AIME–TMS 150th CELEBRATION

TMS2021

Annual Meeting & Exhibition

SINCE 1871

TMS2021 VIRTUAL

MARCH 15-18, 2021 • #TMSAnnualMeeting

FINAL TECHNICAL PROGRAM

The content in this final program was generated on March 5, 2021. Please refer to the online session sheets for the most up-to-date information.

All times listed in this Final Technical Program are in EDT time zone (UTC-4:00).

www.tms.org/TMS2021

Symposium and Session	Day	Time	Page
Materials and Chemistry for Molten Salt Systems			
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Corrosion & Chemistry	MON PM	2:00 PM	41
Loops and Irradiation Effects	TUE AM	8:30 AM	65
Electrochemistry	TUE PM	2:00 PM	89
Poster Session	TUE EVE	5:30 PM	178
Salt Structure and Properties	WED AM	8:30 AM	112
Mechanical Behavior of Nuclear Reactor Components			
Processing Effects	MON AM	8:30 AM	18
Defect Evolution	MON PM	2:00 PM	43
Poster Session	MON EVE	5:30 PM	172
Small Scale Testing	TUE AM	8:30 AM	67
Microstructure Effects	TUE PM	2:00 PM	91
Early Career	WED AM	8:30 AM	114
Creep, Fatigue, and Fracture	WED PM	2:00 PM	137
Thermal Property Characterization, Modeling, and Theory in Extreme Environments			
Early Career Scholars in Thermal Properties	WED AM	8:30 AM	117
Thermal Transport Theory & Mechanisms	WED PM	2:00 PM	141
Nuclear Fuel Performance & Advanced Thermal Analysis	THU AM	8:30 AM	156
Structure - Thermal Property Relationships	THU PM	2:00 PM	167
Physical Metallurgy			
Computational Thermodynamics and Kinetics			
Grain Boundary Properties and Kinetics	MON AM	8:30 AM	10
Diffusion, Kinetics and Non-equilbrium Events	MON PM	2:00 PM	34
Poster Session	MON EVE	5:30 PM	171
Software Tools and Material Prediction / Thermodynamics and Phase Selection	TUE AM	8:30 PM	58
Phase Stability I	TUE PM	2:00 PM	83
Solidification, Additive Manufacturing / Ordering, Coarsening and Patterning	WED AM	8:30 AM	104
Phase Stability II	WED PM	2:00 PM	131
Data Methods, Tools and High Throughput	THU AM	8:30 AM	149
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Continuous Phase Transformations			
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Defect and Phase Transformation Pathway Engineering for Desired Microstructures			
Invited Presentations	TUE AM	8:30 PM	59
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Frontiers in Solidification Science VIII			
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Symposium and Session	Day	Time	Page
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Structures and Characterization	WED AM	8:30 AM	101
Structures and Modeling	WED PM	2:00 PM	128
Structures and Mechanical Properties	THU AM	8:30 AM	147
Alloy Design and Development	THU PM	2:00 PM	160
High Entropy Alloys IX: Alloy Development and Properties			
Alloy Development and Application I	MON AM	8:30 AM	16
Alloy Development and Application II	MON PM	2:00 PM	40
Structures and Mechanical Properties I	TUE AM	8:30 AM	63
Alloy Development and Application III	TUE PM	2:00 PM	87
Joint Session with Materials for High Temperature Applications: Next Generation Superalloys and Beyond	WED AM	8:30 AM	110
Structures and Mechanical Properties II	WED PM	2:00 PM	134
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Thermal and Other Properties	THU PM	2:00 PM	165
High Entropy Alloys IX: Structures and Modeling			
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Structures and Modeling II	MON PM	2:00 PM	40
Structures and Modeling III	TUE AM	8:30 AM	64
Structures and Characterization I	TUE PM	2:00 PM	88
Structures and Characterization II	WED AM	8:30 AM	111
Modeling and Machine Learning	WED PM	2:00 PM	135
Structures and Characterization III	THU AM	8:30 AM	153
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Materials for High Temperature Applications: Next Generation Superalloys and Beyond			
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Superalloys: Mechanical Behavior	MON PM	2:00 PM	42
Superalloys: Beyond Nickel-based Superalloys	TUE AM	8:30 AM	66
Refractory Alloys: Design and Mechanical Properties	TUE PM	2:00 PM	90
Superalloys: Processing	WED AM	8:30 AM	113
Refractory Alloys: Processing and Properties of Novel Materials	WED PM	2:00 PM	137
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Electronic Packaging and Interconnections 2021			
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Developments in Magnetic Materials for Sensors and Data Storage	TUE AM	8:30 AM	52
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Advances in Characterization, Processing, and Design of Magnetic Materials	THU PM	2:00 PM	159
Advanced Materials for Energy Conversion and Storage VII			
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Energy Conversion and Storage II	THU PM	2:00 PM	159
Energy Technologies and CO2 Management			
Session I	MON AM	8:30 AM	13
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Recycling and Sustainability for Emerging Technologies and Strategic Materials			
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Recycling and Process Optimization I	WED AM	8:30 AM	116
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Biomaterials			
Advances in Biomaterials for 3D Printing of Scaffolds and Tissues			
Advances in Biomaterials for 3D Printing of Scaffolds and Tissues I	MON PM	2:00 PM	27
Biological Materials Science			
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Biological Materials Science II	WED PM	2:00 PM	128
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Symposium and Session	Day	Time	Page
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AI/Data Informatics: Applications and Uncertainty Quantification at Atomistics and Mesoscales			
Session I	MON AM	8:30 AM	6
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AI/Data informatics: Design of Structural Materials			
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Poster Session	WED EVE	5:30 PM	180
AI/Data informatics: Tools for Accelerated Design of High-temperature Alloys			
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Machine Learning and Atomistic Algorithms to Accelerate Materials Study and Design	MON AM	8:30 AM	7
Machine Learning Algorithms and Computational Modeling for Study and Design Materials	MON PM	2:00 PM	28
Large Scale Computational Simulations and Microscale Algorithms for Study Structure-Processing Relations	TUE AM	8:30 AM	54
Computational Models and Algorithms in Atomistic Scale	TUE PM	2:00 PM	79
Models and Algorithms for Study Microstructures and Mechanical Properties of Materials	WED AM	8:30 AM	100
Computational Simulations and Algorithms for Study Structure-Processing Relations	WED PM	2:00 PM	126
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Computational and Modeling Challenges in Metals and Alloys for Extreme Environments			
Extreme Environment Simulations from Nano- to Macro-scale	MON AM	8:30 AM	10
High Strain Rates and Irradiation Effects	MON PM	2:00 PM	34
Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling			
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From Cyclic Plastic Localization and Accumulation to Crack Nucleation and Propagation	WED AM	8:30 AM	108
Microstructure-based Fatigue Studies on Additive Manufacturing Materials (Jointly organized with the Additive Manufacturing Fatigue and Fracture V symposium)	WED PM	2:30 PM	119
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Hume-Rothery Symposium: Accelerated Measurements and Predictions of Thermodynamics and Kinetics for Materials Design and Discovery			
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NANOSTRUCTURED MATERIALS

100 Years and Still Cracking: A Griffith Fracture Symposium — Fracture in Complex Alloys

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

Program Organizers: Megan Cordill, Erich Schmid Institute of Materials Science; William Gerberich, University of Minnesota; David Bahr, Purdue University; Christopher Schuh, Massachusetts Institute of Technology; Daniel Kiener, Montanuniverstität Leoben; Neville Moody; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht

Monday AM **March 15, 2021**

Session Chair: David Bahr, Purdue University

8:30 AM
Introductory Comments: 100 Years and Still Cracking: A Griffith Fracture Symposium: *Megan Cordill*[1]; [1]Erich Schmid Institute of Materials Science

8:35 AM Invited
Designing Ductility in BCC High Entropy Alloys?: Eleanor Mak[1]; Binglun Yin[1]; *William Curtin*[1]; [1]Epfl Sti Igm Lammm

9:15 AM
2,000 Years and Still Getting Dull: Mechanisms of Blade Chipping: *Gianluca Roscioli*[1]; S. Mohadeseh Taheri-Mousavi[1]; Cemal Tasan[1]; [1]Massachusetts Institute of Technology

9:35 AM
A Length-scale Independent Phase-Field Model for Quantitative Prediction of Ductile Fracture: *William Huber*[1]; Mohsen Asle Zaeem[1]; [1]Colorado School of Mines

9:55 AM
Quantitative Phase-Field Modeling of Crack Propagation in Multi-Phase Material Based on Griffith's Fracture Theory: *Arezoo Emdadi*[1]; Mohsen Asle Zaeem[2]; [1]Missouri University of Science and Technology; [2]Colorado School of Mines

10:15 AM Invited
On the Fracture of Multi-element Metallic Alloys: *Bernd Gludovatz*[1]; Robert Ritchie[2]; [1]UNSW Sydney; [2]Lawrence Berkeley National Laboratory

10:55 AM
On the Transition from Shear Banding to Fracture in Metals: In Situ Analysis of Plastic Flow and Deformation Fields: Shwetabh Yadav[1]; Harshit Chawla[1]; *Dinakar Sagapuram*[1]; [1]Texas A&M University

11:15 AM
Probing Small-scale Fracture and Plasticity in Quasicrystals and High-entropy Alloys: *Yu Zou*[1]; [1]University of Toronto

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture V: Processing-Structure-Property Investigations and Application to Qualification — Aluminum

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; John Lewandowski, Case Western Reserve University; Nima Shamsaei, Auburn University; Mohsen Seifi, ASTM International/Case Western Reserve University; Steve Daniewicz, University of Alabama

Monday AM **March 15, 2021**

Session Chair: Nima Shamsaei, Auburn University

8:30 AM Invited
Mechanical Behavior of Induced Lack of Fusion Flaws in AlSi10Mg: *John Lewandowski*[1]; Brett Conner[2]; Austin Ngo[1]; Varthula De Silva Jayasekera[3]; Griffin Jones[4]; Kenneth Meinert[4]; [1]Case Western Reserve University; [2]DOE KC National Security Campus; [3]Youngstown State University; [4]Penn State University

9:00 AM
Cold Spray of Al and 6061 Al Alloy Powders: Effects of Oxide Thickness: *Trevor Bond*[1]; Mobin Vandadi[1]; Arvand Navabi[1]; Vahid Rahneshin[1]; Ridwan Ahmed[1]; Nima Rahbar[1]; Vic Champagne[2]; W.O. Soboyejo[1]; [1]Worcester Polytechnic Institute; [2]Army Research Laboratory

9:20 AM
Critical Fracture Toughness of Al 6061 Cold Spray Deposits: *Scott Julien*[1]; Sinan Muftu[1]; [1]Northeastern University

9:40 AM
Notch Sensitivity of AlSi10Mg Aluminum Alloy Produced by Laser Powder Bed Fusion Process: *Avinesh Ojha*; Wei-Jen Lai[1]; Carlos Engler-Pinto[1]; Xuming Su[1]; [1]Ford Motor Company

10:00 AM Invited
Interplay between Geometry, Defects, and Porosity on the Mechanical Behavior of AM Components: *Garrett Pataky*[1]; Benjamin Smith[1]; Christopher Laursen[2]; Jody Bartanus[1]; Jay Carroll[2]; [1]Clemson University; [2]Sandia National Laboratories

10:30 AM
Managing Heat Buildup and Standardizing Melt Pool Dimensions in Laser Powder Bed Fusion through a "Powder Moat" Scan Strategy: Evan Diewald[1]; Christian Gobert[1]; *Jack Beuth*[1]; [1]Carnegie Mellon University

10:50 AM
Using Post Build Porosity Analysis to Inform Future Build Strategies: *Connor Varney*[1]; Robert Quammen[1]; Nicholas Telesz[1]; John Balk[1]; Andrew Wessman[2]; Paul Rottmann[1]; [1]University of Kentucky; [2]University of Arizona

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications III — Characterization of Additive Manufactured Products

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

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Indrajit Charit, University of Idaho; Subhashish Meher, Idaho National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Kumar Sridharan, University of Wisconsin-Madison; Xiaoyuan Lou, Auburn University

Monday AM **March 15, 2021**

Session Chair: Subhashish Meher, Idaho National Laboratory

8:30 AM Invited
Microstructural, Mechanical, and Corrosion Behavior of a High Entropy Alloy (HEA) Designed for Harsh Aqueous Environments: *Nikole Kucza*[1]; Martin Morra[1]; Kosuke Kuwabara[2]; [1]GE Global Research; [2]Global Research & Innovative Technology Center GRIT

8:50 AM
Microstructural Stability and Creep Behavior of an Additively Manufactured Al-Ce-Ni-Mn Alloy: *Richard Michi*[1]; Kevin Sisco[2]; Sumit Bahl[1]; Jonathan Poplawsky[1]; Lawrence Allard[1]; Ryan Dehoff[1]; Alex Plotkowski[1]; Amit Shyam[2]; [1]Oak Ridge National Laboratory; [2]University of Tennessee, Knoxville

9:10 AM
Microstructure-property of a Novel 9Cr Ferritic Martensitic Steel via Additive Manufacturing Directed Energy Deposition: *Weicheng Zhong*[1]; Lizhen Tan[1]; Kevin Field[2]; Niyanth Sridharan[3]; Ying Yang[1]; Kurt Terrani[1]; [1]Oak Ridge National Laboratory; [2]University of Michigan, Ann Arbor; [3]Lincoln Electric Company

9:30 AM
The Effect of Grain Orientation on Nanoindentation Behavior of Selective Laser Melted Austenitic Stainless Steel: *Sravya Tekumalla*[1]; Sudharshan Raman[1]; Matteo Seita[1]; [1]Nanyang Technological University

9:50 AM
Quality Evaluation of As-printed Wire Arc Additively Manufactured 316L Stainless Steel Blocks: *Yukinori Yamamoto*[1]; Lizhen Tan[1]; Ying Yang[1]; Andrzej Nycz[1]; Mark Noakes[1]; Yousub Lee[1]; Luke Meyer[1]; William Carter[1]; Thak Sang Byun[1]; Ryan Dehoff[1]; Kurt Terrani[1]; [1]Oak Ridge National Laboratory

10:10 AM
Elevated Temperature Dip in Tensile Elongation of an Additively Manufactured Al-Cu-Ce Alloy: *Sumit Bahl*[1]; Kevin Sisco[2]; Jonathan Poplawsky[1]; Richard Michi[1]; Lawrence Allard[1]; Ryan Dehoff[1]; Alex Plotkowski[1]; Amit Shyam[1]; [1]Oak Ridge National Laboratory; [2]University of Tennessee-Knoxville

10:30 AM
Microstructure and Properties Comparison for 316L Wire-fed Laser Metal Deposition AM Under Vacuum Conditions: *Nicholas Brubaker*[1]; Nicolene van Rooyen[2]; Hussam Ali[1]; Mark Jaster[3]; Indrajit Charit[1]; Michael Maughan[1]; [1]University of Idaho; [2] University of Idaho; [3]Premier Technology

10:50 AM
Advances in Digital Light Printing for Energy Applications: *Donna Guillen*[1]; Patrick Moo[1]; Michael Shaltry[1]; Robert O'Brien[1]; [1]Idaho National Laboratory

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Applications of Solidification Fundamentals — Continuum Scale Modeling and Experiments

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

Program Organizers: Alex Plotkowski, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Northrop Grumman; Mohsen Asle Zaeem, Colorado School of Mines; Wenda Tan, University of Utah; Lianyi Chen, University of Wisconsin-Madison

Monday AM **March 15, 2021**

Session Chairs: Alex Plotkowski, ORNL; Matt Rolchigo, LLNL

8:30 AM
Statistical Modeling of Microstructure Signatures in Laser Powder Bed Fusion: *Supriyo Ghosh*[1]; Raiyan Seede[1]; Jaylen James[1]; Ibrahim Karaman[1]; Alaa Elwany[1]; Douglas Allaire[1]; Raymundo Arroyave[1]; [1]Texas A&M University

8:50 AM
Solidification Behavior of Martensitic Precipitation-hardenable Stainless Steels Produced via Additive Manufacturing: *Eric Lass*[1]; [1]University of Tennessee, Knoxville

9:10 AM
3D Characterisation of Cracks Formed in AA2024 and Implications for Alloy Design: *Giuseppe Del Guercio*[1]; Marco Simonelli[1]; Nesma Aboulkhair[1]; Graham McCartney[1]; Chris Tuck[1]; [1]University of Nottingham

9:30 AM
Quantification and Propagation of Aleatoric Uncertainty Through Numerical Simulation of Laser Powder Bed Fusion Process for IN625: *Scott Wells*[1]; [1]Purdue University

9:50 AM
Quantifying Impact of Fluid Flow on Melt Pool Model Predictions Across AM Processing Regimes: *Gerald Knapp*[1]; Matthew Rolchigo[2]; Tarasankar DebRoy[1]; Jim Belak[2]; Alex Plotkowski[3]; [1]The Pennsylvania State University; [2]Lawrence Livermore National Laboratory; [3]Oak Ridge National Laboratory

10:10 AM
Alternative Scan Strategies for Laser Powder Bed Additive Manufacturing to Expand Process Space: *Elizabeth Chang-Davidson*[1]; Nicholas Jones[1]; Jack Beuth[1]; [1]Carnegie Mellon University

10:30 AM
Microstructure Control with Advanced Scan Strategies Developed via Fast Analytic Thermal Modeling of Additive Processes: *Benjamin Stump*[1]; Patxi Fernandez[1]; Matt Rolchigo[2]; Alex Plotkowski[1]; Jim Belak[2]; [1]ORNL; [2]LLNL

10:50 AM
Consistent Coupling between Melt Pool Heat Transfer and Grain-scale CA Calculations for Additive Manufacturing: *John Coleman*[1]; Alex Plotkowski[1]; Matt Rolchigo[2]; [1]Oak Ridge National Laboratory; [2]Lawrence Livermore National Laboratory

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development III -- Super Materials and Extreme Environments — Fundamentals

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

Program Organizers: Behrang Poorganji, University of Waterloo; Hunter Martin, HRL Laboratories LLC; James Saal, Citrine Informatics; Orlando Rios, Oak Ridge National Laboratory; Atieh Moridi, Cornell University; Jiadong Gong, Questek Innovations LLC

Monday AM **March 15, 2021**

Session Chairs: Behrang Poorganji, Beehive3D; James Saal, Citrine Informatics

8:30 AM
Introductory Comments: Additive Manufacturing: Materials Design and Alloy Development III -- Super Materials and Extreme Environments: *Behrang Poorganji*[1]; [1]University of Waterloo

8:35 AM Invited
AM Enabled Super Materials for Extreme Environments Applications: *Youping Gao*[1]; John Porter[1]; Cameron Schmidt[1]; [1]Castheon Inc

9:05 AM Invited
Development of a Rapid Alloy Selection Tool for Rapid Solidification Processing Conditions: *Emma White*[1]; Ralph Napolitano[1]; Timothy Prost[1]; Duane Johnson[1]; Samantha Tatar[2]; Naren Raghavan[3]; Michael Kirka[3]; Andrew Kustas[4]; Nicolas Argibay[4]; Iver Anderson[1]; [1]Ames Laboratory; [2]Kansas City National Security Campus; [3]Oak Ridge National Laboratory; [4]Sandia National Laboratories

9:35 AM
Additive Manufacturing and Characterization of High-density Materials for Aerospace Applications: *Kristyn Kadala*[1]; Scott Smith[1]; [1]Lockheed Martin ATC

9:55 AM Invited
Computational Design and Additive Manufacturing-Enabled Fabrication of Functionally Graded Steel-to-Tungsten Joints for Fusion Energy Applications: *Dana Frankel*[1]; Marie Thomas[1]; Pin Lu[1]; Olga Eliseeva[2]; Tanner Kirk[2]; Raymundo Arroyave[2]; Ibrahim Karaman[2]; [1]QuesTek Innovations LLC; [2]Texas A&M University

10:25 AM Invited
Rapid Exploration of Refractory Complex Concentrated Alloys via Additive Manufacturing and Molecular Dynamics: *Andrew Kustas*[1]; Jonathan Pegues[1]; Michael Melia[1]; Raymond Puckett[1]; Shaun Whetten[1]; Morgan Jones[1]; Nicolas Argibay[1]; Michael Chandross[1]; [1]Sandia National Laboratories

10:55 AM
Application of Taguchi, Response Surface, and Artificial Neural Networks for Rapid Optimization of Laser-based Powder-Bed Fusion Process: *Ebrahim Asadi*[1]; Behzad Fotovvati[1]; Faridreza Attarzadeh[1]; [1]University of Memphis

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session I

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

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; 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; Arul Kumar Mariyappan, Los Alamos National Laboratory; Olivia Underwood, Sandia National Laboratories

Monday AM **March 15, 2021**

8:30 AM Invited
Mechanism of Hardening and Damage Initiation in Oxygen Embrittlement of Body-Centred-Cubic Niobium: *Weizhong Han*[1]; [1]Xi'an Jiaotong University

9:00 AM
Evaluation Method of Ductile-to-Brittle Transition Temperature Using Nano-indentation and Molecular Dynamics Simulation: *Yeonju Oh*[1]; Won-Seok Ko[2]; Nojun Kwak[1]; Takahito Ohmura[3]; Heung Nam Han[1]; [1]Seoul National University; [2]University of Ulsan; [3]National Institute for Materials Science

9:20 AM
Migration kinetics of twinning disconnections in nanotwinned Cu: an in situ HRTEM deformation study: *Quan Li*[1]; Jian Song[1]; GuiSen Liu[1]; Yue Liu[1]; XiaoQin Zeng[1]; [1]Shanghai Jiao Tong University

9:40 AM
High Angular Resolution EBSD From Spherical Harmonic Transform Indexing: *Gregory Sparks*[1]; Mark Obstalecki[2]; Paul Shade[2]; Michael Uchic[2]; Stephen Niezgoda[1]; Michael Mills[1]; [1]Ohio State University; [2]Air Force Research Laboratory

10:00 AM
Kinking in MAX Phases Studied via a Combined Experimental/ Computational Approach: *Gabriel Plummer*[1]; Garritt Tucker[1]; [1]Colorado School of Mines

10:20 AM
Studying Dislcoation Interactions in the Bulk Using Dark Field X-ray Microscopy: *Henning Friis Poulsen*[1]; [1]DTU

10:40 AM
Interactions between Dislocations and a Low-angle Grain Boundary in a Single Crystalline CrCoNi Medium-entropy Alloy: *Frederic Habiyaremye*[1]; Antoine Antoine Guitton[1]; Florian Schafer[2]; Felicitas Scholz[3]; Mike Schneider[3]; Jan Frenzel[3]; Guillaume Laplanche[3]; Nabila Maloufi[1]; [1]Université de Lorraine–CNRS–Arts et Métiers ParisTech–LEM3; [2]Saarland University; [3]Institut für Werkstoffe, Ruhr–Universität Bochum, Universitätsstr. 150

11:00 AM
Electron Microscopy-based Assessment of the Role of Short Range Order on Deformation Behavior of High and Medium Entropy Alloys: *Daniel Foley*[1]; James Hart[1]; Elaf Anber[2]; Robert Ritchie[3]; Andrew Minor[3]; Mark Asta[3]; Flynn Walsh[4]; Douglas Spearot[5]; Mitra Taheri[1]; [1]Johns Hopkins University; [2]Drexel University; [3]University of California, Berkeley; [4]Lawrence Berkeley National Laboratory; [5]University of Florida

ADVANCED MATERIALS

Advanced High Strength Steels V — Session I

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

Program Organizers: Ana Luiza Araujo, CBMM North America Inc.; Louis Hector, General Motors Global Technical Center; Igor Vieira, Nucor Steel; Lijia Zhao, ArcelorMittal USA; Krista Limmer, CCDC Army Research Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Sebastien Allain, Institut Jean Lamour; MingXin Huang, University of Hong Kong

Monday AM **March 15, 2021**

8:30 AM
Ferrite Recrystallization Investigated by In Situ High Energy X-ray Diffraction Experiments: *Clélia Couchet*[1]; Sébastien Allain[1]; Julien Teixeira[1]; Marc Moreno[2]; Guillaume Geandier[1]; Frédéric Bonnet[3]; [1]Institut Jean Lamour; [2]Transvalor S.A.; [3]ArcelorMittal

8:50 AM
Carbon Content in Carbide-free Bainite during Isothermal Transformations: Irina Pushkareva[1]; Babak Shalchi-Amirkhiz[1]; *Sebastien Allain*[2]; Guillaume Geandier[2]; Frédéric Danoix[3]; Fateh Fazeli[1]; Matthew Sztanko[1]; Colin Scott[1]; [1]CanMet Materials - Natural Resources Canada; [2]Institut Jean Lamour; [3]Groupe de Physique des Matériaux

9:10 AM
Dislocation Densities during Martensite Transformation in a Low-carbon Steel Determined by In Situ High Energy X-ray Diffraction: *Juan Macchi*[1]; Steve Gaudez[1]; Guillaume Geandier[1]; Julien Teixeira[1]; Sabine Denis[1]; Frédéric Bonnet[2]; Sébastien Allain[1]; [1]Institut Jean Lamour; [2]ArcelorMittal Research SA

9:30 AM
Effect of Phase Stability of Retained Austenite during Deformation in Low-alloy Multiphase Steels: *Avala Lavakumar*[1]; Myeong-heom PARK[1]; Hiroki Adachi[2]; Masugu Sato[3]; Nobuhiro Tsuji[1]; [1]Kyoto University; [2]University of Hyogo; [3]Japan Synchrotron Radiation Research Institute (JARSI), Sayo-gun, Hyogo

9:50 AM
Microstructural and Plastic Deformation Study of a Multi-phase Advanced High Strength Steel: AFM Monowar Hossain[1]; *Nilesh Kumar*; [1]University of Alabama Tuscaloosa

10:10 AM
Strain Rate Sensitive Martensite Transformation in a Q&P Steel: *Christopher Finfrock*[1]; Melissa Thrun[1]; Trevor Ballard[1]; John Copley[1]; Benjamin Ellyson[1]; Amy Clarke[1]; Kester Clarke[1]; [1]Colorado School of Mines

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VII — 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; Soumendra Basu, Boston University; Amit Pandey, Lockheed Martin Space; Paul Ohodnicki, University of Pittsburgh; Kyle Brinkman, Clemson University; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota

Monday AM **March 15, 2021**

Session Chairs: Jung Pyung Choi, Pacific Northwest National Laboratory; Partha Mukherjee, Purdue University

8:30 AM Keynote
Infiltration Strategies to Improve the Performance of Solid Oxide Fuel Cell Anodes: *Soumendra Basu*[1]; Boshan Mo[1]; Jillian Rix[1]; Srikanth Gopalan[1]; Uday Pal[1]; [1]Boston University

9:10 AM Keynote
Thermal Implications of Diverging Degradation Modes in Battery Electrodes and Opportunities to Enable Anode-free Systems: *Corey Love*[1]; Rachel Carter[1]; Robert Atkinson[2]; Todd Kingston[3]; [1]US Naval Research Laboratory; [2]EXCET, Inc.; [3]NRC/NRL Postdoctoral Research Associate

9:50 AM Keynote
Designing Electrode Architectures across Length Scales: Some Lessons Learned from Li-ion and "Beyond Li" Chemistries: *Sarbajit Banerjee*[1]; [1]Texas A&M University

CHARACTERIZATION

Advanced Real Time Imaging — Additive Manufacturing

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

Program Organizers: Jinichiro Nakano, US Department of Energy 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; Noritaka Saito, Kyushu University; Anna Nakano, US Department of Energy National Energy Technology Laboratory; Zuotai Zhang, Southern University of Science and Technology; Candan Tamerler, University of Kansas; Bryan Webler, Carnegie Mellon University; Wangzhong Mu, KTH Royal Institute of Technology; David Veysset, Stanford University

Monday AM **March 15, 2021**

Session Chairs: David Veysset, Stanford University; Jinichiro Nakano, USDOE National Energy Technology Laboratory

8:30 AM
An In Situ and Operando Additive Manufacturing Process Replicator for High Speed Optical, Infra-red and Synchrotron X-ray Imaging: *Sebastian Marussi*[1]; Chu Lun Alex Leung[1]; Samuel Clark[1]; Leigh Stranger[2]; Robert Atwood[3]; Veijo Honkimäki[4]; Alexander Rack[4]; Mike Besston[5]; Jon Willmott[2]; Peter Lee[1]; [1]University College London; [2]The University of Sheffield; [3]Diamond Light Source Ltd; [4]European Synchrotron Radiation Facility; [5]Oxford Lasers Ltd

8:50 AM
In Situ Characterization of the Balling Phenomenon in Additive Manufacturing: *Debomita Basu*[1]; Jack Beuth[1]; Bryan Webler[1]; [1]Carnegie Mellon University

9:10 AM
In-Situ Machine Learning Enabled Spatter Detection in Laser Powder Bed Fusion Additive Manufacturing: *Brandon Abranovic*[1]; Jack Beuth[1]; Rishikesh Magar[1]; Lalit Ghule[1]; Amir Farimani[1]; [1]Carnegie Mellon University

9:30 AM
High-speed Synchrotron X-ray Imaging of Metal Additive Manufacturing Processes: *Tao Sun*[1]; Kamel Fezzaa[2]; [1]University of Virginia; [2]Argonne National Laboratory

9:50 AM Invited
Characterizing Laser-Driven Metal Ejecta Interactions: *Alison Saunders*[1]; Camelia Stan[1]; Kyle Mackay[1]; Suzanne Ali[1]; Hans Rinderknecht[2]; Hye-Sook Park[1]; Jon Eggert[1]; Fady Najjar[1]; Tomorr Haxhimali[1]; Brandon Morgan[1]; Marcho Echeverria[3]; Jeremy Horwitz[1]; Yuan Ping[1]; [1]Lawrence Livermore National Laboratory; [2]Laboratory for Laser Energetics; [3]University of Connecticut

10:10 AM
Quantifying Spatter in Powder Bed Fusion Processes with High-Speed Video Observations and Machine Learning: *Christian Gobert*[1]; Evan Diewald[1]; Jack Beuth[1]; [1]Carnegie Mellon University

MATERIALS PROCESSING

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

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

Program Organizers: Bowen Li, Michigan Technological University; Shefford Baker, Cornell University; Huazhang Zhai, Beijing Institute of Technology; Kathy Lu, Virginia Polytechnic Institute and State University; 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; Eugene Olevsky, San Diego State University

Monday AM **March 15, 2021**

Session Chairs: Ruigang Wang, The University of Alabama; Jinhong Li, China University of Geosciences (Beijing)

8:30 AM Invited
Structural Integrity of Complex Oxide Scales for Improved Oxidation Resistance of Ultra-high Temperature Ceramics: *Ambreen Nisar*[1]; Cheng Zhang[1]; Benjamin Boesl[1]; Arvind Agarwal[1]; [1]Florida International University

8:50 AM Invited
New Insights into Sintering Processing for Solid State Electrolytes – A Phase-Field Simulation Study
: *Rongpei Shi*[1]; Marissa Wood[1]; Jose Espitia[1]; Xiaosi Gao[2]; Joshua Hammons[1]; LiWen Wan[1]; Shin Young Kang[1]; Dive Mukund[1]; Kwangnam Kim[1]; Tae Wook Heo[1]; Brandon Wood[1]; Jianchao Ye[1]; [1]Lawrence Livermore National Laboratory; [2]Cornell University

9:10 AM
Flash Sintering of Gadolinium-doped Ceria: Densification and Microstructure: *Tarini Prasad Mishra*[1]; Viviana Avila[2]; Rubens Roberto Ingraci Neto[2]; Rishi Raj[2]; Olivier Guillon[1]; Martin Bram[1]; [1]Forschungszentrum Jülich GmbH; [2]University of Colorado Boulder

9:30 AM
Processing of TiB2-TiC Based Materials with Fine Microstructure and Improved Mechanical Properties: *Zhezhen Fu*[1]; [1]University of Wisconsin Platteville

9:50 AM
Discovery of Novel High-entropy Ceramics via Machine Learning: *Kevin Kaufmann*[1]; William Mellor[1]; Tyler Harrington[1]; Chaoyi Zhu[1]; Alexander Rosengarten[1]; Daniel Maryanovsky[1]; Kenneth Vecchio[1]; [1]University of California, San Diego

10:10 AM
Elucidating the Influence of the Thermodynamics, Kinetics, and Chemistries of Molten Salts to Synthesize Ceramics for Energy Applications: *Benjamin Levitas*[1]; Katsuyoshi Kakinuma[2]; Srikanth Gopalan[1]; [1]Boston University; [2]University of Yamanashi

10:30 AM
Effects of Yttria Content and Atmosphere on Structural Evolution of Highly Porous Yttria-stabilized Zirconia Aerogels: *Nathaniel Olson*[1]; Frances Hurwitz[2]; Haiquan Guo[3]; Jessica Krogstad[1]; [1]University of Illinois Urbana Champaign; [2]NASA Glenn Research Center; [3]Ohio Aerospace Institute

MATERIALS DESIGN

AI/Data Informatics: Applications and Uncertainty Quantification at Atomistics and Mesoscales — Session I

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

Program Organizers: Kamal Choudhary, National Institute of Standards and Technology; Garvit Agarwal, Argonne National Laboratory; Wei Chen, Illinois Institute of Technology; Mitchell Wood, Sandia National Laboratories; Vahid Attari, Texas A&M University; Oliver Johnson, Brigham Young University; Richard Hennig, University of Florida

Monday AM **March 15, 2021**

Session Chairs: Ghanshyam Pilania, LANL; Garvit Agarwal, ANL

8:30 AM
Are We Making Progress on ML Algorithms for Structure-property Relationships? Using MatBench as a Test Bed: *Anubhav Jain*[1]; [1]Lawrence Berkeley National Laboratory

9:00 AM
Model Comparison and Uncertainty Prediction for ML Models of Crystalline Solids Material Properties: *Francesca Tavazza*[1]; Kamal Choudhary[1]; Brian De Cost[1]; [1]NIST

9:30 AM
Data Science Approaches to Develop Predictive Models for Energy-relevant Materials: *Badri Narayanan*[1]; [1]University of Louisville

10:00 AM
Discovery and Classification of Double Spinel Chemical Space: *Ghanshyam Pilania*[1]; Vancho Kocevski[1]; Blas Uberuaga[1]; [1]Los Alamos National Laboratory

10:30 AM
Inverse Design of Energy Storage Materials via Active Learning: *Hieu Doan*[1]; Garvit Agarwal[1]; Rajeev Assary[1]; [1]Argonne National Laboratory

10:50 AM
Accelerating the Discovery of Self-Reporting Redox-active Materials Using Quantum Chemistry Guided Machine Learning: *Garvit Agarwal*[1]; Hieu Doan[1]; Lily Robertson[1]; Lu Zhang[1]; Rajeev Assary[1]; [1]Argonne National Laboratory

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Machine Learning and Atomistic Algorithms to Accelerate Materials Study and Design

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

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

Monday AM **March 15, 2021**

Session Chairs: Mohsen Asle Zaeem, Colorado School of Mines; Mikhail Mendelev, Ames Laboratory

8:30 AM Invited
Theory-infused Machine Learning Algorithms of Chemisorption at Metal Surfaces: *Hongliang Xin*[1]; [1]Virginia Polytechnic Institute and State University

9:00 AM Invited
Accelerating Atomistic Monte Carlo Simulations with Autoregressive Models: *Rafael Gomez-Bombarelli*[1]; James Damewood[1]; [1]Massachusetts Institute of Technology

9:30 AM
Application of a Shape Moment Descriptor Set Towards a Robust and Transferable Description of Local Atomic Environments: *Jacob Tavenner*[1]; Edward Kober[2]; Garritt Tucker[1]; [1]Colorado School of Mines; [2]Los Alamos National Laboratory

9:50 AM Invited
High Speed Artificial Neural Network Implementation of Interatomic Force Fields in Metals: *Doyl Dickel*[1]; Christopher Barrett[1]; Mashroor Nitol[1]; [1]Mississippi State University

10:20 AM
Machine Learning and Supercomputing to Accelerate the Development of ReaxFF Interatomic Potentials: *N. S. Harsha Gunda*[1]; Jian Peng[1]; Yun Kyung Shin[2]; Sangkeun Lee[1]; Adri C. T. Van Duin[2]; Dongwon Shin[1]; [1]Oak Ridge National Laboratory; [2]Pennsylvania State University

10:40 AM
Development of Machine Learned SNAP Potentials for Studying Radiation Damage in Materials: *Mary Alice Cusentino*[1]; Mitchell Wood[1]; Aidan Thompson[1]; [1]Sandia National Laboratories

11:00 AM
Computational Synthesis of Substrates by Crystal Cleavage: *Joshua Paul*[1]; Alice Galdi[2]; Richard Hennig[1]; [1]University of Florida; [2]Cornell University

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications IX — Session I

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

Program Organizers: Hsin-Jay Wu, National Chiao Tung University; Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Cnrs Crismat Unicaen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Lan Li, Boise State University; Takao Mori, National Institute for Materials Science; Tiejun Zhu, Zhejiang University; Alexandra Zevalkink, Michigan State University; Wan-Ting Chiu, Tokyo Institute of Technology

Monday AM **March 15, 2021**

Session Chairs: Hsin-Jay Wu, National Chiao-Tung University; Albert T. Wu, National Central University

8:30 AM
Introductory Comments: Alloys and Compounds for Thermoelectric and Solar Cell Applications IX: *Hsin-Jay Wu*[1]; [1]National Chiao Tung University

8:35 AM Invited
n-Bi2-xSbxTe3 as an Alternative to Mainstream n-Bi2Te3-xSex Near Room Temperature: *Jian He*[1]; Lipeng Hu[2]; [1]Clemson University; [2]Shenzhen University

8:55 AM Invited
Enhanced Thermoelectric Figure-of-Merit in Nanostructured n-type Bi2Te3 via Phase Diagram Engineering: Hsin-Ching Huang[1]; Wan-Ting Yen[2]; *Hsin-Jay Wu*[2]; [1]National Sun Yat-sen University; [2]National Chiao Tung University

9:15 AM Invited
Unique Influences of Laser Additive Manufacturing on Multiscale Structuring of Bismuth Telluride Thermoelectric Materials: *Saniya Leblanc*[1]; Ryan Welch[1]; Bengisu Sisik[1]; [1]George Washington University

9:35 AM Invited
Assessment of Electroless Cobalt Diffusion Layer for Bi_2Te_3-based Thermoelectric Module: *Albert T. Wu*[1]; Chun-Hsien Wang[1]; [1]National Central University

9:55 AM
Effect of Interfacial Reaction on Bi2Te3 and Sb2Te3 Thin-film Thermoelectric Module: *Kai-Wen Cheng*[1]; Zhen-Wei Sun[1]; Albert T. Wu[1]; [1]National Central University

10:15 AM
Thermomagnetic Properties of Single-crystal 2H-$NbSe_2$ and Bi_2Te_3: *Md Sabbir Akhanda*[1]; S. Emad Rezaei[1]; Md Golam Rosul[1]; Keivan Esfarjani[1]; Sergiy Krylyuk[2]; Albert Davydov[2]; Mona Zebarjadi[1]; [1]University of Virginia; [2]National Institute of Standards and Technology

BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Bio-Nano 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

Monday AM **March 15, 2021**

Session Chairs: Candan Tamerler, Uniersity of Kansas; KAlpana Katti, North Dakota State University

8:30 AM Invited
Bio-imaging with Photoluminescence of Single-layer MoS2: *Yuhei Hayamizu*[1]; [1]Tokyo Institute of Technology

9:00 AM Invited
Stickiness at Bio-nano-interfaces: From Nanoscale Characterization to Macroscale Properties: *Hannes Schniepp*[1]; [1]College of William & Mary

9:30 AM Invited
Insight into the Mechanobiological Progression of Cancer Metastasis to Bone: *Dinesh Katti*[1]; Sharad Jaswandkar[1]; Kalpana Katti[1]; [1]North Dakota State University

10:00 AM
Control of Scaffold Shear Forces Through a Perfusion Bioreactor for Design of Prostate Cancer Bone Metastasis Testbed: *Haneesh Jasuja*[1]; Akerkouch Lahcen[1]; Trung Le[1]; Dinesh Katti[1]; Kalpana Katti[1]; [1]North Dakota State University

CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2021 — Advanced Characterization Methods I

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

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Instituto Militar de Engenharia; Shadia Ikhmayies; 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; Rajiv Soman, Eurofins EAG Materials Science LLC; Alex Moser, US Naval Research Laboratory

Monday AM **March 15, 2021**

Session Chairs: Alex Moser, U.S. Naval Research Laboratory; Juan Escobedo-Diaz, University of New South Wales

8:30 AM
Performance of High Fidelity Inert Thermomechanical Mocks Over a Diverse Range of Strain Rates and Temperatures: *Alexandra Burch*[1]; Benjamin Morrow[1]; Carl Cady[1]; David Bahr[2]; John Yeager[1]; [1]Los Alamos National Laboratory; [2]Purdue University

8:50 AM
Microstructure Characterization of Aluminum 1100 Using Ultrasonic Backscatter Measurements and Synthetic Polycrystals: *Musa Norouzian*[1]; Joseph Turner[1]; [1]University of Nebraska-Lincoln

9:10 AM
A Lightweight Mossbauer Spectrometer for Lunar Exploration Using a Piezoelectric Doppler Drive: *Pedro Guzman*[1]; Stefan Lohaus[1]; Valerie Scott[2]; Brent Fultz[1]; [1]California Institute of Technology; [2]Jet Propulsion Laboratory, California Institute of Technology

9:30 AM
SAXS Tomography of Precipitation Hardened Multilayer Al Alloy Sheets: *Shan Lin*[1]; Hiroshi Okuda[1]; [1]Kyoto University

9:50 AM
APT Composition Profiling for Accurate Evaluation of Diffusion Coefficients in the Zr-Ta Binary System: *Yaqiao Wu*[1]; Megha Dubey[1]; Shujuan Wang[1]; Chuangye Wang[2]; Ji-Cheng Zhao[2]; [1]Boise State University; [2]University of Maryland

10:10 AM
Large-scale Crystal Orientation Mapping by Directional Reflectance Microscopy: *Matteo Seita*[1]; Xiaogang Wang[1]; Mallory Wittwer[1]; [1]Nanyang Technological University

10:30 AM
Utilization of Magneto-optical Kerr Effect Microscopy for Microstructural Characterization of Steels: *Matic Jovicevic-Klug*[1]; Patricia Jovicevic-Klug[1]; Lars Thormählen[2]; Jeffrey McCord[2]; Bojan Podgornik[1]; [1]Institute of Metals and Technology; [2]Institute for Materials Science, Kiel University

10:50 AM
Characterization of Dealloyed Gradient Nanoporous Foams: *Karina Hemmendinger*[1]; Andrea Hodge[1]; [1]University of Southern California

NUCLEAR MATERIALS

Characterization of Nuclear Materials and Fuels with Advanced X-ray and Neutron Techniques — X-ray Diffraction/Scattering I

Sponsored by: TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Nuclear Materials Committee

Program Organizers: Xuan Zhang, Argonne National Laboratory; Jonathan Almer, Argonne National Laboratory; Maria Okuniewski, Purdue University; Joshua Kane, Idaho National Laboratory; Donald Brown, Los Alamos National Laboratory; J. Kennedy, Idaho National Laboratory; Arthur Motta, Pennsylvania State University

Monday AM **March 15, 2021**

Session Chairs: Jonathan Almer, Argonne National Laboratory; Maria Okuniewski, Purdue University

8:30 AM Invited
Synchrotron High-energy X-ray Studies of Nuclear Reactor Materials: *Meimei Li*[1]; Xuan Zhang[1]; Jonathan Almer[1]; Jun-Sang Park[1]; Peter Kenesei[1]; Andrew Chuang[1]; [1]Argonne National Laboratory

9:00 AM
Evolution of Stresses in Deformation Twins in the Plastic Zone Using Three-dimensional Synchrotron X-ray Diffraction: Hamidreza Abdolvand[1]; *Karim Louca*[1]; Charles Mareau[2]; Marta Majkut[3]; Jonathan Wright[3]; [1]Western University; [2]Arts et Métiers ParisTech; [3]European Synchrotron Radiation Facility (ESRF)

9:20 AM
Characterization of Long Range Ordering in Ni-based Alloys with Ex-situ and In-situ Synchrotron X-ray Diffraction: *Nicholas Aerne*[1]; David Sprouster[2]; Fei Teng[3]; Mehmet Topsakal[4]; Adrien Couet[5]; Kumar Sridharan[5]; Julie Tucker[1]; [1]Oregon State University; [2]Stony Brook University; [3]Idaho National Lab; [4]Brookhaven National Lab; [5]University of Wisconsin-Madison

9:40 AM
Irradiation-induced Effects in HT-UPS Steel Using Far-field X-ray Diffraction and Grain Tracking Analysis: *Sri Tapaswi Nori*[1]; Alejandro Figueroa[1]; Jonova Thomas[1]; Hemant Sharma[2]; Jun-Sang Park[2]; Peter Kenesei[2]; Jonathan Almer[2]; Maria Okuniewski[1]; [1]Purdue University; [2]Argonne National Laboratory

10:00 AM Invited
Multimodal Synchrotron Characterization of Transmutation Products in Structural Materials: *David Sprouster*[1]; J Trelewicz[1]; D Morrall[2]; X Hu[2]; C Parish[2]; B Wirth[3]; Y Katoh[2]; L Snead[1]; [1]Stony Brook University; [2]ORNL; [3]University of Tennessee, Knoxville

10:30 AM
4D X-ray Diffraction Microscopy Study of Tensile Deformation of Neutron-irradiated Fe-9Cr Alloy: *Xuan Zhang*[1]; Dominic Piedmont[2]; Jun-Sang Park[1]; Peter Kenesei[1]; Jonathan Almer[1]; Meimei Li[1]; [1]Argonne National Laboratory; [2]University of Illinois at Urbana-Champaign

10:50 AM
In-Situ XRD Study of Alloy 709's Mechanical Behavior for Advanced Fast Reactor Applications: *Dominic Piedmont*[1]; Donghee Park[1]; Victoria Riso[1]; Xiang Liu[1]; James Stubbins[1]; [1]University of Illinois at Urbana Champaign

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CORROSION

Coatings and Surface Engineering for Environmental Protection III — Protection from Environmental Degradation, Session I

Sponsored by: TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Surface Engineering Committee, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Arif Mubarok, PPG; Tushar Borkar, Cleveland State University; Rajeev Gupta, North Carolina State University; Mary Lyn Lim, PPG Industries; Raul Rebak, GE Global Research; Brian Okerberg, PPG Industries

Monday AM **March 15, 2021**

8:30 AM
Revealing the Long-term Growth Kinetics and Morphology of Atmospheric Corrosion Pitting in Aluminum via In-operando Microtomography: *Philip Noell*[1]; Michael Melia[1]; Eric Schindelholz[2]; [1]Sandia National Laboratories; [2]The Ohio State University

8:50 AM
Pitting Corrosion in Powder-processed Aluminum Alloys Containing Quasicrystalline Dispersoids: *Sarshad Rommel*[1]; Hannah Leonard[1]; Mingxuan Li[1]; Thomas Watson[2]; Tod Policandriotes[3]; Mark Aindow[1]; [1]University of Connecticut; [2]Pratt & Whitney; [3]Collins Aerospace

9:10 AM
The Effect of Surface Treatment on the Formation, Structure, and Chemistry of Protective Oxide Scale on High-temperature Oxidation-resistant Nickel Alloys: *Stephen House*[1]; Henry Ayoola[1]; John Lyons[1]; Meng Li[1]; Bingtao Li[1]; Judith Yang[1]; Wissam Saidi[1]; Brian Gleeson[1]; [1]University of Pittsburgh

9:30 AM
Cycling Corrosion Testing of Al-Mg Friction Stir Welding Bi-metallic Joints: *Qingli Ding*[1]; Brajendra Mishra[1]; Adam C Powell[1]; Kübra Karayagiz[1]; [1]Worcester Polytechnic Institute

9:50 AM
Dealloying and Passivation of Cu-doped Carbide-reinforced Martensitic Steels in a Sulfuric Acid: *Kenta Yamanaka*[1]; Manami Mori[2]; Kazuo Yoshida[1]; Kazuyo Omura[1]; Yusuke Onuki[3]; Shigeo Sato[3]; Akihiko Chiba[1]; [1]Tohoku University; [2]National Institute of Technology, Sendai College; [3]Ibaraki University

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NUCLEAR MATERIALS

Composite Materials for Nuclear Applications — TRISO Fuel

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

Program Organizers: Anne Campbell, Oak Ridge National Laboratory; Dong Liu, University of Bristol; Rick Ubic, Boise State University; Lauren Garrison, Oak Ridge National Laboratory; Peng Xu, Idaho National Laboratory; Johann (Hans) Riesch, Max Planck Institute for Plasma Physics

Monday AM **March 15, 2021**

Session Chair: Dong Liu, University of Bristol

8:30 AM Invited
Tristructural Isotropic (TRISO) Fuel for High-Temperature, Passively-Safe Nuclear Reactors: *John Stempien*[1]; Paul Demkowicz[1]; John Hunn[2]; [1]Idaho National Laboratory; [2]Oak Ridge National Laboratory

9:00 AM
Experimental Characterisation of the Variation of Local Residual Stresses in TRISO Coatings: *Alex Leide*[1]; Steven Knol[2]; Arjan Vreeling[2]; Dave Goddard[3]; Dong Liu[1]; [1]University of Bristol; [2]NRG; [3]National Nuclear Laboratory

9:20 AM
Post-irradiation Examinations of TRISO Particles Corroded in Molten FLiBe Salt under Neutron Irradiation: *Guiqiu Zheng*[1]; David Carpenter[1]; [1]Massachusetts Institute of Technology

MATERIALS DESIGN

Computational and Modeling Challenges in Metals and Alloys for Extreme Environments — Extreme Environment Simulations from Nano- to Macro-scale

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

Program Organizers: Jean-Briac le Graverend, Texas A&M University; Jaafar El-Awady, Johns Hopkins University; Giacomo Po, University of Miami; Beñat Gurrutxaga-Lerma, University of Birmingham

Monday AM **March 15, 2021**

Session Chairs: Jean-Briac le Graverend, Texas A&M University; Avinash Dongare, University of Connecticut

8:30 AM
Molecular Dynamics Modeling of the Influence of Magnesium Dopants on Grain Boundary Stabilization in Nanocrystalline Aluminum: *Wenye Ye*[1]; Leslie Mushongera[1]; [1]University of Nevada, Reno

8:50 AM
Understanding Interface Properties Through Dislocation Dynamics Simulations in Metallic Nanolaminates: *Aritra Chakraborty*[1]; Miroslav Zecevic[1]; Abigail Hunter[1]; Xiang-Yang Liu[1]; Ricardo Lebensohn[1]; Laurent Capolungo[1]; [1]Los Alamos National Laboratory

9:10 AM
A Thermo-mechanical Model of the Dynamics of Dislocation Fields in Transient Heterogeneous Temperature Fields: *Manas Upadhyay*[1]; [1]LMS, CNRS, Ecole Polytechnique, Institut Polytechnique de Paris

9:30 AM
Multi-scale Simulations of Crystallographic Facet-orientation Dependent Corrosion Behavior in Metallic Alloys: *Rongpei Shi*[1]; Stephen Weitzner[1]; Tim Hsu[1]; Xiao Chen[1]; Tae Wook Heo[1]; Tuan Pham[1]; Christine Orme[1]; Morris Wang[1]; Brandon Wood[1]; [1]Lawrence Livermore National Laboratory

9:50 AM
The Role of Precipitates on the Microstructure-sensitive Creep Response of 347H Steel via Crystal Plasticity Simulations: *Veerappan Prithivirajan*[1]; Nathan Beets[1]; Aritra Chakraborty[1]; M Arul Kumar[1]; Ricardo Lebensohn[1]; Laurent Capolungo[1]; [1]Los Alamos National Laboratory

10:10 AM
Lattice Orientation Effect on Intragranular Void Growth in Single- and Poly-crystalline Metals: *Paul Christodoulou*[1]; Sylvain Dancette[2]; Ricardo Lebensohn[3]; Eric Maire[2]; Irene Beyerlein[1]; [1]University of California, Santa Barbara; [2]Institut National des Sciences Appliquées de Lyon; [3]Los Alamos National Laboratory

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Grain Boundary Properties and Kinetics

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

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Vahid Attari, Texas A&M University; Jorge Munoz, University of Texas at El Paso

Monday AM **March 15, 2021**

Session Chairs: Reza Darvishi Kamachali, Federal Institute for Materials Research and Testing (BAM); Brandon Runnels, University of Colorado; Ian Winter, Lawrence Livermore National Laboratory; Nana Ofori-Opoku, Canadian Nuclear Laboratories

8:30 AM
Introductory Comments: Computational Thermodynamics and Kinetics: *Nana Ofori-Opoku*[1]; [1]Canadian Nuclear Laboratories

8:35 AM
Extracting and Examining the Grain Boundary Diffusivity Tensor of Hydrogen in Nickel Using Atomistic Simulations: *David Page*[1]; Hadley Peay[1]; Katie Varela[1]; Oliver Johnson[1]; David Fullwood[1]; Eric Homer[1]; [1]Brigham Young University

8:55 AM Invited
Elastic Interactions in Grain Boundary Phase Transformations: *Ian Winter*[1]; Robert Rudd[1]; Tomas Oppelstrup[1]; Timofey Frolov[1]; [1]Lawrence Livermore National Laboratory

9:25 AM
Atomistic Modeling of Carbon Atom Redistribution in the Fe-C Martensite: Helena Zapolsky[1]; Felix Schwab[1]; *Gilles Demange*[2]; Frederic Danoix[1]; Renaud Patte[1]; Armen Khachaturyan[3]; [1]Cnrs, Gpm, Umr 6634; [2]Cnrs-University of Rouen Normandy; [3]Rutgers University

9:45 AM Invited
Density-based Thermodynamics of Microstructure Defects: Lei Wang[1]; *Reza Darvishi Kamachali*[1]; [1]Federal Institute for Materials Research and Testing (BAM)

PHYSICAL METALLURGY

Continuous Phase Transformations — Session I

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

Program Organizers: Jessica Krogstad, University of Illinois at Urbana-Champaign; Gregory Thompson, University of Alabama; Matthew Steiner, University of Cincinnati; Janelle Wharry, Purdue University

Monday AM **March 15, 2021**

Session Chairs: Jessica Krogstad, University of Illinois at Urbana-Champaign; Gregory Thompson, University of Alabama

8:30 AM Invited
Cluster Variation Model of Phase Behavior in Heusler-forming Alloy Systems: *Michael Widom*[1]; [1]Carnegie Mellon University

9:00 AM Invited
Interfacial Spinodals: *Reza Darvishi Kamachali*[1]; [1]Federal Institute for Materials Research and Testing (BAM)

9:30 AM
Competitive Partitioning and Decomposition Evolution in Nanocrystalline Alloys: *Gregory Thompson*[1]; Xuyang Zhou[2]; Reza Kamachali[3]; Jaber Mianroodi[4]; Alisson Kwiatkowski da Silva[4]; Pratheek Shanthraj[5]; Dirk Ponge[4]; Baptiste Gault[4]; Bob Svendsen[6]; Dierk Raabe[4]; Brad Boyce[7]; Blythe Clark; Blythe Clark; Blythe Clark[7]; [1]University of Alabama; [2]Max-Planck-Institut für Eisenforschung ; [3]Federal Institute for Materials Research and Testing (BAM); [4]Max-Planck-Institut für Eisenforschung; [5]The University of Manchester; [6]Aachen University; [7]Sandia National Laboratories

9:50 AM
Study of Precipitation Behavior of High-Cr Ni-based Filler Metals Using In-situ S/TEM: *Cheng-Han Li*[1]; Sriram Vijayan[1]; Carolin Fink[1]; Joerg Jinschek[1]; [1]The Ohio State University

10:10 AM Invited
Microstructural Engineering of Ni-based Superalloys Processed by Conventional and Additive Manufacturing: Felix Theska[1]; Nima Haghdadi[1]; *Sophie Primig*[1]; [1]University of New South Wales

10:40 AM
Phase Competition in the Two Steps Continuous Phase Transformation during Solidification of Terbium: *Huajing (Wilson) Song*[1]; M.I. Mendelev[2]; [1]Physics and Chemistry of Materials, Los Alamos National Lab; [2]Ames Laboratory, US Department of Energy

CORROSION

Corrosion in Heavy Liquid Metals for Energy Systems — Materials Compatibility with Liquid Metal Coolants I

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

Program Organizers: Osman Anderoglu, University of New Mexico; Alessandro Marino, SCK-CEN; Michael Short, Massachusetts Institute of Technology; Peter Hosemann, University of California; Mike Ickes, Westinghouse Electric Company

Monday AM **March 15, 2021**

Session Chairs: Alessandro Marino, SCK-CEN; Michael Short, MIT

8:30 AM
Material Needs and Developments for the Westinghouse Lead Fast Reactor: *Mike Ickes*[1]; Arash Parsi[1]; Luke Czerniak[1]; Paolo Ferroni[1]; [1]Westinghouse Electric Company

8:50 AM Invited
Compatibility of Alumina-forming Austenitic Steels in Static and Flowing Pb: *Bruce Pint*[1]; Jiheon Jun[1]; Michael Brady[1]; Yuki Yamamoto[1]; Michael Ickes[2]; [1]Oak Ridge National Laboratory; [2]Westinghouse Electric Company

9:15 AM
Fundamental Interactions of Steels and Nickel-based Alloys with Lead-based Liquid Alloys or Liquid Tin: *Carsten Schroer*[1]; [1]Karlsruhe Institute of Technology (KIT)

9:35 AM Invited
Exposure Tests of Different Materials in Liquid Lead for LFRs: Effect of the Dissolved Oxygen on Corrosion: *Serena Bassini*[1]; Camillo Sartorio[1]; Andrea Antonelli[1]; Sebastiano Cataldo[1]; Angela Fiore[1]; Massimo Angiolini[1]; Daniele Martelli[1]; Micheal Ickes[2]; Paolo Ferroni[2]; Ivan Di Piazza[1]; Mariano Tarantino[1]; [1]ENEA; [2]Westinghouse Electric Company

10:00 AM Invited
Corrosion of Refractory Metals and Advanced Steels in Lead-bismuth Eutectic: *Stuart Maloy*[1]; Keith Woloshun[1]; Eric Olivas[1]; Robert Wahlen[2]; Terry Grimm[2]; [1]Los Alamos National Laboratory; [2]Niowave Inc.

10:25 AM
Corrosion Investigations of Materials in Antimony-tin and Antimony-bismuth Alloys For Liquid Metal Batteries: *Tianru Zhang*[1]; Annette Heinzel[1]; Adrian Jianu[1]; Alfons Weisenburger[1]; Georg Müller[1]; [1]Karlsruhe Institute of Technology

10:45 AM
Lead Bismuth Eutectic Corrosion on Austenitic Stainless Steel: *Peter Hosemann*[1]; Konstanza Lambrinou[1]; David Frazer[1]; Erich Stergar[1]; [1]University of California Berkeley

11:05 AM
Corrosion Behaviour and Microstructural Stability of Alumina-forming Austenitic Steels Exposed to Oxygen-containing Molten Lead: *Annette Heinzel*[1]; Adrian Jianu[1]; Alfons Weisenburger[1]; Hao Shi[1]; Renate Fetzer[1]; Georg Müller[1]; [1]Karlsruher Institut of Technology

11:25 AM
Liquid Metal Embrittlement of Al-containing High-entropy Alloys Exposed to Lead-bismuth Eutectic: *Xing Gong*[1]; [1]Shenzhen University

CHARACTERIZATION

Data Science and Analytics for Materials Imaging and Quantification — Session I: Data-led Approaches for 2D Characterization & EBSD

Sponsored by: TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Emine Gulsoy, Northwestern University; Charudatta Phatak, Argonne National Laboratory; Stephan Wagner-Conrad, Carl Zeiss Microscopy; Marcus Hanwell, Brookhaven National Laboratory; David Rowenhorst, Naval Research Laboratory; Tiberiu Stan, Northwestern University

Monday AM **March 15, 2021**

Session Chair: Emine Gulsoy, Northwestern University

8:30 AM
Introductory Comments: Data Science and Analytics for Materials Imaging and Quantification: *Emine Gulsoy*[1]; [1]Northwestern University

8:35 AM
Computer Vision and Machine Learning for Microstructural Characterization and Analysis: *Elizabeth Holm*[1]; Ryan Cohn[1]; Nan Gao[1]; Katelyn Jones[1]; Bo Lei[1]; Srujana Yarasi[1]; [1]Carnegie Mellon University

9:00 AM
Microstructure Image Segmentation with Deep Learning: from Supervised to Unsupervised Methods: *Bo Lei*[1]; Elizabeth Holm[1]; [1]Carnegie Mellon University

9:20 AM
Improved EBSD Indexing through Non-Local Pattern Averaging: *David Rowenhorst*[1]; Patrick Brewick[1]; [1]Naval Research Laboratory

9:45 AM
Resolving Pseudosymmetry in Tetragonal ZrO_2 Using EBSD with a Modified Dictionary Indexing Approach: *Edward Pang*[1]; Peter Larsen[1]; Christopher Schuh[1]; [1]Massachusetts Institute of Technology

10:05 AM
Dictionary Indexing of EBSD Patterns Assisted by Convolutional Neural Network: *Zihao Ding*[1]; Marc Graef[1]; [1]Carnegie Mellon University

10:25 AM
Advancements in EBSD Using Machine Learning: *Kevin Kaufmann*[1]; Chaoyi Zhu[1]; Alexander Rosengarten[1]; Daniel Maryanovsky[1]; Tyler Harrington[1]; Hobson Lane[2]; [1]University of California, San Diego; [2]Tangible AI LLC

MATERIALS PROCESSING

Deformation Induced Microstructural Modification — Session I: Deformation of Pure Metals and Model Alloys

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

Program Organizers: Arun Devaraj, Pacific Northwest National Laboratory; Suveen Mathaudhu, University of California-Riverside; Kester Clarke, Colorado School of Mines; Bharat Gwalani, Pacific Northwest National Laboratory; Daniel Coughlin, Los Alamos National Laboratory

Monday AM **March 15, 2021**

Session Chair: Arun Devaraj, Pacific Northwest National Laboratory

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8:30 AM
Introductory Comments: Deformation Induced Microstructural Modification: *Arun Devaraj*[1]; [1]Pacific Northwest National Laboratory

8:35 AM Invited
Phase Evolution in Two-phase Alloys during Severe Plastic Deformation: Nirab Pant[1]; Nisha Verma[1]; Yinon Ashkenazy[1]; *Pascal Bellon*[1]; Robert Averback[1]; [1]University of Illinois at Urbana-Champaign

9:05 AM
Extreme Shear-deformation-induced Modification of Defect Structures and Hierarchical Microstructure in Immiscible Alloy: *Bharat Gwalani*[1]; Matthew Olszta[1]; Anqi Yu[2]; Krassimir Bozhilov[2]; Soumya Varma[3]; Siddhartha Pathak[3]; Aashish Rohatgi[1]; Suveen Mathaudhu[1]; Peter Sushko[1]; Cynthia Powell[1]; Arun Devaraj[1]; [1]Pacific Northwest National Laboratory; [2]University of California, Riverside; [3]Iowa State University

9:25 AM Invited
Microstructural Changes in Nanotwinned Metals under Various Deformation Modes: *Andrea Hodge*[1]; [1]University of Southern California

9:55 AM
Effect of Cryogenic Equal Channel Angular Pressing on Mechanical Behavior and Microstructure of Pure Copper: *Pedro Henrique Oliveira*[1]; Danielle Magalhães[1]; Andrea Kliauga[1]; Vitor Sordi[1]; [1]Federal University of São Carlos

10:15 AM
Influence of Deformation on Microstructure of Al4Si and Cu4Nb Alloys during Friction Stir Processing: A Multi-modal Microstructural Characterization Study: *Julian D. Escobar*[1]; Bharat Gwalani[1]; Matthew Olszta[1]; Joshua Silverstein[1]; Luciano Bergmann[2]; Jorge dos Santos[2]; Peter Staron[2]; Emad Maawad[2]; Benjamin Klusemann[2]; Suveen Mathaudhu[2]; Arun Devaraj[1]; [1]Pacific Northwest National Laboratory; [2]Helmholtz-Zentrum Geesthacht

10:30 AM Invited
Hierarchical Microstructure in Shear Bands of Pure Titanium: Xiaolong Ma[1]; Dexin Zhao[2]; Dinakar Sagapuram[2]; *Kelvin Xie*[2]; [1]Pacific Northwest National Lab; [2]Texas A&M University

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SPECIAL TOPICS

Design and Manufacturing Approaches for the Next Generation of Sustainable Materials: The 2021 Student-led Symposium — Challenges in Sustainable Materials: Novel Processing and Recycling

Sponsored by: TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Mary Dougherty, Colorado School of Mines; Christopher Finfrock, Colorado School of Mines; Brady McBride, Colorado School of Mines; Jaden Zymbaluk, Colorado School of Mines; Desmond Mills, Colorado School of Mines; Casey Gilliams, Colorado School Of Mines

Monday AM **March 15, 2021**

Session Chairs: Mary Dougherty, Colorado School of Mines; Christopher Finfrock, Colorado School of Mines; Casey Gilliams, Colorado School of Mines; Brady McBride, Colorado School of Mines; Desmond Mills, Colorado School of Mines; Jaden Zymbaluk, Colorado School of Mines

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8:30 AM
Introductory Comments: Design and Manufacturing Approaches for the Next Generation of Sustainable Materials: The 2021 Student-led Symposium: *Christopher Finfrock*[1]; [1]Colorado School of Mines

8:35 AM Invited
Research with a Sustainable Materials Science and Engineering Approach: *Bryan Boudouris*[1]; Lynnette Madsen[1]; [1]National Science Foundation

8:55 AM Invited
Research Requirements for Sustainable Materials: *Daniel Cooper*[1]; [1]University of Michigan

9:15 AM Invited
Creating New Green Jobs Starts at the Product Design Stage: *Justine Burt*[1]; [1]Appraccel

9:35 AM Invited
Materials Innovations Towards Decarbonization of Industrial Processes: *Elsa Olivetti*[1]; [1]Massachusetts Institute of Technology

9:55 AM Invited
Genomic Computational Design: Materials for Sustainability: *Gregory Olson*[1]; [1]Massachusetts Institute of Technology

10:15 AM Invited
Additive Manufacturing of High Temperature Materials: New Alloys and Sustainability Considerations: *Tresa Pollock*[1]; [1]University of California, Santa Barbara

10:35 AM Invited
Challenges in Optimizing Structural Metamaterials: *Brad Boyce*[1]; Anthony Garland[1]; Benjamin White[1]; Ryan Alberdi[1]; [1]Sandia National Laboratories

10:55 AM Invited
Microstructural Development and Powder Feedstock Recyclability in Additive Manufacturing by Laser Powder Bed Fusion: *Yongho Sohn*[1]; Sharon Park[1]; Holden Hyer[1]; Nathalia Diaz Vallejo[1]; Thinh Huynh[1]; Asif Mahmud[1]; Kevin Graydon[1]; Cameron Lucas[1]; Nicolas Ayers[1]; Abhishek Mehta[1]; Le Zhou[1]; [1]University of Central Florida

11:15 AM Invited
Shaping a Sustainable World Together – Delivering Novelis' Commitment to Sustainability: *James Fekete*[1]; [1]Novelis Global Research and Technology Center

11:35 AM Invited
Using Rapid Alloy Prototyping to Investigate the Effects of Increased Levels of Residual Elements from Recycled Scrap on DP800 Steel: *Caroline Norrish*[1]; Carlos Llovo-Vidal[2]; Richard Underhill[2]; Cameron Pleydell-Pearce[1]; Nicholas Lavery[1]; [1]Swansea University, Bay Campus; [2]Tata Steel Europe

ELECTRONIC MATERIALS

Electronic Packaging and Interconnections 2021 — Pb-free Solder Alloys I

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

Program Organizers: Mehran Maalekian, Mat-Tech; Christopher Gourlay, Imperial College London; Babak Arfaei, Ford Motor Company; Praveen Kumar, Indian Institute of Science; Sai Vadlamani, Intel Corporation; Kazuhiro Nogita, University of Queensland; David Yan, San Jose State University

Monday AM **March 15, 2021**

Session Chairs: Mehran Maalekian, Mat-Tech; Amir Hossein Nobari, 5NPlus

8:30 AM Invited
Nucleation and Growth Kinetics of Sn Whiskers Under Applied Pressure: *Eric Chason*[1]; Piyush Jagtap[1]; Nupur Jain[1]; Allan Bower[1]; [1]Brown University

8:50 AM
Development of Near Room Temperature Solder Alloys and Soldering Processes in Microelectronics: *Shiqian Liu*[1]; Stuart McDonald[1]; Tetsuro Nishimura[2]; Kazuhiro Nogita[1]; [1]University of Queensland; [2]Nihon Superior Co., Ltd

9:10 AM Invited
Comparison of Corrosion for Ni- and Co-based Surface Finishes: *Albert T. Wu*[1]; Si-Wei Lin[1]; Shu-Chi Ku[2]; Nico Li[2]; [1]National Central University; [2]Taiwan Uyemura Co., Ltd

9:30 AM Invited
Microstructural Evolution in Low-temperature Pb-free Solders: *Nikhilesh Chawla*[1]; [1]Purdue University

9:50 AM
Tailoring ßSn Grain Orientations in Electronic Interconnections via Manipulating Textures of Interfacial Intermetallics: *Zhaolong Ma*[1]; Ce Li[1]; Xingwang Cheng[1]; Suyuan Yang[1]; [1]Beijing Institute of Technology

10:10 AM
Reliability Evaluation of Ag Sinter-joining Die Attach under a Harsh Thermal Cycling Test: *Zheng Zhang*[1]; Chuantong Chen[1]; Suetake Aiji[1]; Ming-Chun Hsieh[1]; Iwaki Aya[1]; Katsuaki Suganuma[1]; [1]Osaka University/ISIR

10:30 AM
Modeling Effect of Copper Solute on Electromigration Induced Stress Generation in Al-based Interconnects: *Kieran Cavanagh*[1]; Ping-Chuan Wang[1]; [1]SUNY New Paltz

ENERGY & ENVIRONMENT

Energy Technologies and CO2 Management — Session I

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

Program Organizers: Alafara Baba, University of Ilorin; Lei Zhang, University of Alaska Fairbanks; Donna Guillen, Idaho National Laboratory; Xiaobo Chen, RMIT University; John Howarter, Purdue University; Neale Neelameggham, IND LLC; Cong Wang, Northeastern University; Ziqi Sun, Queensland University of Technology; Hong Peng, University of Queensland; Yu Lin Zhong, Griffith University

Monday AM **March 15, 2021**

Session Chairs: Alafara Baba, University of Ilorin; Lei Zhang, University of Alaska Fairbanks

8:30 AM
CO_2 Emission Calculation Model of Integrated Steel Works Based on Process Analysis: Xinchuang Li[1]; *Hui Li*[2]; Weijian Tian[2]; Zhe Chen[2]; Hao Bai[2]; [1]China Metallurgical Industry Planning and Research Institute; [2]University of Science and Technology Beijing

8:50 AM
In-situ Electrode Temperature Monitoring and Thermal Runaway Detection of Li-ion Pouch Cell: Bing Li[1]; Mihit Parekh[1]; Vilas Pol[1]; Thomas Adams[1]; James Fleetwood[1]; *Casey Jones*; Vikas Tomar[1]; [1]Purdue University

9:10 AM
Experimental Study on Dust Removal Performance of Dynamic Wave Scrubber for Smelting Flue Gas: *Fang Dong*[1]; Yan Liu[1]; Xiaolong Li[1]; Guili Liu[1]; Tingan Zhang[1]; [1]Northeastern University

9:30 AM
Homogenization of the Dense Composite Membranes for Carbon-dioxide Removal: *Dragutin Nedeljkovic*[1]; [1]American University of the Middle East

9:50 AM
Hydrodynamics of Gas-liquid Two-phase Flow in Reverse Spray Washing Process: *Xiaolong Li*[1]; Tingan Zhang[1]; Yan Liu[1]; Guili Liu[1]; Fang Dong[1]; [1]Northeastern University

10:10 AM
Influence of Coal Reactivity on Carbon Composite Briquette Reaction in Blast Furnace: *Huiqing Tang*[1]; Zi Yu[1]; Tao Rong[1]; [1]University of Science and Technology Beijing

MATERIALS PROCESSING

Friction Stir Welding and Processing XI — Lightweight Materials & High Entropy Alloys

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

Program Organizers: Yuri Hovanski, Brigham Young University; Piyush Upadhyay, Pacific Northwest National Laboratory; Yutaka Sato, Tohoku University; Nilesh Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter the Great St. Petersburg Polytechnic University

Monday AM **March 15, 2021**

Session Chair: Nilesh Kumar, University of Alabama

8:30 AM
Case Study: Implementation of FSW in the Colombian Rail Transport Sector: *Elizabeth Hoyos*[1]; Jeroen De Backer[2]; Santiago Escobar[1]; Jonathan Martin[2]; Mauricio Palacio[3]; [1]Universidad EIA; [2]TWI; [3]Metro de Medellin

8:50 AM
Three Sheet Al Alloy Assembly for Automotive Application: *Piyush Upadhyay*[1]; Hrishikesh Das[1]; Daniel Graff[1]; [1]Pacific Northwest National Laboratory

9:10 AM
Bobbin Friction Stir Processing of AZ31B Mg Alloy Plates: Eisha Khalid[1]; Vasanth Shunmugasamy[1]; *Bilal Mansoor*; [1]Texas A&M University at Qatar

9:30 AM
Characterization and Analysis of the Effective Wear Mechanisms on FSW Tools: *Michael Hasieber*[1]; Michael Grätzel[1]; Jean Pierre Bergmann[1]; [1]Technische Universität Ilmenau

9:50 AM
Friction Stir Lap Welding between Al and FeCoCrNiMn High Entropy Alloy: Haining Yao[1]; *Ke Chen*[1]; Muyang Jiang[1]; Min Wang[1]; Xueming Hua[1]; Lanting Zhang[1]; Aidang Shan[1]; [1]Shanghai Jiao Tong University

10:10 AM
Modified Friction Stir Welding of Al-Mg-Cu-Zn Aluminum Alloy: *Ahmad Alali Alkhalaf*[1]; Anna Tesleva[1]; Pavel Polyakov[1]; Matthias Moschinger[2]; Sebastian Fritsche[2]; Iuliia Morozova[3]; Anton Naumov[1]; Fedor Isupov[1]; Gonçalo Pina Cipriano[2]; Sergio T. Amancio-Filho[2]; [1]Peter the Great St.Petersburg Polytechnic University (SPbPU); [2]Graz University of Technology; [3]Brandenburg University of Technology Cottbus-Senftenberg

10:30 AM
Heterogeneous Structure-induced Strength-ductility Synergy by Partial Recrystallization during Friction Stir Welding of a High-entropy Alloy: Po-Ting Lin[1]; *Hung-Chi Liu*[1]; Po-Ying Hsieh[1]; Cheng-Yu Wei[1]; Che-Wei Tsai[1]; Yutaka Sato[2]; Shih-Che Chen[3]; Hung-Wei Yen[3]; Nian-Hu Lu[3]; Chih-Hsuan Chen[3]; [1]National Tsing Hua University; [2]Tohoku University; [3]National Taiwan University

PHYSICAL METALLURGY

Frontiers in Solidification Science VIII — Dendritic Growth

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Phase Transformations Committee, TMS: Solidification Committee, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Damien Tourret, IMDEA Materials; Amy Clarke, Colorado School of Mines; Ulrike Hecht, Access e.V.; Nana Ofori-Opoku, Canadian Nuclear Laboratories; Melis Serefoglu, Koc University; Tiberiu Stan, Northwestern University

Monday AM **March 15, 2021**

Session Chairs: Charles-Andre Gandin, MINES ParisTech CEMEF UMR CNRS 7635; Damien Tourret, IMDEA Materials; Tomohiro Takaki, Kyoto Institute of Technology; Amy Clarke, Colorado School of Mines

8:30 AM
Introductory Comments: Frontiers in Solidification Science VIII: *Damien Tourret*[1]; [1]IMDEA Materials

8:35 AM Invited
In-situ Measurement of Dendrite Tip Shape in a Metallic Alloy: *Christoph Beckermann*[1]; H. Neumann-Heyme[2]; N. Shevchenko[2]; J. Grenzer[2]; S. Eckert[2]; [1]University of Iowa; [2]Helmholtz-Zentrum Dresden-Rossendorf (HZDR)

9:05 AM
Microstructural Evolution in Metallic Alloys during Solidification: *Tiberiu Stan*[1]; Peter Voorhees[1]; [1]Northwestern University

9:25 AM
Shapes of Dendritic Tips at Small and Large Undercoolings: *Andrew Kao*[1]; Liubov Toropova[2]; Dmitri Alexandrov[2]; Peter Galenko[3]; [1]University of Greenwich; [2]Ural Federation University; [3]Friedrich Schiller University Jena

9:45 AM
A Model for Dendrite Fragmentation in Alloy Solidification: *Hieram Neumann-Heyme*[1]; Kerstin Eckert[1]; Christoph Beckermann[2]; [1]Helmholtz-Zentrum Dresden-Rossendorf (HZDR); [2]University of Iowa

10:05 AM
Dendritic Spacing Selection during Al-Cu Casting: Experiments and Multiscale Simulations: Barbara Bellon[1]; Ahmed Boukellal[2]; Thomas Isensee[1]; John Coleman[3]; Matthew Krane[3]; Michael Titus[3]; Damien Tourret[2]; *Javier Llorca*[4]; [1]IMDEA Materials Institute & Polytechnic University of Madrid; [2]IMDEA Materials Institute; [3]Purdue University; [4]IMDEA Materials Institute & Technical University of Madrid

10:25 AM
Characterization of Dendritic Spatially Extended 3D Patterns in Directional Solidification: Microgravity Experiments in DECLIC-DSI Onboard ISS and 3D Phase-field Simulations: *Kaihua Ji*[1]; Fatima Mota[2]; Louise Strutzenberg[3]; Rohit Trivedi[4]; Nathalie Bergeon[2]; Alain Karma[1]; [1]Northeastern University; [2]Aix-Marseille Université; [3]NASA Marshall Space Flight Center; [4]Iowa State University

10:45 AM
Comparison of Solidification Characteristics of In-situ X-radiography Experiments and DNN Simulations: *Maike Becker*[1]; Laszlo Sturz[2]; Dirk Bräuer[1]; Florian Kargl[1]; [1]German Aerospace Center (DLR); [2]Access e.V.

11:05 AM
Grain Competition in Polycrystalline Columnar Dendritic Solidification: Scale Bridging between Phase Field and Cellular Automaton Methods: *Elaheh Dorari*[1]; Kaihua Ji[1]; Gildas Guillemot[2]; Charles-Andre Gandin[2]; Alain Karma[1]; [1]Northeastern University; [2]MINES ParisTech

11:25 AM
Interaction of Hydrogen-bubbles with the Approaching Solidification Front in Al-Cu Melt - An In-situ Study: *Thomas Werner*[1]; Juliane Baumann[1]; Maike Becker[1]; Christoph Pickmann[2]; Laszlo Sturz[2]; Florian Kargl[1]; [1]German Aerospace Center (DLR) - Institute of Materials Physics in Space; [2]ACCESS e.V.

SPECIAL TOPICS

Frontiers of Materials Award Symposium: 2021 Functional Nanomaterials: Translating Innovation into Pioneering Technologies — Session I

Program Organizer: Huanyu Cheng, Pennsylvania State University

Monday AM **March 15, 2021**

8:30 AM
Introductory Comments: Frontiers of Materials Award Symposium: 2021 Functional Nanomaterials: Translating Innovation into Pioneering Technologies: *Huanyu Cheng*[1]; [1]Pennsylvania State University

8:35 AM Invited
Bio-inspired Artificial Vision and Wirelessly-integrated Wearable/Implantable Device: *Dae-Hyeong Kim*[1]; [1]Seoul National University

9:15 AM Invited
Graphene and 2D Materials for Wearable Electronic Devices and Biosensors: *Jong-Hyun Ahn*[1]; [1]Yonsei University

9:55 AM Invited
The Science of Contact-electrification and the Technology of Triboelectric Nanogenerators: *Zhong Wang*[1]; [1]Beijing Institute of Nanoenergy and Nanosystems; Georgia Institute of Technology

10:35 AM Invited
Conformal Bioelectronic Interfaces: *Xiaodong Chen*[1]; [1]Nanyang Technological University

11:15 AM Invited
Flash Joule Heating as a Rapid Solvent-free Scalable Route to New Materials: *James Tour*[1]; [1]Rice University

NANOSTRUCTURED MATERIALS

Heterostructured and Gradient Materials (HGM IV): Tailoring Heterogeneity for Superior Properties — Heterostructured Materials I: Fundamentals

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

Program Organizers: Yuntian Zhu, City University of Hong Kong; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California-Santa Barbara; Yves Brechet, Grenoble Institute of Technology; Huajian Gao, Nanyang Technological University; Hyoung Seop Kim, Pohang University of Science and Technology; Ke Lu, Institute of Metal Research; Xiaolei Wu, Chinese Academy of Sciences

Monday AM **March 15, 2021**

Session Chairs: Cem Tasan, Massachusetts Institute of Technology; Jongun Moon, POSTECH; Yujie Wei, Institute of Mechanics, CAS; Deliang Zhang, Northeast University

8:30 AM Invited
Gradients, Singularities and Interatomic Potentials: K. Parisis[1]; *Elias Aifantis*[1]; [1]Aristotle University of Thessaloniki

8:55 AM Invited
Microstructure Dependence of Strain Partitioning and Localization in Heterostructured Metals: *C. Tasan*[1]; [1]Massachusetts Institute of Technology

9:20 AM Invited
Nanoscale Heterogeneity and Gradients Engineered by Compositional Defect Decoration and Manipulation: The Atomic Scale Basis of Segregation Engineering: *Dierk Raabe*[1]; [1]Max-Planck Institute

9:45 AM Invited
Cu-Fe Based Immiscible Medium-entropy Alloys with Excellent Tensile Properties: *Jongun Moon*[1]; Jeong Min Park[1]; Jae Wung Bae[1]; Peter Liaw[2]; Hyoung Seop Kim[1]; [1]POSTECH; [2]The University of Tennessee

10:10 AM Invited
Thickness-dependent Shear Localization in Cu/Nb Metallic Nanolayered Composites: *Caizhi Zhou*[1]; Shujing Dong[1]; [1]University of South Carolina

10:30 AM
Heterostructured Materials: An Emerging Materials Field with Great Potential: *Yuntian Zhu*[1]; Xiaolei Wu[2]; Chongxiang Huang[3]; [1]North Carolina State University; [2]Institute of Mechanics, CAS; [3]Sichuan University

ADVANCED MATERIALS

High Entropy Alloys IX: Alloy Development and Properties — Alloy Development and Application 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

Monday AM **March 15, 2021**

Session Chairs: Peter Liaw, The University of Tennesee; Carl Koch, North Carolina State Univ

8:30 AM Keynote
Nanostructured High Entropy Alloys: A Review: *Carl Koch*[1]; [1]North Carolina State University

9:00 AM Invited
Exploring Benefits of Metastability in High Entropy Alloys: *C. Tasan*[1]; Shaolou Wei[1]; [1]Massachusetts Institute of Technology

9:25 AM Invited
Opportunities and Trends in High Entropy Alloys: A Materials Science Perspective from the National Science Foundation: *Judith Yang*[1]; [1]National Science Foundation

9:50 AM Invited
Linking the Metallurgy of Multiple Principal Element Alloys to Properties: *David Shifler*[1]; [1]Office of Naval Research

10:15 AM Invited
Order and Disorder in Amorphous and High-entropy Alloys: Yong Zhang[1]; *Xuehui Yan*[2]; [1]University of Science and Technology Beijing; [2]University of Science and Technology Beijing

ADVANCED MATERIALS

High Entropy Alloys IX: Structures and Modeling — 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

Monday AM **March 15, 2021**

Session Chairs: Chelsey Hargather, New Mexico Institute of Mining and Technology; Xie Xie, FCA US LLC

8:30 AM
Using Large Scale Ab Initio Computing to Predict and Understand High Entropy Alloys Formation: *Geoffroy Hautier*[1]; Georgios Bokas[1]; Wei Chen[1]; Stéphane Gorsse[2]; Antoine Hilhorst[1]; Pascal Jacques[1]; [1]Université catholique de Louvain; [2]Institut de Chimie de la Matière Condensée de Bordeaux

8:50 AM
Mobility of Dislocations in FeNiCrCoCu High Entropy Alloys via Molecular Dynamics Simulations: *Yixi Shen*[1]; Douglas Spearot[1]; [1]University of Florida

9:10 AM
Screening of Generalized Stacking Fault Energies, Surface Energies and Intrinsic Ductile Potency of Refractory Multicomponent Alloys: *Yong-Jie Hu*[1]; Liang Qi[1]; Aditya Sundar[1]; [1]University of Michigan

9:30 AM Invited
Efficient First-principles Methods of Calculating Stacking Fault Energies in High Entropy Alloys: Comparison of FCC and BCC Lattices: Joshua Strother[1]; Alexandra Scheer[1]; *Chelsey Hargather*[1]; [1]New Mexico Institute of Mining and Technology

9:55 AM
Physics-based and Data-driven Micromechanics for Metastable High Entropy Alloys: *Anssi Laukkanen*[1]; Matti Lindroos[1]; Tatu Pinomaa[1]; Tomi Suhonen[1]; [1]VTT Technical Research Center of Finland

10:15 AM
Revisit the VEC Rule in High Entropy Alloys (HEAs) with High-throughput CALPHAD Approach and Its Applications for Material Design: A Case Study with Al-Co-Cr-Fe-Ni System: *Songge Yang*[1]; Jun Lu[1]; Fangzhou Xing[2]; Lijun Zhang[2]; Yu Zhong[1]; [1]Worcester Polytechnic Institute; [2]Central South University

MATERIALS DESIGN

Hume-Rothery Symposium: Accelerated Measurements and Predictions of Thermodynamics and Kinetics for Materials Design and Discovery — Session I

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

Program Organizers: Wei Xiong, University of Pittsburgh; Shuanglin Chen, CompuTherm LLC; Wei Chen, Illinois Institute of Technology; James Saal, Citrine Informatics; Greta Lindwall, KTH Royal Institute of Technology

Monday AM **March 15, 2021**

Session Chair: Wei Xiong, University of Pittsburgh

8:30 AM
Introductory Comments: Hume-Rothery Symposium: Accelerated Measurements and Predictions of Thermodynamics and Kinetics for Materials Design and Discovery: *Wei Xiong*[1]; [1]University of Pittsburgh

8:35 AM Keynote
William Hume-rothery Award Lecture: High-throughput Measurements of Composition-dependent Properties of Alloy Phases for Accelerated Alloy Design: *Ji-Cheng Zhao*[1]; [1]University of Maryland

9:20 AM Invited
Combinatorial Design of High-entropy Alloys: *Dierk Raabe*[1]; Zhiming Li[2]; [1]Max-Planck Institute; [2]Central South University

10:00 AM Invited
Emerging Capabilities for the High-throughput Characterization of Structural Materials: *Daniel Miracle*[1]; [1]Air Force Research Laboratory

10:40 AM Invited
Genomic Materials Design: From CALPHAD Data to Flight: *Gregory Olson*[1]; [1]MIT

11:20 AM Invited
Design of Cobalt Base Superalloys for 3D Printing: Sean Murray[1]; Kira Pusch[1]; Michael Kirka[2]; Ning Zhou[3]; Stephane Forsik[3]; *Tresa Pollock*[1]; [1]University of California, Santa Barbara; [2]Oak Ridge National Laboratory; [3]Carpenter Technology Corp

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LIGHT METALS

Magnesium Technology 2021 — Keynote Session

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

Program Organizers: Victoria Miller, University of Florida; Petra Maier, University of Applied Sciences Stralsund; J. Brian Jordon, University of Alabama; Neale Neelameggham, IND LLC

Monday AM **March 15, 2021**

Session Chairs: Victoria Miller, University of Florida; Petra Maier, Stralsund University of Applied Sciences

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8:30 AM Keynote
Measurement of the Critical Resolved Shear Stress for Slip in Mg Alloys Using Instrumented Indentation: *Warren Poole*[1]; Shuheng Li[1]; Ghazal Nayyeri[1]; [1]University of British Columbia

9:15 AM Invited
Development of a Low-cost and Room-temperature Formable Mg Alloy Sheet with In-plane Isotropic Tensile Properties: *Taiki Nakata*[1]; Chao Xu[2]; Hideaki Ohashi[1]; Yu Yoshida[3]; Katsuhito Yoshida[3]; Shigeharu Kamado[1]; [1]Nagaoka University of Technology; [2]Harbin Institute of Technology; [3]Sumitomo Electric Industries, Ltd.

9:45 AM Invited
Microstructure and Fracture Toughness of an Extruded Mg-Dy-Nd-Zn-Zr Alloy Influenced by Heat Treatment: *Petra Maier*[1]; Benjamin Clausius[1]; Charis Joy[1]; Roman Menze[2]; Benjamin Bittner[2]; Norbert Hort[3]; [1]University of Applied Sciences Stralsund; [2]Meko Laser Material Processing; [3]Helmholtz-Zentrum Geesthacht

10:15 AM Invited
The High-solution Design of Magnesium Alloys: *Yuan Yuan*[1]; Jun Wang[1]; Xiongying Cheng[1]; Tao Chen[1]; Bin Jiang[1]; Torben Boll[2]; Fushen Pan[1]; [1]Chongqing University; [2]Karlsruhe Institute of Technology

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NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — Corrosion

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

Program Organizers: Stephen Raiman, Texas A&M University; Kumar Sridharan, University of Wisconsin-Madison; Nathaniel Hoyt, Argonne National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Michael Short, Massachusetts Institute of Technology; Raluca Scarlat, University of California-Berkeley

Monday AM **March 15, 2021**

Session Chair: Kumar Sridharan, University of Wisconsin

8:30 AM
Introductory Comments: Materials and Chemistry for Molten Salt Systems: *Stephen Raiman*[1]; [1]Texas A&M University

8:35 AM
Assessment and Qualification of Austenitic Stainless Steel for Use in Molten Salts: *George Young*[1]; Micah Hackett[1]; [1]Kairos Power

9:05 AM
Corrosion Behavior of SS316, Hastelloy X, and Hastelloy N in FLiNaK: *Amanda Leong*[1]; Huali Wu[1]; Jinsuo Zhang[1]; [1]Virginia Tech

9:25 AM
Corrosion of 316 Stainless Steel in Molten Chloride Salt Micro Convection Loop: *Yafei Wang*[1]; [1]University of Wisconsin Madison

9:45 AM
Development of an In-situ Mechanical Test System for Molten Salts: *Jake Quincey*[1]; Peter Beck[1]; Josef Parrington[2]; Lars Parrington[2]; Christopher Lamb[2]; George Young[1]; Julie Tucker[1]; Samuel Briggs[1]; [1]Oregon State University; [2]Parrington Instruments

10:05 AM
High-throughput Electrochemical Methods Development to Accelerate Molten Salt Corrosion-resistant Alloy Design: *Bonita Goh*[1]; Yafei Wang[1]; William Doniger[1]; Phalgun Nelaturu[1]; Dimitris Papailiopoulos[1]; Dan Thoma[1]; Kumar Sridharan[1]; Adrien Couet[1]; [1]University Of Wisconsin Madison

10:25 AM
Role of Alloy Chemistry in Governing Corrosion Rates of Candidate Materials for Molten Salt Reactors: *Rishi Pillai*[1]; Cory Parker[1]; Stephen Raiman[1]; Bruce Pint[1]; [1]Oak Ridge National Laboratory

10:45 AM
Influence of Corrosion Product Solubility and Dissimilar Materials on Corrosion of Alloys in Molten Salt Environment: *Cody Falconer*[1]; William Doniger[1]; Matthew Weinstein[1]; Mohamed Elbakhshwan[1]; Kumar Sridharan[1]; Adrien Couet[1]; [1]University of Wisconsin - Madison

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ADVANCED MATERIALS

Materials for High Temperature Applications: Next Generation Superalloys and Beyond — Superalloys: Alloy Development

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

Program Organizers: Govindarajan Muralidharan, Oak Ridge National Laboratory; Martin Heilmaier, KIT Karlsruhe; Benjamin Adam, Portland State University; Mario Bochiechio, Pratt & Whitney; Katerina Christofidou, University of Sheffield; Eric Lass, University of Tennessee-Knoxville; Jeremy Rame, Safran Aircraft Engines; Pierre Sallot, Safran; Akane Suzuki, GE Research; Michael Titus, Purdue University

Monday AM **March 15, 2021**

8:30 AM
Introductory Comments: Materials for High Temperature Applications-Next Generation Superalloys and Beyond: *Govindarajan Muralidharan*[1]; [1]Oak Ridge National Laboratory

8:35 AM Keynote
Next Generation Superalloys and beyond for Aircraft Engine Applications: *Deborah Whitis*[1]; [1]General Electric Co.

9:15 AM
Compositionally Graded Nanosize Precipitates at Grain Boundaries of Directionally Solidified Nickel Based (GTD444) Superalloy: *Richa Gupta*[1]; M.J.N.V. Prasad[1]; Prita Pant[1]; [1]IIT Bomaby

9:35 AM
TROPEA: A Platinum Containing New Generation Nickel-based Superalloy for Single Crystalline Applications: *Jeremy Rame*[1]; Satoshi Utada[2]; Luciana Maria Bortoluci Ormastroni[2]; Lorena Mataveli Suave[3]; Edern Menou[3]; Lucille Després[4]; Paraskevas Kontis[5]; Jonathan Cormier[6]; [1]Safran Aircraft Engines; [2]Institut Pprime - ISAE-ENSMA / Safran Aicraft Engines; [3]Safran Tech; [4]Institut Pprime - ISAE-ENSMA / Safran Tech; [5]Max Planck Institut für Eisenforschung; [6]Institut Pprime - ISAE-ENSMA

9:55 AM
Enhancing the Creep Performance of a Corrosion Resistant Ni-based Superalloy through Grain Boundary Design: *Martin Detrois*[1]; Paul Jablonski[1]; Jeffrey Hawk[1]; [1]National Energy Technology Laboratory

10:15 AM
Segregation-assisted Climb of Frank Partial Dislocations: A Novel Planar Fault Formation Mechanism in L12-hardened Superalloys: *Malte Lenz*[1]; Erdmann Spiecker[1]; Mingjian Wu[1]; [1]Institute of Micro- and Nanostructure Research

10:35 AM
Microstructural Evolution under Complex Stress States during Creep of Single Crystal Ni-base Superalloy CMSX-4: *Nicolas Karpstein*[1]; Malte Lenz[1]; Jonathan Cormier[2]; Erdmann Spiecker[1]; [1]Institute of Micro- and Nanostructure Research; [2]Institut Pprime, CNRS-Université de Poitiers-ISAE ENSMA

10:55 AM Invited
On the Crack Growth Retardation under Dwell-fatigue in Nickel Disc Alloys: *Hangyue Li*[1]; [1]University of Birmingham

11:25 AM
Crack Initiation Anisotropy of Ni-based Single-crystal Superalloys in the VHCF Regime: *Alice Cervellon*[1]; Chris Torbet[1]; Tresa Pollock[1]; [1]University Of California Santa Barbara

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NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Processing Effects

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Eda Aydogan, Middle East Technical University; Laurent Capolungo, Los Alamos National Laboratory; Khalid Hattar, Sandia National Laboratories; Kayla Yano, Pacific Northwest National Laboratory; Caleb Massey, Oak Ridge National Laboratory

Monday AM **March 15, 2021**

8:30 AM Invited
Development of Modified 3Cr-3WVTa Base Bainitic Steels for Fusion Structural Applications: *Yukinori Yamamoto*[1]; Roger Miller[1]; Arthur Rowcliffe[1]; [1]Oak Ridge National Laboratory

9:00 AM
Low Temperature Neutron Irradiation and Mechanical Properties of Welded AISI 347: *Lauren Garrison*[1]; Nathan Reid[1]; John Echols[1]; Kaustubh Bawane[1]; [1]Oak Ridge National Laboratory

9:20 AM
Neutron Irradiation Response of SA508 Pressure Vessel Steel Prepared by Powder Metallurgy and Hot Isostatic Pressing: *Yangyang Zhao*[1]; Caleb Clement[1]; Shujuan Wang[2]; Yaqiao Wu[2]; Katelyn Wheeler[3]; Donna Guillen[3]; David Gandy[4]; Janelle Wharry[1]; [1]Purdue University; [2]Boise State University, Center for Advanced Energy Studies; [3]Idaho National Laboratory; [4]Electric Power Research Institute

9:40 AM
Dose and Temperature Dependence of Microstructure and Mechanical Properties in Ion-Irradiated PM-HIP Inconel 625: *Caleb Clement*[1]; Janelle Wharry[1]; Yangyang Zhao[1]; David Gandy[2]; Shujuan Wang[3]; Yaqiao Wu[3]; [1]Purdue University; [2]Electric Power Research Institute; [3]Boise State University, Center for Advanced Energy Studies

10:00 AM Invited
Mechanical Behavior and Radiation Effect in Additively Manufactured 316L Stainless Steel: *Meimei Li*[1]; Xuan Zhang[1]; Wei-Ying Chen[1]; [1]Argonne National Laboratory

10:30 AM
Mechanical Properties of Additively Manufactured 316L Stainless Steel before and after Neutron Irradiation: *Thak Sang Byun*[1]; Timothy Lach[1]; Maxim Gussev[1]; Kurt Terrani[1]; [1]Oak Ridge National Laboratory

10:50 AM
Effects of Low-temperature Neutron Irradiation and Post-weld Heat Treatment on Tensile Properties of Welded Zircaloy-4: *John Echols*[1]; Nate Reid[1]; Sara Wonner[1]; Lauren Garrison[1]; [1]Oak Ridge National Laboratory

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CHARACTERIZATION

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, TMS: Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; 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

Monday AM **March 15, 2021**

Session Chair: Minh-Son Pham, Imperial College

8:30 AM
In-situ X-Ray Diffraction Investigation of High-strain Rate, High-temperature Deformation in Microalloyed Steel: *Tim Wigger*[1]; Rosa Pineda[1]; Simon Hunt[2]; Danielle Fenech[3]; Ben Thomas[4]; Thomas Kwok[5]; David Dye[5]; Gorka Plata[6]; Jokin Lozares[6]; Inaki Hurtado[6]; Stefan Michalik[7]; Michael Preuss[2]; Mohammed Azeem[8]; Peter Lee[1]; [1]University College of London; [2]University of Manchester; [3]University of Cambridge; [4]University of Sheffield; [5]Imperial College London; [6]Mondragon Unibertsitatea; [7]Diamond Light Source; [8]University of Leicester

8:50 AM
In-situ Characterization of Material under Extreme Thermal Cycling Using High-speed Synchrotron X-ray Diffraction: *Andrew Chuang*[1]; Peter Kenesei[1]; Yan Gao[2]; Jonathon Almer[1]; Jun-Sang Park[1]; [1]Argonne National Laboratory; [2]GE Global Research

9:10 AM
Mechanical Behavior and Microstructural Evolution of a Cu-0.7Cr-0.1Zr Alloy at Cryogenic Temperature: An In-situ Synchrotron X-ray Evaluation: *Pedro Henrique Oliveira*[1]; Danielle Magalhães[1]; Marcel Izumi[2]; Osvaldo Cintho[2]; Andrea Kliauga[1]; Vitor Sordi[1]; [1]Federal University Of São Carlos; [2]State University Of Ponta Grossa

9:30 AM
A Quantitative Assessment of Stress/Strain Partitioning in a Dual-phase Titanium Alloy: Gaoming Zhu[1]; *Shaolou Wei*; Cemal Tasan[1]; [1]Massachusetts Institute of Technology

9:50 AM
Dislocation Density Inference from XRD Simulations of In-situ Microstructure Evolution Using Discrete Dislocation Dynamics: *Dylan Madisetti*[1]; Jaafar El Awady[1]; [1]Johns Hopkins University

10:10 AM Keynote
Microstructural Anisotropy and Its Influence on the Internal Stress Field within Grains: Experimental Confrontation with Full Field Crystal Plasticity Models: *Kaustubh Venkatraman*[1]; Meriem Ben Haj Slama[1]; Vincent Taupin[1]; Nabila Maloufi[1]; Stephane Berbenni[1]; Anthony Rollett[2]; Martin Diehl[3]; Antoine Guitton[1]; [1]Université de Lorraine – CNRS; [2]Carnegie Mellon University; [3]Max-Planck-Institut für Eisenforschung GmbH

10:50 AM
Impact of Precipitate Size, Orientation, and Temperature on Strain Hardening Behavior in Al-Cu Alloys: *Brian Milligan*[1]; Dong Ma[2]; Lawrence Allard[2]; Amit Shyam[2]; Amy Clarke[1]; [1]Colorado School of Mines; [2]Oak Ridge National Laboratory

MATERIALS DESIGN

Metal-Matrix Composites: Advances in Analysis, Measurement and Observations — Metal Matrix Composites

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

Program Organizers: Srivatsan Tirumalai, The University of Akron; William Harrigan, Gamma Alloys; Simona Hunyadi Murph, Savannah River National Laboratory

Monday AM **March 15, 2021**

Session Chair: Goswami Ramasis, Naval Research Laboratory

8:30 AM Invited
The Mechanical Performance of an In Situ Processed Nickel-Titanium-Graphite Metal Matrix Composites: Influence of Processing: *Amit Patil*[1]; Tushar Borkar[1]; [1]Cleveland State University

9:00 AM
Development of Ultra-high Conductivity Metal Composites: *Keerti Kappagantula*[1]; Xiao Li[1]; Woongjo Choi[1]; Glenn Grant[1]; [1]Pacific Northwest National Laboratory

9:20 AM Invited
Role of Microstructure on the Potential of MAX and MAB Phases and Their Derivative-based Composites – A Review: *Surojit Gupta*[1]; [1]University of North Dakota

9:50 AM
Microstructure Evolution of Al/Ca Metal-Matrix Composite Conductor Wires by Thermal Aging: *Dustin Hickman*[1]; Trevor Riedemann[2]; Iver Anderson[2]; [1]Iowa State University; [2]Ames Laboratory

10:10 AM
Understanding the Mechanical Response of Friction Stir Welded In-situ Processed Aluminum Alloy Metal Matrix Composite: Experimental and Statistical Modelling Approaches: Jimmy Karloopia[1]; Shaik Mozammil[1]; Pradeep Jha[1]; *Srivatsan Tirumalai*[2]; [1]Indian Institute of Technology; [2]University of Akron

10:40 AM
The Effect of Titanium Carbide and Spark Plasma Sintering Processing on Nickel-titanium Carbide Composites: *Ganesh Walunj*[1]; Tushar Borkar[1]; [1]Cleveland State University

11:00 AM
The Tribological Behavior of an In-situ Processed Magnesium Alloy Based Metal Matrix Composite: *Arabinda Meher*[1]; Manas Mohan Mahapatra[1]; [1]Indian Institute of Technology Bhubaneswar

MATERIALS PROCESSING

Ni-Co 2021: The 5th International Symposium on Nickel and Cobalt — Plenary

Sponsored by: The Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy and Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Pyrometallurgy Committee

Program Organizers: Corby Anderson, Colorado School of Mines; Dean Gregurek, RHI Magnesita; Mari Lundström, Aalto University; Christina Meskers; Prabhat Tripathy, Batelle Energy Alliance (Idaho National Laboratory); Fiseha Tesfaye, Abo Akademi University; Yuanbo Zhang, Central South University; Sari Muinonen, Glencore; Graeme Goodall, XPS- Glencore; Shijie Wang, Rio Tinto Kennecott Utah Copper Corp (Retired)

Monday AM **March 15, 2021**

8:30 AM
Introductory Comments: Ni-Co 2021: The 5th International Symposium on Nickel and Cobalt: *Corby Anderson*[1]; [1]Colorado School of Mines

8:35 AM
Introductory Comments: EPD Distinguished Lecture: *Christina Meskers*

8:40 AM Invited
EPD Distinguished Lecture: Ferronickel - Thermodynamics, Chemistry, and Economics: *Rodney Jones*[1]; [1]Mintek; University of the Witwatersrand; Pyro Consulting

9:10 AM Invited
"Around the Nickel World in Eighty Days" A Virtual Tour of World Nickel Sulphide and Laterite Operations and Technologies: *Phillip Mackey*[1]; Ahmed Vahed[1]; Tony Warner[1]; [1]Worley

9:40 AM Invited
A Review of Nickel Pyrometallurgy over the Past 50 Years with Special Reference to the Former INCO Ltd and Falconbridge Ltd.: A Vahed[1]; Phillip Mackey[1]; *Anthony Warner*[1]; [1]Worley

10:10 AM Invited
Establishing a Domestic Cobalt Supply Chain: Unlocking Challenging Feedstocks: *Frank Santaguida*[1]; [1]First Cobalt Corporation

10:30 AM Invited
Sustainable Developments in Nickel Recovery Process: John Quinn[1]; Dennis Berger[1]; *Shijie Wang*[2]; [1]Freeport McMoRan Mining; [2]Rio Tinto Kennecott Utah Copper Corp

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Modeling and Simulations

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

Program Organizers: Rongpei Shi, Lawrence Livermore National Laboratory; Yipeng Gao, Idaho National Laboratory; Fadi Abdeljawad, Clemson University; Bharat Gwalani, Pacific Northwest National Laboratory; Qi An, University of Nevada-Reno ; Eric Lass, University of Tennessee-Knoxville; Huajing (Wilson) Song, Los Alamos National Laboratory

Monday AM **March 15, 2021**

Session Chair: Fadi Abdeljawad, Clemson University

8:30 AM
Burgers Circuit Analysis of Grain Boundary Junctions: *Ian Winter*[1]; Robert Rudd[1]; Tomas Oppelstrup[1]; Timofey Frolov[1]; [1]Lawrence Livermore National Laboratory

8:50 AM
Electron-hole Carriers Induced Microstructure Evolution in Inorganic Semiconductors: Yidi Shen[1]; *Qi An*[1]; [1]University of Nevada, Reno

9:10 AM
Image-driven Discriminative and Generative Machine Learning Algorithms for Establishing Microstructure-processing Relationships: Wufei Ma[1]; *Elizabeth Kautz*[2]; Arun Baskaran[3]; Aritra Chowdhury[4]; Vineet Joshi[2]; Bulent Yener[3]; Daniel Lewis[3]; [1]Purdue University; [2]Pacific Northwest National Laboratory; [3]Rensselaer Polytechnic Institute; [4]GE Research Center

9:30 AM
Structure and Local Environment of Intermetallic Precipitate Phase Nucleus: *Deep Choudhuri*[1]; [1]New Mexico Institute of Mining and Technology

9:50 AM
The Origin and Stability of Nanostructural Hierarchy in Nickel-base Superalloys: *Subhashish Meher*[1]; Larry Aagesen[1]; Tresa Pollock[2]; [1]Idaho National Laboratory; [2]University of California Santa Barbara

10:10 AM
The Role of Grain Boundaries in Nanoscale Sintering: An Atomistic Simulation Study: Omar Hussein[1]; Maher Alghalayini[1]; *Fadi Abdeljawad*[1]; [1]Clemson University

10:30 AM
A Phase Field Modeling Study on Coupling of Compositional Patterning with Evolution of Grain Boundaries in Irradiated Binary Immiscible Alloys: *Qun Li*[1]; Pascal Bellon[1]; Robert Averback[1]; [1]University Of Illinois Urbana-Champain

10:50 AM
Characterizing Evolution of Grain Boundary Network Structure during Anisotropic Grain Growth.: *Jose Nino*[1]; Oliver Johnson[1]; [1]Brigham Young University

11:10 AM
Investigating the Microstructural Evolution of Cylindrical Interfaces: *Anqi Qiu*[1]; Ian Chesser[1]; Elizabeth Holm[1]; [1]Carnegie Mellon University

MATERIALS PROCESSING

Phonons, Electrons and Dislons: Exploring the Relationships Between Plastic Deformation and Heat — Session I

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

Program Organizers: Aashish Rohatgi, Pacific Northwest National Laboratory; Sean Agnew, University of Virginia; Thomas Bieler, Michigan State University

Monday AM **March 15, 2021**

Session Chairs: Aashish Rohatgi, Pacific Northwest National Lab; Sean Agnew, University of Virginia; Thomas Bieler, Michigan State University

8:30 AM
Introductory Comments: Phonons, Electrons and Dislons: Exploring the Relationships between Plastic Deformation and Heat: *Aashish Rohatgi*[1]; [1]Pacific Northwest National Laboratory

8:35 AM Invited
Introduction to Dislons: A Quantized Description of Dislocations with Implications for Thermal and Electrical Transport: *Mingda Li*[1]; [1]Massachusetts Institute of Technology

8:55 AM
Inelastic Neutron Scattering Investigation of the Phonon Spectra of Dislocated Nb Crystals: *Sean Agnew*[1]; Thomas Bieler[2]; Matthew Stone[3]; [1]University of Virginia; [2]Michigan State University; [3]Oak Ridge National Laboratory

9:15 AM Invited
Dislocation-limited Thermal Transport in III-Nitride Materials: *Lucas Lindsay*[1]; Hongkun Li[2]; Riley Hanus[1]; Carlos Polanco[1]; Andreas Zeidler[3]; Gregor Koblmuller[3]; Yee Kan Koh[2]; [1]Oak Ridge National Laboratory; [2]National University of Singapore; [3]Technical University of Munich

9:35 AM
Role of Tantalum Concentration and Processing Temperature on High Strain Rate Phonon Behavior in Copper-tantalum Alloys: *Soundarya Srinivasan*[1]; Scott Turnage[2]; Billy Hornbuckle[2]; Chaitanya Kale[1]; Kris Darling[2]; Kiran Solanki[1]; [1]Arizona State University; [2]Army Research Laboratory

9:55 AM Invited
Dislocation Drag in Metals: Dependence on Velocity, Temperature, Density, and Crystal Geometry, and Its Effect on Material Response: *Daniel Blaschke*[1]; Leonid Burakovsky[1]; Abigail Hunter[1]; Darby J. Luscher[1]; Dean L. Preston[1]; [1]Los Alamos National Laboratory

10:15 AM
The Effects of Heating Rate on Defect Reduction by Recrystallization in Deformed Polycrystal Niobium: *E. Nicometo*[1]; Z. Thune[1]; C. Edge[1]; T. Bieler[1]; [1]Michigan State University

NANOSTRUCTURED MATERIALS

Plasmonics in Nanocomposite Materials — From Theory to Application Session I

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

Program Organizers: Nasrin Hooshmand, Georgia Institute of Technology; Simona Hunyadi Murph, Savannah River National Laboratory; Mahmoud Abdelwahed, The University of Texas at San Antonio

Monday AM **March 15, 2021**

Session Chair: Nasrin Hooshmand, Georgia Institute of Technology

8:30 AM Keynote
Gold and Au/Ni and Other Plasmonic Nanoparticles: Using Theory to Understand Metal Recovery and Optical Properties: *George Schatz*[1]; [1]Northwestern University

9:15 AM Invited
Anisotropic and Shape-selective Plasmonic Nanomaterials: Structure-property Relationships: *Simona Hunyadi Murph*[1]; [1]Savannah River National Laboratory

9:45 AM Invited
Nanophotonics for Neural Engineering: David Garfield[1]; Emory Chan[1]; Peter Schuck[1]; Michel Maharbiz[1]; *Maysam Chamanzar*[2]; [1]The Molecular Foundry, Lawrence Berkeley National Laboratory; [2]Carnegie Mellon University

10:05 AM Invited
Understanding Photocarrier and Gas Dynamics to Rationally Design Nano-heterostructured Photocatalysts for CO2 Conversion: *Anthony Thompson*[1]; [1]Savannah River National Laboratory

ENERGY & ENVIRONMENT

Powder Materials for Energy Applications — Metal Powder Materials

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

Program Organizers: Kathy Lu, Virginia Polytechnic Institute and State University; Eugene Olevsky, San Diego State University; Hang Yu, Virginia Polytechnic Institute and State University; Ruigang Wang, The University of Alabama; Isabella Van Rooyen, Idaho National Laboratory

Monday AM **March 15, 2021**

Session Chairs: Hang Yu, Virginia Polytechnic Institute and State University; Ruigang Wang, The University of Alabama

8:30 AM
Introductory Comments: Powder Materials for Energy Applications: *Kathy Lu*[1]; [1]Virginia Polytechnic Institute and State University

8:35 AM
Development of Gas Atomization Processes for Production of Passivated Calcium Powders: *Jordan Tiarks*[1]; Dustin Hickman[2]; Trevor Riedemann[1]; Iver Anderson[1]; [1]Ames Laboratory; [2]Iowa State University

8:55 AM
Utilizing Solid-state Grain Alignment to Bias Abnormal Grain Growth in Strategically Designed Alnico Alloys: *Emily Rinko*[1]; Timothy Prost[2]; Emma White[3]; Iver Anderson[3]; [1]Iowa State University; [2]Ames Laboratory ; [3]Ames Laboratory

9:15 AM Invited
Wear Resistant Powder Materials for Energy Applications: *Paul Prichard*[1]; Matthew Yao[1]; [1]Kennametal Inc.

9:45 AM
Conformal Coating of Powders by Physical Vapor Deposition: *Jonathan Priedeman*[1]; Gregory Thompson[1]; [1]University of Alabama

MATERIALS DESIGN

Practical Tools for Integration and Analysis in Materials Engineering — Session I

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

Program Organizers: Adam Pilchak, US Air Force Research Laboratory; Michael Gram, Titanium Metals Corporation; William Joost; Raymundo Arroyave, Texas A&M University; Charles Ward, AFRL/RXM

Monday AM **March 15, 2021**

8:30 AM
Introductory Comments: Practical Tools for Integration and Analysis in Materials Engineering: *Adam Pilchak*[1]; [1]US Air Force Research Laboratory

8:35 AM Invited
Accelerated Tools for Disordered-materials Discovery: *Stefano Curtarolo*[1]; [1]Duke University

9:05 AM
Calculation of First Principles Based Thermodynamic and Kinetic Materials Properties Using CASM: *Brian Puchala*[1]; John Thomas[2]; John Goiri[2]; Anton Van der Ven[2]; [1]University of Michigan; [2]University of California, Santa Barbara

9:25 AM
A Framework for Closed-loop Materials Design Using Density Functional Theory: *Vinay Hegde*[1]; Kevin Williams[1]; Travis Ludlum[1]; Maxwell Hutchinson[1]; Eric Lundberg[1]; Bryce Meredig[1]; [1]Citrine Informatics

9:45 AM
Batch Reification Fusion Optimization (BAREFOOT) Framework: *Richard Couperthwaite*[1]; Danial Khatamsaz[1]; Abhilash Molkeri[1]; Douglas Allaire[1]; Ankit Srivastava[1]; Raymundo Arroyave[1]; [1]Texas A&M University

10:05 AM Invited
Microstructural Modeling with FiPy: *Jonathan Guyer*[1]; Daniel Wheeler[2]; James Warren[2]; [1]National Institute of Standards & Technology; [2]National Institute of Standards and Technology

10:35 AM
A Private Ledger Architecture Tailored for Secure Workflow Management in Additive Manufacturing Facilities: *Evan Diewald*[1]; Jack Beuth[1]; [1]Carnegie Mellon University

10:55 AM Invited
LAMMPS as a Tool in Materials Modeling Workflows: *Steve Plimpton*[1]; Aidan Thompson[2]; Mitch Wood[2]; [1]Sandia National Laboratories; [2]Sandia National Labs

11:25 AM
The Materials Commons 2.0: A Collaboration Platform and Information Repository for the Global Materials Community: *Brian Puchala*[1]; Glenn Tarcea[1]; Tracy Berman[1]; John Allison[1]; [1]University of Michigan

MATERIALS PROCESSING

Rare Metal Extraction & Processing — Li, Co, Ni

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; Kerstin Forsberg, KTH Royal Institute of Technology; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Alafara Baba, University of Ilorin; Neale Neelameggham, IND LLC

Monday AM **March 15, 2021**

8:30 AM
Introductory Comments: Rare Metal Extraction & Processing: *Gisele Azimi*[1]; [1]University of Toronto

8:35 AM Keynote
Scenarios of Future Lithium Use, 2021-2040: *Roderick Eggert*[1]; [1]Colorado School of Mines

8:55 AM Invited
The Importance of Spodumene Decrepitation on the Lithium Sulfate Extraction: Colin Dessemond[1]; *Gervais Soucy*[1]; [1]Université de Sherbrooke

9:15 AM
Application of Eutectic Freeze Crystallization in Recycling of Li-ion Batteries: *Yiqian Ma*[1]; Michael Svärd[1]; James Gardner[1]; Richard Olsson[1]; Kerstin Forsberg[1]; [1]KTH - Royal Institute of Technology

9:35 AM Invited
Selective Separation of Co and Ni from REE in Recycling: *Gulaim Seisenbaeva*[1]; Ani Vardanyan[2]; [1] Swedish University of Agricultural Sciences; [2] Swedish University of Agricultural Sciences

9:55 AM
Recovery of Valuable Metals from End-of-life Lithium-ion Battery Using Electrodialysis: *Ka Ho Chan*[1]; Monu Malik[1]; Gisele Azimi[1]; [1]University of Toronto

10:15 AM
Lithium Adsorption Mechanism for Li2TiO3: *Raja Shekhar Marthi*[1]; York Smith[1]; [1]University Of Utah

10:35 AM
Study on the Production of Lithium by Aluminothermic Reduction Method: *Huimin Lu*[1]; Neale Neelameggham[2]; [1]Beihang University; [2]IND LLC

10:55 AM Invited
Effect of Synthesis Method on the Electrochemical Performance of LiNixMnCo1-x-yO2 (NMC) Cathode for Li-ion Batteries: A Review: *Monu Malik*[1]; Ka Ho Chan[1]; Gisele Azimi[1]; [1]University of Toronto

LIGHT METALS

Sustainability in the Aluminum Supply Chain: Joint Session — Keynote Session

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

Program Organizer: Les Edwards, Rain Carbon Inc.

Monday AM **March 15, 2021**

Session Chair: Les Edwards, Rain Carbon Inc.

8:30 AM
Introductory Comments: Sustainability in the Aluminum Supply Chain: Joint Session: *Linus Perander*; [1]

8:35 AM
Introductory Comments: Sustainability in the Aluminum Supply Chain: Joint Session: *Les Edwards*[1]; [1]Rain Carbon Inc.

8:40 AM Invited
Long Term Sustainability of the Aluminium Sector: *Pernelle Nunez*[1]; [1]International Aluminium Institute

9:05 AM Invited
Near Zero-waste and Near Break-even: A Path towards Sustainable Bauxite Processing: *Efthymios Balomenos*[1]; [1]Mytilineos SA

9:30 AM Invited
Alumina in a More Sustainable World: *Andrew Furlong*[1]; [1]Worley

9:55 AM Invited
Review of Sustainability in the Carbon Supply Chain: *Les Edwards*[1]; [1]Rain Carbon Inc.

10:20 AM Invited
Hydro's Approach to Sustainability: *Hans Erik Vatne*[1]; [1]Hydro

10:45 AM Invited
Aluminium Production: A Pathway to Zero Carbon by 2050: *Mark Dorreen*[1]; [1]EnPot Limited

11:10 AM Invited
The Aluminium Stewardship Initiative (ASI): Implementation and Impact: Fiona Solomon[1]; *Marieke van der Mijn*[1]; [1]Aluminium Stewardship Initiative

11:35 AM Question and Answer Period

NANOSTRUCTURED MATERIALS

100 Years and Still Cracking: A Griffith Fracture Symposium — Fracture and Dislocations

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

Program Organizers: Megan Cordill, Erich Schmid Institute of Materials Science; William Gerberich, University of Minnesota; David Bahr, Purdue University; Christopher Schuh, Massachusetts Institute of Technology; Daniel Kiener, Montanuniverstität Leoben; Neville Moody; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht

Monday PM **March 15, 2021**

Session Chair: Daniel Kiener, Montuniversität Leoben

2:00 PM Invited
The Role of Fracture in the Reduction of Iron Ore with Hydrogen: *Dierk Raabe*[1]; [1]Max-Planck Institute

2:40 PM Invited
Dislocation Pathways in Refractory Multi-principal Element Alloys: Fulin Wang[1]; Glenn Balbus[1]; Shuozhi Xu[1]; Yanqing Su[2]; Jungho Shin[1]; Paul Rottmann[3]; Keith Knipling[4]; Jean-Charles Stinville[1]; Leah Mills[1]; Oleg Senkov[5]; Irene Beyerlein[1]; Tresa Pollock[1]; *Daniel Gianola*[1]; [1]University of California, Santa Barbara; [2]Utah State University; [3]University of Kentucky; [4]U. S. Naval Research Laboratory; [5]Air Force Research Laboratory

3:20 PM Invited
In Situ Observations and Measurements of Local Plastic Deformation and Fracture with 4D-STEM
: Yang Yang[1]; Tom Pekin[2]; Ruopeng Zhang[3]; Shiteng Zhao[3]; Qin Yu[1]; Sheng Yin[1]; Colin Ophus[1]; Mark Asta[3]; Robert Ritchie[3]; *Andrew Minor*[3]; [1]Lawrence Berkeley National Laboratory; [2]Humbolt University, Berlin; [3]University of California, Berkeley and Lawrence Berkeley National Laboratory

4:00 PM
Dislocations Processes in Fracture and Toughening Mechanisms of UFG bcc Metals at Room Temperature: *Inas Issa*[1]; Anton Hohenwarter[2]; Jakub Zálešák[1]; Daniel Kiener[1]; [1]Montanuniversität Leoben, Austria; [2]Montanuniversität Leoben, Austria.

