FEBRUARY 27-MARCH 3, 2022

ANAHEIM CONVENTION CENTER & ANAHEIM MARRIOTT

ANAHEIM, CALIFORNIA, USA

MOBILE-FRIENDLY FINAL TECHNICAL PROGRAM

#TMSAnnualMeeting • www.tms.org/TMS2022

The content in this final technical program was generated on February 11, 2022.

Please refer to the online session sheets for the most up-to-date information.

All times listed in this final technical program are in Pacific Standard Time (UTC-8:00).

IMPORTANT

For full functionality of this mobile-friendly Technical Program PDF it is recommended that you have the Adobe Acrobat Reader™ app downloaded on your device:

1. Open the App Store or the Google Play™ Store and search "Adobe Acrobat Reader".
2. Download the free PDF Reader application on your mobile device.

Open this PDF in Adobe Acrobat Reader and set the "View Settings" to "Continuous Pages".

ADOBE ACROBAT READER

The free global standard for reliably viewing PDFs.

It is recommended that you DO NOT PRINT this version of the Technical Program.

TABLE OF CONTENTS

JUMP TO A DAY AND TIME.

Symposium Name	ROOM	MON AM	MON PM	POSTER	TUE AM	TUE PM	POSTER	WED AM	WED PM	THU AM	THU PM	ON DEMAND
Additive Manufacturing												
Additive Manufacturing and Innovative Powder Processing of Functional and Magnetic Materials	262C						•	•	•	•	•	•
Additive Manufacturing Fatigue and Fracture: Developing Predictive Capabilities	258B				•	•	•	•	•	•	•	•
Additive Manufacturing for Energy Applications IV	261B	•			•		•	•				•
Additive Manufacturing Keynote Session	257		•									
Additive Manufacturing of Large-scale Metallic Components	263A				•	•	•		•			•
Additive Manufacturing of Refractory Metallic Materials	262C	•			•	•						•
Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques II	258A	•			•	•		•	•	•		•
Additive Manufacturing: Beyond the Beam III	263B				•	•	•	•	•			•
Additive Manufacturing: Beyond the Beam III	263C	•										
Additive Manufacturing: Materials Design and Alloy Development IV: Rapid Development	261A	•			•	•	•	•	•	•		•
Additive Manufacturing: Nano/Micro-mechanics and Length-scale Phenomena	260A					•	•	•	•	•		•
Additive Manufacturing: Nano/Micro-mechanics and Length-scale Phenomena	204B										•	
Powder Materials Processing and Fundamental Understanding	263C		•		•	•	•	•	•			•
Materials Processing												
12th International Symposium on High Temperature Metallurgical Processing	213A		•	•					•			•
Advances in Powder and Ceramic Materials Science	213C	•	•	•	•	•						•
Advances in Surface Engineering IV	210C	•	•	•		•						•
Defects and Properties of Cast Metals IV	210B	•	•	•	•	•						•
Furnace Tapping 2022	213D	•	•			•						•
Furnace Tapping 2022	204B				•							
Materials Processing Fundamentals	213D			•				•	•			•
Powder Metallurgy of Light, Reactive and Other Non-ferrous Metals	211B		•									•
Rare Metal Extraction and Processing	213B	•	•									•
Mechanics & Structural Reliability												
Deformation and Damage Mechanisms of High Temperature Alloys	263A									•		•
Deformation and Damage Mechanisms of High Temperature Alloys	304B	•	•	•	•	•		•	•			
Dynamic Behavior of Materials IX	263C									•	•	•
Dynamic Behavior of Materials IX	304D	•	•	•	•	•		•	•			
Grain Boundaries and Interfaces: Metastability, Disorder, and Non-Equilibrium Behavior	263B									•		•
Grain Boundaries and Interfaces: Metastability, Disorder, and Non-Equilibrium Behavior	304C	•	•	•	•	•		•	•			
Structural Metamaterials	304A	•	•	•	•	•						•
Nuclear Materials												
Advanced Characterization and Modeling of Nuclear Fuels: Microstructure, Thermo-physical Properties	202B	•	•		•	•	•	•	•			•
Materials and Chemistry for Molten Salt Systems	203B	•	•		•	•	•	•	•			•
Materials Systems for the Future of Fusion Energy	203A				•	•	•	•	•	•	•	•
Mechanical Behavior and Degradation of Advanced Nuclear Fuel and Structural Materials	204A	•	•		•	•	•	•	•		•	•
Synergistic Irradiation, Corrosion, and Microstructural Evolution in Nuclear Materials	202A				•	•	•	•	•	•		•
Physical Metallurgy												
Computational Thermodynamics and Kinetics	255C	•	•		•	•	•	•	•	•	•	•
Phase Transformations and Microstructural Evolution	255B	•	•		•	•	•	•	•	•	•	•
Light Metals												
2022 Light Metals Keynote Session	204B	•										
Alumina & Bauxite	On-Demand Only											•
Aluminum Alloys, Processing and Characterization	208B		•	•	•	•			•			•
Aluminum Reduction Technology	209B					•				•		•
Aluminum Reduction Technology	211A		•									
Aluminum Reduction Technology Joint Session with REWAS: Decarbonizing the Metals Industry	210C				•							•
Cast Shop Technology	209A		•		•			•	•			•
Electrode Technology for Aluminum Production	208A		•		•	•						•
Failure, and a Career That is Anything But: An LMD Symposium Honoring J. Wayne Jones	209B		•		•							•
Magnesium Technology	210A	•		•	•			•		•	•	•
Primary Aluminum Industry - Energy and Emission Reductions: An LMD Symposium in Honor of Halvor Kvande	208A							•	•			•
Recycling and Sustainability in Cast Shop Technology: Joint Session with REWAS 2022	209A					•						•
Characterization												
Advanced Characterization Techniques for Quantifying and Modeling Deformation	207A	•	•		•	•		•	•	•	•	•
Advanced Real Time Imaging	206A	•			•	•	•	•				•
Characterization of Minerals, Metals and Materials 2022	207B	•	•		•	•	•	•		•		•

Symposium Name	ROOM	MON AM	MON PM	POSTER	TUE AM	TUE PM	POSTER	WED AM	WED PM	THU AM	THU PM	ON DEMAND
Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling	206B	•	•		•		•	•	•	•	•	•
Seeing is Believing -- Understanding Environmental Degradation and Mechanical Response Using Advanced Characterization Techniques: An SMD Symposium in Honor of Ian M. Robertson	207C	•	•		•	•		•	•	•		•
Nanostructured Materials												
30 Years of Nanoindentation with the Oliver-Pharr Method and Beyond	259A	•	•	•	•	•						•
30 Years of Nanoindentation with the Oliver-Pharr Method and Beyond	259B								•		•	
30 Years of Nanoindentation with the Oliver-Pharr Method and Beyond	204B									•		
Advances and Discoveries in Non-equilibrium Driven Nanomaterials and Thin Films	259B		•	•	•							•
Functional Nanomaterials: Functional Low-Dimensional (0D, 1D, 2D) Materials 2022	260B	•	•	•	•	•		•	•	•	•	•
Mechanical Behavior at the Nanoscale VI	262B	•	•	•	•	•		•		•		•
Mechanical Behavior at the Nanoscale VI	204B								•			
Self-organizing Nano-architectured Materials	260C	•	•	•	•	•		•				•
Ultrafine-grained and Heterostructured Materials (UFGH XII)	262A	•	•	•	•	•		•	•	•		•
Advanced Materials												
2D Materials – Preparation, Properties & Applications	252C	•	•	•								•
Advanced Functional and Structural Thin Films and Coatings	204B					•						
Advanced Functional and Structural Thin Films and Coatings	252B			•				•	•	•		•
Advances in Multi-Principal Elements Alloys X: Alloy Development and Properties	251A	•	•			•		•	•	•	•	•
Advances in Multi-Principal Elements Alloys X: Structures and Modeling	251B	•	•	•	•	•		•	•	•	•	•
Bulk Metallic Glasses XIX	253C		•	•	•	•		•		•	•	•
High Performance Steels	252C					•		•	•	•	•	•
Materials in Sport	251C	•										
Refractory Metals	252B	•	•		•							•
Electronic Materials												
Alloys and Compounds for Thermoelectric and Solar Cell Applications X	303D	•		•	•			•				•
Electronic Packaging and Interconnections	303B	•			•							•
Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXI	303A		•		•	•						•
Recent Advances in Printed Electronics and Additive Manufacturing: 2D/3D Functional Materials, Fabrication Processes, and Emerging Applications	303C	•	•	•	•	•						•
Energy & Environment (ncluding REWAS 2022 Symposia)												
Advanced Magnetic Materials for Sensors, Power, and Multifunctional Applications	213B								•	•	•	•
Advanced Materials for Energy Conversion and Storage 2022	212B	•	•	•	•	•		•	•	•		•
Composite Materials for Sustainable Eco-Friendly Applications	211A			•					•	•		•
Composites for Energy Applications: Materials for Renewable Energy Applications 2022	210D			•		•			•			•
Magnetics and the Critical Materials Challenge: An FMD Symposium Honoring Matthew J. Kramer	210D	•	•		•							•
REWAS 2022: Coupling Metallurgy and Sustainability: An EPD Symposium in Honor of Diran Apelian	204B		•									
REWAS 2022: Coupling Metallurgy and Sustainability: An EPD Symposium in Honor of Diran Apelian	211A				•	•						•
REWAS 2022: Energy Technologies and CO2 Management	212A	•			•							•
REWAS 2022: Plenary	204B		•									
REWAS 2022: Poster Session	Exhibit Hall C			•								
REWAS 2022: Recovering the Unrecoverable	211B					•						•
REWAS 2022: Sustainable Production and Development Perspectives	211B				•							•
REWAS 2022: Automation and Digitalization for Advanced Manufacturing	212A							•				•
REWAS 2022: Automation and Digitalization for Advanced Manufacturing	211B								•			
REWAS 2022: Decarbonizing the Materials Industry	212A					•			•			•
Biomaterials												
Advances in Biomaterials for 3D Printing of Scaffolds and Tissues	201A	•	•				•					
Biological Materials Science	201B	•	•		•	•	•		•			•
Biological Materials Science	204B							•				
BioNano Interfaces and Engineering Applications	201A				•	•	•	•	•			•
Materials Design												
Advances in Titanium Technology	252A		•		•	•	•	•	•	•		•
AI/Data Informatics: Computational Model Development, Validation, and Uncertainty Quantification	256A	•	•		•	•	•	•	•	•	•	•
Algorithm Development in Materials Science and Engineering	253A	•	•		•	•	•	•	•	•		•
Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling	254B	•	•		•	•		•				•

Symposium Name	ROOM	MON AM	MON PM	POSTER	TUE AM	TUE PM	POSTER	WED AM	WED PM	THU AM	THU PM	ON DEMAND
Hume-Rothery Symposium on Connecting Macroscopic Materials Properties to Their Underlying Electronic Structure: The Role of Theory, Computation, and Experiment	255A	•	•		•	•						•
ICME Case Studies: Successes and Challenges for Generation, Distribution, and Use of Public/Pre-Existing Materials Datasets	254A	•	•									•
Materials Design and Processing Optimization for Advanced Manufacturing: from Fundamentals to Application	253B	•	•		•	•	•	•	•	•		•
Metal-Matrix Composites: Advances in Processing, Characterization, Performance and Analysis	256B	•	•		•	•		•				•
Microstructural Templates Consisting of Isostructural Ordered Precipitate / Disordered Matrix Combinations: Microstructural Evolution and Properties	254A				•	•			•			•
Recent Investigations and Developments of Titanium-containing High Entropy Alloys	251C							•				•
Corrosion												
Environmental Degradation of Additively Manufactured Alloys	201C	•	•		•							•
Environmental Degradation of Multiple Principal Component Materials	201C			•				•	•	•		•
Environmentally Assisted Cracking: Theory and Practice	201D	•	•	•	•	•		•	•	•		•
Special Topics												
2022 Technical Division Student Poster Contest	Exhibit Hall C			•								
Acta Materialia Symposium	Ballroom E					•						•
Diversity in the Minerals, Metals, and Materials Professions 4 (DMMM4)	Marriott Grand Ballroom F							•	•	•	•	•
Diversity in the Minerals, Metals, and Materials Professions 4 (DMMM4)	Marriott Grand Ballroom H, J, K								•	•		
Frontiers of Materials Award Symposium Session: Data-Driven, Machine-learning Augmented Design and Novel Characterization for Nano-architectured Materials	260C								•			•
Frontiers of Materials Award Symposium: Microbiologically Influenced Corrosion - How Organisms Accelerate Materials Degradation	On-Demand Only											•
Frontiers of Materials Award Symposium: Nanocarbon-based Flexible Devices: Emerging Materials and Processes	260A	•	•		•							
Late News Poster Session	Exhibit Hall C			•			•					
Moving Forward from a Pandemic: How the Field of Materials Science Has Adapted (2022 Student-led Symposium)	202A	•	•									•
Nix Award and Lecture Symposium: Nanomechanics and Mechanomaterials	259A								•			
Nix Award and Lecture Symposium: Recent Advances in Nanoindentation and Small-Scale Mechanical Testing	259A							•				

LIGHT METALS

2022 Light Metals Keynote Session — 50 Years of Continuous Light Metals Proceedings - Highlights and Vision for the Century

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

Program Organizer: Linus Perander, Yara International

Monday AM | February 28, 2022
204B | Anaheim Convention Center

Session Chair: Linus Perander, Yara International

8:30 AM Introductory Comments: Linus Perander, Yara International

8:35 AM Keynote
An Overview of the Last 50 Years of the Bayer Process: *Gyorgy Banvolgyi*[1]; [1]Bán-Völgy Limited Partnership

8:55 AM Keynote
The Evolution of Smelting Aluminas: *James Metson*[1]; [1]University of Auckland

9:15 AM Keynote
Review of Different Types of Models Related to Aluminum Reduction Cell Design and Operation: *Marc Dupuis*[1]; [1]GeniSim Inc.

9:35 AM Keynote
50 Years of Fundamental Research, Continuous Development, and Technology Innovation within the Aluminum Smelting Industry: *Jayson Tessier*[1]; [1]Alcoa Corporation

9:55 AM Break

10:10 AM Keynote
50 Years of Aluminum Cast House Technology Development: Lessons from 5 Case Studies: *John Grandfield*[1]; [1]Grandfield Technology

10:30 AM Keynote
From Grain Refining to Casting Defects: Simplicity in Complexity: *Dmitry Eskin*[1]; [1]Brunel University London

10:50 AM Keynote
Challenges for the Carbon Transition – Revisiting 50 Years of Anode Technology Development: *Alan Tomsett*[1]; [1]Rio Tinto Pacific Operations

11:10 AM Keynote
50 Years of Research and Developments on Cathode Designs in Aluminium Reduction: *Arne Ratvik*[1]; [1]SINTEF

11:30 AM Panel Discussion

ADVANCED MATERIALS

2D Materials – Preparation, Properties & Applications — Session 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

Monday AM | February 28, 2022
252C | Anaheim Convention Center

Session Chairs: Ramana Chintalapalle, University of Texas ; David Bird, US Army

---

8:30 AM Introductory Comments

8:40 AM
Synthesis and Characterization of Laser-induced Graphene for Gas Sensing Applications: *Cadre Francis*[1]; Zach Dike[1]; Ariel Briggs[1]; Paul Simmonds[1]; Jennifer Forbey[1]; David Estrada[1]; [1]Boise State University

9:00 AM Invited
A Comprehensive Understanding of the Gas Sensing Properties of 2D Materials Using the Framework of Density Functional Theory: *Mohsen Asle Zaeem*[1]; Siby Thomas[1]; [1]Colorado School of Mines

9:30 AM
Corrosion Behaviour of Atomic Layers of Graphene on Nickel Surfaces Exposed to Aggressive Microbial Environments: *Ramesh Devadig*[1]; Md Hasan-Ur Rahman[1]; Pawan Sigdel[1]; Suvarna Talluri[1]; Manoj Tripathi[2]; Bharat Jasthi[1]; Venkataramana Gadhamshetty[1]; [1]South Daota School of Mines and Technology; [2]University of Sussex

9:50 AM
Effect of Temperature and Acoustic Pressure during Ultrasound Liquid Phase Processing of Graphite in Water: *Justin Morton*[1]; Dmitry Eskin[2]; Nicole Grobert[3]; Jiawei Mi[4]; Kyriakos Porfyrakis[5]; Paul Prentice[6]; Iakovos Tzanakis[1]; [1]Oxford Brookes University; [2]Brunel University London; [3]University of Oxford ; [4]University of Hull; [5]University of Greenwich; [6]University of Glasgow

10:10 AM Break

10:30 AM
Ferromagnetism in Q-carbon Balls as a Function of Their Size: *Nayna Khosla*[1]; Jagdish Narayan[1]; Kaushik Sarkar[2]; Dhananjay Kumar[2]; [1]North Carolina State University; [2]North Carolina Agricultural and Technical State University

10:50 AM
Well-defined 3D Printing of Titanium Carbide (Ti3C2Tx) MXene Nanosheets into Complex and Hierarchical Microarchitectures with High Aspect Ratio: *Bin Yuan*[1]; Chunshan Hu[1]; Md. Azahar Ali[1]; Rahul Panat[1]; [1]Carnegie Mellon University

---

NANOSTRUCTURED MATERIALS

30 Years of Nanoindentation with the Oliver-Pharr Method and Beyond — Main Session - 30 years of Nanoindentation with the Oliver-Pharr Method

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

Program Organizers: Verena Maier-Kiener, Montanuniversitaet Leoben; Benoit Merle, University Erlangen-Nuremberg (Fau); Erik Herbert, Michigan Technological University; Samantha Lawrence, Los Alamos National Laboratory; Nigel Jennett, Coventry University

Monday AM | February 28, 2022
259A | Anaheim Convention Center

Session Chairs: Benoit Merle, University Erlangen-Nuremberg (Fau); Samantha Lawrence, Los Alamos National Laboratory

---

8:30 AM Introductory Comments

8:40 AM Invited
Measurement of Hardness and Elastic Modulus by Depth Sensing Indentation: Improvements to the Technique Based on Continuous Stiffness Measurement: *Warren Oliver*[1]; Phani Sudharshan[2]; George Pharr[3]; [1]KLA; [2]ARCI; [3]Texas A&M University

9:05 AM Invited
Nanoindentation's Top Ten Unexpected and Unusual Applications: *George Pharr*[1]; [1]Texas A&M University

9:30 AM Invited
On the Generality of the Contact Stiffness Relationship in Frictional Contact of Dissimilar Elastic Solids: *Yanfei Gao*[1]; Allan Bower[2]; [1]University of Tennessee-Knoxville; [2]Brown University

9:55 AM Break

10:15 AM Invited
From Instrumented Indentation to Nanoindentation and Beyond: *Jean-Luc Loubet*[1]; [1]LTDS UMR CNRS 5513

10:40 AM Invited
Nanoindentation: From the 1-D Original to 2 Dimensions: *John Pethica*[1]; [1]Trinity College Dublin

11:05 AM Invited
10% Rule of Thumb for Indentation Mechanical Behavior: Fact or Fiction: *Megan Cordill*[1]; [1]Erich Schmid Institute of Materials Science

11:30 AM
Nucleation, Activation, and Looking for Perfection: Yield Points in Nanoindentation: *David Bahr*[1]; Michael Maughan[2]; Alexandra Burch[3]; [1]Purdue University; [2]University of Idaho; [3]Los Alamos National Laboratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications IV — Mechanical Properties and Performance Testing

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

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

Monday AM | February 28, 2022
261B | Anaheim Convention Center

Session Chair: Indrajit Charit, University of Idaho

8:30 AM Invited
Additive Manufacturing Topology Optimization and Materials Testing at Westinghouse: William Cleary[1]; *Thomas Pomorski*[2]; [1]Westinghouse Electric; [2]Penn United Technologies

9:00 AM
Topological Optimization of CoCrMo Lattice Structures Fabricated by Laser Powder Bed Fusion: *Bandar AlMangour*[1]; So-Yeon Park[2]; Kyu-Sik Kim[2]; Dariusz Grzesiak[3]; Kee-Ahn Lee[2]; [1]King Fahd University of Petroleum and Minerals; [2]Inha University; [3]West Pomeranian University of Technology

9:20 AM
Mechanical and Corrosion Properties of Friction Surfaced 304L Stainless Steel for Crack Repair: *Hemant Agiwal*[1]; Hwasung Yeom[1]; Kenneth Ross[2]; Kumar Sridharan[1]; Frank Pfefferkorn[1]; [1]University of Wisconsin Madison; [2]Pacific Northwest National Laboratory

9:40 AM
Evaluation of Tensile Strength and Microstructure of 304L Stainless Steel Repaired via Additive Friction Stir Deposition: *Harish Rao*[1]; Malcom Williams[1]; Christopher Williamson[1]; Noah Zahm[1]; Paul Allison[1]; Brian Jordon[1]; Luke Brewer[1]; Vijay Vasudevan[1]; [1]University of Alabama

10:00 AM Break

10:20 AM
Oxide Dispersion Strengthened Stainless Steel by Reactive Additive Manufacturing: *Houshang Yin*[1]; Jingfan Yang[1]; Bingqiang Wei[2]; Mukesh Bachhav[3]; Jian Wang[2]; Xiaoyuan Lou[1]; [1]Auburn University; [2]University of Nebraska–Lincoln; [3]Idaho National Laboratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Refractory Metallic Materials — Additive Manufacturing of Refractory Alloys and Pure Refractory Elements

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

Program Organizers: Antonio Ramirez, Ohio State University; Jeffrey Sowards, NASA Marshall Space Flight Center; Isabella Van Rooyen, Pacific Northwest National Laboratory; Omar Mireles, NASA Marshall Space Flight Center; Eric Lass, University of Tennessee-Knoxville; Faramarz Zarandi, Raytheon Technologies; Edward Herderick, Ohio State University; Matthew Osborne, Global Advanced Metals

Monday AM | February 28, 2022
262C | Anaheim Convention Center

Session Chairs: Antonio Ramirez, The Ohio State University; Jeffrey Sowards , Nasa - MSFC; Isabella Van Rooyen, Pacific Northwest National Laboratory

---

8:30 AM Introductory Comments

8:35 AM Invited
Refractory Metals – Some Historical Observations: *Jeffrey Wadsworth*

9:10 AM
Additive Manufacture of Refractory Metals for Aerospace Applications: *Omar Mireles*[1]; Jeffrey Sowards[1]; [1]NASA Marshall Space Flight Center

9:30 AM
Refractory Development Framework Using Computational Modeling: *Nathan Daubenmier*[1]; Antonio Ramirez[1]; Fredrick Michael[2]; Jeffrey Sowards[2]; Omar Mireles[2]; [1]The Ohio State University; [2]NASA

9:50 AM Break

10:10 AM
Laser Powder-bed-fusion of Pure Tungsten for Fusion Energy Applications: *Alberico Talignani*[1]; Shiqi Zheng[1]; Philip DePond[2]; Maria Strantza[2]; Jianchao Ye[2]; Y. Morris Wang[1]; [1]University of California, Los Angeles; [2]Lawrence Livermore National Laboratory

10:30 AM
LPBF Printing of Nb for the Production of 3D Resonance Cavities: *Antonio Ramirez*[1]; Ricardo Namur[2]; Graham Clark[1]; David Doll[3]; Michael Sumption[1]; [1]Ohio State University; [2]Univ. Estadual de Ponta Grossa; [3]Hypertechresearch

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques II — High-speed X-ray Diffraction

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

Program Organizers: Fan Zhang, National Institute of Standards and Technology; Donald Brown, Los Alamos National Laboratory; Andrew Chuang, Argonne National Laboratory; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Tao Sun, University of Virginia

Monday AM | February 28, 2022

258A | Anaheim Convention Center

Session Chair: Andrew Chuang, Argonne National Laboratory

8:30 AM Introductory Comments

8:40 AM Invited
In Situ X-ray Diffraction and Visualization of Laser Melting and Subsequent Phase Evolution: *Anthony Rollett*[1]; [1]Carnegie Mellon University

9:10 AM
Study of Solidification Behavior in Laser Additive Manufacturing Using Synchrotron X-ray Diffraction: Adrita Dass[1]; *Atieh Moridi*[1]; [1]Cornell University

9:30 AM Invited
Unveiling Phase Transformation Dynamics of Metals under Additive Manufacturing Conditions by In-situ High-speed X-ray Diffraction: *Lianyi Chen*[1]; [1]University of Wisconsin-Madison

10:00 AM Break

10:15 AM Invited
Application of High-speed X-ray Diffraction to Understand the Microstructure Evolution during Additive Manufacturing of Hot-work Tool Steels: Greta Lindwall[1]; Niklas Holländer Pettersson[1]; *Hans-Henrik König*[1]; A. Durga[1]; Chrysoula Ioannidou[1]; Fan Zhang[2]; Andrew Chihpin Chuang[3]; Qilin Guo[4]; Lianyi Chen[4]; Steven Van Petegem[5]; [1]KTH Royal Institute of Technology; [2]NIST; [3]Argonne National Laboratory; [4]University of Wisconsin; [5]Paul Scherrer Institut

10:45 AM
In-situ Temperature Quantification during Laser Powder Bed Fusion Additive Manufacturing: *Rachel Lim*[1]; Tuhin Mukherjee[1]; Tarasankar DebRoy[1]; Thien Phan[2]; Darren Pagan[1]; [1]Pennsylvania State University; [2]National Institute of Standards and Technology

11:05 AM
Investigating the Ferrite-to-Austenite Solidification Competition in Stainless Steel Laser Welds with Time-resolved X-ray Diffraction: *Joseph Aroh*[1]; Seunghee Oh[1]; Rachel Lim[2]; Benjamin Gould[3]; Andrew Chuang[3]; P. Chris Pistorius[1]; Anthony Rollett[1]; [1]Carnegie Mellon University; [2]Pennsylvania State University; [3]Argonne National Laboratory

11:25 AM
Time-resolved Structural Characterization of Ni Alloy 718 under Laser Processing with In-situ Synchrotron X-ray Diffraction: *Seunghee Oh*[1]; Rachel Lim[2]; Joseph Aroh[1]; Benjamin Gould[3]; Andrew Chuang[3]; Robert Suter[1]; Anthony Rollett[1]; [1]Carnegie Mellon University; [2]Penn State University; [3]Argonne National Laboratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Beyond the Beam III — Binder Jetting

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

Program Organizers: Brady Butler, US Army Research Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory; James Paramore, US Army Research Laboratory; Nihan Tuncer, Desktop Metal; Markus Chmielus, University of Pittsburgh; Paul Prichard, Kennametal Inc.

Monday AM | February 28, 2022
263C | Anaheim Convention Center

Session Chair: Peeyush Nandwana, Oak Ridge National Laboratory

---

8:30 AM
3D Binder-jet Printed Metal Filters: Aaron Acierno[1]; Teddi Sedlar[1]; Eric Rhodes[1]; *Markus Chmielus*[1]; [1]University of Pittsburgh

8:50 AM
Binder Jet Additive Manufactured H13: Microstructure Evolution and Properties: *Peeyush Nandwana*[1]; Rangasayee Kannan[1]; Kinga Unocic[1]; [1]Oak Ridge National Laboratory

9:10 AM
Impact of Grain Boundary Mobility on Decreasing Porosity in Metal Binder Jetting of Free-sintering Low-alloy Steel: *Stephen House*[1]; Pedro De Souza-Ciacco[1]; Javier Carreno[1]; Jackeline Vicente-Vazquez[1]; Calixto Garcia[1]; [1]University of Pittsburgh

9:30 AM
Droplet-powder Interactions in Binder Jetting: From Droplet to Line to Layer to Part: *Nathan Crane*[1]; Trenton Colton[1]; Colton Inkley[1]; [1]Brigham Young University

9:50 AM Break

10:10 AM
Print Parameter Effects on Porosity Distribution in Binder Jetting of WC-Co: *Paul Prichard*[1]; Hadi Miyanaji[1]; Zhuqing Wang[1]; [1]Kennametal Inc.

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development IV: Rapid Development — Fundamentals of Rapid Alloy Development

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering 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 | February 28, 2022
261A | Anaheim Convention Center

Session Chair: Behrang Poorganji, University of Toledo

8:30 AM Invited
Accelerating Materials Design for Additive Manufacturing through Graded Alloy Deposition Techniques: *Wei Xiong*[1]; [1]University of Pittsburgh

9:00 AM Invited
Additive Manufacturing Based Combinatorial Approach for Assessing the Magnetic Properties of High Entropy Alloys: Sriswaroop Dasari[1]; M.S.K.K.Y. Nartu[1]; Varun Chaudhary[2]; Tushar Borkar[3]; Bharat Gwalani[4]; Raju Ramanujan[2]; *Rajarshi Banerjee*[1]; [1]University of North Texas; [2]Nanyang Technological University; [3]Cleveland State University; [4]Pacific Northwest National Laboratory

9:30 AM Invited
Design of Alloy Compositions Conducive to AM: *Abhinav Saboo*[1]; Marie Thomas[1]; Jacqueline Hardin[1]; Greg Olson[1]; Jiadong Gong[1]; Dana Frankel[1]; [1]QuesTek Innovations LLC

10:00 AM Break

10:15 AM Invited
Why Model When You Can Just Go Print? Valuable Lessons From "Quick and Clean" Experimentation in AM: *Jacob Nuechterlein*[1]; [1]Elementum 3D, Inc.

10:45 AM
Design Cycle Reductions in Novel Material and Alloy Development: Michael Juhasz[1]; *Melanie Lang*[1]; Jeff Riemann[1]; [1]FormAlloy Technologies, Inc.

11:05 AM
A Phase-field Study of Microstructure Development in a Melt Pool during Additive Manufacturing: *Yijia Gu*[1]; Xiaoming He[1]; [1]Missouri University of Science and Technology

11:25 AM
Rapid Alloy Design via Additively Manufacturing Compositionally Graded Materials: Siyuan Wei[1]; *Yakai Zhao*[1]; Pei Wang[2]; Upadrasta Ramamurty[1]; [1]Nanyang Technological University; [2]Institute of Materials Research and Engineering, Agency for Science, Technology and Research

---

NUCLEAR MATERIALS

Advanced Characterization and Modeling of Nuclear Fuels: Microstructure, Thermo-physical Properties — Thermo-physical and Microstructure Properties of Nuclear Fuels Special Session - Early Career

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

Program Organizers: David Frazer, Idaho National Laboratory; Fabiola Cappia, Idaho National Laboratory; Tsvetoslav Pavlov, Idaho National Laboratory; Peter Hosemann, University of California

Monday AM | February 28, 2022
202B | Anaheim Convention Center

Session Chairs: David Frazer, Idaho National Laboratory ; Fabiola Cappia, Idaho National Laboratory ; Tsvetoslav Pavlov, Idaho National Laboratory

---

8:30 AM Invited
Investigation of Hot-cell Capable Thermal Conductivity Measurements for Ceramic Fuels: *Troy Munro*[1]; Justin Loose[1]; Brian Merritt[1]; Peter Hartvigsen[1]; Ryan Ruth[1]; [1]Brigham Young University

8:50 AM Invited
Thermal Stability of Uranium Compounds and Advanced Nuclear Materials under Extreme Conditions: *Elizabeth Sooby*[1]; [1]University of Texas at San Antonio

9:10 AM
An Atomistic Study of the Anisotropic Elastic Response of Defects in Alpha Uranium: *Yuhao Wang*[1]; Benjamin Beeler[2]; Andrea Jokisaari[3]; [1]University of Michigan Ann Arbor; [2]North Carolina State University; [3]Idaho National Laboratory

9:30 AM
Micromechanical Behavior of Thermally Loaded Monoclinic U-6Nb: *Daniel Savage*[1]; Bjorn Clausen[1]; Travis Carter[1]; Joshua White[1]; Sven Vogel[1]; Donald Brown[1]; [1]Los Alamos National Laboratory

9:50 AM Invited
Thermal Energy Transport in Defect-bearing and Uranium-doped Single Crystal Thorium Dioxide: *Cody Dennett*[1]; David Hurley[1]; [1]Idaho National Laboratory

---

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session I

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

Program Organizers: Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; Olivia Underwood Jackson, Sandia National Laboratories

Monday AM | February 28, 2022
207A | Anaheim Convention Center

Session Chairs: Balila Jaya, Indian Institute of Technology Bombay; Khalid Hattar, Sandia National Laboratories; Daniel Gianola, University of California-Santa Barbara

---

8:30 AM Invited
Imaging Defects and Their Dynamics Using Scanning Electron Microscopy Approaches: *Daniel Gianola*[1]; [1]University of California-Santa Barbara

9:00 AM
High Temperature In Situ TEM Based Nanomechanical Testing: *Shen Dillon*[1]; [1]University of California, Irvine

9:20 AM
Applications of Direct Detection for EBSD Analysis of Deformed Materials: *Matthew Nowell*[1]; Stuart Wright[1]; William Lenthe[1]; Rene de Kloe[1]; [1]EDAX LLC

9:40 AM
Role of Misorientation on Grain Boundary Sliding through High-resolution Digital Image Correlation: *Alberto Orozco-Caballero*[1]; Eugenia Nieto-Valeiras[2]; Javier Llorca[2]; Fernando Carreño[3]; [1]Polytechnic University of Madrid; [2]IMDEA Materials Institute; [3]CENIM-CSIC

10:00 AM Break

10:15 AM Invited
Exploring Nanoscale Fatigue through Coupled In-situ Microscopy and Modeling: *Khalid Hattar*[1]; Christopher Barr[1]; Ta Duong[2]; Daniel Bufford[1]; Abhilash Molkeri[2]; Nathan Heckman[1]; David Adams[1]; Ankit Srivastava[2]; Michael Demkowicz[2]; Brad Boyce[1]; [1]Sandia National Laboratories; [2]Texas A&M University

10:45 AM
Significant Disparity of Deformation Behavior in Hot-rolled Highly-textured Mg and Mg-3Al-1Zn Alloy under Tension: *Kelvin Xie*[1]; Dexin Zhao[1]; [1]Texas A&M University

11:05 AM
In Situ Study of Kink Banding in Cu/Nb Nanolaminates: *Yifan Zhang*[1]; Nan Li[1]; Matthew Schneider[1]; Laurent Capolungo[1]; Rodney McCabe[1]; [1]Los Alamos National Laboratory

11:25 AM
Strain Rate Dependent Deformation and In-situ TEM Crystallization in Crystalline/Amorphous Ni-Zr Thin Films: *Bibhu Prasad Sahu*[1]; Amlan Dutta[2]; Rahul Mitra[2]; [1]University of Michigan; [2]Indian Institute of Technology Kharagpur

---

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage 2022 — Energy Conversion and Storage
MIX I

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

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

Monday AM | February 28, 2022
212B | Anaheim Convention Center

Session Chair: Jung Pyung Choi, Pacific Northwest National Laboratory

---

8:30 AM Introductory Comments

8:35 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

9:10 AM Keynote
Development of Solid Oxide Cell and Stack Technologies at Nexceris: From Fuel Cells to Electrolyzers and Reversible Operation: *Emir Dogdibegovic*[1]; Gene Arkenberg[1]; David Kopechek[1]; Anila Wallace[1]; Scott Swartz[1]; [1]Nexceris

9:45 AM
Effect of Transition Metal Doping on the Electrochemical Properties of B-site Doped Neodymium Nickelate for Reversible Solid Oxide Cells: *Ayesha Akter*[1]; Srikanth Gopalan[1]; [1]Boston University

10:05 AM Keynote
High Energy Density Batteries for Vehicle Electrification: *Gayatri Dadheech*[1]; [1]GM

CHARACTERIZATION

Advanced Real Time Imaging — Emerging Imaging Techniques

Sponsored by: 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 Engergy Technology Laboratory; David Alman, National Energy Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki Shibata, 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; Pranjal Nautiyal, University of Pennsylvania

Monday AM | February 28, 2022
206A | Anaheim Convention Center

Session Chair: Cody Dennett, Idaho National Laboratory

8:30 AM Invited
Observing Nanoscale Defect Populations in Nickel through Transient Elasticity: *Cody Dennett*[1]; [1]Idaho National Laboratory

8:50 AM
Molten State Physical Properties of Divalent and Trivalent Alkaline Earth, Transition Metal, and Rare Earth Oxides: *Jonathan Paras*[1]; Osamu Takeda[1]; Mindy Wu[1]; Antoine Allanore[1]; [1]Massachusetts Institute of Technology

9:10 AM
Pseudo-4D Characterization of Lamella Orientations in Locked Al-Al2Cu Eutectic Colonies: *Paul Chao*[1]; George Lindemann[1]; Ashwin Shahani[1]; [1]University of Michigan

9:30 AM
Analysis of In-situ X-ray Tomography Datasets of Dendritic Solidification Using 2D and 3D Machine Learning Algorithms: *Tiberiu Stan*[1]; Nathan Pruyne[2]; Jim James[2]; Marcus Schwarting[2]; Jiwon Yeom[3]; Ben Blaiszik[2]; Ian Foster[2]; Peter Voorhees[1]; [1]Northwestern University; [2]Argonne National Laboratory; [3]Korea Advanced Institute of Science and Technology

9:50 AM Break

10:10 AM
Challenges for Quantitative High-temperature Confocal Scanning Laser Microscopy: Understanding the Temperature Profile: *S. Thomas Britt*[1]; P. Chris Pistorius[1]; [1]Carnegie Mellon University

10:30 AM
Investigation of Echo Source and Signal Deterioration in Ultrasound Measurement of Metal Melt: *Bitong Wang*[1]; Andrew Caldwell[2]; Antoine Allanore[2]; Douglas Kelley[1]; [1]University of Rochester; [2]Massachusetts Institute of Technology

BIOMATERIALS

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

in Biomaterials for 3D Printing of Scaffolds and Tissues I

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

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

Monday AM | February 28, 2022
201A | Anaheim Convention Center

Session Chairs: Changxue Xu, Texas Tech University; Kaidong Song, University of Florida

---

8:30 AM
Multifunctional Artificial Artery from Direct 3D Printing with Built-in Ferroelectricity and Tissue-matching Modulus for Real-time Sensing and Occlusion Monitoring: *Jun Li*[1]; [1]University of Wisconsin-Madison

8:50 AM
Prediction of Cell Viability in Dynamic Optical Projection Stereolithography-based Bioprinting Using Machine Learning: *Heqi Xu*[1]; Qingyang Liu[2]; Changxue Xu[1]; Dazhong Wu[2]; [1]Texas Tech University; [2]University of Central Florida

9:10 AM
4D Printable Salicylic Acid Photopolymers for Sustained Drug-releasing, Shape Memory Soft Tissue Scaffolds: *Andrew Weems*[1]; [1]Ohio University

9:30 AM
Additive Manufacturing of Natural Materials as a Multidisciplinary Approach in Engineering Education: *Henry Colorado*[1]; Mery Gomez-Marroquin[2]; Elkin Gutierrez[3]; [1]Universidad de Antioquia; [2]Universidad Nacional de Ingeniería; [3]Universidad Antonio Nariño

9:50 AM
Effects of Cell Sedimentation on Droplet Formation Process and Cell Distribution during Inkjet Printing of Cell-laden Bioink: Heqi Xu[1]; Md Shahriar[1]; *Jiachen Liu*[1]; Changxue Xu[1]; [1]Texas Tech University

10:10 AM Break

10:30 AM
Acemannan Loaded Mg-doped 3D Printed Multifunctional Scaffolds: In Vivo and In Vitro Biological Property Evaluation: *Ujjayan Majumdar*[1]; Susmita Bose[1]; [1]Washington State University

10:50 AM
Curcumin and Vitamin D3 Enhances Osteogenic and Chemopreventive Properties of 3D Printed CaP Bone Scaffolds: *Yongdeok Jo*[1]; Susmita Bose[1]; [1]Washington State University

11:10 AM
Influence of Strut-size and Cell-size Variations on Additively Manufactured Porous Ti6Al4V: *Sushant Ciliveri*[1]; Amit Bandyopadhyay[1]; [1]Washington State University

---

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: 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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Monday AM | February 28, 2022
251A | Anaheim Convention Center

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

---

8:30 AM Keynote
Low Density Multi-principal Element Alloys: A Review: *Carl Koch*[1]; [1]North Carolina State University

9:00 AM Keynote
Design of Multi-principal Element Alloys for Use in a Broad Range of Temperatures: Cheng Zhang[1]; *Enrique Lavernia*[2]; [1]University of California Irvine; [2]National Academy of Engineering

9:30 AM
Strengthening Mechanisms and Deformation Behaviors in Single BCC Phase Refractory High-entropy Alloys: Chanho Lee[1]; George Kim[2]; Yi Chou[3]; Michael Gao[4]; Ke An[5]; Gian Song[6]; Yi-Chia Chou[3]; Wei Chen[2]; Nan Li[1]; Saryu Fensin[1]; *Peter Liaw*[7]; [1]Los Alamos National Laboratory; [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; [7]The University of Tennessee

9:50 AM Invited
Exploring Passivity of Multiple Principal Element Alloys: *David Shifler*[1]; [1]Office of Naval Research

10:10 AM Break

10:30 AM Invited
Toward High Throughput Design and Development of Multi-principal Element Alloys for Corrosion and Oxidation Resistance (MPEAs): *Mitra Taheri*[1]; [1]Johns Hopkins University

10:50 AM Invited
Exploring Alloy Design Pathways for Beneficial Short-range Ordering: *C. Tasan*[1]; Feng He[1]; Hyun Oh[1]; Shaolou Wei[1]; James Lebeau[1]; Michael Xu[1]; [1]Massachusetts Institute of Technology

11:10 AM Invited
Additive Manufacturing of High-performance High-entropy Alloys: *Wen Chen*[1]; [1]University of Massachusetts-Amherst

---

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: 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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Monday AM | February 28, 2022
251B | Anaheim Convention Center

Session Chairs: Jeffrey Rickman, Lehigh University; Liang Qi, University of Michigan

---

8:30 AM
Modeling the Effect of Stress and Composition on the Stability of Lomer/Lomer-Cottrell Dislocations: *Anas Abu-Odeh*[1]; Tarun Allaparti[1]; Mark Asta[1]; [1]University of California Berkeley

8:50 AM
Jerky Dislocation Motion in Multi-principal Element Alloys: From Atomic Peierls Stress to Dislocation Mobility: *Daniel Utt*[1]; Subin Lee[2]; Yaolong Xing[3]; Hyejin Jeong[3]; Alexander Stukowski[4]; Sang Ho Oh[3]; Gerhard Dehm[5]; Karsten Albe[1]; [1]Technische Universität Darmstadt; [2]Karlsruhe Institute of Technology; [3]Sungkyunkwan University; [4]OVITO GmbH; [5]Max-Planck-Institut für Eisenforschung GmbH

9:10 AM Invited
Energy Landscape of Deformation Twinning in Multi-principal Elements bcc Alloys: *Liang Qi*[1]; Shih-Kuang Lee[1]; [1]University of Michigan

9:30 AM
Critical Shear Stress Distributions and Dislocation Mobility in FeNiCrCoCu High Entropy Alloys via Atomistic Simulations: *Yixi Shen*[1]; Douglas Spearot[1]; [1]University of Florida

---

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; Kathy Lu, Virginia Polytechnic Institute and State University; Faqin Dong, Southwest University of Science and Technology; Jinhong Li, China University of Geosciences; Eugene Olevsky, San Diego State University; Ruigang Wang, The University of Alabama; Dipankar Ghosh, Old Dominion University

Monday AM | February 28, 2022
213C | Anaheim Convention Center

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

8:30 AM Introductory Comments

8:35 AM Invited
High Flowability Ultra-high Temperature Ceramic Nanocomposites Feedstock Powder Synthesis via Gel-casting: *Amy Wat*[1]; Ashley Hall[1]; Bruce Yang[1]; Congwang Ye[1]; Gabriella King[1]; Elizabeth Sobalvarro[1]; Joshua Kuntz[1]; Marcus Worsley[1]; Wyatt Du Frane[1]; James Cahill[1]; [1]Lawrence Livermore National Laboratory

8:55 AM
Surface-engineered CeO2 Nanocrystals as Cathode Host for High-performance Li-S Battery: *Zhen Wei*[1]; Ruigang Wang[1]; [1]The University of Alabama

9:15 AM
Immobilization of Laccase on CuO Nanoparticles: Stability, Catalytic Activity, and Cu Ion Exchange: *F. Javier Suarez*[1]; Rafael Vazquez-Duhalt[2]; Olivia Graeve[1]; [1]University of California San Diego; [2]Universidad Nacional Autónoma de México

9:35 AM
Atomistic Simulations of Tension and Compression of Hybrid Core-shell Ceramic Nanoparticles: *Kevin Kayang*[1]; Alexey Volkov[1]; [1]The University of Alabama

9:55 AM
Deformation and Energy Absorbing Mechanism of Expanded Vermiculite Particles: *Bowen Li*[1]; Hong Zou[2]; Jason Seeterlin[1]; [1]Michigan Technological University; [2]Runway Safe Group

10:15 AM Break

10:30 AM Invited
On the Manufacturing of Ceramics Powders by Sustainable Manufacturing Matrix: *Surojit Gupta*[1]; [1]University of North Dakota

10:50 AM
Crystal Structure of Alkaline-doped Calcium and Strontium Hexaborides: *Alan Hirales*[1]; Olivia Graeve[1]; [1]University of California San Diego

11:10 AM
Cold Sintering of Iron Powdered Metal Compacts and Their Performance: *Linsea Paradis*[1]; Ramakrishnan Rajagopalan[1]; Austin Fairman[1]; Kyle Robertson[1]; Daudi Waryoba[1]; Clive Randall[1]; [1]Penn State University

---

MATERIALS PROCESSING

Advances in Surface Engineering IV — Session I

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

Program Organizers: Arif Mubarok, PPG; Bharat Jasthi, South Dakota School of Mines & Technology; Tushar Borkar, Cleveland State University; Mary Lyn Lim, PPG Industries; Rajeev Gupta, North Carolina State University

Monday AM | February 28, 2022
210C | Anaheim Convention Center

Session Chair: Rajeev Gupta, North Carolina State University

8:30 AM
Atomic Origin of Corrosion Passivation in NiCrAl Alloys: A Density Functional Theory Study: *Sainyam Nagar*[1]; Yashaswini Karanth[1]; Vikrant Beura[1]; Kiran Solanki[1];

[1]Arizona State University

8:50 AM
Fluorine from Bad to Good in the Oxidation Behavior of Metallic Materials: Alexander Donchev[1]; *Mathias Galetz*[1]; [1]DECHEMA-Forschungsinstitut

9:10 AM
Microstructural Design via Plasma Variations in Hollow and Planar Cathode Sputtering: *Adie Alwen*[1]; Andrea Hodge[1]; [1]University of Southern California

9:30 AM
Ultra-high Temperature Oxidation Protection Coatings: Alloying of Transition Metal Borides: *Thomas Glechner*[1]; Rainer Hahn[1]; Ahmed Bahr[1]; Tomasz Wojcik[1]; Maximilian Weiss[2]; Jürgen Ramm[3]; Oliver Hunold[3]; Szilard Kolozsvári[4]; Helmut Riedl[1]; [1]Christian Doppler Laboratory for Surface Engineering of high-performance Components, TU Wien, Austria; [2]Institute of Chemical Technologies and Analytics, TU Wien, Austria; [3]Oerlikon Surface Solutions AG, Liechtenstein; [4]Plansee Composite Materials GmbH, Germany

---

MATERIALS DESIGN

AI/Data Informatics: Computational Model Development, Validation, and Uncertainty Quantification — MGI/Uncertainty Quantification

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Dennis Dimiduk, BlueQuartz Software LLC; Darren Pagan, Pennsylvania State University; Anthony Rollett, Carnegie Mellon University; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory

Monday AM | February 28, 2022
256A | Anaheim Convention Center

Session Chairs: Somnath Ghosh, Johns Hopkins University; Gary Whelan, QuesTek Innovations LLC

8:30 AM Invited
10 Years of the Materials Genome Initiative: *James Warren*[1]; [1]National Institute of Standards and Technology

9:00 AM Invited
Uncertainty Quantified Parametrically Homogenized Constitutive Models for Multi-scale Predictions of Fatigue Crack Nucleation in Ti Alloys: *Somnath Ghosh*[1]; Shravan Kotha[1]; Deniz Ozturk[1]; [1]Johns Hopkins University

9:30 AM
Inference, Uncertainty Quantification, and Uncertainty Propagation for Grain Boundary Structure-property Models: *Oliver Johnson*[1]; Eric Homer[1]; David Fullwood[1]; David Page[1]; Kathryn Varela[1]; Sterling Baird[1]; [1]Brigham Young University

9:50 AM Break

10:10 AM
Uncertainty Quantification Framework for Robust Design of Fatigue Critical Alloys: *Gary Whelan*[1]; David McDowell[2]; Sam Sorkin[1]; Jiadong Gong[1]; [1]QuesTek Innovations LLC; [2]Georgia Institute of Technology

10:30 AM
Using Polycrystals for Bayesian Inference and Uncertainty Quantification of Grain Boundary Structure-property Models: *Brandon Snow*[1]; Sterling Baird[1]; Christian Kurniawan[1]; David Fullwood[1]; Eric Homer[1]; Oliver Johnson[1]; [1]Brigham Young University

---

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Electronic and Atomistic Scale Algorithms and Their Applications

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; Garritt Tucker, Colorado School of Mines; Ebrahim Asadi, University of Memphis; Bryan Wong, University of California, Riverside; Sam Reeve, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Adrian Sabau, Oak Ridge National Laboratory

Monday AM | February 28, 2022
253A | Anaheim Convention Center

Session Chairs: Bryan Wong, University of California, Riverside; Ebrahim Asadi, University of Memphis

---

8:30 AM Invited
Massive Parallelism for Theoretical Spectroscopy and Femtosecond Electron Dynamics First-principles Simulations: *Andre Schleife*[1]; [1]University of Illinois Urbana-Champaign

9:00 AM
Quantum Computation for Predicting Solids-state Material Properties: *Kamal Choudhary*[1]; [1]National Institute of Standards and Technology

9:20 AM
Verification of the Self-consistent Potential Correction as Applied to Charged 2D Materials: *Preston Vargas*[1]; Richard Hennig[1]; [1]University of Florida

9:40 AM Invited
Accurate First-principles Predictions of Organic Molecular Crystal Polymorphism: *Gregory Beran*[1]; [1]University of California Riverside

10:10 AM Break

10:30 AM
Development of Segregation Energy Predictions Utilizing Advanced Descriptors of Local Atomic Environments: *Jacob Tavenner*[1]; Ankit Gupta[1]; Garritt Tucker[1]; [1]Colorado School of Mines

10:50 AM
Measuring Individual Grain Boundary Diffusivity Measurements in Polycrystal Molecular Dynamics Simulations: *David Page*[1]; Christian Kurniawan[1]; Oliver Johnson[1]; David Fullwood[1]; Eric Homer[1]; [1]Brigham Young University

---

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications X — Session I and II

Sponsored by: TMS Structural Materials Division, TMS Functional 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; Takao Mori, National Institute For Materials Science; Alexandra Zevalkink, Michigan State University; Wan-Ting Chiu, Tokyo Institute of Technology; Pai-chun Wei, National Taiwan University

Monday AM | February 28, 2022
303D | Anaheim Convention Center

Session Chairs: Takao Mori, National Institute for Materials Science (NIMS); Hsin-Jay Wu, National Yang Ming Chiao Tung University

---

8:30 AM Introductory Comments

8:35 AM Invited
Advancing the Thermoelectric Performance of Full Heusler Alloys: *Ernst Bauer*[1]; Fabian Garmroudi[1]; Matthias Knopf[1]; Alexander Riss[1]; Michael Parzer[1]; Takao Mori[2]; [1]Technische Universität Wien; [2]NIMS Tsukuba

8:55 AM
Rational Band Engineering Leads to Enhanced Thermoelectric Performance of Fe_2VAl-type Heusler Compounds: *Alexander Riss*[1]; Fabian Garmroudi[1]; Michael Parzer[1]; Sergii Khmelevskyi[1]; Raimund Podloucky[2]; Kazuki Tobita[3]; Yukari Katsura[4]; Kaoru Kimura[3]; Takao Mori[5]; Ernst Bauer[1]; [1]TU Wien; [2]Universität Wien; [3]The University of Tokyo; [4]The University of Tokyo, Kashiwa; [5]NIMS

9:15 AM
Anderson Transition as a Novel Route for High-performance Thermoelectrics: *Fabian Garmroudi*[1]; Michael Parzer[1]; Alexander Riss[1]; Andrei Ruban[2]; Sergii Khmelevskyi[1]; Michele Reticcioli[3]; Matthias Knopf[1]; Herwig Michor[1]; Andrej Pustogow[1]; Takao Mori[4]; Ernst Bauer[1]; [1]Technische Universität Wien; [2]KTH Royal Institute of Technology; [3]Universität Wien; [4]National Institute for Materials Science

9:35 AM
Improvement of Thermoelectric Figure of Merit of p-type BiSbTe Alloys through the Microstructure Controlling by Optimization of Initial Powder Size: *Babu Madavali*[1]; Pathan Sharief[1]; Sungjae Jo[1]; Gian Song[1]; Soon-Jik Hong[1]; [1]Kongju National University

---

BIOMATERIALS

Biological Materials Science — Biological Materials Science I

Sponsored by: TMS Functional 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; Hannes Schniepp, William & Mary

Monday AM | February 28, 2022
201B | Anaheim Convention Center

Session Chairs: Steven Naleway, The University of Utah; Hannes Schniepp, William and Mary

---

8:30 AM Invited
Lessons from Nature: Plants, Fish, Birds, and Mammals: *Marc Meyers*[1]; Haocheng Quan[2]; Audrey Velasco-Hogan[1]; Benjamin Lazarus[1]; Iwona Jasiuk[3]; Robert Ritchie[4]; [1]University of California-San Diego; [2]Institute for New Materials; [3]University of Illinois; [4]University of California, Berkeley

9:05 AM
Bioinspiration of the Equine Hoof: *Rachel Luu*[1]; Benjamin Lazarus[1]; Charul Chadha[2]; Teresa Gómez-del Río[3]; Iwona Jasiuk[2]; Marc Meyers[1]; [1]University of California, San Diego; [2]University of Illinois at Urbana-Champaign; [3]Universidad Rey Juan Carlos

9:25 AM
Properties, Mechanics, and Material Applications of Fungi: *Debora Lyn Porter*[1]; Alexander Bradshaw[1]; Ryan Nielsen[1]; Pania Newell[1]; Bryn Dentinger[1]; Steven Naleway[1]; [1]University of Utah

9:45 AM
Damage Control and Impact Resistance of the Jackfruit: *Benjamin Lazarus*[1]; Rachel Luu[1]; Ryan Fancher[1]; Charles Soulen[1]; Nicholas Boechler[1]; Marc Meyers[1]; [1]UCSD

CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2022 — Advanced Characterization Methods I

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

Program Organizers: Mingming Zhang, Wood Mackenzie; Jian Li, CanmetMATERIALS; 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, DEVCOM U.S. Army Research Laboratory; Rajiv Soman, Eurofins EAG Materials Science LLC; Zhiwei Peng, Central South University

Monday AM | February 28, 2022
207B | Anaheim Convention Center

Session Chairs: Rajiv Soman, Eurofins EAG Laboratories; Bowen Li, Michigan Technological University

---

8:30 AM Introductory Comments

8:35 AM
A Review of Atom Probe Tomography Technology: The Present and Future: *Robert Ulfig*[1]; David Larson[1]; David Reinhard[1]; Peter Clifton[1]; [1]Cameca Instruments Inc.

8:55 AM
Characterization of Platinum Nanoparticles on a Non-conductive Perovskite Catalyst through Tailored Imaging Conditions in Scanning Electron Microscopy: Andy Holwell[1]; *Maadhav Kothari*[1]; John Irvine[2]; Yukwon John[3]; Andrea Pascuii[4]; [1]Carl Zeiss Microscopy Llc; [2]University of St Andrews; [3]Yonsei University; [4]Johnson Matthey

9:15 AM
The Needle in the Haystack: The Role of New Advances in Correlative Light, Electron, Ion Beam and X-ray Microscopy in Finding, Imaging and Understanding Ever Fewer and Smaller Inclusions and Features in Steel: *Andy Holwell*[1]; [1]Carl Zeiss Microscopy Llc

9:35 AM
Characterization of Explosive Crystals with X-ray Micro and Nano-scale Tomography: *Brian Patterson*[1]; Lindsey Kuettner[1]; Steven Young[1]; Larry Hill[1]; Alexandra Burch[1]; John Yeager[1]; [1]Los Alamos National Laboratory

9:55 AM Break

10:15 AM
Simulating Electron Microscopy to Elucidate Connections between Structural Measurements and Properties of Glassy Materials: *Nicholas Julian*[1]; Robert Rudd[2]; Jaime Marian[1]; [1]University of California Los Angeles; [2]Lawrence Livermore National Laboratory

---

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Phase Stability I and II

Sponsored by: TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee

Program Organizers: Vahid Attari, Texas A&M University; Sara Kadkhodaei, University Of Illinois At Chicag; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Tourret, IMDEA Materials Institute; James Morris, Ames Laboratory

Monday AM | February 28, 2022
255C | Anaheim Convention Center

Session Chairs: Prashant Singh, Ames Laboratory; Mira Todorova, Max-Planck-Institute

---

8:30 AM
Stability of Immiscible Nanocrystalline Alloys in Compositional and Thermal Fields: *Joseph Monti*[1]; Emily Hopkins[2]; Fadi Abdeljawad[3]; Khalid Hattar[1]; Brad Boyce[1]; Remi Dingreville[1]; [1]Sandia National Laboratories; [2]Johns Hopkins University; [3]Clemson University

8:50 AM
Ab Initio Simulations on the Pure Cr Lattice Stability at 0K: Verification with the Fe-Cr and Ni-Cr Binary Systems: *Songge Yang*[1]; Yi Wang[2]; Zi-kui Liu[2]; Yu Zhong[1]; [1]Worcester Polytechnic Institute; [2]Pen State University

9:10 AM Invited
Role of Alloying on Tunability of Martensitic Phase Transformation in Multi-principal Element Alloys: *Prashant Singh*[1]; Sezer Picak[2]; Aayush Sharma[1]; A.V. Smirnov[1]; Y.I. Chumlyakov[3]; Raymundo Arroyave[4]; Ibrahim Karaman[4]; Duane D. Johnson[1]; [1]Ames Laboratory; [2]Texas A&M University ; [3]Tomsk State University; [4]Texas A&M University

9:40 AM
Compositional Patterning in Irradiated Polycrystalline Alloys: Robert Averback[1]; *Pascal Bellon*[1]; Qun Li[1]; [1]University of Illinois at Urbana-Champaign

10:00 AM Break

10:20 AM
Semiclassical Monte Carlo Simulation of the Heisenberg Model With Near-quantum Accuracy: *Flynn Walsh*[1]; Lin-Wang Wang[1]; Robert Ritchie[1]; Mark Asta[1]; [1]Lawrence Berkeley National Laboratory

---

MATERIALS PROCESSING

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

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

Program Organizers: Lang Yuan, University of South Carolina; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Andrew Kao, University of Greenwich; Kyle Fezi, Fort Wayne Metals

Monday AM | February 28, 2022
210B | Anaheim Convention Center

Session Chairs: Brian Thomas, Colorado School of Mines; Mark Jolly, Cranfield University

---

8:30 AM Introductory Comments

8:35 AM Invited
Measurement and Simulation of Reoxidation Inclusions in Steel Casting: Robert Donahue[1]; *Christoph Beckermann*[1]; [1]University of Iowa

9:00 AM
Particle Capture Defects in Continuous Steel Casting: Seong-Mook Cho[1]; *Brian Thomas*[2]; [1]Pukyong National University; [2]Colorado School of Mines

9:20 AM
Understanding Effects of Oxide Bifilms on Solidification Microstructures by Multiscale Modeling: *Sepideh Kavousi*[1]; Mohsen Asle Zaeem[1]; [1]Colorado School of Mines

9:40 AM
Characterization of Second Phase Particles in Twin Roll Cast Aluminum Alloy AA 8011: *Sooraj Patel*[1]; Jyoti Mukhopadhyay[1]; [1]Indian Institute of Technology Gandhinagar

---

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Mechanisms of High Temperature Alloys — Microstructural Evolution during Material Processing

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

Program Organizers: Mark Hardy, Rolls-Royce Plc; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Jeremy Rame, Safran Aircraft Engines; Akane Suzuki, GE Research; Jean-Charles Stinville, University of California, Santa Barbara; Paraskevas Kontis, Norwegian University of Science and Technology; Andrew Wessman, University of Arizona

Monday AM | February 28, 2022
304B | Anaheim Convention Center

Session Chairs: Mark Hardy, Rolls-Royce plc; Akane Suzuki, GE Research

---

8:30 AM Invited
Influence of Gamma' Precipitates on Recrystallization and Grain Growth Phenomena in Ni Based Superalloys : Smith-Zener Pinning and So Much More: *Nathalie Bozzolo*[1]; [1]MINES-ParisTech

9:00 AM
Forging and Heat Treatment Conditions that Produce Visible Grains in a Nickel Alloy: *Mark Hardy*[1]; Ross Buckingham[1]; Kevin Severs[2]; Christos Argyrakis[1]; Sammy Tin[3]; [1]Rolls-Royce Plc; [2]ATI Forged Products Cudahy; [3]University of Arizona

9:20 AM Invited
Precipitate Free Zone Formation in an Alumina-forming Austenitic Stainless Steel and the Effect on Mechanical Properties: Andrew Peterson[1]; *Ian Baker*[1]; [1]Dartmouth College

9:50 AM Break

10:10 AM
Precipitate Free Zones (PFZ) Formation at Grain Boundaries in γ/γ Ni-based Superalloys: *Guillaume Burlot*[1]; Jonathan Cormier[1]; Anne Joulain[1]; Dominique Eyidi[1]; Patrick Villechaise[1]; [1]Institut Pprime

10:30 AM
Preferential Precipitation of γ on Annealing Twin Boundaries in Superalloys: *Semanti Mukhopadhyay*[1]; Hariharan Sriram[1]; Shakthipriya Basker Kannan[1]; Charles Xu[1]; Ashton Egan[1]; Fei Xue[2]; Longsheng Feng[1]; Richard DiDomizio[3]; Andrew Detor[3]; Katelun Wertz[4]; Milan Heczko[1]; Robert Hayes[5]; Gopal B. Viswanathan[1]; Christopher Zenk[6]; Emmanuelle Marquis[2]; Maryam Ghazisaeidi[1]; Stephen Niezgoda[1]; Yunzhi Wang[1]; Michael Mills[1]; [1]The Ohio State University; [2]University of Michigan; [3]GE Global Research Center; [4]Air Force Research Laboratory; [5]Metals Technology Inc.; [6]Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)

MECHANICS & STRUCTURAL RELIABILITY

Dynamic Behavior of Materials IX — Dynamic Loading of Additive Manufactured Materials

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

Program Organizers: Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Cyril Williams, US Army Research Laboratory

Monday AM | February 28, 2022
304D | Anaheim Convention Center

Session Chairs: Eric Brown, Los Alamos National Laboratory; Arezoo Zare, Johns Hopkins University; Mukul Kumar, Lawrence Livermore National Laboratory

---

8:30 AM
Triaxiality-dependence of Dynamic Failure in Additively Manufactured Steel: *Jack Borg*[1]; Bernard Gaskey[2]; Parth Garud[3]; Peter Sable[4]; [1]Marquette University; [2]University of Dayton Research Institute; [3]Georgia Institute of Technology; [4]Air Force Research Laboratory

8:50 AM
Additive Manufacturing and Intermediate-rate Mechanical Response of High Performance Steel: *Bernard Gaskey*[1]; Nick Hopkins[2]; Richard Harris[3]; Philip Flater[3]; [1]University of Dayton Research Institute; [2]Integrated Solutions for Systems; [3]Air Force Research Lab Munitions Directorate

9:10 AM
Design of Damage Resistance Materials Using Additive Manufacturing: *Saryu Fensin*[1]; David Jones[1]; George Gray[1]; Carl Trujillo[1]; Daniel Martinez[1]; Ankur Agrawal[1]; Dan Thoma[1]; [1]Los Alamos National Laboratory

9:30 AM
Tailorable Shock and Fragmentation Behaviors of Additively Manufactured Interpenetrating Composites: *Spencer Taylor*[1]; Bernard Gaskey[2]; Zachary Cordero[1]; [1]Massachusetts Institute of Technology; [2]Air Force Research Lab

9:50 AM Break

10:05 AM
Evaluation of the Effectiveness of Additive Friction Stir Deposition for Ballistic Repair of Aluminum Alloy 7075: George Stubblefield[1]; *Malcolm Williams*[1]; Zack Tew[1]; Russell Rowe[1]; Craig Mason[2]; James Jordon[1]; Paul Allison[1]; Mark Barkey[1]; [1]University of Alabama; [2]Pacific Northwest National Laboratory

10:25 AM
Spall Failure of ECAE-processed Mg-6Al via Laser-driven Micro-flyer Impact Experiments: *Christopher DiMarco*[1]; Debjoy Mallick[2]; Chengyun Miao[1]; David Gibbins[1]; Jenna Krynicki[1]; Nathaniel Davenport[1]; Laszlo Kecskes[1]; Tim Weihs[1]; K.T. Ramesh[1]; [1]Johns Hopkins University; [2]US Army CCDC Army Research Laboratory

10:45 AM
Deformation Mechanisms and Shock Loading Responses of a Tribology-grade NiTiHf Alloy: *Tyler Knapp*[1]; Aaron Stebner[1]; [1]Georgia Institute of Technology

11:05 AM
Delamination Propagation in Laminate Carbon Fiber-epoxy Composites: *Lilly Schroer*[1]; Mohammad Hamza Kirmani[1]; [1]Georgia Institute of Technology

11:25 AM
Mitigating Spall Fracture of Ductile Materials by Introducing Porosity: *Edwin Chiu*[1]; Ankit Srivastava[1]; [1]TAMU Material Science Department

---

ELECTRONIC MATERIALS

Electronic Packaging and Interconnections — Low Melting Temperature Solder

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

Program Organizers: Tae-Kyu Lee, Cisco Systems; Albert T. Wu, National Central University; Won Sik Hong, Korea Electronics Technology Institute; Kazuhiro Nogita, University of Queensland; Govindarajan Muralidharan, Oak Ridge National Laboratory; David Yan, San Jose State University; Luke Wentlent, Plug Power

Monday AM | February 28, 2022
303B | Anaheim Convention Center

Session Chair: Praveen Kumar, Indian Institute of Science

8:30 AM Invited
Comparing Intermetallic Compound Formation in Solder Interconnects under Different Current Load Conditions: *Yi Ram Kim*[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.

8:55 AM
Length Scale Dependent Mechanical Behaviour of Elastically Constrained Sn Rich Solder Joints: Anwesha Kanjilal[1]; *Praveen Kumar*[1]; [1]Indian Institute of Science,Bangalore

9:15 AM
Microstructural Evolution of Bi Phase during Reflow and Thermal Aging in Sn-58Bi Solder: *Amey Luktuke*[1]; Sridhar Niverty[1]; Hamidreza Torbati-Sarraf[1]; Fengjiang Wang[2]; Aniket Tekawade[3]; Viktor Nikitin[3]; Rajkumar Kettimuthu[3]; Nikhilesh Chawla[1]; [1]Purdue University; [2]Jiangsu University of Science and Technology; [3]Argonne National Laboratory

9:35 AM
Stress Development in Solder Interconnects under Pulsed Electric Current: *Allison Osmanson*[1]; Yi Ram Kim[1]; Mohsen Tajedini[1]; Choong-Un Kim[1]; Patrick Thompson[2]; Qiao Chen[2]; Sylvester Ankamah-Kusi[2]; [1]University of Texas at Arlington; [2]Texas Instruments

9:55 AM Break

10:15 AM
Surface Precipitation and Growth of Bismuth Particles in Sn-Ag-Cu-Bi Solder Joints: *John Wu*[1]; Amey Luktuke[1]; Nikhilesh Chawla[1]; [1]Purdue University

10:35 AM
Enhancing Mechanical Properties via Adding Ni and Zn in Cu/Sn3.5Ag/Cu TLP Soldering by TCB Process: *Zih You Wu*[1]; Junq Gong Duh[1]; [1]National Tsing Hua University

---

CORROSION

Environmental Degradation of Additively Manufactured Alloys — Part I: Low Temperature/Aqueous Corrosion, Stress Corrosion Cracking, Pitting, Metal Dissolution

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; Xiaoyuan Lou, Auburn University; Elizabeth Trillo, Southwest Research Institute; Andrew Hoffman, GE Research; Brendy Rincon Troconis, University of Texas at San Antonio

Monday AM | February 28, 2022
201C | Anaheim Convention Center

Session Chairs: Jennifer Locke, Ohio State University; Brendy Rincon, UTSA

8:30 AM Introductory Comments

8:35 AM Invited
Corrosion of Additively Manufacture Magnesium Alloys: *Nick Birbilis*[1]; Zhuoran Zeng[1]; [1]The Australian National University

9:05 AM
Effect of Post Processing Treatments on Corrosion Behavior of Laser Powder Bed Fusion(LPBF) 7050 Aluminum Alloy: *Rupesh Rajendran*[1]; Crosby Owens[2]; Preet Singh[1]; [1]Georgia Institute of Technology; [2]Northrop Grumman Corporation

9:25 AM
Corrosion Properties of AM A20X: Jamie Stull[1]; *Courtney Clark*[1]; Timothy Gorey[1]; Colt Montgomery[1]; Robin Pacheco[1]; Don Johnson[1]; Daniel Hooks[1]; [1]Los Alamos National Laboratory

9:45 AM Break

10:00 AM Invited
Impact of Chemistry and Microstructure on Corrosion Properties of Designed High-performance Stainless Steel Powder for Additive Manufacturing: Dana Frankel[1]; Abhinav Saboo[1]; Marie Thomas[1]; *Jason Sebastian*[1]; [1]QuesTek Innovations LLC

10:30 AM
Surface Finishing Effects on the Corrosion Properties of Additively Manufactured 316L Stainless Steel: *Courtney Clark*[1]; Timothy Gorey[1]; Jamie Stull[1]; Don Johnson[1]; Randy Edwards[1]; Enkeleda Dervishi-Whetham[1]; Daniel Hooks[1]; [1]Los Alamos National Laboratory

10:50 AM
Exploring the Stress-corrosion Cracking Susceptibility of Additively Manufactured 316L in Boiling Magnesium Chloride: *Erin Karasz*[1]; Jason Taylor[1]; David Autenrieth[1]; Philip Reu[1]; Kyle Johnson[1]; Michael Melia[1]; Philip Noell[1]; [1]Sandia

---

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

Monday AM | February 28, 2022
201D | Anaheim Convention Center

Session Chairs: Reiner Kirchheim, Georg-August-Universität Göttingen; Ting Zhu, Georgia Tech

---

8:30 AM Invited
Contributions to the Understanding of Hydrogen Embrittlement by a Thermodynamic Approach: *Reiner Kirchheim*[1]; [1]University of Goettingen

9:05 AM
Hydrogen-Induced Cracking of Pure Titanium in Hydrochloric Acid Solution Using Constant Load Method: *Osama Alyousif*[1]; [1]Kuwait University

9:25 AM
Atomistic Study on Diffusion and Trapping of Hydrogen in Nanocrystalline Steel: Denver Seely[1]; Bradley Huddleston[1]; Nayeon Lee[1]; Sungkwang Mun[1]; Anh Vo[1]; *Doyl Dickel*[1]; Krista Limmer[2]; [1]Mississippi State University; [2]U.S. Army Combat Capabilities Development Command Army Research Laboratory

9:45 AM
A Surface Deformation Approach for Improved Hydrogen Embrittlement Resistance: *Haoxue Yan*[1]; Dylan Hall[2]; Jinwoo Kim[1]; S. Raima Mahmud[1]; David Dye[2]; C. Cem Tasan[1]; [1]Massachusetts Institute of Technology; [2]Imperial College London

---

MATERIALS DESIGN

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — From Plastic Localization to Damage Nucleation and Propagation

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials 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: Jean-Charles Stinville, University of Illinois Urbana-Champaign; Garrett Pataky, Clemson University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University; Orion Kafka, NIST

Monday AM | February 28, 2022
254B | Anaheim Convention Center

Session Chair: Jean-Charles Stinville, University of Illinois Urbana-Champaign

---

8:30 AM Invited
On the Relevant Scale Related to Fatigue Crack Initiation in Different Metallic Alloys: *Patrick Villechaise*[1]; Jonathan Cormier[1]; Samuel Hemery[1]; [1]Institut Pprime

9:00 AM Invited
Role of Cyclic Strain Localization in Fatigue Crack Initiation and Growth: Jaroslav Polak[1]; *Veronika Mazanova*[2]; Tomáš Babinský[1]; Milan Heczko[2]; [1]Institute of Physics of Materials ASCR; [2]CEMAS, Ohio State University

9:30 AM
Influence of Compressive Hold Times In Dwell-fatigue of Alloy 718: *Melanie Bordas-Czaplicki*[1]; Jonathan Cormier[2]; Patrick Villechaise[2]; Vincent Roue[3]; [1]Safran Aircraft Engines - ENSMA - Institut Pprime - UPR CNRS 3346; [2]Institut Pprime; [3]Safran Aircraft Engines

9:50 AM
Cyclic Plasticity and Fatigue Properties of Ultra-high Strength CrCoNi Medium-entropy Alloy with Heterogeneous Partially Recrystallized Microstructure: *Milan Heczko*[1]; Veronika Mazánová[1]; Connor Slone[2]; Ivo Kubena[3]; Jirí Tobiáš[3]; Tomáš Kruml[3]; Easo George[4]; Maryam Ghazisaeidi[1]; Jaroslav Polák[3]; Michael Mills[1]; [1]The Ohio State University; [2]Exponent, Inc.; [3]Institute of Physics of Materials CAS; [4]Oak Ridge National Laboratory

10:10 AM Break

10:25 AM
Role of Twins on Localization of Cyclic Strain and Fatigue Crack Initiation in CrCoNi Medium-entropy Alloy: *Veronika Mazanova*[1]; Mulaine Shih[1]; Milan Heczko[1]; Connor E. Slone[2]; Easo George[3]; Jaroslav Polak[4]; Maryam Ghazisaeidi[1]; Michael J. Mills[1]; [1]The Ohio State University; [2]Exponent; [3]Oak Ridge National Laboratory; [4]Institute of Physics of Materials CAS

10:45 AM
Enhancing Fatigue Crack Growth Resistance of High Strength Aluminum Alloys Reinforced by Shape Memory Alloy: *Nelson Netto*[1]; Lv Zhao[2]; Eric Charkaluk[3]; Aude Simar[1]; [1]Institute of Mechanics, Materials and Civil Engineering, Université Catholique de Louvain, Louvain la Neuve, Belgium; [2]Department of Mechanics, School of Aerospace Engineering, Huazhong University of Science and Technology, Wuhan, China; [3]Laboratoire de Mécanique des Solides, CNRS, École Polytechnique, Palaiseau, France

11:05 AM
Crack Initiation and Growth Behavior of Additively Manufactured Contemporary Aluminum Alloys: Surface Roughness, Micro-/Defect-structure, and Build Orientation: *P.D. Nezhadfar*[1]; Muztahid Muhammad[1]; Mikyle Paul[1]; Spencer Thompson[2]; Ankit Saharan[2]; Nam Phan[3]; Nima Shamsaei[1]; [1]Auburn University; [2]EOS GmbH; [3]Naval Air Systems Command

11:25 AM
Microstructures, Mechanical Properties, and Fatigue Damage Mechanisms in Laser Powder Bed and Conventionally Cast Al-10Si-0.4Mg Alloys: *Timothy Piette*[1]; Robert Warren[1]; Anthony Spangenberger[1]; Diana Lados[1]; [1]Worcester Polytechnic Institute

11:45 AM
Effect of Wire Size on the Fatigue Life of Superelastic Nitinol: *Parisa Shabani Nezhad*[1]; Jacob Rusch[1]; John Moore[1]; Dinc Erdeniz[2]; [1]Marquette University; [2]University of Cincinnati

12:05 PM
Understanding the Connections Between Microstructural Features and Fatigue Crack Initiation and Propagation Properties in Medical Formulations of Ultra-high-molecular-weight-polyethylene (UHMWPE): *Bethany Smith*[1]; Qin Yu[2]; Lisa Pruitt[1]; Robert Ritchie[1]; Samantha Kwan[1]; Alex Sangster[3]; Jon Ell[1]; [1]University of California, Berkeley; [2]Lawrence Berkeley National Laboratory; [3]Marlboro Academy

SPECIAL TOPICS

Frontiers of Materials Award Symposium: Nanocarbon-based Flexible Devices: Emerging Materials and Processes — Session I: Future of Nanoelectronics

Program Organizer: Mostafa Bedewy, University of Pittsburgh

Monday AM | February 28, 2022
260A | Anaheim Convention Center

8:30 AM Introductory Comments

8:35 AM Keynote
Nanoelectronics Grafted onto and within Colloids to Enable Colloidal Robotics: *Michael Strano*[1]; [1]Massachusetts Institute of Technology

9:15 AM Keynote
Design and Applications of Printable and Flexible Nanoelectronic Material Inks: *Mark Hersam*[1]; [1]Northwestern University

9:55 AM Break

10:10 AM Keynote
Going where Silicon Cannot Reach: Print-in-place and Recyclable Electronics from Nanomaterials: *Aaron Franklin*[1]; [1]Duke University

10:50 AM Keynote
Direct-write of Laser Induced Graphene with Spatially Varying Properties on Polymers: *Mostafa Bedewy*[1]; [1]University of Pittsburgh

NANOSTRUCTURED MATERIALS

Functional Nanomaterials: Functional Low-Dimensional (0D, 1D, 2D) Materials 2022 — Low-Dimensional 0D Nanoparticles & Plasmonics

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

Program Organizers: Michael Cai Wang, University of South Florida; Yong Lin Kong, University of Utah; Sarah Ying Zhong, University of South Florida; Surojit Gupta, University of North Dakota; Nasrin Hooshmand, Georgia Institute of Technology; Woochul Lee, University of Hawaii at Manoa; Min Kyu Song, Washington State University; Simona Hunyadi Murph, Savannah River National Laboratory; Hagar Labouta, University of Manitoba; Max Anikovskiy, University of Calgary; Patrick Ward, Savannah River National Laboratory

Monday AM | February 28, 2022
260B | Anaheim Convention Center

Session Chairs: Nasrin Hooshmand, Georgia Institute of Technology; Hagar Labouta, University of Manitoba

8:30 AM
Extinction Properties of Singular Plasmonic Nanoparticles: *Nasim Mohammadi Estakhri*[1]; Nooshin M. Estakhri[2]; [1]Chapman University; [2]University of Michigan

8:50 AM
Hydrogen Sensing Using Novel Core-shell Plasmonic Nanoparticles: *Joshua Maurer*[1]; David Sconyers[1]; Rosemary Calabro[1]; Stephen Bartolucci[1]; [1]US Army DEVCOM-AC

9:10 AM
Electron Transport in Plasmonic Nanocomposites: *Patrick Ward*[1]; [1]Savannah River National Laboratory

9:30 AM
Plasmonic Nanoparticles for Sensing, Drug Delivery and Photothermal Therapy of Cancer: *Nasrin Hooshmand*[1]; [1]Georgia Institute of Technology

9:50 AM Break

10:10 AM Keynote
Plasmonic Approaches to Biology and Medicine: *Paul Weiss*[1]; [1]University of California Los Angeles

---

MATERIALS PROCESSING

Furnace Tapping 2022 — Session I

Sponsored by: The Southern African Institute of Mining and Metallurgy, TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Materials Characterization Committee, Industrial Advisory Committee

Program Organizers: Joalet Steenkamp, MINTEK; Dean Gregurek, RHI Magnesita; Quinn Reynolds, Mintek; Gerardo Alvear Flores, Rio Tinto; Hugo Joubert, Tenova Pyromet; Phillip Mackey, P.J. Mackey Technology, Inc.

Monday AM | February 28, 2022
213D | Anaheim Convention Center

Session Chair: Joalet Steenkamp, Mintek / University of the Witwatersrand

---

8:30 AM Introductory Comments

8:40 AM Keynote
Controlled Tapping – The Research Project: *Merete Tangstad*[1]; [1]Norwegian University of Science and Technology

9:25 AM
MIRS Robotic Tapping and Plugging of Non-ferrous Smelting Furnaces: *Rodrigo Madariaga*[1]; Luis Arevalo[1]; Tom Gabardi[1]; Phillip Mackey[2]; [1]MIRS Robotics; [2]P.J. Mackey Technology, Inc.

9:45 AM Invited
CFD Study on Continuous Tapping of Silicon: *Jan Erik Olsen*[1]; Michal Ksiazek[1]; Merete Tangstad[2]; [1]SINTEF; [2]NTNU

10:05 AM Break

10:25 AM
Reduced-order Models of Furnace Tapping Systems – A Case Study from a Submerged Arc Furnace Producing Silicomanganese: *Quinn Reynolds*[1]; Joalet Steenkamp[1]; Jakobus Sutherland[2]; [1]MINTEK; [2]Transalloys

10:45 AM
The Interaction of Slag and Carbon on the Electrical Properties: *Gerrit Surup*[1]; Kseniia Koseniuk[1]; Merete Tangstad[1]; [1]NTNU

11:10 AM
Electrical Resistivity of Transformed Carbon Materials in the Silicon Furnace: *Haley Hoover*[1]; Merete Tangstad[1]; Gudrun Sævarsdóttir[2]; [1]NTNU; [2]Reykjavik University

11:35 AM Concluding Comments

MECHANICS & STRUCTURAL RELIABILITY

Grain Boundaries and Interfaces: Metastability, Disorder, and Non-Equilibrium Behavior — Grain Boundary Migration and Deformation: Part I

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

Program Organizers: Yue Fan, University of Michigan; Liang Qi, University of Michigan; Jeremy Mason, University of California, Davis; Garritt Tucker, Colorado School of Mines; Pascal Bellon, University of Illinois at Urbana-Champaign; Mitra Taheri, Johns Hopkins University; Eric Homer, Brigham Young University; Xiaofeng Qian, Texas A&M University

Monday AM | February 28, 2022
304C | Anaheim Convention Center

Session Chairs: Yue Fan, University of Michigan, Ann Arbor; Jeremy Mason, University of California, Davis; Garritt Tucker, Colorado School of Mines

---

8:30 AM Introductory Comments

8:35 AM Invited
Grain Boundary Mobilities in Polycrystalline Materials: Jin Zhang[1]; Phillip Staublin[1]; Henning Poulsen[2]; James Warren[3]; *Peter Voorhees*[1]; [1]Northwestern University; [2]Technical University of Denmark; [3]National Institute of Standards and Technology

9:05 AM
Reconciling the Variability of Grain Boundary Migration Behaviors Using a Classical Approach: *Eric Homer*[1]; Darcey Britton[1]; Oliver Johnson[1]; Gregory Thompson[2]; [1]Brigham Young University; [2]University of Alabama

9:25 AM
Emergent Disconnections in Phase Field Microstructure: Modeling Complex Boundary Migration at the Mesoscale: Mahi Gokuli[1]; *Brandon Runnels*[2]; [1]California Institute of Technology; [2]University of Colorado Colorado Springs

9:45 AM
Interactions between Interfacial Disconnections and Facet Junctions: Implications for Faceting and Boundary Evolution: *Douglas Medlin*[1]; Chris Barr[1]; James Nathaniel[1]; Elton Chen[1]; Ping Lu[1]; David Adams[1]; Rémi Dingreville[1]; Brad Boyce[1]; [1]Sandia National Laboratories

10:05 AM Break

10:20 AM Invited
Does Grain Boundary Character Matter? Intergranular Failure in Al Alloys under Bending: *Josh Kacher*[1]; Sazol Das[2]; Yung Suk Jeremy Yoo[3]; [1]Georgia Institute of Technology; [2]Novelis Inc.; [3]University of Michigan

10:50 AM
Model for Grain Boundary Stress Field Evolution due to Dislocation-grain Boundary Interactions and Influence on Subsequent Slip Transmission: *Darshan Bamney*[1]; Laurent Capolungo[2]; Douglas Spearot[1]; [1]University of Florida; [2]Los Alamos National Laboratory

11:10 AM
Effects of Segregated Solute Atoms and Clusters on Grain Boundary Properties in Magnesium Alloys: *Vaidehi Menon*[1]; Liang Qi[1]; [1]University of Michigan

11:30 AM
Investigating Factors that Influence Stress-induced Grain Boundary Migration in Ultrafine-grained Metal Thin Films: *Sandra Stangebye*[1]; Yin Zhang[1]; Ting Zhu[1]; Olivier Pierron[1]; Josh Kacher[1]; [1]Georgia Institute of Technology

11:50 AM
High-throughput Atomistic Simulations of Dislocation-grain Boundary Interactions: *Sumit Suresh*[1]; Michael Baskes[1]; Nithin Mathew[1]; Abigail Hunter[1]; Saryu Fensin[1]; [1]Los Alamos National Laboratory

---

MATERIALS DESIGN

Hume-Rothery Symposium on Connecting Macroscopic Materials Properties to Their Underlying Electronic Structure: The Role of Theory, Computation, and Experiment — Alloy Theory I: Cluster and Machine Learning Representations of Thermodynamics

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

Program Organizers: Raymundo Arroyave, Texas A&M University; Wei Chen, Illinois Institute of Technology; Yong-Jie Hu, Drexel University; Tresa Pollock, University of California, Santa Barbara

Monday AM | February 28, 2022
255A | Anaheim Convention Center

Session Chair: To Be Announced

8:30 AM Introductory Comments

8:35 AM Keynote
William Hume-Rothery Award Lecture: Study of Ferroelectricity and Phase Transitions in Hafnia: Sesha Behara[1]; *Anton Van der Ven*[1]; [1]University of California, Santa Barbara

9:15 AM Invited
ACE of Spades: *Drautz Ralf*[1]; [1]Icams Ruhr-Universitaet Bochum

9:45 AM Invited
Construction and Application of First-principles Parameterized Cluster Expansion Effective Hamiltonians Using CASM: *Brian Puchala*[1]; John Thomas[2]; Anirudh Natarajan[2]; Anton Van der Ven[2]; [1]University of Michigan; [2]University of California, Santa Barbara

10:15 AM Break

10:30 AM Invited
Turning Ab Initio Simulations into Surprising Bulk Predictions: *Elizabeth Decolvenaere*[1]; Emily Levin[2]; Ram Seshadri[2]; Alexander Donchev[1]; John Klepeis[1]; Anton Van der Ven[2]; David Shaw[1]; [1]D. E. Shaw Research; [2]University of California, Santa Barbara

11:00 AM Invited
Building Useful Machine-learned Interatomic Potentials: *Gus Hart*[1]; [1]Brigham Young University

---

MATERIALS DESIGN

ICME Case Studies: Successes and Challenges for Generation, Distribution, and Use of Public/Pre-Existing Materials Datasets — Leveraging Open Datasets

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

Program Organizers: Stephen DeWitt, Oak Ridge National Laboratory; Vikas Tomar, Purdue University; James Saal, Citrine Informatics; James Warren, National Institute of Standards and Technology

Monday AM | February 28, 2022
254A | Anaheim Convention Center

Session Chair: Stephen DeWitt, Oak Ridge National Laboratory

8:30 AM
Filling Data Gaps in 3D Microstructure with Deep Learning: *Neal Brodnik*[1]; Devendra Jangid[1]; Michael Goebel[1]; Amil Khan[1]; Saisidharth Majeti[1]; McLean Echlin[1]; B. S. Manjunath[1]; Samantha Daly[1]; Tresa Pollock[1]; [1]University of California Santa Barbara

8:50 AM
Holistic Merging of Experimental and Computational Datasets – A Case Study for Diffusion Coefficients: Wei Zhong[1]; *Ji-Cheng Zhao*[1]; [1]University of Maryland

9:10 AM Invited
Materials Innovation and Design Enabled by the Materials Project: *Kristin Persson*[1]; [1]University of California, Berkeley

9:40 AM
Data-driven Model Based Comparison of Public Datasets for Online State of Charge Estimation in Lithium-ion Batteries: *Meghana Sudarshan*[1]; Alexey Serov[1]; Casey Jones[1]; Vikas Tomar[1]; [1]Purdue University

---

LIGHT METALS

Magnesium Technology — Keynote Session

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

Program Organizers: Petra Maier, University of Applied Sciences Stralsund; Steven Barela, Terves, Inc; Victoria Miller, University of Florida; Neale Neelameggham, IND LLC

Monday AM | February 28, 2022
210A | Anaheim Convention Center

Session Chairs: Petra Maier, University of Applied Sciences Stralsund; Steven Barela, Terves, Inc.

8:30 AM Introductory Comments

8:40 AM Keynote
Magnesium Alloy Development for Structural and Biomedical Applications: *Alan Luo*[1]; [1]Ohio State University

9:20 AM Keynote
Unlocking the Strengthening Potential of Magnesium Alloys Using Deformation-induced Clustering and Precipitation: Suhas Eswarappa Prameela[1]; Taisuke Sasaki[2]; Peng Yi[1]; Michael Falk[1]; *Timothy Weihs*[1]; [1]Johns Hopkins University; [2]NIMS

10:00 AM Break

10:15 AM Keynote
An Update on Magnesium Based Powder Metallurgy and Additive Manufacturing Processes: *Rajiv Tandon*[1]; [1]Luxfer Magtech

10:55 AM Keynote
Historical Developments and Status of Carbothermal Reduction Technology to Produce Magnesium Metal: *Aaron Palumbo*[1]; Boris Chubukov[1]; [1]Big Blue Technologies

---

ENERGY & ENVIRONMENT

Magnetics and the Critical Materials Challenge: An FMD Symposium Honoring Matthew J. Kramer — Hard Magnets

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

Program Organizers: Scott McCall, Lawrence Livermore National Laboratory; Ryan Ott, Ames Laboratory

Monday AM | February 28, 2022
210D | Anaheim Convention Center

Session Chair: Ryan Ott, Ames Laboratory

8:30 AM Introductory Comments

8:35 AM Invited
Challenges in Affordable, Reliable Permanent Magnets: *Matthew Kramer*[1]; [1]Iowa State University

9:05 AM Invited
Iron Nitride: a Non-rare-earth Containing Permanent Magnet: *Frank Johnson*[1]; [1]Niron Magnetics, Inc.

9:35 AM Invited
Critical Materials Challenges in ThMn12-type Hard Magnetic Alloys for Permanent Magnets: *Daniel Salazar*[1]; [1]BCMaterials

10:05 AM Break

10:25 AM Invited
Developing Substitutes for Magnetic Alloys: *Thomas Lograsso*[1]; [1]Critical Materials Institute

10:55 AM Invited
Controlling First-order Magnetic Phase Transitions in Rare-earth Intermetallics: *Vitalij Pecharsky*[1]; [1]Ames Laboratory, Iowa State University

---

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — Corrosion I

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

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

Monday AM | February 28, 2022
203B | Anaheim Convention Center

Session Chair: Kumar Sridharan, University of Wisconsin

8:30 AM
Effects of Molten Salt Corrosion Associated with Proton Irradiation on the Micro-tensile Strength of Grain Boundaries in a Ni-20Cr Alloy: *Fei Teng*[1]; Weiyue Zhou[2]; Yachun Wang[1]; Daniel Murray[1]; Michael Short[2]; Lingfeng He[1]; [1]Idaho National Laboratory; [2]Massachusetts Institute of Technology

8:50 AM
Inconel 617 Corrosion Study in Molten NaF-KF-UF4-UF3 Salts: *Qiufeng Yang*[1]; Jinsuo Zhang[1]; [1]Virginia Polytechnic Institute of Technology

9:10 AM
Corrosion Resistance of Steel and Nickel Alloys in Molten Nitrate Salt: *Andrew Dong*[1]; Camilla Stitt[2]; Peter Hosemann[1]; George Young[2]; [1]University of California Berkeley; [2]Kairos Power

9:30 AM
Voids Observed during Molten Salt Corrosion: Kirkendall or Not?: *Weiyue Zhou*[1]; Miaomiao Jin[2]; Yang Yang[2]; Michael Short[1]; [1]Massachusetts Institute of Technology; [2]Penn State University

9:50 AM Break

10:10 AM
The Corrosion of Severely Plastically Deformed SS316 in LiCl-Li_2O at 650 ˚C: *Jeremy Moon*[1]; Andrew Hoffman[2]; Haiming Wen[3]; Dev Chidambaram[1]; [1]University of Nevada, Reno; [2]GE Research; [3]Missouri S&T

10:30 AM
Understanding Molten Salt Corrosion in Ni-20Cr Model Alloy Using Multimodal Characterization: *Kaustubh Bawane*[1]; Xiaoyang Liu[2]; Ruchi Gakhar[1]; Michael Woods[1]; Mingyuan Ge[3]; Xianghui Xiao[3]; Wah-Keat Lee[3]; Simon Pimblott[1]; James Wishart[3]; Yu-chen Karen Chen-Wiegart[2]; Lingfeng He[1]; [1]Idaho National Laboratory; [2]Stony Brook University; [3]Brookhaven National Laboratory

10:50 AM
ICME Development of a Cold Spray Enabled Corrosion Resistant Bimetallic Structure for Nuclear Reactors: *Pin Lu*[1]; Joseph Heelan[2]; Vilupanur Ravi[3]; [1]Questek Innovations LLC; [2]Solvus Global; [3]Cal Poly Pomona

---

MATERIALS DESIGN

Materials Design and Processing Optimization for Advanced Manufacturing: From Fundamentals to Application — Materials Design and Processing Optimization: Young Investigator Session I

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

Program Organizers: Wei Xiong, University of Pittsburgh; Dana Frankel, QuesTek Innovations LLC; Gregory Olson, Massachusetts Institute of Technology

Monday AM | February 28, 2022
253B | Anaheim Convention Center

Session Chairs: Dana Frankel, QuesTek Innovations LLC; Wei Xiong, University of Pittsburgh

---

8:30 AM Keynote
Materials Design for Advanced Manufacturing: Gregory Olson[1]; *Jason Sebastian*; [1]Massachusetts Institute of Technology

9:00 AM Invited
Development Framework Advancing State-of-the-art for Space Propulsion Components: *Ida Berglund*[1]; Fuyao Yan[1]; Martin Walbrühl[1]; Jiayi Yan[1]; [1]QuesTek Europe AB

9:25 AM Invited
Finding a Balance in FeCrAl, Optimizing Fabrication Routes and Chemistry Utilizing Experiments, Modeling, and Machine Learning: *Andrew Hoffman*[1]; Vipul Gupta[1]; Bojun Feng[1]; Sayan Ghosh[1]; Rajnikant Umretiya[1]; Raul Rebak[1]; [1]GE Research

9:50 AM Invited
Chemistry-processing-microstructure Relationships in Materials for Advanced Manufacturing: *Eric Lass*[1]; [1]University of Tennessee-Knoxville

10:15 AM Break

10:35 AM Invited
Laser Powder Bed Fusion of High-strength, Crack-susceptible Superalloys: Considerations in Composition, Printing Process and Heat Treatment.: *Marcus Lam*[1]; [1]Monash University

11:00 AM Invited
Modeling Non-equilibrium Segregation and Microstructural Evolution during Rapid Solidification in Additive Manufacturing: Application to IN718 Alloy: Kang Wang[1]; *Bi-Cheng Zhou*[1]; [1]University of Virginia

11:25 AM Invited
Deformation Pathways in an Engineered Ti Alloy Duplex Microstructure Produced Using Selective Laser Melting: Jenniffer Bustillos[1]; *Atieh Moridi*[1]; [1]Cornell University

---

ADVANCED MATERIALS

Materials in Sport — Materials in Sport

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

Program Organizers: Brian Love, University of Michigan; W. Jud Ready, Georgia Institute of Technology; Nikhilesh Chawla, Purdue University

Monday AM | February 28, 2022
251C | Anaheim Convention Center

Session Chairs: Nikhilesh Chawla, Purdue University; W. Jud Ready, Georgia Institute of Technology; Brian Love, University of Michigan

---

8:30 AM Introductory Comments

8:35 AM
Material Characterization of Nordic Ski Waxes: *Jeffrey Bates*[1]; [1]University of Utah

8:55 AM
"Stuck on You": Functional Friction Measurements of Doctored Baseballs Coated with "Sticky Substances": *Brian Love*[1]; [1]University of Michigan

9:15 AM
Additive Manufacturing for Adjustable Putters: *Brittan Pero*[1]; Caroline Means[1]; Jaime Berez[1]; Elliott Jost[1]; Jason Kuiper[2]; Justin Martin[2]; Stewart Cink[3]; Chris Saldana[1]; [1]Georgia Institute of Technology; [2]Bobby Jones Golf Course; [3]PGA Tour

9:35 AM
Viscoelastic Self-sensing Nano-composite Materials and Their Use in Sports Applications: *David Fullwood*[1]; Isaac Sorensen[1]; Jacob Carter[1]; Kurt Jensen[1]; Ryan Hanson[1]; Spencer Baker[1]; Adam Bilodeau[1]; Matthew Seeley[1]; Ulrike Mitchell[1]; Anton Bowden[1]; [1]Brigham Young University

9:55 AM Break

10:15 AM
Materials Science and Engineering of Multiscale Foams for High Performance Footware: Arun Sundar Singaravelu[1]; Max Drexler[2]; Jasmine Rupert[2]; Chris Holmes[2]; Eshan Ganju[3]; *Nikhilesh Chawla*[3]; [1]Arizona State University; [2]adidas; [3]Purdue University

10:35 AM
Measuring Cool Touch of Key Sports Performance Apparel T-shirt Materials Using a Modified Transient Plane Source (MTPS) Sensor to Inform Future Technology Development: *Susan Sokolowski*[1]; Emily Karolidis[1]; Arya Hakimian[2]; [1]University of Oregon; [2]CTherm

10:55 AM
A Mechanical Behavior Comparison between Cloth and Elastomeric Kinesiotapes Used in Athletic Training and Rehabilitation: Declan Shannon[1]; *Brian Love*[1]; [1]University of Michigan

11:15 AM
Adding a New Dimension to Activewear Fabrics: One-Way Transport Leveraging Biomimicry Science instead of Chemical Treatments for Perspiration Transport: Chad Lawrence[1]; *Jordan Lightstone*[1]; Jason Hu[1]; [1]NexTex Innovations, Inc.

11:35 AM Concluding Comments

NUCLEAR MATERIALS

Mechanical Behavior and Degradation of Advanced Nuclear Fuel and Structural Materials — Fuels & Claddings I

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

Program Organizers: Dong Liu, University of Bristol; Peng Xu, Idaho National Laboratory; Simon Middleburgh, Bangor University; Christian Deck, General Atomics; Erofili Kardoulaki, Los Alamos National Laboratory; Robert Ritchie, University of California, Berkeley

Monday AM | February 28, 2022
204A | Anaheim Convention Center

Session Chairs: Peng Xu, Idaho National Laboratory; Erofili Kardoulaki, Los Alamos National Laboratory

---

8:30 AM Invited
Development of Advanced Nuclear Fuels for Current and Next Generation Reactors: *Joshua White*[1]; Tarik Saleh[1]; Kenneth McClellan[1]; [1]Los Alamos National Laboratory

9:00 AM
Fabrication and Thermophysical Properties of (U,Zr)C; A High Uranium Density Fuel Candidate for Nuclear Thermal Propulsion Reactors: *Erofili Kardoulaki*[1]; Brian Taylor[2]; Jhonathan Rosales[2]; Tim Coons[1]; Darrin Byler[1]; Ken McClellan[1]; [1]Los Alamos National Laboratory; [2]NASA

9:20 AM
High Temperature Mechanical Testing of Uranium Fuel Pellets: *Tarik Saleh*[1]; James Valdez[1]; Michael Torrez[1]; Scarlett Widgeon Paisner[1]; Kathryn Metzger[2]; Joshua White[1]; [1]Los Alamos National Laboratory; [2]Westinghouse Electric Corporation

9:40 AM
Material Degradation Analysis through Machine Learning-based Information Extraction from Legacy SFR Metallic Fuel Performance Data: *Zhi-Gang Mei*[1]; Aaron Oaks[1]; Kun Mo[1]; Yinbin Miao[1]; Logan Ward[1]; Abdellatif Yacout[1]; [1]Argonne National Laboratory

10:00 AM Break

10:20 AM
Investigating the Thermophysical Properties and Key Contributions to the Thermal Conductivity of Different Nitride Systems: *Conor Galvin*[1]; Nicholas Barron[2]; Navaratnarajah Kuganathan[1]; Michael Cooper[3]; Robin Grimes[1]; [1]Imperial College London; [2]National Nuclear Laboratory; [3]Los Alamos National Laboratory

10:50 AM
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]; Yucheng Fu[1]; Zhijie Xu[1]; Ayoub Soulami[1]; Vineet Joshi[1]; [1]Pacific Northwest National

Laboratory

11:10 AM
Phase Field Fracture Study of the Effect of Gas Bubble on Fracture at U-Mo/Zr Interface: *Aashique Rezwan*[1]; Sean Masengale[1]; Benjamin Beeler[2]; Yongfeng Zhang[1]; [1]University of Wisconsin Madison; [2]Idaho National Laboratory

---

NANOSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale VI — Deformation Mechanisms I

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

Program Organizers: Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, University of Texas at San Antonio; Changhong Cao, McGill University; Mohsen Asle Zaeem, Colorado School of Mines

Monday AM | February 28, 2022
262B | Anaheim Convention Center

Session Chairs: Matthew Daly, University of Illinois at Chicago; Christopher Weinberger, Colorado State University

---

8:30 AM Introductory Comments

8:40 AM
Deciphering the Deformation Mechanisms of Nanocrystalline-nanotwinned Metals in Hall-Petch Breakdown Regime: *Yinmin (Morris) Wang*[1]; [1]University of California, Los Angeles

9:00 AM Invited
Deformation Twins in BCC Metals - Atomic Level Origins: *Christopher Weinberger*[1]; Anik Faisal[1]; [1]Colorado State University

9:30 AM
The Complexity of Deformation Twinning: *Huseyin Sehitoglu*[1]; Sameer Mohammed[1]; Gorkem Gengor[1]; Orcun Celebi[1]; [1]University of Illinois

---

CHARACTERIZATION

Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling — Session I

Sponsored by: TMS Structural Materials Division, TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Shailendra Joshi, University of Houston; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Jagannathan Rajagopalan, Arizona State University; Robert Wheeler, Microtesting Solutions LLC

Monday AM | February 28, 2022

206B | Anaheim Convention Center

Session Chairs: Daniel Miracle, Air Force Research Laboratory; Alejandro Barrios, Sandia National Laboratories

---

8:30 AM Keynote
Emerging Capabilities for the High-throughput Characterization of Structural Materials: *Daniel Miracle*[1]; Mu Li[2]; Zhaohan Zhang[2]; Rohan Mishra[2]; Katharine Flores[2]; [1]Air Force Research Laboratory; [2]Washington University in St. Louis

9:10 AM Invited
Capturing the Mechanical Response of Three Phase Semi-solids at High Temperatures Using In Situ Synchrotron Imaging - From Superalloys to Magmas: *Peter Lee*[1]; Mohammed Azeem[1]; Nolwenn Le Gall[1]; Robert Atwood[2]; [1]University College London; [2]Diamond Light Source

9:40 AM Invited
Elucidating Deformation Pathways in Refractory Multi-principal Element Alloys via In Situ Experiments: *Daniel Gianola*[1]; [1]University of California-Santa Barbara

10:10 AM Break

10:30 AM
High-throughput Fatigue Testing of Nanocrystalline Al Thin Films: *Alejandro Barrios*[1]; Cody Kunka[1]; John Nogan[1]; Khalid Hattar[1]; Brad Boyce[1]; [1]Sandia National Laboratories

---

MATERIALS DESIGN

Metal-Matrix Composites: Advances in Processing, Characterization, Performance and Analysis — Aluminum Metal Matrix Composites

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

Program Organizers: Srivatsan Tirumalai, The University of Akron; Pradeep Rohatgi, University of Wisconsin; Simona Hunyadi Murph, Savannah River National Laboratory

Monday AM | February 28, 2022
256B | Anaheim Convention Center

Session Chair: Tirumalai S Srivatsan, The University of Akron

---

8:30 AM Invited
The Abrasive Wear Behavior of an In-situ Processed Aluminum Alloy Metal Matrix Composites: Srivatsan Tirumalai[1]; *Jimmy Karloopia*[2]; Shaik Mozammil[2]; Pradeep Jha[2]; [1]The University of Akron; [2]Indian Institute of Technology, Roorkee

8:55 AM
A Comparative Study of Carbon Nanotubes and Graphene Nanoplatelets on Structure-property Relationship of Aluminium Matrix Composites Synthesized by Spark Plasma Sintering: Mahmood Khan[1]; Muhammad Shahzad[2]; Muhammad Basit[3]; Rafi Din[2]; *Shahid Akhtar*[4]; Syed Wilayat Husain[3]; Ragnhild Aune[1]; [1]Norwegian University of Science and Technology; [2]Pakistan Institute of Science and Technology; [3]Institute of Space Technology (IST); [4]Hydro Aluminium AS

9:15 AM Invited
Application of Triboinformatics Approach in Tribological Studies of Aluminum Alloys and Aluminum/Graphite Metal Matrix Composites: *Md Syam Hasan*[1]; Amir Kordijazi[2]; Pradeep Rohatgi[1]; Michael Nosonovsky[1]; [1]University of Wisconsin-Milwaukee; [2]SUNY Polytechnic Institute

9:40 AM Invited
Interfacial Structure and Mechanical Properties of 6082 Al Matrix Composites Reinforced with Al-Cu-Fe Quasicrystalline: *Yagnesh Shadangi*[1]; Vikas Shivam[2]; Joysurya Basu[1]; Kausik Chattopadhyay[1]; Nilay Mukhopadhyay[1]; [1]IIT BHU; [2]IIT Ropar

10:05 AM Break

10:20 AM
Mechanical Alloying of Feedstock Powder for Selective Laser Melting: Aluminum Alloy Matrix Composites: *Ethan Parsons*[1]; [1]Massachusetts Institute of Technology

10:40 AM Invited
Recent Advances in Aluminium-based Hybrid Metal Matrix Composites: A Review: *Sudhir Ranjan*[1]; Jimmy Karloopia[1]; Pradeep Jha[1]; [1]Indian Institute of Technology Roorkee

11:05 AM
Role of Ultrasonic Cavitation on Microstructure, Bulk Mechanical and Tribological Behavior of 2D Tungsten Disulfide Reinforced Aluminum Matrix Composites: *Tanaji Paul*[1]; Ana Exime[1]; Riddhiben Joshi[1]; Cheng Zhang[1]; Benjiamin Boesl[1]; Arvind Agarwal[1]; [1]Florida International University

11:25 AM Invited
The Damping Capacity and Sliding Wear Behavior of an Aluminum Alloy Metal Matrix Composite: Role of Reinforcement
: *Kedarnath Rane*[1]; Narendra Dhokey[2]; Srivatsan Tirumalai[3]; [1]National Manufacturing Institute Scotland; [2]College of Engineering; [3]The University of Akron

---

SPECIAL TOPICS

Moving Forward from a Pandemic: How the Field of Materials Science Has Adapted (2022 Student-led Symposium) — Materials Research and Leadership in Uncertain Times

Program Organizers: Gianmarco Sahragard-Monfared, University of California, Davis; Christine Smudde, Univeristy of California, Davis; Jared Stimac; Mingwei Zhang, University of California, Davis

Monday AM | February 28, 2022
202A | Anaheim Convention Center

Session Chairs: Gianmarco Sahragard-Monfared, University of California, Davis; Christine Smudde, University of California, Davis

---

8:30 AM Introductory Comments

8:35 AM
Materials Science during a Pandemic: A National Lab Perspective: *Ellen Cerreta*[1]; [1]Los Alamos National Laboratory

8:55 AM
Conducting Materials Research during and after a Global Pandemic: *Timothy Smith*[1]; Pete Bonacuse[1]; [1]NASA Glenn Research Center

9:15 AM
When the World Went Remote: Adapting to Crisis and Creating Positive Change during the COVID-19 Pandemic: *Paul Mason*[1]; [1]Thermo-Calc Software Inc.

9:35 AM
COVID-19 Impacts on Policy and Funding in Materials Engineering - A Perspective from the National Science Foundation: *Alexis Lewis*[1]; [1]National Science Foundation

9:55 AM Break

10:15 AM
Lessons Learned during the COVID-19 Pandemic Regarding Antimicrobial Copper-based or Copper-containing Materials/Surfaces: *Bryer Sousa*[1]; Danielle Cote[1]; [1]Worcester Polytechnic Institute

10:35 AM
Copper Ion Release in Copper-based Alloys: Implications on the Transmission of Coronaviruses Originating from Human Contact with Fomite Surfaces: *Victor Wallemacq*[1]; Carol Glover[1]; Tsuyoshi Miyake[1]; Daniel Engel[1]; John Scully[1]; Stephen McDonnell[1]; [1]University of Virginia

10:55 AM
Challenges and Solutions Associated with Publishing during a Global Pandemic: *Susan Sinnott*[1]; [1]Pennsylvania State University

11:15 AM
Improvements to the Nanoindentation Technique and Its Use to Measure the Properties of Microfibers: *Warren Oliver*[1]; Yujie Meng[1]; [1]KLA

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Phase Transformation

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Ramasis Goswami, Naval Research Laboratory; Saurabh Puri, Microstructure Engineering; Eric Payton, Air Force Research Laboratory; Bij-Na Kim, Carpenter Additive; Megumi Kawasaki, Oregon State University; Eric Lass, University of Tennessee-Knoxville

Monday AM | February 28, 2022
255B | Anaheim Convention Center

Session Chairs: Eric Payton, Air Force Research Laboratory; Mohsen Asle Zaeem, Colorado School of Mines

---

8:30 AM Invited
Tuning Nano-scale Phase Transitions to Expand Transformation-induced Plasticity: *C. Tasan*[1]; Shaolou Wei[1]; [1]Massachusetts Institute of Technology

9:00 AM
Deformation-induced Phase Transformation and Microstructure Evolution in CrCoNi Medium Entropy Alloy: *Hangman Chen*[1]; Penghui Cao[1]; [1]University of California, Irvine

9:20 AM
Effect of Boron Segregation on Bainite Nucleation during Isothermal Transformation: *Pierre Douguet*[1]; Gregory Da Rosa[2]; Philippe Maugis[1]; Josée

Drillet[2]; Khalid Hoummada[1]; [1]Aix Marseille Univ, CNRS, IM2NP, Marseille, France; [2]ArcelorMittal Maizières Research SA, Voie Romaine, BP30320, 57283 Maizières les Metz, France

9:40 AM Invited
Localized Phase Transformation at Stacking Faults and Mechanism-based Alloy Design: Longsheng Feng[1]; Timothy Smith[2]; Ashton Egan[1]; Fan Zhang[3]; Michael Mills[1]; *Yunzhi Wang*[1]; [1]The Ohio State University; [2]NASA Glenn Research Center; [3]CompuTherm LLC

10:10 AM Break

10:25 AM
Shear Deformation-induced Modification of Defect Structures and Hierarchical Microstructures in Metallic systems: *Bharat Gwalani*[1]; Matthew Olszta[1]; Miao Song[1]; Wenkai Fu[1]; Yulan Li[1]; Qin Pang[1]; Anqi Yu[1]; Mayur Pole[1]; Jia Liu[1]; Joshua Silverstein[1]; Xiaolong Ma[1]; Tanvi Anjantiwalay[1]; Aashish Rohatgi[1]; Mert Efe[1]; Peter Sushko[1]; Arun Devaraj[1]; Ayoub Soulami[1]; Suveen Mathaudhu[1]; Cynthia Powell[1]; Lei Li[1]; [1]Pacific Northwest National Laboratory

10:45 AM
Tricky Transformations in an Ion Irradiated Nickel-titanium Alloy: *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 Laboratories; [3]Sandia National Laboratories

11:05 AM
Unravelling the Mechanisms of Irradiation Induced Phase Transformation in Nanocrystalline Gold: *James Nathaniel*[1]; Douglas Medlin[1]; Khalid Hattar[1]; Mitra Taheri[2]; [1]Sandia National Laboratories; [2]Johns Hopkins University

---

MATERIALS PROCESSING

Rare Metal Extraction and Processing — Processes for Rare Earth Elements

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

Program Organizers: Takanari Ouchi, University of Tokyo; Gisele Azimi, University of Toronto; Kerstin Forsberg, KTH Royal Institute of Technology; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Neale Neelameggham, IND LLC; Alafara Baba, University of Ilorin; Hong Peng, University of Queensland

Monday AM | February 28, 2022
213B | Anaheim Convention Center

Session Chairs: Kerstin Forsberg, KTH Royal Institute of Technology; Hojong Kim, Pennsylvania State University; Takanari Ouchi, University of Tokyo

---

8:30 AM Introductory Comments

8:40 AM Invited
EPD Distinguished Lecture: Rare Earth and Critical Material Recovery from Peralkaline Volcanic Ores: Minerals Processing, Hydrometallurgy and Solvent Extraction Separation: *David Dreisinger*[1]; [1]University of British Columbia

9:20 AM
Two-phase Rare-earth Alloys as Reference Electrodes in Molten Chlorides for Reliable Electrochemical Measurements: Nathan Smith[1]; Stephanie Castro

Baldivieso[1]; Timothy Lichtenstein[1]; Sanghyeok Im[1]; *Hojong Kim*[1]; [1]Pennsylvania State University

9:40 AM
Electrochemical Cell Design for Emf Measurements of Liquid Nd-Bi Alloys via Coulombic Titration in LiCl-KCl-$NdCl_3$ Electrolyte: *Sanghyeok Im*[1]; Nathan Smith[1]; Stephanie Castro Baldivieso[1]; Hojong Kim[1]; [1]The Pennsylvania State University

10:00 AM Break

10:20 AM
Low-cost Distillation Technology for Rare Earth Recycling: *Chinenye Chinwego*[1]; Hunter Wagner[1]; Emily Giancola[1]; Jonathan Jironvil[1]; Adam Powell[1]; [1]Worcester Polytechnic Institute

10:40 AM Keynote
Extraction and Recovery of Rare-earth Elements and Critical Materials from Coal Waste Using Low Cost Processing Methods: Prasenjit Podder[1]; *Michael Free*[1]; Prashant Sarswat[1]; [1]University of Utah

11:20 AM
Selective Sulfidation for Rare Earth Element Separation: *Caspar Stinn*[1]; Antoine Allanore[1]; [1]Massachusetts Institute of Technology

---

ELECTRONIC MATERIALS

Recent Advances in Printed Electronics and Additive Manufacturing: 2D/3D Functional Materials, Fabrication Processes, and Emerging Applications — Functional Materials and 2D/3D Devices I

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; Yong Lin Kong, University of Utah; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Changyong Cao, Michigan State University; David Estrada, Boise State University; Nuggehalli Ravindra, New Jersey Institute of Technology

Monday AM | February 28, 2022
303C | Anaheim Convention Center

Session Chairs: Pooran Joshi, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Yong Kong, University of Utah

---

8:30 AM Invited
Bridging the Length-scale Gap: Synthesizing Three-dimensional Ceramic Microlattices by Aerosol Jet Nanoparticle Printing: Bin Yuan[1]; *Chunshan Hu*[1]; Rahul Panat[1]; [1]Carnegie Mellon University

8:55 AM Invited
Direct 4D Printing of Stretchable Supercapacitors Using Hybrid Composite Materials: Yihao Zhou[1]; Charles Parker[2]; Jeffrey Glass[2]; Pooran Joshi[3]; Amit Naskar[3]; *Changyong Cao*[1]; [1]Michigan State University; [2]Duke University; [3]Oak Ridge National Laboratory

9:20 AM Invited
Flexible Electric Energy Storage for Low-power Devices: By Liya Napollion[1]; *Kwang Kim*[1]; [1]University of Nevada, Las Vegas

9:45 AM
3D Printing of Nanostructures Using Electrohydrodynamic Jet Printing for Surface Enhanced Raman Scattering (SERS) Based Optical Sensor: *Savan Suri*[1]; Konstantinos Sierros[1]; [1]West Virginia University

10:05 AM Break

10:20 AM
Computational Modeling of Transport Properties of Functional Conductive Inks Using Molecular Dynamic Simulation for Printed Electronics: *Patrick Dzisah*[1]; Nuggehalli Ravindra[1]; [1]New Jersey Institute of Technology

---

ADVANCED MATERIALS

Refractory Metals — Tungsten, Molybdenum, and Niobium

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

Program Organizers: Eric Taleff, University of Texas at Austin; Lauren Garrison, Oak Ridge National Laboratory; Alexander Knowles, University of Birmingham

Monday AM | February 28, 2022
252B | Anaheim Convention Center

Session Chairs: Lauren Garrison, Oak Ridge National Laboratory; Gary Rozak, H.C. Starck Solutions

---

8:30 AM
Grain Boundary Doping as Effective Method to Improve Mechanical Properties in Ultra-fine Grained Tungsten: *Daniel Kiener*[1]; Michael Wurmshuber[1]; Simon Doppermann[1]; Stefan Wurster[2]; Severin Jakob[1]; Markus Alfreider[1]; Klemens Schmuck[1]; Rishi Bodlos[3]; Lorenz Romaner[1]; Verena Maier-Kiener[1]; Helmut Clemens[1]; [1]University of Leoben; [2]Erich Schmid Institute of Materials Science; [3]Materials Center Leoben

8:50 AM
Realizing Sub-micron Tungsten and Tungsten Composite Microstructures via Deformable Punch Spark Plasma Sintering: *Nachiket Shah*[1]; Nathan Madden[1]; Sergei Zvenigorodsky[2]; Zachariah Koyn[2]; Jessica Krogstad[1]; [1]University of Illinois at Urbana-Champaign; [2]Energy Driven Technologies LLC

9:10 AM
NanoPhase Separation Sintering in Mo and Mo-W Based Systems: *Christian Oliver*[1]; Christopher Schuh[1]; [1]Massachusetts Institute of Technology

9:30 AM
Nanostructured Tungsten Alloys for Nuclear Fusion: *Neal Parkes*[1]; Alexander Knowles[1]; Chris Hardie[2]; [1]University of Birmingham; [2]UK Atomic Energy Authority

9:50 AM Break

10:05 AM
Tensile Properties of Molybdenum & ODS MoLa Sheet at Elevated Temperatures: *Alex Xie*[1]; Jacqueline Foradora[1]; Gary Rozak[1]; Mike Stawovy[1]; [1]H.C. Starck Solutions

10:25 AM
Bending Creep Deformation of ODS MoLa with 0.6 vs 1.1 wt.%La: *Brandon Kenny*[1]; Gary Rozak[2]; Jacqueline Foradora[2]; Alex Xie[3]; [1]Miami University; [2]H.C. Starck Solutions Euclid; [3]H.C. Starck Solutions Taicang

10:45 AM
Flow Behavior and Associated Microstructures of Niobium at 1200 to 1500°C:
Emily Brady[1]; Eric Taleff[2]; [1]Exponent; [2]University of Texas at Austin

---

ENERGY & ENVIRONMENT

REWAS 2022: Energy Technologies and CO2 Management — Renewable Energy and Combustion Technologies

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

Program Organizers: Fiseha Tesfaye, Åbo Akademi University; Lei Zhang, University of Alaska Fairbanks; Donna Guillen, Idaho National Laboratory; Ziqi Sun, Queensland University of Technology; Alafara Baba, University of Ilorin; Neale Neelameggham, IND LLC; Mingming Zhang, Wood Mackenzie; Dirk Verhulst, Consultant, Extractive Metallurgy and Energy Efficiency; Shafiq Alam, University of Saskatchewan; Mertol Gökelma, Izmir Institute of Technology; Camille Fleuriault, Eramet Norway; Chukwunwike Iloeje, Argonne National Laboratory

Monday AM | February 28, 2022
212A | Anaheim Convention Center

Session Chair: Camille Fleuriault, Eramet Norway

8:30 AM Introductory Comments

8:35 AM
Design of a Molten Salt Metal-air Battery with High-energy Density: *Mahya Shahabi*[1]; Nicholas Masse[1]; Hongyi Sun[1]; Lucien Wallace[1]; Adam Powell[1]; Yu Zhong[1]; [1]Worcester Polytechnic Institute

8:55 AM
Silicon-production from SiO-gas via Gas-phase Reactions: *Halvor Dalaker*[1]; [1]Sintef

9:15 AM
Macroscopic Modeling and Phase Field Modeling of Solar Grade Silicon by Molten Salt Electrolysis: *Aditya Moudgal*[1]; Mohammad Asadikiya[1]; Douglas Moore[1]; Gabriel Espinosa[1]; Lucien Wallace[1]; Alexander Wadsworth[1]; Alexander Alonzo[1]; Peter Catalino[1]; Andrew Charlebois[1]; Evan Costa[1]; Tyler Melo[1]; Adam Powell[1]; Yu Zhong[1]; Uday Pal[2]; [1]Worcester Polytechnic Institute; [2]Boston University

9:35 AM
Design of Phase Change Material Composites for Efficient and Rapid Storage of Thermal Energy: *Patrick Shamberger*[1]; Alison Hoe[1]; Achutha Tamraparni[1]; Chen Zhang[1]; Alaa Elwany[1]; Jonathan Felts[1]; [1]Texas A&M University

---

CHARACTERIZATION

Seeing is Believing -- Understanding Environmental Degradation and Mechanical Response Using Advanced Characterization Techniques: An SMD Symposium in Honor of Ian M. Robertson — Broader Impacts and Environmental Degradation I: Hydrogen Embrittlement

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Nuclear Materials Committee

Program Organizers: Kaila Bertsch, Lawrence Livermore National Laboratory; Khalid Hattar, Sandia National Laboratories; Josh Kacher, Georgia Institute of Technology; Bai Cui, University of Nebraska-Lincoln; Benjamin Eftink, Los Alamos National Laboratory; Stephen House, University of Pittsburgh; May Martin, National Institute of Standards and Technology; Kelly Nygren, Cornell High Energy Synchrotron Source; Blythe Clark, Sandia National Laboratories; Shuai Wang, Southern University of Science and Technology

Monday AM | February 28, 2022
207C | Anaheim Convention Center

Session Chairs: Kaila Bertsch, Lawrence Livermore National Laboratory; Kelly Nygren, Cornell University/CHESS; May Martin, National Institute of Standards and Technology; Shuai Wang, Souther University of Science and Technology; Bai Cui, University of Nebraska- Lincoln

---

8:30 AM Introductory Comments

8:40 AM Invited
Hydrogen Embrittlement: From Experiments and Modeling to Prognosis: *Petros Sofronis*[1]; Zahra Hosseini[1]; Mohsen Dadfarnia[2]; Masanobu Kubota[3]; Akihide Nagao[3]; Brian Somerday[1]; Robert Ritchie[4]; [1]University of Illinois; [2]Seattle University; [3]Kyushu University; [4]University of California, Berkeley

9:10 AM Invited
Multi-scale Characterization of the Effects of High Altitude Environments on Crack Tip Damage Evolution during Fatigue Loading of AA7075-T651: *James Burns*[1]; Zach Harris[1]; Adam Thompson[1]; [1]University of Virginia

9:40 AM Invited
Factors Influencing Fatigue Crack Growth Properties of Steels in Hydrogen Gas Environment: *Hisao Matsunaga*[1]; [1]Kyushu University

10:10 AM Break

10:25 AM Invited
Effect of Hydrogen on Creep Properties: *Masanobu Kubota*[1]; Daisuke Takazaki[2]; Ryosuke Komoda[3]; Kentrao Wada[2]; Toshihiro Tsuchiyama[4]; Mohsen Dadfarnia[5]; Brian Somerday[6]; Petros Sofronis[7]; [1]I2CNER, Kyushu University; [2]Graduate School of Kyushu University; [3]Fukuoka University & I2CNER, Kyushu University; [4]Kyushu University; [5]Seattle University & I2CNER, Kyushu University; [6]University of Illinois at Urbana-Champaign, Somerday Consulting LLC & I2CNER, Kyushu University; [7]University of Illinois at Urbana-Champaign & I2CNER, Kyushu University

10:55 AM Invited
Effects of Hydrogen on Deformation Evaluated with EBSD of Single Crystal Austenitic Stainless Steel: *Brian Kagay*[1]; Coleman Alleman[1]; Brandon Talamini[1]; Chris San Marchi[1]; [1]Sandia National Laboratories

11:25 AM Invited
The Central Role of the Chemical Potential of Hydrogen Regarding Hydrogen Ingress, Trapping, Defect Generation and Fracture: *Reiner Kirchheim*[1]; [1]University of Goettingen

---

NANOSTRUCTURED MATERIALS

Self-organizing Nano-architectured Materials — Pattern Formation and Synthesis

Program Organizers: Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Ian McCue, Northwestern University; Erica Lilleodden, Helmholtz-Zentrum hereon; Pierre-Antoine Geslin, CNRS / INSA-Lyon; Qing Chen, Hong Kong University of Science & Technology

Monday AM | February 28, 2022
260C | Anaheim Convention Center

Session Chairs: Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Jonah Erlebacher, Johns Hopkins University

---

8:30 AM Invited
Self-organizing Gradient Nanostructures via Chemical Heterogeneities: *Brad Boyce*[1]; Khalid Hattar[1]; Remi Dingrevillie[1]; Doug Medlin[1]; Joseph Monti[1]; Alejandro Barrios[1]; James Nathaniel[1]; Zachary Milne[1]; David Adams[1]; [1]Sandia National Laboratories

9:00 AM Invited
Hierarchical Morphologies in Co-sputter Deposited Thin Films: *Amit Misra*[1]; [1]University of Michigan

9:20 AM
Microporous Nanoparticle Emulsion Thermosets for Multi-material, Multifunctional Porous Nano-composites: *Yogin Patel*[1]; Michael Grzenda[1]; Charm Nicholas[1]; Molla Hasan[2]; Jonathan Singer[1]; [1]Rutgers–New Brunswick; [2]Alfred University

9:40 AM Break

10:00 AM Invited
Nanoporous Nanoparticles: From Catalysis to 3D Printing: *Jonah Erlebacher*[1]; Alyssa Chuang[1]; Pheobe Appel[1]; Jodie Baris[1]; [1]Johns Hopkins University

10:30 AM Invited
Grain Boundary Formation through Particle Detachment during Coarsening of 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 Geesthach

11:00 AM
Quasi-periodic Nanoarchitectures in Eutectic Thin Films: Lengthscales and Inherent Instabilities: Eli Sullivan[1]; Jonathan Skelton[1]; James Fitz-Gerald[1]; *Jerrold Floro*[1]; [1]University of Virginia

11:20 AM
Elucidating the Kinetics for Three-dimensional Bicontinuous Structures Formation in Molten Salt Dealloying via In Situ Synchrotron X-ray Nano-tomography: *Xiaoyang Liu*[1]; Arthur Ronne[1]; Kaustubh Bawane[2]; Xiaoyin Zheng[1]; Yang Liu[1]; Lin-Chieh Yu[1]; Mingyuan Ge[3]; Phillip Halstenberg[4]; Xianghui Xiao[3]; Shannon Mahurin[5]; Sheng Dai[6]; Wah-Keat Lee[3]; James Wishart[3]; Lingfeng He[2]; Yu-chen Chen-Wiegart[7]; [1]Stony Brook University; [2]Idaho National Laboratory; [3]Brookhaven National Laboratory; [4]University of Tennessee; [5]Oak Ridge National Laboratory; [6]University of Tennessee/ Oak Ridge National Laboratory; [7]Stony Brook University/ Brookhaven National Laboratory

---

MECHANICS & STRUCTURAL RELIABILITY

Structural Metamaterials — Session I

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

Program Organizers: Amy Wat, Lawrence Livermore National Laboratory; Brad Boyce, Sandia National Laboratories; Xiaoyu Zheng, University of California, Los Angeles; Fabrizio Scarpa, University of Bristol; Robert Ritchie, University of California, Berkeley

Monday AM | February 28, 2022
304A | Anaheim Convention Center

Session Chair: To Be Announced

8:30 AM
Bioinspired Hierarchical Architected Structures Via Additive Manufacturing: *Ali Afrouzian*[1]; Amit Bandyopadhyay[1]; [1]Washington State University

8:50 AM
Phase Field Modeling of Crack Propagation, Deflection and Delamination in Engineered Interfaces: *Vinamra Agrawal*[1]; Brandon Runnels[2]; [1]Auburn University; [2]University of Colorado at Colorado Springs

9:10 AM
Seeing Beneath the Surface: Estimating Interior Material Properties with Visual Vibration Tomography: *Berthy Feng*[1]; Alexander Ogren[1]; Chiara Daraio[1]; Katherine Bouman[1]; [1]Caltech

9:30 AM Invited
Temperature and Stress-induced Recovery in Artificial Shape Memory Alloys: Yunlan Zhang[1]; Mirian Velay[1]; David Restrepo[2]; Nilesh Mankame[3]; *Pablo Zavattieri*[1]; [1]Purdue University; [2]University of Texas, San Antonio; [3]General Motors Global Research & Development

---

NANOSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XII) — Fundamentals in Mechanical Behavior and Radiation Effects I

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Penghui Cao, University of California, Irvine; Xiaoxu Huang, Chongqing University; Enrique Lavernia, University of California, Irvine; Xiaozhou Liao, University of Sydney; Lee Semiatin, Material Resources LLC; Nobuhiro Tsuji, Kyoto University; Caizhi Zhou, University of South Carolina; Yuntian Zhu, City University of Hong Kong

Monday AM | February 28, 2022
262A | Anaheim Convention Center

Session Chairs: Ting Zhu, Georgia Institute of Technology.; Francesco Maresca, University of Groningen; Xialong Ma, Pacific Northwest National Laboratory

---

8:30 AM Invited
Non-equilibrium Evolution of Metastable Grain Boundaries in Nanocrystals at Extreme Conditions: Zhitong Bai[1]; *Yue Fan*[1]; [1]University of Michigan

9:00 AM Invited
Predicting the Transformation Strain that Controls Ductility and Toughness in Advanced Steels: *Francesco Maresca*[1]; Efthymios Polatidis[2]; Miroslav Smid[2]; Helena Van Swygenhoven[2]; William Curtin[3]; [1]University of Groningen; [2]PSI; [3]EPFL

9:30 AM Invited
On the Role of Gradients on Strengthening, Ductility, and Size Effects: *Elias Aifantis*[1]; [1]Emeritus, Aristotle University, Thessaloniki 54124, GR; Emeritus, Michigan Technological University, Houghton MI 49931, USA; Mercator Fellow, Friedrich – Alexander University, Erlangen – Nuremberg 90762, DE

10:00 AM Break

10:20 AM
Deformation Mechanism of Ultrafine-grained FeCrAl Alloy – An In Situ Micropillar Compression Strain Rate Jump Study: *Tianyi Sun*[1]; Jaehun Cho[1]; Zhongxia Shang[1]; Tongjun Niu[1]; Jie Ding[1]; Dongyue Xie[2]; Jian Wang[2]; Haiyan Wang[1]; Xinghang Zhang[1]; [1]Purdue University, School of Materials Engineering; [2]University of Nebraska-Lincoln

---

MATERIALS PROCESSING

12th International Symposium on High Temperature Metallurgical Processing — Energy Efficient Clean Metallurgical Technologies

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

Program Organizers: Zhiwei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jesse White, Elkem Carbon Solutions; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, Jiangxi University of Science and Technology; Onuralp Yücel, Istanbul Technical University; Ender Keskinkilic, Atilim University; Tao Jiang, Central South University; Morsi Mahmoud, King Fahd University of Petroleum & Minerals

Monday PM | February 28, 2022
213A | Anaheim Convention Center

Session Chair: Onuralp Yücel, Istanbul Technical University

2:00 PM Introductory Comments

2:05 PM
Recent Studies on Hot Metal Desulfurization: *Ender Keskinkilic*[1]; [1]Atilim University

2:25 PM
Evaporation of Antimony Trioxide from Antimony Slag by Nitrogen Injection in a Top Submerged Lance Smelting Set-up: *Hongbin Ling*[1]; Annelies Malfliet[1]; Bart Blanpain[1]; Muxing Guo[1]; [1]KU Leuven

2:45 PM
Large Eddy Simulation on Slag Entrainment in Slab Continuous Casting Mold under Different Casting Speeds: *Yanbin Yin*[1]; Jiongming Zhang[1]; [1]University of Science and Technology Beijing

ADVANCED MATERIALS

2D Materials – Preparation, Properties & Applications — Session 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

Monday PM | February 28, 2022
252C | Anaheim Convention Center

Session Chairs: Sufian Abedrabbo, Khalifa University; Gerald Ferblantier, Strasbourg University

---

2:00 PM Introductory Comments

2:10 PM
Chemisorption of Gadolinium Ions on 2D-g-C3N4 for an Efficient Piezo-photocatalytic Remediation of Kanamycin Sulfate: *Saikat Kuila*[1]; Tarun Kundu[1]; [1]Indian Institute of Technology Kharagpur

2:30 PM
Effect of Pore Alignment in the Mechanical Properties of 2D Material 3D Foam – Polymer Composites: *Kazue Orikasa*[1]; Arvind Agarwal[1]; [1]Florida International University

2:50 PM
Elastic Response and Strain Solitons Behavior of Molybdenum Ditelluride ($MoTe_2$) Based 2D Van der Waals Heterostructure: *Aditya Dey*[1]; Shoieb Chowdhury[1]; Hesam Askari[1]; [1]University of Rochester

3:10 PM Invited
Dispersing Two-dimensional Ti3C2Tx MXene Nanosheets in Nonpolar Organic Solvents within Minutes: *Bin Yuan*[1]; Chunshan Hu[1]; Azahar Ali[1]; Rahul Panat[1]; [1]Carnegie Mellon University

3:40 PM Break

4:00 PM
High Fidelity Multi-physics Numerical Modelling of Ultrasonic Bubble Dynamics and Liquid Exfoliation of 2D Graphite: *Ling Qin*[1]; Barbara Maciejewska[2]; Kyriakos Porfyrakis[3]; Iakovos Tzanakis[4]; Nicole Grobert[2]; Dmitry Eskin[5]; Jiawei Mi[1]; [1]University of Hull; [2]University of Oxford; [3]University of Greenwich; [4]Oxford Brookes University; [5]Brunel University London

4:20 PM
Novel Approach to Produce Thick CNT Based Bucky Paper for Radar Absorption and EMI Shielding Applications: *Syed Sajl*[1]; Rajakumar Devarapalli[1]; Daniel Choi[1]; Shaohong Luo[1]; [1]Khalifa University

4:40 PM
Structural Phase Transition and Pseudoelastic Behavior in Strained Monolayer Molybdenum Ditelluride ($MoTe_2$): *Shoieb Ahmed Chowdhury*[1]; Aditya Dey[1]; Hesam Askari[1]; [1]University of Rochester

---

NANOSTRUCTURED MATERIALS

30 Years of Nanoindentation with the Oliver-Pharr Method and Beyond — High Strain Rates and Creep Testing

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

Program Organizers: Verena Maier-Kiener, Montanuniversitaet Leoben; Benoit Merle, University Erlangen-Nuremberg (Fau); Erik Herbert, Michigan Technological University; Samantha Lawrence, Los Alamos National Laboratory; Nigel Jennett, Coventry University

Monday PM | February 28, 2022
259A | Anaheim Convention Center

Session Chairs: Megan Cordill, Erich Schmid Institute of Materials Science; Yang-Tse Cheng, University of Kentucky

---

2:00 PM Invited
A Mathematical Framework for High Strain Rate Nanoindentation Testing: *Sudharshan Phani Pardhasaradhi*[1]; Benjamin Hackett[2]; Christopher Walker[2]; Warren Oliver[3]; George Pharr[2]; [1]ARCI; [2]Texas A&M University; [3]KLA Corporation

2:25 PM
Nanoindentation at High Sustained Strain Rates: Recent Improvements and Challenges: *Benoit Merle*[1]; [1]University Erlangen-Nuremberg (Fau)

2:45 PM Invited
New Instrumentation and Analysis Methodology for Nano-impact Testing: Mario Rueda[1]; Ben Beake[2]; *Jon Molina-Aldareguia*[1]; [1]Imdea Materials Institute; [2]Micro Materials Ltd.

3:10 PM
Work-based Definition of the Strain Rate in indentation: *Donald Stone*[1]; Z. Melgarejo[1]; Abdelmageed Elmustafa[2]; [1]University of Wisconsin; [2]Old Dominion University

3:30 PM Break

3:45 PM Invited
Development of a New Method to Measure Surface Mechanical Properties Using In Situ SEM Microshear: Application at High Strain Rate: *Gaylord Guillonneau*[1]; Guillaume Kermouche[2]; Sergio Sao Joao[2]; [1]Ecole Centrale de Lyon; [2]Mines Saint-Etienne

4:10 PM
A New Long-term Indentation Relaxation Method to Measure Creep Properties at the Micro-scale with Application to Fused Silica, PMMA and Amorphous Selenium: *Paul Baral*[1]; Gaylord Guillonneau[2]; Guillaume Kermouche[3]; Jean-Michel Bergheau[2]; Jean-Luc Loubet[2]; [1]Université Catholique de Louvain; [2]Ecole Centrale de Lyon; [3]Ecole Nationale des Mines de Saint Etienne

4:30 PM
Nanoindentation Creep Testing: Advantages and Limitations of the Constant Contact Pressure Method: *Karsten Durst*[1]; Christian Minnert[1]; [1]TU Darmstadt

4:50 PM
Simulations and Experiments of the Strain Rate Sensitivity Measurements Using Conical and Spherical Indentation Creep: Yousuf Mohammed[1]; Donald Stone[2]; *Abdelmageed Elmustafa*[1]; [1]Old Dominion University; [2]University of Wisconsin-Madison

ADDITIVE TECHNOLOGIES

Additive Manufacturing Keynote Session — Additive Manufacturing Keynote Session

Sponsored by:

Program Organizer: Allison Beese, Pennsylvania State University

Monday PM | February 28, 2022
257 | Anaheim Convention Center

2:00 PM Introductory Comments

2:05 PM Keynote
Metallic Alloy Microstructure Control under Additive Manufacturing Conditions: *Amy Clarke*[1]; [1]Colorado School of Mines

2:35 PM Keynote
Designing High-temperature Aluminum Intermetallics for Additive Manufacturing: *Michele Manuel*[1]; [1]University of Florida

3:05 PM Keynote
Advancing Process Control in Metal Additive Manufacturing: *Manyalibo Matthews*[1]; [1]Lawrence Livermore National Laboratory

3:35 PM Break

3:55 PM Keynote
TMS Young Innovator in the Materials Science of Additive Manufacturing Award: The Critical Roles of Keyhole in Laser Powder Bed Fusion: *Tao Sun*[1]; [1]University of Virginia

NUCLEAR MATERIALS

Advanced Characterization and Modeling of Nuclear Fuels: Microstructure, Thermo-physical Properties — Nuclear Fuels - Thermo-physical Property Modeling

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

Program Organizers: David Frazer, Idaho National Laboratory; Fabiola Cappia, Idaho National Laboratory; Tsvetoslav Pavlov, Idaho National Laboratory; Peter Hosemann, University of California

Monday PM | February 28, 2022
202B | Anaheim Convention Center

Session Chair: Peter Hosemann, University of California, Berkeley

2:00 PM Invited
Predicting Thermophysical Properties of Actinide Oxides Using Atomic Scale Simulation: *Michael Rushton*[1]; Conor Galvin[2]; Michael Cooper[3]; [1]Bangor University; [2]Imperial College London; [3]Los Alamos National Laboratory

2:30 PM
An Integrated Approach for Coupling Experimental Data, Physics-based Models, and Machine Learning Algorithms for Predicting the Effective Thermal Conductivity of U-based Fuels: Fergany Badry[1]; Monika Singh[1]; Timothy Coffman[1]; Mohammed Gomaa Abdoelatef[1]; Sean McDeavitt[1]; *Karim Ahmed*[1]; [1]Texas A&M University

2:50 PM
A Predictive Approach to Model Thermal Conductivity Degradation for In-pile UO2: *Joshua Ferrigno*[1]; Saqeeb Adnan[1]; Marat Khafizov[1]; [1]Ohio State University

3:10 PM
Thermal Conductivity Degradation by Solid Fission Products: Machine Learning Coupled with First Principles Model: *Elina Charatsidou*[1]; Kyle Johnson[2]; Marcus Hedberg[3]; Pär Olsson[1]; Denise Adorno Lopes[4]; [1]KTH Royal Institute of Technology; [2]Studsvik Nuclear AB; [3]Chalmers University of Technology; [4]Westinghouse Electric Sweden

3:30 PM
A Monte-Carlo Solver for Coupled Electron-phonon Boltzmann Transport Equation in Metallic a-U: *Jie Peng*[1]; Anter El-Azab[1]; W. Ryan Deskins[1]; Linu Malakkal[2]; [1]Purdue University; [2]Idaho National Laboratory

---

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session II

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

Program Organizers: Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; Olivia Underwood Jackson, Sandia National Laboratories

Monday PM | February 28, 2022
207A | Anaheim Convention Center

Session Chairs: Penghui Cao, University of California, Irvine; Aeriel Murphy-Leonard, Ohio State University

---

2:00 PM Invited
Quantifying Damage Evolution during In-situ Loading of Additive Manufactured 316L Stainless Steel Using High Energy X-rays: *Aeriel Murphy-Leonard*[1]; David Rowenhorst[2]; [1]Ohio State University; [2]US Naval Research Laboratory

2:30 PM
Line Profile Analysis from In Situ Synchrotron X-ray Diffraction to Study the Microstructural Evolution during Elasto-plastic Transition in Nickel with Bimodal Grain Structure: *Elis Sjogren*[1]; Wolfgang Pantleon[2]; Ulrich Lienert[3]; Zoltan Hegedüs[3]; Kei Ameyama[4]; Dmyto Orlov[1]; [1]Lund University; [2]Technical University of Denmark; [3]Deutsches Elektronen-Synchrotron; [4]Ritsumeikan University

2:50 PM
Recent Advances and Applications of Lab-based Diffraction Contrast Tomography: Jette Oddershede[1]; Jun Sun[1]; Florian Bachmann[1]; Hrishikesh Bale[2]; *Erik Lauridsen*[1]; [1]Xnovo Technology; [2]Carl Zeiss X-ray Microscopy Inc.

3:10 PM
Time Resolved Evolution of the 3D Nanoporous Structure of Sintered Ag by X-ray Nanotomography: Role of the Interface with a Copper Substrate: *Xavier Milhet*[1]; Kokouvi N'Tsouaglo[1]; Jerome Colin[1]; Loic Signor[1]; Azdine Nait-Ali[1]; Juan Creus[2]; Mikael Gueguen[1]; Marc Legros[3]; [1]Prime Institute CNRS ENSMA; [2]LaSIE Universite La Rochelle; [3]CEMES - CNRS - Toulouse

3:30 PM Break

3:45 PM Invited
Fundamental Deformation Mechanisms in Metals with Gradient Structure and Multi-principal Element Alloys: *Penghui Cao*[1]; [1]University of California, Irvine

4:15 PM
Cores of 1/2<110>-type Dislocations in the CrMnFeCoNi High-entropy Alloy Investigated by STEM, the Center of Symmetry and the Nye Tensor Mapping Techniques: *Milan Heczko*[1]; Veronika Mazánová[1]; Roman Gröger[2]; Tomáš Záležák[2]; Mohammad Hooshmand[3]; Easo George[4]; Michael Mills[1]; Antonín Dlouhý[2]; [1]The Ohio State University; [2]Institute of Physics of Materials CAS; [3]University of California; [4]Oak Ridge National Laboratory

4:35 PM
Local Phase Transformation at Microtwins and Planar Defects in Creep Deformed Ni-Base Superalloys: *Ashton Egan*[1]; Fei Xue[2]; Longsheng Feng[1]; Shakthipriya Baskar Kannan[1]; Gregory Sparks[3]; Timothy Smith[4]; Emmanuelle Marquis[2]; Yunzhi Wang[1]; Maryam Ghazisaeidi[1]; Michael Mills[1]; [1]Ohio State University; [2]University of Michigan; [3]Air Force Research Laboratory; [4]NASA Glenn Research Center

4:55 PM
Investigation of Dislocation Structures in an Al-Li Binary Alloy via High Resolution X-ray Characterization Techniques: *Sven Gustafson*[1]; Wolfgang Ludwig[2]; Katherine Shanks[3]; Carsten Detlefs[4]; Michael Sangid[1]; [1]Purdue University; [2]University Lyon I; [3]Cornell High Energy Synchrotron Source; [4]European Synchrotron Radiation Facility

---

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage 2022 — Energy Conversion with SOCs

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

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

Monday PM | February 28, 2022
212B | Anaheim Convention Center

Session Chairs: Soumendra Basu, Boston University; Xiao-Dong Zhou, University of Louisiana at Lafayette

---

2:00 PM Invited
High-performance Solid Oxide Cells for Cost Effective Hydrogen Production: *Xiao-Dong Zhou*[1]; Yudong Wang[1]; Yanhua Sun[1]; Nengneng Xu[1]; Gordon Xia[1]; [1]University of Louisiana at Lafayette

2:25 PM Invited
Microstructural Stability of Reversible Solid Oxide Electrochemical Cells Subjected to Mode Switching: Hector Grande[1]; Jillian Rix[1]; Michelle Sugimoto[1]; John-In Lee[1]; Ayesha Akter[1]; Srikanth Gopalan[1]; Uday Pal[1]; *Soumendra Basu*[1]; [1]Boston University

2:50 PM
Quantifying Triple Phase Boundary Density in Nanocatalyst-infiltrated SOFC Anodes Using 3-D Reconstruction and Scanning Electron Microscopy: *Jillian Rix*[1]; Hector Grande[1]; Uday Pal[1]; Srikanth Gopalan[1]; Soumendra Basu[1]; [1]Boston University

---

NANOSTRUCTURED MATERIALS

Advances and Discoveries in Non-equilibrium Driven Nanomaterials and Thin Films — Advances inThin Film Oxides I/Recent Advances in Nanoscale Materials

Sponsored by: TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Ritesh Sachan, Oklahoma State University; Amit Pandey, Lockheed Martin Space; Saurabh Puri, Microstructure Engineering; Amber Srivastava, Indian Institute of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology

Monday PM | February 28, 2022
259B | Anaheim Convention Center

Session Chairs: Ritesh Sachan, Oklahoma State University; Saurabh Puri, Microstructure Engineering; David Bird, US Army

---

2:00 PM Invited
Hybrid Thin Film Interface for High Temperature Electronics Modules: *Ajit Roy*[1]; Sergei Shenogin[1]; John Ferguson[1]; John Jones[1]; Sabyasachi Ganguli[1]; [1]Air Force Research Laboratory

2:30 PM Invited
Meta-stable Orthorhombic Phase of HfZrOx Thin Films for Ferroelectric Devices: *Jiyoung Kim*[1]; [1]University of Texas at Dallas

3:00 PM Invited
Identification of NV Centers in Nanodiamond through STEM-EELS/EDS: *Bethany Hudak*[1]; Rhonda Stroud[1]; [1]Naval Research Laboratory

3:30 PM Break

3:50 PM
Correlating Properties of Irradiation Produced Nanoscale Superlattices with Irradiation Condition Parameters by Combining Rate Theory and Kinetic Monte Carlo Simulations: *Anton Schneider*[1]; Yongfeng Zhang[1]; Chao Jiang[2]; Jian Gan[2]; [1]University of Wisconsin Madison; [2]Idaho National Laboratory

4:15 PM
Growth of Complex Oxide Thin Films with Nanoscale Porosity by Pulsed Laser Deposition: *Huiming Guo*[1]; Xin Wang[1]; Alexander Dupuy[1]; Julie Schoenung[1]; William Bowman[1]; [1]Department of Materials Science and Engineering, University of California, Irvine

4:40 PM
Novel Bent-lattice Nanostructures in Crystallizing Amorphous Films Discovered by Transmission Electron Microscopy: *Vladimir Kolosov*[1]; [1]Ural Federal University

---

BIOMATERIALS

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

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

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

Monday PM | February 28, 2022
201A | Anaheim Convention Center

Session Chairs: Heqi Xu, Texas Tech University; Jiachen Liu, Texas Tech University

---

2:00 PM
Development and 3D Printing of a Bioabsorbable Composite Material for Orthopaedic Applications: Cillian Thompson[1]; Cristina Pascual-González[1]; Guillermo Domínguez[1]; Monica Echeverry-Rendón[1]; Carlos González[2]; *Javier Llorca*[2]; [1]IMDEA Materials Institute; [2]IMDEA Materials Institute & Technical University of Madrid

2:20 PM
Femto-second Laser Lithography of Fluorescent 2D/3D Nanostructures: *Shobha Shukla*[1]; [1]IIT Bombay

2:40 PM
Effects of Topographic Parameters on a Micropillar Surface on Cell Migration and Morphology: Srikumar Krishnamoorthy[1]; *Jiachen Liu*[1]; Heqi Xu[1]; Zhengyi Zhang[2]; Changxue Xu[1]; Md Shahriar[1]; [1]Texas Tech University; [2]Huazhong University of Science and Technology

3:00 PM
Synthesis and Characterization of Hydroxyapatite from Solid Mineral for Dental and Orthopedic Applications: Grace Oyatogun[1]; Temitope Esan[1]; *Victor Abere*[1]; Chinenye Ibekwe[1]; Kunle Oluwasegun[1]; [1]Obafemi Awolowo University

---

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: 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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Monday PM | February 28, 2022

251A | Anaheim Convention Center

Session Chairs: Brian Cantor, University of Oxford; Joseph Poon, University of Virginia

---

2:00 PM Invited
CANCELLED: Do We Need a Refractory Alloy with Super-high Strength at Room Temperature?: Oleg Senkov[1]; *Daniel Miracle*[1]; [1]Air Force Research Laboratory

2:20 PM Invited
What Controls Corrosion and Passivation of Compositionally Complex Alloys?: *John Scully*[1]; Samuel Inman[1]; Junsoo Han[2]; Debashish Sur[1]; Angela Gerard[1]; [1]Department of Materials Science and Engineering- University of Virginia; [2]Institut de Recherche Chimie Paris- Chimie ParisTech

2:40 PM Invited
A Periodic Table for HEA Design: *Scott Broderick*[1]; Krishna Rajan[1]; Debasis Sengupta[2]; Stephen Giles[2]; [1]University at Buffalo; [2]CFD Research Corporation

3:00 PM Invited
Data-guided Exploration of High Entropy Alloys for Cryocooler Applications: *Indranil Roy*[1]; Ankit Roy[1]; Ganesh Balasubramanian[1]; Louis Santodonato[2]; [1]Lehigh University; [2]Santo Science

3:20 PM Break

3:40 PM
Additive Manufacturing of High-entropy Alloys for High Strength and Lightweight Structures: *Jie Ren*[1]; Wen Chen[1]; [1]UMass Amherst

---

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: 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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Monday PM | February 28, 2022
251B | Anaheim Convention Center

Session Chairs: Diana Farkas, Virginia Polytechnic Institute; Francesco Maresca, University of Groningen

---

2:00 PM Invited
Simulations of Deformation and Fracture in Multi-principal Element Alloys: *Diana Farkas*[1]; [1]Virginia Polytechnic Institute

2:20 PM Invited
Interactions between a Dislocation and a Twin Boundary/HCP Lamella and Their Temperature Dependence in Ni-based Equiatomic Alloys: *Haixuan Xu*[1]; Sho[1]; [1]University of Tennessee

2:40 PM Invited
Theory of Yield Strength in BCC High Entropy Alloys: *Francesco Maresca*[1]; Chanho Lee[2]; Rui Feng[2]; Yi Chou[3]; Tamas Ungar[4]; Michael Widom[5]; Ke An[6]; Jonathan Poplawsky[6]; Yi-Chia Chou[3]; Peter Liaw[2]; William Curtin[7]; [1]University of Groningen; [2]University of Tennessee; [3]National Chiao Tung University; [4]Eotvos University Budapest; [5]Carnegie Mellon University; [6]Oak Ridge National Laboratory; [7]EPFL

3:00 PM
Atomistic Modeling of Diffusive High Temperature Plasticity in BCC Refractory-based MPEAs: *Joel Berry*[1]; Kate Elder[1]; Aurelien Perron[1]; [1]Lawrence Livermore National Laboratory

---

MATERIALS PROCESSING

Advances in Powder and Ceramic Materials Science — Advanced Ceramics and Processes and 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; Kathy Lu, Virginia Polytechnic Institute and State University; Faqin Dong, Southwest University of Science and Technology; Jinhong Li, China University of Geosciences; Eugene Olevsky, San Diego State University; Ruigang Wang, The University of Alabama; Dipankar Ghosh, Old Dominion University

Monday PM | February 28, 2022
213C | Anaheim Convention Center

Session Chairs: Shefford Baker, Cornell University; Jinhong Li, China University of Geosciences (Beijing)

2:00 PM Introductory Comments

2:05 PM Invited
Transformative Ceramic Science and Engineering Design to Address Societal Needs: *Julie Schoenung*[1]; [1]University of California, Irvine

2:25 PM
Processing & Mechanical Properties of Additively Manufactured Ceramic Matrix Composites Using Preceramic Polymers: *Mark O'Masta*[1]; Ekaterina Stonkevitch[1]; Kayleigh Porter[1]; Phuong Bui[1]; Zak Eckel[1]; Tobias Schaedler[1]; [1]HRL Laboratories LLC

2:45 PM
Numerical Characteristics of Plasma Arc Welding in SiC-ZrB2 Composite Ceramics: *Akash Meena*[1]; Jecee Jarman[1]; Arezoo Emdadi[1]; Jeremy Watts[1]; [1]Missouri Univ of Science and Tech

3:05 PM
The Effect of Particle Size on the Morphology of Polyester and Epoxy Based Auto–hybrid Composites: *Kator Jomboh*[1]; Adele Garkida[2]; Vershima Alkali[2]; [1]University of Maiduguri, Borno State; [2]Ahmadu Bello University, Zaria. Nigeria

3:25 PM Break

3:45 PM
Catalytic Pyrolysis of Polyethylene and Polypropylene over Y Zeolite: *Xunrui Wang*[1]; Jinhong Li[1]; Chengdong Wang[1]; Xiang Wang[2]; [1]China University of Geosciences, Beijing; [2]Chinese Academy of Sciences, Beijing

4:05 PM
Effect of Boron Nitride on the Thermal Properties of Expanded Vermiculite-based Composite Phase Change Material: *Yong Deng*[1]; Jinhong Li[2]; [1]Guizhou University; [2]China University of Geosciences, Beijing

---

MATERIALS PROCESSING

Advances in Surface Engineering IV — Session II

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

Program Organizers: Arif Mubarok, PPG; Bharat Jasthi, South Dakota School of Mines & Technology; Tushar Borkar, Cleveland State University; Mary Lyn Lim, PPG Industries; Rajeev Gupta, North Carolina State University

Monday PM | February 28, 2022
210C | Anaheim Convention Center

Session Chair: Mohammad Umar Farooq Khan, Texas A&M University

---

2:00 PM
Effect of Test Temperature on Tribological Behavior of Laser Cladded Stellite 21 Coating on 350 Maraging Steel: *Sougata Roy*[1]; Niyanth Sridharan[2]; Ercan Cakmak[2]; Hamed Ghaednia[3]; Arup Gangopadhyay[4]; Jun Qu[2]; [1]University of North Dakota; [2]Oak Ridge National Laboratory; [3]Ghering Group; [4]Ford Motor Company

2:20 PM
Electrochemical Study of Stainless Steels in Diesel Exhaust Fluid (DEF) and Simulated Diesel Exhaust Acid Condensate Environments: *Anusha' Chilukuri*[1]; Michael Warwick[1]; Gaurav Argade[1]; [1]Cummins Inc.

2:40 PM
Evolution of Friction and Shear Deformation Induced Mixing of Graphene on Copper Substrate: *Mayur Pole*[1]; Shuang Li[1]; Kate Whalen[1]; Aditya Nittala[1]; Jinhui Tao[1]; Bharat Gwalani[1]; Keerti Kappagantula[1]; [1]Pacific Northwest National Laboratory

3:00 PM
Corrosion-resistant Yet Sacrificial Metallic Coatings with an Ability to Release Inhibitor on Demand: C.S. Witharamage[1]; M. Alrizqi[1]; A. Darwish[1]; A. Nieto[2]; *Rajeev Gupta*[1]; [1]North Carolina State University; [2]Naval Postgraduate School

3:20 PM Break

3:40 PM
Finite Element Simulation for the Electropolishing of Niobium: *Kaiwen Wang*[1]; Wenjun Cai[1]; Hui Tian[2]; Charles Reece[2]; [1]Virginia Polytechnic Institute and State University; [2]Thomas Jefferson National Accelerator Facility

4:00 PM
Mapping the Nanomechanical Behavior of Refractory Alloy Nitride Coatings: *Andre Bohn*[1]; Yu-Hsuan Lin[1]; Justin Cheng[1]; David Poerschke[1]; Nathan Mara[1]; [1]University of Minnesota

MATERIALS DESIGN

Advances in Titanium Technology — Invited Talks

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

Program Organizers: Yufeng Zheng, University of Nevada-Reno; Zachary Kloenne, Ohio State University; Fan Sun, PSL Research University; Stoichko Antonov, National Energy Technology Laboratory; Rongpei Shi, Lawrence Livermore National Laboratory

Monday PM | February 28, 2022
252A | Anaheim Convention Center

Session Chair: Yufeng Zheng, University of Nevada Reno

2:00 PM Invited
Developing New Metastable Beta-titanium Alloys and Optimizing Their Properties through Heat-treatments: Brian Welk[1]; Nevin Taylor[1]; Mathew Cohen[1]; Zachary Kloenne[1]; *Hamish Fraser*[1]; [1]Ohio State University

2:20 PM Invited
Defect Engineering for Heterogeneous and Adaptive Microstructures: *Yunzhi Wang*[1]; [1]Ohio State University

2:40 PM Invited
Tuning Elastic Properties of -phase to Engineer High Strength-ductility ß-Titanium Alloys: Riyadh Salloom[1]; Srinivas Aditya Mantri[1]; Mohan Sai Kiran Nartu[1]; Abhishek Sharma[1]; Sriswaroop Dasari[1]; Ravisankar Haridas[1]; Srinivasan Srivilliputhur[1]; *Rajarshi Banerjee*[1]; [1]University of North Texas

3:00 PM Invited
Enlarging the Palette of Mechanical Properties of TI64 by a Quenching and Partitioning Approach: *Stephane Godet*[1]; Loic Malet[1]; Frederic Prima[2]; Odeline Dumas[1]; [1]Universite Libre De Bruxelles; [2]Chimie ParisTech

3:20 PM Invited
Microstructure Formation in Titanium Alloys: *Abigail Ackerman*[1]; Benjamin Savitzky[2]; Colin Ophus[2]; Mohsen Danaie[3]; Phani Karamched[4]; David Dye[1]; [1]Imperial College, London; [2]National Center for Electron Microscopy Lawrence Berkeley National Laboratory; [3]Electron Physical Sciences Imaging Centre (ePSIC), Diamond Light Source; [4]University of Oxford

---

MATERIALS DESIGN

AI/Data Informatics: Computational Model Development, Validation, and Uncertainty Quantification — Material Design I

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Dennis Dimiduk, BlueQuartz Software LLC; Darren Pagan, Pennsylvania State University; Anthony Rollett, Carnegie Mellon University; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory

Monday PM | February 28, 2022

256A | Anaheim Convention Center

Session Chair: Anjana Talapatra, Los Alamos National Laboratory

---

2:00 PM Invited
Autonomous Research Systems: *Benji Maruyama*[1]; [1]US Air Force

2:30 PM Invited
AI/ML/DL Approaches for Accelerating Materials Discovery and Design: *Ankit Agrawal*[1]; [1]Northwestern University

3:00 PM
Ensemble of State-of-the-art Property Prediction Machine Learning Algorithms: *Sterling Baird*[1]; Marianne Liu[2]; Kaai Kauwe[1]; Taylor Sparks[1]; [1]University of Utah; [2]West High School

3:20 PM Break

3:40 PM
Band Gap Predictions of Novel Double Perovskite Oxides: *Anjana Talapatra*[1]; Blas Uberuaga[1]; Christopher Stanek[1]; Ghanshyam Pilania[1]; [1]Los Alamos National Laboratory

4:00 PM
Closed-loop Discovery of the Composition-structure-properties Relationships of Superconductors: *Christopher Stiles*[1]; Nam Le[1]; Ian McCue[1]; Alexander New[1]; Christine Piatko[1]; Janna Domenico[1]; Eddie Gienger[1]; Kyle McElroy[1]; Ivelisse Cabrera[1]; Daniel Rose[1]; Timothy Montalbano[1]; Michael Pekala[1]; Christine Chung[1]; Tyrel McQueen[2]; Elizabeth Pogue[2]; Christopher Ratto[1]; Andrew Lennon[1]; [1]Johns Hopkins University Applied Physics Laboratory; [2]Johns Hopkins University

4:20 PM
Topological Class Detection with Attention-based Neural Network: *Hasan Muhammad Sayeed*[1]; Taylor D. Sparks[1]; [1]University of Utah

---

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Nano and Micro Scale Algorithms and Their Applications

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; Garritt Tucker, Colorado School of Mines; Ebrahim Asadi, University of Memphis; Bryan Wong, University of California, Riverside; Sam Reeve, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Adrian Sabau, Oak Ridge National Laboratory

Monday PM | February 28, 2022
253A | Anaheim Convention Center

Session Chairs: Mohsen Asle Zaeem, Colorado School of Mines; Sam Reeve, Oak Ridge National Laboratory

---

2:00 PM
Combining Discrete and Continuous in Time Stochastic Simulations in a Solid-solid Phase Field Simulation: *Nicholas Julian*[1]; Enrique Martinez Saez[2]; Jaime Marian[1]; [1]University of California Los Angeles; [2]Clemson University

2:20 PM
An Orientation-field Phase Field Model for Anisotropic Grain Growth: *Philip Staublin*[1]; Peter Voorhees[1]; James Warren[2]; Arnab Mukherjee[1]; [1]Northwestern University; [2]National Institute of Standards and Technology

2:40 PM
Digital Representation and Quantification of Discrete Dislocation Structures: *Andreas Robertson*[1]; Surya Kalidindi[1]; [1]Georgia Institute of Technology

3:00 PM
Line Free 3D Dislocation Dynamics in Finite Domains: *Aitor Cruzado*[1]; Pilar Ariza[2]; Alan Needleman[1]; Michael Ortiz[3]; Amine Benzerga[1]; [1]Texas A&M University; [2]University of Seville; [3]California Institute of Technology

3:20 PM Break

3:40 PM
Statistics of the Lattice Distortion of Dislocated Crystals: *Joseph Anderson*[1]; Anter El-Azab[1]; [1]Purdue University

---

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Alloy and MMC Development

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

Program Organizers: Andre Phillion, McMaster University; Dmitry Eskin, Brunel University

Monday PM | February 28, 2022
208B | Anaheim Convention Center

Session Chair: Dmitry Eskin, Brunel University

2:00 PM Introductory Comments

2:05 PM
Development of Advanced Aluminum Alloy for Structural Castings: *Randy Beals*[1]; Xiaoping Niu[1]; Zach Brown[1]; [1]Magna International

2:30 PM
Interplay between Cooling Rate, Microstructure, and Mechanical Properties of an Al-Ce-Ni-Mn Alloy: *Jordan Kozakevich*[1]; Joshua Stroh[2]; Victor Mallouhi[1]; Dimitry Sediako[1]; David Weiss[2]; [1]HPPM Laboratories, UBCO; [2]Eck Industries

2:55 PM
Influence of Tungsten Nanoparticles on the Structure and Mechanical Behavior of AA5056 under Quasi-static Loading: *Nikolai Kakhidze*[1]; Anastasia Akhmadieva[1]; Anton Khrustalyov[1]; Ilya Zhukov[1]; Alexander Vorozhtsov[1]; [1]National Research Tomsk State University

3:20 PM Break

3:35 PM
On the Influence of Alloy Composition and Sn Micro-alloying on Mechanical Properties and Corrosion Resistance of EN-AW 6056: *Axel Marquardt*[1]; Ines Zerbin[1]; Peer Decker[1]; Peter Baumgart[2]; Luisa Marzoli[1]; Marcel Rosefort[1]; [1]TRIMET Aluminium SE; [2]IBPB Engineering Services

4:00 PM
Effect of Alloying Elements on Strength Properties and Casting Properties of Corrosion Resistant Quench-free Al-Ca Alloys: *Dmitry Fokin*[1]; Sergey Matveev[1]; Roman Vakhromov[1]; Aleksandr Alabin[2]; [1]Light Materials and Technologies Institute UC RUSAL; [2]JSC RUSAL Management

4:25 PM
Effect of Bi Alloying Element Addition on Microstructural Change in Al-Mg-Si Alloys: *Zeynep Tutku Özen*[1]; Osman Halil Çelik[1]; Mehmet Bugra Guner[1]; Ilyas Artunç Sari[1]; Abdullah Kinaci[1]; [1]Asas Aluminium

4:50 PM
Effect of TiC Nanoparticles on Solidification Processing and Properties of Al-1.4Mg-0.8Si Alloy: Shuaihang Pan[1]; Yitian Chi[1]; Jie Yuan[1]; *Tianqi Zheng*[1]; Xiaochun Li[1]; [1]University of California-Los Angeles

---

LIGHT METALS

Aluminum Reduction Technology — Cell Technology and Operations

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

Program Organizers: Kristian Etienne Einarsrud, Norwegian University of Science and Technology; Stephan Broek, Boston Metal; Mertol Gökelma, Izmir Institute of Technology; Dmitry Eskin, Brunel University

Monday PM | February 28, 2022
211A | Anaheim Convention Center

Session Chair: Andre Felipe Schneider, Hatch

2:00 PM Introductory Comments

2:05 PM
Restart of Copper-insert Pots in EGA's High Amperage Potlines: *Ali Jassim*[1]; Pradeep Kalidindi[1]; Shaikha Al Shehhi[1]; Najeeba Al Jabri[1]; Abdallah Rahbar[1]; Nadia Ahli[1]; [1]EGA

2:30 PM
Strategic Training and Development of Smelter Teams to Improve Business Outcomes: *David Emerson*[1]; Leo Ruffo[1]; Barry Sadler[1]; Dave Umbaugh[1]; [1]SCCR Training & Development

2:55 PM
Concentration Distribution of Carbon Particles in Aluminium Electrolysis Cells: *Matthias Dechent*[1]; [1]Trimet Aluminium SE

3:20 PM Break

3:35 PM
Stabilizing a Low-dimensional Model of Magnetohydrodynamic Instabilities in Aluminum Electrolysis Cells: *Ibrahim Mohammad*[1]; Douglas Kelley[1]; [1]University of

Rochester

4:00 PM
An Attempt to Estimate the Sulfuric Acid Dewpoint in the Flue Gas from Aluminium Electrolysis Cells: *Asbjorn Solheim*[1]; [1]SINTEF Industry

---

BIOMATERIALS

Biological Materials Science — Biological Materials Science II

Sponsored by: TMS Functional 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; Hannes Schniepp, William & Mary

Monday PM | February 28, 2022
201B | Anaheim Convention Center

Session Chairs: David Restrepo, The University of Texas at San Antonio; Alexander Ossa, Universidad EAFIT

2:00 PM Invited
Biological Blueprints Towards Next Generation Multifunctional Materials: *David Kisailus*[1]; [1]University of California-Irvine

2:35 PM
Diatom Frustules: Universal Building Blocks for Novel Multi-functional Materials: *Hannes Schniepp*[1]; Aaron Stapel[1]; [1]William & Mary

2:55 PM
Deep Learning and Finite Element Method towards the Application of Microfracture Analysis for Prevention of Fatigue Fractures in Bones: *Gerardo Presbitero*[1]; Marco Hernandez[2]; Inés Hernández-Ferruzca[3]; José Quiroga-Arias[4]; Bibiana González-Pérez[3]; Carlos Mora-Núñez[3]; Eduardo Macías-Ávila[1]; Álvaro Gómez-Ovalle[1]; Christian Mendoza-Buenrostro[5]; [1]Industrial Engineering and Development Center (CIDESI); [2]Autonomous University of Nuevo León; [3]Technological University of Querétaro; [4]Aeronautical University in Querétaro; [5]Tecnológico de Monterrey, ITESM, Centro de Innovación en Diseño y Tecnología (CIDyT)

3:15 PM Invited
On the Mechanics of the Tooth-stylus-radula Systems of Chitons: A Soft Conveying-belt for Efficient Force Transduction: John Connolly[1]; Phani Saketh Dasika[1]; Wen Yang[2]; Devis Montroni[2]; Robin James[2]; David Kisailus[2]; *Pablo Zavattieri*[1]; [1]Purdue University; [2]Univesity of California, Irvine

3:50 PM Break

4:05 PM
Nature's Soft Robot: The Chiton Radula: Wen Yang[1]; John Connelly[2]; Devis Montroni[1]; Robin James[1]; Taifeng Wang[1]; Li Xing[1]; Pablo Zavattieri[2]; David Kisailus[1]; *Jung-Eun Lee*[1]; [1]University of California-Irvine; [2]Purdue University

4:25 PM
Bioinspired Materials from Extrinsically-controlled Fabrication Techniques: *Steven Naleway*[1]; Debora Lyn Porter[1]; Josh Fernquist[1]; Tony Yin[1]; Josh Alexander[1]; Max Mroz[1]; [1]University of Utah

4:45 PM
Interwoven Lattices Inspired by the Venus Flower Basket: *Yash Mistry*[1]; Swapnil Morankar[2]; Nikhilesh Chawla[2]; Clint Penick[3]; Dhruv Bhate[1]; [1]Arizona State University; [2]Purdue University; [3]Kennesaw State University

---

ADVANCED MATERIALS

Bulk Metallic Glasses XIX — Homogeneous and Inhomogeneous Deformation & Mechanical and Physical Properties I

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

Program Organizers: Robert Maass, Federal Institute for Materials Research and Testing (BAM); Peter Derlet, Paul Scherrer Institut; Katharine Flores, Washington University in St. Louis; Yonghao Sun, Chinese Academy of Sciences; Lindsay Greer, University of Cambridge; Peter Liaw, University of Tennessee

Monday PM | February 28, 2022
253C | Anaheim Convention Center

Session Chair: Peter Derlet, Paul Scherrer Institute

2:00 PM Invited
Unveiling the Local Atomic Arrangements and Short-circuit Diffusion in Shear Bands: *Reda Chellali*[1]; Sree Nandam[1]; Horst Hahn[1]; [1]Karlsruhe Institute of Technology (KIT)

2:25 PM
Small-scale Deformation Behavior of Metallic Glasses and Their Composites: *Nandita Ghodki*[1]; Shristy Jha[1]; Saideep Muskeri[1]; Sundeep Mukherjee[1]; [1]University of North Texas

2:45 PM
Strength, Ductility and Elasticity of Metallic Glass Nanoparticles and Bulk Nano-glasses: *Wendy Gu*[1]; Melody Wang[1]; Mehrdad Kiani[1]; Abhinav Parakh[1]; Anabelle Colmenares[1]; [1]Stanford University

3:05 PM
On the True Stress-strain Curve of Metallic Glasses: *Amlan Das*[1]; Catherine Ott[1]; Dinesh Pechimuthu[2]; Robabeh Moosavi[2]; Anja Waske[2]; Mihai Stoica[3]; Robert Maass[2]; [1]University Of Illinois Urbana Champaign; [2]Federal Institute of Materials Research and Testing; [3]ETH Zurich

3:25 PM Break

3:40 PM
A Cavity-based Micromechanical Model for the Shear Band Failure in Metallic Glasses under Arbitrary Stress State: *Yanfei Gao*[1]; [1]University of Tennessee-Knoxville

4:00 PM
Measuring Metallic Glass Viscosities over Wide Composition Ranges: *Sebastian Kube*[1]; Sungwoo Sohn[1]; Theo Evers[1]; Will Polsky[1]; Rodrigo Ojeda-Mota[1]; Kevin Ryan[1]; Sean Rinehart[1]; Yong Sun[1]; Jan Schroers[1]; [1]Yale University

4:20 PM
Shear Fracture in Bulk Metallic Glass Composites: Devashish Rajpoot[1]; R.L. Narayan[1]; Long Zhang[2]; Parag Tandaiya[1]; Ramamurty Upadrasta[3]; *Punit Kumar*[4]; [1]IIT-Bombay; [2]Institute for Metals Research, CAS; [3]Nanyang Technological University;

[4]LBNL

4:40 PM Discussion on deformation of metallic glasses

LIGHT METALS

Cast Shop Technology — Analysis / Special Wagstaff

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

Program Organizers: Stephen Instone, Speira GmbH; Mertol Gökelma, Izmir Institute of Technology; Samuel Wagstaff, Oculatus; Dmitry Eskin, Brunel University

Monday PM | February 28, 2022
209A | Anaheim Convention Center

Session Chair: Sam Wagstaff, Oculatus Consulting

2:00 PM Introductory Comments

2:05 PM
Microalloying to Inhibit Oxidation of Al-Mg Alloys: *Nicholas Smith*[1]; Martin Syvertsen[1]; Anne Kvithyld[1]; [1]SINTEF

2:30 PM
Heat Treatment of Mg-containing Aluminum Alloys 5182 and 6016 in an Oxidizing Atmosphere with 4 % CO_2: *Cathrine Solem*[1]; Per Erik Vullum[2]; Gabriella Tranell[1]; Ragnhild Aune[1]; [1]Norwegian University of Science and Technology; [2]SINTEF Industry

2:55 PM
Quality Defects Metallurgical Root Cause Analysis for Aluminium Thin Foil Production: *Feyza Denizli*[1]; Yusuf Özçetin[1]; Ali Ulus[1]; Canan Inel[1]; [1]Asas Alumuninum

3:20 PM Break

3:35 PM
The Origins of Wagstaff Inc. Part 1- Two Emerging Technologies Collide: Frank Wagstaff[1]; *Robert Wagstaff*[2]; Samuel Wagstaff[2]; [1]Retired; [2]Oculatus

4:00 PM
The Origins of Wagstaff Inc. Part 2- Aggressive R&D: Frank Wagstaff[1]; *Robert Wagstaff*[2]; Samuel Wagstaff[2]; [1]Retired; [2]Oculatus

4:25 PM Panel Discussion

CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2022 — Advanced Microstructural Characterization Methods

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

Program Organizers: Mingming Zhang, Wood Mackenzie; Jian Li, CanmetMATERIALS; 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, DEVCOM U.S. Army Research Laboratory; Rajiv Soman, Eurofins EAG Materials Science LLC; Zhiwei Peng, Central South University

Monday PM | February 28, 2022
207B | Anaheim Convention Center

Session Chairs: John Carpenter, Los Alamos National Laboratory; Bowen Li, Michigan Technological University

---

2:00 PM Introductory Comments

2:05 PM
Challenges Concerning the Characterization of Cementite in Low Carbon Steel Using Electron Backscatter Diffraction: *Mary O'Brien*[1]; Kip Findley[2]; Samantha Lawrence[1]; [1]Los Alamos National Laboratory; [2]Colorado School of Mines

2:25 PM
Characterizing Microstructures of Additively Manufactured Nickel and Cobalt Based Superalloys via TriBeam Tomography: *James Lamb*[1]; McLean Echlin[1]; Tresa Pollock[1]; [1]University of California Santa Barbara

2:45 PM
Interpreting X-ray Absorption and Diffraction Contrast for Massive Non-destructive 3D Crystallographic Mapping of Metals in Laboratory CT: *Andy Holwell*[1]; Maadhav Kothari[1]; Hrishikesh Bale[1]; Jun Sun[2]; Jette Oddershede[2]; [1]Carl Zeiss Microscopy Llc; [2]Xnovo Technology ApS

3:05 PM
Single Crystal Cast Microstructures Characterized by the RVB-EBSD Method: *Pascal Thome*[1]; Felicitas Scholz[1]; Jan Frenzel[1]; Gunther Eggeler[1]; [1]Ruhr University Bochum

3:25 PM Break

3:45 PM
A Multiscale, Multimodal Approach to Studying Static Recrystallization in Mg-3Zn-0.1Ca with In-situ nf-HEDM, ff-HEDM, and DFXM: *Ashley Bucsek*[1]; Sangwon Lee[1]; Reza Roumina[1]; Tracy Berman[1]; Can Yildirim[2]; Carsten Detlefs[2]; John Allison[1]; [1]University of Michigan; [2]European Synchrotron Radiation Facility

4:05 PM
Three-dimensional Atomic Mapping of Ligands on Nanoparticles by Atom Probe Tomography: *Kyuseon Jang*[1]; Seho Kim[2]; Hosun Jun[1]; Chanwon Jung[1]; Jiwon Yu[3]; Sangheon Lee[3]; Pyuck-pa Choi[1]; [1]Korea Advanced Institute of Science and Technology (KAIST); [2]Max-Planck-Institut für Eisenforschung GmbH; [3]Ewha Womans University

---

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — High Entropy Alloys/Alloying

Sponsored by: TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee

Program Organizers: Vahid Attari, Texas A&M University; Sara Kadkhodaei, University Of Illinois At Chicag; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Tourret, IMDEA Materials Institute; James Morris, Ames Laboratory

Monday PM | February 28, 2022
255C | Anaheim Convention Center

Session Chairs: Maryam Ghazisaeidi, Ohio State University; James Morris, Ames Lab

---

2:00 PM Invited
Using Ab Initio Thermodynamic Modeling to Understand Phase Stability in High Entropy Alloys and How Order-disorder Transition Affects the Performance of Photovoltaic Materials: *Geoffroy Hautier*[1]; [1]Dartmouth

2:30 PM
Refractory-HEAs: From CALPHAD to Alloy Optimization: *Aurelien Perron*[1]; Joel Berry[1]; Brandon Bocklund[1]; Richard Otis[2]; Alexander Landa[1]; Charles Tong[1]; Amit Samanta[1]; Hunter Henderson[1]; Zachary Sims[1]; Thomas Voisin[1]; Vincenzo Lordi[1]; Scott McCall[1]; Joseph McKeown[1]; [1]Lawrence Livermore National Laboratory; [2]Jet Propulsion Laboratory, California Institute of Technology

2:50 PM Invited
Utilizing Nanoprecipitates to Modulate Phase Transformation, Strength, and Ductility of HEAs: *Ying Yang*[1]; Eva Zarkadoula[1]; Easo George[1]; [1]Oak Ridge National Laboratory

3:20 PM
Predicting Phase Behavior in High Entropy and Chemically Complex Alloys: *James Morris*[1]; Louis Santodonato[2]; Andreas Kulovits[3]; German Samolyuk[4]; [1]Ames Laboratory; [2]Santo Science; [3]Arconic Inc.; [4]Oak Ridge National Laboratory

3:40 PM Break

4:00 PM
Strain and Chemical Interactions in the Early Stages of Precipitation of Multi-component Mg Alloys: *Du Cheng*[1]; Kang Wang[1]; Bi-Cheng Zhou[1]; [1]University of Virginia

---

MATERIALS PROCESSING

Defects and Properties of Cast Metals IV — Defects II & Properties I

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

Program Organizers: Lang Yuan, University of South Carolina; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Andrew Kao, University of Greenwich; Kyle Fezi, Fort Wayne Metals

Monday PM | February 28, 2022
210B | Anaheim Convention Center

Session Chairs: Kyle Fezi, Fort Wayne Metals ; Paul King, Ampere Scientific

---

2:00 PM Invited
Elucidating the Relationship between Arc Behavior and Solidification Defects during Vacuum Arc Remelting of Superalloys: *Daniel McCulley*[1]; Joshua Motley[1]; Matthew Cibula[1]; Paul King[1]; [1]Ampere Scientific

2:25 PM
Controlling Freckle Defect Formation Using Magnetic Fields: *Andrew Kao*[1]; Natalia Shevchenko[2]; Xianqiang Fan[3]; Catherine Tonry[1]; Peter Lee[3]; Sven Eckert[2]; Koulis Pericleous[1]; [1]University Of Greenwich; [2]Helmholtz-Zentrum Dresden-Rossendorf; [3]UCL

2:45 PM
Improving Material Properties Using Contactless Ultrasonic Cavitation: *Catherine Tonry*[1]; Agnieszka Dybalska[2]; Valdis Bojarevics[1]; Georgi Djambazov[1]; William Griffiths[2]; Koulis Pericleous[1]; [1]University Of Greenwich; [2]University of Birmingham

3:05 PM
Formation Mechanisms of Surface Blistering in AA6xxx Rolled Products: Microstructure Characterization, Ultrasonic Analysis, and Rolling Tests: *Pascal Gauthier*[1]; Mousa Javidani[2]; Tao Wang[1]; John Evans[3]; [1]Rio Tinto; [2]Université du Québec à Chicoutimi; [3]Constellium

3:25 PM Break

3:45 PM
3D Characterization of Competitive Dendrite Growth and On the Role of Low Angle Grain Boundaries during Solidification of Single Crystal Ni-based Superalloys: *Felicitas Scholz*[1]; Pascal Thome[1]; Jan Frenzel[1]; Gunther Eggeler[1]; [1]Ruhr-University Bochum

4:05 PM
Evolution of Microstructure and Mechanical Properties of the As-cast 1030B Al Sheet during Ultrasound-assisted Continuous Casting: Ripeng Jiang[1]; Wenhao Zhao[1]; *Li Zhang*[2]; Xiaoqian Li[1]; Shaokang Guan[2]; [1]Central South University; [2]Zhengzhou University

---

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Mechanisms of High Temperature Alloys — Effects of Component Manufacture on Microstructure & Properties

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

Program Organizers: Mark Hardy, Rolls-Royce Plc; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Jeremy Rame, Safran Aircraft Engines; Akane Suzuki, GE Research; Jean-Charles Stinville, University of California, Santa Barbara; Paraskevas Kontis, Norwegian University of Science and Technology; Andrew Wessman, University of Arizona

Monday PM | February 28, 2022
304B | Anaheim Convention Center

Session Chairs: Andrew Wessman, University of Arizona; Jeremy Rame, Safran Aircraft Engines

---

2:00 PM Invited
Welding and Weldability of Ni- and Ni-Fe-based Superalloys: *Joel Andersson*[1]; [1]University West

2:30 PM
Creep Behavior and Durability of Laser Metal Deposited Waspaloy: *Romain Bordas*[1]; Roland Fortunier[2]; Patrick Villechaise[1]; Jonathan Cormier[1]; Azdine Nait-Ali[1]; Sébastien Rix[3]; Lucie Rat[3]; [1]ENSMA - Institut Pprime - UPR CNRS 3346; [2]LTDS, école centrale Lyon, on secondment to ENSMA; [3]Safran Aircraft Engines

2:50 PM
Defect Control and Mechanical Properties of Laser Powder Bed Fusion Built Haynes 230 for High Temperature Application
: *Ziheng Wu*[1]; Junwon Seo[1]; Nicholas Lamprinakos[1]; Srujana Rao Yarasi[1]; Anthony Rollett[1]; [1]Carnegie Mellon University

3:10 PM
Rejuvenation Treatment for Ni-based Single Crystal Superalloys with Process Induced Pre-deformation: *Satoshi Utada*[1]; Jeremy Rame[2]; Patrick Villechaise[3]; Jonathan Cormier[3]; [1]Department of Materials, University of Oxford; [2]Safran Aircraft Engines; [3]ENSMA - Institut Pprime - UPR CNRS 3346

3:30 PM Break

3:50 PM
Improving the Creep Properties of High-strength Superalloys Produced by Laser Powder Bed Fusion: *Marcus Lam*[1]; [1]Monash University

---

MECHANICS & STRUCTURAL RELIABILITY

Dynamic Behavior of Materials IX — Strength and Spall I

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

Program Organizers: Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Cyril Williams, US Army Research Laboratory

Monday PM | February 28, 2022
304D | Anaheim Convention Center

Session Chairs: Neil Bourne, The University of Manchester; Bruce Remington, Lawrence Livermore National Laboratory

---

2:00 PM
In-Situ X-ray Diffraction Shock Experiments on Titanium Diboride: *Cyril Williams*[1]; [1]US Army Research Laboratory

2:20 PM
Shock Response of Single-crystal Boron Carbide along Orientations with Extreme Elastic Moduli: MD Simulations and Experimental Comparison: *Ghatu Subhash*[1]; Amith Cheenady[1]; [1]University of Florida

2:40 PM
Dynamic Compressive Response of Highly-oriented MAX Phases under Planar Confinement: *Xingyuan Zhao*[1]; Tarek Elmelegy[2]; Maxim Sokol[3]; Michel Barsoum[2]; Leslie Lamberson[1]; [1]Colorado School of Mines; [2]Drexel University; [3]Tel Aviv University

3:00 PM
Structure / Property (Constitutive and Dynamic Strength / Damage) Characterization of Single-phase FeAl: *George Gray*[1]; Saryu Fensin[1]; David Jones[1]; H Wang[2]; Kenneth Vecchio[2]; [1]Los Alamos National Laboratory; [2]University of California, San Diego

3:20 PM Break

3:40 PM
Dynamic Compression Behavior of Composite Media with Varying "Microstructural" Conditions: *Mukul Kumar*[1]; [1]Lawrence Livermore National Laboratory

4:00 PM
Investigating Spall Failure in Shock Compressed Iron: *Gaia Righi*[1]; Carlos Ruestes[2]; Camelia Stan[3]; Suzanne Ali[3]; Robert Rudd[3]; Hye-Sook Park[3]; Marc Meyers[1]; [1]University Of California San Diego; [2]Universidad Nacional de Cuyo; [3]Lawrence Livermore National Lab

4:20 PM
Path Dependence in Spall Fracture: *David Jones*[1]; Daniel Martinez[1]; Ramon Martinez[1]; Saryu Fensin[1]; Neil Bourne[2]; George Gray[1]; [1]Lanl; [2]University of Manchester

---

LIGHT METALS

Electrode Technology for Aluminum Production — Session I

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

Program Organizers: Stephan Broek, Boston Metal; Dmitry Eskin, Brunel University

Monday PM | February 28, 2022
208A | Anaheim Convention Center

Session Chairs: Derek Santangelo, Hatch; Stephan Broek, Boston Metal

---

2:00 PM Introductory Comments

2:05 PM
Driving Continuous Improvement in a Modern GPC/CPC Testing Laboratory: Heather Riche'[1]; Leona Fletcher[1]; *Maia Hunt*[1]; Les Edwards[1]; [1]Rain Carbon Inc.

