The content in the preliminary program was generated on July 13, 2022. However, changes are still being implemented for the technical program. Please refer to the online session sheets for the most up-to-date information.
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**Additive Manufacturing**

**Additive Manufacturing and Cellular/Lattice Structures: Designs, Realization and Applications**

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**Additive Manufacturing Modeling, Simulation, and Machine Learning: Microstructure, Mechanics, and Process**

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**Additive Manufacturing of High and Ultra-high Temperature Ceramics and Composites: Processing, Characterization and Testing**

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**Additive Manufacturing of Polymeric-based Materials: Challenges and Potentials**

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**Additive Manufacturing of Titanium-based Materials: Processing, Microstructure and Material Properties**

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## Program At A Glance

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<td>2D Materials Synthesis &amp; Properties</td>
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<td>Nanostructure Synthesis &amp; Mechanisms</td>
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<td>Poster Session</td>
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<td>Nanostructured Films &amp; Properties</td>
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<td>Energy Applications</td>
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<td>Heterostructures &amp; Polymer-Derived Ceramics</td>
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<td><strong>Nanotechnology for Energy, Environment, Electronics, Healthcare and Industry</strong></td>
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<td><strong>Nuclear Energy</strong></td>
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<td>Advanced Characterization of Materials for Nuclear, Radiation, and Extreme Environments III</td>
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<td>Thermomechanical Properties</td>
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<td>Beamline/Scattering</td>
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<td>In Situ Microscopy</td>
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<td>Spectroscopy/Tomography</td>
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<td><strong>Ceramics for a New Generation of Nuclear Energy Systems and Applications</strong></td>
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<td>Ceramic Nuclear Fuel</td>
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<td>Ceramics for Nuclear Energy Application</td>
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<td><strong>Tackling Structural Materials Challenges for Advanced Nuclear Reactors</strong></td>
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<td>Advanced Structural Materials</td>
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<td>Molten Salt Systems</td>
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<td>Investigating Microstructural Features</td>
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<td>Mechanical Behaviors</td>
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<td>Advanced Joining Technologies for Automotive Lightweight Structures</td>
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<td>Self-piercing Riveting (SPR)</td>
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<td>Friction Stir Welding (FSW)</td>
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<td><strong>Advances in Surface Engineering</strong></td>
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<td><strong>Innovative Process Design and Processing for Advanced Structural Materials</strong></td>
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<td>Welding, Electrical Current-Induced Phenomenon, and Additive Manufacturing</td>
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<td>Mechanics and Modeling</td>
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<td>Advanced Structural Materials</td>
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<td><strong>Sustainability, Energy, and the Environment</strong></td>
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<td>14th Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing</td>
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<td>Application of Sustainable Materials for Functional Applications I/Novel Manufacturing Methods</td>
<td>MON AM</td>
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<td>Application of Sustainable Materials for Functional Applications II</td>
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<td>Sustainable Processing of Ceramics and Composites I/Novel Processing of Coatings and Metals</td>
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<td>Sustainable Processing of Ceramics and Composites II</td>
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<td>Advanced Ceramics for Environmental Remediation</td>
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<td>Advances and Challenges in Decarbonization of the Steel Industry</td>
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<td><strong>Energy Materials for Sustainable Development</strong></td>
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<td>Storage Batteries I</td>
<td>MON AM</td>
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<td>Radiative and Electrochemical Conversion/Storage Batteries</td>
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<td>Fuel Cells and Electrolyzers</td>
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<td>Electrets and Magnetic Conversion/Capacitative Storage and Electrochemical Conversion</td>
<td>WED AM</td>
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<td>Thermal Conversion</td>
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<td><strong>Special Topics</strong></td>
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<td>ACerS Robert B. Sosman Award Symposium: Advancing the Science of Materials for Extreme Environments</td>
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<td><strong>Art and Cultural Heritage: Discoveries during the Pandemic Year</strong></td>
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<td><strong>K-12 Educators Forum</strong></td>
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<td><strong>Resisting Degradation from the Environment: A Symposium Honoring Carolyn M. Hansson’s Research and Pioneering Experiences as a Woman in STEM</strong></td>
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<td>Talks to Introduce Posters I</td>
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<td>Talks to Introduce Posters II</td>
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Technical Meeting and Exhibition

MS&T 22
MATERIALS SCIENCE & TECHNOLOGY

Featuring:

THE Advanced Materials Show | USA
THE NANO Technology Show

PRELIMINARY
TECHNICAL PROGRAM
SUSTAINABILITY, ENERGY, AND THE ENVIRONMENT

14th Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing — Application of Sustainable Materials for Functional Applications I / Novel Manufacturing Methods

**Sponsored by:** ACerS Engineering Ceramics Division

**Program Organizers:** Suroljit Gupta, University of North Dakota; Mritunjay Singh, Ohio Aerospace Institute; Tatsuki Ohji, National Institute of Advanced Industrial Science and Technology; Hisayuki Suematsu, Nagaoka University of Technology; Enrico Bernardo, University of Padova; Rajiv Asthana, University of Wisconsin; Yiqian Wu, Alfred University; Zhengyi Fu, Wuhan University of Technology; Allen Apblett, Oklahoma State University

**Monday AM | October 10, 2022**

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**Session Chairs:** Huong Le, Faraday Technology; Junichi Tatami, Yokohama National University; Bai Cui, University of Nebraska-Lincoln; Hisayuki Suematsu, Nagaoka University of Technology

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8:00 AM Invited

A Computationally Engineered Sustainable Approach for Tuning Nanoclays for Biomaterials Applications: **Kalpana Katti**; Krishna Kundi; Hanmant Gaikwad; Dinesh Katti; North Dakota State University

8:30 AM

Capture of Plant Nutrients by Ceramics for Subsequent Use as a Slow Release Fertilizer: **Allen Apblett**; Russel Rahman; Ciara Kelley; Patrick Kitzel; Oklahoma State University

8:50 AM

Change in the Density Distribution during Sintering of Alumina Ceramics Visualized by In-situ OCT Observation: **Junichi Tatami**; Mitsuki Tajima; Motyokuji Iijima; Takuma Takahashi; Yokohama National University; Kanagawa Institute of Industrial Science and Technology

9:10 AM

Electrochemical Remediation of PFAS-Contaminated Aqueous Waste Streams: **Huong Le**; Brian Skinn; Katherine Lee; Stephen T. Snyder; Maria Inman; Faraday Technology

9:30 AM

Critical Metals Recovery from Recycled Lithium-ion Batteries: **Meng Shi**; Luis Diaz; John Klaehn; Aaron Wilson; Tedd Lister; Idaho National Laboratory

9:50 AM Break

10:10 AM Invited

Direct Selective Laser Sintering for Additive Manufacturing of Advanced Ceramic Materials: **Bai Cui**; Xiang Zhang; Fei Wang; Zhipeng Wu; Michael Nastasi; Yan Chen; Yongfeng Lu; University of Nebraska-Lincoln; Texas A&M University; Oak Ridge National Laboratory

10:40 AM

Effect of Hydrolysis on Mechanical Properties of Rice Husk Reinforced Composites for 3D Printing: **Athira Nair Surendran**; Sreeisha Malayil; Kunal Kate; Jagannadh Satyavolu; University of Louisville

**11:00 AM**

Enabling Sustainability and Circular Economy Through Big Area Additive Manufacturing: **Soydan Ozcan**; Oak Ridge National Laboratory

**11:20 AM**

Growth of β-MoO3 Whiskers by Pulsed wire Discharge: **Hisayuki Suematsu**; Ngo Chu; Thi Do; Tadachika Nakayama; Koichi Niihara; Nagaoka University of Technology

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BIOMATERIALS

3D Printing of Biomaterials and Devices — Session I

**Sponsored by:** ACerS Bioceramic Division

**Program Organizers:** Sahar Vahabzadeh, Northern Illinois University; Susmita Bose, Washington State University; Amit Bandyopadhyay, Washington State University; Mukesh Kumar, LincoTek Medical; Mangal Roy, Indian Institute of Technology - Kharagpur (IIT-Kgp)

**Monday AM | October 10, 2022**

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**Session Chair:** To Be Announced

8:00 AM Invited

3-D Printing in Regenerative Engineering: **Yusuf Khan**; Cato Laurencin; Godwin Dzidotor; Amir Seyedsalehi; University of Connecticut Health Center; University of Connecticut

8:30 AM Invited

3D Printing Integrated with Controlled Delivery for In Situ Tissue Engineering of Complex and Inhomogeneous Tissues from Endogenous Stem/Progenitor Cells: **Solaiman Tarafder**; Chang Lee; Columbia University Medical Center

9:00 AM

3D Bio-printing with Engineered Living Materials for Advanced Biofabrication: **Weinan Xu**; University of Akron

9:20 AM

Solvant Cast 3D Printing with Different Molecular Weight Polymers: **Tyler French**; John Tolbert; Lesley Chow; Lehigh University

9:40 AM Invited

The Regulatory Roles of the Substrate Microenvironment in Cancer Progression in Tissue Engineering Scaffolds: **Dinesh Katti**; Sharad Jaswandkar; Hanmant Gaikwad; Kalpana Katti; North Dakota State University

10:00 AM Break

10:20 AM

Effect of Sr2+ and Ca2+ ions on 3D printed Beta Tricalcium-Phosphate/Alginate Composite Scaffolds for Bone Tissue Engineering: **Shebin Tharakan**; Sally Lee; Serin Ahn; Chris Mathew; Michael Hadijargyrou; Azhar Ilyas; New York University of Technology

10:40 AM

Additive Manufacturing Process Simulation of Polyetherimide Porous Scaffolds for Bone Tissue Engineering Applications: **Ramsha Irman**; Ans Al Rashid; Muammar Koc; Hamad Bin Khalifa University

**11:00 AM** Invited

Selective Artificial Neural Network by Targeted Delivery of Neuronal Cells Using Magnetically Controlled 3D Printed Microrobots: **Hongsou Choi**; Daegu-Gyeongbuk Institute of Science and Technology
11:30 AM Invited
Biohybrid Functional Material Design by Engineered Peptides: Canandan Tamerler¹; ¹University of Kansas

SPECIAL TOPICS

ACerS/EPDC: Arthur L. Friedberg Ceramic Engineering Tutorial and Lecture

Sponsored by: ACerS/Education and Professional Development Council

Monday AM | October 10, 2022
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9:00 AM Invited
From Moon Rocks to Melting Gels: Lisa Klein¹; ¹Rutgers University

ADDITIVE MANUFACTURING

Additive Manufacturing and Cellular/Lattice Structures: Designs, Realization and Applications — Cellular/Lattice Structures I

Sponsored by: TMS Additive Manufacturing Committee, TMS Materials Characterization Committee

Program Organizers: Li Yang, University of Louisville; Allison Beese, Pennsylvania State University; John Carpenter, Los Alamos National Laboratory; Carolyn Seepersad, University of Texas at Austin; Miguel Aguilo, Morphom LLC

Monday AM | October 10, 2022
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Session Chair: Li Yang, University of Louisville

8:00 AM
Design, Manufacture, Modelling and Testing of Honeycombs with Aperiodic Order: Richard Moat¹; Chikwesiri Imediegwu¹; Daniel Clarke¹; Patrick Carter¹; Iestyn Jowers¹; Uwe Grimm¹; ¹The Open University

8:20 AM
A Simplistic Experimental Study of the Material Property and Quality Issues with Topology Optimization Designs Fabricated by Powder Bed Fusion Additive Manufacturing: Li Yang¹; William Dorsch¹; ¹University of Louisville

8:40 AM
3D Printed Fibrous Cellular Multifunctional Structures: William Johnston¹; Janith Godakawela¹; Carlos Galti¹; Suresh Keshavanarayana¹; Bhisham Sharma¹; ¹Wichita State University

9:10 AM
AM-Fabricated Plate Lattice Structures for Impact Applications: Joseph Berthel¹; Nicholas Jones¹; Jack Beuth¹; Rahul Panat¹; Brandon McWilliams¹; ¹Carnegie Mellon University; ²US Army DEVCOM Army Research Laboratory

9:30 AM
Optimized Dissolvable Support Design for 316L Stainless Steel Produced by Laser Powder Bed Fusion: Shawn Hinnebusch¹; David Anderson¹; Kevin Glunt¹; Robert Hoffman¹; Owen Hildreth¹; Albert To¹; ¹University of Pittsburgh; ²Colorado School of Mines

9:50 AM Break

10:10 AM
Permeable Additive Manufacturing (PermiAM) for Rocketry: Adam Polizzi¹; Kimberly Devore¹; Matthew Kuhns¹; Jeremy Iten¹; ¹Elementum 3D; ²Masten Space Systems

10:30 AM
Laser-based 4D Printing of Ni-Mn-Ga Magnetic Shape Memory Alloys Lattice Structures: Anastassia Milleret¹; Ville Laitinen¹; Nour-eddine Feniniche¹; Moataz Attallah¹; ¹University of Birmingham; ²Lappeenranta-Lahti University of Technology; ³UTBM

10:50 AM
Mechanical Behavior of 7050 Aluminum AM Lattice Structures: Ben Dimarco¹; Noah Gula¹; Jeremy Seidt¹; Edward Herderick¹; ¹The Ohio State University

ADDITIVE MANUFACTURING


Program Organizers: Jing Zhang, Indiana University - Purdue University Indianapolis; Brandon McWilliams, US Army Research Laboratory; Li Ma, Johns Hopkins University; Yeongil Jung, Changwon National University

Monday AM | October 10, 2022
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Session Chairs: Jing Zhang, Indiana University - Purdue University Indianapolis; Li Ma, Johns Hopkins University Applied Physics Laboratory; Brandon McWilliams, CCDC Army Research Laboratory; Yeon-Gil Jung, Changwon National University

8:00 AM
Effects of a Novel Post Processing Technique on Mechanical Performance of AlSi10Mg Produced via LPBF: John Lewandowski¹; Austin Ngo¹; Jag Sankar²; Tony Schmitz³; Jian Cao³; Glenn Daehn³; ²Case Western Reserve University; ³North Carolina A & T State University; ¹University of Tennessee-Knoxville; ²Northwestern University; ³The Ohio State University

8:20 AM
A Modeling Tool for Mechanical Performance Prediction and Qualification of Additive Manufacturing Parts: Behrooz Jalalahmadi¹; Jingfu Liu¹; Ziye Liu¹; ¹Sentient Science

8:40 AM
Accuracy of Different Thermomechanical Simulation Approaches for Predicting Residual Stress and Distortion in Laser Powder Bed Fusion: Chien Vo¹; Albert To¹; Alaaeldin Olleak¹; Wen Dong¹; Florian Dugast¹; ¹University of Pittsburgh
9:00 AM
Residual Stress Modeling during Wire Arc Additive Manufacturing of Low Temperature Transformation Alloy: Guru Charan Reddy Madireddy1; Yousub Lee1; Kyle Saleeby1; Wei Tang1; Thomas Feldhausen1; Alex Plotkowski1. 1Oak Ridge National Laboratory

9:20 AM
Modified Inherent Strain Modeling of Residual Stress and Distortion in WAAM and LPBF Processes: Wen Dong1; Albert To1. 1University of Pittsburgh

9:40 AM
Anisotropic Distortion Modeling during Sintering of Binder Jet Printed Parts: Basil Paudel1; Albert To1. 1University of Pittsburgh

10:00 AM
Additive Manufacturing Moment Measure: A Reduced Order Model of the Laser Powder Bed Fusion Process: Samuel Hocker1; Brodan Richter1; Joseph Zalameda1; Peter Spaeth1; Erik Frankforter1; Andrew Kitahara2. 1NASA; 2National Institute of Aerospace

10:40 AM
Mesoscale Modeling of the Additively Manufactured 316L: Effects of Microstructure and Microscale Residual Stresses: Mohammadreza Yaghoobi1; Yin Zhang2; Krzysztof S. Stopka3; David J Rowenhorst4; Ting Zhu5; John E. Allison1; David L. McDowell2. 1University of Michigan; 2Georgia Institute of Technology; 3Purdue University; 4US Naval Research Laboratory

11:00 AM
Crystal Plasticity Modeling Effort to Capture Microstructural Variations in Cold Sprayed Ceramics: Aulora Ruskin1; Yubraj Paudel1; Ryan Cochran1; Shiraz Mujahid1; Marc Pepe2; Hongjoo Rhe2; Peter Czech1. 1Center for Advanced Vehicular Systems; 2Army Research Laboratory; 3American Lightweight Materials Manufacturing Innovation Institute

11:20 AM
Phase Stability and Mechanical Properties of Ni-Al and Ni-Cr Binary Solid Solutions Using CASTEP Supercell Approach: Violet Hilane1; Maje Phasha1; Mariandra Mulamu2; Josias van der Merwe1. 1University of the Witwatersrand; 2Mintek

11:40 AM
Additively Manufactured Multi-metallic Design for Ti-6Al-4V and Inconel 718 Joining by Scheil-Gulliver Ternary Projection Diagrams: Saeid Alipour Mosoumabadi1; Arezoo Emdadi1. 1Missouri University of Science & Technology; 2Missouri University of Science and Technology

ADDITIVE MANUFACTURING


Sponsored by: ACerS Basic Science Division, ACerS Engineering Ceramics Division, ACerS Manufacturing Division

Program Organizers: Lei Chen, University of Michigan-Dearborn; Xuan Song, University of Iowa; Xiangyang Dong, Missouri University of Science and Technology; Yiquan Wu, Alfred University, Paolo Colombo, University of Padova; Rajendra Bordia, Clemson University; Long-Qing Chen, Pennsylvania State University

Monday AM | October 10, 2022

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Session Chair: Lei Chen, University of Michigan-Dearborn

8:00 AM
Transparent Alumina Fabricated by Energy Efficient Spark Plasma Sintering: Eugene Olevsky1; CheolWoo Park1; Elisa Torresani1. 1San Diego State University; 2US Army DEVCOM - Army Research Laboratory

9:00 AM
Brittle Particle Cold Spray Technology: Richard Thuss1. 1TTEC LLC

9:20 AM
Ceramic 3D Printing for Investment Casting: Cindy Schick1; Richard Gaignon1. 13Dceram-Sinto

10:00 AM
Brittle Particle Cold Spray Technology: Richard Thuss1. 1TTEC LLC

10:40 AM
Production of 3D Printed Electrodes for Batteries: Sina Bakhtar Chavari1; Bharat Yelamanchi1; Ana Martinez2; Alexis Maurel3; Eric MacDonald4; Pedro Cortes5. 1Youngstown State University; 2University of Texas at El Paso; 3UTEF
11:20 AM
Additive Manufacturing of Alumina Toughened Zirconia and Zirconia Toughened Alumina: Nicholas Voellm1; Shawn Allan1; Ryan Fordham1; Nicole Ross1; 1Lithoz America

11:40 AM
Advanced Manufacturing of Controlled SOFC Electrolyte and Electrode Microstructures through Aerosol Deposition: Joshua Tenney1; Edward Sabolsky1; Harry Abernathy2; Tao Yang2; Katarzyna Sabolsky3; Evan Helgeson1; Jordan Conte1; Michael Jones1; 1West Virginia University; 3DOE- National Energy Technology Laboratory

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Fe-based Alloys - 316L

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Jurgen Eckert, Erich Schmid Institute of Materials Science; Zhi Wang, South China University of Technology

Monday AM | October 10, 2022
301 | David L. Lawrence Convention Center

Session Chair: To Be Announced

8:00 AM
Binder Jetting of Ultra-fine 316L Austenitic Stainless Steel Powder: Microstructure Observation and Mechanical Properties: Mohammad Jamalthani1; Mohammadreza Asherloo1; Amir Mostafaei1; 1Illinois Institute of Technology

8:20 AM
Understanding Variations in Solidification Behavior of Additively Manufactured 316L Printed via Laser-Wire Directed Energy Deposition: Olivia Denomo1; Charles Smith1; Matthew Schreiber1; Kip Findley1; John Speer1; Anthony Petrella1; Craig Brice1; Jonah Klemm-Toole1; Zhenzhen Yu1; 1Colorado School of Mines

8:40 AM
Understanding the Effects of Residual Stress in Mechanical Behavior of SS-316L Manufactured by Laser-wire DED Process: Sandeep Dhakal1; Alyssa Bateman1; Boyd Panton1; Jeffrey Bunn1; Brian Jaques1; 1Boise State University; 2Ohio State University; 2Oak Ridge National Laboratory

9:00 AM
Influence of Substrate Geometry and Feedstock Morphology on the Mechanical and Metallurgical Properties of Direct Energy Deposition Stainless Steel 316L: Samantha Sorondo1; Jakob Hamilton1; Iris Rivero1; 1Rochester Institute of Technology

9:20 AM
Effect of Surface Roughness on the Fatigue Behavior of Binder Jet Printed Ultra-fine 316L Austenitic Stainless Steel Powder: Mohammad Jamalthani1; Amir Mostafaei1; 1Illinois Institute of Technology

9:40 AM
Effects of Process Parameters on Mechanical Behavior of Wire Arc Additive Manufactured (WAAM) AISI 316LSi: Vishnushankar Viralliyur Ramasamy1; John Lewandowski1; 1Case Western Reserve University

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Ni-based Super Alloys

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Jurgen Eckert, Erich Schmid Institute of Materials Science; Zhi Wang, South China University of Technology

Monday AM | October 10, 2022
302 | David L. Lawrence Convention Center

Session Chair: To Be Announced

8:00 AM
Characterizing the Effects of Laser Power, Scanning Velocity, and Deposition Temperature on Inconel 718 Single-track Melt Pool Geometry in Laser Powder Bed Fusion: William Frieden Templeton1; Seth Strayer1; Shawn Hinnebusch1; Albert To1; Sneha Prabha Narra1; 1Carnegie Mellon University; 2University of Pittsburgh

8:20 AM
In-situ and Ex-situ Characterization of Inconel 738 Subjected to Additive Manufacturing: Adriana Eres-Castellanos1; Jeremy Shin1; Ruben Ochoa1; Chandler Becker1; Beau Nannie1; Jonah Klemm-Toole1; Alec Saville1; Brian Rodgers1; Kamel Fezza1; Amy Clarke1; 1Colorado School of Mines; 2Argonne National Laboratory

8:40 AM
The Competition of Failure Modes in an Additively Manufactured Disk Superalloy: Tim Gabb1; C. Sudbrack1; M. Kirka1; S. Semiatin1; T. Smith1; C. Kantzos1; 1NASA Glenn Research Center; 2National Energy Technology Laboratory; 3Oak Ridge National Laboratory; 4Air Force Research Laboratory (retired)
9:00 AM  Effect of Hot Isostatic Pressing on Mechanical Properties of Additively Manufactured Ni-based Superalloy Rene65: Colleen Hilla; Andrew Wessman; Michael Ef; Ron Aman; Michael Mills; Wei Zhang; 1Ohio State University; 2University of Arizona; 3Edison Welding Institute.

9:20 AM  Superalloy IN625 as a Candidate for Additively Manufactured Injectors for Hydrogen Combustion in Power Generation: Chantal Sudbrack; Kyle Rozman; Kristin Tippey; Martin Detris; Lucas Teeter; Matthew Searle; Ömer Dogan; 1National Energy Technology Laboratory.

9:40 AM  Nitride Formation and Their Influence on Delta Phase Precipitation in Additively Manufactured Nickel Superalloys: James Zuback; Selda Nayir; Mingze Gao; Todd Palmer; 1National Institute of Standards and Technology; 2Pennsylvania State University.

10:00 AM  Break

10:20 AM  AM Processing and Microstructural Evolution in Nickel-based Superalloys: Ruben Ochoa; Amy Clarke; 1Colorado School of Mines.

10:40 AM  A Compositional and Microstructural Understanding of Powder-blown Directed Energy Deposition (DED) Used for Functionally Graded Ni-superalloys Alloys for Hot-and-harsh Gas Path Environments: Marissa Brennan; Chen Shen; Shenyang Huang; Michael Knussman; Daniel Ruscitto; Alex Kilt; Changjie Sun; Lee Kervin; Anindya Bhaduri; Siyeong Ju; Hyeyun Song; Lang Yuan; 1GE Research; 2EWI; 3University of South Carolina.

11:00 AM  Directed Energy Deposition of Bi-metallic Tensile Specimens by Direct Bonding of Inconel 625 to Stainless Steel 304: Anthony Stair; Nicholas Jones; Jack Beuth; Maarten de Boer; 1Carnegie Mellon University.

11:20 AM  Multi-material Additive Manufacturing with Inconel 718 and GRCop-84: Nicholas O’Brien; Zexiao Wang; Nicholas Jones; Sheng Shen; Jack Beuth; 1Carnegie Mellon University.

11:40 AM  Additive Manufacturing Research with Mission Intent: JHU/APL’s Research toward Solving Critical Defense Challenge Problems: Morgana Trexler; Michael Presley; Steven Storck; Gianna Valentino; Li Ma; Brendan Croom; Sal Nimer; Drew Seker; 1Johns Hopkins University Applied Physics Laboratory.

12:00 PM  Break

12:20 PM  Intellectual Property Challenges for the Additive Manufacturing Industry: Van Vekris; 1Marks & Clerk.

2:00 PM  Scalability and Applications of Additive Manufacturing in Academic, Industrial, and Governmental Sectors: Anurag Gadgil; Pushpndant Jain; 1Vellore Institute of Technology Bhopal.

2:40 PM  The Effects of Powder Recycling in LPBF AM of Al-Sc-Mg Alloy on Powder Quality: Junwon Seo; Srujana Rao Varasi; Sandra DeVincent Wolf; Bryan Webler; Anthony Rollett; 1Carnegie Mellon University.

3:40 PM  Directed Bonding of Inconel 625 to Stainless Steel 304: Anthony Stair; Nicholas Jones; Jack Beuth; Maarten de Boer; 1Carnegie Mellon University.

4:00 PM  Multi-material Additive Manufacturing with Inconel 718 and GRCop-84: Nicholas O’Brien; Zexiao Wang; Nicholas Jones; Sheng Shen; Jack Beuth; 1Carnegie Mellon University.

4:20 PM  Additive Manufacturing Research with Mission Intent: JHU/APL’s Research toward Solving Critical Defense Challenge Problems: Morgana Trexler; Michael Presley; Steven Storck; Gianna Valentino; Li Ma; Brendan Croom; Sal Nimer; Drew Seker; 1Johns Hopkins University Applied Physics Laboratory.