4:20 PM
Imaging the Chemo-mechanical Coupled Fracture in Metal Passivation Layer by In-situ TEM: *Yang Yang*[1]; Akihiro Kushima[2]; Huolin Xin[3]; Peter Hosemann[4]; Ju Li[5]; [1]Lawrence Berkeley National Laboratory; [2]University of Central Florida; [3]University of California, Irvine; [4]University of California, Berkeley; [5]Massachusetts Institute of Technology

SPECIAL TOPICS

2021 TMS Special Sessions — SMD/FMD Awards Ceremony & Special Lecture

Monday PM **March 15, 2021**

12:00 PM
FMD Awards Ceremony: *Paul Ohodnicki*[1]; [1]University of Pittsburgh

12:15 PM
SMD Awards Ceremony & Introduction of Special Lecturer: *Daniel Miracle*[1]; [1]Air Force Research Laboratory

12:35 PM
SMD Special Lecturer: Pushing Structural Performance of Materials by Combining Alloy Design with Disruptive Manufacturing Technologies: *Rajiv Mishra*[1]; [1]University of North Texas

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture V: Processing-Structure-Property Investigations and Application to Qualification — Titanium and Steel

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; John Lewandowski, Case Western Reserve University; Nima Shamsaei, Auburn University; Mohsen Seifi, ASTM International/Case Western Reserve University; Steve Daniewicz, University of Alabama

Monday PM **March 15, 2021**

Session Chair: John Lewandowski, Case Western Reserve University

2:00 PM Invited
Strain Accumulation during Fatigue and Fracture of Additively Manufactured Ti6Al4V: Experiments and Simulations: Raymundo Muro-Barrios[1]; Raeann VanSickle[1]; Huck Beng Chew[1]; *John Lambros*[1]; [1]University of Illinois

2:30 PM
Effect of Defects on Stress State Dependent Fracture of Additively Manufactured Metals: *Allison Beese*[1]; [1]Pennsylvania State University

2:50 PM
Structure-property Relationships to Explain the Elasto-plastic Anisotropy of Additively Manufactured Metal Alloys: *Hunter Macdonald*[1]; Jishnu Battacharyya[1]; Md Shamsujjoha[1]; Sean Agnew[1]; [1]University of Virginia

3:10 PM Invited
Design of Fatigue Resistant Additive Manufactured Austenitic Stainless Steels: *Jonathan Pegues*[1]; Seungjong Lee[2]; Theron Rodgers[1]; David Siaz[1]; Shaun Whetten[1]; Andrew Kustas[1]; Michael Roach[3]; Nima Shamsaei[2]; [1]Sandia National Laboratories; [2]Auburn University; [3]University of Mississippi Medical Center

3:40 PM
Progressive Amplitude Fatigue Performance of Additively Manufactured Stainless Steel Superalloy: *Sanna Siddiqui*[1]; Krystal Rivera[1]; Isha Ruiz-Candelario[1]; Ali Gordon[2]; [1]Florida Polytechnic University; [2]University of Central Florida

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications III — Additive Manufacturing Processing

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

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Indrajit Charit, University of Idaho; Subhashish Meher, Idaho National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Kumar Sridharan, University of Wisconsin-Madison; Xiaoyuan Lou, Auburn University

Monday PM **March 15, 2021**

Session Chair: Indrajit Charit, University of Idaho

2:00 PM Invited
Metal Additive Manufacturing for Energy Industries: *Edward Herderick*[1]; [1]Ohio State University

2:20 PM Invited
Laser Powder Bed Fusion of Grade 300 Maraging Steel for Tooling Applications: *Peeyush Nandwana*[1]; Rangasayee Kannan[1]; Donovan Leonard[1]; Derek Siddel[1]; Chase Joslin[1]; Ryan Dehoff[1]; [1]Oak Ridge National Laboratory

2:40 PM
Additive Manufacturing of Zr-modified Aluminum Alloy 6061 by Laser-powder Bed Fusion: *Abhishek Mehta*[1]; Le Zhou[1]; Holden Hyer[1]; Thinh Huynh[1]; Sharon Park[1]; Devin Imholte[2]; Nicolas Woolstenhulme[2]; Daniel Wachs[2]; Yongho Sohn[1]; [1]University of Central Florida; [2]Idaho National Laboratory

3:00 PM
Harnessing a High Energy, Superconducting Electron Beam for Additive and Far-from-Equilibrium Manufacturing: *Adam Duzik*[1]; Justin Hill[1]; [1]Mainstream Engineering Corporation

3:20 PM Invited
Novel Aspects of multi-Wire Arc Additive Manufacturing for Large Component Fabrication for Extreme Environments and New Alloy Discovery: *Thomas Lillo*[1]; Nathan Huft[1]; Denis Clark[2]; Michael Glazoff[1]; Joel Simpson[1]; [1]Idaho National Lab; [2]DEClark Welding Engineering, PLLC

3:40 PM
Efficient Production of a High-performance Dispersion Strengthened, Multi-principal Element Alloy: *Timothy Smith*[1]; Aaron Thompson[1]; Timothy Gabb[1]; Christopher Kantzos[1]; [1]NASA Glenn Research Center

4:00 PM
Investigation of the Effect of Laser Energy Density on Properties of Additively Manufactured Tungsten Lattices: *Carly Romnes*[1]; Omar Mireles[2]; James Stubbins[1]; [1]University of Illinois at Urbana-Champaign; [2]NASA Marshall Space Flight Center

4:20 PM
Toward Part Qualification: Thermal Signature Analysis Using Wavelet Transform in Metal Additive Manufacturing: *Sujana Chandrasekar*[1]; Jamie Coble[1]; Amy Godfrey[1]; Serena Beauchamp[1]; Fred List[2]; Vincent Paquit[2]; Sudarsanam Babu[1]; [1]University of Tennessee; [2]Oak Ridge National Laboratory

4:40 PM
Effective Thermal Conductivity of Additively Manufactured Metal Matrix Composite: *Saereh Mirzababaei*[1]; Venkata Vinay Krishna Doddapaneni[1]; Kijoon Lee[1]; Sriram Manoharan[1]; Chih-hung Chang[1]; Brian K. Paul[1]; Somayeh Pasebani[1]; [1]Oregon State University

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Applications of Solidification Fundamentals — Micro-scale Modeling

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

Program Organizers: Alex Plotkowski, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Northrop Grumman; Mohsen Asle Zaeem, Colorado School of Mines; Wenda Tan, University of Utah; Lianyi Chen, University of Wisconsin-Madison

Monday PM **March 15, 2021**

Session Chairs: Lianyi Chen, University of Wisconsin; Wenda Tan, University of Utah

2:00 PM
3D Analysis of Grain Morphologies and Solidification Texture in AM 316L: *David Rowenhorst*[1]; [1]Naval Research Laboratory

2:20 PM
A Multi-scale Modeling Approach to Microstructure Prediction for Powder Bed Fusion Additive Manufacturing Processes Through Phase Field and Cellular Automata Methods: *Daniel Dreelan*[1]; Abdur Rahman Al Azad[1]; Alojz Ivankovic[1]; Philip Cardiff[1]; David Browne[1]; [1]University College Dublin

2:40 PM
CA Model Sensitivity to Material Parameters, Nucleation, and Thermal Conditions Across AM Process Space: *Matthew Rolchigo*[1]; Alex Plotkowski[2]; John Coleman[2]; Jim Belak[1]; [1]Lawrence Livermore National Laboratory; [2]Oak Ridge National Laboratory

3:00 PM
Controlling Additive Manufacturing Processes with Magnetic Fields: *Andrew Kao*[1]; Teddy Gan[1]; Xianqiang Fan[2]; Catherine Tonry[1]; Ivars Krastins[3]; Peter Lee[2]; Koulis Pericleous[1]; [1]University of Greenwich; [2]UCL; [3]University of Latvia

3:20 PM
Optimizing and Validating the Cellular Automata Finite Element Model for Additive Manufacturing: *Kirubel Teferra*[1]; David Rowenhorst[1]; [1]United States Naval Research Laboratory

3:40 PM
Prediction of Columnar-to-equiaxed Transition in Single Tracks during Laser Powder Bed Fusion Additive Manufacturing: *Lang Yuan*[1]; Adrian Sabau[2]; David StJohn[3]; Arvind Prasad[3]; Peter Lee[4]; [1]University of South Carolina; [2]Oak Ridge National Laboratory; [3]The University of Queensland; [4]University College London

4:00 PM
Effect of Kinetic Anisotropy on Microstructure Development during Simulated Powder Bed Fusion of 316L Stainless Steel: *Alexander Chadwick*[1]; Peter Voorhees[1]; [1]Northwestern University

4:20 PM
Microstructure Prediction Framework for Additively Manufactured Metals: *Andrew Polonsky*[1]; Narendran Raghavan[2]; McLean Echlin[3]; Michael Kirka[2]; Ryan Dehoff[2]; Jonathan Madison[1]; Tresa Pollock[3]; [1]Sandia National Laboratories; [2]Oak Ridge National Laboratory; [3]University of California, Santa Barbara

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development III -- Super Materials and Extreme Environments — Light Weight Materials

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

Program Organizers: Behrang Poorganji, University of Waterloo; Hunter Martin, HRL Laboratories LLC; James Saal, Citrine Informatics; Orlando Rios, Oak Ridge National Laboratory; Atieh Moridi, Cornell University; Jiadong Gong, Questek Innovations LLC

Monday PM **March 15, 2021**

Session Chair: Hunter Martin, HRL

2:00 PM Invited
Architectured Interpenetrating Structures with Tailorable Energy Absorption in Tension: *Zachary Cordero*[1]; [1]Massachusetts Institute of Technology

2:30 PM
Al-Cu-Zn-Mg Alloy for Additive Manufacturing by Electron Beam Deposition: Marcia Domack[1]; *Cecilia Mulvaney*[2]; Christopher Domack[3]; Brandon Bodily[4]; Karen Taminger[1]; [1]NASA Langley Research Center; [2]University of Virginia; [3]Analytical Mechanical Associates; [4]Arconic Technology Center

2:50 PM
Development of High Strength and/or Corrosion-resistant Al Alloys with High Printability: *Le Zhou*[1]; Holden Hyer[2]; Abhishek Mehta[2]; Sharon Park[2]; Thinh Huynh[2]; Brandon McWilliams[3]; Kyu Cho[3]; Yongho Sohn[2]; [1]Marquette University; [2]University of Central Florida; [3]CCDC Army Research Laboratory

3:10 PM
Ability of Creation of Aluminium Alloys with High Heat Conductivity Suitable for 3D Printing: Mann Viktor[1]; Krokhin leksandr[1]; Vakhromov Roman[2]; Ryabov Dmitriy[2]; Mikhaylov Ivan[2]; *Kirill Nyaza*[2]; Grol Mariya[2]; [1]RUSSIAN Aluminum Management; [2]Light Materials and Technologies Institute RUSAL Management

3:30 PM
High Strength WE43 Microlattices Manufactured by Laser Powder Bed Fusion: Holden Hyer[1]; Qingyang Liu[1]; Le Zhou[1]; Dazhong Wu[1]; Shutao Song[1]; Yuanli Bai[1]; Brandon McWilliams[2]; Kyu Cho[2]; *Yongho Sohn*[1]; [1]University of Central Florida; [2]CCDC Army Research Laboratory

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session II

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

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; 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; Arul Kumar Mariyappan, Los Alamos National Laboratory; Olivia Underwood, Sandia National Laboratories

Monday PM **March 15, 2021**

2:00 PM
3D Maps of Geometrically Necessary Dislocations in Shock-loaded Polycrystalline Tantalum: *Wyatt Witzen*[1]; Toby Francis[1]; Tresa Pollock[1]; Irene Beyerlein[1]; [1]University of California Santa Barbara

2:20 PM
Dislocation Imaging by Precession Electron Diffraction: *Dexin Zhao*[1]; Kelvin Xie[1]; [1]Texas A&M University

2:40 PM
On the Mechanistic Origins of Maximum Strength in Nanocrystalline Materials: *Ankit Gupta*[1]; Gregory Thompson[2]; Garritt Tucker[1]; [1]Colorado School of Mines; [2]University of Alabama

3:00 PM
Grain Boundary Slip Transfer Classification and Metric Selection with Artificial Neural Networks: *Zhuowen Zhao*[1]; Thomas Bieler[1]; Javier LLorca[2]; Philip Eisenlohr[1]; [1]Michigan State University; [2]IMDEA Materials Institute

3:20 PM
High Resolution Characterization of Dislocations Using Weak Beam Dark Field Scanning Transmission Electron Microscopy: *Jiashi Miao*[1]; [1]Ohio State University

3:40 PM
Revisiting the Origin of Indentation Size Effect at Sub-micrometer Scales: *Xiaolong Ma*[1]; Wesley Higgins[2]; Zhiyuan Liang[2]; Dexin Zhao[2]; George Pharr[2]; Kelvin Xie[2]; [1]Pacific Northwest National Laboratory; [2]Texas A&M University

4:00 PM
Critical Resolved Shear Stresses (CRSS) of Hexagonal Titanium from Nanoindentation Optimization: *Zhuowen Zhao*[1]; Mario Ruiz[2]; Jiawei Lu[1]; Miguel Monclus[2]; Jon Molina-Aldareguia[2]; Thomas Bieler[1]; Philip Eisenlohr[1]; [1]Michigan State University; [2]IMDEA Materials Institute

4:20 PM
Spatial Localization of Dislocation Avalanches in Microplasticity of a High-entropy Alloy: *Quentin Rizzardi*[1]; Robert Maass[1]; [1]University of Illinois at Urbana-Champaign

ADVANCED MATERIALS

Advanced High Strength Steels V — Session II

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

Program Organizers: Ana Luiza Araujo, CBMM North America Inc.; Louis Hector, General Motors Global Technical Center; Igor Vieira, Nucor Steel; Lijia Zhao, ArcelorMittal USA; Krista Limmer, CCDC Army Research Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Sebastien Allain, Institut Jean Lamour; MingXin Huang, University of Hong Kong

Monday PM **March 15, 2021**

2:00 PM
Cryogenic Tensile and Microstructural Behaviors of High Manganese Steel Welds: *Myeonghwan Choi*[1]; Junghoon Lee[1]; Hyunbin Nam[1]; Namhyun Kang[1]; Myunghyun Kim[1]; Daewon Cho[2]; [1]Pusan National University; [2]Korea Institute of Machinery and Materials

2:20 PM
Effects of V and Mo Additions on the Suppression of HAZ Softening of Friction Stir Welded Si-Mn Martensitic Steel: *Zexi Wu*[1]; Kohsaku Ushioda[1]; Hidetoshi Fujii[1]; [1]Joining and Welding Research Institute, Osaka University

2:40 PM
Microstructural Characterization of Fracture in Fe-10 pct Ni Gas Metal Arc Welds: *Richard Baumer*[1]; Daniel Bechetti[2]; Matthew Sinfield[2]; [1]LeTourneau University; [2]Naval Surface Warfare Center, Carderock Division

3:00 PM
Use of Physical Simulations for Accelerated Welding Procedure Development in Supermartensitic Stainless Steels: Reed Phillips[1]; Ezequiel Pessoa[1]; *Richard Baumer*[1]; [1]LeTourneau University

3:20 PM
Use of Thermo-mechanical Simulation to Assess Liquid Metal Embrittlement (LME) in Zinc Coated Advanced High Strength Steels: Kaleb Ponder[1]; Dean Sage[1]; Carolin Fink[1]; Hassan Ghassemi-Armaki[2]; Michael Karagoulis[3]; *Antonio Ramirez*; [1]Ohio State University; [2]ArcelorMittal Global R&D - East Chicago, East Chicago, IN, USA; [3]Retired - General Motors

3:40 PM
Revisit the Slow Strain Rate Test for Hydrogen Embrittlement of Press-hardened Steel: Zuoheng Cao[1]; *MingXin Huang*[1]; [1]University of Hong Kong

4:00 PM
Methods for Improving the Hydrogen Embrittlement Resistance in Press-hardened Steel: Zuoheng Cao[1]; Xiaochuan Xiong[2]; *MingXin Huang*[1]; [1]University of Hong Kong; [2]Ironovation (Suzhou) Materials Technology

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VII — Sustainability Materials

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

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

Monday PM **March 15, 2021**

Session Chairs: Surojit Gupta, University of North Dakota; Monu Malik, University of Toronto

2:00 PM
Design of Novel Agriculture-based Materials by Using Principles of Circular Economy: *Surojit Gupta*[1]; [1]University of North Dakota

2:30 PM
Aluminum-ion Battery Made of $AlCl_3$-Trimethylamine Hydrochloride Ionic Liquid with Superior Performance: *Kok Long Ng*[1]; Tony Dong[1]; John Anawati[1]; Gisele Azimi[1]; [1]University of Toronto

2:50 PM
High Performing Vertically Aligned Graphene/Metal Oxide on Carbon Fiber Composite Electrodes for Wearable Supercapacitors and Strength Applications: *Deepak Pandey*[1]; Kowsik Sambath Kumar[1]; Jayan Thomas[1]; [1]University of Central Florida

3:10 PM
Investigation of Cost-effective AlCl3-urea Ionic Liquid Analog for Al-ion Batteries: *Monu Malik*[1]; Kok Long Ng[1]; Gisele Azimi[1]; [1]University of Toronto

3:30 PM
Morphology Evolution and Interface Instability of Sodium Metal Electrodes: *Susmita Sarkar*[1]; Partha Mukherjee[1]; [1]Purdue University

CHARACTERIZATION

Advanced Real Time Imaging — Iron & Steelmaking

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

Program Organizers: Jinichiro Nakano, US Department of Energy 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; Noritaka Saito, Kyushu University; Anna Nakano, US Department of Energy National Energy Technology Laboratory; Zuotai Zhang, Southern University of Science and Technology; Candan Tamerler, University of Kansas; Bryan Webler, Carnegie Mellon University; Wangzhong Mu, KTH Royal Institute of Technology; David Veysset, Stanford University

Monday PM **March 15, 2021**

Session Chairs: Il Sohn, Yonsei University; Jinichiro Nakano, USDOE National Energy Technology Laboratory

2:00 PM
In-situ Real Time Observation of Austenite Formation in Duplex Stainless Steels during Different Cooling Conditions: *Wangzhong Mu*[1]; Oscar Rova[1]; Sohei Sukenaga[2]; Hiroyuki Shibata[2]; [1]Kth Royal Institute of Technology; [2]IMRAM, Tohoku University

2:20 PM
Dissolution Mechanism of Oxide Particles in Silicate Melt: A Theoretical Study Supported by In-situ Observation Experiment: Changji Xuan[1]; *Wangzhong Mu*[2]; [1]Sandvik Machining Solutions AB; [2]Kth Royal Institute of Technology

2:40 PM
Direct Observation of Boron Nitride Dissolution in a Heat Resistant Martensitic Steel Using Confocal Scanning Laser Microscopy: *Andrew (Drew) Huck*[1]; Bryan Webler[1]; [1]Carnegie Mellon University

3:00 PM Invited
Observation of Surface and Interfacial Phenomena at High Temperature: *Masashi Nakamoto*[1]; [1]Osaka University

3:20 PM
Wetting and Spreading Kinetics between Liquid CaO-SiO2 Slags and a Solid SiO2: Chaeyeon Yoo[1]; *Jaewoo Myung*[1]; Yongsug Chung[1]; [1]Korea Polytechnic University

3:40 PM
In-situ Quantitative Study of Heat Transfer Performance of Mold Flux by Using Double Hot Thermocouple Technology: *Zhe Wang*[1]; Guanghua Wen[1]; Wenbo Jiang[1]; Ping Tang[1]; Shuheng Huang[1]; [1]Chongqing University

4:00 PM
In-situ Observation of Interfacial Phenomena between Magnetite and Matte at High Temperature by a Novel Optical Microscopic Technique: *Seung-Hwan Shin*[1]; Sakiko Kawanishi[1]; Sohei Sukenaga[1]; Junichi Takahashi[2]; Hiroyuki Shibata[1]; [1]Tohoku University; [2]Sumitomo Metal Mining

BIOMATERIALS

Advances in Biomaterials for 3D Printing of Scaffolds and Tissues — Advances in Biomaterials for 3D Printing of Scaffolds and Tissues I

Sponsored by:

Program Organizers: Changxue Xu, Texas Tech University; Yifei Jin, University of Nevada, Reno; Zhengyi Zhang, Huazhong University of Science and Engineering; Jun Yin, Zhejiang University

Monday PM **March 15, 2021**

Session Chairs: Changxue Xu, Texas Tech University; Jun Yin, Zhejiang University

2:00 PM
A Bilayered GelMA/PEGDA-based Nerve Conduit with Supportive Cells for Peripheral Nerve Regeneration: *Jingyi Liu*[1]; Yun Yin[1]; [1]Zhejiang University

2:20 PM
A Novel Dual-layer Hydrogel/Cell Conduit Fabrication Method for Tissue Engineering: *Xixia Liu*[1]; Jun Yin[1]; [1]Zhejiang University

2:40 PM
Design and Evaluations System for 3D-printed Dental Implants Based on Deep Neural Networks: *Pei-Ching Kung*[1]; Chai-Wei Hsu[1]; An-Cheng Yang[2]; Nan-Yow Chen[2]; Nien-Ti Tsou[1]; [1]National Chiao Tung University; [2]National Center for High-performance Computing

3:00 PM
Mechanical Properties and Biodegradability of Porous Mg and Zn Scaffolds Fabricated by Power Bed Laser Fusion for Biomedical Applications: Muzi Li[1]; Felix Benn[2]; Thomas Derra[2]; Alexander Kopp[2]; Jon Molina-Aldareguía[1]; *Javier Llorca*[3]; [1]IMDEA Materials Institute; [2]Meotec; [3]IMDEA Materials Institute & Technical University of Madrid

3:20 PM
Mechanical Properties and Biodegradability of Porous PLA/Mg and PLA/Zn Scaffolds Fabricated by Fused Filament Deposition for Biomedical Applications: Cristina Pascual[1]; Cillian Thompson[1]; Jimena de la Vega[1]; De-Yi Wang[1]; Carlos González[2]; *Javier Llorca*[2]; [1]IMDEA Materials Institute; [2]IMDEA Materials Institute & Technical University of Madrid

3:40 PM
Laser-based Powder-bed Fusion Strategies for the Fabrication of Cellular Scaffolds with a Fine Resolution: *Ebrahim Asadi*[1]; Fatemeh Hejripour[1]; Md Abdus Salam[1]; Faridreza Attarzadeh[1]; Lauren Priddy[2]; Gary Bowlin[1]; [1]University of Memphis; [2]Mississippi State University

MATERIALS PROCESSING

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

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

Program Organizers: Bowen Li, Michigan Technological University; Shefford Baker, Cornell University; Huazhang Zhai, Beijing Institute of Technology; Kathy Lu, Virginia Polytechnic Institute and State University; 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; Eugene Olevsky, San Diego State University

Monday PM **March 15, 2021**

Session Chairs: Shefford Baker, Cornell University; Huazhang Zhai, Beijing Institute of Technology

2:00 PM Invited
Effect of Diamond Content and Modality on the Densification of Diamond Particulate Ceramic Composites by Hot-pressing: *Jerry LaSalvia*[1]; Anthony DiGiovanni[1]; Kristopher Behler[1]; [1]CCDC Army Research Laboratory

2:25 PM
An Analysis on the Factors Affecting Oxidation Resistance of Silicon Containing Ultra High Temperature Borides Ceramics: *Giuseppe Bianco Atria*[1]; Arvind Agarwal[1]; Cheng Zhang[1]; Ambreen Nisar[1]; [1]Florida International University

MATERIALS DESIGN

AI/Data Informatics: Applications and Uncertainty Quantification at Atomistics and Mesoscales — Session II

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

Program Organizers: Kamal Choudhary, National Institute of Standards and Technology; Garvit Agarwal, Argonne National Laboratory; Wei Chen, Illinois Institute of Technology; Mitchell Wood, Sandia National Laboratories; Vahid Attari, Texas A&M University; Oliver Johnson, Brigham Young University; Richard Hennig, University of Florida

Monday PM **March 15, 2021**

Session Chairs: Vahid Attari, Texas A&M University; Wei Chen, Illinois Institute of Technology

2:00 PM
Uncertainty Quantification in Computational Thermodynamics - From the Atomistic to the Continuum Scale: *Noah Paulson*[1]; Joshua Gabriel[1]; Thien Duong[1]; Marius Stan[1]; [1]Argonne National Laboratory

2:30 PM
Bayesian Inference and Uncertainty Quantification of Grain Boundary Properties: *Sterling Baird*[1]; Brandon Snow[1]; Alexia Bigelow[1]; David Fullwood[1]; Eric Homer[1]; Oliver Johnson; [1]Brigham Young University

2:50 PM
A Bayesian Optimization Framework for Exploring the Grain Boundary Manifold: *Leila Khalili*[1]; Owen Rettenmaier[1]; Srikanth Patala[1]; [1]North Carolina State University

3:10 PM
Machine Learning for Predicting Grain Boundary Properties: *Lingxiao Mu*[1]; Elizabeth Holm[1]; [1]Carnegie Mellon University

3:30 PM
Machine Learning Prediction of Defect Formation Energies: *Vinit Sharma*[1]; Pankaj Kumar[2]; Pratibha Dev[2]; Ghanshyam Pilania[3]; [1]University of Tennessee Knoxville; [2]Howard University; [3]Los Alamos National Laboratory

3:50 PM
Accuracy, Uncertainty, Inspectability: The Benefits of Compositionally-restricted Attention-based Networks: *Taylor Sparks*[1]; Steven Kauwe[1]; Ryan Murdock[1]; Anthony Wang[2]; [1]University of Utah; [2]Technische Universitat Berlin

4:10 PM
A Probabilistic Approach with Built-in Uncertainty Quantification for the Calibration of a Superelastic Constitutive Model from Full-field Strain Data: *Harshad Paranjape*[1]; Kenneth Aycock[2]; Craig Bonsignore[1]; Jason Weaver[2]; Brent Craven[2]; Thomas Duerig[1]; [1]Confluent Medical; [2]U.S. Food and Drug Administration

4:30 PM
Uncertainty Quantification of Microstructures with a New Technique: Shape Moment Invariants: *Arulmurugan Senthilnathan*[1]; Pinar Acar[1]; [1]Virginia Tech

4:50 PM
Predicting Adsorption Energies and Surface Pourbaix Diagram of Metal NPs by GCNN Method: Kihoon Bang[1]; Youngtae Park[1]; Donghun Kim[2]; Sang Soo Han[2]; *Hyuck Mo Lee*[1]; [1]KAIST; [2]KIST

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Machine Learning Algorithms and Computational Modeling for Study and Design Materials

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

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

Monday PM **March 15, 2021**

Session Chairs: Bryan Wong, University of California, Riverside; Bryce Meredig, Citrine Informatics

2:00 PM Invited
Multi-Information Source Bayesian Optimization Applied to Materials Design: *Raymundo Arroyave*[1]; Danial Khatamsaz[1]; Richard Couperthwaite[1]; Abhilash Molkeri[1]; Douglass Allaire[1]; Ankit Srivastava[1]; [1]Texas A&M University

2:30 PM
Understanding Grain Boundary Metastability Using the SOAP Descriptor and Unsupervised Machine Learning Techniques: *Lydia Serafin*[1]; Derek Hensley[1]; Jay Spendlove[1]; Gus Hart[1]; Eric Homer[1]; [1]Brigham Young University

2:50 PM
Grain Boundary Network Optimization through Human Computation and Machine Learning: *Christopher Adair*[1]; Oliver Johnson[1]; [1]Brigham Young University

3:10 PM Invited
Deep Learning for Characterization of Deformation Induced Damage: *Ulrich Kerzel*[1]; Setareh Medghalchi[2]; Carl Kusche[2]; Talal Al-Samman[2]; Sandra Korte-Kerzel[2]; [1]IUBH; [2]RWTH Aachen University

3:40 PM
Automatic Segmentation of Microstructures in Steel Using Machine Learning Methods: *Hoheok Kim*[1]; Junya Inoue[1]; Tadashi Kasuya[1]; [1]The University of Tokyo

4:00 PM
2D Microstructure Reconstruction for SEM via Non-local Patch-based Image Inpainting: *Anh Tran*[1]; Hoang Tran[2]; [1]Sandia National Laboratories; [2]Oak Ridge National Laboratory

4:20 PM Invited
AI-assisted Analysis of Flame Stability: *Marius Stan*[1]; Jessica Pan[2]; Noah Paulson[1]; Joseph Libera[1]; [1]Argonne National Laboratory; [2]Princeton University

4:50 PM
Neural Network Model of He Diffusion in W-based High Entropy Alloys: Gustavo Esteban-Manzanares[1]; Enrique Martínez[2]; Duc Nguyen[2]; *Javier Llorca*[3]; [1]IMDEA Materials Institute; [2]Los Alamos National Laboratory; [3]IMDEA Materials Institute & Technical University of Madrid

5:10 PM
Comparison of Correction Schemes for Charged Point Defects in 2D Materials: *Preston Vargas*[1]; Anne Marie Tan[1]; Biswas Rijal[1]; Richard Hennig[1]; [1]University of Florida

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ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications IX — Session II

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

Program Organizers: Hsin-Jay Wu, National Chiao Tung University; Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Cnrs Crismat Unicaen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Lan Li, Boise State University; Takao Mori, National Institute for Materials Science; Tiejun Zhu, Zhejiang University; Alexandra Zevalkink, Michigan State University; Wan-Ting Chiu, Tokyo Institute of Technology

Monday PM **March 15, 2021**

Session Chairs: Yi-Fen Tsai, National Chiao Tung University; Wan-Ting Yen, National Chiao Tung University

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2:00 PM Invited
Challenges and Opportunities of Flexible Thermoelectric Devices Based on Printing Technology: *Chien-Neng Liao*[1]; [1]National Tsing Hua University

2:20 PM Invited
Comparing Thermoelectricity of Bulk and Thin Film Heusler Alloys: *Ernst Bauer*[1]; B. Hinterleitner[1]; A. Riss[1]; M. Parzer[1]; F. Garmroudi[1]; T. Mori[2]; X. Chen[3]; [1]Technische Universität Wien; [2]NIMS; [3]Shenyang National Laboratory for Materials Science

2:40 PM
Optimizing Thermoelectric Properties of Few-layer Transition Metal Dichalcogenides: *Tianhui Zhu*[1]; Mona Zebarjadi[1]; [1]University of Virginia

3:00 PM
Solid-state thermionic Devices: Effect of Asymmetry on the Device Performance: *Md Golam Rosul*[1]; Mona Zebarjadi[1]; [1]University of Virginia

3:20 PM
Interfacial Reaction in Ag/Se, Ag/Te, Ag2Te/Se and Ag2Te/Se-30at.%Te Couples and Their Related Phase Diagram: *Yohanes Hutabalian*[1]; Sinn-wen Chen[1]; [1]National Tsing Hua University

3:40 PM
Thermoelectric Cell Setup for Heat Recovery in Industrial Chimneys: Manuela Castañeda Montoya[1]; Andrés Amell Arrieta[1]; *Henry Colorado*[1]; [1]Universidad de Antioquia

4:00 PM Invited
Impact of Surface Engineering in Silicon Film Thermoelectrics: *Masahiro Nomura*[1]; [1]The University of Tokyo

4:20 PM Invited
Developing Thermoelectric Thin Films and Modules for IoT Energy Harvesting: *Takao Mori*[1]; [1]National Institute for Materials Science

4:40 PM Invited
Thermomagnetic Transport in 2D Layered Topological Materials: *Mona Zebarjadi*[1]; Md. Sabbir Akhanda[1]; Emad Rezaei[1]; Md. Golam Rosul[1]; Keivan Esfarjani[1]; Albert Davydov[2]; Sergiy Krylyuk[2]; [1]University of Virginia; [2]NIST

5:00 PM Invited
Cu-Sn Based Thiospinel Compounds: Insight of Alternative Route for Developing Thermoelectrics Thiospinel Compounds?: *Cédric Bourgès*[1]; [1]Nims

5:20 PM
First-principles Calculation of Nernst Coefficient and Magneto-Seebeck: *Emad Rezaei*[1]; Md Sabbir Akhanda[1]; Keivan Esfarjani[1]; Mona Zebarjadi[1]; [1]University of Virginia

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LIGHT METALS

Alumina and Bauxite — Process Optimization and Bauxite Enrichment

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

Program Organizer: Anne Duncan, Hatch

Monday PM **March 15, 2021**

2:00 PM
Introductory Comments: Alumina and Bauxite: *Anne Duncan*[1]; [1]Hatch

2:05 PM Invited
Implementation of Digital Technologies in Alumina Refining: A Producer Experience: *Vladimir Golubev*[1]; Dmitry Mayorov[1]; Dmitry Chistyakov[1]; Evgeniy Fomichev[1]; Ilya Blednykh[1]; Andrey Panov[1]; [1]RUSAL Engineering and Technological Center

2:40 PM
The Application of Intelligent Control to Red Mud Settling and Washing in Alumina Refinery: Yuehua Jiang[1]; *Jinlong Tian*; Zhengyong Zhang[1]; [1]Shenyang Aluminium and Magnesium Engineering and Research Institute Co., Ltd

3:00 PM
Alumina Refinery Volume Control: *Thiago Franco*[1]; [1]CBA

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Alloy and MMC Development

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

Program Organizer: Dimitry Sediako, University of British Columbia

Monday PM **March 15, 2021**

Session Chair: Dimitry Sediako, University of British Columbia

2:00 PM
Introductory Comments: Aluminum Alloys, Processing and Characterization: *Dimitry Sediako*[1]; [1]University of British Columbia

2:05 PM Invited
Anodization Compatibility of Eutectic Aluminum-Cerium Alloys: *Zachary Sims*[1]; David Weiss[2]; Hunter Henderson[3]; Orlando Rios[4]; Jiheon Jun[5]; Sur Debashish[6]; Max Wiener[7]; Ryan Ott[8]; Fangqiang Meng[8]; [1]University of Tennessee; [2]Eck Industries; [3]Lawrence Livermore National Laboratory; [4]University of Tennessee Knoxville; [5]Oak Ridge National Laboratory; [6]University of Virginia; [7]Auto Anodics; [8]Ames Laboratory

2:35 PM
Al-Sm Alloys Under Far-from-Equilibrium Conditions: *Can Okuyucu*[1]; Burçin Kaygusuz[1]; Cemil Isiksaçan[2]; Onur Meydanoglu[2]; Amir Motallebzadeh[3]; Sezer Özerinç[1]; Yunus Kalay[1]; [1]Middle East Technical University; [2]Assan; [3]Koç University

2:55 PM
Effect of Minor Additives to Al-Zn-Mg Alloys on Welding and Corrosion Performance for Building Constructions: *Alexander Gradoboev*[1]; Dmitriy Ryabov[1]; Viktor Mann[2]; Aleksandr Krokhin[2]; Roman Vakhromov[1]; Anna Ivanova[1]; Anton Legkikh[1]; [1]Light Materials and Technology Institute LLC; [2]RUSAL Management JSC

3:15 PM
Mechanism Behind Al/Cu Interface Reaction: The Kinetics and Diffusion of Cu in Forming Different Intermetallic Compounds: Yongqiong Ren[1]; Jie Chen[1]; *Bingge Zhao*[2]; [1]Yonggu Group Corporation Co., Ltd.; [2]Shanghai University

3:35 PM
Phase Formation of Mo- and Cr-rich Compounds in an Al-Si Cast Alloy: *Peer Decker*[1]; Jan Steglich[1]; Anna-Lena Kauws[1]; Andreas Kiefert[1]; Luisa Marzoli[1]; Marcel Rosefort[1]; [1]Trimet Aluminium SE

3:55 PM
Understanding the Effect of Quench Delay and Alloy Chemistry on Various 6000 Series Alloys Systems
: David Shoemaker[1]; *Robert Matuska*[1]; [1]Kaiser Aluminum

4:15 PM
Effect of Heat Treatment on the Microstructure and Mechanical Properties of LB-PBF AlSi10Mg and Scalmalloy: *Shaharyar Baig*[1]; Seyed Ghiaasiaan[1]; Nima Shamsaei[1]; [1]Auburn University

4:35 PM
Thermal Properties of Hybrid Al-Cu-Components Produced by Combining Powder Pressing and Semi-solid Forming Strategies: *Marco Speth*[1]; Mathias Liewald[1]; Kim Rouven Riedmueller[1]; [1]Universtiy of Stuttgart, Institute for Metal Forming Technology

4:55 PM Question and Answer Period Dr. Dimitry Sediako

LIGHT METALS

Aluminum Reduction Technology — Cell Modernization (Modelling and Energy Optimization)

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

Program Organizers: Nadia Ahli, Emirates Global Aluminium; Nancy Holt, Hydro Aluminium AS

Monday PM **March 15, 2021**

Session Chairs: Jayson Tessier , ALCOA; Andre Schneider, HATCH

2:00 PM
Introductory Comments: Aluminum Reduction Technology: *Nadia Ahli*[1]; [1]Emirates Global Aluminium

2:05 PM
Mass Transport by Waves: Bath-metal Interface Deformation, Rafts Collision and Physical Model: *Lovatiana Rakotondramanan*[1]; László Kiss[1]; Sándor Poncsák[1]; Renaud Santerre[1]; Sebastien Guerard[2]; Jean-François Bilodeau[2]; Simon Richer[1]; [1]Grips Universite Du Quebec A Chicoutimi; [2]Rio Tinto

2:25 PM
Modeling Anode Current Pickup After Setting: *Choon-Jie Wong*[1]; Yuchen Yao[1]; Jie Bao[1]; Maria Skyllas-Kazacos[1]; Barry J. Welch[1]; Ali Jassim[2]; [1]University of New South Wales; [2]Emirates Global Aluminum

2:45 PM
Superconductor Busbars – High Benefits for Aluminium Plants: *Wolfgang Reiser*[1]; Till Reek[2]; Carsten Räch[3]; Daniel Kreutzer[3]; [1]Vision Electric Super Conductors GmbH; [2]Martin Iffert Consulting; [3]University of Applied Sciences Kaiserslautern

3:05 PM
Coupled SPH-DEM to Simulate the Injection of a Powder into a Liquid with Heat Transfer and Phase Change: *Thomas Roger*[1]; Laszlo Kiss[1]; Kirk Fraser[2]; Sandor Poncsak[3]; Sébastien Guérard[3]; Jean Francois Bilodeau[3]; Guillaume Bonneau[1]; [1]Universite Du Quebec A Chicoutimi; [2]National Research Council Canada; [3]Rio Tinto Aluminium

3:25 PM
Individual Anode Current Monitoring during Aluminum Reduction Cell Power Reduction: *Yuchen Yao*[1]; Jie Bao[1]; Maria Skyllas-Kazacos[1]; Barry Welch[1]; Ali Jassim[2]; [1]University of New South Wales; [2]Emirates Global Aluminum

3:45 PM Question and Answer Period

BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Bio-Nano 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

Monday PM **March 15, 2021**

Session Chairs: Candan Tamerler, University of Kansas; Feride Sermin Utku, Yeditepe University

2:00 PM Invited
Flexible-glass Like Coating onto PTFE Vascular Graft Material via Nonthermal Plasma Process: Vineeth Vijayan[1]; Bernabe Tucker[1]; Yogesh Vohra[1]; *Vinoy Thomas*[1]; [1]University of Alabama at Birmingham

2:30 PM
Detection of Limonene Using Graphene Field Effect Transistor Modified by Self-assembling Peptide: *Honma Chishu*[1]; Yoshiaki Sugizaki[2]; Atsunobu Isobayashi[2]; Yuhei Hayamizu[1]; [1]Tokyo Tech; [2]Toshiba Corporation

2:50 PM
Enhancing Electrochemical Detection of Choline Using Molecularly Imprinted Polymer Electrode: Sermin Utku[1]; *Sevgul Bakay*[2]; Adil Denizli[3]; Inci Cilesiz[4]; [1]Yeditepe University Biomedical Engineering; [2]Duzce University; [3]Hacettepe University; [4]Istanbul Technical University

3:20 PM
Developing Nanostructured Metals for Innovative Medical Implants with Improved Design and Biofunctionality: *Ruslan Valiev*[1]; Evgeny Parfenov[1]; Olga Kulyasova[1]; [1]UFA State Aviation Technical University

3:40 PM Invited
The Mechanical Significance of Sublamellar Organization of Mineralized Collagen Fibrils: *Sermin Utku*[1]; [1]Yeditepe University Biomedical Engineering

CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2021 — Advanced Microstructure 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, Instituto Militar de Engenharia; Shadia Ikhmayies; 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; Rajiv Soman, Eurofins EAG Materials Science LLC; Alex Moser, US Naval Research Laboratory

Monday PM **March 15, 2021**

Session Chairs: John Carpenter, Los Alamos National Laboratory; Mingming Zhang, ArcelorMittal Global R&D

2:00 PM
A Comparison between ZnO Cauliflowers on Glass and Aluminum Substrates: *Shadia Ikhmayies*

2:20 PM
Plastic Behavior and Texture Anisotropy in Dynamically Loaded Tin: *Veronica Anghel*[1]; Carl Trujillo[1]; Ramon Martinez[1]; George Gray III[1]; [1]Los Alamos National Laboratory

2:40 PM
Effect of Misorientation Development Near Grain and Twin Boundaries in Pure Copper and Copper-aluminium Alloy: *Sandhya Verma*[1]; Prita Pant[1]; M P Gururajan[1]; [1]Indian Institute of Technology Bombay

3:00 PM
Rapid Irradiation and Characterization of HT9: *Gabriella Bruno*[1]; Kevin Field[1]; Li He[2]; T.M. Kelsy Green[1]; Todd Allen[1]; [1]University of Michigan; [2]University of Wisconsin-Madison

3:20 PM
The Influence of Alloying in Stabilizing a Faceted Grain Boundary Structure: *Jonathan Priedeman*[1]; Gregory Thompson[1]; [1]University of Alabama

3:40 PM
Crystal Mosaicity and Local Alloy Chemistry of Low Angle Grain Boundaries in Ni-based Superalloys: *Felicitas Scholz*[1]; Junyang He[2]; Oliver Horst[1]; Pascal Thome[1]; Gunther Eggeler[1]; Baptiste Gault[2]; Jan Frenzel[1]; [1]Ruhr-Universitat Bochum; [2]Max-Planck-Institut für Eisenforschung GmbH

4:00 PM
Insights into the Formation of Al-Cu Intermetallic Compounds during the Solid-liquid Reaction by High-resolution Transmission Electron Microscopy: Jie Chen[1]; Yongqiong Ren[1]; *Bingge Zhao*[2]; [1]Yonggu Group Corporation Co., Ltd.; [2]Shanghai University

NUCLEAR MATERIALS

Characterization of Nuclear Materials and Fuels with Advanced X-ray and Neutron Techniques — X-ray Diffraction/Scattering II

Sponsored by: TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Nuclear Materials Committee

Program Organizers: Xuan Zhang, Argonne National Laboratory; Jonathan Almer, Argonne National Laboratory; Maria Okuniewski, Purdue University; Joshua Kane, Idaho National Laboratory; Donald Brown, Los Alamos National Laboratory; J. Kennedy, Idaho National Laboratory; Arthur Motta, Pennsylvania State University

Monday PM **March 15, 2021**

Session Chairs: Arthur Motta, The Pennsylvania State University; Xuan Zhang, Argonne National Laboratory

2:00 PM Invited
In-situ Investigation into The Stability of Hydride Phases in Zirconium: *Fei Long*[1]; Nima Badr[1]; Matthew Topping[1]; Igor Cherubin[1]; Jun-Sang Park[2]; Mark Daymond[1]; [1]Queens University; [2]Advanced Photon Source

2:30 PM
In-situ Synchrotron X-ray Diffraction Study on Tensile Deformation of Neutron Irradiated Fe-Cr-C Alloys: *Hoon Lee*[1]; Xiang Liu[2]; Mark Warren[3]; Dominic Piedmont[1]; Xuan Zhang[4]; Meimei Li[4]; Jeff Terry[3]; Jonathan Almer[4]; James Stubbins[1]; [1]University of Illinois at Urbana-Champaign; [2]Idaho National Laboratory; [3]Illinois Institute of Technology; [4]Argonne National Laboratory

2:50 PM
Microstructural Characterization of the Stress and Strain Deformation Partitioning Evolution in Tungsten Heavy Alloys: *David Sprouster*[1]; M. E. Alam[2]; G. R. Odette[2]; L Snead[1]; [1]Stony Brook University; [2]UCSB

3:10 PM
Creep Behavior of Advanced Austenitic (Fe-25Ni-20Cr) Alloy 709 through In-situ Neutron Diffraction Characterization and Transmission Electron Microscopy Characterization: Yuchen Zhao[1]; *Ryan Schoell*[1]; Matthew Frost[2]; Djamel Kaoumi[1]; [1]North Carolina State University; [2]Oak Ridge National Laboratory

3:30 PM
Using In-situ Synchrotron X-ray Scattering to Determine the TTT Diagram of U-6Nb: *Nathan Peterson*[1]; Jianzhong Zhang[2]; Don Brown[2]; Bjorn Clausen[2]; Eloisa Zepeda-Alarcon[2]; Erik Watkins[2]; Elena Garlea[3]; Sean Agnew[1]; [1]University of Virginia; [2]Los Alamos National Laboratory; [3]Y-12 National Security Complex

CORROSION

Coatings and Surface Engineering for Environmental Protection III — Protection from Environmental Degradation, Session II

Sponsored by: TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Surface Engineering Committee, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Arif Mubarok, PPG; Tushar Borkar, Cleveland State University; Rajeev Gupta, North Carolina State University; Mary Lyn Lim, PPG Industries; Raul Rebak, GE Global Research; Brian Okerberg, PPG Industries

Monday PM **March 15, 2021**

2:00 PM
Designing Lubricant-impregnated Coatings to Reduce Corrosion and Hydrogen Embrittlement: *Sami Khan*[1]; Kripa Varanasi[1]; [1]Massachusetts Institute of Technology

2:20 PM
Effects of Heat Treatments, Current Density, and Electroless Ni Layer Thickness on Corrosion Performance of Trivalent Chromium Passivations on ZnNi Coatings: *Kevin Foster*[1]; William Fahrenholtz[2]; Matthew O'Keefe[2]; James Claypool[2]; [1]Missouri University of Science & Technology; [2]Missouri University of Science & Technology

2:40 PM
Electronic Structure Mechanisms to Explain the Onset of Cl-induced Localised Corrosion in Al_2O_3: *Aditya Sundar*[1]; Ganlin Chen[1]; Liang Qi[1]; [1]University of Michigan

3:00 PM
Galvanic Corrosion Mitigation by Material and Coating Selection for AZ31B bolt-joined with CFRP: *Yong Chae Lim*[1]; Jiheon Jun[1]; Charles Warren[1]; Zhili Feng[1]; [1]Oak Ridge National Laboratory

3:20 PM
Using Mechanical and Ion Polishing to Identify Structural and Chemical Defects for the Pitting Corrosion of a Compositionally Complex Steel: *Mark Wischhusen*[1]; Carol Glover[1]; John Scully[1]; Sean Agnew[1]; [1]University of Virginia

NUCLEAR MATERIALS

Composite Materials for Nuclear Applications — Metal Based Composites

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

Program Organizers: Anne Campbell, Oak Ridge National Laboratory; Dong Liu, University of Bristol; Rick Ubic, Boise State University; Lauren Garrison, Oak Ridge National Laboratory; Peng Xu, Idaho National Laboratory; Johann (Hans) Riesch, Max Planck Institute for Plasma Physics

Monday PM **March 15, 2021**

Session Chair: Rick Ubic, Boise State University

2:00 PM
A Novel Processing Route for ODS Steel by Liquid Metallurgy: *Shiqi Zheng*[1]; Xiaochun Li[1]; [1]UCLA

2:20 PM
Competition between Void Evolution and Amorphization In Radiation-tolerant Nanocrystalline Cu-10at%Ta Alloy: *Priyam Patki*[1]; Wei-Ying Chen[2]; Janelle Wharry[1]; [1]Purdue University; [2]Argonne National Laboratory

2:40 PM
Enhanced Microstructural Stability of ARB-processed Cu/Nb Nanolayers Under Heavy Dose Ion Irradiation at Elevated Temperatures: *Madhavan Radhakrishnan*[1]; Thomas Nizolek[2]; Mukesh Bachhav[3]; Yongqiang Wang[2]; Nathan Mara[4]; Osman Anderoglu[1]; [1]University of New Mexico; [2]Los Alamos National Laboratory; [3]Idaho National Laboratory; [4]University of Minnesota

3:00 PM
Evaluation and Irradiation of 14YWT Capacitive Discharge Resistance Welds: *Calvin Lear*[1]; Benjamin Eftink[1]; Hyosim Kim[1]; Todd Steckley[1]; Thomas Lienert[2]; Stuart Maloy[1]; [1]Los Alamos National Laboratory; [2]T.J. Lienert Consulting, LLC

3:20 PM
Irradiation Induced Forced Chemical Mixing and Local Hardening in Mechanically-processed Immiscible Zr/Nb Multilayers: *Madhavan Radhakrishnan*[1]; Thomas Nizolek[2]; Daniel Savage[3]; Marko Knezevic[3]; Nan Li[2]; Yongqiang Wang[2]; Mukesh Bachhav[4]; Boopathy Kombaiah[4]; Nathan Mara[5]; Osman Anderoglu[1]; [1]University of New Mexico; [2]Los Alamos National Laboratory; [3]University of New Hampshire; [4]Idaho National Laboratory; [5]University of Minnesota

3:40 PM
Mechanical Strength of Explosion Welded Thin Stainless-steel Cladding on Carbon Steel: *Nathan Reid*[1]; Lauren Garrison[2]; John Echols[2]; Kaustubh Bawane[3]; Jean Paul Allain[4]; [1]University of Illinois Urbana Champaign; [2]Oak Ridge National Laboratory; [3]Idaho National Laboratory; [4]Pennsylvania State University

4:00 PM
Radiation Tolerance and Microstructural Changes of Nanocrystalline Cu-Ta Alloy to High Dose Self-ion Irradiation: *Soundarya Srinivasan*[1]; Chaitanya Kale[1]; Billy Hornbuckle[2]; Kris Darling[2]; Matthew Chancey[3]; Efrain Hernández-Rivera[2]; Yimeng Chen[4]; Thomas Koenig[5]; Yongqiang Wang[3]; Gregory Thompson[5]; Kiran Solanki[1]; [1]Arizona State University; [2]Army Research Laboratory; [3]Los Alamos National Laboratory; [4]CAMECA Instruments Inc; [5]The University of Alabama

4:20 PM
Synthesis and Irradiation Response of Hetero FeCr - Fe_2O_3 Interfaces: *Benjamin Derby*[1]; Jon Kevin Baldwin[1]; Djamel Kaoumi[2]; Danny Edwards[3]; Daniel Schreiber[3]; Timothy Lach[4]; Blas Uberuaga[1]; Nan Li[1]; [1]Los Alamos National Laboratory; [2]North Carolina State University; [3]Pacific Northwest National Laboratory; [4]Oak Ridge National Laboratory

4:40 PM
Understanding Defect Recovery and Accommodation and Their Implications on Mechanical Performance in Irradiated Nanocomposite Materials: *Michael Wurmshuber*[1]; David Frazer[2]; Mehdi Balooch[3]; Inas Issa[1]; Andrea Bachmaier[4]; Peter Hosemann[3]; Daniel Kiener[1]; [1]Montanuniversitaet Leoben; [2]Los Alamos National Laboratory; [3]University of California, Berkeley; [4]Erich Schmid Institute of Materials Science

MATERIALS DESIGN

Computational and Modeling Challenges in Metals and Alloys for Extreme Environments — High Strain Rates and Irradiation Effects

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

Program Organizers: Jean-Briac le Graverend, Texas A&M University; Jaafar El-Awady, Johns Hopkins University; Giacomo Po, University of Miami; Beñat Gurrutxaga-Lerma, University of Birmingham

Monday PM **March 15, 2021**

Session Chairs: Giacomo Po, University of Miami; Laurent Capolungo, Los Alamos National Lab

2:00 PM
Investigation of Role of Interface Microstructure on the Shock Compression and Spall Failure Behavior of Nanoscale Cu/Ta Multiphase Metallic Materials: *Marco Echeverria*[1]; Avinash Dongare[1]; [1]University of Connecticut

2:20 PM
Modeling of Laser Interactions with BCC Metals Using a Hybrid Atomistic-continuum Approach: *Ching Chen*[1]; Avanish Mishra[1]; Sergey Galitskiy[1]; Avinash Dongare[1]; [1]University of Connecticut

2:40 PM
Mesoscale Modeling of Deformation Behavior of Fe-based Microstructures at High Strain Rates and under Shock Loading Conditions: *Ke Ma*[1]; Avinash Dongare[1]; [1]University of Connecticut

3:00 PM
The Microscopic Structure of a Heavily Irradiated Metal: *Peter Derlet*[1]; Sergei Dudarev[2]; [1]Paul Scherrer Insitute; [2]UKAEA CCFE

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Diffusion, Kinetics and Non-equilbrium Events

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

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Vahid Attari, Texas A&M University; Jorge Munoz, University of Texas at El Paso

Monday PM **March 15, 2021**

Session Chairs: Pascal Bellon, University of Illinois at Urbana-Champaign; Enrique Martinez Saez, Clemson University; Nana Ofori-Opoku, Canadian Nuclear Laboratories; Maylise Nastar, C.E.A

2:00 PM
Hydrogen Diffusion and Trapping in Multiphase Materials: A Multiscale Model for Non-point Trapping: *Fernando León-Cázares*[1]; Dominic Dziedzic[1]; Enrique Galindo-Nava[1]; [1]University of Cambridge

2:20 PM
Kinetic Assessment of HCP Mg-Li-Al Alloys: *David Christianson*[1]; Lilong Zhu[2]; Michele Manuel[1]; [1]University of Florida; [2]Yantai University

2:40 PM
Quantitative Inference of the Mobility Coefficient in the Cahn-Hilliard Equation from a Model Experiment: *Zirui Mao*[1]; Michael Demkowicz[1]; [1]Texas A&M University

3:00 PM Invited
Defect Kinetics in Multi-component Oxides via Accelerated Molecular Dynamics: *Blas Uberuaga*[1]; Ghanshyam Pilania[1]; [1]Los Alamos National Laboratory

3:30 PM Invited
Predicting Non-equilibrium Patterns Beyond Thermodynamic Concepts: Application to Radiation Induced Microstructures: *David Simeone*[1]; Philippe Garcia[1]; Laurence Luneville[1]; [1]CEA

4:00 PM
Quantitative Phase-field Modeling for Corrosion of Engine Materials at High Temperature: *Xueyang Wu*[1]; Michael Tonks[1]; [1]University of Florida

4:20 PM Invited
Molecular Dynamics Modeling of Embrittlement in Irradiated Nickel-base Alloys: *Michael Demkowicz*[1]; [1]Texas A&M University

4:50 PM Invited
Modeling Delayed-onset Kinetics of Materials Used in Nuclear Power Applications Using Atomistic Simulations: *Laurent Béland*[1]; Cong Dai[2]; Peyman Saidi[1]; Eric Nicholson[3]; Yu Luo[1]; Chandra Singh[3]; Mark Daymond[1]; Zhongwen Yao[1]; [1]Queen's University; [2]Canadian Nuclear Laboratories; [3]University of Toronto

PHYSICAL METALLURGY

Continuous Phase Transformations — Session II

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

Program Organizers: Jessica Krogstad, University of Illinois at Urbana-Champaign; Gregory Thompson, University of Alabama; Matthew Steiner, University of Cincinnati; Janelle Wharry, Purdue University

Monday PM **March 15, 2021**

Session Chairs: Janelle Wharry, Purdue University; Matthew Steiner, University of Cincinnati

2:00 PM Invited
Effect of Bulk and Local Phase Transformation on Deformation Mechanisms: *Maryam Ghazisaeidi*[1]; Mulaine Shih[1]; Edwin Antillon[2]; [1]Ohio State University; [2]Naval Research Lab

2:30 PM
Cross-Slip and Work-Hardening in Short-Range Ordered FCC Alloys: *Anas Abu-Odeh*[1]; Mark Asta[1]; [1]University of California, Berkeley

2:50 PM Invited
Structural Transformations Driven by Irradiation in the High Defect Density Limit: *Sergei Dudarev*[1]; Daniel Mason[1]; Peter Derlet[2]; [1]UK Atomic Energy Authority; [2]Paul Scherrer Institut

3:20 PM
Magnetically Driven Short-range Order in the CrCoNi System: *Flynn Walsh*[1]; Robert Ritchie[1]; Mark Asta[1]; [1]Lawrence Berkeley National Laboratory

3:40 PM
Short-range Clustering and Ordering Evolution of Ni-22Cr-13Mo Alloy: *Po-Cheng Kung*[1]; Jessica Krogstad[1]; [1]University of Illinois at Urbana-Champaign

4:00 PM
Thermodynamics of the Invar Transition: Phonons vs. Magnetism: *Stefan Lohaus*[1]; Pedro Guzman[1]; Brent Fultz[1]; [1]California Institute of Technology

4:20 PM Invited
Intrinsic Phase Stability and Continuous Phase Transformations in TiAlZrN Ultra-hard Nitride Coatings: *Vahid Attari*[1]; Raymundo Arroyave[1]; [1]Texas A&M University

CORROSION

Corrosion in Heavy Liquid Metals for Energy Systems — Materials Compatibility with Liquid Metal Coolants II

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

Program Organizers: Osman Anderoglu, University of New Mexico; Alessandro Marino, SCK-CEN; Michael Short, Massachusetts Institute of Technology; Peter Hosemann, University of California; Mike Ickes, Westinghouse Electric Company

Monday PM **March 15, 2021**

Session Chairs: Peter Hosemann, UC Berkeley; Michael Ickes, Westinghouse Electric Co.

2:00 PM
Numerical Modelling of Coolant Chemistry in Lead Bismuth Eutectic Cooled Nuclear Reactors: *Alessandro Marino*[1]; Kristof Gladinez[1]; Borja Gonzalez Prieto[1]; Jun Lim[1]; Kris Rosseel[1]; Alexander Aerts[1]; [1]SCK-CEN

2:20 PM Invited
Behaviour of Spallation, Activation and Fission Products in LBE: *Alexander Aerts*[1]; Borja Gonzalez Prieto[1]; Jörg Neuhausen[2]; [1]SCK CEN; [2]Paul Scherrer Institut

2:45 PM
Engineering Model of the Kinetics of the Steel Oxide Layer in a Flow of a Heavy Liquid Metal Coolant Under Various Oxygen Conditions: Alexander Avdeenkov[1]; Alexander Orlov[2]; *Nafees Kabir*[3]; [1]«All-Russian Research Institute for Nuclear Power Plants Operation» JSC; [2]Proryv JSC; [3]MEPhI

3:05 PM Invited
Progress in LBE Chemistry Control and Measurement Techniques for MYRRHA: *Jun Lim*[1]; Kristof Gladinez[1]; Borja Gonzalez-Prieto[1]; Alessandro Marino[1]; Kris Rosseel[1]; Alexander Aerts[1]; [1]SCK CEN

3:30 PM
PILLAR: Pool-type Integral Leading Facility for Lead-alloy Cooled Advanced Small Modular Reactor, and Its Use for Natural Convection Study and Corrosion: *Jaewon Choi*[1]; SangBum KIM[1]; Kyunghwan Keum[1]; Youho Lee[1]; Il Soon Hwang[2]; Han-Chil Lee[3]; [1]Seoul National University; [2]Ulsan National Institute of Science and Engineering (UNIST); [3]Moojin

3:50 PM
Materials Compatibility Testing with Molten Lead up to 700°C: *Osman Anderoglu*[1]; Cemal Cakez[1]; Shuprio Ghosh[1]; Khaled Talaat[1]; Madhavan Radhakarishnan[1]; Keith Woloshun[2]; Cetin Unal[2]; Stuart Maloy[2]; Michael Ickes[3]; Paolo Ferroni[3]; [1]University of New Mexico; [2]Los Alamos National Laboratory; [3]Westinghouse Electric Company

4:10 PM
Anubis Multiphysics: A Neutronics-Thermal Hydraulics Coupling Platform for Flow Accelerated Corrosion Modeling in Reactor Conditions: *Khaled Talaat*[1]; Osman Anderoglu[1]; [1]The University of New Mexico

4:30 PM
Performance of Candidate Alloys at 500°C in Flowing Lead: *Cemal Cakez*[1]; Shuprio Ghosh[1]; Khaled Talaat[1]; Keith Woloshun[1]; Stuart Maloy[2]; Cetin Unal[2]; Michael Ickes[3]; Paolo Ferroni[4]; Osman Anderoglu[1]; [1]University of New Mexico; [2]Los Alamos National Lab; [3]Westinghouse Electric Corporation ; [4]Westinghouse Electric Corporation

CHARACTERIZATION

Data Science and Analytics for Materials Imaging and Quantification — Session II: Data-led Approaches for 3D Characterization & X-Ray Imaging

Sponsored by: TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Emine Gulsoy, Northwestern University; Charudatta Phatak, Argonne National Laboratory; Stephan Wagner-Conrad, Carl Zeiss Microscopy; Marcus Hanwell, Brookhaven National Laboratory; David Rowenhorst, Naval Research Laboratory; Tiberiu Stan, Northwestern University

Monday PM **March 15, 2021**

Session Chair: Charudatta Phatak, Argonne National Laboratory

2:00 PM
Convolutional neural network-assisted recognition of nanoscale L12 ordered structures in face-centred cubic alloys: *Yue Li*[1]; Leigh Stephenson[1]; Raabe Dierk[1]; Baptiste Gault[1]; [1]Max-Planck-Institut für Eisenforschung GmbH

2:20 PM
Deep Neural Network Facilitated Complex Imaging of Phase Domains: *Longlong Wu*[1]; Pavol Juhas[1]; Shinjae Yoo[1]; Ian Robinsion[1]; [1]Brookhaven National Lab

2:40 PM
Quantitative X-ray Fluorescence Nanotomography: *Mingyuan Ge*[1]; Xiaojing Huang[1]; Hanfei Yan[1]; Wilson Chiu[2]; Kyle Brinkman[3]; Yong Chu[1]; [1]Brookhaven National Laboratory; [2]University of Connecticut; [3]Clemson University

3:00 PM
Materials Characterization in 3D Using High Energy X-ray Diffraction Microscopy: Irradiated and Deformed Materials: *Hemant Sharma*[1]; Peter Kenesei[1]; Jun-Sang Park[1]; Zhengchun Liu[1]; Jon Almer[1]; [1]Argonne National Laboratory

3:20 PM
Understanding the Keyhole Dynamics in Laser Processing Using Time-resolved X-ray Imaging Coupled With Computer Vision and Data Analytics: *Jongchan Pyeon*[1]; Joseph Aroh[1]; Runbo Jiang[1]; Andy Ramlatchan[2]; Benjamin Gould[3]; Anthony Rollett[1]; [1]Carnegie Mellon University; [2]NASA Langley Research Center; [3]Argonne National Laboratory

3:40 PM Question and Answer Period

MATERIALS PROCESSING

Deformation Induced Microstructural Modification — Session II: In Situ Interrogation of Microstructural Evolution During Deformation

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

Program Organizers: Arun Devaraj, Pacific Northwest National Laboratory; Suveen Mathaudhu, University of California-Riverside ; Kester Clarke, Colorado School of Mines; Bharat Gwalani, Pacific Northwest National Laboratory; Daniel Coughlin, Los Alamos National Laboratory

Monday PM **March 15, 2021**

Session Chair: Bharat Gwalani, Pacific Northwest National Laboratory

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2:00 PM Invited
Probing Microstructural Evolution in Deformation with Electrons and X-rays: *Anthony Rollett*[1]; Robert Suter[1]; Rachel Lim[1]; Matthew Wilkin[1]; Yueheng Zhang[1]; Patcharapit Promoppatum[2]; Carter Cocke[3]; Ashley Spear[3]; Ricardo Lebensohn[4]; Jerard Gordon[1]; [1]Carnegie Mellon University; [2]KMUTT; [3]University of Utah; [4]Los Alamos National Laboratory

2:30 PM
In Situ Analysis of Microstructural Evolution of Metallic Alloys under High Speed Rotational Shear Deformation: *Arun Devaraj*[1]; Tingkun Liu[1]; Bharat Gwalani[1]; Matthew Olszta[1]; changyong Park[2]; Stanislav Sinogeikin[3]; Cynthia Powell[1]; Suveen Mathaudhu[4]; [1]Pacific Northwest National Laboratory; [2]High pressure collaborative access team; [3]DAC tools; [4]University of California Riverside

2:50 PM Invited
Deformation at a Single Precipitate Using a Nanocube Model System: *Wendy Gu*[1]; Mehrdad Kiani[1]; Mitsu Murayama[2]; [1]Stanford University; [2]Virginia Tech

3:20 PM
In-situ Analysis of Microscale Deformation and Fracture in Severely Deformed Polycrystalline Tungsten: *Lara Draelos*[1]; Zachary Levin[1]; Ankit Srivastava[1]; [1]Texas A&M University

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SPECIAL TOPICS

Design and Manufacturing Approaches for the Next Generation of Sustainable Materials: The 2021 Student-led Symposium — Materials for Energy Production and Storage

Sponsored by: TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Mary Dougherty, Colorado School of Mines; Christopher Finfrock, Colorado School of Mines; Brady McBride, Colorado School of Mines; Jaden Zymbaluk, Colorado School of Mines; Desmond Mills, Colorado School of Mines; Casey Gilliams, Colorado School Of Mines

Monday PM **March 15, 2021**

Session Chairs: Christopher Finfrock, Colorado School of Mines; Casey Gilliams, Colorado School of Mines; Brady McBride, Colorado School of Mines; Desmond Mills, Colorado School of Mines; Jaden Zymbaluk, Colorado School of Mines

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2:00 PM Invited
III-V Photovoltaic Substrate Reuse and Recycle Strategies for Reduced Cost and Improved Materials Utilization: *Corinne Packard*[1]; [1]Colorado School of Mines

2:20 PM Invited
Reducing CO2 Emissions Through Improvements in the Materials Science of Fossil Fuels: *Jonah Erlebacher*[1]; Shashank Lakshman[1]; Gina Greenidge[1]; [1]Johns Hopkins University

2:40 PM Invited
Lithium-ion Battery Recycling Research at the ReCell Center: Linda Gaines[1]; Bryant Polzin[1]; *Jeffrey Spangenberger*[1]; [1]Argonne National Laboratory

3:00 PM Invited
Stepwise Approach to Improving Lead Furnace Operation Through Pilot Scale Studies and Computational Modeling: *Alexandra Anderson*[1]; Joseph Grogan[1]; John Wagner[2]; Sandeep Alavandi[3]; David Cygan[3]; [1]Gopher Resource; [2]Gas Technology Institute ; [3]Gas Technology Institute

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LIGHT METALS

Electrode Technology for Aluminum Production — Carbon Anode Production – Where is the Cutting Edge? – A Focus on 4.0 and the Future

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

Program Organizer: Derek Santangelo, Hatch

Monday PM **March 15, 2021**

Session Chair: Antti Koulumies, Outotec

2:00 PM
Introductory Comments: Electrode Technology for Aluminum Production: *Derek Santangelo*[1]; [1]Hatch

2:05 PM Invited
Digitalization in the Carbon Area as a Means to Improve Productivity: *Antti Koulumies*[1]; Paul Merlin[1]; Ana Maria Becerra[1]; [1]Metso Outotec

2:25 PM Invited
AMELIOS Suite or the Fives Digital Package for Carbon 4.0: Christophe Bouche[1]; Xavier Genin[1]; Sylvain Georgel[1]; *Pierre Mahieu*[1]; [1]Fives

2:45 PM
Development and Applications of the Four Points Probe (4PP) Electrical Resistivity Measurements for Anode Process Optimization: *Julien Lauzon-Gauthier*[1]; John Secasan[1]; [1]Alcoa Corporation

3:05 PM Invited
The Readiness and Compatibility of a Modern Anode Handling and Cleaning System for Industry 4.0 Technologies: *Kevin Williams*[1]; [1]Advanced Dynamics Corporation Ltd.

3:25 PM Break

3:40 PM Panel Discussion

ELECTRONIC MATERIALS

Electronic Packaging and Interconnections 2021 — 3D Microelectronic Packaging and Emerging Interconnects

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

Program Organizers: Mehran Maalekian, Mat-Tech; Christopher Gourlay, Imperial College London; Babak Arfaei, Ford Motor Company; Praveen Kumar, Indian Institute of Science; Sai Vadlamani, Intel Corporation; Kazuhiro Nogita, University of Queensland; David Yan, San Jose State University

Monday PM **March 15, 2021**

Session Chairs: Praveen Kumar , Indian Institute of Science; Nilesh Badwe, Intel Corp.

2:00 PM
Electromigration of Cu-Cu Bonds Fabricated by Instant Bonding Using <111>-oriented Nanotwinned Cu Microbumps: *Kai-Cheng Shie*[1]; Po-Ning Hsu[1]; Yu-Jin Li[1]; King-Ning Tu[1]; Chih Chen[1]; [1]National Chiao Tung University

2:20 PM
Enhancement on the Bonding Strength of Instantly-bonded Cu-Cu Joints by Post Annealing: *Jia Juen Ong*[1]; Chih Chen[1]; King-Ning Tu[1]; [1]National Chiao Tung University

2:40 PM
High Electromigration Resistance of Nanotwinned Cu Redistribution Lines for Fan-out Packaging: *I-Hsin Tseng*[1]; Chih Chen[1]; Benson Lin[2]; Chia-Cheng Chang[2]; [1]National Chiao Tung University; [2]MediaTek Inc

3:00 PM
Investigation of Interdiffusion In Micro Solder Joint with a Fine Pitch Copper Pillar Subjected to Electromigration Stressing: *Hossein Madanipour*[1]; Yi Ram Kim[1]; Allison Osmanson[1]; Mohsen Tajedini[1]; Choong-Un Kim[1]; [1]University of Texas at Arlington

3:20 PM
On the 3D Evolution of the Nanoporous Structure of Sintered Ag on a Cu Substrate During Isothermal Aging Observed by In-situ X-ray NanoTomography: *Kokouvi N'Tsouaglo*[1]; Azdine Nait-Ali[1]; Mikael Gueguen[1]; Pascal Gadaud[1]; Loic Signor[1]; Juan Creus[2]; Marc Legros[3]; Yijin Liu[4]; Xavier Milhet[1]; [1]Prime Institute CNRS ENSMA; [2]LASIE Université La Rochelle; [3]CEMES CNRS; [4]SLAC-SSRL

3:40 PM
Low Temperature Cu Direct Bonding with (111)-oriented Nanotwinned Copper Films on Metal Substrates: *Hung-Che Liu*[1]; Chih Chen[1]; [1]National Chiao Tung Universality

4:00 PM
Effect of Annealing on Mechanical Properties of nt-Cu Lines in Fan-out Wafer Level Packaging: *Wei-You Hsu*[1]; Yu-Jin Li[1]; I-Hsin Tseng[1]; Benson Tzu-Hung Lin[2]; Chia-Cheng Chang[2]; Chih Chen[1]; [1]National Chiao Tung University; [2]MediaTek Inc.

4:20 PM
Direct Bonding Process of (111) Nanotwinned Copper Thin Films: *Jing-Yi Zhong*[1]; Yung-Ting Tai[1]; Fan-Yi Ouyang[1]; [1]National Tsing Hua University

ENERGY & ENVIRONMENT

Energy Technologies and CO2 Management — Session II

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

Program Organizers: Alafara Baba, University of Ilorin; Lei Zhang, University of Alaska Fairbanks; Donna Guillen, Idaho National Laboratory; Xiaobo Chen, RMIT University; John Howarter, Purdue University; Neale Neelameggham, IND LLC; Cong Wang, Northeastern University; Ziqi Sun, Queensland University of Technology; Hong Peng, University of Queensland; Yu Lin Zhong, Griffith University

Monday PM **March 15, 2021**

Session Chairs: Donna Guillen, Idaho National Laboratory; Neale Neelameggham, IND LLC

2:00 PM
Low Energy Mesoporous Silica Recovery from a Nigerian Kaolinite Ore for Industrial Value Additions: *Alafara Baba*[1]; Abdullah Ibrahim[1]; Dele Fapojuwo[2]; Kuranga Ayinla[1]; Daud Olaoluwa[1]; Sadisu Girigisu[3]; Mustapha Raji[1]; Fausat Akanji[4]; Abdul Alabi[5]; [1]University of Ilorin; [2]University of Johannesburg; [3]University of Ilorin; Federal Polytechnic Offa; [4]SHEDA, Abuja; [5]Kwara State University

2:20 PM
Prediction Model of Converter Oxygen Consumption Based on Recursive Classification and Feature Selection: *Liu Zhang*[1]; Zhong Zheng[1]; Kaitian Zhang[1]; Xinyue Shen[1]; Yongzhou Wang[1]; [1]Chongqing University

2:40 PM
Reduction Behaviors of Hematite to Metallic Iron by Hydrogen at Low Temperatures: *Kun He*[1]; Zhong Zheng[1]; Hongsheng Chen[1]; Weiping Hao[1]; [1]Chongqing University

3:00 PM
Simulation and Optimization of Defluorination and Desulfurization Processes of Aluminum Electrolysis Flue Gas: *Xueke Li*[1]; Yan Liu[1]; Xiaolong Li[1]; Tingan Zhang[1]; [1]Northeastern University

3:20 PM
The Influence of Hydrogen Injection on the Reduction Process in the Lower Part of Blast Furnace: A Thermodynamic Study: *Zeji Tang*[1]; Zhong Zheng[1]; Hongsheng Chen[1]; Kun He[1]; [1]Chongqing University

3:40 PM
A Study of Numerical Modeling of Jet Heating Phenomenon in a Porous Media: Qingxuan Luo[1]; *Yuchao Chen*[1]; Armin Silaen[1]; Chenn Zhou[1]; [1]Purdue University Northwest

MATERIALS PROCESSING

Friction Stir Welding and Processing XI — High Melting Temperature Materials

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

Program Organizers: Yuri Hovanski, Brigham Young University; Piyush Upadhyay, Pacific Northwest National Laboratory; Yutaka Sato, Tohoku University; Nilesh Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter the Great St. Petersburg Polytechnic University

Monday PM **March 15, 2021**

2:00 PM
Study of Residual Stress and Microstructure Changes in Friction Stir Processed Dual Phase 980 Grade Steel: *Koichi Taniguchi*[1]; Yong Chae Lim[2]; Jeffery Bunn[2]; Zhili Feng[2]; [1]JFE Steel Corporation; [2]Oak Ridge National Laboratory

2:20 PM
Advances in High Temperature FSW: Single Use Tools: *Jonathan Martin*[1]; [1]TWI Ltd.

2:40 PM
Phosphorus Segregation and Its Effect on Properties in Friction Stir Welded High Phosphorus Weathering Steel: *Takumi Kawakubo*[1]; Kohsaku Ushioda[1]; Hidetoshi Fujii[1]; [1]Joining and Welding Research Institute Osaka University

3:00 PM
Friction Stir Welding of Armor Grade Steels: Stan Hawkes[1]; Rafael Giorjao[1]; Martin McDonnell[2]; *Antonio Ramirez*[1]; Alex Thiel[3]; Michael Eff[4]; [1]Ohio State University; [2]US Army; [3]Oshkosh Corp.; [4]EWI

3:20 PM
Friction Stir Welding of NiTi Shape Memory Alloy: Parker West[1]; Vasanth Shunmugasamy[2]; *Bilal Mansoor*; Ibrahim Karaman[1]; [1]Texas A&M University; [2]Texas A&M University at Qatar

3:40 PM
On the Development of Friction Stir Welding to Repair or Mitigate Chloride-induced Corrosion in 304L Austenitic Stainless Steel: *Ben Sutton*[1]; Gabriella Marino[1]; Rafael Giorjao[1]; Jayendran Srinivasan[1]; Antonio Ramirez[1]; Jenifer Locke[1]; [1]Ohio State University

4:00 PM
Low-force Friction Surfacing for Crack Repair in 304L Stainless Steel: *Hemant Agiwal*[1]; Hwasung Yeom[1]; Kumar Sridharan[1]; Kenneth Ross[2]; Frank Pfefferkorn[1]; [1]University of Wisconsin-Madison; [2]Pacific Northwest National Laboratory

4:20 PM
Evaluation of Residual Stresses in Isothermal Friction Stir Welded 304L Stainless Steel Plates: Madhumanti Bhattacharyya[1]; Thomas-Gnaupel Herold[2]; Krishnan Raja[1]; Jens Darsell[3]; Saumyadeep Jana[3]; *Indrajit Charit*[1]; [1]University of Idaho; [2]National Institute of Standards and Technology; [3]Pacific Northwest National Laboratory

PHYSICAL METALLURGY

Frontiers in Solidification Science VIII — Convection & Gravity

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Phase Transformations Committee, TMS: Solidification Committee, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Damien Tourret, IMDEA Materials; Amy Clarke, Colorado School of Mines; Ulrike Hecht, Access e.V.; Nana Ofori-Opoku, Canadian Nuclear Laboratories; Melis Serefoglu, Koc University; Tiberiu Stan, Northwestern University

Monday PM **March 15, 2021**

Session Chairs: Sven Eckert, Helmholtz-Zentrum Dresden-Rossendorf; Nana Ofori-Opoku, Canadian Nuclear Laboratories; Christoph Beckermann, University of Iowa; Tiberiu Stan, Northwestern University

2:00 PM Invited
Permeability Prediction of Dendritic Mushy Zone by Phase-field and Lattice Boltzmann Simulations: *Tomohiro Takaki*[1]; [1]Kyoto Institute of Technology

2:30 PM
Multiscale Modeling of Alloy Dendritic Growth with Liquid Convection: *Thomas Isensee*[1]; Damien Tourret[2]; [1]IMDEA Materials Institute & Polytechnic University of Madrid; [2]IMDEA Materials Institute

2:50 PM Invited
Coupling of Solidification Grain Structures with Heat and Mass Transfers: *Charles-Andre Gandin*[1]; Vincent Maguin[1]; Gildas Guillemot[1]; Chengdan Xue[1]; Michel Bellet[1]; Romain Fleurisson[1]; Yijian Wu[1]; Orianne Senninger[1]; [1]MINES ParisTech CEMEF UMR CNRS 7635

3:20 PM
Understanding the Role of Magnetic Fields on Freckle Formation during Solidification through In Situ Imaging: *Xianqiang Fan*[1]; Natalia Shevchenko[2]; Samuel Clark[1]; Sebastian Marussi[1]; Saurabh Shah[1]; Robert Atwood[3]; Sven Eckert[2]; Andrew Kao[4]; Peter Lee[1]; [1]University College London; [2]Helmholtz-Zentrum Dresden-Rossendorf; [3]Diamond Light Source; [4]University of Greenwich

3:40 PM Invited
Solidification and Fluid Convection - The Story of an Inseparable Couple: Sten Anders[1]; Natalia Shevchenko[1]; Andrew Kao[2]; *Sven Eckert*[1]; [1]Helmholtz-Zentrum Dresden-Rossendorf; [2]University of Greenwich

4:10 PM
Directional Solidification of Al-10wt.%Cu Alloy in Hypergravity: *Ali Jafarizadeh Koohbanani*[1]; Sonja Steinbach[1]; Florian Kargl[1]; [1]German Aerospace Center, Institute of Materials Physics in Space

4:30 PM
A Comparison of Terrestrial and Microgravity Isothermal Equiaxed Alloy Solidification through Machine Learning, Multi-stage Thresholding and Sub-dendrite-based In Situ X-ray Video Processing: *Jonathan Mullen*[1]; Mert Celikin[1]; Pádraig Cunningham[1]; David Browne[1]; [1]University College Dublin

SPECIAL TOPICS

Frontiers of Materials Award Symposium: 2021 Functional Nanomaterials: Translating Innovation into Pioneering Technologies — Session II

Program Organizer: Huanyu Cheng, Pennsylvania State University

Monday PM **March 15, 2021**

2:00 PM Invited
Becoming Sustainable, The New Frontier in Soft Electronics and Robotics: *Martin Kaltenbrunner*[1]; [1]Johannes Kepler University Linz

2:40 PM Invited
Organic Bioelectronics for the Precise Sensing, Delivery and Processing of Bio-signals: *Magnus Berggren*[1]; [1]Linköping University

3:20 PM Invited
Nanomembrane Materials for Electronic "Soft-Wear" and Micro-Robotic "Hard-Ware": *Oliver Schmidt*[1]; [1]Leibniz IFW Dresden; TU Chemnitz

4:00 PM Invited
Electronics on the Brain: *George Malliaras*[1]; [1]University of Cambridge

4:40 PM Invited
3D Printing Functional Materials & Devices: *Michael McAlpine*[1]; [1]University of Minnesota

LIGHT METALS

Greater Than the Sum of Its Parts — Concurrent Alloy Design and Processing Science: An LMD Symposium Honoring Raymond Decker — Session I

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

Program Organizers: Victoria Miller, University of Florida; Eric Nyberg, Tungsten Heavy Powder & Parts; J. Brian Jordon, University of Alabama; Wilhelmus Sillekens, European Space Agency; Neale Neelameggham, IND LLC; Vineet Joshi, Pacific Northwest National Laboratory

Monday PM **March 15, 2021**

Session Chair: Victoria Miller, University of Florida

2:00 PM Invited
Nickel-base Alloys Development:Then and Now: Victoria Miller[1]; *Aziz Asphahani*[2]; [1]University of Florida; [2]QuesTek

2:30 PM Invited
New Under the Sun: *Robert Carnahan*[1]; Victoria Miller[2]; [1]Retired; [2]University of Florida

3:00 PM Invited
Development of Biomaterials at NanoMAG from a Historical and Commercial Perspective: Victoria Miller[1]; *Stephen LeBeau*[2]; [1]University of Florida; [2]nanoMAG LLC

3:30 PM
Enabling High Strength AA7xxx Sheet for Automotive Hot Stamping Applications: A Microstructural Perspective: *Atish Ray*[1]; Tudor Piroteala[1]; Rashmi Ranjan Mohanty[1]; John Carsley[1]; [1]Novelis Inc.

NANOSTRUCTURED MATERIALS

Heterostructured and Gradient Materials (HGM IV): Tailoring Heterogeneity for Superior Properties — Heterostructured Materials II: Mechanical Properties

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

Program Organizers: Yuntian Zhu, City University of Hong Kong; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California-Santa Barbara ; Yves Brechet, Grenoble Institute of Technology; Huajian Gao, Nanyang Technological University; Hyoung Seop Kim, Pohang University of Science and Technology; Ke Lu, Institute of Metal Research; Xiaolei Wu, Chinese Academy of Sciences

Monday PM **March 15, 2021**

Session Chairs: Mingxin Huang, The University of Hong Kong; Ruslan Valiev, Ufa Aviation Technical University; Xiaolong Ma, Pacific Northwest National Lab.

2:00 PM Invited
Grain-boundary Delamination-induced Toughening in 2 GPa Deformed and Partitioned Steel: Li Liu[1]; *MingXin Huang*[1]; [1]University of Hong Kong

2:25 PM
Enhanced Mechanical Properties in 3D Interface Metallic Multilayers: *Justin Cheng*[1]; Jon Baldwin[2]; Nan Li[2]; Shuozhi Xu[3]; Irene Beyerlein[3]; Nathan Mara[1]; [1]University of Minnesota Twin Cities; [2]Los Alamos National Laboratory; [3]University of California, Santa Barbara

2:45 PM
Enhanced Mechanical Properties of Interface-strengthened UFG Tungsten and Tungsten-based Nanocomposites: *Michael Wurmshuber*[1]; Simon Doppermann[1]; Markus Alfreider[1]; Michael Burtscher[1]; Daniel Kiener[1]; [1]Montanuniversitaet Leoben

3:05 PM
Effect of Alloying Additions on the Strength of Confined Nanocrystalline Layers: Sevda Fathipour[1]; Amir Motallebzadeh[2]; Özgür Duygulu[3]; *Sezer Ozerinc*[1]; [1]Middle East Technical University; [2]Koç University; [3]TÜBITAK Marmara Research Center

3:25 PM Invited
Heterostructured Ultrafine-grained Metallic Materials with Enhanced Superplasticity and Superior Strength: *Ruslan Valiev*[1]; Maxim Murashkin[1]; Nguyen Chinh[2]; [1]UFA State Aviation Technical University; [2]Eötvös Loránd University

3:50 PM Invited
Hierarchical 3D Nanolayered Duplex-phase Zr with High Strength, Strain Hardening, and Ductility: *Weizhong Han*[1]; [1]Xi'an Jiaotong University

ADVANCED MATERIALS

High Entropy Alloys IX: Alloy Development and Properties — Alloy Development and Application II

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

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Monday PM **March 15, 2021**

Session Chairs: Veerle Keppens, Univ of Tennessee; Ke An, Oak Ridge National Laboratory

2:00 PM Invited
Synthesis and Mechanical Properties of High Entropy Oxide Spinels: Veerle Keppens[1]; *Brianna Musico*[1]; Kurt Sickafus[1]; Quinton Wright[1]; Joshua Smith[1]; [1]University of Tennessee

2:25 PM Invited
Phase Formation, Structure Modulation and Property Optimization of High Entropy Alloys, Composites and Glasses: *Jurgen Eckert*[1]; [1]Erich Schmid Institute of Materials Science

2:50 PM Invited
High Etropy Alloy Design Aided by Neutron Scattering: *Ke An*[1]; Rui Feng[1]; Sichao Fu[1]; [1]Oak Ridge National Laboratory

3:15 PM Invited
Combining Elemental and Microstructure Heterogeneities in High-entropy Alloys to Enhance Radiation Resistance: *Yanwen Zhang*[1]; Miguel L. Crespillo[2]; Walker L. Boldman[2]; Philip D. Rack[2]; Hongbin Bei[1]; Yongqin Chang[3]; Li Jiang[4]; Lumin Wang[4]; William J. Weber[2]; [1]Oak Ridge National Laboratory; [2]University of Tennessee; [3]University of Science and Technology Beijing; [4]University of Michigan

3:40 PM
Distinctive Room Temperature Deformation Behavior in Plastic BCC Refractory High-entropy Alloys: Chanho Lee[1]; Gian Song[2]; Michael Gao[3]; Wei Chen[4]; Ke An[5]; *Peter Liaw*[1]; [1]University of Tennessee; [2]Kongju National University; [3]National Energy Technology Laboratory/Leidos Research Support Team; [4]Illinois Institute of Technology; [5]Oak Ridge National Laboratory

4:00 PM
Metastability and Phase Selection in High Entropy Alloys: *Sebastian Kube*[1]; Pamela Banner[1]; Sungwoo Sohn[1]; David Uhl[2]; Amit Datye[1]; Suchismita Sarker[3]; Apurva Mehta[3]; Jan Schroers[1]; [1]Yale University; [2]Southern Connecticut State University; [3]SLAC National Accelerator Laboratory

ADVANCED MATERIALS

High Entropy Alloys IX: Structures and Modeling — Structures and Modeling II

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

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Monday PM **March 15, 2021**

Session Chairs: Diana Farkas, Virginia Polytechnic Institute; Irene Beyerlein, University Of California, Santa Barbara

2:00 PM Invited
Mechanisms of Short-range Ordering and Cluster Formation and their Effects on Mechanical Properties of High-entropy Alloys: Shuai Chen[1]; Zachary Aitken[1]; Subrahmanyam Pattamatta[2]; Zhaoxuan Wu[2]; Zhi-Gen Yu[1]; Rajarshi Banerjee[3]; David Srolovitz[2]; Peter Liaw[4]; *Yong-wei Zhang*[1]; [1]Institute of High Performance Computing, A*STAR; [2]City University of Hong Kong; [3]University of North Texas; [4]University of Tennessee

2:25 PM Invited
Development of Interatomic Potentials to Model the Deformation Behaviors in Highly Concentrated/Entropy-stabilized Ni-base Superalloys: *Ridwan Sakidja*[1]; Andrew Duff[2]; Wai-Yim Ching[3]; Caizhi Zhou[4]; [1]Missouri State University; [2]STFC; [3]University of Missouri-Kansas City; [4]University of South Carolina

2:50 PM Invited
Structural Essentiality for Plasticity of High-entropy Alloys Profiled by Data Mining: Wei-Ren Chen[1]; *Chi-Huan Tung*[2]; Shou-Yi Chang[2]; Yue Fan[3]; Zhitong Bai[3]; Changwoo Do[1]; [1]Oak Ridge National Laboratory; [2]National Tsing Hua University; [3]University of Michigan

3:15 PM Invited
Deformation Behavior of a Model High Entropy Alloy from Atomistic Simulations: *Diana Farkas*[1]; [1]Virginia Polytechnic Institute

3:40 PM
Phase-Field Dislocation Dynamics Modeling of Refractory Multi-Principal Element Alloys: *Lauren Smith*[1]; Abigail Hunter[2]; Irene Beyerlein[1]; [1]University Of California, Santa Barbara; [2]Los Alamos National Laboratory

4:00 PM
Statistics of the NiCoCr Medium-entropy Alloy: Novel Aspect of an Old Puzzle: *Zongrui Pei*[1]; Rui Li[2]; G. Malcolm Stocks[3]; Michael Gao[1]; [1]National Energy Technology Laboratory; [2]University of Tennessee, Knoxville; [3]Oak Ridge National Laboratory

4:20 PM
Phase Stability of NbVZrMx (M = Ti, Mo; x = 0 – 1) Refractory Complex Concentrated Alloys: *Zhaohan Zhang*[1]; Mu Li[1]; Guodong Ren[1]; Arashdeep Thind[1]; Katharine Flores[1]; Rohan Mishra[1]; [1]Washington University in St.Louis

4:40 PM
EAM and RF-MEAM Potentials for Thermal Properties of Zirconium Diboride: *Bikash Timalsina*[1]; Alin Niraula[1]; William Fahrenholtz[2]; Gregory Hilmas[2]; Andrew Duff[3]; Ridwan Sakidja[1]; [1]Missouri State University; [2]Missouri University of Science and Technology; [3]Science and Technology Facilities Council

MATERIALS PROCESSING

High Temperature Electrochemistry IV — Session I

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

Program Organizers: Prabhat Tripathy, Batelle Energy Alliance (Idaho National Laboratory); Guy Fredrickson, Idaho National Laboratory

Monday PM **March 15, 2021**

Session Chair: Uday Pal, Boston University, Boston, USA

2:00 PM
Selective Extraction of Gold from Gold-copper Alloy Using Anodic Electrochemical Deposition in Molten Salt Electrolyte: *Takanari Ouchi*[1]; Shuang Wu[1]; Toru Okabe[1]; [1]The University of Tokyo

2:30 PM
High-speed Electrodeposition of Textured Monolithic Lithiated Transition Metal Oxide Cathodes for Low Cost, High Energy, and Fast Charging Li-ion Batteries.: *John Cook*[1]; [1]Xerion Advanced Battery Corp

3:00 PM
Characterization of Uranium Electrodeposits Separated in Molten ClLiK Salt with Varied Applied Overpotentials and Uranium-cerium Compositions: *Dimitris Killinger*[1]; Supathorn Phongikaroon[1]; [1]Virginia Commonwealth University

3:30 PM
Molten Hydroxide Mediated Electrosynthesis of Layered Transition Metal Oxides for Electrochemical Energy Storage: *Arghya Patra*[1]; Paul Braun[1]; [1]University of Illinois at Urbana-Champaign

MATERIALS DESIGN

Hume-Rothery Symposium: Accelerated Measurements and Predictions of Thermodynamics and Kinetics for Materials Design and Discovery — Session II

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

Program Organizers: Wei Xiong, University of Pittsburgh; Shuanglin Chen, CompuTherm LLC; Wei Chen, Illinois Institute of Technology; James Saal, Citrine Informatics; Greta Lindwall, KTH Royal Institute of Technology

Monday PM **March 15, 2021**

Session Chair: Wei Chen, Illinois Institute of Technology

2:00 PM Invited
An Atom-Probe Tomogaphy Study of the Temporal Evolution of Concentration Retention Excesses and Depletions at gamma-f.c.c/gamma-prime-L12 Interfaces in a Ni-Al-Cr-Re Superalloy: *David Seidman*[1]; [1]Northwestern University

2:40 PM Invited
Extended Applications of the CALPHAD Simulations: *Fan Zhang*[1]; Duchao Lv[1]; Weisheng Cao[1]; Shuanglin Chen[1]; Chuan Zhang[1]; Songmao Liang[1]; [1]CompuTherm LLC

3:20 PM Invited
Computational Modeling-assisted Development of Cast Alumina-forming Austenitic Stainless Steels for High Temperature Corrosive Environments: *Govindarajan Muralidharan*[1]; Yukinori Yamamoto[1]; Michael Brady[1]; Shivakant Shukla[1]; Tanya Ros[2]; Stanley Fauske[3]; Roman Pankiw[4]; Jim Myers[5]; [1]Oak Ridge National Laboratory; [2]Arcelor Mittal Global R & D; [3]Arcelor Mittal Coatesville; [4]Duraloy Technologies; [5]Metaltek International

4:00 PM Invited
Visualizing and Rationalizing Synthesis Pathways in Oxides: *Gerbrand Ceder*[1]; [1]University of California, Berkeley

4:40 PM Invited
High-throughput Testing and Characterization of Novel Additive Manufactured Materials: Madelyn Madrigal-Camacho[1]; Adam Freund[1]; Kendrick Mensink[1]; Guillermo Aguilar[1]; *Suveen Mathaudhu*[1]; [1]University of California, Riverside

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — Corrosion & Chemistry

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

Program Organizers: Stephen Raiman, Texas A&M University; Kumar Sridharan, University of Wisconsin-Madison; Nathaniel Hoyt, Argonne National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Michael Short, Massachusetts Institute of Technology; Raluca Scarlat, University of California-Berkeley

Monday PM **March 15, 2021**

Session Chair: Jinsuo Zhang, Virginia Tech

2:00 PM
Corrosion Control of 316H Stainless Steel and Nickel-Based Alloys in Molten Chloride Salts: *Kasey Hanson*[1]; Krishna Moorthi Sankar[1]; Remi Dingreville[2]; Joshua Sugar[2]; Chaitanya Deo[1]; Preet Singh[1]; [1]Georgia Institute of Technology; [2]Sandia National Laboratories

2:20 PM
Analysis of Particulate Properties of Commercial FLiNaK in a 316 Stainless Steel System.: *Timothy Kennedy*[1]; Timothy Head[1]; NEXT Lab[2]; [1]Abilene Christian University; [2]NEXT Lab

2:40 PM
Chemical Interaction Between Molten Flibe and Nitrate Solar Salt: *Michael Hanson*[1]; Michael Zupan[1]; Augustus Merwin[1]; Francesco Carotti[1]; Alan Kruizenga[1]; [1]Kairos Power

3:00 PM
Mechanistic Understanding of 3D Morphological Evolution of Metals in Molten Salts
by *In Situ* X-ray Nano-tomography: Xiaoyang Liu[1]; Arthur Ronne[1]; Lin-Chieh Yu[1]; Mingyuan Ge[2]; Lingfeng He[3]; Phillip Halstenberg[4]; Cheng-Hung Lin[1]; Bobby Layne[2]; Sheng Dai[4]; Wah-Keat Lee[2]; Shannon Mahurin[4]; James Wishart[2]; Xianghui Xiao[2]; *Yu-chen Karen Chen-Wiegart*[5]; [1]Stony Brook University; [2]Brookhaven National Laboratory; [3]Idaho National Laboratory; [4]Oak Ridge National Laboratory; [5]Stony Brook University/Brookhaven National Laboratory

3:20 PM
Effect of Impurities on Corrosion and Its Control in Molten FLiNaK: *Krishna Moorthi Sankar*[1]; Preet Singh[1]; [1]Georgia Institute of Technology

3:40 PM
Complex Structure of Molten NaCl-CrCl2 and NaCl-CrCl3: Cr-Cl Octahedra Network and Intermediate-range Order: *Boris Khaykovich*[1]; Qing-Jie Li[1]; David Sprouster[2]; Guiqiu (Tony) Zheng[1]; Joerg Neuefeind[3]; Alex Braatz[3]; Joanna McFarlane[3]; Stephen Tsz Tang Lam[1]; Daniel Olds[4]; Matthew Marshall[5]; Ju Li[1]; [1]Massachusetts Institute of Technology; [2]Stony Brook University; [3]Oak Ridge National Laboratory; [4]Brookhaven National Laboratory; [5]Radiation Monitoring Devices

4:10 PM
Electrochemistry and Corrosion Studies for Alloy Development for Molten Salt Reactors (MSRs): *William Doniger*[1]; Cody Falconer[1]; Matthew Weinstein[1]; Mohamed Elbakshwan[1]; Govindarajan Muralidharan[2]; Adrien Couet[3]; Kumar Sridharan[3]; [1]University Of Wisconsin Madison; [2]Oak Ridge National Laboratory; [3]University of Wisconsin Madison

MATERIALS PROCESSING

Materials Engineering -- From Ideas to Practice: An EPD Symposium in Honor of Jiann-Yang Hwang — Mineral and Material Processing

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

Program Organizers: Bowen Li, Michigan Technological University; Baojun Zhao, University of Queensland; Jian Li, CanmetMATERIALS; Sergio Monteiro, Instituto Militar de Engenharia; Zhiwei Peng, Central South University; Dean Gregurek, RHI Magnesita; Tao Jiang, Central South University; Yong Shi, Futianbao Environment Technologies; Cuiping Huang, FuTianBao Environment Protection Technology Company Ltd.; Shadia Ikhmayies

Monday PM **March 15, 2021**

Session Chairs: Baojun Zhao, University of Queensland; Yong Shi, Futianbao Environment Technologies

2:00 PM Keynote
Materials Processing: From Ideas to Practice: *Jiann-Yang Hwang*[1]; [1]Michigan Technological University

2:30 PM Invited
Recent Progress in Microwave-assisted Pyrometallurgy at Central South University: Liancheng Wang[1]; *Zhiwei Peng*[1]; Jie Wang[1]; Wenxing Shang[1]; Qiang Zhong[1]; Mingjun Rao[1]; Guanghui Li[1]; Tao Jiang[1]; [1]Central South University

2:50 PM Keynote
Production and High Ratio Application of Iron Ore Pellets in Shougang: *Gele Qing*[1]; Minge Zhao[1]; Gang An[1]; Kai Wang[1]; xiaojiang Wu[1]; zhixing Zhao[1]; [1]Shougang Group

3:10 PM
Comparison between Compression Strength of Two Castor Oil Polyurethane Resin Matrix Composites Reinforced with Coconut or Piassava Fiber: Juliana Carvalho[1]; Jessika Azevedo[1]; Noan Simonassi[2]; *Felipe Lopes*[3]; Carlos Vieira[1]; [1]Universidade Estadual do Norte Fluminense; [2]State University of Northern Rio de Janeiro; [3]UENF

3:30 PM
Characterization of Mortars Incorporated with Natural Açai Fiber: *Afonso Azevedo*; Marcio Barbosa[1]; Higor Azevedo Rocha Rocha[2]; Markssuel Marvila[2]; Sergio Monteiro[3]; [1]Fluminense Federal University; [2]Universidade Estadual do Norte Fluminense; [3]Military Institute of Engineering

3:50 PM Invited
Renewable Energy for Sustainable Mining: *Tom Xu*[1]; Jiann-Yang (Jim) Hwang[2]; [1]AGreatE Inc; [2]Michigan Technological University

ADVANCED MATERIALS

Materials for High Temperature Applications: Next Generation Superalloys and Beyond — Superalloys: Mechanical Behavior

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

Program Organizers: Govindarajan Muralidharan, Oak Ridge National Laboratory; Martin Heilmaier, KIT Karlsruhe; Benjamin Adam, Portland State University; Mario Bochiechio, Pratt & Whitney; Katerina Christofidou, University of Sheffield; Eric Lass, University of Tennessee-Knoxville; Jeremy Rame, Safran Aircraft Engines; Pierre Sallot, Safran; Akane Suzuki, GE Research; Michael Titus, Purdue University

Monday PM **March 15, 2021**

2:00 PM
Damage Mechanisms Involved during Very High Cycle Fatigue of a Coated and Grit-blasted Ni-based Single-crystal Superalloy: *Alice Cervellon*[1]; Luciana Bortoluci Ormastroni[2]; Tresa Pollock[1]; Fernando Pedraza[3]; Jonathan Cormier[2]; [1]University Of California Santa Barbara; [2]Institut Pprime; [3]LaSIE

2:20 PM Invited
Enhancing the Creep Strength of Next Generation Disk Superalloys via Local Phase Transformation Strengthening: *Timothy Smith*[1]; Timothy Gabb[1]; Katelun Wertz[2]; Joshua Stuckner[1]; Laura Evans[1]; Ashton Egan[3]; Michael Mills[3]; [1]NASA Glenn Research Center; [2]AFRL; [3]Ohio State University

2:50 PM
Quantifying Deformation Processes Resulting in Local Phase Transformation Strengthening: *Ashton Egan*[1]; Veronika Mazanova[1]; Timothy Smith[2]; Timothy Gabb[2]; Timothy Hanlon[3]; Michael Mills[1]; [1]Ohio State University; [2]NASA Glenn Research Center; [3]GE Research

3:10 PM
Solute Segregation at Intrinsic Stacking Faults in Disordered Face-centered Cubic Ni-Co Solid Solution: First-principles and Thermodynamic Modeling: *Dongsheng Wen*; Longsheng Feng[1]; Yunzhi Wang[1]; Michael Titus[2]; [1]The Ohio State University; [2]Purdue University

3:30 PM
Partitioning of Cu and Si Contaminants in a Ni-based Superalloy and their Effect on Creep Properties: *Martin Detrois*[1]; Zongrui Pei[1]; Kyle Rozman[1]; Michael Gao[1]; Jonathan Poplawsky[2]; Paul Jablonski[1]; Jeffrey Hawk[1]; [1]National Energy Technology Laboratory; [2]Oak Ridge National Laboratory

3:50 PM
Deformation of the "'-Ni2(Cr, Mo, W) Phase during Mechanical Testing: *Thomas Mann*[1]; Michael Fahrmann[2]; Michael Titus[1]; [1]Purdue University; [2]Haynes International

4:10 PM
Mechanical Properties and Microstructural Characterization of Cast Haynes 282 for Advanced Ultra-supercritical (A-USC) Applications: *Ling Wang*[1]; Kinga Unocic[1]; Peter Tortorelli[1]; Xiang Chen[1]; [1]Oak Ridge National Laboratory

4:30 PM
Microstructure and Mechanical Properties of a Centrifugal Cast Ni-Based Alloy: *Govindarajan Muralidharan*[1]; Shivakant Shukla[1]; Jim Myers[2]; [1]Oak Ridge National Laboratory; [2]Metaltek International

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Defect Evolution

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Eda Aydogan, Middle East Technical University; Laurent Capolungo, Los Alamos National Laboratory; Khalid Hattar, Sandia National Laboratories; Kayla Yano, Pacific Northwest National Laboratory; Caleb Massey, Oak Ridge National Laboratory

Monday PM **March 15, 2021**

2:00 PM Invited
Simulation of Intergranular Void Growth under the Combined Effects of Surface Diffusion, Grain Boundary Diffusion, and Bulk Creep: *John Sanders*[1]; Negar Jamshidi[1]; Niloofar Jamshidi[1]; Mohsen Dadfarnia[2]; Sankara Subramanian[3]; James Stubbins[4]; [1]California State University, Fullerton; [2]Seattle University; [3]PhotoGAUGE; [4]University of Illinois at Urbana-Champaign

2:30 PM
A Novel Displacement Cascade Driven Irradiation Creep Mechanism in Pure Copper: *Nargisse Khiara*[1]; Fabien Onimus[1]; Laurent Dupuy[1]; Jean-Paul Crocombette[1]; Stéphanie Jublot-Leclerc[2]; Thomas Jourdan[1]; Thomas Pardoen[3]; Jean-Pierre Raskin[4]; Yves Bréchet[5]; [1]CEA Saclay; [2]Université Paris–Saclay; [3]Ecole Polytechnique de Louvain, Institute of Mechanics, Materials and Civil Engineering (IMMC), Materials and process engineering, Belgium; [4]Ecole Polytechnique de Louvain; [5]SIMAP - Science et Ingénierie des MAtériaux et Procédés, Grenoble-INP, France

2:50 PM
Controlling Helium Morphology in Pure Metals: Dislocation-helium Interactions: *Calvin Lear*[1]; Jonathan Gigax[1]; Nan Li[1]; Saryu Fensin[1]; [1]Los Alamos National Laboratory

3:10 PM
Correlating the Neutron-irradiation Induced Hardening and Solute Nano-clustering in Oxide Dispersion Strengthened Alloys: *Samara Levine*[1]; Arunodaya Bhattacharya[2]; Andrew Lupini[2]; David Hoelzer[2]; Yutai Katoh[2]; Steven Zinkle[1]; [1]Oak Ridge National Laboratory, University of Tennessee; [2]Oak Ridge National Laboratory

3:30 PM Invited
Effect of Cr Concentration On <111> and <100> Dislocation Loop Formation in Fe-Cr Alloys: Yaxuan Zhang[1]; Ziqi Xiao[1]; *Xian-Ming Bai*[1]; [1]Virginia Polytechnic Institute and State University

4:00 PM
Void Swelling and Transmutation in Tungsten Metals and Alloys after Fusion Relevant Neutron Irradiation: *Daniel Morrall*[1]; John Echols[1]; Josina Geringer[1]; Lauren Garrison[1]; Chad Parish[1]; [1]Oak Ridge National Lab

4:20 PM
Irradiation Resistance in Several Multi-principal Element Alloys: *Yanqing Su*[1]; [1]Utah State University

CHARACTERIZATION

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, TMS: Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; 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

Monday PM **March 15, 2021**

Session Chair: Amit Pandey, Lockheed Martin Space

2:00 PM
Low Temperature Failure Mechanism of [001] Niobium Micropillars under Uniaxial Tension: *Seok-Woo Lee*[1]; Gyuho Song[1]; Nicole Aragon[2]; Ill Ryu[2]; [1]University Of Connecticut; [2]University of Texas at Dallas

2:20 PM
Quantifying Electron Beam Effects during In-situ TEM Nanomechanical Tensile Testing on Aluminum Thin Films: *Sandra Stangebye*[1]; Olivier Pierron[1]; Joshua Kacher[1]; [1]Georgia Institute of Technology

2:40 PM
Deformation Tests of Al Thin Films Using In-situ TEM and Molecular Dynamics Simulations: *Lucia Bajtošová*[1]; Rostislav Králik[1]; Barbora Krivská[1]; Jozef Veselý[1]; Jan Fikar[2]; Miroslav Cieslar[1]; [1]Charles University; [2]Ústav Fyziky Materiálu AV CR, v.v.i.

3:00 PM
In-situ TEM Investigation of the Electroplasticity Phenomenon in Ti-6Al: *Xiaoqing Li*[1]; Shiteng Zhao[2]; John Turner[2]; Karen Bustillo[2]; Rohan Dhall[2]; Andrew Minor[1]; [1]University of California, Berkeley; [2]Lawrence Berkeley National Laboratory

3:20 PM
Giant Superelasticity in $SrNi_2P_2$ Micropillars via Lattice Collapse and Expansion: *Shuyang Xiao*[1]; Vladislav Borisov[2]; Guilherme Gorgen-Lesseux[3]; Gyuho Song[1]; Roser Valentí[2]; Paul Canfield[3]; Seok-Woo Lee[1]; [1]University Of Connecticut; [2]Goethe University; [3]Iowa State University

3:40 PM
Ripplocations: A Novel Deformation Mechanism in Layered Crystalline Solids: *Hussein Badr*[1]; [1]Drexel University

MATERIALS DESIGN

Metal-Matrix Composites: Advances in Analysis, Measurement and Observations — NanoComposites [Nanoscale + Nanoreinforcements]

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

Program Organizers: Srivatsan Tirumalai, The University of Akron; William Harrigan, Gamma Alloys; Simona Hunyadi Murph, Savannah River National Laboratory

Monday PM **March 15, 2021**

Session Chair: Tirumalai Srivatsan, University of Akron

2:00 PM Keynote
A Study Aimed at Understanding the Use of Nanomaterial-treated Filters for the Uptake of Heavy Metals from Water Sources: *Simona Hunyadi Murph*[1]; [1]Savannah River National Laboratory

2:40 PM Invited
Strengthening Effects of Multi-walled Carbon Nanotubes and Graphene Nanoplatelets Reinforced in Nickel Matrix Nanocomposites: *Amit Patil*[1]; Tushar Borkar[1]; [1]Cleveland State University

3:10 PM
Influence of Tungsten Nanopowders on Enhancing the Aging Behavior of a Copper-chromium Alloy: *Gongcheng Yao*[1]; Shuaihang Pan[1]; Xiaochun Li[1]; [1]University of California Los Angeles

3:30 PM Invited
In situ Atomic Study of Spontaneous Nanocrystallization of Intermetallic for Interconnection of High-power and Flexible Electronics: *Ying Zhong*[1]; Chunqing Wang[2]; Sungho Jin[3]; [1]University of South Florida; [2]Harbin Institute of Technology; [3]University of California at San Diego

4:00 PM Invited
Correlation of Fine Scale Microstructure and Mechanical Properties of Copper-alumina Nanocomposites: *Ramasis Goswami*[1]; [1]Naval Research Laboratory

4:30 PM
Influence of Sintering on the Development of Alumina Toughened Nanocomposites: Conventional Versus Microwave: Kunjee Meena[1]; *Srivatsan Tirumalai*[2]; [1]Indian Institute of Technology Roorkee; [2]University of Akron

MATERIALS PROCESSING

Ni-Co 2021: The 5th International Symposium on Nickel and Cobalt — Batteries

Sponsored by: The Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy and Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Pyrometallurgy Committee

Program Organizers: Corby Anderson, Colorado School of Mines; Dean Gregurek, RHI Magnesita; Mari Lundström, Aalto University; Christina Meskers; Prabhat Tripathy, Batelle Energy Alliance (Idaho National Laboratory); Fiseha Tesfaye, Abo Akademi University; Yuanbo Zhang, Central South University; Sari Muinonen, Glencore; Graeme Goodall, XPS- Glencore; Shijie Wang, Rio Tinto Kennecott Utah Copper Corp (Retired)

Monday PM **March 15, 2021**

2:00 PM
BATCircle – Towards CO2 Low Battery Recycling: *Mari Lundstrom*[1]; Antti Porvali[1]; Heini Elomaa[2]; Pyry Hannula[1]; Pertti Kauranen[1]; [1]Aalto University; [2]Outotec Reserach Center (Finland) Oy

2:20 PM
Selective Sulfidation and Electrowinning of Nickel and Cobalt for Lithium Ion Battery Recycling: *Caspar Stinn*[1]; Antoine Allanore[1]; [1]Massachusetts Institute of Technology

2:40 PM
Additive Manufacturing of 3D Microlattice Lithium-ion Battery Electrodes: A Review: *Modupeola Dada*[1]; Patricia Popoola[1]; [1]Tshwane University of Technology

3:00 PM
A Strategy for Acid-free Waste Lithium Battery Processing: *Mark Strauss*[1]; Luis Diaz Aldana[1]; Mary Case[1]; Tedd Lister[1]; [1]Idaho National Laboratory

3:20 PM
The Role of Nickel in Batteries: *Ken Rudisuela*[1]; [1]Nickel Institute

3:40 PM
The Effect of Cu, Al and Fe Impurities on Leaching Efficiency of Two Lithium-ion Battery Waste Fractions: Alexander Chernyaev[1]; *Jere Partinen*[1]; Mari Lundström[1]; [1]Aalto University

4:00 PM
A Sustainable Oxalate Process for Recovery of Metals from $LiCoO_2$: Experimental and Modeling Study: *Ankit Verma*[1]; David Corbin[1]; Mark Shiflett[1]; [1]University of Kansas

4:20 PM
Refining of Mixed Sulphide Precipitate to Produce Battery Grade Metals Using Outotec Pressure Oxidation Process: *Christopher Ecott*[1]; [1]Outotec

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Martensitic Transformation

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

Program Organizers: Rongpei Shi, Lawrence Livermore National Laboratory; Yipeng Gao, Idaho National Laboratory; Fadi Abdeljawad, Clemson University; Bharat Gwalani, Pacific Northwest National Laboratory; Qi An, University of Nevada-Reno ; Eric Lass, University of Tennessee-Knoxville; Huajing (Wilson) Song, Los Alamos National Laboratory

Monday PM **March 15, 2021**

Session Chair: Yipeng Gao, Idaho National Laboratory

2:00 PM
Monte Carlo Simulation and Three-dimensional Diffuse Scattering Study of Martensitic Transformation: Xiaoxu Guo[1]; *Yongmei Jin*[1]; Yu Wang[1]; Yang Ren[2]; [1]Michigan Technological University; [2]Argonne National Laboratory

2:20 PM
Size Effects and Microstructural Evolution of Shape Memory Ceramics during Cyclic Phase Transformations: *Isabel Crystal*[1]; Christopher Schuh[1]; [1]Massachusetts Institute Of Technology

2:40 PM
Super-critical Elasticity: A Challenge to Martensitic Transformation Theory: Haiyang Chen[1]; Yan-Dong Wang[1]; *Yang Ren*[2]; [1]University of Science and Technology Beijing; [2]Argonne National Laboratory

3:00 PM
Uncovering the Role of Nanoscale Precipitates on Martensitic Transformation and Superelasticity: *Shivam Tripathi*[1]; Karthik Guda Vishnu[1]; Michael Titus[1]; Alejandro Strachan[1]; [1]Purdue University

MATERIALS PROCESSING

Phonons, Electrons and Dislons: Exploring the Relationships Between Plastic Deformation and Heat — Session II

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

Program Organizers: Aashish Rohatgi, Pacific Northwest National Laboratory; Sean Agnew, University of Virginia; Thomas Bieler, Michigan State University

Monday PM **March 15, 2021**

Session Chairs: Thomas Bieler, Michigan State University; Sean Agnew, University of Viriginia; Aashish Rohatgi, Pacific Northwest National Laboratory

2:00 PM Invited
Do Moving Dislocations Induce Lattice Instabilities?: *Benat Gurrutxaga-Lerma*[1]; [1]University of Birmingham

2:20 PM Invited
Thermal and Strain Rate Effects on Plasticity and Fracture of Gen 3 Steels: *Louis Hector*[1]; [1]General Motors Global Technical Center

2:40 PM Invited
Thermo-mechanics of Large Deformation Shear Banding: *Curt Bronkhorst*[1]; Charles Lieou[2]; Hashem Mourad[2]; Veronica Anghel[2]; [1]University of Wisconsin, Madison; [2]Los Alamos National Laboratory

3:00 PM
Thermomechanical Conversion in Metals: Dislocation Plasticity Model Evaluation of the Taylor-quinney Coefficient: *Charles Lieou*[1]; Curt Bronkhorst[2]; [1]Los Alamos National Laboratory; [2]University of Wisconsin-Madison

3:20 PM
Unified Analysis of Temperature Fields Arising from Large Strain Deformation and Friction in Manufacturing Processes: Harish Dhami[1]; Priti Panda[1]; Debapriya Mohanty[2]; Anirudh Udupa[2]; James Mann[3]; *Koushik Viswanathan*[1]; Srinivasan Chandrasekar[2]; [1]Indian Institute of Science; [2]Purdue University; [3]M4 Sciences Corporation

3:40 PM
Shear Bands, Thermal Profiles and Microstructure Stability in Large-strain Deformation of High Entropy Alloys: Shwetabh Yadav[1]; Dhruvil Shah[1]; Andrew Kustas[2]; Nicolas Argibay[2]; Ping Lu[2]; *Dinakar Sagapuram*[1]; [1]Texas A&M University; [2]Sandia National Laboratories

NANOSTRUCTURED MATERIALS

Plasmonics in Nanocomposite Materials — From Theory to Application Session II

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

Program Organizers: Nasrin Hooshmand, Georgia Institute of Technology; Simona Hunyadi Murph, Savannah River National Laboratory; Mahmoud Abdelwahed, The University of Texas at San Antonio

Monday PM **March 15, 2021**

Session Chair: Sajanlal R Panikkanvalappil, Dana-Farber Cancer Institute

2:00 PM Invited
Emerging Anisotropic 2D Layered Materials for Plasmonics and Polaritonics: *Koray Aydin*[1]; [1]Northwestern University

2:30 PM Invited
Plasmonic Compound Nanohole Arrays: *Yiping Zhao*[1]; [1]University of Georgia

3:00 PM Invited
Electron Transfer and Catalysis in Plasmonic Nanocomposite Systems: *Patrick Ward*[1]; Simona Murph[1]; [1]Savannah River National Laboratory

ENERGY & ENVIRONMENT

Powder Materials for Energy Applications — Ceramic Powder Materials

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

Program Organizers: Kathy Lu, Virginia Polytechnic Institute and State University; Eugene Olevsky, San Diego State University; Hang Yu, Virginia Polytechnic Institute and State University; Ruigang Wang, The University of Alabama; Isabella Van Rooyen, Idaho National Laboratory

Monday PM **March 15, 2021**

Session Chairs: Eugene Olevsky, San Diego State University; Isabella Van Rooyen, Idaho National Laboratory

2:00 PM
Electric Current Effects in Spark Plasma Sintering: Heating Pathway Analysis: *Eugene Olevsky*[1]; Geuntak Lee[1]; Charles Maniere[1]; Elisa Torresani[1]; [1]San Diego State University

2:20 PM
Electrochemical Deposition Synthesis of CeO2 Nanoarrays: *Ruigang Wang*[1]; Yifan Wang[1]; [1]The University of Alabama

2:40 PM Invited
High Temperature Corrosion and Irradiation Behavior of Silicon Carbide and Nanostructured Ferritic Alloy Composites: *Kaustubh Bawane*[1]; Kathy Lu[2]; Xian-Ming Bai[2]; Kaijie Ning[2]; Wei-Ying Chen[3]; Meimei Li[3]; [1]Idaho National Laboratory; [2]Virginia Tech; [3]Argonne National Laboratory

3:10 PM
Oxidation Behaviors of Matrix-grade Graphite in Water Vapor Ingress Accidents for High Temperature Gas-cooled Reactors: Kathy Lu[1]; *Yi Je Cho*[1]; [1]Virginia Polytechnic Institute and State University

3:30 PM
Simulation of C-SiOC Coatings on Yttria Stabilized Zirconia Microspheres in a Fluidized Bed Coater Based on Multiphase Flow with Interface Exchange: Kathy Lu[1]; *Sanjay Kumar*[1]; [1]Virginia Polytechnic Institute and State University

MATERIALS DESIGN

Practical Tools for Integration and Analysis in Materials Engineering — Session II

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

Program Organizers: Adam Pilchak, US Air Force Research Laboratory; Michael Gram, Titanium Metals Corporation; William Joost; Raymundo Arroyave, Texas A&M University; Charles Ward, AFRL/RXM

Monday PM **March 15, 2021**

2:00 PM Invited
Foundations and Applications of DAMASK: *Philip Eisenlohr*[1]; Martin Diehl[2]; Pratheek Shanthraj[3]; Franz Roters[4]; Dierk Raabe[4]; [1]Michigan State University; [2]KU Leuven; [3]The University of Manchester; [4]Max-Planck-Institut für Eisenforschung

2:40 PM
Prisms-plasticity: An Open Source Crystal Plasticity Finite Element Software: *Mohammadreza Yaghoobi*[1]; Sriram Ganesan[1]; Aaditya Lakshmanan[1]; Srihari Sundar[1]; Duncan Greeley[1]; Shiva Rudraraju[2]; John E. Allison[1]; Veera Sundararaghavan[1]; [1]University of Michigan, Ann Arbor; [2]University of Michigan; University of Wisconsin-Madison

3:00 PM
A Fast Fourier Transform Based Crystal Plasticity Constitutive Model for Predicting Creep and Rupture Lifetime in Metallic Systems: *Nathan Beets*[1]; Laurent Capolungo[1]; Arul Mariyappan[1]; Ricardo Lebensohn[1]; [1]Los Alamos National Laboratory

3:20 PM
PRISMS-PF: A High Performance Phase-field Modeling Framework to Simulate Microstructure Evolution: *David Montiel*[1]; Stephen DeWitt[1]; Yanjun Lyu[1]; Katsuyo Thornton[1]; John Allison[1]; [1]University of Michigan

3:40 PM Invited
Tools for Microstructural Analysis Using Computer Vision and Machine Learning: *Elizabeth Holm*[1]; Bo Lei[1]; Andrew Kitahara[1]; Nan Gao[1]; Ryan Cohn[1]; [1]Carnegie Mellon University

4:20 PM
AMPIS: Automated Materials Particle Instance Segmentation: *Ryan Cohn*[1]; Timothy Prost[2]; Iver Anderson[2]; Emma White[2]; Jordan Tiarks[2]; Elizabeth Holm[1]; [1]Carnegie Mellon University; [2]Ames Laboratory

4:40 PM
A Method to Reconstruct Prior Beta Grain Orientations from Measured Alpha-phase Electron Backscatter Diffraction Data: *Adam Pilchak*[1]; [1]US Air Force Research Laboratory

MATERIALS PROCESSING

Rare Metal Extraction & Processing — Li, Co, Au, Ag, PGMs, Te, Na, W, In

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; Kerstin Forsberg, KTH Royal Institute of Technology; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Alafara Baba, University of Ilorin; Neale Neelameggham, IND LLC

Monday PM **March 15, 2021**

2:00 PM Invited
Environmental Aspects of the Electrochemical Recovery of Tellurium by Electrochemical Deposition-redox Replacement (EDRR): Petteri Halli[1]; Marja Rinne[1]; Benjamin Wilson[1]; Kirsi Yliniemi[1]; *Mari Lundstrom*[1]; [1]Aalto University

2:20 PM
Sodium Metal from Sulfate: Jed Checketts[1]; *Neale Neelameggham*[2]; [1]Powerball Industries; [2]IND LLC

2:40 PM
Preparation of High-grade Ammonium Metatungstate (AMT) as Precursor for Industrial Tungsten Catalyst: *Alafara Baba*[1]; Sadisu Girigisu[1]; Mustapha Raji[1]; Abdullah Ibrahim[1]; Daud Olaoluwa[1]; Kuranga Ayinla[1]; Christianah Adeyemi[1]; Aishat Abdulkareem[1]; Abdul Alabi[2]; Mohammed Abdul[3]; [1]University of Ilorin; [2]Kwara State University, Malete; [3]Federal Polytechnic, Offa

3:00 PM Invited
Extraction of Platinum Group Metals from Spent Catalyst Material by a Novel Pyro-metallurgical Process: *Ana Maria Martinez*[1]; Kai Tang[1]; Camilla Sommerseth[1]; Karen Osen[1]; [1]SINTEF

3:20 PM
Developed Commercial Processes to Recover Au, Ag, Pt and Pd from E-waste.: *Rekha Panda*[1]; Manis Kumar Jha[1]; Jae-chun Lee[2]; Devendra Deo Pathak[3]; [1]CSIR-National Metallurgical Laboratory; [2]Korea Institute of Geosciences and Mineral Resources (KIGAM); [3]Indian Institute of Technology (ISM) Dhanbad

NANOSTRUCTURED MATERIALS

100 Years and Still Cracking: A Griffith Fracture Symposium — Fracture of Thin Films

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

Program Organizers: Megan Cordill, Erich Schmid Institute of Materials Science; William Gerberich, University of Minnesota; David Bahr, Purdue University; Christopher Schuh, Massachusetts Institute of Technology; Daniel Kiener, Montanuniverstität Leoben; Neville Moody; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht

Tuesday AM **March 16, 2021**

Session Chair: Megan Cordill, Erich Schmid Institute

8:30 AM Invited
Leveraging Griffith's Energy Balance in Extreme Environments: *Timothy Weihs*[1]; [1]Johns Hopkins University

9:10 AM
Fracture-based Reuse of Single Crystal Wafers for High-Efficiency Photovoltaics: *Jie Chen*[1]; Corinne Packard[1]; [1]Colorado School of Mines

9:30 AM
Modeling Insights into Micro Single-Edge Bend Fracture Toughness Testing of Multilayered Metal-ceramic Cu/TiN and Al/TiN Nanocomposite Thin Films: *Daniel Savage*[1]; Shubhrodev Bhowmik[2]; Cayla Harvey[3]; Amit Misra[4]; Nathan Mara[5]; Jeffrey Wheeler[6]; Johann Michler[7]; Siddhartha Pathak[8]; Marko Knezevic[2]; [1]University of New Hampshire/Los Alamos National Lab; [2]University of New Hampshire; [3]University of Nevada; [4]University of Michigan; [5]University of Minnesota; [6]ETH Zürich; [7]Empa, Swiss Federal Laboratories for Materials Science and Technology; [8]University of Nevada/Iowa State University

9:50 AM Invited
Fracture and Adhesion in Small Scale Devices– Microswitches, Microcantilevers and Micron-thick Films: *Maarten De Boer*[1]; [1]Carnegie Mellon University

10:30 AM
Improving Metal-polymer Adhesion through Alloy Development: *Megan Cordill*[1]; Patrice Krieml[1]; [1]Erich Schmid Institute

10:50 AM
Domain Nucleation in Ferroelastic Microcrystals: Competition between Twinning, Slip and Fracture: *Jessica Krogstad*[1]; Charles Smith[1]; [1]University of Illinois at Urbana-Champaign

ADDITIVE TECHNOLOGIES

2021 Young Innovator in the Materials Science of Additive Manufacturing Award Lecture — 2021 Young Innovator in the Materials Science of Additive Manufacturing Award Lecture

Tuesday AM **March 16, 2021**

11:00 AM
Introduction of Award Recipient: 2021 Young Innovator in the Materials Science of Additive Manufacturing Award Lecture: *Allison Beese*[1]; [1]Pennsylvania State University

11:05 AM Invited
Additive Manufacturing of High Temperature Metals: Present and Future Opportunities: *Michael Kirka*[1]; [1]Oak Ridge National Laboratory

11:35 AM Question and Answer Period Morderator: Allison Beese, Pennsylvania State University

ADVANCED MATERIALS

2D Materials – Preparation, Properties & Applications — Preparation & Properties

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

Program Organizers: Nuggehalli Ravindra, New Jersey Institute of Technology; Ramana Chintalapalle, University of Texas at El Paso; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Sufian Abedrabbo, Khalifa University; Amber Shrivastava, Indian Institute of Technology Bombay

Tuesday AM **March 16, 2021**

Session Chairs: Ramana Chintalapalle, University of Texas - El Paso; Nuggehalli Ravindra (Ravi), New Jersey Institute of Technology

8:30 AM Invited
Pressure-induced Formation and Mechanical Properties of 2D Diamond Boron Nitride: *Elisa Riedo*[1]; [1]New York University

8:55 AM Keynote
Direct Conversion of Carbon into Graphene, Diamond or Q-carbon: A New Frontier in Materials Science and Applications: *Jagdish Narayan*[1]; [1]North Carolina State University

9:25 AM
Anisotropic Thermal Conductivity and Associated Heat Transport Mechanism in Roll-to-Roll Graphene Reinforced Copper Matrix Composites: *Kunming Yang*[1]; Y.C. Ma[1]; Z.Y. Zhang[2]; J. Zhu[2]; Yue Liu[1]; T.X. Fan[1]; [1]Shanghai Jiao Tong University; [2]Dalian University of Technology

9:45 AM Invited
Controlled Synthesis of Reduced Graphene Oxide-carbon Nanotube Hybrids and Their Applications in The Fabrication of Membranes for Water Purification: Samar Azizighannad[1]; Oindrila Gupta[1]; *Somenath Mitra*[1]; [1]New Jersey Institute of Technology

10:10 AM
Black Phosphorus Ink Formulation for Aerosol Jet Printing of Optoelectronics: *Florent Muramutsa*[1]; Samuel Pedersen[1]; Joshua Wood[2]; Chad Husko[3]; Brian Jaques[1]; David Estrada[1]; [1]Boise State University; [2]Promethean Consulting, LLC; [3]Iris Light Technologies

10:30 AM
High Volume Mechanochemical Synthesis of Black Phosphorus for Optoelectronic Applications: *Samuel Pedersen*[1]; Florent Muramutsa[1]; Chad Husko[2]; Joshua Wood[3]; David Estrada[1]; Brian Jaques[1]; [1]Boise State University; [2]Iris Light Technologies; [3]Promethean Consulting

NUCLEAR MATERIALS

Accelerated Discovery and Qualification of Nuclear Materials for Energy Applications — Challenges and Recent Progresses and in Nuclear Fuels and Materials Development

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

Program Organizers: Yongfeng Zhang, University of Wisconsin-Madison; Adrien Couet, University of Wisconsin-Madison; Michael Tonks, University of Florida; Jeffery Aguiar, Idaho National Laboratory; Andrea Jokisaari, Idaho National Laboratory; Karim Ahmed, Texas A&M University

Tuesday AM **March 16, 2021**

Session Chairs: Tyler Gerczak , Oak Ridge National Laboratory ; Robert Roach, Idaho National Laboratory

8:30 AM Invited
Materials Selection in Nuclear Applications a Challenge and an Opportunity for Advanced Material Design, Fabrication and Testing: *Peter Hosemann*[1]; Bernd Gludovatz[2]; Edward Obbard[2]; Michael Moschetti[2]; Ashley Reichardt[1]; Stuart Maloy[3]; [1]University of California Berkeley; [2]UNSW Sydney; [3]Los Alamos National Laboratory

9:00 AM
High power irradiation testing of TRISO MiniFuel-Compacts in HFIR: *Tyler Gerczak*[1]; Christian Petrie[1]; Jason Harp[1]; Grant Helmreich[1]; John Hunn[1]; Andrew Kercher[1]; Zane Wallen[1]; Ryan Gallagher[1]; Kory Linton[1]; Annabelle Le Coq[1]; Ryan Latta[2]; Blaise Collin[2]; Nicholas Brown[3]; [1]Oak Ridge National Laboratory; [2]Kairos Power; [3]University of Tennessee

9:20 AM Invited
Qualification of 316L Stainless Steel Components for ASME Pressure Retaining Applications: *David Gandy*[1]; Marc Albert[1]; Stephen Tate[1]; Clint Armstrong[2]; William Cleary[2]; [1]Electric Power Research Institute; [2]Westinghouse Electric Corporation

9:50 AM Invited
Overview of Nuclear Materials Discovery and Qualification Initiative (NMDQi): *Robert Roach*[1]; [1]Idaho National Laboratory

10:20 AM
Development and Qualification of Ultrafine-grained and Nanocrystalline Steels for Nuclear Applications: *Haiming Wen*[1]; Andrew Hoffman[1]; Maalavan Arivu[1]; Rinat Islamgaliev[2]; [1]Missouri University of Science and Technology; [2]Ufa State Aviation Technical University

10:40 AM
Development of Assembly Technique for Fuel Specimens for the MARCH-SERTTA TREAT Irradiation Testing Platform: *Connor Woolum*[1]; Lance Hone[1]; Korbin Tritthart[1]; [1]Idaho National Laboratory

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture V: Processing-Structure-Property Investigations and Application to Qualification — Titanium

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; John Lewandowski, Case Western Reserve University; Nima Shamsaei, Auburn University; Mohsen Seifi, ASTM International/Case Western Reserve University; Steve Daniewicz, University of Alabama

Tuesday AM **March 16, 2021**

Session Chair: Nik Hrabe, National Institute of Standards and Technology (NIST)

8:30 AM Invited
Implementing Processing Strategies and Unique Hot Isostatic Pressing Treatments to Control Microstructure, Defect Content, and Mechanical Properties of Electron Beam Melted Ti-6Al-4V: *Jake Benzing*[1]; Nikolas Hrabe[1]; Enrico Lucon[1]; Timothy Quinn[1]; Julius Bonini[2]; Magnus Ahlfors[3]; [1]National Institute of Standards and Technology; [2]Lucideon M+P; [3]Quintus Technologies

9:00 AM
Effect of Oxide and Hydroxide on Cold Spray of Titanium Particles: *Mobin Vandadi*[1]; Arvand Navabi[1]; Trevor Bond[1]; Nima Rahbar[1]; Winston Soboyejo[1]; [1]Worcester Polytechnic Institute

9:20 AM
The Inhomogeneous Microstructure and Properties of Ti-6Al-4V Additively Manufactured with Electron Beam Freeform Fabrication: *Samuel Present*[1]; Karen Taminger[2]; Chris Domack[2]; Kevin Hemker[1]; [1]Johns Hopkins University; [2]NASA Langley Research Center

9:40 AM
Quantifying Layer Uniformity in Ti6Al4V Hybrid Additively Manufactured Samples Using Ultrasound: *Luz Sotelo*[1]; Cody Pratt[1]; Rakeshkumar Karunakaran[1]; Cody Kanger[1]; Michael Sealy[1]; Joseph Turner[1]; [1]University of Nebraska Lincoln

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications III — Additive Manufacturing Applications in Nuclear

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

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Indrajit Charit, University of Idaho; Subhashish Meher, Idaho National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Kumar Sridharan, University of Wisconsin-Madison; Xiaoyuan Lou, Auburn University

Tuesday AM **March 16, 2021**

Session Chair: Kumar Sridharan , University of Wisconsin

8:30 AM Invited
Tailored Radiation Responses of 9-12 wt.% Cr Steels Through Additive Manufacturing: *Kevin Field*[1]; T.M. Kelsy Green[1]; Weicheng Zhong[2]; Pengyuan Xiu[1]; Gabriella Bruno[1]; Niyanth Sridharan[3]; Lizhen Tan[2]; Maxim Gussev[2]; Ying Yang[2]; [1]University of Michigan; [2]Oak Ridge National Laboratory; [3]Lincoln Electric

8:50 AM
Functional Advanced Printings for Nuclear In-pile Sensing: *Kunal Mondal*[1]; Michael McMurtrey[1]; [1]Idaho National Laboratory

9:10 AM
Cold Spray Stainless Steel Deposition to Mitigate CISCC in Canisters for Used Nuclear Fuel Storage: *Nicholas Pocquette*[1]; Hwasung Yeom[1]; Hemant Agiwal[1]; Kenneth Ross[2]; John Kessler[3]; Gary Cannell[4]; Frank Pfefferkorn[1]; Kumar Sridharan[1]; [1]University of Wisconsin Madison; [2]Pacific Northwest Research Laboratory; [3]J Kessler and Associates LLC; [4]Fluor Corporation

9:30 AM
A Review of Solution Based Processing Routes for Advanced Nuclear Fuel Materials: *Elizabeth Zell*[1]; Milo Gill[2]; Yazen Alfayez[2]; Edward Herderick[2]; Isabella Van Rooyen[1]; [1]Idaho National Laboratory; [2]The Ohio State University

9:50 AM
Cold Spray Mitigation of Chloride-induced Stress Corrosion Cracking in Austenitic Stainless Steel Welds: *Haozheng Qu*[1]; Timothy Montoya[2]; Rebecca Schaller[2]; Eric Schindelholz[3]; Kyle Johnson[4]; Janelle Wharry[1]; [1]Purdue University; [2]Sandia National Laboratories; [3]The Ohio State University; [4]VRC Metal Systems

10:10 AM Invited
From Flight to Fission: Additive Manufacturing Advances at GE in Nuclear Energy: Vipul Gupta[1]; *Andrew Hoffman*[1]; Xiaoyuan Lou[2]; Raul Rebak[1]; [1]GE Research; [2]Auburn University

10:30 AM
Laser Additive Manufacturing of Grade 91 Steel for Affordable Nuclear Reactor Components with Improved Radiation Tolerance: *Stuart Maloy*[1]; Calvin Lear[1]; Osman El-Atwani[1]; Peter Hosemann[2]; Jeff Bickel[2]; Thomas Lienert[3]; Tarasankar DebRoy[4]; Tuhin Mukherjee[4]; [1]Los Alamos National Laboratory; [2]University of California Berkeley; [3]Optomec Inc.; [4]Penn State University.