2:30 PM
Machine Vision Sensor Based on Image Texture Analysis Applied to Industrial Anode Paste: *Julien Lauzon-Gauthier*[1]; Carl Duchesne[2]; Jayson Tessier[1]; [1]Alcoa Corporation; [2]Laval University

2:55 PM
Optical and Electrochemical Characterisation of Carbon Anodes with Varying Porosity and Coke Quality: *Gøril Jahrsengene*[1]; Mahyar Farahani[2]; Hogne Linga[3]; Ann Mari Svensson[2]; [1]SINTEF Industry; [2]NTNU Norwegian University of Science and Technology; [3]Hydro Aluminium AS

CORROSION

Environmental Degradation of Additively Manufactured Alloys — Part II: Low Temperature/Aqueous Corrosion, Stress Corrosion Cracking, Pitting, Metal Dissolution

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; Xiaoyuan Lou, Auburn University; Elizabeth Trillo, Southwest Research Institute; Andrew Hoffman, GE Research; Brendy Rincon Troconis, University of Texas at San Antonio

Monday PM | February 28, 2022
201C | Anaheim Convention Center

Session Chairs: Elizabeth Trillo, SWRI; Xiaoyuan Lou, Auburn University

---

2:00 PM Invited
AM Stainless Steel 316L in Corrosive Environment: Features Controlling Pitting and Metal Dissolution: *Thomas Voisin*[1]; Rongpei Shi[1]; Shohini Sen-Britain[1]; Zhen Qi[1]; Yuliang Zhang[1]; Seongkoo Cho[1]; Yakun Zhu[1]; Josh Kacher[2]; Ibo Matthews[1]; Y. Morris Wang[3]; Roger Qiu[1]; Brandon Wood[1]; [1]Lawrence Livermore National Laboratory; [2]Georgia Institute of Technology; [3]University of California Los Angeles

2:30 PM
Environmental Susceptibility of EBM Ti-6Al-4V as a Function of Print Direction in Seawater: *Matthew McMahon*[1]; Nicholas Pizzolato[1]; Fatou Cisse[1]; Eric Dau[1]; William Golumbfskie[1]; [1]Naval Surface Warfare Center, Carderock Division

2:50 PM
Tribo-corrosion Degradation of Additively Manufactured Multi-principal Element Alloy.: *Jibril Shittu*[1]; Maryam Sadeghilaridjani[2]; Mayur Pole[3]; Sundeep Mukherjee[3]; [1]LLNL; [2]Arizona State University; [3]University of North Texas

3:10 PM
Microstructure and Corrosion Behavior of 309L Stainless Steel Clad onto Carbon Steel Using Wire-fed Directed Energy Deposition: *Scott Bozeman*[1]; O. Isgor[1]; Julie Tucker[1]; [1]Oregon State 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

Monday PM | February 28, 2022
201D | Anaheim Convention Center

Session Chairs: Peter Andresen, Andresen Consulting; Yong Yang, University of Florida

---

2:00 PM Invited
Stress Corrosion Cracking Guidelines Challenges: *Peter Andresen*[1]; [1]Andresen Consulting

2:35 PM
Peening Technologies to Mitigate Initiation and Resurgence of Stress Corrosion Cracking in Dry Cask Storage Stainless Steel Canisters: *John Lacy*[1]; Hwasung Yeom[1]; Stan Bovid[2]; Micheal Kattoura[2]; Andrew Tieu[3]; Willie Bloom[3]; Jonathan Tatman[4]; Kenneth Ross[5]; Kumar Sridharan[1]; [1]University of Wisconsin-Madison; [2]LSP Technologies; [3]VLN Advanced Technologies; [4]Electric Power Research Institute ; [5]Pacific Northwest National Laboratory

2:55 PM
An Investigation of Stress Corrosion Cracking Performance for Naturally Aged 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

3:15 PM
Effect of Water on Localized Corrosion and Stress Corrosion Cracking of Stainless Steels in Chloride Environments: *Narasi Sridhar*[1]; Liu Cao[2]; Angeire Huggins Gonzalez[2]; Ramgopal Thodla[2]; [1]MC Consult LLC; [2]DNV

LIGHT METALS

Failure, and a Career That is Anything But: An LMD Symposium Honoring J. Wayne Jones — Keynote Session

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

Program Organizers: Victoria Miller, University of Florida; Michael Caton, US Air Force Research Laboratory; Nikhilesh Chawla, Purdue University; Trevor Harding, California Polytechnic State University; Paul Krajewski, General Motors Corporation; Tresa Pollock, University of California, Santa Barbara

Monday PM | February 28, 2022
209B | Anaheim Convention Center

Session Chair: Victoria Miller, University of Florida

2:00 PM Introductory Comments

2:10 PM Keynote
Reducing Uncertainty: Reflections on Establishing Life Limits: *James Larsen*[1]; Sushant Jha[2]; Reji John[1]; Andrew Rosenberger[1]; Dennis Buchanan[2]; John Porter, III[2]; Adam Pilchak[3]; Patrick Golden[1]; [1]Air Force Research Laboratory; [2]University of Dayton Research Institute; [3]Materials Resources, LLC

2:55 PM Keynote
Strain Localization and Very High Cycle Fatigue: Jean-Charles Stinville[1]; Alice Cervellon[1]; *Tresa Pollock*[1]; [1]University of California, Santa Barbara

3:40 PM Break

4:00 PM Keynote
Accelerating Understanding of Fatigue of Metals: *John Allison*[1]; [1]University of Michigan

4:45 PM Keynote
Automotive Unobtanium: Material Challenges for the Future of Transportation: *Paul Krajewski*[1]; Nancy Johnson[1]; Xingyi Yang[1]; Selina Zhao[1]; Janet Robincheck[1]; Whitney Poling[1]; Kai-Han Chang[1]; Andrea Corrion[2]; [1]General Motors Corporation; [2]HRL Laboratories, LLC.

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Advanced Experimental Characterization of Microstructurally Driven Fatigue Behavior

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials 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: Jean-Charles Stinville, University of Illinois Urbana-Champaign; Garrett Pataky, Clemson University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University; Orion Kafka, NIST

Monday PM | February 28, 2022
254B | Anaheim Convention Center

Session Chair: Garrett Pataky, Clemson University

2:00 PM Invited
Coupled Characterization Approaches for Fatigue Assessment of High-strength Steel and Light Metal Alloy Structures
: Alexander Koch[1]; Nikolas Baak[1]; Jochen Tenkamp[1]; Anke Schmiedt-Kalenborn[1]; *Frank Walther*[1]; [1]TU Dortmund University

2:30 PM
Slip Localization, Fatigue Strength and Microstructural Effects in Polycrystalline Alloys.: *Jean-Charles Stinville*[1]; T.M. Pollock[2]; [1] University of Illinois Urbana-Champaign; [2]University of California-Santa Barbara

2:50 PM Invited
Direct Observations and Characterization of Crack Closure during Microstructurally Small Fatigue Crack Growth via In Situ High-energy X-ray Characterization: *Michael Sangid*[1]; Priya Ravi[1]; Diwakar Naragani[1]; Peter Kenesei[2]; Jun-Sang Park[2]; [1]Purdue University; [2]Argonne National Laboratory

3:20 PM Break

3:40 PM Invited
Tracking Crystal-scale Cyclic Plasticity in Inconel 718 Using In Situ Loading and High Energy X-rays: Dalton Shadle[1]; *Kelly Nygren*[2]; Matthew Miller[1]; [1]Cornell University; [2]Cornell High Energy Synchrotron Source

4:10 PM
Grain Reorientation and Stress-state Evolution during Cyclic Loading of an \945-Ti Alloy below the Elastic Limit: *Rachel Lim*[1]; Darren Pagan[1]; Joel Bernier[2]; Paul Shade[3]; Anthony Rollett[4]; [1]Pennsylvania State University; [2]Lawrence Livermore National Laboratory; [3]Air Force Research Laboratory; [4]Carnegie Mellon University

4:30 PM
In-situ Diffraction Studies of the Fatigue-crack-growth Behavior in a TRIP-assisted Advanced High Strength Steel: Di Xie[1]; Yi Yang[1]; Lu Huang[2]; Yang Ren[3]; *Yanfei Gao*[1]; [1]University of Tennessee Knoxville; [2]United States Steel Corporation; [3]Argonne National Laboratory

---

SPECIAL TOPICS

Frontiers of Materials Award Symposium: Nanocarbon-based Flexible Devices: Emerging Materials and Processes — Session II: From 1D Nanostructures to Soft Materials

Program Organizer: Mostafa Bedewy, University of Pittsburgh

Monday PM | February 28, 2022
260A | Anaheim Convention Center

2:00 PM Introductory Comments

2:05 PM Keynote
Self-assembly and Synthesis of Semiconducting Carbon Nanotubes and Graphene Nanoribbons for Electronics: *Michael Arnold*[1]; [1]University of Wisconsin-Madison

2:45 PM Keynote
Soft Materials Approaches to Carbon Nanotubes: Gels and Composites: *Mohammad Islam*[1]; [1]Carnegie Mellon University

3:25 PM Break

3:40 PM Keynote
1D Nanomaterial Based Flexible and Stretchable Electronics: *Yong Zhu*[1]; [1]North Carolina State University

4:20 PM Panel Discussion

NANOSTRUCTURED MATERIALS

Functional Nanomaterials: Functional Low-Dimensional (0D, 1D, 2D) Materials 2022 — Low-Dimensional Materials Synthesis

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

Program Organizers: Michael Cai Wang, University of South Florida; Yong Lin Kong, University of Utah; Sarah Ying Zhong, University of South Florida; Surojit Gupta, University of North Dakota; Nasrin Hooshmand, Georgia Institute of Technology; Woochul Lee, University of Hawaii at Manoa; Min Kyu Song, Washington State University; Simona Hunyadi Murph, Savannah River National Laboratory; Hagar Labouta, University of Manitoba; Max Anikovskiy, University of Calgary; Patrick Ward, Savannah River National Laboratory

Monday PM | February 28, 2022
260B | Anaheim Convention Center

Session Chairs: Woochull Lee, University of Hawaii at Manoa; Michael Cai Wang, University of South Florida

---

2:00 PM
Water-driven CH3NH3PbBr3 Nanocrystals: *Fuqian Yang*[1]; [1]University of Kentucky

2:20 PM
Tuning the Rapid Thermochemical Pretreatment of Alumina-supported Iron Catalyst to Improve Catalytic Lifetime in Chemical Vapor Deposition of Carbon Nanotubes: *Golnaz Tomaraei*[1]; Jaegeun Lee[1]; Moataz Abdulhafez[1]; Mostafa

Bedewy[1]; [1]University of Pittsburgh

2:40 PM
Salt Treatment to Purify Carbon Nanotube Sheets Produced via the Floating Catalyst CVD Method: *Anuptha Pujari*[1]; Arun Bhattacharjee[2]; Ashley Paz y Puente[1]; Mark Schulz[1]; [1]University of Cincinnati; [2]Pacific Northwest National Laboratory

3:00 PM
Thermal Conductivity Enhancement of PEO/PEDOT: PSS Composite Nanofiber: *Anh Tuan Nguyen*[1]; Woochul Lee[1]; [1]University of Hawaii at Manoa

3:20 PM Break

3:40 PM
The Scaling of Low-temperature Ferroelectric $Hf_{0.5}Zr_{0.5}O_2$ Thin Films Using Anhydrous H_2O_2: *Yong Chan Jung*[1]; Jin-Hyun Kim[1]; Jaidah Mohan[1]; Heber Hernandez-Arriaga[1]; Su Min Hwang[1]; Daniel Alvarez[2]; Jeffrey Spiegelman[2]; Si Joon Kim[3]; Jiyoung Kim[1]; [1]The University of Texas at Dallas; [2]RASIRC; [3]Kangwon National University

4:00 PM
Two-dimensional Metallic Mesoporous Materials (2D-MMM) via Mechanical Transformation from 0D/1D Precursors: *Md Rubayat-E Tanjil*[1]; Tanuj Gupta[2]; Matthew Gole[3]; Zhewen Yin[1]; Keegan Suero[1]; Donald McCleeary[1]; Ossie Douglas[1]; Alissa Anderson[1]; Catherine Murphy[3]; Huijuan Zhao[2]; Michael Cai Wang[1]; [1]University of South Florida; [2]Clemson University; [3]University of Illinois Urbana-Champaign

4:20 PM Keynote
Wafer-scale Epitaxial Growth of 2D Transition Metal Dichalcogenides: *Joan Redwing*[1]; [1]Pennsylvania State University

---

MATERIALS PROCESSING

Furnace Tapping 2022 — Session II

Sponsored by: The Southern African Institute of Mining and Metallurgy, TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Materials Characterization Committee, Industrial Advisory Committee

Program Organizers: Joalet Steenkamp, MINTEK; Dean Gregurek, RHI Magnesita; Quinn Reynolds, Mintek; Gerardo Alvear Flores, Rio Tinto; Hugo Joubert, Tenova Pyromet; Phillip Mackey, P.J. Mackey Technology, Inc.

Monday PM | February 28, 2022
213D | Anaheim Convention Center

Session Chair: Hugo Joubert, Tenova Pyromet

2:00 PM Introductory Comments

2:05 PM
Furnace Tapping 101: *Joalet Steenkamp*[1]; Jan Olsen[2]; Quinn Reynolds[1]; [1]MINTEK; [2]SINTEF

2:25 PM
Tapped Alloy Mass Prediction Using Data-driven Models with an Application to Silicomanganese Production: *Alexey Cherkaev*[1]; Khutso Rampyapedi[2]; Quinn Reynolds[1]; Joalet Steenkamp[1]; [1]Mintek; [2]Transalloys

2:45 PM
Slag Reduction and Viscosities Interaction in Ferromanganese Process: *Tichaona Mukono*[1]; Maria Wallin[1]; Merete Tangstad[1]; [1]Norwegian University of Science and Technology

3:10 PM Break

3:30 PM
Lab Scale Physical Model Experiments to Understand the Effect of Particle Bed on Tapping Flow Rates: Varun Loomba[1]; Hesam Pourfallah[1]; Jan Olsen[2]; *Kristian Einarsrud*[1]; [1]Norwegian University of Science and Technology; [2]SINTEF Industry

3:55 PM
Theoretical Framework and Practical Recommendations for Proper Thermal Lance Use and Selection: Roberto Pena[1]; *Sebastian Nunez*[1]; Antonio Umana[1]; Darwin Morales[1]; [1]Trefimet S.A.

4:15 PM Concluding Comments

MECHANICS & STRUCTURAL RELIABILITY

Grain Boundaries and Interfaces: Metastability, Disorder, and Non-Equilibrium Behavior — Behaviors at Extreme Environments

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

Program Organizers: Yue Fan, University of Michigan; Liang Qi, University of Michigan; Jeremy Mason, University of California, Davis; Garritt Tucker, Colorado School of Mines; Pascal Bellon, University of Illinois at Urbana-Champaign; Mitra Taheri, Johns Hopkins University; Eric Homer, Brigham Young University; Xiaofeng Qian, Texas A&M University

Monday PM | February 28, 2022
304C | Anaheim Convention Center

Session Chairs: Yue Fan, University of Michigan, Ann Arbor; Pascal Bellon, UIUC

2:00 PM Invited
Radiation Effects on Interfacial Phenomena in Ceramics: *Izabela Szlufarska*[1]; Hongliang Zhang[1]; Jianqi Xi[1]; Brian Sheldon[2]; Christos Athanasiou[2]; Xing Wang[3]; [1]University of Wisconsin-Madison; [2]Brown University; [3]Penn State University

2:30 PM Invited
Interpreting Discrete GND Footprints of Atomic-level Irradiation Defects Near Grain Boundaries: *Jaime Marian*[1]; Mitra Taheri[2]; David Srolovitz[3]; [1]University of California, Los Angeles; [2]Johns-Hopkins University; [3]City University of Hong Kong

3:00 PM
Phase Field Modeling of the Coupling between Compositional Patterning and Radiation Induced Precipitation at Grain Boundaries and Dislocation Loops in Immiscible Binary Alloys during Irradiation: *Gabriel Franck Bouobda Moladje*[1]; Robert S Averback[1]; Pascal Bellon[1]; [1]University of Illinois at Urbana-Champaign

3:20 PM
Plastic Deformation in Nickel Bicrystals Containing Helium Bubbles: *Tung Yan Liu*[1]; Michael Demkowicz[1]; [1]Texas A&M University

3:40 PM Break

3:55 PM Invited
Computational Insights into the Interactions of Defects with Grain Boundaries: *Blas Uberuaga*[1]; [1]Los Alamos National Laboratory

4:25 PM
Integration of Microscopy and Deep Learning to Define Localized Grain Boundary Sink Efficiency: *Emily Hopkins*[1]; Emma Liu[1]; Ryan Jacobs[2]; Priyam Patki[3]; James Nathaniel[1]; Kevin Field[3]; Dane Morgan[2]; Mitra Taheri[1]; [1]Johns Hopkins University; [2]University of Wisconsin - Madison; [3]University of Michigan

4:45 PM
Dynamic Interaction between Grain Boundary and Structural Defects by Molecular Dynamics Simulation: *Liang Zhang*[1]; Cheng Lu[2]; Yasushi Shibuta[3]; [1]Chongqing University; [2]University of Wollongong; [3]The University of Tokyo

---

MATERIALS DESIGN

Hume-Rothery Symposium on Connecting Macroscopic Materials Properties to Their Underlying Electronic Structure: The Role of Theory, Computation, and Experiment — Alloy Theory II: Quantum, Electronic and Atomistic Approaches to Materials Understanding

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

Program Organizers: Raymundo Arroyave, Texas A&M University; Wei Chen, Illinois Institute of Technology; Yong-Jie Hu, Drexel University; Tresa Pollock, University of California, Santa Barbara

Monday PM | February 28, 2022
255A | Anaheim Convention Center

Session Chair: To Be Announced

2:00 PM Invited
Leveraging First-principles Theory in the Pursuit of Novel Electrode Materials: *Kristin Persson*[1]; [1]University of California, Berkeley

2:30 PM Invited
Prospects of Quantum Computing for Modeling Phase Transformations in Battery Materials: *Maxwell Radin*[1]; Peter Johnson[1]; [1]Zapata Computing

3:00 PM Invited
From Layered Oxides to Disordered Rocksalt Cathodes: The Future of Energy Storage by Understanding the Atomistics of Li Diffusion: *Gerbrand Ceder*[1]; [1]University of California-Berkeley

3:30 PM Break

3:50 PM Invited
Molecular-scale Structure and Dynamics of Molten Salts: Simulations and Implications for Corrosive Processes: Nick Winner[1]; Haley Williams[1]; Raluca Scarlat[1]; *Mark Asta*[1]; [1]University of California, Berkeley

4:20 PM Invited
First-principles Materials Design for Mechanically-controlled Topological Magnetism: *Daniil Kitchaev*[1]; Anton Van der Ven[1]; [1]University of California Santa Barbara

MATERIALS DESIGN

ICME Case Studies: Successes and Challenges for Generation, Distribution, and Use of Public/Pre-Existing Materials Datasets — Public Dataset Construction and Metadata Tagging

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

Program Organizers: Stephen DeWitt, Oak Ridge National Laboratory; Vikas Tomar, Purdue University; James Saal, Citrine Informatics; James Warren, National Institute of Standards and Technology

Monday PM | February 28, 2022
254A | Anaheim Convention Center

Session Chair: James Saal, Citrine Informatics

2:00 PM Invited
Added Value and Increased Organization: Capturing Experimental Data Provenance in Materials Commons 2.0: *Tracy Berman*[1]; Brian Puchala[1]; Glenn Tarcea[1]; John Allison[1]; [1]University of Michigan

2:30 PM Invited
Generating, Sharing, and Using Halide Perovskite Exploratory Synthesis Data to Discover New Materials: *Joshua Schrier*[1]; [1]Fordham University

3:00 PM Invited
Challenges in Producing, Curating, and Sharing Large Multimodal, Multi-institutional Data Sets for Additive Manufacturing: *Lyle Levine*[1]; Brandon Lane[2]; Carelyn Campbell[2]; Gerard Lemson[2]; Edwin Schwalbach[3]; Megna Shah[3]; [1]The Ohio State University; [2]National Institute of Standards and Technology; [3]Air Force Research Labroatory

3:30 PM Break

3:50 PM
A Validation Framework for Microstructure-sensitive Fatigue Simulation Models: *Ali Riza Durmaz*[1]; Nikolai Arnaudov[2]; Erik Natkowski[2]; Petra Sonnweber-Ribic[2]; Sebastian Münstermann[3]; Chris Eberl[1]; Peter Gumbsch[1]; [1]Fraunhofer Iwm; [2]Robert Bosch GmbH; [3]RWTH Aachen

4:10 PM Invited
Hard Fought Lessons on Open Data and Code Sharing and the Terra Infirma of Ground Truth: *Jason Hattrick-Simpers*; [1]

ENERGY & ENVIRONMENT

Magnetics and the Critical Materials Challenge: An FMD Symposium Honoring Matthew J. Kramer — Microstructure and Processing

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

Program Organizers: Scott McCall, Lawrence Livermore National Laboratory; Ryan Ott, Ames Laboratory

Monday PM | February 28, 2022

210D | Anaheim Convention Center

Session Chair: Orlando Rios, University of Tennessee-Knoxville

---

2:00 PM Invited
Far-from-equilibrium Materials Processing: *Jeffrey Shield*[1]; [1]University of Nebraska

2:30 PM Invited
From High-throughput Synchrotron Diffraction to Closed-loop Autonomous Materials Discovery: *Ichiro Takeuchi*[1]; [1]University of Maryland

3:00 PM
Mechanically Strengthened Heterogeneous Sm-Co Sintered Magnets: *Baozhi Cui*[1]; Xubo Liu[1]; Cajetan Nlebedim[1]; Jun Cui[1]; [1]Ames Laboratory

3:20 PM Break

3:40 PM
Utilizing High Energy X-rays to Perform In Situ observations of Alnico Spinodal Evolution: *Emily Rinko*[1]; Matthew Kramer[1]; Iver Anderson[1]; [1]Iowa State University

4:00 PM Invited
Exploring the Edge of Stability in Chemically Complex Alloys: *Pratik Ray*[1]; [1]IIT Ropar

4:30 PM Invited
Synthesis and Characterization of Rare-earth-based Metallic Glasses: *Yunus Kalay*[1]; [1]Middle East Technical University

---

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — Corrosion II

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

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

Monday PM | February 28, 2022
203B | Anaheim Convention Center

Session Chair: Jinsuo Zhang, Virginia Tech

2:00 PM
Multi-modal Characterization of Interfacial Corrosion of Ni-based Alloys in Chloride-based Molten Salts: *Trishelle Copeland-Johnson*[1]; Michael Woods[1]; Ruchi Gakhar[1]; Guoping Cao[1]; Lingfeng He[1]; [1]Idaho National Laboratory

2:20 PM
Static Corrosion of 316 Stainless Steel Upon Exposure to Metal Fluorides in Molten Salt: *Ryan Hayes*[1]; Sean Mills[1]; Haley Williams[1]; Andrew Minor[1]; Raluca Scarlat[1]; [1]University of California Berkeley

2:40 PM
Study of the Influence of Metal Ions on the Kinetics of Molten Salt Corrosion with Transmission Electron Microscopy and In situ Synchrotron X-ray Nano-tomography: *Xiaoyang Liu*[1]; Xiaoyin Zheng[1]; Kaustubh Bawane[2]; Michael Woods[2]; Mingyuan Ge[3]; Phillip Halstenberg[4]; Sheng Dai[5]; Xianghui Xiao[3]; Wah-Keat Lee[3]; Shannon Mahurin[6]; Ruchi Gakhar[2]; Lingfeng He[2]; Yu-chen Chen-Wiegart[7]; [1]Stony Brook University; [2]Idaho National Laboratory; [3]Brookhaven National Laboratory; [4]University of Tennessee; [5]University of Tennessee/ Oak Ridge National Laboratory; [6]Oak Ridge National Laboratory; [7]Stony Brook University/ Brookhaven National Laboratory

3:00 PM
Effect of Impurities on Stability of Graphite in Molten FLiNaK: *Krishna Moorthi Sankar*[1]; Preet Singh[1]; [1]Georgia Institute of Technology

---

MATERIALS DESIGN

Materials Design and Processing Optimization for Advanced Manufacturing: From Fundamentals to Application — Materials Design and Processing Optimization: Young Investigator Session II

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

Program Organizers: Wei Xiong, University of Pittsburgh; Dana Frankel, QuesTek Innovations LLC; Gregory Olson, Massachusetts Institute of Technology

Monday PM | February 28, 2022
253B | Anaheim Convention Center

Session Chairs: Wei Xiong, University of Pittsburgh; Dana Frankel, QuesTek Innovations LLC

2:00 PM Invited
Composition and Thermo-mechanical Processing Optimization towards Superior Steels: Two Case Studies: *C. Tasan*[1]; Gianluca Roscioli[1]; Menglei Jiang[1]; Hyun Oh[1]; [1]Massachusetts Institute of Technology

2:25 PM Invited
Understanding Welding Metallurgy and Process-structure-property Relationships for Advanced Manufacturing: High-throughput Experimental Techniques Guided by Thermodynamic Modeling: *Carolin Fink*[1]; [1]Ohio State University

2:50 PM Invited
Development and Manufacturing of Solid-solution or Precipitation-strengthened Multi-principal Element Alloys with Superior Properties: *Haiming Wen*[1]; Matthew Luebbe[1]; Hans Pommerenke[1]; [1]Missouri University of Science and Technology

3:15 PM Invited
Deformation and Failure of Cold Sprayed Metal Matrix Composites: A Synchrotron X-ray Approach: Lewei He[1]; *Mostafa Hassani*[1]; [1]Cornell University

3:40 PM Break

3:55 PM Invited
Short-range Order and Its Impacts on the BCC NbMoTaW Multi-principal Element Alloy by Machine-learning Potentials: *XiaoXiang Yu*[1]; Qiang Zhu[2]; YunJiang Wang[3]; Lin Li[4]; [1]Northwestern University; [2]University of Nevada, Las Vegas; [3]Institute of Mechanics, Chinese Academy of Sciences; [4]The University of Alabama

4:20 PM Invited
Local Electronic Descriptors for Defect Properties of bcc Refractory Alloys: *Yong-Jie Hu*[1]; Liang Qi[2]; [1]Drexel University; [2]University of Michigan

4:45 PM Invited
How Deep Learning Can Help with Materials Design: *Sara Kadkhodaei*[1]; Ali Davariashtiyani[1]; [1]University of Illinois at Chicago

5:10 PM Invited
Materials Design of High-melting-point Materials from First Principles, Database, and Machine Learning: *Qijun Hong*[1]; [1]Arizona State University

---

NUCLEAR MATERIALS

Mechanical Behavior and Degradation of Advanced Nuclear Fuel and Structural Materials — Novel Nuclear Materials & Characterization I

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

Program Organizers: Dong Liu, University of Bristol; Peng Xu, Idaho National Laboratory; Simon Middleburgh, Bangor University; Christian Deck, General Atomics; Erofili Kardoulaki, Los Alamos National Laboratory; Robert Ritchie, University of California, Berkeley

Monday PM | February 28, 2022
204A | Anaheim Convention Center

Session Chairs: Alex Leide, University of Bristol; Jie Lian, Rensselaer Polytechnic Institute

---

2:00 PM Invited
Characterizing and Testing High Dose Neutron Irradiated Materials for Cladding Applications: *Stuart Maloy*[1]; Ben Eftink[1]; Tarik Saleh[1]; Mychailo Toloczko[2]; Dave Hoelzer[3]; T. S Byun[3]; [1]Los Alamos National Laboratory; [2]Pacific Northwest National Laboratory; [3]Oak Ridge National Laboratory

2:30 PM
Microstructure Characterization and Micro-mechanical Properties of 14YWT Tubing after Proton Irradiation: *Cayla Harvey*[1]; Osman El-Atwani[2]; Stuart Maloy[2]; Siddhartha Pathak[3]; [1]University of Nevada, Reno; [2]Los Alamos National Laboratory; [3]Iowa State University

2:50 PM
Behavior of Ceramic Matrix Composite in Molten Salt Environments Under Biaxial Stresses: *Wylie Simpson*[1]; Xinyi Wang[1]; James Earthman[1]; [1]University of California Irvine

3:10 PM
Ion Irradiation Effects on Microstructure Evolution and Mechanical Properties of Silicon Oxycarbide: *Kathy Lu*[1]; Sanjay Kumar Singh[1]; Kaustubh Bawane[2]; [1]Virginia Polytechnic Institute and State University; [2]Idaho National Laboratory

3:30 PM Break

3:50 PM
Compositionally Graded Specimen: A High-throughput Approach for Nuclear Material Development
: *Jingfan Yang*[1]; Laura Hawkins[2]; Miao Song[3]; Lingfeng He[2]; Zhijie Jiao[3]; Yongfeng

Zhang[4]; Daniel Schwen[2]; Xiaoyuan Lou[1]; [1]Auburn University; [2]Idaho National Laboratory; [3]University of Michigan; [4]University of Wisconsin

4:10 PM
Chemical Redistribution of Alloying Elements through Oxide/Metal Interface of Irradiated ZrNbFe Alloys and Its Implication on Corrosion Behavior: Zefeng Yu[1]; Elizabeth Kautz[2]; Hongliang Zhang[1]; Anton Schneider[1]; Yongfeng Zhang[1]; Sten Lambeets[2]; Arun Devaraj[2]; *Adrien Couet*[1]; [1]University of Wisconsin-Madison; [2]Pacific Northwest National Laboratory

4:30 PM
Deformation Behavior of Helium Irradiated Nano-pillars Containing a Helium Gas Bubble Superlattice: *Andrew Scott*[1]; Yujun Xie[2]; Peter Hosemann[1]; [1]University of California Berkeley; [2]Lawrence Berkeley National Laboratory

---

NANOSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale VI — Size Effects

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

Program Organizers: Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, University of Texas at San Antonio; Changhong Cao, McGill University; Mohsen Asle Zaeem, Colorado School of Mines

Monday PM | February 28, 2022
262B | Anaheim Convention Center

Session Chairs: Changhong Cao, McGill University; Kevin Turner, University of Pennsylvania

---

2:00 PM Invited
In Situ Atomic-scale Observation of Surface-diffusion-controlled Softening in Metallic Nanocrystals: *Scott Mao*[1]; [1]University of Pittsburgh

2:30 PM
Dynamic Recrystallization-induced Strengthening in Amorphous-nanocrystalline Silver-nickel Nanolaminates: Ryan Pringle[1]; *Frederic Sansoz*[1]; [1]The University of Vermont

2:50 PM
Achieving Micron-scale Plasticity and Theoretical Strength in Silicon: Ming Chen[1]; Laszlo Pethö[2]; Alla Sologubenko[3]; Johann Michler[2]; Ralph Spolenak[4]; *Jeffrey Wheeler*[5]; [1]Paul Scherrer Institute; [2]Empa; [3]ScopeM/ETH Zurich; [4]ETH Zurich; [5]FemtoTools AG, Furtbachstrasse 4, CH-8107 Buchs/ZH, Switzerland

3:10 PM
Grain Size Dependent Deformation Mechanisms in Complex Concentrated Oxides (Co,Cu,Mg,Ni,Zn)O: *Xin Wang*[1]; Justin Cortez[1]; Alexander Dupuy[1]; Julie Schoenung[1]; William Bowman[1]; [1]University of California Irvine

3:30 PM Break

3:50 PM Invited
Tuning the Fracture Toughness of Polymer-infiltrated Nanoparticle Films via Nanoconfinement: *Kevin Turner*[1]; Yiwei Qiang[1]; Daeyeon Lee[1]; [1]University of

Pennsylvania

4:20 PM
Mechanical Behavior of Nanotwinned Al Alloys at Elevated Temperatures: *Xinghang Zhang*[1]; Qiang Li[2]; Dongyue Xie[3]; Jian Wang[3]; [1]Purdue University; [2]Ames Lab; [3]University of Nebraska, Lincoln

4:40 PM
Precipitation Hardening in BCC Multilayer Thin Films: *Yailuth Loaiza Lopera*[1]; David Bahr[1]; [1]Purdue University

5:00 PM
The Effects of Grain Boundaries on the Micromechanical Properties of Transparent Nanocrystalline Spinel: *Jessica Maita*[1]; Sarshad Rommel[1]; Jacob Davis[2]; James Wollmershauser[3]; Edward Gorzkowski[3]; Boris Feigelson[3]; Mark Aindow[1]; Seok-Woo Lee[1]; [1]University of Connecticut; [2]University of Massachusetts Amherst; [3]U.S. Naval Research Laboratory

---

CHARACTERIZATION

Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling — Session II

Sponsored by: TMS Structural Materials Division, TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Shailendra Joshi, University of Houston; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Jagannathan Rajagopalan, Arizona State University; Robert Wheeler, Microtesting Solutions LLC

Monday PM | February 28, 2022
206B | Anaheim Convention Center

Session Chairs: Shailendra Joshi, University of Houston; C. Tasan, Massachusetts Institute of Technology

---

2:00 PM Invited
Linking Local and Global Strains: From Films to Lattices: *Mitra Taheri*[1]; [1]Johns Hopkins University

2:30 PM
Investigation of Dislocation-grain Boundary Interactions through In-situ Micro-mechanical Testing with Strain Mapping: *Dongyue Xie*[1]; Sumit Suresh[1]; Jade Peng[1]; Jonathan Gigax[1]; Nithin Mathew[1]; Darby Luscher[1]; Abigail Hunter[1]; Saryu Fensin[1]; Nan Li[1]; [1]Los Alamos National Laboratory

2:50 PM
Effect of Temperature and Composition on the Superelasticity of $SrNi_2P_2$ Single Crystal: *Shuyang Xiao*[1]; Juan Schmidt[2]; Gorgen-Lesseux Guilherme[2]; Paul Canfield[2]; Seok-Woo Lee[1]; [1]University of Connecticut; [2]Iowa State University

3:10 PM
Deformation Behavior Identification of a Friction Stir Welded 304L Austenitic Stainless-steel Using In-situ EBSD: *Nitish Bibhanshu*[1]; Maxim Gussev[1]; Wei Tang[1]; [1]Oak Ridge National Laboratory

3:30 PM Break

3:50 PM
Transmission X-ray Microscopy Reveals Role of Voids in Hydrogen Embrittlement: *Andrew Lee*[1]; Abhinav Parakh[1]; Wendy Gu[1]; [1]Stanford University

4:10 PM
Growing Voids and Migrating Twins: *Shailendra Joshi*[1]; [1]University of Houston

4:30 PM
Examining Hot Corrosion Crack Tip Arrest through Advanced Microscopy Analysis of Ni-superalloy CMSX-4: *Maadhav Kothari*[1]; Andy Holwell[1]; Hrishikesh Bale[1]; Simon Gray[2]; Jonathan Leggett[3]; [1]Carl Zeiss Microscopy Llc; [2]Cranfield University; [3]Rolls Royce

4:50 PM Invited
Similarity of Microscopic Strain Localization in Very Different Microstructures: *C. Tasan*[1]; Krista Biggs[1]; Onur Guvenc[1]; Jiyun Kang[1]; Hyun Oh[1]; Shaolou Wei[1]; [1]Massachusetts Institute of Technology

---

MATERIALS DESIGN

Metal-Matrix Composites: Advances in Processing, Characterization, Performance and Analysis — Additive Manufacturing and Processing of Composite Materials

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

Program Organizers: Srivatsan Tirumalai, The University of Akron; Pradeep Rohatgi, University of Wisconsin; Simona Hunyadi Murph, Savannah River National Laboratory

Monday PM | February 28, 2022
256B | Anaheim Convention Center

Session Chair: Tirumalai Srivatsan, The University of Akron

2:00 PM Keynote
Additive Manufacturing of Metal Matrix Composites for Structural and Biomedical Applications: *Amit Bandyopadhyay*[1]; Susmita Bose[1]; [1]Washington State University

2:30 PM Invited
Additive Manufacturing of Titanium – Boron Carbide In situ Composites: *Mohan Sai Kiran Nartu*[1]; Srinivas Aditya Mantri[1]; Thomas W. Scharf[1]; Brandon Mc Williams[2]; Kyu Cho[2]; Narendra Dahotre[1]; Rajarshi Banerjee[1]; [1]University of North Texas; [2]CCDC U.S. Army Research Laboratory

2:55 PM
Solid-state Additive Manufacturing of AA6061-graphene MMCs: *Jessica Lopez*[1]; Malcom Williams[1]; James Jordon[1]; Timothy Rushing[2]; Gregory Thompson[1]; Paul Allison[1]; [1]The University of Alabama; [2]U.S. Army ERDC

3:15 PM Invited
Development of Aluminum-based Metal Matrix Composites Using Friction Extrusion: *Rajib Kalsar*[1]; Xiaolong Ma[1]; Jens Darsell[1]; Miao Song[1]; Nicole Overman[1]; Keerti Kappagantula[1]; Vineet Joshi[1]; [1]Pacific Northwest National Laboratory

3:40 PM Break

3:55 PM
An Investigation of Mechanical Properties of Additively Manufactured Regolith Reinforced Titanium Alloy [Ti6Al4V]: *Ali Afrouzian*[1]; Kellen Traxel[1]; Amit Bandyopadhyay[1]; [1]Washington State University

4:15 PM Invited
In-situ Synthesis of (TiB+TiN)/Ti Composites with Ultrahigh Mechanical Strength via Laser Powder Bed Fusion: Boyuan Li[1]; Changjun Han[1]; *Kun Zhou*[1]; [1]Nanyang Technological University

---

SPECIAL TOPICS

Moving Forward from a Pandemic: How the Field of Materials Science Has Adapted (2022 Student-led Symposium) — Education and User Facilities - Supporting Students and Users During the Pandemic

Program Organizers: Gianmarco Sahragard-Monfared, University of California, Davis; Christine Smudde, Univeristy of California, Davis; Jared Stimac; Mingwei Zhang, University of California, Davis

Monday PM | February 28, 2022
202A | Anaheim Convention Center

Session Chairs: Mingwei Zhang, University of California, Davis; Jared Stimac, University of California, Davis

---

2:00 PM
Survey Results from the TMS Education Committee: Changes in Education due to Covid-19: *Alison Polasik*[1]; Kester Clarke[2]; [1]Campbell University; [2]Colorado School of Mines

2:20 PM
How CHESS Responded to the Corona Virus Pandemic: Joel Brock[1]; *Matthew Miller*[1]; [1]Cornell University

2:40 PM
Materials Science at the Molecular Foundry - Adaptation and Innovation during the COVID-19 Pandemic: *Shannon Ciston*[1]; [1]Lawrence Berkeley National Laboratory

3:00 PM
Supporting Students in a Turbulent Time: Lessons Learned: *Susan Gentry*[1]; [1]University of California, Davis

3:20 PM Break

3:35 PM
Maintaining a Productive Electron Microscopy Facility in the Face of COVID-19: *Nicholas Rudawski*[1]; [1]University of Florida

3:55 PM
Engineering Education during and Post Pandemic: *Matthew Sherburne*[1]; [1]University of California, Berkeley

4:15 PM
Navigating and Adapting User Facilities through Challenging Times: *Khalid Hattar*[1]; [1]Sandia National Laboratories

---

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXI — Machine Learning and Phase Stability/Advanced Electronic Interconnections

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

Program Organizers: Hiroshi Nishikawa, Osaka University; Shih-kang Lin, National Cheng Kung University; Chaohong Wang, National Chung Chung University; Chih Ming Chen, National Chung Hsing University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; A.S.Md Abdul Haseeb, University of Malaya; Vesa Vuorinen, Aalto University; Ligang Zhang, Central South University; Sehoon Yoo, KITECH; Yu-chen Liu, National Cheng Kung University; Ting-Li Yang, National Yang Ming Chiao Tung University

Monday PM | February 28, 2022
303A | Anaheim Convention Center

Session Chairs: Shih-kang Lin, National Cheng Kung University; Yu-chen Liu, National Cheng Kung University

---

2:00 PM Invited
The Challenge of Machine Learning the Stability of Materials: *Christopher Bartel*[1]; [1]University of California, Berkeley

2:30 PM
Role of Composition in the Phase Transition of Ge-Sb-Te Alloys: *Robert Appleton*[1]; Alejandro Strachan[1]; Zachary McClure[1]; [1]Purdue University

2:50 PM
The Influence of Morphology in Ultrathin Ag Structure on ZnO/Ag/ZnO Transmittance Grown by Sputtering Compared with Simulation: *Bao-Jhen Li*[1]; [1]National Central University

3:10 PM
Ab Initio Interfacial Stability and Cu-segregation Effect upon ' and 2 Precipitates in Al-Zn-Mg-Cu Alloys
: *Yu-ning Chiu*[1]; Chung-yi Yu[2]; Shih-kang Lin[1]; [1]National Cheng Kung University; [2]China Steel Corp

3:30 PM Break

3:50 PM
Study of Ferroelectricity and Phase Transitions in Hafnia: *Sesha Behara*[1]; Anton Van der Ven[1]; [1]University of California Santa Barbara

4:10 PM
Interfacial Reactions between Sn-0.7 Cu Alloys C194, Alloy25, and C1990 Substrates: *Yong-Chi Chang*[1]; Tzu-Yang Tsai[1]; Tai-Hsuan Chung[1]; Yee-Wen Yen[1]; [1]NTUST

4:30 PM
Mechanical Performance of Advanced Multicomponent Solder Alloy under Thermal Aging: *Ding Zhou*[1]; A.S.M.A. Haseeb[1]; Andri Andriyana[1]; [1]University of Malaya

4:50 PM
Investigation of Thermal Properties and Thermal Reliability of Ga-based Low Melting Temperature Alloys as Thermal Interface Materials (TIMs): *Yifan Wu*[1]; Rajath Kantharaj[1]; Albraa Alsaati[1]; Amy Marconnet[1]; Carol Handwerker[1]; [1]Purdue

University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Microstructure Evolution

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Ramasis Goswami, Naval Research Laboratory; Saurabh Puri, Microstructure Engineering; Eric Payton, Air Force Research Laboratory; Bij-Na Kim, Carpenter Additive; Megumi Kawasaki, Oregon State University; Eric Lass, University of Tennessee-Knoxville

Monday PM | February 28, 2022
255B | Anaheim Convention Center

Session Chair: Ramasis Goswami, Naval Research Laboratory

2:00 PM
Dynamic Microstructural Evolution of Al-Cu Alloy during Friction Stir Processing Studied Using Synchrotron Based In Situ High Energy X-ray Diffraction: *Arun Bhattacharjee*[1]; Julian Escobar Atehortua[1]; Jorge dos Santos[2]; Jan Herrnring[2]; Luciano Bergmann[2]; Peter Staron[2]; Benjamin Klusemann[2]; Bharat Gwalani[1]; Suveen Mathaudhu[3]; Cynthia Powell[4]; Arun Devaraj[1]; [1]Physical and Computational Sciences Directorate, Pacific Northwest National Laboratory; [2]Institute of Materials Mechanics, Helmholtz-Zentrum Hereon; [3]Metallurgical and Materials Engineering, Colorado School of Mines; [4]Energy and Environment Directorate, Pacific Northwest National Laboratory

2:20 PM
Formation of Three-phase Eutectic Grains on Primary Phases: Observations from In Situ and Multi-modal Imaging: *George Lindemann*[1]; Paul Chao[1]; Allen Hunter[1]; Ashwin Shahani[1]; [1]University of Michigan

2:40 PM
Microstructural Evolution during Galling: *Samuel Rogers*[1]; David Dye[1]; [1]Imperial College London

3:00 PM Invited
Metallic Alloy Microstructure Evolution during Materials Processing: *Amy Clarke*[1]; Jonah Klemm-Toole[1]; Kester Clarke[1]; Alec Saville[1]; Christopher Jasien[1]; Gus Becker[1]; Brian Rodgers[1]; Jeremy Shin[1]; Joseph McKeown[2]; John Roehling[2]; Damien Tourret[3]; Sven Vogel[4]; Jake Benzing[5]; Adam Creuziger[5]; Adam Pilchak[6]; Kamel Fezzaa[7]; Tao Sun[8]; Tresa Pollock[9]; Alain Karma[10]; [1]Colorado School of Mines; [2]Lawrence Livermore National Laboratory; [3]IMDEA Materials; [4]Los Alamos National Laboratory; [5]National Institute of Standards and Technology; [6]MRL Materials Resources LLC; [7]Argonne National Laboratory; [8]University of Virginia; [9]University of California Santa Barbara; [10]Northeastern University

ADDITIVE TECHNOLOGIES

Powder Materials Processing and Fundamental Understanding — Additive Manufacturing I

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, Pacific Northwest National Laboratory

Monday PM | February 28, 2022
263C | Anaheim Convention Center

Session Chairs: Eugene Olevsky, San Diego State University; Hang Yu, Virginia Polytechnic Institute and State University

---

2:00 PM Invited
Laser-based, Machine-learning Guided, Additive Manufacturing of Ceramics with Designed Microstructure and Hardness: Xiao Geng[1]; Jianan Tang[1]; Dongsheng Li[2]; Yunfeng Shi[3]; Jianhua Tong[1]; Hai Xiao[1]; Fei Peng[1]; *Rajendra Bordia*[1]; [1]Clemson University; [2]Advanced Manufacturing LLC; [3]Rensselaer Polytechnic Institute

2:30 PM
Influence of Powder Reuse in LPBF on the Attributes of SS316L Particles and Powder Beds: *Timothée Delacroix*[1]; Fernando Lomello[1]; Frédéric Schuster[1]; Hicham Maskrot[1]; Jean-Paul Garandet[1]; [1]CEA

2:50 PM
Understanding Surface Roughness on Vertical Walls in Laser Powder Bad Fusion Additive Manufacturing: *Tianyu Zhang*[1]; Lang Yuan[1]; [1]University of South Carolina

3:10 PM
Optical Analysis of Powder Oxygen Content in Metal Powder Bed Fusion: *Tan-Phuc Le*[1]; Xiaogang Wang[1]; Nick Weeks[2]; Matteo Seita[1]; [1]Nanyang Technological University; [2]Carpenter Additive

3:30 PM Break

3:50 PM
Synchrotron X-ray Imaging of Cracking during Laser Powder Bed Fusion (LPBF) of Aged CM247 Powder with Varying Oxygen Content: *David Rees*[1]; Chu Lun Alex Leung[1]; Thomas Kellock[1]; Gowtham Soundarapandiyan[2]; Sebastian Marussi[1]; Saurabh Shah[1]; Robert Atwood[3]; Ben Saunders[4]; Gavin Baxter[5]; Peter Lee[1]; [1]University College London; [2]National Structural Integrity Research Centre; [3]Diamond Light Source Ltd; [4]Rolls-Royce plc.; [5]MAPP EPSRC Future Manufacturing Hub

4:10 PM
Inconel 718 Contamination in Ti6Al4V during Powder Bed Fusion: *Cory Groden*[1]; Kellen Traxel[1]; Amit Bandyopadhyay[1]; [1]Washington State University

4:30 PM
Electromigration Behavior of Additively Manufactured Copper Wirings: *Hugo Ramirez Grijalba*[1]; Ping-Chuan Wang[1]; Dan Freedman[1]; [1]SUNY New Paltz

---

MATERIALS PROCESSING

Powder Metallurgy of Light, Reactive and Other Non-ferrous Metals — Powder Metallurgy of Non-ferrous and Refractory Metals

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

Program Organizers: Ma Qian, Royal Melbourne Institute of Technology; James Paramore, US Army Research Laboratory; David Yan, San Jose State University; Gang Chen, University of Science and Technology Beijing

Monday PM | February 28, 2022
211B | Anaheim Convention Center

Session Chairs: James Paramore, United States Army Research Laboratory; David Yan, San Jose State University

---

2:00 PM
Investigations of Phase Transformations in a Blendend Elemental Ti-Nb-Zr-O Alloys Prepared by a Field-assisted Sintering Technique: *Dalibor Preisler*[1]; Jiri Kozlik[1]; Josef Strasky[1]; Tomas Chraska[2]; Milos Janecek[1]; Hanus Seiner[3]; [1]Charles University; [2]Institute of Plasma Physics, Czech Academy of Sciences; [3]Institute of Thermomechanics, Czech Academy of Sciences

2:20 PM
Microstructural/Mechanical Properties Relationship of Elongated Ti-15Mo Bars Produced by Unconventional Spark Plasma Sintering Technology: *Mariano Casas Luna*[1]; Adrián Majoros[1]; Anna Veverková[1]; Dalibor Preisler[1]; Josef Stráský[1]; [1]Charles University

2:40 PM Invited
Titanium Near Net Shape PM Parts Produced by Direct Powder Forging: *Bernard Tougas*[1]; Sébastien Germain-Careau[1]; Elena Kolitsky[1]; Gheorghe Marin[1]; [1]Quebec Metallurgy Center

3:05 PM
Influence of Calcium Powder in Heavily Deformed Aluminum-calcium Metal-metal Composites: *Dustin Hickman*[1]; Trevor Riedemann[2]; Jordan Tiarks[2]; Iver Anderson[2]; [1]Iowa State University; [2]Ames Laboratory

3:25 PM Break

3:40 PM Keynote
Microstructural Refinement and Uniformity of Refractory Metals: *Lin Zhang*[1]; Xingyu Li[1]; Xuanhui Qu[1]; [1]University of Science and Technology Beijing

4:20 PM
Scaling Up Porous Copper Foams by Planetary Milling and Oxide Reduction: *Julian Tse Lop Kun*[1]; Adam Rutherford[1]; Mark Atwater[1]; [1]Liberty University

4:40 PM
Accelerated Powder Consolidation in Nanocrystalline Materials Competes with Organic Burn-off: *Yannick Naunheim*[1]; Christopher A. Schuh[1]; [1]Massachusetts Institute of Technology

---

MATERIALS PROCESSING

Rare Metal Extraction and Processing — Solvent Extraction for Rare Metals

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

Program Organizers: Takanari Ouchi, University of Tokyo; Gisele Azimi, University of Toronto; Kerstin Forsberg, KTH Royal Institute of Technology; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Neale Neelameggham, IND LLC; Alafara Baba, University of Ilorin; Hong Peng, University of Queensland

Monday PM | February 28, 2022
213B | Anaheim Convention Center

Session Chairs: Takanari Ouchi, University of Tokyo; Hojong Kim, Pennsylvania State University; Kerstin Forsberg, KTH Royal Institute of Technology

---

2:00 PM Introductory Comments

2:10 PM Keynote
Physicochemistry in Service of Process Design: Case of Uranium Recovery by Liquid-liquid Extraction: *Alexandre Chagnes*[1]; [1]Universite De Lorraine-Georess

2:50 PM
Effect of Antisolvent Type and Concentration on Morphology and Crystal Size of $(NH_4)_3ScF_6$ Obtained by Antisolvent Crystallization: Edward Peters[1]; Michael Svärd[1]; *Kerstin Forsberg*[1]; [1]KTH Royal Institute of Technology

3:10 PM
Tellurium Recovery – Development of a Novel Hydrometallurgical Process: *Shijie Wang*[1]; [1]Coeur Mining, Inc

3:30 PM Break

3:50 PM
Purification of a Low-grade Molybdenite Ore for Industrial Steel Production: *Alafara Baba*[1]; Christianah Adeyemi[2]; Mamata Mohapatra[3]; Mustapha Raji[1]; Fausat Akanji[4]; Abdul Alabi[5]; [1]University of Ilorin; [2]University of Ilorin & The Federal Polytechnic, Offa; [3]CSIR-Institute of Minerals and Materials Technology; [4]University of Ilorin & Sheda, Kwali, Abuja; [5]Kwara State University, Malete

4:10 PM
Comprehensive Processing of Mica Concentrate from Yaroslavsky GRK for Lithium Carbonate, Potassium Sulfate, Aluminum Sulfate, Rubidium and Cesium: Andrey Panov[1]; *Aleksandr Suss*[1]; Nataliya Kuznetsova[1]; Sergey Ostashin[2]; Evgeniy Isakov[3]; [1]RUSAL Engineering and Technology Center; [2]JSC RUSAL Management; [3]Yaroslavsky GRK

ELECTRONIC MATERIALS

Recent Advances in Printed Electronics and Additive Manufacturing: 2D/3D Functional Materials, Fabrication Processes, and Emerging Applications — Functional Materials and 2D/3D Devices II

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; Yong Lin Kong, University of Utah; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Changyong Cao, Michigan State University; David Estrada, Boise State University; Nuggehalli Ravindra, New Jersey Institute of Technology

Monday PM | February 28, 2022
303C | Anaheim Convention Center

Session Chairs: Rahul Panat, Carnegie Mellon University; Tolga Aytug, Oak Ridge National Laboratory; Changyong Cao, Michigan State University

---

2:00 PM Invited
3D Printed Energy Storage Devices: *Majid Beidaghi*[1]; [1]Auburn University

2:25 PM
Controlled Embedding of Multidimensional Flexible Sensors Using Direct Ink Writing: *Akshay Kakar*[1]; Derrick Banerjee[1]; Edward Sablosky[1]; Konstantinos Sierros[1]; [1]West Virginia University

2:45 PM Invited
Copper-carbon Nanotube Composite Based Advanced Conductors: *Kai Li*[1]; Michael McGuire[1]; Andrew Lupini[1]; Fred List[1]; Burak Ozpineci[1]; Soydan Ozcan[1]; Tolga Aytug[1]; [1]Oak Ridge National Laboratory

3:10 PM Invited
Screen Printing of Multifunctional Wearable E-Textile from Water-based Silver Conductive Inks: Bin Tian[1]; Wei Wu[1]; *Changyong Cao*[2]; [1]Whuhan University; [2]Michigan State University

3:35 PM Break

3:50 PM Invited
Revealing the Mesostructures of 3D Printed Battery with Synchrotron Coherent X-ray Scattering and Nano-tomography: Dean Yen[1]; Karol Dyro[1]; Cheng-Hung Lin[1]; Mingyuan Ge[2]; Lutz Wiegart[2]; *Yu-chen Karen Chen-Wiegart*[3]; [1]Stony Brook University; [2]Brookhaven National Laboratory; [3]Stony Brook University / Brookhaven National Laboratory

4:15 PM Invited
Laser-induced Direct-write of Conductive Graphene Patterns with Tunable Porosity on Polymers: Moataz Abdulhafez[1]; *Golnaz Tomaraei*[1]; Ki-Ho Nam[1]; Mostafa Bedewy[1]; [1]University of Pittsburgh

4:40 PM
Coaxial Core-shell Direct Ink Writing of Conductive Elastomeric Fibers: *John Burke*[1]; Derrick Banerjee[1]; Domenic Cipollone[1]; Chih-Hung Chang[2]; Han Mei[2]; Edward Sabolsky[1]; Konstantinos Sierros[1]; [1]West Virginia University; [2]Oregon State University

5:00 PM
Utilizing Direct Ink Writing to Create Applications-specific Flexible and Stretchable Solid-state Lithium Battery Arrays: *Nicholas Winch*[1]; Harrison Loh[1]; Domenic Cipollone[1]; Savan Suri[1]; Eda Aysal[1]; Derrick Banerjee[1]; Konstantinos Sierros[1]; [1]West Virginia University

---

ADVANCED MATERIALS

Refractory Metals — Alloy Development and Compositionally Complex Alloys

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

Program Organizers: Eric Taleff, University of Texas at Austin; Lauren Garrison, Oak Ridge National Laboratory; Alexander Knowles, University of Birmingham

Monday PM | February 28, 2022
252B | Anaheim Convention Center

Session Chairs: Sandy Knowles, University of Birmingham; Lesley Cornish, University of the Witwatersrand

---

2:00 PM Invited
Platinum-based Superalloys: Combating High Temperatures and Aggressive Environments: *Lesley Cornish*[1]; [1]University of the Witwatersrand

2:20 PM
Design of BCC High-entropy Alloys with Low Neutron Absorption Cross-section: *Pedro Ferreirós*[1]; Daniel King[2]; Alexander Knowles[1]; [1]University of Birmingham; [2]Imperial College London

2:40 PM
Design of MoWTaTiZr Refractory Multi-principal Element Alloys: *Gaoyuan Ouyang*[1]; Prashant Singh[1]; Jun Cui[1]; Matthew Kramer[1]; Duane Johnson[1]; [1]Ames Laboratory

3:00 PM Invited
Refractory High Entropy Alloys for Applications in Extreme Environments: *Osman El-Atwani*[1]; Hi Vo[1]; Matheus Tunes[1]; Andrew Alvarado[1]; Kevin Baldwin[1]; Koray Iroc[2]; Eda Aydogan[2]; Stuart Maloy[1]; Enrique Martinez[3]; [1]Los Alamos National Laboratory; [2]Middle East Technical University; [3]Clemson University

3:20 PM Break

3:40 PM
High-throughput Engineering of Oxidation Behavior in Complex Refectory Alloys: *Daniel Sauceda*[1]; Prashant Singh[2]; Raymundo Arroyave[1]; [1]Texas A&M University; [2]AMES Laboratory

4:00 PM
Sustainability-based Selection of Materials for Refractory High Entropy Alloys: *Xinyi Wang*[1]; Annalise Kramer[1]; Haoyang He[1]; Julie Schoenung[1]; [1]University of California, Irvine

4:20 PM
The Influence of Impurities on the Interfacial Chemistry of Niobium – Alumina High-temperature Refractories: *Michael Eusterholz*[1]; Torben Boll[1]; Alexander Kauffmann[1]; Reshma Sonkusare[1]; Tilo Zienert[2]; Dirk Endler[2]; Vincent Ott[1]; Anja Weidner[2]; Julian Gebauer[1]; Christos Aneziris[2]; Michael Stüber[1]; Martin Heilmaier[1]; Bastian Kraft[1]; [1]Karlsruhe Institute of Technology; [2]TU Bergakademie Freiberg

---

ENERGY & ENVIRONMENT

REWAS 2022: Coupling Metallurgy and Sustainability: An EPD Symposium in Honor of Diran Apelian — Sustainability Opportunities in Aluminum

Sponsored by: TMS: Recycling and Environmental Technologies Committee, TMS: Aluminum Committee

Program Organizers: Elsa Olivetti, Massachusetts Institute of Technology; Brajendra Mishra, Worcester Polytechnic Institute; Bart Blanpain, Ku Leuven; Adam Powell, Worcester Polytechnic Institute; Mertol Gökelma, Izmir Institute of Technology; Camille Fleuriault, Eramet Norway

Monday PM | February 28, 2022
204B | Anaheim Convention Center

4:15 PM Introductory Comments

4:20 PM Invited
Aluminum Roadmap to a Sustainable Future: *John Weritz*[1]; [1]The Aluminum Association

4:45 PM Invited
Increasing Secondary Alloy Usage in Aluminum Die Casting Industry: *Alan Luo*[1]; [1]Ohio State University

5:10 PM Invited
The Future of the Aluminum Industry. It's Closer Than You Think: *Robert De Saro*[1]; Sean Kelly[2]; Joe Craparo[1]; Emily Molstad[2]; [1]Energy Research Company; [2]Solvus Global

---

ENERGY & ENVIRONMENT

REWAS 2022: Plenary — REWAS 2022: Plenary Session: Developing Tomorrow's Technical Cycles

Program Organizer: Elsa Olivetti, Massachusetts Institute of Technology

Monday PM | February 28, 2022
204B | Anaheim Convention Center

Session Chairs: Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Eramet Norway

---

2:00 PM Introductory Comments

2:05 PM Invited
Life Cycle of Materials – A Personal Journey: *Diran Apelian*[1]; [1]University of California, Irvine

2:30 PM Invited
The Intersection Sustainable Manufacturing and Industrial Decarbonization: *Joe Cresko*[1]; Chukwunwike Iloeje[2]; [1]Advanced Manufacturing Office, U.S. Department of Energy; [2]Energy Systems Division, Argonne National Laboratory

2:55 PM Invited
EU and NA Perspectives on the Potential of Carbon Utilization: Business, Technology and Policy Landscape: *Frederic Clerc*[1]; Anastasios Perimenis[2]; [1]Urban Future Lab; [2]CO2 Value Europe

3:35 PM Invited
Actions of the Copper Industry towards Future Carbon Neutral Society: *Takashi Nakamura*[1]; [1]Tohoku University

4:00 PM Break

CHARACTERIZATION

Seeing is Believing -- Understanding Environmental Degradation and Mechanical Response Using Advanced Characterization Techniques: An SMD Symposium in Honor of Ian M. Robertson — Advanced Characterization I: Transmission Electron Microscopy

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Nuclear Materials Committee

Program Organizers: Kaila Bertsch, Lawrence Livermore National Laboratory; Khalid Hattar, Sandia National Laboratories; Josh Kacher, Georgia Institute of Technology; Bai Cui, University of Nebraska-Lincoln; Benjamin Eftink, Los Alamos National Laboratory; Stephen House, University of Pittsburgh; May Martin, National Institute of Standards and Technology; Kelly Nygren, Cornell High Energy Synchrotron Source; Blythe Clark, Sandia National Laboratories; Shuai Wang, Southern University of Science and Technology

Monday PM | February 28, 2022
207C | Anaheim Convention Center

Session Chairs: Stephen House, University of Pittsburgh/ECC; Khalid Hattar, Sandia National Laboratory; Kelly Nygren, Cornell University/CHESS; Blythe Clark, Sandia National Laboratory

---

2:00 PM Invited
Experiments in an Environmental Transmission Electron Microscope: Challenges And Solutions: *Renu Sharma*[1]; Wei-Chang Yang[1]; [1]National Institute of Standards and Technology

2:30 PM Invited
Seeing is Believing: Contributions of Advanced Electron Microscopy Techniques to Understanding Materials Degradation in Energy Systems: *M Grace Burke*[1]; [1]University of Manchester

---

NANOSTRUCTURED MATERIALS

Self-organizing Nano-architectured Materials — Synthesis: Diffusion-Coupled Growth

Program Organizers: Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Ian McCue, Northwestern University; Erica Lilleodden, Helmholtz-Zentrum hereon; Pierre-Antoine Geslin, CNRS / INSA-Lyon; Qing Chen, Hong Kong University of Science & Technology

Monday PM | February 28, 2022
260C | Anaheim Convention Center

Session Chairs: Ian McCue, Northwestern University; Erica Lilleodden, Helmholtz-Zentrum Hereon

---

2:00 PM Invited
Bicontinuous Structure Formation by Peritectic Melting: *Mingwang Zhong*[1]; Longhai Lai[1]; Alain Karma[1]; [1]Northeastern University

2:30 PM
Oriented Nanoporous Metal via Reduction-induced Decomposition: *Congcheng Wang*[1]; Qing Chen[1]; [1]Hong Kong University of Science & Technology

2:50 PM
Coupled Coarsening and Dissolution Kinetics during Liquid Metal Dealloying: *Longhai Lai*[1]; Bernard Gaskey[2]; Alyssa Chuang[2]; Jonah Erlebacher[2]; Alain Karma[1]; [1]Northeastern University; [2]Johns Hopkins University

3:10 PM
Nanoporous Refractory Multi-principal Element Alloy Thin Films for Higher Temperature Application Fabricated by Vacuum Thermal Dealloying: *Tibra Das Gupta*[1]; Thomas Balk[1]; [1]University of Kentucky

3:30 PM Break

3:50 PM
Powder-based Dealloying: Scalable Synthesis of Porous Refractory Alloys: *Alyssa Chuang*[1]; Ian McCue[2]; Jonah Erlebacher[1]; [1]Johns Hopkins University; [2]Johns Hopkins Applied Physics Laboratory

4:10 PM
Grain Boundary Effects in Liquid Metal Dealloying: A Phase Field Study: *Nathan Bieberdorf*[1]; Laurent Capolungo[2]; Mark Asta[1]; [1]University of California Berkeley; [2]Los Alamos National Laboratory

4:30 PM
Process-structure Relationships in Nanoporous Gold Dealloying and Sources of Its Synthesis Variability: *Stanislau Niauzorau*[1]; Aliaksandr Sharstniou[1]; Natalya Kublik[1]; Bruno Azeredo[1]; [1]Arizona State University

---

MECHANICS & STRUCTURAL RELIABILITY

Structural Metamaterials — Session II

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

Program Organizers: Amy Wat, Lawrence Livermore National Laboratory; Brad Boyce, Sandia National Laboratories; Xiaoyu Zheng, University of California, Los Angeles; Fabrizio Scarpa, University of Bristol; Robert Ritchie, University of California, Berkeley

Monday PM | February 28, 2022
304A | Anaheim Convention Center

Session Chair: To Be Announced

2:00 PM
Flexibly Tunable Yet Strong Gear-based Mechanical Metamaterials: *Peter Gumbsch*[1]; Xin Fang[2]; Jihong Wen[2]; Li Cheng[3]; Dianlong Yu[2]; Hongjia Zhang[2]; [1]Karlsruhe Institute of Technology KIT; [2]NUDT; [3]HongKong Polytechnic University

2:20 PM
A Comparison of Energy Absorption Behavior of Additively Manufactured AlSi10Mg Honeycomb, Lattice and TPMS Cellular Structures under Quasistatic Compression: *Mandar Shinde*[1]; Irving Ramirez-Chavez[1]; Daniel Anderson[1]; Jason Fait[2]; Mark Jarrett[2]; Dhruv Bhate[1]; [1]Arizona State University; [2]BAE Systems

2:40 PM
Architectured Bioinspired Alumina with a Metallic Nickel Compliant-phase: *Amy Wat*[1]; Claudio Ferraro[2]; Xu Deng[3]; Andrew Sweet[4]; Antoni Tomsia[5]; Eduardo Saiz[2]; Robert Ritchie[4]; [1]Lawrence Livermore National Laboratory; [2]Imperial College London; [3]University of Electronic Science and Technology of China; [4]University of California, Berkeley; [5]Lawrence Berkeley National Laboratory

3:00 PM
Interpenetrating Chain Lattices with Tailorable Energy Absorption in Tension: *Spencer Taylor*[1]; Zachary Cordero[1]; [1]Massachusetts Institute of Technology

3:20 PM Break

3:40 PM
Combined Effects of Heterogeneity and Length-scale on Mechanical Properties of Lattice Metamaterials: *Mujan Seif*[1]; Matthew Beck[1]; [1]University of Kentucky

4:00 PM
Machine Learning Design of Dynamic / Impact Behaviors: *Desheng Yao*[1]; [1]University of California, Los Angeles

---

NANOSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XII) — Fundamentals in Mechanical Behavior and Radiation Effects II

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Penghui Cao, University of California, Irvine; Xiaoxu Huang, Chongqing University; Enrique Lavernia, University of California, Irvine; Xiaozhou Liao, University of Sydney; Lee Semiatin, Material Resources LLC; Nobuhiro Tsuji, Kyoto University; Caizhi Zhou, University of South Carolina; Yuntian Zhu, City University of Hong Kong

Monday PM | February 28, 2022
262A | Anaheim Convention Center

Session Chairs: Khalid Hattar, Sandia National Laboratories; Michael Demkowicz, Texas A&M University; Brad Boyce, Sandia National Laboratories

---

2:00 PM Invited
Helium in Metal Composites: *Michael Demkowicz*[1]; [1]Texas A&M University

2:30 PM Invited
Comparing the Thermal, Mechanical, and Radiation Stability of Nanocrystalline Platinum-gold: *Khalid Hattar*[1]; Alejandro Barrios Santos[1]; Emily Hopkins[1]; Christopher Barr[1]; James Nathaniel[1]; Elton Chen[1]; Chongze Hu[1]; Remi Dingreville[1]; Daniel Bufford[1]; David Adams[1]; Doug Medlin[1]; Fadi Abedljawad[2]; Brad Boyce[1]; [1]Sandia National Laboratories; [2]Clemson University

3:00 PM Invited
Synergistic Thermal and Radiation Stability in Grain Boundary Doped Nanocrystalline Tungsten: William Cunningham[1]; Khalid Hattar[2]; Yuanyuan Zhu[3]; Danny Edwards[4]; *Jason Trelewicz*[1]; [1]Stony Brook University; [2]Sandia National

Laboratories; [3]University of Connecticut; [4]Pacific Northwest National Laboratory

3:30 PM Break

3:50 PM Invited
Amorphous Ceramic and Metallic Composites: Microstructure and Mechanical Properties: *Jian Wang*[1]; Binqiang Wei[1]; Wenqian Wu[1]; [1]University of Nebraska-Lincoln

4:20 PM Invited
Implications of Fatigue-crack Healing in Nanocrystalline Metals: *Brad Boyce*[1]; Christopher Barr[1]; Ta Duong[1]; Daniel Bufford[1]; Abhilash Molkeri[1]; Nathan Heckman[1]; David Adams[1]; Ankit Srivastava[1]; Khalid Hattar[1]; Michael Demkowicz[1]; [1]Sandia National Laboratories

4:50 PM Invited
A Perspective on Microstructural and Phase Evolution in Alloys during Extended Plastic Deformation: *Pascal Bellon*[1]; Robert Averback[1]; Fuzeng Ren[2]; Nirab Pant[1]; Yinon Ashkenazy[3]; [1]University of Illinois at Urbana-Champaign; [2]Southern University of Science and Technology; [3]Hebrew University of Jerusalem

5:20 PM
Microstructure Control in Metal Composites Processed by Equal Channel Angular Extrusion: *Charles Borenstein*[1]; Brady Butler[2]; James Paramore[2]; Robert Barber[1]; Zachary Levin[3]; Karl Hartwig[1]; Michael Demkowicz[1]; [1]Texas A&M; [2]US Army Research Laboratory; [3]MS-16 Group, Los Alamos National Laboratory

---

NANOSTRUCTURED MATERIALS

30 Years of Nanoindentation with the Oliver-Pharr Method and Beyond — High Temperature & Local Flow Curves

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

Program Organizers: Verena Maier-Kiener, Montanuniversitaet Leoben; Benoit Merle, University Erlangen-Nuremberg (Fau); Erik Herbert, Michigan Technological University; Samantha Lawrence, Los Alamos National Laboratory; Nigel Jennett, Coventry University

Tuesday AM | March 1, 2022
259A | Anaheim Convention Center

Session Chairs: Jeffrey Wheeler, ETH Zurich; Nathan Mara, University of Minnesota

---

8:00 AM
High-temperature Scanning Indentation: A New Technique to Assess Microstructural Changes Along Thermal Ramping: *Gabrielle Tiphéne*[1]; Paul Baral[2]; Solène Comby-Dassonneville[3]; Gaylord Guillonneau[1]; Guillaume Kermouche[4]; Jean-Michel Bergheau[1]; Warren Oliver[5]; Jean-Luc Loubet[1]; [1]Ecole centrale de Lyon, LTDS UMR CNRS 5513, France; [2]Institute of Mechanics, Materials and Civil Engineering, UCLouvain, B-1348, Louvain–la–Neuve, Belgium; [3]INSA-Lyon, MATEIS UMR CNRS 5510, 7 Avenue Jean Capelle, 69621, Villeurbanne Cedex, France; [4]Mines Saint-Etienne, UMR CNRS 5307 LGF, Centre SMS, F – 42023 Saint-Etienne, France; [5]KLA Nanomechanics Inc, Oak Ridge, USA

8:20 AM
Nanoindentation to Determine High Temperature Rate Effects in Advanced Nuclear Reactor Steels: *Moujhuri Sau*[1]; Zezhou Li[1]; Eric Hintsala[2]; Douglas Stauffer[2];

Laurent Capolungo[3]; Nathan Mara[1]; [1]University of Minnesota; [2]Bruker Nano Inc.; [3]Los Alamos National Laboratory

8:40 AM Invited
Variable Strain Rate Stress-strain Behavior Using Displacement-controlled Spherical Nanoindentation: *Jeffrey Wheeler*[1]; [1]FemtoTools AG, Furtbachstrasse 4, CH-8107 Buchs/ZH, Switzerland

9:05 AM
Nanoindentation for Reliable Assessment of Mechanical Flow Curves Under Ambient and Non-ambient Conditions: Verena Maier-Kiener[1]; Gerald Schaffar[1]; Anna Ebner[1]; *Daniel Kiener*[1]; [1]Montanuniversitaet Leoben

9:25 AM Break

9:40 AM
Measuring Stress-strain Curves of Metals by Nanoindentation with a Frustum: *Jennifer Hay*[1]; Marzyeh Moradi[1]; [1]KLA

10:00 AM
Process-structure-property-performance Relations for High-pressure Cold-sprayed Metals via Nanoindentation Stress-strain Measurements: *Bryer Sousa*[1]; Jennifer Hay[2]; Danielle Cote[1]; [1]Worcester Polytechnic Institute; [2]KLA Instruments

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture: Developing Predictive Capabilities — Reimagining Process, Material, and Component Optimization

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 1, 2022
258B | Anaheim Convention Center

Session Chair: Nima Shamsaei, Auburn University

8:00 AM Invited
Powder Oxygen Heterogeneities and Significant Intra-build Tensile Strength Variation from Common EB-PBF Ti-6Al-4V Powder Reuse Methods: Nicholas Derimow[1]; Jake Benzing[1]; Newell Moser[1]; Orion Kafka[1]; *Nik Hrabe*[1]; Priya Pathare[2]; Frank DelRio[2]; [1]National Institute of Standards and Technology; [2]Sandia National Laboratory

8:30 AM
Characterization of Additively Manufactured 17-4 PH Steel Structure with Ultrasonic Technique: *Justin Boswell*[1]; Ping-Chuan Wang[1]; Aaron Nelson[1]; Terence Costigan[2]; Robert Van Pelt[2]; [1]SUNY New Paltz; [2]Sono-Tek Corporation

8:50 AM
Fracture Behavior of Laser Powder Bed Fusion Fabricated Ti41Nb via In-situ Alloying: *Sheng Huang*[1]; Punit Kumar[1]; R. Lakshmi Narayan[2]; Wai Yee Yeong[1]; Upadrasta Ramamurty[1]; [1]Nanyang Technological University; [2]Indian Institute of Technology Delhi

9:10 AM
Compression Testing and Characterization of L-PBF Ti-5Al-5V-5Mo-3C and E-PBF Ti-6Al-4V: Paul Korinko[1]; *Mackenzie Smith*[1]; [1]Savannah River National Laboratory

9:30 AM Break

9:50 AM Invited
Rotating Bending Fatigue Behavior of EB-PBF Ti-6Al-4V with Globular Alpha Surface Layer: Nicholas Derimow[1]; *Keenan Hanson*[2]; Jake Benzing[1]; Newell Moser[1]; Orion Kafka[1]; Nik Hrabe[1]; [1]National Institute of Standards and Technology; [2]Stryker Orthopaedics

10:20 AM Invited
High-strain Rate / Shock-loading Response of AM-processed Materials: *George Gray*[1]; Saryu Fensin[1]; David Jones[1]; Dan Thoma[2]; [1]Los Alamos National Laboratory; [2]University of Wisconsin-Madison

10:50 AM Invited
Mechanical Properties of AM Deposited Metallic Components: *Jan Dzugan*[1]; Daniel Melzer[1]; Sylwia Rzepa[1]; Libor Kraus[1]; Mohsen Seifi[2]; Nima Shamsaei[3]; John Lewandowski[4]; [1]COMTES FHT; [2]ASTM International; [3]Auburn University; [4]Case Western Reserve University

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications IV — Characterization/ Modeling

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

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

Tuesday AM | March 1, 2022
261B | Anaheim Convention Center

Session Chairs: Indrajit Charit, University of Idaho; Amey Khanolkar, Idaho National Laboratory; Xiaoyuan Lou, Auburn University

---

8:00 AM Invited
Characterization and Testing of Additively Manufactured T-91 Ferritic / Martensitic Material: *Peter Hosemann*[1]; Jeffrey Bickel[1]; Calvin Lear[2]; Thomas Lienert[3]; Debroy Tarasankar[4]; Tuhin Mukherjee[4]; Osman El Atwani[2]; Stuart Maloy[2]; [1]University of California, Berkeley; [2]Los Alamos National Laboratory; [3]Optomec; [4]Penn State University

8:30 AM
Optimization, Processing and Characterization of a Crack-resistant High-gamma Prime Superalloy for Additive Manufacturing in Power Generation Applications: Ning Zhou[1]; *Stephane Forsik*[1]; Austin Dicus[1]; Tao Wang[1]; Gian Colombo[1]; Andrew Holliday[2]; Michael Kirka[3]; Alexander Lunt[4]; Mario Epler[1]; [1]Carpenter Technology Corporation; [2]Carpenter Additive; [3]Oak Ridge National Laboratory; [4]University of Bath

8:50 AM
Effect of Microstructural Features on High Temperature Strength and Ductility of Selective Laser Melted Ni-base Superalloy: *Masaki Taneike*[1]; [1]Mitsubishi Heavy

Industries, Ltd.

9:10 AM
Relating Laser Scanning Effects to Cracking and Grain Structure of High-strength Superalloys: *Marcus Lam*[1]; [1]Monash University

9:30 AM Break

9:45 AM
The Microstructure, Mechanical, and Physical Properties of Additively Manufactured 316H Stainless Steel Lattices: *Carly Romnes*[1]; Mohamed Aboukhatwa[2]; James Stubbins[1]; [1]University of Illinois at Urbana-Champaign; [2]Illinois Applied Research Institute

10:05 AM
High Substrate Heating (up to 500 degC) in Laser Powder Bed Fusion of High-strength Superalloys and Its Implications: *Marcus Lam*[1]; [1]Monash University

10:25 AM
Light on: In Situ Investigation of Structural Transformation of Additive Manufactured Aluminum Alloys Using Synchrotron Methods: *Fan Zhang*[1]; [1]National Institute of Standards and Technology

10:45 AM
Identification of Nanoparticles Dispersion Mechanism in 316L Metal Matrix Composite Additively Manufactured by Hybrid Process of Jetting and Laser Powder Bed Fusion: *Milad Ghayoor*[1]; Omid Sadeghi[1]; Bryce Cox[1]; Ryan Doyle[1]; Joshua Gess[1]; Somayeh Pasebani[1]; [1]Oregon State University

11:05 AM
Design of Graded Transition Joints between Grade 91 Ferritic/Martensitic Steel and 347 Austenitic Stainless Steels with Non-linear Composition Variation Using Integrated Computational Materials Engineering (ICME) Approach: *Rangasayee Kannan*[1]; Yousub Lee[1]; Andres Rossy[1]; Brian Jordan[1]; Edgar Lara-Curzio[1]; Peeyush Nandwana[1]; [1]Oak Ridge National Laboratory

11:25 AM
Recent Advancements in SPPARKS Metal Additive Manufacturing Simulation Capabilities: *Theron Rodgers*[1]; Robert Moore[2]; John Mitchell[1]; Jeremy Trageser[1]; Daniel Moser[1]; Fadi Abdeljawad[2]; Jonathan Madison[1]; [1]Sandia National Laboratories; [2]Clemson University

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Large-scale Metallic Components — Steels

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

Program Organizers: Sneha Prabha Narra, Carnegie Mellon University; Sougata Roy, University of North Dakota; Andrzej Nycz, Oak Ridge National Laboratory; Yousub Lee, Oak Ridge National Laboratory; Chantal Sudbrack, National Energy Technology Laboratory; Albert To, University of Pittsburgh

Tuesday AM | March 1, 2022
263A | Anaheim Convention Center

Session Chair: Sougata Roy, University of North Dakota

8:00 AM
Correlating Microstructure with Thermal Models in Wire-arc Additive Manufacturing of Mild Steel: *Mark Anderson*[1]; Jeffrey Shield[1]; Prahalada Rao[1]; Janmejay Kulkarni[2]; Alex Riensche[1]; Surya Kumar[2]; [1]University of Nebraska - Lincoln; [2]Indian Institute of Technology Hyderabad

8:20 AM
Characterization of a Large-scale 316L Body Produced with High Deposition Rate Wire Arc Directed Energy Deposition: *Luc Hagen*[1]; Zhenzhen Yu[1]; Stephen Tate[2]; Andrezj Nycz[3]; Luke Meyer[3]; Jonah Klemm-Toole[1]; [1]Colorado School of Mines; [2]EPRI; [3]Oak Ridge National Labratory

8:40 AM
Effects of Interlayer Dwell Time on Microstructure of Maraging Steel 250 Thin Walls Fabricated via Wire Arc Additive Manufacturing: *Yao Xu*[1]; Brajendra Mishra[1]; Sneha Prabha Narra[2]; [1]Worcester Polytechnic Institute; [2]Carnegie Mellon University

9:00 AM
The Effect of Preheating Substrate on the Microstructure and Mechanical Properties in Laser Deposited Martensitic Steel: *Md Mehadi Hassan*[1]; Madhavan Radhakrishnan[1]; Thomas Lienert[2]; Osman Anderoglu[1]; [1]University of New Mexico; [2]Optomec Inc.

9:20 AM Break

9:40 AM
Wire Arc Additive Manufacturing of Stainless Steels: Kinetics Modeling of Phase Transformations Using Differential Scanning Calorimetry: *Md Moniruzzaman*[1]; Ali Nasiri[2]; Amir Hadadzadeh[1]; [1]University of Memphis; [2]Dalhousie University

10:00 AM
A Comparative Study of Deformation Mechanisms in 316L Stainless Steel Fabricated by Additive and Additive + Subtractive (Hybrid) Manufacturing: *Rangasayee Kannan*[1]; Peeyush Nandwana[1]; Christopher Fancher[1]; Thomas Feldhausen[1]; [1]Oak Ridge National Laboratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Refractory Metallic Materials — Additive Manufacturing of Refractory Alloys and High Entropy Alloys

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

Program Organizers: Antonio Ramirez, Ohio State University; Jeffrey Sowards, NASA Marshall Space Flight Center; Isabella Van Rooyen, Pacific Northwest National Laboratory; Omar Mireles, NASA Marshall Space Flight Center; Eric Lass, University of Tennessee-Knoxville; Faramarz Zarandi, Raytheon Technologies; Edward Herderick, Ohio State University; Matthew Osborne, Global Advanced Metals

Tuesday AM | March 1, 2022
262C | Anaheim Convention Center

Session Chairs: Eric Lass, University of Tennessee - Knoxville ; Matt Osbourne , Global Advanced Metals; Jeffrey Sowards , Nasa - MSFC

8:00 AM
Additive Manufacturing of Refractory High Entropy Alloys: *Shahryar Mooraj*[1]; Xuesing Fan[2]; George Kim[3]; Wen Chen[1]; Peter Liaw[2]; Wei Chen[3]; [1]UMass Amherst; [2]University of Tennessee, Knoxville; [3]Illinois Institute of Technology

8:20 AM
Effect of Minor Titanium and Aluminum Addition on Ductility of Refractory High Entropy Alloy: *Surya Bijjala*[1]; Pankaj Kumar[1]; [1]University of New Mexico

8:40 AM
Mechanical Properties and Microstructural Characteristics of Additively Manufactured C103 Niobium Alloy: *Prithvi Awasthi*[1]; Priyanka Agrawal[1]; Ravi Haridas[1]; Rajiv Mishra[1]; Michael Stawovy[2]; Scott Ohm[2]; Aidin Imandoust[1]; [1]University of North Texas; [2]H.C. Starck Solutions

9:00 AM
Laser Beam Directed Energy Deposition Process Optimization for Refractory High Entropy Alloys: *Erin Barrick*[1]; Raymond Puckett[1]; Shaun Whetten[1]; Jonathan Pegues[1]; Michael Melia[1]; Remi Dingreville[1]; Sal Rodriguez[1]; Andrew Kustas[1]; [1]Sandia National Laboratories

9:20 AM Break

9:40 AM
Design and Development of 3D Printable Nb-based Alloys for High Temperature Applications: *Ishtiaq Ahmed Fazle Rabbi*[1]; Prithvi Awasthi[1]; Aidin Imandoust[1]; [1]University of North Texas

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques II — High-speed X-ray Imaging

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

Program Organizers: Fan Zhang, National Institute of Standards and Technology; Donald Brown, Los Alamos National Laboratory; Andrew Chuang, Argonne National Laboratory; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Tao Sun, University of Virginia

Tuesday AM | March 1, 2022
258A | Anaheim Convention Center

Session Chair: Tao Sun, University of Virginia

8:00 AM Invited
Utilising High-speed Synchrotron X-ray Imaging to Understand the Response of AM Alloys under Realistic Processing Conditions: *Peter Lee*[1]; Chu Lun Alex Leung[1]; Yunhui Chen[1]; Sebastian Marussi[1]; Samy Hocine[1]; Elena Ruckh[1]; Yuze Huang[1]; Maureen Fitzpatrick[1]; Marta Majkut[2]; Alexander Rack[2]; Veijo Honkimaki[2]; Robert Atwood[3]; Sam Clark[4]; Ben Saunders[5]; Martyn Jones[5]; [1]University College London; [2]European Synchrotron Radiation Facility; [3]Diamond Light Source; [4]Argonne National Laboratory; [5]Rolls-Royce plc

8:30 AM
In-situ Dynamic Synchrotron X-ray Radiography Study on the Effect of Laser Power on Melt Pool Dynamics and Solidification Kinetics during Laser Spot

Melting of Ti-6Al-4V Alloy: *Rakesh Kamath*[1]; Ryan Heldt[1]; Yuan Li[1]; Meiyue Shao[2]; Sriram Vijayan[2]; Joerg Jinschek[2]; Tao Sun[3]; Hahn Choo[1]; [1]University of Tennessee; [2]Ohio State University; [3]Argonne National Laboratory; University of Virginia

8:50 AM
Grain Morphology Prediction in AM Simulated Beta-Titanium: *Chris Jasien*[1]; Alec Saville[1]; Jonah Klemm-Toole[1]; Kamel Fezzaa[2]; Tao Sun[2]; Amy Clarke[1]; [1]Colorado School of Mines; [2]Advanced Photon Source, Argonne National Laboratory

9:10 AM
Comparison of Benefits and Limitations of High Temporal Versus Low Temporal Resolution of In Situ In Operando AM Imaging of Superalloys: *Maureen Fitzpatrick*[1]; Yunhui Chen[1]; Marta Majkut[2]; Bratislav Lukic[2]; Kudakwashe Jakata[2]; Sebastian Marussi[1]; Alexander Rack[2]; Peter Lee[1]; [1]UCL; [2]ESRF

9:30 AM Break

9:45 AM
Characterization of the Healability of Aluminium Alloys Produced by Laser Powder Bed Fusion (L-PBF) Using X-ray Nanoholotomography at Synchrotron (ESRF): *Julie Gheysen*[1]; Mariia Arseenko[1]; Grzegorz Pyka[1]; Florent Hannard[1]; Julie Villanova[2]; Aude Simar[1]; [1]UCLouvain; [2]ESRF

10:05 AM
Building Links between Laser Melting Phenomena Observed with In Situ X-ray Imaging and Laboratory-based Process Monitor: *Nicholas Calta*[1]; Aiden Martin[2]; Jenny Wang[2]; Jean Baptiste Forien[2]; Maria Strantza[2]; Manyalibo Matthews[2]; [1]Lawrence Livermore National Laboratory; [2]Lawrence Livermore National Lab

10:25 AM Invited
Melt Pool Oscillations at Keyhole Transition as a Precursor to Pore-generating Turbulence: *Brian Simonds*[1]; Tao Sun[2]; Saad Khairallah[3]; [1]National Institute of Standards and Technology; [2]University of Virginia; [3]Lawrence Livermore National Laboratory

10:55 AM
Pairing X-ray Synchrotron Imaging, In-situ Absorption Measurements, Thermal Modeling, and Post-mortem Metallography Towards the Understanding of the Solidification Microstructures in Ti-6Al-4V for Additive Manufacturing Applications: *Nicholas Derimow*[1]; Edwin Schwalbach[2]; Jake Benzing[1]; Alexandria Artusio-Glimpse[1]; Nikolas Hrabe[1]; Brian Simonds[1]; [1]National Institute of Standards and Technology; [2]Air Force Research Laboratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Beyond the Beam III — Cold Spray

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

Program Organizers: Brady Butler, US Army Research Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory; James Paramore, US Army Research Laboratory; Nihan Tuncer, Desktop Metal; Markus Chmielus, University of Pittsburgh; Paul Prichard, Kennametal Inc.

Tuesday AM | March 1, 2022
263B | Anaheim Convention Center

Session Chairs: Zach Levin, Los Alamos National Laboratory; Brady Butler, DEVCOM ARL

8:00 AM Introductory Comments

8:10 AM
Effect of Laser Heating on Microstructure and Deposition Properties of Cold Sprayed SS304L: *Christopher Roper*[1]; Anita Heczel[1]; Venkata Satish Bhattiprolu[2]; Jeno Gubicza[3]; Tamas Kolonits[3]; Luke Brewer[1]; [1]The University of Alabama; [2]South Dakota School of Mines and Technology; [3]Eötvös Loránd University

8:30 AM
Mesoscale Simulation of Cold Spray Microstructure Formation: *Theron Rodgers*[1]; Jacob Mahaffey[1]; [1]Sandia National Laboratories

8:50 AM
Influence of Hydrogen Content and Particle Size Distribution on the Microstructure of Tantalum Cold Spray Coatings: Kliah Soto Leytan[1]; Mahsa Amiri[1]; Lorenzo Valdevit[1]; *Daniel Mumm*[1]; [1]University of California, Irvine

9:10 AM
Practical Considerations for Complex Path Planning for Cold Spray Additive Manufacturing: *Christopher Massar*[1]; [1]Worcester Polytechnic Institute

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development IV: Rapid Development — High Temperature Alloys

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering 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 1, 2022
261A | Anaheim Convention Center

Session Chair: James Saal, Citrine Informatics

8:00 AM
Composition-dependence of the Microstructural and Mechanical Properties of Co-Cr-Fe-Ni Multicomponent Alloys Fabricated by Directed Energy Deposition: *Daniel Salas Mula*[1]; Ryan Saucier[1]; Tanner Kirk[1]; Sezer Picak[1]; Michael Elverud[1]; Raymundo Arróyave[1]; Ibrahim Karaman[1]; [1]Texas A&M University

8:20 AM
Development of Metal-ceramic Hybrid Structure Using Additive Manufacturing Technology: *Hyun-Gil Kim*[1]; Sung Chan Yoo[1]; [1]KAERI

8:40 AM
3D Printing of Ni-based Superalloys: Influence of Composition on Processability and Performance: *Joseph Ghoussoub*[1]; Yuanbo Tang[1]; Roger Reed[1]; [1]University of Oxford

9:00 AM
Additively Manufactured 718 Ni Alloys with Oxide Nanoparticles: *Benjamin Stegman*[1]; Bo Yang[1]; Zhongxia Shang[1]; Jie Ding[1]; Tianyi Sun[1]; Jack Lopez[2]; William Jarosinski[2]; Haiyan Wang[1]; Xinghang Zhang[1]; [1]Purdue University; [2]Praxair Surface

Technologies Inc.

9:20 AM Break

9:35 AM
Applications of a Subspace-inclusive Sampling Method for the Computational Design of Compositionally Graded Alloys: *Marshall Allen*[1]; Raymundo Arroyave[1]; Richard Malak[1]; [1]Texas A&M University

9:55 AM
Behavior of Coated Particles in Directed Energy Deposition: Sen Jiang[1]; *Baolong Zheng*[1]; David Svetlizky[2]; Yizhang Zhou[1]; Lorenzo Valdevit[1]; Noam Eliaz[2]; Enrique Lavernia[3]; Julie Schoenung[1]; [1]University of California Irvine; [2]Tel-Aviv University; [3]National Academy of Engineering

---

NUCLEAR MATERIALS

Advanced Characterization and Modeling of Nuclear Fuels: Microstructure, Thermo-physical Properties — Nuclear Fuels Microstructure-Experimental

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

Program Organizers: David Frazer, Idaho National Laboratory; Fabiola Cappia, Idaho National Laboratory; Tsvetoslav Pavlov, Idaho National Laboratory; Peter Hosemann, University of California

Tuesday AM | March 1, 2022
202B | Anaheim Convention Center

Session Chair: Fabiola Cappia, Idaho National Laboratory

8:00 AM Invited
Pulsed Neutron Characterization of Irradiated Fuels at LANSCE: *Sven Vogel*[1]; Thilo Balke[1]; Charles A. Bouman[2]; Luca Capriotti[3]; Jason M. Harp[4]; Alexander M. Long[1]; Danielle C. Schaper[1]; Anton S. Tremsin[5]; Brendt E. Wohlberg[1]; Eric J. Larson[1]; Aaron E. Craft[3]; Brian J. Gross[3]; D. Travis Carver[1]; James R. Angell[3]; Vedant K. Mehta[1]; [1]Los Alamos National Laboratory; [2]Purdue University; [3]Idaho National Laboratory; [4]Oak Ridge National Laboratory; [5]University of California Berkeley

8:30 AM
On the Phases Observed in Irradiated U-19Pu-14Zr Fuels: *Assel Aitkaliyeva*[1]; Thaddeus Rahn[1]; Karen Wright[2]; Luca Capriotti[2]; [1]University of Florida; [2]Idaho National Laboratory

8:50 AM
Perspectives on Synchrotron Micro-computed Tomography and Serial Sectioning Applied to Metallic Nuclear Fuels: *Maria Okuniewski*[1]; Alejandro Figueroa Bengoa[1]; Jonova Thomas[2]; [1]Purdue University; [2]Argonne National Laboratory

9:10 AM
Thermophysical Properties of Liquid Chlorides from 600-1600 K: *Stephen Parker*[1]; [1]Los Alamos National Laboratory

---

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling

Deformation — Session III

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

Program Organizers: Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; Olivia Underwood Jackson, Sandia National Laboratories

Tuesday AM | March 1, 2022
207A | Anaheim Convention Center

Session Chairs: Michael Tonks, University Of Florida; Rodney McCabe, Los Alamos National Laboratory

---

8:00 AM Invited
A 3D Microstructure Evaluation Tool for Interface Statistics: An Application to Deformation Twins: *Rodney McCabe*[1]; Patrick Pinney[1]; Renuka Gogusetti[1]; M Arul Kumar[1]; Carlos Tomé[1]; Laurent Capolungo[1]; [1]Los Alamos National Laboratory

8:30 AM
Martensitic Transformation-mediated Twin Nucleation in Hexagonal Close Packed Metals: *Lei Cao*[1]; Amir Hassan Zahiri[1]; Jamie Ombogo[1]; [1]University of Nevada

8:50 AM
Investigation of Grain Size Effects on Cyclic Deformation and Twinning in Magnesium Alloys by High Energy X-ray Diffraction: *Duncan Greeley*[1]; Mohammadreza Yaghoobi[1]; Katherine Shanks[2]; Darren Pagan[2]; Veera Sundararaghavan[1]; John Allison[1]; [1]University of Michigan; [2]Cornell High Energy Synchrotron Source

9:10 AM
Statistical Analysis of Forward and Lateral Transmission of Twins Across Grain Boundaries in HCP Magnesium: *Mariyappan Arul Kumar*[1]; Rodney McCabe[1]; Laurent Capolungo[1]; Carlos Tome[1]; [1]Los Alamos National Laboratory

9:30 AM Break

9:45 AM Invited
Considering the Impact of Anisotropy on Microcracking in Brittle Materials Using the Phase Field Fracture Model: *Michael Tonks*[1]; Shuaifang Zhang[2]; Aashique Rezwan[3]; Andrea Jokisaari[4]; Wen Jiang[4]; [1]University of Florida; [2]Oak Ridge National Laboratory; [3]University of Wisconsin-Madison; [4]Idaho National Laboratory

10:15 AM
On the Correlation between Plastic Strain and Misorientation in Polycrystalline Body-centered-cubic Titanium Alloys: An Experimentally and Numerically Study: Vahid Khademi[1]; Thomas Bieler[1]; Masahiko Ikeda[2]; *Carl Boehlert*[1]; [1]Michigan State University; [2]Kansai University

10:35 AM
The Effects of Precipitates on Twinning in Mg Alloys: *Brandon Leu*[1]; M Arul Kumar[2]; Kelvin Xie[3]; Irene Beyerlein[1]; [1]University of California, Santa Barbara; [2]Los Alamos National Laboratory; [3]Texas A&M University

10:55 AM
Experimental Characterization and Explicit Slip Band Micromechanical Modeling of Slip Localization in FCC and HCP Metals: *Behnam Ahmadikia*[1]; Jean Charles Stinville[1]; Tresa Pollock[1]; Irene Beyerlein[1]; [1]University Of California Santa Barbara

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage 2022 — Energy Storage with Battery

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

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

Tuesday AM | March 1, 2022
212B | Anaheim Convention Center

Session Chairs: Sarbajit Banerjee, Texas A&M University; Partha Mukherjee, Purdue Univeristy

---

8:00 AM Invited
Engineering Phase Transformations in Intercalation Materials: *Ananya Renuka Balakrishna*[1]; [1]University of Southern California

8:25 AM
Chemo-mechanics of Alkali-ion Intercalation into Iron Phosphate Composite Cathodes: Omer Ozgur Capraz[1]; *Bertan Ozdogru*[1]; [1]Oklahoma State University

8:45 AM
Computational Investigations of the Structure and Interface Stability of the Solid Electrolyte Material Li4PS4I: *Ahmad Al-Qawasmeh*[1]; El Mostafa Benchafia[1]; Sufian Abedrabbo[1]; [1]Khakifa University

9:05 AM
First Principles Studies on Doping Effect of Ni-rich Cathode Material: *Zhou Xiangyuan*[1]; [1]Central South University

9:25 AM Break

9:45 AM
AI BMS Design with Sensor and ML Integration: *Alexey Serov*[1]; [1]Purdue University

---

CHARACTERIZATION

Advanced Real Time Imaging — Alloys, Ceramics, and Additive Manufacturing

Sponsored by: 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 Engergy Technology Laboratory; David Alman, National Energy Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki Shibata, 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; Pranjal Nautiyal, University of Pennsylvania

Tuesday AM | March 1, 2022
206A | Anaheim Convention Center

Session Chair: Wangzhong Mu, Kth Royal Institute of Technology

---

8:00 AM
In-situ Observation of Phase Transformations in Co-based Dual Phase Entropic Alloys Using High Temperature Confocal Laser Scanning Microscopy: *Wangzhong Mu*[1]; Wei Wang[2]; Ziyong Hou[3]; Sohei Sukenaga[4]; Hiroyuki Shibata[4]; Henrik Larsson[1]; Huahai Mao[1]; [1]KTH Royal Institute of Technology; [2]Northeast Electric Power University; [3]International Joint Laboratory for Light Alloys (MOE), College of Materials Science and Engineering & Shenyang National Laboratory for Materials Science, Chongqing University; [4]Institute of Multidisciplinary Research for Advanced Materials, Tohoku University

8:20 AM
Assessing the Evolution of Pit Growth Kinetics during Atmospheric Corrosion Using In-situ X-ray Tomography: *Philip Noell*[1]; Eric Schindelholz[2]; Michael Melia[1]; Ian Campbell[1]; [1]Sandia National Laboratories; [2]The Ohio State University

8:40 AM
In-situ X-ray Imaging of Melt Flow and Melt Pool Variation during Laser Metal Additive Manufacturing Process: *Qilin Guo*[1]; Cang Zhao[2]; Minglei Qu[1]; Lianghua Xiong[3]; Luis I. Escano[1]; S. Mohammad H. Hojjatzadeh[1]; Niranjan D. Parab[2]; Kamel Fezzaa[2]; Wes Evehart[4]; Tao Sun[2]; Lianyi Chen[1]; [1]University Of Wisconsin Madison; [2]Argonne National Laboratory; [3]Missouri S&T; [4]Department of Energy's Kansas City National Security Campus Managed by Honeywell FM&T

9:00 AM
Two-color Pyrometry as a Defect Predictor in the Additive Manufacturing of 316L Stainless Steel: *Mary Arnhart*[1]; Andrew Polonsky[1]; Thomas Ivanoff[1]; John Mitchell[1]; Bradley Jared[1]; Daryl Dagel[2]; Jonathan Madison[1]; [1]Sandia National Laboratories; [2]Ball Aerospace & Technlogies Corporation

9:20 AM Break

9:40 AM
Visualizing the Path of Corroding Mg Alloys Using High Phase Contrast X-ray Computed Tomography: *Chi Zhang*[1]; Junsheng Wang[1]; Chen Liu[2]; Keli Liu[1]; Guangyuan Tian[1]; Xin Li[1]; [1]Beijing Institute of Technology; [2]Ningbo Branch of Chinese Academy of Ordnance Science

---

NANOSTRUCTURED MATERIALS

Advances and Discoveries in Non-equilibrium Driven Nanomaterials and Thin Films — Advances inThin Film Oxides II

Sponsored by: TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Ritesh Sachan, Oklahoma State University; Amit Pandey, Lockheed Martin Space; Saurabh Puri, Microstructure Engineering; Amber Srivastava, Indian Institute of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology

Tuesday AM | March 1, 2022
259B | Anaheim Convention Center

Session Chair: Amber Srivastava, IIT-B

8:00 AM Invited
ALD Deposited Functional Hetero-nano Structured Ceria Films: *Sudipta Seal*[1]; Udit Kumar[1]; Corbin Feit[1]; S. Novia Berriel[1]; Ayush Arunachalam[1]; Kanad Basu[1]; Parag Banerjee[1]; [1]University of Central Florida

8:30 AM
Effect of Saturated Gas Species on the Binding Interaction between Nanobubbles and Nanoparticles: *Ao Li*[1]; James Earthman[1]; [1]University of California-Irvine

8:55 AM
3D Heterostructures via Mechanochemical Reshuffling of Layered and Non-layered Metal Chalcogenides: *Viktor Balema*[1]; [1]ProChem Inc. Rockford IL USA

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: 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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Tuesday AM | March 1, 2022
251B | Anaheim Convention Center

Session Chairs: Chelsey Hargather, New Mexico Institute of Mining and Technology; Seungha Shin, University of Tennessee

---

8:00 AM
First-principles-based High-throughput Prediction of the Phase Stability of Refractory Complex Concentrated Alloys: *Zhaohan Zhang*[1]; Mu Li[1]; John Cavin[1]; Katharine Flores[1]; Rohan Mishra[1]; [1]Washington University in St.Louis

8:20 AM Invited
First-principles Exploration of Diffusion Activation Energy in CoCrNi and CoCrFeNiMn High-entropy Alloys, with Comparison to Creep Activation Energy: Christopher Lafferty[1]; *Chelsey Hargather*[1]; [1]New Mexico Institute of Mining and Technology

8:40 AM Invited
Experimental, Theoretical, and Numerical Study for Dynamic Strain Aging in HfNbTaTiZr High-entropy Alloys: *Yooseob Song*[1]; Weidong Li[2]; Shuying Chen[3]; Ko-Kai Tseng[4]; Jien-Wei Yeh[4]; Peter K. Liaw[2]; [1]University of Texas Rio Grande Valley; [2]The University of Tennessee, Knoxville; [3]Yantai University; [4]National Tsing Hua University

9:00 AM Invited
Multiscale Dynamics of the Oxide Scale in High-entropy Alloys: *Indranil Roy*[1]; Jhalak[2]; Ganesh Balasubramanian[1]; Pratik Ray[2]; [1]Lehigh University; [2]Indian Institute of Technology Ropar

9:20 AM Break

9:40 AM Invited
Developing Interatomic Potentials for High Entropy Alloys: *Diana Farkas*[1]; Alfredo Caro[2]; [1]Virginia Polytechnic Institute; [2]George Washington University

10:00 AM
Atomistic Modeling of Vacancy Concentration and Tracer Diffusion in Ni-CoCrFeMn Alloys: *Daniel Utt*[1]; Karsten Albe[1]; [1]Technische Universität Darmstadt

10:20 AM Invited
Computational Study of Thermodynamic and Thermoelectric Properties of Al-Co-Cr-Fe-Ni and Al-Cu-Fe-Mn-Ni High-entropy Alloys: Md Abdullah Al Hasan[1]; *Seungha Shin*[1]; Xuesong Fan[1]; Peter Liaw[1]; Dustin Gilbert[1]; [1]University of Tennessee

---

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; Kathy Lu, Virginia Polytechnic Institute and State University; Faqin Dong, Southwest University of Science and Technology; Jinhong Li, China University of Geosciences; Eugene Olevsky, San Diego State University; Ruigang Wang, The University of Alabama; Dipankar Ghosh, Old Dominion University

Tuesday AM | March 1, 2022
213C | Anaheim Convention Center

Session Chairs: Eugene Olevsky, San Diego State University; Faqin Dong, Southwest University of Science and Technology

---

8:00 AM Invited
Tailored and Bioinspired Porous Ceramics from Extrinsically-controlled Freeze Casting: *Steven Naleway*[1]; Debora Lyn Porter[1]; Josh Fernquist[1]; Tony Yin[1]; Josh Alexander[1]; Max Mroz[1]; [1]University of Utah

8:20 AM
Atomistic Modeling of the Effect of External Electric Field on Diffusivity and Flash Sintering of 8YSZ: *Wenwu Xu*[1]; Md. Shahrier Hasan[1]; Eugene Olevsky[1]; [1]San Diego State University

8:40 AM
Consolidation of Cemented Tungsten Carbide with FeNiZr Binder via Tandem Field Assisted Sintering and Hot Isostatic Pressing: *Sean Fudger*[1]; Thomas Luckenbaugh[1]; B. Chad Hornbuckle[1]; Anit Giri[1]; Kris Darling[1]; [1]DEVCOM - Army Research Laboratory

9:00 AM
Effect of Copper Doping on the Thermal Stability of Mayenite Electride: Liam Fisher[1]; *Kaka Ma*[1]; [1]Colorado State University

9:20 AM
Rapid Synthesis of Zirconia-ceria Mixed Oxides by Flash Sintering: *Rubens Ingraci*[1]; Darrin Byler[1]; Kenneth McClellan[1]; Erofili Kardoulaki[1]; [1]Los Alamos National Laboratory

9:40 AM Break

9:55 AM
Multiscale Phase Homogeneity in Bulk (CoCuMgNiZn)O High Entropy Oxides: *Alexander Dupuy*[1]; Mohammed Reda Chellali[2]; Xin Wang[1]; Horst Hahn[2]; Julie Schoenung[1]; [1]University of California, Irvine; [2]Karlsruhe Institute of Technology

10:15 AM
Kinetic Investigations of Phase Formation Processes in the Ba(Ca,Sr)O-Al2O3-ZrO2 System: *Nickolai Iliukha*[1]; [1]Kyiv University

10:35 AM
Containerless Processing and Characterization of Potential Host Crystals for Photorefractive Devices: *Elizabeth Hodges*[1]; Michael Sansoucie[2]; Robert Hyers[1]; [1]University of Massachusetts-Amherst; [2]NASA

10:55 AM
Microstructures and Mechanical Properties of á-SiC Ceramics after High-temperature Laser Shock Peening: *Fei Wang*[1]; Xin Chen[2]; Daniel DeLellis[3]; Amanda Krause[3]; Yongfeng Lu[4]; Bai Cui[4]; [1]University of Nebraska Lincoln; [2]University of Nebraska-Lincoln; [3]University of Florida; [4]University of Nebraska–Lincoln,

---

MATERIALS DESIGN

Advances in Titanium Technology — Phase Tranformation in Ti Alloys

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

Program Organizers: Yufeng Zheng, University of Nevada-Reno; Zachary Kloenne, Ohio State University; Fan Sun, PSL Research University; Stoichko Antonov, National Energy Technology Laboratory; Rongpei Shi, Lawrence Livermore National Laboratory

Tuesday AM | March 1, 2022
252A | Anaheim Convention Center

Session Chair: Stoichko Antonov, Max-Planck-Institut für Eisenforschung GmbH

8:00 AM
Role of Defects in Alpha Precipitation in Metastable Beta Ti-5Al-5Mo-5V-3Cr Alloy: Dian Li[1]; Wenrui Zhao[1]; Stoichko Antonov[2]; *Yufeng Zheng*[1]; [1]University of Nevada-Reno; [2]Max-Planck-Institut für Eisenforschung

8:20 AM
β-titanium bcc-superalloys with Reinforcement by β' Ordered bcc TiFe Precipitates: *Paraic O'Kelly*[1]; Alexander Knowles[1]; [1]University of Birmingham

8:40 AM
Exploring Sub-stoichiometric Titanium Hydride Phase Space via Vacuum Hydrogen Annealing, X-ray Diffraction, and Combined Thermogravimetric Analysis/Mass Spectroscopy: *Chad Macziewski*[1]; Daniel Bufford[1]; [1]Sandia National Laboratories

9:00 AM
Local Distortion Effects on the Dynamic Lattice Stability in the BCC Phase of Titanium and Its Alloys: An Ab-initio Study: *Sri Ranga Jai Likith*[1]; Benjamin Ellyson[1]; Amy Clarke[1]; [1]Colorado School of Mines

9:20 AM
Monte Carlo Simulations for Texture-controlled Grain Growth during Beta-annealing of Ti-6Al-4V: Denielle Ricciardi[1]; Nate Levkulich[1]; Lee Semiatin[1]; *Eric Payton*[1]; [1]Air Force Research Laboratory

---

MATERIALS DESIGN

AI/Data Informatics: Computational Model Development, Validation, and Uncertainty Quantification — Image Characterization

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Dennis Dimiduk, BlueQuartz Software LLC; Darren Pagan, Pennsylvania State University; Anthony Rollett, Carnegie Mellon University; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory

Tuesday AM | March 1, 2022
256A | Anaheim Convention Center

Session Chair: Marat Latypov, University of Arizona

8:00 AM Invited
Physics-informed Data-driven Surrogate Modeling for Advancing Experiments and the Study of Novel Materials: *Anup Pandey*[1]; Reeju Pokharel[1]; [1]Los Alamos National Laboratory

8:30 AM
Learning from 2D: Data-driven Model Predicting Bulk Properties Based on 2D Microstructure Sections: *Marat Latypov*[1]; [1]University of Arizona

8:50 AM
Investigation of Microstructure Image Segmentation via Deep Learning with Limited Data Annotations: Bo Lei[1]; *Elizabeth Holm*[1]; [1]Carnegie Mellon University

9:10 AM
Synthesizing Realistic Images of Material Microstructures Using Convolutional Neural Networks: Stephen Baek[1]; H.S. Udaykumar[2]; WaiChing Sun[3]; *Phong Nguyen*[1]; [1]University of Virginia; [2]University of Iowa; [3]Columbia University

9:30 AM Break

9:50 AM
Density-based Monte Carlo Consensus Clustering (DMC3) for Feature Extraction from Atom Probe Tomographs: *Evan Still*[1]; Daniel Schrieber[2]; Peter Hosemann[1]; [1]University of California Berkeley; [2]Pacific Northwest National Laboratory

10:10 AM
Deep Learning-based Algorithms for X-ray Microtomography Analysis: Unravelling Challenges for 4D Experiments: *Hamidreza T-Sarraf*[1]; Hanyu Zhu[1]; Swapnil Morankar[1]; Amey Luktuke[1]; Sridhar Niverty[1]; Nikhilesh Chawla[1]; [1]Purdue University

---

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Interatomic Potentials and Their Applications

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; Garritt Tucker, Colorado School of Mines; Ebrahim Asadi, University of Memphis; Bryan Wong, University of California, Riverside; Sam Reeve, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Adrian Sabau, Oak Ridge National Laboratory

Tuesday AM | March 1, 2022
253A | Anaheim Convention Center

Session Chairs: Mikhail Mendelev, KBR, Inc./NASA Ames Research Center; Garritt Tucker, Colorado School of Mines

---

8:00 AM Invited
Addressing Variability in Atomistic Predictions: *Lucas Hale*[1]; [1]National Institute of Standards and Technology

8:30 AM
A Generalization of the Universal Equation of States to Develop Magnetic Interatomic Potentials: *Isaac Toda-Caraballo*[1]; Jan Wróbel[2]; Duc Nguyen-Manh[3]; [1]CENIM-CSIC; [2]Warsaw University of Technology; [3]Culham Centre for Fusion Energy, United Kingdom Atomic Energy Authority

8:50 AM Invited
An Entropy-maximization Approach for the Generation of Training Sets for Machine-learned Potentials: Joshua Brown[1]; Mariia Karabin[2]; *Danny Perez*[1]; [1]Los Alamos National Laboratory; [2]Oak Ridge National Laboratory

9:20 AM Break

9:40 AM
Interatomic Potentials for Materials Science and Beyond; Advances in Machine Learned Spectral Neighborhood Analysis Potentials: *Mitchell Wood*[1]; Mary Alice Cusentino[1]; Ivan Oleynik[2]; Aidan Thompson[1]; [1]Sandia National Laboratories; [2]University of South Florida

10:00 AM
Refinements to the Production of Machine Learning Interatomic Potentials: *Jared Stimac*[1]; Jeremy Mason[1]; [1]University of California, Davis

---

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications X — Session III and IV

Sponsored by: TMS Structural Materials Division, TMS Functional 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; Takao Mori, National Institute For Materials Science; Alexandra Zevalkink, Michigan State University; Wan-Ting Chiu, Tokyo Institute of Technology; Pai-chun Wei, National Taiwan University

Tuesday AM | March 1, 2022
303D | Anaheim Convention Center

Session Chairs: Yoshisato Kimura, Tokyo Institute of Technology; Philippe Jund, Montpellier University

---

8:00 AM Invited
Electronic and Phononic Features for High Thermoelectric Performance in Half-Heusler Materials: *David Singh*[1]; Zhenzhen Feng[2]; [1]University of Missouri; [2]Henan University

8:20 AM
Ultra-high Solubility of Al and Enhanced Thermopower in $Fe2VAl_{1+x}$: *Michael Parzer*[1]; Fabian Garmroudi[1]; Alexander Riss[1]; Takao Mori[2]; Ernst Bauer[1]; [1]TU Wien; [2]National Institute of Materials Science

8:40 AM
High-throughput Transport Property Measurements of Additively Manufactured Thermoelectric Materials: *Dylan Kirsch*[1]; Vijayabarathi Ponnambalam[2]; Joshua Martin[1]; Connor Headley[3]; Saniya LeBlanc[2]; Prasanna Balachandran[3]; Ji Ma[3]; [1]National Institute of Standards and Technology; [2]George Washington University; [3]University of Virginia

9:00 AM Invited
The Role of Additive Manufacturing in Tailoring Thermoelectric Leg Shape and Transport Properties: *Saniya Leblanc*[1]; Bengisu Sisik[1]; Ryan Welch[1]; Yahya Oztan[1]; Vijayabarathi Ponnambalam[1]; [1]George Washington University

---

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Solidification Microstructure and Processing

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

Program Organizers: Andre Phillion, McMaster University; Dmitry Eskin, Brunel University

Tuesday AM | March 1, 2022
208B | Anaheim Convention Center

Session Chair: Jiawei Mi, University of Hull

8:00 AM
Understanding Pre-solidified Grains in Structural Castings of Nemalloy HE700 Experiments: *Talha Aziz*[1]; Andre Phillion[1]; Sumanth Shankar[1]; Kumar Sadayappan[2]; [1]McMaster University; [2]CanmetMaterials

8:25 AM
High Speed Observations of Ultrasonic Fragmentation and De-agglomeration Process of Free-floating Intermetallics and Oxide Particles: *Abhinav Priyadarshi*[1]; Tungky Subroto[2]; Koulis Pericleous[3]; Dmitry Eskin[2]; John Durodola[1]; Iakovos Tzanakis[1]; [1]Oxford Brookes University; [2]Brunel University London; [3]University of Greenwich

8:50 AM Invited
Machine Learning Enhanced Synchrotron X-ray Tomography Analysis of the Convoluted 3D Fe-rich Intermetallic Phases in a Recycled Al Alloy: *Zhiguo Zhang*[1]; Ling Qin[1]; Jiawei Mi[1]; [1]University of Hull

9:15 AM Break

9:30 AM
Al-Mg2Si-Mg Alloys: Microstructure and Mechanical Properties from High Pressure Die Casting to Additive Manufacturing: Hailin Yang[1]; Jianying Wang[1]; Xixi Dong[2]; Shouxun Ji[2]; *Eric Nyberg*[3]; [1]Central South University; [2]Brunel University London; [3]Kaiser Aluminum Trentwood

9:55 AM
Phase Transformation and Microstructure Evolution of Al-Mn Alloy Made by Laser Additive Manufacturing: *Qingyu Pan*[1]; Monica Kapoor[2]; Sean Mileski[2]; John Carsley[2]; Xiaoyuan Lou[1]; [1]Auburn University; [2]Novelis Global Research and Technology Center

10:20 AM
Growth Morphology of Nodular Primary Silicon in Hypereutectic Al-Si Alloy and Growth Mechanism: *Ruyao Wang*[1]; Weihua Lu[1]; [1]Institute of Materials Science and Engineering, Donghua University,

---

LIGHT METALS

Aluminum Reduction Technology Joint Session with REWAS: Decarbonizing the Metals Industry — Sustainability Joint Session with REWAS

Sponsored by: TMS: Recycling and Environmental Technologies Committee, TMS: Aluminum Committee

Program Organizers: Mertol Gökelma, Izmir Institute of Technology; Stephan Broek, Boston Metal

Tuesday AM | March 1, 2022
210C | Anaheim Convention Center

Session Chair: Stephan Broek, Hatch

8:00 AM Introductory Comments

8:05 AM
Cooling of Pot Gas Enabling Carbon Footprint Reductions: *Anders Sorhuus*[1]; Håvard Olsen[1]; Mikkel Sørum[1]; Guillaume Girault[2]; [1]REEL Norway AS; [2]REEL

8:25 AM
Bus Bars FSW Repair during Full Operation of Alumina Electrolysis: *Peter Brziak*[1]; Gabriel Batista[1]; Oliver Rovný[1]; Vojtech Václav[1]; Rastislav Dankoviè[1]; [1]Welding Research Institute

8:45 AM
Stabilizing Electrolysis Cells with Oscillating Currents: Amplitude, Frequency and Current Efficiency: *Ibrahim Mohammad*[1]; Marc Dupuis[2]; Paul Funkenbusch[1]; Douglas Kelley[1]; [1]University of Rochester; [2]GeniSim Inc.

BIOMATERIALS

Biological Materials Science — Biological Materials Science III

Sponsored by: TMS Functional 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; Hannes Schniepp, William & Mary

Tuesday AM | March 1, 2022
201B | Anaheim Convention Center

Session Chairs: Jing Du, Penn State University; Ning Zhang, The University of Alabama

---

8:00 AM
Use of Freeze-casted Fluorohydroxyapatite as an Osteogenic Bone Substitute: *Anthony Yin*[1]; Sujee Jeyapalina[2]; Steven Naleway[1]; [1]Department of Mechanical Engineering, University of Utah; [2]Department of Surgery, University of Utah Health

8:20 AM
Nanomechanical Mapping in Bone Using Atomic Force Microscopy: Yichun Tang[1]; Yuxiao Zhou[1]; *Jing Du*[1]; [1]Penn State University

8:40 AM
Freeze-cast Ceramic Membranes for Pathogen Capture and Bio-processing: *Katherine Faber*[1]; Orland Bateman[1]; Noriaki Arai[1]; Laura Quinn[1]; Julia Kornfield[1]; Mamadou Diallo[1]; [1]California Institute of Technology

9:00 AM
Curcumin Loaded Zinc – Fluorine Doped Hydroxyapatite for Osteoblast Growth, Osteosarcoma Inhibition, and Antibacterial Properties: *Arjak Bhattacharjee*[1]; Amit Bandyopadhyay[1]; Susmita Bose[1]; [1]W. M. Keck Biomedical Materials Research Lab,Washington State University

---

BIOMATERIALS

BioNano Interfaces and Engineering Applications — Bionano Interfaces & Engineering Applications I

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

Program Organizers: Candan Tamerler, University of Kansas; Hendrik Heinz, University of Colorado Boulder; Kalpana Katti, North Dakota State University; Terry Lowe, Colorado School of Mines; Po-Yu Chen, National Tsing Hua University

Tuesday AM | March 1, 2022
201A | Anaheim Convention Center

Session Chair: To Be Announced

8:00 AM Keynote
3D Printing for Bone Regeneration: Convergence of Knowledge: *Susmita Bose*[1]; [1]Washington State University

8:40 AM Invited
Self-assembling Nanoclay Gels for Tissue Regeneration: *Jon Dawson*[1]; [1]University of Southampton

9:10 AM
In vitro Pre-osteoblast Cell Differentiation by Luminescent Hydroxyapatite: *Fabian Martinez*[1]; Karla Juárez-Moreno[2]; Manuel Herrera[2]; Olivia Graeve[1]; [1]University of California San Diego; [2]Universidad Nacional Autónoma de México

9:30 AM Break

9:50 AM
Sensing of COVID-19 Antibodies and Antigens in Seconds via Aerosol Jet Nanoprinted Reduced Graphene Oxide Coated Three Dimensional Electrodes: *Md. Azahar Ali*[1]; Chunshan Hu[1]; Sanjida Jahan[1]; Bin Yuan[1]; Mohammad Sadeq Saleh[1]; Fei Zhang[2]; Shou-Jiang Gao[2]; Rahul Panat[1]; [1]Carnegie Mellon University; [2]University of Pittsburgh Medical Center

---

ADVANCED MATERIALS

Bulk Metallic Glasses XIX — Mechanical and Physical Properties II

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

Program Organizers: Robert Maass, Federal Institute for Materials Research and Testing (BAM); Peter Derlet, Paul Scherrer Institut; Katharine Flores, Washington University in St. Louis; Yonghao Sun, Chinese Academy of Sciences; Lindsay Greer, University of Cambridge; Peter Liaw, University of Tennessee

Tuesday AM | March 1, 2022
253C | Anaheim Convention Center

Session Chairs: Lindsay Greer, University of Cambridge; Katherine Flores, Washington University

---

8:00 AM Invited
Elasticity and Configurational Thermodynamics of Metallic Glass Forming Liquids: *William Johnson*[1]; Qi An[2]; [1]California Institute of Technology; [2]Univ. of Nevada Reno

8:25 AM
Assessment of Excess Entropy in Extremely Fragile Glasses: *Hillary Smith*[1]; Claire Saunders[2]; Camille Bernal[2]; Stefan Haegeli Lohaus[2]; Marios Demetriou[3]; Brent Fultz[2]; [1]Swarthmore College; [2]Caltech; [3]Glassimetal

8:45 AM
Cu-Nb Metallic Glasses with High Hardness: Mohammad Abboud[1]; Amir Motallebzadeh[2]; Özgür Duygulu[3]; Robert Maaß[4]; *Sezer Ozerinc*[1]; [1]Middle East Technical University; [2]Koç University Surface Science and Technology Center; [3]TÜBITAK Marmara Research Center Materials Institute; [4]Federal Institute of Materials Research and Testing (BAM)

9:05 AM
Observation of the Invar Effect by In-situ X-ray Diffraction in Fe-based Bulk Metallic Glasses: *Alexander Firlus*[1]; Mihai Stoica[1]; Stefan Michalik[2]; Robin Schäublin[1]; Jörg Löffler[1]; [1]ETH Zurich; [2]Diamond Light Source

9:25 AM Discussion on mechanical and physical properties of metallic glasses

---

LIGHT METALS

Cast Shop Technology — Melt Treatment

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

Program Organizers: Stephen Instone, Speira GmbH; Mertol Gökelma, Izmir Institute of Technology; Samuel Wagstaff, Oculatus; Dmitry Eskin, Brunel University

Tuesday AM | March 1, 2022
209A | Anaheim Convention Center

Session Chair: Gerd-Ulrich Gruen, Speira GmbH

8:00 AM
Performance of Regular and Modified Ceramic Foam Filters (CFFs) during Aluminium Melt Filtration in a Pilot Scale Setup: *Are Bergin*[1]; Claudia Voigt[2]; Robert Fritzsch[3]; Shahid Akhtar[4]; Lars Arnberg[3]; Christos G. Aneziris[2]; Ragnhild E. Aune[3]; [1]Norwegian University of Science and Technology & Hydro Aluminium AS; [2]Technische Universität Bergakademie Freiberg; [3]Norwegian University of Science and Technology; [4]Hydro Aluminium AS

8:25 AM
Effect of Flow Management on Ultrasonic Melt Processing in a Launder upon DC Casting: Tungky Subroto[1]; *Dmitry Eskin*[1]; Christopher Beckwith[2]; Dan Roberts[3]; Iakovos Tzanakis[4]; Georgi Djambazov[2]; Koulis Pericleous[2]; [1]Brunel Centre for Advanced Solidification Technology (BCAST), Brunel University London; [2]University of Greenwich; [3]Constellium UTC; [4]Oxford Brookes University

8:50 AM
Chlorine Free Degas System for Aluminum Slab Casting and Its Effect on Sheet Products: *Sandrella Samaha*[1]; Tao Wang[1]; Patrice Robichaud[1]; Pascal Gauthier[1]; Josee Colbert[1]; Ginny Hammersmith[2]; Peter Evans[3]; [1]Rio Tinto; [2]Logan Aluminum ; [3]Novelis Corporation

9:15 AM
Aluminothermic Reduction of Sulfides via Reactive Vacuum Distillation: *Caspar Stinn*[1]; Spencer Toll[1]; Antoine Allanore[1]; [1]Massachusetts Institute of Technology

---

CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2022 — Characterization of Mechanical Properties

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

Program Organizers: Mingming Zhang, Wood Mackenzie; Jian Li, CanmetMATERIALS; 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, DEVCOM U.S. Army Research Laboratory; Rajiv Soman, Eurofins EAG Materials Science LLC; Zhiwei Peng, Central South University

Tuesday AM | March 1, 2022
207B | Anaheim Convention Center

Session Chairs: Kelvin Xie, Texas A&M University; Veeraraghavan Sundar, UES Inc.

8:00 AM Introductory Comments

8:05 AM
Harnessing Thermomechanical Treatment to Explore Processing-structure-property Relationships in ARB Cu/Nb: *Justin Cheng*[1]; Madhavan Radhakrishnan[2]; Cody Miller[3]; Ryan Mier[3]; Carl Osborn[3]; Sven Vogel[3]; John Carpenter[3]; Osman Anderoglu[2]; Nathan Mara[1]; [1]University of Minnesota Twin Cities; [2]University of New Mexico; [3]Los Alamos National Laboratory

8:25 AM
Review on Hybrid Severe Plastic Deformation of ZV44 Magnesium Alloy: Microstructure, Property, and Application: *Raviraj Verma*[1]; Gaurav Singh[1]; Rakesh Ch.[1]; Jayaganthan R.[1]; [1]Engineering Design Department, Indian Institute of Technology Madras, INDIA

8:45 AM
Development of a New Small Punch Test System for Shear and Bending Tests: *Tal Yehuda*[1]; Matan Tubul[1]; Ziv Ungarish[1]; Shay Amar[1]; [1]Negev Nuclear Research Center

9:05 AM
Automated Laue Pattern Analysis for Multi-peak Strain Imaging of Nanocrystals at 34-ID-C: *Yueheng Zhang*[1]; Anthony Rollett[1]; Robert Suter[1]; [1]Carnegie Mellon University

9:25 AM Break

9:45 AM
Effect of Equal Channel Angular Pressing and Targeted Heat Treatment on Aluminum AA7075 Sheet Metal: *Maximilian Gruber*[1]; Thomas Spoerer[1]; Christian Illgen[2]; Philipp Frint[2]; Martin Wagner[2]; Philipp Lechner[3]; Wolfram Volk[1]; [1]Technical University of Munich; [2]Technical University of Chemnitz; [3]Chair of Metal Forming and Casting, Technical University of Munich

---

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Machine Learning in CTK I

and II

Sponsored by: TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee

Program Organizers: Vahid Attari, Texas A&M University; Sara Kadkhodaei, University Of Illinois At Chicag; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Tourret, IMDEA Materials Institute; James Morris, Ames Laboratory

Tuesday AM | March 1, 2022
255C | Anaheim Convention Center

Session Chairs: Kamal Choudhary, NIST; Jorge Munoz, University of Texas El Paso

---

8:00 AM
Modeling Anharmonicity with Many-body Perturbation Theory and Machine Learning Potentials in Cu_2O: *Claire Saunders*[1]; Dennis Kim[2]; Olle Hellman[3]; Hillary Smith[4]; Camille Bernal[1]; Vladimir Ladygin[1]; Brent Fultz[1]; [1]California Institute of Technology; [2]Massachusetts Institute of Technology; [3]Weizmann Institute of Science; [4]Swarthmore College

8:20 AM
Finite-temperature Lattice Dynamics from Graph Kernel Machine Learning Interatomic Potentials: *Jorge Munoz*[1]; Adrian De la Rocha[1]; Valeria Arteaga[1]; Vanessa Meraz[1]; Sofia Gomez[1]; Yu-Hang Tang[2]; Wibe de Jong[2]; [1]University of Texas at El Paso; [2]Lawrence Berkeley National Laboratory

8:40 AM Invited
Machine Learning Assisted Simulations of Materials Thermodynamics: *Ying Wai Li*[1]; [1]Los Alamos National Laboratory

9:10 AM Invited
ALIGNN:Atomistic Line Graph Neural Network for Improved Materials Property Predictions: *Kamal Choudhary*[1]; [1]National Institute of Standards and Technology

9:40 AM Break

10:00 AM Invited
Integrating Model Interpretability Methods into Machine Learning with Implications in Materials Discovery: *Prasanna V. Balachandran*[1]; [1]University Of Virginia

10:30 AM
Predicting the Energetics and Kinetics of Cr Atoms in Fe-Ni-Cr Alloys via Physics-based Machine Learning: *Yuchu Wang*[1]; Yue Fan[1]; [1]University of Michigan

---

MATERIALS PROCESSING

Defects and Properties of Cast Metals IV — Properties II

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

Program Organizers: Lang Yuan, University of South Carolina; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Andrew Kao, University of Greenwich; Kyle Fezi, Fort Wayne Metals

Tuesday AM | March 1, 2022
210B | Anaheim Convention Center

Session Chairs: Peter Lee, University College London; Andrew Kao, University of Greenwich

---

8:00 AM
Uncertainty Quantification of Model Predictions due to Fluid Flow in Laser Powder Bed Fusion of IN625: *Scott Wells*[1]; Matthew Krane[1]; [1]Purdue University

8:20 AM
Modelling Concurrent Structural Mechanical Mechanisms in Microstructure Solidification: *Peter Soar*[1]; Andrew Kao[1]; Georgi Djambazov[1]; Natalia Shevchenko[2]; Sven Eckert[2]; Koulis Pericleous[1]; [1]University Of Greenwich; [2]Helmholtz-Zentrum Dresden-Rossendorf

8:40 AM
The Influence of Environmental and Material Properties Data on Defect Predictions in Computational Fluid Dynamics Simulations of Investment Casting: *Christopher Jones*[1]; Mark Jolly[1]; Anders Jarfors[2]; Patrik Vrethed[3]; Pedro Silva[3]; [1]Cranfield University; [2]Jönköping University; [3]TPC Components AB

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Mechanisms of High Temperature Alloys — Understanding Deformation Behavior & Damage Using Advanced Characterization

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

Program Organizers: Mark Hardy, Rolls-Royce Plc; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Jeremy Rame, Safran Aircraft Engines; Akane Suzuki, GE Research; Jean-Charles Stinville, University of California, Santa Barbara; Paraskevas Kontis, Norwegian University of Science and Technology; Andrew Wessman, University of Arizona

Tuesday AM | March 1, 2022
304B | Anaheim Convention Center

Session Chairs: Paraskevas Kontis, Max-Planck-Institut fur Eisenforschung GmbH; Jean Charles Stinville, University of Illinois at Urbana-Champaign

---

8:00 AM
Effects of Alloying Elements on Mechanical Properties and Environmental Resistance of Silicide Strengthened Nb-based Alloys: *Akane Suzuki*[1]; Chen Shen[1]; Patrick Brennan[1]; Scott Oppenheimer[1]; Bernard Bewlay[1]; [1]GE Research

8:20 AM
Slip Localization and the Prediction of Fatigue Strength of Polycrystalline Alloys: *Jean-Charles Stinville*[1]; M.A. Charpagne[1]; A. Cervellon[2]; S. Hémery[2]; F. Wang[3]; P.G.

Callahan[4]; V. Valle[2]; T.M. Pollock[5]; [1]University of Illinois Urbana-Champaign; [2]Institut Pprime; [3]Shanghai Jiao Tong University; [4]Naval Research Laboratory; [5]University of California Santa Barbara

8:40 AM
Intra- and Intergranular Deformation Measurement in Polycrystalline Materials at High Temperature Using High-resolution Digital Image Correlation: *Damien Texier*[1]; Julien Milanese[2]; Eric Andrieu[3]; Marie-Agathe Charpagne[4]; Jean-Charles Stinville[4]; [1]CNRS - Institut Clément Ader; [2]MIDIVAL; [3]CIRIMAT - UMR CNRS 5085; [4]Materials Science and Engineering, UIUC

9:00 AM
Investigating the High-temperature High-cycle Fatigue Properties of a Novel Fe-Ni-Cr-Al-Ti-based Superalloy: *Shivakant Shukla*[1]; Jonathan Poplawsky[1]; Donovan Leonard[1]; Michael Lance[1]; Govindarajan Muralidharan[1]; [1]Oak Ridge National Laboratory

9:20 AM
In Situ Characterisation of the Thermomechanical Deformation Behaviour of Powder Processed Ni-based Superalloys: *Frances Synnott*[1]; Lewis Owen[1]; Howard Stone[2]; Nicholas Jones[2]; Paul Mignanelli[3]; Mark Hardy[3]; Martin Jackson[1]; Katerina Christofidou[1]; [1]University of Sheffield; [2]The University of Cambridge; [3]Rolls-Royce plc

9:40 AM Break

10:00 AM
Stacking Faults in Forged Polycrystalline Ni-based Superalloys in the Fully Heat-treated Condition Prior to Further Deformation: *Regina Schluetter*[1]; Mauro Callisti[1]; Mark Hardy[2]; Cathie Rae[1]; [1]University Of Cambridge; [2]Rolls-Royce plc

10:20 AM
Local Phase Transformation Strengthening in Ni-based Superalloys and Induction of Alternative Displacive-diffusional Shearing Pathways: *Ashton Egan*[1]; Fei Xue[2]; Gregory Sparks[3]; Timothy Smith[4]; Emmanuelle Marquis[2]; Sammy Tin[5]; Michael Mills[1]; [1]Ohio State University; [2]University of Michigan; [3]Air Force Research Laboratory; [4]NASA Glenn Research Center; [5]University of Arizona

10:40 AM
Investigating Deformation Mechanisms in Ni-based Superalloys with Compact '-" Coprecipitates: *Semanti Mukhopadhyay*[1]; Hariharan Sriram[1]; Richard DiDomizio[2]; Andrew Detor[2]; Robert Hayes[3]; Gopal B. Viswanathan[1]; Christopher Zenk[4]; Yunzhi Wang[1]; Michael Mills[1]; [1]The Ohio State University; [2]GE Global Research Center; [3]Metals Technology Inc.; [4]Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)

11:00 AM
Materials Selection and Structural Design Considerdations for Regeneratively Cooled Rotating Detonation Rocket Engines: *Zachary Cordero*[1]; Eric Jorgensen[1]; [1]Massachusetts Institute of Technology

MECHANICS & STRUCTURAL RELIABILITY

Dynamic Behavior of Materials IX — Strength and Spall II / X-ray, Spectroscopy and Imaging I

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

Program Organizers: Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Cyril Williams, US Army Research Laboratory

Tuesday AM | March 1, 2022
304D | Anaheim Convention Center

Session Chairs: George Gray, Los Alamos National Laboratory; Michael Demkowicz, Texas A&M University

---

8:30 AM
Dynamic Materials Experiments at High Pressures and High Strain Rates on the National Ignition Facility Laser*: *Bruce Remington*[1]; [1]Lawrence Livermore Nat Lab

8:50 AM
Richtmyer-Meshkov Instability Plate Impact Experiments on Three Body-centred Cubic Metals: *Ben Adams*[1]; Glenn Whiteman[1]; Ben Thorington-Jones[1]; James Turner[1]; [1]Awe Plc

9:10 AM
On Phase Transformation in the Weak Shock Regime: *Neil Bourne*[1]; George Gray[2]; Saryu Fensin[2]; [1]University of Manchester; [2]Los Alamos National Laboratory

9:30 AM
Measurement and Simulation of Dynamic Friction via Kolsky Bar Technique: *Benjamin Morrow*[1]; Virginia Euser[1]; Clarissa Yablinsky[1]; Nicholas Denissen[1]; [1]Los Alamos National Laboratory

9:50 AM Break

10:05 AM
Exploring the Effect of Microstructure on the Dynamic Behavior of 1045 Steel: *Virginia Euser*[1]; George Gray[1]; David Jones[1]; Daniel Martinez[1]; Saryu Fensin[1]; [1]Los Alamos National Laboratory

10:25 AM
Prospects and Challenges in Understanding the Strength of Materials in Extremes: *Marc Meyers*[1]; Gaia Righi[1]; Hye Sook Park[2]; Bruce Remington[2]; Chris Wehrenberg[2]; Carlos Ruestes[3]; Eduardo Bringa[3]; [1]University of California-San Diego; [2]LLNL; [3]U. Nacional de Cuyo

10:45 AM
Dynamic-tensile-extrusion for Investigating Large Strain and High Strain Rate Behavior: *Eric Brown*[1]; George Gray[1]; Nicola Bonora[2]; Carl Trujillo[1]; [1]Los Alamos National Laboratory; [2]University of Cassino

---

LIGHT METALS

Electrode Technology for Aluminum Production — Session II

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

Program Organizers: Stephan Broek, Boston Metal; Dmitry Eskin, Brunel University

Tuesday AM | March 1, 2022
208A | Anaheim Convention Center

Session Chair: Derek Santangelo, Hatch

8:00 AM
Dynamics of Anode Baking Furnace VOC Emissions through a Firing Cycle: *Ole Kjos*[1]; Thor Aarhaug[1]; Heiko Gaertner[1]; Anders Brunsvik[1]; [1]Sintef As

8:25 AM
Anode Rod Tracking: A New Marking Method for Optimized Implementation: *Pascal Cote*[1]; Jean-Pierre Gagné[1]; Rémi St-Pierre[1]; [1]Stas Inc.

8:50 AM
Plate Yokes. Anode Assembly without Cast Iron: *Jørund Hop*[1]; Vidar Hjelle[1]; Per Johnny Teigen[1]; Inge Arild Vee[1]; Bjarte Øye[2]; Grzegorz Stefanski[1]; [1]Hydro Aluminium AS; [2]SINTEF

9:15 AM
Bio-binders and Its Carbonization and Interaction with Petroleum Coke during Baking: *Gøril Jahrsengene*[1]; Stein Rørvik[1]; Anne Støre[1]; Liang Wang[2]; Øyvind Skreiberg[2]; [1]SINTEF Industry; [2]SINTEF Energy Research

---

ELECTRONIC MATERIALS

Electronic Packaging and Interconnections — Advanced Bonding and Interface

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

Program Organizers: Tae-Kyu Lee, Cisco Systems; Albert T. Wu, National Central University; Won Sik Hong, Korea Electronics Technology Institute; Kazuhiro Nogita, University of Queensland; Govindarajan Muralidharan, Oak Ridge National Laboratory; David Yan, San Jose State University; Luke Wentlent, Plug Power

Tuesday AM | March 1, 2022
303B | Anaheim Convention Center

Session Chairs: Kazuhiro Nogita, University of Queensland; Xin-Fu Tan, University of Queensland; Govindarajan Muralidharan, Oak Ridge National Laboratory; Luke Wentlent, Plug Power

---

10:00 AM Invited
Tin Whisker Growth in Space: *Katsuaki Suganuma*[1]; Norio Nemoto[2]; Tsuyoshi Nakagawa[2]; Seiichiroh Kan[2]; Shinichiroh Ichimaru[2]; [1]Osaka University; [2]Japan Aerospace Exploration Agency

10:25 AM
Die-bonding Performance and Mechanism of Ag Micron Paste with Pressure-less Sintering: *Tetsu Takemasa*[1]; Chuantong Chen[2]; Katsuaki Suganuma[2]; [1]Senju Metal Industry Co., Ltd.; [2]Osaka University

10:45 AM
Study of Creep Properties of Sn-Ag-Cu Alloys Employing Different Strain Rates Using Nanoindentation: M.A. Mamun[1]; Donald Stone[2]; *Abdelmageed Elmustafa*[1]; [1]Old Dominion University; [2]University of Wisconsin-Madison

---

CORROSION

Environmental Degradation of Additively Manufactured Alloys — High Temperature and Environmental Effects

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; Xiaoyuan Lou, Auburn University; Elizabeth Trillo, Southwest Research Institute; Andrew Hoffman, GE Research; Brendy Rincon Troconis, University of Texas at San Antonio

Tuesday AM | March 1, 2022
201C | Anaheim Convention Center

Session Chairs: Kinga Unocic, ORNL; Sebastien Dryepondt, ORNL; Andrew Hoffman, GE Research, US

8:00 AM
Long-term High-temperature Oxidation Performance of Inconel 625 Processed by Laser-assisted Additive Manufacturing: *Grace De Leon Nope*[1]; Juan Alvarado-Orozco[2]; Guofeng Wang[1]; Brian Gleeson[1]; [1]University of Pittsburgh; [2]CIDESI

8:20 AM
Metal Dusting Resistance of Additively Manufactured Ni-based Alloys: Influence of Post-processing Surface and Heat Treatments: *Emma White*[1]; Clara Schlereth[1]; Benedikt Nowak[2]; Heike Hattendorf[2]; Mathias Galetz[1]; [1]DECHEMA Forschungsinstitut; [2]VDM Metals

8:40 AM Invited
Hydrogen Trapping at Grain Boundaries and Dislocation Structures in Additively-manufactured Stainless Steel 316L Evaluated via SIMS/EBSD: *Kaila Bertsch*[1]; Peter Weber[1]; Shohini Sen-Britain[1]; Chris San Marchi[1]; Thomas Voisin[1]; Morris Wang[2]; Brandon Wood[1]; [1]Lawrence Livermore National Laboratory; [2]University of California- Los Angeles

9:10 AM
Sensitization of Austenitic Alloys Made by Laser Powder Bed Fusion: *Jingfan Yang*[1]; Laura Hawkins[2]; John Snitzer[1]; Xiang Liu[2]; Miao Song[3]; Lingfeng He[2]; Xiaoyuan Lou[1]; [1]Auburn University; [2]Idaho National Laboratory; [3]University of Michigan

9:30 AM Break

9:45 AM
Pulsed Transient High Heat Flux Testing of Coated Alloys in Extreme Environments: *Sanjay Sampath*[1]; John Saputo[1]; Felipe Caliari[1]; [1]State University of New York

10:05 AM
Transpiration Cooling of Additively Manufactured Porous Metallic Structures in High Heat Flux Environments: *Kaitlyn Mullin*[1]; John Martin[2]; Christopher Roper[2]; Carlos Levi[1]; Tresa Pollock[1]; [1]University of California Santa Barbara; [2]HRL Laboratories

10:25 AM
How Part Surfaces Influence Corrosion for a Laser Powder Bed Fusion 316L Stainless Steel: *Michael Melia*[1]; Erin Karasz[1]; Kasandra Escarcega Herrera[1]; Jason Taylor[1]; Samantha Rosenberg[1]; Paul Kotula[1]; Michael Heiden[1]; Jeffrey Rodelas[1]; [1]Sandia National Laboratories

---

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

Tuesday AM | March 1, 2022
201D | Anaheim Convention Center

Session Chairs: Yongfeng Lu, University of Nebraska-Lincoln; Khalid Hattar, Sandia National Laboratories

---

8:00 AM Invited
A Portable Solution to Corrosion Remediation of Sea Ships to Desensitize Severely Sensitized Aluminum Alloys Using Lasers: *Yongfeng Lu*[1]; Leimin Deng[1]; Chenfei Zhang[1]; Shiding Sun[1]; Bai Cui[1]; [1]University of Nebraska, Lincoln

8:35 AM
Effect of Grain Boundary Character on Chloride-induced Transgranular Stress Corrosion Cracking Propagation in an Austenitic Stainless Steel: *Haozheng Qu*[1]; Eric Schindelholz[2]; Rebecca Schaller[3]; Jason Taylor[3]; Timothy Montoya[3]; Nianju Gu[1]; Nathaniel Pettifor[4]; Janelle Wharry[1]; [1]Purdue University; [2]Ohio State University; [3]Sandia National Laboratories; [4]Ivy Tech Community College

8:55 AM Invited
Recent Developments in Coupled In-situ Transmission Electron Microscopy to Better Understand Materials Degradation: *Khalid Hattar*[1]; Katherine Jungjohann[1]; [1]Sandia National Laboratories

9:30 AM
Relating Localized Corrosion Rates to Microstructure in Pure Al Exposed to Salt Water Environments: *Bruno Geoly*[1]; Frank Yu[1]; Devon Phelps[1]; Joseph Stover[1]; Michael Melia[2]; Philip Noell[2]; Josh Kacher[1]; [1]Georgia Institute of Technology; [2]Sandia National Labs

9:50 AM Break

10:10 AM
In-situ SEM Investigation of Chemo-mechanical Effects on Cutting-induced Mixed-mode II-III fracture of Martensitic Stainless Steel: *Gianluca Roscioli*[1]; Cemal Tasan[1]; [1]Massachusetts Institute of Technology

---

LIGHT METALS

Failure, and a Career That is Anything But: An LMD Symposium Honoring J. Wayne Jones — Fatigue, Creep, and Other Types of Failure

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

Program Organizers: Victoria Miller, University of Florida; Michael Caton, US Air Force Research Laboratory; Nikhilesh Chawla, Purdue University; Trevor Harding, California Polytechnic State University; Paul Krajewski, General Motors Corporation; Tresa Pollock, University of California, Santa Barbara

Tuesday AM | March 1, 2022
209B | Anaheim Convention Center

Session Chairs: Benjamin Begley, University of Florida; Paul Krajewski, General Motors Company

---

8:00 AM Invited
Understanding Fatigue Damage of Metallic Materials in 4D: Probing Microstructural Evolution in Real-time: *Nikhilesh Chawla*[1]; [1]Purdue University

8:30 AM
Contributions of R. F. Mehl (Carnegie-Mellon University; 1932-76) to Metal Fatigue: *K. S. Ravi Chandran*[1]; [1]University of Utah

8:50 AM Invited
Very High Cycle Fatigue (VHCF) Phenomena – Influence of Microstructure on Crack Growth in the Near-threshold Regime Investigated by Means of Ultrasonic Fatigue Testing: *Martina Zimmermann*[1]; Tina Kirsten[1]; Fatih Bülbül[2]; Marcel Wicke[3]; Angelika Brückner-Foit[4]; Hans-Jürgen Christ[5]; [1]Technical University of Dresden; [2]Formerly: University of Siegen; [3]Formerly: University of Kassel; [4]University of Kassel; [5]University of Siegen

9:20 AM Break

9:35 AM
Tear Resistance of AA7075-T6 Sheet at Room Temperature and 200 °C: *Daniel Nikolai*[1]; Eric Taleff[1]; [1]University of Texas Austin

9:55 AM
The Elevated Temperature High Cycle Fatigue Behavior of an Additively Manufactured Al-Ce-Ni-Mn Alloy: *Amit Shyam*[1]; Sumit Bahl[1]; Alex Plotkowski[1]; Joseph Simpson[1]; Richard Michi[1]; Kevin Sisco[2]; Ryan Dehoff[1]; Allen Haynes[1]; Qigui Wang[3]; [1]Oak Ridge National Laboratory; [2]University of Tennessee; [3]General Motors

10:15 AM Invited
Hold Time Low Cycle Fatigue of Ni-base Single-crystal Superalloys: *Akane Suzuki*[1]; [1]GE Research

10:35 AM Invited
Capturing the Full Range: *Tracy Berman*[1]; [1]University of Michigan

11:05 AM Concluding Comments

MATERIALS DESIGN

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Multiscale Modeling Approaches to Improve Fatigue Predictions

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials 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: Jean-Charles Stinville, University of Illinois Urbana-Champaign; Garrett Pataky, Clemson University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University; Orion Kafka, NIST

Tuesday AM | March 1, 2022
254B | Anaheim Convention Center

Session Chair: Antonios Kontsos, Drexel University

8:00 AM Invited
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]; Veera Sundararaghavan[1]; John E. Allison[1]; David L. McDowell[2]; [1]University of Michigan; [2]Georgia Institute of Technology

8:30 AM
Microstructure Effects on the Extreme Value Fatigue Response of FCC Metals and Alloys: Effects of Sample Size and Grain Neighborhood: *Krzysztof Stopka*[1]; Mohammadreza Yaghoobi[2]; John Allison[2]; David McDowell[3]; [1]Purdue University; [2]University of Michigan; [3]Georgia Institute of Technology

8:50 AM
Mechanistic Short Crack Growth in Ni Single Crystals: A Study of the Crack Paths and Growth Rates in -' Microstructure: *Vassilios Karamitros*[1]; Duncan MacLachlan[2]; Fionn Dunne[1]; [1]Imperial College London; [2]Rolls-Royce plc

9:10 AM
How Do Heterogeneous Dislocation Distributions Determine the Long-range Internal Stress: *Yejun Gu*[1]; Jaafar El-Awady[2]; [1]IHPC/Johns Hopkins University; [2]Johns Hopkins University

9:30 AM Break

9:50 AM Invited
Discovery of a Reciprocal Relationship in Fatigue between Stress-life (S-N) Behavior and Fatigue Crack Growth Behavior: *K. S. Ravi Chandran*[1]; [1]University of Utah

10:20 AM
Prediction of Critical Stress by Anisotropic Calculation of Dislocation Core-width: *Orcun Koray Celebi*[1]; Ahmed Sameer Khan Mohammed[1]; Jessica Anne Krogstad[1]; Huseyin Sehitoglu[1]; [1]University of Illinois at Urbana-Champaign

---

SPECIAL TOPICS

Frontiers of Materials Award Symposium: Nanocarbon-based Flexible Devices: Emerging Materials and Processes — Session III: Emerging Nanocarbon Applications

Program Organizer: Mostafa Bedewy, University of Pittsburgh

Tuesday AM | March 1, 2022
260A | Anaheim Convention Center

8:00 AM Introductory Comments

8:05 AM Invited
Probing the Brain with Carbon Microelectrode Arrays: Promises and Challenges: *Elisa Castagnola*[1]; [1]University of Pittsburgh

8:35 AM Invited
Wafer-scale Processing of Carbon Nanotube Forests for High-performance, Flexible Composites: *Eric Meshot*[1]; [1]Lawrence Livermore National Laboratory

9:05 AM Invited
Electromechanically Stable Thin Metallic Films Reinforced by Synthesis of a Graphene Wrapper: *Sameh Tawfick*[1]; Kaihao Zhang[1]; Mitisha Surana[1]; Jad Yaacoub[1]; [1]University of Illinois at Urbana Champaign

9:35 AM Invited
Controlled Deformation of Graphene for Flexible Electronics: *SungWoo Nam*[1]; [1]University of California, Irvine

---

NANOSTRUCTURED MATERIALS

Functional Nanomaterials: Functional Low-Dimensional (0D, 1D, 2D) Materials 2022 — Low-Dimensional Mechanics, Interfaces, Surfaces

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

Program Organizers: Michael Cai Wang, University of South Florida; Yong Lin Kong, University of Utah; Sarah Ying Zhong, University of South Florida; Surojit Gupta, University of North Dakota; Nasrin Hooshmand, Georgia Institute of Technology; Woochul Lee, University of Hawaii at Manoa; Min Kyu Song, Washington State University; Simona Hunyadi Murph, Savannah River National Laboratory; Hagar Labouta, University of Manitoba; Max Anikovskiy, University of Calgary; Patrick Ward, Savannah River National Laboratory

Tuesday AM | March 1, 2022
260B | Anaheim Convention Center

Session Chairs: Michael Cai Wang, University of South Florida; Surojit Gupta, University of North Dakota

---

8:00 AM Invited
Nanoscale Effects on Intercalation-induced Phase Transitions in 2D Materials: *Mengjing Wang*[1]; Joshua Pondick[1]; Shiyu Xu[1]; Judy Cha[1]; [1]Yale University

8:20 AM Invited
Freeze Casting of Graphene Aerogel Structures with Unidirectional Pores: Yu-Kai Weng[1]; *Seungha Shin*[1]; Kenneth Kihm[1]; Douglas Aaron[1]; Mohammad Bahzad[1]; Mian Umar Saeed[1]; [1]University of Tennessee

8:40 AM Invited
Intrinsic Fatigue of Graphene and Molybdenum Disulfide: *Tobin Filleter*[1]; [1]University of Toronto

9:00 AM Keynote
Mechanics Design in Cellulose-enabled High-performance Functional Materials: *Teng Li*[1]; [1]University of Maryland, College Park

9:45 AM Break

10:05 AM
Effects of Graphene Surface Interaction on Water-ice Phase Change: *Yu-Kai Weng*[1]; Seungha Shin[1]; Kenneth Kihm[1]; Douglas Aaron[1]; [1]University of Tennessee

10:25 AM
Exciton Transport in Strained Two-dimensional Semiconductors: *Jin Myung Kim*[1]; Kwang-Yong Jeong[2]; Jaepil So[2]; Mike Wang[3]; Peter Snapp[1]; Hong-Gyu Park[2]; SungWoo Nam[1]; [1]University of Illinois at Urbana-Champaign; [2]Korea University; [3]University of South Florida

10:45 AM Keynote
Nanoscale Frictional Behavior of Two-dimensional Materials: *Robert Carpick*[1]; [1]University of Pennsylvania

---

MATERIALS PROCESSING

Furnace Tapping 2022 — Session III

Sponsored by: The Southern African Institute of Mining and Metallurgy, TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Materials Characterization Committee, Industrial Advisory Committee

Program Organizers: Joalet Steenkamp, MINTEK; Dean Gregurek, RHI Magnesita; Quinn Reynolds, Mintek; Gerardo Alvear Flores, Rio Tinto; Hugo Joubert, Tenova Pyromet; Phillip Mackey, P.J. Mackey Technology, Inc.

Tuesday AM | March 1, 2022
204B | Anaheim Convention Center

Session Chair: Quinn Reynolds, Mintek

8:00 AM Introductory Comments

8:05 AM Keynote
PGM-Ni-Cu Tapping: An Updated Industry Survey: *Isabelle Nolet*[1]; Lucy Rodd[1]; Tyler Futterer[1]; Spencer Straub[1]; Jehane Du Toit[1]; Wesley Taylor[1]; [1]Hatch

8:50 AM Panel Discussion: "The Good, the Bad and the Ugly of Furnace Tapping"
- Panelists include Stanko Nikolic, Glencore Technology; Ryan Walton, Rio Tinto Kennecott; Christine Wenzl, RHI Magnesita; Stefan Schmidt, Aurubis AG; and Harmen Oterdoom, Independent Consultant

10:25 AM Break

10:45 AM Invited
Data Analysis to Assess Carry-over Slag: *P. Chris Pistorius*[1]; [1]Carnegie Mellon University

11:10 AM
Sensor Technologies for Optimized Tapping Procedures: Christine Wenzl[1]; Magnus Persson[1]; Ladislav Koncik[1]; *Guenter Unterreiter*[2]; [1]RHI Magnesita; [2]RHI Magnesita GmbH

11:30 AM
Successful Development and Optimisation of Lead ISASMELT™ Furnace Slag Tapping System at Kazzinc Ltd.: Benjamin Hogg[1]; *Mark Prince*[1]; Mark Letchford[1]; Alistair Burrows[2]; Timur Tokzhigitov[2]; Turarbek Azekenov[2]; [1]Glencore Technology; [2]Kazzinc Ltd

11:50 AM Concluding Comments

MECHANICS & STRUCTURAL RELIABILITY

Grain Boundaries and Interfaces: Metastability, Disorder, and Non-Equilibrium Behavior — Alloying, Solute Segregation, and Precipitation: Part I

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

Program Organizers: Yue Fan, University of Michigan; Liang Qi, University of Michigan; Jeremy Mason, University of California, Davis; Garritt Tucker, Colorado School of Mines; Pascal Bellon, University of Illinois at Urbana-Champaign; Mitra Taheri, Johns Hopkins University; Eric Homer, Brigham Young University; Xiaofeng Qian, Texas A&M University

Tuesday AM | March 1, 2022
304C | Anaheim Convention Center

Session Chairs: Yue Fan, University of Michigan, Ann Arbor; Liang Qi, University of Michigan, Ann Arbor; Garritt Tucker, Colorado School of Mines

---

8:00 AM Invited
Spectrum-based Isotherms for Grain Boundary Segregation: *Christopher Schuh*[1]; Malik Wagih[1]; Nutth Tuchinda[1]; Thomas Matson[1]; [1]Massachusetts Institute of Technology

8:30 AM
Atomic-scale Analysis of Heterogeneous Nickel Solute Segregation into Random Grain Boundaries and Polycrystals: *Frederic Sansoz*[1]; Eve-Audrey Picard[1]; Tara Nenninger[1]; [1]The University of Vermont

8:50 AM
Competition Between Shear Coupling and Sliding in Doped Nickel Grain Boundaries: *Spencer Thomas*[1]; Jason Trelewicz[1]; [1]Stony Brook University

9:10 AM
Contributions of Triple Junctions and Quadruple Nodes to Grain-size Dependent Intergranular Segregation: *Nutth Tuchinda*[1]; Christopher Schuh[1]; [1]Massachusetts Institute of Technology

9:30 AM Break

9:45 AM
2nd Generation of Nanocrystalline Cu-3Ta with Improved Precipitate Coherency: *Billy Hornbuckle*[1]; Josh Smeltzer[2]; Albert Ostlind[1]; Blake Fullenwider[1]; Chris Marvel[2]; Anit Giri[1]; Martin Harmer[2]; Kiran Solanki[3]; Kris Darling[1]; [1]US Army Research Laboratory; [2]Lehigh University; [3]Arizona State University

10:05 AM Invited
Influence of Contaminates on Nanocrystalline Thermomechanical Stability: Jonathan Priedeman[1]; B. Chad Hornbuckle[2]; Kristopher Darling[3]; Sean Fudger[3]; *Gregory Thompson*[1]; [1]University of Alabama; [2]Army Research Laboratory ; [3]Army

Research Laboratory

10:35 AM
Corrosion-induced Grain Boundary Migration: *Yang Yang*[1]; Weiyue Zhou[2]; Sheng Yin[3]; Qin Yu[3]; Daniel Schreiber[4]; Jim Ciston[3]; Mark Asta[3]; Michael Short[2]; Andrew Minor[3]; [1]The Pennsylvania State University; [2]Massachusetts Institute of Technology; [3]Lawrence Berkeley National Laboratory; [4]Pacific Northwest National Laboratory

10:55 AM
Origins of Weak Strengthening Effect in As-cast Al-Si Alloys: *Wenqian Wu*[1]; Mingyu Gong[1]; Bingqiang Wei[1]; Amit Misra[2]; Jian Wang[1]; [1]University of Nebraska-Lincoln; [2]University of Michigan

---

MATERIALS DESIGN

Hume-Rothery Symposium on Connecting Macroscopic Materials Properties to Their Underlying Electronic Structure: The Role of Theory, Computation, and Experiment — Theory-Guided and Simulation-Assisted Materials Discovery and Design

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

Program Organizers: Raymundo Arroyave, Texas A&M University; Wei Chen, Illinois Institute of Technology; Yong-Jie Hu, Drexel University; Tresa Pollock, University of California, Santa Barbara

Tuesday AM | March 1, 2022
255A | Anaheim Convention Center

Session Chair: To Be Announced

8:00 AM Invited
To Mix or Not to Mix? Synthesizability Entropy-descriptors and the Controversial Role of Vibrations in the Stability of High-entropy Ceramics: *Stefano Curtarolo*[1]; [1]Duke University

8:30 AM
Towards the Accelerated Exploration of the High Entropy Alloy Space: *Raymundo Arroyave*[1]; [1]Texas A&M University

9:00 AM Invited
Integrating Theory, Simulation and Experiment to Accelerate Predictive Materials Science: *John Allison*[1]; [1]University of Michigan

9:30 AM Break

9:45 AM Invited
Computational Tools for the Ab-initio Design of Advanced Structural Materials: *Anirudh Raju Natarajan*[1]; Anton Van der Ven[1]; [1]University of California, Santa Barbara

10:15 AM Invited
Integrated Computational Modeling of Solute Segregation to Defect, Segregation Transition, Localized Phase Transformation and Dislocation Transformation, All Starting from Ab Initio Calculations: Longsheng Feng[1]; You Rao[2]; Ashton Egan[1]; Maryam Ghazisaeidi[1]; Michael Mills[1]; *Yunzhi Wang*[1]; [1]The Ohio State University; [2]EPFL

10:45 AM Invited
High-throughput Discovery of Inorganic Compounds: Sean Griesemer[1]; Cheol Woo Park[1]; Logan Ward[2]; *Christopher Wolverton*[1]; [1]Northwestern University; [2]Argonne National Laboratory

---

LIGHT METALS

Magnesium Technology — Fundamentals of Plastic Deformation and Primary Production, Recycling and Ecological Issues

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

Program Organizers: Petra Maier, University of Applied Sciences Stralsund; Steven Barela, Terves, Inc; Victoria Miller, University of Florida; Neale Neelameggham, IND LLC

Tuesday AM | March 1, 2022
210A | Anaheim Convention Center

Session Chairs: Tracy Berman, University of Michigan; Dmytro Orlov, Lund University; Joshua Caris, Terves, Llc.; Aaron Palumbo, Big Blue Technologies

---

8:00 AM Invited
Strengthening Mechanisms and Thermal Stability of MgLiCa Alloys Processed by Severe Plastic Deformation: Heather Salvador[1]; *Suveen Mathaudhu*[1]; [1]University of California-Riverside

8:20 AM
A Magnesium Clean Energy Ecosystem Vision: *Adam Powell*[1]; [1]Worcester Polytechnic Institute

8:40 AM
ILTEC Technology in Magnesium Industry – Elimination of Water as Cooling Medium: *Andreas Filzwieser*[1]; Hans-Jörg Krassnig[1]; Martina Hanel[1]; [1]METTOP GmbH

9:00 AM
Design of Efficient Low-cost Recycling of Magnesium Using Gravity-driven Multiple Effect Thermal System (G-METS): *Gabriel Espinosa*[1]; Armaghan Telgerafchi[1]; Daniel McArthur[1]; Madison Rutherford[1]; Adam Powell[1]; David Dussault[2]; [1]Worcester Polytechnic Institute; [2]Elemental Beverage Company

9:20 AM
Mg-Ca-X Alloys – A Brief Fact Sheet of High Strength Mg Wrought Alloys: *Nikolaus Papenberg*[1]; Clemens Simson[1]; Stefan Gneiger[1]; [1]Light Metals Technologies Ranshofen

---

ENERGY & ENVIRONMENT

Magnetics and the Critical Materials Challenge: An FMD Symposium Honoring Matthew J. Kramer — The Softer Side of Magnetism

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

Program Organizers: Scott McCall, Lawrence Livermore National Laboratory; Ryan Ott, Ames Laboratory

Tuesday AM | March 1, 2022
210D | Anaheim Convention Center

Session Chair: Scott McCall, LLNL

8:00 AM Invited
Giant Saturation Magnetization of Fe-based Soft Magnetic Amorphous Alloy by Introducing Nitrogen: Song-Yi Kim[1]; Hye-Ryeong Oh[2]; Hwi-Jun Kim[1]; *Min-Ha Lee*[3]; [1]KITECH; [2]Korea Electronics Technology Institute; [3]KITECH North America

8:30 AM Invited
Nanocomposite Soft Magnetics: Applications, State-of-art, and Emerging Trends: *Paul Ohodnicki*[1]; [1]University of Pittsburgh

9:00 AM Invited
Like Poles Attraction and Unlike Poles Repulsion - Science Behind the Mystery: Hui Meng[1]; Guiping Tang[2]; Abby Shen[3]; Michelle Qian[3]; Qifeng Wei[1]; George Mizzell[4]; *Min Zou*[3]; Christina Chen[3]; [1]Foresee Group; [2]Quadrant at Hangzhou; [3]Quadrant at San Jose; [4]SuperMagnetMan

9:30 AM Break

9:50 AM Invited
Microstructural Evolutions, Phase Transformations and Hard Magnetic Properties in Polycrystalline Ce-Co-Fe-Cu Alloys: Kinjal Gandha[1]; Rakesh Chaudhary[1]; Matthew Kramer[1]; Ryan Ott[1]; Durga Paudyal[1]; *Ikenna Nlebedim*[1]; [1]Ames Laboratory

10:20 AM Invited
Structure and Magnetic Properties of Galfenol Nanocomposite Alloys: M. T. Islam[1]; R. Nandwana[1]; J. Healy[1]; J. K. Jaklich[1]; B. Dong[1]; *Matthew Willard*[1]; A. Yu[2]; Y. Ijiri[2]; E. E. Moore[3]; S. K. McCall[3]; [1]Case Western Reserve University; [2]Oberlin College; [3]Lawrence Livermore Laboratory

10:50 AM
A Solution to the Permalloy Problem: *Ananya Renuka Balakrishna*[1]; [1]University of Southern California

---

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — Electrochemistry

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

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

Tuesday AM | March 1, 2022
203B | Anaheim Convention Center

Session Chair: Nathan Hoyt, Argonne National Laboratory

8:00 AM
Electrochemical Solutions for Corrosion in Molten Chloride Salt Systems: Kerry Rippy[1]; Judith Vidal[1]; *Liam Witteman*[1]; [1]National Renewable Energy Laboratory

8:20 AM
Development of an Electrochemical Model for Corrosion of 316H Stainless Steel by Molten FLiNaK Using Meso-scale YellowJacket: *Chaitanya Bhave*[1]; Michael Tonks[1]; Kumar Sridharan[2]; Guiqui Zheng[3]; [1]University of Florida; [2]University of Wisconsin-Madison; [3]Massachusetts Institute of Technology

8:40 AM
UF4/UF3 Redox Control in NaF-KF-UF4 Systems: *Amanda Leong*[1]; Jinsuo Zhang[1]; [1]Virginia Polytechnic Institute

9:00 AM
To Galvanically Corrode or Not Galvanically Corrode: *Cody Falconer*[1]; Yafei Wang[1]; William Doniger[1]; Matthew Weinstein[1]; Mohamed Elbakhshwan[1]; Kumar Sridharan[1]; Adrien Couet[1]; [1]University of Wisconsin Madison

9:20 AM Break

9:40 AM
A Novel Cyclic Voltammetry-based Automated Mini-probe for In-situ Corrosion Product Quantification during High-throughput HEA Corrosion Testing in Molten Salts: *Bonita Goh*[1]; Yafei Wang[1]; Will Doniger[1]; Phalgun Nelaturu[1]; Dan Thoma[1]; Kumar Sridharan[1]; Adrien Couet[1]; [1]University of Wisconsin Madison

10:00 AM
Electrochemical Measurement of Uranium Concentration in FLiNaK: *Matthew Newton*[1]; Michael Simpson[1]; [1]University of Utah

10:20 AM
Redox Control as Corrosion Control Method in Molten FLiNaK: *Krishna Moorthi Sankar*[1]; Preet Singh[1]; [1]Georgia Institute of Technology

---

MATERIALS DESIGN

Materials Design and Processing Optimization for Advanced Manufacturing: From Fundamentals to Application — Materials Design and Processing Optimization: Young Investigator Session III

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

Program Organizers: Wei Xiong, University of Pittsburgh; Dana Frankel, QuesTek Innovations LLC; Gregory Olson, Massachusetts Institute of Technology

Tuesday AM | March 1, 2022
253B | Anaheim Convention Center

Session Chairs: Xun Liu, The Ohio State University; Xiaoxiang Yu, Novelis Inc.

