Brian Phan; Jet Propulsion Laboratory

**E-48: CaO Poisoning on Mn-Ge/AC Catalyst for Selective Catalytic Reduction of NO with NH₃ at Low Temperature:** Zenghui Su; Shan Ren; Jie Yang; Tianshi Zhang; Zelong Cai; Lin Chen; Ming Kong; Qingcai Liu; Jian Yang; Jinglong Li; Chongqing University

**E-49: Enabling Corrosion-resistant Magnesium Through Cross-linking Polymerized Inorganic Sol Coatings:** Wei Wang; Xiaona Yang; Yong Fan; Xiaobo Chen; Jilin University; RMIT University

**E-50: MnO₂-decorated Fe-Zr Based Nano-catalysts for Low Temperature NH₃-SCR: Improvement of Catalytic Activity:** Chen Yang; Jian Yang; Qingrui Jiao; Yuanmeng Tian; Qingcai Liu; Shan Ren; Jinglong Li; Chongqing University

**E-51: Modeling the Rate of Heat Loss from the Stack of a Natural Gas Pressure Reducing Station Heater:** Amin Kazemi; Ali Kianifar; Ferdowsi University of Mashhad

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**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; James Burns; University of Virginia

**C-10: Localized Corrosion of Selective Laser Melted Stainless Steel 316L:** Duane Armell Macatangay; Jonathan Skelton; Wenhao Lin; Robert Kelly; Ji Ma; University of Virginia

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**POSTERS**

**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 Spearat, University of Florida; Jian Luo, University of California, San Diego; Jennifer Carter, Case Western Reserve University

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**POSTERS**

**G-8 (Invited): Novel X-ray Tools to Study Size Effects on Nanocrystalline Materials:** Anastasios Pateras; Jonathan Giga; Kevin Baldwin; Wonsuk Cha; Ross Harder; Richard Sandberg; Saryu Fensin; Reeju Pokhare; Los Alamos National Laboratory; Argonne National Laboratory; Brigham Young University

**G-9: Deformation Nanomechanics and Dislocation Quantification at Atomic Scale in Nanocrystalline Pure-metal Magnesium: Md Shahrier Hasan; Wenwu Xu; San Diego State University and University of California, San Diego; San 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; Saurabh Gupta; Yin Zhang; Joshua Kacher; Olivier Pierron; Ting Zhu; Georgia Institute of Technology

**G-11: The Chemical Effect on the Potential Energy Landscape of Grain Boundary:** Sam Garretson; Liang Tian; Lin Li; University of Alabama

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**POSTERS**

**TMS2020 TECHNICAL PROGRAM**

1; Yin Zhang 1; Joshua Kacher 1; Olivier Pierron 1; Ting Saurabh Gupta 1; Saryu Fensin1; Reeju Pokharel 1; 1Los Alamos National Laboratory; Kevin Baldwin 1; Wonsuk Cha 2; Ross Harder 2; Richard Sandberg 3; Neale Neelameggham, IND LLC; Cong Wang, Northeastern University; Ziqi Sun, Queensland University of Technology

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**POSTERS**

**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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**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; James Burns; University of Virginia

**C-10: Localized Corrosion of Selective Laser Melted Stainless Steel 316L:** Duane Armell Macatangay; Jonathan Skelton; Wenhao Lin; Robert Kelly; Ji Ma; University of Virginia

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**POSTERS**

**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

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**POSTERS**

**G-8 (Invited): Novel X-ray Tools to Study Size Effects on Nanocrystalline Materials:** Anastasios Pateras; Jonathan Giga; Kevin Baldwin; Wonsuk Cha; Ross Harder; Richard Sandberg; Saryu Fensin; Reeju Pokhare; Los Alamos National Laboratory; Argonne National Laboratory; Brigham Young University

**G-9: Deformation Nanomechanics and Dislocation Quantification at Atomic Scale in Nanocrystalline Pure-metal Magnesium: Md Shahrier Hasan; Wenwu Xu; San Diego State University and University of California, San Diego; San 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; Saurabh Gupta; Yin Zhang; Joshua Kacher; Olivier Pierron; Ting Zhu; Georgia Institute of Technology

**G-11: The Chemical Effect on the Potential Energy Landscape of Grain Boundary:** Sam Garretson; Liang Tian; Lin Li; University of Alabama

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**POSTERS**

**TMS2020 TECHNICAL PROGRAM**

1; Yin Zhang 1; Joshua Kacher 1; Olivier Pierron 1; Ting Saurabh Gupta 1; Saryu Fensin1; Reeju Pokharel 1; 1Los Alamos National Laboratory; Kevin Baldwin 1; Wonsuk Cha 2; Ross Harder 2; Richard Sandberg 3; Neale Neelameggham, IND LLC; Cong Wang, Northeastern University; Ziqi Sun, Queensland University of Technology

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**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; Jennifer Locke, Ohio State University

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*Session Chair:* Bai Cui, University of Nebraska-Lincoln

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**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 Ie Graverend, Texas A&M University; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University

*Monday PM | February 24, 2020*  
*Sails Pavilion | San Diego Convention Ctr*  
*Session Chair:* Garrett Pataky, Clemson University

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**ADDITIONAL TECHNOLOGIES**

General Poster Session — Additive Technologies

*Monday PM | February 24, 2020*  
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A-159: Effects of Bi in Rapid Solidification of a Hypoeutectic Al-Si Alloy: José Marcelino Dias1; Abdoul-Aziz Bogno2; Jose Spinelli3; Amauri Garcia4; Hani Henein5; 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 Xu1; Jazzmin Casillas1; Changxue Xu1; 1Texas Tech University

A-161: Microstructure and Mechanical Properties of 410 Stainless Steel via Metal Area Additive Manufacturing: Sougata Roy1; Benjamin Shassere2; Jake Yoder3; Andrzej Nycz1; Mark Noakes2; Niyanth Sridharan3; Oak Ridge National Laboratory; 3MS Technology, Inc.; 3Virginia Tech

A-162: Microstructure and Mechanical Properties of Ti-6Al-4V Additively Manufactured with Electron Beam Freeform Fabrication: Samuel Present1; Karen Taminger1; Kevin Hemker1; 1Johns Hopkins University; 1NASA Langley Research Center

A-163: Properties and Microstructure of Additive Manufactured Carbon Steel: Shifeng Liu1; 1Xi’an University of Architecture and Technology

B-33: Zn-0.8Li Alloy with Superior Mechanical Properties and Ideal Degradation Rate for Biomedical Stents: Lu-Ning Wang1; 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 Samanta1; Charu Singh2; Kailol Mondal1; Amar Bhagat1; Monojit Dutta1; Shiv Brat Singh1; 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 Olugbade1; Chang Liu1; Jian Lu1; 1City University of Hong Kong

C-16: Mechanical Testing and Tomography of Crack Development in 5XXX Aluminum Service Material: Benjamin Palmer1; Visweswara Gutla1; John Lewandoski1; 1Virginia Tech; 2Case Western Reserve University; 3University of Manchester

C-17: Replicating Corrosion in Gas Turbine Engines: Abigail Ackerman1; 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 Thammaiah1; Norman Richards2; William Caley1; 1University of Manitoba

ELECTRONIC MATERIALS

General Poster Session — Electronic Materials

Monday PM | February 24, 2020
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D-30: Facile Microwave Synthesis of Size-tunable CdSe Quantum Dots for Industry and Solar Cell Applications: Jacob Strimalitis1; Taliya Gunawansa2; Sangram Pradhan3; Messaoud Bahoura1; 1Norfolk State University

ENERGY & ENVIRONMENT

General Poster Session — Energy & Environment

Monday PM | February 24, 2020
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E-66: Effect of Additives on the Electrochemical Performance of the Cathodes based on Pure Oxygen Redox Reaction: Yong Joon Park1; Si Yeol Lee1; 1Kyonggi University

E-67: Numerical Modeling of an Active Magnetic Regenerator Device for the Assessment of Promising Magnetic Refrigerants: Huseyin Ucar1; Durga Paudyal2; 1California State Polytechnic University, Pomona; 2Ames Laboratory

E-68: Simulation of Heating Profiles of Various Magnetic Fluids in Alternating Magnetic Fields: Brittany Williams1; Huseyin Ucar1; Durga Paudyal2; 1California State Polytechnic University, Pomona; 2Iowa State University

E-69: Sound Wave Induced Agglomeration of Ultra-fine Particles for Efficient Filtering: Hyo-Soo Lee1; 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 Rezaie1; Boniface Fokwa1; Juchen Guo1; 1University of California, Riverside

LIGHT METALS

General Poster Session — Light Metals

Monday PM | February 24, 2020
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F-62: Effect of Heat Treatment on Bending Performance of Extruded 6082 Aluminum Alloy T Profiles: Mehmet Güner1; Osman Halli Çelik1; Mert Altay2; Cem Mehmetalioğlu1; 1ASAS Aluminium

F-65: Screw Gradient Continuous Casting and High-Throughput Characterization: Jingyuan Li1; 1University of Science and Technology Beijing

F-64: Pyramidal 60°c+a 62 Cross-slip Mediated Ductility in Mg Alloys: Rasool Ahmad1; 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: Amarni Ksibi; 1Cea Cadarache
G-32: On the Computational Solution of Continuum Dislocation Dynamics: A Comparison of Two Stress Update Algorithms: Peng Lin1; Ben Anglin1; Clint Geller1; Anter El-Azab1; Vignesh Vivethanandan1; 1Purdue University; 2Naval Nuclear Laboratory

NUCLEAR MATERIALS

General Poster Session — Nuclear Materials

Monday PM | February 24, 2020
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H-67: Deformation Studies on Highly Irradiated RPV Steels using Advanced Instrumented Technique: Mikhail Solodov1; Maxim Gussev1; Robert Odetee1; 1Oak Ridge National Laboratory
H-68: Influence of Grain Size and Precipitates on Tellurium Corrosion Behaviors of GH3535 Alloy: Li Jiang1; Zhi Jun Li1; 1Shanghai Institute Of Applied Physics
H-69: Systematic Analysis on the Primary Radiation Damage in Th1-xUxO2 Fluorite Systems: Miaomiao Jin1; Chao Jiang1; 1Idaho National Laboratory
H-70: The Interaction between the Oxidation and Tellurium Corrosion in the Ni-based Superalloy: Zhijun Li1; 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: Novel Low-cost Magnesium Alloys with High Yield Strength and Plasticity: Peng Peng1; 1Chongqing University

F-39: Effect of Annealing on Microstructure and Mechanical Properties of Mg-6Al Alloy Plates Processed by Differential Speed Rolling: Honglin Zhang1; Zhigang Xu1; Sergey Yarmolenko1; Laszlo Kecskes1; Qinming Wei1; Jag Sankar1; 1North Carolina A&T State University; 2Johns Hopkins University; 3UNCC
F-40: Effect of Gradient Nanostructure on Microstructural and Mechanical Properties of AZ31 Magnesium Alloy under High Strain Rate: Yong Liu1; Meng Duan1; 1Key Laboratory of Lightweight and High Strength Structural Materials of Jiangxi Province. School of Mechatronics Engineering, Nanchang University
F-43: Effect of ZnO Nano-particle Addition and High Shear Process on Grain Refinement in the As-cast Magnesium: Kwangmin Choi1; Donghyun Bae1; 1Yonsei University
F-45: Grain Refinement Technology of Mg Alloy for Road Wheel Application: Jun Ho Bae1; Young Hoon Moon1; Bong Sun You1; Ha Sik Kim1; 1Korea Institute Of Materials Science
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 Vaughan1; Bilal Mansoor1; Robert Barber1; Ibrahim Karaman1; Rainer Eiffer1; H.J. Maier1; 1Texas A&M University; 2Texas A&M University at Qatar; 3Leibniz Universitat Hannover
F-48: Influence of Manganese on Deformation Behavior of Magnesium Under Dynamic Loading: Ryutaro Goeda1; Masatake Yamaguchi1; Tatsuya Nakatsui1; Naoko Ikeo1; Toshiji Mukai1; 1Kobe University; 2Japan Atomic Energy Agency
F-50: In-vivo Performance of Bioabsorbable BioMg 250 Mg Alloy Implants: Raymond Decker1; 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 Li1; 1Washington State University
F-52: Microstructure and Mechanical Properties of Mg-65n Alloy Processed by Differential Speed Rolling: Kamil Majchrowicz1; Zbigniew Pakiela1; Pawel Jozwik1; Zbigniew Bojar1; 1Warsaw University of Technology, Faculty of Materials Science and Engineering; 2Military University of Technology, Faculty of Advanced Technologies and Chemistry
F-53: Preparing Magnesium Alloys for Electron Backscatter Diffraction: Tracy Berman1; 1University of Michigan
F-56: Quantifying Dislocation Behavior in Mg Using a Phase Field Dislocation Dynamics Model Multiple Active Slip Planes: Claire Weaver1; Abigail Hunter1; Shouzhi Xu1; Anil Kumar1; Irene Beyerle1; 1University of California, Santa Barbara; 2Los Alamos National Laboratory
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**F-57: Sol-gel Based Lanthanum Phosphate Coating on Magnesium Alloys for Corrosion Resistance:** Jithu Jayaraj; Ashitha P. P.; Suja P.; A Srinivasan; K. G. Raghu; U. T. S Pillai; 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; 1Northwestern Polytechnical University

**F-59: The Application of Hydrogen-containing Phase Diagram Calculations on the Design of Mg-RE Hydrogen Storage Alloy:** Qun Luo; Qian Li; Kuo-Chih Chou; 1State Key Laboratory of Advanced Special Steel & Shanghai Key Laboratory of Advanced Ferrometallurgy & School of Materials Science and Engineering, Shanghai University; 2Materials Genome Institute, Shanghai University; 3Shanghai University

**F-60: The Study ofGalvanic Corrosion of Magnesium Alloy from the Perspective of Work Functions:** Chen Tao; Yuan Yuan; Pan Sheng; 1Chongqing University

**F-61: Thermomechanical Processing of Dilute Mg-Zn-Ca Alloys:** Jenna Krynicki; Laszlo Kecskes; Suhas Eswarappa Prameela; Zhigang Xu; Timothy Weilfs; 1Johns Hopkins University; 2MATSYS, Inc.; North Carolina A&T State University

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**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; Jinbao 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; 1University of California, Berkeley

**H-12: Ab-initio Thermodynamics of Molten Salts:** Nicholas Winner; Mark Asta; 1University of California, Berkeley

**H-13: Characterization of LiCl-KCl Eutectic and LiCl-KCl+H2O Mixtures Using Electrochemical Impedance Spectroscopy:** Liliun Swain; Gurudas Pakhui; Sudhasasawta Ghosh; Bandi Prabhakara Reddy; 1Indira Gandhi Centre for Atomic Research, Kalpakkam, Tamil Nadu

**H-14: Effect of Mn and Zn Inhibitors on the Corrosion of Incoloy 800H in the MgCl2-KCl Molten Salt:** Yuxiang Peng; Ramana Reddy; 1University of Alabama

**H-15: Electrochemical Impedance Spectroscopic Study of Oxide Scales on 316L Stainless Steel in Molten FLiNaK Salt:** Jie Qiu; Peter Hosemann; Digby Macdonald; John Scully; 1University of California, Berkeley

**H-16: Hot Corrosion Behavior of Ni Based Inconel 939 Superalloy in Molten Salt:** Ali Hemmasian Ettfeagh; Congyun Zeng; Shengmin Guo; 1Louisiana State University

**H-17: LIBS Investigation of Molten Salt Corrosion:** William Pondere; Kristian Myhre; Stephen Raiman; 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; Michael Simpson; 1University of Utah

**H-19: Molten Salt Electrolysis of Alkaline-earth Elements Using Liquid Metal and Alloy Electrodes:** Thomas Nigl; Timothy Lichtenstein; Yuran Kong; Hojong Kim; 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; Yi Xie; Phillip Halstenberg; Mingyuon Ge; Xianghui Xiao; Yachun Wang; Wah-Keat Lee; Lingfeng He; Shannon Mahurin; Yu-Chen Karen Chen-Wiegart; 1Department of Materials Science and Chemical Engineering, Stony Brook University; 2Advanced Characterization Department, Idaho National Laboratory; 3Chemical Sciences Division, Oak Ridge National Laboratory; National Synchrotron Light Source - II, Brookhaven National Laboratory; National Synchrotron Light Source - II, Brookhaven National Laboratory; National Synchrotron Light Source - II, Brookhaven National Laboratory and Department of Materials Science and Chemical Engineering, Stony Brook University

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**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; Shih-Kang Lin, National Cheng Kung University; Chao-Hong Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing University; Jiehao Lee, Hongi University; Zhi-Qian 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 Hasseeb, 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:** Hwanoowk Lee; Minkyu Shin; Yongwoo Kwon; 1Hongi University

**D-11: CALPHAD-assisted Analyses of BOF Slag Recovery:** Han-Yu Wang; Wan-Yu Huang; Yung-Chang Liu; Kuan-Ju Lin; Shih-kang Lin; 1National Cheng Kung University; 2China Steel Corporation