10:50 AM
Cold Spray Chromium Deposition for Accident Tolerant Fuel Cladding: *Tyler Dabney*[1]; Hwasung Yeom[1]; Kyle Quillin[1]; Nick Pocquette[1]; Yinbin Miao[2]; Kun Mo[2]; Laura Jamison[2]; Kumar Sridharan[1]; [1]University of Wisconsin Madison; [2]Argonne National Laboratory

11:10 AM
Evaluation of Oxide Dispersion Strengthened (ODS) Steel Fuel Cladding Tubes Manufactured by Cold Spray Technology: *Hwasung Yeom*[1]; Vishnu Ramasawmy[1]; Mia Lenling[1]; Peter Hosemann[2]; David Hoelzer[3]; Stuart Maloy[4]; Kumar Sridharan[1]; [1]University of Wisconsin Madison; [2]University of California-Berkeley; [3]Oak Ridge National Laboratory; [4]Los Alamos National Laboratory

11:30 AM
Densification of Binder Jetted Tungsten through Chemical Vapor Infiltration for Fusion Energy Application: *John Echols*[1]; Amy Elliot[1]; Yutai Katoh[1]; Lauren Garrison[1]; [1]Oak Ridge National Laboratory

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Applications of Solidification Fundamentals — In Situ Characterization

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

Program Organizers: Alex Plotkowski, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Northrop Grumman; Mohsen Asle Zaeem, Colorado School of Mines; Wenda Tan, University of Utah; Lianyi Chen, University of Wisconsin-Madison

Tuesday AM **March 16, 2021**

Session Chairs: Mohsen Aisle Zaeem, Colorado School of Mines; Lang Yuan, University of South Carolina

8:30 AM Invited
Characterization of Material Solidification Behaviors in Laser Powder Bed Fusion Using Operando Synchrotron X-ray Imaging: *Tao Sun*[1]; Lianyi Chen[2]; [1]University of Virginia; [2]University of Wisconsin-Madison

9:00 AM
In-situ High-speed X-ray Diffraction Study of Phase Transformation in a Laser-Processed 420 Stainless Steel: *Xuan Zhang*[1]; Andrew Chihpin Chuang[1]; Meimei Li[1]; [1]Argonne National Laboratory

9:20 AM
In-situ Observation of Ferritic vs Austenitic Solidification Mode Competition in 316L Laser Powder Bed Fusion Welds with Synchrotron X-ray Diffraction: *Joseph Aroh*[1]; Seunghee Oh[1]; Rachel Lim[1]; Benjamin Gould[2]; Andrew Chuang[2]; P. Chris Pistorius[1]; Anthony Rollett[1]; [1]Carnegie Mellon University; [2]Argonne National Laboratory

9:40 AM
In-situ X-ray Imaging of Melt Flow Dynamics in Laser Metal Additive Manufacturing: *Qilin Guo*[1]; Cang Zhao[2]; Minglei Qu[1]; Lianghua Xiong[3]; S. Mohammad H. Hojjatzadeh[1]; Luis I. Escano[1]; Niranjan D. Parab[2]; Kamel Fezzaa[2]; Tao Sun[2]; Lianyi Chen[1]; [1]University of Wisconsin-Madison; [2]Argonne National Laboratory; [3]Missouri University of Science and Technology

10:00 AM
In Situ Imaging of the Effect of Gas Flowrates on Directed Energy Deposition: *Lorna Sinclair*[1]; Yunhui Chen[1]; Samuel Clark[1]; Oliver Hatt[2]; Sebastian Marussi[1]; Saurabh Shah[1]; Robert Atwood[3]; Martyn Jones[4]; Gavin Baxter[4]; Chu Lun Alex Leung[1]; Iain Todd[2]; Peter Lee[1]; [1]University College London; [2]University of Sheffield; [3]Diamond Light Source Ltd; [4]Rolls-Royce plc

10:20 AM
Microstructure Evolution and Nanoindentation Measurements after Laser Re-solidification of Hypo-eutectic Al-10 at %Cu: *Mohammed Alamoudi*[1]; Vishwanadh Bathula[1]; Jörg Wiezorek[1]; [1]University of Pittsburgh

10:40 AM
Simultaneous, In-situ Synchrotron X-ray Radiography and Thermal Imaging of Liquid-to-solid Phase Transformation during Laser Fusion Processing of Ti- and Ni-alloys: *Rakesh Kamath*[1]; Ryan Heldt[1]; Logan White[1]; David Garcia[2]; Rongxuan Wang[2]; Zhenyu Kong[2]; Kamel Fezzaa[3]; Tao Sun[4]; Hahn Choo[1]; [1]University of Tennessee Knoxville; [2]Virginia Polytechnic Institute and State University; [3]Argonne National Laboratory; [4]University of Virginia

11:00 AM
Ultrafast Dynamics of Solidification and Thermal Strain Evolution in Laser Powder Bed Additive Manufacturing Using High Energy X-ray Diffraction: *Adrita Dass*[1]; Chenxi Tian[1]; Shonak Bhattacharya[1]; Darren Pagan[2]; Atieh Moridi[1]; [1]Cornell University; [2]Cornell High Energy Synchrotron Source

11:20 AM
In-situ X-ray Imaging of Porosity Formation in Directed Energy Deposition: *Sarah Wolff*[1]; Benjamin Gould[2]; Aaron Greco[2]; Tao Sun[3]; [1]Texas A&M University; [2]Argonne National Laboratory; [3]University of Virginia

11:40 AM
Undercooling in Laser Powder Bed Fusion Metal Additive Manufacturing: Meelap Coday[1]; Minglei Qu[1]; Qilin Guo[1]; *Lianyi Chen*[1]; [1]University of Wisconsin-Madison

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ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development III -- Super Materials and Extreme Environments — Microstructural Aspects

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

Program Organizers: Behrang Poorganji, University of Waterloo; Hunter Martin, HRL Laboratories LLC; James Saal, Citrine Informatics; Orlando Rios, Oak Ridge National Laboratory; Atieh Moridi, Cornell University; Jiadong Gong, Questek Innovations LLC

Tuesday AM **March 16, 2021**

Session Chair: Orlando Rios, University of Tennessee

8:30 AM Invited
Microstructure Evolution of Metallic Alloys under Additive Manufacturing Conditions: *Amy Clarke*[1]; Jonah Klemm-Toole[1]; Behnam Aminahmadi[1]; Chloe Johnson[1]; Alec Saville[1]; Brian Rodgers[1]; Jeremy Shin[1]; Kamel Fezzaa[2]; Sven Vogel[3]; Joseph McKeown[4]; Tresa Pollock[5]; Alain Karma[6]; [1]Colorado School of Mines; [2]Advanced Photon Source, Argonne National Laboratory; [3]Los Alamos National Laboratory; [4]Lawrence Livermore National Laboratory; [5]University of California Santa Barbara; [6]Northeastern University

9:00 AM Invited
Solidification Condition and Its Effects on Microstructure in Metal-power Bed Fusion Processes: *Yuichiro Koizumi*[1]; [1]Osaka University

9:30 AM
Exploring the Structure-property Relationships of the Compositionally Graded WxCoCrFeMnNi High-entropy Alloy: *Jonathan Pegues*[1]; Michael Melia[1]; Benjamin Gould[2]; Raymond Puckett[1]; Shaun Whetten[1]; Nicolas Argibay[1]; Tomas Babuska[1]; Andrew Kustas[1]; [1]Sandia National Laboratories; [2]Argonne National Laboratory

9:50 AM
Structure-property Relationships of Additively Manufactured Ni-Nb Binary Alloys: *Andrew Kustas*[1]; Jonathan Pegues[1]; N. Scott Bobbitt[1]; Raymond Puckett[1]; Morgan Jones[1]; Michael Chandross[1]; Nicolas Argibay[1]; [1]Sandia National Laboratories

10:10 AM
Microstructural and Mechanical Characterization of Additively Manufactured Al-Fe-V-Si: *Paul Wilson*[1]; Christopher Meyer[1]; Fatmata Barrie[1]; [1]The Boeing Company

10:30 AM
Bulk Single Crystals in Cubic Systems Produced via Electron Beam Melting Additive Manufacturing: *Patxi Fernandez-Zelai*[1]; Michael Kirka[1]; Sebastien Dryepondt[1]; Yousub Lee[1]; Christopher Ledford[1]; [1]Oak Ridge National Laboratory

10:50 AM
A Comparison between In-situ and Ex-situ Mixing of Nanoparticles with a Matrix in Additive Manufacturing of Metal Matrix Composite: *Somayeh Pasebani*[1]; Milad Ghayoor[1]; Kijoon Lee[1]; Yujuan He[1]; Chih-hung Chang[1]; Brian Paul[1]; [1]Oregon State University

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ADDITIVE TECHNOLOGIES

Additive Manufacturing: Solid-State Phase Transformations and Microstructural Evolution — Simulation and Modelling

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

Program Organizers: Bij-Na Kim, Carpenter Additive; Andrew Wessman, University of Arizona; Chantal Sudbrack, National Energy Technology Laboratory; Eric Lass, University of Tennessee-Knoxville; Katerina Christofidou, University of Sheffield; Peeyush Nandwana, Oak Ridge National Laboratory; Rajarshi Banerjee, University of North Texas; Whitney Poling, General Motors Corporation; Yousub Lee, Oak Ridge National Laboratory

Tuesday AM **March 16, 2021**

Session Chairs: Andrew Wessman, The University of Arizona; Yousub Lee, Oak Ridge National Laboratory

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8:30 AM Invited
Fundamental Investigation of Multi-Principal Element Alloy (MPEA) Design and Processing Research to Explore Additive Manufacturing (AM) Effects: *Iver Anderson*[1]; Emma White[1]; Duane Johnson[1]; Timothy Prost[1]; Ralph Napolitano[1]; Andrew Kustas[2]; Nicolas Argibay[2]; [1]Iowa State University / Ames Laboratory; [2]Sandia National Lab-NM

9:00 AM
CALPHAD Based Thermo Kinetic Modeling for Additive Manufacturing (AM): A Case Study for Fusion Based and Supersolidus Liquid Phase Sintering During Binder Jet: *Rangasayee Kannan*[1]; Peeyush Nandwana[1]; [1]Oak Ridge National Laboratory

9:20 AM
Phase Field Modeling of Powder Densification in Sintering: Rui Dong[1]; *Wenda Tan*[1]; [1]University of Utah

9:40 AM Invited
Probabilistic Machine Learning Assisted Study of Directed Energy Deposited Alloys: *Soumya Nag*[1]; Yiming Zhang[1]; Sreekar Karnati[1]; Lee Kerwin[2]; Eric MacDonald[3]; Neil Johnson[1]; Sathyanarayanan Raghavan[1]; Dora Cheung[2]; Alex Kitt[2]; Changjie Sun[1]; Genghis Khan[1]; Chris Williams[4]; Thomas Broderick[5]; Mark Benedict[5]; Brandon Ribic[6]; [1]GE Research; [2]EWI - Buffalo Manufacturing Works; [3]Youngstown State University; [4]GE Aviation; [5]Air Force Research Laboratory; [6]America Makes

10:10 AM
Prediction of Microstructure and Phase Evolution during Multi-track, Multi-layer Directed Energy Deposition of H13: Neil Bailey[1]; Christopher Katinas[1]; *Yung Shin*[1]; [1]Purdue University

10:30 AM
New Insights on Cellular Structures Strengthening Mechanisms and Thermal Stability of L-PBF Stainless Steel 316L: *Thomas Voisin*[1]; Jean-Baptiste Forien[1]; Aurelien Perron[1]; Sylvie Aubry[1]; Nicolas Bertin[1]; Amit Samanta[1]; Alexander Baker[1]; Y. Morris Wang[1]; [1]Lawrence Livermore National Laboratory

10:50 AM
Process Dependent Nanoscale Vanadium Clustering within Martensite Laths in Laser Powder Bed Fused Additively Manufactured Ti6Al4V: *Mangesh Pantawane*[1]; Sriswaroop Dasari[1]; Srinivas Mantri[1]; Rajarshi Banerjee[1]; Narendra Dahotre[1]; [1]University of North Texas

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session III

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

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; 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; Arul Kumar Mariyappan, Los Alamos National Laboratory; Olivia Underwood, Sandia National Laboratories

Tuesday AM **March 16, 2021**

8:30 AM
Characterization and Modeling of Deformation Twinning in Mg during Compression and Tension: *Zhe Chen*[1]; Mohammadreza Yaghoobi[1]; Veera Sundararaghavan[1]; John Allison[1]; Samantha Daly[2]; [1]University of Michigan; [2]University of California, Santa Barbara

8:50 AM
Recent Advances in Applying In-situ Electron Microscopy for Local Determination of Crack Processes: *Daniel Kiener*[1]; Markus Alfreider[1]; Inas Issa[1]; Michael Wurmshuber[1]; Michael Burtscher[1]; Klemens Schmuck[1]; [1]University of Leoben

9:10 AM Invited
Materials Science Applications of Four Dimensional–scanning Transmission Electron Microscopy (4D-STEM): *Colin Ophus*[1]; [1]Lawrence Berkeley National Laboratory

9:40 AM
Study of Slip Transmissibility and Its Correlation to Local Geometrically Necessary Dislocation Content in Grade 1 Pure Titanium: *Harsha Phukan*[1]; Thomas Bieler[1]; Ruqing Xu[2]; Philip Eisenlohr[1]; Martin Crimp[1]; Carl Boehlert[1]; [1]Michigan State University; [2]Argonne National Laboratory

10:00 AM
Study of the Effect of Grain Boundary Parameters on the Micro Hall-Petch Slope in Mg Alloys: *Mohsen Taheri Andani*[1]; Aaditya Lakshmanan[1]; Veera Sundararaghavan[1]; John Allison[1]; Amit Misra[1]; [1]University of Michigan

10:20 AM
Recent Advances in Bragg Coherent Diffraction for Nanoscale Imaging of Strain: *Ross Harder*[1]; [1]Argonne National Laboratory

10:40 AM
Towards Accurate Absolute Stress and Orientation Measurement by Electron Backscatter Diffraction: *Tijmen Vermeij*[1]; Johan Hoefnagels[1]; [1]Eindhoven University of Technology

ADVANCED MATERIALS

Advanced High Strength Steels V — Session III

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

Program Organizers: Ana Luiza Araujo, CBMM North America Inc.; Louis Hector, General Motors Global Technical Center; Igor Vieira, Nucor Steel; Lijia Zhao, ArcelorMittal USA; Krista Limmer, CCDC Army Research Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Sebastien Allain, Institut Jean Lamour; MingXin Huang, University of Hong Kong

Tuesday AM **March 16, 2021**

8:30 AM
A Spatial Spin Average Approach to Model Austenitic Steels Using First Principle Calculations: *Edwin Antillon*[1]; Michelle Johannes[1]; Noam Bernstein[1]; [1]Naval Research Lab

8:50 AM
Phase Evolution of Triple Nano-precipitate Strengthened Mn-stabilized Austenitic Steel: *Colin Stewart*[1]; Richard Fonda[2]; Keith Knipling[2]; Patrick Callahan[2]; [1]National Research Council Associate at the U.S. Naval Research Laboratory; [2]U.S. Naval Research Laboratory

9:10 AM
Microstructural Refinement and Homogenization of High Strength Austenitic Steels for Lightweighting Using Equal Channel Angular Pressing: Ibrahim Karaman[1]; Matthew Vaughan[1]; *Sezer Picak*[1]; [1]Texas A&M University

9:30 AM
Role of Metal Carbides in the Formation of Austenite in a High-Ni Martensitic Steel: *Chia-Pao Lee*[1]; Amir Farkoosh[1]; Paul Lambert[2]; David Seidman[1]; [1]Northwestern University; [2]Carderock Division, Naval Surface Warfare Center

9:50 AM
Effects of Cold Rolling on Austenite Formation in a QLT-Treated High-Ni Martensitic Steel: *Chia-Pao Lee*[1]; Amir Farkoosh[1]; Paul Lambert[2]; David Seidman[1]; [1]Northwestern University; [2]Carderock Division, Naval Surface Warfare Center

10:10 AM
Twinning-induced Plasticity of Austenitic Lightweight High-entropy Steel: *Hung-Wei Yen*[1]; Zen-Hao Lai[1]; Yi-Hsuan Sun[1]; Yi-Ting Lin[1]; Jui-Fan Tu[2]; [1]National Taiwan University; [2]China Steel Corporation

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: Richard Beddingfield, North Carolina State University; Daniel Salazar, BCMaterials; Alex Leary, NASA Glenn Research Center; Huseyin Ucar, California Polytechnic University; Yongmei Jin, Michigan Technological University; Arcady Zhukov, University of the Basque Country

Tuesday AM **March 16, 2021**

Session Chair: Manh-Huong Phan, University of South Florida

8:30 AM
Engineering of Magnetic Properties and Magnetoimpedance Effect of Fe-rich Microwires by Reversible and Irreversible Stress-annealing Anisotropy: *Paula Corte-Leon*; Valentina Zhukova[1]; Juan Maria Blanco[2]; Mihail Ipatov[1]; Arcady Zhukov[3]; [1]Dept. Phys. Mater., Upv/Ehu; [2]Dept. Appl. Phys., Univ. Basque Country; [3]Dept. Phys. Mater., Upv/Ehu and Ikerbasque

8:50 AM
Engineering of Magnetic Properties of Co- -rich Microwires by Post-processing
: Lorena Gonzalez-Legarreta[1]; Valentina Zhukova[1]; Mihail Ipatov[1]; *Paula Corte-Leon*; Juan Blanco[2]; Arcady Zhukov[3]; [1]Dept. Phys. Mater., Upv/Ehu; [2]Dept. Appl. Phys., Univ. Basque Country; [3]Dept. Phys. Mater., Upv/Ehu and Ikerbasque

9:10 AM
In Pursuit of Antiskyrmions for Energy-Efficient Spintronics: Structural and Magnetic Characterization of Uniaxial [Pt/Co]-based C_{2v} Thin Films: *Michael Kitcher*[1]; Marc De Graef[2]; Vincent Sokalski[2]; [1]Carnegie Mellon University; [2]Carnegie Mellon University

9:30 AM Invited
Kondo-like Behaviour and GMR Effect in Co-Cu Granular Alloys and Multilayers: *Ricardo Lopez Anton*[1]; Mihail Ipatov[2]; Juan Antonio Gonzalez[1]; Juan Pedro Andres[1]; Julian Gonzalez[2]; Valentina Zhukova[2]; Jakub Mino[2]; Arcady Zhukov[2]; [1]Universidad de Castilla-La Mancha; [2]University of the Basque Country

10:00 AM Invited
Magnetic Real-time Tracking of Coronavirus Progress: A New Approach Utilizing Magnetic Sensor and Machine Learning: *Manh-Huong Phan*[1]; [1]University of South Florida

10:30 AM Invited
Oxide Thin-film Electronics for the Front-end Conditioning of Flexible Magnetic Field Sensors: *Niko Münzenrieder*[1]; [1]Free University of Bozen-Bolzano

11:00 AM
The Development of On-chip-coil Type GSR Sensor: Yoshinobu Honkura[1]; Shinpin Honkura[1]; *Mizue Uemura*[1]; [1]Magnedesign Corp.

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VII — 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; Soumendra Basu, Boston University; Amit Pandey, Lockheed Martin Space; Paul Ohodnicki, University of Pittsburgh; Kyle Brinkman, Clemson University; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota

Tuesday AM **March 16, 2021**

Session Chairs: Soumendra Basu, Boston University; Amit Pandey, Lockheed Martin Space

8:30 AM
Experimental and Computational Investigations of the Multiple Impurities Effect on the SOFC Cathode Materials: Rui Wang[1]; Hooman Sabarou[1]; *Yu Zhong*[1]; [1]Worcester Polytechnic Institute

8:50 AM
Characteristics of Advanced Protective Layer for SOFC Stacks: *Jung Pyung Choi*[1]; John Hardy[1]; [1]Pacific Northwest National Laboratory

9:20 AM Invited
Compositionally-stabilized Nickelate-Ceria Composite Oxygen Electrodes for Reversible Solid Oxide Fuel Cells and Electrolyzers: *Srikanth Gopalan*[1]; Jane Banner[1]; Ayesha Aktar[1]; [1]Boston University

9:50 AM
Computational Guided Investigations on LSM/YSZ Triple-phase Boundaries: *Rui Wang*[1]; Yu Zhong[1]; [1]Worcester Polytechnic Institute

10:10 AM
In-situ Cathode Cleaning for Chromium Poisoning Recovery in Solid Oxide Fuel Cells: Zhikuan Zhu[1]; Michelle Sugimoto[1]; Srikanth Gopalan[1]; Soumendra Basu[1]; *Uday Pal*[1]; [1]Boston University

10:40 AM
Three-dimensional Simulation of Electrochemical Impedance in Solid Oxide Fuel Cell (SOFC) Cathodes and Its Application in Cathode Characterization: *Vishwas Goel*[1]; Dalton Cox[2]; Scott Barnett[2]; Katsuyo Thornton[1]; [1]University of Michigan; [2]Northwestern University

CHARACTERIZATION

Advanced Real Time Imaging — Alloys

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

Program Organizers: Jinichiro Nakano, US Department of Energy 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; Noritaka Saito, Kyushu University; Anna Nakano, US Department of Energy National Energy Technology Laboratory; Zuotai Zhang, Southern University of Science and Technology; Candan Tamerler, University of Kansas; Bryan Webler, Carnegie Mellon University; Wangzhong Mu, KTH Royal Institute of Technology; David Veysset, Stanford University

Tuesday AM **March 16, 2021**

Session Chairs: Wangzhong Mu, KTH Royal Institute of Technology ; Bryan Webler, Carnegie Mellon University

8:30 AM Invited
In Situ Thermoelastic Property Evolution of Ni-based Concentrated Solid Solution Alloys under Extremes: *Cody Dennett*[1]; [1]Idaho National Laboratory

8:50 AM
Atomic Scale Processes of Initial Oxidation of Cu and Cu-Ni Alloy Revealed by In Situ Environmental TEM: *Meng Li*[1]; Matthew Curnan[1]; Richard Garza[1]; Stephen House[1]; Wissam Saidi[1]; Judith Yang[1]; [1]University of Pittsburgh

9:10 AM
In Situ Investigation of the Effect of Ion Irradiation and Carbon Addition in GST on Crystallization and Amorphization Thresholds: *Trevor Clark*[1]; David Adams[1]; Khalid Hattar[1]; [1]Sandia National Laboratories

9:30 AM
High-velocity Microparticle Impact Modes for Mismatched Metals: *David Veysset*[1]; Mostafa Hassani[2]; Yuchen Sun[1]; Keith Nelson[1]; Christopher Schuh[1]; [1]Massachusetts Institute of Technology; [2]Cornell University

9:50 AM
Dynamics of Abnormal Grain Growth in a Particle-containing System Uncovered by Multimodal Three-dimensional X-ray Imaging: *Jiwoong Kang*[1]; Ning Lu[1]; Nancy Senabulya[1]; Nicolas Gueninchault[2]; Ashwin Shahani[1]; [1]University of Michigan; [2]Carl Zeiss X-ray Microscopy, Inc.

MATERIALS PROCESSING

Advances in Powder and Ceramic Materials Science — Ceramic Particles and Powder

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

Program Organizers: Bowen Li, Michigan Technological University; Shefford Baker, Cornell University; Huazhang Zhai, Beijing Institute of Technology; Kathy Lu, Virginia Polytechnic Institute and State University; 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; Eugene Olevsky, San Diego State University

Tuesday AM **March 16, 2021**

Session Chairs: Bowen Li, Michigan Tech; Rajiv Soman, Eurofins EAG Materials Science LLC

8:30 AM Invited
Understanding the Role of Electric Field in the Manipulation of Particles in Aqueous Media and Fabrication of Ice-templated Ceramics: *Dipankar Ghosh*[1]; Sashanka Akurati[1]; Shizhi Qian[1]; Diego Terrones[1]; Bharath Gundrati[1]; [1]Old Dominion University

8:50 AM
Chemical Etch/Modification Effect on CO Oxidation Performance of Ceria Supported Catalysts: *Ruigang Wang*[1]; Yifan Wang[1]; [1]The University of Alabama

9:10 AM
Layered Ceramic Structures In1+x(Ti1/2Zn1/2)1-xO3(ZnO)m (m = 2, 4, and 6; x = 0.5): Synthesis, Phase Stability and Dielectric Properties: *Victor Emmanuel Alvarez Montano*[1]; Subhash Sharma[2]; Francisco Brown[1]; Alejandro Durán[3]; [1]Universidad De Sonora; [2]Catedra CONACYT CNyN-UNAM; [3]Universidad Nacional Autonoma de Mexico CNyN-UNAM

9:30 AM
Mineralogical Characteristics of Sepiolite under Thermal Treatment: *Huaguang Wang*[1]; Bowen Li[1]; [1]Michigan Technological University

9:50 AM
Dielectrophoretic Control of Ceramic Particles for Fabrication of Ice-templated Structures: *Bharath Gundrati*[1]; Sashanka Akurati[1]; Shizhi Qian[1]; Dipankar Ghosh[1]; [1]Old Dominion University

MATERIALS DESIGN

AI/Data Informatics: Applications and Uncertainty Quantification at Atomistics and Mesoscales — Session III

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

Program Organizers: Kamal Choudhary, National Institute of Standards and Technology; Garvit Agarwal, Argonne National Laboratory; Wei Chen, Illinois Institute of Technology; Mitchell Wood, Sandia National Laboratories; Vahid Attari, Texas A&M University; Oliver Johnson, Brigham Young University; Richard Hennig, University of Florida

Tuesday AM **March 16, 2021**

Session Chairs: Mitchell Wood, Sandia national lab; Oliver Johnson, Brigham Young University

8:30 AM
AI Guided High-throughput Exploration of Potential Energy Surfaces: *Subramanian Sankaranarayanan*[1]; [1]University of Illinois Chicago

9:00 AM
Decision Trees in Continuous Action Space for High-throughput Exploration of Potential Energy Surfaces: *Sukriti Manna*[1]; Troy Loeffler[1]; Rohit Batra[1]; Suvo Banik[1]; Henry Chan[1]; Subramanian Sankaranarayanan[1]; [1]Argonne National Laboratory

9:20 AM
Building a Better Database to Learn From; Application to Interatomic Potentials: *Mitchell Wood*[1]; Nicholas Lubbers[2]; Danny Perez[2]; Charles Sievers[1]; [1]Sandia National Laboratories; [2]Los Alamos National Lab

9:40 AM
Neural Network Reactive Force Field for C, H, N, O Systems: *Pilsun Yoo*[1]; Michael Sakano[1]; Saaketh Desai[1]; Mahbubul Islam[2]; Peilin Liao[1]; Alejandro Strachan[1]; [1]Purdue University; [2]Wayne State University

10:00 AM
Accelerating Phase-field Predictions via Machine Learning Trained Surrogate Models: David Montes de Oca Zapiain[1]; James Stewart[1]; *Remi Dingreville*[1]; [1]Sandia National Laboratories

10:20 AM
Simultaneous Development and Robust Optimization of a Microstructure Dependent Material Model: Leveraging Sequential Monte-Carlo Methods to Enhance Symbolic Regression Analysis: *Karl Garbrecht*[1]; Nolan Strauss[1]; Geoffrey Bomarito[2]; Patrick Leser[2]; Jacob Hochhalter[1]; [1]University of Utah; [2]NASA

10:40 AM
Exploring Metastability and Mapping Metastable Phase Diagrams Using Machine Learning: *Srilok Srinivasan*[1]; Rohit Batra[1]; Duan Luo[1]; Troy Loeffler[1]; Sukriti Manna[1]; Henry Chan[1]; Liuxiang Yang[2]; Wenge Yang[2]; Jianguo Wen[1]; Pierre Darancet[1]; Subramanian Sankaranarayanan[1]; [1]Argonne National Laboratory; [2]Center for High Pressure Science and Technology Advanced Research

11:00 AM
Machine Learning Guided Discovery of Novel Oxide Perovskites for Scintillator Applications: *Anjana Talapatra*[1]; Blas Uberuaga[1]; Christopher Stanek[1]; Ghanshyam Pilania[1]; [1]Los Alamos National Laboratory

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Large Scale Computational Simulations and Microscale Algorithms for Study Structure-Processing Relations

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

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

Tuesday AM **March 16, 2021**

Session Chairs: Cheikh Cisse, Colorado School of Mines; Mohsen Asle Zaeem, Colorado School of Mines

8:30 AM
Exascale-motivated Algorithm Development for Nano and Mesoscale Materials Methods: *Samuel Reeve*[1]; Matthew Rolchigo[1]; Jim Belak[1]; [1]Lawrence Livermore National Laboratory

8:50 AM
Preparing for Exascale Phase-field Simulations: Scalable, Performance-portable Precipitation Simulations: *Stephen DeWitt*[1]; Philip Fackler[1]; Younggil Song[1]; Bala Radhakrishnan[1]; John Turner[1]; [1]Oak Ridge National Laboratory

9:10 AM
Tusas: A Modern Computational Approach for Microstructure Evolution Toward Exascale: *Supriyo Ghosh*[1]; Christopher Newman[1]; Marianne Francois[1]; [1]Los Alamos National Laboratory

9:30 AM
Bayesian Data Assimilation for Phase-field Simulation of Solid-state Sintering: *Akimitsu Ishii*[1]; Akinori Yamanaka[1]; Yuki Okada[1]; Akiyasu Yamamoto[1]; [1]Tokyo University of Agriculture and Technology

9:50 AM
Phase Field Dislocation Dynamics (PFDD) Modeling of Non-Schmid Effects in BCC Metals: *Hyojung Kim*[1]; Nithin Mathew[1]; Darby J. Luscher[1]; Abigail Hunter[1]; [1]Los Alamos National Laboratory

10:10 AM
A Quantitative Phase-field Model for Study of Shape Memory Behavior and Elastocaloric Effect in CuAlBe: *Cheikh Cissé*[1]; Mohsen Asle Zaeem[1]; [1]Colorado School of Mines

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications IX — Session III

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

Program Organizers: Hsin-Jay Wu, National Chiao Tung University; Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Cnrs Crismat Unicaen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Lan Li, Boise State University; Takao Mori, National Institute for Materials Science; Tiejun Zhu, Zhejiang University; Alexandra Zevalkink, Michigan State University; Wan-Ting Chiu, Tokyo Institute of Technology

Tuesday AM **March 16, 2021**

Session Chairs: Yoshisato Kimura, Tokyo Institute of Technology; Chenguang Fu, Zhejiang University

8:30 AM Invited
Mg3(Sb,Bi)2 Thermoelectric Single Crystals: From p-type to n-type: *Chenguang Fu*[1]; Yu Pan[2]; Kazuki Imasato[3]; Mengyu Yao[2]; Tiejun Zhu[1]; G. Jeffrey Snyder[3]; Claudia Felser[2]; [1]Zhejiang University; [2]Max Planck Institute for Chemical Physics of Solids; [3]Northwestern University

8:50 AM Invited
Optimization of n- and p-type Mg2X (X: Si, Ge, Sn): Understanding the Impact of Mg on the Thermoelectric Performance and the Change of the Valence Bands Under Solid Solution Formation: *Johannes De Boor*[1]; Hasbuna Kamila[1]; Mohammad Yasseri[1]; Aryan Sankhla[1]; Eckhard Müller[1]; [1]German Aerospace Center

9:10 AM Invited
Phase Interface Formation Induced by Phase Separation Process in Thermoelectric Mg_2(Si, Sn) Alloys and (Zr, Ti)NiSn Alloys: *Yoshisato Kimura*[1]; Yaw Wang Chai[1]; Manabu Watanabe[1]; Yonghoon Lee[2]; [1]Tokyo Institute of Technology; [2]KELK Ltd.

9:30 AM
Microstructure and Band Engineering for the High Performance of n-type Mg3Sb2-Mg3Bi2 Alloy: *Kazuki Imasato*[1]; G. Jeffrey Snyder[1]; [1]Northwestern University

9:50 AM Invited
Self-tuning of Carrier Type and Improved Thermoelectric Performance in Skutterudite CoM1.5Te1.5 (M = Sn or Ge): *Li-Chyong Chen*[1]; Suneesh MV[2]; Ta-Lei Chou[2]; Kuei-Hsien Chen[2]; [1]National Taiwan University; [2]Academia Sinica

10:10 AM Invited
The Doping Effects on the Thermal Conductivity of GeTe: *Jie Ma*[1]; Jiong Yang[2]; Yangzhong Pei[3]; Siqi Lin[3]; [1]Shanghai Jiao Tong University; [2]Shanghai University; [3]Tongji University

10:30 AM
High-performance GeTe-based Thermoelectric Materials via Carrier Optimization: *Yi-Fen Tsai*[1]; Hsin-Jay Wu[1]; [1]National Chiao Tung University

10:50 AM
Phase Transition Behavior and Thermoelectric Property of Te doped Cu2Se: *Wan-Ting Yen*[1]; Hsin-jay Wu[1]; [1]National Chiao Tung University

11:10 AM Invited
Functionalization of the Conductive Network and Structural Disorder Engineering: Two Strategies to Reach High ZT in Ternary and Quaternary Sulfides: *Emmanuel Guilmeau*[1]; [1]Laboratoire CRISMAT

11:30 AM
Effect of Structural Disorder on the Thermoelectric Properties of Kesterite (Cu2ZnSnS4): *Eleonora Isotta*[1]; Binayak Mukherjee[1]; Carlo Fanciulli[2]; Nicola M. Pugno[1]; Paolo Scardi[1]; [1]University of Trento; [2]CNR-ICMATE, Lecco Unit

LIGHT METALS

Alumina and Bauxite — Novel Processes and Bauxite Residue

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

Program Organizer: Anne Duncan, Hatch

Tuesday AM **March 16, 2021**

8:30 AM Invited
Revisiting Alternative Smelter Grade Alumina Production Processes: *Andrey Panov*[1]; Alexander Senyuta[1]; Andrey Smirnov[1]; [1]RUSAL Engineering and Technological Center

9:05 AM
Silicon Rich Iron Alloy from Bauxite Residue: *Halvor Dalaker*[1]; Casper van der Eijk[1]; [1]Sintef

9:25 AM
Bauxite Residue Neutralization Potential Using Biogenic Sulfuric and Citric Acids: Patricia Silva[1]; Roseanne Holanda[1]; Andre Carmo[1]; Fernando Gomes[1]; Raphael Costa[2]; Caio Melo[2]; *Adriano Lucheta*[1]; Marcelo Montini[2]; [1]SENAI Innovation Institute for Mineral Technologies; [2]Norsk Hydro Brasil

9:45 AM
Gravity Methods Applied to Bauxite Residue for Mineral Pre-concentration: Paula Araújo[1]; Patricia Silva[1]; Andre Carmo[1]; Marcus Vinícius Gonçalves[2]; Raphael Costa[3]; Caio Melo[3]; *Adriano Lucheta*[1]; Marcelo Montini[3]; [1]SENAI Innovation Institute for Mineral Technologies; [2]SENAI Innvation Institute for Mineral Processing; [3]Norsk Hydro Brasil

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Material Processing and Modeling

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

Program Organizer: Dimitry Sediako, University of British Columbia

Tuesday AM **March 16, 2021**

Session Chair: Eric Taleff, University of Texas

8:30 AM
Simulations of Wear-induced Microstructural Evolution in Nanocrystalline Aluminum: *Yeqi Shi*[1]; Izabela Szlufarska[1]; [1]University of Wisconsin-Madison

8:50 AM
High-throughput Aluminum Alloy Discovery Using Laser Additive Manufacturing: *Qingyu Pan*[1]; Monica Kapoor[2]; Sean Mileski[2]; John Carsley[2]; Xiaoyuan Lou[1]; [1]Aubrun University; [2]Novelis Global Research and Technology Center

9:10 AM
Manufacturing A206 Aluminum Alloy by Step Sand Casting: Effect of Solidification Time on Mechanical and Surface Properties of the Cast Samples Using Experimental and Simulation Results: *Amir Kordijazi*[1]; Pradeep Rohatgi[1]; [1]University of Wisconsin Milwaukee

9:30 AM
Experimental and Numerical Examinations Regarding the Material Flow of Combined Rolling Extrusion Process: *Christoph Heinzel*[1]; Aleksandr Salnikov[2]; Sören Müller[3]; [1]SMS Group GmbH; [2]RUSAL; [3]FZS - TU Berlin

9:50 AM
Comparison of Simulation and Real Life to Set Up Holistic Approach for Extrusion Process: *Zeynep Tutku Ozen*[1]; Mehmet Bugra Güner[1]; Osman Halil Çelik[1]; Görkem Özçelik[1]; Murat Konar[1]; Turgay Güler[1]; Cem Mehmetalioglu[1]; Mustafa Serkan Özcan[1]; Tolga Demirkiran[1]; [1]ASAS

10:10 AM
Computational Simulation of Nanoparticle Distributions in Metal Matrix Composite Casting Processes: *Gongyuan Zheng*[1]; Juergen Jakumeit[1]; Thomas Pabel[2]; Christian Kneissl[2]; Luca Magagnin[3]; [1]ACCESS e. V.; [2]Austrian Foundry Research Institute (OGI); [3]Politecnico di Milano

10:30 AM
Effect of Thermomechanical Processing on Strengthening of the 5181 Alloy (with 0.03 %Sc) Sheets for Preservation of 40 % Improved Strength Compared with 5083: *Dmitry Fokin*[1]; Aleksandr Alabin[2]; Sergey Valchuk[2]; Viktor Mann[2]; Aleksandr Krokhin[2]; [1]Light Materials and Technologies Institute UC RUSAL; [2]JSC RUSAL Management

10:50 AM Question and Answer Period

LIGHT METALS

Aluminum Reduction Technology — Cell Operation (Performance and Operating Advances)

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

Program Organizers: Nadia Ahli, Emirates Global Aluminium; Nancy Holt, Hydro Aluminium AS

Tuesday AM **March 16, 2021**

Session Chairs: Nabeel Al Jallabi, ALBA; Nancy Holt, Hydro Aluminium AS

8:30 AM
Carbon Dust - Its Short-Term Influence on Potroom Operations: *Matthias Dechent*[1]; [1]Trimet Aluminium SE

8:50 AM
Experience with Lengthy Pot Hibernation at Alcoa Baie-Comeau: *Xiangwen Wang*[1]; Marie-Eve Laframboise[1]; Patricia Gagnon[1]; Gilles Proulx[1]; [1]Alcoa Corp

9:10 AM
Improvement to Alpsys Instability and Alumina Feeding Control: *Anne Gosselin*[1]; [1]Rio Tinto

9:30 AM
Hydro's New Karmøy Technology Pilot: Start-up and Early Operation: *Pierre Reny*[1]; Martin Segatz[1]; Haakon Haakonsen[1]; Håvard Gikling[1]; Mona Assadian[1]; Jan Frode Høines[1]; Espen Kvilhaug[1]; Asgeir Bardal[1]; Erik Solbu[1]; [1]Hydro

9:50 AM
AP12 Low Energy Technology at ALRO Smelter: *Marian Cilianu*[1]; Bertrand Allano[2]; Gheorghe Dobra[1]; Ion Mihaescu[1]; Claude Ritter[2]; Andre Auge[2]; Yves Caratini[2]; [1]Vimetco alro; [2]Rio Tinto

10:10 AM Question and Answer Period

ADVANCED MATERIALS

Bulk Metallic Glasses XVIII — Alloy Development and Application I

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

Program Organizers: Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee-Knoxville; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Robert Maass, Federal Institute for Materials Research and Testing (BAM); Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Tuesday AM **March 16, 2021**

Session Chairs: Peter Liaw, The University of Tennesee; Jinn Chu, National Taiwan University of Science and Technology

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8:30 AM Invited
Overview on Additive Manufacturing Techniques for Bulk Metallic Glasses: *Douglas Hofmann*[1]; Punnathat Bordeenithikasem[1]; Samad Firdosy[1]; Andre Pate[1]; Daniel East[2]; [1]NASA JPL/Caltech; [2]CSIRO

8:55 AM
Demisability of Bulk Metallic Glasses for Potential Satellite Applications: *Punnathat Bordeenithikasem*[1]; Scott Roberts[1]; Douglas Hofmann[1]; J. Martin Ratliff[1]; Benton Greene[2]; John Bacon[2]; Sungwoo Sohn[3]; Jan Schroers[3]; [1]NASA Jet Propulsion Laboratory; [2]NASA Johnson Space Center; [3]Yale University

9:15 AM
Nanomolding Far and Close to Equilibrium: *Naijia Liu*[1]; Guannan Liu[1]; Arindam Raj[1]; Sungwoo Sohn[1]; Jan Schroers[1]; [1]Yale University

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CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2021 — Advanced 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, Instituto Militar de Engenharia; Shadia Ikhmayies; 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; Rajiv Soman, Eurofins EAG Materials Science LLC; Alex Moser, US Naval Research Laboratory

Tuesday AM **March 16, 2021**

Session Chairs: Andrew Brown, Army Research Laboratory; Yunus Kalay, Middle East Technical University

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8:30 AM
On the Origins of the Discrepancies between Optical, SEM, and EBSD-based Grain Size Measurements: *Eric Payton*[1]; Kayla Evans[1]; [1]Air Force Research Laboratory

8:50 AM
A Correlative Approach for Distinguishing Multiple BCC Phases in Thick-Section High Strength Steels: *Virginia Bertolo*[1]; Quanxin Jiang[1]; Carey Walters[2]; Jilt Sietsma[1]; Vera Popovich[1]; [1]Delft University of Technology; [2]TNO

9:10 AM
Ultrasonic Scattering in Two-phase Polycrystalline Materials: *Showmic Islam*[1]; Musa Norouzian[1]; Joseph Turner[1]; [1]University of Nebraska-Lincoln

9:30 AM
Effects of Microstructural Features on the Crack Initiation Mechanism in AA6451 during Three-point Bending: *Yung Suk Yoo*[1]; Sazol Das[2]; Richard Hamerton[2]; Josh Kacher[1]; [1]Georgia Institute of Technology; [2]Novelis Inc.

9:50 AM
Applying Stereological Characterisation to the Solidification Structure of Single Crystal Alloys to Deduce the 3D Macroscopic Solid/Liquid Interface Shape: *Joel Strickland*[1]; Bogdan Nenchev[1]; Karl Tassenberg[1]; Samuel Perry[1]; Gareth Sheppard[1]; Hongbiao Dong[1]; [1]University of Leicester

10:10 AM
Development of Onboard Temperature Monitoring System for Axlebox in Railway Bogie: *Jeongguk Kim*[1]; [1]Korea Railroad Research Institute

10:30 AM
Influence of Morphology on Ultrasonic Scattering: A Theoretical Study: *Showmic Islam*[1]; Musa Norouzian[1]; Joseph Turner[1]; [1]University of Nebraska-Lincoln

10:50 AM
In Situ Study of High Temperature Oxidation of Alloys Using Ambient Pressure X-ray Photoelectron Spectroscopy: *Richard Oleksak*[1]; John Baltrus[1]; Tao Liu[1]; Rafik Addou[2]; J Trey Diulus[2]; Gregory Herman[2]; Bharat Gwalani[3]; Arun Devaraj[3]; Ömer Dogan[1]; [1]National Energy Technology Laboratory; [2]Oregon State University; [3]Pacific Northwest National Laboratory

11:10 AM
Characterization of Reactive Metallic Nanolayers through High-speed Imaging: Ali Bagheri Behboud[1]; Feyza Kazanc[1]; *Sezer Ozerinc*[1]; [1]Middle East Technical University

NUCLEAR MATERIALS

Characterization of Nuclear Materials and Fuels with Advanced X-ray and Neutron Techniques — Neutron Diffraction and Imaging

Sponsored by: TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Nuclear Materials Committee

Program Organizers: Xuan Zhang, Argonne National Laboratory; Jonathan Almer, Argonne National Laboratory; Maria Okuniewski, Purdue University; Joshua Kane, Idaho National Laboratory; Donald Brown, Los Alamos National Laboratory; J. Kennedy, Idaho National Laboratory; Arthur Motta, Pennsylvania State University

Tuesday AM **March 16, 2021**

Session Chairs: J. Rory Kennedy, Idaho National Laboratory; Donald Brown, Los Alamos National Laboratory

8:30 AM Invited
Advanced Characterization of Nuclear Fuel Using Neutron Imaging: *Yuxuan Zhang*[1]; Hassina Bilheux[1]; Kristian Myhre[1]; Jean Bilheux[1]; Jiao Lin[2]; Jared Johnson[1]; Andrew Miskowiec[1]; Rodney Hunt[1]; Louis Santodonato[3]; Jamie Molaison[1]; Paris Cornwell[1]; Erik Stringfellow[1]; [1]Oak Ridge National Laboratory; [2]Satelytics; [3]Advanced Research Systems, Inc.

8:55 AM Invited
Neutron Imaging at LANSCE: Characterizing Nuclear Materials for Next Generation Reactor Designs.: *Alexander Long*[1]; Sven Vogel[1]; [1]Los Alamos National Laboratory

9:20 AM
Characterization of Irradiated Nuclear Fuels with Pulsed Neutrons: *Sven Vogel*[1]; Kenneth McClellan[1]; Luca Capriotti[2]; Jason Harp[3]; Alexander Long[1]; Danielle Schaper[1]; Eric Larson[1]; D. Travis Carver[1]; Jay Lin[4]; Peter Hosemann[4]; Thilo Balke[5]; [1]Los Alamos National Laboratory; [2]Idaho National Laboratory; [3]Oak Ridge National Laboratory; [4]UC Berkeley; [5]LANL/Purdue University

9:40 AM
Characterization of the Crystal Structure Evolution of U-Zr Alloys Utilizing Time-of-Flight Neutron Diffraction with In-situ-heating: *Walter Williams*[1]; Sven Vogel[2]; Jianzhong Zhang[2]; Maria Okuniewski[3]; [1]Idaho National Laboratory; [2]Los Alamos National Laboratory; [3]Purdue University

10:00 AM
Microstructure and Crystal Structure Studies in the U-Zr System: *Sven Vogel*[1]; Yi Xie[2]; Luca Capriotti[3]; Michael Benson[3]; Jason Harp[4]; [1]Los Alamos National Laboratory; [2]Purdue University; [3]Idaho National Laboratory; [4]Oak Ridge National Laboratory

10:20 AM
Non-destructive Characterization of Nuclear Materials using Neutron Imaging Techniques: *Hassina Bilheux*[1]; Yuxuan Zhang[1]; Jean Bilheux[1]; Erik Stringfellow[1]; Kristian Myhre[1]; Brianne Beers[1]; Brent Heuser[1]; Tommy Thomasson[1]; Amy Jones[1]; Richard Ibberson[1]; [1]Oak Ridge National Laboratory

10:40 AM
Neutron Radiography Capabilities at LANSCE: Completing LANSCE's Cold/Thermal/Epithermal Imaging Suite With Fast-neutron Radiography: *Danielle Schaper*[1]; Jeremy Bundgaard[2]; Carl Carlson[2]; Patrick Feng[3]; Donald Gautier[1]; Alexander Long[1]; Darcy Newmark[1]; Sven Vogel[1]; [1]Los Alamos National Laboratory; [2]Nevada National Security Site; [3]Sandia National Laboratory

11:00 AM
Transmission Spectrum Estimation and Material Decomposition with Energy Resolved Neutron Imaging: *Thilo Balke*[1]; Alexander Long[1]; Sven Vogel[1]; Brendt Wohlberg[1]; Charles Bouman[1]; [1]Los Alamos National Laboratory

NUCLEAR MATERIALS

Composite Materials for Nuclear Applications — Ceramic Composites

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

Program Organizers: Anne Campbell, Oak Ridge National Laboratory; Dong Liu, University of Bristol; Rick Ubic, Boise State University; Lauren Garrison, Oak Ridge National Laboratory; Peng Xu, Idaho National Laboratory; Johann (Hans) Riesch, Max Planck Institute for Plasma Physics

Tuesday AM **March 16, 2021**

Session Chair: Peng Xu, Idaho National Laboratory

8:30 AM Invited
SiGA SiC-SiC Composites Development for Accident Tolerant Fuel: *Christian Deck*[1]; Rolf Haefelfinger[1]; Jon Sheeder[1]; Lucas Borowski[1]; Sarah Oswald[1]; Joel Kosmatka[1]; Ryan Hon[1]; Kirill Shapovalov[1]; Sean Gonderman[1]; Jack Gazza[1]; Christina Back[1]; [1]General Atomics

9:00 AM
Development of PVD Cr Coatings for Hydrothermal Corrosion Mitigation of SiC-SiC$_f$ Fuel Cladding in LWRs: *Kyle Quillin*[1]; Hwasung Yeom[1]; Tyler Dabney[1]; John Lacy[1]; Taeho Kim[1]; Sergey Chemerisov[2]; Adrien Couet[1]; Kumar Sridharan[1]; [1]University of Wisconsin, Madison; [2]Argonne National Laboratory

9:20 AM
Corrosion and TEM Analysis of CVD and PVD Coatings for BWR Accident Tolerant Fuel Cladding: *Ryan Schoell*[1]; Joey Kabel[2]; Sebastian Lam[3]; Kirill Shapovalov[4]; Peter Hosemann[3]; Djamel Kaoumi[1]; [1]North Carolina State University; [2]University of California Berkeley ; [3]University of California Berkeley; [4]General Atomics

9:40 AM
Novel Fiber Fretting Technique for Tribological Properties of Composite Interphases: *Joseph Kabel*[1]; Thomas Edwards[2]; Caroline Hain[2]; Tatiana Kochetkova[2]; Johann Michler[2]; Peter Hosemann[1]; [1]University of California, Berkeley; [2]EMPA

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Software Tools and Material Prediction / Thermodynamics and Phase Selection

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

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Vahid Attari, Texas A&M University; Jorge Munoz, University of Texas at El Paso

Tuesday AM **March 16, 2021**

Session Chairs: Prashant Singh, Ames Laboratory; Vahid Attari, Texas A&M University; Enrique Martinez Saez, Clemson University; Carelyn Campbell, National Institute of Standards and Technology

8:30 AM Invited
Application of CALPHAD-based Tools for Optimizing AM Microstructures and Properties: *Carelyn Campbell*[1]; Mark Stoudt[1]; James Zuback[1]; Souzan Hammadi[2]; [1]National Institute of Standards and Technology; [2]Royal Institute of Technology (KTH)

9:00 AM
Ga-Sn-Zn Alloys – Thermophysical Properties of Novel Liquid Metals: *Alexandra Dobosz*[1]; Tomasz Gancarz[1]; [1]Institute of Metallurgy and Materials Science Polish Academy of Sciences

9:20 AM Invited
Understanding Phase Stability and Diffusion Kinetics in Structurally Unstable Phases from First-principles: *Sara Kadkhodaei*[1]; [1]University of Illinois at Chicago

9:50 AM
First Principles Thermodynamics of Fe-Cr-Mn Carbides in High-Mn Steels: *Lekshmi Sreekala*[1]; Tilmann Hickel[1]; Jörg Neugebauer[1]; [1]Max-Planck-Institute For Iron Research

10:10 AM
Interplay between Chemical Interactions and Constituent Strain Energy during the Early Stages of Precipitations: *Kang Wang*[1]; Du Cheng[1]; Bi-Cheng Zhou[1]; [1]University of Virginia

CORROSION

Corrosion in Heavy Liquid Metals for Energy Systems — Materials Compatibility with Liquid Metal Coolants III

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

Program Organizers: Osman Anderoglu, University of New Mexico; Alessandro Marino, SCK-CEN; Michael Short, Massachusetts Institute of Technology; Peter Hosemann, University of California; Mike Ickes, Westinghouse Electric Company

Tuesday AM **March 16, 2021**

Session Chairs: Osman Anderoglu, University of New Mexico; Alessandro Marino, SCK-CEN

8:30 AM
Electromagnetic Flow Sensor for Heavy Liquid Metals for Energy Systems: *Heng Ban*[1]; Osman Anderoglu[2]; Cetin Unal[3]; [1]University of Pittsburgh; [2]University of New Mexico; [3]Los Alamos National Lab

8:50 AM
Review of Liquid Metal Corrosion Under Irradiation and Progress Report on the LBE-Irradiation-Corrosion Experiment (ICE): *Franziska Schmidt*[1]; Peter Hosemann[1]; [1]University of California, Berkeley

9:10 AM
Preliminary Results on the Compatibility of Fe-Cr-Al and Fe-Cr-Al-Mo Steels with Liquid Sodium at 700 °C.
: *Marie Romedenne*[1]; Rishi Pillai[1]; Bruce Pint[1]; [1]ORNL

9:30 AM
Investigation on the Evaporation Rate of Liquid Lead and Radioisotope Retention Capability of Molten Lead as Coolant: *Shuprio Ghosh*[1]; Osman Anderoglu[1]; Cemal Cakez[1]; Khaled Talaat[1]; Keith Woloshun[2]; Michael Epstein[3]; Sung Lee[4]; Paolo Ferroni[3]; Emre Tatli[3]; Matthew Memmott[5]; [1]University of New Mexico; [2]Los Alamos National Laboratory; [3]Westinghouse Electric Company, LLC; [4]Fauske & Associates, LLC; [5]Brigham Young University

PHYSICAL METALLURGY

Defect and Phase Transformation Pathway Engineering for Desired Microstructures — Invited Presentations

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; Yipeng Gao, Idaho National Laboratory; Timofey Frolov, Lawrence Livermore National Laboratory; Stoichko Antonov, Max-Planck-Institut für Eisenforschung GmbH; Jessica Krogstad, University of Illinois at Urbana-Champaign; Bin Li, University of Nevada, Reno

Tuesday AM **March 16, 2021**

Session Chairs: Yufeng Zheng, University of Nevada Reno; Rongpei Shi, Lawrence Livermore National Laboratory

8:30 AM Invited
New Insights on Deformation Twinning- Mechanisms and Modeling: *Huseyin Sehitoglu*[1]; ASK Mohammed[1]; Orcun Celebi[1]; Gorkem Gengor[1]; Jessica Krogstad[1]; [1]University of Illinois

8:50 AM Invited
Phase Transformation Pathways in High Entropy Alloys or Complex Concentrated Alloys mediated by Defects: *Sriswaroop Dasari*[1]; Bharat Gwalani[1]; Yao-Jen Chang[2]; Deep Choudhuri[1]; Stephane Gorsse[3]; An-Chou Yeh[2]; Rajarshi Banerjee[1]; [1]University of North Texas; [2]National Tsing Hua University; [3]University of Bordeaux, France

9:10 AM Invited
Microstructure and Tensile Behavior of Nanostructured Gradient TWIP Steel: Jie Ding[1]; Zhongxia Shang[1]; Jin Li[1]; Haiyan Wang[1]; *Xinghang Zhang*[1]; [1]Purdue University

9:30 AM Invited
Kinetic Monte Carlo Simulations of Solute Clustering in Multicomponent Al Alloys: Mingfei Zhang[1]; Zhucong Xi[1]; Louis Hector Jr.[1]; Chaoming Yang[1]; *Liang Qi*[1]; [1]University of Michigan

9:50 AM Invited
Grain Boundary Segregation in Immiscible Alloys: Anisotropy and Trijunction Effects: Anne Barnett[1]; Michael Cox[1]; Derek Moore[1]; Maher Alghalayini[1]; Chris Barr[2]; Khalid Hattar[2]; Brad Boyce[2]; *Fadi Abdeljawad*[1]; [1]Clemson University; [2]Sandia National Laboratories

10:10 AM Invited
Development of Superalloys Driven by Atomic-scale Interactions of Solutes with Crystal Defects: *Paraskevas Kontis*[1]; Stoichko Antonov[1]; Philipp Kürnsteiner[1]; Shyam Katnagallu[2]; Jaber Mianroodi[1]; Lola Lilensten[3]; [1]Max-Planck-Institut für Eisenforschung GmbH; [2]Karlsruhe Institute of Technology; [3]CNRS - Institut de Recherche de Chimie Paris

10:30 AM Invited
Evolution of Metastable Grain Boundaries and Its Implications on Nanocrystals' Hardness Variation: Zhitong Bai[1]; Glenn Balbus[2]; Daniel Gianola[2]; *Yue Fan*[1]; [1]University of Michigan; [2]UCSB

MATERIALS PROCESSING

Deformation Induced Microstructural Modification — Session III: Computational Studies of Deformation

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

Program Organizers: Arun Devaraj, Pacific Northwest National Laboratory; Suveen Mathaudhu, University of California-Riverside ; Kester Clarke, Colorado School of Mines; Bharat Gwalani, Pacific Northwest National Laboratory; Daniel Coughlin, Los Alamos National Laboratory

Tuesday AM **March 16, 2021**

Session Chairs: Peter Sushko, Pacific Northwest National Laboratory; Suveen Mathaudhu, University of California Riverside

8:30 AM Invited
Grain Boundary Segregation in Nanocrystalline Alloys: Multicomponent, Anisotropy, and Stress Effects: Malek Alkayyali[1]; Yasir Mahmood[1]; Josh Arrington[1]; *Fadi Abdeljawad*[1]; [1]Clemson University

9:00 AM
Effect of Loading Path on Grain Misorientation Evolution in Polycrystalline Al under Large Deformation: *Wenkai Fu*[1]; Yulan Li[1]; Shenyang Hu[1]; Peter Sushko[1]; Suveen Mathaudhu[2]; [1]Pacific Northwest National Laboratory; [2]Pacific Northwest National Laboratory & University of California, Riverside

9:20 AM
A First Principles Criterion for Microstructure Evolution in Deformation Twinned FCC Materials: *Matthew Daly*[1]; Ritesh Jagatramka[1]; Junaid Ahmed[1]; [1]University of Illinois at Chicago

9:40 AM Invited
Microstructure-based Modeling of Impact-Induced Plastic Deformation: Qi Tang[1]; *Mostafa Hassani*[1]; [1]Cornell University

10:10 AM
Molecular Dynamics Simulations of Defect Structure Evolution under Shear Deformation in Polycrystalline Al: *Nanjun Chen*[1]; Shenyang Hu[1]; Wahyu Setyawan[1]; Peter Sushko[1]; Suveen Mathaudhu[2]; [1]Pacific Northwest National Laboratory; [2]University of California, Riverside

10:30 AM
Modeling the Bonding and Structure of Non-metallic Inclusions within a Nickel Matrix during Forging: *Brandon Mackey*[1]; Thomas Siegmund[1]; Michael Sangid[1]; [1]Purdue University

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ELECTRONIC MATERIALS

Electronic Packaging and Interconnections 2021 — Solder Joint Intermetallics

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

Program Organizers: Mehran Maalekian, Mat-Tech; Christopher Gourlay, Imperial College London; Babak Arfaei, Ford Motor Company; Praveen Kumar, Indian Institute of Science; Sai Vadlamani, Intel Corporation; Kazuhiro Nogita, University of Queensland; David Yan, San Jose State University

Tuesday AM **March 16, 2021**

Session Chairs: Kazuhiro Nogita, The University of Queensland; Xin Fu Tan, The University of Queensland

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8:30 AM
On Interface Formation in Zr-based BMG /6061 Al Interconnects Joined by µFSSW: *David Yan*[1]; Logan Vahlstrom[1]; [1]San Jose State University

8:50 AM
Real-time Observation of the Accelerated Growth of $(Cu,Ni)_6Sn_5$ on Cu-xNi: *Xin Tan*[1]; Sergey Belyakov[2]; Te-Cheng Su[2]; Stuart McDonald[1]; Christopher Gourlay[2]; Hideyuki Yasuda[3]; Syo Matsumura[4]; Kazuhiro Nogita[1]; [1]University of Queensland; [2]Imperial College London; [3]Kyoto University; [4]Kyushu University

9:10 AM
Influence of Indium on the Microstructure and Properties of Interfacial IMC in Sn-rich Solder Joints: Experiments and First Principle Calculations: *Amey Luktuke*[1]; Arun Sundar[1]; Nikhilesh Chawla[1]; [1]Purdue University

9:30 AM
Atomic Insights into the Role of Dopants in -Cu6Sn5 toward Its Structural Stability: *Wenhui Yang*[1]; Xuan Quy Tran[1]; Tomokazu Yamamoto[1]; Kazuhiro Nogita[2]; Syo Matsumura[1]; [1]Kyushu University; [2]University of Queensland

9:50 AM Invited
Reducing Cracking in BGA Solder Joint Cu6Sn5 by Controlling the Reflow Profile: *Kazuhiro Nogita*[1]; Flora Somidin[2]; Keith Sweatman[3]; Tetsuya Akaiwa[3]; Tetsuro Nishimura[3]; Syo Matsumura[4]; Xiaozhou Ye[1]; Stuart McDonald[1]; [1]University of Queensland; [2]Universiti Malaysia Perlis (UniMAP); [3]Nihon Superior Co. Ltd.; [4]Kyushu University

10:10 AM
The Formation and Growth Kinetics of a Peculiar Cu_6Sn_5/Ag_3Sn Composite Intermetallic Layer at the Cu50Ag/Sn Interface during Solid-state Aging: *Chien-Lung Liang*[1]; Tsung-Chieh Chiu[2]; Kwang-Lung Lin[1]; [1]National Cheng Kung University; [2]Conquer Electronics

10:30 AM
Reconciling Phase Equilibria and Crystal Structures for the Cu_6Sn_5 Intermetallic in the Cu-Sn System: *Andreas Leineweber*[1]; [1]Technical University Bergakademie Freiberg

10:50 AM
Interfacial Reaction of Ni-In System and Mechanical Properties of Ni3In7: *Jia-Yi Liao*[1]; C. Robert Kao[1]; H. T. Hung[1]; [1]National Taiwan University

11:10 AM
Microalloying Effects on Intermetallic Compound Growth and Mechanical Reliability of Sn-Bi Solder Joints: *Yaohui Fan*[1]; Yifan Wu[1]; Travis Dale[1]; Sukshitha Achar[1]; Hannah Fowler[1]; Nilesh Badwe[2]; Raiyo Aspandiar[2]; John Blendell[1]; Ganesh Subbarayan[1]; Carol Handwerker[1]; [1]Purdue University; [2]Intel Corporation

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ENERGY & ENVIRONMENT

Energy Technologies and CO2 Management — Session III

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

Program Organizers: Alafara Baba, University of Ilorin; Lei Zhang, University of Alaska Fairbanks; Donna Guillen, Idaho National Laboratory; Xiaobo Chen, RMIT University; John Howarter, Purdue University; Neale Neelameggham, IND LLC; Cong Wang, Northeastern University; Ziqi Sun, Queensland University of Technology; Hong Peng, University of Queensland; Yu Lin Zhong, Griffith University

Tuesday AM **March 16, 2021**

Session Chairs: Hong Peng, University of Queensland; Xiaobo Chen, RMIT University

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8:30 AM
Effects on Operational Capabilities and Lifecycle of Commercially Available Li-ion Batteries Due to Partial Nail Penetration from Drop Hammer Impact Test: *Casey Jones*[1]; Bing Li[1]; Vikas Tomar[1]; [1]Purdue University

8:50 AM
Excitonic Effects in Absorption Spectra of Carbon Dioxide Reduction Photocatalysts: *Tathagata Biswas*[1]; Arunima Singh[1]; [1]Arizona State University

9:10 AM
Experimental Study and Numerical Modeling of Nanoparticle Injection Technology for Remediating Leaks of CO2 Storage: *Linfei Li*[1]; Yige Zhang[1]; Mija Hubler[1]; Yunping Xi[1]; Pania Newell[2]; [1]University of Colorado Boulder; [2]University of Utah

9:30 AM
High Temperature Properties in Ferritic Heat Resistant Steels with Intermetallic Precipitates for High Efficient Heat Recovery Systems: Akio Mitani[1]; Mari Miyoseta[1]; *Yukio Tachi*[1]; [1]Sanyo Special Steel Co., Ltd.

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Hydrogen Embrittlement

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, Advanced Cooling Technologies Inc; Jenifer Locke, Ohio State University

Tuesday AM **March 16, 2021**

Session Chairs: Ian Robertson , University of Wisconsin-Madison; Reiner Kirchheim, Georg-August-Universität Göttingen

8:30 AM Invited
Hydrogen Embrittlement – A Retrospective Opinion: *Ian Robertson*[1]; [1]University of Wisconsin-Madison

9:15 AM
Discrepancy Between Hydrogen-modified Dislocation Structures in the Surface and Interior Grain: *Shuai Wang*[1]; Qingqing Sun[1]; [1]Southern University of Science and Technology

9:35 AM
Macroscale-based Approaches for Assessing the Influence of Hydrogen on the Deformation Behavior of Polycrystalline Ni: *Zachary Harris*[1]; Sean Agnew[1]; James Burns[1]; [1]University of Virginia

9:55 AM
Assessing the Susceptibility of Existing Pipelines to Hydrogen Embrittlement: *Tim Boot*[1]; Ton Riemslag[1]; Elise Reinton[1]; Carey Walters[1]; Ping Liu[2]; Vera Popovich[1]; [1]TU Delft; [2]INTECSEA BV

MATERIALS DESIGN

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Multi-mechanical Interactions during Extreme Environment Fatigue Loading

Sponsored by: TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, 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; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University; Jean-Charles Stinville, University of California-Santa Barbara

Tuesday AM **March 16, 2021**

Session Chair: Brian Wisner, Ohio University

8:30 AM
Additively Manufactured Haynes 282 Superalloy Using L-PBF: Heat Treatment Effect on Mechanical Properties at Room and Elevated Temperatures: Seyed Ghiaasiaan[1]; *Nabeel Ahmad*[1]; Paul Gradl[1]; Samuel Cordner[1]; Colton Katsarelis[1]; William Tilson[1]; Shuai Shao[1]; Nima Shasaei[1]; [1]Auburn University

8:50 AM
Quantification of Fatigue Crack Growth Rates and Fatigue-creep Load Interaction Effects of Heterogeneous Fiber Networks via Thresholded Strain Fields: *Sarah Paluskiewicz*[1]; Yoon Joo Na[1]; Christopher Muhlstein[1]; [1]Georgia Institute of Technology

9:10 AM
Rapid Characterization of Cyclic Response of Small-volume Metal Samples Using Spherical Microindentation Stress-strain: *Camilla Johnson*[1]; Soumya Mohan[1]; Reji John[2]; Adam Pilchak[2]; Surya Kalidindi[1]; [1]Georgia Institute of Technology; [2]Air Force Research Laboratory

9:30 AM
Fatigue Crack Growth in a Ni-rich NiTiHf High Temperature Shape Memory Alloy under Thermomechanical Loading: *Behrouz Haghgouyan*[1]; Benjamin Young[1]; Ibrahim Karaman[1]; Dimitris Lagoudas[1]; [1]Texas A&M University

MATERIALS PROCESSING

Friction Stir Welding and Processing XI — Friction Stir Technologies

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

Program Organizers: Yuri Hovanski, Brigham Young University; Piyush Upadhyay, Pacific Northwest National Laboratory; Yutaka Sato, Tohoku University; Nilesh Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter the Great St. Petersburg Polytechnic University

Tuesday AM **March 16, 2021**

8:30 AM
Effect of Die Geometry on Rate-controlled Friction Extrusion: *Xiao Li*[1]; Md. Reza-E-Rabby[1]; Lei Li[1]; Ayoub Soulami[1]; Glenn Grant[1]; Anthony Reynolds[2]; [1]Pacific Northwest National Laboratory; [2]University of South Carolina

8:50 AM
Engineered Metal Matrix Composites Produced Via Co-extrusion for High-temperature Friction Stir Welding: *Paul Brune*[1]; Greg Hilmas[1]; Jeremy Watts[1]; [1]Missouri University of Science and Technology

9:10 AM
Residual Stresses and Nanoscale Evolution in AA6061 Produced by Additive Friction Stir-deposition: *Luke Brewer*[1]; Ning Zhu[1]; Dustin Avery[1]; Paul Allison[1]; James Jordon[1]; Yan Chen[2]; Ke An[2]; [1]University of Alabama; [2]Oak Ridge National Laboratory

9:30 AM
Additive Friction Stir Deposition for Repair and Cladding Applications: *Hang Yu*[1]; [1]Virginia Polytechnic Institute and State University

PHYSICAL METALLURGY

Frontiers in Solidification Science VIII — Eutectic Growth

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Phase Transformations Committee, TMS: Solidification Committee, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Damien Tourret, IMDEA Materials; Amy Clarke, Colorado School of Mines; Ulrike Hecht, Access e.V.; Nana Ofori-Opoku, Canadian Nuclear Laboratories; Melis Serefoglu, Koc University; Tiberiu Stan, Northwestern University

Tuesday AM **March 16, 2021**

Session Chairs: Nathalie Mangelinck-Noël, Aix Marseille Univ. CNRS, IM2NP UMR 7334; Melis Serefoglu, Koç University; Sabine Bottin-Rousseau, Sorbonne University; Ulrike Hecht, Access e.V.

8:30 AM Invited
Coupled and Decoupled Eutectic Growth in a Transparent Irregular Eutectic Alloy: *Sabine Bottin-Rousseau*[1]; Samira Mohagheghi[2]; Silvère Akamatsu[1]; Melis Serefoglu[2]; [1]Sorbonne University; [2]Koç University

9:00 AM
Crystal-orientation Maps of Lamellar Eutectic Growth Microstructures in Thin Al-Al2Cu Films Obtained by Laue Microdiffraction: *Mehdi Medjkoune*[1]; Silvère Akamatsu[1]; Geoffroy Prévot[1]; Jean-Sébastien Micha[2]; Sabine Bottin-Rousseau[1]; [1]Nanoscience institute of Paris; [2]European Synchrotron ESRF, CRG IF Beamline BM32

9:20 AM
Coexistence of Rod-like and Lamellar Eutectic Growth Patterns: In Situ Experiments in Microgravity: *Silvere Akamatsu*[1]; Sabine Bottin-Rousseau[2]; Mathis Plapp[3]; Victor Witusiewicz[4]; Ulrike Hecht[4]; [1]Cnrs; [2]Sorbonne University; [3]Ecole Polytechnique; [4]Access eV

9:40 AM
Phase-field Simulations of the Lamella-to-rod Transition in Eutectic Solidification: *Mathis Plapp*[1]; Sabine Bottin-Rousseau[2]; Silvère Akamatsu[2]; [1]Ecole Polytechnique, CNRS; [2]Sorbonne Université, CNRS

10:00 AM
Orientation Relationships and Pattern Evolution In Directionally Solidified Al-Cu-Mg Ternary Eutectic: *Dominic Ezemenaka*[1]; Amber Genau[1]; [1]University of Alabama at Birmingham

10:20 AM Invited
Phase Field Modeling of Solidification with Application to Template-directed Solidification: Erik Hanson[1]; Mojue Zhang[1]; Yanjun Lyu[1]; David Montiel[1]; *Katsuyo Thornton*[1]; [1]University of Michigan

10:50 AM
Probing the Growth Dynamics of Eutectic Colonies in Zn-Al via X-ray Video Microscopy: Yeqing Wang[1]; Jianrong Gao[2]; *Ashwin Shahani*[1]; [1]University of Michigan; [2]Northeastern University

11:10 AM
Lamellar Spacing Selection during Oscillatory Eutectic Solidification: *Paul Chao*[1]; Ashwin Shahani[1]; [1]University of Michigan

11:30 AM
Phase Field Modeling of Biomineralization? Microstructure Evolution in Mollusk Shells
: *Laszlo Granasy*[1]; Laszlo Ratkai[1]; Tamas Pusztai[1]; [1]Wigner Research Centre for Physics

SPECIAL TOPICS

Frontiers of Materials Award Symposium: 2021 Functional Nanomaterials: Translating Innovation into Pioneering Technologies — Session III

Program Organizer: Huanyu Cheng, Pennsylvania State University

Tuesday AM **March 16, 2021**

8:30 AM Invited
Programmable Gold Nanowire Electronic Skins and Tattoos: *Wenlong Cheng*[1]; [1]Monash University

9:10 AM Keynote
Wearable Gas Sensors with Wireless Communication and RF Energy Harvesting Capabilities: *Huanyu Cheng*[1]; [1]Pennsylvania State University

9:50 AM Invited
Engineering Self-folding and Shape Morphing in Patterned Materials: *David Gracias*[1]; [1]Johns Hopkins University

10:30 AM Invited
Flexible Printable Bioelectronics Devices: Wearable Biosensors and Bioenergy Harvesters: *Joseph Wang*[1]; [1]University California, San Diego

SPECIAL TOPICS

Frontiers of Materials Award Symposium: Low-Dimensional Materials and Interfaces for Next Generation Computing — Session I

Program Organizer: Deep Jariwala, University of Pennsylvania

Tuesday AM **March 16, 2021**

8:30 AM
Introductory Comments: Frontiers of Materials Award Symposium: Low-dimensional Materials and Interfaces for Next Generation Computing: *Deep Jariwala*[1]; [1]University of Pennsylvania

8:35 AM Invited
Gate-tunable Neuromorphic Devices Enabled by Low-dimensional Materials: *Mark Hersam*[1]; [1]Northwestern University

9:15 AM Keynote
2D/3D Heterostructures for Low-power Logic and Memory Devices: *Deep Jariwala*[1]; [1]University of Pennsylvania

9:55 AM Invited
Ferroelectrics: From Memory to Computing: *Suman Datta*[1]; [1]University of Notre Dame

LIGHT METALS

Greater Than the Sum of Its Parts — Concurrent Alloy Design and Processing Science: An LMD Symposium Honoring Raymond Decker — Session II

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

Program Organizers: Victoria Miller, University of Florida; Eric Nyberg, Tungsten Heavy Powder & Parts; J. Brian Jordon, University of Alabama; Wilhelmus Sillekens, European Space Agency; Neale Neelameggham, IND LLC; Vineet Joshi, Pacific Northwest National Laboratory

Tuesday AM **March 16, 2021**

Session Chair: Victoria Miller, University of Florida

8:30 AM Invited
Thixomolded Magnesium: Quick, Light, and Mighty: *Tracy Berman*[1]; [1]University of Michigan

9:00 AM Invited
Magnesium Sheet Alloy Development for Room Temperature Forming: *Alan Luo*[1]; Renhai Shi[1]; Jiashi Miao[1]; Thomas Avey[1]; [1]Ohio State University

9:30 AM
Impacts of Grain Boundary Particle Characteristics on Twin Transmission: *Benjamin Anthony*[1]; Brandon Leu[2]; Irene Beyerlein[2]; Victoria Miller[1]; [1]University Of Florida; [2]University of California Santa Barbara

9:50 AM Keynote
Evolution of Alloy Design, It's Science/Instruments Base, Tech Transfer Routes and Market Pull, 1921-2021: *Raymond Decker*[1]; [1]University of Michigan

10:35 AM Break

10:55 AM Panel Discussion

NANOSTRUCTURED MATERIALS

Heterostructured and Gradient Materials (HGM IV): Tailoring Heterogeneity for Superior Properties — Heterostructured Materials III: Processing and Properties

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

Program Organizers: Yuntian Zhu, City University of Hong Kong; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California-Santa Barbara
; Yves Brechet, Grenoble Institute of Technology; Huajian Gao, Nanyang Technological University; Hyoung Seop Kim, Pohang University of Science and Technology; Ke Lu, Institute of Metal Research; Xiaolei Wu, Chinese Academy of Sciences

Tuesday AM **March 16, 2021**

Session Chairs: Andrea Hodge, University of Southern California; Megumi Kawasaki, Oregon State University; Nobuhiro Tsuji, Kyoto University

8:30 AM Invited
Heterogenous Nanostructured Nickel Superalloy: *Andrea Hodge*[1]; [1]University of Southern California

8:55 AM
Interface Affected Plasticity in Accumulative Roll Bonded FCC/BCC Metallic Laminates: *Rodney McCabe*[1]; Matthew Schneider[1]; Jonathan Gigax[1]; Nan Li[1]; Thomas Nizolek[1]; John Carpenter[1]; [1]Los Alamos National Laboratory

9:15 AM
Mechanical Properties and Structural Stability of a Bulk Nanostructured Metastable Aluminum-magnesium: *Megumi Kawasaki*[1]; [1]Oregon State University

9:35 AM Invited
Nucleation of New Deformation Modes in Nanostructured Metals: *Nobuhiro Tsuji*[1]; [1]Kyoto University

10:00 AM Invited
Solid-tsate Additive Manufacturing of Heterostructured Materials via Additive Friction Stir Deposition: *Hang Yu*[1]; [1]Virginia Polytechnic Institute and State University

10:25 AM
Optimizing Wear and Corrosion Resistance of Metallic Multilayers through Atomic-scale Design: *Wenbo Wang*[1]; Wenjun Cai[1]; [1]Virginia Polytechnic Institute and State University

ADVANCED MATERIALS

High Entropy Alloys IX: Alloy Development and Properties — Structures and Mechanical Properties 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

Tuesday AM **March 16, 2021**

Session Chairs: Lei Lu, Institute of Metal Research, Chinese Academy of Sciences; Hyoung Kim, Pohang University of Science and Technology

8:30 AM Keynote
Current Perspectives in High Entropy Alloys: *Diran Apelian*[1]; Benjamin Macdonald[1]; Cheng Zhang[1]; Enrique Lavernia[1]; [1]University of California, Irvine

9:00 AM Invited
FCC-HCP Transformation in Cr-Mn-Fe-Co-Ni High Entropy Alloys:-Mechanical Property and Nanograin Formation: *Koichi Tsuchiya*[1]; Jangho Yi[1]; Baozhen Jiang[1]; Je In Lee[2]; [1]National Institute for Materials Science; [2]Pusan National University

9:25 AM
Low Cycle Fatigue Behavior and Cyclic Plastic Response of Equiatomic CrCoNi Medium-entropy Alloy: *Milan Heczko*[1]; Veronika Mazanova[1]; Connor Slone[1]; Ivo Kubena[2]; Jiri Tobias[2]; Tomas Kruml[2]; Easo George[3]; Maryam Ghazisaeidi[1]; Jaroslav Polak[2]; Michael Mills[1]; [1]The Ohio State University; [2]Institute of Physics of Materials CAS; [3]Oak Ridge National Laboratory

9:45 AM Invited
Deformation Twinning in FCC High- and Medium-entropy Alloys: *Haruyuki Inui*[1]; Koudai Niitsu[1]; Kyosuke Kishida[1]; [1]Kyoto University

10:10 AM Invited
High-strain-rate 2000% Superplasticity in A nanostructured High-entropy Alloy: *Hyoung Seop Kim*[1]; Nhung Thi-Cam Nguyen[1]; Peyman Asghari-Rad[1]; Praveen Sathiyamoorthi[1]; Alireza Zargaran[1]; Chong Soo Lee[1]; [1]Pohang University of Science and Technology

10:35 AM
Intermediate Temperature Precipitation in the HfNbTaTiZr Multi-principal Element Alloy: *Megan Emigh*[1]; Noah Phillips[2]; Leah Mills[2]; Sean Murray[2]; Tresa Pollock[1]; [1]University of California, Santa Barbara; [2]ATI Specialty Alloys and Components

ADVANCED MATERIALS

High Entropy Alloys IX: Structures and Modeling — Structures and Modeling III

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

Tuesday AM **March 16, 2021**

Session Chairs: Michael Gao, National Energy Technology Lab; Louis Santodonato, Advanced Research Systems

8:30 AM Invited
Phase Stability of High Entropy Alloys: Effects of Pressure and Temperature: *Michael Gao*[1]; Xuesong Fan[2]; Sita Ram Aryal[3]; Lizhi Ouyang[3]; Peter Liaw[2]; Jeffrey Hawk[1]; David Alman[1]; [1]National Energy Technology Laboratory; [2]University of Tennessee; [3]Tennessee State University

8:55 AM Invited
Monte Carlo Study of the Entropy Hypothesis Associated with High-entropy Alloys: Louis Santodonato[1]; *Peter Liaw*[2]; [1]Advanced Research Systems; [2]University of Tennessee

9:20 AM Invited
Core Effect of Local Atomic Configuration and Design Principles in AlxCoCrFeNi High-entropy Alloys: Yu-Chia Yang[1]; *Zhenhai Xia*[1]; [1]University of North Texas

9:45 AM
Atomistic Modeling of Screw Dislocations in Body-centered Cubic High-entropy Alloys: *Sheng Yin*[1]; Jun Ding[1]; Mark Asta[1]; Robert Ritchie[1]; [1]Lawrence Berkeley National Laboratory

10:05 AM
Can We Control Lattice Distortions in Entropy-stabilized Oxides?: *Keivan Esfarjani*[1]; Jonathan Kaufman[1]; [1]University of Virginia

MATERIALS PROCESSING

High Temperature Electrochemistry IV — Session II

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

Program Organizers: Prabhat Tripathy, Batelle Energy Alliance (Idaho National Laboratory); Guy Fredrickson, Idaho National Laboratory

Tuesday AM **March 16, 2021**

Session Chair: Vasant Kumar Ramachandran, University of Cambridge

8:30 AM
Electrochemical Reactions of Oxide Ions with Tungsten in Molten $CaCl_2$: Chao Zhang[1]; Devin Rappleye[1]; *Michael Simpson*[2]; [1]Lawrence Livermore National Laboratory; [2]University of Utah

9:00 AM
Optimizing Reaction Selectivity in High Temperature Molten Electrolytes: *Mary Elizabeth Wagner*[1]; Antoine Allanore[1]; [1]Massachusetts Institute of Technology

9:30 AM
Fundamental Challenges for the Development of Electrolytic Reduction of Uranium Oxide in Molten LiCl-Li2O: *Jarom Chamberlain*[1]; Adam Burak[1]; Mario Gonzalez[1]; Michael Simpson[1]; [1]University of Utah

10:00 AM
New Electrochemical Deoxidation Method of Ti Metal in Molten Salts Containing YCl_3: *Akihiro Iizuka*[1]; Takanari Ouchi[1]; Toru Okabe[1]; [1]The University of Tokyo

MATERIALS DESIGN

Hume-Rothery Symposium: Accelerated Measurements and Predictions of Thermodynamics and Kinetics for Materials Design and Discovery — Session III

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

Program Organizers: Wei Xiong, University of Pittsburgh; Shuanglin Chen, CompuTherm LLC; Wei Chen, Illinois Institute of Technology; James Saal, Citrine Informatics; Greta Lindwall, KTH Royal Institute of Technology

Tuesday AM **March 16, 2021**

Session Chair: Wei Zhong, University of Maryland

8:30 AM Invited
Unexpected Phenomena Observed in Metallurgical Studies: *Sinn-wen Chen*[1]; [1]National Tsing Hua University

9:10 AM Invited
High-throughput Hot-isostatic-pressing Micro-synthesis for Accelerated Studies of High Entropy Alloys: Lei Zhao[1]; Shuying Chen[2]; Zi Wang[3]; Lixia Yang[1]; Hui Wang[1]; Haizhou Wang[1]; *Liang Jiang*[2]; [1]Central Iron & Steel Research Institute, China; [2]Yantai University; [3]Central South University

9:50 AM Invited
Integration of Computational Tools and Advanced Characterization Methods to Understand Phase Transformations in Additively Manufactured Steels: *Greta Lindwall*[1]; Niklas Holländer Pettersson[1]; Chia-Ying Chou[1]; Durga Ananthanarayanan[1]; Benjamin Neding[1]; Peter Hedström[1]; Fan Zhang[2]; [1]KTH Royal Institute of Technology; [2]NIST

10:30 AM Invited
Computational Thermodynamics and Its Applications: *Zi-Kui Liu*[1]; [1]Pennsylvania State University

11:10 AM Invited
High-throughput Experiments and Machine Learning Modeling for Designing Next Generation Superalloys: *Akane Suzuki*[1]; Chen Shen[1]; [1]GE Research

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NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — Loops and Irradiation Effects

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

Program Organizers: Stephen Raiman, Texas A&M University; Kumar Sridharan, University of Wisconsin-Madison; Nathaniel Hoyt, Argonne National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Michael Short, Massachusetts Institute of Technology; Raluca Scarlat, University of California-Berkeley

Tuesday AM **March 16, 2021**

Session Chair: Stephen Raiman, Texas A&M University

8:30 AM
Corrosion and Mass Transfer of 316H Stainless Steel in Flowing FliNaK Salt: *Stephen Raiman*[1]; Matthew Kurley[2]; Dino Sulejmanovic[2]; Scott Nelson[2]; James Keiser[2]; Bruce Pint[2]; [1]Texas A&M University; [2]Oak Ridge National Laboratory

8:50 AM
Dutch Molten Salt Irradiation Program: *Ralph Hania*[1]; Uazir Bezerra de Oliveira[1]; [1]NRG

9:10 AM
Design of Molten Salt Static Corrosion Experiments to Predict Phenomena Relevant to Corrosion in Non-isothermal Nuclear Reactor Salt Loops: *Raluca Scarlat*[1]; [1]University of California, Berkeley

9:30 AM
Structural Health Impacts Due to Exposure of Irradiated Molten Chloride Salts: Nora Dianne Ezell[1]; *Stephen Raiman*[2]; Joel McDuffee[1]; Matt[1]; [1]Oak Ridge National Laboratory; [2]ORNL

9:50 AM
Alloy Compatibility in Flowing Cl and F Salts: *Bruce Pint*[1]; Dino Sulejmanovic[1]; J. Kurley[1]; Stephen Raiman[1]; [1]Oak Ridge National Laboratory

10:10 AM
Chemical Effects of Ionizing Radiation on Molten Salt Systems: *Simon Pimblott*[1]; Ruchi Gakhar[1]; Gregory Horne[1]; Kazihiro Iwamatsu[2]; Alejandro Ramos[3]; Jay LaVerne[3]; James Wishart[2]; [1]Idaho National Laboratory; [2]Brookhaven National Laboratory; [3]University of Notre Dame

10:40 AM
Microstructural Characterization of Grain Boundaries in Hastelloy N Corroded in Molten FLiBe Salt under Neutron Irradiation: *Guiqiu Zheng*[1]; David Carpenter[1]; [1]Massachusetts Institute of Technology

11:00 AM
Exploration of the Corrosion Morphologies of Ni-Cr Alloys in Molten Fluoride Salts with/without Radiation: *Weiyue Zhou*[1]; Yang Yang[2]; Miaomiao Jin[3]; Andrew Minor[2]; Michael Short[1]; [1]Massachusetts Institute of Technology; [2]Lawrence Berkeley National Laboratory; [3]Idaho National Laboratory

11:20 AM
Release Behavior of Tritium Generated inside FLiNaBe by Thermal Neutron: *Kazunari Katayama*[1]; [1]Kyushu University

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MATERIALS PROCESSING

Materials Engineering -- From Ideas to Practice: An EPD Symposium in Honor of Jiann-Yang Hwang — Polymer Materials and Processes

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

Program Organizers: Bowen Li, Michigan Technological University; Baojun Zhao, University of Queensland; Jian Li, CanmetMATERIALS; Sergio Monteiro, Instituto Militar de Engenharia; Zhiwei Peng, Central South University; Dean Gregurek, RHI Magnesita; Tao Jiang, Central South University; Yong Shi, Futianbao Environment Technologies; Cuiping Huang, FuTianBao Environment Protection Technology Company Ltd.; Shadia Ikhmayies

Tuesday AM **March 16, 2021**

Session Chairs: Sergio Monteiro, Military Institute of Engineering; Gele Qing, Shougang Group

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8:30 AM Keynote
Improved Ballistic Armor with Composites Reinforced with Natural Fibers Functionalized with Graphene Oxide: *Sergio Monteiro*[1]; Fernanda da Luz[1]; Fabio Garcia Filho[1]; [1]Military Institute of Engineering

8:50 AM Invited
Tensile Properties of Epoxy Matrix Reinforced with Fique Fabric: *Michelle Oliveira*; Fabio Garcia Filho[1]; Fernanda da Luz[1]; Artur Pereira[1]; Luana Cristyne Demosthenes[1]; Lucio Fabio Nascimento[1]; Sergio Monteiro[1]; [1]Military Institute of Engineering

9:10 AM Invited
Blending of Polystyrene-block-poly(ethylene-ran-butylene)-block-polystyrene with Polyethylene-graft-polystyrene for Cation Exchange Membrane Preparation with Enhanced Properties: *Zhichao Chen*[1]; Jiann-Yang Hwang[2]; Yong Shi[3]; Di Huang[2]; Weigang Zhao[3]; [1]Futianbao Environmental Protection Technology Ltd; [2]Michigan Technological University; [3]Futianbao Environmental protection technology

9:30 AM
Novel Route of Polymerization for Engineering Thermorrigid Biopolymer Based on Soybean Oil
: João Gabriel Rodrigues[1]; Karollyne Monsores[1]; Suzane Oliveira[1]; *Sergio Monteiro*[1]; Ricardo Weber[1]; [1]Military Institute of Engineering

9:50 AM
Novel Ballistic Composites: Performance Evaluation of Epoxy Composite Reinforced with Buriti Fabric as Component of a Multilayer Armor System: *Luana Cristyne Demosthenes*[1]; Lucio Fabio Nascimento[1]; Michelle Oliveira[1]; Fabio Garcia Filho[1]; Fernanda da Luz[1]; Ulisses Costa[1]; Sergio Monteiro[1]; Artur Pereira[1]; Fabio Braga[2]; [1]Military Institute of Engineering; [2]Fluminense Federal University

10:10 AM
Barcol Hardness of Green Composites for Cold Repair in Industrial Piping: *Felipe Lopes*[1]; Noan Tonini Simonassi[1]; Carlos Fontes Vieira[1]; Sergio Neves Monteiro[1]; [1]Universidade Estadual do Norte Fluminense

10:30 AM Invited
Comparison of Mechanical Properties of Banana Fibers Reinforcement in Different Thermoset Matrix Composites: *Fabio Garcia Filho*; Michelle Oliveira[1]; Foluke de Assis[1]; Artur Pereira[1]; Fernanda da Luz[1]; Luana Cristyne Demosthenes[1]; Sergio Monteiro[1]; [1]Military Institute of Engineering

10:50 AM
Tensile Strength of Synthetic and Green Composites Used as Wrapping Cold Repair in Piping: *Felipe Lopes*[1]; Noan Tonini Simonassi[1]; Carlos Fontes Vieira[1]; Sergio Neves Monteiro[1]; [1]Universidade Estadual do Norte Fluminense

11:10 AM
Influence of Mercerization Process on the Surface of Coconut Fiber for Composite Reinforcement: Géssica Nicolau[1]; Ricardo Weber[1]; *Sergio Monteiro*[1]; Gabriela Loureiro[1]; Amanda Lavinsky[1]; Letícia da Fonseca[1]; Eduardo da Silva[1]; Pedro Luiz dos Santos[1]; Rodrigo Abranches[1]; Vinícius Machado[1]; [1]Military Institute of Engineering

ADVANCED MATERIALS

Materials for High Temperature Applications: Next Generation Superalloys and Beyond — Superalloys: Beyond Nickel-based Superalloys

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

Program Organizers: Govindarajan Muralidharan, Oak Ridge National Laboratory; Martin Heilmaier, KIT Karlsruhe; Benjamin Adam, Portland State University; Mario Bochiechio, Pratt & Whitney; Katerina Christofidou, University of Sheffield; Eric Lass, University of Tennessee-Knoxville; Jeremy Rame, Safran Aircraft Engines; Pierre Sallot, Safran; Akane Suzuki, GE Research; Michael Titus, Purdue University

Tuesday AM **March 16, 2021**

8:30 AM Invited
Accelerated Design of '-strengthened Co-base Superalloys with Improved Comprehensive Performances: *Qiang Feng*[1]; Longfei Li[1]; Wendao Li[1]; Min Zou[1]; Xiaoli Zhuang[1]; Ji-Cheng Zhao[2]; [1]University of Science & Technology Beijing (USTB); [2]University of Maryland

9:00 AM
Effects of Key Elements Ni, Cr and W on High-temperature Microstructural Stability of Multicomponent Co-base Superalloys: *Longfei Li*[1]; Wendao Li[1]; Min Zou[1]; Qiang Feng[1]; Ji-Cheng Zhao[2]; [1]University of Science & Technology Beijing (USTB); [2]University of Maryland

9:20 AM Invited
Experimentally Determined Creep Properties of Various Alloys and Conclusions for Beyond Nickel-based Superalloys: *Uwe Glatzel*[1]; [1]University Bayreuth

9:50 AM Keynote
Metallic Materials Beyond Nickel-base Superalloys: The Challenges and Potential: *Tresa Pollock*[1]; [1]University of California, Santa Barbara

10:30 AM
Modeling Planar Fault Energies in Ordered D022 Structures: *K V Vamsi*[1]; Tresa Pollock[1]; [1]University of California Santa Barbara

10:50 AM
Inverse Design of Chemistry of High Temperature Ni-base Superalloys Using CALPHAD and Machine Learning: *Rajesh Jha*; George Dulikravich[1]; [1]Florida International University

11:10 AM
Direct Production of Complex Metallic Alloys: *Jawad Haidar*[1]; [1]Kinaltek Pty Ltd.

MATERIALS PROCESSING

Materials Processing Fundamentals — Molten Metal Processing and Modeling

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Jonghyun Lee, Iowa State University; Samuel Wagstaff, Oculatus; Alexandra Anderson, Gopher Resource; Fiseha Tesfaye, Abo Akademi University; Guillaume Lambotte, Boston Metal; Antoine Allanore, Massachusetts Institute of Technology

Tuesday AM **March 16, 2021**

Session Chair: Jonghyun Lee, Iowa State University

8:30 AM
Contactless Inductive Flow Tomography for Control of Liquid Metal Flow with Electromagnetic Actuators: *Ivan Glavinic*[1]; Matthias Ratajczak[1]; Frank Stefani[1]; Sven Eckert[1]; Thomas Wondrak[1]; [1]Helmholtz-Zentrum Dresden-Rossendorf

8:50 AM
X-ray and Neutron Radiographic Experiments on Particle-laden Molten Metal Flows: *Tobias Lappan*[1]; Martinš Sarma[1]; Sascha Heitkam[2]; David Mannes[3]; Pavel Trtik[3]; Natalia Shevchenko[1]; Kerstin Eckert[2]; Sven Eckert[1]; [1]Helmholtz-Zentrum Dresden-Rossendorf; [2]Technische Universität Dresden; [3]Paul Scherrer Institut

9:10 AM
Computational Fluid Dynamics Modeling of Damped Oscillations of Molten Metal Droplets: *Ali Rabeh*[1]; Makrand Khanwale[1]; Baskar Ganapathysubramian[1]; Michael SanSoucie[2]; Jonghyun Lee[1]; [1]Iowa State University; [2]NASA MSFC

9:30 AM
Numerical Simulation of the Influence of Particle Physical Properties on Flow Field during the Aeration Leaching Process: *Mingzhao Zheng*[1]; Qiuyue Zhao[1]; Zimu Zhang[1]; Lei Zhou[1]; Tingan Zhang[1]; [1]Northeastern University

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Small Scale Testing

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Eda Aydogan, Middle East Technical University; Laurent Capolungo, Los Alamos National Laboratory; Khalid Hattar, Sandia National Laboratories; Kayla Yano, Pacific Northwest National Laboratory; Caleb Massey, Oak Ridge National Laboratory

Tuesday AM **March 16, 2021**

8:30 AM Invited
In-situ Micro-tensile Studies on the Effects of Ion Irradiation on the Mechanical Properties of Small-grained Alloys: *Dhriti Bhattacharyya*[1]; Alan Xu[1]; Mihail Ionescu[1]; Tao Wei[1]; Michael Saleh[1]; [1]Australian Nuclear Science and Technology Organization

9:00 AM
Bridging the Length Scales via Femtosecond Laser Machining of Micro-mesoscale Tensile Specimens: *Andrew Dong*[1]; Hi Vo[1]; Peter Hosemann[1]; Stuart Maloy[2]; [1]University of California, Berkeley; [2]Los Alamos National Laboratory

9:20 AM
a' Precipitation and Hardness Change in Ion Irradiated High Purity FeCr Alloys: *Yajie Zhao*[1]; Arunodaya Bhattacharya[2]; Cristelle Pareige[3]; Pengcheng Zhu[1]; Caleb Massey[2]; Philip Edmondson[2]; Jean Henry[4]; Steven Zinkle[1]; [1]The University of Tennessee; [2]Oak Ridge National Laboratory; [3]GPM, Université et INSA de Rouen; [4]CEA, DEN, Service de Recherches Métallurgiques Appliquées, Laboratoire d'Analyse Microstructurale des Matériaux, Université Paris-Saclay

9:40 AM Invited
Nanomechanical Assessment of a Neutron Irradiated U-10Zr Fuel: *Maria Okuniewski*[1]; Jonova Thomas[1]; Alejandro Figueroa[1]; Fei Tang[2]; Daniel Murray[2]; Xiang Liu[2]; [1]Purdue University; [2]Idaho National Laboratory

10:10 AM
Challenges to Accurate Evaluation of Bulk Hardness with Nanoindentation Testing at Low Indent Depths: *Pengcheng Zhu*[1]; Yajie Zhao[1]; Shradha Agarwal[1]; Steven Zinkle[1]; [1]University of Tennessee

10:30 AM
High Throughput Assessment of Creep Behavior of Advanced Alloys for Model Development and Validation: *Moujhuri Sau*[1]; Zezhou Li[1]; Eric Hintsala[2]; Douglas Stauffer[2]; Laurent Capolungo[3]; Nathan Mara[1]; [1]University of Minnesota; [2]Bruker Corporation; [3]Los Alamos National Labs

10:50 AM
Creep Behavior of Helium Implanted Submicron Films under Irradiation: *Nargisse Khiara*[1]; Michaël Coulombier[2]; Fabien Onimus[1]; Jean-Pierre Raskin[2]; Thomas Pardoen[2]; Yves Bréchet[3]; [1]CEA Saclay; [2]Ecole Polytechnique de Louvain; [3]Science et Ingénierie des MAtériaux et Procédés

CHARACTERIZATION

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, TMS: Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Jagannathan Rajagopalan, Arizona State University; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Robert Wheeler, Microtesting Solutions LLC; Shailendra Joshi, University of Houston

Tuesday AM **March 16, 2021**

Session Chair: Minh-Son Pham, Imperial College

8:30 AM Keynote
Observation of Microstructure Evolution in Pure Copper and Copper-8 wt. % Aluminium Alloy during Deformation: *Sandhya Verma*[1]; Prita Pant[1]; M P Gururajan[1]; [1]Indian Institute of Technology Bombay

9:10 AM
Sub-surface Microtensile Testing in Oxidized Equiatomic Alloy NbTiCr: *Robert Wheeler*[1]; Todd Butler[2]; Marc Doran[3]; Scott Apt[3]; Melinda Ostendorf[3]; [1]Microtesting Solutions LLC; [2]Air Force Research Laboratory; [3]UES, Inc.