4:40 PM  Break

5:00 PM  Intellectual Property Challenges for the Additive Manufacturing Industry: Van Vekris; 1Marks & Clerk.
10:00 AM Break

10:30 AM Invited Optimization of 1D Core-shell Heterostructures for Gas Sensing: Nicola Pinna; 1Humboldt-Universitaet Zu Berlin

10:50 AM Invited Utilizing Band Diagrams to Engineer the Performance of Photocatalytic Processes: Kirk Bevan; Botong Miao; Asif Iqbal; 1McGill University

11:10 AM Nanofibrous Oxide Ceramics: Manufacturing and Applications: Riley Yager; Rachel Day; Tabitha Berry; Arielle Griffin; Andrei Stanishevski; 1University of Alabama at Birmingham

NUCLEAR ENERGY

Advanced Characterization of Materials for Nuclear, Radiation, and Extreme Environments III — Thermomechanical Properties

Sponsored by: TMS Nanomechanical Materials Behavior Committee, TMS Nuclear Materials Committee

Program Organizers: Cody Dennett, Idaho National Laboratory; Samuel Briggs, Oregon State University; Christopher Barr, Naval Nuclear Laboratory; Michael Short, Massachusetts Institute of Technology; Janelle Wharry, Purdue University; Cheng Sun, Idaho National Laboratory; Caitlin Taylor, Los Alamos National Laboratory; Khalid Hattar, Sandia National Laboratories; Yuanyuan Zhu, University of Connecticut

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Session Chairs: Michael Short, Massachusetts Institute of Technology; Cody Dennett, Commonwealth Fusion Systems

8:00 AM Invited Defect Structure and Property Evolution in Ion-irradiated Tungsten: Progress towards a Comprehensive Understanding: Felix Hofmann; Daniel Mason; Abdallah Reza; Suchandrima Das; Hongbing Yu; Sergei Dudarev; 1University of Oxford; 2UKAEA; 3Canadian Nuclear Laboratories; 4University of Alabama at Birmingham

8:30 AM Characterization of Simultaneous High-energy Proton and Spallation-Neutron Radiation Effects in Structural Alloys: Timothy Lach; Maxim Gussev; David McClintock; 1Oak Ridge National Laboratory

8:50 AM Deformation Twinning versus Slip in Ni-based Alloys, Containing Pt2Mo-structured, Ni2Cr-typed Precipitates: Hi Vo; Khanh Dang; Fei Teng; Matt Schneider; Benjamin Eftink; Stuart Maloy; Laurent Capoluongo; Peter Hosemann; 1Los Alamos National Laboratory; 2Idaho National Laboratory; 3Pacific Northwest National Laboratory; 4UC Berkeley

9:10 AM Automated In Situ Deformation Characterization via Analytical SEM during High Temperature Tensile Testing: Sebastian Krauss; Hirshikesh Bale; Stephen Kelly; 1ZEISS Research Microscopy Solutions

9:30 AM Applications of Cryogenic Nanomechanical Testing: Eric Hintsala; Douglas Stauffer; 1Bruker Nano Surfaces and Metrology; 2Bruker Nano Surfaces & Metrology

9:50 AM Break

10:10 AM Invited Advanced In-situ and Post-Irradiation-Examination Thermal Conductivity Measurements of Nuclear Fuels and Materials: Zilong Hua; Ameen Khanolkar; Cody Dennett; Robert Schley; Austin Fleming; Colby Jensen; Marat Khafizov; David Hurley; 1Idaho National Laboratory; 2Commonwealth Fusion Systems; 3Ohio State University

10:40 AM In-situ Thermal Diffusivity Recovery and Defect Annealing Kinetics in Self-ion Implanted Tungsten Using Transient Grating Spectroscopy: Mohamed Abdallah Reza; Hongbing Yu; Cody Dennett; Kenichiro Mizohata; Felix Hofmann; Guanze He; 1University of Oxford; 2Canadian Nuclear Laboratories; 3Massachusetts Institute of Technology; 4University of Helsinki

11:00 AM Detection of Radiation Vulnerability in Microelectronic Systems: Sergei Stepanoff; Md Rasel; Aman Haque; Douglas Wolfe; Fan Ren; Stephen Pearton; 1The Applied Research Laboratory; 2The Pennsylvania State University; 3University of Florida

11:20 AM Ring Pull Testing: The Effect of Mandrel Diameter: Matthew Hayne; Peter Beck; James Valdez; Cheng Lui; Thomas Nizolek; Tarik Saleh; Stuart Maloy; Benjamin Eftink; 1Los Alamos National Laboratory

MATERIALS-ENVIRONMENT INTERACTIONS

Advanced Coatings for Wear and Corrosion Protection — Session I

Program Organizers: Evelina Vogli, LM Group Holdings Inc.; Virendra Singh, Schlumberger

Monday AM | October 10, 2022
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Session Chairs: Virendra Singh, Schlumberger; Evelina Vogli, LM Group Holdings Inc.

8:00 AM Investigation of Corrosion Properties of Magnesium Alloy and the Effect of Time and Number of Immersions on Its Corrosion Resistance: Nasim Emami; Mohammad Alipour; Shahab Khameneh Ast; 1Tabriz University

8:20 AM Alpha-Tocopheryl Acetate as a Green Corrosion Inhibitor for Biomaterials at Ambient and Body Temperatures: Bram Kuijer; 1Dartmouth College

8:40 AM A Comparison of Corrosion Behavior and Effect of Properties on Passivation Film by Al and Mo Addition in Ni-based Coatings: Jaehui Bang; Junyeop Lee; Minhye Kang; Eunkyoung Lee; 1National Korea Maritime and Ocean University
9:00 AM
Chemical Durability of Textured Glass Coat as an Engineering Material: Andrew Adejo1; Kator Jomboh2; Adele Garkida3; 1Federal University of Lafia; 2University of Maiduguri; 3Ahmadu Bello University

9:20 AM
Coating Properties of Alkyd Resin, Epoxy Resins and Polyurethane Based Nanocomposites: A Review: Ikhuazagbe Ifijen1; Nyaknno U. Udokpoi1; Gregory E. Onaiwu2; Kate E. Mokobia3; Ewanole B. Ohiochooya3; Osemwetkhun Esene3; 1Rubber Research Institute of Nigeria; 2Benson Idahosa University; 3Delta State Polytechnic

9:40 AM
Direct Electrodeposition of Corrosion Resistant Coatings onto Aluminum after One Step Surface Pretreatment: Rajeswaran Radhakrishnan1; Timothy Hall1; Maria Inman1; Stephen Snyder1; Cory Crowley1; 1Faraday Technology Inc; 2Fermi National Accelerator Laboratory

10:00 AM Break

10:20 AM
Corrosion Resistant Amorphous Based Thermal Sprayed Coatings for Fluoride Molten Salt Environment: Evelina Vogl1; Jinsuo Zhang1; John Kang1; Ricardo Salas1; 1Lm Group Holdings Inc; 2Virginia Tech

10:40 AM
Evaluation of Wear and Corrosion Performance of Wire Arc Sprayed Al-Si Coating for Marine Applications: Minhye Kang1; Junyeop Lee1; Jaehui Bang1; Eunykung Lee1; 1Korea Maritime and Ocean University

11:00 AM
Optimization of the Microstructure and Performance of Aluminum Alloy Cold Spray Coatings on Magnesium Alloy Substrates: Sridhar Nivety1; Rajib Kalsar1; Anthony Naccarelli1; Timothy Eden1; Vineet Joshi1; 1Pacific Northwest National Laboratory; 2Pennsylvania State University

11:20 AM
Metallurgical and Mechanical Bonding of Al2O3 on Mold Steel and Wear Behavior: Laser Cladding vs. Thermal Spray: Sumin Song1; Taebum Kim1; Sungjin Kim1; Kyuntaek Cho1; 1KITECH; 2Sunchon National University

MATERIALS-ENVIRONMENT INTERACTIONS

Advanced Materials for Harsh Environments — Session I

Sponsored by: ACerS Electronics Division

Program Organizers: Navin Manjooran, Chairman; Solve; Gary Pickrell, Virginia Tech

Monday AM | October 10, 2022 333 | David L. Lawrence Convention Center

Session Chairs: Gary Pickrell, Virginia Tech; Navin Manjooran, Chairman, Solve

8:00 AM Introductory Comments

8:40 AM
Grain Boundary Engineering to Improve Austenitic Stainless Steels Stress Corrosion Cracking Behavior in Boiling Saturated Magnesium Chloride Solutions: Osama Alyousif1; 1Kuwait University

9:00 AM
Characterization of Nb-Si Alloys for High-temperature Applications: Kaisr Aguirre1; Scott Oppenheimer2; Akane Suzuki2; Bernard Bewlay2; John Lewandowski3; 1Case Western Reserve University; 2GE Research

9:20 AM
Corrosion Detection in Oil and Gas Pipeline Using 3-D Bluetooth Printed Microsensor: Stephen Appiah1; Holly Martin1; Pedro Cortes2; Frank Li2; Vamsi Bora1; Brendan Kuzior1; 1Youngstown State University; 2Virginia Tech

9:40 AM
Corrosion Phenomena in Powder-Processed Aluminum Alloys Containing Quasicrystalline Dispersoids: Sarshad Rommel1; Hannah Leonard1; Mingxuan Li2; Thomas Watson2; Tod Policandriotes2; Mark Aindow2; 1University of Connecticut; 2Pratt & Whitney; 3Collins Aerospace

10:00 AM Break

10:20 AM
Electrochemical Characterization of Joints Inconel 600 to TiC-Composites, Immersed in Seawater: Mariano Braullo-Sanchez1; Pedro Durán-Reséndiz2; Rogelio Orozco-Martinez1; 1Instituto Tecnologico Superior del Sur de Guanajuato

10:40 AM
Exfoliated-graphite-based Flexible Graphite as a Multifunctional Material for Harsh Environments: Deborah Chung1; 1State University of New York Buffalo

11:00 AM
Expulsion of Arsenic Metals from Water Using Zinc Nanoparticles: A Review: Ikhuazagbe Ifijen1; Presley Ohikhena1; 1Rubber Research Institute of Nigeria; 2Roadmap Construction Company Limited

11:20 AM Concluding Comments

CERAMIC AND GLASS MATERIALS

Advances in Dielectric Materials and Electronic Devices — Processing, Properties, and Biomedical Applications

Sponsored by: ACerS Electronics Division

Program Organizers: Amar Bhalla, University of Texas; Ruyan Guo, University of Texas at San Antonio; Rick Ubic, Boise State University; Matjaž Spreitzer, Jožef Stefan Institute

Monday AM | October 10, 2022 410 | David L. Lawrence Convention Center

Session Chair: Amar Bhalla, University of Texas San Antonio

8:00 AM
Design of Highly Reliable Dielectrics with Cold Sintering: Jake DeChiara1; Zhongming Fan2; Clive Randall1; 1Pennsylvania State University

8:20 AM
Designing Novel Dielectric Composites with High Thermal Conductivity Enabled by Cold Sintering: Javier Mená-García1; Arnaud Ndayishimiye1; Zhongming Fan1; Devon Eichfeld2; Christopher Wheatley1; Haley Jones3; Andrea Arguelles1; Brian Foley1; Clive Randall1; 1The Pennsylvania State University
8:40 AM
Tape Casting and Optimization of the Slurry Composition of a SiCer-compatible LTCC-tape: Clemens Motzkus; Beate Capraro; Fraunhofer IKTS

9:00 AM
Non-destructive Evaluation of Inkjet Printed Cobalt Ferrite/Barium Titanate Films: William Flynn; University of Texas at San Antonio

9:20 AM
Tunable Properties of Zinc Oxide Films Using In-situ Reactive Hybrid 3D Printing: Sean Garnsey; William Flynn; Matthew Trippy; Ruyan Guo; Amar Bhalla; ECE/ COE, University of Texas at San Antonio

9:40 AM
Leveraging Coupled-Cluster Techniques to Predict Pre-Cursor Material Improvements: Matthew Trippy; Maximillian Estrada; Sean Garnsey; Paul Flynn; Amar Bhalla; Ruyan Guo; University of Texas at San Antonio

10:00 AM Break

10:20 AM
Magnetoelectric Nanorobot - A Revolutionary Nanoscale Device for Targeted Treatment: Soultik Beta; Amar Bhalla; Ruyan Guo; IIT Delhi; University of Texas at San Antonio

NANOMATERIALS

Advances in Emerging Electronic Nanomaterials: Synthesis, Enhanced Properties, Integration, and Applications — 2D TMDC and Quantum Materials

Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory; Jung-Kun Lee, University of Pittsburgh; Stephen McDonnell, University of Virginia

Monday AM | October 10, 2022
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Session Chairs: Chang-Yong Nam, Brookhaven National Laboratory; Stephen McDonnell, University of Virginia

8:00 AM Invited
Synthesis and Integration of Transition Metal Dichalcogenides: Stephen McDonnell; University of Virginia

8:30 AM Invited
Synthesis, Nanofabrication and Characterization of 2D Magnetic Semiconductors for Magnetic Tunnel Junctions: Eui-Hyeok Yang; Stevens Institute of Technology

9:00 AM Invited
Two Dimensional Materials for Neuromorphic Computing: Tania Roy; University of Central Florida

9:30 AM Invited
Wafer-scale Heterogeneous Integration of Atomically Thin Electronic Materials on Arbitrary Substrates toward Mechanically Reconfigurable Devices: Yeonwoong Jung; University of Central Florida

10:00 AM Break

10:15 AM Invited
Raman Spectroscopy Studies of Magneto-optical Effects in CrI₃: Wencan Jin; Auburn University

10:45 AM Invited
Applications of Electron Spectro-microscopy to Investigations of Chemistry and Electronic Structure of 2D Materials: Jerzy Sadowski; Brookhaven National Laboratory

11:15 AM Invited
Synthesis of Atomically Precise Graphene Nanoribbons with Tunable Electronic Properties: An-Ping Li; Oak Ridge National Laboratory

IRON AND STEEL (FERROUS ALLOYS)

Advances in Ferrous Metallurgy — HSLA Steel and Advances in Characterization Techniques

Sponsored by: AIST Metallurgy — Processing, Products & Applications Technology Committee

Program Organizers: Siddhartha Biswas, Big River Steel; Daniel Baker, General Motors Corporation; Lijia Zhao, Northeastern University

Monday AM | October 10, 2022
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Session Chair: Siddhartha Biswas, Big River Steel

8:00 AM
A Modified Technique in the Prediction of Low Alloy Steel Continuous Cooling Transformation Behaviour: Joshua Collins; The University of Manchester

8:20 AM
Adapting HSLA-100 to Thick-Section Forgings: Josh Mueller; Virginia Euser; Josher Gibson; Mark Royer; Los Alamos National Laboratory; Lehigh Heavy Forge Corporation

8:40 AM
Characterization of Ductility Limiting Precipitation at High Temperatures in HSLA steels: Alyssa Stubbers; John Balk; University of Kentucky

9:00 AM
Further Analysis of the Relationship between Precipitate Formation and a Loss of Hot Ductility in Two Microalloyed Steels: Paul Estermann; Viorel-Sergiu Ilie; Jakob Six; Ernst Kozeschnik; Technische Universität Wien; Voestalpine Stahl GmbH

9:20 AM
Evaluation of Martensite Transformation Temperatures Using Magnetometry: Nicholas Jones; Paul Lambert; Jin-Hyeong Yoo; Suok-Min Na; Charles Fisher; Naval Surface Warfare Center, Carderock Division

9:40 AM
Rigorous, Machine-Learning based Classification of Steel Microstructures Using EBSD: Michael Hjelmstad; Pat Trimby; Oxford Instruments
10:00 AM Break

10:15 AM
Stereological Analysis for Microstructure Quantification in Advanced High Strength Steels: Brian Lin1; Narayan Pottore2; Siriram Sadagopan3; Jiahao Cheng4; Xiaohua Hu4; 1ArcelorMittal Global R&D; 2Oak Ridge National Laboratory

10:35 AM
In-situ Laser Confocal Microscopic Analysis of Phase Transformations in Cr-Ni-Mo and Cr-Mo High-strength Steels Coupled with Dilatometric Study: Virgil Ashok Athavale1; Katelyn Kisier1; Rogerio Antao Cardoso1; Mario Buchely2; Laura Bartlett1; Ronald O’Malley4; 1Missouri University of Science and Technology

10:55 AM
Effect of Leaching Process Variables on the Reaction Kinetics of Pyrite Using Surface Response Methodology: Hilary Rutto1; Tumisang Seodigeng1; 1Vaal University of Technology

11:15 AM
Modelling of Accelerated Runout Table Cooling of Thicker Gauge Steel Products: Shixin Zhou1; Ali Doustahadi1; Vladan Prodanovic1; Matthias Militzer1; 1University of British Columbia

11:35 AM
Dielectric Behavior of Steel and Its Application in Structural Self-powering: Deborah Chung1; Xiang Xi1; 1State University of New York Buffalo

ARTIFICIAL INTELLIGENCE

AI for Big Data Problems in Advanced Imaging, Materials Modeling and Automated Synthesis — AI and ML for Materials Discovery I

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Mathew Cherukara, Argonne National Laboratory; Subramanian Sankaranarayanan, University of Illinois-Chicago; Badri Narayanan, University of Louisville

Monday AM | October 10, 2022
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Session Chairs: Badri Narayanan, University of Louisville; Mathew Cherukara, Argonne National Laboratory

8:00 AM
A Feasibility Study of Machine Learning-assisted Alloy Design Using Wrought Aluminum Alloys as An Example: Yasaman Jamalipour Soofi1; Md Asad Rahman1; Yijia Gu1; Jinling Liu1; 1Missouri University of Science and Technology

8:20 AM
Are Process-Structure-Property Relationships Useful for Materials Design?: Raymundo Arroyave1; 1Texas A&M University

8:40 AM
Artificial Intelligence Guided Studies of van der Waals Magnets: Trevor David Rhone1; Bethany Luschi2; Misha Salim1; Daniel Larson3; Efthimios Kaxiras5; 1Rensselaer Polytechnic Institute; 2Argonne National Laboratory; 3Harvard University

9:00 AM
A.I. Driven Sustainable Aluminum Alloy Design: Fatih Sen4; 1Novelis

9:20 AM
De Novo Molecular Drug Design Using Deep and Reinforcement Learning: Srilok Srinivasan1; Rohit Batra2; Henry Chan3; Mathew Cherukara4; Jonathan Steckbeck1; Nicholas Nystrom1; Subramanian Sankaranarayanan5; 1Peptilogics; 2Argonne National Laboratory

9:40 AM
Characterizing Disorder and Materials Phases in Atomic Microstructures Using Euclidean Neural Networks: Tim Hsu1; James Chapman1; Cheol Woo Park1; Nicolas Bertin1; Babak Sadigh1; Vasily Bulatov1; Tae Wook Heo1; Xiao Chen1; Brandon Wood1; Fei Zhou1; 1Lawrence Livermore National Laboratory

10:00 AM Break

10:20 AM
Explainable Property Predictions with Incorporated Uncertainty Quantification: Michael Pekala1; Alexander New1; Nam Le1; Janna Domenico1; Christine Piatko1; Tyrel McQueen1; Christopher Stiles1; 1Johns Hopkins University Applied Physics Laboratory; 2Johns Hopkins University

10:40 AM
High-dimensional Neural Network Potential for Liquid Electrolyte Simulations: Applications to Li-ion Battery Materials: Garvit Agarwal1; Steven Dajnowicz2; James Stevenson1; Leif Jacobson1; Farhad Ramezanghorbani1; Karl Leswing1; Mathew Halls1; Robert Abet1; 1Schroding Inc

11:00 AM Question and Answer Period

CERAMIC AND GLASS MATERIALS

Ceramics and Glasses Modeling by Simulations and Machine Learning — Machine Learning Modeling of Glass and Ceramics

Sponsored by: ACerS Glass & Optical Materials Division

Program Organizers: Mathieu Bauchy, University of California, Los Angeles; Peter Kroll, University of Texas at Arlington; N. M. Anoop Krishnan, Indian Institute of Technology Delhi

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Session Chairs: Mathieu Bauchy, UCLA; Peter Kroll The University of Texas at Arlington; Anoop Krishnan. IIT Delhi

8:00 AM Invited
Machine Learning Defect Properties of Semiconductors: Arun Kumar Mannodi Kanakkithodi1; 1Purdue University

8:30 AM
Natural Language Processing Aided Understanding of Material Science Literature: Mohd Zaki1; Tanishq Gupta1; N. M. Anoop Krishnan2; Mauzam Mausam1; 1Indian Institute of Technology Delhi

8:50 AM
Machine Learning-Derived Atomistic Potentials for Y2 Si2O7 and Yb2 Si2O7: Cameron Bodenschatz1; Wissam Saidi1; Jamesa Stokes1; 1NASA Glenn Research Center; 2University of Pittsburgh
9:10 AM
Using Machine Learning Empirical Potentials to Investigate Interdiffusion at Metal-Chalcogenide Alloy Interfaces: Siddarth Achar1; Derek Stewart2; Julian Schneider3; 1University of Pittsburgh; 2Western Digital Technologies; 3Synopsis Inc.

9:30 AM
Quantifying the Local Structure of Metallic Glass as a Function of Composition and Atomic Size: Thomas Hardin1; Michael Chandross1; Murray Daw2; 1Sandia National Laboratories; 2Clemson University

9:50 AM
Data-driven Prediction of Room Temperature Density of Multicomponent Silicate-based Glasses: Kai Gong1; Elsa Olivetti1; 1Massachusetts Institute of Technology

10:10 AM Break

10:30 AM Invited
A Physics Informed Machine Learning Approach to Predict Glass Forming Ability: Collin Wilkinson1; Cory Trivelpiece2; Rebecca Welch3; John Mauro4; 1Pennsylvania State University; 2Savannah River National Laboratory

11:00 AM
Data Driven Design and Enhancement of Machinable Glass Ceramics: Prachi Gang1; Scott Broderick1; Baishakhi Mazumder1; 1University at Buffalo

11:20 AM
Predicting and Accessing Metastable Phases: Vancho Kocevski1; James Valdez2; Benjamin Derby1; Ghanshyam Pilania1; Blas Uberuaga2; 1Los Alamos National Laboratory

11:40 AM
Predicting the Dynamics of Atoms in Glass-Forming Liquids by a Surrogate Machine-Learned Simulator: Mathieu Bauchy1; 1University of California, Los Angeles

8:30 AM Invited
Visualizing complex many-body phenomena in atomically thin quantum materials: Jyoti Katoch1; 1Carnegie Mellon University

9:00 AM
Synthesis of Solid-Solution MXenes with Tunable Electronic, Optical, and Electrochemical Properties: Christopher Shuck1; Meikang Han1; Kathleen Maleski1; Yizhou Yang1; James Glazar2; Alexandre Foucher3; Kanit Hantanasirisakul1; Asia Sarycheva4; Nathan Frey5; Steven May5; Vivek Shenoy6; Eric Stach6; Yury Gogotsi7; 1Drexel University; 2University of Pennsylvania

9:20 AM
Safer Etching of Ti3AlC2 MAX Phases to Directly Yield Ti3C2Tz MXene Nanosheets Using Quarternary Ammonium Fluorides: Vrushali Kotasthane1; Zeyi Tan1; Junyeong Yun1; Jodie Lutkenhaus1; Micah Green1; Miladin Radovic2; 1Texas A&M University

9:40 AM
Transition Metal Carbo-Chalcogenide "TMCC" a New Family of Two-dimensional Materials: Ahmad Ibrahim1; Manish Kothakonda1; Fei Wang2; Eric Tseng2; Kaitlyn Prenger1; Xiaodong Zhang1; Per Persson2; Jiang Wei1; Jianwei Sun1; Michael Naguib1; 1Tulane University; 2Linköping University

10:00 AM Break

10:20 AM Invited
Exciton Physics at the Atomic Scale: Dan Gunlyche1; 1U.S. Naval Research Laboratory

10:50 AM Invited
Synthesis of Nanolamellar Ultra-high Temperature Carbides by High-temperature Phase Transformation of 2D MXenes: Babak Anasori1; 1Purdue School of Eng. & Tech., IUPUI

11:20 AM
Fundamental Understanding of Defect Evolution in Two-dimensional Phosphorus Under Ion Irradiation: Saransh Gupta1; Badri Narayanar1; 1University of Louisville

11:40 AM
Scalable Synthesis of Titanium Carbo-oxides Nanofilaments and 2D Flakes, Their Properties, and Potential Applications: Hussein Badr1; Michel Barsoum2; 1Drexel University

12:00 PM
Synthesis of Functional Semiconducting Metal-sulfide Materials by Molecular Building Blocks: Veronika Brune1; Sanjay Mathur1; 1University of Cologne

NANOMATERIALS

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials — 2D Materials Synthesis & Properties

Sponsored by: ACerS Basic Science Division, ACerS Electronics Division, ACerS Engineering Ceramics Division

Program Organizers: Haitao Zhang, University of North Carolina at Charlotte; Gurpreet Singh, Kansas State University; Kathy Lu, Virginia Polytechnic Institute and State University; Edward Gorzkowski, Naval Research Laboratory; Jian Shi, Rensselaer Polytechnic University; Michael Naguib, Tulane University; Sanjay Mathur, University of Cologne

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Session Chairs: Michael Naguib, Tulane University; Haitao Zhang, University of North Carolina at Charlotte

8:00 AM Keynote
Near-field Imaging of 2D-heterostructures: Portraying Optical Nonuniformity at the Nanoscale: Slava V Rothin1; 1The Pennsylvania State University
**EDUCATION**

Curricular Innovations and Continuous Improvement of Academic Programs (and Satisfying ABET along the Way): The Elizabeth Judson Memorial Symposium — Curricular Advances and Accreditation

*Sponsored by:* TMS Accreditation Committee, TMS Education Committee

*Program Organizers:* Alison Polaski, Campbell University; Jeffrey Fergus, Auburn University; Assel Aitkaliyeva, University of Florida; Kester Clarke, ASPPRC; Colorado School of Mines

*Monday AM | October 10, 2022 | 312 | David L. Lawrence Convention Center*

*Session Chairs:* Robert Heard, Carnegie Mellon University; Kester Clarke, Colorado School of Mines

8:00 AM  
ABET and Continuous Improvement: What’s New, and Q&A: Janet Callahan; 1Michigan Technological University

8:20 AM
Inclusive Pedagogy in Introductory Materials Science Courses: Vincent Sokalski; 1Carnegie Mellon University

8:40 AM
Preparing Engineering Students to Work in and Design Solutions for Diverse Populations: Jeffrey Fergus; 1Auburn University

9:00 AM  
Panel Discussion: Best Practices as You Prepare for an ABET Visit

9:40 AM
Helping to Prepare Students for Communicating in the Professional World: Gregg Janowski; 1University of Alabama at Birmingham

10:00 AM  
Break

10:20 AM
Technical Communication: Graduate Student Training via Regular Reporting within I/UCRCs: Kester Clarke; 1Colorado School of Mines

10:40 AM  
Panel Discussion: Teaching Technical Communication and "Soft Skills"

**FUNDAMENTALS AND CHARACTERIZATION**

Dynamic Behavior of Materials: Experiments and Molecular Dynamics Simulations — Dynamic Behavior of Materials: Experiments and Molecular Dynamics Simulations

*Sponsored by:* TMS: Computational Materials Science and Engineering Committee

*Program Organizers:* Ghatu Subhash, University of Florida; Douglas Spearot, University of Florida

*Monday AM | October 10, 2022 | 326 | David L. Lawrence Convention Center*

*Session Chairs:* Ghatu Subhash, University of Florida; Douglas Spearot, University of Florida

8:00 AM  
Keynote  
Structure / Property (Constitutive and Dynamic Strength / Damage) Characterization of Single-Phase FeAl: George Gray; Saryu Fensin; Carl Cady; H Wang; Kenneth Vecchio; 1Los Alamos National Laboratory; 2University of California San Diego

8:40 AM
Shock-induced Spallation in Monocrystalline Boron Carbide: Ghatu Subhash; Amith Adoor Cheenady; 1University of Florida

9:00 AM
Phase Transformation in Cu: Nilanjan Mitra; 1Johns Hopkins University

9:20 AM
Atomic Simulations of Shock Wave Propagation in Polymers and Their Interfaces: Nuwan Dewapriya; Ron Miller; 1Simon Fraser University

9:40 AM
Shock Compression of Cu$_x$Zr$_{100-x}$ Metallic Glasses: Peng Wen; Brian Demaske; Simon Philipot; Douglas Spearot; 1Nanjing University of Science and Technology; 2Sandia National Laboratories; 3University of Florida

10:00 AM  
Break

10:20 AM
Exploring Thermal, Mechanical, and Electrical Shock via In-situ Electron Microscopy: Eric Lang; Ryan Schoell; Nathan Madden; Kathryn Small; Khalid Hattar; 1Sandia National Laboratories