**D-12: Comparison of Oxide Reduction Temperature between Highly <111>-Oriented Nanotwinned Cu and Regular Cu Films:** Weiyou Hsie; Cheng-Syuan Wu; Chi-Shen Lee; Chih Chen; 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 Huang; Kwang-Lung Lin; 1National Cheng Kung University

**D-14: Effects of Plating Current Density on the Microstructure of Cu Pillars and Its Solderability:** Pei-Zu Lee; Ying-Syuan Wu; Cheng-Yu Lee; Wei-Ling Chou; Hung-Cheng Liu; 1National Taiwan University; 2Yuan Ze University; 3Kinsus Interconnect Technology Corporation

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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 Lee2; Tsai-Tung Kuo2; Cheng-En Ho3; Yuan Ze University; 2Taiwan Uyemura Limited Company

D-16: From Current-induced Lattice Strain to Electromigration Occurrence: an In-situ Study: Kuan-Hsueh Lin1; Yu-chen Liu1; Shih-kang Lin1; Ching-Shun Ku2; Shang-Jui Chiu2; National Cheng Kung University; 2National Synchrotron Radiation Research Center

D-17: Interfacial Reaction of Au-xAg/Al Couples: Chiao-Yi Yang1; Kuo-Jung Chen2; Hsien-Ming Hsiao3; Yee-Wen Yen1; Department 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 Lin1; Yi-Pin Wu2; Yee-Wen Yen1; National Taiwan University of Science and Technology

D-19: Interfacial Reactions in the Cu/Sn/Ni Sandwich Couples: Cheng-Han Lee1; Shih-Jung Chai1; Yee-Wen Yen1; National Taiwan University of Science and Technology

D-20: Interfacial Reactions in the Sn/Au-xCu Couples: Po-Cheng Kuo1; Chia-Yi Yeh1; Hsien-Ming Hsiao3; Yee-Wen Yen1; Department 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 Au: Chiao-Yi Yang1; Kuo-Jung Chen2; Wallace Chuang3; Eckart Schellkes2; Yee-Wen Yen1; National 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 Tsai1; Fan-Yi Ouyang1; National 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 Marnavi, 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-21 (Digital): Evidence of Radiation Enhanced Diffusion via In-situ Ion Irradiation of Yttria Stabilized Zirconia Nanoparticles: Nathan Madden1; Khalid Hattar1; Jessica Krogstad1; University of Illinois at Urbana-Champaign; 2Sandia National Laboratories

H-22 (Digital): Helium Irradiation Induced Ultra-high Strength Nanotwinned Cu with Nanovoids: Cuncal Fan1; Qiang Li1; Jie Ding1; Yanxiang Liang2; Zhongxia Shang1; Jin Li1; Ruizhe Su1; Jaehun Cho1; Di Chen1; Yongqiang Wang2; Jian Wang3; Haiyan Wang4; Xinghang Zhang1; 2Purdue University; 3University of Nebraska, Lincoln; 4University of Houston; 5Los Alamos National Laboratory

H-23: Coupled Electronic and Nuclear Stopping Effects on Damage Accumulation in SiC: Lauren Nuchols1; Miguel Crespillico1; Chen Xu1; Yanwen Zhang2; William Weber2; 1University of Tennessee; 2Oak Ridge National Laboratory

H-24: Damage Evolution in Apatite Irradiated with Alpha Emitters: Dee Jay Cerico1; Frederico Garrido1; Cécile Gautheron1; Lech Nowicki1; Cyril Bachelet1; Jérôme Bourcioux1; Sandrine Picard1; Aurelie Gentils1; 2CSNM, Université Paris-Sud-CNRS; 3Geosciences Paris-Sud, Université Paris-Sud-CNRS; 4National Centre for Nuclear Research

H-25: Deep Ion Implantation at the 88-Inch Cyclotron: Sarah Stevenson1; Peter Housman1; Lee Bernstein1; Andrew Voyles1; Saryu Fensin1; 2University of California, Berkeley; 3Lawrence Berkeley National Laboratory; 4Los Alamos National Laboratory

H-26: Defect Clustering in Irradiated Alpha Uranium: Cluster Dynamics Modeling and Ion Irradiation Experiments: Fabia Farlin Athena1; Sanjoy Majumder1; Tiankai Yao1; Lingfeng He2; Anter El-Azab3; 4Purdue University; 2Idaho National Laboratory

H-27: Defect Ordering in Yttria Stabilized Zirconia under 45 MeV Ion Irradiation: David Madden1; Eric Lang1; Shannon Murray1; Neal Allain1; Daniel Shoemaker1; Khalid Hattar1; Jessica Krogstad1; University 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 Kim1; Jeonghyun Lee1; Ji Hyun Kim1; 2Ulsan National Institute of Science and Technology

H-29: Electronic Effects in Molecular Dynamics Simulations of Ion Irradiation of SiC: Eva Zarhoudoula1; 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 Yao1; Lingfeng He2; Anter El-Azab3; 4Purdue University; 2Idaho National Laboratory

H-31: Gamma-radiation Induced Corrosion of Copper: Inna Soroka1; Mats Jonsson1; 2KTH

H-32: Ionization Induced Changes in Carbon Bonding of Graphite: John Demaree1; Lenore Miller1; Zhiping Luo1; Daryush Ila1; 2CCDC Army Research Laboratory; 3Fayetteville State University

H-33: Irradiation Behavior of Piezoelectric Materials for Nuclear Reactor Sensors Applications: Maha Yazbeck1; Gaofeng Sha1; Joel Hatch1; Cole Harlow1; Aleksandr Chernatsynsky1; Joshua Daw2; Marat Khafizov3; 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 Thomas1; Alejandro Figueroa1; Lingfeng He2; Xiang Liu2; Daniel Murray2; Peter Kenesei3; Jonathin Almer4; Jason Harper4; Maria Okuniewski1; 2Purdue University; 3Idaho National Laboratory; 4Argonne National Laboratory

H-35: XCT Characterization of Neutron Irradiated SiC-SiC Composites: Jose Arregui-Mena1; Takaaki Koyanagi1; Gyanender Singh1; Christian Deck1; Yu-tai Katoh1; 2Oak Ridge National Laboratory
H-36: Combined In-situ Ion Irradiation and In-situ Nanomechanical Testing for Characterizing Helium Pre-implanted 304 Stainless Steel. Ce Zheng1; David Franzer1; Peter Hosemann1; Djamel Kaoumi2; 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 Li1; 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. Carl Rommes1; 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 Simian1; Han Weizhong1; Xi’an Jiaotong University

H-41: Elucidating the Role of Dispersoids on the Bulk and Nanomechanical Properties of Dispersion-strengthened W Alloys Following Ion Irradiation with in-situ Characterization: Eric Lang1; Quentin Rizzardi1; Robert Maass1; Jean Paul Allain2; 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 Morrall1; Sierra DetalRova1; Russell Doerner1; Matthew Baldwin1; 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 Bar1; Patrick Price1; Nathan Heckman1; Brad Boyce1; Khalid Hattar1; 1Sandia National Laboratories

H-44: Generalized Dislocation Mobility Law for BCC FeCrAl Alloys: Sanjoy Mazumder1; Raven Maccione1; Yash Pachau1; Janelle Wharry1; Anter El-Azab1; Tomohisa Kumagai1; 1Purdue University; 2Central Research Institute of Electric Power Industry, Japan

H-46: How to Improve an Irradiation-simulation Testbed: Younggak Shin1; Sanghyuk Yoo1; Keonwook Kang1; Byeongchan Lee1; Kyung 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 Radiguet1; Auriane Etienne1; Cristelle Pareige1; Nariman Enikeev2; Constantinos Hatzoglo1; Maria Vrellou1; Julia Ivansenko1; 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 Gentils1; Celine Cabet1; 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 Agrawal1; Andy Nelson1; Steven Zinkle1; 1University of Tennessee and Oak Ridge National Laboratory; 2Oak Ridge National Laboratory; 3University of Tennessee

H-51: Ion Irradiation Effects on the Microstructure of PM-HIP Inconel 625: Caleb Clement1; Janelle Wharry1; Xiang Liu1; Megha Dubey1; David Gandy1; 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 Clark1; Suveen Mathaudhu1; Samuel Briggs1; Robert Dowding1; Jason Trelewicz1; 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 Pamiés1; Alexander Gottberg1; 1TRIUMF

H-54: Mechanical Response of FeCr Alloys under Thermal Aging and Irradiation: Pengchong Zhu1; Yajie Zhao1; Shradha Agrawal1; Steven Zinkle1; 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 Gentils2; Maria Ganchenkova3; Amir Gumarov4; Igor Yanilkin4; Iskander Vakhitov4; Igor Golovchanskiy4; Igor Shchetinin4; Lenar Tagirov4; Vladimir Borodin4; 1CSNSM, Univ Paris-Sud, CNRS/IN2P3, Université Paris-Saclay and National Research Nuclear University MEPhI; 2CSNSM, Univ Paris-Sud; 3CNRS/IN2P3, Université Paris-Saclay; 4National Research Nuclear University MEPhI; 5Kazan Federal University; 6University of Science and Technology MISIS; 7Zavoisky Physical-Technical Institute, FRC Kazan Scientific Center of RAS; 8NRC Kurchatov Institute and National Research Nuclear University MEPhI

H-56: Modeling Slip-induced Crack Initiation in Nickel Containing Nano-scale Helium Bubbles: Tung Yan Liu1; Michael Demkowicz1; 1Texas A&M University

H-57: Molecular Dynamics Simulation of Irradiation Damage in Disordered Alloys with Ordered Precipitation: Shijun Zhao1; 1City University of Hong Kong

H-58: Neutron Radiation Induced Patterning of Fe-Cr System: A Phase-field Approach: Bohyun Yoon1; Jeongwhan Lee1; Kunok Changi1; Kyung Hee University

H-60: Radiation Damage Mechanisms in the Oxides Formed on Zr Alloys: Junliang Liu1; Guanzhe He1; Anamul Mir2; Jing Hu3; Stephen Donnelly3; Meimei Li4; Sergio Lozano-Perez1; Chris Grovenor3; 1University of Oxford; 2University of Huddersfield; 3Argonne National Laboratory

H-61: Radiation Tolerance in Stabilized Alumina Coatings: an In-situ Irradiation Study: Matteo Vanazzi1; Davide Loiacono2; Wei-Ying Chen1; Meimei Li1; Marco G. Beghi1; 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 Salvador1; Yiwei Sun2; Trevor Clark3; Khalid Hattar3; Sina Shahrezaei1; Suveen Mathaudhu2; 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 Wang1; Xiang Liu1; Daniel Murray1; Fei Teng1; Mukesh Bachhav1; Wen Jiang1; Lingfeng He1; Cheng Sun1; Ziqi Xiao2; Xian-Ming Bai3; John Jackson3; Robert Carter1; 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 Reid1; Lauren Garrison2; Yutai Katoh1; 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 Niggehalli, New Jersey Institute of Technology; Anming Hu, University of Tennessee; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Yong Hu, University of Tennessee; Lei Huang1; Lingyue Zhang1; Quanhong Chang1; 1Oak Ridge National Laboratory

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Session Chair: Pooran Joshi, Oak Ridge National Laboratory

E-52: Characterization of Wasted LEDs from Tubular Lamps Focused on Recycling Process by Hydrometallurgy: Rafael Oliveira1; Amilton Botelho Junior1; Denise Espinosa1; 1University of São Paulo

E-53: Comprehensive Utilization of Vanadium Extraction Tailings: A Brief Review: Xin Wang1; Junyi Xiang1; Jiawei Ling1; Qingyun Huang1; Xuwei Lv1; 1College of Materials Science and Engineering, Chongqing University; 2College of Metallurgical and Materials Engineering, Chongqing University of Science and Technology

B-27: Characterization of Rubber Seed Oil Modified for Biolubricant Feedstock Application: Farouk Mohammed1; Isiaka Bakare1; Felix Okieimen2; 1Rubber Research Institute of Nigeria; 2University of Benin

B-29: Effect of Post-Deposition Annealing on the Structural and Optical Properties of Sputter-Deposited Ga2O3 Thin Films: Nanthakishore Makeswaran1; 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 Titanium Alloys for Biomedical Application: Anna Majchrowicz1; Agata Roguska2; Malgorzata Lewandowska2; 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 Luo1; Lijuan Xiang1; Ruyi Yang1; Yang Li1; 1Yangtze Normal University

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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Session Chair: Mingming Zhang, ArcelorMittal Global R&D

B-28: Comprehensive Characterization of TiO2 Modified for Biomedical Application: Jihui Luo1; Lijuan Xiang1; Ruyi Yang1; Yang Li1; 1Yangtze Normal University

B-33: Preparation and Uniformity Analysis of Sol-Gel TiO2 Thin Films: Jihui Luo1; 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

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 Wang1; Govindasamy Man1; 1National Taiwan University Of Technology

D-24: Hierarchical Porous Graphene Microsphere Ink for Printed Microsupercapacitors: Quanhong Chang1; Lei Huang1; 1Shanghai Normal University

D-25: Printed Flexible Sensors Functionalized with TiO2 Nanowires for Room Temperature CO2 Gas Sensing: Lingyue Zhang1; Anming Hu1; Yongchao Yu1; 1University of Tennessee, Knoxville

D-26: Processing of Bistable Composites with Embedded Mechano-electrical Transduction for Filtered Mechanosensing: Hortense Le Ferrand1; 1Université de Nantes

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 Martinez1; Samih Hossain1; Jessy Nemati1; Niggehalli Ravindra1; 1New Jersey Institute of Technology

D-29: Effect of Post-Deposition Annealing on the Structural and Optical Properties of Sputter-Deposited Ga2O3 Thin Films: Nanthakishore Makeswaran1; Anil Krishna Battu1; C.V. Ramana1; 1University Of Texas, El Paso

D-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

D-31: Nanotubular Oxide Layers Enhancing Biological Potential of Titanium Alloys for Biomedical Application: Anna Majchrowicz1; Agata Roguska2; Malgorzata Lewandowska2; 1Warsaw University of Technology; 2Institute of Physical Chemistry of the Polish Academy of Sciences

D-32: Preparation and Uniformity Analysis of Sol-Gel TiO2 Thin Films: Jihui Luo1; Lijuan Xiang1; Ruyi Yang1; Yang Li1; 1Yangtze Normal University

E-52: Characterization of Wasted LEDs from Tubular Lamps Focused on Recycling Process by Hydrometallurgy: Rafael Oliveira1; Amilton Botelho Junior1; Denise Espinosa1; 1University of São Paulo

E-53: Comprehensive Utilization of Vanadium Extraction Tailings: A Brief Review: Xin Wang1; Junyi Xiang1; Jiawei Ling1; Qingyun Huang1; 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: Gengqiang Fan1; Jundan Tan1; Run Zhan2; Jie Dang2; Chenguang Bai1; Chaowen Tan; Huxu Lei1; Chongqing University

E-55: Gravity Separation of Zinc Mine Tailing Using Wilfley Shaking Table to Concentrate Hematite: Jonathan Tenório Vinhal1; Raquel Hungaro Costa2; Amilton Botelho Junior2; Jorge Tenório1; Denise Espinosa1; 1University of Sao Paulo; 2USP

E-56: Hydrothermal Regeneration of Cycled LiFePO4 Cathode Material from Spent Lithium Ion Batteries: Qiankun Jing1; Yubo Liu1; Bao Liu1; Jiangle Zhang1; Chengyan Wang3; 1University of Science and Technology, Beijing

E-57: Minimization of Copper Contamination in Steel Scrap: Hungaro Costa1; Bao Liu1; Jialiang Zhang1; Chengyan Wang3; 1University of Science and Technology, Beijing

E-58: Recycling Corrugated Cardboard: Boon-Chai Ng1; Joshua Lim1; 1Andrews University

E-59: Recycling of Blast Furnace Flue Dust with In-flight Reduction Technology: Reduction Behavior and Kinetic Analysis: Jin Xu1; 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 Ho1; 1RIST

E-61: Residual Quarry Sludge Stabilization to Prefabricate Spent Lithium Ion Batteries: Yan Xi1; 1University of Science and Technology, Beijing

E-62: Selective Recovery of Lithium from Ternary Spent Lithium-Ion Batteries using Sulfate Roasting-water Leaching Process: Di Chang1; 1Central South University

E-63: Separation and Recovery of Zinc and Cobalt from Zinc Plant Residue by Alkali Leaching: Guihong Han1; Yangbo Geng1; Yuhun Huang2; Zuoqi Ma1; Yanfang Huang3; Weijun Peng1; 1Zhengzhou University

E-64: Study on Mineral Phase Pospomization and Viscosity of Hot Metal Pretreatment Desulfurization Slag Based on Factsage: 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 Xi1; 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 Li1; 1University of California, San Diego