9:30 AM
In-situ Micro-tensile Testing of Proton-irradiated HT-9 Steels: *Tanvi Ajantiwalay*[1]; Stuart Maloy[2]; Khalid Hattar[3]; Assel Aitkaliyeva[1]; [1]University of Florida; [2]Los Alamos National Laboratory; [3]Sandia National Laboratory

9:50 AM
Dislocation Structure in FeCrAl Alloys through Advanced In-situ Microscopy Experiments: *Keyou Mao*[1]; Maxim Gussev[1]; Caleb Massey[1]; Kinga Unocic[1]; Yukinori Yamamoto[1]; Kevin Field[2]; Philip Edmondson[1]; [1]Oak Ridge National Laboratory; [2]University of Michigan

10:10 AM
In-situ Nanomechanics of Ni-based Superalloys and Bond Coating at Room Temperature to 1000C: *Sanjit Bhowmick*[1]; Eric Hintsala[1]; Praveena Manimunda[1]; Douglas Stauffer[1]; [1]Bruker

10:30 AM
Analysis of Deformation Mechanisms in Advanced FeCrAl Alloy via SEM-EBSD In-situ Testing: *Nitish Bibhanshu*[1]; Maxim Gussev[1]; Caleb Massey[1]; Kevin Field[2]; [1]Oak Ridge National Laboratory; [2]University of Michigan

10:50 AM
MEMS-based In-situ Tensile Experiments Designed to Arrest Catastrophic Failure in Brittle Nanomaterials: *Daehyeok Ahn*[1]; Dongchan Jang[2]; [1]Korea Advanced Institute of Science & Technology; [2]Korea Advanced Institute of Science & Technology

11:10 AM
In-situ Characterization of the Damage Initiation and Evolution in Sustainable Cellulose-based Cottonid: *Ronja Scholz*[1]; Alexander Delp[1]; Frank Walther[1]; [1]TU Dortmund University

MATERIALS DESIGN

Metal-Matrix Composites: Advances in Analysis, Measurement and Observations — Novel Composites and Coatings

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

Program Organizers: Srivatsan Tirumalai, The University of Akron; William Harrigan, Gamma Alloys; Simona Hunyadi Murph, Savannah River National Laboratory

Tuesday AM **March 16, 2021**

Session Chair: William Harrigan, GAMMA Technology

8:30 AM Invited
Use of an Infrared Spectroscopic Method for Isotopic Analysis of Gaseous Uranium Hexafluoride: *K. Alicia Strange Fessler*[1]; Patrick O'Rourke[1]; Nicholas DeRoller[1]; Darrell Simmons[2]; Steven Serkiz[3]; [1]Savannah River National Laboratory; [2]Oak Ridge National Laboratory; [3]Clemson University

9:00 AM
Recent Advances in Analysis, Measurement and Properties of Composite Metal Foams: *Afsaneh Rabiei*[1]; Brian Lattimer[2]; Elias Bearinger[2]; [1]North Carolina State University; [2]Virginia Tec

9:20 AM Invited
Effect of Heat Treatment on the Mechanical Properties of an Aluminum Alloy and Aluminum Alloy Composite: A Comparative Study: Shaik Mozammil[1]; Jimmy Karloopia[1]; Pradeep Jha[1]; *Srivatsan Tirumalai*[2]; [1]Indian Institute of Technology Roorkee; [2]University of Akron

9:50 AM Invited
2D Interlayer Enabled Electrical Ductility for Flexible Electronics: *Pilgyu Kang*[1]; Chullhee Cho[2]; Amir Taqieddin[2]; Yuhang Jing[2]; Keong Yong[2]; Jin Myung Kim[2]; Md Farhadul Haque[2]; Narayana R. Aluru[2]; SungWoo Nam[2]; [1]George Mason University; [2]University of Illinois at Urbana-Champaign

10:20 AM
A Method for Measuring Total Protium and Total Deuterium in a Gas Mixture Containing Hydrogen, Deuterium and Hydrogen Deuterium Mixture Using Gas Chromatography: *Henry Sessions, Jr.*[1]; Simona Hunyadi Murph[2]; [1]University of Georgia; [2]Savannah River National Laboratory; University of Georgia

10:40 AM
Iron Oxide - Gold Composite Nanoparticles and Nanogap Junctions for Sensing Applications Using Surface Enhanced Raman Scattering: *Simona Hunyadi Murph*[1]; Emily Searles[2]; [1]Savannah River National Laboratory; University of Georgia; [2]Savannah River National Laboratory

MATERIALS PROCESSING

Ni-Co 2021: The 5th International Symposium on Nickel and Cobalt — Hydrometallurgy I

Sponsored by: The Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy and Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Pyrometallurgy Committee

Program Organizers: Corby Anderson, Colorado School of Mines; Dean Gregurek, RHI Magnesita; Mari Lundström, Aalto University; Christina Meskers; Prabhat Tripathy, Batelle Energy Alliance (Idaho National Laboratory); Fiseha Tesfaye, Abo Akademi University; Yuanbo Zhang, Central South University; Sari Muinonen, Glencore; Graeme Goodall, XPS- Glencore; Shijie Wang, Rio Tinto Kennecott Utah Copper Corp (Retired)

Tuesday AM **March 16, 2021**

8:30 AM
Alkaline Leaching of Nickel from Electric Arc Furnace Dust Using Ammonia-ammonium Glutamate as Lixiviant: *Erik Prasetyo*[1]; [1]Indonesian Institute of Sciences

8:50 AM
Chemical Leaching of Inactive Gold Mine Tailings as Secondary Source of Cobalt and Nickel – A Preliminary Case Study: Marouen Jouini[1]; *Lucie Coudert*[1]; Mathilde Perrin[2]; [1]UQAT; [2]Université de Lorraine

9:10 AM
Microbial Leaching for Recovery of Nickel & Cobalt from Lateritic Ore, A Review: *Lala Behari Sukla*[1]; Archana Pattanaik[1]; DP Krishna Samal[1]; Debabrata Pradhan; [1]Siksha 'O' Anusandhan

9:30 AM
Sulfuric Acid Leaching for Low-nickel Matte under Atmospheric Pressure: Wanhai Xiao[1]; *Fenglong Sun*[1]; Xuheng Liu[1]; Zhongwei Zhao[1]; [1]Central South University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Microstructure and Precipitation

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

Program Organizers: Rongpei Shi, Lawrence Livermore National Laboratory; Yipeng Gao, Idaho National Laboratory; Fadi Abdeljawad, Clemson University; Bharat Gwalani, Pacific Northwest National Laboratory; Qi An, University of Nevada-Reno ; Eric Lass, University of Tennessee-Knoxville; Huajing (Wilson) Song, Los Alamos National Laboratory

Tuesday AM **March 16, 2021**

Session Chairs: Thomas Voisin, Lawrence Livermore National Laboratory; Kaila Bertsch, Lawrence Livermore National Laboratory

8:30 AM
Chemistry Effects on a' Precipitation in FeCrAl Alloys: *Andrew Hoffman*[1]; Soumya Nag[1]; Chen Shen[1]; Chao Jiang[2]; Yongfeng Zhang[3]; Raul Rebak[1]; [1]GE Research; [2]Idaho National Lab; [3]University of Wisconsin-Madison

8:50 AM
Effect of Slip and Twinning Microstructure on High Pressure Phase Transformation in Zirconium: *Mariyappan Arul Kumar*[1]; Yanbin Wang[2]; Rodney McCabe[1]; Laurent Capolungo[1]; Carlos Tome[1]; [1]Los Alamos National Laboratory; [2]Argonne National Laboratory

9:10 AM
Probing the Plasticity and Microstructure Evolution of an Icosahedral Quasicrystal i-Al-Pd-Mn at Elevated Temperatures : *Yu Zou*[1]; [1]University of Toronto

9:30 AM
Spinodal Decomposition in a Nanostructured Cu-Ti Alloy: *Julian Rosalie*[1]; Oliver Renk[2]; [1]University of Leoben, Austria; [2]Erich Schmid Institute, Austrian Academy of Sciences

9:50 AM
The Synergistic Role of Mn and Zr/Ti in Producing '/L1$_2$ Co-precipitates in Al-Cu Alloys: *Jonathan Poplawsky*[1]; Brian Milligan[2]; Patrick Shower[3]; Lawrence Allard[1]; Matthew Chisholm[1]; Dongwon Shin[1]; Amit Shyam[1]; [1]Oak Ridge National Laboratory; [2]Colorado School of Mines; [3]GE Global Research

10:10 AM
Understanding the Influence of Thermal Gyrations on Solid-solid Interfaces in Ti-6Al-4V during EBM PBF Process Using In Situ TEM: *Sriram Vijayan*[1]; Meiyue Shao[1]; Joerg Jinschek[1]; [1]The Ohio State University

10:30 AM
Variability of Grain Boundary Migration Behaviors among the Metastable Grain Boundary Structures: *Eric Homer*[1]; Darcey Britton[1]; Oliver Johnson[1]; Lydia Serafin[1]; Gus Hart[1]; [1]Brigham Young University

NANOSTRUCTURED MATERIALS

Plasmonics in Nanocomposite Materials — From Theory to Application Session III

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

Program Organizers: Nasrin Hooshmand, Georgia Institute of Technology; Simona Hunyadi Murph, Savannah River National Laboratory; Mahmoud Abdelwahed, The University of Texas at San Antonio

Tuesday AM **March 16, 2021**

Session Chair: Simona Hunyadi Murph, Savannah River National Laboratory (SRNL)

8:30 AM Keynote
Nanoplasmonics and Its Applications in Nanomedicine: *Mostafa El-Sayed*[1]; [1]Georgia Institute of Technology

9:15 AM Invited
Fin p-n Heterojunctions for High Brightness Light Emitting Diodes and Lasers at Sub-micron Scale: *Babak Nikoobakht*[1]; Robin Hansen[2]; Yuqin Zong[2]; Amit Agrawal[2]; Michael Shur[3]; Jerry Tersoff[4]; [1]National Institute of Standards and Technology; [2]NIST; [3]Rensselaer Polytechnic Institute; [4]IBM T. J. Watson Research Center

9:45 AM Invited
Spectral Enhancement of Dye Molecules Adsorbed on Titania Prepared on Gold Nanoparticles: *Hiromasa Nishikiori*[1]; Yosuke Kageshima[1]; Katsuya Teshima[1]; [1]Shinshu University

10:05 AM Invited
Engineered Plasmonic Nanoparticle Based Detection: Advanced Sensitivity and Selectivity: *Nasrin Hooshmand*[1]; [1]Georgia Institute of Technology

ENERGY & ENVIRONMENT

Powder Materials for Energy Applications — Novel Powder Materials

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

Program Organizers: Kathy Lu, Virginia Polytechnic Institute and State University; Eugene Olevsky, San Diego State University; Hang Yu, Virginia Polytechnic Institute and State University; Ruigang Wang, The University of Alabama; Isabella Van Rooyen, Idaho National Laboratory

Tuesday AM **March 16, 2021**

Session Chair: Kathy Lu, Virginia Polytechnic Institute and State University

8:30 AM
Synthesis of Chicken Feather Fiber Bio-waste Derived Sustainable Nitrogen Doped-carbon Material: Vijaya Rangari[1]; *Zaheeruddin Mohammed*[1]; Zahria Duncan[1]; Shaik Jeelani[1]; [1]Tuskegee University

8:50 AM Invited
Mechanical Activation Enhanced Solid-state Synthesis of NaCrO2 Cathode Material for Na-ion Batteries: *Leon Shaw*[1]; Mei Luo[1]; Angel Ortiz[2]; [1]Illinois Institute of Technology; [2]Universidad de Extremadura

9:20 AM Invited
Powder to Energy Application: *Jung Pyung Choi*[1]; John Hardy[1]; [1]Pacific Northwest National Laboratory

9:50 AM Invited
Powder Characteristics of Perovskite Anodes on the Electrochemical Performance of Solid Oxide Fuel Cell: A Perspective: *Manoj Mahapatra*[1]; [1]University of Alabama at Birmingham

10:20 AM
Structural Evolution and Electrical Conductivity of Ti3C2-SiOC Systems: Kathy Lu[1]; *Sanjay Kumar*[1]; [1]Virginia Polytechnic Institute and State University

MATERIALS PROCESSING

Rare Metal Extraction & Processing — 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; Kerstin Forsberg, KTH Royal Institute of Technology; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Alafara Baba, University of Ilorin; Neale Neelameggham, IND LLC

Tuesday AM **March 16, 2021**

8:30 AM Keynote
Innovative Reactors for Recovery of Rare Earth Elements (REE): *Alison Lewis*[1]; Jemitias Chivavava[1]; Jacolien DuPlessis[1]; Dane Smith[1]; Jody-Lee Smith[1]; [1]University of Cape Town

8:50 AM Invited
Study of the Recovery of Rare Earth Elements from Ion Adsorption Clays through Perolation Leaching Processes: *Jochen Petersen*[1]; Megan Becker[2]; Chad Naude[2]; [1]University of Cape Town; [2]Univ of Cape Town

9:10 AM
Recovery of Rare Earth Elements from Recycled Hard Disk Drive Mixed Steel and Magnet Scrap: Tedd Lister[1]; Michelle Meagher[2]; *Mark Strauss*[1]; Luis Aldana[1]; Harry Rollins[1]; [1]Idaho National Laboratory; [2]Colorado School of Mines

9:30 AM Invited
Extraction Chromatography for Separation of Rare Earth Elements: *Meher Sanku*[1]; Kerstin Forsberg[1]; Michael Svärd[1]; [1]KTH Royal Institute of Technology

9:50 AM Invited
Tool and Workflow for Systematic Design of Reactive Extraction for Separation and Purification of Valuable Components: Hana Benkoussas[1]; David Leleu[1]; Swagatika Satpathy[1]; Zaheer Shariff[1]; *Andreas Pfennig*[1]; [1]University of Liège

10:10 AM Invited
Rethinking Mineral Processing and Extractive Metallurgy Approaches to Ensure a Sustainable Supply of High-tech and Critical Raw Materials: *Yousef Ghorbani*[1]; Glen Nwaila[2]; Steven Zhang[3]; Jan Rosenkranz[1]; [1]Luleå University of Technology; [2]University of the Witwatersrand; [3]PG Techno Wox, 43 Patrys Avenue, Helikon Park

10:30 AM Invited
Extraction of Rare Earth Metals: The New Thermodynamic Considerations towards Process Hydrometallurgy: *Ajay Patil*[1]; Rudolf Struis[1]; Andrea Testino[2]; Christian Ludwig[1]; [1]Paul Scherrer Institut and École Polytechnique Fédérale de Lausanne; [2]Paul Scherrer Institut

NANOSTRUCTURED MATERIALS

100 Years and Still Cracking: A Griffith Fracture Symposium — Fracture in Complex Materials

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

Program Organizers: Megan Cordill, Erich Schmid Institute of Materials Science; William Gerberich, University of Minnesota; David Bahr, Purdue University; Christopher Schuh, Massachusetts Institute of Technology; Daniel Kiener, Montanuniverstität Leoben; Neville Moody; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht

Tuesday PM **March 16, 2021**

Session Chair: Neville Moody, Sandia National Laboratories - Retired

2:00 PM Invited
Fracture Resistance of Hierarchical Metallic Nanocomposite Thin Films: *Amit Misra*[1]; Y. Cui[1]; B. Derby[1]; N. Li[2]; [1]University of Michigan; [2]LANL

2:40 PM
In-situ Fracture along Distinct Interface Types: *Michael Burtscher*[1]; Markus Alfreider[1]; Michael Wurmshuber[2]; Klemens Schmuck[1]; Helmut Clemens[3]; Svea Mayer[1]; Daniel Kiener[1]; [1]Montanuniversität Leoben, Austria; [2]Department Materials Science, Chair of Materials Physics, Montanuniversität Leoben, Austria; [3]Department Materials Science, Chair of Physical Metallurgy and Metallic Materials, Montanuniversität Leoben, Austria

3:00 PM
The Clamped Beam Bending as a Length Scale Compatible Fracture Test Geometry: *Balila Nagamani Jaya*[1]; Ashwini Kumar Mishra[1]; Hrushikesh Sahasrabuddhe[1]; Neha Kumari[1]; Deepesh Yadav[1]; Tanmayee More[1]; Tejas Chaudhari[1]; [1]Indian Institute of Technology Bombay

3:20 PM
A Griffith's Theory-based Model for Strength of Silicon Nitride Nanoporous Membranes from Atomistic Simulation Perspective: *Ali Khourshaei Shargh*[1]; Gregory Madejski[1]; James McGrath[1]; Niaz Abdolrahim[1]; [1]University of Rochester

3:40 PM Invited
Transformation-induced Cracking in ZrO_2 Shape-memory Ceramics: towards Cyclic Stability in Polycrystals: *Edward Pang*[1]; Isabel Crystal[1]; Christopher Schuh[1]; [1]Massachusetts Institute of Technology

SPECIAL TOPICS

2021 Institute of Metals Lecture/Robert Franklin Mehl Award — 2021 Institute of Metals Lecture/ Robert Franklin Mehl Award

Tuesday PM **March 16, 2021**

12:00 PM
Introduction of Award Recipient: 2021 Institute of Metals Lecture/Robert Franklin Mehl Award: *James Williams*[1]; [1]The Ohio State University

12:05 PM Keynote
New Superalloys in the Co-Ni Design Space: *Tresa Pollock*[1]; [1]University of California, Santa Barbara

12:45 PM Question and Answer Period Moderator: Jim Williams, The Ohio State University

SPECIAL TOPICS

2021 TMS Special Sessions — EPD/MPMD Awards Ceremony & Special Lecture

Tuesday PM **March 16, 2021**

12:00 PM
EPD Awards Ceremony: *Christina Meskers*

12:30 PM
MPMD Awards Ceremony & Introduction of Special Lecturer: *Edward Glaessgen*[1]; [1]NASA Langley Research Center

12:45 PM
MPMD Special Lecturer: Qualification and Certification Strategies for Additive Manufactured Parts for Manned Spaceflight: *Richard Russell*[1]; [1]NASA Kennedy Space Center

SPECIAL TOPICS

2021 TMS Special Sessions — LMD Awards Ceremony & Special Lecture

Tuesday PM **March 16, 2021**

12:00 PM
LMD Awards Ceremony: *Eric Nyberg*[1]; [1]Tungsten Heavy Powder & Parts

12:30 PM
LMD Scholarship Lecturer: *Zachary Wolff*[1]; [1]University of Nevada Reno

12:40 PM
LMD Special Lecturer Introduction: *Eric Nyberg*[1]; [1]Tungsten Heavy Powder & Parts

12:45 PM
LMD Special Lecturer: Near Net Manufacturing of Light Metal Alloys: *Mark Easton*[1]; [1]RMIT University

SPECIAL TOPICS

2021 TMS Special Sessions — Student Career Forum

Tuesday PM **March 16, 2021**

2:00 PM
Student Career Forum

SPECIAL TOPICS

2021 TMS Special Sessions — Young Professional Tutorial Lecture

Tuesday PM **March 16, 2021**

12:00 PM
Young Professional Tutorial Lecture Introduction: *Abby Cisko*[1]; [1]US Army ERDC

12:05 PM
Early Career Faculty Fellow Recipient: Electrochemical Healing of Metals: A New Way to Repair Additive and Cellular Metals at Room Temperature: *James Pikul*[1]; [1]University of Pennsylvania

12:35 PM
Early Career Faculty Fellow Recipient: Integrated Computational Materials Design for Alloy Additive Manufacturing: *Wei Xiong*[1]; [1]University of Pittsburgh

ADVANCED MATERIALS

2D Materials – Preparation, Properties & Applications — Modeling & Simulations I

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

Program Organizers: Nuggehalli Ravindra, New Jersey Institute of Technology; Ramana Chintalapalle, University of Texas at El Paso; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Sufian Abedrabbo, Khalifa University; Amber Shrivastava, Indian Institute of Technology Bombay

Tuesday PM **March 16, 2021**

Session Chairs: Gerald Ferblantier, University of Strasbourg; Sufian Abedrabbo, Khalifa University

2:00 PM
Computational Synthesis of 2D Materials: A High-throughput Approach to Materials Design: *Tara Boland*[1]; Arunima Singh[1]; [1]Arizona State University

2:20 PM Invited
Assessment of Gas Sensing Properties of 2D Materials by Comprehensive Density Functional Theory Calculations: Siby Thomas[1]; *Mohsen Asle Zaeem*[1]; [1]Colorado School of Mines

2:45 PM Invited
Computational Modeling of Two-Dimensional Materials for Sustainable Energy Storage: *Dibakar Datta*[1]; [1]New Jersey Institute of Technology

3:10 PM Invited
Thermal Laser Assisted Manufacturing of Two-dimensional Atomic Layers Heterostructures: Yingtao Wang[1]; *Xian Zhang*[1]; [1]Stevens Institute of Technology

3:35 PM Invited
Energetics and Electronic Properties of Dopants and Defect Complexes in 2D Transition Metal Dichalcogenides from First-principles: Anne Marie Tan[1]; Christoph Freysoldt[2]; *Richard Hennig*[1]; [1]University of Florida; [2]Max-Planck-Institut f ¨ur Eisenforschung GmbH

4:00 PM Invited
Stabilization of a Ferroelectric Phase in Two Dimensional MXene Monolayers: *Joshua Young*[1]; Mo Li[1]; Olamide Omisakin[1]; [1]New Jersey Institute of Technology

4:25 PM Invited
Tracking Structural Flexibility and Dynamics in 2D Metal-Organic Frameworks and their Effects on Electrical Conductivity and Catalytic Activity: *Farnaz Shakib*[1]; Mohammad Momeni[1]; [1]New Jersey Institute of Technology

NUCLEAR MATERIALS

Accelerated Discovery and Qualification of Nuclear Materials for Energy Applications — High Throughput Testing, Advanced Characterization and Property Measurement

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

Program Organizers: Yongfeng Zhang, University of Wisconsin-Madison; Adrien Couet, University of Wisconsin-Madison; Michael Tonks, University of Florida; Jeffery Aguiar, Idaho National Laboratory; Andrea Jokisaari, Idaho National Laboratory; Karim Ahmed, Texas A&M University

Tuesday PM **March 16, 2021**

Session Chairs: Janelle Wharry , Purdue University ; Tiankai Yao, Idaho National Laboratory

2:00 PM Invited
A Standards Perspective on Nanomechanical Testing to Accelerate Nuclear Materials Development & Qualification: *Janelle Wharry*[1]; Priyam Patki[1]; George Warren[1]; Patrick Warren[1]; J Hall[2]; [1]Purdue University; [2]Westinghouse Electric Company, LLC

2:30 PM
A Rapid Turnaround Approach Studying Helium Effects in Materials: *Peter Hosemann*[1]; Andrew Scott[1]; Sarah Stevenson[1]; Mehdi Balooch[1]; [1]University of California Berkeley

2:50 PM
High-throughput Heavy Ion Irradiation of CrFeMnNi Magnetron-sputtered Combinatorial Thin Film: *Calvin Parkin*[1]; Michael Moorehead[1]; Mohamed Elbakhshwan[1]; Kumar Sridharan[1]; Chuan Zhang[2]; Alan Savan[3]; Alfred Ludwig[3]; Adrien Couet[1]; [1]University of Wisconsin Madison; [2]Computherm, LLC; [3]Ruhr-Universität Bochum

3:10 PM
Accelerated Study of Thermal and Irradiation Creep in Fe-based Multi-principal Element Alloys: *Marcus Parry*[1]; Colin Judge[2]; Cheng Sun[2]; Wen Jiang[2]; Boopathy Kombaiah[2]; Gary Was[3]; Jeffery Aguiar[2]; Taylor Sparks[1]; [1]University of Utah; [2]Idaho National Laboratory; [3]University of Michigan

3:30 PM
High-temperature, High-throughput Ion Irradiation Enabled by Additive Technologies: *Michael Moorehead*[1]; Calvin Parkin[1]; Phalgun Nelaturu[1]; Michael Niezgoda[1]; Mohamed Elbakhshwan[1]; Kumar Sridharan[1]; Dan Thoma[1]; Adrien Couet[1]; [1]University of Wisconsin - Madison

3:50 PM
In-situ TEM Heating Chip Experiments to Study Thermal Behavior of U-Zr Metallic Fuel: *Tiankai Yao*[1]; Fei Teng[1]; Daniel Murray[1]; Jian Gan[1]; Michael Benson[1]; Lingfeng He[1]; [1]Idaho National Laboratory

4:10 PM
Multiscale Characterization of Defects in Ion Irradiated Ceramics for Validation of Atomistic Models: *Marat Khafizov*[1]; Vinay Chauhan[1]; Lingfeng He[2]; Janne Pakarinen[3]; David Hurley[2]; [1]Ohio State University; [2]Idaho National Laboratory; [3]Studsvik

4:30 PM
In-situ Thermal Conductivity Measurement of SiC Composite: *Di Chen*[1]; Wei-Kan Chu[1]; Piyush Sabharwall[2]; [1]University of Houston; [2]Idaho National Laboratory

SPECIAL TOPICS

Acta Materialia Symposium — Acta Materialia Award Session

Program Organizer: Carolyn Hansson, University of Waterloo

Tuesday PM **March 16, 2021**

2:00 PM
Introductory Comments: Acta Materialia Symposium: *Carolyn Hansson*[1]; [1]University of Waterloo

2:05 PM Invited
Acta Materialia Gold Medal Lecture: Modeling Microstructure Complexity for Better Property Predictions: *Günter Gottstein*[1]; [1]RWTH Aachen University

2:25 PM Invited
Acta Materialia Silver Medal Lecture: Measuring Hydrogen in Steels by Using Atom Probe Tomography: *Julie Cairney*[1]; [1]The University of Sydney

2:45 PM Invited
Acta Materialia Hollomon Materials and Society Award: Global Energy Challenges and Development of Thermoelectric Materials and Systems in China: *Qingjie Zhang*[1]; [1]Wuhan University of Technology

3:05 PM Invited
Acta Materialia Mary Fortune Global Diversity Lecture: STEM Mentor Programs and New Opportunities for Women and Other Under- Represented Groups in the Materials Science: *Katalin Balazsi*[1]; ; [1]Centre for Energy Research

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture V: Processing-Structure-Property Investigations and Application to Qualification — Inconel, New Alloys, and Functional Gradients

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; John Lewandowski, Case Western Reserve University; Nima Shamsaei, Auburn University; Mohsen Seifi, ASTM International/Case Western Reserve University; Steve Daniewicz, University of Alabama

Tuesday PM **March 16, 2021**

Session Chair: Mohsen Seifi, ASTM International/Case Western Reserve University

2:00 PM Invited
Laser Powder Bed Fusion of TiTa Alloys: Process Optimisation and Fatigue Properties: *Andrey Molotnikov*[1]; Erin Brodie[2]; Thomas Niendorf[3]; [1]RMIT University, Centre for Additive Manufacturing; [2]Monash University; [3]University of Kassel

2:30 PM
Synchrotron Imaging of the Influence of TiB2 in Suppressing Hot Cracking during Laser Powder Bed Fusion of Al-2139: *David Rees*[1]; Chu Lun Alex Leung[1]; Joe Elambasseril[2]; Sebastian Marussi[1]; Saurabh Shah[1]; Shashidhara Marathe[3]; Milan Brandt[2]; Mark Easton[2]; Peter Lee[1]; [1]University College London; [2]RMIT University; [3]Diamond Light Source Ltd

2:50 PM
Microstructural Heterogeneity and Mechanical Anisotropy of 18Ni-330 Maraging Steel Fabricated by Selective Laser Melting: The Effect of Build Orientation and Height: Yao Yi[1]; Kaiwen Wang[2]; *Xiaoqing Wang*[3]; Lin Li[1]; Wenjun Cai[2]; Samuel Kelly[3]; Natalia Esparragoza[3]; Matthew Rosser[3]; Feng Yan[1]; [1]The University of Alabama; [2]Virginia Polytechnic Institute and State University; [3]Jacksonville State University

3:10 PM
Characterization of 3D-printed Metals with Ultrasonic Technique: *Terence Costigan*[1]; Ping-Chuan Wang[1]; Robert Van Pelt[2]; Aaron Nelson[1]; [1]SUNY New Paltz; [2]Sono-Tek Corporation

3:30 PM Invited
Tensile and Fatigue Behavior of Cold Sprayed Material Using Heat Treated Feedstock Powders: *Luke Brewer*[1]; A. R. Webb[1]; Ning Zhu[1]; J. Brian Jordon[1]; [1]The University of Alabama

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications III — Modeling and Non-destructiveTesting in Additive Manufacturing

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

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Indrajit Charit, University of Idaho; Subhashish Meher, Idaho National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Kumar Sridharan, University of Wisconsin-Madison; Xiaoyuan Lou, Auburn University

Tuesday PM **March 16, 2021**

Session Chair: Xiaoyuan Lou, Auburn University

2:00 PM Invited
Porosity in Metal Additive Manufacturing: X-ray Tomography Insights: *Anton du Plessis*[1]; [1]Research Group 3D Innovation, Stellenbosch University

2:20 PM
Effects of Void Configuration on the Overall Thermal and Mechanical Behavior of Porous Materials: A Numerical Modeling Approach: *Yu-lin Shen*[1]; Mohammad Abdo[2]; Binh Pham[2]; Isabella Van Rooyen[2]; [1]University of New Mexico; [2]Idaho National Laboratory

2:40 PM
Experimental and Numerical Investigation of Single Clads Generated by Directed Energy Deposition Additive Manufacturing Processes: *Luis Nunez*; John Shelton[1]; Kyu Cho[1]; [1]Northern Illinois University

3:00 PM
Multi-scale Multi-fidelity Metamodeling for Advanced Materials: *Mohammad Abdo*[1]; Yu-Lin Shen[2]; Cam Pham[1]; Isabella Von Rooyen[1]; [1]Idaho National Laboratory; [2]University of New Mexico

3:20 PM
Detection of Defects in Additively Manufactured Metals Using Thermal Tomography: *Alexander Heifetz*[1]; Dmitry Shribak[1]; Zoe Fisher[1]; William Cleary[2]; [1]Argonne National Laboratory; [2]Westinghouse Electric Company

3:40 PM
Real Time Non-destructive Evaluation during 3D Manufacturing of Metal Parts: *Araz Yacoubian*[1]; [1]LER Technologies, Inc.

4:00 PM
Combining Modelling and Microstructural Studies in Explaining the Laser Parameter Effect on Superalloy Cracking during Selective Laser Melting: *Marcus Lam*[1]; [1]Monash University

4:20 PM
Simulation of Part Printability in Electron Beam Melting Additive Manufacturing: *Yousub Lee*[1]; Patxi Fernandez-Zelaia[1]; Srdjan Simunovic[1]; Mike Kirka[1]; [1]Oak Ridge National Laboratory

4:40 PM
Defect Analysis in Selectively Laser Melted Parts via Surface Topography Characterization: *Qingyang Lu*[1]; Matteo Seita[1]; [1]Nanyang Technological University

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Applications of Solidification Fundamentals — Solidification Structure and Defects

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

Program Organizers: Alex Plotkowski, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Northrop Grumman; Mohsen Asle Zaeem, Colorado School of Mines; Wenda Tan, University of Utah; Lianyi Chen, University of Wisconsin-Madison

Tuesday PM **March 16, 2021**

2:00 PM
A Phase-field Study of Epitaxial Effect on Solidification Microstructure in Metal Additive Manufacturing: *Jiwon Park*[1]; Joo-Hee Kang[1]; Chang-Seok Oh[1]; [1]Korea Institute of Materials Science

2:20 PM
Composition and Equilibrium Phase Diagram Feature Effects on the Printability of Alloys: *Raiyan Seede*[1]; Xueqin Huang[1]; Bing Zhang[1]; Austin Whitt[1]; Alaa Elwany[1]; Raymouno Arroyave[1]; Ibrahim Karaman[1]; [1]Texas A&M University

2:40 PM
Influence of Process Parameters on the Microstructure Evolution and Mechanical Properties of Additively Manufactured 316L Stainless Steel: *Ankur Kumar Agrawal*[1]; Dan Thoma[1]; [1]University of Wisconsin Madison

3:00 PM
LPBF Processing of the Al-Ni Eutectic Alloy: Experiments and Phase Field Simulations: *Guillaume Boussinot*[1]; Markus Apel[1]; Markus Döring[2]; [1]Access e.V.; [2]LPT University Erlangen

3:20 PM
Modeling Grain Refinement for Metallic Additive Manufacturing: *Yijia Gu*[1]; [1]Missouri University of Science and Technology

3:40 PM
New Composition Based Index for Solidification Cracking Resistance: *Rafael Giorjao*[1]; Benjamin Sutton[1]; Antonio Ramirez[1]; [1]The Ohio State University

4:00 PM
Phase-Field Modeling of CET During Alloy Solidification: An Insight for Additive Manufacturing: *Nima Najafizadeh*[1]; Yijia Gu[1]; [1]University of Missouri Science and Technology

4:20 PM
Quantifying the Influence of Local Layer Thickness on Pore Evolution during Laser Powder Fusion Using High-speed X-ray Imaging: *Chu Lun Alex Leung*[1]; Yuze Huang[1]; Samuel J. Clark[1]; Yunhui Chen[1]; Sebastian Marussi[1]; Lorna Sinclair[1]; Iain Todd[2]; Margie P. Olbinado[3]; Elodie Boller[4]; Alexander Rack[4]; Peter D. Lee[1]; [1]University College London; [2]University of Sheffield; [3]Paul Scherrer Institute; [4]European Synchrotron Radiation Facility

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development III -- Super Materials and Extreme Environments — High Temperature and Heavy Materials

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

Program Organizers: Behrang Poorganji, University of Waterloo; Hunter Martin, HRL Laboratories LLC; James Saal, Citrine Informatics; Orlando Rios, Oak Ridge National Laboratory; Atieh Moridi, Cornell University; Jiadong Gong, Questek Innovations LLC

Tuesday PM **March 16, 2021**

Session Chair: Atieh Moridi, Cornel

2:00 PM
Process Development for the Selective Laser Melting of Tungsten Carbide-nickel Matrix Composites: *Edgar Mendoza Jimenez*[1]; Baby Reeja-Jayan[1]; Jack Beuth[1]; [1]Carnegie Mellon University

2:20 PM
Laser Powder-bed Fusion Austenitic Steels with Superior Creep Resistance: *Sebastien Dryepondt*[1]; Peeyush Nandwana[1]; Kinga Unocic[1]; Patxi Fernandez-Zelaia[1]; Ying Yang[1]; Rangasayee Kannan[1]; Yousub Lee[1]; Fred List[1]; [1]Oak Ridge National Laboratory

2:40 PM
Development of Multi-principle Element Alloys for Oxidation Resistant Coatings Applied with Additive Manufacturing: *Jose Loli*[1]; Yining He[1]; Amish Chovatiya[1]; Zachary Ulissi[1]; Bryan Webler[1]; Maarten De Boer[1]; Jack Beuth[1]; [1]Carnegie Mellon University

3:00 PM
Reactive Selective Laser Synthesis and Additive Manufacturing of Ultra-high Temperature Ceramics: *Adam Peters*[1]; Dajie Zhang[2]; Alberto Hernandez[1]; Michael Brupbacher[2]; Dennis Nagle[1]; Tim Mueller[1]; James Spicer[1]; [1]Johns Hopkins University; [2]The Johns Hopkins Applied Physics Laboratory

3:20 PM
The Mechanisms Behind the Effect of Oxygen on DED AM Ti Alloy Build: *Caterina Iantaffi*[1]; Yunhui Chen[1]; Samuel J. Clark[1]; Robert C. Atwood[2]; Eral Bele[1]; Martina Meisnar[3]; Thomas Rohr[4]; Lertthanasarn Jedsada[5]; Minh-Son Pham[5]; Peter D. Lee[1]; [1]UCL Mechanical Engineering; [2]Diamond Light Source Ltd; [3]ESA-RAL Advanced Manufacturing Laboratory; [4]ESA-ESTEC; [5]Imperial College London

3:40 PM
A Novel Heat Treatment Design to Overcome Inferior Creep Behaviour of SLM Processed IN738LC Alloy: *Haoyu Song*[1]; [1]MCAM, Monash University

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Solid-State Phase Transformations and Microstructural Evolution — Ni-based Superalloys

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

Program Organizers: Bij-Na Kim, Carpenter Additive; Andrew Wessman, University of Arizona; Chantal Sudbrack, National Energy Technology Laboratory; Eric Lass, University of Tennessee-Knoxville; Katerina Christofidou, University of Sheffield; Peeyush Nandwana, Oak Ridge National Laboratory; Rajarshi Banerjee, University of North Texas; Whitney Poling, General Motors Corporation; Yousub Lee, Oak Ridge National Laboratory

Tuesday PM **March 16, 2021**

Session Chairs: Katerina Christofidou, The University of Sheffield; Chantal Sudbrack, National Energy Technology Laboratory

2:00 PM Invited
Impact of Post-processing on the Performances of Laser Additively Manufactured High-γ' Ni Superalloys: *Ning Zhou*[1]; Austin Dicus[1]; Stephane Forsik[1]; Tao Wang[1]; Gian Colombo[1]; Mario Epler[1]; [1]Carpenter Technology

2:30 PM
Improving the Creep Properties on gamma prime-strengthened Nickel-based Superalloy by Selective Laser Melting: *Marcus Lam*[1]; [1]Monash University

2:50 PM
New Superalloy ABD-900AM for Additive Manufacturing: The Role of Heat Treatment on Mechanical Properties: *Yuanbo Tang*[1]; Joseph Ghoussoub[1]; John Clark[2]; Andre Nemeth[2]; Roger Reed[1]; [1]University of Oxford; [2]OxMet Technologies

3:10 PM
Microstructure and Texture Evolution During Printing and Post Processing of Ni-based Superalloy: *Colleen Hilla*[1]; Wei Zhang[1]; Michael Mills[1]; Alber Sadek[2]; Hyeyun Song[3]; [1]The Ohio State University; [2]Edison Welding Institute ; [3]Edison Welding Institute

3:30 PM Invited
Applying Additive Manufacturing Itself as a High-throughput Tool to Accelerate Heat Treatment Design of Additively Manufactured Alloys: Yunhao Zhao[1]; Noah Sargent[1]; Kun Li[1]; *Wei Xiong*[1]; [1]University of Pittsburgh

4:00 PM
Simulation of Solid State Precipitation during Post Process Annealing of Additively Manufactured alloy 625: *Bala Radhakrishnan*[1]; Younggil Song[1]; John Turner[1]; [1]Oak Ridge National Laboratory

4:20 PM
Assessing Compositional Gradients in DED Inconel 718 Builds via Directional Reflectance Microscopy: *Ekta Jain*[1]; Yeoh Yong Chen[1]; Bernard Gaskey[1]; Guido Macchi[2]; Antonio Mattia Grande[2]; Matteo Seita[1]; [1]NTU Singapore; [2]Politecnico di Milano, Italy

4:40 PM
Effect of Stress-relief Treatments on The Microstructure and Mechanical Response of Additively Manufactured IN625 Thin-walled Elements: *Arunima Banerjee*[1]; Mo-Rigen He[1]; William Musinski[2]; Paul Shade[2]; Marie Cox[2]; Edwin Schwalbach[2]; Kevin Hemker[1]; [1]Johns Hopkins University; [2]Air Force Research Laboratory

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session IV

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

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; 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; Arul Kumar Mariyappan, Los Alamos National Laboratory; Olivia Underwood, Sandia National Laboratories

Tuesday PM **March 16, 2021**

2:00 PM Invited
A Framework for Quantitative Measurement of Plastic Deformation in Relation to 3D Microstructure: *Jean-Charles Stinville*[1]; M. A. Charpagne[1]; A. Cervellon[1]; J. Hestroffer[1]; M. P. Echlin[1]; V. Valle[2]; D. Texier[3]; I.J. Beyerlein[1]; T. M. Pollock[1]; [1]University of California, Santa Barbara; [2]Institut P' - UPR 3346, CNRS - Université de Poitiers - ENSMA; [3]Institut Clément Ader - UMR CNRS 5312

2:30 PM
Characterization and Modelling of Twin Evolution and Cyclic Deformation in Magnesium Alloys by High Energy X-ray Diffraction Microscopy: *Duncan Greeley*[1]; Mohammadreza Yaghoobi[1]; Darren Pagan[2]; Veera Sundararaghavan[1]; John Allison[1]; [1]University of Michigan; [2]Cornell High Energy Synchrotron Source

2:50 PM
Elastoplastic Transition in a Metastable ß-titanium Alloy, Timetal 18 by In-situ High Energy X-ray Diffraction: *Jishnu Bhattacharyya*[1]; Sriramya Nair[2]; Darren Pagan[3]; Vahid Tari[4]; Ricardo Lebensohn[5]; Anthony Rollett[6]; Sean Agnew[1]; [1]University of Virginia; [2]Cornell University; [3]Cornell High Energy Synchrotron Source, Cornell University; [4]Eaton Corporate Research and Technology; [5]Los Alamos National Laboratory; [6]Carnegie Mellon University

3:10 PM
A Strain Gradient Crystal Plasticity Constitutive Model for Hexagonal Close-packed Polycrystals: *Omid Sedaghat*[1]; Hamidreza Abdolvand[1]; [1]Western University

3:30 PM
Estimating Stress on the Microstructural Length Scale Using the Measured Strain Field: *Benjamin Cameron*[1]; Cem Tasan[1]; [1]Massachusetts Institute of Technology

3:50 PM Invited
FFT-based Modeling of Strain Localization in Nano-metallic Laminates: *Miroslav Zecevic*[1]; Ricardo Lebensohn[1]; Thomas Nizolek[1]; Rodney McCabe[1]; Laurent Capolungo[1]; [1]Los Alamos National Laboratory

4:20 PM
Dynamic Recovery Observed in Distinct Grains Within A Polycrystalline Nickel-based Superalloy During Cyclic High Temperature Loading via High Energy X-ray Diffraction Microscopy: *Sven Gustafson*[1]; Darren Pagan[2]; Paul Shade[3]; Michael Sangid[1]; [1]Purdue University; [2]Cornell High Energy Synchrotron Source; [3]Air Force Research Laboratory

4:40 PM
Statistical Assessment of Strain Localization in Inconel 718 Informed by Digital Image Correlation Coupled with 3D EBSD: *Marie Charpagne*[1]; J.C. Stinville[1]; Andrew Polonsky[1]; McLean Echlin[1]; Valery Valle[2]; Tresa Pollock[1]; [1]University of California, Santa Barbara; [2]P' Institute ENSMA Poitiers

5:00 PM
Analysis of Slip Transfer in Ti-5al-2.5 (Wt. %) at Two Temperatures in Comparison to Pure Aluminum: Chelsea Edge[1]; *Thomas Bieler*[1]; [1]Michigan State University

5:20 PM
Orientation, Pattern Center Refinement and Deformation State Extraction through Global Optimization Algorithms: *Chaoyi Zhu*[1]; Christian Kurniawan[1]; Marcus Ochsendorf[1]; Marc De Graef[1]; [1]Carnegie Mellon University

ADVANCED MATERIALS

Advanced Functional and Structural Thin Films and Coatings — Coating Technologies and Surface Structuring for Tools I

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

Program Organizers: Adele Carrado, IPCMS - CNRS; Ramana Chintalapalle, University of Texas at El Paso; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Nancy Michael, University of Texas at Arlington; Karine Mougin, Is2m Cnrs; Heinz Palkowski, Clausthal University of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology; Vikas Tomar, Purdue University

Tuesday PM **March 16, 2021**

Session Chairs: Karine Mougin, IS2M UHA; Heinz Palkowski, IMET

2:00 PM Invited
Investigations on the Process Stability of Dry Deep Drawing with Volatile Lubricants Injected through Laser-drilled Microholes: *Gerd Reichardt*[1]; Manuel Henn[2]; Kim Riedmüller[1]; Rudolf Weber[2]; Thomas Graf[2]; Mathias Liewald[1]; Daniel Hemming[3]; Georg Umlauf[4]; Paul Reichle[3]; Jakob Barz[4]; Günter E.M. Tovar[3]; [1]Institute for Metal Forming Technology; [2]Institut für Strahlwerkzeuge; [3]Institute of Interfacial Process Engineering and Plasma Technology; [4]Fraunhofer Institute for Interfacial Engineering and Biotechnology

2:30 PM
Laboratory-on-a Crystal for Multifunctional, Multiscale Testing of Thin Films: *Ilia Ivanov*[1]; [1]Center for Nanophase Materials Sciences, Oak Ridge National Laboratory

2:50 PM Keynote
Nanomanipulation and Nanolithography Experiments on Mono- and Multilayer MoS2 Surfaces: *Enrico Gnecco*[1]; Alper Özogul[1]; Felix Cassin[1]; Roberto Guerra[2]; Andrey Turchanin[1]; Franciszek Krok[3]; [1]Friedrich Schiller University Jena; [2]University of Milan; [3]Jagiellonian University Krakow

3:30 PM
Development of a Laboratory Test to Identify Permanent PVD Coatings to Minimize Lubricant Use during Forging: *Kester Clarke*; Trevor Kehe[1]; Spencer Randell[1]; Stephen Midson[1]; [1]Colorado School of Mines

3:50 PM
Molten Aluminum Test for the Identification of PVD Coating Candidates for Lube-free Aluminum Die Casting: *Nelson Delfino de Campos Neto*[1]; Andras Korenyi-Both[1]; Stephen Midson[1]; Michael Kaufman[1]; [1]Colorado School of Mines

ADVANCED MATERIALS

Advanced High Strength Steels V — Session IV

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

Program Organizers: Ana Luiza Araujo, CBMM North America Inc.; Louis Hector, General Motors Global Technical Center; Igor Vieira, Nucor Steel; Lijia Zhao, ArcelorMittal USA; Krista Limmer, CCDC Army Research Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Sebastien Allain, Institut Jean Lamour; MingXin Huang, University of Hong Kong

Tuesday PM **March 16, 2021**

2:00 PM
A Novel Study on Plasticity Mechanisms during Yield Point Elongation in Medium Manganese Steels: *Poornachandra Satyampet*[1]; Saurabh Kundu[2]; Prita Pant[1]; [1]Indian Institute of Technology Bomaby, Mumbai.; [2]Tata Steels

2:20 PM
Strain Path Effect on Martensitic Transformation in Medium Mn Steels: *Poornachandra Satyampet*[1]; Saurabh Kundu[2]; Prita Pant[3]; [1]Indian Institute of Technology Bomaby, Mumbai.; [2]Tata Steels; [3]Indian Institute of technology Bomaby, Mumbai.

2:40 PM
Static Recrystallization during Hot Deformation of HSLA Nb-Bearing Steels: *Rami Almatani*[1]; Juha Uusitalo[2]; Anthony Deardo[1]; [1]University of Pittsburgh; [2]University of Oulu

3:00 PM
Correlation of Rolling Schedules, Mechanical Properties, and SCC Susceptibility of API X70 Steel: Anthony Roccisano[1]; *Shahrooz Nafisi*[1]; Douglas Stalheim[2]; Reza Ghomashchi[1]; [1]University of Adelaide; [2]DGS Metallurgical Solutions, Inc.

3:20 PM
High-resolution Digital Image Correlation Study of Plasticity and Damage at Lamellar Scales in Ferrite -- Pearlite Steel: *Tijmen Vermeij*[1]; Johan Hoefnagels[1]; [1]Eindhoven University of Technology

ENERGY & ENVIRONMENT

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

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

Program Organizers: Richard Beddingfield, North Carolina State University; Daniel Salazar, BCMaterials; Alex Leary, NASA Glenn Research Center; Huseyin Ucar, California Polytechnic University; Yongmei Jin, Michigan Technological University; Arcady Zhukov, University of the Basque Country

Tuesday PM **March 16, 2021**

Session Chair: Alex Leary, NASA Glenn Research Center

2:00 PM
Advances in Amorphous Core Technology for Loss Reduction in Distribution Transformers: *Eric Theisen*[1]; [1]Metglas Inc.

2:20 PM
Magnetic Augmented Rotation System (MARS) – An Update: Nuggehalli Ravindra[1]; Chimaobi Ibeh[1]; *Tyler Brunstein-Ellenbogen*[1]; Bilal Adra[1]; Balraj Mani[1]; Tiensee Chow[2]; [1]New Jersey Institute of Technology; [2]ETD Inc.

2:40 PM
Overview of Magnetic Component Design for Power Converters: *Richard Beddingfield*[1]; Paul Ohodnicki[2]; [1]North Carolina State University; [2]University of Pittsburgh

3:00 PM Invited
Permanent Magnet Biased Inductors for Power Systems Applications: *Mark Nations*[1]; [1]North Carolina State University

3:30 PM
The Effects of Stack Manufacturing Processes on the Magnetic Properties of Iron-Cobalt Alloys: *Natan Aronhime*[1]; [1]Carpenter Technology

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VII — Functional Materials for Energy I

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

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

Tuesday PM **March 16, 2021**

Session Chairs: Jung Pyung Choi, Pacific Northwest National Laboratory; Peter Godart, Massachusetts Institute of Technology

2:00 PM
Assessment of Grain Boundary Composition on the Thermodynamics Structural Properties in Concentrated Ceramic Oxides: *Tara Boland*[1]; Arunima Singh[1]; Peter Rez[1]; Peter Crozier[1]; [1]Arizona State University

2:20 PM
A Novel and Practical Water-reactive Aluminum Fuel from Scrap: *Peter Godart*[1]; Douglas Hart[1]; [1]MIT

2:50 PM
Aging Behavior of Advanced Martensitic Steels for Next Generation Diesel Engine Pistons: *Dean Pierce*[1]; Govindarajan Muralidharan[1]; Larry Allard[1]; Jon Poplawsky[1]; Ercan Cakmak[1]; Artem Trofimov[1]; Hsin Wang[1]; Allen Haynes[1]; [1]Oak Ridge National Laboratory

3:10 PM
Breaking Atomic-level Ordering via Biaxial Strain in Functional Oxides: A DFT Study: *Kanishk Rawat*[1]; Dilpuneet Aidhy[1]; Dillon Fong[2]; [1]University of Wyoming; [2]Argonne National Laboratory

3:30 PM
Direct Correlation of Anion Conductivity with Grain Boundary Defect Chemistry in Concentrated Oxide Solid Solutions: Hasti Vahidi[1]; Shengquan Xuan[1]; *William Bowman*[1]; [1]University of California, Irvine

3:50 PM
Effect of Alloying Elements (Ni, Co) on Low Pt-transition Metals Nanowires for Oxygen Reduction Electrocatalysts: Jaeyoung Yoo[1]; Youngtae Park[1]; Changsoo Lee[2]; *Hyuck Mo Lee*[1]; [1]KAIST; [2]KIER

4:10 PM
Electrochemical Behavior of Palladium in 1-Ethyl-3-Methylimidazolium Chloride Ionic Liquid: *Wu Zhang*[1]; Batric Pesic[2]; [1]Shenyang Ligong University; [2]University of Idaho

CHARACTERIZATION

Advanced Real Time Imaging — Energy & Biomaterials

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

Program Organizers: Jinichiro Nakano, US Department of Energy 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; Noritaka Saito, Kyushu University; Anna Nakano, US Department of Energy National Energy Technology Laboratory; Zuotai Zhang, Southern University of Science and Technology; Candan Tamerler, University of Kansas; Bryan Webler, Carnegie Mellon University; Wangzhong Mu, KTH Royal Institute of Technology; David Veysset, Stanford University

Tuesday PM **March 16, 2021**

Session Chairs: Anna Nakano, USDOE National Energy Technology Laboratory; Jinichiro Nakano, USDOE National Energy Technology Laboratory

2:00 PM Invited
Ultrafast Synchrotron X-ray Imaging and Modelling of Multiphase Flow in Ultrasound Based Materials Processing: Ling Qin[1]; *Jiawei Mi*[1]; [1]University of Hull, UK

2:20 PM Invited
In-operando Non-invasive Optical Visualization of Battery Reactions and Processes: *Nian Liu*[1]; [1]Georgia Institute of Technology

2:40 PM
In-operando Investigations of Refractory Materials Interacting with Ash/Slag from Mixed Feedstock Gasification: *Jinichiro Nakano*[1]; Anna Nakano[1]; Ömer Dogan[1]; Matthew Lambert[2]; Dana Goski[2]; [1]U.S. Department of Energy National Energy Technology Laboratory; [2]Allied Mineral Products, LLC

3:00 PM
Evaluating Amplitude Variation of Frequency Spectrum in Ultrasound Imaging by Through Transmission Method: *Koushik Paul*[1]; Leila Ladani[1]; [1]Arizona State University

3:20 PM
In-situ Analysis of Select Oxygen Carrier Materials under Chemical Looping Combustion Conditions: *Anna Nakano*[1]; Jinichiro Nakano[2]; Ömer Dogan[3]; [1]U.S. Department of Energy National Energy Technology Laboratory/ Leidos Research Support Team; [2]U.S. Department of Energy National Energy Technology Laboratory/ Leidos Research Support Team ; [3]U.S. Department of Energy National Energy Technology Laboratory

3:40 PM Invited
Synchronized High-speed Microscopy and Thermo-analytical Measurement for Sub-mm/sub-ms-scale Cathodic Behavior in Molten Salt Electrolysis: *Shungo Natsui*[1]; Ryota Shibuya[2]; Hiroshi Nogami[1]; Tatsuya Kikuchi[2]; Ryosuke Suzuki[2]; [1]Tohoku University; [2]Hokkaido University

4:00 PM Break

4:20 PM Panel Discussion

MATERIALS PROCESSING

Advances in Powder and Ceramic Materials Science — Ceramic-based Composites

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

Program Organizers: Bowen Li, Michigan Technological University; Shefford Baker, Cornell University; Huazhang Zhai, Beijing Institute of Technology; Kathy Lu, Virginia Polytechnic Institute and State University; 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; Eugene Olevsky, San Diego State University

Tuesday PM **March 16, 2021**

Session Chair: Dipankar Ghosh, Old Dominion University

2:00 PM
Low-cost Forming and Reactive Melt Infiltration Processing of High-temperature, Thermally-cyclable Carbide/Metal Composites in Complex, Near Net Shapes for Renewable Energy Applications: *Yujie Wang*[1]; Priyatham Tumurugoti[1]; Zhenhui Chen[1]; Alex Strayer[1]; Adam Caldwell[1]; Saeed Bagherzadeh[1]; Grigorios Itskos[1]; Kevin Trumble[1]; Mario Caccia[1]; Kenneth Sandhage[1]; [1]Purdue University

2:20 PM
Diamond Graphitization and Its Effect on Hardness of Diamond Particulate Ceramic Composites: *Jerry LaSalvia*[1]; Anthony DiGiovanni[1]; Kristopher Behler[1]; William Shoulders[1]; Scott Walck[1]; [1]CCDC Army Research Laboratory

2:40 PM
Bulk High-entropy Nitrides and Carbonitrides: *Olivia Dippo*[1]; Neda Mesgarzadeh[1]; Tyler Harrington[1]; Grant Schrader[1]; Kenneth Vecchio[1]; [1]University of California San Diego

MATERIALS DESIGN

AI/Data Informatics: Applications and Uncertainty Quantification at Atomistics and Mesoscales — Session IV

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

Program Organizers: Kamal Choudhary, National Institute of Standards and Technology; Garvit Agarwal, Argonne National Laboratory; Wei Chen, Illinois Institute of Technology; Mitchell Wood, Sandia National Laboratories; Vahid Attari, Texas A&M University; Oliver Johnson, Brigham Young University; Richard Hennig, University of Florida

Tuesday PM **March 16, 2021**

Session Chairs: Sukriti Manna, Argonne National Laboratory; Noah Paulson, Argonne National Laboratory

2:00 PM
Fast Crystal Structure Reconstruction and Prediction Method: Based on X-ray Diffraction Dataset and Neural Network: *Cheng-Che Tung*[1]; Yan-Zhen Chen[1]; Yuan-Yu Lin[2]; Nan-Yow Chen[3]; An-Cheng Yang[3]; Po-Yu Chen[1]; [1]National Tsing Hua University; [2]National Chiao Tung University; [3]National Center for High-Performance Computing

2:20 PM
Finding and Sharing Atomistic Materials Data and Software with the NIST Materials Resource Registry: *Chandler Becker*[1]; Raymond Plante[1]; Laura Bartolo[2]; Robert Hanisch[1]; James Warren[1]; Gretchen Greene[1]; [1]Material Measurement Laboratory, National Institute of Standards and Technology; [2]Center for Hierarchical Materials Design, Northwestern University

2:40 PM
Accelerating High Throughput Materials Simulation Studies Using Machine Learning Based Application Programming Interface (API): *Jason Gibson*[1]; Stephen Xie[1]; Richard Hennig[1]; [1]University of Florida

3:00 PM
Coupling Machine Learning and Global Structure Optimization in GASP 2.0: *Stephen Xie*[1]; Shreyas Honrao[1]; Venkata Kolloru[1]; Richard Hennig[1]; [1]University of Florida

3:20 PM
Harnessing Materials Data and Simulation Capabilities for the Accelerated Discovery of Photocathode Materials: *Evan Antoniuk*[1]; Yumeng Yue[1]; Yao Zhou[1]; Peter Schindler[1]; W. Schroeder[2]; Theodore Vecchione[3]; Bruce Dunham[4]; Piero Pianetta[3]; Evan Reed[1]; [1]Stanford University; [2]University of Illinois at Chicago; [3]SLAC; [4]SLAC

3:40 PM
De Novo Design of Therapeutic Agents Against COVID-19 Using Artificial Intelligence: *Srilok Srinivasan*[1]; Rohit Batra[1]; Henry Chan[1]; Ganesh Kamath[2]; Mathew Cherukara[1]; Subramanian Sankaranarayanan[1]; [1]Argonne National Laboratory; [2]Dalzielfiver LLC

4:00 PM
AI Guided Discovery of Self-assembly Peptide Sequences using Monte Carlo Tree Search and Coarse-grained Simulations: *Rohit Batra*[1]; Troy Loeffler[1]; Henry Chan[1]; Srilok Srinivasan[1]; Christopher Fry[1]; Subramanian Sankaranarayanan[1]; [1]Argonne National Lab

MATERIALS DESIGN

AI/Data informatics: Design of Structural Materials — AI/ML for Design of Structural Alloys & Additively Manufactured Materials

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

Program Organizers: Jennifer Carter, Case Western Reserve University; Amit Verma, Carnegie Mellon University; Natasha Vermaak, Lehigh University; Jonathan Zimmerman, Sandia National Laboratories; Darren Pagan, Pennsylvania State University; Chris Haines, Ccdc Army Research Laboratory; Judith Brown, Sandia National Laboratories

Tuesday PM **March 16, 2021**

2:00 PM Invited
Zoning Processing Spaces for Additive Manufacturing: Applications for Inverse Design: *Sean Donegan*[1]; Edwin Schwalbach[1]; Matthew Krug[1]; [1]Air Force Research Laboratory

2:30 PM
High-throughput Alloy Design via Additive Manufacturing: *Olivia Dippo*[1]; Kevin Kaufmann[1]; Grant Schrader[1]; Kenneth Vecchio[1]; [1]University of California San Diego

2:50 PM
Alloy Design for Additive Manufacturing: *Mariam Assi*[1]; Julien Favre[1]; Anna Fraczkiewicz[1]; Franck Tancret[2]; [1]Mines Saint-Etienne, Univ Lyon, LGF - UMR 5307 CNRS/ Centre SMS; [2]Université de Nantes, Institut des Matériaux Jean Rouxel (IMN), Polytech Nantes, BP 50609

3:10 PM Invited
Multi-objective Lattice Optimization Using an Efficient Neural Network Approach: *Anthony Garland*[1]; Ben White[1]; Brad Boyce[1]; Ryan Alberdi[1]; [1]Sandia National Labs

3:40 PM
Design of Ti-Al-Cr-V Alloys for Maximum Thermodynamic Stability: *Rajesh Jha*; George Dulikravich[1]; [1]Florida International University

4:00 PM
Prediction of the Mechanical Properties of Aluminum Alloy Using Bayesian Learning for Neural Networks: *Shimpei Takemoto*[1]; Kenji Nagata[2]; Takeshi Kaneshita[1]; Yoshishige Okuno[1]; Katsuki Okuno[1]; Masamichi Kitano[1]; Junya Inoue[3]; Manabu Enoki[3]; [1]Showa Denko K.K.; [2]National Institute for Materials Science; [3]The University of Tokyo

4:20 PM
Machine Learning Assisted Exploration of FeCoCrNi Based Nanocrystal-amorphous Dual-phase Alloys: *Yi Yao*[1]; Xiaobing Hu[2]; Xiaoxiang Yu[2]; Jiaqi Gong[1]; Feng Yan[1]; Lin Li[1]; [1]The University of Alabama; [2]Northwestern University

4:40 PM
Topology Optimization for Design of Stress-dependent Material Properties: *Justin Unger*[1]; Matthew Vaughn[1]; Andrew Gaynor[2]; Brandon McWilliams[2]; James Guest[1]; Kevin Hemker[1]; [1]Johns Hopkins University; [2]CCDC U.S. Army Research Laboratory

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Computational Models and Algorithms in Atomistic Scale

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

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

Tuesday PM **March 16, 2021**

Session Chair: Ebrahim Asadi, University of Memphis

2:00 PM
Characterizing Atomistic Geometries and Potential Functions Using Strain Functionals: *Edward Kober*[1]; Colin Adams[1]; Jacob Tavenner[2]; Nithin Mathew[1]; [1]Los Alamos National Laboratory; [2]Colorado School of Mines

2:20 PM
Modeling Static Recrystallization within the SPParKS Kinetic Monte Carlo Framework for Polycrystalline Materials: *Austin Gerlt*[1]; David Newell[2]; Adam Pilchak[2]; Eric Payton[2]; [1]The Ohio State University; [2]Air Force Research Lab

2:40 PM Invited
Characterizing the Length Dependence of High-Peierls-Stress Dislocations' Mobility in BCC Crystals under Deformation at Finite Temperature from the Atomistic to the Mesoscale: *Liming Xiong*[1]; [1]Iowa State University

3:10 PM
Dislocation Dipole Study on Material Hardening/Softening: *Abu Siddique*[1]; Tariq Khraishi[1]; Hojun Lim[2]; [1]University of New Mexico; [2]Sandia National Laboratories

3:30 PM
Continuum Dislocation Dynamics with Junction Reactions: Computational Modeling and Preliminary Results: *Kyle Starkey*[1]; Anter El-Azab[1]; [1]Purdue University

3:50 PM
Advancements in Discrete Dislocation Modeling of Slip Transmission through Equilibrium and Non-equilibrium Grain Boundaries: *Darshan Bamney*[1]; Laurent Capolungo[2]; Douglas Spearot[1]; [1]University of Florida; [2]Los Alamos National Laboratory

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications IX — Session IV

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

Program Organizers: Hsin-Jay Wu, National Chiao Tung University; Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Cnrs Crismat Unicaen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Lan Li, Boise State University; Takao Mori, National Institute for Materials Science; Tiejun Zhu, Zhejiang University; Alexandra Zevalkink, Michigan State University; Wan-Ting Chiu, Tokyo Institute of Technology

Tuesday PM **March 16, 2021**

Session Chairs: Wan-Ting Chiu, Tokyo Institute of Technology; Ping-Yuan Deng, National Chiao Tung University

2:00 PM Invited
Structure and Physical Properties of Complex Chalcogenides: Fundamental Research with an "Eye" Towards Lower Temperature Applications: *George Nolas*[1]; [1]University of South Florida

2:20 PM
Phase Boundary Mapping to Improve Na solubility, Band Convergence, and Thermoelectric Properties in p-type PbTe: *James Male*[1]; Priyanka Jood[2]; Shashwat Anand[1]; G. Snyder[1]; [1]Northwestern University; [2]National Institute of Advanced Industrial Science and Technology

2:40 PM
Defect Evolution Enabling Low Thermal Conductivity and High Thermoelectric Performance for n-type PbTe
: *Ping-Yuan Deng*[1]; Kuang-Kuo Wang[2]; Jia-Yu Du[3]; Hsin-Jay Wu[1]; [1]National Chiao Tung University; [2]National Sun Yat-sen University; [3]National Tsing Hua University

3:00 PM Invited
Thermal and Electrical Transport in Zintl Thermoelectrics: From Ab Initio Understanding to Materials Discovery: *Geoffroy Hautier*[1]; [1]Université catholique de Louvain

3:20 PM Invited
The "Grand Challenge" of Thermoelectric Materials: *David Parker*[1]; [1]ORNL

3:40 PM Invited
The Origin of Low Thermal Conductivity in Tetrahedrites: A Jahn-Teller Electronic Instability: *Paz Vaqueiro*[1]; [1]University of Reading

4:00 PM Invited
Effect of Phonon Drag on Seebeck Coefficient Based on Linear Response Theory: *Masao Ogata*[1]; Junya Endo[1]; Hiroyasu Matsuura[1]; Hideaki Maebashi[1]; Hidetoshi Fukuyama[2]; [1]University of Tokyo; [2]Tokyo University of Science

4:20 PM Invited
Strategies for the Balance of Oxide/Metal Composites Towards the Applications of Flexible Solar Energy Harvesters: *Wan-Ting Chiu*[1]; Chang Tso-Fu Mark[1]; Masato Sone[1]; Agnes TIXIER-MITA[2]; Hiroshi Toshiyoshi[2]; Hideki Hosoda[1]; [1]Tokyo Institute of Technology; [2]The University of Tokyo

4:40 PM
Effect of Zn and Cr Co-doping on the Thermoelectric Properties of Colusite Cu26V2M6S32 (M=Ge,Sn): *Paulina Kaminska*[1]; Cédric Bourgès[2]; Piotr Spiewak[1]; Takao Mori[2]; [1]Warsaw University of Technology; [2]National Institute for Materials Science

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Mechanical Properties, Applications, and Fitness for Service Testing

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

Program Organizer: Dimitry Sediako, University of British Columbia

Tuesday PM **March 16, 2021**

Session Chair: Nima Shamsaei, Auburn University

2:00 PM
The Effect of Rare Earth Mischmetal on the High Temperature Tensile Properties of an A356 Aluminum Alloy: *Joshua Stroh*[1]; Dimitry Sediako[1]; David Weiss[2]; [1]University of British Columbia Okanagan; [2]Eck Industries

2:20 PM
Effects of Ultrasonic Melt Processing on Microstructure, Mechanical Properties and Electrical Conductivity of Hypereutectic Al-Si, Al-Fe and Al-Ni Alloys with Zr Additions: *Suwaree Chankitmunkong*[1]; Dmitry Eskin[2]; Chaowalit limmaneevichitr[1]; [1]King Mongkut's University of Technology Thonburi; [2]Brunel University London

2:40 PM
The Corrosion Behavior of 5xxx and 6xxx Aluminum Alloys with Trace Calcium: *Saugat Singh*[1]; Kumar Sundaram[2]; B. Pesic[1]; [1]University of Idaho; [2]Novelis Molten Metal Processing, Novelis Corporation

3:00 PM
Review of Retrogression Forming and Reaging for AA7075-T6 Sheet: *Katherine Rader*[1]; Jon Carter[2]; Louis Hector[2]; Eric Taleff[1]; [1]University of Texas at Austin; [2]General Motors

3:20 PM
Fatigue and Failure Analysis of an Additively Manufactured Contemporary Aluminum Alloy: *P.D. Nezhadfar*[1]; Spencer Thompson[2]; Ankit Saharan[2]; Nam Phan[3]; Nima Shamsaei[1]; [1]Auburn University; [2]EOS North America; [3]Structures Division, Naval Air Systems Command (NAVAIR)

3:40 PM
Investigation of Weld Quality for Friction Stir Welding of Extrued 6XXX Series Aluminium Alloys: Mehmet Bugra Guner[1]; *Murat Konar*; Arif Fatih Yigit[1]; Görkem Özçelik[1]; Tolga Demirkiran[1]; [1]Asas Aluminium

4:00 PM
The Effect of Al3Er Particles on the Structure and Mechanical Properties of an Al-Mg Alloy: *Anton Khrustalev*[1]; Ilya Zhukov[1]; Vladimir Platov[1]; Alexander Vorozhtsov[1]; [1]Tomsk State University

4:20 PM Question and Answer Period

LIGHT METALS

Aluminum Reduction Technology Across the Decades: An LMD Symposium Honoring Alton T. Tabereaux and Harald A. Øye — Alton Tabereaux Honorary Session: Reduction Cell Operation and Process Control - Joint session with Aluminum Reduction Technology

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

Program Organizers: Arne Ratvik, SINTEF; Marc Dupuis, GeniSim Inc.; Kristian Etienne Einarsrud, Norwegian University of Science and Technology

Tuesday PM **March 16, 2021**

Session Chair: Marc Dupuis, GeniSim Inc.

2:00 PM
Introductory Comments: Aluminum Reduction Technology Across the Decades: An LMD Symposium Honoring Alton T. Tabereaux and Harald A. Øye: *Marc Dupuis*[1]; [1]GeniSim Inc.

2:05 PM
Alton Tabereaux: A Humble Individual Who Dedicates His Lifetime to Aluminum - An Aluminum Legend of Our Time: *Xiangwen Wang*[1]; [1]Alcoa Corp

2:45 PM
Awakening of the Aluminum Industry to PFC Emissions and Global Warming: *Alton Tabereaux*[1]; David Wong[1]; [1]Consultant

3:05 PM
Application and Adaptability of MHD Stability Computation for Modern Aluminium Reduction Cells at Extreme Conditions of Low ACD: Valdis Bojarevics[1]; *Marc Dupuis*[2]; [1]University of Greenwich; [2]GeniSim Inc.

3:25 PM
Investigation of Cyclic Process Variations within Hall-Héroult Reduction Cells: *Jayson Tessier*[1]; Samuel Duplessis[1]; [1]Alcoa

3:45 PM
In Line Cell Position and Anode Change Effects on the Alumina Dissolution: *Valdis Bojarevics*[1]; [1]University of Greenwich

4:05 PM
History of Computer Control of Aluminum Reduction Cells: *Vinko Potocnik*[1]; Michel Reverdy[1]; [1]Vinko Potocnik Consulting

4:25 PM Question and Answer Period

ADVANCED MATERIALS

Bulk Metallic Glasses XVIII — 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, Federal Institute for Materials Research and Testing (BAM); Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Tuesday PM **March 16, 2021**

Session Chairs: Eun Park, Seoul National Univerisity; David Browne, University College Dublin

2:00 PM
Fabrication of Fe-based Metallic Glassy Microparts Through Unprecedented Processes: *Rui Yamada*[1]; Noriharu Yodoshi[1]; Naoyuki Nomura[1]; Junji Saida[1]; Akira Kawasaki[1]; [1]Tohoku University

2:20 PM Invited
Selection and Testing of Bulk Metallic Glass Alloys for Space-based Mechanisms: *Andrew Murphy*[1]; Andrew Norman[2]; David Browne[1]; [1]University College Dublin; [2]European Space Agency

2:45 PM
Measuring Metallic Glass Viscosities Over Wide Composition Ranges: *Sebastian Kube*[1]; Theo Evers[1]; Will Polsky[1]; Rodrigo Miguel Ojeda Mota[1]; Kevin Ryan[1]; Jan Schroers[1]; [1]Yale University

3:05 PM
Machine Learning from Elemental and Simulation Features for Predicting Glass Forming Ability: *Dane Morgan*[1]; Benjamin Afflerbach[1]; Lane Schultz[1]; Janine Erickson[1]; Dan Thoma[1]; John Perepezko[1]; Carter Francis[1]; Paul Voyles[1]; George Bokas[2]; Jianqi Xi[1]; Izabela Szlufarska[1]; [1]University of Wisconsin-Madison; [2]Siemens Industry Software

LIGHT METALS

Cast Shop Technology — Recycling and Furnace Operations

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

Program Organizer: Samuel Wagstaff, Oculatus

Tuesday PM **March 16, 2021**

Session Chairs: Kjerstin Ellingsen, SINTEF; Jean-Francois Desmeules, Dynamic Concept

2:00 PM
Introductory Comments: Cast Shop Technology: *Samuel Wagstaff*[1]; [1]Oculatus

2:05 PM
Impact of COVID-19 on the British Foundries: *Prateek Saxena*[1]; Pam Murrell[2]; Tharmalingam Sivarupan[3]; Konstantinos Salonitis[1]; Mark Jolly[1]; [1]Cranfield University; [2]Cast Metals Federation; [3]The University of Queensland

2:25 PM
Effect of Steam on Aluminium Packaging Multilayers: *Martin Syvertsen*[1]; Anne Kvithyld[1]; Birgitte Vågenes[1]; Stephan Kubowicz[1]; Rune Gaarder[1]; [1]SINTEF Industry

2:45 PM
Compaction of Aluminium Foil and Its Effect on Oxidation and Recycling Yield: *Alicia Vallejo Olivares*[1]; Harald Philipson[1]; Mertol Gökelma[2]; Hans Roven[1]; Trond Furu[3]; Anne Kvithyld[4]; Gabriella Tranell[1]; [1]Norwegian University of Science and Technology; [2]Izmir Institute of Technology; [3]Norsk Hydro; [4]SINTEF

3:05 PM
Influence of Mg Concentration on the Inhibiting Effect of CO_2 on the Oxidation Rate of Aluminum Alloys 5182 and 6016: *Cathrine Solem*[1]; Egil Solberg[2]; Gabriella Tranell[1]; Ragnhild Aune[1]; [1]Norwegian University of Science and Technology (NTNU); [2]Alcoa Norway ANS

3:25 PM
Automated Chemical Analysis of Liquid Aluminum for Process Control: Sveinn Hinrik Gudmundsson[1]; Halldor Gudmundsson[2]; *Kristjan Leosson*[1]; [1]DT Equipment; [2]Nordural ehf.

3:45 PM
Characteristic Impurities of Silicon Metal SI-441 as Additive Material to Produce Aluminium Foundry Alloy A356.2: *Reggy Zurcher*[1]; Rainaldy Harahap[1]; Edi Mugiono[1]; M. Yasir Parapat[1]; Masrul Ponirin[1]; [1]PT Indonesia Asahan Aluminium

4:25 PM Question and Answer Period

4:05 PM
Molten Aluminium Transfer: Review and Comparison of Different Technologies: *Olivier Dion-Martin*[1]; Robert Dumont[1]; Jean Francois Desmeules[1]; [1]Dynamic Concept

CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2021 — Characterization of Composite Materials

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

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Instituto Militar de Engenharia; Shadia Ikhmayies; 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; Rajiv Soman, Eurofins EAG Materials Science LLC; Alex Moser, US Naval Research Laboratory

Tuesday PM **March 16, 2021**

Session Chairs: Sergio Monteiro, Military Institute of Engineering; Kelvin Xie, Texas A&M University

2:00 PM
Composite Binder and Particle Size Effects on Mechanical Properties of Non-hazardous High Explosive Surrogates: *Matthew Herman*[1]; Caitlin Woznick[1]; Amanda Duque[1]; John Yeager[1]; [1]Los Alamos National Laboratory

2:20 PM
Mechanical Testing and Microstructural Investigation into the Effects of Heat Treatment on Additively Manufactured TiC Reinforced Ti-Ni Matrix Composites (TNMCs): Andrew Dodd[1]; Jianshen Wang[1]; Daniel East[2]; Evgeny Morozov[1]; *Juan Escobedo-Diaz*[1]; [1]University of New South Wales; [2]CSIRO Manufacturing

2:40 PM
Influence of Graphene Oxide Fuctionalization Strategy on the Dynamic Mechanical Response of Natural Fiber Reinforced Polymer Matrix Composites: *Fabio Garcia Filho*[1]; Michelle Oliveira[1]; Fernanda Luz[1]; Sergio Monteiro[1]; [1]Military Institute of Engineering

3:00 PM
Charpy Impact Tests of Castor Oil Derived Polyurethane Matrix Composites Reinforced by Wood Industry Waste: Juliana de Faria[1]; Noan Simonassi[1]; Carlos Maurício Vieira[1]; *Felipe Lopes*[2]; [1]State University of Northern Rio de Janeiro; [2]UENF

3:20 PM
Flexural Strength of Castor Oil Derived Polyurethane Matrix Composite Reinforced with Luffa Fibers: Anna Carolina Cerqueira Neves[1]; Noan Simonassi[2]; *Felipe Lopes*[1]; Carlos Mauricio Vieira[1]; [1]UENF; [2]State University of Northern Rio de Janeiro

3:40 PM
Spall Damage Characterization of Additively Manufactured Ti-Ni-C Composites: Warwick Absolon[1]; Jianshen Wang[1]; Daniel East[2]; Ali Ameri[1]; Hongxu Wang[1]; Evgeny Morozov[1]; Paul Hazell[1]; *Juan Escobedo-Diaz*[1]; [1]University of New South Wales; [2]CSIRO Manufaturing

4:00 PM
Characterization of Equimolar Zinc Ferrite - ZF: *Mery Gomez-Marroquin*[1]; José Carlos D´Abreu[2]; Henry Colorado[3]; Abraham Terrones - Ramírez[4]; Kim Phatti - Satto[4]; Nilton Cárdenas-Falcón[5]; [1]APMMM/UNI; [2]DEQM PUC-Rio; [3]University of Antioquia - UDEA; [4]FIGMM UNI; [5]PUCP

4:20 PM
Characterization of Ultra-hard Ceramic AlMgB14-based Materials Obtained by Self-propagating High-temperature Synthesis and Spark Plasma Sintering: Ilya Zhukov[1]; *Pavel Nikitin*[1]; Alexander Vorozhtsov[1]; [1]Tomsk State University

4:40 PM
Preparation of Ceramic Coating on Copper Substrate with Transitional Layer by Low-temperature Slurry Method: *Zefei Zhang*[1]; Hao Bai[1]; Lihong Li[2]; Min Zhong[2]; [1]University of Science and Technology Beijing; [2]Shantou Huaxing Metallurgical Equipment Co., Ltd.

NUCLEAR MATERIALS

Characterization of Nuclear Materials and Fuels with Advanced X-ray and Neutron Techniques — X-ray Tomography and Microscopy

Sponsored by: TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Nuclear Materials Committee

Program Organizers: Xuan Zhang, Argonne National Laboratory; Jonathan Almer, Argonne National Laboratory; Maria Okuniewski, Purdue University; Joshua Kane, Idaho National Laboratory; Donald Brown, Los Alamos National Laboratory; J. Kennedy, Idaho National Laboratory; Arthur Motta, Pennsylvania State University

Tuesday PM **March 16, 2021**

Session Chairs: Joshua Kane, Idaho National Laboratory; Xuan Zhang, Argonne National Laboratory

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2:00 PM
Characterization of Nuclear Energy Materials in 2D and 3D using Laboratory-based X-ray Microscopy: *Nikolaus Cordes*[1]; Joshua Kane[1]; Aaron Craft[1]; [1]Idaho National Laboratory

2:20 PM
Non-destructive Correlative 3D Characterization of Nuclear Graphite: From the Microscale to the Nanoscale: Stephen Kelly[1]; *Robin White*[1]; William Harris[1]; Tobias Volkenandt[1]; Benjamin Tordoff[1]; Giuliano Laudone[2]; Katie Jones[2]; Ben Veater[2]; [1]Carl Zeiss X-ray Microscopy; [2]University of Plymouth

2:40 PM
Irradiation Effects on Precipitate Distributions in High-temperature Ultrafine-precipitate-strengthened Steel Characterized by Synchrotron Micro-computed Tomography: *Alejandro Figueroa*[1]; Sri Nori[1]; Peter Kenesei[2]; Jonathan Almer[2]; Maria Okuniewski[1]; [1]Purdue University; [2]Argonne National Laboratory

3:00 PM
Identifying the Microstructural Origins of Creep Damage in Alloy 617: *Mark Messner*[1]; Xuan Zhang[1]; Meimei Li[1]; Michael McMurtrey[2]; [1]Argonne National Laboratory; [2]Idaho National Laboratory

3:20 PM
Getting "Around" the High Mass Attenuation Issue for μX-ray Computed Tomography of Nuclear Fuels: *Joshua Kane*[1]; Nikolaus Cordes[1]; Aaron Craft[1]; Douglas Marshall[1]; John Stempien[1]; [1]Idaho National Laboratory

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NUCLEAR MATERIALS

Composite Materials for Nuclear Applications — Composite Fuels/Graphite Carbon

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

Program Organizers: Anne Campbell, Oak Ridge National Laboratory; Dong Liu, University of Bristol; Rick Ubic, Boise State University; Lauren Garrison, Oak Ridge National Laboratory; Peng Xu, Idaho National Laboratory; Johann (Hans) Riesch, Max Planck Institute for Plasma Physics

Tuesday PM **March 16, 2021**

Session Chair: Anne Campbell, Oak Ridge National Laboratory

2:00 PM Invited
Improved Techniques for Determining Local Thermal Transport in Composite Nuclear Fuels: *Scott Middlemas*[1]; Joshua Kane[1]; Tsvetoslav Pavlov[1]; Boopathy Kombaiah[1]; Daniel LaBrier[2]; Yu-lin Shen[3]; Isabella Van Rooyen[1]; [1]Idaho National Laboratory; [2]Idaho State University; [3]University of New Mexico

2:30 PM Invited
Overview of the Westinghouse Accident Tolerant and High Burnup Fuel Program: *Edward Lahoda*[1]; Zeses Karoutas[1]; Luke Olson[1]; Luther Hallman[1]; Kathryn Metzger[1]; Jorie Walters[1]; Michael Sivack[1]; John Lyons[1]; Luke Czerniak[1]; Allan Jaworski[1]; Ben Maier[1]; Robert Terry[1]; Zachary McDaniel[1]; Frank Boylan[1]; Jeffrey Kobelak[1]; Michael Shockling[1]; Magnus Limback[1]; Antoine Claisse[1]; Jonathan Wright[1]; John Ghergurovich[1]; [1]Westinghouse Electric

3:00 PM
Development of UN/UO2 Composite Fuels for LWR Applications: *Peng Xu*[1]; Lingfeng He[1]; Brian Jaques[2]; Kumar Sridharan[3]; Darryl Butt[4]; [1]Idaho National Laboratory; [2]Boise State University; [3]University of Wisconsin; [4]University of Utah

3:20 PM
Uranium Nitride Advanced Fuel: An Evaluation of the Oxidation Resistance of Coated and Doped Grains: *Yulia Mishchenko*[1]; Denise Adorno Lopes[2]; Kyle Johnson[3]; Janne Wallenius[1]; [1]KTH; [2]Westinghouse Electric Company; [3]Studsvik Nuclear AB

3:40 PM
Fabrication, Characterisation and Oxidation Resistance of an Innovative Composite Fuel: UN Microspheres Embedded in UO_2 Matrix: *Diogo Costa*[1]; Marcus Hedberg[2]; Simon Middleburgh[3]; Janne Wallenius[4]; Pär Olsson[4]; Denise Lopes[5]; [1]KTH Royal Institute of Technology, Westinghouse Electric Sweden AB; [2]Chalmers University of Technology; [3]Bangor University; [4]KTH Royal Institute of Technology; [5]Westinghouse Electric Sweden AB

4:00 PM Invited
Use of Carbon Fibre-reinforced Carbon in Wendelstein 7-X: *Jean Boscary*[1]; Henri Greuner[1]; Boris Mendelevitch[1]; Gunnar Ehrke[1]; Patrick Junghanns[1]; Reinhold Stadler[1]; [1]Max-Planck-Institut für Plasmaphysik

4:30 PM
Sub-critical Crack Initiation, Coalescence and Propagation in Nuclear Graphite Studied by High-speed Pink Beam Synchrotron Tomography: *Thomas Zillhardt*[1]; Dong Liu[2]; James Marrow[1]; [1]University of Oxford; [2]University of Bristol

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PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Phase Stability I

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

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Vahid Attari, Texas A&M University; Jorge Munoz, University of Texas at El Paso

Tuesday PM **March 16, 2021**

Session Chairs: Mira Todorova, Max Planck Institut fur Eisenforschung; Jorge Munoz, University of Texas El Paso; Hong Liu, KU Leuven; Eva Zarkadoula, Oak Ridge National Laboratory

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2:00 PM Invited
Integrated Models for the Design of Precipitation Hardenable Mg and Al Alloys: *Hong Liu*[1]; Ioannis Papadimitriou[2]; Fengxiang Lin[3]; Javier Llorca[4]; Jian-Feng Nie[5]; Moelans Nele[1]; [1]KU Leuven; [2]IMDEA Materials ; [3]UC Louvain ; [4]IMDEA Materials; [5]Monash University

2:30 PM
Competing and Collaborating Phase Transitions Studied within Cluster Variation Method: *Tetsuo Mohri*[1]; [1]Tohoku University

2:50 PM
First principles Study of Precipitation in Al-Cu, Al-Li and Al-Cu-Li Alloys: Sha Liu[1]; *Javier Llorca*[2]; [1]IMDEA Materials Institute; [2]IMDEA Materials Institute & Technical University of Madrid

3:10 PM Invited
Insights into Processes at Electrochemical Solid/Liquid Interfaces from Ab Initio Molecular Dynamics Simulations: *Mira Todorova*[1]; Sudarsan Surendralal[1]; Stefan Wippermann[1]; Florian Deissenbeck[1]; Christoph Freysoldt[1]; Joerg Neugebauer[1]; [1]Max Planck Institut fur Eisenforschung

3:40 PM
Effect of Oxygen on Joining Magnesium and Iron: Insights from Ab Initio Simulations: *Peter Sushko*[1]; Yingge Du[1]; Hrishikesh Das[1]; Piyush Upadhyay[1]; [1]Pacific Northwest National Laboratory

4:00 PM
A First-principles Analysis of the Temperature Dependence of Stacking Fault Energies in Mg and Ti: *Julian Brodie*[1]; Maryam Ghazisaeidi[1]; [1]Ohio State University

4:20 PM Invited
Vacancy-mediated Phase Selection in High-entropy Alloys: *Prashant Singh*[1]; Shalabh Gupta[1]; A V Smirnov[1]; Matthew J Kramer[1]; Duane D Johnson[1]; [1]Ames Laboratory

4:50 PM
Lattice Dynamics of FeTi at Simultaneous High Temperature and High Pressure from First Principles: Adrian De la Rocha[1]; *Jorge Munoz*[1]; Armando Garcia[1]; Vanessa Meraz[1]; Bethuel Khamala[1]; Bert de Jong[2]; Yu-Hang Tang[2]; [1]The University of Texas at El Paso; [2]Lawrence Berkeley National Laboratory

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PHYSICAL METALLURGY

Defect and Phase Transformation Pathway Engineering for Desired Microstructures — Simulation and Modeling

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; Yipeng Gao, Idaho National Laboratory; Timofey Frolov, Lawrence Livermore National Laboratory; Stoichko Antonov, Max-Planck-Institut für Eisenforschung GmbH; Jessica Krogstad, University of Illinois at Urbana-Champaign; Bin Li, University of Nevada, Reno

Tuesday PM **March 16, 2021**

Session Chair: Yipeng Gao, Idaho National Laboratory

2:00 PM
Interactions between Lattice Dislocations and 3D Metallic Interfaces: *Shuozhi Xu*[1]; Justin Cheng[2]; Nathan Mara[2]; Irene Beyerlein[1]; [1]University of California, Santa Barbara; [2]University of Minnesota, Twin Cities

2:20 PM
Interfacial Segregation and Segregation-induced Transitions in a Polycrystalline Grain Boundary Network: *Pulkit Garg*[1]; Zhiliang Pang[2]; Vladyslav Turlo[3]; Timothy Rupert[4]; [1]Arizona State University; [2]Guilin University of Electronic Technology; [3]Swiss Federal Laboratories for Materials Science and Technology (Empa); [4]University of California, Irvine

2:40 PM
Twin Boundaries Continue to Surprise Us: Understanding Type II Twin in NiTi and {1012} Twin in HCP Materials: *Ahmedsameerkhan Mohammed*[1]; Huseyin Sehitoglu[1]; [1]University of Illinois Urbana-Champaign

3:00 PM
New Insights into The Effect of Solutes on Twinning in Ti Alloys: *Mohammad Shahriar Hooshmand*[1]; Yan Chong[1]; Ruopeng Zhang[1]; Andrew Minor[1]; Mark Asta[1]; [1]University of California, Berkeley

3:20 PM
Evolving Core Structures in Dislocation-twin Boundary Interactions: *Orcun Koray Celebi*[1]; Ahmed Sameer Khan Mohammed[1]; Francisco Andrade Chávez[1]; Jessica Krogstad[1]; Huseyin Sehitoglu[1]; [1]University of Illinois Urbana Champaign

3:40 PM
Characterizing and Modeling Collective Atomic Displacements during Grain Boundary Migration: *Ian Chesser*[1]; Anqi Qiu[1]; Ankit Gupta[2]; Garritt Tucker[2]; Brandon Runnels[3]; Elizabeth Holm[1]; [1]Carnegie Mellon University; [2]Colorado School of Mines; [3]University of Colorado Colorado Springs

4:00 PM
Assessment and Design of Complex Microstructural Features in Zirconia Shape Memory Ceramics via Elasto-Plastic Phase-field Modeling: *Cheikh Cissé*[1]; Mohsen Asle Zaeem[1]; [1]Colorado School of Mines

4:20 PM
Pseudoelastic Response of Ion-implanted Nickel-titanium Shape Memory Alloy: Combining Experimentation and Forward Modeling: *Daniel Hong*[1]; Harshad Paranjape[2]; Peter Anderson[1]; Alejandro Hinojos[1]; Michael Mills[1]; Khalid Hattar[3]; Nan Li[4]; Jeremy Schaffer[5]; [1]The Ohio State University; [2]Confluent Medical; [3]CINT Sandia National Laboratories; [4]CINT Los Alamos National Laboratories; [5]Fort Wayne Metals

4:40 PM
Investigation of Nucleation Mechanisms Associated with Formation of Co-precipitates in Ni-based Superalloys: *Hariharan Sriram*[1]; Semanti Mukhopadhyay[1]; Rongpei Shi[2]; Michael Mills[1]; Yunzhi Wang[1]; [1]The Ohio State University; [2]Lawrence Livermore National Laboratory

MATERIALS PROCESSING

Deformation Induced Microstructural Modification — Session IV: Deformation of Alloys I

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

Program Organizers: Arun Devaraj, Pacific Northwest National Laboratory; Suveen Mathaudhu, University of California-Riverside ; Kester Clarke, Colorado School of Mines; Bharat Gwalani, Pacific Northwest National Laboratory; Daniel Coughlin, Los Alamos National Laboratory

Tuesday PM **March 16, 2021**

Session Chair: Daniel Coughlin, Los Alamos National Laboratory

2:00 PM Invited
Deformation Induced Precipitation (DIP) in Light Alloys: Theory and Experiments: Suhas Eswarappa Prameela[1]; Peng Yi[1]; Yannick Hollenweger[2]; Laszlo Kecskes[1]; Dennis Kochmann[2]; Michael Falk[1]; *Timothy Weihs*[1]; [1]Johns Hopkins University; [2]ETH Zurich

2:30 PM
Cyclic Deformation and Fatigue Behavior of 316L Stainless Steel Processed by Surface Mechanical Rolling Treatment: *Luiz Carneiro*[1]; Xiaogui Wang[2]; Yanyao Jiang[1]; [1]University of Nevada, Reno; [2]Zhejiang University of Technology

2:50 PM
High Pressure Torsion Processed Maraging Steels: Microstructure and Mechanical Behaviour: *Kevin Jacob*[1]; Deepesh Yadav[1]; Saurabh Dixit[2]; Anton Hohenwarter[3]; Balila Jaya[1]; [1]IIT Bombay; [2]Mishra Dhatu Nigam Ltd.(Midhani); [3]Montanuniversität Leoben

3:10 PM Invited
Fabrication of Ultrafine Grained Ferritic Steels by Combining Dynamic Transformation and Dynamic Recrystallization: *Nobuhiro Tsuji*[1]; Lijia Zhao[2]; Nokeun Park[3]; Yanzhong Tian[4]; Akinobu Shibata[5]; [1]Kyoto University; [2]ArcelorMittal; [3]Yeungnam University; [4]Northeastern University; [5]National Institute for Materials Science

3:40 PM Invited
Microstructural Evolution and Deformation Mechanisms in Segregation-Engineered Nanocrystalline Al Alloys: Glenn Balbus[1]; Johann Kappacher[2]; David Sprouster[3]; Jungho Shin[4]; Fulin Wang[4]; Jason Trelewicz[3]; Daniel Kiener[2]; Verena Maier-Kiener[2]; *Daniel Gianola*[4]; [1]UCSB; [2]Montanuniversität Leoben; [3]Stony Brook University; [4]University of California, Santa Barbara

4:10 PM
The Effect of Processing Parameters on the Microstructure and Performance of Ni-Mn-Ga Alloys: *Pnina Ari-Gur*[1]; Pranav Bhale[1]; Irek Musabirov[2]; Ronald Noebe[3]; Vladimir Shavrov[4]; Victor Koledov[4]; [1]Western Michigan University; [2]Russian Academy of Sciences, Ufa; [3]NASA Glenn Research Center; [4]Russian Academy of Sciences, Moscow

4:30 PM
Thermomechanical Processing of Dilute Mg-Zn-Ca Alloys: *Jenna Krynicki*[1]; Laszlo Kecskes[1]; John Gibbins[1]; Zhigang Xu[2]; Timothy Weihs[1]; [1]Johns Hopkins University; [2]North Carolina A&T State University

ELECTRONIC MATERIALS

Electronic Packaging and Interconnections 2021 — Pb-free Solder Alloys II

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

Program Organizers: Mehran Maalekian, Mat-Tech; Christopher Gourlay, Imperial College London; Babak Arfaei, Ford Motor Company; Praveen Kumar, Indian Institute of Science; Sai Vadlamani, Intel Corporation; Kazuhiro Nogita, University of Queensland; David Yan, San Jose State University

Tuesday PM **March 16, 2021**

Session Chairs: Christopher Gourlay, Imperial College London; David Yan, San José State University

2:00 PM Invited
Effect of Current Stress on the Microstructure of SnBiAg-SAC Mixed Solder Joints: *Eric Cotts*[1]; Faramarz Hadian[1]; Randy Owen[1]; [1]Binghamton University

2:20 PM
Effects of Antimony on the Microstructure and Reliability of Sn-Ag-Cu-based Solder Joints: Sergey Belyakov[1]; Richard Coyle[2]; Babak Arfaei[3]; *Christopher Gourlay*[1]; [1]Imperial College London; [2]Nokia Bell Laboratories; [3]Ford Motor Company

2:40 PM Invited
Sn-Ag-Cu and Sn-Bi Solder Powders for Fine Pitch Printing: *Amir Nobari*[1]; Arslane Bouchemit[2]; Gilles L'Espérance[2]; [1]5N Plus Inc - Micro Powders; [2]École Polytechnique de Montréal

3:00 PM Invited
Single Solder Joint Shear with In-situ Current Stressing: Kendra Young[1]; Choong-Un Kim[2]; *Tae-Kyu Lee*[1]; [1]Portland State University; [2]University of Texas, Arlington

3:20 PM
Solderability Assessment of Lead-free Alloys: *Mehran Maalekian*[1]; [1]Mat-Tech

3:40 PM
Finite Element Analysis Modeling of Stress Evolution and Whisker Growth Under Applied Pressure: *Nupur Jain*[1]; Piyush Jagtap[1]; Allan Bower[1]; Eric Chason[1]; [1]Brown University

4:00 PM
Corrosion Behavior of Co-based Surface Finishes in Sulfur-containing Gas: *Si-Wei Lin*[1]; Albert T. Wu[1]; [1]National Central University

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Stress Corrosion Cracking I

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

Program Organizers: Bai Cui, University of Nebraska-Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Advanced Cooling Technologies Inc; Jenifer Locke, Ohio State University

Tuesday PM **March 16, 2021**

Session Chairs: Karl Sieradzki, Arizona State University; Yong Yang , University of Florida

2:00 PM
Finite Element Modeling and Uncertainty Quantification of Stressed Corrosion Behavior in Aluminum Alloys: *Kaiwen Wang*[1]; Yinan Wang[1]; Xiaowei Yue[1]; Wenjun Cai[1]; [1]Virginia Polytechnic Institute and State University

2:20 PM
Understanding the Effects of ß-phase Precipitation on the Stress Corrosion Cracking Performance of Thin Plate 5xxx Alloys: *William Golumbfskie*[1]; Matthew McMahon[1]; Emily Holcombe[1]; Mitra Taheri[2]; [1]Naval Surface Warfare Center, Carderock Division; [2]Johns Hopkins University

2:40 PM Invited
Stress Corrosion Cracking Behavior of the Addictively Manufactured 316L Stainless Steel: *Yong Yang*[1]; [1]University of Florida

3:20 PM
SCC Performance of Repaired 304L: *Gabriella Marino*[1]; J. Srinivasan[1]; B. Sutton[1]; J. Li[1]; G. Daehn[1]; A. Vivek[1]; R. Thodla[2]; A. Shapiro[3]; A. Ramirez[1]; J. Locke[1]; [1]The Ohio State University; [2]DNV GL; [3]The Ohio State University, Titanium Brazing Inc.

3:40 PM
Irradiation-assisted Stress Corrosion Cracking (IASCC) of Austenitic Stainless Steels with Oversized Solutes in High-temperature Water: *Jingfan Yang*[1]; Xiang Liu[2]; Miao Song[3]; Lingfeng He[2]; Yongfeng Zhang[4]; Xiaoyuan Lou[1]; [1]Auburn University; [2]Idaho National Laboratory; [3]University of Michigan; [4]University of Wisconsin

MATERIALS DESIGN

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Advanced Experimental Characterization of Microstructurally Driven Fatigue Behavior

Sponsored by: TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, 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; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University; Jean-Charles Stinville, University of California-Santa Barbara

Tuesday PM **March 16, 2021**

Session Chair: Garrett Pataky, Clemson University

2:00 PM Invited
Microstructure and Fatigue Damage Evolution in Additive-manufactured Metals Using Enhanced Measurement Techniques and Modeling Approaches: *Mustafa Awd*[1]; Frank Walther[1]; Ali Fatemi[2]; [1]TU Dortmund University; [2]University of Memphis

2:20 PM
Low Cycle Fatigue Behavior of an Optimally Produced Additive Manufactured Aluminum Alloy: *Emine Tekerek*[1]; Vignesh Perumal[1]; Darren Beckett[2]; Scott Halliday[3]; Antonios Kontsos[1]; [1]Drexel University; [2]Sigma Labs; [3]Navajo Technical University

2:40 PM
Investigation of the Fatigue Crack Behavior of 304 Stainless Steels Using Synchrotron X-ray Tomography: *Ryan Schoell*[1]; Li Xi[1]; Harvey West[1]; Zeev Shayer[2]; Djamel Kaoumi[1]; [1]North Carolina State University; [2]Colorado School of Mines

3:00 PM
Long Range Internal Stress Assessment Using Convergent Beam Electron Diffraction and Dislocation Dipole Height in Cyclically Deformed Copper Single Crystals: *Roya Ermagan*[1]; Maxime Sauzay[2]; Michael Kassner[1]; [1]University of Southern California; [2]CEA Paris-Saclay

3:20 PM
Correlation between Cyclic Plastic Deformations and Strength Mismatches in Ni-Steel Dissimilar Joints under Isothermal Low-cycle Fatigue Tests: *Shutong Zhang*[1]; Sebastian Romo[1]; Rafael Arthur Giorjao[1]; Antonio Ramirez[1]; [1]Ohio State University

3:40 PM
High and Very High Cycle Fatigue Behavior of Additively Manufactured 17-4 PH Stainless Steel: The Effect of Shielding Gas: *P.D. Nezhadfar*[1]; Jade Welsh[2]; Jutima Simsiriwong[2]; Shuai Shao[1]; Nima Shamsaei[1]; [1]Auburn University; [2]University of North Florida

4:00 PM
An In-situ Analysis on the Fatigue Damage in Martensitic Spring Steel: *Anna Wildeis*[1]; Matthias Thimm[1]; Robert Brandt[1]; Hans-Jürgen Christ[1]; Claus-Peter Fritzen[1]; [1]University of Siegen

4:20 PM
Post-fatigue Study of SLM Ti64 Medical Implant by 3D Correlative Microscopy: *Bartlomiej Winiarski*[1]; Matteo Benedetti[2]; Philip Withers[3]; [1]Thermo Fisher Scientific; [2]University of Trento; [3]The University of Manchester

MATERIALS PROCESSING

Friction Stir Welding and Processing XI — Control & Non-Destructive Examination

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

Program Organizers: Yuri Hovanski, Brigham Young University; Piyush Upadhyay, Pacific Northwest National Laboratory; Yutaka Sato, Tohoku University; Nilesh Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter the Great St. Petersburg Polytechnic University

Tuesday PM **March 16, 2021**

2:00 PM
Real-time Measurement of Friction Stir Tool Motion during Defect Interaction in Aluminum Alloy 6061-T6: *Daniel Franke*[1]; Frank Pfefferkorn[1]; Shiva Rudraraju[1]; Michael Zinn[1]; [1]University of Wisconsin Madison

2:20 PM
Development of Automatic Quality Control Techniques for Friction Stir Welding Processes: *Egoitz Aldanondo*[1]; [1]LORTEK

2:40 PM
Preliminary Investigation of the Effect of Temperature Control in Friction Stir Welding: *Johnathon Hunt*[1]; David Pearl[2]; Carter Hamilton[2]; Yuri Hovanski[1]; [1]Brigham Young University; [2]Miami University

3:00 PM
Transitioning FSW to a Controlled Production Process: *Arnold Wright*[1]; Devry Smith[1]; Brandon Taysom[2]; Yuri Hovanski[1]; [1]Brigham Young University; [2]Pacific Northwest National Laboratory

3:20 PM
Removing Rotational Variations from Shoulder Thermocouples in Friction Stir Welding: *Brandon Taysom*[1]; Kenneth Ross[1]; Woongjo Choi[1]; [1]Pacific Northwest National Laboratory

PHYSICAL METALLURGY

Frontiers in Solidification Science VIII — Faceted Growth / Solid-Liquid Interfaces

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Phase Transformations Committee, TMS: Solidification Committee, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Damien Tourret, IMDEA Materials; Amy Clarke, Colorado School of Mines; Ulrike Hecht, Access e.V.; Nana Ofori-Opoku, Canadian Nuclear Laboratories; Melis Serefoglu, Koc University; Tiberiu Stan, Northwestern University

Tuesday PM **March 16, 2021**

Session Chairs: Mohsen Asle Zaeem, Colorado School of Mines; Damien Tourret, IMDEA Materials; Alain Karma, Northeastern University; Nana Ofori-Opoku, Canadian Nuclear Laboratories

2:00 PM Invited
3D Phase-field Simulations of Pattern Formation during Freeze Casting: Kaihua Ji[1]; Kaiyang Yin[1]; Louise Strutzenberg[2]; Rohit Trivedi[3]; Ulrike Wegst[1]; *Alain Karma*[1]; [1]Northeastern University; [2]NASA Marshall Space Flight Center; [3]Iowa State University

2:30 PM
Experimental Observations of Mechanisms of Pattern Formation during Freeze Casting: *Kaiyang Yin*[1]; Kaihua Ji[1]; Louise Strutzenberg[2]; Rohit Trivedi[3]; Alain Karma[1]; Ulrike G.K. Wegst[1]; [1]Northeastern University; [2]NASA Marshall Space Flight Center; [3]Iowa State University

2:50 PM Invited
Combination of X-ray Topography and Radiography for In Situ and Time Resolved Investigation of the Solidification of Silicon: Hadjer Ouaddah[1]; Gabrielle Regula[1]; Guillaume Reinhart[1]; *Nathalie Mangelinck-Noël*[1]; [1]IM2NP CNRS UMR 7334, Aix Marseille University

3:20 PM
Facetted Growth in Isothermal Solidification of Silicon: 3D Phase-field Simulations of Growth and Equilibrium Shapes
: *Ahmed Kaci Boukellal*[1]; Ahmed Kerim Sidi Elvalli[2]; Jean-Marc Debierre[3]; [1]Aix-Marseille University (IM2NP) and IMDEA Materials; [2]Aix-Marseille University (IM2NP) and Spintec; [3]Aix-Marseille University (IM2NP)

3:40 PM Invited
Bridging Multiscale Models for Predicting Nano and Microstructures in Rapid Solidification of Metals and Alloys: *Mohsen Asle Zaeem*[1]; [1]Colorado School of Mines

4:10 PM
A Method of Estimation of Solid-liquid Interface Anisotropy Based on Machine Learning Combined with Phase-field Simulations: *Geunwoo Kim*[1]; Tomohiro Takaki[2]; Yasushi Shibuta[3]; Munekazu Ohno[1]; [1]Hokkaido University; [2]Kyoto Institute of Technology; [3]The University of Tokyo

4:30 PM
Structural Changes during Crystallization and Vitrification of Dilute FCC-based Binary Alloys: *Deep Choudhuri*[1]; Bhaskar Majumdar[1]; [1]New Mexico Institute of Mining and Technology

4:50 PM
Unraveling the Effect of Solid-liquid Interfacial Anisotropy on Pattern Formation in Rapid Directional Solidification of Binary Alloys: *Ghavam Azizi*[1]; Mohsen Asle Zaeem[1]; [1]Colorado School of Mines

SPECIAL TOPICS

Frontiers of Materials Award Symposium: 2021 Functional Nanomaterials: Translating Innovation into Pioneering Technologies — Session IV

Program Organizer: Huanyu Cheng, Pennsylvania State University

Tuesday PM **March 16, 2021**

2:00 PM Invited
Intelligent Materials at the AI-robotics-medicine Nexus: *Xuanhe Zhao*[1]; [1]Massachusetts Institute of Technology

2:40 PM Invited
Expansile Kirigami Wrapping Designs for Breast Reconstruction: Young-Joo Lee[1]; Hyesung Cho[1]; Jason Christopher Jolly[1]; Eric Jablonka[1]; Michael Tanis[1]; Randall Kamien[1]; Suhail Kanchwala[1]; *Shu Yang*[1]; [1]University of Pennsylvania

3:20 PM Invited
Liquid Metals and Hydrogels: Inherently Stetchable Materials for Wearables: *Michael Dickey*[1]; [1]North Carolina Stste University

4:00 PM Invited
Semiconductor Nanomaterials for Neural Interfaces: *John Rogers*[1]; [1]Northwestern University

4:40 PM Invited
Skin-inspired Organic Electronics: *Zhenan Bao*[1]; [1]Stanford University

NANOSTRUCTURED MATERIALS

Heterostructured and Gradient Materials (HGM IV): Tailoring Heterogeneity for Superior Properties — Gradient Materials

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

Program Organizers: Yuntian Zhu, City University of Hong Kong; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California-Santa Barbara
; Yves Brechet, Grenoble Institute of Technology; Huajian Gao, Nanyang Technological University; Hyoung Seop Kim, Pohang University of Science and Technology; Ke Lu, Institute of Metal Research; Xiaolei Wu, Chinese Academy of Sciences

Tuesday PM **March 16, 2021**

Session Chairs: Brad Boyce, Sandia National Lab; Hyoung Seop Kim, Postech; Suveen Mathaudhu, University of California, Riverside

2:00 PM Invited
Chemical Gradients to Control Stability and Mechanical Behavior in Nanostructured Pt-Au: *Brad Boyce*[1]; David Adams[1]; Khalid Hattar[1]; Remi Dingreville[1]; Riley Parrish[1]; Fadi Abdeljawad[2]; [1]Sandia National Laboratories; [2]Clemson University

2:25 PM
Multi-layered Gradient Structure by Single-roll Angular-rolling and Ultrasonic Nanocrystalline Surface Modification: *Hyoung Seop Kim*[1]; Hak Hyeon Lee[1]; Hyung Keun Park[1]; Jaimyun Jung[2]; Auezhan Amanov[3]; [1]Pohang University of Science and Technology; [2]KIMS; [3]Sun Moon University

2:45 PM
Mechanical Enhancement of Graded Nanoporous Structure: *Lijie He*[1]; Niaz Abdolrahim[1]; [1]University of Rochester

3:05 PM
Tuning the Strongest Size by Tailoring Grain Size Gradient in Metals: *Penghui Cao*[1]; [1]University of California Irvine

3:25 PM Invited
Exploring the Grain Size Stability of Heterogeneous Copper in Thermal, Mechanical and Radiation Environments: Heather Salvador[1]; Evander Ramos[1]; Sina Shahrezaei[2]; Trevor Clark[3]; Khalid Hattar[3]; *Suveen Mathaudhu*[1]; [1]University of California, Riverside; [2]Pacific Northwest National Laboratory; [3]Sandia National Laboratories

3:50 PM
Site-specific Texture Control for Functionally Graded Structures of Stainless Steel 316L Manufactured by Selective Laser Melting: *Karl Sofinowski*[1]; Raman Sudharshan[1]; Adarsh Nair[1]; Matteo Seita[1]; [1]Nanyang Technological University

ADVANCED MATERIALS

High Entropy Alloys IX: Alloy Development and Properties — Alloy Development and Application III

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

Tuesday PM **March 16, 2021**

Session Chairs: Wen Chen, University of Massachusetts Amherst; Duck Kim, Tennessee Technological University

2:00 PM Invited
High-Entropy Alloys Containing Cu: Effects on Microstructure and Liquid Phase: Reza Abbaschian[1]; *Nicholas Derimow*[2]; Raquel Jaime[1]; Bryan Le[1]; [1]University of California, Riverside; [2]National Institute of Standards and Technology

2:25 PM Invited
Accelerated Design of High-entropy Alloys for Gas-Turbine Blade Components: Baldur Steingrimsson[1]; Joseph Poon[2]; Michael Widom[3]; Anand Kulkarni[4]; Xuesong Fan[5]; Chanho Lee[5]; Chuan Zhang[6]; Michael Kirka[7]; Jaafar El-Awady[8]; *Peter Liaw*[5]; [1]Imagars LLC; Portland State University; [2]University of Virginia; [3]Carnegie Mellon University; [4]Siemens Corporation; [5]University of Tennessee; [6]CompuTherm LLC; [7]Oak Ridge National Laboratory; [8]John Hopkins University

2:50 PM Invited
Effect of Process Parameters on the Microstructure and Mechanical Properties of Wire+Arc Additively Manufactured AlCoCrFeNi High Entropy Alloy: Rumman Ahsan[1]; Xuesong Fan[2]; Gi-Jeong Seo[1]; Peter Liaw[2]; *Duck Bong Kim*[1]; [1]Tennessee Technological University; [2]The University of Tennessee, Knoxville

3:15 PM Invited
Welding Metallurgy and Weld Properties of High Entropy Alloys: *Carolin Fink*[1]; Alexander C. Martin[1]; [1]Ohio State University

3:40 PM Invited
Fabrication of Medium- and High-entropy Alloys Using Electroplating and Radio Frequency Plasma: *Yu Zou*[1]; [1]University of Toronto

4:05 PM
Friction Stir Gradient Alloying: A Novel High-throughput Screening Technique to Explore HCP to BCC Transformation in a γ-FCC Dominated High Entropy Alloy by V Addition: *Priyanka Agrawal*[1]; Shivakant Shukla[1]; Sanya Gupta[1]; Priyanshi Agrawal[1]; Rajiv Mishra[1]; [1]University of North Texas

4:25 PM
Exploring the Structure-property Relationships of (Ti, TiAl6V4) xCoCrFeMnNi Graded High Entropy Alloy: *Michael Melia*[1]; Jonathan Pegues[1]; Mark Rodriguez[1]; Raymond Puckett[1]; Shaun Whetten[1]; Nicolas Argibay[1]; Andrew Kustas[1]; [1]Sandia National Laboratories

ADVANCED MATERIALS

High Entropy Alloys IX: Structures and Modeling — Structures and Characterization 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

Tuesday PM **March 16, 2021**

Session Chairs: Robert Ritchie, University of California, Berkeley; Michael Widom, Carnegie Mellon University

2:00 PM Invited
Electronic Effects on the Mechanical Properties of HEA: *Takeshi Egami*[1]; [1]University of Tennessee

2:25 PM Invited
An Averaged Cluster Approach to Include Chemical Short Range Order in First Principles Calculations with Application to High Entropy Alloys: Vishnu Raghuraman[1]; Yang Wang[1]; *Michael Widom*[1]; [1]Carnegie Mellon University

2:50 PM
Faulting-mediated Plasticity in a CoCrNiW Complex Concentrated Alloy: *Shaolou Wei*[1]; Cem Tasan[1]; [1]Massachusetts Institute of Technology

3:10 PM Invited
Unique Deformation Behavior in the NbTaTiV Refractory High-entropy Alloy: *Chanho Lee*[1]; George Kim[2]; Yi Chou[3]; Brianna Musicó[1]; Michael Gao[4]; Ke An[5]; Gian Song[6]; Yi-Chia Chou[3]; Veerle Keppens[1]; Wei Chen[2]; Peter Liaw[1]; [1]University of Tennessee; [2]Illinois Institute of Technology; [3]National Chiao Tung University; [4]National Energy Technology Laboratory/Leidos Research Support Team; [5]Oak Ridge National Laboratory; [6]Kongju National University

3:35 PM Invited
Unprecedented Supercritical Elasticity in NiCoFeGa Multi-principal-element Alloys: Haiyang Chen[1]; Yan-Dong Wang[1]; *Yang Ren*[2]; [1]University of Science and Technology Beijing; [2]Argonne National Laboratory

4:00 PM Invited
Influence of Ductile Multicomponent Intermetallic Phase on Mechanical Behavior in High-entropy Alloys: *Rui Feng*[1]; You Rao[2]; Huamiao Wang[3]; Yan Chen[1]; Chuan Zhang[4]; Maryam Ghazisaeidi[2]; Ke An[1]; Peter Liaw[5]; [1]Oak Ridge National Laboratory; [2]The Ohio State University; [3]Shanghai Jiao Tong University; [4]Computherm, LLC; [5]The University of Tennessee, Knoxville

MATERIALS PROCESSING

High Temperature Electrochemistry IV — Session III

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

Program Organizers: Prabhat Tripathy, Batelle Energy Alliance (Idaho National Laboratory); Guy Fredrickson, Idaho National Laboratory

Tuesday PM **March 16, 2021**

Session Chair: Michael Simpson, University of Utah

2:00 PM
Validated Modeling of Quartzite Reduction to Solar Silicon by Molten Salt Electrolysis: *Aditya Moudgal*[1]; Mohammad Asadikiya[1]; Jacob Hazerjian[1]; Vicky Luu[1]; Ariana Ly[1]; Adam Powell[1]; Uday Pal[2]; Yu Zhong[1]; [1]Worcester Polytechnic Institute; [2]Boston University

2:30 PM
A Comparative Study of Working Electrode Materials for Voltammetry Measurements in LiCl–Li2O Salts: *Guoping Cao*[1]; Ammon Williams[1]; Michael Shaltry[1]; [1]Idaho National Laboratory

3:00 PM
Liquid Bipolar Electrode for Extraction of Aluminium and PGM Concentrate from Spent Catalysts: *Andrey Yasinskiy*[1]; Peter Polyakov[1]; Dmitriy Varyukhin[1]; Sai Krishna Padamata[1]; [1]Siberian Federal University

MATERIALS DESIGN

Hume-Rothery Symposium: Accelerated Measurements and Predictions of Thermodynamics and Kinetics for Materials Design and Discovery — Session IV

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

Program Organizers: Wei Xiong, University of Pittsburgh; Shuanglin Chen, CompuTherm LLC; Wei Chen, Illinois Institute of Technology; James Saal, Citrine Informatics; Greta Lindwall, KTH Royal Institute of Technology

Tuesday PM **March 16, 2021**

Session Chair: Dana Frankel, QuesTek Innovations LLC

2:00 PM Invited
High-throughput Synthesis, Characterization and Prediction of Metallic Glass Formation: *John Perepezko*[1]; Janine Erickson[1]; Dan Thoma[1]; Carter Francis[1]; Paul Voyles[1]; Benjamin Afflerbach[1]; Dane Morgan[1]; [1]University of Wisconsin-Madison

2:40 PM Invited
A Thermodynamic and Molar Volume Database for Co-base Superalloys: *Ursula Kattner*[1]; Peisheng Wang[2]; [1]National Institute of Standards and Technology; [2]Central South University

3:20 PM Invited
Phase Stability and Kinetic Considerations in Materials Processing and Performance: *Steven Zinkle*[1]; Yajie Zhao[1]; Ty Austin[1]; Ying Yang[1]; [1]University of Tennessee

4:00 PM Invited
Machine Learning-assisted ICME Approaches to Explore the Alloy and Process Space in Metals Additive Manufacturing: *Raymundo Arroyave*[1]; [1]Texas A&M University

4:40 PM Invited
Printability and Properties of Metallic Alloys for Laser Powder Bed Fusion Additive Manufacturing: *Yongho Sohn*[1]; Le Zhou[1]; Holden Hyer[1]; Abhishek Mehta[1]; [1]University of Central Florida

LIGHT METALS

Magnesium Technology 2021 — Fundamentals of Plastic Deformation

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

Program Organizers: Victoria Miller, University of Florida; Petra Maier, University of Applied Sciences Stralsund; J. Brian Jordon, University of Alabama; Neale Neelameggham, IND LLC

Tuesday PM **March 16, 2021**

Session Chairs: Tracy Berman, University of Michigan; Sean Agnew, University of Virginia

2:00 PM Invited
Accounting for the Effects of Dislocation Climb Mediated Flow in Mg alloy ZK10 Sheet: Michael Ritzo[1]; *Sean Agnew*[1]; [1]University of Virginia

2:30 PM
Three Dimensional Interaction of {101 ¯2} Twins with Tilt Boundaries in Mg: Twin and Dislocation Transmission: Khanh Dang[1]; John Graham[1]; Carlos Tome[1]; Vincent Taupin[2]; *Laurent Capolungo*[1]; [1]Los Alamos National Laboratory; [2]LEM3

2:50 PM Invited
Revisiting <c+a> Pyramidal Slip in Magnesium: *Jaafar El-Awady*[1]; [1]Johns Hopkins University

3:20 PM
Thermally Activated Nature of Basal and Prismatic Slip in Mg and Its Alloys: *Mohammed Shabana*[1]; Jishnu Bhattacharyya[1]; Marek Niewczas[2]; Sean Agnew[1]; [1]University of Virginia; [2]McMaster University

3:40 PM
Mechanisms and Machine Learning for Magnesium Alloys Design: *Zongrui Pei*[1]; [1]National Energy Technology Laboratory

4:00 PM
Three Dimensional Atomistic Simulations of {101 ¯2} Non-cozone Twin -- Twin Interaction in Mg – Role of Twin Stability and Mobility: *Khanh Dang*[1]; Carlos Tomé[1]; Laurent Capolungo[1]; [1]Los Alamos National Laboratory

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — Electrochemistry

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

Program Organizers: Stephen Raiman, Texas A&M University; Kumar Sridharan, University of Wisconsin-Madison; Nathaniel Hoyt, Argonne National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Michael Short, Massachusetts Institute of Technology; Raluca Scarlat, University of California-Berkeley

Tuesday PM **March 16, 2021**

Session Chair: Nathaniel Hoyt, Argonne National Laboratory

2:00 PM
Research Paths on Spectroelectrochemistry for Molten Salt Chemistry in the U.S with Respect to Other Nations: *Supathorn Phongikaroon*[1]; [1]Virginia Commonwealth University

2:30 PM
Materials Compatibility and Potential Stability of Reference Electrodes for Molten FLiBe: *Francesco Carotti*[1]; Raluca Scarlat[2]; [1]University of Wisconsin, Madison; [2]University of California, Berkeley

2:50 PM
Redox Measurement and Control in Molten Chloride Fast Reactor Fuel Salt: *Matthew Newton*[1]; D. Hamilton[1]; Michael Simpson[1]; [1]Univ of Utah

3:10 PM
Oxidation Potential of Molten Halide Salts: A First Principles Study: *Jianguo Yu*[1]; Guoping Cao[1]; [1]Idaho National Lab

3:30 PM
High-throughput Electrochemical Characterization and Screening of CSP-relevant Alloys: *Nathaniel Hoyt*[1]; Jicheng Guo[1]; Mark Williamson[1]; [1]Argonne National Laboratory

3:50 PM
Corrosion of Zircaloy-2 in Molten LiCl-xLi2O at 650 °C: *Vineeth Kumar Gattu*[1]; Evan Wu[1]; William Ebert[1]; [1]Argonne National Laboratory

4:10 PM
Development of an Electrochemical Phase Field Model for the Corrosion of Ni-Cr Alloys by Molten Fluoride Salts: *Chaitanya Bhave*[1]; Michael Tonks[1]; David Andersson[2]; Jake McMurray[3]; [1]University of Florida; [2]Los Alamos National Laboratory; [3]Oak Ridge National Lab

MATERIALS PROCESSING

Materials Engineering -- From Ideas to Practice: An EPD Symposium in Honor of Jiann-Yang Hwang — Metallurgy

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

Program Organizers: Bowen Li, Michigan Technological University; Baojun Zhao, University of Queensland; Jian Li, CanmetMATERIALS; Sergio Monteiro, Instituto Militar de Engenharia; Zhiwei Peng, Central South University; Dean Gregurek, RHI Magnesita; Tao Jiang, Central South University; Yong Shi, Futianbao Environment Technologies; Cuiping Huang, FuTianBao Environment Protection Technology Company Ltd.; Shadia Ikhmayies

Tuesday PM **March 16, 2021**

Session Chairs: Ailiang Chen, Central South University; Xiaodi Huang, Michigan Technological University

2:00 PM Invited
Effect of Boron Iron Concentrate on the Strength of Preheated Iron Ore Pellets: Li Ma[1]; *Gele Qing*; Zhixing Zhao[1]; Baojun Zhao[2]; [1]Shougang Research Institute of Technology; [2]University of Queensland

2:20 PM
Metallographic Feature of a Nickel-based Superalloy in Fluoride Electrolyte Melt: *Bowen Li*[1]; Xiaodi Huang[1]; Jiann-Yang Hwang[1]; [1]Michigan Technological University

2:40 PM Invited
Phase Diagram and Thermodynamic Properties of Cu-O Binary System: *Shadia Ikhmayies*

3:00 PM
Characterization of Mixing Conditions of Different Nozzle and Porous Plugs Setups in Non-ferrous Refining Furnaces: *Anton Ishmurzin*[1]; Daniel Kreuzer[1]; Goran Vukovic[1]; [1]RHI Magnesita

3:20 PM Invited
The Formation Mechanism of the Third Phase in Nickel Electrolyte: *Ailiang Chen*[1]; Jiale Mao[1]; Guanwen Luo[1]; Sujun Lu[2]; Peng Zhang[3]; Yutian Ma[3]; Shengli Chen[2]; Zuojuan Du[1]; Jinxin Qiao[1]; Bowen Li[4]; [1]Central South University; [2]State Key Laboratory of Nickel and Cobalt Resources Comprehensive Utilization, Jinchang; [3]State Key Laboratory of Nickel and Cobalt Resources Comprehensive Utilization, Jinchang ; [4]Michigan Technological University

ADVANCED MATERIALS

Materials for High Temperature Applications: Next Generation Superalloys and Beyond — Refractory Alloys: Design and Mechanical Properties

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

Program Organizers: Govindarajan Muralidharan, Oak Ridge National Laboratory; Martin Heilmaier, KIT Karlsruhe; Benjamin Adam, Portland State University; Mario Bochiechio, Pratt & Whitney; Katerina Christofidou, University of Sheffield; Eric Lass, University of Tennessee-Knoxville; Jeremy Rame, Safran Aircraft Engines; Pierre Sallot, Safran; Akane Suzuki, GE Research; Michael Titus, Purdue University

Tuesday PM **March 16, 2021**

2:00 PM Invited
Rapid Screening, Machine Learning, and Multi-objective Optimization for Refractory Alloy Development: *Andrew Detor*[1]; Meinolf Sellmann[1]; Scott Oppenheimer[1]; Emily Cheng[1]; James Ruud[1]; [1]GE Research

2:30 PM
Rapid Design of Refractory Multi-principal Element Alloys for High-T Structural Applications: Theory-guided Combinatorial Synthesis and Characterization Approach: *Gaoyuan Ouyang*[1]; Prashant Singh[1]; Ranran Su[2]; Shalabh Gupta[1]; John Perepezko[2]; Jun Cui[1]; Matthew Kramer[1]; Duane Johnson[1]; [1]Ames Laboratory (US DOE); [2]University of Wisconsin – Madison

2:50 PM
New Tools for Analysis of Microplasticity in BCC Refractory Metals: *Leah Mills*[1]; Jean-Charles Stinville[1]; Marie-Agathe Charpagne[1]; Joseph Wendorf[1]; McLean Echlin[1]; Valéry Valle[2]; Paul Dawson[3]; Daniel Gianola[1]; Tresa Pollock[1]; [1]University of California Santa Barbara; [2]Pprime Institut; [3]Cornell University

3:10 PM
The Creep Performance of Pesting-Resistant Mo-Si-Ti Alloys: *Susanne Obert*[1]; Alexander Kauffmann[1]; Martin Heilmaier[1]; [1]Karlsruhe Institute for Technology

3:30 PM
Effect of Processing Parameters on Molybdenum Weld Microstructures: *Noah Kohlhorst*[1]; Govindarajan Muralidharan[2]; Roger Miller[2]; Kevin Faraone[2]; Ji-Cheng Zhao[3]; [1]Ohio State Univerity; [2]Oak Ridge National Laboratory (ORNL); [3]University of Maryland, Department of Materials Science and Engineering

3:50 PM
Creep Testing of Molybdenum: Brandon Kenny[1]; Jacqueline Foradora[2]; Alex Xie[3]; *Gary Rozak*[2]; [1]Miami University; [2]H.C. Starck Solutions Euclid; [3]H.C. Starck Solutions Taicang

MATERIALS PROCESSING

Materials Processing Fundamentals — Steel Casting

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Jonghyun Lee, Iowa State University; Samuel Wagstaff, Oculatus; Alexandra Anderson, Gopher Resource; Fiseha Tesfaye, Abo Akademi University; Guillaume Lambotte, Boston Metal; Antoine Allanore, Massachusetts Institute of Technology

Tuesday PM **March 16, 2021**

Session Chairs: Samuel Wagstaff, Oculatus Consulting; Antoine Allanore, MIT

2:00 PM
The $CuCl_2$-$CuSO_4$-$ZnSO_4$ System at Elevated Temperatures: *Fiseha Tesfaye*[1]; Daniel Lindberg[2]; Mykola Moroz[3]; Leena Hupa[1]; [1]Abo Akademi University; [2]Aalto University; [3]Ivan Franko National University of Lviv

2:20 PM
Stress Development Simulation in Continuously Cast Steel Slabs during Cooling Process: *Duo Huang*[1]; [1]Purdue University

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Microstructure Effects

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Eda Aydogan, Middle East Technical University; Laurent Capolungo, Los Alamos National Laboratory; Khalid Hattar, Sandia National Laboratories; Kayla Yano, Pacific Northwest National Laboratory; Caleb Massey, Oak Ridge National Laboratory

Tuesday PM **March 16, 2021**

2:00 PM
He Ion Irradiation Response of a Gradient T91 Steel: *Zhongxia Shang*[1]; Jie Ding[1]; Cuncai Fan[2]; Di Chen[3]; Jin Li[1]; Yifan Zhang[1]; Yongqiang Wang[4]; Haiyan Wang[1]; Xinghang Zhang[1]; [1]Purdue University; [2]Oak Ridge National Laboratory; [3]University of Houston; [4]Los Alamos National Laboratory

2:20 PM
High Temperature Strength of Additively Manufactured Gr91 Steel: *Benjamin Eftink*[1]; Daniel Vega[2]; Osman El Atwani[1]; David Sprouster[3]; Carl Cady[1]; Mohamad Al-Sheikhly[4]; Thomas Lienert[5]; Stuart Maloy[1]; [1]Los Alamos National Laboratory; [2]DOE; [3]Stony Brook University; [4]University of Maryland; [5]T.J. Lienert Consulting, LLC

2:40 PM Invited
Wear Behavior of Incoloy™ 800HT and Inconel™ 617 for High-Temperature Gas-cooled Reactor (HTGR) Applications: Valentin Pauly[1]; Joseph Kern[1]; Malcolm Clark[1]; David Grierson[1]; *Kumar Sridharan*[1]; [1]University of Wisconsin-Madison

3:10 PM
Modeling the Effect of Helium Bubbles, Rigid Inclusions, and Grain Boundaries on Crack Initiation in Nickel: *Tung Yan Liu*[1]; Michael Demkowicz[1]; [1]Texas A&M University

3:30 PM
Quantifying Zirconium Embrittlement Due to Hydride Microstructure Using Image Analysis: *Pierre-Clement Simon*[1]; Cailon Frank[1]; Long-Qing Chen[1]; Mark Daymond[2]; Michael Tonks[3]; Arthur Motta[1]; [1]The Pennsylvania State University; [2]Queen's University; [3]University of Florida

3:50 PM
In-situ Observations of the Failure Mechanisms of Hydrided Zircaloy-4 under Different Stress-States: *Brian Cockeram*[1]; Kwai Chan[2]; [1]Naval Nuclear Laboratory-Bettis Laboratory; [2]Southwest Research Institute

CHARACTERIZATION

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, TMS: Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Jagannathan Rajagopalan, Arizona State University; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Robert Wheeler, Microtesting Solutions LLC; Shailendra Joshi, University of Houston

Tuesday PM **March 16, 2021**

Session Chair: Amit Pandey, Lockheed Martin Space

2:00 PM
Quantifying the Long-range Stress ahead of the Tip of a Dislocation Pileup at a Grain Boundary and Its Contribution to the Subsequent Structure Changes in Ti-alloys from the Atomistic to the Mesoscale: *Liming Xiong*[1]; [1]Iowa State University

2:20 PM
Dislocation Pileup Induced Transmission across Grain Boundaries in Aluminum via Molecular Dynamics Simulations: *Royce Reyes*[1]; Douglas Spearot[1]; [1]University of Florida

2:40 PM
Decoupling the Effect of Nanoscale Geometry and Internal Microstructure on the Mechanics of Nanoporous Pt: Ankit Gupta[1]; Timothy Ibru[2]; Antonia Antoniou[2]; *Garritt Tucker*[1]; [1]Colorado School Of Mines; [2]Georgia Institute of Technology

3:00 PM
Constitutive Model Materials Parameter Determination Using Cyclic Tension-compression Test Data: *Dilip Banerjee*[1]; William Luecke[1]; Mark Iadicola[1]; Evan Rust[1]; [1]National Institute of Standards and Technology

3:20 PM
Multiphysics Modeling of Coupled Chemical-Thermal-mechanical Phenomena in Chemically Blown Polyurethane Foams during Manufacturing: Kevin Long[1]; *Judith Brown*[1]; Rekha Rao[1]; Christine Roberts[1]; [1]Sandia National Laboratories

3:40 PM
Effects of Phase Purity and Pore-reinforcement on the Mechanical Behavior of Metal–organic Frameworks: *Kevin Schmalbach*[1]; Zhao Wang[1]; Rebecca Combs[1]; Youxing Chen[2]; R. Lee Penn[1]; Andreas Stein[1]; Nathan Mara[1]; [1]University of Minnesota; [2]University of North Carolina at Charlotte

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MATERIALS PROCESSING

Ni-Co 2021: The 5th International Symposium on Nickel and Cobalt — Hydrometallurgy II

Sponsored by: The Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy and Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Pyrometallurgy Committee

Program Organizers: Corby Anderson, Colorado School of Mines; Dean Gregurek, RHI Magnesita; Mari Lundström, Aalto University; Christina Meskers; Prabhat Tripathy, Batelle Energy Alliance (Idaho National Laboratory); Fiseha Tesfaye, Abo Akademi University; Yuanbo Zhang, Central South University; Sari Muinonen, Glencore; Graeme Goodall, XPS- Glencore; Shijie Wang, Rio Tinto Kennecott Utah Copper Corp (Retired)

Tuesday PM **March 16, 2021**

2:00 PM
Effective Treatment of Domestic US Cobalt Ores and Concentrates: Andy Tomaka[1]; *Corby Anderson*[1]; [1]Colorado School of Mines

2:20 PM
Separating and Recovering Cobalt and Iron from Co, Fe-bearing Metallurgical Slag via Acid Leaching Process: *Yuanbo Zhang*[1]; Yikang Tu[1]; Zijian Su[1]; Tao Jiang[1]; [1]Central South University

2:40 PM
Starved Acid Leaching Technology for Nickel and Cobalt Recovery from Lean Resources: *David Dreisinger*[1]; [1]University of British Columbia

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PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Ferrous Alloys

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

Program Organizers: Rongpei Shi, Lawrence Livermore National Laboratory; Yipeng Gao, Idaho National Laboratory; Fadi Abdeljawad, Clemson University; Bharat Gwalani, Pacific Northwest National Laboratory; Qi An, University of Nevada-Reno ; Eric Lass, University of Tennessee-Knoxville; Huajing (Wilson) Song, Los Alamos National Laboratory

Tuesday PM **March 16, 2021**

Session Chair: HuaJing Song, Los Alamos National Lab

2:00 PM
Solute Partitioning during the Double Soaking Heat Treatment of Medium Manganese Steels: *Alexandra Glover*[1]; Emmanuel De Moor[2]; John Speer[2]; [1]Los Alamos National Laboratory; [2]Colorado School of Mines

2:20 PM
Cementite Formation in Ferritic Steels:Ffirst-principles Based AtomisticSsimulations.: *Océane Buggenhoudt*[1]; Chu-Chun Fu[1]; Thomas Schuler[1]; Jean-Luc Béchade[1]; [1]CEA, Université Paris Saclay

2:40 PM
Effect of Cold Rolling on PhaseTtransformations in 2202 Lean Duplex Stainless Steel: *Frederic Danoix*[1]; Sophie Cazottes[2]; Raphaele Danoix[3]; Dimitri Rolland[2]; Sarata Cissé[4]; Véronique Massardier[2]; [1]CNRS; [2]INSA Lyon; [3]CNRS - Univ Rouen Normandie; [4]INDUSTEEL

3:00 PM
Phase Instability and Formation of Radiation-induced BCC-phases in Austenitic Stainless Steel after Long Term Neutron Exposure: Diana Merezhko[1]; *Mikhail Merezhko*[1]; Maxim Gussev[2]; Thomas Rosseel[2]; Oleg Maksimkin[1]; Francis Garner[3]; [1]Institute of Nuclear Physics; [2]Oak Ridge National Laboratory; [3]Radiation Effects Consulting

3:20 PM
Applicability of Deep Cryogenic Treatment in Emerging Industries: *Patricia Jovicevic-Klug*[1]; Matic Jovicevic-Klug[1]; Bojan Podgornik[1]; [1]Institute of Metals and Technology

3:40 PM
Austempered Microstructures for Bearing Applications: *Scott Hyde*[1]; [1]The Timken Company

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MATERIALS PROCESSING

Rare Metal Extraction & Processing — REEs, Sc

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; Kerstin Forsberg, KTH Royal Institute of Technology; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Alafara Baba, University of Ilorin; Neale Neelameggham, IND LLC

Tuesday PM **March 16, 2021**

2:00 PM Keynote
Understanding the Feasibility for Secondary and by Product Sources to Supply Rare Earth Metals: *Gabrielle Gaustad*[1]; Eric Williams[2]; Alexandra Leader[2]; Ajay Gupta[2]; Saptarshi Das[2]; [1]Alfred University; [2]Rochester Institute of Technology

2:20 PM Invited
Uranium and Thorium Removal from Rare Earth Sulfate Solutions by Ion Exchange and Solvent Extraction: *David Dreisinger*[1]; Mike Johnson[2]; Niels Verbaan[2]; Greg Andrews[2]; [1]University of British Columbia; [2]SGS Minerals

2:40 PM Invited
Rare Earth Elements Extraction from Coal Waste Using Biooxidation Approach: *Prashant Sarswat*[1]; Michael Free[1]; [1]University of Utah

3:00 PM Invited
Supercritical Extraction of Neodymium from NdFeB Magnet Using Organophosphorus Ligands: Nattanai Kunanusont[1]; Jiakai Zhang[2]; Kimberly Watada[2]; Yusuke Shimoyama[1]; *Gisele Azimi*[2]; [1]Tokyo Institute of Technology; [2]University of Toronto

3:20 PM Invited
Scandium Extraction from Bauxite Residue Using Sulfuric Acid and a Composite Extractant-enhanced Ion-exchange Polymer Resin: *Efthymios Balomenos*[1]; Ghazaleh Nazari[2]; Panagiotis Davris[1]; Gomer Abrenica[2]; Anastasia Pilichou[3]; Eleni Mikeli[3]; Dimitrios Panias[3]; Shailesh Patkar[2]; Wen-Qing Xu[2]; [1]Mytilineos Metallurgy Buisness Unit; [2]II-VI; [3]NTUA

3:40 PM Invited
Scandium: Leaching and Extraction Chemistry: *Dag Eriksen*[1]; [1]Primus.Inter.Pares As

4:00 PM Invited
Environmentally Friendly Solid Phase Extraction of Critical Materials and REE from Unconventional Sources: *Athanasios Karamalidis*[1]; Jonathan Callura[2]; Madhav Patel[1]; [1]Pennsylvania State University; [2]Carnegie Mellon University

ENERGY & ENVIRONMENT

Recycling and Sustainability for Emerging Technologies and Strategic Materials — E-Waste & Value Recovery

Sponsored by: TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Recycling and Environmental Technologies Committee

Program Organizers: John Howarter, Purdue University; Mingming Zhang, ArcelorMittal Global R&D; Elsa Olivetti, Massachusetts Institute of Technology; Hong Peng, University of Queensland

Tuesday PM **March 16, 2021**

Session Chair: John Howarter, Purdue University

2:00 PM Invited
Characterisation and Techno-economics of a Process to Recover Value from E-waste Materials: *Khairul Islam*[1]; Michael Somerville[2]; Nawshad Haque[2]; [1]RMIT University; [2]CSIRO

2:30 PM
Recycling of Spent SCR Catalyst to Recover Vanadium and Tungsten by Hydrometallurgical Routes: *Ana Belen Cueva-Sola*[1]; Jin-Young Lee[2]; Rajesh Kumar Jyothi[2]; [1]Korea University of Science and Technology (UST), Daejeon 34113, South Korea; [2]Korea Inst of Geoscience & Mineral Resources

2:50 PM
The Separation of Nickel and Cobalt from Lithium-ion Battery Leachate: *Mark Strauss*[1]; Josh McNally[1]; Luis Aldana[1]; John Klaehn[1]; Tedd Lister[1]; [1]Idaho National Laboratory

3:10 PM
Rare Earth Magnet or Ferroalloy? What Steel Processing Can Teach Us about Magnet Sludge Recycling.: *Mary Elizabeth Wagner*[1]; Antoine Allanore[1]; [1]Massachusetts Institute of Technology

NANOSTRUCTURED MATERIALS

100 Years and Still Cracking: A Griffith Fracture Symposium — Fracture and Cracks

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

Program Organizers: Megan Cordill, Erich Schmid Institute of Materials Science; William Gerberich, University of Minnesota; David Bahr, Purdue University; Christopher Schuh, Massachusetts Institute of Technology; Daniel Kiener, Montanuniverstität Leoben; Neville Moody; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht

Wednesday AM **March 17, 2021**

Session Chair: Nathan Mara, University of Minnesota

8:30 AM Invited
Modeling Mechanics of Nanoparticles: Everything but Size: *Jonathan Amodeo*[1]; Laurent Pizzagalli[2]; [1]MATEIS lab, INSA-Lyon Univ. Lyon CNRS; [2]P' institute, Univ. Poitiers CNRS

9:10 AM
The Curious Phenomenon of Prince Rupert's Drops: Koushik Viswanathan[1]; Hillar Aben[2]; Munawar Chaudhri[3]; *Srinivasan Chandrasekar*[4]; [1]Indian Institute of Science; [2]Tallinn University of Technology; [3]University of Cambridge; [4]Purdue University

9:30 AM
Effect of Aspect Ratio on Stress Intensity Factor Solutions for Single Edge Notch Wire Fracture Test Specimen under Tensile and Clamped Bend Loading Conditions: *Hrushikesh Sahasrabuddhe*[1]; Ashwini Mishra[1]; Nagamani Jaya Balila[1]; [1]India Institute of Technology Bombay

ADVANCED MATERIALS

2D Materials – Preparation, Properties & Applications — Case Studies & Applications

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

Program Organizers: Nuggehalli Ravindra, New Jersey Institute of Technology; Ramana Chintalapalle, University of Texas at El Paso; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Sufian Abedrabbo, Khalifa University; Amber Shrivastava, Indian Institute of Technology Bombay

Wednesday AM **March 17, 2021**

Session Chairs: Amber Shrivastava, Indian Institute of Technology; Ramana Chintalapalle, University of Texas - El Paso

8:30 AM Invited
Formation of h-BN Ultrathin Films and Heterojunction MIS Diodes by Pulsed Laser Annealing: *Siddharth Gupta*[1]; Ritesh Sachan[2]; Jagdish Narayan[1]; [1]North Carolina State University; [2]Oklahoma State University

8:55 AM Invited
Graphene and Carbon Nanotubes: Key Materials for Electrochemical Energy Materials and Nano Biosensors: *Eon Soo Lee*[1]; [1]New Jersey Institute of Technology

9:20 AM Invited
hBN for Quantum Information Sciences: *Ritesh Sachan*[1]; [1]Oklahoma State University

9:45 AM
The Growth of $NbSe_2$ by Molecular Beam Epitaxy for Thermomagnetic Energy Conversion: *Peter Litwin*[1]; Sabbir Akhanda[1]; Mona Zebrajadi[1]; Stephen McDonnell[1]; [1]University of Virginia

NUCLEAR MATERIALS

Accelerated Discovery and Qualification of Nuclear Materials for Energy Applications — Data Analytics and Machine Learning in Nuclear Energy Applications

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

Program Organizers: Yongfeng Zhang, University of Wisconsin-Madison; Adrien Couet, University of Wisconsin-Madison; Michael Tonks, University of Florida; Jeffery Aguiar, Idaho National Laboratory; Andrea Jokisaari, Idaho National Laboratory; Karim Ahmed, Texas A&M University

Wednesday AM **March 17, 2021**

Session Chairs: Dane Morgan, University of Wisconsin; Karim Ahmed, Texas A&M U

8:30 AM Invited
Machine Learning and Atomistic Modeling of Defect Diffusion in Concentrated Ni-Fe Alloys: Wenjiang Huang[1]; *Xian-Ming Bai*[1]; [1]Virginia Polytechnic Institute and State University

9:00 AM
Characterization of As-Fabricated Additively Manufactured Alloy 718 Enhanced by Modern Tools and Machine Learning: *Stephen Taller*[1]; Luke Scime[1]; Kurt Terrani[1]; [1]UT-Battelle

9:20 AM Invited
Machine Learning for Accelerating Property Prediction and Materials Characterization in Irradiated Materials: *Dane Morgan*[1]; Mingren Shen[1]; Ryan Jacobs[1]; G. Robert Odette[2]; Kevin Field[3]; [1]University of Wisconsin-Madison; [2]University of California, Santa Barbara; [3]University of Michigan

9:50 AM
Point Defect Energies in Concentrated Alloys Using Ab Initio Calculations and Machine Learning: *Anus Manzoor*[1]; Gaurav Arora[1]; Dilpuneet Aidhy[1]; [1]University of Wyoming

10:10 AM Invited
Machine Learning Perovskites in the Quest for Improved Scintillators: Anjana Talapatra[1]; Christopher Stanek[1]; Blas Uberuaga[1]; *Ghanshyam Pilania*[1]; [1]Los Alamos National Laboratory

10:40 AM
An Integrated Approach for Coupling Experimental Data, Physics-based Models, and Machine Learning Algorithms for Predicting the Effective Thermal Conductivity of U-based Fuels: *Karim Ahmed*[1]; Fergany Badry[1]; [1]Texas A&M University

11:00 AM
Deep Learning for Automated Analysis of Cavities in Transmission Electron Microscopy Images: *Chun Yin Wong*[1]; Xing Wang[2]; Zhe Fan[3]; Karren More[4]; Sergei Kalinin[4]; Maxim Ziatdinov[4]; [1]University of Tennessee; [2]The Pennsylvania State University, Oak Ridge National Laboratory; [3]Lamar University, Oak Ridge National Laboratory; [4]Oak Ridge National Laboratory

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture V: Processing-Structure-Property Investigations and Application to Qualification — Fatigue Modeling and Prediction

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; John Lewandowski, Case Western Reserve University; Nima Shamsaei, Auburn University; Mohsen Seifi, ASTM International/Case Western Reserve University; Steve Daniewicz, University of Alabama

Wednesday AM **March 17, 2021**

Session Chair: Nik Hrabe, National Institute of Standards and Technology (NIST)

8:30 AM Invited
Damage Tolerant Approach in Additively Manufactured Metallic Materials: *Mauro Madia*[1]; Uwe Zerbst[1]; Tiago Werner[1]; [1]Bundesanstalt fuer Materialforschung und -pruefung (BAM)

9:00 AM
Defect-based Fatigue Model for AlSi10Mg Produced by Laser Powder Bed Fusion Process: *Avinesh Ojha*[1]; Wei-Jen Lai[1]; Ziang Li[1]; Carlos Engler-Pinto Jr.[1]; Xuming Su[1]; [1]Ford Motor Company

9:20 AM
State-of-the-Art in Predicting Fatigue Life for Applications in Metal-based Additive Manufacturing: *Newell Moser*[1]; Orion Kafka[1]; Jake Benzing[1]; Nicholas Derimow[1]; Nik Hrabe[1]; Edward Garboczi[1]; [1]National Institute of Standards and Technology

9:40 AM Invited
Synergistic Effects of Defects and Microstructure on Fatigue Behavior of LB-PBF Metallic Materials: *Shuai Shao*[1]; Nima Shamsaei[1]; [1]Auburn University

10:10 AM
Microstructure-based Model Validation and Predictions of Single-build-plate Fatigue Strength Sensitivity for Additively Manufactured Ti-6Al-4V: *Orion Kafka*[1]; Newell Moser[1]; Jake Benzing[1]; Nicholas Derimow[1]; Nikolas Hrabe[1]; Edward Garboczi[1]; [1]NIST

10:30 AM
3-D Convolutional Neural Networks for Pore Analysis in Metal Additive Manufacturing Builds: *Andrew Kitahara*[1]; Ziheng Wu[1]; Srujana Yarasi[1]; Nihal Sivakumar[1]; Anthony Rollett[1]; Elizabeth Holm[1]; [1]Carnegie Mellon University

10:50 AM
Bayesian Inference of Elastic Constants and Texture Coefficients in Additively Manufactured Alloys Using Resonant Ultrasound Spectroscopy: *Jeffrey Rossin*[1]; Patrick Leser[2]; Chris Torbet[1]; Stephen Smith[2]; Samantha Daly[1]; Tresa Pollock[1]; [1]University of California, Santa Barbara; [2]NASA Langley Research Center

Additive Manufacturing: Beyond the Beam II — Binder Jetting

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

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

Wednesday AM **March 17, 2021**

Session Chair: Paul Prichard, Kennametal

8:30 AM
Introductory Comments: Additive Manufacturing: Beyond the Beam II: *Paul Prichard*[1]; [1]Kennametal Inc.