10:40 AM
A Molecular Dynamics Study of the Effect of an Oxide Layer on the High Velocity Deposition of Tantalum Nanoparticles: Stephen Bierschenk; Michael Becker; Desiderio Kovar; 1The University of Texas at Austin

11:00 AM
Micro Cold Spray of Zinc Oxide Films: Scott Burlison; Michael Becker; Desiderio Kovar; 1University of Texas at Austin

11:20 AM
Scaling up Molecular Dynamics Simulations of High Velocity Particle Impacts: Aidan Moyers; Michael Becker; Desiderio Kovar; 1The University of Texas at Austin
11:40 AM
Mechanical Properties in Thermally Processed Ag-Cu-Ni Nanoclusters: Effect of Surface Composition and Core-shell Morphology Using Hybrid Monte Carlo/Molecular Dynamics Simulations: Serzat Safaltin¹; Pamir Alpay¹; ¹University of Connecticut

SUSTAINABILITY, ENERGY, AND THE ENVIRONMENT

Energy Materials for Sustainable Development — Storage Batteries

Sponsored by: ACerS Energy Materials and Systems Division

Program Organizers: Krista Carlson, University of Nevada, Reno; Armin Feldhoff, Leibniz Universität Hannover; Kyle Brinkman, Clemson University; Eva Hemmer, University of Ottawa; Nikola Kanas, BioSense Institute; Kjell Wiik, Norwegian University of Science and Technology; Lei Zuo, Virginia Tech; Joshua Tong, Clemson University; Danielle Benetti, Institut National de la Recherche Scientifique; Katherine Develos-Bagarinao, National Institute of Advanced Industrial Science and Technology; Soumi Chatterjee, Aditya Birla Science & Technology; Eva Hemmer, University of Ottawa; Nikola Kanas, BioSense Institute; Kjell Wiik, Norwegian University of Science and Technology; Lei Zuo, Virginia Tech; Joshua Tong, Clemson University; Danielle Benetti, Institut National de la Recherche Scientifique; Katherine Develos-Bagarinao, National Institute of Advanced Industrial Science and Technology; Soumi Chatterjee, Aditya Birla Science & Technology Company, Ltd

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Session Chairs: Kyle Brinkman, Clemson University; Krista Carlson, University of Nevada, Reno; Armin Feldhoff, Leibniz Universität Hannover

8:00 AM Introductory Comments

8:10 AM Invited Design, Modeling, and Direct Write Additive Manufacturing (DWAM) of Electrodes for Batteries: Anjed Almansour¹; Roy Sullivan¹; Mritunjay Singh²; Michael Halbig¹; Daniel Gorican¹; ¹NASA Glenn Research Center; ²Ohio Aerospace Institute at NASA Glenn; ³KSLC at NASA Glenn

8:40 AM Ceramic-based Solid-state Sodium-ion Batteries Fabricated in a Single Step via Cold Sintering: Zane Grady¹; Julian Fanghanel¹; Clive Randall¹; ¹Penn State

9:00 AM Molecular Pathways to AL2S3 for Next Generation Battery Application: Chijioke Amadi¹; Veronika Brune¹; Michael Wilhelm¹; Sanjay Mathur¹; ¹University of Cologne

9:20 AM A Saccharide-based Binder for Efficient Polysulfide Regulations in Li-S Batteries: Yingyi Huang¹; Mainak Majumder¹; Matthew Hill¹; Mahdokht Shaibani¹; ¹Monash University; ²Monash University & CSIRO

9:40 AM Self-propagating High Temperature Synthesis of Chevrel Phase Sulfoides from Elemental Precursors: Tessa Gilmore¹; Pelagia-Irene Gouma¹; ¹The Ohio State University

10:00 AM Break

10:20 AM Invited Processing and Characterization of Li7La3Zr0.5Nb0.5Ta0.5Hf0.5O12 High-entropy Li-garnet Electrolyte: Zhezhen Fu¹; ¹University of Wisconsin-Platteville

10:40 AM High Entropy Oxalates (HEOx) as Promising Anode Materials for Rechargeable Li-ion and Na-ion Batteries: Aman Bhardwaj¹; Michael Wilhelm¹; Ziyaad Aytuna¹; Niusha Heshmati¹; Sanjay Mathur¹; ¹University of Cologne

11:00 AM Cycling Demonstration of Sequential Deposition Synthesis-synthesized Lithium Garnet Films in Full Batteries: Jesse Hinricher²; Chae-Ah Kim²; Heung Chan Lee²; Lincoln Miara²; Won Seok Chang³; Andrea Maurano²; Jeong-Ju Cho³; Zachary Hood³; Jennifer Rupp³; ¹Massachusetts Institute of Technology; ²Samsung Research America; ³Samsung Advanced Institute of Technology

11:20 AM Electrospun Vanadium Pentoxide Nanofibers as a Photocathode in a Light Rechargeable LIB: Michael Wilhelm¹; Ruth Adam¹; Aman Bhardwaj¹; Veronika Brune¹; Sanjay Mathur¹; ¹University of Cologne

11:40 AM Synthesis of Ce-Doped NaSICON Using Mechanical-Activation-Enhanced-Process: Brian Johnston¹; ¹North Central College

CERAMIC AND GLASS MATERIALS

Glasses and Optical Materials: Current Issues and Functional Applications — Silicate (rich) Glasses

Sponsored by: ACerS Basic Science Division, ACerS Glass & Optical Materials Division

Program Organizers: Doris Möncke, Alfred University; Mathieu Hubert, Corning Incorporated

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Session Chair: Dominique de Ligny, University Erlangen

8:00 AM Purification and Investigation of Tellurium Rich Ge-Sb-Se-Te Chalcogenide Glass for Far Infrared Applications: Akila Prabhudessai¹; Balaji S²; Shweta Chahal¹; Ramesh K²; Rana Dasgupta²; Pratik Sarkar²; Annapurna K²; ¹Indian Institute of science (IISc); ²CSIR-NEERI; ³CSIR-CGCRI

8:20 AM Invited Thin-Film Glassy Solid Electrolytes Enabling High Energy Density Na Solid State Batteries: Steve Martin¹; ¹Iowa State University

8:50 AM Invited A Comparison of Polymerization in Barium Silicate Glasses and Crystals: Benjamin Moulton¹; ¹Friedrich–Alexander Universitat

9:20 AM Oxygen Triclusters and Five-Coordinated Alumina Species in Calcium-aluminosilicate Glasses: Andrea Maurano²; Jeong-Ju Cho²; Zachary Hood²; Jennifer Rupp²; ¹Massachusetts Institute of Technology; ²Samsung Research America

9:40 AM Effect of Modifier Cation Type on Structure and Nickel Speciation in Alkali Borosilicate Glasses: Lucas Greiner¹; Brian Topper¹; Randall Youngman¹; Doris Möncke¹; ¹Alfred University; ²Corning Inc.
10:00 AM Break

10:20 AM MD Simulations of SLS Batch Melting: Alastair Cormack; Alfred University

10:40 AM Continuation of the Investigation of Double Ion-exchange in Mixed Alkali-lime Silicate Glasses: Jacob Kaspryk; William LaCourse; Alfred University

11:00 AM Effect of Ion-exchange Strengthening on the Mechanical Behavior of Sodium Aluminophosphosilicate Glass: Kasimuthumaniyan S; Allu Amarnath Reddy; N. M. Anoop Krishnan; Nitya Nand Gosvami; Indian Institute of Technology Delhi; CSIR-Central Glass and Ceramic Research Institute

11:20 AM 3D Mapping of Glass Indentation Stress Fields: Amanda Bellafatto; Ivar Reimanis; Colorado School of Mines


FUNDAMENTALS AND CHARACTERIZATION
Grain Boundaries, Interfaces, and Surfaces: Fundamental Structure-Property-Performance Relationships — Interfaces in Functional Materials

Sponsored by: ACerS Basic Science Division

Program Organizers: Shen Dillon, University of California, Irvine; Wolfgang Rheinheimer, Julich Research Center; Catherine Bishop, University of Canterbury; Ming Tang, Rice University; John Blendell, Purdue University; Wayne Kaplan, Technion - Israel Institute Of Technology; Melissa Santala, Oregon State University

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Session Chair: To Be Announced

8:00 AM Understanding of Interface-property Relationships of Vertically Aligned Mixed Ionic Electronic Conductor-Ionic Conductor Heterostructures: Gene Yang; Mohammad El Loubani; Dongkyu Lee; University of South Carolina

8:20 AM Influence of Misfit Dislocations on Oxygen Vacancy Migration at SrTiO3/BaZrO3 Heterointerfaces: Will Ebmeyer; Pratik Dholabha; Rochester Institute of Technology

8:40 AM Electronic Structure Engineering through Atomic-scale Strain Control In Complex Oxide Heterostructures: Peter A. van Aken; Max Planck Institute for Solid State Research

9:10 AM Invited Grain Boundary Metal-insulator Transitions in Ionic Ceramics: Edwin Garcia; Purdue University

9:30 AM Impact of Grain Boundaries on the Dielectric Behavior of Graphite: Deborah Chung; Xiang Xi; State University of New York Buffalo

9:50 AM Break

10:10 AM Invited Grain Boundary Segregation and Impedance in Dielectric Ceramics: Elizabeth Dickey; Andrew Aumen; Seonghwan Hong; Carnegie Mellon University

10:40 AM Moisture Incorporation and Degradation in Dielectrics and Piezoelectrics: John McGarrahan; Elizabeth Dickey; NC State University; Carnegie Mellon University

11:00 AM Invited Advanced (S)TEM Characterization of the Role of Interfaces and Defects during Electrochemical Cycling of Oxide-Based Solid Electrolytes and Electrode Materials: Kai Wang; Ziming Ding; Yushu Tang; Georgian Melinte; Xiaoke Mu; Di Wang; Ben Breitung; Christian Kuebel; Karlsruher Institute for Technology

11:30 AM Multiphysics-Based Data Analytics of LiMn2O4 Particles Decrepidation: Alfredo Sanjuan; Edwin Garcia; Purdue University

FUNDAMENTALS AND CHARACTERIZATION
High Entropy Materials: Concentrated Solid Solutions, Intermetallics, Ceramics, Functional Materials and Beyond III — Processing and Properties

Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Yu Zhong, Worcester Polytechnic Institute; Michael Gao, National Energy Technology Laboratory; Xingbo Liu, West Virginia University; Peter Liaw, University of Tennessee; Jian Luo, University of California; Yiquan Wu, Alfred University; Mitra Taheri, Johns Hopkins University; Amy Clarke, Colorado School of Mines

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Session Chairs: Martin Detroit, National Energy Technology Laboratory; Amy Clarke, Colorado School of Mines

8:00 AM Keynote Do We Need a Refractory Alloy with Super-high Strength at Room Temperature?: Daniel Miracle; S. Rao; Oleg Senkov; Carolina Frey; Air Force Research Laboratory; Air Force Research Laboratory; MRL Materials Resources LLC; University of California Santa Barbara

8:30 AM Invited Phase Formation Capability of 𝛽-(REI0.25REII0.25REIII0.25REIV0.25)2Si2O7: Towards Compositional Design of Multiple Rare Earth Principal Components: Jingyang Wang; Shenyang National Laboratory for Materials Science, Institute of Metal Research
8:50 AM
Probing Short-Range Order and Its Effect on the Mechanical Properties of a CrCoNi Multi-principal Element Alloy Using Nanoindentation: Mingwei Zhang1; Qin Yu1; Dongye Liu2; Robert Ritchie1; Andrew Minor1; 1Lawrence Berkeley National Laboratory; 2University of California, Berkeley

9:10 AM
Production, Characterization, Mechanical Properties and Corrosion Resistance of CrCoNi-based Multi-principal Element Alloys: Francisco Coury1; Diego Santana2; Gustavo Bertoli3; David Silva4; Maria Eduarda Pablo5; Caroline Stoco6; Guilherme Koga6; Nicholas Birbilis6; João Pedro Oliveira3; Michael Kaufman4; Amy Clarke1; 1Universidade Federal de São Carlos; 2Australian National University; 3Universidade Nova de Lisboa; 4Colorado School of Mines

9:30 AM
Revealing Phase Transformation and Deformation Behavior in a B2-base High-Entropy Alloy by In-situ Neutron Diffraction: Rui Feng1; Peter Liaw2; Ke An1; 1Oak Ridge National Laboratory; 2The University of Tennessee, Knoxville

9:50 AM  Break

10:10 AM Invited
A Bayesian Approach to Efficiently Discover Refractory High Entropy Alloys: Raymundo Arroyave1; 1Texas A&M University

10:40 AM Invited
Manufacturing of HEAs at Different Scales: Martin Detroit1; Michael Gao2; Paul Jablonski1; 1National Energy Technology Laboratory

11:00 AM
Thermodynamics and Phase Transformations in Refractory Complex Concentrated Superalloys: Eric Lass2; 1University of Tennessee-Knoxville

11:20 AM
Deformation Behaviors and Mechanisms in Single BCC Phase Refractory High-entropy Alloys: Channya Lee5; George Kim3; Yi Chou4; Michael Gao2; Ke An1; Gian Song2; Yi-Chia Chou1; Wei Chen4; Nan Li2; Saryu Fensin3; Peter Liaw2; 1Los Alamos National Laboratory; 2Illinois Institute of Technology; 3National Chiao Tung University; 4National Energy Technology Laboratory; 5Oak Ridge National Laboratory; 6Kongju University, 7The University of Tennessee, Knoxville

11:40 AM
Design & Microstructural Evolution of Fe-rich, Co-Free Multi-principal Element Alloys: James Frishkoff2; Camden Gruchow3; Madeline Rivera1; Nathan Brown1; Kester Clarke2; Amy Clarke1; 1Colorado School of Mines

PROCESSING AND MANUFACTURING

Innovative Process Design and Processing for Advanced Structural Materials — Welding, Electrical Current-induced Phenomenon, and Additive Manufacturing

Program Organizers: Ju-Young Kim, UNIST; Jae-il Jang, Hanyang University, Sung-Tae Hong, University of Ulsan; Rongshan Qin, The Open University

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Session Chairs: Megumi Kawasaki, Oregon State University; Rongshan Qin, The Open University; Sung-Tae Hong, University of Ulsan

8:00 AM
A Novel Gas-pocket Assisted Underwater Friction Stir Spot Processing Technique for Underwater Welding: Soumyabrata Basak1; Mouarik Mondal1; Kun Gao1; Sung-Tae Hong1; Sam Anaman2; Hoon-Hwe Cho3; 1University of Ulsan; 2Hanbat National University

8:20 AM Invited
A New Method for Measurement of Flow Stresses at High Strain Rates and Temperatures for Improved Simulation of Friction Stir Welding: Michael Miles1; Tracy Nelson1; David Prymak1; Fredrick Michael2; 1Brigham Young University; 2NASA Marshall Space Flight Center

8:40 AM Invited
Effect of Electric Current on The Microstructure and Properties of Duplex Stainless Steel: Rongshan Qin1; 1The Open University

9:00 AM Invited
Effects of Electric Current on the Plastic Deformation Behavior of Pure Copper, Iron, and Titanium: Christopher Rudolf1; 1US Naval Research Laboratory

9:20 AM Keynote
Electric Current-induced Phenomena in Materials: Heung Nam Han1; 1Seoul National University

10:00 AM Break

10:20 AM Keynote
Co-design of 3D Printing, Parts and Microstructure: Anthony Rollett1; Nicholas Lamprinakos2; Junwon Seo3; Srujana Yarasi1; 1Carnegie Mellon University

11:00 AM Invited
Additive Manufacturing of Multi-principal Element Alloys: Pan Wang1; Mehmet Cagirici1; Mui Ling Sharon Nai2; Jun Ding2; Jun Wei2; 1Singapore Inst of Manufacturing Tech (SIMTech); 2National University of Singapore

11:20 AM Invited
Structural Evolution during Nanostructuring and Heating of an Additive-manufactured Stainless Steel Examined by X-ray and In-situ Neutron Diffraction Analyses: Megumi Kawasaki1; Jae-Kyung Han1; Xiaoqiang Lu2; Yusuoke Onuki2; Yulia Kuzminova3; Stanislav Evtushin3; Klaus-Dieter Liss4; 1Seoul National University; 2Guangdong Technion - Israel Institute of Technology; 3Ibaraki University; 4Skolkovo Institute of Science and Technology
11:40 AM
Novel Solid-State Metal Powder Fabrication Process for Feedstock of Metal Matrix Composites Additive Manufacturing: Taegyu Lee1; Seunghyeok Chung1; Wonjong Jeong1; Ho Jin Ryu1; 1KAIST

MODELING

Integration between Modeling and Experiments for Crystalline Metals: From Atomic to Macroscopic Scales IV — Session I

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee, TMS Materials Characterization Committee, TMS: Nanomaterials Committee

Program Organizers: Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Levente Balogh, Queen’s University; Caizhi Zhou, University of South Carolina; Lei Cao, University of Nevada; Josh Kacher, Georgia Institute of Technology

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Session Chairs: Amit Misra, University of Michigan; Hamidreza Abdolvand, The University of Western Ontario

8:00 AM Invited
Integration of Experiments and Modeling in Polycrystalline Plasticity of Mg-Al Single Phase Alloys: Moshen Andani1; A Lakshmanan1; Y Yoo1; V Sundararaghavan1; J Allison1; Amit Misra1; 1University of Michigan

8:30 AM
Modeling of the Tension-compression Asymmetry Reduction of ECAPed Mg-3Al-1Zn Through Grain Fragmentation: Georges Ayoub1; Ali Kobaissyp2; Mutaseh Shehadehp2; 1University of Michigan; 2American University of Beirut

8:50 AM
Concurrent Atomistic-continuum Simulation of the Interplay between Dislocations, Phase Transformation, Twinning, and Reverse Phase Transformation in Plastically Deformed Materials: Liming Xiong1; 1Iowa State University

9:10 AM
Mapping the Dislocation Density Around a SS316L Weld Using Synchrotron X-ray Diffraction to Validate Finite Element Method Plasticity Modeling: Lucas Rakhov1; Ondrej Muransky2; Levente Balogh1; 1Queen’s University; 2Australian Nuclear Science and Technology Organisation

9:30 AM Invited
New Insights into the Spatiotemporal Structure of Plastic Flow in hcp Materials by Combination of Advanced In Situ Techniques and Modeling: Kristian Mathis1; 1National Physics Institute of the CAS

10:00 AM Break

10:20 AM
Role of Dislocations and Deformation Twinning on the High-pressure Phase Transformation in Zirconium: Mariyappan Arul Kumar1; T Yu2; Y Wang2; Rodney McCabe1; Carlos Tome1; Laurent Capolungo1; 1Los Alamos National Laboratory; 2The University of Chicago

10:40 AM
A Numerical Study on How Surfaces Bias Relative Slip Family Activity: Ruxin Zhang1; Thomas Bieler1; Philip Eisenlohr1; 1Michigan State University

11:00 AM Invited
Deformation Mechanisms of Hexagonal Close-packed Materials: Modeling and Experimentation: Hamidreza Abdolvand1; 1The University of Western Ontario

SPECIAL TOPICS

K-12 Educators Forum — Session I

Sponsored by: ACerS

Program Organizers: Kathleen Richardson, University of Central Florida; Adelle Schade, Albright College

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Session Chair: Kathleen Richardson, University of Central Florida

9:00 AM Invited
The Art of Teaching Materials Characterization Techniques to K-12 Students: Julie Donnelly1; Rashi Sharma1; Casey Schwarz2; Matilwyn Lam1; 1University of Central Florida; 2Ursinus College

9:35 AM Invited
Total Experience Learning in Practice: K to 12 Materials and Glass Science Inventive Education: Adelle Schade1; Karen DeNunzio1; Kayla Gordon1; Chris Spohn1; 1Albright College

10:10 AM Break

10:30 AM Invited
Glass science and Materials engineering to Engage Students (GaMES): An Interdisciplinary Materials Science Camp Designed to Inspire 4th-10th Grade Students through Unique Topics in STEM: Casey Schwarz1; Max Liggett1; Kat Swan1; Caroline Vauclain1; Jason Bennett1; Quentin Altemose1; Julie Donnelly1; Rashi Sharma1; 1Ursinus College; 2University of Central Florida

11:05 AM Invited
Uncovering the Genius That Resides In Every Child, Total Experience Learning: Adelle Schade1; Karen DeNunzio1; Ellen Albright1; 1Albright College
ARTIFICIAL INTELLIGENCE

Materials Processing and Fundamental Understanding Based on Machine Learning and Data Informatics — AI-guided Microstructure Study

Program Organizers: Kathy Lu, Virginia Polytechnic Institute and State University; Jian Luo, University of California, San Diego; Xian-Ming Bai, Virginia Polytechnic Institute and State University; Yi Je Cho, Sunchon National University

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Session Chair: To Be Announced

8:00 AM Invited
Al/ML-Driven Multi-Scale Modeling and Design of Structural Materials: Pinar Acar1; Sheng Liu2; Mahmudul Hasan3; Arulmurugan Senthilnathan4; Hengduo Zhao5; 1Virginia Tech

8:30 AM
AI Driven Microscopic Analysis to Predict the Local Structure in Zirconia Ceramics: Prachi Garg1; Kristofer Reyes1; Baishakhi Mazumder1; 1University at Buffalo

8:50 AM
Graph Neural Network Modeling of Deforming Polycrystals: Darren Pagan1; 1Pennsylvania State University

9:10 AM
High-throughput Machine Learning Experiments with Graph Neural Networks for Predicting Abnormal Grain Growth in Polycrystalline Materials: Ryan Cohn1; Elizabeth Holm1; 1Carnegie Mellon University

9:30 AM Invited
Convex Neural Networks to Predict Texture-dependent Anisotropic Yield Surfaces: Matthew Kasemer1; Jan Fuhg2; Nikolaos Bouklas1; Lloyd van Wees3; 1University of Alabama; 2Cornell University

10:00 AM Break

10:20 AM
Microstructure Characterization and Reconstruction by Deep Learning Methodology: Satoshi Noguchi1; Junya Inoue1; 1The University of Tokyo

10:40 AM
Large Scale Atomistic Simulation of the B1-B4 Phase Transition of GaN with the Machine Learning Potential: Qiang Zhu1; Pedro Santos2; Yansun Yao3; 1University of Nevada, Las Vegas; 2University of Saskatchewan

FUNDAMENTALS AND CHARACTERIZATION

Metal Powder Synthesis and Processing — Session I

Sponsored by: TMS Powder Materials Committee

Program Organizers: James Paramore, US Army Research Laboratory; Iver Anderson, Iowa State University Ames Laboratory; Kyle Tsakopoulos, Worcester Polytechnic Institute

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Session Chairs: Kyle Tsakopoulos, Worcester Polytechnic Institute; James Paramore, United States Army Research Laboratory; Iver Anderson, Iowa State University Ames Laboratory

8:00 AM Invited
Mine-to-Market and Scrap Recycling Production of Low-Cost Near Carbon Neutral CP-Ti and Ti-6Al-4V: Hyrum Lefler1; Taylor Smith1; Aubrey Smith1; 1IperionX

8:40 AM
Synthesis and Characterization of Gas Atomized Ultra-high Strength Steel Powder Feedstock for Additive Manufacturing: Thinh Huynh1; Kevin Graydon1; Brandon McWilliams1; Kyu Cho1; Yongho Sohn1; 1University of Central Florida; 2DEVCOM US Army Research Laboratory

9:00 AM
Large Scale Manufacture and Processing of Nano-Crystalline Metal Powders by Mechanical Alloying (MA): Ryan Koseski1; Brian Gordon1; 1Veloxint CIF; 2Touchstone Research Labs

9:20 AM
Mechanical Alloying and Thermal Stability of Amorphous Co-C Alloys: Alex Aning1; Hesham Elmkharram1; 1Virginia Polytechnic Institute

9:40 AM
Engineering Amorphous Aluminum High Entropy Powder for Producing High Strength Cold Sprayed Deposits: Denny John1; Kazue Orikasa1; Tanaji Paul1; Cheng Zhang1; Arvind Agarwal1; 1Florida International University

10:00 AM Break

10:20 AM
A Framework for Powder Evaluation with Reuse in Laser Powder Bed Fusion Additive Manufacturing: Chinmay Phutela1; Federico Bosio1; Nesma Aboulkhair1; 1Technology Innovation Institute

10:40 AM
Processing of Selective Laser Melted Ti-5553 Aerospace Structures: Timothy Tan1; Roman Bolzowski1; David Yan1; 1San Jose State University

11:00 AM
Microstructural Comparison of Metal Hydrides Fabricated Using Direct Hydriding and Powder Metallurgy Techniques: Caitlin Taylor1; Aditya Shivprasad1; Thomas Nizolek1; Rodney McCabe1; Tyler Smith1; Michael Torrez1; Erik Luther1; Tarik Saleh1; 1Los Alamos National Laboratory
11:20 AM
Production Research of High-cut Steels by Methods of Hot Isostatic Pressing of Powder Materials: Anton Matiukhin\textsuperscript{1}; Vitalii Shyroko\textsuperscript{2}; Sergey Sheyk\textsuperscript{2}; Anna Ben\textsuperscript{1}; Elena Kulabneva\textsuperscript{1}; Tetiana Matiukhina\textsuperscript{1}; Zaporizhzhia Polytechnic National University; Zaporizhzhia National University

11:40 AM
Resistance Sintering Solid-state Bonding Model: Olga Eliseeva\textsuperscript{1}; Jerry Gould\textsuperscript{1}; EWI

MODELING

Multi Scale Modeling of Microstructure Deformation in Material Processing — Multi Scale Modeling of Microstructure Deformation in Material Processing

Sponsored by: AIST Metallurgy — Processing, Products & Applications Technology Committee

Program Organizers: Lukasz Madej, AGH University of Science and Technology; Jaimie Tiley, Oak Ridge National Laboratory; Krzysztof Muszka, AGH University of Science and Technology; Danuta Szeliga, AGH University of Science and Technology

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Session Chair: Krzysztof Muszka, AGH University

8:00 AM
PRISMS-fatigue: A General Framework for Fatigue Analysis in Polycrystalline Metals and Alloys Using the Crystal Plasticity Finite Element Method: Mohammadreza Yazhoo\textsuperscript{1}; Krzysztof S. Stopka\textsuperscript{1}; Aaditya Lakhsmanan\textsuperscript{1}; Veera Sundararaghav\textsuperscript{1}; John E. Allison\textsuperscript{1}; David L. McDowell\textsuperscript{1}; University of Michigan; \textsuperscript{2}Purdue University; \textsuperscript{3}Georgia Institute of Technology

8:20 AM
Microstructure Based Computational Analysis of Heterogeneous Materials: Riddhi Joshi\textsuperscript{1}; Tanaji Paul\textsuperscript{1}; Cheng Zhang\textsuperscript{1}; Benjamin Boesl\textsuperscript{1}; Arvind Agarwal\textsuperscript{1}; Florida International University

8:40 AM
Development of the Random Cellular Automata Model of Unconstrained Grain Growth: Mateusz Sli\textsuperscript{1}; Michal Czarnecki\textsuperscript{1}; Lukasz Madej\textsuperscript{1}; AGH University of Science and Technology

9:00 AM
Hardness-dependent Plasticity and Damage Initiation Within Simulated Tension-shear Testing of AHSS Resistance Spot Welds: Eric Brizes\textsuperscript{1}; Nathan Daubenmier\textsuperscript{1}; Antonio Ramirez\textsuperscript{1}; OSU Welding Engineering

9:20 AM
New Insights into the Cube Texture Development during Recrystallization of High to Medium SFE FCC Metals: Supriyo Chakraborty\textsuperscript{1}; Chaitali Patil\textsuperscript{1}; Stephen Niezgoda\textsuperscript{1}; Yunzhi Wang\textsuperscript{1}; The Ohio State University

9:40 AM
Multi Scale Modeling of Elastic Properties of FeMnNiCoMo System: Kamil Cichocki\textsuperscript{1}; Tomasz Kargul\textsuperscript{1}; Piotr Bala\textsuperscript{1}; Krzysztof Muszka\textsuperscript{1}; AGH University of Science and Technology
10:40 AM
Graphene Infused High Conductivity Copper: Syed Jalali\textsuperscript{1}; Rishi Raj\textsuperscript{1}; Emmanuel Bamidele\textsuperscript{1}; \textsuperscript{1}University of Colorado, Boulder

11:00 AM
Touch Free Flash Sintering of Ceramics: Syed Jalali\textsuperscript{1}; Rishi Raj\textsuperscript{1}; Emmanuel Bamidele\textsuperscript{1}; \textsuperscript{1}University of Colorado, Boulder

11:20 AM
Using Organic Acids to Densify Ceramics: Julian Fanghanel\textsuperscript{2}; Clive Randall\textsuperscript{2}; \textsuperscript{2}Penn State

11:40 AM
Mechanochemistry: From Scientific Mystery to Scalable Materials Preparation and Recycling Technique: Viktor Balema\textsuperscript{1}; \textsuperscript{1}ProChem Inc.