8:00 AM Keynote
Design of Cold-workable Refractory Complex Concentrated Alloys for Applications at Ambient-to-elevated Temperatures: Cheng Zhang[1]; *Enrique Lavernia*[2]; [1]University of California Irvine; [2]National Academy of Engineering

8:30 AM Invited
Laser Forming of Sheet Metal: Incorporating a Metallurgical Perspective: *Victoria Miller*[1]; [1]University of Florida

8:55 AM Invited
Power Ultrasound in Advanced Manufacturing: *Xun Liu*[1]; Jiarui Kang[1]; Tianzhao Wang[1]; [1]Ohio State University

9:20 AM Invited
Design and Manufacturing of Tailorable Polymer Derived Ceramic Composites: *Yan Li*[1]; [1]Dartmouth College

---

NUCLEAR MATERIALS

Materials Systems for the Future of Fusion Energy — Cross-cutting Experiments and Fusion Materials Perspectives

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

Program Organizers: Jason Trelewicz, Stony Brook University; Kevin Field, University of Michigan; Takaaki Koyanagi, Oak Ridge National Laboratory; Yuanyuan Zhu, University of Connecticut; Dalong Zhang, Pacific Northwest National Laboratory

Tuesday AM | March 1, 2022
203A | Anaheim Convention Center

Session Chairs: Yuanyuan Zhu, University of Connecticut; Jason Trelewicz, Stony Brook University

---

8:00 AM
In-situ Thermal Diffusivity Recovery and Defect Annealing Kinetics in Self-ion Implanted Tungsten Using Transient Grating Spectroscopy: *Mohamed Abdallah Reza*[1]; Hongbing Yu[2]; Kenichiro Mizohata[3]; Felix Hofmann[1]; [1]University of Oxford; [2]Canadian Nuclear Laboratories; [3]University of Helsinki

8:20 AM
Direct Visualization of Tungsten Oxidation by In-situ Environmental TEM: Maanas Togaru[1]; Rajat Sainju[1]; Lichun Zhang[1]; Weilin Jiang[2]; *Yuanyuan Zhu*[1]; [1]University of Connecticut; [2]Pacific Northwest National Laboratory

8:40 AM Invited
Paving the Way for a Fusion Pilot Plant: *Kathryn McCarthy*[1]; [1]Oak Ridge National Laboratory

---

NUCLEAR MATERIALS

Mechanical Behavior and Degradation of Advanced Nuclear Fuel and Structural Materials — Accident Tolerant Fuels and Advanced Characterization

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

Program Organizers: Dong Liu, University of Bristol; Peng Xu, Idaho National Laboratory; Simon Middleburgh, Bangor University; Christian Deck, General Atomics; Erofili Kardoulaki, Los Alamos National Laboratory; Robert Ritchie, University of California, Berkeley

Tuesday AM | March 1, 2022
204A | Anaheim Convention Center

Session Chairs: Alexander Leide, University of Bristol; Joshua Kane, Idaho National Laboratory; Takaaki Koyanagi, Oak Ridge National Laboratory; Kumar Sridharan, University of Wisconsin-Madison

---

8:00 AM
Advanced Characterization and Multiscale Testing for SiC Ceramic Matrix Composite Cladding as Accident Tolerant Fuel Candidate Materials for LWR Applications: *Peng Xu*[1]; David Frazer[1]; Tsvetoslav Pavlov[1]; Nikolaus Cordes[1]; Fabiola Cappia[1]; David Kamerman[1]; Sean Gonderman[2]; Christian Deck[2]; Jack Gazza[2]; [1]Idaho National Laboratory; [2]General Atomics

8:20 AM
Fiber/Matrix Debonding of SiC/SiC Composites Evaluated Using the Micropillar Compression: *Omer Karakoc*[1]; Takaaki Koyanagi[1]; Takashi Nozawa[2]; Yutai Katoh[1]; [1]Oak Ridge National Laboratory; [2]National Institutes for Quantum and Radiological Science and Technology

8:40 AM
Strain Rate Sensitivity Studies of Commercial FeCrAl Alloy: *Hamdy Abouelella*[1]; Chengying Xu[1]; Korukonda Murty[1]; [1]North Carolina State University

9:00 AM
Impact of Lithium Accommodation on Defect Chemistry in ZrO2: *Gareth Stephens*[1]; Yan Ren Than[2]; [1]Nuclear Futures Institute Bangor; [2]National University of Singapore

9:20 AM
In Situ Study of High Temperature Mechanical Behavior of Irradiated FeCrAl Alloys: *Tianyi Sun*[1]; Tongjun Niu[1]; Dongyue Xie[2]; Adam Gabriel[3]; Lin Shao[3]; Jian Wang[2]; Haiyan Wang[1]; Xinghang Zhang[1]; [1]Purdue University; [2]University of Nebraska-Lincoln; [3]Texas A&M University

9:40 AM Break

10:00 AM
Accelerating Advanced Fuel Development and Analysis by Combining Modelling and Experiment: *Simon Middleburgh*[1]; Phylis Makurunje[1]; Fabio Martini[1]; Mustafa Bolukbasi[1]; Lee Evitts[1]; Dave Goddard[2]; Antoine Claisse[3]; William Lee[1]; Nicholas Barron[2]; [1]Bangor University; [2]National Nuclear Laboratory (NNL); [3]Westinghouse Electric Sweden AB

10:20 AM
Assessment of Local Deformation Behavior in Mesoscale Tensile Specimens via Digital-image Correlation: *Yachun Wang*[1]; David Frazer[1]; Daniel Murray[1]; Geoffrey Beausoleil[1]; Mahmut Cinbiz[1]; [1]Idaho National Laboratory

---

NANOSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale VI — Deformation Mechanisms II

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

Program Organizers: Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, University of Texas at San Antonio; Changhong Cao, McGill University; Mohsen Asle Zaeem, Colorado School of Mines

Tuesday AM | March 1, 2022

262B | Anaheim Convention Center

Session Chairs: Douglas Stauffer, Bruker Nano Inc.; Garritt Tucker, Colorado School of Mines

---

8:00 AM
Atomistic Simulation of Amorphous/Crystalline Metal Composite Interface Mechanical Behavior by Nanoindentation: *Amir Abdelmawla*[1]; Thanh Phan[1]; Liming Xiong[1]; Ashraf Bastawros[1]; [1]Iowa State University

8:20 AM Invited
On the Nanoscale Mechanics of Basal Dislocations in MAX Phases: Atomistic Modeling of Structure and Mobility: Gabriel Plummer[1]; Christopher Weinberger[2]; Michel Barsoum[3]; *Garritt Tucker*[1]; [1]Colorado School of Mines; [2]Colorado State University; [3]Drexel University

8:50 AM
The Evolution of Deformation Twinning in a Heterogeneous Planar Fault Energy Landscape: *Ritesh Jagatramka*[1]; Matthew Daly[1]; [1]University of Illinois at Chicago

9:10 AM
Mechanical Behavior of Free-standing and Matrix-embedded Metallic Nanoparticles at Different Temperatures: *Alla Dieng*[1]; Louise Grau[1]; Celine Gerard[1]; Jean-Claude Grandidier[1]; [1]Institut Pprime - CNRS ISAE-ENSMA

9:30 AM Break

9:50 AM
Mechanical Behavior and Microstructure Evolution in a Nanocrystalline Tri-immiscible Alloy: *Yashaswini Karanth*[1]; Saurabh Sharma[1]; Billy Hornbuckle[2]; Kristopher Darling[2]; Kiran Solanki[1]; [1]Arizona State University; [2]U.S. Army Research Laboratory

10:10 AM Invited
Nano-mechanical Behavior Associated with Dislocation-boundary Interaction Characterized though Nanoindentation and TEM In-situ Straining: *Takahito Ohmura*[1]; [1]National Institute for Materials Science

---

CHARACTERIZATION

Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling — Session III

Sponsored by: TMS Structural Materials Division, TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Shailendra Joshi, University of Houston; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Jagannathan Rajagopalan, Arizona State University; Robert Wheeler, Microtesting Solutions LLC

Tuesday AM | March 1, 2022
206B | Anaheim Convention Center

Session Chairs: Benjamin Eftink, Los Alamos National Laboratory; Sourav Das, University of Illinois at Urbana-Champaign

---

8:00 AM
Dwell Fatigue in Ti Alloys; TEM on Dislocations, HEDM, alpha2-Ti3Al and SAXS: *David Dye*[1]; Sudha Joseph[1]; Felicity Dear[1]; Yilun Xu[1]; Rachel Lim[2]; Thomas McAuliffe[1]; Joel Bernier[3]; Darren Pagan[2]; Phani Karamched[4]; Kate Fox[5]; David Rugg[6]; Fionn Dunne[1]; [1]Imperial College; [2]Penn State University; [3]Lawrence Livermore National Laboratory; [4]Oxford University; [5]Rolls-Royce plc; [6]formerly Rolls-Royce plc

8:20 AM
Correlating the Microstructure of Friction-stir Processed Al 7085 to Mechanical Properties Using In-situ Micromechanical Testing: *Tanvi Ajantiwalay*[1]; Christian Roach[1]; Hrishikesh Das[1]; Mert Efe[1]; Piyush Upadhyay[1]; Arun Devaraj[1]; [1]Pacific Northwest National Laboratory

8:40 AM
High Strength Nanocrystalline CoAl Intermetallics with Room Temperature Deformability: *Xinghang Zhang*[1]; Ruizhe Su[1]; Dajla Neffati[2]; Yashashree Kulkarni[2]; [1]Purdue University; [2]University of Houston

9:00 AM Invited
Three-dimensional Dislocation Characterization during In-situ Straining TEM: *Benjamin Eftink*[1]; Stuart Maloy[1]; [1]Los Alamos National Laboratory

9:30 AM Break

9:50 AM
In Situ TEM Measurements of Electron-induced Creep in Amorphous Materials: *Sourav Das*[1]; Gowtham Jawaharram[1]; Shen Dillon[1]; Robert Averback[1]; [1]University of Illinois at Urbana-Champaign

10:10 AM
Deformation and Mechanical Properties of Benzene Microcrystals at Cryogenic Temperatures: *Wenxin Zhang*[1]; Bryce Edwards[1]; Lucas Pabarcius[1]; Lei Zhong[2]; Xuan Zhang[3]; Huajian Gao[2]; Robert Hodyss[4]; Julia Greer[1]; [1]California Institute of Technology; [2]Brown University; [3]NM—Leibniz Institute for New Materials,; [4]Jet Propulsion Laboratory

10:30 AM
In-situ Mechanics of Superalloys and Bond Coating at 1000C: *Sanjit Bhowmick*[1]; [1]Bruker

---

MATERIALS DESIGN

Metal-Matrix Composites: Advances in Processing, Characterization, Performance and Analysis — Design and Development of Metal-based Composite Materials

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

Program Organizers: Srivatsan Tirumalai, The University of Akron; Pradeep Rohatgi, University of Wisconsin; Simona Hunyadi Murph, Savannah River National Laboratory

Tuesday AM | March 1, 2022
256B | Anaheim Convention Center

Session Chair: Simona Murph, Savannah River National Laboratory

---

8:00 AM Keynote
Transforming the Approach to Designing Metal Matrix Composites: *Julie Schoenung*[1]; [1]University of California, Irvine

8:30 AM Keynote
Superconducting Metal Matrix Composites: *Krishan Chawla*[1]; [1]University of Alabama at Birmingham

9:00 AM Invited
Investigation of Fine Scale Microstructure and Mechanical Behavior of Al-Mg-B and Al-Mg-Cd Composites for Intergranular Corrosion Protection Applications: *Ramasis Goswami*[1]; [1]Naval Research Laboratory

9:25 AM
Design and Synthesis of Carbon-inorganic Nanocomposites via Direct Utilization of Carbon Dioxide for Sustainable Energy: *Min Kyu Song*[1]; [1]Washington State University

9:45 AM Break

10:00 AM
Sustainable and Climate-friendly Economic and Technological Development from Use of Metal Matrix Composites: *Akhil Charak*[1]; Jimmy Karloopia[1]; Srivatsan Tirumalai[2]; [1]Indian Institute of Technology Roorkee; [2]The University of Akron

10:20 AM Invited
Development of Zirconia Toughened Nanocomposites Using the Technique of Spark Plasma Sintering: Role of Reinforcement: Srivatsan Tirumalai[1]; *Kunjee Meena*[2]; Shaik Mozammil[3]; [1]The University of Akron; [2]Mahatma Gandhi Engineering College; [3]Indian Institute of Technology Roorkee

10:45 AM
Use of Three-dimensional Finite Elements to Simulate Morphology of Chip during Turning of an Aluminum Alloy Composite: *Shaik Mozammil*[1]; Eklavya Koshta[1]; Jimmy Karloopia[1]; Kunjee Meena[2]; Srivatsan Tirumalai[3]; P.K. Swain[4]; [1]Indian Institute of Technology Roorkee; [2]Mahatma Gandhi Engineering College Jaipur; [3]The University of Akron; [4]Aryan Institute of Engineering and Technology

11:05 AM
Metal Matrix Composites Development Using Binder Jet Additive Manufacturing: *Hanlei Zhang*[1]; Daozheng Li[1]; Mitra Shabani[1]; Wei Xiong[1]; [1]University of Pittsburgh

---

MATERIALS DESIGN

Microstructural Templates Consisting of Isostructural Ordered Precipitate / Disordered Matrix Combinations: Microstructural Evolution and Properties — Session I

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

Program Organizers: Rajarshi Banerjee, University of North Texas; Eric Lass, University of Tennessee-Knoxville; Bharat Gwalani, Pacific Northwest National Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Jessica Krogstad, University of Illinois at Urbana-Champaign; Ashley Paz Y Puente, University of Cincinnati; Keith Knipling, Naval Research Laboratory; Matthew Steiner, University of Cincinnati

Tuesday AM | March 1, 2022
254A | Anaheim Convention Center

Session Chairs: Rajarshi Banerjee, University of North Texas, Denton; Bharat Gwalani, Pacific Northwest National Laboratory

---

8:00 AM Introductory Comments

8:05 AM Invited
Novel Nickel-based Alloys for High Temperature Structural Applications: Boateng Twum Donkor[1]; Sonali Ravikumar[1]; Anurag Sharma[1]; Jie Song[1]; *Vijay Vasudevan*[2]; [1]University of Cincinnati; [2]University of North Texas

8:35 AM Invited
Tuning the Degree of Chemical Ordering in the Solid Solution of a Complex Concentrated Alloy and Its Impact on Mechanical Properties: *Sriswaroop Dasari*[1]; Abhinav Jagetia[1]; Abhishek Sharma[1]; M.S.K.K.Y. Nartu[1]; Vishal Soni[1]; Bharat Gwalani[1]; Stephane Gorsse[1]; Rajarshi Banerjee[1]; [1]University of North Texas

9:05 AM Invited
The Role of Precipitate Size Distribution and Morphology on Ni Superalloy Deformation Micromechanisms: *James Coakley*[1]; Muhammad Awais[2]; Jonathan Cormier[2]; Ke An[3]; Neil D'Souza[4]; Howard Stone[5]; [1]University of Miami; [2]École nationale supérieure de mécanique et d'aérotechnique; [3]Oak Ridge National Laboratory; [4]Rolls-Royce plc.; [5]University of Cambridge

9:35 AM Break

9:55 AM
Investigation of Nucleation Mechanisms Associated with the Formation of Coprecipitates in Ni-based Superalloys: *Hariharan Sriram*[1]; Semanti Mukhopadhyay[1]; Michael Mills[1]; Yunzhi Wang[1]; [1]Ohio State University

---

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXI — Adaptable, Reconfigurable, and Self-healing Hard Materials

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

Program Organizers: Hiroshi Nishikawa, Osaka University; Shih-kang Lin, National Cheng Kung University; Chaohong Wang, National Chung Chung University; Chih Ming Chen, National Chung Hsing University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; A.S.Md Abdul Haseeb, University of Malaya; Vesa Vuorinen, Aalto University; Ligang Zhang, Central South University; Sehoon Yoo, KITECH; Yu-chen Liu, National Cheng Kung University; Ting-Li Yang, National Yang Ming Chiao Tung University

Tuesday AM | March 1, 2022
303A | Anaheim Convention Center

Session Chair: James Pikul, University of Pennsylvania

8:00 AM Invited
Vat Polymerization of Adaptable and Reconfigurable Three-dimensional (3D) Micro-architected Materials: *Julia Greer*[1]; Amylynn Chen[1]; Zane Taylor[1]; Xiaoxing Xia[1]; [1]California Institute of Technology

8:25 AM Invited
Design of Multifunctional Architected Materials: *James Guest*[1]; [1]Johns Hopkins University

8:50 AM Invited
Using Solid-liquid Phase Transformation in Fusible Metals as a Self-healing Mechanism for Next Generation Metal-ion Battery Anodes: Lin Wang[1]; *Eric Detsi*[1]; [1]University of Pennsylvania

9:15 AM Invited
Room-temperature Electrochemical Healing of Difficult-to-weld Metallic Materials: *James Pikul*[1]; [1]University of Pennsylvania

9:40 AM Break

10:00 AM Invited
Self-healing of Fiber-composite Laminates via In Situ Thermal Remending: *Jason Patrick*[1]; Alexander Snyder[1]; Zachary Phillips[1]; [1]North Carolina State University

10:25 AM Invited
Linked Metamaterials with Adaptable Stiffness: *Chiara Daraio*[1]; [1]ETH Zurich

10:50 AM
Novel Zr-based Alloy with Low Young's Modulus and Magnetic Susceptibility for Biomedical Implants: *Ligang Zhang*[1]; Renhao Xue[1]; Dong Wang[1]; Libin Liu[1]; [1]Central South University

---

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Ferrous Alloys

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Ramasis Goswami, Naval Research Laboratory; Saurabh Puri, Microstructure Engineering; Eric Payton, Air Force Research Laboratory; Bij-Na Kim, Carpenter Additive; Megumi Kawasaki, Oregon State University; Eric Lass, University of Tennessee-Knoxville

Tuesday AM | March 1, 2022
255B | Anaheim Convention Center

Session Chair: Megumi Kawasaki, Oregon State University

8:00 AM
Kinetics of Phase Transformations in Boron-containing 304L Stainless Steel: *Erin Barrick*[1]; James (Tony) Ohlhausen[1]; Donald Susan[1]; Khalid Hattar[1]; Jack Herrmann[1]; Peter Duran[1]; Jeffrey Rodelas[1]; Charles Robino[1]; [1]Sandia National Laboratories

8:20 AM
Structural Evolution by Grain Refinement and Relaxation upon Heating of an Additive-manufactured 316L Stainless Steel: Jae-Kyung Han[1]; Xiaojing Liu[2]; Yusuke Onuki[3]; Yulia Kuzminova[4]; Stanislav Evlashin[4]; Klaus-Dieter Liss[2]; *Megumi Kawasaki*[1]; [1]Oregon State University; [2]Guangdong Technion - Israel Institute of Technology; [3]Ibaraki University; [4]Skolkovo Institute of Science and Technology

8:40 AM
Cluster Evolution and Phase Transformation in Austenitic High-Cr Stainless Steel: A Comparison of Thin Film and Bulk Geometries: *Po-Cheng Kung*[1]; Jian-Min Zuo[1]; Jessica Krogstad[1]; [1]University of Illinois Urbana Champaign

9:00 AM
Phase Separation under Irradiation in FeNi and Low-alloyed Steels: *Quentin Tence*[1]; Maylise Nastar[1]; Estelle Meslin[1]; Isabelle Mouton[2]; Brigitte Décamps[3]; [1]CEA Saclay, Service de Recherche en Métallurgie Physique, Université Paris Saclay; [2]CEA Saclay, Service de Recherche en Métallurgie Appliquée, Université Paris Saclay; [3]CNRS, IJC-Lab, Université Paris Saclay

9:20 AM
Leveraging EBSD Data for Phase Transformation Product Quantification in a Low Carbon Steel by Deep Learning: Simon Breumier[1]; *Tomas Ostormujof*[2]; Nathalie Gey[3]; Audrey Couturier[4]; Pierre-Emmanuel Aba-perea[1]; Bianca Frincu[4]; Natalia Loukachenko[4]; Lionel Germain[2]; [1]Institut de Recherche Technologique Matériaux, Métallurgie et Procédés - 4, rue Augustin Fresnel F-57078 Metz France; [2]Laboratory of Excellence on Design of Alloy Metals for Low-mAss Structures (DAMAS), Université de Lorraine, France; [3]Université de Lorraine, CNRS, Arts et Métiers Paris Tech, LEM3, F-57000 Metz, France; [4]INDUSTEEL (ArcelorMittal), Centre de Recherche des Matériaux du Creusot (CRMC), Le Creusot, France

---

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Ferrous Alloys

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Ramasis Goswami, Naval Research Laboratory; Saurabh Puri, Microstructure Engineering; Eric Payton, Air Force Research Laboratory; Bij-Na Kim, Carpenter Additive; Megumi Kawasaki, Oregon State University; Eric Lass, University of Tennessee-Knoxville

Tuesday AM | March 1, 2022
255B | Anaheim Convention Center

Session Chair: Megumi Kawasaki, Oregon State University

8:00 AM
Kinetics of Phase Transformations in Boron-containing 304L Stainless Steel: *Erin Barrick*[1]; James (Tony) Ohlhausen[1]; Donald Susan[1]; Khalid Hattar[1]; Jack Herrmann[1]; Peter Duran[1]; Jeffrey Rodelas[1]; Charles Robino[1]; [1]Sandia National Laboratories

8:20 AM
Structural Evolution by Grain Refinement and Relaxation upon Heating of an Additive-manufactured 316L Stainless Steel: Jae-Kyung Han[1]; Xiaojing Liu[2]; Yusuke Onuki[3]; Yulia Kuzminova[4]; Stanislav Evlashin[4]; Klaus-Dieter Liss[2]; *Megumi Kawasaki*[1]; [1]Oregon State University; [2]Guangdong Technion - Israel Institute of Technology; [3]Ibaraki University; [4]Skolkovo Institute of Science and Technology

8:40 AM
Cluster Evolution and Phase Transformation in Austenitic High-Cr Stainless Steel: A Comparison of Thin Film and Bulk Geometries: *Po-Cheng Kung*[1]; Jian-Min Zuo[1]; Jessica Krogstad[1]; [1]University of Illinois Urbana Champaign

9:00 AM
Phase Separation under Irradiation in FeNi and Low-alloyed Steels: *Quentin Tence*[1]; Maylise Nastar[1]; Estelle Meslin[1]; Isabelle Mouton[2]; Brigitte Décamps[3]; [1]CEA Saclay, Service de Recherche en Métallurgie Physique, Université Paris Saclay; [2]CEA Saclay, Service de Recherche en Métallurgie Appliquée, Université Paris Saclay; [3]CNRS, IJC-Lab, Université Paris Saclay

9:20 AM
Leveraging EBSD Data for Phase Transformation Product Quantification in a Low Carbon Steel by Deep Learning: Simon Breumier[1]; *Tomas Ostormujof*[2]; Nathalie Gey[3]; Audrey Couturier[4]; Pierre-Emmanuel Aba-perea[1]; Bianca Frincu[4]; Natalia Loukachenko[4]; Lionel Germain[2]; [1]Institut de Recherche Technologique Matériaux, Métallurgie et Procédés - 4, rue Augustin Fresnel F-57078 Metz France; [2]Laboratory of Excellence on Design of Alloy Metals for Low-mAss Structures (DAMAS), Université de Lorraine, France; [3]Université de Lorraine, CNRS, Arts et Métiers Paris Tech, LEM3, F-57000 Metz, France; [4]INDUSTEEL (ArcelorMittal), Centre de Recherche des Matériaux du Creusot (CRMC), Le Creusot, France

---

ADDITIVE TECHNOLOGIES

Powder Materials Processing and Fundamental Understanding — Additive Manufacturing II

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, Pacific Northwest National Laboratory

Tuesday AM | March 1, 2022
263C | Anaheim Convention Center

Session Chairs: Ruigang Wang, The University of Alabama; Isabella Van Rooyen, Pacific Northwest National Laboratory

---

8:00 AM
Additive Manufacturing of Ionic Liquids Harvested Metal for Martian Habitation: *Blake Stewart*[1]; Haley Doude[1]; Jennifer Edmunson[2]; Eric Fox[2]; Hongjoo Rhee[1]; [1]Mississippi State University; [2]National Aeronautics and Space Administration

8:20 AM
Challenges Associated with Micro-additive Manufactured 316 and 17-4PH Stainless Steel Components Produced by Binder Jet and Direct Metal Laser Sintering: *Michael Pires*[1]; Chia-chun Chao[1]; Gregory Pawlikowski[2]; Rodney Martens[2]; Bradley Schultz[2]; Martin Bayes[2]; Masashi Watanabe[1]; Wojciech Misiolek[1]; [1]Lehigh University; [2]TE Connectivity Corporation

8:40 AM
Direct Powder Combination, Consolidation, and Forming of Metals and Composites via Solid-state Additive Manufacturing: *Robert Griffiths*[1]; Hunter Rauch[1]; Hang Yu[1]; [1]Virginia Polytechnic Institute

9:00 AM
Effect of Powder Reuse on Mechanical Behavior of Additively Manufactured Ti-6Al-4V: Shuai Shao[1]; *Arash Soltani-Tehrani*; Nima Shamsaei[1]; [1]Auburn University

---

ELECTRONIC MATERIALS

Recent Advances in Printed Electronics and Additive Manufacturing: 2D/3D Functional Materials, Fabrication Processes, and Emerging Applications — Functional Materials and 2D/3D Devices III

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; Yong Lin Kong, University of Utah; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Changyong Cao, Michigan State University; David Estrada, Boise State University; Nuggehalli Ravindra, New Jersey Institute of Technology

Tuesday AM | March 1, 2022
303C | Anaheim Convention Center

Session Chairs: David Estrada, Boise State University; Konstantinos Sierros, West Virginia University; David Bird, US Army

---

8:00 AM Invited
Enabling Sustainability and Circularity Through Big Area Additive Manufacturing: Katie Copenhaver[1]; Meghan Lamm[1]; Matthew Korey[1]; Mitchell Rencheck[1]; Xianhui Zhao[1]; Halil Tekinalp[1]; *Soydan Ozcan*[1]; [1]Oak Ridge National Laboratory

8:25 AM
Electrohydrodynamic Printing as an Enabler for High Resolution Deposition: Direct and Hybrid Printing Strategies: *Harrison Loh*[1]; Konstantinos Sierros[1]; [1]West Virginia University

8:45 AM
Engineered Low Density Polymers Within Additively Manufactured Polyacrylates: *Elbert Caravaca*[1]; David Bird[1]; Katlyn Hanson[2]; Nuggehalli Ravindra[3]; [1]CCDC-Armament Center, FCDD-ACM-EP; [2]LEIDOS; [3]New Jersey Institute of Technology

9:05 AM Invited
Evaluation of Graphene Based Materials for Electromagnetic Shielding: *Eugene Zakar*[1]; Theodore Anthony[1]; Wayne Churaman[1]; Madan Dubey[1]; [1]Army Research Laboratory

9:30 AM Break

9:45 AM
Imbibition Control of Polymer Solutions via Molecular Weight and Surface Functionalization onto Nanoporous Metal Media: *Amm Hasib*[1]; Bruno Azeredo[1]; [1]Arizona State University

10:05 AM Invited
Self-limiting Electrospray Deposition Post-processing with Functional Materials: *Jonathan Singer*[1]; [1]Rutgers University

10:30 AM
Isolation of Monolayer Black Phosphorus for Additive Manufacturing of Optoelectronic Devices: *Florent Muramutsa*[1]; Ariel Briggs[1]; Joshua Wood[2]; Chad Husko[2]; Jonathan Logan[2]; Samuel Pedersen[3]; Brian Jaques[3]; David Estrada[4]; [1]Boise State University; [2]Iris Light Technologies, Inc.; [3]Boise State University, Center for Advanced Energy Studies; [4]Boise State University, Center for Advanced Energy Studies, Idaho National Laboratory

---

ADVANCED MATERIALS

Refractory Metals — Alloy Development, Silicides, and Hardmetals

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

Program Organizers: Eric Taleff, University of Texas at Austin; Lauren Garrison, Oak Ridge National Laboratory; Alexander Knowles, University of Birmingham

Tuesday AM | March 1, 2022
252B | Anaheim Convention Center

Session Chairs: Eric Taleff, The University of Texas at Austin; Anke Silvia Ulrich, DECHEMA Forschungsinstitut

---

8:00 AM Invited
Development of Heat-treatable Crss-Cr3Si-based Alloys: Microstructure, Oxidation, and Creep: Anke Ulrich[1]; Petra Pfizenmaier[2]; Uwe Glatzel[2]; *Mathias Galetz*[1]; [1]Dechema-Forschungsinstitut; [2]University Bayreuth

8:20 AM
Effect of Heating Rate and Substrate on the Oxidation Behavior of Hafnium Aluminum Diboride Thin Films: *Samyukta Shrivastav*[1]; Dana Yun[1]; Carly Romnes[1]; Kinsey Canova[1]; John Abelson[1]; Jessica Krogstad[1]; [1]University of Illinois at Urbana Champaign

8:40 AM
Oxidation Behavior of Mo-Si-B-Al Alloys at Elevated Temperature: *Longfei Liu*[1]; Ranran Su[1]; John Perepezko[1]; [1]University of Wisconsin-Madison

9:00 AM
Hydrogen Reduction of Cobalt(II,III) Oxide to Make Sub-micron and Micron Size Cobalt Metal Powder for WC-Co Synthesis: *Raj Singh Gaur*[1]; Thomas Jewett[2]; Scott Braymiller[2]; [1]SH Chemicals; [2]Global Tungsten and Powders

---

ENERGY & ENVIRONMENT

REWAS 2022: Coupling Metallurgy and Sustainability: An EPD Symposium in Honor of Diran Apelian — Building Sustainability in Metals through Partnerships

Sponsored by: TMS: Recycling and Environmental Technologies Committee, TMS: Aluminum Committee

Program Organizers: Elsa Olivetti, Massachusetts Institute of Technology; Brajendra Mishra, Worcester Polytechnic Institute; Bart Blanpain, Ku Leuven; Adam Powell, Worcester Polytechnic Institute; Mertol Gökelma, Izmir Institute of Technology; Camille Fleuriault, Eramet Norway

Tuesday AM | March 1, 2022
211A | Anaheim Convention Center

Session Chair: Brajendra Mishra, Worcester Polytechnic Institute

---

8:00 AM Introductory Comments

8:05 AM Invited
A Foundation for Learning and Collaboration to Solve Future Societal Challenges: *Christina Meskers*[1]; Maurits Van Camp[2]; [1]Norwegian University of Science & Technology; [2]University of Queensland

8:30 AM Invited
Electrochemical Pathways Towards Sustainable Energy: *Donald Sadoway*[1]; [1]Massachusetts Institute of Technology

8:55 AM Invited
How the Implications of Force Majeure Resulted in the Adoption of More Sustainable Materials: Kevin Anderson[1]; Jason Mallek[1]; Miles Gathright[2]; *James Miller*[3]; Tina Glass[3]; Lee Berry[4]; [1]Brunswick-Mercury Marine; [2]Brunswick - Boston Whaler; [3]Celanese Corporation; [4]Mafic Corporation

9:15 AM Invited
Industry-University Collaboration in Metals Processing and Recycling: Challenges and Lessons Learned from a Regional and Global Perspective: *Bart Blanpain*[1]; [1]KU Leuven

9:40 AM Break

9:55 AM Invited
Materials-aware STEM Education as a Foundation for a Sustainable World: *Glenn Daehn*[1]; [1]Ohio State University

10:20 AM Invited
New Approaches for Implementing and Teaching Sustainability: *Carol Handwerker*[1]; [1]Purdue University

10:45 AM Invited
Sustainable Development of Materials: Combining Chemicals Management, Life Cycle Thinking and the Circular Economy: *Julie Schoenung*[1]; [1]University of California, Irvine

11:10 AM Invited
The Legacy of Prof. Diran Apelian: In Retrospect: *Brajendra Mishra*[1]; [1]Worcester Polytechnic Institute

---

ENERGY & ENVIRONMENT

REWAS 2022: Energy Technologies and CO2 Management — Energy Efficiency, Decarbonization and CO2 Management

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

Program Organizers: Fiseha Tesfaye, Åbo Akademi University; Lei Zhang, University of Alaska Fairbanks; Donna Guillen, Idaho National Laboratory; Ziqi Sun, Queensland University of Technology; Alafara Baba, University of Ilorin; Neale Neelameggham, IND LLC; Mingming Zhang, Wood Mackenzie; Dirk Verhulst, Consultant, Extractive Metallurgy and Energy Efficiency; Shafiq Alam, University of Saskatchewan; Mertol Gökelma, Izmir Institute of Technology; Camille Fleuriault, Eramet Norway; Chukwunwike Iloeje, Argonne National Laboratory

Tuesday AM | March 1, 2022
212A | Anaheim Convention Center

Session Chair: Camille Fleuriault, Eramet Norway

8:00 AM Introductory Comments

8:05 AM Invited
Circored Fine Ore Direct Reduction Plus DRI Smelting - Proven Technologies for the Transition towards Green Steel: Sebastian Lang[1]; Timo Haimi[2]; Max Koepf[1]; *Roberto Valery*[3]; [1]Metso Outotec GmbH & Co KG; [2]Metso Outotec Oy; [3]Metso Outotec Germany GmbH - Oberursel (Taunus)

8:35 AM
Treatment of an Indigenous Lepidolite Ore for Sustainable Energy Considerations: *Alafara Baba*[1]; Daud Olaoluwa[1]; Kuranga Ayinla[1]; Abdullah Ibrahim[1]; Ayo Balogun[1]; Sadisu Girigisu[1]; Oluwagbemiga Adebola[1]; Jumoke Fasiku[1]; [1]University of Ilorin

8:55 AM Invited
To Decarbonize Industry, We Must Decarbonize Heat: *Addison Stark*[1]; [1]Clark Street Associates

9:25 AM
Benefits of a Smart Electrical Energy Management Information System and Its Impact in Your CO2 Footprint: *Hector Linares*[1]; [1]Carmeuse

9:45 AM Break

10:00 AM Invited
Energy Efficiency, Electrification, and Low-carbon Fuels & Energy Sources for Decarbonizing Materials Industry: *Sachin Nimbalkar*[1]; Chukwunwike Iloeje[2]; Joe Cresko[3]; [1]Oak Ridge National Laboratory; [2]Argonne National Laboratory; [3]U.S. Department of Energy

10:25 AM
Geomimicry Inspired MicroNano Concrete as Subsurface Hydraulic Barrier Materials: Learning from Shale Rocks as Best Geological Seals: *Cody Massion*[1]; Vamsi S.K. Vissa[1]; Yunxing Lu[2]; Dustin Crandall[3]; Andrew Bunger[2]; Mileva Radonjic[1]; [1]Oklahoma State University; [2]University of Pittsburgh; [3]National Energy Technology Laboratory

10:45 AM Invited
Radiative Cooling: Harnessing the Cold of Space as a Renewable Thermodynamic Resource: *Aaswath Raman*[1]; [1]UCLA Samueli School of Engineering

11:10 AM
Solidification of Salt Hydrate Eutectics Using Multiple Nucleation Agents: *Sophia Ahmed*[1]; Robert Mach[1]; Haley Jones[1]; Fabiola Alamo[1]; Patrick Shamberger[1]; [1]Texas A&M University

11:30 AM
The Influence of H_2 and CO Atmospheres on SiO Formation: *Trygve Aarnæs*[1]; Eli Ringdalen[2]; Merete Tangstad[1]; [1]Norwegian University of Science and Technology; [2]SINTEF Industry

ENERGY & ENVIRONMENT

REWAS 2022: Sustainable Production and Development Perspectives — Developing Responsible Production Practices and Supply Chains

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

Program Organizers: Mertol Gökelma, Izmir Institute of Technology; Mingming Zhang, Wood Mackenzie; Elsa Olivetti, Massachusetts Institute of Technology; Gerardo Alvear, Glencore Technology; Camille Fleuriault, Eramet Norway

Tuesday AM | March 1, 2022
211B | Anaheim Convention Center

Session Chairs: Adamantia Lazou, Norwegian University of Science and Technology; Katrin Daehn, Massachusetts Institute of Technology

---

8:00 AM Introductory Comments

8:05 AM Invited
Process Simulation and Digitization for Integrated Circularity and Life Cycle Sustainability Assessment of Silicon, Perovskite and Tandem Photovoltaic Systems: Neill Bartie[1]; Lucero Cobos-Becerra[2]; Magnus Fröhling[3]; Rutger Schlatmann[2]; *Markus Reuter*[4]; [1]Technische Universität Braunschweig, Technical University of Munich; [2]Helmholtz-Zentrum Berlin für Materialien und Energie; [3]Technical University of Munich; [4]SMS Group GmbH

8:35 AM
Economics-informed Material System Modeling of the Copper Supply Chain: *John Ryter*[1]; Xinkai Fu[1]; Karan Bhuwalka[1]; Richard Roth[1]; Elsa Olivetti[1]; [1]Massachusetts Institute of Technology

8:55 AM
Environmental Benefits of Closing the Solar Manufacturing and Recycling Loop: *Robert Flores*[1]; Haoyang He[1]; Parikhit Sinha[2]; Garvin Heath[3]; Paul Leu[4]; Julie Schoenung[1]; [1]University of California, Irvine; [2]First Solar; [3]National Renewable Energy Laboratory; [4]University of Pittsburgh

9:15 AM
Life Cycle Sustainability Assessment of Repair through Wire and Arc Additive Manufacturing: *Emanuele Pagone*[1]; Joachim Antonissen[2]; Filomeno Martina[3]; [1]Cranfield University; [2]Guaranteed BV; [3]WAAM3D

9:35 AM Break

9:55 AM
Brass Jewelry: A Sustainability Assessment: *Christopher Glaubensklee*[1]; Annalise Kramer[1]; Amir Saeidi[1]; Haoyang He[1]; Julie Schoenung[1]; [1]University of California, Irvine

10:15 AM
The UK Transforming the Foundation Industries Research and Innovation Hub (TransFIRe): Mark Jolly[1]; Anne Velenturf[2]; *Konstantinos Salonitis*[1]; Sanjooram Paddea[1]; [1]Cranfield University; [2]University of Leeds

10:35 AM
The REMADE Institute: R&D to Accelerate the Transition to a Circular Economy: *Edward Daniels*[1]; [1]REMADE Institute

10:55 AM
Chemical Hazard Assessment of Electrolyte Compounds for Lithium-ion Batteries: Branden Schwaebe[1]; *Haoyang He*[1]; Christopher Glaubensklee[1]; Julie Schoenung[1]; [1]University of California, Irvine

11:15 AM
Lithium Ion and Flow Batteries for Energy Storage: A Chemical Hazard Assessment: *Haoyang He*[1]; Shan Tian[1]; Chris Glaubensklee[1]; Brian Tarroja[1]; Scott Samuelsen[1]; Oladele Ogunseitan[1]; Julie Schoenung[1]; [1]University of California Irvine

---

CHARACTERIZATION

Seeing is Believing -- Understanding Environmental Degradation and Mechanical Response Using Advanced Characterization Techniques: An SMD Symposium in Honor of Ian M. Robertson — Deformation and Plasticity

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Nuclear Materials Committee

Program Organizers: Kaila Bertsch, Lawrence Livermore National Laboratory; Khalid Hattar, Sandia National Laboratories; Josh Kacher, Georgia Institute of Technology; Bai Cui, University of Nebraska-Lincoln; Benjamin Eftink, Los Alamos National Laboratory; Stephen House, University of Pittsburgh; May Martin, National Institute of Standards and Technology; Kelly Nygren, Cornell High Energy Synchrotron Source; Blythe Clark, Sandia National Laboratories; Shuai Wang, Southern University of Science and Technology

Tuesday AM | March 1, 2022
207C | Anaheim Convention Center

Session Chairs: Josh Kacher, Georgia Institute of Technology; Stephen House, University of Pittsburgh/ECC; Blythe Clark, Sandia National Laboratory

---

8:00 AM Invited
Elucidating Dislocation-interface Interactions via In Situ Straining in the Electron Microscope: *Nathan Mara*[1]; [1]University of Minnesota

8:30 AM Invited
Interaction of Glide Dislocations with Interfaces in Mg Alloys: M. T. Andani[1]; Z. Huang[1]; C. Yang[1]; A. Lakshmanan[1]; L. Qi[1]; V. Sundararaghavan[1]; J. Allison[1]; *Amit Misra*[1]; [1]University of Michigan

9:00 AM Invited
Investigation of Slip Transmission through a Complete Grain-level Assessment of the Stress-strain Evolution in Polycrystalline Alloys: *Michael Sangid*[1]; John Rotella[1]; Diwakar Naragani[1]; Jun-Sang Park[2]; Peter Kenesei[2]; Paul Shade[3]; [1]Purdue University; [2]Argonne National Laboratory; [3]Air Force Research Laboratory

9:30 AM Break

9:45 AM Invited
Deformation by Dislocations, Twinning, and Phase Transformations in Compositionally Complex FCC Solid Solutions: *Michael Mills*[1]; Connor Slone[2]; Jiashi Miao[1]; Veronika Mazanova[1]; Mulaine Shih[1]; Milan Heczko[1]; Maryam Ghazisaeidi[1]; [1]Ohio State University; [2]Exponent

10:15 AM Invited
Multifaceted Research in Plasticity: *Huseyin Sehitoglu*[1]; Sameer Mohammed[1]; [1]University of Illinois

10:45 AM Invited
Modeling Grain Boundary Mediated Plasticity with Massively Parallel Atomistic Simulations: *Timofey Frolov*[1]; Nicolas Bertin[1]; Tomas Oppelstrup[1]; [1]Lawrence Livermore National Laboratory

---

NANOSTRUCTURED MATERIALS

Self-organizing Nano-architectured Materials — Synthesis: Novel Approaches

Program Organizers: Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Ian McCue, Northwestern University; Erica Lilleodden, Helmholtz-Zentrum hereon; Pierre-Antoine Geslin, CNRS / INSA-Lyon; Qing Chen, Hong Kong University of Science & Technology

Tuesday AM | March 1, 2022
260C | Anaheim Convention Center

Session Chairs: Ian McCue, Northwestern University; Andrea Hodge, University of Southern California

---

8:00 AM Invited
Composite Hierarchical Structures: *Andrea Hodge*[1]; [1]University of Southern California

8:30 AM Invited
3D Printing of Biomimetic Hierarchical Architectures by Integration of Self-organized Nanoporous Materials: *Juergen Biener*[1]; [1]Lawrence Livermore National Laboratory

9:00 AM Invited
Additive Manufacturing of Nanoporous Nanostructures: *Wendy Gu*[1]; Qi Li[1]; John Kulikowski[1]; David Doan[1]; [1]Stanford University

9:30 AM Break

9:50 AM
Hierarchically Porous Gold via 3D Printing and Dealloying for Selective Electrochemical Reduction of CO_2 to CO with Enhanced Mass Transport: *Jintao Fu*[1]; Shahryar Mooraj[2]; Shuai Feng[2]; Wen Chen[2]; Eric Detsi[1]; [1]University of Pennsylvania; [2]University of Massachusetts

10:10 AM Invited
Programming Self-assembly of Designed Nano-architectured Materials: *Oleg Gang*[1]; [1]Columbia University

10:40 AM
Centimeter-scale Crack-free Self-assembly for Ultra-high Tensile Strength Metallic Nanolattices: *Zhimin Jiang*[1]; James Pikul[1]; [1]University of Pennsylvania

11:00 AM
Kinetic Monte-Carlo Simulations of Vapor Phase Dealloying: *Longhai Lai*[1]; Alain Karma[1]; [1]Northeastern University

---

MECHANICS & STRUCTURAL RELIABILITY

Structural Metamaterials — Session III

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

Program Organizers: Amy Wat, Lawrence Livermore National Laboratory; Brad Boyce, Sandia National Laboratories; Xiaoyu Zheng, University of California, Los Angeles; Fabrizio Scarpa, University of Bristol; Robert Ritchie, University of California, Berkeley

Tuesday AM | March 1, 2022
304A | Anaheim Convention Center

Session Chair: To Be Announced

8:00 AM
Single Test Evaluation and Design of Directional Elastic Properties in Anisotropic Materials: *Jagannadh Boddapati*[1]; Moritz Flaschel[2]; Siddhant Kumar[3]; Laura De Lorenzis[2]; Chiara Daraio[1]; [1]California Institute of Technology; [2]ETH Zürich; [3]Delft University of Technology

8:20 AM Invited
Topological States and Bandgaps in Dimerized Minimal Surfaces: Massimo Ruzzene[1]; Matheus Rosa[1]; *Yuning Guo*[1]; [1]University of Colorado

9:00 AM
Machine Learning of Symbolic Expressions to Model Dispersion Curves in Metamaterials: *Hongsup Oh*[1]; Sharat Paul[1]; Alberdi Ryan[2]; Robbins Joshua[2]; Pai Wang[1]; Jacob Hochhalter[1]; [1]University of Utah; [2]Sandia National Laboratories

9:20 AM Break

9:40 AM
Large-strain Compressive Response and Failure Mechanisms of Additively Manufactured Cubic Chiral Lattices: *Caterina Iantaffi*[1]; Eral Bele[1]; Chu Lun Alex Leung[1]; Martina Meisnar[2]; Thomas Rohr[2]; Peter D. Lee[1]; [1]University College London; [2]ESA-ESTEC

10:00 AM Invited
Exceptional Mechanical Properties of Additively Manufactured Nano-architected Materials with Complex Topologies: *Lorenzo Valdevit*[1]; [1]University of California, Irvine

---

NUCLEAR MATERIALS

Synergistic Irradiation, Corrosion, and Microstructural Evolution in Nuclear Materials — Irradiation-Corrosion of Materials in Light Water Reactors I

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

Program Organizers: Djamel Kaoumi, North Carolina State University; Michael Short, Massachusetts Institute of Technology; Peter Hosemann, University of California, Berkeley; Stephen Raiman, Texas A&M University; Raluca Scarlat, University of California, Berkeley; Aaron Kohnert, Los Alamos National Laboratory; Ryan Schoell, North Carolina State University; Philip Edmondson, Oak Ridge National Laboratory; Celine Cabet, Commissariat a l'Energie Atomique

Tuesday AM | March 1, 2022
202A | Anaheim Convention Center

Session Chair: To Be Announced

8:00 AM Invited
Synergistic Processes in Irradiation-corrosion of Materials in High Temperature Water: Rigel Hanbury[1]; Peng Wang[1]; Stephen Raiman[1]; *Gary Was*[1]; [1]University of Michigan

8:30 AM
Effect of Ion Irradiation on the Corrosion of 304SS in PWR Simulated Water Chemistry: *Fu-Yun Tsai*[1]; Ryan Schoell[1]; Khalid Hattar[2]; Djamel Kaoumi[1]; [1]North Carolina State University; [2]Sandia National Laboratories

8:50 AM
Investigation of Hydrogen Trapping by Irradiation-induced Defects in 316L Stainless Steel: *Frantz Martin*[1]; Anne-Cécile Bach[2]; S. Perrin[3]; F. Jomard[4]; Cecilie Duhamel[4]; Jerome Crepin[5]; [1]Université Paris-Saclay, CEA; [2]Université Paris-Saclay, CEA, MINES ParisTech, PSL Research University; [3]CEA, DES, ISEC, DE2D, SEAD, LCBC, University of Montpellier; [4]Groupe d'Etude de la Matière Condensée, CNRS, UVSQ; [5]MINES ParisTech, PSL Research University

9:10 AM
Effects of Water Radiolysis and Displacement Damage during Simultaneous Irradiation and Corrosion of 316L Stainless Steel: *Rigel Hanbury*[1]; Jonas Heuer[2]; Gary Was[1]; [1]University of Michigan; [2]Naval Nuclear Laboratory

9:30 AM Break

9:50 AM
Effects of Pre-irradiation on the Corrosion Behavior of I600 in Hydrogenated Water: *Ryan Schoell*[1]; Fu-Yun Tsai[1]; Peter Baldo[2]; Yongqiang Wang[3]; Djamel Kaoumi[1]; [1]North Carolina State University; [2]Argonne National Laboratory ; [3]Los Alamos National Laboratory

10:10 AM
The Role of Surface and Interfacial Chemistry in Hydrogen Corrosion of Uranium: *Shohini Sen-Britain*[1]; Yaakov Idell[1]; Wigbert Siekhaus[1]; Kerri Blobaum[1]; Bill Mclean[1]; [1]Lawrence Livermore National Laboratory

10:30 AM
Cooperative Role of Pressure- and Corrosion on Stress Buildup of the High Temperature LWR Pipes: *Asghar Aryanfar*[1]; Jaime Marian[2]; [1]American University of Beirut; [2]University of California Los Angeles

---

NANOSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XII) — Microstructure, Mechanisms & Property I

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Penghui Cao, University of California, Irvine; Xiaoxu Huang, Chongqing University; Enrique Lavernia, University of California, Irvine; Xiaozhou Liao, University of Sydney; Lee Semiatin, Material Resources LLC; Nobuhiro Tsuji, Kyoto University; Caizhi Zhou, University of South Carolina; Yuntian Zhu, City University of Hong Kong

Tuesday AM | March 1, 2022
262A | Anaheim Convention Center

Session Chairs: Yuntian Zhu, City University of Hong Kong; Xiaolei Wu, Institute of Mechanics, Chinese Academy; Hao Zhou, Nanjing University of Science and Technology

---

8:00 AM
Strain Hardening and Ductility by Grain Refinement-induced Plasticity in Multi-level Hetero-structured Brass: *Xiaolei Wu*[1]; [1]Chinese Academy of Sciences

8:20 AM
Ultra-high Strength and Ductility of a Multiple Component Alloy with a Heterogeneous Microstructure of Grains and Precipitates: Weitong Wang[1]; Shengyun Yuan[1]; *Yong Zhang*[1]; [1]Nanjing University of Science and Technology

8:40 AM
Microstructural Evolution and Tensile Properties of Nano-crystalline Twinning Induced Plasticity Steel Produced by High-pressure Torsion: *Gyeonghyeon Jang*[1]; Jae Nam Kim[1]; Hakhyeon Lee[1]; Taekyung Lee[2]; Nariman Enikeev[3]; Marina Abramova[3]; Ruslan Z Valiev[3]; Hyoung Seop Kim[1]; Chong Soo Lee[1]; [1]Pohang University of Science & Technology; [2]Pusan National University; [3]Ufa State Aviation Technical University

---

SPECIAL TOPICS

TMS2022 All-Conference Plenary

Tuesday PM | March 1, 2022
Ballroom A-D | Anaheim Convention Center

Session Chair: Ellen Cerreta, Los Alamos National Laboratory

12:00 PM Plenary
Alloy Design at Apple: *James Yurko*[1]; [1]Apple Materials Engineering

---

NANOSTRUCTURED MATERIALS

30 Years of Nanoindentation with the Oliver-Pharr Method and Beyond — Extreme Environments

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

Program Organizers: Verena Maier-Kiener, Montanuniversitaet Leoben; Benoit Merle, University Erlangen-Nuremberg (Fau); Erik Herbert, Michigan Technological University; Samantha Lawrence, Los Alamos National Laboratory; Nigel Jennett, Coventry University

Tuesday PM | March 1, 2022
259A | Anaheim Convention Center

Session Chairs: Matt Pharr, Texas A&M University; Samantha Lawrence, Los Alamos National Laboratory

---

2:30 PM Invited
Nanoindentations on Nuclear Reactor Relevant Materials: *Peter Hosemann*[1]; Stuart Maloy[2]; Robert Odette[3]; X Huang[1]; Jeffrey Bickle[1]; [1]University of California, Berkeley; [2]Los Alamos National Laboratory; [3]University of California, Santa Barbara

2:55 PM Invited
Adapting Nanoindentation for In-situ Electron Microscopy Experiments in Coupled Environments: *Khalid Hattar*[1]; Shen Dillon[2]; Brad Boyce[1]; Katherine Jungjohann[1]; [1]Sandia National Laboratories; [2]University of California, Irvine

3:20 PM
Nanoindentation of Zoned Radiation-damaged Zircon: Micro-pillar Splitting and Mechanical Properties Mapping: *Tobias Beirau*[1]; Edoardo Rossi[2]; Marco Sebastiani[2]; Warren Oliver[3]; Herbert Pöllmann[1]; Rodney Ewing[4]; [1]Martin Luther University Halle-Wittenberg; [2]"Roma TRE" University; [3]KLA-Tencor; [4]Stanford University

3:40 PM Invited
Indentation Measurements of the Coupled Electrochemical-mechanical Behavior of Materials for Making Better Batteries: *Yang-Tse Cheng*[1]; [1]University of Kentucky

4:05 PM Break

4:25 PM Invited
Nanomechanics of Materials for High-capacity Rechargeable Batteries: *Matt Pharr*[1]; [1]Texas A&M University

---

SPECIAL TOPICS

Acta Materialia Symposium — Acta Materialia Award Session

Program Organizer: Carolyn Hansson, University of Waterloo

Tuesday PM | March 1, 2022
Ballroom E | Anaheim Convention Center

Session Chair: Carolyn Hansson, University of Waterloo

3:00 PM Introductory Comments

3:10 PM Presentation of Acta Student Awards

3:30 PM Invited
Acta Materialia Gold Medal Lecture: Sustainable Physical Metallurgy: Making Green Steel with Hydrogen: *Dierk Raabe*[1]; [1]Max-Planck lnstitut fur Eisenforschung

3:50 PM Invited
Acta Materialia Silver Medal Lecture: Dwell Fatigue and In-service Cracking in Jet Engine Titanium: *David Dye*[1]; [1]Imperial College

4:10 PM Question and Answer Period

4:20 PM Invited
Acta Materialia Hollomon Award for Materials and Society: Advanced Ceramics for Energy Storage and Green Hydrogen Production: *Alexander Michaelis*[1]; [1]Fraunhofer Institute of Ceramic Technologies and Systems, IKTS

4:40 PM Question and Answer Period

4:50 PM Invited
Acta Materialia Mary Fortune Global Diversity Lecture: Engaging a Diverse Student Body through Education, Outreach and Mentorship: *Amber Genau*[1]; [1]University of Alabama at Birmingham

5:10 PM Question and Answer Period

5:20 PM Brief break for prepare for reception

5:30 PM Wine and Cheese Reception with Posters: Student Award Winners in Acta Materialia Symposium:

Cemile Basgul - Thermal Localization Improves the Interlayer Adhesion and Structural Integrity of 3D Printed PEEK Lumbar Spinal Cages; Alice Cervellon - Crack Initiation Mechanisms of Ni-based Single-crystal Superalloys in the Very High Cycle Fatigue Regime at High Temperature; Sebastian Kube - Metastability in High Entropy Alloys; William Meador - A Detailed Mechanical and Microstructural Analysis of the Ovine Tricuspid Valve Leaflets; Jonathan Priedeman - The Influence of Alloying in Stabilizing a Faceted Grain Boundary Structure; Shaolou Wei, Cemal Cem Tasan - Deformation Faulting in a Metastable CoCrNiW Complex Concentrated Alloy: A Case of Negative Intrinsic Stacking Fault Energy?

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture: Developing Predictive Capabilities — Surface Roughness and Porosity Effects

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 1, 2022
258B | Anaheim Convention Center

Session Chairs: Nik Hrabe, National Institute of Standards and Technology (NIST); Jake Benzing, National Institute of Standards and Technology (NIST)

2:30 PM Invited
Additive Manufacturing Surface Roughness Formation, Characterization, and Influence on Fatigue Performance: *Joy Gockel*[1]; Rachel Evans[2]; Edwin Glaubitz[1]; Anna Dunn[2]; Wesley Eidt[2]; [1]Colorado School of Mines; [2]Wright State University

3:00 PM
The Role of As-built Surface Morphology in High Cycle Fatigue Failure of IN718: *Orion Kafka*[1]; Jake Benzing[1]; Nikolas Hrabe[1]; Newell Moser[1]; Donald Godfrey[2]; Philipp Schumacher[2]; Chad Beamer[3]; [1]National Institute of Standards and Technology; [2]SLM Solutions; [3]Quintus Technologies

3:20 PM
The Influence of Orientation and Processing Method on Fatigue Crack Growth Behavior of AM Stainless Steel: *Christine Smudde*[1]; Michael Hill[1]; Christopher San Marchi[2]; Jeffery Gibeling[1]; [1]Univeristy of California, Davis; [2]Sandia National Laboratories

3:40 PM
Mesoscale Modeling of the Additively Manufactured 316L: Effects of Microstructure and Microscale Residual Stresses: *Mohammadreza Yaghoobi*[1]; Yin Zhang[2]; Krzysztof S. Stopka[2]; David J Rowenhorst[3]; Ting Zhu[2]; John E. Allison[1]; David L. McDowell[2]; [1]University of Michigan; [2]Georgia Institute of Technology; [3]US Naval Research Laboratory

4:00 PM Break

4:20 PM Invited
Effect of Stress State and Pores on Multiaxial Fracture of Low- and High-ductility Additively Manufactured Metals: *Allison Beese*[1]; [1]Pennsylvania State University

4:50 PM
Flaw Type Dependent Tensile Properties of 316L Stainless Steel Manufactured by Laser Powder Bed Fusion: *Nathalia Diaz Vallejo*[1]; Ke Huang[2]; Christopher Kain[2]; Le Zhou[3]; Jeongmin Woo[1]; Nicolas Ayers[1]; Asif Mahmud[1]; Erin Honse[4]; Han Chan[4]; Alexander Hall[4]; František Zelenka[4]; Yongho Sohn[1]; [1]University of Central Florida; [2]Siemens Energy; [3]Marquette University; [4]Thermo Fisher Scientific

5:10 PM
High Cycle Fatigue Behavior of Additively Manufactured Thin Wall Inconel 718 (Dependence on Thickness and HIP): *Paul Paradise*; Anushree Saxena[1]; Andrew Sarrasin[1]; Nikki Van Handel[1]; Dhruv Bhate[1]; [1]Arizona State University

5:30 PM
Non-destructive Determination of Single Crystal Elastic Constants in Additively Manufactured Alloys by Bayesian Inference and Resonant Ultrasound Spectroscopy: *Jeffrey Rossin*[1]; Patrick Leser[2]; Kira Pusch[1]; Carolina Frey[1]; Chris Torbet[1]; Stephen Smith[2]; Samantha Daly[1]; Tresa Pollock[1]; [1]University of California Santa Barbara; [2]NASA Langley Research Center

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Large-scale Metallic Components — Novel Applications and Alloys

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

Program Organizers: Sneha Prabha Narra, Carnegie Mellon University; Sougata Roy, University of North Dakota; Andrzej Nycz, Oak Ridge National Laboratory; Yousub Lee, Oak Ridge National Laboratory; Chantal Sudbrack, National Energy Technology Laboratory; Albert To, University of Pittsburgh

Tuesday PM | March 1, 2022
263A | Anaheim Convention Center

Session Chair: Joel Andersson, University West

2:30 PM Invited
Large Metal Structures with Wire Arc Additive Manufacturing- Case Studies with Invar Tooling and AM718 Structural Parts: *Badri Narayanan*[1]; Ben Schaeffer[1]; Brad Barnhart[1]; Andrzej Nycz[2]; Sougata Roy[3]; Hannah Sims[4]; Thodla Ramgopal[5]; [1]Lincoln Electric Company; [2]Oakridge National Labs; [3]University of North Dakota; [4]Case Western Reserve University; [5]DNV

3:10 PM
Rapid Low-temperature Bend-forming of Hierarchical Reticulated Structures: *Zachary Cordero*[1]; Harsh Bhundiya[1]; Fabien Royer[1]; [1]Massachusetts Institute of Technology

3:30 PM
An Investigation on the Capabilities of Laser Directed Energy Deposition Additive Manufacturing Process in Building Challenging Materials and Geometries: *Meysam Akbari*[1]; Ji-Cheng Zhao[1]; [1]University of Maryland

3:50 PM Break

4:10 PM
Assessment of Hybrid Additive Manufacturing Concept for Production of Parts for Space Applications: *Simon Malej*[1]; Matjaž Godec[1]; Matej Balazic[2]; Crtomir Donik[1]; Alexander Walzl[3]; Tom Lienert[4]; Laurent Pambaguian[5]; [1]Institute of Metals and Technology; [2]Balmar d.o.o.; [3]DISTECH – Disruptive Technologies GmbH; [4]Optomec, Inc; [5]European Space Research and Technology Centre

4:30 PM
A Comparative Study between the Laser Metal Deposition and Selective Laser Melting of AlxCoCrFeNi MPEA: *Praveen Sreeramagiri*[1]; Husam Alrehaili[2]; Xin Wu[2]; Ganesh Balasubramanian[1]; [1]Lehigh University; [2]Wayne State University

4:50 PM Invited
Wire Arc Additive Manufacturing of Nano-treated High Strength Aluminum Alloys: *Yitian Chi*[1]; Maximilian Liese[1]; Xiaochun Li[1]; [1]University of California Los Angeles

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Refractory Metallic Materials — Additive Manufacturing of Refractory Alloys and Hybrid Alloys and Components

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

Program Organizers: Antonio Ramirez, Ohio State University; Jeffrey Sowards, NASA Marshall Space Flight Center; Isabella Van Rooyen, Pacific Northwest National Laboratory; Omar Mireles, NASA Marshall Space Flight Center; Eric Lass, University of Tennessee-Knoxville; Faramarz Zarandi, Raytheon Technologies; Edward Herderick, Ohio State University; Matthew Osborne, Global Advanced Metals

Tuesday PM | March 1, 2022
262C | Anaheim Convention Center

Session Chairs: Omar Mireles , NASA MFSC; Edward Herderick, Ohio State University; Faramarz Zarandi, Raytheon Technologies

---

2:30 PM
Development of Titanium-steel Hybrid Material Using DED Additive Manufacturing Technology: *Sung Chan Yoo*[1]; Hyun-Gil Kim[1]; [1]Korea Atomic Energy Research Institute

2:50 PM
Union of Mo and Cr Alloys into a Single Multi-materials Part Using Laser-powder Directed Energy Deposition: *Vincent Jacquier*[1]; Julien Zollinger[2]; Frédéric Schuster[3]; Hicham Maskrot[1]; Philippe Zeller[1]; Wilfried Pacquentin[1]; [1]Université Paris-Saclay, CEA, Service d'Etudes Analytiques et de Réactivité des Surfaces, 91191, Gif-sur-Yvette, France; [2]IJL, Université de Lorraine, CNRS, 54000 Nancy, France; [3]Cross-Cutting Program on Materials and Processes Skills, CEA, Université Paris-Saclay, 91191 Gif-sur-Yvette, France

3:10 PM
Enhancement of the Thermal Conductivity of Inconel 718 with the Addition of Tungsten: *Cory Groden*[1]; Eric Nyberg[1]; Amit Bandyopadhyay[1]; [1]Washington State University

3:30 PM
Laser Assisted Cold Spray Deposition for Niobium and Tantalum Materials: *Brett Tucker Roper*[1]; Luke Brewer[1]; Paul Allison[1]; Andy Deal[2]; Tim Eastman[2]; [1]The Univerisity of Alabama; [2]Kansas City National Security Campus

3:50 PM Break

4:10 PM
Study of Melt-pool Geometry and Microstructure in Pure W by Powder-feed Directed Energy Deposition: *Amaranth Karra*[1]; Maarten de Boer[1]; Bryan Webler[1]; [1]Carnegie Mellon University

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques II — In Situ Monitoring of Laser Powder-bed Fusion

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

Program Organizers: Fan Zhang, National Institute of Standards and Technology; Donald Brown, Los Alamos National Laboratory; Andrew Chuang, Argonne National Laboratory; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Tao Sun, University of Virginia

Tuesday PM | March 1, 2022
258A | Anaheim Convention Center

Session Chair: Joy Gockel, Colorado School of Mines

2:30 PM Invited
Digitally Twinned Additive Manufacturing: Real-time Detection of Flaws in Laser Powder Bed Fusion by Combining Thermal Simulations with In-Situ Meltpool Sensor Data.: Reza Yavari[1]; Alex Riensche[1]; Emine Tekerek[2]; Adriane Tenequer[3]; Lars Jacquemetton[4]; Scott Halliday[3]; Marcie Vandever[3]; Ziyad Smoqi[1]; Vignesh Perumal[2]; Kevin Cole[1]; Antonios Kontsos[2]; *Prahalad Rao*[1]; [1]University of Nebraska; [2]Drexel University; [3]Navajo Technical University; [4]Sigma Labs

3:00 PM
Simultaneous 3D-location and Temperature Tracking of Hot Spatter during Laser Powder Bed Fusion Using a High-speed Spectral Plenoptic Camera: *Ralf Fischer*[1]; Dustin Kelly[1]; Sarah Morris[1]; Ari Goldman[1]; Brian Thurow[1]; Barton Prorok[1]; [1]Auburn University

3:20 PM Invited
Process Monitoring of Melt Pool Spatter at Melt Pool, Layer and Part Scales: *Jack Beuth*[1]; Christian Gobert[1]; Brandon Abranovic[1]; [1]Carnegie Mellon University

3:50 PM Break

4:05 PM
Sensor Enabled Material Response Prediction in Powder Bed Fusion Additive Manufacturing: *Justin Gambone*[1]; [1]GE Research

4:25 PM
In Situ Characterization of Laser-based Metal Additive Manufacturing by Detection of Thermal Electron Emission: Philip Depond[1]; John Fuller[1]; Saad Khairallah[1]; Justin Angus[1]; Gabe Guss[1]; Manyalibo Matthews[1]; *Aiden Martin*[1]; [1]Lawrence Livermore

National Laboratory

4:45 PM
In-situ Characterization of Melt Flow Instability in Laser Metal Additive Manufacturing: *Qilin Guo*[1]; Minglei Qu[1]; S. Mohammad H. Hojjatzadeh[1]; Luis I. Escano[1]; Zachary Young[1]; Kamel Fezzaa[2]; Lianyi Chen[1]; [1]University of Wisconsin Madison; [2]Argonne National Laboratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Beyond the Beam III — Friction Stir Processing

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

Program Organizers: Brady Butler, US Army Research Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory; James Paramore, US Army Research Laboratory; Nihan Tuncer, Desktop Metal; Markus Chmielus, University of Pittsburgh; Paul Prichard, Kennametal Inc.

Tuesday PM | March 1, 2022
263B | Anaheim Convention Center

Session Chair: Nihan Tuncer, Desktop Metal

2:30 PM Introductory Comments

2:35 PM
Overview of the Process Fundamentals Underlying Additive Friction Stir Deposition: Hang Yu[1]; *Hunter Rauch*; Robert Griffiths; [1]Virginia Polytechnic Institute and State University

2:55 PM
MechanicalPropertiesandCharacterizationofSolid-stateAdditiveManufacturing of AA6061 and AA5083: *Sadie Beck*[1]; J. Jordon[2]; Paul Allison[2]; C. Williamson[2]; [1]The University of West Alabama; [2]The University of Alabama

3:15 PM
Micro- and Nanostructural Evolution in AA7075 Manufactured by Additive Friction Stir Deposition: *Rekha M Y*[1]; Dustin Avery[1]; Paul G Allison[1]; Brian Jordon[1]; Luke N Brewer[1]; [1]University of Alabama

3:35 PM
Processing-structure-property Correlation in Additive Friction Stir Deposited Ti-6Al-4V Alloy from Recycled Metal Chips: *Priyanshi Agrawal*[1]; Rajiv Mishra[1]; Ravi Verma[2]; [1]University of North Texas; [2]Materials and Manufacturing Tech, Boeing Research and Technology

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development IV: Rapid Development — Aluminum Alloys

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering 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 1, 2022
261A | Anaheim Convention Center

Session Chair: Hunter Martin, HRL

2:30 PM Invited
Alloy Design for High Temperature Aluminum: *Darby LaPlant*[1]; John Martin[1]; [1]HRL Laboratories, LLC

3:00 PM Invited
Alloy Design and Rapid Development of New Ternary and Quaternary Al-Ce-based Alloys for Additive Manufacturing: *Hunter Henderson*[1]; Aurelien Perron[1]; Emily Moore[1]; Scott McCall[1]; Ryan Ott[2]; Orlando Rios[3]; [1]Lawrence Livermore National Laboratory; [2]Ames Laboratory; [3]University of Tennessee-Knoxville

3:30 PM
A Modified 7068 Aluminum Alloy Designed for Laser Powder Bed Fusion: *Brandon Fields*[1]; Benjamin MacDonald[1]; Xiaochun Li[2]; Lorenzo Valdevit[1]; Diran Apelian[1]; [1]University of California, Irvine; [2]University of California, Los Angeles

3:50 PM
An Advanced High-performance Aluminum Alloy Designed for Wire-arc Additive Manufacturing: *Thomas Klein*[1]; Martin Schnall[1]; Rudolf Gradinger[1]; Stephan Ucsnik[1]; [1]LKR Light Metals Technologies Ranshofen

4:10 PM Break

4:25 PM
Laser Powder Bed Fusion of Novel Aluminum Alloy: *Glenn Bean*[1]; [1]The Aerospace Corporation

4:45 PM
Selective Laser Melting of Novel 7075 Aluminum Alloy with Internally Dispersed Nanoparticles: *Tianqi Zheng*[1]; Shuaihang Pan[1]; Bingbing Li[2]; Xiaochun Li[1]; [1]University of California, Los Angeles; [2]California State University, Northridge

5:05 PM
Towards New High-strength Al-alloys Specifically Designed for L-PBF: *Giuseppe Del Guercio*[1]; David McCartney[1]; Nesma Aboulkhair[1]; Christopher Tuck[1]; Marco Simonelli[1]; [1]University of Nottingham

5:25 PM
Thermodynamic Modeling to Design New Al-Ce Alloys: *Emily Moore*[1]; Hunter Henderson[1]; Orlando Rios[2]; Scott McCall[1]; David Weiss[3]; Aurélien Perron[1]; [1]Lawrence Livermore National Laboratory; [2]University of Tennessee at Knoxville; [3]Eck Industries

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Nano/Micro-mechanics and Length-scale Phenomena — Small Scale Mechanical Testing/Microstructural Features I

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

Program Organizers: Meysam Haghshenas, University of Toledo; Robert Lancaster, Swansea University; Andrew Birnbaum, US Naval Research Laboratory; Jordan Weaver, National Institute of Standards and Technology; Aeriel Murphy-Leonard, Ohio State University

Tuesday PM | March 1, 2022
260A | Anaheim Convention Center

Session Chairs: Meysam Haghshenas, University of Toledo; Joy Gockel, Colorado School of Mines

---

2:30 PM Introductory Comments

2:35 PM
High-throughput Synthesis and Testing of Novel Alloys for Additive Manufacturing: Madelyn Madrigal-Camacho[1]; Kendrick Mensink[1]; Guillermo Aguilar[1]; *Suveen Mathaudhu*[1]; [1]University of California-Riverside

2:55 PM
Bridging the Deformation Length-scales in Additively Manufactured Metals via In Situ Mechanical Testing: *Yinmin (Morris) Wang*[1]; [1]University of California, Los Angeles

3:15 PM
What Can We Learn from Micromechanical Testing: A Case Study for EBM-produced Ti-6Al-4V: *Sezer Ozerinc*[1]; [1]Middle East Technical University

3:35 PM
The Effect of Microstructural Features on the Mechanical Properties of Additively Manufactured Metals and Alloys: *Ajit Achuthan*[1]; [1]Clarkson University

3:55 PM Break

4:15 PM
Effect of Cr Addition on the Microstructure and Mechanical Properties of Additively Manufactured GRCop-84: *Ajay Bhagavatam*[1]; Husam Alrehaili[1]; Guru Dinda[2]; Golam Newaz[1]; [1]Wayne State University; [2]Savannah River National Laboratory

4:35 PM
In Situ Investigation on the Multi-scale Deformation Mechanisms in Additively Manufactured Hierarchical Boron Nitride Nanotube Based Composites: *Tyler Dolmetsch*[1]; Tanaji Paul[1]; Cheng Zhang[1]; Benjamin Boesl[1]; Arvind Agarwal[1]; [1]Florida International University

---

NUCLEAR MATERIALS

Advanced Characterization and Modeling of Nuclear Fuels: Microstructure, Thermo-physical Properties — Nuclear Fuels Microstructure-Modeling

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

Program Organizers: David Frazer, Idaho National Laboratory; Fabiola Cappia, Idaho National Laboratory; Tsvetoslav Pavlov, Idaho National Laboratory; Peter Hosemann, University of California

Tuesday PM | March 1, 2022
202B | Anaheim Convention Center

Session Chair: David Frazer, Idaho National Laboratory

2:30 PM Invited
Mesoscale Hybrid Model for Fission Gas Behavior in UO2: Coupling the Phase Field Method to Spatially Resolved Cluster Dynamics: *Sophie Blondel*[1]; David Andersson[2]; David Bernholdt[3]; Dong-Uk Kim[4]; Fande Kong[5]; Md Ali Muntaha[4]; Philip Roth[3]; Michael Tonks[4]; Brian Wirth[1]; [1]University of Tennessee; [2]Los Alamos National Laboratory; [3]Oak Ridge National Laboratory; [4]University of Florida; [5]Idaho National Laboratory

3:00 PM
Adding Irradiation-assisted Grain Growth to the MARMOT Tool for UO_2 Nuclear Fuel: *Md Ali Muntaha*[1]; Larry Aagesen[2]; Michael Tonks[1]; Zefeng Yu[3]; Arthur Motta[3]; [1]University of Floirda; [2]Idaho National Laboratory; [3]Penn State University

3:20 PM
Multiphysics Modeling of Fracture in Sintered Uranium Dioxide Pellets: Levi McClenny[1]; *Mohammad Abdoelatef*[1]; Moiz Butt[1]; Hari Krishnan[1]; Michal Pate[1]; Kay Yee[1]; Wen Jiang[2]; Karim Ahmed[1]; Sean McDeavitt[1]; [1]Texas A&M University; [2]Idaho National Laboratory

3:40 PM Invited
Modeling Irradiation-enhanced Diffusion in Advanced Ceramic Nuclear Fuels: *Michael Cooper*[1]; Christopher Matthews[1]; Vancho Kocevski[1]; Christopher Stanek[1]; David Andersson[1]; [1]Los Alamos National Laboratory

4:10 PM Break

4:30 PM
Centipede: A New Tool for Calculating Irradiation Enhanced Transport of Defects in Nuclear Fuel: *Christopher Matthews*[1]; Michael Cooper; Romain Perriot[1]; Xiang-Yang Liu[1]; Chris Stanek[1]; David Andersson[1]; [1]Los Alamos National Laboratory

---

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session IV

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

Program Organizers: Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; Olivia Underwood Jackson, Sandia National Laboratories

Tuesday PM | March 1, 2022

207A | Anaheim Convention Center

Session Chairs: Michael Glazoff, Idaho National Laboratory; Carlos Tome, LANL

2:30 PM Invited
Applications of an Efficient Elasto-visco-plastic Self-consistent Polycrystal Model Interfaced with a Finite Element Framework: Youngung Jeong[1]; *Carlos Tome*[2]; Bohye Jeon[1]; Mooyeong Joo[1]; [1]Changwon National University; [2]Los Alamos National Laboratory

3:00 PM
Prismatic Slip Induced Interface Sliding in Alpha/Beta Titanium Alloys: *Zachary Kloenne*[1]; Stoichko Antonov[2]; Gopal Viswanathan[1]; Michael Loretto[3]; Hamish Fraser[1]; [1]Ohio State University; [2]Max-Planck-Institut für Eisenforschung GmbH; [3]University of Birmingham

3:20 PM
Analysis of RVE Size Based on Slip Activity Using Far-field HEDM Data: *Rachel Lim*[1]; Anthony Rollett[2]; Darren Pagan[1]; [1]Pennsylvania State University; [2]Carnegie Mellon University

3:40 PM
Strain Accommodation Mechanisms in the Near Alpha Ti-6Al-2Sn-4Zr-2Mo Alloy Studied Using Experiments and Simulations: *Samuel Hemery*[1]; Azdine Naït-Ali[2]; Mikael Gueguen[2]; Olga Smerdova[2]; Christophe Tromas[2]; [1]Institute Prime - Ensma; [2]Institut Pprime

---

ADVANCED MATERIALS

Advanced Functional and Structural Thin Films and Coatings — Young Talents in Research/Multifunctional Biomaterials, Innovative Approaches to New Concepts and Applications

Sponsored by: TMS: Thin Films and Interfaces Committee

Program Organizers: Ramana Chintalapalle, University of Texas at El Paso; Adele Carrado, IPCMS - CNRS Université de Strasbourg; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Karine Mougin, Cnrs - Is2m; Heinz Palkowski, Clausthal University of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology

Tuesday PM | March 1, 2022
204B | Anaheim Convention Center

Session Chairs: Adele Carrado, IPCMS - CNRS, Université de Strasbourg, France; Heinz Palkowski, TU-Clausthal IMET

2:30 PM Introductory Comments

2:35 PM Invited
Challenges of TiN Thin Film Coating Development and Deposition onto Medical Grade Thermoplastic Polyurethane (TPU) Used in Biomedical Devices: *Maren Fossum*[1]; Kari Kjørholt[1]; Javier Sanchez[2]; Christoph Burgstaller[3]; Richard Olsson[4]; Ragnhild Aune[1]; [1]Norwegian University of Science and Technology; [2]Danderyd Hospital at Karolinska Institute (DS KI); [3]TCKT - Transfercenter für Kunststofftechnik ; [4]KTH Royal Institute of Technology

3:05 PM Invited
Polymer Grafting on Metal Surfaces Using "Grafting from" Chemical Method: *Flavien Mouillard*[1]; Oumaima Laghzali[1]; Patrick Masson[1]; Genevieve Pourroy[1]; Adele Carrado[1]; [1]CNRS UMR7504

3:35 PM Invited
Metal Mesh Reinforced Polymers: An Interesting Alternative for Biomedical Applications: *Gargi Nayak*[1]; Heinz Palkowski[2]; [1]TU Clausthal; [2]Tu Clausthal

4:05 PM Break

4:25 PM Invited
Effect of Post-deposition Annealing on the Structure and Optical Properties of GeO2 Thin Films: *Paul Nalam*[1]; Debabrata Das[1]; Ramana Chintalapalle[1]; [1]The Center for Advanced Materials Research, The University of Texas at El Paso

4:55 PM
Effects of Femtosecond Laser Shock Peening on the Tribocorrosion Resistance of Biodegrade WE43 Magnesium Alloys: *Wenbo Wang*[1]; Chang-Yu Hung[1]; Leslie Howe[1]; Jia Chen[1]; Kaiwen Wang[1]; Vinh Ho[1]; Shannon Lenahan[1]; Mitsuhiro Murayama[1]; Nguyen Vinh[1]; Wenjun Cai[1]; [1]Virginia Polytechnic Institute and State University

5:15 PM Concluding Comments

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage 2022 — Functional Materials for Energy

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

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

Tuesday PM | March 1, 2022
212B | Anaheim Convention Center

Session Chairs: Paul Ohodnicki, University of Pittsburgh; Swetha Chandrasekaran, Lawrence Livermore National Laboratory

---

2:30 PM
Enhancing the Thermoelectric Performance of Si Using Energy Filtering: Aria Hosseini[1]; Lorenzo Mangolini[1]; *Peter Greaney*[1]; [1]University of California, Riverside

2:50 PM
Adsorption and Surface Diffusion of Metals for Advanced Manufacturing Applications: *Austin Biaggne*[1]; Lan Li[1]; [1]Boise State University

3:10 PM
Bioinspired Low-cost Photoelectrochemical Green Hydrogen Production Cell: *Laura Carmona Saldarriaga*[1]; Edgar Ossa Henao[1]; [1]Universidad Eafit

3:30 PM
Chemical Vapor Deposition Synthesis of Atomically Dispersed Single Metal Site Carbon Fibers for Highly Efficient Electrocatalysis: Qiurong Shi[1]; *Sivasankara Rao Ede*[2]; David Kisailus[1]; [1]University of California, Irving; [2]University of California, Irvine

3:50 PM Break

4:10 PM
Bismuth Ferrite: Comparing the Effect of Synthesis Route on Properties: *Lyndon Smith*[1]; Rifat Mahbub[2]; Jeffrey Shield[2]; Vijaya Rangari[1]; Shaik Jeelani[1]; [1]Tuskegee University; [2]University of Nebraska-Lincoln

4:30 PM
Film Strains Enhance the Reversible Cycling of Intercalation Electrodes: *Delin Zhang*[1]; Ananya Renuka Balakrishna[1]; [1]University of Southern California

4:50 PM
Synthesis of Bicontinuous 3-D Turbostratic Graphene: *Peter Santiago*[1]; Sierra Gross[1]; Derek Chang[1]; Ali Mohraz[1]; Regina Ragan[1]; [1]University of California, Irvine

---

CHARACTERIZATION

Advanced Real Time Imaging — Joint session: Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling

Sponsored by: 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 Engergy Technology Laboratory; David Alman, National Energy Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki Shibata, 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; Pranjal Nautiyal, University of Pennsylvania

Tuesday PM | March 1, 2022
206A | Anaheim Convention Center

Session Chair: Jiawei Mi, University of Hull

2:30 PM Invited
Ultrafast Real-time Imaging and Modelling of the Dynamics of Fatigue Liquid Exfoliation of 2D Graphite under Ultrasound: *Jiawei Mi*[1]; Ling Qin[1]; [1]University of Hull

2:50 PM Invited
Real-time Deformation Mechanisms of Hierarchically Structured Nanocomposites Using High-resolution In Situ Testing: *Tyler Dolmetsch*[1]; Kazue Orikasa[1]; Tanaji Paul[1]; Cheng Zhang[1]; Benjamin Boesl[1]; Arvind Agarwal[1]; [1]Florida International University

3:10 PM
In Situ Atomic Force Microscopy Evaluation of the Normal Pressure-dependent Lubrication Mechanism of Phosphonium Phosphate Ionic Liquid: *Filippo Mangolini*[1]; Zixuan Li[1]; Andrei Dolocan[1]; Oscar Morales-Collazo[1]; Jerzy Sadowski[2]; Hugo Celio[1]; Joan Brennecke[1]; [1]University of Texas at Austin; [2]Brookhaven National Laboratory

3:30 PM
Tension Compression Asymmetry and Plastic Anisotropy in Mg Single Crystal Response Evaluated Using Micromechanical Tests: *Skye Supakul*[1]; Manish Jain[2]; Bin Li[3]; Siddhartha Pathak[1]; [1]Iowa State University; [2]EMPA - Materials Science and

Technology; [3]University of Nevada, Reno

3:50 PM Break

4:10 PM Invited
Understanding Deformation at the Nanoscale via In Situ SEM Mechanical Testing: *Nathan Mara*[1]; [1]University of Minnesota

4:30 PM
Determination of Strain Path Envelope in an Optimized Biaxial Cruciform Specimen of AISI 1008 Steel under Linear, Bilinear, and Nonlinear Strain Paths: Jordan Hoffman[1]; *Dilip Banerjee*[1]; Mark Iadicola[1]; [1]National Institute of Standards and Technology

4:50 PM
In-situ Investigation of Deformation Behavior of 5Mn Steel at Different Strain Rates by Digital Image Correlation: Yonggang Yang[1]; *Zhenli Mi*[1]; Wangzhong Mu[2]; Mian Li[1]; Mai Wang[1]; [1]University of Science and Technology Beijing; [2]KTH-Royal Institute of Technology

---

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: 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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Tuesday PM | March 1, 2022
251A | Anaheim Convention Center

Session Chairs: Yanwen Zhang, Oak Ridge National Laboratory; William Weber, University of Tennessee

---

2:30 PM Invited
DiscoveryofNewRefractoryHigh-entropyAlloyswithImprovedHigh-temperature Properties: *Stephen Giles*[1]; Debasis Sengupta[1]; Scott Broderick[2]; Krishna Rajan[2]; Peter Liaw[3]; [1]CFD Research Corp; [2]University at Buffalo; [3]University of Tennessee, Knowxville

2:50 PM Invited
Multi-principal Elements Alloys as Filler Metals for Similar and Dissimilar Joining Applications: *Zhenzhen Yu*[1]; Benjamin Schneiderman[1]; Abdelrahman Abdelmotagaly[1]; Andrew Chuang[2]; [1]Colorado School of Mines; [2]Argonne National Laboratory

3:10 PM
A Novel Approach to Designing Low-density CCAs Exploiting Multi-element Eutectics: *Clemens Simson*[1]; Stefan Gneiger[1]; Alexander Großalber[1]; Stefan Pogatscher[2]; [1]LKR Light Metals Technologies Ranshofen; [2]Montanuniversität Leoben

3:30 PM
Microalloying Technology: A Promising Strategy for Design of Nanocrystalline High-entropy Alloy Films: *Wenyi Huo*[1]; Feng Fang[2]; Zonghan Xie[3]; Hyoung Seop Kim[4]; Jianqing Jiang[1]; [1]Nanjing Forestry University; [2]Southeast University; [3]University of Adelaide; [4]Pohang University of Science & Technology (POSTECH)

3:50 PM Break

4:10 PM
Synthesis and Characterization of Porous AlCoCrFeNi High-entropy-alloy: *Akib Jabed*[1]; Golden Kumar[1]; [1]The University of Texas at Dallas

4:30 PM
Expanding the Design Space of Ti-V-Nb-Hf Refractory High-entropy Alloys through Al-alloying: *Shaolou Wei*[1]; Cem Tasan[1]; [1]Massachusetts Institute of Technology

---

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: 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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Tuesday PM | March 1, 2022
251B | Anaheim Convention Center

Session Chairs: Takeshi Egami, The University of Tennessee, Knoxville; Jian-Min Zuo, University of Illinois Urbana-Champaign

---

2:30 PM Invited
Chemical Randomness and Lattice Distortions in Multi-principal Elements Alloys: Advances in Characterization: *Jian Min Zuo*[1]; Haw-Wen Hsiao[1]; Yu-Tsun Shao[1]; Yang Hu[1]; Qun Yang[2]; [1]University of Illinois; [2]ShanghaiTech University

2:50 PM
Metastability and Phase Selection in High Entropy Alloys: *Sebastian Kube*[1]; Sungwoo Sohn[1]; Pamela Banner[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

3:10 PM Invited
TEM Study of a Refractory Complex Concentrated Alloy with BCC/B2 Microstructure: *Jean-Philippe Couzinie*[1]; Milan Heczko[2]; Veronika Mazanova[2]; Oleg Senkov[3]; Rajarshi Banerjee[4]; Maryam Ghazisaeidi[2]; Michael Mills[2]; [1]Université Paris Est and Department of Materials Science and Engineering, The Ohio State University; [2]The Ohio State University; [3]Air Force Research Laboratory; [4]University of North Texas

3:30 PM Invited
Design of High Temperature RCCAs Using Ordered Thermally Stable Structures: *Jaimie Tiley*[1]; Soumya Nag[1]; Ke An[1]; Ercan Cakmak[1]; Jonathan Poplawsky[1]; Raymond Unocic[1]; Sriswaroop Dasari[2]; Rajarshi Banerjee[2]; [1]Oak Ridge National Laboratory;

[2]University of North Texas

3:50 PM Break

4:10 PM Invited
In-situ 4D-STEM Imaging of the Synergistic Deformation Mechanisms Responsible for the Fracture Resistance in CrCoNi: *Yang Yang*[1]; Sheng Yin[2]; Qin Yu[2]; Ruopeng Zhang[2]; Mark Asta[2]; Robert Ritchie[2]; Andrew Minor[2]; [1]The Pennsylvania State University; [2]LBNL

4:30 PM Invited
Effective Atomic Size in Multi-principal Element Alloys: *Takeshi Egami*[1]; [1]University of Tennessee

---

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; Kathy Lu, Virginia Polytechnic Institute and State University; Faqin Dong, Southwest University of Science and Technology; Jinhong Li, China University of Geosciences; Eugene Olevsky, San Diego State University; Ruigang Wang, The University of Alabama; Dipankar Ghosh, Old Dominion University

Tuesday PM | March 1, 2022
213C | Anaheim Convention Center

Session Chairs: Dipankar Ghosh, Old Dominion University; Bowen Li, Michigan Tech

---

2:30 PM
Influence of Microstructure on Mechanical Properties in High Entropy Oxides: *Justin Cortez*[1]; Alexander Dupuy[1]; Hasti Vahidi[1]; Olivia Donaldson[1]; Tim Rupert[1]; William Bowman[1]; Julie Schoenung[1]; [1]University of California Irvine

2:50 PM
A Novel Design Approach to Achieving High Strength and Ductility in Traditionally Brittle Nanoporous Silicon Nitride Membranes: *Ali K. Shargh*[1]; Gregory Madejski[1]; James McGrath[1]; Niaz Abdolrahim[1]; [1]University of Rochester

3:10 PM Invited
Low-temperature Pathways to Porous SiC Solids: Laura Quinn[1]; Taijung Kuo[1]; *Katherine Faber*[1]; [1]California Institute of Technology

3:30 PM
The Emergence of ZIA Phases: *Matheus Araujo Tunes*[1]; Rubens Ingraci Neto[1]; James Valdez[1]; Jon Baldwin[1]; Saryu Fensin[1]; Osman El-Atwani[1]; Stuart Maloy[1]; [1]Los Alamos National Laboratory

3:50 PM Break

4:05 PM
The Influence of Composition, Processing, and Microstructure on the Electrical Behavior of High Entropy Oxides: *Arturo Meza*[1]; Alexander Dupuy[1]; Julie Schoenung[1];

[1]University of California Irvine

4:25 PM
Phase Field Modeling of Silicon Carbide Microstructure Evolution: *Elias Munoz*[1]; Vahid Attari[1]; Marco Martinez[1]; Matthew Dickerson[2]; Miladin Radovic[1]; Raymundo Arroyave[1]; [1]Texas A&M University; [2]Air Force Research Lab

---

MATERIALS PROCESSING

Advances in Surface Engineering IV — Session III

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

Program Organizers: Arif Mubarok, PPG; Bharat Jasthi, South Dakota School of Mines & Technology; Tushar Borkar, Cleveland State University; Mary Lyn Lim, PPG Industries; Rajeev Gupta, North Carolina State University

Tuesday PM | March 1, 2022
210C | Anaheim Convention Center

Session Chair: Rajeev Gupta, North Carolina State University

2:30 PM
Corrosion Behavior of Shear Extruded Mg-3Si Magnesium Alloy: Role of Mg2Si Fragmentation and Grain Refinement: *Vikrant Beura*[1]; Vineet Joshi[2]; Kiran Solanki[1]; [1]Arizona State University; [2]Pacific Northwest National Laboratory

2:50 PM
Microstructural, Mechanical, and Corrosion Properties of Pulsed Laser Deposited Hexagonal Boron Nitride Nanofilms: *Venkata Kandadai*[1]; Venkata Gadhamshetty[1]; Bharat K. Jasthi[1]; [1]South Dakota School of Mines & Technology

3:10 PM
HVOF 316L and C276 Metal Cladding for Corrosion Protection: Juliane Ribeiro da Cruz[1]; *Sanjay Sampath*[1]; [1]State University of New York at Stony Brook

3:30 PM
Simultaneous Effects of MC Carbide Formers on Hardness of Wear Resistant Overlays by Design of Experiments and Machine Learning: *Jing Li*[1]; Bing Cao[1]; Haohan Chen[1]; Leijun Li[1]; [1]University Of Alberta

3:50 PM Break

4:10 PM
Strong Covalent Bonding between PMMA/Zn-Mg Alloys Using Grafting-from Technique for Biomedical Applications: Oumaima Laghzali[1]; Alia Diaa[2]; Flavien Mouillard[1]; Nahed El Mahalawy[2]; Genevieve Pourroy[1]; Patrick Masson[1]; Heinz Palkowski[3]; *Adele Carrado*[1]; [1]IPCMS - CNRS, Université de Strasbourg, France; [2]German University of Cairo, Cairo, Egypt; [3]IMET, Clausthal University of Technology, Clausthal-Zellerfeld, Germany

4:30 PM
Towards the Tuning of the Degradation Behaviour of Pure Biodegradable Zn by Laser Texturing: *Carlo Biffi*[1]; Jacopo Fiocchi[1]; Sofia Gambaro[1]; Ausonio Tuissi[1]; [1]CNR - National Research Council

4:50 PM
Unraveling the Roles of Thickness, Crystallinity and Composition of Powder Passivation Layers during Cold Spraying of Aluminum Powder: *Cameron Crook*[1];

Seyed Saeidi[1]; Diran Apelian[1]; Daniel Mumm[1]; Lorenzo Valdevit[1]; [1]University of California Irvine

MATERIALS DESIGN

Advances in Titanium Technology — Deformation Behavior in Ti Alloys I

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

Program Organizers: Yufeng Zheng, University of Nevada-Reno; Zachary Kloenne, Ohio State University; Fan Sun, PSL Research University; Stoichko Antonov, National Energy Technology Laboratory; Rongpei Shi, Lawrence Livermore National Laboratory

Tuesday PM | March 1, 2022
252A | Anaheim Convention Center

Session Chair: Fan Sun, PSL Research University

2:30 PM
Transformations in TRIP/TWIP Ti Alloys Studied via In-situ Methods: *Fan Sun*[1]; Bingnan Qian[1]; Lola Lilensten[1]; Philippe Vermaut[1]; Frédéric Prima[1]; [1]PSL Research University

2:50 PM
In-situ Synchrotron X-ray Diffraction of High Strain Rate Deformation of TRIP/TWIP Ti-Mo Alloys: *Benjamin Ellyson*[1]; Kamel Fezzaa[1]; Tao Sun[1]; Niranjan Parab[1]; Christopher Finfrock[1]; Connor Rietema[1]; Douglas Smith[1]; John Copley[1]; Chloe Johnson[1]; Chandler Becker[1]; Jonah Klemm-Toole[1]; Cody Kirk[1]; Nesredin Kedir[1]; Jinling Gao[1]; Weinong Wayne Chen[1]; Rajarshi Banerjee[1]; Kester Clarke[1]; Amy Clarke[1]; [1]; [1]Colorado School of Mines

3:10 PM
Characterization of Nanoscale Metastable Phases in a TRIP Titanium Alloy: Wenrui Zhao[1]; Dian Li[1]; *Yufeng Zheng*[1]; [1]University of Nevada, Reno

3:30 PM
Assessing the Variability in Mechanical Properties of Biocompatible Ti-13Nb-13Zr Titanium Alloy with Respect to Thermomechanical Treatments and Associated Microstructures.: *Stéphanie Delannoy*[1]; Sarah Baïz[2]; Pascal Laheurte[3]; Laurence Jordan[4]; Frédéric Prima[5]; [1]PSL Research University, Chimie ParisTech - CNRS, Institut de Recherche de Chimie Paris UMR CNRS 8247 / Biotech Dental; [2]Laboratoire Procédés et Ingénierie en Mécanique et Matériaux, PIMM, ENSAM, UMR 8006, CNRS, CNAM; [3]Laboratoire d'Etude des Microstructures et de Mécanique des Matériaux, LEM3 UMR CNRS 7239, Université de Lorraine; [4]PSL Research University, Chimie ParisTech—CNRS, Institut de Recherche de Chimie Paris UMR CNRS 8247 / Dental Faculty, Université de Paris / Hospital Rothschild, AP-HP; [5]PSL Research University, Chimie ParisTech—CNRS, Institut de Recherche de Chimie Paris UMR CNRS 8247

3:50 PM Break

4:10 PM
Twins in Ti under Different Loading Conditions: *Nilanjan Mitra*[1]; [1]Johns Hopkins University

4:30 PM
Formation of {11-22} Contraction Twins in Titanium through Reversible Martensitic Phase Transformation: *Amir Hassan Zahiri*[1]; Jamie Ombogo[1]; Lei Cao[1]; [1]Universitiy of Nevada Reno

4:50 PM
Critical Comparison of Estimation of Critical Resolved Shear Stress from Slip Line Trace Analysis and Spherical Indentation Protocols and Bayesian Learning Techniques for Ti 6Al-2Sn-4Zr-2Mo and Ti 6Al-2Sn-4Zr-6Mo Alloys: *Soumya Mohan*[1]; Arunima Banerjee[2]; Andrew Castillo[1]; Natalia Millan Espitia[1]; Biswaranjan Dash[3]; Zhuowen Zhao[4]; Shanoob Balachandran[5]; Dipankar Banerjee[6]; Surya Kalidindi[1]; [1]Georgia Institute of Technology; [2]John Hopkins University; [3]Garrett Advancing Motion; [4]Michigan State University; [5]Alloyed; [6]Indian Institute of Science

5:10 PM
Characterization and Slip of &lta&gt Screw Dislocation in Pure hcp a Titanium from Atomistic Simulations: Ali Rida[1]; Satish Rao[2]; *Jaafar El-Awady*[1]; [1]Johns Hopkins University; [2]UES, Inc.

MATERIALS DESIGN

AI/Data Informatics: Computational Model Development, Validation, and Uncertainty Quantification — Material Design II

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Dennis Dimiduk, BlueQuartz Software LLC; Darren Pagan, Pennsylvania State University; Anthony Rollett, Carnegie Mellon University; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory

Tuesday PM | March 1, 2022
256A | Anaheim Convention Center

Session Chairs: Taylor Sparks, University of Utah; Jason Gibson, University Of Florida

---

2:30 PM
DiSCoVeR Algorithm for Identifying Promising Unlikely Candidates for New Materials: *Taylor Sparks*[1]; Tran Diep[1]; [1]University of Utah

2:50 PM
Physics Based Analytical Models for the Design of New Metastable Rare-earth Compounds: *Prashant Singh*[1]; T. Del Rose[1]; Guillermo Vazquez[2]; Raymundo Arroyave[2]; Yaroslav Mudryk[1]; [1]Ames Laboratory; [2]Texas A&M University

3:10 PM
Optimizing Thermoelectric Compositions to Achieve Extraordinary Properties: *Andrew Falkowski*[1]; Taylor Sparks[1]; [1]University of Utah

3:30 PM
Deep Neural Network Regressor for Phase Fraction Estimation on the High Entropy Alloy System Al-Co-Cr-Fe-Mn-Nb-Ni: *Guillermo Vazquez Tovar*[1]; Sourav Chakravarty[1]; Rebeca Gurrola[1]; Raymundo Arroyave[1]; [1]Texas A&M University

3:50 PM
A Novel Approach for Rapid Alloy Development Leveraging Machine Learning: *Nhon Vo*[1]; Ha Bui[2]; [1]NanoAl LLC; [2]Amatrium Inc.

4:10 PM Break

4:30 PM
Accelerated Genetic Algorithm via a Pre-trained Crystal Graph Convolutional Neural Network: *Jason Gibson*[1]; Richard Hennig[1]; [1]University of Florida

4:50 PM
Balancing Data for Generalizable Machine Learning to Predict Glass-forming Ability of Ternary Alloys: *Yi Yao*[1]; Timothy Sullivan[1]; Feng Yan[1]; Jiaqi Gong[1]; Lin Li[1]; [1]University of Alabama Tuscalosa

5:10 PM
Data Driven Approach to Design / Discover Intercalating Ions and Layered Materials for Metal-ion Batteries: *Shayani Parida*[1]; Avanish Mishra[1]; Arthur Dobley[2]; C Barry Carter[3]; Avinash Dongare[1]; [1]University of Connecticut; [2]EaglePicher Technologies LLC; [3]CINT, Sandia National Laboratories

---

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Microscale Algorithms and Their Applications - Solidification

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; Garritt Tucker, Colorado School of Mines; Ebrahim Asadi, University of Memphis; Bryan Wong, University of California, Riverside; Sam Reeve, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Adrian Sabau, Oak Ridge National Laboratory

Tuesday PM | March 1, 2022
253A | Anaheim Convention Center

Session Chairs: Mohsen Asle Zaeem, Colorado School of Mines; Adrian Sabau, Oak Ridge National Laboratory

---

4:00 PM
Multiscale Modeling of Ni Alloys Selective Laser Melting Combining CalPhaD, Finite Elements, and Phase-field Methods: Seyed Mohammad Elahi[1]; Rouhollah Tavakoli[2]; Ahmed Kaci Boukellal[2]; Thomas Isensee[1]; Ignacio Romero[1]; *Damien Tourret*[2]; [1]IMDEA Materials & Universidad Politecnica de Madrid (UPM); [2]IMDEA Materials

4:20 PM
Microstructure and Porosity Predictions in Additively Manufactured Ti-6Al-4V Alloys Using a Hierarchical Modeling Approach: Bonnie Whitney[1]; *Akshatha Chandrashekar Dixith*[1]; Anthony Spangenberger[1]; Diana Lados[1]; [1]Worcester Polytechnic Institute

4:40 PM Invited
OpenMP GPU Offloading for Cellular Automaton Solidification Microstructural Model: *Lang Yuan*[1]; Adrian Sabau[2]; Jean-Luc Fattebert[2]; [1]University of South Carolina; [2]Oak Ridge National Laboratory

---

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Microstructure Evolution & Characterization

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

Program Organizers: Andre Phillion, McMaster University; Dmitry Eskin, Brunel University

Tuesday PM | March 1, 2022
208B | Anaheim Convention Center

Session Chair: Andre Phillion, McMaster University

2:30 PM
Computational and Microstructural Analysis to Understand the Correlation between Precipitate Distribution and Mechanical Properties in Al-Cu-Mg-Mn Wire Material: *Peer Decker*[1]; Axel Marquardt[1]; Dominique Cance[2]; Magali Guizard[2]; Luisa Marzoli[1]; Marcel Rosefort[1]; [1]Trimet Aluminium Se; [2]Trimet France

2:55 PM
Influence of Heat Treatment on the Electrical Resistivity of Aluminum Alloyed with Zirconium and Scandium: Alexander Alabin[1]; *Dmitry Fokin*[1]; Sergey Valchuk[1]; [1]UC RUSAL

3:20 PM
Micro and Mechanical Characteristic of Hotband Annealed of a Continuous Cast Al-1.5Cu Alloy with Potential Application in High Strength and Low-cost Auto Forming Parts & Sheets: *Xiyu Wen*[1]; [1]University of Kentucky

3:45 PM
Effect of Homogenization on Anodic Film and Electrochemical Behavior of an A535 Alloy after Sealing with Stearic Sealant: *Suwaree Chankitmunkong*[1]; Dmitry Eskin[2]; Chaowalit Limmaneevichitr[3]; Phromphong Pandee[3]; Nattarat Kengkla[3]; Jirakit Athchasiri[3]; Tanawat Tanawansombat[3]; Napadol Parnlasarn[3]; Onnjira Diewwanit[3]; [1]King Mongkut's Institute of Technology Ladkrabang; [2]Brunel University; [3]King Mongkut's University of Technology Thonburi

---

LIGHT METALS

Aluminum Reduction Technology — Alumina Dissolution and Dispersion

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

Program Organizers: Kristian Etienne Einarsrud, Norwegian University of Science and Technology; Stephan Broek, Boston Metal; Mertol Gökelma, Izmir Institute of Technology; Dmitry Eskin, Brunel University

Tuesday PM | March 1, 2022
209B | Anaheim Convention Center

Session Chair: Andrey Yasinsky, Siberian Federal Institute

2:30 PM Introductory Comments

2:35 PM
Advanced Alumina Dissolution Modelling: *Valdis Bojarevics*[1]; Marc Dupuis[2]; [1]University of Greenwich; [2]GeniSim Inc

3:00 PM
Oxide Sensor Measurements and Simultaneous Optical Observations during Dissolution of Alumina in Cryolite Melt: Luis Bracamonte[1]; Kristian Etienne Einarsrud[1]; Christian Rosenkilde[2]; *Espen Sandnes*[1]; [1]Norwegian University of Science and Technology; [2]Hydro Aluminium

---

BIOMATERIALS

Biological Materials Science — Biological Materials Science IV

Sponsored by: TMS Functional 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; Hannes Schniepp, William & Mary

Tuesday PM | March 1, 2022
201B | Anaheim Convention Center

Session Chairs: Steven Naleway, The University of Utah; Hannes Shniepp, William and Mary

---

2:30 PM Invited
Harnessing Biomolecules for Multifunctional Dental Biomaterials: *Candan Tamerler*[1]; Paulette Spencer[1]; [1]University of Kansas

3:05 PM
Preparation and Characterization of Alloys of the Ti-10Mo-Mn System for Biomedical Purposes: Mariana Lourenço[1]; *Carlos Grandini*[1]; [1]Unesp

3:25 PM Invited
Bioinspired Materials for Organic, Flexible, and Degradable Biosensors: Sayantan Pradhan[1]; Meng Xu[1]; Ramendra Pal[1]; *Vamsi Yadavalli*[1]; [1]Virginia Commonwealth University

4:00 PM Break

4:15 PM
Mechanical Characterization of Collagen Hydrogels by Quasi-static Uniaxial Tensile Experiments: JiEung Kim[1]; Sangmin Lee[1]; Taek-soo Kim[1]; *Dongchan Jang*[1]; [1]KAIST

BIOMATERIALS

BioNano Interfaces and Engineering Applications — Bionano Interfaces & Engineering Applications II

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

Program Organizers: Candan Tamerler, University of Kansas; Hendrik Heinz, University of Colorado Boulder; Kalpana Katti, North Dakota State University; Terry Lowe, Colorado School of Mines; Po-Yu Chen, National Tsing Hua University

Tuesday PM | March 1, 2022
201A | Anaheim Convention Center

Session Chair: To Be Announced

2:30 PM
Calcium Phosphate-based Bone Grafts with Curcumin and Vitamin C Shows Osteogenic, Chemo-preventive and Anti-bacterial Potential for Orthopaedic and Dental Applications: *Ujjayan Majumdar*[1]; Susmita Bose[1]; [1]Washington State University

2:50 PM
Structural Development and Phase Transformation of Mesocrystalline Iron Oxides in the Ultrahard Teeth of Cryptochiton Stelleri: *Taifeng Wang*[1]; Wei Huang[1]; Wen Yang[1]; Satoshi Murata[2]; Atsushi Arakaki[2]; David Kisailus[1]; [1]University of California, Irvine; [2]Tokyo University of Agriculture and Technology

3:10 PM
Gingerol and EGCG Enhance Osteogenic and Antibacterial Properties of Ag-doped CaP Bone Grafts: *Yongdeok Jo*[1]; Susmita Bose[1]; [1]Washington State University

3:30 PM
Zinc Functionalized Polydopamine-curcumin Coated 3D Printed Calcium Phosphate Scaffolds for Enhanced Osteogenesis, and in Vitro Chemoprevention: *Arjak Bhattacharjee*[1]; Susmita Bose[1]; [1]W. M. Keck Biomedical Materials Research Lab,Washington State University

3:50 PM Break

4:10 PM Invited
Grain Size Effects and Mechanisms for Increased Antimicrobial Efficiency in Ultrafine-grained Bulk Copper: Evander Ramos[1]; Isabella Bagdasarian[1]; Yaqiong Li[1]; Masuda Takahiro[2]; Yoichi Takizawa[3]; Justin Chartron[1]; Alex Greaney[1]; Zenji Horita[2]; Joshua Morgan[1]; *Suveen Mathaudhu*[1]; [1]University of California-Riverside; [2]Kyushu University; [3]Nagano Forging Co., Ltd

---

ADVANCED MATERIALS

Bulk Metallic Glasses XIX — Atomistic Simulations, Modelling and Theory

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

Program Organizers: Robert Maass, Federal Institute for Materials Research and Testing (BAM); Peter Derlet, Paul Scherrer Institut; Katharine Flores, Washington University in St. Louis; Yonghao Sun, Chinese Academy of Sciences; Lindsay Greer, University of Cambridge; Peter Liaw, University of Tennessee

Tuesday PM | March 1, 2022
253C | Anaheim Convention Center

Session Chairs: Daniel Sopu, Erich Schmid Institute of Materials Science; Jun Ding, Xi'an Jiaotong University

---

2:30 PM Invited
Atomic Cooperativity in Metallic Glass: *Takeshi Egami*[1]; [1]University of Tennessee

2:55 PM
Chemical and Topological Frustration in Binary Metallic Glass Formation: *Yuanchao Hu*[1]; Jan Schroers[1]; Mark Shattuck[2]; Corey O'Hern[1]; [1]Yale University; [2]The City College of New York

3:15 PM
Evidence of Crystalline Phase Precursors within High-temperature Metallic Liquids and their Effect on Glass-forming Ability: *Porter Weeks*[1]; Katharine Flores[1]; [1]Washington University in St Louis

3:35 PM
Hall-Petch-like Relationship in Metallic Glasses: *Yucong Gu*[1]; Lin Li[1]; Xiao Han[1]; Feng Yan[1]; [1]University of Alabama

3:55 PM Discussion on atomistic simulations, modelling, and theory of metallic glasses

---

CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2022 — Characterization of Polymers, Composites, Coatings and Ceramics

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

Program Organizers: Mingming Zhang, Wood Mackenzie; Jian Li, CanmetMATERIALS; 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, DEVCOM U.S. Army Research Laboratory; Rajiv Soman, Eurofins EAG Materials Science LLC; Zhiwei Peng, Central South University

Tuesday PM | March 1, 2022
207B | Anaheim Convention Center

Session Chairs: Wendell Bruno Almeida Bezerra, University of California San Diego; Sheron Tavares, University of California San Diego

---

2:30 PM Introductory Comments

2:35 PM
CobaltFerriteBasedMultiferroicPolymerNanocomposites:*AlixMartin*[1]; [1]Tuskegee

2:55 PM
Understanding 3D Volumetric Analysis of Active MOF Embedded in Thin Film Polymer: Andy Holwell[1]; *Maadhav Kothari*[1]; Markus Boese[1]; Simon Vo[2]; Russell Morris[2]; Alexander Forse[3]; Suzi Pugh[3]; [1]Carl Zeiss Microscopy Llc; [2]University of St Andrews; [3]University of Cambridge

3:15 PM
Employing a Semi-quantitative System to Elucidate Particle Spacing in Particle-reinforced Composite: *Andrew O'Connor*[1]; Cheol Park[1]; Michele Manuel[1]; [1]University of Florida

3:35 PM
Interfacial Investigation of High Loaded Plastic Bonded Explosive Interfaces ModifiedviaBiologicallyInspiredCore-shellCoatingTechnique.LA-UR-21-26026: *Matthew Herman*[1]; Erik Watkins[1]; John Yeager[1]; [1]Los Alamos National Laboratory

3:55 PM Break

4:10 PM
Evaluation of the Puzolanic Effect of Microsilice on Physical and Mechanical Properties in Mortar Mixtures: *Elisa Alcala de Villarroel*[1]; Inocente Villarroel[1]; [1]UNEG

4:30 PM
Ubim fiber: another possible reinforcement in composites: Belayne Marchi[1]; *Wendell Bezerra*[1]; Michelle Oliveira[1]; Talita de Sousa[1]; Veronica Candido[2]; Alisson Silva[2]; Sergio Monteiro[1]; [1]Instituto Militar de Engenharia; [2]Universidade Federal do Pará

ENERGY & ENVIRONMENT

Composites for Energy Applications: Materials for Renewable Energy Applications 2022 — Hydrogen and Thermal Energy Storage

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

Program Organizers: Patrick Ward, Savannah River National Laboratory; Joseph Teprovich, California State University Northridge; Anthony Thompson, Savannah River National Laboratory; Simona Hunyadi Murph, Savannah River National Laboratory

Tuesday PM | March 1, 2022
210D | Anaheim Convention Center

Session Chair: Patrick Ward, Savannah River National Laboratory

---

2:30 PM Invited
Sulfur-based High Temperature Thermal Energy Storage: *Kaiyuan Jin*[1]; [1]University of California-Los Angeles

3:00 PM Invited
Design of Novel Composites by Using Bioplastics and Biomass: *Surojit Gupta*[1]; [1]University of North Dakota

3:30 PM Invited
Energetics of the Reversible Dehydrogenation of Magnesium Borohydride and Mg(BH4)2-THF Composite to Magnesium Boranes: *Craig Jensen*[1]; Sunil Shrestha[1]; Kazuumi Fujioka[1]; Rui Sun[1]; Phuong Nguyen[1]; Tom Autrey[2]; [1]University of Hawaii; [2]Pacific Northwest National Laboratory

4:00 PM
Development and Characterization of High Capacity Hydrogen Energy Storage Materials: *Zachary Duca*[1]; Patrick Ward[1]; Hector Colon-Mercado[1]; Henry Sessions[1]; Dustin Olson[1]; Joseph Teprovich[2]; [1]Savannah River National Laboratory; [2]California State University Northridge

4:20 PM Concluding Comments

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Uncertainty Quantification in CTK/Grain Boundary Thermodynamics

Sponsored by: TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee

Program Organizers: Vahid Attari, Texas A&M University; Sara Kadkhodaei, University Of Illinois At Chicag; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Tourret, IMDEA Materials Institute; James Morris, Ames Laboratory

Tuesday PM | March 1, 2022
255C | Anaheim Convention Center

Session Chairs: Reza Darvishi Kamachali, Institute for Materials Research and Testing (BAM); Vahid Attari, Texas A&M University

---

2:30 PM
Bayesian Learning of Thermodynamic Integration and Numerical Convergence for Accurate Phase Diagrams: *Vladimir Ladygin*[1]; Alexander Shapeev[2]; Iliya Beniya[3]; Edgar Makarov[2]; [1]California Institute of Technology; [2]Skolkovo Institute of Science and Technology; [3]Moscow Institute of Technology

2:50 PM Invited
Uncertainty Reduction for Calculated Phase Equilibria: *Richard Otis*[1]; Brandon Bocklund[2]; Zi-Kui Liu[2]; [1]Jet Propulsion Laboratory; [2]Pennsylvania State University

3:20 PM Invited
CALPHAD-guided Grain Boundary Phase Diagrams and Opening Possibilities for Grain Boundary Engineering: *Reza Darvishi Kamachali*[1]; Lei Wang[1]; Anna Manzoni[1]; Birgit Skrotzki[1]; Gregory Thompson[2]; [1]Federal Institute for Materials Research and Testing (BAM); [2]Department of Metallurgical Materials Engineering, The University of Alabama

3:50 PM Break

4:10 PM
Computing Grain Boundary Diagrams: *Chongze Hu*[1]; Jian Luo[2]; [1]Sandia National Laboratories; [2]University of California San Diego

4:30 PM
Nucleation of Grain Boundary Phases: Ian Winter[1]; Rob Rudd[1]; Tomas Oppelstrup[1]; *Timofey Frolov*[1]; [1]Lawrence Livermore National Laboratory

---

MATERIALS PROCESSING

Defects and Properties of Cast Metals IV — Defects III- Porosity & Cracking

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

Program Organizers: Lang Yuan, University of South Carolina; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Andrew Kao, University of Greenwich; Kyle Fezi, Fort Wayne Metals

Tuesday PM | March 1, 2022
210B | Anaheim Convention Center

Session Chairs: Alex Plotkowski, Oak Ridge National Laboratory; Etienne Martin , Polytechnique Montreal

---

4:00 PM Invited
Quantifying Pore Evolution during Laser Powder Fusion Using High-speed X-ray Imaging and High Fidelity Multiphase Simulation: *Chu Lun Alex Leung*[1]; Michael Mallon[2]; Dawid Luczyniec[2]; Yuze Huang[1]; Samuel J. Clark[3]; Yunhui Chen[1]; Sebastian Marussi[1]; Lorna Sinclair[1]; Margie P. Olbinado[4]; Elodie Boller[5]; Alexander Rack[5]; Iain Todd[6]; Peter D. Lee[1]; [1]University College London; [2]European Space Agency; [3]Argonne National Laboratory; [4]Paul Scherrer Institute; [5]European Synchrotron Radiation Facility; [6]University of Sheffield

4:25 PM
Porosity Formation in High Pressure Die Casting: Experiments and Simulations: Nicole Trometer[1]; Xuejun Huang[1]; Michael Moodispaw[1]; Jianyue Zhang[1]; *Alan Luo*[1]; [1]Ohio State University

4:45 PM
Nucleation in Undercooled Melt upon Changes in the Electromagnetic Stirring: *Gwendolyn Bracker*[1]; Stephan Schneider[2]; Juergen Brillo[2]; Georg Lohoefer[2]; Robert Hyers[1]; [1]University of Massachusetts; [2]Deutsches Zentrum für Luft- und Raumfahrt (DLR)

5:05 PM Concluding Comments

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Mechanisms of High Temperature Alloys — Material Models

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

Program Organizers: Mark Hardy, Rolls-Royce Plc; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Jeremy Rame, Safran Aircraft Engines; Akane Suzuki, GE Research; Jean-Charles Stinville, University of California, Santa Barbara; Paraskevas Kontis, Norwegian University of Science and Technology; Andrew Wessman, University of Arizona

Tuesday PM | March 1, 2022
304B | Anaheim Convention Center

Session Chairs: Paraskevas Kontis, Max-Planck-Institut fur Eisenforschung GmbH; Jonathan Cormier, ISAE-ENSMA & Institut Pprime

---

2:30 PM
Systematic Study of the Effect of Alloying on APB and SISF Energies in $L1_2$-$(Co,Ni)_3(Al,W,Ta)$: *K V Vamsi*[1]; Tresa Pollock[1]; [1]University of California-Santa Barbara

2:50 PM
A Physics-based Vacancy Diffusion Model to Capture High Temperature Creep Responses: Application to 316H Stainless Steel: *Aritra Chakraborty*[1]; Mariyappan Arul Kumar[1]; Ricardo Lebensohn[1]; Laurent Capolungo[1]; [1]Los Alamos National Laboratory

3:10 PM
Damage-coupled Monotonic and Cyclic Softening Modeling in Inconel 718 Superalloys: *Jean-Briac le Graverend*[1]; [1]Texas A&M University

3:30 PM
Phase Field Modeling of Void Growth under Creep: *Tianle Cheng*[1]; Fei Xue[2]; Jeffrey Hawk[3]; Youhai Wen[3]; [1]U.S. Department of Energy, National Energy Technology Laboratory / NETL Site Support Contractor; [2]U.S. Department of Energy, National

Energy Technology Laboratory / ORISE; [3]U.S. Department of Energy, National Energy Technology Laboratory

3:50 PM
Numerical Studies to Analyze the Deformation Behavior of Corroded Material under High Velocity Impact Using Continuum Damage Mechanics: Yogeshwar Jasra[1]; *Pardeep Kumar*[2]; Paras Mohan Jasra[3]; Ravindra Kumar Saxena[1]; [1]Sant Longowal Institute of Engineering and Technology; [2]R.V. Industries; [3]DOTec Corp

---

MECHANICS & STRUCTURAL RELIABILITY

Dynamic Behavior of Materials IX — X-ray, Spectroscopy and Imaging II

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

Program Organizers: Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Cyril Williams, US Army Research Laboratory

Tuesday PM | March 1, 2022
304D | Anaheim Convention Center

Session Chairs: Cyril Williams, Army Research Laboratory; Christopher DiMarco, Johns Hopkins University

---

2:30 PM
Observation of Shear Band Localization in Ti-64 through In-situ Imaging under Dynamic Compression Conditions: *Jonathan Lind*[1]; Matthew Nelms[1]; Alison Kubota[1]; Mukul Kumar[1]; Nathan Barton[1]; [1]Lawrence Livermore Laboratory

2:50 PM
Modified Reflective Digital Gradient Sensing (R-DGS) for Impact Applications: *Pinkesh Malhotra*[1]; Chengyun Miao[1]; Justin Moreno[1]; Matt Shaeffer[1]; Kaliat Ramesh[1]; [1]Johns Hopkins University

3:10 PM
Using Full-field Strain and Temperature Measurements to Determine the Taylor-Quinney Coefficient in Tensile Split Hopkinson Bar Tests: *Amos Gilat*[1]; Jarrod Smith; Jermy Seidt[1]; [1]Ohio State Univ

3:30 PM
Amorphization of Covalently-bonded Materials: A Generalized Deformation Mechanism under Extreme Conditions: *Boya Li*[1]; Shiteng Zhao[2]; Bruce Remington[3]; Christopher Wehrenberg[3]; Hye-Sook Park[3]; Eric Hahn[1]; Marc Meyers[1]; [1]University of California San Diego; [2]Beihang University ; [3]Lawrence Livermore National Laboratory

3:50 PM Break

4:05 PM
Twinning-assisted Dynamic Recrystallization: A New Mechanism Revealed by Single Microparticle Supersonic Impact: *Ahmed Alade Tiamiyu*[1]; Edward Pang[1]; Christopher Schuh[1]; [1]MIT

4:25 PM
Quasi-static to Dynamic Transition in Strengthening Effects of Helium Bubbles in Copper: *Calvin Lear*[1]; David Jones[1]; Jonathan Gigax[1]; Daniel Martinez[1]; Rachel

Flanagan[1]; Minh Hoang[1]; Jeremy Payton[1]; Michael Prime[1]; Saryu Fensin[1]; [1]Los Alamos National Laboratory

---

LIGHT METALS

Electrode Technology for Aluminum Production — Session III

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

Program Organizers: Stephan Broek, Boston Metal; Dmitry Eskin, Brunel University

Tuesday PM | March 1, 2022
208A | Anaheim Convention Center

Session Chair: Stephan Broek, Hatch

2:30 PM
Effects of Stub Preheating Temperature on the Anode Voltage Drop in the Aluminium Reduction Cell: *Tuofu Li*[1]; Wenju Tao[2]; Zhaowen Wang[2]; [1]General Research Institute of Mining and Metallurgy Technology Group; [2]Northeastern University

2:55 PM
EGA Journey with Different Ramming Pastes: *Ali Jassim*[1]; Najeeba Al Jabri[1]; Alexander Arkhipov[1]; Mohamed Tawfik Boraie[1]; [1]EGA

3:20 PM
Molecular Dynamic Insights into Carbon Electrode Behaviors of Aluminium Electrolysis: *Jiaqi Li*[1]; Jie Li[1]; Jingkun Wang[1]; Hongliang Zhang[1]; [1]Central South University

3:45 PM
Quality Evaluation of Nitride Bonded SiC Sidelining Materials. Historical Trends 1997-2022 Including Results and Development of Test Methods: *Egil Skybakmoen*[1]; [1]SINTEF Industry

---

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

Tuesday PM | March 1, 2022
201D | Anaheim Convention Center

Session Chair: To Be Announced

2:30 PM
A New Test Specimen to Determine Environmentally-assisted Cracking Threshold: *James Sobotka*[1]; Carl Popelar[1]; Fassett Hickey[1]; Julian Hallai[2]; Yifei Zeng[3]; [1]Southwest Research Institute; [2]Exponent; [3]ExxonMobil

2:50 PM
Predicting Electrochemical Conditions in a Stress Corrosion Crack Tip and the Influence of Exposure Environment: *Ryan Katona*[1]; Erin Karasz[1]; James Burns[2]; Charles Bryan[1]; Rebecca Schaller[1]; Robert Kelly[2]; [1]Sandia National Laboratories; [2]University of Virginia

3:10 PM
Environmental Fracture of Alpha-brass in a Multi-scale QM/MM Approach: *Antoine Clement*[1]; Thierry Auger[1]; [1]CNRS

3:30 PM
Optimization of Stress Corrosion Mitigation in Al-Mg via Zn-Rich Primers: Matthew McMahon[1]; Eric Dau[1]; *Allison Akman*[1]; [1]Naval Surface Warfare Center, Carderock Division

3:50 PM
The Effect of Loading Rate on the Environment-assisted Cracking Behavior of Sensitized AA5456-H116: *Zachary Harris*[1]; James Burns[1]; [1]University of Virginia

---

MATERIALS DESIGN

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Data-Driven Investigations of Fatigue

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials 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: Jean-Charles Stinville, University of Illinois Urbana-Champaign; Garrett Pataky, Clemson University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University; Orion Kafka, NIST

Tuesday PM | March 1, 2022
254B | Anaheim Convention Center

Session Chairs: Ashley Spear, University of Utah; Orion L. Kafka, National Institute of Standards and Technology

---

2:30 PM
Combining Multimodal Data of Fatigue Fracture Surfaces for Analysis in a CNN: *Katelyn Jones*[1]; Elizabeth Holm[1]; Anthony Rollett[1]; [1]Carnegie Mellon University

2:50 PM
Process-microstructure-behavior Relationships for Fatigue of Additively Manufactured Al Alloys: *Emine Tekerek*[1]; Vignesh Perumal[1]; Alex Riensche[2]; Prahalada Rao[2]; Lars Jacquemetton[3]; Darren Beckett[3]; Harold Halliday[4]; Joseph T. Mckeown[5]; Antonios Kontsos[1]; [1]Drexel University; [2]University of Nebraska-Lincoln; [3]Sigma Labs, Inc.; [4]Navajo Technical University; [5]Lawrence Livermore National Laboratory

3:10 PM
Revealing the Critical Role of Volumetric Defects in the Fatigue Behavior of LB-PBF Ti-6Al-4V: Muztahid Muhammad[1]; Arun Poudel[1]; Salman Yasin[1]; *Shuai Shao*[1]; Nima Shamsaei[1]; [1]Auburn University

3:30 PM
Correlation of Microstructure and Damage Tolerant Properties of Additive Manufactured Ti-6Al-4V: *Ralph Bush*[1]; Tessa Barbosa[1]; Elijah Palm[1]; Benjamin Smith[1]; [1]US Air Force

---

NANOSTRUCTURED MATERIALS

Functional Nanomaterials: Functional Low-Dimensional (0D, 1D, 2D) Materials 2022 — Low-Dimensional Electronics & Optoelectronics

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

Program Organizers: Michael Cai Wang, University of South Florida; Yong Lin Kong, University of Utah; Sarah Ying Zhong, University of South Florida; Surojit Gupta, University of North Dakota; Nasrin Hooshmand, Georgia Institute of Technology; Woochul Lee, University of Hawaii at Manoa; Min Kyu Song, Washington State University; Simona Hunyadi Murph, Savannah River National Laboratory; Hagar Labouta, University of Manitoba; Max Anikovskiy, University of Calgary; Patrick Ward, Savannah River National Laboratory

Tuesday PM | March 1, 2022
260B | Anaheim Convention Center

Session Chairs: Surojit Gupta, University of North Dakota; Michael Cai Wang, University of South Florida

---

2:30 PM Invited
"Smart" Biodegradable Polymer at Nano and Micro Scales for Medical Applications: *Thanh Nguyen*[1]; [1]University of Connecticut

2:55 PM
Harnessing Microstructures for Tunable Interference Color: *Lauren Zarzar*[1]; [1]Penn State University

3:15 PM
Strain-tunable Optoelectronic Response of Crumpled Graphene/Organic Semiconductor Heterostructure: *Zhichao Zhang*[1]; Jin Myung Kim[1]; Sungwoo Nam[1]; [1]University of Illinois

3:35 PM
Suspended Graphene/PEDOT:PSS Channel for H2 Gas Sensing Fabricated Using Direct-write Functional Fibers: *Abiral Regmi*[1]; Noori Na[1]; Jiyoung Chang[1]; [1]University of Utah

3:55 PM Break

4:15 PM
Controlled Synthesis of Gas Sensing Composite Metal/Metal Oxide Graphene-based Nanofibers: Luz Cruz[1]; Qiurong Shi[1]; Devis Montroni[1]; *David Kisailus*[1]; Roberto Rivera[1]; [1]University of California, Irvine

4:35 PM Keynote
Structural Evolution and Electrical Conductivity of Polymer Derived Ceramics: *Kathy Lu*[1]; Sanjay Kumar[1]; [1]Virginia Polytechnic Institute and State University

---

MATERIALS PROCESSING

Furnace Tapping 2022 — Session IV

Sponsored by: The Southern African Institute of Mining and Metallurgy, TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Materials Characterization Committee, Industrial Advisory Committee

Program Organizers: Joalet Steenkamp, MINTEK; Dean Gregurek, RHI Magnesita; Quinn Reynolds, Mintek; Gerardo Alvear Flores, Rio Tinto; Hugo Joubert, Tenova Pyromet; Phillip Mackey, P.J. Mackey Technology, Inc.

Tuesday PM | March 1, 2022
213D | Anaheim Convention Center

Session Chair: Rodrigo Madariaga, MIRS USA

2:30 PM Introductory Comments

2:35 PM
Health Friendly Plugging Repair Pastes: *Antonio De Pretto*[1]; Lars Lindstad[1]; [1]Elkem Carbon AS

2:55 PM
Tapblock Refractory Wear Monitoring and Hearth Refractory Design Optimization in Metallurgical Furnaces: *Cameron Soltys*[1]; Jayant Borana[1]; Hamid Ghorbani[1]; Richard MacRosty[1]; Tom Plikas[1]; Chad Van der Woude[1]; [1]Hatch

3:15 PM
The Evaluation of Chemical Wear of Carbon-based Tap-hole Refractories in Ferrochrome Production: *Martin Sitefane*[1]; Joalet Steenkamp[1]; [1]Mintek

3:35 PM
Metal and Slag Extraction from Different Zones of a Submerged Arc Furnace with Non-uniform Porous Bed Using CFD: Varun Loomba[1]; Jan Olsen[2]; *Kristian Einarsrud*[1]; [1]Norwegian University of Science and Technology; [2]SINTEF Industry

3:55 PM Break

4:15 PM
Investigation of Melting Behavior and Viscosity of Slags from Secondary Ferromanganese Production: *David Scheiblehner*[1]; Christoph Sagadin[1]; Helmut Antrekowitsch[1]; Stefan Luidold[1]; Dieter Offenthaler[2]; [1]Montanuniversität; [2]Batrec Industrie AG

4:35 PM
Tap-hole Refractory Issues and Remedies: *Dean Gregurek*[1]; Christine Wenzl[1]; Jürgen Schmidl[1]; Alfred Spanring[1]; [1]RHI Magnesita

4:55 PM
Slide Gate Technology for Slag Tapping: *Goran Vukovic*[1]; [1]RHI Magnesita

5:15 PM
Tap-hole Clay Technologies for Ferroalloy Reduction Furnaces: *Tomas Oliveira*[1]; Wagner Moulin-Silva[1]; Aloísio Ribeiro[1]; Modestino Brito[2]; [1]RHI Magnesita; [2]Yamagata Consultoria

5:35 PM
Simulation-based Approaches for Optimized Tap Hole Design: *Guenter Unterreiter*[1]; Anton Ishmurzin[1]; Ulrich Marschall[1]; Alfred Spanring[1]; [1]RHI Magnesita

5:55 PM Concluding Comments

MECHANICS & STRUCTURAL RELIABILITY

Grain Boundaries and Interfaces: Metastability, Disorder, and Non-Equilibrium Behavior — Grain Boundary Migration and Deformation: Part II

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

Program Organizers: Yue Fan, University of Michigan; Liang Qi, University of Michigan; Jeremy Mason, University of California, Davis; Garritt Tucker, Colorado School of Mines; Pascal Bellon, University of Illinois at Urbana-Champaign; Mitra Taheri, Johns Hopkins University; Eric Homer, Brigham Young University; Xiaofeng Qian, Texas A&M University

Tuesday PM | March 1, 2022
304C | Anaheim Convention Center

Session Chairs: Yue Fan, University of Michigan, Ann Arbor; Jeremy Mason, UC-Davis

---

2:30 PM
Slip Transfer and Cracking at Grain Boundaries in FCC and HCP Metals: Eugenia Nieto-Valeiras[1]; Maral Sarebanzadeh[2]; Meijuan Zhang[3]; Alberto Orozco-Caballero[2]; *Javier Llorca*[1]; [1]IMDEA Materials Institute & Technical University of Madrid; [2]Technical University of Madrid; [3]IMDEA Materials Institute

2:50 PM Invited
Mechanisms for and Thermodynamics of Interfacial Strain Mediation: *Shen Dillon*[1]; [1]University of California, Irvine

3:20 PM
Grain Boundary Pop-in during Nanoindentation of W: Recent Observation on Dislocation Grain Boundary Interaction: *Karsten Durst*[1]; [1]TU Darmstadt

3:40 PM
A Crystal Plasticity Framework to Model Continuum Disconnections in Polycrystals: Junan He[1]; Himanshu Joshi[1]; *Nikhil Chandra Admal*[1]; [1]University of Illinois at Urbana-Champaign

---

ADVANCED MATERIALS

High Performance Steels — Metastability in Steels

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

Program Organizers: Ana Luiza Araujo, CBMM North America Inc.; C. Tasan, Massachusetts Institute of Technology; Jonah Kleem-Toole, Colorado School of Mines; Louis Hector, General Motors Global Technical Center; Tilmann Hickel, Max-Planck-Institut Fuer Eisenforschung; Benjamin Adam, Oregon State University

Tuesday PM | March 1, 2022
252C | Anaheim Convention Center

Session Chairs: Ana Araujo, CBMM NA; Melissa Thrun, Colorado School of Mines

---

2:30 PM
A Novel Approach to Improve Strength-ductility Combinations in Medium Manganese Steels: *Dawn Van Iderstine*[1]; Matthew Cagle[1]; YubRaj Paudel[1]; Shiraz Mujahid[1]; Hongjoo Rhee[1]; Haitham El Kadiri[2]; [1]Center for Advanced Vehicular Systems, Mississippi State University; [2]Department of Mechanical Engineering, Mississippi State University

2:50 PM
Deformable Plastic Strain-induced Epsilon-martensite in FeMnCo Alloys: A Pathway Towards Overcoming the Limits of Metastability: *Shaolou Wei*[1]; Cem Tasan[1]; [1]Massachusetts Institute of Technology

3:10 PM
Effects of Austenite Stability on Sheet Forming of Advanced High Strength Steels: *Christopher Finfrock*[1]; Benjamin Ellyson[1]; John Copley[1]; Brady McBride[1]; C. Becker[1]; Diptak Bhattacharya[1]; Doug Smith[1]; Chloe Johnson[1]; Connor Rietema[1]; Raj Banerjee[2]; Kamel Fezzaa[3]; Cody Kirk[4]; Nesredin Kedir[4]; Jinling Gao[4]; Weinong Chen[4]; Tao Sun[5]; Niranjan Parab[3]; Jonah Klemm-Toole[1]; Amy Clarke[1]; Kester Clarke[1]; [1]Colorado School of Mines; [2]University of North Texas; [3]Argonne National Laboratory; [4]Purdue University; [5]University of Virginia

3:30 PM
Stacking Fault Energy Dependent Deformation Mechanisms in Medium-Mn Steels: *Krista Limmer*[1]; Daniel Field[1]; Daniel Magagnosc[1]; Timothy Walter[1]; Christopher Meredith[1]; Jeffrey Lloyd[1]; [1]DEVCOM Army Research Laboratory

3:50 PM
Reverted Austenite in Precipitation Hardened Stainless Steels: Design Considerations and Mechanical Effects: *Hyunseok Oh*[1]; Jiyun Kang[1]; Menglei Jiang[1]; Cemal Cem Tasan[1]; [1]Massachusetts Institute of Technology

4:10 PM Break

4:25 PM
Tailoring Transformation Plasticity to Resist Microvoid Shear Localization: *Brandon Snow*[1]; G. Olson[1]; D. Parks[1]; [1]Massachusetts Institute of Technology

4:45 PM
Tempering & Austempering of Double Soaked Medium Manganese Steels: *Alexandra Glover*[1]; Cheng Liu[1]; Emmanuel DeMoor[2]; John Speer[2]; [1]Los Alamos National Laboratory; [2]Colorado School of Mines

5:05 PM
The Influence of Temperature on the Strain-hardening Behavior of Fe-22/25/28Mn-3Al-3Si TRIP/TWIP Steels
: *Dean Pierce*[1]; Jake Benzing[2]; Jose Jiménez[3]; Tilmann Hickel[4]; Ivan Bleskov[4]; Jong Keum[1]; Dierk Raabe[4]; Jim Wittig[5]; [1]Oak Ridge National Laboratory; [2]National Institute of Standards and Technology; [3]Centro Nacional de Investigaciones Metalurgicas (CSIC); [4]Max-Planck-Institut für Eisenforschung; [5]Vanderbilt University

5:25 PM
Manganese-diffusion Controlled Kinetics of Austenite Growth and Cementite Dissolution during Intercritical Annealing of Medium-Mn Steels: *Josh Mueller*[1]; John Speer[2]; David Matlock[2]; Emmanuel De Moor[2]; [1]Los Alamos National Laboratory; [2]Colorado School of Mines

---

MATERIALS DESIGN

Hume-Rothery Symposium on Connecting Macroscopic Materials Properties to Their Underlying Electronic Structure: The Role of Theory, Computation, and Experiment — Phonons, Transport and Microstructure Evolution/CALPHAD

and Alloy Design

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

Program Organizers: Raymundo Arroyave, Texas A&M University; Wei Chen, Illinois Institute of Technology; Yong-Jie Hu, Drexel University; Tresa Pollock, University of California, Santa Barbara

Tuesday PM | March 1, 2022
255A | Anaheim Convention Center

Session Chair: To Be Announced

2:30 PM Invited
Phonon Anharmonicity Beyond Perturbation Theory: *Brent Fultz*[1]; Vladimir Ladygin[1]; Michael Manley[2]; Yang Shen[1]; Claire Saunders[1]; Camille Bernal[1]; [1]California Institute of Technology; [2]Oak Ridge National Laboratory

3:00 PM Invited
Machine Learning in Diffusivity Calculations Using a Variational Principle: *Dallas Trinkle*[1]; [1]University of Illinois at Urbana-Champaign

3:30 PM Invited
Building a Diffusion Mobility Database for γ/γ' Co-superalloys: *Carelyn Campbell*[1]; Kil-won Moon[1]; Greta Lindwall[2]; [1]National Institute of Standards and Technology; [2]Royal Institute of Technology

4:00 PM Break

4:15 PM Invited
CALPHAD Modeling of Phase-based Properties: Ursula Kattner[1]; *Carelyn Campbell*[1]; [1]National Institute of Standards and Technology

4:45 PM Invited
Precipitate Shearing, Fault Energies and the Design of Superalloys: K.V. Vamsi[1]; Yolita Eggeler[2]; *Tresa Pollock*[1]; [1]University of California, Santa Barbara; [2]Karlsruhe Institute of Technology

5:15 PM Invited
Challenges in Addressing the Silicate Attack Problem in Gas Turbine Coatings: *Carlos Levi*[1]; [1]University of California, Santa Barbara

---

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — Salt Properties and Chemistry

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

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

Tuesday PM | March 1, 2022
203B | Anaheim Convention Center

Session Chair: Raluca Scarlat, University of California, Berkeley

---

2:30 PM
Determination of Fluoride Molten Salt Thermal Diffusivity and Sound Speed via Transient Grating Spectroscopy: *Sean Robertson*[1]; Michael Short[1]; [1]Massachusetts Institute of Technology

2:50 PM
Understanding the Structure of Complexes in Molten Salts Using Absorption Spectroscopy: *Jeremy Moon*[1]; Dev Chidambaram[1]; [1]University of Nevada, Reno

3:10 PM
Ab Initio Molecular Dynamics Study of Thermophysical and Transport Properties for High Temperature LiCl-KCl and NaCl-MgCl2 System: *Kai Duemmler*[1]; Yuxiao Lin[2]; Michael Woods[2]; Toni Karlsson[2]; Ruchi Gahkar[2]; Benjamin Beeler[1]; [1]North Carolina State University; [2]Idaho National Laboratory

3:30 PM
Chlorination of UO2 to UCl3 in a Molten LiCl-KCl Using ZrCl4: *Jarom Chamberlain*[1]; Michael Simpson[1]; [1]University of Utah

3:50 PM Break

4:10 PM
Molten Uranium Chloride Salts Investigated by Ab Initio Molecular Dynamics Simulations: *David Andersson*[1]; [1]Los Alamos National Laboratory

4:30 PM
First-principles Molecular Dynamics of CaF2-MgF2 Molten Salt System: *Yifan Zhang*[1]; Abu Miraz[2]; Uday Pal[3]; Adam Powell[1]; Michael Gao[4]; Yu Zhong[1]; [1]Worcester Polytechnic Institute; [2]Louisiana Tech University; [3]Boston University; [4]National Energy Technology Laboratory

---

MATERIALS DESIGN

Materials Design and Processing Optimization for Advanced Manufacturing: From Fundamentals to Application — Materials Design and Processing Optimization: Session IV

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

Program Organizers: Wei Xiong, University of Pittsburgh; Dana Frankel, QuesTek Innovations LLC; Gregory Olson, Massachusetts Institute of Technology

Tuesday PM | March 1, 2022
253B | Anaheim Convention Center

Session Chairs: Le Zhou, Marquette University; Xiaoxiang Yu, Novelis Inc.

4:00 PM
Variation in Density, Phase Constituents, Microstructure, Surface Roughness and Modulus/Hardness Observed from LPBF Parametric Study of Ti – 6 wt.% Al – 4 wt.% V Alloy: *Asif Mahmud*[1]; Jeongmin Woo[1]; Holden Hyer[1]; Ji-Yoon Kim[2]; Thinh Huynh[1]; Abhishek Mehta[1]; Kee-Ahn Lee[2]; Yongho Sohn[1]; [1]University of Central Florida; [2]Inha University

4:20 PM
Towards Laser Powder Bed Process Optimization: An Approach for Fast Process-microstructure Predictions: *Mason Jones*[1]; Jean-Pierre Delplanque[1]; [1]University

of California Davis

4:40 PM Invited
Additive Manufacturing of High-performance Compositionally Complex Metal Alloys: Wen Chen[1]; *Shahryar Mooraj*[1]; [1]University of Massachusetts-Amherst

---

NUCLEAR MATERIALS

Materials Systems for the Future of Fusion Energy — Radiation Effects in High Heat Flux Materials I

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

Program Organizers: Jason Trelewicz, Stony Brook University; Kevin Field, University of Michigan; Takaaki Koyanagi, Oak Ridge National Laboratory; Yuanyuan Zhu, University of Connecticut; Dalong Zhang, Pacific Northwest National Laboratory

Tuesday PM | March 1, 2022
203A | Anaheim Convention Center

Session Chairs: Brian Wirth, University of Tennessee; Jason Trelewicz, Stony Brook University

---

2:30 PM
Grain Boundary Softening in Helium Implanted Fine-grained Tungsten: *William Cunningham*[1]; Yang Zhang[1]; Osman El-Atwani[2]; Jason Trelewicz[1]; [1]Stony Brook University; [2]Los Alamos National Laboratory

2:50 PM Invited
Multiscale Materials Modeling of Structural Materials and Plasma Facing Components in the Extreme Fusion Environment: *Brian Wirth*[1]; [1]University of Tennessee

3:20 PM
Evaluating the Temperature Dependence of Bubble Bursting Rate for Low Energy Helium Plasma-exposed Tungsten: *Yogendra Panchal*[1]; Sophie Blondel[1]; Dwaipayan Dasgupta[1]; Robert Kolasinski[2]; Brian Wirth[1]; [1]University of Tennessee, Knoxville; [2]Sandia National Laboratories

3:40 PM
Macroscopic Elastic Stress and Strain Produced by Irradiation: *Luca Reali*[1]; Max Boleininger[1]; Mark Glbert[1]; Sergei Dudarev[1]; [1]UKAEA

4:00 PM Break

4:20 PM Invited
Integrated Multi-physics Modeling of Impurity Migration, Surface Morphology, and Material Evolution in Present and Future Tokamaks: *Ane Lasa*[1]; Sophie Blondel[1]; Timothy Younkin[2]; David Bernholdt[2]; John Canik[2]; Mark Cianciosa[2]; Wael Elwasif[2]; David Green[2]; Phil Roth[2]; Jon Drobny[3]; Davide Curreli[3]; Brian Wirth[1]; [1]University of Tennessee; [2]Oak Ridge National Laboratory; [3]University of Illinois Urbana-Champaign

4:50 PM Invited
Expanding Irradiation Damage Models to Fusion Conditions: Tackling the Multispecies Paradigm at High Temperatures: *Jaime Marian*[1]; [1]University of

California, Los Angeles

NUCLEAR MATERIALS

Mechanical Behavior and Degradation of Advanced Nuclear Fuel and Structural Materials — Structural Materials Characterization & Modelling I

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

Program Organizers: Dong Liu, University of Bristol; Peng Xu, Idaho National Laboratory; Simon Middleburgh, Bangor University; Christian Deck, General Atomics; Erofili Kardoulaki, Los Alamos National Laboratory; Robert Ritchie, University of California, Berkeley

Tuesday PM | March 1, 2022
204A | Anaheim Convention Center

Session Chairs: Erofili Kardoulaki, LANL; Joshua White, LANL

2:30 PM Invited
Degradation Modes of Core Materials under Multiple Components of the Reactor Environment: *Gary Was*[1]; [1]University of Michigan

3:00 PM
Study of the Irradiation Induced Microstructure and Mechanical Properties in Low Alloyed Ferritic Steels: *Maria Vrellou*[1]; Bertrand Radiguet[1]; Akiyoshi Nomoto[2]; Philippe Pareige[1]; [1]Groupe de Physique des Matériaux - Université de Rouen Normandie; [2]Central Research Institute of Electric Power Industry

3:20 PM
Neutron Irradiation Effects on Mechanical Anisotropy in Alloy 625: *Caleb Clement*[1]; Megha Dubey[2]; Yu Lu[2]; Sheng Cheng[2]; 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

3:40 PM Break

4:00 PM
Micromechanical Testing of Femtosecond Laser Machined Tensile Samples of Varied Geometries: *Jason Duckering*[1]; Andrew Dong[1]; Peter Hosemann[1]; Stuart Maloy[2]; [1]University of California Berkeley; [2]Los Alamos National Laboratory

4:20 PM
Through-thickness Microstructure Characterization in a Centrifugally Cast Austenitic Stainless Steel Nuclear Reactor Primary Loop Pipe Using Time-of-flight Neutron Diffraction: *Matthew Schmitt*[1]; Daniel Savage[1]; James Wall[2]; John Yeager[1]; Chanho Lee[1]; Sven Vogel[1]; [1]Los Alamos National Laboratory; [2]Electric Power Research Institute

NANOSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale VI — Contact and Fracture

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

Program Organizers: Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, University of Texas at San Antonio; Changhong Cao, McGill University; Mohsen Asle Zaeem, Colorado School of Mines

Tuesday PM | March 1, 2022
262B | Anaheim Convention Center

Session Chairs: Matthew Daly, University of Illinois-Chicago; Robert Carpick, University of Pennsylvania

---

2:30 PM Invited
Visualizing Nanoscale Contacts In Situ: History-dependent Adhesion of Si-Si and MoS2-MoS2 Interfaces: *Robert Carpick*[1]; [1]University of Pennsylvania

3:00 PM
Measuring and Understanding Nanoscale Adhesion and Deformation Using In Situ Experiments in a Transmission Electron Microscope: *Tevis Jacobs*[1]; Soodabeh Azadehranjbar[1]; Ruikang Ding[1]; Andrew Baker[1]; Sai Bharadwaj Vishnubhotla[1]; Ingrid Padilla Espinosa[2]; Rimei Chen[2]; Ashlie Martini[2]; [1]University of Pittsburgh; [2]University of California, Merced

3:20 PM
Tribochemical Formation of Diamond-like Carbon Films on Catalytically-active Noble Alloys: *Frank DelRio*[1]; Morgan Jones[1]; Thomas Beechem[1]; Anthony McDonald[1]; Tomas Babuska[2]; Michael Dugger[1]; Michael Chandross[1]; Nicolas Argibay[1]; John Curry[1]; [1]Sandia National Laboratories; [2]Florida State University

3:40 PM
Direct Measurement of Adhesion for Noble-metal Nanoparticles Using In Situ Transmission Electron Microscopy: *Andrew Baker*[1]; Sai Bharadwaj Vishnubhotla[1]; Sanjana Karpe[1]; Yahui Yang[1]; Goetz Veser[1]; Tevis Jacobs[1]; [1]University of Pittsburgh

4:00 PM Break

4:20 PM Invited
Fracture of Two-dimensional Materials: *Jun Lou*[1]; [1]Rice University

4:50 PM
Competing Behavior of Slip and Fracture on the Nanomechanical Response of Pharmaceutical Materials: *Sushmita Majumder*[1]; Chenguang Wang[1]; Kevin Schmalbach[1]; Javier Garcia-Barriocanal[1]; Greg Haugstad[1]; Changquan Calvin Sun[1]; Nathan Mara[1]; [1]University of Minnesota-Twin Cities

---

MATERIALS DESIGN

Metal-Matrix Composites: Advances in Processing, Characterization, Performance and Analysis — Self-Healing Composite Materials and Other Composites

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

Program Organizers: Srivatsan Tirumalai, The University of Akron; Pradeep Rohatgi, University of Wisconsin; Simona Hunyadi Murph, Savannah River National Laboratory

Tuesday PM | March 1, 2022
256B | Anaheim Convention Center

Session Chair: Tirumalai S Srivatsan, The University of Akron

---

2:30 PM Keynote
Design and Fabrication of a Novel Al-based Self-healing Metal-matrix Composite: David Svetlizky[1]; Baolong Zheng[2]; Sen Jiang[2]; Yizhang Zhou[2]; Lorenzo Valdevit[2]; Enrique Lavernia[3]; *Julie Schoenung*[2]; Noam Eliaz[1]; [1]Tel-Aviv University; [2]University of California, Irvine; [3]National Academy of Engineering

3:00 PM Invited
Particle Injection and Phase Formation in Directed Energy Deposited Nickel-based Superalloy Composites: Sen Jiang[1]; *Baolong Zheng*[1]; Xin Wang[1]; Benjamin MacDonald[1]; Yizhang Zhou[1]; Julie Schoenung[1]; [1]University of California Irvine

3:20 PM Invited
Solidification Processing of Functionally Graded Metal Matrix Composites: *TPD Rajan*[1]; [1]CSIR-National Institute for Interdisciplinary Science and Technology

3:45 PM
Recent Advances in Self-healing Metal Matrix Composites: *Masum Bellah*[1]; Michael Nosonovsky[1]; Pradeep Rohatgi[1]; [1]University of Wisconsin Milwaukee

4:05 PM Break

4:20 PM Invited
Tribological Response of Magnesium/Glass Microballoon Syntactic Foams: *Vyasaraj Manakari*[1]; Gururaj Parande[1]; Mrityunjay Doddamani[2]; Srivatsan Tirumalai[3]; Manoj Gupta[1]; [1]National University of Singapore; [2]National Institute of Technology Karnataka; [3]The University of Akron

4:45 PM
Wettability of High Pressure Die Cast Aluminium Alloy on SiC and Al2O3 with the Influence of Surfactants: *Mahfuz Karim*[1]; Guangyu Liu[1]; Brian McKay[1]; Dmitry Eskin[1]; [1]BCAST Brunel University

---

MATERIALS DESIGN

Microstructural Templates Consisting of Isostructural Ordered Precipitate / Disordered Matrix Combinations: Microstructural Evolution and Properties — Session II

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

Program Organizers: Rajarshi Banerjee, University of North Texas; Eric Lass, University of Tennessee-Knoxville; Bharat Gwalani, Pacific Northwest National Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Jessica Krogstad, University of Illinois at Urbana-Champaign; Ashley Paz Y Puente, University of Cincinnati; Keith Knipling, Naval Research Laboratory; Matthew Steiner, University of Cincinnati

Tuesday PM | March 1, 2022
254A | Anaheim Convention Center

Session Chairs: Sriswaroop Dasari, University of North Texas; Eric Lass, The University of Tennessee, Knoxville

---

2:30 PM Introductory Comments

2:35 PM Invited
Deformable Intermetallic Nanorods Leads to an Excellent Strength-ductility Combination in a High Entropy Alloy: *Bharat Gwalani*[1]; Sriswaroop Dasari[2]; Vishal Soni[2]; Shivakant Shukla[1]; Abhinav Jagetia[2]; Priyanshi Agrawal[2]; Rajiv Mishra[2]; Rajarshi Banerjee[2]; [1]Pacific Northwest National Laboratory; [2]University of North Texas

3:05 PM Invited
Free Energy Landscape, Transformation Pathway and Alloy Parameters Leading to Various Isostructural Ordered Precipitate Microstructures: Kamalnath Kadirvel[1]; Shalini Roy Koneru[1]; Rajarshi Banerjee[2]; Hamish Fraser[1]; *Yunzhi Wang*[1]; [1]The Ohio State University; [2]University of North Texas

3:35 PM Invited
High Temperature Deformation Pathways in Ordered L12- and Immm-based Compounds: Thomas Mann[1]; Dongsheng Wen[1]; Sae Matsunaga[1]; Marisol Koslowski[1]; Michael Fahrmann[2]; *Michael Titus*[1]; [1]Purdue University; [2]Haynes International

4:05 PM Break

4:25 PM Invited
Core/Triple Shell Precipitates in Al-Er-Sc-Zr-(V,Nb,Ta) Alloys: *Keith Knipling*[1]; [1]Naval Research Laboratory

4:55 PM Concluding Comments

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXI — Advanced Process and Materials for Electronics

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

Program Organizers: Hiroshi Nishikawa, Osaka University; Shih-kang Lin, National Cheng Kung University; Chaohong Wang, National Chung Chung University; Chih Ming Chen, National Chung Hsing University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; A.S.Md Abdul Haseeb, University of Malaya; Vesa Vuorinen, Aalto University; Ligang Zhang, Central South University; Sehoon Yoo, KITECH; Yu-chen Liu, National Cheng Kung University; Ting-Li Yang, National Yang Ming Chiao Tung University

Tuesday PM | March 1, 2022
303A | Anaheim Convention Center

Session Chairs: Chih Ming Chen, National Chung Hsing University; Jaeho Lee, Hongik University

---

2:30 PM Invited
A Critical Analysis of Joining Processes for NiTi Shape Memory Alloys: *Boyd Panton*[1]; Amirali Shamsolhodaei[2]; Jianxiong Li[1]; Anupam Vivek[1]; Glenn Daehn[1]; Peng Peng[2]; Y. N. Zhou[2]; [1]The Ohio State University; [2]University of Waterloo

3:00 PM
Effect of Detwinning on Tensile Strength of Nanotwinned Cu Films: *Chiahung Lee*[1]; [1]National Central University

3:20 PM
Effect of Vertical Interfaces on Phase Transformation Behavior of MoS_2: *Shayani Parida*[1]; Arthur Dobley[2]; Barry Carter[3]; Avinash Dongare[1]; [1]University of Connecticut; [2]EaglePicher Technologies LLC; [3]CINT, Sandia National Laboratories

3:40 PM
Comparison of NiCo and NiP Electroplating for Wear Resistant Probe Tip: Na-Young Kang[1]; *Jaeho Lee*[1]; [1]Hongik University

4:00 PM
Morphological Effect of Patterned Sapphire Substrate on Efficiency of White-light Phosphor LED Package: *Chia-Yueh Chou*[1]; Cheng-Yi Liu[1]; [1]National Central University

---

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Superalloys and Shape Memory Alloys

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Ramasis Goswami, Naval Research Laboratory; Saurabh Puri, Microstructure Engineering; Eric Payton, Air Force Research Laboratory; Bij-Na Kim, Carpenter Additive; Megumi Kawasaki, Oregon State University; Eric Lass, University of Tennessee-Knoxville

Tuesday PM | March 1, 2022
255B | Anaheim Convention Center

Session Chair: Eric Lass, University of Tennessee-Knoxville

2:30 PM Invited
A Strategy to Optimize Local Phase Transformation Strengthening for Next Generation Superalloys: *Timothy Smith*[1]; Nikolai Zarkevich[2]; Ashton Egan[3]; Timothy Gabb[1]; John Lawson[2]; Michael Mills[3]; [1]NASA Glenn Research Center; [2]NASA Ames; [3]Ohio State University

3:00 PM
An Investigation into the Effect of Primary Gamma Prime Stimulated Metadynamic Recrystallization on Supersolvus Grain Sizes in Ni Superalloy LSHR: *Eric Payton*[1]; Jared Shank[2]; Kayla Evans[3]; Denielle Ricciardi[2]; Victoria Miller[4]; [1]Air Force Research Laboratory; [2]UES, Inc; [3]Wright State University; [4]University of Florida

3:20 PM
Lattice Correspondences in Martensitic Transformation and Twinning in NiTi Shape Memory Alloy: *Bin Li*[1]; [1]University of Nevada, Reno

3:40 PM
Phase-field Modeling and Design of Elastocaloric Effect in Shape Memory Alloys and Composites: *Cheikh Cisse*[1]; Mohsen Asle Zaeem[1]; [1]Colorado School of Mines

4:00 PM Break

4:20 PM
The Effect of Precipitate Size on the Thermo-mechanical Properties of Ni-Ti-Hf-Al Shape Memory Alloys: *Ching-Chien Chen*[1]; Shivam Tripathi[1]; Alexandra Loaiza[1]; David Bahr[1]; Alejandro Strachan[1]; Michael Titus[1]; [1]Purdue University

4:40 PM
Microstructural Evolution in Oligocrystalline Fe-Mn-Al-Ni Shape Memory Alloys: *Hande Ozcan*[1]; Daniel Salas[1]; Ji Ma[2]; Ren Yang[3]; Yuriy Chumlyakov[4]; Ibrahim Karaman[1]; [1]Texas A&M University; [2]University of Virgina; [3]Argonne National Laboratory; [4]Tomsk State University

---

ADDITIVE TECHNOLOGIES

Powder Materials Processing and Fundamental Understanding — Additive Manufacturing and Data-Driven Approaches

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, Pacific Northwest National Laboratory

Tuesday PM | March 1, 2022
263C | Anaheim Convention Center

Session Chair: Kathy Lu, Virginia Polytechnic Institute and State University

---

2:30 PM
A Bayesian Approach to the Eagar-Tsai Model for Melt Pool Geometry Predictions: *Brendan Whalen*[1]; Prasanna Balachandran[1]; [1]University of Virginia Materials Informatics

2:50 PM Invited
From Ultrafast Sintering with and without Electric Fields to Electrochemically Controlled Microstructural Evolution: *Jian Luo*[1]; [1]University of California, San Diego

3:20 PM
Surface Chemistry Changes Resulting from Ti-6Al-4V Feedstock Powder Reuse in Electron Beam Additive Manufacturing: *Nicholas Derimow*[1]; Justin Gorham[1]; May Martin[1]; Jake Benzing[1]; Ryan White[1]; Nikolas Hrabe[1]; [1]National Institute of Standards and Technology

3:40 PM
The Effects of Melt Pool Geometry on Microstructure Development during Additive Manufacturing: *Alexander Chadwick*[1]; Peter Voorhees[1]; [1]Northwestern University

4:00 PM Break

4:20 PM
Understanding of Agglomeration and Chemical Reactions of $CoAl_2O_4$ Inoculants in IN718 Processed by Selective Laser Melting: *I-Ting Ho*[1]; Kai-Chun Chang[2]; Dhruv Tiparti[1]; An-Chou Yeh[2]; Sammy Tin[3]; [1]Illinois Institute of Technology; [2]National Tsing Hua University; [3]University of Arizona

4:40 PM
Understanding Powder Morphology and Its Effect on Flowability in Additive Manufacturing through Machine Learning Techniques: *Srujana Rao Yarasi*[1]; Anthony Rollett[1]; Elizabeth Holm[1]; [1]Carnegie Mellon University

5:00 PM
Synthesis and Consolidation of CoCr+X (X=SiC or WC) Milled Powder for Additive Manufacturing: *Madelyn Madrigal-Camacho*[1]; Guillermo Aguilar[1]; Suveen Mathaudhu[1]; [1]University of California-Riverside

---

ELECTRONIC MATERIALS

Recent Advances in Printed Electronics and Additive Manufacturing: 2D/3D Functional Materials, Fabrication Processes, and Emerging Applications — Functional Materials and 2D/3D Devices IV

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; Yong Lin Kong, University of Utah; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Changyong Cao, Michigan State University; David Estrada, Boise State University; Nuggehalli Ravindra, New Jersey Institute of Technology

Tuesday PM | March 1, 2022
303C | Anaheim Convention Center

Session Chairs: Yong Kong, University of Utah; Changyong Cao, Michigan State University; Pooran Joshi, Oak Ridge National Laboratory

---

2:30 PM Invited
Plasmonic and Nanocomposite Material Enabled Low Cost Optical Fiber Sensing for Electrical Asset Monitoring: *Paul Ohodnicki*[1]; Yang-Duan Su[1]; [1]University of Pittsburgh

2:55 PM Invited
3D Printing of Electrochemical Biosensors: A New World of Detecting Pathogens in Seconds: *Md. Azahar Ali*[1]; Chunshan Hu[1]; Sanjida Jahan[1]; Bin Yuan[1]; M. Sadeq Saleh[1]; Rahul Panat[1]; [1]Carnegie Mellon University

3:20 PM
Unconventional Low-viscosity Direct Ink Writing: Surface Force-driven Deposition of Polyelectrolyte-based Membranes: *Guy Cordonier*[1]; KmProttoy Piash[1]; Oishi Sanyal[1]; Konstantinos Sierros[1]; [1]West Virginia University

3:40 PM
On Depositing Chromium-nitride Patterns by Magnetic Guided Physical Vapor Deposition: *Santiago Vargas*[1]; Diana Galeano[1]; Carlos Castano[1]; [1]Virginia Commonwealth University

---

LIGHT METALS

Recycling and Sustainability in Cast Shop Technology: Joint Session with REWAS 2022 — Recycling and Sustainability Joint Session with REWAS 2022

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

Program Organizers: Mertol Gökelma, Izmir Institute of Technology; Stephen Instone, Speira GmbH

Tuesday PM | March 1, 2022
209A | Anaheim Convention Center

Session Chair: Rauan Meirbekova, DTE

2:30 PM Introductory Comments

2:35 PM
Effect of Compaction and Thermal De-coating Pre-treatments on the Recyclability of Coated and Uncoated Aluminium: *Alicia Vallejo Olivares*[1]; Solveig Høgåsen[1]; Anne Kvithyld[2]; Gabriella Tranell[1]; [1]Norwegian University of Science and Technology; [2]SINTEF

2:55 PM
Innovative Utilization of Aluminum-based Secondary Materials for Production of Metallurgical Silicon and Alumina-rich Slag: *Harald Philipson*[1]; Gjermund L. Solbakk[1]; Maria Wallin[1]; Kristian Etienne Einarsrud[1]; Gabriella Tranell[1]; [1]Norwegian University of Science and Technology

3:15 PM
Use of Incinerator Bottom Ash (IBA) in Aluminium Recycling: *Martin Syvertsen*[1]; Thomas Ludwig[2]; Snorre Rist[2]; Kjerstin Ellingsen[1]; [1]SINTEF Industry; [2]Hydro Aluminium

---

ENERGY & ENVIRONMENT

REWAS 2022: Coupling Metallurgy and Sustainability: An EPD Symposium in Honor of Diran Apelian — Innovations in Materials Design, Processing and Recycling

Sponsored by: TMS: Recycling and Environmental Technologies Committee, TMS: Aluminum Committee

Program Organizers: Elsa Olivetti, Massachusetts Institute of Technology; Brajendra Mishra, Worcester Polytechnic Institute; Bart Blanpain, Ku Leuven; Adam Powell, Worcester Polytechnic Institute; Mertol Gökelma, Izmir Institute of Technology; Camille Fleuriault, Eramet Norway

Tuesday PM | March 1, 2022
211A | Anaheim Convention Center

Session Chair: Elsa Olivetti, Massachusetts Institute of Technology

---

2:30 PM Introductory Comments

2:35 PM Invited
Current Perspectives in Metal Based Additive Manufacturing: *Benjamin MacDonald*[1]; Enrique Lavernia[2]; Carl Soderhjelm[1]; Diran Apelian[1]; [1]University of

California, Irvine; [2]National Academy of Engineering

3:00 PM Invited
Informatics Driven Materials Innovation for a Regenerative Economy: *Krishna Rajan*[1]; [1]University at Buffalo- State University of New York

3:25 PM Invited
Nanotechnology Enabled Solidification Processing for Sustainability: *Xiaochun Li*[1]; [1]University of California, Los Angeles

3:50 PM Invited
Sustainability of Feedstock in Additive Manufacturing: *Dan Thoma*[1]; Frank Pfefferkorn[1]; Marcus Jackson[2]; Aishwarya Deshpande[1]; Phalgun Nelaturu[1]; Zahabul Islam[1]; [1]University of Wisconsin-Madison; [2]NASA Ames Research Center

4:15 PM Break

4:30 PM Invited
The Ecosystem for Materials Innovation in Advanced Manufacturing: *Aaron Birt*[1]; [1]Solvus Global

4:55 PM Invited
The Framework for Establishing a Collaborative Resource Recovery and Recycling Research Center: A Tribute to Professor Diran Apelian: *Sean Kelly*[1]; [1]Solvus Global, LLC

5:20 PM Invited
The Circular Economy in Practice: A Case Study in Li-ion Battery Recycling and Materials Re-integration: *Eric Gratz*[1]; [1]Battery Resourcers

---

ENERGY & ENVIRONMENT

REWAS 2022: Recovering the Unrecoverable — Complex Scrap, By-products and Residues

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

Program Organizers: Mertol Gökelma, Izmir Institute of Technology; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Eramet Norway; John Howarter, Purdue University; Takanari Ouchi, University of Tokyo; Gisele Azimi, University of Toronto; Kerstin Forsberg, KTH Royal Institute of Technology; Hong Peng, University of Queensland

Tuesday PM | March 1, 2022
211B | Anaheim Convention Center

Session Chairs: Takanari Ouchi, University of Tokyo; Kerstin Forsberg, KTH - Royal Institute of Technology

---

2:30 PM Introductory Comments

2:35 PM Invited
BlueMetals Technology – Experience from Commissioning E-Scrap Recycling Plants: *Timm Lux*[1]; Markus Reuter[1]; Rolf Degel[1]; Frank Kaussen[1]; Nikolaus Borowski[1]; [1]Sms Group Gmbh

3:05 PM Invited
Physicochemistry of Lithium-ion Battery Recycling Processes: *Alexandre Chagnes*[1]; [1]Universite De Lorraine-Georess

3:35 PM
Characterisation of Hyperaccumulators for Lithium Recovery from Ancient Mine Soils: *Lorna Anguilano*[1]; Uchechukwu Onwukwe[1]; Danny Aryani[1]; Jesus Ojeda Ledo[2]; Guido Lingua[3]; Valentina Gianotti[3]; Alessandra Devoto[4]; [1]Brunel University London; [2]Swansea University; [3]Universita' del Piemonte Orientale; [4]Royal Holloway University London

3:55 PM Break

4:15 PM
Shifting the Burden of Selectivity from Chemical to Physical Separation Processes via Selective Sulfidation: *Caspar Stinn*[1]; Antoine Allanore[1]; [1]Massachusetts Institute of Technology

4:35 PM
Pre-study of the Dissolution Behavior of Silicon Kerf Residue in Steel: *Adamantia Lazou*[1]; David Nilssen[1]; Mertol Gökelma[2]; Maria Wallin[1]; Gabriella Tranell[1]; [1]Norwegian University of Science and Technology; [2]Izmir Institute of Technology

4:55 PM
Investigation of Hydrometallurgical Recycling Parameters of WC-Co Cutting Tool Scraps: Hakan Kusdemir[1]; Onuralp Yücel[1]; Ahmet Turan[2]; *Kagan Benzesik*[3]; [1]Istanbul Techical University; [2]Yeditepe University; [3]Istanbul Technical University

5:15 PM
Recovery of Copper, Iron and Alumina from Metallurgical Waste by Use of Hydrogen: Casper Van Der Eijk[1]; *Halvor Dalaker*[1]; [1]SINTEF

ENERGY & ENVIRONMENT

REWAS 2022: Decarbonizing the Materials Industry — Alternative Reduction and Carburization Sources

Sponsored by: TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee, TMS: Energy Committee, TMS: Process Technology and Modeling Committee, TMS: Aluminum Committee

Program Organizers: Camille Fleuriault, Eramet Norway; Christina Meskers, Norwegian University of Science and Technology (NTNU); Mertol Gökelma, Izmir Institute of Technology; Elsa Olivetti, Massachusetts Institute of Technology; Jesse White, Elkem Carbon Solutions; Chukwunwike Iloeje, Argonne National Laboratory; Neale Neelameggham, IND LLC

Tuesday PM | March 1, 2022
212A | Anaheim Convention Center

Session Chair: Jesse White, Elkem Carbon Solutions

2:30 PM Introductory Comments

2:35 PM Invited
HIsarna: A Technology to Meet Both the Climate and Circularity Challenges for the Iron and Steel Industry: *Johan van Boggelen*[1]; [1]Tata Steel

3:05 PM
Tecno-economic Pre-feasibility Study of a Hydrogen Plasma Based Ferromanganese Plant: *Halvor Dalaker*[1]; Nils Eldrup[1]; Roar Jensen[1]; Rannveig Kvande[1]; [1]Sintef

3:25 PM Invited
PreMa-project
Development of New Technologies to Reduce CO2 Emissions in Mn-alloy Production: *Eli Ringdalen*[1]; [1]Sintef

3:55 PM Break

4:15 PM
Towards Green Ferroalloys: Replacement of Fossil Reductants in the Pre-reduction Process of Chromite by Bio-based Alternatives: *Marcus Sommerfeld*[1]; Bernd Friedrich[1]; [1]IME Process Metallurgy and Metal Recycling, Institute of RWTH Aachen University

4:35 PM Invited
Pyrometallurgy-based Research Conducted at Mintek towards Decarbonizing the Metals Industry: *Joalet Steenkamp*[1]; Pieter Johannes Andries Bezuidenhouta[2]; ItumelengThobadi[2];LuniaMalaka[2];SusannaHockaday[3];GlenMichaelDenton[2];Buhle Xakalashe[2]; Elias Matinde[1]; Thokozile Penelope Kekana[2]; Sonwabo Bambazala[2]; Aditya Kale[2]; Quinn Gareth Reynolds[4]; [1]Mintek; University of the Witwatersrand; [2]Mintek; [3]University of Stellenbosch; [4]Mintek; University of Stellenbosch

5:05 PM
Solid Oxide Membrane (SOM) Based Technology for Carbon-free Efficient Production of Solar-grade Silicon: *Haoxuan Yan*[1]; Michelle Sugimoto[1]; Uday Pal[1]; Adam Powell[2]; [1]Boston University; [2]Worcester Polytechnic Institute

---

CHARACTERIZATION

Seeing is Believing -- Understanding Environmental Degradation and Mechanical Response Using Advanced Characterization Techniques: An SMD Symposium in Honor of Ian M. Robertson — Advanced Characterization II: Multi-modal Analysis Techniques

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Nuclear Materials Committee

Program Organizers: Kaila Bertsch, Lawrence Livermore National Laboratory; Khalid Hattar, Sandia National Laboratories; Josh Kacher, Georgia Institute of Technology; Bai Cui, University of Nebraska-Lincoln; Benjamin Eftink, Los Alamos National Laboratory; Stephen House, University of Pittsburgh; May Martin, National Institute of Standards and Technology; Kelly Nygren, Cornell High Energy Synchrotron Source; Blythe Clark, Sandia National Laboratories; Shuai Wang, Southern University of Science and Technology

Tuesday PM | March 1, 2022
207C | Anaheim Convention Center

Session Chairs: Kaila Bertsch, Lawrence Livermore National Laboratory; Kelly Nygren, Cornell University/CHESS; Stephen House, University of Pittsburgh/ECC; Khalid Hattar, Sandia National Laboratory; Josh Kacher, Georgia Institute of Technology

---

2:30 PM Invited
Connecting Plasticity to Hydrogen Embrittlement Using High Energy Synchrotron X-rays: Timothy Long[1]; Kelly Nygren[2]; *Matthew Miller*[1]; [1]Cornell University; [2]Cornell High Energy Synchrotron Source

3:00 PM Invited
Graph-based Analysis of Deforming Polycrystals: *Darren Pagan*[1]; Austin Benson[2]; Matthew Kasemer[3]; [1]Pennsylvania State University; [2]Cornell University; [3]University of Alabama

3:30 PM Invited
Slip Transfer at Grain Boundaries Investigated with 2-D and 3-D Experimental Measurements: *Thomas Bieler*[1]; Harsha Phukan[1]; Chelsea Edge[1]; Zhuowen Zhao[1]; Ruxin Xu[2]; Martin Crimp[1]; Philip Eisenlohr[1]; Carl Boehlert[1]; [1]Michigan State University; [2]Argonne National Laboratory

4:00 PM Break

4:15 PM Invited
Incorporating Dislocations into the Simulation of EBSD Patterns: *Marc De Graef*[1]; [1]Carnegie Mellon University

4:45 PM Invited
Visualization and Analysis in Additive Manufacturing: *Anthony Rollett*[1]; [1]Carnegie Mellon University

---

NANOSTRUCTURED MATERIALS

Self-organizing Nano-architectured Materials — Mechanical Properties and Advanced Characterization

Program Organizers: Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Ian McCue, Northwestern University; Erica Lilleodden, Helmholtz-Zentrum hereon; Pierre-Antoine Geslin, CNRS / INSA-Lyon; Qing Chen, Hong Kong University of Science & Technology

Tuesday PM | March 1, 2022
260C | Anaheim Convention Center

Session Chairs: Erica Lilleodden, Helmholtz-Zentrum hereon; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory

---

2:30 PM Invited
Architected Nanocomposites with Exceptional Energy Dissipation: *Lorenzo Valdevit*[1]; Jens Bauer[1]; Marti Sala Casanovas[1]; [1]University of California, Irvine

3:00 PM
Mechanical Properties of Two Photon Lithographed Structures Made Using Nanocluster-based Resins: *John Kulikowski*[1]; Qi Li[1]; David Doan[1]; Wendy Gu[1]; [1]Stanford University

3:20 PM
Persistence of Crystal Orientations across Sub-micron-scale "Super-grains" in Self-organized Cu-W Nanocomposites: Kelvin Xie[1]; *Digvijay Yadav*[1]; Dexin Zhao[1]; Arun Devaraj[2]; Michael Demkowicz[1]; [1]Texas A&M University; [2]Pacific Northwest National Lab

3:40 PM Break

4:00 PM Invited
Characterization of Particle Impact and Pore Formation in Directed Energy Deposition via In-situ, High speed Imaging and Micro X-ray Computed Tomography: *Samantha Webster*[1]; Jian Cao[1]; Newell Moser[2]; Edward Garboczi[2]; Sarah Wolff[3]; Kamel Fezzaa[4]; Tao Sun[5]; [1]Northwestern University; [2]National Institute of Standards and Technology; [3]Texas A&M University; [4]Argonne National Laboratory; [5]University of Virginia

4:30 PM
3-dimensionally Ordered Interpenetrating Tungsten-silicon Oxycarbide Nanocomposites for High-temperature Applications: *Kevin Schmalbach*[1]; Zhao Wang[1]; R. Lee Penn[1]; David Poerschke[1]; Antonia Antoniou[2]; Andreas Stein[1]; Nathan Mara[1]; [1]University of Minnesota; [2]Georgia Institute of Technology

4:50 PM Brief break for prepare for reception

5:00 PM Reception

MECHANICS & STRUCTURAL RELIABILITY

Structural Metamaterials — Session IV

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

Program Organizers: Amy Wat, Lawrence Livermore National Laboratory; Brad Boyce, Sandia National Laboratories; Xiaoyu Zheng, University of California, Los Angeles; Fabrizio Scarpa, University of Bristol; Robert Ritchie, University of California, Berkeley

Tuesday PM | March 1, 2022
304A | Anaheim Convention Center

Session Chair: To Be Announced

4:00 PM
Multi-phase Viscoelastic Kirigami Plates: *Shahram Janbaz*[1]; Corentin Coulais[1]; [1]Universiteit van Amsterdam

4:20 PM
3D-printable Cactus and Spider-silk Hydrogel Composites for Next Generation Multifunctional and Sustainable Energy Absorptive Metamaterials: *Graham Day*[1]; Qicheng Zhang[1]; Gianni Comandini[1]; Adam Perriman[1]; Fabrizio Scarpa[1]; [1]University of Bristol

4:40 PM
Sequential Deformation in Metamaterials Tuned by Elastoplastic Buckling: *Wenfeng Liu*[1]; Shahram Janbaz[1]; Corentin Coulais[1]; [1]University of Amsterdam

---

NUCLEAR MATERIALS

Synergistic Irradiation, Corrosion, and Microstructural Evolution in Nuclear Materials — Irradiation-Corrosion of Materials in Light Water Reactors II

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

Program Organizers: Djamel Kaoumi, North Carolina State University; Michael Short, Massachusetts Institute of Technology; Peter Hosemann, University of California, Berkeley; Stephen Raiman, Texas A&M University; Raluca Scarlat, University of California, Berkeley; Aaron Kohnert, Los Alamos National Laboratory; Ryan Schoell, North Carolina State University; Philip Edmondson, Oak Ridge National Laboratory; Celine Cabet, Commissariat a l'Energie Atomique

Tuesday PM | March 1, 2022
202A | Anaheim Convention Center

Session Chair: To Be Announced

2:30 PM Invited
Decoupling of Ion Irradiation Effects on the Corrosion Rate of Zirconium Alloys: Experiment and Modelling: *Marc Tupin*[1]; [1]CEA

3:00 PM Invited
Modeling Zircaloy Oxidation and Hydridation under Irradiation: What Can be Learned from Physical Models and Simulations: *Jaime Marian*[1]; [1]University of California, Los Angeles

3:30 PM
Ion Irradiation Study of Polymer Derived SiFeOC-C-SiC Composite: *Kathy Lu*[1]; Sanjay Kumar Singh[1]; [1]Virginia Polytechnic Institute and State University

3:50 PM Invited
Dramatic E-beam Enhancement of Zircalloy-4 Corrosion: *David Bartels*[1]; [1]Notre Dame University

4:20 PM Break

4:40 PM
Understanding the Hydrogen Pickup Mechanism of M5Framatome under Ion Irradiation: *Benoit Queylat*[1]; Michael Jublot[1]; Frantz Martin[1]; Francois Jomard[2]; Marc Tupin[1]; [1]Commissariat a l'Energie Atomique et aux Energies Alternatives (CEA); [2]Universite de Versailles St-Quentin-en-Yvelines

5:00 PM Invited
Electrochemical Behavior of Fuel Cladding under In-situ UV Irradiation: *Adrien Couet*[1]; Taeho Kim[1]; Antoine Ambard[2]; [1]University of Wisconsin-Madison; [2]Electricite de France

5:30 PM
Atomic Level Mechanisms Underlying Hydrothermal Corrosion of Silicon Carbide in Nuclear Reactors: *Jianqi Xi*[1]; Dane Morgan[1]; Izabela Szlufarska[1]; [1]University of Wisconsin-Madison

---

NANOSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XII) — Microstructure, Mechanisms & Property II

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Penghui Cao, University of California, Irvine; Xiaoxu Huang, Chongqing University; Enrique Lavernia, University of California, Irvine; Xiaozhou Liao, University of Sydney; Lee Semiatin, Material Resources LLC; Nobuhiro Tsuji, Kyoto University; Caizhi Zhou, University of South Carolina; Yuntian Zhu, City University of Hong Kong

Tuesday PM | March 1, 2022
262A | Anaheim Convention Center

Session Chairs: Cem Tasan, Massachusetts Institute of Technology; Hyoung Seop Kim, Pohang University of Science and Technology; Terry Lowe, Colorado School of Mines

---

4:00 PM Invited
Heterostructured V-Ti-Ni Alloy Containing Superelastic Nano-precipitates: *C. Tasan*[1]; Jaclyn Cho[1]; [1]Massachusetts Institute of Technology

4:30 PM
Mechanical Behavior of Heterostructured Fe Films with Precisely Defined Bimodal Architectures: Rohit Berlia[1]; *Jagannathan Rajagopalan*[1]; [1]Arizona State University

4:50 PM
Introducing Gradient Structure to a CrMnFeCoNi High-entropy Alloy for Superior Mechanical Properties: Nazmul Hasan[1]; Xianghai An[1]; Yuntian Zhu[2]; *Xiaozhou Liao*[1]; [1]University of Sydney; [2]City University of Hong Kong

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Innovative Powder Processing of Functional and Magnetic Materials — Soft Magnetic Materials

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

Program Organizers: Emily Rinko, Iowa State University; Iver Anderson, Iowa State University Ames Laboratory; Markus Chmielus, University of Pittsburgh; Emma White, DECHEMA Forschungsinstitut; Deliang Zhang, Northeastern University; Andrew Kustas, Sandia National Laboratories; Kyle Johnson, Sandia National Laboratories

Wednesday AM | March 2, 2022
262C | Anaheim Convention Center

Session Chair: Kyle Johnson, Sandia National Laboratories

8:30 AM Introductory Comments

8:35 AM
Laser Additive Manufacturing of Fe-Co and Fe-Si Based Soft Magnetic Alloys: *Andrew Kustas*[1]; Donald Susan[1]; Todd Monson[1]; Kyle Johson[1]; Mark Wilson[1]; Erin Barrick[1]; Jonathan Pegues[1]; Shaun Whetten[1]; Raymond Puckett[1]; [1]Sandia National Laboratories

8:55 AM Invited
Structure-processing-magnetic Property Interrelationships in Additively Manufactured FeCo-2V and Fe-80Ni-5Mo Soft Magnetic Alloys: *Samad Firdosy*[1]; Nick Ury[1]; Andrew Kustas[2]; Jay Carroll[2]; Dan Tung[2]; Donald Susan[2]; J.P. Borgonia[1]; Ryan Conversano[1]; Bryan Mcenerney[1]; Vilupanur Ravi[3]; Robert Dillon[1]; [1]NASA Jet Propulsion Laboratory; [2]Sandia National Laboratories; [3]California State Polytechnic University

9:25 AM
Reduction of Power Losses in SLM Printed FeSi6.5 Alloy by Geometry Optimizing: *Przemyslaw Zackiewicz*[1]; Adrian Radon[1]; Bartosz Jozwik[1]; Lukasz Hawelek[1]; Marcin Polak[1]; Magdalena Steczkowska-Kempka[1]; Adam Pilsniak[1]; Aleksandra Kolano-Burian[1]; [1]Lukasiewicz IMN

9:45 AM Invited
X-ray and Neutron Scattering Reveals Insights into the Formation and Thermal Stability of Metastable Disordered Phases in FeCo and FeSi: *Chris Fancher*[1]; Andrew Kustas[2]; [1]Oak Ridge National Laboratory; [2]Sandia National Laboratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture: Developing Predictive Capabilities — 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 2, 2022
258B | Anaheim Convention Center

Session Chair: Nima Shamsaei, Auburn University

8:30 AM Invited
Predicting Structural Integrity of Additively Manufactured Parts Using Probabilistic Damage Tolerance: *Robert Mcclung*[1]; [1]Southwest Research Institute

9:00 AM
Predictive Modeling of Fracture in Anisotropic and Porous Materials: *Amine Benzerga*[1]; Vigneshwaran Radhakrishnan[1]; [1]Texas A&M University

9:20 AM
Information-rich Fatigue Fracture Surface to Evaluate Additive Manufacturing Parameters: *David Scannapieco*[1]; Austin Ngo[1]; Collin Sharpe[1]; Hunter Taylor[2]; Joseph Pauza[3]; Enrique Garibay[2]; Evan Diewald[3]; Christian Gobert[3]; Ryan Wicker[2]; Anthony Rollett[3]; Jack Beuth[3]; John Lewandowski[1]; [1]Case Western Reserve University; [2]University of Texas at El Paso; [3]Carnegie Mellon University

9:40 AM
Effects of Process Parameters on Fatigue Behavior and Defect Characteristics in LPBF Ti-6Al-4V: *Austin Ngo*[1]; David Scannapieco[1]; Hunter Taylor[2]; Ryan Wicker[2]; Joseph Pauza[3]; Anthony Rollett[3]; Jack Beuth[3]; John Lewandowski[1]; [1]Case Western Reserve University; [2]University of Texas at El Paso; [3]Carnegie Mellon University

10:00 AM Break

10:20 AM Invited
Candidate Methods to Assess Structural Integrity of Higher-criticality AM Components: *James Sobotka*[1]; Robert McClung[1]; [1]Southwest Research Institute

10:50 AM
Size Effect on the Ultrasonic Fatigue Behavior of Laser-powder Bed Fusion 316L: *Megan Trombley*[1]; Qianying Shi[1]; John Allison[1]; [1]University of Michigan

11:10 AM
Rapid Characterization and Comparison of the Cyclic Response of Laser Powder Bed Fusion Additive Manufactured Inconel 718 Samples Using Spherical Microindentation: *Camilla Johnson*[1]; Aaron Stebner[1]; Surya R. Kalidindi[1]; [1]Georgia Institute of Technology

11:30 AM
Quantifying the Influence of Scan Strategy on the Microstructure and Fatigue Properties of SLM Inconel 718 Thin Walls: *Connor Varney*[1]; Paul Rottmann[1]; [1]University of Kentucky

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications IV — Processing and Advanced Materials Enabled by Additive Manufacturing

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

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

Wednesday AM | March 2, 2022
261B | Anaheim Convention Center

Session Chairs: Xiaoyuan Lou, Auburn University; Kumar Sridharan, University of Wisconsin-Madison

---

8:30 AM Invited
3D Printing Energetics for Gun Propulsion Technology: *David Bird*[1]; Elbert Caravaca[1]; Joseph Laquidara[2]; Ravindra Nuggehalli[3]; [1]Picatinny Arsenal, US Army Combat Capabilities Development Command (CCDC); New Jersey Institute of Technology ; [2]Picatinny Arsenal, US Army Combat Capabilities Development Command (CCDC); [3]New Jersey Institute of Technology

9:00 AM
Effective Sensitization Treatment for High-performance Steel Parts Made by Laser Powder Bed Fusion: Mitra Shabani[1]; Soumya Sridar[1]; Robert Hoffman[2]; Noah Sargent[1]; Owen Hildreth[2]; *Wei Xiong*[1]; [1]University of Pittsburgh; [2]Colorado School of Mines

9:20 AM
Co-design of Parts and Processing for Additively Manufactured Heat Exchangers: *Nicholas Lamprinakos*[1]; Ziheng Wu[1]; Junwon Seo[1]; Srujana Rao Yarasi[1]; Anthony Rollett[1]; [1]Carnegie Mellon University

9:40 AM Invited
Ballistic Additive Manufacturing -- Versatile Solid-state Fabrication: *Glenn Daehn*[1]; Jianxiong Li[1]; Yu Mao[1]; Blake Barnett[1]; K. Sajun Prasad[1]; Anupam Vivek[1]; [1]Ohio State University

10:10 AM Break

10:30 AM
Compositionally Graded Joint of 316L Stainless Steel to A508 Low Alloy Steel by Additive Manufacturing: *Xiaoyuan Lou*[1]; Josh Le[1]; Houshang Yin[1]; Jingfan Yang[1]; [1]Auburn University

10:50 AM
Direct Ink Writing of Ultra High Temperature Ceramics: *Swetha Chandrasekaran*[1]; Amy Wat[1]; Qi Rong Yang[1]; James Cahill[1]; Wyatt Du Frane[1]; Joshua Kuntz[1]; Marcus Worsley[1]; [1]Lawrence Livermore National Laboratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques II — In Situ Monitoring of Directed Energy Deposition Processes

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

Program Organizers: Fan Zhang, National Institute of Standards and Technology; Donald Brown, Los Alamos National Laboratory; Andrew Chuang, Argonne National Laboratory; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Tao Sun, University of Virginia

Wednesday AM | March 2, 2022
258A | Anaheim Convention Center

Session Chair: Sneha Narra, Carnegie Mellon University

8:30 AM Invited
Porosity Formation, Evolution, and Solidification in Powder-blown Directed Energy Deposition Additive Manufacturing Using High-speed Synchrotron X-ray Imaging: *Sarah Wolff*[1]; Hui Wang[1]; Mahsa Valizadeh[1]; Marwan Haddad[1]; Benjamin Gould[2]; [1]Texas A&M University; [2]Argonne National Laboratory

9:00 AM
Blown Powder Additive Manufacturing Process Replicator for High Speed Optical, Infra-red and Synchrotron X-ray Imaging: *Sebastian Marussi*[1]; Yunhui Chen[1]; Samuel Clark[2]; Robert Atwood[3]; Veijo Honkimaki[4]; Alexander Rack[4]; Ben Saunders[5]; Martyn Jones[5]; Peter Lee[1]; [1]University College London; [2]Argonne National Laboratory; [3]Diamond Light Source; [4]European Synchrotron Radiation Facility; [5]Rolls-Royce plc.