8:35 AM
A Look into Solid-state Metal AM Techniques from Metallurgical Bonding Perspective: *Nihan Tuncer*[1]; Animesh Bose[1]; [1]Desktop Metal

8:55 AM
Development, Characterization, and Modeling of a 3D Binder-jet Printed N95 Metal Filter for COVID-19: *Aaron Acierno*[1]; Katerina Kimes[1]; Erica Stevens[1]; Pierangeli Rodriguez[1]; Steve Pilz[2]; Kyle Myers[3]; Patrick Dougherty[3]; Kurt Svihla[2]; Thomas Spirka[4]; Markus Chmielus[1]; [1]University of Pittsburgh; [2]ANSYS; [3]ExOne; [4]Synopsys

9:15 AM
Effect of Processing Defects on Properties of Binderjet WC-Co: *Paul Prichard*[1]; Hadi Miyanaji[1]; Zhuqing Wang[1]; [1]Kennametal Inc.

9:35 AM
Droplet Powder Interactions in Binder Jet Additive Manufacturing: Trenton Colton[1]; *Nathan Crane*[1]; [1]Brigham Young University

9:55 AM
Fluid and Particle Dynamics Simulation in Binder Jetting Process: Fangzhou Li[1]; *Wenda Tan*[1]; [1]University of Utah

10:15 AM
Gravity Influence on Sintering of Binder Jetted Components: *Elisa Torresani*[1]; Eugene Olevsky[1]; Randall German[1]; [1]San Diego State University

10:35 AM
Distortion Modeling of Sintering Process in Binder Jet Printed Parts: *Basil Paudel*[1]; Dave Conover[2]; Albert To[1]; [1]University of Pittsburgh; [2]ANSYS Inc.

Additive Manufacturing: Materials Design and Alloy Development III -- Super Materials and Extreme Environments — Other Materials and Aspects

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

Program Organizers: Behrang Poorganji, University of Waterloo; Hunter Martin, HRL Laboratories LLC; James Saal, Citrine Informatics; Orlando Rios, Oak Ridge National Laboratory; Atieh Moridi, Cornell University; Jiadong Gong, Questek Innovations LLC

Wednesday AM **March 17, 2021**

Session Chair: Jiadong Gong , QuesTek

8:30 AM Invited
Design of Novel Fe-based Bulk Metallic Glasses Enabled by Additive Manufacturing: *Martin Walbrühl*[1]; Jiayi Yan[1]; Ida Berglund[1]; Zaynab Mahbooba[2]; Abhinav Saboo[2]; [1]QuesTek Europe AB; [2]QuesTek Innovations

9:00 AM
Understanding the Corrosion Mechanism of an Equimolar AlCoCrFeNi High-entropy Alloy Additively Manufactured by Electron Beam Melting: *Kenta Yamanaka*[1]; Hiroshi Shiratori[2]; Manami Mori[3]; Kazuyo Omura[1]; Tadashi Fujieda[2]; Kosuke Kuwabara[2]; Akihiko Chiba[1]; [1]Tohoku University; [2]Hitachi, Ltd.; [3]National Institute of Technology, Sendai College

9:20 AM
Design and Additive Manufacturing of Hastelloy C22 for Corrosive Environment: *Somayeh Pasebani*[1]; Dongqing Yan[1]; Alireza Torbati-Sarraf[2]; Behrang Poorganji[3]; Osman Ertorer[4]; O Isgor[1]; [1]Oregon State University; [2]LAM Research Corporation and University of Southern California; [3]University of Waterloo; [4]Oryx Advanced Materials, Inc

9:40 AM
Catalytic Inhibition of Metal Dusting by Cu – The Difference of Cast and AM Alloys: *Anke Ulrich*[1]; Clara Schlereth[1]; Katrin Jahns[2]; Ulrich Krupp[3]; Mathias Galetz[1]; [1]DECHEMA-Forschungsinstitut; [2]University of Applied Sciences Osnabrück; [3]RWTH Aachen University

10:00 AM
Correlating Data from Digital and Virtual Twins of Component Manufacturing via DED: Monica Salgueiro[1]; Carlos Gonzalez[1]; Camilo Prieto[1]; Bernardo Freire[2]; Mihail Babcinschi[2]; Joerg Willem[3]; *Mustafa Megahed*[3]; [1]AIMEN; [2]University of Coimbra; [3]ESI Group

10:20 AM
Material Development Using RF Plasma: *Nicolas Gobeil*[1]; [1]Tekna

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Solid-State Phase Transformations and Microstructural Evolution — Steels

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

Program Organizers: Bij-Na Kim, Carpenter Additive; Andrew Wessman, University of Arizona; Chantal Sudbrack, National Energy Technology Laboratory; Eric Lass, University of Tennessee-Knoxville; Katerina Christofidou, University of Sheffield; Peeyush Nandwana, Oak Ridge National Laboratory; Rajarshi Banerjee, University of North Texas; Whitney Poling, General Motors Corporation; Yousub Lee, Oak Ridge National Laboratory

Wednesday AM **March 17, 2021**

Session Chairs: Eric Lass, The University of Tennessee Knoxville; Peeyush Nandwana, Oak Ridge National Laboratory

8:30 AM
The Crystallography and Orientation of Cellular Features in Additively Manufactured 316L: *Richard Fonda*[1]; Joseph Aroh[2]; Jerry Feng[1]; David Rowenhorst[1]; [1]Naval Research Laboratory; [2]Carnegie Mellon University

8:50 AM
The Dislocation and Composition Microstructure Evolution and Mechanical Properties of Selective Laser Melted Stainless Steels: *Markus Sudmanns*[1]; Yejun Gu[1]; Jaafar El-Awady[1]; [1]Johns Hopkins University

9:10 AM
Microstructural Characterization of Maraging 300 Steel Fabricated by Select Laser Melting: *Johnnatan Rodriguez*[1]; Elizabeth Hoyos[1]; Fabio Conde[2]; André Jardini Munhoz[3]; Julian Avila[4]; [1]EIA University; [2]University of Sao Paolo; [3]BIOFABRIS - National Institute of Science and Technology in Biomanufacturing; [4]UNESP – São Paulo State University

9:30 AM
Recrystallization-based Grain Boundary Engineering of 316L Stainless Steel Produced via Selective Laser Melting: *Shubo Gao*[1]; Zhiheng Hu[2]; Sravya Tekumalla[1]; Matteo Seita[1]; [1]Nanyang Technological University; [2]Singapore Institute of Manufacturing Technology

9:50 AM Invited
Grain Orientation Analysis of Additively Manufactured 316L Stainless Steel: *Anthony Rollett*[1]; [1]Carnegie Mellon University

10:20 AM
Phase Transformation Modeling of Functionally Graded Materials Made by Direct Energy Deposition: *Noah Sargent*[1]; Wei Xiong[1]; Richard Otis[2]; [1]University of Pittsburgh; [2]Jet Propulsion Laboratory

10:40 AM
Effect of Low-temperature Plasma Nitriding on the Wear and Corrosion Resistance of Additive-manufactured Stainless and Maraging Steels: *Matjaz Godec*[1]; Crtomir Donik[1]; Aleksandra Kocijan[1]; Bojan Podgornik[1]; Danijela Anica Skobir Balantic[1]; [1]Institute of Metals and Technology

11:00 AM
Section Thickness Dependent Behavior in Additively Manufactured Stainless Steel: *Thomas Slagle*[1]; Alexandra Vyatskikh[1]; Sen Jiang[1]; Salma El-Azab[1]; Umberto Scipioni Bertoli[1]; Lorenzo Valdevit[1]; Enrique Lavernia[1]; Julie Schoenung[1]; [1]University of California Irvine

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session V

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

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; 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; Arul Kumar Mariyappan, Los Alamos National Laboratory; Olivia Underwood, Sandia National Laboratories

Wednesday AM **March 17, 2021**

8:30 AM Invited
Combining Advanced Characterization Techniques to Rationalize the Multiple Mechanical Behaviors Observed in TRIP/TWIP Ti-alloys: *Lola Lilensten*[1]; Yolaine Danard[2]; Inès Danard[1]; Raphaëlle Guillou[3]; Nathalie Bozzolo[4]; Dominique Thiaudière[5]; Frédéric Prima[1]; [1]CNRS - IRCP; [2]ICMPE ; [3]CEA; [4]Mines ParisTech - CEMEF ; [5]Synchotron Soleil

9:00 AM
A Study on Migrating Boundary Induced Plasticity Using Atomistic Simulation: *Simoon Sung*[1]; Jaehoon Jang[2]; Hyerim Hwang[3]; Yanghoo Kim[4]; Heung Nam Han[1]; [1]Seoul National University; [2]Korea Institute of Materials Science; [3]Harvard University; [4]Korea Institute of Industrial Technology

9:20 AM
Deformation Behavior and Phase Transformation of Nanotwinned Al/Ti Multilayers: *Yifan Zhang*[1]; Qiang Li[1]; Mingyu Gong[2]; Sichuang Xue[1]; Jie Ding[1]; Jaehun Cho[1]; Tongjun Niu[1]; Ruizhe Su[1]; Nicholas Richter[1]; Haiyan Wang[1]; Jian Wang[2]; Xinghang Zhang[1]; [1]Purdue University; [2]University of Nebraska-Lincoln

9:40 AM
Fingerprinting Shock-induced Deformations via Virtual Diffraction: *Avanish Mishra*[1]; Cody Kunka[2]; Marco Echeverria[1]; Rémi Dingreville[2]; Avinash Dongare[1]; [1]University of Connecticut; [2]Sandia National Laboratories

10:00 AM Invited
Deformation Behaviour of High-alloy Twinning-induced Plasticity Steels Unravelled by Complementary Local and Integral Methods: *Stefan Martin*[1]; Christiane Ullrich[1]; Christian Schimpf[1]; Mykhaylo Motylenko[1]; Anja Weidner[1]; Horst Biermann[1]; David Rafaja[1]; Alexey Vinogradov[2]; Yuri Estrin[3]; [1]Tu Bergakademie Freiberg; [2]NTNU; [3]Monash University

10:30 AM
Ultrasonic Effects on Plastic Deformation Behavior of TRIP 780 Steel: *Jiarui Kang*[1]; Xun Liu[1]; [1]The Ohio State University

10:50 AM
In-situ Shock Stress Field Detection Using Laser Array Raman Spectroscopy: *Abhijeet Dhiman*[1]; Ayotomi Olokun[1]; Nolan Lewis[1]; Vikas Tomar[1]; [1]Purdue University

11:10 AM
Experimental Characterization and FFT-based Modeling of Heterogeneous Deformation in HCP Materials: *Behnam Ahmadikia*[1]; Leyun Wang[2]; Irene Beyerlein[1]; [1]University of California, Santa Barbara; [2]Shanghai Jiao Tong University

ADVANCED MATERIALS

Advanced Functional and Structural Thin Films and Coatings — Multifunctional Biomaterials, Innovative Approaches to New Concepts and Applications I

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

Program Organizers: Adele Carrado, IPCMS - CNRS; Ramana Chintalapalle, University of Texas at El Paso; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Nancy Michael, University of Texas at Arlington; Karine Mougin, Is2m Cnrs; Heinz Palkowski, Clausthal University of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology; Vikas Tomar, Purdue University

Wednesday AM **March 17, 2021**

Session Chair: Adele Carrado, Université de Strasbourg IPCMS

8:30 AM Keynote
Bio-inspired Nano- and Microstructured Surfaces: *Hendrik Hoelscher*[1]; [1]Karlsruhe Institute of Technology

9:10 AM Invited
TiN and DLC Coated Medical Grade Polyurethane (PUR) for Controlled Surface Degradation and Improved Mechanical Properties: *Maren Fossum*[1]; Mohammad Ibrahim[1]; Javier Sanchez[2]; Christoph Burgstaller[3]; Emma Strömberg[4]; Gunilla Björling[5]; Ragnhild Aune[1]; [1]Norwegian University of Science and Technology; [2]Danderyd Hospital at Karolinska Institute ; [3]TCKT - Transfercenter für Kunststofftechnik GmbH; [4]KTH Royal Institute of Technology; [5]The Swedish Red Cross University College

9:40 AM Invited
Multimodal Flexible Optoelectronic Devices for Colocalized Electrophysiology and Optophysiology: *Luyao Lu*[1]; [1]George Washington University

10:10 AM Invited
Structural and Biological Properties of Silicon-incorporated Diamond-like Carbon Coatings: *Roger Narayan*[1]; [1]University of North Carolina

10:40 AM
Silicone Breast Implants: Grafting of a Bioactive Polymer to Improve the Bio-integration: *Mylan Lam*[1]; Vivien Moris[1]; Vincent Humblot[2]; Véronique Migonney[1]; Céline Falentin-Daudré[1]; [1]Université Sorbonne Paris Nord; [2]Université Bourgogne Franche-Comté

11:00 AM Keynote
Determining the Interaction between Porous Titanium and Adhesion of a Bioactive Coating: *Holly Martin*[1]; Patrick McWhorter[1]; Arthur Kasson[1]; Snjezana Balaz[1]; [1]Youngstown State University

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Structures and Modelling of Soft Magnetic Materials

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

Program Organizers: Richard Beddingfield, North Carolina State University; Daniel Salazar, BCMaterials; Alex Leary, NASA Glenn Research Center; Huseyin Ucar, California Polytechnic University; Yongmei Jin, Michigan Technological University; Arcady Zhukov, University of the Basque Country

Wednesday AM **March 17, 2021**

Session Chair: Richard Beddingfield, North Carolina State University

8:30 AM Invited
Advanced Magnetics for Power and Energy Development (AMPED) : A New Consortium Model for US Power Magnetics Research and Workforce Development: *Paul Ohodnicki*[1]; Brandon Grainger[1]; Michael McHenry[2]; Maarten DeBoer[2]; Subhashish Bhattacharya[3]; Richard Beddingfield[3]; [1]University of Pittsburgh; [2]Carnegie Mellon University; [3]North Carolina State University

9:00 AM
Radio Frequency Rapid Thermal Processing of Nanocrystalline Soft Magnetic Alloys: Ahmed Talaat[1]; David Greve[2]; *Paul Ohodnicki*[1]; [1]University of Pittsburgh; [2]DWGreve Consulting

9:20 AM
Soft Magnetic Fe-Co-Cu Supersaturated Solid Solutions by Severe Plastic Deformation: *Martin Stückler*[1]; Heinz Krenn[2]; Lukas Weissitsch[1]; Stefan Wurster[1]; Andrea Bachmaier[1]; [1]Erich Schmid Institute of Materials Science, Austrian Academy of Sciences; [2]Institute of Physics, University of Graz

9:40 AM
Accurate Modelling of Soft Magnetic Materials for Power Applications Using Finite Element Methods: *Alex Leary*[1]; Byron Beddingfield[2]; Randy Bowman[1]; [1]Nasa Glenn Research Center; [2]North Carolina State University

10:00 AM
Regression Modelling of the High-frequency Inductors Used for Power Electronic Applications: Sanket Parashar[1]; *Richard Beddingfield*; Subhashish Bhattacharya[1]; [1]North Carolina State University

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VII — Functional Materials for Energy II

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

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

Wednesday AM **March 17, 2021**

Session Chairs: Paul Ohodnicki, University of Pittsburgh; Christian Faria, Worcester Polytechnic Institute

8:30 AM
Integrated $Mo_{1-x}Co_xS_2$/Carbon Nanotubes for Water Splitting Applications: *Lee Kendall*[1]; Amir Chamaani[1]; Stephen McDonnell[1]; Giovanni Zangari[1]; [1]University of Virginia

8:50 AM
Heterogeneous Metal/Oxide Nanostructure Integration for Catalytic Chemical Transformation: from HCs Oxidation, CO2 Conversion, to H2 Production: *Pu-Xian Gao*[1]; [1]University of Connecticut

9:10 AM
High-efficiency High Power Density Direct Carbon Fuel Cell: *Christian Faria*[1]; Jun Lu[1]; Adam Powell[1]; Boyd Davis[2]; Yu Zhong[1]; Uday Pal[3]; [1]Worcester Polytechnic Institute; [2]Kingston Process Metallurgy; [3]Boston University

9:40 AM
Magnesium as a Zero- or Negative-Emissions Fuel for Shipping and Aerospace: *Hongyi Sun*[1]; Yi Jie Wu[1]; Jake Scarponi[1]; Adam Powell[1]; Jagannath Jayachandran[1]; [1]Worcester Polytechnic Institute

10:00 AM
Metal Dichalcogenide Based Planner Thermoelectric Generator for Efficient Waste Heat Harvesting: *Sangram Pradhan*[1]; Gilbert Kogo[1]; Messaoud Bahoura[1]; [1]Norfolk State University

MATERIALS PROCESSING

Advances in Surface Engineering III — Session I

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

Program Organizers: Tushar Borkar, Cleveland State University; Arif Mubarok, PPG; Rajeev Gupta, North Carolina State University; Sandip Harimkar, Oklahoma State University; Bharat Jasthi, South Dakota School of Mines & Tech

Wednesday AM **March 17, 2021**

Session Chairs: Bharat Jasthi, South Dakota School of Mines & Tech; Tushar Borkar, Cleveland State University

8:30 AM
Surface Modification by In-situ Grown VC Reinforced Composite Layer on Steel Substrate Using TIG Arcing Process: *Nilesh Kumar*[1]; Prakriti Ghosh[1]; Sourav Das[1]; [1]Indian Institute of Technology Roorkee

8:50 AM
Effect of Potassium Hydroxide (KOH) Additives on Corrosion Behavior of Coatings Formed by Plasma Electrolytic Oxidation (PEO) Method on the Titanium Substrate: *Navid Attarzadeh*[1]; Maryam Molaei[2]; Kazem Babaei[2]; Arash Fattah-alhosseini[2]; [1]University of Texas at El Paso; [2]Bu-Ali Sina University

9:10 AM
Electroplated Powder to Improve Particle Adhesion in Cold Spray Applications: *Gwendolyn Bracker*[1]; Elizabeth Hodges[1]; Madeline Scott[1]; V. Champagne[2]; Robert Hyers[2]; [1]University of Massachusetts; [2]Cold Spray Innovations International

MATERIALS DESIGN

Advances in Titanium Technology — Invited Presentations

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

Program Organizers: Don Li, Howmet Engineered Products; Yufeng Zheng, University of Nevada-Reno
; Peeyush Nandwana, Oak Ridge National Laboratory; Matthew Dunstan, US Army Research Laboratory

Wednesday AM **March 17, 2021**

Session Chair: Don Li, Howmet Engineered Products

8:30 AM Invited
Titanium Mill Product Yield Enhancement via Electrochemical Conditioning: *Kurt Faller*[1]; [1]MetCon

8:50 AM Invited
Optimizing Microstructure and Properties of Additively Manufactured Titanium Alloys Using Alloying and Post-AM Heat-treatment: Brian Welk[1]; Nevin Taylor[1]; Gopal Viswanathan[1]; *Hamish Fraser*[1]; [1]Ohio State University

9:10 AM Invited
Multiscale Characterization of Titanium Alloy Microstructures and Links to Processing and Properties: *Amy Clarke*[1]; Benjamin Ellyson[1]; Alec Saville[1]; Jonah Klemm-Toole[1]; Behnam Aminahmadi[1]; Jake Benzing[2]; Adam Creuziger[2]; Sven Vogel[3]; Kamel Fezzaa[4]; Wayne Chen[5]; Adam Pilchak[6]; [1]Colorado School of Mines; [2]National Institute of Standards and Technology; [3]Los Alamos National Laboratory; [4]Advanced Photon Source, Argonne National Laboratory; [5]Purdue University; [6]Air Force Research Laboratory

9:30 AM
Atom Probe Tomographic Study of Precursor Metastable Phases and Their Influence on a Precipitation in the Metastable ß-titanium Alloy, Ti-5Al-5Mo-5V-3Cr: *Stoichko Antonov*[1]; Yufeng Zheng[2]; Hamish Fraser[3]; Baptiste Gault[1]; [1]Max Planck Insitut fur Eisenforschung GmbH; [2]University of Nevada, Reno; [3]The Ohio State University

9:50 AM
An In-situ Deformation Micro-mechanisms Study of a Ti-Al-V-Fe (a+ß) Alloy: *Shaolou Wei*[1]; Gaoming Zhu[1]; Cem Tasan[1]; [1]Massachusetts Institute of Technology

10:10 AM
Enhanced Work-hardening from Oxygen-stabilized Omega Precipitation in Aged Metastable Beta Ti Alloys: *Kathleen Chou*[1]; Emmanuelle Marquis[1]; [1]University of Michigan

AI/Data informatics: Design of Structural Materials — AI/ML for Integrating Experiments and Simulations; Steels

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

Program Organizers: Jennifer Carter, Case Western Reserve University; Amit Verma, Carnegie Mellon University; Natasha Vermaak, Lehigh University; Jonathan Zimmerman, Sandia National Laboratories; Darren Pagan, Pennsylvania State University; Chris Haines, Ccdc Army Research Laboratory; Judith Brown, Sandia National Laboratories

Wednesday AM **March 17, 2021**

8:30 AM Invited
A Physics-informed Bayesian Experimental Autonomous Researcher for Structural Design: *Keith Brown*[1]; [1]Boston University

8:50 AM
Solving Inverse Problems for Process-structure Linkages Using Asynchronous Parallel Bayesian Optimization: *Anh Tran*[1]; Tim Wildey[1]; [1]Sandia National Laboratories

9:10 AM
Model Reification with Batch Bayesian Optimization: *Richard Couperthwaite*[1]; Danial Khatamsaz[1]; Abhilash Molkeri[1]; Douglas Allaire[1]; Ankit Srivastava[1]; Raymundo Arroyave[1]; [1]Texas A&M University

9:30 AM Invited
Structural Response Statistics of Deformed Polycrystals Leading to Rare Events: *Curt Bronkhorst*[1]; Peter Marcy[2]; Hansohl Cho[3]; Scott Vander Wiel[2]; Satyapriya Gupta[1]; Veronica Anghel[2]; George Gray[2]; [1]University of Wisconsin, Madison; [2]Los Alamos National Laboratory; [3]Korea Advanced Institute of Science and Technology

10:00 AM Invited
Data-driven Approaches for Automated Analysis of Non-metallic Inclusions that Form during Steel Processing: Mohammad Abdulsalam[1]; Nan Gao[1]; Elizabeth Holm[1]; *Bryan Webler*[1]; [1]Carnegie Mellon University

10:30 AM
Incorporating Historical Data & Past Analyses for Improved Tensile Property Prediction of 9% Cr Steel: *Madison Wenzlick*[1]; Ram Devanathan[2]; Osman Mamun[2]; Kelly Rose[3]; Jeffrey Hawk[3]; [1]Leidos Research Support Team for the National Energy Technology Laboratory; [2]Pacific Northwest National Laboratory; [3]National Energy Technology Laboratory

MATERIALS DESIGN

AI/Data informatics: Tools for Accelerated Design of High-temperature Alloys — Uncertainty Quantification, AI Tools, and Environmental Degradation

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

Program Organizers: Michael Titus, Purdue University; Pinar Acar, Virginia Tech; Andrew Detor, GE Research; James Saal, Citrine Informatics; Dongwon Shin, Oak Ridge National Laboratory

Wednesday AM **March 17, 2021**

Session Chairs: Michael Titus, Purdue University; James Saal, Citrine Informatics

8:30 AM Invited
Domain and Uncertainty Quantification in Machine Learning Models of Alloy Properties: *Dane Morgan*[1]; Ryan Jacobs[1]; Benjamin Blaiszik[2]; [1]University of Wisconsin-Madison; [2]University of Chicago

9:00 AM
Domain Knowledge-informed, Process-mapping AI Graph for Designing Fe-based Alloys: *Vyacheslav Romanov*[1]; [1]National Energy Technology Laboratory

9:20 AM Invited
Toward High Throughput Design and Development of Multi-principal Element Alloys for Corrosion and Oxidation Resistance (MPEAs): *Mitra Taheri*[1]; Todd Hufnagel[1]; Chris Wolverton[2]; James Rondinelli[2]; Jason Hattrick-Simpers[3]; Brian DeCost[3]; Elizabeth Opila[4]; John Scully[4]; Jean-Philippe Couzinie[5]; Nick Birbilis[6]; [1]Johns Hopkins University; [2]Northwestern University; [3]NIST; [4]University of Virginia; [5]University Paris-Est Créteil (UPEC); [6]Australian National University

9:50 AM
Advanced Data SCiENce Toolkit for Non-data Scientists (ASCENDS)
- A Case Study of the Oxidation Kinetics of NiCr-based Alloys: *Jian Peng*[1]; Rishi Pillai[1]; Marie Romedenne[1]; Sangkeun Lee[1]; Govindarajan Muralidharan[1]; Bruce Pint[1]; J. Allen Haynes[1]; Dongwon Shin[1]; [1]Oak Ridge National Laboratory

10:10 AM
Expanding Materials Selection via Transfer Learning for High-temperature Oxide Selection: *Zachary Mcclure*[1]; Alejandro Strachan[1]; [1]Purdue University

10:30 AM Invited
Optimal Design of High-temperature, Oxidation-resistant Complex Concentrated Alloys: *Alejandro Strachan*[1]; [1]Purdue University

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Models and Algorithms for Study Microstructures and Mechanical Properties of Materials

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

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

Wednesday AM **March 17, 2021**

Session Chair: Garritt Tucker, Colorado School of Mines

8:30 AM
Mechanistic Modeling of Point Diffusion in Polycrystals to Capture Different Diffusion-deformation Mechanisms: *Aritra Chakraborty*[1]; Veerappan Prithivirajan[1]; Nathan Beets[1]; Arul Kumar Mariyappan[1]; Ricardo Lebensohn[1]; Laurent Capolungo[1]; [1]Los Alamos National Laboratory

8:50 AM
Quantitative Phase-field Model for Void Nucleation and Growth Under Ion Irradiation: *Rayaprolu Sreekar Annadanam*[1]; Anter El-Azab[1]; [1]Purdue University

9:10 AM
Low Dimensional Polynomial Chaos Expansion Performance at Assessing Uncertainty in Creep Life Prediction of Grade 91 Steel: *Timothy Truster*[1]; Amirfarzad Behnam[1]; Varun Gupta[2]; Ramakrishna Tipireddy[2]; [1]University of Tennessee; [2]Pacific Northwest National Laboratory

9:30 AM
Full-field Stress Computation from Measured Deformation Fields: A Hyperbolic Formulation: *Benjamin Cameron*[1]; Cem Tasan[1]; [1]Massachusetts Institute of Technology

9:50 AM
A Simulation Survey of Recrystallization Behavior in Al-xSi Microstructures Under Shear Loading Conditions: *William Frazier*[1]; Bharat Gwalani[1]; Lei Li[1]; Ayoub Soulami[1]; Arun Devaraj[1]; Petr Sushko[1]; [1]Pacific Northwest National Laboratory

10:10 AM
Predicting Mechanical Property Parameters from Load-displacement Curve of Nanoindentation Test by Using Machine Learning Model: *Jinmyoung Jeon*[1]; Jungwook Cho[1]; Kyojun Hwang[1]; [1]GIFT, POSTECH

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Microstructure Evolution and Characterization

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

Program Organizer: Dimitry Sediako, University of British Columbia

Wednesday AM **March 17, 2021**

Session Chair: Izabela Szlufarska, University of Wisconsin–Madison

8:30 AM Invited
Microstructure Evolution of an Al-Fe-Ni Alloy with Zr and Sc Additions Upon Different Cooling Rates during Solidification for Improving the Mechanical and Electrical Conductivity Properties: Suwaree Chankitmunkong[1]; Dmitry Eskin[2]; *Chaowalit Limmaneevichitr*[1]; [1]King Mongkut's University of Technology Thonburi; [2]Brunel University London

8:50 AM
Microstructure and Mechanical Properties of a Precipitation-hardened Al-Mn-Zr-Er Alloy: *Amir Farkoosh*[1]; David Seidman[1]; David Dunand[1]; [1]Northwestern University

9:10 AM
Characterization of the Microstructure of Al-Mg Alloy Matrix Syntactic Foam by Three-dimensional Analysis: *Jeki Jung*[1]; Su-Hyeon Kim[1]; Won-Kyoung Kim[1]; Cha-Yong Lim[1]; Yong Ho Park[2]; [1]Korea Institute of Materials Science; [2]Pusan National University/ Department of Materials Science and Engineering

9:30 AM
Thermal Analysis of the Solidification Behavior of AA7075 Containing Nanoparticles: *Maximilian Sokoluk*[1]; Igor De Rosa[1]; Shuaihang Pan[1]; Xiaochun Li[1]; [1]University of California Los Angeles

9:50 AM
Microstructural Evolution of Ultra-fine Grained (UFGs) Aluminum in Tribological Contacts: *Shuguang Wei*[1]; Chaiyapat Tangpatjaroen[1]; Hongliang Zhang[1]; Izabela Szlufarska[1]; [1]University of Wisconsin Madison

10:10 AM
Microchemistry Evolution for 8xxx Alloys by Homogenization: *Erik Santora*[1]; Roland Morak[1]; [1]Amag

10:30 AM Question and Answer Period Dr. Dimitry Sediako

BIOMATERIALS

Biological Materials Science — Biological Materials Science I

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

Program Organizers: David Restrepo, University of Texas at San Antonio; Steven Naleway, University of Utah; Jing Du, Pennsylvania State University; Ning Zhang, University of Alabama

Wednesday AM **March 17, 2021**

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

8:30 AM Invited
Understanding the Role of Ridged Geometries in the Telson of the Mantis Shrimp: Adwait Trikanad[1]; Wei Huang[2]; Jesus Rivera[3]; David Kisailus[2]; *Pablo Zavattieri*[1]; [1]Purdue University; [2]University of California, Irvine; [3]University of California, Riverside

9:00 AM Invited
Bioinspired Design of Fracture Resistant Layer-by-Layer Composite Structure: *Xinrui Niu*[1]; [1] City University of Hong Kong

9:30 AM
Assessing the Role of Loading Direction on the Compressive Response and Deformation Mechanism in Bioinspired Multilayered Composites: *Sashanka Akurati*[1]; Justine Marin[1]; Bharath Gundrati[1]; Dipankar Ghosh[1]; [1]Old Dominion University

9:50 AM Invited
Bamboo Fibre-reinforced Mycelium Composites for Sustainable Structures: *Hortense Le Ferrand*[1]; [1]Nanyang Technological University

ADVANCED MATERIALS

Bulk Metallic Glasses XVIII — 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, Federal Institute for Materials Research and Testing (BAM); Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Wednesday AM **March 17, 2021**

Session Chairs: Robert Maass, Federal Institute of Materials Testing and Research; Joerg Loeffler, ETH Zurich

8:30 AM Invited
Ultrafast-calorimetry Experiments to Study Multistep Crystallization and Melting Pathways in Metals: *Joerg Loeffler*[1]; [1]ETH Zurich

8:55 AM Invited
Tracing Structural Dynamics in Metallic Glasses during Cryogenic Cycling: Amlan Das[1]; Eric Dufresne[2]; *Robert Maass*[3]; [1]University of Illinois at Urbana-Champaign; [2]Argonne National Laboratory; [3]Federal Institute for Materials Research and Testing (BAM)

9:20 AM
The Secondary Phase of Bulk Metallic Glass: *Sydney Corona*[1]; Seola Lee[1]; Celia Chari[1]; Jong Hyun Na[2]; Konrad Samwer[3]; William Johnson[1]; [1]California Institute of Technology; [2]Glassimetal Technologies; [3]University of Göttingen

9:40 AM
Fragility, Medium Range Order and Boson Peak in Liquids: *Chae Woo Ryu*[1]; Takeshi Egami[1]; [1]University of Tennessee

10:00 AM
Non-destructive Probing of Internal Damage Processes in a Metallic Glass: *Amlan Das*[1]; Robert Maass[2]; [1]University of Illinois; [2]Federal Institute for Materials Research and Testing

LIGHT METALS

Cast Shop Technology — Metal Cleanliness

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

Program Organizer: Samuel Wagstaff, Oculatus

Wednesday AM **March 17, 2021**

Session Chairs: Gerd-Ulrich Gruen, Hydro; Kumar Sundaram, Novelis

8:30 AM
Automated Metal Cleanliness Analyzer (AMCA) – An Alternative Assessment of Metal Cleanliness in Aluminum Melts: *Hannes Zedel*[1]; Robert Fritzsch[1]; Ragnhild Aune[1]; Shahid Akhtar[2]; [1]NTNU; [2]Norsk Hydro

8:50 AM
Overview of the Possibilities and Limitations of the Characterization of Ceramic Foam Filters for Metal Melt Filtration: *Claudia Voigt*[1]; Jana Hubálková[1]; Are Bergin[2]; Robert Fritzsch[2]; Ragnhild Aune[2]; Christos G. Aneziris[1]; [1]Institute of Ceramic, Glass and Construction Materials; [2]Norwegian University of Science and Technology

9:10 AM
Compression Testing of Ceramic Foam Filters (CFFs) Submerged in Aluminium at Operating Temperature: *Are Bergin*[1]; Robert Fritzsch[2]; Shahid Akhtar[3]; Lars Arnberg[2]; Ragnhild E. Aune[2]; [1]Norwegian University of Science and Technology & Hydro Aluminium AS; [2]Norwegian University of Science and Technology; [3]Hydro Aluminium AS

9:30 AM
The Effect of Grain Refiner on Aluminium Filtration: *Sarina Bao*[1]; Jiawei Yang[2]; Shahid Akhtar[3]; Stig Tjøtta[3]; Ulf Tundal[3]; Tanja Pettersen[4]; Yanjun Li[2]; [1]SINTEF Materials & Chemistry; [2]Norwegian University of Science and Technology; [3]Norsk Hydro; [4]SINTEF Manufacturing

9:50 AM
Next-generation Electrical Preheating System for Filter Boxes: *Jochen Schnelle*[1]; Markus Byczek[1]; [1]Drache Umwelttechnik GmbH

10:10 AM
Reduction of Impurity Elements by Applying Electromagnetic Stirring in Fractional Crystallization: *Yuichiro Murakami*[1]; Naoki Omura[1]; [1]National Institute of Advanced Industrial Science and Technology

10:30 AM
NatureAlu: Manufacturing High Purity Aluminum from the Concept Idea to the Production Plant: Jean Francois Desmeules[1]; *Denis Mazerolle*[2]; [1]Dynamic Concept; [2]NatureAlu

10:50 AM Question and Answer Period

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications — High Burnup Oxide Fuels

Sponsored by: TMS Extraction and Processing Division, TMS Structural Materials Division, TMS Light Metals Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Energy Committee, TMS: Nuclear Materials Committee

Program Organizers: Xian-Ming Bai, Virginia Polytechnic Institute and State University; Yongfeng Zhang, University of Wisconsin-Madison; Larry Aagesen, Idaho National Laboratory; Vincenzo Rondinella, Jrc-Ec

Wednesday AM **March 17, 2021**

Session Chairs: Miaomiao Jin, Idaho National Laboratory; Karim Ahmed, Texas A&M University

8:30 AM Invited
Modeling of Pressure-driven Inter-granular Fracture in High Burnup Structure UO2 during LOCA Using A Phase-field Approach: *Wen Jiang*[1]; Larry Aagesen[1]; Kyle Gamble[1]; [1]Idaho National Laboratory

9:00 AM
Multiscale Modeling of High Burn-up Structure (HBS) Formation and Evolution in UO2: *Karim Ahmed*[1]; Mohammed Abdoelatef[1]; Sudipta Biswas[2]; Larry Aagesen[2]; David Andersson[3]; [1]Texas A&M University; [2]INL; [3]LANL

9:20 AM
A Thermo-mechanical Coupled Phase Field Dynamic Fracture Model and Its Application in UO2: *Shuaifang Zhang*[1]; Wen Jiang[2]; Michael Tonks[1]; [1]University of Florida; [2]Idaho National Laboratory

9:40 AM Invited
Phase-field Modeling of Bubble Growth During High Burn-up Structure Formation in UO2: *Sudipta Biswas*[1]; Andrea Jokisaari[1]; Larry Aagesen[1]; [1]Idaho National Laboratory

10:10 AM Invited
Electron Microscopy Characterization of the Fuel-cladding Interaction in Annular Fast Reactor MOX: *Fabiola Cappia*[1]; Alex Winston[1]; Brandon Miller[1]; Jeffery Aguiar[1]; Boopathy Kombaiah[1]; Fei Teng[1]; Daniel Murray[1]; Jason Harp[1]; [1]Idaho National Laboratory

10:40 AM
Microstructural and Fission Products Analysis from Irradiated UO2 Fuel Using Atom Probe Tomography: *Mukesh Bachhav*[1]; Lingfeng He[1]; Brandon Miller[1]; Xiang Liu[1]; Fabiola Cappia[1]; Jian Gan[1]; [1]Idaho National Laboratory

CHARACTERIZATION

Characterization of Materials through High Resolution Imaging — High Resolution Characterization of Materials with Coherent Diffraction Imaging

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

Program Organizers: Richard Sandberg, Brigham Young University; Ross Harder, Argonne National Laboratory; Xianghui Xiao, Brookhaven National Laboratory; Brian Abbey, La Trobe University; Saryu Fensin, Los Alamos National Laboratory; Ana Diaz, Paul Scherrer Institut; Mathew Cherukara, Argonne National Laboratory

Wednesday AM **March 17, 2021**

Session Chair: Ana Diaz, Paul Scherrer Institute

8:30 AM Invited
Investigating the Early Life on Earth with Nanoscale X-ray Coherent Imaging: *Lara Maldanis*[1]; Douglas Galante[2]; [1]Université Grenoble Alpes; [2]Brazilian Synchrotron Light Laboratory

9:00 AM
Confocal Bragg Ptychography for 3D Mapping of Bulk Specimens: *Henning Friis Poulsen*[1]; [1]DTU

9:20 AM
Improve Phase Retrieval Performance in Bragg CDI by Simultaneous Reconstruction of Multiple Diffraction Peaks: *Yuan Gao*[1]; Garth Williams[1]; [1]Brookhaven National Laboratory

9:40 AM
Near-surface Optical Characterisation of Ion Implantation in Titanium Oxide Thin Films: Eugeniu Balaur[1]; *Brian Abbey*[1]; [1]La Trobe University

10:00 AM Invited
ID01 in Light of the ESRF-EBS: *Steven Leake*[1]; Peter Boesecke[1]; Tobias Schulli[1]; [1]ESRF - The European Synchrotron

10:30 AM
Retrieving the Full 3D Strain Tensor for Nanoscale Materials Science Applications at 34-ID-C: Anastasios Pateras[1]; Ross Harder[2]; Wonsuk Cha[2]; Jonathan Gigax[1]; Jon Baldwin[1]; Jon Tischler[2]; Ruxing Xu[2]; Wenjun Liu[2]; Mark Erdmann[2]; Robert Kalt[2]; *Richard Sandberg*[3]; Saryu Fensin[1]; Reeju Pokharel[1]; [1]Los Alamos National Laboratory; [2]Argonne National Laboratory; [3]Bringham Young University

10:50 AM
Multi-peak Phase Retrieval for Coherent X-ray Diffraction Imaging at High Energies: *Matthew Wilkin*[1]; Anthony Rollett[1]; [1]Carnegie Mellon University

11:10 AM Invited
X-ray Imaging of Three-dimensional Magnetic Systems and Their Dynamics: *Claire Donnelly*[1]; [1]University of Cambridge

CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2021 — Characterization of Mechanical Properties

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, Instituto Militar de Engenharia; Shadia Ikhmayies; 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; Rajiv Soman, Eurofins EAG Materials Science LLC; Alex Moser, US Naval Research Laboratory

Wednesday AM **March 17, 2021**

Session Chairs: Bowen Li, Michigan Technological University; Shadia Ikhmayies, Al Isra University

8:30 AM
Effect of Specimen Dimension on Plasticity Behaviour Below Submillimetre Scale: *Arijit Lodh*[1]; Gustavo Castelluccio[1]; [1]Cranfield University

8:50 AM
Significant Disparity of Non-basal Dislocation Activities in Hot-rolled Mg and AZ31 Alloy Under Tension: *Dexin Zhao*[1]; Xiaolong Ma[1]; Abhinav Srivastavaa[1]; Griffin Turner[1]; Ibrahim Karaman[1]; Kelvin Xie[1]; [1]Texas A&M University

9:10 AM
Analysis of Wear Issues in the Rotary Shear Biomass Comminution System: *Kyungjun Lee*[1]; Lianshan Lin[2]; Dave Lanning[3]; Ercan Cakmak[2]; James R. Keiser[2]; Jun Qu[2]; [1]11612 Lanesborough Way; [2]ORNL; [3]Forest concepts

9:30 AM
Characterization of Solidification Structure Morphology in High-carbon Steel Billet by Fractal Dimension: *Jianghai Cao*[1]; Zibing Hou[1]; Zhiqiang Peng[1]; Dongwei Guo[1]; Ping Tang[1]; [1]Chongqing University

9:50 AM
Dislocation Creep at Low Stresses and High Temperature: Harper-Dorn Creep Revisited: *Shobhit Singh*[1]; Michael Kassner[2]; Praveen Kumar[1]; [1]Indian Institute of Science, Bangalore; [2]University of Southern California

10:10 AM
The Study of Structure-mechanical Properties Relationship in Different Cross-linked SU-8 Thermoset Polymers: *Prakash Sarkar*[1]; Prita Pant[1]; Hemant Nanavati[1]; [1]Indian Institute of Technology Bombay

NUCLEAR MATERIALS

Composite Materials for Nuclear Applications — Tungsten

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

Program Organizers: Anne Campbell, Oak Ridge National Laboratory; Dong Liu, University of Bristol; Rick Ubic, Boise State University; Lauren Garrison, Oak Ridge National Laboratory; Peng Xu, Idaho National Laboratory; Johann (Hans) Riesch, Max Planck Institute for Plasma Physics

Wednesday AM **March 17, 2021**

Session Chairs: Lauren Garrison, Oak Ridge National Laboratory; Johann Riesch, Max Planck Institute for Plasma Physics

8:30 AM Invited
Tungsten-based High and Medium Entropy Alloys and Composites for Nuclear Applications: Owais Waseem[1]; *Ho Jin Ryu*[2]; [1]MIT PSFC; [2]KAIST, Korea

9:00 AM Invited
Tungsten Fibre-reinforced Copper – A High-Conductivity, High-Strength Composite Material for Plasma-facing Component Applications: *Alexander von Müller*[1]; Bernd Böswirth[1]; Henri Greuner[1]; Rudolf Neu[1]; Udo Siefken[2]; Eliseo Visca[3]; Jeong-Ha You[1]; [1]Max-Planck-Institut für Plasmaphysik; [2]Louis Renner GmbH; [3]ENEA Frascati

9:30 AM Invited
W_2C-reinforced Tungsten: A Promising Candidate for DEMO Divertor Material: Petra Jenus[1]; *Aljaz Ivekovic*[1]; Matej Kocen[1]; Anze Abram[1]; Andreja Sestan[1]; Andrei Galatanu[2]; Magdalena Galatanu[2]; Sandra Tarancón[3]; Elena Tejado[3]; Jose Ygnacio Pastor[3]; Marius Wirtz[4]; Gerald Pintsuk[5]; Sasa Novak[1]; [1]Jožef Stefan Institute; [2]National Institute of Materials Physics; [3]Universidad Politécnica de Madrid; [4]Institute for Energy and Climate Reseach, Forschungszentrum Juelich GmbH, ; [5]Institute for Energy and Climate Reseach, Forschungszentrum Juelich GmbH,

10:00 AM
Solving the Brittleness Problem of Tungsten - Tungsten Fibre-reinforced Tungsten Composites: *Johann Riesch*[1]; Jan Coenen[2]; Bailey Curzadd[1]; Maximilian Fuhr[1]; Lauren Garisson[3]; Hanns Gietl[3]; Henri Greuner[1]; Till Höschen[1]; Yiran Mao[2]; Wolfgang Pantleon[4]; Leonard Raumann[2]; Daniel Schwalenberg[2]; Thomas Schwarz-Selinger[1]; Dmitry Terentyev[5]; Rudolf Neu[1]; [1]Max Planck Institute für Plasma Physics; [2]Forschungszentrum Jülich GmbH, Institut für Energie- und Klimaforschung – Plasmaphysik, Partner of the Trilateral Euregio Cluster (TEC); [3]Oak Ridge National Laboratory; [4]Technical University of Denmark; [5]Belgian Nuclear Research

10:20 AM
Opportunities for Nanostructured Tungsten Alloys in Composite Fusion Materials: *Jason Trelewicz*[1]; Nicholas Olynik[1]; Wenbo Wang[1]; David Sprouster[1]; Chad Parish[2]; [1]Stony Brook University; [2]Oak Ridge National Laboratory

10:40 AM
Conformal Tungsten Coatings for Cermet Nuclear Fuel Elements: *Jonathan Johnson*[1]; Ryan Wilkerson[2]; Stephen DiPietro[3]; Scott O'Dell[4]; Gregory Thompson[1]; [1]University of Alabama; [2]NASA Marshall Space Flight Center; [3]Exothermics Inc; [4]Plasma Processes LLC

11:00 AM
Coupled Primary and Secondary Recrystallization in Single Tungsten Fiber-reinforced Tungsten Composites: Umberto Ciucani[1]; Lea Haus[1]; Maximilian Fuhr[2]; Hanns Gietl[3]; Johann Riesch[2]; *Wolfgang Pantleon*[1]; [1]Technical University of Denmark; [2]Max-Planck-Institute for Plasma Physics; [3]Oak Ridge National Laboratory

ADDITIVE TECHNOLOGIES

Computational Techniques for Multi-Scale Modeling in Advanced Manufacturing — Multiscale Computational Techniques

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Extraction and Processing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Process Technology and Modeling Committee

Program Organizers: Adrian Sabau, Oak Ridge National Laboratory; Anthony Rollett, Carnegie Mellon University; Laurentiu Nastac, University of Alabama; Mei Li, Ford Motor Company; Alexandra Anderson, Gopher Resource; Srujan Rokkam, Advanced Cooling Technologies Inc

Wednesday AM **March 17, 2021**

Session Chair: Adrian Sabau, Oak Ridge National Laboratory

8:30 AM
Machine-learning Informed Design of High-strength Gradient Metals for Additive Manufacturing: *S. Mohadeseh Taheri-Mousavi*[1]; A. John Hart[1]; [1]MIT

8:55 AM
A Hybrid Approach to Connecting a Low Fidelity Model to a High Fidelity Model for Efficient and Accurate Prediction of Thermal History of Large Domains in Additive Manufacturing: Christopher Katinas[1]; Corbin Grohol[1]; *Yung Shin*[1]; [1]Purdue University

9:20 AM Invited
Predicting Mechanical Performance in Additive Manufacturing Components Using Deep Learning: *Kyle Johnson*[1]; John Emery[1]; Demitri Maestas[1]; Matthew Smith[1]; Carianne Martinez[1]; Mircea Grigoriu[2]; [1]Sandia National Laboratories; [2]Cornell University

10:00 AM
Smoothed Particle Hydrodynamics based approach for 3D Modeling of Linear Friction Welding Process: *Srujan Rokkam*[1]; Quang Truong[1]; [1]Advanced Cooling Technologies Inc

10:25 AM
Synchrotron Calibrated Lagrangian Particle Tracking of Melt-pool Ejections during Laser Powder Bed Fusion: *Samuel Clark*[1]; Gongyuan Zeng[2]; Juergen Jakumeit[2]; Chu Lun Alex Leung[1]; Yunhui Chen[1]; Sebastian Marussi[1]; Lorna Sinclair[1]; Margie Olbinado[3]; Alexander Rack[4]; Peter Lee[1]; [1]University College London; [2]Access e.V.; [3]Paul Scherrer Institute; [4]European Synchrotron Radiation Facility

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Solidification, Additive Manufacturing / Ordering, Coarsening and Patterning

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

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Vahid Attari, Texas A&M University; Jorge Munoz, University of Texas at El Paso

Wednesday AM **March 17, 2021**

Session Chairs: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Vahid Attari, Texas A&M University; Eva Zarkadoula, Oak Ridge National Laboratory; Laurent Béland, Queen's University

8:30 AM Invited
Influence of Interphase Boundary Anisotropy on the Formation of Lamellar Eutectic Solidification Patterns: *Mathis Plapp*[1]; Supriyo Ghosh[2]; Sabine Bottin-Rousseau[3]; Silvère Akamatsu[3]; [1]Ecole Polytechnique, CNRS; [2]Los Alamos National Laboratory; [3]Sorbonne Université, CNRS

9:00 AM
Thermokinetics and Associated Microstructural Evolution of Laser Powder Bed Fused Additively Manufactured Ti6Al4V: *Mangesh Pantawane*[1]; Narendra Dahotre[1]; [1]University of North Texas

9:20 AM Invited
Inhomogeneous Free Energies Beyond the Cahn-Hilliard Model: Interface Anisotropy and Equilibrium Patterning: *Pascal Bellon*[1]; Qun Li[1]; Robert Averback[1]; [1]University of Illinois at Urbana-Champaign

9:50 AM
Topological Transitions during Coarsening in Nanoporous Metals: *Kate Elder*[1]; W. Beck Andrews[2]; Markus Ziehmer[3]; Alexander Chadwick[1]; Erica Lilleodden[3]; Katsuyo Thornton[2]; Peter Voorhees[1]; [1]Northwestern University; [2]University of Michigan; [3]Helmholtz-Zentrum Geesthacht

PHYSICAL METALLURGY

Defect and Phase Transformation Pathway Engineering for Desired Microstructures — Experiment and Characterization

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; Yipeng Gao, Idaho National Laboratory; Timofey Frolov, Lawrence Livermore National Laboratory; Stoichko Antonov, Max-Planck-Institut für Eisenforschung GmbH; Jessica Krogstad, University of Illinois at Urbana-Champaign; Bin Li, University of Nevada, Reno

Wednesday AM **March 17, 2021**

Session Chair: Stoichko Antonov, Max Planck Insitut fur Eisenforschung GmbH

8:30 AM
Grain Boundary Segregation for Thermal Stability in Ternary Nanocrystalline Alloys: *Sebastian Kube*[1]; Wenting Xing[2]; Arvind Kalidindi[2]; Sungwoo Sohn[1]; Amit Datye[1]; Dor Amram[2]; Christopher Schuh[2]; Jan Schroers[1]; [1]Yale University; [2]Massachusetts Institute of Technology

8:50 AM
Tuning Fine-scale Alpha Microstructures via Nano-scale Structural and Compositional Non-uniformities in Beta Titanium Alloys: Dian Li[1]; Rongpei Shi[2]; Rajarshi Banerjee[3]; Yunzhi Wang[4]; Hamish Fraser[4]; *Yufeng Zheng*[1]; [1]University of Nevada, Reno; [2]Lawrence Livermore National Laboratory; [3]University of North Texas; [4]Ohio State University

9:10 AM
Exploring the Microstructure of Sputtered Nanotwinned Alloys and Its Role in the Study of Dislocation-Twin Interactions: *Francisco Andrade Chávez*[1]; Orcun Koray Calebi[1]; Ahmed Sameer Khan Mohammed[1]; Huseyin Sehitoglu[1]; Jessica Krogstad[1]; [1]University of Illinois at Urbana-Champaign

9:30 AM
Pseudo-in situ Characterization of Phase Transformation in an Al-Cu-Mn-Zr Alloy Using Atom Probe Tomography: *Bharat Gwalani*[1]; Jia Liu[1]; Jonathan Poplawsky[2]; Amit Shyam[2]; Arun Devaraj[1]; [1]Pacific Northwest National Laboratory; [2]Oak Ridge National Lab

9:50 AM
High-temperature Bulk Dislocation Dynamics in Aluminum: *Leora Dresselhaus-Marais*[1]; [1]Lawrence Livermore National Laboratory

10:10 AM
Interaction between Martensite Transformation and Ion-induced Damage in Shape Memory Alloys: *Alejandro Hinojos*[1]; Daniel Hong[1]; Nan Li[2]; Khalid Hattar[3]; Peter Anderson[1]; Michael Mills[1]; [1]The Ohio State University; [2]Los Alamos National Labs; [3]Sandia National Labs

10:30 AM
Microstructural Evolution of Nanotwinned Al-Zr Alloy with Significant 9R Phase Stabilization: *Nick Richter*[1]; Yifan Zhang[1]; Ruizhe Su[1]; Tongjun Niu[1]; Qiang Li[1]; Sichuang Xue[1]; Haiyan Wang[1]; Xinghang Zhang[1]; [1]Purdue University

MATERIALS PROCESSING

Deformation Induced Microstructural Modification — Session V: Deformation of Alloys II and Composites

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

Program Organizers: Arun Devaraj, Pacific Northwest National Laboratory; Suveen Mathaudhu, University of California-Riverside ; Kester Clarke, Colorado School of Mines; Bharat Gwalani, Pacific Northwest National Laboratory; Daniel Coughlin, Los Alamos National Laboratory

Wednesday AM **March 17, 2021**

Session Chair: Kester Clarke, Colorado School of Mines

8:30 AM
Grain Refinement and Bimodal Distribution of Precipitates in Al 6xxx and 7xxx Alloys during ShAPE (Shear Assisted Processing and Extrusion): *Xiaolong Ma*[1]; Rajib Kalsar[1]; Jens Darsell[1]; Miao Song[1]; Nicole Overman[1]; Keerti Kappagantula[1]; Vineet Joshi[1]; [1]Pacific Northwest National Laboratory

8:50 AM
Influence of Shear Rolling on Microstructure and Properties of Low-density Steels: *Dean Pierce*[1]; Tomas Scuseria[1]; Kelcey Garza[1]; Amrinder Gill[1]; Jerry Arnold[1]; Amy Clarke[1]; Kester Clarke[1]; Ercan Cakmak[1]; Artem Trofimov[1]; Hsin Wang[1]; Govindarajan Muralidharan[1]; Tom Muth[1]; [1]Oak Ridge National Laboratory

9:10 AM
Investigation of Path Dependent Microstructural Evolution in Cu-Nb System Processed via Friction Consolidation: *Mageshwari Komarasamy*[1]; Xiao Li[1]; Scott Whalen[1]; Xiaolong Ma[1]; Nathan Canfield[1]; Matthew Olszta[1]; Tamas Varga[1]; Glenn Grant[1]; Suveen Mathaudhu[2]; [1]Pacific Northwest National Laboratory; [2]University of California, Riverside and Pacific Northwest National Laboratory

9:30 AM
Low Temperature Superplasticity in Al 5083 Produced by Accumulative Roll Bonding: *Brady McBride*[1]; Kester Clarke[1]; Amy Clakre[1]; [1]Colorado School of Mines

9:50 AM
Tailoring the Mechanical Performance in Novel Zn-Ag-Mg Alloy Processed by Cold Plastic Deformation Processes: *Maria Watroba*[1]; Wiktor Bednarczyk[1]; Jakub Kawalko[1]; Terence G. Langdon[2]; Piotr Bala[1]; [1]AGH University of Science and Technology; [2]University of Southampton

10:10 AM
The Unusual Effect of HPT Processing on Microstructure and Mechanical Properties in Zn-alloys: *Wiktor Bednarczyk*[1]; Maria Watroba[1]; Jakub Kawalko[1]; Piotr Bala[1]; Terence G. Langdon[2]; [1]AGH University of Science and Technology in Krakow; [2]University of Southampton

10:30 AM
Mg-Fe Bonded Interface Using FaST: *Hrishikesh Das*[1]; Tianhao Wang[1]; Piyush Upadhyay[1]; Bharat Gwalani[1]; Xiaolong Ma[1]; Dalong Zhang[1]; [1]Pacific Northwest National Laboratory

10:50 AM
Harnessing Thermomechanical Processing to Influence Texture in ARB Cu/Nb Composites: *Justin Cheng*[1]; Sven Vogel[2]; Cody Miller[2]; Ryan Mier[2]; Carl Osborn[2]; John Carpenter[2]; Madhavan Radhakrishnan[3]; Osman Anderoglu[3]; Nathan Mara[1]; [1]University of Minnesota Twin Cities; [2]Los Alamos National Laboratory; [3]University of New Mexico

11:10 AM
Evolution of Mechanical Properties and Microstructure in Accumulative Roll Bonded FCC/BCC Metallic Composites: *Thomas Nizolek*[1]; Daniel Coughlin[1]; Cody Miller[1]; Nan Li[1]; Rodney McCabe[1]; John Carpenter[1]; [1]Los Alamos National Laboratory

11:30 AM
Analysis of Al 6061 and Mild Steel Joints from Rotary Friction Welding: *Nikhil Gotawala*[1]; Amber Shrivastava[1]; [1]Indian Institute of Technology Bombay

LIGHT METALS

Electrode Technology for Aluminum Production — Anode Production - Green & Baked Anode Production/Modelling and Performance

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

Program Organizer: Derek Santangelo, Hatch

Wednesday AM **March 17, 2021**

Session Chair: Julien Lauzon-Gauthier, Alcoa Corporation

8:30 AM
Start-up of a New "Smart & Green" Anode Plant: *Christophe Bouche*[1]; Xavier Genin[1]; Vincent Philippaux[1]; Jérôme Morfoise[1]; [1]Fives

8:50 AM
The Steps to Optimize and Implement an Anode Stub Hole Cleaning Machine Modification: *Valerie Langelier*[1]; Derek Santangelo[1]; [1]Hatch

9:10 AM
Biocarbon in the Aluminium Industry: A Review: *Samuel Senanu*[1]; Asbjørn Solheim[1]; [1]SINTEF

9:30 AM
Anode to Cathode Electrical Current Modelling for Cell Retrofit Application of Conductive Nails Technology: *William Berends*[1]; [1]Alucelltech Inc.

9:50 AM
Managing Anode Performance with a Versatile Reactivity Analysis Method: *Lorentz Petter Lossius*[1]; Juraj Chmelar[1]; Viktorija Tomkute[1]; [1]Hydro Aluminium AS

10:10 AM Question and Answer Period

ELECTRONIC MATERIALS

Electronic Packaging and Interconnections 2021 — Advanced Microelectronic Packaging Materials

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

Program Organizers: Mehran Maalekian, Mat-Tech; Christopher Gourlay, Imperial College London; Babak Arfaei, Ford Motor Company; Praveen Kumar, Indian Institute of Science; Sai Vadlamani, Intel Corporation; Kazuhiro Nogita, University of Queensland; David Yan, San Jose State University

Wednesday AM **March 17, 2021**

Session Chairs: Sai Vadlamani, Intel Corp.; Prithwish Chatterjee, Intel Corp.

8:30 AM Invited
Advances in Low Temperature/Low Pressure Ag Sinter Joining and Its Thermal Performance: *Katsuaki Suganuma*[1]; Chuantong Chen[1]; Zheng Zhang[1]; Aiji Suetake[1]; Aya Iwaki[1]; Ming Hsieh[1]; Naoki Sato[1]; [1]Osaka University

8:50 AM
Electric-enhanced Sintering of Copper Interconnects: *Tzu-Hao Shen*[1]; Albert T. Wu[1]; [1]National Central University

9:10 AM
Modeling and Simulation of Stress Gradient Driven Migration: *Zachary Morgan*[1]; Yongmei Jin[1]; Vahid Attari[2]; Raymundo Arroyave[2]; [1]Michigan Technological University; [2]Texas A&M University

9:30 AM
Plasticity and Contact Resistance Behavior in Wirebond Packaging: *Allison Osmanson*[1]; Mohsen Tajedini[1]; Hossein Madanipour[1]; Yi Ram Kim[1]; Choong-Un Kim[1]; [1]University of Texas at Arlington

9:50 AM
The Effects of DC, Pulsed DC, and AC Load Conditions on Electromigration Failure Mechanism in Solder Interconnects: *Yi Ram Kim*[1]; Hossein Madanipour[1]; Allison Osmanson[1]; Mohsen Tajedini[1]; Choong-Un Kim[1]; Patrick Thompson[2]; Qiao Chen[2]; [1]University of Texas at Arlington; [2]Texas Instruments, Inc.

10:10 AM
Sintered Micro-silver Joints with the Addition of Indium Applied to Power IC Packaging: *Chin-Hao Tsai*[1]; Wei-Chen Huang[1]; Ly May Chew[2]; Wolfgang Schmitt[2]; Hiroshi Nishikawa[3]; C. Robert Kao[1]; [1]National Taiwan University; [2]Heraeus Deutschland GmbH & Co. KG; [3]Joining and Welding Research Institute, Osaka University

10:30 AM
Low-Temperature and Pressureless Cu-to-Cu Bonding by Electroless Pd Plating Using Microfluidic System: *Po Shao Shih*[1]; Zhen De Ma[1]; Han Tang Hung[1]; Jeng Hau Huang[1]; C.Robert Kao[1]; [1]National Taiwan University

CORROSION

Environmental Degradation of Additively Manufactured Alloys — High Temperature Oxidation and Corrosion, High Temperature Alloys

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Additive Manufacturing Committee

Program Organizers: Kinga Unocic, Oak Ridge National Laboratory; Jenifer Locke, Ohio State University; Sebastien Dryepondt, Oak Ridge National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Xiaoyuan Lou, Auburn University; Brendy Rincon Troconis, University of Texas at San Antonio; Luke Brewer, University of Alabama

Wednesday AM **March 17, 2021**

Session Chairs: Kinga Unocic, Oak Ridge National Laboratory; Sebastien Dryepondt, Oak Ridge National Laboratory; Michael Kirka, Oak Ridge National Laboratory

8:30 AM Invited
High Temperature Air Oxidation Behavior of Ni-based Superalloys Processed by Electron Beam Melting (EBM) and Selective Laser Melting (SLM): *Marie Romedenne*[1]; Rishi Pillai[1]; Sebastien Dryepondt[1]; [1]ORNL

9:00 AM Invited
Effect of High-temperature Oxidation on the Fatigue Properties of Inconel 625 Fabricated by Laser Additive Manufacturing: *Grace De Leon Nope*[1]; Juan Alvarado-Orozco[2]; Guofeng Wang[1]; Brian Gleeson[1]; [1]University of Pittsburgh; [2]CIDESI

9:30 AM Invited
High Temperature Oxidation of Additively Manufactured FeCrAl and Ni-based Alloys: *Mohammad Sattari*[1]; Irina Fedorova[1]; Alberto Visibile[1]; Kerem Gündüz[1]; Jan Froitzheim[1]; Krystyna Stiller[1]; Mats Halvarsson[1]; [1]Chalmers University of Technology

10:00 AM
Microstructural Evolution and Oxidation Behavior of Fe-25Cr-20Ni-1.4Nb-0.2C Steel Fabricated by Laser Powder-bed Fusion: *Kinga Unocic*[1]; Marie Romedenne[1]; Peeyush Nandwana[1]; Sebastien Dryepondt[1]; [1]Oak Ridge National Laboratory

10:20 AM Invited
High Temperature Oxidation and Corrosion of LBM and EBM Ni-base Superalloys and Ti Alloys: *Daniel Monceau*[1]; Tom Sanviemvongsak[2]; Antoine Casadebaigt[3]; Annabelle Vernouillet[4]; Bruno Macquaire[5]; Jonathan Hugues[6]; Sebastien Doublet[7]; Aurélie Vande Put[1]; [1]CIRIMAT Laboratory; [2]CIRIMAT Laboratory; Safran Tech; [3]CIRIMAT Laboratory; IRT Saint Exupery; [4]CIRIMAT Laboratory; Air Liquide; [5]Safran Tech; [6]IRT Saint Exupery; [7]Air Liquide

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, Advanced Cooling Technologies Inc; Jenifer Locke, Ohio State University

Wednesday AM **March 17, 2021**

Session Chairs: Khalid Hattar, Sandia National Lab; Michele Manuel, University of Florida

8:30 AM Invited
Deconvoluting Mechanism in Complex Environments via In-situ Electron Microscopy: *Khalid Hattar*[1]; [1]Sandia National Laboratories

9:10 AM Invited
Elucidation of Corrosion Mechanisms in Light Alloys by In situ X-ray Micro and Nanotomography: *Nikhilesh Chawla*[1]; [1]Purdue University

9:50 AM Invited
Controlling the Corrosion Behavior of Bioresorbable Magnesium Implants: *Michele Manuel*[1]; [1]University of Florida

10:30 AM Invited
Understanding General Grain Boundaries: The Weak Link for Mechanical and Chemical Degradation: *Jian Luo*[1]; [1]University of California, San Diego

11:10 AM
Classifying Liquid-solid Metal Interactions: Separation of the Multiple Mechanisms of Liquid Metal Embrittlement: Justin Norkett[1]; Cameron Frampton[1]; *Victoria Miller*[1]; [1]University of Florida

MATERIALS DESIGN

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — From Cyclic Plastic Localization and Accumulation to Crack Nucleation and Propagation

Sponsored by: TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, 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; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University; Jean-Charles Stinville, University of California-Santa Barbara

Wednesday AM **March 17, 2021**

Session Chair: Jean-Charles Stinville, University of California - Santa Barbara

8:30 AM
Fatigue and Dwell-fatigue Crack Initiation at (0001) Twist Boundaries in Ti Alloys: Cyril Lavogiez[1]; Jean-Charles Stinville[2]; Tresa Pollock[2]; Paraskevas Kontis[3]; Valéry Valle[4]; Patrick Villechaise[1]; *Samuel Hemery*[5]; [1]ISAE-ENSMA; [2]University of California Santa Barbara; [3]MPIE; [4]Université de Poitiers; [5]Institute Prime - Ensma

8:50 AM
Multi-scale Analysis of Fatigue Damage in Welded Lean Duplex Stainless Steel Components: *Ayoub Elmoutaouakkil*[1]; Anna Fraczkiewicz[1]; Alexandre Gay[2]; Jacques Stolarz[1]; [1]Emse; [2]e.l.m. Leblanc

9:10 AM Invited
Tracking Crystal-scale Cyclic Plasticity in Inconel 718 Using High Energy X-rays: *Dalton Shadle*[1]; Kelly Nygren[2]; Matthew Miller[1]; [1]Cornell University; [2]Cornell High Energy Synchrotron Source

9:30 AM
Plastic Localization in Solid Solution and Precipitation Strengthened Inconel 718 and Its Effect on VHCF Properties: *Alice Cervellon*[1]; Damien Texier[2]; Marie Agathe Charpagne[1]; Chris Torbet[1]; Valéry Valle[3]; Jean Charles Stinville[1]; Tresa Pollock[1]; [1]University of California Santa Barbara; [2]Institut Clément Ader; [3]Institut Pprime

9:50 AM
Microstructural and Mechanical Evolution of Aluminum 7075-T6 during Non-reversible Fatigue Loading: *Joseph Indeck*[1]; Gabriel Demeneghi[1]; Jason Mayeur[1]; Cyril Williams[2]; Kavan Hazeli[1]; [1]The University of Alabama in Huntsville; [2]U.S. Army Research Laboratory

10:10 AM
Effect of Microtexture on Minimum Dwell Fatigue Life of Ti-6Al-4V: *Sushant Jha*[1]; Daniel Sparkman[2]; James Larsen[2]; Reji John[2]; Adam Pilchak[2]; [1]University of Dayton Research Institute; [2]US Air Force Research Laboratory

10:30 AM
On the Role of Annealing Twin Boundaries in the Cyclic Plastic Strain Localization and the Fatigue Crack Initiation in Equiatomic CrCoNi Medium-entropy Alloy: *Veronika Mazánová*[1]; Milan Heczko[1]; Connor Slone[1]; Ivo Kubena[2]; Easo George[3]; Maryam Ghazisaeidi[1]; Tomas Kruml[2]; Jaroslav Polak[2]; Michael Mills[1]; [1]The Ohio State University; [2]Institute of Physics of Materials CAS; [3]Oak Ridge National Laboratory

10:50 AM Reminder ... A joint session, "Microstructure-based Fatigue Studies on Additive-Manufactured Materials," will be held on Wednesday at 2 p.m. EDT in conjunction with the Additive Manufacturing Fatigue and Fracture V: Processing-Structure-Property Investigations and Application to Qualification symposium.

MATERIALS PROCESSING

Friction Stir Welding and Processing XI — Dissimilar

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

Program Organizers: Yuri Hovanski, Brigham Young University; Piyush Upadhyay, Pacific Northwest National Laboratory; Yutaka Sato, Tohoku University; Nilesh Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter the Great St. Petersburg Polytechnic University

Wednesday AM **March 17, 2021**

8:30 AM Invited
Friction Stir Welding of Metal and Carbon Fiber Reinforced Plastic: *Hidetoshi Fujii*[1]; Jeong-Won Choi[1]; Yoshiaki Morisada[1]; Kimiaki Nagatsuka[1]; Kazuhiro Nakata[1]; [1]Osaka University

8:50 AM
Friction Stir Welding of Metal Matrix Composites to Dissimilar Aluminum Alloys: Optimization of Weld Quality and Tool Life : *Michael Eff*[1]; Scott Rose[2]; Kyung Chung[3]; Don Hashiguchi[3]; Drew Shipley[1]; Elizabeth Burns[2]; [1]EWI; [2]Boeing; [3]Materion

9:10 AM
Dissimilar Joining of ZEK100 and AA6022 for Automotive Application: *Hrishikesh Das*[1]; Piyush Upadhyay[1]; Woongjo Choi[1]; Shank Kulkarni[1]; [1]Pacific Northwest National Laboratory

9:30 AM
Fracture Mechanics Approach to Improve Fatigue Strength of a Dissimilar Metal T-Lap Joint by Friction Stir Welding: *Masakazu Okazaki*[1]; Hao Duong[1]; Satoshi Hirano[2]; [1]Nagaoka University of Technology; [2]Hitachi Research Laboratory

9:50 AM
Effect of Diffusion on Intermetallics at Interface during Friction Stir Welding of Stainless Steel and Pure Titanium: *Nikhil Gotawala*[1]; Amber Shrivastava[1]; [1]Indian Institute of Technology Bombay

10:10 AM
Microstructural and Mechanical Characterization of Titanium/Steel Joints Produced by Ultrasound Enhanced Friction Stir Welding: *Andreas Gester*[1]; Marco Thomae[1]; Guntram Wagner[1]; [1]Chemnitz University of Technology

PHYSICAL METALLURGY

Frontiers in Solidification Science VIII — Melting, Nucleation & Laser Processing

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Phase Transformations Committee, TMS: Solidification Committee, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Damien Tourret, IMDEA Materials; Amy Clarke, Colorado School of Mines; Ulrike Hecht, Access e.V.; Nana Ofori-Opoku, Canadian Nuclear Laboratories; Melis Serefoglu, Koc University; Tiberiu Stan, Northwestern University

Wednesday AM **March 17, 2021**

Session Chairs: Julien Zollinger, Institut Jean Lamour; Amy Clarke, Colorado School of Mines; Guillaume Boussinot, Access e.V.; Tiberiu Stan, Northwestern University

8:30 AM Invited
Melting of Metastable Solid-states in Au-Si Eutectic Alloy: *Güven Kurtuldu*[1]; [1]ETH Zürich

9:00 AM Invited
Microstructure Evolution during Melting: *Guillaume Boussinot*[1]; Mahdi Torabi Rad[1]; Markus Apel[1]; Alexandre Viardin[1]; [1]Access e.V.

9:30 AM Invited
ISRO-mediated Nucleation in Fcc Alloys during Rapid Melting and Solidification Processes: *Julien Zollinger*[1]; Ivan Cazic[2]; Michel Rappaz[3]; Benoît Appolaire[1]; [1]Institut Jean Lamour; [2]Institut Jean Lamour / Institut de Soudure; [3]EPFL

10:00 AM
Orientation Relationships between Al3Ti and TiB2 due to Nucleation and Pushing/Engulfment: Yi Cui[1]; Andrew Horsfield[1]; *Christopher Gourlay*[1]; [1]Imperial College London

10:20 AM
Model the Initiation of Hot Cracking in Aluminum 6061 during the Processes of Laser Welding: *Guannan Tang*[1]; Anthony Rollett[1]; [1]Carnegie Mellon University

10:40 AM
Using Composition and Patterning to Induce Solidification Instabilities in Al-Cu Eutectic Thin Films: *Eli Sullivan*[1]; John Tomko[1]; Jonathan Skelton[1]; James Fitz-Gerald[1]; Patrick Hopkins[1]; Jerrold Floro[1]; [1]University of Virginia

SPECIAL TOPICS

Frontiers of Materials Award Symposium: Low-Dimensional Materials and Interfaces for Next Generation Computing — Session II

Program Organizer: Deep Jariwala, University of Pennsylvania

Wednesday AM **March 17, 2021**

8:30 AM Invited
Designing Solid-state Materials from Quantum Dots for Next-generation Electronic Devices: *Cherie Kagan*[1]; [1]University of Pennsylvania

9:10 AM Invited
vdW Contacts on 2D Semiconductors: *Manish Chhowalla*[1]; [1]Cambridge University

9:50 AM Panel Discussion Moderator: Deep Jariwala; Panelists: Mark C. Hersam,Suman Datta,Cherie Kagan, and Manish Chhowalla

NANOSTRUCTURED MATERIALS

Functional Nanomaterials: Functional Low-dimensional Materials (0D, 1D, 2D) Driving Innovations in Electronics, Energy, Sensors, and Environmental Engineering and Science 2021 — Nanomanufacturing & Sensors

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

Program Organizers: Jiyoung Chang, University of Utah; Michael Cai Wang, University of South Florida; Sarah Zhong, University of South Florida; Sun Choi, Korea Institute of Science and Technology; Pei Dong, George Mason University

Wednesday AM **March 17, 2021**

Session Chairs: Jiyoung Chang, University of Utah; Sun Choi, Korea Institute of Science and Technology

8:30 AM Invited
In-situ Production of Metal Nanoparticles on Polymer Derived Ceramic Fibers for Catalysis and Sensing: Sajia Afrin[1]; Jean Calderon[1]; *Lei Zhai*[1]; [1]University of Central Florida

8:55 AM
Suspended Graphene H2 Sensors With Enhanced Sensitivity Fabricated Using Direct-write Functional Fibers: *Abiral Regmi*[1]; Dongwoon Shin[1]; Noori Na[1]; Jiyoung Chang[1]; [1]University of Utah

9:15 AM Invited
Laser Digital Patterning for Nickel-based Flexible Electrodes and Its Applications for Electronics and Sensors: *Daeho Lee*[1]; [1]Gachon University

9:40 AM Invited
Redesigning Batteries via Additive Manufacturing: *Corie Cobb*[1]; [1]University of Washington

10:20 AM Invited
Ultra-fast Nanomaterial Assembly and R2R Printing for High-performance Skin Sensors: *Ying Zhong*[1]; Long Wang[2]; Rui Kou[2]; [1]University of South Florida; [2]University of California at San Diego

10:45 AM
Transparent and Flexible Nanoelectrodes for Wearable Electronics by Direct-writing of PEDOT:PSS-nanofiber: *Dongwoon Shin*[1]; Abiral Regmi[1]; Jiyoung Chang[1]; [1]University of Utah

11:05 AM
Wireless Strain Field Mapping of Metallic Surfaces through THz Time Domain Spectroscopy of Electrostrictive Coating Acting as Passive Sensor: *Luis Reig Buades*[1]; Abhijeet Dhiman[1]; Vikas Tomar[1]; [1]Purdue University

NANOSTRUCTURED MATERIALS

Heterostructured and Gradient Materials (HGM IV): Tailoring Heterogeneity for Superior Properties — Harmonic Structure, Composites and Films

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

Program Organizers: Yuntian Zhu, City University of Hong Kong; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California-Santa Barbara
; Yves Brechet, Grenoble Institute of Technology; Huajian Gao, Nanyang Technological University; Hyoung Seop Kim, Pohang University of Science and Technology; Ke Lu, Institute of Metal Research; Xiaolei Wu, Chinese Academy of Sciences

Wednesday AM **March 17, 2021**

Session Chairs: Kei Ameyama, Ritsumeikan University; Dmytro Orlov, Lund University; Benjamin Guennec, Toyama Prefectural University

8:30 AM
Unique Hall-petch Relation in Harmonic Structure Materials: *Kei Ameyama*[1]; [1]Ritsumeikan University

8:50 AM Invited
Size Effect Issue on the Fatigue Properties of Ti-6Al-4V Designed in Heterogeneous Harmonic Structure: *Benjamin Guennec*[1]; Takayuki Ishiguri[2]; Mie Ota Kawabata[3]; Shoichi Kikuchi[4]; Akira Ueno[3]; Kei Ameyama[3]; [1]Toyama Prefectural University; [2]Mitsui High-tec; [3]Ritsumeikan University; [4]Shizuoka University

9:15 AM
Yielding in a Metallic Nanocomposite at the Nanoscale: *Kangpyo So*[1]; Myles Stapelberg[1]; Yu Ren Zhou[1]; Hideki Mori[2]; Shigenobu Ogata[2]; Michael Short[1]; Ju Li[2]; Sidney Yip[1]; [1]Massachusetts Institute Of Technology; [2]College of Industrial Technology

9:35 AM Invited
Lattice Defect Development in Harmonic Metals through Atomic Simulations: *Tomotsugu Shimokawa*[1]; Tatsuya Hasegawa[1]; Tomoaki Niiyama[1]; [1]Kanazawa University

10:00 AM Invited
Backstress Development and Strain Partitioning in Harmonic-structure Materials: *Dmytro Orlov*[1]; Roman Kulagin[2]; Yan Beygelzimer[3]; [1]Lund University; [2]Karlsruhe Institute of Technology; [3]Donetsk Institute for Physics and Engineering

10:25 AM Invited
Outstanding Mechanical Properties in a Harmonic Structure Designed Titanium Due to Preferential Recrystallization: *Bhupendra Sharma*[1]; Motoki Miyakoshi[1]; Mie Kawabata[1]; Kei Ameyama[1]; [1]Ritsumeikan University

10:50 AM
High Strength and Tensile Ductility in Bicrystalline Nickel Thin Films with Incoherent Twin Boundaries: Rohit Berlia[1]; *Jagannathan Rajagopalan*; [1]Arizona State University

11:10 AM
Effect of Rolling on Fatigue Crack Propagation in Harmonic Structured Commercially Pure Titanium: *Yoshikazu Nakai*[1]; Shoichi Kikuchi[2]; Kohei Osaki[1]; Mie Kawabata[3]; Kei Ameyama[3]; [1]Kobe Univ; [2]Shizuoka University; [3]Ritsumeikan University

11:30 AM
Synthesis and Mechanical Characterization of Metallic Films with Precisely Defined Heterogeneous Microstructures: Rohit Berlia[1]; *Jagannathan Rajagopalan*; [1]Arizona State University

ADVANCED MATERIALS

High Entropy Alloys IX: Alloy Development and Properties — Joint Session with Materials for High Temperature Applications: Next Generation Superalloys and Beyond

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

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Wednesday AM **March 17, 2021**

Session Chairs: Oleg Senkov, Air Force Research Laboratory; Ridwan Sakidja, Missouri State University

8:30 AM Invited
Temperature Dependent Deformation Behavior and Strengthening Mechanisms in a Two-phase BCC+B2 Refractory High Entropy Alloy: *Oleg Senkov*[1]; Jean-Philippe Couzinie[2]; Satish Rao[1]; Vishal Soni[3]; Rajarshi Banerjee[3]; [1]Air Force Research Laboratory; [2]Université Paris Est Creteil; [3]University of North Texas

8:55 AM Invited
Mechanical Properties of Precipitation Strengthened Refractory High Entropy Alloys at Elevated Temperatures: *Stephan Laube*[1]; Steven Schellert[2]; Daniel Schliephake[1]; Alexander Kauffmann[1]; Bronislava Gorr[2]; Hans-Jürgen Christ[2]; Martin Heilmaier[1]; [1]Karlsruher Institut für Technologie (KIT); [2]Universität Siegen

9:20 AM
Transport Properties of Binary and Entropy-stabilized Diborides: *Alin Niraula*[1]; Bikash Timalsina[1]; Gregory Hilmas[2]; William Fahrenholtz[2]; Ridwan Sakidja[1]; [1]Missouri state university; [2]Missouri university of Science and technology

9:40 AM Invited
The Design and Characterization of High Entropy Alloys for High Temperature Applications: *Kevin Garber*[1]; Bhaskar Majumdar[1]; [1]New Mexico Institute of Mining and Technology

10:05 AM Invited
Unique Microstructural Evolution and Deformation Behavior of HfNbTaTiZr BCC High Entropy Alloy at Elevated Temperatures: *Nobuhiro Tsuji*[1]; Rajeshwar Eleti[1]; Atul Chokshi[2]; Akinobu Shibata[3]; [1]Kyoto University; [2]Indian Institute of Science; [3]National Institute for Materials Science (NIMS)

10:30 AM Invited
Design of Corrosion and Irradiation Resistant Compositionally Complex Alloys Using a High-throughput Platform for Applications in Extreme Environments: *Adrien Couet*[1]; Michael Moorehead[1]; Michael Niezgoda[1]; Phalgun Nelaturu[1]; Bonita Goh[1]; Yafei Wang[1]; Mediha Karatas[1]; Chuan Zhang[2]; Fan Zhang[2]; Thien Duong[3]; Santanu Chaudhuri[3]; Kumar Sridharan[1]; Dan Thoma[1]; [1]University of Wisconsin-Madison; [2]Computherm LLC; [3]Argonne National Laboratory

10:55 AM
Microstructure and Mechanical Properties of High-entropy Superalloy HESA-3 at Intermediate Temperature: *Takuma Saito*[1]; Akira Ishida[2]; Michinari Yuyama[2]; Yuji Takata[2]; Kyoko Kawagishi[1]; Hideyuki Murakami[1]; [1]National Institute for Materials Science / Waseda University; [2]National Institute for Materials Science

ADVANCED MATERIALS

High Entropy Alloys IX: Structures and Modeling — Structures and Characterization II

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

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Wednesday AM **March 17, 2021**

Session Chairs: James Morris, Ames Laboratory; Yang Ren, Argonne National Laboratory

8:30 AM Invited
Predicting High Entropy Alloy Behavior: What We Can Learn from Non-empirical Approaches: *James Morris*[1]; [1]Ames Laboratory

8:50 AM Invited
Role of Local Chemical Order in Orientation Relationship Determination in an Al0.3CoCrFeNi High Entropy Alloys: *Elaf Anber*[1]; Daniel Foley[1]; Diana Farkas[2]; Peter Liaw[3]; Mitra Taheri[1]; [1]Johns Hopkins University; [2]Virginia Tech; [3]The University of Tennessee

9:10 AM
Microstructure and Mechanical Properties of a Dual Phase Transformation Induced Plasticity Fe-Mn-Co-Cr High Entropy Alloy: *AFM Monowar Hossain*[1]; Rajiv Mishra[2]; Nilesh Kumar[1]; [1]University of Alabama Tuscaloosa; [2]University of North Texas

MATERIALS PROCESSING

High Temperature Electrochemistry IV — Session IV

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

Program Organizers: Prabhat Tripathy, Batelle Energy Alliance (Idaho National Laboratory); Guy Fredrickson, Idaho National Laboratory

Wednesday AM **March 17, 2021**

Session Chair: Guy Fredrickson, Idaho National Laboratory

8:30 AM
Interaction between Solute Species and Metallic Alloying Elements in Molten Chloride Systems: *William Phillips*[1]; Ruchi Gakhar[1]; [1]Idaho National Laboratory

9:00 AM
Effect of Hydroxide and Oxide Impurities in Electrochemical Processes Using Molten LiCl and $CaCl_2$: *Mario Alberto Gonzalez*[1]; Emma Faulkner[1]; Michael Simpson[1]; [1]University of Utah

MATERIALS DESIGN

Hume-Rothery Symposium: Accelerated Measurements and Predictions of Thermodynamics and Kinetics for Materials Design and Discovery — Session V

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

Program Organizers: Wei Xiong, University of Pittsburgh; Shuanglin Chen, CompuTherm LLC; Wei Chen, Illinois Institute of Technology; James Saal, Citrine Informatics; Greta Lindwall, KTH Royal Institute of Technology

Wednesday AM **March 17, 2021**

Session Chairs: Greta Lindwall, KTH Royal Institute of Technology; Shuanglin Chen, CompuTherm LLC

8:30 AM Invited
Some Properties if the Multicomponent Diffusivity Matrix: *John Agren*[1]; [1]Royal Institute of Technology

9:10 AM Invited
A Tale of Two Approaches: From Phase Equilibria to Materials Properties
: *Qing Chen*[1]; [1]Thermo-Calc Software AB

9:50 AM Invited
A Diffusion Mobility Database for γ/ γ' Co-Superalloys: *Carelyn Campbell*[1]; Kil-won Moon[1]; Maureen Williams[1]; Greta Lindwall[2]; [1]National Institute of Standards and Technology; [2]Royal Institute of Technology (KTH)

10:30 AM Invited
Modeling of Diffusion and Intermetallic Phase Formation in Al-Mg Bimetallic Structures
: *Alan Luo*[1]; [1]Ohio State University

11:10 AM Invited
An Integrated Computational Materials Engineering (ICME) Framework for Additive Manufacturing (AM) of Ni-based Superalloys: *Qiaofu Zhang*[1]; Abhinav Saboo[1]; Jiadong Gong[1]; Greg Olson[1]; [1]QuesTek Innovations LLC

LIGHT METALS

Magnesium Technology 2021 — Mechanical Behavior

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

Program Organizers: Victoria Miller, University of Florida; Petra Maier, University of Applied Sciences Stralsund; J. Brian Jordon, University of Alabama; Neale Neelameggham, IND LLC

Wednesday AM **March 17, 2021**

Session Chairs: Brian Jordon, University of Alabama; Kiran Solanki, Arizona State University

8:30 AM Invited
Quasi-static and Dynamic Rate Mechanical Behavior and Microstructural Investigation of High-purity Mg and AZ31B Alloy: *Benjamin Morrow*[1]; Ellen Cerreta[1]; Saryu Fensin[1]; Sara Perez-Bergquist[1]; Carl Trujillo[1]; Suveen Mathaudhu[2]; Veronica Anghel[1]; Rodney McCabe[1]; George Gray[1]; [1]Los Alamos National Laboratory; [2]University of California - Riverside

9:00 AM Invited
Understanding Twinning: Detwinning Behavior of Unalloyed Mg during Low-cycle Fatigue Using High Energy X-ray Diffraction: *Aeriel Murphy-Leonard*[1]; John Allison[2]; [1]Naval Research Laboratory; [2]University of Michigan

9:30 AM
The Effects of Basal and Prismatic Precipitates on Deformation Twinning in AZ91 Magnesium Alloy: *Brandon Leu*[1]; M Arul Kumar[2]; Irene Beyerlein[1]; [1]University of California Santa Barbara; [2]Los Alamos National Laboratory

9:50 AM
On the Role of Crystallographic Anisotropy and Texture in Damage Tolerance of Magnesium and its Alloys: *Shahmeer Baweja*[1]; Padmeya Indurkar[2]; Shailendra Joshi[1]; [1]University of Houston; [2]National University of Singapore

10:10 AM Invited
Achieving Excellent Room Temperature Formability and High Strength in Wrought Magnesium Alloy Sheets: *Taisuke Sasaki*[1]; Zehao Li[1]; Kazuhiro Hono[1]; [1]NIMS

10:40 AM Invited
Texture and Microstructure Evolution in Thermomechanically Processed Mg-Ca and Mg-Zn-Ca Alloys: *Tracy Berman*[1]; John Allison[1]; [1]University of Michigan

11:10 AM
Eliminating Yield Anisotropy and Enhancing Ductility in Mg Alloys by Shear Assisted Processing and Extrusion: Dalong Zhang[1]; *Jens Darsell*[1]; Nicole Overman[1]; Darrell Herling[1]; Vineet Joshi[1]; [1]Pacific Northwest National Laboratory

11:30 AM
Numerical Study of Multi-axial Loading Behavior of Mg Alloy AZ31 Extruded Bar: *Huamiao Wang*[1]; Xiaodan Zhang[1]; [1]Shanghai Jiao Tong University

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — Salt Structure and Properties

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

Program Organizers: Stephen Raiman, Texas A&M University; Kumar Sridharan, University of Wisconsin-Madison; Nathaniel Hoyt, Argonne National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Michael Short, Massachusetts Institute of Technology; Raluca Scarlat, University of California-Berkeley

Wednesday AM **March 17, 2021**

Session Chair: Raluca Scarlat, UC Berkeley

8:30 AM
Development of Higher Order Systems for the Molten Salt Thermodynamic Database and their Application: *Theodore Besmann*[1]; Kaitlin Johnson[1]; Johnathan Ard[1]; Jacob Yingling[1]; Matthew Christian[1]; Juliano Schorne-Pinto[1]; Mahmut Aslani[1]; Jake McMurray[2]; Max Poschmann[3]; Markus Piro[3]; [1]University of South Carolina; [2]Oak Ridge National Laboratory; [3]Ontario Tech

8:50 AM
Ab Initio Molecular Dynamics Simulations of Actinide Molten Chloride Salts: *David Andersson*[1]; [1]Los Alamos National Laboratory

9:10 AM
Extracting Salt Properties from Visualization of Molten Salt Sessile Droplets: Sara Mastromarino[1]; Malachi Nelson[1]; Raluca Scarlat[1]; *Ryan Hayes*[2]; [1]University of California Berkeley; [2]University of California, Berkeley

9:30 AM
Liquid-vapor Equilibrium and Transport Phenomena in Molten Salt Systems: *Jacob Mcmurray*[1]; Joanna McFarlane[1]; Scott Greenwood[1]; Abbey McAlister[1]; Matt Kurley[1]; [1]Oak Ridge National Laboratory

9:50 AM
Optimization of the Phase Equilibria and Thermodynamics for Rare-earth Fluoride Systems Relevant to Molten Salt Reactors: *Kaitlin Johnson*[1]; Juliano Schorne Pinto[1]; Theodore Besmann[1]; [1]University Of South Carolina

10:10 AM
Molten Salt Reactor: Fluoride/Chloride Salt Comparison: *Sylvie Delpech*[1]; Céline Cannes[1]; Davide Rodrigues[1]; [1]IJCLAB-CNRS

10:40 AM
X-ray Absorption Studies Investigating Solute-solvent Interactions in Molten Salt Environments: Elaine Dias[1]; *Simerjeet Gill*[1]; Ruchi Gakhar[2]; Santanu Roy[3]; Mehmet Topsakal[1]; William Phillips[2]; Bobby Layne[1]; Shannon Mahurin[3]; Phillip Halstenberg[3]; James Wishart[1]; Vyacheslav Bryantsev[3]; Anatoly Frenkel[1]; [1]Brookhaven National Laboratory; [2]Idaho National Laboratory; [3]Oak Ridge National Laboratory

11:00 AM
Imaging Nanostructural Heterogeneities Induced by Molten Salt Corrosion in Ni-Cr Alloy: *Yang Yang*[1]; Weiyue Zhou[2]; Sheng Yin[1]; Sarah Wang[3]; Qin Yu[1]; Robert Ritchie[1]; Mark Asta[1]; Ju Li[2]; Michael Short[2]; Andrew Minor[1]; [1]Lawrence Berkeley National Laboratory; [2]Massachusetts Institute of Technology; [3]University of California, Berkeley

MATERIALS PROCESSING

Materials Engineering -- From Ideas to Practice: An EPD Symposium in Honor of Jiann-Yang Hwang — Material Processing and Recycling

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

Program Organizers: Bowen Li, Michigan Technological University; Baojun Zhao, University of Queensland; Jian Li, CanmetMATERIALS; Sergio Monteiro, Instituto Militar de Engenharia; Zhiwei Peng, Central South University; Dean Gregurek, RHI Magnesita; Tao Jiang, Central South University; Yong Shi, Futianbao Environment Technologies; Cuiping Huang, FuTianBao Environment Protection Technology Company Ltd.; Shadia Ikhmayies

Wednesday AM **March 17, 2021**

Session Chairs: Tom Xu, AGreatE Inc; Yongguang Luo, Chi Hong Zn & Ge .Co,Ltd

8:30 AM
Investigation of Nickel Laterite Smelting Slags: *Ender Keskinkilic*[1]; [1]Atilim University

8:50 AM
Recycled Common Glass Bottle Used in Composite Repair for Industrial Piping: *Felipe Lopes*[1]; Noan Tonini Simonassi[1]; Carlos Fontes Vieira[1]; Sergio Neves Monteiro[1]; [1]Universidade Estadual do Norte Fluminense

9:10 AM
The Effect of the Diameter on the Density of Ubim Fiber: *BELAYNE MARCHI*[1]; Sergio Monteiro[2]; Veronica Cândido[1]; Raphael Reis[1]; [1]Instituto Militar de Engenharia; [2]Instituto Militar de Engenharia

9:30 AM Invited
Effect of Temperature on the Leachability of Chromium in EAF Slag: *Ya-Jun Wang*[1]; Jun-Guo Li[1]; Ya-Nan Zeng[1]; Zhi-Yuan Gao[2]; [1]North China University of Science and Technology; [2]Tangshan research academy of environmental planning

ADVANCED MATERIALS

Materials for High Temperature Applications: Next Generation Superalloys and Beyond — Superalloys: Processing

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

Program Organizers: Govindarajan Muralidharan, Oak Ridge National Laboratory; Martin Heilmaier, KIT Karlsruhe; Benjamin Adam, Portland State University; Mario Bochiechio, Pratt & Whitney; Katerina Christofidou, University of Sheffield; Eric Lass, University of Tennessee-Knoxville; Jeremy Rame, Safran Aircraft Engines; Pierre Sallot, Safran; Akane Suzuki, GE Research; Michael Titus, Purdue University

Wednesday AM **March 17, 2021**

8:30 AM Keynote
Considerations for Manufacturability and Repairability of Next Generation High Temperature Alloys: *Rob Proctor*[1]; [1]Rolls-Royce Corporation

9:10 AM
Observation of Multiply Coherent Grains in Ni-Based Superalloy LSHR: *Cameron Hale*[1]; Brady Dowdell[2]; Victoria Miller[1]; [1]University of Florida; [2]North Carolina State University

9:30 AM
Feasibility of Near-net-shape HIP Fabrication and PM/Wrought Weld in Alloy IN740H for AUSC Components: *Shenyan Huang*[1]; Victor Samarov[2]; Jack deBarbadillo[3]; Timothy Hanlon[1]; Beth Lewis[4]; Ronnie Gollihue[3]; John Shingledecker[5]; Jason Mortzheim[1]; [1]GE Research; [2]Synertech PM Inc.; [3]Special Metals; [4]Wyman-Gordon; [5]Electric Power Research Institute

9:50 AM Invited
Understanding the Effects of Alloy Chemistry and Microstructure on the Stress Relaxation Behavior of High Strength Ni-base Superalloys: *Sammy Tin*[1]; [1]Illinois Institute of Technology

10:20 AM
Synchrotron X-Ray Scattering Characterization of Strengthening Precipitates in a Model Ni-based Alloy: *Matthew Frith*[1]; John Chiles[2]; Jonathan Poplawsky[2]; Jan Ilavsky[1]; Govindarajan Muralidharan[2]; [1]Argonne National Laboratory; [2]Oak Ridge National Laboratory

10:40 AM
On the Early Stages of Gamma' Evolution in a Model Ni-based Alloy: *Govindarajan Muralidharan*[1]; Shivakant Shukla[1]; John Chiles[1]; Dean Pierce[1]; Larry Allard[1]; Balasubramaniam Radhakrishnan[1]; Jonathan Poplawsky[1]; [1]Oak Ridge National Laboratory

MATERIALS PROCESSING

Materials Processing Fundamentals — Thermodynamics on Metals and Slags Processing

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Jonghyun Lee, Iowa State University; Samuel Wagstaff, Oculatus; Alexandra Anderson, Gopher Resource; Fiseha Tesfaye, Abo Akademi University; Guillaume Lambotte, Boston Metal; Antoine Allanore, Massachusetts Institute of Technology

Wednesday AM **March 17, 2021**

Session Chairs: Guillaume Lambotte, Boston Metal; Fiseha Tesfaye, Åbo Akademi University

8:30 AM
Effect of Slag Conductivity on Decarburisation Reaction Kinetics: *Jayasree Biswas*[1]; Kenneth Coley[2]; [1]McMaster University; [2]Western University

8:50 AM
Experimental Characterization of Liquid Metal Bubble-driven Flows Modeling the Situation in a Steel Ladle
: Thomas Wondrak[1]; Christian Bruch[2]; *Sven Eckert*[1]; Pascal Gardin[3]; Gernot Hackl[4]; Helmut Lachmund[5]; Hans-Bodo Lüngen[6]; Hans-Jürgen Odenthal[7]; Klaus Timmel[1]; Bernd Willers[1]; [1]Helmholtz-Zentrum Dresden-Rossendorf; [2]Saarstahl AG; [3]ArcelorMittal; [4]RHI-Magnesita; [5]Dillinger Hüttenwerke; [6]Steel Institute VDEh; [7]SMS group GmbH

9:10 AM
Influence of Slab Transportation and Handling Practice on Crack Sensitivity of Micro-alloyed Steels: *Hossam Shafy*[1]; Heinz Palkowski[1]; [1]Clausthal University of Technology

9:30 AM
Low Temperature Aluminothermic Reduction of Metal Oxides: *Jawad Haidar*[1]; [1]Kinaltek Pty Ltd.

9:50 AM
Modelling of Metal Loss in Ferromanganese Furnace Tapping Operations: *Quinn Reynolds*[1]; Jan Erik Olsen[2]; [1]Mintek; [2]SINTEF Industry

10:10 AM
Carbothermal Reduction of Brazilian Linz Donawitz-LD Steel Sludges: *Mery Gomez-Marroquin*[1]; Jose Carlos D´Abreu[2]; Enrique Dionisio-Calderón[2]; Nilton Cárdenas-Falcón[3]; Abraham Terrones - Ramirez[4]; Jhony Huarcaya-Nina[5]; Kim Phatti - Satto[4]; Fernando Huaman-Perez[6]; [1]APMMM/Universidad Nacional de Ingeniería; [2]Pontifícia Universidade Católica do Rio de Janeiro ; [3]Pontificia Universidad Católica del Perú ; [4]FIGMM Universidad Nacional de Ingeniería; [5]FIA Universidad Nacional de Ingeniería; [6]FIQT Universidad Nacional de Ingeniería

10:30 AM
Liquid-liquid Extraction Thermodynamic Parameter Estimator (LLEPE) for Multicomponent Separation Systems: *Titus Quah*[1]; Chukwunwike Iloeje[1]; [1]Argonne National Laboratory

10:50 AM
Thermodynamic Modeling of Iron-copper-sulfuric Acid Solutions during Solvent Extraction and Electrowinning for Copper Production: *Jiahao Xu*[1]; Guikuan Yue[1]; [1]University of Texas El Paso

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Early Career

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Eda Aydogan, Middle East Technical University; Laurent Capolungo, Los Alamos National Laboratory; Khalid Hattar, Sandia National Laboratories; Kayla Yano, Pacific Northwest National Laboratory; Caleb Massey, Oak Ridge National Laboratory

Wednesday AM **March 17, 2021**

8:30 AM Invited
On the Role of Material Pedigree to Predict Engineering Material Properties: *Andrea Rovinelli*[1]; Mark Messner[1]; T.-L. Sham[1]; [1]Argonne National Laboratory

8:50 AM Invited
A Model for Dislocation Climb and Precipitate Interactions Applied to Creep in Ferritic Steel: *Aaron Kohnert*[1]; Laurent Capolungo[1]; [1]Los Alamos National Laboratory

9:10 AM Invited
Atom-probe Study of Nano-hardening Features in Neutron Irradiated RAFM Steels: *Arunodaya Bhattacharya*[1]; Philip Edmondson[1]; Hiroyasu Tanigawa[2]; Takashi Nozawa[2]; Josina Geringer[1]; Yutai Katoh[1]; Michael Rieth[3]; [1]Oak Ridge National Laboratory; [2]National Institutes for Quantum and Radiological Science and Technology; [3]Karlsruhe Institute of Technology

9:30 AM Invited
Microstructural Effects on the Mechanical Behavior of FeCrAl Alloys: *Andrew Hoffman*[1]; Shenyan Huang[1]; Steve Buresh[1]; Michael Schuster[1]; Evan Dolley[1]; Raul Rebak[1]; [1]GE Research

9:50 AM Invited
Novel Small Scale Mechanical Testing Techniques for Nuclear Materials: *Jonathan Gigax*[1]; Hyosim Kim[1]; Calvin Lear[1]; Matthew Chancey[1]; Peter Hosemann[2]; Yongqiang Wang[1]; Stuart Maloy[1]; Nan Li[1]; [1]Los Alamos National Lab; [2]University of California-Berkeley

10:10 AM Invited
Probing the Mechanical Behavior of Irradiated Materials through Micromechanical Testing: *Sezer Ozerinc*[1]; [1]Middle East Technical University

10:30 AM Invited
Small Scale Mechanical Testing of Nuclear Fuel and Cladding: *David Frazer*[1]; Joshua White[2]; Tarik Saleh[2]; Fabiola Cappia[1]; Fei Teng[1]; Daniel Murray[1]; Cameron Howard[1]; Colin Judge[1]; [1]Idaho National Lab; [2]LANL

10:50 AM Invited
Atomistic Simulations and Theoretical Modelling of the Yield Behavior of Industrial Tantalum Alloys: *Divya Singh*[1]; Satish Rao[2]; Jaafar El-Awady[1]; [1]Johns Hopkins University; [2]UES Inc.

11:10 AM Invited
The Merit of In-situ Environmental TEM for the Study of Tungsten under Fusion-relevant Conditions: Maanas Togaru[1]; Rajat Sainju[1]; *Yuanyuan Zhu*[1]; [1]University of Connecticut

CHARACTERIZATION

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, TMS: Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; 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 **March 17, 2021**

Session Chair: Shailendra Joshi, University of Houston

8:30 AM
Complementary In-situ Methods for Crack Evaluation within High-temperature Materials at Ambient Conditions
: *Michael Burtscher*[1]; Markus Alfreider[1]; Michael Wurmshuber[1]; Klemens Schmuck[1]; Helmut Clemens[2]; Svea Mayer[1]; Daniel Kiener[1]; [1]Montanuniversität Leoben; [2] Montanuniversität Leoben

8:50 AM
In-situ Experimental Evaluation of Residual Stresses in Composites during Autoclave Manufacturing: *Sandeep Chava*[1]; Sirish Namilae[1]; Marwan Al-Haik[1]; [1]Embry-Riddle Aeronautical University

9:10 AM
In-situ Investigation of Intergranular Crack Initiation in Hydrogen Embrittled Inconel 725: *Mengying Liu*[1]; Lai Jiang[1]; Emmeline Sheu[1]; Michael Demkowicz[1]; [1]Texas A&M University

9:30 AM
Advanced In-situ Electrochemical Nanoindentation Testing for Understanding Hydrogen-materials Interactions: *Verena Maier-Kiener*[1]; Anna Ebner[1]; Helmut Clemens[1]; Reinhard Pippan[2]; [1]Montanuniversitaet Leoben; [2]Austrian Academy of Sciences

9:50 AM
Size Effects in Barium Titanate: *Nidhin Mathews*[1]; Ashish Saxena[2]; Christoph Kirchlechner[2]; N Venkataramani[1]; Gerhard Dehm[2]; Balila Nagamani Jaya[1]; [1]Indian Institute of Technology Bombay; [2]Max-Planck-Institut für Eisenforschung GmbH

10:10 AM
Size Effect, Friction and Adhesion in Small-scale Cutting of Metals: *Gan Feng*[1]; Parth Dave[1]; Dinakar Sagapuram[1]; [1]Texas A&M University

10:30 AM
The Effect of Material Volume on Impact Energy Absorption for Protective Equipment Applications: *Kendra Hartley*[1]; Prasad Tennakoon[2]; John Nychka[1]; [1]University of Alberta; [2]Superior Glove Works, Ltd.