G-30: Iron Response in Extreme Compression and Tension Regimes: Complementary NIF and Janus Experiments: Gaia Righi1; 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; Jianyang Huang, Michigan Technological University; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atlim University; Tao Jiang, Central South University; Jesse White, Elkem Carbon AS; Morsi Mahmoud, King Fahd University of Petroleum and Minerals

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Session Chairs: Ender Keskinilic, Atlim University; Jesse White, Elkem Carbon AS

M-1: A Multi-zone Equilibrium Model for Using Secondary Raw Materials in the Silicon Furnace: Kai Erik Erostrem1; Gabriella Tranelli1; 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 Furnace: Avinash Kandalam1; Jörg Kleeberg2; Michael Stelter3; Markus Reuter4; 1TU Bergakademie Freiberg; 2Helmholtz Institute Freiberg for Resource Technology

M-5: Analysis of Post-combustion Behavior on O2 Gas Injection in Converter Process: Ji-A Lee1; Jae-Hoe Kwon1; Kyeong-UK Lee1; Chang-Su Ha1; Jeong-Whan Han1; 1Inha University; 2POSCO

M-6: Characterization and Treatment of Electric Arc Furnace Dusts Generated During Steel Production in Peruvian Industries: Mary Gomez-Marroquin1; José Carlos D’Abreu2; Roberto de Avillez2; Sonia Letichevsky3; 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 She1; Chengxin Liu1; Hong Yu1; 1Wuhan Institute of Technology; 2Helmholtz Institute Freiberg for Resource Technology

M-8: Drying Characteristic of Artificial Magnesite Pellet: Hanzuan Zhang1; 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 Dong1; Guang Wang1; Hao Zhang1; Jingsong Wang1; Qinggao Xue1; 1University of Science and Technology, Beijing; 2Delong Steel Limited

M-11: Effect of Slag-conglomerating Agent on Melting Properties of Desulfurized Slag in Hot Metal Pretreatment: Wufeng Jiang1; Tomfei Ma1; Suji 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 Yan1; Yuanying Wu1; Qiangqiang Wang1; Shengping He1; Qian Wang1; 1Chongqing University

M-14: Experimental Research on Gasification Dephosphorization with Coke Powder Reducing Converter Molten Slag: Chenxiao Li1; 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 Li1; 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; Junwei Han; Wei Liu; Wenqing Qin; Fen Jiao; 1Central South University

M-17: Feasibility Research of Steel Scrap Melting in Multifunctional Hot Metal Ladle: Shuai Deng; Anjun Xu; Fei Yuan; 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; Zhang Tingan; Yan Liu; Peilin Chen; 1Northeastern University

M-19: Gasification Behaviors of Biomass with Vanadium Titanomagnetite as Oxygen Carrier: Wei Cai1; 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; Pengjie Liu1; Tingfang Jian1; Leizhang Gao1; Meiling Hu1; 1Chongqing University

M-21: Influence of Process Parameters on the Metal Quality at Electron Beam Melting of Molybdenum: Katia Vutova1; Vania Vassileva1; Vladislava Stefanova1; Maria Naplatanova1; 1Institute Of Electronics, Bas; 2University of Chemical Technology and Metallurgy

M-22: Influence of Rotation Speed and Temperature on Dissolution Rate of Cr2O3 in Ti-bearing Blast Furnace Slag: Peng Zhang1; Guibao Qiu1; Bing Yang1; Jiang Wang1; 1Chongqing University

M-23: In-situ Electrical Conductivity Measurements During Slag Cooling: Ling Zhang1; Annelies Maltfiel1; Bart Blanpain1; Muxing Guo1; 1KU Leuven

M-25: In-situ Investigation of Iron Ore Stock Pile during its Stacking and Reclaiming Process: Wen Pan1; Zhi-peng Kang1; Xia Zhao1; Yaqing Luo1; 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 Chen1; Nan Wang1; 1Northeastern University

M-28: Preparing Cupsidine Glass-ceramics from Iron-removed Stainless Steel Pickling Sludge: Guanghui Li1; Jian Wang1; 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 Wang1; Wei Liu1; Junwei Han1; Xin Wang1; Zihan Li1; Wenqing Qin1; 1Central South University

M-32: Reduction Kinetics of Oxidized Magnetite Briquettes in Ca-atmosphere: Bayaraa Sarataanbazar1; Guanghui Li1; 1Central South University

M-34: Research of Gas-liquid Multiphase Flow in Oxygen-enriched Bottom Blowing Copper Smelting Furnace: Dongbo Li1; Zeshang Dong1; 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 Zhang1; Xiaojian Wu1; Gele Jing1; Yunqing Tian1; Haoyu Cai1; 1Shougang Group

M-39: Study on Coal Injection Evaluation Method in Blast Furnace: Dongming Wang1; 1Shougang Group

M-40: Study on Distribution of Sulfur Element in Blast Furnace Process with Different Pellet Ratios: Wenxiang Deng1; Lingling Zhang1; Daqiang Cang1; 1University of Science and Technology Beijing

M-41: Study on Tuayer Coke Deterioration in the Super Large Blast Furnaces: Weichun Zhu1; 1Shougang Group

M-42: Super-gravity Field Enrichment of Silver and Antimony Contained in Pb-Ag-Sb Melts: Xiaoqun Weng1; 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 Souza1; Joao Vidal1; Nathall Mello1; Eduardo Broch1; 1Pontificial Catholic Universidade de Rio de Janeiro

M-44: Synthesis of Porous Graphite by Dealloying of Silicon Carbide: Gino Greenidge1; 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 Yan1; Chao Luo1; Hui Li1; Jingqiong Liang1; 1College of Metallurgy and Energy, North China University of Science and Technolo; 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 Jin1; 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 Megahed1; 1Honeywell Aerospace; 2Esi Group

K-3: 3D Characterization of Nano-scale Precipitates in Shape-memory Alloys: Dexin Zhao1; Tejas Umale1; Jobin Joy2; 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 Zhao1; Kornelius Nielsch1; Thomas Woodcock1; 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-Lebdeh1; Tobi Kalejaiye1; Sameer Hamoush1; Vincent Lambert1; 1North Carolina A&T State University

K-6: Characterizing the Influence of Microstructure on Twin Nucleation in Ferroelastic Ceramics: Charles Smith1; 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 Mededovic\(^1\); Patrick O’Hara\(^1\); Anton Paar USA

K-8: Determination of Strains in Clear Teeth Aligners for Orthodontics: Ning Ye\(^2\); Susan Mantell\(^1\); Alex Fok\(^1\); \(^1\)University 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 Gwalani\(^1\); Arun Devaraj\(^1\); \(^1\)Pacific Northwest National Laboratory

K-10: Imaging Microplasticity Events by Combining High Energy Diffraactive Microscopy and Bragg Coherent Diffraactive Imaging: Matthew Wilthin\(^1\); Anthony Rollett\(^1\); \(^1\)Carnegie Mellon University

K-11: Precipitation of Tetragonal \(-\)MnAl in a Twinned Rhombohedral \(\alpha\)\(_{\text{Mn}}\) Matrix: an EBSD Study: Thomas G. Woodcock\(^1\); Florian Bittner\(^1\); \(^1\)IFW Dresden

K-12: Slip and Twinning of Commercial Pure Titanium during In-situ Tensile Test: Joo-Hee Kang\(^1\); Hye In Jung\(^1\); Ji Hoon Kim\(^2\); Chang-Seok Oh\(^2\); \(^1\)Korea Institute of Materials Science; \(^2\)Pusan National University

K-15: Thermal Corrections for Glebee Right Circular Cylinder Compression Tests: Kevin Severs\(^1\); Ravi Shah\(^1\); Vikas Saraf\(^1\); \(^1\)Allegheny Technologies Incorporated (Ati)

K-16: Thermo-mechanical Simulation of Steam Turbine Blade with Spark Plasma Sintering Developed NiCrCoTiAlW-Ta Superalloy Properties: Olugbenga Ogundiyi\(^1\); Tshwane 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 An\(^2\); Zhi Li\(^2\); Hahn Choo\(^3\); \(^1\)University of Tennessee; \(^2\)Oak Ridge National Laboratory

K-18: Understanding Deformation Mechanisms in a Low Ni/Co Alloy: Bharat Gwalani\(^1\); Govindarajan Muralidharan\(^2\); Dean Pierce\(^1\); Jonathan Poplawsky\(^1\); Donovan Leonard\(^1\); Libor Kovarik\(^1\); Arun Devaraj\(^1\); \(^1\)Pacific Northwest National Laboratory; \(^2\)Oak Ridge National Laboratory

K-19: Understanding the Deformation Mechanisms and Phase Transformations in High Alloy Metastable Austenitic Steels: Stefan Martin\(^1\); Christianne Ullrich\(^1\); Mykhaylo Motylenko\(^2\); David Rafaja\(^2\); \(^1\)TU Bergakademie Freiberg

J-1: Electrochemical Characterization of Advanced High Strength Steel DP 780 MPa: Abraham Escalona Gómez\(^1\); Marisol Delgado Espino\(^1\); María del Refugio Lara Banda\(^1\); Facundo Almeraya Calderón\(^1\); \(^1\)Universidad 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 Park\(^1\); Seok Su Sohn\(^1\); Taejin Song\(^1\); Hyung Seop Kim\(^1\); Sungkuk Lee\(^1\); \(^1\)Pohang Inst of Sci & Tech (POSTECH); \(^2\)Korea University; \(^3\)POSCO

J-4: Producing a 1200 MPa Complex-phase Advanced High Strength Steel: Renan Lima\(^1\); Kester Clarke\(^2\); Amy Clarke\(^2\); F.T.F Tolomelli\(^2\); Fernando Rizzo\(^2\); \(^1\)Pontificia Universidade Católica do Rio de Janeiro (PUC-RIO); \(^2\)Colorado School of Mines; \(^3\)Companhia Siderúrgica Nacional, Rodovia

J-6: The Effect of Alloy Elements on the Peritectic Range of Low-carbon Steels: Thermodynamic Calculation and High Temperature DSC Measurement: Qingfeng Ren\(^1\); Sung Il Baik\(^1\); Bruce Krakauer\(^1\); David Seidman\(^1\); \(^1\)Northwestern University; \(^2\)AO Smith Corportate

J-7: Transformation Kinetics in a Trip Steel during the Plastic Deformation by Tension and Compression: Jose Pacheco\(^1\); Pedro Garcia\(^1\); Yadir Solano\(^1\); Leslie Espino\(^1\); Jorge Navarro\(^1\); \(^1\)DICIM UASLP; \(^2\)TecNM, Instituto Tecnológico de Morelia, División de Estudios de Posgrado e Investigación; \(^3\)TecNM, 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: Jinchiro 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, Ryukyu University; Hye In Jung, Yonsei University; Hiroyuki Shibata, Imram, Technology Laboratory; David Alman, National Energy Technology Laboratory; 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 Parra\(^1\); Antoine Allanore\(^1\); \(^1\)Massachusetts Institute of Technology
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 Orłowska1; Piotr Bazarnik1; Zygmunt Szulc2; Malgorzata Lewandowska3; 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 Nanostructured MoS2: Kory Burns1; 1University of Florida

N-2: Scalable Synthesis of Graphene Quantum Dots and Its Application in Bioimaging: Vijayesh Kumar1; Abhay Sachdev1; 1CSIO-Delhi, India

N-3: Synthesis of Mesoporous Metal-Silicates via Silicate-Exfoliation on Metal Hydroxides: Hong-Ping Lin1; Hsiien-Ming Hsiao1; 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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K-21 (Invited): Enhanced Stability and Carrier Transport Quality of a-CsPbI3 Perovskite Nanocrystals with Reduced Graphene Oxide: Hong Lin1; Qi Zhang2; 1Tsinghua University

K-22: Biinspired Ceramic Monoliths from Freeze-Casting for Filtration Applications: Sean Garner1; Zhixiong Li1; Doheon Lee1; Dimitri Deheyn2; Joanna McKittrick1; 1University of California, San Diego

K-23: Evaluation of the Incorporation of Marble and Granite Residue in Coating Mortars: Ezebio Zanelato1; Jonas Alexandre2; Afonso Azevedo2; Markssuel Marvila3; Gustavo Xavier4; Sergio Monteiro1; 1UENF; 2UFF; 3UCAM; 4IME

K-24: Influence of Construction and Demolition Waste Incorporation in Concrete: Antônio Macedo1; Ezebio Zanelato1; André Manhães2; Afonso Azevedo2; Markssuel Marvila3; Jonas Alexandre4; Sergio Monteiro1; Lucio Petruccci1; 1UCAM; 2UENF; 3UFF; 4IME

K-25: Manufacturing and Characterization of Ceramics Made of Kaolinite, Clay and Sewage Sludge from the Anodizing Industry: Andrés Ramírez1; Mauricio Correa2; Henry Colorado3; 1Universidad de Antioquia

K-26: Microstructure Characterization of Annealed Polycrystalline YIG Samples Prepared from the Sol-gel Method Using 2d EBSD: Minji Kim1; Minsun Jang1; Youngkyun Son1; Kisuk Lee2; Sukbin Lee3; 1Ulsan National Institute of Science and Technology

K-27: Polymer Fibers from Waste Tires and Sugar Cane Molasses for Soil Improving: Juan Jimenez-Hoyos1; Henry Colorado2; 1Universidad de Antioquia

K-28: Preparation of Lithium and Terbium Doped Yttrium Borate: Xiaoling Tan1; 1Northeastern University

K-29: Preparation of Na4V2O7 Powder by Solid-state Reaction: Guishang Pei1; Junyi Xiang1; Zhongci Liu2; Dapeng Zhong3; Feifei Pan4; Xuewei Lv1; 1Chongqing University

K-30: Preparation of YBO3:Ce3+ Film via Impregnation-lifting Method and Its Photoluminescence Property: Hongen Nian1; 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 Tao1; 1Northeastern University

K-32: Synthesis of Silicate Zinc Bioceramic via Mechnanochemical Technique: Sorour Sadeghzade1; Rahmatollah Emadi2; Fariborz Tavangarian3; 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 Pinheiro1; Anthony Oliveira2; Andrea Lima3; 1Military Institute of Engineering

M-50: The Synchronous Suppression - Reduced Dispersion Behaviors of Regulators on Micro Fine Ilmenite and Titanaugeite. Gui-xia Fan1; Taojin Wang2; Shi-Xiong Zhang3; Yi-Jun Cao4; Peng Li5; 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 Mendeleev, Ames Laboratory; Bryce Meredith, 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. Qi-Kuang Luo1; Elizabeth Holm2; Chen Wang3; 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 Thomas1; Mohsen Asle Zaeem2; 1Colorado School of Mines

L-3: An Improved Collocation Method to Treat Traction-free Surfaces in Dislocation Dynamics Simulations. Abu Bakar Siddique1; Tariq Kharesh2; 1University of New Mexico

L-4: Classifying Atomic Environments by the Gromov-Wasserstein Distance. Satoshi Kawanow1; Jeremy Mason2; 1University of California, Davis

L-5: Coupled Light Capture and Lattice Boltzmann Model of TiO2 Micropillars Array for Water Purification. Pegah Mirabedini1; Agnieszka Truskowska2; Duncan Ashby3; Masaru P. Rao4; P. Alex Greaney5; 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 Guo2; Jian-Ping Wang3; 1University of Minnesota

L-7: Machine Learning Driven Functionally Graded Material Designs for Mitigation of Thermally Induced Stress. Zhizhou Zhang1; Zeqing Jin2; Kahraman Demir3; Grace Gu4; 1Department of Mechanical Engineering, University of California, Berkeley

L-8: Methods to Simulate Grain Boundary Diffusion in Bicrystals and Polycrystals. David Page1; Katie Varela2; Oliver Johnson3; David Fultzwood4; Eric Homer5; 1Brigham Young University

L-9: Numerical Simulation for Microstructural Evolution in Solidification Process using CFD-CA (Cellular Automata) Coupled Method. Wonjoo Lee1; Yuhyeong Jeong2; Chanhee Won3; Jae-Wook Lee4; Howon Lee5; Seong-hoon Kang6; Johnhun Yoon7; 1Hanyang University; 2Korea Institute of Materials Science

L-10: PyMob: Software for Automated Assessment of Atomic Mobilities. Katrin Abrahams1; Irina Roslyakova2; Ingo Steinbach3; 1Ruhr University Bochum

L-11: Randomness at Scale: Properties of Bulk Nanostructured Materials from Stochastic Representative Volume Elements. Styler Mays1; Katherine Moody2; Mujan Seif3; John Balk4; Matthew Beck5; 1University of Kentucky

L-12: Simulation of Compressive Stress-strain Curve for Additive Manufactured Ti6Al4V Cuboctahedron Cellular Structure. Dhinakar Annadurai1; Chen Jhean-Kuang2; 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 Nabavizadeh1; Mohsen Eshraghi2; Sergio Felicelli3; 1University of Akron; 2Department of Mechanical Engineering, California State University