SPECIAL TOPICS

Resisting Degradation from the Environment: A Symposium Honoring Carolyn M. Hansson’s Research and Pioneering Experiences as a Woman in STEM — Talks to Introduce Posters I

Sponsored by: TMS: Corrosion and Environmental Effects Committee, TMS: Steels Committee

Program Organizers: Jenifer Locke, Ohio State University; Brendy Rincon Troconis, University of Texas at San Antonio; Ashley Paz y Puente, University of Cincinnati; George Gray, Los Alamos National Laboratory; Suveen Mathaudhu, Colorado School of Mines; David Shifter, Office of Naval Research

Monday AM | October 10, 2022
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Session Chair: Jenifer Locke, The Ohio State University

8:00 AM
Environmental Effect on Reinforced Concrete Structures; DURACON Project, 20 Years of Contributions: Oladis Troconis de Rincon\textsuperscript{1}; Juan Montenegro\textsuperscript{2}; Rosa Vera\textsuperscript{2}; Ruby Mejia de Gutierrez\textsuperscript{2}; Erika Saborio\textsuperscript{2}; Andres Torres-Acosta\textsuperscript{3}; Pedro Castro-Borges\textsuperscript{3}; Manuela Salta\textsuperscript{3}; Isabel Martinez\textsuperscript{3}; Miguel Pedron\textsuperscript{4}; Valentina Millano\textsuperscript{4}; Miguel Sanchez\textsuperscript{4}; \textsuperscript{1}University of Cincinnati; \textsuperscript{2}George Gray, Los Alamos National Laboratory; \textsuperscript{3}Suveen Mathaudhu, Colorado School of Mines; \textsuperscript{4}David Shifter, Office of Naval Research

8:20 AM
Galvanic Corrosion of Active and Passive Steel Bars with Different Area Ratios: Amir Pourasaei\textsuperscript{1}; Zheng Dong\textsuperscript{1}; \textsuperscript{1}Clemson University; \textsuperscript{2}Zhejiang University of Technology

8:40 AM
Corrosion and Environmentally Assisted Cracking (EAC) Evaluation of Additively Manufactured (AM) High Strength Precipitation Hardened Steel (UNS S17400): Michelle Koul\textsuperscript{1}; Conner Panick\textsuperscript{2}; \textsuperscript{1}United States Naval Academy; \textsuperscript{2}United States Navy

9:00 AM
Evaluating the Sensitivities of SCC Susceptibility in Stainless-steel Nuclear Waste Storage Containers: Sarah Blust\textsuperscript{1}; James Burns\textsuperscript{1}; \textsuperscript{1}University of Virginia

9:20 AM
Corrosion of Fe-Cr-Mn Stainless Steel in Supercritical Water: Joseph Kish\textsuperscript{1}; Shooka Mahboubi\textsuperscript{1}; Yinan Jiao\textsuperscript{2}; \textsuperscript{1}Mcmaster University

9:40 AM
Oxidation Behavior of Model FeCrAl Steel and APMT Alloy After Exposure in Steam: Kinga Unocic\textsuperscript{3}; Kenneth Kane\textsuperscript{3}; Yukinori Yamamoto\textsuperscript{4}; Bruce Pint\textsuperscript{5}; \textsuperscript{3}Oak Ridge National Laboratory

10:00 AM Break

10:20 AM
Corrosion and Biocompatibility of 316L Stainless Steels Fabricated by Selective Laser Melting: Erica Murray\textsuperscript{6}; \textsuperscript{1}Louisiana Tech University

10:40 AM
Investigation of Crack Initiation in Hydrogen Embrittled Ni-base Alloy 725: Mengying Liu\textsuperscript{7}; Lai Jiang\textsuperscript{8}; Michael Demkowicz\textsuperscript{9}; \textsuperscript{7}Washington and Lee University; \textsuperscript{8}Texas A&M University; \textsuperscript{9}Texas A&M University

11:00 AM
Characterization of Internal Oxidation in Alloy 690 and Model Ni Alloys: Masoud Zakeri\textsuperscript{10}; Ibrahim Ogunsanya\textsuperscript{10}; Ali Ashrafiiah\textsuperscript{10}; Roger Newman\textsuperscript{10}; \textsuperscript{10}University of Toronto

11:20 AM Fireside Chat with Prof Carolyn Hansson

BIOMATERIALS

Society for Biomaterials: Biological Response to Materials and Material’s Response to Biological Environments — Session I

Program Organizers: Thomas Dziubla, University of Kentucky; Christopher Siedlecki, Penn State College of Medicine; Jeffrey Capadona, Case Western Reserve University; Lynne Jones, Johns Hopkins Orthopaedics

Monday AM | October 10, 2022
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Session Chairs: Thomas Dziubla, University of Kentucky; Lynne Jones, Johns Hopkins University

8:00 AM Introductory Comments

8:05 AM
Biomaterial-induced Activation of the Blood Coagulation Cascade: Christopher Siedlecki\textsuperscript{1}; Lichong Xu\textsuperscript{2}; \textsuperscript{1}Penn State College of Medicine

8:35 AM
Effects of Phospholipid Saturation and Cholesterol Concentration on Liposome Interaction with Fungal and Mammalian Cells: Ronnie LaMastro\textsuperscript{1}; Kayla Campbell\textsuperscript{1}; Peter Gonzalez\textsuperscript{1}; Anita Shukla\textsuperscript{1}; \textsuperscript{1}Brown University

8:55 AM
Targeting Cancer-associated Fibroblasts within a Tumor Microenvironment via Liposomes with Arginine-based Surface Modifiers: Tanzeel Ur Rehman\textsuperscript{1}; Kaitlin Bratlie\textsuperscript{1}; \textsuperscript{1}Iowa State University

9:15 AM
Antibacterial Activity of Titanium-based Material Systems: Golnaz Karbalaei Salehi\textsuperscript{1}; Parvane Shahmohammadi\textsuperscript{1}; Milad Rasouli\textsuperscript{1}; \textsuperscript{1}Karaj Islamic Azad University; \textsuperscript{2}Razi University; \textsuperscript{3}Tehran University of Medical Sciences
9:35 AM
Degradable Antioxidant Poly(Beta Amino Esters) as Systems to Control Inflammation and the Biomaterials Response: Thomas Dziubla; 1University of Kentucky

9:55 AM Break

10:15 AM Invited
Bone Formation via Acoustic Radiation Force: Transdermal Stimulation of Hydrogel-encapsulated Stem Cells: Yusuf Khan; 1Kevin Grassie; 1Hanna Anderson; 1William Linthicum; 2Bryan Huey; 2Fayekah Assanah; 1University of Connecticut Health Center; 2University of Connecticut

10:45 AM Carrageenan Based Composite Film Dressing for Effective Wound Healing Applications: Bavya Devi Karuppasamy; Nimu Reger; 1Thassim Beevi Abdul Kader College; 2National Institute of Technology Tiruchirappalli

11:05 AM Wear Particle-induced Differentially Polarized Macrophages Exhibit Variation in Protein Profile than M1 and M2: Divya Bijukumar; Vaishnavi Beena Valsan; Ryan Bomgardner; Guoxing Zheng; Mark Barba; Deborah Hall; Mathew Thoppill Mathew; Robin Pourzal; 1University of Illinois; 2Thermo Fisher Scientific; 3Ortho Illinois; 4Rush University Medical Centre

BIOMATERIALS

Society for Biomaterials: Biomaterial Applications — Cardiovascular Biomaterials

Program Organizers: Jessica Jennings, University of Memphis; Guillermo Ameer, Northwestern University; Danielle Benoit, University of Rochester; Jordan Gilmore, Clemson University

Monday AM | October 10, 2022
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Session Chair: Guillermo Ameer, Northwestern University

8:00 AM Invited
Development of a Microfluidic Blood-Vessel-on-Chip Model: Shaurya Prakash; 1The Ohio State University

8:30 AM Development of Tissue-Specific, Perfusable Vasculature in Microphysiological Systems: Kevin Ling; 1Arvind Srivatsava; 1Kannan Mannian; 1James McGrath; 1Ruchira Singh; 1Danielle Benoit; 1University of Rochester

8:50 AM Platinum Wire-based Aptasensors Exploiting Self-assembled Monolayer (SAM) Components for Cardiac Biomarker Detection: Prashant Kunta; 1Mitali Patil; 1Sangeetha Kunjukkan; 1John Ohodnicki; 1University of Pittsburgh

9:10 AM Additive Manufacturing and Characterization of Stimuli-Responsive Biomaterials for Cardiovascular Stents: Hamid Ilram; 1Ans Al Rashid; 1Muammer Koc; 1Hamad Bin Khalifa University

9:30 AM Invited
Combinatorial Approaches to Blood Contacting Materials: Christopher Siedlecki; 1Lichong Xu; 1Penn State College of Medicine

10:00 AM Break

10:20 AM Exploring Single Electrospun PLGA Fiber Mechanics and Fiber Mat Applications in Cardiac Bioengineering: Lihua Lou; 1Tanaji Paul; 1Alberto Rubiano; 1Jin He; 1Arvind Agarwal; 1Florida International University

10:40 AM Three-dimensional (3D) Iron Oxide Nanoparticles via Green Synthesis: A Review on Their Synthesis and Antibacterial Application: Ikhazuagbe Ifijen; Stanley O Omorogbe; Godfrey Otabor; 1Rubber Research Institute of Nigeria; 2University of Benin

11:00 AM Rapid Fire Posters

BIOMATERIALS

Society for Biomaterials: Biomaterial Applications — Today’s Industry: Development, Translation & Commercialization — Society for Biomaterials: Applications in Today’s Healthcare Industry

Program Organizers: Bob Hastings, Depuy Synthes, J&J; SuPing Lyu, Medtronic

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Session Chair: SuPing Lyu, Medtronic

8:00 AM Invited
Polymer Material Applications in Medical Devices: SuPing Lyu; 1Medtronic

8:30 AM Invited
Thermoplastic Polyurethanes in Medical Applications: Nathan Rohner; 1Anthony Walder; 1Michael Wiggins; 1Lubrizol

9:00 AM Invited
Predicting Patient Exposure to Medical Device Leachables: David Saylor; 1U.S. Food and Drug Administration

9:30 AM Invited
Metallic Materials Application in Medical Devices: Bernie LP; 1Medtronic

10:00 AM Effect of Newly Designed Hybrid Threaded Tapered Ti6Al4V Dental Implant in Enhancing Osseointegration: Validated in Rabbit Model Against a Commercial Implant: Deepa Mishra; 1Bikramjit Basu; 1Materials Research Centre; 1Indian Institute of Science

10:20 AM Murata’s NeuroStone Free-Form Inter-Connected Ceramic Technology for Medical Applications: Mark Waugh; 1Seth Berbano; 1Mike Cannon; 1Faycal Mounaim; 1Takumi Okashiro; 1Shu Hamada; 1Murata Electronics North America, Inc.; 2Murata Manufacturing Co., Ltd.
10:40 AM Break

11:00 AM
Silicon Nitride-infused Fabrics Exhibit Antiviral Behavior: Brittany Heath1; Chelsey McMinn2; Sherry Van Mondfrans2; Jackson Hendry2; Sean Ronayne3; Douglas Hoxworth2; B. Sonny Bal2; Bryan McEntire2; Kylene Kehn-Hall1; Ryan Bock1; 1Virginia Polytechnic Institute and State University; 2SINTX Technologies

11:20 AM
Evaluation of Antibacterial Silicon Nitride Powder and Infiltrated Fabrics: Chelsey McMinn1; Sherry Van Mondfrans2; Jackson Hendry2; Sean Ronayne1; Douglas Hoxworth2; Bryan McEntire2; Ryan Bock1; 1SINTX Technologies

11:40 AM Invited
Optimized Nanopatterned Electrodes for Enhanced Electrochemical Biosensors: Emily Kinser1; 13M Company

12:10 PM
Long-Term Biocompatibility of a Novel Radiopaque Non-compressible Microsphere for Transarterial Embolization: Kathleen O’Connell1; Daniel Boyd2; Robert Abraham2; Sharon Kehoe2; 1ABK Biomedical Inc.; 2Dalhousie University

9:00 AM Invited
Development of Novel Garnet-based Transparent Ceramics for the High Power White Lighting: Jianqiang Li1; Shaowei Feng2; Mathieu Allix3; Yongchang Guo2; Haiming Qin2; 1University of Science and Technology Beijing; Chinese Academy of Sciences; 2CNRS, CEMHTI UPR 3079, Univ. Orléans; 3Chinese Academy of Sciences

9:20 AM Invited
Investigation of Micro/Nano Mechanical Behavior of AlON Transparent Ceramics: Chenyun Zhang1; Ying Shi1; Yurui Xing1; Hongti Zhang2; 1Shanghai University; 2shanghaiTechUniversity

9:40 AM Invited
Stress Memory of Mechanoluminescent Phosphors with Deep Traps: Rong-Jun Xie1; 1Xiamen University

10:00 AM Break

10:20 AM Invited
Electroluminescence During Flash Experiments Interpreted as a Solid State Plasma: Syed Jalali1; Rishi Raj1; 1University of Colorado

10:40 AM Invited
Crystallization from Glass: Application to Transparent (Glass-) Ceramics: Mathieu Allix1; 1Laboratoire CEMHTI

11:00 AM Invited
MgAl2O4 and ZnAl2O4: Correlating Microstructure and Luminescence: Luiz Jacobsohn1; Robin Conner1; 1Clemson University

11:20 AM Invited
Non-equilibrium Synthesis of New Oxide Materials with Modified Optical Properties: Michael Pitcher1; 1CNRS UPR3079

11:40 AM
Structural and Optical Properties of the Spin-coated YAG and Nd:YAG Epitaxial Films: Iva Milisavljevic1; Yiquan Wu1; 1Alfred University

FUNDAMENTALS AND CHARACTERIZATION


Sponsored by: ACerS Basic Science Division

Program Organizers: Lan Li, Boise State University; Winnie Wong-Ng, National Institute of Standards and Technology; Kevin Huang, University of South Carolina

Monday AM | October 10, 2022
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Session Chair: Lan Li, Boise State University

8:00 AM Introductory Comments

8:05 AM Invited
Ceramic Faraday Rotator for Laser Machining: Akio Ikesue1; 1World-Lab. Co., Ltd

8:20 AM Invited
Beta-SiC for High Strength Windows: Joshua Gild1; Kim Woohong2; Shyam Bayya2; Guillermo Villalobos2; Adam Floyd2; Bryan Sadowski2; Tony Zhou1; Jasbinder Sanghera2; 1University Research Foundation; 2US Naval Research Lab; 3Jacobs

8:40 AM Invited
Ceramic Processes for LHPG (Laser Heated Pedestal Growth): Hyunjun Kim1; Randall Hay2; Kent Averett2; Andrew Schlup2; John Drazin3; Benjamin Gray3; Randall Corns1; Robert Turner1; Cynthia Bowers3; 1AFRL/UES; 2AFRL; 3AFRL/Azimuth

8:00 AM Invited
Neutron and X-ray Scattering to Characterize Adsorbents and Their Hosts: Hayden Evans1; Ryan Klein2; Benjamin Trump3; Craig Brown4; 1NIST; 2NREL

12:10 PM Invited
Beta-SiC for High Strength Windows: Joshua Gild1; Kim Woohong2; Shyam Bayya2; Guillermo Villalobos2; Adam Floyd2; Bryan Sadowski2; Tony Zhou1; Jasbinder Sanghera2; 1University Research Foundation; 2US Naval Research Lab; 3Jacobs

8:40 AM Invited
Ceramic Processes for LHPG (Laser Heated Pedestal Growth): Hyunjun Kim1; Randall Hay2; Kent Averett2; Andrew Schlup2; John Drazin3; Benjamin Gray3; Randall Corns1; Robert Turner1; Cynthia Bowers3; 1AFRL/UES; 2AFRL; 3AFRL/Azimuth
8:35 AM Invited
Energetic Insights into Encapsulation of Molybdenum Oxide and Carbide Particles in Zeolite Y: Xianghui Zhang1; Margaret Reece2; Andrew Strzelecki2; Cody Cockreham2; Vitaliy Goncharov3; Houqian Li4; Kyungmin Yin4; Jinsoo Kim4; Junming Sun4; Hui Sun4; Baodong Wang4; Xiaofeng Guo4; Hongwu Xu4; Su Ha4; Yong Wang4; Di Wu1; 1Washington State University; 2Kyung Hee University; 3East China University of Science and Technology; 4National Institute of Clean-and-Low Carbon Energy; 1Arizona State University

9:05 AM Invited
Metal Organic Framework Compound, [Ni(4,4’-bipyridine)Ni(CN)4]n, Based on Pillared Cyanonickelate (PICNIC) Architecture: Winnie Wong-Ng1; Jeffrey Culp2; Yu-Sheng Chen3; Daniel Siderius1; Lan Li4; 1National Institute of Standards and Technology; 2NETL; 3University of Chicago; 4Boise State University

9:35 AM Invited
Porous Materials Design Using Machine Learning: Lan Li1; 1Boise State University

10:05 AM Break

10:25 AM Invited
Investigating Flexible Framework Materials by Combining Powder Diffraction and First-principles Calculations: Wei Zhou1; 1National Institute of Standards and Technology

10:55 AM Invited
Structure and CO2 Adsorption Sites in the Flexible Coordination Polymer NiDBM-Bpy from Density Functional Theory Calculations: Eric Cockayne1; Winnie Wong-Ng2; Andrew Allen1; 1National Institute of Standards and Technology; 2Indian Institute of Science

11:25 AM
MOF Derived Green Catalysts: Suzuki-Miyaura C-C Coupling of Aryl Chlorides and Bechamp Reduction of Nitroarenes to Amines Employing Pd@MOF and Porous Co@Carbonized MOFs as Heterogeneous and Recyclable Catalysts: Krishna Manna1; Natarajan S1; 1Indian Institute of Science

11:45 AM
Linking Structure and Catalytic Properties of Heterogeneous and Automotive Catalysts Through High Resolution X-ray Nanotomography and CryogenicFocused Ion Beam Microscopy in Three Dimensions: Andy Holwell1; Maadhav Kothari1; Markus Boese2; Aakash Varambhia1; Dogan Ozkaya2; 1Carl Zeiss Microscopy Llc; 2Johnson Matthey Plc

NUCLEAR ENERGY

Tackling Structural Materials Challenges for Advanced Nuclear Reactors — Advanced Structural Materials

Sponsored by: TMS Corrosion and Environmental Effects Committee, TMS Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Miaomiao Jin, Pennsylvania State University; Xing Wang, Pennsylvania State University; Karim Ahmed, Texas A&M University; Jeremy Bischoff, Framatome; Adrien Couet, University of Wisconsin-Madison; Kevin Field, University of Michigan; Lingfeng He, North Carolina State University; Raul Rebak, GE Global Research

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Session Chair: To Be Announced
11:40 AM
In Situ Dual Ion Irradiation of Additively Manufactured Reduced Activation Ferritic-martensitic Steels: Robert Renfrow1; T.M. Kelsy Green1; Priyam Patki2; Wei-Ying Chen3; Christopher Field4; Kevin Field4; 1University of Michigan; 2Intel Corporation; 3Argonne National Laboratory; 4Theria Scientific, LLC

MATERIALS-ENVIRONMENT INTERACTIONS

Thermodynamics of Materials in Extreme Environments — Thermodynamics of Molten Salts

Sponsored by: ACerS Basic Science Division, ACerS Energy Materials and Systems Division

Program Organizers: Xiaofeng Guo, Washington State University; Kristina Lilova, Arizona State University; Kyle Brinkman, Clemson University; Alexandra Navrotsky, Arizona State University; Jake Amoroso, Savannah River National Laboratory; Xingbo Liu, West Virginia University; Gustavo Costa, NASA Glenn Research Center

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Session Chair: Xiaofeng Guo, Washington State University

8:00 AM Introductory Comments

8:10 AM Invited
Thermodynamic Database Development with a Focus on Corrosion in Potential Nuclear Reactor Molten Salt Systems: Theodore Besmann1; Juliano Schorne-Pinto1; Jacob Yingling1; Johnathan Ard1; Mina Aziziha1; Amir Mofrad1; 1University of South Carolina

8:40 AM Invited
Predictive Modeling of Complex Liquids with Uncertainty Quantification by Open-Source Tools: Illustrated with Thermodynamic Properties of Molten Salts: Shun-Li Shang1; Rushi Gong1; Jorge Paz Soldan Palma1; Brandon Bocklund2; Nathan Smith1; Yi Wang3; Hojong Kim4; Zi-Kui Liu5; 1University of Michigan; 2Lawrence Livermore National Laboratory; 3Pacific Northwest National Laboratory

9:10 AM
Addressing the Thermodynamic Behavior of Volatile Fission Products in Fluoride Salt-Fueled Molten Salt Reactors: Behavior of Cesium and Iodine: Clara Dixon1; Mina Aziziha1; Juliano Schorne-Pinto1; Jacob Yingling1; Amir Mofrad1; Theodore Besmann1; 1University of South Carolina

9:30 AM
Melting Point, Enthalpy of Fusion, and Excess Heat Capacity of a FLiNaK Nuclear Reactor Molten Salt Determined by the CALPHAD Method: Juliano Schorne Pinto1; Johnathan Ard1; Mina Aziziha1; Kyle Foster1; Jacob Yingling1; Amir Mofrad1; Matthew Christian1; Theodore Besmann1; 1University of South Carolina

9:50 AM Break

10:00 AM
Thermodynamic Modelling and Experimental Investigation of LiCl-NaCl-UCl3 and KCl-NaCl-UCl3 Systems: Liangyan Hao1; Soumya Sridar1; Thomas Kirtley2; Elizabeth Sooby2; Wei Xiong3; 1University of Pittsburgh; 2University of Texas at San Antonio

10:20 AM
Thermophysical Properties of Key Binary Salt Systems using High-Sensitivity Twin Calvet Drop Calorimetry for Next Generation Molten Salt Reactors: Kyle Makovsky2; Vitaliy Goncharov2; Jordan Barr2; Xiaofeng Guo1; Scott Beckman3; Richard Clark3; Bruce McNamara3; Charmayne Lonergan4; Jason Lonergan4; 1Pacific Northwest National Laboratory; 2Washington State University

10:40 AM
Enthalpy of Mixing of LaCl3 – LiCl:KCl Pseudo Binary Molten Salt System: Vitaliy Goncharov2; Jeffrey Eakin2; Jiahong Li3; Qiang Zhang4; Cornelius Ivory1; James Boncella1; Jason Lonergan2; Hongwu Xu1; Xiaofeng Guo1; 1Washington State University; 2Pacific Northwest National Laboratory

11:00 AM
Calorimetric Determination of Melting Point Temperatures, Heat Capacities, and Heats of Fusion of Binary NaCl–UCl3 and MgCl2−UCl3 Systems: Vitaliy Goncharov1; Xiaofeng Guo1; Jason Lonergan2; Kyle Makovsky2; Bruce McNamara3; 1Washington State University; 2Pacific Northwest National Laboratory

11:20 AM
Density, Volatility, and Viscosity of Molten Sodium and Potassium Chloride Salts: Michaella Swinhart1; Jordan Barr2; Ralf Sudowe3; Scott Beckman2; Kyle Makovsky2; Bruce McNamara3; Charmayne Lonergan4; Jason Lonergan4; 1Colorado State University/Pacific Northwest National Lab; 2Washington State University; 3Colorado State University; 4Pacific Northwest National Lab

ARTIFICIAL INTELLIGENCE

Uncertainty Quantification in Data-Driven Materials and Process Design — Data-driven Process-Structure-Property Surrogate Modeling

Sponsored by: TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Yan Wang, Georgia Institute of Technology; Raymundo Arroyave, Texas A&M University; Anh Tran, Sandia National Laboratories; Dehao Liu, Binghamton University

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Session Chairs: Anh Tran, Sandia National Laboratories; Dehao Liu, Binghamton University; Ramin Bostanabad, University of California, Irvine; Sam Reeve, Oak Ridge National Laboratory

8:00 AM
Enabling the Fourth Paradigm of Multiscale ICME Models through Versatile Gaussian Process and Bayesian Optimization: Anh Tran1; 1Sandia National Laboratories

8:20 AM
Learning from Multi-source Scarce Data via Latent Map Gaussian Processes: Mehdi Shishehbor1; Tammer Eweis-labolle1; Ramin Bostanabad1; 1University of California, Irvine

8:40 AM
Bayesian Estimation and Active Learning of Data-driven Interatomic Potentials for Propagation of Uncertainty through Molecular Dynamics: Dallas Foster1; 1Massachusetts Institute of Technology
Biomaterials

3D Printing of Biomaterials and Devices — Session II

Sponsored by: ACerS Bioceramic Division

Program Organizers: Sahar Vahabzadeh, Northern Illinois University; Susmita Bose, Washington State University; Amit Bandyopadhyay, Washington State University; Mukesh Kumar, LincoTek Medical; Mangal Roy, Indian Institute of Technology Kharagpur (IIT-Kgp)

Monday PM | October 10, 2022
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Session Chair: To Be Announced

2:00 PM Invited
3D Printing of Nanomaterials-based Biomedical Electronics: Yong Lin Kong1; University of Utah

2:30 PM Invited
3D Printing of Zonal-structured Scaffolds for Complex Tissue Engineering: Syam Nukavarapu1; Aleksandra Golebiowska1; University of Connecticut

3:00 PM
Periodic and Random Cellular Ceramic Structures by Replication of Additive Manufactured Templates: Swantje Simon1; Tobias Fey1; Friedrich-Alexander-Universität Erlangen-Nürnberg Institute of Glass and Ceramics

3:20 PM Break

3:40 PM Invited
Laser-Based 3D Printing for Medical Applications: Roger Narayan1; University of North Carolina

4:10 PM Invited
Ultrasound-assisted Bioprinting using Composite Bioinks for Soft Tissue Engineering: Rohan Shirwalkar1; Parth Chansoria2; North Carolina State University; 2ETH Zurich

Additive Manufacturing

Additive Manufacturing and Cellular/Lattice Structures: Designs, Realization and Applications — Cellular/Lattice Structures II

Sponsored by: TMS Additive Manufacturing Committee, TMS Materials Characterization Committee

Program Organizers: Li Yang, University of Louisville; Allison Beebe, Pennsylvania State University; John Carpenter, Los Alamos National Laboratory; Carolyn Seepersad, University of Texas at Austin; Miguel Aguilo, Morphorm LLC

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Session Chair: John Carpenter, Los Alamos National Laboratory

2:00 PM
Prediction of Mechanical Properties of Ceramic Honeycombs by Polarimetry Measurements of Epoxy Resin Prototypes: David Köllner1; Bastien Tolve-Granier2; Swantje Simon1; Ken-ichi Kakimoto3; Tobias Fey1; Friedrich-Alexander-Universität Erlangen-Nürnberg; 2Science and Technologies Faculty of Limoges; 3Nagoya Institute of Technology

2:20 PM
Specific Energy Absorption of 3D Printed Octet-Truss Lattice Structures with Hollow Struts: Matthew Bolan1; Alexander Bardelcik1; University of Guelph

2:40 PM Invited
Performance of Titanium Alloy Lattice Structures in Quasi-static and High Strain Rate Environments: John Carpenter1; B. Brown2; N.S. Johnson1; Donald Brown2; David Jones1; Borys Drach4; Jonathan Pegues6; Manyalibo Matthews8; Los Alamos National Laboratory; 2Kansas City National Security Campus; 3SLAC National Accelerator Laboratory; 4New Mexico State University; 5Sandia National Laboratories; 6Lawrence Livermore National Laboratory

3:00 PM Evaluation of Structural Robustness in Additively Manufactured Lattice Structures: Mrinaal Lorengo1; Ji Ma1; University of Virginia

Special Topics

ACerS Richard M. Fulrath Award Session — Session I

Sponsored by: ACerS

Monday PM | October 10, 2022
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2:00 PM Invited
Elucidation of Dielectric Polarization Mechanism Using THz Spectroscopy: Takuya Hoshina1; Tokyo Institute of Technology

2:40 PM Invited
Material Development for High Performance and Miniaturization of Multilayer Ceramic Capacitors by Using Sn: Shoichiro Suzuki1; Murata Manufacturing Co., Ltd.
3:20 PM Break

3:40 PM
Progressive Nature of Failure of 3D Lattices under Compressive, Shear and Hydrostatic Loads; Sahar Choukir1; Chandra Veer Singh1; 1University of Toronto

4:00 PM
The Effects of Powder Feedstock and Process Parameter on the Material Characteristics of Ti6Al4V Thin Wall Features Fabricated by Laser Powder Bed Fusion Additive Manufacturing; Naresh Koju1; Jonah Hermes1; Sumit Paul1; Li Yang1; 1University of Louisville

ADDITIVE MANUFACTURING


Program Organizers: Jing Zhang, Indiana University – Purdue University Indianapolis; Brandon McWilliams, US Army Research Laboratory; Li Ma, Johns Hopkins University; Yeongil Jung, Changwon National University

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Session Chairs: Li Ma, Johns Hopkins University Applied Physics Laboratory; Jing Zhang, Indiana University - Purdue University Indianapolis; Brandon McWilliams, CCDC Army Research Laboratory; Yeon-Gil Jung, Changwon National University

2:00 PM
Quantitative Analysis of Computed Tomography Characterization of Porosity in AM Ti64 Using Serial Sectioning Ground Truth; Bryce Jolley1; Michael Uchic1; Daniel Sparkman1; Christine Henry1; Michael Chapman1; Edwin Schwabach1; 1Air Force Research Laboratory; 2UES, Inc.