MATERIALS PROCESSING

Ni-Co 2021: The 5th International Symposium on Nickel and Cobalt — Pyrometallurgy I

Sponsored by: The Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy and Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Pyrometallurgy Committee

Program Organizers: Corby Anderson, Colorado School of Mines; Dean Gregurek, RHI Magnesita; Mari Lundström, Aalto University; Christina Meskers; Prabhat Tripathy, Batelle Energy Alliance (Idaho National Laboratory); Fiseha Tesfaye, Abo Akademi University; Yuanbo Zhang, Central South University; Sari Muinonen, Glencore; Graeme Goodall, XPS- Glencore; Shijie Wang, Rio Tinto Kennecott Utah Copper Corp (Retired)

Wednesday AM **March 17, 2021**

8:30 AM
One-step Extraction of Nickel from Nickel Sulfide Concentrates by Iron Addition: *Fanmao Wang*[1]; Sam Marcuson[1]; Leili Khajavi[2]; Mansoor Barati[1]; [1]University of Toronto; [2]University of British Columbia

8:50 AM
Continuous Improvement of Process Advisor Optimizing Furnace Model: *Peter Björklund*[1]; David Grimsey[2]; Mikko Korpi[1]; Miikka Marjakoski[3]; [1]Outotec; [2]BHP; [3]Boliden

9:10 AM
Fluxing Optimisation and Control Improvements at the Kalgoorlie Nickel Smelter: *David Grimsey*; Eric Grimsey[1]; Peter Björklund[2]; [1]Curtin University; [2]Outotec

9:30 AM
Preparation of Refractory Materials by Co-sintering of Ferronickel Slag and Ferrochromium Slag: Thermodynamic Analysis: Foquan Gu[1]; *Yuanbo Zhang*[1]; Zhiwei Peng[1]; Huimin Tang[1]; Zijian Su[1]; Tao Jiang[1]; [1]Central South University

9:50 AM
PGM Furnace Design, Construction, Improvement and Performance Optimisation: Isobel McDougall[1]; Gerrit de Villiers[1]; *Hugo Joubert*[1]; Burger van Beek[2]; John Davis[2]; Trevor Goff[2]; [1]Tenova Pyromet; [2]Sibanye-Stillwater

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XX — Advanced Electronic Interconnection

Sponsored by: TMS Functional Materials Division, TMS Structural 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; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; 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; A.S.Md Abdul Haseeb, University of Malaya; Ligang Zhang, Central South University; Sehoon Yoo, KITECH; Vesa Vuorinen, Aalto University; Yu-chen Liu, National Cheng Kung University

Wednesday AM **March 17, 2021**

Session Chairs: Shih-kang Lin, National Cheng Kung University; Yee-Wen Yen, National Taiwan University of Science and Technology

8:30 AM
Introductory Comments: Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XX: *Sinn-wen Chen*[1]; [1]National Tsinghua University

8:35 AM Keynote
Interfacial Reactions in the Bi2Te3 Thermoelectric Modules: *Sinn-wen Chen*[1]; Ya-Hsiang Hsu[1]; Hao-wei Shih[1]; [1]National Tsing Hua University

9:15 AM Invited
Review of X-ray Microbeam Study of Electromigration: *Ping-Chuan Wang*[1]; [1]SUNY New Paltz

9:45 AM
Effects of Bromide and Adipic Acid on Electrochemical Migration of Tin: *A.S.Md Abdul Haseeb*[1]; Ee Lynn Lee[1]; Yi Sing Goh[1]; Y. H. Wong[1]; M. F. M. Sabri[1]; B. Y. Low[2]; [1]University of Malaya; [2]NXP Semiconductor Sdn Bhd

10:05 AM
The Microstructure and Properties Variations of Sn-coated Cu Wires Induced by Electromigration: *Hsiao-Chun Liu*[1]; Chien-Lung Liang[1]; Tsung-Chieh Chiu[2]; Kwang-Lung Lin[1]; [1]National Cheng Kung University; [2]Conquer Electronics

10:25 AM
Thermomigration Failure Induced by Surface Diffusion of Sn on Ni/Cu Metallization in Microbumps for 2.5-dimensional Integrated Circuits Packaging: *Wei-Dung Tsai*[1]; Chen Wei Lee[1]; Fan-Yi Ouyang[1]; [1]National Tsing Hua University

10:45 AM
Synchrotron White Laue Nanodiffraction Characterization of Allotropic Phase Transformation of Hexagonal- into Monoclinic-Cu_6Sn_5: *Pei-Tzu Lee*[1]; Wan-Zhen Hsieh[2]; Cheng-Yu Lee[3]; Yu-Hsuan Huang[3]; Ching-Yu Chiang[2]; Ching-Shun Ku[2]; C. Robert Kao[1]; Cheng-En Ho[3]; [1]National Taiwan University; [2]National Synchrotron Radiation Research Center; [3]Yuan Ze University

11:05 AM
Electroplating of NiP for the Low Residual and High Strength MEMS Probe Tip: Na-Young Kang[1]; *Jaeho Lee*[1]; [1]Hongik University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Non-Ferrous Alloys

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

Program Organizers: Rongpei Shi, Lawrence Livermore National Laboratory; Yipeng Gao, Idaho National Laboratory; Fadi Abdeljawad, Clemson University; Bharat Gwalani, Pacific Northwest National Laboratory; Qi An, University of Nevada-Reno ; Eric Lass, University of Tennessee-Knoxville; Huajing (Wilson) Song, Los Alamos National Laboratory

Wednesday AM **March 17, 2021**

Session Chair: Deep Choudhuri, New Mexico Institute of Mining and Technology

8:30 AM
Effect of Zirconium Addition to Wrought Al-Mg-Si Alloys on Microstructure: *Florian Schmid*[1]; Irmgard Weißensteiner[2]; Matheus Tunes[2]; Thomas Kremmer[2]; Thomas Ebner[3]; Peter J. Uggowitzer[2]; Stefan Pogatscher[2]; [1]Christian Doppler Laboratory for Advanced Aluminum Alloys; [2]Montanuniversitaet Leoben; [3]AMAG rolling GmbH

8:50 AM
Phase Transitions in Beta Ti and Beta Zr Alloys: Josef Strasky[1]; *Anna Veverková*[1]; [1]Charles University

9:10 AM
Local Phase Transformation Strengthening in Ni-based Superalloys: *Ashton Egan*[1]; Timothy Smith[2]; You Rao[1]; Longsheng Feng[1]; Emmanuelle Marquis[3]; Maryam Ghazisaeidi[1]; Yunzhi Wang[1]; Steve Niezgoda[1]; Michael Mills[1]; [1]Ohio State University; [2]NASA Glenn Research Center; [3]University of Michigan

9:30 AM
On the Application Potential of Aluminum Crossover Alloys: *Lukas Stemper*[1]; Matheus Tunes[1]; Ramona Tosone[2]; Peter Uggowitzer[1]; Stefan Pogatscher[1]; [1]Montanuniversitaet Leoben; [2]AMAG rolling GmbH

9:50 AM
Thermal Behavior and Decomposition of Quasicrystalline Dispersoids in Powder-processed Aluminum Alloys: *Hannah Leonard*[1]; Sarshad Rommel[1]; Mingxuan Li[1]; Thomas Watson[2]; Tod Policandriotes[3]; Mark Aindow[1]; [1]University of Connecticut; [2]Pratt & Whitney; [3]Collins Aerospace

MATERIALS PROCESSING

Rare Metal Extraction & Processing — Recycling, Co, REE

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; Kerstin Forsberg, KTH Royal Institute of Technology; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Alafara Baba, University of Ilorin; Neale Neelameggham, IND LLC

Wednesday AM **March 17, 2021**

8:30 AM
Recycling of Rare Earths from Neodymium Magnets Using Focused Infrared and Solid Phase Extraction: *Mélodie Bonin*[1]; Dominic Larivière[1]; [1]Université Laval

8:50 AM Invited
The Italian National Research Council Operations within the EIT Raw Materials Framework: *Paolo Dambruoso*[1]; Salvatore Siano[2]; Armida Torreggiani[1]; Ornella Russo[3]; Vladimiro Dal Santo[4]; Stefania Marzocchi[5]; [1]ISOF-CNR; [2]IFAC-CNR; [3]Library of the Bologna CNR Research Area ; [4]SCITEC-CNR; [5]Library of the Bologna CNR Research Area

9:10 AM
Experimental Determination of Liquidus Temperature and Phase Equilibria of the CaO-Al_2O_3-SiO_2-Na_2O Slag System Relevant to E-waste Smelting: *Md Khairul Islam*[1]; Michael Somerville[2]; Mark Pownceby[2]; James Tardio[1]; Nawshad Haque[2]; Suresh Bhargava[1]; [1]RMIT University; [2]CSIRO

9:30 AM Invited
How to Prepare Future Generations for the Challenges in the Raw Materials Sector: *Armida Torreggiani*[1]; Alberto Zanelli[2]; Alessandra Degli Esposti[2]; Eleonora Polo[2]; Paolo Dambruoso[2]; Renata Lapiska-Viola[2]; Kerstin Forsberg[3]; Emilia Benvenuti[4]; [1]National Research Council of Italy-CNR; [2]ISOF- CNR; [3]KTH - Royal Institute of Technology; [4]National Research Council of Italy (CNR)

9:50 AM Invited
Circular Economy for Rare Earths: What are the Different Strategies, Challenges, and Opportunities?: *Komal Habib*[1]; [1]University of Waterloo

ENERGY & ENVIRONMENT

Recycling and Sustainability for Emerging Technologies and Strategic Materials — Recycling and Process Optimization I

Sponsored by: TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Recycling and Environmental Technologies Committee

Program Organizers: John Howarter, Purdue University; Mingming Zhang, ArcelorMittal Global R&D; Elsa Olivetti, Massachusetts Institute of Technology; Hong Peng, University of Queensland

Wednesday AM **March 17, 2021**

Session Chair: Hong Peng, University of Queensland

8:30 AM
Copper Separation from Steel Scrap: *Hyunsoo Jin*[1]; Brajendra Mishra[1]; [1]Worcester Polytechnic Institute

8:50 AM
Improvement of Steel Scrap Recycling: Optical Recognition of Cu Impurities Using Machine Learning: *Zhijiang Gao*[1]; [1]Colorado School of Mines

9:10 AM
Copper Supply for Electric Vehicles and Impacts on the Recycling Sector: *Ayomipo Arowosola*[1]; Gabrielle Gaustad[2]; [1]Rochester Institute of Technology; [2]Alfred University

9:30 AM
Development and Impact of High-performance Al Alloys Alloyed with Rare Earth Co-products: *Hunter Henderson*[1]; Zachary Sims[2]; David Weiss[3]; Tomer Fishman[4]; Ryan Ott[5]; Orlando Rios[2]; Scott McCall[1]; [1]Lawrence Livermore National Laboratory; [2]University of Tennessee-Knoxville; [3]Eck Industries, Inc.; [4]IDC Herzliya; [5]Ames Laboratory

9:50 AM
Electrochemical Separation of Aluminum from Mixed Scrap Using Ionic Liquids: *Aninda Nafis Ahmed*[1]; Ramana Reddy[1]; [1]The University of Alabama

10:10 AM
High-temperature Oxidation of Explosion Welded Tantalum-tungsten Alloy on Steel Substrate as a Potential Technique for Recycling: *Akanksha Gupta*[1]; Brajendra Mishra[1]; [1]Worcester Polytechnic Institute

NUCLEAR MATERIALS

Thermal Property Characterization, Modeling, and Theory in Extreme Environments — Early Career Scholars in Thermal Properties

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

Program Organizers: Janelle Wharry, Purdue University; Mukesh Bachhav, Idaho National Laboratory; Marat Khafizov, Ohio State University; Eric Lass, University of Tennessee-Knoxville; Vikas Tomar, Purdue University; Tiankai Yao, Idaho National Laboratory; Cody Dennett, Idaho National Laboratory; Karim Ahmed, Texas A&M University

Wednesday AM **March 17, 2021**

Session Chairs: Cody Dennett, Idaho National Laboratory; Fergany Badry, Texas A&M University

8:30 AM Invited
A Thermodynamically-consistent Model for Heat Transport in Heterogeneous Solids: *Karim Ahmed*[1]; Fergany Badry[1]; [1]Texas A&M University

8:55 AM Invited
Defect Density and Annealing Kinetics Estimation Using Thermal Diffusivity Measurements from Transient Grating Spectroscopy: *Mohamed Abdallah Reza*[1]; Hongbing Yu[1]; Kenichiro Mizohata[2]; Felix Hofmann[1]; [1]University Of Oxford; [2]University of Helsinki

9:20 AM Invited
Thermal Behaviors of Correlated Insulators ThO2 and SmB6: *Narayan Poudel*[1]; Daniel Murray[1]; Matthew Mann[2]; Jason Jeffries[3]; Krzysztof Gofryk[1]; [1]Idaho National Laboratory; [2]Air Force Research Laboratory; [3]Lawrence Livermore National Laboratory

9:45 AM Invited
Thermal Conductivity Degradation from Irradiation-induced Microstructural Defects in Single Crystal Thorium Dioxide: *Amey Khanolkar*[1]; Zilong Hua[1]; Cody Dennett[1]; Marat Khafizov[2]; Tiankai Yao[1]; Kaustubh Bawane[1]; Lingfeng He[1]; J. Matthew Mann[3]; Anter El-Azab[4]; Jian Gan[1]; David Hurley[1]; [1]Idaho National Laboratory; [2]Ohio State University; [3]Air Force Research Laboratory; [4]Purdue University

10:10 AM Invited
Phase-dictated Thermal Conductivity Response in Carbon Systems Exposed to Ion Irradiation: *Ethan Scott*[1]; Khalid Hattar[2]; Jeffrey Braun[1]; Sean King[3]; Mark Goorsky[4]; Patrick Hopkins[1]; [1]University of Virginia; [2]Sandia National Laboratories; [3]Intel Corporation ; [4]University of California Los Angeles

10:35 AM Invited
Thermal Transport Behavior of U-50Zr at the Mesoscale: Before and After Irradiation: *Zilong Hua*[1]; Tiankai Yao[1]; Amey Khanolkar[1]; Cody Dennett[1]; Xiaxin Ding[1]; Krzysztof Gofryk[1]; Michael Benson[1]; Lingfeng He[1]; Jian Gan[1]; David Hurley[1]; [1]Idaho National Laboratory

11:00 AM Invited
Non-magnetic Kondo Effect in Eelta-UZr2: *Xiaxin Ding*[1]; Kaya Wei[2]; Tiankai Yao[1]; Ryan Baumbach[2]; Krzysztof Gofryk[1]; [1]Idaho National Laboratory; [2]National High Magnetic Field Laboratory

LIGHT METALS

TMS-DGM Symposium: A Joint US-European Symposium on Linking Basic Science to Advances in Manufacturing of Lightweight Metals — Session I

Sponsored by: Deutsche Gesellschaft für Materialkunde e.V. (DGM): German Materials Society , TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

Program Organizers: William Joost; Norbert Hort, Helmholtz-Zentrum Geesthacht

Wednesday AM **March 17, 2021**

Session Chair: William Joost, Pratt & Whitney

8:30 AM
Stacking-fault Mediated Plasticity and Strengthening in Lean, Rare-earth Free Magnesium Alloys: *Indranil Basu*[1]; Jörg Löffler[1]; [1]ETH Zurich

8:50 AM
High-throughput Evaluation of Hardening Potency and Solubility of Eight Alloying Elements in Magnesium: *Chuangye Wang*[1]; Wei Zhong[1]; Ji-Cheng Zhao[1]; [1]University Of Maryland

9:10 AM
High-throughput Experimental Techniques to Measure the CRSS for Slip and Twinning in Mg and Mg Alloys: Jingya Wang[1]; Reza Alizadeh[2]; *Javier Llorca*[3]; [1]Shanghai Jiao Tong University and IMDEA Materials Institute; [2]Sharif University of Technology and IMDEA Materials Institute; [3]IMDEA Materials Institute & Technical University of Madrid

9:30 AM
Study of the Solidification Pathways of Hypo/hyper-eutectic Al-Ce over a Wide Range of Thermal Histories: *Akankshya Sahoo*[1]; Abdoul Aziz Bogno[1]; Hani Henein[1]; [1]University of Alberta

9:50 AM
Solute-vacancy Clustering in Aluminum: *Dongwon Shin*[1]; Jian Peng[1]; Sumit Bahl[1]; Amit Shyam[1]; James Haynes[1]; [1]Oak Ridge National Laboratory

10:10 AM
Fracture Mechanisms under Monotonic Tensile, Fatigue, and Creep Deformation of Cast Al-Cu-Mn-Zr Alloys: Impact of Brittle Intermetallic Grain Boundary Particles: *Sumit Bahl*[1]; Xiaohua Hu[1]; Jiahao Cheng[1]; Eric Hoar[2]; Kevin Sisco[3]; Richard Michi[1]; J. Allen Haynes[1]; Amit Shyam[1]; [1]Oak Ridge National Laboratory; [2]Georgia Institute of Technology; [3]University of Tennessee-Knoxville

10:30 AM
Al-Fe-Si Phase Stabilization Using Experimentally Validated Computational Thermodynamics: *Sujeily Soto-Medina*[1]; Biswas Rijal[1]; Lilong Zhu[2]; Richard Hennig[1]; Michele Manuel[1]; [1]University of Florida; [2]Yantai University

10:50 AM
Spatial Correlations between Strengthening Particles in Multi-phase Hardenable Aluminum Alloys: *Viktor Wessely*[1]; Robin Schäubin[1]; Stephan Gerstl[1]; Stefan Pogatscher[2]; Peter Uggowitzer[1]; Jörg Löffler[1]; [1]Laboratory of Metal Physics and Technology; [2]Montanuniversitaet Leoben,

NANOSTRUCTURED MATERIALS

100 Years and Still Cracking: A Griffith Fracture Symposium — Fracture and Modeling

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

Program Organizers: Megan Cordill, Erich Schmid Institute of Materials Science; William Gerberich, University of Minnesota; David Bahr, Purdue University; Christopher Schuh, Massachusetts Institute of Technology; Daniel Kiener, Montanuniverstität Leoben; Neville Moody; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht

Wednesday PM **March 17, 2021**

Session Chair: Megan Cordill, Erich Schmid Institute

2:00 PM
Characterization of a Novel Crack Growth Mechanism in Ti-6Al-4V Subjected to Dwell Fatigue at Elevated Temperature: *Adam Pilchak*; John Rotella[1]; Nate Levkulich[2]; Sushant Jha[3]; Reji John[4]; Jim Larsen[4]; [1]Purdue University and Air Force Research Lab; [2]UES Inc.; [3]University of Dayton Research Institute; [4]Air Force Research Lab

2:20 PM
The Maximum Limit of Compressive Strength and Hardness of Nanocrystalline $MgAl_2O_4$ Spinel: *Jessica Maita*[1]; Jacob Davis[2]; James Wollmershauser[3]; Edward Gorzkowski[3]; Boris Feigelson[3]; Seok-Woo Lee[1]; [1]University of Connecticut; [2]University of Massachusetts Amherst; [3]U.S. Naval Research Laboratory

2:40 PM
Reversing Griffith after 100 Years: Mechanics of the Solid-state Bonding: *Yanfei Gao*[1]; Zhili Feng[2]; [1]University of Tennessee - Knoxville; [2]Oak Ridge National Laboratory

3:00 PM
High-strength and Thermal Stability of Nanotwinned Al Alloys: Qiang Li[1]; Sichuang Xue[1]; Yifan Zhang[1]; Haiyan Wang[1]; Jian Wang[2]; *Xinghang Zhang*[1]; [1]Purdue University; [2]University of Nebraska-Lincoln

3:20 PM
Nanomechanics of Amorphous Silica: From Mechanical to Fracture Properties: *Pania Newell*[1]; Truong Vo[1]; Bang He[1]; Michael Blum[1]; Angelo Damone[2]; [1]The University of Utah; [2]University of Brescia

SPECIAL TOPICS

2021 TMS Special Sessions — All-conference Plenary

Wednesday PM **March 17, 2021**

Session Chair: Thomas Battle

12:00 PM
Introductory Comments: *Thomas Battle*[1]; [1]2020 TMS President

12:05 PM
New Methodologies: Producing High-Quality Metal from Low-Grade Ores: *Anne Lauvergeon*[1]; [1]Founder/CEO of ALP; Chair, École des Mines de Nancy; former CEO of Areva S.A.

12:45 PM Question and Answer Period

SPECIAL TOPICS

2021 TMS Special Sessions — Young Professional Workshop on Preparing a Winning Application Package

Wednesday PM **March 17, 2021**

2:00 PM
Young Professional Workshop on Preparing a Winning Application Package

ADVANCED MATERIALS

2D Materials – Preparation, Properties & Applications — Synthesis, Properties & Applications

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

Program Organizers: Nuggehalli Ravindra, New Jersey Institute of Technology; Ramana Chintalapalle, University of Texas at El Paso; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Sufian Abedrabbo, Khalifa University; Amber Shrivastava, Indian Institute of Technology Bombay

Wednesday PM **March 17, 2021**

Session Chairs: Sufian Abedrabbo, Khalifa University; Nuggehalli Ravindra (Ravi), New Jersey Institute of Technology

2:00 PM Invited
Magnetic and Transport Properties of 2D Layered Chiral Magnets: *Junjie Yang*[1]; [1]New Jersey Institute of Technology

2:25 PM Invited
Elaboration and Characterization of Thin Films of SiP Lamellar Alloys: A First Step towards 2D-SiP: *Mathieu Stoffel*[1]; Alix Valdenaire[1]; Sébastien Geiskopf[1]; Xavier Devaux[1]; Erwan André[1]; Cedric Carteret[1]; Alexandre Bouché[1]; Michel Vergnat[1]; Hervé Rinnert[1]; [1]Universite De Lorraine

2:50 PM Invited
Polymer Composites Reinforced with 3D Foam of 2D Materials: *Tony Thomas*[1]; Kazue Lopez[1]; Arvind Agarwal[1]; [1]Florida International University

NUCLEAR MATERIALS

Accelerated Discovery and Qualification of Nuclear Materials for Energy Applications — Multiscale, Physics Based Modeling of Nuclear Materials

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

Program Organizers: Yongfeng Zhang, University of Wisconsin-Madison; Adrien Couet, University of Wisconsin-Madison; Michael Tonks, University of Florida; Jeffery Aguiar, Idaho National Laboratory; Andrea Jokisaari, Idaho National Laboratory; Karim Ahmed, Texas A&M University

Wednesday PM **March 17, 2021**

Session Chairs: Benjamin Beeler, North Carolina State University ; Shijun Zhao, City University of Hong Kong

2:00 PM Invited
Overview of Advanced Fuels and Materials R&D within the US DOE-NE NEAMS Program: *Chris Stanek*[1]; [1]Los Alamos National Laboratory

2:30 PM
Constructing Multi-component Diffusion under Irradiation in U-Mo Alloys: *Benjamin Beeler*[1]; Bei Ye[2]; Yipeng Gao[3]; Shenyang Hu[4]; [1]North Carolina State University; [2]Argonne National Laboratory; [3]Idaho National Laboratory; [4]Pacific Northwest National Laboratory

2:50 PM
Effective Bias for Interstitial Clusters to Cavities in BCC Fe: *Yuhao Wang*[1]; Fei Gao[1]; Brian Wirth[2]; [1]University of Michigan - Ann Arbor; [2]University of Tennessee, Knoxville

3:10 PM
Microscale Measurement of Elastic Constants in Ceramics Using Picosecond Ultrasonics for High Throughput Characterization and Atomic Model Validations: *Yuzhou Wang*[1]; David Hurley[2]; Zilong Hua[2]; Amey Khanolkar[2]; Cody Dennett[2]; Marat Khafizov[1]; [1]Ohio State University; [2]Idaho National Laboratory

3:30 PM
Effect of Distributed Gas Bubbles on Elastic-plastic Deformation Behavior in Polycrystalline UMo: *Shenyang Hu*[1]; Benjamin Beeler[2]; Douglas Burkes[1]; [1]Pacific Northwest National Laboratory; [2]North Carolina State University

3:50 PM
Molecular Dynamics Study of Cascade Overlap Effects in FCC Ni: *Samuel Morris*[1]; Brian Wirth[1]; [1]University of Tennessee-Knoxville

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture V: Processing-Structure-Property Investigations and Application to Qualification — Microstructure-based Fatigue Studies on Additive-Manufactured Materials (Jointly Organized with Fatigue in Materials Symposium)

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; John Lewandowski, Case Western Reserve University; Nima Shamsaei, Auburn University; Mohsen Seifi, ASTM International/Case Western Reserve University; Steve Daniewicz, University of Alabama

Wednesday PM **March 17, 2021**

Session Chair: Garrett Pataky, Clemson University

2:00 PM Invited
Automotive-specific Requirements for Additive Manufacturing of Metal Materials: *Tyson Brown*[1]; Whitney Poling[1]; [1]General Motors

2:30 PM
Fatigue Crack Growth and Fracture Toughness Behavior of Laser Powder Bed Fusion Titanium Alloys: *Jamie Kruzic*[1]; Tarik Hasib[1]; Xiaopeng Li[1]; [1]University of New South Wales

2:50 PM
Fatigue Crack Growth Rate of Electron Beam Melted (EBM) Titanium Alloy (Ti-6Al-4V): Effect of Crystallographic Texture and Internal Porosity: *Nik Hrabe*[1]; Jake Benzing[1]; Nick Derimow[1]; Tim Quinn[1]; Jolene Splett[1]; Lucas Koepke[1]; [1]National Institute of Standards and Technology

3:10 PM
Laser Powder Bed Fusion of Hydride-dehydride Ti-6Al-4V Powders: Effect of Hot Isostatic Pressing on Microstructure and Mechanical Properties: *Mohammadreza Asherloo*[1]; Ziheng Wu[2]; Srujana Rao Yarasi[2]; Muktesh Paliwal[3]; Mike Marucci[3]; Joe Capone[4]; Anthony Rollett[2]; Amir Mostafaei[1]; [1]Illinois Institute of Technology; [2]Carnegie Mellon University; [3]Kymera International - Reading Alloys; [4]Ametek Inc.

3:30 PM
Towards Validation for Computed Tomography Processes for Additive Manufacturing: Griffin Jones[1]; Jayme Keist[1]; Rachel Reed[2]; *Veeraraghavan Sundar*[2]; [1]The Pennsylvania State University; [2]UES Inc.

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Functional, Energy, and Magnetic Materials — Advanced Manufacturing of Magnetic Materials

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

Program Organizers: Markus Chmielus, University of Pittsburgh; Sneha Prabha Narra, Worcester Polytechnic Institute; Mohammad Elahinia, University of Toledo; Reginald Hamilton, Pennsylvania State University; Iver Anderson, Iowa State University Ames Laboratory

Wednesday PM **March 17, 2021**

2:00 PM Invited
Development of High-temperature Permanent Magnet Alloys for Additive Manufacturing: *Ryan Ott*[1]; Emrah Simsek[1]; Rakesh Chaudhary[1]; Scott McCall[2]; Alex Baker[2]; [1]Ames Laboratory/Cmi; [2]Lawrence Livermore National Laboratory

2:20 PM
Advanced Design for Lightweighting Wind Power Generators Using Additively Manufactured Hard and Soft Magnets: *Latha Sethuraman*[1]; Ganesh Vijayakumar[1]; Shreyas Ananthan[1]; Jonathan Keller[1]; M.Parans Paranthaman[2]; [1]National Renewable Energy Laboratory; [2]Oak Ridge National Laboratory

2:40 PM
An Additive Manufacturing Design Approach to Achieving High Strength and Ductility in Traditionally Brittle Alloys via Laser Powder Bed Fusion: *Andrew Kustas*[1]; Tomas Babuska[1]; Kyle Johnson[1]; Trevor Verdonik[2]; Samuel Subia[1]; Brandon Krick[3]; Donald Susan[1]; [1]Sandia National Laboratories; [2]Lehigh University; [3]Florida State University

3:00 PM
Cold Spray of Permanent Magnets: *Alexander Baker*[1]; Richard Thuss[2]; Nathan Woollett[1]; Elis Stavrou[1]; Scott McCall[1]; Harry Radousky[1]; [1]Lawrence Livermore National Laboratory; [2]TTEC LLC

3:20 PM
Establishing Fundamentals for Laser Metal Deposition of Functional Ni-Mn-Ga Alloys: Effect of Rapid Solidification on Microstructure and Phase Transformation Characteristics: *Emily Flitcraft*[1]; Jakub Toman[2]; Markus Chmielus[2]; Carolin Fink[1]; [1]Ohio State University; [2]University of Pittsburgh

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Beyond the Beam II — Material Deposition for Sinter Densification

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

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

Wednesday PM **March 17, 2021**

Session Chair: Nihan Tuncer, Desktop Metal

2:00 PM
Wall Thickness Effects on Dimensional Variation, Microstructure, and Mechanical Properties in Stainless Steel Samples Manufactured Using a Bound Metal Deposition (BMD) Sintering Process: *Joy Forsmark*[1]; Emily Wolbeck[1]; Ignacio Arretche[1]; Eric Poczatek[1]; Yun Bai[1]; Hiroko Ohtani[1]; Sushmit Chowdhury[1]; [1]Ford Motor Company

2:20 PM
Bi-metal Composite Material for Plastic Injection Molding Tooling Applications via Fused Filament Fabrication Process
: *Maxim Seleznev*[1]; Joe Roy-Mayhew[1]; [1]Markforged Inc.

2:40 PM
Direct Ink Writing of Ceramic Architected Materials: *Raphael Thiraux*[1]; Lorenzo Valdevit[1]; [1]University of California, Irvine

3:00 PM
Beyond the Beam Additive Manufacturing of Titanium Alloys: *James Paramore*[1]; Brady Butler[1]; Matthew Dunstan[1]; Daniel Lewis[1]; Michael Hurst[1]; Laura Moody[1]; [1]U.S. Army Research Laboratory

3:20 PM
Spatial Architecture of Copper Fillers in Additively Manufactured PLA-matrix Composite: *Nazmul Haque*[1]; Hadi Noori[1]; [1]Oklahoma State University

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Solid-State Phase Transformations and Microstructural Evolution — Titanium Alloys

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

Program Organizers: Bij-Na Kim, Carpenter Additive; Andrew Wessman, University of Arizona; Chantal Sudbrack, National Energy Technology Laboratory; Eric Lass, University of Tennessee-Knoxville; Katerina Christofidou, University of Sheffield; Peeyush Nandwana, Oak Ridge National Laboratory; Rajarshi Banerjee, University of North Texas; Whitney Poling, General Motors Corporation; Yousub Lee, Oak Ridge National Laboratory

Wednesday PM **March 17, 2021**

Session Chairs: Raj Banerjee, University of North Texas; Bij-Na Kim, Carpenter Additive

2:00 PM Invited
Prediction of Large Regions of Microstructure and Phase Distributions for Additive Manufactured Alloys Prediction of the Microstructure, Resultant Phases and Hardness of Additively Manufactured Ti6Al4V: Shunyu Liu[1]; Kyung-min Hong[1]; *Yung Shin*[1]; [1]Purdue University

2:30 PM
Designing Duplex Microstructures in Additive Manufactured Ti Alloys: An Avenue to Achieve High Strength and Ductility: *Jenniffer Bustillos*[1]; Atieh Moridi[1]; [1]Cornell University

2:50 PM
Controlled Thermal Post-processing of Additively Manufactured Ti-6Al-4V Parts in Order to Enhance their Mechanical Performance: *Frederico Rossi Kaschel*[1]; Rajani Vijayaraghavan[1]; Patrick McNally[1]; Mert Celikin[1]; Denis Dowling[1]; [1]I-Form Advanced Manufacturing Centre

3:10 PM
Recyclability of Ti-6Al-4V Powders Used in Additive Manufacturing: Perspectives and Outlooks: *Nicholas Derimow*[1]; Nikolas Hrabe[1]; [1]National Institute of Standards and Technology

3:30 PM
Microstructure Control in a Beta Titanium Alloy via Selective Laser Melting: *Sravya Tekumalla*[1]; Alex Tan Sui Wei[2]; Krishnan Manickavasagam[2]; Matteo Seita[1]; [1]Nanyang Technological University; [2]Advanced Remanufacturing Technology Centre

3:50 PM
Second Phase Precipitation during AM Processing of Metastable Beta Ti Alloys
: *Mohan Sai Kiran Nartu*[1]; Srinivas Aditya Mantri[1]; Abhishek Sharma[1]; Eugene Ivanov[2]; Kyu Cho[3]; Brandon McWilliams[3]; Narendra Dahotre[1]; Rajarshi Banerjee[1]; [1]University of North Texas; [2]Tosoh SMD; [3]CCDC, US Army Research Laboratory

4:10 PM
Main Microstructural Characteristics of Ti-6Al-4V Components Produced via Electron Beam Additive Manufacturing (EBAM): *Silvia Lopez-Castaño*[1]; Philippe Emile[2]; Claude Archambeau[2]; Florence Pettinari-Sturmel[3]; Joël Douin[3]; [1]CEMES-CNRS / Airbus Operations S.A.S.; [2]Airbus Operations S.A.S.; [3]CEMES-CNRS

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session VI

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

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; 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; Arul Kumar Mariyappan, Los Alamos National Laboratory; Olivia Underwood, Sandia National Laboratories

Wednesday PM **March 17, 2021**

2:00 PM Invited
Dominant Microstructural Features for Structural Properties in Additively Manufactured AlSi10Mg: *Jay Carroll*[1]; Christopher Laursen[1]; Philip Noell[1]; John Emery[1]; David Moore[1]; Garrett Pataky[2]; [1]Sandia National Laboratories; [2]Clemson University

2:30 PM Invited
Investigation of Porosity, Texture, and Damage Evolution of Additively Manufactured 316L Stainless Steel during In-situ Tensile Loading Using High Energy X-rays: *Aeriel Murphy-Leonard*[1]; David Rowenhorst[1]; [1]Naval Research Laboratory

3:00 PM
Temperature-dependent Intermittent Microplasticity: Quentin Rizzardi[1]; Cameron McElfresh[2]; Jaime Marian[2]; Douglas Stauffer[3]; *Robert Maass*[4]; [1]University of Illinois Urbana Champaign; [2]University of California Los Angeles; [3]Bruker Nano Surfaces; [4]Federal Institute for Materials Research and Testing (BAM)

3:20 PM
Characterization and Modeling of Fatigue-induced Grain Growth in Ultrafine Grained Ni: *Alejandro Barrios*[1]; Ebiakpo Kakandar[2]; Xavier Maeder[3]; Gustavo Castelluccio[2]; Olivier Pierron[1]; [1]Georgia Institute of Technology; [2]Cranfield University; [3]Empa, Swiss Federal Laboratories for Materials Science and Technology

3:40 PM Invited
Microstructure Evolution of a Stainless Steel Produced via Laser Powder Bed Fusion Subjected to Post-Fabrication Treatments: *Gwenaelle Proust*[1]; Wen Hao Kan[2]; Quentin Portella[3]; Mahdi Chemkhi[4]; Magnus Garbrecht[1]; Delphine Retraint[3]; [1]University of Sydney; [2]Monash University; [3]University of Technology of Troyes; [4]EPF

4:10 PM
Informing Mechanical Model Development Using Lower-dimensional Descriptions of Microstructural Evolution: *Darren Pagan*[1]; Gideon Schmidt[2]; Andy Borum[2]; Timothy Long[2]; Matthew Miller[2]; Armand Beaudoin[3]; [1]Pennsylvania State University; [2]Cornell University; [3]Cornell High Energy Synchrotron Source

4:30 PM
Effects of Room Temperature Interface Sliding in TIMETAL-407 (Ti-407): *Zachary Kloenne*[1]; Gopal Viswanathan[1]; Stoichko Antonov[2]; Stephen Fox[3]; Michael Loretto[4]; Hamish Fraser[1]; [1]Ohio State University; [2]Max-Planck-Institut für Eisenforschung GmbH; [3]TIMET; [4]University of Birmingham

4:50 PM
Combined In-situ Neutron and Synchrotron X-ray Diffraction Study of Tensile Deformation and Texture Evolution in a Magnesium Alloy: *Tingkun Liu*[1]; Aashish Rohatgi[1]; Ke An[2]; Yang Ren[3]; Bita Ghaffari[4]; Erin Barker[1]; Arun Devaraj[1]; [1]Pacific Northwest National Laboratory; [2]Oak Ridge National Laboratory; [3]Argonne National Laboratory; [4]Ford Motor Company

5:10 PM
Modeling the Effects of Free Surfaces on Twinning Behavior: *Brandon Leu*[1]; M Arul Kumar[2]; Irene Beyerlein[1]; [1]University of California Santa Barbara; [2]Los Alamos National Laboratory

ADVANCED MATERIALS

Advanced Functional and Structural Thin Films and Coatings — Thin Films and Nanostructures for Optoelectronics I

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

Program Organizers: Adele Carrado, IPCMS - CNRS; Ramana Chintalapalle, University of Texas at El Paso; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Nancy Michael, University of Texas at Arlington; Karine Mougin, Is2m Cnrs; Heinz Palkowski, Clausthal University of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology; Vikas Tomar, Purdue University

Wednesday PM **March 17, 2021**

Session Chairs: Gerald Ferblantier, ICUBE; Ramana Chintalapalle, UTEP

2:00 PM Keynote
Multi-photon Microfabrication: from Direct Laser Writing to 4D Microprinting: *Arnaud Spangenberg*[1]; [1]IS2M

2:45 PM
Facile Synthesis of 3D Dendritic Gold Nanostructures Assisted by a Templated Growth Process: Application at the Detection of Traces of Molecules: *Karine Mougin*[1]; Pierre Bauer[1]; [1]Is2m Cnrs

3:10 PM Keynote
Highly Doped Si Metasurfaces Obtained by Coupling Top Down and Out of Equilibrium Approaches: Jean-Marie Poumirol[1]; Clément Majorel[1]; Nicolas Chery[1]; Meiling Zhang[1]; Christian Girard[1]; Nicolas Mallet[2]; Filadelfo Cristiano[2]; Peter Wiecha[2]; Guilhem Larrieu[2]; Sébastien Kerdiles[3]; Anne-Sophie Royet[3]; Pablo Acosta[3]; Vincent Paillard[1]; *Caroline Bonafos*[1]; [1]Cemes Cnrs; [2]LAAS-CNRS; [3]CEA-LETI

3:55 PM
Key Mechanical Test Methods to Characterize Optically Clear Adhesives: *Mobin Yahyazadehfar*[1]; Aref Samadi[1]; Leopoldo Carbajal[1]; Mark Lamontia[1]; [1]DuPont

4:15 PM
Spin Coating of Doped-silica on Czochralski-Silicon for Enhanced Radiative Properties: *Sufian Abedrabbo*[1]; EL Mostafa Benchafia[1]; Anthony Fiory[2]; Nuggehalli Ravindra[2]; [1]Khalifa University; [2]New Jersey Institute of Technology

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Magnetocaloric and Energy Harvesting

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

Program Organizers: Richard Beddingfield, North Carolina State University; Daniel Salazar, BCMaterials; Alex Leary, NASA Glenn Research Center; Huseyin Ucar, California Polytechnic University; Yongmei Jin, Michigan Technological University; Arcady Zhukov, University of the Basque Country

Wednesday PM **March 17, 2021**

Session Chair: Huseyin Ucar, California Polytechnic University

2:00 PM
Bulk-Nano Spark Plasma Sintered Fe-Si-B-Cu-Nb Based Magnetic Alloys: *Taban Larimian*; Tushar Borkar[1]; Varun Chaudhary[2]; Raju V Ramanujan[2]; rajeev Gupta[3]; Jijo Christudasjustus[3]; [1]Cleveland State University; [2]Nanyang Technological University; [3]University of Akron

2:20 PM Invited
Characterization of Binder Jet 3D Printed and Direct Laser Deposited Functional Magnetic Materials: *Markus Chmielus*[1]; Jakub Toman[1]; Pierangeli Rodriguez de Vecchis[1]; Tyler Paplham[1]; Aaron Acierno[1]; Katerina Kimes[1]; Erica Stevens[1]; [1]University of Pittsburgh

2:50 PM
Magnetics and Magnetoelastics of Ce-doped Cobalt Ferrite Processed under the Influence of Magnetic Field: Monaji Reddy[1]; *Tanjore Jayaraman*[2]; Neeraj Patil[2]; Dibakar Das[1]; [1]University of Hyderabad; [2]University of Michigan-Dearborn

3:10 PM
Magnetoelasic Domains in Fe-Ga Alloys: Matthew Tianen[1]; *Yongmei Jin*[1]; [1]Michigan Technological University

3:30 PM
Overview of Material Thermal Properties for the Advancement of Machine Learning Based Magnetic Design: *Zackery Miller*[1]; [1]North Carolina State University

3:50 PM Invited
Spin Crossover Complexes as Multicaloric Materials: *Steven Vallone*[1]; Karl Sandeman[1]; [1]The City University of New York

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VII — Energy Storage with Emphasis on Batteries I

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

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

Wednesday PM **March 17, 2021**

Session Chairs: Partha Mukherjee, Purdue University; Pallab Barai, Argonne National Laboratory

2:00 PM
Lithium Solid State Batteries as Next Generation Energy Storage Devices: *Pallab Barai*[1]; Anh Ngo[1]; Larry Curtiss[1]; Venkat Srinivasan[1]; [1]Argonne National Laboratory

2:30 PM
A Simple Method to Fabricate Cu6Sn5 Anodes for Lithium-ion Batteries: *Xin Tan*[1]; Qinfen Gu[2]; Stuart McDonald[1]; Kazuhiro Nogita[1]; [1]University of Queensland; [2]Australian Synchrotron, ANSTO

2:50 PM
Bio-inspired, Machine Learning-enabled Vascular Structures for Fast-Charging Lithium-ion Batteries: *Po-Chun Hsu*[1]; [1]Duke University

3:10 PM
Coating Yeast-derived Carbon Nanotubes on Separators to Suppress Li-S Battery Shuttle Effect: Jiajun He[1]; Zan Gao[1]; *Xiaodong Li*[1]; [1]University of Virginia

3:30 PM
Electrochemically Grown Energy Dense Cathodes for Li and Na Ion Battery: *Arghya Patra*[1]; Omar Kazi[1]; Jerome Davis[1]; Beniamin Zahiri[1]; Paul Braun[1]; [1]University of Illinois at Urbana-Champaign

3:50 PM
Lithium-sulfur Batteries Featuring High Sulfur Loading and Low Electrolyte: Sheng-Heng Chung[1]; *Yun-Chung Ho*[1]; [1]National Cheng Kung University

4:10 PM
Mesoscale Origin of Morphological Instability in All-Solid-State Lithium Batteries: *Bairav Vishnugopi*[1]; Partha Mukherjee[1]; [1]Purdue University

CHARACTERIZATION

Advanced Real Time Imaging — Mechanical (Joint session with Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling Symposium)

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

Program Organizers: Jinichiro Nakano, US Department of Energy 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; Noritaka Saito, Kyushu University; Anna Nakano, US Department of Energy National Energy Technology Laboratory; Zuotai Zhang, Southern University of Science and Technology; Candan Tamerler, University of Kansas; Bryan Webler, Carnegie Mellon University; Wangzhong Mu, KTH Royal Institute of Technology; David Veysset, Stanford University

Wednesday PM **March 17, 2021**

Session Chairs: David Alman, USDOE National Energy Technology Laboratory; Robert Wheeler, Microtesting Solutions LLC

2:00 PM Invited
Real Time Studies of the Mechanics of Spherical Microparticles: Lewei He[1]; Xuchen Wang[1]; David Veysset[2]; *Mostafa Hassani*[1]; [1]Cornell University; [2]MIT

2:20 PM
Determination of Uranium Oxidation Kinetics Through White-Light Interferometry: *Yaakov Idell*[1]; Wigbert Siekhaus[1]; Kerri Blobaum[1]; William McLean[1]; [1]Lawrence Livermore National Laboratory

2:40 PM
The Accurate Measurement of Elastic Modulus and Hardness of Different Cross-linked SU-8 Polymer: *Prakash Sarkar*[1]; Prita Pant[1]; Hemant Nanavati[1]; [1]Indian Institute of Technology Bombay

3:00 PM
Lubrication Mechanism of Phosphonium Phosphate Ionic Liquid: a Combined In Situ Atomic Force Microscopy and Ex Situ Surface Spectroscopic Study: *Filippo Mangolini*[1]; Zixuan Li[1]; Oscar Morales-Collazo[1]; Jerzy Sadowski[2]; Hugo Celio[1]; Andrei Dolocan[1]; Joan Brennecke[1]; [1]University of Texas at Austin; [2]Brookhaven National Laboratory

3:20 PM Invited
Mapping Local Strains during *In Situ* SEM Deformation of Nanoporous Materials: Kevin Schmalbach[1]; *Nathan Mara*[1]; Antonia Antoniou[2]; [1]University of Minnesota; [2]Georgia Institute of Technology

3:40 PM
Local Shock Viscosity Measurement in Composites Using In-situ Time-Gated Raman Spectroscopy: *Abhijeet Dhiman*[1]; Ayotomi Olokun[1]; Nolan Lewis[1]; Vikas Tomar[1]; [1]Purdue University

CHARACTERIZATION

Advanced Real Time Imaging — Mechanical (Joint session with the 'Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling' Symposium)

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

Program Organizers: Jinichiro Nakano, US Department of Energy 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; Noritaka Saito, Kyushu University; Anna Nakano, US Department of Energy National Energy Technology Laboratory; Zuotai Zhang, Southern University of Science and Technology; Candan Tamerler, University of Kansas; Bryan Webler, Carnegie Mellon University; Wangzhong Mu, KTH Royal Institute of Technology; David Veysset, Stanford University

Wednesday PM **March 17, 2021**

Session Chairs: David Alman, USDOE National Energy Technology Laboratory; Robert Wheeler, Microtesting Solutions LLC

2:00 PM Invited
Real Time Studies of the Mechanics of Spherical Microparticles: Lewei He[1]; Xuchen Wang[1]; David Veysset[2]; *Mostafa Hassani*[1]; [1]Cornell University; [2]MIT

2:20 PM
Determination of Uranium Oxidation Kinetics Through White-Light Interferometry: *Yaakov Idell*[1]; Wigbert Siekhaus[1]; Kerri Blobaum[1]; William McLean[1]; [1]Lawrence Livermore National Laboratory

2:40 PM
The Accurate Measurement of Elastic Modulus and Hardness of Different Cross-linked SU-8 Polymer: *Prakash Sarkar*[1]; Prita Pant[1]; Hemant Nanavati[1]; [1]Indian Institute of Technology Bombay

3:00 PM
Lubrication Mechanism of Phosphonium Phosphate Ionic Liquid: a Combined In Situ Atomic Force Microscopy and Ex Situ Surface Spectroscopic Study: *Filippo Mangolini*[1]; Zixuan Li[1]; Oscar Morales-Collazo[1]; Jerzy Sadowski[2]; Hugo Celio[1]; Andrei Dolocan[1]; Joan Brennecke[1]; [1]University of Texas at Austin; [2]Brookhaven National Laboratory

3:20 PM Invited
Mapping Local Strains during *In Situ* SEM Deformation of Nanoporous Materials: Kevin Schmalbach[1]; *Nathan Mara*[1]; Antonia Antoniou[2]; [1]University of Minnesota; [2]Georgia Institute of Technology

3:40 PM
Local Shock Viscosity Measurement in Composites Using In-situ Time-Gated Raman Spectroscopy: *Abhijeet Dhiman*[1]; Ayotomi Olokun[1]; Nolan Lewis[1]; Vikas Tomar[1]; [1]Purdue University

MATERIALS PROCESSING

Advances in Surface Engineering III — 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, North Carolina State University; Sandip Harimkar, Oklahoma State University; Bharat Jasthi, South Dakota School of Mines & Tech

Wednesday PM **March 17, 2021**

Session Chairs: Praful Bari, Oklahoma State University; Tushar Borkar, Cleveland State University

2:00 PM
Electropolishing of Bronze in Concentrated H3PO4: *Geng Ni*[1]; Choong-un Kim[1]; [1]University of Texas at Arlington

2:20 PM
Enhancement of Liquid Metal Wetting by Patterning Particles on Oxide Surfaces: *Jiyun Park*[1]; Jason Nicholas[2]; Yue Qi[1]; [1]Brown University; [2]Michigan State University

2:40 PM
Magnetron Sputtered Micro-lattice Structures: Expanding the Materials Working Space of Lattice Materials: *Alina Garcia Taormina*[1]; Chantal Kurpiers[2]; Andrea Hodge[1]; Ruth Schwaiger[3]; [1]University of Southern California; [2]Karlsruhe Institute of Technology; [3]Karlsruhe Institute of Technology, Forschungszentrum Juelich GmbH

3:00 PM
Modifying Corrosion Performance of Plasma Electrolytic Oxidation (PEO) Coatings using Potassium Hydroxide (KOH) and Potassium Fluoride (KF) Additives: *Navid Attarzadeh*[1]; Maryam Molaei[2]; Arash Fattah-alhosseini[2]; [1]University of Texas at El Paso; [2]Bu-Ali Sina University

3:20 PM
Nitriding-assisted Surface Enhancement of Multi-principal Element Alloys: *Yu-Hsuan Lin*[1]; David Poerschke[1]; [1]University of Minnesota

3:40 PM
Phase-field Approach on Modeling Wetting of Rough Surfaces: *Dong-Uk Kim*[1]; Michael Tonks[1]; [1]University of Florida

4:00 PM
The Role of Particle Passivation Layers in the Critical Adhesion Velocity of Cold Sprayed Powders: *Cameron Crook*[1]; Lorenzo Valdevit[1]; Daniel Mumm[1]; Diran Apelian[1]; [1]University of California, Irvine

4:20 PM
Trace Element Distributions in Al-Zn Based Coating Alloys on Steel Substrates: *Dongdong Qu*[1]; Matthew Gear[1]; Nega Setargew[2]; Wayne Renshaw[2]; Stuart McDonald[1]; David StJohn[1]; David Paterson[3]; Kazuhiro Nogita[1]; [1]The University of Queensland; [2]BlueScope Steel Ltd; [3]Australian Synchrotron

Advances in Titanium Technology — Phase Transformation and Deformation in Titanium Alloys

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

Program Organizers: Don Li, Howmet Engineered Products; Yufeng Zheng, University of Nevada-Reno
; Peeyush Nandwana, Oak Ridge National Laboratory; Matthew Dunstan, US Army Research Laboratory

Wednesday PM **March 17, 2021**

Session Chair: Yufeng Zheng, University of Nevada Reno

2:00 PM
Hierarchical Twinning Microstructure in Beta Titanium Alloys: Dian Li[1]; Wenrui Zhao[1]; Zachary Kloenne[2]; Stoichko Antonov[3]; Dong Wang[4]; Yipeng Gao[2]; Yunzhi Wang[2]; Hamish Fraser[2]; *Yufeng Zheng*[1]; [1]University of Nevada, Reno; [2]Ohio State University; [3]Max-Planck-Institut für Eisenforschung; [4]Xi'an Jiaotong University

2:20 PM
How Microtextured Regions Influence the Early Slip Activity in Ti Alloys: *Samuel Hemery*[1]; Azdine Naït-Ali[1]; Loic Signor[1]; Patrick Villechaise[1]; McLean Echlin[2]; Joseph Wendorf[2]; Jean-Charles Stinville[2]; Tresa Pollock[2]; Mikael Gueguen[1]; [1]ISAE-ENSMA; [2]UCSB

2:40 PM
Influence of Microtextured Regions on Early Plasticity in Ti64: *Joseph Wendorf*[1]; Jean-Charles Stinville[1]; Marie-Agathe Charpagne[1]; McLean Echlin[1]; Andrew Polonsky[1]; Paul Dawson[2]; Tresa Pollock[1]; [1]University of California Santa Barbara; [2]Cornell University

3:00 PM
Localization of Plastic Strain in Microtextured Regions of Ti-6Al-4V: *Jonathan Cappola*[1]; Jean-Charles Stinville[2]; Marie-Agathe Charpagne[2]; Patrick Callahan[3]; McLean Echlin[2]; Tresa Pollock[2]; Adam Pilchak[4]; Matthew Kasemer[1]; [1]University of Alabama; [2]University of California, Santa Barbara; [3]US Naval Research Laboratory; [4]Air Force Research Laboratory

3:20 PM
Anomalous c+a Dislocation Activity in TIMETAL-407 (Ti-407): *Zachary Kloenne*[1]; Gopal Viswanathan[1]; Bo Pang[2]; Stephen Fox[3]; Michael Loretto[2]; Hamish Fraser[1]; [1]Ohio State University; [2]University of Birmingham; [3]TIMET

3:40 PM
Colony Orientation Dependence in the Deformation and Spheroidization of Two-Phase Titanium Alloys: *Benjamin Begley*[1]; Cameron Frampton[1]; Thomas Spradley[1]; Jennifer Perez[1]; Adam Pilchak[2]; Victoria Miller[1]; [1]University of Florida; [2]Air Force Research Laboratory

4:00 PM
Effect of Grain Orientation on Slip Transmission in Titanium: An Analysis of Strain Localization within Slip Bands: *Behnam Ahmadikia*[1]; Irene Beyerlein[1]; [1]University of California, Santa Barbara

AI/Data informatics: Design of Structural Materials — AI/ML Frameworks; Grain Growth and Simulation Integration

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

Program Organizers: Jennifer Carter, Case Western Reserve University; Amit Verma, Carnegie Mellon University; Natasha Vermaak, Lehigh University; Jonathan Zimmerman, Sandia National Laboratories; Darren Pagan, Pennsylvania State University; Chris Haines, Ccdc Army Research Laboratory; Judith Brown, Sandia National Laboratories

Wednesday PM **March 17, 2021**

2:00 PM Invited
Data Science Approaches for Microstructure-property Connections in Structural Materials: *Elizabeth Holm*[1]; bo Lei[1]; Katelyn Jones[1]; Ryan Cohn[1]; Nan Gao[1]; [1]Carnegie Mellon University

2:30 PM Invited
Physics-informed Data-driven Machine Learning Approach for Mesoscale Materials Science: *Reeju Pokharel*[1]; Anup Pandey[1]; Alexander Scheinker[1]; [1]Los Alamos National Laboratory

3:00 PM Invited
Combined Statistical and Energetic Approach to Understand Grain Boundary Embrittlement for Segregation Engineering: Doruk Aksoy[1]; Remi Dingreville[2]; *Douglas Spearot*[1]; [1]University of Florida; [2]Sandia National Laboratories

3:30 PM
Machine Learning Approach to Understanding Abnormal Grain Growth: *Ryan Cohn*[1]; Megna Shah[2]; Adam Pilchak[2]; Eric Payton[2]; Anthony Rollett[1]; Elizabeth Holm[1]; [1]Carnegie Mellon University; [2]Air Force Research Laboratory

3:50 PM
Machine Learning for the Recognition and Synthesis of Polycrystalline Metal Microstructures: *Neal Brodnik*[1]; Devendra Jangid[1]; Amil Khan[1]; Michael Goebel[1]; McLean Echlin[1]; B. S. Manjunath[1]; Samantha Daly[1]; Tresa Pollock[1]; [1]University of California Santa Barbara

4:10 PM Invited
Using Machine Learning for Targeted Alloy Design in High Entropy Composition Spaces: *Tanner Kirk*[1]; Richard Couperthwaite[1]; Guillermo Vazquez[1]; Daniel Sauceda[1]; Pejman Honarmandi[1]; Prashant Singh[2]; Raymundo Arroyave[1]; [1]Texas A&M University; [2]Ames Laboratory

4:30 PM
Unsupervised ML to Bridge Molecular Dynamics and Phase field Simulations: *Sukriti Manna*[1]; Henry Chan[1]; Subramanian Sankaranarayanan[1]; [1]Argonne National Laboratory

MATERIALS DESIGN

AI/Data informatics: Tools for Accelerated Design of High-temperature Alloys — High Temperature Mechanical Properties

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

Program Organizers: Michael Titus, Purdue University; Pinar Acar, Virginia Tech; Andrew Detor, GE Research; James Saal, Citrine Informatics; Dongwon Shin, Oak Ridge National Laboratory

Wednesday PM **March 17, 2021**

Session Chairs: Andrew Detor, GE Research; Dongwon Shin, Oak Ridge National Laboratory; Sudeepta Mondal, Argonne National Laboratory

2:00 PM
Elastic Properties Machine-learning-based Descriptor for a Refractory High Entropy Alloy: *Guillermo Vazquez*[1]; Prashant Singh[2]; Daniel Sauceda[1]; Raymundo Arroyave[1]; [1]Texas A&M University; [2]AMES Laboratory

2:20 PM
Predicting Yield Stress of High Temperature Alloys via Computer Vision and Machine Learning: *Nan Gao*[1]; Zongrui Pei[2]; Youhai Wen[2]; Michael Gao[2]; Elizabeth Holm[1]; [1]Carnegie Mellon University; [2]National Energy Technology Laboratory

2:40 PM
Revealing Nanoscale Features Controlling Diffusion Within Multi-component Alloys through Machine Learning: *S. Mohadeseh Taheri-Mousavi*[1]; S. Sina Moeini-Ardakani[1]; Ryan W. Penny[1]; Ju Li[1]; A. John Hart[1]; [1]MIT

3:00 PM
Uncertainty Quantification for Thermo-mechanical Behavior of Aircraft Engine Materials in Elevated Temperatures: *Arulmurugan Senthilnathan*[1]; Pinar Acar[1]; [1]Virginia Tech

3:20 PM Invited
Coupling of Data Mining, Thermodynamics and Multi-objective Genetic Algorithms for the Design of High-temperature Alloys: *Franck Tancret*[1]; Edern Menou[2]; Gérard Ramstein[1]; [1]University of Nantes; [2]Safran

3:50 PM
Machine Learning Augmented Predictive & Generative Models for Rupture Life in High Temperature Alloys: *Madison Wenzlick*[1]; Osman Mamun[2]; Ram Devanathan[2]; Kelly Rose[3]; Jeffrey Hawk[3]; [1]Leidos Research Support Team for the National Energy Technology Laboratory; [2]Pacific Northwest National Laboratory; [3]National Energy Technology Laboratory

4:10 PM
Determining Solute Site Preference and Correlations to Antiphase Boundary Energy in Ni-based Superalloys: *Enze Chen*[1]; Tao Wang[2]; Mario Epler[2]; Timofey Frolov[3]; Mark Asta[1]; [1]University of California, Berkeley; [2]Carpenter Technology Corporation; [3]Lawrence Livermore National Laboratory

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Computational Simulations and Algorithms for Study Structure-Processing Relations

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

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

Wednesday PM **March 17, 2021**

Session Chair: Ebrahim Asadi, University of Memphis

2:00 PM
Real Time Boundary Condition Acquisition and Integration of Heats of Fusion and Phase Transformation Using an Implicit Finite Element Newton Raphson Based Approach for Thermal Behavior Prediction in Additively Manufactured Parts: *Deepankar Pal*[1]; Madhu Keshavamurty[1]; Grama Bhashyam[1]; [1]Ansys

2:20 PM
Global Local Modeling of Melt Pool Dynamics and Bead Formation in Laser Bed Powder Fusion Process Using a Comprehensive Multi-Physics Simulation: *Faiyaz Ahsan*[1]; Jafar Razmi[1]; Leila Ladani[1]; [1]Arizona State University

2:40 PM
Multi-scale Modeling of Hierarchical Microstructure in Ceramic Composites: *Matthew Guziewski*[1]; David Montes de Oca Zapiain[2]; Jennifer Synowczynski-Dunn[1]; Remi Dingreville[2]; Shawn Coleman[1]; [1]Army Research Laboratory; [2]Sandia National Laboratory

3:00 PM
Analysis of Dendrite Growth and Microstructure Evolution during Solidification of Al 6061 via 2D and 3D Phase Field Models: Neil Bailey[1]; *Yung Shin*[1]; [1]Purdue University

3:20 PM
A Machine Learning Approach for Predicting Melt Pool Size in Wire-feed DED Process: Amit Verma[1]; *Zhening Yang*[1]; Ali Gruzel[1]; Anthony Rollett[1]; [1]Carnegie Mellon University

Aluminum Alloys, Processing and Characterization — Processing Innovation, New Applications and Products

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

Program Organizer: Dimitry Sediako, University of British Columbia

Wednesday PM **March 17, 2021**

Session Chair: Xiaochun Li, University of California, Los Angeles

2:00 PM
Shear Assisted Processing and Extrusion of Aluminum Alloy 7075 Tubing at High Speed: *Scott Whalen*[1]; Md. Reza-E-Rabby[1]; Tianhao Wang[1]; Xiaolong Ma[1]; Timothy Roosendaal[1]; Darrell Herling[1]; Nicole Overman[1]; Brandon Taysom[1]; [1]Pacific Northwest National Laboratory

2:20 PM
Shear Assisted Processing and Extrusion of Thin-walled AA 6063 Tubing: *Brandon Taysom*[1]; Scott Whalen[1]; MD Reza-E-Rabby[1]; Tim Skszek[2]; Massimo DiCiano[2]; [1]Pacific Northwest National Laboratory; [2]Magna International

2:40 PM
Influence of the Quench Rate and Trace Elements on 6XXX Alloys: *Alexander Wimmer*[1]; Annika Haemmerle[1]; [1]Neuman Aluminium

3:00 PM
The Combined Method for Producing Long Products from Aluminium and Aluminium Alloys: *Alexander Salnikov*[1]; Christoph Heinzel[1]; [1]RUSAL ETC

3:20 PM
Effect of Extrusion Process on Mechanical, Welding and Corrosion Behaviour of 6XXX Series of Aluminium Alloys: *Mehmet Bugra Guner*[1]; Murat Konar[1]; Görkem Özçelik[1]; Tolga Demirkiran[1]; [1]Asas Aluminium

3:40 PM
TIG Welding of Dissimilar High-Strength Aluminum Alloys 6061 and 7075 with Nano-treated Filler Wires: *Narayanan Murali*[1]; Xiaochun Li[1]; [1]UCLA Department of Materials Science and Engineering

4:00 PM Question and Answer Period

Aluminum Reduction Technology Across the Decades: An LMD Symposium Honoring Alton T. Tabereaux and Harald A. Øye — Harald Øye Honorary Session: Fundamentals in Anode and Cathode Technology - Joint Session with Electrode Technology

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

Program Organizers: Arne Ratvik, SINTEF; Marc Dupuis, GeniSim Inc.; Kristian Etienne Einarsrud, Norwegian University of Science and Technology

Wednesday PM **March 17, 2021**

Session Chair: Kristian Etienne Einarsrud, 1Norwegian University of Science and Technology (NTNU)

2:00 PM
Introductory Comments: Aluminum Reduction Technology Across the Decades: An LMD Symposium Honoring Alton T. Tabereaux and Harald A. Øye: *Kristian Etienne Einarsrud*[1]; [1]Norwegian University of Science and Technology

2:05 PM
Forty Years of Trondheim International Course on Process Metallurgy of Aluminium: *Michel Reverdy*[1]; Vinko Potocnik[2]; [1]Emirates Global Aluminium; [2]Vinko Potocnik Consultant Inc

2:45 PM
Establishing a Chemical Model of the Melt in the Cathode: *Lorentz Petter Lossius*[1]; Harald Arnljot Øye[2]; [1]Hydro Aluminium AS; [2]NTNU

3:05 PM
Heating New Anodes Using the Waste Heat of Anode Butts Establishing the Interface Thermal Contact Resistance: *Marc Dupuis*[1]; Kristian Etienne Einarsrud[2]; Henrik Gudbrandsen[2]; [1]GeniSim Inc.; [2]Norwegian University of Science and Technology (NTNU)

3:25 PM
Forty Years of Cathode Block Evolution at EGA: Michel Reverdy[1]; *Mustafa Mustafa*[1]; Mohamed Boraie[1]; [1]Emirates Global Aluminium

3:45 PM
Wetting of Carbon Cathodes by Molten Electrolyte and Aluminium: *Samuel Senanu*[1]; Arne Petter Ratvik[1]; Zhaohui Wang[1]; Tor Grande[2]; [1]SINTEF; [2]NTNU Norwegian University of Science and Technology

4:05 PM Question and Answer Period

BIOMATERIALS

Biological Materials Science — Biological Materials Science II

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

Program Organizers: David Restrepo, University of Texas at San Antonio; Steven Naleway, University of Utah; Jing Du, Pennsylvania State University; Ning Zhang, University of Alabama

Wednesday PM **March 17, 2021**

Session Chairs: Jing Du, Penn State University; Ning Zhang, The University of Alabama

2:00 PM Invited
Cancer Testbed for Breast and Prostate Cancer Bone Metastasis: *Kalpana Katti*[1]; Haneesh Jasuja[1]; Sumanta Kar[1]; Dinesh Katti[1]; [1]North Dakota State University

2:30 PM
Conformational Transition of G-Actin Subunits Controls the Deformation Behavior of Actin Filament: *Sharad Jaswandkar*[1]; Kalpana Kattti[1]; Dinesh Katti[1]; [1]North Dakota State University

2:50 PM
Nanotechnology Enhanced Novel Bioresorbable Zn Alloy Implant for Short Bowel Syndrome Treatment: *Jingke Liu*[1]; Zeyi Guan[1]; Yuxin Zeng[1]; Chase Linsley[1]; James Dunn[2]; Bejamin Wu[1]; Xiaochun Li[1]; [1]University of California, Los Angeles; [2]Stanford University School of Medicine

3:10 PM
Novel Zn-Fe-Si Alloy as Biodegradable Stent Material: *Yuxin Zeng*[1]; Zeyi Guan[1]; Jingke Liu[1]; Xiaochun Li[1]; [1]UCLA

3:30 PM Invited
Investigating the Remodeling of the Cellular and Collagen Tissue Structures of the Optic Nerve Head in Mouse Models of Glaucoma: *Thao Nguyen*[1]; [1]Johns Hopkins University

4:00 PM Invited
Biomineralized Low-density Structural Materials: *Ling Li*[1]; [1]Virginia Polytechnic Institute

4:30 PM
Euplectella Aspergillum: Multiscale Structural Characterization, Quantification and Micromechanical Properties: *Swapnil Morankar*[1]; Arun Singaravelu[1]; Sridhar Niverty[1]; Jason Williams[2]; Yash Mistry[2]; Clint Penick[3]; Dhruv Bhate[2]; Nikhilesh Chawla[1]; [1]Purdue University; [2]Arizona State University; [3]Kennesaw State University

4:50 PM
Freeze Casting of Bioinspired Materials with Extrinsic Control Techniques: *Steven Naleway*[1]; Isaac Nelson[2]; Tony Yin[1]; Debora Lyn Porter[1]; Josh Fernquist[1]; Josh Alexander[1]; Max Mroz[1]; Paul Wadsworth[1]; [1]University of Utah; [2]Sandia National Lab

5:10 PM
Employing Electric Field in the Fabrication of Directionally Porous Ice-templated Ceramics: *Dipankar Ghosh*[1]; Sashanka Akurati[1]; Diego Terrones[1]; Shizhi Qian[1]; Bharath Gundrati[1]; [1]Old Dominion University

ADVANCED MATERIALS

Bulk Metallic Glasses XVIII — 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, Federal Institute for Materials Research and Testing (BAM); Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Wednesday PM **March 17, 2021**

Session Chairs: Juergen Eckert, Erich Schmid Inst of Materials Science; Katharine Flores, Washington University

2:00 PM Invited
Brittle-to-Ductile Transition in Metallic Glasses: *Jurgen Eckert*[1]; [1]Erich Schmid Institute of Materials Science

2:25 PM Invited
Correlated Disorder Order in a Model Binary Glass: *Peter Derlet*[1]; [1]Paul Scherrer Insitute

2:50 PM
Effect of Porosity on Fracture Behavior of Porous Bulk Metallic Glasses: *Devashish Rajpoot*[1]; Parag Tandaiya[1]; [1]Indian Institute of Technology Bombay

3:10 PM
Effective Quantification of Liquid Structure in Metallic Alloys and its Relation to Glass-Forming Ability: *Porter Weeks*[1]; Katharine Flores[1]; [1]Washington University in St Louis, Institute of Materials Science and Engineering

3:30 PM Invited
Structural Relaxation and Mechanical Properties of Model Glass Systems at the Micro-second Timescale: *Peter Derlet*[1]; Robert Maass[2]; [1]Paul Scherrer Insitute; [2]University of Illinois at Urbana Champaign

3:55 PM
Emerging Fractal Potential Energy Landscape as the Origin of Activation Volume in Metallic Glasses: Chaoyi Liu[1]; *Yue Fan*[1]; [1]University of Michigan

4:15 PM
Glass Forming Ability of the Cu-Zr Alloys: What Do We Learn from Molecular Dynamics Simulation?: *Mikhail Mendelev*[1]; Yang Sun[2]; Feng Zhang[1]; Cai-Zhuang Wang[1]; Kai-Ming Ho[1]; [1]Ames Laboratory; [2]Columbia University

4:35 PM
Stress Breaks Universal Aging Behavior in a Metallic Glass: *Amlan Das*[1]; Peter Derlet[2]; Chaoyang Liu[1]; Eric Dufresne[3]; Robert Maass[1]; [1]University of Illinois at Urbana Champaign; [2]Paul Scherrer Institute; [3]Argonne National Laboratory

4:55 PM
Local Structure of the Al-RE Marginal Metallic Glasses Studied by Molecular Dynamics Simulation: *Doguhan Sariturk*[1]; Tolga Han Ulucan[1]; Yunus Kalay[1]; [1]Middle East Technical University

LIGHT METALS

Cast Shop Technology — Metal Treatment and Shape Casting

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

Program Organizer: Samuel Wagstaff, Oculatus

Wednesday PM **March 17, 2021**

Session Chair: Filippos Patsiogiannis, Bridgnorth Aluminium

2:00 PM
Grain Refinement Efficiency: *Rein Vainik*[1]; John Courtenay[1]; Frode Lien[1]; [1]MQP Ltd

2:20 PM
A Comparison of AA6060 Grain Structures Achieved Using AMG's TiBAl Advance™ and Alternative Al-Ti-B Grain Refiners via a 1D Upward Solidification Device: *Matthew Piper*[1]; Shahid Akhtar[2]; Phil Enright[3]; [1]AMG Aluminum UK Limited; [2]Hydro Aluminium Reseach Centre; [3]NTec

2:40 PM
Mechanism of High Grain Refinement Effectiveness on New Grain Refiner "TiBAl Advance": *Akihiro Minagawa*[1]; Matthew Piper[2]; [1]Uacj Corporation; [2]AMG Aluminum

3:00 PM
Resonance for Contactless Ultrasonic Treatment in Direct Chill Casting: *Catherine Tonry*[1]; Valdis Bojarevics[1]; Georgi Djambazov[1]; Koulis Pericleous[1]; [1]Unviersity of Greenwich

3:20 PM
Ultrasonic Melt Treatment in a DC Casting Launder: The Role of Melt Processing Temperature: *Christopher Beckwith*[1]; Tungky Subroto[2]; Koulis Pericleous[1]; Georgi Djambazov[1]; Dmitry Eskin[2]; Iakovos Tzanakis[3]; [1]University of Greenwich; [2]Brunel University London; [3]Oxford Brookes University

3:40 PM
Residual Stress Prediction in the Casting Process of Automotive Powertrain Components: *Sina Kianfar*[1]; Joshua Stroh[1]; Nasim Bahramian[1]; Dimitry G. Sediako[1]; Anthony Lombardi[2]; Glenn Byczynski[2]; Philipp Mayr[3]; Mark Reid[4]; Anna Paradowska[4]; [1]University of British Columbia; [2]Nemak Canada; [3]Nemak Global; [4]ANSTO

4:00 PM
Coupled Modeling of Misrun, Could Shut, Air Entrainment and Porosity for High Pressure Die Casting Applications: *Juergen Jakumeit*[1]; Herfried Behnken[1]; Romuald Laqua[1]; Simon Mbewou[2]; Martin Fehlbier[2]; Julian Gänz[3]; Leonard Becker[3]; [1]Access E.V.; [2]Foundry technic, University Kassel; [3]Siemens Industry Software GmbH, DI SW STS CCM TO

4:20 PM
Study on the Mechanical Properties of Commercial Vehicle Wheel Through the Molten-Forged on the A356 Alloy with a Multi-cavity Fabrication Process: *Min Seok Moon*[1]; Myeong Han Yoo[1]; Kee Won Kim[2]; Joon Hyuk Song[1]; Je Ha Oh[1]; [1]Korea Institute of Carbon Convergence Technology; [2]Rheoforge Co., Ltd.

4:40 PM Question and Answer Period

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications — Microstructure and Properties - Experiments and Modeling

Sponsored by: TMS Extraction and Processing Division, TMS Structural Materials Division, TMS Light Metals Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Energy Committee, TMS: Nuclear Materials Committee

Program Organizers: Xian-Ming Bai, Virginia Polytechnic Institute and State University; Yongfeng Zhang, University of Wisconsin-Madison; Larry Aagesen, Idaho National Laboratory; Vincenzo Rondinella, Jrc-Ec

Wednesday PM **March 17, 2021**

Session Chairs: William Weber, University of Tennessee, Knoxville; Marat Khafizov, Ohio State University

2:00 PM Invited
Exotic Magneto-elastic Properties in Uranium Dioxide: *Krzysztof Gofryk*[1]; [1]Idaho National Laboratory

2:30 PM Invited
Towards a Model of Coupled Irradiation and Corrosion: Amitava Banerjee[1]; Aaron Kohnert[1]; Edward Holby[1]; Laurent Capolungo[1]; *Blas Uberuaga*[1]; [1]Los Alamos National Laboratory

3:00 PM
Impact of Dislocation Loops on Thermal Conductivity of CeO2: *Marat Khafizov*[1]; Lingfeng He[2]; Miaomiao Jin[2]; David Hurley[2]; [1]Ohio State University; [2]Idaho National Laboratory

3:20 PM
Microstructural Analysis and Micro-mechanical Testing on Xenon-irradiated Uranium Dioxide: *Mack Cullison*[1]; Fei Teng[2]; David Fraser[2]; Boopathy Kombaiah[2]; Kun Mo[3]; Jie Lian[4]; Tianyi Chen[1]; Fabiola Cappia[2]; [1]Oregon State University; [2]Idaho National Laboratory; [3]Argonne National Laboratory; [4]Rensselaer Polytechnic Institute

3:40 PM Invited
Comprehensive Treatment of Thermal Transport Under Irradiation in ThO2: *David Hurley*[1]; Marat Khafizov[2]; Cody Dennett[1]; Amey Khanolkar[1]; Zilong Hua[1]; Lingfeng He[1]; Jian Gan[1]; Anter ElAzab[3]; Maneieha Salaken[3]; Chao Jiang[1]; Miaomiao Jin[1]; Ryan Deskins[3]; Bawane Kausubh[1]; Chris Marianettii[4]; Matthew Mann[5]; [1]Idaho National Laboratory; [2]Ohio State University; [3]Purdue University; [4]Columbia University; [5]AFRL

4:10 PM
TEM Characterization of Dislocation Loops in Ion-irradiated Single Crystal ThO_2: *Kaustubh Bawane*[1]; Xiang Liu[1]; Tiankai Yao[1]; Marat Khafizov[2]; Aaron French[3]; Matthew Mann[4]; Lin Shao[3]; Jian Gan[1]; David Hurley[1]; Lingfeng He[1]; [1]Idaho National Laboratory; [2]Ohio State University; [3]Texas A&M University; [4]Air Force Research Laboratory

4:30 PM
Hydrothermal Corrosion of Silicon Carbide: *Jianqi Xi*[1]; Dane Morgan[1]; Izabela Szlufarska[1]; [1]University of Wisconsin-Madison

4:50 PM
TMIST-3A Post-irradiation Examination: *Mark Lanza*[1]; Walter Luscher[1]; David Senor[1]; Gary Hoggard[2]; [1]Pacific Northwest National Laboratory; [2]Idaho National Laboratory

CHARACTERIZATION

Characterization of Materials through High Resolution Imaging — High Resolution Characterization of Materials with General Coherent Imaging Techniques

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

Program Organizers: Richard Sandberg, Brigham Young University; Ross Harder, Argonne National Laboratory; Xianghui Xiao, Brookhaven National Laboratory; Brian Abbey, La Trobe University; Saryu Fensin, Los Alamos National Laboratory; Ana Diaz, Paul Scherrer Institut; Mathew Cherukara, Argonne National Laboratory

Wednesday PM **March 17, 2021**

Session Chair: Richard Sandberg, Brigham Young University

2:00 PM Keynote
The Fourth is Strong in These Ones!: *Ian McNulty*[1]; [1]MAX IV Laboratory

2:30 PM
X-ray Based Nanodiffraction to Study Strain in Materials for Nuclear Energy: *Ericmoore Jossou*[1]; Mehmet Topsakal[1]; Xiaojing Huang[1]; Khalid Hattar[2]; Hanfei Yan[1]; Yong Chu[1]; Cheng Sun[3]; Lingfeng He[3]; Jian Gan[3]; Lynne Ecker[1]; Simerjeet Gill[1]; [1]Brookhaven National Laboratory; [2]Sandia National Laboratories; [3]Idaho National Laboratory

2:50 PM Invited
Imaging Phase Transitions of Quantum Materials with Bragg Coherent X-ray Diffraction: *Tadesse Assefa*[1]; Yao Cao[2]; Jiecheng Diao[3]; Wonsuk Cha[2]; Ross Hardar[2]; Kim Kisslinger[1]; Mark Dean[1]; Genda Gu[1]; John Tranquada[1]; Ian Robinson[1]; [1]Brookhaven National Laboratory; [2]Argonne National Laboratory; [3]University College London

3:20 PM
Mesoscale Defect Dynamics in the Bulk with Time-resolved Dark-field X-ray Microscopy: *Leora Dresselhaus-Marais*[1]; [1]Lawrence Livermore National Laboratory

3:40 PM Invited
Laboratory and Synchrotron-based X-ray Tomographic Imaging during In Situ Loading of Materials: *Brian Patterson*[1]; Lindsey Kuettner[1]; Cindy Welch[1]; Paul Welch[1]; Axinte Ionita[1]; Nikhilesh Chawla[2]; Xianghui Xiao[3]; [1]Los Alamos National Laboratory; [2]Arizona State University; [3]Brookhaven National Laboratory

4:10 PM
Magnetic Correlations and Time Fluctuations in Assemblies of Fe3O4 Nanoparticles Probed via X-rays: *Karine Chesnel*[1]; [1]Brigham Young University

4:30 PM
Using the Rotation Vector Base Line Electron Back Scatter Diffraction (RVB-EBSD) Method to Characterize Single Crystal Cast Microstructures: *Pascal Thome*[1]; Felicitas Scholz[1]; Jan Frenzel[1]; Gunther Eggeler[1]; [1]Ruhr-University Bochum

CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2021 — Advanced Characterization Methods 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, Instituto Militar de Engenharia; Shadia Ikhmayies; 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; Rajiv Soman, Eurofins EAG Materials Science LLC; Alex Moser, US Naval Research Laboratory

Wednesday PM **March 17, 2021**

Session Chairs: Jian Li, CanmetMATERIALS; Kim Jeongguk , Korea Railroad Research Institute

2:00 PM
Nanotwinned Ni-Mo-W Alloys with Ultrahigh Strength and Localized Plasticity: *Gianna Valentino*[1]; Jessica Krogstad[2]; Timothy Weihs[1]; Kevin Hemker[1]; [1]Johns Hopkins University; [2]University of Illinois Urbana-Champaign

2:20 PM
FIB-SIMS in a Multi-Ion Source Plasma FIB: *Daniel Murray*[1]; Xiaofei Pu[1]; [1]Idaho National Lab

2:40 PM
In-situ Nanoscale Characterization of Phase Transformations in Materials Undergoing Ultra-fast Heating and Cooling: *Azin Akbari*[1]; James Ranney[1]; [1]ThermoFisherScientific

3:00 PM
A Study of the Absorption Edge of ZnO Thin Films Prepared by the Spray Pyrolysis Method: *Shadia Ikhmayies*; [1]

3:20 PM
Modeling Empirical Estimators for the 3D Particle Size, Distribution, and Expected Error from 2D Cross Sections of a Lognormal Distribution of Spherical Particles: *Austin Gerlt*[1]; Amanda Criner[2]; Lee Semiatin[2]; Katelun Wertz[2]; Eric Payton[2]; [1]The Ohio State University; [2]Air Force Research Lab

3:40 PM
Imaging Materials and their Evolution with High-Energy X-rays: *Jonathan Almer*[1]; Peter Kenesei[1]; Jun-Sang Park[1]; Meimei Li[1]; Paul Shade[2]; [1]Argonne National Laboratory; [2]Air Force Research Laboratory

4:00 PM
General Guideline of FIB Milling of Metal Alloys: *Jian Li*[1]; [1]CanmetMATERIALS

4:20 PM
Integrated, Table-top Instrumentation for High-temperature Thermal Property Measurements of Molten Salts: *Haoxuan Yan*[1]; Federico Coppo[1]; Uday Pal[1]; [1]Boston University

ADDITIVE TECHNOLOGIES

Computational Techniques for Multi-Scale Modeling in Advanced Manufacturing — Modeling of Microstructural Evolution

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Extraction and Processing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Process Technology and Modeling Committee

Program Organizers: Adrian Sabau, Oak Ridge National Laboratory; Anthony Rollett, Carnegie Mellon University; Laurentiu Nastac, University of Alabama; Mei Li, Ford Motor Company; Alexandra Anderson, Gopher Resource; Srujan Rokkam, Advanced Cooling Technologies Inc

Wednesday PM **March 17, 2021**

Session Chair: Laurentiu Nastac, The University of Alabama

2:00 PM Invited
In Situ and Operando Synchrotron Experiments for Additive Manufacturing Model Validation: *Peter Lee*[1]; Chu Lun Alex Leung[1]; Yunhui Chen[1]; Samuel Clark[1]; Sebastian Marussi[1]; Robert Atwood[2]; Martyn Jones[3]; Gavin Baxter[3]; [1]University College London; [2]Diamond Light Source; [3]Rolls-Royce plc

2:40 PM
Investigation of Powder Spattering in Laser Powder Bed Fusion through Multi-physics Modeling and High-speed Synchrotron X-ray Imaging: *Xuxiao Li*[1]; Qilin Guo[2]; Zachary Young[3]; Fangzhou Li[1]; Lianyi Chen[2]; Wenda Tan[1]; [1]University of Utah; [2]University of Wisconsin-Madison; [3]Missouri University of Science and Technology

3:05 PM
Particle Resolved Simulation of Laser Powder-bed Fusion Including Metal Evaporation and Vapor Plume Dynamics: *Juergen Jakumeit*[1]; Romuald Laqua[1]; Gongyuan Zheng[1]; Yuze Huang[2]; Samuel Clark[2]; Peter Lee[2]; [1]Access E.V.; [2]University College London

3:30 PM
Phase-field Modeling of The Evolution Kinetics of Porous Structure During Dealloying of Binary Alloys: *jie li*[1]; [1]The Hong Kong Polytechnic University

3:55 PM
Fluid Dynamics Effects on Microstructure Prediction in Single-Laser Tracks for Additive Manufacturing: *Adrian Sabau*[1]; Lang Yuan[2]; Narendran Raghavan[1]; Matthew Bement[1]; John Turner[1]; [1]Oak Ridge National Laboratory; [2]University of South Carolina

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Phase Stability II

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

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Vahid Attari, Texas A&M University; Jorge Munoz, University of Texas at El Paso

Wednesday PM **March 17, 2021**

Session Chair: Peter Galenko, Friedrich Schiller University Jena

2:00 PM
Thermodynamic Stability of the Light Elements Doping in $Sm(Fe,Co)_{12}$ Compounds: *Arkapol Saengdeejing*[1]; Ying Chen[1]; [1]Tohoku University

2:20 PM
First-principles Investigation of the Phase Structures and Stabilities in Mg-Zn Alloys: *Du Cheng*[1]; Kang Wang[1]; Bi-Cheng Zhou[1]; [1]University of Virginia

2:40 PM
Stability and Phase Transition of Cristobalite in SiO_2: *Ying Chen*[1]; Nguyen-Dung Tran[1]; Hao Wang[2]; Masanori Kohyama[3]; Satoshi Kitaoka[4]; Tetsuo Mohri[1]; [1]Tohoku University; [2]Shanghai University; [3]AIST; [4]Japan Fine Ceramics Center (JFCC)

3:00 PM
Phase stability and Atomic Diffusion in fcc Fe-Ni Alloys: Interplay between Magnetic and Chemical Degrees of Freedom: *Kangming Li*[1]; Chu-Chun Fu[1]; Maylise Nastar[1]; [1]DEN-Service de Recherches de Métallurgie Physique, CEA, Université Paris-Saclay

3:20 PM
Dislocation Formation Mechanism in Polycrystalline HCP Zr and Zr-2.5wt.%Nb Alloy: *Cong Dai*[1]; Nana Ofori-Opoku[1]; [1]Canadian Nuclear Laboratories

CORROSION

Environmental Degradation of Additively Manufactured Alloys — AM Materials and Aqueous Corrosion - Part I

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Additive Manufacturing Committee

Program Organizers: Kinga Unocic, Oak Ridge National Laboratory; Jenifer Locke, Ohio State University; Sebastien Dryepondt, Oak Ridge National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Xiaoyuan Lou, Auburn University; Brendy Rincon Troconis, University of Texas at San Antonio; Luke Brewer, University of Alabama

Wednesday PM **March 17, 2021**

Session Chairs: Jenifer S. Locke , The Ohio State University; Xiaoyuan Lou, Auburn University

2:00 PM
Comparing Corrosion of Alloys Made by Additive Manufacturing and Traditional Methods: Sohrab Ghiasi[1]; *Vineeth Kumar Gattu*[2]; William Ebert[2]; J Ernesto Indacochea[1]; [1]University of Illinois at Chicago; [2]Argonne National Laboratory

2:20 PM
Anisotropic Electrochemical Response of Laser Powder Bed Additively Fused Ti6Al4V in Chloride Medium: *Sangram Mazumder*[1]; Mangesh V. Pantawane[1]; Yee-Hsien Ho[1]; Narendra B. Dahotre[1]; [1]University of North Texas

2:40 PM
Simulation of the Effect of Corrosion on the Mechanical Properties of Porous Mg Scaffolds Fabricated by Power Bed Laser Fusion for Biomedical Applications: M. Marvi-Mashhadi[1]; Muzi Li[2]; Wahaaj Ali[2]; Carlos González[3]; *Javier Llorca*[3]; [1]Carlos III University; [2]IMDEA Materials Institute; [3]IMDEA Materials Institute & Technical University of Madrid

3:00 PM
Characterization of Corrosion Behavior in Additively Manufactured Al-6061 RAM Processed by Laser Powder Bed Fusion (L-PBF): *Hamidreza T-Sarraf*[1]; Nikhilesh Chawla[2]; [1]Purdue University; [2]Arizona State University

3:20 PM
Effect of Heat Treatment on the Stress Corrosion Cracking Behavior of an Additively Manufactured 7050 Aluminum Alloy Produced by Selective Laser Melting (SLM): *Kevin Chasse*[1]; Crosby Owens[1]; Rupesh Rajendran[2]; Preet Singh[2]; [1]Northrop Grumman Corporation; [2]Georgia Institute of Technology

3:40 PM
Influence of Cold Spray Deposition Parameters on Pitting of AA2024: *Ozymandias Agar*[1]; Luke Brewer[1]; [1]University of Alabama

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, Advanced Cooling Technologies Inc; Jenifer Locke, Ohio State University

Wednesday PM **March 17, 2021**

Session Chairs: James Burns , University of Virginia; Yiren Chen, Argonne National Lab

2:00 PM Invited
Cracking Growth Behavior of Irradiated Stainless Steels in Light Water Reactors: *Yiren Chen*[1]; Bogdan Alexanderanu[1]; Appajosula Rao[2]; [1]Argonne National Laboratory; [2]Nuclear Regulatory Commission

2:40 PM
Stress Corrosion Cracking of TRIP Fe39Mn20Co20Cr15Si5Al1 (at.%) High Entropy Alloy: *Pranshul Varshney*[1]; Rajiv Mishra[2]; Nilesh Kumar[1]; [1]University of Alabama Tusaloosa; [2]University of North Texas

3:00 PM
An Alternate Approach to DCB Specimens for Determining Sulfide Stress Cracking Thresholds: Constant or Increasing Driving Force Specimens: *Carl Popelar*[1]; W. Hickey[1]; James Sobotka[1]; Julian Hallai[2]; Yifei Zeng[2]; [1]Southwest Research Institute; [2]ExxonMobil Upstream Research Co

3:20 PM Invited
The Effect of Loading Rate on Environment-assisted Cracking Behavior in Ti, Fe, Al, and Ni-based Structural Alloys: *James Burns*[1]; Zachary Harris[1]; [1]University of Virginia

4:00 PM
Comparison of Surface Treatment Technologies for the Mitigation of Stress Corrosion Cracking in Al-Mg: *Matthew McMahon*[1]; William Golumbfskie[1]; Eric Dau[2]; [1]Naval Surface Warfare Center, Carderock Division; [2]Vision Point Systems

4:20 PM
Understanding the Effect of Polarization on SCC Resistance and Crack Tip pH of AA6111-T8: *Katrina Catledge*[1]; Mark Nichols[2]; Gerald Frankel[1]; Jenifer Locke[1]; [1]The Ohio State University; [2]Ford Research and Advanced Engineering, Ford Motor Company

MATERIALS PROCESSING

Friction Stir Welding and Processing XI — Derivative Technologies for Dissimilar

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

Program Organizers: Yuri Hovanski, Brigham Young University; Piyush Upadhyay, Pacific Northwest National Laboratory; Yutaka Sato, Tohoku University; Nilesh Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter the Great St. Petersburg Polytechnic University

Wednesday PM **March 17, 2021**

2:00 PM
An Analysis of Joint between AZ31 and DP590 Steel Created Using Friction-stir Assisted Scribe Technique: Metallurgical vs Mechanical Bonding: *Shank Kulkarni*[1]; Hrishikesh Das[1]; Daniel Tamayo[1]; Piyush Upadhyay[1]; Kyoo Sil Choi[1]; Ayoub Soulami[1]; [1]Pacific Northwest National Laboratory

2:20 PM
Oscillation Behavior of Dissimilar Aluminum/Steel Joints Realized by Ultrasound Enhanced Friction Stir Welding (USE-FSW): *Marco Thoma*[1]; Andreas Gester[1]; Guntram Wagner[1]; [1]Chemnitz University of Technology

2:40 PM
Process Robustness of Friction Stir Dovetailing of AA7099 to Steel with In Situ AA6061 Interlayer Linking: *Md Reza-E-Rabby*[1]; Timothy Roosendaal[1]; Piyush Upadhyay[1]; Nicole Overman[1]; Joshua Silverstein[1]; Martin McDonnell[1]; Scott Whalen[1]; [1]Pacific Northwest National Laboratory

PHYSICAL METALLURGY

Frontiers in Solidification Science VIII — Additive Manufacturing / Rapid Solidification

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Phase Transformations Committee, TMS: Solidification Committee, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Damien Tourret, IMDEA Materials; Amy Clarke, Colorado School of Mines; Ulrike Hecht, Access e.V.; Nana Ofori-Opoku, Canadian Nuclear Laboratories; Melis Serefoglu, Koc University; Tiberiu Stan, Northwestern University

Wednesday PM **March 17, 2021**

Session Chairs: Güven Kurtuldu, ETH Zürich; Ulrike Hecht, Access e.V.; Peter Voorhees, Northwestern University; Damien Tourret, IMDEA Materials

2:00 PM Invited
Morphological Evolution during Solidification: Tiberiu Stan[1]; Alexander Chadwick[1]; Kate Elder[1]; Xianghui Xiao[2]; *Peter Voorhees*[1]; [1]Northwestern University; [2]Brookhaven National Laboratory

2:30 PM
Quantification of the Extent of Disequilibrium at the Solid-liquid Interface during Additive Manufacturing: *Prabhakar Pal*[1]; André Phillion[1]; [1]McMaster University

2:50 PM
Grain Refinement Mechanisms of A6061-RAM2 Metal Matrix Composite Alloys during Laser Powder Bed-fusion (LPB-F): *Chloe Johnson*[1]; G. Becker[1]; Kamel Fezzaa[2]; Jonah Klemm-Toole[1]; Jeremy Iten[3]; Amy Clarke[1]; [1]Colorado School of Mines; [2]Argonne National Laboratory; [3]Elementum 3D

3:10 PM Invited
In Situ Studies of Alloy Solidification Using Dynamic TEM: *Joseph McKeown*[1]; [1]Lawrence Livermore National Laboratory

3:40 PM
Rapid Solidification of Polycrystalline Al-Cu with a Quantitative Phase Field Model and In-situ Imaging: *Tatu Pinomaa*[1]; Joseph McKeown[2]; Anssi Laukkanen[1]; Jörg Wiezorek[3]; Nikolas Provatas[4]; [1]VTT Technical Research Centre of Finland; [2]Lawrence Livermore National Laboratory; [3]University of Pittsburgh; [4]McGill University

4:00 PM
Numerical Model of Al-33wt%Cu Eutectic Growth during Impulse Atomization: *Jonas Valloton*[1]; Abdoul-Aziz Bogno[1]; Michel Rappaz[2]; Hani Henein[1]; [1]University of Alberta; [2]Ecole Polytechnique Fédérale de Lausanne

NANOSTRUCTURED MATERIALS

Functional Nanomaterials: Functional Low-dimensional Materials (0D, 1D, 2D) Driving Innovations in Electronics, Energy, Sensors, and Environmental Engineering and Science 2021 — 2D Materials & Nanostructures

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

Program Organizers: Jiyoung Chang, University of Utah; Michael Cai Wang, University of South Florida; Sarah Zhong, University of South Florida; Sun Choi, Korea Institute of Science and Technology; Pei Dong, George Mason University

Wednesday PM **March 17, 2021**

Session Chairs: Michael Wang, University of South Florida; Sarah Zhong, University of South Florida

2:00 PM Invited
2D Thermoelectric Devices: *Xian Zhang*[1]; [1]Stevens Institute of Technology

2:25 PM Invited
Intrinsic and Interfacial Fatigue of Graphene: *Tobin Filleter*[1]; [1]University of Toronto

2:50 PM Invited
Janus Monolayer-Induced Abnormal Mechanical and Optical Properties in 2D Heterostructures: *Shengxi Huang*[1]; [1]The Pennsylvania State University

3:15 PM
Photoresponse Characterization of Au Nanorods Coated $PtSe_2$: *Tatsuya Nakazawa*[1]; Shinichi Kato[2]; Donghyun Kim[1]; Jwa-Min Nam[2]; Hyungjun Kim[1]; [1]Yonsei University; [2]Seoul National University

3:35 PM Invited
Rapid Water Harvesting and Non-thermal Drying in Humid Air by N-doped Graphene Micro-Pads: Yiyang Wan[1]; Yong Gao[2]; *Zhenhai Xia*[1]; [1]University of North Texas; [2]Northewstern Polytechnical University

4:00 PM Invited
Two-dimensional Transition Metal Dichalcogenides for Optoelectronics and Chemiresistive Applications: *Jungwook Choi*[1]; [1]Yeungnam University

4:25 PM
WSe_2 Growth on Hafnium Zirconium Oxide by Molecular Beam Deposition: The Effect of Growth Conditions on the Substrate Properties: *Maria Gabriela Sales*[1]; Shelby Fields[2]; Samantha Jaszewski[2]; Sean Smith[3]; Riley Christopher[4]; Nikhil Shukla[4]; Jon Ihlefeld[2]; Stephen McDonnell[2]; [1]University of Virginia; [2]Department of Materials Science and Engineering, University of Virginia; [3]Materials Science and Engineering Center, Sandia National Laboratories; [4]Department of Electrical and Computer Engineering, University of Virginia

NANOSTRUCTURED MATERIALS

Heterostructured and Gradient Materials (HGM IV): Tailoring Heterogeneity for Superior Properties — Functional Heterostructured Materials

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

Program Organizers: Yuntian Zhu, City University of Hong Kong; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California-Santa Barbara
; Yves Brechet, Grenoble Institute of Technology; Huajian Gao, Nanyang Technological University; Hyoung Seop Kim, Pohang University of Science and Technology; Ke Lu, Institute of Metal Research; Xiaolei Wu, Chinese Academy of Sciences

Wednesday PM **March 17, 2021**

Session Chairs: Peter Anderson, Ohio State University; Jagannathan Rajagopalan, Arizona State University; Anding Wang, City University of Hong KOng

2:00 PM Invited
Shape Memory Alloys: Using Heterostructure-induced Defects to Train Thermo-mechanical Response: *Peter Anderson*[1]; Harshad Paranjape[2]; Sivom Manchiraju[3]; Michael Mills[1]; [1]Ohio State University; [2]Confluent Medical Technologies; [3]Ansys, Inc.

2:25 PM
High Strength and Low Coercivity Cobalt with Three-dimensional Planar Defects Introduced by Heterogeneous Coherent Interface: *Jian Song*[1]; Guisen Liu[1]; Y. Liu[1]; J. Wang[2]; X. Zhang[3]; [1]Shanghai Jiao Tong University; [2]University of Nebraska-Lincoln; [3]Purdue University

2:45 PM
Analysis of Inertially Dampened Structure in High Strain Rate Impacts: *Trenin Bayless*[1]; Jerome Downey[1]; [1]Montana Technological University

3:05 PM
Interface Engineered Tungsten Based Nanocomposites and Nanofoams for Harsh Environments: *Daniel Kiener*[1]; Mingyue Zhao[1]; Inas Issa[1]; Michael Wurmshuber[1]; [1]University of Leoben

3:25 PM
Hydrogen Charging Behavior of Gradient Structured High-Mn Steels: *Jung Gi Kim*[1]; Hyun Joo Seo[2]; Jeong Min Park[2]; Seung Mi Baek[2]; Auezhan Amanov[3]; Chong Soo Lee[2]; Hyoung Seop Kim[2]; [1]Gyeongsang National University; [2]Pohang Univerisity of Science and Technology; [3]Sun Moon University

3:45 PM
Effects of Constituent Properties on Propagating Stress Waves in Multiphase Composites: *Avery Samuel*[1]; Irene Beyerlein[1]; Frank Zok[1]; [1]University Of California, Santa Barbara

ADVANCED MATERIALS

High Entropy Alloys IX: Alloy Development and Properties — Structures and Mechanical Properties II

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

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Wednesday PM **March 17, 2021**

Session Chairs: Saryu Fensin, Los Alamos National Laboratory; Nan Li, Los Alamos National Laboratory

2:00 PM Invited
Dynamic Properties of a High Entropy Alloy -- FeCrMnNi: Michelle Hawkins[1]; Robert Hixson[2]; Jonathan Gigax[2]; Nan Li[2]; Sarah Thomas[1]; *Saryu Fensin*[2]; [1]Mission Support and Test Services, LLC; [2]Los Alamos National Laboratory

2:20 PM
Effect of Cooling Rate on the High Strain Rate Deformation of Dual-phase High Entropy Alloy: *Samrat Tamuly*[1]; Saurabh Dixit[1]; V Parameswaran[1]; Prasenjit Khanikar[1]; [1]Indian Institute of Technology Guwahati

2:40 PM
Mechanical and Elastic Behavior as Well as Microstructural Response of NbTaTiV and NbTaTiVZr as a Function of Strain Rate: *Mathew Hayne*[1]; Saryu Fensin[1]; Tarik Saleh[1]; Chanho Lee[2]; Peter Liaw[2]; [1]Los Alamos National Laboratory; [2]The University of Tennessee

3:00 PM
Deformation Mechanism and Microstructural Evolution in $Al_{0.4}$CoCrFeNi High Entropy Alloy: *Anumat Sittiho*[1]; Jadzia Graves[1]; Sanjit Bhowmick[2]; Indrajit Charit[1]; Rajiv Mishra[3]; [1]University of Idaho; [2]Bruker; [3]University of North Texas

3:20 PM
On the Phase Stability, Mechanical Properties, and Deformation Mechanisms of the Equiatomic CrFeNi Medium-entropy Alloy: *Mike Schneider*[1]; Guillaume Laplanche[1]; [1]Ruhr-Universitat Bochum

ADVANCED MATERIALS

High Entropy Alloys IX: Structures and Modeling — 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

Wednesday PM **March 17, 2021**

Session Chairs: Yu Zhong, Worcester Polytechnic Institute; Jia Li, Hunan University

2:00 PM Invited
The Application of High-throughput Calculations in High Entropy Alloys
: *Yu Zhong*[1]; [1]Worcester Polytechnic Institute

2:25 PM Invited
Extrapolation of Machine Learning Models for Designing Multi-principal Element Alloys: *James Saal*[1]; Chris Borg[1]; Clara Nyby[1]; Bryce Meredig[1]; [1]Citrine Informatics

2:50 PM
Machine Learning Enabled Prediction of Stacking Fault Energies in Concentrated Alloys: *Gaurav Arora*[1]; Anus Manzoor[1]; Dilpuneet Aidhy[1]; [1]University of Wyoming

3:10 PM Invited
Optimalizing Properties of High Entropy Alloy by Machine Learning and Multiscale Simulations: *Jia Li*[1]; Yang Chen[1]; Qihong Fang[1]; [1]Hunan University

3:35 PM
Accelerated Exploration of Refractory Multi-principal Element Alloys by Machine Learning: *Carolina Frey*[1]; Christopher Borg[2]; James Saal[3]; Bryce Meredig[3]; Daniel Miracle[4]; Tresa Pollock[1]; [1]University of California, Santa Barbara; [2]Citrine Informatics ; [3]Citrine Informatics; [4]Air Force Research Laboratory

3:55 PM
Ab Initio Modeling on the Elastic Properties of Al-Co-Cr-Fe-Ni High Entropy Alloys: A Case Study with FCC Phase: *Songge Yang*[1]; Jize Zhang[1]; Yu Zhong[1]; [1]Worcester Polytechnic Institute

MATERIALS PROCESSING

High Temperature Electrochemistry IV — Session V

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

Program Organizers: Prabhat Tripathy, Batelle Energy Alliance (Idaho National Laboratory); Guy Fredrickson, Idaho National Laboratory

Wednesday PM **March 17, 2021**

Session Chair: Hojong Kim, The Pennsylvania State University

2:00 PM
Advances in Solid Oxide Membrane Based Electrolysis for Solar-grade Silicon Deposition: *Michelle Sugimoto*[1]; Haoxuan Yan[1]; Federico Coppo[1]; Adam Powell[2]; Uday Pal[1]; [1]Boston University; [2]Worchester Polytechnic Institute

2:30 PM
Feasibility of Potentiometry for Monitoring Activity of GdCl3 in Molten LiCl-KCl Salt: *Guoping Cao*[1]; Steven Herrmann[1]; Guy Fredrickson[1]; Robert Hoover[1]; Kevin Tolman[1]; [1]Idaho National Laboratory

3:00 PM
First-principles Molecular Dynamics and CALPHAD Modeling of the CaF2-MgF2-SiO2 Molten Salt System: *Yifan Zhang*[1]; Uday Pal[2]; Adam Powell[1]; Michael Gao[3]; Yu Zhong[1]; [1]Worcester Polytechnic Institute; [2]Boston University; [3]National Energy Technology Laboratory

MATERIALS DESIGN

Hume-Rothery Symposium: Accelerated Measurements and Predictions of Thermodynamics and Kinetics for Materials Design and Discovery — Session VI

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

Program Organizers: Wei Xiong, University of Pittsburgh; Shuanglin Chen, CompuTherm LLC; Wei Chen, Illinois Institute of Technology; James Saal, Citrine Informatics; Greta Lindwall, KTH Royal Institute of Technology

Wednesday PM **March 17, 2021**

Session Chair: Qiaofu Zhang, QuesTek Innovations LLC

2:00 PM Invited
Integrated Predictive Materials Science: Filling the ICME Pipeline: *John Allison*[1]; [1]University of Michigan

2:40 PM Invited
Phonon Anharmonicity Causes the Large Thermal Expansion of NaBr: *Brent Fultz*[1]; Yang Shen[1]; Claire Saunders[1]; Camille Bernal[1]; Michael Manley[2]; [1]California Institute of Technology; [2]Oak Ridge National Laboratory

3:20 PM Invited
Multi-cell Monte Carlo Method for Phase Prediction: *Maryam Ghazisaeidi*[1]; You Rao[1]; Edwin Antillon[2]; changning Niu[3]; Wolfgang Windl[1]; [1]Ohio State University; [2]Naval Research Lab; [3]QuesTek Innovations LLC

4:00 PM Invited
Insights from a Comprehensive Assessment of Diffusion Coefficients of 20 Binary Systems and a Comprehensive Diffusion Mobility Database for Magnesium Alloys: *Wei Zhong*[1]; Qiaofu Zhang[2]; Ji-Cheng Zhao[1]; [1]University of Maryland; [2]QuesTek Innovations LLC

LIGHT METALS

Magnesium Technology 2021 — Alloying & Processing / Primary Production

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

Program Organizers: Victoria Miller, University of Florida; Petra Maier, University of Applied Sciences Stralsund; J. Brian Jordon, University of Alabama; Neale Neelameggham, IND LLC

Wednesday PM **March 17, 2021**

Session Chairs: Vineet Joshi, Pacific Northwest National Laboratory; Joshua Caris, Terves, LLC

2:00 PM
Absorbable Wire Radiopacity: Influence of Composition and Size on X-ray Visibility: *Adam Griebel*[1]; Aubrey Ehle[2]; Jeremy Schaffer[1]; [1]Fort Wayne Metals; [2]Indiana University School of Medicine

2:20 PM
Magnesium and Magnesium Alloy Powder Processing Towards the Development of Near Shape Structural Materials: *Steven Johnson*[1]; Dylan Goncalves[1]; [1]Central Connecticut State University

2:40 PM
Effect of Processing Parameters on the Microstructure and Mechanical Behavior of Additively Manufactured WE43 Mg Alloy: *Leila Sorkhi*[1]; Joshua Hammell[1]; Grant Crawford[1]; [1]South Dakota School of Mines & Tecchnogy

3:00 PM
Effects of Hot Isostatic Pressing on the Microstructure and Properties of Mg-Gd-Y-Zn Alloys: *Janet Meier*[1]; Joshua Caris[2]; Alan Luo[1]; [1]Ohio State University; [2]Terves LLC

3:20 PM
Low-cost Magnesium Primary Production Using Gravity-driven Multiple Effect Thermal System (G-METS) Distillation: *Madison Rutherford*[1]; Armaghan Ehsani Telgerafchi[1]; Gabriel Espinosa[1]; Adam Powell[1]; David Dussault[2]; [1]Worcester Polytechnic Institute; [2]Elemental Beverage

3:40 PM
Efficient Low-cost Gravity-driven Multiple Effect Thermal System (G-METS) Distillation of Magnesium: *Armaghan Telgerafchi*[1]; Gabriel Espinosa[1]; Madison Rutherford[1]; Adam Powell[1]; David Dussault[2]; [1]Worcester Polytechnic Institute; [2]Elemental Beverage Company

4:00 PM
Industrial Practice of Extracting Magnesium from Serpentine: *Huimin Lu*[1]; Neale Neelameggham[2]; [1]Beijing Ofikintai Technology Co., Ltd.; [2]IND LLC

MATERIALS PROCESSING

Materials Engineering -- From Ideas to Practice: An EPD Symposium in Honor of Jiann-Yang Hwang — Wastewater Treatment

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

Program Organizers: Bowen Li, Michigan Technological University; Baojun Zhao, University of Queensland; Jian Li, CanmetMATERIALS; Sergio Monteiro, Instituto Militar de Engenharia; Zhiwei Peng, Central South University; Dean Gregurek, RHI Magnesita; Tao Jiang, Central South University; Yong Shi, Futianbao Environment Technologies; Cuiping Huang, FuTianBao Environment Protection Technology Company Ltd.; Shadia Ikhmayies

Wednesday PM **March 17, 2021**

Session Chairs: Jinjing Luo, Xiamen University; Jiann-Yang Hwang, Michigan Technological University

2:00 PM Invited
Development and Management of Industrial Park for Chinese Electroplating Industry: Yong Shi[1]; Cuiping Huang[1]; *Zhibo Huang*[2]; Jiann-Yang Hwang[3]; [1]Futianbao Environmental Protection, Ltd; [2]Futianbo Environment Protection Technology, Ltd; [3]Michigan Technological University

2:20 PM Invited
Mercury Removal by Bio-chars with Plasma Surface Modification: *Jinjing Luo*[1]; [1]Xiamen University

2:40 PM Invited
Electroplating Wastewater Treatment in China: *Zhibo Huang*[1]; Jiann-Yang Hwang[2]; Cuiping Huang[1]; Yong Shi[1]; [1]Futianbo Environment Protection Technology, Ltd; [2]Michigan Technological University

3:00 PM Invited
Effects of Ozone on COD Reduction in Electroplating Wastewater: *Yahui Sun*[1]; Jiann-Yang Hwang[2]; Lili Xi[1]; Zhixing Fu[1]; Fujiu Nian[1]; Yang Yang[1]; Xin Chen[1]; [1]Futianbo Environment Protection Technology, Ltd; [2]Michigan Technological University

3:20 PM
Extraction of Cerium from Catalyst of Waste Automobile Exhaust Gas Purifier: Chen Ailiang[1]; *Guanwen Luo*[1]; Mao Jiale[1]; Lu Sujun[2]; Ma Yutian[2]; Du Zuojuan[1]; Chen Shengli[2]; Pan Yujun[1]; Qiao Jinxi[1]; Bowen Li[3]; [1]Central South University; [2]State Key Laboratory of Nickel and Cobalt Resources Comprehensive Utilization; [3]Michigan Technological University

3:40 PM Invited
A New Electroplating Wastewater Treatment Process Using Electric Lime and Vacuum Filtration: Zhixing Fu[1]; Jiann-Yang Hwang[2]; *Yahui Sun*[1]; Yang Yang[1]; Fujiu Nian[1]; Lili Xi[1]; Zhibo Huang[1]; [1]Futianbo Environment Protection Technology, Ltd; [2]Michigan Technological University

4:00 PM
COD Removal from Electroplating Degreasing Wastewater by UV/H2O2 Process: Jianjun Liu[1]; *Zhichao Chen*[1]; Lili Xi[1]; Jiann-Yang Hwang[2]; Yong Shi[1]; [1]Futianbao Environmental protection technology; [2]Michigan Technological University

4:20 PM Invited
Oxidation of Cyanide and Simultaneous Copper Electrodeposition from Electroplating Wastewater in an Electrochemical Reactor: Yang Yang[1]; Fujiu Nian[1]; Dong Xu[1]; *Yahui Sun*[1]; Jiann-Yang Hwang[2]; Peiyu Qiao[1]; Zhixing Fu[1]; Lili Xi[1]; [1]Futianbo Environment Protection Technology, Ltd; [2]Michigan Technological University

4:40 PM Invited
Treatment of Electroless Nickel Plating Wastewater by Ozone Oxidation: Lili Xi[1]; *Yahui Sun*[1]; Jiann-Yang Hwang[2]; Fujiu Nian[1]; Zhixing Fu[1]; Yang Yang[1]; Cuiping Huang[1]; [1]Futianbo Environment Protection Technology, Ltd; [2]Michigan Technological University

ADVANCED MATERIALS

Materials for High Temperature Applications: Next Generation Superalloys and Beyond — Refractory Alloys: Processing and Properties of Novel Materials

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

Program Organizers: Govindarajan Muralidharan, Oak Ridge National Laboratory; Martin Heilmaier, KIT Karlsruhe; Benjamin Adam, Portland State University; Mario Bochiechio, Pratt & Whitney; Katerina Christofidou, University of Sheffield; Eric Lass, University of Tennessee-Knoxville; Jeremy Rame, Safran Aircraft Engines; Pierre Sallot, Safran; Akane Suzuki, GE Research; Michael Titus, Purdue University

Wednesday PM **March 17, 2021**

2:00 PM Invited
High-temperature, Thermally-cyclable, Reaction-formed, Co-continuous Refractory Metal/Ceramic Composites for Extreme Environments: *Kenneth Sandhage*[1]; Yujie Wang[1]; Priyatham Tumurugoti[1]; Camilla McCormack[1]; Alex Strayer[1]; Adam Caldwell[1]; Gregory Scofield[1]; Zhenhui Chen[1]; Raheleh Rahimi[1]; Thuan Nguyen[1]; Saeed Bagherzadeh[1]; Kevin Trumble[1]; Michael Sangid[1]; Grigorios Itskos[1]; Mario Caccia[1]; [1]Purdue University

2:30 PM
ICME-guided Design of Novel Metal Matrix Composites for Extreme Environments: David Linder[1]; *Martin Walbrühl*[1]; Qiaofu Zhang[2]; [1]QuesTek Europe AB; [2]QuesTek Innovations

2:50 PM Invited
Advanced Refractory Alloys for Use at Temperatures above 1273K: *Oleg Senkov*[1]; Satish Rao[1]; Todd Butler[1]; Tinuade Daboiku[1]; Eric Payton[1]; [1]Air Force Research Laboratory

3:20 PM
Oxidation-resistant, Thermally-cyclable, Robust Oxide/Metal Composite Materials for Concentrated Solar Power: *Camilla McCormack*[1]; Mario Caccia[1]; Thuan Dinh Nguyen[1]; Gregory Scofield[1]; Grigorios Itskos[1]; Michael Sangid; Kenneth Sandhage[1]; [1]Purdue University

3:40 PM
Hot Isostatic Pressing of Niobium-based Refractory Alloy Powders: *Calvin Mikler*[1]; Brian Welk[1]; Benjamin Georgin[1]; Todd Butler[2]; Noah Philips[3]; Hamish Fraser[1]; [1]The Ohio State University; [2]Air Force Research Laboratory; [3]ATI Specialty Alloys and Components

4:00 PM
A Review of Plastic Flow and Microstructure Evolution at Elevated-temperatures in Unalloyed Niobium: *Emily Brady*[1]; Eric Taleff[1]; [1]University of Texas at Austin

4:20 PM
Effect of Alloy Composition on the Microstructure of Developmental Iridium Alloys: *Noah Kohlhorst*[1]; Glenn Romanoski[2]; Govindarajan Muralidharan[2]; Roger Miller[2]; Ji-Cheng Zhao[3]; [1]Ohio State Univerity; [2]Oak Ridge National Laboratory (ORNL); [3]University of Maryland, Department of Materials Science and Engineering

4:40 PM
Kinetics of Grain Boundary Segregation in an Ir Alloy*: *Dean Pierce*[1]; Govindarajan Muralidharan[1]; Jon Poplawsky[1]; George Ulrich[1]; [1]Oak Ridge National Laboratory

MATERIALS PROCESSING

Materials Processing Fundamentals — Metal Processing and Manufacturing

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Jonghyun Lee, Iowa State University; Samuel Wagstaff, Oculatus; Alexandra Anderson, Gopher Resource; Fiseha Tesfaye, Abo Akademi University; Guillaume Lambotte, Boston Metal; Antoine Allanore, Massachusetts Institute of Technology

Wednesday PM **March 17, 2021**

Session Chairs: Allie Anderson, Gopher Resource; Yunbo Wang, Caterpillar Inc.

2:00 PM
Effect of Dissolution of Titanium Ions on Ti Alloys Electrodeposition from EMIC-$AlCl_3$ Ionic Liquid at Low Temperature: *Pravin Shinde*[1]; Ramana Reddy[1]; [1]The University Of Alabama

2:20 PM
Cylindrical and Planar Magnetron Sputtering for Microstructural Control: *Adie Alwen*[1]; Alina Garcia Taormina[1]; A.M. Hodge[1]; [1]University of Southern California

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Creep, Fatigue, and Fracture

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Eda Aydogan, Middle East Technical University; Laurent Capolungo, Los Alamos National Laboratory; Khalid Hattar, Sandia National Laboratories; Kayla Yano, Pacific Northwest National Laboratory; Caleb Massey, Oak Ridge National Laboratory

Wednesday PM **March 17, 2021**

2:00 PM Invited
Multiscale Modeling of Creep and Transient Conditions in Steels: Application to HT9 Steel Alloy: *Mariyappan Arul Kumar*[1]; Aaron Tallman[1]; Christopher Matthews[1]; Laurent Capolungo[1]; [1]Los Alamos National Laboratory

2:30 PM
Creep Crack Growth Behaviour of Austenitic Stainless Steels Alloy 709 and 316H: *Suyang Yu*[1]; Jin Yan[1]; Hangyue Li[1]; Afsaneh Rabiei[2]; Paul Bowen[1]; [1]University of Birmingham; [2]North Carolina State University

2:50 PM
Stress Corrosion Cracking Resistance of FeCrAl Alloys in Light Water Reactor Environments: *Raul Rebak*[1]; Liang Yin[1]; Andrew Hoffman[1]; [1]GE Global Research

3:10 PM
Enabling In-situ Crack Growth Testing and Monitoring in VTR Cartridge Loop Environments: *Samuel Briggs*[1]; Peter Beck[1]; Dustin Mangus[1]; Jake Quincey[1]; Andrew Brittan[1]; George Young[1]; Guillaume Mignot[1]; Julie Tucker[1]; [1]Oregon State University

3:30 PM Invited
In-situ Scanning Electron Microscopic Observation of Creep and Creep-fatigue of Alloy 709: Amrita Lall[1]; Rengen Ding[2]; Paul Bowen[2]; *Afsaneh Rabiei*[1]; [1]North Carolina State University; [2]University of Birmingham

4:00 PM
Mechanical Characterization of Neutron Irradiated HT-9 Heats (ORNL, LANL and EBR II) at LWR and Fast Reactor Relevant Temperatures: *Ramprashad Prabhakaran*[1]; Mychailo Toloczko[1]; Kumar Sridharan[2]; [1]Pacific Northwest National Laboratory; [2]University of Wisconsin-Madison

4:20 PM
Burst Behavior of Accident Tolerant Fuel Cladding Concepts under Simulated Loss-of-coolant Conditions: *Samuel Bell*[1]; Bruce Pint[1]; Ken Kane[1]; [1]Oak Ridge National Laboratory

4:40 PM
C-ring Compression of SiC-SiC Cladding at 1200°C with In-situ X-ray Computed Micro-tomography: *Dong Liu*[1]; Jon Ell[2]; Guanjie Yuan[1]; Peng Xu[3]; Roger Lu[4]; Edward Lahoda[4]; Harold Barnard[2]; Dula Parkinson[2]; Robert Ritchie[2]; [1]University of Bristol; [2]Lawrence Berkeley National Laboratory; [3]Idaho National Laboratory; [4]Westinghouse Electric Company

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CHARACTERIZATION

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, TMS: Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; 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 PM **March 17, 2021**

Session Chair: Dongchan Jang, KAIST

2:00 PM
Synchrotron X-ray Studies of Deformation and Failure in Cold Spray Composites: Lewei He[1]; Darren Pagan[1]; Qi An[1]; Aaron Nardi[2]; *Mostafa Hassani*[1]; [1]Cornell University; [2]U.S. Army Research Laboratory

2:20 PM
Metal Foams: Linking Dynamic CT Results to Simulation and Modeling: *Luke Hunter*[1]; Wesley De Boever[2]; Martina Humbert[3]; Andreas Griesser[3]; [1]Tescan USA, Inc; [2]TESCAN XRE; [3]Math2Market

2:40 PM
Non-destructive Inspection of Contaminated Epoxy Plates Using Propagating Acoustic Waves: *Isabel McBrayer*[1]; Fady Barsoum[2]; [1]Embry-Riddle Aeronautical University; [2]Embry-Riddle Aeronautical University

3:00 PM
Rhodium and Cobalt Oxidation: A Nanoscale Study by In-situ and in Operando Atom Probe Tomography: *Sten LAMBEETS*[1]; Norbert Kruse[2]; Daniel Perea[1]; [1]Pacific Northwest National Laboratory; [2]Washington State University

3:40 PM
Experimental Measurements of Anisotropic Mechanical Behavior of -HMX Crystals: Ayotomi Olokun1; Abhijeet Dhiman1; Vikas Tomar1; 1Purdue University

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MATERIALS PROCESSING

Ni-Co 2021: The 5th International Symposium on Nickel and Cobalt — Pyrometallurgy II

Sponsored by: The Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy and Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Pyrometallurgy Committee

Program Organizers: Corby Anderson, Colorado School of Mines; Dean Gregurek, RHI Magnesita; Mari Lundström, Aalto University; Christina Meskers; Prabhat Tripathy, Batelle Energy Alliance (Idaho National Laboratory); Fiseha Tesfaye, Abo Akademi University; Yuanbo Zhang, Central South University; Sari Muinonen, Glencore; Graeme Goodall, XPS- Glencore; Shijie Wang, Rio Tinto Kennecott Utah Copper Corp (Retired)

Wednesday PM **March 17, 2021**

2:00 PM
A Novel Process to Reduce SO_2 Emissions during Electric Furnace Smelting of Sulphides: *David Tisdale*[1]; Sari Muinonen[1]; Michael Molinski[1]; Arthur Stokreef[1]; [1]Glencore Sudbury Integrated Nickel Operations

2:20 PM
Influence of the Cemented Carbides Composition on the Disintegration in Liquid Zinc: *Tamara Ebner*[1]; Stefan Luidold[1]; Christoph Czettl[2]; Christian Storf[2]; [1]Montanuniversitaet Leoben; [2]CERATIZIT Austria GmbH

2:40 PM
Study on CFD and Oxygen Lance Injection Technology of High Nickel Ternary Cathode Material Roasting Process in Roller Hearth Furnace: *Zhong Ling(Rocky) Wei*[1]; Gang Zhang[2]; Xu Qian[2]; Heng Zhu[1]; [1]Linde Technology Center Shanghai; [2]Zhongtian Energy Materials Co., Ltd.