L-14: Uncertainty Propagation in CalPhaD Calculations. Nicholas Ury1; Richard Otis2; Vilupanur Ravi3; 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 Kabani1; Pál Jóvári2; Ju Wang3; Mark Adam Webb4; Ning Chen5; Jacques Darpentigny6; 1IFW Dresden, Germany; 2Wigner Research Centre for Physics, Budapest, Hungary; 3Canadian Light Source, Saskatoon, Canada; 4Laboratoire Léon Brillouin, CEA-Saclay, France
K-39: Analysis of 8° (Cu4Ti) Precipitation during Isothermal Aging of a Cu-4wt.%Ti Alloy: Victor Lopez-Hirata1; Felipe Hernandez-Santiago2; Maribel Saucedo-Muñoz1; Jose Villegas-Cardenas1; Erika Avila-Davila1; 1Instituto Politecnico Nacional-ESISIE; 2Universidad Politecnica del Valle de Mexico; 3Tecnologico Nacional de Mexico/Instituto Tecnologico de Pachuca

K-40: Analysis of The Effect of Marine Salinity in Durability of Red Ceramics Calculated In Different Temperatures: Markussel Marvila1; Afonso Azevedo1; Maiyanne Souza1; Euzébio Zanelato1; Jonas Alexandre1; Gustavo Xavier1; Sergio Monteiro1; Carlos Mauricio Vieira1; Geovana Delaquila1; 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 Garcez1; 2Univ Redentor

K-42: Analysis of the Performance of Applied Tire Residues in Concrete Pavements: Luana Demosthenes1; Michelle Oliveira1; Fabio Garcia1; Fernanda Luz1; Fabio Braga1; Leandro Demosthenes1; Lucio Nascimento1; Sergio Monteiro1; 2Instituto Militar de Engenharia; 1UFAM

K-43: Application of Nanoparticles of ZnO and ZnO-doped-Ag in Polymeric Blend of HMSPP/SEBS for Biocide Activity: Luz Kornats1; Washington Oliani1; Camila Oliveira1; Vijaya Rangari1; Duclerc Parra1; 1Nuclear and Energy Research Institute; 2Uskegey University

K-44: Ballistic Behavior of Walnut Shell Composite: Larissa Nunes1; Raphael Henrique Reis1; Michelle Oliveira1; Sergio Monteiro1; 1Military Institute of Engineering

K-45: Ballistic Evaluation of Reinforced Composites with Mauve / Jute Hybrid Fabric for Ballistic Armor: Luana Demosthenes1; Michelle Oliveira1; Fabio Garcia1; Artur Pereira1; Fernanda Luz1; Wendell Bezerra1; Ulisses Costa1; Sergio Monteiro1; Lucio Nascimento1; 2Instituto Militar de Engenharia

K-46: Ballistic Test of Multilayered Armor with Intermediate Polymer Composite Reinforced with High Concentration of Fique Fabric: Artur Camapo Pereira1; Fernanda da Luz1; Fabio Garcia Filho1; Ulisses Costa1; Michelle Oliveira1; Luana Demosthenes1; Wendell Bezerra1; Sergio Monteiro1; 2Military Institute of Engineering

K-47: Characterization and Metallurgical Performance of Titangarnet: Gang Li1; Xuwei Lu1; Xiangeng Zhou1; Guibao Qiu1; 1Chongqing University

K-48: Characterization by FTIR of Oxidized Pyrrargyrite with Sodium Sulfide: Yessica Paulina Gómez Espinosa1; M Reyes Perez1; Elia Guadalupe Palacios Beas2; J. C. Juárez Tapia1; M Perez Labra1; Ivan A. Reyes Dominguez1; Mizraim Uriel Flores Guerrero1; Victor Estaban Reyes Cruz1; 1Universidad Autonoma del Estado de Hidalgo; 2Instituto Politecnico Nacional; 3Universidad Autónoma de San Luis Potosí; 4Universidad Tecnológica de Tulancingo.

K-49: Characterization by FTIR of Sphalerite Obtained in the Floation without Collector in the Presence of Ferric Iron: José Antonio Granados Oliver1; M Reyes Perez1; Aislinn Michelle Teja Ruiz1; Francisco Raúl Barrientos Hernández2; M. Pérez-Labra1; J. C. Juárez Tapia1; José Angel Cobos-Murcia1; Elia Guadalupe Palacios Beas2; 1Universidad Autónoma del Estado de Hidalgo; 2Instituto Politecnico Nacional

K-50: Characterization of a Brazilian Kaolin for Its Use in the Controlled Release of Isoniazid: Maria Valenzuela1; Jessica Arjona1; Bianca Michel1; Tatiana Costa1; Thamyres Cardoso1; Gilmar Pinheiro1; Margarita Bobadilla1; Roberto Neves1; 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; Vinicius Macedo Brito Medeiros1; Maria das Graças Silva Valenzuela2; Francisco Rolando Valenzuela Díaz2; 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 Azevedo1; Daiane Cecchini1; Naiáde Luiz1; Vasco Cruz2; Markssuel Marvila1; Euzébio Zanelato1; Sergio Monteiro1; Gabriela Morais1; Jonas Alexandre3; 1Fluminense Federal University; 2Universidade de Evora; 3UCAM; 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 Pereira1; Miriam Lucia Machado1; Suzan Casarim2; Leonardo Silva1; Mauro Álvares1; 1Instituto De Pesquisas Energéticas E Nucleares - IPEN; 2Univ. Presbiteriana Mackenzie; 3Aser Porto Ferreira

K-54: Characterization of Hydrogels for Release of Cosmetic Assets Containing Nanoemulsions Of Mandelic Acid in Different Concentrations of Pseudoboehmite: Leila Miranda1; Isabella Terezinha Barbosa1; Terezinha Masson1; Antonio Munhoz Junior1; Leonardo Andrade e Silva1; 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.T.K Microcapsules: Fernanda Santos da Luz1; Francisco Valenzuela-Díaz2; Maria das Graças Silva-Valenzuela2; Wang Hui1; Jessica Arjona1; 1Polytechnical School - Usp

K-56: Izod Impact Test Of Epoxy Composites Reinforced with Arapaima Scales: Wendell Bruno Almeida Bezerra1; Ulisses Oliveira Costa1; Fernando Santos da Luz2; Michelle Souza Oliveira2; Luana Cristyne Da Cruz Demosthenes3; Fabio Da Costa Garcia Filho3; Sergio Neves Monteiro3; 1Instituto Militar de Engenharia

K-57: Chemical and Mineralogical Characterization of a Cuprite-margyrite Ore and Proposal of Elimination of Semimetals by Alkaline Bath: Aislln Teja Ruíz1; Kinardo Flores Castro1; M. Perez Labra1; Martin Reyes Perez2; Elia G. Palacios Beas1; Victor Esteban Reyes Cruz2; Julio Cesar Juárez Tapia2; 1Instituto Politécnico Nacional; 2Universidad Autónoma del Estado de Hidalgo

K-58: Chemical Characterization and Mineralogical Analysis of Mining-metallurgical Tailing from the State of Morelos: Iván Martínez Soto1; Aislln Michelle Teja Rúiz2; Martín Reyes Pérez3; M. Pérez-Labra3; Victor Reyes Cruz3; José Angel Cobos-Murcia1; Gustavo Urbano Reyes1; Julio Cesar Juárez Tapia2; 1Universidad Autónoma del Estado de Hidalgo

K-59: Thermal Characterization and Mineralogical Analysis of Mining-Metalurgical Tailing from the State of Morelos: Iván Martínez Soto; Aislln Michelle Teja Rúiz; Martín Reyes Pérez; M. Pérez-Labra; Victor Reyes Cruz; José Angel Cobos-Murcia; Gustavo Urbano Reyes; Julio Cesar Juárez Tapia; 1Universidad Autónoma del Estado de Hidalgo

K-60: Crystallization Kinetics and Mechanical Properties of Zr-Cu-Al-Sm Metallic Glasses and Their Nanocomposites: Huseyin Cerici1; Ilkay Katay1; 1Cankaya University

K-61: Determinations of Trace and Ultra-Trace Level Contaminants in Advanced Materials Using Electrothermal Vaporization ICP-OES: Abbas Fahami; Karol Putyera; 1Eurofins EAG Materials Science LLC

K-62: Development and Characterization of a Luminescent Coating for Asphalt Pavements: Elhin Gutierrez; Henry Colorado; 1Universidad Antonio Nariño; 2Universidad de Antioquia

K-63: Development and Characterization of CoCrCuFeNiTiAl High Entropy Alloys: Ilkay Katay1; Huseyin Cerici1; 1Cankaya University

K-64: Development of Non-equiaxial High Entropy Alloys for High Temperature Applications: Ilkay Katay1; 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: Héctor Dorantes-Rosales1; Maribel Saucedo-Muñoz1; Nicolas Cayetano-Castro2; Erika Avila-Davila2; 1Instituto Politecnico Nacional-ESIQIE; 2Instituto Tecnológico 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 Mingsheng1; Jing Zhang1; Xuecheng Gong2; Yong Lei3; 1China University of Petroleum - Beijing; 2The University of Western Australia. Perth; 3X-ray Science Division, Argonne National Laboratory

K-67: Effect of Different Ti-Sn Intermetallic Compounds Addition on Synthesis of Ti2SnC by Self-propagating High-temperature Combustion Technique: Hongyan Sun1; Xin Kong1; Guiyang Liu1; 1Hohge University

K-68: Effect of Martensite Reorientation Deformation on the Evolutions of Crystallographic Textures and Lattice Strains of NiTi Wire: Xiangguang Kong1; Shijie Hao1; Hong Yang1; Zhen Sun1; Yinong Liu1; Yang Ren1; Changfeng Chen1; Lishan Cui1; 1Instituto Federal de Pachuca; 2IFPA; 3IME-RJ; 4UCAM; 5UFV

K-69: Dynamic Mechanical Behaviour of Lean Duplex Stainless Steel 2101: Eng Yeo1; Ali Ameri1; Juan Escobedo-Díaz1; 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 Luz1; Fabio Garcia Filho1; Luana Demosthenes3; 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 Oliveira1; Luana Demosthenes3; 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 Arjona1; Maria das Graças Silva-Valenzuela2; Bianca Micheli1; Tatiana Costa1; Gilmar Pinheiro1; Thamyes Cardoso1; Francisco Valenzuela-Díaz1; 1Universidade De Sao Paulo

K-73: Capillary Absorption Evaluation of Different Mortars Applied in Civil Construction: Afonso Azevedo1; Maríusquell Marvila1; Juliana Pessanha1; Euzébio Zanelato1; André Manhães1; Sergio Monteiro1; Leonardo Pedrotti1; Beatriz Mendes1; Niander Cerqueira1; Victor Souza1; 1Fluminense Federal University; 2UFEN; 3UCAM; 4IME; 5UFV

K-74: Evaluation of the Impedance of Shock MulltiLayer Armoring with Epoxy Matrix Composite Reinforced with Fibers of Mallow and Hybrid Fabric of Jute and Mallow: Lucio Nascimento1; Sergio Monteiro1; Ulisses Costa1; Fernanda Luz1; 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: Edwilsson Oliveira Filho1; Veronica Candido1; Roberto Fujiyama1; Jean Rodrigues1; Sergio Monteiro1; 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 Oliveira1; Larissa Nunes1; Luana Demosthenes1; Wendell Bezerra1; Sergio Monteiro1; 1Instituto Militar de Engenharia


K-78: Characterization of Bentonite Beneficiation Residue for Use in Structural Ceramics: Larissa Maia dos Santos1; Vinicius Macedo Brito Medeiros1; Maria das Graças Silva Valenzuela2; Francisco Rolando Valenzuela Díaz2; Orley Magalhães de Oliveira1; 1IFBA - Instituto Federal da Bahia; 2Politécnica da Universidade de São Paulo
K-78: Experimental Validation of Molecular Dynamics Simulation Results of Copper Single Crystal in Oriented Torsion: Sergio Monteiro; Fabio Garcia Filho; Fernanda da Luz; Military Institute of Engineering

K-79: Fique Fabric with Surface Reinforcements Produced from Natural Graphite: Michelle Oliveira; Fabio Garcia Filho; Fernanda da Luz; Artur Pereira; Wagner Pinheiro; Sergio Monteiro; Instituto Militar de Engenharia

K-80: Functionalization of Curauá Fibers with Graphene Oxide: Ulisses Costa; Lucio Fabio Nascimento; Julianna Magalhães Garcia; Fabio Garcia Filho; Fernanda Santos da Luz; Sergio Neves Monteiro; Wagner Anaceto Pinheiro; Wendell Bruno Almeida Bezerra; Military Institute of Engineering

K-81: Functionalization of Plassava Fibers with Graphene Oxide: Fernanda da Luz; Fabio Garcia Filho; Ulisses Costa; Michelle Oliveira; Luana Demothenes; Artur Pereira; Wendell Bezerra; Sergio Monteiro; Military Institute of Engineering, IME

K-82: Fundamental Study on Wettability of Pure Metal by Liquid Sodium: Jun-Ichi Saito; Hideo Shibutani; Yohei Kobayashi; Atomic Energy Agency; Kurume Institute of Technology, National Institute of Technology, Maizuru College

K-83: Graphene Oxide Functionalization in Curauá Fiber/Epoxy Composites: Toward Tensile Properties: Ulisses Costa; Lucio Fabio Nascimento; Julianna Magalhães Garcia; Fernanda Santos da Luz; Fabio Garcia Filho; Wendell Bruno Almeida Bezerra; Wagner Anaceto Pinheiro; Sergio Neves Monteiro; Military Institute of Engineering

K-84: High Strain Rate Nanoindentation of Single Crystalline Metals: Wesley Higgins; George Phar; Texas A&M University

K-85: How Small Molecules Can Trigger the One-way Effect in Shape Memory Polymers: Axel Marquardt; Klaus Neuking; Gunther Eggeler; Ruhr University Bochum

K-86: How to Measure High-temperature Heat Capacity Reliably by Drop Calorimetry: Guishang Pei; Junyi Xiang; Xuewei Lv; Lilian Yang; Gang Li; Dapeng Zhong; Feifei Pan; Chongqing University

K-87: Improvement Properties of Polypropylene by Graphene Oxide Incorporation: Tatiane Tatei; Marcio Andrade; Eric Fontes; Renan Moreira; Rene Oliveira; Francisco Valenzuela-Diaz; Vijaya Rangari; esperidiana Moura; Nuclear and Energy Research Institute; University of Sao Paulo; Tuskegee University

K-88: Incorporation of Coke Dust Gas (FGD) in Redes Ceramics: Victor Barbosa De Souza; Daniel Gallo; Nander Cerequio; Uni Redentor

K-89: Incorporation of the Light Green Clay into Textile Polyamide Residues Properties: Mariana Sartori; Dione Castro; Francisco Valenzuela-Diaz; Leonardo Silva; Nuclear and Energy Research Institute; Escola Politecnica

K-90: Influence of Adiabatic Shear Bands on the Ballistic Resistance of High Hardness Armor Steel: Suzane Oliveira; Ricardo Weber; Andersan de Paula; Sergio Monteiro; Elson Souza; Pedro Passaline; João Miguez Suarez; IME

K-91: Influence of Pmma Chemical Degradation in Ethanol: Karolyne Monsores; Géssica Nicolaú; Anderson Oliveira; Suzane Oliveira; Ricardo Weber; Instituto Militar de Engenharia

K-92: Influence of Sealing Mortar in the Strength of Compression of the Structural Masonry Ceramic: Markssuel Marvalí; Afonso Azevedo; Jonas Alexandre; Rafael Oliveira; Michelle Oliveira; Euzébio Zanolato; Sergio Monteiro; Universidade Estadual do Norte Fluminense Darcy Ribeiro; IFF; UFES; IME

K-93: Influence of the Reduced Graphene Oxide Incorporation on Properties of Acrylonitrile Butadiene Styrene (ABS): Bianca Santos; Robson Costa; Andre Inácio; Suellen Bartolomei; Karina Carmo; Taise Silva; Rene Oliveira; Esperidiana Moura; Nuclear and Energy Research Institute

K-94: Influence of UV Radiation in a Composite of Epoxidic Matrix Reinforced with Hybrid Epoxy: Ulisses Costa; Lucio Fabio; Julianna Magalhães Garcia; Michelle Souza Oliveira; Fabio Garcia Filho; Fernanda Santos da Luz; Sergio Neves Monteiro; Luana Demothenes; Wendell Bruno Almeida Bezerra; Military Institute of Engineering

K-95: Influence of UV Radiation in The Ballistic Behavior of a Composite of Epoxidic Matrix Reinforced with Hybrid Epoxy: Ulisses Costa; Lucio Fabio Nascimento; Fabio Garcia Filho; Fernanda Santos da Luz; Julianna Magalhães Garcia; Anderson Oliveira da Silva; André Ben-Hur Figueiredo; Michelle Souza Oliveira; Sergio Neves Monteiro; Military Institute of Engineering