9:20 AM
In-situ Synchrotron X-ray Diffraction Experiments to Study the Role of Solid-state Thermal Cycling on Microstructure Formation during Metal AM: *Steve Gaudez*[1]; Wolfgang Pantleon[2]; Manas V. Upadhyay[1]; [1]CNRS UMR7649 Ecole Polytechnique; [2]Technical University of Denmark

9:40 AM
Characterizing Void Morphology in Single-track Builds of Directed Energy Deposition Using New Image Processing Techniques for X-ray Computed

Tomography Data Sets: *Newell Moser*[1]; Edward Garboczi[1]; Samantha Webster[2]; Jian Cao[2]; [1]National Institute of Standards and Technology; [2]Northwestern University

10:00 AM Break

10:15 AM
Deep Learning for Real-time Non-destructive Inter-layer Quality Control during Additive Manufacturing Process: Steven Hespeler[1]; Michael Juhasz[2]; Ehsan Dehghan-Niri[1]; *Jeffrey Riemann*[2]; [1]New Mexico State University; [2]FormAlloy Technologies, Inc.

10:35 AM Invited
Overview of Modelling for Deformation Temperature and Stress Prediction for Wire Arc Large Scale Additive Manufacturing: *Andrzej Nycz*[1]; Yousub Lee[1]; Srdjan Simunovic[1]; Luke Meyer[1]; Chris Masuo[1]; William Carter[1]; Mark Noakes[1]; [1]Oak Ridge National Laboratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Beyond the Beam III — Beyond the Beam - Fundamental Science to Novel Processes

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

Program Organizers: Brady Butler, US Army Research Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory; James Paramore, US Army Research Laboratory; Nihan Tuncer, Desktop Metal; Markus Chmielus, University of Pittsburgh; Paul Prichard, Kennametal Inc.

Wednesday AM | March 2, 2022
263B | Anaheim Convention Center

Session Chair: Markus Chmielus, University of Pittsburgh

8:30 AM Introductory Comments

8:35 AM
Modeling Sintering Processes with Continuum Approaches: *Thaddeus Low*[1]; Basil Paudel[2]; [1]Ansys, Inc; [2]University of Pittsburgh

8:55 AM
Atomistic and Mesoscale Modeling of Sintering Kinetics in Solid-state Additive Manufacturing: *Fadi Abdeljawad*[1]; Omar Hussein[1]; [1]Clemson University

9:15 AM
Interface Formation during Metal 3D Printing: From Individual Droplets to 3D Parts: *Negar Gilani*[1]; Nesma Aboulkhair[1]; Marco Simonelli[1]; Ian Ashcroft[1]; Richard Hague[1]; [1]University of Nottingham

9:35 AM
Additive Manufacturing Assisted by Subtractive Sintering of Powder Components: *Maricruz Carrillo*[1]; Eugene Olevsky[1]; Geuntak Lee[1]; Charles Maniere[1]; [1]San Diego State University

9:55 AM Break

10:15 AM
In Situ Observation of Melt Pool in Ultrasonic Vibration-assisted Directed Energy Deposition: *Salma El-Azab*[1]; Aleksandra Vyatskikh[1]; Sen Jiang[1]; Cheng Zhang[1];

Lorenzo Valdevit[1]; Enrique Lavernia[1]; Julie Schoenung[1]; [1]University of California, Irvine

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development IV: Rapid Development — Titanium Alloys

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering 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 2, 2022
261A | Anaheim Convention Center

Session Chair: Jiadong Gong , QuesTek

8:30 AM
High Speed In-situ Alloying of Ti34Nb via Laser Powder Bed Fusion: *Sheng Huang*[1]; R. Lakshmi Narayan[2]; Joel Heang Kuan Tan[3]; Swee Leong Sing[1]; Wai Yee Yeong[1]; [1]Nanyang Technological University; [2]Indian Institute of Technology Delhi; [3]Freelance

8:50 AM
Hydrogen-aided Microstructural Engineering of Additively Manufactured Ti-6Al-4V Alloy: *Lara Draelos*[1]; Peeyush Nandwana[2]; James Paramore[3]; Brady Butler[3]; Ankit Srivastava[1]; [1]Texas A&M University; [2]Oak Ridge National Laboratory; [3]Army Research Laboratory

9:10 AM
In Situ Monitoring and Post Operando Analysis of Additive Manufactured Dissimilar Alloys: AlSi10Mg and Ti6Al4V: *Caterina Iantaffi*[1]; Yunhui Chen[1]; Maureen Fitzpatrick[1]; Marta Majkut[2]; Bratislav Lukic[2]; Alexander Rack[2]; Kudakwashe Jakata[2]; Martina Meisnar[3]; Thomas Rohr[3]; Eral Bele[1]; Peter D. Lee[1]; [1]University College London; [2]ESRF; [3]ESA-ESTEC

9:30 AM
Microstructure Investigation of Ti15Mo and Compositionally Graded Ti+Ti15Mo Alloys Prepared by Additive Manufacturing: *Tomas Krajnak*[1]; Miloš Janecek[1]; Dalibor Preisler[1]; Josef Stráský[1]; Michal Brázda[2]; Jaroslav Vavrík[2]; Jan Džugan[2]; [1]Charles University; [2]COMTES FHT a.s.

9:50 AM Break

10:05 AM
Tailored Microstructures in a Laser-processed Metastable Beta-Ti Alloy Using Enforced Epitaxial Growth: *Wenhao Lin*[1]; Ji Ma[1]; [1]Mse/University of Virginia

10:25 AM
Understanding the Effect of Solute Elements on the Evolution of Equiaxed and Columnar Grains in AM Processed Beta Titanium Alloys: *Mohan Sai Kiran Nartu*[1]; Srinivas Aditya Mantri[1]; Brian Welk[2]; Narendra Dahotre[1]; Hamish Fraser[2]; Rajarshi Banerjee[1]; [1]University of North Texas; [2]Ohio State University

10:45 AM
Powder Blown Directed Energy Deposition of Nickel-titanium Shape Memory Alloys: Process-structure-property Relationship: *Dyuti Sarker*[1]; Samad Firdosy[2]; Nicholas Ury[2]; James Tsangarides[1]; Lauren Holm[1]; Aaron Stebner[1]; [1]Georgia Institute of Technology; [2]NASA Jet Propulson Laboratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Nano/Micro-mechanics and Length-scale Phenomena — Microstructural Features II

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

Program Organizers: Meysam Haghshenas, University of Toledo; Robert Lancaster, Swansea University; Andrew Birnbaum, US Naval Research Laboratory; Jordan Weaver, National Institute of Standards and Technology; Aeriel Murphy-Leonard, Ohio State University

Wednesday AM | March 2, 2022
260A | Anaheim Convention Center

Session Chairs: Kavan Hazeli, The University of Arizona; Andrew Birnbaum, US Naval Research Laboratory (NRL)

8:30 AM
Understanding the Influence of Microstructure and Voids during Induced Spall Failure of Additive Manufactured Stainless Steel: *Josh Kacher*[1]; Katie Koube[1]; Taylor Sloop[1]; Kevin Lamb[2]; Suresh Babu[3]; [1]Georgia Institute of Technology; [2]Y-12 National Security Complex; [3]University of Tennessee Knoxville

8:50 AM
Effect of Skin Microstructure on the Bending Properties of Additively Manufactured IN625 Beams: *Arunima Banerjee*[1]; Sara Messina[2]; William Musinski[3]; Paul Shade[3]; Marie Cox[3]; Matthew Begley[2]; Kevin Hemker[1]; [1]Johns Hopkins University; [2]UCSB; [3]Air Force Research Laboratory

9:10 AM
Effect of LPBF Parameters on Post Heat Treatment Microstructure and Sub-sized Tensile Properties of LPBF Inconel 718: *Jayaraj Radhakrishnan*[1]; Punit Kumar[2]; Upadrasta Ramamurty[2]; [1]Nanyang Technological University; [2]NTU

9:30 AM
Microstructure and Mechanics of Hydrogel Enabled Additively Manufactured Metals and Metal Alloys: *Rebecca Gallivan*[1]; Max Saccone[1]; Thomas Tran[1]; Julia Greer[1]; [1]California Institute of Technology

9:50 AM Break

10:10 AM
On the Influence of the Representative Volume Elements Size on Predicting Dislocation Microstructure Evolution in Laser Additive Manufacturing Metals: Markus Sudmanns[1]; *Jaafar El-Awady*[1]; [1]Johns Hopkins University

10:30 AM
Temperature-dependent Evolution of Dislocation Microstructure and Mechanical Properties of SLM-316L Stainless Steel: Markus Sudmanns[1]; Andrew Birnbaum[2]; Yejun Gu[1]; Athanasios Iliopoulos[2]; John Michopoulos[2]; *Jaafar El-Awady*[1]; [1]Johns Hopkins University; [2]US Naval Research Laboratory

NUCLEAR MATERIALS

Advanced Characterization and Modeling of Nuclear Fuels: Microstructure, Thermo-physical Properties — Nuclear Fuels Thermo-physical Properties - Experiment

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

Program Organizers: David Frazer, Idaho National Laboratory; Fabiola Cappia, Idaho National Laboratory; Tsvetoslav Pavlov, Idaho National Laboratory; Peter Hosemann, University of California

Wednesday AM | March 2, 2022
202B | Anaheim Convention Center

Session Chair: Tsvetoslav Pavlov, Idaho National Laboratory

8:30 AM Invited
Accelerating Nuclear Fuel Qualification through Multiscale Models: *Joshua White*[1]; Tammie Nelson[1]; David Andersson[1]; [1]Los Alamos National Laboratory

9:00 AM
Diffusion Coefficients of Zr- and Cr-based Binary Systems for Simulation of Cr-coated Zircaloy Nuclear Fuel Cladding: *Ella Kartika Pek*[1]; Wei Zhong[1]; Alexander Butler[1]; Ji-Cheng Zhao[1]; [1]University of Maryland, College Park

9:20 AM
Thermo-physical Properties of the Ternary (U2Cr)N3 Phase: *Yulia Mishchenko*[1]; Denise Adorno Lopes[1]; Elina Charatsidou[1]; [1]KTH Royal Institute of Technology

9:40 AM
Thermal Transport Behavior of Pristine and Zirconium-doped Alpha-Uranium: *Zilong Hua*[1]; David Hurley[1]; [1]Idaho National Laboratory

10:00 AM Break

10:10 AM
Bulk Thermal Conductivity Measurement of Fuels and Surrogates: *Kunal Mondal*[1]; Scott Middlemass[1]; Peng Xu[1]; Isabella van Rooyen[1]; [1]Idaho National Laboratory

10:30 AM
The Influence of Radiation-induced Microstructural Defects on the Optical and Elastic Properties of Ceramic Nuclear Fuels: *Amey Khanolkar*[1]; Zilong Hua[1]; Cody Dennett[1]; Joshua Ferrigno[2]; Marat Khafizov[2]; J. Mann[3]; David Hurley[1]; [1]Idaho National Laboratory; [2]The Ohio State University; [3]Air Force Research Laboratory

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session V

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

Program Organizers: Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; Olivia Underwood Jackson, Sandia National Laboratories

Wednesday AM | March 2, 2022
207A | Anaheim Convention Center

Session Chairs: Donovan Leonard, Oak Ridge National Laboratory; Martin Diehl, KU Leuven

---

8:30 AM Invited
Full Field Crystal Plasticity Simulations of Measured Microstructures: Going 3D: *Martin Diehl*[1]; Nikhil Prabhu[1]; [1]KU Leuven

9:00 AM
Identification of Crystal Plasticity Model Parameters by Multi-objective Optimization Integrating Texture Evolution: *Daniel Savage*[1]; Marko Knezevic[2]; Zhangxi Feng[2]; [1]Los Alamos National Laboratory; [2]University of New Hampshire

9:20 AM Invited
Centimeter to Nanometer Materials Characterization Informed Phase Field Modeling of Mechanical Failure in 6022/EK100 Linear Friction Stir Welds: *Donovan Leonard*[1]; Kubra Karayagiz[2]; Adam Powell[2]; Brajendra Mishra[2]; Qingli Ding[2]; Piyush Upadhyay[3]; Tim Skszek[4]; [1]Oak Ridge National Laboratory; [2]WPI; [3]PNNL; [4]Magna International Inc.

9:50 AM Break

10:05 AM
A Thermo-elasto-viscoplastic Finite Element Model to Study Polycrystalline Evolution during Metal AM: Nikhil Mohanan[1]; Jérémy Bleyer[2]; Thomas Helfer[3]; *Manas Upadhyay*[1]; [1]LMS, CNRS, Ecole Polytechnique, Institut Polytechnique de Paris; [2]Navier Laboratory, CNRS, École des Ponts ParisTech; [3]DEC, CEA

10:25 AM
Meso-scale Characterization and Strain-gradient Enabled Simulation of the Multi-strain Path Deformation of AA6016-T4: *Rishabh Sharma*[1]; Md Zahidul Sarkar[2]; Dane Sargeant[1]; Marko Kenezevic[2]; Michael Miles[3]; David Fullwood[3]; [1]Brigham Young University Student; [2]University of New Hampshire; [3]Brigham Young University

10:45 AM
Modeling and Experimental Characterization of Intragranular Residual Stresses, Statistically Stored and Geometrically Necessary Dislocations: *Ritwik Bandyopadhyay*[1]; Sven Gustafson[1]; Hemant Sharma[2]; Peter Kenesei[2]; Michael Sangid[1]; [1]Purdue University; [2]Argonne National Laboratory

---

ADVANCED MATERIALS

Advanced Functional and Structural Thin Films and Coatings — Coating Technologies and Surface Structuring

Sponsored by: TMS: Thin Films and Interfaces Committee

Program Organizers: Ramana Chintalapalle, University of Texas at El Paso; Adele Carrado, IPCMS - CNRS Université de Strasbourg; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Karine Mougin, Cnrs - Is2m; Heinz Palkowski, Clausthal University of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology

Wednesday AM | March 2, 2022
252B | Anaheim Convention Center

Session Chairs: Ramana Chintalapalle, University of Texas at El Paso; David Bird, US Army

---

8:30 AM Introductory Comments

8:40 AM Keynote
Multimaterials for Advanced Structural Applications: *Gerhard Ziegmann*[1]; Maximilian Feyrer[1]; Sebastian Sdrenka[1]; Tobias Fischer[1]; [1]Clausthal University Of Technology

9:20 AM
Investigation of Pineapple Leaf Fiber Reinforced Natural Rubber by Dynamic Mechanical Properties: *Karine Mougin*[1]; Budsaraporn Surajarusarn[2]; Gautier Schrodj[1]; Taweechai Amornsakchai[2]; [1]CNRS - IS2M; [2]Mahidol University

9:40 AM
Microstructural Characterization and Vibration Damping Behavior of Al-NiTi Composites: *Namrata Gangil*[1]; Arshad Siddiquee[2]; Sameera Mufazzal[2]; S. M. Muzakkir[2]; Sachin Maheshwari[3]; [1]Ajay Kumar Garg Engineering College; [2]Jamia Millia Islamia; [3]Netaji Subhas University of Technology

10:00 AM Break

10:20 AM
Improvement of Corrosion Resistance of A36 Steel Using SiC and TiB2 Thermally Sprayed Coatings: Abhijeeth Nagaraj[1]; *Adarsha H*[1]; Hariprasad S A[1]; Ramkumar N P[1]; [1]Jain University

10:40 AM Concluding Comments

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage 2022 — Sustainability and Energy

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

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

Wednesday AM | March 2, 2022
212B | Anaheim Convention Center

Session Chairs: Surojit Gupta, University of North Dakota; Kamala Raghavan, US Department of Energy

---

8:30 AM
Synthesis and Electrochemical Studies of Sodium ß''-Al2O3/10Sc1CeZr Composite as a Two Independent Phase Mixed Ion Conductor: *Pooya Elahi*[1]; Taylor Sparks[1]; [1]University of Utah

8:50 AM Invited
Design Paradigm for Manufacturing Functional Materials from Environmentally Benigh Precursors: *Surojit Gupta*[1]; [1]University of North Dakota

9:15 AM Invited
In-situ Surface Modification of Biocompatible 3D Printed Polylactic Acid (PLA) and PLA Composites Using Plasma Micro-discharge: *Sankha Banerjee*[1]; Saquib Ahmed[2]; Deidra Hodges[3]; Edbertho Leal-Quiros[4]; [1]California State University, Fresno; [2]State University of New York at Buffalo State; [3]Florida International University ; [4]University of California, Merced

9:35 AM
Long-term Stability Improvement of Perovskite Solar Cells through a Solvent-free Encapsulation Method: *Manuel Salado*[1]; David Payno[1]; Shahzada Ahmad[1]; [1]BC Materials

---

CHARACTERIZATION

Advanced Real Time Imaging — Energy and Biomaterials

Sponsored by: 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 Engergy Technology Laboratory; David Alman, National Energy Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki Shibata, 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; Pranjal Nautiyal, University of Pennsylvania

Wednesday AM | March 2, 2022
206A | Anaheim Convention Center

Session Chair: Tanaji Paul, Florida International University

8:30 AM Invited
Real-time Optical Visualization of Battery Reactions and Processes: *Nian Liu*[1]; [1]Georgia Institute of Technology

8:50 AM
High Temperature In Situ Imaging and Strain Measurement during Synthesis of Monolithic Zirconium Hydride Components: *Thomas Nizolek*[1]; Caitlin Taylor[1]; Erik Luther[1]; Aditya Shivprasad[1]; Tarik Saleh[1]; [1]Los Alamos National Laboratory

9:10 AM
Evaluating Cellular-level Inhomogeneity through High-frequency Ultrasound -- A Computational Study: *Koushik Paul*[1]; Leila Ladani[1]; [1]Arizona State University

9:30 AM
Phase Evolution in Water at High Pressures from XRD and Raman Spectroscopy: A Combined MD Simulation and Experimental Investigation: *Ali K. Shargh*[1]; Shanti Deemyad[2]; Niaz Abdolrahim[1]; Saveez Saffarian[2]; [1]University of Rochester; [2]University of Utah

---

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: Alloy Development and Properties — Structures and Mechanical Properties I and 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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Wednesday AM | March 2, 2022
251A | Anaheim Convention Center

Session Chairs: Veerle Keppens, University of Tennessee; Lei Lu, Chinese Academy of Sciences; Michael Widom, Carnegie Mellon University; Liang Jiang, Yantai University

---

8:30 AM Invited
Synthesis and Properties of High Entropy Oxide Ceramics: *Veerle Keppens*[1]; [1]University of Tennessee

8:50 AM Invited
Gradient Cell Structured High-entropy Alloy with Superior Mechanical Behavior: *Lei Lu*[1]; Qingsong Pan[1]; liangxue Zhang[1]; Rui Feng[2]; Peter K Liaw[3]; [1]Chinese Academy of Sciences; [2]Oak Ridge National Laboratory; [3]The University of Tennessee

9:10 AM Invited
Dynamic Deformation Behaviors in Single BCC Phase Refractory High-entropy Alloys: *Chanho Lee*[1]; Mathew Hayne[1]; Peter Liaw[2]; Nan Li[1]; Saryu Fensin[1]; [1]Los Alamos National Laboratory; [2]The University of Tennessee

9:30 AM Invited
AHigh-throughputStrategytoStudyPhaseStability,MicrostructureDevelopment and Mechanical Properties in Complex Concentrated Alloys: Mu Li[1]; Zhaohan Zhang[1]; Katharine Padilla[1]; Rohan Mishra[1]; *Katharine Flores*[1]; [1]Washington University in St. Louis

9:50 AM Break

10:10 AM Invited
Small-scale Deformation Behavior of Multi-principal Element Alloys: *Shristy Jha*[1]; Saideep Muskeri[1]; Sundeep Mukherjee[1]; [1]University of North Texas

10:30 AM
Composition- and Grain-size-dependent Hydrogen Uptake and Its Effect on Plastic Deformation of Face-centered Cubic High-entropy Alloys: *Yakai Zhao*[1]; Jeong-Min Park[2]; Upadrasta Ramamurty[1]; Jae-il Jang[2]; [1]Nanyang Technological University; [2]Hanyang University

---

Advances in Multi-Principal Elements Alloys X: 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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Wednesday AM | March 2, 2022
251B | Anaheim Convention Center

Session Chairs: Wei Chen, Illinois Institute of Technology; Yi-Chia Chou, National Chiao Tung University

---

8:30 AM Invited
Microstructural Inversion Accompanied by B2 to hP18 Phase Transformation in a BCC Based Refractory Complex Concentrated Alloy: *Abhishek Sharma*[1]; Sriswaroop Dasari[1]; Vishal Soni[1]; Oleg Senkov[2]; Daniel Miracle[3]; Rajarshi Banerjee[1]; [1]University of North Texas; [2]UES Inc.; [3]Air Force Research Laboratory

8:50 AM Invited
Slip Localization in the Refractory High Entropy Alloy HfNbTaTiZr at Room Temperature: *Marie Charpagne*[1]; J.C. Stinville[1]; Fulin Wang[2]; Tresa Pollock[3]; [1]University of Illinois; [2]Jiaotong University; [3]University of California Santa Barbara

9:10 AM Invited
Microstructure and Mechanical Properties of Medium-entropy Alloys with High-density Nano Precipitates: *CheWei Tsai*[1]; Hung-Chih Liu[1]; Pai-Keng Shen[1]; Jein-Wei Yeh[1]; Cheng-Yao Huang[1]; Hung-Wei Yen[1]; [1]National Tsing Hua University, Department of Materials Science and Engineering,

9:30 AM
Electron Diffraction-based Studies of Ordering and Mechanical Behavior in FCC and BCC Multi-principal Element Alloys: *Daniel Foley*[1]; David Beaudry[1]; Elaf Anber[1]; Yevgeny Rakita Shlafstein[1]; Partha Das[2]; Simon Billinge[3]; Andrew Matejunas[4]; Carolina Frey[5]; Leslie Lamberson[4]; Tresa Pollock[5]; Irene Beyerlein[5]; Garritt Tucker[4]; Chris Weinberger[6]; Mitra Taheri[1]; [1]Johns Hopkins University; [2]NanoMEGAS SPRL; [3]Columbia University; [4]Colorado School of Mines; [5]University of California, Santa Barbara; [6]Colorado State University

9:50 AM Break

10:10 AM
Characterization of High-entropy Titanate Pyrochlore Oxide Single Crystals: *Candice Kinsler-Fedon*[1]; Lauren Nuckols[1]; Anamul Haq Mir[2]; David Mandrus[1]; Yanwen Zhang[1]; William Weber[1]; Veerle Keppens[1]; [1]The University of Tennessee, Knoxville; [2]University of Huddersfield

10:30 AM
Size Effects in a Dual Phase High Entropy Alloy: *Junaid Ahmed*[1]; Matthew Daly[1]; [1]UIC

10:50 AM
A High-throughput Investigation of Microstructure-property Relationships in NbVZr: *Katharine Padilla*[1]; Mu Li[1]; Zhaohan Zhang[1]; Rohan Mishra[1]; Katharine Flores[1];

[1]Washington University in St. Louis

MATERIALS DESIGN

Advances in Titanium Technology — Deformation Behavior in Ti Alloys II

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

Program Organizers: Yufeng Zheng, University of Nevada-Reno; Zachary Kloenne, Ohio State University; Fan Sun, PSL Research University; Stoichko Antonov, National Energy Technology Laboratory; Rongpei Shi, Lawrence Livermore National Laboratory

Wednesday AM | March 2, 2022
252A | Anaheim Convention Center

Session Chair: Zachary Kloenne, Ohio State University

8:30 AM
Anomalous c+a Dislocation Activity in TIMETAL-407: *Zachary Kloenne*[1]; Gopal Viswanathan[1]; Michael Loretto[2]; Hamish Fraser[1]; [1]Ohio State University; [2]University of Birmingham

8:50 AM
Heterogeneous and Cooperative Deformation in Two-phase Titanium Alloys: Slip Initiation, Transfer, and Their Effects on Strain Localization: *Shaolou Wei*[1]; Cem Tasan[1]; [1]Massachusetts Institute of Technology

9:10 AM
Strengthening of Ti-6Al-4V/TiC Composites: Pavlo Markovsky[1]; Dmytro Savvakin[1]; Olexandr Stasyuk[1]; Matthew Mecklenburg[2]; Vianey Ellison[3]; *Sergey Prikhodko*[3]; [1]G.V. Kurdyumov Institute for Metal Physics, NAS of Ukraine; [2]University of Southern California, Los Angeles; [3]University of California Los Angeles

9:30 AM
The Effect of Sample Size and Plastic Behavior on the Validity of Sub-scale Mechanical Testing of Titanium Alloys: *James Paramore*[1]; Laura Moody[1]; Xinzhu Zheng[2]; Ankit Srivastava[2]; Brady Butler[1]; [1]US Army Research Laboratory; [2]Texas A&M University

9:50 AM
Modeling Local Stress States Near Microtextured Regions in Ti64 and Implications on Dwell Fatigue Life: *Joseph Wendorf*[1]; Jean-Charles Stinville[1]; Marie-Agathe Charpagne[1]; McLean Echlin[1]; Andrew Polonsky[2]; Paul Dawson[3]; Tresa Pollock[1]; [1]University of California Santa Barbara; [2]Sandia National Laboratories; [3]Cornell University

MATERIALS DESIGN

AI/Data Informatics: Computational Model Development, Validation, and Uncertainty Quantification — Material Design III

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Dennis Dimiduk, BlueQuartz Software LLC; Darren Pagan, Pennsylvania State University; Anthony Rollett, Carnegie Mellon University; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory

Wednesday AM | March 2, 2022
256A | Anaheim Convention Center

Session Chair: Tiankai Yao, Idaho National Laboratory

8:30 AM
Neural Message Passing for Prediction of Abnormal Grain Growth in Monte Carlo Simulations of Polycrystalline Materials: *Ryan Cohn*[1]; Elizabeth Holm[1]; [1]Carnegie Mellon University

8:50 AM
Application of Compositionally-restricted Attention-based Network (CrabNet) for Screening Candidate Dispersed Phases for Designing High Strength Alloys: *Trupti Mohanty*[1]; Fan Zhang[2]; K. S. Ravi Chandran[1]; Taylor D. Sparks[1]; [1]University of Utah; [2]CompuTherm,LLC

9:10 AM
Feature Selection and Interpretation for Machine Learning Models: Reducing the Dimensionality of Complex Concentrated Alloys: *Zachary Mcclure*[1]; Austin Hernandez[1]; Michael Titus[1]; Alejandro Strachan[1]; [1]Purdue University

9:30 AM
EfficientOptimizationofVariableandUncertainAdditiveManufacturingProcesses Using Machine Learning: *Maher Alghalayini*[1]; Ali Khosravani[2]; Surya Kalidindi[3]; Chris Paredis[1]; Fadi Abdeljawad[1]; [1]Clemson University; [2]Multiscale Technologies; [3]Georgia Institute of Technology

9:50 AM Break

10:10 AM
UncertaintyQuantificationandPropagationinPredictionofSolid-liquidInterfacial Properties and Solidification Microstructures: *Sepideh Kavousi*[1]; Mohsen Asle Zaeem[1]; [1]Colorado School of Mines

10:30 AM
Understanding Fission Gas Bubble Distribution, Lanthanide Transportation, and Thermal Conductivity Degradation in Neutron-irradiated a-U Using Machine Learning: *Tiankai Yao*[1]; Lu Cai[1]; Fei Xu[2]; Fidelma Dilemma[1]; Michael Benson[1]; Daniel Murray[1]; Cynthia Adkins[1]; Joshua Kane[1]; Min Xian[3]; Luca Capriotti[1]; [1]Idaho National Laboratory; [2]Grand View University; [3]University of Idaho

---

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — ML Algorithms and Their Applications I

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; Garritt Tucker, Colorado School of Mines; Ebrahim Asadi, University of Memphis; Bryan Wong, University of California, Riverside; Sam Reeve, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Adrian Sabau, Oak Ridge National Laboratory

Wednesday AM | March 2, 2022
253A | Anaheim Convention Center

Session Chairs: Garritt Tucker, Colorado School of Mines; Enrique Martinez Saez, Clemson University

---

8:30 AM Invited
Capturing Nanoscale Lattice Variations by Applying AI-powered Computer Vision Techniques on Synthetic X-ray Diffraction Data: *Niaz Abdolrahim*[1]; [1]University of Rochester

9:00 AM
Application of Information Theory in Molecular Dynamics Simulations: *Khaled Talaat*[1]; Osman Anderoglu[1]; [1]University of New Mexico

9:20 AM
Clustering Algorithms for Nanomechanical Property Mapping and Resultant Microstructural Constituent Quantification: *Bryer Sousa*[1]; Christopher Vieira[1]; Rodica Neamtu[1]; Danielle Cote[1]; [1]Worcester Polytechnic Institute

9:40 AM
Materials Design, Model Calibration, and Multi-fidelity Modeling with Latent Map Gaussian Processes: *Ramin Bostanabad*[1]; [1]University of California, Irvine

10:00 AM Break

10:20 AM
Comparing Transfer Learning to Feature Optimization in Microstructure Classification: *Taylor Sparks*[1]; Debanshu Banerjee[2]; [1]University of Utah; [2]Jadavpur University

10:40 AM
Improving Autonomous Data Collection by Iterative Learning Control as Applied to a Robomet.3D Mechanical Serial-sectioning System: *Damian Gallegos-Patterson*[1]; Claus Danielson[2]; Jonathan Madison[1]; [1]Sandia National Laboratories; [2]University of New Mexico

11:00 AM
Chemistry and Processing History Prediction from Materials Microstructure by Deep Learning: *Amir Abbas Kazemzadeh*[1]; Mahmood Mamivand[1]; [1]Boise State University

---

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications X — Session V

Sponsored by: TMS Structural Materials Division, TMS Functional 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; Takao Mori, National Institute For Materials Science; Alexandra Zevalkink, Michigan State University; Wan-Ting Chiu, Tokyo Institute of Technology; Pai-chun Wei, National Taiwan University

Wednesday AM | March 2, 2022
303D | Anaheim Convention Center

Session Chairs: Wan-Ting Chiu, Tokyo Institute of Technology; Franck Gascoin, Cnrs Crismat Unicaen

---

8:30 AM Invited
Niobium Chalcogenides: Phases Stability and Transport Properties: *Franck Gascoin*[1]; Hugo Bouteiller[1]; David Berthebaud[2]; Sylvain Letonquesse[2]; Takao Mori[3]; Amélie Galodé[4]; Louise Goodwin[4]; [1]Cnrs Crismat Unicaen; [2]CNRS LINK; [3]NIMS; [4]University of Caen

8:50 AM
Rhombohedral Distortion Elicits High-performance GeTe Theremoelectrics: *Chen Bo-Chia*[1]; Kuang-Kuo Wang[2]; Hsin-Jay Wu[1]; [1]National Yang Ming Chiao Tung University; [2]National Sun Yat-sen University

9:10 AM Invited
Computational Understanding and Design of Carrier Lifetime in Solar Absorber Materials: *Geoffroy Hautier*[1]; [1]Dartmouth

9:30 AM Concluding Comments

BIOMATERIALS

Biological Materials Science — Biological Materials Science V

Sponsored by: TMS Functional 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; Hannes Schniepp, William & Mary

Wednesday AM | March 2, 2022
204B | Anaheim Convention Center

Session Chairs: David Restrepo, The University of Texas at San Antonio; Jing Du, Penn State University

---

8:30 AM
Cellulose-hemicellulose-lignin Interaction in Coconut Endocarp: *Sharmi Mazumder*[1]; Ning Zhang[1]; [1]The University of Alabama

8:50 AM
Polymer Interfaces with Small-scale Biological Systems and the Impact on Sperm Viability: *Jeffrey Bates*[1]; Kenneth Aston[1]; Benjamin Emery[1]; Ashwin Velraj[1]; Abhishek Pachauri[1]; Parker Toews[1]; Meredith Humphreys[1]; [1]University of Utah

9:10 AM
Bioinspired Self-strengthening Tape Junctions: *Ben Skopic*[1]; Hannes Schniepp[1]; [1]William & Mary

9:30 AM
Investigation of Multiscale Hierarchical Structure and Micromechanical Properties of Cholla Cactus: *Swapnil Morankar*[1]; Amey Luktuke[1]; Sridhar Niverty[1]; Hamidreza Torbati-Sarraf[1]; Yash Mistry[2]; Clint Penick[3]; Dhruv Bhate[2]; Nikhilesh Chawla[1]; [1]Purdue University; [2]Arizona State University; [3]Kennesaw State University

---

BIOMATERIALS

BioNano Interfaces and Engineering Applications — Bionano Interfaces & Engineering Applications III

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

Program Organizers: Candan Tamerler, University of Kansas; Hendrik Heinz, University of Colorado Boulder; Kalpana Katti, North Dakota State University; Terry Lowe, Colorado School of Mines; Po-Yu Chen, National Tsing Hua University

Wednesday AM | March 2, 2022
201A | Anaheim Convention Center

Session Chair: To Be Announced

8:30 AM Invited
Alloy Design via 3D Printing for Metallic Implants: *Amit Bandyopadhyay*[1]; Susmita Bose[1]; [1]Washington State University

9:10 AM Invited
Bioinspired Interface for Titanium Implants: *Malcolm Snead*[1]; Candan Tamerler[2]; Casey Chen[1]; [1]Usc, Center For Craniofacial Mol Biol Ostrow School Of Dentistry Of; [2]University of Kansas

9:40 AM
Computational Investigation of DNA-scaffolded Squariane Dye Aggregates: *German Barcenas*[1]; Lawrence Spear[1]; Lan Li[1]; [1]Boise State University

10:00 AM Break

10:20 AM
Computational Modeling of Cyanine Dyes Attached to DNA Scaffolds: *Austin Biaggne*[1]; Lan Li[1]; [1]Boise State University

---

ADVANCED MATERIALS

Bulk Metallic Glasses XIX — Atomic Structure

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

Program Organizers: Robert Maass, Federal Institute for Materials Research and Testing (BAM); Peter Derlet, Paul Scherrer Institut; Katharine Flores, Washington University in St. Louis; Yonghao Sun, Chinese Academy of Sciences; Lindsay Greer, University of Cambridge; Peter Liaw, University of Tennessee

Wednesday AM | March 2, 2022
253C | Anaheim Convention Center

Session Chairs: Michael Atzmon, University of Michigan; Jinwoo Hwang, Ohio State University; Peter Derlet, Paul Scherrer Institut

---

8:30 AM
Investigating the Structural Origin of the Change in Ductility of Zr-Cu-Co-Al Metallic Glasses Using 4-dimensional Scanning Transmission Electron Microscopy: *Soohyun Im*; Pengyang Zhao[1]; Yuchi Wang[2]; Geun Hee Yoo[3]; Eun Soo Park[3]; Yunzhi Wang[2]; Jinwoo Hwang[2]; [1]Shanghai Jiao Tong University; [2]The Ohio State University; [3]Seoul National University

8:50 AM Invited
Determining the Three-dimensional Atomic Structure of Metallic Glass: *Jianwei (John) Miao*[1]; [1]Univ of California Los Angeles

9:15 AM
Structural Origin of Ultrastable Metallic Glasses: Zhen Lu[1]; Akihiko Hirata[2]; *Mingwei Chen*[3]; [1]WPI-AIMR, Tohoku University; [2]Waseda University; [3]Johns Hopkins University

9:35 AM
X-ray Techniques to Study the Interplay of Short- and Long-range Structural Ordering in Zr and Pd Bulk Metallic Glasses: *Alex Dommann*[1]; Aurelio Borzi[1]; Antonia Neels[1]; [1]Empa

9:55 AM Discussion on atomic structure of metallic glasses

LIGHT METALS

Cast Shop Technology — Safety / Furnace

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

Program Organizers: Stephen Instone, Speira GmbH; Mertol Gökelma, Izmir Institute of Technology; Samuel Wagstaff, Oculatus; Dmitry Eskin, Brunel University

Wednesday AM | March 2, 2022
209A | Anaheim Convention Center

Session Chair: Anne Kvithyld, SINTEF AS

8:30 AM
Dew Point Monitoring and Alarm System for Meltable Storage: *John Zeh*[1]; Keaton Davenport[1]; Cameron Crick[1]; [1]Logan Aluminum Inc.

8:55 AM
Evaluation of Breathability of Molten Metal PPE Fabrics: Robert Wagstaff[1]; Sarah Walker[2]; *Samuel Wagstaff*[1]; [1]Oculatus Consulting; [2]Rolling Boulder Design

9:20 AM
Aluminium Melting Process Pptimization with SmartMelt, a Digital Tool for Real-time Operational Guidance: *Amin Rostamian*[1]; Mario Salgado[1]; Marc Bertherat[2]; Jean-Luc Desbiolles[1]; Michel Rappaz[3]; [1]Novamet Sarl; [2]Constellium; [3]MRC Consulting

9:45 AM
Continuous Chemical Analysis of Molten Aluminum: *Kristjan Leosson*[1]; Rauan Meirbekova[1]; Sveinn Gudmundsson[1]; Georges Salloum-Abou-Jaoude[2]; [1]DTE; [2]Constellium C-TEC

10:10 AM Break

10:25 AM
Bauxite & Alumina: Now and In the Future: *Lavinya Kugaswaran*[1]; [1]International Aluminium Institute

---

CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2022 — Metallurgical Processing Analysis and Characterization

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

Program Organizers: Mingming Zhang, Wood Mackenzie; Jian Li, CanmetMATERIALS; 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, DEVCOM U.S. Army Research Laboratory; Rajiv Soman, Eurofins EAG Materials Science LLC; Zhiwei Peng, Central South University

Wednesday AM | March 2, 2022
207B | Anaheim Convention Center

Session Chairs: Rajiv Soman, Eurofins EAG Laboratories; Mariyappan Arul Kumar, Los Alamos National Laboratory

---

8:30 AM Introductory Comments

8:35 AM
Investigation of MRO Clusters in Molten Marginal Metallic Glasses: *Can Okuyucu*[1]; Doguhan Sariturk[1]; Ilkay Kalay[2]; Yunus Kalay[1]; [1]Middle East Technical University; [2]Çankaya University

8:55 AM
Study on the Degradation Behavior of Organic Humic Acid from the Wastewater by Refractory High-titanium Slag after Metallurgical Transformation: Yubi Wang[1]; *Bingbing Liu*[1]; Shengpeng Su[1]; Guihong Han[1]; Yanfang Huang[1]; [1]Zhengzhou University

9:15 AM
Study on Efficient Burdening for Preparation of Fused Calcium Magnesium Phosphate Fertilizer from Low-grade Phosphate Ores: *Tingting Wang*[1]; Luyi Li[1]; Cuihong Hou[1]; Haobin Wang[1]; Shouyu Gu[1]; Jie Wang[1]; [1]Zhengzhou University

9:35 AM
Charactesrization of Nano-crystalline Metallurgical-grade Silicon Prepared from Rice Husk Ash: *Benedict Ayomanor*[1]; Cookey Iyen[2]; Ifeoma Iyen[2]; Vitalis Mbah[1]; Daniel Anyaogu[1]; Daniel Dawuk[1]; Sunday Anikoh[1]; Matthew Omonokhua[1]; Suleiman Ndiriza[1]; [1]Federal Polytechnic Nasarawa; [2]Federal University Wukari, Nigeria.

9:55 AM Break

10:10 AM
Characteristics of Placer Gold from Glacial Sediment: *Bowen Li*[1]; [1]Michigan Technological University

10:30 AM
Chemical Analysis of Mineral Surfaces Using Digital Image Processing: Mizraim Flores[1]; *Juan Gonzalez*[1]; Abdon Aparicio[1]; Gildardo Godínez[1]; Karime González[2]; [1]UNIVERSIDAD TECNOLÓGICA DE TULANCINGO; [2]Instituto Tecnológico de Saltillo

---

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Solidification/Additive Manufacturing

Sponsored by: TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee

Program Organizers: Vahid Attari, Texas A&M University; Sara Kadkhodaei, University Of Illinois At Chicag; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Tourret, IMDEA Materials Institute; James Morris, Ames Laboratory

Wednesday AM | March 2, 2022
255C | Anaheim Convention Center

Session Chairs: Eva Zarkadoula, ORNL; Damien Tourret, IMDEA Materials Institute

---

8:30 AM
Multiscale Dendritic Needle Network Study of the Effect of Buoyant Liquid Flow on Dendritic Growth Kinetics: *Thomas Isensee*[1]; Damien Tourret[2]; [1]IMDEA Materials Institute & Universidad Politécnica de Madrid; [2]IMDEA Materials

8:50 AM
Machine Learning-assisted High-throughput Exploration of Interface Energy Space in Multi-phase-field Model with CALPHAD Potential: *Vahid Attari*[1]; Raymundo Arroyave[1]; [1]Texas A&M University

9:10 AM
Capturing the Undercooling for Solidification of Inoculated FCC Metals: *Mark O'Masta*[1]; Eric Clough[1]; John Martin[1]; [1]HRL Laboratories LLC

9:30 AM
Simulation of Evolving Microstructure in Additive Manufacturing of Al-Si Alloys Using Phase Field Modeling: *Abdur Al Azad*[1]; Philip Cardiff[1]; David Browne[1]; [1]University College Dublin

9:50 AM Break

10:10 AM
Modelling Informed Strategy for the Additive Manufacturing of High-strength Al-alloys: *Giuseppe Del Guercio*[1]; William Reynolds[1]; Adam Clare[1]; Marco Simonelli[1];

[1]University of Nottingham

10:30 AM
Simulation of Molten Pool Dynamics during Metallic Additive Manufacturing: *Lu Wang*; Wentao Yan[1]; [1]National Univeristy of Singapore

---

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Mechanisms of High Temperature Alloys — Crystal Plasticity, Micro-mechanics & Environmental Behavior

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

Program Organizers: Mark Hardy, Rolls-Royce Plc; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Jeremy Rame, Safran Aircraft Engines; Akane Suzuki, GE Research; Jean-Charles Stinville, University of California, Santa Barbara; Paraskevas Kontis, Norwegian University of Science and Technology; Andrew Wessman, University of Arizona

Wednesday AM | March 2, 2022
304B | Anaheim Convention Center

Session Chairs: Andrew Wessman, University of Arizona; Mark Hardy, Rolls-Royce

---

8:30 AM
Grain Scale Deformation Study of a Nickel-based Superalloy under Thermo-mechanical Fatigue Utilizing Crystal Plasticity Simulations and High-energy X-ray Diffraction Microscopy: *Brandon Mackey*[1]; Ritwik Bandyopadhyay[1]; Sven Gustafson[1]; Michael Sangid[1]; [1]Purdue University

8:50 AM
A Framework to Enable Location-specific Analysis of Components by Incorporating Microstructural Information during the Product Design Cycle: *Saikiran Gopalakrishnan*[1]; Ritwik Bandyopadhyay[1]; Michael Sangid[1]; [1]Purdue University

9:10 AM
Temperature Dependence of Tensile and Fatigue Properties of Additively Manufactured Ni-base Superalloys: A Comparative Study: Reza Ghiaasiaan[1]; Arun Poudel[1]; Nabeel Ahmad[1]; Muztahid Muhammad[1]; Paul Gradl[2]; *Shuai Shao*[1]; Nima Shamsaei[1]; [1]Auburn University; [2]NASA Marshall Space Flight Center

9:30 AM
The Effect of Environment on the Near-crack Deformation Induced during Dwell Fatigue of a Ni-base Superalloy: *Zachary Harris*[1]; Philippa Reed[2]; James Burns[1]; [1]University of Virginia; [2]University of Southampton

9:50 AM Break

10:10 AM
Frictional Ignition of Superalloys in High-pressure, High-temperature Oxygen: *Zachary Cordero*[1]; Andres Garcia-Jimenez[1]; [1]Massachusetts Institute of Technology

10:30 AM
Contributions of Oxidation and Creep to High Temperature Fatigue Crack Susceptibility in Waspaloy: *Alex Jennion*[1]; Zachary Harris[1]; James Burns[1]; [1]University of Virginia

10:50 AM
Microstructural and Mechanical Aspects of Damage Mechanisms In Dwell-fatigue In Inconel 718: *Melanie Bordas-Czaplicki*[1]; Jonathan Cormier[2]; Patrick Villechaise[2]; Vincent Roue[3]; [1]Safran Aircraft Engines - Institut Pprime; [2]Institut Pprime; [3]Safran Aircraft Engines

11:10 AM
Numerical Studies to Predict the Fracture Behavior due to Stress Corrosion Cracking under Different Environmental Conditions: Sorabh Singhal[1]; Yogeshwar Jasra[1]; *Pardeep Kumar*[2]; Ravindra Kumar Saxena[1]; [1]Sant Longowal Institute of Engineering and Technology; [2]R. V. Industries

---

SPECIAL TOPICS

DMMM4 — All-Summit Keynote Session

Sponsored by: TMS: Diversity, Equity, and Inclusion Committee

Program Organizers: Aeriel Murphy-Leonard, Ohio State University; Mark Carroll, Federal-Mogul Powertrain; Blythe Clark, Sandia National Laboratories; K. Cunningham, ATI Specialty Alloys & Components; Lauren Garrison, Oak Ridge National Laboratory; Atieh Moridi, Cornell University; Ashleigh Wright, University of Illinois at Urbana-Champaign; Megan Cordill, Erich Schmid Institute of Materials Science; Jonathan Madison, National Science Foundation; Mitra Taheri, Johns Hopkins University; Clarissa Yablinsky, Los Alamos National Laboratory

Wednesday AM | March 2, 2022
Grand Ballroom F | Anaheim Marriott

Session Chairs: Clarissa Yablinsky, Los Alamos National Laboratory; Aeriel Murphy-Leonard, The Ohio State University

---

8:30 AM Introductory Comments

8:40 AM Keynote
The Road to Equity and Inclusion: Lessons Learned on the Journey: *Viola Acoff*[1]; [1]University of Alabama, Tuscaloosa

9:45 AM Break

10:00 AM Panel Discussion: Voices of TMS A panel of diverse TMS members will build upon the discussion introduced in the Keynote Presentation through their own stories and perspectives, with ample opportunity for questions and engagement by attendees. Panel members include: Lawrence Fung, Gabriel Ilevbare, Suveen Mathaudhu, and Raul Rebak. Moderated by Clarissa Yablinsky

11:00 AM Small Group Discussion and Sharing This segment of the program will provide attendees with the opportunity to reflect upon the lessons learned in this session through directed discussion.

MECHANICS & STRUCTURAL RELIABILITY

Dynamic Behavior of Materials IX — Plasticity / Modeling and Simulation I

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

Program Organizers: Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Cyril Williams, US Army Research Laboratory

Wednesday AM | March 2, 2022
304D | Anaheim Convention Center

Session Chairs: Marc Meyers, University of California San Diego; Jeremy Millett, Awe Plc

---

8:30 AM
Contrasting the Shock Response of Typical Face Centred Cubic and Body Centred Cubic Single Crystals: *Jeremy Millett*[1]; Saryu Fensin[2]; Yu-Lung Chiu[3]; Glenn Whiteman[1]; George Gray[2]; [1]Awe Plc; [2]Los Alamos National Laboratory; [3]University of Birmingham

8:50 AM
Anomalous Strain Rate History Effects in TRIP and TWIP Steels: *Christopher Meredith*[1]; Daniel Field[1]; Daniel Magagnosc[1]; Timothy Walter[1]; Jeffrey Lloyd[1]; Krista Limmer[1]; [1]Army Research Laboratory

9:10 AM
Multi-mechanism Models for Impact on Ceramics: *Nilanjan Mitra*[1]; Weixin Li[1]; K T Ramesh[1]; [1]Johns Hopkins University

9:30 AM
Modeling Dislocation Evolution in High Velocity Microparticle Impacts: *Kevin Larkin*[1]; Abigail Hunter[1]; Miles Buechler[1]; [1]Los Alamos National Laboratory

9:50 AM Break

10:05 AM
A Twinning Model Based on Dislocation Kinetics for Polycrystalline Beryllium under Dynamic Loading Conditions: *Nitin Daphalapurkar*[1]; Darby Luscher[1]; Daniele Versino[1]; [1]Los Alamos National Laboratory

10:25 AM
Spall of Tin and Its Sensitivity to Microscale Behaviors – A Computational Study: *Kazem Alidoost*[1]; Nathan Barton[1]; Garry Maskaly[1]; Fady Najjar[1]; [1]Lawrence Livermore National Laboratory

10:45 AM
Mechanical Properties of a Model Co-continuous Two-phase Metal Composite: *Lauren Poole*[1]; Avery Samuel[1]; Frank Zok[1]; [1]University of California-Santa Barbara

11:05 AM
Simulations of Laser-driven Metal Microjet Formation and Their Interactions: *Kyle Mackay*[1]; Fady Najjar[1]; Alison Saunders[1]; Hye-Sook Park[1]; Suzanne Ali[1]; Jon Eggert[1]; Jeremy Horwitz[1]; Brandon Morgan[1]; Yuan Ping[1]; Camelia Stan[1]; [1]Lawrence Livermore National Lab

11:25 AM
Effect of Surfaces on Dislocation Mobility in the Transonic Regime: *Ta Duong*[1]; Michael J. Demkowicz[1]; [1]Texas A&M University

11:45 AM
High Strain-rate Nanoindentation Testing of Soft and Hard Model Materials: *Benjamin Hackett*[1]; Christopher Walker[1]; Wesley Higgins[1]; Sudharshan Phani Pardhasaradhi[2]; Warren Oliver[3]; George Pharr[1]; [1]Texas A&M University; [2]International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI); [3]KLA Corporation

---

CORROSION

Environmental Degradation of Multiple Principal Component Materials — Design, Modeling, Simulation, and Machine Learning

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

Program Organizers: Wenjun Cai, Virginia Polytechnic Institute and State University; ShinYoung Kang, Lawrence Livermore National Laboratory; XiaoXiang Yu, Northwestern University; Vilupanur Ravi, California State Polytechnic University Pomona; Christopher Weinberger, Colorado State University; Elizabeth Opila, University of Virginia; Bai Cui, University of Nebraska-Lincoln; Mark Weaver, University of Alabama; Bronislava Gorr, Karlsruhe Institute of Technology (KIT); Srujan Rokkam, Advanced Cooling Technologies Inc

Wednesday AM | March 2, 2022
201C | Anaheim Convention Center

Session Chairs: Xiao-xiang Yu, Northwestern University ; Shinyoung Kang, Lawrence Livermore National Laboratory

---

8:30 AM
Modeling Preferential Dissolution during Aqeous Corrosion of Multi-principal Element Alloys: *Kang Wang*[1]; Bi-Cheng Zhou[1]; [1]University of Virginia

8:50 AM
Interpretable Machine Learning to Understand Corrosion in Complex Compositional Alloys: *Timothy Hartnett*[1]; Angela Gerard[1]; Prasanna Balachandran[1]; John Scully[1]; [1]University Of Virginia

9:10 AM Invited
Corrosion Resistance of Al-Cr-Ti Containing Compositionally Complex Alloys: *Samuel Inman*[1]; Jie Qi[2]; Mark Wischhusen[1]; Sean Agnew[1]; Joseph Poon[2]; John Scully[1]; [1]Department of Materials Science and Engineering- University of Virginia; [2]Department of Physics- University of Virginia

9:40 AM
Computational Investigation of the Trends that Govern the Coefficient of Thermal Expansion in Rare-earth Silicates: *Mukil Ayyasamy*[1]; [1]University of Virginia

10:00 AM Break

10:20 AM
Oxygen Modulation of Miscibility and Ordering in BCC Nb-Ti-Zr Alloys: *Michael Waters*[1]; David Beaudry[2]; Yevgeny Shlafstein[2]; Elaf Anber[2]; Mitra Taheri[2]; James Rondinelli[1]; [1]Northwestern University; [2]Johns Hopkins University

10:40 AM
Machine Learning Potential for High Entropy Alloys: *Qiang Zhu*[1]; Yanxon Howard[1]; Pedro Santos[1]; Xiaoxiang Yu[2]; Yunjiang Wang[3]; [1]University of Nevada Las Vegas; [2]Northwestern University; [3]State Key Laboratory of Nonlinear Mechanics, Institute of Mechanics, Chinese Academy of Sciences

11:00 AM
Modeling and Design of CoCrFeNi Multi-principle Element Alloys on Their Aqueous Corrosion Resistance via First Principle Calculations: *Zhengyu Zhang*[1]; Liping Liu[1]; Tianyou Mou[1]; Hongliang Xin[1]; Wenjun Cai[1]; [1]Virginia Polytechnic Institute and State University

---

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Corrosion Fatigue and Cracking

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 2, 2022
201D | Anaheim Convention Center

Session Chairs: Jenifer Locke, Ohio State University; Wenjun Cai, Virginia Tech

---

8:30 AM Invited
Correlating Crack Tip pH to Corrosion Fatigue Performance in Al Alloys: *Jenifer Locke*[1]; Katrina Catledge[1]; Gabriella Montiel[1]; Mary Cefaratti[2]; David Schrock[1]; Saba Esmaeely[1]; [1]Ohio State University; [2]Wittenberg University

9:05 AM
Effects of Atmospheric Corrosion on Corrosion Fatigue of AA7085-T7451: Investigating the Role of Surface Salts, Varied Humidity, and Temperature: *Brandon Free*[1]; Jason Niebuhr[2]; Nathan Houser[2]; Sarah Galyon Dorman[2]; Jenifer (Warner) Locke[1]; [1]The Fontana Corrosion Center, The Ohio State University; [2]SAFE Inc.

9:25 AM Invited
Designing Robust Aluminum Alloys and Structures Resistant to Simultaneous Surface Stress and Corrosion: *Wenjun Cai*[1]; [1]Virginia Polytechnic Institute and State University

10:00 AM Break

10:20 AM
Investigation of Fundamental Mechanical and Electrochemical Mechanism during the Tribocorrosion Process of Aluminum Using Experiments and Simulations: *Kaiwen Wang*[1]; Wenjun Cai[1]; [1]Virginia Polytechnic Institute and State University

10:40 AM
Investigating the Effect of Polarization on SCC Resistance of AA6111 and the Role of Crack Tip pH: Katrina Catledge[1]; Gabriella Montiel[1]; Saba Esmaeely[2]; *Jenifer Locke*[1]; [1]The Ohio State University; [2]DNV

MATERIALS DESIGN

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Multi-Mechanical Interactions during Extreme Environment Fatigue Loading

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials 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: Jean-Charles Stinville, University of Illinois Urbana-Champaign; Garrett Pataky, Clemson University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University; Orion Kafka, NIST

Wednesday AM | March 2, 2022
254B | Anaheim Convention Center

Session Chair: Brian Wisner, Ohio University

8:30 AM Invited
Damage Manifestation in Hydrogen-assisted Fatigue: *Matthew Connolly*[1]; May Martin[1]; Robert Amaro[2]; Peter Bradley[1]; Damian Lauria[1]; Jun-Sang Park[3]; Zack Buck[1]; Andrew Slifka[1]; [1]National Institute of Standards and Technology; [2]Advanced Materials Testing & Technologies; [3]Argonne National Laboratory

8:50 AM
Spatial and Temporal Slip Heterogeneity in Ti–7Al as a Function of Oxygen Content and Crystallographic Ordering: *Felicity Dear*[1]; Rachel Lim[2]; Darren Pagan[2]; Joel Bernier[3]; Yilun Xu[1]; Thomas McAuliffe[1]; David Rugg[4]; Fionn Dunne[1]; David Dye[1]; [1]Imperial College London; [2]Pennsylvania State University; [3]Lawrence Livermore National Laboratory; [4]Rolls-Royce plc

9:10 AM
Model the Initiation of Hot Cracking during Laser Welding of Al6061: *Guannan Tang*[1]; Anthony Rollett[1]; [1]Carnegie Mellon University

9:30 AM
Atomic Mechanism of Near Threshold Fatigue Crack Growth in Vacuum: *Mingjie Zhao*[1]; Wenjia Gu[1]; Derek Warner[1]; [1]Cornell University

---

NANOSTRUCTURED MATERIALS

Functional Nanomaterials: Functional Low-Dimensional (0D, 1D, 2D) Materials 2022 — Functional Bio-Nanomaterials & Biosensors I

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

Program Organizers: Michael Cai Wang, University of South Florida; Yong Lin Kong, University of Utah; Sarah Ying Zhong, University of South Florida; Surojit Gupta, University of North Dakota; Nasrin Hooshmand, Georgia Institute of Technology; Woochul Lee, University of Hawaii at Manoa; Min Kyu Song, Washington State University; Simona Hunyadi Murph, Savannah River National Laboratory; Hagar Labouta, University of Manitoba; Max Anikovskiy, University of Calgary; Patrick Ward, Savannah River National Laboratory

Wednesday AM | March 2, 2022
260B | Anaheim Convention Center

Session Chairs: Yong Lin Kong, University of Utah; Michael Cai Wang, University of South Florida

---

8:30 AM
Investigation of the Capturing Mechanism of Aerosols on Functional Polymeric Fiber Matrix: *Noori Na*[1]; Abiral Regmi[1]; Jiyoung Chang[1]; [1]University of Utah

8:50 AM Keynote
3D Printing Bionic Devices: *Michael McAlpine*[1]; [1]University of Minnesota

9:35 AM Invited
Rapid and Scalable Fabrication of Hierarchical Multiscale Nanocomposite Films for Bone Tissue Repair and Infection Control: *Amanda Clifford*[1]; [1]The University of British Columbia

10:05 AM Break

10:25 AM Keynote
Electrical Detection and Characterization of Individual Molecules with Single Nanometer-scale Pores: *John Kasianowicz*[1]; Jessica Benjamini[2]; Kenneth Rubinson[3]; Haiyan Wang[4]; [1]USF Tampa; [2]Columbia University; [3]Wright State University; [4]Southeast University

---

MECHANICS & STRUCTURAL RELIABILITY

Grain Boundaries and Interfaces: Metastability, Disorder, and Non-Equilibrium Behavior — Special Interfaces: Twins, Laminates, etc

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

Program Organizers: Yue Fan, University of Michigan; Liang Qi, University of Michigan; Jeremy Mason, University of California, Davis; Garritt Tucker, Colorado School of Mines; Pascal Bellon, University of Illinois at Urbana-Champaign; Mitra Taheri, Johns Hopkins University; Eric Homer, Brigham Young University; Xiaofeng Qian, Texas A&M University

Wednesday AM | March 2, 2022
304C | Anaheim Convention Center

Session Chairs: Yue Fan, University of Michigan, Ann Arbor; Liang Qi, University of Michigan, Ann Arbor

---

8:30 AM Invited
Twin-boundary Structural Phase Transitions in Elemental Titanium: Mohammad Hooshmand[1]; Ruopeng Zhang[2]; Yan Chong[1]; Enze Chen[1]; Timofey Frolov[3]; David Olmsted[1]; Andrew Minor[1]; *Mark Asta*[1]; [1]University of California, Berkeley; [2]Lawrence Berkeley National Laboraory; [3]Lawrence Livermore National Laboratory

9:00 AM Invited
Migration Free Energy of Twin Boundaries and Other Crystalline Defects: *David Rodney*[1]; Yuji Sato[2]; Arnaud Allera[1]; Thomas Swinburne[3]; [1]Lyon University; [2]Tokyo University; [3]Aix Marseille University

9:30 AM
Thermal Stability and Mechanical Behavior of Immiscible Cu-Ag/Fe Triphase Multilayers with Triple Junctions: *Tongjun Niu*[1]; Yifan Zhang[2]; Jaehun Cho[1]; Nicholas Richter[1]; Tianyi Sun[1]; Haiyan Wang[1]; Xinghang Zhang[1]; [1]Purdue University; [2]Los Alamos National Laboratory

9:50 AM
Disconnection-mediated Transition in Segregation Structure at Twin Boundaries: A Molecular Dynamic Simulation of Platinum-gold System: *Chongze Hu*[1]; Douglas Medlin[1]; Remi Dingreville[1]; [1]Sandia National Laboratories

10:10 AM Break

10:25 AM Invited
Disconnections and Other Defects Associated with Twin Interfaces: *Jian Wang*[1]; [1]University of Nebraska-Lincoln

10:55 AM
Nudged Elastic Band-based Modeling of Stress-dependent Twin Boundary Migration in Magnesium: *Kehang Yu*[1]; Xin Wang[1]; Subhash Mahajan[2]; Timothy Rupert[1]; Irene Beyerlein[3]; Penghui Cao[1]; Julie Schoenung[1]; Enrique Lavernia[4]; [1]University of California, Irvine; [2]University of California, Davis; [3]University of California, Santa Barbara; [4]National Academy of Engineering

11:15 AM
Amorphous/Crystalline Interfaces in Nanomultilayers: *Kyle Russell*[1]; [1]University of Southern California

---

ADVANCED MATERIALS

High Performance Steels — Modeling and Computation in Steels Research

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

Program Organizers: Ana Luiza Araujo, CBMM North America Inc.; C. Tasan, Massachusetts Institute of Technology; Jonah Kleem-Toole, Colorado School of Mines; Louis Hector, General Motors Global Technical Center; Tilmann Hickel, Max-Planck-Institut Fuer Eisenforschung; Benjamin Adam, Oregon State University

Wednesday AM | March 2, 2022
252C | Anaheim Convention Center

Session Chairs: Allie Glover, Los Alamos National Laboratory; Chris Finfrock, Colorado School of Mines

---

8:30 AM
First Principles Calculations of Structural Point-defect Calculations in Austenitic Stainless Steels: *Edwin Antillon*[1]; Noam Bernstein[1]; Michelle Johannes[1]; [1]Naval Research Laboratory

8:55 AM
ICME Design of β-NiAl + Cu + VC Triple Nano-precipitate Strengthened Austenitic Steel: *Colin Stewart*[1]; Paul Lambert[2]; Richard Fonda[1]; Keith Knipling[1]; Patrick Callahan[1]; [1]US Naval Research Laboratory; [2]US Naval Surface Warfare Center, Carderock Division

9:20 AM
Modeling Liquid Metal Embrittlement Cracks in Cross-tension Spot Weld Testing for Advanced High Strength Steels: *Kayla Molnar*[1]; Matthew Zappulla[1]; Kip Findley[2]; [1]Los Alamos National Laboratory; [2]Colorado School of Mines

9:45 AM
Using Computer Vision to Predict Mechanical Properties of High Temperature Alloys: *Nan Gao*[1]; Zongrui Pei[2]; Youhai Wen[2]; Michael Gao[2]; Elizabeth Holm[1]; [1]Carnegie Mellon University; [2]NETL

10:10 AM Break

10:25 AM
Computational Design of a High Strength High Toughness Fully-austenitic TRIP Steel: *Amit Behera*[1]; Dana Frankel[1]; Fan Meng[1]; Peter Jacobson[1]; Greg Olson[1]; [1]QuesTek Innovations LLC

10:50 AM
Properties and Performance of Fe-Mn-Al-C Alloys as a Function of Composition: *Krista Limmer*[1]; Daniel Field[1]; Katherine Sebeck[2]; [1]DEVCOM Army Research Laboratory; [2]DEVCOM Ground Vehicle Systems Center

---

LIGHT METALS

Magnesium Technology — Characterization and Joining, Machining, and Forming

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

Program Organizers: Petra Maier, University of Applied Sciences Stralsund; Steven Barela, Terves, Inc; Victoria Miller, University of Florida; Neale Neelameggham, IND LLC

Wednesday AM | March 2, 2022
210A | Anaheim Convention Center

Session Chairs: Suveen Mathaudhu, Colorado School of Mines; Domonkos Tolnai, Helmholtz-Zentrum Hereon; Alan Luo, The Ohio State University; Vineet Joshi, Pacific Northwest National Laboratory

---

8:30 AM
Characterization of Binary Solute Contributions to Cyclic Deformation in Magnesium Alloys by High Energy X-ray Diffraction: *Duncan Greeley*[1]; Mohammadreza Yaghoobi[1]; Katherine Shanks[2]; Darren Pagan[2]; Veera Sundararaghavan[1]; John Allison[1]; [1]University of Michigan; [2]Cornell High Energy Synchrotron Source

8:50 AM Invited
To Fail or Not to Fail: Norbert Hort[1]; *Petra Maier*[2]; [1]Helmholtz-Zentrum Hereon; [2]University of Applied Sciences Stralsund

9:10 AM
Microstructure Evolution of AZ31B Mg Alloy during Bi-axial Fatigue Loading: *Sugrib Shaha*[1]; Dwayne Toscano[2]; Hamid Jahed[2]; [1]Georgia Institute of Technology; [2]University of Waterloo

9:30 AM
Wire-based Additive Manufacturing of Magnesium Alloys: *Stefan Gneiger*[1]; Daniel Koutny[2]; Sascha Senck[3]; Martin Schnall[1]; Nikolaus Papenberg[1]; Thomas Klein[1]; [1]Light Metals Technologies Ranshofen; [2]Brno University of Technology; [3]University of Applied Sciences Upper Austria

9:50 AM Break

10:10 AM
Nanomechanical Analysis and Fractography of Extruded Mg-Dy-Nd Based Alloy Influenced by Solution Heat Treatment: *Petra Maier*[1]; Asta Richter[2]; Benjamin Clausius[1]; Norbert Hort[3]; [1]University of Applied Sciences Stralsund; [2]University of Applied Sciences Wildau; [3]Helmholtz-Zentrum Hereon

10:30 AM
Dissimilar Metal Micro Friction Stir Welding of Magnesium AZ31 to Aluminum 6061: *Eisha Khalid*[1]; Vasanth Shunmugasamy[1]; Bilal Mansoor[1]; [1]Texas A&M University at Qatar

10:50 AM
Friction Stir Extrusion of AZ31 Magnesium Alloy Rod: *Maryam Al-Buainain*[1]; Vasanth Shunmugasamy[2]; Bilal Mansoor[2]; [1]Texas A&M University; [2]Texas A&M University at Qatar

11:10 AM
Determining the Contributions of Dynamic Recrystallization and Deformation Mechanisms to the Weak Textures Observed in As-deformed Mg-Zn-Ca Alloys: *Tracy Berman*[1]; Mohammadreza Yaghoobi[1]; John Allison[1]; [1]University of Michigan

---

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — General Materials and Chemistry I

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

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

Wednesday AM | March 2, 2022
203B | Anaheim Convention Center

Session Chair: Michael Short, MIT

8:30 AM
Recovery of Purified Cerium Metal via Metallothermic Reduction after Chlorination-based Purification: *Sierra Freitas*[1]; Mario Alberto Gonzalez[1]; Chao Zhang[2]; Devin Rappleye[3]; Michael Simpson[1]; [1]University of Utah; [2]Lawrence Livermore National Labratory; [3]Brigham Young University

8:50 AM
Electrochemical Sensor for Real-time O2- concentration Measurements of a Direct Oxide Reduction: *Forest Felling*[1]; Mario Gonzales[1]; Chao Zhang[2]; Devin Rappleye[3]; Michael Simpson[1]; [1]University of Utah; [2]Lawrence Livermore National Laboratory; [3]Brigham Young University

9:10 AM
Crystal Structure Evolution of UCl3 from Room Temperature to Melting: *Sven Vogel*[1]; A. David R. Andersson[1]; Marisa J. Monreal[1]; J. Matthew Jackson[1]; S. Scott Parker[1]; Gaoxue Wang[1]; Ping Yang[1]; Jianzhong Zhang[1]; [1]Los Alamos National Laboratory

9:30 AM
System for Chemical Analysis of Molten Salts: *Diego Zometa Panigua*[1]; [1]NEXT Lab

9:50 AM Break

10:10 AM
The Versatile Forced Convection Fluoride Loop (VeFoCoFLoo): *Stephen Raiman*[1]; Randi Mazza[1]; Aslak Stubsgaard[2]; Thomas Pedersen[2]; [1]Texas A&M University; [2]Copenhagen Atomics

10:30 AM
Thermophysical Property Measurements and Modeling of Molten Salts: *Ryan Gallagher*[1]; Can Agca[1]; Abbey McAlister[1]; Paul Rose[1]; Alex Martin[1]; Jake McMurray[1]; N. Dianne Bull Ezell[1]; Shane Henderson[1]; Robert Lefebvre[1]; [1]Oak Ridge National Laboratory

---

MATERIALS DESIGN

Materials Design and Processing Optimization for Advanced Manufacturing: From Fundamentals to Application — Materials Design and Processing Optimization: Session V

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

Program Organizers: Wei Xiong, University of Pittsburgh; Dana Frankel, QuesTek Innovations LLC; Gregory Olson, Massachusetts Institute of Technology

Wednesday AM | March 2, 2022
253B | Anaheim Convention Center

Session Chairs: Le Zhou, Marquette University; Hanlei Zhang, University of Pittsburgh

---

8:30 AM Invited
FeNiMnAl(Cr) and FeCoMnAl Multi-principal Component Alloys: *Ian Baker*[1]; [1]Dartmouth College

8:55 AM
An Experience in Development of Modified Invar Alloy: Building the Capacity of Overhead Power Transmission Lines: *Ashmita Patra*[1]; Narahari Satyanarayana[1]; Gayatri Yadav[1]; [1]Mishra Dhatu Nigam Ltd

9:15 AM
Predicting the Columnar-to-equiaxed Transition during Additive Manufacturing of Concentrated Multicomponent Alloys: *Christopher Hareland*[1]; Gildas Guillemot[2]; Oriane Senninger[2]; Charles-André Gandin[2]; Peter Voorhees[1]; [1]Northwestern University; [2]CEMEF - Centre de Mise en Forme des Matériaux

9:35 AM Invited
Characterization of the Microstructure and Deformation Substructure evolution in Additively Manufactured High-entropy Alloys via Correlative EBSD and ECCI: *Zhangwei Wang*[1]; Ji Gu[1]; Lin Guo[1]; Yong Liu[1]; Min Song[1]; [1]Central South University

---

MATERIALS PROCESSING

Materials Processing Fundamentals — Process Studies and Optimizations

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Samuel Wagstaff, Oculatus; Alexandra Anderson, Gopher Resource; Jonghyun Lee, Iowa State University; Adrian Sabau, Oak Ridge National Laboratory; Fiseha Tesfaye, Åbo Akademi University

Wednesday AM | March 2, 2022
213D | Anaheim Convention Center

Session Chair: To Be Announced

8:30 AM Introductory Comments

8:35 AM
Thermoelectric Magnetohydrodynamic Control of Melt Pool Dynamics and Microstructure Evolution in Direct Energy Deposition Additive Manufacturing: *Xianqiang Fan*[1]; Tristan Fleming[2]; David Rees[1]; Yuze Huang[1]; Yunhui Chen[1]; Sebastian Marussi[1]; Robert Atwood[3]; Andrew Kao[4]; Peter Lee[1]; [1]University College London; [2]Queen's University; [3]Diamond Light Source Ltd; [4]University of Greenwich

8:55 AM
Significance of Post-processing Subtransus Heat Treatment on the Microstructure and Mechanical Behavior of Additively Manufactured Ti-6Al-4V Alloy: *Abbas Mohammadi*[1]; Bonnie Whitney[1]; Akshatha Chandrashekar Dixith[1]; Anthony Spangenberger[1]; Cory Cunningham[2]; Jared Gross[2]; Austin Mann[3]; Diana Lados[1]; [1]Worcester Polytechnic Institute; [2]Boeing Additive Manufacturing; [3]Boeing Research & Technology

9:15 AM
Development of Activated Carbon from Coconut Shell as AN Absorbent in a Refrigeration Thermodynamic Cycle: *Ademola Agbeleye*[1]; Manasseh Oyekeye[1]; [1]University of Lagos

9:35 AM
Strategies for the Upgrade of a TBZC Product (Tetra Basic Zinc Chloride) by Selective Removal of the Impurity Chlorine: *Lukas Hoeber*[1]; Thomas Hofbauer[2]; Rana Ahmed[3]; Stefan Steinlechner[1]; [1]CDL for Selective Recovery of Minor Metals Using Innovative Process Concepts; [2]Andritz Metals; [3]Montanuniversität Leoben

9:55 AM Break

10:15 AM
Pulsed Electric Current Joining of Oxide-dispersion-strengthened Austenitic Steels: *Fei Wang*[1]; Xueliang Yan[1]; Xin Chen[1]; Nathan Snyder[1]; Michael Nastasi[2]; Khalid Hattar[3]; Bai Cui[1]; [1]University of Nebraska-Lincoln; [2]Texas A&M University; [3]Sandia National Laboratories

---

NUCLEAR MATERIALS

Materials Systems for the Future of Fusion Energy — Radiation Effects in High Heat Flux Materials II

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

Program Organizers: Jason Trelewicz, Stony Brook University; Kevin Field, University of Michigan; Takaaki Koyanagi, Oak Ridge National Laboratory; Yuanyuan Zhu, University of Connecticut; Dalong Zhang, Pacific Northwest National Laboratory

Wednesday AM | March 2, 2022
203A | Anaheim Convention Center

Session Chairs: Jaime Marian, University of California, Los Angeles; William Cunningham, Stony Brook University

---

8:30 AM
Deuterium Trapping and Release from Irradiation-induced Voids in Tungsten: Theory and Experimental Validation: *Mikhail Zibrov*[1]; Klaus Schmid[1]; [1]Max Planck Institute for Plasma Physics

8:50 AM
Strain and Thermal Gradient Effects on the Transport Properties of Intrinsic Defects and Impurities in Tungsten: *Enrique Martinez Saez*[1]; Bochuan Sun[1]; Dimitrios Maroudas[2]; Nithin Mathew[3]; Danny Perez[3]; Sophie Blondel[4]; Dwaipayan Dasgupta[4]; Brian Wirth[4]; [1]Clemson University; [2]University of Massachusetts; [3]Los Alamos National Laboratory; [4]University of Tennessee, Knoxville

9:10 AM
Reduced Interstitial Mobility in W Based Transition Metal Ternary Systems: *Younggak Shin*[1]; Byeongchan Lee[1]; Keonwook Kang[2]; [1]Kyung Hee University; [2]Yonsei University

---

NUCLEAR MATERIALS

Mechanical Behavior and Degradation of Advanced Nuclear Fuel and Structural Materials — Structural Materials Characterization & Modelling II

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

Program Organizers: Dong Liu, University of Bristol; Peng Xu, Idaho National Laboratory; Simon Middleburgh, Bangor University; Christian Deck, General Atomics; Erofili Kardoulaki, Los Alamos National Laboratory; Robert Ritchie, University of California, Berkeley

Wednesday AM | March 2, 2022
204A | Anaheim Convention Center

Session Chairs: Michael Rushton, Bangor University; Conor Oscar Galvin, LANL

8:30 AM Invited
Development of Direct and Indirect Ab Initio Radiation Damage Models: *Par Olsson*[1]; Ebrahim Mansouri[1]; Qigui Yang[1]; Elin Toijer[1]; Par Olsson[2]; [1]KTH Royal Institute of Technology; [2]Malmo University

9:00 AM
Effective Bias of Cavities in BCC Fe: As Revealed by Atomistic Calculations: *Yuhao Wang*[1]; Fei Gao[1]; Brian Wirth[2]; [1]University of Michigan - Ann Arbor; [2]University of

Tennessee, Knoxville

9:20 AM
Implementation of a Damage Degradation Function for Creep Predictions within a FFT-based Framework: *Nathan Beets*[1]; Paul Christodoulou[2]; M. Arul Kumar[1]; Ricardo Lebensohn[1]; Laurent Capolungo[1]; [1]Los Alamos National Laboratory; [2]University Of California Sanra Barbara

9:40 AM
On the Diffusion of Hydrogen Atoms towards Notch Tips in Zirconium Polycrystals: A CPFE Analysis: *Alireza Tondro*[1]; Hamidreza Abdolvand[1]; [1]University of Western Ontario

10:00 AM Break

10:20 AM
Atomistic Simulation Study of the Effect of Hydride Morphology on the Ductility of Polycrystalline Zirconium: *Hadi Ghaffarian*[1]; Ye-eun Na[1]; Dongchan Jang[1]; [1]Korea Advanced Institute of Science and Technology (KAIST)

10:40 AM Invited
Oxygen and Carbon Defects in Uranium and Plutonium Nitride: Navaratnarajah Kuganathan[1]; Conor Galvin[1]; *Robin Grimes*[1]; [1]Imperial College London

11:05 AM
Temperature Sensitive Dislocation Dynamics Modeling of Hardening and Embrittlement: *Aaron Kohnert*[1]; Laurent Capolungo[1]; [1]Los Alamos National Laboratory

11:25 AM
Radiation-Induced Segregation in Binary Alloy Systems Examined Via Phase Field Simulations: *Daniel Vizoso*[1]; Chaitanya Deo[1]; Remi Dingreville[2]; [1]Georgia Institute of Technology; [2]Sandia National Laboratories

---

NANOSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale VI — Small Scale and In Situ Testing

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

Program Organizers: Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, University of Texas at San Antonio; Changhong Cao, McGill University; Mohsen Asle Zaeem, Colorado School of Mines

Wednesday AM | March 2, 2022
262B | Anaheim Convention Center

Session Chairs: Mohsen Zaeem, Colorado School of Mines; Shraddha Vachhani, Iowa State University

---

8:30 AM Invited
In Situ Nanoscale Mechanical Testing to Isolate the Effect of Grain Boundary and Linear Complexions: *Timothy Rupert*[1]; [1]University of California, Irvine

9:00 AM
Understanding the Role of Surface Faceting in Metallic Nanoparticles via In Situ TEM Compression: *Soodabeh Azadehranjbar*[1]; Ruikang Ding[1]; Andrew Baker[1]; Ingrid Padilla Espinosa[2]; Ashlie Martini[2]; Tevis Jacobs[1]; [1]University of Pittsburgh; [2]University of California Merced

9:20 AM
Nanostructured Metallic Glasses from Colloidal Nanoparticles: *Melody Wang*[1]; Wendy Gu[1]; Mehrdad Kiani[1]; [1]Stanford University

9:40 AM
Direct Observation of Intermittent Dislocation Motions and Deformation Mechanisms in Nanocrystalline Molybdenum: *Haw-Wen Hsiao*[1]; Jia-Hong Huang[2]; Jian Min Zuo[1]; [1]University of Illinois; [2]National Tsing Hua University

10:00 AM Break

10:20 AM Invited
In Situ Nanomechanical Testing to Understand the Role of Grain Boundary Structure in Materials: *Nan Li*[1]; Saryu Fensin[1]; Abigail Hunter[1]; Darby Luscher[1]; [1]Los Alamos National Laboratory

---

CHARACTERIZATION

Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling — Session IV

Sponsored by: TMS Structural Materials Division, TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Shailendra Joshi, University of Houston; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Jagannathan Rajagopalan, Arizona State University; Robert Wheeler, Microtesting Solutions LLC

Wednesday AM | March 2, 2022
206B | Anaheim Convention Center

Session Chairs: David Rowenhorst, Naval Research Laboratory; Ashley Bucsek, University of Michigan

---

8:30 AM Invited
High Energy X-ray Diffraction – Seeing Data through a Model: *Matthew Miller*[1]; [1]Cornell University

9:00 AM Invited
In Situ 3D Characterization and Crystal Plasticity Modeling of Martensite Formation in Austenitic Steels
: Todd Hufnagel[1]; *Ye Tian*[1]; [1]Johns Hopkins University

9:30 AM
Modeling In-situ X-ray Diffraction of Dislocation Evolution during Selective Laser Melting of 316L Stainless Steels with Discrete Dislocation Dynamics and GPU-accelerated Raytracing: *Dylan Madisetti*[1]; Markus Sudmanns[1]; Christopher Stiles[2]; Jaafar El-Awady[1]; [1]Johns Hopkins University; [2]Johns Hopkins University Applied Physics Laboratory

9:50 AM Break

10:10 AM Invited
The Development of a Laboratory-scale High-energy Diffraction Microscopy Instrument: *Ashley Bucsek*[1]; Reza Roumina[1]; Anasuya Adibhatla[2]; Robert Drake[3]; [1]University of Michigan; [2]Excillum Inc.; [3]Proto Mfg.

10:40 AM Invited
Using High Energy X-rays to Investigate the Evolution of Plastic Strain and Damage in Additively Manufactured 316L Stainless Steel: *David Rowenhorst*[1]; Aeriel Leonard[2]; [1]Naval Research Laboratory; [2]Ohio State University

---

MATERIALS DESIGN

Metal-Matrix Composites: Advances in Processing, Characterization, Performance and Analysis — Techniques Related to Metal-based Composite Materials

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

Program Organizers: Srivatsan Tirumalai, The University of Akron; Pradeep Rohatgi, University of Wisconsin; Simona Hunyadi Murph, Savannah River National Laboratory

Wednesday AM | March 2, 2022
256B | Anaheim Convention Center

Session Chair: Tirumalai Srivatsan, The University of Akron

8:30 AM Invited
Effects of Oxide Ceramic Addition on Biocompatibility of Titanium: *Sushant Ciliveri*[1]; Indranath Mitra[1]; Susmita Bose[1]; Amit Bandyopadhyay[1]; [1]Washington State University

8:55 AM Invited
Micro-scale In-situ Mechanical Testing and Nano-CT Characterization of Directed Energy Deposited Hybrid Al/Al3Ni Composite Foam Materials: *Baolong Zheng*[1]; Xin Wang[1]; Dongxu Liu[1]; Lizhi Sun[1]; Enrique Lavernia[2]; Julie Schoenung[1]; [1]University of California, Irvine; [2]National Academy of Engineering

9:20 AM Invited
Modification of Bi2Te3 Nanowires-based Composites for Enhanced Flexible Thermoelectric Films: *Jaeyun Moon*[1]; Matthew Pusko[1]; [1]University of Nevada Las Vegas

9:40 AM Invited
Vapor-phase Infiltration Synthesis of Functional Organic-inorganic Hybrid Nanocomposites: *Chang-Yong Nam*[1]; [1]Brookhaven National Laboratory

10:00 AM Break

10:15 AM
Insights into Salt-flux Reaction Synthesis Using Synchrotron-based 3D Nanotomography: *Aaron Gladstein*[1]; Jonathan Goettsch[1]; Caleb Reese[1]; Ashwin Shahani[1]; Alan Taub[1]; [1]University of Michigan

---

SPECIAL TOPICS

Nix Award and Lecture Symposium: Recent Advances in Nanoindentation and Small-Scale Mechanical Testing — Nix Award II

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

Program Organizers: Wendelin Wright, Bucknell University; Gang Feng, Villanova University

Wednesday AM | March 2, 2022
259A | Anaheim Convention Center

Session Chairs: Wendelin Wright, Bucknell University; Gang Feng, Villanova University; Kevin Hemker, Johns Hopkins University

---

8:30 AM Invited
2021 William D Nix Award Lecture: Nanoindentation - The Next Generation: *George Pharr*[1]; [1]Texas A&M University

9:30 AM Invited
Correlating the Small Scale Mechanical Behavior and the Evolving 3D-microstructure by In Situ Laue Tomography: Jean-Baptiste Molin[1]; Patric Gruber[1]; Jean-Sebastien Micha[2]; *Christoph Kirchlechner*[1]; [1]Karlsruhe Institute of Technology; [2]ESRF

10:00 AM Break Coffee Break

10:30 AM Invited
Nanoindentation as a Reliable Tool for Measuring Surface Free Energy Over Five Orders of Magnitude: Edoardo Rossi[1]; P. Sudharshan Phani[2]; R. Guillemet[3]; Julie Cholet[3]; Doriane Jussey[3]; W.C. Oliver[4]; *Marco Sebastiani*[1]; [1]Roma Tre University; [2]International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI); [3]Thales Research & Technology; [4]KLA Corporation

11:00 AM Invited
Size Effects in the Plastic Deformation and Fracture of Strontium Titanate: *Karsten Durst*[1]; Javaid Farhan[2]; Xufei Fang[1]; [1]TU Darmstadt; [2]National University of Sciences and Technology, Islamabad

11:30 AM Invited
Nanoindentation in an Electrochemical Cell: Electro-chemo-mechanical Coupling: *Erica Lilleodden*[1]; [1]Helmholtz-Zentrum Geesthacht

---

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Non-Ferrous Alloys

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Ramasis Goswami, Naval Research Laboratory; Saurabh Puri, Microstructure Engineering; Eric Payton, Air Force Research Laboratory; Bij-Na Kim, Carpenter Additive; Megumi Kawasaki, Oregon State University; Eric Lass, University of Tennessee-Knoxville

Wednesday AM | March 2, 2022
255B | Anaheim Convention Center

Session Chair: Ramasis Goswami, Naval Research Laboratory

8:30 AM
Precipitation Behavior of Strengthening Phases in a High Temperature Aluminum-cerium Alloy: *Opemipo Adetan*[1]; Dinc Erdeniz[1]; [1]University of Cincinnati

8:50 AM
Time Resolved In-situ Small Angle X-ray Scattering Clarifies the Competition between Continuous and Discontinuous Precipitation in U-6wt%Nb: *Nathan Peterson*[1]; Erik Watkins[2]; Don Brown[2]; Bjorn Clausen[2]; Travis Carver[2]; Jun-Sang Park[3]; Sean Agnew[1]; [1]University of Virginia; [2]Los Alamos National Laboratory; [3]Argonne National Laboratory - Advanced Photon Source

9:10 AM
The Role of Non-hydrostatic Stress State in the a to Phase Transformation in Ti: *Khanh Dang*[1]; Laurent Capolungo[1]; Carlos Tome[1]; [1]Los Alamos National Laboratory

9:30 AM
Precipitation Behavior in a Laser-glazed Powder-processed Icosahedral-phase-strengthened Aluminum Alloy: *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

9:50 AM Break

10:10 AM
Shuffle Transformation in Titanium Alloys: Wenrui Zhao[1]; Dian Li[1]; *Yufeng Zheng*[1]; [1]University of Nevada-Reno

10:30 AM
The Effect of Grain Size on Quasi-static and Dynamic Strength: *Jenna Krynicki*[1]; Laszlo Kecskes[1]; Christopher DiMarco[1]; Jake Diamond[1]; Zhigang Xu[2]; K.T. Ramesh[1]; Timothy Weihs[1]; [1]Johns Hopkins University; [2]North Carolina A&T State University

10:50 AM
The Impact of Al on the SRO, LRO, and Clustering of Elements within a CoFeNi High Entropy Alloy: *Jaimie Tiley*[1]; Soumya Nag[1]; Ke An[1]; Joerg Neuefeind[1]; Jonathan Poplawsky[1]; Sriswaroop Dasari[2]; Rajarshi Banerjee[2]; [1]Oak Ridge National Laboratory; [2]University of North Texas

---

ADDITIVE TECHNOLOGIES

Powder Materials Processing and Fundamental Understanding — Sintering

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, Pacific Northwest National Laboratory

Wednesday AM | March 2, 2022
263C | Anaheim Convention Center

Session Chairs: Eugene Olevsky, San Diego State University; Hang Yu, Virginia Polytechnic Institute and State University

---

8:30 AM Invited
Gravitation Effects on Sintering: *Elisa Torresani*[1]; Randall German[1]; Eugene Olvesky[1]; [1]San Diego State University

9:00 AM
Gravity-affected Sintering of 3D-printed Powder Components: *Eugene Olevsky*[1]; Elisa Torresani[1]; Randall German[1]; [1]San Diego State University

9:20 AM
Powder Metallurgy Fabrication of ZrH_x Moderator and U-ZrH_x Moderated Nuclear Fuel: *Caitlin Taylor*[1]; Erik Luther[1]; Adrian Wagner[2]; Thomas Nizolek[1]; Aditya Shivprasad[1]; Tarik Saleh[1]; [1]Los Alamos National Laboratory; [2]Idaho National Laboratory

9:40 AM Invited
Sintering Based Production of Complex Shapes by the Coupling of Additive Manufacturing and Spark Plasma Sintering: *Charles Maniere*[1]; Geuntak Lee[2]; Elisa Torresani[3]; Sylvain Marinel[1]; Lise Durand[4]; Claude Estournès[5]; Eugene A. Olevsky[3]; [1]Normandie University, ENSICAEN, UNICAEN, CNRS, CRISMAT, 14000, Caen, France; [2]Powder Technology Laboratory, San Diego State University, San Diego, USA ; [3]Powder Technology Laboratory, San Diego State University, San Diego, USA; [4]CEMES, CNRS UMR 8011, Université de Toulouse, 29 rue Jeanne Marvig, 31055 Toulouse, France; [5]CIRIMAT, CNRS-INP-UPS, Université Toulouse 3 – Paul Sabatier 118 route de Narbonne, F-31062 Toulouse cedex 9, France

10:10 AM Break

10:30 AM
Stable Temperature Regulation in Spark Plasma Sintering Simulations: *Runjian Jiang*[1]; Elisa Torresani[1]; Eugene Olevsky[1]; [1]San Diego State University

10:50 AM
Transparent Al2O3 Fabricated by Energy Efficient Spark Plasma Sintering: *CheolWoo Park*[1]; Elisa Torresani[1]; Eugene A Olevesky[1]; Chris Haines[2]; [1]San Diego State University/College of Engineering; [2]US Army DEVCOM

11:10 AM
Sintering Anisotropy of Binder Jetting 316L: *Alberto Cabo Rios*[1]; Eduard Hryha[2]; Eugene Olevsky[1]; Peter Harlin[3]; [1]SDSU; [2]Chalmers University of Technology; [3]Sandvik Additive Manufacturing

11:30 AM
Surface Modification of Micro Powders Using Plasma-based Reactors for Sintering of Copper-Chromium Alloys: *Santiago Vargas*[1]; Diana Galeano[1]; Carlos Castano[1]; [1]Virginia Commonwealth University

---

LIGHT METALS

Primary Aluminum Industry - Energy and Emission Reductions: An LMD Symposium in Honor of Halvor Kvande — Energy and Emission Reductions I: An LMD Symposium in Honor of Halvor

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

Program Organizer: Arne Ratvik, SINTEF

Wednesday AM | March 2, 2022
208A | Anaheim Convention Center

Session Chairs: Guðrún Sævarsdóttir, University of Iceland; Arne Ratvik, SINTEF Industry

---

8:30 AM Introductory Comments

8:35 AM
Vaporization of Fluorides from Aluminium Cells. Part I: Theoretical Study on Replacement of Aluminium Fluoride and Soda: Asbjorn Solheim[1]; *Samuel Senanu*[1]; [1]SINTEF Industry

9:00 AM
Vaporization of Fluorides from Aluminium Cells. Part II: Treatment of Spent Potlining in a Laboratory Furnace: *Camilla Sommerseth*[1]; Samuel Senanu[1]; Henrik Gudbrandsen[1]; Stein Rørvik[1]; Per Eidem[2]; Asbjørn Solheim[1]; Morten Isaksen[3]; Ellen Myrvold[4]; [1]SINTEF Industry; [2]SINTEF Helgeland; [3]Hydro Aluminium AS; [4]Alcoa Mosjøen

9:25 AM
Scale Formation in Primary Aluminium Production: *Morten Isaksen*[1]; Nancy Holt[1]; [1]Hydro Aluminium AS

9:50 AM Break

10:05 AM
Sampling and Analysis Methodology Review to Report Total PFC Emissions: *Luis Espinoza-Nava*[1]; Julie Young[1]; [1]Alcoa Technical Center

10:30 AM
Reflections on the Low Voltage Anode Effect in Aluminium Electrolysis Cells: *Asbjorn Solheim*[1]; [1]SINTEF Industry

10:55 AM
Environmental Enhancement of Potroom Processes by Using a Machine Vision System: Alexey Zherdev[1]; Alexey Svoevskiy[1]; Vitaliy Pingin[1]; *Yuriy Shtefanyuk*[1]; Valentin Shakhmatov[1]; [1]UC RUSAL

MATERIALS DESIGN

Recent Investigations and Developments of Titanium-containing High Entropy Alloys — Session I

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

Program Organizers: Masahiko Ikeda, Kansai University; Masato Ueda, Kansai University; Carl Boehlert, Michigan State University; Peter Liaw, University of Tennessee

Wednesday AM | March 2, 2022
251C | Anaheim Convention Center

Session Chairs: Masato Ueda, Kansai University; Peter Liaw, University of Tennessee; Masahiko Ikeda, Kansai University; Carl Boehlert, Michigan State University

---

8:30 AM Invited
BiocompatibleTitaniumContainingMediumandHighEntropyAlloys:Konstantinos Georgarakis[1]; Kimon Konakoglou[1]; *Martin Stiehler*[1]; Mark Jolly[1]; [1]Cranfield University

8:50 AM
In-situ Laser-deposited Ti-based High Entropy Alloys for Aerospace Applications: *Modupeola Dada*[1]; Patricia Popoola[1]; Samson Adeosun[2]; Ntombi Mathe[2]; Sisa Pityana[2]; Thembisile Dlamini[2]; Raji Sadiq[3]; [1]Tshwane University of Technology; [2]Council for Scientific and Industrial Research; [3]Yaba College of Technology, Lagos Nigeria

9:10 AM Invited
Gas Tungsten Arc Welding of Cr29.7Co29.7Ni35.4Al4Ti1.2 (at.%) High Entropy Alloy: *Joao Oliveira*[1]; Francisco Coury[2]; [1]FCT-UNL; [2]UFSCAR

9:30 AM Invited
Evolution of Microstructure and Deformation Substructure in Al1 Mo0.5 Nb1Ta0.5Ti1Zr1, a Refractory HEA Alloy with Disordered BCC Precipitates Embedded in a Continuous Ordered B2 Matrix: *Gopal Viswanathan*[1]; Jean-Philippe Couzinie[2]; Zachary Kloenne[1]; Brian Welk[1]; Oleg Senkov[3]; Hamish Fraser[1]; [1]The Ohio State University; [2]The Ohio State University; Université Paris Est ICMPE; [3]UES Inc.

ENERGY & ENVIRONMENT

REWAS 2022: Automation and Digitalization for Advanced Manufacturing — Use of Artificial Intelligence for Improved Process Control & Optimization

Sponsored by: TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee, TMS: Process Technology and Modeling Committee

Program Organizers: Elsa Olivetti, Massachusetts Institute of Technology; Alexandra Anderson, Gopher Resource; Mertol Gökelma, Izmir Institute of Technology; Camille Fleuriault, Eramet Norway

Wednesday AM | March 2, 2022
212A | Anaheim Convention Center

Session Chairs: Alexandra Anderson, Gopher Resourece; Luca Montanelli, Massachusetts Institute of Technology

---

8:30 AM Introductory Comments

8:35 AM Keynote
Digitalizing the Circular Economy (CE): From Reactor Simulation to System Models of the CE: *Markus Reuter*[1]; Neill Bartie[1]; [1]SMS Group

9:15 AM
AI/Data Mining in Materials Manufacturing: *Elsa Olivetti*[1]; [1]Massachusetts Institute of Technology

9:35 AM
Factors to Consider when Designing Aluminium Alloys for Increased Scrap Usage: *Luca Montanelli*[1]; [1]Massachusetts Institute of Technology

9:55 AM Break

10:15 AM Invited
An Automated Recycling Process of End-of-life Lithium-ion Batteries Enhanced by Online Sensing and Machine Learning Techniques: Liurui Li[1]; Maede Maftouni[1]; Zhenyu Kong[1]; *Zheng Li*[1]; [1]Virginia Polytechnic Institute and State University

10:45 AM
Steel Production Efficiency Improvements by Digitalization: *Markus Schulte*[1]; Bill Emling[1]; [1]SMS Group

11:05 AM
Development of Virtual Die Casting Simulator for Workforce Development: John Moreland[1]; Kyle Toth[1]; John Estrada[1]; Junyi Chen[1]; Na Zhu[1]; *Chenn Zhou*[1]; [1]Purdue University Northwest

---

CHARACTERIZATION

Seeing is Believing -- Understanding Environmental Degradation and Mechanical Response Using Advanced Characterization Techniques: An SMD Symposium in Honor of Ian M. Robertson — Environmental Degradation II: Stress Corrosion Cracking,Ccorrosion, and Liquid Metal Embrittlement

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Nuclear Materials Committee

Program Organizers: Kaila Bertsch, Lawrence Livermore National Laboratory; Khalid Hattar, Sandia National Laboratories; Josh Kacher, Georgia Institute of Technology; Bai Cui, University of Nebraska-Lincoln; Benjamin Eftink, Los Alamos National Laboratory; Stephen House, University of Pittsburgh; May Martin, National Institute of Standards and Technology; Kelly Nygren, Cornell High Energy Synchrotron Source; Blythe Clark, Sandia National Laboratories; Shuai Wang, Southern University of Science and Technology

Wednesday AM | March 2, 2022
207C | Anaheim Convention Center

Session Chairs: Kaila Bertsch, Lawrence Livermore National Laboratory; Bai Cui, University of Nebraska- Lincoln; Kelly Nygren, Cornell University/CHESS; May Martin, National Institute of Standards and Technology; Shuai Wang, Southern University of Science and Technology

---

8:30 AM Invited
Liquid Metal Embrittlement: Mechanisms at Small Scales: *Thierry Auger*[1]; [1]CNRS

9:00 AM Invited
On the Path to Understanding Stress Corrosion Crack Initiation of Austenitic Alloys in High Temperature Water: *Gary Was*[1]; Drew Johnson[2]; Wejun Kuang[3]; Diana Farkas[4]; Ian Robertson[5]; [1]University of Michigan; [2]Idaho National Laboratory; [3]Xi'an Jiaotong University; [4]Virginia Tech; [5]University of Wisconsin

9:30 AM Invited
Understanding Basic Properties and Degradation Mechanisms of Materials Using Ion Beams: *Steven Zinkle*[1]; Ling Wang[2]; Yan-Ru Lin[1]; [1]University of Tennessee; [2]Oak Ridge National Laboratory

10:00 AM Break

10:15 AM Invited
Special Effects Testing and Advanced Characterization for the Development of a Multi-scale Model of Corrosion Fatigue Crack Growth that Incorporates Environmental Effects: *Bryan Miller*[1]; [1]Naval Nuclear Laboratory

10:45 AM Invited
Validated Theory-guided Design of Refractory Multi-principal-element Alloys with Oxidation-resistant Coatings: *Duane Johnson*[1]; Prashant Singh[1]; Andrey Smirnov[1]; Gaoyuan Ouyang[1]; Jun Cui[1]; RanRan Su[2]; John Perepezko[2]; Matt Kramer[1]; [1]Iowa State University Ames Laboratory; [2]University of Wisconsin

---

NANOSTRUCTURED MATERIALS

Self-organizing Nano-architectured Materials — Applications and Functional Properties

Program Organizers: Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Ian McCue, Northwestern University; Erica Lilleodden, Helmholtz-Zentrum hereon; Pierre-Antoine Geslin, CNRS / INSA-Lyon; Qing Chen, Hong Kong University of Science & Technology

Wednesday AM | March 2, 2022
260C | Anaheim Convention Center

Session Chairs: Erkin Seker, University of California, Davis; Ian McCue, Northwestern University

---

10:00 AM
Coarsening Mechanisms in Surface-doped Nanoporous Metals: Jesse Ko[1]; *Ian McCue*[2]; Zhiyong Xia[1]; [1]Johns Hopkins University Applied Physics Laboratory; [2]Northwestern University

10:20 AM Invited
High Energy and Power Density Batteries Enabled by Electrodeposition and Self-assembly: *Paul Braun*[1]; [1]University of Illinois

10:50 AM Invited
Nanoporous Gold: From an Ancient Material to Biomedical Devices: *Erkin Seker*[1]; [1]University of California, Davis

11:20 AM
Elasto-plastic NiTi Nanofoams for Potential Elastocaloric Cooling Applications Using Molecular Dynamics: *Arne Klomp*[1]; Karsten Albe[1]; [1]TU Darmstadt

---

NUCLEAR MATERIALS

Synergistic Irradiation, Corrosion, and Microstructural Evolution in Nuclear Materials — Irradiation-Corrosion of Materials in Molten Salts and Liquid Metal

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

Program Organizers: Djamel Kaoumi, North Carolina State University; Michael Short, Massachusetts Institute of Technology; Peter Hosemann, University of California, Berkeley; Stephen Raiman, Texas A&M University; Raluca Scarlat, University of California, Berkeley; Aaron Kohnert, Los Alamos National Laboratory; Ryan Schoell, North Carolina State University; Philip Edmondson, Oak Ridge National Laboratory; Celine Cabet, Commissariat a l'Energie Atomique

Wednesday AM | March 2, 2022
202A | Anaheim Convention Center

Session Chair: To Be Announced

8:30 AM
On the Use of Corrosion Electrochemistry in Understanding Materials Corrosion in Molten FLiNaK Salts: *Ho Lun Chan*[1]; Elena Romanovskaia[1]; Raluca Scarlat[2]; Peter Hosemann[2]; John Scully[1]; [1]University of Virginia; [2]University of California Berkeley

8:50 AM
Effect of Ion Irradiated Microstructure on Molten Salt Corrosion of Hastelloy N: *Hazel Gardner*[1]; Ryan Schoell[2]; Jie Qiu[3]; Fedi Fehri[2]; Michael Moody[1]; Peter Hosemann[3]; Djamel Kaoumi[2]; David Armstrong[1]; [1]University of Oxford; [2]North Carolina State University; [3]University of California, Berkeley

9:10 AM
Characterizing Commercial Alloys Undergoing Simultaneous Molten Salt Corrosion and Proton Irradiation: *Nouf Almousa*[1]; Weiyue Zhou[1]; Kevin Woller[1]; Micheal Short[1]; [1]Massachusetts Institute of Technology

9:30 AM
One-dimensional Wormhole Morphology Induced by Molten Salt Corrosion in Ni-Cr Alloy: *Yang Yang*[1]; Weiyue Zhou[2]; Sheng Yin[3]; Sarah Wang[4]; Qin Yu[3]; Matthew Olszta[5]; Daniel Schreiber[5]; Jim Ciston[3]; John Scully[6]; Robert Ritchie[3]; Mark Asta[3]; Ju Li[2]; Michael Short[2]; Andrew Minor[3]; [1]The Pennsylvania State University; [2]Massachusetts Institute of Technology; [3]Lawrence Berkeley National Laboratory; [4]University of California, Berkeley; [5]Pacific Northwest National Laboratory; [6]University of Virginia

9:50 AM Break

10:10 AM Invited
In-situ Measurement and Analysis of Structural Alloy Corrosion in Liquid Metals: *Peter Hosemann*[1]; Jie Qiu[1]; Franziska Schmied[1]; John Scully[2]; Yongqiang Wang[3]; Blas Uberuaga[3]; Djamel Kaoumi[4]; Farida Selim[5]; Rasheed Auguste[1]; Junsoo Han[2]; [1]University of California, Berkeley; [2]University of Virginia; [3]Los Alamos National Laboratory; [4]University of North Carolina; [5]Bowling Green University

10:40 AM
Investigating Radiation-altered Corrosion in Liquid Lead: Michael Short[1]; *Weiyue Zhou*[1]; Nouf AlMousa[1]; Kevin Woller[1]; Djamel Kaoumi[2]; Ryan Schoell[2]; Felix Hofmann[3]; Mark Lapington[3]; Minyi Zhang[3]; Michael Moody[3]; Angus Wilkinson[3]; [1]Massachusetts Institute of Technology; [2]North Carolina State University; [3]Oxford University

11:00 AM
In situ Monitoring of Corrosion Progression under Irradiation in the Irradiation-Corrosion Experiment (ICE): *Franziska Schmidt*[1]; Matthew Chancey[2]; Yongqiang Wang[2]; Peter Hosemann[1]; [1]University of California-Berkeley; [2]Los Alamos National Laboratory

---

NANOSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XII) — Processing & Microstructure

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Penghui Cao, University of California, Irvine; Xiaoxu Huang, Chongqing University; Enrique Lavernia, University of California, Irvine; Xiaozhou Liao, University of Sydney; Lee Semiatin, Material Resources LLC; Nobuhiro Tsuji, Kyoto University; Caizhi Zhou, University of South Carolina; Yuntian Zhu, City University of Hong Kong

Wednesday AM | March 2, 2022
262A | Anaheim Convention Center

Session Chairs: David Field, Washington State University; Suveen Mathaudhu, Colorado School of Mines; Nobuhiro Tsuji, Kyoto University

---

8:30 AM
Influence of High-pressure Torsion-induced Strain on Electrical Conductivity and Wear Resistance: Evander Ramos[1]; Takahiro Masuda[2]; Zenji Horita[2]; *Suveen Mathaudhu*[1]; [1]University of California-Riverside; [2]Kyushu University

9:00 AM
Designed Heterostructures in AZ31 Using Linear Corrugated Straightening: Mueed Jamal[1]; Gunnar Blaschke[1]; *David Field*[1]; [1]Washington State University

9:20 AM Invited
Superplastic Response of Accumulatively Roll-bonded Aluminum Sheets: *Kester Clarke*[1]; Amy Clarke[1]; Brady McBride[1]; [1]Colorado School of Mines

9:50 AM
Breaking the Strength-toughness Barrier through Impact-induced Recrystallization of Single-crystal Silver Microcubes: *Claire Griesbach*[1]; Jizhe Cai[1]; Ramathasan Thevamaran[1]; [1]University of Wisconsin Madison

---

MATERIALS PROCESSING

12th International Symposium on High Temperature Metallurgical Processing — Preparation of Alloys and Materials/Process Optimization

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

Program Organizers: Zhiwei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jesse White, Elkem Carbon Solutions; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, Jiangxi University of Science and Technology; Onuralp Yücel, Istanbul Technical University; Ender Keskinkilic, Atilim University; Tao Jiang, Central South University; Morsi Mahmoud, King Fahd University of Petroleum & Minerals

Wednesday PM | March 2, 2022
213A | Anaheim Convention Center

Session Chairs: Onuralp Yücel, Istanbul Technical University; Ender Keskinkilic, Atilim University

---

2:00 PM Introductory Comments

2:05 PM
Evaluation of Aluminum White Dross: Ilayda Öner[1]; Buse Polat[1]; Selçuk Kan[1]; *Kagan Benzesik*[1]; Onuralp Yücel[1]; [1]Istanbul Technical University

2:25 PM
Investigation of Microstructure and Mechanical Properties of Ferritic Stainless Steels Joined by Laser Welding: Gunseli Guc[1]; *Onuralp Yücel*[2]; [1]Istanbul Technical University/Arçelik; [2]Istanbul Technical University

2:45 PM
Pelletizing of Iron Ore with High Iron Grade and Low Silicon Content: *Yan Zhang*[1]; [1]Shougang Group

3:05 PM
Optimization of Allihn Condensers for Distillation of Ethanol: *Sarah Gandu*[1]; Clement Gonah[1]; Adele Garkida[1]; [1]Ahmadu Bello University

---

NANOSTRUCTURED MATERIALS

30 Years of Nanoindentation with the Oliver-Pharr Method and Beyond — Novel Methods

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

Program Organizers: Verena Maier-Kiener, Montanuniversitaet Leoben; Benoit Merle, University Erlangen-Nuremberg (Fau); Erik Herbert, Michigan Technological University; Samantha Lawrence, Los Alamos National Laboratory; Nigel Jennett, Coventry University

Wednesday PM | March 2, 2022
259B | Anaheim Convention Center

Session Chairs: Daniel Gianola, University of California, Santa Barbara; Benoit Merle, University Erlangen-Nuremberg (Fau)

2:00 PM Invited
Optimization of Segregation-engineered Nanocrystalline Al Alloys Using Nanomechanical Testing: *Daniel Gianola*[1]; [1]University of California-Santa Barbara

2:25 PM
Using Machine Learning Approaches to Enable Insights in Nanoindentation Tip Wear: *Claus Trost*[1]; Stanislav Zak[1]; Sebastian Schaffer[2]; Megan Cordill[1]; [1]Erich Schmid Institute of Materials Science; [2]Wolfgang Pauli Institute, Faculty of Mathematics and University of Vienna Research Platform MMM Mathematics - Magnetism - Materials

2:45 PM
Correlation between Electrical Contact Resistance, Deviation from Elastic Unloading and Phase Transformation in Silicon: Ben Beake[1]; *Tim Jochum*[1]; [1]Micro Materials Ltd.

3:05 PM
A Novel Nanoindentation Protocol to Characterize Surface Free Energy of Superhydrophobic Nanopatterned Materials: *Edoardo Rossi*[1]; Pardhasaradhi Sudharshan Phani[2]; Warren Oliver[3]; Marco Sebastiani[1]; [1]Università degli Studi Roma Tre; [2]International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI); [3]KLA Corporation

3:25 PM Break

3:40 PM
A Multi-modal Mapping Approach to Enable Correlative Compositional, Crystallographic and Mechanical Property Analysis: *Hazel Gardner*[1]; Christopher Magazzeni[1]; Phillip Gopon[2]; Katharine Fox[3]; Michael Moody[1]; Paul Bagot[1]; David Armstrong[1]; [1]University of Oxford; [2]University of Leoben; [3]Rolls-Royce plc

4:00 PM
Your Default Load Function May be Working Against You and What To Do About It: *Michael Maughan*[1]; Evan Allen[1]; Marzyeh Moradi[2]; [1]University of Idaho; [2]KLA Corporation

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Innovative Powder Processing of Functional and Magnetic Materials — Shape Memory Alloys

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

Program Organizers: Emily Rinko, Iowa State University; Iver Anderson, Iowa State University Ames Laboratory; Markus Chmielus, University of Pittsburgh; Emma White, DECHEMA Forschungsinstitut; Deliang Zhang, Northeastern University; Andrew Kustas, Sandia National Laboratories; Kyle Johnson, Sandia National Laboratories

Wednesday PM | March 2, 2022
262C | Anaheim Convention Center

Session Chair: Markus Chmielus, University of Pittsburgh

4:00 PM Introductory Comments

4:05 PM
Microstructure of Additively Manufactured Magnetic Shape Memory Alloys: Jakub Toman[1]; Tyler Paplham[1]; Pierangeli Rodriguez de Vecchis[1]; Aaron Acierno[1]; Amir Mostafaei[2]; Erica Stevens[1]; *Markus Chmielus*[1]; [1]University of Pittsburgh; [2]Illinois Institute of Technology

4:25 PM
Controlled Shape-morphing Metallic Components for Deployable Structures: *Gianna Valentino*[1]; Ian McCue[2]; Steven Storck[1]; Morgana Trexler[1]; [1]Johns Hopkins University Applied Physics Lab; [2]Northwestern University

4:45 PM
Selective Laser Melting of NiTi: Experiments and Modeling to Correlate Hatch Spacing, Texture, Residual Stress, and Superelastic Response: *Peter Anderson*[1]; Natalie Zeleznik[1]; Alejandro Hinojos[1]; Mohammadreza Nematollahi[2]; Narges Shayesteh[3]; Soheil Saedi[4]; Mohammad Elahinia[2]; Haluk Karaca[5]; James Cawley[5]; Michael Mills[1]; [1]Ohio State University; [2]University of Toledo; [3]University of Texas at Arlington; [4]University of Arkansas at Little Rock; [5]University of Kentucky

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture: Developing Predictive Capabilities — Joint Session with Fatigue in Materials Symposium - Microstructure-based Fatigue Studies on Additive-Manufactured Materials

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

Program Organizers: Nik Hrabe, National Institute of Standards and Technology; 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 2, 2022
258B | Anaheim Convention Center

Session Chairs: Orion Kafka, National Institute of Standards and Technology (NIST); Nik Hrabe, National Institute of Standards and Technology (NIST)

2:00 PM Invited
Designing Printable Alloys for Fatigue Strength: Gregory Olson[1]; *Jiadong Gong*; Gary Whelan; [1]Massachusetts Institute of Technology

2:30 PM
Micromechanical Modeling of Porosity Defects in Additively Manufactured Alloys: *Krzysztof Stopka*[1]; Michael Sangid[1]; [1]Purdue University

2:50 PM
Fatigue Crack Initiation Behavior of Laser Beam Powder Bed Fused IN718: Mohammad Dodaran[1]; Muztahid Muhammad[1]; *Shuai Shao*[1]; Nima Shamsaei[1]; [1]Auburn University

3:10 PM
Experiments to Enable Expert-informed Machine Learning of Fatigue Performance of DMLM Ti-6Al-4V: *Samuel Present*[1]; Laura Dial[2]; Thomas Straub[3]; Chris Eberl[3]; Kevin Hemker[1]; [1]Johns Hopkins University; [2]General Electric Research Laboratory; [3]Fraunhofer Institute for Mechanics of Materials IWM

3:30 PM Break

3:50 PM Invited
Microstructure-based Fatigue Studies on Additive-manufactured Materials: *Jiadong Gong*[1]; Gary Whelan[1]; Abhinav Saboo[1]; Greg Olson[1]; [1]Questek Innovations LLC

4:20 PM
Comparison of Statistical Predictors of Additive Manufacturing Process-induced Defects Using Fractography and Metallography: *David Scannapieco*[1]; Austin Ngo[1]; Collin Sharpe[1]; Mahya Shahabi[2]; Sneha Narra[3]; John Lewandowski[1]; [1]Case Western Reserve University; [2]Worcester Polytechnic Institute; [3]Carnegie Mellon University

4:40 PM
A Method to Predict Critical Pore/Defect Size in Laser Powder Bed Fusion Additively Manufactured Ti-6Al-4V Parts: Mahya Shahabi[1]; Austin Ngo[2]; *David Scannapieco*[2]; John Lewandowski[2]; Sneha Prabha Narra[3]; [1]Worcester Polytechnic Institute; [2]Case Western Reserve University; [3]Carnegie Mellon University

5:00 PM
Fatigue Modeling Approaches for Additively Manufactured Ti-6Al-4V: *Sushant Jha*[1]; Matthew Krug[2]; Luke Sheridan[2]; Patrick Golden[2]; Mark Benedict[2]; Nathan Bryant[1]; Jessica Orr[1]; [1]University of Dayton Research Institute; [2]US Air Force Research Laboratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Large-scale Metallic Components — Titanium and Nickel-based Alloys/Modeling

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

Program Organizers: Sneha Prabha Narra, Carnegie Mellon University; Sougata Roy, University of North Dakota; Andrzej Nycz, Oak Ridge National Laboratory; Yousub Lee, Oak Ridge National Laboratory; Chantal Sudbrack, National Energy Technology Laboratory; Albert To, University of Pittsburgh

Wednesday PM | March 2, 2022
263A | Anaheim Convention Center

Session Chairs: Badri Narayanan, Lincoln Electric Company; Jonathan Pegues, Sandia National Laboratories; Jonah Klemm-Toole, Colorado School of Mines

---

2:00 PM Invited
Heat Treatment Effects on Mechanical Properties of Wire Arc Additive Manufactured and Electron Beam Additive Manufactured Ti-6Al-4V: *Jonathan Pegues*[1]; Shaun Whetten[1]; Andrew Kustas[1]; William Dannemann[1]; [1]Sandia National Laboratories

2:40 PM
Process-structure-property Study on CP-Ti (Grade 2) Produced via High Deposition AM Laser-hot Wire: *Hannah Sims*[1]; John Lewandowski[1]; [1]Case Western Reserve University

3:00 PM
Prior-β Grain Structure Control of Ti-6Al-4V WAAM in the As-deposited Condition: *James Wainwright*[1]; Stewart Williams[1]; Jialuo Ding[1]; Alec Davis[2]; [1]Cranfield University; [2]University of Manchester

3:20 PM Break

3:40 PM
Formation of Multiple Necks in Wire-based Electron Beam Additively Manufactured Ti-6Al-4V Pulled in Uniaxial Tension: *Daniel Lewis*[1]; Michael Hurst[2]; James Paramore[2]; Brady Butler[2]; [1]Texas A&M University; [2]Army Research Lab

4:00 PM
The Effects of $CoAl_2O_4$ on the Microstructural Evolution of Inconel 718 Processed by Direct Energy Deposition: *Dhruv Tiparti*[1]; Tilo Buergel[2]; Fred Carter[2]; Sammy Tin[3]; [1]Illinois Institute of Technology; [2]DMG Mori Advanced Solutions; [3]University of Arizona

4:20 PM
Design for Metal Large-scale Additive Manufacturing: Mitigation of Bending Deformation on Curved Sheet: *Yousub Lee*[1]; Andrzej Nycz[1]; Srdjan Simunovic[1]; Luke Meyer[1]; Derek Vaughan[1]; William Carter[1]; [1]Oak Ridge National Laboratory

4:40 PM
Process Optimization in Metal Additive Manufacturing Using Image Processing and Statistical Analysis: *Faiyaz Ahsan*[1]; Jafar Razmi[1]; Leila Ladani[1]; [1]Arizona State University

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Advanced Characterization with Synchrotron,

Neutron, and In Situ Laboratory-scale Techniques II — Advanced Microstructural Characterization of AM Alloys

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

Program Organizers: Fan Zhang, National Institute of Standards and Technology; Donald Brown, Los Alamos National Laboratory; Andrew Chuang, Argonne National Laboratory; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Tao Sun, University of Virginia

Wednesday PM | March 2, 2022
258A | Anaheim Convention Center

Session Chair: Fan Zhang, National Institute of Standards and Technology

---

2:00 PM Invited
In-operando X-ray Scattering Diagnostics to Observe Morphological Transformations during Additive Manufacturing: *Joshua Hammons*[1]; Aiden Martin[1]; Aurelien Perron[1]; Nicholas Calta[1]; Hunter Henderson[1]; Michael Nielsen[1]; Trevor Willey[1]; Manyalibo Matthews[1]; Scott McCall[1]; Jonathan R.I. Lee[1]; [1]Lawrence Livermore National Laboratory

2:30 PM
In-situ Heat Treatment of Additively Manufactured Ti-6Al-4V: *Donald Brown*[1]; Maria Strantza[2]; Gennadi Rafailov[3]; Eloisa Zepeda-Alarcon[4]; Darren Pagan[5]; [1]Los Alamos National Laboratory; [2]Lawrence Livermore National Laboratory; [3]Ben Gurion University; [4]Nevada Nuclear Security Site; [5]Penn State University

2:50 PM
Precipitate Evolution in DED 316L Stainless Steel Due to Solid State Thermal Cycling: A 3D synchrotron X-ray Nanotomography Study: *Steve Gaudez*[1]; Meriem Ben Haj Slama[1]; Juan Guillermo Santos Macias[1]; Eva Héripré[2]; Mario Scheel[3]; Manas V. Upadhyay[1]; [1]CNRS UMR7649 Ecole Polytechnique; [2]CNRS UMR8579 Centrale Supélec; [3]Synchrotron SOLEIL, ANATOMIX

3:10 PM
In Situ Synchrotron Analysis of Aging in Commercial High Strength 7000 Series Additive Aluminum Alloys: *John Martin*[1]; Darby LaPlant[1]; Fan Zhang[2]; David Beaudry[3]; Patrick Callahan[4]; [1]HRL Laboratories LLC; [2]NIST; [3]John's Hopkins University; [4]NRL

3:30 PM
Effect of Heat Treatments on Fabricated Wire and Arc Additive Manufacturing Parts of Stainless Steel 316: Microstructure and Synchrotron X-ray Diffraction Analysis: *Joao Oliveira*[1]; [1]FCT-UNL

3:50 PM Break

4:05 PM
In-situ Characterization of Residual Strain Relaxation of Additively Manufactured Inconel 625 through Energy-resolved Neutron Imaging: *Anton Tremsin*[1]; Yan Gao[2]; Ade Makinde[2]; Hassina Bilheux[3]; Jean Bilheux[3]; Ke An[3]; Takenao Shinohara[4]; Kenichi Oikawa[4]; [1]University of California at Berkeley; [2]General Electric Global Research Center; [3]ORNL; [4]Japan Atomic Energy Agency

4:25 PM
High-throughput Surface Characterization to Identify Processing Defect Boundaries in Additively Manufactured Materials: *Ankur Kumar Agrawal*[1]; Dan Thoma[1]; [1]University of Wisconsin-Madison

4:45 PM
Multimodal Characterization of L-PBF 316L Stainless Steel: David Sprouster[1]; M Ouyang[1]; W Cunningham[1]; G Halada[1]; D Olds[2]; A Pattammattel[2]; H Yan[2]; Y Chu[2]; E. Dooryhee[2]; S. Storck[3]; *J Trelewicz*[1]; [1]Stony Brook University; [2]Brookhaven National Laboratory; [3]Johns Hopkins University

5:05 PM
In-situ TEM Heating-cooling Experiments to Study Precipitate Evolution in DED 316L Steel: Meriem Ben Haj Slama[1]; Eva Héripré[2]; Lluís Yedra[3]; *Manas Upadhyay*[4]; [1]LMS, CNRS, Ecole Polytechnique, Institut Polytechnique de Paris & MSSMat, CNRS, CentraleSupelec, Universite Paris-Saclay; [2]MSSMat, CNRS, CentraleSupélec, Université Paris-Saclay; [3]IN2UB, Department of Electronics and Biomedical Engineering, University of Barcelona & MSSMat SPMS, CNRS, CentraleSupélec, Université Paris-Saclay; [4]LMS, CNRS, Ecole Polytechnique, Institut Polytechnique de Paris

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Beyond the Beam III — Beyond the Beam - Student Session

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

Program Organizers: Brady Butler, US Army Research Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory; James Paramore, US Army Research Laboratory; Nihan Tuncer, Desktop Metal; Markus Chmielus, University of Pittsburgh; Paul Prichard, Kennametal Inc.

Wednesday PM | March 2, 2022
263B | Anaheim Convention Center

Session Chair: Paul Prichard, Kennametal Inc.

2:00 PM Introductory Comments

2:05 PM
Investigating Process-structure-property Relationships of 17-4 PH Stainless Steel Fabricated via Laser Beam Powder Bed Fusion (LB-PBF), Laser Powder Directed Energy Deposited (LP-DED), and Metal Binder Jetting (MBJ) Methods: *P.D. Nezhadfar*[1]; Benoit Verquin[2]; Fabien Lefebvre[2]; Christophe Reynaud[2]; Maxime Robert[2]; Paul Gradl[3]; Shuai Shao[1]; Nima Shamsaei[1]; [1]Auburn University; [2]CETIM; [3]NASA Marshall Space Flight Center

2:25 PM
Modeling of Effect of Powder Spreading on Green Body Dimensional Accuracy in Additive Manufacturing by Binder Jetting: Andrii Maximenko[1]; *Ifeanyichukwu Olumor*[1]; A Maidaniuk[1]; Eugene Olevsky[1]; [1]San Diego State University

2:45 PM
Topological Toughness in Additively Manufactured Ceramic Architected Materials: *Raphael Thiraux*[1]; Alexander Dupuy[1]; Lorenzo Valdevit[1]; [1]University of California Irvine

3:05 PM
Effect of Powder Heat Treatment on Fatigue Performance of Free Standing AA7075 Cold Spray: *Christopher Williamson*[1]; Arthur Webb[1]; James Jordon[1]; Luke Brewer[1]; [1]The University of Alabama

3:25 PM Break

3:45 PM
Finite Element Analysis of High-strain-rate Deformation: *Elizabeth Hodges*[1]; Victor Champagne[2]; Robert Hyers[1]; [1]University of Massachusetts-Amherst; [2]Cold Spray Innovations International

4:05 PM
Processing and Characterization of Tantalum Powders for Cold Spray: *Griffin Turner*[1]; James Paramore[2]; Kelvin Xie[1]; Brady Butler[2]; [1]Texas A&M University; [2]DEVCOM - Army Research Laboratory

4:25 PM
Material Flow and Microstructure Evolution during Additive Friction Stir Deposition of Aluminum Alloys: *Mackenzie Perry*[1]; Hang Yu[1]; [1]Virginia Polytechnic Institute

4:45 PM
Microstructure Evolution Pathway in Solid-state Additive Manufacturing of Copper: *Robert Griffiths*[1]; David Garcia[2]; Hang Yu[1]; [1]Virginia Polytechnic Institute; [2]Pacific Northwest National Laboratory

5:05 PM Concluding Comments

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development IV: Rapid Development — Ferrous Alloys

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering 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 PM | March 2, 2022
261A | Anaheim Convention Center

Session Chair: Atieh Moridi, Cornel

2:00 PM
In-situ Tempering of Ferrous Martensite during Laser Powder Bed Fusion: *William Hearn*[1]; Kristina Lindgren[1]; Eduard Hryha[1]; [1]Chalmers University of Technology

2:20 PM
Developing High-temperature High-strength Laser Powder-bed Fusion Austenitic Steels: *Sebastien Dryepondt*[1]; Kinga Unocic[1]; Rangasayee Kannan[1]; Peeyush Nandwana[1]; Marie Romedenne[1]; Patxi Fernandez-Zelaia[1]; Michael Lance[1]; Arun Devaraj[2]; Jia Liu[2]; [1]Oak Ridge National Laboratory; [2]Pacific Northwest National Laboratory

2:40 PM Invited
High Strength Fe-C-Cu Alloys for Laser Powder Bed Fusion: *Andrew Bobel*[1]; Louis Hector[1]; Lee Casalena[2]; [1]General Motors; [2]Thermo Fisher Scientific

3:00 PM
Additive Manufactured Stainless Steel Nanocomposites with Uniform Dispersion of Nanoparticles: *Minglei Qu*[1]; Luis Izet Escano[1]; Qilin Guo[1]; Lianyi Chen[1]; [1]University

of Wisconsin-Madison

3:20 PM Break

3:35 PM
Melt Pool Scale Modeling of Solidification Kinetics and Its Effects on Stainless Steel Microstructures for Laser Powder Bed Fusion: *Joseph Aroh*[1]; P. Chris Pistorius[1]; Anthony Rollett[1]; [1]Carnegie Mellon University

3:55 PM
Microstructure and Mechanical Properties of a Multipurpose High-strength High-toughness Martensitic Steel Produced via Selective Laser Melting: *Amir Farkoosh*[1]; Daniel Bechetti[2]; Matthew Sinfield[2]; David Seidman[1]; [1]Northwestern University; [2]Naval Surface Warfare Center Carderock (NSWCC) Division

4:15 PM
Printability and Defects in Steels Printed by Laser Powder Bed Fusion: Amaranth Karra[1]; Yining He[1]; Sraavya Ranga[1]; Maarten de Boer[1]; *Bryan Webler*[1]; [1]Carnegie Mellon University

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Nano/Micro-mechanics and Length-scale Phenomena — Monitoring and Imaging/Nanoindentation Mapping

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

Program Organizers: Meysam Haghshenas, University of Toledo; Robert Lancaster, Swansea University; Andrew Birnbaum, US Naval Research Laboratory; Jordan Weaver, National Institute of Standards and Technology; Aeriel Murphy-Leonard, Ohio State University

Wednesday PM | March 2, 2022
260A | Anaheim Convention Center

Session Chairs: Aeriel Leonard, Ohio State University; Jordan Weaver, National Institute of Standards and Technology

---

2:00 PM Introductory Comments

2:05 PM
Plastic Strain Visualization and Analysis of Laser Processed Nickel Single Crystals and Polycrystalline 316L: *Andrew Birnbaum*[1]; Athanasios Iliopoulos[1]; Anna Rawlings[1]; John Steuben[1]; John Michopoulos[1]; [1]US Naval Research Laboratory

2:25 PM
Deformation and Microstructure Development in DED-AM Structures via Dark Field X-ray Microscopy and In Situ Imaging: *Yunhui Chen*[1]; Yuanbo Tang[2]; David Collins[3]; Samuel Clark[4]; Wolfgang Ludwig[5]; Raquel Rodriguez-Lamaz[5]; Carsten Detlefs[5]; Roger Reed[2]; Can Yildirim[5]; Peter Lee[6]; Philip Withers[1]; [1]University of Manchester; [2]University of Oxford; [3]University of Birmingham; [4]Advanced Photon Source; [5]ESRF; [6]University College London

2:45 PM
Melt Pool-scale Monitoring of Laser Powder Bed Fusion: *Jack Beuth*[1]; Christian Gobert[1]; Syed Uddin[1]; Guadalupe Quirarte[1]; David Guirguis[1]; Luke Scime[2]; Conrad Tucker[1]; Jonathan Malen[1]; [1]Carnegie Mellon University; [2]Oak Ridge National Laboratory

3:05 PM
Multi Length-scale In-situ Monitoring of AM Processes: Towards Prediction of Local Defects and Properties: *Paul Hooper*[1]; [1]Imperial College London

3:25 PM Break

3:45 PM
Mechanical Microscopy of Additively-manufactured Steels Using High-speed Nanoindentation: *Jeffrey Wheeler*[1]; Marius Wagner[2]; Léa Deillon[2]; Markus Bambach[2]; Ralph Spolenak[2]; [1]FemtoTools AG, Furtbachstrasse 4, CH-8107 Buchs/ZH, Switzerland; [2]ETH Zurich

4:05 PM
A Nanomechanical Approach to Reveal the Origins of Superior Intergranular Cracking Resistance in Irradiated Additively-manufactured Stainless Steel: *Xiaoyuan Lou*[1]; Jingfan Yang[1]; Laura Hawkins[2]; Lingfeng He[2]; Daniel Schwen[2]; [1]Auburn University; [2]Idaho National Laboratory

4:25 PM
Micromechanical Study of Microstructurally Heterogenous and Hierarchical Additive Manufactured Material Using High-resolution Nanoindentation Mapping: *Abhijeet Dhal*[1]; Rajiv Mishra[1]; [1]University of North Texas

---

NUCLEAR MATERIALS

Advanced Characterization and Modeling of Nuclear Fuels: Microstructure, Thermo-physical Properties — Thermo-physical and Microstructure Properties of TRISO and ThO2

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

Program Organizers: David Frazer, Idaho National Laboratory; Fabiola Cappia, Idaho National Laboratory; Tsvetoslav Pavlov, Idaho National Laboratory; Peter Hosemann, University of California

Wednesday PM | March 2, 2022
202B | Anaheim Convention Center

Session Chair: David Frazer, Idaho National Laboratory

2:00 PM
Advanced Characterization of Oxidation Behavior of TRISO Fuel SiC Coating: *Haiming Wen*[1]; Adam Bratten[1]; Visharad Jalan[1]; [1]Missouri University of Science and Technology

2:20 PM
Microstructural Characterization of the Porous Pyrocarbon Buffer Layer in TRISO Fuel Particles: *Claire Griesbach*[1]; Tyler Gerczak[2]; Kumar Sridharan[1]; Yongfeng Zhang[1]; Ramathasan Thevamaran[1]; [1]University of Wisconsin-Madison; [2]Oak Ridge National Laboratory

2:40 PM
Correlating Atomic Scale Microstructure with Mechanical Properties in Low-density Pyrocarbon Used in TRISO Particle Fuel Buffer Layer: *Yongfeng Zhang*[1]; Claire Griesbach[1]; Ramathasan Thevamaran[1]; Kumar Sridharan[1]; Tyler Gerczak[2]; Wen Jiang[3]; Karim Ahmed[4]; [1]University of Wisconsin; [2]Oak Ridge National Laboratory ;

[3]Idaho National Laboratory ; [4]Texas A&M University

3:00 PM
An Atomistically-informed Cluster Dynamics Approach for Defect Evolution in ThO_2 under Irradiation: *Sanjoy Mazumder*[1]; Maniesha Singh[1]; Tomohisa Kumagai[1]; Anter El-Azab[1]; [1]Purdue University

---

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session VI

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

Program Organizers: Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; Olivia Underwood Jackson, Sandia National Laboratories

Wednesday PM | March 2, 2022
207A | Anaheim Convention Center

Session Chairs: Peter Hedstrom, KTH; Yuki Yamamoto, Oak Ridge National Laboratory

---

2:00 PM
Enhanced Predictive Modelling of Laser Weld Failure Using 3D Characterization of 304L: *Andrew Polonsky*[1]; Mary Arnhart[1]; Alyssa Skulborstad[1]; Helena Jin[1]; Kyle Karlson[1]; Jonathan Madison[1]; [1]Sandia National Laboratories

2:20 PM
Investigation of the Microstructure and Plastic Deformation of AM 316L Stainless Steels: Marissa Linne[1]; Jean-Baptiste Forien[1]; Nicolas Bertin[1]; Margaret Wu[1]; Sylvie Aubry[1]; Tatu Pinomaa[2]; Anssi Laukkanen[2]; Kirubel Teferra[3]; Nathan Barton[1]; Y. Morris Wang[1]; *Thomas Voisin*[1]; [1]Lawrence Livermore National Laboratory; [2]VTT Research Centre of Finland; [3]US Naval Research Laboratory

2:40 PM Invited
Modeling Precipitation in Alloy 347H for the XMAT Project: *Michael Glazoff*[1]; Jianguo Yu[1]; Michael Gao[2]; Yukinori Yamamoto[3]; Q.Q. Ren[3]; Jonathan Poplawsky[3]; Michael Brady[3]; Laurent Capolungo[4]; [1]Idaho National Laboratory; [2]NETL; [3]ORNL; [4]LANL

3:10 PM Invited
Characterization of Microstructure Evolution and Micromechanics Behavior of Steels with Metastable Austenite during Uniaxial Tensile Loading: *Peter Hedström*[1]; Benjamin Neding[1]; [1]KTH

3:40 PM Break

3:55 PM
Study of Microstructure Evolution due to Solid-state Thermal Cycling during AM via Laser-integrated Scanning Electron Microscopy: *Juan Guillermo Santos Macias*[1]; Alexandre Tanguy[1]; Manas Upadhyay[1]; [1]Ecole Polytechnique

---

ADVANCED MATERIALS

Advanced Functional and Structural Thin Films and Coatings — Coating Technologies and Surface Structuring for Tools

Sponsored by: TMS: Thin Films and Interfaces Committee

Program Organizers: Ramana Chintalapalle, University of Texas at El Paso; Adele Carrado, IPCMS - CNRS Université de Strasbourg; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Karine Mougin, Cnrs - Is2m; Heinz Palkowski, Clausthal University of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology

Wednesday PM | March 2, 2022
252B | Anaheim Convention Center

Session Chairs: Heinz Palkowski, TU-Clausthal IMET; Karine Mougin, CNRS- IS2M

4:00 PM Introductory Comments

4:10 PM
Performance of nc-AlTiN/Si3N4 and ZrO2/Al2O3 Coated Carbide Inserts in Dry Turning of AlSI304 Stainless Steel: Kaushik V Prasad[1]; Sharma SC[2]; *Adarsha H*[1]; Deepak J[1]; [1]Jain University; [2]Director,National Assessment and Accreditation Council

4:30 PM
In-air Polymerization and Crosslinking of Monomers during Electrospray Deposition: *Catherine Nachtigal*[1]; Michael Grzenda[1]; Jonathan Singer[1]; [1]Rutgers University

4:50 PM
Polymeric Coatings Embedded with Green Anti-corrosive Pigment for Corrosion Inhibition of Steel: Muddasir Nawaz[1]; *Abdul Shakoor*[1]; Ramazan Kahraman[1]; M. F. Montemor[2]; [1]Center for Advanced Materials, Qatar University; [2]Universidade de Lisboa

5:10 PM Concluding Comments

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Sensors, Power, and Multifunctional Applications — Developments in Soft Magnetic Materials

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

Program Organizers: Daniel Salazar, BCMaterials; Alex Leary, NASA Glenn Research Center; Eric Theisen, Metglas Inc.; Huseyin Ucar, California Polytechnic University,Pomona; Yongmei Jin, Michigan Technological University

Wednesday PM | March 2, 2022
213B | Anaheim Convention Center

Session Chair: Alex Leary, NASA GRC

2:00 PM Invited
Accelerated Design of Fe-based Soft Magnetic Materials Using Machine Learning and Stochastic Optimization: *Raymundo Arroyave*[1]; Yuhao Wang[1]; Tanner Kirk[1]; Yefan Tian[1]; Joseph Ross[1]; Ron Noebe[2]; [1]Texas A&M University; [2]NASA Glenn Research Center

2:30 PM
Development of a CoFe - Al_2O_3 Soft Magnetic Composite Using Spark Plasma Sintering: *Calvin Belcher*[1]; Baolong Zheng[1]; Benjamin MacDonald[1]; Eric Langlois[2]; Benjamin Lehman[2]; Diran Apelian[1]; Todd Monson[2]; Enrique Lavernia[3]; [1]University of California Irvine; [2]Sandia National Laboratory; [3]National Academy of Engineering

2:50 PM
Domain Refined Amorphous Ribbon Technology for Core Loss Reduction: *Eric Theisen*[1]; [1]Metglas Inc.

3:10 PM
Two-step Annealing of FeNi-based Metal Amorphous Nanocomposites: Kevin Byerly[1]; Yuval Krimer[1]; Charudatta Phatak[2]; Eric Theisen[3]; *Michael McHenry*[1]; [1]Carnegie Mellon University; [2]Argonne National Laboratory; [3]Metglas, Inc.

3:30 PM Break

3:45 PM
Flash Annealing of FeNi-based Metal Amorphous Nanocomposite: *James Egbu*[1]; Ahmed Talaat[2]; Kevin Byerly[1]; Paul Ohodnicki[2]; Michael McHenry[1]; [1]Carnegie Mellon University; [2]University of Pittsburgh

4:05 PM
Radio Frequency Thermal Processing of Soft Magnetic Alloys: *Ahmed Talaat*[1]; David Greve[2]; Tyler Paplham[1]; Paul Ohodnicki[1]; [1]Mechanical Engineering & Materials Science, University of Pittsburgh, PA 15261, USA; [2]DWGreve Consulting, Sedona, AZ, 86351, USA & Electrical &Computer Engineering, Carnegie Mellon University, Pittsburgh, PA, 15213, USA

4:25 PM
Investigation of Magnetic Behaviour of Spinel Ferrites using First Order Reversal Curves (FORC): *Suraj Mullurkara*[1]; Ahmed Talaat[1]; Brad Dodrill[2]; Paul Ohodnicki[1]; [1]University of Pittsburgh; [2]Lake Shore Cryotronics

---

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage 2022 — Energy Conversion and Energy Storage Student

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

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

Wednesday PM | March 2, 2022
212B | Anaheim Convention Center

Session Chairs: Scott Roberts, Sandia National Laboratory; Johanna Nelson Weker, Slac National Accelerator Laboratory

---

2:00 PM
Experimental and Computational Investigations of the Multiple Impurities Effects on the SOFC Cathode Materials: *Rui Wang*[1]; Lucas Parent[2]; S. Pamir Alpay[2]; Srikanth Gopalan[3]; Yu Zhong[1]; [1]Worcester Polytechnic Institute; [2]University of Connecticut; [3]Boston University

2:20 PM
Joining and Oxidation of Haynes 282 Superalloy Microtubes for High-performance Heat Exchanger Applications: *Narayanan Murali*[1]; Xiaochun Li[1]; [1]University of California, Los Angeles

2:40 PM
Magnesium Hydride Slurry Aerospace Fuel with Net-zero or Net-negative Emissions: *Yi Jie Wu*[1]; Jake Scarponi[1]; Jagannath Jayachandran[1]; Adam Powell[1]; [1]Worcester Polytechnic Institute

3:00 PM
Prevention of Thermal Runaway in Li-ion Batteries Using Machine Learning Model Prediction: *Meghana Sudarshan*[1]; Alexey Serov[1]; Casey Jones[1]; Vikas Tomar[1]; [1]Purdue University

3:20 PM Break

3:40 PM
Use of Internal Thermal Sensors in Lithium-ion 18650 Battery Packs for Analysis of Individual Cell Temperatures during Cycling: *Casey Jones*[1]; Vikas Tomar[1]; [1]Purdue University

---

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: Alloy Development and Properties — Structures and Mechanical Properties 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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Wednesday PM | March 2, 2022
251A | Anaheim Convention Center

Session Chairs: Eric Lass, University of Tennessee-Knoxville; Jeffery Gibeling, University of California, Davis

---

2:00 PM
Mechanisms of Creep in NiCoCr and ODS-NiCoCr Multi-principal Element Alloys: *Gianmarco Sahragard-Monfared*[1]; Timothy Smith[2]; Jeffery Gibeling[1]; [1]University of California, Davis; [2]NASA Glenn Research Center

2:20 PM
Strain Partitioning Enables Excellent Tensile Ductility in Precipitated Heterogenous High-entropy Alloys with Gigapascal Yield Strength: *Feng He*[1]; [1]State Key Laboratory of Solidification Processing

2:40 PM
Solidification Behavior and Mechanical Performance of Ductile Mn35Fe5Co20Ni20Cu20 MPEA Brazing Filler: *Benjamin Schneiderman*[1]; Andrew Chuang[2]; Olivia DeNonno[1]; Jonah Klemm-Toole[1]; Zhenzhen Yu[1]; [1]Colorado School of Mines; [2]Advanced Photon Source - Argonne National Laboratory

3:00 PM
Investigation of Al_2 (Co, Cr_x, Fe_y, Ni)$_{14}$ Precipitation Strengthened Transition Metal High Entropy Alloys: *Serena Beauchamp*[1]; Eric Lass[1]; T. G. Nieh[1]; [1]University of Tennessee Knoxville

3:20 PM Break

3:40 PM
Improved Properties of Non-equiatomic MnFeCoNiCu HEA Compared to Its Equiatomic Counterpart: *Tibra Das Gupta*[1]; Artashes Ter-Isahakyan[1]; Thomas Balk[1]; [1]University of Kentucky

4:00 PM
Tailoring High Entropy Alloys for Advanced Technology Fuel (ATF) Coatings: *Jack Wilson*[1]; Lee Evitts[1]; Michael Rushton[1]; William Lee[1]; David Goddard[2]; Simon Middleburgh[1]; [1]Bangor University; [2]National Nuclear Laboratory

4:20 PM
Effect of Valence Electron Concentration on the Mechanical Properties of Non-equiatomic Refractory Multi-principal Element Alloys: *Taohid Bin Nur Tuhser*[1]; Daryl Chrzan[2]; Andrew Minor[2]; Mark Asta[2]; Thomas Balk[1]; [1]University of Kentucky; [2]Lawrence Berkeley National Laboratory

---

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: Structures and Modeling — Alloy Design and Modeling

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

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Wednesday PM | March 2, 2022
251B | Anaheim Convention Center

Session Chairs: E-Wen Huang, National Yang Ming Chiao Tung University; Saryu Fensin, Los Alamos National Laboratory

---

2:00 PM Invited
Data-driven Discovery of High-entropy Alloys: George Kim[1]; Chanho Lee[2]; Peter Liaw[3]; *Wei Chen*[1]; [1]Illinois Institute of Technology; [2]Los Alamos National Lab; [3]University of Tennessee

2:20 PM Invited
Predicting Fundamental Properties of Refractory Multicomponent Alloys Using Electronic Descriptors and Statistical Learning: *Yong-Jie Hu*[1]; Christopher Tandoc[1]; Liang Qi[2]; Peter Liaw[3]; [1]Drexel University; [2]University of Michigan; [3]University of Tennessee

2:40 PM Invited
Development of Novel Refractory High-entropy Alloys via High-throughput Alloy-design Approach: *Saryu Fensin*[1]; chanho Lee[1]; James Valdez[1]; Nan Li[1]; [1]Los Alamos National Laboratory

3:00 PM Invited
Magnetism in Metastable and Annealed HEAs of (FeNiCrMn): Nan Tang[1]; Lizabeth Quigley[1]; Walker Boldman[1]; Cameron Jorgensen[1]; Rémi Koch[1]; Daniel O'Leary[1]; Hugh Medal[1]; Philip Rack[1]; *Dustin Gilbert*[1]; [1]University of Tennessee

3:20 PM Break

3:40 PM
Combination of High Throughput Experiments and ICME Approaches to Discover the Composition Space for Lightweight High Entropy Alloys: *Shengyen Li*[1]; John Macha[1]; Mirella Vargas[1]; Michael Miller[1]; [1]Southwest Research Institute

4:00 PM
Polymetallic MOF Derived High Entropy FeCoNiMnMo/NC Nanoparticles for Efficient Alkaline Hydrogen Evolution Reactions: *Shiqi Wang*[1]; Feng Fang[1]; [1]Southeast University

4:20 PM
Multiscale Modeling and Design of High Entropy Alloys: Justin Almeida[1]; Jide Oyerinde[1]; Philip Yuya[1]; *Ioannis Mastorakos*[1]; [1]Clarkson University

---

MATERIALS DESIGN

Advances in Titanium Technology — Advanced Manufacturing of Ti Alloys

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

Program Organizers: Yufeng Zheng, University of Nevada-Reno; Zachary Kloenne, Ohio State University; Fan Sun, PSL Research University; Stoichko Antonov, National Energy Technology Laboratory; Rongpei Shi, Lawrence Livermore National Laboratory

Wednesday PM | March 2, 2022
252A | Anaheim Convention Center

Session Chair: To Be Announced

2:00 PM
Microstructure Evolution in Additively Manufactured Ti-5Al-5Mo-5V-3Cr Alloy: *Veronica Anghel*[1]; Ramon Martinez[1]; Jillian Bennett[1]; William Anderson[1]; John Carpenter[1]; Ben Brown[2]; [1]Los Alamos National Laboratory; [2]Kansas City National Security Campus

2:20 PM
Using Defects to Inform on Physical Phenomena in EBM Ti-6Al-4V across Scanning Strategies: *Katie O'Donnell*[1]; Maria Quintana[1]; Matthew Kenney[1]; Peter Collins[1]; [1]Iowa State University

2:40 PM
Thermohydrogen Refinement of Microstructure of AM Titanium Components: *Michael Hurst*[1]; James Paramore[1]; Brady Butler[1]; Daniel Lewis[1]; Laura Moody[1]; [1]United States Army Research Laboratory

3:00 PM
Thermohydrogen Refinement of Microstructure (THRM) to Improve the Performance of Material Extrusion Additively Manufactured Ti-6Al-4V: *Brady Butler*[1]; Daniel Lewis[2]; Michael Hurst[1]; James Paramore[1]; [1]US Army Research Laboratory; [2]Texas A&M University

3:20 PM Break

3:40 PM
Titanium Metal Matrix Composites via Selective Laser Melting: *William Hixson*[1]; Howard Stone[2]; James Coakley[1]; [1]University of Miami; [2]University of Cambridge

4:00 PM
Triggering New Deformation Mechanisms in Ti Alloys by Heat Treatments: A Step Forward into the Improvement of the Ductility and Work-hardening of 3D Printed Parts: *Odeline Dumas*[1]; Loïc Malet[1]; Frédéric Prima[2]; Stéphane Godet[1]; [1]Universite Libre De Bruxelles; [2]PSL Research University, Chimie ParisTech, CNRS, Institut de Recherche de Chimie Paris

4:20 PM
Microstructural Scale Evolution of Titanium Alloys during Additive Manufacturing: *Alec Saville*[1]; Adam Creuziger[2]; Jake Benzing[2]; Sven Vogel[3]; Amy Clarke[1]; [1]Colorado School of Mines; [2]National Institute of Standards and Technology; [3]Los Alamos National Laboratory

4:40 PM
Mechanical Behavior of Ti Alloys in Relation to the Microstructure across Lengthscales: Anais Huet[1]; Thomas Yvinec[1]; Tiphaine Giroud[1]; Azdine Nait-Ali[1]; Joseph Wendorf[2]; Jean-Charles Stinville[2]; McLean Echlin[2]; Tresa Pollock[2]; Jonathan Cormier[1]; Loic Signor[1]; Patrick Villechaise[1]; Mikael Gueguen[1]; *Samuel Hemery*[1]; [1]Institut Pprime; [2]UCSB

MATERIALS DESIGN

AI/Data Informatics: Computational Model Development, Validation, and Uncertainty Quantification — Constitutive Modeling/Cracks

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Dennis Dimiduk, BlueQuartz Software LLC; Darren Pagan, Pennsylvania State University; Anthony Rollett, Carnegie Mellon University; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory

Wednesday PM | March 2, 2022
256A | Anaheim Convention Center

Session Chairs: Karl Garbrecht, University of Utah; Remi Dingreville, Sandia National Laboratories

---

2:00 PM
Data-driven Approaches for Understanding Fatigue Damage Initiation: *Akhil Thomas*[1]; Ali Durmaz[1]; Chris Eberl[2]; Harald Sack[3]; [1]Fraunhofer IWM; [2]University of Freiburg; [3]FIZ Karlsruhe

2:20 PM
A Statistical Perspective for Predicting Polycrystalline Strength with Machine Learning: *Yejun Gu*[1]; Christopher Stiles[2]; Jaafar El-Awady[3]; [1]IHPC, Johns Hopkins University; [2]Johns Hopkins University Applied Physics Laboratory; [3]Johns Hopkins University

2:40 PM
A Physics-informed Regularization Approach for Machine Learning Derivation of Constitutive Models: *Karl Garbrecht*[1]; Jacob Hochhalter[1]; [1]University of Utah

3:00 PM
A Data-driven Approach for Improving the Existing Gurson Material Damage Model Using Genetic Programming for Symbolic Regression: *Donovan Birky*[1]; Jacob Zamora[1]; John Emery[2]; Coleman Alleman[2]; Brian Lester[2]; Geoffrey Bomarito[3]; Jacob Hochhalter[1]; [1]University of Utah; [2]Sandia National Laboratories; [3]NASA

3:20 PM
Convolutional Neural Networks to Expedite Predictions of Volume Requirements in Studies of Microstructurally Small Cracks: *Karen Demille*[1]; Ashley Spear[1]; [1]University of Utah

3:40 PM Break

4:00 PM
Importance of the Choice of Constitutive Model for Full Field Crystal Plasticity Simulations: A Comparison of Predictions of the Voce and the Dislocation Density Based Hardening Laws: *Chaitali Patil*[1]; Supriyo Chakraborty[1]; Stephen Niezgoda[1]; [1]The Ohio State University

4:20 PM
Graph Neural Network Framework to Emulate Multiple Crack Propagation and Coalescence: *Roberto Aguiar*[1]; Vinamra Agrawal[1]; Davide Guzzetti[1]; [1]Auburn University

4:40 PM
Accelerating Phase-field Based Predictions via Surrogate Models Trained by Machine Learning Methods: *Remi Dingreville*[1]; David Montes de Oca Zapiain[1]; James Stewart[1]; Chongze Hu[1]; Shawn Martin[1]; [1]Sandia National Laboratories

---

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Nano, Micro and Macro Scale Algorithms and Their Applications

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; Garritt Tucker, Colorado School of Mines; Ebrahim Asadi, University of Memphis; Bryan Wong, University of California, Riverside; Sam Reeve, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Adrian Sabau, Oak Ridge National Laboratory

Wednesday PM | March 2, 2022
253A | Anaheim Convention Center

Session Chairs: Adrian Sabau, Oak Ridge National Laboratory; Ebrahim Asadi, University of Memphis

---

2:00 PM
An Examination of the Dislocation Orientation Distribution Function as Test for CDD Theories: *Jose Manuel Torres Lopez*[1]; Joseph Anderson[2]; Anter El-Azab[2]; [1]University of Rochester; [2]Purdue University

2:20 PM
FFT-based Polycrystal Plasticity Modelling: New Implementations and Integration with 3-D Imaging Techniques: *Ricardo Lebensohn*[1]; Miroslav Zecevic[1]; [1]Los Alamos

National Laboratory

2:40 PM
Simulating Dislocation Transport at Experimental Time Scales Using a Time-explicit Runge-Kutta Discontinuous Galerkin Finite Element Scheme: *Manas Upadhyay*[1]; Jérémy Bleyer[2]; Vincent Taupin[3]; Stéphane Berbenni[3]; [1]LMS, CNRS, Ecole Polytechnique, Institut Polytechnique de Paris; [2]Navier Laboratory, CNRS, École des Ponts ParisTech; [3]LEM3, CNRS, Université de Lorraine

3:00 PM
Computational Modeling of Dual Phase Titanium Armor: *Collin Roberts*[1]; [1]University of California Los Angeles

---

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Mechanical Properties: Characterization, Modelling, and Extrusion

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

Program Organizers: Andre Phillion, McMaster University; Dmitry Eskin, Brunel University

Wednesday PM | March 2, 2022
208B | Anaheim Convention Center

Session Chair: Carly Romnes, University of Illinois at Urbana-Champaign

---

2:00 PM
Fabrication of Aluminum Alloy 6063 Tubing from Secondary Scrap with Shear Assisted Processing and Extrusion: *Brandon Taysom*[1]; Md. Reza-E-Rabby[1]; Xiaolong Ma[1]; Massimo DiCiano[2]; Tim Skszek[2]; Scott Whalen[1]; [1]Pacific Northwest National Laboratory; [2]Magna International

2:25 PM
Effect of Extrusion Parameters and Heat Treatment on Strength Performance of Low Sc 5181 Alloy: *Alexander Gradoboev*[1]; Dmitry Ryabov[1]; Roman Vakhromov[1]; Victor Mann[2]; Aleksandr Krokhin[2]; [1]Lmti Llc (Uc Rusal); [2]UC RUSAL

2:50 PM
Influence of the Mg/Si Ratio on Speed Extrusion of 6XXX Alloys: Alexander Gradoboev[1]; *Irina Matveeva*[1]; Dmitry Ryabov[1]; Roman Vakhromov[1]; Victor Mann[2]; Aleksandr Krokhin[2]; [1]Lmti Llc (Uc Rusal); [2]UC RUSAL

3:15 PM Break

3:30 PM
Weldability Study of AlMg5ScZr Alloys versus Common 5083 Alloy: *Dionysios Spathis*[1]; John Tsiros[1]; Andreas Mavroudis[1]; Vassilis Stergiou[2]; [1]ELVAL SA; [2]Hellenic Aerospace Industry SA

3:55 PM
Modeling of Springback Behavior in AA6016-T4 Sheet via an Elastoplastic Self-consistent Model Incorporating Backstress: *Dane Sargeant*[1]; Zahidul Sarkar[2]; Rishabh Sharma[1]; Marko Knezevic[2]; David Fullwood[1]; Michael Miles[1]; [1]Brigham Young University; [2]University of New Hampshire

---

BIOMATERIALS

Biological Materials Science — Biological Materials Science VI

Sponsored by: TMS Functional 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; Hannes Schniepp, William & Mary

Wednesday PM | March 2, 2022
201B | Anaheim Convention Center

Session Chair: Jeffrey Bates, The University of Utah

4:00 PM
Micromechanical and Microstructural Studies of Wavy Enamel in the Grinding Dentition of Hadrosaurid Dinosaurs: Understanding Its Remarkable Damage Tolerance and Fracture Resistance: *Soumya Varma*[1]; Yi Lee[2]; Shane Johnson[3]; D. G. Harlow[4]; Tomas Grejtak[5]; Brandon Krick[5]; Tyler Hunt[5]; Gregory Erickson[5]; Manish Jain[6]; Johann Schwiedrzik[6]; Johann Mitchler[6]; Daniele Casari[6]; Sandip Basu[7]; Shraddha Vachani[1]; Sid Pathak[1]; Arun Devraj[8]; [1]Iowa State University; [2]Exxon Mobile; [3]University of Nevada Reno; [4]Lehigh University; [5]Florida State University; [6]EMPA; [7]Bruker Nano Surfaces; [8]Pacific Northwest National Laboratory

4:20 PM
Dynamic Finite Element Analysis of QPD Crack Detection in Natural Teeth: *Jie Shen*[1]; Omid Komari[1]; Aboozar Mapar[2]; Cherilyn Sheets[3]; James Earthman[1]; [1]University of California Irvine; [2]Perimetrics, Inc.; [3]Newport Coast Oral Facial Institute

4:40 PM
Enhancing Biocompatibility of Zinc Nanocomposites with Improved Nanoparticle Incorporation: *Jingke Liu*[1]; Chase Linsley[1]; Yuxin Zeng[1]; Benjamin Wu[1]; Xiaochun Li[1]; [1]University of California Los Angeles

---

BIOMATERIALS

BioNano Interfaces and Engineering Applications — Bionano Interfaces & Engineering Applications IV and V

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

Program Organizers: Candan Tamerler, University of Kansas; Hendrik Heinz, University of Colorado Boulder; Kalpana Katti, North Dakota State University; Terry Lowe, Colorado School of Mines; Po-Yu Chen, National Tsing Hua University

Wednesday PM | March 2, 2022
201A | Anaheim Convention Center

Session Chair: To Be Announced

2:00 PM Keynote
Bioinspired Wear-resistant Triboelectric Nanodevice for Biomechanical Energy Harvesting: Ming-Zheng Huang[1]; An-Rong Chen[1]; Naveen Tiwari[1]; Yung-Hsin Chen[1]; *Zong-Hong Lin*[1]; [1]National Tsing Hua University

2:40 PM Invited
Reverse Engineering Spider Silk by Disassembly and Assembly: Dinidu Perera[1]; Linxuan Li[1]; Qijue Wang[1]; *Hannes Schniepp*[1]; [1]William & Mary

3:10 PM
Peptide-mediated Remineralizable Collagen Fibrils as a Model for Dentin Repair: *Nilan Kamathewatta*[1]; Quang Ye[1]; Paulette Spencer[1]; Candan Tamerler[1]; [1]The University of Kansas

3:30 PM
Controlled Synthesis of Polystyrene/Citrate Capped AuNPs Microparticles for the Colorimetric Detection of Hg2+ Ions through Aptamer-target Interaction: *Ana Ulloa*[1]; Min Zhao[2]; Qiyue Liang[2]; George Chiu[3]; Jan Allebach[2]; Lia Stanciu[1]; [1]Purdue University-Materials Engineering; [2]Purdue University- ECE; [3]Purdue University

---

LIGHT METALS

Cast Shop Technology — Shape Casting

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

Program Organizers: Stephen Instone, Speira GmbH; Mertol Gökelma, Izmir Institute of Technology; Samuel Wagstaff, Oculatus; Dmitry Eskin, Brunel University

Wednesday PM | March 2, 2022
209A | Anaheim Convention Center

Session Chair: Stephen Instone, Speira GmbH

2:00 PM
Energy Resilient Foundries: The "Small is beautiful" Projects: Mark Jolly[1]; *Konstantinos Salonitis*[1]; Emanuele Pagone[1]; Michail Papanikolaou[1]; Prateek Saxena[1]; [1]Cranfield University

2:25 PM
The Effect of the Holding Time on the Microstructure of Gd-containing AlSi7Mg Alloys: *Özen Gürsoy*[1]; Giulio Timelli[1]; [1]Department of Management and Engineering, University of Padova

2:50 PM
Effects of Casting Temperature and Iron Content on the Microstructure of Hypoeutectic A380 Aluminum Alloy: Reza Haghayeghi[1]; Giulia Scampone[2]; *Özen Gürsoy*[2]; Giulio Timelli[2]; [1]Volvo Truck; [2]Padova University

3:15 PM
Effect of Heat Treatment on Mechanical Properties of Er, Dy and Eu Modified A356 Alloy: Onur Ernam[1]; Tarik Sekban[1]; Oguzhan Tugan[1]; Kerem Dizdar[2]; Hayati Sahin[2]; *Derya Dispinar*[2]; [1]Istanbul Technical University; [2]Foseco

---

ENERGY & ENVIRONMENT

Composite Materials for Sustainable Eco-Friendly Applications — Eco-Friendly Composite Materials-Recycled Materials

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

Program Organizers: Brian Wisner, Ohio University; Ioannis Mastorakos, Clarkson University; Simona Hunyadi Murph, Savannah River National Laboratory

Wednesday PM | March 2, 2022

211A | Anaheim Convention Center

Session Chair: Brian Wisner, Ohio University

2:00 PM Invited
4D Printable Terpene/Terpenoid Photopolymers For Upcycling Commodity Polystyrene Towards A Circular Economy: *Andrew Weems*[1]; [1]Ohio University-Main Campus

2:20 PM
Cadmium (II) Removal from Aqueous Solution by Magnetic Biochar Composite Produced from KOH Modified Poplar Sawdust Biochar: *Lei Zhang*[1]; Yongsheng Zhang[1]; Yanfang Huang[1]; Guihong Han[1]; Hafiza Sana[1]; Shengpeng Su[1]; [1]Zhengzhou University

2:40 PM
Efficient Removal of Molybdenum from Ultra-low Concentration Solutions via Fe(III) Chelating Precipitation: Precipitation Sludge for MoFe Alloy Production via Metallothermic Reduction: *Bei Zhang*[1]; Bingbing Liu[1]; Yanfang Huang[1]; Guihong Han[1]; Yubi Wang[1]; Shengpeng Su[1]; [1]Zhengzhou University

3:00 PM
Characterization on the Electrochemical Property of the Ion Flotation Sludges after Thermal Treatment: *Guihong Han*[1]; Jingwen Wang[1]; Bingbing Liu[1]; Ze Yang[1]; Yanfang Huang[1]; [1]Zhengzhou University

---

ENERGY & ENVIRONMENT

Composites for Energy Applications: Materials for Renewable Energy Applications 2022 — Electrochemical Storage and Conversion

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

Program Organizers: Patrick Ward, Savannah River National Laboratory; Joseph Teprovich, California State University Northridge; Anthony Thompson, Savannah River National Laboratory; Simona Hunyadi Murph, Savannah River National Laboratory

Wednesday PM | March 2, 2022
210D | Anaheim Convention Center

Session Chair: Joseph Teprovich, California State University Northridge

---

2:00 PM Invited
Co-infiltration of Solid Oxide Fuel Cell Anodes with Ni/Mixed Ionic and Electronic Conducting Catalyst Nanoparticles: *Soumendra Basu*[1]; Jillian Rix[1]; Srikanth Gopalan[1]; Uday Pal[1]; [1]Boston University

2:30 PM Invited
Aperiodic Three-dimensional Tricontinuous Conductor-insulator-conductor Nanocomposite for Use as High Energy Density Nanocapacitor: *Eric Detsi*[1]; Samuel Welborn[1]; John Corsi[1]; Jeff DeHosson[2]; [1]University of Pennsylvania; [2]University of Groningen

3:00 PM
Genetic Manipulation of M13 Bacteriophage for Enhancing the Efficiency of Virus-inoculated Perovskite Solar Cells with a Certified Efficiency of 22.3%: *Il Jeon*[1]; [1]Pusan National University

3:20 PM Break

3:40 PM Invited
Nanocomposites for Gel and Solid Polymer Electrolytes in Lithium Batteries: *Reza Shahbazian-Yassar*[1]; [1]University of Illinois at Chicago

4:10 PM
Polymer Templating Method for the Formation of Hierarchically Porous Nitrogen-rich Tin-carbon Composite Anodes: *Jason Weeks*[1]; [1]University of Texas at Austin

---

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Phase Transformation/ Microstructure Modeling

Sponsored by: TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee

Program Organizers: Vahid Attari, Texas A&M University; Sara Kadkhodaei, University Of Illinois At Chicag; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Tourret, IMDEA Materials Institute; James Morris, Ames Laboratory

Wednesday PM | March 2, 2022
255C | Anaheim Convention Center

Session Chair: Kubra Karayagiz, Worcester Polytechnic Institute

---

2:00 PM Invited
Morphological Evolution of Surface Instabilities during Vapor Co-deposition of Phase-separating Alloy Films: Rahul Raghavan[1]; Pei En Chen[1]; Yang Jiao[1]; *Kumar Ankit*[1]; [1]Arizona State University

2:30 PM
High Performance Cahn-Hilliard Solver for Advanced Microstructure Modeling: *Kubra Karayagiz*[1]; David Montiel[2]; Siamak G. Faal[1]; Marcus Sarkis-Martins[1]; Adam Powell[1]; [1]Worcester Polytechnic Institute; [2]University of Michigan

2:50 PM Invited
Thermodynamic Investigation of Multicomponent Chloride Molten Salts for Spent Fuel Processing: Liangyan Hao[1]; Soumya Sridar[1]; Thomas Kirtley[2]; Ethan Schneider[2]; Elizabeth Sooby[2]; *Wei Xiong*[1]; [1]University of Pittsburgh; [2]University of Texas at San Antonio

3:20 PM
Phase-field Model of Precipitation Processes with Spontaneous Coherency Loss: *Tianle Cheng*[1]; Youhai Wen[2]; [1]U.S. Department of Energy, National Energy Technology Laboratory / NETL Site Support Contractor; [2]U.S. Department of Energy, National Energy Technology Laboratory

3:40 PM Break

4:00 PM
CALPHAD Modeling of Double Ordering: *Yijia Gu*[1]; Kyaw Hla Saing Chak[1]; Julia Medvedeva[1]; [1]Missouri University of Science and Technology

---

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Mechanisms of High Temperature Alloys — Directionally Solidified Ni Based Superalloys & Fe Based Superalloys

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

Program Organizers: Mark Hardy, Rolls-Royce Plc; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Jeremy Rame, Safran Aircraft Engines; Akane Suzuki, GE Research; Jean-Charles Stinville, University of California, Santa Barbara; Paraskevas Kontis, Norwegian University of Science and Technology; Andrew Wessman, University of Arizona

Wednesday PM | March 2, 2022
304B | Anaheim Convention Center

Session Chairs: Jeremy Rame, Safran Aircraft Engines; Akane Suzuki, GE Research

---

4:00 PM Invited
Very High Cycle Fatigue Properties of CoNi- and Ni-based Single-crystal Superalloys: *Alice Cervellon*[1]; Tresa Pollock[2]; Chris Torbet[2]; [1]Institut Pprime; [2]University of California Santa Barbara

4:30 PM
On the Influence of γ'-particle Size on the Yield Stress Anomaly in Ni-base Single Crystal Superalloys: *Marc Sirrenberg*[1]; David Bürger[1]; Alireza Parsa[1]; Gunther Eggeler[1]; [1]Ruhr-University Bochum

4:50 PM
Mechanistic Modeling of Thermal Creep Response of 347H Stainless Steel: Effect of Microstructure and Chemistry: *Mariyappan Arul Kumar*[1]; Ricardo Lebensohn[1]; Laurent Capolungo[1]; [1]Los Alamos National Laboratory

---

SPECIAL TOPICS

DMMM4 — Career Development Tools and Strategies

Sponsored by: TMS: Diversity, Equity, and Inclusion Committee

Program Organizers: Aeriel Murphy-Leonard, Ohio State University; Mark Carroll, Federal-Mogul Powertrain; Blythe Clark, Sandia National Laboratories; K. Cunningham, ATI Specialty Alloys & Components; Lauren Garrison, Oak Ridge National Laboratory; Atieh Moridi, Cornell University; Ashleigh Wright, University of Illinois at Urbana-Champaign; Megan Cordill, Erich Schmid Institute of Materials Science; Jonathan Madison, National Science Foundation; Mitra Taheri, Johns Hopkins University; Clarissa Yablinsky, Los Alamos National Laboratory

Wednesday PM | March 2, 2022
Grand Ballroom F | Anaheim Marriott

Session Chairs: Ashleigh Wright, University of Illinois Urbana-Champaign; Blythe G. Clark, Sandia National Laboratories; Mark Carroll, Tenneco

---

2:00 PM Invited
Bruised But Not Broken: Storytelling as a Method to Share to the Experiences and Persistence Strategies of African American Women in Engineering Degree Programs: *Stacie LeSure*[1]; [1]Engineers for Equity, LLC

2:50 PM
Peer-to-Peer Mentoring to Support Career Development: *Blythe Clark*[1]; [1]Sandia National Laboratories

3:10 PM
Tools and Strategies to Succeed in Your Career with the Attributes of an Effective Leader: *Saleem Al Dajani*[1]; Ibrahim Almojel[2]; [1]MIT/UCB-NE; [2]Saudi Industrial Development Fund

3:30 PM Break

4:00 PM Panel Discussion on Career Development: Join our invited speaker alongside several of our TMS members as they share insights into career development. Learn how they have invested in their own and others' career development, hear ideas for how to expand your career horizons, and ask questions about career development from this group of panelists devoted to supporting retention of diversity in STEM. Panel members include: Stacie LeSure, Gabriel Lievebare, JC Zhao, and Amit Misra. Moderated by Blythe Clark.