3:00 PM
Real-time Fe End-point Determination at Sudbury INO Smelter Finishing Converter Using Thermodynamic Process Simulation: *Tanai Marin-Alvarado*[1]; Brett MacKinnon[1]; Arina Moraes[1]; Kurt Westhaver[1]; Phil Nelson[1]; Nicolas Lazare[1]; Vince McIver[2]; Sari Muinonen[2]; [1]XPS Expert Process Solutions; [2]Sudbury Integrated Nickel Operations

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XX — Properties and Microstructures of Electronic Materials

Sponsored by: TMS Functional Materials Division, TMS Structural 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; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; 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; A.S.Md Abdul Haseeb, University of Malaya; Ligang Zhang, Central South University; Sehoon Yoo, KITECH; Vesa Vuorinen, Aalto University; Yu-chen Liu, National Cheng Kung University

Wednesday PM **March 17, 2021**

Session Chairs: A.S. Md. Abdul Haseeb, University of Malaya; Chih-Ming Chen, National Chung Hsing University

2:00 PM Keynote
Effect of Initial Volume Ratio and Reflow Temperature on the Microstructure of SnBiAg-SAC Mixed Solder Joints: *Eric Cotts*[1]; Faramarz Hadian[1]; Randy Owen[1]; Mohammed Genanu[1]; [1]Binghamton University

2:40 PM
Effect of Low Bi Content on Mechanical Property of Sn-Bi-Zn Alloy before and after Thermal Aging: *Hiroshi Nishikawa*[1]; Shiqi Zhou[1]; Chih-han Yang[2]; Yu-An Shen[2]; Shih-kang Lin[2]; [1]Osaka University; [2]National Cheng Kung University

3:00 PM
High-throughput Calculations for Sn-Bi-Ag and Sn-Bi-Ag-In Low-temperature Lead-free Solders: *Chih-Han Yang*[1]; Yuki Hirata[2]; Hiroshi Nishikawa[2]; Shih-kang Lin[1]; [1]National Cheng Kung University; [2]Osaka University

3:20 PM
Solid-liquid Interfacial Reaction between Cu and In-48Sn Alloy: *F. L. Chang*[1]; C. Robert Kao[1]; H. T. Hung[1]; S. Y. Lin[1]; [1]National Taiwan University

3:40 PM
Using Machine Learning to Predict Hardness of Sn-based Alloys: *Yu-chen Liu*[1]; Chih-han Yang[1]; Hannah Carillo[1]; Chuan-cheng Lin[1]; Shih-kang Lin[1]; [1]National Cheng Kung University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — High Entropy Alloys

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

Program Organizers: Rongpei Shi, Lawrence Livermore National Laboratory; Yipeng Gao, Idaho National Laboratory; Fadi Abdeljawad, Clemson University; Bharat Gwalani, Pacific Northwest National Laboratory; Qi An, University of Nevada-Reno ; Eric Lass, University of Tennessee-Knoxville; Huajing (Wilson) Song, Los Alamos National Laboratory

Wednesday PM **March 17, 2021**

Session Chair: Bharat Gwalani, Pacific Northwest National Laboratory

2:00 PM
Microstructutal Evolution of Metals at High Temperature Revealed by In-situ Neutron and Synchrotron X-ray Diffraction: *Klaus-Dieter Liss*[1]; [1]Guangdong Technion - Israel Institute of Technology (GTIIT)

2:20 PM
Atomistic Modeling of the Effects of Precipitates in Phase Stability of Fe-Ni Based Alloys: *Eva Zarkadoula*[1]; Ying Yang[1]; Albina Borisevic[1]; Easo George[1]; [1]Oak Ridge National Laboratory

2:40 PM
Microstructural Characterization of As-cast $Al_{2.7}$CrFeMnV, $Al_{2.7}$CrFeTiV, and $Al_{2.7}$CrMnTiV High Entropy Alloys: *Keith Knipling*[1]; Patrick Callahan[1]; David Beaudry[2]; Richard Michi[3]; [1]U.S. Naval Research Laboratory; [2]Johns Hopkins University; [3]Oak Ridge National Laboratory

3:00 PM
Comparison of Low Temperature Oxidation Behavior of Pure W and MoNbTaW Thin Films: *Robert Quammen*[1]; Paul F. Rottmann[1]; [1]University of Kentucky

3:20 PM
Hydrogen-induced Microstructural Transformations in an FeMnCoCr High-entropy Alloy: *Maria Ronchi*[1]; Haoxue Yan[1]; Shaolou Wei[1]; C. Tasan[1]; [1]Massachusetts Institute of Technology

3:40 PM
Stacking Fault Energy in Metastable Alloys: *Mulaine Shih*[1]; Maryam Ghazisaeidi[1]; [1]Ohio State University

MATERIALS PROCESSING

Rare Metal Extraction & Processing — V, Ce, Mo, Cr, 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; Kerstin Forsberg, KTH Royal Institute of Technology; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Alafara Baba, University of Ilorin; Neale Neelameggham, IND LLC

Wednesday PM **March 17, 2021**

2:00 PM
Study on the Enhancement of Iron Removal in the Becher Aeration by a Novel Tubular Reactor: *Lei Zhou*[1]; Qiuyue Zhao[1]; Mingzhao Zheng[1]; Zimu Zhang[1]; Guozhi Lv[1]; Tingan Zhang[1]; [1]Northeastern University

ELECTRONIC MATERIALS

Recent Advances in Functional Materials and 2D/3D Processing for Sensors, Energy Storage, and Electronic Applications — Functional Materials and Printed Electronic Devices

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

Program Organizers: Pooran Joshi, Oak Ridge National Laboratory; Rahul Panat, Carnegie Mellon University; Ravindra Nuggehalli, New Jersey Institute of Technology; Tolga Aytug, Oak Ridge National Laboratory; Yong Lin Kong, University of Utah; Konstantinos Sierros, West Virginia University

Wednesday PM **March 17, 2021**

Session Chairs: Pooran Joshi, Oak Ridge National Laboratory; Ravindra Nuggehalli, New Jersey Institute of Technology; Konstantinos Sierros, West Virginia University

2:00 PM Invited
3D Printed Passive Sensors: An Overview: *Vishal Mehta*[1]; Nuggehalli Ravindra[2]; [1]Ohio Northern University; [2]New Jersey Institute of Technology

2:25 PM Invited
Direct Metal Contacts Printing on 4H-SiC for Radiation Detection: *Neil Taylor*[1]; Yongchao Yu[2]; Mihee Ji[2]; Nora Dianne Ezell[2]; Pooran Joshi[2]; Lei Raymond Cao[3]; [1]Oak Ridge National Laboratory; The Ohio State University; [2]Oak Ridge National Laboratory; [3]The Ohio State University

2:50 PM
Modeling of Rheological Properties of Metal Nanoparticle Conductive Inks for Printed Electronics: *Patrick Dzisah*[1]; Nuggehalli Ravindra[1]; [1]New Jersey Institute of Technology

3:10 PM
High Strength Nanotwinned Copper Foils for Current Collectors in Lithium Ion Battery: *Fu Chian Chen*[1]; Chen Chih[1]; [1]National Chiao Tung University

3:30 PM Invited
Advancing Multiscale 3D Printing of Bioelectronics with Soft Matter Physics: *Yong Lin Kong*[1]; [1]University of Utah

3:55 PM Invited
Nanostructured Thin Film Enabled Thermal Emission Based Passive Sensing for Extreme Environment Applications with Optical Fibers: *Paul Ohodnicki*[1]; Sheng Shen[2]; Henry Du[3]; [1]University of Pittsburgh; [2]Carnegie Mellon University; [3]Stevens Institute of Technology

ENERGY & ENVIRONMENT

Recycling and Sustainability for Emerging Technologies and Strategic Materials — Recycling & Process Optimization II

Sponsored by: TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Recycling and Environmental Technologies Committee

Program Organizers: John Howarter, Purdue University; Mingming Zhang, ArcelorMittal Global R&D; Elsa Olivetti, Massachusetts Institute of Technology; Hong Peng, University of Queensland

Wednesday PM **March 17, 2021**

Session Chair: Mingming Zhang, ArcelorMittal Global R&D

2:00 PM
Ecodesign and Strategic Design of Alloys by Combinatorial Optimisation: *Franck Tancret*[1]; Madeleine Bignon[1]; Edern Menou[2]; Gérard Ramstein[1]; Emmanuel Bertrand[1]; Pedro Rivera-Diaz-Del-Castillo[3]; [1]University Of Nantes; [2]Safran; [3]Lancaster University

2:20 PM
Hydrometallurgical Recycling of Bauxite Residue: *Himanshu Tanvar*[1]; Brajendra Mishra; [1]Worcester Polytechnic Institute

2:40 PM
Investigation of Ionic Liquids Isolated Iron for Ductile Iron Castings: *Blake Stewart*[1]; Haley Doude[1]; Morgan Abney[2]; Eric Fox[2]; Jennifer Edmunson[2]; Hongjoo Rhee[1]; [1]Mississippi State University; [2]National Aeronautics and Space Administration

3:00 PM
Uncertainty Analysis and Reduction for Environmental Impact Modeling of Emerging Manufacturing Technologies: *Jiankan Liao*[1]; Daniel Cooper[1]; [1]University of Michigan

NUCLEAR MATERIALS

Thermal Property Characterization, Modeling, and Theory in Extreme Environments — Thermal Transport Theory & Mechanisms

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

Program Organizers: Janelle Wharry, Purdue University; Mukesh Bachhav, Idaho National Laboratory; Marat Khafizov, Ohio State University; Eric Lass, University of Tennessee-Knoxville; Vikas Tomar, Purdue University; Tiankai Yao, Idaho National Laboratory; Cody Dennett, Idaho National Laboratory; Karim Ahmed, Texas A&M University

Wednesday PM **March 17, 2021**

Session Chairs: Vikas Tomar, Purdue University; Mukesh Bachhav, Idaho National Laboratory; Karim Ahmed, Texas A&M University

2:00 PM Invited
Thermal Transport in Irradiated ThO2: A Combined Experimental and Phonon Level Investigation: Anter El-Azab[1]; *Walter Deskins*[1]; Maniesha Singh[1]; Sanjoy Mazumder[1]; Kumagai Tomohisa[1]; Jie Peng[1]; Marat Khafizov[2]; Zilong Hua[3]; Lingfeng He[3]; David Hurley[3]; [1]Purdue University; [2]Ohio State University; [3]Idaho National Laboratory

2:30 PM Invited
Thermal Conductivity and Heat Transport Processes of Ion Irradiated and Laser Heated Solids: *Patrick Hopkins*[1]; Thomas Pfeifer[1]; Ethan Scott[1]; John Gaskins[1]; David Olson[1]; Khalid Hattar[2]; Mark Goorsky[3]; [1]University of Virginia; [2]Sandia National Labs; [3]UCLA

3:00 PM
Thermal Gradient Effect on the Transport Properties of Helium and Intrinsic Defects in Tungsten: *Enrique Martinez Saez*[1]; Nithin Mathew[1]; Danny Perez[1]; Dimitrios Maroudas[2]; Brian Wirth[3]; [1]Los Alamos National Laboratory; [2]University of Massachusetts; [3]University of Tennessee

3:20 PM Invited
Phonon Transport in ThO2 from Neutron Scattering and First-principles Computation: *Michael Manley*[1]; Matthew Bryan[1]; Chris Marianetti[2]; Lyuwen Fu[2]; Krzystof Gofryk[3]; [1]Oak Ridge National Laboratory; [2]Columbia University; [3]Idaho National Laboratory

3:50 PM Invited
Theory of Non-equilibrium Thermal Transport at High Temperatures from First-principles: *Keivan Esfarjani*[1]; [1]University of Virginia

ADVANCED MATERIALS

2D Materials – Preparation, Properties & Applications — Modeling & Simulations II

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

Program Organizers: Nuggehalli Ravindra, New Jersey Institute of Technology; Ramana Chintalapalle, University of Texas at El Paso; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Sufian Abedrabbo, Khalifa University; Amber Shrivastava, Indian Institute of Technology Bombay

Thursday AM **March 18, 2021**

Session Chairs: Gerald Ferblantier, University of Strasbourg; Amber Shrivastava, Indian Institute of Technology

8:30 AM
Cesium Lead Bromides - Structural, Electronic & Optical Properties: *Aneer Lamichhane*[1]; Nuggehalli Ravindra[1]; [1]New Jersey Institute of Technology

8:50 AM
Thermoelectric Properties of 2-D B_4C Nanosheets: *Adway Gupta*[1]; Arunima Singh[1]; [1]Arizona State University

9:10 AM
Low Temperature Phonon Anharmonicity in Tungsten Diselenide: *Qingan Cai*[1]; [1]University of California, Riverside

9:30 AM
Mechanism of Strain Transfer in Transition Metal Dichalcogenides for Phase Change Transistors: *Shoieb Ahmed Chowdhury*[1]; Tara Peña[1]; Stephen Wu[1]; Hesam Askari[1]; [1]University of Rochester

NUCLEAR MATERIALS

Accelerated Discovery and Qualification of Nuclear Materials for Energy Applications — Innovative Design and Development of Nuclear Materials

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

Program Organizers: Yongfeng Zhang, University of Wisconsin-Madison; Adrien Couet, University of Wisconsin-Madison; Michael Tonks, University of Florida; Jeffery Aguiar, Idaho National Laboratory; Andrea Jokisaari, Idaho National Laboratory; Karim Ahmed, Texas A&M University

Thursday AM **March 18, 2021**

Session Chairs: Julie Tucker, Oregon State University ; Andrea Jokisaari, Idaho National Laboratory

8:30 AM
Compositionally Graded Bulk Specimen: A High-throughput Approach for Nuclear Alloy Development and Qualification: *Xiaoyuan Lou*[1]; Jingfan Yang[1]; Xiang Liu[2]; Miao Song[3]; Lingfeng He[2]; Yongfeng Zhang[4]; Daniel Schwen[2]; [1]Auburn University; [2]Idaho National Lab; [3]University of Michigan; [4]University of Wisconsin-Madison

8:50 AM
A Superb Void Swelling Resistant Type 316L Stainless Steel Developed by Additive Manufacturing Enabled High Throughput Microalloying: *Miao Song*[1]; Jingfan Yang[2]; Xiang Liu[3]; Xiaoyuan Lou[2]; Yongfeng Zhang[4]; Lingfeng He[3]; Daniel Schwen[3]; [1]University of Michigan; [2]Auburn University; [3]Idaho National Laboratory; [4]University of Wiscousin

9:10 AM
Improving Irradiation Resistance of Alloys by Controlling Defect Diffusion: A Modeling Perspective: *Yongfeng Zhang*[1]; Miao Song[2]; Xiang Liu[3]; Lingfeng He[4]; Daniel Schwen[4]; Xiaoyuan Lou[5]; [1]University of Wisconsin-Madison; [2]University of Michigan ; [3]Idaho National Laboratory ; [4]Idaho National Laboratory; [5]Auburn University

9:30 AM Invited
Role of Composition and Thermal Aging on Corrosion Behavior of Duplex Stainless Steels in Pressurized Water Reactors: *Julie Tucker*[1]; Pratik Murkute[1]; Kofi Oware Sarfo[1]; Isak McGieson[1]; Melissa Santala[1]; Yongfeng Zhang[2]; Liney Arnadottir[1]; Burkan Isgor[1]; [1]Oregon State University; [2]University of Wisconsin - Madison

10:00 AM
Development of Sintered High Strength and Thermal Conductivity Cu-Cr-Nb-Zr Alloy for Fusion Components: *Bin Cheng*[1]; Ling Wang[2]; David Sprouster[1]; Jason Trelewicz[1]; Weicheng Zhong[3]; Ying Yang[3]; Steven Zinkle[2]; Lance Snead[1]; [1]Stony Brook University; [2]University of Tennessee, Knoxville; [3]Oak Ridge National Laboratory

10:20 AM
Evaluation of Creep Deformation of Ferritic/Martensitic (FM) Grade 91 Steel Fabricated Using Wire Arc Additive Manufacturing (WAAM): *Mahmoud Hawary*[1]; K. Murty[1]; [1]North Carolina State University

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ADDITIVE TECHNOLOGIES

Additive Manufacturing of Functional, Energy, and Magnetic Materials — Additive Manufacturing of NiTi

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

Program Organizers: Markus Chmielus, University of Pittsburgh; Sneha Prabha Narra, Worcester Polytechnic Institute; Mohammad Elahinia, University of Toledo; Reginald Hamilton, Pennsylvania State University; Iver Anderson, Iowa State University Ames Laboratory

Thursday AM **March 18, 2021**

8:30 AM
Composition Control in Laser Powder Bed Fusion Additive Manufacturing Through Differential Evaporation: *Meelad Ranaiefar*[1]; Ibrahim Karaman[1]; Alaa Elwany[1]; Raymundo Arroyave[1]; [1]Texas A&M University

8:50 AM
Toward Understanding the Effect of Selective Laser Re-melting on the Mechanical Properties of the SLM Fabricated Nitinol: *Parisa Bayati*[1]; Keyvan Safaei[1]; Mohammadreza Nematollahi[1]; Ahmadreza Jahadakbar[2]; Mohammad Mahtabi[3]; Mohammad Elahinia[1]; [1]The University of Toledo; [2]Thermomorph LLC; [3]The University of Tennessee at Chattanooga

9:10 AM
Selective Laser Melting of Defect-free NiTi SMA Parts Using a Process Optimization Framework: *Lei Xue*[1]; Chen Zhang[1]; Kadri Atli[1]; Bing Zhang[1]; Alaa Elwany[1]; Raymundo Arroyave[1]; Ibrahim Karaman[1]; [1]TAMU

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Beyond the Beam II — Deformation Based Processing

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

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

Thursday AM **March 18, 2021**

Session Chair: James Paramore, Texas A&M University

8:30 AM
In Situ Monitoring of Additive Friction Stir Deposition: An Overview: *Hang Yu*[1]; [1]Virginia Polytechnic Institute and State University

8:50 AM
Texture Development and Influence in Solid-state Additive Manufacturing: *Robert Griffiths*[1]; Mackenzie Perry[1]; David Garcia[1]; Hang Yu[1]; [1]Virginia Polytechnic Institute

9:10 AM
Complex Material Deformation and Flow Phenomena during Additive Friction Stir Deposition of Dissimilar Aluminum Alloys: *Mackenzie Perry*[1]; Hunter Rauch[1]; Robert Griffiths[1]; Jennifer Sietins[2]; Yunhui Zhu[1]; David Garcia[1]; Hang Yu[1]; [1]Virginia Tech; [2]CCDC Army Research Laboratory

9:30 AM
Friction Stir Additive Manufacturing of Al 6061-T6: Modeling and Experimental Analysis: Nitin Rohatgi[1]; *Yung Shin*[1]; [1]Purdue University

9:50 AM
Cold Spray Processing of Soft Metals and Hard Tool Steels: *Yu Zou*[1]; [1]University of Toronto

10:10 AM
Heat Treatment of Recycled Battlefield Stainless-Steel Scrap for Cold Spray Applications: *Christopher Massar*[1]; Kyle Tsaknopoulos[1]; Bryer Sousa[1]; Jack Grubbs[1]; Danielle Cote[1]; [1]Worcester Polytechnic Institute

10:30 AM
Understanding the Effects of Repeated Environmental Exposure on Powder Properties for Additive Manufacturing Applications: *Jack Grubbs*[1]; Aaron Birt[2]; Aaron Nardi[3]; Danielle Cote[1]; [1]Worcester Polytechnic Institute; [2]Solvus Global; [3]Army Research Lab

10:50 AM
Aluminum Alloy Powders for Solid State Additive Manufacturing Processing: *Kyle Tsaknopoulos*[1]; Jack Grubbs[1]; Danielle Cote[1]; [1]Worcester Polytechnic Institute

11:10 AM
Linear Friction Welding: a Solid-state Joining Process for the Manufacturing of Aerospace Titanium Parts: *Nicolas Piolle*[1]; [1]ACB

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Solid-State Phase Transformations and Microstructural Evolution — Aluminium Alloys

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

Program Organizers: Bij-Na Kim, Carpenter Additive; Andrew Wessman, University of Arizona; Chantal Sudbrack, National Energy Technology Laboratory; Eric Lass, University of Tennessee-Knoxville; Katerina Christofidou, University of Sheffield; Peeyush Nandwana, Oak Ridge National Laboratory; Rajarshi Banerjee, University of North Texas; Whitney Poling, General Motors Corporation; Yousub Lee, Oak Ridge National Laboratory

Thursday AM **March 18, 2021**

Session Chairs: Whitney Poling, General Motors; Andrew Wessman, The University of Arizona

8:30 AM Invited
Connecting Microstructure Evolution to Mechanical Behavior of an Al-Mn-Sc Alloy Designed for Selective Laser Melting: *Fan Zhang*[1]; Qingbo Jia[2]; Xinhua Wu[2]; [1]National Institute of Standards and Technology; [2]Monash University

9:00 AM
Characterization and Simulation of Eta and Eta-prime Precipitates Evolution in Laser Heat Treated Cold Spray of AA7050: *Ning Zhu*[1]; Luke Brewer[1]; [1]University of Alabama

9:20 AM
Possibilities for Replacing Scandium in High Strength Al-Mg Alloys for 3D Printing by Transition Metal Alloying: Viktor Mann[1]; Roman Vakhromov[2]; *Dmitriy Ryabov*[2]; Vladimir Korolev[2]; Daria Daubarayte[2]; Maria Grol[2]; Alexander Seferyan[2]; Kirill Nyaza[2]; [1]RUSAL Management; [2]Light Materials and Technologies Institute

9:40 AM
Solidification Structure Characterization of an AlCuMnZr Alloy with respect to geometric features and Multiple Parameters: *Kevin Sisco*[1]; Sumit Bahl[2]; Matthew Chisholm[2]; Richard Michi[2]; Jonathan Poplawsky[2]; Amit Shyam[2]; Ryan Dehoff[2]; Alex Plotkowski[2]; Suresh Babu[1]; [1]University of Tennessee Knoxville; [2]Oak Ridge National Lab

10:00 AM
Effects of Thermal Processing on the Microstructure and Mechanical Properties of Additively Manufactured AlSi10Mg Parts: *John Fite*[1]; Suhas Prameela[2]; John Slotwinski[1]; Timothy Weihs[2]; [1]Jhu Applied Physics Lab; [2]Johns Hopkins University

10:20 AM
Evolution of Microstructure and Dispersoids in Al-Mg 5xxx Alloys Under Wire + Arc Additive Manufacturing and Permanent Mold Casting: Kun Liu[1]; *Ahmed Algendy*[1]; Jianglong Gu[2]; X. Grant Chen[1]; [1]University of Quebec at Chicoutimi; [2]Yanshan University

10:40 AM
Effect of Laser Glazing on Powder-Processed Icosahedral-Phase-Strengthened Aluminum Alloys: From Single Track to Overlapping Tracks: *Mingxuan Li*[1]; Hannah Leonard[1]; Sarshad Rommel[1]; Cain Hung[1]; Thomas Watson[2]; Tod Policandriotes[3]; Rainer Hebert[1]; Mark Aindow[1]; [1]University of Connecticut; [2]Pratt & Whitney; [3]Collins Aerospace

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session VII

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

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; 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; Arul Kumar Mariyappan, Los Alamos National Laboratory; Olivia Underwood, Sandia National Laboratories

Thursday AM **March 18, 2021**

8:30 AM
Materials Processing in a Synchrotron Beam: *Klaus-Dieter Liss*[1]; [1]Guangdong Technion - Israel Institute of Technology (GTIIT)

8:50 AM
On the Coupled Effects of Hydrogen Diffusion and Hydride Precipitation in Zirconium Alloys: *Alireza Tondro*[1]; Hamidreza Abdolvand[1]; [1]Western University

9:10 AM
Crystal Plasticity-based Modelling of Taylor Impact Test of Single Crystal Tantalum: *Zhangxi Feng*[1]; Miroslav Zecevic[2]; Ricardo Lebensohn[2]; Marko Knezevic[1]; [1]University of New Hampshire; [2]Los Alamos National Laboratory

9:30 AM
Slip-twin Transfer Across Phase Boundaries: An In-situ Investigation of a Ti-Al-V-Fe (a+ß) Alloy
: *Shaolou Wei*[1]; Gaoming Zhu[1]; Cem Tasan[1]; [1]Massachusetts Institute of Technology

9:50 AM
Variability in Mechanical Properties Related to Porosity in LMD Waspaloy: *Azdine Nait-Ali*[1]; Romain Bordas[1]; Roland Fortunier[1]; Patrick Villechaise[1]; Lucie Rat[2]; Sebastien Rix[2]; Samuel Hemery[1]; Jonathan Cormier[1]; [1]Isae Ensma; [2]Safran Aircraft Engines

ADVANCED MATERIALS

Advanced Functional and Structural Thin Films and Coatings — Coating Technologies and Surface Structuring for Tools II

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

Program Organizers: Adele Carrado, IPCMS - CNRS; Ramana Chintalapalle, University of Texas at El Paso; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Nancy Michael, University of Texas at Arlington; Karine Mougin, Is2m Cnrs; Heinz Palkowski, Clausthal University of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology; Vikas Tomar, Purdue University

Thursday AM **March 18, 2021**

Session Chairs: Heinz Palkowski, IMET; Ravindra Nuggehalli, New Jersey Institute of Technology

8:30 AM Invited
Nanoengineered Coating; Lotus Effect, Morphology, Contact Angles and Wettability: Narsingh Singh[1]; Lisa Kelly[1]; Narasimha Prasad[1]; *Brett Setera*[1]; Stacey Sova[1]; David Sachs[1]; Bradley Arnold[1]; Fow-Sen Choa[1]; Christopher Cooper[1]; [1]University of Maryland, Baltimore County

9:00 AM
High-quality Diamond Films on Q-carbon Coated Austenitic Stainless Steels 304 and 316: *Pratik Joshi*[1]; Siddharth Gupta[2]; Ariful Haque[2]; Jagdish Narayan[2]; [1]NC State University; [2]Intel Corporation

9:20 AM
Ni-Zn-Al2O3 Cermet Nanocomposite Coatings by High-pressure Cold Spraying: *Jagannadh Sripada*[1]; Gobinda Saha[1]; [1]University of New Brunswick

9:40 AM Invited
Manipulating Polyolefin Performance by Control of Morphology through Processing: *Michael Jaffe*[1]; [1]New Jersey Innovation institute

ADVANCED MATERIALS

Advanced Functional and Structural Thin Films and Coatings — Multifunctional Biomaterials, Innovative Approaches to New Concepts and Applications II

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

Program Organizers: Adele Carrado, IPCMS - CNRS; Ramana Chintalapalle, University of Texas at El Paso; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Nancy Michael, University of Texas at Arlington; Karine Mougin, Is2m Cnrs; Heinz Palkowski, Clausthal University of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology; Vikas Tomar, Purdue University

Thursday AM **March 18, 2021**

Session Chairs: Adele Carrado, Université de Strasbourg IPCMS; Heinz Palkowski, IMET

8:30 AM Keynote
Diamond-like Coatings: A Flexible Platform for Multifunctional Antibacterial Coatings for Health: Linda Bonilla[1]; Pascale Chevallier[1]; *Diego Mantovani*[1]; [1]Laval University

9:10 AM Invited
Grafting of Bioactive Polymers with Various Architectures for Preparing Antibacterial and Biocompatible Surfaces: *Céline Falentin-Daudre*[1]; Véronique Migonney[1]; [1]LBPS-CSPBAT

9:40 AM
On the Controlled Antibacterial Activity of a Silver Oxide Doped Diamond-like Carbon Nanocoating With a Semi-permeable Polymeric Top Layer for Long-term Stability: *Linda Bonilla-Gameros*[1]; Pascale Chevallier[1]; Diego Mantovani[1]; [1]Laboratory for Biomaterials and Bioengineering, Laval University

10:00 AM Keynote
Biomimetic Calcium-deficient Hydroxyapatite Coating on Activated Carbon Fiber Cloth: A Dual Drug Delivery System: *Sylvie Bonnamy*[1]; [1]CNRS

10:40 AM
Design of Ti-copolymer Sandwiches for Biomedical Implant to Improve Formability: *Flavien Mouillard*; Patrick Masson[1]; Genevieve Pourroy[1]; Adele Carrado[1]; [1]IPCMS - CNRS

11:00 AM
Design of Innovative Hybrid Structures Using Grafting of Architecture-controlled Polymers for Biomedical Applications: *Caroline Pereira*[1]; Jean-Sébastien Baumann[1]; Patrick Masson[2]; Geneviève Pourroy[2]; Heinz Palkowsky[3]; Adele Carradò[2]; Véronique Migonney[1]; Céline Falentin-Daudré[1]; [1]LBPS/CSPBAT, UMR CNRS 7244, Institut Galilée, Université Sorbonne Paris Nord; [2]Institut de Physique et Chimie des Matériaux de Strasbourg (IPCMS), UMR 7504 CNRS, Université de Strasbourg; [3]Clausthal University of Technology (TUC), IMET Institute of Metallurgy

11:20 AM
Forming Limits and Shaping of Ti-PMMA-Ti Sandwiches for Biomedical Applications: *Gargi Nayak*[1]; Heinz Palkowski[1]; [1]TU Clausthal

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Developments in Emerging Permanent Magnets

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

Program Organizers: Richard Beddingfield, North Carolina State University; Daniel Salazar, BCMaterials; Alex Leary, NASA Glenn Research Center; Huseyin Ucar, California Polytechnic University; Yongmei Jin, Michigan Technological University; Arcady Zhukov, University of the Basque Country

Thursday AM **March 18, 2021**

Session Chairs: Yongmei Jin, Michigan Technological University; Zachary Morgan, Oak Ridge National Laboratory

8:30 AM
Atomic Cooperation in Enhancing Magnetism: (Fe, Cu)-doped CeCo5: *Durga Paudyal*[1]; Renu Choudhary[1]; [1]Ames Laboratory

8:50 AM
Computational Modeling of Fracture in Sm-Co Magnet: *Ikenna Nlebedim*[1]; Xubo Liu[1]; Baozhi Cui[1]; Jun Cui[1]; [1]Ames Laboratory

9:10 AM
Effects of Lattice Distortions on Magnetic Properties of Fe16N2: First-principles Study: *Yusuke Asari*[1]; Tomohiro Tabata[1]; Shinya Tamura[1]; Matachiro Komuro[1]; Shohei Terada[1]; [1]Hitachi, Ltd.

9:30 AM
Heterogeneous Sm-Co Sintered Magnets with Enhanced Mechanical Properties: *Baozhi Cui*[1]; Xubo Liu[1]; Gaoyuan Ouyang[1]; Cajetan Nlebedim[1]; Jun Cui[1]; [1]Ames Laboratory

9:50 AM Invited
MnBi Thin Film Micromagnets with Tunable Anisotropy for High Temperature Applications: M. Villanueva[1]; E. H. Sánchez[2]; P. Pedraz[1]; P. Olleros[1]; P. Perna[1]; P. S. Normile[2]; C. Navío[1]; J. Camarero[1]; *Jose De Toro*[2]; A. Bollero[1]; [1]IMDEA Nanoscience, Madrid, Spain; [2]IRICA & Applied Physics Dept, University of Castilla-La Mancha, Spain

10:20 AM
Role of Fe in Stabilizing Ce(Co, Fe, Cu)$_5$ and Enhancing Its Magnetic Properties: *Matthew Kramer*[1]; Oleana Palasyuk[1]; Tae-Hoon Kim[1]; Lin Zhou[1]; Sergey Budko[1]; Paul Canfield[1]; Andriy Palasyuk[1]; [1]Ames Laboratory

10:40 AM
Evaluation of Medium-entropy FexCoyNiz Alloys as Precursors for FeCoNi-based High Entropy Magnetic Alloys: Alex Paul[1]; *Tanjore Jayaraman*[1]; [1]University of Michigan-Dearborn

11:00 AM
Substitutional and Interstitial Doping in 1-5 and Its Derivative Structures for the Development of Hard Magnetic Properties: A First Principles Study: *Huseyin Ucar*[1]; Durga Paudyal[2]; [1]California Polytechnic University, Pomona; [2]Ames Laboratory

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VII — Energy Storage with Emphasis on Batteries II

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

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

Thursday AM **March 18, 2021**

Session Chairs: Eric Detsi, University of Pennsylvania; Scott Roberts, Sandia National Laboratory

8:30 AM
Mesoscale Mechanics: Simulating the Role of Stress on Electrode Electrochemical Performance: *Scott Roberts*[1]; Mark Ferraro[1]; Jeffrey Horner[1]; Julia Meyer[2]; Benjamin Ng[1]; [1]Sandia National Laboratories; [2]Purdue University

9:00 AM
Metal-sulfur nanocomposite for developing high-loading electrochemical cathode: Sheng-Heng Chung[1]; *Cun-Sheng Cheng*[1]; [1]National Cheng Kung University

9:20 AM
Molecular-level Characterization of the Electrode-electrolyte Interfaces in Li Batteries: *Lauren Marbella*[1]; [1]Columbia University

9:50 AM
New Insights Linking Material Properties and Performance of the Lithium SEI: *Betar Gallant*[1]; [1]MIT

10:20 AM
Simulations of Phase Transformation in Complex Graphite Electrode Microstructures: *Affan Malik*[1]; Kent Snyder[2]; Minghong Liu[2]; Hui-Chia Yu[1]; [1]Michigan State University; [2]Ford Auto Company

MATERIALS DESIGN

Advances in Titanium Technology — Powder Metallurgy and Additive Manufacturing of Ti and Ti Alloys

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

Program Organizers: Don Li, Howmet Engineered Products; Yufeng Zheng, University of Nevada-Reno
; Peeyush Nandwana, Oak Ridge National Laboratory; Matthew Dunstan, US Army Research Laboratory

Thursday AM **March 18, 2021**

Session Chair: Matthew Dunstan, U.S. Army Research Laboratory

8:30 AM
Development of Cold Spray Additive Technology for Manufacturing Titanium Mill Products: *Stefan Gulizia*[1]; Leon Prentice[1]; Peter King[1]; Saden Zahiri[1]; Alejandro Vargas Uscategui[1]; Christian Doblin[1]; [1]CSIRO Manufacturing

8:50 AM
Investigation to Hole Surface Microstructure Evolution in Drilling of
Aerospace Alloys: Ti-5553
: *David Yan*[1]; [1]San Jose State University

9:10 AM
Process Design for Laser Hot Wire Additive Manufacturing of Ti-6Al-4V: *Brandon Abranovic*[1]; Elizabeth Chang-Davidson[1]; Jack Beuth[1]; [1]Carnegie Mellon University

9:30 AM
Opportunities to Develop Superior Titanium Alloys by Laser Powder Bed Fusion: *Marco Simonelli*[1]; Graham McCartney[1]; Zou Zhiyi[1]; Nesma Aboulkhair[1]; Yau Yau Tse[1]; Adam Clare[1]; Richard Hague[1]; [1]University of Nottingham

9:50 AM
Towards an ICME Framework of Designing Post-process for Additively Manufactured Ti-6Al-4V: *Shengyen Li*[1]; Kirby Matthew[1]; James Sobotka[1]; [1]Southwest Research Institute

MATERIALS DESIGN

AI/Data informatics: Tools for Accelerated Design of High-temperature Alloys — AI Design and Thermodynamics

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

Program Organizers: Michael Titus, Purdue University; Pinar Acar, Virginia Tech; Andrew Detor, GE Research; James Saal, Citrine Informatics; Dongwon Shin, Oak Ridge National Laboratory

Thursday AM **March 18, 2021**

Session Chairs: Pinar Acar, Virginia Tech; Michael Titus, Purdue University

8:30 AM Invited
Knowledge-driven Platform for Federated Multimodal Big Data Storage & Analytics: *Kareem Aggour*[1]; Vipul Gupta[1]; Andy Detor[1]; Scott Oppenheimer[1]; Joe Vinciquerra[1]; [1]GE Research

9:00 AM
Exploring the Compositional Space of High Entropy Alloys via Sequential Learning: *Juan Verduzco*[1]; Zachary McClure[1]; David Farache[1]; Saaketh Desai[1]; Alejandro Strachan[1]; [1]Purdue University

9:20 AM
Uncertainty Reduction for Calculated Phase Equilibria: *Richard Otis*[1]; Brandon Bocklund[2]; Zi-Kui Liu[2]; [1]Jet Propulsion Laboratory; [2]Pennsylvania State University

9:40 AM
Predicting Vibrational Entropy of FCC Solids Uniquely from Bond Chemistry Using Machine Learning: *Anus Manzoor*[1]; Dilpuneet Aidhy[1]; [1]University of Wyoming

LIGHT METALS

Aluminum Reduction Technology — Environment (Material and Equipment)

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

Program Organizers: Nadia Ahli, Emirates Global Aluminium; Nancy Holt, Hydro Aluminium AS

Thursday AM **March 18, 2021**

Session Chair: Shane Polle, EGA

8:30 AM
Low and High Voltage PFC Slope Coefficient Monitoring during Pot Start-up: Christine Dubois[1]; *Luis Espinoza-Nava*[1]; [1]Alcoa

8:50 AM
Latest Developments in GTC Design to Reduce Fluoride Emissions: *Philippe Martineau*[1]; Youssef Joumani[1]; Bassam Hureiki[1]; Jérémy Neveu[1]; Fabienne Virieux[1]; [1]Fives

9:10 AM
Process and Environmental Aspects of Applying Unshaped Carbon Materials for Cell Lining Purposes: *Alexander Proshkin*[1]; Vitaly Pingin[1]; Viktor Mann[1]; Aleksey Zherdev[1]; Andrey Sbitnev[1]; Yury Shtefanyuk[1]; [1]RUSAL

9:30 AM
Characterisation of Powders-precondition for Plant Engineering: Peter Hilgraf[1]; Arne Hilck[2]; *Jan Paepcke*[2]; [1]HAW, Hamburg, University of Applied Science; [2]Claudius Peters Projects GmbH

9:50 AM
Gas Treatment in the GE Pot Integrated ABART Modules (PIA): *Anders Sorhuus*[1]; Håvard Olsen[1]; Eivind Holmefjord[1]; Roger Theodorsen[1]; Mikkel Sørum[1]; [1]GE Power

10:10 AM
New Phase in Upgrade of Søderberg Technology at RUSAL's Smelters: *Viktor Buzunov*[1]; Viktor Mann[2]; Vitaliy Pingin[1]; Aleksey Zherdev[1]; Maksim Kazantsev[1]; Andrey Pinaev[1]; Yuriy Bogdanov[1]; [1]Rusal Etc; [2]UC RUSAL

10:30 AM Question and Answer Period

BIOMATERIALS

Biological Materials Science — Biological Materials Science III

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

Program Organizers: David Restrepo, University of Texas at San Antonio; Steven Naleway, University of Utah; Jing Du, Pennsylvania State University; Ning Zhang, University of Alabama

Thursday AM **March 18, 2021**

Session Chairs: Santiago Orrego, Temple University; Alexander Ossa, Universidad EAFIT

8:30 AM Invited
Microstructural Variations in Mammalian Enamel: An Exploration of Decussation from the Micro- to the Macro-scale: Cameron Renteria[1]; Juliana Fernández-Arteaga[2]; Alexander Ossa[2]; *Dwayne Arola*[1]; [1]University of Washington; [2]Universidad EAFIT

9:00 AM
On the Structure and Mechanical Properties of Aprismatic Enamel in Crocodilian Teeth: *Jack Grimm*[1]; Cameron Renteria[1]; Savannah Camacho[1]; Xitlalit Sanchez-Martinez[1]; Dwayne Arola[1]; [1]University of Washington

9:20 AM
Tough Enlightenments From the Prayer Bead: Fracture-tolerant Endocarp of *Elaeocarpus Ganitrus* Seed (Rudraksha): *Ashish Ghimire*[1]; Po-Yu Chen[1]; [1]National Tsing Hua University

9:40 AM Invited
Bioinspired Graphene Nanocomposites with Exceptionally High Mechanical Performance: *Xiaodong Li*[1]; [1]University of Virginia

10:10 AM Invited
Tapes: An Overlooked Biological Material Archetype: *Hannes Schniepp*[1]; [1]College of William & Mary

10:40 AM Invited
Mechanical Properties of Tough, Mechanochemically Active Hydrogels and Hydrogel-based Composites: *Jamie Kruzic*[1]; Yuwan Huang[1]; Bhakthi Jayathilaka[1]; Shariful Islam[1]; Meredith Silberstein[2]; Kristopher Kilian[1]; [1]University of New South Wales; [2]Cornell University

ADVANCED MATERIALS

Bulk Metallic Glasses XVIII — 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, Federal Institute for Materials Research and Testing (BAM); Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday AM **March 18, 2021**

Session Chairs: Jamie Kruzic, University of New South Wales; Xie Xie, FCA US LLC

8:30 AM Invited
Microstructure - Fracture Toughness Relationships in Bulk Metallic Glasses: *Jamie Kruzic*[1]; Bosong Li[1]; Bernd Gludovatz[1]; Anna Ceguerra[2]; Keita Nomoto[1]; Simon Ringer[2]; Shenghui Xie[3]; Sergio Scudino[4]; [1]University of New South Wales; [2]The University of Sydney; [3]Shenzhen University; [4]IFW Dresden

8:55 AM Invited
Structural Heterogeneities Dictate Strength and Fracture Toughness in a Zr-based Metallic Glass: *Bernd Gludovatz*[1]; Lisa Krämer[2]; Bosong Li[1]; Anton Hohenwarter[3]; Jamie Kruzic[1]; [1]UNSW Sydney; [2]ESI-Leoben; [3]Montanuniversität Leoben

9:20 AM Invited
Mechanical Behavior and Phase Stability of Ductile Metallic Glass Nanoparticles: *Wendy Gu*[1]; Mehrdad Kiani[1]; Abhinav Parakh[1]; [1]Stanford University

9:45 AM Invited
Microscopic Description of Plasticity, Relaxation and Rejuvenation Using Anelastic Relaxation Spectra: *Michael Atzmon*[1]; Tianjiao Lei[2]; Luis Rangel DaCosta[3]; [1]University of Michigan; [2]University of California, Irvine; [3]University of California, Berkeley

10:10 AM
Competing Effects of Topology and Chemical Bonding on Mechanical Properties of Metallic Glasses: *Vrishank Jambur*[1]; Chaiyapat Tangpatjaroen[1]; Jianqi Xi[1]; Meng Gao[1]; John Perepezko[1]; Izabela Szlufarska[1]; [1]University of Wisconsin - Madison

LIGHT METALS

Cast Shop Technology — DC Casting

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

Program Organizer: Samuel Wagstaff, Oculatus

Thursday AM **March 18, 2021**

Session Chairs: Philippe Jarry, Constellium; Samuel Wagstaff, Oculatus

8:30 AM
Simulation-based Analysis for Optimization of Casting Process in AA7075: Siamak Rafiezadeh[1]; *Philip Pucher*[1]; Steffen Neubert[1]; Waldemar Ivanov[1]; [1]AMAG

8:50 AM
Characterization of Ingots Cast with the APEX™ Casting System: *Craig Cordill*[1]; Gerhard Castro[1]; Bin Zhang[1]; [1]Wagstaff

9:10 AM
Effect of Ultrasonic Melt Treatment on the Sump Profile and Microstructure of a Direct-chill Cast AA6008 Aluminum Alloy: *Tungky Subroto*[1]; Gerard Serge Bruno Lebon[1]; Dmitry Eskin[1]; Ivan Skalicky[2]; Dan Roberts[2]; Iakovos Tzanakis[3]; Koulis Pericleous[4]; [1]Brunel University London; [2]Constellium UTC; [3]Oxford Brookes University; [4]University of Greenwich

9:30 AM
The Influence of the Casting Speed in Horizontal Continuous Casting of Aluminium Alloy EN AW 6082: *Akin Oball*[1]; Kerem Dilek[1]; Mertol Gokelma[2]; Seracettin Akdi[3]; Deniz Kavrar Ürk[1]; [1]Sistem Teknik Industrial Furnaces Ltd.; [2]Izmir Institute of Technology; [3]Akdi Engineering and Consultancy

9:50 AM
The Impact of Casting Conditions on Edge Cracking of AA5182 Ingots during Hot Rolling: *Samuel Wagstaff*[1]; [1]Oculatus

10:10 AM
Reducing Gas Shrinkage Porosity in AlMg Alloy Slabs: *Igor Kostin*[1]; Aleksandr Sidorov[1]; Aleksey Startsev[1]; Andrey Krechetov[1]; Aleksandr Krokhin[1]; Sergey Belyaev[2]; [1]UC RUSAL; [2]SFU

10:30 AM
Molecular Dynamics Simulations of the Evolution of Residual Stresses during Rapid Solidification of Aluminium: *Michail Papanikolaou*[1]; Konstantinos Salonitis[1]; Mark Jolly[1]; [1]Cranfield University

10:50 AM Question and Answer/Panel Discussion

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications — Radiation Effects and Mass Transport

Sponsored by: TMS Extraction and Processing Division, TMS Structural Materials Division, TMS Light Metals Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Energy Committee, TMS: Nuclear Materials Committee

Program Organizers: Xian-Ming Bai, Virginia Polytechnic Institute and State University; Yongfeng Zhang, University of Wisconsin-Madison; Larry Aagesen, Idaho National Laboratory; Vincenzo Rondinella, Jrc-Ec

Thursday AM **March 18, 2021**

Session Chairs: Simon Pimblott, Idaho National Laboratory; Walter Luscher, Pacific Northwest National Laboratory

8:30 AM Invited
Irradiation Effects on Zirconium Alloy Oxides and Their Impacts on In-reactor Corrosion Rates: *Adrien Couet*[1]; Zefeng Yu[1]; Taeho Kim[1]; Hongliang Zhang[1]; Mukesh Bachhav[2]; Lingfeng He[2]; [1]University of Wisconsin-Madison; [2]Idaho National Laboratory

9:00 AM
Effect of UV and Gamma Irradiation on the Hydrothermal Corrosion of Ion-irradiated SiC: *Arunkumar Seshadri*[1]; Koroush Shirvan[1]; Taeho Kim[2]; Adrien Couet[2]; [1]Massachusetts Institute of Technology; [2]University of Wisconsin-Madison

9:20 AM Invited
In-situ Measurement of Tritium Release from Lithium Aluminate Under Neutron Irradiation: *Walter Luscher*[1]; David Senor[1]; Gary Hoggard[2]; [1]Pacific Northwest National Laboratory; [2]Idaho National Laboratory

9:50 AM
Influence of Dose Rate and Temperature on Mass Transport in Hematite: *Kayla Yano*[1]; Sandra Taylor[1]; Tiffany Kaspar[1]; Danny Edwards[1]; Daniel Schreiber[1]; [1]Pacific Northwest National Laboratory

10:10 AM
Radiation Tolerance of Nanoporous Gadolinium Titanate: *Nathan Madden*[1]; Matthew Janish[2]; James Valdez[2]; Blas Uberuaga[2]; Jessica Krogstad[1]; [1]University of Illinois at Urbana-Champaign; [2]Los Alamos National Laboratory

10:30 AM
Radiolytic Damage and Hydrogen Generation at Carbide – Water Interfaces: *Simon Pimblott*[1]; Jay LaVerne[2]; [1]Idaho National Laboratory; [2]University of Notre Dame

10:50 AM
Molecular Dynamics Investigations of AlN-based Piezoelectric Ceramics under Irradiation: *Michael Kempner*[1]; Jesse Sestito[1]; Eva Zarkadoula[2]; Yan Wang[1]; [1]Georgia Institute of Technology; [2]Oak Ridge National Laboratory

11:10 AM
Irradiation Damage in High-entropy Carbide Ceramics: Fei Wang[1]; Xueliang Yan[1]; Tianyao Wang[2]; Yaqiao Wu[3]; Lin Shao[2]; Michael Nastasi[2]; Yongfeng Lu[1]; *Bai Cui*[1]; [1]University of Nebraska-Lincoln; [2]Texas A&M University; [3]Boise State University

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CHARACTERIZATION

Characterization of Materials through High Resolution Imaging — High Resolution Characterization of Materials with Phase Contrast Imaging

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

Program Organizers: Richard Sandberg, Brigham Young University; Ross Harder, Argonne National Laboratory; Xianghui Xiao, Brookhaven National Laboratory; Brian Abbey, La Trobe University; Saryu Fensin, Los Alamos National Laboratory; Ana Diaz, Paul Scherrer Institut; Mathew Cherukara, Argonne National Laboratory

Thursday AM **March 18, 2021**

Session Chair: Xianghui Xiao, Brookhaven National Laboratory

8:30 AM Invited
In Situ and Operando 3D Nano-imaging for Materials Science at the ESRF: *Julie Villanova*[1]; Richi Kumar[1]; Victor Vanpeene[1]; Jaime Segura-Ruiz[1]; Remi Tucoulou[1]; Pierre Lhuissier[2]; Luc Salvo[2]; [1]ESRF; [2]SIMAP/UGA

9:00 AM
Evaluation of TATB Crystal Morphology for Predicting Sensitivity Using X-ray Computed Tomography: *Lindsey Kuettner*[1]; Brian Patterson[1]; John Yeager[1]; Larry Hill[1]; [1]Los Alamos National Laboratory

9:20 AM
Megahertz X-ray Microscopy for Imaging High-speed Phenomena in Opaque Materials: *Valerio Bellucci*[1]; Tokushi Sato[1]; Pablo Villanueva Perez[2]; Jozef Ulicny[3]; Wataru Yashiro[4]; Henry Chapman[5]; Adrian Mancuso[1]; Patrik Vagovic[5]; [1]European XFEL GmbH; [2]Lund University; [3]Pavol Jozef Šafárik University; [4]Tohoku University; [5]Center for Free-Electron Laser Science

9:40 AM
Microstructural Characterization and Mechanical Behavior of a Meteorite Using Correlative Microscopy: *Tai-Jan Huang*[1]; Sridhar Niverty[1]; Arun Sundar[1]; Md Fazle Rabbi[2]; Laurence Garvie[2]; Aditi Chattopadhyay[2]; Desireé Cotto-Figueroa[3]; Nikhilesh Chawla[1]; [1]Purdue University; [2]Arizona State University; [3]University of Puerto Rico at Humacao

10:00 AM Invited
Imaging Materials on the Run: Shedding Light on Fast Structural Processes Using Time-resolved Synchrotron X-ray Tomographic Microscopy: *Christian Schlepütz*[1]; Federica Marone[1]; Anne Bonnin[1]; Marco Stampanoni[1]; [1]Paul Scherrer Institute

10:30 AM
Quantitative Data Analysis of Dynamic Tomography Data with Motion Artifacts: *Xianghui Xiao*[1]; Yang Yang[1]; Zhenrui Xu[2]; James Steiner[2]; Yijin Liu[3]; Feng Lin[2]; [1]Brookhaven National Laboratory; [2]Virginia Tech; [3]SLAC National Accelerator Laboratory

10:50 AM Invited
High Speed, High Resolution, High Temperature 3D Imaging of Spacecraft Materials during Atmospheric Entry Conditions: *Dilworth Parkinson*[1]; Harold Barnard[1]; Alastair MacDowell[1]; Sam Schickler[1]; Shawn Shacterman[1]; Talia Benioff-White[1]; Kara Levy[1]; Francesco Panerai[2]; Collin Foster[2]; Benjamin Ringel[2]; Christian Schlepuetz[3]; [1]Lawrence Berkeley National Laboratory; [2]University of Illinois, Urbana-Champaign; [3]Paul Scherrer Institute

11:20 AM
Study of Structure of Beam-sensitive Supported Nanoparticle Catalysts by Low-dose High Resolution Phase Contrast Imaging: *Cheng-Han Li*[1]; Joerg Jinschek[1]; [1]The Ohio State University

11:40 AM
Indexing Grains: A Comparison between Three-dimensional Synchrotron X-ray Diffraction and Electron Backscatter Diffraction Techniques: *Karim Louca*[1]; Hamidreza Abdolvand[1]; [1]Western University

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ADDITIVE TECHNOLOGIES

Computational Techniques for Multi-Scale Modeling in Advanced Manufacturing — Multiscale Solidification Models

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Extraction and Processing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Process Technology and Modeling Committee

Program Organizers: Adrian Sabau, Oak Ridge National Laboratory; Anthony Rollett, Carnegie Mellon University; Laurentiu Nastac, University of Alabama; Mei Li, Ford Motor Company; Alexandra Anderson, Gopher Resource; Srujan Rokkam, Advanced Cooling Technologies Inc

Thursday AM **March 18, 2021**

Session Chair: Anthony Rollett, Carnegie Mellon

8:30 AM
Computational Multi-Scale Modeling of Segregation and Microstructure Evolution during the Solidification of A356 Ingots Processed via a 2-Zone Induction Melting Furnace: Aqi Dong[1]; *Laurentiu Nastac*[1]; [1]University of Alabama

8:55 AM
Microstructural Evolution and Defect Formation During Pulsed and Continuous Selective Laser Melting: *Ian Mccue*[1]; Steven Storck[1]; James Mastandrea[1]; Morgana Trexler[1]; [1]Johns Hopkins Applied Physics Laboratory

9:20 AM
Computational Modeling of Nanoparticles Dispersion in Hybrid Process of Ink Jetting and Laser Powder Bed Fusion: *Milad Ghayoor*[1]; Bryce Cox[1]; Joshua Gess[1]; Somayeh Pasebani[1]; [1]Oregon State University

9:45 AM
Multi-scale, Multi-physics Modeling of Additive Manufacturing: Challenges and Potential Solutions: *Dayalan Gunasegaram*[1]; Anthony Murphy[1]; [1]CSIRO

10:10 AM
Multiphysics Simulation of Microstructure Evolution in Selective Laser Melting of AlSi10Mg: *Dehao Liu*[1]; Yan Wang[1]; [1]Georgia Institute of Technology

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Data Methods, Tools and High Throughput

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

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Vahid Attari, Texas A&M University; Jorge Munoz, University of Texas at El Paso

Thursday AM **March 18, 2021**

Session Chairs: Rodrigo Freitas, Stanford University; Dehao Liu, Georgia Institute of Technology; Arunima Singh, Arizona State University; Raymundo Arroyave, Texas A&M University

8:30 AM Invited
Data-driven Discovery of Materials for Photocatalytic Energy Conversion: *Arunima Singh*[1]; [1]Arizona State University

9:00 AM
High-throughput Density-functional Theory Methods for Discovery of Actinide Materials: *Matthew Christian*[1]; Erin Johnson[2]; Theodore Besmann[1]; [1]University of South Carolina; [2]Dalhousie University

9:20 AM Invited
The High Entropy Alloy Space is Not as Big as We Think It is: *Raymundo Arroyave*[1]; Tanner Kirk[1]; [1]Texas A&M University

9:50 AM Invited
Uncovering Atomistic Mechanisms of Crystallization Using Machine Learning: *Rodrigo Freitas*[1]; Evan Reed[2]; [1]Massachusetts Institute of Technology; [2]Stanford University

10:20 AM Invited
A Data-driven Approach to Long-Time Molecular Dynamics: *Danny Perez*[1]; Nithin Mathew[1]; Enrique Martinez[1]; [1]Los Alamos National Laboratory

10:50 AM Invited
Dendritic Growth Prediction in Metal Additive Manufacturing with Physics-constrained Neural Networks: *Dehao Liu*[1]; Yan Wang[1]; [1]Georgia Institute of Technology

CORROSION

Environmental Degradation of Additively Manufactured Alloys — AM Materials and Aqueous Corrosion - Part II: Stainless Steel, Inconel 718 and Coatings

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Additive Manufacturing Committee

Program Organizers: Kinga Unocic, Oak Ridge National Laboratory; Jenifer Locke, Ohio State University; Sebastien Dryepondt, Oak Ridge National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Xiaoyuan Lou, Auburn University; Brendy Rincon Troconis, University of Texas at San Antonio; Luke Brewer, University of Alabama

Thursday AM **March 18, 2021**

Session Chairs: Brendy Rincon Troconis, University of Texas at San Antonio; Luke Brewer, University of Alabama

8:30 AM
Localized Corrosion of Additively Manufactured Stainless Steels: *Michael Melia*[1]; Jesse Duran[1]; Rebecca Marshall[2]; Ryan Katona[2]; Rebecca Schaller[1]; Jeffrey Rodelas[1]; Michael Heiden[1]; Bradley Jared[1]; Robert Kelly[2]; Eric Schindelholz[3]; [1]Sandia National Laboratories; [2]University of Virginia; [3]The Ohio State University

8:50 AM Invited
Melt Pool Boundaries and the Corrosion of Laser Powder Fusion Stainless Steels: *Eric Schindelholz*[1]; Michael Melia[2]; Christopher Barr[3]; Bradley Jared[3]; Jeffrey rodelas[3]; Paul Kotula[3]; [1]Ohio State University; [2]Sandia National Laboratories ; [3]Sandia National Laboratories

9:20 AM Invited
Selective Corrosion and Sensitization Behavior in Laser Powder Bed Fusion 316L: *Robert Kelly*[1]; Duane Macatangay[1]; Jenna Conrades[1]; Keegan Brunner[1]; [1]University of Virginia

9:50 AM
High Performance AM Stainless Steel 316L Under Corrosive Environment: *Thomas Voisin*[1]; Zhen Qi[1]; Yuliang Zhang[1]; Rongpei Shi[1]; Josh Kacher[2]; Manyalibo Matthews[1]; Brandon Wood[1]; Y. Morris Wang[1]; [1]Lawrence Livermore National Laboratory; [2]Georgia Tech

10:10 AM
Improving the Corrosion Performance of Additively Manufactured 316L via Chemically-modified Feedstock: *Joseph Sopcisak*[1]; Steven Storck[1]; Rengaswamy Srinivasan[1]; Jason Trelewicz[2]; David Sprouster[2]; Kevin Hemker[3]; Mo-Rigen He[3]; Timothy Montalbano[1]; [1]Johns Hopkins University Applied Physics Laboratory; [2]Stony Brook University; [3]Johns Hopkins University

10:30 AM
Electrochemical Response of Additively Printed Inconel 718 by Laser-based Direct Energy Deposition: *Sangram Mazumder*[1]; Mangesh V. Pantawane[1]; Yee-Hsien Ho[1]; Narendra B. Dahotre[1]; [1]University of North Texas

10:50 AM
Corrosion Behavior of Functionally Graded Inconel 718 Produced by Additive Manufacturing: *Yaiza Gonzalez-Garcia*[1]; Lola Devignes[2]; Aytac Yilmaz[1]; Arjan de Groot[1]; Evgenii Borisov[3]; Vera Popovich[1]; [1]Delft University of Technology; [2]SIGMA Clermont; [3]Peter de Great Saint-Petersburg Polytechni University

11:10 AM
Nano-crystalline Cold Spray Coatings for Repair and Retrofit of Existing Large-Scale Structures: *Rose Roy*[1]; Baillie Haddad[1]; Kris Klus[1]; Christian Widener[1]; [1]VRC Metal Systems

11:30 AM Invited
Tailoring Microstructure in Additively Manufactured Stainless Steels for Enhanced Corrosion Performance: *Jason Trelewicz*[1]; David Sprouster[1]; Gary Halada[1]; Joseph Sopcisak[2]; Steven Storck[2]; [1]Stony Brook University; [2]The Johns Hopkins University Applied Physics Laboratory

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CORROSION

Environmentally Assisted Cracking: Theory and Practice — Environmental Embrittlement, Fracture, and Fatigue

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

Program Organizers: Bai Cui, University of Nebraska-Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Advanced Cooling Technologies Inc; Jenifer Locke, Ohio State University

Thursday AM **March 18, 2021**

Session Chairs: Jian Luo, University of California, San Diego; Stephen Raiman, Texas A&M University

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8:30 AM Invited
Corrosion, Irradiation, and Cracking Studies in Support of Coating Development for SiC-based Accident Tolerant Fuel Cladding: *Stephen Raiman*[1]; Peter Doyle[2]; Peter Mouche[3]; Yutai Katoh[3]; [1]Texas A&M University; [2]University of Tennessee; [3]Oak Ridge National Laboratory

9:10 AM
Modeling of Corrosion Crack Dynamics and Fracture Using a Physics-based Meshless Peridynamics Approach: *Srujan Rokkam*[1]; Masoud Behzadinasab[2]; Max Gunzburger[3]; Sachin Shanbhag[3]; Nam Phan[4]; [1]Advanced Cooling Technologies Inc; [2]Brown University; [3]Florida State University; [4]Naval Air Systems Command

9:30 AM
Humidity and Chemistry Dependent Embrittlement in the Al-Ga-In Liquid Metal Embrittlement System
: *Justin Norkett*[1]; Cameron Frampton[1]; Victoria Miller[1]; [1]University of Florida

9:50 AM
The Effect of Additive Manufacturing Process Parameters on the Fatigue Crack Growth Rates of Alloy 718 in Elevated-pressure and Elevated temperature Hydrogen Gas: *William Hickey*[1]; John Macha[1]; Vinicio Ynciarte[2]; Brendy Rincon Troconis[2]; [1]Southwest Research Institute; [2]University of Texas at San Antonio

10:10 AM
Influence of Hydrogen on Softened HAZ during In-situ Slow Strain Rate Testing in YS 550 MPa Grade Steel Welds: *Namhyun Kang*[1]; Hanji Park[1]; Cheolho Park[2]; Junghoon Lee[2]; Stephen Liu[3]; Dae-Geun Nam[4]; [1]Pusan National University; [2]Chosun University; [3]Colorado School of Mines; [4]Korea Institute of Industrial Technology

10:30 AM
Hydrogen Permeability for Determining Hydrogen Embrittlement Susceptibility of High Hardness Steels: *William Williams*[1]; David Salley[1]; Haley Doude[1]; David Wipf[1]; Daniel Field[2]; Krista Limmer[2]; Kevin Doherty[2]; Hongjoo Rhee[1]; [1]Mississippi State University, CAVS; [2]CCDC Army Research Laboratory

10:50 AM
Characterization of Hydrogen Embrittlement Sensitivity of Various High Hardness Steels: David Salley[1]; Will Williams[1]; Haley Doude[1]; Wilburn Whittington[1]; Dan Field[2]; Krista Limmer[2]; Kevin Doherty[2]; Hongjoo Rhee[1]; *Shiraz Mujahid*[3]; [1]Center for Advanced Vehicular Systems, Mississippi State University; [2]Metals Branch, US CCDC Army Research Laboratory; [3]Mississippi State University

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MATERIALS DESIGN

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Multiscale Modeling Approaches to Improve Fatigue Predictions

Sponsored by: TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, 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; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University; Jean-Charles Stinville, University of California-Santa Barbara

Thursday AM **March 18, 2021**

Session Chair: Antonios Kontsos, Drexel University

8:30 AM
Experimental Analysis and Numerical Simulation of Cyclic Deformation and Fatigue Behavior of AZ31 Mg Alloy: Abbas Jamali[1]; Meijuan Zhang[2]; Anxin Ma[2]; *Javier Llorca*[1]; [1]IMDEA Materials Institute & Technical University of Madrid; [2]IMDEA Materials Institute

8:50 AM
PRISMS-fatigue: A General Framework for Fatigue Analysis in Polycrystalline Metals and Alloys Using the Crystal Plasticity Finite Element Method: *Mohammadreza Yaghoobi*[1]; Krzysztof S. Stopka[2]; Aaditya Lakshmanan[1]; John E. Allison[1]; Veera Sundararaghavan[1]; David L. McDowell[2]; [1]University of Michigan; [2]Georgia Institute of Technology

9:10 AM
Propagation of Microstructure-induced Fatigue Variability onto Stress Concentrations: *Gustavo Castelluccio*[1]; Farhan Ashraf[1]; [1]Cranfield University

9:30 AM
Origin of Long-range Internal Stress with Heterogeneous Dislocation Distributions: *Yejun Gu*[1]; Jaafar El-Awady[1]; [1]Johns Hopkins University

9:50 AM
A Simplified Formula to Estimate the Size of the Cyclic Plastic Zone in Metals Containing Elastic Particles: *Tito Andriollo*[1]; Varvara Kouznetsova[2]; [1]Technical University of Denmark; [2]Eindhoven University of Technology

MATERIALS PROCESSING

Friction Stir Welding and Processing XI — Modeling: Process & Properties

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

Program Organizers: Yuri Hovanski, Brigham Young University; Piyush Upadhyay, Pacific Northwest National Laboratory; Yutaka Sato, Tohoku University; Nilesh Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter the Great St. Petersburg Polytechnic University

Thursday AM **March 18, 2021**

8:30 AM
Application of Machine Learning for Prediction of Microstructure and Mechanical Performances in Solid-state Joining Processes: Benjamin Klusemann[1]; Frederic Bock[1]; Uceu Suhuddin[1]; Lucian Blaga[1]; *Jorge dos Santos*[1]; [1]Helmholtz-Zentrum Geesthacht

8:50 AM
Friction Stir Welding Defect Prediction Using Computational Solid Mechanic's Modeling: *Rafael Giorjao*[1]; Julian Avila[2]; Eduardo Monlevade[3]; Antonio Ramirez[1]; Andre Tschiptschin[3]; [1]The Ohio State University; [2]UNESP; [3]USP

9:10 AM
The Development of FSW Process Modelling for Use by Process Engineers: *Mike Lewis*[1]; Simon Smith[2]; [1]FTS Engineering Answers Ltd.; [2]Transforming Stress Ltd.

9:30 AM
Effect of Tool Geometries on "Heat-input" during Friction Stir Welding of Aluminum Alloys: *Yutaka Sato*[1]; Yuichiro Tanai[1]; Tianbo Zhao[1]; Dalong Yi[2]; [1]Tohoku University; [2]Tsinghua University/ Tohoku Univdersity

9:50 AM
Experimental and Numerical Investigations of High Strain Rate Torsion Tests of Al-based Alloys at Elevated Temperatures: *Anton Naumov*[1]; Anatolii Borisov[1]; Anastasiya Borisova[1]; [1]Peter the Great St. Petersburg Polytechnic University

10:10 AM
Numerical Simulation and Analysis of Solid Phase Processing: A Validated Friction Extrusion Smoothed Particle Hydrodynamics Model: Lei Li[1]; Xiao Li[1]; Anthony Reynolds[2]; Glenn Grant[1]; *Ayoub Soulami*[1]; [1]Pacific Northwest National Laboratory; [2]University of South Carolina

10:30 AM
Effect of Temperature and Strain Parameters of High Strain Rate Torsion Tests on the Microstructure Evolution of Al-based Alloys: Anastasiya Borisova[1]; Elizaveta Anhimova[1]; Oleg Zotov[1]; *Anton Naumov*[1]; Anatolii Borisov[1]; [1]Peter the Great St. Petersburg Polytechnic University

PHYSICAL METALLURGY

Frontiers in Solidification Science VIII — Processing, Defects & Segregation / Steel & Cast Iron

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Phase Transformations Committee, TMS: Solidification Committee, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Damien Tourret, IMDEA Materials; Amy Clarke, Colorado School of Mines; Ulrike Hecht, Access e.V.; Nana Ofori-Opoku, Canadian Nuclear Laboratories; Melis Serefoglu, Koc University; Tiberiu Stan, Northwestern University

Thursday AM **March 18, 2021**

Session Chairs: Hideyuki Yasuda, Kyoto University; Melis Serefoglu, Koç University; Joseph McKeown, Lawrence Livermore National Laboratory; Damien Tourret, IMDEA Materials

8:30 AM
Cellular Automaton Modeling of Solidification Microstructure and Microporosity in Multi-component Aluminum Alloys: Cheng Gu[1]; Michael Moodispaw[1]; Colin Ridgeway[1]; *Alan Luo*[1]; [1]Ohio State University

8:50 AM
Effects of Process Conditions and Morphology Evolution on Microsegregation During Solidification: A Combined Phase-field and Experimental Study: *Zhenjie Yao*[1]; David Montiel[1]; Mei Li[2]; Katsuyo Thornton[1]; John Allison[1]; [1]University of Michigan; [2]Ford Motor Company

9:10 AM
Effect of Vacuum during Flow in High-pressure Die Casting: Water Analog Experiments: *Nicole Trometer*[1]; Xuejun Huang[1]; Emre Cinkilic[1]; Alan Luo[1]; [1]The Ohio State University

9:30 AM Invited
Grain Selection after a Massive-like Transformation from Ferrite to Austenite during Solidification in Fe-based Alloys: *Hideyuki Yasuda*[1]; Taka Narumi[1]; Takeru Suga[1]; Yukihiko Nanri[1]; [1]Kyoto University

10:00 AM
Synchrotron Examination of Nucleation and Growth of Nodular and Compacted Graphite Particles during Cyclic Solidification of Ductile Cast Iron: *Chaoling Xu*[1]; Tim Wigger[2]; Mohammed Azeem[3]; Tito Andriollo[1]; Samuel Clark[2]; Robert Atwood[4]; Jesper Hattel[1]; Peter Lee[2]; Niels Tiedje[1]; [1]Technical University of Denmark; [2]University College London, Mechanical Engineering; [3]University of Leicester; [4]Diamond Light Source

10:20 AM
In Situ Quantification of Degenerate Graphite Nodule Formation during the Solidification of Ductile Cast Iron: *Tim Wigger*[1]; Tito Andriollo[2]; Mohammed Azeem[3]; Chaoling Xu[2]; Samuel Clark[1]; Robert Atwood[4]; Niels Tiedje[2]; Peter Lee[1]; [1]UCL; [2]DTU; [3]University of Leicester; [4]Diamond Light Source

SPECIAL TOPICS

Frontiers of Materials Award Symposium: Radiation Processing of Materials — Session I: Radiation Synthesis and Processing of Materials

Program Organizer: Jessika Rojas, Virginia Commonwealth University

Thursday AM **March 18, 2021**

8:30 AM
Introductory Comments: Frontiers of Materials Award Symposium: Radiation Processing of Materials: *Jessika Rojas*[1]; [1]Virginia Commonwealth University

8:35 AM Keynote
Ionizing Radiation in the Synthesis and Processing of Nanocomposites for Medical and Environmental Applications: *Jessika Rojas*[1]; [1]Virginia Commonwealth University

9:05 AM Invited
Radiation-grafting of Smart Polymers for Potential Biomedical Applications: *Emilio Bucio*[1]; [1]Nuclear Science Institute at National University of Mexico

9:35 AM Invited
Direct Prompt Synthesis of Radioactive Nanoparticles (Prompt Nano Radioisotopes): *Carlos Castano*[1]; [1]Missouri University of Science and Technology

10:05 AM Invited
Probing and Processing Nanomaterials and Devices with Radiation: *Cory Cress*[1]; [1]U.S. Naval Research Laboratory

10:35 AM Invited
Nanochannels, Nanowires, and Nanotubes Fabricated by Ion-track Nanotechnology: *Maria Eugenia Toimil-Molares*[1]; [1]GSI Helmholtz Center

11:05 AM Invited
Ionizing Radiation Synthesis of Novel Fabrics for Extraction of Uranium from Seawater: *Mohammed Al-Sheikhly*[1]; [1]University of Maryland

11:35 AM Live Question and Answer

NANOSTRUCTURED MATERIALS

Functional Nanomaterials: Functional Low-dimensional Materials (0D, 1D, 2D) Driving Innovations in Electronics, Energy, Sensors, and Environmental Engineering and Science 2021 — 1D Materials & Nanostructures

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

Program Organizers: Jiyoung Chang, University of Utah; Michael Cai Wang, University of South Florida; Sarah Zhong, University of South Florida; Sun Choi, Korea Institute of Science and Technology; Pei Dong, George Mason University

Thursday AM **March 18, 2021**

Session Chairs: Sun Choi, Korea Institute of Science and Technology; Jiyoung Chang, University of Utah

8:30 AM Invited
3D Assembled Functional Structures from Crumpled 2D Nanomaterials: *Baoxing Xu*[1]; [1]University of Virginia

8:55 AM
Facile Green Synthesis of ZnInS Quantum Dots: Temporal Evolution of Its Optical Properties and Cell Viability against Normal and Cancerous Cells: *Samuel Oluwafemi*[1]; Nkosingiphile Zikalala[1]; Sundararajan Parani[1]; [1]University of Johannesburg

9:15 AM Invited
Scalable Synthesis of Nanofibers for Energy Storage and Filtration Applications: *Yuepeng Zhang*[1]; Devon Powers[1]; Byeongdu Lee[1]; Erik Dahl[1]; Sanja Tepavcevic[1]; Peter Zapol[1]; Hee Je Seong[1]; Ashley Simmons[1]; Mark Koziel[1]; Michael LeResche[1]; Krzysztof Pupek[1]; Gregory Krumdick[1]; [1]Argonne National Laboratory

9:40 AM
Growth Mechanism Study of Boron Carbide Nanowires: *Manira Akter*[1]; Terry Xu[2]; [1]University of North Carolina, Charlotte; [2]UNCC

10:00 AM
Unveiling the Origin of Morphological Instability in Topologically Complex Electrocatalytic Nanostructures: *Ian Mccue*[1]; Yawei Li[2]; Zhiyong Xia[1]; Joshua Snyder[3]; [1]Johns Hopkins Applied Physics Laboratory; [2]National Renewable Energy Laboratory; [3]Drexel University

ADVANCED MATERIALS

High Entropy Alloys IX: Alloy Development and Properties — Alloy Development and Application IV

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 **March 18, 2021**

Session Chairs: Wei Chen, Illinois Institute of Technology; Jian Luo, University of California, San Diego

8:30 AM Invited
From High-entropy Ceramics (HECs) to Compositionally Complex Ceramics (CCCs): *Jian Luo*[1]; [1]University of California, San Diego

8:55 AM
Direct Production of High Entropy Alloy Powders: *Jawad Haidar*[1]; [1]Kinaltek Pty Ltd.

9:15 AM
Hierarchical Eutectoid Nano-lamellar Decomposition in an Al0.3CoFeNi Complex Concentrated Alloy: *Sriswaroop Dasari*[1]; Bharat Gwalani[1]; Abhishek Sharma[1]; Vishal Soni[1]; Abhinav Jagetia[1]; Stephane Gorsse[2]; Rajarshi Banerjee[1]; [1]University of North Texas; [2]University of Bordeaux, France

9:35 AM Invited
Data-driven Design of Refractory High-entropy Alloys: *Wei Chen*[1]; George Kim[1]; Chanho Lee[2]; Peter Liaw[2]; [1]Illinois Institute of Technology; [2]University of Tennessee

10:00 AM
Accelerated Alloy Development and Characterization of Compositionally Complex Alloys via High-throughput Methods: *Phalgun Nelaturu*[1]; Michael Moorehead[1]; Thien Duong[2]; Michael Niezgoda[1]; Adrien Couet[1]; Kumar Sridharan[1]; Santanu Chaudhuri[2]; Dan Thoma[1]; [1]University of Wisconsin; [2]Argonne National Laboratory

10:20 AM
Nanostructured Oxide-dispersion-strengthened High-entropy Alloys: Xiang Zhang[1]; Fei Wang[1]; Xueliang Yan[1]; Xing-Zhong Li[1]; Khalid Hattar[2]; *Bai Cui*[1]; [1]University of Nebraska-Lincoln; [2]Sandia National Laboratories

10:40 AM
A High-throughput Strategy to Study Phase Stability and Mechanical Properties in Nb-Ti-V-Zr: *Mu Li*[1]; Zhaohan Zhang[1]; Arashdeep Thind[1]; Guodong Ren[1]; Rohan Mishra[1]; Katharine Flores[1]; [1]Washington University in St. Louis

ADVANCED MATERIALS

High Entropy Alloys IX: Structures and Modeling — Structures and Characterization III

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 **March 18, 2021**

Session Chairs: Keith Knipling, US Naval Research Laboratory; Jonathan Poplawsky, Oak Ridge National Laboratory

8:30 AM
Analysis of Multi-hit Events in Atom Probe Tomography of Refractory High Entropy Alloys: *Patrick Callahan*[1]; Keith Knipling[1]; [1]US Naval Research Laboratory

8:50 AM Invited
Heavy Ion Irradiation Response of AlxFeCrNiMn High Entropy Alloys: *Nan Li*[1]; Di Chen[2]; Youxing Chen[3]; Jordan Weaver[4]; Yongqiang Wang[1]; Saryu Fensin[1]; Stuart Maloy[1]; Amit Misra[5]; [1]Los Alamos National Laboratory; [2]University of Houston; [3]University of North Carolina; [4]National Institute of Standards and Technology; [5]University of Michigan

9:15 AM Invited
Understanding Radiation Resistance in High Entropy Alloys Through Atom Probe Tomography: *Jonathan Poplawsky*[1]; Xing Wang[1]; Wei-Ying Chen[2]; Tengfei Yang[3]; William Weber[1]; Yanwen Zhang[1]; [1]Oak Ridge National Laboratory; [2]Argonne National Laboratory; [3]Hunan University

9:40 AM
Grain-scale Plastic Response of Equiatomic CoCrFeMnNi High-entropy Alloy Using High Energy Diffraction Microscopy: *Jerard Gordon*[1]; Rachel Lim[1]; Tony Rollett[1]; Darren Pagan[2]; [1]Carnegie Mellon University; [2]Cornell High Energy Sychrotron Source

10:00 AM
Characteristics of Dislocation Slip in Refractory Multi-principal Element Alloys: *Fulin Wang*[1]; Jean-Charles Stinville[1]; Marie-Agathe Charpagne[1]; Glenn Balbus[1]; Leah Mills[1]; Tresa Pollock[1]; Daniel Gianola[1]; [1]University Of California, Santa Barbara

10:20 AM
Nitrogen-induced Solid Solution Hardening of an Austenitic (CrFeMnNi) HEA: *Mathieu Traversier*[1]; Pierre Rinn[1]; Emmanuel Rigal[2]; Anna Fraczkiewicz[1]; [1]École des mines de Saint-Étienne; [2]CEA LITEN

ADVANCED MATERIALS

Materials for High Temperature Applications: Next Generation Superalloys and Beyond — Superalloys and Beyond: Oxidation and Mechanical Behavior I

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

Program Organizers: Govindarajan Muralidharan, Oak Ridge National Laboratory; Martin Heilmaier, KIT Karlsruhe; Benjamin Adam, Portland State University; Mario Bochiechio, Pratt & Whitney; Katerina Christofidou, University of Sheffield; Eric Lass, University of Tennessee-Knoxville; Jeremy Rame, Safran Aircraft Engines; Pierre Sallot, Safran; Akane Suzuki, GE Research; Michael Titus, Purdue University

Thursday AM **March 18, 2021**

8:30 AM
Early Stage Oxidation of Ni- and Co-based Superalloys: Novel Insights from Rapid Thermal Annealing (RTA) Experiments: *Dorota Kubacka*[1]; Erdmann Spiecker[1]; [1]FAU Erlangen-Nuremberg

8:50 AM
Residual Stress with High Temperature Oxidation of Ni-based Haynes 282 Superalloy: *Kuan-Che Lan*[1]; Hsiao-Ming Tung[2]; [1]National Tsing Hua University; [2]Institute of Nuclear Energy Research

9:10 AM
Understanding the High-temperature Fatigue Properties of the Novel Fe-Ni-Cr Based Superalloy: *Shivakant Shukla*[1]; Govindarajan Muralidharan[2]; Lawrence Allard[2]; Jonathan Poplawsky[2]; [1]Oak Ridge National Laboratory; [2]ORNL

9:30 AM
Low Cycle Fatigue of Single Crystal Co- and CoNi-base Superalloys: The Role of Oxidation Resistance: *Sean Murray*[1]; Alice Cervellon[1]; Jean-Charles Stinville[1]; Jonathan Cormier[2]; Tresa Pollock[1]; [1]University Of California, Santa Barbara; [2]ISAE-ENSMA & Institut Pprime

9:50 AM
Concomitant Oxidation-diffusion-creep Processes for Stress Generation and Its Effects in Cyclic Oxidation Behavior: *Yanfei Gao*[1]; [1]University of Tennessee - Knoxville

10:10 AM
Effect of Water Species on Formation of Cationic Defects in Yttria-stabilized-Zirconia (YSZ): *Amir Saeidi*[1]; Daniel Mumm[1]; [1]University of California, Irvine

10:30 AM
Paving the Way Beyond Ni-based Superalloys: Role of Coupled Thermodynamic-kinetic Models: *Rishi Pillai*[1]; Bruce Pint[1]; [1]Oak Ridge National Laboratory

10:50 AM Invited
Development of Refractory Metal 'BCC-superalloys' Reinforced by Ordered-BCC Intermetallic Precipitates: *Alexander Knowles*[1]; [1]University of Birmingham

11:20 AM Invited
Beyond Superalloys: An Efficient Strategy for Assessing Environmental Resistance: *Bruce Pint*[1]; [1]Oak Ridge National Laboratory

CHARACTERIZATION

Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling — Session VII

Sponsored by: TMS Structural Materials Division, TMS: Thin Films and Interfaces Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Jagannathan Rajagopalan, Arizona State University; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Robert Wheeler, Microtesting Solutions LLC; Shailendra Joshi, University of Houston

Thursday AM **March 18, 2021**

Session Chair: Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

8:30 AM Keynote
Microstructural Influences on Grain Boundary Sliding in High Purity Aluminum: *Marissa Linne*[1]; Thomas Bieler[2]; Samantha Daly[3]; [1]University of Michigan; Lawrence Livermore National Laboratory; [2]Michigan State University; [3]University of California at Santa Barbara

9:10 AM
In-situ Analysis of Powder Bed Quality during Selective Laser Melting: *Tan-Phuc Le*[1]; Matteo Seita[1]; [1]Nanyang Technological University

9:30 AM
Non-linear Reversible Behaviour of Metallic Alloys at Low Stresses: *Jaji Naveena Chamakura*[1]; Vera Popovich[1]; Jilt Sietsma[1]; [1]TU Delft

9:50 AM
Creation of Strength Diagrams of Aluminum Flat Products, Dependent on the Different Thermomechanical Processes: *Kaan Ipek*[1]; Emel Çaliskan[2]; Derya Dispinar[3]; [1]Teknik Aluminyum San. A.S.; [2]Istanbul University; [3]Istanbul Teknik University

10:10 AM
Microscale Insight into the Effect of Twinning on Fracture in a Manganese Steel: *Xinzhu Zheng*[1]; Ankit Srivastava[1]; [1]Texas A&M University

10:30 AM
Surface Erosion of Spacecraft by High-velocity Regolith Impacts to Simulate Wind Storms on Martian Surfaces: *Nicole Bacca*[1]; Cheng Zhang[1]; Arvind Agarwal[1]; [1]Florida International University

MATERIALS PROCESSING

Ni-Co 2021: The 5th International Symposium on Nickel and Cobalt — Market, Materials and Mineral Processing

Sponsored by: The Metallurgy & Materials Society of the Canadian Institute of Mining, Metallurgy and Petroleum, TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Pyrometallurgy Committee

Program Organizers: Corby Anderson, Colorado School of Mines; Dean Gregurek, RHI Magnesita; Mari Lundström, Aalto University; Christina Meskers; Prabhat Tripathy, Batelle Energy Alliance (Idaho National Laboratory); Fiseha Tesfaye, Abo Akademi University; Yuanbo Zhang, Central South University; Sari Muinonen, Glencore; Graeme Goodall, XPS- Glencore; Shijie Wang, Rio Tinto Kennecott Utah Copper Corp (Retired)

Thursday AM **March 18, 2021**

8:30 AM Invited
Global Electrification of Electric Vehicles and Intertwined Material Supply Chains of Cobalt, Copper and Nickel: *Ruby Nguyen*[1]; Roderick Eggert[2]; Corby Anderson; Mike Severson[3]; [1]Idaho National Laboratory; [2]Colorado School of Mines; [3]Miami University of Ohio

8:50 AM
An Innovative Beneficiation Process Developed for Jinchuan Nickel Ore Resources: *Shijie Wang*[1]; [1]Rio Tinto Kennecott Utah Copper Corp

9:10 AM
Effect of Fluorine on the High Temperature Oxidation Behavior of Nickel-based Alloys: *Alexander Donchev*[1]; Mathias Galetz[1]; [1]DECHEMA-Forschungsinstitut

9:30 AM
The Increasing Use of Nickel in the 21st Century: *Gary Coates*[1]; [1]Nickel Institute

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XX — Advanced Electronic Materials

Sponsored by: TMS Functional Materials Division, TMS Structural 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; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; 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; A.S.Md Abdul Haseeb, University of Malaya; Ligang Zhang, Central South University; Sehoon Yoo, KITECH; Vesa Vuorinen, Aalto University; Yu-chen Liu, National Cheng Kung University

Thursday AM **March 18, 2021**

Session Chairs: Vuorinen Vesa, Aalto University; Hiroshi Nishikawa, Osaka University

8:30 AM Keynote
Solid-Liquid Interdiffusion (SLID) Bonding; For Thermal Challenges in Microsystem Bonding: *Knut Aasmundtveit*[1]; Hoang-Vu Nguyen[1]; [1]University of South-Eastern Norway

9:10 AM Invited
Change in Electric Resistance of Conductive Pastes Including Ag Particles Coated with Various Higher Fatty Acids during Curing Process: *Shinji Fukumoto*[1]; Kazuhiro Makimoto[1]; Kengo Ohta[1]; Yoshihiro Kashiba[1]; Michiya Matsushima[2]; Kozo Fujimoto[1]; [1]Osaka University; [2]Osaka Universty

9:40 AM
IMC-free Low-temperature TLP Cu-to-Cu Interconnection with Excellent Thermal Stability: *Shih-kang Lin*[1]; Yu-chen Liu[1]; Chih-han Yang[1]; Yu-Hsiang Hsieh[1]; Chien-wei Huang[1]; Chih-feng Lin[1]; [1]National Cheng Kung University

10:00 AM
Intermetallic Reactions and Interfacial Stability in Cu-Co-Sn System: *Fahimeh Emadi*[1]; Vesa Vuorinen[1]; Hongqun Dong[1]; Mervi Paulasto-Kröckel[1]; [1]Aalto University

10:20 AM
Synthesis and Characterization of Silver Tin Alloy Powders by High Energy Ball Milling: *Wei-Chen Huang*[1]; Chin-Hao Tsai[1]; C. Robert Kao[1]; [1]National Taiwan University

10:40 AM
Interfacial Microstructure Evolution of Ag/ENIG and Ag/Cu Joint under Thermal Aging: *Min-Su Kim*[1]; Sehoon Yoo[1]; Hiroshi Nishikawa[2]; [1]Korea Institute of Industrial Technology; [2]Osaka University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — General Topic I

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

Program Organizers: Rongpei Shi, Lawrence Livermore National Laboratory; Yipeng Gao, Idaho National Laboratory; Fadi Abdeljawad, Clemson University; Bharat Gwalani, Pacific Northwest National Laboratory; Qi An, University of Nevada-Reno ; Eric Lass, University of Tennessee-Knoxville; Huajing (Wilson) Song, Los Alamos National Laboratory

Thursday AM **March 18, 2021**

Session Chair: Qi An, University of Nevada, Reno

8:30 AM
About the Plasticity of Cobalt upon Phase Transformation: A High Temperature Nanoindentation Study: *Verena Maier-Kiener*[1]; Johann Kappacher[1]; Helmut Clemens[1]; [1]Montanuniversitaet Leoben

8:50 AM
Atomistic Modeling of the Twinning fcc/bcc Phase Transformation in Binary Systems: Quasi-particle Approach and Experiment: *Gilles Demange*[1]; Helena Zapolsky[2]; Kaixuan Chen[3]; Renaud Patte[1]; Zidong Wang[3]; Pavel Korzhavyi[4]; [1]CNRS-University Of Rouen Normandy; [2]Cnrs-University Of Rouen Normandy; [3]University of Science and Technology Beijing; [4] KTH - Royal Institute of Technology

9:10 AM
Data Assimilation-based Approach to Estimate Grain Boundary Properties Using Phase-field Grain Growth Simulations: *Eisuke Miyoshi*[1]; Tomohiro Takaki[1]; Yasushi Shibuta[2]; Munekazu Ohno[3]; [1]Kyoto Institute of Technology; [2]The University of Tokyo; [3]Hokkaido University

9:30 AM
Effects of Oxygen Interstitials on Phase Transformation Paths in Nb-Ti Alloys: *Ravit Silverstein*[1]; Raphaële Clément[1]; Carlos Levi[1]; [1]University of California, Santa Barbara

9:50 AM
In Situ Transformations during Heating of Copper-intercalated Bismuth Telluride: *Pralav Shetty*[1]; Matthew McDowell[1]; [1]Georgia Institute of Technology

10:10 AM
Intrinsic Coupling between Phase Transformation and Deformation Twinning: *Yipeng Gao*[1]; [1]The Ohio State University

ELECTRONIC MATERIALS

Recent Advances in Functional Materials and 2D/3D Processing for Sensors, Energy Storage, and Electronic Applications — Functional Materials and 2D/3D Devices

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

Program Organizers: Pooran Joshi, Oak Ridge National Laboratory; Rahul Panat, Carnegie Mellon University; Ravindra Nuggehalli, New Jersey Institute of Technology; Tolga Aytug, Oak Ridge National Laboratory; Yong Lin Kong, University of Utah; Konstantinos Sierros, West Virginia University

Thursday AM **March 18, 2021**

Session Chairs: Rahul Panat, Carnegie Mellon University; Tolga Aytug, Oak Ridge National Laboratory; Yong Lin Kong, University of Utah

8:30 AM Invited
Additive Manufacturing of NdFeB Bonded Permanent Magnets: Prospects and Challenges: *Mariappan Paranthaman*[1]; [1]Oak Ridge National Laboratory

8:55 AM Invited
Copper-carbon Nanotube Composites Enabled by Electrospinning for Advanced Conductors: *Kai Li*[1]; Michael McGuire[1]; Andrew Lupini[1]; Lydia Skolrood[1]; Fred List[1]; Burak Ozpineci[1]; Soydan Ozcan[1]; Tolga Aytug[1]; [1]Oak Ridge National Laboratory

9:20 AM
Performance of Chromium Doped Zinc Selenide Nanocrystals: Morphological and Fluorescence Characteristics: *Narsingh Singh*[1]; Ching Hua Su[1]; Bradley Arnold[1]; Fow-Sen Choa[1]; David Sachs[1]; Brett Setera[1]; Christopher Cooper[1]; Brian Cullum[1]; Kamdeo Mandal[1]; [1]University of Maryland, Baltimore County

9:40 AM Invited
Revealing Meso-structure Dynamics in Additive Manufacturing of Energy Storage via Operando Coherent X-ray Scattering: Cheng-Hung Lin[1]; Karol Dyro[1]; Olivia Chen[1]; Dean Yen[1]; Bingqian Zheng[1]; Surita Bhatia[1]; Ke Sun[1]; Qingkun Meng[2]; Lutz Wiegart[3]; *Yu-chen Karen Chen-Wiegart*[4]; [1]Stony Brook University; [2]China University of Mining and Technology; Stony Brook University; [3]Brookhaven National Laboratory; [4]Stony Brook University; Brookhaven National Laboratory

10:05 AM Invited
Sterilize and Recharge Masks Simultaneously for Safe Reuse: *Ying Zhong*[1]; Sriram Krishnamoorthy[1]; Vladislav Paley[1]; Xudong Wang[1]; Libin Ye[1]; [1]University of South Florida

NUCLEAR MATERIALS

Thermal Property Characterization, Modeling, and Theory in Extreme Environments — Nuclear Fuel Performance & Advanced Thermal Analysis

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

Program Organizers: Janelle Wharry, Purdue University; Mukesh Bachhav, Idaho National Laboratory; Marat Khafizov, Ohio State University; Eric Lass, University of Tennessee-Knoxville; Vikas Tomar, Purdue University; Tiankai Yao, Idaho National Laboratory; Cody Dennett, Idaho National Laboratory; Karim Ahmed, Texas A&M University

Thursday AM **March 18, 2021**

Session Chairs: Janelle Wharry, Purdue University; Elizabeth Sooby Wood, University of Texas at San Antonio

8:30 AM
Ultra-high Lattice Thermal Conductivity and the Effect of Pressure in Superhard Hexagonal BC2N: Safoura Nayeb Sadeghi[1]; S. Mehdi Vaez Allaei[2]; Mona Zebarjadi[1]; *Keivan Esfarjani*[1]; [1]University of Virginia; [2]University of Tehran

8:50 AM Invited
Performance of UO2 Reactor Fuel with High Thermal Conductivity Additives: *Michael Tonks*[1]; Floyd Hilty[1]; [1]University of Florida

9:20 AM Invited
Atmosphere Controlled Thermogravimetric Analysis as a Tool to Screen, Test and Qualify Advanced Fuels under Extreme Conditions: *Elizabeth Sooby*[1]; [1]University of Texas at San Antonio

9:50 AM
Thermal Stability of Metallic Multilayers with TripleJjunctions: *Tongjun Niu*[1]; Yifan Zhang[1]; Jaehun Cho[1]; Jin Li[1]; Haiyan Wang[1]; Xinghang Zhang[1]; [1]Purdue University

10:10 AM
Energy Balance Investigation of Close-coupled Optimized-pressure Gas Atomization Pour-tube Design Geometry to Prevent Melt Freeze-off: *Franz Hernandez*[1]; Eric Deaton[1]; Iver Anderson[1]; [1]Ames Laboratory of US DOE

NUCLEAR MATERIALS

Accelerated Discovery and Qualification of Nuclear Materials for Energy Applications — Irradiation Effect in Nuclear Fuels and Materials

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

Program Organizers: Yongfeng Zhang, University of Wisconsin-Madison; Adrien Couet, University of Wisconsin-Madison; Michael Tonks, University of Florida; Jeffery Aguiar, Idaho National Laboratory; Andrea Jokisaari, Idaho National Laboratory; Karim Ahmed, Texas A&M University

Thursday PM **March 18, 2021**

Session Chair: Mohammed Abdoelatef, Texas A&M U

2:00 PM
Point Defect Capture Characteristics and Stress States of Dislocation Loops in α-zirconium: *Jose March-Rico*[1]; Brian Wirth[1]; [1]University of Tennessee Knoxville

2:20 PM
Comparison of Void Swelling in Conventional and Novel HT9 Alloys after High Damage Level Ion Irradiation: *Hyosim Kim*[1]; Jonathan Gigax[1]; Osman Atwani[1]; Stuart Maloy[1]; Yongqiang Wang[1]; Matthew Chancey[1]; Jon Baldwin[1]; [1]Los Alamos National Laboratory

2:40 PM
Dislocation Loop Formation in Self-ion Irradiated Ultra-high Purity FeCr Alloys: *Yao Li*[1]; Yajie Zhao[1]; Arunodaya Bhattacharya[2]; Jean Henry[3]; Steven Zinkle[1]; [1]The University of Tennessee, Knoxville; [2]Oak Ridge National Laboratory; [3]The French Alternative Energies and Atomic Energy Commission

3:00 PM
Effect of Microstructure and Rolling Treatment on Static Recrystallization Behavior in Monolithic U-10Mo Fuel Foils: *William Frazier*[1]; Kyoo Sil Choi[1]; Lei Li[1]; Zhiie Xu[1]; Vineet Joshi[1]; Ayoub Soulami[1]; [1]Pacific Northwest National Laboratory

3:20 PM
Properties of a Helium Ion Beam Degrader for Implanting SSJ2 Tensile Specimens at the LBL 88-Inch Cyclotron: *Sarah Stevenson*[1]; Adi Ben-Artzy[1]; Lee Bernstien[2]; Peter Hosemann[1]; [1]University of California, Berkeley; [2]LBL

3:40 PM
Proton Irradiation Induced Microstructural Evolution in Compositionally Graded Type 316L Stainless Steel: *Xiang Liu*[1]; Jingfan Yang[2]; Miao Song[3]; Xiaoyuan Lou[2]; Yongfeng Zhang[4]; Lingfeng He[1]; Daniel Schwen[1]; [1]Idaho National Laboratory; [2]Auburn University; [3]University of Michigan; [4]University of Wisconsin-Madison

4:00 PM
Sink Strength Effect on Bubble Formation in Helium-implanted Nanostructured Ferritic Alloys: *Yan-Ru Lin*[1]; Zhanfeng Yan[2]; David Hoelzer[3]; Lizhen Tan[3]; Steven Zinkle[1]; [1]University of Tennessee; [2]Peking University; [3]Oak Ridge National Laboratory

4:20 PM
Synergistic Irradiation and Ageing Effect on Microstructure and Mechanical Properties of Grade 92 at ~700C: *Weicheng Zhong*[1]; Lizhen Tan[1]; [1]Oak Ridge National Laboratory

4:40 PM
Dislocation Loop Characterization Using STEM-Contrast Techniques in an Irradiated FCC Alloy: *Pengyuan Xiu*[1]; Lumin Wang[1]; Kevin Field[1]; [1]University of Michigan

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Functional, Energy, and Magnetic Materials — Advanced Manufacturing of Other Functional Materials

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

Program Organizers: Markus Chmielus, University of Pittsburgh; Sneha Prabha Narra, Worcester Polytechnic Institute; Mohammad Elahinia, University of Toledo; Reginald Hamilton, Pennsylvania State University; Iver Anderson, Iowa State University Ames Laboratory

Thursday PM **March 18, 2021**

2:00 PM
Inconel-steel Multi-metal-material by Liquid dispersed Metal Powder Bed Fusion: Microstructure, Stress and Property Gradients: *Sabine Bodner*[1]; L.T.G. van de Vorst[2]; Jakub Zalesak[3]; Juraj Todt[3]; Julius Keckes[3]; Verena Maier-Kiener[1]; Bernhard Sartory[4]; Norbert Schell[5]; Jaap Hooijmans[6]; Jaco Saurwalt[6]; Jozef Keckes[1]; [1]Montanuniversität Leoben; [2]TNO; [3]Austrian Academy of Sciences; [4]Materials Center Leoben GmbH; [5]Helmholtz-Zentrum Geesthacht ; [6]Admatec Europe BV

2:20 PM
Meltpool Oxidation and Reduction and Inclusion Evolution during the PBF Type Additive Manufacturing: Durim Eo[1]; Seong Gyu Chung[1]; *Jungwook Cho*[1]; [1]Pohang University of Science and Technology

2:40 PM
Engineered Interconnected Porosity for Enhanced Functional Devices: *Scott Roberts*[1]; Ben Furst[1]; Eric Sunada[1]; [1]Jet Propulsion Laboratory

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Beyond the Beam II — Novel Solid State Processing

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

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

Thursday PM **March 18, 2021**

Session Chair: Peeyush Nandwana, Oak Ridge National Lab

2:00 PM
Control of High-temperature Drop-on-demand Metal Jetting Through Numerical Modelling and Experimentation: *Negar Gilani*[1]; Nesma Aboulkhair[1]; Marco Simonelli[1]; Ian Ashcroft[1]; Richard Hague[1]; [1]University of Nottingham

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Solid-State Phase Transformations and Microstructural Evolution — In Situ Characterisation and Material Response to Build Processes

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

Program Organizers: Bij-Na Kim, Carpenter Additive; Andrew Wessman, University of Arizona; Chantal Sudbrack, National Energy Technology Laboratory; Eric Lass, University of Tennessee-Knoxville; Katerina Christofidou, University of Sheffield; Peeyush Nandwana, Oak Ridge National Laboratory; Rajarshi Banerjee, University of North Texas; Whitney Poling, General Motors Corporation; Yousub Lee, Oak Ridge National Laboratory

Thursday PM **March 18, 2021**

Session Chairs: Katerina Christofidou, The University of Sheffield; Bij-Na Kim, Carpenter Additive

2:00 PM
In Situ Synchrotron Observation of Directed Energy Deposition Additive Manufacturing Process: *Yunhui Chen*[1]; Samuel Clark[1]; David Collins[2]; Sebastian Marussi[1]; Thomas Connolley[3]; Robert Atwood[3]; Oxana Magdysyuk[3]; Gavin Baxter[4]; Martyn Jones[4]; Chu Lun Alex Leung[1]; Peter Lee[1]; [1]University College London; [2]The University of Birmingham; [3]Diamond Light Source; [4]Rolls-Royce plc

2:20 PM
In-situ TEM Solid-state Thermal Cycling of a Stainless Steel Fabricated via AM: *Manas Upadhyay*[1]; Lluis Yedra-Cardona[2]; Eva Héripré[3]; Simon Hallais[1]; Alexandre Tanguy[1]; [1]LMS, CNRS, Ecole Polytechnique, Institut Polytechnique de Paris; [2]MSSMat and SPMS, CNRS, CentraleSupelec, Université Paris-Saclay; [3]MSSMat, CNRS, CentraleSupelec, Université Paris-Saclay

2:40 PM
Time-resolved Synchrotron X-ray Diffraction Studies of Phase Evolution in Ni alloy 718 during Laser Melting: *Seunghee Oh*[1]; Rachel Lim[1]; Joseph Aroh[1]; Joseph Pauza[1]; Andrew Chuang[2]; Benjamin Gould[2]; Joel Bernier[3]; Tao Sun[4]; Robert Suter[1]; Anthony Rollett[1]; [1]Carnegie Mellon University; [2]Argonne National Laboratory; [3]Lawrence Livermore National Laboratory; [4]University of Virginia

3:00 PM
The Effects of Scanning Strategy on Cracking and Grain Structure of the IN738LC Superalloy Produced by Selective Laser Melting: *Marcus Lam*[1]; [1]Monash University

3:20 PM
Aging Effects on Phase Transformation and Microstructure Evolution in Selective Laser Melted NiTi Shape Memory Alloy: *Madhavan Radhakrishnan*[1]; Sayed Saghaian[2]; Mohammadreza Nematollahi[3]; Keyvan Safaei[3]; Osman Anderoglu[1]; Mohammad Elahinia[3]; Haluk Karaca[2]; [1]University of New Mexico; [2]University of Kentucky; [3]University of Toledo

3:40 PM
Study of the Role of Beam Scan Strategies on the Microstructure and Mechanical Properties of EBM Additively Manufactured Ti-6Al-4V Builds: *Meiyue Shao*[1]; Sriram Vijayan[1]; Sabina Kumar[2]; Sudarsanam Babu[2]; Joerg Jinschek[1]; [1]The Ohio State University; [2]University of Tennessee

4:00 PM
Microstructural Control and Refinement in DMLS Ti-6Al-4V: *Matthew Vaughn*[1]; Justin Unger[1]; Matthew Dunstan[2]; Andrew Gaynor[2]; Brandon Mcwilliams[2]; James Guest[1]; Kevin Hemker[1]; [1]Johns Hopkins University; [2]Army Research Laboratory

ADVANCED MATERIALS

Advanced Functional and Structural Thin Films and Coatings — Thin Films and Nanostructures for Optoelectronics II

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

Program Organizers: Adele Carrado, IPCMS - CNRS; Ramana Chintalapalle, University of Texas at El Paso; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Nancy Michael, University of Texas at Arlington; Karine Mougin, Is2m Cnrs; Heinz Palkowski, Clausthal University of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology; Vikas Tomar, Purdue University

Thursday PM **March 18, 2021**

Session Chairs: Ramana Chintalapalle, UTEP; Gerald Ferblantier, ICUBE

2:00 PM Keynote
Metamaterial Coatings for Tuning Optical and Fluid Wetting Behavior: *Shawn Putnam*[1]; [1]University of Central Florida

2:45 PM
Simulation of Optical Properties for Multilayers from Extreme Ultraviolet to Far Infrared: *Leqi Lin*[1]; Nuggehalli Ravindra[1]; [1]New Jersey Institute of Technology

3:05 PM Invited
Localization of Dopants and Optical Properties of Phosphorus Doped Silicon Nanocrystals: *Hervé Rinnert*[1]; Alaa Eldin Giba[1]; Fatme Trad[1]; Mathieu Stoffel[1]; Xavier Devaux[1]; Alexandre Bouché[1]; Michel Vergnat[1]; Rémi Demoulin[2]; Etienne Talbot[2]; Anne-Sophie Royet[3]; Pablo Acosta Alba[3]; Sébastien Kerdiles[3]; [1]University of Lorraine, IJL; [2]Université de Rouen, GPM; [3]Université Grenoble Alpes, CEA

3:40 PM
Interface Characteristics in Transparent Optical Nanomultilayers: *Danielle White*[1]; Chelsea Appleget[1]; Andrea Hodge[1]; [1]University of Southern California

4:00 PM
Pulsed-laser Deposition and Optical Characterization of Gallium Oxide (Ga_2O_3) Thin Films: *Vishal Zade*[1]; Nanthkishore Makeswaran[1]; Ramana Chintalapalle[1]; [1]UTEP

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Advances in Characterization, Processing, and Design of Magnetic Materials

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

Program Organizers: Richard Beddingfield, North Carolina State University; Daniel Salazar, BCMaterials; Alex Leary, NASA Glenn Research Center; Huseyin Ucar, California Polytechnic University; Yongmei Jin, Michigan Technological University; Arcady Zhukov, University of the Basque Country

Thursday PM **March 18, 2021**

Session Chair: Daniel Salazar, BCMaterials

2:00 PM Invited
Magnetic Domain Tomography: *Rudolf Schaefer*[1]; [1]Ifw Dresden

2:30 PM
A Refinement Program to Characterize Single Crystal Magnetic Diffuse Scattering from Neutron Diffraction Experiments: *Zachary Morgan*[1]; Feng Ye[2]; [1]Michigan Technological University; [2]Oak Ridge National Laboratory

2:50 PM
Scale-up Production on MnBi Magnet with High Performance: *Wei Tang*[1]; Gaoyuan Ouyang[1]; Xubo Liu[1]; Baozhi Cui[1]; Kevin Dennis[1]; Jun Cui[2]; [1]Ames Laboratories; [2]Iowa State University

3:10 PM Invited
Exchange-coupled Ferromagnetism in Self-assembled Co-Pt Nanochessboards: *Jerrold Floro*[1]; [1]University of Virginia

3:40 PM Invited
Neutron Diffraction: A Key Tool to Unravel the Magnetic Behaviour in Heusler Alloys: *Jose Maria Porro*[1]; [1]BCMaterials & Ikerbasque

4:10 PM
Magnetic Field-assisted HDDR Processing of NdFeB Powders: *Michael Kesler*[1]; Xubo Lui[2]; Ikenna Nlebedim[2]; Matthew Kramer[2]; Michael McGuire[1]; [1]Oak Ridge National Laboratory; [2]Ames Laboratory

4:30 PM
Magnetic Domain Observation by Soft X-ray Magnetic Circular Dichroism Microscopy of Nd-Fe-B-Ga Sintered Magnets Under High Magnetic Field and High Temperature: *Andres Martin-Cid*[1]; Shintaro Kobayashi[2]; David Billington[2]; Kentaro Toyoki[2]; Yoshinori Kotani[2]; Yukio Takada[3]; Takashi Sato[3]; Yuji Kaneko[3]; Akira Kato[4]; Taisuke Sasaki[5]; Tadakatsu Ohkubo[5]; Kazuhiro Hono[5]; Satoshi Hirosawa[5]; Motohiro Suzuki[2]; Tetsuya Nakamura[6]; [1]Japan Synchrotron Radiation Research Institute (JASRI), SPring-8; [2]Japan Synchrotron Radiation Research Institute (JASRI), SPring-8; [3]Toyota Central R&D Labs, Inc; [4]Advanced Material Engineering Division, Toyota Motor Corporation; [5]National Institute for Materials Science; [6]Institute of Multidisciplinary Research for Advanced Materials (IMRAM), Tohoku University

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VII — Energy Conversion and Storage II

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

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

Thursday PM **March 18, 2021**

Session Chairs: Partha Mukherjee, Purdue University; Boniface Fokwa, University of California Riverside

2:00 PM Invited
Designing Earth-abundant Boron-based Electrocatalysts for Hydrogen Production: Eunsoo Lee[1]; Hyounmyung Park[1]; Palani Jothi[1]; Yuemei Zhang[1]; *Boniface Fokwa*[1]; [1]University of California, Riverside

2:30 PM
Morphology Study of Palladium Produced by Electrodeposition from EMIM-Cl Ionic Liquid: *Wu Zhang*[1]; Batric Pesic[2]; [1]Shenyang Ligong University; [2]University of Idaho

2:50 PM
Synthetic Control of Nanostructured Bilayered Vanadium Oxides for Intercalation Batteries: *Ekaterina Pomerantseva*[1]; [1]Drexel University

3:20 PM
Understanding the Role of Water-soluble Additive and pH in the Fabrication of Directionally Porous Electrodes for Lithium-Ion Batteries: *Rohan Parai*[1]; Justine Marin[1]; Dipankar Ghosh[1]; Ziyang Nie[2]; Gary Koenig[2]; [1]Old Dominion University; [2]University of Virginia

MATERIALS DESIGN

Advances in Titanium Technology — General Topic of Ti and Ti Alloys

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

Program Organizers: Don Li, Howmet Engineered Products; Yufeng Zheng, University of Nevada-Reno
; Peeyush Nandwana, Oak Ridge National Laboratory; Matthew Dunstan, US Army Research Laboratory

Thursday PM **March 18, 2021**

Session Chair: Peeyush Nandwana, Oak Ridge National Laboratory

2:00 PM
The Effect of Process Parameters on Abnormal Grain Growth during Beta Annealing of Hot-Forged Ti-6Al-4V: *Nathan Levkulich*[1]; Lee Semiatin[2]; Adam Pilchak[2]; Eric Payton[2]; [1]Ues Inc.; [2]Air Force Research Laboratory

LIGHT METALS

Aluminum Reduction Technology — Continue Environment (Material and Equipment) & Fundamental Studies (Alumina Dissolution and Bath)

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

Program Organizers: Nadia Ahli, Emirates Global Aluminium; Nancy Holt, Hydro Aluminium AS

Thursday PM **March 18, 2021**

Session Chair: Bertrand Allano, RIO TINTO

2:00 PM
Instant Monitoring of Aluminum Chemistry in Cells Using a Portable Liquid Metal Analyzer: Sveinn Hinrik Gudmundsson[1]; Birna Björnsdóttir[2]; *Kristjan Leosson*[1]; [1]DT Equipment; [2]Nordural ehf

2:20 PM
Dissolution Characteristics and Concentration Measurements of Alumina in Cryolite Melts: *Luis Bracamonte*[1]; Vegard Aulie[1]; Christian Rosenkilde[2]; Kristian Einarsrud[1]; Espen Sandnes[1]; [1]Ntnu University; [2]Hydro Aluminium

2:40 PM
On Gaseous Emissions during Alumina Feeding: *Sindre Engzelius Gylver*[1]; Åste Follo[2]; Vegard Aulie[1]; Espen Sandnes[1]; Helene Marie Granlund[3]; Anders Sørhuus[4]; Kristian Etienne Einarsrud[1]; [1]Norwegian University of Science and Technology; [2]Elkem; [3]Alcoa Mosjøen; [4]GE Power

3:00 PM
On the Feasibility of Using Low-melting Bath to Accommodate Inert Anodes in Aluminium Electrolysis Cells: *Asbjorn Solheim*[1]; [1]SINTEF Industry

3:20 PM
Electrochemical Reduction and Dissolution of Aluminium in a Thin-layer Refinery Process: *Andrey Yasinskiy*[1]; Peter Polyakov[1]; Ilya Moiseenko[1]; Sai Krishna Padamata[1]; [1]Siberian Federal University

3:40 PM
Influence of Additives on Alumina Dissolution in Superheated Cryolite Melts: *Jonathan Alarie*[1]; László Kiss[1]; Sándor Poncsák[1]; Renaud Santerre[2]; Sébastien Guérard[3]; Jean-François Bilodeau[3]; [1]University of Quebec at Chicoutimi; [2]Technical Advisor, Retired from Rio Tinto; [3]Arvida Research and Development Centre, Rio Tinto

4:00 PM Question and Answer Period

BIOMATERIALS

Biological Materials Science — Biological Materials Science IV

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

Program Organizers: David Restrepo, University of Texas at San Antonio; Steven Naleway, University of Utah; Jing Du, Pennsylvania State University; Ning Zhang, University of Alabama

Thursday PM **March 18, 2021**

Session Chairs: Steven Naleway, The University of Utah; Ning Zhang, The University of Alabama

2:00 PM Invited
Understanding Heterogeneity in Bone Adaptation Following Exercise: *Mariana Kersh*[1]; Sony Manandhar[1]; Hyunggwi Song[1]; John Polk[1]; [1]University of Illinois at Urbana-Champaign

2:30 PM
Internal Strain Mapping for Native and Implanted Glenoids: Yuxiao Zhou[1]; Gregory Lewis[1]; April Armstrong[1]; *Jing Du*[1]; [1]Penn State University

2:50 PM
Negative Compressibility Architected Materials for Novel Cardiac Patches: *Juan Sebastian Rincon Tabares*[1]; David Restrepo[1]; Juan Velasquez[1]; Hai-Chao Han[1]; [1]University of Texas at San Antonio

3:10 PM
Investigating the Effect of Morphological Parameters on the Sound-Induced Mechanical Response of Mosquito Antennae: *Adwait A. Trikanad*[1]; Hoover Pantoja-Sánchez[1]; Ximena Bernal[2]; Pablo Zavattieri[1]; [1]Purdue University; [2]Purdue University, Smithsonian Tropical Research Institute

ADVANCED MATERIALS

Bulk Metallic Glasses XVIII — Alloy Design and Development

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, Federal Institute for Materials Research and Testing (BAM); Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday PM **March 18, 2021**

Session Chairs: Kefu Yao, Tsinghua University; Qiaoshi Zeng, Center for High Pressure Science and Technology Advanced Research

2:00 PM
Atomistic Characterization and Modeling of Corrosion in Al-based Amorphous Metals: *Jia Chen*[1]; Wenjun Cai[1]; [1]Virginia Polytechnic Institute and State University

2:20 PM
Synthesis of Bulk Metallic Glass-alumina Composites with Intertwined Dendritic Structure: *Je In Lee*[1]; Amy Wat[2]; Chae Woo Ryu[3]; Jinyeon Kim[3]; Eun Soo Park[3]; Robert Ritchie[2]; [1]Pusan National University; [2]University of California, Berkeley; [3]Seoul National University

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications — Advanced Ceramics Concepts

Sponsored by: TMS Extraction and Processing Division, TMS Structural Materials Division, TMS Light Metals Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Energy Committee, TMS: Nuclear Materials Committee

Program Organizers: Xian-Ming Bai, Virginia Polytechnic Institute and State University; Yongfeng Zhang, University of Wisconsin-Madison; Larry Aagesen, Idaho National Laboratory; Vincenzo Rondinella, Jrc-Ec

Thursday PM **March 18, 2021**

Session Chairs: Haiming Wen, Missouri University of Science and Technology; Xunxiang Hu, Oak Ridge National Laboratory

2:00 PM Invited
Development of Yttrium Hydride for High Temperature Moderator Application: *Xunxiang Hu*[1]; Kurt Terrani[1]; [1]Oak Ridge National Laboratory

2:30 PM
Ionization Effects on Damage Accumulation Behavior in SiC: *Lauren Nuckols*[1]; Miguel Crespillo[1]; Yanwen Zhang[2]; William Weber[1]; [1]University of Tennessee Knoxville; [2]Oak Ridge National Laboratory

2:50 PM
Microstructural Characterization of Radiation Effects in 3D printed SiC: *Timothy Lach*[1]; Takaaki Koyanagi[1]; Chad Parish[1]; Thak Sang Byun[1]; Kurt Terrani[1]; [1]Oak Ridge National Laboratory

3:10 PM Invited
Microstructure and Chemical States of Fission Products in Irradiated AGR-1 and AGR-2 TRISO Particle UCO Fuel Kernels: *Yong Yang*[1]; Isabella van Rooyen[2]; Zhenyu Fu[1]; Boopathy Kombaiah[2]; [1]University of Florida; [2]Idaho National Laboratory

3:40 PM Invited
Oxidation Behavior of TRISO Fuel Materials: *Haiming Wen*[1]; Adam Bratten[1]; Visharad Jalan[1]; [1]Missouri University of Science and Technology

4:10 PM
Evolution of Ion Irradiated Nitride Ceramics Properties for Coated Particle Fuel Systems: *Adrien Terricabras*[1]; Alicia Raftery[2]; Andrew Nelson[2]; Steven Zinkle[1]; [1]University of Tennessee; [2]Oak Ridge National Laboratory

4:30 PM
On the Role of Neutron Irradiation Damages on Fission Products Transport in the SiC Layer of TRISO Fuel Particles: *Subhashish Meher*[1]; Isabella van Rooyen[1]; Chao Jiang[1]; [1]Idaho National Laboratory

CHARACTERIZATION

Characterization of Materials through High Resolution Imaging — Algorithms for High Resolution Coherent Imaging of Materials

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

Program Organizers: Richard Sandberg, Brigham Young University; Ross Harder, Argonne National Laboratory; Xianghui Xiao, Brookhaven National Laboratory; Brian Abbey, La Trobe University; Saryu Fensin, Los Alamos National Laboratory; Ana Diaz, Paul Scherrer Institut; Mathew Cherukara, Argonne National Laboratory

Thursday PM **March 18, 2021**

Session Chair: Mathew Cherukara, Argonne National Laboratory

2:00 PM Invited
Optimization Based Approach for 3D Alignment in X-ray Nano-tomography: *Kanupriya Pande*[1]; [1]Lawrence Berkeley National Laboratory

2:30 PM
Adaptive Machine Learning for 3D Bragg Coherent Diffraction Imaging Reconstructions: *Alexander Scheinker*[1]; Reeju Pokharel[1]; [1]Los Alamos National Laboratory

2:50 PM Invited
Exploiting Machine Learning Techniques in X-ray Ptychography: *Pablo Enfedaque*[1]; [1]LBNL

3:20 PM
Ptychographic Inversion with Deep Learning Network and Automatic Differentiation: *Tao Zhou*[1]; Mathew Cherukara[1]; Saugat Kandel[1]; Stephan Hruszkewycz[1]; Alexander Hexemer[1]; Ross Harder[1]; Pablo Enfedaque[1]; Martin Holt[1]; [1]Argonne National Laboratory

3:40 PM
Image-based Simulation of Permeability and Image-to-Mesh Conversion of X-ray Tomographic Images of a Nickel Foam: *S. Ali Shojaee*[1]; Arsalan Zolfaghari[1]; [1]Thermo Fisher Scientific

4:00 PM Invited
Using Phase Field Simulations to Train Convolutional Neural Networks for Segmentation of Experimental Materials Imaging Datasets: *Tiberiu Stan*[1]; Jiwon Yeom[2]; Seungbum Hong[2]; Peter Voorhees[1]; [1]Northwestern University; [2]Korea Advanced Institute of Science and Technology

CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2021 — Metallurgical Process Optimization

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, Instituto Militar de Engenharia; Shadia Ikhmayies; 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; Rajiv Soman, Eurofins EAG Materials Science LLC; Alex Moser, US Naval Research Laboratory

Thursday PM **March 18, 2021**

Session Chairs: Rajiv Soman, Eurofins EAG Materials Science LLC; Arnab Baksi, Merichem Company

2:00 PM
Structure and Magnetic Properties of Gas-atomized Maraging Steel Powders for Additive Manufacturing: Ganesh Varma Thotakura[1]; Alex Paul[1]; Ramasis Goswami[2]; *Tanjore Jayaraman*[1]; [1]University of Michigan-Dearborn; [2]Naval Research Laboratory

2:20 PM
Effects of Sinter Feed Size on Productivity and Quality of Iron Ore Sinter: *Mingming Zhang*[1]; Marcelo Andrade[1]; [1]ArcelorMittal Global R&D

2:40 PM
Characterization of Brazilian Linz Donawitz-LD Steel Sludges: *Mery Gomez-Marroquin*[1]; Roberto de Avillez[2]; Sonia Letichevsky[2]; Dalia Carbonel-Ramos[3]; Antoni Quintanilla-Balbuena[4]; Kenny Salazar-Yantas[4]; [1]APMMM/UNI; [2]DEQM PUC-Rio; [3]FIA UNI; [4]FIGMM UNI

3:00 PM
Manufacture of Porous Frit Vents using Space Holder Methodology for Radioisotopic Space Power Systems: *Gareth Sheppard*[1]; Karl Tassenburg[1]; Ramy Mesalam[1]; Bogdan Nenchev[1]; Joel Strickland[1]; Hugo Williams[1]; [1]University of Leicester

ADDITIVE TECHNOLOGIES

Computational Techniques for Multi-Scale Modeling in Advanced Manufacturing — Multiscale Solid-state Models

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Extraction and Processing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Process Technology and Modeling Committee

Program Organizers: Adrian Sabau, Oak Ridge National Laboratory; Anthony Rollett, Carnegie Mellon University; Laurentiu Nastac, University of Alabama; Mei Li, Ford Motor Company; Alexandra Anderson, Gopher Resource; Srujan Rokkam, Advanced Cooling Technologies Inc

Thursday PM **March 18, 2021**

Session Chair: Srujan Rokkam, Advanced Cooling Technologies Inc.

2:00 PM Invited
Multiscale Crystal Plasticity in Integrated Computational Materials Engineering: *Deepankar Pal*[1]; Javed Akram[1]; Thaddeus Song[1]; Jobie Gerken[1]; Dave Conover[1]; [1]Ansys

2:40 PM
Microstructure Based Modeling of Friction Stir Welded Joint between Dissimilar Metals Using Crystal Plasticity: *Shank Kulkarni*[1]; Kyoo Sil Choi[1]; Piyush Upadhyay[1]; Ayoub Soulami[1]; [1]Pacific Northwest National Laboratory

3:05 PM
Modeling Material Behavior during Continuous Bending Under Tension for Inferring the Post-necking Strain Hardening Response of Ductile Sheet Metals: Application to Dual-phase Steels: *Marko Knezevic*[1]; Russell Marki[1]; [1]University of New Hampshire

3:30 PM
Modeling the Role of Local Crystallographic Correlations in Microstructures of Ti-6Al-4V Using a Lamellar Visco-plastic Self-consistent Polycrystal Plasticity Formulation: *Iftekhar Riyad*[1]; Ricardo Lebensohn[2]; Brandon McWilliams[3]; Adam Pilchak[4]; Marko Knezevic[1]; [1]University of New Hampshire; [2]Los Alamos National Laboratory; [3]CCDC Army Research Laboratory; [4]Air Force Research Laboratory

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Phonons, Magnons and Other Excitations

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

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Vahid Attari, Texas A&M University; Jorge Munoz, University of Texas at El Paso

Thursday PM **March 18, 2021**

Session Chairs: Chen Li, University of California Riverside; Huajing (Wilson) Song, Los Alamos National Laboratory; Sara Kadkhodaei, University Of Illinois At Chicago; Jorge Munoz, University of Texas El Paso

2:00 PM Invited
Phonons and Transition-induced Plasticity of bcc Refractory High-entropy Alloys from First Principles: *Yuji Ikeda*[1]; Prashanth Srinivasan[2]; Blazej Grabowski[1]; Fritz Körmann[3]; [1]University of Stuttgart; [2]TU Delft; [3]Max-Planck-Institut für Eisenforschung GmbH; TU Delft

2:30 PM
Contributions of Atom Vibrations to the Heat of Fusion of Germanium: *Camille Bernal*[1]; Claire Saunders[1]; Stefan H. Lohaus[1]; Douglas Abernathy[2]; Brent Fultz[1]; [1]California Institute of Technology; [2]Oak Ridge National Laboratory

2:50 PM
A Computational and Experimental Study of Phonon Anharmonicity and Thermal Expansion of Cuprous Oxide: *Claire Saunders*[1]; Dennis Kim[2]; Hillary Smith[3]; Brent Fultz[1]; [1]California Institute of Technology; [2]Massachusetts Institute of Technology; [3]Swarthmore College

3:10 PM Invited
Development of New Ab-initio Non-adiabatic Excited-state Molecular Dynamics Method in NWChem: *Huajing (Wilson) Song*[1]; Sean Fischer[2]; Victor Freixas[3]; Niranjan Govind[4]; Sergei Tretiak[1]; [1]Physics and Chemistry of Materials, Los Alamos National Lab; [2]U.S. Naval Research Laboratory; [3]Universidad Nacional de Quilmes; [4]Pacific Northwest National Laboratory

3:40 PM
First Principle Studies of Charged Point Defect in Phosphorene: *Biswas Rijal*[1]; Anne Marie Tan[1]; Christoph Freysoldt[2]; Richard Hennig[1]; [1]University of Florida; [2]Max Planck Institute

4:00 PM
Negative Grüneisen Parameters in Nonmagnetic bcc-based Intermetallic FeTi at High Pressure: *Bethuel Khamala*[1]; Jorge Munoz[2]; [1]University of Texas El Paso; [2]University of Texas El Paso

4:20 PM Invited
Anomalous Magnon-phonon Dynamics in Antiferromagnets: *Chen Li*[1]; [1]University of California Riverside

CORROSION

Environmental Degradation of Additively Manufactured Alloys — Material Degradation in Irradiated Environments, Environmental Assisted Cracking

Sponsored by: TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Additive Manufacturing Committee

Program Organizers: Kinga Unocic, Oak Ridge National Laboratory; Jenifer Locke, Ohio State University; Sebastien Dryepondt, Oak Ridge National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Xiaoyuan Lou, Auburn University; Brendy Rincon Troconis, University of Texas at San Antonio; Luke Brewer, University of Alabama

Thursday PM **March 18, 2021**

Session Chairs: Kinga Unocic, Oak Ridge National Laboratory; Sebastien Dryepondt, Oak Ridge National Laboratory; Michael Kirka, Oak Ridge National Laboratory

2:00 PM Invited
Additively Manufactured 316L Stainless Steel for Nuclear Applications: Gary Was[1]; *Miao Song*[1]; [1]University of Michigan

2:30 PM
Comparison of Oxidation Behavior of Ultrasonic Additively Manufactured and Conventional Zircaloy-4: *Cory Parker*[1]; Kenneth Kane[1]; Stephen Raiman[1]; Bruce Pint[1]; Caleb Massey[1]; Andrew Nelson[1]; [1]Oak Ridge National Laboratory

2:50 PM
Performance of Additively Manufactured FeCrAl Alloy Accident Tolerant Fuel Cladding in Nuclear Power Reactor Environments: Vipul Gupta[1]; *Andrew Hoffman*[1]; Raul Rebak[1]; [1]GE Research

3:10 PM
Sensitization and Stress Corrosion Cracking of Alloy 800H by Laser Powder Bed Fusion: *Jingfan Yang*[1]; Xiang Liu[2]; Miao Song[3]; Lingfeng He[2]; Xiaoyuan Lou[1]; [1]Auburn University; [2]Idaho National Laboratory; [3]University of Michigan

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, Advanced Cooling Technologies Inc; Jenifer Locke, Ohio State University

Thursday PM **March 18, 2021**

Session Chairs: Nikhilesh Chawla, Purdue University; Brendy Troconis , University of Texas at San Antonio

2:00 PM Invited
Spectroelectrochemical Evaluation of Carbon Steel in Slightly Sour Environments Under the Presence of H_2S/CO_2 and Triazine-Based H_2S Scavenger: Vinicio Ynciarte[1]; Leonardo Caseres[2]; James Dante[2]; *Brendy Rincon Troconis*[1]; [1]University of Texas at San Antonio; [2]Southwest Research Institute

2:40 PM
A Multiphysics Model of Synergistic Environmental Exposure Assisted Damage of Composite Using Homogenization-based Degradation Variables: *Zhiye Li*[1]; Michael Lepech[1]; [1]Stanford University

3:00 PM
Combined Ab-initio and Experimental Study of Hydrogen Sorption in Dual Phase Steels: *Saurabh Sagar*[1]; Vera Popovich[1]; Pascal Kömmelt[2]; Poulumi Dey[1]; [1]Delft University of Technology; [2]Research and Development, Forming Technology, Tata Steel Ijmuiden BV

3:20 PM
Fatigue Crack Propagation in AA7085-T7451 Exposed to Complex Atmospheric Environments: *Brandon Free*[1]; Sarah Galyon Dorman[2]; Jason Niebuhr[2]; Jenifer Locke[1]; [1]The Ohio State Uniersity; [2]SAFE Inc.