K-96: Investigation of Flame Propagation in Nanocomposites with Expanded Polystyrene Recycled, Clay, Gypsum and Titanium Dioxide: Suellen Bartolomei; Robson Costa; Esperidiana Moura; Helio Wiebeck; University of Sao Paulo; Ipen

K-97: In-situ Annealing and Orientation Mapping Studies of Deformed Multiphase Materials: Magdalena Bieda-Niemiec; Anna Jarzewska; Marek Faryna; Institute 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; Naouel Hezil; Karima Abderrahim; Mohamed Abdul Samad; Alex Montagne; Alberto Mejias; Alain Lost; Stephania Kosman; Timofey Chekalkin; Sabine Weiss; Aleskei Obrosov; Abbas Laghrour University; Surface Engineering Laboratory (LIS), Badji Mokhtar University; KFUPM; Arts et Metiers ParisTech; Research Institute of Medical Materials, Tomsk State University; Department 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 Bartolomei; Robson Costa; Karina Carmo; Bianca Santos; Suellen Bartolomei; Rene Oliveira; Esperidiana Moura; Nuclear and Energy Research Institute

K-100: Investigations on Flotation Separation of Scheelite from Calcite and Fluorite Using ZT as Depressant: Tiantian Wang; Hongxin Zhang; Yanfang Huang; Guihong Han; Jongtian Liu; Zhengzhou University; Zhengzhou Institute of Multipurpose Utilization of Mineral Resources

K-101: Iron Ore Fines Granulation in a New High-speed Mixing Granulator: Shanshan Wu; Xuewei Lv; Zhongci Liu; Chongqing University

K-102: Leaching of Pre-oxidized Pyrargyrite With Na2s2o5: Vicente Gonzalez Martinez; Isabel Hernandez Martinez; Reyes Perez; Perez; Perez Labra; C. J. Juarez Tapia; Ivan A. Reyes Dominguez; Mirela Uriei Flores Guerrero; Gustavo Urbano Reyes; Universidad Autonoma del Estado de Hidalgo; Universidad Autonoma de San Luis Potosi, Instituto de Metalurgia; Universidad Tecnologica de Tultancingo. Area de Electromecanica Industrial

K-103: Magnetic and Microstructure Properties of Co-doped Rapidly Solidified Ni50Mn25-xCoxGa25 Heusler Alloys: Imadddin Al-Omari; K. Meghana; D. K. Satapathy; T. Adhikary; S. Aich; Sultan Qaboos University; Indian 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 Tamura; Marcio Andrade; Mariana Arantes; Karina Carmo; Bianca Santos; Rene Oliveira; Esperidiana Moura; 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; Ulisses Costa; Clara Caminha; Fábio Braga; Lucio Nascimento; Sergio Monteiro; 1Instituto Militar de Engenharia

K-106: Microstructural Characterization of a Metallic Fabric: Suzane Oliveira; Karollyne Monsoreis; Anderson da Silva; Gessica Nicolaui; Pedro Passalín e; Débora Alves; Ricardo Weber; 1IME

K-107: Microstructural Transformations in a High Hardness Armor Steel, After Ballistic Test with a 7.62 AP: Suzane Oliveira; Karollyne Monsoreis; Anderson da Silva; Gessica Nicolaui; Ricardo Weber; 1IME

K-108: Observation of Topological Defects in Synthetic Antiferromagnets with Inverted Dzyaloshinski-Moriya Interaction: Nisrit Pandey; Maxwell Li; Marc De Graef; Vincent Sokalski; 1Carnegie Mellon University

K-109: Orientation-induced Variability Range in Indentation-measured Elastic Modulus of Molecular Crystals: Alexandra Burch; John Yeager; David Bahr; 1Purdue University; 2Los Alamos National Laboratory

K-110: PALF Reinforced Epoxy Composite Applied in a Rigid Armor System: Fernanda da Luz; Fabio Garcia Filho; Michelle Oliveira; Ulisses Costa; Luana Demothenes; Artur Pereira; Wendell Bezerra; Sergio Monteiro; 1Military Institute of Engineering; 2IME

K-111: Preparation of Lithium Ion Battery Anode Materials from Precipitation Flotation Product: Huahanuan Mao; Wenyuan Wang; Yanfang Huang; Guihong Han; 1Zhejiang University

K-112: Preparation of Vanadium Powder by Thermal Reduction: A Review: Daping Zhong; Xuewei Lv; Junyi Yang; Zhongli Liu; Guishang Pei; Wuan Gu; 1Chongqing University; 2Sichuan University

K-113: Processing and Characterization of Polyethylene-AgNPs Films – Biocide Effect: Washington Ollani; Luiz Komatsu; Ademar Lugao; Vijaya Rangari; DucTrac Parra; 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; Robson Costa; Danielle Araujo; Rene Oliveira; Vijaya Rangari; Francisco Valenzuela-Diaz; Esperidiana Moura; 1Nuclear and Energy Research Institute; 2University of São Paulo

K-115: Reducing and Restoring the Strength of Rocks with Periodic Behavior with Different Dosages: Zheeqing Jin; Xi-Cheng Zhang; 1University of Rochester

K-116: Resistance and Durability of Pressed and Burned Blocks of Red Ceramics with Humidity Variation: Nionder Cerqueira; Afonso Azevedo; Victor Souza; Daniel Gallo; 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: Nionder Cerqueira; Victor Souza; 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: Zheeqing Jin; Xi-Cheng Zhang; 1University of Rochester

K-119: Solder Cup Wire Insertion Study: Shelley Williams; Lisa Deibler; Rebecca Wheeling; 1Sandia National Laboratories

K-120: Statistical Analysis Applied to Ceramic Pellets Produced with (Al2O3 + Nb2O5 + LiF) at Different Temperatures with Different Watermills: Luana Demothenes; Fabio Garcia; Michelle Oliveira; Fernanda Luz; Leandro Demothenes; Sergio Monteiro; 1Instituto Militar de Engenharia; 2UFAM

K-121: Study of Fe-doped- KNN Ceramic as Multifunctional Material: Fernando Badillo; Henry Colorado; Alvaro Herrera; Sebastian Amaya; Adriana Echarvarria; 1Universidad de Antioquia

K-122: Study of Styrene Effect on Non-radiation Grafting of Vinyl Benzy Chloride on to Polyethylene-based Anion Exchange Membrane: Di Huang; Jiann-Yang Huang; Zhichao Chen; 1Michigan Technological University; 2Fitianbao Environmental Protection Company

K-123: Study of Thermal and Mechanical Properties of Geopolymers: Alisson Silva; Verónica Candido; Sérgio Monteiro; 1Universidade Federal do Pará; 2Military Engineering Institute

K-124: Study on the Effect of Ultraviolet Radiation on Interfacial Resistance Between Polypyramide Thermostat Resin: Anderson da Silva; Karollyne Monsoreis; Suzane Oliveira; Gessica Nicolaui; Pedro Passalini; Ricardo Weber; Sérgio Monteiro; 1Military Institute Engineering

K-125: Study on the Separation of Zinc and Iron in Electric Arc Furnace Baghouse Dusts and Its Kinetics: Zhaoran Wang; Chengcheng Huo; Yuhong Zha; Canhua Li; 1Anhui University of Technology

K-126: Synthesis and Characterization of Batio3 Doped with Eu3+ by the Reaction Solid State Method: Juan Pablo Hernandez Lara; Miguel Perez Labra; Francisco Raul Barrientos Hernandez; Jose Antonio Romero Serrano; Aurelio Hernandez Ramirez; Martin Reyes Perez; Julio Cesar Juzuer Tapia; Aislin Michelle Teja Ruiz; Victor Esteban Reyes Cruz; Jaret del Carmen Ramirez Castellanos; 1Acetym-Uaseh; 2ESIGIE-IPN.

K-127: Synthesis and Characterization on Copper Oxide Anode of Lithium-Ion Battery: Xuechun Han; Shuzhen Yang; Huina Sun; Yanfang Huang; Guihong Han; 1Zhejiang University

K-128: Synthesis of a Synthetic Clay for the Use of Controlled Isoniazid Release Systems: Thamyres de Carvalho; Pinheiro Gilmar; Arjona Jessica; Valenzuela Maria das Graças; Hildebrando Edemarino; Neves Roberto; Valenzuela-Diaz Francisco; 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 Suo; Yang Li; Xiong Xiao; Guishang Pei; 1Chongqing University

K-130: Thermal and Mechanical Properties of Iron-actinides Intermetallic Compounds Existing in Metallic Phase of Fuel Debris: Daisuke Okada; Yuji Ohishi; Hiroaki Mutta; Ken Kurosaki; 1Osaka University; 2Kyoto University

K-131: Thermal Behavior of Epoxidic Matrix Composites Reinforced with Graphene Oxide Functionalized Curaú Fibers: Ulisses Costa; Lucio Fabio Nascimento; Julianna Magalahes Garcia; Wagner Anacleto Pinheiro; Fernanda Santos da Luz; Fabio Garcia Filho; Sergio Neves Monteiro; Wendell Bruno Almeida Bezerra; 1Military Institute of Engineering

K-132: Thermal Characterization of Human Hair: Débora Alves; Ricardo Weber; 1Military Institute of Engineering

K-133: Thermal Characterization of Polymer Composites Reinforced with Sugarcane Bagasse Fiber: Verônica Scarpini Candido; Alisson Rios da Silva; Sergio Neves Monteiro; 1Universidade Federal do Pará; 2Military Engineering Institute
K-134: Viscosity Determination of Liquid Soaps Based on MMT: Maria das Graças da Silva-Valenzuela; Jéssica Arjona; Bianca Michel; Gilmar Pinheiro; Tatiana Costa; Francisco Valenzuela-Diaz; 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 Simonassi; Fabio Garcia Filho; Sergio Monteiro; 1Military Institute of Engineering

K-136: Wettability of Liquid Phase Caesium Compounds Against Metal Oxides Including UO, and ThO: Hiroto Ishii; Yuji Ohishi; Hiroaki Muta; Masayoshi Uno; Ken Kurosaki; 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 Yang; Kai-Ming Ho; Cai-Zhuang Wang; 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; 1Georgia Institute of Technology

L-17: Searching for Electrical Conductivity Tunable Organic Molecules for Single-molecule Electronics: Weiyi Zhang; Peter Greaney; 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; Z-Kui Liu, Penn State University

O-1 (Invited): Computational Simulation of Precipitation during Continuous Cooling of 6xxx Al-alloys: Bernhard Miesenberger; Ernst Kozeschnik; Benjmin Mikkelen; Erwin Povoden-Karadeniz; Christian Doppler Laboratory for Interfaces and Precipitation Engineering CDL-IPE; Institute of Materials Science and Technology; Mechanical Engineering and Marine Technology, University of Rostock

O-2: A Model Fusion Approach to Modeling Microstructure Development during Heat Treatment: Richard Couperthwaite; Raymundo Arroyave; Ankit Srivastava; Douglas Allain; Ibrahim Karaman; 1Texas A&M University

O-3: Atomistic Modeling of Austenite-ferrite Transformation Interface: Olha Nakonechna; Helena Zapolsky; Frederic Danoix; Mohamed Gouné; Didier Huin; Nicolas Charbonnier; University of Rouen Normandy; ICMCB, UPR CNRS 9048, University of Bordeaux; ArcelorMittal research SA, voie romaine, 57 280 Maizières Les Metz

O-5: Computational and Experimental Thermodynamics of Fe-Cr-Al-O Quaternary System: Can Agca; Jake McMurray; Joerg Neuvefeind; Alexandria Navrotsky; 1University of California, Davis; 2Oak Ridge National Laboratory

O-6: Computational Study of the Structure and Thermodynamics of GP Zones in Mg Alloys: Kang Wang; Du Cheng; Bi-Cheng Zhou; 1University of Virginia

O-8: Effect of Free Surface on Grain Growth by Monte Carlo Potts Model: Sokyun Hong; Kyung Jong Lee; 1Hanyang University

O-9: Engineering Improved Electron-emitting Materials: Examining the Desorption and Diffusion Behavior of Scandate Cathodes at Operating Temperature: Mujan Seif; Sydney Kolnsberg; 1Wright State University; 2Air Force Research Laboratory

O-10: First-principles Study of Substitutional Solute Diffusion along a Screw Dislocation in fcc Ni: Luke Wirth; 1Air Force Research Laboratory

O-11: Experimental and Modeling Studies Using Fe2O3 Doped Coke: Ziming Wang; Kejiang Li; Jianliang Zhang; Minmin Sun; Chunhe Jiang; Hongtao Li; 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; Zhun Yong Ong; Hiroto Kawai; Liling Zhang; Gang Wu; 1Institute Of High Performance Computing
O-14: Kinetics of Scrap Melting in Iron-carbon Bath: Menghe Liu1; 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 Zhao1; Bin Yang2; Liang Li3; 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 Nakao1; Eisuke Miyoshi1; Tomohiro Takaki1; 1Kyoto Institute of Technology

O-17: Multi-phase-field Modeling for Interaction of Moving Dendritic Particles: Namito Yamamoto1; Tomohiro Takaki1; Shinji Sakane2; 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 Xia1; Jason Liu1; Rodney Priestley1; Craig Arnold2; Mikko Haataja3; 1Princeton University

O-20: Phase-field Study on the Transformation of Lath Martensite in Steel: Mingyu Cha1; Pilryung Cha1; 1Kookmin University

O-21: Phase Field Modeling of Grain Boundary Grooving and Migration due to Electric Field and Thermal Gradient: Supriyo Chakraborty1; 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 Ramachandran1; Houloung Zhuang1; Klaus Lackner2; 1Arizona State University

O-24: Prediction of Permeability Tensor for Columnar Dendritic Structures: Phase-field and Lattice Boltzmann Simulations: Yasumasa Mitsuyama1; Tomohiro Takaki1; Shinji Sakane2; Yasushi Shibuta2; Munekazu Ohno3; 1Kyoto Institute of Technology; 2The University of Tokyo; 3Hokkaido University

O-25: Probing the Interactions Between Intersitial Hydrogen Atoms in Niobium Through Density Functional Theory Calculations: Arvind Ramachandran1; Houloung Zhuang1; Klaus Lackner2; 1Arizona State University

O-26: Reduction Kinetics Analysis of Fe2O3 in the Case of Carbon Precipitation: Yangxin Chen1; Liangying Wen1; Shengfu Zhang1; Jiao Cao2; 1Chongqing University

O-27: Role of Defects, Interfaces in FCC-BCC Massive Transformation in Iron Using Molecular Dynamics Simulation: Pawan Tripathi1; Somnath Bhowmick1; 1Indian Institute of Technology, Kanpur, India

O-28: Solute Partition at Solid-liquid Interface of Binary Alloy by Molecular Dynamics Simulation: Kensho Ueno1; Yasushi Shibuta2; 1The University of Tokyo

O-29: Study of Drying during Straight Grate Process and Its Factors - Analysis with CFD: Feng Cao1; 2Central South University

O-30: Studying the Nb-H System Using Density Functional Theory Calculations: Arvind Ramachandran1; Houloung Zhuang1; Klaus Lackner2; 1Arizona State University

O-31: Surface Diffusion in Metallic Glasses Using Atomistic Simulations: Ajay Annamareddy1; Paul Voyles1; John Perepezko2; Dane Morgan3; 1University of Wisconsin; 2Cornell University

O-32: Thermodynamic Stability and Kinetics of Nb3Ge, Nb3Al, and Nb3Ga A15 Phases: Ajinhya Hire1; Hannah Bayard1; Chris Orozco2; Biswas Rijal1; Lilong Zhu2; Ryan Porter2; Zeming Sun2; Matthias Liepe2; Michele Manuel1; Richard Hennig2; 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 Wei1; Xing Peng1; Zhao Hongliang1; Wang Chengyan2; Chen Yongqiang1; Guo Shumei2; Liu Fengqin3; Huang Teng4; 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 Luo1; Xinbin Deng1; Li Zhang1; Suliang Wang1; Zhongfeng Xie1; Xianyue Ren1; 1Yangtze Normal University

M-53: Ni/Mn Replacement in High-Ni Austenitic Stainless Cast Steels used for Turbo-charger: Jisung Yoo1; Won-Mi Choi2; Byeong-Joo Lee3; Yong-Jun Oh4; Gi-Yong Kim5; Sunghak Lee6; 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: Zhiyuan Gong1; Shishira Bhagavath1; Tim Wiggen2; Saurabh Shah1; Sebastian Marussi1; Shashidar Marathe1; Shyamprasad Karagadde2; Peter Lee3; 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 Shah1; Guiwu Lu2; 1China University of Petroleum-Beijing
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: Flexible Honeycombed Nanoporous/glassy Hybrid for Efficient Electrocatalytic Hydrogen Generation: Rui Li1; K.C. Chan1; Xiongjun Liu2; Z.P. Lu3; Hong Kong Polytechnic University; 2University of Science & Technology Beijing

N-49: Nano-engineered Hybrid Flywheels for High Energy Density and High Power Density: Jamshid Kavoshi1; Mohammad Naraghi1; Terry Creasy2; Alan Palazzolo3; Texas A&M University