2:20 PM
Uncertainty Quantification in Process-Structure-Properties Simulations of Additive Manufactured Ti-6Al-4V; Joshua Pripe1; Brodan Richter1; Patrick Leser1; Saikumar Yeratapally1; George Weber1; Andrew Kitahara1; Edward Glaessger1; 1National Institute of Aerospace; 2NASA Langley Research Center

2:40 PM
Analyzing Uncertainty in Modeled Additive Process-Microstructure-Property Relationships Using the ExaAM Framework; Matthew Rolchigo1; John Coleman1; Robert Carson1; Gerry Knapp1; Alex Plotkowski1; Scott Wells1; Samuel Reeve1; Lyle Levine1; Jim Belak1; John Turner1; 1Oak Ridge National Laboratory; 2Lawrence Livermore National Laboratory; 3Purdue University; 4National Institute of Standards and Technology

3:00 PM
Thermal Modeling of Laser Powder Bed Fusion Additive Manufacturing of Refractory Materials; Li Ma2; Gianna Valentino2; Mitra Taheri2; Morgana Trexler1; 1Johns Hopkins University Applied Physics Laboratory; 2Johns Hopkins University

3:20 PM Break

3:40 PM
Parent Grain Reconstruction Using Orientation Imaging Microscopy and Deep Learning; Patxi Fernandez-Zelaia1; Andres Marquez Rossy1; Quinn Campbell1; Andrzej Nyicz2; Chris Ledford1; Michael Kirka1; 1Oak Ridge National Laboratory

4:00 PM
CFD Simulations of Spatter Removal in a Laser Powder Bed Fusion Machine; Nicholas O’Brien1; Syed Zia Uddin1; Satbir Singh1; Jonathon Malen1; Jack Beuth1; 1Carnegie Mellon University

4:20 PM
A Parametric Molecular Dynamics Study of Additive Nanomanufacturing: Effects of Size, Misorientation, and Temperature on Sintering Characteristics; Douma Jamshideastani1; Shuai Shao1; Masoud Mahjouri-Samani1; Nima Shamseal1; 1Auburn University

4:40 PM
Additive Manufacturing Beyond the Gaussian Beam: Insights from Mesoscale Modeling Studies; Daniel Moore1; Theron Rodgers1; Heather Murdoch1; Fadi Abdeljawad1; 1Clemson University; 2Sandia National Laboratories; 3Army Research Laboratory

5:00 PM
Increasing the Service Life of the Trimming Punch Using Nimonic Cutting Edge; Miroslav Urbanek1; 1COMTES FHT a.s.
3:10 PM
Multi-material Printing of Reaction Bonded Carbides by Robocasting:
Larissa Wahl1; Michelle Weichelt1; Nahum Travitzky1; 1Friedrich-Alexander Universität Erlangen-Nürnberg

3:30 PM Break

3:50 PM
Bonding Mechanisms in Indirect Selective Laser Sintering: Doug Sossaman1; Matthew Ide2; Joseph Beam1; Desiderio Kovar1; 1University of Texas Austin; 2ExxonMobil Research and Engineering Company

3:50 PM Break

4:20 PM
Phase-field Modeling of Co-Sintering of Ceramic Electrolyte/Electrode for All Solid-State Li-ion Batteries: Lei Chen1; Yaohong Xiao1; 1University of Michigan-Dearborn

4:40 PM
Effect of Using Bentonite Clay on the Hydration and Rheological Properties of 3D Printenable Cement Pastes: Francisco Jordão Nunes de Lima1; Luana Silveira1; Valdecir Quarcioni2; Roberto César Romano2; Maria Alba Cincotto2; Rafael Pileggi2; 1Universidade de Sao Paulo; 2Instituto de Pesquisas Tecnológicas

4:40 PM Break

5:00 PM
Microstructure and Mechanical Properties of Laser Powder Bed Fusion Aluminum Matrix Composite Reinforced with Al2O3 Nanofibers: Babak Alinejad1; Amir Mostafaei2; 1Illinois Institute of Technology

5:20 PM
Aluminum Matrix Composites Reinforced with Multi-walled Carbon Nanotubes and C60 Manufactured by Laser Powder Bed Fusion: Sangmin Yoo1; Se-Eun Shin1; 1Sunchon National University

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Al-based Alloys

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Jurgen Eckert, Erich Schmid Institute of Materials Science; Zhi Wang, South China University of Technology

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Session Chair: To Be Announced

2:00 PM
Regional Mechanical Performance and the Effects of Surface Defects in AM Al-10Si-Mg: Thomas Ivanoff1; Nathan Heckman1; Andrew Polonsky1; Kyle Johnson1; 1Sandia National Laboratories

2:20 PM
Crystallographic Relationships between the Prior-beta Structure and Precipitate Phases in Additively Manufactured Nickel Aluminum Bronze: Dillon Watring1; Colin Stewart1; Richard Fonda1; David Rowenhorst1; 1National Research Council Research Associateship at Naval Research Laboratory; 2Naval Research Laboratory

2:40 PM
Laser-Stirred Powder Bed Fusion of High Strength Aluminum Alloys: Alber Sadek1; 1Edison Welding Institute

3:00 PM
Multi-scale Microstructural Characterization of Additively Manufactured 7050 Aluminum Alloy Subjected to Post-processing Treatments: Rupesh Rajendran1; Crosby Owens2; Jeffrey Eisenhaure2; David Spain3; Preet Singh1; 1Georgia Institute of Technology; 2Northrop Grumman Corporation

3:20 PM Break

3:40 PM
Microstructure Development and Creep Resistance of Selective Laser Melted Al-Fe-Mn-Si-Zr Alloy: Jovid Rahimnov1; Nhon Vo2; Joseph Croteau3; Joshua Dorn3; David Dunand1; 1Northwestern University; 2NanoAL LLC

4:00 PM
Al Nanoparticle inside Si Grain of Al-Si Alloy by Powder Bed Fusion Using an Electron Beam: Kenta Ishigami1; Kenta Aoyagi1; Huakang Bian1; Akihiko Chiba1; Yoshiki Hashizume1; Akiel Tanaka1; 1Toyo Aluminium K.K. and Tohoku University; 2Institute for Materials Research, Tohoku University

4:20 PM
The Effects of Post-Weld Processing on Friction Stir Welded Additive Manufactured AlSi10Mg: Michael EP1; Harvey Hack2; 1EWI; 2Northrop Grumman

5:00 PM
Microstructure and Mechanical Properties of Laser Powder Bed Fusion Aluminum Matrix Composite Reinforced with Al2O3 Nanofibers: Babak Alinejad1; Amir Mostafaei2; 1Illinois Institute of Technology

5:20 PM
Alumimum Matrix Composites Reinforced with Multi-walled Carbon Nanotubes and C60 Manufactured by Laser Powder Bed Fusion: Sangmin Yoo1; Se-Eun Shin1; 1Sunchon National University

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Functional Materials and W-based Systems

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Jurgen Eckert, Erich Schmid Institute of Materials Science; Zhi Wang, South China University of Technology

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Session Chair: To Be Announced

2:00 PM
Different Additive Manufacturing Routes for Magnetic Shape Memory Alloys: Markus Chmielus1; Pierangeli Rodriguez de Vecchis1; Erica Stevens1; Aaron Acierno1; Jakub Toman1; 1University of Pittsburgh

2:20 PM
Towards the Laser-based 4D Printing of Ni-Mn-Ga Magnetic Shape Memory Alloy Actuators: Ville Laitinen1; Kari Ullakko1; 1LUT University

2:40 PM
Effect of Heat-treatment on the Structure of Ni-Mn-Ga-Co Alloy: Mahsa Namvari1; 1LUT University
Binder Jet Additive Manufacturing Process Parameters Effect on Magnetic Performance of Fe-50Ni Alloy: Emreca Soylemez; Emre Sarı; Emre Durna; Baris Kırım; Istanbul Technical University; Core Electronics; Aselsan Inc.

3:20 PM Embedding Information in Additively Manufactured Metals via Magnetic Property Grading for Traceability and Counterfeiting Prevention: Deniz Ebeperi; Daniel Salas Mula; Ibrahim Karaman; Raymundo Arroyave; Richard Malak; Texas A&M University

4:00 PM Laser Powder Bed Fusion of the LaCe(Fe,Mn,Si)13 Magnetocaloric Material: Kun Sun; Abdelmoez Hussein; Moataz Attallah; University of Birmingham

4:20 PM Crack-Free Tungsten Processing above the Ductile-to-Brittle Transition Temperature, Using Electron Beam Powder Bed Fusion: Arun Balachandramurthi; Ulf Ackelid; Freemelt AB

4:40 PM Crack Mitigation Strategies in Laser Powder Bed Fusion of Pure Tungsten: Philip Depond; Maria Stranza; Shiqi Zheng; Alberico Talignani; Morris Wang; Jianchao Ye; Lawrence Livermore National Lab; UCLA

5:00 PM Laser Powder Bed Fusion of Tungsten Heavy Alloys: Elias Jelis; Matthew Feurer; US Army DEVCOM AC

5:20 PM Processing of High Quality Tungsten Through Electron Beam Melting: Michael Kirka; Chris Ledford; Patxi Fernandez-Zelaia; Oak Ridge National Laboratory

ADDITIVE MANUFACTURING


Program Organizers: Ola Rashwan, Pennsylvania State University-Harrisburg; Matt Caputo, Pennsylvania State University; Daud Waryoba, Pennsylvania State University; Pedro Cortes, Youngstown State University

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Session Chair: Matthew Caputo, Penn State Shenango; Ola Rashwan, Penn State Harrisburg

2:00 PM Numerical Simulation of a Failed Large Area Additive Manufacturing Build to Determine Thermal, Stress, and Distortion History: Brian Friedrich; Kyosung Choo; Youngstown State University

2:30 PM Molecular Engineering and Additive Manufacturing of Polyisobutylene-Based Functional Elastomers: Weinan Xu; University of Akron

2:50 PM Understanding Print Stability in Material Extrusion Additive Manufacturing of Thermoset Composites: Brett Compton; Stian Romberg; University of Tennessee; National Institute of Standards and Technology

3:10 PM Non-planer 3D Printing of Epoxy Using Freeform Reversible Embedding: Neetha Dev Arun; Humphrey Yang; Lining Yao; Adam Feinberg; Carnegie Mellon University

3:30 PM Break

3:50 PM Mixed Matrix Thermoset Casting with Thermoplastic Fused Filament Fabrication 3D Printing: Saleh Khanjar; Kunal Kate; Rajiv Malhotra; University of Louisville; Rutgers University

4:10 PM An Object-oriented Implementation of Discrete Event Simulation of Temperature Evolution in Fused Deposition Modeling Process: Bowen Deng; Peter Lucon; Ronald White; Montana Technological University

4:40 PM Estimation of 3D Statistics For Synthetic Generation of AM Carbon Fiber Composite Structures: Andrew Abbott; Michael Chapman; Kenneth Clarke; Mark Flores; Michael Groebner; Michael Uchic; John Wertz; Air Force Research Lab; Ohio State University

5:00 PM Highly Cross-linking Hydrogels Obtained by Gamma-rays with pH Sensitivity for Biomedical Purposes: Moisés Bustamante; Emilio Bucio; Universidad Nacional Autónoma de México

5:20 PM Question and Answer Period
October 9-12, 2022
Pittsburgh, Pennsylvania, USA

2:20 PM
Scientific Foundations and Approaches for Qualification of Additively Manufactured Structural Components: Sharlotte Kramer1; Tyler LeBrun2; Jonathan Pegues1; 1Sandia National Laboratories

2:40 PM
Providing a Rigorous Benchmark Measurement Foundation for Modeling-Informed Qualification and Certification of Metal AM Components: Lyle Levine1; Brandon Lane1; 1National Institute of Standards and Technology

3:00 PM
Role of Interstitial Alloying Elements on Microstructural Evolution in Additively Manufactured Materials: Todd Palmer1; 1Pennsylvania State University

3:20 PM
New Standardization Efforts to Collect, Correlate, and Identify Metrics of Reuse Powder with Functional Performance Data of Material Resultant of Additive Manufacturing Workflows: Tyler LeBrun1; 1Sandia National Laboratories

3:40 PM Break

4:00 PM
AM Materials Data – Challenges and Opportunities: Richard Huff1; 1ASTM International

4:20 PM
Additive Materials Data: Truths and Myths: Amber Andreaco1; Mark Shaw2; 1GE Additive

4:40 PM
An Intelligent Data Infrastructure for Additive Manufacturing: Shengyen Li1; 1Southwest Research Institute

5:00 PM
Research and Standards Development Needs for AM Industrialization: Brandon Ribic1; 1America Makes

NUCLEAR ENERGY

Advanced Characterization of Materials for Nuclear, Radiation, and Extreme Environments III — Beamline/Scattering

Sponsored by: TMS Nanomechanical Materials Behavior Committee, TMS Nuclear Materials Committee

Program Organizers: Cody Dennett, Idaho National Laboratory; Samuel Briggs, Oregon State University; Christopher Barr, Naval Nuclear Laboratory; Michael Short, Massachusetts Institute of Technology; Janelle Wharry, Purdue University; Cheng Sun, Idaho National Laboratory; Caitlin Taylor, Los Alamos National Laboratory; Khalid Hattar, Sandia National Laboratories; Yuanyuan Zhu, University of Connecticut

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Session Chairs: Caitlin Taylor, Los Alamos National Laboratory; Khalid Hattar, Sandia National Laboratories

2:00 PM Invited
Advanced Synchrotron Characterization of Fission and Fusion Energy Materials: David Sproouster1; T Koyanagi2; B Cheng; D Bhardwaj; J Gentle; J Trelewicz; L Sneed; 1Stony Brook University; 2Oak Ridge National Laboratory

2:30 PM Invited
Neutron Imaging at LANSCE: Characterizing Materials for the Next Generation of Nuclear Reactor Designs: Alexander Long1; Sven Vogel1; Marisa Monreal1; J. Jackson1; S. Parker1; Holly Trellue1; Erik Luther1; Aditya Shivasada1; Thilo Balke1; James Torres1; 1Los Alamos National Laboratory

3:00 PM
Probing Short-Range Order in Disordered Crystalline Materials for Extreme Environments: Eric O’Quinn1; Devon Drey1; William Cureton1; Gianguido Baldinozzi1; Maik Lang1; 1University of Tennessee; 2Oak Ridge National Laboratory; 3Université Paris-Saclay

3:20 PM Invited
Three-dimensional Characterization of Multiple Phase Regions within a Neutron Irradiated U-Zr Fuel: Maria Okuniewski1; Nicole Rodriguez Pérez1; Alejandro Figueroa Bongoa1; Kezia Peck1; Jonova Thomas2; 1Purdue University; 2Argonne National Laboratory

3:50 PM Break

4:10 PM
Hydrogen Dynamics in Yttrium Hydride Moderator Material: James Torres1; Alexander Long1; Dale Carver1; Sven Vogel1; Aditya Shivprasad1; Tyler Smith1; Caitlin Taylor1; Erik Luther1; Holly Trellue1; 1Los Alamos National Laboratory

4:30 PM Invited
Elucidating Helium Induced Softening in Nanograin Tungsten Through Electron Microscopy Informed Synchrotron X-Ray Scattering: W. Cunningham1; Cormac Killeen1; Yang Zhang1; David Sproouster1; Osman El Atwani1; Jason Trelewicz2; 1Stony Brook University; 2Los Alamos National Laboratory
### Advanced Coatings for Wear and Corrosion Protection — Session II

**Program Organizers:** Evelina Vogli, Lm Group Holdings Inc.; Virendra Singh, Schlumberger

**Monday PM | October 10, 2022**

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<th>Time</th>
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<tr>
<td>2:00 PM</td>
<td>Session Chairs</td>
<td>Friction and Anti-galling Properties of Diamond-like Carbon Coating on Oil Field Parts</td>
<td>Virendra Singh; Alireza Zolfaghari; Manuel Marya; Schlumberger</td>
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<td>2:20 PM</td>
<td></td>
<td>PVD Coated Ceramics and Cubic-boron Nitride (cBN) for Metalcutting: Benefits and Challenges</td>
<td>Abhijit Roy; Debangshu Banerjee; Brittanay Macshane; Joern Kohlscheen; Christian Bareiss; Kennametal Inc.</td>
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<td>2:40 PM</td>
<td>Development of Novel Wear and Impact Resistant Titanium-Boron Nitride Coatings for Lunar Structural Components</td>
<td>Abhijith Sukumaran; Cheng Zhang; Arvind Agarwal; Florida International University</td>
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<td>3:00 PM</td>
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<td>Features of Increase Wearproofness Became Influence of Polymethylmethacrylat at a Contact</td>
<td>Volodymyr Tsyganov; Vadim Shalomeev; Sergei Sheyko; Zaporizhzhia Polytechnic National University; Zaporizhzhia National University</td>
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<td>3:20 PM</td>
<td>Break</td>
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<td>3:40 PM</td>
<td>Improved Coating Performance of REACH Compliant Trivalent Chromium Plating Process for Functional Applications</td>
<td>Andrew Moran; Rajeswaran Radhikrishnan; Tim Hall; EJ Taylor; George Bokisa; Mark Feathers; Stanko Brankovic; Kamyar Ahmadi; Faraday Technology Inc.; Coventya International; U.S. Army Aviation and Missile Command; University of Houston</td>
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<tr>
<td>4:00 PM</td>
<td>Novel Surface Treatment for Electrolytic Deposition of Chromium onto Zirconium</td>
<td>Benjamin Aronson; Patrick Fourspring; Justin Reiss; Lucas Erich; Michael Ammendola; Ryan Romesberg; Jason Globes; Brendan Enson; Leslie Stubna; Douglas Wolfe; Pennsylvania State University; Naval Nuclear Laboratory</td>
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<tr>
<td>4:20 PM</td>
<td>High-performance Coatings with Exposure to High Temperatures Obtained under SHS Conditions</td>
<td>Boris Sereda; Dmytro Sereda; Dmytro Kforuk; Dneprovsky State Technical University</td>
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<td>4:40 PM</td>
<td>Investigation of the Electrochemical Behavior of Titanium Dioxide Coating on Magnesium Alloy and the Effect of Fluoride Ion and Etching Time on the Corrosion Rate</td>
<td>Nasim Emami; Shahab Khameneh Asli; Mohammad Alipour; Tabriz University</td>
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### Advanced Materials for Harsh Environments — Session II

**Sponsored by:** ACerS Electronics Division

**Program Organizers:** Navin Manjooran, Chairman, Solve; Gary Pickrell, Virginia Tech

**Monday PM | October 10, 2022**

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<th>Title</th>
<th>Speakers</th>
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<tr>
<td>2:00 PM</td>
<td>Introductory Comments</td>
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<td>2:40 PM</td>
<td>High Temperature Irradiation Resistant Thermocouples for In-Pile Temperature Sensing</td>
<td>Scott Riley; Kyle Holloway; Richard Skifton; Brian Jaques; Boise State University; Idaho National Laboratory</td>
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<td>3:00 PM</td>
<td>Integrating Multimodal Corrosion with Correlative Microscopy Across Multiple Lengthscales</td>
<td>Sridhar Niverty; Rajib Kalsar; Lyndi Strange; Venkateshkumar Prabhakaran; Ramprashad Prabhakaran; Colin Campbell; Benjamin Legg; Vineet Joshi; Pacific Northwest National Laboratory</td>
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<td>3:20 PM</td>
<td>Investigation of Stress Corrosion Cracking in CMSX-4 Turbine Blade Alloys Using Deep Learning Assisted X-ray Microscopy</td>
<td>Hrishikesh Bale; Maadhav Kothari; Sebastian Krauss; Michael Phaneuf; Johnathan Legget; Simon Gray; Carl Zeiss Microscopy; Fibics Incorporated; Rolls Royce; Cranfield University</td>
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<td>3:40 PM</td>
<td>Break</td>
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<td>4:00 PM</td>
<td>Irvingi gabonensis Leaf-Extract Effect on Concrete Steel-Reinforcement Corrosion in Industrial/Microbial Simulating-Environment</td>
<td>Joshua Okeniyi; Elizabeth Okeniyi; Jacob Ikotun; Covenant University; Durban University of Technology</td>
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<td>4:20 PM</td>
<td>Isothermal Oxidation Behavior of Pack-Cementation Coated Three-phase Mo-Nb-Si-B Alloys</td>
<td>Liam Wood; John Perepeko; UW-Madison</td>
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<td>4:40 PM</td>
<td>JHU/APL’s Science of Extreme and Multifunctional Materials Program: Materials Research with Mission Intent</td>
<td>Morgana Trexler; Leslie Hamilton; Michael Brubacher; Steven Storck; Erin LaBarre; Nicholas Pavlopoulos; The Johns Hopkins University Applied Physics Laboratory</td>
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<tr>
<td>5:00 PM</td>
<td>New Strategies for Designing Colloidal Inks for Additive Manufacturing of UHTCs</td>
<td>Julio Goyer; Carolina Talon; Virginia Tech</td>
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CERAMIC AND GLASS MATERIALS

Advances in Dielectric Materials and Electronic Devices — Piezoelectrics, Microwave Materials, and Conductive Applications

Sponsored by: ACerS Electronics Division

Program Organizers: Amar Bhalla, University of Texas; Ruyan Guo, University of Texas at San Antonio; Rick Ubic, Boise State University; Matjaž Spreitzer, Jožef Stefan Institute

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Session Chair: Ruyan Guo, University of Texas San Antonio

2:00 PM Carbon-based Glass Foam Composites for High Power Microwave Absorption: Ratiba Benzerga1; Vincent Laur2; Laurent Le Gendre3; Ronan Lebullenger1; Ala Sharaiha1; 1University of Rennes, IETR; 2Lab-STICC; 3Univ Rennes, ISCR

2:20 PM TTB Strontium Tantalum Ceramics for Integration into Miniature Dielectric Resonator Antennas: Matthew Julian1; Mouad Barzani2; Mohamad Haydoura3; Ratiba Benzerga1; Laurent Le Gendre3; Ala Sharaiha1; Francois Chevire1; Claire Le Paven1; 1Université de Rennes, CNRS, IETR-UMR 6164, F-35000 Rennes, France; 2Université de Rennes, CNRS, ISCR-UMR 6226, F-35000 Rennes, France

2:40 PM New Insights into Bismuth Sodium Titanate Ferroelectric Ceramics: Zhongming Fan1; 1Penn State University

3:00 PM Enhanced Piezoelectric Transducers with 3D Printed Piezoelectric PZT: Shawn Allan1; Justin Tufariello2; Barry Robinson1; Nicholas Voeltl1; Nicole Ross1; Ryan Fordham1; Casey Corrado2; Alex Angilella1; Leslie Riesenhuber2; Brian Pazol1; 1Lithoz America LLC; 2MITRE Corporation; 3MSI Transducers Corp.

3:20 PM Break

3:40 PM Dielectric Behavior of Electronic Materials, Specifically Silicon, Solder and Conductive Thick Films: Deborah Chung1; 1State University of New York Buffalo

4:00 PM Effects of β-Silicon Carbide Microstructure on the Electrical Response of PMMA Matrix Nanocomposites: Roshaun Titus1; Rosario Gerhardt1; 1Georgia Institute of Technology

4:20 PM Sensitivity Analysis of PZT-4 Material Properties Using the Complex Variable Finite Element Method: Carlos Acosta1; Amar Bhalla1; Ruyan Guo1; 1University of Texas at San Antonio

NANOMATERIALS

Advances in Emerging Electronic Nanomaterials: Synthesis, Enhanced Properties, Integration, and Applications — Graphene and Other Nanomaterials

Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory; Jung-Kun Lee, University of Pittsburgh; Stephen McDonnell, University of Virginia

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Session Chairs: Chang-Yong Nam, Brookhaven National Laboratory; Jung-Kun Lee, University of Pittsburgh

2:00 PM Invited Novel Dirac-source Cold Carrier Injection for Energy-efficient 2D Nanoelectronics: Huamin Li1; Fei Yao2; 1University at Buffalo

2:30 PM Invited How to Achieve State-of-the-art Heterostructures from Polymer-contaminated Graphene?: Zhujun Huang1; Suji Park2; Kevin Yager1; Davood Shahjerdi1; 1New York University; 2Brookhaven National Laboratory

3:00 PM Invited Nanomaterials for Energy-efficient Memory Devices: Jung-Kun Lee1; 1University of Pittsburgh

3:30 PM Solution Processible Carbon Precursors for 2D Amorphous Carbon Dielectric: Congjun Wang1; Viet Hung Pham1; Fufei An1; Christopher Matranga1; Qing Cao2; 1National Energy Technology Laboratory; 2University of Illinois at Urbana-Champaign

3:50 PM Break

4:05 PM Correlative Analyses of Low-dimensional Materials: Veronika Hegrova1; Radek Dalo1; Jan Neuman1; 1NenoVision s.r.o.