5:00 PM Career Development for a Diverse Workforce: Networking Event: Join us for a networking event focused on sharing best practices to support career development for a diverse workforce. Whether you have lots of experience in career development or are just starting on your journey, we would love to have your perspective and questions at this session. Tables will be arranged to focus on key topics, and there will be opportunity to rotate tables and topics through the event. Participants can expect to leave inspired and connected to new contacts from across TMS.

SPECIAL TOPICS

DMMM4 — STEM Outreach Case Studies and Best Practices

Sponsored by: TMS: Diversity, Equity, and Inclusion Committee

Program Organizers: Aeriel Murphy-Leonard, Ohio State University; Mark Carroll, Federal-Mogul Powertrain; Blythe Clark, Sandia National Laboratories; K. Cunningham, ATI Specialty Alloys & Components; Lauren Garrison, Oak Ridge National Laboratory; Atieh Moridi, Cornell University; Ashleigh Wright, University of Illinois at Urbana-Champaign; Megan Cordill, Erich Schmid Institute of Materials Science; Jonathan Madison, National Science Foundation; Mitra Taheri, Johns Hopkins University; Clarissa Yablinsky, Los Alamos National Laboratory

Wednesday PM | March 2, 2022
Grand Ballroom H, J, K | Anaheim Marriott

Session Chairs: Megan Cordill, Erich Schmid Institute of Materials Science; Lauren Garrison, Oak Ridge National Laboratory; Atieh Moridi, Cornell University

---

2:00 PM Invited
Building Effective STEM Outreach Programs: *Jessica Krogstad*[1]; [1]University of Illinois at Urbana-Champaign

2:30 PM Invited
Materials Calisthenics: Harnessing Your Interests to Inspire Diverse Audiences: *Suveen Mathaudhu*[1]; [1]Colorado School of Mines / Pacific Northwest National Laboratory

3:00 PM
Designing Inclusive Research Experiences for Undergraduates: A Case Study on the Stanford Materials Science and Engineering REU Program: *Rajan Kumar*[1];

Abby Carbone[1]; [1]Stanford University

3:20 PM What's next? - *Megan Cordill*, Erich Schmid Institute

3:30 PM Break

4:00 PM Outreach Activities: Hands-on activities lead by session speakers and TMS members for participants to perform at their own pace. The activities include materials science-based demonstrations for children and adults, new teaching methods to engage students, and short-term project planning for undergraduates.

5:00 PM Evaluating Outreach Activities: After the hands-on activities, comments, suggestions, and feedback is anticipated from the participants. Additionally, what have others done for STEM outreach? What has worked and was has not? Panel members include: Suveen Mathaudhu, Rajan Kumar, and Abby Carbone. Moderated by: Megan Cordill

---

MECHANICS & STRUCTURAL RELIABILITY

Dynamic Behavior of Materials IX — Modeling and Simulation II

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

Program Organizers: Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Cyril Williams, US Army Research Laboratory

Wednesday PM | March 2, 2022
304D | Anaheim Convention Center

Session Chairs: Saryu Fensin, Los Alamos National Laboratory; Douglas Spearot, University of Florida

---

2:00 PM
Understanding the Implications of Finite Specimen Size on the Interpretation of Dynamic Experiments for Polycrystalline Metals through Direct Numerical Simulations: *Bryan Zuanetti*[1]; Darby Luscher[1]; Cynthia Bolme[1]; Kyle Ramos[1]; [1]Los Alamos National Laboratory

2:20 PM
Phase Transformation of Aluminum under Ramp Loading Compression; A Combined Atomistic Simulation and Experimental Study: Lijie He[1]; Danae Polsin[1]; Shuai Zhang[1]; Gilbert Collins[1]; *Niaz Abdolrahim*[1]; [1]University of Rochester

2:40 PM
Shockwave Propagation and Attenuation in Poly(ethylene glycol) Diacrylate Hydrogels: Ke Luo[1]; Ghatu Subhash[1]; *Douglas Spearot*[1]; [1]University of Florida

3:00 PM
Mechanisms Responsible for Kinking in Layered Crystalline Solids: *Gabriel Plummer*[1]; Xingyuan Zhao[1]; Leslie Lamberson[1]; Garritt Tucker[1]; [1]Colorado School of Mines

3:20 PM Break

3:35 PM
Understanding the Phase Transformation Mechanisms of Fe-based Microstructures at the Atomic Scales: *Avanish Mishra*[1]; Jonathan Lind[2]; Mukul Kumar[2]; Avinash Dongare[1]; [1]University of Connecticut; [2]Lawrence Livermore National Laboratory

3:55 PM
Reduction of Richtmyer-Meshkov Instabilities via Layered Explosive Charge Design: *Michael Hennessey*[1]; H. Springer[1]; Jon Belof[1]; [1]Lawrence Livermore National Laboratory

---

CORROSION

Environmental Degradation of Multiple Principal Component Materials — Aqueous Corrosion and Embrittlement

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

Program Organizers: Wenjun Cai, Virginia Polytechnic Institute and State University; ShinYoung Kang, Lawrence Livermore National Laboratory; XiaoXiang Yu, Northwestern University; Vilupanur Ravi, California State Polytechnic University Pomona; Christopher Weinberger, Colorado State University; Elizabeth Opila, University of Virginia; Bai Cui, University of Nebraska-Lincoln; Mark Weaver, University of Alabama; Bronislava Gorr, Karlsruhe Institute of Technology (KIT); Srujan Rokkam, Advanced Cooling Technologies Inc

Wednesday PM | March 2, 2022
201C | Anaheim Convention Center

Session Chairs: Wenjun Cai, Virginia Tech; Bai Cui, University of Nebraska-Lincoln

---

2:00 PM
The Tribocorrosion Behaviors of Al0.1CrCoFeNi Multi-principal Element Alloys in Different pH Conditions: Jia Chen[1]; *Wenbo Wang*[1]; Wenjun Cai[1]; [1]Virginia Polytechnic Institute and State University

2:20 PM
Localized Corrosion Resistance of Ni-Cr-Co-Fe-Mo MPE Alloys in Aqueous and Methanolic Environments: Angeire Huggins Gonzalez[1]; *Narasi Sridhar*[2]; Ramgopal Thodla[1]; [1]DNV; [2]MC Consult LLC

2:40 PM
Equivalent Hydrogen Fugacity during Electrochemical Charging of Nickel Single Crystal: Comparison with Gaseous Hydrogen Charging: *Clara Juillet*[1]; Jiaqi Li[1]; Caroline Traisnel[1]; Marie Landeiro Dos Reis[1]; Jamaa Bouhattate[1]; Abdelali Oudriss[1]; Laurent Briottet[2]; Xavier Feaugas[1]; [1]Laboratoire des Sciences de l'Ingénieur pour l'Environnement (LaSIE); [2]Univ Grenoble Alpes, CEA, LITEN, DTCH, LCA

3:00 PM Invited
Exploring Hydrogen-induced Martensitic Transformation and Twinning Effects Metastable Fe-Mn-Co-Cr High Entropy Alloys: *C. Tasan*[1]; Maria Ronchi[1]; Haoxue Yan[1]; [1]Massachusetts Institute of Technology

---

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Corrosion and Degradation in Harsh Environments 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

Wednesday PM | March 2, 2022
201D | Anaheim Convention Center

Session Chairs: C. Cem Tasan, Massachusetts Institute of Technology; Yanfei Gao, University of Tennessee

---

2:00 PM Invited
Hydrogen Effects in Metals: New Tools, New Insights: *C. Tasan*[1]; Jinwoo Kim[1]; Haoxue Yan[1]; [1]Massachusetts Institute of Technology

2:35 PM
Alloy and Process Modification for Reduced Hydrogen Sensitivity of High Hardness Steel: *William Williams*[1]; Shiraz Mujahid[1]; Shane Brauer[1]; Haley Doude[1]; Kevin Doherty[2]; Daniel Field[2]; Krista Limmer[2]; Hongjoo Rhee[1]; [1]Mississippi State University; [2]CCDC Army Research Laboratory

2:55 PM
Role of Accumulated Plastic Strain on Grain Boundary Corrosion of Steel: *Amir Abdelmawla*[1]; Kaustubh Kulkarni[1]; Ashraf Bastawros[1]; [1]Iowa State University

3:15 PM
Mechanisms of Mitigating Chloride-induced Stress Corrosion Cracking of Austenitic Steels by Laser Shock Peening: Yongchul Yoo[1]; Xueliang Yan[1]; Fei Wang[1]; Qiuchi Zhu[1]; Yongfeng Lu[1]; *Bai Cui*[1]; [1]University of Nebraska-Lincoln

3:35 PM Break

3:55 PM Invited
On the Critical Role of Localized Oxidation Processes in High Temperature Failures under Cyclic Thermomechanical Loading Conditions: *Yanfei Gao*[1]; [1]University of Tennessee-Knoxville

4:30 PM
Corrosion and Mechanical Characterization of Friction-stir Welded Joints between Aluminum and Magnesium Alloys: *Qingli Ding*[1]; Kübra Karayagiz[1]; Brajendra Mishra[1]; Adam C Powell[1]; Donovan Leonard[2]; [1]Worcester Polytechnic Institute; [2]Oak Ridge National Laboratory

4:50 PM
Modeling of Corrosion and Mechanical Failure in Friction Stir Welded Magnesium-aluminum Vehicle Joints: *Kubra Karayagiz*[1]; Adam Powell[1]; Qingli Ding[1]; Donovan Leonard[2]; Piyush Upadhyay[3]; Brajendra Mishra[1]; [1]Worcester Polytechnic Institute; [2]Oak Ridge National Laboratory; [3]Pacific Northwest National Laboratory

---

SPECIAL TOPICS

Frontiers of Materials Award Symposium Session: Data-Driven, Machine-learning Augmented Design and Novel Characterization for Nano-architectured Materials — A Special Award Session for Symposium: Self-organizing Nano-architectured Materials

Program Organizer: Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory

Wednesday PM | March 2, 2022
260C | Anaheim Convention Center

Session Chairs: Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Ian McCue, Northwestern University

---

2:00 PM Invited
Designing Nano-architectured Materials with a Machine-learning Augmented Framework: Chonghang Zhao[1]; Cheng-Chu Chung[1]; *Yu-chen Karen Chen-Wiegart*[2]; [1]Stony Brook University; [2]Stony Brook University / Brookhaven National Laboratory

2:30 PM
"Big Data" Characterization of Material Properties and High Temperature Kinetics: *James Horwath*[1]; Peter Voorhees[2]; Eric Stach[1]; [1]University of Pennsylvania; [2]Northwestern University

2:50 PM Invited
Discovery of Nanocomposite Phase Change Memory Materials via Closed-loop Autonomous Combinatorial Experimentation: *Ichiro Takeuchi*[1]; [1]University of Maryland

3:20 PM Break

3:40 PM Invited
Intelligent Design of Additively Manufactured Architected Materials: *Mitra Taheri*[1]; [1]Johns Hopkins University

4:10 PM
Machine Learning Based Hierarchical Multi-scale Modeling of Mechanical Deformation for Metal-matrix-nano-composites: *Md Shahrier Hasan*[1]; Wenwu Xu[1]; [1]San Diego State University

4:30 PM
Accelerated Discovery of Multi-phase Refractory Alloys through Machine Learning Surrogate Models of CALPHAD: *Samuel Price*[1]; Ian McCue[1]; Jonah Erlebacher[2]; [1]Northwestern University; [2]Johns Hopkins University

---

NANOSTRUCTURED MATERIALS

Functional Nanomaterials: Functional Low-Dimensional (0D, 1D, 2D) Materials 2022 — Functional Bio-Nanomaterials & Biosensors II

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

Program Organizers: Michael Cai Wang, University of South Florida; Yong Lin Kong, University of Utah; Sarah Ying Zhong, University of South Florida; Surojit Gupta, University of North Dakota; Nasrin Hooshmand, Georgia Institute of Technology; Woochul Lee, University of Hawaii at Manoa; Min Kyu Song, Washington State University; Simona Hunyadi Murph, Savannah River National Laboratory; Hagar Labouta, University of Manitoba; Max Anikovskiy, University of Calgary; Patrick Ward, Savannah River National Laboratory

Wednesday PM | March 2, 2022
260B | Anaheim Convention Center

Session Chairs: Michael Cai Wang, University of South Florida; Yong Lin Kong, University of Utah

---

2:00 PM
Spatial Control of Laser Induced Graphene Morphology on Flexible Substrates: Moataz Abdulhafez[1]; Golnaz Tomaraei[1]; Ki-Ho Nam[1]; *Mostafa Bedewy*[1]; [1]University of Pittsburgh

2:20 PM
Joining Graphene-modified Textile Fiber Sensors via Nanosolder Melting and Interconnection: *Edward Fratto*[1]; Ramaswamy Nagarajan[1]; Xuejun Lu[1]; Zhiyong Gu[1]; [1]University of Massachusetts Lowell

2:40 PM Keynote
Skin-interfaced Wearable Biosensors: *Wei Gao*[1]; [1]California Institute of Technology

3:25 PM Break

3:45 PM
Multi-scale Numerical Modelling of Nanoparticle Transport across the Placental Barrier on Placenta-on-a-chip Physical Model: Hongwei Liu[1]; *Anisa Khan*[1]; Moustafa Ali[1]; Hagar Labouta[1]; Pooneh Maghoul[1]; [1]University of Manitoba

4:05 PM
Machine Learning Analysis of Spectral Data Using Bacteria for Signal Amplification: *Hong Wei*[1]; Yixin Huang[1]; Peter Santiago[1]; Allon Hochbaum[1]; Regina Ragan[1]; [1]University of California Irvine

4:25 PM
Optically Active Nanoparticles in Protein Corona Studies: *Max Anikovskiy*[1]; [1]University of Calgary

---

MECHANICS & STRUCTURAL RELIABILITY

Grain Boundaries and Interfaces: Metastability, Disorder, and Non-Equilibrium Behavior — Alloying, Solute Segregation, and Precipitation: Part II

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

Program Organizers: Yue Fan, University of Michigan; Liang Qi, University of Michigan; Jeremy Mason, University of California, Davis; Garritt Tucker, Colorado School of Mines; Pascal Bellon, University of Illinois at Urbana-Champaign; Mitra Taheri, Johns Hopkins University; Eric Homer, Brigham Young University; Xiaofeng Qian, Texas A&M University

Wednesday PM | March 2, 2022
304C | Anaheim Convention Center

Session Chairs: Yue Fan, University of Michigan, Ann Arbor; Xiaofeng Qian, Texas A&M University

---

2:00 PM Invited
Disordered Interfacial Features as Local Equilibrium States Capable of Modifying Nanocrystalline Metals: *Timothy Rupert*[1]; [1]University of California, Irvine

2:30 PM
The Role of Grain Boundary Metastability in Solute Segregation: Insights from Atomistic and Machine Learning Studies: *Fadi Abdeljawad*[1]; Yasir Mahmood[1]; Enrique Martinez[1]; [1]Clemson University

2:50 PM
Exploring the Structure and Chemistry Contributions to Interfacial Segregation in NbMoTaW with High-throughput Atomistic Simulations: *Ian Geiger*[1]; Timothy Rupert[1]; [1]University of California Irvine

3:10 PM
Using Grain Boundary Segregation Spectra to Design for Nanocrystalline Stability: *Malik Wagih*[1]; Christopher Schuh[1]; [1]Massachusetts Institute of Technology

3:30 PM Break

3:45 PM Invited
Unraveling Mechanisms of Interface Diffusion and Interfacial Creep in Metals and Metal-ceramic Composites: *Ian Chesser*[1]; Raj Koju[1]; Yuri Mishin[1]; [1]George Mason University

4:15 PM
Solute Drag in Regular Solution Alloys: Self-similarity and the Role of Grain Boundary Structure: *Fadi Abdeljawad*[1]; Malek Alkayyali[1]; [1]Clemson University

4:35 PM
Segregation-assisted Concentration Modulation within Grain Boundaries: *Longsheng Feng*[1]; Di Qiu[2]; Kamal Kadirvel[1]; Pengyang Zhao[3]; Suliman Dregia[1]; Yunzhi Wang[1]; [1]The Ohio State University; [2]Shanghai University; [3]Shanghai Jiao Tong University

4:55 PM
Machine Learning-assisted Prediction of Interfacial Segregation in a Refractory Multi-principal Element Alloy: *Doruk Aksoy*[1]; Timothy Rupert[1]; [1]University of California, Irvine

---

ADVANCED MATERIALS

High Performance Steels — Damage and Fracture in Steels

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

Program Organizers: Ana Luiza Araujo, CBMM North America Inc.; C. Tasan, Massachusetts Institute of Technology; Jonah Kleem-Toole, Colorado School of Mines; Louis Hector, General Motors Global Technical Center; Tilmann Hickel, Max-Planck-Institut Fuer Eisenforschung; Benjamin Adam, Oregon State University

Wednesday PM | March 2, 2022
252C | Anaheim Convention Center

Session Chairs: Kayla Molnar, Los Alamos National Laboratory; Louis Hector, General Motors

---

2:00 PM
In-situ Investigation of Strain Partitioning and Localization in a Dual Phase Steel Up to and Beyond Necking: *Hyunseok Oh*[1]; Krista Biggs[1]; Onur Güvenç[1]; Hassan Ghassemi-Armaki[1]; Narayan Pottore[1]; Cemal Cem Tasan[1]; [1]Massachusetts Institute of Technology

2:20 PM
Strain Path Dependence of Microstructural Strain Path Development: An Experimental-numerical Study on Dual-phase Steels: *Julian Rackwitz*[1]; Onur Güvenç[1]; Cem Tasan[1]; [1]Massachusetts Institute of Technology

2:40 PM
Microstructure and Mechanism Based Lifetime Predictions in Various Weldment Failures Under Complex Thermomechanical Conditions: *Yi Yang*[1]; Yanfei Gao[1]; Jorge Penso[2]; Zhili Feng[3]; [1]University of Tennessee Knoxville; [2]Shell; [3]Oak Ridge National Laboratory

3:00 PM
Strain Partitioning Analysis during Tensile Tests in Intercritically Deformed Steels: Unai Mayo[1]; Nerea Isasti[1]; Jose Rodriguez-Ibabe[1]; *Pello Uranga*[1]; [1]CEIT and TECNUN (University of Navarra)

3:20 PM Break

3:35 PM
Tensile Behaviour and Martensitic Transformations in a Cold Rolled Medium Mn Steel: *Thomas Kwok*[1]; [1]Imperial College London

---

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — General Materials and Chemistry II

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

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

Wednesday PM | March 2, 2022
203B | Anaheim Convention Center

Session Chair: Stephen Raiman, Texas A&M University

2:00 PM
High-throughput and Machine Learning Accelerated Discovery of Corrosion-resistant Alloy for Molten Salt Applications: *Yafei Wang*[1]; Bonita Goh[1]; Phalgun Nelaturu[1]; Thien Duong[2]; Najlaa Hassan[1]; Raphaelle David[1]; Michael Moorehead[1]; Santanu Chaudhuri[2]; Jason Hattrick-Simpers[3]; Dan Thoma[1]; Kumar Sridharan[1]; Adrien Couet[1]; [1]University of Wisconsin-Madison; [2]Argonne National Laboratory; [3]National Institute of Standard and Technology

2:20 PM
Mechanisms and Model Development for Molten Salt Corrosion: *Jinsuo Zhang*[1]; [1]Virginia Polytechnic Institute and State University

2:40 PM
In-situ Corrosion Monitoring of 316 SS L Natural Convection Loop by Radioactive Isotope Tracking: *Yafei Wang*[1]; Cody Falconer[1]; Aeli Olson[1]; Jonathan Engle[1]; Brian Kelleher[2]; Kumar Sridharan[1]; Adrien Couet[1]; [1]University of Wisconsin-Madison; [2]TerraPower, LLC

3:00 PM
Thermal Gradient Mass Transport Corrosion in Molten Chloride Salts: *Brian Kelleher*[1]; Sean Gagnon[1]; Ivan Mitchell[1]; [1]Terrapower

3:20 PM Break

3:40 PM
Thermodynamic Properties of Gd-Bi Alloys Determined by EMF Measurements in LiCl-KCl-$GdCl_3$ Electrolyte: *Stephanie Castro Baldivieso*[1]; Nathan Smith[1]; Sanghyeok Im[1]; Hojong Kim[1]; [1]Penn State University

---

MATERIALS DESIGN

Materials Design and Processing Optimization for Advanced Manufacturing: From Fundamentals to Application — Materials Design and Processing Optimization: Session VI

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

Program Organizers: Wei Xiong, University of Pittsburgh; Dana Frankel, QuesTek Innovations LLC; Gregory Olson, Massachusetts Institute of Technology

Wednesday PM | March 2, 2022
253B | Anaheim Convention Center

Session Chairs: Yan Li, Dartmouth College; Victoria Miller, University of Florida

---

2:00 PM Invited
Alloy Design/Modification, Powder Feedstock Atomization and Process Optimization Modeling for Additive Manufacturing by Laser Powder Bed Fusion: *Yongho Sohn*[1]; Jeongmin Woo[1]; Abhishek Mehta[1]; Kevin Graydon[1]; Thinh Huynh[1]; Nathalia Diaz[1]; Asif Mahmud[1]; [1]University of Central Florida

2:25 PM
Microstructure Prediction of Additively Manufactured 316L Using Heat Transfer, Thermodynamic, and Solidification Models: *Charles Smith*[1]; Olivia Denonno[1]; Matthew Schreiber[1]; Anthony Petrella[1]; Amy Clarke[1]; Zhenzhen Yu[1]; Jonah Klemm-Toole[1]; [1]Colorado School of Mines

2:45 PM
A New CALPHAD-based Approach to Develop Chromium and Nickel Equivalencies for Austenitic Stainless Steels: *Benjamin Sutton*[1]; Nathan Daubenmier[1]; Antonio Ramirez[1]; [1]Ohio State University

3:05 PM
Microstructural Evolution of Compositionally Graded Proton Irradiated 316 Stainless Steel as a High Throughput Alloy: *Laura Hawkins*[1]; Jingfan Yang[2]; Xiaoyuan Lou[2]; Miao Song[3]; Yongfeng Zhang[4]; Daniel Schwen[1]; Lin Shao[5]; Lingfeng He[1]; [1]Idaho National Laboratory; [2]Auburn University; [3]University of Michigan; [4]University of Wisconsin - Madison; [5]Texas A&M University

3:25 PM Break

3:40 PM
Material Interdiffusion and Necking between Dissimilar Nanoporous Metal Interfaces: *Natalya Kublik*[1]; Stanislau Niauzorau[1]; Sridhar Niverty[2]; Nikhilesh Chawla[2]; Bruno Azeredo[1]; [1]Arizona State University; [2]Purdue University

4:00 PM
A Numerical and Experimental Study of Simultaneous Topology/Orientation Optimization via SOMP and Principal Stress Directions: *Bailey Brown*[1]; Brett Compton[2]; Natasha Vermaak[1]; Nadim Hmeidat[2]; Jackson Wilt[2]; Xiu Jia[1]; [1]Lehigh University; [2]University of Tennessee, Knoxville

4:20 PM
Designing Photopolymer Inks from Low Viscosity Newtonian Resins: *Andrew Weems*[1]; [1]Ohio University-Main Campus

4:40 PM
Shear Assisted Processing and Extrusion (ShAPETM) for Manufacturing of Copper-graphene Composites for Ultra-high Electrical Conductivity: Emphasis on Microstructural Evolution: *Bharat Gwalani*[1]; Xiao Li[1]; Woongjo Choi[1]; Aditya Nittala[1]; Julian Escobar[1]; Joshua Silverstein[1]; William Frazier[1]; Keerti Kappagantula[1]; [1]Pacific Northwest National Laboratory

---

MATERIALS PROCESSING

Materials Processing Fundamentals — Numerical Process Simulations/ Process Thermodynamics

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Samuel Wagstaff, Oculatus; Alexandra Anderson, Gopher Resource; Jonghyun Lee, Iowa State University; Adrian Sabau, Oak Ridge National Laboratory; Fiseha Tesfaye, Åbo Akademi University

Wednesday PM | March 2, 2022
213D | Anaheim Convention Center

Session Chair: To Be Announced

2:00 PM Introductory Comments

2:05 PM
Analytical and Numerical Study on Martensitic Coatings by Cold-spraying Austenitic Stainless Steel: Cal Vin Wong[1]; Christian Widener[2]; Dennis Helfritch[3]; Victor Champagne[3]; *Jonghyun Lee*[1]; [1]Iowa State University; [2]VRC Metal Systems; [3]ARL Cold Spray Center

2:25 PM
Ultrasonics in Levitating Droplets: *Catherine Tonry*[1]; Valdis Bojarevics[1]; Georgi Djambazov[1]; Andrew Kao[1]; Koulis Pericleous[1]; [1]University of Greenwich

2:45 PM
VOF-based CFD Simulation of a Pilot-scale TSL Furnace: *Daniele Obiso*[1]; Markus Reuter[2]; Andreas Richter[3]; [1]Cic Virtuhcon, Tubaf; [2]SMS group GmbH; [3]TU Bergakademie Freiberg

3:05 PM
Finite Element Analysis Modeling of Gravity-driven Multiple Effect Thermal System(G-METS)DistillationforEfficientLow-costMagnesiumRefining:*Armaghan Ehsani Telgerafchi*[1]; Daniel McArthur[1]; Gabriel Espinosa[1]; Madison Rutherford[1]; Adam Powell[1]; David Dussault[2]; [1]Worcester Polytechnic Institute; [2]Elemental Brewing Company

3:25 PM Break

3:45 PM
Study on the Interface Structure and Element Distribution of Manganese-containing Slag: *Xiaobo He*[1]; Lijun Wang[1]; Kuochih Chou[1]; [1]University of Science and Technology Beijing

4:05 PM
Experimental Phase Diagram Study in CaO-MgO-V2O5 System: *Guishang Pei*[1]; Lilian Yang[1]; Dapeng Zhong[1]; Junyi Xiang[1]; Xuewei Lv[1]; [1]Chongqing University

---

NUCLEAR MATERIALS

Materials Systems for the Future of Fusion Energy — Radiation Effects in FeCr Alloys and ODS Steels

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

Program Organizers: Jason Trelewicz, Stony Brook University; Kevin Field, University of Michigan; Takaaki Koyanagi, Oak Ridge National Laboratory; Yuanyuan Zhu, University of Connecticut; Dalong Zhang, Pacific Northwest National Laboratory

Wednesday PM | March 2, 2022
203A | Anaheim Convention Center

Session Chairs: Gary Was, University of Michigan; William Cunningham, Stony Brook University

---

2:00 PM
Post-irradiation Examination of High-dose Ion Irradiated MA956 ODS Alloy: *Yu Lu*[1]; Yaqiao Wu[1]; Ramprashad Prabhakaran[2]; Megha Dubey[1]; Lin Shao[3]; Jing Wang[2]; Dalong Zhang[2]; [1]Boise State University/Center for Advanced Energy Studies; [2]Pacific Northwest National Laboratory; [3]Texas A&M University

2:20 PM Invited
Low Temperature Hardening-embrittlement in Neutron Irradiated ODS Steels: *Arunodaya Bhattacharya*[1]; Samara Levine[2]; Xiang Chen[1]; Takashi Nozawa[3]; Steven Zinkle[2]; Yutai Katoh[1]; [1]Oak Ridge National Laboratory; [2]University of Tennessee; [3]National Institutes for Quantum and Radiological Science and Technology (QST)

2:50 PM Invited
Recent Progress in Understanding Fundamental Radiation Degradation Processes: *Steven Zinkle*[1]; Yan-Ru Lin[1]; Yajie Zhao[1]; Samara Levine[1]; Yao Li[1]; Zehui Qi[1]; Arunodaya Bhattacharya[1]; Shradha Agarwal[1]; [1]University of Tennessee

3:20 PM Break

3:45 PM
Effect of Cr and He on Cavity Swelling in Dual-Ion Irradiated High Purity Fe-Cr Alloys: Yan-Ru Lin[1]; Arunodaya Bhattacharya[2]; Jean Henry[3]; *Steven Zinkle*[1]; [1]University of Tennessee; [2]Oak Ridge National Laboratory; [3]CEA

4:05 PM Invited
Synergies between H and He in Radiation-induced Swelling of Candidate Fusion Blanket Materials: Logan Clowers[1]; Zhijie Jiao[1]; *Gary Was*[1]; [1]University of Michigan

NUCLEAR MATERIALS

Mechanical Behavior and Degradation of Advanced Nuclear Fuel and Structural Materials — Novel Nuclear Materials & Characterization II

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

Program Organizers: Dong Liu, University of Bristol; Peng Xu, Idaho National Laboratory; Simon Middleburgh, Bangor University; Christian Deck, General Atomics; Erofili Kardoulaki, Los Alamos National Laboratory; Robert Ritchie, University of California, Berkeley

Wednesday PM | March 2, 2022
204A | Anaheim Convention Center

Session Chairs: Joshua White, LANL; Robert Ritchie, Lawrence Berkeley National Laboratory

---

2:00 PM
Helium Implantation Responses of Co-deposited Copper-tungsten Nanocomposites: *Kelvin Xie*[1]; Digvijay Yadav[1]; Michael Demkowicz[1]; [1]Texas A&M University

2:20 PM
A Case Study on Radiation-induced Degradation of High-entropy Alloys: *Matheus Araujo Tunes*[1]; Osman El-Atwani[1]; Stuart Maloy[1]; [1]Los Alamos National Laboratory

2:40 PM
In Situ Microstructural Evolution in Face-centered Cubic Compositionally Complex Alloys under Dual-beam Heavy-ion Irradiation: *Calvin Parkin*[1]; Michael Moorehead[1]; Kumar Sridharan[1]; Weiying Chen[2]; Meimei Li[2]; Adrien Couet[1]; [1]University of Wisconsin-Madison; [2]Argonne National Laboratory

3:00 PM
Hydrogen Accommodation in the TiZrNbHfTa High Entropy Alloy: *Christopher Moore*[1]; Jack Wilson[1]; Michael Rushton[1]; Jack Astbury[2]; Simon Middleburgh[1]; [1]Bangor University; [2]Tokamak Energy Ltd

3:20 PM Break

3:40 PM
Effect of Residual Strain on Short Time Oxidation Behavior of Machined 304 Stainless Steel in High Temperature, High Pressure Deaerated Water: *Rachel Turfitt*[1]; Bryan Webler[1]; [1]Carnegie Mellon University

---

NANOSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale VI — Nanomechanics-coupled Material Physics

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

Program Organizers: Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, University of Texas at San Antonio; Changhong Cao, McGill University; Mohsen Asle Zaeem, Colorado School of Mines

Wednesday PM | March 2, 2022
204B | Anaheim Convention Center

Session Chairs: Douglas Stauffer, Bruker Nano Inc.; Katherine Jungjohann, Sandia National Laboratories

---

2:00 PM Invited
Impact of Hydrogen on Dislocation Nucleation and Strength in bcc Fe-Cr Alloys: *Gerhard Dehm*[1]; Jing Rao[1]; Maria Jazmin Duarte[1]; [1]MPI Eisenforschung

2:30 PM
Micro-mechanical Characterization of Geometric and Defect Dependent Responses in 3D Kirigami Polymer Structures: *Jungkyu Lee*[1]; Kian Bashandeh[2]; Andreas Polycarpou[2]; [1]Bruker Nano Surfaces Division; [2]Texas A&M University

2:50 PM Invited
Nanoscale Characterization of Electrochemical-mechanical Mechanisms with Electron Microscopy: *Katherine Jungjohann*[1]; Daniel Long[1]; Katharine Harrison[1]; Laura Merrill[1]; Zach Milne[1]; Khalid Hattar[1]; [1]Sandia National Laboratories

3:20 PM Break

3:40 PM
Thermal Stability of Nanocrystalline NiYZr Alloys: *Saurabh Sharma*[1]; Kris Darling[2]; Vikrant Beura[1]; Yashaswini Karanth[1]; Kiran Solanki[1]; [1]Arizona State University; [2]Army Research Laboratory

4:00 PM
Molecular Dynamics Modeling of Helium Nanobubble Growth in Irradiated Copper Matrix: *Ali K. Shargh*[1]; Ognjen Bosic[1]; Niaz Abdolrahim[1]; [1]University of Rochester

4:20 PM
Understanding the Local Structure-property Relationships of Pb-Sn Solders in Terrestrial vs. Microgravity Environments: *Manish Kumar*[1]; Sid Pathak[1]; [1]Iowa State University Ames

---

CHARACTERIZATION

Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling — Session V

Sponsored by: TMS Structural Materials Division, TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Shailendra Joshi, University of Houston; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Jagannathan Rajagopalan, Arizona State University; Robert Wheeler, Microtesting Solutions LLC

Wednesday PM | March 2, 2022
206B | Anaheim Convention Center

Session Chairs: Nathan Johnson, Stanford University Eric Payton, Air Force Research Laboratory

---

2:00 PM Invited
A Predictive Capability for Mechanical Behavior of Additively Manufactured Lattice Structures: John Carpenter[1]; Donald Brown[1]; Vimal Chaitanya[2]; Borys Drach[2]; Zachary Paesani[2]; *Nathan Johnson*[3]; Jenny Wang[4]; Maria Strantza[4]; [1]Los Alamos National Laboratory; [2]New Mexico State University; [3]SLAC National Accelerator Laboratory; [4]Lawrence Livermore National Laboratory

2:30 PM Invited
Toward Improved Constitutive Behavior Models Sensitive to High Strength Steel Microstructures through Advancements in Data Analysis Tools: *Eric Payton*[1]; [1]Air Force Research Laboratory

3:00 PM
A Numerical Study on Surface Effect in Hexagonal Slip Activity: *Ruxin Zhang*[1]; Thomas Bieler[1]; Philip Eisenlohr[1]; [1]Michigan State University

3:20 PM Break

3:40 PM
Inferring Dynamic Mechanical Properties of Materials Using a Combination of High-rate Machining Experiments and Simulations: *Umair Bin Asim*[1]; Michael Demkowicz[1]; Ankit Srivastava[1]; [1]Texas A&M University

4:00 PM
Strain Localization in Metastable Beta Ti Alloys in Relation to the Beta Structure: *Azdine Nait-Ali*[1]; Anaïs Huet[1]; Samuel Hemery[1]; [1]Isae-Ensma

---

MATERIALS DESIGN

Microstructural Templates Consisting of Isostructural Ordered Precipitate / Disordered Matrix Combinations: Microstructural Evolution and Properties — Session III

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

Program Organizers: Rajarshi Banerjee, University of North Texas; Eric Lass, University of Tennessee-Knoxville; Bharat Gwalani, Pacific Northwest National Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Jessica Krogstad, University of Illinois at Urbana-Champaign; Ashley Paz Y Puente, University of Cincinnati; Keith Knipling, Naval Research Laboratory; Matthew Steiner, University of Cincinnati

Wednesday PM | March 2, 2022
254A | Anaheim Convention Center

Session Chairs: Ashley Puente, University of Cincinnati; Keith Knipling, Naval Research Laboratory

---

2:00 PM Introductory Comments

2:05 PM Invited
Comparison of γ' and B2 Precipitates and Their Influence on the Mechanical Behavior of FeNiCoAl-based High-entropy Alloys: Cheng Zhang[1]; Benjamin MacDonald[1]; Mingjie Xu[1]; *Enrique Lavernia*[1]; [1]University of California, Irvine

2:35 PM Invited
Understanding the Role of Chemistry on Planar Fault Energies in A3B Compositions: *K V Vamsi*[1]; Tresa Pollock[1]; [1]University of California, Santa Barbara

3:05 PM Invited
Optimizing Composition and Microstructure in Compositionally Complex Alloys Possessing bcc and B2 Mixtures: Zachary Kloenne[1]; Brian Welk[1]; Kamalnath Kadirvel[1]; Gopal Viswanathan[1]; Jean-Philippe Cousinie[1]; Yunzhi Wang[1]; *Hamish Fraser*[1]; [1]The Ohio State University

3:35 PM Break

3:55 PM
Precipitation of Ordered B2 Precipitates in BCC $Al_{2.7}$CrMnTiV High-entropy Alloys: *Keith Knipling*[1]; Patrick Callahan[1]; David Beaudry[1]; [1]Naval Research Laboratory

4:25 PM
Bcc-Superalloys Microstructure Templates: Tungsten to Titanium to Iron: *Alexander Knowles*[1]; [1]University of Birmingham

4:55 PM
The Microstructural Design and Thermomechanical Processing of Compositionally Complex Alloys: *Mark Wischhusen*[1]; Samuel Inman[1]; Jie Qi[1]; Joseph Poon[1]; John Scully[1]; Jishnu Bhattacharyya[1]; Alireza Zargaran[2]; Sean Agnew[1]; [1]University of Virginia; [2]Pohang University of Science and Technology

5:20 PM Concluding Comments

SPECIAL TOPICS

Nix Award and Lecture Symposium: Nanomechanics and Mechanomaterials — Nix Award III

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

Program Organizers: Wendelin Wright, Bucknell University; Gang Feng, Villanova University

Wednesday PM | March 2, 2022
259A | Anaheim Convention Center

Session Chairs: Gang Feng, Villanova University; Wendelin Wright, Bucknell University; Erica Lilleodden, Helmholtz-Zentrum Geesthacht

---

2:00 PM Invited
2022 William D Nix Award Lecture: Mechano-materials: Engineering Mechanical Properties of Materials with Internal Interfaces and Lightweight Structures: *Huajian Gao*[1]; [1]Nanyang Technological University

3:00 PM Invited
Release with Ease – Bioinspired Designs for Placing Micro-objects: *Eduard Arzt*[1]; Xuan Zhang[1]; Yue Wang[1]; René Hensel[1]; [1]INM – Leibniz Institute for New Materials and Saarland University

3:30 PM Break Coffee Break

4:00 PM Invited
Modeling Programmable Drug Delivery in Bioelectronics with Electrochemical Actuation: *Yonggang Huang*[1]; [1]Northwestern University

4:30 PM Invited
Materials by Design: Three-dimensional (3D) Nano-architected Meta-materials: *Julia Greer*[1]; [1]California Institute of Technology

---

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Modeling and Simulations

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Ramasis Goswami, Naval Research Laboratory; Saurabh Puri, Microstructure Engineering; Eric Payton, Air Force Research Laboratory; Bij-Na Kim, Carpenter Additive; Megumi Kawasaki, Oregon State University; Eric Lass, University of Tennessee-Knoxville

Wednesday PM | March 2, 2022
255B | Anaheim Convention Center

Session Chair: Vahid Tari, ATI

2:00 PM
Atomistic Modeling of -Fe2C Carbide Precipitation Kinetics in Fe-C System: Helena Zapolsky[1]; *Felix Schwab*[1]; Renaud Patte[1]; Gilles Demange[1]; Armen Khachaturyan[2]; [1]Cnrs, Gpm, Umr 6634; [2]Rutgers University NJ, USA

2:20 PM
An Molecular Dynamics Simulation Study of the Interface Migration Mechanism during B2-B33 Transformation in Ni50Zr50 Alloy: *Huajing Song*[1]; M.I. Mendelev[2];

[1]Los Alamos National Laboratory; [2]Ames Laboratory

2:40 PM
Modeling of Phase Transformation Kinetics in Ti-6Al-4V Alloy during Additive Manufacturing: *Adrian Boccardo*[1]; Xinyu Yang[2]; Damien Tourret[3]; Javier Segurado[4]; Mingming Tong[2]; Seán Leen[2]; [1]Mechanical Engineering, School of Engineering, College of Science and Engineering, National University of Ireland Galway, Galway, Ireland. I-Form Advanced Manufacturing Research Centre, National University of Ireland Galway, Galway, Ireland. IMDEA Materials Institute, Madrid, Spain; [2]Mechanical Engineering, School of Engineering, College of Science and Engineering, National University of Ireland Galway, Galway, Ireland. I-Form Advanced Manufacturing Research Centre, National University of Ireland Galway, Galway, Ireland; [3]IMDEA Materials Institute, Madrid, Spain; [4]IMDEA Materials Institute, Madrid, Spain. Universidad Politécnica de Madrid (UPM), Escuela Técnica Superior de Ingenieros de Caminos, Canales y Puertos, Madrid, Spain

3:00 PM
Phase Field Simulations of Microstructural Evolution Using the PRISMS-PF Framework: *David Montiel*[1]; Stephen DeWitt[1]; John Allison[1]; Katsuyo Thornton[1]; [1]University of Michigan

3:20 PM Break

3:40 PM
A Strain-induced Austenite to Martensite Transformation Kinetics Law Implemented in Crystal Plasticity for Predicting Strain-path Sensitive Deformation of Stainless Steels: *Marko Knezevic*[1]; Zhangxi Feng[1]; [1]University of New Hampshire

---

ADDITIVE TECHNOLOGIES

Powder Materials Processing and Fundamental Understanding — Powder Material Studies

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, Pacific Northwest National Laboratory

Wednesday PM | March 2, 2022
263C | Anaheim Convention Center

Session Chairs: Ruigang Wang, The University of Alabama; Isabella Van Rooyen, Pacific Northwest National Laboratory

---

2:00 PM
Redox Chemistry of Surface-engineered CeO2 Nanocrystals: Catalytic and Electrochemical Applications: Yifan Wang[1]; Zhen Wei[1]; *Ruigang Wang*[1]; [1]The University of Alabama

2:20 PM Invited
Particle-based Nanostructured Ceramics for Tailored Functional and Mechanical Properties: *Diletta Giuntini*[1]; Buesra Bor[2]; Alexander Plunkett[2]; Berta Domenech[2]; Gerold Schneider[2]; [1]Eindhoven University of Technology; [2]Hamburg University of Technology

2:50 PM
Silicon Oxycarbide Coatings on Zirconia Microspheres Using a Fluidized Bed Coating Process: *Kathy Lu*[1]; Sanjay Singh[1]; [1]Virginia Polytechnic Institute and State University

3:10 PM
Rapid Solidification of Ultrasonically Atomised Aluminium Melt: Shazamin Shahrani[1]; Tungky Subroto[2]; Dmitry Eskin[2]; Iakovos Tzanakis[1]; John Durodola[1]; Georges Salloum-Abou-Joude[3]; *Abhinav Priyadarshi*[1]; [1]Oxford Brookes University; [2]Brunel University; [3]Constellium

3:30 PM Break

3:50 PM
Understanding Mechanisms Behind Morphological Changes in Gas Atomized Powders after Laser Irradiation: *Jonathan Skelton*[1]; Connor Headley[1]; Eli Sullivan[1]; James Fitz-Gerald[1]; Jerrold Floro[1]; [1]University of Virginia

---

LIGHT METALS

Primary Aluminum Industry - Energy and Emission Reductions: An LMD Symposium in Honor of Halvor Kvande — Energy and Emission Reductions II: An LMD Symposium in Honor of Halvor

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

Program Organizer: Arne Ratvik, SINTEF

Wednesday PM | March 2, 2022
208A | Anaheim Convention Center

Session Chair: Arne Ratvik, SINTEF Industry

2:00 PM Introductory Comments

2:05 PM
A Historical Review of Aluminum Reduction Cell Start-up and Early Operation: *Michel Reverdy*[1]; Vinko Potocnik[2]; [1]Emirates Global Aluminium; [2]Vinko Potocnik Consultant Inc.

2:30 PM
Direct and Indirect CO2 Equivalent Emissions from Primary Aluminium Production: Halvor Kvande[1]; *Gudrun Saevarsdottir*[2]; Barry Welch[3]; [1]Norwegian University of Science & Technology; [2]Reykjavik University; [3]University of Auckland, Auckland, New Zealand, and University of New South Wales

2:55 PM
Gas Recycling and Energy Recovery. Future Handling of Flue Gas from Aluminium Electrolysis Cells: *Samuel Senanu*[1]; Asbjørn Solheim[1]; Rune Lødeng[1]; [1]SINTEF

3:20 PM
The TMS Industrial Aluminum Electrolysis Course – History, Development of Contents, and Future: Halvor Kvande[1]; Stephen Lindsay[2]; Vinko Potocnik[3]; Alton Tabereaux[4]; Barry Welch[5]; *Michel Reverdy*; [1]Norwegian University of Science & Technology; [2]Hatch. Previously: Alcoa Inc.; [3]Potocnik Consultant Inc.; [4]Smelting Consultant; [5]University of Auckland and University of New South Wales

3:45 PM Panel Discussion

REWAS 2022: Automation and Digitalization for Advanced Manufacturing — Advanced Process Simulation, Visualization and Measurement Techniques

Sponsored by: TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee, TMS: Process Technology and Modeling Committee

Program Organizers: Elsa Olivetti, Massachusetts Institute of Technology; Alexandra Anderson, Gopher Resource; Mertol Gökelma, Izmir Institute of Technology; Camille Fleuriault, Eramet Norway

Wednesday PM | March 2, 2022
211B | Anaheim Convention Center

Session Chair: Alexandra Anderson, Gopher Resource

2:00 PM Introductory Comments

2:05 PM Invited
Digitalization for Advanced Manufacturing through Simulation, Visualization and Machine Learning: *Chenn Zhou*[1]; John Moreland[1]; Armin Silaen[1]; Tyamo Okosun[1]; Nicholas Walla[1]; Kyle Toth[1]; [1]Purdue University Northwest

2:35 PM Invited
Computational Methodology to Simulate Pyrometallurgical Processes in a Secondary Lead Furnace: Vivek Rao[1]; Vineet Kumar[1]; *Alexandra Anderson*[2]; Joseph Grogan[2]; [1]Oak Ridge National Laboratory; [2]Gopher Resource

3:05 PM
Determining the Bubble Dynamics of a Top Submerged Lance Smelter: *Avinash Kandalam*[1]; Markus Reinmöller[1]; Michael Stelter[1]; Markus Reuter[1]; Alexandros Charitos[1]; [1]TU Bergakademie Freiberg

---

ENERGY & ENVIRONMENT

REWAS 2022: Decarbonizing the Materials Industry — Carbon Capture, Utilization and Storage

Sponsored by: TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee, TMS: Energy Committee, TMS: Process Technology and Modeling Committee, TMS: Aluminum Committee

Program Organizers: Camille Fleuriault, Eramet Norway; Christina Meskers, Norwegian University of Science and Technology (NTNU); Mertol Gökelma, Izmir Institute of Technology; Elsa Olivetti, Massachusetts Institute of Technology; Jesse White, Elkem Carbon Solutions; Chukwunwike Iloeje, Argonne National Laboratory; Neale Neelameggham, IND LLC

Wednesday PM | March 2, 2022
212A | Anaheim Convention Center

Session Chair: Camille Fleuriault, Eramet Norway

2:00 PM Introductory Comments

2:05 PM Invited
The Carbon Age: Reimaging the Lifecycle of Fuels and Materials: *Jonah Erlebacher*[1]; Shashank Lakshman[1]; Jonathan Horlyck[1]; Gina Greenidge[1]; [1]Johns Hopkins University

2:35 PM
Field Demonstration of the Reversa Mineral Carbonation Process Using Coal and Natural Gas Flue Gas Streams: *Dale Prentice*[1]; Iman Mehdipour[2]; Gabriel Falzone[3]; Stephen Raab[2]; Dante Simonetti[1]; Gaurav Sant[1]; [1]University of California; [2]CarbonBuilt; [3]RCAM Technologies

2:55 PM
Pilot Scale Test of Flue Gas Recirculation for the Silicon Process: *Vegar Andersen*[1]; Ingeborg Solheim[2]; Heiko Gaertner[2]; Bendik Sægrov-Sorte[2]; Kristian Einarsrud[1]; Gabriella Tranell[1]; [1]NTNU; [2]Sintef

3:15 PM Break

3:35 PM
Carbon Footprint Reduction Opportunities in the Manganese Alloys Industry: *Camille Fleuriault*[1]; Kåre Bjarte Bjelland[1]; [1]Eramet Norway

3:55 PM
Effect of Moisture and High Temperature to Separation Properties of Mixed Matrix Membranes: *Dragutin Nedeljkovic*[1]; [1]American University of the Middle East

4:15 PM Invited
CO2 as Raw Material for Chemical and Fuel Productions through Electrocatalysis: *Di-Jia Liu*[1]; [1]Argonne National Laboratory

---

CHARACTERIZATION

Seeing is Believing -- Understanding Environmental Degradation and Mechanical Response Using Advanced Characterization Techniques: An SMD Symposium in Honor of Ian M. Robertson — Microstructure-Deformation Relationships

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Nuclear Materials Committee

Program Organizers: Kaila Bertsch, Lawrence Livermore National Laboratory; Khalid Hattar, Sandia National Laboratories; Josh Kacher, Georgia Institute of Technology; Bai Cui, University of Nebraska-Lincoln; Benjamin Eftink, Los Alamos National Laboratory; Stephen House, University of Pittsburgh; May Martin, National Institute of Standards and Technology; Kelly Nygren, Cornell High Energy Synchrotron Source; Blythe Clark, Sandia National Laboratories; Shuai Wang, Southern University of Science and Technology

Wednesday PM | March 2, 2022
207C | Anaheim Convention Center

Session Chairs: Kaila Bertsch, Lawrence Livermore National Laboratory; Josh Kacher, Georgia Institute of Technology; Stephen House, University of Pittsburgh/ECC; Blythe Clark, Sandia National Laboratory

---

2:00 PM Invited
The Influence of Microstructural Anisotropy and Strain Rate on the Shear Response of 6061 And 7039 Aluminum Alloys: *George Gray*[1]; [1]Los Alamos National Laboratory

2:30 PM Invited
Uncovering the Limits of Grain Boundary Stability through In Situ and In Operando Characterization: *Mitra Taheri*[1]; Jaime Marian[2]; David Srolovitz[3]; [1]Johns Hopkins University; [2]University of California, Los Angeles; [3]The University of Hong Kong

3:00 PM Invited
In-situ Materials Micromechanics at Extreme Rates above 10^6 s^{-1}: *Christopher Schuh*[1]; [1]Massachusetts Institute of Technology

3:30 PM Break

3:45 PM Invited
Grain Boundary Diffusion n Stainless Steel from Atomistic Simulations: *Diana Farkas*[1]; [1]Virginia Polytechnic Institute

4:15 PM Invited
On the Evolution of Dislocation Structures in Irradiated Ferritic-Martensitic Steels: *G. Robert Odette*[1]; Ben Eftink[2]; Jack Haley[3]; David Sprouster[4]; [1]University of California-Santa Barbara; [2]Los Alamos National Laboratory; [3]Oxford University; [4]Stoneybrook University

4:45 PM Invited
Insight into Deformation of Irradiated Materials through Combined Molecular Dynamics and In-situ TEM Studies: *Brian Wirth*[1]; [1]University of Tennessee

5:15 PM Invited
The Roles of Layering and Interfaces in Radiation Resistance of MAX and MAB Phase Materials: *Izabela Szlufarska*[1]; Hongliang Zhang[1]; Jianqi Xi[1]; Ranran Su[1]; Jun Kim[1]; [1]University of Wisconsin-Madison

---

NUCLEAR MATERIALS

Synergistic Irradiation, Corrosion, and Microstructural Evolution in Nuclear Materials — Irradiation Effects in Oxides

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

Program Organizers: Djamel Kaoumi, North Carolina State University; Michael Short, Massachusetts Institute of Technology; Peter Hosemann, University of California, Berkeley; Stephen Raiman, Texas A&M University; Raluca Scarlat, University of California, Berkeley; Aaron Kohnert, Los Alamos National Laboratory; Ryan Schoell, North Carolina State University; Philip Edmondson, Oak Ridge National Laboratory; Celine Cabet, Commissariat a l'Energie Atomique

Wednesday PM | March 2, 2022
202A | Anaheim Convention Center

Session Chair: To Be Announced

2:00 PM
Investigation on the Impact of Proton-irradiation on Vibrational Properties of $LiNbO_3$ with Raman Spectroscopy: *Saqeeb Adnan*[1]; Maha Yazbeck[1]; Yuzhou Wang[2]; Marat Khafizov[1]; [1]The Ohio State University; [2]Idaho National Laboratory

2:20 PM
In Situ Observations of the Amorphization Behavior of Fe2O3, Cr2O3, and Al2O3 under Ion Irradiation: *Angelica Lopez Morales*[1]; Ryan Schoell[1]; Tiffany Kaspar[2]; Ben Derby[3]; Nan Li[3]; Dan Schreiber[2]; Djamel Kaoumi[1]; [1]North Carolina State University; [2]Pacific Northwest National Laboratory; [3]Los Alamos National Laboratory

2:40 PM
Heavy-ion Irradiation Induced Cation Intermixing in Lanthanide Pyrochlores: *Benjamin Derby*[1]; Yogesh Sharma[1]; Matthew Chancey[1]; James Valdez[1]; Matthew Schneider[1]; Yongqiang Wang[1]; Aiping Chen[1]; Blas Uberuaga[1]; Nan Li[1]; Cortney Kreller[1]; Matthew Janish[1]; [1]Los Alamos National Laboratory

3:00 PM
Study of Irradiation Defects Annealing in Thermally Grown Oxides by In Situ Raman Spectroscopy: *Benoit Queylat*[1]; Taeho Kim[1]; Adrien Couet[1]; [1]University of Wisconsin, Madison

---

NANOSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XII) — Processing, Microstructure & Property I

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Penghui Cao, University of California, Irvine; Xiaoxu Huang, Chongqing University; Enrique Lavernia, University of California, Irvine; Xiaozhou Liao, University of Sydney; Lee Semiatin, Material Resources LLC; Nobuhiro Tsuji, Kyoto University; Caizhi Zhou, University of South Carolina; Yuntian Zhu, City University of Hong Kong

Wednesday PM | March 2, 2022
262A | Anaheim Convention Center

Session Chairs: Megumi Kawasaki, Oregon State University; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Hang Yu, Virginia Polytechnic Institute and State University

---

2:00 PM Invited
Solid-state Additive Manufacturing of Ultrafine-grained Alloys via Additive Friction Stir Deposition: Hang Yu[1]; *Hunter Rauch*; [1]Virginia Polytechnic Institute and State University

2:30 PM
Influence of Strain Gradients in Heterostructured Nanomaterials: *Daniel Goodelman*[1]; Andrea Hodge[1]; [1]University of Southern California

2:50 PM
Control of Layer Instabilities during ARB Processing of Iron-based FCC/BCC Metallic Laminates: *Thomas Nizolek*[1]; Rodney McCabe[1]; Cody Miller[1]; Yifan Zhang[1]; Nan Li[1]; Daniel Coughlin[2]; John Carpenter[1]; [1]Los Alamos National Laboratory; [2]United States Steel Corporation

3:10 PM
Effect of Nanostructuring in Additive-manufactured 316L Stainless Steel on Structural Relaxation Examined by In-situ Heating Neutron Diffraction Analysis: Jae-Kyung Han[1]; Xiaojing Liu[2]; Yusuke Onuki[3]; Yulia Kuzminova[4]; Stanislav Evlashin[4]; Klaus-Dieter Liss[2]; *Megumi Kawasaki*[1]; [1]Oregon State University; [2]Guangdong Technion - Israel Institute of Technology; [3]Ibaraki University; [4]Skolkovo Institute of Science and Technology

NANOSTRUCTURED MATERIALS

30 Years of Nanoindentation with the Oliver-Pharr Method and Beyond — Thin Films & Confinement Effects

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

Program Organizers: Verena Maier-Kiener, Montanuniversitaet Leoben; Benoit Merle, University Erlangen-Nuremberg (Fau); Erik Herbert, Michigan Technological University; Samantha Lawrence, Los Alamos National Laboratory; Nigel Jennett, Coventry University

Thursday AM | March 3, 2022
204B | Anaheim Convention Center

Session Chairs: Benoit Merle, University Erlangen-Nuremberg (Fau); Andrea Hodge, University of Southern California

---

8:30 AM Invited
Analyzing Thin Film Strength and Thermo-mechanical Behavior by Wedge Indentation and Bi-metal Beams: *Daniel Kiener*[1]; Markus Alfreider[1]; Benjamin Seligmann[1]; [1]University of Leoben

8:55 AM
An Improved Technique for Accurate Mechanical Characterization of Free-standing Films and Its Applications: *Gang Feng*[1]; Lu An[1]; Dong Zhou[1]; Bo Li[1]; [1]Villanova University

9:15 AM Invited
Mechanics of Non-equilibrium Thin Films: *Graham Cross*[1]; [1]Trinity College Dublin

9:40 AM
Nanomechanical Evaluation of Porous Polymeric Thin Films: *Robert Green-Warren*[1]; Luc Bontoux[1]; Zongling Ren[2]; Noah MacAllister[1]; Shalaka Tendolkar[1]; Lin Lei[1]; Jae-Hwang Lee[2]; Assimina Pelegri[1]; Jonathan Singer[1]; [1]Rutgers University; [2]University of Massachusetts

10:00 AM Break

10:20 AM Invited
Mechanical Deformation in Nanomultilayers: *Andrea Hodge*[1]; [1]University of Southern California

10:45 AM
Bulk Metallic Glass Ductility Trends Are Revealed by High Data Rate Experiments: Jordan Sickle[1]; Wesley Higgins[2]; Wendelin Wright[3]; George Pharr[2]; *Karin Dahmen*[1]; [1]University of Illinois; [2]Texas A&M University; [3]Bucknell University

11:05 AM
Application of Nanoindentation Strain Rate Jump Tests to Measure Strain Rate Sensitivity of Single Crystal Tungsten and Microcrystalline Cellulose: *Kevin Schmalbach*[1]; Albert Lin[1]; Daniel Bufford[2]; Chenguang Wang[1]; Changquan Calvin Sun[1]; Nathan Mara[1]; [1]University of Minnesota; [2]Sandia National Laboratories

11:25 AM
Size-dependent Indentation Behavior and Geometrically Necessary Dislocation Structures of Single-crystalline Tungsten: *Jin Wang*[1]; Ruth Schwaiger[1]; [1]Forschungszentrum Juelich GmbH

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Innovative Powder Processing of Functional and Magnetic Materials — Unique Consolidation and Computational Processing

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

Program Organizers: Emily Rinko, Iowa State University; Iver Anderson, Iowa State University Ames Laboratory; Markus Chmielus, University of Pittsburgh; Emma White, DECHEMA Forschungsinstitut; Deliang Zhang, Northeastern University; Andrew Kustas, Sandia National Laboratories; Kyle Johnson, Sandia National Laboratories

Thursday AM | March 3, 2022
262C | Anaheim Convention Center

Session Chair: Emily Rinko, Iowa State University

8:30 AM Introductory Comments

8:35 AM Invited
Iron Nitride Based Soft Magnets through Spark Plasma Sintering: *Todd Monson*[1]; Tyler Stevens[1]; Stanley Atcitty[1]; Baolong Zheng[2]; Calvin Belcher[2]; Yizhang Zhou[2]; Enrique Lavernia[2]; [1]Sandia National Laboratories; [2]University of California, Irvine

9:05 AM
Additive Manufacturing as a Hybrid Synthesis-joining Method to Optimize Magnetic and Mechanical Properties of Dissimlar Alloys: *Donald Susan*[1]; Andrew Kustas[1]; Rick Kellogg[1]; Dale Cillessen[1]; Bradley Salzbrenner[1]; [1]Sandia National Laboratories

9:25 AM
Selective Laser Melting of NiZnCu-ferrite Soft Magnetic Composites: Process-property Relationships: *Joseph Sopcisak*[1]; Caleb Andrews[2]; Li Ma[1]; Ryan Carter[1]; Mitra Taheri[2]; [1]Johns Hopkins University Applied Physics Laboratory; [2]Johns Hopkins University

9:45 AM Break

10:05 AM
The Development of a Machine Learning Guided Process for the Additive Manufacturing of Thermoelectric Materials: *Connor Headley*[1]; Roberto Herrera del Valle[1]; Ji Ma[1]; Prasanna Balachandran[1]; Vijayabarathi Ponnambalam[2]; Dylan Kirsch[3]; Saniya LeBlanc[2]; Joshua Martin[3]; [1]University of Virginia; [2]George Washington University; [3]National Institute for Standards and Technology

10:25 AM
Deep Learning with Generative Adversarial Network for Ti-6Al-4V Surface Roughness Improvement in Direct Energy Deposition Process: *Im Doo Jung*[1]; Tae Kyeong Kim[1]; Hyo Kyung Sung[1]; Jung Gi Kim[1]; Hyung Sub Kim[1]; [1]UNIST

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture: Developing Predictive Capabilities — Heat Treatment Development

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

Thursday AM | March 3, 2022
258B | Anaheim Convention Center

Session Chair: Mohsen Seifi, ASTM International/Case Western Reserve University

---

8:30 AM Invited
Mechanical Behaviour of Additively Manufactured Al-Alloys: Impact of Post-processing: *Moataz Attallah*[1]; [1]University of Birmingham

9:00 AM
Fatigue Resistance Improvement of Laser Powder Bed Fusion AlSi10Mg by Post-processing: *Juan Guillermo Santos Macias*[1]; Chola Elangeswaran[2]; Brecht Van Hooreweder[2]; Jean-Yves Buffière[3]; Brigitte Bacroix[4]; David Tingaud[4]; Grzegorz Pyka[1]; Lv Zhao[1]; Aude Simar[1]; [1]UCLouvain; [2]KU Leuven; [3]Université de Lyon; [4]Université Paris 13

9:20 AM
The Study on Microstructural Evolution during Post-processing of Additively Manufactured Ti64: *Bryan Naab*[1]; Denis Dowling[1]; Mert Celikin[1]; [1]University College Dublin

9:40 AM
Tailoring Hot Isostatic Pressing Treatments to Homogenize Process-dependent Microstructures and Mechanical Properties of Electron Beam Melted Ti-6Al-4V Parts: *Jake Benzing*[1]; Nik Hrabe[1]; Enrico Lucon[1]; Tim Quinn[1]; Julius Bonini[2]; Chad Beamer[3]; Magnus Ahlfors[3]; [1]National Institute of Standards and Technology; [2]Lucideon Consulting; [3]Quintus Technologies

10:00 AM Break

10:20 AM Invited
Cold Spray for Aircraft Structural Repair: *Sarah Galyon Dorman*[1]; Justin Rausch[1]; Moriah Ausherman[1]; Scott Fawaz[1]; [1]SAFE Inc

10:50 AM
Effects of Process Parameters, Post-processing, and Defects on Tension and Fatigue Properties of LPBF AlSi10Mg: *Austin Ngo*[1]; Collin Sharpe[1]; Varthula Jayasekera[2]; Brett Conner[3]; Holly Martin[2]; Christopher Tuma[1]; John Lewandowski[1]; [1]Case Western Reserve University; [2]Youngstown State University; [3]Honeywell Federal Manufacturing & Technologies

11:10 AM
Effects of Processing Parameters and Heat Treatments on the Mechanical Properties of SS316L Parts Repaired by Laser Metal Deposition: *Thomas Cailloux*[1]; Wilfried Pacquentin[1]; Narasimalu Srikanth[2]; Hicham Maskrot[1]; Frédéric Schuster[1]; Kun Zhou[2]; Fanny Balbaud[1]; [1]CEA; [2]Nanyang Technological University

11:30 AM
Effects of Process Parameters, Defects, and HIP Processing on S-N Fatigue of LPBF AlSi10Mg: Collin Sharpe[1]; *Austin Ngo*[1]; Christopher Tuma[1]; Michael Shinohara[1]; Holly Martin[1]; John Lewandowski[1]; [1]Case Western Reserve University

Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques II — Advanced Mechanical Characterization of AM Alloys

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

Program Organizers: Fan Zhang, National Institute of Standards and Technology; Donald Brown, Los Alamos National Laboratory; Andrew Chuang, Argonne National Laboratory; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Tao Sun, University of Virginia

Thursday AM | March 3, 2022
258A | Anaheim Convention Center

Session Chair: Donald Brown, Los Alamos National Laboratory

8:30 AM
In Situ Synchrotron Characterization of the Fatigue Behavior of WE43 Mg Porous Scaffolds for Biomedical Applications: Dolores Martín[1]; Guillermo Domínguez[1]; Muzi Li[1]; Federico Sket[1]; Monica Echeverry-Rendón[1]; Felix Benn[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

8:50 AM
Investigating the Impact and Evolution Porosity of LPBF Ti6Al4V Using In-situ Mechanical/XCT Testing: *Hossein Talebinezhad*[1]; Ralf Fischer[1]; Barton Prorok[1]; [1]Auburn University

9:10 AM
Cellular Structures Strengthening Mechanisms and Thermal Stability of L-PBF Stainless Steel 316L: Jean-Baptiste Forien[1]; Aurelien Perron[1]; Sylvie Aubry[1]; Nicolas Bertin[1]; Amit Samanta[1]; Alexander Baker[1]; Y. Morris Wang[1]; Marissa Linne[1]; Margaret Wu[1]; Nathan Barton[1]; *Thomas Voisin*[1]; [1]Lawrence Livermore National Laboratory

9:30 AM
On the Effects of Additive Manufacturing Process Parameters on the Performance of Hastelloy-X: A Neutron Diffraction Experiment and CPFE Modeling: *Ahmed Aburakhia*[1]; Ali Bonakdar[2]; Marjan Molavi-Zarandi[3]; Joe Keller[4]; Hamidreza Abdolvand[1]; [1]Western University; [2]Siemens Energy Canada Limited; [3]National Research Council ; [4]ISIS Neutron and Muon Source User Office

9:50 AM Break

10:05 AM
In-situ Process Monitoring for Laser Powder Bed Fusion: A Data-driven Approach: *Anant Raj*[1]; Dongli Huang[1]; Benjamin Stegman[1]; Hany Abdel-Khalik[1]; Xinghang Zhang[1]; John Sutherland[1]; [1]Purdue University

10:25 AM
In-situ Residual Strain Monitoring in Metal Additive Manufacturing: *Sandra Cabeza Sanchez*[1]; Burak Ozcan[1]; Thilo Pirling[1]; Thomas Hansen[1]; Ines Puente Orench[2]; [1]ILL; [2]ILL, CSIC

Additive Manufacturing: Materials Design and Alloy Development IV: Rapid Development — Other Alloys

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

Thursday AM | March 3, 2022
261A | Anaheim Convention Center

Session Chair: Orlando Rios, University of Tennessee

8:30 AM
Additive Manufacturing of AlCu0.5FeNiCoCr High-Entropy Alloy: *Bandar AlMangour*[1]; [1]King Fahd University of Petroleum and Minerals

8:50 AM
Laser Powder Bed Fusion Additive Manufacturing of Pure Copper (Cu) Metal: *Maryam Sadeghilaridjani*[1]; Leila Ladani[1]; [1]Arizona State University

9:10 AM
Rapid Design and Evaluation of Compositionally Complex Alloys by Combining Additive Manufacturing with Machine Learning Methods: *Phalgun Nelaturu*[1]; Jason Hattrick-Simpers[2]; Michael Moorehead[1]; Santanu Chauduri[3]; Adrien Couet[1]; Dan Thoma[1]; [1]University of Wisconsin; [2]National Institute of Standards and Technology; [3]Argonne National Laboratory

9:30 AM
Site-specific Grain Boundary Engineering of Additively Manufactured Stainless Steel: *Shubo Gao*[1]; Matteo Seita[1]; [1]Nanyang Technological University

9:50 AM Break

10:05 AM
Versatile Additive Manufacturing of Metals and Alloys via Hydrogel Infusion: *Max Saccone*[1]; Daryl Yee[2]; Rebecca Gallivan[1]; Kai Narita[1]; Julia Greer[1]; [1]Caltech; [2]MIT

10:25 AM
Comparison of Multiple Rapid Solidification Techniques to Accelerate Stainless Steel Alloy Development in Additive Manufacturing: *Zachary Hasenbusch*[1]; Johnathan Roze[1]; Andy Deal[2]; Ben Brown[2]; Davis Wilson[2]; Laurentiu Nastac[1]; Luke Brewer[1]; [1]University of Alabama; [2]Honeywell FM&T

10:45 AM
Mechanical Behavior of Functionally Integrated Materials Produced by Directed Energy Deposition: *Benjamin MacDonald*[1]; Baolong Zheng[1]; Sen Jiang[1]; Penghui Cao[1]; Lorenzo Valdevit[1]; Enrique Lavernia[2]; Julie Schoenung[1]; [1]University of California, Irvine; [2]National Academy of Engineering

11:05 AM
Efficacy of Elemental Mixing for In Situ Alloyed Al-33wt%Cu during Laser Powder Bed Fusion: *Jonathan Skelton*[1]; Eli Sullivan[1]; James Fitz-Gerald[1]; Jerrold Floro[1]; [1]University of Virginia

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Nano/Micro-mechanics and Length-scale Phenomena — Defects and Damage/Deformation Mechanisms and Mechanical Properties

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

Program Organizers: Meysam Haghshenas, University of Toledo; Robert Lancaster, Swansea University; Andrew Birnbaum, US Naval Research Laboratory; Jordan Weaver, National Institute of Standards and Technology; Aeriel Murphy-Leonard, Ohio State University

Thursday AM | March 3, 2022
260A | Anaheim Convention Center

Session Chairs: Robert Lancaster, Swansea University; Jordan Weaver, National Institute of Standards and Technology

---

8:30 AM
Deciphering the Fundamental Cause of Shape Distortion in Sintering-based Additive and Non-additive Manufacturing Processes: *Sandra Ritchie*[1]; Sasa Kovacevic[1]; Prith Deshmukh[1]; Sinisa Mesarovic[1]; Rahul Panat[1]; [1]Carnegie Mellon University

8:50 AM
Mechanical Properties of Tantalum Cold Sprayed Deposits: Insight Into the Interstitial Hydrogen Content and Powder Size Distribution Effects: *Mahsa Amiri*[1]; Kliah Soto Leytan[1]; Daniel R. Mumm[1]; Lorenzo Valdevit[1]; [1]University of California, Irvine

9:10 AM
Deformation Mechanism of Selective Laser Melted 316L Stainless Steel and Its Cellular Substructure Dependence: *Feng He*[1]; [1]State Key Laboratory of Solidification Processing

9:30 AM
Capturing the Effects of Grain Boundaries and Intersplat Boundaries on Deformation Behavior of Cold Sprayed Components: *Yubraj Paudel*[1]; Ryan Cochran[1]; Shiraz Mujahid[1]; Kyle Considine[1]; Hongjoo Rhee[1]; [1]Mississippi State University

9:50 AM Break

10:10 AM
Probing Heterogenous Mechanical Properties in AM Materials Due to Melt Pool Boundaries: *John Fite*[1]; Timothy Weihs[2]; John Slotwinski[1]; Suhas Eswarappa Prameela[2]; [1]JHU Applied Physics Lab; [2]Johns Hopkins University

10:30 AM
Hardening Rate Dependent Deformation Behavior of Additively Manufactured Inconel 718 during Nano-scratch: *Mustafa Rifat*[1]; Saurabh Basu[1]; [1]Pennsylvania State Unversity

---

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session VII

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

Program Organizers: Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; Olivia Underwood Jackson, Sandia National Laboratories

Thursday AM | March 3, 2022
207A | Anaheim Convention Center

Session Chairs: Jay Carroll, Sandia National Laboratories; Mitra Taheri, Johns Hopkins University

---

8:30 AM Invited
Accessing Order-dependent Defect Distributions Using Novel Diffraction Techniques: *Mitra Taheri*[1]; [1]Johns Hopkins University

9:00 AM
AThermo-mechanicalModelforDislocationDynamicsinTransientHeterogeneous Temperature Fields: *Manas Upadhyay*[1]; [1]LMS, CNRS, Ecole Polytechnique, Institut Polytechnique de Paris

9:20 AM
The Role of GNDs in Memory Response of FCC and BCC Metals during Deformation: *Tristan Russell*[1]; David Fullwood[1]; Robert Wagoner[2]; Sobhan Nazari Tiji[2]; Guowei Zhou[3]; [1]Brigham Young University; [2]Ohio State University; [3]Shanghai Jiao Tong University

9:40 AM
Low kV EBSD & Physics-based Modeling of Dislocation Cell Structures in Aluminum: *Toby Francis*[1]; Chaoyi Zhu[1]; Elizabeth Holm[1]; Marc De Graef[1]; [1]Carnegie Mellon University

10:00 AM Break

10:15 AM Invited
Dominant Microstructural Features Impacting Failure 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

10:45 AM
Improving 2D Diffraction Peak Detection Using Shannon Entropy: Kieran Nehil-Puleo[1]; Jonthan Tischler[2]; *Philip Eisenlohr*[1]; [1]Michigan State University; [2]Argonne National Laboratory

11:05 AM
Exploring Plastic Deformation and Color of Metals with Mathematical Morphology: *Michael Glazoff*[1]; [1]Idaho National Lboratory

11:25 AM
Use of Spherical Nanoindentation Protocols to Study the Anisotropic Mechanical Response of a-ß Single Colonies in Ti-6Al-4V Alloy: *Soumya Mohan*[1]; Adam Pilchak[2]; Surya Kalidindi[1]; [1]Georgia Institute of Technology; [2]Air Force Research Laboratory

11:45 AM
Advanced Characterization of Mock High Explosive: *Summer Camerlo*[1]; William Wallace[1]; Gus Becker[1]; Amy Clarke[1]; Kester Clarke[1]; [1]Colorado School of Mines

---

ADVANCED MATERIALS

Advanced Functional and Structural Thin Films and Coatings — Thin Films and Nanostructures for Optoelectronics I

Sponsored by: TMS: Thin Films and Interfaces Committee

Program Organizers: Ramana Chintalapalle, University of Texas at El Paso; Adele Carrado, IPCMS - CNRS Université de Strasbourg; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Karine Mougin, Cnrs - Is2m; Heinz Palkowski, Clausthal University of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology

Thursday AM | March 3, 2022
252B | Anaheim Convention Center

Session Chairs: Ramana Chintalapalle, University of Texas at El Paso; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Karine Mougin, Cnrs - Is2m

---

8:30 AM Introductory Comments

8:40 AM
$(CrMoTaVNb)Si_2$: A Novel Single-phase High Entropy Silicide Material: Aleksandra Vyatskikh[1]; *Benjamin MacDonald*[2]; Leonardo Velasco[3]; Alexander Dupuy[2]; Enrique Lavernia[2]; Julie Schoenung[2]; Horst Hahn[3]; [1]University of California Irvine; [2]University of California Irvine; [3]Karlsruhe Institute of Technology

9:00 AM Invited
Ellipsometry Characterization of Plasmonic Responses of Nanoparticles: *Aotmane En Naciri*[1]; [1]Université de Lorraine

9:30 AM
Fabrication of Carbon Encapsulated Si Nano-particles for High Performance Li-ion Batteries: *Aamna Hameed*[1]; Abhishek Lokhande[1]; Daniel Choi[1]; [1]Khalifa University of Science and Technology

9:50 AM Break

10:10 AM Invited
Bandgap Emission of Czochralski-silicon Coated with Spin-coated Silica Using Various Catalysis: *Sufian Abedrabbo*[1]; El Mostafa Benchafia[1]; Ahmad Al-Qawasmeh[1]; Nuggehalli Ravindra[2]; Anthony Fiory[3]; [1]Khalifa University; [2]New Jersey Institute of Technology; [3]Integron Solutions LLC.

10:40 AM
Radiative Properties of Polymers: *Airefetalo Sadoh*[1]; Samiha Hossain[1]; Nuggehalli Ravindra[1]; [1]New Jersey Institute of Technology

11:00 AM
Enhancing Light Emission Properties of c-Si by Developing Stresses on Silicon Surface via Sol-gel Ceramic Coatings: *Ali Abdullah*[1]; El Mostafa Benchafia[1]; Daneil Choi[1]; Sufian Abedrabbo[1]; [1]Khalifa university

11:20 AM Concluding Comments

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Sensors, Power, and Multifunctional Applications — Nanoscale Magnetism and High Coercivity Materials

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

Program Organizers: Daniel Salazar, BCMaterials; Alex Leary, NASA Glenn Research Center; Eric Theisen, Metglas Inc.; Huseyin Ucar, California Polytechnic University,Pomona; Yongmei Jin, Michigan Technological University

Thursday AM | March 3, 2022
213B | Anaheim Convention Center

Session Chair: Yongmei Jin, Michigan Technological University

---

8:30 AM
Evolution of Magnetic Properties during the Post-annealing Process for the Sintered (NdLa)-(FeCo)-B Based Magnets: *Wei Tang*[1]; Jing Wang[1]; Kinjal Gandha[1]; Xubo Liu[1]; Kevin Dennis[1]; Ikenna Nlebedim[1]; Ryan Ott[1]; Scott McCall[2]; David Parker[3]; Jun Cui[4]; [1]Ames Laboratory; [2]Lawrence Livermore National Laboratory; [3]Oak Ridge National Laboratory; [4]Iowa State University

8:50 AM Invited
Metal-organic Magnets with Large Coercivity and Ordering Temperatures up to 242°C: *Itziar Oyarzabal*[1]; Panagiota Perlepe[2]; Aaron Mailman[3]; Morgane Yquel[2]; Mikhail Platunov[4]; Iurii Dovgaliuk[5]; Mathieu Rouzières[2]; Philippe Negrier[6]; Denise Mondieig[6]; Elizaveta A Suturina[7]; Dourges Marie-Anne[8]; Sébastien Bonhommeau[8]; Rebecca A. Musgrave[2]; Kasper Pedersen[2]; Dmitry Chernyshov[5]; Fabrice Wilhelm[4]; Andrei Rogalev[4]; Corine Mathonière[9]; Rodolphe Clérac[2]; ; [1]BCMaterials - Ikerbasque; [2]Centre de Recherche Paul Pascal; [3]University of Jyväskylä; [4]ESRF-The European Synchrotron; [5]ESRF - Swiss-Norwegian Beamline; [6]Laboratoire Ondes et Matière d'Aquitaine - CNRS / Univ. Bordeaux; [7]University of Bath; [8]ISM - CNRS / Univ. Bordeaux; [9]ICMCB - CNRS / Univ. Bordeaux

9:20 AM
Quantum-confined Charge Transfer that Enhances Magnetic Anisotropy in Lanthanum M-type Hexaferrites: Churna Bhandari[1]; *Durga Paudyal*[1]; [1]Ames Laboratory

9:40 AM
Additive Manufacturing of 3D Metallic Structures: An Environmental-friendly Way of Printing Cellulose-based Metallic Inks: *Bosco Rodriguez*[1]; Daniel Salazar[1]; D. Payno[1]; Volodymyr Chernenko[2]; [1]BCMaterials; [2]BCMaterials; Ikerbasque, Basque Foundation for Science

---

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage 2022 — Energy Conversion and Energy Storage MIX II

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

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

Thursday AM | March 3, 2022
212B | Anaheim Convention Center

Session Chair: Peter Godart, Massachusetts Institute of Technology

---

8:30 AM Invited
3D Printed Carbon and Graphene Aerogels for Energy Storage Applications: *Swetha Chandrasekaran*[1]; Dun Lin[2]; Bin Yao[2]; Jean-Baptiste Forien[1]; Juergen Biener[1]; Victor Beck[1]; Yat Li[2]; Marcus Worsley[1]; [1]lawrence livermore national laboratory; [2]University of California, Santa Cruz

8:50 AM Invited
Bulk Ferroelectric Metamaterial with Enhanced Piezoelectric and Biomimetic Mechanical Properties from Additive Manufacturing: *Jun Li*[1]; [1]University of Wisconsin-Madison

9:10 AM Invited
Continuous Process for Harvesting Energy from Aluminum Scrap via Liquid-metal Activation: *Peter Godart*[1]; Douglas Hart[1]; [1]Massachusetts Intitute of Technology

9:30 AM
Machine Learning-driven Analytics for Solid-state Batteries: *Debanjali Chatterjee*[1]; Bairav S. Vishnugopi[1]; Partha P. Mukherjee[1]; [1]Purdue University

9:50 AM Break

10:10 AM
Use of Machine Learning Methods to Predict Remaining Useful Life of Lithium-ion Batteries after Experiencing Non-catastrophic Nail Puncture: *Casey Jones*[1]; Meghana Sudarshan[1]; Alex Serov[1]; Vikas Tomar[1]; [1]Purdue University

---

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: 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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday AM | March 3, 2022
251A | Anaheim Convention Center

Session Chairs: Jianxun Hu, Honda Development & Manufacturing of Americas; Baldur Steingrimsson, Imagars LLC

8:30 AM Invited
A Comparison of the Sliding Wear of Carbon-doped $Fe_{40.4}Ni_{11.3}Mn_{34.8}Al_{7.5}Cr_6$ and CoCrFeMnNi High Entropy Alloys with 316 Stainless Steel at 293 K and Cryogenic Temperatures: *Ian Baker*[1]; F.E. Kennedy[1]; Y. Ye[1]; J. D. Bonilla Toledo[1]; R.R. White[1]; R.L. Barry[1]; X. Guo[2]; S.P. Ringer[3]; H. Chen[3]; W. Zhang[4]; Y. Liu[4]; M. Song[4]; [1]Dartmouth College; [2]School of Materials Science and Engineering, Central South University; [3]The University of Sydney; [4]Central South University

8:50 AM Invited
Thermodynamics and Phase Transformations in Refractory Complex Concentrated Superalloys: *Eric Lass*[1]; [1]University of Tennessee-Knoxville

9:10 AM
Antimicrobial Properties of a Multicomponent Alloy: *Anne Murray*[1]; Daniel Bryan[1]; David Garfinkle[1]; Cameron Jorgensen[1]; Eric Lass[1]; Easo George[2]; Ying Yang[2]; Philip Rack[1]; Tom Denes[1]; Dustin Gilbert[1]; [1]University of Tennessee; [2]Oak Ridge National Lab

9:30 AM Invited
Development of Multi-principal-element Alloys and the Applications in Dissimilar Metals Welding: *Jianxun Hu*[1]; Peiyong Chen[2]; Xuesong Fan[2]; John Bohling[2]; Chanho Lee[3]; Peter Liaw[2]; Carl Lundin[2]; A. M. M. Abdelmotagaly[4]; Zhenzhen Yu[4]; [1]Honda Manufacturing & Development, Americas; [2]University of Tennessee; [3]Los Alamos National Laboratory; [4]Colorado School of Mines

9:50 AM Break

10:10 AM
Spinodal Decomposition in Multi-component Alloys: *Shalini Koneru*[1]; Kamalnath Kadirvel[1]; Yunzhi Wang[1]; [1]The Ohio State University

10:30 AM Invited
Compositionally Complex Ceramics (CCCs): *Jian Luo*[1]; [1]University of California, San Diego

---

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: 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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday AM | March 3, 2022
251B | Anaheim Convention Center

Session Chairs: Fritz Körmann, TU Delft; Ganesh Balasubramanian, Lehigh University

---

8:30 AM
Expediting the Materials Discovery Process of MPEAs through Efficient Coupling of High-throughput Density Functional Theory, Molecular Dynamics and Machine Learning Techniques: *Jacob Startt*[1]; Mitchell Wood[1]; Sean Donegan[2]; Remi Dingreville[1]; [1]Sandia National Labs; [2]Air Force Research Lab

8:50 AM
Machine Learning Enabled Defect Energies Prediction in Concentrated Alloys: Anus Manzoor[1]; Gaurav Arora[1]; *Dilpuneet Aidhy*[1]; [1]University of Wyoming

9:10 AM
Exploration of Refractory Complex Concentrated Alloys through the Use of High-throughput Calculations and Experimentation: *Austin Hernandez*[1]; Sharmila Karumuri[1]; Sona Avetian[1]; Zachary McClure[1]; Logan Ware[1]; Alejandro Strachan[1]; Ilias Bilionis[1]; Kenneth Sandhage[1]; Michael Titus[1]; [1]Purdue University

9:30 AM
Revealing Strengthening Mechanisms in Refractory Multi-principal Elements Alloys: *Xinyi Wang*[1]; Francesco Maresca[2]; Penghui Cao[1]; [1]University of California, Irvine; [2]University of Groningen

9:50 AM Break

10:10 AM
Factors Affecting Stacking Fault Energy in Concentrated Alloys Using Density Functional Theory and Machine Learning: *Gaurav Arora*[1]; Anus Manzoor[1]; Dilpuneet Aidhy[1]; [1]University Of Wyoming

10:30 AM
Machine Learning Guided Descriptor Selection for Predicting Corrosion Resistance in Multi-principal Element Alloys (MPEAs): *Ankit Roy*[1]; M. F. N. Taufique[2]; Hrishabh Khakurel[3]; Ram Devanathan[2]; Duane Johnson[4]; Ganesh Balasubramanian[1]; [1]Lehigh University; [2]Pacific Northwest National Lab; [3]The University of Texas at Arlington; [4]Ames Laboratory

---

MATERIALS DESIGN

Advances in Titanium Technology — General Topics in Ti Alloys

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

Program Organizers: Yufeng Zheng, University of Nevada-Reno; Zachary Kloenne, Ohio State University; Fan Sun, PSL Research University; Stoichko Antonov, National Energy Technology Laboratory; Rongpei Shi, Lawrence Livermore National Laboratory

Thursday AM | March 3, 2022
252A | Anaheim Convention Center

Session Chair: To Be Announced

8:30 AM
Hierarchical a Microstructure in a Metastable ß Ti-5Al-5Mo-5V-3Cr Alloy: *Dian Li*[1]; Wenrui Zhao[1]; Xing Zhang[2]; Stoichko Antonov[3]; Yiliang Liao[2]; Yufeng Zheng[1]; [1]University of Nevada, Reno; [2]Iowa State University; [3]Max-Planck-Institut für Eisenforschung GmbH

8:50 AM
The Influence of Fe and Al on the Microstructure and Mechanical Performance of Ti-Cr Alloys: *Joann Ballor*[1]; Jonathan Poplawsky[2]; Elizabeth Kautz[3]; Bharat Gwalani[3]; Arun Devaraj[3]; Alexandra Zevalkink[1]; Scott Misture[4]; Masahiko Ikeda[5]; Carl Boehlert[1]; [1]Michigan State University; [2]Oak Ridge National Laboratory; [3]Pacific Northwest National Laboratory; [4]Alfred University; [5]Kansai University

9:10 AM
A Comparative Study on Mechanical Properties of Additively Manufactured Titanium Alloys: Mohammad Yasin[1]; *Arash Soltani-Tehrani*; Meysam Haghshenas[2]; Shuai Shao[1]; Nima Shamsaei[1]; [1]Auburn University; [2]University of Toledo

9:30 AM
Development of a Phenomenological Equation to Predict Yield Strength in Additively Manufactured Ti-5Al-5V-5Mo-3Cr: *Andrew Temple*[1]; Madison Harrington[1]; Peter Collins[1]; [1]Iowa State University

9:50 AM
Microstructural and Mechanical Properties Structural Repairs of near a and near ß Titanium Alloys by Additive Friction Stir Deposition: *Christopher Williamson*[1]; Zack Tew[1]; Malcolm Williamson[1]; James Jordon[1]; Paul Allison[1]; [1]The University of Alabama

---

MATERIALS DESIGN

AI/Data Informatics: Computational Model Development, Validation, and Uncertainty Quantification — Data Mining/Microstructure

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Dennis Dimiduk, BlueQuartz Software LLC; Darren Pagan, Pennsylvania State University; Anthony Rollett, Carnegie Mellon University; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory

Thursday AM | March 3, 2022
256A | Anaheim Convention Center

Session Chair: Darren Pagan, Pennsylvania State University

8:30 AM Invited
Making the Most of What We've Got: Designing Microstructural Data Sets for AI Applications: *Elizabeth Holm*[1]; [1]Carnegie Mellon University

9:00 AM
Generating Discrete Dislocation Dynamics Structures from Experimental µXRD Images Using Graph-based Neural Networks: *Dylan Madisetti*[1]; Christopher Stiles[2]; Jaafar El Awady[1]; [1]Johns Hopkins University; [2]Johns Hopkins University Applied Physics Laboratory

9:20 AM
Efficient Generation of Arbitrary N-field Microstructures from 2-point Statistics Using Multioutput Gaussian Random Fields: *Andreas Robertson*[1]; Surya Kalidindi[1]; [1]Georgia Institute of Technology

9:40 AM
One-stage Simulation of EBSD Patterns over Multiple Parameters through a CVAE-GAN Model: *Zihao Ding*[1]; Marc Graef[1]; [1]Carnegie Mellon University

10:00 AM Break

10:20 AM
Spatiotemporal Prediction of Microstructure by Deep Learning: *Amir Abbas Kazemzadeh*[1]; Mahmood Mamivand[1]; [1]Boise State University

10:40 AM
A Generalized Spherical Harmonics-based Procedure for the Interpolation of Partial Datasets of Orientation Distributions to Enable Crystal Mechanics-based Simulations: *Marko Knezevic*[1]; Russell Marki[1]; Kyle Brindley[2]; Sven Vogel[2]; Rodney McCabe[2]; [1]University of New Hampshire; [2]Los Alamos National Laboratory

---

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — ML Algorithms

and Their Applications II

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; Garritt Tucker, Colorado School of Mines; Ebrahim Asadi, University of Memphis; Bryan Wong, University of California, Riverside; Sam Reeve, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Adrian Sabau, Oak Ridge National Laboratory

Thursday AM | March 3, 2022
253A | Anaheim Convention Center

Session Chairs: Enrique Martinez Saez, Clemson University; Sam Reeve, Oak Ridge National Laboratory

---

8:30 AM
Designing Thin Film Microstructures via Neuroevolution Guided Time-dependent Processing Protocols: *Saaketh Desai*[1]; Remi Dingreville[1]; [1]Sandia National Laboratories

8:50 AM
Application of Vision Transformers in Tomography Image Segmentations of AM Parts: *Saber Nemati*[1]; Les Butler[1]; Shengmin Guo[1]; [1]Louisiana State University

9:10 AM
Neural Network Models of Phase Field Simulations: *Haiying Yang*[1]; Michael Demkowicz[1]; [1]Texas A&M University

9:30 AM
Random Forest Regressor Models for the Prediction of Novel Alloy Corrosion Performance: *Bonita Goh*[1]; Yafei Wang[2]; Phalgun Nelaturu[2]; Thien Duong[3]; Dan Thoma[2]; Jason Hattrick-Simpers[4]; Santanu Chaudhuri[3]; Adrien Couet[2]; [1]University of Wisconsin Madison; [2]University of Wisconsin Madison; [3]Argonne National Laboratory; [4]National Institute of Standards and Technology

9:50 AM Break

10:10 AM
Predicting Temperature-dependent Oxide Redox Reactions with Machine-learning Augmented First-principles Calculations: José Garrido Torres[1]; Vahe Gharakhanyan[1]; Tobias Hoffmann Eegholm[1]; Nongnuch Artrith[1]; *Alexander Urban*[1]; [1]Columbia University

10:30 AM
Using Machine Learning Methods to Decode VO_x Diffractograms: *Saaketh Desai*[1]; Suvo Banik[2]; Haidan Wen[2]; Subramanian Sankaranarayanan[2]; Remi Dingreville[1]; [1]Sandia National Laboratories; [2]Argonne National Laboratory

---

LIGHT METALS

Aluminum Reduction Technology — Cell Design and New Processes

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

Program Organizers: Kristian Etienne Einarsrud, Norwegian University of Science and Technology; Stephan Broek, Boston Metal; Mertol Gökelma, Izmir Institute of Technology; Dmitry Eskin, Brunel University

Thursday AM | March 3, 2022
209B | Anaheim Convention Center

Session Chair: Camilla Sommerseth, SINTEF Industry

8:30 AM Introductory Comments

8:35 AM
Preparation of Aluminum Master Alloys by Electrolytic Co-deposition in Hall-Héroult Cells: *Xiangwen Wang*[1]; [1]Alcoa Corporation

9:00 AM
Direct Production of Aluminum Manganese and Silicon Alloys in Aluminum Reduction Cells, A Laboratory Test: *Gudrun Saevarsdottir*[1]; Omar Awayassa[2]; Rauan Meirbekova[3]; Geir Haarberg[2]; [1]Reykjavik University; [2]NTNU; [3]DTE

9:25 AM
Trace Elements in Aluminium Smelting Carbon Dust and Their Extraction: Aleksandr Shimanskii[1]; *Andrey Yasinskiy*[1]; Vladimir Losev[1]; Olga Buyko[1]; Yakov Kazantsev[1]; Nataliya Simonova[1]; [1]Siberian Federal University

9:50 AM Break

10:05 AM
Developing and Implementing an Efficient Forced Cooling Network at Aluminerie Alouette: *Diego Oitabén*[1]; Jules Côté[2]; Marc Gagnon[2]; Alain Charbonnier[3]; Patrice Verdu[3]; Olivier Martin[3]; François Riffaud[1]; Alexandre Lamoureux[1]; André Felipe Schneider[1]; Julien Samson[1]; Simon Poirier[1]; [1]Hatch; [2]Aluminerie Alouette; [3]Rio Tinto

---

ADVANCED MATERIALS

Bulk Metallic Glasses XIX — Glass-forming Ability and the Glass Transition

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

Program Organizers: Robert Maass, Federal Institute for Materials Research and Testing (BAM); Peter Derlet, Paul Scherrer Institut; Katharine Flores, Washington University in St. Louis; Yonghao Sun, Chinese Academy of Sciences; Lindsay Greer, University of Cambridge; Peter Liaw, University of Tennessee

Thursday AM | March 3, 2022
253C | Anaheim Convention Center

Session Chairs: Yonghao Sun, Chinese Academy of Sciences; Paul Voyles, University of Wisconsin

---

10:00 AM Invited
Surface Mobility of Metallic Glass Thin Films Controls Glass Phase Stability and Crystallization: Debaditya Chatterjee[1]; Ajay Annamareddy[1]; Chengrong Cao[1]; Yuhui Li[1]; John Perepezko[1]; Lian Yu[1]; Dane Morgan[1]; *Paul Voyles*[1]; [1]University of Wisconsin

10:25 AM
Inside Glass Tormation: The Pathway of Metallic Liquids to Vitrification Monitored in Situ by Ultrafast High-energy Synchrotron X-ray Diffraction: *Martin Stiehler*[1]; Mark Jolly[1]; Konstantinos Georgarakis[1]; [1]Cranfield University

10:45 AM
Structural Influences on Glass Forming Ability in Mg-Ni-Y: *Carter Francis*[1]; Janine Erickson[1]; John Sunderland[1]; Chengrong Cao[1]; Dan Thoma[1]; John Perepezko[1]; Paul Voyles[1]; [1]University of Wisconsin Madison

11:05 AM Discussion on glass formation of metallic glasses

CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2022 — Advanced Characterization Methods II

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

Program Organizers: Mingming Zhang, Wood Mackenzie; Jian Li, CanmetMATERIALS; 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, DEVCOM U.S. Army Research Laboratory; Rajiv Soman, Eurofins EAG Materials Science LLC; Zhiwei Peng, Central South University

Thursday AM | March 3, 2022
207B | Anaheim Convention Center

Session Chairs: Kelvin Xie, Texas A&M University; Rajiv Soman, Eurofins EAG Materials Science LLC

8:30 AM Introductory Comments

8:35 AM
Analysis of MoNbTi and HfNbTaTiZr Refractory High Entropy Alloys by Atom Probe Tomography: *Patrick Callahan*[1]; David Beaudry[2]; Keith Knipling[1]; [1]Us Naval Research Laboratory; [2]Johns Hopkins University

8:55 AM
On the Phase Composition, Properties and Application of AlMgB14-based Materials: Ilya Zhukov[1]; *Pavel Nikitin*[1]; Alexander Vorozhtsov[1]; [1]Tomsk State University

9:15 AM
TEM Characterization of an AS7G06 Alloy with Several Heat Treatments: *Nicolas Bello*[1]; Cassiopée Galy[2]; Céline Larignon[2]; Joël Douin[1]; [1]CEMES-CNRS; [2]IRT Saint Exupéry

9:35 AM
Sample Preparation Influence on a Direct Artificially Aged Al-Si-Mg Alloy Elaborated by Laser Beam Melting: *Nicolas Bello*[1]; Cassiopée Galy[2]; Céline Larignon[2]; Joël Douin[1]; [1]CEMES-CNRS; [2]IRT Saint Exupéry

9:55 AM
Ion-irradiation-induced Property Change in FeCr: Hardness, Thermal Diffusivity and Lattice Strain: *Kay Song*[1]; Suchandrima Das[1]; Abdallah Reza[1]; Nicholas Phillips[2];

Ruqing Xu[3]; Hongbing Yu[4]; Kenichiro Mizohata[5]; David Armstrong[1]; Felix Hofmann[1]; [1]University of Oxford; [2]Paul Scherrer Institut; [3]Argonne National Laboratory; [4]Canadian Nuclear Laboratories; [5]University of Helsinki

ENERGY & ENVIRONMENT

Composite Materials for Sustainable Eco-Friendly Applications — Eco-Friendly Composites - Naturally Sourced Materials

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

Program Organizers: Brian Wisner, Ohio University; Ioannis Mastorakos, Clarkson University; Simona Hunyadi Murph, Savannah River National Laboratory

Thursday AM | March 3, 2022
211A | Anaheim Convention Center

Session Chair: Ioannis Mastorakos, Clarkson University

8:30 AM
Additive Manufacturing with Wood-based Composites for Building Construction Applications: *Michael Maughan*[1]; Conal Thie[1]; Berlinda Orji[1]; Robert Carne[1]; Tais Mitchell[1]; Kenneth Baker[1]; Armando McDonald[1]; [1]University of Idaho

8:50 AM
Designing Novel MicroNano Concrete as Subsurface Hydraulic Barrier Materials Using Shale Rocks as Templates: Cody Massion[1]; Vamsi S.K. Vissa[1]; Yunxing Lu[2]; Dustin Crandall[3]; Andrew Bunger[2]; *Mileva Radonjic*[1]; [1]Oklahoma State University; [2]University of Pittsburgh; [3]National Energy Technology Laboratory

9:10 AM
Prediction of the Mechanical Properties of Epoxy-snail Shell Particulate (ESSP) Composites Using Artificial Neural (ANN) Method: *Ademola Agbeleye*[1]; Harrison Onovo[1]; [1]University of Lagos

9:30 AM
Biodegrability of Bioplastic Films with Manihot Esculenta Starch in Natural Environment: *Harrison Onovo*[1]; Ademola Agbeleye[1]; Ruth Nnaji[1]; Esther Towolawi[1]; [1]University of Lagos, Nigeria

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Phonons and Other Excitations/Diffusion and Kinetics

Sponsored by: TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee

Program Organizers: Vahid Attari, Texas A&M University; Sara Kadkhodaei, University Of Illinois At Chicag; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Tourret, IMDEA Materials Institute; James Morris, Ames Laboratory

Thursday AM | March 3, 2022
255C | Anaheim Convention Center

Session Chairs: Sara Kadkhodaei, University of Illinois at Chicago ; Liang Qi, University of Michigan

---

8:30 AM
Understanding the Role of Anharmonic Phonons in Diffusion of bcc Metal: *Seyyedfaridoddin Fattahpour*[1]; Sara Kadkhodaei[1]; [1]University of Illinois at Chicago

8:50 AM
Phonon and Thermodynamic Properties of Defected-ThO_2 and (U,Th)O_2: *Maniesha Singh*[1]; Tomohisa Kumagai[2]; Anter El-Azab[1]; [1]Purdue University; [2]Central Research Institute of Electric Power Industry

9:10 AM
Matryoshka Phonon Twinning in \945-GaN: Bin Wei[1]; Qingan Cai[2]; Qiyang Sun[2]; Yaokun Su[2]; Ayman Said[3]; Doug Abernathy[4]; Jiawang Hong[5]; *Chen Li*[2]; [1]Henan Polytechnic University; [2]University of California-Riverside; [3]Argonne National Laboratory; [4]Oak Ridge National Laboratory; [5]Beijing Institute of Technology

9:30 AM Invited
First-principles Investigations of Corrosion Mechanisms of Lightweight Metals: *Liang Qi*[1]; Mingfei Zhang[1]; Louis Hector Jr.[2]; Aditya Sundar[1]; Ganlin Chen[1]; [1]University of Michigan; [2]General Motors Research and Development

10:00 AM Break

10:20 AM
Simplified and Robust Diffusion Coefficient Models for Reliable Diffusion (Atomic Mobility) Databases: *Wei Zhong*[1]; Qiaofu Zhang[2]; Ji-Cheng Zhao[1]; [1]University of Maryland; [2]QuesTek Innovations LLC

10:40 AM
Role of Electrical and Chemical Stimuli on the Electrical Responses of Resistive RAM and Neuromorphic Computing Devices: A Phase Field Study: *Arijit Roy*[1]; Pil-Ryung Cha[1]; [1]Kookmin University

---

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Mechanisms of High Temperature Alloys — New Material & Design Considerations

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

Program Organizers: Mark Hardy, Rolls-Royce Plc; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Jeremy Rame, Safran Aircraft Engines; Akane Suzuki, GE Research; Jean-Charles Stinville, University of California, Santa Barbara; Paraskevas Kontis, Norwegian University of Science and Technology; Andrew Wessman, University of Arizona

Thursday AM | March 3, 2022
263A | Anaheim Convention Center

Session Chairs: Jonathan Cormier, ISAE-ENSMA & Institut Pprime; Jean Charles Stinville, University of Illinois at Urbana-Champaign

---

8:30 AM
Tensile Ductility and Plastic Deformation Behavior of Polycrystalline Refractory Multi-principal Element Alloys: *Leah Mills*[1]; Jean-Charles Stinville[1]; Marie-Agathe Charpagne[1]; Carolina Frey[1]; Valéry Valle[2]; Noah Philips[3]; Daniel Gianola[1]; Tresa

Pollock[1]; [1]University of California-Santa Barbara; [2]Pprime Institut-Université de Poitiers; [3]ATI Specialty Alloys and Components

8:50 AM
Composition and Heat Treatment Modifications of a New Low-cost Ni Base Wrought Alloy for Improved Creep Resistance and Elevated Temperature Ductility: *Ning Zhou*[1]; Filip Van Weereld[1]; Gian Colombo[1]; [1]Carpenter Technology Corporation

9:10 AM
A Comparative Analysis of the Low-cycle Fatigue Behaviors of HAYNES 244 Alloy and Waspaloy: *Michael Fahrmann*[1]; [1]Haynes International

9:30 AM
Deformation Twinning during Elevated Temperature Testing in HAYNES® 244® Alloy: *Thomas Mann*[1]; Michael Fahrmann[2]; Michael Titus[1]; [1]Purdue University; [2]Haynes Intl

9:50 AM
An In-situ SEM Elevated-temperature Investigation of Serrated Plastic Flow in a CoCrFeNiW-C Alloy: *Shaolou Wei*[1]; Daniel Moriarty[1]; Cem Tasan[1]; [1]Massachusetts Institute of Technology

---

SPECIAL TOPICS

DMMM4 — Combating Biases in STEM

Sponsored by: TMS: Diversity, Equity, and Inclusion Committee

Program Organizers: Aeriel Murphy-Leonard, Ohio State University; Mark Carroll, Federal-Mogul Powertrain; Blythe Clark, Sandia National Laboratories; K. Cunningham, ATI Specialty Alloys & Components; Lauren Garrison, Oak Ridge National Laboratory; Atieh Moridi, Cornell University; Ashleigh Wright, University of Illinois at Urbana-Champaign; Megan Cordill, Erich Schmid Institute of Materials Science; Jonathan Madison, National Science Foundation; Mitra Taheri, Johns Hopkins University; Clarissa Yablinsky, Los Alamos National Laboratory

Thursday AM | March 3, 2022
Grand Ballroom H, J, K | Anaheim Marriott

Session Chairs: Lauren Garrison, Oak Ridge National Lab; Jonathan Madison, Sandia National Laboratories

---

8:30 AM
Mitigating Implicit Bias as Individuals and Institutions: *Blythe Clark*[1]; *Olivia Underwood Jackson*[1]; [1]Sandia National Laboratories

9:10 AM Learn By Playing: The Buffalo Card Game: Unconscious bias can have negative effects, but the first stage of changing it is recognizing your own opinions and biases. Join us for playing Buffalo, a card game designed by Tiltfactor to subtly challenge your own stereotypes and unconscious bias through play. The card game will be played in small groups with a facilitator. No prior experience or knowledge about card games or unconscious bias is necessary to participate. We will discuss the science behind the game design, participant reactions to the game, and how you could facilitate playing the game at your own institution or

event.

Facilitator: Jonathan Madison

10:00 AM Break

10:20 AM
Leveraging a Strengths-based Approach to Diversity and Inclusion: *Kathryn Thomas*[1]; [1]Idaho State University

11:05 AM Unconscious Bias Scenario Discussions: How does unconscious bias impact your experiences at work? Participate in small group discussions of scenarios relevant to the minerals, metals, and materials professions. If you have attended the other sessions in this track, this will be a chance to put what you have learned into practice and share your own experiences. If this is your first introduction to the topic, it is a great way to help you start to recognize unconscious bias around you and how you can take actions to mitigate it.

Facilitator: Victoria Miller

SPECIAL TOPICS

DMMM4 — The Invisible Pipeline: Recruitment/Retention of Underrepresented Minorities

Sponsored by: TMS: Diversity, Equity, and Inclusion Committee

Program Organizers: Aeriel Murphy-Leonard, Ohio State University; Mark Carroll, Federal-Mogul Powertrain; Blythe Clark, Sandia National Laboratories; K. Cunningham, ATI Specialty Alloys & Components; Lauren Garrison, Oak Ridge National Laboratory; Atieh Moridi, Cornell University; Ashleigh Wright, University of Illinois at Urbana-Champaign; Megan Cordill, Erich Schmid Institute of Materials Science; Jonathan Madison, National Science Foundation; Mitra Taheri, Johns Hopkins University; Clarissa Yablinsky, Los Alamos National Laboratory

Thursday AM | March 3, 2022
Grand Ballroom F | Anaheim Marriott

Session Chairs: Aeriel Murphy-Leonard, The Ohio State University; Mark Carroll, Tenneco

---

8:30 AM Invited
Stop Playing Diversity with Underrepresented Minority Faculty: *Ashleigh Wright*[1]; [1]University of Illinois at Urbana-Champaign

9:30 AM
Inclusion in STEM in Latin America and Case Studies from Colombia: *Henry Colorado*[1]; Elkin Gutierrez[2]; Pedro León Simanca[1]; [1]Universidad de Antioquia; [2]Universidad Antonio Nariño

9:50 AM Break

10:20 AM Invited
Building an Inclusively Diverse Workforce at Idaho National Laboratory: *Gabriel Ilevbare*[1]; Toni Carter[1]; Julie Ulrich[1]; Ryan Carroll[1]; [1]Idaho National Laboratory

11:00 AM Building the Pipeline – Addressing Diversity Issues in Materials Science and Beyond: Finding creative solutions and developing new technologies requires diverse and talented teams. There are many challenges in recruiting and retaining diverse students and employees as many organizations still struggle to implement

recruitment strategies that actually work or fail to foster supportive, inclusive environments, where all members regardless of background can contribute and succeed. The panel will discuss physical and invisible barriers as well as institutional policies that create and maintain systemic disparities in underrepresented and marginalized groups.

The panel includes Aeriel D. Murphy-Leonard, Ohio State University; Olivia Underwood Jackson, Sandia National Laboratories; Michele Manuel, University of Florida; Victoria Miller, University of Florida; and Michael Rawlings, TMS.

MECHANICS & STRUCTURAL RELIABILITY

Dynamic Behavior of Materials IX — Ejecta, RMI, RT & Jetting / Shear

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

Program Organizers: Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Cyril Williams, US Army Research Laboratory

Thursday AM | March 3, 2022
263C | Anaheim Convention Center

Session Chairs: Arun Shukla, University of Rhode Island; Vikas Prakas, Washington State University

---

8:30 AM
Experimental & Computational Development of Shallow Bubble Collapse as an Ejecta Production Mechanism: *Garry Maskaly*[1]; Fady Najjar[1]; Gerald Stevens[2]; William Turley[2]; Matthew Staska[2]; Brandon LaLone[2]; Thomas Hartsfield[3]; [1]Lawrence Livermore National Lab; [2]NNSS STL; [3]Los Alamos National Lab

8:50 AM
Ejecta and Melting Produced by High Velocity Impact of Steel Microparticles: *Jasper Lienhard*[1]; David Veysset[2]; Keith Nelson[1]; Christopher Schuh[1]; [1]MIT; [2]Stanford University

9:10 AM
3D Hydrodynamics Computations of High-areal Mass Ejecta Production from Shallow Bubble Collapse Mechanism: Fady Najjar[1]; Garry Maskaly[1]; Gerald Stevens[2]; W. Dale Turley[2]; Brandon LaLone[2]; Matthew Staska[2]; Ruben Valencia[2]; *David Brantley*[1]; [1]Lawrence Livermore National Laboratory; [2]MSTS-STL

9:30 AM
In Situ X-ray Diffraction of Shock Driven Sn Microjets: *David Bober*[1]; Jonathan Lind[1]; Alison Saunders[1]; Minta Akin[1]; Fady Najjar[1]; [1]Lawrence Livermore National Laboratory

9:50 AM
Determining Constitutive Properties of Metals under Extreme Deformation Conditions Using Cutting: *Harshit Chawla*[1]; Shwetabh Yadav[2]; Hrayer Aprahamian[1]; Dinakar Sagapuram[1]; [1]Department of Industrial and Systems Engineering, Texas A&M University; [2]Department of Civil Engineering, Indian Institute of Technology Hyderabad

10:10 AM Break

10:25 AM
Dynamic Response of Polycrystalline Pure Magnesium under Pressure and Shear Plate Impact Loading at Elevated Temperatures: *Vikas Prakash*[1]; [1]Washington State University

10:45 AM
In-situ SEM High Strain Rate Testing of Mg Micropillars with TEM Postmortem Analysis: *Zhaowen Lin*[1]; Daniel Magagnosc[2]; Jianguo Wen[3]; Chung-Seog Oh[4]; Sang-Min Kim[5]; Horacio Espinosa[1]; [1]Northwestern University; [2]The Army Research Laboratory; [3]Argonne National Laboratory; [4]Kumoh National Institute of Technology; [5]Korea Institute of Machinery and Materials

11:05 AM
Understanding the Ejecta Dynamics in Gas Cells for Shallow Bubble Collapse Mechanism: *Georges Akiki*[1]; Garry Maskaly[1]; Fady Najjar[1]; Gerald Stevens[2]; William Turley[2]; Brandon La Lone[2]; Matthew Staska[2]; [1]Lawrence Livermore National Laboratory; [2]Special Technologies Laboratory

---

CORROSION

Environmental Degradation of Multiple Principal Component Materials — High Temperature Corrosion

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

Program Organizers: Wenjun Cai, Virginia Polytechnic Institute and State University; ShinYoung Kang, Lawrence Livermore National Laboratory; XiaoXiang Yu, Northwestern University; Vilupanur Ravi, California State Polytechnic University Pomona; Christopher Weinberger, Colorado State University; Elizabeth Opila, University of Virginia; Bai Cui, University of Nebraska-Lincoln; Mark Weaver, University of Alabama; Bronislava Gorr, Karlsruhe Institute of Technology (KIT); Srujan Rokkam, Advanced Cooling Technologies Inc

Thursday AM | March 3, 2022
201C | Anaheim Convention Center

Session Chairs: Bronislava Gorr, Karlsruhe Institut für Technologie; Mathias Galetz, Dechema

---

8:30 AM
Dynamic and Chemical Processes Associated with Deposit-induced Corrosion Testing at Elevated Temperatures: *Preston Nguyen*[1]; Brian Gleeson[1]; [1]University of Pittsburgh

8:50 AM Invited
Enhanced Oxidation Resistance of (Mo95W5)85Ta10(TiZr)5 Refractory Multi-principal Element Alloy up to 1300°C: *Ranran Su*[1]; Hongliang Zhang[1]; Gaoyuan Ouyang[2]; Longfei Liu[1]; Jun Cui[2]; Duane Johnson[2]; John Perepezko[1]; [1]Department of Materials Science and Engineering, University of Wisconsin-Madison; [2]Ames Laboratory, U.S. Department of Energy at Iowa State University

9:20 AM
Investigation of Low Temperature Oxidation Behavior of MoNbTaW Thin Films: *Robert Quammen*[1]; Paul F. Rottmann[1]; Taohid Bin Nur Tuhser[1]; [1]University of Kentucky

9:40 AM
Oxidation of Different High Entropy Alloys Under the Influence of Water Vapour: Mary-Lee Brückner[1]; Lukas Mengis[1]; Emma White[1]; *Mathias Galetz*[1]; [1]DECHEMA-Forschungsinstitut

10:00 AM Break

10:20 AM
Joining of FeCrAl Based Alloys for Lead Cooled Fast Reactor Applications: *Brandon Bohanon*[1]; Shuprio Ghosh[1]; Cemal Cakez[1]; Khalid Talaat[1]; Jake Noltensmeyer[1]; Md Mehadi Hassan[1]; Osman Anderoglu[1]; Keith Woloshun[2]; Stu Maloy[2]; Cetin Unal[2]; [1]University of New Mexico; [2]Los Alamos National Laboratory

10:40 AM
Optimization of Multicomponent Rare Earth Silicate Environmental Barrier Coating Properties: Mackenzie Ridley[1]; Kathleen Tomko[1]; David Olson[1]; Patrick Hopkins[1]; *Elizabeth Opila*[1]; [1]University of Virginia

11:00 AM Invited
Exploring Untapped Potential in High Entropy Alloys: Combinatorial Exploration in Corrosive Environments: *Mitra Taheri*[1]; [1]Johns Hopkins University

---

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Corrosion and Degradation in Harsh Environments 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

Thursday AM | March 3, 2022
201D | Anaheim Convention Center

Session Chairs: Rongjie Song, Idaho National Laboratory; Srujan Rokkam, Advanced Cooling Technologies

---

10:00 AM
Composition and Morphology of C1018 Carbon Steel Coupons Retrieved from High Temperature Water Injection Well: *Mohammad Haque*[1]; Rajesh Saini[1]; Khaled Al-Muhammadi[2]; Ahmed Bukhamseen[2]; [1]Aramco Services Company; [2]Saudi Aramco

10:20 AM
Sensitization Responses along Different Directions of 5XXX Series Aluminum Alloy Plate Microstructures: *Matthew Steiner*[1]; Likun Sun[1]; Syeda Noor E Sumaiya[1]; [1]University of Cincinnati

10:40 AM Invited
Physics-based Modeling of Corrosion Crack Dynamics and Fracture: A Case for 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

---

NANOSTRUCTURED MATERIALS

Functional Nanomaterials: Functional Low-Dimensional (0D, 1D, 2D) Materials 2022 — Functional Energy Nanomaterials: Electrochemistry & Sustainability

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

Program Organizers: Michael Cai Wang, University of South Florida; Yong Lin Kong, University of Utah; Sarah Ying Zhong, University of South Florida; Surojit Gupta, University of North Dakota; Nasrin Hooshmand, Georgia Institute of Technology; Woochul Lee, University of Hawaii at Manoa; Min Kyu Song, Washington State University; Simona Hunyadi Murph, Savannah River National Laboratory; Hagar Labouta, University of Manitoba; Max Anikovskiy, University of Calgary; Patrick Ward, Savannah River National Laboratory

Thursday AM | March 3, 2022
260B | Anaheim Convention Center

Session Chairs: Sarah Ying Zhong, University of South Florida; Min-Kyu Song, Washington State University

---

8:30 AM
The Influence of Magnetic Moment on Chemical Activity for Design of Hierarchical Electrochemical Systems: *Chloe Groome*[1]; Huong Ngo[1]; Jie Li[1]; Ruqian Wu[1]; Regina Ragan[1]; [1]University of California Irvine

8:50 AM Invited
MOF-derived Metal Oxide Composites for High Performance Energy Storage: *Tae-Sik Oh*[1]; [1]Auburn University

9:15 AM
Porous Assemblies of 2-D MnO2 Nanosheets and Their Conversion to 1-D Tunnel Structures: Peter Metz[1]; Alec Ladonis[1]; Peng Gao[1]; Madeleine Flint[1]; *Scott Misture*[1]; [1]Alfred University

9:35 AM Invited
3D Carbon Nanotube Sponges: Surface Treatments for Improving the Performances of Energy Storage and Mechanical Properties: *Choongho Yu*[1]; [1]Texas A&M University

10:00 AM Break

10:20 AM Invited
Electrochemical Imaging of Precisely Defined Redox and Reactive Nanomaterials: *Venkateshkumar Prabhakaran*[1]; [1]Pacific Northwest National Laboratory

10:45 AM Keynote
Electrochemical Behaviors of Two-dimensional Materials for Energy Applications: *Jun Lou*[1]; [1]Rice University

---

MECHANICS & STRUCTURAL RELIABILITY

Grain Boundaries and Interfaces: Metastability, Disorder, and Non-Equilibrium Behavior — Microstructures: Crystallography, GB Network, Phase Diagram, etc

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

Program Organizers: Yue Fan, University of Michigan; Liang Qi, University of Michigan; Jeremy Mason, University of California, Davis; Garritt Tucker, Colorado School of Mines; Pascal Bellon, University of Illinois at Urbana-Champaign; Mitra Taheri, Johns Hopkins University; Eric Homer, Brigham Young University; Xiaofeng Qian, Texas A&M University

Thursday AM | March 3, 2022
263B | Anaheim Convention Center

Session Chairs: Yue Fan, University of Michigan, Ann Arbor; Eric Homer, Brigham Young University

---

8:30 AM Invited
Grain Boundary "Phase" Diagrams: *Jian Luo*[1]; [1]University of California, San Diego

9:00 AM
Characterization of the Structure and Chemistry of Grain Boundaries and Heterointerfaces in Multiphase High Entropy Oxides Processed by Heat Treatment: *Hasti Vahidi*[1]; Alexander Dupuy[1]; Justin Cortez[1]; Julie Schoenenung[1]; William Bowman[1]; [1]University of California Irvine

9:20 AM
Calculating Representative and Statistical Volume Elements for Grain Boundary Networks Using 3D Microstructural Data: Jeremy Green[1]; Nathan Miller[1]; *Oliver Johnson*[1]; [1]Brigham Young University

9:40 AM
5D Grain Boundary Energy Landscapes, Paths and Correlations from Bayesian Inference: *Sterling Baird*[1]; Eric Homer[1]; David Fullwood[1]; Oliver Johnson[1]; [1]Brigham Young University

10:00 AM
Percolation Behavior of Three-dimensional Grain Boundary Networks: *Jiwoong Kang*[1]; Ashwin Shahani[1]; [1]University of Michigan

10:20 AM Break

10:35 AM Invited
Relationships between Grain Boundary Crystallographic Structure and Grain Boundary Properties: *Gregory Rohrer*[1]; [1]Carnegie Mellon University

11:05 AM
Spanning the 5D Space of Grain Boundaries: A Comprehensive Database of Computed Aluminum Grain Boundary Structures and Their Interface Energy: *Braxton Owens*[1]; Lydia Serafin[1]; Derek Hensley[1]; Jay Spendlove[1]; Gus Hart[1]; Eric Homer[1]; [1]Brigham Young University

11:25 AM
Motion of a Dislocation Boundary in Thermal Annealing Resolved with Dark-field X-ray Microscopy: *Leora Dresselhaus-Marais*[1]; Can Yildirim[2]; Henning Poulsen[3]; Carsten Detlefs[2]; Grethe Winther[3]; [1]Stanford University; [2]ESRF; [3]DTU

11:45 AM
Study of the Evolution of the Grain Boundary Network Using Spectral Graph Theory: *Jose Nino*[1]; Oliver Johnson[1]; [1]Brigham Young University

---

ADVANCED MATERIALS

High Performance Steels — Alloy and Thermo-mechanical Process Design

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

Program Organizers: Ana Luiza Araujo, CBMM North America Inc.; C. Tasan, Massachusetts Institute of Technology; Jonah Kleem-Toole, Colorado School of Mines; Louis Hector, General Motors Global Technical Center; Tilmann Hickel, Max-Planck-Institut Fuer Eisenforschung; Benjamin Adam, Oregon State University

Thursday AM | March 3, 2022
252C | Anaheim Convention Center

Session Chairs: Tomas Scuseria, Colorado School of Mines; Cem Tasan, MIT

8:30 AM
Multi-stage Welding Cycles for Resistance Spot Welding of Advanced Martensitic Steels: *Emmitt Fagerstrom*[1]; Benjamin Hilpert[2]; Holger Schubert[2]; Bharat Balasubramanian[1]; Luke Brewer[1]; [1]University of Alabama; [2]Mercedes-Benz

8:50 AM
Impact of Alloy Composition on the Hot Ductility of Steel during Continuous Casting: *Alyssa Stubbers*[1]; Thomas Balk[1]; [1]University of Kentucky

9:10 AM
Custom Designed Tapered-rolling Process Enables Hard Steels with Mixed-mode Cracking Resistance: *Gianluca Roscioli*[1]; Cemal Tasan[1]; [1]Massachusetts Institute of Technology

9:30 AM
Large Strain Ambient Temperature Rolling Reduction of an Ultra-high Strength Steel: *Joshua Edwards*[1]; Thomas Kozmel[2]; Jeffrey Lin[2]; Suveen Mathaudhu[1]; [1]Colorado School of Mines; [2]QuesTek Innovations LLC.

9:50 AM Break

10:05 AM
Understanding Composition Dependence of Deformation Microstructure in Hydrogen Resistant Austenitic Steels: *Quinten Yurek*[1]; [1]University of Illinois

---

LIGHT METALS

Magnesium Technology — Surface Protection, Corrosion and Degradation

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

Program Organizers: Petra Maier, University of Applied Sciences Stralsund; Steven Barela, Terves, Inc; Victoria Miller, University of Florida; Neale Neelameggham, IND LLC

Thursday AM | March 3, 2022
210A | Anaheim Convention Center

Session Chairs: Kiran Solanki, Arizona State University; Regine Willumeit-Römer, Helmholtz-Zentrum Hereon

---

8:30 AM
Flexible Surface Treatment Technology to Enable Temporary SCC Prevention for Mg Dissolvable Alloys: *Lei Zhao*[1]; Wenhan Yue[1]; Jiaxiang Ren[1]; Tim Dunne[1]; Peng Cheng[1]; Huailiang Liu[1]; [1]CNPC USA

8:50 AM
Enhanced Corrosion Resistance of an AZ31 Magnesium Alloy through Shear Extrusion: *Vikrant Beura*[1]; Vineet Joshi[2]; Kiran Solanki[1]; [1]Arizona State University; [2]Pacific Northwest National Laboratory

9:10 AM
Active Corrosion Protection Surfaces Based on Layered Double Hydroxides Nanocontainers: A Computational Study: *Xuejiao Li*[1]; Christian Feiler[1]; Tim Würger[2]; Robert Meißner[2]; Daniel Höche[1]; Mikhail Zheludkevich[1]; [1]Helmholtz-Zentrum Hereon; [2]Hamburg University of Technology

9:30 AM Invited
Novel Laboratory-scale *In Situ* Methods for Studying Mg Alloy Degradation: *Dmytro Orlov*[1]; [1]Lund University

---

MATERIALS DESIGN

Materials Design and Processing Optimization for Advanced Manufacturing: From Fundamentals to Application — Materials Design and Processing Optimization: Session VII

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

Program Organizers: Wei Xiong, University of Pittsburgh; Dana Frankel, QuesTek Innovations LLC; Gregory Olson, Massachusetts Institute of Technology

Thursday AM | March 3, 2022
253B | Anaheim Convention Center

Session Chairs: Victoria Miller, University of Florida; Yan Li, Dartmouth College

---

8:30 AM Invited
Role of Interstitial and Minor Alloying Element Additions on Microstructural Evolution in Additively Manufactured Materials: *Todd Palmer*[1]; [1]Pennsylvania State University

8:55 AM
Solidification Behavior of Additively Manufactured Martensitic Precipitation-hardenable Stainless Steels: *Melanie Buziak*[1]; Eric Lass[1]; [1]University of Tennessee Knoxville

9:15 AM
Healing Damage in Friction Stir Processed Mg2Si Reinforced Al Alloy: Mariia Arseenko[1]; Florent Hannard[1]; Lipeng Ding[2]; Ankush Kashiwar[1]; Elie Paccou[3]; Lv Zhao[4]; Grzegorz Pyka[1]; Hosni Idrissi[1]; Williams Lefebvre[3]; Julie Villanova[5]; Eric Maire[6]; *Julie Gheysen*[1]; Aude Simar[1]; [1]Universite Catholique De Louvain; [2]Nanjing Tech University; [3]Université de Rouen; [4]Huazhong University of Science and Technology; [5]ESRF; [6]INSA Lyon

9:35 AM
Material Flow Behavior Prediction of Additive Friction Stir Deposition Using Smoothed Particle Hydrodynamics: *George Stubblefield*[1]; Kirk Fraser[2]; Thomas Robinson[3]; Ning Zhu[3]; Ryan Kinser[3]; James Tew[3]; Bret Cordle[3]; James Jordon[3]; Paul Allison[3]; [1]The Engineer Research and Development Center; [2]National Research Council Canada; [3]The University of Alabama

NUCLEAR MATERIALS

Materials Systems for the Future of Fusion Energy — ODS Steel and Tungsten Alloy Development

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

Program Organizers: Jason Trelewicz, Stony Brook University; Kevin Field, University of Michigan; Takaaki Koyanagi, Oak Ridge National Laboratory; Yuanyuan Zhu, University of Connecticut; Dalong Zhang, Pacific Northwest National Laboratory

Thursday AM | March 3, 2022
203A | Anaheim Convention Center

Session Chairs: Iver Anderson, Iowa State University Ames Laboratory; Eric Lang, Sandia National Laboratories

---

8:30 AM
Fabrication of an Oxide Dispersion Strengthened Ferritic Steel Using SolidStir Technology: *Pranshul Varshney*[1]; Kumar Kandasamy[2]; Nilesh Kumar[1]; [1]University of Alabama; [2]Enabled Engineering

8:50 AM Invited
Promoting Oxide Dispersion Strengthening in Ferritic Steels Made with GARS Powder for High-shear Powder Consolidation and for L-PBF: *Iver Anderson*[1]; E. Cockburn[1]; T.R. Riedemann[1]; Ralph Napolitano[1]; [1]Ames Laboratory (USDOE), Iowa State University

9:20 AM
Alternative ODS Steel Manufacturing with Gas Atomization Reaction Synthesis (GARS) and Friction-based Processing: *Dalong Zhang*[1]; Jens Darsell[1]; Glenn Grant[1]; Iver Anderson[2]; Xiaolong Ma[1]; Jing Wang[1]; Danny Edwards[1]; Wahyu Setyawan[1]; Takuya Yamamoto[3]; Robert Odette[3]; [1]Pacific Northwest National Laboratory; [2]Ames Laboratory; [3]University of California-Santa Barbara

9:40 AM
In-situ TEM of the Microstructure and He Behavior of AM W Alloys: *Eric Lang*[1]; Ian McCue[2]; W.S. Cunningham[3]; Jason Trelewicz[3]; Khalid Hattar[1]; [1]Sandia National Laboratories; [2]Northwestern University; [3]Stonybrook University

10:00 AM
Microstructural Transitions during Powder Metallurgical Processing of Solute Stabilized Nanostructured Tungsten Alloys: *Nicholas Olynik*[1]; Sean Mascarenhas[1]; David Sprouster[1]; Chad Parish[2]; Jason Trelewicz[1]; [1]Stony Brook University; [2]Oak Ridge National Laboratory

---

NANOSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale VI — Thin Films and Multilayers

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

Program Organizers: Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, University of Texas at San Antonio; Changhong Cao, McGill University; Mohsen Asle Zaeem, Colorado School of Mines

Thursday AM | March 3, 2022
262B | Anaheim Convention Center

Session Chairs: Matthew Daly, University of Illinois at Chicago; Megan Cordill, Erich Schmid Institute

---

8:30 AM Invited
The Role of Thin Film Architecture to Enhance Fracture Resistance: *Megan Cordill*[1]; [1]Erich Schmid Institute of Materials Science

9:00 AM
Investigating Role of Interfaces on Deformation Behavior of Metallic Nanolaminates Using Dislocation Dynamics Simulations: *Aritra Chakraborty*[1]; Abigail Hunter[1]; Laurent Capolungo[1]; [1]Los Alamos National Laboratory

9:20 AM
Strain-rate Dependent Deformation Mechanisms in Multilayer Cu/Mo Thin Films: *Bibhu Prasad Sahu*[1]; Amit Misra[1]; George M. Pharr[2]; [1]University of Michigan; [2]Texas A&M University

9:40 AM
Orientation Dependence of Strength and Ductility in Nanolaminates Containing Interfaces with Three Dimensional Character: *Justin Cheng*[1]; Shuozhi Xu[2]; Zezhou Li[1]; Jonathan Poplawsky[3]; J. Kevin Baldwin[4]; Irene Beyerlein[2]; Nathan Mara[1]; [1]University of Minnesota Twin Cities; [2]University of California Santa Barbara; [3]Oak Ridge National Laboratory; [4]Los Alamos National Laboratory

10:00 AM Break

10:20 AM
Mechanistic-design of Multilayered Nanocomposites: Hierarchical Metal-MAX Materials for Tunable Strength and Toughness: *Skye Supakul*[1]; Garritt Tucker[2]; Siddhartha (Sid) Pathak[1]; [1]Iowa State University; [2]Colorado School of Mines

10:40 AM
Mechanical Behavior of Optimized Transparent Nanomultilayers: *Danielle White*[1]; Edoardo Rossi[2]; Marco Sebastiani[2]; Andrea Hodge[1]; [1]University of Southern California; [2]Roma Tre University

---

CHARACTERIZATION

Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling — Session VI

Sponsored by: TMS Structural Materials Division, TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Shailendra Joshi, University of Houston; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Jagannathan Rajagopalan, Arizona State University; Robert Wheeler, Microtesting Solutions LLC

Thursday AM | March 3, 2022
206B | Anaheim Convention Center

Session Chairs: Ankit Srivastava, Texas A&M University; Isabel Crystal, Lawrence Livermore National Laboratory

---

8:30 AM
In-situ SEM Investigation of Thermally Induced Cracking in Shape Memory Ceramics: *Isabel Crystal*[1]; Haoxue Yan[2]; Christopher Schuh[2]; [1]Lawrence Livermore National Laboratory; [2]Massachusetts Institute of Technology

8:50 AM
Determination of Fracture Toughness Using the Compression Fracture Technique: *Carl Cady*[1]; Cheng Liu[1]; [1]Los Alamos National Laboratory

9:10 AM
X-ray Microbeam Characterization of Electromigration Process in Al(0.25wt% Cu) Interconnect: *Ping-Chuan Wang*[1]; Kieran Cavanagh[1]; [1]SUNY New Paltz

9:30 AM
Achieving the Maximum Modulus of Resilience in Polymer Nanocomposites via Sequential Infiltration of Metal Oxides: *Zhongyuan Li*[1]; Nikhil Tiwale[2]; Ashwanth Subramanian[2]; Ying Li[1]; Chang-Yong Nam[2]; Seok-Woo Lee[1]; [1]University of Connecticut; [2]Brookhaven National Laboratory

9:50 AM Break

10:10 AM
Characterization of the Role of Lath Boundaries in Lath Martensitic Steel Using In-situ Micro-pillar Compression Tests: *Ye-Eun Na*[1]; Hadi Ghaffarian[1]; Dongchan Jang[1]; [1]KAIST

10:30 AM
Super-fast Fabrication of Micropillar Arrays Using Laser FIB Combination for More Statistically Relevant Micropillar Compression Tests: *Fang Zhou*[1]; Tobias Volkenandt[1]; Tim Schubert[2]; Nicholas Randall[3]; Timo Bernthaler[2]; [1]Carl Zeiss Microscopy GmbH; [2]Aalen University; [3]Alemnis AG

10:50 AM
In Situ Observation of Room Temperature Crack-healing in an Atomically Layered Ternary Carbide: Hemant Rathod[1]; Thierry Ouisse[2]; Miladin Radovic[1]; *Ankit Srivastava*[1]; [1]Texas A&M University; [2]Université Grenoble Alpes

---

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Solidification and Microstructural Evolution/General Topic

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Ramasis Goswami, Naval Research Laboratory; Saurabh Puri, Microstructure Engineering; Eric Payton, Air Force Research Laboratory; Bij-Na Kim, Carpenter Additive; Megumi Kawasaki, Oregon State University; Eric Lass, University of Tennessee-Knoxville

Thursday AM | March 3, 2022
255B | Anaheim Convention Center

Session Chair: To Be Announced

8:30 AM
Growth Competition between Columnar Dendritic Grains - The Role of Microstructural Length Scales: *Elaheh Dorari*[1]; Kaihua Ji[1]; Gildas Guillemot[2]; Charles-Andre Gandin[2]; Alain Karma[1]; [1]Northeastern University; [2]MINES ParisTech

8:50 AM
Growth, Coarsening, and Fragmentation of Dendritic Microstructures in Metallic Materials: *Tiberiu Stan*[1]; Zachary Thompson[1]; Peter Voorhees[1]; [1]Northwestern University

9:10 AM
The Structural Evolution of the Metastable $Ni_{23}B_6$ Phase during Rapid Solidification of Undercooled Ni-B Melts: *Lianjie Liu*[1]; [1]Shanghai Jiao Tong University

9:30 AM
In Situ Interrogation of Dynamic Microstructural Evolution during Friction Stir Processing of Al – 4 at.% Si: *Julian Escobar*[1]; Arun Bhattacharjee[1]; Jorge dos Santos[2]; Jan Herrnring[2]; Luciano Bergmann[2]; Peter Staron[2]; Benjamin Klusemann[1]; Bharat Gwalani[2]; Suveen Mathaudhu[1]; Cynthia Powell[1]; Arun Devaraj[1]; [1]Pacific Northwest National Laboratory; [2]Helmholtz-Zentrum Hereon

9:50 AM Break

10:10 AM
In-situ Observation of Coupled Growth Morphologies in Organic Peritectics under Pure Diffusion Conditions: *Johann Mogeritsch*[1]; [1]Montanuniversitaet Leoben

10:30 AM
Understanding Microstructural Evolution in Powder Bed Fusion Additive Manufacturing: Observations of Phase Transformation in Ti-6Al-4V Using In Situ TEM Heating Experiments: *Sriram Vijayan*[1]; Carolin Fink[1]; Joerg Jinschek[1]; [1]The Ohio State University

10:50 AM
Experimental Investigation of Ni2Cr Long-range Ordering in Ni-Cr-Fe Based Model and Commercial Alloys: *Nicholas Aerne*[1]; David Sprouster[2]; Julie Tucker[1]; [1]Oregon State University; [2]Stony Brook Univsersity

---

CHARACTERIZATION

Seeing is Believing -- Understanding Environmental Degradation and Mechanical Response Using Advanced Characterization Techniques: An SMD Symposium in Honor of Ian M. Robertson — In-situ and Multi-modal Characterization of Environmental Degradation (Contributed)

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Nuclear Materials Committee

Program Organizers: Kaila Bertsch, Lawrence Livermore National Laboratory; Khalid Hattar, Sandia National Laboratories; Josh Kacher, Georgia Institute of Technology; Bai Cui, University of Nebraska-Lincoln; Benjamin Eftink, Los Alamos National Laboratory; Stephen House, University of Pittsburgh; May Martin, National Institute of Standards and Technology; Kelly Nygren, Cornell High Energy Synchrotron Source; Blythe Clark, Sandia National Laboratories; Shuai Wang, Southern University of Science and Technology

Thursday AM | March 3, 2022
207C | Anaheim Convention Center

Session Chair: To Be Announced

8:30 AM
An Experimental-numerical Approach to Investigate Hydrogen Effects on Dislocations: *Haoxue Yan*[1]; Qingjie Li[1]; Jinwoo Kim[1]; Ju Li[1]; C. Cem Tasan[1]; [1]Massachusetts Institute of Technology

8:50 AM
In Situ Investigation of the Role of Slip in Crack Initiation in Hydrogen Embrittled Alloy 725: *Mengying Liu*[1]; Lai Jiang[2]; Michael Demkowicz[2]; [1]Washington and Lee University; [2]Texas A&M University

9:10 AM
In-situ 4D-STEM Imaging of Mechanical Deformation in Medium Entropy Alloy (MEA) and Bulk Metallic Glass (BMG): *Yang Yang*[1]; Sheng Yin[2]; Qin Yu[2]; Ruopeng Zhang[2]; Mark Asta[2]; Robert Ritchie[2]; Andrew Minor[2]; [1]The Pennsylvania State University; [2]Lawrence Berkeley National Laboratory

9:30 AM
In Situ TEM Studies on the Radiation Response of Cu with Nanovoids: Cuncai Fan[1]; Rayaprolu Goutham Sreekar Annadanam[1]; Zhongxia Shang[1]; Meimei Li[2]; Anter El-Azab[1]; *Xinghang Zhang*[1]; [1]Purdue University; [2]Argonne National Laboratory

9:50 AM
Revealing Hidden Defects via Stored Energy Measurements of Radiation Damage: *Charles Hirst*[1]; Fredric Granberg[2]; Penghui Cao[3]; Scott Middlemas[4]; R. Kemp[1]; Ju Li[1]; Kai Nordlund[2]; Michael Short[1]; [1]Massachusetts Institute of Technology; [2]University of Helsinki; [3]University of California, Irvine; [4]Idaho National Laboratory

---

NUCLEAR MATERIALS

Synergistic Irradiation, Corrosion, and Microstructural Evolution in Nuclear Materials — Advanced Techniques for Fundamental Understanding of Irradiation-Corrosion Processes

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

Program Organizers: Djamel Kaoumi, North Carolina State University; Michael Short, Massachusetts Institute of Technology; Peter Hosemann, University of California, Berkeley; Stephen Raiman, Texas A&M University; Raluca Scarlat, University of California, Berkeley; Aaron Kohnert, Los Alamos National Laboratory; Ryan Schoell, North Carolina State University; Philip Edmondson, Oak Ridge National Laboratory; Celine Cabet, Commissariat a l'Energie Atomique

Thursday AM | March 3, 2022
202A | Anaheim Convention Center

Session Chair: To Be Announced

8:30 AM Invited
The Coupled Effects of Irradiation and Corrosion on Materials: *Blas Uberuaga*[1]; [1]Los Alamos National Laboratory

9:00 AM Invited
The Role of *In Situ* Analytical Electron Microscopy in Understanding the Behaviour of Structural Materials in Nuclear Power Systems: Examples and Opportunities: *M Grace Burke*[1]; Joven Lim[2]; [1]University of Manchester; [2]UK Atomic Energy Authority

9:30 AM
4D-STEM and Atomic Resolution Analysis of He–rich Gas Bubbles Formed in Au Thin Films via He-ion Irradiation: *Sean Mills*[1]; Andrew Minor[1]; [1]University of California-Berkeley

9:50 AM Break

10:10 AM
Quantification of the Oxidizing Effects of Neutron Activation Reactions in FLiBe: *Lorenzo Vergari*[1]; Ryan Hayes[1]; Massimiliano Fratoni[1]; Raluca Scarlat[1]; [1]University of California- Berkeley

10:30 AM
Modelling the Primary Damage in Nickel and Nickel Based Alloys: Influence of Cascade Energy and Morphology in Displacement Cascades: *Adithya Nair*[1]; Charlotte Becquart[2]; Christophe Domain[3]; Andrée De Backer[2]; [1]Univ. Lille, CNRS, INRAE, Centrale Lille, UMR 8207 - UMET - Unité Matériaux et Transformations, F-59000 Lille, France; [2]Univ. Lille, CNRS, INRAE, Centrale Lille, UMR 8207 - UMET - Unité Matériaux et Transformations,F-59000 Lille, France; EDF-CNRS Joint Laboratory EM2VM Study and Modeling of the Microstructure for Ageing of Materials (France); [3]EDF R&D - MMC, Moret sur Loing (France); EDF-CNRS Joint Laboratory EM2VM Study and Modeling of the Microstructure for Ageing of Materials (France)

NANOSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XII) — Processing, Microstructure & Property II

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Penghui Cao, University of California, Irvine; Xiaoxu Huang, Chongqing University; Enrique Lavernia, University of California, Irvine; Xiaozhou Liao, University of Sydney; Lee Semiatin, Material Resources LLC; Nobuhiro Tsuji, Kyoto University; Caizhi Zhou, University of South Carolina; Yuntian Zhu, City University of Hong Kong

Thursday AM | March 3, 2022
262A | Anaheim Convention Center

Session Chair: To Be Announced

8:30 AM Invited
Bulk Nanostructured Metallic Materials with Superior Multifunctional Properties: Ruslan Valiev[1]; *Xiaozhou Liao*; [1]UFA State Aviation Technical University

9:00 AM
Deformation Mechanisms of Laser Rapid Solidified Al–Si Heterostructures: *Bingqiang Wei*[1]; Wenqian Wu[1]; Amit Misra[2]; Jian Wang[1]; [1]University of Nebraska-Lincoln; [2]University of Michigan

9:20 AM
Significance of Grain Refinement on Micro-mechanical Properties and Structures of Additive-manufactured CoCrFeNi High-entropy Alloy: *Jae-Kyung Han*[1]; Yulia O. Kuzminova[2]; Stanislav A. Evlashin[2]; Jae-il Jang[3]; Klaus-Dieter Liss[4]; Megumi Kawasaki[1]; [1]Oregon State University; [2]Skolkovo Institute of Science and Technology; [3]Hanyang University; [4]Guangdong Technion - Israel Institute of Technology

9:40 AM
Strengthening Mechanisms in Dilute Ultrafine-grained Ag Alloys Processed by Top-down and Bottom-up Approaches: *Erik Sease*[1]; Evander Ramos[1]; Peter Jacobson[2]; Manuel Esparragoza[2]; Thomas Kozmel[2]; Suveen Mathaudhu[3]; [1]University of California Riverside; [2]Questek Innovations LLC; [3]University of California, Riverside/ Pacific Northwest National Laboratory

10:00 AM Break

10:20 AM
Strength Softening Mitigation in Bimodal Nanostructured Metals: *Han Wang*[1]; Penghui Cao[1]; [1]University of California, Irvine

10:40 AM
Evolution of Microstresses during Elasto-plastic Transition under In Situ Tensile Loading of Harmonic Structure Materials by Synchrotron X-ray Diffraction: *Elis Sjogren*[1]; Wolfgang Pantleon[2]; Ulrich Lienert[3]; Zoltan Hegedüs[3]; Kei Ameyama[4]; Dmyto Orlov[1]; [1]Lund University; [2]Technical University of Denmark; [3]Deutsches Elektronen-Synchrotron; [4]Ritsumeikan University

---

NANOSTRUCTURED MATERIALS

30 Years of Nanoindentation with the Oliver-Pharr Method and Beyond — Characterization of Advanced Materials Systems

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

Program Organizers: Verena Maier-Kiener, Montanuniversitaet Leoben; Benoit Merle, University Erlangen-Nuremberg (Fau); Erik Herbert, Michigan Technological University; Samantha Lawrence, Los Alamos National Laboratory; Nigel Jennett, Coventry University

Thursday PM | March 3, 2022
259B | Anaheim Convention Center

Session Chairs: Karsten Durst, TU Darmstadt; Graham Cross, Trinity College Dublin

---

2:00 PM Invited
Best Practices for Berkovich Nanoindentation in Hard Biological Tissues: Joseph Jakes[1]; *Donald Stone*[2]; [1]USDA FS Forest Products Laboratory; [2]University of Wisconsin - Madison

2:25 PM
Nanoindentation of Supercrystalline Nanocomposites: *Diletta Giuntini*[1]; Shiteng Zhao[2]; Buesra Bor[3]; Cong Yan[3]; Alexander Plunkett[3]; Gerold Schneider[3]; [1]Eindhoven University of Technology; [2]University of California Berkeley; [3]Hamburg University of Technology

2:45 PM
Characterization of Grain Boundaries in Geological Materials Using Micromechanical Testing: *Diana Avadanii*[1]; Lars Hansen[2]; Katharina Marquardt[3]; Ed Darnbrough[1]; David Armstrong[1]; Angus Wilkinson[1]; [1]University of Oxford; [2]University of Minnesota; [3]Imperial College London

3:05 PM
A Comparative Study of Fracture Toughness Measurements in Two Silicate Glasses Using Nanoindentation: *Yvonne Dieudonné*[1]; George Pharr[1]; [1]Texas A&M University

3:25 PM Break

3:45 PM
Nanoindentation of NiTi Shape Memory Alloys: *Gunther Eggeler*[1]; [1]Ruhr-Universität Bochum

4:05 PM
Determination of Constitutive Properties for Shape Memory Alloys from Nanoindentation Response: *Xuesong Gao*[1]; Daniel Hong[1]; Harshad Paranjape[2]; Wei Zhang[1]; Peter Anderson[1]; [1]The Ohio State University; [2]Confluent Medical Technologies, Inc

4:25 PM
Assessing Segregation-induced Softening in Nanocrystalline Stabilized NiP by Nanoindentation: *Ilias Bikmukhametov*[1]; Thomas Koenig[1]; Garritt Tucker[2]; Gregory Thompson[1]; [1]University of Alabama; [2]Colorado School of Mines

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Innovative Powder Processing of Functional and Magnetic Materials — Overcoming Build Challenges, Feedstock to Thermal Treatments

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

Program Organizers: Emily Rinko, Iowa State University; Iver Anderson, Iowa State University Ames Laboratory; Markus Chmielus, University of Pittsburgh; Emma White, DECHEMA Forschungsinstitut; Deliang Zhang, Northeastern University; Andrew Kustas, Sandia National Laboratories; Kyle Johnson, Sandia National Laboratories

Thursday PM | March 3, 2022
262C | Anaheim Convention Center

Session Chair: Iver Anderson, Iowa State University Ames Laboratory

---

2:00 PM Introductory Comments

2:05 PM
Mechanical Alloying and Characterization of Al2Ni5Co6Fe6Sm0.2 High-entropy Alloy: *Afsaneh Darvish Motevali*[1]; Majid Vaseghi[1]; Mahmood Sameezadeh[1]; [1]Shahid Beheshti University

2:25 PM
Improved Near-infrared Absorption for Additive Manufacturing Feedstock Using Reduced Graphene Oxide: *Chu Lun Alex Leung*[1]; Iuliia Elizarova[2]; Mark Isaacs[1]; Shashidhara Marathee[3]; Eduardo Saiz[2]; Peter D. Lee[1]; [1]University College London; [2]Imperial College London; [3]Diamond Light Source Ltd

2:45 PM
Additive Manufacturing of a Composite Made of Al 5083 Matrix and Encapsulated ZnAl Particles: *Baolong Zheng*[1]; David Svetlizky[2]; Sen Jiang[1]; Yizhang Zhou[1]; Lorenzo Valdevit[1]; Noam Eliaz[2]; Enrique Lavernia[3]; Julie Schoenung[1]; [1]University of California, Irvine; [2]Tel-Aviv University; [3]National Academy of Engineering

3:05 PM
Growth Optimization of Single Crystal Fibers of Congruently and Incongruently Melting Garnets via Laser Heated Pedestal Growth Method: *Dolendra Karki*[1]; Edward Clover Hoffman[1]; Paul R. Ohodnicki[1]; [1]University of Pittsburgh

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture: Developing Predictive Capabilities — Environmental and Corrosion Effects

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

Thursday PM | March 3, 2022
258B | Anaheim Convention Center

Session Chair: Mohsen Seifi, ASTM International/Case Western Reserve University

---

2:00 PM Invited
Environmental Cracking Behavior of Additively Manufactured 17-4PH Stainless Steel: *James Burns*[1]; Trevor Shoemaker[1]; [1]University of Virginia

2:30 PM
Machining vs Heat Treatment in Additive Manufacturing of Ti6Al4V Alloy: Alireza Dareh Baghi[1]; *Shahrooz Nafisi*[1]; Reza Hashemi[2]; Heike Ebendorff-Heidepriem[1]; Reza Ghomashchi[1]; [1]The University of Adelaide; [2]Flinders University

2:50 PM
The Elevated Temperature Creep, Fatigue and Fracture Behavior of Additively Manufactured Inconel 718: Michael Kassner[1]; *Theophil Oros*[1]; Kee-Ahn Lee[2]; Thien Phan[3]; Lyle Levine[3]; Andrea Hodge[1]; [1]University of Southern California; [2]Inha Univ.; [3]NIST

3:10 PM
On Fatigue Performance of Al-Cu-Mg-Ag-Ti-B Alloy: Additive Manufactured Versus Cast: Maryam Avateffazeli[1]; Md Faysal Khan[2]; Shuai Shao[2]; Nima Shamsaei[2]; *Meysam Haghshenas*[1]; [1]University of Toledo; [2]Auburn University

3:30 PM Break

3:50 PM Invited
Accelerated Corrosion Behavior of Cold Spray Deposited AA2024 and AA7075 and Implications for Mechanical Performance: *Gregory Kubacki*[1]; Ozymandias Agar[1]; Munsu Kim[1]; Sheri Stanke[2]; Christine Sanders[2]; Rachel Black[3]; Sean Kane[3]; Luke Brewer[1]; [1]The University of Alabama; [2]Naval Research Laboratory; [3]Naval Air Systems Command

4:20 PM
Short-crack Growth Behavior in Additively Manufactured AlSi10Mg: Robert Rhein[1]; Qianying Shi[2]; J Wayne Jones[2]; Srinivasan Arjun Tekalur[1]; Jason Carroll[1]; *Kathleen Chou*[1]; [1]Eaton Corporation; [2]University of Michigan

4:40 PM
High Cycle Fatigue Behaviour of Additively Manufactured 316L Austenitic Stainless Steel: *Punit Kumar*[1]; Jayaraj Radhakrishnan[1]; James McKinnell[2]; Upadrasta Ramamurty[1]; [1]NTU Singapore; [2]HP Inc.

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Nano/Micro-mechanics and Length-scale Phenomena — Special Topics

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

Program Organizers: Meysam Haghshenas, University of Toledo; Robert Lancaster, Swansea University; Andrew Birnbaum, US Naval Research Laboratory; Jordan Weaver, National Institute of Standards and Technology; Aeriel Murphy-Leonard, Ohio State University

Thursday PM | March 3, 2022
204B | Anaheim Convention Center

Session Chairs: Suveen Mathaudhu, Colorado School of Mines ; Sezer Ozerinc, Middle East Technical University

---

2:00 PM
Harnessing Non Equilibrium Processing in Additive Manufacturing: Kathryn Small[1]; Markus Suddmans[2]; Anna Rawlings[3]; Ian McCue[4]; Jaafar El-Awady[2]; *Mitra Taheri*[2]; [1]John Hopkins University; [2]Johns Hopkins University; [3]U.S. Naval Research Laboratory; [4]Northwestern University

2:20 PM
Intentional and Unintentional Spatial Variation in Laser Powder Bed Fusion: *Joy Gockel*[1]; Cherish Lesko[2]; Anna Dunn[2]; Daniel Young[2]; Luke Sheridan[3]; [1]Colorado School of Mines; [2]Wright State University; [3]Air Force Research Laboratory

2:40 PM
Multi-scale Dynamic Strain Measurement and Machine Learning Optimization to Uncover Solidification Dynamics of Ti-5553 L-PBF Melt Pools: *Caleb Andrews*[1]; Maria Strantza[2]; Nicholas Calta[2]; Tae Wook Heo[2]; Saad Khairallah[2]; Rongpei Shi[2]; Manyalibo Matthews[2]; Mitra Taheri[1]; [1]Johns Hopkins University; [2]Lawrence Livermore National Laboratory

3:00 PM
Strategies for Functional Grading Using Additive Manufacturing: *Moataz Attallah*[1]; [1]University of Birmingham

3:20 PM Break

3:40 PM
Investigations of Toughening Mechanisms in Nanoarchitected Polymers: *Lucas Meza*[1]; Zainab Patel[1]; [1]University of Washington

4:00 PM
Quasi-static Mechanical Properties of As-printed Thin Wall Inconel 718 Manufactured with Laser Powder Bed Fusion: Effects of Thickness and Hot Isostatic Pressing: *Paul Paradise*; Nikki Van Handel[1]; Samuel Temes[1]; Anushree Saxena[1]; Dhruv Bhate[1]; [1]Arizona State University

4:20 PM
Investigating the Influence of Scan Strategy and Small-scale Geometrical Complexity on the Microstructure and Mechanical Properties of Thin Wall SLM IN718: Connor Varney[1]; *Paul Rottmann*[1]; [1]University of Kentucky

---

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session VIII

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

Program Organizers: Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; Olivia Underwood Jackson, Sandia National Laboratories

Thursday PM | March 3, 2022
207A | Anaheim Convention Center

Session Chairs: Kyle Johnson, Sandia National Laboratories; Amy Clarke, Colorado School of Mines; Aritra Chakraborty, Los Alamos National Laboratory

---

2:00 PM Invited
Multiscale Characterization of Metallic Alloy Microstructures and Links to Properties: *Amy Clarke*[1]; Benjamin Ellyson[1]; Likith Sri Ranga Jai[1]; John Copley[1]; Kester Clarke[1]; Jonah Klemm-Toole[1]; Kamel Fezzaa[2]; Francisco Coury[3]; [1]Colorado School of Mines; [2]Argonne National Laboratory; [3]Federal University of São Carlos

2:30 PM
Estimation of Micro-Hall-Petch Coefficients in Mg-4Al as a Function of Grain Boundary Parameters: *Mohsen Taheri Andani*[1]; Aaditya Lakshmanan[1]; Yung Suk Jeremy Yoo[1]; Veera Sundararaghavan[1]; John Allison[1]; Amit Misra[1]; [1]University of Michigan

2:50 PM
The Early Stage of Deformation-induced Dislocation Patterning Studied by DFXM: *Albert Zelenika*; Can Yildirim[1]; Carsten Detlefs[1]; Henning Poulsen[2]; Grethe Winther[2]; [1]ESRF; [2]DTU

3:10 PM Invited
Capturing Deformation Mechanisms in Additively Manufactured Parts through High-fidelity Modeling and In Situ Computed Tomography: *Kyle Johnson*[1]; Thomas Ivanoff[1]; Philip Noell[1]; Nathan Heckman[1]; John Emery[1]; [1]Sandia National Laboratories

3:40 PM Break

3:55 PM
Coupling In-situ SEM Experiments with Acoustic Emission to Unravel the Underlying Deformation Mechanism in Metals: *Mostafa Omar*[1]; Jaafar El-Awady[1]; [1]Johns Hopkins University

4:15 PM
Grain Environment Dependent Deformation Twinning in a TWIP Steel: A 3DXRD Study: *James Ball*[1]; Stefan Michalik[1]; Oxana Magdysyuk[1]; Thomas Connolley[1]; David Collins[2]; [1]Diamond Light Source; [2]University of Birmingham

---

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Sensors, Power, and Multifunctional Applications — Structures and Properties of Multifunctional Magnetic Materials

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

Program Organizers: Daniel Salazar, BCMaterials; Alex Leary, NASA Glenn Research Center; Eric Theisen, Metglas Inc.; Huseyin Ucar, California Polytechnic University,Pomona; Yongmei Jin, Michigan Technological University

Thursday PM | March 3, 2022
213B | Anaheim Convention Center

Session Chair: Daniel Salazar, BCMaterials

2:00 PM Invited
Current Challenges on Magnetic Sensors for Bio Applications Based on Giant Magnetoimpedance: *Eduardo Fernandez Martin*[1]; Nerea Lete Segura[2]; Alfredo Garcia-Arribas[2]; [1]BCMaterials; [2]Universidad del Pais Vasco (UPV/EHU)

2:30 PM
Heusler Alloys: Past, Properties, New Alloys, and Mechanical Properties: *Sheron Tavares*[1]; Marc Meyers[1]; [1]University of California San Diego

2:50 PM
Spontaneous Exchange Bias in a Metamagnetic Heusler Alloy Thin Film: Vasileios Alexandrakis[1]; Ivan Rodriguez Aseguinolaza[2]; Dimitrios Anastasakos[1]; Jose Manuel Barandiaran[2]; Volodymyr Chernenko[3]; *Jose Maria Porro*[3]; [1]NCSR "Demokritos"; [2]University of the Basque Country (UPV/EHU); [3]BCMaterials

3:10 PM
Effect of Mesoscale $L2_1$ Domain Size on the Nucleation of Thermoelastic Martensitic Transformation in $Ni_{45}Co_5Mn_{36.7}In_{13.3}$ Magnetic Shape Memory Alloys: *Juan Lago*[1]; Woohyun Cho[1]; Daniel Salas[1]; Yijia Zhang[1]; Ibrahim Karaman[1]; Patrick Shamberger[1]; [1]Texas A&M University

3:30 PM Break

3:45 PM
Crack Detection in Structural Material Using Phase Transforming Magnetic Particles: *Woohyun Cho*[1]; Ibrahim Karaman[1]; [1]Texas A&M University

4:05 PM
Magneto-mechanical Properties and Magneto-caloric Behaviour of Rapidly Solidified Melt-spun $Ni_{50}Mn_{28}Ga_{22}$ Heusler Alloy: Deepak Satapathy[1]; P Babu[2]; *Imaddin Al-Omari*[3]; Shampa Aich[1]; [1]Indian Institute of Technology; [2]UGC-DAE Consortium for Scientific Research; [3]Sultan Qaboos University

4:25 PM
Enhanced Magnetostriction in Galfenol through Dilute Ce-doping: Alexander Baker[1]; Hunter Henderson[1]; Emily Moore[1]; Mohammad Islam[2]; Yumi Ijiri[3]; Matthew Willard[2]; Scott McCall[1]; *Alfred Amon*[1]; [1]Lawrence Livermore National Laboratory; [2]Case Western Reserve University; [3]Oberlin College and Conservatory

4:45 PM
Phase Stability of Fe-Ga-Ce-Zr Alloys: *Emily Moore*[1]; Devika Nandwana[2]; Alexander Baker[1]; Mohammad Islam[3]; Hunter Henderson[1]; Yumi Ijiri[4]; Matthew Willard[3]; Scott McCall[1]; [1]Lawrence Livermore National Laboratory; [2]Case Western Reserve University ; [3]Case Western Reserve University; [4]Oberlin College

---

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: Alloy Development and Properties — Additive Manufacturing and Other Techniques

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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday PM | March 3, 2022
251A | Anaheim Convention Center

Session Chairs: Wen Chen, University of Massachusetts-Amherst; Duckbong Kim, Tennessee Technological University

---

2:00 PM
Nanostructured Oxide-dispersion-strengthened CoCrFeMnNi High Entropy Alloys: Processing, Microstructures, and Thermal Stability: 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

2:20 PM
Experimental Investigations of an Additively Manufactured Multi-principal Element Alloy with Extraordinarily High Strength: *Morgan Jones*[1]; Jonathan Pegues[1]; Michael Melia[1]; Ping Lu[1]; Frank DelRio[1]; Raymond Puckett[1]; Iver Anderson[2]; Emma White[2]; Duane Johnson[2]; Prashant Singh[2]; Andrew Kustas[1]; Irene Beyerlein[3]; [1]Sandia National Laboratories; [2]Ames Laboratory; [3]University of California Santa Barbara

2:40 PM
Additive Manufacturing and Mechanical Properties of Al18Co30Cr10Fe10Ni32 Eutectic Multi-principal Elements Alloy Fabricated by Laser-powder Bed Fusion: Abhishek Mehta[1]; *Thinh Huynh*[1]; Kevin Graydon[1]; Asif Mahmud[1]; Yongho Sohn[1]; [1]University of Central Florida

3:00 PM
Mapping Processibility in the Family of Additive Manufacturing for MPEAs: *Praveen Sreeramagiri*[1]; Hengrui Zhang[2]; Wei Chen[2]; Ganesh Balasubramanian[1]; [1]Lehigh University; [2]Northwestern University

3:20 PM
Oxidation Characteristic of Complex Concentrated Alloys FeAlCrV and FeAlCrMo: *Eliška Jaca*[1]; Peter Minárik[1]; Josef Pešicka[1]; Stanislav Daniš[1]; Adam Hotar[2]; [1]Charles University; [2]Technical University of Liberec

---

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: Structures and Modeling — Modeling and Characterization

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

Program Organizers: Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Thursday PM | March 3, 2022
251B | Anaheim Convention Center

Session Chairs: Seungha Shin, University of Tennessee; Dustin Allen Gilbert, University of Tennessee

---

2:00 PM
High Thermal Stability B2 Precipitates in a Ru-containing Multi-principal Element Alloy: *Carolina Frey*[1]; Ravit Silverstein[1]; Tresa Pollock[1]; [1]University of California Santa Barbara

2:20 PM
Effects of Short-range Order on Thermodynamic Properties of AlxCoCrFeNi High-entropy Alloys: *Md Abdullah Al Hasan*[1]; Seungha Shin[1]; Peter Liaw[1]; Dustin Gilbert[1]; [1]University of Tennessee

2:40 PM
Local Configuration Effects on Vibrational Properties of BCC MPEAs: *Sarah O'Brien*[1]; Matthew Beck[1]; [1]University of Kentucky

3:00 PM
Melting Temperature Prediction of Multi-principal Elements Alloys Using Ab-initio Calculations: *Saswat Mishra*[1]; Alejandro Strachan[1]; [1]Purdue University

3:20 PM
A Method to Predict Fluctuations in the Fault Energy Landscape of FCC Solid Solutions: *Ritesh Jagatramka*[1]; Chu Wang[1]; Matthew Daly[1]; [1]University of Illinois at Chicago

3:40 PM Break

4:00 PM
The Impact of Short-range Order on Atomic Diffusions in Multi-principal Elements Alloys: *Bin Xing*[1]; William Bowman[1]; Penghui Cao[2]; [1]Department of Materials Science and Engineering, University of California, Irvine; [2]Department of Mechanical and Aerospace Engineering, University of California, Irvine

4:20 PM
Vacancy Defects: Formation Energy and Migration Paths in Multi-principal-element Alloys (MPEAs): *Ankit Roy*[1]; Prashant Singh[2]; Ganesh Balasubramanian[1]; Duane Johnson[2]; [1]Lehigh University; [2]Ames Laboratory

---

MATERIALS DESIGN

AI/Data Informatics: Computational Model Development, Validation, and Uncertainty Quantification — Material Design IV

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Dennis Dimiduk, BlueQuartz Software LLC; Darren Pagan, Pennsylvania State University; Anthony Rollett, Carnegie Mellon University; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory

Thursday PM | March 3, 2022
256A | Anaheim Convention Center

Session Chair: Jason Gibson, University of Florida

2:00 PM
Coping with Materials Variance Using Transfer Learning: *Ali Riza Durmaz*[1]; Aurèle Goetz[1]; Martin Müller[2]; Akhil Thomas[1]; Pierre Kerfrieden[3]; [1]Fraunhofer IWM; [2]Universität des Saarlandes; [3]Mines ParisTech (PSL University)

2:20 PM
Comparison of Human, Machine Learning, and Common Optimization Approaches on Grain Boundary Networks: *Christopher Adair*[1]; Oliver Johnson[1]; Emily Beatty[1]; Hayley Evans[1]; Seth Holladay[1]; Derek Hansen[1]; [1]Brigham Young University

2:40 PM
Design of a Scalable Interatomic Potential for GST+C Device Modeling: *Zachary Mcclure*[1]; Alejandro Strachan[1]; Robert Appleton[1]; David Adams[2]; [1]Purdue University; [2]Sandia National Laboratory

3:00 PM
Combined Clustering and Regression for Predicting Melting Temperatures of Solids: *Vahe Gharakhanyan*[1]; José Garrido Torres[1]; Ethan Eisenberg[1]; Snigdhansu Chatterjee[2]; Dallas Trinkle[3]; Alexander Urban[1]; [1]Columbia University; [2]University of Minnesota; [3]University of Illinois at Urbana-Champaign

3:20 PM Break

3:40 PM
Ultra-fast and Interpretable Machine-learning Potentials with Application to Structure Prediction: Stephen Xie[1]; Matthias Rupp[2]; *Richard Hennig*[1]; [1]University of Florida; [2]University of Konstanz

4:00 PM
Mining Structure-property Linkage in Nanoporous Materials Using an Interpretative Deep Learning Approach: Haomin Liu[1]; *Niaz Abdolrahim*[1]; [1]University of Rochester

---

ADVANCED MATERIALS

Bulk Metallic Glasses XIX — Novel Alloys, Processing or Manufacturing Methods

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

Program Organizers: Robert Maass, Federal Institute for Materials Research and Testing (BAM); Peter Derlet, Paul Scherrer Institut; Katharine Flores, Washington University in St. Louis; Yonghao Sun, Chinese Academy of Sciences; Lindsay Greer, University of Cambridge; Peter Liaw, University of Tennessee

Thursday PM | March 3, 2022
253C | Anaheim Convention Center

Session Chairs: Jan Schroers, Yale University; Jörg Löffler, ETH Zurich

---

2:00 PM Invited
Lab-scale Injection Molding of Bulk Metallic Glasses: *Douglas Hofmann*[1]; Scott Roberts[2]; [1]NASA Jet Propulsion Laboratory; [2]NASA Jet Propulsion Laboratory

2:25 PM
The Secondary Glass Phase in High Fragility PtCuP Bulk Metallic Glass: *Sydney Corona*[1]; Jong Na[2]; Qi An[3]; William Goddard[1]; Konrad Samwer[4]; William Johnson[1]; [1]California Institute of Technology; [2]Glassimetal Technologies; [3]University of Nevada, Reno; [4]University of Göttingen

2:45 PM
Towards Qualifying Bulk Metallic Glasses for Spacecraft Components: *Punnathat Bordeenithikasem*[1]; Douglas Hofmann[1]; Richard Otis[1]; Robert Dillon[1]; [1]NASA Jet Propulsion Laboratory

3:05 PM Discussion on novel alloys and processing of metallic glasses

---

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Role of Defects in Phase Stability and Transformations

Sponsored by: TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee

Program Organizers: Vahid Attari, Texas A&M University; Sara Kadkhodaei, University Of Illinois At Chicag; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Tourret, IMDEA Materials Institute; James Morris, Ames Laboratory

Thursday PM | March 3, 2022
255C | Anaheim Convention Center

Session Chairs: Eva Zarkadoula, Oak Ridge National lab.; Shahriyar Keshavarz, NIST

2:00 PM Invited
Signatures of the Effects of Defects on the Bulk Moduli of Crystalline Solids: *Saryu Fensin*[1]; Richard Hoagland[1]; [1]Los Alamos National Laboratory

2:30 PM
A First-principles Analysis of the Temperature Dependence of Stacking Fault Energies and Cross-slip Barrier in Mg and Its Alloys: *Julian Brodie*[1]; Maryam Ghazisaeidi[1]; [1]Ohio State University

2:50 PM
Effect of Electric Fields on Bulk and Surface Driven Dislocation Behavior in fcc Metals: *Soumendu Bagchi*[1]; Danny Perez[1]; [1]Los Alamos National Laboratory

3:10 PM
Does Vibrational Motion Explain the Latenth Heat of Melting in Materials?: *Camille Bernal*[1]; Claire Saunders[1]; Stefan Lohaus[1]; Doug Abernathy[2]; Brent Fultz[1]; [1]California Institute of Technology; [2]Oak Ridge National Laboratory

3:30 PM Break

3:50 PM
Thermodynamic Explanation of the Invar Effect by Computation and Experiments: *Stefan Lohaus*[1]; Matthew Heine[2]; Pedro Guzman[1]; Camille Bernal[1]; Olle Hellman[3]; David Broido[2]; Brent Fultz[1]; [1]California Institute of Technology; [2]Boston College; [3]Linkoping University

4:10 PM
Entropic Effects on Thermally Activated Dislocation Cross-slip: *Yifan Wang*[1]; Wei Cai[1]; [1]Stanford University

---

SPECIAL TOPICS

DMMM4 — All-Summit Closing Plenary: Engaging Those with Physical, Cognitive or Sensory Challenges

Sponsored by: TMS: Diversity, Equity, and Inclusion Committee

Program Organizers: Aeriel Murphy-Leonard, Ohio State University; Mark Carroll, Federal-Mogul Powertrain; Blythe Clark, Sandia National Laboratories; K. Cunningham, ATI Specialty Alloys & Components; Lauren Garrison, Oak Ridge National Laboratory; Atieh Moridi, Cornell University; Ashleigh Wright, University of Illinois at Urbana-Champaign; Megan Cordill, Erich Schmid Institute of Materials Science; Jonathan Madison, National Science Foundation; Mitra Taheri, Johns Hopkins University; Clarissa Yablinsky, Los Alamos National Laboratory

Thursday PM | March 3, 2022

Grand Ballroom F | Anaheim Marriott

Session Chairs: Mitra Taheri, Johns Hopkins University; Aeriel Murphy-Leonard, The Ohio State University

---

2:00 PM Invited
Maximizing the Potential of Neurodiversity in the Employment and Educational Settings: *Lawrence Fung*[1]; [1]Stanford University School of Medicine

2:40 PM
Accessibility for Disability: A Case Study of Graduate Colloquia during the COVID-19 Pandemic: *Claire Saunders*[1]; Camille Bernal[1]; Brent Fultz[1]; [1]California Institute of Technology

3:00 PM
Breaking Down Geographical Barriers: Virtual and Non-standard Recruiting Efforts for Graduate Engineering at Purdue: *Brenden Hamilton*[1]; Benjamin Stegman[1]; Rosemary Son[1]; Juan Carlos Verduzco Gastelum[1]; Robynne Paldi[1]; Jared Gohl[1]; Nicholas Richter[1]; [1]Purdue University

3:30 PM Wrap up of DMMM4: *Aeriel Murphy-Leonard*, Ohio State University

---

MECHANICS & STRUCTURAL RELIABILITY

Dynamic Behavior of Materials IX — Energetic Materials and High Explosives

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

Program Organizers: Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Cyril Williams, US Army Research Laboratory

Thursday PM | March 3, 2022
263C | Anaheim Convention Center

Session Chairs: Benjamin Morrow, Los Alamos National Laboratory; Georges Akiki, Lawrence Livermore National Laboratory

---

2:00 PM
Energy Localization during the Shock Compression of Nanoscale Plastically Bonded Explosives from All-atom Simulations: *Brenden Hamilton*[1]; Tongtong Shen[1]; Michael Sakano[1]; Lorena Alzate-Vargas[2]; Chunyu Li[1]; Alejandro Strachan[1]; [1]Purdue University; [2]Oak Ridge National Lab

2:20 PM
Characterization of Dynamic Hydrostatic Constitutive Response of Closed-cell PVC Foams Using Water Filled Shock Tube and 3D DIC: Piyush Wanchoo[1]; Shyamal Kishore[1]; *Arun Shukla*[1]; [1]URI

2:40 PM
Simultaneous Lattice Strain and Bulk Strain Measurements during Thermal Cycling of PBX 9502: *Matthew Schmitt*[1]; Bjorn Clausen[1]; Travis Carver[1]; Sven Vogel[1]; John Yeager[1]; [1]Los Alamos National Laboratory

3:00 PM
Development of New, Robust Mock Materials for PBX 9502: *Alexandra Burch*[1]; Matthew Herman[1]; Amanda Duque[1]; John Yeager[1]; [1]Los Alamos National Laboratory

3:20 PM Break

3:35 PM
Comparison of Deflagration Modes in a Granular Energetic Material due to Spherical and Planar Impact: *Meghana Sudarshan*[1]; Ayotomi Olokun[1]; Abhijeet Dhiman[1]; Vikas Tomar[1]; [1]Purdue University

---

NANOSTRUCTURED MATERIALS

Functional Nanomaterials: Functional Low-Dimensional (0D, 1D, 2D) Materials 2022 — Functional Energy Nanomaterials: Lithium-based Energy Storage

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

Program Organizers: Michael Cai Wang, University of South Florida; Yong Lin Kong, University of Utah; Sarah Ying Zhong, University of South Florida; Surojit Gupta, University of North Dakota; Nasrin Hooshmand, Georgia Institute of Technology; Woochul Lee, University of Hawaii at Manoa; Min Kyu Song, Washington State University; Simona Hunyadi Murph, Savannah River National Laboratory; Hagar Labouta, University of Manitoba; Max Anikovskiy, University of Calgary; Patrick Ward, Savannah River National Laboratory

Thursday PM | March 3, 2022
260B | Anaheim Convention Center

Session Chairs: Min-Kyu Song, Washington State University; Woochull Lee, University of Hawaii at Manoa

---

2:00 PM Invited
2D Materials for Lithium Batteries: *Reza Shahbazian-Yassar*[1]; [1]University of Illinois at Chicago

2:25 PM Invited
Real-time Observations of Chemo-mechanical Behaviors of Si-based Anodes for Advanced Lithium-ion Batteries: *Jung-Hyun Kim*[1]; [1]The Ohio State University

2:50 PM Keynote
Lithium Dendrite Growth and Stress Generation in Solid-state Batteries: *Sulin Zhang*[1]; [1]Penn State

---

ADVANCED MATERIALS

High Performance Steels — Microstructure Evolution in Steels

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

Program Organizers: Ana Luiza Araujo, CBMM North America Inc.; C. Tasan, Massachusetts Institute of Technology; Jonah Kleem-Toole, Colorado School of Mines; Louis Hector, General Motors Global Technical Center; Tilmann Hickel, Max-Planck-Institut Fuer Eisenforschung; Benjamin Adam, Oregon State University

Thursday PM | March 3, 2022
252C | Anaheim Convention Center

Session Chairs: Jonah Klemm-Toole, Colorado School of Mines; Benjamin Adam, Portland State University

---

2:00 PM
Co-optimization of Mechanical, Thermal, and Oxidation Properties in Steels for Energy Conversion Systems: *Dean Pierce*[1]; Govindarajan Muralidharan[1]; Artem Trofimov[1]; Hsin Wang[1]; Michael Tess[2]; Katie Sebeck[2]; Eric Gingrich[2]; Gerald. Byrd[2]; Allen Haynes[1]; [1]Oak Ridge National Laboratory; [2]Ground Vehicles Systems Center

2:20 PM
Loading/Unloading Yielding Behavior in 304 Stainless Steel: *Melissa Thrun*[1]; Christopher Finfrock[1]; Amy Clarke[1]; Kester Clarke[1]; [1]Colorado School of Mines

2:40 PM
Low-density Steels: Influence of Al Content and Processing on Microstructure and Properties in Medium-Mn Steels: *Tomas Scuseria*[1]; Kelcey Garza[2]; Dean Pierce[3]; Amrinder Gill[2]; Jerry Arnold[2]; Amy Clarke[1]; Kester Clarke[1]; [1]Colorado School of Mines; [2]Cleveland-Cliffs Inc.; [3]Oak Ridge National Laboratory

3:00 PM
On the Phase Stability, Mechanical Properties, and Deformation Mechanisms of an Equiatomic CrFeNi Medium-entropy Alloy: *Mike Schneider*[1]; Guillaume Laplanche[1]; [1]Ruhr-University Bochum

3:20 PM Break

3:35 PM
Non-metallic Precipitates Evolution Mechanism of Fe-3.0wt%Si Steel: *Huilan Sun*[1]; Zimo Bi[1]; Di Zhang[1]; Zhihong Guo[1]; Bo Wang[1]; [1]Hebei University of Science and Technology

---

LIGHT METALS

Magnesium Technology — Computational Materials Engineering

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

Program Organizers: Petra Maier, University of Applied Sciences Stralsund; Steven Barela, Terves, Inc; Victoria Miller, University of Florida; Neale Neelameggham, IND LLC

Thursday PM | March 3, 2022
210A | Anaheim Convention Center

Session Chairs: Sean Agnew, University of Virginia; Christopher Barrett, Mississippi State University

---

2:00 PM
First-principles Investigation of Early-stage Precipitation in Mg-Sn and Mg-Zn Alloys: Du Cheng[1]; Kang Wang[1]; *Bi-Cheng Zhou*[1]; [1]University of Virginia

2:20 PM
A Predictive Multisurface Approach to Damage Modeling in Mg Alloys: *Vigneshwaran Radhakrishnan*[1]; Amine Benzerga[1]; [1]Texas A&M University

2:40 PM
Phase Field Modeling of Deformation Twinning and Dislocation Slip Interaction in Polycrystalline Solids: *Eric Ocegueda*[1]; Kaushik Bhattacharya[1]; [1]California Institute

of Technology

3:00 PM
PRISMS-plasticity: Recent Advancements for Simulating Deformation of Mg Alloys: *Mohammadreza Yaghoobi*[1]; Aaditya Lakshmanan[1]; Zhe Chen[1]; Duncan A. Greeley[1]; John E. Allison[1]; Veera Sundararaghavan[1]; [1]University of Michigan

---

NUCLEAR MATERIALS

Materials Systems for the Future of Fusion Energy — Advanced Materials and Interfaces

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

Program Organizers: Jason Trelewicz, Stony Brook University; Kevin Field, University of Michigan; Takaaki Koyanagi, Oak Ridge National Laboratory; Yuanyuan Zhu, University of Connecticut; Dalong Zhang, Pacific Northwest National Laboratory

Thursday PM | March 3, 2022
203A | Anaheim Convention Center

Session Chairs: Lance Snead, Stony Brook University; Jason Trelewicz, Stony Brook University

---

2:00 PM Invited
High-performance Superconductors for High Field Magnets for Compact Fusion: *Venkat Selvamanickam*[1]; [1]University of Houston

2:30 PM
Radiation Effects and Thermal Stability in Ferritic Steels and High Entropy Alloys: *Eda Aydogan*[1]; Osman El-Atwani[2]; Koray Iroc[1]; Stuart Maloy[2]; Eren Kalay[1]; [1]Middle East Technical University; [2]Los Alamos National Laboratory

2:50 PM Invited
Composite Shielding for Advanced Fusion Systems: *Lance Snead*[1]; Steven Zinkle[2]; Jason Trelewicz[1]; Ethan Peterson[3]; David Sprouster[1]; Bin Cheng[1]; [1]Stony Brook University; [2]University of Tennessee, Knoxville; [3]MIT

NUCLEAR MATERIALS

Mechanical Behavior and Degradation of Advanced Nuclear Fuel and Structural Materials — Fuels & Claddings II

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

Program Organizers: Dong Liu, University of Bristol; Peng Xu, Idaho National Laboratory; Simon Middleburgh, Bangor University; Christian Deck, General Atomics; Erofili Kardoulaki, Los Alamos National Laboratory; Robert Ritchie, University of California, Berkeley

Thursday PM | March 3, 2022
204A | Anaheim Convention Center

Session Chairs: Simon Middleburgh, Bangor University ; Peng Xu, INL

2:00 PM
Microscale Thermal Conductivity and Residual Stress Measurements in TRISO Particle Coatings: *Alexander Leide*[1]; Miriam Mowat[2]; James Pomeroy[1]; Roland Simon[2]; Mark Davies[3]; Dave Goddard[4]; Martin Kuball[1]; Dong Liu[1]; [1]University of Bristol; [2]Thermap Solutions; [3]Ultra Safe Nuclear Corporation; [4]National Nuclear Laboratory

2:20 PM
Mesoscale Modeling of the Relationships between Microstructure and Mechanical Properties in the Porous Pyrocarbon Buffer Layer for TRISO Particle Fuel: *Mohammed Gomaa Abdoelatef*[1]; Claire Griesbach[2]; Kumar Sridharan[2]; Ramathasan Thevamaran[2]; Gerczak Tyler[3]; Wen Jiang[4]; karim Ahmed[1]; [1]Texas A&M University; [2]University of Wisconsin; [3]Oak Ridge National Laboratory; [4]Idaho National Laboratory

2:40 PM
Effect of Nb Alloying and Thermo-mechanical Processing on the Anisotropic Biaxial Creep Behavior of Zircaloy Cladding: *Mahmoud Hawary*[1]; K. Murty[1]; [1]North Carolina State University

3:00 PM
Size-dependent Radiation Damage Mechanisms in Nanowires and Nanoporous Structures: Daniel Vizoso[1]; Maria Kosmidou[2]; T. John Balk[2]; Khalid Hattar[3]; Chaitanya Deo[1]; *Remi Dingreville*[3]; [1]Georgia Institute of Technology; [2]University of Kentucky; [3]Sandia National Laboratories

3:20 PM Break

3:40 PM
Investigation of Elemental Segregation and Precipitation in Ion-irradiated Advance Austenitic Alloy A709 Using Advance Techniques: *Dominic Piedmont*[1]; Xiang Liu[2]; Hyosim Kim[3]; Frank Garner[4]; Lin Shao[4]; T.-L. Sham[5]; James Stubbins[1]; [1]University of Illinois at Urbana-Champaign; [2]Zhejiang University; [3]Los Alamos National Laboratory; [4]Texas A&M University; [5]Argonne National Laboratory

Visit the Poster Sessions in the TMS2022 Exhibit Hall

View a changing display of posters in the TMS2022 Exhibit Hall (Hall C) during exhibit hours. Then join us for two separate presentation sessions, grouped by topic areas, on Monday and Tuesday evening. Presenters will be on hand during these sessions to discuss their work.