N-50: Novel VS4 Nanorods Synthesized by a Facile Solvothermal Method for High Performance Electrochemical Capacitor Electrode: Jun-Kai Feng1; Jie Huang1; Hong-Yi Li1; Bing Xie1; Chongqing University

N-51: Solid-state Electrolytes for Lithium–selenium Disulfide Batteries with Enhanced Safety: Panpan Dong1; Xiaohui Zhang1; Younghwan Cha1; Min-Kyu Song2; School of Mechanical and Materials Engineering, Washington State University

N-53: Surface Composition of Cu@Ag Bimetallic Nanoparticles Tuned for Enhanced Oxygen Reduction Reaction: Youngtae Park1; Changsoo Lee1; Hyuck Mo Lee1; KAIST

N-55: High-performance Piezoelectric Nanogenerator Based on Electrospun Polymer for Powering Smart Wearables: Siddharth Sharma1; Indranil Lahiri2; Partha Roy3; Debrupa Lahiri4; IIIT Roorkee University

N-56: Interfacial Surface Chemistry Effect on Thermal and Electrical Conductivity of Carbon Nanotube-copper Composites: Farhad Daneshvar1; Atif Aziz2; Tan Zhang1; Hung-Jue Sue2; Mark Welland1; Texas A&M University; University of Cambridge

N-57: Optimized Optical Properties and Mechanical Assessment of AlN/SiO2 Nanomultilayers: Chelsea Applegate1; Andrea Hodge1; University of Southern California

N-58: Study of pH Influence in The Synthesis of Copper Nanoparticles Using Ascorbic Acid as Reducing and Stabilizing Agent: Thamiris Martins1; Botelho Junior1; Viviane de Moraes2; Denise Espinosa3; USP; 2Mauá Institute of Technology

N-59: The Effect of a Ripening Step in the Early Stages of WS2 Synthesis by Molecular Beam Epitaxy: Peter Litwin1; Costel Constantin2; Stephen McDonnell1; University of Virginia; James Madison University

N-60: Thermal Stability of Hafnium Zirconium Oxide on Transition Metal Dichalcogenides: Maria Gabriela Sales1; Shelby Fields1; Samantha Jaszewski2; Sean Smith2; Jon Ihlefeld2; Stephen McDonnell1; Department of Materials Science and Engineering, University of Virginia; Sandia National Laboratories
ADVANCED MATERIALS

General Poster Session — Advanced Materials

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J-137: Advanced Manufacturing of High Density Reactive Materials: Chris Haines1; 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: Nikolaus Bruno1; Ronald Neebe2; Alex Leary3; 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 Larimian1; Rajeev Kumar Gupta1; Varun Chaudhary2; Raju Ramanujan2; 1The University of Akron; 2School of Materials Science & Engineering, Nanyang Technological University; 3Nanyang Technological University

J-140: Influence of Solution Heat Treatment on the Microstructures and Mechanical Properties of TC4 Alloy Prepared by SLM: Shifeng Liu1; 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 Lit Lee1; J. Mi2; S. Ren3; S. Zhao4; J. Fan5; S. Khabra1; P. Grant1; 1UK Research and Innovation (STFC); 2University of Hull; 3Baosteel; 4University of Oxford

MATERIALS DESIGN

General Poster Session — Materials Design

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L-30: An Investigation on Improvement of the Mechanical Properties and Fatigue Life of Steel Cardan Shafts: Mehmet Kesiltemer1; Mehrdad Tasdelen1; 1Arkansas Tech University

L-31: Density Functional Theory Calculations Based on Investigation of Interaction between Multiple Hydroxamidine Ligands and La3+ Ion: Anindita Pal1; Tarun Kundu2; 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 Jiang1; Xiaoxu Wang1; Caiqun Wang1; Liutao Zhao1; 1Beijing Computing Center

L-33: Integrated Study of First-principles Calculations and Experimental Measurements for Hydrogen Effect on FCC to HCP Martensitic Transformation: Satoshi Illikubo1; Kenji Hirata2; Yui Kuroki2; Shoya Kawano1; Hiroshi Ohtani1; Motomichi Koyama1; Kaneaki Tsuzuki1; 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 Takemoto1; Yoshisige Okuno1; Kenji Nagata2; Junya Inoue2; Manabu Enoki2; 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 Terada1; Tesuo 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; Zhbin 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 Xiong1; 1Taiyuan University of Technology; 2Heaptech

M-85: Microstructural and Mechanical Properties of Pinch Rolls Fabricated by Horizontal Centrifugal Casting: Kyeongsoon Park1; 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 Betancourt1; Mahmood Mamivand1; 1Boise State University
POSTERS

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 Nian1; Rui Dai1; 1Arizona State University

N-62: Monodisperse Polystyrene Spheres: Studies on the Effects of Reaction Parameters on Particle Diameter and Colloidal Stability: Ikhuomafua Ifijen2; Esther Ikuhoria2; Aireguamen Aigbodion2; 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: Wiltor Bednarczyk1; Maria Watroba1; Jakub Kawalko1; Nong Gao2; Marco Starink6; Piotr Bala1; Terence Langdon2; 1AGH University of Science and Technology; 2University of Southampton

N-66: Wallpaper-inspired Approach to Create Wrinkles in a Single-layer Graphene: Won Il Park1; Sang Il Lee1; Jae Hyung Lee1; Dong Won Yang2; Jae Hyeok Shin1; Won Jun Chang1; 1Hanyang University

PHYSICAL METALLURGY

General Poster Session — Physical Metallurgy
Tuesday PM | February 25, 2020
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O-52 (Digital): Explaining the Martensitic Transformation by Optimizing the Strain: Félix Therrien1; 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 a-Fe and MnS: Wenting Lv1; Luchun Yan1; Xiaolu Pang1; Huisheng Yang1; Lijie Gao1; Yanjing Su1; Kewei Gao1; 1University of Science and Technology Beijing

O-54: Optimization of Oxidation Resistance and Mechanical Properties of Refractory High-entropy Alloys-futuristic Strategy: Saad Sheikh1; 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; Sivatsan 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 Farkas1; Roberto Piasniot2; 1Virginia Polytechnic Institute; 2Atomic Energy Comission, Argentina

J-16 (Invited): Stability of the Stress-induced Phase in a TiZrHfNbO.3 Refractory High-entropy Alloy: Xuesong Fan1; Michael Gao2; Xiehong Chen3; Zongyang Lyu1; Yan Chen1; Ke An4; Eran Greenberg5; Vatali Prakapenka6; Qiaoshi Zeng7; 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 Chen1; Chanho Lee1; Xuesong Fan1; Chuan Zhang1; Jim Hu2; 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 Yin1; Jun Ding2; Mark Asta1; Robert Ritchie2; 1University of California, Berkeley; 2Lawrence Berkeley National Laboratory

J-19: An Investigation into the Link Between Microstructure and Pitting Corrosion of Novel Alloy FBB8+Ti: Mark Wischhusen1; Carol Glover1; John Scully1; Peter Liaw1; 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 Yen1; Shi-Wei Chen1; 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 Hillel1; Yatir Linden1; Shai Salhov1; Malki Pinkas1; 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 Middleburgh1; Daniel King1; 1Nuclear Futures Institute; 2Imperial College London

J-23: Combinatorial Exploration of High Entropy Alloys: Sebastian Alexander Kube1; Sungwoo Sohn1; David Uhl1; Amit Datye1; Apurva Mehta1; Jan Schroers2; 1Yale University; 2Southern Connecticut State University; 3SLAC National Accelerator Laboratory

J-25: Concurrent TWIP-TRIP, Short-range Order and Strand Localization in Single-crystal NiCrCo Medium Entropy Alloy Drives Exceptional Mechanical Behavior: Sezer Picas1; Prashant Singh2; Aayush Sharma2; Yuri I. Chumlyakov2; Duane D. Johnson1; 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 Godlewiska; Marzena Mitroja-Krolatkowska; Jakub Czerski; Monika Jawanska; Sergei Gein; Ulrike Hecht; AGH UST; Access e.V.

J-29: Deformation Mechanisms of Two Stable Face-Centered Cubic High Entropy Alloys at Cryogenic Temperature: Feng He; Shaolou Wei; Zhijun Wang; C. Cem Tasan; City University of Hong Kong; Massachusetts Institute of Technology; Northwestern Polytechnical University

J-30: Design of Non-equiatomic Refractory High Entropy Alloys through Combination of Various Strengthening Mechanisms Towards Strength-ductility Synergy: Cheng Zhang; Benjamin MacDonald; Fengwei Guo; Yongwang Kang; Xiaochang Xie; Zhiqiang Fu; Yizhang Zhou; Enrique Lavernia; Department of Materials Science and Engineering, University of California, Irvine;

J-31: Designing New Corrosion Resistant High Entropy Alloys with Exceptional Strength-ductility Synergy and Good Weldability: Saurabh Nene; Sanya Gupta; Rajiv Mishra; University of North Texas

J-32: Direct Production of High Entropy Alloy Powders: Jawad Hoidari; Kinaitel Pty Ltd.

J-34: Effect of AI on Microstructure, Hardness, and Corrosion Performance of Al-Cr-Fe-Mn Alloys: Jarrod Gesuadili; Cameron Blanchard; Hojung Kim; The Pennsylvania State University

J-35: Effect of Heat Treatment on the Microstructure and Mechanical Properties of AlCrFeNiCu High Entropy Alloy: Nicholas Malatij; Rudolf Kanyane; Thabo Lengopeng; Patricia Popoola; Sisa Pityana; Tswane University of Technology

J-36: Effect of Mn in CrCoFeNiMn High Entropy Alloy on Creep Performance: Kyle Rozman; Martin DETROIS; Paul Jablonski; Michael Gao; Jeffrey Hawk; National 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-Sarraf; Mitra Shaban; Garrett Pataky; Paul Jablonski; Amir Poursaeae; Clemson University

J-38: Engineering Atomic-level Complexity in Complex Concentrated Alloys: Hsu Chao; Shih-Chieh Chao; Ti NbTaZr-based High-entropy Alloys for Biomedical Applications: Shih-Chieh Chao; Kuan-Cheng Lai; Po-Yu Chen; National Tsing Hua University

J-39: Enhanced Irradiation Resistance Through Phase Transformation in NiFeCoCrCu HEA Film: Li Jiang; Yuan Xu; Wen Zhang; Min Wang; University of Michigan

J-40: Evaluation of Microstructural and Mechanical Properties of AlCrFeMnNi High Entropy Alloys: Nicholas Malatij; Khuma Masemola; Patricia Popoola; Tswane University of Technology

J-41: Evolution of Texture during Thermo-mechanical Processing of High Entropy Alloy (HEA): Shi Hoon Choi; Min-seong Kim; Lalit Kaushik; Jaiveer Singh; Sunchon National University

J-43: Friction Stir Processing: A Microstructural Modification Technique for Complex Concentrated Alloys: Anumal Sithitho; Jadzia Graves; Madhumanti Bhattacharyya; Indrajit Chait; Rajiv Mishra; University of Idaho; University of North Texas

J-44: Grain Size Dependent Entropy-driven Phase Transformation in High Entropy Oxides: Alexander Dupuy; Xin Wang; Julie Schoenung; University of California, Irvine

J-45: Impact of Interstitial Alloying on Stacking-fault Energies in High-entropy Alloys from First Principles: Yuji Ikeda; Jörg Neugebauer; Fritz Körmann; Max-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 Mehtra; Yongho Sohn; University of Central Florida

J-47: Internal Oxidation of Refractory MoWTaTiZr HEA Using Periodic DFT and Atomistic Thermodynamic Modeling: Eric Osei-Agyemang; Ganesh Balasubramaniam; Lehigh 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; Connor Stone; Veronika Mazanova; Ivo Kubena; Easo George; Tomas Krumi; Jaroslav Polak; Michael Mills; Institute of Physics of Materials CAS; The Ohio State University; Oak Ridge National Laboratory

J-49: Mechanical Properties and Tribocorrosion Behaviors of TiNiTaZr-based High-entropy Alloys for Biomedical Applications: Shih-Chieh Chao; Kuan-Cheng Lai; Po-Yu Chen; National Tsing Hua University

J-50: Mechanical Properties of CoCrFeMnNiMox High Entropy Alloy Films: Tzu-Hsun Huang; Chia-Lin Li; Chun-Hway Hsueh; National Taiwan University

J-51: Micro- and Mesoscale Mechanical Properties of a FeCrMnNi High Entropy Alloy Subject to Large Strain Extrusion Machining: Jonathan Gigax; Osman El-Altwani; Quinn McCulloch; Berk Aytuna; Mert Ef; Saryu Fensin; Stuart Maloy; Nan Li; Los Alamos National Lab; Middle East Technical University

J-53: Microstructure Evolution and Mechanical Behavior of Nitrogen Interstitial CoCrFeMnHigh-entropy Alloys: Jing Zhang; Min Seok Kim; Kook Noh Yoon; Heh Sang Ahn; Eun Soo Park; Jiangsu University of Science and Technology; Seoul National University

J-54: Multi-component Intermetallic Precipitation in FCC based Complex Concentrated Alloys: Vishal Soni; Abhinav Jagetia; Rajarshi Banerjee; University of North Texas

J-55: Origin of High Cr Cation Fractions in Passive OXide of Ni3S8Fe21Cr25Mn21-0.5xCo21-0.5x High Entropy Alloys: Junsoo Han; Angela Gerard; Xuejie Li; James Saal; Pin Lu; Wolfgang Windt; Kevin Ogle; Gerald Frankel; John Scully; University of Virginia; Chimie ParisTech; Questek; The Ohio State University

J-56: Passivation Phenomena in Highly Corrosion Resistant High Entropy Alloys: An Evaluation of the Role of Chromium Content: Angela Gerard; Junsoo Han; Stephen McDonnell; Dan Schreiber; Pin Lu; James Saal; Wolfgang Windt; Gerald Frankel; John Scully; University of Virginia; Pacific Northwest National Laboratory; Questek Innovations; The Ohio State University

J-57: Phase Inversion in Refractory High Entropy Alloys: Vishal Soni; Srisswaroop Dasari; Bharat Gwalani; Talukder Alam; Oleg Senkov; Daniel Miracle; Rajarshi Banerjee; University of North Texas; UES Inc.; Air Force Research Laboratory

J-58: Phase Stability of B2-ordered High Entropy Alloy: Yonghua Meng; Fenghui Duan; Jie Pan; YL Li; Shenyang National Laboratory for Materials Science, Institute of Metal Research

J-60: Second-phase of 29Fe15Al18Cr27Ni High Entropy Alloy: Jintao Wang; Shouping Liu; Xiong Xiao; Xiaoyu Han; Chongqing University

J-61: Size Effects and the Hall-Petch Relationship in the Mn17Fe22Co4Ni24Cu13 System: Artashes Ter-Isahakyan; John Bath; University of Kentucky
J-62: Static and Dynamic Mechanical Performance of Non-equatomic CoCrFeMnNi HEA: Kyle Rozman; Paul Jablonski; Jeffrey Hawk; Michael Gao; 1National Energy Technology Laboratory

J-63: Strengthening of Transformation-induced Plasticity-assisted High Entropy Alloy via Interstitial Nitrogen: Kenta Yamanaka; Manami Mori; Yusuke Onuki; Shigee Sato; Akihiko Chiba; Tohoku University; 1National Institute of Technology, Sendai College; 2Ibaraki University

J-64: Synthesis of High Entropy Metal Carbides by a Solvothermal Process: Ved Vakharia; Olivia Grawe; 1University of California, San Diego

J-65: Tailoring Multi-principal Element (MPE) Alloy Compositions based on Competing Deformation Mechanisms: K V Vamsi; Marie-Agathe Charpagne; Anton Van der Ven; Tresa Pollock; 1University of California

J-66: The Controlled Large-area Synthesis of Two Dimensional Metals: Tianyu Wang; Guanfeng He; Jingyang Zhang; Zhaoyi Ding; Fucheng Li; Yong Yang; 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; Mohammad Asadikia; Vadam Drozd; Yu Zhong; 1Worcester Polytechnic Institute; 2Florida International University

J-68: Thermal Expansion of Refractory MoWTa TiZr High Entropy Alloy via Interstitial Nitrogen: Kun Lin; Bing Li; Zhihong Zhong; Peter Liaw; Zhiming Li; Won-Seok Ko; 1Hefei University of Technology; 2Max-Planck-Institut für Eisenforschung; 3Korea Advanced Institute of Science and Technology

J-69: Ultrastrong VCoNi Medium-entropy Alloy Enabled by Severe Lattice Distortion: Seok Sohn; Kwangyong Kim; Haewon Lim; Eun Soo Park; 1Seoul National University; 2POSTECH; 3Max-Planck-Institut für Eisenforschung

J-70: Ultrahigh Strength and Thermal Stability of Nanocrystalline High-entropy Alloys Made by Electrodeposition: Michel Hache; Uwe Erb; Yu Zou; 1University of Toronto