4:25 PM Unique Molecular Approach to 2D Tin Chalcogenide Materials by Single-Source Precursor Design: Fabian Hartl1; Veronika Brune1; Sanjay Mathur1; 1University of Cologne

4:45 PM Nanomolding of Topological Nanowires: Mehrdad Kian1; Hyeuk Jin Han1; Quynh Sam2; Judy Cha1; 1Yale University; 2Cornell University

5:05 PM Near-Band-Edge Enhancement in Perovskite Solar Cells via Tunable Surface Plasmons: Yulin Liu1; 1University of Pittsburgh

5:25 PM Hybrid Liquid Metal Nanostructures for Electronics and Energy Applications: Weinan Xu1; 1University of Akron

5:45 PM Stable Perovskite Solar Cells: Seongha Lee1; 1University of Pittsburgh
IRON AND STEEL (FERROUS ALLOYS)

Advances in Ferrous Metallurgy — AHSS and Steelmaking Process Innovation

Sponsored by: AIST Metallurgy — Processing, Products & Applications Technology Committee

Program Organizers: Siddhartha Biswas, Big River Steel; Daniel Baker, General Motors Corporation; Lijia Zhao, Northeastern University

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Session Chair: To Be Announced

2:00 PM
Difference in Deformation-induced Martensitic Transformation Behavior at Tensile and Compressive Deformations of High-carbon Bainitic Steel Investigated by In Situ Neutron Diffraction: Rintaro Ueji1; Wu Gong2; Stefanus Harjo2; Takuro Kawasaki2; Akinobu Shibata1; Yuuji Kimura1; Tadanobu Inoue 1; Noriyuki Tsuchida3; 1National Institute for Materials Science; 2Japan Atomic Energy Agency; 3University of Hyogo

2:20 PM
Effects of Cyclic Intercritical Annealing on Retained Austenite in Medium Manganese Steels: Dawn Van Iderstine1; Matthew Cagle1; Shiraz Mujahid1; YubRaj Paudel1; Sven Vogel2; Zackery McClelland3; Robert Moser3; Haitham El Kadiri3; Hongjoo Rhee3; 1Mississippi State University, Center for Advanced Vehicular Systems; 2Los Alamos National Laboratory; Materials Science and Technology Division; 3U.S. Army Engineer Research and Development Center, Geotechnical and Structures Laboratory; 4Mississippi State University, Department of Mechanical Engineering

2:40 PM
Mechanical Behavior and Plasticity Mechanisms of Ultrahigh Strength-high Ductility 1 GPa Low Density Austenitic Steel with Ordered Precipitation Strengthening Phase: Craig Guerrero1; Devesh Misra1; 1University of Texas at El Paso

3:00 PM
Obtaining a Dual-phase Steel by Hot Rolling from a Chemically Modified Commercial Steel: Víctor Gaytan1; Nancy López1; José Ramos1; Emmanuel Gutiérrez2; Constantín Hernández3; 1Instituto Tecnológico de Morelia; 2Universidad Autónoma de San Luis Potosí; 3CONACYT

3:20 PM
In Situ Formation of Titanium Carbide during Surface Modification of Steel via TIG Arcing: Nilesh Paraye1; Prakriti Ghosh1; Sourav Das1; 1Indian Institute of Technology Roorkee

3:40 PM Break

3:55 PM
The Significance of Deformation Mechanisms on the Fracture Behavior of Phase Reversion-induced Nanostructured Austenitic Stainless Steel: Yashwanth Injeti1; Devesh Misra1; Mahesh Somani1; 1Big River Steel; 2University of Texas at El Paso; 3University of Oulu

4:15 PM
Structure-property Relationship of High Mn Steel and Bi-metallic Hammers for Clinker Crusher Application: Abhinav Karanam1; Arnab Sarkar1; Erik Nenzen2; Lukas Bichler1; 1Unicat Inc; 2University of British Columbia

4:35 PM
Silicide Strengthened Ferritic Alloy - A New Method of Wear Protection in Nuclear Environments: Rahul Unnikrishnan1; Ed Pickering1; Michael Preuss1; 1The University of Manchester

4:55 PM
Novel Tough Ultrahigh Strength Steels Through Direct Quenching and Partitioning Route – A Status Report: Mahesh Somani1; Sumit Ghosh1; Pekka Kantanen1; Devesh Misra1; Jukka Komi1; 1University of Oulu; 2University of Texas at El Paso

5:15 PM
Flow Optimization for Steel Refining Process in an EAF: Neel Bush1; Yuchao Chen1; Armin Silaëri1; Bikram Konar2; Chenn Zhou1; 1Purdue University Northwest; 2EVRAZ NA

PROCESSING AND MANUFACTURING

Advances in Surface Engineering — Session I

Sponsored by: TMS Surface Engineering Committee

Program Organizers: Rajeswaran Radhakrishnan, Faraday Technology Inc; Timothy Hall, Faraday Technology Inc; Michael Roach, University of Mississippi Medical Center; Sandip Harimkar, Oklahoma State University; Tushar Borkar, Cleveland State University; Rajeev Gupta, North Carolina State University; Bharat Jasthi, South Dakota School of Mines & Technology

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Session Chairs: Rajeswaran Radhakrishnan, Faraday Technology, Inc; Andrew Moran, Faraday Technology, Inc

2:00 PM
Electrochemical Finishing of Mo Feedhorn Arrays: Huong Le1; Timothy Hall1; Stephen Snyder1; E. Jennings Taylor1; Maria Inman1; 1Faraday Technology

2:20 PM
Mechanical and Fracture Mechanisms of Ultrahigh Strength-high Ductility 1 GPa Low Density Austenitic Steel with Ordered Precipitation Strengthening Phase: Craig Guerrero1; Devesh Misra1; 1University of Texas at El Paso

3:00 PM
Obtaining a Dual-phase Steel by Hot Rolling from a Chemically Modified Commercial Steel: Víctor Gaytan1; Nancy López1; José Ramos1; Emmanuel Gutiérrez2; Constantín Hernández3; 1Instituto Tecnológico de Morelia; 2Universidad Autónoma de San Luis Potosí; 3CONACYT

3:20 PM
In Situ Formation of Titanium Carbide during Surface Modification of Steel via TIG Arcing: Nilesh Paraye1; Prakriti Ghosh1; Sourav Das1; 1Indian Institute of Technology Roorkee

3:40 PM Break

3:55 PM
The Significance of Deformation Mechanisms on the Fracture Behavior of Phase Reversion-induced Nanostructured Austenitic Stainless Steel: Yashwanth Injeti1; Devesh Misra1; Mahesh Somani1; 1Big River Steel; 2University of Texas at El Paso; 3University of Oulu

4:15 PM
Structure-property Relationship of High Mn Steel and Bi-metallic Hammers for Clinker Crusher Application: Abhinav Karanam1; Arnab Sarkar1; Erik Nenzen2; Lukas Bichler1; 1Unicat Inc; 2University of British Columbia

4:35 PM
Silicide Strengthened Ferritic Alloy - A New Method of Wear Protection in Nuclear Environments: Rahul Unnikrishnan1; Ed Pickering1; Michael Preuss1; 1The University of Manchester

4:55 PM
Novel Tough Ultrahigh Strength Steels Through Direct Quenching and Partitioning Route – A Status Report: Mahesh Somani1; Sumit Ghosh1; Pekka Kantanen1; Devesh Misra1; Jukka Komi1; 1University of Oulu; 2University of Texas at El Paso

5:15 PM
Flow Optimization for Steel Refining Process in an EAF: Neel Bush1; Yuchao Chen1; Armin Silaëri1; Bikram Konar2; Chenn Zhou1; 1Purdue University Northwest; 2EVRAZ NA
3:20 PM Break

3:40 PM
Wear Behaviour of Surface Modified Carbide Free Bainitic Steel: Ajeet Rajput; Nilesh Paraye; Sourav Das; Indian Institute of Technology Roorkee

4:00 PM
Surface Modification of Low Carbon Steel via In Situ Formed Tantalum Carbide through Tungsten Inert Gas Arcing: Sachin Balbande; Nilesh Paraye; Sourav Das; IIT Roorkee

FUNDAMENTALS AND CHARACTERIZATION

Alloy Phase Transformations at Elevated Temperatures — Session I

Sponsored by: TMS High Temperature Alloys Committee, TMS Phase Transformations Committee

Program Organizers: Dinc Erdeniz, University of Cincinnati; Benjamin Adam, Oregon State University; Jonah Klemm-Toole, Colorado School of Mines; Eric Lass, University of Tennessee-Knoxville; Ashley Paz y Puente, University of Cincinnati; Sophie Primig, University of New South Wales; Chantal Sudbrack, National Energy Technology Laboratory

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Session Chair: Dinc Erdeniz, University of Cincinnati

2:00 PM Invited
The Optimization of Local Phase Transformation Strengthening in Next Generation Superalloys: Timothy Smith; Nikolai Zarkevich; Mikhail Mendeleev; Valery Borovikov; Ashton Egan; Timothy Gabb; John Lawson; Michael Mills; NASA Glenn Research Center; NASA Ames Research Center; The Ohio State University

2:30 PM Invited
Microstructure Evolution and Mechanical Properties of a/a-Strengthened Ferritic Superalloys: Christopher Zenkl; Luis Morales; Andreas Bezold; Andreas Förner; Steffen Neumeier; Carolin Körner; Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)

3:00 PM
Single-step Aging Treatment on Cast Haynes 282 Ni-based Alloy – Microstructure and Mechanical Behavior: Timothy Lach; Xiang Chen; Oak Ridge National Laboratory

3:20 PM
Effect of Grain Boundary Phases on Creep Properties of a Novel Ni-Co Based Superalloy: Yoshihi Kumagai; David Dunand; Daido Steel Co Ltd.; Northwestern University

3:40 PM Break

4:00 PM
Microstructure and Mechanical Properties of W-free Co-based Superalloys with Ni, Cr, and Fe Additions: Brandon Ohl; Howard Stone; David Dunand; Northwestern University; University of Cambridge

4:20 PM
Concurrent Precipitation of Nb(C,N), M23C6, and Sigma Phases in Alloy 347H with and without Ancillary Additions of Boron and Nitrogen: Michael Glazoff; Jianguo Yu; Laurent Capolungo; Michael Gao; Gabriel Itievare; Idaho National Laboratory; Los Alamos National Laboratory; National Energy Technology Laboratory

4:40 PM
Hyper Duplex Stainless Steel: A Study on the Sigma Phase Formation: Andres Acuna; Antonio Ramirez; Ohio State University

5:00 PM
In-situ and Ex-situ Evaluation of Phase Transformation and Its Impact on the Hot Ductility of Steel during Continuous Casting Processes: Alyssa Stubbers; John Balk; University of Kentucky

CERAMIC AND GLASS MATERIALS

Ceramics and Glasses Modeling by Simulations and Machine Learning — Simulation of Glass and Ceramics

Sponsored by: ACerS Glass & Optical Materials Division

Program Organizers: Mathieu Bauchy, University of California, Los Angeles; Peter Kroll, University of Texas at Arlington; N. M. Anoop Krishnan, Indian Institute of Technology Delhi

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Session Chairs: Mathieu Bauchy, UCLA; Peter Kroll, The University of Texas at Arlington; Anoop Krishnan, IIT Delhi

2:00 PM Invited
Machine Learning to Design and Discover Sustainable Cementitious Binders: Learning from Small Databases and Developing Closed-form Analytical Models: Aditya Kumar; Missouri S&T

2:30 PM
Developing ReaxFF for Simulation of Silicon Carbonitride Polymer-derived Ceramics: Shariq Haseen; Peter Kroll; University of Texas at Arlington

2:50 PM
Molecular Dynamics Simulation of Tellurite Glasses: Amreen Jan; N M Anoop Krishnan; Indian Institute of Technology Delhi

3:10 PM
Molecular Dynamics Study of Domain Switching Dynamics in KNbO3 and BaTiO3: Rajan Khadka; Pawel Keblinski; Rensselaer Polytechnic Institute

3:30 PM Break

4:00 PM
In-Silico Simulations of Polymer Pyrolysis: Peter Kroll; University of Texas at Arlington

4:20 PM
Pore-resolved Simulations of Chemical Vapor Infiltration in 3D Printed Preforms and the Kinetic Regimes: Mengnan Li; Vimal Ramanuj; Ying She; Ramanan Sankaran; Oak Ridge National Laboratory; Raytheon Technologies Research Center
Before and After Extended Carbon Exposure: Pengyuan Xiu 1; Tiankai Yao 1; Chao Jiang 1; Marat Khafizov 2; Miaomiao Benjamin Liu1; Christopher Stanek1; 1Los Alamos National Laboratory

Christopher Matthews1; Jason Rizk1; Romain Perriot1; Michael Cooper1; Kardoulaki2; Ming Tang 1; 1Clemson University; 2Los Alamos National Laboratory

Evolution in Irradiated Ceramic Nuclear Fuels: David Andersson 1; Christopher Matthews1; Jason Rizk1; Romain Perriot1; Michael Cooper1; Benjamin Liu 1; Christopher Stanek1; Los Alamos National Laboratory

Cluster Dynamics Simulations of Point Defects and Fission Gas: Lingfeng He1; Kaustubh Bawane 1; Erofili Kardoulaki 1; Los Alamos National Laboratory; Levi Gardner; Argonne National Laboratory; Jian Zhang; Xiamen University; Charmayne Lonergan; Pacific Northwest National Laboratory

Fabrication and Properties of Sintered Yttrium Hydride: Aditya Shivprasad 1; Vedant Mehta 1; Joshua White2; Michael Cooper1; Tarik Saleh1; Joseph Werner1; Erik Luther1; Holly Trellue1; D.V. Rao1; Los Alamos National Laboratory


Sponsored by: ACerS Basic Science Division, ACerS Electronics Division, ACerS Engineering Ceramics Division

Program Organizers: Haitao Zhang, University of North Carolina at Charlotte; Gurpreet Singh, Kansas State University; Kathy Lu, Virginia Polytechnic Institute and State University; Edward Gorzkowski, Naval Research Laboratory; Jian Shi, Rensselaer Polytechnic University; Michael Naguib, Tulane University; Sanjay Mathur, University of Cologne

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Session Chairs: Haitao Zhang, University of North Carolina at Charlotte; Sanjay Mathur, University of Cologne

2:00 PM Invited Manipulating Material Synthesis Using Electromagnetic Fields: B. Reetia Jaya1; 1Carnegie Mellon University

2:30 PM Invited Out-of-oven Rapid Fabrication of Entropy Stabilized Oxides Patterned on Carbonaceous Nanomaterials Using Radio Frequency Heating: Jared Rapp1; Lalith Kumar Bhaskar2; Ravi Kumar2; Aniruddh Vashisth2; 1University of Washington; 2Indian Institute of Technology-Madras

3:00 PM Synthesis and Growth Mechanism Study of Metalloid Nanostructures: Ahmed Abdelazeez2; Shifat Us Sami1; Tom Schmedake1; Yong Zhang1; Haitao Zhang1; 1University of North Carolina at Charlotte

3:20 PM Break

3:40 PM Molten Salt Synthesis of Inorganic Nanomaterials: Yuanbing Mao1; 1Illinois Institute of Technology

4:00 PM Enhancing the Low-temperature Consolidation of Nanosilver Materials: Henry Young1; Jared McCoppin2; 1Wright State University; 2University of Dayton

4:20 PM Thermo-Chemical Reduction Controlled Exsolution of Metal Nanoparticles (NPs) From Perovskite Lattice: Synthesis to Application: Aman Bhardwaj1; Shruti Jena1; Shakti Singh1; Sharat Chandra1; 1Indira Gandhi Centre for Atomic Research

4:40 PM Mechanistic Investigation of the Formation of Transition Metal Nanocrystallites Embedded in Amorphous Silicon Nitride Nanocomposites: Norifumi Asakuma1; Shotaro Tada1; Erika Kawaguchi1; Motoharu Terashima1; Sawao Honda1; Samuel Bernard2; Yuji Iwamoto1; 1Nagoya Institute of Technology; 2University of Limoges, CNRS, IRCER, UMR 7315
EDUCATION

Curricular Innovations and Continuous Improvement of Academic Programs (and Satisfying ABET along the Way): The Elizabeth Judson Memorial Symposium — What Should We Teach and How Should We Teach it?

Sponsored by: TMS Accreditation Committee, TMS Education Committee

Program Organizers: Alison Polasik, Campbell University; Jeffrey Fergus, Auburn University; Assel Aitkaliyeva, University of Florida; Kester Clarke, ASPPRC Colorado School of Mines

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Session Chairs: Gregg Janowski, The University of Alabama at Birmingham; Kester Clarke, Colorado School of Mines

2:00 PM
Machine Learning and Data Science in the MSE Undergraduate Program: Elizabeth Holm1; 1Carnegie Mellon University

2:20 PM
The Material Science Core: A Need to Align Worldviews?: Robert Heard1; 1Carnegie Mellon University

2:40 PM
Introducing Students to the Importance of Materials in Sustainability: Jeffrey Fergus1; 1Auburn University

3:00 PM
Teaching Glass across Disciplines at Alfred University: Alexis Clare1; Jessica Domino1; Doris Möncke1; Angus Powers1; Darren Stohr1; S.K. Sundaram1; 1Alfred University

3:20 PM
Investigating the Effects of Different Instructional Methods on Student Performance and Satisfaction in Online Learning: Michael Roberts1; Charles D’Ambra1; Aroba Saleem1; 1University of Florida

3:40 PM Break

4:00 PM
Assisting Curation of Open-Source Textbook with Natural Language Processing: Amit Verma1; Benjamin Glaser1; Robin Kuo1; Jason Zhang1; Nicholas David1; Zhisong Zhang1; Emma Strubell1; Anthony Rollett1; 1Carnegie Mellon University

4:20 PM Panel Discussion: Developing an Open SourceIntroductory Textbook for the Materials Community

LIGHTWEIGHT ALLOYS

Development in Light Weight Alloys and Composites — Processing and Mechanical Performance

Sponsored by: TMS Composite Materials Committee, TMS Materials Characterization Committee

Program Organizers: Ramasis Goswami, Naval Research Laboratory; Nikhil Gupta, New York University; Aashish Rohatgi, Pacific Northwest National Laboratory; Tanjore Jayaraman, University of Michigan-Dearborn

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Session Chair: Ramasis Goswami, US Naval Research Laboratory

2:00 PM Invited
Delayed Aging in Aluminum Alloys: Ramachandra Canumalla1; Samuel Meyer1; 1Weldaloy Specialty Forgings

2:40 PM Invited
Correlations between Ultrasonic Processing, Reinforcement Morphology, and Multi-scale Mechanical Performance of Metal Matrix Composites: Tanaji Paul1; Siddhi Joshi1; Cheng Zhang1; Benjamin Boesi1; Arvind Agarwal1; 1Florida International University

3:10 PM
Development and Research of a Scandium-containing Filler for Welding Aircraft Products from an Alloy of the Mg-Zr-Nd System: Volodymyr Tsyganov1; Vadim Shalomeev1; Sergei Sheyko1; 1Zaporizhzhia Polytechnic National University; 2Zaporizhzhia National University

3:30 PM Break

3:50 PM Invited
Investigating Solid Solution Formation in High Entropy Carbidebased Ceramics: Lavina Backman1; Heonjune Ryou1; James Wollmershauser1; Syed Qadri1; Edward Gorzkowski1; Jesse Maxwell1; 1U.S. Naval Research Laboratory

4:20 PM Invited
Ultrasonically-Induced Microstructural Refinement to Improve Strength of an Al-Si-Mg Casting: Katherine Rader1; Jens Darsell1; Jon Helgeland1; Timothy Roosendaal1; Ethan Nickerson1; Aashish Rohatgi1; 1Pacific Northwest National Laboratory

4:50 PM Electromagnetic Methods for Production of Aluminium Matrix Composites: Mihus Milgravis1; Toms Beinerts1; Mattis Kalvans1; Raimonds Nikoluskins1; Andris Bojarevics1; Imants Kaldre1; 1University of Latvia
**SUSTAINABILITY, ENERGY, AND THE ENVIRONMENT**

**Energy Materials for Sustainable Development — Radiative and Electrochemical Conversion/Storage Batteries**

*Sponsored by:* ACerS Energy Materials and Systems Division

*Program Organizers:* Krista Carlson, University of Nevada, Reno; Armin Feldhoff, Leibniz University Hannover; Kyle Brinkman, Clemson University; Eva Hemmer, University of Ottawa; Nikola Kanas, BioSense Institute; Kjell Wilk, Norwegian University of Science and Technology; Lei Zuo, Virginia Tech; Joshua Tong, Clemson University; Danielle Benetti, Institut National de la Recherche Scientifique; Katherine Develos-Bagarinao, National Institute of Advanced Industrial Science and Technology; Soumi Chatterjee, Aditya Birla Science & Technology Company, Ltd

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*Session Chairs:* Jake Amoroso, Savannah River National Laboratory; Dhruba Panthi, Kent State University; Zhezhen Fu, The Pennsylvania State University

2:00 PM Keynote
Highly Stable and Efficient Perovskite Solar Cells with Functional Nanocomposites: Yoon-Bong Hahn; Jeonbuk National University

2:40 PM Invited
Manipulation of Ferroelectric Domain Walls and Light Absorption for Optimization of Bulk Photovoltaic Effect: Vasilii Balanov; Jani Perantie; Yang Bai; University of Oulu

3:00 PM
Sustainable Bio-Engineered Magnetoelectric Nanogenerator to Convert Ambient Stray Magnetic Noise to Electricity: Ojodomo Achadu; University of Warwick

3:20 PM Break

3:40 PM
Low-temperature Integration of Oxide-based All-solid-state Batteries Using a Ceramic Binder: Junting Du; Angel Burgos; Jae Chul Kim; Stevens Institute of Technology

4:00 PM
Molecular Precursors for Li,S as Cathode Material for Sustainable Energy Storage: Veronika Brune; Sanjay Mathur; Michael Wilhelm; University of Cologne

4:20 PM
Preparation and Characterization of Metallic Ion-Doped LiNiO.8Co0.15Al0.05O2 Cathode Material: Yunke Wang; R & D center of Yunnan Yuntianhua Co., Ltd

4:40 PM
Iron Oxide Redox Cycling for Low-cost Iron-air Batteries: Samuel Pennell; Jacob Mack; David Dunand; Northwestern University

**CERAMIC AND GLASS MATERIALS**

**Engineering Ceramics: Microstructure-Property-Performance Relations and Applications — Advanced Processing and Properties of Engineering Ceramics**

*Sponsored by:* ACerS Engineering Ceramics Division

*Program Organizers:* Young-Wook Kim, University of Seoul; Hua-Tay Lin, Guangdong University of Technology; Junichi Tatami, Yokohama National University; Michael Halbig, NASA Glenn Research Center

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*Session Chairs:* Koji Morita, National Institute for Materials Science; Young-Wook Kim, University of Seoul

2:00 PM Invited
Stereolithographic Additive Manufacturing of Fine Ceramic Components: Soshu Kirihara; Osaka University

2:30 PM Invited
Influence of Inversion Level of Ti:MgGa2O4 Ceramics on the Optical Absorption: Guangnan Zhang; Yiquan Wu; Alexander Shemes; Adrian Goldstein; Alfred University; Ben-Gurion University of the Negev; Israel Ceramic and Silicate Institute

3:00 PM Invited
Transparent and Fluorescent Rare-earth-doped α-SialON Ceramics: Junichi Tatami; Kohei Aminaka; Motoyuki Iijima; Takuma Takahashi; Yokohama National University; Kanagawa Institute of Industrial Science and Technology

3:30 PM Novel Gel-casting Route for Radially Graded All-ceramic Structures for Microwave Metamaterial Antenna Applications: Abhijeet Sarangi; Dmitry Isakov; Claire Dancer; University of Warwick

3:50 PM Break

4:10 PM
Effect of Initial a-phase Content on Mechanical, Thermal, and Electrical Properties of Pressureless Sintered SiC Ceramics: Young-Wook Kim; Shynar Kultayeva; Rohit Malik; University of Seoul

4:30 PM
Mechanical Properties and Fragmentation Mechanisms of Si/SiC Core-shell Nanoparticles: Kevin Kayang; Alexey Volkov; The University of Alabama

4:50 PM
The Role of Micro-Scale Analysis Tools in Industrial Problem Solving: Jeanette Vass; Auto and Materials
CERAMIC AND GLASS MATERIALS

Glasses and Optical Materials: Current Issues and Functional Applications — Non-silicate Glasses

Sponsored by: ACerS Basic Science Division, ACerS Glass & Optical Materials Division

Program Organizers: Doris Möncke, Alfred University; Mathieu Hubert, Corning Incorporated

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Session Chair: To Be Announced

2:00 PM
Intermediate-range Order in Organic Glasses: Fnu Spoogmay1; Gang Chen2; 1Ohio University

2:20 PM
A Review of Head-up Display (HUD) Coating Technologies for Commercial Vehicle Applications: Sadella Santos1; Chetali Gupta1; Hilda Buss1; 1Exponent

2:40 PM
The Problem with Lead: Elizabeth Tsekrekas1; Alexis Clare1; 1Alfred University

3:00 PM
Structural Study and Investigation of Crystallization Behavior of the Alumino(Boro)Silicate Glasses Containing Tin-doped Indium Oxide Nanocrystals: Amir Ashjari1; Bijan Eftekhar Yekta2; Doris Möncke1; 1Alfred University; 2Iran University of Science and Technology

3:20 PM Break

3:40 PM
Structural Relaxation Mechanism of Anisotropic Alkali Metaphosphate Glass: Jun Endo1; Seiji Inaba1; Setsuro Ito1; 1AGC Inc. 4:00 PM Invited

Ionics Glasses: An Emerging Separate Class of Amorphous Materials with Unique Topology and Dynamic Properties: Courtney Calahoo1; Lothar Wondraczek2; 1University of Alberta; 2Otto Schott Institute for Materials Research

4:30 PM
The Dissolution of Lithium Disilicate Glass under Ultrasonic Cavitation: Ben Dillinger1; Carlos Suchicital1; David Clark3; 1Virginia Polytechnic Institute and State University

FUNDAMENTALS AND CHARACTERIZATION

Grain Boundaries, Interfaces, and Surfaces: Fundamental Structure-Property-Performance Relationships — Mechanics at Interfaces

Sponsored by: ACerS Basic Science Division

Program Organizers: Shen Dillon, University of California, Irvine; Wolfgang Rheinheimer, Julich Research Center; Catherine Bishop, University of Canterbury; Ming Tang, Rice University; John Blendell, Purdue University; Wayne Kaplan, Technion - Israel Institute Of Technology; Melissa Santala, Oregon State University

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Session Chair: To Be Announced