POSTER SESSION I

Monday, February 28
5:30 p.m. to 7:00 p.m.

FEATURING POSTERS ON:

- Advanced Materials
- Corrosion
- Electronic Materials
- Energy & Environment (including REWAS 2022 Symposia)
- Light Metals
- Materials Processing
- Mechanics and Structural Reliability
- Nanostructured & Heterostructured Materials

POSTER SESSION II

Tuesday, March 1
5:30 p.m. to 7:00 p.m.

FEATURING POSTERS ON:

- Additive Technologies
- Biomaterials
- Characterization
- Materials Design
- Nuclear Materials
- Physical Metallurgy

MATERIALS PROCESSING

12th International Symposium on High Temperature Metallurgical Processing — Poster Session

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

Program Organizers: Zhiwei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jesse White, Elkem Carbon Solutions; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, Jiangxi University of Science and Technology; Onuralp Yücel, Istanbul Technical University; Ender Keskinkilic, Atilim University; Tao Jiang, Central South University; Morsi Mahmoud, King Fahd University of Petroleum & Minerals

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chairs: Ailiang Chen, Central South University; Ender Keskinkilic, Atilim University

---

F-4: Effect of Humic Acid-based Binder on the Properties of Vanadium-titanium Magnetite Oxidized Pellets: *Jin Zhang*[1]; [1]Central South University

F-9: Phosphorus Migration Behavior in the Process of Converter Slag Gasification Dephosphorization: *Chenxiao Li*[1]; Yuekai Xue[1]; Shuai Tong[1]; Kaixuan Zhang[1]; [1]North China University of Science and Technology

F-10: Prediction Model of Calcium Addition in SPHC Steel Refining Process: Zhiqiang Du[1]; *Nan Wang*[1]; [1]Northeastern University

F-11: Simulation Study on Top Blowing Combustion in Iron Bath Smelting Reduction: Panfeng Wang[1]; *Nan Wang*[1]; [1]Northeast University

F-12: Thermodynamic Study on Modification Converter Slag Using Hot Blast Furnace Slag: *YuZhu Pan*[1]; Dajun Luo[1]; Xiang Yuan[1]; Gaoming Liang[1]; Jingxin Wang[1]; Pengcheng Zhang[1]; [1]Hunan ValinXiangtan Iron & Steel Co.,Ltd.

SPECIAL TOPICS

2022 Technical Division Student Poster Contest — EPD 2022 Technical Division Graduate Student Poster Contest

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

SPG-1: Challenges for Molten Oxide Electrolysis in Reduced Gravity: *Matthew Humbert*[1]; Akbar Rhamdhani[1]; Geoff Brooks[1]; Chad Hargrave[1]; [1]Swinburne University of Technology

SPG-2: Decopperization Study for Steel Recycling: *Hyunsoo Jin*[1]; Brajendra Mishra[1]; [1]Worcester Polytechnic Institute

SPG-3: Influence of Graphene Nano Sheets on Friction and Wear Behaviour of Aluminum A380 Nanocomposite Produced by Powder Metallurgy: *Hanieh*

Sajjadpour[1]; Mohammad Alipour[1]; [1]Tabriz University

SPG-4: Investigating of the Microstructure and Mechanical Properties of Al-A380 Nanocomposite Reinforced with SiC Nanoparticles Produced by Powder Metallurgy: *Ali Mohammadi*[1]; Mohammad Alipour[1]; [1]Tabriz University

SPG-5: Investigating of the Wear Behavior of Al- A380 Nanocomposite Reinforced with SiC Nanoparticles Produced by Powder Metallurgy: *Ali Mohammadi*[1]; Mohammad Alipour[1]; [1]Tabriz University

SPG-6: Recycling of CrC-nichrome Coated Stainless Steel by Remelting and Addition of Alloys with Validation from Mathematical Modelling: *Akanksha Gupta*[1]; Brajendra Mishra[1]; [1]Worcester Polytechnic Institute

SPG-7: Sustainable Process Flowsheet for Recovery of Value added Products from Bauxite Residue: *Himanshu Tanvar*[1]; Brajendra Mishra[1]; [1]Worcester Polytechnic Institute

SPG-8: The Effect of Graphene Nano Sheets on Microstructure and Mechanical Properties of Aluminum A380 Nanocomposite Produced by Powder Metallurgy: *Hanieh Sajjadpour*[1]; Mohammad Alipour[1]; [1]Tabriz University

SPECIAL TOPICS

2022 Technical Division Student Poster Contest — FMD 2022 Technical Division Graduate Student Poster Contest

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

SPG-10: Assessing the Bio-stability of miRNA Conjugated Metal and Metal Oxide Nanoparticles via Electroanalysis: *Chaimae El Ghzaoui*[1]; Craig Neal[1]; Elayaraja Kolanthai[1]; Yifei Fu[1]; Udit Kumar[1]; Carlos Zgheib[2]; Kenneth Liechty[2]; Sudipta Seal[1]; [1]University of Central Florida; [2]University of Colorado Denver School of Medicine and Children's Hospital Colorado

SPG-11: Crumpled MoS2 Flexoelectric Energy Harvester: *Yeageun Lee*[1]; Hyung Jong Bae[1]; Md Haque[1]; SungWoo Nam[2]; [1]University of Illinois at Urbana-Champaign; [2]University of California, Irvine

SPG-12: Dual miRNAs Functionalized Cerium Oxide for Angiogenesis and Anti-inflammatory: *Elayaraja Kolanthai*[1]; Aadith Menon[1]; Balaashwin Babu[1]; Yifei Fu[1]; Udit Kumar[1]; Craig Neal[1]; Kenneth Liechty[2]; Sudipta Seal[1]; [1]University of Central Florida; [2]University of Colorado Denver School of Medicine and and Childrens Hospital Colorado

SPG-13: Engineering Ce^{3+} State in Cerium Oxide Nanoparticles Under The Presence of a Reducing Sugar: *Balaashwin Babu*[1]; Elayaraja Kolanthai[1]; Craig Neal[1]; Udit Kumar[1]; Sudipta Seal[1]; [1]University of Central Florida

SPG-16: Study of Anti-inflammatory miRNA146a Loading on Cerium Oxide Nanoparticles with Different Surface Facet: *Yifei Fu*[1]; Elayaraja Kolanthai[1]; Craig Neal[1]; Udit Kumar[1]; Carlos Zgheib[2]; Kenneth Liechty[2]; Sudipta Seal[1]; [1]University of Central Florida; [2]University of Colorado Denver

SPG-17: Upconversion Nanomaterials (UCNPs) Based Self-sterilizing Surfaces with Efficacy Against SARS-CoV-2: *Udit Kumar*[1]; Candace Fox[1]; Craig Neal[1]; Elayaraja Kolanthai[1]; kritika kedarinath[1]; Balaashwin Babu[1]; Erik Marcelo[1]; Yifei Fu[1]; Griffith Parks[1]; Sudipta Seal[1]; [1]University of Central Florida

SPECIAL TOPICS

2022 Technical Division Student Poster Contest — FMD 2022 Technical Division Undergraduate Student Poster Contest

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

SPU-2: Exploring the Synthetic Plastic Degradation Capabilities of SURF and Rapid City Wastewater Microbes: *Brianna Hoff*[1]; Paycen Harroun[1]; Tanvi Govil[1]; David Salem[1]; Rajesh Sani[1]; [1]South Dakota School of Mines & Technology

SPU-3: Investigation of Nanoparticle Size Effects on the Dielectric Properties of Functionalized Barium Titanate: *Evan Flitz*[1]; Emma Cooper[2]; Eduardo De Anda[2]; Halie Kim[2]; Zoe Kedzierski[2]; Albert Dato[2]; Todd Monson[3]; [1]Pomona College; [2]Harvey Mudd College; [3]Sandia National Laboratories

SPU-4: Medical Applications of Polymer Coated Cannulas: *Catalina Lizarazo*[1]; Christopher Batich[1]; Malisa Sarntinoranont[1]; Nagarajan Rajagopal[1]; Katherine Ryland[1]; Kenna Hildenbrand[1]; [1]University of Florida

SPU-5: Thermomechanical Clamp for Curing Low- Dielectric Dry Films: *Ethan Shackelford*[1]; Pragna Bhaskar[1]; Mohanalingam Kathaperumal[1]; Madhavan Swaminathan[1]; [1]Packaging Research Center

SPECIAL TOPICS

2022 Technical Division Student Poster Contest — LMD 2022 Technical Division Graduate Student Poster Contest

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

SPG-18: A Promising Orthopedic Implant Material with Enhanced Corrosion Resistance, Mechanical Properties, Osteogenic and Antibacterial Activity: Mg-Sc-Sr Alloy: *Nadia Aboutalebianaraki*[1]; Sudipta Seal[1]; Mehdi Razavi[1]; [1]University of Central Florida

SPG-19: Development of Equiaxed Titanium Alloys in Additive Manufacturing: *Nevin Taylor*[1]; [1]Ohio State University

SPG-20: Effects of Cu on the Interfacial Stability of Nanoprecipitates in Al-Zn-Mg-Cu Alloys from First-principles Investigations: *Yu-ning Chiu*[1]; Chung-yi Yu[2]; Shih-kang Lin[1]; [1]National Cheng Kung University; [2]China Steel Corp, Aluminum Prod R&D Sect

SPG-21: Fatigue Behavior of Fastener Holes in High-strength Aluminum Plates Repaired by Additive Friction Stir Deposition: *Ismael Hidalgo*[1]; Paul Allison[1]; Brian Jordon[1]; Malcolm Williams[1]; Jacob Strain[1]; Bret Cordle[1]; Troy Pierson[1]; Jacob Williamson[1]; James Tew[1]; [1]The University of Alabama

SPG-22: Microstructural Evolution during Post Processing of Additively Manufactured 7050 Aluminum Alloy and Its Effect on Corrosion Behavior: *Rupesh Rajendran*[1]; Crosby Owens[2]; David Spain[2]; Preet Singh[1]; [1]Georgia Institute of Technology; [2]Northrop Grumman Aeronautics Systems

SPG-23: Prior Grain Boundary Alpha in BASCA Ti-17: *Mathew Cohen*[1]; [1]The Ohio

State University

SPG-24: Thermomechanical Processing of Aluminum-Cerium Alloys: *Elizabeth Heon*[1]; Eric Lass[1]; [1]University of Tennessee Knoxville

---

SPECIAL TOPICS

2022 Technical Division Student Poster Contest — LMD 2022 Technical Division Undergraduate Student Poster Contest

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

SPU-6: Bubble Raft Education: *Drew Davidson*[1]; [1]University of Florida

SPU-7: Investigate the Effect of Crystallographic Orientation on the Mechanical and Corrosion Properties of Copper Single Crystals: *Devin Davis*[1]; [1]University of North Texas

---

SPECIAL TOPICS

2022 Technical Division Student Poster Contest — MPMD 2022 Technical Division Graduate Student Poster Contest

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

SPG-28: Microstructure and Mechanical Properties of Eutectic Ni-Ce and Ni-Ce-Al Alloys: *Syeda Bushra Haider*[1]; Elizabeth Heon[1]; Eric Lass[1]; [1]University of Tennessee, Knoxville

SPG-29: Production via Machining and Rolling of High resistivity Electrical Steel: *B. Stiven Puentes*[1]; James Mann[1]; Srinivasan Chandrasekar[1]; Kevin Trumble[1]; [1]Purdue University

SPG-32: Water Transport through Porous Membranes - Modeling and Experiments: *Harjot Singh*[1]; Nicholas Ury[1]; Jaewan Bae[1]; Ali Mehrabi[2]; Naira Khosravian[2]; Vilupanur Ravi[1]; [1]California Polytechnic State University Pomona; [2]Avery Dennison

---

SPECIAL TOPICS

2022 Technical Division Student Poster Contest — MPMD 2022 Technical Division Undergraduate Student Poster Contest

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

SPU-8: COMSOL-generated Weld Heat Transfer Models For Automation of Infrared Thermography Non-destructive Testing (IR-TNDT) Image Analysis: *Savannah Horowitz*[1]; Brittani Maskley[1]; Michele Manuel[1]; [1]University of Florida

SPU-9: Mechanochemistry for Creation of Functional Surface Treatments: *Jennifer Johnson*[1]; William Cross[1]; James Tomich[1]; Grant Crawford[1]; Jon Kellar[1]; [1]South Dakota School of Mines and Technology

---

SPECIAL TOPICS

2022 Technical Division Student Poster Contest — SMD 2022 Technical Division Graduate Student Poster Contest

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

SPG-33: Computational Modeling of Non-equilibrium Phenomena in Laser Additive Manufacturing Using Molecular Dynamics: *Gurmeet Singh*[1]; Veera Sundararaghavan[1]; [1]University of Michigan

SPG-34: Development of a Generalized Fatigue Assessment Approach for Steel Castings: *Bret Cordle*[1]; James Jordon[1]; Paul Allison[1]; Hayley Brown[2]; Jacob Williamson[1]; [1]The University of Alabama; [2]Steel Founders Society of America

SPG-35: Discovering the Corrosion Mechanism of Chromium in High-temperature LiF-NaF-KF Molten Salts for Gen-IV Molten Salt Reactor Applications: *Ho Lun Chan*[1]; Elena Romanovskaia[1]; Minsung Hong[2]; Peter Hosemann[2]; John Scully[1]; [1]University of Virginia; [2]University of California Berkeley

SPG-36: Effect of Oxide Impurities on Corrosion of Materials in Molten Fluoride Salt: *Krishna Moorthi Sankar*[1]; Preet Singh[1]; [1]Georgia Institute of Technology

SPG-39: Mechanical Behavior of a Next-generation Steel (AF9628) Printed via Directed Energy Deposition: *Ankita Roy*[1]; Ravi Haridas[1]; Rajiv Mishra[1]; B McWilliams[1]; Clara Mock[1]; K Cho[1]; [1]University of North Texas

---

SPECIAL TOPICS

2022 Technical Division Student Poster Contest — SMD 2022 Technical Division Undergraduate Student Poster Contest

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

SPU-10: Correlating Grain Boundary Energy to Abnormal Grain Growth Using Atomic Force Microscopy: *Molly Kole*[1]; Bryan Conry[1]; Prabal Tiwari[1]; William Burnett[1]; Amanda Krause[1]; [1]University of Florida

SPU-11: Model Based Control of Microstructure for Additive Manufacturing 316L Stainless Steel: *Matthew Michalek*[1]; Daniel Moser[1]; Theron Rodgers[1]; [1]Sandia National Laboratories

SPU-12: Quantitative Analysis of Microstructure in the Ti-6Al-4V Alloy Using Scanning Electron Microscopy: *Sydney Fields*[1]; Dian Li[1]; Yufeng Zheng[1]; [1]University of Nevada, Reno

---

ADVANCED MATERIALS

2D Materials – Preparation, Properties & Applications — Poster Session

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

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chairs: Ramana Chintalapalle, University of Texas; Sufian Abedrabbo, Khalifa University

---

A-1: Preparation and Electro-sorption Performance of Lotus Petiole-based Activated Carbon: Zhongmei Miao[1]; Mengyao Ma[1]; *Wencui Chai*[1]; [1]Zhengzhou University

---

NANOSTRUCTURED MATERIALS

30 Years of Nanoindentation with the Oliver-Pharr Method and Beyond — Poster Session

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

Program Organizers: Verena Maier-Kiener, Montanuniversitaet Leoben; Benoit Merle, University Erlangen-Nuremberg (Fau); Erik Herbert, Michigan Technological University; Samantha Lawrence, Los Alamos National Laboratory; Nigel Jennett, Coventry University

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

H-1: High-speed Indentation for 3D Mapping of Nanoporous Gold: *Kerry Baker*[1]; T Balk[1]; [1]University of Kentucky

H-2: Investigating the Strain Rate Dependence of Hardness of Cu/Mo Nanolaminate Films Using Conventional and High Strain Rate Nanoindentation Methods: *Wesley Higgins*[1]; Christopher Walker[1]; Benjamin Hackett[1]; George Pharr[1]; [1]Texas A&M University

H-3: Nanoindentation of Semi-crystalline and Amorphous Thermoplastics: *Petra Christöfl*[1]; Caterina Czibula[2]; Michael Berer[1]; Christian Teichert[3]; Gerald Pinter[3]; Gernot Oreski[1]; [1]PCCL; [2]Graz University of Technology; [3]Montanuniversitaet Leoben

---

ADVANCED MATERIALS

Advanced Functional and Structural Thin Films and Coatings — Poster Session

Sponsored by: TMS: Thin Films and Interfaces Committee

Program Organizers: Ramana Chintalapalle, University of Texas at El Paso; Adele Carrado, IPCMS - CNRS Université de Strasbourg; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Karine Mougin, Cnrs - Is2m; Heinz Palkowski, Clausthal University of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology

Monday PM | February 28, 2022

Exhibit Hall C | Anaheim Convention Center

Session Chairs: Gerald Ferblantier, Icube Laboratory - Strasbourg University; Karine Mougin, CNRS- IS2M

A-2: Corrosion Behaviour of an Aisi 4140 Steel Nitrided by Plasma in a Seawater Medium Solution: *Ariosto Medina*[1]; Jesús Valdes[1]; Claudio Aguilar[2]; Engelbert Huape[1]; [1]Universidad Michoacana de San Nicolás de Hidalgo; [2]Universidad Técnica Federico Santa María

A-3: Incorporation of Metallic Nanoparticles into Alkyd Resin: A Review of their Coating Performance: Ikhazuagbe Ifijen[1]; *Muniratu Maliki*[2]; Stanley Omorogbe[1]; Ibrahim Danjuma[1]; [1]Rubber Research Institute of Nigeria; [2]Department of Chemistry, Edo University Iyamho, Edo State, Nigeria

A-4: Nanostructured Graphene Thin Films: A Brief Review of Their Fabrication Techniques and Corrosion Protective Performance: *Ikhazuagbe Ifijen*[1]; Oscar Aghedo[2]; Ifeanyi Odiachi[3]; Stanley Omorogbe[1]; Ekebafe Olu[4]; Innocent Onuguh[5]; [1]Rubber Research Institute of Nigeria; [2]University of Benin, P.M.B. 1154, Benin City, Nigeria; [3]Department of Science Laboratory Technology, Delta State Polytechnic Ogwashi-Uku, Nigeria; [4]University of Lagos; [5]Department of Chemistry, Igbinedion University,Okada, Edo State, Nigeria

A-5:TheDesignofCoatingsDevelopedUsingPolyetherimideandNanocomposites Thereof for Corrosion Protection of Base Metals: *Tiffany Sill*[1]; Rachel Davidson[1]; Lacey Douglas[1]; Viswanathan Kalyanaraman[2]; Nikhil Verghese[2]; Kapil Sheth[2]; Sarbajit Banerjee[1]; [1]Texas A&M University; [2]Sabic

A-6: The Effect of Additives in Hybrid Zr-based Chemical Conversion Coating on the Surface Morphology Chemical Compositions and Corrosion Resistance : *Cheng-Chu Chung*[1]; Xiaoyang Liu[1]; Donald Vonk[2]; Bruce Ravel[3]; Kim Kisslinger[4]; Xiao Tong[4]; Gary Halada[1]; Stanislas Petrash[2]; Kate Foster[2]; Yu-chen Chen-Wiegart[1]; [1]Stony Brook University; [2]Henkel Corporation; [3]National Institute of Standards and Technology; [4]Brookhaven National Laboratory

A-7: Tribocorrosion Performance of Polymer-derived Ceramic Coatings on 304 Stainless Steel: *Wenbo Wang*[1]; Senam Tamakloe[1]; Wenjun Cai[1]; Kathy Lu[1]; [1]Virginia Polytechnic Institute and State University

---

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage 2022 — Poster Session

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

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

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chairs: Soumendra Basu, Boston University; Jung Pyung Choi, Pacific Northwest National Laboratory

---

D-2: Crystal Facet-controlled SnS Photocathodes for Bias-free Photoelectrochemical Solar Water Splitting: Hyungsoo Lee[1]; Jaemin Park[1]; Young

Sun Park[1]; Juwon Yun[1]; *Jooho Moon*[1]; [1]Yonsei University

D-3: Degradation Characteristics of PU Foam in District Heating Pipe under Accelerated Aging Condition: *Hyung-Gyu Kim*[1]; Jooyong Kim[2]; Hea-Yong Lee[2]; Jonghun Yoon[1]; [1]Hanyang University; [2]Korea District Heating Corporation(KDHC)

D-7: On Recent Development in Two-dimensional Transition Metal Dichalcolgenides for Applications in Hydrogen Evolution Reaction: *Chukwudike Ukeje*; [1]

D-8: Study on a Short Process Method for Preparation of 3.5 Valence Vanadium Electrolyte: *Zhengtuan Li*[1]; Lanjie Li[1]; Heli Wan[2]; [1]Chengde Iron and Steel Group Co., Ltd, HBIS Group Co.,LTD.; [2]National Engineering Laboratory for Vacuum Metallurgy

---

NANOSTRUCTURED MATERIALS

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

Sponsored by: TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Ritesh Sachan, Oklahoma State University; Amit Pandey, Lockheed Martin Space; Saurabh Puri, Microstructure Engineering; Amber Srivastava, Indian Institute of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

H-6: Synthesis and Characterization of Mesoporous Copper Cobalt Oxide (CuCo2O4) Using Inverse Micelle Method: *Sung Gue Heo*[1]; Kyoung-Tae Park[2]; Soong Ju Oh[3]; Seok-Jun Seo[2]; [1]Kitech/Korea University; [2]Korea Institute of Industrial Technology; [3]Korea University

---

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: Structures and Modeling — 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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

A-12: KMC Modeling of Screw Dislocation Strength in Equiatomic bcc Refractory Alloys: *Xinran Zhou*[1]; Jaime Marian[1]; Sicong He[1]; [1]UCLA

A-13: Phase Transition Zones in Compositionally Complex Alloy Films: *Daniel*

Goodelman[1]; Andrea Hodge[1]; [1]University of Southern California

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; Kathy Lu, Virginia Polytechnic Institute and State University; Faqin Dong, Southwest University of Science and Technology; Jinhong Li, China University of Geosciences; Eugene Olevsky, San Diego State University; Ruigang Wang, The University of Alabama; Dipankar Ghosh, Old Dominion University

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chairs: Kathy Lu, Virginia Polytechnic Institute and State University; Dipankar Ghosh, Old Dominion University

F-13: Atomistic Modeling of Hot-press Sintering of AlN Nanoceramics: *Aoyan Liang*[1]; Chang Liu[1]; Paulo Branicio[1]; [1]University of Southern California

F-14: Determining the Processing Conditions for Fe Metal Exsolution and Phase-decomposition of Doped CaTiO3 for Catalysis Applications: *Jason Luong*[1]; Komal Syed[1]; William Bowman[1]; [1]University of California, Irvine

F-15: Incorporation of Ornamental Stone Waste into Red Ceramics: *Mariane de Aguiar*[1]; Monica Gadioli[1]; Francisco Vidal[1]; Kayrone de Almeida[1]; [1]CETEM

F-16: Microstructure and Mechanical Properties of Mechanically Alloyed and Spark Plasma Sintered NbC-Ni Cermets: *Supreeth Gaddam*[1]; Surekha Yadav[1]; Amit Behera[2]; Qiaofu Zhang[2]; Fan Meng[2]; Noriaki Arai[2]; Zaynab Mahbooba[2]; Rajiv Mishra[1]; [1]University of North Texas; [2]QuesTek Innovations LLC

F-17: Participation of Nitrosamide in the Selective Catalytic Reduction of Nitrogen Oxides over Cu/SSZ-13: *Anna Getley*[1]; Furio Cora`[1]; Jasper Berry-Gair[1]; Chu Lun Alex Leung[1]; [1]University College London

F-19: Purity Improvement According to Batch and Continuous Hot Chlorination Processes of Natural Quartz Powder: *Jong Ho Kim*[1]; [1]Rist

F-20: Technological Behavior of Ceramics Incorporating Powdered Waste from Ornamental Stone: *Maria Angélica Sant'Ana*[1]; Mônica Gadioli[1]; [1]CETEM

F-22: Three-dimensional Interconnected Porous Titanium Dioxide Ceramic for High-temperature Thermal Storage: *Siyi Zhao*[1]; Jinhong Li[1]; [1]China University of Geosciences, Beijing

MATERIALS PROCESSING

Advances in Surface Engineering IV — Poster Session

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

Program Organizers: Arif Mubarok, PPG; Bharat Jasthi, South Dakota School of Mines & Technology; Tushar Borkar, Cleveland State University; Mary Lyn Lim, PPG Industries; Rajeev Gupta, North Carolina State University

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chair: Mohammad Umar Farooq Khan, Texas A&M University

---

F-23: Plasma Functionalization of Packaging Waste Derived Sustainable Carbon for Composite Reinforcement: Vijaya Rangari[1]; *Zaheeruddin Mohammed*[1]; Shaik Jeelani[1]; [1]Tuskegee University

F-24: 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

---

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications X — Poster Session

Sponsored by: TMS Structural Materials Division, TMS Functional 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; Takao Mori, National Institute For Materials Science; Alexandra Zevalkink, Michigan State University; Wan-Ting Chiu, Tokyo Institute of Technology; Pai-chun Wei, National Taiwan University

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

C-1: Flexible *n*-type Chalcopyrite/PEDOT:PSS/Graphene Hybrid Film for Thermoelectric Device Harvesting Low Grade Heat: *Yanan Wang*[1]; Hong Pang[1]; Quansheng Guo[1]; Naohito Tsujii[1]; Takao Mori[1]; [1]National Institute for Materials Science

C-2: Ternary Phase Diagram and Thermoelectric Performance of Bi-doped GeTe: *Chen Bo-Chia*[1]; Kuang-Kuo Wang[2]; Hsin-Jay Wu[1]; [1]National Yang Ming Chiao Tung University; [2]National Sun Yat-sen University

---

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Poster Session

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

Program Organizers: Andre Phillion, McMaster University; Dmitry Eskin, Brunel University

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

E-2: Corrosion Evaluations of Aluminium for Pre-painted Products with Alternative Alloys and Comparable Test Methods: Yusuf Özçetin[1]; Ezgi Ipek[1]; Koray Dündar[1]; Cemre Kocahakimoglu[2]; Sümbüle Sagdiç[1]; *Ali Ulus*[1]; [1]ASAS Aluminum I. Company; [2]AkzoNobel Kemipol I. Company

E-3: Development and Analysis of Near Shape Powder Processed Aluminum Alloy Materials: *Steven Johnson*[1]; William Caron[1]; [1]Central Connecticut State University

E-5: Effect of Step Aging Conditions on Mechanical Properties of AlMgSi Alloy Profiles for Automotive Industry: Osman Halil Çelik[1]; Mehmet Bugra Guner[1]; *Zeynep Tutku Özen*[1]; Ilyas Artunç Sari[1]; [1]Asas Aluminium

E-6: Effects of Different Homogenization Conditions on High Strength Al-Mg-Si Alloys with Cu Addition: Mehmet Bugra Guner[1]; Görkem Özçelik[1]; Tolga Demirkiran[1]; Osman Halil Çelik[1]; *Zeynep Tutku Özen*[1]; Baris Akin[1]; Esra Kaymak Aksu[1]; [1]Asas Aluminium

E-7: Evaluation of As-built Properties of Aluminum Alloys Manufactured Using Various Directed Energy Deposition Techniques: *Carly Romnes*[1]; Omar Mireles[2]; James Stubbins[1]; [1]University of Illinois at Urbana-Champaign; [2]NASA Marshall Space Flight Center

E-8: Experimental and Modelling Investigation of Oxide Layer Fragmentation and Metal Micro-extrusion Behavior during Cold Rolling of Aluminum Alloy: *Mahsa Navidirad*[1]; John Plumeri[1]; Wojciech Misiolek[1]; Masashi Watanabe[1]; Wojciech Stepniowski[1]; [1]Lehigh University

E-10: Joining of Aluminum Alloy 6061 Using Additive Friction Stir Deposition: *Jacob Strain*[1]; Malcolm Williams[1]; Christopher Williamson[1]; Ryan Kinser[1]; Paul Allison[1]; James Jordon[1]; [1]The University of Alabama

E-11: New 6xxx Al-Mg-Si Alloy with High Formability for Structural Automotive Parts and Suitable for E-mobility Applications: *Gregor Michael*[1]; Zahra Tarzimoghadam[1]; Angela Thum[1]; Josef Berneder[1]; [1]AMAG Rolling GmbH

E-12: Optimization of Twin Roll Casting Method of 5XXX Series Alloys for Automotive Applications Possible to be Produced with 6XXX Series Alloy: *Gorkem Demir*[1]; [1]Asas Aluminyum Sanayi Ve Ticaret A.S

E-14: Solid Stir Extrusion: An Innovative Solid-state Extrusion Process: *Anurag Gumaste*[1]; Sanya Gupta[1]; Supreeth Gaddam[1]; Ravi Sankar Haridas[1]; Rajiv Mishra[1]; Kumar Kandasamy[2]; Brandon McWilliams[3]; Kyu Cho[3]; [1]University of North Texas Denton; [2]Enabled Engineering; [3]CCDC Army Research Laboratory

E-15: TEM Dislocation Interaction with the Microstructure of an Al-Si-Mg Alloy Elaborated by Laser Beam Melting: *Nicolas Bello*[1]; Malo Jullien[1]; Cassiopée Galy[2]; Céline Larignon[2]; Joël Douin[1]; [1]CEMES-CNRS; [2]IRT Saint Exupéry

E-16: The Study on the Relationship with Rolling Condition and Properties in Al Alloys: *Sun Ki Kim*[1]; Taeyang Kwak[2]; Changhee Cho[3]; Jinkyu Lee[1]; Youngjig Kim[4]; [1]NICELMS Co., Ltd; [2]Ruantech Co., Ltd; [3]Korea Institute of Industrial Technology; [4]Sungkyunkwan Univ.

ADVANCED MATERIALS

Bulk Metallic Glasses XIX — Poster Session

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

Program Organizers: Robert Maass, Federal Institute for Materials Research and Testing (BAM); Peter Derlet, Paul Scherrer Institut; Katharine Flores, Washington University in St. Louis; Yonghao Sun, Chinese Academy of Sciences; Lindsay Greer, University of Cambridge; Peter Liaw, University of Tennessee

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chairs: Katherine Flores, Washington University; Robert Maass, BAM and UIUC

A-14: A Molecular Dynamics Study of the Evolution of Medium-range Ordering in Liquid Metals: *Doguhan Sariturk*[1]; Can Okuyucu[1]; Yunus Kalay[1]; [1]Middle East Technical University

A-19: High Metalloid Containing Ti-based Metallic Glasses for Biomedical Applications: *Baran Sarac*[1]; Eray Yüce[1]; Florian Spieckermann[2]; Amir Rezvan[1]; Jürgen Eckert[2]; [1]Erich Schmid Institute of Materials Science; [2]Montanuniversität Leoben

A-20: Investigating the Fundamentals of Incipient Spall via Bulk Metallic Glasses with Laser-driven Micro-flyer Experiments: *Christopher DiMarco*[1]; Ethen Lund[2]; Gavin Mackay[1]; Laszlo Kecskes[1]; Jan Schroers[2]; K.T. Ramesh[1]; [1]Johns Hopkins University; [2]Yale University

A-22: The Mechanical Properties of Al-Tb Nanocrystalline Marginal Metallic Glass Composite: *Can Okuyucu*[1]; Doguhan Sariturk[1]; Tolga Ulucan[2]; Mohammad Abboud[3]; Amir Motallebzadeh[4]; Sezer Özerinç[1]; Ilkay Kalay[5]; Yunus Kalay[1]; [1]Middle East Technical University; [2]Max-Planck-Institut für Kohlenforschung; [3]Bilkent University; [4]Koç University; [5]Çankaya University

---

ENERGY & ENVIRONMENT

Composite Materials for Sustainable Eco-Friendly Applications — Poster Session

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

Program Organizers: Brian Wisner, Ohio University; Ioannis Mastorakos, Clarkson University; Simona Hunyadi Murph, Savannah River National Laboratory

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chair: Brian Wisner, Ohio University

D-9: Effect of Thermal Conductivity on the Mechanical Behavior of Marginal Construction Waste as a Structural Material for Recycled Pavements: *Liliana Hernandez Garcia*[1]; Henry Colorado[1]; [1]Universidad de Antioquia

D-10: High Strain Rate Compression Response of Curaua/Aramid Epoxy Laminate Hybrid Composites for Ballistic Helmets: Natalin Meliande[1]; Lucio Nascimento[1]; *Sergio Monteiro*[1]; [1]IME

D-12: Removal of Fluoride from Aqueous Solution by NH2-MIL-101(Al): *Xinhui*

Liu[1]; Wenjuan Wang[1]; Guihong Han[1]; Yanfang Huang[1]; Bingbing Liu[1]; Shengpeng Su[1]; [1]Zhengzhou University

D-13: Study on the Application of Modified MOFs to the Treatment of Simulated Metallurgical Wastewater: *Junpeng Zuo*[1]; Guihong Han[1]; Wenjuan Wang[1]; Yanfang Huang[1]; Bingbing Liu[1]; Shengpeng Su[1]; [1]Zhengzhou University

D-14: The Response of Curaua/Aramid Epoxy Laminate Hybrid Composites to Ballistic Impact by Fragment Simulating Projectiles: Natalin Meliande[1]; Lucio Nascimento[1]; *Sergio Monteiro*[1]; [1]IME

D-15: Thermal Aging Evaluation of Epoxy Composites Reinforced with Fique Fabric Using Thermogravimetric Analyses: Michelle Oliveira[1]; Elisa de Brito[2]; Foluke de Assis[3]; Fernanda da Luz[1]; Sergio Monteiro[1]; *Wendell Bezerra*[1]; [1]Military Institute Of Engineering; [2]Institute of Macromolecules Professor Eloisa Mano (IMA); [3]Navy Research Institute (IPqM)

D-16: Utilizing Spent Espresso Grounds for Composite Filaments with Improved Thermal Properties: *Shardai Johnson*[1]; Vijaya Rangari[1]; [1]Tuskegee University

---

ENERGY & ENVIRONMENT

Composites for Energy Applications: Materials for Renewable Energy Applications 2022 — Poster Session

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

Program Organizers: Patrick Ward, Savannah River National Laboratory; Joseph Teprovich, California State University Northridge; Anthony Thompson, Savannah River National Laboratory; Simona Hunyadi Murph, Savannah River National Laboratory

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chair: Anthony Thompson, Savannah River National Laboratory

---

D-17: Fabrication of Novel LiCrTiO4-MWCNTS Based Composite Electrodes for Flexible Li Ion Batteries: *Prerna Chaturvedi*[1]; Amarsingh Bhabu Kanagaraj[1]; Daniel Choi[1]; [1]Khalifa University

D-18: Preparation of Coal Liquefaction Residue/PAN Composite Carbon Nanofibers by Electrostatic Spinning: *Xiao-Yan Zhang*[1]; Tong-Xin Qiao[1]; Peng Li[1]; [1]Zhengzhou University

D-20: Seebeck Analysis of ALD Synthesized Thermoelectric Thin Films: Sadiya Tahsin[1]; Jameson Crouse[2]; Helmut[1]; *Abdelmageed Elmustafa*[1]; [1]Old Dominion University; [2]Dept. of Physics, College of William and Mary, Williamsburg, VA 23187

MATERIALS PROCESSING

Defects and Properties of Cast Metals IV — Poster Session

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

Program Organizers: Lang Yuan, University of South Carolina; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Andrew Kao, University of Greenwich; Kyle Fezi, Fort Wayne Metals

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

F-26: Correlation between Purification Effect and Surface Segregation of Impurities in Aluminium at High Temperatures: *Jin-Kyu Lee*[1]; Sun-Ki Kim[1]; [1]Nice LMS Co., LTD

F-27: 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

F-28: The Mechanical Properties and Microstructural of Cast Zinc though Aluminum Inoculation by Ultrasonic Treatment: *Dachao Wu*[1]; Zhilin Liu[1]; Zhaojin Fan[1]; Tian Huang[1]; [1]Central south university

---

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Mechanisms of High Temperature Alloys — Poster Session

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

Program Organizers: Mark Hardy, Rolls-Royce Plc; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Jeremy Rame, Safran Aircraft Engines; Akane Suzuki, GE Research; Jean-Charles Stinville, University of California, Santa Barbara; Paraskevas Kontis, Norwegian University of Science and Technology; Andrew Wessman, University of Arizona

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

G-1: Developing Methods for Microstructural Control of Ni-Cr Binary Alloys: *Diego Macias*[1]; Mohammad Umar Farooq khan[1]; Stephen Raiman[1]; [1]Texas A&M University

G-2: The Efficacy of Using Flat Plate Oxidation Data as a Proxy for Active Crack Tip Behavior in Waspaloy: *Alex Jennion*[1]; Zachary Harris[1]; James Burns[1]; [1]University of Virginia

---

MECHANICS & STRUCTURAL RELIABILITY

Dynamic Behavior of Materials IX — Poster Session

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

Program Organizers: Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Cyril Williams, US Army Research Laboratory

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chairs: Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Cyril Williams, Army Research Laboratory; Marc Meyers, University of California San Diego; George Gray, Los Alamos National Laboratory; Neil Bourne, The University of Manchester

---

G-4: An Improved Method for High Strain Rate Nanoindentation Testing Using Piezoelectric Load Cell Measurements: *Christopher Walker*[1]; Benjamin Hackett[1]; Sudharshan Pardhasaradhi[2]; Warren Oliver[3]; George Pharr[1]; [1]Texas A&M University; [2]ARCI; [3]KLA Corporation

G-5: Atomistic Investigation of Stress Release Mechanisms of Aramid Fibers: *Emily Gurniak*[1]; Subodh Tiwari[1]; Aiichiro Nakano[1]; Rajiv Kalia[1]; Priya Vashishta[1]; Paulo Branicio[1]; [1]University of Southern California

G-7: Deformation Mechanism of Laser Direct Metal Deposited Cu-Fe Alloy under High Strain Rate Condition: *Arya Chatterjee*[1]; Wesley Higgins[2]; Ethan Sprague[1]; George Pharr[2]; Amit Misra[1]; [1]University of Michigan; [2]Texas A&M University

G-10: Dynamic Compressive Response of Hot-pressed Boron Carbide: Understanding the Role of Microstructural Heterogeneities: *Arezoo Zare*[1]; Amartya Bhattacharjee[1]; Qi Rong Yang[2]; Kent Christian[2]; Richard Haber[2]; Lori Graham-Brady[1]; Matt Shaeffer[1]; K.T. Ramesh[1]; [1]Johns Hopkins University; [2]Rutgers University

G-12: Equibiaxial Strength Testing of Lithium Hydride: *Gabriella King*[1]; Christian Bustillos[1]; Wyatt Du Frane[1]; Joshua Kuntz[1]; [1]LLNL

G-14: High Strain-rate Strength Response of Single Crystal Tantalum through In-situ Hole Closure Imaging Experiments: *Jonathan Lind*[1]; Robert Carson[1]; Nicolas Bertin[1]; Matthew Nelms[1]; [1]Lawrence Livermore Laboratory

G-15: In Situ Analysis of Shear Bands and Fracture in Metals: Shwetabh Yadav[1]; *Harshit Chawla*[2]; Dinakar Sagapuram[2]; [1]Department of Civil Engineering, Indian Institute of Technology Hyderabad; [2]Department of Industrial & Systems Engineering, Texas A&M University

G-16: Influence of Microstructure on Radial Expansion of 4340 SS Cylinders: *Carl Trujillo*[1]; Saryu Fensin[1]; George Gray[1]; [1]Los Alamos National Laboratory

G-18: Modeling Shock Wave Propagation Using a Moving Window CAC Framework: *Alexander Davis*[1]; Vinamra Agrawal[1]; [1]Auburn University

G-19: Phase Transformation in Cu: *Nilanjan Mitra*[1]; [1]Johns Hopkins University

G-20: Polymer Mechanics under High Pressure: Jennifer Jordan[1]; Daniel Casem[2]; *Eric Brown*[1]; Blake Sturtevant[1]; [1]Los Alamos National Laboratory; [2]CCDC US Army

Research Laboratory

G-22: Shock Response of Titanium Containing Helium Bubbles: *Sarah Stevenson*[1]; Saryu Jindal Fensin[2]; Peter Hosemann[1]; [1]University of California Berkeley; [2]Los Alamos National Laboratory

G-23: Shock-driven Foamed Metals for Studying Shallow Bubble Collapse: *Eric Stallcup*[1]; Garry Maskaly[1]; Fady Najjar[1]; Gerald Stevens[2]; William Turley[2]; Brandon La Lone[2]; Matthew Staska[2]; [1]Lawrence Livermore National Laboratory; [2]MSTS Special Technologies Laboratory

---

CORROSION

Environmental Degradation of Multiple Principal Component Materials — Poster Session

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

Program Organizers: Wenjun Cai, Virginia Polytechnic Institute and State University; ShinYoung Kang, Lawrence Livermore National Laboratory; XiaoXiang Yu, Northwestern University; Vilupanur Ravi, California State Polytechnic University Pomona; Christopher Weinberger, Colorado State University; Elizabeth Opila, University of Virginia; Bai Cui, University of Nebraska-Lincoln; Mark Weaver, University of Alabama; Bronislava Gorr, Karlsruhe Institute of Technology (KIT); Srujan Rokkam, Advanced Cooling Technologies Inc

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

B-1: Evaluating the Influences of Microstructural Attributes on the High Temperature Oxidation of a AlCoCrFeNi High Entropy Alloy: *Michael Pavel*[1]; Mark Weaver[1]; [1]Univ of Alabama Tuscaloosa

---

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

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chair: Bai Cui, University of Nebraska-Lincoln

B-3: Hydrogen Embrittlement in Ni-base Superalloy 718: *Hamza Khalid*[1]; Bilal Mansoor[2]; [1]Texas A&M University; [2]Texas A&M University at Qatar

---

NANOSTRUCTURED MATERIALS

Functional Nanomaterials: Functional Low-Dimensional (0D, 1D, 2D) Materials 2022 — Poster Session

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

Program Organizers: Michael Cai Wang, University of South Florida; Yong Lin Kong, University of Utah; Sarah Ying Zhong, University of South Florida; Surojit Gupta, University of North Dakota; Nasrin Hooshmand, Georgia Institute of Technology; Woochul Lee, University of Hawaii at Manoa; Min Kyu Song, Washington State University; Simona Hunyadi Murph, Savannah River National Laboratory; Hagar Labouta, University of Manitoba; Max Anikovskiy, University of Calgary; Patrick Ward, Savannah River National Laboratory

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

H-8: Hydrothermal Synthesis of ZnO Nanorod Arrays for Gas Sensing: P. Kojo Amoah[1]; Jordan Shields[2]; Helmut Baumgart[1]; Y.S. Obeng[3]; *Abdelmageed Elmustafa*[1]; [1]Old Dominion University; [2]College of William and Mary; [3]National Institute of Standards and Technology

H-9: Strain-induced Reversible Phase Transitions in 2D Transition Metal Dichalcogenides: *Zhewen Yin*[1]; Anjun Hu[1]; Md Rubayat-E Tanjil[1]; Ossie Douglas[1]; Mahabubur Rahman[2]; Huijuan Zhao[2]; Michael Cai Wang[1]; [1]University of South Florida; [2]Clemson University

H-10: The Interaction Dynamics and Binding Strength of Proteins on Gold Nanoparticles: *Tushar Upreti*[1]; [1]University of Manitoba

---

MECHANICS & STRUCTURAL RELIABILITY

Grain Boundaries and Interfaces: Metastability, Disorder, and Non-Equilibrium Behavior — Poster Session

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

Program Organizers: Yue Fan, University of Michigan; Liang Qi, University of Michigan; Jeremy Mason, University of California, Davis; Garritt Tucker, Colorado School of Mines; Pascal Bellon, University of Illinois at Urbana-Champaign; Mitra Taheri, Johns Hopkins University; Eric Homer, Brigham Young University; Xiaofeng Qian, Texas A&M University

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chair: To Be Announced

G-27: Fractal-like Grain Exfoliation in Liquid-metal-activated Aluminum-water Reactions: *Peter Godart*[1]; Douglas Hart[1]; [1]Massachusetts Intitute of Technology

G-28: Investigation of the Effect of Heating Rate on the Recrystallization of Deformed Samples of Polycrystalline High-purity Niobium: *Zackery Thune*[1]; Nathan Fleming[1]; Conor McKinney[1]; Elizabeth Nicometo[1]; Thomas Bieler[1]; [1]Michigan State University

G-29: Numerical Determination of the GND Footprint of Dislocation Loops: Connecting Atomistic Descriptions with Experimental Observations: *Sicong He*[1];

Jaime Marian[1]; [1]University of California, Los Angeles

G-30: The Dimensionality of Absorbed Defects Dictates GB Response to Irradiation: *Chang-Yu Hung*[1]; James Nathaniel[1]; Emily Hopkins[1]; Khalid Hattar[2]; Mitra Taheri[1]; [1]Johns Hopkins University; [2]Sandia National Laboratories

G-31: The Effect of Grain Boundaries on High-temperature Microstructure Evolution in Cu/Nb Composites: *Emmeline Sheu*[1]; Jon Baldwin[2]; Michael Demkowicz[1]; [1]Texas A&M University; [2]Los Alamos National Laboratory

---

SPECIAL TOPICS

Late News Poster Session — Advanced Materials

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

A-23: Computational Discovery of Ultra-high Strength BCC Refractory Metal-based MPEAs: *Kate Elder*[1]; Joel Berry[1]; Aurelien Perron[1]; Hunter Henderson[1]; Jibril Shittu[1]; Zachary Sims[1]; Scott McCall[1]; Joseph McKeown[1]; [1]Lawrence Livermore National Laboratory

A-24: Geometric Analysis of the Growth Front of Iron Borides Fe2B in AISI-1018 Steel: *Katia Andrade Michel*; [1]

A-25: High Solid Content Porous Cordierite with Controllable Structure Prepared by Pickering Emulsion Technology: *Xuezhu Luan*[1]; [1]Shenyang University

A-26: Microstructural Analysis of the Casting Defects in the Low Pressure Turbine Blades: *Rafal Cygan*[1]; Lukasz Rakoczy[2]; Miroslaw Antosz[1]; Dorota Wyrobek[2]; Tomasz Szczech[2]; [1]Consolidated Precision Products Poland; [2]AGH University of Science and Technology

A-27: Self-healing Behavior of Fe-Ni Base Superalloy Based on Spontaneous Segregation of Boron: *Chamil Kim*[1]; WooChul Kim[1]; YongJoo Kim[1]; WonTae Kim[2]; Do Hyang Kim[1]; [1]Yonsei University; [2]Cheongju University

A-28: Software Design for ICME, PSPP and Multiscale: *Deepankar Pal*[1]; Grama Bhashyam[1]; [1]ANSYS

SPECIAL TOPICS

Late News Poster Session — Corrosion

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

B-4: Corrosion Evaluation of Cold Spray Materials on SS304L Material: Timothy Montoya[1]; *Erin Karasz*[1]; Jason Taylor[1]; Kenneth Ross[2]; Rebecca Schaller[1]; [1]Sandia National Laboratories; [2]Pacific Northwest National Laboratory

---

SPECIAL TOPICS

Late News Poster Session — Electronic Materials

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

C-4: Correlation between Crystallographic Microstructure of Electrodeposits and Adsorption of Additives through Electrochemical Calculations at Feature Scale: *Han-Kyun Shin*[1]; Yeon-Soo Jung[1]; Hyun Park[1]; Hyojong Lee[1]; [1]Dong-A University

C-5: Effect of Antimony on the Microstructure Evolution and Mechanical Properties of Near Eutectic Sn-Bi and Sn-Bi-Ag Alloys: *Hannah Fowler*[1]; Raiyo Aspandiar[2]; Yaohui Fan[1]; Sukshitha Achar Puttur Lakshminarayana[1]; Ganesh Subbarayan[1]; John Blendell[1]; Carol Handwerker[1]; [1]Purdue University; [2]Intel

SPECIAL TOPICS

Late News Poster Session — Energy & Environment (including REWAS 2022 Symposia)

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

D-29: DFT Studies on the HER Activity, Electronic Structure, and Bonding Properties of the Boride MoxVx-1B2 (0 < x < 1): *Johan Yapo*[1]; Eunsoo Lee[1]; Boniface Fokwa[1]; [1]University of California Riverside

D-30: Electricity Properties of Foam Insulation Materials: *Ibrahim Gunes*[1]; [1]Istanbul University Cerrahpasa

D-31: Extraction of Strategic Metals from Spent Catalyst by Using Integrated Hydrometallurgical Approach: *Rajesh Kumar Jyothi*[1]; Jong Hyuk Jeon[1]; In-Hyeok Choi[2]; Ana Belen Cueva-Sola[1]; Jin-Young Lee[1]; Hee-Nam Kang[1]; [1]Korea Institute of Geoscience & Mineral Resources; [2]HANNAE for T (Spent Catalyst Recycling Company),

D-32: Influence of the Dielectric Constant of Ba(1-x)Sr(x)TiO3 and Flux Mediated Ion Doping on Photoreactivity: *Nnamdi Ene*[1]; Gregory Rohrer[1]; Paul Salvador[1]; [1]Carnegie Mellon University

D-33: Iron-rich Layered Chalcogenide Fe5Ge2Te2 for Highly Efficient Hydrogen Evolution: *Diana Luong*[1]; Eunsoo Lee[1]; Amir Rezaie[1]; Johan Yapo[1]; Boniface Fokwa[1]; [1]University of California, Riverside

D-34: Molybdenum Borocarbide (Mo2BC) as a New Electrocatalyst for Hydrogen Evolution Reaction: *Eunsoo Lee*[1]; Boniface Fokwa[1]; [1]University of California, Riverside

D-35: Study on the Gasification Reactivity of Hypercoal Coke: *Jun Zhao*[1]; Xiaolin Song[1]; Haibin Zuo[2]; [1]China University of Mining and Technology; [2]University of Science and Technology Beijing

SPECIAL TOPICS

Late News Poster Session — Light Metals

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

E-29: Development of Heat Dissipation Housing for Sensing Device through Material Development and Prediction of Heat Dissipation Phenomenon: *JiHyeon Byeon*[1]; JungHan Kim[1]; CheolJin Yoon[1]; SungHo Kim[1]; SangHo Hwang[1]; Oeon Kwon[1];

[1]Gyeongbuk Institute of IT Convergence Industry Technology

E-30: Influence of Atmosphere and Temperature on PAH Emission from Green Anode Paste: *Kamilla Arnesen*[1]; Thor Aarhaug[2]; Kristian Einarsrud[1]; Gabriella Tranell[1]; [1]Norwegian University of Science and Technology; [2]SINTEF

E-32: Microstructure and Mechanical Properties of Al-Cu-Ca Based Alloys with Sn Addition: *Jung Han Kim*[1]; Jihyeon Byeon[1]; Cheol-Jin Yoon[1]; Sung-Ho Kim[1]; Sang-Ho Hwang[1]; O-Eon Kwon[1]; [1]Gyeongbuk Institute of IT Convergence Industry Technology

E-33: Newly Developed Ceramic Foam Filters for Filtration and Hydrogen Removal in Aluminum Casthouses: Alexander Mach[1]; Frank Reusch[1]; Claus Disser[1]; *Jochen Schnelle*[1]; Marcel Rosefort[2]; Phil Jankowski[2]; Giuseppe Esposito[2]; [1]Drache; [2]TRIMET

E-34: The Modification Effect of Ultrasonic Irradiation Amplitude during Melt Treatment on Al3Zr Compounds: *Jincheng Sun*[1]; Sergey Komarov[1]; Takuya Yamamoto[1]; [1]Tohoku University

---

SPECIAL TOPICS

Late News Poster Session — Materials Processing

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

F-34: A Study on the Role of Crystal Shape on the Freeze-lining Growth and Stability: *Gaëlle Butin*[1]; Lennart Scheunis[2]; Bart Blanpain[1]; Annelies Malfliet[1]; [1]KU Leuven; [2]Umicore

F-36: Development of Austenitic Stainless Steel with TWIP Effect: *Pavel Podany*[1]; Tomas Studecky[1]; Radek Prochazka[1]; [1]COMTES FHT

F-37: Effect of Modifiers on Charge Dissipation and Properties of Electrosprayed Melting Gels: *Kelly Hughes*[1]; Michael Grzenda[1]; Alfusainey Samateh[2]; Andrei Jitianu[2]; Jonathan Singer[1]; [1]Rutgers University; [2]City University of New York

F-40: Enhancing Mechanical Properties of Molybdenum with Equal Channel Angular Extrusion Processing: *Ekaterina Maynor*[1]; David Foley[2]; James Paramore[1]; Kelvin Xie[1]; Brady Butler[1]; [1]Texas A&M University; [2]Shear Form, Inc.

F-41: From Long-term Aging to Rapid Annealing – The Heat Treatment Optimization of Melt-spun $Fe_{81}Ni_4Cu_1B_{14}$ Alloy. Crystal Structure and Magnetic Properties Evolution: *Lukasz Hawelek*[1]; Tymon Warski[1]; Marcin Polak[1]; Adam Pilsniak[1]; Magdalena Steczkowska-Kempka[1]; Anna Wojcik[2]; Aleksandra Kolano-Burian[1]; [1]Lukasiewicz Research Network - Institute of Non-Ferrous Metals; [2]Institute of Metallurgy and Materials Science Polish Academy of Sciences

F-42: Study of the Sub-surface Thermal and Plastic Strain Distribution during Laser Shock Peening of Aerospace Grade Alloys – Simulation and Experiments: *Ayan Bhowmik*[1]; Varad Choudhari[1]; Niroj Maharjan[2]; [1]Indian Institute of Technology Delhi; [2]Advanced Remanufacturing and Technology Centre

F-43: X-ray Decomposition of PET Nanoparticles as an Alternative Process to Decontaminate Water Resources: *Leonardo Batista Capaverde Silva*[1]; J.V Rojas[2]; Maria C Molina Higgins[1]; [1]The Pennsylvania State University; [2]Virginia Commonwealth University

---

SPECIAL TOPICS

Late News Poster Session — Mechanics & Structural Reliability

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

G-34: Strain-dependent Dislocation Density Formation in 4130 Steel Studied by Neutron Diffraction: *Zachary Buck*[1]; Matthew Connolly[1]; May Martin[1]; Damian Lauria[1]; Peter Bradley[1]; Yan Chen[2]; Andrew Slifka[1]; [1]National Institute of Standards and Technology; [2]Oak Ridge National Laboratory

---

SPECIAL TOPICS

Late News Poster Session — Nanostructured Materials

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

H-28: Carbon Nanotubes Reinforced WC-Co Hard Alloys: *Guolong Tan*[1]; Chenglong Li[2]; Xijun Wu[3]; [1]Wuhan University of Technology; [2]Nostan Comapny; [3]Zhejiang University

H-29: Enhancing HER Performance of Transition Metal Borides (TMBs) Nanoparticles Synthesized with Excess Sn Flux: *Sang Bum Kim*[1]; Boniface Fokwa[1]; [1]University of California, Riverside

H-30: Evidence for Nanoindentation Induced Dynamical Recovery in Aluminum: *Yuwei Zhang*[1]; George Pharr[1]; [1]Texas A&M University

H-31: Evolution of Microstructure and Crystallographic Texture of Ni-Mn-Ga Melt-spun Ribbons Exhibiting 1.15% Magnetic Field-induced Strain: *Anna Wójck*[1]; Robert Chulist[1]; Maciej Kowalczyk[2]; Przemyslaw Zackiewicz[3]; Pawel Czaja[1]; Norbert Schell[4]; Wojciech Maziarz[1]; [1]Institute of Metallurgy and Materials Science PAS; [2]The Faculty of Materials Science and Engineering, Warsaw University of Technology; [3]Lukasiewicz Research Network—Institute of Non-Ferrous Metals; [4]Institute of Materials Physics, Helmholtz-Zentrum Geesthacht

H-32: Fabrication of NiFe(CO3)(OH)2 Composite Nano-sheet Arrays for Supercapacitor: *Kyung Mox Cho*[1]; Kwang Ho Kim[1]; [1]Pusan National University

H-33: Hydrothermally Processed Ni(OH)2 Nano-sheet Electrode for Supercapacitor: Kyung Mox Cho[1]; *Kwang Ho Kim*[1]; [1]Pusan National University

H-34: Low-cost Solution Processed Facile h-MoO3 Synthesis for Heterojunction Diode: Surendra Kumar[1]; *Kamal Rudra*[2]; Abhishek Kumar Singh[3]; Sanjai Singh[1]; Pramod Kumar[1]; [1]Indian Institute of Information Technology-Allahabad; [2]University of Michigan; [3]Rajiv Gandhi Institute of Petroleum Technology

H-35: Microscratch Characterization of Multilayered Cu-Nb Produced by Accumulative Roll Bonding: Hamed Zeinalabedini[1]; *Sezer Ozerinc*[1]; [1]Middle East Technical University

H-36: Multiferroism of La Modified M-type Hexaferrites: *Guolong Tan*[1]; Congcong Duan[2]; Nan Nan[2]; [1]Wuhan University of Technology; [2]Wuhan University of Technology

---

LIGHT METALS

Magnesium Technology — Poster Session

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

Program Organizers: Petra Maier, University of Applied Sciences Stralsund; Steven Barela, Terves, Inc; Victoria Miller, University of Florida; Neale Neelameggham, IND LLC

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

E-17: A Parametric Study of the Role of Basal-prismatic <a> Dislocation Interactions in Dynamic Strain Aging in Mg Alloys: Mohammed Shabana[1]; Jishnu Bhattacharyya[1]; *Sean Agnew*[1]; [1]University of Virginia

E-18: Corrosion Properties of Friction Stir Processed Cast Mg-alloys: Rajib Kalsar[1]; David Garcia[1]; Hrishikesh Das[1]; Venkateshkumar Prabhakaran[1]; Glenn Grant[1]; Darrell Herling[1]; Mageshwari Komarasamy[1]; *Vineet Joshi*[1]; [1]Pacific Northwest National Laboratory

E-19: Effect of ECAP on Corrosion Properties of ZK40 Magnesium Alloy for Biodegradable Load-bearing Applications: *Hamza Ghauri*[1]; Marwa AbdelGawad[1]; Matthew Vaughan[2]; Bilal Mansoor[1]; Ibrahim Karaman[1]; Hans Maier[3]; [1]Texas A&M University at Qatar; [2]Texas A&M University; [3]Leibniz Universität Hannover

E-20: Effect of Minimum Quantity Lubrication on Machinability of Magnesium RZ5 Alloy: A Comparative study: *Arabinda Meher*[1]; Manas Mahapatra[1]; [1]IIT Bhubaneswar

E-21: Mechanical and Microstructural Behavior of Rolled AZ31B Magnesium Alloy Subjected to Multiaxial Stress State: *Luiz Carneiro*[1]; Qin Yu[2]; Yanyao Jiang[3]; [1]University of Nevada Reno; [2]Materials Sciences Division, Lawrence Berkeley National Laboratory, Berkeley; [3]University of Nevada Reno

E-22: Phase-field Modeling of the Effects of Second Phases on the Corrosion of Mg Alloys: *Yanjun Lyu*[1]; David Montiel[1]; Stephen Dewitt[1]; Alexander Chadwick[1]; Katsuyo Thornton[1]; [1]University of Michigan

E-23: Possibility of Joining Explosively Welded AA1050/AZ31 Clad Plates Using FSW/Laser Hybrid Method: *Marcin Wachowski*[1]; Robert Kosturek[1]; Krzysztof Grzelak[1]; Janusz Torzewski[1]; Ireneusz Szachogluchowicz[1]; [1]Military University of Technology

E-24: Primary Production of Magnesium via Molten Salt Electrolysis with Reactive Cathode: *Madison Rutherford*[1]; Armaghan Telgerafchi[1]; Nicholas Masse[1]; Lucien Wallace[1]; Gabriel Espinosa[1]; Adam Powell[1]; [1]Worcester Polytechnic Institute

E-25: Process-structure-property-performance Relationship of Solid-state Additively Manufactured Magnesium Alloy WE43: *Malcolm Williams*[1]; Thomas Robinson[1]; Christopher Williamson[1]; Ryan Kinser[1]; Paul Allison[1]; James Jordon[1]; [1]University of Alabama

E-27: Towards High Hardness and Corrosion Resistant Mg Alloys Using High-energy Ball Milling: *Mohammad Umar Farooq Khan*[1]; Taban Larimian[2]; Tushar Borkar[2]; Rajeev Gupta[3]; [1]Texas A&M University; [2]Cleveland State University; [3]North Carolina State University

E-28: Understanding Mechanisms of Electrocrystallization in Mg-based Batteries: *Rachel Davidson*[1]; Stefany Angarita-Gomez[1]; Perla Balbuena[1]; Sarbajit Banerjee[1]; [1]Texas A&M University

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: Samuel Wagstaff, Oculatus; Alexandra Anderson, Gopher Resource; Jonghyun Lee, Iowa State University; Adrian Sabau, Oak Ridge National Laboratory; Fiseha Tesfaye, Åbo Akademi University

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

F-33: Phase Equilibria in the Ag–Ge–Bi–Te System and Thermodynamic Properties of the *n*GeTe\215*m*Bi_2Te_3 (n, m = 1-4) Layered Compounds: Mykola Moroz[1]; *Fiseha Tesfaye*[2]; Pavlo Demchenko[3]; Myroslava Prokhorenko[4]; Orest Pereviznyk[3]; Bohdan Rudyk[1]; Lyudmyla Soliak[1]; Daniel Lindberg[5]; OLeksandr Reshetnyak[3]; Leena Hupa[2]; [1]National University of Water and Environmental Engineering; [2]Åbo Akademi University; [3]Ivan Franko National University of Lviv; [4]Lviv Polytechnic National University; [5]Aalto University

NANOSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale VI — Poster Session

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

Program Organizers: Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, University of Texas at San Antonio; Changhong Cao, McGill University; Mohsen Asle Zaeem, Colorado School of Mines

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

H-12: Atomistic Modeling of the Mechanical Behavior of Gradient Nanoglasses: *Suyue Yuan*[1]; Paulo Branicio[1]; [1]USC

H-13: Dynamic Mechanical Properties of High-entropy Alloys: *Aomin Huang*[1]; [1]Univerisity of California San Diego

ELECTRONIC MATERIALS

Recent Advances in Printed Electronics and Additive Manufacturing: 2D/3D Functional Materials, Fabrication Processes, and Emerging Applications — Poster Session

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; Yong Lin Kong, University of Utah; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Changyong Cao, Michigan State University; David Estrada, Boise State University; Nuggehalli Ravindra, New Jersey Institute of Technology

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

C-6: Mechanical Characterization of Oxide Dispersed Stainless Steels via Direct Ink Writing: *Havva Aysal*[1]; Konstantinos Sierros[1]; Brian Paul[2]; Chih-Hung Chang[2]; [1]West Virginia University; [2]Oregon State University

---

NANOSTRUCTURED MATERIALS

Self-organizing Nano-architectured Materials — Poster Session

Program Organizers: Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Ian McCue, Northwestern University; Erica Lilleodden, Helmholtz-Zentrum hereon; Pierre-Antoine Geslin, CNRS / INSA-Lyon; Qing Chen, Hong Kong University of Science & Technology

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chairs: Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Ian McCue, Northwestern University; Erica Lilleodden, Helmholtz-Zentrum hereon; Pierre-Antoine Geslin, CNRS / INSA-Lyon; Qing Chen, Hong Kong University of Science & Technology

---

H-14: Characterization of Dealloyed Gradient Nanoporous Foams: *Karina Hemmendinger*[1]; Andrea Hodge[1]; [1]University of Southern California

H-15: In-situ Observation of Ligament Coarsening in Nanoporous Gold: *Kerry Baker*[1]; T Balk[1]; [1]University of Kentucky

H-16: Kinetics of Peritectic Melting: *Mingwang Zhong*[1]; Longhai Lai[1]; Alain Karma[1]; [1]Northeastern University

H-19: Unveiling Phase Transition in Solid-state Dealloyed Thin Films Using Autonomous Synchrotron X-ray Characterization: *Cheng-Chu Chung*[1]; Chonghang Zhao[1]; Marcus Noack[2]; Kedar Manandhar[3]; Joshua Lynch[4]; Hui Zhong[1]; Ming Lu[4]; Mingzhao Liu[4]; Jianming Bai[4]; Philip Maffettone[4]; Daniel Olds[4]; Masafumi Fukuto[4]; Ichiro Takeuchi[3]; Sanjit Ghose[4]; Thomas Caswell[4]; Kevin Yager[4]; Yu-Chen Chen-Wiegart[1]; [1]Stony Brook University; [2]Lawrence Berkeley National Laboratory; [3]University of Maryland; [4]Brookhaven National Laboratory

---

MECHANICS & STRUCTURAL RELIABILITY

Structural Metamaterials — Poster Session

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

Program Organizers: Amy Wat, Lawrence Livermore National Laboratory; Brad Boyce, Sandia National Laboratories; Xiaoyu Zheng, University of California, Los Angeles; Fabrizio Scarpa, University of Bristol; Robert Ritchie, University of California, Berkeley

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

G-32: Coated Nano- and Micro-lattices via Magnetron Sputtering: *Adie Alwen*[1]; Alina Garcia Taormina[1]; Andrea Hodge[1]; [1]University of Southern California

G-33: Gaussian Process Regression as a Surrogate Model for the Computation of Dispersion Relations: *Alexander Ogren*[1]; Berthy Feng[1]; Katherine Bouman[1]; Chiara Daraio[1]; [1]California Institute of Technology

---

NANOSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XII) — Poster Session I

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Penghui Cao, University of California, Irvine; Xiaoxu Huang, Chongqing University; Enrique Lavernia, University of California, Irvine; Xiaozhou Liao, University of Sydney; Lee Semiatin, Material Resources LLC; Nobuhiro Tsuji, Kyoto University; Caizhi Zhou, University of South Carolina; Yuntian Zhu, City University of Hong Kong

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

H-21: Effect of Severe Plastic Deformation Processes on the Microstructure, Texture and Mechanical Property of Nb-1Zr Alloy: *Soumita Mondal*[1]; Surendra Makineni[1]; Apu Sarkar[2]; Pradipta Ghosh[3]; Rajeev Kapoor[2]; Satyam Suwas[1]; [1]Indian Institute of Science, Bangalore; [2]Bhabha Atomic Research Center; [3]Indian Institute of Technology Gandhinagar

H-22: Energy Absorption Performance of Functionally Graded High Strength Steel: *Adam Tyedmers*[1]; Hatem Zurob[1]; Bosco Yu[1]; Moisei Bruhis[1]; [1]McMaster University

H-24: Enhancing Mechanical Performance of Commercial Al Alloy by Tailoring Their Microstructural Heterogeneity: Khaled Adam[1]; *Ahmed Mohammed*[2]; Mohammed Aldlemy[3]; [1]Kennesaw State University; [2]Collage of Mechanical Engineering Technology; [3]Collage of Mechanical Engineering Technology

---

NANOSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XII) — Poster Session II

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Penghui Cao, University of California, Irvine; Xiaoxu Huang, Chongqing University; Enrique Lavernia, University of California, Irvine; Xiaozhou Liao, University of Sydney; Lee Semiatin, Material Resources LLC; Nobuhiro Tsuji, Kyoto University; Caizhi Zhou, University of South Carolina; Yuntian Zhu, City University of Hong Kong

Monday PM | February 28, 2022
Exhibit Hall C | Anaheim Convention Center

H-25: Microstructure Evolution Kinetics and Strengthening Mechanisms of the Partially Recrystallized High Entropy Alloys: *Feng He*[1]; Zhongsheng Yang[1]; Zhijun Wang[1]; [1]State Key Laboratory of Solidification Processing

H-26: New Strategies for the Control, Study, and Scale-up of Surface Nanocrystallization: *Samuel Scott*[1]; Mark Atwater[1]; [1]Liberty University

H-27: Structural Evolution during Nanostructuring of Additive-manufactured 316L Stainless Steel by High-pressure Torsion: *Isshu Lee*[1]; Jae-Kyung Han[1]; Xiaojing Liu[2]; Yulia Kuzminova[3]; Stanislav Evlashin[3]; Klaus-Dieter Liss[2]; Megumi Kawasaki[1]; [1]Oregon State University; [2]Guangdong Technion - Israel Institute of Technology; [3]Skolkovo Institute of Science and Technology

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Innovative Powder Processing of Functional and Magnetic Materials — Poster Session

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

Program Organizers: Emily Rinko, Iowa State University; Iver Anderson, Iowa State University Ames Laboratory; Markus Chmielus, University of Pittsburgh; Emma White, DECHEMA Forschungsinstitut; Deliang Zhang, Northeastern University; Andrew Kustas, Sandia National Laboratories; Kyle Johnson, Sandia National Laboratories

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

J-1: Development of NiTiMo Alloys Using Powder Blown Laser Direct Energy Deposition Additive Manufacturing: *Nathaniel Lies*[1]; [1]Georgia Institute of Technology

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture: Developing Predictive Capabilities — 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 1, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chair: Nik Hrabe, National Institute of Standards and Technology (NIST)

J-5: Evaluation of Heat-treated Microstructure and Mechanical Properties of Al-Zn-Mg-Cu Plates Repaired via Additive Friction Stir-deposition: Dustin Avery[1]; Conner Cleek[1]; Brandon Phillips[1]; M Y Rekha[1]; *Ryan Kinser*[1]; Harish Rao[1]; Paul Allison[1]; Luke Brewer[1]; James Jordon[1]; [1]The University of Alabama

J-7: Monitoring Additive Manufacturing Process Stability with Bayesian Changepoint Detection on High-Throughput Tensile Test Data: *Stefan Colton*[1]; Brad Boyce[2]; Aaron Stebner[1]; [1]Georgia Institute of Technology; [2]Sandia National Laboratories

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications IV — Poster Session

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

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

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chair: Subhashish Meher, Idaho National Laboratory

J-8: Creep Resistance of Al-Ce Binary Alloys Produced by Casting and Additive Manufacturing: *Jillian Stinehart*[1]; Le Zhou[1]; [1]Marquette University

J-10: Investigation in Multi-layer and Multi-element Alloy Wire-arc Additive Manufacturing Cladding: *Nicholas Brubaker*[1]; Soumya Mandal[2]; Ritesh Sachan[2]; Michael Maughan[1]; [1]University of Idaho; [2]Oklahoma State University

J-11: Microstructural and Mechanical Investigation of IN718 Nickel-based Superalloy Fabricated via Laser-based Additive Manufacturing (LBAM): *Hassan Ghorbani*[1]; Mohammad Eizadinia[1]; Hiwa Khledi[2]; Behnam Rasti[1]; [1]University of Tehran; [2]Sharif University

J-12: Microstructure Evolution and Mechanical Properties of Selective Laser Melted SB-CoNi-10 Superalloy: *Evan Raeker*[1]; Sean Murray[1]; Kira Pusch[1]; Chris Torbet[1]; Tresa Pollock[1]; [1]University of California, Santa Barbara

J-13: Printing Nano Inks and Process Control for Plasma Jet Printer: Carl Karlsson[1];

Kunal Mondal[1]; Michael McMurtrey[1]; [1]Idaho National Laboratory

J-14: Process-property Relationship for Fabricating Complex Heat Exchanger Geometry via Laser Powder Bed Fusion Additive Manufacturing: *Junwon Seo*[1]; Ziheng Wu[1]; Nicholas Lamprinakos[1]; Srujana Rao Yarasi[1]; Anthony Rollett[1]; [1]Carnegie Mellon University

J-15: Quantifying Equiaxed Versus Epitaxial Solidification in CMSX-4 Single Crystal Superalloy Processed by Laser Powder Bed Fusion Using Single-tracks: *Runbo Jiang*[1]; Zhongshu Ren[2]; Joseph Aroh[1]; Amir Mostafaei[3]; Benjamin Gould[4]; Tao Sun[2]; Anthony Rollett[1]; [1]Carnegie Mellon University; [2]University of Virginia; [3]Illinois Institute of Technology; [4]Argonne National Laboratory

J-16; Understanding Microstructure Evolution of High Temperature Ni Alloys Across Additive Manufacturing Processes: *Jonah Klemm-Toole*[1]; Juan Gonzalez[1]; Luc Hagen[1]; Andrew Wessman[2]; Zhenzhen Yu[1]; Amy Clarke[1]; [1]Colorado School of Mines; [2]University of Arizona

J-17: Understanding Process-structure-property Linkages in Electron Beam Melted Haynes 282: *Avantika Gupta*[1]; Sriram Vijayan[1]; Joerg Jinschek[1]; Carolin Fink[1]; [1]The Ohio State University

J-18: Understanding the Process-structure-property Correlation in Additively Manufactured IN718 Alloy: *Saurabh Sharma*[1]; Kristopher Darling[2]; Kiran Solanki[1]; [1]Arizona State University; [2]Army Research Laboratory

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Large-scale Metallic Components — Poster Session

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

Program Organizers: Sneha Prabha Narra, Carnegie Mellon University; Sougata Roy, University of North Dakota; Andrzej Nycz, Oak Ridge National Laboratory; Yousub Lee, Oak Ridge National Laboratory; Chantal Sudbrack, National Energy Technology Laboratory; Albert To, University of Pittsburgh

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

J-19: Hybrid Additive Manufacturing of the Ni Super Alloy Inconel 718: *Matjaz Godec*[1]; Simon Malej[1]; Darja Feizpour[1]; Crtomir Donik[1]; Matej Balažic[2]; Damjan Klobcar[3]; Laurent Pambaguian[4]; Marjetka Conradi[1]; aleksandra kocijan[1]; [1]Institute of Metals and Technology; [2]Balmar; [3]Faculty for Mechanical Engineering, University of Ljubljana; [4]ESA European Space Research and Technology Centre

J-20: Modelling and Analysis of Single-pass Laser Cladded High Speed Steel Considering Phase Transformation Effects: *Ke Ren*[1]; Yiming Rong[1]; Zhichao (Charlie) Li[2]; Gang Wang[3]; [1]Harbin Institute of Technology; [2]Deformation Control Technology, Inc.; [3]Tsinghua University

J-21: Numerical Modeling of Non-equilibrium Partitioning in Copper-iron Binary Systems Manufactured by Direct Metal Deposition (DMD): *Daniel Yin*[1]; Amit Misra[1]; Jyoti Mazumder[1]; [1]University of Michigan

J-22: Repair of High Hard Steel Using Similar Filler Material by a Solid-state Additive Manufacturing Approach: *Troy Pierson*[1]; [1]The University of Alabama

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Beyond the Beam III — Poster Session

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

Program Organizers: Brady Butler, US Army Research Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory; James Paramore, US Army Research Laboratory; Nihan Tuncer, Desktop Metal; Markus Chmielus, University of Pittsburgh; Paul Prichard, Kennametal Inc.

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

J-23: Additive Friction Stir Deposition of Al0.04CoCrFeNi High Entropy Alloy: *Michael Amling*[1]; Malcolm Williams[1]; Paul Allison[1]; Mark Weaver[1]; [1]University of Alabama

J-24: Temperature Influence on Microstructure and Mechanical Behavior during Deposition of Solid-state Additively Manufactured Aluminum Alloy 7050: *James Tew*[1]; Malcolm Williams[1]; Christopher Williamson[1]; Ryan Kinser[1]; Bret Cordle[1]; James Jordon[1]; Paul Allison[1]; [1]The University of Alabama

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development IV: Rapid Development — Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering 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 1, 2022
Exhibit Hall C | Anaheim Convention Center

J-25: Can Hot Cracking in LPBF Steel be Mitigated by Controlling the Powder Recoating Speed?: *Tan-Phuc Le*[1]; Qingyang Lu[1]; Shubo Gao[1]; Jay Carroll[2]; Matteo Seita[1]; [1]Nanyang Technological University; [2]Sandia National Laboratories

J-26: Deformation Behavior of Powder Bed Fusion Additive Manufactured Ti6Al4V Alloy at High Temperatures: *Md Jamal Mian*[1]; Jafar Razmi[1]; Leila Ladani[1]; [1]Arizona State University

J-27: Design and Analysis of Metal Based Brake Caliper Using FEA and Simufact for Its Development Using Additive Manufacturing: *Swapnil Kumar*[1]; Sundar Atre[1]; [1]University of Louisville

J-28: Effect of Hot Isostatic Pressing on the Microstructure of Directionally Solidified Nickel Alloy after SLM: *Evgenii Borisov*[1]; Anna Gracheva[1]; Vera Popovich[2]; Anatoly Popovich[1]; [1]SPbPU; [2]TU Delft

J-29: Effect of Porosity and Composition on Mechanical and Biological Properties of Additively Manufactured Titanium Alloy: *Sushant Ciliveri*[1]; Indranath Mitra[1];

Susmita Bose[1]; Amit Bandyopadhyay[1]; [1]Washington State University

J-31: Geometric Effects on Microcracking in Superalloys Produced by Laser Powder Bed Fusion: *Marcus Lam*[1]; [1]Monash University

J-32: Investigation of Solidification Kinetics and Its Effect on Mechanical Response of IN718 Fabricated via Selective Laser Melting: *Digvijay Parganiha*[1]; Priyanka Agrawal[1]; Ravi Sankar Haridas[1]; Rajiv S. Mishra[1]; Hirotsugu Kawanaka[2]; Shinji Matsushita[2]; Yusuke Yasuda[2]; Seung Hwan C. Park[2]; Wei Yuan[3]; [1]University of North Texas, Denton; [2]Research & Development Group, Hitachi Ltd, Japan; [3]Research & Development Division, Hitachi America Ltd.

J-33: Mechanism of Oxygen-induced Hot Cracking of IN738 during Additive Manufacturing: *KenHee Ryou*[1]; Boryung Yoo[1]; Pyuck-Pa Choi[1]; [1]Korea Advanced Institute of Science and Technology

J-36: Tailoring the Preferred Texture of SS316L & IN718 in Laser Bed Powder Fusion: *Prosenjit Biswas*[1]; Ji Ma[1]; [1]University of Virginia

J-37: The Development of a Directed Energy Deposition (DED) Printability Framework for Improving Part Density and Performance in a 316L Stainless Steel: *Matthew Vaughan*[1]; Michael Elverud[1]; Jiahui Ye[1]; Peter Marcos[1]; Raiyan Seede[1]; Sean Gibbons[2]; Raymundo Arroyave[1]; Alaa Elwany[1]; Ibrahim Karaman[1]; [1]Texas A&M University; [2]Air Force Research Laboratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Nano/Micro-mechanics and Length-scale Phenomena — Poster Session

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

Program Organizers: Meysam Haghshenas, University of Toledo; Robert Lancaster, Swansea University; Andrew Birnbaum, US Naval Research Laboratory; Jordan Weaver, National Institute of Standards and Technology; Aeriel Murphy-Leonard, Ohio State University

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chair: Meysam Haghshenas, University of Toledo

J-38: A Small Punch Test Study of Additively Manufactured AlSi10Mg: *Ziv Ungarish*[1]; Matan Tubul[1]; Tal Yehuda[1]; [1]Nuclear Research Center Negev

J-39: Crack-free Three-dimensional Electrical Interconnects 3D Printed on Soft PDMS Substrates: *Jacob Brenneman*[1]; Derya Tansel[1]; Gary Fedder[1]; Rahul Panat[1]; [1]Carnegie Mellon University

J-41: Effects of Processing Parameters on Residual Stresses in Commercially Pure Ti: *Claire Adams*[1]; Kellen Traxel[1]; Amit Bandyopadhyay[1]; David Field[1]; [1]Washington State University

J-42: Investigating Microstructural Features of 304L Stainless Steel Friction-stir Weld with Indentation Methods: *Michael Maughan*[1]; Nicolene van Rooyen[1]; Madhumanti Bhattacharyya[1]; Indrajit Charit[1]; [1]University of Idaho

J-43: Microstructure Characterization of As-sprayed and Post-processed Cold-

spray Materials: *Ryan Cochran*[1]; Shiraz Mujahid[1]; Yubraj Paudel[1]; Kyle Considine[1]; Hongjoo Rhee[1]; [1]Center for Advanced Vehicular Systems at Mississippi State University

J-44: Probing the Mechanism of Healing Micropores in Additive Manufacturing Al-Li Alloys Using High Resolution X-ray Computed Tomography: Junsheng Wang[1]; *Chenpeng Xue*[1]; [1]Beijing Institute of Technology

J-45: The Effect of Extrusion and Aging on the Mechanical Properties of Additively Manufactured AlSi10Mg: *Adi Benartzy*[1]; Gal Hadad[1]; Arie Bussiba[2]; Moshe Nahmany[2]; [1]Ben Gurion University; [2]N.R.C.N

NUCLEAR MATERIALS

Advanced Characterization and Modeling of Nuclear Fuels: Microstructure, Thermo-physical Properties — Poster Session

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

Program Organizers: David Frazer, Idaho National Laboratory; Fabiola Cappia, Idaho National Laboratory; Tsvetoslav Pavlov, Idaho National Laboratory; Peter Hosemann, University of California

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chairs: David Frazer, Idaho National Laboratory ; Tsvetoslav Pavlov, Idaho National Laboratory; Fabiola Cappia, Idaho National Labortory; Peter Hosemann, University of California, Berkeley

---

N-1: 3D Reconstruction and Quantification of Oxide Nano-porosity in Zirconium Alloys: *Hongliang Zhang*[1]; Adrien Couet[1]; Taeho Kim[1]; William Howland[2]; [1]University of Wisconsin-Madison; [2]Naval Nuclear Laboratory

N-2: An Experimentally Validated Mesoscale Model for the Effective Thermal Conductivity of UZr Fuels: Monika Singh[1]; Timothy Coffman[1]; Fergany Badry[1]; Moiz Butt[1]; Mohammed Gomaa Abdoelatef[1]; Katie Anderson[2]; James Jewell[2]; Rory R. Kennedy[2]; Collin J. Knight[2]; Mitchell Meyer[2]; Sean McDeavitt[1]; *Karim Ahmed*[1]; [1]Texas A&M University; [2]Idaho National Laboratory

N-4: Atomistic Modeling of Transport Properties and Interaction with Point Defects of a-U Tilt Grain Boundaries: *Khadija Mahbuba*[1]; Benjamin Beeler[1]; Andrea Jokisaari[2]; [1]North Carolina State University; [2]Idaho National Laboratory

N-5: Characterization of Additively Manufactured UO2 Fuel Pellets with Pulsed Neutron Techniques and 450 keV X-ray CT: *Sven Vogel*[1]; Donald W. Brown[1]; Bjorn Clausen[1]; Alexander M. Long[1]; Erik B. Watkins[1]; D. Cort Gautier[1]; Cheryl Kendall[1]; Cheng Sun[2]; Chuting Tan[2]; [1]Los Alamos National Laboratory; [2]Idaho National Laboratory

N-6: Characterization of Nuclear Materials from the Millimeter to the Nanometer: *Robert Ulfig*[1]; Anne-Sophie Robbes[1]; Paula Peres[1]; [1]Cameca Instruments Inc.

N-7: Investigation of the Impact the 3D Fission Product Structure has on the Local Thermal Conductivity in FBR MOX Fuel: *Casey McKinney*[1]; Tsvetoslav Pavlov[2]; Assel Aitkaliyeva[1]; [1]University of Florida; [2]Idaho National Laboratory

CHARACTERIZATION

Advanced Real Time Imaging — Poster Session

Sponsored by: 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 Engergy Technology Laboratory; David Alman, National Energy Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki Shibata, 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; Pranjal Nautiyal, University of Pennsylvania

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

L-1: Ultrasonic Doppler Velocimetry Technique for Investigation of Flows in Liquid Metal Batteries: Jonathan Cheng[1]; Ibrahim Mohammad[1]; *Bitong Wang*[1]; Jarod Forer[1]; Douglas Kelley[1]; [1]University of Rochester

---

BIOMATERIALS

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

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

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

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chair: Changxue Xu, Texas Tech University

K-1: Gingerol – Curcumin Loaded Magnesium – Zinc Doped Calcium Phosphate Based Scaffolds and Coatings for Bone Tissue Engineering Applications: *Arjak Bhattacharjee*[1]; Susmita Bose[1]; [1]W. M. Keck Biomedical Materials Research Lab,Washington State University

---

MATERIALS DESIGN

Advances in Titanium Technology — Poster Session

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

Program Organizers: Yufeng Zheng, University of Nevada-Reno; Zachary Kloenne, Ohio State University; Fan Sun, PSL Research University; Stoichko Antonov, National Energy Technology Laboratory; Rongpei Shi, Lawrence Livermore National Laboratory

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

M-1: About Dislocation Density Distribution in Titanium Alloys after Hot-deformation in the \945 + \946 Domain: *Matheus Brozovic Gariglio*[1]; Nathalie Bozzolo[1]; Daniel Pino Muñoz[1]; [1]Mines ParisTech – PSL University, CEMEF – Centre for Material Forming

M-2: Anisotropy in Tensile Properties of Ti-10V-2Fe-3Al Metastable β Alloy : An Effect of the β Structure: *Tiphaine Giroud*[1]; Samuel Hemery[1]; Patrick Villechaise[1]; [1]Institut Pprime - ENSMA

M-4: Microstructural Evolution and Mechanical Properties of Additively Manufactured Commercially-pure Grade 2 Titanium after Post-process Heat Treatment: *Ralf Fischer*[1]; Greyson Harvill[1]; Hossein Talebinezhad[1]; Barton Prorok[1]; [1]Auburn University

M-5: Microstructure in the Selective Laser Melted Ti-48Al-2Cr-2Nb Alloy: *Dian Li*[1]; Wenrui Zhao[1]; Xing Zhang[2]; Yiliang Liao[2]; Yufeng Zheng[1]; [1]University of Nevada, Reno; [2]Iowa State University

M-7: Young Modulus and Micro-characterization of Ternary Titanium Alloys for Biomedical Applications: *Marcos da Silva*[1]; Carlos Grandini[2]; Raul de Araújo[1]; Pedro Bazaglia Kuroda[2]; [1]IFSP; [2]Unesp

---

MATERIALS DESIGN

AI/Data Informatics: Computational Model Development, Validation, and Uncertainty Quantification — Poster Session

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Dennis Dimiduk, BlueQuartz Software LLC; Darren Pagan, Pennsylvania State University; Anthony Rollett, Carnegie Mellon University; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

M-8: A Data-driven Surrogate Model for Fast Predicting the U-10Mo Fuel Grain Structures during the Hot Rolling and Annealing Processes: *Yucheng Fu*[1]; William Frazier[1]; Kyoo Choi[1]; Lei Li[1]; Zhijie Xu[1]; Vineet Joshi[1]; Ayoub Soulami[1]; [1]Pacific Northwest National Laboratory

M-9: Determination of Aluminum Mechanical Properties Using Small Punch Test and Advanced Numerical Methods: *Matan Tubul*[1]; Ziv Ungarish[1]; Shay Amar[1]; Eytan Kochavi[2]; [1]Negev Nuclear Research Center; [2]Ben Gurion University of the Negev

(on Sabbatical leave from NRCN)

M-10: Investigating the Suitability of Tableau Dashboards and Decision Trees for Particulate Materials Science and Engineering Data Analysis: *Bryer Sousa*[1]; Richard Valente[1]; Aaron Krueger[1]; Eric Schmid[1]; Danielle Cote[1]; Rodica Neamtu[1]; [1]Worcester Polytechnic Institute

M-11: Machine Learning Based Prediction of Melting Temperature and Coefficient of Thermal Expansion Coefficient Using SciGlass Datasets: *Jong Ho Kim*[1]; [1]Rist

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; Garritt Tucker, Colorado School of Mines; Ebrahim Asadi, University of Memphis; Bryan Wong, University of California, Riverside; Sam Reeve, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Adrian Sabau, Oak Ridge National Laboratory

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chair: Mohsen Asle Zaeem, Colorado School of Mines

M-12: Discrete Stochastic Model of Point Defect-dislocation Interaction for Simulating Dislocation Climb: *Cameron Mcelfresh*[1]; Yinan Cui[2]; Sergei Dudarev[3]; Giacomo Po[4]; Sylvie Aubry[5]; Nicolas Bertin[5]; Jaime Marian[1]; [1]University of California, Los Angeles; [2]Tsinghua University; [3]United Kingdom Atomic Energy Authority, Culham Science Centre; [4]University of Miami; [5]Lawrence Livermore National Laboratory

M-13: Finite Element Level-set Methods to Study Microstructural Evolution during Recrystallization and Grain Growth: *Daniel Pino Munoz*[1]; Marc Bernacki[1]; Nathalie Bozzolo[1]; [1]Mines ParisTech, PSL University

M-14: Smoke Detection in Ladle Hot Repair Process Based on Convolution Neural Network: *Yanming Zhang*[1]; Jialu Wu[1]; Mujun Long[1]; Wei Guo[1]; Huamei Duan[1]; Dengfu Chen[1]; [1]Chongqing University

BIOMATERIALS

Biological Materials Science — Poster Session

Sponsored by: TMS Functional 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; Hannes Schniepp, William & Mary

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chairs: Ning Zhang, The University of Alabama; Jeffrey Bates, The University of Utah

---

K-2: Alternative Method for Diagnosing Cystic Fibrosis Using Fluoresce: *Cassidy Holdeman*[1]; [1]University of Utah

K-3: Bio-inspired Impact Resistant Coatings: *Taige Hao*[1]; Wei Huang[1]; Robin James[1]; Paige Romero[1]; Taifeng Wang[1]; Devis Montroni[1]; David Kisailus[1]; [1]University of California, Irvine, Materials Science and Engineering Department

K-4: Biodegradable Hotmelt Pressure Sensitive Adhesive: *Amelia Heiner*[1]; [1]University of Utah

K-5: Biodegradable Superabsorbent Polymers: Kaylon Draney[1]; *Jeffrey Bates*[1]; [1]University of Utah

K-6: Biomedical Surface Treatment of Non-toxic Ti-Zr-Mo-Sn Shape Memory Alloys by Micro-arc Oxidation: *Yeon-Wook Kim*[1]; [1]Keimyung University

K-9: Effect of Nb, Zr and Ta Content on Properties of Ti-Nb-Ta-Zr-O: *Kristián Šalata*[1]; Dalibor Preisler[1]; Lucie Bodnárová[2]; Petr Harcuba[1]; Miloš Janecek[1]; Josef Stráský[1]; [1]Charles University, Department of Physics of materials; [2]Institute of Thermomechanics, Czech Academy of Sciences

K-11: Impact Resistance for Wind Energy Blades Using Biomimetic Helicoidal Structure: Paige Romero[1]; Robin James[1]; David Kisailus[1]; *Naresh Kakur*[1]; [1]University of California, Irvine

K-12: Preliminary Characterization of the Structure and Composition of Brazilian Cattle Hooves for Bioinspiration: *Wendell Bruno Almeida Bezerra*[1]; Benjamin Lazarus[2]; Fernanda Santos da Luz[1]; Ulisses Oliveira Costa[1]; Sergio Neves Monteiro[1]; Fabio da Costa Garcia Filho[1]; [1]Military Institute Of Engineering - Ime; [2]UCSD

K-13: Reinforced Freeze-cast Structures Using Uniform Magnetic Fields: *Josh Fernquist*[1]; Henry Fu[1]; Steven Naleway[1]; [1]University of Utah

---

BIOMATERIALS

BioNano Interfaces and Engineering Applications — Poster Session

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

Program Organizers: Candan Tamerler, University of Kansas; Hendrik Heinz, University of Colorado Boulder; Kalpana Katti, North Dakota State University; Terry Lowe, Colorado School of Mines; Po-Yu Chen, National Tsing Hua University

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

K-14: AuNps Tailored Microneedle Based Point of Care Device Fabrication for Hormonal Sensing: *Shubhangi Shukla*[1]; [1]NCSU

K-15: Potentiometric Immunosensor for the Selective Thyroxine Detection Using Cu-MOF@PANI Composite in Serum Samples: *Mradula Mradula*[1]; Rocky Raj[1]; Sunita Mishra[1]; [1]CSIR-Central Scientific Instruments Organization

---

CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2022 — Poster Session

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

Program Organizers: Mingming Zhang, Wood Mackenzie; Jian Li, CanmetMATERIALS; 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, DEVCOM U.S. Army Research Laboratory; Rajiv Soman, Eurofins EAG Materials Science LLC; Zhiwei Peng, Central South University

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chair: Rajiv Soman, Eurofins EAG Materials Science LLC

L-3: Analysis of Mechanical Behavior, Failure Mode and Displacement of Concrete Block Structural Masonry Prisms with Variation in Grouting: *Valber Pinheiro*[1]; Jonas Alexandre[2]; Niander Cerqueira[2]; [1]UENF; [2]Centro Universitário Redentor

L-4: Analysis of Mechanical Properties and Curing of Soil-cement Brick with Incorporation of Stone Residue: *Natália Tavares Gomes*[1]; Jonas Alexandre[1]; Niander Cerqueira[2]; [1]UENF; [2]Centro Universitário Redentor

L-5: Analysis of the Influence of Hydrated Lime Addition on Soil-cement Bricks: *Bruno Silva*[1]; Jonas Alexandre[1]; Niander Cerqueira[2]; [1]UENF; [2]Centro Universitário Redentor

L-6: Antifungal Efficacy of AgNPs-Clay Infused into LDPE Films: *Washington Oliani*[1]; Fabio Pusceddu[2]; Duclerc Parra[1]; [1]Nuclear and Energy Research Institute; [2]Santa Cecilia University

L-7: Application of Grinding, Pyrometallurgical Pretreatment and Silver Leaching of Mineral Tailings from the State of Morelos, Mexico: *Jesús Iván Martínez-Soto*[1]; Aislinn M. Teja-Ruiz[1]; Miguel Peréz-Labra[1]; Martín Reyes-Pérez[1]; Gustavo Urbano-Reyes[1]; Victor Reyes-Cruz[1]; José Angel Cobos-Murcia[1]; Julio Cesar Juárez T.[1]; [1]Universidad Autónoma del Estado de Hidalgo

L-8: Ballistic Properties of Novel Epoxy Composite Reinforced with Sedge Fibers (Cyperus malaccensis): Lucas Neuba[1]; Andressa Teixeira[1]; Raí Junio[1]; Matheus Ribeiro[1]; Thuane Silva[1]; Sergio Monteiro[1]; *Wendell Bezerra*[1]; [1]Instituto Militar de Engenharia

L-9: Cause Analysis of Edge Scratch Defects of Cold Rolled Wide Steel Strip in Continuous Annealing Furnace: *He Mingsheng*[1]; Yuan Li[1]; Jun Li[1]; Rongjin Xia[1]; Guangqiang Wu[1]; Rong Du[1]; [1]R&D Center of Wuhan Iron & Steel Co Ltd.

L-10: Characterization and Basic Properties of Vine-root "Heteropisis flexuosa" as Potential Polymer Composite Reinforcement: Juliana Cunha[1]; Lucio Fabio Nascimento[1]; Fernanda da Luz[1]; *Sergio Monteiro*[1]; Valdir da Veiga Junior[1]; Veronica Candido[2]; [1]Instituto Militar de Engenharia; [2]Federal University of Pará

L-12: Characterization of Chiral Spin Structures in Pt/Co/Ni Based Magnetic Superlattices: *Nisrit Pandey*[1]; Maxwell Li[1]; Marc De Graef[1]; Vincent Sokalski[1];

[1]Carnegie Mellon University

L-13: Characterization of Clays from Southern Espírito Santo State in Brazil: *Maria Angélica Sant'Ana*[1]; Mônica Gadioli[1]; [1]CETEM

L-14: Charpy Impact on Polymer Composites Reinforced with Titica Vine Fibers: Juliana Cunha[1]; Lucio Fabio Nascimento[1]; Wendell Bezerra[1]; *Sheron Tavares*[2]; Sergio Monteiro[1]; [1]Military Institute of Engineering; [2]UCSD

L-15: Chemical Analysis of Graphene Oxide Coating on Hemp Fibers for Engineering Application: *Matheus Ribeiro*[1]; Pedro Henrique Da Silveira[1]; Thuane Da Silva[1]; Lucas Neuba[1]; Sergio Monteiro[1]; [1]Military Institute Of Engineering

L-17: Devitrification Behavior of Al-RE based Ternary Metallic Glasses: Emel Erdal[1]; *Doguhan Sariturk*[1]; Can Okuyucu[1]; Ilkay Kalay[2]; Yunus Kalay[1]; [1]Middle East Technical University; [2]Çankaya University

L-18: Effects of Natural Aging on Fique Fabric Reinforced Epoxy Composites: An Analysis by Charpy Impact Energy: Michelle Oliveira[1]; Artur Pereira[1]; Fabio Garcia Filho[1]; Noan Simonassi[1]; Lucio Nascimento[1]; Fernanda da Luz[1]; Sergio Monteiro[1]; *Wendell Bezerra*[1]; [1]Military Institute Of Engineering

L-19: Evaluation of Ballistic Behavior and Natural Aging of Epoxy Matrix Composites and Fique Fabric for Potential Use in Bulletproof Vest: Michelle Oliveira[1]; Fernanda da Luz[1]; André Figueiredo[1]; Sergio Monteiro[1]; *Wendell Bezerra*[1]; [1]Military Institute Of Engineering

L-20: Evaluation of the Mechanical, Physical and Chemical Characteristics of the of AISI 316 Austenitic Stainless Steel: *Niander Cerqueira*[1]; Victor Souza[2]; [1]Centro Universitário Redentor; [2]UENF

L-21: Evaluation of the Projectile's Loss Energy in Epoxy Composites Reinforced with Carnaúba Fibers: Raí Junio[1]; Lucas Neuba[1]; Raphael Reis[1]; Sérgio Monteiro[1]; Lucio Fabio Nascimento[1]; *Wendell Bruno Bezerra*[1]; [1]Military Institute of Engineering

L-25: Incorporation of Waste into Cement Matrices - A Review: Valber Pinheiro[1]; *Niander Cerqueira*[2]; Afonso Azevedo[1]; Jonas Alexandre[1]; [1]UENF; [2]Centro Universitário Redentor

L-26: Influence of Laser Scan Speed on the Diffusion and Vaporization of a Solid-state Electrolyte Produced Using Laser Powder Bed Fusion: *Leanna Hao*[1]; Katherine Acord[1]; Julie Schoenung[1]; [1]UCI

L-28: Influence of the Sand Content on the Physical and Mechanical Properties of Metakaolin-based Geopolymer Mortars: Igor Andrade[1]; Beatryz Mendes[1]; *Leonardo Pedroti*[1]; Carlos Vieira[2]; José Carvalho[1]; [1]Federal University of Viçosa; [2]State University of the Northern Rio de Janeiro

L-29: Investigation of the Use of Modified Polyaminoamide Imidazoline in Epoxy Composites: Artur Camposo Pereira[1]; Michelle Souza Oliveira[1]; Fabio da Costa Garcia Filho[1]; Ulisses Oliveira Costa[1]; Sergio Neves Monteiro[1]; Wendell Bezerra[1]; Noan Simonassi[2]; *Sheron Tavares*[3]; [1]Military Institute of Engineering; [2]Universidade Estadual do Norte Fluminense Darcy Ribeiro; [3]UCSD

L-30: Magnetic, Structure, and Microstructure Properties of (Sm0.12Co0.88)95Hf5-xBx Nano-composites Ribbons: *Imaddin Al-Omari*[1]; A. Raja[2]; T. Adhikary[2]; G.P. Das[2]; S. Ghosh[2]; D.K. Satapathy[2]; A. Oraon[2]; J.E. Shield[3]; S. Aich[2]; [1]Sultan Qaboos University; [2]IIT-Kharagpur; [3]UNL

L-31: Mechanical Analysis of Tensile Strength of PALF Reinforced Epoxy Composite: Pamela Neves[1]; Lucio Fabio Nascimento[1]; Sergio Monteiro[1]; *Wendell*

Bezerra[1]; [1]Military Institute of Engineering

L-32: Mechanical and Microstructural Evaluation of Eco-friendly Geopolymer Produced from Chamotte and Waste Glass: Beatryz Mendes[1]; *Leonardo Pedroti*[1]; José Maria Carvalho[1]; Carlos Maurício Vieira[2]; Igor Klaus Andrade[1]; Pedro Henrique Drumond[1]; [1]Universidade Federal De Vicosa; [2]Universidade Estadual do Norte Fluminense Darcy Ribeiro

L-33: Dynamic-mechanical Analysis of Epoxy Matrix Composites Reinforced with Kenaf Fiber: Thuane da Silva[1]; Matheus Ribeiro[1]; Pedro Henrique Da Silveira[1]; *Wendell Bezerra*[1]; Lucas Neuba[1]; Sergio Monteiro[1]; Lucio Fabio Nascimento[1]; [1]Military Institute of Engineering

L-35: Microstructural and Mechanical Response of CoCrFeNi- FCC Matrix HEA with Addition of Mo: Fabio Garcia Filho[1]; Sergio Monteiro[1]; Wendel Bezerra[1]; *Sheron Tavares*[1]; [1]Military Institute Of Engineering

L-36: Promising Izod Impact Resistance of Novel Epoxy Composites Reinforced with Caranan Fiber: Andressa Souza[1]; Lúcio Nascimento[1]; Sérgio Monteiro[1]; Wendell Bezerra[1]; *Sheron Tavares*[2]; [1]IME; [2]UCSD

L-37: Properties and Microstructure of a Novel TiZrNbVFeCr-based Non-equiatomic HEA: Fabio Garcia Filho[1]; Sergio Monteiro[1]; Wendel Bezerra[1]; *Sheron Tavares*[2]; [1]Military Institute of Engineering; [2]UCSD

L-38: Recycling Glass Packaging into Ceramic Bricks: Geovana Carla Delaqua[1]; *Carlos Maurício Fontes Vieira*[1]; [1]Universidade Estadual do Norte Fluminense Darcy Ribeiro

L-39: Soil-cement Brick (BSC) an Excellent Form of Incorporation of Waste and Mitigation of the Civil Construction Environmental Impact: *Niander Cerqueira*[1]; Jonas Alexandre[2]; [1]Centro Universitário Redentor; [2]UENF

L-40: Study of the Collectorless Flotation Behavior of Galena in the Presence of Ferric Ion: Martín Reyes Pérez[1]; *Jimena Detzamin Trejo Martínez*[1]; Iván Alejandro Reyes Domínguez[2]; Mizraim Uriel Flores Guerrero[3]; Elia G. Palacios Beas[4]; Miguel Pérez Labra[1]; Francisco Raúl Barrientos Hernández[1]; Aislinn Michelle Teja Ruiz[1]; Julio Cesar Juárez Tapia[1]; [1]Universidad Autonoma Del Estado De Hidal; [2]Universidad Autónoma de San Luis Potosí; [3]Universidad Tecnológica de Tulancingo; [4]Instituto Politécnico Nacional, IPN, ESIQIE

L-41: Study of the Potential of Clays at the Ceramist Pole of Campos dos Goytacazes – RJ, for the Production of Metakaolin: *Niander Cerqueira*[1]; Valber Pinheiro[2]; Jonas Alexandre[2]; Afonso Azevedo[2]; Victor Souza[1]; Leonardo Pedroti[3]; [1]Centro Universitário Redentor; [2]UENF; [3]UFV

L-42: Surface Modification of Jamesonite during Flotation; Effect of the Presence of Ferric Ion: Martín Reyes Pérez[1]; *Jazmin Terrazas Medina*[1]; Iván Alejandro Reyes Domínguez[2]; Mizraim Uriel Flores Guerrero[3]; Julio Cesar Juárez Tapia[1]; Elia G. Palacios Beas[4]; Miguel Pérez Labra[1]; Aislinn Michelle Teja Ruiz[1]; Francisco Raúl Barrientos Hernández[1]; [1]Universidad Autonoma Del Estado De Hidal; [2]Universidad Autónoma de San Luis Potosí; [3]Universidad Tecnológica de Tulancingo; [4]Instituto Politécnico Nacional, IPN, ESIQIE

L-43: The Collectorless Flotation of Pyrargyrite, Surface Analysis via FTIR: Martín Reyes Pérez[1]; *Zaida Peralta García*[1]; Iván Alejandro Reyes Domínguez[2]; Mizraim Uriel Flores Guerrero[3]; Elia G. Palacios Beas[4]; Julio Cesar Juárez Tapia[1]; Miguel Pérez Labra[1]; Aislinn Michelle Teja Ruiz[1]; Francisco Raúl Barrientos Hernández[1]; [1]Universidad Autonoma Del Estado De Hidal; [2]Universidad Autónoma de San Luis Potosí; [3]Universidad Tecnológica de Tulancingo ; [4]Instituto Politécnico Nacional,

IPN, ESIQIE

L-44: The Elastic Constants Measurement in a Medical Ti-6al-4v Eli Alloy by Using Ultrasonic Means: *Hector Carreon*[1]; Maria Carreon-Garcidueñas[1]; [1]Universidad Michoacana Universidad Michoacana

L-45: Thermal Analysis of Graphene Oxide Coating on Hemp Fibers for Engineering Application: *Matheus Ribeiro*[1]; Pedro Henrique Da Silveira[1]; Thuane Da Silva[1]; Lucas Neuba[1]; Sergio Monteiro[1]; [1]Military Institute of Engineering

L-46: Thermal Analysis of PALF Reinforced Epoxy Composite TGA: Pamela Neves[1]; Lucio Fabio Nascimento[1]; Sergio Monteiro[1]; Wendell Bezerra[1]; *Sheron Tavares*[2]; [1]Military Institute of Engineering; [2]University of California San Diego

L-47: Thermal and Thermomechanical Characterization of Brazilian Cattle Hooves: *Wendell Bruno Almeida Bezerra*[1]; Benjamin Lazarus[2]; Fernanda Santos da Luz[1]; Ulisses Oliveira Costa[1]; Sergio Neves Monteiro[1]; Fabio da Costa Garcia Filho[1]; [1]Military Institute Of Engineering - Ime; [2]UCSD

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Poster Session

Sponsored by: TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee

Program Organizers: Vahid Attari, Texas A&M University; Sara Kadkhodaei, University Of Illinois At Chicag; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Tourret, IMDEA Materials Institute; James Morris, Ames Laboratory

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chairs: Vahid Attari, Texas A&M University; Prashant Singh, Ames Laboratory/US Department of Energy; Mira Tadarova, Max-Planck-Institut für Eisenforschung GmbH

O-1: A CALPHAD Approach to Alloy Design for Printability and Performance When Additively Manufactured: *Soumya Mohan*[1]; Branden Kappes[2]; Akansha Singh[3]; Ben Rafferty[4]; Jeremy Iten[4]; Sridhar Seetharaman[5]; Aaron Stebner[1]; [1]Georgia Institute of Technology; [2]KMMD, LLC; [3]Shell Technology Center; [4]Elementum 3D; [5]Arizona State University

O-3: A Study on the CFD Simulation of Microbubbles Generation and Movement during the Mineral Flotation Process: *Guihong Han*[1]; Hao Wu[1]; Yanfang Huang[1]; Shengpeng Su[1]; Bingbing Liu[1]; [1]Zhengzhou University

O-4: Analysis of the Kinetic Process of Carbothermal Reduction of ZnFe2O4: *Ning Mao*[1]; Chengbo Wu[1]; yang Wang[1]; Zhihui Guo[1]; [1]Chongqing University

O-5: Atomistic Scale Studies of Shape Memory Ceramic Bismuth Ferrite (BiFeO3): *Henan Zhou*[1]; Doyl Dickel[1]; Michae Baskes[2]; Sungkwang Mun[1]; Mohsen Zaeem[3]; [1]Center for Advanced Vehicular Systems; [2]University of North Texas; [3]Colorado School of Mines

O-6: Dehydrating MgO Surface to Improve Mg Corrosion Resistance: Insights From Atomistic Simulations: *Chi Zhang*[1]; Xin Li[1]; Junsheng Wang[1]; [1]Beijing Institute

of Technology

O-7: Identification of the Eutectic Composition in the Multicomponent Systems with the High Throughput CALPHAD Approach: Jize Zhang[1]; *Rui Wang*[1]; Yu Zhong[1]; [1]Worcester Polytechnic Institute

O-8: First-principles Calculations and Thermodynamics Modeling of the Ca-Zn System: *Chuliang Fu*[1]; Bicheng Zhou[1]; [1]University of Virginia

O-9: Formation of Grain Boundaries during Polycrystalline Solidification of hcp Alloys: Ahmed Kaci Boukellal[1]; Maral Sarebanzadeh[2]; Alberto Orozco-Caballero[3]; Federico Sket[1]; Javier Llorca[2]; *Damien Tourret*[1]; [1]IMDEA Materials Institute, Madrid (Spain); [2]IMDEA Materials Institute and Department of Materials Science, Polytechnic University of Madrid/Universidad Politécnica de Madrid, E.T.S. de Ingenieros de Caminos, Madrid (Spain); [3]Department of Mechanical Engineering, Chemistry and Industrial Design, Polytechnic University of Madrid/Universidad Politécnica de Madrid, E.T.S. Ingeniería y Diseño Industrial, Madrid (Spain)

O-10: Grain Precipitation and Growth Model of TiN Inclusions in 22MnB5 Steel: *Haohao Zhang*[1]; Jialu Wu[1]; Wei Guo[1]; Songyuan Ai[1]; Mujun Long[1]; Huamei Duan[1]; Dengfu Chen[1]; [1]Chongqing University

O-11: Numerical Modelling of Powder Spreading, Meltpool Dynamics, and Grain Structure Evolution during Additive Manufacturing: *Daniel Dreelan*[1]; Gowthaman Parivendhan[1]; Philip Cardiff[1]; Alojz Ivankovic[1]; David Browne[1]; [1]University College Dublin

O-12: Quantitative Electrochemical Phase-field Modeling for Corrosion of Engine Materials at High Temperature: *Xueyang Wu*[1]; Michael Tonks[1]; [1]University of Florida

O-13: Revisit the VEC Criterion with High-throughput Ab Initio Calculations: A Case Study with Al-Co-Cr-Fe-Ni System: *Songge Yang*[1]; Yu Zhong[1]; [1]Worcester Polytechnic Institute

O-14: Simulation of Steam Film Motion Process on the Surface of Zirconium Alloy Rod: *Juyi Pu*[1]; Xiao Ping Liang[1]; Shuang Liang[1]; Bai Feng Luan[1]; [1]Chingqing University

O-15: Structural Ordering and Dynamics of Cu-Ag Chemically Heterogeneous Solid-liquid Interface: *Boqiang Wu*[1]; [1]School of materials science and engineer,Shanghai Jiao Tong University

O-16: Ternary Phase Diagram Determination for Understanding and Modeling of the TCP Phase Formation in Ni-based Superalloys: *Chuangye Wang*[1]; Hui Sun[2]; ShunLi Shang[2]; Zi-Kui Liu[2]; Ji-Cheng Zhao[1]; [1]University of Maryland; [2]Pennsylvania State University

O-17: The Electronic Structures of Anosovite with Different Components: *Pan Deng*[1]; Liang Li[1]; Dachun Liu[1]; Xiumin Chen[1]; [1]Kunming University of Science and Technology

O-18: Thermal Vibration Effects on Physical Gas Adsorption: A Computational Study: *Ziyi Wang*[1]; Claire Saunders[1]; Camille Bernal[1]; Cullen Quine[1]; Brent Fultz[1]; [1]Caltech

O-19: Thermodynamic Assessment of the SiO2-Y2O3 System: *Wenke Zhi*[1]; Fei Wang[1]; Xiaoyi Chen[1]; Bin Yang[1]; Yongnian Dai[1]; Yang Tian[1]; [1]Kunming University of Science and Technology

O-20: Uncertainty Quantification and Propagation in CALPHAD Modeling: *Brandon Bocklund*[1]; Richard Otis[2]; Zi-Kui Liu[1]; [1]Pennsylvania State University; [2]Jet

Propulsion Laboratory, California Institute of Technology

ADDITIVE TECHNOLOGIES

Foundations of Additive Manufacturing Course – Project Posters — Poster Session

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

J-46: A CFD Model to Predict the Thermo-fluid Properties of AlCoCrFeNi High Entropy Alloy in Powder-bed Laser Beam Additive Manufacturing: *Chayan Das*[1]; Praveen Sreeramagiri[1]; Ganesh Balasubramanian[1]; [1]Lehigh University

SPECIAL TOPICS

Late News Poster Session — Additive Technologies

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

J-49: Data-driven Quality Control of Laser Directed Energy Deposition (DED): *Michael Juhasz*[1]; Melanie Lang[1]; Jeff Riemann[1]; [1]FormAlloy Technologies, Inc.

J-51: Laser Metal Deposition (LMD) and High-speed Laser Cladding – Perspectives for Brake Discs: *Eliana Fu*[1]; Sabrina Vogt[1]; Marco Goebel[1]; [1]Trumpf

J-52: Towards a Magnetic Field Induced Strain in Additive Manufactured NiMnGa Shape Memory Alloys: *Robert Chulist*[1]; Anna Wójcik[1]; Maciej Kowalczyk[2]; Lukasz Zrodowski[2]; Norbert Schell[3]; Rafal Wróblewski[2]; Wojciech Maziarz[1]; [1]IMMS PAS; [2]Warsaw University of Technology; [3]Helmholtz-Zentrum Geesthacht

J-53: Uncovering the Deformation Pathways of an AM Ti Alloy with Engineered Duplex Microstructure: *Jenniffer Bustillos*[1]; Atieh Moridi[1]; [1]Cornell University

SPECIAL TOPICS

Late News Poster Session — Biomaterials

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

K-16: DFT Screening of Exciton Delocalization and Coupling Properties of Dyes for Aggregate Systems: *Maia Ketteridge*[1]; German Barcenas[1]; Austin Biaggne[1]; Lan Li[1]; [1]Boise State University

K-17: Electrochemical Thyroxine Detection Using Copper Metal Organic Framework and Polyaniline Composite: *Mradula Mradula*[1]; [1]CSIR-Central Scientific Instruments Organization

K-18: Stretchable-ion Responsive Hydrogel and Its Rheology: *Abhishek Pachauri*[1]; Jeffrey Bates[1]; [1]University of Utah

SPECIAL TOPICS

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

L-51: An Innovative Mass Spectrometer Simplifies Elemental Characterization of Metals: *Ellen Williams*[1]; Jonathan Putman[1]; Jeffrey Williams[1]; [1]Exum Instruments

L-52: Application of HRTEM and LTEM for Investigations of Microstructure and Magnetic Domain Structure of Nanocrystalline Fe Based Soft Magnetic Materials after Ultra-rapid Annealing Process: *Wojciech Maziarz*[1]; Anna Wójcik[1]; Robert Chulist[1]; Maciej Szlezynger[1]; Maciej Kowalczyk[2]; Aleksandra Kolano-Burian[3]; Pawel Czaja[1]; [1]Institute of Metallurgy and Materials Science, Polish Academy of Sciences; [2]The Faculty of Materials Science and Engineering, Warsaw University of Technology; [3]Lukasiewicz Research Network—Institute of Non-Ferrous Metals

L-53: Computer Vision for Microvia Characterization: *Nikhil Damani*[1]; Pragna Bhaskar[1]; Mohan Kathaperumal[1]; Madhavan Swaminathan[1]; [1]3D Systems Packaging Research Center Georgia Institute of Technology

L-54: Correlative Microscopy and Applied Statistics – Development of a Simultaneous Electron Diffraction and Energy Dispersive X-ray Spectroscopy Data Analysis Method to Understand Interface Populations: *Chris Bilsland*[1]; Andrew Barrow[2]; Ben Britton[3]; [1]Imperial College London; [2]Rolls-Royce; [3]Imperial College London/ University of British Columbia

L-55: Digital Image Processing for the Analysis of Spray Coated Porous Films: *Noah McAllister*[1]; Robert Green-Warren[1]; Jae-Hwang Lee[2]; Assimina Pelegri[1]; Jonathan Singer[1]; [1]Rutgers School of Engineering; [2]University of Massachusetts Amherst

L-56: High Resolution STEM and LM STEM DPC Studies of Ni-Mn-Ga Based Precursor Powders and 3D Printed Magnetic Shape Memory Alloys: *Pawel Czaja*[1]; Anna Wójcik[1]; Robert Chulist[1]; Maciej Kowalczyk[2]; Wojciech Maziarz[1]; [1]Institute of Metallurgy and Materials Science PAS; [2]The Faculty of Materials Science and Engineering Warsaw University of Technology

L-57: Enhancement of Electrical, Thermal and Mechanical Properties of Epoxy-carbon Nanotube/Egg Shell Ash Particles Nanocomposites: *Suleiman Hassan*[1]; Sunday Aigbodion[2]; [1]Nigerian Institute of Mining and Geosciences; [2]University of Nigeria, Nsukka, Nigeria

L-58: Experimental and Computational Investigations of TiIrB: A New Ternary Boride with $Ti_{1+x}Rh_{2-x+y}Ir_{3-y}B_3$-type Structure: *Kate Gibson*[1]; Jan Scheifers[1]; Boniface Fokwa[1]; [1]University of California, Riverside

L-59: Seeing More with Machine Learning and Electron Backscatter Diffraction (EBSD): Tom McAuliffe[1]; David Dye[1]; *Thomas Britton*[2]; [1]Imperial College London; [2]University of British Columbia

L-60: Study of the Martensitic Transformation by Deformation of Traction in the Steels AISI 304 through Electrical Resistivity: *Edgar Apaza Huallpa*[1]; Helio Goldenstein[2]; Esequiel Nicolas Collado Cardenas[1]; Elmer Antonio Mamani Calcina[1]; Juan Carlos Negron Lopez[1]; Lino Reynaldo Quispe Cardenas[1]; Alejandro Boris Marquez Guevara[1]; Erick Omar Tunqui Labra[1]; [1]Universidad Nacional de San Agustin de Arequipa, Perú; [2]Universidade de São Paulo

L-61: Thermogravimetric and FTIR Analysis of Amazonian Oils: Luana Demosthenes Demosthenes[1]; Waldeir Silva Dias[2]; Foluke Salgado de Assis[3]; Kleynice kazumy de lima Yamaguchi[4]; Sergio Neves Monteiro[1]; *Wendell Bruno de Almeida Bezerra*[1]; [1]Military Institute of Engineering (IME); [2]Universidade do Estado do Amazonas;

[3]Instituto de Pesquisas da Marinha; [4]Universidade Federal do Amazonas

L-62: X-ray Tomography In-situ Mechanical Testing: *Alex Arzoumanidis*[1]; [1]Psylotech

L-63: XRD and SEM Characterization of Amazon Biomass Residues: Euterpe Oleracea, Theobroma Grandiflorum and Astrocaryum Vulgare Mart: Luana Demosthenes Demosthenes[1]; Waldeir Silva Dias[2]; Foluke Salgado de Assis[3]; Kleynice kazumy de lima Yamaguchi[4]; Sergio Monteiro[1]; *Wendell Bruno de Almeida Bezerra*[1]; [1]Military Institute of Engineering (IME); [2]Universidade do Estado do Amazonas; [3]Instituto de Pesquisas da Marinha; [4]Universidade Federal do Amazonas

SPECIAL TOPICS

Late News Poster Session — Materials Design

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

M-25: AI-based Design of Daytime Radiative Cooling Materials with Record Temperature Reduction: *Quang-Tuyen Le*[1]; Sih-Wei Chang[2]; Huyen-Anh Phan[1]; An-Chen Yang[3]; Nan-yow Chen[3]; Hsueh-Li Chen[2]; Yu-Chieh Lo[1]; Dehui Wan[4]; [1]National Yang Ming Chiao Tung University; [2]National Taiwan University; [3]National Center for High-Performance Computing, NARLabs, Taiwan; [4]National Tsing Hua University

M-26: Combined Experimental and DFT Computational Study of NiTiZrCu High Temperature Shape Memory Alloy: *Tapasendra Adhikary*[1]; Bharat Charan Marupalli[1]; Gourab Bhattacharya[1]; Akash Oraon[1]; Banty Kumar[1]; Shampa Aich[1]; [1]IIT Kharagpur

M-27: Machine Learning-enabled Framework for the Screening of Hydrogen Storage Materials: *Amit Bundela*[1]; Rahul R[1]; [1]Indian Institute of Technology (Indian School of Mines) Dhanbad

M-28: Uncertainty Quantification Using Thermo-Calc's TC-Python Package: *Giancarlo Trimarchi*[1]; Masoomeh Ghasemi[1]; Qing Chen[1]; [1]Thermo-Calc Software AB

SPECIAL TOPICS

Late News Poster Session — Nuclear Materials

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

N-39: Assessing Void Swelling Resistance of Internal Reactor Materials with an Ultrarapid Photoacoustic Technique: *Nouf Almousa*[1]; Benjamin Dacus[1]; Kevin Woller[1]; Ji Ho Shin[2]; Changheui Jang[3]; Michael Short[1]; [1]Massachusetts Institute of Technology; [2]Korea Advanced Institute for Science and Technology ; [3]Korea Advanced Institute for Science and Technology

N-41: Effect of the Surface Roughness of Tungsten on the Sputtering Yield Under Helium Irradiation: A Molecular Dynamics Study: *Hyeonho Kim*[1]; Kunok Chang[1]; [1]Kyung Hee University

N-42: Fabrication and Phase Analysis of U_3Si_2 and UB_2 Fuel Composites with Al and Al_2O_3 Strengthening Additions: *Geronimo Robles*[1]; Joshua White[2]; Elizabeth

Sooby[1]; [1]University of Texas at San Antonio; [2]Los Alamos National Laboratory

N-43: Nanoindentation Creep Testing on Austenitic Alloys: *Tianyi Chen*[1]; [1]Oregon State University

N-44: Oxidation and Microstructural Characterization of Tristructural Isotropic Particles (TRISO) in High Temperature Mixed Gas Atmospheres: *Katherine Montoya*[1]; Brian Brigham[1]; Tyler Gerczak[2]; Elizabeth Sooby[2]; [1]University of Texas at San Antonio; [2]Oak Ridge National Laboratory

N-46: ZrO2 Corrosion Layers and Their Grain Boundary Networks: *Aaron Chote*[1]; [1]Imperial College, London

---

SPECIAL TOPICS

Late News Poster Session — Physical Metallurgy

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

O-40: Effects of Alloying Elements on Stability of ”-Ni3Nb Phase in Nickel Based Alloy: *Kako Tokutomi*[1]; Satoru Kobayashi[1]; [1]Tokyo Institute of Technology

O-41: Fe-rich Metastable Multi-principal Element Alloys: *James Frishkoff*[1]; Nathan Brown[1]; Madeline Rivera[1]; Amy Clarke[1]; Kester Clarke[1]; [1]Colorado School of Mines

O-43: Microstructural Evolution during Deformation of 1 GPa Ultrahigh Strength-high Ductility Combination Austenitic Low Density Steel: *Devesh Misra*[1]; Jaehyun Kim[1]; L. Wei[2]; [1]The University of Texas at El Paso; [2]Shanghai Jiatong University

O-44: The Design Strategy and Creep Properties of Cr-free Model NiCo-based Superalloys: *Victoria Tucker*[1]; Sae Matsunaga[1]; Michael Titus[1]; [1]Purdue University

O-45: The Validity of Using the Hollomon-Jaffe Parameter to Predict Hardness of Tempered Low-carbon High-performance Stainless-steel Alloys for Nuclear Applications: *Shmuel Samuha*[1]; Jeff Bickel[2]; Thomas Lienert[3]; James Valdez[3]; Tarasankar DebRoy[4]; Tuhin Mukherjee[4]; Stuart Maloy[3]; Peter Hosemann[2]; [1]University of California, Berkeley Nuclear Engineering, and NRCN; [2]University of California, Berkeley Nuclear Engineering; [3]Los Alamos National Laboratory; [4]The Pennsylvania State University

---

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — Poster Session

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

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

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

N-9: Galvanic Corrosion in Containment Materials: *Nicholas Adams*[1]; Kerry Rippy[1];

Liam Witteman[1]; Judith Vidal[1]; [1]NREL

N-10: Measurement of Vapor Pressure of UCl3 in NaCl-MgCl2-UCl3 via Transpiration Experiments: *Jacob Yankey*[1]; Easton Sadler[1]; Marisa Monreal[2]; Matt Jackson[2]; Scott Parker[2]; Suhee Choi[1]; Mario Gonzalez[1]; Michael F. Simpson[1]; [1]University of Utah; [2]Los Alamos National Laboratory

N-11: Methods for Recycle of Uranium in Molten Salt Reactor Fuel: *Claire Perhach*[1]; [1]Caltech

N-12: Molten Salt Corrosion and Irradiation Behaviors of Cladded and Surface-treated SS316H: Matthew Weinstein[1]; Hongliang Zhang[1]; Cody Falconer[1]; William Doniger[1]; Louis Bailly-Salins[1]; Alex Nelson[1]; Kumar Sridharan[1]; *Adrien Couet*[1]; [1]University of Wisconsin-Madison

N-13: Multi-parametric Studies of Graphite Compatibility with Fluoride Salt: *Randi Mazza*[1]; Stephen Raiman[1]; [1]Texas A&M University

N-14: Process Optimization for the Purification of Molten Fluoride Salts via Gas Sparging: *Kyle Williams*[1]; Kimberly Zabava[1]; Stephen Raiman[1]; [1]Texas A&M University

N-15: Revealing Local Ionic Metal Structures in Molten Salt Environments Applying X-ray Absorption Spectroscopy: *Luis Betancourt*[1]; Yang Liu[1]; Mehmet Topsakal[1]; Ruchi Gakhar[2]; Michael Woods[2]; Phillip Halstenberg[3]; Santanu Roy[4]; James Wishart[1]; Vyacheslav Bryantsev[4]; Anatoly Frenkel[1]; Simerjeet Gill[1]; [1]Brookhaven National Laboratory; [2]Idaho National Laboratory; [3]University of Tennessee Knoxville; [4]Oak Ridge National Laboratory

N-16: Robust and Standardized High-temperature Molten Chloride Salt Reference Electrode: *Suhee Choi*[1]; Jim Steppan[2]; Michael Simpson[1]; [1]The University of Utah; [2]HiFunda LLC

N-17: Tellurium Cracking Study in Inconel 617: *Ryan Gordon*[1]; Stephen Raiman[2]; Lesley Frame[1]; [1]University of Connecticut; [2]Texas A&M University

N-18: The Reduction of Uranium Dioxide Pellet in Molten CaCl2-CaF2-CaO: *Nagihan Karakaya*[1]; Jinsuo Zhang[1]; [1]Virginia Tech

---

MATERIALS DESIGN

Materials Design and Processing Optimization for Advanced Manufacturing: From Fundamentals to Application — Poster Session I

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

Program Organizers: Wei Xiong, University of Pittsburgh; Dana Frankel, QuesTek Innovations LLC; Gregory Olson, Massachusetts Institute of Technology

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

M-16: Effect of Nozzle Structure Parameters on Liquid Steel Flow Behavior in Slab Mold: *Sikun Peng*[1]; [1]Chongqing University

M-17: Influence of Single Fold and Double Fold on the Stress and Strain of AMOLED Module: Qiujun Wang[1]; Weiwei Su[1]; Di Zhang[1]; *Weijin Ji*[2]; Bo Wang[1]; [1]Hebei University of Science and Technology; [2]Hebei Special Equipment Supervision and

Inspection Institute

M-18: Microwave Dielectric Spectroscopy of Intrinsic and Doped HKUST-1 Metal-organic Framework Films: Papa K. Amoah; Zeinab Hassan[1]; Helmut Baumgart[2]; Y.S. Obeng[3]; Engelbert Redel[1]; *Abdelmageed Elmustafa*[2]; [1]Karlsruhe Institute of Technology (KIT), Institute of Functional Interfaces (IFG), Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen, Germany; [2]Old Dominion University; [3]Physical Measurement Laboratory, National Institute of Standards and Technology NIST

M-19: Optimization of Parameters in Modified Strain-induced Melt Activation Process for Al-7Si Alloy: *Chandan Choudhary*[1]; Kanai Lal Sahoo[2]; Durbadal Mandal[3]; [1]Maharashtra Institute of Technology, Aurangabad; [2]CSIR-NML Jamshedpur; [3]NIT Durgapur

M-20: Phase Field Modeling Investigation of Polycrystalline Grain Growth Using a Spherical-Gaussian-Based 5-D Computational Approach: *Lenissongui Yeo*[1]; Michael Costa[1]; Jacob Bair[1]; [1]Oklahoma State University

---

MATERIALS DESIGN

Materials Design and Processing Optimization for Advanced Manufacturing: From Fundamentals to Application — Student Poster Session II

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

Program Organizers: Wei Xiong, University of Pittsburgh; Dana Frankel, QuesTek Innovations LLC; Gregory Olson, Massachusetts Institute of Technology

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

M-21: Cold Spray Deposition onto CFRP with Engineered Bond Layer: *Brian Feng*[1]; [1]University of Southern California

M-23: Numerical Simulation Study of Strip Floater: *Ning Mao*[1]; Chengbo Wu[1]; Zhihui Guo[1]; [1]Chongqing University

---

NUCLEAR MATERIALS

Materials Systems for the Future of Fusion Energy — Poster Session

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

Program Organizers: Jason Trelewicz, Stony Brook University; Kevin Field, University of Michigan; Takaaki Koyanagi, Oak Ridge National Laboratory; Yuanyuan Zhu, University of Connecticut; Dalong Zhang, Pacific Northwest National Laboratory

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

N-21: Dislocation Loop Formation in Self-ion Irradiated Ultra-high Purity Fe-Cr Alloys: Yao Li[1]; Arunodaya Bhattacharya[2]; Yajie Zhao[1]; Ling Wang[2]; *Steven Zinkle*[1];

[1]University of Tennessee Knoxville; [2]Oak Ridge National Laboratory

N-24: Microstructure Deformation and Possible Densification of Tungsten in High Heat Flux Conditions: *Minsuk Seo*[1]; Ke Wang[1]; John Echols[2]; Leigh Winfrey[1]; [1]The Pennsylvania State University; [2]Oak Ridge National Laboratory

N-26: Oxide-dispersion-strengthened Steel Processing by Additive Manufacturing of Gas Atomization Reaction Synthesis (GARS) Powders: *Matthew deJong*[1]; Ryan Schoell[1]; Sourabh Saptarshi[1]; Sarah Timmins[1]; Emma White[2]; Iver Anderson[2]; Djamel Kaoumi[1]; Christopher Rock[1]; Timothy Horn[1]; [1]North Carolina State University; [2]Iowa State University

N-27: Polycrystal Homogenization Modelling Accounting for Channeling in Irradiated Metals and Alloys: *Diogo Gonçalves*[1]; Maxime Sauzay[1]; Laurent Dupuy[1]; [1]Université Paris-Saclay, Commissariat à l'Énergie Atomique et aux Énergies Alternatives (CEA)

N-28: Promoting Radiation Resistance in Metallic Solid Solutions via the Use of Multiple Synergistic Solutes: *Soumyajit Jana*[1]; Thomas Schuler[2]; Pascal Bellon[1]; Robert Averback[1]; [1]University of Illinois Urbana Champaign; [2]Cea Saclay

N-29: Thermal and Mechanical Characterization of W-Cu Composites for Next Generation Fusion Devices: *Elena Tejado*[1]; Alexander Müller[2]; Jeong-Ha You[2]; J.Y. Pastor[1]; [1]Universidad Politécnica de Madrid; [2]Max-Planck-Institut für Plasmaphysik

NUCLEAR MATERIALS

Mechanical Behavior and Degradation of Advanced Nuclear Fuel and Structural Materials — Poster Session

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

Program Organizers: Dong Liu, University of Bristol; Peng Xu, Idaho National Laboratory; Simon Middleburgh, Bangor University; Christian Deck, General Atomics; Erofili Kardoulaki, Los Alamos National Laboratory; Robert Ritchie, University of California, Berkeley

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

N-32: Dynamics of Helium Bubbles during Thermal Annealing: A Data-driven Approach: *Kory Burns*[1]; Kayvon Tadj[1]; Assel Aitkaliyeva[1]; Khalid Hattar[1]; Mary Scott[1]; [1]University of Florida

N-34: Influence of the Bulk Chemical Composition on the Microstructure Evolution of Irradiated Chemically-tailored Nuclear RPV Steels: *Aidar Zakirov*[1]; Bertrand Radiguet[1]; Rachid Chaouadi[2]; Philippe Pareige[1]; [1]Groupe de Physique des Matériaux - Université de Rouen Normandie; [2]SCK CEN

N-35: Investigation of Ion Irradiation Effects on Mineral Analogues of Concrete Aggregates: Zehui Qi[1]; *Steven Zinkle*[1]; Yann Le Pape[2]; Elena Rodriguez[2]; Xin Chen[3]; Gaurav Sant[3]; [1]University of Tennessee, Knoxville; [2]Oak Ridge National Laboratory; [3]University of California, Los Angeles

N-36: Stress Distribution of Disk Geometry Under Three-point Bending Tests to Evaluate Mechanical Properties of Neutron-irradiated Tungsten for Future Fusion Devices: *Trevor Marchhart*[1]; Nathan Reid[2]; Lauren Garrison[3]; Jean Paul Allain[1]; [1]Penn

State University; [2]University of Illinois; [3]Oak Ridge National Laboratory

N-37: Study of Microstructure, Hydrogen Solubility and Corrosion of Ta-modified Zr-1Nb Alloys for Nuclear Applications: *Pedro Ferreirós*[1]; Estefanía Savoy Polack[2]; Liliana Lanzani[2]; Paula Alonso[2]; Dante Quirós[2]; Juan Mieza[2]; Eugenia Zelaya[3]; Alexander Knowles[1]; Gerardo Rubiolo[3]; [1]University of Birmingham; [2]Comisión Nacional de Energía Atómica; [3]Consejo Nacional de Investigaciones Científicas y Técnicas

---

CHARACTERIZATION

Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling — Poster Session

Sponsored by: TMS Structural Materials Division, TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Shailendra Joshi, University of Houston; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Jagannathan Rajagopalan, Arizona State University; Robert Wheeler, Microtesting Solutions LLC

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

L-48: Deformation Behaviour of Novel Beta-Ti Bcc-Superalloys: *Vincent Gagneur*[1]; Tianhong Gu[1]; Alexander Knowles[1]; [1]University of Birmingham

L-50: Multiscale Mechanical Evaluation of FiberForm: *Robert Quammen*[1]; Paul F. Rottmann[1]; Connor Varney[1]; [1]University of Kentucky

---

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Poster Session

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Ramasis Goswami, Naval Research Laboratory; Saurabh Puri, Microstructure Engineering; Eric Payton, Air Force Research Laboratory; Bij-Na Kim, Carpenter Additive; Megumi Kawasaki, Oregon State University; Eric Lass, University of Tennessee-Knoxville

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chair: Mohsen Asle Zaeem, Colorado School of Mines

O-22: Carbon Transformations in Rapidly Solidified Nickel-carbon Ribbon: Gina Greenidge[1]; Samuel Price[1]; *Jonah Erlebacher*[1]; [1]Johns Hopkins University

O-24: Coarsening, Dissolution and Re-precipitation in Multimodal Ni Superalloys: An In-situ Study: *Muhammad Awais*[1]; Jan Ilavsky[2]; James Coakley[1]; [1]University of

Miami; [2]Argonne National Laboratory

O-25: Contribution of the Electronic Entropy to Some Congruent and Allotropic Phase Transformations: *Jonathan Paras*[1]; Antoine Allanore[1]; [1]Massachusetts Institute of Technology

O-27: Influence of the Austenitic Grain Size on the Strength in a Medium-carbon and Low-alloy Steel: *David Fernández-Sánchez*[1]; Octavio Vázquez-Gómez[1]; Alexis Gallegos-Pérez[1]; Pedro Garnica-González[1]; Héctor Vergara-Hernández[1]; [1]Tecnológico Nacional de México / I.T. Morelia

O-29: Leveraging Solid-state Phase Transformations to Tailor Residual Stress in Additively Manufactured Metal Components: Aleksandra Vyatskikh[1]; Xin Wang[2]; Lorenzo Valdevit[2]; Enrique Lavernia[2]; *Julie Schoenung*[2]; [1]University of California Irvine; [2]University of California Irvine

O-30: Microstructural and Mechanical Property of Ti-6Al-4V/STS 304 Dissimilar Joints by Diffusion Bonding Using Hierarchical Multilayers Structure: Bo Hun Jang[1]; Jin Gyu Lee[1]; Jeong Pyo Lee[1]; *Jin Kyu Lee*[1]; [1]Kongju National University

O-31: Modeling Phase Transformation and Tensile Properties of Micro-alloyed Structural Steels for Fire Resistance: *Fahim Khan Prionto*[1]; Razia Sharme[1]; H. M. Mamun Rashed[2]; [1]Khulna University of Engineering & Technology; [2]Bangladesh University of Engineering and Technology

O-32: Phase Evolution of Laser Melted Single Tracks of 316L: *Anna Rawlings*[1]; Andrew Birnbaum[1]; John Steuben[1]; Athanasios Iliopoulos[1]; John Michopoulos[1]; [1]U.S. Naval Research Laboratory

O-33: Phase Transformations and Microstructural Evolution: *George Lindemann*[1]; Paul Chao[1]; Ashwin Shahani[1]; [1]University of Michigan

O-34: Polyamorphism in a Solute-lean Al-Ce Metallic Glass: *Ziliang Yin*[1]; [1]Center for High Pressure Science & Technology Advanced Research

O-35: The Effect of Ni Ion Implantation on the Nanoindentation Response of a Ni 50.5at%-Ti 49.5at% Shape Memory Alloy: *Daniel Hong*[1]; Alejandro Hinojos[1]; Nan Li[2]; Khalid Hattar[3]; Jeremy Schaffer[4]; Taiwu Yu[1]; Yunzhi Wang[1]; Michael Mills[1]; Peter Anderson[1]; [1]Ohio State University; [2]Los Alamos National Laboratories; [3]Sandia National Laboratories; [4]Fort Wayne Metals

O-36: The Influence of Ru Addition on the Precipitation Behavior of Topologically Close-packed Phase in the Ni-based Superalloy: *Sangwon Lee*[1]; Kyuseon Jang[1]; Hosun Jun[1]; Jeonghyun Do[2]; Pyuck-Pa Choi[1]; [1]Korea Advanced Institute of Science and Technology; [2]Korea Institute of Materials Science

O-37: The Microstructural Evolution of Ag-39.9at%Cu Eutectic Alloys under Different Cooling Rates: *Qingyuan Qin*[1]; [1]Shanghai Jiaotong University

O-38: Thermodynamics of Elinvar Behavior: *Pedro Guzman*[1]; Stefan Lohaus[1]; Camille Bernal[1]; Brent Fultz[1]; [1]California Institute of Technology

O-39: Transformation-induced Plasticity in Omega Titanium: *Amir Hassan Zahiri*[1]; Jamie Ombogo[1]; Tengfei Ma[1]; Pranay Chakraborty[1]; Lei Cao[1]; [1]Universitiy of Nevada Reno

---

ADDITIVE TECHNOLOGIES

Powder Materials Processing and Fundamental Understanding — Poster Session

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, Pacific Northwest National Laboratory

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

Session Chair: Kathy Lu, Virginia Polytechnic Institute and State University

---

J-47: Induction Sintering of Copper-chromium Powders at Low-pressure Environment: *Santiago Vargas*[1]; Gregory Hadley[1]; Diana Galeano[1]; Carlos Castano[1]; [1]Virginia Commonwealth University

J-48: Simutaneously Increasing the Thermoelectric and Mechanical Properties by Developing Harmonic Structure in Bi2Te3 Gas Atomized Powders: *Pee-Yew Lee*[1]; [1]National Taiwan Ocean University

---

NUCLEAR MATERIALS

Synergistic Irradiation, Corrosion, and Microstructural Evolution in Nuclear Materials — Poster Session

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

Program Organizers: Djamel Kaoumi, North Carolina State University; Michael Short, Massachusetts Institute of Technology; Peter Hosemann, University of California, Berkeley; Stephen Raiman, Texas A&M University; Raluca Scarlat, University of California, Berkeley; Aaron Kohnert, Los Alamos National Laboratory; Ryan Schoell, North Carolina State University; Philip Edmondson, Oak Ridge National Laboratory; Celine Cabet, Commissariat a l'Energie Atomique

Tuesday PM | March 1, 2022
Exhibit Hall C | Anaheim Convention Center

N-25: HIPE: A Versatile Test Platform for Hydrogen Permeability Measurements: *Reid Bohanon*[1]; Diego Macias[1]; Tu Le[1]; Stephen Raiman[1]; [1]Texas A&M University

N-38: Development of Coatings to Provide Corrosion Resistance and Tritium Retention for Application in Nuclear Fusion Reactors: *Hazel Gardner*[1]; Alice Laferrere[1]; Callum Gallagher[1]; David Bowden[1]; [1]The UK Atomic Energy Authority

ON-DEMAND PRESENTATIONS

The following are details to help prepare for the program if you are presenting in the virtual on-demand option:

- The on-demand presentations are scheduled to be available beginning Monday, March 14 starting at 8:00 a.m. EDT.
- The presentations will be available to view through April 30, 2022.
- Presentations will be pre-recorded.
- All presentations are in Eastern US Time. Note that Sunday, March 13 is the start of Daylight Savings Time in the US. The virtual conference will automatically re-set the times to display Eastern Daylight Savings time beginning on Sunday. Eastern Daylight Savings Time is UTC-4:00.

MATERIALS PROCESSING

12th International Symposium on High Temperature Metallurgical Processing — On-Demand Oral Presentations

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

Program Organizers: Zhiwei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jesse White, Elkem Carbon Solutions; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, Jiangxi University of Science and Technology; Onuralp Yücel, Istanbul Technical University; Ender Keskinkilic, Atilim University; Tao Jiang, Central South University; Morsi Mahmoud, King Fahd University of Petroleum & Minerals

Monday AM | March 14, 2022
Materials Processing | On-Demand Room

Numerical Simulation of the Effect of Bed Height Diameter Ratio on Gas-solid Flow Characteristics in a Side Stirred Fluidized Bed: *Chuanfu Li*[1]; Yan Liu[1]; Tingan Zhang[1]; Ning Li[1]; Shengyu Zhang[1]; [1]Northeastern University

Smelting Reduction of FeO in Molten Slag Using Alternative Solid Carbon Sources: *Theint Theint Htet*[1]; Zhiming Yan[1]; Koen Meijer[2]; Zushu Li[1]; [1]WMG, University of Warwick; [2]Tata Steel IJmuiden

Dynamics Behaviors of Droplets Impacting on a Heated Tailings Surface: *Yan Zhao*[1]; Liangying Wen[1]; Li Su[1]; Bo Liu[1]; JianXin Wang[1]; Liwen Hu[1]; [1]Chongqing University

3D Experimental Model Study on Gas-solid Flow of Raceway in Blast Furnace: *Cong Li*[1]; Qingguo Xue[1]; Xing Peng[1]; Haibin Zuo[1]; Xuefeng She[1]; Guang Wang[1]; Jingsong Wang[1]; [1]University of Science and Technology Beijing

Effect of the Injection Angle of Reducing Gas on Coal Flow and Combustion in a 50% Oxygen Blast Furnace: *Xing Peng*[1]; Jingsong Wang[1]; Zhiyao Li[1]; Haibin Zuo[1]; Xuefeng She[1]; Guang Wang[1]; Qingguo Xue[1]; [1]University of Science and Technology Beijing

Decarburization and Chromium Conservation Model in AOD Refining Process of 304 Stainless Steel: *Jun Cai*[1]; Jing Li[1]; [1]University of Science and Technology Beijing

Comparative Study on the Cleanliness of Ultra-low Carbon Al-killed Steel by

Different Heating Processes: *Shenyang Song*[1]; Jing Li[1]; Wei Yan[1]; Jianxiao Zhang[1]; [1]University of Science and Technology Beijing

Optimization of VD Refining Slag and Control of Non-metallic Inclusions for 55SiCrA Spring Steel: *Chen Wang*[1]; Qing Liu[2]; Jiangshan Zhang[2]; Jun Chen[3]; Dan Lin[3]; Xuji Wang[3]; Jiancheng Zhu[3]; [1]University of Science and Technology Beijing; [2]University of Science & Technology Beijing; [3]Xiangtan Branch, Hunan Valin Iron & Steel Co., Ltd.

Structural and Magnetic Properties of Rare-earth Lanthanum-doped Cobalt Ferrites: Xijun Zhang[1]; *Guoqian Wang*[2]; Xin Peng[2]; Sujun Lu[1]; Dalin Chen[1]; Yutian Ma[1]; Ailiang Chen[2]; [1]State Key Laboratory of Nickel and Cobalt Resources Comprehensive Utilization; [2]Central South University

Evaluation of Processing Parameters for the Production of Tungsten Carbide in a Fluidized Bed Reactor: *Maureen Chorney*[1]; Jerome Downey[1]; K. Sudhakar[1]; [1]Montana Technological University

Thermal Analysis of Potential High Entropy Alloy Binder Alternatives for Tungsten Carbide: *Jannette Chorney*[1]; Jerome Downey[1]; K. Sudhakar[1]; Morgan Ashbaugh[1]; Grant Wallace[1]; [1]Montana Technological University

Modelling of Permanent Magnetic Field for Its Application in Electroslag Remelting: *Guotao Zhou*[1]; Shenyang Song[1]; Wei Yan[1]; Jing Li[1]; [1]University of Science and Technology Beijing

Contact Line Undulation Induced Capillary Interaction between Micron-sized Ce2O3 Inclusions at the Ar Gas/Liquid Steel Interface: *Zilong Qiu*[1]; Annelies Malfliet[2]; Bart Blanpain[2]; Muxing Guo[2]; [1]KU Leuven; [2]KULeuven

Microstructural Evolution of Thermal Insulation Materials Prepared by Sintering of Ferronickel Slag and Fly Ash Cenosphere: *Guangyan Zhu*[1]; Zhiwei Peng[1]; Lei Yang[1]; Wenxing Shang[1]; Mingjun Rao[1]; [1]Central South University

Influence of Aluminum on Hot Ductility of High-strength Steel: Pei Zhu[1]; *Lifeng Zhang*[2]; Ying Ren[1]; [1]University of Science and Technology Beijing; [2]Yanshan University

Effect of Ce Content on Non-metallic Inclusions in Si-Mn Killed Stainless Steels: Lingxiao Cui[1]; *Lifeng Zhang*[2]; Ying Ren[1]; Ji Zhang[1]; [1]University of Science and Technology Beijing; [2]Yanshan University

Effect of Calcium Treatment on Non-metallic Inclusions in Steel during Refining Process: Weijian Wang[1]; *Lifeng Zhang*[2]; Ying Ren[1]; Yan Luo[1]; Xiaohui Sun[3]; [1]University of Science and Technology Beijing; [2]Yanshan University; [3]Shanghai Meishan Iron and steel Co. Ltd

Observation on Clogging Behavior of Submerged Entry Nozzle of Al-killed Steels: Fenggang Liu[1]; Qiuyue Zhou[1]; *Lifeng Zhang*[2]; Ying Ren[1]; [1]University of Science and Technology Beijing; [2]Yanshan University

Effect of Lanthanum on Inclusions in a High Sulfur Steel: Sha Ji[1]; *Lifeng Zhang*[2]; Ying Ren[1]; Xindong Wang[1]; [1]University of Science and Technology Beijing; [2]Yanshan University

Investigation of Bubble Penetration through Interface between Immiscible Liquids: *Xiangfeng Cheng*[1]; Baojun Zhao[2]; Fuming Zhang[3]; Gele Qing[1]; Zhixing Zhao[1]; [1]Shougang Research Institute of Technology; [2]Jiangxi Unviersity of Science and Techonology; [3]Shougang Group

Improvement of Iron Coke Strength by Adding Coal Tar during Coking: *Chen Yin*[1];

Mingxuan Song[1]; Shengfu Zhang[1]; [1]Chongqing University

Modification of Basic Oxygen Furnace Slag Using Iron Ore Tailing and Blast Furnace Dust: Liang Wang[1]; *Wei Ren*[1]; Xiaofang Zhang[1]; Ziwen Han[1]; Jinlian Li[1]; [1]HBIS Group Hansteel Company

Removal of Arsenic from Molten Bearing Steel by Adding Rare Earth Lanthanum: *Peng Yu*[1]; Wang Hongpo[1]; Zhou Xiaoqing[1]; [1]Chongqing University

Effect of Austenitizing and Cooling Process on Microstructure Transformation of Low-carbon Bainite Steel: *Zhou XiaoQing*[1]; Wang Hongpo[1]; [1]ChongQing University

Experimental Study on Thermodynamics of CaO-SiO2-Ce2O3-5wt.%Al2O3 System at 1773 K: Mengchuan Li[1]; *Tongsheng Zhang*[2]; Wanlin Wang[1]; Hualong Zhang[1]; Rensheng Li[1]; [1]Center South University; [2]Central South University

Effect of Ti and Ca Content on the Characteristics of Inclusions in Si-Mn-Al Deoxidized Spring Steel: Rensheng Li[1]; *Tongsheng Zhang*[1]; Wanlin Wang[1]; Mengchuan Li[1]; Daoyuan Huang[1]; [1]Central South University

Research on Cost System of Total Scrap EAF Steel-making Process: *Bo Li*[1]; Ling-zhi Yang[1]; Yu-feng Guo[1]; Shuai Wang[1]; Hang Hu[1]; [1]Central South University School of Minerals Processing and Bioengineering

Calculation of Heat Loss of Furnace Body in Electric Arc Furnace Steelmaking: *Zhi-hui Li*[1]; Ling-zhi Yang[1]; Yu-feng Guo[1]; Shuai Wang[1]; Hang Hu[1]; [1]Central South University School of Minerals Processing and Bioengineering

---

MATERIALS PROCESSING

12th International Symposium on High Temperature Metallurgical Processing — On-Demand Poster Session

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

Program Organizers: Zhiwei Peng, Central South University; Jiann-Yang Hwang, Michigan Technological University; Jesse White, Elkem Carbon Solutions; Jerome Downey, Montana Technological University; Dean Gregurek, RHI Magnesita; Baojun Zhao, Jiangxi University of Science and Technology; Onuralp Yücel, Istanbul Technical University; Ender Keskinkilic, Atilim University; Tao Jiang, Central South University; Morsi Mahmoud, King Fahd University of Petroleum & Minerals

Monday AM | March 14, 2022
Materials Processing | On-Demand Poster Hall

Disintegration Behavior of Vanadium–titanium Magnetite Pellets in Gas Mixtures of CO–H2–CO2–N2: Yue Wang[1]; Jianbo Zhao[1]; Donglai Ma[1]; Qingqing Hu[1]; *Yongjie Liu*[1]; Zhixiong You[1]; [1]Chongqing University

Effect of Channel Heights on the Flow Field, Temperature Field and Inclusion Removal of Induction Heating Tundish: *Xi-qing Chen*[1]; Hong Xiao[1]; Pu Wang[1]; Peng Lan[1]; Hai-yan Tang[1]; Jia-quan Zhang[1]; [1]University of Science & Technology Bejing

Experimental Study on Thermal Shock Resistance of Magnesia Carbon Brick: *Changhai Lv*[1]; Jing Li[1]; Renxiang Lv[2]; Shouxin Tian[3]; [1]University of Science and Technology Beijing; [2]Jinan Ludong Refractories Company; [3]Baosteel Group Central

Research Institute

Changes of SO2, NOx Emission and Production of Iron Ore Sintering with Steam Injection at the Surface of Sintering Bed: *Yapeng Zhang*[1]; Wen Pan[1]; Shaoguo Chen[1]; Huaiying Ma[1]; Jingjun Zhao[2]; Zhixing Zhao[1]; Huayang Liu[2]; [1]Shougang Group Co., LTD Research Institute of Technology; [2]Shougang Jingtang United Iron &Steel Co., Ltd

Study on Burden Mineral Phase Identification System and Prediction Model of Metallurgical Properties Based on BP Neural Network: *Qingqing Hu*[1]; Donglai Ma[1]; Yue Wang[1]; Zhixiong You[1]; Xuewei Lv[1]; [1]Chongqing University

Effect of Slag Basicity on Non-metallic Inclusions in a Heavy Rail Steels: Nan Liu[1]; *Lifeng Zhang*[2]; Yanping Chu[1]; Ying Ren[1]; [1]University of Science and Technology Beijing; [2]Yanshan University

Distribution of Inclusions in an IF Steel Continuous Casting Slab Casted during SEN-Clogged State: Qiuyue Zhou[1]; Rikang Huang[1]; *Lifeng Zhang*[2]; [1]University of Science and Technology Beijing; [2]Yanshan University

ADVANCED MATERIALS

2D Materials – Preparation, Properties & Applications — On-Demand Oral Presentations

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

Monday AM | March 14, 2022
Advanced Materials | On-Demand Room

Keynote
Novel Approach to Wafer Scale Integration of Graphene and h-BN Related 2-D Materials: *Jagdish Narayan*[1]; [1]North Carolina State University

Invited
Synthesis and Characterization of MnCo2O4 /GQDs Nano-composites for Super Capacitor Electrodes: *Poonam Kharangarh*[1]; [1]University of Delhi

Raman and Transport Characterization of Semiconducting and Superconducting Selenide-based Transition Metal Dichalcogenides: *Kishan Jayanand*[1]; Anupama Kaul[1]; [1]University of North Texas

Rapid Exfoliation of Low-defectivity Graphene in Alkali Lignin Aqueous Media: *Claudio Marchi*[1]; Harrison Loh[2]; Federico Lissandrello[1]; Konstantinos Sierros[2]; Luca Magagnin[1]; [1]Politecnico di Milano; [2]West Virginia University

Immobilization of Glycine Molecules on Graphene Oxide for Enhanced Piezoelectricity: *Sabrina Binte Ashraf*[1]; Emmet O'Reilly[2]; Shaheen Sarkar[2]; Syed Tofail[2]; Fahmida Gulshan[1]; Md Moniruzzaman[1]; [1]Bangladesh University of Engineering and Technology; [2]Bernal Institute, University of Limerick

NANOSTRUCTURED MATERIALS

30 Years of Nanoindentation with the Oliver-Pharr Method and Beyond — On-Demand Oral Presentations

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

Program Organizers: Verena Maier-Kiener, Montanuniversitaet Leoben; Benoit Merle, University Erlangen-Nuremberg (Fau); Erik Herbert, Michigan Technological University; Samantha Lawrence, Los Alamos National Laboratory; Nigel Jennett, Coventry University

Monday AM | March 14, 2022
Nanostructured Materials | On-Demand Room

Invited
Determining Material Parameters from Nanoindentation Data by Inverse Methods: *Alexander Hartmaier*[1]; [1]ICAMS Ruhr University Bochum

Length Scale Effects of Nanoindentation on Additively Manufactured Stainless Steel: *Kunqing Ding*[1]; Yin Zhang[1]; David McDowell[1]; Ting Zhu[1]; [1]Georgia Institute of Technology

Understanding Rate-depending Plastic Deformation under Hydrogen Influence through Advanced In-situ Electrochemical Nanoindentation: *Anna Ebner*[1]; Verena Maier-Kiener[1]; [1]Montanuniversitaet Leoben

Comparison between Long-term Nanoindentation Creep Testing under Constant Load and Constant Pressure: *Thomas Chudoba*[1]; [1]ASMEC GmbH

Factors Affecting Nanoindentation Derived Activation Parameters for PLC Effects: *Henry Ovri*[1]; Erica Lilleodden[1]; [1]Helmholtz Zentrum Hereon

Estimating the Elastic Constants of Pulp Fibers with Nanoindentation: *Caterina Czibula*[1]; August Brandberg[2]; Megan Cordill[3]; Artem Kulachenko[2]; Christian Teichert[4]; Ulrich Hirn[1]; [1]Institute of Bioproducts and Paper Technology, Graz University of Technology; [2]KTH Royal Institute of Technology; [3]Erich Schmid Institute for Materials Science, Austrian Academy of Sciences; [4]Institute of Physics, Montanuniversitaet Leoben

A Novel Indentation-size-effect-based Nanoindentation Test Method Enabling Smaller Scale Testing for Safer Nuclear Structural Health Monitoring: *Rohit Sharma*[1]; Nigel M. Jennett[1]; Chris D. Hardie[2]; Alexandra J. Cackett[2]; [1]Coventry University; [2]UK Atomic Energy Authority

Hardening Relationship with Hydrogen and Dislocation Structure in FeCr Alloys by In Situ Nanoindentation: *Jing Rao*[1]; Subin Lee[2]; Gerhard Dehm[1]; María Jazmin Duarte Correa[1]; [1]Max-Planck-Institut für Eisenforschung G; [2]Karlsruhe Institute of Technology (North)

NANOSTRUCTURED MATERIALS

30 Years of Nanoindentation with the Oliver-Pharr Method and Beyond — On-Demand Poster Session

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

Program Organizers: Verena Maier-Kiener, Montanuniversitaet Leoben; Benoit Merle, University Erlangen-Nuremberg (Fau); Erik Herbert, Michigan Technological University; Samantha Lawrence, Los Alamos National Laboratory; Nigel Jennett, Coventry University

Monday AM | March 14, 2022
Nanostructured Materials | On-Demand Poster Hall

On the Plastic Deformation Mechanisms Operating in High Purity Indium at Small Length Scales and High Homologous Temperatures: *Fereshteh Mallakpour*[1]; Stephen Hackney[1]; Erik Herbert[1]; [1]Michigan Tech University

Simultaneous Nanoindentation and Acoustic Monitoring Enhanced by the Deep Learning Methodology: *Antanas Daugela*[1]; Jurgis Daugela[2]; [1]Nanometronix LLC; [2]Johns Hopkins University

---

SPECIAL TOPICS

Acta Materialia Symposium — On-Demand Poster Session: Student Award Winners in Acta Materialia Symposium

Program Organizer: Carolyn Hansson, University of Waterloo

Monday AM | March 14, 2022
Special Topics | On-Demand Room

Data-driven Design Guidelines for Ceramic Superlattices with Enhanced Fracture Resistance: *Nikola Koutna*[1]; Alexander Brenner[1]; David Holec[2]; Paul Mayrhofer[1]; [1]TU Wien; [2]Montanuniversitat Leoben

A Comparative Study on Intrinsic Mobility of Incoherent and Semicoherent Interfaces during the Austenite to Ferrite Transformation: *Haokai Dong*[1]; [1]Tohoku-Tsinghua Universities Joint Program

Engineering Highly-aligned Cardiac Patches by Electrohydrodynamically-printed Microlattices: *Mao Mao*[1]; [1]Xi'an Jiaotong University

Machine Learned Feature Identification for Predicting Phase and Young's Modulus of Low-,Medium- and High-entropy Alloys: *Ankit Roy*[1]; [1]Lehigh University

Evaluation of Low-stress High-temperature Creep: The Harper-Dorn Creep: *Shobhit Singh*[1]; [1]Indian Institute of Science

Direct Observation of the Ni Stabilising Effect in Interfacial (Cu,Ni)6Sn5 Intermetallic Compounds: *Flora Somidin*[1]; [1]University Malaysia Perlis

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Innovative Powder Processing of Functional and Magnetic Materials — On-Demand Oral Presentations

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

Program Organizers: Emily Rinko, Iowa State University; Iver Anderson, Iowa State University Ames Laboratory; Markus Chmielus, University of Pittsburgh; Emma White, DECHEMA Forschungsinstitut; Deliang Zhang, Northeastern University; Andrew Kustas, Sandia National Laboratories; Kyle Johnson, Sandia National Laboratories

Monday AM | March 14, 2022
Additive Technologies | On-Demand Room

Invited
Additive Manufacturing of Electrical Steels: Opportunities to Link Microstructure and Design: *Alex Plotkowski*[1]; Chris Fancher[1]; Michael Haines[2]; Fred List[1]; Keith Carver[1]; Benjamin Stump[1]; Andrew Kustas[3]; Peter Wang[1]; John Coleman[1]; Amiee Jackson[1]; Suresh Babu[2]; Ryan Dehoff[1]; [1]Oak Ridge National Laboratory; [2]University of Tennessee Knoxville; [3]Sandia National Laboratory

Modeling Alignment of Magnetic Particles in Functionalized Magnetic 3D Printer: *Abhishek Sarkar*[1]; M. Paranthaman[2]; Cajetan Nlebedim[1]; [1]Ames Laboratory; [2]Oak Ridge National Laboratory

Influence of Composition and Microstructure on Magnetic Properties of Additively Manufactured Fe/Co/Ni Based Soft Magnetic Alloys: *SaiSree Varahabhatla*[1]; Mohansaikiran Nartu[1]; Sriswaroop Dasari[1]; Abhishek Sharma[1]; Varun Chaudhary[1]; Srinivas Mantri[1]; Raju Ramanujan[1]; Rajarshi Banerjee[1]; [1]University of North Texas

Mapping the Selective Laser Melting Parameter-thermophysical Property Space of a Ni51.2Ti Alloy Using a Combined Experimental and Computational Approach: *Asher Leff*[1]; Nathan Hite[2]; Chen Zhang[2]; Adam Wilson[1]; Raymundo Arroyave[2]; Alaa Elwany[2]; Ibrahim Karaman[2]; Darin Sharar[1]; [1]DEVCOM Army Research Laboratory; [2]Texas A&M

Additively Manufactured Nitinol for Prescribed Properties and Prediction of Its Bulk Elastic Properties by Molecular Dynamic Simulation: Jeongwoo Lee[1]; *Yung Shin*[1]; [1]Purdue University

Process-structure-property Relationships in Laser Powder Bed Fusion of Permanent Magnetic Nd-Fe-B: *Julan Wu*[1]; Nesma Aboulkhair[2]; Michele Degano[1]; Richard Hague[1]; Ian Ashcroft[1]; [1]University of Nottingham; [2]University of Nottingham (UK) and Technology Innovation Institute (UAE)

ADDITIVE TECHNOLOGIES

Additive Manufacturing Fatigue and Fracture: Developing Predictive Capabilities — On-Demand Oral Presentations

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 14, 2022
Additive Technologies | On-Demand Room

Invited
On the Fatigue Properties of Additively Manufactured Materials Processed at Non-optimal Conditions: *Thomas Niendorf*[1]; [1]Universitaet Kassel

Invited
Probabilistic Methods for Additive Manufacturing – How to Understand and Manage the Uncertainty: Mohsen Seifi[1]; *Martin White*[2]; Mahdi Jamshidinia[2]; Doug Wells[3]; [1]ASTM International/Case Western Reserve University; [2]ASTM International; [3]NASA

Effect of Surface Roughness on Fatigue Behavior of 316L Stainless Steel Produced by Binder Jetting Process: *Wei-Jen Lai*[1]; Avinesh Ojha[1]; Zhenxuan Luo[2]; [1]Ford Motor Company; [2]Shanghai Jiao Tong University

Mechanism-based Characterization of the Mechanical Behavior of PBF-EB Manufactured IN718 Lattice Structures: *Daniel Kotzem*[1]; Tizian Arold[2]; Thomas Niendorf[2]; Frank Walther[1]; [1]TU Dortmund University; [2]University of Kassel

High Strain Rate Deformation of EBM-Ti-6Al-4V: Microstructure, Texture, Mechanical Properties, Fracture Surface, Deformation Mechanism, and Constitute Modeling: *Reza Alaghmandfard*[1]; Mohsen Mohammadi[1]; [1]University of New Brunswick

Methodology of Low Cycle Fatigue Testing on Thin-walled Stainless Steel 316L Manufactured by Laser Powder Bed Fusion: *Cheng-Han Yu*[1]; Johan Moverare[1]; Ru Peng[1]; Alexander Leicht[2]; [1]Linköping University; [2]Chalmers University of Technology

Prediction of Fatigue Life Based on the Microstructure and Porosity Distribution Using the Novel Computationally Efficient Multiscale Modeling: *Mohamed Elkhateeb*[1]; Yung Shin[2]; [1]Mansoura University; [2]Purdue University

The Tensile Behavior of Additively Manufactured 17-4 PH Stainless Steel with Different Heat Treatments: *Saadi Habib*[1]; Steven Mates[2]; Mark Stoudt[2]; Fan Zhang[2]; Olaf Borkiewicz[3]; [1]National Institute of Standards and Technology; [2]National Institute of Standards and Technology (NIST); [3]Advanced Photon Source, Argonne National Laboratory

High-throughput Characterization of the Fatigue Behavior of Additively Manufactured Metals toward Rapid Qualification: *Adam Pilchak*[1]; Pawan Vedanti[1]; Dan Satko[1]; Ayman Salem[1]; [1]Materials Resources, LLC

Load-dependent Degenerating Structures in Additively Manufactured Implants: *Dennis Milaege*[1]; Kay-Peter Hoyer[1]; Mirko Schaper[1]; [1]Paderborn University

Effect of Post Heat Treatment on Fatigue Strength of AlSi10Mg Produced by Laser Powder Bed Fusion Process: *Wei-Jen Lai*[1]; Avinesh Ojha[1]; Ziang Li[1]; [1]Ford Motor Company

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications IV — On-Demand Oral Presentations

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

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

Monday AM | March 14, 2022
Additive Technologies | On-Demand Room

Invited
Process-aware Design Optimization Methods for Metal Additive Manufacturing: Albert To[1]; *Praveen Vulimiri*[1]; [1]University of Pittsburgh

3D Ink-extrusion Printing of Thermoelectric Materials onto Heat Exchangers: Alexander Proschel[1]; *Donna Guillen*[1]; Dennis Tucker[1]; David Dunand[2]; [1]Idaho National Laboratory; [2]Northwestern University

Advanced Manufacturing for the Development of Advanced In-pile Sensors and Instrumentation: *Kiyo Fujimoto*[1]; Michael McMurtrey[1]; Troy Unruh[1]; Tommy Holschuh[1]; Lance Hone[1]; Patrick Moo[1]; Dave Estrada[2]; [1]Idaho National Laboratory; [2]Boise State University

Effects of Processing Conditions on Microstructure of Metals Produced via Laser Powder Bed Fusion – A Case Study on Pure Nickel: *Qingyang Lu*[1]; Xiaogang Wang[1]; Tan-Phuc Le[1]; Jude Emil Fronda[1]; Karl Davidson[1]; Matteo Seita[1]; [1]Nanyang Technological University

Implications of Zr Additions for High-temperature Performance of Additively Manufactured Aluminum Alloys: *Richard Michi*[1]; Kevin Sisco[2]; Sumit Bahl[1]; Ying Yang[1]; Jonathan Poplawsky[1]; Lawrence Allard[1]; Ryan Dehoff[1]; Alex Plotkowski[1]; Amit Shyam[1]; [1]Oak Ridge National Laboratory; [2]University of Tennessee, Knoxville

In-situ Powder-directed Energy Process Control for Additively Manufactured Multi-layer, Functionally Graded Components: *Calvin Downey*[1]; Luis Nunez[1]; Isabella van Rooyen[2]; Indrajit Charit[3]; Michael Maughan[3]; Edward Herderick[4]; [1]Idaho National Laboratory; [2]Pacific Northwest National Laboratory; [3]University of Idaho; [4]Ohio State University

Process Maps Using Fluid Dynamics Models in Single-laser Tracks for Additive Manufacturing: *Adrian Sabau*[1]; Narendran Raghavan[2]; Lang Yuan[3]; John Turner[1]; Vipul Gupta[4]; [1]Oak Ridge National Laboratory; [2]Los Alamos National Laboratory; [3]University of South Carolina; [4]GE Research

Surface Roughness of Metal Additive-manufactured Single-track Clads: *Luis Nuñez*[1]; Calvin Downey[1]; Isabella van Rooyen[2]; Indrajit Charit[3]; Michael Maughan[3]; [1]Idaho National Laboratory; [2]Pacific Northwest National Laboratory; [3]University of Idaho

Data-driven Modeling for Microstructure-property Relationships of 17-4 Stainless Steel: Michael Porro[1]; Bin Zhang[1]; Akanksha Parmar[1]; *Yung Shin*[1]; [1]Purdue University

Elevated Temperature Deformation Behavior of Al-Cu-Ce(-Zr) Alloys Produced by Laser Powder Bed Fusion Process: *Sumit Bahl*[1]; Richard Michi[1]; Kevin Sisco[1]; Donovan Leonard[1]; Lawrence Allard[1]; Jonathan Poplawsky[1]; Ryan Dehoff[1]; Amit Shyam[1]; Alex Plotkowski[1]; [1]Oak Ridge National Laboratory

---

Additive Manufacturing for Energy Applications IV — On-Demand Poster Session

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

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

Monday AM | March 14, 2022
Additive Technologies | On-Demand Poster Hall

The Creep and Corrosion Performance of AM303, an Elevated Temperature Ni-superalloy Designed for Direct Metal Laser Melting: *Laura Dial*[1]; Monica Soare[1]; Bruce Pint[2]; Rishi Pallai[2]; Voramon Dheeradhada[1]; [1]GE Research; [2]Oak Ridge National Laboratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Large-scale Metallic Components — On-Demand Oral Presentations

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

Program Organizers: Sneha Prabha Narra, Carnegie Mellon University; Sougata Roy, University of North Dakota; Andrzej Nycz, Oak Ridge National Laboratory; Yousub Lee, Oak Ridge National Laboratory; Chantal Sudbrack, National Energy Technology Laboratory; Albert To, University of Pittsburgh

Monday AM | March 14, 2022
Additive Technologies | On-Demand Room

Mechanical Response of Wire-arc Additively Manufactured LA100™ with and without Post-print Heat-treatments: *Yukinori Yamamoto*[1]; Sougata Roy[2]; Peeyush Nandwana[1]; Wei Tang[1]; Andrzej Nycz[1]; Mark Noakes[1]; Ben Schaeffer[3]; Badri Narayanan[3]; [1]Oak Ridge National Laboratory; [2]Oak Ridge National Laboratory (now with University of North Dakota); [3]Lincoln Electric

Modified Inherent Strain Method for Wire Arc Additive Manufacturing: *Wen Dong*[1]; Albert To[1]; [1]University of Pittsburgh

Residual Stress, Microstructure and Characterization of Self-mated Repair of Inconel718 Using Cold Spray Process: *Hariharan Sundaram*[1]; Prasad Raghupatruni[1]; [1]GE

Thermal Fluid Dynamics of the WAAM Bead Reshaping by Adding a Scanning Laser: *Xin Chen*[1]; Guangyu Chen[1]; Jialuo Ding[1]; Yipeng Wang[1]; Stewart Williams[1]; [1]Cranfield University

Experimental and Numerical Assessment of H13 Tool Steel Produced by Directed Energy Deposition: *Sameehan Joshi*; Shashank Sharma[1]; Sangram Mazumder[1]; Mangesh Pantawane[1]; Narendra Dahotre[1]; [1]University of North Texas

A High Fidelity Melt Pool Dynamics Model with Experimental Validation Results under Various Laser Power Densities and Scanning Speeds: Kyung-min Hong[1];

Corbin Grohol[1]; *Yung Shin*[1]; [1]Purdue University

Prediction of Large Domain Thermal History and Molten Pool Shape Using the Surrogate Modeling and Machine Learning: Corbin Grohol[1]; *Yung Shin*[1]; [1]Purdue University

Constitutive Modeling of Additively Manufactured Multi-phase Steel Alloys by the Crystal Plasticity Finite Element Method: Hongguang Liu[1]; *Yung Shin*[1]; [1]Purdue University

Wire Arc Processing of Stainless Steels; Microstructure and Properties: *Patxi Fernandez-Zelai*[1]; Andrzej Nycz[1]; Quinn Campbell[1]; Yousub Lee[1]; Michael Kirka[1]; [1]Oak Ridge National Laboratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Large-scale Metallic Components — On-Demand Poster Session

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

Program Organizers: Sneha Prabha Narra, Carnegie Mellon University; Sougata Roy, University of North Dakota; Andrzej Nycz, Oak Ridge National Laboratory; Yousub Lee, Oak Ridge National Laboratory; Chantal Sudbrack, National Energy Technology Laboratory; Albert To, University of Pittsburgh

Monday AM | March 14, 2022
Additive Technologies | On-Demand Poster Hall

Microstructure Control in Wire-arc Additively Manufactured Maraging Steels: *Yukinori Yamamoto*[1]; Peeyush Nandwana[1]; Andrzej Nycz[1]; Mark Noakes[1]; Ben Schaeffer[2]; Badri Narayanan[2]; [1]Oak Ridge National Laboratory; [2]Lincoln Electric

Reverse Engineering of Aerospace Components Utilizing Additive Manufacturing Technology: Balakrishnan Subeshan[1]; Abdulaziz Abdulaziz[1]; Zeeshan Khan[1]; Md. Uddin[1]; *Muhammad Rahman*[1]; Eylem Asmatulu[1]; [1]Wichita State University

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Refractory Metallic Materials — On-Demand Oral Presentations

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

Program Organizers: Antonio Ramirez, Ohio State University; Jeffrey Sowards, NASA Marshall Space Flight Center; Isabella Van Rooyen, Pacific Northwest National Laboratory; Omar Mireles, NASA Marshall Space Flight Center; Eric Lass, University of Tennessee-Knoxville; Faramarz Zarandi, Raytheon Technologies; Edward Herderick, Ohio State University; Matthew Osborne, Global Advanced Metals

Monday AM | March 14, 2022
Additive Technologies | On-Demand Room

Thermal-chemical-fluid Flow of Dissimilar Species Mixing between Titanium

and Refractory Metals: *Junji Shinjo*[1]; Chinnapat Panwisawas[2]; [1]Shimane University; [2]University of Leicester

Case Studies on Additive Manufacturing of Refractory Materials: Jeongwoo Lee[1]; *Yung Shin*[1]; [1]Purdue University

Electron Beam Melting Additive Manufacturing of Pure Molybdenum: *Patxi Fernandez-Zelai*[1]; Christopher Ledford[1]; Quinn Campbell[1]; Andrés Márquez Rossy[1]; Donovan Leonard[1]; Michael Kirka[1]; [1]Oak Ridge National Laboratory

Fabrication of Pure Tungsten Using Electron Beam Powder Bed Fusion: *Christopher Ledford*[1]; Patxi Fernandez-Zelaia[2]; Andres Marquez Rossy[2]; Julio Ortega Rojas[2]; Quinn Campbell[2]; Michael Kirka[2]; Yutai Kato[2]; [1]Oak Ridge National Laboratory; [2]Oak Ridge National Labratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques II — On-Demand Oral Presentations

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

Program Organizers: Fan Zhang, National Institute of Standards and Technology; Donald Brown, Los Alamos National Laboratory; Andrew Chuang, Argonne National Laboratory; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Tao Sun, University of Virginia

Monday AM | March 14, 2022
Additive Technologies | On-Demand Room

Invited
In-situ Temperature Measurements of Wire Based Directed Energy Deposition Additive Manufacturing Process Using Pyrometry and Cameras: *Kevin Mullaney*[1]; Thomas Charrett[1]; Stewart Williams[1]; Ralph Tatam[1]; [1]Cranfield University

Invited
Solidification Crack Propagation and Morphology Dependence on Processing Parameters in AA6061 from Ultra-high-speed X-ray Visualization: *Nadia Kouraytem*[1]; Po-Ju Chiang[2]; Runbo Jiang[2]; Christopher Kantzos[2]; Joseph Pauza[2]; Ross Cunningham[2]; Ziheng Wu[2]; Guannan Tang[2]; Niranjan Parab[3]; Cang Zhao[3]; Kamel Fezzaa[3]; Tao Sun[3]; Anthony Rollett[2]; [1]Utah State University; [2]Carnegie Mellon University; [3]Argonne National Laboratory

Invited
In-situ Characterization of Laser Powder Bed Fusion Processes at the Stanford Synchrotron Light Source: *Kevin Stone*[1]; [1]SLAC National Accelertor Laboratory

Predicting WAAM Material Properties via Machine Learning: Pinelopi Kyvelou[1]; Leroy Gardner[1]; Lei Zou[2]; Stasha Lauria[2]; Carlos Gonzales[3]; Filippo Gilardi[4]; Odysseas Krystalakos[4]; Amine Ammar[5]; Victor Champaney[5]; *Mustafa Megahed*[6]; [1]Imperial College; [2]Brunel University; [3]AIMEN; [4]MX3D; [5]ENSAM; [6]ESI Group

Neutron Imaging Capabilities and Recent Development at High Flux Isotope Reactor: *Yuxuan Zhang*[1]; Leslie Butler[2]; Hassina Bilheux[1]; Kyungmin Ham[2]; Jean Bilheux[1]; Wieslaw Stryjewski[2]; Erik Stringfellow[1]; Michael Vincent[2]; [1]Oak Ridge

National Laboratory; [2]Louisiana State University

Controlling Interdependent Meso-nanosecond Dynamics and Defect Generation Using a Digital Twin: *Saad Khairallah*[1]; Brian Simonds[2]; Tao Sun[3]; Michael Stokes[4]; Alexey Volkov[4]; Aiden Martin[1]; John Lee[1]; Gabe Guss[1]; Nicholas Calta[1]; Joshua Hammons[1]; Michael Nielsen[1]; Kevin Chaput[5]; Edwin Schwalbach[5]; Megna Shah[5]; Michael Chapman[5]; Trevor Willey[1]; Alexander Rubenchik[1]; Andrew Anderson[1]; Y. Morris Wang[6]; Manyalibo Matthews[1]; Wayne King[7]; [1]Lawrence Livermore National Laboratory; [2]NIST; [3]University of Virginia; [4]University of Alabama; [5]Air Force Research Laboratory; [6]University of California, Los Angeles; [7]The Barnes Group Advisors

Flexible Simulation Augmentation for DED AM Using In-situ Digital Image Correlation, Multispectral Infrared Imaging, and Neutron Scattering Validation: *James Haley*[1]; Stephan DeWitt[1]; Thomas Feldhausen[1]; Bruno Turcksin[1]; [1]Oak Ridge National Laboratory

Keyhole Melting Regimes and Porosity Formation during Laser Powder Bed Fusion Additive Manufacturing: *Yuze Huang*[1]; Tristan G. Fleming[2]; Chu Lun Alex Leung[1]; Samuel J. Clark[1]; Sebastian Marussi[1]; Kamel Fezzaa[3]; Jakumeit Jürgen[4]; Jeyan Thiyagalingam[5]; Peter D. Lee[1]; [1]University College London; [2]Queen's University; [3]Argonne National Laboratory; [4]Access e.V.; [5]Science and Technology Facilities Council

Material Processing-microstructure-mechanical Property Relationship of Supersolidus Liquid Phase Sintered Binder Jet Additively Manufactured H13 Tool Steel: *Jia Liu*[1]; Rangasayee Kannan[2]; Dalong Zhang[1]; Tingkun Liu[1]; Peeyush Nandwana[2]; Arun Devaraj[1]; [1]Pacific Northwest National Laboratory; [2]Oak Ridge National Laboratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Beyond the Beam III — On-Demand Oral Presentations

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

Program Organizers: Brady Butler, US Army Research Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory; James Paramore, US Army Research Laboratory; Nihan Tuncer, Desktop Metal; Markus Chmielus, University of Pittsburgh; Paul Prichard, Kennametal Inc.