J-71: A Cuboidal B2-enhanced Dual-phase CrMnFeCoNiAl$_{0.75}$ High-entropy Alloy with Excellent High-temperature Strength: Lijing Lin; Zhihong Zhang; Peter Liaw; 1Hefel University of Technology; 2University of Tennessee, Knoxville

J-72: A Machine Learning Model for Alloy Design: Zhaohan Zhang; Mu Li; Katharine Flores; Rohan Mishra; 1Washington University in St. Louis

J-73: A Strategy for Designing Heterogeneous Medium-entropy Alloys with Excellent Tensile Properties: Jongun Moon; Jeong Min Park; Jae Wung Bae; Hyoung Seop Kim; 1POSTECH

J-74: Ab Initio Modeling of Large Defects in γ', γ, and γ'' Superalloys: Saro Sanl; Wai-Yim Ching; 1University of Missouri, Kansas City

J-75: Analysis of Irradiation Resistance of Tungsten-based Reduced Activation Alloy for Fusion Plasma Applications: Owaish Waseem; Ho Jin Ryu; 1KAIST, Korea

J-76: Analysis of Strengthening due to Grain Boundaries and Annealing Twin Boundaries in the CrCoNi Medium-entropy Alloy: Mike Schneider; Easo George; Tomáš Záležák; Antoni Dziolhy; Gunther Eggele; Guillaume Laplanche; 1Ruhr-Universitaet Bochum; 2Oak Ridge National Laboratory; 3Institute of Physics of Materials

J-77: Atom Probe Tomography Study of a Fe25Ni25Co25Ti15AI10 High-entropy Alloy: Zhiquang Fu; Andrew Hoffman; Benjamin MacDonald; Maalavan Arivu; Haiming Wen; Enrique Lavernia; 1University of California, Irvine; 2Missouri University of Science and Technology

J-78: Atomic Diffusion in Melts of Refractory HEAs: Ankit Roy; Ganesh Balasubramanian; 1Lehigh University

J-79: CALPHAD Aided Design of MoNbTiZr-based High Entropy Alloys: Benjamin MacDonald; Cheng Zhang; Zhiquiang Fu; Fengwei Guo; Yongwang Kang; Xiangchao Xie; Yizhang Zhou; Enrique Lavernia; 1University of California, Irvine; 2AECC Beijing Institute of Aeronautical Materials

J-80: Composition Design of Coherent Precipitate-strengthening AICuFeNiTi Multi-principal Element Alloys by High-throughput CALPHAD-type Calculation: Shao-Yu Yan; Hao-che Wang; Shih-kang Lin; 1National Cheng-Kung University

J-81: Compositional Effects of Stacking Fault Energies in Ni-based FCC Concentrated Alloys: Liubin Xu; Luis Casillas-Trujillo; Yanfei Gao; Haixuan Xu; 1The University of Tennessee, Knoxville; 2The University of Tennessee, Knoxville (now at Linköping University, Sweden)

J-82: Deformation Behavior of the Al0.3CoCrFeNi High-entropy Alloy during Low-cycle Fatigue by In-situ Neutron Diffraction: Zongyang Lyu; Rui Feng; Di Xie; Yan Chen; Ke An; Yanfei Gao; Peter Liaw; 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; Jae Wung Bae; Zhiming Li; Won-Seok Ko; Hyoung Seop Kim; 1POSTECH; 2Max-Planck-Institut für Eisenforschung GmbH, Max-Planck-Strasse; 1University of Ulsan

J-84: Determination of Young’s Modulus and Phase Prediction using Classical Molecular Dynamics in Refractory HEAs: Ankit Roy; Ganesh Balasubramanian; 1Lehigh University

J-85: Developing Non-equatomic Refractory BCC HEAs with Improved Mechanical Properties Using Combinatorial Screening: Taohid Bin Nur Tuhser; Ian Winter; Daryl Chrzan; Andrew Minor; Mark Asta; Thomas Balk; 1University of Kentucky; 2Lawrence Berkeley National Laboratory

J-86: Development of Metastable Nanolaminate High Entropy Alloy Overcoming Strength-ductility Trade-off: Min Seok Kim; Kook Noh Yoon; Hyun Seok Oh; Eun Soo Park; 1Seoul National University; 2Massachusetts Institute of Technology

J-87: Development of TiVNbTaW High Entropy Alloy with TRIPLEX Nanostructure: Sangjun Kim; Jinyeon Kim; Da Hye Song; Jin Kyu Lee; Eun Soo Park; 1Seoul National University; 2Kongju National University

J-88: Ductility of Quaternary Refractory Medium Entropy Alloys with Body-centered Cubic Structure: Qian He; Shuhei Yoshida; Tilak Bhattacharjee; Nobuhiro Tsuji; 1Kyoto University
J-89: Effect of Sputtering Parameters on Structure and Mechanical Properties of TiZrHfNiCuCo High Entropy Alloy Films: Ki Buem Kim1; Young Seok Kim1; Taekjip Choi1; Jin Kyu Lee2; Hyo Soo Lee3; 1Sejong University; 2Konju National University; 3Korea Institute of Industrial Technology (KITECH)

J-90: Enhanced Mechanical Properties by Nitrogen Addition in N-CoCrNi and N-CoCrFeMnNi Compositonally Complex Alloys: Dennis Jodi1; Choi Nuri2; Joohyun Park3; Nokkeun Park4; Timothy Alexander Listyawan5; 1Yeungnam University; 2Hanyang University

J-91: Fabricate and Mechanical Properties of Non-equiaxial High Entropically Reinforced 6082 Al Matrix Nanocomposite: Anoushka Pat1; 1Indian Institute of Technology

J-92: Fabrication and Hardness Behavior of High Entropy Alloys: Modupeola Dada1; Patricia Popoola2; Ntombi Mathe3; Sisa Pityana4; Samson Adeosun5; Thabo lengopeng5; 1Tshwane University of Technology; 2Council for Scientific and Industrial Research; 3University of Lagos, Okota

J-93: Formation and Mechanical Properties of TaNbVtW High Entropy Alloys Prepared by Powder Metallurgy: Da Hye Song1; Sangjun Kim2; Eun Soo Park3; Jn Kyu Lee4; 1Konju National University; 2Seoul National University

J-94: Formation Zone Prediction of the Al-Co-Fe-Ni-Ti t High Entropy Alloys by Throughput Calculation (HTC) Technique: Yu-Chun Li1; Chua-Hsuan Wang2; Hsieng-Ming Hsiao3; Satoshi Ikubo4; Chuan Zhang5; Yee-Wenn Yen6; 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; 4ComputTherm 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: Anoushka Pat1; Chandra Singh2; 1University of Toronto

J-96: High Temperature Creep Behavior of AlZrCrMoNbTi High Entropy Alloy Using the Spark Plasma Sintering (SPS) System: Faris Sweidan1; Ho Join Ryu1; 1KAIST, Korea

J-97: High Temperature Creep Behavior of AlZrCrMoNbTi High Entropy Alloy Using the Spark Plasma Sintering (SPS) System: Faris Sweidan1; Ho Join Ryu1; 1KAIST, Korea

J-98: Homogenous Structure Formation in FeCoNiCrMo High Entropy Alloy: Ismaiel Hidalgo1; Lin Li2; Feng Yan3; Xiao Han4; 1University of Puerto Rico at Mayaguez; 2Lawrence Berkeley National Laboratory

J-99: Imaging Short Range Order in The CrCoNi Medium Entropy Alloys by Heaviside Digital Image Correlation: Xuesong Fan1; Li Hang2; 1University of California, Berkeley; 2Lawrence Berkeley National Laboratory

J-100: Microstructure and Magnetic Behavior of FeCoNi(Mn–Si) x (x=0.5,0.75,1.0) High-entropy Alloys: Priyanka Sahu1; Suresh Solanki2; Sheetal Dewangan1; Vinod Kumar3; 1Indian Institute of Technology Indore; 2Global Institute of Technology, Jaipur, India

J-101: Microstructure and Mechanical Properties of an Equiaxitatic CoCrFeMnNi High Entropy Alloys Fabricated by Gas Atomization: Cheeneepalli Nagarjuna1; Kang Won Jeong2; Hyeon Jeong You3; Gion Song4; Jin Kyu Lee5; Soon Jik Hong5; 1Konju National University

J-102: Microstructure and Mechanical Properties of Non-equiaxitatic Fe-Mn-Ni-Co-Al-Ti Septenary High Entropy Alloy: S. Varalakshmi1; Yagnesh Shadangi1; R. Manna2; N. K. Mukhopadhyay3; 1Indian Institute of Technology (BHU) Varanasi

J-103: Microstructure Evolution and Enhanced Strength in CoCrFeMnNi Alloy through High Speed Shear Loading: Ting Wuan1; 1KAIST; 2KITECH; 3CNU

J-104: Oxidation Behavior of Al4Co3Cr25Cu10Fe25Ni33 at High Temperatures: Cheng-Yuan Tsai1; Chi-Huan Tung2; Shou-Yi Chang3; 1National Tsing Hua University

J-105: Mechanical Properties and Discrete Slip Events in Conventional Alloys and High-entropy Alloys at Different Temperatures: Chun-Yi Chen1; Chi-Huan Tung2; Shou-Yi Chang3; 1National Tsing Hua University

J-106: Mechanical Properties and Discrete Slip Events in Conventional Alloys and High-entropy Alloys at Different Temperatures: Chun-Yi Chen1; Chi-Huan Tung2; Shou-Yi Chang3; 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-Chung Chang1; Chia-Ying Yeh2; Hsiang-Ming Lai3; Yu-Ting Hsiao4; Shou-Yi Chang5; 1National Tsing Hua University

J-108: Microalloying Technology: an Attractive Strategy for the Design of High-entropy Alloys: Wenyi Huo1; Feng Fang2; Jianku Shang3; Jianqing Jiang4; 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 Sahu1; Suresh Solanki2; Sheetal Dewangan1; Vinod Kumar3; 1Indian Institute of Technology Indore; 2Global Institute of Technology, Jaipur, India

J-110: Microstructure and Mechanical Properties of an Equiaxitatic CoCrFeMnNi High Entropy Alloys Fabricated by Gas Atomization: Cheeneepalli Nagarjuna1; Kang Won Jeong2; Hyeon Jeong You3; Gion Song4; Jin Kyu Lee5; Soon Jik Hong5; 1Konju National University

J-111: Microstructure and Mechanical Properties of Non-equiaxitatic Fe-Mn-Ni-Co-Al-Ti Septenary High Entropy Alloy: S. Varalakshmi1; Yagnesh Shadangi1; R. Manna2; N. K. Mukhopadhyay3; 1Indian Institute of Technology (BHU) Varanasi

J-112: Microstructure and Tribological Behavior of Non-equiaxitatic Ti-Zr-Cr-Al-Si-V and Ti-Zr-Cr-Al-Si-V-Nb Refractory High Entropy Alloys: Harash Jain1; Yagnesh Shadangi2; Vikas Shivam2; Nilay Mukhopadhyay3; Devendra Kumar4; 1IIIT BHU

J-113: Microstructure Characterization of Oxide Dispersion Strengthened CoCrFeMnNi High Entropy Alloy Synthesized by Cryo-milling and Spark Plasma Sintering: Seung-Hyeong Chung1; Bin Lee2; Soo Yeol Lee3; Ho Jin Ryu4; 1KAIST; 2KITECH; 3CNU

J-114: Microstructure and Mechanical Properties of an Equiaxitatic CoCrFeMnNi High Entropy Alloy through High Speed Shear Loading: Toru Murata1; Nobuhiro Imakura2; Alok Singh3; Ivan Gutierrez-Urrutia4; Koichi Tsuchiya1; Naoko Iko5; Toshiji Mukai5; 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 Frey1; Chris Borg2; James Saal3; Bryce Meredith4; Daniel Miracle5; Tresa Pollock6; 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 Bae1; Jaimyung Jung2; Jung Gi Kim3; Jeong Min Park4; Stefanus Harjo5; Takuro Kawasaki6; Hyoong Seop Kim7; 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 Park1; Jung Gi Kim2; Jungho Choe3; Jae Wung Bae4; Jongun Moon5; Ji-Hun Yu6; Hyoong Seop Kim7; 1POSTECH; 2Gyeongsang National University; 3Korea Institute of Materials Science

J-118: Oxidation Behavior of Al4Co3Cr25Cu10Fe25Ni33 at High Temperature: Cheng-Yuen Tsai1; Feng-Yi Cho2; Fan-Yi Ouyang3; 1National Tsing Hua University
J-119: Partitioning Behavior Based Design of BCC / B2 Dual-phase Refractory Multi-principal Element Alloys: Hosun Jun1; Pyuck-Pa Choi1; Zhiming Li2; Dierk Raabe3; 1Korea Advanced Institute of Science and Engineering (KAIST); 2Max-Planck-Institut für Eisenforschung GmbH

J-120: Phase Field Disolocat Dynamics Modeling of Refractory High Entropy Alloys: Lauren Smith1; Shuzoo Xu2; Yanqing Su3; Abigail Hunter3; Irene Beyertlein2; 1University of California, Santa Barbara; 2Los Alamos National Laboratory

J-121: Phase Stability and Defect Properties of fcc FeCrMnNi HEAs: Mark Fedorov1; Jan Wróbel2; Antonio Fernandez-Caballero3; Krzysztof Kurzydlowski3; 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 Kim1; Hyunseok Oh1; Kook Noh Yoon1; Eun Soo Park1; 1Seoul National University

J-123: Phase Stability of a Group of fcc-structured Medium-entropy Alloys Under High Pressure and High Temperature: Fei Zhang1; Hongbo Lou1; Yuan Wu1; Zhaoping Lu2; Qiaoshi Zeng2; 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 An1; Jing Zhang1; Hongwei Wang1; Chan-Ho Lee1; 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 Yang1; Tongxiang Ma1; Mengjun Hu1; Pengjie Liu1; Lianying Wen1; Liwen Hu1; Meilong1; 1Chongqing University

J-126: Significance of Grain Refinement in HfNbTiZr and CoCrFeNi High-entropy Alloys: Wenrui Zhao1; Jae-Kyung Han1; Megumi Kawasaki1; 1Oregon state University

J-127: Solute and Self-diffusion in HCP High Entropy Alloys: Sandipan Sen1; Mayur Vaidya1; Xi Zhang1; Lukasz Rogal1; Blazej Grabowski1; 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 Liu1; Qian Chen2; Yang Wang3; Narumasa Miyazaki1; Yusuke Ootani1; Nobuki Ozawa1; Momoji Kubo1; 1Tohoku University

J-129: Structural Evolution and Thermal Stability of Nanocrystalline High Entropy Alloy through Cryomilling: Harshvaradhan Saragadam1; Yagnesh Shadangi1; Bhaskar Majumdar1; Nilay Krishna Mukhopadhyay1; 1IIT(BHU)-VARANASI. 1Defence Metallurgical Research Laboratory, Hyderabad

J-130: Synthesis and Phase Stability of High-entropy Nitrides and Carbonitrides: Olivia Dippo1; 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 Huang1; Yao-Jen Chang2; Chi-Hung Lee2; Yi-Jia Chen1; Uwe Glätzel3; An-Chou Yeh4; Wen-Hsien Li5; Ssu-Yen Huang6; Nadya Mestli1; Bo-Hong Lai2; Tu-Ngoc Lam7; E-Wen Huang8; 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 Feng1; Dai Xu1; Hidemi Kato2; Akihiko Chiba2; 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 Li1; Zhaohan Zhang2; Arasdeep Thind3; Rohan Mishra3; Katharine Flores4; 1Washington University in St. Louis

J-134: Tuning Microstructure of Refractory High-entropy Alloys via Controlling Cooling Rates: Haifeng Huang1; Zhaopeng Li1; 1University of Science and Technology Beijing

J-135: Wire Arc Additive Manufacturing of AlCoCrFeNi High Entropy Alloy: Runman Ul Ahsar1; Gi-Jeong Seo1; A. N. M. Tanvir2; Yousub Lee3; P. K. Liaw4; Duck Bong Kim5; 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; Caryl 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: Sudeepa Mondal1; Daniel Gwynn2; Asok Ray3; Anitta Basalka4; 1Pennsylvania State University

L-19: Data-driven Hard-magnetic Materials Selection for AC Applications by Multiple Attribute Decision Making: Sunny Pinnam1; Alex Paul1; Tanjore Jayaraman1; 1University of Michigan-Dearborn

L-20: Data Driven Prediction of Crystallographic Attributes of Small Molecules Using Various Molecular Fingerprints: Piyush Karande1; Peggy Li1; Soo Kim2; 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 Garland1; Brad Boyce1; Bradley Jared1; David Saiz2; Michael Heiden3; Matthew Roach1; David Moore2; 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-Alı1; Samuel Hemery1; 1Ensma
L-23: Identification of Fatigue Crack Nucleation Mechanisms Using Bayesian Inference: Maxwell Pinz1; 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: Juyaing Kim1; Joo-Hwan Bae2; Hong Kyu Kim2; Jaeyoung Hong3; Gyeung Ho Kim4; Kyu Hyong Lee1; Dong Won Chun1; 1Yonsei University; 2Korea Institute of Science and Technology

L-25: Multi-class Inclusion Identification via Machine Learning of Multilevel Image Features: Nan Gao1; Mohammad Abdulsalam2; Bryan Webler1; Elizabeth Holm1; 2Carnegie Mellon University

L-26: Prediction of Temperature After Cooling in Coils Using Machine Learning and Finite Element Method: Hyeok Jae Jeong1; Seonghwan Kim2; Nam Hoon Goo2; 1Hyundai steel

L-27: Uncertainty Quantification in Metallic Additive Manufacturing Through Physics-informed Data-driven Modeling with Experimental Validation: Lei Chen1; Zhuo Wang2; Zhen Hu3; Sankaran Mahadevan1; 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 Yang1; 1Waikato University

M-63: Effect of Sintering Temperature on Mechanical and Tribological Behavior of Ti-Ni Alloy for Biomedical Applications: Fellah Mamoun1; Hezil Naouel1; Touhami Mohammed Zine2; Mohamed Abd Rabou Hussein3; Alex Montagne1; Alberto Mejias4; Alain Iost5; Stephanie Kosman4; Timofey Chekal'kin6; Aleskei Obrovsk6; Sabine Wiess1; 1Abbes Laghrour University; 2Tribology and Materials Group, Laboratory of Foundry, BADJI Mokhtar University BO; 3KFUPM; 4LABO MSMP Ecole Nationale Superieur Arts et Metiers Paris Tech Lille; 4Research Institute of Medical Materials, Tomsk State University; 5Department 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 Zhang1; Yifeng Zheng1; Rui Wang1; Junkun Yue1; Yifei Luo1; Hongzhi Niu2; Jianmiao Liang3; 1Northeastern University; 2Shanghai Jiao Tong University

M-65: Refinement of PEG/PMMA Binder Systems for Metal Injection Molding of Titanium: Peng Cao1; 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 Carley, Novelis, Inc.