2:00 PM Invited
Alteration of Microstructures by Stressing Surfaces and Interfaces: Klaus van Benthem1; 1University of California, Davis

2:30 PM
Grain-boundary Energy Variation and Evolution during Dislocation-assisted Grain-boundary Sliding in Poly crystalline Mg2SiO4 — Linking Earth and Materials Sciences: Katharina Marquardt1; Alexandra Austin1; Marina Sediak2; Filippe Ferreira3; Lars Hansen4; Sanae Koizumi4; 1Imperial College; 2University of Heidelberg; 3University of Minnesota; 4University of Tokyo

2:50 PM Invited
Atomistic Dynamics of Deformation, Fracture and GB Migration in Oxides: Yuichi Ikuhara1; 1Univ.Tokyo, JFCC, Tohoku University

3:20 PM Break

3:40 PM Invited
The Role of Grain Boundaries in Nucleation-controlled Plasticity of Metal Nanoparticles: Eugen Rabkin1; Amit Sharma2; Jonathan Amodeo3; Tatyana Fedyayeva3; Anuj Bisht3; Olivier Thomas3; 1Technion; 2Empa; 3Aix Marseille Univ., Université de Toulon, CNRS

4:10 PM
Cracking in a Reacted Layer Material: C. Barry Carter1; Chanchal Ghosh1; Manish Singh1; Matthew Janish1; Shayan Parida1; Arthur Doble1; Avinash Dongare1; 1University of Massachusetts

4:40 PM
Characteristics of Steady State and a Scale Law of Plastic Deformation: Yan Huang1; 1Brunel University London
**FUNDAMENTALS AND CHARACTERIZATION**

**High Entropy Materials: Concentrated Solid Solutions, Intermetallics, Ceramics, Functional Materials and Beyond III — Theory and Modeling**

*Sponsored by:* TMS: Nanomaterials Committee

**Program Organizers:** Yu Zhong, Worcester Polytechnic Institute; Michael Gao, National Energy Technology Laboratory; Xingbo Liu, West Virginia University; Peter Liaw, University of Tennessee; Jian Luo, University of California, San Diego; Yiquan Wu, Alfred University; Mitra Taheri, Johns Hopkins University; Amy Clarke, Colorado School of Mines

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**Session Chairs:** Songge Yang, Worcester Polytechnic Institute; Guangchen Liu, Worcester Polytechnic Institute

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2:00 PM Invited
Modeling of Oxidation Resistance in Ni-containing High Entropy Alloys: A Combined First-principles and Machine Learning Study: *Shun-Li Shang*; Yi Wang; Zi-Kui Liu; Michael Gao; *Pennsylvania State University; National Energy Technology Laboratory*

2:20 PM
Revisit the VEC Criterion with High-throughput Ab Initio Calculations: A Case Study With Al-Co-Cr-Fe-Ni System: *Songge Yang*; Guangchen Liu; Yu Zhong; *Worcester Polytechnic Institute*

2:40 PM
An Automated, Machine Learning-driven Framework for Predicting High Temperature Oxidation Properties in Refractory Complex, Concentrated Alloys: *Sharmila Karumuri*; Saswat Mishra; Vincent Mika; Collin Scott; Nimish Awalgaonkar; Austin Hernandez; Kenneth Sandhage; Iljas Bilionis; Alejandro Strachan; *Michael Titus; Purdue University*

3:00 PM
First Principles Prediction of Mechanical Properties of High Entropy Alloys: *Guofeng Wang*; Siming Zhang; *University of Pittsburgh*

3:20 PM Break

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**MATERIALS-ENVIRONMENT INTERACTIONS**

**High Temperature Oxidation of Metals and Ceramics — Corrosion**

*Sponsored by:* TMS Corrosion and Environmental Effects Committee

**Program Organizers:** Kenneth Kane, Oak Ridge National Laboratory; Elizabeth Sooby, University of Texas at San Antonio; Patrick Brennan, General Electric Research; Lavina Backman, U.S. Naval Research Laboratory; Kinga Unocic, Oak Ridge National Laboratory; Richard Oleksak, National Energy Technology Laboratory; David Shifler, Office of Naval Research; Raul Rebak, GE Global Research

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**Session Chairs:** Patrick Brennan, General Electric; Raul Rebak, General Electric

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2:00 PM Invited
Factors Affecting Deposit-Induced Corrosion of Aero-Turbine Components at Elevated Temperatures: *Brian Gleeson*; *University of Pittsburgh*

2:30 PM
Advanced Characterization of Hot Stress Corrosion Cracking in CMSX-4 Turbine Blade Alloys Using Deep Learning-assisted 3D X-ray Microscopy to Reveal High Temperature Fracture and Crack Arrest Mechanisms: *Andy Holwell*; Madhav Kothari; Hirshikesh Bale; Simon Gray; Jonathan Leggett; *Carl Zeiss Microscopy Llc; Cranfield University; Rolls Royce*

2:50 PM
Obtaining Surface Coatings Providing Protection Against High Temperatures in the Production of Coke: *Borys Sereda*; Iryna Kruhlak; Dmytro Sereda; Aleksandr Gaydaenko; *Dneprovsky State Technical University*

3:10 PM
Effects of Secondary Additions to Na₂SO₄ Deposits on High-Temperature Hot Corrosion: *Preston Nguyen*; *University of Pittsburgh*

3:30 PM
Environmentally Assisted Cracking of Nickel and Iron Based Alloys in Te-containing Molten Salts: *Mohammad Umar Farooq Khan*; Miranda Mazza; Lesley Frame; Stephen Raiman; *Texas A&M University; University of Connecticut*

3:50 PM Break

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4:00 PM
Phonon Broadening and Thermal Conductivity in High Entropy Ceramic Carbide: *Linu Malakkal*; Kaustubh Bhawane; Cody Dennett; Zilong Hua; Lingfeng He; Yongfeng Lu; Bai Cui; *Idaho National Lab; University of Nebraska*
4:30 PM
Experimental Studies to Understand Corrosion and Mass Transfer in Molten Salts: Stephen Raiman; 1Texas A&M University

4:50 PM
Analysis and Simulation of Alkoxide Corrosion Occurring in Automotive Metals with Biofuels: Visheet Arya; Rüdiger Reitz; Matthias Oechsner; Eugen Gazenbiller; Daniel Höche; 1MPA-IfW TU Darmstadt; 2Helmholtz-Zentrum Hereon

5:10 PM
Materials Compatibility of Automotive Alloys in Synthetic Fuels - Test Method Development to Evaluate the Corrosion Behavior of Aluminum Materials in Oxygenates(OMEs): Rüdiger Reitz; Visheet Arya; Matthias Oechsner; 1MPA-IfW TU Darmstadt

PROCESSING AND MANUFACTURING

Innovative Process Design and Processing for Advanced Structural Materials — Mechanics and Modeling

Program Organizers: Ju-Young Kim, UNIST; Jae-il Jang, Hanyang University; Sung-Tae Hong, University of Ulsan; Rongshan Qin, The Open University

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Session Chairs: Sukbin Lee, UNIST; Ju-Young Kim, UNIST

2:00 PM Invited
Nano-mechanical Characterization in Constituent Phases of Steels for Understanding Multi-scale Deformation Behavior: Takahito Ohmura; 1National Institute For Materials Science

2:20 PM Invited
Enhancement of Mechanical Properties in Nanoporous Gold: Ju-Young Kim; 1UNIST

2:40 PM Invited
Recent Nanoindentation Studies on Innovative Process Design for Advanced Structural Materials: Zhe Gao; A-Hyun Jeon; Jae-il Jang; 1Hanyang University

3:00 PM
Residual Stress in Steel H-beam Produced by Hot-rolling and QST Investigated by Instrumented Indentation Testing: Sohyeon Lee; Eunji Song; Gyeong-Seok Hwang; Ju-Young Kim; 1UNIST (Ulsan National Institute of Science and Technology)

3:20 PM Break

3:40 PM Invited
Manufacture of Advanced 3D Composites Using a New 3D Weaving Technique and Their Design Using a Neural Network: Hyun Joon Yang; Kyeong Mo Kang; Heung-Nam Han; Woong-Ryeol Yu; 1Seoul National University

4:00 PM Invited
Monte Carlo Simulations for Microstructure Evolution via Diffusion: Sukbin Lee; Youngkyun Son; Ju-Young Kim; 1UNIST (Ulsan National Institute of Science and Technology)

4:20 PM Invited
Improvement of Mechanical Properties of Metallic Materials by Multilayered Structure: Shoichi Nambu; 1University of Tokyo

4:40 PM
Mechanical Properties and Reliability of Nanolayered Stretchable Interconnect with Nanocrystalline Copper and Ternary Metallic Glass: Gyeong-Seok Hwang; Eunji Song; Sohyeon Lee; Ju-Young Kim; 1UNIST (Ulsan National Institute of Science and Technology)
MODELING

Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales IV — Session II

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee, TMS Materials Characterization Committee, TMS: Nanomaterials Committee

Program Organizers: Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Levente Balogh, Queen’s University; Caizhi Zhou, University of South Carolina; Lei Cao, University of Nevada; Josh Kacher, Georgia Institute of Technology

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Session Chairs: Yue Fan, University of Michigan; Siddhartha Pathak, Iowa State University

2:00 PM Invited
Evolution of Metastable Grain Boundaries and Their Tunability under Extreme Conditions: Yue Fan1; Zhitong Bai1; 1University of Michigan

2:30 PM
A Grain Boundary Dislocation-density-based Crystal Plasticity Model for FCC Nanocrystalline Metals: Jonathan Cappola1; Jian Wang2; Lin Li2; 1University of Alabama; 2University of Nebraska-Lincoln

2:50 PM
Continuum Dislocation Dynamics-based Full Field Crystal Plasticity Modeling for Characterizing Dislocation Distribution and Boundary Transmission in Polycrystalline Materials: Navid Kermanshahimonfared1; Georges Ayoub2; Ioannis Mastorakos3; 1Clarkson University; 2University of Michigan; 3Clarkson University

3:10 PM
Motions in Cylindrical Grain Boundaries: Anqi Qiu1; Ian Chesser2; Elizabeth Holm3; 1Carnegie Mellon University; 2George Mason University; 3University of Alabama

3:30 PM Break

3:50 PM Invited
In Situ Studies on Room Temperature Deformability of Nanolaminates and Nanocrystalline Intermetallics: Xiangdong Zhang1; Ruizhe Su2; Dajia Nefati3; Yashashree Kulkarni4; 1Purdue University; 2University of Nebraska-Lincoln; 3University of Michigan; 4Clarkson University

4:20 PM
Slip Transmission and Voiding during Slip Band Intersections in Fe70Ni10Cr20 Stainless Steel: Xiaowang Zhou1; Richard Skelton2; Ryan Sills3; Christopher San Marchi4; 1Sandia National Laboratories; 2Rutgers University

4:40 PM Invited
Structure and Properties of Pseudo-morphically Transformed bcc Mg in Mg/Nb Multilayer Nanocomposite: Siddhartha (Sid) Pathak1; 1Iowa State University

SPECIAL TOPICS

K-12 Educators Forum — Session II

Sponsored by: ACerS

Program Organizers: Kathleen Richardson, University of Central Florida; Adelle Schade. Albright College

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Session Chair: Adelle Schade, Albright College

2:00 PM Panel Discussion

CERAMIC AND GLASS MATERIALS

Manufacturing and Processing of Advanced Ceramic Materials — New Advances in Ceramic Processing I: Sintering

Program Organizers: Bai Cui, University of Nebraska-Lincoln; James Hemrick, Oak Ridge National Laboratory; Mike Alexander, Allied Mineral Products; Eric Faierson, Quad City Manufacturing Laboratory/Western Illinois University; Keith DeCarlo, Blasch Precision Ceramics

Monday PM | October 10, 2022
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Session Chairs: Richard Todd, University of Oxford; Clive Randall, Pennsylvania State University

2:00 PM Invited
Flash Sintering of Ceramics: Towards Homogeneous Components with Improved Mechanical Properties: Richard Todd1; Y. Kubota2; Yinsheng Li3; Riccardo Torchio4; Simone Falco5; Piergiorgio Alotto6; 1University of Oxford; 2University of Padua

2:30 PM Invited
Ultrafast Sintering with and without Electric Fields and Electrochemically Controlled Microstructural Evolution: Jian Luo1; 1University of California, San Diego

3:00 PM
Doping Alumina with Carbon?: Li-or Cohen1; Priyadarshini Ghosh1; Rachel Marder1; Wayne Kaplan2; 1Technion - Israel Institute of Technology

3:20 PM Break

3:40 PM Invited
Utilizing Cold Sintering in the Design and Integration of New Functional Composite Materials: Clive Randall1; 1Pennsylvania State University

3:40 PM
High Throughput, Ultra-fast Laser Sintering of Alumina Sample Array for Establishing the Machine-learning-based Mapping Between Microstructure and Hardness: Fei Peng1; Hai Xiao2; Dongsheng Li3; Rajendra Bordia1; Jianhua Tong3; Jianan Tang1; Xiao Geng3; Siddhartha Sarkar4; Bridget Sheridan1; 1Clemson University

4:10 PM Invited
High Throughput, Ultra-fast Laser Sintering of Alumina Sample Array for Establishing the Machine-learning-based Mapping Between Microstructure and Hardness: Fei Peng1; Hai Xiao2; Dongsheng Li3; Rajendra Bordia1; Jianhua Tong3; Jianan Tang1; Xiao Geng3; Siddhartha Sarkar4; Bridget Sheridan1; 1Clemson University
4:40 PM Cold and Flash Sintering of Metal-doped LLZO for Solid-State Battery Applications: Gareth Jones1; Christopher Green2; Dinesha Dabera3; Parinaz Tabrizian1; Scott Gorman2; Sherry Ghanizadeh2; Sandra Fisher John1; David Pearmain1; Geoff West2; Emma Kendrick1; Claire Dancer1; 1University of Warwick; 2Lucideon Ltd; 3University of Birmingham

5:00 PM Processing of High Entropy Garnet Optical Ceramics: Jiao Li1; Yiquan Wu1; 1Alfred University

ARTIFICIAL INTELLIGENCE

Materials Processing and Fundamental Understanding Based on Machine Learning and Data Informatics — AI-guided Processing Study

Program Organizers: Kathy Lu, Virginia Polytechnic Institute and State University; Jian Luo, University of California, San Diego; Xian-Ming Bai, Virginia Polytechnic Institute and State University; Yi Je Cho, Sunchon National University

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Session Chair: To Be Announced

2:00 PM Invited Unraveling the Process Fundamentals of Additive Friction Stir Deposition by Integrating Physics Simulation with Data-driven Approaches: Hang Yu1; 1Virginia Polytechnic Institute and State University

2:30 PM Comparison of Data Driven and Physics-informed Machine Learning Models for Temperature Prediction of Shear Assisted Processing and Extrusion: Ethan King1; Colby Wight; WoongJo Choi1; Zhao Chen1; Keerti Kappagantula1; Shenyang Hu1; Yulan Li1; Tegan Emerson1; Sarah Akers1; Henry Kvinge1; Eric Machorro1; Jenna Pope1; Erin Barker1; Eric Smith1; 1Pacific Northwest National Laboratory

2:50 PM Composition and Property Prediction of Polymer-derived Silicon Oxycarbides: Yi Je Cho1; Harrison Chaney2; Kathy Lu2; 1Sunchon National University; 2Virginia Tech

3:10 PM Computational and Machine Learning Studies of DNA-templated Dye Aggregate Design: Lan Li1; 1Boise State University

3:30 PM Break

4:00 PM Machine Learning for Joint Quality Performance-determining Relationship between Intermetallic Properties and weld Microstructure of Al/steel Resistance Spot Welds: Moses Yeboah Obiri1; Alejandro Ojeda2; Deborah Fagan1; Keerti Kappagantula1; Hassan Ghassemi-Armaki1; Blair Carlson1; 1Pacific Northwest National Laboratory

4:40 PM Addressing Data Needs for High Temperature Material Processing with Natural Language Processing: Amit Verma1; Benjamin Glaser2; Robin Kuo1; Jason Zhang1; Nicholas David1; Zhisong Zhang1; Emma Strubell1; Anthony Rollett1; 1Carnegie Mellon University

5:00 PM Machine Learning Based Prediction of Cation Distribution in Complex Spinel Oxides as a Function of Processing Temperature: Ying Fang1; Siming Zhang1; Guofeng Wang1; 1University of Pittsburgh

BIOMATERIALS

Next Generation Biomaterials — Next Generation Biomaterials II

Sponsored by: ACerS Bioceramics Division

Program Organizers: Roger Narayan, University of North Carolina; Sanjiv Lalwani, Lynntech, Inc.

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Session Chairs: Wenzhou Wu, Purdue University; Jonathan Massera, Tampere University

2:00 PM Invited Next Generation Models for Bone Metastasis of Cancer: Kalpana Katti1; Haneesh Jasuja1; Farid Solaymani1; Sharad Jaswandkar1; Jiha Kim1; Anu Gaba1; Dinesh Katti2; 1North Dakota State University

2:20 PM Invited Scalable Nanomanufacturing of Biomass Based Triboelectric Wearable Sensors: Wenzhuo Wu1; 1Purdue University

2:40 PM Invited Synthesis of Hierarchical TiO2 Nanowire Architectures for Drug Delivery and Cell Carrier Applications: Song Chen1; Akiyoshi Osaka2; 1Taiyuan University of Technology; 2Okayama University

3:00 PM Invited Luminescent Bioactive Glass Scaffolds: Jonathan Massera1; 1Tampere University

3:20 PM Break

3:40 PM Invited Mineralized Biomaterials from Extrinsically-Controlled Freezecasting: Steven Naleway1; Tony Yin2; Josh Fernquist1; Maddie Schmitz2; Debora Lyn Porter1; Elise Hotz1; 1University of Utah

4:00 PM Invited Copper Containing Glass-Based Bone Adhesives for Orthopaedic Applications: Glass Characterization, Antimicrobial Efficacy and Mechanical Suitability: Sahar Mokhtari1; Anthony Wren1; 1Alfred University

4:20 PM Acetone Sensing with a Chemo-mechanical Actuating Polyaniline-cellulose Acetate Composite: Anthony Annerino1; Perena Gouma1; 1The Ohio State University

4:40 PM A Novel Glass-based Material for Vital Pulp Therapy: Biocompatibility and Physiochemical Properties: Jerry Howard1; John Colombo1; Kirsta Carlson1; 1University of Nevada, Reno; 2University of Nevada, Las Vegas
SPECIAL TOPICS

Resisting Degradation from the Environment: A Symposium Honoring Carolyn M. Hansson’s Research and Pioneering Experiences as a Woman in STEM — Talks to Introduce Posters II

Sponsored by: TMS: Corrosion and Environmental Effects Committee, TMS: Steels Committee

Program Organizers: Jenifer Locke, Ohio State University; Brendy Rincon Troconis, University of Texas at San Antonio; Ashley Paz y Puente, University of Cincinnati; George Gray, Los Alamos National Laboratory; Suveen Mathaudhu, Colorado School of Mines; David Shifler, Office of Naval Research

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Session Chair: To Be Announced

2:00 PM
Liquid Metal Embrittlement: Cracking Open the Disparate Mechanisms: Justin Norkett1; Victoria Miller1; 1University of Florida

2:20 PM
Combined Corrosion Mechanisms Involving Complexing Agents and Proteins: Yolanda Hedberg1; 1University of Western Ontario

2:40 PM
Relating Microstructure to Environmental Degradation in Al-Mg Alloys: Josh Kacher1; 1Georgia Institute of Technology

3:00 PM Break

3:20 PM
Quantifying the Environmentally Assisted Cracking Initiation and Short Crack Behavior in New Generation 7xxx Aluminium: Tim Burnett1; Ryan Euesden1; Yasser Aboua1; At Gamer1; Thomas Jailnin1; Zak Barrett1; Christian Engel1; Phil Prangnell1; 1University of Manchester; 2Airbus

3:40 PM
Correlating Crack Tip pH to Environment Assisted Cracking Performance in Al Alloys: Jennifer Locke1; Katrina Catledge1; Gabby Montiel1; Gabriella Marino1; 1Ohio State University

4:00 PM
Effect of Cyclic RH and pH on Galvanic Corrosion: Vangelina Osteguin1; James Dante1; Brendy Rincon Troconis1; 1University of Texas at San Antonio; 2Southwest Research Institute

4:20 PM
The Multi-dimensional Impact of Corrosion on Sustainability: Christopher Taylor1; 1Dnv GL

BIOMATERIALS

Society for Biomaterials: Biological Response to Materials and Material’s Response to Biological Environments — Session II

Program Organizers: Thomas Dziubla, University of Kentucky; Christopher Siedlecki, Penn State College of Medicine; Jeffrey Capadona, Case Western Reserve University; Lynne Jones, Johns Hopkins Orthopaedics

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Session Chairs: Christopher Siedlecki, Penn State University; Jeffrey Capadona, Case Western Reserve University

2:00 PM Invited
Silicone-aided Advanced Additive Manufacturing of Glass and Glass-ceramic Scaffolds: Enrico Bernardo1; Hamada Elsayed1; Jozef Kraxner2; Franco Stabile3; 1University of Padova; 2University of Trentin; 3CETMIC. Centro de Tecnologia de recursos Minerales y Ceramica

2:30 PM
Modeling the Reliability and Proof Testing of Bioceramics: Osama Jadaan1; Eric Baker2; 1University of North Florida; 2Connecticut Reserve Technologies

2:50 PM
Effects of Debinding Temperature of Carbonate Apatite Honeycomb on Osteoconductivity: Kunio Ishikawa1; Keigo Shibahara2; Koichiro Hayashi1; Yasuharu Nakashima1; 1Kyushu University

3:10 PM
Architected Biomaterials for Multifunctional Medical Implants: Kaveh Barri1; Qianyun Zhang1; Amir Alavi1; 1University of Pittsburgh

3:30 PM Break

3:50 PM
Biodegradable Magnesium-based Bone Fixation Implants: Alloy Design, Post-fabrication Processes, and Biocompatibility: Hamdy Ibrahim1; 1University of Tennessee Chattanooga

4:10 PM
Scalable Green Electrospinning of an Environmentally Safe Nanofibrous Fish Skin Gelatin Material for a Sustainable Tissue Replacement Bank: Amanda Kennell1; Olivia Shivers2; Ma Halog3; Ranoah Holcomb4; Courtney Severino4; Andrei Stanishevsky4; 1University of Alabama in Birmingham
BIOMATERIALS

Society for Biomaterials: Biomaterial Applications — Biomaterials for Healing and Regeneration

Program Organizers: Jessica Jennings, University of Memphis; Guillermo Ameer, Northwestern University; Danielle Benoit, University of Rochester; Jordon Gilmore, Clemson University

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Session Chair: Jessica Jennings, University of Memphis

2:00 PM Invited
Bioactive Glass and Its Role in Healing: Steven Jung; Mo-Sci Corporation

2:30 PM
Magnesium-Based Nanocomposites for Bone Fracture Repair: Shelby Hash; Mary Jia; Wendy Reynoso-Diaz; Mostafa Elsaadany; Hamdy Ibrahim; University of Tennessee Chattanooga; University of Arkansas

2:50 PM
Design of a Biocompatible Hydrogel Coating to Modulate Properties of Bio-ceramic Scaffolds for Bone Regeneration: Irfan Ahmed; Mohammed Saleem; Bayya Devi Karuppasamy; Thassim Beevi Abdul Kader College for Women

3:10 PM
Development of Natural Polymer-based Hydrogels for Corneal Tissue Engineering Applications: Prashant Kumta; Sangeetha Kunjukunju; John Ohodnicki; Joe Candiello; University of Pittsburgh

3:30 PM Break

3:50 PM
Next Generation Nanosurfaces for Drugfree Antibiofilm Applications: Tolou Shokuhfar; University of Illinois at Chicago

4:10 PM
Plant Polymer for Climate and Health Management: Khwaja Hossain; Mayville State University

4:30 PM
Biodegradable Magnesium Fixation Wires for Bone Healing: Karel Tesar; Anezka Jancova; Margit Zaloudková; Radka Vrbova; Martin Bartoš; Stefan Juhas; Jitka Lunackova; Karel Balik; Czech Technical University in Prague; Institute of Rock Structure and Mechanics of The Czech Academy of Sciences; Charles University; Institute of Animal Physiology and Genetics of The Czech Academy of Sciences

4:50 PM
Electrospraying Chitosan on Co-electrospun PCL/PVA Composite with Mesoporous Silica Particles to Release Curcumin for Skin Tissue Engineering Application: Ali Sadeghiannamary; Saman Naghieh; Joel D. Bumgardner; University of Memphis; University of Saskatchewan

5:10 PM Rapid Fire Posters

CERAMIC AND GLASS MATERIALS

Solid-state Optical Materials and Luminescence Properties — Processing and Study of Advanced Optical Materials II

Sponsored by: ACerS Basic Science Division

Program Organizers: Yiquan Wu, Alfred University; Jas Sanghera, Naval Research Laboratory; Akio Ikesue, World-Lab. Co., Ltd; Rong-Jun Xie, Xiamen University; Mathieu Allix, Laboratoire CEMHTI; Kiyoshi Shimamura, National Institute for Materials Science; Liangbi Su, Shanghai Institute of Ceramics; Dariusz Hreniak, Institute of Low Temperature and Structure Research

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Session Chair: Guangran Zhang, Corning Incorporated

2:00 PM Invited
High-entropy Rare-earth Aluminates: Crystal Growth and Ceramics: Mariya Zharavleva; Kaden Anderson; Mathew Pianassola; Charles Melcher; Yimin Wang; Jaroslaw Glodo; University of Tennessee; Radiation Monitoring Devices, Inc.