Monday AM | March 14, 2022
Additive Technologies | On-Demand Room

A Multi-step Data Driven Model for Reverse Shape Compensation for Binder Jet Parts: Hao Deng[1]; *Basil Paudel*[1]; Albert To[1]; [1]University of Pittsburgh

Microstructure and Mechanical Properties of Friction Stir Deposited SS304: *Nikhil Gotawala*[1]; Neeraj Mishra[1]; Amber Shrivastava[1]; [1]Indian Institute of Technology Bombay

Friction and Gravity Effects during Sintering of Binder Jet Parts: *Basil Paudel*[1]; Albert To[1]; [1]University of Pittsburgh

Optimization of Al 6061 Powder Feedstock for Cold Spray Using a Through-process Experimental Approach: *Kyle Tsaknopoulos*[1]; Bryer Sousa[1]; Jack Grubbs[1]; Christopher Massar[1]; Matthew Gleason[1]; Danielle Cote[1]; [1]Worcester Polytechnic

Institute

X-ray Computed Tomographic Study of Density Gradients within Binder Jet Printed H13 Components: *Dustin Gilmer*[1]; Peeyush Nandwana[2]; Ryan Dehoff[2]; Tomonori Saito[1]; [1]University of Tennessee Knoxville/Oak Ridge National Laboratory Bredesen Center; [2]Oak Ridge National Laboratory

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development IV: Rapid Development — On-Demand Oral Presentations

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering 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 14, 2022
Additive Technologies | On-Demand Room

Invited
Relationship between the Solidification Behavior and Porosity in Gas-atomized Powders and Electron Beam Melted Co-Cr-Mo Alloys: *Kenta Yamanaka*[1]; Shoya Aota[1]; Jérôme Adrien[2]; Eric Maire[2]; Damien Fabrègue[2]; Akihiko Chiba[1]; [1]Tohoku University; [2]INSA Lyon

Towards Scaling Law-based Process Screening in Laser Powder Bed Fusion by Melt Pool Control: *Theresa Hanemann*[1]; Christoph Seyfert[2]; Astrid Rota[2]; Martin Heilmaier[1]; [1]Karlsruhe Institute of Technology; [2]EOS GmbH Electro Optical Systems

Effect of Laser Parameters on The Microstructure and Formation of TiC-Fe Cermets Fabricated through Selective Laser Melting: *Himanshu Maurya*[1]; Prashanth Gokuldoss[1]; Lauri Kollo[1]; Marek Tarraste[1]; Kristjan Juhani[1]; Fjodor Sergejev[1]; [1]Tallinn University of Technology

Functionally Graded Alloys from 316 Stainless Steel to Inconel 718 by Powder-based Laser Direct Energy Deposition: *Kun Li*[1]; Jianbin Zhan[1]; Qian Tang[1]; David Zhang[2]; Wei Xiong[3]; Huajun Cao[1]; [1]Chongqing University; [2]Chongqing University; University of Exeter; [3]University of Pittsburgh

Development of a CoNi-based Superalloy with a Focus on As-printed Microstructure: *Kira Pusch*[1]; Sean Murray[1]; Evan Raeker[1]; Ning Zhou[2]; Stephane Forsik[2]; Tresa Pollock[1]; [1]University of California, Santa Barbara; [2]Carpenter Technology

High Throughput Material Characterization Framework for Additively Manufactured Graded Materials: *Karthik Adapa*[1]; Christopher Saldana[1]; Surya Kalidindi[1]; Thomas Feldhausen[2]; [1]Georgia Institute of Technology; [2]Oak Ridge National Laboratory

High Performance Computing to Aid the Design of Novel Ti Alloys for Additive Manufacturing: *Bala Radhakrishnan*[1]; Tahany El-Wardany[2]; Ranadip Acharya[3]; [1]Oak Ridge National Laboratory; [2]Raytheon Technologies Research Center; [3]Collins Aerospace Applied Research and Technology

AM-based Combinatorial Approach for Site-specific Property Response: *Soumya*

Nag[1]; Jaimie Tiley[1]; Ke An[1]; Raymond Unocic[1]; Jonathan Poplawsky[1]; [1]Oak Ridge National Laboratory

Multi-metal 316L SS+Cu with Tailored Thermal Conductivity Manufactured via Laser Powder Bed Fusion: *Saereh Mirzababaei*[1]; V. Vinay Doddapaneni[1]; Kijoon Lee[1]; Chih-hung Chang[1]; Brian K. Paul[1]; Somayeh Pasebani[1]; [1]Oregon State University

Processing of Immiscible Iron-silver-materials via Laser Beam Melting: *Jan Krüger*[1]; Malte Dreyer[1]; Kay-Peter Hoyer[1]; Mirko Schaper[1]; [1]Paderborn University

Design and Development of New Titanium Metastable Alloys for Use in Laser Powder Bed Fusion: Zou Zhiyi[1]; Minh-Son Pham[2]; Adam Clare[1]; James Murray[1]; *Marco Simonelli*[1]; [1]University of Nottingham; [2]Imperial College London

Development of Al-Cu-Mg and Al-Mg-Si-Zr Alloys with Improved L-PBF Processability: *Filippo Belelli*[1]; Riccardo Casati[1]; Maurizio Vedani[1]; [1]Politecnico di Milano

Precipitation Strengthening Mechanism of a Ti-based Alloy Manufactured by Electron Beam Melting: *Yujie Cui*[1]; Kenta Aoyagi[1]; Kenta Yamanaka[1]; Tadashi Fujieda[2]; Akihiko Chiba[1]; [1]Tohoku University; [2]Hitachi Metals, Ltd.

Preventing Mg Loss during Laser Powder Bed Fusion of an Al-Mg-Sc Alloy: *Léa Deillon*[1]; Felix Jensch[2]; Frank Palm[3]; Markus Bambach[1]; [1]ETH Zürich; [2]BTU Cottbus-Senftenberg; [3]Airbus Central Research & Technology

Composition Control in Laser Powder Bed Fusion Additive Manufacturing through Differential Evaporation: *Meelad Ranaiefar*[1]; Edwin Schwalbach[2]; Ibrahim Karaman[1]; Raymundo Arroyave[1]; Alaa Elwany[1]; [1]Texas A&M University; [2]Air Force Research Laboratory

Parameter Development and Fabrication of Test Parts of Bronze Alloy Cu-10Sn Using Powder Bed Fusion (PBF): *Michael Brand*[1]; Robin Pacheco[1]; Colt Montgomery[1]; Ryan Mier[1]; [1]Los Alamos National Laboratory

Alloy Design for Additive Manufacturing: *Bhaskar Majumdar*[1]; [1]New Mexico Institute of Mining and Technology

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development IV: Rapid Development — On-Demand Poster Session

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering 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 14, 2022
Additive Technologies | On-Demand Poster Hall

A 3-D Multiple-slip Crystal Plasticity Model for Precipitate Hardening in Additively Manufactured High Strength Steels: Moustafa AbdelHamid[1]; *Tarek Hatem*[2]; [1]Nile University; [2]The British University in Egypt

Analysis on Solidification Microstructure and Cracking Mechanism of a Matrix

High-speed Steel Deposited by Direct Energy Deposition Process: Geon-Woo Park[1]; Sunmi Shin[1]; Byung Jun Kim[1]; Wookjin Lee[2]; Sung Soo Park[3]; *Jong Bae Jeon*[4]; [1]Korea Institute of Industrial Tehcnology; [2]Pusan National University; [3]Ulsan National Institute of Science and Technology; [4]Dong-A University

Ceramic–metal Composites Using Ceramic 3D Printing and Centrifugal Infiltration: *Shahbaz Khan*[1]; Ling Li[1]; [1]Virginia Tech

In-situ Alloying of Ti-Zr-Nb-Sn Bio-titanium Alloys via Direct Energy Deposition: *Yukyeong Lee*[1]; Jonghyun Jeong[1]; Eun Sung Kim[2]; Shuanglei Li[1]; Jae Bok Seol[1]; Hyokyung Sung[1]; Hyoung Seop Kim[2]; Taehyun Nam[1]; Jung Gi Kim[1]; [1]Gyeongsang National University; [2]Pohang University of Science and Technology

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Nano/Micro-mechanics and Length-scale Phenomena — On-Demand Oral Presentations

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

Program Organizers: Meysam Haghshenas, University of Toledo; Robert Lancaster, Swansea University; Andrew Birnbaum, US Naval Research Laboratory; Jordan Weaver, National Institute of Standards and Technology; Aeriel Murphy-Leonard, Ohio State University

Monday AM | March 14, 2022
Additive Technologies | On-Demand Room

Mechanical Properties of Single Struts Made by Laser Powder-bed Fusion: Effects of Melt-track Transient States and Process Parameters: *Behzad Fotovvati*[1]; Subin Shrestha[1]; Kevin Chou[1]; [1]University of Louisville

Designing Additive Layered Manufacturing Inspired Damage Tolerant Architectures: *Deepesh Yadav*[1]; Tanmayee More[1]; B N Jaya[1]; [1]Indian Institute of Technology Bombay

The Role of Microstructure on the Creep Response of Additively Manufactured IN718 Using Crystal Plasticity: *Veerappan Prithivirajan*[1]; M Arul Kumar[1]; Laurent Capolungo[1]; [1]Los Alamos National Lab

Correlating the Microstructure and Mechanical Properties of Additively Manufactured Al-Ce Alloys Using In-situ Micromechanical Testing: *Tanvi Ajantiwalay*[1]; Richard Michie[2]; Amit Shyam[2]; Alex Plotkowski[2]; Arun Devaraj[1]; [1]Pacific Northwest National Laboratory; [2]Oak Ridge National Laboratory

Three-pronged Approach to Prediction of Polymer-additive System Rheology: *Scott Muller*[1]; Peiyuan Gao[1]; Lirong Zhong[1]; Amanda Howard[1]; Jaehun Chun[1]; Gregory Schenter[1]; [1]Pacific Northwest National Laboratory

Mechanical Response of "Meta-Polycrystalline" Steel 316L Produced by Laser Powder Bed Fusion: *Karl Sofinowski*[1]; Mallory Wittwer[1]; Matteo Seita[1]; [1]Nanyang Technological University

The Effect of Defects on Additive Manufacturing Material at the Microscale -- Approaches to Manage the Consequences: *Martin White*[1]; Mohsen Seifi[1]; [1]ASTM International

Indentation-derived Mechanical Properties of Ti-6Al-2Sn-4Zr-2Mo Alloy

Fabricated through Laser-powder Bed Fusion: *Harish Kaushik*[1]; Meysam Haghshenas[2]; Amir Hadadzadeh[1]; [1]University of Memphis; [2]University of Toledo

---

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Nano/Micro-mechanics and Length-scale Phenomena — On-Demand Poster Session

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

Program Organizers: Meysam Haghshenas, University of Toledo; Robert Lancaster, Swansea University; Andrew Birnbaum, US Naval Research Laboratory; Jordan Weaver, National Institute of Standards and Technology; Aeriel Murphy-Leonard, Ohio State University

Monday AM | March 14, 2022
Additive Technologies | On-Demand Poster Hall

Laser Scan Length: A New Parameter to Tune the Thermal Buildup in Laser Powder Bed Fusion Processes: *Qingyang Lu*[1]; Xiaogang Wang[1]; Tan-Phuc Le[1]; Jude Emil Fronda[1]; Matteo Seita[1]; [1]Nanyang Technological University

---

NUCLEAR MATERIALS

Advanced Characterization and Modeling of Nuclear Fuels: Microstructure, Thermo-physical Properties — On-Demand Oral Presentations

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

Program Organizers: David Frazer, Idaho National Laboratory; Fabiola Cappia, Idaho National Laboratory; Tsvetoslav Pavlov, Idaho National Laboratory; Peter Hosemann, University of California

Monday AM | March 14, 2022
Nuclear Materials | On-Demand Room

Invited
High-resolution Thermal Conductivity and Thermal Boundary Resistance Mapping in TRISO: *Dong Liu*[1]; [1]University of Bristol

Invited
Structural Analysis of the IPyC/SiC Interface of AGR-2 Irradiated and Safety Tested TRISO Fuel: *Rachel Seibert*[1]; Tyler Gerczak[1]; Jesse Werden[1]; Darren Skitt[1]; John Hunn[1]; [1]Oak Ridge National Laboratory

Invited
A Combined Molecular and Cluster Dynamics Approach to Determine Radiation Enhanced Diffusion in UMo Alloys: *Benjamin Beeler*[1]; Park Gyuchul[2]; Maria Okuniewski[2]; Shenyang Hu[3]; Zhi-Gang Mei[4]; [1]North Carolina State University; [2]Purdue University; [3]Pacific Northwest National Laboratory; [4]Argonne National

Laboratory

Invited
Comparison of Observations from the Microstructure of Two High Burnup Fuel Samples Operated at Different Linear Heat Generation Rates: *Jason Harp*[1]; Tyler Gerczak[1]; [1]Oak Ridge National Laboratory

Invited
Thermal Conductivity Measurement of Microstructures in Irradiated Nuclear Fuels: *Yinbin Miao*[1]; Lakshmi Amulya Nimmagadda[2]; Jingyi Shi[3]; Kun Mo[1]; Bei Ye[1]; Shipeng Shu[1]; Peter Mouche[1]; Winfried Petry[3]; Sanjiv Sinha[2]; Abdellatif Yacout[1]; [1]Argonne National Laboratory; [2]University of Illinois Urbana-Champaign; [3]Technical University of Munich

High-throughput Viscosity Measurements of Molten Salts for Molten Salt Reactors: *Alexander Levy*[1]; Haoxan Yan[1]; Federico Coppo[1]; Uday Pal[1]; Karl Ludwig[1]; Adam Powell[2]; [1]Boston University; [2]Worchester Polytechnic Institute

Mesoscale Model of Gas Bubble Evolution and Creep in Monolithic UMo Fuels: *Shenyang Hu*[1]; Benjamin Beeler[2]; [1]Pacific Northwest National Laboratory; [2]Idaho National Laboratory

Synergistic Electron/Thermal Microscope for High-throughput Screening of Emerging Nuclear Materials: *Yuzhou Wang*[1]; Cody Dennett[1]; Zilong Hua[1]; Robert Schley[1]; Daniel Murray[1]; Geoffrey Beausoleil II[1]; David Hurley[1]; [1]Idaho National Laboratory

Investigation of Damage Structure Evolution on Proton Irradiated Zr-alloys of Various Compositions Using Synchrotron X-ray Diffraction and TEM: *Ömer Koç*[1]; Tamas Ungár[1]; Rebecca Jones[2]; Hattie Xu[1]; Robert Harrison[1]; Michael Preuss[1]; Philipp Frankel[1]; [1]The University of Manchester; [2]Rolls-Royce

Mesoscale Modeling of Effective Thermal Conductivity in U-Zr Fuels with Heterogeneous Phases: Weiming Chen[1]; *Xian-Ming Bai*[1]; [1]Virginia Polytechnic Institute and State University

Correlative APT-TEM Investigation of Defects' Influence on Thermal Diffusivity in ThO_2 Nuclear Fuel: *Amrita Sen*[1]; Mukesh Bachhav[2]; Cody Dennett[2]; James Mann[3]; Janelle Wharry[1]; [1]Purdue University; [2]Idaho National Laboratory; [3]Air Force Research Laboratory

Evolution of the Internal Layer Structure in Irradiated TRISO Fuel: *Tyler Gerczak*[1]; John Hunn[1]; Grant Helmreich[1]; Rachel Seibert[1]; John Stempien[2]; Darren Skitt[1]; Brian Eckhart[1]; Andrew Kercher[1]; [1]Oak Ridge National Laboratory; [2]Idaho National Laboratory

Experimentally Validated Model for Investigating High-burnup Structure Formation in U-Mo Fuels: *Sudipta Biswas*[1]; Charlyne Smith[2]; Brandon Miller[1]; Dennis Keiser[1]; Assel Aitkaliyeva[2]; [1]Idaho National Laboratory; [2]University of Florida

NUCLEAR MATERIALS

Advanced Characterization and Modeling of Nuclear Fuels: Microstructure, Thermo-physical Properties — On-Demand Poster Session

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

Program Organizers: David Frazer, Idaho National Laboratory; Fabiola Cappia, Idaho National Laboratory; Tsvetoslav Pavlov, Idaho National Laboratory; Peter Hosemann, University of California

Monday AM | March 14, 2022
Nuclear Materials | On-Demand Poster Hall

Propose Advanced Nuclear Fuels with High Thermal Conductivity Using Machine Learning: *Meigyoku Kin*[1]; Masaya Kumagai[1]; Yuji Ohishi[2]; Eriko Sato[1]; Masako Aoki[1]; Ken Kurosaki[1]; [1]Kyoto University; [2]Osaka University

The Effect of the Proton Irradiation Dose Rate on the Evolution of Microstructure in Zr Alloys: A Synchrotron Micro-beam X-ray and TEM Study: *Ömer Koç*[1]; Rhys Thomas[1]; Tamas Ungár[1]; Zoltan Hegedues[2]; Robert Harrison[1]; Michael Preuss[1]; Philipp Frankel[1]; [1]The University of Manchester; [2]Deutsches Elektronen-Synchrotron (DESY)

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — On-Demand Oral Presentations

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

Program Organizers: Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; Olivia Underwood Jackson, Sandia National Laboratories

Monday AM | March 14, 2022
Characterization | On-Demand Room

Invited
Characterization of Heat-resistant Steels and Alloys for Life-prediction Modeling: *Yukinori Yamamoto*[1]; David Hoelzer[1]; Michael Lance[1]; Michael Brady[1]; Edgar Lara-Curzio[1]; Qing-Qiang Ren[2]; Jonathan Poplawsky[2]; Arul Kumar Mariyappan[3]; Ricardo Lebensohn[3]; Laurent Capolungo[3]; Michael Glazoff[4]; Michael Gao[5]; Paul Jablonski[5]; Jeffrey Hawk[5]; [1]MSTD, Oak Ridge National Laboratory; [2]CNMS, Oak Ridge National Laboratory; [3]Los Alamos National Laboratory; [4]Idaho National Laboratory; [5]National Energy Technologies Laboratory

3D Orientation and Strain Mapping of Recrystallization and Micro-texture Development in Heavily Deformed Ferritic Alloys: *Can Yildirim*[1]; Carsten Detlefs[1]; Henning Poulsen[2]; Raquel Rodrigues-Lamas[1]; Philip Cook[1]; Mustafacan Kutsal[1]; Melanie Gauvin[3]; Dominique Mangelinck[4]; Myriam Dumont[4]; Nikolas Mavrikakis[3]; [1]European Synchrotron Radiation Facility; [2]Technical University of Denmark; [3]OCAS; [4]Aix Marseille Universite

Crystal Plasticity Finite Element Simulation of Microstructural Deformation in Ultra-thin Ferritic Steel Sheet: *Minh Tien Tran*[1]; Tri Hoang Nguyen[1]; Sun-Kwang Hwang[2]; Ho Won Lee[3]; Dong-Kyu Kim[1]; [1]University of Ulsan; [2]Korea Institute of

Industrial Technology; [3]Korea Institute of Materials Science

Evolution of Sigma Phases in 347H Stainless Steels Subjected to Isothermal Aging at 750 oC: *Qing-Qiang Ren*[1]; Yukinori Yamamoto[1]; Michael Brady[1]; Jonathan Poplawsky[1]; [1]Oak Ridge National Laboratory

An Atomistic-to-microscale Computational Analysis of the Dislocation-interface Reaction and the Subsequent Structure Changes in Two-phase Materials under Compression and Shear: *Liming Xiong*[1]; [1]Iowa State University

---

ADVANCED MATERIALS

Advanced Functional and Structural Thin Films and Coatings — On-Demand Oral Presentations

Sponsored by: TMS: Thin Films and Interfaces Committee

Program Organizers: Ramana Chintalapalle, University of Texas at El Paso; Adele Carrado, IPCMS - CNRS Université de Strasbourg; Gerald Ferblantier, Icube Laboratory - Strasbourg University; Karine Mougin, Cnrs - Is2m; Heinz Palkowski, Clausthal University of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology

Monday AM | March 14, 2022
Advanced Materials | On-Demand Room

Keynote
Silicone Breast Implants: Grafting of a Bioactive Polymer to Improve the Bio-integration: Mylan Lam[1]; Vincent Humblot[2]; Romain Vayron[3]; Véronique Migonney[1]; *Celine Falentin-Daudre*[1]; [1]Universite Sorbonne Paris Nord; [2]Université Bourgogne Franche-Comté; [3]Université de Valenciennes

Keynote
Doping of Biomimetic Calcium-deficient Hydroxyapatite Deposited on Activated Carbon Fiber Cloth to Improve Bone Regeneration: Florian Olivier[1]; Nathalie Rochet[2]; *Sylvie Bonnamy*[1]; [1]ICMN/CNRS; [2]iBV/ INSERM

Invited
Materials for Antireflective Coatings in Photovoltaics - An Overview: *Vishal Mehta*[1]; NM Ravindra[2]; Andrew Cochran[1]; Cory Conkel[1]; [1]Ohio Northern University; [2]New Jersey Institute of Technology

Invited
Grafting Phosphonic Acid Polymers onto Titanium Implant by UV Irradiation: *Caroline Pereira*[1]; Véronique Migonney[1]; Céline Falentin-Daudré[1]; [1]LBPS/CSPBAT, UMR CNRS 7244, Institut Galilée, Université Sorbonne Paris Nord

Invited
Fifty Shades of TiN: How Deposition Conditions Influence the Growth Morphology and Thereby Hardness and Especially Fracture Toughness: *Paul Mayrhofer*[1]; Rainer Hahn[1]; Alexander Kirnbauer[1]; [1]TU Wien

In-situ Mapping of Local Orientation and Strain in a Fully Operable Infrared Sensor Using Dark Field X-ray Microscopy: *Can Yildirim*[1]; Philippe Ballet[2]; Patrice Gergaud[2]; Francois Boulard[2]; Tao Zhou[3]; Raphael Pesci[4]; Tobias Schulli[2]; Nicolas Baier[2]; Thanh Nguyen[2]; Brellier Delphine[2]; [1]European Synchrotron Radiation Facility; [2]CEA; [3]ANL; [4]ENSAM

Study on Surface Cracking and Interfacial Delamination of Metallic Coatings

Using a Tension Test: *Deepesh Yadav*[1]; Sanjay Sampath[1]; B N Jaya[1]; [1]Indian Institute of Technology Bombay

Surface Chemistry and Subsurface Microstructure of Al 2024-T3 Laser-interference Structured: *Adrian Sabau*[1]; Harry Meyer[1]; Donovan Leonard[1]; [1]Oak Ridge National Laboratory

Numerical Study of Intrinsic Stresses in Perovskite-on-Si Solar Cells with Intermetallic Bonding: Seif Elbadry[1]; *Tarek Hatem*[1]; Salah Bedair[2]; [1]The British University in Egypt; [2]North Carolina State University

Stress Evolution and Recovery in High-entropy Metal Sublattice Diborides: *Alexander Kirnbauer*[1]; Peter Polcik[2]; Paul Mayrhofer[3]; [1]TU Wien; [2]Plansee Composite Materials GmbH; [3]TU Wien, Thin Film Materials Science Division

Large Scale Growth of Diamond on Surface-terminated Silicon-incorporated Diamond-like Carbon Thin Films: *Parand Riley*[1]; Pratik Joshi[1]; Roger Narayan[1]; Jagdish Narayan[1]; [1]North Carolina State University

Application of Mg/Al2O3 and Mg/SiO2 Nanolaminates for Uniform and Controlled Corrosion of Biodegradable Implants: *Pratap Deshmukh*[1]; Sudheer Neralla[1]; Jagannathan Sankar[1]; Sergey Yarmolenko[1]; [1]North Carolina A&T State University

Effect of Oxygen Partial Pressure and Pulse Frequency on the Structure and Properties of Tungsten Incorporated Ga2O3 Films made by Pulsed Laser Deposition: *Francelia Sanchez*[1]; Debabrata Das[2]; C.V. Ramana[2]; [1]University of Texas at El Paso; [2]UTEP

Improvement of Hydrophilicity and Wetting Behavior on Patterned PLA Substrates by AP Plasma Treatment and APTES Grafting: *Mai Uyên*[1]; Po-Yu Chen[1]; [1]National Tsing Hua University

Non-reactively Sputtered Ultra-high Temperature Nb-C Coatings: *Ahmed Bahr*[1]; Rainer Hahn[1]; Oliver Hudak[1]; Tomasz wojcik[1]; Jürgen Ramm[2]; Szilard Kolozsvári[3]; Eleni Ntemou[4]; Eduardo Pitthan[4]; Daniel Primetzhofer[4]; Alexander Kirnbauer[5]; Helmut Riedl-Tragenreif[1]; [1]Christian Doppler Laboratory for Surface Engineering of high-performance Components, TU Wien; [2]Oerlikon Balzers, Oerlikon Surface Solutions AG; [3]Plansee Composite Materials GmbH; [4]Department of Physics and Astronomy, Uppsala University; [5]Institute of Materials Science and Technology, TU Wien

---

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Sensors, Power, and Multifunctional Applications — On-Demand Oral Presentations

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

Program Organizers: Daniel Salazar, BCMaterials; Alex Leary, NASA Glenn Research Center; Eric Theisen, Metglas Inc.; Huseyin Ucar, California Polytechnic University,Pomona; Yongmei Jin, Michigan Technological University

Monday AM | March 14, 2022
Energy & Environment (including REWAS 2022 Symposia) | On-Demand Room

---

Invited
Magnetization Measurements from Nanometer-sized Regions: Progress in Electron Holography: *Yasukazu Murakami*[1]; [1]Kyushu University

Effect of Hot Band Annealing and Final Annealing Temperatures on the Texture, Grain Size and Magnetic Properties of 1.2 wt% Si Non-oriented Electrical Steel: *Youliang He*[1]; Mehdi Mehdi[1]; Tihe Zhou[2]; Chad Cathcart[2]; Peter Badgley[2]; Afsaneh Edrisy[3]; [1]Canmetmaterials, Nrcan; [2]Stelco Inc.; [3]University of Windsor

Custom-designed Miniature-coil Winding/Wrapping Machine: *Balraj Mani*[1]; Bilal Adra[1]; Nuggehalli Ravindra[1]; [1]New Jersey Institute of Technology

High Saturation Magnetization of FeCoN Bulk Martensite: *Tomohiro Tabata*[1]; Matahiro Komuro[1]; Yusuke Asari[1]; Shinya Tamura[1]; Shohei Terada[1]; Satoshi Sugimoto[2]; [1]Hitachi, Ltd.; [2]Tohoku University

Correlation of Microstructure and Hard Magnetic Properties in Ce-Fe-B Magnet: *Xubo Liu*[1]; Ikenna Nlebedim[1]; [1]Ames Laboratory, CMI

Characterization of Black Box Medium Voltage, Medium Frequency, Transformers for High Power Converters: *Richard Beddingfield*[1]; Apoorv Agarwal[1]; Subhashish Bhattacharya[1]; [1]North Carolina State University

Ordering and Its Effect on Magnetostrictive Behavior in Fe-Al Single Crystals: Travis Willhard[1]; Andrew Laroche[1]; *Rahulkumar Sunil Singh*[1]; Sivaraman Guruswamy[1]; [1]University of Utah

---

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage 2022 — On-Demand Oral Presentations

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

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

Monday AM | March 14, 2022
Energy & Environment (including REWAS 2022 Symposia) | On-Demand Room

---

Keynote
Materials and Manufacturing for High Temperature Concentrating Solar Power Applications: *Kamala Raghavan*[1]; Vijaykumar Rajgopal[1]; Nikkia McDonald[1]; Avi Shultz[1]; [1]US Department of Energy

Invited
Feasibility Studies of Fully Inorganic Perovskite Cells through Experimental Degradation and Metrics Identification: Towards the Development of Hybrid Sensors for Biomedical Wearable Devices: *Saquib Ahmed*[1]; Sankha Banerjee[2]; Deidra Hodges[3]; [1]State University of New York at Buffalo State; [2]California State

University, Fresno; [3]Florida International University

Invited
Machine Learning Enables Discovery of Ternary Alloy Catalysts for Oxygen Reduction: Youngtae Park[1]; *Hyuck Mo Lee*[1]; [1]KAIST

Invited
Interplay between Mechanics and Electrochemistry in FeS2 Electrode Performance: *Scott Roberts*[1]; Jeffrey Horner[1]; [1]Sandia National Laboratories

Invited
X-ray Characterization of Battery Degradation: *Johanna Nelson Weker*[1]; [1]SLAC National Accelerator Laboratory

Multi-layered Thin-films Metal Contacts for New Generation Solar Cells: Andriy Orlov[1]; *Ivan Kruhlov*[1]; Vitalii Yanchuk[1]; Sergey Prikhodko[2]; Svitlana Voloshko[1]; [1]National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"; [2]University of California Los Angeles

Magnetoelectrochemical Control of Interfacial Degradation during Fast Charging of LIB: *Abhishek Sarkar*[1]; Pranav Shrotriya[2]; Cajetan Nlebedim[1]; [1]Ames Laboratory; [2]Iowa State University

Characterization of AlCl3-urea Electrolyte for Speciation, Conductivity, and Electrochemical Stability and Its Application in Al-ion Batteries: *Monu Malik*[1]; Kok Long Ng[2]; Gisele Azimi[1]; [1]University of Toronto; [2]University of Tororno

Ag@AgCl Core/shell Catalysts with Bumpy Surface to Enhance Oxygen Reduction Reaction: *Suyeon Choi*[1]; Changsoo Lee[2]; Jahyun Koo[3]; Hyuck Mo Lee[1]; [1]Korea Advanced Institute of Science and Technology; [2]Korea Institute of Energy Research; [3]Korea University

Photoabsorbers with Hybrid Organic-inorganic Structures for Optoelectronics and Solar Cells: Mohin Sharma[1]; Mritunjaya Parashar[1]; Anupama Kaul[1]; *Ravindra Mehta*[1]; [1]University of North Texas

Simulating Microstructure Evolution in Ni-YSZ Electrodes of Solid Oxide Cells under Operating Conditions: *Yinkai Lei*[1]; William Epting[1]; Jerry Mason[1]; Tianle Cheng[1]; Harry Abernathy[1]; Gregory Hackett[2]; Youhai Wen[2]; [1]US DOE National Energy Technology Laboratory, NETL support contractor; [2]US DOE National Energy Technology Laboratory

Electric Field Process for Lithium Ion Batteries: Hiep Pham[1]; Yufang He[1]; Jie Li[1]; Susmita Sarkar[1]; *Jonghyun Park*[1]; [1]Missouri University of Science and Technology

Initiatory Plating and Stripping towards the Survival of Sodium Metal Electrodes: *Susmita Sarkar*[1]; Partha Mukherjee[1]; [1]Purdue University

Mesoscale Analysis of Electrochemical-mechanical Interactions in Solid-state Batteries: *Bairav Vishnugopi*[1]; Partha Mukherjee[1]; [1]Purdue University

Impact of Low Operating Temperatures on the Performance of Li-ion Batteries: *Amani Alhammadi*[1]; Amarsingh Kanagaraj[1]; Prerna Chaturvedi[1]; Daniel Choi[1]; [1]Khalifa University of Science and Technology

---

ENERGY & ENVIRONMENT

Advanced Materials for Energy Conversion and Storage 2022 — On-Demand Poster Session

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

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

Monday AM | March 14, 2022
Energy & Environment (including REWAS 2022 Symposia) | On-Demand Poster Hall

---

Thermoelectric Generators System Made with Low-cost Thermoelectric Modules for Low Temperature Waste Heat Recovery: *Manuela Castañeda Montoya*[1]; Andrés Amell Arrieta[1]; Henry Colorado[1]; [1]Universidad de Antioquia

---

CHARACTERIZATION

Advanced Real Time Imaging — On-Demand Oral Presentations

Sponsored by: 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 Engergy Technology Laboratory; David Alman, National Energy Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki Shibata, 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; Pranjal Nautiyal, University of Pennsylvania

Monday AM | March 14, 2022
Characterization | On-Demand Room

Invited
In Situ Evidence of Dynamic Interactions between Droplets and Dendrites during Rapid Solidification of Immiscible Alloys: *Jianrong Gao*[1]; [1]Northeastern University

Invited
Dissolution Behavior of Non-metallic Inclusions in Refining Slag Observed Using Confocal Scanning Laser Microscopes: *Ying Ren*[1]; Lifeng Zhang[2]; Changyu Ren[1]; [1]University of Science and Technology Beijing; [2]Yanshan University

Invited
In Situ Observation and Investigation of the Wetting Behaviors of Mold Flux on Steel Substrate: *Lejun Zhou*[1]; Yang Yang[1]; Wanlin Wang[1]; Hao Luo[1]; Houfa Wu[1]; [1]Central South University

Three-dimensional Time Evolution Behavior of Short Fatigue Crack Morphology and Crack Closure in Ti-6Al-4V Alloy Assessed Using High-energy Imaging Type CT: *Valary Tubei*[1]; Hiroyuki Toda[1]; Akihisa Takeuchi[2]; Masayuki Uesugi[2]; [1]Kyushu University; [2]Japan Synchrotron Radiation Research Institute

Ca^{2+} and pH Imaging during Dissolution of $CaSiO_3$ into Aqueous Solution: *Sakiko Kawanishi*[1]; Hinako Nakayama[1]; Jun Kawano[2]; Takeshi Yoshikawa[3]; Hiroyuki Shibata[1];

[1]Tohoku University; [2]Hokkaido University; [3]The University of Tokyo

Evaluation of Interfacial Energy between Molten Fe- 18%Cr-9%Ni Alloy and Non-metallic Inclusion-type Oxides at 1873K: Tomoki Furukawa[1]; *Noritaka Saito*[2]; Kunihiko Nakashima[2]; [1]The University of Tokyo; [2]Kyushu University

In-operando Interactions of Refractory Materials with Ash/Slag from Mixed Feedstock Gasification: *Anna Nakano*[1]; Kristin Tippey[2]; Jinichiro Nakano[1]; Hugh Thomas[3]; Ömer Dogan[3]; Matthew Lambert[4]; Dana G. Goski[4]; [1]U.S. Department of Energy National Energy Technology Laboratory/ NETL Support Contractor; [2]National Energy Technology Laboratory; [3]U.S. Department of Energy National Energy Technology Laboratory; [4]Allied Mineral Products, LLC

Simultaneous Extraction of Nickel and Vanadium from Petroleum Byproducts: *Jinichiro Nakano*[1]; Anna Nakano[1]; Ryu Takekoh[2]; Hugh Thomas[3]; [1]US Department of Energy - National Engergy Technology Laboratory; [2]IT-Related Chemicals Research Laboratory, Sumitomo Chemical Co., Ltd.; [3]US DOE National Energy Technology Laboratory

In-situ Observation of SO2 Gas Formation at the Magnetite/Matte Interface at 1200: *Seung-Hwan Shin*[1]; Sakiko Kawanishi[1]; Sohei Sukenaga[1]; Junichi Takahashi[2]; Hiroyuki Shibata[1]; [1]Tohoku University; [2]SMM Co., LTD

Real Time Quantification of Nickel, Cobalt, and Manganese Concentration Using Ultraviolet-visible Spectroscopy -- A Feasibility Study: *Monu Malik*[1]; Ka Ho Chan[1]; Gisele Azimi[1]; [1]University of Toronto

Real Time Observation of Reactive Spreading and Interfacial Reactions between Liquid AlNi Alloy and Solid Ni: *Youqing Sun*[1]; Ensieh Yousefi[1]; Anil Kunwar[2]; Nele Moelans[2]; David Seveno[1]; Muxing Guo[2]; [1]KU Leuven; [2]Silesian University of Technology

Evaluation of Dynamic Wetting Properties of Si/C Interface: *Yoshiki Takeuchi*[1]; Shun Ueda[1]; Takeshi Yoshikawa[1]; Kazuki Morita[1]; [1]The University of Tokyo

---

NANOSTRUCTURED MATERIALS

Advances and Discoveries in Non-equilibrium Driven Nanomaterials and Thin Films — On-Demand Oral Presentations

Sponsored by: TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Ritesh Sachan, Oklahoma State University; Amit Pandey, Lockheed Martin Space; Saurabh Puri, Microstructure Engineering; Amber Srivastava, Indian Institute of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology

Monday AM | March 14, 2022
Nanostructured Materials | On-Demand Room

Keynote
Extraordinary Properties of Q-carbon and Diamond Related Materials: *Jagdish Narayan*[1]; [1]North Carolina State University

Invited
Low-dimensional Titanium Oxynitride Thin Films and Nanowires for Water-splitting and Ultra-high Capacitance Supercapacitors Applications: *Dhananjay*

Kumar[1]; [1]North Carolina A&T State University

Invited
Magnetic Properties of Qausi-2D van der Waals Crystals by Protons and Photons: *Srinivasa Rao Singamaneni*[1]; [1]University of Texas at El Paso

Invited
Recent Advances for Highly Stable Practical Potassium Ion Batteries: Qian Liu[1]; Qingfeng Zhang[1]; Chengxin Wang[2]; *Rao Apparao*[3]; Bingan Lu[1]; [1]Hunan University; [2]Sun Yat-sen University; [3]Clemson University

Invited
Magneto-optical Properties of Equilibrium and Non-equilibrium Bi-metallic Materials: *Philip Rack*[1]; David Garfinkel[1]; Reece Emery[1]; Nan Tang[1]; Dustin Gilbert[1]; [1]University of Tennessee

Invited
Salt-assisted Chemical Vapor Deposition Synthesis of 2D WSe2 and Its Integration in High Performance Field-effect Transistors: *Anupama Kaul*[1]; Avra Bandyopadhyay[1]; [1]University of North Texas

Invited
Exploring Functional Nanomaterials at XTIP Beamline: *Nozomi Shirato*[1]; [1]Argonne National Laboratory

Invited
Linking Defects with Electronic Structure, and Optoelectronic Properties in Semiconductor Thin Films: *Emila Panda*[1]; [1]IIT Gandhinagar

Invited
Surrogates for Actinide Thin Film Research: *Ashutosh Tiwari*[1]; Cody Dennett[2]; Narayan Poudel[2]; Krzysztof Gofryk[2]; [1]University of Utah; [2]Idaho National Lab

Invited
Two-photon Lithography of 2D/3D Nanostructures in Polymer and Composite Matrix: *Shobha Shukla*[1]; [1]IIT Bombay

Transient Laser Heating Induced Nanoscopic Surface Reconstruction in VO2 Thin Film: *Soumya Mandal*[1]; Adele Moatti[2]; Jagdish Narayan[2]; Ritesh Sachan[1]; [1]Oklahoma State University; [2]North Carolina State University

Tailoring the Properties of Carbon Thin Films on Flexible HDPE Substrate by Non-equilibrium Laser Annealing: *Pratik Joshi*[1]; Parand Riley[1]; Roger Narayan[1]; Jagdish Narayan[1]; [1]North Carolina State University

---

NANOSTRUCTURED MATERIALS

Advances and Discoveries in Non-equilibrium Driven Nanomaterials and Thin Films — On-Demand Poster Session

Sponsored by: TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Ritesh Sachan, Oklahoma State University; Amit Pandey, Lockheed Martin Space; Saurabh Puri, Microstructure Engineering; Amber Srivastava, Indian Institute of Technology; Nuggehalli Ravindra, New Jersey Institute of Technology

Monday AM | March 14, 2022
Nanostructured Materials | On-Demand Poster Hall

Laser Irradiation Induced Nanoscale Surface Transformations in Strontium Titanate: *Ashish Kumar Gupta*[1]; Siddharth Gupta[2]; Soumya Mandal[1]; Jagdish Narayan[2]; Ritesh Sachan[1]; [1]Oklahoma State University; [2]North Carolina State University

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: Alloy Development and Properties — On-Demand Oral Presentations

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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Monday AM | March 14, 2022
Advanced Materials | On-Demand Room

Keynote
Strengthening in HEAs by Solute-solute Interactions and Short-range-order: *William Curtin*[1]; Shankha Nag[2]; Binglun Yin[3]; [1]Epfl Sti Igm Lammm; [2]TU Darmstadt; [3]Zhejiang University

Invited
Chemical Effect on the Strength of Refractory High Entropy Alloys with Severe Local Lattice Distortion: *Yang Tong*[1]; Shuying Chen[1]; Fanchao Meng[1]; Peter Liaw[2]; Liang Jiang[1]; [1]Yantai University; [2]University of Tennessee-Knoxville

Invited
Compositionally Complicated Titanium Rich Alloy for Biomedical Application: *Poulami Bhattacharjee*[1]; Ren Chung[2]; Hung Yen[1]; [1]National Taiwan University; [2]National Taipei University of Technology

Invited
Heterogeneous Ultrafine Grain Formation by Severe Plastic Deformation in CrMnFeCoNi HEAs: *Koichi Tsuchiya*[1]; Jangho Yi[1]; Sangmin Lee[1]; Je In Lee[2]; [1]National Institute for Materials Science; [2]Pusan National University

Invited
Hydrogen Storage Characteristics of Multi-principal Element Alloys and Composites: *Jurgen Eckert*[1]; [1]Erich Schmid Institute of Materials Science

Invited
Shear Instabilities of BCC Refractory High Entropy Alloys: *Michael Widom*[1]; [1]Carnegie Mellon University

Invited
Ultrafast Multilayer Combustion Synthesis of B2 Single Phase AlCoCrFeNi High Entropy Alloy Films Using Reactive Al/Ni Multilayer as Heat Source: Anni Wang[1]; *Isabella Gallino*[2]; Sascha Riegler[2]; Yi-Ting Lin[3]; Nishchay Isaac[4]; Yesenia Sauni Camposano[4]; Sebastian Matthes[4]; Dominik Flock[4]; Heiko Jacobs[4]; Hung-Wei Yen[3]; Peter Schaaf[4]; [1]FemtoTools; [2]Saarland University; [3]National Taiwan University; [4]TU

Ilmenau

Invited
Predicting Temperature-dependent Ultimate Strengths of BCC High-entropy Alloys: Baldur Steingrimsson[1]; *Xuesong Fan*[2]; Michael Gao[3]; Peter Liaw[2]; [1]Imagars LLC; [2]University of Tennessee; [3]National Energy Technology Laboratory

Invited
Tunable Chemical Disorder in Concentrated Alloys: Defects and Radiation Performance: *Yanwen Zhang*[1]; Yuri Osetsky[1]; William Weber[2]; [1]Oak Ridge National Laboratory; [2]Department of Materials Science and Engineering, The University of Tennessee

Invited
Thermal and Irradiation-induced Grain Growth in Nanocrystalline High-entropy Alloys: William Weber[1]; *Yanwen Zhang*[2]; Chinthaka Silva[2]; Timothy Lach[2]; Walker Boldman[1]; Philip Rack[1]; Li Jiang[3]; Lumin Wang[3]; Graeme Greaves[4]; Matheus Tunes[4]; Stephen Donnelly[4]; [1]University of Tennessee; [2]Oak Ridge National Laboratory; [3]University of Michigan; [4]University of Huddersfield

Invited
Characteristics of Uniaxial Mechanical Properties of Single Crystals of FCC High- and Medium-entropy Alloys: *Haruyuki Inui*[1]; Kyosuke Kishida[1]; Le Li[1]; [1]Kyoto University

Invited
Corrosion of Single-phase Ni-Fe-Cr-Mo-W-X Non-equimolar Multi-principal Element Alloys: *Gerald Frankel*[1]; Anup Panindre[1]; Yehia Khalifa[1]; Christopher Taylor[1]; Pin Lu[2]; John Scully[3]; [1]Ohio State University; [2]Questek Innovations; [3]University of Virginia

Invited
Deformation Behavior of a Multicomponent L21 Heusler Alloy: *Rui Feng*[1]; Chuan Zhang[2]; Michael Gao[3]; Zongrui Pei[3]; Yan Chen[1]; Michael Widom[4]; Ke An[1]; Peter Liaw[5]; [1]Oak Ridge National Laboratory; [2]Computherm, LLC; [3]National Energy Technology Laboratory; [4]Carnegie Mellon University; [5]The University of Tennessee, Knoxville

Development of a High Entropy Alloy Alx(CoCrCuFeNi)1-x for Diverse Security Applications: *Daniel Butcher*[1]; Jonathan Cullen[1]; Neil Barron[2]; Shahin Mehraban[1]; Monique Calvo-Dahlborg[1]; Stephen Brown[1]; Nicholas Lavery[1]; [1]Swansea University; [2]Zeal Innovation Ltd

Mixed Metal Oxide Reduction: A Novel Ceramic Derived Processing Route for Multi-principal Element Alloys: *Animesh Kundu*[1]; Helen Chan[1]; Madison Gianelle[1]; [1]Lehigh Univ

Alloy Design, Microstructure Analysis, Mechanical Testing and Weldability of a Novel CoCuFeMnNi-based High Entropy Alloy: *Jacopo Fiocchi*[1]; Carlo Biffi[2]; Mauro Coduri[3]; Ali Mostaed[4]; Luca Patriarca[5]; Maurizio Vedani[5]; Ausonio Tuissi[2]; Riccardo Casati[5]; [1]Politecnico di Milano / CNR ICMATE; [2]CNR ICMATE; [3]University of Pavia; [4]University of Oxford; [5]Politecnico di Milano

Fabrication and Investigation of Lightweight Porous Titanium-containing Medium and High-entropy Alloys by Freeze Casting: *Kuan-Cheng Lai*[1]; Ko-Kai Tseng[1]; Jien-Wei Yeh[1]; Po-Yu Chen[1]; [1]National Tsing Hua University

Hydrogen-enhanced Ductility in CoCrFeMnNi High-entropy Alloy Additively Manufactured by Selective Laser Melting: *Yi Ting Lin*[1]; Zhiguang Zhu[2]; Xianghai An[3]; Mui Ling Sharon Nai[2]; Hung Wei Yen[1]; [1]National Taiwan University; [2]Singapore Institute of Manufacturing Technology; [3]The University of Sydney

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: Alloy Development and Properties — On-Demand 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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Monday AM | March 14, 2022
Advanced Materials | On-Demand Poster Hall

Micro-mechanical Properties and Plastic Deformation Behavior of Refractory Low-to-High-entropy Alloys at Different Temperatures: *Ping-Hsu Ko*[1]; Yuan-Tao Hsu[1]; Chi-Huan Tung[1]; Shou-Yi Chang[1]; [1]National Tsing Hua University

Plastic Deformation and Defect Recovery of NiTi-based B2-phase High-entropy Intermetallic Compounds: *Ya-Jing Lee*[1]; Ting-Ying Shih[1]; Cheng-Yuan Tsai[1]; Chi-Huan Tung[1]; Shou-Yi Chang[1]; [1]National Tsing Hua University

Study of the Nitriding Behavior of an Austenitic High Entropy Alloy Powder: *Mathieu Traversier*[1]; Emmanuel Rigal[2]; Pierre-Eric Frayssines[2]; Xavier Boulnat[3]; Franck Tancret[4]; Jean Dhers[5]; Anna Fraczkiewicz[1]; [1]CNRS Lgf Umr5307 Mines Saint-Etienne; [2]CEA/LITEN; [3]INSA Lyon, MATEIS; [4]Université de Nantes, IMN; [5]FRAMATOME

Friction Stir Processing of Non Equiatomic High Entropy Alloy: *Neelam Meena*[1]; Satya Dommati[2]; Vinay Deshmukh[2]; Nithyanand Prabhu[1]; [1]IIT BOMBAY; [2]Naval Materials Research Labroatory

Effect of Fe Contents on Plane Stress Fracture Toughness of Fex(CoCrMnNi)100-x High Entropy Alloys at Cryogenic Temperature: *Sangeun Park*[1]; Nokeun Park[2]; Im Doo Jung[3]; Jae Bok Seol[1]; Jung Gi Kim[1]; Hyokyung Sung[1]; [1]Gyeongsang National University; [2]Yeungnam University; [3]Ulsan National Institute of Science and Technology

---

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: Structures and Modeling — On-Demand Oral Presentations

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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Monday AM | March 14, 2022
Advanced Materials | On-Demand Room

Invited
Controlling Short-range Ordering to Simultaneously Enhance Strength and Ductility of High-entropy Alloys: Shuai Chen[1]; Zachary Aitken[1]; Subrahmanyam Pattamatta[2]; Zhaoxuan Wu[2]; Zhigen Yu[1]; David Srolovitz[2]; Peter Liaw[3]; *Yong-Wei Zhang*[1]; [1]Institute of High Performance Computing; [2]City University of Hong Kong; [3]The University of Tennessee

Invited
Interplay between Dislocations and Correlated Stress Environment in Random Alloys: *Pierre-Antoine Geslin*[1]; Ali Rida[2]; Enrique Martinez Saez[3]; David Rodney[4]; [1]CNRS / INSA-Lyon; [2]Johns Hopkins University; [3]Clemson University; [4]Univ Lyon 1

Invited
Mixing and Diffusion at Internal Interfaces in High Entropy Alloys: *Gerhard Wilde*[1]; [1]University of Munster

Invited
Understanding Chemical Short-range Ordering/Demixing Coupled with Lattice Distortion in Solid Solution High Entropy Alloy: Quanfeng He[1]; *Yong Yang*[2]; [1]City University of Hong Kong; [2]City University of Hong Kong

Invited
Mechanical Properties and Deformation Behavior of a Refractory Multiprincipal Element Alloy under Cyclic Loading: *Jia Li*[1]; Jing Peng[1]; Baobin Xie[1]; Li Li[1]; Yang Chen[1]; Yuanyuan Tian[1]; Fusheng Tan[1]; Qihong Fang[1]; Peter K. Liaw[2]; [1]Hunan University; [2]University of Tennessee

Invited
Atomistic Simulations of Mechanical Responses and Defect Activities in B2 Low-to-high-entropy Intermetallic Compounds: *Cheng-Yuan Tsai*[1]; Chi-Huan Tung[1]; Shou-Yi Chang[1]; [1]National Tsing Hua University

Invited
Beyond Configurational Entropy: A Harmonic Multi-principal Elements Alloy: Zhaowei Wan[1]; Subramamyan Pattamatta[1]; Jian Han[1]; *David Srolovitz*[2]; [1]City University of Hong Kong; [2]The University of Hong Kong

High-throughput Ion Irradiation and Microstructural Characterization of Multi-principal-element Alloys: *Michael Moorehead*[1]; Benoit Queylat[1]; Phalgun Nelaturu[1]; Daniel Murray[2]; Mukesh Bachhav[2]; Dan Thoma[1]; Dane Morgan[1]; Adrien Couet[1]; [1]University of Wisconsin-Madison; [2]Idaho National Laboratory

High-throughput Mapping and Screening of Refractory High Entropy Alloy Property Space: *Brent Vela*[1]; Tanner Kirk[2]; Prashant Singh[3]; William Trehern[1]; Kadri Atli[1]; Raymundo Arroyave[1]; Ibrahim Karaman[1]; [1]Texas A&M University; [2]QuesTek Innovations LLC; [3]Ames Laboratory

Phase Field Modelling of Transformation Pathways and Microstructural Evolution in Multi-principal Element Alloys (MPEAs): *Kamalnath Kadirvel*[1]; Zachary Kloenne[1]; Jacob Jensen[1]; Shalini Koneru[1]; Hamish Fraser[1]; Yunzhi Wang[1]; [1]Ohio State University

Unveil the Origin of Segregation-assisted Hardening in CoCrNi-alloys with Varying Mo Content Using Correlative TEM/APT Microscopy: *Manuel Köbrich*[1]; Daniel Hausmann[1]; Gernot Hausch[2]; Steffen Neumeier[1]; Mathias Göken[1]; [1]Friedrich-Alexander-Universität Erlangen-Nürnberg; [2]Dentalex

Transformation Behavior and Superelasticity of TiZrHfNiCoCu Multi-component High-temperature Shape Memory Alloys: *Izaz Rehman*[1]; Tae-Hyun Nam[1]; [1]Gyeonsang National University

Novel Co-free Multi Principal Element Alloys (MPEAs) for Nuclear Applications: Computational Design and Experimental Evaluation: *Dinesh Ram*[1]; Gérard

Ramstein[2]; Anna Fraczkiewicz[3]; Franck Tancret[4]; [1]Université de Nantes, Institut des Matériaux de Nantes – Jean Rouxel (IMN), CNRS UMR 6502, Polytech Nantes, Rue Christian Pauc, BP 50609, 44306 Nantes Cedex 3, France & MINES Saint-Étienne, Centre SMS / LGF UMR CNRS 5307, 158, cours Fauriel, 42023 Saint-Étienne Cedex 2, France.; [2]Université de Nantes, Polytech Nantes, UMR 6004 Laboratoire des Sciences du Numérique de Nantes, rue Christian Pauc, BP 50609, 44306 Nantes Cedex 3, France; [3]MINES Saint-Étienne, Centre SMS / LGF UMR CNRS 5307, 158, cours Fauriel, 42023 Saint-Étienne Cedex 2, France.; [4]Université de Nantes, Institut des Matériaux de Nantes – Jean Rouxel (IMN), CNRS UMR 6502, Polytech Nantes, Rue Christian Pauc, BP 50609, 44306 Nantes Cedex 3, France

ADVANCED MATERIALS

Advances in Multi-Principal Elements Alloys X: Structures and Modeling — On-Demand 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; Jennifer Carter, Case Western Reserve University; Srivatsan Tirumalai, The University of Akron; Xie Xie, FCA US LLC; Gongyao Wang, Alcoa Technical Center

Monday AM | March 14, 2022
Advanced Materials | On-Demand Poster Hall

First-principles Study of Quaternary High Entropy Alloys Consisting of Fe-Ni-Co-Cr-Mn/Pd: *Nguyen-Dung Tran*[1]; Lui Chang[2]; Ying Chen[1]; [1]Tohoku University; [2]The Institute of Statistical Mathematics

MATERIALS PROCESSING

Advances in Powder and Ceramic Materials Science — On-Demand Oral Presentations

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; Kathy Lu, Virginia Polytechnic Institute and State University; Faqin Dong, Southwest University of Science and Technology; Jinhong Li, China University of Geosciences; Eugene Olevsky, San Diego State University; Ruigang Wang, The University of Alabama; Dipankar Ghosh, Old Dominion University

Monday AM | March 14, 2022
Materials Processing | On-Demand Room

Invited
Differential Volume Changes During Binder Removal from Ceramics: *John Halloran*[1]; [1]University of Michigan

Understanding the Role of Intrinsic Parameters on Microstructure and Mechanical Properties of Ice-templated Porous Sintered Electrodes for Lithium-ion Batteries: *Dipankar Ghosh*[1]; Rohan Parai[1]; Ziyang Nie[2]; Gary Koenig[2]; [1]Old Dominion University;

[2]University of Virginia

Synthesis and Optimization of BiFeO3 and La Doped BiFeO3 Prepared by Solid State Reaction Method: Subhash Sharma[1]; *Victor Emmanuel Alvarez Montano*[2]; Eunice Vargas Viveros[3]; Rosario I Yocupicio-Gaxiola[4]; Jesus Siqueiros[1]; Oscar Raymond Herrera[1]; [1]Universidad Nacional Autónoma de México; [2]Universidad De Sonora; [3]Universidad Autónoma de Baja California; [4]Center for Scientific Research and Higher Education at Ensenada (CICESE)

Design of New High Entropy Ceramics in the Pseudo-binary System RGaO3-R2Ti2O7: *Victor Emmanuel Alvarez Montano*[1]; Francisco Brown[1]; Subhash Sharma[2]; Jorge Mata Ramirez[3]; Ofelia Hernández Negrete[1]; Javier Hernandez Paredes[1]; Alejandro Durán[2]; [1]Universidad De Sonora; [2]Universidad Nacional Autónoma de México; [3]Universidad Autónoma de Baja California

Fabrication of Hierarchically-porous, Gyroid-structured Hydroxyapatite Scaffolds by a Dual-templating Method: *Jui-Yuan Ho*[1]; Haw-Kai Chang[1]; Cheng-Che Tung[1]; Po-Yu Chen[1]; [1]National Tsing Hua University

---

MATERIALS PROCESSING

Advances in Powder and Ceramic Materials Science — On-Demand 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; Kathy Lu, Virginia Polytechnic Institute and State University; Faqin Dong, Southwest University of Science and Technology; Jinhong Li, China University of Geosciences; Eugene Olevsky, San Diego State University; Ruigang Wang, The University of Alabama; Dipankar Ghosh, Old Dominion University

Monday AM | March 14, 2022
Materials Processing | On-Demand Room

Fabrication of Uranium Doped Yttrium Aluminium Garnets: *Brian Bettes*[1]; Yi Xie[1]; [1]Purdue University

Determination of Structural Parameters of Solid Solutions Type Ba1-3XGd2XTi1-3XEu4XO3. (x = at 0.1, 0.15, 0.3 and 0.6% by Weight): *Ricardo Martinez*[1]; Miguel Pérez Labra[1]; Francisco Raúl Barrientos Hernández[1]; Martín Reyes Pérez[1]; Victor Esteban Reyes Cruz[1]; Julio Cesar Juárez Tapia[1]; Aislinn Michelle Teja Ruiz[1]; José Ángel Cobos Murcia[1]; [1]Academic Area of Earth and Materials Sciences. Autonomous University of the State of Hidalgo, UAEH

MATERIALS PROCESSING

Advances in Surface Engineering IV — On-Demand Oral Presentations

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

Program Organizers: Arif Mubarok, PPG; Bharat Jasthi, South Dakota School of Mines & Technology; Tushar Borkar, Cleveland State University; Mary Lyn Lim, PPG Industries; Rajeev Gupta, North Carolina State University

Monday AM | March 14, 2022
Materials Processing | On-Demand Room

Effect of Laser Surface Treatment on Corrosion Behavior of AZ91D Mg Alloy: *Jiheon Jun*[1]; Gerald Knapp[1]; Alex Plotkowski[1]; Donovan Leonard[1]; Yong Chae Lim[1]; Michael Brady[1]; [1]Oak Ridge National Laboratory

Atmospheric Plasma Surface Processing of a 7xxx Al Alloy Surface to Improve Corrosion Resistance: *Yong Chae Lim*[1]; Jiheon Jun[1]; Donovan Leonard[1]; Harry Meyer III[1]; Jong Kahk Keum[1]; Michael Brady[1]; Zhili Feng[1]; [1]Oak Ridge National Laboratory

Intermetallic Formation in High-temperature Al/Ni Wetting: A Molecular Dynamics Study: *Ensieh Yousefi*[1]; Youqing Sun[1]; Anil Kunwar[2]; Muxing Guo[1]; Nele Moelans[1]; David Seveno[1]; [1]KU Leuven; [2]Silesian University of Technology

Damage Evolution of HVOF Coatings under Shear Lag Test: *Deepesh Yadav*[1]; Sanjay Sampath[1]; Jaya Balila[1]; [1]IIT Bombay

Multi-objective Machine Learning Assisted Optimization of Multi-layered PVD Coatings: *Aida Amroussia*[1]; Andrew Detor[1]; Scott Weaver[1]; Patrick Shower[1]; Anteneh Kebbede[1]; Andrew Hoffman[1]; Raul Rebak[1]; [1]GE Global Research

Ternary Transition Metal Diborides: A New Generation of Protective Coating Materials?: Anna Hirle[1]; Christoph Fuger[1]; Ahmed Bahr[1]; Thomas Glechner[1]; Lukas Zauner[1]; Oliver Hudak[1]; Rainer Hahn[1]; Oliver Hunold[2]; Peter Polcik[3]; *Helmut Riedl*[4]; [1]Christian Doppler Laboratory for Surface Engineering of High-performance Components, TU Wien; [2]Oerlikon Surface Solutions AG; [3]Plansee Composite Materials GmbH; [4]TU Wien, Institute of Materials Science and Technology

An Investigation of the Microstructure and Oil Retention of Electrolyte Jet Plasma Oxidation (EJPO) Coating: *Nasim Bahramian*[1]; Sina Kianfar[1]; Joshua Stroh[1]; Dimitry Sediako[1]; Jimi Tjong[2]; [1]The University of British Columbia; [2]University of Windsor

Electrochemical Corrosion Tests of Aluminum 1100 Alloy Coupons in Acid Condensate Environment: *Vasundhara Shinde*[1]; Gaurav Argade[2]; Anusha Chilukuri[2]; Monica Gehrich[2]; Chirag Parikh[1]; [1]Cummins Filtration Inc.; [2]Cummins Inc.

An Electrochemical Study of Ferrous and Nonferrous Materials in an Engine Coolant Environment: *Gaurav Argade*[1]; Anusha Chilukuri[1]; Justin Perry[1]; Monica Gehrich[1]; Erica Raisor[1]; Corey Trobaugh[1]; [1]Cummins Inc.

MATERIALS PROCESSING

Advances in Surface Engineering IV — On-Demand Poster Session

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

Program Organizers: Arif Mubarok, PPG; Bharat Jasthi, South Dakota School of Mines & Technology; Tushar Borkar, Cleveland State University; Mary Lyn Lim, PPG Industries; Rajeev Gupta, North Carolina State University

Monday AM | March 14, 2022

Tribological and Wetting Behavior of Laser Shock Peened High Pressure Cold Sprayed (HPCS) Duplex 316L Stainless Steel: *Alessandro Ralls*[1]; Bo Mao[2]; Mohammadreza Daroonpravar[1]; Pradeep Menezes[1]; [1]University of Nevada, Reno; [2]Shanghai Jiao Tong University

Understanding the Mechanism of Laser Shock Peened Austenitic Stainless Steel Welds: *Merbin John*[1]; Alessandro Ralls[1]; Manoranjan Misra[1]; Pradeep L. Menezes[1]; [1]University of Nevada, Reno

MATERIALS DESIGN

Advances in Titanium Technology — On-Demand Oral Presentations

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

Program Organizers: Yufeng Zheng, University of Nevada-Reno; Zachary Kloenne, Ohio State University; Fan Sun, PSL Research University; Stoichko Antonov, National Energy Technology Laboratory; Rongpei Shi, Lawrence Livermore National Laboratory

Monday AM | March 14, 2022
Materials Design | On-Demand Room

Invited
Towards Sub-nanometer Scale Characterizing the 'Real' H in Titanium Alloy - Importance of Combined Cryogenic Focused Ion Beam & Atom Probe Tomography Technique: *Yanhong Chang*[1]; Wenjun Lu[2]; Abigail Ackerman[3]; David Dye[3]; Dirk Ponge[2]; Dierk Raabe[2]; Baptiste Gault[2]; [1]Institute of Materials, China Academy of Engineering Physics; [2]Max Planck Institute für Eisenforschung, Düsseldorf; [3]Department of Materials, Royal School of Mines, Imperial College

Invited
New Insights into Oxygen-rich Alpha Titanium Alloys for Structural Applications: Régis Poulain[1]; Stéphanie Delannoy[2]; Ivan Guillot[3]; Fabienne Amann[4]; Raphaëlle Guillou[5]; Jean-Philippe Couzinié[3]; Lola Lilensten[1]; Stoichko Antonov[6]; Baptiste Gault[7]; Frédéric De Geuser[8]; Dominique Thiaudière[9]; Jean-Luc Béchade[5]; Emmanuel Clouet[5]; *Frederic Prima*[1]; [1]Chimie ParisTech; [2]Chimie ParisTech, Biotech Dental; [3]Université Paris Est Créteil; [4]Chimie-ParisTech, Université Paris Est Créteil; [5]Université Paris-Saclay, CEA; [6]Max-Planck-Institut für Eisenforschung ; [7]Max-Planck-Institut für Eisenforschung; [8]Université Grenoble Alpes; [9]Synchrotron SOLEIL

Invited
Multiscale Modeling of Metal-hydrogen Interactions: A Case Study of Hydride Formation in Titanium: *Tae Wook Heo*[1]; Kyoung Eun Kweon[1]; Nathan Keilbart[1]; Rongpei Shi[1]; Ryan Mullen[1]; Brandon Wood[1]; [1]Lawrence Livermore National Laboratory

Micromechanical Fracture Behavior of Distinct Interfaces in an Intermetallic TiAl Alloy: *Michael Burtscher*[1]; Markus Alfreider[1]; Klemens Schmuck[1]; Helmut Clemens[1]; Christoph Gammer[2]; Daniel Kiener[1]; [1]Montanuniversitaet Leoben; [2]Austrian Academy of Sciences

Beta Ti Alloys with Increased Oxygen Content and TRIP/TWIP Effect: *Josef Strasky*[1]; Dalibor Preisler[1]; 1Charles University

High-temperature Oxidation Behavior of Dilute Ti-Si Alloys at 800 °C: *Thomas*

Valenza[1]; Emmanuelle Marquis[1]; [1]University of Michigan

Grain Boundary Segregation and Its Implications Regarding the Formation of the Grain Boundary a Phase in the Metastable ß-Titanium Ti–5Al–5Mo–5V–3Cr Alloy: *Stoichko Antonov*[1]; T.S. Prithiv[1]; Zachary Kloenne[2]; Rongpei Shi[3]; Yufeng Zheng[4]; Hamish Fraser[2]; Baptiste Gault[1]; [1]Max-Planck-Institut für Eisenforschung GmbH; [2]The Ohio State University; [3]Lawrence Livermore National Laboratory; [4]University of Nevada Reno

The Formation of Titanium Ultrafine Laminar Microstructures via Additive Manufacturing: *Marco Simonelli*[1]; Yau Yau Tse[2]; Pere Barriobero-Vila[3]; Richard Hague[1]; [1]University of Nottingham; [2]Loughborough University; [3]German Aerospace Center

Fatigue Behavior of Additively Processed, PVD Coated Ti-6Al-7Nb Alloy for Biomedical Applications: *Maxwell Hein*[1]; Dominic Stangier[2]; David Kokalj[2]; Nelson Filipe Lopes Dias[2]; Hilke Oltmanns[3]; Kay-Peter Hoyer[1]; Jessica Meißner[3]; Wolfgang Tillmann[2]; Mirko Schaper[1]; [1]Paderborn University; [2]TU Dortmund University; [3]University of Veterinary Medicine Hannover

Mechanical Behavior of Ti-Ni-Fe Based B2 Pseudo Binary Intermetallic at Different Length Scales: *Subha Panda*[1]; Jayant Jain[2]; Sudhanshu Singh[1]; [1]IIT Kanpur; [2]IIT Delhi

Design and Characterization of New Metastable β Ti-Mo-Zr-Sn Alloys for Biomedical Applications: *Manon Laurençon*[1]; Damien Fabregue[2]; Akihiko Chiba[3]; Kenta Yamanaka[3]; [1]INSA de Lyon; Tohoku University; [2]INSA de Lyon; [3]Tohoku University

A Novel High-strength Beta Titanium Alloy Reinforced by Nanoscale Intermetallic Precipitates: *Rosie Mellor*[1]; Nicholas Jones[1]; Howard Stone[1]; [1]University of Cambridge

Effect of Aging Treatment on Microstructure and Superelastic Properties of a High Zr-containing Ti–Zr–Nb–Sn Shape Memory Alloy: *Shuanglei Li*[1]; Yeon-Wook Kim[2]; Jung Gi Kim[1]; Tae-Hyun Nam[1]; [1]Gyeongsang National University; [2]Keimyung University

MATERIALS DESIGN

Advances in Titanium Technology — On-Demand Poster Session

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

Program Organizers: Yufeng Zheng, University of Nevada-Reno; Zachary Kloenne, Ohio State University; Fan Sun, PSL Research University; Stoichko Antonov, National Energy Technology Laboratory; Rongpei Shi, Lawrence Livermore National Laboratory

Monday AM | March 14, 2022
Materials Design | On-Demand Poster Hall

A Review on Impact Resistance of Partially Filled 3D Printed Titanium Matrix Composite Designed Aircraft Turbine Engine Fan Blade: *Daniel Okanigbe*[1]; Shade Van Der Merwe[1]; [1]Tshwane University of Technology

Effect of Sn on Texture Characteristics and Superelastic Behavior of ß-type Ti-30Zr-10Nb-xSn (x = 0, 2, 3, 4) Texture Alloy: *Won-Tae Lee*; Yeon-Ju Ryu; Shuanglei Li; Jung-Gi Kim; Tae-Hyun Nam; [1]

Microstructure, Transformation Behavior and Superlasticity of an Aged Ti-40Ni-

12Cu (at. %) Shape Memory Alloy: *Jin-hwan Lim*[1]; Ji-hyun Kim[1]; Jung-gi Kim[1]; Tae-kyung Lee[2]; Shuanglei Li[1]; Tae-hyun Nam[1]; [1]Gyeongsang National University; [2]Pusan National University

Surface Analysis, Microstructure Characterization, and ISV Modeling of Electron Beam Melted (EBM) Ti-6Al-4V: *Jared Darius*[1]; Marcos Lugo[1]; Daniel Kenney[1]; [1]Liberty University

MATERIALS DESIGN

AI/Data Informatics: Computational Model Development, Validation, and Uncertainty Quantification — On-Demand Oral Presentations

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Dennis Dimiduk, BlueQuartz Software LLC; Darren Pagan, Pennsylvania State University; Anthony Rollett, Carnegie Mellon University; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory

Monday AM | March 14, 2022
Materials Design | On-Demand Room

Invited
Extracting and Making Use of Materials Data from Millions of Journal Articles via Natural Language Processing Techniques: *Anubhav Jain*[1]; [1]Lawrence Berkeley National Laboratory

Invited
Orchestrating Multi-task Material Design Campaigns with Artificial Intelligence: *Logan Ward*[1]; [1]Argonne National Laboratory

Invited
Variational System Identification of the Partial Differential Equations Governing Microstructure Evolution in Materials: Inference over Sparse and Spatially Unrelated Data: *Krishna Garikipati*[1]; Xun Huan[1]; Zhenlin Wang[1]; [1]University of Michigan

Automatic Segmentation and Quantification of Microscopy Data Using Transfer Learning from a Large Microscopy Database: *Joshua Stuckner*[1]; [1]NASA Glenn Research Center

Multi-fidelity Surrogate Modeling of Epistemic Uncertainty Arising from Microstructure Reconstruction: *Arulmurugan Senthilnathan*[1]; Pinar Acar[1]; [1]Virginia Tech

Thermodynamic Analysis for the Design of High-strength Aluminum Alloys at High Temperatures: Takeshi Kaneshita[1]; *Shimpei Takemoto*[1]; Yoshishige Okuno[1]; Kenji Nagata[2]; Junya Inoue[3]; Manabu Enoki[3]; [1]Showa Denko K.K.; [2]National Institute for Materials Science; [3]The University of Tokyo

Using Machine Learning to Improve Melt Pool Prediction in Additive Manufacturing: Data Denoising and Predictive Modelin: *Yaohong Xiao*[1]; Zhuo Wang[1]; Lei Chen[1]; [1]University of Michigan-Dearborn

Digital Image Correlation Based Machine Learning Predictions for Grain-boundary Strain Accumulation in a Polycrystalline Metal: Renato Vieira[1]; *John Lambros*[2]; [1]Pontifícia Universidade Católica do Rio de Janeiro; [2]University of Illinois

Urbana Champaign

Uncertainty Prediction for a Variety of Material Properties Modelled via Machine Learning: *Francesca Tavazza*[1]; Kamal Choudhary[1]; Brian DeCost[1]; [1]National Institute of Standards and Technology

Accelerated Alloy Design by Batch Constrained Multiobjective Optimization Using Surrogate Models: Gérard Ramstein[1]; *Franck Tancret*[1]; [1]Université de Nantes

A Statistical-physical Framework for the Analysis of Uncertainties due to Material Parameters in Multi-physics Modelling: *Amanda Giam*[1]; Jiaxiang Cai[1]; Fan Chen[1]; Zhisheng Ye[1]; Wentao Yan[1]; [1]National University of Singapore

Austenitic Parent Grain Reconstruction in Martensitic Steel Using Deep Learning: *Patxi Fernandez-Zelai*[1]; Andrés Márquez Rossy[1]; Quinn Campbell[1]; Andrzej Nycz[1]; Michael Kirka[1]; [1]Oak Ridge National Laboratory

Semi-mechanistic Gaussian Process Model for Disentangling Structural and Chemical Influences on Material Properties: *Brian DeCost*[1]; Howie Joress[1]; Jason Hattrick-Simpers[2]; [1]National Institute of Standards and Technology; [2]University of Toronto

---

MATERIALS DESIGN

AI/Data Informatics: Computational Model Development, Validation, and Uncertainty Quantification — On-Demand Poster Session

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Dennis Dimiduk, BlueQuartz Software LLC; Darren Pagan, Pennsylvania State University; Anthony Rollett, Carnegie Mellon University; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory

Monday AM | March 14, 2022
Materials Design | On-Demand Poster Hall

Applicability Domain for Prediction Models of Thermoelectric Properties Based on Similarity to Known Materials: *Masaya Kumagai*[1]; Yukari Katsura[2]; Yuki Ando[2]; Atsumi Tanaka[3]; Koji Tsuda[3]; Ken Kurosaki[1]; [1]Kyoto University; [2]National Institute for Materials Science; [3]The University of Tokyo

Direct Prediction of Mechanical Properties from X-ray Diffraction Patterns Using Machine Learning: *Naoki Hato*[1]; Masaya Kumagai[1]; Ken Kurosaki[1]; [1]Kyoto University

---

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — On-Demand Oral Presentations

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; Garritt Tucker, Colorado School of Mines; Ebrahim Asadi, University of Memphis; Bryan Wong, University of California, Riverside; Sam Reeve, Oak Ridge National Laboratory; Enrique Martinez Saez, Clemson University; Adrian Sabau, Oak Ridge National Laboratory

Monday AM | March 14, 2022
Materials Design | On-Demand Room

Invited
Physics-based Data-driven Discovery of Continuum Equations: *Celia Reina*[1]; [1]University of Pennsylvania

Invited
Highly Accurate Prediction of Material Microstructure Using High-performance Phase-field Simulation and Data Assimilation: *Tomohiro Takaki*[1]; [1]Kyoto Institute of Technology

Invited
Modelling Solidification with Phase-field on High-performance Computers: *Jean-Luc Fattebert*[1]; John Turner[1]; [1]Oak Ridge National Laboratory

Coarse-graining Techniques for Migration of Solutes around Defects: *Xiaowang Zhou*[1]; Christian Nowak[1]; Catalin Dan Spataru[1]; Michael Foster[1]; Kevin Chu[2]; Ryan Sills[3]; [1]Sandia National Laboratories; [2]Georgia Institute of Technology; [3]Rutgers University

Development of a New Shape Descriptor for Modeling and Uncertainty Quantification of Microstructures: *Arulmurugan Senthilnathan*[1]; Pinar Acar[1]; [1]Virginia Tech

ExaCA: An Exascale-capable Cellular Automata Code for Microstructure Modeling: *Matthew Rolchigo*[1]; Samuel Reeve[1]; John Coleman[1]; Benjamin Stump[1]; Alex Plotkowski[1]; Jim Belak[2]; [1]Oak Ridge National Laboratory; [2]Lawrence Livermore National Laboratory

Parameter Estimation of Phase-field Model Based on Microstructure Data and Its Uncertainty Quantification by the Adjoint Method: *Yuki Matsuura*[1]; Yuhki Tsukada[1]; Toshiyuki Koyama[1]; [1]Nagoya University

Extending the KineCluE Code to the Computation of Transport Coefficients in Concentrated Alloys: *Pamela Camilos*[1]; Thomas Schuler[1]; Maylise Nastar[1]; [1]Université Paris-Saclay, CEA

Calculating Cluster Diffusion Coefficients from Interatomic Potentials: *Craig Daniels*[1]; Thomas Schuler[2]; Pascal Bellon[1]; Robert Averback[1]; [1]University of Illinois; [2]CEA, Universite Paris-Saclay

Using 2D, Dendrite-resolved, Melt-pool-scale Phase-field Simulations of Solidification as Reference Solutions for a Multiscale Model: Yigong Qin[1]; Yuanxun Bao[1]; *Stephen DeWitt*[2]; Balasubramaniam Radhakrishnan[2]; George Biros[1]; [1]University of Texas at Austin; [2]Oak Ridge National Laboratory

Exascale-capable Graph Convolutional Neural Network Surrogates for Atomic Property Prediction: *Pei Zhang*[1]; Sam Reeve[1]; Max Lupo Pasini[1]; [1]Oak Ridge National

Laboratory

Development of Interatomic Potential to Study Elementary Dislocation Properties in High Entropy Alloys: The FeNiCrMn Model Alloy: *Ayobami Daramola*[1]; Giovanni Bonny[2]; Gilles Adjanor[3]; Christophe Domain[3]; Ghiath Monnet[3]; Anna Fraczkiewicz[1]; [1]MINES – St-Etienne – LGF UMLR 5307 CNRS – CENTRE SMS; [2]SCK CEN, Nuclear Materials Science Institute, Boeretang 200, B-2400; [3]EDF – Departement Materiaux et Mecanique des Composants – Les Renardieres Ecuelles av Renardieres

Statistical Predictions of Failure in Hydrided Zirconium Materials: *Tamir Hasan*[1]; Laurent Capolungo[2]; Mohammed Zikry[1]; [1]North Carolina State University; [2]Los Alamos National Laboratory

Calibrating Uncertain Parameters in Melt Pool Simulations of Additive Manufacturing: *Gerald Knapp*[1]; John Coleman[1]; Miroslav Stoyanov[1]; Alex Plotkowski[1]; [1]Oak Ridge National Laboratory

Machine Learning Models for Predictive Materials Science from Fundamental Physics: An Application to Titanium and Zirconium: *Mashroor Shafat Nitol*[1]; Doyl Dickel[1]; Christopher Barrett[1]; [1]Mississippi State University

A Finite Difference Analysis of the Effect of Graphene Additions on the Electrical Conductivity of Polycrystalline Copper: *William Frazier*[1]; Bharat Gwalani[1]; Julian Escobar[1]; Joshua Silverstein[1]; Keerti Kappagantula[1]; [1]Pacific Northwest National Laboratory

A Combined Kinetic Monte Carlo and Phase Field Approach to Modeling Thermally Activated Dislocation Motion: *Xiaoyao Peng*[1]; Enrique Martinez[2]; Nithin Mathew[1]; Darby Luscher[1]; Abigail Hunter[1]; [1]Los Alamos National Laboratory; [2]Clemson University

A Computationally Scalable Time-parallel Approach for Melt Pool Resolved Simulations of Additive Manufacturing: *John Coleman*[1]; Matt Bement[1]; Alex Plotkowski[2]; Benjamin Stump[1]; [1]Oak Ridge National Laboratory; [2]Oak Ridge National LaboratoryL

A Monte Carlo Model for the Formation and Evolution of Line Compound Systems Such as SiC: *Philip Goins*[1]; Anthony DiGiovanni[1]; Matthew Guziewski[1]; [1]Army Research Laboratory

Conventional Ti Alloys for Aircraft Landing Gear Beams and Aeroengines—A Data-driven Analysis for Selection of Ti-based Alloys and Future Directions: *Tanjore Jayaraman*[1]; Ramachandra Canumalla[2]; [1]University of Michigan-Dearborn; [2]Weldaloy Specialty Forgings

---

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications X — On-Demand Oral Presentations

Sponsored by: TMS Structural Materials Division, TMS Functional 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; Takao Mori, National Institute For Materials Science; Alexandra Zevalkink, Michigan State University; Wan-Ting Chiu, Tokyo Institute of Technology; Pai-chun Wei, National Taiwan University

Monday AM | March 14, 2022

Invited
Defect Engineering for Enhancement and Control over Thermoelectric Materials: *Takao Mori*[1]; [1]National Institute for Materials Science

Invited
Interfacial Reactions in Ni/PbSe and Ni/SnSe2 and Couples: *Sinn-wen Chen*[1]; Zhi-Kai Hu[1]; Hsu-Hui Chen[1]; Yohanes Hutabalian[1]; [1]National Tsing Hua University

Invited
Metallic Thermoelectric Materials as Active Heat Sinks: *Mona Zebarjadi*[1]; Shuai Li[1]; Kyle Snyder[2]; [1]University of Virginia; [2]CCAM

Invited
Modular Flexible Thermoelectric Generators for Ambient Energy Recovery: *Chien-Neng Liao*[1]; Shih-Yao Chien[1]; [1]National Tsing Hua University

Invited
Thermoelectric Properties of Nanostructured Al-doped ZnO Thin Films: *Paolo Mele*[1]; [1]Shibaura Institute of Technology

Invited
Planar-type Nano Phononic Si Energy Harvesters: *Masahiro Nomura*[1]; [1]University of Tokyo

Invited
Fabrication of Nanostructured Half-Heusler Compounds via Crystallization of an Amorphous Precursor: *Pyuck-Pa Choi*[1]; Chanwon Jung[1]; Hail Park[1]; [1]KAIST

Invited
Development of Low–defect Single Crystalline Ferromagnetic Shape Memory Alloy for Magnetic Cooling and Actuation: *Wan-Ting Chiu*[1]; Pimpet Sratong-On[2]; Masaki Tahara[1]; Volodymyr Chernenko[3]; Hideki Hosoda[1]; [1]Tokyo Institute of Technology; [2]Thai-Nichi Institute of Technology; [3]Department of Electricity and Electronics, University of the Basque Country (UPV/EHU) & BCMaterials, Basque Center for Materials, Applications and Nanostructures, UPV/EHU Science Park

Invited
Theory of Huge Thermoelectric Effect Based on Magnon Drag Mechanism: Application to Thin-film Heusler Alloy: *Masao Ogata*[1]; Hiroyasu Matsuura[1]; Takao Mori[2]; Ernst Bauer[3]; [1]University of Tokyo; [2]National Institute for Materials Science, and University of Tsukuba; [3]Technische Universitat Wien

Invited
Enhancing Room-temperature Thermoelectric Performance of SnSe with Excess Ag: *Hsin-Jay Wu*[1]; Meng-Yuan Ho[1]; [1]National Chiao Tung University

Invited
Development of n-type Mg3Sb2-Mg3Bi2 Alloys for Thermoelectrics: *Kazuki Imasato*[1]; Michihiro Ohta[1]; G. Jeffrey Snyder[2]; [1]National Institute of Advanced Industrial Science and Technology; [2]Northwestern University

Invited
Giant Isotopic Shift in Phonons Keeps Charge Carriers Hot Longer in a Photovoltaic Perovskite: *Michael Manley*[1]; Kunlun Hong[1]; Panchao Yin[1]; Hsin Wang[1]; Songxue Chi[1]; Luke Daemen[1]; Andrew May[1]; Chengyun Hua[1]; Raphael Hermann[1]; Mark Asta[2]; Yao Cai[2]; Mahshid Ahmadi[3]; [1]Oak Ridge National Laboratory; [2]University of California,

Berkeley; [3]University of Tennessee

Invited
Seebeck Coefficient Enhancement in $CoSb_3$-Skutterudite Induced by Constructive Magneto-composite Effects: *Cedric Bourges*[1]; Wenhao Zhang[1]; Bhuvanesh Srinivasan[1]; Naoyuki Kawamoto[1]; Masanori Mitome[1]; Kazuaki Kobayashi[1]; Jean-Francois Halet[2]; David Berthebaud[2]; Takao Mori[1]; [1]National Institute for Materials Science; [2]Laboratory for Innovative Key Materials and Structures, IRL 3629-CNRS

Invited
Thermoelectric Transport and Crystal Morphology of the Quasi-1D Zintl Ca5M2Sb6: *Alexandra Zevalkink*[1]; [1]Michigan State University

Invited
Integration of Si-based Micro Thermoelectric Generator Devices: *Takanobu Watanabe*[1]; [1]Waseda University

Invited
Impact of Cation Substitution in (AgxCu1-x)2ZnSnSe4 Absorber-based Solar Cells towards 10% Efficiency: Experimental and Theoretical Analyses: *Li-Chyong Chen*[1]; Shaham Quadir[1]; Mohammad Qorbani[1]; Ying-Ren Lai[1]; Ho-Thi Thong[2]; Amr Sabbah[2]; Michitoshi Hayashi[1]; Cheng-Ying Chen[3]; Kuei-Hsien Chen[2]; [1]National Taiwan University; [2]Academia Sinica; [3]Ming Chi University of Technology

Invited
Uncovering Design Principles for Amorphous-like Heat Conduction Using Two-channel Lattice Dynamics: *Raphael Hermann*[1]; Riley Hanus[1]; Michael Manley[1]; Janine George[2]; [1]Oak Ridge National Laboratory; [2]Universite Catholique de Louvain

Invited
Liquid-like Ion Diffusion Leading to the Ultralow Thermal Conductivity of Ag8SiTe6 Argyrodite: *Pai-Chun Wei*[1]; [1]Center for Condensed Matter Sciences, National Taiwan University

Invited
Relationship between Lattice-site Preference and Phase Stability in Thermoelectric Compounds Mg_2M (M: Si, Ge, Sn) and RNiSn (R: Ti, Zr, Hf): *Yoshisato Kimura*[1]; Yaw Wang Chai[1]; Manabu Watanabe[1]; Yonghoon Lee[2]; [1]Tokyo Institute of Technology; [2]KELK Ltd.

Invited
Combustor/Heat Exchanger-integrated Thermoelectric Power Generation System for Autonomous Robots: *Yuji Suzuki*[1]; Minhyeok Lee[1]; Shintaro Uchida[1]; Hajime Asama[1]; Keiji Nagatani[1]; Shunsuke Hamasaki[1]; Shota Chikushi[1]; Chul-Ho Lee[2]; Yong Fan[2]; Kazuo Nagase[2]; Hirokuni Hachiuma[3]; Shinichi Fujimoto[4]; Naoki Yokoo[5]; Hiroyuki Sato[5]; Kenichi Odagawa[5]; [1]The University of Tokyo; [2]National Institute of Advanced Industrial Science and Technology; [3]Komatsu Ltd.; [4]KELK Ltd.; [5]Dainichi Co. Ltd.

Invited
Intermetallic and Chalcogenide Materials for Mid-range Temperature Thermoelectric Applications: *David Berthebaud*[1]; [1]CNRS - Saint-Gobain - NIMS, IRL3629, Laboratory for Innovative Key Materials and Structures (LINK),

Invited
Ternary and Quaternary Thermoelectric Sulphides: Mechanical-alloying, Order/Disorder Phenomena, Conductive Network, Transport Properties, and Theory: *Emmanuel Guilmeau*[1]; [1]CRISMAT/CNRS

Enhanced Thermoelectric Performance with High Thermal Stability in Cu-based n-type PbTe: *Ping-Yuan Deng*[1]; Hsin-Jay Wu[1]; Kung-Kuo Wang[2]; [1]National Yang

Ming Chiao Tung University; [2]National Sun Yat-sen University

Enhancing Thermoelectric Performance via Microstructure Engineering in GeTe Alloys: *Yi-Fen Tsai*[1]; Hsin-Jay Wu[1]; [1]National Chiao Tung University

Enhanced Thermoelectric Properties in Sb_2Te_3 Thin Film Modules: *Zhen-Wei Sun*[1]; Albert T. Wu[1]; [1]National Central University

Enhanced Thermoelectric Performance of n-type Silver Chalcogenide with Excess Ag
: *You-Cheng Du*[1]; Wan-Ting Yen[1]; Hsin-Jay Wu[1]; [1]National Yang Ming Chiao Tung University

Phase Equilibria of Cu-Se-Te System and Interfacial Reactions in Cu/Se, Cu/Se-20at.%Te and Cu_2Te/Se Couples: *Yohanes Hutabalian*[1]; Sinn-wen Chen[1]; [1]National Tsing Hua University

Light Impurity Doping and Entropy Engineering Eliciting High-performance n-type Bi_2Te_3 Thermoelectrics: *Wan-Ting Yen*[1]; Hsin-jay Wu[1]; [1]National Yang Ming Chiao Tung University

Phase Diagram Engineering Enables Lightly Impurity Doping for High-performance GeTe Thermoelectrics: *Szu-Chien Wu*[1]; Yi-Fen Tsai[1]; Hsin-Jay Wu[1]; [1]National Yang Ming Chiao Tung University

Thermal Evolution of Internal Strain in Doped PbTe: *James Male*[1]; Riley Hanus[2]; G. Jeffrey Snyder[1]; Raphael Hermann[2]; [1]Northwestern University; [2]Oak Ridge National Laboratory

The Effects of Hot-compression at Working Temperatures on the Physical and Mechanical Behavior of the Thermoelectric GeTe Alloy: *Gilad Guttmann*[1]; Shmuel Samuha[1]; Reuven Gertner[1]; Shlomo Harush[1]; Yaniv Gelbstein[2]; [1]NRCN; [2]Ben-Gurion University of the Negev

Achieving High Thermoelectric Performance in Hierarchical Structured Bi0.5Sb1.5Te3 Alloys via Controlling the Hot Pressing Temperature: *Peyala Dharmaiah*[1]; Sungjae Jo[1]; Yeeun Lee[1]; Soon-Jik Hong[1]; [1]Kongju National University

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications X — On-Demand Poster Session

Sponsored by: TMS Structural Materials Division, TMS Functional 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; Takao Mori, National Institute For Materials Science; Alexandra Zevalkink, Michigan State University; Wan-Ting Chiu, Tokyo Institute of Technology; Pai-chun Wei, National Taiwan University

Monday AM | March 14, 2022
Electronic Materials | On-Demand Poster Hall

Enhancing Thermoelectric Performance via Delaying Transition Temperature in GeTe Alloys: *Yi-Fen Tsai*[1]; Hsin-Jay Wu[1]; [1]National Chiao Tung University

High Thermoelectric Performance in n-type PbTe Enabled by Carrier Optimization

and Nano-precipitates: *Ping-Yuan Deng*[1]; Kung-Kuo Wang[2]; Hsin-Jay Wu[1]; [1]National Yang Ming Chiao Tung University; [2]National Sun Yat-sen University

Interfacial Reactions in Ni/(Se,Te) and Ni/$Pb_{1-x}Sn_xSe$ Couples: *Yohanes Hutabalian*[1]; Hsu-Hui Chen[1]; Zhi-Kai Hu[1]; Sinn-wen Chen[1]; [1]National Tsing Hua University

Lightly Impurity Doping and Entropy Engineering Synergy Realizing High-performance n-type Bi_2Te_3 Thermoelectrics: *Wan-Ting Yen*[1]; Hsin-jay Wu[1]; [1]National Yang Ming Chiao Tung University

N-type Silver Chalcogenide with Excess Ag Leading to Improved Thermoelectric Properties: *You-Cheng Du*[1]; Wan-Ting Yen[1]; Hsin-Jay Wu[1]; [1]National Yang Ming Chiao Tung University

Realizing High Thermoelectric Figure of Merit of Co-doped GeTe Alloy via Phase Diagram Engineering: *Szu-Chien Wu*[1]; Yi-Fen Tsai[1]; Hsin-Jay Wu[1]; [1]National Yang Ming Chiao Tung University

The Wurtzite CuFeS2 Thin Film and Its Phase Transformation to Chalcopyrite for Thermoelectric Generator: *Hong Pang*[1]; Cédric Bourgès[1]; Naohito Tsujii[1]; Takahiro Baba[1]; Naoki Sato[1]; Tetsuya Baba[1]; Takao Mori[1]; [1]National Institute for Materials Science

---

LIGHT METALS

Alumina & Bauxite — On-Demand Oral Presentations

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

Program Organizers: Roberto Seno, Cba; Dmitry Eskin, Brunel University

Monday AM | March 14, 2022
Light Metals | On-Demand Room

Fast Solution of Shrinking Core Model for Calcination Applications: *Vladimir Golubev*[1]; Dmitriy Chistyakov[1]; Dmitriy Mayorov[1]; Evgeniy Fomichev[1]; Iliya Blednykh[1]; [1]Rusal Etc

Green Alumina: A Technological Roadmap: *Alessio Scarsella*[1]; Edgar Gasafi[1]; [1]Metso Outotec

Potential of Alumochloride Technology for Production of Competitive Products: *Andrei Smirnov*[1]; Dmitriy Kibartas[1]; Alexander Senyuta[1]; Vladimir Bayanov[1]; Andrey Knyazev[1]; Andrey Panov[1]; [1]RUSAL ETC

Removal of Fluorine, Chlorine, Nitrogen from Aluminum Dross by Wet Process: *Xinxin Zhao*[1]; Yan Liu[1]; Guozhi Lyu[1]; Yubin Zhang[2]; Tingan Zhang[1]; [1]Northeastern University; [2]Shenyang Aluminum Magnesium Engineering Research Institute Co., Ltd.

Results of Metso: Outotec Calciner Optimizer Operation at CBA Alumina Calcination Plants: *Steffen Haus*[1]; Allan Borges[1]; Natalia Almeida[2]; Anderson Duck[2]; [1]Outotec GmbH & Co. KG; [2]Companhia Brasileira de Alumínio

Recovery of Iron from High-iron Bayer Red Mud by Melting Reduction with Spent Cathode Carbon Block: *Xiaofei Li*[1]; Tingan Zhang[1]; Kun Wang[1]; Guozhi Lyu[1]; Xin Chen[1]; [1]Northeastern University

---

LIGHT METALS

Aluminum Alloys, Processing and Characterization — On-Demand Oral Presentations

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

Program Organizers: Andre Phillion, McMaster University; Dmitry Eskin, Brunel University

Monday AM | March 14, 2022
Light Metals | On-Demand Room

An Advanced Industrial Methodology for Optimizing the Properties and the Process of Homogenization for Extruded AA2xxx & AA6xxx: Simon Recnik[1]; Jožef Medved[2]; *Varuzan Kevorkijan*[1]; Sandi Žist[1]; [1]Impol Aluminum Industry; [2]University of Ljubljana, Faculty of Natural Sciences and Engineering

Correlation between Electrochemical and Standard Testing of Aluminum Alloys: Matjaž Finšgar[1]; Irena Lesjak[2]; *Varuzan Kevorkijan*[2]; Marko Degiampietro[2]; [1]University of Maribor, Faculty of Chemistry and Chemical Engineering; [2]Impol Aluminum Industry

Heat-treatment Response of Al–Mg–Si Alloys with Varying Mg/Si Ratio: *Abdul Wahid Shah*[1]; Seong-Ho Ha[2]; Young-Ok Yoon[2]; Shae Kwang Kim[1]; [1]UST korea; [2]Korea Institute of Industrial Technology

Through Thickness Localized Strain Distribution and Microstructural Characterization of Functionally Graded Al/GNP Composite Fabricated by Friction Stir Processing: *Abhishek Sharma*[1]; Yoshiaki Morisada[1]; Hidetoshi Fujii[1]; [1]JWRI, Osaka University

Precipitation Hardening in Innovative Processing of 6xxx Aluminum Alloys: Alexander Wimmer[1]; *Annika Haemmerle*[1]; Calin Marioara[2]; [1]Neuman Aluminium; [2]SINTEF Industry

Evolution of Work Hardening in 6xxx Aluminum Alloys in the Course of Natural Aging Following Continuous Annealing: Christian Bollmann[1]; Chengchao Yu[2]; *Mehdi Lalpoor*[3]; Alexis Miroux[3]; [1]Alvance Germany GmbH; [2]RWTH Aachen University; [3]Alvance Aluminum Duffel BV

Co-extrusion of Dissimilar Al Alloys via Shear Assisted Processing and Extrusion: *Mageshwari Komarasamy*[1]; Scott Taysom[1]; Darrell Herling[1]; Scott Whalen[1]; [1]Pacific Northwest National Laboratory

Development of a Machine Learning Model to Predict Constitutive Behaviour of Macrosegregated A356 Alloy: *Jun Ou*[1]; Shaul Avraham[1]; Daan Maijer[1]; Steve Cockcroft[1]; [1]University of British Columbia

Multi-alloy Aluminum Tubing via Shear Assisted Processing and Extrusion: *Brian Milligan*[1]; Mageshwari Komarasamy[1]; Anil Battu[1]; Tamas Varga[1]; Anthony Guzman[1]; Brandon Taysom[1]; Darrell Herling[1]; Scott Whalen[1]; [1]Pacific Northwest National Laboratory

Quantification of Plastic Strain in the Precipitate Free Zone of Natural Aged Al-Mg-Si Alloys: *Mojtaba Mansouri Arani*[1]; Xiang Wang[2]; Nick Parson[3]; Warren Poole[1]; [1]University of British Columbia; [2]McMaster University; [3]Rio Tinto Aluminium

Solubility Limit of Iron in Aluminum and Its Alloys: Role on Recrystallization, Grain Growth, Texture and Interfacial Segregation Leading to Ductile Failure: *Shigeo Saimoto*[1]; Christopher Gabryel[1]; Haiou Jin[2]; Raja Mishra[3]; [1]Queen's University;

[2]Natural Resources Canada; [3]University of Waterloo

Microstructural Evolution of High Zn 7000-series Aluminum Alloy with Addition of Titanium: *Kwangjun Euh*[1]; Jae-Gil Jung[1]; Sang-Hwa Lee[1]; Se-Hun Kim[2]; [1]Korea Institute of Materials Science; [2]Korea Automotive Technology Institute

Effect of Post Extrusion Heat Treatment on Mechanical Property of Aluminum Alloy 2024 Tube Produced Using Shear Assisted Processing and Extrusion (ShAPE): *Md Reza-E-Rabby*[1]; Tianhao Wang[1]; Daniel Graff[1]; Timothy Roosendaal[1]; Nathan Canfield[1]; Scott Whalen[1]; [1]Pacific Northwest National Laboratory

In Situ Processing of Rapidly Solidified Al-33wt%Cu Droplets: *Jonas Valloton*[1]; Najia Mahdi[2]; Loraine Rabago[1]; Hani Henein[1]; [1]University of Alberta; [2]Norcada Inc.

LIGHT METALS

Aluminum Alloys, Processing and Characterization — On-Demand Poster Session

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

Program Organizers: Andre Phillion, McMaster University; Dmitry Eskin, Brunel University

Monday AM | March 14, 2022
Light Metals | On-Demand Poster Hall

Interaction between Recrystallization and Second Phase Particles in Al-Mn Alloy with Impurities (Fe, Si): *Kazuha Yamase*[1]; Ken-ichi Ikeda[1]; Seiji Miura[1]; [1]Hokkaido University

Development of High-strength 6xxx Aluminium Nanocomposites by Direct-chill Casting and Thermo-mechanical Processing: *Guangyu Liu*[1]; Mahfuz Karim[1]; Dmitry Eskin[1]; Brian McKay[1]; [1]Brunel University London

Effect of Minor Alloying Elements on Mechanical Properties of 6xxx Series Aluminum Alloy Sheets: *GyeongSeok Joo*[1]; MinSang Kim[1]; YongWook Song[2]; Hyunjoo Choi[2]; SeHoon Kim[1]; JaeHyuk Shin[1]; SoonMok Choi[3]; [1]Korea Automotive Technology Institute; [2]Kookmin University; [3]Korea University of Technology & Education

A Study on the Improvement of Plastic Deformability and Thermal Conductivity of High Strength Aluminum Alloy: *Minsang Kim*[1]; Gyeongseok Joo[1]; Hansol Son[2]; Hyunjoo Choi[2]; Sehoon Kim[1]; [1]KATECH; [2]Kookmin University

Fabricating Tubes with Variable Properties via Shear Assisted Processing and Extrusion: *Mageshwari Komarasamy*[1]; Scott Whalen[1]; Brandon Taysom[1]; Timothy Roosendaal[1]; Angel Ortiz[1]; Glenn Grant[1]; Darrell Herling[1]; [1]Pacific Northwest National Laboratory

---

LIGHT METALS

Aluminum Reduction Technology — On-Demand Oral Presentations

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

Program Organizers: Kristian Etienne Einarsrud, Norwegian University of Science and Technology; Stephan Broek, Boston Metal; Mertol Gökelma, Izmir Institute of Technology; Dmitry Eskin, Brunel University

Monday AM | March 14, 2022
Light Metals | On-Demand Room

A Water Model Study of Alumina Feeding and Dispersion: Kristian Etienne Einarsrud[1]; *Sindre Engzelius Gylver*[1]; Simen Aase[1]; Simen Bekkevoll[1]; Sigmund Forberg[1]; [1]Norwegian University of Science and Technology

Managing Power Interruptions at 360 KA Smelter: *Amit Jha*[1]; Amit Gupta[1]; Pratap Sahu[2]; Kamal Pandey[2]; Senthil Nath[2]; [1]Aditya Birla Science & Technology Company, Ltd; [2]Hindalco Industries Ltd, Mahan Aluminum

A Pragmatic Model for Alumina Feeding: Stein Tore Johansen[1]; Asbjørn Solheim[1]; *Kurian J. Vachaparambil*[1]; Kristian Etienne Einarsrud[2]; [1]SINTEF Industry; [2]Norwegian University of Science and Technology

Statistical Model for Forecasting the Cell Replacement Rate in an Aluminum Smelter: *Sebastien Guerard*[1]; Pascal Thibeault[1]; [1]Rio Tinto

The Survivability of Aluminum Potlines after Lengthy Electrical Power Outages: *Alton Tabereaux*[1]; [1]Consultant

Imaging Alumina Distribution Using Low-voltage Anode Effect Detections in Anodic Current: *Joan Boulanger*[1]; Anne Gosselin[1]; Simon Gaboury[1]; Louis Guimond[1]; Claude Simard[1]; Alexandre Blais[1]; Francis Lalancette[1]; [1]Rio Tinto

Modeling of the Heat Exchange, the Phase Change, and Dissolution of Alumina Injected in Electrolysis Cells: *Thomas Roger*[1]; László Kiss[1]; Lukas Dion[1]; Jean Francois Bilodeau[2]; Sébastien Guérard[2]; Guillaume Bonneau[1]; Kirk Fraser[3]; [1]Universite Du Quebec A Chicoutimi; [2]Rio Tinto Aluminium; [3]Aluminum Technology Center

Direct Production of Aluminum Titanium Alloys in Aluminum Reduction Cells, A Laboratory Test: *Geir-Martin Haarberg*[1]; Omar Awayssa[1]; Gudrun Saevarsdottir[2]; Rauan Meirbekova[3]; Wenting Xu[1]; [1]Norwegian University of Science & Technology; [2]Reykjavik University; [3]DTE

Mass Transport by Waves: Physical Model with Coalescence, Fragmentation, and Displacement on a Bath-metal Interface: *Thomas Richer*[1]; Lukas Dion[1]; Laszlo Kiss[1]; Sebastien Gerard[1]; Jean-François Bilodeau[1]; Guillaume Bonneau[1]; Lovatianna Rakotondramanana[1]; Renaud Santerre[1]; [1]GRIPS

Empirical Prediction of Alumina Dissolution Rate in a Cryolitic Melt: Comparison with the Existing Literature: *Jonathan Alarie*[1]; László Kiss[1]; Lukas Dion[1]; Martin Truchon[2]; Renaud Santerre[3]; Sébastien Guérard[4]; Jean-François Bilodeau[4]; [1]Aluminium Research Centre – REGAL, University of Quebec at Chicoutimi; [2]University of Quebec-Chicoutimi; [3]Technical advisor, Retired from Rio Tinto; [4]Arvida Research and Development Centre, Rio Tinto

---

LIGHT METALS

Aluminum Reduction Technology Joint Session with REWAS: Decarbonizing the Metals Industry — On-Demand Oral Presentations

Sponsored by: TMS: Recycling and Environmental Technologies Committee, TMS: Aluminum Committee

Program Organizers: Mertol Gökelma, Izmir Institute of Technology; Stephan Broek, Boston Metal

Monday AM | March 14, 2022
Light Metals | On-Demand Room

Research on Low Temperature Aluminium Electrolysis Charging Recovery System of Renewable Energy Cycle Power Generation System: *Huimin Lu*[1]; Neale Neelameggham[2]; [1]Beijing Ofikintai Technology Co Ltd.; [2]IND LLC

The Contribution and Economics of Demand Side Response towards Decarbonizing the Aluminium Industry: *Nick Depree*[1]; David Wong[2]; David Thomas[3]; [1]EnPot Ltd; [2]Atmolite Consulting Pty Ltd; [3]Energy and Environment Ltd

Building of a Superconductor Busbar at 200 kA for an Aluminium Plant: *Wolfgang Reiser*[1]; Viktor Stark[1]; Till Reek[1]; [1]Vision Electric Super Conductors Gmbh

---

BIOMATERIALS

Biological Materials Science — On-Demand Oral Presentations

Sponsored by: TMS Functional 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; Hannes Schniepp, William & Mary

Monday AM | March 14, 2022
Biomaterials | On-Demand Room

Invited
Lightweight, Strong and Tough Structural Materials Inspired from Nature and Optimized by A.I.: *Po-Yu Chen*[1]; Cheng-Che Tung[1]; Ashish Ghimire[1]; Yen-Shuo Chen[1]; Yu-Yi Lai[1]; Chi-Hua Yu[2]; [1]National Tsing Hua University; [2]National Cheng Kung University

Invited
Tuning the Cancer Microenvironment at Bone Metastasis Using the Cancer Testbed: *Kalpana Katti*[1]; Sharad Jaswandkar[1]; Haneesh Jasuja[1]; Hanmant Gaikwad[1]; Farid Solaymani[1]; Jiha Kim[1]; Anu Gaba[2]; Dinesh Katti[1]; [1]North Dakota State University; [2]Sanford Health

Nanoparticle Embedded Multifunctional Catheter for Multimodal Cancer Therapy: *Hiep Pham*[1]; Yufang He[1]; Jonghyun Park[1]; [1]Missouri University of Science and Technology

Multidrug Delivery via Electrospun Core-shell Structured Nanofibers for Enhanced Post-surgical Healing: *Hiep Pham*[1]; Gracie Boyer[1]; Jonghyun Park[1]; [1]Missouri University of Science and Technology

Cement-polymer Composite Structures Inspired by Molluscan Prismatic Layers: *Shahbaz Khan*[1]; Ling Li[1]; [1]Virginia Tech

Decussation in Human Enamel: Descriptions of the Complex Pattern of the Enamel Rods: *Cameron Renteria*[1]; Susana Estrada Hernandez[2]; Juliana Fernández-Arteaga[2]; Jack Grimm[1]; Alex Ossa[2]; Dwayne Arola[1]; [1]University of Washington;

[2]Universidad EAFIT

The Influence of Reactive Oxygen Species in in Vitro Corrosion Resistance of CoCrMo: *Sangram Mazumder*[1]; Mangesh V. Pantawane[1]; Narendra B. Dahotre[1]; [1]University of North Texas

Controlled Drug Diffusion Kinetics in HEMA-backbone Hydrogels for Ocular Disease Treatment: *Parker Toews*[1]; Jeff Bates[1]; [1]University of Utah

A Study of the Composition and Mechanical Properties of Aprismatic Tooth Enamel Afflicted by Amelogenesis Imperfecta: *Jack Grimm*[1]; Dwayne Arola[1]; [1]University of Washington

Biodegradable Molybdenum/Polybutylene Adipate Terephthalate Conductive Paste for Flexible and Stretchable Transient Electronics: *Jaeyoung Yoo*[1]; Kyung-Sub Kim[2]; Jun-Seok Shim[2]; Jahyun Koo[3]; Seung-Kyun Kang[2]; Hyuck Mo Lee[1]; [1]Kaist; [2]Seoul National university; [3]Korea university

Optimization of Multi-physical Properties of Gradient Cellular Structures Inspired by Termite Nests: *Wen-Fei Chen*[1]; Cheng-Che Tung[1]; Tsung-Hui Huang[1]; Po-Yu Chen[1]; [1]National Tsing Hua University

Mimicking the Glioblastoma Cells' Microenvironment via Anisotropic Sub-microscaled Surface Patterns and Enabling Directional Adhesion of Filopodia on Metallic Biomaterials: *Benay Uzer-Yilmaz*[1]; [1]Izmir Institute of Technology

Tissue Derived Nanocomposite for Embolization: *Jingjie Hu*[1]; [1]North Carolina State University

On the Intrinsic Mechanical Properties of Individual Biogenic Mineral Units in Biomineralized Skeletons: *Zhifei Deng*[1]; Ling Li[1]; [1]Virginia Polytechnic Institute and State University

Novel Expandable Architected Breathing Tube for Improving Airway Securement in Emergency Care: *David Restrepo*[1]; Carlos Bedolla[1]; James White[1]; David Berard[1]; R. Lyle Hood[1]; [1]University of Texas at San Antonio

---

BIOMATERIALS

Biological Materials Science — On-Demand Poster Session

Sponsored by: TMS Functional 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; Hannes Schniepp, William & Mary

Monday AM | March 14, 2022
Biomaterials | On-Demand Poster Hall

Design of a Novel Bio-HEA for Potential Use as Orthopedical Implants: *Jhuliene Torrento*[1]; Tiago de Sousa[1]; Carlos Grandini[1]; Diego Correa[2]; [1]Univ. Estadual Paulista - Laboratório de Anelasticidade e Biomateriais; [2]Instituto Federal de Educação, Ciência e Tecnologia de São Paulo

Fabrication and Characterisation of Two-layered Synthetic Titanium-Chitosan Bone Scaffolds: *Lemiha Yildizbakan*[1]; Vasiliki Panagiotopoulou[2]; Neelam Iqbal[1]; Ngoc Do[1]; Elena Jones[1]; Peter Giannoudis[1]; Animesh Jha[1]; Dina Abdul Aziz[1];

[1]University of Leeds; [2]University of Patras

Development and Characterization of Novel Ti-Mo-Nb Alloys for Biomedical Applications: *Giovana Cardoso*[1]; Carlos Roberto Grandini[1]; [1]UNESP – Univ. Estadual Paulista, Laboratório de Anelasticidade e Biomateriais

---

BIOMATERIALS

BioNano Interfaces and Engineering Applications — On-Demand Oral Presentations

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

Program Organizers: Candan Tamerler, University of Kansas; Hendrik Heinz, University of Colorado Boulder; Kalpana Katti, North Dakota State University; Terry Lowe, Colorado School of Mines; Po-Yu Chen, National Tsing Hua University

Monday AM | March 14, 2022
Biomaterials | On-Demand Room

Keynote
Nanostructured Metals for Miniaturized Medical Implants with Improved Biofunctionality: Ruslan Valiev[1]; Nariman Enikeev[1]; Benjamin Ewing[2]; Adam Griebel[2]; *Terry Lowe*[3]; [1]UFA State Aviation Technical University; [2]Fort Wayne Metals; [3]Colorado School of Mines

Invited
Mechanics of Cellular Actin Filaments: *Dinesh Katti*[1]; Sharad Jaswandkar[1]; Kalpana Katti[1]; [1]North Dakota State University

Invited
A New Approach to the Mechanics of DNA: Atoms-to-beam Homogenization: Johannes Kalliauer[1]; Gerhard Kahl[1]; Stefan Scheiner[1]; *Christian Hellmich*[1]; [1]Vienna University Of Technology

Invited
Inductively Coupled Plasma for Cell and Microbial Interfacing Surfaces: *Vinoy Thomas*[1]; [1]University of Alabama at Birmingham

Invited
Biomaterials by Design: *Chi-Hua Yu*[1]; Wei Chen[1]; [1]National Cheng Kung University

Designing and Optimization of Bio-inspired 3D Structures — From Ordered TPMS to Disordered Reaction Models: *Cheng-Che Tung*[1]; Wen-Fei Chen[1]; Chi-Hua Yu[2]; Shu-Wei Chang[3]; Chuin-Shan Chen[3]; Po-Yu Chen[1]; [1]National Tsing Hua University; [2]National Cheng Kung University; [3]National Taiwan University

Antiviral Surface Topographies on Metal Surfaces: *Terry Lowe*[1]; Rebecca Reiss[2]; Heather Slomski[1]; [1]Colorado School of Mines; [2]New Mexico Tech

Disrupted Osteogenesis at Bone Metastasis of Breast Cancer and Prostate Cancer: *Kalpana Katti*[1]; Haneesh Jasuja[1]; Dinesh Katti[1]; [1]North Dakota State University

---

BIOMATERIALS

BioNano Interfaces and Engineering Applications — On-Demand Poster

Session

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

Program Organizers: Candan Tamerler, University of Kansas; Hendrik Heinz, University of Colorado Boulder; Kalpana Katti, North Dakota State University; Terry Lowe, Colorado School of Mines; Po-Yu Chen, National Tsing Hua University

Monday AM | March 14, 2022
Biomaterials | On-Demand Poster Hall

Thermal Oxidation as a Tool to Biofunctionalize Novel Biomedical Ti-based Alloys: *Diego Correa*[1]; Carlos Grandini[2]; Luís Rocha[2]; Lívia Sottovia[2]; Nilson Cruz[2]; Elidiane Rangel[2]; [1]IFSP - Campus Sorocaba; [2]UNESP - Univ. Estadual Paulista

---

ADVANCED MATERIALS

Bulk Metallic Glasses XIX — On-Demand Oral Presentations

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

Program Organizers: Robert Maass, Federal Institute for Materials Research and Testing (BAM); Peter Derlet, Paul Scherrer Institut; Katharine Flores, Washington University in St. Louis; Yonghao Sun, Chinese Academy of Sciences; Lindsay Greer, University of Cambridge; Peter Liaw, University of Tennessee

Monday AM | March 14, 2022
Advanced Materials | On-Demand Room

Invited
Are Metallic Glasses Brittle or Ductile?: *Jan Schroers*[1]; [1]Yale University

Invited
Atomic Motion in Ultrastable Metallic Glasses: *Beatrice Ruta*[1]; Martin Luettich[2]; Konrad Samwer[3]; [1]Univ Lyon 1 and CNRS; [2]ESRF and Goettingen University; [3]Goettingen University

Invited
Relaxation Dynamics in Glass Forming Alloys: Microscopic Nature, Timescales and Aging Effects: *Eloi Pineda*[1]; [1]Universitat Politècnica de Catalunya

Invited
Shear Bands in Metallic Glasses: Local Structure, Atomic Mobility and Relaxation Kinetics: *Gerhard Wilde*[1]; [1]University of Muenster

Invited
STZ-vortex Unit – The Key to Understand and Control Shear Banding in Metallic Glasses: *Daniel Sopu*[1]; Xudong Yuan[1]; Jürgen Eckert[1]; [1]Erich Schmid Institute of Materials Science of the Austrian Academy of Sciences

Invited
Size-dependent Freezing Kinetics of Bulk Metallic Glasses: *Isabella Gallino*[1]; Daniele Cangialosi[2]; Sascha Riegler[1]; Golden Kumar[3]; [1]Saarland University;

[2]Donostia International Physics Center; [3]The University of Texas at Dallas

Invited
Strength-controlled Fracture of Metallic Glass at the Micrometer Scale: *Ruitao Qu*[1]; Robert Maaß[2]; Zengqian Liu[3]; Robert Ritchie[4]; Zhefeng Zhang[3]; Cynthia Volkert[5]; Feng Liu[1]; [1]Northwestern Polytechnical University; [2]University of Illinois at Urbana-Champaign; [3]Institute of Metal Research, Chinese Academy of Sciences; [4]Materials Sciences Division, Lawrence Berkeley National Laboratory; [5]Institute of Materials Physics, University of Göttingen

Invited
Systematic Identification of Local Shear Events during the Plastic Deformation of Colloidal Glasses: *Frans Spaepen*[1]; [1]Harvard University

Shear Band Interactions in Bulk Metallic Glass Composites: *Jurgen Eckert*[1]; [1]Erich Schmid Institute of Materials Science

Relative Contributions of Local Structural State, Elastic Perturbation, and Heat Generation to Plasticity in Metallic Glass: *Thomas Hardin*[1]; [1]Sandia National Laboratories

Nature of the Medium-range Order Distinct from the Short-range Order in Metallic Liquids: *Chae Woo Ryu*[1]; Takeshi Egami[1]; [1]University of Tennessee

Atomic Structure of Bulk Metallic Glasses/Liquids Studied by Synchrotron-radiation X-ray Diffraction, Scanning Tunneling Microscopy and Ab-initio Molecular Dynamics Simulation: *Dmitri Louzguine*[1]; [1]WPI-AIMR, Tohoku University

Cryogenic Thermal Cycling of a $Pd_{43}Cu_{27}Ni_{10}P_{20}$ Bulk Metallic Glass: *Miguel B. Costa*[1]; Juan J. Londoño[2]; Andreas Blatter[2]; Michael Carpenter[3]; A. Lindsay Greer[1]; [1]Department of Materials Science and Metallurgy, University of Cambridge; [2]Research and Development Department, PX Services; [3]Department of Earth Sciences, University of Cambridge

New $(Fe_{0.5}Co_{0.5})_{71.64}B_{19.104}Si_{4.776}Nb_{3.98}Cu_{0.5}$ Bulk Glassy Alloy: A Comprehensive Time-resolved Synchrotron X-ray Study: *Mihai Stoica*[1]; Gavin Vaughan[2]; Jonathan Wright[2]; Jörg Löffler[1]; [1]ETH Zurich; [2]European Synchrotron Radiation Facility

Influence of Medium Range Ordering on the Deformation Behavior and Mechanical Properties of Metallic Glasses: *Yuchi Wang*[1]; Pengyang Zhao[2]; Soohyun Im[1]; Jinwoo Hwang[1]; Yunzhi Wang[1]; [1]The Ohio State University; [2]Shanghai Jiao Tong University

Long-time Structural Evolution of a Metallic Glass at Elevated Temperature Measured by XPCS: *Birte Riechers*[1]; Amlan Das[2]; Eric Dufresne[3]; Robert Maass[1]; [1]Federal Institute for Materials Research and Testing (BAM); [2]University of Illinois at Urbana-Champaign; [3]Argonne National Laboratory

High-resolution Transmission Electron Microscopy Study of Rejuvenation in Bulk Metallic Glasses: *Iurii Ivanov*[1]; Lindsay Greer[1]; [1]University of Cambridge

Pressure Effects in Zr-based Super-cooled Liquids: *Wojciech Dmowski*[1]; Stanislaw Gierlotka[2]; Geun Hee Yoo[3]; Eun Soo Park[3]; Takeshi Egami[1]; [1]University of Tennessee; [2]Polish Academy of Science; [3]Seoul National University

Phenomenology of Viscosity and Transport in a Model Fragile Metallic Glass: *Peter Derlet*[1]; Hugo Bocquet[1]; Robert Maass[2]; [1]Paul Scherrer Institut; [2]BAM

Mechanisms of Strain-hardening in Metallic Glasses: *A. Lindsay Greer*[1]; Y. Li[2]; A. Inoue[3]; [1]University of Cambridge; [2]Institute of Metal Research; [3]Josai International

University

Metallic Glacial Glass Formation by a First-order Liquid-liquid Transition: *Yonghao Sun*[1]; [1]Institute of Physics, the Chinese Academy of Sciences

Strain-dependent Shear-band Structure in a Metallic Glass: *Robert Maass*[1]; [1]Federal Institute for Materials Research and Testing (BAM)

Crystallization of a Au-based Bulk Metallic Glass: Influence of the Initial Glassy State: *Owain Houghton*[1]; Yurii Ivanov[1]; A. Lindsay Greer[1]; [1]Dept. Materials Science & Metallurgy, University of Cambridge

Synchrotron X-ray Diffraction of Metallic Glass Rejuvenated under Triaxial Compression: *Nikolaos Panagiotopoulos*[1]; Konstantinos Georgarakis[2]; Yi Li[3]; Alan Greer[1]; [1]University of Cambridge; [2]Cranfield University; [3]Chinese Academy of Sciences

Statistical Analysis on Single Versus Successive Pop-ins in Nanoindentation Tests of Zr-based Bulk Metallic Glass: *Priyanka Saini*[1]; Upadrasta Ramamurty[2]; Jae-il Jang[3]; R.L. Narayan[1]; [1]Indian Institute of Technology; [2]Nanyang Technological University; [3]Hanyang University

---

ADVANCED MATERIALS

Bulk Metallic Glasses XIX — On-Demand Poster Session

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

Program Organizers: Robert Maass, Federal Institute for Materials Research and Testing (BAM); Peter Derlet, Paul Scherrer Institut; Katharine Flores, Washington University in St. Louis; Yonghao Sun, Chinese Academy of Sciences; Lindsay Greer, University of Cambridge; Peter Liaw, University of Tennessee

Monday AM | March 14, 2022
Advanced Materials | On-Demand Poster Hall

Amorphization of Si in Al-Cu-Si Ternary Alloy System with Liquid Quenching Process: *Rui Yamada*[1]; Junpei T. Okada[2]; Takeshi Wada[2]; Haruka Isano[3]; Tomohiro Yoshikawa[3]; Junji Saida[1]; [1]Frontier Research Institute for Interdisciplinary Sciences, Tohoku University; [2]Institute for Materials Research, Tohoku University; [3]Graduate School of Engineering, Tohoku University

Bulk Intrinsic Heterogeneity of Metallic Glasses Probed by Meissner Effect: Shubin Li[1]; *Fujun Lan*[2]; Qian Dong[2]; Qiaoshi Zeng[1]; [1]Center for High Pressure Science & Technology Advanced Research; [2]Shanghai Jiao Tong University

Compression Experiments on Metallic Glass Specimens of Varying Size Differentiate between Models of Plasticity: Alan Long[1]; Wendelin Wright[2]; Xiaojun Gu[2]; *Karin Dahmen*[1]; [1]University of Illinois; [2]Bucknell University

Evolutionary Design of Machine-learning Predicted Bulk Metallic Glasses: *Robert Forrest*[1]; A. Greer[1]; [1]University of Cambridge terials

Microstructures and Mechanical Properties of Non-toxic TiZr-based BMG Foams with Customized Porosity for Bio-implant Application: *Po-Sung Chen*[1]; Yu-Chin Liao[1]; Sin-Mao Song[1]; Pei-Hua Tsai[1]; Jason S. C. Jang[1]; Xavier Pei-Chun Wong[2]; Van Tai Nguyen[3]; [1]National Central University; [2]Taipei Medical University; [3]Can Tho University

LIGHT METALS

Cast Shop Technology — On-Demand Oral Presentations

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

Program Organizers: Stephen Instone, Speira GmbH; Mertol Gökelma, Izmir Institute of Technology; Samuel Wagstaff, Oculatus; Dmitry Eskin, Brunel University

Monday AM | March 14, 2022
Light Metals | On-Demand Room

Digital Twin for Design and Optimization of DC Casting Lines: *Knut Omdal Tveito*[1]; Arild Håkonsen[2]; [1]Hydro Aluminium; [2]Hycast AS

Analytical, Numerical and Experimental Investigations of Transient Heat Conduction in Launder during Casting Process: *Akash Pakanati*[1]; Knut Tveito[1]; [1]Norsk Hydro

The Local Squeeze Technology for Challenging Aluminium HPDC Automotive Components: *Elisa Fracchia*[1]; Federico Simone Gobber[2]; Claudio Mus[3]; Raul Pirovano[4]; Mario Rosso[1]; [1]INSTM c/o Politecnico di Torino; [2]Politecnico di Torino; [3]Endurance Overseas; [4]XC Engineering Srl

Quantitative Assessment of Operational Parameters on Die Temperature during an Industrial Low-pressure Die Casting Process: *Jun Ou*[1]; Chunying Wei[1]; Steve Cockcroft[1]; Daan Maijer[1]; Lin Zhu[2]; Lateng A[2]; [1]UBC; [2]Dicastal Co., LTD

Casthouse Furnace Tending: A New Approach Thanks to Custom Robotics: *Jean Francois Desmeules*[1]; Robert Dumont[1]; [1]Dynamic Concept

Short- and Long-term Aluminum Filtration Trials with Carbon-bonded Alumina Filters: *Claudia Voigt*[1]; Jana Hubálková[1]; Are Bergin[2]; Robert Fritzsch[2]; Shahid Akhtar[3]; Ragnhild Aune[2]; Christos Aneziris[1]; [1]Institute Of Ceramics, Refractories And; [2]Department of Materials Science and Engineering, Norwegian University of Science and Technology; [3]Hydro Aluminium AS, Karmøy Primary Production

Adaptive Tempering in High Pressure Die Casting through Prediction Functions: *Torben Disselhoff*[1]; Sebastian Tewes[1]; Sebastian Biehl[2]; [1]University Duisburg-Essen; [2]thermobiehl Apparatebau GmbH

Aluminum Melt Cleanliness Analysis Based on Direct Comparison of Computationally Segmented PoDFA Samples and LiMCA Results: *Robert Fritzsch*[1]; Hannes Zedel[1]; Trygve Schanche[1]; Are Bergin[2]; Shahid Akthar[3]; Lars Arnberg[1]; Ragnhild E. Aune[1]; [1]Dept. of Materials Science and Engineering, Norwegian University of Science and Technology (NTNU); [2]Hydro Aluminium AS, Commercial Technology, Sunndalsøra, NORWAY; [3]Hydro Aluminium AS, Karmøy Primary Production, 4265 Håvik, NORWAY

Numerical and Experimental Investigation of Heat Transfer in the Solidification-deformation Zone during Twin-roll Casting of Aluminum Strips: *Olexandr Grydin*[1]; Dag Mortensen[2]; Moritz Neuser[1]; Dag Lindholm[2]; Hallvard Fjær[2]; Mirko Schaper[1]; [1]Materials Science, Paderborn University; [2]Institute for Energy Technology

Microstructural Modification of a High-pressure Die-cast A380 Alloy through Friction Stir Processing and Its Effect on Mechanical Properties: *Avik Samanta*[1]; Hrishikesh Das[1]; David Garcia[1]; Robert Seffens[1]; Timothy Roosendaal[1]; Anthony

Guzman[1]; Glenn Grant[1]; Saumyadeep Jana[1]; [1]Pacific Northwest National Laboratory

Control Pin Refractory Reaction in High Magnesium Aluminium-melts: *Reiza Mukhlis*[1]; John Grandfield[2]; M. Akbar Rhamdhani[1]; [1]Swinburne University of Technology; [2]Grandfield Technology Pty Ltd

The Great Debate - High vs Low Water Direct Chill Casting Pits - Which is Safer: *Alex Lowery*[1]; [1]Wise Chem LLC

Predicted Back-meniscus Stability for the Horizontal Single Belt Casting (HSBC) with Single Impingement Feeding System: *Daniel Ricardo Gonzalez Morales*[1]; Mihaiela Isac[1]; Roderick Guthrie[1]; [1]McGill Metals Processing Center

CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2022 — On-Demand Oral Presentations

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

Program Organizers: Mingming Zhang, Wood Mackenzie; Jian Li, CanmetMATERIALS; 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, DEVCOM U.S. Army Research Laboratory; Rajiv Soman, Eurofins EAG Materials Science LLC; Zhiwei Peng, Central South University

Monday AM | March 14, 2022
Characterization | On-Demand Room

Session Chair: Mingming Zhang, Wood Mackenzie

Direct Correlation of Frank Loop Nature and Morphology in Self-ion Irradiated Nickel: *Kan Ma*[1]; Brigitte Décamps[2]; Anna Fraczkiewicz[3]; Frédéric Prima[4]; Marie Loyer-Prost[1]; [1]DEN-Service de Recherches de Métallurgie Physique, CEA; [2]IJCLab, Université Paris-Saclay; [3]MINES Saint-Etienne, Université de Lyon; [4]PSL Research University-Chimie ParisTech

Machine Learning Enabled Atom Tomographic Imaging of Chemical Short-range Order in Fe-18Al: *Yue Li*[1]; Zhangwei Wang[2]; Leigh T. Stephenson[1]; Baptiste Gault[1]; [1]Max-Planck-Institut Fur Eisenforschung; [2]Central South University

Leaching Cobalt from a Nickel-containing Copper-cobalt Zebesha Ore: Yotamu Hara[1]; *Foibe Uahengo*[1]; Rainford Hara[1]; Nachikonde Fumpa[1]; Alexander Old[1]; Golden Kaluba[1]; [1]Copperbelt University

Exploring Three Dimensional Orientation and Residual Stresses in Railway Steels: *Can Yildirim*[1]; Yubin Zhang[2]; Erika Steyn[3]; Fang Liu[3]; Carsten Detlefs[1]; Casey Jessop[3]; Johan Alstrom[3]; [1]European Synchrotron Radiation Facility; [2]Technical University of Denmark; [3]Chalmers University of Technology

Microstructural Characterisation of AA5083 in AA5083/SiC Co-continuous Ceramic Composites (C4) Fabricated by Gravity and Gas Pressure Infiltration: Georgia Warren[1]; Jianshen Wang[1]; AS Prasanth[2]; Krishna Shankar[1]; V Krishnaraj[3]; R Ramesh[4]; *Juan Escobedo-Diaz*[1]; [1]School of Engineering and Information Technology, University of New South Wales, Canberra, Australia; [2]Department of Mechanical Engineering, PSG College of Technology, Coimbatore, India;

[3]Department of Production Engineering, PSG College of Technology, Coimbatore, India; [4]Department of Mechanical Engineering, PSG Institute of Technology and Applied Research, Coimbatore, India

Temperature Monitoring of Bearings in Railway Vehicles Using Infrared Thermography Technology: *Jeongguk Kim*[1]; [1]Korea Railroad Research Institute

Interaction between Iron Ore and Magnesium Additives during Pellet Roasting Process: *Lianda Zhao*[1]; Jingsong Wang[1]; Qingguo Xue[1]; Hong Su[1]; [1]State Key Laboratory of Advanced Metallurgy,University of Science and Technology Beijing

Development of Surface Tension and Heat Capacity Measurement Techniques for Molten Materials Using Aerodynamic Levitation: *Yifan Sun*[1]; Hiroaki Muta[1]; Yuji Ohishi[1]; [1]Osaka University

Coking Coal Macromolecular Structural Characteristic and Its Correlations with the Compressive Strength of CaO-containing Carbon Pellets: *Xiaomin You*[1]; Xuefeng She[1]; Jingsong Wang[1]; Qingguo Xue[1]; [1]State Key Laboratory of Advanced Metallurgy, University of Science and Technology Beijing

SAXS Tomography of Multilayered Al-Zn-Mg Alloy Sheets: *Shan Lin*[1]; Hiroshi Okuda[1]; [1]Kyoto University

Low-temperature Preparation and Mechanism Study of Vanadium Nitride: *Yongjie Liu*[1]; Qingqing Hu[1]; Donglai Ma[1]; Yue Wang[1]; Zhixiong You[1]; [1]Chongqing University

Application of Flue Gas Desulfurization Waste for the Production of Geopolymer Tiles: Markssuel Marvila[1]; *Afonso Azevedo*; Felipe Gama[1]; Euzébio Zanelato[1]; Sergio Monteiro[1]; Carlos Maurício Vieira[1]; [1]Universidade Estadual do Norte Fluminense Darcy Ribeiro

Separation of Nickel and Cobalt from Nickel and Cobalt Solution by Cyanex272: Yan Ganggang[1]; *Wang Zibiao*[2]; Le Dinghao[2]; Sun Xintao[2]; Zhang Xijun[1]; Chen Dalin[1]; [1]State Key Laboratory of Nickel and Cobalt Resources Comprehensive Utilization; [2]Central south university

Evolution of the Thermal Conductivity of Sintered Ag Paste as a Function of the Density, the Roughness of the Interface and Aging: *Anas Sghuri*[1]; Yann Billaud[1]; Loïc Signor[1]; Pascal Gadaud[1]; Didier Saury[1]; Xavier Milhet[1]; [1]Pprime Institut

High-speed X-rays for Quantitative Analyses of Dynamic Events: *Andrew Brown*[1]; Thomas Plaisted[1]; Hans Broos[2]; Frits Hilvers[2]; [1]DEVCOM U.S. Army Research Laboratory; [2]TNO

Lowering the Presence of Heavy Metals in Textured Coat Using Recycled Post Consumer Glass: *Andrew Adejo*[1]; Adele Garkida[2]; Clement Gonah[2]; Eric Opoku[2]; [1]Federal University of Lafia; [2]Ahmadu Bello University

Adsorption of Iron, Copper, Chromium and Cadmium in Cobalt Sulfate Solution by Goethite: Sujun Lu[1]; *Jiang Cao*[2]; Yuanyuan Li[2]; Guoju Chen[1]; Priska Jesika[2]; Guanwen Luo[2]; [1]State Key Laboratory of Nickel and Cobalt Resources Comprehensive Utilization; [2]Central South University

Degradation of Structure and Properties of Coke in Blast Furnace: Effect of High Temperature Heat Treatment: *Jingbo Chen*[1]; Shengfu Zhang[1]; Yan Guo[1]; [1]Chongqing Unversity

Strength and Failure Characterization of the Gibeon (IVA) Iron Meteorite: *Md Fazle Rabbi*[1]; Khaled Khafagy[1]; Laurence Garvie[1]; Erik Asphaug[2]; Desiree Cotto-Figueroa[3]; Aditi Chattopadhyay[1]; [1]Arizona State University; [2]University of Arizona; [3]University of Puerto Rico at Humacao

CHARACTERIZATION

Characterization of Minerals, Metals and Materials 2022 — On-Demand Poster Session

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

Program Organizers: Mingming Zhang, Wood Mackenzie; Jian Li, CanmetMATERIALS; 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, DEVCOM U.S. Army Research Laboratory; Rajiv Soman, Eurofins EAG Materials Science LLC; Zhiwei Peng, Central South University

Monday AM | March 14, 2022
Characterization | On-Demand Poster Hall

Session Chair: Mingming Zhang, Wood Mackenzie

Characterization of Slag and Growth of Ferronickel Grains during Smelting of Nickel Laterite Ore: *Donglai Ma*[1]; Jianbo Zhao[1]; Hanghang Zhou[1]; Zhixiong You[1]; [1]Chongqing University

Evaluation of Recyclable Thermoplastics for the Manufacturing of Wind Turbines Blades H-Darrieus: *Andrés Olivera Castillo*[1]; Edwin Chica[1]; Henry Colorado[1]; [1]Universidad de Antioquia

Coking Coal Macromolecular Structural Characteristic and Its Correlations with the Compressive Strength of CaO-containing Carbon Pellets: *Xiaomin You*[1]; Jingsong Wang[1]; Xuefeng She[1]; Qingguo Xue[1]; [1]State Key Laboratory of Advanced Metallurgy, University of Science and Technology Beijing

Synthesis and Electrical and Magnetic Characterization of Electroceramics Type Ba1-xEuxTi1-x/4O3 (x = 0.001 and x = 0.005% by Weight Eu3+): *Juan Hernández-Lara*[1]; M. Pérez-Labra[1]; A. Hernández-Ramírez[2]; J. A. Romero-Serrano[2]; F. R. Barrientos-Hernández[1]; J.C. Juárez-Tapia[1]; M. Reyes-Pérez[1]; V. E. Reyes-Cruz[1]; [1]UAEH; [2]National Polytechnic Institute

Characterization of Soil from Areas Degraded by Mining Activity in Campos dos Goytacazes-RJ, Brazil: *Afonso Azevedo*[1]; Júlia Brainer[1]; Markssuel Marvila[1]; Gustavo Xavier[1]; Sergio Monteiro[2]; [1]Universidade Estadual do Norte Fluminense; [2]IME

Characterization of Mortar in Fresh State with the Addition of Acai Fiber: *Afonso Azevedo*[1]; Diego Rocha[1]; Thuany Lima[1]; Markssuel Marvila[1]; Euzebio Zanelato[2]; Jonas Alexandre[1]; Sergio Neves Monteiro[3]; Henry Colorado[4]; [1]Universidade Estadual do Norte Fluminense; [2]IFF; [3]IME; [4]Universidad de Antioquia

Comparative Study of Staining Resistance for Polished and Resined Silicatic Ornamental Rocks: Silmara Rocha[1]; Evanizis Castilho[2]; *Afonso Azevedo*[3]; Lucas Reis[3]; Markssuel Marvila[3]; Sergio Neves Monteiro[4]; [1]IFES; [2]UENF/IFES; [3]Universidade Estadual do Norte Fluminense; [4]IME

Characterization and Stain Analysis in Natural and Artificial Rocks: Marialice Freitas[1]; Evanizis Castilho[2]; *Afonso Azevedo*[2]; José Alexandre Linhares Júnior[2]; Markssuel Marvila[2]; Sergio Neves Monteiro[3]; [1]IFES; [2]Universidade Estadual do

Norte Fluminense; [3]IME

Development of Metakaolin Based Geopolymer Mortar and the Flue Gas Desulfurization (FGD) Waste: Leandro Oliveira[1]; *Afonso Azevedo*[1]; Markssuel Marvila[1]; Carlos Mauricio Vieira[1]; Niander Cerqueira[1]; Sergio Neves Monteiro[2]; [1]Universidade Estadual do Norte Fluminense; [2]IME

Determination of Strength to the Hard Body Impact of Raw, Resinate and Screened Ornamental Rocks: Andréia Hilário[1]; Evanizis Castilho[2]; *Afonso Azevedo*[3]; Thuany Lima[3]; Markssuel Marvila[3]; Sergio Neves Monteiro[4]; [1]IFES; [2]UENF/IFES; [3]Universidade Estadual do Norte Fluminense; [4]IME

Comparative Study of the Flexural Strength of Rock Materials for Applications in Civil Construction: Lynda Campos[1]; Evanizis Castilho[1]; *Afonso Azevedo*[2]; Tulane Silva[2]; Markssuel Marvila[2]; Euzebio Zanelato[2]; Sergio Neves Monteiro[3]; [1]IFES; [2]Universidade Estadual do Norte Fluminense; [3]IME

Study of the Determination of Hardbody Impact Resistance of Screened and Non-screened Ornamental Rocks of Different Thickness: Matheus Braga[1]; Evanizis Castilho[2]; *Afonso Azevedo*[3]; Ariana Cruz[3]; Markssuel Marvila[3]; Sergio Neves Monteiro[3]; [1]IFES; [2]UENF / IFES; [3]Universidade Estadual do Norte Fluminense

Evaluation of Mortars with the Addition of Natural and Treated Açaí Core (Euterpe Oleracea Mart.): Gabriel Monteiro[1]; *Afonso Azevedo*[1]; Markssuel Marvila[1]; Jorge de Brito[2]; Jonas Alexandre[1]; Sergio Neves Monteiro[3]; [1]Universidade Estadual do Norte Fluminense; [2]Universidade de Lisboa; [3]IME

Use of Glass Waste as a Geopolymerization Reaction Activator for Ceramic Materials: *Afonso Azevedo*[1]; Markssuel Marvila[1]; Leandro Oliveira[1]; Daiane Cecchin[1]; Paulo Matos[2]; Gustavo Xavier[1]; Carlos Mauricio Vieira[1]; Sergio Monteiro[3]; [1]Universidade Estadual do Norte Fluminense; [2]UFSM; [3]IME

Fundamental Study on Wettability of Pure Metal Using the Low-melting Temperature Alloy - Theoretical Approach: *Jun-Ichi Saito*[1]; Hideo Shibutani[2]; Yohei Kobayashi[3]; [1]Japan Atomic Energy Agency; [2]Kurume Institute of Technology; [3]National Institute of Technology, Maizuru College

Fundamental Study on Wettability of Pure Metal Using the Low-melting Temperature Alloy - Experimental Approach -: *Yohei Kobayashi*[1]; Jun-ichi Saito[2]; Hideo Shibutani[3]; [1]National Institute of Technology, Maizuru college; [2]Japan Atomic Energy Agency; [3]Kurume Institute of Technology

Comparison of Ceramic Blocks Incorporated with Ornamental Rock Waste in Hoffman and Caieira Furnace: Euzebio Zanelato[1]; *Afonso Azevedo*[2]; Markssuel Marvila[3]; Sergio Monteiro[4]; Jonas Alexandre[3]; [1]IFF; [2]Universidade Estadual do Norte Fluminense; [3]UENF; [4]IME

Evaluation of the Rheology of Mortars with Incorporation of Ornamental Stone Waste: Euzebio Zanelato[1]; *Afonso Azevedo*; Markssuel Marvila[2]; Sergio Monteiro[3]; [1]IFF; [2]UENF; [3]IME

Characterization of Blast Furnace Slag for Preparing Activated Alkali Cements: Markssuel Marvila[1]; *Afonso Azevedo*; Euzébio Zanelato[1]; Sergio Monteiro[1]; Carlos Maurício Vieira[1]; [1]Universidade Estadual do Norte Fluminense Darcy Ribeiro

An Investigation of the Relationship between Raw Coal Caking Characteristics and Its Petrographic Properties: *Yucen Kuang*[1]; Wei Ren[2]; Lechi Zhang[1]; Shengfu Zhang[1]; [1]Chongqing university; [2]Technical Centre, Angang Steel Company Limited, Anshan, Liaoning 114021, China.

Influence of pH Regulating Additives on the Performance of Granite Waste Based Paints: Márcia Lopes[1]; *Leonardo Pedroti*[1]; Hellen Moura[1]; José Maria Carvalho[1]; José

Carlos Ribeiro[1]; Gustavo Nalon[1]; [1]Federal University of Viçosa

---

ENERGY & ENVIRONMENT

Composite Materials for Sustainable Eco-Friendly Applications — On-Demand Oral Presentations

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

Program Organizers: Brian Wisner, Ohio University; Ioannis Mastorakos, Clarkson University; Simona Hunyadi Murph, Savannah River National Laboratory

Monday AM | March 14, 2022
Energy & Environment (including REWAS 2022 Symposia) | On-Demand Room

---

The Formation of Schwertmannite and Its Influence on Mine Environment: *Yao Xiong*; [1]Central South University

Characterization of PLA Bio-nanocomposites with Bacterial Cellulose Derived from Banana Peels: *Erin-Nicole Scott*[1]; [1]Tuskegee University MSE Department

Recycling Diesel Combustion Byproducts as Anode Electrode Material for Lithium-ion Batteries: Darrell Gregory[1]; Sisi Yang[2]; Cody Massion[1]; Mileva Radonjic[1]; Stephen Cronin[2]; *Omer Ozgur Capraz*[1]; [1]Oklahoma State University; [2]University of Southern California

Understanding Photocarrier and Gas Dynamics to Rationally Design Heterostructured Nanocatalysts for Solar CO2 Conversion: *Anthony Thompson*[1]; [1]Savannah River National Laboratory

---

ENERGY & ENVIRONMENT

Composites for Energy Applications: Materials for Renewable Energy Applications 2022 — On-Demand Oral Presentations

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

Program Organizers: Patrick Ward, Savannah River National Laboratory; Joseph Teprovich, California State University Northridge; Anthony Thompson, Savannah River National Laboratory; Simona Hunyadi Murph, Savannah River National Laboratory

Monday AM | March 14, 2022
Energy & Environment (including REWAS 2022 Symposia) | On-Demand Room

---

Invited
Plasmon-initiated Hydrogen Desorption: *Katherine Hurst*[1]; Steven Christensen[1]; Ashley Gaulding[1]; Ana Sanz-Matias[2]; Pragya Verma[2]; Noemi Leick[1]; David Prendergast[2]; Thomas Gennett[1]; [1]National Renewable Energy Laboratory;

[2]Lawrence Berkeley National Laboratory

Invited
Nanoconfined Metal Hydrides as Solid-State Electrolytes and as Reversible Hydrogen Storage Materials: *Vitalie Stavila*[1]; [1]Sandia National Laboratories

Invited
Development of Hydrogen Storage and Gas Purification Materials for Renewable Energy Applications: *Godwin Severa*[1]; [1]University of Hawaii, Hawaii Natural Energy Institute

Invited
System Modeling of Metal Hydrides for Fuel Cell Vehicles: *Kriston Brooks*[1]; Lenna Mahoney[1]; [1]Pacific Northwest National Laboratory

A Review on Epoxy Filled Metallurgical Dust- phase change materials Systems for Enhanced Thermal Energy Storage: *Daniel Okanigbe*[1]; [1]Tshwane University of Technology

Eutectic Electrolytes for Lithium Ion Batteries: *Nathaniel Hardin*[1]; [1]SRNL

Spectroscopic Investigation of the Electronic and Excited State Properties of Para-substituted Tetraphenyl Porphyrins and Their Electrochemically Generated Ions: *Lauren Hanna*[1]; Joseph Teprovich[2]; Patrick Ward[1]; [1]Savannah River National Laboratory; [2]California State University Northridge

Densification and Microstructure Features of Lithium Hydride Fabrication: *Christian Bustillos*[1]; Gabriella King[1]; Jaben Root[1]; Joshua Kuntz[1]; Wyatt Du Frane[1]; [1]Lawrence Livermore National Laboratory

---

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — On-Demand Oral Presentations

Sponsored by: TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee

Program Organizers: Vahid Attari, Texas A&M University; Sara Kadkhodaei, University Of Illinois At Chicag; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Tourret, IMDEA Materials Institute; James Morris, Ames Laboratory

Monday AM | March 14, 2022
Physical Metallurgy | On-Demand Room

Invited
Magnetic-field-induced Phonon Stiffening Enhances Demagnetization Entropy in a Shape Memory Alloy: *Michael Manley*[1]; Paul Stonaha[1]; Nick Bruno[2]; Ibrahim Karaman[2]; Raymundo Arroyave[2]; Douglas Abernathy[1]; Songxue Chi[1]; Jeffrey Lynn[3]; [1]Oak Ridge National Laboratory; [2]Texas A&M University; [3]NIST

Invited
Modelling Columnar-to-equiaxed Transition during Additive Manufacturing: *Durga Ananthanarayanan*[1]; Niklas Holländer Pettersson[1]; Greta Lindwall[1]; [1]Kth

Royal Institute Of Technology

Invited
Slow Interface Dynamics from Atomistic Simulations: *Chad Sinclair*[1]; Siavash Soltani[1]; Joerg Rottler[1]; [1]Univ. of British Columbia

Invited
Thermodynamics of Ferroelectrics beyond Phenomenological Landau Theory: A Case Study of PbTiO3: *Zi-Kui Liu*[1]; Jinglian Du[1]; Yi Wang[1]; Shunli Shang[1]; [1]Pennsylvania State University

Invited
Machine Learning for Inverse Crystal Structure and Topology Design: Suvo Banik[1]; Troy Loeffler[1]; Rohit Batra[2]; *Subramanian Sankaranarayanan*[1]; Sukriti Manna[1]; [1]University of Illinois-Chicago; [2]Argonne National Lab

Invited
Uncertainty Driven Computational Thermodynamics: *Noah Paulson*[1]; Joshua Gabriel[1]; [1]Argonne National Laboratory

Invited
Phase Field Modelling of Microstructure Formation in Rapidly Solidified Steel: *Nikolas Provatas*[1]; Salvador Valtierra Rodriguez[1]; Damien Pinto[1]; Michael Greenwood[2]; [1]McGill University; [2]McMaster University

Phase-field Model of Solid Stoichiometric Compounds and Solution Phases: *Yanzhou Ji*[1]; Long-Qing Chen[1]; [1]Penn State University

Data-driven Magnetic Materials Modeling; Advances in Classical Molecular Dynamics: *Svetoslav Nikolov*[1]; Mitchell Wood[1]; Aidan Thompson[1]; Julien Tranchida[1]; [1]Sandia National Laboratories

Vacancy Ordering in Zirconium Carbide Explored via First-principles Calculations and Calphad: *Theresa Davey*[1]; Ying Chen[1]; [1]Tohoku University

Ab-initio Insights into the Impact of the Wet-synthesis Conditions on the Structure and Composition of Metal Nano-aerogels: *Mira Todorova*[1]; Su-Hyun Yoo[1]; Poulami Chakraborty[1]; Tilmann Hickel[1]; Se-Ho Kim[1]; Baptiste Gault[1]; Joerg Neugebauer[1]; [1]Max-Planck-Insitut Fuer Eisenforschung

Solute Drag Assessment of Grain Boundary Migration in Au Using Atomistic Simulations: *Ayush Suhane*[1]; Daniel Scheiber[2]; Maxim Popov[2]; Vsevolod Razumovskiy[2]; Lorenz Romaner[3]; Matthias Militzer[1]; [1]The Centre for Metallurgical Process Engineering, The University of British Columbia, Vancouver, Canada; [2]Materials Center Leoben Forschung GmbH, Roseggerstrasse 12, 8700 Leoben, Austria; [3]Department of Materials Science, University of Leoben, Leoben, Austria

Uncertainty Quantification for Ferromagnetic-Paramagnetic Phase Transition Onset by Integrating an Analytical Approach into Ising Models: *Md Mahmudul Hasan*[1]; Arulmurugan Senthilnathan[1]; Pinar Acar[1]; [1]Virginia Tech

Multi-scale Crystal Plasticity Model for Superalloys: *Shahriyar Keshavarz*[1]; Carelyn Campbell[1]; Andrew Reid[1]; [1]NIST

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — On-Demand Poster Session

Sponsored by: TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee

Program Organizers: Vahid Attari, Texas A&M University; Sara Kadkhodaei, University Of Illinois At Chicag; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Tourret, IMDEA Materials Institute; James Morris, Ames Laboratory

Monday AM | March 14, 2022
Physical Metallurgy | On-Demand Poster Hall

3D-reconstruction of Sectioning Nephograms Based on Simulated Results: *Xiao Han*[1]; [1]Beijing Jiaotong University

Effect of Alloying Elements on the Stability of (Cr,Zr) Intermetallic Phases: *Theresa Davey*[1]; Ying Chen[1]; [1]Tohoku University

Thermodynamic Database of Sm-Ti Binary System from First-principles Calculations: *Arkapol Saengdeejing*[1]; Ying Chen[1]; [1]Tohoku University

Simulation and Experimental Characterization of Intragranular Ferrite Nucleation on Deformation Induced (Ti,V)(C,N) Precipitates in Microalloyed Steel: *Evelyn Sobotka*[1]; Johannes Kreyca[2]; Nora Fuchs[1]; Tomasz Wojcik[1]; Erwin Povoden-Karadeniz[1]; [1]Christian Doppler Laboratory for Interfaces and Precipitation Engineering (CDL-IPE), Institute of Materials Science and Technology, TU Wien, Vienna, Austria; [2]Voestalpine Forschungsservicegesellschaft Donawitz GmbH

Evaluation of Semi-solid Shear Deformation Behavior Using the Multi-phase-field Lattice Boltzmann Method: *Namito Yamanaka*[1]; Shinji Sakane[1]; Tomohiro Takaki[1]; [1]Kyoto Institute of Technology

Development of a Twin Experiment-validated Data Assimilation System for Dendrite Growth with Melt Convection Using Phase-field Lattice Boltzmann Method: *Ayano Yamamura*[1]; Shinji Sakane[1]; Munekazu Ohno[2]; Tomohiro Takaki[1]; [1]Kyoto Institute of Technology; [2]Hokkaido University

Investigation of Phase-field Data Assimilation System Using In-situ Observation Results Obtained during Dendrite Growth in Thin Films: *Yuki Imai*[1]; Tomohiro Takaki[1]; Shinji Sakane[1]; Munekazu Ohno[2]; Hideyuki Yasuda[3]; [1]Kyoto Institute of Technology; [2]Hokkaido University; [3]Kyoto University

Multiphysics Modelling of Additively Manufactured Cellular Structures Using Selective Laser Melting: Mahmoud Elsadek[1]; *Tarek Hatem*[1]; [1]The British University in Egypt

A Tailor-made Experimental Setup for Thermogravimetric Analysis of the Hydrogen- and Carbon Monoxide- based Reduction of Iron (III) Oxide (Fe2O3) and Zinc Ferrite (ZnOFe2O3): *Ulrich Brandner*[1]; Juergen Antrekowitsch[1]; Felix Hoffelner[1]; Manuel Leuchtenmueller[1]; [1]Montanuniversitaet Leoben

---

MATERIALS PROCESSING

Defects and Properties of Cast Metals IV — On-Demand Oral Presentations

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

Program Organizers: Lang Yuan, University of South Carolina; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Andrew Kao, University of Greenwich; Kyle Fezi, Fort Wayne Metals

Monday AM | March 14, 2022
Materials Processing | On-Demand Room

Research Progress of Composite Preparation Technology of Bimetallic Wire: *Chenglin Li*[1]; Tingan Zhang[1]; Yan Liu[1]; [1]Northeastern University

Porosity Defects in High Pressure Die Castings: Mechanisms and Uncertainties: *Shishira Bhagavath*[1]; Zhixuan Gong[2]; Tim Wigger[2]; Saurabh Shah[2]; Shashidhara Marathe[3]; Bita Ghaffari[4]; Mei Li[4]; Shyamprasad Karagadde[1]; Peter Lee[2]; [1]Indian institute of Technology Bombay, India; [2]University College London, UK; [3]Diamond Light Source, UK; [4]Ford Research and Advanced Engineering, Dearborn, USA

Probabilistic Multiscale Finite Element Model for Predicting Strength and Fracture Strain of Cast Al-Si-Mg Alloy: Woojin Jeong[1]; Chanyang Kim[1]; Chung-An Lee[2]; Hyukjong Bong[3]; Seung-Hyun Hong[2]; *Myoung-Gyu Lee*[1]; [1]Seoul National University; [2]Hyundai Motor Company; [3]Korea Institute of Materials Science

Hybrid Additive Manufacturing of Island Grain Bicrystals: *Logan Ware*[1]; Benjamin Herstein[2]; Yuxuan Zhang[3]; Hassina Bilheux[3]; Zachary Cordero[4]; [1]Purdue University; [2]Rice University; [3]Oak Ridge National Laboratory; [4]Massachusetts Institute of Technology

Reduced-Order Multiscale Modeling of Elasto-Plastic Cast Alloys with Process-Induced Porosity: *Shiguang Deng*[1]; Carl Soderhjelm[1]; Diran Apelian[1]; Ramin Bostanabad[1]; [1]University of California Irvine

Modification of Cast and Wrought Aluminum Parts Using Hybrid Laser Hot-wire Manufacturing: *Gerald Knapp*[1]; Thomas Feldhausen[1]; Ying Yang[1]; Benjamin Stump[1]; Donovan Leonard[1]; Alex Plotkowski[1]; [1]Oak Ridge National Laboratory

---

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Mechanisms of High Temperature Alloys — On-Demand Oral Presentations

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

Program Organizers: Mark Hardy, Rolls-Royce Plc; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Jeremy Rame, Safran Aircraft Engines; Akane Suzuki, GE Research; Jean-Charles Stinville, University of California, Santa Barbara; Paraskevas Kontis, Norwegian University of Science and Technology; Andrew Wessman, University of Arizona

Monday AM | March 14, 2022
Mechanics & Structural Reliability | On-Demand Room

Invited
Microstructurally-sensitive Fatigue Crack Nucleation and Growth in Nickel Single Crystals: Vassilios Karamitros[1]; Duncan Maclachlan[1]; *Fionn Dunne*[1]; [1]Imperial

College

Microstructural Evolution of Borides at 850\176C in a Polycrystalline Superalloy and Implications on Creep Performance: Lola Lilensten[1]; Aleksander Kostka[2]; Sylvie Lartigue-Korinek[3]; Baptiste Gault[4]; Sammy Tin[5]; Stoichko Antonov[4]; *Paraskevas Kontis*[4]; [1]Chimie ParisTech; [2]Ruhr-Universität Bochum; [3]Institut de Chimie et des Matériaux Paris Est; [4]Max-Planck-Institut für Eisenforschung GmbH; [5]University of Arizona

Design of Cast Alumina-forming Austenitic Alloys for Extreme Environments: *Yukinori Yamamoto*[1]; Michael Brady[1]; Govindarajan Muralidharan[1]; James Haynes[1]; Arun Devaraj[2]; Bharat Gwalani[2]; Libor Kovarik[2]; [1]MSTD, Oak Ridge National Laboratory; [2]Pacific Northwest National Laboratory

Quantification of the Temperature and Strain Rate Dependent Evolution of Defect Structures in a CoNi-base Superalloy: *Andreas Bezold*[1]; Nicklas Volz[1]; Jan Vollhüter[1]; Malte Lenz[1]; Nicolas Karpstein[1]; Christopher Zenk[1]; Erdmann Spiecker[1]; Mathias Göken[1]; Steffen Neumeier[1]; [1]Friedrich-Alexander-Universität Erlangen-Nürnberg

Enhanced 900 ˚C-yield Strength in Inconel 738 Superalloys While Reducing Expensive Co Compositions: *Hyo Ju Bae*[1]; Kwang Kyu Ko[1]; Joong Eun Jung[2]; Jung Gi Kim[1]; Hyokyung Sung[1]; Jae-Bok Seol[1]; [1]Gyeongsang National University; [2]Korea Institute of Materials Science

Ferritic Bcc-Superalloys – Slip System Control Through Alloying: *Johan Pauli Magnussen*[1]; David Collins[1]; Alexander Knowles[1]; [1]University of Birmingham

The Effect of Carbon on the Fabricability and Mechanical Performance of Nimonic 105: *Martin Detrois*[1]; Kyle Rozman[1]; Paul Jablonski[1]; Jeffrey Hawk[1]; [1]National Energy Technology Laboratory

Investigating the Role of Dynamic Strain Aging in 347H Steel Using Crystal Plasticity: *Veerappan Prithivirajan*[1]; M Arul Kumar[1]; Bjorn Clausen[1]; Ricardo Lebensohn[1]; Laurent Capolungo[1]; [1]Los Alamos National Lab

Machining-induced Microstructural Deformation and Grain Refinement of Ni-base Superalloys under Controlled Thermal Conditions: *Andrea la Monaca*[1]; Dragos Axinte[1]; Zhirong Liao[1]; Rachid M'Saoubi[2]; Mark Hardy[3]; [1]Rolls-Royce UTC in Manufacturing and On-Wing Technology, University of Nottingham, Nottingham, NG8 1BB, United Kingdom; [2] R&D Material and Technology Development, Seco Tools AB, 737 82, Fagersta, Sweden; [3]Rolls-Royce plc, PO Box 31, Derby, DE24 8BJ, United Kingdom

Strengthening via Chemical Segregation to Deformation Twin Boundaries in Co-Ni-Cr-Mo Superalloy: *Stoichko Antonov*[1]; Qing Tan[1]; Baptiste Gault[1]; [1]Max-Planck-Institut für Eisenforschung GmbH

Coupled Diffusional-mechanical Modeling of Hydrogen Embrittlement in Polycrystalline Materials: *Sofia Yassir*[1]; [1]Mississippi State University

Ultra-high Temperature Deformation in a Single Crystal Superalloy: Mesoscale Process Simulation and Micro-mechanisms: Yuanbo Tang[1]; Neil D'Souza[2]; Bryan Roebuck[3]; Phani Karamched[1]; Chinnapat Panwisawas[4]; *David Collins*[5]; [1]University of Oxford; [2]Rolls-Royce plc; [3]National Physical Laboratory; [4]University of Leicester; [5]University of Birmingham

Microstructure and Mechanical Properties of Rotary Friction Welded IN-600 and SS316L with Copper Interlayer: *Neeraj Mishra*[1]; Amber Shrivastava[1]; [1]Indian Institute of Technology Bombay

---

SPECIAL TOPICS

DMMM4 — On-Demand Oral Presentations

Sponsored by: TMS: Diversity, Equity, and Inclusion Committee

Program Organizers: Aeriel Murphy-Leonard, Ohio State University; Mark Carroll, Federal-Mogul Powertrain; Blythe Clark, Sandia National Laboratories; K. Cunningham, ATI Specialty Alloys & Components; Lauren Garrison, Oak Ridge National Laboratory; Atieh Moridi, Cornell University; Ashleigh Wright, University of Illinois at Urbana-Champaign; Megan Cordill, Erich Schmid Institute of Materials Science; Jonathan Madison, National Science Foundation; Mitra Taheri, Johns Hopkins University; Clarissa Yablinsky, Los Alamos National Laboratory

Monday AM | March 14, 2022
Special Topics | On-Demand Room

National Laboratories' Research and Development Experience Opportunities for Diverse Scholars: *Simona Hunyadi Murph*[1]; [1]Savannah River National Laboratory

---

MECHANICS & STRUCTURAL RELIABILITY

Dynamic Behavior of Materials IX — On-Demand Oral Presentations

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

Program Organizers: Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Cyril Williams, US Army Research Laboratory

Monday AM | March 14, 2022
Mechanics & Structural Reliability | On-Demand Room

Modeling Hypervelocity Impacts in Additively Manufactured Interpenetrating Composites: *Jason Allen*[1]; Jiahao Cheng[1]; Xiaohua Hu[1]; Derek Splitter[1]; Amit Shyam[1]; [1]Oak Ridge National Laboratory

Energy Balance of Rapidly Deforming Foam Filled Cylindrical Shells in a High Pressure Fluid Environment: *Carlos Javier*[1]; Shyamal Kishore[2]; Koray Senol[3]; Arun Shukla[2]; [1]US Naval Undersea Warfare Center; [2]University of Rhode Island; [3]Edwards Lifesciences

Multi-fidelity Machine Learning Based Approach to Predict Local Strain Response: *Tyler Dillard*[1]; Nolan Lewis[1]; Abhijeet Dhiman[1]; Vikas Tomar[1]; [1]Purdue University

In Situ X-ray Diffraction of Sapphire Single Crystals during Laser Compression and Release: *Anirudh Hari*[1]; Saransh Singh[2]; Joel Bernier[2]; Rohit Hari[1]; Raymond Smith[2]; Thomas Duffy[3]; Todd Hufnagel[1]; June Wicks[1]; [1]Johns Hopkins University; [2]Lawrence Livermore National Laboratory; [3]Princeton University

High Strain Rate Atomistic and Mesoscale Simulations of Ejecta Jet Formation in Cu and Sn Systems: Probing Initial Conditions for Ejecta Jet Formation: *Marco Echeverria*[1]; Sergey Galitskiy[1]; Alison Saunders[2]; Tomorr Haxhimali[2]; Robert Rudd[2]; Faddy Najjar[2]; Avinash Dongare[1]; [1]University Of Connecticut; [2]Lawrence Livermore

National Laboratory

In-situ Shock Stress Field Detection Using Laser Array Raman Spectroscopy: *Abhijeet Dhiman*[1]; Nolan Lewis[1]; Vikas Tomar[1]; [1]Purdue University

Effect of Microstructure and Strain-rate on the Out-of-plane Compressive Response of UHMWPE Composites: *Jason Parker*[1]; KT Ramesh[1]; [1]Johns Hopkins University

Exploring the Spall Strength of the Interface of Additively Manufactured GRCop-84 and Inconel 625 Bimetallics: *Andrew Boddorff*[1]; Sungwoo Jang[1]; Gregory Kennedy[1]; Naresh Thadhani[1]; [1]Georgia Institute of Technology

Dynamic Non-equilibrium Plastic Flow of Metals under Rapid Heating: *Steven Mates*[1]; [1]NIST

Accelerating and Supersonic Dislocation in Metals under Extreme Conditions: *Daniel Blaschke*[1]; Khanh Dang[1]; Saryu Fensin[1]; Jie Chen[2]; Benjamin Szajewski[3]; Darby Luscher[1]; [1]Los Alamos National Laboratory; [2]N/A (formerly Los Alamos National Laboratory); [3]United States Army Research Laboratory

High Strain Rate Fracture Properties of Additively Manufactured Stainless Steel: *Kevin Lamb*[1]; Katie Koube[2]; Suresh Babu[3]; Josh Kacher[2]; Naresh Thadhani[2]; [1]CNS Y12 / University of Tennessee; [2]Georgia Institute of Technology; [3]University of Tennessee

Data Mining the Mesoscale to Study Shock Ignition and Reaction Growth in Pressed Energetic Materials: *Judith Brown*[1]; Julia Hartig[1]; Dan Bolintineanu[1]; Mitchell Wood[1]; [1]Sandia National Laboratories

Dynamic and Spall Behavior of Model Binary Magnesium Alloys Using High-throughput Testing Protocols: *Suhas Eswarappa Prameela*[1]; Debjoy Mallick[1]; Christopher Walker[2]; Taisuke Sasaki[3]; Abigail Park[1]; Elaine Lipkin[1]; Alice Lee[1]; Fanuel Mammo[1]; Christopher DiMarco[1]; Kazuhiro Hono[3]; George Pharr[2]; KT Ramesh[1]; Timothy Weihs[1]; [1]Johns Hopkins University; [2]TAMU; [3]NIMS

Microstructural Evolution of Pure Aluminum Revealed by In-situ Synchrotron X-ray Diffraction during Shear Deformation in a High-speed Rotational Diamond Anvil Cell: *Tingkun Liu*[1]; Bharat Gwalani[1]; Joshua Silverstein[1]; Changyong Park[2]; Lei Li[1]; Stas Sinogeikin[3]; Tamas Varga[1]; Ayoub Soulami[1]; Arun Devaraj[1]; [1]Pacific Northwest National Laboratory; [2]Argonne National Laboratory; [3]DAC Tools, LLC

MECHANICS & STRUCTURAL RELIABILITY

Dynamic Behavior of Materials IX — On-Demand Poster Session

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

Program Organizers: Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Avinash Dongare, University of Connecticut; Benjamin Morrow, Los Alamos National Laboratory; Cyril Williams, US Army Research Laboratory

Monday AM | March 14, 2022
Mechanics & Structural Reliability | On-Demand Poster Hall

Machine Learning Based Approach to Modeling and Predicting Material Behavior and Failure Criteria in Composites: *Tyler Dillard*[1]; Nolan Lewis[1]; Abhijeet Dhiman[1];

Vikas Tomar[1]; [1]Purdue University

Mesoscale Modeling of Deformation Behavior of Fe-based Microstructure under Shock Loading Conditions: *Ke Ma*[1]; Avanish Mishra[1]; Avinash Dongare[1]; [1]University of Connecticut

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

Bulk Crystallographic Texture and Dynamic Elastic Modulus Variation in Laser Additively Manufactured Ti6Al4V: *Mangesh Pantawane*[1]; Teng Yang[1]; Yuqi Jin[1]; Sameehan Joshi[1]; Sriswaroop Dasari[1]; Abhishek Sharma[1]; Arkadii Krokhin[1]; Srivilliputhur Srinivasan[1]; Rajarshi Banerjee[1]; Arup Neogi[1]; Narendra Dahotre[1]; [1]University of North Texas

Design of Metals and Alloys with High Spall Strengths: *Keara Frawley*[1]; Harikrishna Sahu[1]; Naresh Thadhani[1]; Rampi Ramprasad[1]; [1]Georgia Institute of Technology

DynamicTensile Testing of Cu/Ta Multilayered Metal Composites: *Liya Semenchenko*[1]; Lauren Poole[2]; Francis Zok[2]; Michael Demkowicz[1]; [1]Texas A&M University; [2]University of California Santa Barbara

Microscale Spall Strength Measurement for CoCrFeMnNi High Entropy Alloy: *Abhijeet Dhiman*[1]; Leonardo Facchini[1]; Andrew Kustas[2]; Remi Dingreville[2]; Vikas Tomar[1]; [1]Purdue University; [2]Sandia National Laboratories

Amorphization Mechanism under Shock Loading in the Medium Entropy Alloy CoCrNi: *Wurong Jian*[1]; Shuozhi Xu[1]; Irene Beyerlein[1]; [1]University of California, Santa Barbara

---

LIGHT METALS

Electrode Technology for Aluminum Production — On-Demand Oral Presentations

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

Program Organizers: Stephan Broek, Boston Metal; Dmitry Eskin, Brunel University

Monday AM | March 14, 2022
Light Metals | On-Demand Room

Assessment of Pre-baked Anodes Homogeneity Using Acousto-ultrasonic Testing and 3D Interpolation Methods: *Daniel Rodrigues*[1]; Carl Duchesne[1]; Donald Picard[1]; Julien Lauzon-Gauthier[2]; [1]Laval University; [2]Alcoa Canada

Effect of Coke Type on the Partial Replacement of Coke with Modified Biocoke in Anodes Used in Primary Aluminum Production: Belkacem Amara[1]; *Duygu Kocaefe*[1]; Yasar Kocaefe[1]; Dipankar Bhattacharyay[1]; Jules Côté[1]; André Gilbert[1]; [1]University of Quebec at Chicoutimi

Ecofriendly Glue for the Aluminium Electrolysis Pot: *Benedicte Allard*[1]; Regis Paulus[1]; Nicolas Gros[1]; Herve Mezin[1]; Danny Gagnon[2]; Claude Fradet[2]; Gael Lambert[3]; [1]TOKAI COBEX; [2]EQUIBRAS; [3]ALVANCE Aluminium Dunkerque

Blocked Fluewall Detection and Improved Safety for Anti-flooding Module, A New Approach for Safer Operations of Anode Baking Furnaces: *Detlef Maiwald*[1]; Frank Heinke[1]; Sandra Besson[2]; Diane Tremblay[2]; Lucas Ruel[2]; Alexandre Gagnon[2];

[1]Innovatherm GmbH; [2]Rio Tinto Aluminium

The Development of RUSAL's Prebake Anode Production in Support of the Company's Green Initiatives: *Viktor Buzunov*[1]; Viktor Mann[2]; Vitaliy Yakovlev[2]; Yuriy Frantsev[1]; Matvey Golubev[1]; Valeriy Polovnikov[1]; Mikhail Grinishin[1]; [1]Rusal Etc; [2]RUSAL

ELECTRONIC MATERIALS

Electronic Packaging and Interconnections — On-Demand Oral Presentations

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

Program Organizers: Tae-Kyu Lee, Cisco Systems; Albert T. Wu, National Central University; Won Sik Hong, Korea Electronics Technology Institute; Kazuhiro Nogita, University of Queensland; Govindarajan Muralidharan, Oak Ridge National Laboratory; David Yan, San Jose State University; Luke Wentlent, Plug Power

Monday AM | March 14, 2022
Electronic Materials | On-Demand Room

Invited
In-situ Observation of Liquid Solder Alloys and Solid Substrate Reactions Using High-voltage Transmission Electron Microscopy: Xin Fu Tan[1]; *Kazuhiro Nogita*[1]; Flora Somidin[2]; Stuart McDonald[1]; Hiroshi Maeno[3]; Syo Matsumura[3]; [1]University of Queensland; [2]Universiti Malaysia Perlis; [3]Kyushu University

Invited
Power Cycling and Thermal Cycling Performance of Pressureless Silver Sintered Silicon Carbide Power Module Compared to Lead-free Solder Joint: *Won Sik Hong*[1]; Mi Song Kim[1]; [1]Korea Electronics Technology Institute

Characterising the Intermetallic Layer in Mixed Sn-Bi Paste/SAC BGA Solder Ball Joints: Jiye Zhou[1]; Qichao Hao[1]; Xin Fu Tan[1]; Stuart McDonald[1]; *Kazuhiro Nogita*[1]; [1]University of Queensland

Characterisation of *951*-$(Cu,Ni)_6Sn_5$ Formed between Cu-xNi/Sn Couples: *Xin Tan*[1]; Qinfen Gu[2]; Michael Bermingham[1]; Stuart McDonald[1]; Kazuhiro Nogita[1]; [1]University of Queensland; [2]ANSTO

Wire Bonding Novel 3D Air-metal Dielectric Structures with ISIG Passivation: Process Development and Reliability: Yipin Wu[1]; *Pichaya Sommai*[1]; Joyce Christiansen-Salameh[2]; Jim Clatterbaugh[1]; Leyla Hashemi-Sadraei[1]; [1]Keysight Technologies; [2]Keysight Technologies, Cornell University

Low Temperature Solder Interconnect Board Level Shock Performance at Elevated Temperature: *Tae-Kyu Lee*[1]; Gnyaneshwar Ramakrishna[1]; Young-Woo Lee[2]; Edward Ibe[3]; Karl Loh[3]; [1]Cisco Systems; [2]MK Electron; [3]Zymet

Thermal Expansions of ßSn and Bi in Sn-Bi Alloys: *Qichao Hao*[1]; Xin Fu Tan[1]; Qinfen Gu[2]; Stuart McDonald[1]; Kazuhiro Nogita[1]; [1]The University of Queensland; [2]Australian Synchrotron

Electromigration Behaviors of Nanotwinned Ag Interconnects: *Chi-Shen Chen*[1]; Tsung Lin[1]; Fan-Yi Ouyang[1]; [1]National Tsing Hua University

Transient Liquid Phase (TLP) Bonding in Cu-Ni/Sn-0.7Cu/Cu-Ni Joints: *Nurul Razliana Abdul Razak*[1]; Xin Fu Tan[1]; Stuart McDonald[1]; Michael Bermingham[1];

Hideyuki Yasuda[1]; Kazuhiro Nogita[1]; [1]School of Mechanical and Mining Engineering, The University of Queensland

Corrosion Mechanism of Co-based Surface Finishing Layer: *Si-Wei Lin*[1]; Albert T. Wu[1]; [1]National Central University

Interfacial Reaction between Cu and In-48Sn Alloy: *Fu-Ling Chang*[1]; Han-Tang Hung[1]; C. Robert Kao[1]; [1]National Taiwan University

Development of Silver-Tin Alloy Paste for High Power IC Packaging by High Energy Ball Milling: *Wei Chen Huang*[1]; Chin-Hao Tsai[1]; C. Robert Kao[1]; [1]National Taiwan University

Electromigration of Cu-Cu Joints Fabricated by of Highly (111)-oriented Nanotwinned Cu: *Shih Chi Yang*[1]; Chih Chen[1]; [1]National Yang Ming Chiao Tung University

Cu-Cu Bonding with Silver Thin Film Capping Layer: *Hsiang Hou Tseng*[1]; Chih Chen[1]; [1]National Yang Ming Chiao Tung University

Low Temperature Direct Bonding in Atmosphere on Highly (111) Oriented Nanotwinned Silver: *Ching-Yao Cheng*[1]; Po-Hsien Wu[1]; Fan-Yi Ouyang[1]; [1]Dept. of Engineering & System Science, National Tsing Hua University

Low Temperature and Presureless Cu-to-Cu Direct Bonding by Sintering of Green Synthesized Cu Nanoparticles: *Albert T. Wu*[1]; Wei Liu[1]; Chang-Meng Wang[2]; [1]National Central University; [2]SHENMAO Technology Inc.