3:40 PM
The Effect of Applied Potential and Loading Rate on the Hydrogen Environment-assisted Cracking Behavior of AA7075-T6511: *Zachary Harris*[1]; Alen Korjenic[1]; John Scully[1]; James Burns[1]; [1]University of Virginia

4:00 PM
Phase-field Modeling of Galvanic Corrosion in Magnesium-Aluminum Joints: *Kubra Karayagiz*[1]; Adam Powell[1]; Qingli Ding[1]; Brajendra Mishra[1]; [1]Worcester Polytechnic Institute

4:20 PM
Understanding Pitting Corrosion in a High-performance Aluminum Alloy by Four-dimensional (4D) X-ray Microtomography: *Daniel Sinclair*[1]; Sridhar Niverty[1]; Nikhilesh Chawla[1]; [1]Purdue University

4:40 PM
Formation of Ni-O-H-S Surface Phases on Cathodically Charged Ni: *Lai Jiang*[1]; Stanislav Verkhoturov[1]; Emile Schweikert[1]; Michael Demkowicz[1]; [1]Texas A&M University

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MATERIALS DESIGN

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Data-Driven Investigations of Fatigue

Sponsored by: TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, 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; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University; Jean-Charles Stinville, University of California-Santa Barbara

Thursday PM **March 18, 2021**

Session Chair: Ashley Spear, University of Utah

2:00 PM
Discovering the Structural Signature of Fatigue Crack Growth Rate Using Computer Vision and Machine Learning: *Katelyn Jones*[1]; William Musinski[2]; Adam Pilchak[2]; Reji John[2]; Paul Shade[2]; Anthony Rollett[1]; Elizabeth Holm[1]; [1]Carnegie Mellon University; [2]Air Force Research Laboratory

2:20 PM
A Microstructural Model for Fatigue in NiTi Shape Memory Alloy Based on Information Fusion from Advanced Experiments and Simulation: *Harshad Paranjape*[1]; Darren Pagan[2]; Sivom Manchiraju[3]; Peter Anderson[4]; Craig Bonsignore[1]; Justin Gilbert[1]; Ich Ong[1]; Lot Vien[1]; [1]Confluent Medical; [2]Pennsylvania State University; [3]Ansys, Inc.; [4]The Ohio State University

2:40 PM
In-situ Diffraction and Cohesive-zone Studies of the Fatigue-crack-growth Behavior in the ZK60 Mg Alloy: *Di Xie*[1]; Peter Liaw[1]; Yang Ren[2]; Yanfei Gao[1]; [1]University of Tennessee; [2]Argonne National Laboratory

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MATERIALS PROCESSING

Friction Stir Welding and Processing XI — Spot Technologies

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

Program Organizers: Yuri Hovanski, Brigham Young University; Piyush Upadhyay, Pacific Northwest National Laboratory; Yutaka Sato, Tohoku University; Nilesh Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter the Great St. Petersburg Polytechnic University

Thursday PM **March 18, 2021**

2:00 PM
Advances in Refill Spot Welding Productivity: *Yuri Hovanski*[1]; Andrew Curtis[1]; Sarah Michaelis[1]; Paul Blackhurst[1]; Brigham Larsen[1]; [1]Brigham Young University

2:20 PM
Finite Element Analysis and Failure Mechanisms of Refill Friction Stir Spot Welding: *Enkhsaikhan Boldsaikhan*[1]; Shintaro Fukada[2]; Mitsuo Fujimoto[2]; Kenichi Kamimuki[2]; [1]Wichita State University; [2]Kawasaki Heavy Industries, Inc.

2:40 PM
Characterization of Intermetallics Formation in μFSSW of Dissimilar Al/Cu Alloy Sheets: *David Yan*[1]; Logan Vahlstrom[1]; [1]San Jose State University

3:00 PM
Dissimilar Friction Stir Spot Welding of Low Carbon Steel and Aluminum Alloy by Double Side Adjustable Tools: *Xiaopei Wang*[1]; Yoshiaki Morisada[1]; Hidetoshi Fujii[1]; [1]Osaka University

3:20 PM
Microstructural Characterization of Lap-jointed Ti-6Al-4V Plates by Pin-less Friction Stir Spot Welding: *Hyojin Park*[1]; Yong Chae Lim[2]; Scott A Rose[3]; Zhili Feng[2]; Hahn Choo[1]; [1]University of Tennessee, Knoxville; [2]Oak Ridge National Laboratory; [3]Boeing

3:40 PM
Temperature Distribution during Friction Stir Spot Welding of Thin AA 6082-T6 and AA 5082-O Sheets: *Mikhail Ozhegov*[1]; Fedor Isupov[1]; Roman Smelianskii[1]; [1]St. Petersburg Polytechnic University of Peter the Great

NANOSTRUCTURED MATERIALS

Functional Nanomaterials: Functional Low-dimensional Materials (0D, 1D, 2D) Driving Innovations in Electronics, Energy, Sensors, and Environmental Engineering and Science 2021 — Functional Nanomaterials

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

Program Organizers: Jiyoung Chang, University of Utah; Michael Cai Wang, University of South Florida; Sarah Zhong, University of South Florida; Sun Choi, Korea Institute of Science and Technology; Pei Dong, George Mason University

Thursday PM **March 18, 2021**

Session Chairs: Sarah Zhong, University of South Florida; Michael Wang, University of South Florida

2:00 PM Invited
Direct Backbone Attachment of Polyesters on Grain Boundaries Enhances Chemical Stability and Suppressing Ion Migration in $CH_3NH_3PbI_3$ Hybrid Perovskite Solar Cells: *Chang-Yong Nam*[1]; [1]Brookhaven National Laboratory

2:25 PM
Antireflective Hybrid Nanocoatings Derived via Heated Liquid-phase Infiltration in Hierarchically Self-Assembled Block Copolymer Thin Film Templates: *Ashwanth Subramanian*[1]; Nikhil Tiwale[2]; Gregory Doerk[2]; Kim Kisslinger[2]; Chang-Yong Nam[2]; [1]Stony Brook University; [2]Brookhaven National Laboratory

2:45 PM
Giant Low-temperature Anharmonicity in Silicon Nanocrystals: *Shuonan Chen*[1]; Devin Coleman[1]; Douglas Abernathy[2]; Arnab Banerjee[2]; Luke Daemen[2]; Lorenzo Mangolini[1]; Chen Li[1]; [1]University of California, Riverside; [2]Oak Ridge National Laboratory

3:05 PM Invited
Nanomaterials for Multispectral Adaptive Radiative Heating and Cooling: *Po-Chun Hsu*[1]; [1]Duke University

3:30 PM Invited
Silicon Carbide Biotechnology: Carbon-based Neural Interfaces: Chenyin Feng[1]; Mohamad Beygi[1]; Christopher Frewin[1]; Md Rubayat-E Tanjil Rubayat-E Tanjil[2]; Ashok Kumar[2]; Michael Wang[2]; *Stephen Saddow*[1]; [1]University of South Florida; [2]USF ME

3:55 PM
Substituent Effects on Electronic Properties of Cy5: Density Functional and Time-Dependent Density Functional Calculations: *Austin Biaggne*[1]; Lan Li[1]; Bernard Yurke[1]; [1]Boise State University

ADVANCED MATERIALS

High Entropy Alloys IX: Alloy Development and Properties — Thermal and Other Properties

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

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday PM **March 18, 2021**

Session Chairs: John Scully, University of Virginia; Gerald Frankel, The Ohio State University

2:00 PM Invited
Controlling the Corrosion Resistance of Multi-principal Element Alloys: *John Scully*[1]; Samuel Inman[1]; Angela Gerard[1]; Christopher Taylor[2]; Wolfgang Windl[2]; Daniel Schreiber[3]; Pin Lu[4]; James Saal[5]; Gerald Frankel[2]; [1]University of Virginia; [2]The Ohio State University; [3]Pacific Northwest National Laboratory; [4]Questek Innovations LLC; [5]Citrine Informatics

2:25 PM
Tracer Diffusion in Single Crystalline CoCrFeNi and CoCrFeMnNiHigh-entropy Alloys: Kinetic Hints towards a Low-temperature PhaseInstability of the Solid-solution?: *Daniel Gaertner*[1]; Josua Kottke[1]; Yury Chumlyakov[1]; Fabian Hergemöller[1]; Gerhard Wilde[1]; Sergiy Divinski[1]; [1]Institute of Materials Physics, University of Münster

2:45 PM
Electron and Phonon Thermal Conductivity in High Entropy Carbides with Variable Carbon Content: *Patrick Hopkins*[1]; Christina Rost[2]; Trent Borman[3]; Mohammad Hossain[3]; Mina Lim[4]; Kathleen Quiambao-Tomko[1]; John Tomko[1]; Donald Brenner[4]; Jon-Paul Maria[3]; [1]University of Virginia; [2]James Madison University; [3]Pennsylvania State University; [4]North Carolina State University

3:05 PM
Hyperbaric Laser Chemical Vapor Deposition of High-strength Aluminium-Silicon Carbide Nanocomposite Fibers: *James Maxwell*[1]; Avinash Baji[1]; Ben Mahler[1]; [1]La Trobe University, EMC[2] Centre, Engineering Dept.

ADVANCED MATERIALS

High Entropy Alloys IX: Structures and Modeling — Structures and Characterization IV

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 **March 18, 2021**

Session Chairs: Eun Park, Seoul National Univerisity; Stefano Curtarolo, Duke University

2:00 PM Invited
Rational Use of Entropy Unavoidability in High-entropy Ceramics: *Stefano Curtarolo*[1]; [1]Duke University

2:20 PM
Examination of the Bulk Metal-oxide Layer Interface of a Cr-Nb-Ta-V-W High Entropy Alloy at 700 and 800oC: *Rebecca Romero*[1]; S.K. Varma[1]; Nanthakishore Makeswaran[1]; Ravisankar Naraparaju[1]; C.V. Ramana[1]; [1]The University of Texas at El Paso

2:40 PM
Ex-situ and In-situ Characterization of Early Stage Oxidation Mechanism of High Entropy Alloys: *Bharat Gwalani*[1]; Sten Lambeets[1]; Matthew Olszta[1]; Daniel Perea[1]; Arun Devaraj[1]; [1]Pacific Northwest National Laboratory

3:00 PM
On Sluggish Diffusion in Random, Equimolar FCC Alloys: *Murray Daw*[1]; Michael Chandross[2]; [1]Clemson University; [2]Sandia National Laboratories

ADVANCED MATERIALS

Materials for High Temperature Applications: Next Generation Superalloys and Beyond — Superalloys and Beyond: Oxidation and Mechanical Behavior II

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

Program Organizers: Govindarajan Muralidharan, Oak Ridge National Laboratory; Martin Heilmaier, KIT Karlsruhe; Benjamin Adam, Portland State University; Mario Bochiechio, Pratt & Whitney; Katerina Christofidou, University of Sheffield; Eric Lass, University of Tennessee-Knoxville; Jeremy Rame, Safran Aircraft Engines; Pierre Sallot, Safran; Akane Suzuki, GE Research; Michael Titus, Purdue University

Thursday PM **March 18, 2021**

2:00 PM Invited
Understanding the Oxidation Mechanisms of Complex Concentrated Refractory-based Alloys: *Todd Butler*[1]; Tinuade Daboiku[1]; Joshua Gild[1]; Oleg Senkov[1]; [1]Wright Patterson Air Force Base

2:30 PM Invited
Effect of Al Addition on the Oxidation Behavior of a Mo-Si-B Alloy: *John Perepezko*[1]; Longfei Lu[1]; [1]University of Wisconsin-Madison

3:00 PM
Oxidation Behavior of Nb-Si Based Ultrahigh Temperature Alloy at 600-1350: *Xiping Guo*[1]; Xiaoyu Luo[1]; Yanqiang Qiao[1]; Ping Guan[1]; [1]Northwestern Polytechnical University

3:20 PM
Oxidation of TiAl Alloys GE 4822 and TNM-B1 between 600°C and 900°C and Impact on Mechanical Properties: *Mathias Galetz*[1]; Lukas Mengis[1]; Anke Ulrich[1]; [1]DECHEMA-Forschungsinstitut

3:40 PM
On the High-temperature Air Oxidation Behavior of Ti3Al0.6Ga0.4C2 MAX Phase Solid-solution in the 1000 to 1300 °C Temperature Range: *Tarek Elmeligy*[1]; Enrica Epifano[2]; Maxim Sokol[1]; Michel Barsoum[1]; [1]Drexel University, Department of Materials Science & Engineering, Philadelphia, PA, USA; [2]Laboratoire d'Etudes des Microstructures, CNRS-ONERA, Boite Postale 72, 92322 Châtillon Cedex, France

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XX — Phase Stability of Energy Materials

Sponsored by: TMS Functional Materials Division, TMS Structural 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; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; 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; A.S.Md Abdul Haseeb, University of Malaya; Ligang Zhang, Central South University; Sehoon Yoo, KITECH; Vesa Vuorinen, Aalto University; Yu-chen Liu, National Cheng Kung University

Thursday PM **March 18, 2021**

Session Chairs: Yu-chen Liu, National Cheng Kung University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology

2:00 PM Invited
Towards Predictive Solid-state Synthesis: Understanding Phase Evolution during the Formation of YBCO: *Christopher Bartel*[1]; [1]University of California, Berkeley

2:30 PM
Machine Learning for Perovskite Phase Stability: *Dane Morgan*[1]; Wei Li[2]; Ryan Jacobs[1]; [1]University of Wisconsin-Madison; [2]Google

2:50 PM
Vertically Stacked 2H-1T Dual-phase TMD Microstructures during Lithium Intercalation: A First Principles Study: *Shayani Parida*[1]; Avanish Mishra[1]; Jie Chen[1]; Jin Wang[1]; Arthur Dobley[2]; Barry Carter[3]; Avinash Dongare[1]; [1]University Of Connecticut; [2]EaglePicher Technologies LLC; [3]Sandia National Laboratories

3:10 PM
Study on the Phase Diagrams of Bi-Te-RE (Yb, La, Ce, Nd, Sm, Tb, Er) Systems: *Ligang Zhang*[1]; Mingyue Tan[1]; Cun Mao[1]; Libin Liu[1]; [1]Central South University

3:30 PM
The Significance of Transport Electronic Entropy in VO_2: *Jonathan Paras*[1]; Antoine Allanore[1]; [1]Massachusetts Institute of Technology

THURSDAY PM

3:50 PM
Electric Current Effect on the High-strain-rate Deformation of AA7075-T6 Al-alloy: *Yu-Ching Chen*[1]; Kuan-hsueh Lin[1]; Yu-Chen Liu[1]; Tong Chen[1]; Ting-Ju Chen[1]; Woei-Shyan Lee[1]; Shih-Kang Lin[1]; [1]National Cheng Kung University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — General Topic II

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

Program Organizers: Rongpei Shi, Lawrence Livermore National Laboratory; Yipeng Gao, Idaho National Laboratory; Fadi Abdeljawad, Clemson University; Bharat Gwalani, Pacific Northwest National Laboratory; Qi An, University of Nevada-Reno ; Eric Lass, University of Tennessee-Knoxville; Huajing (Wilson) Song, Los Alamos National Laboratory

Thursday PM **March 18, 2021**

Session Chair: Rongpei Shi, Lawrence Livermore National Laboratory

2:00 PM
Microstructural Evolution and Deformation Behavior during Uniaxial Compression of Al-Si Alloys: *Tingkun Liu*[1]; Matthew Olszta[1]; Bharat Gwalani[1]; Changyong Park[2]; Arun Devaraj[1]; [1]Pacific Northwest National Laboratory; [2]Argonne National Laboratory

2:20 PM
Suppression of Samson Phase Formation in Al-Mg Alloys by Boron Addition: *Ramasis Goswami*[1]; [1]Naval Research Laboratory

2:40 PM
Transformations in Amorphous Environments near "Critical" Temperatures: *Deep Choudhuri*[1]; [1]New Mexico Institute of Mining and Technology

3:00 PM
Crystallographic Transitions in Compositionally Complex Alloy Thin Films: *Daniel Goodelman*[1]; Andrea Hodge[1]; [1]University of Southern California

3:20 PM
Porous Graphite Fabricated by Liquid Metal Dealloying of Silicon Carbide: *Gina Greenidge*[1]; Jonah Erlebacher[1]; [1]Johns Hopkins University

3:40 PM
Analysis of Dendrite Fragmentation from Microgravity Solidification Experiments: *Zachary Thompson*[1]; Tiberiu Stan[1]; Peter Voorhees[1]; Nathalie Mangelinck-Nol[2]; Henri Nguyen-Thi[2]; [1]Northwestern University; [2]Aix Marseille Univ, Université de Toulon, CNRS, IM2NP, Marseille, France

NUCLEAR MATERIALS

Thermal Property Characterization, Modeling, and Theory in Extreme Environments — Structure - Thermal Property Relationships

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

Program Organizers: Janelle Wharry, Purdue University; Mukesh Bachhav, Idaho National Laboratory; Marat Khafizov, Ohio State University; Eric Lass, University of Tennessee-Knoxville; Vikas Tomar, Purdue University; Tiankai Yao, Idaho National Laboratory; Cody Dennett, Idaho National Laboratory; Karim Ahmed, Texas A&M University

Thursday PM **March 18, 2021**

Session Chairs: Marat Khafizov, Ohio State University; Tiankai Yao, Idaho National Laboratory

2:00 PM
Mesoscale Modeling of the Effective Thermal Conductivity of a UO2-Mo Composite Nuclear Fuel: *Karim Ahmed*[1]; Fergany Badry[1]; [1]Texas A&M University

2:20 PM
Thermal and Mechanical Properties of Hafnon (HfSiO4), Theory and Experiments: Zhidong Ding[1]; Mackenzie Ridley[1]; Jeroen Deijkers[1]; Naiming Liu[1]; Md. Shafkat Hoque[1]; John Gaskins[1]; Mona Zebarjadi[1]; Patrick Hopkins[1]; Haydn Wadley[1]; Elizabeth Opila[1]; *Keivan Esfarjani*[1]; [1]University of Virginia

2:40 PM Invited
First-principles Modeling of High Temperature Irradiation Resistant Thermocouple (HTIR-TC) Performance and Oxidation: Lan Li[1]; *Ember Sikorski*[1]; Richard Skifton[2]; Brian Jaques[1]; [1]Boise State University; [2]Idaho National Laboratory

3:10 PM
Multiphysics Mesoscale Modeling of Ablative Thermal Protection Systems: *Marina Sessim*[1]; Linuyan Shi[1]; Simon Phillpot[1]; Michael Tonks[1]; [1]University of Florida

3:30 PM
An Experimentally Validated Mesoscale Model for the Effective Thermal Conductivity of U-Zr Fuels: *Karim Ahmed*[1]; Fergany Badry[1]; Sean McDeavitt[1]; [1]Texas A&M University

SPECIAL TOPICS

2021 Technical Division Student Poster Contest — FMD 20201 Technical Division Undergraduate Student Poster Contest

Monday PM **March 15, 2021**

5:30-6:30 PM

Batteries Made with Calcium Could Be Better for Electric Cars or Storing Renewable Energy: *Colton Gerber*[1]; Michael Woodcox[1]; Manuel Smeu[1]; [1]Binghamton University

SPECIAL TOPICS

2021 Technical Division Student Poster Contest — FMD 2021 Technical Division Graduate Student Poster Contest

Monday PM **March 15, 2021**

5:30-6:30 PM

A Flexible Aqueous Rechargeable Battery Operating Over an Extended Temperature Range: *Yehong Chen*[1]; Ying Wang[1]; [1]LSU

Degradation Characterization in Low Cobalt Lithium-ion Intercalation Cathodes: *Hernando Jesus Gonzalez Malabet*[1]; Austin Gabhart[1]; Megan Flannagin[1]; Alex L'Antigua[1]; George Nelson[1]; [1]The University of Alabama in Huntsville

Using Distribution of Relaxation Times Analysis and Microstructural Characterization to Quantify the Effects of Nanoparticle Infiltrants on the Catalytic Activity of Solid Oxide Fuel Cell Anodes: *Jillian Rix*[1]; Boshan Mo[1]; Uday Pal[1]; Srikanth Gopalan[1]; Soumendra Basu[1]; [1]Boston University

Utilizing Advanced Manufacturing for the Development of Advanced In-pile Sensors and Instrumentation: *Kiyo Fujimoto*[1]; Thomas Holschuh[1]; Lance Hone[1]; Michael McMurtrey[1]; Patrick Moo[1]; Troy Unruh[1]; Dave Estrada[2]; [1]Idaho National Laboratory; [2]Boise State University

SPECIAL TOPICS

2021 Technical Division Student Poster Contest — MPMD 2021 Technical Division Graduate Student Poster Contest

Monday PM **March 15, 2021**

5:30-6:30 PM

Comparison of Laser Diffraction and Image Analysis Techniques for Particle Size-Shape Characterization in Additive Manufacturing Applications: *Jack Grubbs*[1]; Kyle Tsaknopoulos[1]; Christopher Massar[1]; Caitlin Walde[2]; Aaron Birt[2]; Danielle Cote[1]; [1]Worcester Polytechnic Institute; [2]Solvus Global

Investigation of Mechanical Properties and Microstructure in Additively Manufactured Austenitic 316L Stainless Steel: *Hussam Ali*[1]; Nicholas Brubaker[1]; Nicolene Van Rooyen[1]; Indrajit Charit[1]; Michael Maughan[1]; Mark Jaster[2]; [1]University of Idaho; [2]Premier Technology

Mechanical and Microstructural Properties of FeCrAl Accident Tolerant Fuels Cladding Subjected to Flow Boiling CHF Testing: *Rajnikant Umretiya*[1]; Donghwi Lee[2]; Mark Anderson[2]; Raul Rebak[3]; Jessika Rojas[1]; [1]Virginia Commonwealth University; [2]Universty of Wisconsin-Madison; [3]GE Global Research

Micro-structure Dependent Nano-scratch Behavior in Additively Manufactured Inconel 718: *Mustafa Rifat*[1]; Saurabh Basu[1]; [1]Penn State University

SPECIAL TOPICS

2021 Technical Division Student Poster Contest — SMD 2021 Technical Division Graduate Student Poster Contest

Monday PM **March 15, 2021**

5:30-6:30 PM

Mechanical Behavior of Thermally Stable, Hierarchical Ni-Y Alloys: *Shruti Sharma*[1]; Samuel Moehring[1]; Saurabh Sharma[1]; Kiran Solanki[1]; Pedro Peralta[1]; [1]Arizona State University

Nano-mechanical Behavior of Advanced Structural Alloys: *Nandita Ghodki*[1]; Sundeep Mukherjee[1]; [1]University of North Texas

Prediction and Testing of Hot Cracking Susceptibility during Local Melting in Binary and Multi Component Aluminum Alloys: *Shubhra Jain*[1]; [1]Iowa State University

Solidification and Defects Structure Evolution in Metal Additive Manufacturing via Molecular Dynamics Simulations: *Gurmeet Singh*[1]; Veera Sundararaghavan[1]; [1]University of Michigan

SPECIAL TOPICS

2021 Technical Division Student Poster Contest — SMD 2021 Technical Division Undergraduate Student Poster Contest

Monday PM **March 15, 2021**

5:30-6:30 PM

First Principles Study of Sigma Phase Destabilization in Compositionally-complex Stainless Steel Alloys: *Anna Soper*[1]; Savanah Diaz[1]; Holly Frank[1]; Jonas Kaufman[2]; Adam Shaw[3]; Kevin Laws[4]; Aurora Pribram-Jones[5]; Lori Bassman[1]; [1]Harvey Mudd College; [2]UC Santa Barbara; [3] California Institute of Technology; [4]University of New South Wales; [5]UC Merced

Utilizing CALPHAD Methods to Determine Phases in a Compositionally Complex Fe-Cr-based Alloy: *Kaitlyn Paulsen*[1]; Alexandra Loumidis[1]; Patrick Conway[2]; Karen Privat[3]; Kevin Laws[3]; Lori Bassman[1]; [1]Harvey Mudd College; [2]Jönköping University; [3]University of New South Wales

ADVANCED MATERIALS

Advanced High Strength Steels V — Poster Session

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

Program Organizers: Ana Luiza Araujo, CBMM North America Inc.; Louis Hector, General Motors Global Technical Center; Igor Vieira, Nucor Steel; Lijia Zhao, ArcelorMittal USA; Krista Limmer, CCDC Army Research Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Sebastien Allain, Institut Jean Lamour; MingXin Huang, University of Hong Kong

Monday PM **March 15, 2021**

5:30-6:30 PM

Effect of Rolling Conditions on Microstructure and Mechanical Properties of Medium Mn Steel: *Poornachandra Satyampet*[1]; Saurabh Kundu[2]; Prita Pant[1]; [1]IIT Bombay; [2]Tata Steels

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage VII — Poster Session

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

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

Monday PM **March 15, 2021**

5:30-6:30 PM

Session Chairs: Soumendra Basu, Boston University; Jung Pyung Choi, Pacific Northwest National Laboratory

A First-principles Study of Silver/Lanthanum Strontium Ferrite Interfacial Adhesion: *Jiyun Park*[1]; Yue Qi[1]; [1]Brown University

AgCl-decorated Ag Nanowire Catalysts to Maximize the Surface Effect in the Oxygen Reduction Reaction: *Suyeon Choi*[1]; Youngtae Park[1]; Changsoo Lee[2]; Hyuck Mo Lee[1]; [1]Korea Advanced Institute of Science and Technology, Korea; [2]Korea Institute of Energy Research

Liquid Enhanced Ga-Sn Alloy Anode for RMBs: *Jiawei Liu*[1]; Chao Song[1]; Yuan Yuan[1]; Dajian Li[1]; Fusheng Pan[1]; [1]Chongqing University

MOF-derived Carbon Nanocomposites as a Novel Cathode for Lithium Air Batteries: *Hien Pham*[1]; Jong-Won Lee[2]; Min-Sik Park[1]; [1]Kyung Hee University; [2]Daegu Gyeongbuk Institute of Science & Technology

Probing Structural Changes of 2D Supercapacitor Electrode by Kelvin Probe Force Microscopy: *Kowsik Sambath Kumar*[1]; Nitin Choudhary[1]; Deepak Pandey[1]; Yi Ding[1]; Luis Hurtado[1]; Hee-Suk Chung[2]; Laurene Tetard[1]; Yeonwoong Jung[1]; Jayan Thomas[1]; [1]University of Central Florida; [2]Analytical Research Division, Korea Basic Science Institute

Synthesis and Electrochemical Performance of Nano Spinel Lithium Manganese Oxide (LiMn2O4) Composite with Functionalized Carbon Nanostructures (CNTs, GNPs & Graphene) by Microwave-Assisted Chemical Coprecipitation Method: *Hanan Tariq*[1]; Abdul Shakoor[1]; Jeffin James[1]; [1]Center for Advanced Materials, Qatar University

Temperature-induced Successive Martensitic and Inter-martensitic Phase Transformations of $Ni_{2.15}Mn_{0.85}Ga$ Heusler Alloy: Amila Madiligama[1]; *Pnina Ari-Gur*; Yang Ren[2]; Vladimir Shavrov[3]; Victor Koledov[3]; Yanling Ge[4]; James George[5]; [1]Penn State DuBois; [2]Argonne National Laboratory; [3]Russian Academy of Sciences; [4]Aalto University; [5]Western Michigan University

MATERIALS PROCESSING

Advances in Powder and Ceramic Materials Science — Poster Session

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

Program Organizers: Bowen Li, Michigan Technological University; Shefford Baker, Cornell University; Huazhang Zhai, Beijing Institute of Technology; Kathy Lu, Virginia Polytechnic Institute and State University; 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; Eugene Olevsky, San Diego State University

Monday PM **March 15, 2021**

5:30-6:30 PM

Session Chair: Kathy Lu, Virginia Polytechnic Institute and State University

Apatite Formation Ability of Ca2MgSi2O7 Bioceramic: *Fariborz Tavangarian*[1]; Sorour Sadeghzade[2]; Caleb Zolko[1]; Rahmatollah Emadi[2]; [1]Pennsylvania State University, Harrisburg; [2]Isfahan University of Technology

Biodegradability and Bioactivity of Porous Hydroxyapatite-PCL-hardystonite for Using in Bone Tissue Engineering Application: *Fariborz Tavangarian*[1]; Sorour Sadeghzade[1]; Rahmatollah Emadi[2]; [1]Pennsylvania State University, Harrisburg; [2]Isfahan University of Technology

Synthesis of Willemite Bioceramic by Mechanochemical Procedure: Sorour Sadeghzade[1]; Rahmatollah Emadi[2]; *Fariborz Tavangarian*[1]; [1]Pennsylvania State University, Harrisburg; [2]Isfahan University of Technology

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications IX — Poster Session

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

Program Organizers: Hsin-Jay Wu, National Chiao Tung University; Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Cnrs Crismat Unicaen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Lan Li, Boise State University; Takao Mori, National Institute for Materials Science; Tiejun Zhu, Zhejiang University; Alexandra Zevalkink, Michigan State University; Wan-Ting Chiu, Tokyo Institute of Technology

Monday PM **March 15, 2021**

5:30-6:30 PM

A Synergistic Approach to Boost the Thermoelectric Performance and Reduce the Thermal Conductivity in n-type PbTe : Carrier Optimization and Phase Diagram Engineering: *Ping-Yuan Deng*[1]; Kuang-Kuo Wang[2]; Jia-Yu Du[3]; Hsin-Jay Wu[1]; [1]National Chiao Tung University; [2]National Sun Yat-sen University; [3]National Tsing Hua University

Co-P Diffusion Barrier for Lead Telluride-based Thermoelectric Joints: *Kai-Wen Cheng*[1]; Hsien-Chien Hsieh[1]; Albert T. Wu[1]; [1]National Central University

Ni/Pb-Te and Ni/Se-Sn Interfacial Reactions and Their Related Phase Diagrams: *Yohanes Hutabalian*[1]; Zhi-kai Hu[1]; Xu-hui Chen[1]; Sinn-wen Chen[1]; [1]National Tsing Hua University

Ultra-low Thermal Conductivity for High-Performance GeTe-based Thermoelectric Materials: *Yi-Fen Tsai*[1]; Hsin-Jay Wu[1]; [1]National Chiao Tung University

Using Neutrons to Probe the Influence of Processing on Temperature-dependent Strain in PbTe: *James Male*[1]; Riley Hanus[1]; G Snyder[1]; Raphael Hermann[2]; [1]Northwestern University; [2]Oak Ridge National Laboratory

ADVANCED MATERIALS

Bulk Metallic Glasses XVIII — 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, Federal Institute for Materials Research and Testing (BAM); Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Monday PM **March 15, 2021**

5:30-6:30 PM

Effect of Porosity Level on the Mechanical Properties of Bicontinuous Nanoporous Metallic Glasses: *Chang Liu*[1]; Paulo Branicio[1]; [1]University of Southern California

NUCLEAR MATERIALS

Characterization of Nuclear Materials and Fuels with Advanced X-ray and Neutron Techniques — Poster Session

Sponsored by: TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Nuclear Materials Committee

Program Organizers: Xuan Zhang, Argonne National Laboratory; Jonathan Almer, Argonne National Laboratory; Maria Okuniewski, Purdue University; Joshua Kane, Idaho National Laboratory; Donald Brown, Los Alamos National Laboratory; J. Kennedy, Idaho National Laboratory; Arthur Motta, Pennsylvania State University

Monday PM **March 15, 2021**

5:30-6:30 PM

Characterization of Microstructure, Texture, And Residual Stress in a Neutron Irradiated CANDU Pressure Tube: Abdulla Alawadi[1]; *Hamidreza Abdolvand*[1]; Michael Bach[2]; Sterling St Lawrence[2]; [1]Western University; [2]Canadian Nuclear Laboratories

Synchrotron Microdiffraction Study of Cracks and Indentation on UO2 Material: Kun Mo[1]; *Yinbin Miao*[1]; Ruqing Xu[1]; Tiankai Yao[2]; Jie Lian[3]; Laura Jamison[1]; Abdellatif Yacout[1]; [1]Argonne National Laboratory; [2]Idaho National Laboratory; [3]Rensselaer Polytechnic Institute

X-ray Based Nanodiffraction to Study Strain in Materials for Nuclear Energy: *Ericmoore Jossou*[1]; Mehmet Topsakal[1]; Xiaojing Huang[1]; Khalid Hattar[2]; Hanfei Yan[1]; Yong Chu[1]; Cheng Sun[3]; Lingfeng He[3]; Jian Gan[3]; Lynne Ecker[1]; Simerjeet Gill[1]; [1]Brookhaven National Laboratory; [2]Sandia National Laboratories; [3]Idaho National Laboratory

CORROSION

Coatings and Surface Engineering for Environmental Protection III — Poster Session

Sponsored by: TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Surface Engineering Committee, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Arif Mubarok, PPG; Tushar Borkar, Cleveland State University; Rajeev Gupta, North Carolina State University; Mary Lyn Lim, PPG Industries; Raul Rebak, GE Global Research; Brian Okerberg, PPG Industries

Monday PM **March 15, 2021**

5:30-6:30 PM

Effects of Processing Conditions on the Tribocorrosion Resistance of Zr-based Thin Film Metallic Glass Coatings: *Wenbo Wang*[1]; Wenjun Cai[1]; [1]Virginia Polytechnic Institute and State University

Role of Surface Mechanical Attritions Processing Conditions on the Corrosion Behavior of Aluminum 7075 Alloys: *Vikrant Beura*[1]; Kiran Solanki[1]; [1]Arizona State University

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Poster Session

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

Program Organizers: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Vahid Attari, Texas A&M University; Jorge Munoz, University of Texas at El Paso

Monday PM **March 15, 2021**

5:30-6:30 PM

Session Chairs: Nana Ofori-Opoku, Canadian Nuclear Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Jorge Munoz, University of Texas El Paso; Vahid Attari, Texas A&M University; Enrique Martinez Saez, Clemson University

Martensitic Transformation in Superlattices of Two Non-transforming Materials: *Shivam Tripathi*[1]; Michael Titus[1]; Alejandro Strachan[1]; [1]Purdue University

Plutonium Phase Diagrams in the New Edition of the Plutonium Handbook: Experiments and Theory: *Aurelien Perron*[1]; Patrice Turchi[1]; [1]Lawrence Livermore National Laboratory

CHARACTERIZATION

Data Science and Analytics for Materials Imaging and Quantification — Poster Session

Sponsored by: TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Emine Gulsoy, Northwestern University; Charudatta Phatak, Argonne National Laboratory; Stephan Wagner-Conrad, Carl Zeiss Microscopy; Marcus Hanwell, Brookhaven National Laboratory; David Rowenhorst, Naval Research Laboratory; Tiberiu Stan, Northwestern University

Monday PM **March 15, 2021**

5:30-6:30 PM

High Dimensional Analysis of Abnormal Grain Growth under Dynamic Annealing Conditions: *Matthew Higgins*[1]; Jiwoong Kang[1]; Ning Lu[1]; He Liu[2]; Robert Suter[2]; Ashwin Shahani[1]; [1]University of Michigan; [2]Carnegie Mellon University

Quantitative EBSD Image Analysis and Prediction via Deep Learning: *Yi Han*[1]; Joey Griffiths[1]; Yunhui Zhu[1]; Hang Yu[1]; [1]Virginia Tech

Understanding Powder Morphology and Its Effect on Flowability Through Machine Learning in Additive Manufacturing: *Srujana Rao Yarasi*[1]; Andrew Kitahara[1]; Anthony Rollett[1]; Elizabeth Holm[1]; [1]Carnegie Mellon University

MATERIALS PROCESSING

Deformation Induced Microstructural Modification — Poster Session

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

Program Organizers: Arun Devaraj, Pacific Northwest National Laboratory; Suveen Mathaudhu, University of California-Riverside; Kester Clarke, Colorado School of Mines; Bharat Gwalani, Pacific Northwest National Laboratory; Daniel Coughlin, Los Alamos National Laboratory

Monday PM **March 15, 2021**

5:30-6:30 PM

Optimization of Continuous Casting Products and High Aluminium-Magnesium Alloys Utilization in Automotive Industry Applications: *Gorkem Demir*[1]; [1]Asas Alüminyum Sanayi ve Ticaret A.S

Synchrotron X-ray Probing Dynamic Structural Change of Materials under Shear Deformation by High-speed Rotational Diamond Anvil Cell: *Tingkun Liu*[1]; Bharat Gwalani[1]; Changyong Park[2]; Stas Sinogeikin[3]; Arun Devaraj[1]; [1]Pacific Northwest National Laboratory; [2]Argonne National Laboratory; [3]DAC Tools, LLC

LIGHT METALS

Magnesium Technology 2021 — Poster Session

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

Program Organizers: Victoria Miller, University of Florida; Petra Maier, University of Applied Sciences Stralsund; J. Brian Jordon, University of Alabama; Neale Neelameggham, IND LLC

Monday PM **March 15, 2021**

5:30-6:30 PM

Corrosion Behaviour of Shear Extruded Magnesium Alloy: *Vikrant Beura*[1]; Vineet Joshi[2]; Kiran Solanki[1]; [1]Arizona State University; [2]Pacific Northwest National Laboratory

Corrosion Response of Friction Stir Processed EZ33 Mg Alloy: Vasanth Shunmugasamy[1]; Marwa AbdelGawad[1]; Eisha Khalid[1]; *Bilal Mansoor*; [1]Texas A&M University at Qatar

Effect of Annealing on Microstructure and Hardness of Mg-9Al Alloy Plates Processed by Single-pass Differential Speed Rolling: *Honglin Zhang*[1]; ZhiGang Xu[1]; Sergey Yarmolenko[1]; QiuMing Wei[2]; Laszlo Kecskes[3]; Jagannathan Sankar[1]; [1]North Carolina A&T State University; [2]University of North Carolina at Charlotte; [3]Johns Hopkins University

Eutectic Modification of Mg_2Si in Mg-Si Alloys for Faster Hydrogen Absorption Kinetics.: *Manjin Kim*[1]; Julio Piraquive[1]; Yahia Ali[1]; Stuart McDonald[1]; Trevor Abbott[2]; Kazhuhiro Nogita[1]; [1]University of Queensland; [2]Magontec Ltd.

In situ Study of Mg-Zn Alloy Degradation Mechanisms towards Advancing In Vitro Testing: Max Viklund[1]; Lars Wadsö[1]; *Dmytro Orlov*[1]; [1]Lund University

Liquid Enhanced Ga-Sn Alloy Anode for RMBs: *Jiawei Liu*[1]; Chao Song[1]; Yuan Yuan[1]; Dajian Li[1]; Fusheng Pan[1]; [1]Chongqing University

Mechanical and Microstructural Behavior of Rolled AZ31B Magnesium Alloy under Three Different Stress States: *Luiz Carneiro*[1]; Duke Culbertson[1]; Qin Yu[2]; Yanyao Jiang[1]; [1]University of Nevada, Reno; [2]Lawrence Berkeley National Laboratory

Optimization of Mechanical Properties in Magnesium Zinc Alloys: *Christopher Hale*[1]; [1]North Carolina A&T University

Preparation of Thin-walled Magnesium AZ31 Alloy Tubes Using Friction Stir Extrusion: Vasanth Shunmugasamy[1]; Eisha Khalid[1]; *Bilal Mansoor*; [1]Texas A&M University at Qatar

Role of Temperature and Pre-strain in Fatigue Strength of WE43-T5 Magnesium Alloy: *Marko Knezevic*[1]; Saeede Ghorbanpour[1]; Brandon McWilliams[2]; [1]University of New Hampshire; [2]CCDC Army Research Laboratory

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Eda Aydogan, Middle East Technical University; Laurent Capolungo, Los Alamos National Laboratory; Khalid Hattar, Sandia National Laboratories; Kayla Yano, Pacific Northwest National Laboratory; Caleb Massey, Oak Ridge National Laboratory

Monday PM **March 15, 2021**

5:30-6:30 PM

Simulating the Effects of Neutron Irradiation on Zirconium Alloys: A Crystal Plasticity Finite Element Approach: *Omid Sedaghat*[1]; Hamidreza Abdolvand[1]; [1]Western University

The Thermo-mechanical Fracture of Chromium-zirconium Systems: T. Hasan[1]; *Mohammed Zikry*[1]; [1]North Carolina State University

MATERIALS DESIGN

Practical Tools for Integration and Analysis in Materials Engineering — Poster Session

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

Program Organizers: Adam Pilchak, US Air Force Research Laboratory; Michael Gram, Titanium Metals Corporation; William Joost; Raymundo Arroyave, Texas A&M University; Charles Ward, AFRL/RXM

Monday PM **March 15, 2021**

5:30-6:30 PM

An Automated Procedure for Reconstructing Deformation Twin Hierarchies in Heavily Twinned Microstructures Implemented Using MTEX: *Daniel Savage*[1]; Rodney McCabe[2]; Marko Knezevic[3]; [1]University of New Hampshire/Los Alamos National Lab; [2]Los Alamos National Laboratory; [3]University of New Hampshire

Application of Prolate Spheroid Stereology to Microtexture Regions in Ti-6Al-4V: *Jaylen James*[1]; Adam Pilchak[2]; Sushant Jha[3]; Raymundo Arroyave[1]; Eric Payton[2]; [1]Texas A&M University; [2]AFRL; [3]AFRL/UDRI

Crystal Plasticity Model for Single Crystal Ni-based Superalloys: Capturing Orientation and Temperature Dependence of Flow Stress: Satyapriya Gupta[1]; *Curt Bronkhorst*[1]; [1]University of Wisconsin, Madison

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; Kerstin Forsberg, KTH Royal Institute of Technology; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Alafara Baba, University of Ilorin; Neale Neelameggham, IND LLC

Monday PM **March 15, 2021**

5:30-6:30 PM

Extraction of Zn, Ga, Ge and In from Zinc Plant Residues: *Vivek Kashyap*[1]; [1]Colorado School of Mines

ENERGY & ENVIRONMENT

Recycling and Sustainability for Emerging Technologies and Strategic Materials — Poster Session

Sponsored by: TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Recycling and Environmental Technologies Committee

Program Organizers: John Howarter, Purdue University; Mingming Zhang, ArcelorMittal Global R&D; Elsa Olivetti, Massachusetts Institute of Technology; Hong Peng, University of Queensland

Monday PM **March 15, 2021**

5:30-6:30 PM

Computational Modeling of Current Density Distribution and Secondary Resistances for Aluminum Electrorefining in Ionic Liquids: *Md Khalid Nahian*[1]; Yuxiang Peng[1]; Laurentiu Nastac[1]; Ramana Reddy[2]; [1]The University of Alabama; [2]University of Alabama

Conductivity of AlCl3-BMIC Ionic liquid Mixtures Containing TiCl4 at Different Temperatures and Molar Ratios: *Md Khalid Nahian*[1]; Aninda Nafis Ahmed[1]; Pravin S. Shinde[1]; Ramana G. Reddy[1]; [1]The University of Alabama

LIGHT METALS

TMS-DGM Symposium: A Joint US-European Symposium on Linking Basic Science to Advances in Manufacturing of Lightweight Metals — Poster Session

Sponsored by: Deutsche Gesellschaft für Materialkunde e.V. (DGM): German Materials Society , TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

Program Organizers: William Joost; Norbert Hort, Helmholtz-Zentrum Geesthacht

Monday PM **March 15, 2021**

5:30-6:30 PM

The Microstructure, Morphology and Mechanical Properties of Rapidly Solidified Al-10wt%Si-0.4wt%Sc Alloy: *Akankshya Sahoo*[1]; Abdoul Aziz Bogno[1]; Hani Henein[1]; [1]University of Alberta

NANOSTRUCTURED MATERIALS

100 Years and Still Cracking: A Griffith Fracture Symposium — Poster Session

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

Program Organizers: Megan Cordill, Erich Schmid Institute of Materials Science; William Gerberich, University of Minnesota; David Bahr, Purdue University; Christopher Schuh, Massachusetts Institute of Technology; Daniel Kiener, Montanuniverstität Leoben; Neville Moody; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht

Tuesday PM **March 16, 2021**

5:30-6:30 PM

Session Chair: Megan Cordill, Erich Schmid Institute

Crack Driving Force Expressions Using Compliance Approach in Clamped Beam Bending Geometry: *Tejas Chaudhari*[1]; Ashwini Mishra[1]; Hrushikesh Sahasrabuddhe[1]; Nagamani Jaya Balila[1]; [1]IIT Bombay

EAM Potential for Liquid Metal Induced Fracture: *Antoine Clement*[1]; Thierry Auger[1]; [1]CNRS / PIMM

NUCLEAR MATERIALS

Accelerated Discovery and Qualification of Nuclear Materials for Energy Applications — Poster Session

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

Program Organizers: Yongfeng Zhang, University of Wisconsin-Madison; Adrien Couet, University of Wisconsin-Madison; Michael Tonks, University of Florida; Jeffery Aguiar, Idaho National Laboratory; Andrea Jokisaari, Idaho National Laboratory; Karim Ahmed, Texas A&M University

Tuesday PM **March 16, 2021**

5:30-6:30 PM

Anisotropic Biaxial Creep Behavior of Textured Nb-modified Zircaloy Cladding: *Mahmoud Hawary*[1]; K. Murty[1]; [1]North Carolina State University

Defect Cluster Mobilities and Preferred Configurations in \945-zirconium: A Comparison of Two Interatomic Potentials: *Jose March-Rico*[1]; Brian Wirth[1]; [1]University of Tennessee Knoxville

Helium Effect on Cavity Swelling in Dual-ion Irradiated Fe and Fe-Cr Alloys: *Yan-Ru Lin*[1]; Arunodaya Bhattacharya[2]; Da Chen[3]; Ji-Jung Kai[3]; Jean Henry[4]; Steven Zinkle[1]; [1]University of Tennessee; [2]Oak Ridge National Laboratory; [3]City University of Hong Kong; [4]CEA

Manufacturing Process Optimization of High-density LEU Targets for Mo-99 Production: *Kinam Kim*[1]; Tae Won Cho[1]; Sunghwan Kim[1]; Kyuhong Lee[1]; Yong Jin Jeong[1]; [1]Korea Atomic Energy Research Institute

Mesoscale Modeling of the Effect of Interfaces on Segregation of Point Defects and Solutes and the Patterning of Extended Defects: *Karim Ahmed*[1]; Abdurrahman Ozturk[1]; Merve Gencturk[1]; Lin Shao[1]; [1]Texas A&M University

Modeling and Analysis of the Effects of the Microstructure on U-10Mo Fuel Thickness Variation during Hot Rolling: *Lei Li*[1]; Vineet Joshi[1]; Ayoub Soulami[1]; [1]Battle Pacific Northwest National Lab

SPECIAL TOPICS

Acta Materialia Awards Poster Session — Poster Session

Program Organizer: Carolyn Hansson, University of Waterloo

Tuesday PM **March 16, 2021**

5:30-6:30 PM

Atom Locations of Minor Dopants and Their Role in Stabilizing the Hexagonal *951*-Cu_6Sn_5 Intermetallic Compound: *Wenhui Yang*[1]; Xuan Quy Tran[1]; Tomokazu Yamamoto[1]; Kazuhiro Nogita[2]; Syo Matsumura[1]; [1]Kyushu University; [2]The University of Queensland

Atomistic Simulation of the Formation and Fracture of Oxide Bifilms in Cast Aluminum: *Jialin Liu*[1]; Qigui Wang[2]; Yue Qi[1]; [1]Michigan State University; [2]General Motors

Bioinspired Mechanically Active Adhesives for the Repair of Heart Bleeds: *Jingjing Wu*[1]; [1]Massachusetts Institute of Technology

Concentration-dependent Atomic Mobilities in FCC CoCrFeMnNi High-entropy Alloys: *Daniel Gaertner*[1]; [1]Institute of Materials Physics, University of Münster

Demonstrating the Potential of Accurate Absolute Cross-grain Stress and Orientation Correlation Using Electron Backscatter Diffraction: *Tijmen Vermeij*[1]; Johan Hoefnagels[1]; [1]Eindhoven University of Technology

Flash Sintering of Gadolinium-doped Ceria: *Tarini Prasad Mishra*[1]; Rubens Roberto Ingraci Neto[2]; Martin Bram[1]; Olivier Guillon[1]; Rishi Raj[3]; [1]Forschungszentrum Jülich GmbH; [2]Los Alamos National Laboratory; [3]University of Colorado Boulder

Microstructural Optimization through Heat Treatment for Enhancing the Fracture Toughness and Fatigue Crack Growth Resistance of Selective Laser Melted Ti-6Al-4V Alloy: *Punit Kumar*[1]; Upadrasta Ramamurty[1]; [1]Nanyang Teechnological University

Orientation-designed Large Single-crystal Cu-Al-Mn Alloys by Abnormal Grain Growth and Their Enhanced Functional Properties: *Sheng Xu*[1]; Xiao Xu[1]; Toshihiro Omori[1]; Ryosuke Kainuma[1]; [1]Tohoku University

Titania Coated Mesoporous sSilica Particles for Sustainable Water Purification: *Ogbogu Kalu*[1]; [1]University of New Brunswick

Unravelling the Role of Zinc in Magnesium Corrosion at the Nanometer Scale: *Martina Cihova*[1]; [1]ETH Zurich

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture V: Processing-Structure-Property Investigations and Application to Qualification — 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; John Lewandowski, Case Western Reserve University; Nima Shamsaei, Auburn University; Mohsen Seifi, ASTM International/Case Western Reserve University; Steve Daniewicz, University of Alabama

Tuesday PM **March 16, 2021**

5:30-6:30 PM

Session Chair: Nik Hrabe, National Institute of Standards and Technology (NIST)

Effect of Laser Power, Laser Spot Size and Hatch Spacing on Mechanical and Microstructural Properties of 316L Stainless Steel Processed via Selective Laser Melting: *Taban Larimian*; Tushar Borkar[1]; Manigandan Kannan[2]; Dariusz Grzesiak[3]; Bandar AlMangour[4]; [1]Cleveland State University; [2]University of Akron; [3]West Pomeranian University of Technology; [4]Saudi Arabia Basic Industries Corporation

Effect of Thickness on Ultrasonic Fatigue Behavior of 316L Stainless Steel Made by Powder Bed Fusion Additive Manufacturing: *Megan Trombley*[1]; Qianying Shi[1]; John Allison[1]; [1]University of Michigan

Quantifying Surface Roughness in Additive Manufactured Ti-6Al-4V Using In-situ X-ray Imaging: *Alisha Bhatt*[1]; Chu Lun Alex Leung[1]; Gowtham Soundarapandivan[2]; Sebastian Marussi[1]; Saurabh Shah[1]; Robert Atwood[3]; Manish Tiwari[1]; Peter Lee[1]; [1]University College of London; [2]TWI Ltd; [3]Diamond Light Source Ltd

Ultrasonic Nondestructive Characterization of Hybrid Additively Manufactured 420 Stainless Steel: *Luz Sotelo*[1]; Cody Pratt[1]; Haitham Hadidi[1]; Michael Sealy[1]; Joseph Turner[1]; [1]University of Nebraska Lincoln

Variation and Impact of Surface Roughness on Fatigue in Laser Powder Bed Fusion: *Rachel Evans*[1]; Joy Gockel[1]; Luke Sheridan[1]; [1]Wright State University

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications III — Poster Session

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

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Indrajit Charit, University of Idaho; Subhashish Meher, Idaho National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Kumar Sridharan, University of Wisconsin-Madison; Xiaoyuan Lou, Auburn University

Tuesday PM **March 16, 2021**

5:30-6:30 PM

Session Chair: Michael Kirka, Oak Ridge National Laboratory

Additive Manufacturing of Nuclear Spacer Grids using Inconel 718 Alloy: Observed Distortion and Proposed Distortion Control Measures for Thin Walled Structures: *Syed Zia Uddin*[1]; Jack Beuth[1]; Qu He[1]; [1]Carnegie Mellon University

Aid of Additive Manufacturing of 2D Materials for Miniaturization: Yingtao Wang[1]; *Xian Zhang*[1]; [1]Stevens Institute of Technology

Development of Additive Manufacturing Processes for Embedding Thermocouples during Directed Energy Deposition: *Matthew McCoy*[1]; Kyu Cho[1]; John Shelton[1]; Piyush Sabharwall[1]; Isabella Van Rooyen[1]; [1]Northern Illinois University

Effect of Cold Rolling on the Microstructure and the Mechanical Properties of 316L Stainless Steel Parts Produced by Laser Powder Bed Fusion (LPBF): *Louis Lemarquis*[1]; Pierre-François Giroux[1]; Hicham Maskrot[1]; Bassem Barkia[1]; Olivier Hercher[1]; Frédéric Bondiguel[1]; Philippe Castany[2]; [1]Université Paris-Saclay, CEA; [2]Université de Rennes, INSA Rennes

Experimental Fabrication of Porous Additive Manufactured Material: *Luis Nunez*[1]; Isabella Van Rooyen[2]; [1]Northern Illinois University; [2]Idaho National Laboratory

Numerical Study to Predict the Effect of Surface Roughness on the Thermal and Hydraulic Performance of Additively Manufactured Heat Exchangers: *Jose Gonzalez*[1]; Kyu Cho[1]; John Shelton[1]; Piyush Sabharwall[1]; Isabella Van Rooyen[1]; [1]Northern Illinois University

On the In-situ Formation of Nano Oxides during Laser Powder Bed Fusion as a Function of Steel Chemistry and Atmospheric Oxygen Level: *Houshang Yin*[1]; Pu Deng[1]; Miao Song[2]; Mallikarjun Karadge[3]; Xiaoyuan Lou[1]; [1]Auburn University; [2]University of Michigan-Ann Arbor; [3]GE Research

Process-induced History Effects on the Creep Behavior of Additively Manufactured IN718 Alloys: *Saurabh Sharma*[1]; Kiran Solanki[1]; [1]Arizona State University

POSTERS

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Applications of Solidification Fundamentals — Poster Session

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

Program Organizers: Alex Plotkowski, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Northrop Grumman; Mohsen Asle Zaeem, Colorado School of Mines; Wenda Tan, University of Utah; Lianyi Chen, University of Wisconsin-Madison

Tuesday PM **March 16, 2021**

5:30-6:30 PM

Analytical Predictions and Experimental Observations of Melt Pool Geometry in Laser Powder Bed Fusion: *Kevin Graydon*[1]; Nathalia Diaz Vallejo[1]; Le Zhou[1]; Holden Hyer[1]; Brandon McWilliams[2]; Kyu Cho[2]; Yongho Sohn[1]; [1]University of Central Florida; [2]CCDC Army Research Laboratory

Continuity of Eutectic Microstructures Across Melt Pool Boundaries in Laser Powder Bed Fusion: *Jonathan Skelton*[1]; James Fitz-Gerald[1]; Jerrold Floro[1]; [1]University of Virginia

Creating Periodic Surface Structures Using Multiple Laser Beams: *Wenxuan Zhang*[1]; Wenyuan Hou[1]; Craig Arnold[1]; [1]Princeton University

Effect of Deoxidizer Addition on Melt Pool Oxidation of AISI 316L during SLM Process: *Seong Gyu Chung*[1]; Durim Eo[1]; Jung Wook Cho[1]; [1]Graduate Institute of Ferrous Technology, Postech

Energy Density on Melt Pool Dynamics and Solidification Microstructures in Laser Powder Bed Fusion Additive Manufacturing: *Tianyu Zhang*[1]; Christopher Carter[1]; Lang Yuan[1]; [1]University of South Carolina

In situ X-ray Observation and Quantification of Keyhole-induced Porosity during Laser Additive Manufacturing: *Yuze Huang*[1]; Chu Lun Alex Leung[1]; Samuel J. Clark[1]; Siu Lun Yeung[2]; Yunhui Chen[1]; Lorna Sinclair[1]; Sebastian Marussi[1]; Kamel Fezzaa[3]; Jeyarajan Thiyagalingam[2]; Peter D. Lee[1]; [1]University College London; [2]Science and Technology Facilities Council; [3]Argonne National Laboratory

Influence of Processing Parameters and Geometry Effects on Residual Stress Development in Laser Powder Bed Fusion Additive Manufacturing: *Anna Hayes*[1]; Krishna Muralidharan[1]; [1]The University of Arizona

Influence of Scan Strategies on Surface Morphology in LPBF: Emil Duong[1]; Lukas Masseling[1]; Ulrich Thombansen[1]; Christian Knaak[1]; Paul Dionne[2]; *Mustafa Megahed*[2]; [1]Fraunhofer Institute for Laser Technology ILT; [2]ESI Group

Investigation into Interfacial Mixing Behavior of Blown Powder Deposited Inconel 625- Copper Alloy Bimetallic for Improvement of Bimetallic Joint Strength: *Noah Naden*[1]; Judy Schneider[1]; Robin Osborne[2]; Paul Gradl[3]; [1]University of Alabama in Huntsville; [2]ERC Inc./ Jacobs Space Exploration Group; [3]NASA/Marshall Space Flight Center

Laser Powder Bed Fusion of Metal Composites via In Situ Dealloying: *Alyssa Chuang*[1]; Adam Peters[1]; Ian McCue[2]; Jonah Erlebacher[1]; [1]Johns Hopkins University; [2]JHU Applied Physics Laboratory

Melt Pool Evolution in High Power Selective Laser Melting of Nickel-based Alloy: Evgenii Borisov[1]; Kirill Starikov[1]; Anatoly Popovich[1]; *V. A. Popovich*[2]; [1]Peter the Great St. Petersburg Polytechnic University; [2]Delft University of Technology

On Mesoscopic Surface Formation in Metal Laser Powder Bed Fusion Process: *Shanshan Zhang*[1]; Subin Shrestha[1]; Kevin Chou[1]; [1]University of Louisville

Spatial Variation of Thermokinetics and Corresponding Grain Morphology Evolution in Laser Surface Engineered IN718: *Mangesh Pantawane*[1]; Sriswaroop Dasari[1]; Srinivas Mantri[1]; Rajarshi Banerjee[1]; Srikumar Banerjee[1]; Narendra Dahotre[1]; [1]University of North Texas

Understanding Solidification of Al-Alloys Processed by Laser Powder Bed Fusion Additive Manufacturing: Holden Hyer[1]; Le Zhou[1]; Abhishek Mehta[1]; Sharon Park[1]; Thinh Huynh[1]; Shutao Song[1]; Kyu Cho[2]; Brandon McWilliams[2]; *Yongho Sohn*[1]; [1]University of Central Florida; [2]CCDC Army Research Laboratory

Using Dimensionless Numbers to Describe Process Boundaries in Laser Powder Bed Fusion: *Theresa Hanemann*[1]; Christoph Seyfert[1]; Armin Witte[1]; Peter Holfelder[1]; Astrid Rota[1]; Martin Heilmaier[2]; [1]EOS Electro Optical Systems GmbH; [2]Karlsruhe Institute of Technology

Wire Arc Additive Manufacturing of Nano-treated High Strength Aluminum Alloys: *Maximilian Liese*[1]; Maximilian Sokoluk[1]; Yitian Chi[1]; Xiaochun Li[1]; [1]SciFacturing Lab

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development III -- Super Materials and Extreme Environments — Poster Session

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

Program Organizers: Behrang Poorganji, University of Waterloo; Hunter Martin, HRL Laboratories LLC; James Saal, Citrine Informatics; Orlando Rios, Oak Ridge National Laboratory; Atieh Moridi, Cornell University; Jiadong Gong, Questek Innovations LLC

Tuesday PM **March 16, 2021**

5:30-6:30 PM

Comprehensive Study on Creep Performance of Selective Laser Melted Inconel 718 through Post Heat Treatment and Microstructure-based Modelling: *Shun Wu*[1]; [1]Monash University

Design and Development of Multi-Microlattice Structures for Improved Mechanical Behavior: *Bikram Sahariah*[1]; Akshay Namdeo[1]; Prasenjit Khanikar[1]; [1]Indian Institute of Technology Guwahati

Influence of Heat Treatments on the Dynamic Behavior of an Additively Manufactured IN718 Alloy: *Saurabh Sharma*[1]; Kiran Solanki[1]; [1]Arizona State University

Mechanical Performance of Additively Manufactured Metallic Tetrahedral Microlattice Structure: *Akshay Namdeo*[1]; Bikram Sahariah[1]; Prasenjit Khanikar[1]; [1]Indian Institute of Technology Guwahati

Synchrotron Imaging of the Influence of Oxidation with Powder Age on Cracking Phenomena during Laser Powder Bed Fusion of CM247: *David Rees*[1]; Chu Lun Alex Leung[1]; Gowtham Soundarapandiyan[2]; Sebastian Marussi[1]; Saurabh Shah[1]; Robert Atwood[3]; Ben Saunders[4]; Gavin Baxter[4]; Peter Lee[1]; [1]University College London; [2]Coventry University; [3]Diamond Light Source Ltd.; [4]Rolls-Royce plc.

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Solid-State Phase Transformations and Microstructural Evolution — Poster Session

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

Program Organizers: Bij-Na Kim, Carpenter Additive; Andrew Wessman, University of Arizona; Chantal Sudbrack, National Energy Technology Laboratory; Eric Lass, University of Tennessee-Knoxville; Katerina Christofidou, University of Sheffield; Peeyush Nandwana, Oak Ridge National Laboratory; Rajarshi Banerjee, University of North Texas; Whitney Poling, General Motors Corporation; Yousub Lee, Oak Ridge National Laboratory

Tuesday PM **March 16, 2021**

5:30-6:30 PM

A Comparison of the Microstructure in Blown Powder Deposition Inconel 718 for Various Heat Treatments: *Giancarlo Puerto*[1]; Chris Hill[2]; Judy Schneider[1]; [1]University of Alabama in Huntsville; [2]NASA Space Flight Center

Constituent Phases and Microstructure of Cu-10Sn Alloy Produced by Laser Powder Bed Fusion: *Le Zhou*[1]; Binghao Lu[2]; Holden Hyer[2]; Abhishek Mehta[2]; Sun Hong Park[3]; Yongho Sohn[2]; [1]Marquette University; [2]University of Central Florida; [3]POSCO Technical Research Laboratories

Effect of Hot Isostatic Pressing Conditions on Microstructure Evolution and Hardness of Laser Powder Bed Fusion Processed Alloy 718: *Hamza Fagiha*[1]; Runbo Jiang[2]; Joseph Pauza[2]; Magnus Ahlfors[3]; Chad Beamer[3]; Anthony Rollett[2]; Amir Mostafaei[1]; [1]Illinois Institute of Technology; [2]Carnegie Mellon University; [3]Quintus Technologies

In Situ Observation of Phase Evolution in Ti-6Al-4V upon Laser Processing with Synchrotron X-ray Diffraction Analysis: *Seunghee Oh*[1]; Rachel Lim[1]; Joseph Aroh[1]; Joseph Pauza[1]; Andrew Chuang[2]; Benjamin Gould[2]; Niranjan Parab[2]; Joel Bernier[3]; Tao Sun[4]; Robert Suter[1]; Anthony Rollett[1]; [1]Carnegie Mellon University; [2]Argonne National Laboratory; [3]Lawrence Livermore National Laboratory; [4]University of Virginia

Microstructure-defect Printability in Laser Powder Deposition of Ni-based Superalloys: *Xueqin Huang*[1]; [1]Texas A&M University

Microstructure Evolution in Laser Deposited AISI 420 Stainless Steel: Effect of Post-processing Heat Treatment: *Madhavan Radhakrishnan*[1]; Md Mehadi Hassan[1]; David Otazu[2]; Thomas Lienert[2]; Osman Anderoglu[1]; [1]University of New Mexico; [2]Optomec Inc

Tailoring Microstructure of Selective Laser Melted TiAl-alloy with In-situ Heat Treatment via Multiple Laser Exposure: Igor Polozov[1]; Artem Kantyukov[1]; Anatoly Popovich[1]; *V. A. Popovich*[2]; [1]Peter the Great St. Petersburg Polytechnic University; [2]Delft University Of Technology

Well-aligned nanoprecipitates in Nickel alloy produced by direct metal laser sintering: *Bo Yang*[1]; Zhongxia Shang[1]; Jie Ding[1]; Jack Lopez[2]; William Jarosinski[2]; Tianyi Sun[1]; Yifan Zhang[1]; Nicholas Richter[1]; Haiyan Wang[1]; Xinghang Zhang[1]; [1]School of Materials Engineering, Purdue University; [2]Praxair Surface Techonologies Inc.

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Poster Session

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

Program Organizers: Rodney McCabe, Los Alamos National Laboratory; 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; Arul Kumar Mariyappan, Los Alamos National Laboratory; Olivia Underwood, Sandia National Laboratories

Tuesday PM **March 16, 2021**

5:30-6:30 PM

Magnetic Anisotropy and Stacking Faults in Ag/Pt/Co/Pt Multilayer Thin Films: *Yukun Liu*[1]; Michael Kitcher[1]; Marc De Graef[1]; Vincent Sokalski[1]; [1]Carnegie Mellon University

MATERIALS DESIGN

AI/Data Informatics: Applications and Uncertainty Quantification at Atomistics and Mesoscales — Poster Session I

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

Program Organizers: Kamal Choudhary, National Institute of Standards and Technology; Garvit Agarwal, Argonne National Laboratory; Wei Chen, Illinois Institute of Technology; Mitchell Wood, Sandia National Laboratories; Vahid Attari, Texas A&M University; Oliver Johnson, Brigham Young University; Richard Hennig, University of Florida

Tuesday PM **March 16, 2021**

5:30-6:30 PM

A Machine Learning Investigation of Crystallographic Parameters for Abnormal Grain Growth: *Meizhong Lyu*[1]; Joseph Pauza[1]; Ryan Cohn[1]; Elizabeth Holm[1]; [1]Carnegie Mellon University

A Sensitivity Analysis of Microstructure-Based Model for U-10Mo Hot Rolling and Annealing: *Yucheng Fu*[1]; William E Frazier III[1]; Kyoo Sil Choi[1]; Lei Li[1]; Zhijie Xu[1]; Vineet V Joshi[1]; Ayoub Soulami[1]; [1]PNNL

Machine Learning Approach of Molecular Dynamics Simulations for Body-Centered Cubic Zirconium: *Vanessa Meraz*[1]; Bethuel Khamala[1]; Armando Garcia[1]; Adrian De La Rocha[1]; Jorge Munoz[1]; Tess Smidt[2]; Wibe de Jong[2]; [1]The University of Texas at El Paso; [2]Lawrence Berkeley National Laboratory

Microstructure-driven Parameter Calibration for Mesoscale Simulation: *Theron Rodgers*[1]; Dan Bolintineanu[1]; Daniel Moser[1]; Reeju Pokharel[2]; [1]Sandia National Laboratories; [2]Los Alamos National Laboratory

Mining Structure-property Linkages in Nonporous Materials Using Interpretative Deep Learning Approach: *Haomin Liu*[1]; Niaz Abdolrahim[1]; [1]University of Rochester

POSTERS

PHYSICAL METALLURGY

Defect and Phase Transformation Pathway Engineering for Desired Microstructures — 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; Yipeng Gao, Idaho National Laboratory; Timofey Frolov, Lawrence Livermore National Laboratory; Stoichko Antonov, Max-Planck-Institut für Eisenforschung GmbH; Jessica Krogstad, University of Illinois at Urbana-Champaign; Bin Li, University of Nevada, Reno

Tuesday PM **March 16, 2021**

5:30-6:30 PM

Anisotropic Thermal Lattice Expansion and Crystallographic Structure of Strontium Aluminide within Al-10Sr Alloy as Measured by In-situ Neutron Diffraction: *Klaus-Dieter Liss*[1]; Stefanus Harjo[2]; Takuro Kawasaki[2]; Kazuya Aizawa[2]; Pingguang Xu[3]; [1]Guangdong Technion - Israel Institute of Technology (GTIIT); [2]J-PARC Center, Japan Atomic Energy Agency; [3]Materials Sciences Research Center, Japan Atomic Energy Agency

Deformation Induced Precipitation (DIP): A Cohesive Processing Strategy to Strengthen Magnesium Alloys: *Suhas Eswarappa Prameela*[1]; Peng Yi[1]; Laszlo Kecskes[1]; Michael Falk[1]; Timothy Weihs[1]; [1]Johns Hopkins University

The Effects of Defect Structure on Transformation Properties in NiTi Alloys for Phase Change Thermal Management Applications: *Asher Leff*[1]; Adam Wilson[1]; Darin Sharar[1]; [1]CCDC Army Research Laboratory

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, Advanced Cooling Technologies Inc; Jenifer Locke, Ohio State University

Tuesday PM **March 16, 2021**

5:30-6:30 PM

Session Chair: Srujan Rokkam, Advanced Cooling Technologies

Extraction of Zinc from Zinc Hypoxide in the Process of Ammonia Leaching: Linfei Zhao[1]; *Hui Li*[1]; Jinglong Liang[1]; [1]North China University of Science and Technology

The Impact of Laser Shock Peening Parameters on the Ability to Mitigate Stress Corrosion Cracking in Al-Mg Alloys: *Eric Dau*[1]; William Golumbfskie[2]; Matthew McMahon[2]; [1]Vision Point Systems; [2]Naval Surface Warfare Center, Carderock Division

MATERIALS DESIGN

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Poster Session

Sponsored by: TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, 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; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University; Jean-Charles Stinville, University of California-Santa Barbara

Tuesday PM **March 16, 2021**

5:30-6:30 PM

Micro-scale Characterization of Life-limiting Areas in Additive Manufactured Parts: *Connor Varney*[1]; Paul Rottmann[1]; [1]University of Kentucky

The Effect of Corrosion Location Relative to Local Stresses on the Fatigue Life of Geometrically-complex, Galvanically Corroded AA7075-T6: *Carly Cocke*[1]; James Burns[1]; [1]University of Virginia

PHYSICAL METALLURGY

Frontiers in Solidification Science VIII — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Phase Transformations Committee, TMS: Solidification Committee, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Damien Tourret, IMDEA Materials; Amy Clarke, Colorado School of Mines; Ulrike Hecht, Access e.V.; Nana Ofori-Opoku, Canadian Nuclear Laboratories; Melis Serefoglu, Koc University; Tiberiu Stan, Northwestern University

Tuesday PM **March 16, 2021**

5:30-6:30 PM

Session Chairs: Amy Clarke, Colorado School of Mines; Ulrike Hecht, Access e.V.; Nana Ofori-Opoku, Canadian Nuclear Laboratories; Melis Serefoglu, Koç University; Tiberiu Stan, Northwestern University; Damien Tourret, IMDEA Materials

Data-assimilation for Dendritic Solidification Using Phase-field Simulation Based on Limited Observation Data: *Yuki Imai*[1]; Shinji Sakane[1]; Tomohiro Takaki[1]; [1]Kyoto Institute of Techonology

Electronic-structure Calculations of Local Orders in Liquid Metals: *Byeongchan Lee*[1]; Geun Woo Lee[2]; [1]Kyung Hee University; [2]Korea Research Institute of Science and Standards

Multi-phase-field Lattice Boltzmann Modeling and Simulations for Semi-solid Deformation: *Namito Yamanaka*[1]; Shinji Sakane[1]; Tomohiro Takaki[1]; [1]Kyoto Institute of Technology

NANOSTRUCTURED MATERIALS

Heterostructured and Gradient Materials (HGM IV): Tailoring Heterogeneity for Superior Properties — Poster Session

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

Program Organizers: Yuntian Zhu, City University of Hong Kong; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California-Santa Barbara
; Yves Brechet, Grenoble Institute of Technology; Huajian Gao, Nanyang Technological University; Hyoung Seop Kim, Pohang University of Science and Technology; Ke Lu, Institute of Metal Research; Xiaolei Wu, Chinese Academy of Sciences

Tuesday PM **March 16, 2021**

5:30-6:30 PM

Effect of Layer Spacing and Elastic-plastic Mismatch on Fracture Toughness of Ti-TiN Multilayers: *Ashwini Mishra*[1]; Hariprasad Gopalan[2]; Marcus Hans[3]; Christoph Kirchlechner[4]; Jochen Schneider[3]; Gerhard Dehm[2]; Nagamani Balila[1]; [1]Indian Institute of Technology Bombay; [2]Max-Planck-Institut für Eisenforschung GmbH; [3]RWTH Aachen University; [4]Karlsruhe Institute of Technology

Evolution of Diffusion Joint of Al-steel Clad Strip during Heat Treatment: *Barbora Krivská*[1]; Michaela Šlapáková[1]; Rostislav Králík[1]; Lucia Bajtošová[1]; Miroslav Cieslar[1]; Mykhailo Stolbchenko[2]; Olexandr Grydin[2]; Mirko Schaper[2]; [1]Charles University; [2]Paderborn University

Hierarchical Morphologies in Co-sputter Deposited Immiscible Alloy Thin Films: *Max Powers*[1]; [1]University of Michigan

Origin of Enhanced Ductility in Laser Rapid Solidified Heterogeneous Hypereutectic Al-20Si Alloy: Slip Interactions between Soft Al Matrix and Hard Si Fibers?: *Huai-Hsun Lien*[1]; [1]University of Michigan

Work Hardening of Gradient FeCrAl Alloy: An *In- situ* Micropillar Compression Study: *Tianyi Sun*[1]; Zhongxia Shang[2]; Jaehun Cho[2]; Jie Ding[2]; Yifan Zhang[2]; Tongjun Niu[2]; Bo Yang[2]; Dongyue Xie[3]; Jian Wang[3]; Haiyan Wang[2]; Xinghang Zhang[2]; [1]Purdue University; [2]Purdue University, School of Materials Engineering; [3]University of Nebraska-Lincoln

MATERIALS PROCESSING

High Temperature Electrochemistry IV — Poster Session

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

Program Organizers: Prabhat Tripathy, Batelle Energy Alliance (Idaho National Laboratory); Guy Fredrickson, Idaho National Laboratory

Tuesday PM **March 16, 2021**

5:30-6:30 PM

Investigation on Preparation of Fe-Al Alloys by Direct Reduction of Fe2O3-Al2O3 Powder in CaCl2-NaCl Molten Salt System: Jinrui Liu[1]; *Hui Li*[1]; Jinglong Liang[1]; [1]North China University of Science and Technology

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, Texas A&M University; Kumar Sridharan, University of Wisconsin-Madison; Nathaniel Hoyt, Argonne National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Michael Short, Massachusetts Institute of Technology; Raluca Scarlat, University of California-Berkeley

Tuesday PM **March 16, 2021**

5:30-6:30 PM

Session Chair: Stephen Raiman, Texas A&M University

A High-temperature Thermodynamic Reference Electrode Enclosed in an Alumina Tube: *Mingyang Zhang*[1]; Jinsuo Zhang[1]; [1]Virginia Tech

An Update on the Round Robin for Molten Salt Chemical and Thermal Properties Characterization: *Raluca Scarlat*[1]; Theodore Bessman[2]; Jake McMurray[3]; [1]University of California, Berkeley; [2]University of South Carolina; [3]Oak Ridge National Laboratory

Cost-effective, Reliable Containment of High-temperature Molten Chlorides for Heat Transfer and Thermal Energy Storage: *Liangjuan Gao*[1]; Elizabeth Laskowksi[1]; Kenneth McGowan[1]; Robert Cullen[1]; Mario Caccia[1]; Kenneth Sandhage[1]; [1]Purdue University

Development and Demonstration of a Novel Spectroelectrochemical Cell for Molten Salts: *Dimitris Killinger*[1]; Supathorn Phongikaroon[1]; [1]Virginia Commonwealth University

Electron Energy Loss Spectroscopy Characterization of Molten Salt Corrosion Damage in Pure Ni and Model Ni-20Cr Binary Alloy: *Kaustubh Bawane*[1]; Panayotis Manganaris[1]; Yachun Wang[1]; Jagadeesh Sure[2]; Arthur Ronne[3]; Xiaoyang Liu[3]; Phillip Halstenberg[4]; Simerjeet Gill[2]; Kotaro Sasaki[2]; Yu-chen Karen Chen-Wiegart[3]; Shannon Mahurin[4]; Simon Pimblott[1]; James Wishart[2]; Lingfeng He[1]; [1]Idaho National Laboratory; [2]Brookhaven National Laboratory; [3]Stony Brook University; [4]Oak Ridge National Laboratory

Fast and Accurate High-dimensional Neural Network Interatomic Potentials for Lithium-based Fluoride Salts: *Stephen Lam*[1]; Qing-Jie Li[2]; Ronald Ballinger; Charles Forsberg[2]; Ju Li[2]; [1]University of Massachusetts - Lowell; [2]Massachusetts Institute of Technology

Fluoride Salt Purification Using Bifluoride Salt for Hydrogen Fluoride-generation: *Ronald Laehn*[1]; Dakotah Martinez[2]; Aaron Robison[1]; [1]Abilene Christian University; [2]ACU NEXT Project

High-temperature, Air-compatible Molten Salts, and an Associated Corrosion-resistant Containment Strategy, for Cost-effective and Reliable Heat Transfer and Thermal Energy Storage: *Adam Caldwell*[1]; Grigorios Itskos[1]; Saeed Bagherzadeh[1]; Mario Caccia[1]; Kenneth Sandhage[1]; [1]Purdue University

High-temperature, High-toughness, Corrosion-resistant Cermet Alloys (NiWC) for CSP Gen 3 Subsystem Component Design
: *Lewis Handy-Cardenas*[1]; Mohamed Elbakhshwan[1]; Scott Lee[1]; Mark Anderson[1]; Joseph Hensel[2]; Gabriel Santillan[2]; [1]University of Wisconsin-Madison; [2]Powdermet

Investigating Test Parameters for Isothermal Salt Compatibility Experiments: *Cory Parker*[1]; Dino Sulejmanovic[1]; James Kurley[1]; Stephen Raiman[1]; Bruce Pint[1]; [1]Oak Ridge National Laboratory

POSTERS

Performance of Corrosion Resistant Claddings on 316H Stainless Steel in Molten Fluoride Salt: *Matthew Weinstein*[1]; Will Doniger[1]; Cody Falconer[1]; Chuan Zhang[2]; Cem Topbasi[3]; Kumar Sridharan[1]; Adrien Couet[1]; [1]University Of Wisconsin Madison; [2]Computherm, LLC; [3]Electric Power Research Institute

Prediction of Actinide Salt Compounds Using Density-Functional Theory and the Universal Structure Predictor: Evolutionary Xtallography (USPEX) Algorithm: *Matthew Christian*[1]; Theodore Besmann[1]; [1]University of South Carolina

Purification of Molten NaCl-CaCl2 Using Anhydrous HCl: *D. Hamilton*[1]; [1]University of Utah

Relevance and Methods of Fluoroacidity Quantification: *Haley Williams*[1]; Nicholas Winner[1]; Raluca O. Scarlat[1]; [1]University of California - Berkeley

Short- and Medium-range Structure of Molten Fluorides with Cr Solutes: *Nicholas Winner*[1]; Haley Williams[1]; Raluca Scarlat[1]; Mark Asta[1]; [1]University of California Berkeley

Testing Setup to Analyze Particulates in 316 Stainless Steel Molten Salt Systems: *Reuben Howe*[1]; Josh Dowell[1]; Timothy Head[1]; Timothy Kennedy[1]; [1]ACU NEXT Lab

Yellowjacket: A New MOOSE-based Corrosion Modelling Application for Molten Salt Reactors: *Parikshit Bajpai*[1]; Chaitanya Bhave[2]; Max Poschmann[1]; David Andrs[3]; Michael Tonks[2]; Markus Piro[1]; [1]Ontario Tech University; [2]University of Florida; [3]Idaho National Laboratory

MATERIALS PROCESSING

Materials Engineering -- From Ideas to Practice: An EPD Symposium in Honor of Jiann-Yang Hwang — Poster Session

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

Program Organizers: Bowen Li, Michigan Technological University; Baojun Zhao, University of Queensland; Jian Li, CanmetMATERIALS; Sergio Monteiro, Instituto Militar de Engenharia; Zhiwei Peng, Central South University; Dean Gregurek, RHI Magnesita; Tao Jiang, Central South University; Yong Shi, Futianbao Environment Technologies; Cuiping Huang, FuTianBao Environment Protection Technology Company Ltd.; Shadia Ikhmayies

Tuesday PM **March 16, 2021**

5:30-6:30 PM

Session Chairs: Zack Li, XL Technologies, Inc; Zhiwei Peng, Central South University

Ballistic Evaluation of the Multilayer Armor System Reinforced by Guaruman Fiber: Raphael Reis[1]; Larissa Nunes[1]; *Sergio Monteiro*; Lucio Nascimento[1]; [1]Military Institute of Engineering

Determination of the Elasticity Modulus of a PC/rGO Nanocomposite via Impulse Excitation Technique - Sonelastic: Anderson Oliveira da Silva[1]; Ricardo Weber[1]; *Sergio Monteiro*; Karollyne Monsores[1]; [1]Military Institute of Engineering

Evaluation of Ballistic Behavior by Residual Velocity of Epoxy Composite Reinforced with Sisal Fabric after UV Radiation Exposure: *Michelle Oliveira*[1]; Lucio Nascimento[1]; Sergio Monteiro[1]; [1]Instituto Militar de Engenharia

Influence of Surface Treatment on Physical and Chemical Behavior of Politetrafluoroethylene: Karollyne Monsores[1]; Géssica Nicolau[1]; Anderson Oliveira[1]; Suzane Oliveira[1]; Ricardo Weber[1]; *Sergio Monteiro*; [1]Instituto Militar de Engenharia

Influence of Weathering on the Mechanical Performance of an Aramid Fabric: Anderson Oliveira da Silva[1]; Ricardo Weber[1]; Rodrigo Nascimento[1]; *Sergio Monteiro*; [1]Military Institute of Engineering

Physical and Morphological Analysis of Concrete Produced with Expanded Clay: *Luana Demosthenes*[1]; Julio Jorge Braga de Carvalho Nunes; Lisley Madeira Coelho[1]; Sergio Neves Monteiro[1]; Ana Maria Abreu Jorge Teixeira[1]; [1]Instituto Militar de Engenharia

Structural Characterization of Caranan Fiber (Mauritiella Aramata): Andressa Souza[1]; Raí Junio[1]; *Lucas Neuba*[1]; Raphael Reis[1]; Luana Demosthenes[1]; Sérgio Monteiro[1]; Lúcio Nascimento[1]; [1]IME

The Influence of Ultraviolet (UV) Radiation on the Surface of Coconut Fiber: Géssica Nicolau[1]; Ricardo Weber[1]; *Sergio Monteiro*[1]; Anderson Oliveira da Silva[1]; Karollyne Monsores[1]; Filipe Araújo[1]; [1]Instituto Militar de Engenharia

Thermal Behavior of Epoxy Matrix Composite Reinforced with Caranan Fibers: Andressa Souza[1]; Raí Junio[1]; Lucas Neuba[2]; Fernanda da Luz[2]; *Sergio Monteiro*[1]; Lúcio Nascimento[2]; [1]Instituto Militar de Engenharia; [2]Instituto Militar de Engenharia

Weibull Analysis of the Mechanical Properties of the Epoxy Composite Reinforced with Guaruman Fibers: Raphael Reis[1]; Larissa Nunes[1]; *Sergio Monteiro*; Lucio Nascimento[1]; [1]Military Institute of Engineering

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Functional, Energy, and Magnetic Materials — Poster Session

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

Program Organizers: Markus Chmielus, University of Pittsburgh; Sneha Prabha Narra, Worcester Polytechnic Institute; Mohammad Elahinia, University of Toledo; Reginald Hamilton, Pennsylvania State University; Iver Anderson, Iowa State University Ames Laboratory

Wednesday PM **March 17, 2021**

5:30-6:30 PM

Additive Manufacturing of Soft Magnets for Electrical Machines—Prospects and Challenges: *Tej Lamichhane*[1]; Latha Sethuraman[2]; Adrian Dalagan[1]; Haobo Wang[1]; Jonathan Keller[2]; M. Parans Paranthaman[1]; [1]Oak Ridge National Laboratory; [2]National Renewable Energy Laboratory

Effect of Processing Parameters on Thermal Cyclic Stability of Nitinol Alloys Manufactured by Selective Laser Melting: *Jianing Zhu*[1]; Evgenii Borisov[2]; Johan Bijleveld[1]; Eduard Farber[2]; Marcel Hermans[1]; Vera Popovich[1]; [1]Delft University of Technology; [2]Peter the Great Saint-Petersburg Polytechnic University

Modeling of Selective Laser Melting of NiTi Shape Memory Alloy: Laser Single Track and Melt Pool Dimension Prediction: *Hossein Abedi*[1]; Reza Javanbakht[1]; Mohammadreza Nematollahi[1]; Keyvan Safaei[1]; Ala Qattawi[1]; Mohammad Elahinia[1]; [1]The University of Toledo

ADVANCED MATERIALS

Advanced Functional and Structural Thin Films and Coatings — Poster Session

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

Program Organizers: Adele Carrado, IPCMS - CNRS; Ramana Chintalapalle, University of Texas at El Paso; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Nancy Michael, University of Texas at Arlington; Karine Mougin, Is2m Cnrs; Heinz Palkowski, Clausthal University of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology; Vikas Tomar, Purdue University

Wednesday PM **March 17, 2021**

5:30-6:30 PM

Session Chair: Ramana Chintalapalle , UTEP EL PASO

A Study on PMMA-copolymers Grafted onto Ti Using Advanced Chemistry Approach
: *Flavien Mouillard*; Patrick Masson[1]; Genevieve Pourroy[1]; Adele Carrado[1]; [1]IPCMS - CNRS

Atomic Layer Deposition & Atomic Layer Etching – An Overview of Selective Processes: Oktay Gokce[1]; Nuggehalli Ravindra[1]; *Samiha Hossain*[1]; [1]New Jersey Institute of Technology

Calcium-phosphate Plasma Electrolytic Oxidation (PEO) Coatings on AZ31 Mg Alloy: Effects of Different Tricalcium Phosphate (TCP) Concentrations: *Navid Attarzadeh*[1]; Amir Hossein Kazemi[2]; Maryam Molaei[2]; Arash Fattah-alhosseini[2]; [1]University of Texas at El Paso; [2]Bu-Ali Sina University

Studying Effects of Frequency on $ZrTiO_4/ZrO_2$ Nanocomposite Coatings on Ti–6Al–4V Alloys Produced by Plasma Electrolytic oxidation (PEO) Process: *Navid Attarzadeh*[1]; Elham Nikoomanzari[2]; Kazem Babaei[2]; Arash Fattah-alhosseini[2]; [1]University of Texas at El Paso; [2]Bu-Ali Sina University

Temperature Dependence of Energy Gap in Semiconductors – Influence on Solar Cell Performance: Leqi Lin[1]; Rayan Daroowalla[2]; *Ritvik Rangaraju*[3]; Nuggehalli Ravindra[1]; [1]New Jersey Institute of Technology; [2]University of Maryland; [3]West Windsor-Plainsboro High School South

MATERIALS PROCESSING

Advances in Surface Engineering III — Poster Session

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

Program Organizers: Tushar Borkar, Cleveland State University; Arif Mubarok, PPG; Rajeev Gupta, North Carolina State University; Sandip Harimkar, Oklahoma State University; Bharat Jasthi, South Dakota School of Mines & Tech

Wednesday PM **March 17, 2021**

5:30-6:30 PM

Damage Tolerance of TiC-laden Tribaloy T400 Suspension-powder Plasma-sprayed Composite Biocompatible Coating: *Moumita Mistri*[1]; Shrikant Joshi[2]; Kantesh Balani[1]; Kamal Kar[1]; [1]Indian Institute of Technology Kanpur; [2]University West

MATERIALS DESIGN

AI/Data Informatics: Applications and Uncertainty Quantification at Atomistics and Mesoscales — Poster Session II

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

Program Organizers: Kamal Choudhary, National Institute of Standards and Technology; Garvit Agarwal, Argonne National Laboratory; Wei Chen, Illinois Institute of Technology; Mitchell Wood, Sandia National Laboratories; Vahid Attari, Texas A&M University; Oliver Johnson, Brigham Young University; Richard Hennig, University of Florida

Wednesday PM **March 17, 2021**

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Multi-fidelity Machine-learning with Uncertainty Quantification and Bayesian Optimization for Materials Design: Application to Random Alloys: Julien Tranchida[1]; *Anh Tran*; Timothy Wildey[1]; Aidan Thompson[1]; [1]Sandia National Laboratories

Parsimonious Neural Networks Learn Classical Mechanics and an Accurate Time Integrator: *Saaketh Desai*[1]; Alejandro Strachan[1]; [1]Purdue University

Quantifying RAMPAGE Interatomic Potentials for Metal Alloys: *Elan Weiss*[1]; Arun Hegde[2]; Cosmin Safta[2]; Habib Najm[2]; David Riegner[1]; Logan Ward[1]; Wolfgang Windl[1]; [1]The Ohio State University; [2]Sandia National Laboratories

Solving Stochastic Inverse Problems for Structure-Property Linkages Using Data-Consistent Inversion: *Anh Tran*[1]; Tim Wildey[1]; [1]Sandia National Laboratories

Use of Atomistic Based Informatics to Model Ionic Bombardment to Synthesize Boron Carbides: *Kwabena Asante Boahen*[1]; Nirmal Baishnab[2]; Paul Rulis[3]; Michelle Paquette[3]; Ridwan Sakidja[1]; [1]Missouri State University; [2]University of Missouri, Columbia; [3]University of Missouri, Kansas City

MATERIALS DESIGN

AI/Data informatics: Design of Structural Materials — Poster Session

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

Program Organizers: Jennifer Carter, Case Western Reserve University; Amit Verma, Carnegie Mellon University; Natasha Vermaak, Lehigh University; Jonathan Zimmerman, Sandia National Laboratories; Darren Pagan, Pennsylvania State University; Chris Haines, Ccdc Army Research Laboratory; Judith Brown, Sandia National Laboratories

Wednesday PM **March 17, 2021**

5:30-6:30 PM

Discovery of Optimized -phase Free Ti-based Alloys Using CALPHAD and Artificial Intelligence Approach: George Dulikravich[1]; *Rajesh Jha*; [1]Florida International University

Evaluating Uncertainty in Clustering of Nanoindentation Mapping Data: Bernard Becker[1]; *Eric Hintsala*[1]; Benjamin Stadnick[1]; Douglas Stauffer[1]; Ude Hangen[1]; [1]Bruker Nano Surfaces Division

Fast and High-throughput Synthesis of Film and Bulk High-entropy Alloys: *Yu Zou*[1]; [1]University of Toronto

High-throughput Calculation to Predict the Eutectic Point in Quaternary System: *Jun Lu*[1]; Yu Zhong[1]; [1]Worcester Polytechnic Institute

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Poster Session

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

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

Wednesday PM **March 17, 2021**

5:30-6:30 PM

Session Chair: Mohsen Asle Zaeem, Colorado School of Mines

Model and Improved Dynamic Programming Algorithm for Optimization of Unplanned Slab Allocation in the Steel Plant: *Yongzhou Wang*[1]; Zhong Zheng[1]; Cheng Wang[1]; Xiaoqiang Gao[1]; [1]Chongqing University

BIOMATERIALS

Biological Materials Science — Poster Session

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

Program Organizers: David Restrepo, University of Texas at San Antonio; Steven Naleway, University of Utah; Jing Du, Pennsylvania State University; Ning Zhang, University of Alabama

Wednesday PM **March 17, 2021**

5:30-6:30 PM

Session Chairs: David Restrepo, The University of Texas at San Antonio; Jing Du, Penn State University

A Novel Cardiac Patch for Treating Myocardial Infarction: *Juan Sebastian Rincon Tabares*[1]; Juan Camilo Velasquez[1]; Hayden Bilbo[1]; Hai-Chao Han[1]; David Restrepo[1]; [1]The University of Texas at San Antonio

Bone-Mimetic ß-TNTZ Alloy for Osteointegration and Antibacterial Property: A Rat Animal Model: *Ya-Ching Yu*[1]; Shih-Jie Lin[2]; Ta-Jen Yen[1]; [1]National Tsing Hua University; [2]New Taipei Municipal TuCheng Hospital, Chang Gung Memorial Hospital, Taiwan

Strain Field Mining of Steady-state Tearing Fields in Thin Film, Heterogeneous Fiber Networks: *Sarah Paluskiewicz*[1]; Christopher Muhlstein[1]; [1]Georgia Institute of Technology

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications — Poster Session

Sponsored by: TMS Extraction and Processing Division, TMS Structural Materials Division, TMS Light Metals Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Energy Committee, TMS: Nuclear Materials Committee

Program Organizers: Xian-Ming Bai, Virginia Polytechnic Institute and State University; Yongfeng Zhang, University of Wisconsin-Madison; Larry Aagesen, Idaho National Laboratory; Vincenzo Rondinella, Jrc-Ec

Wednesday PM **March 17, 2021**

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Session Chair: Yongfeng Zhang, University of Wisconsin - Madison

A Model of Grain Boundary Energy Anisotropy in Uranium Dioxide Nuclear Fuel: *Dallin Fisher*; Evan Hansen[1]; Yongfeng Zhang[2]; Sean Masengale[2]; Axel Seoane[3]; Timothy Harbison[1]; [1]Brighan Young University-Idaho; [2]University of Wisconsin-Madison; [3]Virginia Tech

Development of Hydrothermal Corrosion Barrier Coatings for High-density Nuclear Fuels: *John Lacy*[1]; Hwasung Yeom[1]; Kyle Quillin[1]; Kathryn Metzger[2]; Edward Lahoda[2]; Kumar Sridharan[1]; [1]University of Wisconsin - Madison; [2]Westinghouse Electric Company

Hydrothermal Corrosion Study of Additive Manufactured SiC Fibers: *Arunkumar Seshadri*[1]; Akshay Dave[1]; Bren Phillips[1]; Koroush Shirvan[1]; Shay Harrison[2]; Joseph Pegna[2]; [1]Massachusetts Institute of Technology; [2]Free Form Fibers

CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2021 — Poster Session

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

Program Organizers: Jian Li, CanmetMATERIALS; Mingming Zhang, ArcelorMittal Global R&D; Bowen Li, Michigan Technological University; Sergio Monteiro, Instituto Militar de Engenharia; Shadia Ikhmayies; 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; Rajiv Soman, Eurofins EAG Materials Science LLC; Alex Moser, US Naval Research Laboratory

Wednesday PM **March 17, 2021**

5:30-6:30 PM

Session Chairs: Rajiv Soman, Eurofins EAG Materials Science LLC; Yunus Kalay, Middle East Technical University

Analysis of Potential Applications of Kamafugite Rocks in Fertilizer: Rodrigo Motta[1]; Edson Mattiello[1]; Fabiane Ballotin[1]; Patrícia Matias[1]; *Gustavo Lima*; Leonardo Pedroti[1]; Jéferson Martins[2]; Luiz Silveira[2]; [1]Federal University of Viçosa; [2]Terra Brasil Minerals

Application of Desulphurization Residue in Cementitious Mortars: Ariana Azeredo[1]; *Afonso Azevedo*; Markssuel Marvila[1]; Lucas Reis[1]; José Alexandre Linhares Júnior[1]; Carlos Maurício Vieira[1]; Jonas Alexandre[1]; Sergio Monteiro[2]; [1]Universidade Estadual do Norte Fluminense Darcy Ribeiro; [2]IME

Ballistic Behavior of Epoxidic Matrix Composites Reinforced with Graphene Oxide Functionalized Curauá Fibers: *Ulisses Costa*[1]; Lucio Nascimento[1]; Wendell Almeida Bezerra[1]; Sergio Monteiro[1]; [1]Military Institute of Engineering

Ballistic Behavior of Epoxy Matrix Composites Reinforced with Hemp Fabric Against .22 Ammunition: *Matheus Ribeiro*[1]; [1]Military Institute of Engineering

Characterization of Epoxidic Matrix Composites Reinforced with Graphene Oxide Functionalized Curaua Fibers: *Ulisses Costa*[1]; Lucio Nascimento[1]; Wendell Almeida Bezerra[1]; Sergio Monteiro[1]; [1]Military Institute of Engineering

Characterization of Piassava Fiber Collected as Industrial Waste: Juliana Carvalho[1]; Noan Simonassi[1]; *Felipe Lopes*[1]; Carlos Vieira[1]; [1]UENF

Chemical Characterization of Hemp Fabric for Engineering Composites Applications: *Matheus Ribeiro*[1]; [1]Military Institute of Engineering

Chemical, Physical and Morphological Characterization of Eco-clinker Produced From Industrial Waste: *André Oliveira*[1]; Leonardo Pedroti[1]; Guilheme Brigolini[2]; José Maria Franco de Carvalho[1]; José Carlos Lopes Ribeiro[1]; Cássia de Souza[1]; Marina Altoé[2]; Ana Carolina Martins Pereira[1]; Wellington Fernandes[1]; Beatryz Cardoso Mendes[1]; Caio Torres[1]; Gustavo Emílio Soares de Lima[1]; Márcia Maria Salgado Lopes[1]; [1]Federal University of Viçosa; [2]Federal University of Ouro Preto

Comparative Analysis of Mechanical Resistance and Corrosion of the Welded Region of Stainless Steel Lean Duplex 2102 and Stainless Steel Duplex 2205: Rômulo Candido[1]; Niander Cerqueira[1]; Victor Souza[1]; Daniel Gallo[1]; *Afonso Azevedo*; [1]Centro Universitário Redentor

Comparison Between Red Ceramic Parts With and Without Ornamental Stone Waste Under Weting and Drying Cycles: Mateus Moraes[1]; Gustavo Xavier[1]; *Afonso Azevedo*[2]; Jonas Alexandre[1]; Markssuel Marvila[1]; Sergio Monteiro[3]; Josinaldo Dias[1]; [1]UENF; [2]Fluminense Federal University; [3]IME

Compressive Properties of Additively Manufactured Titanium Carbide: Heet Amin[1]; Jianshen Wang[1]; Daniel East[2]; Ali Ameri[1]; Hongxu Wang[1]; Evgeny Morozov[1]; *Juan Escobedo-Diaz*[1]; [1]University of New South Wales; [2]CSIRO Manufaturing

Correlation between Density and Diameter Variation of Carnauba Fibers: Raí Junio[1]; Lúcio Nascimento[1]; Lucas Neuba[1]; Andressa Souza[1]; Luana Demosthenes[1]; *Sergio Monteiro*[2]; [1]Military Institute of Engineering; [2]Instituto Militar de Engenharia

Critical Length and Interfacial Strength of Sedge Fiber Embedded in Epoxy Matrix: *Lucas Neuba*[1]; Andressa Souza[1]; Raí Junio[1]; Matheus Ribeiro[1]; Raphael Reis[1]; Sergio Neves[1]; [1]Military Institute of Engineering (IME)

Density Weibull Analysis of tucum fiber with Different Diameters: *Michelle Oliveira*[1]; Fabio Garcia Filho[1]; Fernanda da Luz[1]; Sergio Monteiro[1]; [1]Instituto Militar de Engenharia

Determination of the Crystallinity Index and Morphological Aspect of Carnauba Fibers: Raí Junio[1]; Lúcio Nascimento[1]; Lucas Neuba[1]; Andressa Souza[1]; Raphael Reis[1]; *Sergio Monteiro*[2]; [1]Military Institute of Engineering; [2]Instituto Militar de Engenharia

Development of Artificial Stone with Industrial Solid Waste from Fluorescent Lamps in a Polymer Matrix: *Vitor Souza*[1]; Elaine Aparecida Costa[1]; Carlos Maurício Vieira[1]; Sérgio Neves Monteiro[2]; Geovana Carla Delaqua[1]; Daniele Tavares Campos[3]; [1]Universidade Estadual do Norte Fluminense Darcy Ribeiro; [2]Instituto Militar de Engenharia; [3]Instituto Federal do Espírito Santo

Dynamic Behavior of a High Hardness Ballistic Steel: Suzane Oliveira[1]; Karollyne Monsores[1]; Anderson Silva[1]; Géssica Nicolau[1]; Ricardo Weber[1]; Andersan Paula[1]; *Sergio Monteiro*[1]; [1]IME

Ecological Mortars with Blast Slag Residue Application: José Alexandre Linhares Júnior[1]; Markssuel Marvila[1]; *Afonso Azevedo*; Lucas Reis[1]; Ariana Azeredo[1]; Carlos Maurício Vieira[1]; Sergio Monteiro[2]; [1]Universidade Estadual do Norte Fluminense Darcy Ribeiro; [2]IME

Effect of Flying Ash as an Additive or Substitute for Portland Cement on Compression Strength in Concrete Blocks (Vibro-compacted): *Hugo García-Ortiz*[1]; Aislinn M. Teja-Ruiz[1]; Miguel Pérez-Labra[1]; Martín Reyes-Pérez[1]; Edgar Cardoso-Legorreta[1]; Felipe Legorreta-García[1]; Francisco Barrientos-Hernández[1]; Julio Cesar Juárez T.[1]; [1]Universidad Autónoma del Estado de Hidalgo

Effect of the Incorporation of Bauxite and Iron Ore Tailings on the Properties of Clay Bricks: Beatryz Mendes[1]; Leonardo Pedroti[1]; Bianca Bonomo[1]; Anna Carolina Lucas[1]; Lívia Silva[1]; Márcia Lopes[1]; *Gustavo Lima*[1]; [1]Universidade Federal De Vicosa

Evaluation of Different Methods of Surface Treatment of Natural Açaí Fiber Added in Cementitious Composites: *Afonso Azevedo*[1]; Markssuel Marvila[2]; Euzébio Zanelato[2]; Thuany Lima[2]; Daiane Cecchin[1]; Jessica Souza[3]; Marcio Barbosa[1]; Sergio Monteiro[4]; Higor Azevedo[2]; Jonas Alexandre[2]; Gustavo Xavier[2]; [1]Fluminense Federal University; [2]UENF; [3]UNB; [4]IME

Evaluation of Full Bedding Concrete Blocks Prisms with Different Laying Mortar Strength: Thuany Lima[1]; *Afonso Azevedo*[2]; Markssuel Marvila[1]; Euzébio Zanelato[1]; Jonas Alexandre[1]; Sergio Monteiro[3]; [1]UENF; [2]Fluminense Federal University; [3]IME

Evaluation of Izod Impact Energy of Epoxy Matrix Composites Reinforced with Hemp Fabric: *Matheus Ribeiro*[1]; [1]Military Institute of Engineering

Evaluation of Izod Impact Properties of the Epoxy Matrix Composite Reinforced with Curaua Fibers Functionalized with Graphen Oxide: *Ulisses Costa*[1]; Lucio Nascimento[1]; Wendell Almeida Bezerra[1]; Sergio Monteiro[1]; [1]Military Institute of Engineering

Evaluation of Mechanical Behavior in Traction of Epoxy-Caranan Composites: Andressa Souza[1]; Raí Junio[1]; *Lucas Neuba*[1]; Michelle Oliveira[1]; Sérgio Monteiro[1]; Lúcio Nascimento[1]; [1]IME

Evaluation of Tensile Strength and Elastic Modulus of the Epoxy Matrix Composite Reinforced with Hemp Fabric for Engineering Applications: *Matheus Ribeiro*[1]; [1]Military Institute of Engineering

Evaluation of the Correlation between the Diameters of the Sedge Fibers and a Morphological Characterization: *Lucas Neuba*[1]; Andressa Souza[1]; Raí Junio[1]; Matheus Ribeiro[1]; Raphael Reis[1]; Sergio Neves[1]; [1]Military Institute of Engineering (IME)

Evaluation of the Mechanical Behavior of Epxoy Matrix-hybrid Natural Faric Composite: Accelerated Aging by UV Radiation: Clara Caminha[1]; *Michelle Oliveira*[1]; Lucio Nascimento[1]; Sergio Monteiro[1]; [1]Instituto Militar de Engenharia

Evaluation of Thermal Healing in Pervious Concrete Pavers Produced with Reactive Powders Concrete: *Wellington Fernandes*[1]; Leonardo Pedroti[1]; Maurício Felisberto[1]; Guilherme Botelho[1]; Gustavo Lima[1]; Beatryz Mendes[1]; Heraldo Pitanga[1]; André Oliveira[1]; [1]Federal University of Vicosa

Incorporation of Porcelain Residue Powder and Mineral Wastes in Epoxy Matrix for Artificial Stone Purchase: Elaine Costa[1]; *Vitor Souza*[1]; Rubén Rodríguez[1]; Gabriela Barreto[1]; Sérgio Monteiro[1]; Carlos Maurício Vieira[1]; [1]Universidade Estadual do Norte Fluminense

Influence of Modifier Admixture Based on Las in Cement Pastes: Ana Carolina Martins[1]; Matheus Duarte[1]; José Maria Carvalho[1]; *André Oliveira*; Gabriel Arruda[1]; Leonardo Pedroti[1]; [1]Universidade Federal de Viçosa

Influence of the Ceramic Block Sorptivity on the Adherence of Rendering Mortars: Euzebio Zanelato[1]; *Afonso Azevedo*[2]; Markssuel Marvila[2]; Thuany Lima[3]; Jonas Alexandre[2]; Sergio Monteiro[4]; Gustavo Xavier[2]; Carlos Vieira[2]; [1]IFF; [2]UENF; [3]UCAM; [4]IME

Influence of the Granulometry of the Granite Residue on the Sorptivity of Ceramic Blocks: Euzebio Zanelato[1]; *Afonso Azevedo*; Markssuel Marvila[2]; Thuany Lima[3]; Jonas Alexandre[2]; Pedro Rocha[1]; Sergio Monteiro[4]; Carlos Vieira[2]; [1]IFF; [2]UENF; [3]UCAM; [4]IME

Influence of the Incorporation of Granite Waste on the Weathering Resistance of Soil Pigment-based Paints: Márcia Lopes[1]; Leonardo Pedroti[1]; *Gustavo de Lima*[1]; José Carlos Ribeiro[1]; Gustavo Nalon[1]; Beatryz Mendes[1]; André Oliveira Júnior[1]; [1]Federal University of Viçosa

Influence of the Mixing Processes of the Constituents of Incorporated Geopolymer Materials with Glass Waste: Lucas Reis[1]; *Afonso Azevedo*[2]; Markssuel Marvila[1]; Ariana Azeredo[1]; José Alexandre Linhares Júnior[1]; Niander Cerqueira[3]; Sergio Monteiro[4]; Carlos Mauricio Vieira[1]; [1]UENF; [2]Fluminense Federal University; [3]UNIREDENTOR; [4]IME

In-situ Investigation of Iron Ore Stock Pile during Its Stacking and Reclaiming Process: *Wen Pan*[1]; Shaoguo Chen[1]; Yapeng Zhang[1]; Zhipeng Kang[2]; Dongqing Wang[1]; [1]Beijing Key Lab of Green Recyclable Process for Iron & Steel Production Technology; [2]Shougang Jingtang United Iron & Steel Co.,Ltd.

Life Cycle Assessment Applied to Red Ceramic Bricks Production Versus Red Ceramic Bricks Incorporated with Stone Wastes: A Comparative Study: Josinaldo Dias[1]; Gustavo Xavier[1]; *Afonso Azevedo*[2]; Jonas Alexandre[1]; Carlos Mauricio Vieira[1]; Henry Colorado[3]; [1]UENF; [2]Fluminense Federal University; [3]Universidad de Antioquia

Mechanical Properties Evaluation of Epoxy Matrix Composites for Different Conditions of Volumetric Fraction of Sedge Fibers: *Lucas Neuba*[1]; Andressa Souza[1]; Raí Junio[1]; Luana Demosthenes[1]; Ulisses Costa[1]; Sergio Neves[1]; [1]Military Institute of Engineering (IME)

PCM Encapsulation for Incorporation in Construction Materials: *Gustavo Lima*[1]; Matheus Oliveira[1]; Luis Gustavo Nascimento[1]; Evandro Martins[1]; Joyce Carlo[1]; Leonardo Pedroti[1]; Nathália Albuini-Oliveira[1]; Márcia Lopes[1]; [1]Federal University of Viçosa

Physical, Chemical and Mechanical Characterization of AISI 316 Austenitic Stainless Steel: Leonardo Pinheiro[1]; Niander Cerqueira[1]; Victor Souza[1]; Daniel Gallo[1]; *Afonso Azevedo*[2]; [1]UniREDENTOR; [2]UENF

Research Progress of Aging Effects on Fiber Reinforced Polymer Composites: A Brief Review: *Michelle Oliveira*[1]; Fernanda Da Luz[1]; Sergio Monteiro[1]; [1]Instituto Militar de Engenharia

Statistical Analysis of Izod Impact Resistance of an Epoxy Matrix Reinforced with Sedge Fibers: *Lucas Neuba*[1]; Andressa Souza[1]; Raí Junio[1]; Matheus Ribeiro[1]; Michelle Oliveira[1]; Sergio Neves[1]; [1]Military Institute of Engineering (IME)

Study of Face Shell Bedding Concrete Blocks Prisms with Different Laying Mortar Strength: Thuany Lima[1]; *Afonso Azevedo*[2]; Markssuel Marvila[1]; Euzébio Zanelato[1]; Ana Luiza Paes[1]; Jonas Alexandre[1]; Sergio Neves Monteiro[1]; [1]UENF; [2]Fluminense Federal University

Study of Pathologies in Alkali Activated Materials Based on Slag: Markssuel Marvila[1]; *Afonso Azevedo*; Euzébio Zanelato[1]; Thuany Lima[1]; Geovana Delaqua[1]; Carlos Maurício Vieira[1]; Leonardo Pedroti[1]; Sergio Monteiro[1]; [1]Universidade Estadual do Norte Fluminense Darcy Ribeiro

Study of the Feasibility of Incorporation Clay From Campos Dos Goytacazes - RJ, in Mortar Applied on Walls and Ceilings: Larissa Granato[1]; Gustavo Xavier[1]; Henry Colorado[2]; *Afonso Azevedo*[3]; Jonas Alexandre[1]; Carlos Mauricio Vieira[1]; Markssuel Marvila[1]; [1]UENF; [2]Universidad de Antioquia; [3]Fluminense Federal University

Surface Characterization of Concentrated Jamesonite, in the Collectorless Flotation, in Acid, Neutral and Alkaline Medium: *Jazmín Terrazas Medina*[1]; Martín Reyes Perez[2]; Elia Guadalupe Palacios Beas[3]; Mizraim Uriel Flores Guerrero[4]; Iván Alejandro Reyes Domínguez[5]; Aislinn Michelle Teja Ruiz[1]; Miguel Pérez Labra[1]; Francisco Raúl Barrientos Hernández[1]; [1] Universidad Autonoma del Estado de Hidalgo; [2]Universidad Autónoma del Estado de Hidalgo; [3]Instituto Politécnico Nacional; [4]Universidad Tecnológica de Tulancingo. Área de Electromecánica Industrial; [5]Universidad Autónoma de San Luis Potosí

Synergy between Cu and Cr on Localized Corrosion of the Low Alloy Steels: *Kewei Gao*[1]; Luchun Yan[1]; Xiaolu Pang[1]; Zhimeng Guo[1]; Yanjing Su[1]; Lijie Qiao[1]; [1]University of Science and Technology Beijing

Synthesis and Characterization of Iron Oxide Nanoparticles for Application in the Removal of Heavy Metals from the Aqueous Medium: *Arantza Córdova López*[1]; Karen Rivera[1]; Diana Serna[1]; Laura García[1]; Pedro Ramírez[1]; Mizraim Flores[1]; [1]Universidad Tecnológica de Tulancingo

Synthesis and Characterization of ZnO Nanoparticles Obtained from the Extract of Schinus Molle: Estrella Palacios[1]; *Karime Cardenas*[1]; Jenny Dominguez[1]; Mizraim Flores[1]; Laura García[1]; Pedro Ramírez[1]; [1]Universidad Tecnológica de Tulancingo

S/TEM Characterization of Interdendritic Phases in Ni-30Cr Weld Metal 52XL: *Cheng-Han Li*[1]; Carolin Fink[1]; John Lippold[1]; Joerg Jinschek[1]; [1]The Ohio State University

The Simpex-Lattice Method Application to Optimize the Design of Soil-Slag-Fly Ash Mixtures: Mateus Henrique Rodrigues[1]; *Leonardo Pedroti*[1]; Taciano Silva[1]; Heraldo Pitanga[1]; Klaus Henrique Rodrigues[1]; Emerson Lopes[1]; [1]Federal University of Viçosa

Thermal Analysis by Differential Scanning Calorimetry of Sedge Fibers and Epoxy Matrix Composites Reinforced with Sedge Fibers: *Lucas Neuba*[1]; Sergio Neves[1]; [1]Military Institute of Engineering (IME)

Technical, Environmental and Economic Advantages in the Use of Rubber Asphalt: Mariah Soares[1]; Niander Cerqueira[1]; Felipe Almeida[1]; *Afonso Azevedo*; Markssuel Marvila[2]; [1]Centro Universitário Redentor; [2]UENF

Thermal Analysis of Sedge Fibers and Epoxy Matrix Composites Reinforced with Sedge Fibers: *Lucas Neuba*[1]; Michelle Oliveira[1]; Sergio Neves[1]; [1]Military Institute of Engineering (IME)

Thermal Stability of Plain Arapaima Scales and Scales-reinforced Epoxy Matrix Composites: *Wendell Bruno Almeida Bezerra*[1]; Ulisses Oliveira Costa[1]; Michelle Souza Oliveira[1]; Fernanda Santos da Luz[1]; Luana Crystine da Cruz Demosthenes[1]; Sergio Neves Monteiro[1]; [1]Instituto Militar de Engenharia

Thermochemical Characterization of the Carnauba Fibers: Raí Junio[1]; Lúcio Nascimento[1]; Lucas Neuba[1]; Andressa Souza[1]; *Sergio Monteiro*[2]; [1]Military Institute of Engineering; [2]Instituto Militar de Engenharia

Thermogravimetric Characterization of Epoxy Matrix Composite Reinforced with Hemp Fabric for Engineering Applications: *Matheus Ribeiro*[1]; [1]Military Institute of Engineering

Use of Glass Waste as a Geopolymerization Reaction Activator for Ceramic Materials: *Afonso Azevedo*[1]; Markssuel Marvila[2]; Euzébio Zanelato[2]; Thuany Lima[2]; Geovana Delaqua[2]; Sergio Monteiro[3]; Carlos Mauricio Vieira[2]; Leonardo Pedroti[4]; [1]Fluminense Federal University; [2]UENF; [3]IME; [4]UFV

Variation of the Silica Module for Dosing Activated Alkali Mortars: Markssuel Marvila[1]; *Afonso Azevedo*[1]; Euzébio Zanelato[1]; Thuany Lima[1]; Sergio Monteiro[2]; Carlos Maurício Vieira[2]; Jonas Alexandre[1]; Gustavo Xavier[1]; [1]Universidade Estadual do Norte Fluminense Darcy Ribeiro; [2]IME

Weibull Analysis of the Tensile Strength for Different Diameters of Cyperus Malaccensis Sedge Fibers: *Lucas Neuba*[1]; Andressa Souza[1]; Raí[1]; Matheus Ribeiro[1]; Ulisses Costa[1]; Sergio Neves[1]; [1]Military Institute of Engineering (IME)

Characterization of the Palm Fiber: A Natural Fiber from the Amazon: Edwillson Gonçalves de Oliveira Filho[1]; Roberto Tetsuo Fujiyama[1]; Jean da Silva Rodrigues[2]; Sergio Neves Monteiro[3]; Alisson Rios da Silva[1]; *Verônica Scarpini Candido*[1]; [1]Universidade Federal do Pará; [2]Federal Institute of Pará; [3]Military Engineering Institute

Evaluation of the Use of Lignocellulosic Fibers in Replacement of Synthetic Fiber in Polymer Hybrid Composites: Luciano Monteiro Almeida[1]; Roberto Tetsuo Fujiyama[1]; Sérgio Neves Monteiro[2]; Alisson Rios da Silva[1]; *Verônica Scarpini Candido*[1]; [1]Universidade Federal do Pará; [2]Military Engineering Institute

ADDITIVE TECHNOLOGIES

Computational Techniques for Multi-Scale Modeling in Advanced Manufacturing — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Extraction and Processing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Process Technology and Modeling Committee

Program Organizers: Adrian Sabau, Oak Ridge National Laboratory; Anthony Rollett, Carnegie Mellon University; Laurentiu Nastac, University of Alabama; Mei Li, Ford Motor Company; Alexandra Anderson, Gopher Resource; Srujan Rokkam, Advanced Cooling Technologies Inc

Wednesday PM **March 17, 2021**

5:30-6:30 PM

A Parametric Study of Grain Size and Its Volume Fraction Effect on Heterogeneous Materials Mechanical Properties: *Khaled Adam*[1]; Tarek Belgasam[1]; [1]Washington State University

Effect of Nozzle Injection Mode on Initial Transfer Behavior of Round Bloom: *Pu Wang*[1]; liang Li[1]; Datong Zhao[2]; Weidong Liu[2]; Songwei Wang[2]; Haiyan Tang[1]; Jiaquan Zhang[1]; [1]University of Science & Technology Beijing; [2]Shanxi Taigang Stainless Steel Co., Ltd.

Study on the In-mold Flow Behavior Driven by a Subsurface Electromagnetic Stirring for IF Steel Slab Casting: *Hong Xiao*[1]; Shaoxiang Li[2]; Pu Wang[1]; Haiyan Tang[1]; Jiaquan Zhang[1]; [1]University of Science & Technology Beijing; [2]School of Materials Science and Engineering,Tsinghua University

ADVANCED MATERIALS

High Entropy Alloys IX: Alloy Development and Properties — Poster Session

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 **March 17, 2021**

5:30-6:30 PM

Atom-by-atom Understanding of Atom Probe Tomography of HEAs: *Jiayuwen Qi*[1]; Christian Oberdorfer[1]; Emmanuelle Marquis[2]; Wolfgang Windl[1]; [1]The Ohio State University; [2]University of Michigan

Computation of Thermodynamics and Stability of FeNiCoCr(Mn/Pd) High Entropy Alloys: Competition between Equiatomic and Non-equiatomic: *Tran Nguyen-Dung*[1]; Ying Chen[1]; [1]Tohoku University

Fusion Plasma Relevant Erosion of Reduced Activation High Entropy Alloy-based lPasma-facing Material: *Owais Ahmed Waseem*[1]; Kevin Woller[1]; Faris Sweidan[2]; Ho Jin Ryu[2]; [1]Massachusetts Institute of Technology; [2]Korea Advanced Institute of Science and Technology

High Throughput *In Situ* Micro-mechanical Testing of Multi-principal Element Alloy Thin Films to Enable Rapid Combinatorial Qualification: *Robert Quammen*[1]; Paul F. Rottmann[1]; [1]University of Kentucky

Thermal and Corrosion Behaviour of Laser-Deposited High Entropy Alloys: *Modupeola Dada*[1]; Patricia Popoola[1]; Ntombizodwa Mathe[2]; Sisa Pityana[2]; Samson Adeosun[3]; Olufemi Aramide[1]; [1]Tshwane University of Technology; [2]Council for Scientific and Industrial Research; [3]University of Lagos, Akoka

ADVANCED MATERIALS

Materials for High Temperature Applications: Next Generation Superalloys and Beyond — Poster Session

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

Program Organizers: Govindarajan Muralidharan, Oak Ridge National Laboratory; Martin Heilmaier, KIT Karlsruhe; Benjamin Adam, Portland State University; Mario Bochiechio, Pratt & Whitney; Katerina Christofidou, University of Sheffield; Eric Lass, University of Tennessee-Knoxville; Jeremy Rame, Safran Aircraft Engines; Pierre Sallot, Safran; Akane Suzuki, GE Research; Michael Titus, Purdue University

Wednesday PM **March 17, 2021**

5:30-6:30 PM

Creep Deformation Behavior of Ni - 33 Co Alloy: *Divya Sri Bandla*[1]; Atul Chokshi[1]; [1]Indian Institute of Science Bangalore

On the Quantitative Characterization of Weld Microstructures: *Noah Kohlhorst*[1]; Govindarajan Muralidharan[2]; Roger Miller[2]; Ji-Cheng Zhao[3]; [1]Ohio State Univerity; [2]Oak Ridge National Laboratory (ORNL); [3]University of Maryland, Department of Materials Science and Engineering

Reference-free Potential Development for Metal-rich Carbides: *Tyler McGilvry-James*[1]; Bikash Timalsina[1]; Nirmal Baishnab[2]; Puja Adhikari[3]; Saro San[3]; Andrew Duff[4]; Wai-Yim Ching[3]; Ridwan Sakidja[1]; [1]Missouri State University; [2]University of Missouri-Columbia; [3]University of Missouri-Kansas City; [4]Daresbury Laboratory

MATERIALS PROCESSING

Materials Processing Fundamentals — Poster Session

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Jonghyun Lee, Iowa State University; Samuel Wagstaff, Oculatus; Alexandra Anderson, Gopher Resource; Fiseha Tesfaye, Abo Akademi University; Guillaume Lambotte, Boston Metal; Antoine Allanore, Massachusetts Institute of Technology

Wednesday PM **March 17, 2021**

5:30-6:30 PM

Containerless Materials Processing for Materials Science on Earth and in Space: *Jonghyun Lee*[1]; Sai Katamreddy[1]; Yong Chan Cho[2]; Sooheyong Lee[2]; Geun Woo Lee[2]; [1]Iowa State University; [2]Korea Research Institute of Standards and Science

Effect of Nitrogen on Weldability and the Microstructure in Laser Beam Welding of Duplex Stainless Steel: *Yunxing Xia*[1]; Kenshiro Amatsu[1]; Fumikazu Miyasaka[1]; Hiroaki Mori[1]; [1]Osaka University

Thermodynamic Examination of Quaternary Compounds in the Ag–Fe–(Ge, Sn)–Se Systems by the Solid-state EMF Method: Mykola Moroz[1]; *Fiseha Tesfaye*; Pavlo Demchenko[2]; Myroslava Prokhorenko[3]; Bohdan Rudyk[1]; Lyudmyla Soliak[1]; Daniel Lindberg[4]; Oleksandr Reshetnyak[2]; Leena Hupa[5]; [1]National University of Water and Environmental Engineering; [2]Ivan Franko National University of Lviv; [3]Lviv Polytechnic National University; [4]Aalto University; [5]Åbo Akademi University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Poster Session

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

Program Organizers: Rongpei Shi, Lawrence Livermore National Laboratory; Yipeng Gao, Idaho National Laboratory; Fadi Abdeljawad, Clemson University; Bharat Gwalani, Pacific Northwest National Laboratory; Qi An, University of Nevada-Reno ; Eric Lass, University of Tennessee-Knoxville; Huajing (Wilson) Song, Los Alamos National Laboratory

Wednesday PM **March 17, 2021**

5:30-6:30 PM

Dilatometric Analysis of Tempering Kinetics in a Cr–Mo–V Medium Carbon Steel: *Eliuth Barrera-Villatoro*[1]; Octavio Vázquez-Gómez[1]; Alexis Gallegos-Pérez[1]; Héctor Vergara-Hernández[1]; Edgar López-Martínez[2]; Pedro Garnica-González[1]; [1]Tecnológico Nacional de México / I.T. Morelia; [2]Universidad del Istmo

Exploring Non-conventional Microstructural Evolution in Titanium Alloys by Advanced Characterization and Machine Learning: *Dian Li*[1]; Xing Zhang[2]; Yiliang Liao[2]; Yufeng Zheng[1]; [1]University of Nevada, Reno; [2]Iowa State University

Thermal and Mechanical Characterization of the Non-isothermal Tempering of an Experimental Medium-carbon Steel: *Perla Diaz-Villaseñor*[1]; Octavio Vázquez-Gómez[1]; Héctor Vergara-Hernández[1]; Alexis Gallegos-Pérez[1]; Edgar López-Martínez[2]; Bernardo Campillo[3]; [1]Tecnológico Nacional de México / I.T. Morelia; [2]Universidad del Istmo; [3]Universidad Nacional Autónoma de México

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FINAL
TECHNICAL PROGRAM

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