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K-137 (Invited): Understanding Room Temperature Softening Behavior in AA5182: Atish Ray1; John Carley2; 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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M-28 (Invited): Integrated Study of First-principles Calculations and Experimental Measurements for Hydrogen Effect on FCC to HCP Martensitic Transformation: Satoshi Ikubo1; Kenji Hirata1; Y. Kuroki1; Shoya Kawano1; Hiroshi Ohtani1; Atish Ray1; Saikat Mandal1; 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 Lamotte, Boston Metal; Sam Wagstaff, Novelis Inc.; Antoine Allanoire, Massachusetts Institute of Technology; Fisehaf Tafaye, Abo Akademi University

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Session Chair: Jonghyun Lee, Iowa State University

M-66: Effects of Welding Conditions and Post Weld Heat Treatment on Precipitation of Widmanstätten-austenite of Duplex Stainless Steels: Yunxing Xia1; Xiaofu Zhang1; Fumikazu Miyasaka1; Hiroaki Mori1; 1Osaka University
M-67: Evaluation of Mechanical Properties of Welded Zn-Coated Steel Using Tandem MAG Welding Process: Jaesoo Lee1; 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 Li1; 1University of Science and Technology Beijing

M-69: Heterogeneous Grain Microstructure Reducing/ Eliminating Edge Breaks in Low Carbon Steels: The Zhou1; Hatem Zurob2; Peng Zhang3; Sang Hyun Cho3; 1Stelco Inc.; 2McMaster University; 3Algomia University

M-70: Investigation on the Flow Field of Molten Steel in Ultrahigh-speed Billet Continuous Casting Mold: Pei Xu1; Dengfu Chen1; Peng Liu1; Qinzheng Wang2; Mujun Long3; Huamei Duan3; Jie Yang3; Qimin Wang1; 1Chongqing University

M-71: Machine Learning Approaches for Prediction Mechanical Properties of Austenitic Stainless Steels: Liping Yang1; 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-Marroquin1; Kim Phatti - Satto2; Abraham Terrones - Ramirez3; 1APMMM/UNI; 2UNI

M-73: Numerical Study of Inclusion Removal in Gas Stirred and Electromagnetically Stirred Ladles: Xipeng Guo1; Joshua Vandenoevere2; Nicholas Walla1; Armin Silaen1; Chenn Zhou1; 1Purdue University Northwest

M-74: Ordered Arrangements of BaTiO3 Powders of Cubic Morphologies: Maritza Sanchez1; Olivia Graeve1; 1University of California, San Diego

M-76: Roll Forming of Aluminum 7075-T6 Alloy for an Automotive Bumper Beam: Taekyoung Kim1; Geun-Ho Kim1; Sang-Kyo Lee2; Seogou Choi1; Jongsup Lee1; 1Asan Co., Ltd.; 2Korea Institute of Industrial Technology

M-77: Thermodynamic Properties of Layered Tetradyomite-like Compounds of the Ag–Ge–Sb–Te System: Mykola Moroz1; Fiseha Tesfaye2; Pavlo Demchenko3; Myroslava Prokhorenko3; Daniel Lindberg4; Oleksandr Reshetnyak5; Leena Hupa6; 1National University of Water and Environmental Engineering; 2Abo Akademi University; 3Ivvan 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 Kang1; In-sung Hwang2; Young-Min Kim2; Dongseol Kim2; 1Korea Institute of Industrial Technology

NANOSTRUCTURED AND HETERO STRUCTURED 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 Dillon1; 1University of Illinois

N-5: A Novel Bimodal Microstructure for Improved Fatigue Resistance: Wenwu Xu1; Ken Ramirez2; Rachell Lee1; Sharier Hasani2; 1San Diego State University

N-6: Atomistic Modeling of Fundamental Deformation Mechanisms in MAX Phases: Gabriel Plummer1; Garritt Tucker2; 1Colorado School of Mines

N-7: Effect of Additional Elements on Deformation Mechanism of TiAl: Ji Young Kim1; Jong-hun Kim1; Jae-Kwon Kim1; Taegu Lee2; Seung-Hwa Ryu3; Dong-chan Jang1; Eun Soo Park1; Seong-woong Kim1; Seung-Eon Kim1; 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 An1; Dezhou Guo2; Kolan Reddy1; 1University of Nevada, Reno; 2Shanghai Jiao Tong University

N-10: Highly-impermeable and Stretchable Encapsulation with Wavy Structure: Hangeul Kim1; Na-Hyang Kim1; Hansol Jeon1; Han Gi Chae2; 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: Xiaojing Li1; John Turner2; Karen Bustillo2; Rohan Dhall3; Andrew Minor1; 1University of California, Berkeley; 2Lawrence Berkeley National Laboratory

N-12: Interfacial Mechanics and Reconstruction on Graphene-metal Surfaces: Kailiao Zhang1; Mitisha Surana1; Ganesh Ananthakrishnan1; Matthew Poss2; Pascal Pochet1; Harley Johnson3; Sameh Tawfick3; 1University of Illinois Urbana Champaign; 2Institute for Nanoscience and Cryogenics

N-13: Mechanical Properties of Electrochemically Lithiated Tin: Chung Su Hong1; Seung Min Han1; 1KAIST

N-14: Microstructural Analysis and Mechanical Behavior of Ultrafine-grained Ni-Y-Zr Alloys: Shrutl Sharma1; Samuel Mohring1; Pedro Peralta1; 1Arizona State University

N-16: Pseudoelastic Response and Shape Memory Behavior in Ceramic Materials: Hamed Hosseini-Toudeshki1; 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 Srinivasan1; Chaitanya Kale1; Scott Turnage1; Billy Hornbuckle2; Kris Darling3; Kiran Solanki3; 1Arizona State University; 2US Army Research Laboratory

N-18: Strength Recovery in Self-healed Nanoporous Gold: Eun-Ji Gwak1; Hansol Jeon1; Ju-Young Kim1; 1UNIST

N-19: Stress-strain Responses from Small Scale Testing (Nanoindentation, In-situ Micro-compression, Micro-tension) in Pure Magnesium: Sliye Supakul1; 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 Kim1; 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 Chen1; 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 South Carolina; Preeyush 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


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 Jin1; 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 Heo1; ShinYoung Kang2; Xiaowang Zhou2; Rongpei Shi1; Brandon Wood1; 1Lawrence Livermore National Laboratory; 2Sandia National Laboratories

O-34: Abnormal Temperature Dependence of Critical Transition Stress in Nanocrystalline NITi Shape Memory Alloys: Taozao Wang1; Kaiyuan Yu1; Lishan Cui1; 1China University of Petroleum, Beijing

O-35: Bainite Formation during Zinc Galvanizing on Steel: Hong-Kyu Kim1; Jun Hyun Han1; 1Chungnam National University

O-36: Carbon and Microstructure Effects on the Magnetic Properties of Fe-CN Soft Magnetic Materials (Minnealloy): Guannan Guo1; Jinning Liu1; Jian-Ping Wang1; 1University of Minnesota

O-37: Carbonation Behavior of Calcium Aluminate Cements with Additions of Silica: John Zapata1; Henry Colorado1; 1Univ De Antioquia

O-38: Dealloyed High-strength Metallic Coatings: Bernard Gaskey1; Ian McCue2; Michael Brubacher3; Jonah Erlebacher1; 1Nanyang Technological University; 2Johns Hopkins University Applied Physics Laboratory; 1Johns Hopkins University

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O-39: Dilatometric Analysis of the Martensite Decomposition by Stages during Continuous Heating: Perla Díaz-Villaseñor1; Octavio Vázquez-Gómez2; Eluth Barrera-Villatoro1; Héctor Vergara-Hernández2; Edgar López-Martínez2; Bernardo Campillo-Illanes2; 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 Lin1; Shitong Liu1; Hao Lin2; Baojun Yang1; Jun Wang1; Guanzhou Qiu1; 1Central South University; 2Xi'an Jiaotong University

O-41: Enhanced Toughness of Nanograined Metallic Thin Films on Flexible NiTi Shape Memory Alloy Strips: Gan Zhang2; Kaiyuan Yu1; Taoao Wang2; 1China University of Petroleum—Beijing

O-42: Hierarchical Microstructure Enhanced Comprehensive Mechanical Properties in Ti-Alloys: Mengyuan Hao1; Dong Wang2; Qiaoyan Sun1; Pei Li1; Tianlong Zhang1; Yunzhi Wang2; 1Xi’an Jiaotong University

O-43: High-pressure Synthesis of HCP Nickel from a Metallic Glass: Abhinav Parakh1; 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-Pérez1; Octavio Vázquez-Gómez2; José López-Soria1; Héctor Vergara-Hernández2; Pedro Garnica-González1; 1Tecnológico Nacional de México / I.T. Morelia

O-46: Microstructural Evolution during Solidification of Ternary Eutectic Al-Cu-Mg: Dominic Ezemenala1; Amber Genau1; Christian Patino1; 1University of Alabama, Birmingham

O-47: Quasi-linear Superelasticity with Ultralow Modulus Induced by Nanoscaled Martensitic Phase Transition: Shuangshuang Zhao1; Qianglong Liang1; Chuanxin Liang1; Dong Wang1; Yuanchao Ji1; Yu Wang1; Xiaobing Ren1; Yunzhi Wang2; 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 Mushongera1; Pankaj Kumar1; Michael Sangid2; 1University of Nevada, Reno; 2Purdue 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 — Poster Session


Program Organizers: Haiming Wen, Missouri University of Science and Technology; Suveen Mathaudhu, University of California, Riverside; Yunjian 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 Sharma1; Ketan Ganne2; Yagnesh Shadangi3; Bhaskar Majumdar4; Nilay Mukhopadhyay5; 1Department of Metallurgical Engineering Indian Institute of Technology (Banaras Hindu University); 2Department of Metallurgical Engineering Indian Institute of Technology (Banaras Hindu University); 3Department of Metallurgical Engineering Indian Institute of Technology (Banaras Hindu University); 4Applied Materials India, Pvt Ltd, Bangalore, India; 5Defence Metallurgical Research Laboratory, Hyderabad, India

M-80: A Novel Depressant of Sodium Polyacrylate for Magnesite Flotation: Hongwei Cheng1; 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 Wang1; Junyi Xiang1; Qingyun Huang1; 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 — Process Industries in the Circular Economy: Dag Eriksen1; 1University of Oslo, Norway

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; Heojong Kim, Pennsylvania State University; Shaftq 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 Cheng1; 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 Wang1; Junyi Xiang1; Qingyun Huang1; 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 — Process Industries in the Circular Economy: Dag Eriksen1; 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 Elbakshwan, 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 Elbakshwan; UW-Madison; Heramb Mahajan, North Carolina State University

O-49: Joining of 14YWT Ferritic ODS Alloys by Spark Plasma Technique: Madhavan Radhakrishnan1; Elisa Torresani2; Eugene Olevsky2; Stuart Maloy3; Oman 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: Praagatheswaran T1; Rajakumar S1; Balasubramanian V2; Vijay Petley2; Shweta Verma2; 1Annaamalai University; 2Gas Turbine Research Establishment

O-51: Solid State Diffusion Bonding of ODS Eurofer Steel by Spark Plasma Sintering: J. Fu1; J.C. Brouwer1; I.M. Richardson1; M.J.M. Hermans1; 1Delft University of Technology

NANOSTRUCTURED AND HETERO STRUCTURED 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 Semenchenko1; Ryan Mier1; Michael Demkowicz1; 1Texas A&M University; 2Los Alamos National Laboratory

N-23: Bulk High Strength Ultrafine Grained Silver Alloys via Powder Metallurgical Approaches: Enth Sease2; Evander Ramos2; Vladilen Gaisina2; Suveen Mathaudhu1; 1University of California Riverside; 2QuesTek

N-24: Deformation Induced Grain Boundary Segregation in Nanolaminated Al-Cu Alloy: Wei Xu1; XiaoChun Liu2; Xiuyan Li2; Ke Lu2; 1Institute of Metal Research Chinese Academy of Sciences

N-25: Deformation Mechanism and Mechanical Properties of Nano/Ultereine Grained and Heterogeneous Fe-17Cr-6Ni Austenitic Steel: Xiangtuo Deng1; Chengshuai Lei2; Zhaodong Wang2; 1Northeastern University

N-27: Effect of Severe Plastic Deformation on Mechanical Properties of Al6061: Vagish Mishra1; Karthik Palaniappan2; Balkrishna Rao1; Murthy H1; 1Indian Institute of Technology Madras

N-28: Enhanced Mechanical Properties of Nano/Ultereine-grained Structure Formed by Martensite Reversion in 18Cr-8Ni Austenitic Stainless Steel: Jia Liu2; Xiangtuo Deng2; Zhaodong Wang2; 1Northeastern University

N-29: Evolution in Mechanical Response, Phase Transformation and Texture of Titanium Aluminate Processed by High-Pressure Torsion: Jae-Kyung Han1; Xi Li2; Rian Dippenaar3; Klaus-Dieter Liss4; 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 Gao1; 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 Yu1; 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 Orłowska1; Lech Olejnik1; Andreas Huetter1; Norbert Enzinger1; Malgorzata Lewandowska1; 1Warsaw University of Technology; 2Graz University of Technology

N-34: Measurement of Strain Effects on Electrical Conductivity and Wear Properties in Materials Processed by High Pressure Torsion: Evander Ramos1; Takahiro Masuda2; Sina Shahrezaei3; Zenji Horita4; Suveen Mathaudhu5; 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: Xi Li1; Yue Zhang1; Xiaoang Yuan2; RuiChun Wang3; WeiQi Wang3; 1School of Material Science and Engineering, Shenyang University of Technology

N-36: Microstructure and Tensile Behavior of Nanostructured Gradient TWIP Steel: Jie Ding1; Zhongxia Shang2; Jin Li3; H. Wang3; Xinghang Zhang3; 1Purdue University
N-37: Nucleation, Growth and Coarsening of Precipitates in Immiscible Alloys during Low-temperature Severe Plastic Deformation: Gibbs-Thomson Behavior: Nirab Pant1; Yinon Ashkenazy2; Nisha Verma1; Robert Averback1; 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 Sotniczuk1; Krzysztof Topolski1; Halina Garbacz3; 1Warsaw University of Technology

N-39: Pressure Effects during High Pressure Torsion of Dilute Magnesium-Yttrium: Christian Roach1; Kiran Solanki2; Suveen Mathaudhu3; 1University of California, Riverside; 2Arizona State University

N-40: Size-dependent Strengthening and Conductivity of Highly-textured Cu/BN Multilayers: Naiqi Chen1; Houyu Ma1; 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 Fang1; 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 Yang1; 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 Sjögren1; Wolfgang Pantleon2; Ulrich Lienert3; Zoltan Hegedüs3; Kei Ameyama4; Dmitry 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 Berlia1; Jagannathan Rajagopalan1; 1Arizona State University
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