Synchrotron X-ray Study of Cu Electromigration in A Blech Structure: *Pei-Tzu Lee*[1]; Cheng-Yu Lee[2]; Shao-Chin Tseng[3]; Mau-Tsu Tang[3]; C. Robert Kao[1]; Cheng-En Ho[2]; [1]National Taiwan University; [2]Yuan Ze University; [3]National Synchrotron Radiation Research Center (NSRRC)

Effect of Geopolymer Ceramic Reinforcement to the Microstructure Formation and Mechanical Properties of Sn-0.7Cu Solder Joint: *Mohd Izrul Izwan Ramli*[1]; Mohd Arif Anuar Mohd Salleh[1]; Nur Nadiah Izzati Zulkifli[1]; Nur Syahirah Mohamad Zaimi[1]; Mohd Mustafa Albakri Abdullah[1]; [1]Universiti Malaysia Perlis (UniMAP)

Low-thermal-budget Hybrid Cu-Cu Bonding with Highly <111>-oriented Nanotwinned Cu and Polyimide: *Pin-Syuan He*[1]; Kai-Cheng Shie[1]; Chih Chen[1]; [1]National Yang Ming Chiao Tung University

Effect of Grain Size and Stress Relaxation on Whisker Growth under Applied Pressure: *Nupur Jain*[1]; Piyush Jagtap[1]; Allan Bower[1]; Eric Chason[1]; [1]Brown University

In-situ Observations of Sn-58Bi/SAC305 Joints by Synchrotron Imaging: *Mohd Arif Mohd Salleh*[1]; M.I.I. Ramli[1]; D.S.C. Halin[1]; N. Saud[1]; T. Nishimura[2]; H. Yasuda[3]; K. Nogita[4]; [1]Universiti Malaysia Perlis; [2]Nihon Superior Co. Ltd; [3]Kyoto University; [4]The University of Queensland

The Role of Lengthscale in the Creep of Sn-3Ag-0.5Cu Solder with Controlled Microstructure: *Tianhong Gu*[1]; Christopher Gourlay[2]; Ben Britton[3]; [1]University of Birmingham; [2]Imperial College London; [3]The University of British Columbia

Thermal Cycling Reliability Tests of Cu-Cu Joints by Two-step Bonding Processes: *Jia Juen Ong*[1]; Kai Cheng Shie[1]; Chih Chen[1]; [1]National Yang Ming Chiao Tung University

---

CORROSION

Environmental Degradation of Additively Manufactured Alloys — On-Demand

Oral Presentations

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; Xiaoyuan Lou, Auburn University; Elizabeth Trillo, Southwest Research Institute; Andrew Hoffman, GE Research; Brendy Rincon Troconis, University of Texas at San Antonio

Monday AM | March 14, 2022
Corrosion | On-Demand Room

Effect of Oxygen on Corrosion Resistance of Stainless Steel 316L Prepared by Powder Bed Fusion: Xiaolei Guo[1]; Eric Schindelholz[1]; Hsien Lien Huang[1]; Menglin Zhu[1]; Szu-Chia Chien[1]; Karthikeyan Hariharan[1]; Ngan Huynh[1]; Jinwoo Hwang[1]; Wolfgang Windl[1]; *Gerald Frankel*[1]; [1]Ohio State University

High Temperature Oxidation of Additively and Conventionally Manufactured Heat Resistant Steel: HK30Nb: *Marie Romedenne*[1]; Bruce Pint[1]; Michael Lance[1]; Kinga[1]; Sebastien Dryepondt[1]; [1]Oak Ridge National Laboratory

---

CORROSION

Environmental Degradation of Additively Manufactured Alloys — On-Demand Poster Session

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; Xiaoyuan Lou, Auburn University; Elizabeth Trillo, Southwest Research Institute; Andrew Hoffman, GE Research; Brendy Rincon Troconis, University of Texas at San Antonio

Monday AM | March 14, 2022
Corrosion | On-Demand Poster Hall

On the Heating Rate Dependent Oxide Formation and Evolution on Laser-based Directed Energy Additively Deposited IN718: *Sangram Mazumder*[1]; Mangesh V. Pantawane[1]; Narendra B. Dahotre[1]; [1]University of North Texas

---

CORROSION

Environmental Degradation of Multiple Principal Component Materials — On-Demand Oral Presentations

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

Program Organizers: Wenjun Cai, Virginia Polytechnic Institute and State University; ShinYoung Kang, Lawrence Livermore National Laboratory; XiaoXiang Yu, Northwestern University; Vilupanur Ravi, California State Polytechnic University Pomona; Christopher Weinberger, Colorado State University; Elizabeth Opila, University of Virginia; Bai Cui, University of Nebraska-Lincoln; Mark Weaver, University of Alabama; Bronislava Gorr, Karlsruhe Institute of Technology (KIT); Srujan Rokkam, Advanced Cooling Technologies Inc

Monday AM | March 14, 2022
Corrosion | On-Demand Room

Invited
Hydrogen Embrittlement Behavior of Face-centered Cubic High-entropy Alloys: *Hong Luo*[1]; Zhimin Pan[2]; Yu Fu[2]; Xiaogang Li[2]; [1]Max-Planck-Institut für Eisenforschung; [2]University of Science and Technology Beijing

Invited
Nonequilibrium Solute Capture in Complex Alloys: *Laurence Marks*[1]; [1]Northwestern University

Invited
Microstructure and Corrosion of Multi-phase Ni-Fe-Cr-Mo-W-X Multi-principal Element Alloys: Anup Panindre[1]; Henk Colijn[1]; Babu Viswanathan[1]; Carley Goodwin[1]; Daniel Huber[1]; Christopher Taylor[1]; *Gerald Frankel*[1]; [1]Ohio State University

Corrosion Interactions between a Candidate Hollandite Waste Form and Stainless Steel: *Chandi Mohanty*[1]; Keith Bryce[2]; Xiaolei Guo[1]; Kun Yang[2]; Jie Lian[2]; Jianwei Wang[3]; Gerald Frankel[1]; [1]The Ohio State University; [2]Rensselaer Polytechnic Institute; [3]Louisiana State University

Experimental and Numerical Assessment of the Corrosion Behavior of a Friction Stir Processed Equiatomic CrMnFeCoNi High Entropy Alloy in a Neutral Environment: *Sam Anaman*[1]; Solomon Ansah[1]; Sung-Tae Hong[2]; Min-Gu Jo[3]; Jin-Yoo Suh[3]; Heung Nam Han[4]; Minjung Kang[5]; Jong-Sook Lee[6]; Hoon-Hwe Cho[1]; [1]Hanbat National University; [2]University of Ulsan; [3]Korea Institute of Science and Technology; [4]Seoul National University; [5]Korea Institute of Industrial Technology; [6]Chonnam National University

Development of a New Aluminum Dissolvable Alloy for Hydraulic Fracturing Applications: *Ezz Ahmed*[1]; Hani Henein[1]; Ahmed Qureshi[1]; Jing Liu[1]; [1]University of Alberta

---

CORROSION

Environmentally Assisted Cracking: Theory and Practice — On-Demand Oral Presentations

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

Monday AM | March 14, 2022
Corrosion | On-Demand Room

Invited
Multiscale Modeling of Fatigue Crack Growth and Environmental Effects: *Ting Zhu*[1]; [1]Georgia Institute of Technology

Invited
Recent Progress on Modeling Corrosion Damage with Peridynamics: *Florin Bobaru*[1]; [1]University of Nebraska-Lincoln

Invited
Environmentally Assisted Cracking Research for Current and Advanced Nuclear Structural Materials: *Rongjie Song*[1]; Michael McMurtrey[1]; Boopathy Kombaiah[1]; Drew Johnson[1]; Michael Heighes[1]; Peng Xu[1]; Colin Judge[1]; [1]Idaho National Laboratory

Stress Corrosion Cracking Behavior of Mg-Al-Zn Alloys in Humid Air: *Toshiaki Manaka*[1]; [1]National Institute of Technology(KOSEN), Niihama College)

Cold Spray Process to Combat Potential Stress Corrosion Cracking in Used Nuclear Fuel Storage Stainless Steel Canisters: Nicholas Pocquette[1]; *Hwasung Yeom*[1]; Hemant Agiwal[1]; William Bowman[1]; Kenneth Ross[2]; John Kessler[3]; Gary Cannell[4]; Frank Pfefferkorn[1]; Kumar Sridharan[1]; [1]University of Wisconsin-Madison; [2]Pacific Northwest National Laboratory; [3]J Kessler and Associates; [4]Fluor Corporation

Mitigation of Stress Corrosion Cracking in Al-Mg via Laser Shock Peening: *Eric Dau*[1]; Matthew McMahon[1]; [1]Naval Surface Warfare Center, Carderock Division

Capturing the Effect of Environment and Electrochemistry on Crack Growth of Metals and Alloys Using Density Functional Theory: *Christopher Taylor*[1]; [1]DNV

New Insights into the Impact of Hydrogen on Monotonic/Cyclic Plasticity in Nickel Single Crystal Based on Nanoindentation Investigation: *Siva Prasad Murugan*[1]; Abdelali Oudriss[1]; Guillaume Hachet[1]; Xavier Feaugas[1]; [1]La Rochelle University

Ab Initio Study of Hydrogen Embrittlement in Binary Nickel Alloys: *Aman Prasad*[1]; Ranim Mohamad[1]; Frédéric Christien[2]; Franck Tancret[1]; Isabelle Braems[1]; [1]Université de Nantes, Institut des Matériaux de Nantes – Jean Rouxel (IMN), CNRS UMR 6502, 2 rue de la Houssinière, BP 32229, 44322 Nantes Cedex 3, France; [2]Mines Saint-Etienne, Univ Lyon, CNRS, UMR 5307 LGF, Centre SMS, F - 42023 Saint-Etienne France

Environmental Creep Behavior of a 9Cr Martensitic Steel in CO_2 and Air: *Richard Oleksak*[1]; Kyle Rozman[1]; Jeffrey Hawk[1]; Ömer Dogan[1]; [1]National Energy Technology Laboratory

In Situ Experiments to Reveal Coupling Between Stress and Hydrogen on Stress Corrosion Cracking of Fe-based Alloys: *Arun Devaraj*[1]; Dallin Barton[1]; Tingkun Liu[1]; Sten Lambeets[1]; Cheng-Han Li[1]; Mark Wirth[1]; Daniel Perea[1]; Matthew Olszta[1]; Jinhui Tao[1]; Tianyi Li[2]; Yang Ren[2]; Shuang Li[1]; Chongmin Wang[1]; [1]Pacific Northwest National Laboratory; [2]argonne national laboratory

Effect of Irradiation on the Cracking Behavior of Stainless Steels in Light Water Reactor Environment: *Yiren Chen*[1]; Bogdan Alexandreanu[1]; Appajosula Rao[2]; [1]Argonne National Laboratory; [2]Nuclear regulatory commission

Effects of Test Orientation on Environmentally-assisted Cracking of 5xxx Series Aluminum Alloys: *Yang Liu*[1]; John Lewandowski[1]; [1]Case Western Reserve University

Stress Corrosion Cracking Study of Fe39Mn20Co20Cr15Si5Al1 (at.%) Compositionally Complex Alloy in 3.5 wt.% NaCl Salt Solution: *Pranshul Varshney*[1]; Nilesh Kumar[1]; [1]University of Alabama-Tusaloosa

CORROSION

Environmentally Assisted Cracking: Theory and Practice — On-Demand 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

Monday AM | March 14, 2022
Corrosion | On-Demand Poster Hall

Design and Experimental Validation of Hydrogen Trapping Features in Nickel Alloys: *Aman Prasad*[1]; Alixe Dreano[2]; Laurent Couturier[1]; Frédéric Christien[2]; Franck Tancret[1]; [1]Université de Nantes, Institut des Matériaux de Nantes – Jean Rouxel (IMN), CNRS UMR 6502; [2]Mines Saint-Etienne, Univ Lyon, CNRS, UMR 5307 LGF, Centre SMS, F - 42023

LIGHT METALS

Failure, and a Career That is Anything But: An LMD Symposium Honoring J. Wayne Jones — On-Demand Oral Presentations

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

Program Organizers: Victoria Miller, University of Florida; Michael Caton, US Air Force Research Laboratory; Nikhilesh Chawla, Purdue University; Trevor Harding, California Polytechnic State University; Paul Krajewski, General Motors Corporation; Tresa Pollock, University of California, Santa Barbara

Monday AM | March 14, 2022
Light Metals | On-Demand Room

Redefining Liquid Metal Embrittlement: Utilizing Machine Learning to Unravel a Liquid Metal Enigma: *Justin Norkett*[1]; Cameron Frampton[1]; Victoria Miller[1]; [1]University of Florida

---

MATERIALS DESIGN

Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — On-Demand Oral Presentations

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials 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: Jean-Charles Stinville, University of Illinois Urbana-Champaign; Garrett Pataky, Clemson University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Brian Wisner, Ohio University; Orion Kafka, NIST

Monday AM | March 14, 2022
Materials Design | On-Demand Room

A Physics-based Machine Learning Approach to Microstructure-based Modeling of High Cycle Fatigue Life Prediction: *Dong Qian*[1]; [1]The University of Texas at Dallas

---

SPECIAL TOPICS

Frontiers of Materials Award Symposium Session: Data-Driven, Machine-learning Augmented Design and Novel Characterization for Nano-architectured Materials — On-Demand Oral Presentations

Program Organizer: Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory

Monday AM | March 14, 2022
Special Topics | On-Demand Room

Autonomous X-ray Scattering for the Study of Non-equilibrium Self-assembly: *Kevin Yager*[1]; [1]Brookhaven National Laboratory

Volumetric Nanoscale Imaging of DNA-assembled Nanoparticle Superlattices: *Aaron Michelson*[1]; Brian Minevich[1]; Hamed Emamy[1]; Xiaojing Huang[2]; Yong Chu[2]; Hanfei Yan[2]; Oleg Gang[1]; [1]Columbia University; [2]National Light Source II, BNL

SPECIAL TOPICS

Frontiers of Materials Award Symposium: Microbiologically Influenced Corrosion - How Organisms Accelerate Materials Degradation — On-Demand Oral Presentations

Program Organizer: Andrea Koerdt, Bundesanstalt für Materialforschung und Prüfung (BAM)

Monday AM | March 14, 2022
Special Topics | On-Demand Room

Session Chairs: Andrea Koerdt, Bundesanstalt für Materialforschung und Prüfung (BAM); Biwen Annie An, Bundesanstalt für Materialforschung und Prüfung (BAM)

Invited
Methanogen Induced Microbiologically Influenced Corrosion (Mi-MIC): Environmental Condition and Parameter Have a High Impact on the Corrosion

Rate and Products: *Andrea Koerdt*[1]; [1]Bundesanstalt für Materialforschung und Prüfung (BAM)

Invited
Cross-disciplinary Dialog Essential for Overcoming Challenges to Managing Microbiologically Influenced Corrosion (MIC): *Richard Eckert*[1]; [1]Microbial Corrosion Consulting, LLC

Invited
Microbial Communities and Corrosion Across Oil and Gas Systems – Similarities and Differences: *Lisa Gieg*[1]; [1]University of Calgary

Corrosion in Fire Protection Systems (FPS) and the Role of Microbiologically Influenced Corrosion (MIC): *Nanni Noel-Hermes*[1]; Job Klijnstra[1]; Joost van Dam[1]; [1]Endures B.V.

Deciphering the Corrosion Potential of Methanogen-induced Microbiologically Influenced Corrosion Using an Integrative Approach: *Biwen An*[1]; Adelina-Elisa Dinter[1]; Eric Deland[1]; Björn Meermann[1]; Andrea Koerdt[1]; [1]Bundesanstalt für Materialforschung und -prüfung (BAM)

Using Polyoxometalate Materials as Multifunctional Coatings with Antimicrobial and Anticorrosive Properties: *Scott Mitchell*[1]; [1]Instituto de Nanociencia y Materiales de Aragón

Corrosion of Stainless Steel in Deep Groundwater - Microbial and Geochemical Processes: *Pauliina Rajala*[1]; Elisa Isotahdon[1]; [1]VTT Technical Research Centre of Finland Ltd.

NANOSTRUCTURED MATERIALS

Functional Nanomaterials: Functional Low-Dimensional (0D, 1D, 2D) Materials 2022 — On-Demand Oral Presentations

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

Program Organizers: Michael Cai Wang, University of South Florida; Yong Lin Kong, University of Utah; Sarah Ying Zhong, University of South Florida; Surojit Gupta, University of North Dakota; Nasrin Hooshmand, Georgia Institute of Technology; Woochul Lee, University of Hawaii at Manoa; Min Kyu Song, Washington State University; Simona Hunyadi Murph, Savannah River National Laboratory; Hagar Labouta, University of Manitoba; Max Anikovskiy, University of Calgary; Patrick Ward, Savannah River National Laboratory

Monday AM | March 14, 2022
Nanostructured Materials | On-Demand Room

Keynote
Mickey Mouse on NanoCaffeine: *Belinda Heyne*[1]; [1]University of Calgary

Keynote
Processing of Nanocrystalline Diamond Coatings for Biomedical Applications: *Roger Narayan*[1]; [1]University of North Carolina

Invited
Crumpling and Assembling of 1D/2D Nanomaterials into 3D Functional Structures: *Baoxing Xu*[1]; [1]University of Virginia

Invited
Engineered Nanoclays in Bone Tissue Engineering and Bone Metastasis of Cancer: *Kalpana Katti*[1]; Haneesh Jasuja[1]; Dinesh Katti[1]; [1]North Dakota State University

Invited
In Situ Spectroscopic Characterization of the Electrode-electrolyte Interphase: *Sang-Don Han*[1]; [1]National Renewable Energy Laboratory

Invited
LED Assisted Synthesis and Excitation of Silver Nanoparticles for Plasmon-enhanced Antibacterial Effects: *Connor Bourgonje*[1]; Juan C. Scaiano[1]; [1]University of Ottawa

Invited
Reticulated Structure of Sulfur/Nitrogen-doped Graphene Oxide for High Specific Energy Lithium/Sulfur cells: *Yoon Hwa*[1]; [1]Arizona State University

Invited
Photoabsorbers with 2D Layered Perovskites for Bendable Optoelectronics and Solar Cells: *Anupama Kaul*[1]; Mohin Sharma[1]; [1]University of North Texas

Invited
Architecting 3D Lithium-ion Batteries: *Corie Cobb*[1]; [1]University of Washington

Invited
Dynamic Vessel-on-a-chip Model: Bringing Bio-relevance to In Vitro Evaluation of Quantum Dots: *Hagar Labouta*[1]; [1]University of Manitoba

Invited
In Situ Chemo-mechanical Characterization of the Formation and Oxidation of Redox Reaction Products at Nanoscale For Li-O2 Batteries: *Omer Ozgur Capraz*[1]; Hannah Dykes[1]; [1]Oklahoma State University

In-situ Investigation of the Interface Formation between Si-terminated Diamond and a Nb2O5 Electron Acceptor Layer for Electronic Applications: *Gabrielle Abad*[1]; Stephen McDonnell[1]; [1]University of Virginia

MoS2 Thermoelectrics for Sustainable Energy: *Amall Ramanathan*[1]; [1]The University of Jordan

Nanostructured Materials: A Review on Its Application in Water Treatment: Ikhazuagbe Ifijen[1]; *Esther Ikhuoria*[2]; Muniratu Maliki[3]; Godfrey Otabor[2]; Areguamen Aigbodion[1]; [1]Rubber Research Institute of Nigeria; [2]University of Benin, Benin City, Edo State,Nigeria; [3]Department of Industrial Chemistry, Edo University Iyamho, Edo State, Nigeria

Second NIR-absorbing Gelatin Stabilized Gold Nanorods with High Media and Photothermal Stability for Photothermal Cancer Therapy: *Samuel Oluwafemi*[1];

Thabang Lebepe[1]; [1]University of Johannesburg

Facile Synthesis of Novel Quaternary Zn-Cu-In-S/ZnS QDs- mTHPP Porphyrin Conjugate and Its Photodynamic Therapy of Cancer and Antibacterial Activities: *Samuel Oluwafemi*[1]; [1]University of Johannesburg

NANOSTRUCTURED MATERIALS

Functional Nanomaterials: Functional Low-Dimensional (0D, 1D, 2D) Materials 2022 — On-Demand Poster Session

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

Program Organizers: Michael Cai Wang, University of South Florida; Yong Lin Kong, University of Utah; Sarah Ying Zhong, University of South Florida; Surojit Gupta, University of North Dakota; Nasrin Hooshmand, Georgia Institute of Technology; Woochul Lee, University of Hawaii at Manoa; Min Kyu Song, Washington State University; Simona Hunyadi Murph, Savannah River National Laboratory; Hagar Labouta, University of Manitoba; Max Anikovskiy, University of Calgary; Patrick Ward, Savannah River National Laboratory

Monday AM | March 14, 2022
Nanostructured Materials | On-Demand Poster Hall

Fabrication of Hexagonal Diamond by Aqueous Solution-based Electrochemistry: *Rajakumar Sidharada Devarapalli*[1]; Daniel Choi[1]; [1]Khalifa University

MATERIALS PROCESSING

Furnace Tapping 2022 — On-Demand Oral Presentations

Sponsored by: The Southern African Institute of Mining and Metallurgy, TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Materials Characterization Committee, Industrial Advisory Committee

Program Organizers: Joalet Steenkamp, MINTEK; Dean Gregurek, RHI Magnesita; Quinn Reynolds, Mintek; Gerardo Alvear Flores, Rio Tinto; Hugo Joubert, Tenova Pyromet; Phillip Mackey, P.J. Mackey Technology, Inc.

Monday AM | March 14, 2022
Materials Processing | On-Demand Room

Invited
Aluminium Tapping and Molten Metal Handling in Primary Smelters: *John Grandfield*[1]; Sam Wagstaff[2]; Bob Wagstaff[2]; [1]Grandfield Technology Pty Ltd.; [2]Oculatus Consulting

Kansanshi Copper Smelter Isaconvert Furnace Tapping System Design, Operation and Improvements: *Trevor Mwanza*[1]; Matthias Eggert[1]; Winson Chirwa[1]; Nurzhan Dyussekenov[1]; Mark Prince[2]; Dennis Marschall[3]; [1]Kansanshi Mining plc; [2]Glencore Technology; [3]Independent Consultant

MECHANICS & STRUCTURAL RELIABILITY

Grain Boundaries and Interfaces: Metastability, Disorder, and Non-Equilibrium

Behavior — On-Demand Oral Presentations

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

Program Organizers: Yue Fan, University of Michigan; Liang Qi, University of Michigan; Jeremy Mason, University of California, Davis; Garritt Tucker, Colorado School of Mines; Pascal Bellon, University of Illinois at Urbana-Champaign; Mitra Taheri, Johns Hopkins University; Eric Homer, Brigham Young University; Xiaofeng Qian, Texas A&M University

Monday AM | March 14, 2022
Mechanics & Structural Reliability | On-Demand Room

Invited
Integrating Atomistic Modeling and In Situ Experiment to Decipher Grain Boundary Deformation Mechanisms: *Ting Zhu*[1]; Yin Zhang[1]; [1]Georgia Institute of Technology

Invited
Immiscible Phase Interfaces: Controlling Irradiation Amorphization and Void Swelling: *Janelle Wharry*[1]; Priyam Patki[2]; Doruk Aksoy[3]; Timothy Rupert[3]; Wei-Ying Chen[4]; Shujuan Wang[5]; Yaqiao Wu[5]; Kristopher Darling[6]; [1]Purdue University; [2]University of Michigan; [3]University of California - Irvine; [4]Argonne National Laboratory; [5]Boise State University & Center for Advanced Energy Studies; [6]Army Research Laboratory

Irrationalities and Non-unique Lattice Correspondences across Interfaces in Shape Memory Alloys: *Ahmedsameerkhan Mohammed*[1]; Sidharth Ravi[1]; Wael Abuzaid[2]; Hiroshi Akamine[3]; Minoru Nishida[3]; Huseyin Sehitoglu[1]; [1]University of Illinois Urbana Champaign; [2]American University of Sharjah; [3]Kyushu University

Grain Boundaries Govern Plastic Deformation Kinetics in Nanocrystalline FCC Metals: *Yin Zhang*[1]; Kunqing Ding[1]; Sandra Stangebye[1]; Olivier Pierron[1]; Joshua Kacher[1]; Ting Zhu[1]; [1]Georgia Institute of Technology

Grain Boundary Wetting and Phase Transition in Al-Sn Alloy: *Priya Tiwari*[1]; Ranjit Dehury[2]; Abhay Singh Gautam[2]; [1]Indian Institute of Technology, Bombay; [2]Indian Institute of Technology, Gandhinagar

Slip Transfer of Dislocations Across 3D Interfaces in a Cu/Nb System: *Shuozhi Xu*[1]; Justin Cheng[2]; Zezhou Li[2]; Nathan Mara[2]; Irene Beyerlein[1]; [1]University of California-Santa Barbara; [2]University of Minnesota, Twin Cities

Deformation of Lamellar FCC-B2 Nanostructures Containing Kurdjumov-Sachs Interfaces: Relation between Interfacial Structure and Plasticity: *Deep Choudhuri*[1]; [1]New Mexico Institute of Mining and Technology

Characterizing the Dynamics of Ion Hopping under the Effect of a Complex Stress Field Induced by the Micrometer-level Dislocation Pileup at a Non-equilibrium Grain Boundary: *Liming Xiong*[1]; [1]Iowa State University

Atom Probe Tomography Reveals Nickel's Oxygen Solubility in Grains and Grain Boundaries after Oxidation: *Jonathan Poplawsky*[1]; Rishi Pillai[1]; QingQiang Ren[1]; Andrew Breen[2]; Baptiste Gault[3]; Michael Brady[1]; [1]Oak Ridge National Laboratory; [2]The University of Sydney; [3]Max-Planck-Institut für Eisenforschung

Faceting in Cylindrical Grain Boundaries: *Anqi Qiu*[1]; Ian Chesser[2]; Elizabeth Holm[1];

[1]Carnegie Mellon University; [2]George Mason University

A Framework for Continuum Modeling of Dislocation-grain Boundary Interactions in Polycrystalline Metals: *Subhendu Chakraborty*[1]; Abigail Hunter[1]; Darby Luscher[1]; [1]Los Alamos National Laboratory

---

MECHANICS & STRUCTURAL RELIABILITY

Grain Boundaries and Interfaces: Metastability, Disorder, and Non-Equilibrium Behavior — On-Demand Poster Session

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

Program Organizers: Yue Fan, University of Michigan; Liang Qi, University of Michigan; Jeremy Mason, University of California, Davis; Garritt Tucker, Colorado School of Mines; Pascal Bellon, University of Illinois at Urbana-Champaign; Mitra Taheri, Johns Hopkins University; Eric Homer, Brigham Young University; Xiaofeng Qian, Texas A&M University

Monday AM | March 14, 2022
Mechanics & Structural Reliability | On-Demand Poster Hall

Configurational Entropy of Amorphous Undoped and Doped ZrO2 and SiO2: *Megan Owen*[1]; Michael Rushton[1]; Antoine Claisse[2]; William Lee[1]; Simon Middleburgh[1]; [1]Bangor University; [2]Westinghouse Electric Sweden AB

Effect of Effective Range of Precipitate on Final Grain Radius of Grain Growth Simulation Based on the Local Curvature Multi-vertex Model: *Shota Morimoto*[1]; Shuichi Nakamura[1]; [1]Nippon Steel

Self-healing Mechanisms in Shape Memory Alloys: Molecular Dynamics Study: Ahmed Shaker[1]; *Tarek Hatem*[1]; Iman El-Mahallawi[1]; [1]The British University in Egypt

---

ADVANCED MATERIALS

High Performance Steels — On-Demand Oral Presentations

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

Program Organizers: Ana Luiza Araujo, CBMM North America Inc.; C. Tasan, Massachusetts Institute of Technology; Jonah Kleem-Toole, Colorado School of Mines; Louis Hector, General Motors Global Technical Center; Tilmann Hickel, Max-Planck-Institut Fuer Eisenforschung; Benjamin Adam, Oregon State University

Monday AM | March 14, 2022
Advanced Materials | On-Demand Room

Small-scale Rapid Alloy Prototyping of Extra-low Carbon Steel to Investigate the Effects of Cu and Cr Residuals: Mazher Ahmed Yar[1]; *Caroline Norrish*[1]; Jonathan Cullen[1]; Lintao Zhang[1]; Nicholas Lavery[1]; Stephen Brown[1]; Richard Underhill[2]; [1]Swansea University; [2]Tata Steel

Design and Characterization of Abrasion-resistant Steel Coatings for Nuclear Industry: *Lisa Rateau*[1]; Franck Tancret[2]; Anna Fraczkiewicz[3]; Jean Dhers[1]; Gérard Ramstein[4]; [1]Framatome; [2]Institut des Matériaux Jean Rouxel; [3]Laboratoire Georges

Friedel; [4]Laboratoire des Sciences du Numérique de Nantes

Design and Challenge of Cold-rolled Dual-phase Steel Strengthened by Interphase Precipitation: *Shao-Lun Lu*[1]; Kuo-Cheng Yang[2]; Ching-Yuan Huang[2]; Hung-Wei Yen[1]; [1]National Taiwan University; [2]China Steel Corporation

Hydrogen Embrittlement Susceptibility of a High Manganese Twinning Induced Plasticity Steel Examined via Correlative Microscopy: *Heena Khanchandani*[1]; Leigh Stephenson[1]; Dierk Raabe[1]; Stefan Zaefferer[1]; Baptiste Gault[1]; [1]Max Planck Institute for Iron Research

Simultaneous Enhancement of Hardness and Corrosion Resistance in Carbide-reinforced Martensitic Steels: *Kenta Yamanaka*[1]; Haruka Shima[1]; Manami Mori[2]; Kazuo Yoshida[1]; Yusuke Onuki[3]; Shigeo Sato[3]; Akihiko Chiba[1]; [1]Tohoku University; [2]National Institute of Technology, Sendai College; [3]Ibaraki University

Understanding Deformation-induced Cracking in Dual-phase Steel via the Combination of EBSD Analysis and Convolutional Neural Network: *Hung-Wei Yen*[1]; Po-Hsun Lin[1]; Yi-Fan Hu[1]; Min-Yu Tseng[1]; Kuo-Cheng Yang[2]; Kangying Zhu[3]; [1]National Taiwan University; [2]China Steel Corporation; [3]ArcelorMittal

Phase Field Simulations of Microstructure Evolution during Rapid Thermal Processing of High Strength Steels: *Bala Radhakrishnan*[1]; Gary Cola[2]; [1]Oak Ridge National Laboratory; [2]Flash Steelworks, Inc.

Characterization of a Complex-phase Steel by Electron Backscattering Diffraction and Atomic Force Microscopy: *Renan Lima*[1]; Julio Spadotto[2]; Flávia Tolomelli[3]; Omar Pandoli[1]; Fernando Rizzo[1]; [1]PUC-Rio; [2]PUC-Rio / University of Manchester ; [3]CSN

Microstructural Engineering in Dual Phase Steels -Partitioning Aspects and Correlation to Formability: *Soudip Basu*[1]; Anirban Patra[1]; B.N. Jaya[1]; Sarbari Ganguly[2]; Monojit Dutta[2]; Indradev Samajdar[1]; [1]Indian Institute of Technology, Bombay; [2]Tata Steel limited, Jamshedpur

Early Stages of Liquid-metal Embrittlement in an Advanced High-strength Steel: *Yuki Ikeda*[1]; Renliang Yuan[2]; Anirban Chakraborty[3]; Hassan Ghassemi-Armaki[4]; Jian-Min Zuo[2]; Robert Maaß[1]; [1]Bundesanstalt für Materialforschung und -prüfung; [2]University of Illinois Urbana-Champaign; [3]ArcelorMittal Global Research and Development; [4]General Motors R&D, Manufacturing Systems Research Laboratory

Understanding Microstructural Evolution in a Thick Gauge High Strength Niobium-microalloyed Line Pipe Steel: *Monowar Hossain*[1]; Xingshuo Wen[2]; Michael Mulholland[2]; Bertram Ehrhardt[3]; Steven Jansto[4]; Gregory Thompson[1]; Nilesh Kumar[1]; [1]University of Alabama, Tuscaloosa; [2]ArcelorMittal Global R&D - East Chicago; [3]AM/NS Calvert AL; [4]Research & Development Resources, Bowling Green OH

ADVANCED MATERIALS

High Performance Steels — On-Demand Poster Session

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

Program Organizers: Ana Luiza Araujo, CBMM North America Inc.; C. Tasan, Massachusetts Institute of Technology; Jonah Kleem-Toole, Colorado School of Mines; Louis Hector, General Motors Global Technical Center; Tilmann Hickel, Max-Planck-Institut Fuer Eisenforschung; Benjamin Adam, Oregon State University

Monday AM | March 14, 2022

A Study on Magnetization Characteristics According to the Direction of 9%Ni Steel Sheet: Hosung Jang[1]; Suheon Kim[1]; Jong Bae Jeon[2]; Yoon Suk Choi[3]; *Sunmi Shin*[1]; [1]Korea Institute of Industrial Technology (KITECH); [2]Dong-A University; [3]Pusan National University

MATERIALS DESIGN

Hume-Rothery Symposium on Connecting Macroscopic Materials Properties to Their Underlying Electronic Structure: The Role of Theory, Computation, and Experiment — On-Demand Oral Presentations

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

Program Organizers: Raymundo Arroyave, Texas A&M University; Wei Chen, Illinois Institute of Technology; Yong-Jie Hu, Drexel University; Tresa Pollock, University of California, Santa Barbara

Monday AM | March 14, 2022
Materials Design | On-Demand Room

Invited
Diffusion in Stationary and Moving Interfaces in Alloys: Raj Koju[1]; Ian Chesser[1]; *Yuri Mishin*[1]; [1]George Mason University

Invited
Grain Boundary Stress and Localized Precipitation during Creep: *Marcel Sluiter*[1]; Kai Liu[1]; [1]Tu Delft

Invited
Scale Bridging Materials Physics: Active Learning Workflows and Integrable Deep Neural Networks for Free Energy Function Representations in Alloys: *Krishna Garikipati*[1]; Gregory Teichert[1]; Anirudh Natarajan[2]; Sambit Das[1]; Muratahan Aykol[3]; Vikram Gavini[1]; Anton Van der Ven[2]; [1]University of Michigan; [2]University of California at Santa Barbara; [3]Toyota Research Institute

Invited
Phase Field Modeling: A Link Between Atomic-scale Interactions and Microstructures of Multiphase Materials: *Katsuyo Thornton*[1]; [1]University of Michigan

Invited
Cross Phenomena and Predictions of Their Coefficients: *Zi-Kui Liu*[1]; [1]Pennsylvania State University

Invited
Computational Design of Alloy Nanocatalysts: *Tim Mueller*[1]; [1]Johns Hopkins University

Invited
Construction and Application of Defect Phase Diagrams: *Joerg Neugebauer*[1]; Ali Zendegani[1]; Tilmann Hickel[1]; [1]MPI fuer Eisenforschung

MATERIALS DESIGN

ICME Case Studies: Successes and Challenges for Generation, Distribution,

and Use of Public/Pre-Existing Materials Datasets — On-Demand Oral Presentations

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

Program Organizers: Stephen DeWitt, Oak Ridge National Laboratory; Vikas Tomar, Purdue University; James Saal, Citrine Informatics; James Warren, National Institute of Standards and Technology

Monday AM | March 14, 2022
Materials Design | On-Demand Room

Invited
The Status of ML Algorithms for Structure-property Relationships Using Matbench as a Test Protocol: *Anubhav Jain*[1]; [1]Lawrence Berkeley National Laboratory

Invited
A Quest for Re-using 3D Materials Data: *Emine Gulsoy*[1]; Peter Voorhees[1]; [1]Northwestern University

Mg Database Project: Mapping Trends and Data Sets of Magnesium and Its Alloys for Improved Mechanical Performance: *Suhas Eswarappa Prameela*[1]; Suraj Ravindran[2]; Burigede Liu[2]; Padmeya Indurkar[3]; Babak Ravaji[4]; Caitlyn Schuette[1]; Abigail Park[1]; Fanuel Mammo[1]; Stephanie Hernandez[1]; Timothy Weihs[1]; [1]Johns Hopkins University; [2]Caltech; [3]University of Cambridge; [4]University of Houston

Graph Convolutional Neural Networks for Fast, Accurate Prediction of Material Properties for Solid Solution High Entropy Alloys Using Open-source Datasets: *Massimiliano (Max) Lupo Pasini*[1]; Samuel Reeve[1]; Pei Zhang[1]; Marko Burcul[2]; [1]Oak Ridge National Laboratory; [2]Motion-S

SPECIAL TOPICS

Late News Poster Session — On-Demand Poster Session: Addtive Technologies

Monday AM | March 14, 2022
Additive Technologies | On-Demand Poster Hall

Wire Process Development of Laser-assisted DED of Haynes 282 Ni-based Superalloy: *Kristin Tippey*[1]; Chantal Sudbrack[1]; [1]National Energy Technology Laboratory

Influence of Process Parameters on Defect Formation for AA 6061 via Laser Powder Bed Fusion Additive Manufacturing: *Sivaji Karna*[1]; Lang Yuan[1]; Andrew Gross[1]; Tianyu Zhang[1]; Rimah Al-Aridi[1]; Faith Buchanan[1]; Timothy Krentz[2]; Dale Hitchcock[2]; [1]University of South Carolina; [2]Savannah River National Laboratory

---

SPECIAL TOPICS

Late News Poster Session — On-Demand Poster Session: Advanced Materials

Monday AM | March 14, 2022
Advanced Materials | On-Demand Poster Hall

Data-driven Approach to Design of Multicomponent Metallic Glasses: *Anurag*

Bajpai[1]; Krishanu Biswas[1]; [1]Indian Institute of Technology Kanpur, India

Exploring Elastic and Plastic Anisotropy in a Refractory High Entropy Alloy utilizing Combinatorial Instrumented Indentation and Electron Backscatter Diffraction: *Abheepsit Raturi*[1]; N P Gurao[1]; Krishanu Biswas[1]; [1]IIT Kanpur

Quasi-hydrostatic Quasi-constrained Severe Plastic Deformation of Ternary Medium Entropy Alloy: *Saumya Jha*[1]; Krishanu Biswas[1]; N P Gurao[1]; [1]India Institute of Technology Kanpur

---

SPECIAL TOPICS

Late News Poster Session — On-Demand Poster Session: Corrosion

Monday AM | March 14, 2022
Corrosion | On-Demand Poster Hall

Development of Mg2+/0 Reference Electrode Chemistry for the Electrochemical Investigation of Nickel Alloy Corrosion in UCl3 Containing Chloride Melts: *Charles Lhermitte*[1]; Scott Parker[1]; Matt Jackson[1]; Marisa Monreal[1]; [1]Los Alamos National Laboratory

---

SPECIAL TOPICS

Late News Poster Session — On-Demand Poster Session: Energy & Environment (including REWAS 2022 Symposia)

Monday AM | March 14, 2022
Energy & Environment (including REWAS 2022 Symposia) | On-Demand Poster Hall

---

Conducting Graphene Synthesis from Electronic Waste: *Anurag Bajpai*[1]; Chandra Sekhar Tiwary[2]; Krishanu Biswas[1]; [1]Indian Institute of Technology Kanpur, India; [2]Indian Institute of Technology Kharagpur

---

SPECIAL TOPICS

Late News Poster Session — On-Demand Poster Session: Light Metals

Monday AM | March 14, 2022
Light Metals | On-Demand Poster Hall

Formation of Macroscopic Deformation Band in Porous Metals with Unidirectional Pores: *Mahiro Sawada*[1]; Shinsuke Suzuki[1]; [1]Waseda University

Ultrasonically-induced Microstructural Refinement during Casting of an Al-Si-Mg Alloy: *Katherine Rader*[1]; Jens Darsell[1]; Jon Helgeland[1]; Nathan Canfield[1]; Aashish Rohatgi[1]; [1]Pacific Northwest National Laboratory

Effect of Cooling Rate on EN AW 6082 Alloys: Tansu Guven[1]; Emrah Ozdogru[1]; *Hilal Colak*[1]; [1]Tri Metallurgy

Improved Room Temperature Formability of High Strength Al Sheets Using Friction Stir Processing: Hrishikesh Das[1]; *Piyush Upadhyay*[1]; Wahaz Nasim[1]; Mert Efe[1]; [1]Pacific Northwest National Laboratory

SPECIAL TOPICS

Late News Poster Session — On-Demand Poster Session: Materials Processing

Monday AM | March 14, 2022
Materials Processing | On-Demand Poster Hall

A Novel Electrolytic Process for the Production of Cu Metal from Chalcocite in CuCl – KCl Molten Salt at 473 K: *Tae-Hyuk Lee*[1]; Jungshin Kang[1]; [1]KIGAM

Manufacturing of Bulk Nanocrystalline Al-Mg Alloys Using High-pressure Cold Spray Technique for High-strength Lightweight Applications: *Amanendra Kushwaha*[1]; Manoranjan Misra[1]; Pradeep Menezes[1]; [1]University of Nevada, Reno

SPECIAL TOPICS

Late News Poster Session — On-Demand Poster Session: Mechanics and Structural Reliability

Monday AM | March 14, 2022
Mechanics & Structural Reliability | On-Demand Poster Hall

Crystal Plasticity Analysis of Temperature-sensitive Dwell Fatigue in Ti-6Al-4V Alloy for an Aero-engine Fan Disk: *Liangwei Yin*[1]; Osamu Umezawa[1]; [1]Yokohama National University

SPECIAL TOPICS

Late News Poster Session — On-Demand Poster Session: Nanostructured Materials

Monday AM | March 14, 2022
Nanostructured Materials | On-Demand Poster Hall

Mechanical and Sorption Indices of ZnO-rGO Hybrid Filled Natural Rubber Nanocomposites: *Olu Ekebafe*[1]; Emeka Nworie[2]; Hauwa Mahmud[2]; Stanley Omorogbe[3]; [1]University of Lagos; [2]Auchi Polytechnic; [3]Rubber Research Institute of Nigeria

SPECIAL TOPICS

Late News Poster Session — On-Demand Poster Session: Nuclear Materials

Monday AM | March 14, 2022
Nuclear Materials | On-Demand Poster Hall

Defect Structure Classification of Neutron-irradiated Graphite Using Supervised Machine Learning: *Jiho Kim*[1]; Kunok Chang[1]; [1]Kyung Hee University

LIGHT METALS

Magnesium Technology — On-Demand Oral Presentations

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

Program Organizers: Petra Maier, University of Applied Sciences Stralsund; Steven Barela, Terves, Inc; Victoria Miller, University of Florida; Neale Neelameggham, IND LLC

Monday AM | March 14, 2022
Light Metals | On-Demand Room

Keynote
The Comparability of In Vitro and In Vivo Experiments for Degradable Mg-implants: *Regine Willumeit-Romer*[1]; Stefan Bruns[1]; Heike Helmholz[1]; Norbert Hort[1]; Diana Krueger[1]; Yu Sun[1]; Bjoern Wiese[1]; Berit Zeller-Plumhoff[1]; [1]Helmholtz-Zentrum Hereon

Invited
Multi-functional Ceramic Coatings for Corrosion Protection of Magnesium Alloys: *Beatriz Mingo*[1]; Yue Guo[1]; Safiya Al Abri[1]; Allan Matthews[1]; Aleksey Yerokhin[1]; [1]The University of Manchester

Invited
Development of Flame-retardant Wrought Magnesium Alloys and Application of the Alloys to High-speed Railway Body: *Yasumasa Chino*[1]; Kazunori Shimizu[2]; Futoshi Kido[3]; Takeshi Ishikawa[4]; Makoto Taguchi[5]; Hisashi Mori[1]; Takao Horiya[6]; [1]National Institute of Advanced Industrial Science and Technology; [2]Sankyo Tateyama, Inc.; [3]Fuji Light Metal Co., Ltd.; [4]Japan Transport Engineering Company; [5]Kawasaki Heavy Industries, Ltd.; [6]Innovative Structural Materials Association

On the Mechanical Behaviors of Extruded AZ61A Magnesium Alloy Tube under Cyclic Torsion: Xiaodan Zhang[1]; Qin Yu[2]; *Huamiao Wang*[1]; [1]Shanghai Jiao Tong University; [2]Lawrence Berkeley National Laboratory

Towards Improving Cold Formability of Concentrated Mg-Al-Zn-Ca Alloy Sheet: *Mingzhe Bian*[1]; Xinsheng Huang[1]; Yasumasa Chino[1]; [1]National Institute of Advanced Industrial Science and Technology

A Method for Crystal Plasticity Model Parameter Calibration Based on Bayesian Optimization: *Xiaochuan Sun*[1]; Huamiao Wang[1]; [1]Shanghai Jiao Tong University

The Role of Ordered Phases in Enhanced Ductility of RE Based Mg Alloys: *Henry Ovri*[1]; Erica Lilleodden[1]; [1]Helmholtz Zentrum Hereon

Investigation on the Effect of Si Addition in Controlling the Microstructure of Mg-4wt%Al-4wt%RE Alloy: Vigneshwar Hari[1]; *Dongdong Qu*[1]; Trevor Abbott[2]; Kazuhiro Nogita[1]; [1]The University of Queensland; [2]RMIT University

Microstructure and Texture Analysis of Dissimilar Friction Stir Welded AZ31 Mg and Al 6061 Joint: *Nikhil Gotawala*[1]; Amber Shrivastava[1]; [1]Indian Institute of Technology Bombay

Influence of Third Alloying Element on Dislocation Slip and Twinning Activities in Mg-Nd Based Alloys: *Xun Zeng*[1]; Dietmar Letzig[2]; Karl Kainer[3]; Dikai Guan[1]; Sangbong Yi[2]; [1]The University of Sheffield; [2]Institute of Material and Process Design, Helmholtz – Zentrum Hereon; [3]Light Elements Engineering, Foundry and Automation, Wroclaw University of Science and Technology

Accelerated Micromechanical Response Prediction Using a Deep Network-based Surrogate Model: *Wei Dai*[1]; Huamiao Wang[1]; [1]Shanghai Jiao Tong University

Effect of Microstructural Refinement and Na Addition on Hydrogenation Kinetics

of Cast Mg-Al-La Alloy during the First Hydrogen Absorption Process: *Manjin Kim*[1]; Stuart McDonald[1]; Yahia Ali[1]; Trevor Abbott[2]; Kazuhiro Nogita[1]; [1]The University of Queensland; [2]Magontec Ltd.

Effective Dispersion of Stable Quasicrystals in ZW82 and ZA63 Alloys for Strengthening: Karel Tesar[1]; Hidetoshi Somekawa[2]; *Alok Singh*[2]; [1]Czech Technical University in Prague; [2]National Institute for Materials Science

Characterizing Precipitate Composition and Grain Boundary Segregation Behavior in Mg-alloys: *Qianying Shi*[1]; John Allison[1]; [1]University of Michigan

In-situ Analysis on Formation and Development of LPSO-like Nanostructures in Dilute MgYZn and MgGdZn Alloys: *Hiroshi Okuda*[1]; Michiaki Yamasaki[2]; Yoshihito Kawamura[2]; [1]Kyoto University; [2]Kumamoto University

Exploring the Microstructure-property Relationship of Mg-Al-Mn Alloys Enhanced via Friction Stir Processing: *David Garcia*[1]; Hrishikesh Das[1]; Xiaolong Ma[1]; Timothy Roosendaal[1]; Vineet Joshi[1]; Darrell Herling[1]; Mageshwari Komarasamy[1]; Glenn Grant[1]; [1]Pacific Northwest National Laboratory

Improving the Corrosion Behavior and Mechanical Properties of Biodegradable Mg-Zn-Zr Alloys through ECAP for Usage in Biomedical Applications: *Waleed El-Garaihy Nasr*[1]; Abdulrahman Alateyah[1]; Majed Alawad[2]; Talal Aljohani[3]; [1]Qassim University; [2]King Abdulaziz City for Science and Technology ; [3]King Abdulaziz City for Science and Technology

Development of Magnesium-lithium Based Alloys for Space Applications: The Relationship between Precipitation Hardening and Damping Capacity: Florian Schott[1]; David McKeown[1]; Li Jin[2]; *Mert Celikin*[1]; [1]University College Dublin; [2]Shanghai Jiao Tong University

Assessment of Extruded Magnesium Tubing for Absorbable Stent Production: *Adam Griebel*[1]; Gregory Hayes[2]; Robert Werkhoven[2]; Roman Menze[3]; Jeremy Schaffer[1]; [1]Fort Wayne Metals; [2]Complex Materials; [3]MeKo Laser Material Processing

High Performance Mg-4Al-4RE (RE = Cerium and Lanthanum) Die-casting Alloy: *Hua Qian Ang*[1]; Suming Zhu[1]; Trevor Abbott[2]; Mark Easton[1]; [1]RMIT University; [2]Magontec Limited

Unraveling Mg <c+a> Slip Using Neural Network Potentials: *Christopher Barrett*[1]; Mashroor Nitol[1]; Doyl Dickel[1]; [1]Mississippi State University

The Effect of Scandium on the Electronic and Transport Properties of MgO: *Amall Ramanathan*[1]; [1]The University of Jordan

Quantifying the Influence of Coarse Intermetallic Particles on Twin Transmission: *Benjamin Anthony*[1]; Victoria Miller[1]; [1]University of Florida

Water Adsorption and Surface Atom Dissolution on Zn, Al, Ce Doped Mg Surfaces: *Qin Pang*[1]; Miao Song[1]; Rajib Kalsar[1]; Vineet Joshi[1]; Peter Sushko[1]; [1]Pacific Northwest National Laboratory

LIGHT METALS

Magnesium Technology — On-Demand Poster Session

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

Program Organizers: Petra Maier, University of Applied Sciences Stralsund; Steven Barela, Terves, Inc; Victoria Miller, University of Florida; Neale Neelameggham, IND LLC

Monday AM | March 14, 2022
Light Metals | On-Demand Poster Hall

Effect of CO2 Annealing Treatments on Corrosion Behavior of AZ91D Mg Alloy: *Gyoung Gug Jang*[1]; Jiheon Jun[1]; Michael Brady[1]; [1]Oak Ridge National Laboratory

Effect of Different Mold Materials on the Solidification Rate and Microstructure of Magnesium Alloy Plate Castings: *Amjad Javaid*[1]; [1]Natural Resources Canada

Role of Ca & Y in Corrosion Resistance of SEN Magnesium Alloys: *Bong Sun You*[1]; Sang Kyu Woo[2]; Young Min Kim[1]; [1]Korea Institute of Materials Science; [2]Helmholtz–Zentrum Geesthacht, Max-Planck-Straße 1, Geesthacht

Twinning, Detwinning and Crack Initiation in Compression-compression Fatigue of Extruded Magnesium Alloy AZ31: *Yoshikazu Nakai*[1]; Shoichi Kikuchi[2]; Kaito Asayama[1]; Hayata Yoshida[1]; [1]Kobe University; [2]Shizuoka University

The Effects of Annealing Treatment on Microstructure and Mechanical Properties of the Extruded Mg-1.3Zn-0.5Ca Alloy: *Honglin Zhang*[1]; Zhigang Xu[1]; Sergey Yarmolenko[1]; Jagannathan Sankar[1]; [1]North Carolina Agricultural and Technical State University

Effect of Single Pass Differential Speed Rolling on the Dynamic Recrystallization, Microstructure and Mechanical Properties of Mg5Zn: *Christopher Hale*[1]; [1]North Carolina Agricultural and Technical State University

Constitutive Modeling of Rolled AZ31 Magnesium with Temperature and Texture Dependence: *Daniel Kenney*[1]; Marcos Lugo[1]; Jared Darius[1]; [1]Liberty University

---

ENERGY & ENVIRONMENT

Magnetics and the Critical Materials Challenge: An FMD Symposium Honoring Matthew J. Kramer — On-Demand Oral Presentations

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

Program Organizers: Scott McCall, Lawrence Livermore National Laboratory; Ryan Ott, Ames Laboratory

Monday AM | March 14, 2022
Energy & Environment (including REWAS 2022 Symposia) | On-Demand Room

---

Invited
Synthesis and Stabilization of Magnetic Nanoparticles of Rare-earth Metal Alloys: *Shouheng Sun*[1]; [1]Brown University

Magnetoelastic Interactions Reduce Hysteresis in Soft Magnets: *Negar Ahani*[1]; Ananya Renuka Balakrishna[1]; [1]University of Southern California

HDDR Treatment on Nd2Fe14B-based Magnets in the Presence of an Applied Magnetic Field: *Zachary Tener*[1]; Xubo Liu[2]; Ikenna Nlebedim[2]; Matthew Kramer[2]; Michael McGuire[1]; Michael Kesler[1]; [1]Oak Ridge National Laboratory; [2]Ames

Laboratory

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — On-Demand Oral Presentations

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

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

Monday AM | March 14, 2022
Nuclear Materials | On-Demand Room

Thermochemistry of Iodine-containing Molten Reciprocal Salts: *Mina Aziziha*[1]; Juliano Pinto[1]; Clara Dixon[1]; Jacob Yingling[1]; Johnathon Ard[1]; Amir Mofrad[1]; Matthew Christian[1]; Theodore Besmann[1]; [1]University of South Carolina

Wetting Properties of Molten Salts at Material Interface for Reactor Applications: *Michael Woods*[1]; Christopher Wolfe[2]; Toni Karlsson[1]; Ruchi Gakhar[1]; [1]Idaho National Laboratory; [2]University of New Mexico

Electrochemical Determination of Thermodynamic and Kinetic Properties of Ni^{2+} in FLiNaK Molten Salt: *Nathan Smith*[1]; Stephen Lombardo[1]; Hojong Kim[1]; Shunli Shang[1]; Zi-Kui Liu[1]; [1]Pennsylvania State University

Research Progress in the Development of a Molten-salt Forced-circulation Loop: *Guiqiu Zheng*[1]; Guanyu Su[1]; Nesrin Cetiner[1]; David Carpenter[1]; [1]Massachusetts Institute of Technology

Generation of Corrosion-related Component Thermodynamic Values for a Molten Salt Reactor Thermodynamic Database (MSTDB-TC) and Example Applications: *Theodore Besmann*[1]; Jacob Yingling[1]; Juliano Schorne-Pinto[1]; Johnathan Ard[1]; Mina Aziziha[1]; Matthew Christian[1]; Amir Mofrad[1]; Mahmut Aslani[1]; Clara Dixon[1]; Kyle Foster[1]; Jake McMurray[2]; Ruchi Gakhar[3]; [1]University of South Carolina; [2]Oak Ridge National Laboratory; [3]Idaho National Laboratory

Electrochemical Studies of Structural Alloy Corrosion in LiF-NaF-KF (FLiNaK) at 700 °C: *William Doniger*[1]; Adrien Couet[1]; Kumar Sridharan[1]; [1]University of Wisconsin-Madison

Development of Corrosion Resistant Metallic Coatings for Molten Salt Nuclear Reactors: *Elizabeth Trillo*[1]; Ronghua Wei[1]; Xihua He[1]; [1]Southwest Research Institute

Data-driven Models for Corrosion of Structural Alloys in Molten Chloride Salts: *Christopher Taylor*[1]; Brett Tossey[1]; [1]DNV

Development of Novel Methods for Purification of Fluoride Salts: *Dino Sulejmanovic*[1]; Bruce Pint[1]; [1]Oak Ridge National Laboratory

Stainless Steel Compatibility in Flowing Fluoride Salts: *Bruce Pint*[1]; Yi-Feng Su[1]; Cory Parker[1]; Dino Sulejmanovic[1]; Stephen Raiman[1]; [1]Oak Ridge National Laboratory

Molecular Structure of Molten Fluoride Salts for Nuclear Energy by Diffraction

Measurements
and Ab–initio Simulations: *David Sprouster*[1]; G Zheng[2]; D Olds[3]; S-C Lee[4]; Y Zhang[4]; B Khaykovich[2]; [1]Stony Brook University; [2]Massachusetts Institute of Technology; [3]Brookhaven National Laboratory; [4]University of Illinois Urbana-Champaign

Temperature-dependent Dealloying Mechanisms and Morphology Evolutions in Eutectic Molten Chloride Salts: *Touraj Ghaznavi*[1]; Roger Newman[1]; [1]University of Toronto

High-throughput Measurements of Alloy Properties to Enable Long-term Corrosion Simulations: *Nathaniel Hoyt*[1]; Jicheng Guo[1]; [1]Argonne National Laboratory

NUCLEAR MATERIALS

Materials and Chemistry for Molten Salt Systems — On-Demand Poster Session

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

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

Monday AM | March 14, 2022
Nuclear Materials | On-Demand Poster Hall

Electrical Conductivity of 1-Butyl-3-Methylimidazolium Chloride (BMIC) and Aluminum Chloride (AlCl3) Ionic Liquid Electrolytes: *Aninda Nafis Ahmed*[1]; Md Khalid Nahian[1]; Ramana Reddy[1]; [1]University of Alabama Tuscaloosa

MATERIALS DESIGN

Materials Design and Processing Optimization for Advanced Manufacturing: From Fundamentals to Application — On-Demand Oral Presentations

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

Program Organizers: Wei Xiong, University of Pittsburgh; Dana Frankel, QuesTek Innovations LLC; Gregory Olson, Massachusetts Institute of Technology

Monday AM | March 14, 2022
Materials Design | On-Demand Room

Invited
High-fidelity Modeling of Multi-material Additive Manufacturing: *Wentao Yan*[1]; Yanming Zhang[1]; Zeshi Yang[1]; Lu Wang[1]; [1]National University of Singapore

Invited
Improving Powder Feedstock for Metal Additive Manufacturing: *Danielle Cote*[1]; Kyle Tsaknopoulos[1]; Jack Grubbs[1]; Christopher Massar[1]; Matthew Gleason[1]; Bryer Sousa[1]; Matthew Siopis[2]; [1]Worcester Polytechnic Institute; [2]CCDC Army Research

Laboratory

Invited
Additive Manufacturing of Aluminium: Alloy Design and Machine Learning Assisted Process Optimization: *Xiaopeng Li*[1]; Qian Liu[1]; Jay Kruzic[1]; [1]University of New South Wales

ExaCA Workflow and Microstructure Modeling as Part of the ExaAM Framework: *Matthew Rolchigo*[1]; Jim Belak[2]; Samuel Reeve[1]; John Coleman[1]; Gerry Knapp[1]; Robert Carson[2]; Alex Plotkowski[1]; Lyle Levine[3]; Eddie Schwalbach[4]; [1]Oak Ridge National Laboratory; [2]Lawrence Livermore National Laboratory; [3]National Institute of Standards and Technology; [4]Air Force Research Laboratory

Experimental Determination of Forming Limit Diagram for AISI 304: *Krishna Raju*[1]; Abhishek Kumar[1]; Sushil Kumar Mishra[1]; Narasimhan K[1]; [1]IIT, Bombay

Effect of the Casting Process on the Microstructure and Mechanical Properties of a Cast Ni-based Alloy: *Govindarajan Muralidharan*[1]; Shivakant Shukla[1]; Jiten Shah[2]; Jim Myers[3]; [1]Oak Ridge National Laboratory; [2]PDA LLC; [3]Metaltek International

A Machine Learning Based Methodology to Predict the Build Quality of Metallic Alloys Additively Manufactured by Laser Powder Bed Fusion: *Jeongmin Woo*[1]; Kevin Graydon[1]; Yongho Sohn[1]; [1]University of Central Florida

Design of a High Temperature Precipitates for a Complex Concentrated Alloy Using Model Ternary Alloys: *Jaimie Tiley*[1]; Soumya Nag[1]; Ercan Cakmak[1]; Fan Zhang[2]; Y Wang[3]; Pania Newell[3]; [1]Oak Ridge National Laboratory; [2]Computherm LLC; [3]University of Utah

Texture Gradients and Asymmetries in ShAPE Processed ZK60 Magnesium: *Benjamin Schuessler*[1]; Dalong Zhang[1]; Nicole Overman[1]; Jens Darsell[1]; Vineet Joshi[1]; [1]Pacific Northwest National Laboratory

Designing Ultra-conductors Using Solid Phase Processing: Keerti Kappagantula[1]; *Aditya Nittala*[1]; William Frazier[1]; Kashi Subedi[2]; Xiao Li[1]; Woongjo Choi[1]; Bharat Gwalani[1]; Joshua Silverstein[1]; Julian Atehortua[1]; Hrishikesh Das[1]; Frank Kraft[2]; David Drabold[2]; Glenn Grant[1]; [1]Pacific Northwest National Laboratory; [2]Ohio University

---

MATERIALS DESIGN

Materials Design and Processing Optimization for Advanced Manufacturing: From Fundamentals to Application — On-Demand Poster Session

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

Program Organizers: Wei Xiong, University of Pittsburgh; Dana Frankel, QuesTek Innovations LLC; Gregory Olson, Massachusetts Institute of Technology

Monday AM | March 14, 2022
Materials Design | On-Demand Poster Hall

Friction Assisted Dissimilar Solid State Joining of Aluminum and Copper Pipes: *Ji-Won Kang*[1]; Tu-Anh Bui-Thi[1]; Sung-Tae Hong[1]; Heung-Nam Han[2]; [1]University of Ulsan; [2]Seoul National University

New Methodologies for Grain Boundary Detection in EBSD Data of Microstructures: *Richard Catania*[1]; [1]Virginia Tech

---

Materials Processing Fundamentals — On-Demand Oral Presentations

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Samuel Wagstaff, Oculatus; Alexandra Anderson, Gopher Resource; Jonghyun Lee, Iowa State University; Adrian Sabau, Oak Ridge National Laboratory; Fiseha Tesfaye, Åbo Akademi University

Monday AM | March 14, 2022
Materials Processing | On-Demand Room

Anomalous Temperature Effect on Diffusion-controlled Solidification Time during Diffusion Brazing: *Oluwadara Afolabi*[1]; Olanrewaju Ojo[1]; [1]University of Manitoba

Comprehensive Recovery of Pressure Acid Leaching Residue of Zinc Sulfide Concentrate: *Guiqing Liu*[1]; Bangsheng Zhang[2]; Zhonglin Dong[3]; Fan Zhang[2]; Fang Wang[2]; Tao Jiang[3]; Bin Xu[3]; [1]Northeastern University; [2]Jiangsu BGRIMM Metal Recycling Science & Technology Co. Ltd; [3]Central South University

Time Variation of Concentration-dependent Interdiffusion Coefficient: *Osamudiamen Olaye*[1]; Olanrewaju Ojo[1]; [1]University of Manitoba

Study of Y-Fe4N Material Annealing through Molecular Dynamics Modeling: *Jianxin Zhu*[1]; Guannan Guo[1]; Jian-Ping Wang[1]; [1]University of Minnesota

Potentiostatic Electrodeposition of Ti-Al Alloy with 40% Titanium from the Lewis Acidic 1-butyl-3-methylimidazolium Chloride-aluminum Chloride Ionic Liquid Electrolyte: *Pravin Shinde*[1]; Yuxiang Peng[1]; Ramana Reddy[1]; [1]The University of Alabama

Thermodynamic Properties of Sulfur in the CaO–$AlO_{1.5}$–$CeO_{1.5}$ Slag System at 1873 K: *Masaya Higuchi*[1]; Kazuki Morita[1]; [1]The University of Tokyo

Evaluation of Phase Relations for the Al-Cu-Mg-Si-Zn System around Eutectic Composition: *Yusuke Kageyama*[1]; Kazuki Morita[1]; [1]The University of Tokyo

Prediction of Distribution of Composition of Inclusion in Continuous Casting Bloom of the Heavy Rail Steel Coupling Element Segregation, Heat Transfer and Kinetics: Yuexin Zhang[1]; Wei Chen[2]; Jujin Wang[1]; Yadong Wang[1]; Wen Yang[1]; Ying Ren[1]; *Lifeng Zhang*[2]; [1]University of Science and Technology Beijing; [2]Yanshan University

Voltammetric Investigations of the Dissolution of Copper in Acidic Cupric Chloride Solutions Containing Additional Dissolved Cuprous Ions: *Nadine Koerbler*[1]; Eva Gerold[1]; Stefan Luidold[1]; Thomas Krivec[1]; Jolanta Klocek[1]; Helmut Antrekowitsch[1]; [1]Montanuniversity of Leoben

Site Preference of Ti in 6H-SiC: A Combined Photoluminescence and Theoretical Calculation Study: *Hui Chen*[1]; Kazuki Morita[1]; [1]University of Tokyo

Measurement of Thermodynamic Property of Mg in Molten Iron at 1823 K by Transpiration Method: *Tomoya Nakamura*[1]; Akiko Nakajima[1]; Kazuki Morita[1]; [1]Graduate School of Engineering, The University of Tokyo

---

Materials Processing Fundamentals — On-Demand Poster Session

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

Program Organizers: Samuel Wagstaff, Oculatus; Alexandra Anderson, Gopher Resource; Jonghyun Lee, Iowa State University; Adrian Sabau, Oak Ridge National Laboratory; Fiseha Tesfaye, Åbo Akademi University

Monday AM | March 14, 2022
Materials Processing | On-Demand Poster Hall

Phase and Microstructural Analysis of In-situ Derived Alumina-TiB2 Composites: *Evangelos Daskalakis*[1]; [1]University of Leeds

Parametric Study of Mold Electromagnetic Stirring: Effects of Load Condition and Copper Resistivity: Qilan Li[1]; *Lifeng Zhang*[2]; Jing Zhang[2]; [1]University of Science and Technology Beijing; [2]Yanshan University

Effect of Laser Heat Treatment and Nitrogen Content in Shielding Gas on Precipitation of Widmanstätten Austenite in Lap Laser Welds of Duplex Stainless Steels: *Yunxing Xia*[1]; Kenshiro Amatsu[1]; Fumikazu Miyasaka[1]; Hiroaki Mori[1]; [1]Osaka University

---

NUCLEAR MATERIALS

Materials Systems for the Future of Fusion Energy — On-Demand Oral Presentations

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

Program Organizers: Jason Trelewicz, Stony Brook University; Kevin Field, University of Michigan; Takaaki Koyanagi, Oak Ridge National Laboratory; Yuanyuan Zhu, University of Connecticut; Dalong Zhang, Pacific Northwest National Laboratory

Monday AM | March 14, 2022
Nuclear Materials | On-Demand Room

Invited
Development, Production, and Qualification of Berrylide Neutron Multiplier Parts for the He Cooled Breeding Blanket: *Ramil Gaisin*[1]; Michael Duerrschnabel[1]; Michael Klimenkov[1]; Pavel Vladimirov[1]; Sergey Udartsev[2]; [1]Karlsruhe Institute for Technology; [2]Ulba Metallurgical Plant

Invited
In-situ TEM of Quantum De-trapping and Transport of SIA Clusters in Tungsten: *Kazuto Arakawa*[1]; [1]Shimane University

Invited
Microstructural Examination of Radiation Damage in Tungsten: *Michael Klimenkov*[1]; Ute Jäntsch[1]; Ramil Gaisin[1]; Steffen Antusch[1]; Michael Rieth[1]; Hans-Christian Schneider[1]; Dmitry Terentyev[2]; Wouter Van Renterghem[2]; [1]Karlsruhe Institute of

Technology; [2]Belgian Nuclear Research Centre

Invited
Neutron Irradiated Tungsten Defect, Surface Chemistry, and Microstructural Characterization: *Chase Taylor*[1]; Masashi Shimada[1]; Yasuhisa Oya[2]; [1]Idaho National Laboratory; [2]Shizuoka University

Invited
Self-passivating SMART Alloys for a Fusion Power Plant: *Andrey Litnovsky*[1]; Felix Klein[1]; Xiaoyue Tan[1]; Jan W. Coenen[1]; Gerald Pintsuk[1]; Christian Linsmeier[1]; Jesus Gonzalez-Julian[1]; Martin Bram[1]; Ivan Povstugar[1]; Thomas W. Morgan[2]; Yury M. Gasparyan[3]; Alexey Suchkov[3]; Diana Bachurina[3]; Duc Nguyen-Manh[4]; Mark R. Gilbert[4]; Damian Sobieraj[5]; Jan Wrobel[5]; Joven Lim[4]; Pawel Bittner[1]; Anicha Reuban[1]; [1]Forschungszentrum Juelich; [2]DIFFER Dutch Institute for Fundamental Energy Research; [3]National Research Nuclear University MEPhI; [4]CCFE, United Kingdom Atomic Energy Authority; [5]Warsaw University of Technology

Invited
Development of Tungsten Heavy Alloy Composites for Fusion Applications: *Wahyu Setyawan*[1]; Ba Nguyen[1]; Weilin Jiang[1]; Md Alam[2]; James Haag IV[3]; Jing Wang[1]; Laila El-Guebaly[4]; Dalong Zhang[1]; Ramprashad Prabhakaran[1]; Charles Henager Jr.[1]; G. Odette[2]; Mitsu Murayama[3]; [1]Pacific Northwest National Laboratory; [2]University of California at Santa Barbara; [3]Virginia Tech; [4]University of Wisconsin

Neutron Radiation Enhanced Grain Growth in Tungsten and Tungsten Alloys under Mixed Spectrum Neutron Irradiation: *Hanns Gietl*[1]; Takaaki Koyanagi[1]; Xunxiang Hu[1]; Yutai Katoh[1]; [1]Oak Ridge National Laboratory

Characterization of Atomic-scale Defects in Neutron Irradiated Silicon Carbide: *Takaaki Koyanagi*[1]; David Sprouster[2]; Xunxiang Hu[1]; Yutai Katoh[1]; [1]Oak Ridge National Laboratory; [2]Stony Brook University

Novel Transitional Layer Structure between Reduced Activation Ferritic Martensitic Steels and Tungsten for Fusion Reactors: *Tim Graening*[1]; Ishtiaque Robin[2]; Ying Yang[1]; Lizhen Tan[1]; Yutai Kato[1]; [1]Oak Ridge National Laboratory; [2]University of Tennessee Knoxville

Tensile Properties and Microstructure of Neutron Irradiated Tungsten Fibers for Fusion Materials Application: *Lauren Garrison*[1]; John Echols[1]; Johann Riesch[2]; Hans Gietl[1]; Maxim Gussev[1]; [1]Oak Ridge National Laboratory; [2]Max-Planck-Institut für Plasmaphysik, Garching

Effect of He Plasma Exposure on Recrystallization and Properties of W: *Dhriti Bhattacharyya*[1]; Calvin Hoang[2]; Matthew Thompson[3]; Cormac Corr[3]; [1]Australian Nuclear Science and Technology Organization; [2]University of New South Wales; [3]Australian National University

Anomalous Precipitation of Cr in Fe-rich Ferritic Steels under Irradiation in Presence of C and N Impurities: First Principles Modeling and Experimental Observations: *Mark Fedorov*[1]; Jan Wróbel[1]; Andrew London[2]; Krzysztof Kurzydlowski[3]; Sergei Dudarev[2]; Duc Nguyen-Manh[2]; [1]Warsaw University of Technology; [2]Culham Centre for Fusion Energy, United Kingdom Atomic Energy Authority; [3]Bialystok University of Technology

First-principles Calculations of Tungsten-based Alloys under Fusion Power Plant Conditions: Yichen Qian[1]; Mark Gilbert[2]; Lucile Dezerald[3]; *David Cereceda*[1]; [1]Villanova University; [2]Culham Centre for fusion Energy; [3]Universite de Lorraine

Multi-scale Model for Segregation of Transmutation-generated Solutes in Neutron Irradiated Tungsten: *Duc Nguyen-Manh*[1]; Matthew LLoyd[2]; Jan Wrobel[3]; Michael Klimenkov[4]; Luca Messina[5]; Sergei Dudarev[1]; Enrique Martinez[6]; Charlotte Becquart[7]; Christophe Domain[8]; [1]UK Atomic Energy Authority; [2]University of

Oxford; [3]Warsaw University of Technology; [4]Karsruhe Institute of Technology; [5]CEA Cadarache; [6]Clemson University ; [7]Univ. Lille; [8]EDF-R&D

Liquid Metal Compatibility Evaluations for Fusion Applications: *Bruce Pint*[1]; Marie Romedenne[1]; Jiheon Jun[1]; [1]Oak Ridge National Laboratory

---

NUCLEAR MATERIALS

Materials Systems for the Future of Fusion Energy — On-Demand Poster Session

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

Program Organizers: Jason Trelewicz, Stony Brook University; Kevin Field, University of Michigan; Takaaki Koyanagi, Oak Ridge National Laboratory; Yuanyuan Zhu, University of Connecticut; Dalong Zhang, Pacific Northwest National Laboratory

Monday AM | March 14, 2022
Nuclear Materials | On-Demand Poster Hall

Molecular Dynamics Simulations of Hydrogen and Nitrogen Implantation in Tungsten: *Mary Alice Cusentino*[1]; Mitchell Wood[1]; Aidan Thompson[1]; [1]Sandia National Laboratories

Modelling and Experimental Study of Yttrium Segregation in Smart Alloys as Plasma Facing Materials: *Duc Nguyen-Manh*[1]; Damian Sobieraj[2]; Jan Wrobel[2]; Mark Gilbert[1]; Joven Lim[1]; Ivan Povstugar[3]; Felix Klein[3]; Andrey Litnovsky[3]; [1]UK Atomic Energy Authority; [2]Warsaw University of Technology; [3]Forschungszentrum Jülich GmbH

Heavy Ion Irradiation Studies on an Additively Manufactured 316LN Stainless Steel at Elevated Temperatures: *Zhongxia Shang*[1]; Cuncai Fan[1]; Yinmin Wang[2]; Lin Shao[3]; Haiyan Wang[1]; Xinghang Zhang[1]; [1]Purdue University; [2]University of California, Los Angeles; [3]Texas A&M University

---

NUCLEAR MATERIALS

Mechanical Behavior and Degradation of Advanced Nuclear Fuel and Structural Materials — On-Demand Oral Presentations

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

Program Organizers: Dong Liu, University of Bristol; Peng Xu, Idaho National Laboratory; Simon Middleburgh, Bangor University; Christian Deck, General Atomics; Erofili Kardoulaki, Los Alamos National Laboratory; Robert Ritchie, University of California, Berkeley

Monday AM | March 14, 2022
Nuclear Materials | On-Demand Room

Invited
A Comprehensive Study of Responses of SiC Materials to Neutron Irradiation for ATF Cladding Application: *Takaaki Koyanagi*[1]; Christian Petrie[1]; Jose' Arregui

Mena[1]; Hsin Wang[1]; Yutai Katoh[1]; [1]Oak Ridge National Laboratory

Invited
Advances in SiGA® Development for Nuclear Applications: *Sean Gonderman*[1]; Kirill Shapovalov[1]; George Jacobsen[1]; Lucas Borowski[1]; Shaobin Fan[1]; Rolf Haefelfinger[1]; Christian Deck[1]; Jack Gazza[1]; Christina Back[1]; [1]General Atomics

Invited
Small Scale Mechanical Testing of Irradiated Cladding and Fuel for Nuclear Reactors: *David Frazer*[1]; Fabiola Cappia[1]; Daniel Murray[1]; Cameron Howard[1]; Yachun Wang[1]; Fei Teng[1]; Jatuporn Burns[1]; [1]Idaho National Laboratory

Creep Performance of IronClad Accident Tolerant Fuel Cladding: *Evan Dolley*[1]; Wanming Zhang[1]; Dan Lutz[1]; Russ Fawcett[1]; Raul Rebak[1]; [1]GE Research/GE Power

Effect of Free Surface on Displacement-cascade Damage in Neutron Irradiated Nickel: *Michele Fullarton*[1]; Giridhar Nandipati[1]; Ram Devanathan[1]; David Senor[1]; [1]Pacific Northwest National Laboratory

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

Uranium Nitride/Uranium Boride Composite Materials: *Joel Turner*[1]; James Buckley[1]; Robert Worth[1]; Tim Abram[1]; [1]University of Manchester

Simulation of Shearing-induced Edge and Interfacial Fractures in U-10Mo Monolithic Fuel Plates: *Lei Li*[1]; Kyoo Sil Choi[1]; Kenneth Johnson[1]; Vineet Joshi[1]; Ayoub Soulami[1]; [1]Pacific Northwest National Laboratory

Phase Stability in FeCrAl Alloys: Mapping the Miscibility Gap and Understanding the Impact of Alpha Prime Precipitation on Material Properties: *Rajnikant Umretiya*[1]; Andrew Hoffman[1]; Raul Rebak[1]; [1]GE Research

Microstructure and Surface Chemistry of FeCrAl Alloys Accident Tolerant Fuel Cladding Subjected to Fast Heating Rate in Aqueous Environment: *Rajnikant Umretiya*[1]; Donghwi Lee[2]; Mark Anderson[2]; Raul Rebak[1]; Jessika Rojas[3]; [1]GE Research; [2]Universty of Wisconsin-Madison; [3]Virginia Commonwealth University

Interface Characterization of an Explosion Welded Stainless Steel-clad Plate for Neutron Irradiation Studies: *Nathan Reid*[1]; John Echols[2]; Lauren Garrison[2]; Jean Paul Allain[3]; [1]University of Illinois at Urbana-Champaign; [2]Oak Ridge National Laboratory; [3]Pennsylvania State University

Diffusion in Doped and Undoped Amorphous Zirconia: *Megan Owen*[1]; Michael Rushton[1]; Lee Evitts[1]; Antoine Claisse[2]; Mattias Puide[2]; William Lee[1]; Simon Middleburgh[1]; [1]Bangor University; [2]Westinghouse Electric Sweden AB

Effects of Steel Composition and Grain Size on Diffusion with Neodymium: *Brian Bettes*[1]; Yi Xie[1]; [1]Purdue University

Development of PVD Cr Coatings for Hydrothermal Corrosion Resistance of SiC-SiC_f Fuel Cladding in LWRs: *Kyle Quillin*[1]; Hwasung Yeom[1]; Tyler Dabney[1]; Evan Willing[1]; Taeho Kim[1]; Sergey Chemerisov[2]; Christian Deck[3]; Adrien Couet[1]; Kumar Sridharan[1]; [1]University of Wisconsin-Madison; [2]Argonne National Laboratory; [3]General Atomics

Role of Powder Microstructure and Mechanical Properties on Deposition and Properties of Cold Spray Cr Coatings: *Tyler Dabney*[1]; Kyle Quillin[1]; Hwasung Yeom[1]; Kumar Sridharan[1]; [1]University of Wisconsin-Madison

Manufacturing of Oxide Dispersion Strengthened (ODS) Steel Fuel Cladding

Tubes Using Cold Spray Technology: *Hwasung Yeom*[1]; Vishnu Ramasawmy[1]; Xinwu Liu[1]; David Hoelzer[2]; Stuart Maloy[3]; Peter Hosemann[4]; Kumar Sridharan[1]; [1]University of Wisconsin Madison; [2]Oak Ridge National Laboratory; [3]Los Alamos National Laboratory; [4]University of California-Berkeley

Progress on Experimental Investigation of Degradation Mechanisms of ATF Coated Cladding under Transient Conditions: *Hwasung Yeom*[1]; Tyler Dabney[1]; David Kamerman[2]; Michelle Bales[3]; Logan Crevelt[4]; Zhen Li[4]; Anthony Evans[4]; Brent Heuser[4]; Kumar Sridharan[1]; [1]University of Wisconsin Madison; [2]Idaho National Laboratory; [3]U.S. Nuclear Regulatory Commission; [4]University of Illinois Urbana-Champaign

Microstructure, Mechanical Properties, and Irradiation Response of Fe-Cr-Ni-based Multi-principal Element Alloys: *Marcus Parry*[1]; Cheng Sun[1]; Wen Jiang[1]; Boopathy Kombaiah[1]; Colin Judge[1]; Seongtae Kwon[1]; Ovidiu Toader[2]; Gary Was[2]; Taylor Sparks[3]; [1]Idaho National Laboratory; [2]University of Michigan; [3]University of Utah

Deconvoluting Properties of Additively Manufactured Alloy 718 Utilizing Coupled Microscopy and Machine Learning: *Stephen Taller*[1]; Ty Austin[2]; Kurt Terrani[1]; [1]Oak Ridge National Laboratory; [2]University of Tennessee - Knoxville

The Interaction between an Extended Edge Dislocation and a Helium Bubble in Copper: *Wurong Jian*[1]; Shuozhi Xu[1]; Yanqing Su[2]; Irene Beyerlein[1]; [1]University of California, Santa Barbara; [2]Utah State University

Phase-field Simulations of Fission Gas Bubbles in High Burnup UO2 to Inform Engineering-scale Fuel Performance Modeling: *Larry Aagesen*[1]; David Andersson[2]; Sudipta Biswas[1]; Michael Cooper[2]; Kyle Gamble[1]; Wen Jiang[1]; [1]Idaho National Laboratory; [2]Los Alamos National Laboratory

Unraveling the Early Stage Ordering of Krypton Solid Bubbles in Molybdenum: A Multi-modal Study: *Ericmoore Jossou*[1]; Anton Schneider[2]; Cheng Sun[3]; Yongfeng Zhang[2]; Shirish Chodankar[1]; Dmytro Nykypanchuk[1]; Jian Gan[3]; Lynne Ecker[1]; Simerjeet Gill[1]; [1]Brookhaven National Laboratory; [2]University of Wisconsin; [3]Idaho National Laboratory

Modeling High-temperature Corrosion of Zirconium Alloys Using the Extended Finite Element Method: *Wen Jiang*[1]; Louis Bailly-Salins[2]; Benjamin Spencer[1]; Adrien Couet[2]; [1]Idaho National Laboratory; [2]University of Wisconsin-Madison

---

NUCLEAR MATERIALS

Mechanical Behavior and Degradation of Advanced Nuclear Fuel and Structural Materials — On-Demand Poster Session

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

Program Organizers: Dong Liu, University of Bristol; Peng Xu, Idaho National Laboratory; Simon Middleburgh, Bangor University; Christian Deck, General Atomics; Erofili Kardoulaki, Los Alamos National Laboratory; Robert Ritchie, University of California, Berkeley

Monday AM | March 14, 2022
Nuclear Materials | On-Demand Poster Hall

Microstructural and Mechanical Properties of Hot Deformation Behavior of Zr-4 Alloy: *Gaurav Singh*[1]; Raviraj Verma[1]; Vishnu Narayanan KI[2]; Umesh Arora[2]; R

Jayaganthan[1]; [1]Indian Institute of Technology Madras; [2]NFC Hyderabad

Investigation of Degradation Mechanism of Accident Tolerant Fuel (ATF) Coated Cladding Concepts during Interim Storage and Transportation of Used Nuclear Fuels: *Evan Willing*[1]; Hwasung Yeom[1]; Tyler Dabney[1]; Kumar Sridharan[1]; Andrew Nelson[2]; Tim Graening[2]; [1]University of Wisconsin Madison; [2]Oak Ridge National Laboratory

Formation of UN in U-Mo Systems by Mechanical Alloying: *James Zillinger*[1]; Nathan Jerred[1]; Adrian Wagner[1]; Samrat Choudhury[2]; Indrajit Charit[2]; [1]Idaho National Laboratory; [2]University of Idaho

Impact Fretting Wear Behavior of Cr-alloy Coating Layer for Accident-tolerant Fuel cladding: *Youngho Lee*[1]; Dong-Jun Park[1]; Yang-Il Jung[1]; Sung-Chan Yoo[1]; Hyun_Gil Kim[1]; [1]Korea Atomic Energy Research Institute

Comparison of Neutron Irradiation Effects in PM-HIP and Cast Grade 91 Steel: *Sri Sowmya Panuganti*[1]; Yu Lu[2]; Sheng Cheng[3]; Megha Dubey[3]; Yangyang Zhao[1]; Caleb Clement[1]; Donna Guillen[4]; David Gandy[5]; Janelle Wharry[1]; [1]Purdue University; [2]Boise State University ; [3]Boise State University; [4]Idaho National Laboratory; [5]Electric Power Research Institute

NANOSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale VI — On-Demand Oral Presentations

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

Program Organizers: Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, University of Texas at San Antonio; Changhong Cao, McGill University; Mohsen Asle Zaeem, Colorado School of Mines

Monday AM | March 14, 2022
Nanostructured Materials | On-Demand Room

Invited
In Situ Nanomechanics of Deformation Twinning: *Ting Zhu*[1]; Yin Zhang[1]; [1]Georgia Institute of Technology

Invited
Precipitate Looping and Shearing at the Nanoscale: *William Curtin*[1]; Yi Hu[1]; Daniel Marchand[1]; [1]Epfl Sti Igm Lammm

Invited
Analyzing Lamellar Level Correlations between Mechanical Behavior and Composition in Mouse Bone: *Shraddha Vachhani*[1]; Surya Kalidindi[2]; Siddhartha Pathak[1]; [1]Iowa State University; [2]Georgia Institute of Technology

Invited
Mechanistic-design of Multilayered Metal-metal and Metal-ceramic Nanocomposites for Tunable Strength and Toughness: *Siddhartha (Sid) Pathak*[1]; [1]Iowa State University

Theoretical Development of Continuum Dislocation Dynamics with Reactions: Preliminary Results: *Kyle Starkey*[1]; Anter El-Azab[1]; Thomas Hochrainer[2]; [1]Purdue

University; [2]Graz University of Technology

Development of Neural Network Potential for MD Simulation and Evaluation of Mechanical Property: *Takeru Miyagawa*[1]; Akio Yonezu[1]; Kazuki Mori[2]; Nobuhiko Kato[2]; [1]Chuo University; [2]ITOCHU Techno-Solutions Corporation (CTC)

Ligament-size Effect of Time-dependent Plasticity in Nanoporous Gold under Controlled Surface Coated Layer: *Hansol Jeon*[1]; Eunji Song[1]; Ju-Young Kim[1]; [1]Unist

Molecular Dynamics Simulations on Nanosuspension Droplet Impact: *Baiou Shi*[1]; Siddharth Ravi[1]; [1]Pennsylvania State University Erie

Atomistic Mechanism of Stress Modulated Phase Transition in Monolayer MoTe2: *Wei Gao*[1]; [1]University of Texas at San Antonio

---

NANOSTRUCTURED MATERIALS

Mechanical Behavior at the Nanoscale VI — On-Demand Poster Session

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

Program Organizers: Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, University of Texas at San Antonio; Changhong Cao, McGill University; Mohsen Asle Zaeem, Colorado School of Mines

Monday AM | March 14, 2022
Nanostructured Materials | On-Demand Poster Hall

Correlation of Crack Propagation with Mechanical Properties of Parent Phases and Softened Phases in Bearing Steels under Rolling Contact Fatigue: *Eunji Song*[1]; Hansol Jeon[1]; Ju-Young Kim[1]; [1]UNIST

CHARACTERIZATION

Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling — On-Demand Oral Presentations

Sponsored by: TMS Structural Materials Division, TMS Functional Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Thin Films and Interfaces Committee

Program Organizers: Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Dongchan Jang, KAIST; Shailendra Joshi, University of Houston; Josh Kacher, Georgia Institute of Technology; Minh-Son Pham, Imperial College London; Jagannathan Rajagopalan, Arizona State University; Robert Wheeler, Microtesting Solutions LLC

Monday AM | March 14, 2022
Characterization | On-Demand Room

Invited
Integrated Discrete Dislocation Plasticity Modelling, HR-EBSD and TEM Characterisation of Ti Dwell Fatigue: Yilun Xu[1]; Sudha Joseph[1]; Phani Karamchad[1];

David Dye[1]; *Fionn Dunne*[1]; [1]Imperial College

Atomistic Insight into Cumulative Twin-solute Interactions in Mg Alloys: *Yang Hu*[1]; Vladyslav Turlo[2]; Dennis Kochmann[1]; [1]ETH Zurich; [2]Empa

In-situ TEM Observation of Shear Induced Microstructure Evolution in Cu-Nb Alloy: *Shuang Li*[1]; Matthew Olszta[1]; Lei Li[1]; Bharat Gwalani[1]; Ayoub Soulami[1]; Cynthia Powell[1]; Suveen Mathaudhu[1]; Arun Devaraj[1]; Chongmin Wang[1]; [1]Pacific Northwest National Laboratory

Micro-mechanical Investigation of a High-pressure Torsion Processed Nano-crystalline WCu Composite: *Michael Burtscher*[1]; Markus Alfreider[1]; Klemens Schmuck[1]; Daniel Kiener[1]; [1]Montanuniversitaet Leoben

In-situ Digital Image Correlation Study to Reveal Cyclic Plastic Strain Localizations in Stainless Steel 316L: *Elif Cansu Kursun*[1]; Koenraad G.F. Janssens[1]; Philippe Spätig[1]; [1]Paul Scherrer Institute

Effect of Hole Shape and Pattern Orientation on Mechanical Behaviour of Two-dimensional Micro-lattice through In Situ Micro-tensile Testing: *Dhriti Bhattacharyya*[1]; Alan Xu[1]; Michael Saleh[1]; [1]Australian Nuclear Science and Technology Organization

Tensile and FatigueTesting of Metallic Thin Films with Ultra-thin Passivation Layers: *Sunkun Choi*[1]; Ho Jang Kim[1]; Yu Hyun Park[1]; Gi-Dong Sim[1]; [1]KAIST

The Mechanical Behavior of Passivated Al and Al-C Thin Films: *Hojang Kim*[1]; Injong Oh[1]; Gi-Dong Sim[1]; [1]KAIST

A Rapid Testing Method for Evaluating Strain-path Sensitivity: *Anastasia Vrettou*[1]; David Collins[1]; [1]University of Birmingham

---

MATERIALS DESIGN

Metal-Matrix Composites: Advances in Processing, Characterization, Performance and Analysis — On-Demand Oral Presentations

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

Program Organizers: Srivatsan Tirumalai, The University of Akron; Pradeep Rohatgi, University of Wisconsin; Simona Hunyadi Murph, Savannah River National Laboratory

Monday AM | March 14, 2022
Materials Design | On-Demand Room

Keynote
Shape-selective Palladium-based Nanomaterials: *Simona Hunyadi Murph*[1]; [1]Savannah River National Laboratory

Invited
A Study on Thermal Properties of Composite Metal Foams for Applications in Tank Cars Carrying Hazardous Materials: *Afsaneh Rabiei*[1]; [1]North Carolina State University

Invited
Engineered Nano-antenna Susceptors as Efficient Platforms for Efficient Uptake and Release of Analytes: *Simona Hunyadi Murph*[1]; [1]Savannah River National

Laboratory

Role and Potential of Copper Nanocomposites for Use in Power and Electrical Systems: An Overview: *Yue-Hao Choong*[1]; Krishnan Manickavasagam[1]; Manoj Gupta[1]; Srivatsan Tirumalai[2]; [1]National University of Singapore; [2]The University of Akron

Wireless, Self-powered Stretchable Sensing System Based on Laser-induced Graphene Composites: *Huanyu Cheng*[1]; [1]Pennsylvania State University

In Situ Study of Spontaneous Nanocrystallization of Intermetallics for Interconnection of High-power Electronics: *Ying Zhong*[1]; Chunqing Wang[2]; [1]University of South Florida; [2]Harbin Institute of Technology

Characterization of Metal-matrix Composites Synthesized by Reactive Melt Penetration of SiO2-based Preforms in Molten Al-Ti and Al-Fe Alloys: *Constantin Solomon*[1]; Anthony Yurcho[2]; Matthias Zeller[3]; Timothy Wagner[1]; [1]Youngstown State University; [2]Zekelman Industries; [3]Purdue University

Manufacturing of Nano-reinforced Aluminium Composites by a Combination of Stir Mixing, Ultrasonic Processing and High-pressure Die Casting: *Guangyu Liu*[1]; Mahfuz Karim[1]; Dmitry Eskin[1]; Brian McKay[1]; [1]Brunel University London

Novel Nanophotocatalysts for Detection and Remediation of Contaminated Ecosystems: *Simona Hunyadi Murph*[1]; [1]Savannah River National Laboratory

Development of Coating Methods of Fiber Reinforced for Different Matrix Composites for Industrial Applications: *Emel Çaliskan*[1]; Kaan Ipek[2]; Derya Dispinar[3]; Erol Ince[1]; [1]Istanbul Cerrahpasa University; [2]Teknik Aluminyum San. Tic. A.S.; [3]Istanbul Technical University

---

MATERIALS DESIGN

Microstructural Templates Consisting of Isostructural Ordered Precipitate / Disordered Matrix Combinations: Microstructural Evolution and Properties — On-Demand Oral Presentations

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

Program Organizers: Rajarshi Banerjee, University of North Texas; Eric Lass, University of Tennessee-Knoxville; Bharat Gwalani, Pacific Northwest National Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Jessica Krogstad, University of Illinois at Urbana-Champaign; Ashley Paz Y Puente, University of Cincinnati; Keith Knipling, Naval Research Laboratory; Matthew Steiner, University of Cincinnati

Monday AM | March 14, 2022
Materials Design | On-Demand Room

Invited
Microstructural Engineering in NiCoCr Medium Entropy Alloys: Nithin Baler[1]; Abdulla Samin M V[1]; *Surendra Kumar Makineni*[2]; [1]Indian Institute of Science Bangalore; [2]Indian Institute of Science Bangalore

Invited
Precipitate Strengthening and Stabilization Mechanisms in Cast and Additively Manufactured Al-Cu-Mn-Zr Alloys: *Jonathan Poplawsky*[1]; Richard Michi[1]; Sumit Bahl[1]; Brian Milligan[2]; Patrick Shower[3]; Lawrence Allard[1]; Matthew Chisholm[1]; Dongwon Shin[2]; Kevin Sisco[4]; Alex Plotkowski[1]; Ryan Dehoff[1]; Allen Haynes[1]; Amit

Shyam[1]; [1]Oak Ridge National Laboratory; [2]Colorado School of Mines; [3]GE Global Research; [4]University of Tennessee, Knoxville

Invited
On the Detailed Morphological and Chemical Evolution of Phases during Laser Powder Bed Fusion and Common Post-processing Heat Treatments of IN718: Sophie Primig[1]; *Vitor Rielli*[1]; Alessandro Piglione[2]; Minh-Son Pham[2]; [1]University of New South Wales; [2]Imperial College London

Invited
The Origin and Stability of Nanostructural Hierarchy in Nickel-base Superalloys: *Subhashish Meher*[1]; Larry Aagesen[1]; Tresa Pollock[2]; L. J. Carroll[1]; [1]Idaho National Laboratory; [2]University of California, Santa Barbara

Invited
Design of Precipitation Strengthened Metastable High Entropy Alloys: *K. G. Pradeep*[1]; [1]Indian Institute of Technology Madras

Seeing the Shearing of Short-range Order with Dislocations in the High-entropy Alloy: *Jae-Bok Seol*[1]; Jongun Moon[2]; Hyo Ju Bae[1]; Jae Wung Bae[3]; Hyokyung Sung[1]; Jung Gi Kim[1]; Hyoung Seop Kim[2]; [1]Gyeongsang National University; [2]POSTECH; [3]Max-Planck-Institut für Eisenforschung GmbH

SPECIAL TOPICS

Moving Forward from a Pandemic: How the Field of Materials Science Has Adapted (2022 Student-led Symposium) — On-Demand Oral Presentations

Program Organizers: Gianmarco Sahragard-Monfared, University of California, Davis; Christine Smudde, Univeristy of California, Davis; Jared Stimac; Mingwei Zhang, University of California, Davis

Monday AM | March 14, 2022
Special Topics | On-Demand Room

Learning from the Pandemic: *Justine Johannes*[1]; Gilbert Herrera[1]; P Randall Schunk[1]; Jeffrey Nelson[1]; [1]Sandia National Laboratories

Supporting Educators through Software during Remote Teaching: *Kaitlin Tyler*[1]; [1]ANSYS

The Interrupted University: Lessons from Engineering Design in Response to the Covid-19 Pandemic: *Sunniva Collins*[1]; [1]Case Western Reserve

---

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXI — On-Demand Student Poster Session

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

Program Organizers: Hiroshi Nishikawa, Osaka University; Shih-kang Lin, National Cheng Kung University; Chaohong Wang, National Chung Chung University; Chih Ming Chen, National Chung Hsing University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; A.S.Md Abdul Haseeb, University of Malaya; Vesa Vuorinen, Aalto University; Ligang Zhang, Central South University; Sehoon Yoo, KITECH; Yu-chen Liu, National Cheng Kung University; Ting-Li Yang, National Yang Ming Chiao Tung University

Monday AM | March 14, 2022
Electronic Materials | On-Demand Poster Hall

Interfacial Reactions in the Sn/C194 and Sn-3.0Ag-0.5Cu/C194 Couples: Yee-Wen Yen[1]; Jun Wen[1]; *You-Yan Li*[1]; Xin-Bin Hu[1]; [1]National Taiwan University of Science and Technology

---

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXI — On-Demand Oral Presentations

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

Program Organizers: Hiroshi Nishikawa, Osaka University; Shih-kang Lin, National Cheng Kung University; Chaohong Wang, National Chung Chung University; Chih Ming Chen, National Chung Hsing University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; A.S.Md Abdul Haseeb, University of Malaya; Vesa Vuorinen, Aalto University; Ligang Zhang, Central South University; Sehoon Yoo, KITECH; Yu-chen Liu, National Cheng Kung University; Ting-Li Yang, National Yang Ming Chiao Tung University

Monday AM | March 14, 2022
Electronic Materials | On-Demand Room

Invited
Mesoscale Simulations Guiding Data-driven Design of Electronic Materials: *Anil Kunwar*[1]; Johan Hektor[2]; Upadesh Subedi[3]; Nele Moelans[4]; [1]Silesian University of Technology; [2]Malmö University; [3]Tribhuvan University; [4]KU Leuven

Invited
Data-driven Rational Design of Conductive Copper-based Alloys with High Performance: *Jianxin Xie*[1]; Huadong Fu[1]; [1]University of Science and Technology Beijing

Invited
Failure Analysis and Prediction of Solder Microbumps due to Side Wetting and Electromigration by 3D X-ray: Po-Ning Hsu[1]; *Chih Chen*[1]; Kai-Cheng Hsieh[1]; Tzu-Wen Lin[1]; Cheng-Che Wu[1]; Nien-Ti Tsou[1]; Yu-Chieh Lo[1]; Nan-Yo Chen[2]; Mia Wu[3]; Yong-Fen Hsieh[3]; K. N. Tu[4]; [1]National Yang Ming Chiao Tung University; [2]National Center for High-performance Computing, Taiwan; [3]Materials Analysis Technology Inc.; [4]UCLA/City University of Hong Kong

Phase Transformation Temperatures of Sn-based Solder Alloys: *Sinn-wen Chen*[1]; Jun-xiang Liu[1]; [1]National Tsing Hua University

Electric Current-assisted Treatment for 7075 Aluminum Alloy to Withstand High-speed Impact: *Shih-kang Lin*[1]; Yu-chen Liu[1]; Yu-ching Chen[1]; Yu-ning Chiu[1];

[1]National Cheng Kung University

Electronic Material Properties Exploration Using Machine Learning: In Effective Charge, Hardness, and Dissipation Factor: *Yu-chen Liu*[1]; Shih-kang Lin[1]; [1]National Cheng Kung University

Solution-processed Perovskite Photoabsorbers with Mixed Cations for Improved Stability in Solar Cells: Mritunjaya Parashar[1]; Mohin Sharma[1]; Anupama Kaul[1]; *Kishan Jayanand*[1]; [1]University of North Texas

Filp-chip Encapsulation with Hybrid Organic-inorganic Passivation of Perovskite Solar Cells: *Tse-Lin Lai*[1]; [1]National Central University

Cu Sintering Process Modified by Adding a Low Temperature Liquid Sintering Step: *Bo Rong Huang*[1]; [1]National Central University

Bi Orientation-dependence and Mechanical Properties in a Sn-Bi-Ag Low-temperature Lead-free Solder: *Chih-Han Yang*[1]; Yu-chen Liu[1]; Yuki Hirata[2]; Hiroshi Nishikawa[2]; Shih-kang Lin[1]; [1]National Cheng Kung University; [2]Osaka University

Self-healing Kirkendall Voids at the Joint Interface between Sn and <111> Oriented and Nano-twinned Cu: *Shiqi Zhou*[1]; Yubo Zhang[1]; Yue Gao[1]; Li-Yin Gao[1]; Zhi-Quan Liu[1]; [1]Shenzhen Institutes of Advanced Technology, CAS

Interfacial Reaction between In Coated Cu Sheet and ENIG Substrate: *Hiroshi Nishikawa*[1]; Jianhao Wang[2]; Kento Kariya[3]; Noriyuki Masago[3]; [1]Osaka University; [2]Nanjin University of Aeronautics and Astronautcs; [3]Rohm Co., Ltd.

Interfacial Reaction between Sn-rich Solder and FeCoNiCu High-entropy Alloy: *Yu-An Shen*[1]; Sheng-Wen Chen[1]; Hao-Zhe Chen[1]; [1]Feng Chia University

---

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — On-Demand Oral Presentations

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Ramasis Goswami, Naval Research Laboratory; Saurabh Puri, Microstructure Engineering; Eric Payton, Air Force Research Laboratory; Bij-Na Kim, Carpenter Additive; Megumi Kawasaki, Oregon State University; Eric Lass, University of Tennessee-Knoxville

Monday AM | March 14, 2022
Physical Metallurgy | On-Demand Room

Invited
Microstructural Evolution and Nanoprecipitation Behaviour of a Selective Laser Melted, 18% Ni Maraging 300 Steel: Gopi Kompelli[1]; Angelos Nikolaidis[1]; David de Castro[1]; Adriana Eres Castellanos[1]; Isaac Toda Caraballo[1]; David San Martin[1]; Jose Antonio Jimenez[1]; Esteban Urones Garrote[2]; Rosalia Rementeria[3]; Carlos Capdevila[1]; *Francisca Caballero*[1]; [1]CENIM-CSIC; [2]Universidad Complutense de Madrid; [3]ArcelorMittal Global R&D

Atomistic Modeling of Phase Stability and Transformations due to the Presence of Precipitates in High and Medium Entropy Alloys: *Eva Zarkadoula*[1]; Ying Yang[1];

Albina Borisevich[1]; Easo George[1]; [1]Oak Ridge National Laboratory

Influence of Cluster Hardening on Strength and Strain Hardening Behavior of Various Aluminum Alloys: *Philip Aster*[1]; Lukas Stemper[1]; Florian Schmid[1]; Peter Uggowitzer[1]; Stefan Pogatscher[1]; [1]Montanuniversität Leoben

A Combinatorial Approach to Investigate Abnormal Grain Growth Behavior in Cu-Al-Mn Shape Memory Alloys: *Hyoungrok Lee*[1]; Sheng Xu[1]; Toshihiro Omori[1]; Ryosuke Kainuma[1]; [1]Tohoku University

On the Precipitation Behavior of γ-TiAl from a Supersaturated β_o-TiAl Matrix in an Intermetallic Ti-44Al-7Mo (at.%) Alloy: *Gloria Graf*[1]; Christoph Gammer[2]; Simon Fellner[2]; Johanna Byloff[1]; David Holec[1]; Helmut Clemens[1]; Petra Spoerk-Erdely[1]; [1]University of Leoben; [2]Erich-Schmid-Institut für Materialwissenschaft der ÖAW

Cementite Decomposition in 100Cr6 Bearing Steel during High-pressure Torsion: Influence of Composition, Size, Morphology and Matrix Hardness: *Kiranbabu Srikakulapu*[1]; Lutz Morsdorf[1]; Po-Yen Tung[1]; Michael Herbig[1]; [1]Max-Planck-Institut für Eisenforschung

Decoupling of Strain and Temperature Effects on Microstructural Evolution during High Shear Strain Deformation: *Anqi Yu*[1]; Julian Escobar Atehortua[1]; Krassimir Bozhilov[2]; Jia Liu[1]; Mayur Pole[1]; Joshua Silverstein[1]; Sundeep Mukherjee[3]; Suveen Mathaudhu[4]; Arun Devaraj[1]; Bharat Gwalani[1]; [1]Pacific Northwest National Laboratory; [2]University of California, Riverside; [3]University of North Texas; [4]Colorado School of Mines

Processing Electroceramics in the Transmission Electron Microscope: *Jenna Wardini*[1]; Jairo Gonzalez[1]; George Harrington[2]; William Bowman[1]; [1]University of California Irvine; [2]Kyushu University

Phase Field Simulations of Direct Aging of a Rapidly Solidified Ni-Fe-Nb Alloy: *Bala Radhakrishnan*[1]; Sarma Gorti[1]; Ranadip Acharya[2]; [1]Oak Ridge National Laboratory; [2]Collins Aerospace Applied Research and Technology

Role of Phosphorus in Irradiated Microstructure Evolution of a Binary Fe-P Model Alloy by TEM In Situ Irradiation: *Patrick Warren*[1]; Wei-Ying Chen[2]; Ling Wang[3]; Janelle Wharry[1]; [1]Purdue University; [2]Argonne National Laboratory; [3]Materials Science and Technology Division

The Effect of Low-temperature Aging on the Microstructure and Mechanical Behavior of Martensitic Ti-Nb Alloy: *Marissa Linne*[1]; Rohini Sankaran[1]; Sharon Torres[1]; Joseph Mckeown[1]; Amanda Wu[1]; [1]Lawrence Livermore National Laboratory

Lattice Point Defects: A Vacancy in Phase Transformation Models: *Estelle Meslin*[1]; Maylise Nastar[1]; Lisa Belkacémi[1]; Marie Loyer-Prost[1]; [1]Cea

Thermoelastic Martensitic Transformation in Mn-rich Mn-Cu-Al BCC Alloys: *Tatsuya Ito*[1]; Xiao Xu[1]; Toshihiro Omori[1]; Ryosuke Kainuma[1]; [1]Tohoku University

Kinetics of ' Evolution in a Model Ni-based Alloy: *Govindarajan Muralidharan*[1]; Shivakant Shukla[1]; Donovan Leonard[1]; Balasubramaniam Radhakrishnan[1]; Jonathan Poplawsky[1]; Matt Frith[2]; Jan Ilavsky[2]; [1]Oak Ridge National Laboratory; [2]Argonne National laboratory

Z-phase Formation in a 12% Cr Tempered Martensite Ferritic Steel during Long Term Creep: *Johan Westraadt*[1]; William Goosen[1]; Aleksander Kostka[2]; Hongcai Wang[2]; Gunther Eggeler[2]; [1]Nelson Mandela University; [2]Ruhr-Universität

Nucleation of Coupled Body-centered-cubic and Closed-packed Structures in Liquid Ni-Cr Alloys: *Deep Choudhuri*[1]; [1]New Mexico Institute of Mining and

Technology

Effect of Micro-segregation of Alloying Elements on the Precipitation Behaviour in Laser Surface Engineered Alloy 718: *Srinivas Aditya Mantri*[1]; SriSwaroop Dasari[1]; Abhishek Sharma[1]; Mangesh Pantawane[1]; Narendra Dahotre[1]; Rajarshi Banerjee[1]; Srikumar Banerjee[2]; [1]University of North Texas; [2]Homi Bhabha National Institute, Bhabha Atomic Research Centre

Investigating the Dynamic Precipitation of AZ91 Alloy during Friction Stir Processing (FSP): *Xiaolong Ma*[1]; Hrishikesh Das[1]; David Garcia[1]; Ethan Nickerson[1]; Timothy Roosendaal[1]; Mageshwari Komarasamy[1]; Glenn Grant[1]; [1]Pacific Northwest National Laboratory

Multiscale Model for Colony Breakdown Prediction in Two-phase Titanium Alloys: *Benjamin Begley*[1]; Victoria Miller[1]; [1]University of Florida

Deformation Enabled Precipitation in Magnesium Alloys during Hot Compression: *Suhas Eswarappa Prameela*[1]; Yannick Hollenweger[2]; Peng Yi[1]; Steven Lavenstein[1]; Roshan Plamthottam[1]; Alec Davis[3]; Joey Chen[1]; Joseph Robson[3]; Jaafar El-Awady[1]; Michael Falk[1]; Dennis Kochmann[2]; Timothy Weihs[1]; [1]Johns Hopkins University; [2]ETH Zurich; [3]The University of Manchester

High Speed Rotational Diamond Anvil Cell for in situ Analysis of Shear Deformation Induced Microstructural Evolution and Phase Transformation: A Multimodal Experimental and Computational study: *Arun Devaraj*[1]; Tingkun Liu[1]; Changyong Park[2]; Stanislav Sinogeikin[3]; Matthew Olszta[1]; Bharat Gwalani[1]; Lei Li[1]; Wenkai Fu[1]; Qin Pang[1]; Nanjung Chen[1]; Ayoub Soulami[1]; Yulan Li[1]; Shenyang Hu[1]; Peter Sushko[1]; Suveen Mathaudhu[1]; Cynthia Powell[1]; [1]Pacific Northwest National Laboratory; [2]Argonne National Laboratory; [3]DAC tools

Quantitative Assessment of Short-range Order in Fe-Al and Fe-Ga Alloy Single Crystals: *Rahulkumar Sunil Singh*[1]; Andrew Laroche[1]; Travis Willhard[1]; Sivaraman Guruswamy[1]; [1]University of Utah

---

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — On-Demand Poster Session

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Ramasis Goswami, Naval Research Laboratory; Saurabh Puri, Microstructure Engineering; Eric Payton, Air Force Research Laboratory; Bij-Na Kim, Carpenter Additive; Megumi Kawasaki, Oregon State University; Eric Lass, University of Tennessee-Knoxville

Monday AM | March 14, 2022
Physical Metallurgy | On-Demand Poster Hall

Microstructure Evolution of HK40 and HP40 Heat Resistant Steels after Isothermal Aging: *Victor Lopez-Hirata*[1]; Eduardo Perez-Badillo[1]; Maribel Saucedo-Muñoz[1]; Hector Dorantes-Rosales[1]; Carlos Ferreira-Palma[1]; Diego Rivas-Lopez[1]; [1]Instituto Politecnico Nacional-ESIQIE

Coupled Effects of Shear and Temperature on Intermixing in Cu-Ni Multilayers: *Qin Pang*[1]; Jenna Bilbrey[1]; Arun Devaraj[1]; Suveen Mathaudhu[2]; Peter Sushko[1]; [1]Pacific

Northwest National Laboratory; [2]Colorado School of Mines

Precipitation Process during Isothermal Aging of an Austenitic Stainless Fe-12Cr-10Mn-12Ni-5Mo-0.24N-0.03C Steel and Its Effect on the Mechanical Properties: Maribel Saucedo-Muñoz[1]; *Victor Lopez-Hirata*[1]; Erika Avila-Davila[1]; Felipe Hernandez-Santiago[1]; Jose Villegas-Cardenas[1]; [1]Instituto Politecnico Nacional-ESIQIE

Microstructure Rearrangements in Magnesium Alloys upon Thermo-mechanical Processing Studied by Advanced In-situ Synchrotron X-ray Diffraction: *Xiaojing Liu*[1]; Emil Zolotoyabko[2]; Klaus-Dieter Liss[1]; [1]Guangdong Technion – Israel Institute of Technology; [2]Technion – Israel Institute of Technology

Elastic Inhomogeneity Effects on Spinodal Decomposition in Ternary Alloys: *Jitin Nair*[1]; Abinandanan T A[1]; [1]Indian Institute of Science

Overview of the Non-isothermal Recrystallization in Cold-rolled Low-carbon Steels during Low-rate Annealing: *Ivon Alanis-Fuerte*[1]; Octavio Vázquez-Gómez[1]; Pedro Garnica-González[1]; Edgar López-Martínez[2]; Héctor Vergara-Hernández[1]; [1]Tecnológico Nacional de México / I.T. Morelia; [2]Universidad del Istmo

Morphological Evolution of Internally Twinned Martensite in Laser Additively Manufactured Ti6Al4V: *Mangesh Pantawane*[1]; Shashank Sharma[1]; Abhishek Sharma[1]; Sriswaroop Dasari[1]; Srikumar Banerjee[1]; Rajarshi Banerjee[1]; Narendra Dahotre[1]; [1]University of North Texas

The Effect of Irradiation Induced Defects on Martensitic Transformation in NiTi Shape Memory Alloys: *Taiwu Yu*[1]; Alejandro Hinojos[1]; Daniel Hong[1]; Peter Anderson[1]; Michael Mills[1]; Yunzhi Wang[1]; [1]Ohio State University

Phase Transformation upon Low Temperature Nitriding of Co-Cr Alloys: *Maryam Akhlaghi*[1]; Stefan Martin[2]; Johannes Dallmann[1]; Rainer Hock[1]; Carolin Körner[1]; Andreas Leineweber[2]; [1]Friedrich-Alexander University Erlangen-Nuremberg (FAU); [2]TU Bergakademie Freiberg

Advanced Characterization of High-temperature Oxygen-induced Phase Evolution in NbTiZr: *David Beaudry*[1]; Daniel Foley[1]; Elaf Anber[1]; Jean-Philippe Couzinié[2]; Loïc Perrière[2]; Keith Knipling[3]; Christopher Pasco[1]; Tyrel McQueen[1]; Michael Waters[4]; James Rondinelli[4]; Mitra Taheri[1]; [1]Johns Hopkins University; [2]University Paris-Est Créteil; [3]U.S. Naval Research Laboratory; [4]Northwestern University

Kinetic Monte Carlo Simulations of Solute Clustering in Multicomponent Al Alloys: *Zhucong Xi*[1]; Louis Hector[2]; Amit Misra[1]; Liang Qi[1]; [1]University of Michigan; [2]GM Global Technical Center

Coarsening Behavior of Hierarchical B2 Precipitates in a High Entropy Alloy: *Subhashish Meher*[1]; Thomas Lillo[1]; [1]Idaho National Laboratory

---

ADDITIVE TECHNOLOGIES

Powder Materials Processing and Fundamental Understanding — On-Demand Oral Presentations

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, Pacific Northwest National Laboratory

Monday AM | March 14, 2022
Additive Technologies | On-Demand Room

Invited
Microdroplet-based Manufacturing of Metal-organic Frameworks Powder Materials: Fundamentals and Applications: *Weining Wang*[1]; [1]Virginia Commonwealth University

Invited
Particle Packing in Powder Spreading for Selective Laser Melted Additive Manufacturing Using the Discrete Element Method: Priscilla Ng[1]; *Xuan Wang*[1]; Thomas Mackin[1]; [1]California Polytechnic State University San Luis Obispo

Rapid Solidification Behavior of Cast Ni-based Superalloy IN-100 by EBM Process: *Yusaku Hasebe*[1]; Takehito Hagisawa[1]; Satoru Ohsaki[1]; Kazuya Kubo[1]; Cheng Yang[1]; Kenta Aoyagi[1]; Kenta Yamanaka[1]; Akihiko Chiba[1]; [1]The Japan Steel Works Ltd

Investigating Particle Size-shape Effects on Flowability and Moisture Content of Metallic Powders after Environmental Exposure for Additive Manufacturing Applications: *Jack Grubbs*[1]; Brent Ditzler[1]; Aaron Birt[2]; Danielle Cote[1]; [1]Worcester Polytechnic Institute; [2]Solvus Global

Analysis of Additive Manufacturing Powders' Behaviors Using Discrete Element Method-based Simulation: *Safwat Shenouda*[1]; [1]Lawrence Livermore National Laboratory

---

MATERIALS PROCESSING

Powder Metallurgy of Light, Reactive and Other Non-ferrous Metals — On-Demand Oral Presentations

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

Program Organizers: Ma Qian, Royal Melbourne Institute of Technology; James Paramore, US Army Research Laboratory; David Yan, San Jose State University; Gang Chen, University of Science and Technology Beijing

Monday AM | March 14, 2022
Materials Processing | On-Demand Room

Invited
Cost Down and Plain Design of High-performance Titanium via Additive Manufacturing: *Gang Chen*[1]; Wangwang Ding[1]; Qiying Tao[1]; Mingli Qin[1]; Xuanhui Qu[1]; [1]University of Science and Technology Beijing

---

LIGHT METALS

Primary Aluminum Industry - Energy and Emission Reductions: An LMD Symposium in Honor of Halvor Kvande — On-Demand Oral Presentations

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

Program Organizer: Arne Ratvik, SINTEF

Monday AM | March 14, 2022
Light Metals | On-Demand Room

Halvor Kvande: An Academic Ambassador in Aluminum Between China and Norway: *Bingliang Gao*[1]; Zhaowen Wang[1]; Zhongning Shi[1]; Naixiang Feng[1]; [1]Northeastern University

Ready-to-Use Cathodes in High Amperage Technologies: Markus Pfeffer[1]; *Oscar Vera Garcia*[1]; Frank Hiltmann[1]; Seweryn Mielnik[1]; Peter Wang[1]; Louis Bugnion[2]; Laure von Kaenel[2]; Mao Jihong[3]; Ban Yungang[3]; [1]Tokai COBEX GmbH; [2]NOVALUM SA; [3]NEUI

MATERIALS PROCESSING

Rare Metal Extraction and Processing — On-Demand Oral Presentations

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

Program Organizers: Takanari Ouchi, University of Tokyo; Gisele Azimi, University of Toronto; Kerstin Forsberg, KTH Royal Institute of Technology; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Neale Neelameggham, IND LLC; Alafara Baba, University of Ilorin; Hong Peng, University of Queensland

Monday AM | March 14, 2022
Materials Processing | On-Demand Room

Keynote
Development of New Extractants for Platinum Group Metal Ions in Hydrochloric Acid Solutions: *Hirokazu Narita*[1]; [1]National Institute of Advanced Industrial Science & Technology

Keynote
Direct Synthesis of Intermetallic Compounds through Thermo-reduction and Electrochemical Deposition: Shuhan Wang[1]; Chao Du[2]; Xin Lu[1]; Osamu Takeda[1]; *Hongmin Zhu*[1]; [1]Tohoku University; [2]Anhui University of Science and Technology

Keynote
Research Progress in Biohydrometallurgy of Rare Metals and Heavy Nonferrous Metals with an Emphasis on China: *Jianzhi Sun*[1]; Bowei Chen[2]; He Shang[2]; Xiaolan Mo[2]; Jiankang Wen[2]; [1]GRINM Resources and Environment Tech. Co., Ltd.; [2]GRINM Resources and Environment Tech. Co., Ltd

Invited
Development of Molten Salt Electrolysis of MgO Using a Metal Cathode and Vacuum Distillation to Produce Ultra-high Purity Mg Metal: *Jungshin Kang*[1]; Tae-Hyuk Lee[1]; Hyeong-Jun Jeoung[1]; Dong-Hee Lee[1]; Young Min Kim[2]; Kyung-Woo Yi[3]; Toru H. Okabe[4]; Jin-Young Lee[1]; [1]Korea Institute of Geoscience and Mineral Resources; [2]Korea Institute of Materials Science; [3]Seoul National University; [4]The

University of Tokyo

Invited
A Highly Selective Metal–organic Complex Collector for Efficient Mineral Flotation: *Wei Sun*[1]; Zhao Wei[1]; Haisheng Han[1]; [1]Central South University

Method for Producing High Purity LiOH.H2O Using Ba(OH)2: *Hongting Liu*[1]; Gisele Azimi[1]; [1]University of Toronto

Bionanominig: A Revised Insight into Processing of South Africa's Complex Gold Ores: *Daniel Okanigbe*[1]; [1]Tshwane University of Technology

Extraction of Rare Earth Metals from Coal Ash Using Mild Lixiviants in a Single Step Process: *Riya Banerjee*[1]; Saswati Chakladar[1]; Sanchita Chakravarty[1]; [1]CSIR-National Metallurgical Laboratory

Rare Earth Elements Adsorption to Gypsum in Hydrometallurgical Processes: *Farzaneh Sadri*[1]; Ahmad Ghahreman[1]; [1]Queen's University

Electrochemical Reduction of Iron Oxides in Aqueous NaOH Electrolyte Including Iron Residue from Nickel and Zinc Electrowinning Processes: *Geir-Martin Haarberg*[1]; Bo Qin[1]; Babak Khalaghi[2]; [1]Norwegian University of Science & Technology; [2]SINTEF Norlab

Extraction Behaviors of Vanadium(V) with Unacidified- and Acidified-N1923 from a Real Leachate of Vanadium-titanomagnetite: Liu Lei[1]; *Liu Zhaobo*[2]; Pu Nianwen[1]; Fu Yunfeng[2]; Zhang Zhongyu[1]; Du Shangchao[2]; Du Guoshan[2]; Sun Ninglei[2]; Wang Dehua[2]; Li Xiaoyan[2]; [1]Sichuan Xingming Energy and Environmental Protection Technology Co., Ltd.; [2]China ENFI Engineering Corporation

Study on Pre–removal Antimony from Antimony–gold Concentrate Using Slurry Electrolysis: *Yonglu Zhang*[1]; Chengyan Wang[1]; Xiaowu Jie[2]; Wei Gao[2]; Shufeng Ruan[2]; [1]School of Metallurgical and Ecological Engineering, University of Science and Technology Beijing; [2]BGRIMM Technology Group

CO2 Optimized Recovery of Special Metals from Precipitation Residue by Selective Chlorination: *Stefan Steinlechner*[1]; Lukas Hoeber[1]; [1]Montanuniversitat Leoben

Novel Environmentally Friendly Leaching Process for Vanadium and Tungsten Recovery from Spent SCR Catalyst: Jong Hyuk Jeon[1]; *Ana Belen Cueva Sola*[2]; Rajesh Kumar Jyothi[1]; Jin-Young Lee[1]; [1]Korea Institute of Geoscience and Mineral Resources; [2]University of Science and Technology

Extraction for Neodymium from NdFeB Magnet Using Supercritical Carbon Dioxide and Organophosphorus Ligands: Nattanai Kunanusont[1]; *Jiakai Zhang*[2]; Yusuke Shimoyama[1]; Gisele Azimi[2]; [1]Tokyo Institute of Technology; [2]University of Toronto

Extraction of Cerium, Lanthanum, and Neodymium from Alluvial Gold Mining Waste from the Bagre-Nechí Mining District in Colombia: *Luver Echeverry*[1]; [1]Universidad de Nacional de Colombia

Development of Antagonistic Solvent Extraction Systems for Selective Separation of Copper, Cobalt and Nickel in Ammoniacal Solution: *Kurniawan Kurniawan*[1]; Jae-chun Lee[2]; Jonghyun Kim[1]; Ha Bich Trinh[3]; Sookyung Kim[2]; [1]Korea University of Science and Technology, Resources Recycling, KIGAM campus; [2]Korea Institute of Geoscience and Mineral Resources (KIGAM); [3]Kangwon National University

Fundamental Study of a Novel Electrolytic Process Using a Cu Cathode in MgF_2–LiF–KCl Molten Salt for Producing Mg Metal from MgO: *Hyeong-Jun Jeoung*[1]; Tae-Hyuk Lee[1]; Kyung-Woo Yi[2]; Jin-Young Lee[1]; Young Min Kim[3]; Toru H. Okabe[4];

Jungshin Kang[1]; [1]Korea Institute of Geoscience and Mineral Resources; [2]Seoul National University; [3]Korea Institute of Materials Science; [4]The University of Tokyo

ELECTRONIC MATERIALS

Recent Advances in Printed Electronics and Additive Manufacturing: 2D/3D Functional Materials, Fabrication Processes, and Emerging Applications — On-Demand Oral Presentations

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; Yong Lin Kong, University of Utah; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Changyong Cao, Michigan State University; David Estrada, Boise State University; Nuggehalli Ravindra, New Jersey Institute of Technology

Monday AM | March 14, 2022
Electronic Materials | On-Demand Room

Invited
Corona-enabled Electrostatic Printing (CEP) for Ultra-fast R2R Manufacturing of Binder-free Multifunctional E-skins: *Ying Zhong*[1]; Zijian Weng[1]; [1]University of South Florida

Invited
Effect of Dichloroethane on the Electronic Transport Behavior in Semiconducting MoS2 Temperature: *Ravindra Mehta*[1]; Kishan Jyanand[1]; Anupama Kaul[1]; [1]University of North Texas

Invited
Design of Materials for Advanced Energy Storage: *Cengiz Ozkan*[1]; [1]University of California

Invited
Additive Manufacturing of Smart Materials: *Zhangxian Deng*[1]; [1]Boise State University

Invited
Plenty of Room Under the Skin: A Wearable's Perspective: *Sheng Xu*[1]; [1]University of California San Diego

Multiprinter Additive Manufacturing of Flexible Thermoelectric Energy Harvesters Using Colloidal Nanoparticles: *Ariel Briggs*[1]; Tony Varghese[1]; Jacob Manzi[1]; Curtis Hill[2]; Harish Subbaraman[3]; David Estrada[4]; [1]Boise State University; [2]ESSCA/ Quantitech NASA MSFC; [3]Boise State University, Center for Advanced Energy Studies; [4]Boise State University, Center for Advanced Energy Studies, Idaho National Laboratory

ELECTRONIC MATERIALS

Recent Advances in Printed Electronics and Additive Manufacturing: 2D/3D Functional Materials, Fabrication Processes, and Emerging Applications — On-Demand Poster Session

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; Yong Lin Kong, University of Utah; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Changyong Cao, Michigan State University; David Estrada, Boise State University; Nuggehalli Ravindra, New Jersey Institute of Technology

Monday AM | March 14, 2022
Electronic Materials | On-Demand Poster Hall

Additive Manufacturing and Characterization of Surface Acoustic Wave Devices: *Nicholas McKibben*[1]; Blake Ryel[1]; Alex Draper[1]; David Estrada[1]; Zhangxian Deng[1]; [1]Boise State University

A Comparative Study on Supercapacitors Formed with Different Graphene Based Hybrid Nanostructured Materials: *Tasnim Mahjabin*[1]; Md. Abdullah Al Amin[1]; [1]Bangladesh University of Engineering and Technology

---

MATERIALS DESIGN

Recent Investigations and Developments of Titanium-containing High Entropy Alloys — On-Demand Oral Presentations

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

Program Organizers: Masahiko Ikeda, Kansai University; Masato Ueda, Kansai University; Carl Boehlert, Michigan State University; Peter Liaw, University of Tennessee

Monday AM | March 14, 2022
Materials Design | On-Demand Room

Keynote
Single-crystal Mechanical Properties of Equiatomic and Non-equiatomic High-entropy Alloys: *Haruyuki Inui*[1]; Kyosuke Kishida[1]; [1]Kyoto University

Invited
Design and Characterization of Novel Ti-Zr-Nb-Mn-Fe Medium and High Entropy Alloys for Biomedical Applications: Nour Eldabah[1]; *Mohamed Gepreel*[1]; [1]Egypt-Japan University of Science & Technology

Invited
Effect of Elemental Combination on Microstructure and Mechanical Properties of Refractory Medium Entropy Alloys: *Shuhei Yoshida*[1]; Qian He[1]; Hideyuki Yasuda[1]; Nobuhiro Tsuji[1]; [1]Kyoto University

Invited
Designing Porous Refractory High Entropy Alloy Using the Dealloying Method: *Hidemi Kato*[1]; Soo-Hyun Joo[2]; Ilya Okulov[3]; Takeshi Wada[1]; [1]Imr, Tohoku University; [2]Dankook University; [3]University of Bremen

Invited
A Data-driven Analysis for Selection of Ti-containing High Entropy Alloys and Future Directions: *Ramachandra Canumalla*[1]; Tanjore Jayaraman[2]; [1]Weldaloy

Specialty Forgings; [2]University of Michigan-Dearborn

Invited
Solidification Microstructure of High Entropy Alloys Composed with 3d Transition Metal and Silicon: *Toru Maruyama*[1]; Mei Fukuzawa[1]; [1]Kansai University

Predicting the Compositions of an Al-Co-Fe-Ni-Ti High-entropy System by the Calculation of Phase Diagrams Method Coupled with High-throughput Computations: *Sin-Yi Chen*[1]; Chu-Hsuan Wang[1]; Yee-Wen Yen[1]; Peter Liaw[2]; [1]NTUST; [2]University of Tennessee

Enhanced Mechanical Properties of Ti60(NbVCr)34Al6 Medium Entropy by Thermomechanical Treatment: *Po-Sung Chen*[1]; Yu-Chin Liao[1]; Sin-Mao Song[1]; Pei-Hua Tsai[1]; Jason S. C. Jang[1]; [1]National Central University

Phase Stability and the Role of Ti in W-Ta-Ti-Cr-V High-entropy Alloys from the First Principles Thermodynamic Study with Experimental Validation: *Damian Sobieraj*[1]; Jan Wrobel[1]; Tomasz Rygier[1]; Grzegorz Cieslak[1]; Magdalena Plocinska[1]; Krzysztof Kurzydlowski[1]; Duc Nguyen-Manh[2]; [1]Warsaw University of Technology; [2]United Kingdom Atomic Energy Authority

---

LIGHT METALS

Recycling and Sustainability in Cast Shop Technology: Joint Session with REWAS 2022 — On-Demand Oral Presentations

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

Program Organizers: Mertol Gökelma, Izmir Institute of Technology; Stephen Instone, Speira GmbH

Monday AM | March 14, 2022
Light Metals | On-Demand Room

Process-related Characterization of the Influence of the Die Design on the Microstructure and the Mechanical Properties of Profiles Made from Directly Recycled Hot Extruded EN AW-6060 Aluminum Chips: *Alexander Koch*[1]; Sarah Laskowski[1]; Frank Walther[1]; [1]TU Dortmund University, Chair of Materials Test Engineering (WPT)

Recycling Aluminum Casting Alloy Scrap Using Molten Salt Electrolysis: *Xin Lu*[1]; Kyosuke Watanabe[1]; Osamu Takeda[1]; Hongmin Zhu[1]; [1]Tohoku University

Towards Formulation of AlSi10Mg Alloy from Incinerator Bottom Ash: *Astrid Marthinsen*[1]; Joachim Graff[1]; Martin Syvertsen[1]; Kjerstin Ellingsen[1]; Mohammed M'hamdi[1]; [1]SINTEF

ADVANCED MATERIALS

Refractory Metals — On-Demand Oral Presentations

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

Program Organizers: Eric Taleff, University of Texas at Austin; Lauren Garrison, Oak Ridge National Laboratory; Alexander Knowles, University of Birmingham

Monday AM | March 14, 2022

Invited
Thermal Stability of Thin Rolled Potassium-doped Tungsten Sheets at Temperatures between 1100 °C and 1400 °C: Ditlev Tarras Madsen[1]; Umberto Ciucani[1]; Andreas Hoffmann[2]; *Wolfgang Pantleon*[1]; [1]Technical University of Denmark; [2]Plansee SE

Development of Novel Chromium-superalloys Strengthened by B2 Intermetallic Precipitates: *Kan Ma*[1]; Jóhan Magnussen[1]; Anke Ulrich[2]; Till König[2]; Mathias Galetz[2]; Alexander Knowles[1]; [1]University of Birmingham; [2]DECHEMA-Forschungsinstitut

Grain Boundary Segregation Engineering in Technically Pure Molybdenum Examined via Three-point Bending Tests: *Severin Jakob*[1]; Thomas Weissenboeck[1]; Anton Hohenwarter[1]; Alexander Lorich[2]; Wolfram Knabl[2]; Reinhard Pippan[3]; Helmut Clemens[1]; Verena Maier-Kiener[1]; [1]Montanuniversität Leoben; [2]Plansee SE; [3]Erich-Schmid-Institute of Materials Science, Austrian Academy of Sciences

Tungsten Grain Optimization and Composite Fabrication for Use in Fusion Reactors: *Lauren Garrison*[1]; John Echols[1]; Nathan Reid[1]; [1]Oak Ridge National Laboratory

Studies on the Phase Formation of Cobalt Contacted with Zinc Vapour: *Melanie Leitner*[1]; Eva Gerold[1]; Stefan Luidold[1]; Christoph Czettl[2]; Christian Storf[2]; [1]Montanuniversitaet Leoben; [2]CERATIZIT Austria GmbH

ENERGY & ENVIRONMENT

REWAS 2022: Coupling Metallurgy and Sustainability: An EPD Symposium in Honor of Diran Apelian — On-Demand Oral Presentations

Sponsored by: TMS: Recycling and Environmental Technologies Committee, TMS: Aluminum Committee

Program Organizers: Elsa Olivetti, Massachusetts Institute of Technology; Brajendra Mishra, Worcester Polytechnic Institute; Bart Blanpain, Ku Leuven; Adam Powell, Worcester Polytechnic Institute; Mertol Gökelma, Izmir Institute of Technology; Camille Fleuriault, Eramet Norway

Monday AM | March 14, 2022
Energy & Environment (including REWAS 2022 Symposia) | On-Demand Room

Invited
Recycled Cathode Materials Enabled Superior Performance for Lithium-ion Battery: *Yan Wang*[1]; [1]Worcester Polytechnic Institute

Invited
The Discharge Crucible Method: Update on Experimental Design, Measurements, and Orifice Wetting: *Hani Henein*[1]; [1]University of Alberta

Invited
Advances in Powder Metallurgy: *Danielle Cote*[1]; [1]Worcester Polytechnic Institute

Invited
Three Binders and Three Precast Elements from What Was Once Called "Residue": *Yiannis Pontikes*[1]; Glenn Beersaerts[1]; Roberto Eduardo Murillo Alarcón[1]; Jorn Van De Sande[1]; Tobias Hertel[1]; [1]KU Leuven

REWAS 2022: Energy Technologies and CO2 Management — On-Demand Oral Presentations

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

Program Organizers: Fiseha Tesfaye, Åbo Akademi University; Lei Zhang, University of Alaska Fairbanks; Donna Guillen, Idaho National Laboratory; Ziqi Sun, Queensland University of Technology; Alafara Baba, University of Ilorin; Neale Neelameggham, IND LLC; Mingming Zhang, Wood Mackenzie; Dirk Verhulst, Consultant, Extractive Metallurgy and Energy Efficiency; Shafiq Alam, University of Saskatchewan; Mertol Gökelma, Izmir Institute of Technology; Camille Fleuriault, Eramet Norway; Chukwunwike Iloeje, Argonne National Laboratory

Monday AM | March 14, 2022
Energy & Environment (including REWAS 2022 Symposia) | On-Demand Room

---

Invited
Thermoeconomics and Dyanamics of Orange Hydrogen Production, an Energy Matter: *Neale Neelameggham*[1]; Ganesan Subramanian[2]; Praveen Kalamegham[3]; [1]IND LLC; [2]Sai Systems LLC; [3]Workrise

Invited
Heat Island Mitigation Strategy for Urban Areas Using Phase Change Materials (PCM): *Ganesan Subramanian*[1]; Neale Neelameggham[1]; [1]Independent Consultant

Review on Hydrotalcite-derived Material from Waste Metal Dust, a Solid Adsorbent for CO2 Capture: Challenges and Opportunities in South African Coal Fired Thermal Plant: *Daniel Okanigbe*[1]; Olawale Popoola[1]; Abimbola Popoola[1]; [1]Tshwane University of Technology

Power to Hydrogen the Prospects of Green Hydrogen Production Potential in Africa: Nour Aboseada[1]; *Tarek Hatem*[1]; [1]The British University in Egypt

Synthesis Methods for Nanoparticle Morphology Control in Clean Energy Applications: Joy Morin[1]; Kiyo Fujimoto[1]; Arin Preston[1]; *Donna Guillen*[1]; [1]Idaho National Laboratory

Copper in Biomass Fuels and Its Effect on Combustion Processes: *Fiseha Tesfaye*[1]; Daniel Lindberg[2]; Mykola Moroz[3]; Leena Hupa[1]; Mikko Hupa[1]; [1]Abo Akademi University; [2]Aalto University; [3]National University of Water and Environmental Engineering

Development of a Thermodynamic Model for Chromates, Molybdates, Tungstates and Vanadates Involved in the Corrosion of Steels (Fe, Cr, Ni, Mo, W, V) at High Temperatures in Atmospheres Containing O-H-S-C-Cl and Alkaline Salts: *Sara Benalia*[1]; Christian Robelin[1]; Patrice Chartrand[1]; [1]École Polytechnique Montréal

Modes of Operation, Design, and Experiments in a Laboratory Solar Convective Furnace System: Vishwa Deepak Kumar[1]; Laltu Chandra[2]; Piyush Sharma[3]; *Rajiv Shekhar*[3]; [1]IIT Jodhpur; [2]IIT (BHU) Varanasi; [3]IIT (ISM) Dhanbad

---

ENERGY & ENVIRONMENT

REWAS 2022: Poster Session — On-Demand Poster Session

The Research Status and Progress on the Utilization of Coal Fly Ash: A Review: *Joseph Nyarko-Appiah*[1]; Wenzhou Yu[1]; Peng Wei[1]; Hao Chen[1]; [1]Chongqing University

Recovery of Rare Earth Elements from Nd-Fe-B Magnet through Selective Chlorination Using Zinc Chloride: Kyung-Hwan Lim[1]; Chan Uk Choi[1]; Gyeonghye Moon[2]; Tae-Hyuk Lee[1]; *Jungshin Kang*[1]; [1]Korea Institute of Geoscience and Mineral Resources; [2]HANNAE For T

KIGAM Technology for the Recovery of NdFeB Waste Magnet and Manufacturing Scraps: Kyeong Woo Chung[1]; Ho-sung Yoon[1]; Chul-joo Kim[1]; *Rina Kim*[1]; Byunchul Lim[2]; [1]Korea Institute of Geoscience and Mineral Resources; [2]SungLim Rare Earth Metal Co. Ltd.

Recovery of Lithium from Black Cathode Active Materials of Discarded Lithium-ion Batteries (LIBs): *Pankaj Choubey*[1]; Rukshana Parween[1]; Rekha Panda[1]; Om Shankar Dinkar[1]; Manis Kumar Jha[1]; [1]CSIR-National Metallurgical Lab

Selective Separation of Molybdenum from Leaching Solution of Spent Catalyst by Solvent Extraction with TBP: *Kunpeng Shi*[1]; Yanfang Huang[1]; Guihong Han[1]; Shengpeng Su[1]; [1]Zhengzhou University

Recycling of Automobile Discarded Ceramic Converters for Pt-group Metals' Recovery through Pressure CN-leaching: *Sadia Ilyas*[1]; Hyunjung Kim[1]; Rajiv Srivastava[2]; [1]Jeonbuk National University; [2]Dai Hoc Duy Tan

Fe-Si Alloy Preparation and Alumina Extraction from Red Mud and Silica Fume via Vacuum Carbothermal Reduction: *Peng Wei*[1]; Wenzhou Yu[1]; Hao Chen[1]; Joseph Emmanuel Nyarko-Appiah[1]; [1]Chongqing University

Geopolymers Made of Construction and Demolition Waste: Current Trends and Perspectives: *Angelica Cardoza Herrera*[1]; Henry Colorado[1]; [1]Universidad de Antioquia

Advanced Process of Waste Glass Bottle for the Production of Recycled Glass Aggregate and Cullet: *Hoon Lee*[1]; Hansol Lee[1]; Kwanho Kim[1]; [1]Korea Institute of Geoscience and Mineral Resources

ENERGY & ENVIRONMENT

REWAS 2022: Recovering the Unrecoverable — On-Demand Oral Presentations

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

Program Organizers: Mertol Gökelma, Izmir Institute of Technology; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Eramet Norway; John Howarter, Purdue University; Takanari Ouchi, University of Tokyo; Gisele Azimi, University of Toronto; Kerstin Forsberg, KTH Royal Institute of Technology; Hong Peng, University of Queensland

Monday AM | March 14, 2022
Energy & Environment (including REWAS 2022 Symposia) | On-Demand Room

Session Chair: To Be Announced

Invited
Recent Trend on the Studies of Recycling Technologies of Rare Earth Metals: *Osamu Takeda*[1]; Xin Lu[1]; Hongmin Zhu[1]; [1]Tohoku University

Invited
Recycling of Tungsten by Molten Salt Processes: *Tetsuo Oishi*[1]; [1]Aist

Invited
Recycling Technologies Developed at KIGAM: *Jin-Young Lee*[1]; Kyeong Woo Chung[1]; Hong-In Kim[1]; SooKyung Kim[1]; Shun Myung Shin[1]; Ho-Seok Jeon[1]; [1]Korea Institute of Geoscience and Mineral Resources

Invited
Setting New Standards for Circular Economy in the Cement Industry: *Michael Klitzsch*[1]; Martin Geith[1]; [1]RHI Magnesita

Invited
Recycling of Electronic Wastes, Waste Batteries and Rare Metal Wastes in China: *Li Qinxiang*[1]; [1]Jingmeng GEM Co., Ltd.

Yellow Phosphorus Production from Phosphoric Acid by Carbothermic Reduction: *Huafang Yu*[1]; Ryoko Yoshida[2]; Yasushi Sasaki[1]; Tetsuya Nagasaka[1]; [1]Tohoku University; [2]DOWA

Leaching of Rare Earth Elements from Phosphogypsum Using Mineral Acids: *Sicheng Li*[1]; Monu Malik[1]; Gisele Azimi[1]; [1]University of Toronto

Recovery of Terbium, Europium, and Yttrium from Waste Fluorescent Lamp Using Supercritical Fluid Extraction: Jiakai Zhang[1]; John Anawati[1]; *Gisele Azimi*[1]; [1]University of Toronto

Characterization and Thermal Treatment of Eggshell and Olive Stones for Heavy Metals Removal in Mining Environmental Liabilities Sites: *Mery Gomez-Marroquin*[1]; Henry Colorado[2]; Dalia Carbonel-Ramos[3]; Jhony Huarcaya-Nina[3]; Stephany Esquivel-Lorenzo[3]; Alfredo Ceroni-Galloso[3]; Hugo Chirinos-Collantes[3]; [1]FIGMM UNI; [2]University of Antioquia - UDEA; [3]FIA UNI

Characterization and Thermal Treatment of Electric Arc Furnace Dusts Generated during Steel Production in Peruvian Industries: *Mery Gomez-Marroquin*[1]; Jose Carlos D´Abreu[2]; Roberto de Avillez[2]; Sonia Letichevsky[2]; Kim Phatti - Satto[1]; Abraham Terrones - Ramirez[1]; [1]FIGMM UNI; [2]PUC-Rio

Utilization of Copper Nickel Sulfide Mine Tailings for CO2 Sequestration and Enhanced Nickel Sulfidization: *Fei Wang*[1]; David Dreisinger[1]; Glenn Barr[2]; [1]The University of British Columbia; [2]Twin Metals Minnesota LLC

Extraction of Nickel from Recycled Lithium-ion Batteries: *Meng Shi*[1]; Sabrina Reich[2]; Ankit Verma[3]; John Klaehn[1]; Luis Diaz[1]; Tedd Lister[1]; [1]Idaho National Laboratory; [2]Michigan State University; [3]University of Kansas

Recovery of Precious Metal Silver from Scrap Computer Keyboards: *Rekha Panda*[1]; Om Shankar Dinkar[1]; Pankaj Kumar Choubey[1]; Rukshana Parween[1]; Manis Kumar Jha[1]; Devendra Deo Pathak[2]; [1]CSIR-National Metallurgical Laboratory, INDIA; [2]Indian Institute of Technology (ISM) Dhanbad, INDIA

Efficient Steel Mill Dust Recycling – Aiming For Zero Waste: *Juergen Antrekowitsch*[1]; [1]University of Leoben

Deoxidation of Titanium Using Cerium Metal and Its Oxyhalide Formation: *Gen*

Kamimura[1]; Takanari Ouchi[1]; Toru Okabe[1]; [1]The University of Tokyo

Adaptability of the ISASMELT™ Technology for the Sustainable Treatment of Wastes: *Benjamin Hogg*[1]; Damian Corrie[1]; Brad Barter[1]; Stanko Nikolic[1]; Stuart Nicol[1]; [1]Glencore Technology

Estimation of the Generation and Value Recovery from E-waste Printed Circuit Boards: Bangladesh Case Study: *Md Khairul Islam*[1]; Nawshad Haque[2]; Michael Somerville[2]; Mark Pownceby[2]; Suresh Bhargava[1]; James Tardio[1]; [1]Royal Melbourne Institute of Technology; [2]CSIRO

A Green Process to Acquire a High Purity Rare Earth Elements Leach Liquor from Nd-Fe-B Magnets by Caustic Digestion and Roasting Processes: Rina Kim[1]; *Kyeong Woo Chung*[1]; Ho-Sung Yoon[1]; Chul-Joo Kim[1]; Yujin Park[1]; [1]Korea Institute of Geoscience and Mineral Resources (KIGAM)

An Innovative Separation Process for Spent Lithium-ion Battery Using Three-stage Electrodialysis: *Ka Ho Chan*[1]; Monu Malik[1]; Gisele Azimi[1]; [1]University of Toronto

Development of Technology for Recycling Large-capacity Lithium-ion Batteries for EV,ESS: *Hongin Kim*[1]; Jeong-Soo Sohn[2]; Soo-Kyung Kim[2]; Dong-hyo Yang[2]; Suk-hyun Byun[3]; [1]KIGAM/Convergence Research Center for DMR; [2]KIGAM/Mineral Resource Division; [3]SungEel HiTech.

Recovery of Molybdenum from Metallurgical Wastewater by Fe(III) Coagulation and Precipitation Flotation Process: *Bei Zhang*[1]; Bingbing Liu[1]; Yanfang Huang[1]; Guihong Han[1]; Yifan Du[1]; Shengpeng Su[1]; [1]Zhengzhou University

Treatment of Benzohydroxamic Acid Wastewater by Fe(III) as Chelator Precipitation Flotation Process: *Yifan Du*[1]; Guihong Han[1]; Yanfang Huang[1]; Bingbing Liu[1]; Wenjuan Wang[1]; Bei Zhang[1]; [1]Zhengzhou University

Maximizing the Efficiency of By-product Treatment by Multi Metal Recovery and Slag Valorization: *Gustav Hanke*[1]; Jürgen Antrekowitsch[1]; Fernando Castro[2]; Helmut Krug[3]; [1]Montanuniversität Leoben; [2]University of Minho; [3]R+M Ressourcen + Management GmbH

ENERGY & ENVIRONMENT

REWAS 2022: Sustainable Production and Development Perspectives — On-Demand Oral Presentations

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

Program Organizers: Mertol Gökelma, Izmir Institute of Technology; Mingming Zhang, Wood Mackenzie; Elsa Olivetti, Massachusetts Institute of Technology; Gerardo Alvear, Glencore Technology; Camille Fleuriault, Eramet Norway

Monday AM | March 14, 2022
Energy & Environment (including REWAS 2022 Symposia) | On-Demand Room

A Review of Comprehensive Utilization of Copper Slag of China: *Jun Hao*[1]; Zhihe Dou[1]; Tingan Zhang[1]; Kun Wang[1]; [1]Northeastern University

From Aluminium Industry Waste to Soil Amendment for Cash Crops and Fertiliser for Lowbush Blueberry: *Julie Élize Guérin*[1]; Lotfi Khiari[2]; Abdelkarim Lajili[2]; Claude Villeneuve[3]; Patrick Faubert[3]; Marie-Christine Simard[1]; Marc-André Seguin[1]; Jean Lavoie[1]; Stéphane Poirier[1]; [1]Rio Tinto; [2]Laval University; [3]Université du Québec à

Chicoutimi

Validation of an Innovative On-line Legionella Detection Technology in Water-cooling Systems: *Marie-Christine Simard*[1]; Geneviève Doyer[1]; [1]Rio Tinto

---

ENERGY & ENVIRONMENT

REWAS 2022: Automation and Digitalization for Advanced Manufacturing — On-Demand Oral Presentations

Sponsored by: TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee, TMS: Process Technology and Modeling Committee

Program Organizers: Elsa Olivetti, Massachusetts Institute of Technology; Alexandra Anderson, Gopher Resource; Mertol Gökelma, Izmir Institute of Technology; Camille Fleuriault, Eramet Norway

Monday AM | March 14, 2022
Energy & Environment (including REWAS 2022 Symposia) | On-Demand Room

---

Refractory Lifetime Prediction in Industrial Processes with Artificial Intelligence: *Nikolaus Voller*[1]; Christoph Pichler[1]; Christine Wenzl[1]; Gregor Lammer[1]; [1]RHI Magnesita

Audio Signal Processing for Quantitative Moulding Material Regeneration: *Philine Kerst*[1]; Sebastian Tewes[1]; [1]University of Duisburg-Essen

Evolution of Process Models to Digital Twins: *Alex Holtzapple*[1]; [1]Metsim International, LLC, USA

ENERGY & ENVIRONMENT

REWAS 2022: Decarbonizing the Materials Industry — On-Demand Oral Presentations

Sponsored by: TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee, TMS: Energy Committee, TMS: Process Technology and Modeling Committee, TMS: Aluminum Committee

Program Organizers: Camille Fleuriault, Eramet Norway; Christina Meskers, Norwegian University of Science and Technology (NTNU); Mertol Gökelma, Izmir Institute of Technology; Elsa Olivetti, Massachusetts Institute of Technology; Jesse White, Elkem Carbon Solutions; Chukwunwike Iloeje, Argonne National Laboratory; Neale Neelameggham, IND LLC

Monday AM | March 14, 2022
Energy & Environment (including REWAS 2022 Symposia) | On-Demand Room

---

Iron-ore Reduction Using Green Hydrogen: A Study for Recycling Wastes in Egyptian Steel Industry: Abdelrahman Aboseada[1]; *Tarek Hatem*[1]; [1]The British University in Egypt

Supercritical Carbonation of Steelmaking Slag for the CO_2 Sequestration: *Jihye Kim*[1]; Gisele Azimi[1]; [1]University of Toronto

Biomass as a CO2-neutral Carbon Substitute for Reduction Processes in

Metallurgy: *Christian Dornig*[1]; Jürgen Antrekowitsch[1]; [1]Montanuniversität Leoben

CHARACTERIZATION

Seeing is Believing -- Understanding Environmental Degradation and Mechanical Response Using Advanced Characterization Techniques: An SMD Symposium in Honor of Ian M. Robertson — On-Demand Oral Presentations

Sponsored by: TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Nuclear Materials Committee

Program Organizers: Kaila Bertsch, Lawrence Livermore National Laboratory; Khalid Hattar, Sandia National Laboratories; Josh Kacher, Georgia Institute of Technology; Bai Cui, University of Nebraska-Lincoln; Benjamin Eftink, Los Alamos National Laboratory; Stephen House, University of Pittsburgh; May Martin, National Institute of Standards and Technology; Kelly Nygren, Cornell High Energy Synchrotron Source; Blythe Clark, Sandia National Laboratories; Shuai Wang, Southern University of Science and Technology

Monday AM | March 14, 2022
Characterization | On-Demand Room

Invited
Crack-tip Shielding by Dislocations Analyzed by HVEM and Its Effect on Fracture Toughness and Hydrogen Embrittlement: *Kenji Higashida*[1]; Masaki Tanaka[1]; [1]Kyushu University

Invited
In Situ TEM with Ion Irradiation at the IVEM-Tandem: Past, Present and Future: *Meimei Li*[1]; Mark Kirk[1]; Wei-Ying Chen[1]; Pete Baldo[1]; Richard Sisson[1]; [1]Argonne National Laboratory

Invited
Quantitative 3-D Imaging of Damage Evolution in High-temperature Composite Materials, at Temperature under Load, Using In Situ X-ray Computed Micro-tomography with Digital Volume Correlation: *Dong Liu*[1]; Paul Forna Kreutzer[1]; Jon Ell[2]; Robert Ritchie[2]; [1]University of Bristol; [2]University of California, Berkeley

Invited
Some Challenges in Length and Time Scaling for Modeling Dislocations and Interface Reactions: *David McDowell*[1]; [1]Georgia Institute of Technology

Invited
Ian Robertson's Impact on Materials Science: *John Vetrano*[1]; [1]US Department of Energy

Invited
Sluggish Diffusion in Concentrated Solid-solution Alloys: Seeing is Believing: *Yanwen Zhang*[1]; [1]Oak Ridge National Laboratory

Invited
Creep and Fracture Characterization in the TEM Using Full-field Measurement Methods and Finite Element Analyses: Yiguang Zhang[1]; Shen Dillon[2]; *John*

Lambros[1]; [1]University of Illinois Urbana Champaign; [2]University of California, Irvine

Invited
Using Environmental Transmission Electron Microscopy to Understand the Fundamentals of Metal Oxidation: *Eric Stach*[1]; [1]University of Pennsylvania

Invited
Seeing in 3D and 4D - Advancing the Understanding of Recrystallization: *Dorte Juul Jensen*[1]; [1]Technical University of Denmark

Zinc-Aluminum-Magnesium Coatings for Automotive Industry: Corrosion Analysis on Cross-sections via a New Scanning Electrochemical Microscopy Technique: *Marilia Bolsanello*[1]; Javier Izquierdo[2]; Rejane Maria da Silva[1]; Ricardo M. Souto[2]; Jesualdo Luiz Rossi[1]; Andrea Abreu[2]; [1]IPEN/CNEN-SP; [2]Universidad de La Laguna

Various Hydrogen/Deuterium Charging Methods for Site Specific APT Specimens: *Heena Khanchandani*[1]; Leigh Stephenson[1]; Dierk Raabe[1]; Stefan Zaefferer[1]; Baptiste Gault[1]; [1]Max Planck Institute for Iron Research

---

NANOSTRUCTURED MATERIALS

Self-organizing Nano-architectured Materials — On-Demand Oral Presentations

Program Organizers: Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Ian McCue, Northwestern University; Erica Lilleodden, Helmholtz-Zentrum hereon; Pierre-Antoine Geslin, CNRS / INSA-Lyon; Qing Chen, Hong Kong University of Science & Technology

Monday AM | March 14, 2022
Nanostructured Materials | On-Demand Room

Invited
Synthesis and Catalytical Properties of Nanoporous Copper Silver Films via Magnetron Co-sputtering: *I-Chung Cheng*[1]; Yu-Shuo Lee[1]; Jia-Hao Lai[1]; [1]National Taiwan University

Invited
Biomineralized Nanocomposites: Hierarchical Structural Designs, Mechanical Properties, and Multifunctionality: *Ling Li*[1]; [1]Virginia Polytechnic Institute

Invited
Anomalously Low Modulus of the Interpenetrating-phase Composites Synthesized by Liquid Metal Dealloying: *Ilya Okulov*[1]; Jana Wilmers[2]; Pierre-Antoine Geslin[3]; Henry Ovri[4]; Soo-Hyun Joo[5]; Hidemi Kato[6]; [1]Leibniz Institute for Materials Engineering - IWT; [2]University of Wuppertal; [3]CNRS–Université de Lyon–Tohoku University; [4]Helmholtz-Zentrum Hereon; [5]Dankook University; [6]Institute for Materials Research, Tohoku University

Invited
Fabrication, Integration, and Performance of Nanoporous Metals In Electrochemical Energy Devices: *Joshua Snyder*[1]; [1]Drexel University

Invited
Nanoporous Materials for Energy and Environmental Applications: *Mingwei Chen*[1]; [1]Johns Hopkins University

Liquid Metal Dealloying: Formation and Coarsening: *Pierre-Antoine Geslin*[1]; Takeshi

Wada[2]; Hidemi Kato[2]; [1]CNRS / INSA-Lyon; [2]Tohoku University

Processing of Nanoporous FeCr by Liquid Metal Dealloying Technique Observed by *In Situ* Xray Tomography and Xray Diffraction: *Morgane Mokhtari*[1]; Christophe Le Bourlot[2]; Jérome Adrien[2]; Anne Bonnin[3]; Wolfgang Ludwig[4]; Pierre-Antoine Geslin[2]; Takeshi Wada[5]; Jannick Duchet-Rumeau[6]; Hidemi Kato[5]; Eric Maire[2]; [1]LGP, ENIT/INPT, Université de Toulouse; [2]MATEIS Laboratory, INSA-Lyon; [3]Swiss Light Source, Paul Scherrer Institute; [4]European Synchrotron Radiation Facility; [5]Institute for Materials Research, Tohoku University; [6]IMP Laboratory, INSA-Lyon

Magnetic Nanopillars by Self-assembled Block Copolymer Templating: *Alecsander Mshar*[1]; Daniel Arnold[2]; Oreoluwa Agede[1]; Allen Owen[1]; Subhadra Gupta[1]; [1]University of Alabama; [2]University of Alabama at Huntsville

A General Elastic Model for Self-Assembled Metal-oxide Vertical Aligned Nanocomposite (VAN) Thin Films: Kyle Starkey[1]; *Ahmad Ahmad*[1]; Juanjuan Lu[1]; Robynne-Lynn Paldi[1]; Haiyan Wang[1]; Anter El-Azab[1]; [1]Purdue University West Lafayatte

Superinsulation Nanoporous Material, Silica and Biosourced Aerogels Observed in 3D Down to the Nanoscale with Electron Tomography: *Genevieve Foray*[1]; Louis-marie Lebas[1]; Lucian Roiban[1]; [1]MATEIS, INSA Lyon

Hierarchical Grain Structure in Low Stacking-fault Energy Metals for Highly Tough Nanoporous Metal: *Eunji Song*[1]; Hansol Jeon[1]; Ju-Young Kim[1]; [1]Department of Materials Science and Engineering, UNIST

NANOSTRUCTURED MATERIALS

Self-organizing Nano-architectured Materials — On-Demand Poster Session

Program Organizers: Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Ian McCue, Northwestern University; Erica Lilleodden, Helmholtz-Zentrum hereon; Pierre-Antoine Geslin, CNRS / INSA-Lyon; Qing Chen, Hong Kong University of Science & Technology

Monday AM | March 14, 2022
Nanostructured Materials | On-Demand Poster Hall

Mechanical Behavior of Nanoporous Gold with Ligament-size Effect under Tension and Compression: *Hansol Jeon*[1]; Eunji Song[1]; Ju-Young Kim[1]; [1]UNIST

MECHANICS & STRUCTURAL RELIABILITY

Structural Metamaterials — On-Demand Oral Presentations

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

Program Organizers: Amy Wat, Lawrence Livermore National Laboratory; Brad Boyce, Sandia National Laboratories; Xiaoyu Zheng, University of California, Los Angeles; Fabrizio Scarpa, University of Bristol; Robert Ritchie, University of California, Berkeley

Monday AM | March 14, 2022
Mechanics & Structural Reliability | On-Demand Room

High-stiffness Metamaterial Composite Structure with Plate Reinforced Strut-microlattice: *Manash Baishya*[1]; Bikram Sahariah[1]; Nelson Muthu[1]; Prasenjit Khanikar[1]; [1]Indian Institute of Technology Guwahati

Design of 2D-Mechanical Metamaterials with Spinodal Topologies: *Kiara McMillan*[1]; Dogacan Öztürk[2]; Pinar Acar[1]; [1]Virginia Tech; [2]University of Alaska Fairbanks

Engineering Splat Based Features for Improved Damage Tolerance in Brittle Metamaterials: *Deepesh Yadav*[1]; Tanmayee More[1]; B N Jaya[1]; [1]IIT Bombay, Powai

Structural Locking in Multimodal Origami Metamaterials: *Damiano Pasini*[1]; [1]McGill University

Viscoelastic Dynamics of Polymeric Phononic Materials: *Anastasiia Krushynska*[1]; [1]University of Groningen

Sensitivity and Uncertainty Quantification Analysis in Phononic Metamaterials through Complex-Variable Finite Element Method: *David Restrepo*[1]; Juan Navarro[1]; Juan Velasquez[1]; Harry Millwater[1]; Matthew Balcer[1]; [1]University of Texas at San Antonio

Investigation on Mechanical Properties of Honeycomb-based Cellular Solids and Cylindrical Shells with Structural Hierarchy: *Ching-Han Hsu*[1]; Cheng-Che Tung[1]; Po-Yu Chen[1]; [1]National Tsing Hua University

Controlling Failure with Fractal Chiral Metamaterials: *Fabrizio Scarpa*[1]; Wenjiao Zhang[2]; Robin Neville[1]; Dayi Zhang[3]; [1]University of Bristol; [2]Northeast Agricultural University; [3]Beihang University

---

NUCLEAR MATERIALS

Synergistic Irradiation, Corrosion, and Microstructural Evolution in Nuclear Materials — On-Demand Oral Presentations

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

Program Organizers: Djamel Kaoumi, North Carolina State University; Michael Short, Massachusetts Institute of Technology; Peter Hosemann, University of California, Berkeley; Stephen Raiman, Texas A&M University; Raluca Scarlat, University of California, Berkeley; Aaron Kohnert, Los Alamos National Laboratory; Ryan Schoell, North Carolina State University; Philip Edmondson, Oak Ridge National Laboratory; Celine Cabet, Commissariat a l'Energie Atomique

Monday AM | March 14, 2022
Nuclear Materials | On-Demand Room

Radiation Stability of Nanostructured Ytrium Stabilized Zirconia: *Santanu Ghosh*[1]; [1]IIT Delhi

Ni Oxidation by CO2 and Its Impact on D2 Ingress: A Nanoscale Study by In-Situ Atom Probe Tomography: *Sten Lambeets*[1]; Elizabeth Kautz[1]; Karen Kruska[1]; David Senor[1]; Daniel Perea[1]; Arun Devaraj[1]; [1]Pacific Northwest National Laboratory

Quantifying Radiation Enhanced Diffusion in Model Oxides with Isotopic Tracers and Atom Probe Tomography: *Kayla Yano*[1]; Aaron Kohnert[2]; Tiffany Kaspar[1]; Sandra Taylor[1]; Steven Spurgeon[1]; Hyosim Kim[2]; Yongqiang Wang[2]; Blas Uberuaga[2]; Daniel Schreiber[1]; [1]Pacific Northwest National Laboratory; [2]Los Alamos National

Laboratory

Defects and Disorder in Swift Heavy Ion-irradiated, Fluorite-derived Complex Oxides: *Devon Drey*[1]; Eric O'Quinn[1]; Will Cureton[1]; Igor Gussev[1]; Maik Lang[1]; [1]University of Tennessee at Knoxville

Effect of Phosphorus (P) on Precipitation and Segregation Behavior in Neutron Irradiated Reactor Pressure Vessel Steels: *Mukesh Bachhav*[1]; Emmanuelle Marquis[2]; Anshul Kamboj[2]; Megha Dubey[3]; G. Robert Odette[4]; [1]Idaho National Laboratory; [2]University of Michigan; [3]Boise State University; [4]University of California

NANOSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XII) — On-Demand Oral Presentations

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Penghui Cao, University of California, Irvine; Xiaoxu Huang, Chongqing University; Enrique Lavernia, University of California, Irvine; Xiaozhou Liao, University of Sydney; Lee Semiatin, Material Resources LLC; Nobuhiro Tsuji, Kyoto University; Caizhi Zhou, University of South Carolina; Yuntian Zhu, City University of Hong Kong

Monday AM | March 14, 2022
Nanostructured Materials | On-Demand Room

Keynote
2022 Institute of Metals Lecture/Robert Franklin Mehl Award: Schwarz Crystal Structures in Extremely Fine-grained Metals: *Ke Lu*[1]; [1]Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences

Invited
Micro-macro Synergy Effects in Harmonic Structure Steels Design: *Kei Ameyama*[1]; [1]Ritsumeikan University

Invited
Unravelling the Strengthening Effects of Microstructural Heterogeneities: *Ting Zhu*[1]; Yin Zhang[1]; [1]Georgia Institute of Technology

Invited
Ultra-strong Low Carbon Nano-steel Produced by Heterostructure and Interstitial Mediated Warm Rolling: *Hao Zhou*[1]; [1]Nanjing University of Science and Technology

Invited
Copper and Brass Laminate and Lamella Materials: Probing the Fundamental Deformation Mechanisms of Heterostructured Materials: *Xiaolong Ma*[1]; Xiaotian Fang[2]; Chongxiang Huang[3]; Yuntian Zhu[4]; [1]Pacific Northwest National Laboratory; [2]Ames Laboratory; [3]Sichuan University; [4]City University of Hong kong

The Impact of Hydrogen on the Deformation Behavior of Nanostructured Iron and Nickel: *Marlene Kapp*[1]; Jürgen Eckert[1]; Reinhard Pippan[1]; Oliver Renk[1]; [1]Erich-Schmid-Institute of Materials Science

Defect and Substructure Evolution in Nanocrystalline Cu/Ni Composites under Continuous Shear Deformation and Thermal Annealing: *Nanjun Chen*[1]; Shenyang Hu[1]; Arun Devaraj[1]; Wahyu Setyawan[1]; Peter Sushko[1]; Suveen Mathaudhu[2]; [1]Pacific

Northwest National Laboratory; [2]University of California, Riverside

Structural Characterization and Thermal Evolution of Severe Plastic Deformation Processed Materials, by Advanced Synchrotron and Neutron Methods: *Klaus-Dieter Liss*[1]; Xiaojing Liu[1]; Jae-Kyung Han[2]; Yusuke Onuki[3]; Malte Blankenburg[4]; Megumi Kawasaki[2]; [1]Guangdong Technion - Israel Institute of Technology (GTIIT); [2]Oregon State University; [3]Ibaraki University; [4]Deutsches Elektronen Synchrotron (DESY)

Ultrahigh-strength and Ductile High-entropy Alloys with Coherent Nano-lamellar Architectures: *Zengbao Jiao*[1]; [1]The Hong Kong Polytechnic University

Achieving Large Super-elasticity through Changing Relative Easiness of Deformation Modes in Ti-Nb-Mo Alloy by Ultra-grain Refinement: Bingjie Zhang[1]; Mingda Huang[1]; Chong Yan[2]; Wenqi Mao[3]; Wu Gong[3]; Ruixiao Zheng[4]; Yu Bai[5]; Dong Wang[1]; Qiaoyan Sun[1]; Yunzhi Wang[6]; *Nobuhiro Tsuji*[2]; [1]Xi'an Jiaotong University; [2]Kyoto University; [3]JAEA J-PARC Center; [4]Beihang University; [5]Dalian University of Technology; [6]Ohio State University

Microstructure, Texture and Mechanical Properties of cp-Ti Processed by Rotational Constrained Bending: *Milos Janecek*[1]; Tomáš Krajnák[1]; Peter Minárik[1]; Jozef Veselý[1]; Petr Cejpek[1]; Jeno Gubicza[2]; Dalibor Preisler[1]; Georgy Raab[3]; Arseniy Raab[3]; [1]Charles University; [2]Eötvös Loránd University; [3]Ufa State Aviation Technical University

Origin of Extra Strengthening in Gradient Nanotwinned Metals: *Yin Zhang*[1]; Zhao Cheng[2]; Linfeng Bu[3]; Hengan Wu[3]; Lei Lu[2]; Ting Zhu[1]; [1]Georgia Institute of Technology; [2]Institute of Metal Research, Chinese Academy of Sciences; [3]University of Science and Technology of China

Strengthening and Improving Fracture Toughness of Tungsten-copper Nanocomposites: *Klemens Schmuck*[1]; Markus Alfreider[1]; Daniel Kiener[1]; [1]Montanuniversität Leoben

Hetero-deformation Induced (HDI) Stress in Heterostructured Materials: What We Know and Need to Know: *Yuntian Zhu*[1]; [1]City University of Hong Kong

High-strength Gradient-microstructure Steels by Additive Manufacturing: *Wenqi Liu*[1]; Zaiqing Que[2]; Roy Björkstrand[1]; Mika Salmi[1]; Jouni Partanen[1]; Junhe Lian[1]; [1]Aalto University; [2]VTT Technical Research Centre of Finland Ltd

High Load Sliding, Deformation Microstructures, Strength, and Hardening for Gradient Bulk Nanostructures: *Darcy Hughes*[1]; [1]Sandia National Laboratories (ret.)

Severely Deformed Stainless Steel Reveals an Anomaly in Thermal Expansion Behavior: *Oliver Renk*[1]; Robert Enzinger[2]; Christoph Gammer[1]; Daniel Scheiber[3]; Wolfgang Sprengel[2]; Reinhard Pippan[1]; Jürgen Eckert[1]; Lorenz Romaner[4]; Andrei Ruban[5]; [1]Erich Schmid Institute; [2]Graz University of Technology; [3]Materials Center Leoben; [4]Montanuniversität Leoben; [5]KTH Royal Institute of Technology

NANOSTRUCTURED MATERIALS

Ultrafine-grained and Heterostructured Materials (UFGH XII) — On-Demand Poster Session

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Penghui Cao, University of California, Irvine; Xiaoxu Huang, Chongqing University; Enrique Lavernia, University of California, Irvine; Xiaozhou Liao, University of Sydney; Lee Semiatin, Material Resources LLC; Nobuhiro Tsuji, Kyoto University; Caizhi Zhou, University of South Carolina; Yuntian Zhu, City University of Hong Kong

Monday AM | March 14, 2022
Nanostructured Materials | On-Demand Poster Hall

On the Underlying Mechanisms in Binary Ni-based Nanocrystalline Alloys: *Keerti Pandey*[1]; Atul Chokshi[1]; [1]Indian Institute of Science

Investigation of Microstructural Inhomogeneity and Mechanical Characteristics of Severely Deformed Copper Sheet: *Nikhil Tripathi*[1]; Swapnil Sawalkar[1]; Kallol Mondal[1]; Shashank Shekhar[1]; [1]IIT Kanpur

Microstructure Evolution in Additively Manufactured and High-pressure Torsion Processed High-entropy Alloys during Heating as Characterized by Neutron Diffraction: *Xiaojing Liu*[1]; Jae-Kyung Han[2]; Yusuke Onuki[3]; Yulia O Kuzminova[4]; Stanislav A Evlashin[4]; Megumi Kawasaki[2]; Klaus-Dieter Liss[1]; [1]Guangdong Technion – Israel Institute of Technology; [2]Oregon State University; [3]Ibaraki University; [4]Skolkovo Institute of Science and Technology

Ultrafine d-ferrite and Transformation-induced Plasticity in Laser Melting Deposition Processed 304L Austenitic Stainless Steel: *Jung Gi Kim*[1]; Jonghyun Jeong[1]; Yukyeong Lee[1]; Jeong Min Park[2]; Dong Jun Lee[3]; Hyoung Seop Kim[2]; Taehyun Nam[1]; Hyokyung Sung[1]; Jae Bok Seol[1]; [1]Gyeongsang National University; [2]Pohang Univerisity of Science and Technology; [3]Korea Institute of Materials Science

Effect of Processing Temperature on the Microstructure and Mechanical Properties Changes of High-pressure Torsion Processed Al7075 Alloy: *Juhee Oh*[1]; Sangeun Park[1]; Hyo Ju Bae[1]; Sujung Son[2]; Hyoung Seop Kim[2]; Jae Bok Seol[1]; Hyokyung Sung[1]; Jung Gi Kim[1]; [1]Gyeongsang National University; [2]Pohang University of Science and Technology

Deformation Mechanism of Magnesium Alloy with Heterogeneous Ultrafine Structures Composed of Soft and Hard Domains: *Jongbin Go*[1]; Myeong-Heom Park[1]; Si Gao[1]; Nobuhiro Tsuji[1]; [1]Kyoto University

In-situ X-ray Diffraction Study on Tensile Deformation of TRIP-assisted Metastable Austenitic Fe-Ni-C Steel: *Sungsoon Kang*[1]; Si Gao[1]; Wenqi Mao[2]; Yu Bai[3]; Myeongheom Park[1]; Hiroki Adachi[4]; Masugu Sato[5]; Nobuhiro Tsuji[1]; [1]Kyoto University; [2]J-PARC center; [3]Dalian University of Technology; [4]University of Hyogo; [5]Japan Synchrotron Radiation Research Institute (JARSI)