2:20 PM Invited
UVC and UVB Dual-band Persistent Luminescent Phosphor: Yuanbing Mao; Xiinli Wang; Illinois Institute of Technology

2:40 PM Invited
Optical Ceramic Window Materials at NRL: Woohong (Rick) Kim; Shyam Bayya; Colin Baker; Brandon Shaw; Lynda Busse; Jesse Frantz; Bryan Sadowski; Tony Zhou; Adam Floyd; Joshua Gild; Jasbinder Sanghera; Naval Research Laboratory; Jacobs; University Research Foundation

3:00 PM
Advanced Spinel Ceramics with Highest VUV-vis Transparency: Akio Ikesue; World-Lab. Co., Ltd

3:20 PM Break

3:40 PM Invited
Yb Doped MgO Transparent Ceramics Sintered through the SPS Method: Guangran Zhang; Xuan Chen; Yiquan Wu; Robert Tomala; Charles Hreniak; Alfred University; Polish Academy of Sciences; Polish Academy of Sciences

4:00 PM
3D Printing of Infrared Transparent Y2O3-MgO Composite Ceramics: Jiao Li; Yiquan Wu; Alfred University

4:20 PM
Application of La2Zr2O7:Pr3+ Nanoparticles for Luminescence Thermometry: Forough Jahanbazi; Yuanbing Mao; Illinois Institute of Technology

4:40 PM
Manipulable Persistent Luminescence of Pr3+-Activated Phosphors: Yuanbing Mao; Xiinli Wang; Illinois Institute of Technology
FUNDAMENTALS AND CHARACTERIZATION


Sponsored by: ACerS Basic Science Division

Program Organizers: Lan Li, Boise State University; Winnie Wong-Ng, National Institute of Standards and Technology; Kevin Huang, University of South Carolina

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Session Chair: Winnie Wong-Ng, National Institute of Standards and Technology (NIST)

2:00 PM Invited
Crystal Packing and Porosity in Molecular Co-crystals Based on C60 Fullerene: Lawrence Cook1; Greg Brewer1; Winnie Wong-Ng1; 1Catholic University of America; 2National Institute of Standards and Technology

2:30 PM
Mesoscopic Simulations of Tension and Compression of Cross-Linked Carbon Nanotube Films: Effects of the Nanotube Chirality: Kevin Kayang1; Abu Banna1; Alexey Volkov1; 1The University of Alabama

3:10 PM
Porous Solids with Nanostructured Surfaces for Environmental Applications: Sharmila Mukhopadhyay1; Wenhu Wang1; Mallikarjuna Nadagouda1; 1University of Maine; 2USEPA

3:30 PM
Carbon Fibers Loaded Epoxy Foam: From Dielectric Characterization to Electromagnetic Absorption Application: Ratiba Benzergera1; Chloé Méjean1; Laura Pometcu1; Philippe Pouliguen1; Ala Sharaiha1; 1University of Rennes, IETR; 2DGA/DS

3:50 PM
Invited
Integrated Multi-characterization Approach to Understand Pore Size Distributions in Ceramic Composite Membranes: V. V. Rohit Buhka1; Christine Brockman1; Pankaj Sarin1; 1Oklahoma State University

4:20 PM Invited
Correlated Characterization of Ni-based Superalloys Corroded in Uranium-containing Molten Salt Systems: Trishelle Copeland-Johnson1; Daniel Murray1; Guoping Cao1; 1Idaho National Laboratory

NUCLEAR ENERGY

Tackling Structural Materials Challenges for Advanced Nuclear Reactors — Molten Salt Systems

Sponsored by: TMS Corrosion and Environmental Effects Committee, TMS Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Miaomiao Jin, Pennsylvania State University; Xing Wang, Pennsylvania State University; Karim Ahmed, Texas A&M University; Jeremy Bischoff, Framatome; Adrien Couet, University of Wisconsin-Madison; Kevin Field, University of Michigan; Lingfeng He, North Carolina State University; Raul Rebak, GE Global Research

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Session Chair: To Be Announced

2:00 PM Invited
Interfacial Interactions between Molten Salt and Structural Materials: Jinsuo Zhang1; 1Virginia Polytechnic Institute and State University

2:30 PM Invited
Elucidating Interfacial Phenomena in Molten Salt Corroded Nickel-Chromium Alloys using Analytical Transmission Electron Microscopy: Kaustubh Pawane1; Ruchi Gakhar1; Michael Woods1; Panayotis Manganaris1; Yachun Wang1; Jagadeesh Sure1; Arthur Ronnie1; Phillip Halstenberg1; Simerjeet Gill1; Kotaro Sasaki1; Yu-chen Karen Chen-Wiegart1; Sheng Dai1; Shannon Maharin1; Simon Pimbblot1; James Wishart1; Lingfeng He1; 1Idaho National Laboratory; 2Brookhaven National Laboratory; 3Stony Brook University; 4Oak Ridge National Laboratory

3:00 PM
Quantifying Cr and Fe Dissolution to Understand Stainless Steel Molten Salt Compatibility: Bruce Pint1; Dino Sulejmanovic1; Cory Parker1; Yi-Feng Su1; Rishi Pillai1; 1Oak Ridge National Laboratory

3:20 PM Break

3:40 PM
Assessing Materials Susceptibility to Environmentally-assisted Cracking in Advanced Reactor Coolant Environments: Samuel Briggs1; Peter Beck1; Dustin Mangus1; Jake Quincey1; Xavier Quintana1; Guillaume Mignot1; Julie Tucker1; 1Oregon State University

4:00 PM Invited
Imaging Local Vacancy Supersaturation in Metals After Corrosion in Molten Salt: Yang Yang1; Weiyue Zhou1; Sheng Yin1; Qin Yu1; Robert Ritchie1; Mark Asta1; Ju Li1; Michael Short1; Andrew Minor1; 1The Pennsylvania State University; 2MIT; 3BNL

4:40 PM Invited
Assessing Materials Susceptibility to Environmentally-assisted Cracking in Advanced Reactor Coolant Environments: Samuel Briggs1; Peter Beck1; Dustin Mangus1; Jake Quincey1; Xavier Quintana1; Guillaume Mignot1; Julie Tucker1; 1Oregon State University

4:30 PM
Electrochemical Determination Kinetic Properties of Ni2+ and Cr2+/Cr3+ in FLiNaK Molten Salt: Nathan Smith1; Stephen Lombardo1; Hojong Kim1; Shunli Shang1; Zi-Kui Liu1; 1Pennsylvania State University

4:50 PM
Correlated Characterization of Ni-based Superalloys Corroded in Uranium-containing Molten Salt Systems: Trishelle Copeland-Johnson1; Daniel Murray1; Guoping Cao1; 1Idaho National Laboratory
**ARTIFICIAL INTELLIGENCE**

**Uncertainty Quantification in Data-Driven Materials and Process Design — Materials Design under Uncertainty**

*Sponsored by:* TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Yan Wang, Georgia Institute of Technology; Raymundo Arroyave, Texas A&M University; Anh Tran, Sandia National Laboratories; Dehao Liu, Binghamton University

**Monday PM | October 10, 2022**
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**Session Chairs:** Edwin Garcia, Purdue University; Wei Xiong, University of Pittsburgh; Aaron Tallman, Florida International University

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**2:00 PM**

**Machine Learning of Phase Diagrams:** Jarrod Lund1; Haoyue Wang1; *Edwin Garcia*2; Richard Braatz2; 1Purdue University; 2MIT

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**2:20 PM**

**Thermodynamic Modeling with Uncertainty Quantification and its Implications for Intermetallic Catalysts Design: Application to Pd-Zn-Based Gamma-Brass Phase:** Rusli Gong1; Shun-Li Shang1; Griffin Canning1; Robert Rioux1; Michael Janik1; Zi-Kui Liu1; 1The Pennsylvania State University

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**2:40 PM**

**Efficient Phase Diagram Determination via Sequential Learning:** Theresa Davey1; Brandon Bocklund1; Zi-Kui Liu1; Ying Chen1; 1Tohoku University; 2Lawrence Livermore National La.; 3Pennsylvania State University

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**3:00 PM**

**A Feature-rich Approach to the Characterization of High Temperature Sulfate-induced Corrosion of Advanced Alloys:** David Poerschke1; Atharva Chikhalkar1; 1University of Minnesota

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**3:20 PM Break**

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**3:40 PM**

**Bayesian Calibrated Yield Strength Model for High-entropy Alloys:** Xin Wang1; Wei Xiong1; 1University of Pittsburgh

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**4:00 PM**

**Using Scalable Multi-Objective Bayesian Optimization to Develop Aluminum Scandium Nitride Molecular Dynamics Force Fields:** Jesse Sestito1; Michaela Kempner1; Tequila Harris1; Eva Zarkadoula1; Yan Wang1; 1Valparaiso University; 2Georgia Institute of Technology; 3Oak Ridge National Laboratory

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**4:20 PM**

**Uncertainty Quantification of Constitutive Models in Crystal Plasticity Finite Element Method:** Anh Tran1; Hojun Lim1; 1Sandia National Laboratories

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**4:40 PM**

**Uncertainty Quantification of a High-throughput Local Plasticity Test: Profilometry-based Indentation Plastometry of Al 7075 T6 Alloy:** Aaron Tallman1; Denny John1; Tanaji Paul1; Arvind Agarwal1; 1Florida International University

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**SUSTAINABILITY, ENERGY, AND THE ENVIRONMENT**

**14th Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing — Sustainable Processing of Ceramics and Composites I/Novel Processing of Coatings and Metals**

*Sponsored by:* ACerS Engineering Ceramics Division

**Program Organizers:** Surojit Gupta, University of North Dakota; Mritunjay Singh, Ohio Aerospace Institute; Tatsuki Ohji, National Institute of Advanced Industrial Science and Technology; Hisayuki Suematsu, Nagaoka University of Technology; Enrico Bernardo, University of Padova; Rajiv Asthana, University of Wisconsin; Yiquan Wu, Alfred University; Zhengyi Fu, Wuhan University of Technology; Allen Apblett, Oklahoma State University

**Tuesday AM | October 11, 2022**
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**Session Chairs:** Manabu Fukushima, National Institute of Advanced Industrial Science and Technology (AIST); Daniel Kopp, Rutgers, The State University of New Jersey; Surojit Gupta, University of North Dakota; Valerie Wiesner, NASA Langley Research Center

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**8:00 AM Invited**

**Sustainable Processing of Composite Materials:** Daniel Kopp1; Paniz Foroughi1; Paul Antonick1; Noemie Denis1; Richard Riman1; 1Rutgers, The State University of New Jersey

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**8:30 AM**

**Thermal Insulators Prepared by Gelation Freezing Route and Their Energy Efficiency in Prototype Furnace:** Manabu Fukushima1; 1National Institute of Advanced Industrial Science and Technology (AIST)

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**8:50 AM**

**The Effect of Sawdust Particle Size Distribution on the Hydraulic Conductivity of Low-cost Ceramic Water Filters:** Ian Nettleship1; Chuyuan Zheng1; 1University of Pittsburgh

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**9:10 AM**

**Strategies for Patenting “Green” Technologies:** Van Velkris1; 1Marks & Clerk

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**9:30 AM**

**Preparation of Inorganic Green Pigments via a Green Process:** Allen Apblett1; Travis Reed1; 1Oklahoma State University

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**9:50 AM Break**

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**10:10 AM Invited**

**SiOCN Corrosion Resistant Coatings on Stainless Steel:** HyeonJoon Choi1; Kathy Lu1; 1Virginia Tech

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**10:40 AM**

**Keynote**

**Protective Coatings for Lunar Dust Tolerant Applications:** Valerie Wiesner1; Glen King1; Keith Gordon1; Christopher Wohl1; Lopamudra Das1; Jonathan Hernandez2; 1NASA Langley Research Center; 2National Institute of Aerospace

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**11:10 AM**

**Stabilizing Hazardous Chromium-containing Stainless Steel Slags with MnO Additions:** Zhanjun Wang1; Il Sohn2; 1Northeastern University; 2Yonsei University
11:30 AM
Selective Eliminate the Risk of High Toxicity Mercury from Valuable Selenium-enriched Material Using Vacuum Volatilization: Yunke Wang; Guozheng Zha; 1Kunming University of Science and Technology

11:50 AM
Engineering and Implementation of Pour-Flush Latrines in Remote Bolivia During the COVID-19 Pandemic: Caitlin Sexton; Sida Wilson; Claire Gendron; Matthew Patterson; 1Engineers Without Borders University of Pittsburgh Chapter

BIOMATERIALS

3D Printing of Biomaterials and Devices — Session III

Sponsored by: ACerS Bioceramic Division

Program Organizers: Sahar Vahabzadeh, Northern Illinois University; Susmita Bose, Washington State University; Amit Bandyopadhyay, Washington State University; Mukesh Kumar, LincoTech Medical; Mangal Roy, Indian Institute of Technology - Kharagpur (IIT-Kgp)

Tuesday AM | October 11, 2022
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Session Chair: To Be Announced

8:00 AM Invited
Interlocked Bone Scaffolds with BMP Induced Osteogenesis with Use of 3D Printed Molds: Kalpana Katti; Krishna Kundu; Sharad Jaswandkar; Dinesh Katti; 1North Dakota State University

8:30 AM Invited
Sheet Lamination Additive Manufacturing (SLAM) – A Viable Approach to Resorbable 3D Constructs for Bone Tissue Engineering: Prashant Kumta; Matthew Criado; Abhijit Roy; John Ohodnicki; Nick Tondravi; Hannah Fischer; Howard Kuhn; 1University of Pittsburgh

9:00 AM Invited
Implant Optimization Guided by Biomimetic Insight: Malcolm Sneed; 1University of Southern California

9:30 AM Invited
3D Printing Strategies to Fabricate Complex Scaffolds for Tissue Engineering Applications: Murat Guvendiren; 1New Jersey Institute of Technology

10:00 AM Break

10:20 AM
Low-concentration Cell-laden Gelatin Methacryloyl for Osteochondral Tissue Bioprinting: Soumitra Das; Bikramjit Basu; 1Indian Institute of Science, Bangalore

10:40 AM
Mechanical and Electrical Properties of 3D Printed Wearable Structures: Jose Gonzalez-Garcia; Bhargavi Mummareddy; Gina Morrison; Vamsi Borra; Pedro Cortes; 1Youngstown State University

11:00 AM
Low-grained Stainless Steel for Orthopedic Implants: Surya N.; Santanu Mandal; Mangal Roy; 1Indian Institute of Technology Kharagpur

11:20 AM
Effect of Printing Parameters on 3D-printed Biodegradable Biopolymer-metal Composite Material: Prashant Kumta; John Ohodnicki; Abhijit Roy; Matthew Criado; Howard Kuhn; 1University of Pittsburgh

SPECIAL TOPICS

ACerS Richard M. Fulrath Award Session — Session II

Sponsored by: ACerS

Tuesday AM | October 11, 2022
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9:00 AM Invited
Fabrication and Morphology Control of Advanced Glass-Ceramics for Next-generation All-Solid-State Batteries: Tsuyoshi Honma; 1Nagaoka University of Technology in Niigata

9:40 AM Invited

10:00 AM Invited
Displays Having FETs with Crystalline Oxide Semiconductor Materials: Kenichi Okazaki; 1Semiconductor Energy Laboratory Co., Ltd. (SEL)

10:20 AM Break

10:40 AM Invited
Design Paradigm for Sustainable Manufacturing of Ceramics by Analyzing Different Case Studies: Surajit Gupta; 1University of North Dakota

ADDITIVE MANUFACTURING


Program Organizers: Jing Zhang, Indiana University – Purdue University Indianapolis; Brandon McWilliams, US Army Research Laboratory; Li Ma, Johns Hopkins University; Yeongil Jung, Changwon National University

Tuesday AM | October 11, 2022
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Session Chairs: Jing Zhang, Indiana University - Purdue University Indianapolis; Li Ma, Johns Hopkins University Applied Physics Laboratory; Yeon-Gil Jung, Changwon National University; Brandon McWilliams, CCDC Army Research Laboratory

8:00 AM
Embracing Variability: Machine Learning-based Sequential Optimization of Additive Manufacturing Processes: Maher Alghalayini; Surya Kalidindi; Christaana Paredis; Fadi Abdeljawad; 1Clemson University; 2Georgia Institute of Technology
8:20 AM
Generating Novel Porosity Distributions Produced by Metal Additive Manufacturing via Deep Learning: Odinakachukwu Ogoke1; Chris Laursen2; Kyle Johnson2; Michael Glinsky2; Sharlotte Kramer2; Amir Barati Farimani1; 1Carnegie Mellon University; 2Sandia National Laboratories

8:40 AM
Machine Learning Segmentation Methods for Fatigue Fracture Surface Defect Analyses: Austin Ngo1; David Scannapieco2; Shuheng Zhang3; Shuyue Bian4; Collin Sharpe6; John Lewandowski5; 1Case Western Reserve University

9:00 AM
Prediction of Microstructure Formation Under Rapid Solidification Using a Deep Learning Approach: Anindya Bhaduri1; Chen Shen2; Alex Kitt3; Lee Kerwin4; Siyeong Ju5; Luke Mohr6; Yang Jiao7; Marissa Brennan7; Shenyen Huang8; Sreekar Karnati9; Monica Soare5; Arushi Dhakad8; Hamedreza Seyyedhosseinzadeh9; Liping Wang10; Changjie Sun11; Lang Yuan12; 1GE Research; 2EWI; 3University of South Carolina

9:20 AM
Using Generative Adversarial Networks for the Design of Metamaterials to Reach New Property Spaces: Chandra Veer Singh1; Sahar Choukir1; 1University of Toronto

9:40 AM
Using Machine Learning to Characterize Powder Behavior and Surface Roughness in Powder Bed Fusion AM: Srujana Rao Yarasi1; Elizabeth Holm1; Anthony Rollett1; 1Carnegie Mellon University

9:00 AM
Laser Powder Bed Fusion of 14YWT Oxide Dispersion Strengthened Steel Produced Using Gas Atomized Reaction Synthesis Precursor Powder: Sourabh Saptarshi1; Timothy Horn1; Christopher Rock1; Djamel Kacimi1; Matthew De Jong2; Iver Anderson2; Jennifer Forrester2; Timothy Prost3; Ralph Napolitano3; Emma White3; 1North Carolina State University; 2AMES Laboratory; 3Iowa State University; 3DECHEMA Forschungsinstut

9:20 AM
Laser Powder Bed Fusion of Ultra-High Strength Steel from Gas Atomized Powders: Thinh Huynh1; Kevin Graydon2; Nemajla Klejstan3; Marko Knezevic2; Brandon McWilliams2; Kyu Cho4; Yongho Sohn4; 1University of Central Florida; 2University of New Hampshire; 3DEVCOM US Army Research Laboratory

9:40 AM
Mechanical and Microstructure Analysis of 4130 Steel Alloy Produced Using Laser Powder Bed Fusion: Joy Fosmark1; Eric Poczatek1; Yun Bai2; Emily Wolbeck1; 1Ford Motor Company

10:00 AM Break

10:20 AM
Effect of Post-heat Treatment on the Microstructure and Mechanical Properties of High-carbon High-chromium Tool Steel Manufactured by Direct Energy Deposition: Jung-Hyun Park1; Kyu-Sik Kim2; Jin-Young Kim3; Yong-Mo Koo4; Jong-Bae Jeon5; Kee-Ahn Lee6; 1Inha University; 2Agency for Defense Development; 3Fusiontech. Corp.; 4Changsung Corp.; 5Dong-A University

10:40 AM
Microstructure and Mechanical Property Stability of Wire Arc Additive Manufactured Stainless Steels after Long-Term Thermal Aging: Juan Gonzalez1; Luc Hagen2; Stephen Tate3; Jonah Klemm-Toole4; 1Colorado School of Mines

11:00 AM
The Development of a Directed Energy Deposition (DED) Printability Framework for Improving Part Density and Performance in High Strength Martensitic Steels: Matthew Vaughan1; Michael Elverud1; Jiahui Ye1; Riani Seede2; Sean Gibbons3; Philip Flater4; Alaa Elwany5; Raymundo Arroyave1; Ibrahim Karaman1; 1Texas A&M University; 2Air Force Research Laboratory

11:20 AM
L-DED Processability of AISI 410L Stainless Steel: Jefferson Pacheco1; Ana Sofia De Oliveira1; Marcelo Veiga3; Vitor Meura1; Paulo Bloemer3; 1Federal University of Parana
ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Ni-based Alloys II

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Jurgen Eckert, Erich Schmid Institute of Materials Science; Zhi Wang, South China University of Technology

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Session Chair: To Be Announced

8:00 AM
Characterization of Deposits Applied by L-DED and L-PBF Processes onto a GTD 111 Turbine Blade Tip Using Rene 65 Powder: Henry León-Henao; Alejandro Toro; Jorge Giraldo; Antonio Ramirez; National University of Colombia; The Ohio State University

8:20 AM
Material Qualification of IN625 for Binder Jet Printing: Katerina Kimes; Kyle Myers; Desktop Metal / ExOne

8:40 AM
Origin and Evolution of Defects during Sintering in Binder-Jet Printed 625 Alloy: Chuyuan Zheng; Markus Chmielus; Ian Nettleship; University of Pittsburgh

9:00 AM
Thermal and Microstructural Characterizations of GRCop-84/In718 Composite Structure Fabricated by DED Machine: Zexiao Wang; Nicholas O’Brien; Nicholas Jones; Jack Beuth; Sheng Shen; Carnegie Mellon University

9:20 AM
An Investigation into the Effects of CoAl2O4 Oxide Addition on Melt Pool Geometry and Microstructure in Alloy 718 Processed by Laser Powder Bed Fusion: I-Ting Ho; Kai-Chun Chang; Dhruv Tiparti; An-Chou Yeh; Sammy Tin; Illinois Institute of Technology; National Tsing Hua University; The University of Arizona

9:40 AM
Electron Beam Powder Bed Fused Haynes-282 Builds Containing Thin Wall Struts of Varying Thicknesses: Bryan Lim; Hansheng Chen; Keita Nomoto; Zibin Chen; Amy Clarke; Sophie Primig; Xiaozhou Liao; Sudarsanam Babu; Andrew Breen; Simon Ringer; The University of Sydney; The Hong Kong Polytechnic University; Colorado School of Mines; The University of New South Wales; University of Tennessee, Knoxville

10:00 AM
Break

10:20 AM
Optimizing the High Temperature Mechanical Performance of Haynes 282 Printed via Laser Powder Bed Fusion: Nicholas Lamprinatos; Anthony Rollett; Carnegie Mellon University

10:40 AM
Post-heat Treatment Design of Haynes 282 Alloys Processed by Wire-arc Additive Manufacturing: Luis Ladinos Pizano; Soumya Sridar; Wei Xiong; University of Pittsburgh

11:00 AM
Solving Solidification Cracking in Laser Powder Bed Fusion Haynes 230: Jonah Klemm-Toole; Ruben Ochoa; Benjamin Rafferty; Amy Clarke; Jeremy Iten; Colorado School of Mines

11:20 AM
Interface Formation during Drop-on-demand Metal 3D Printing: Negar Gilani; Nesma Aboulkhair; Marco Simonelli; Richard Hague; University of Nottingham

ADDITIVE MANUFACTURING

Additive Manufacturing of Polymeric-based Materials: Challenges and Potentials — Characterization and Novel Approaches to Mitigate the Challenges of Polymeric-based Materials in Additive Manufacturing

Program Organizers: Ola Rashwan, Pennsylvania State University-Harrisburg; Matt Caputo, Pennsylvania State University; Daudi Waryoba, Pennsylvania State University; Pedro Cortes, Youngstown State University

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Session Chairs: Matt Caputo, Penn State Shenango; Ola Rashwan, Penn State Harrisburg

8:00 AM
Improving Material Conveyance of Pellet and Granulated Flake Feedstocks in Material Extrusion Additive Manufacturing: Doug Sassaman; Helen Little; Samantha Snabes; Carolyn Seepersad; Matthew Fiedler; University of Texas Austin; re:3D

8:20 AM
Effects of Ironing on the Surface and Thermo-Mechanical Properties of 3D Printed PLA via Material Extrusion: Matt Caputo; Ola Rashwan; Daudi Waryoba; Kevin McDade; Penn State Shenango; Penn State Harrisburg; Penn State DuBois

8:40 AM
Characterization of Additive Manufactured Carbon Fiber Composite Using an Original Fracture Toughness Measurement Approach: Allison Reda; Constantin Solomon; Youngstown State University

9:00 AM
3D Printing of Highly Stretchable Shape Memory Polymer Composites (SMPCs): Kavish Sudan; Kunal Kate; Rajiv Malhotra; University of Louisville; Rutgers University

9:20 AM
Extrusion and Characterization of Compounded rPET 3D Printing Filament: Ola Rashwan; Zachary Koroneos; Matthew Caputo; Pennsylvania State University- Harrisburg; Penn State Shenango

9:40 AM
Question and Answer Period

9:50 AM
Break

10:10 AM
Wear of Printed Polymer Patterns for Sand Casting: Philip King; Michael Farran; Guha Manoharan; Penn State University
10:50 AM
Direct Ink Writing of Multi-layered Sensors Embedded Using 3D Printing for Soft Robotics: Akshay Kakar1; Derrick Banerjee2; Konstantinos Sierr2; Edward Sablosky3; 1West Virginia University

11:10 AM
Polymeric Composite of Magnetite Iron Oxide Nanoparticles and Their Application in Biomedicine: A Review: Estefani Chichande1; Moises Bustamante2; Emilio Bucio3; 1Universidad Central del Ecuador; 2Universidad Autónoma de México; 3Universidad Autónoma de México

11:30 AM
Fused Deposition Modeling of Natural Carbon-enhanced Composite Filaments for Structural Applications: Logan Veley1; Yahya Al-Majali2; Jason Trembly2; 1Ohio University

ADDED MANUFACTURING
Additive Manufacturing of Titanium-based Materials: Processing, Microstructure and Material Properties — Ti6Al4V

Program Organizers: Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University

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Session Chair: Ola Harrysson, NCSU

8:00 AM Invited
Powder Bed Processing of Ti6Al4V: Comprehensive Process-Microstructure-Properties Analysis: Leila Ladani1; 1Arizona State University

8:40 AM
Characteristics of Ti6Al4V Coupons Manufactured at High and Low Laser Powders Towards Improved Build Rates: Nkutwane Mahtoba1; Ina Yadoitsava2; Igor Yadoitserv2; Lerato Tshabalala1; Sisa Pityana3; 1CSIR- National Laser Center; 2Central University of Technology

9:00 AM
Controlling Aluminum Vaporization in EBM Ti-6Al-4V through Scan Strategy: Katie O’Donnell1; Maria Quintana1; Christopher Ledford2; Michael Kirk2; Peter Collins1; 1Iowa State University; 2Oak Ridge National Laboratory

9:20 AM
Effect of Interlayer Delays on the Microstructure and Properties of As-built Ti64 Parts in Direct Energy Deposition Process: Rajib Halder1; Rigved Sardey2; Amrit Verma3; Zhening Yang4; Anthony Rollett5; 1Carnegie Mellon University

9:40 AM
Effect of Processing Parameters on Texture Evolution of Laser Powder Bed Fusion Processed Hydride-Dehydride Ti-6Al-4V Powder: Mohammadreza Asherloib1; Muktesh Paliwal2; Anthony Rollett3; Amir Mostafaei4; 1Illinois Institute of Technology; 2Kymera International; 3Carnegie Mellon University

10:00 AM Break

10:20 AM
Application of Extreme Value Analysis to Defect Size Distributions for Fatigue Life Prediction of Laser Powder Bed Fusion Processed Ti-6Al-4V: Tharun Reddy1; David Scannapieco2; Austin Ngo3; John Lewandowski4; Anthony Rollett5; Sneha Narra6; 1Carnegie Mellon University; 2Case Western Reserve University

10:40 AM
Effects of Process Parameters on Fatigue Behavior and Defect Characteristics in LPBF Ti-6Al-4V: Austin Ngo1; David Scannapieco2; Francisco Medina3; Christian Gobert4; Anthony Rollett5; Jack Beuth6; John Lewandowski7; 1Case Western Reserve University, 6University of Texas at El Paso, 7Carnegie Mellon University

11:00 AM
Fatigue Life and Fatigue Crack Growth Behavior of Ti-6Al-4V Fabricated via Direct Laser Deposition (DLD): Mohammad Bagher Mahtoba1; Ryan Stokes2; Aref Yadollahi3; Haley Doude4; Linkan Blan5; James C. Newman6; 1University of South Alabama; 2Mississippi State University

11:20 AM
Modeling and Characterizing the Effects of Keyhole Porosity on Simulated Ti-6Al-4V Powder-Bed Fusion Microstructures: Brodan Richter1; Samuel Hockert2; Erik Frankforter3; Joseph Zalameda4; 1National Aerospace and Space Administration

11:40 AM
Effects of Scan Strategies on Residual Stresses in Laser Powder Bed Fusion Ti-6Al-4V: Courtney Morgan-Barnes1; Brad Sampson2; Ryan Stokes3; Haley Doude4; Matthew Priddy5; Linkan Blan6; 1Mississippi State University

ADDED MANUFACTURING
Additive Manufacturing: Equipment, Instrumentation and In-Situ Process Monitoring — Equipment, Instrumentation and In-Situ Process Monitoring I

Sponsored by: TMS Additive Manufacturing Committee

Program Organizers: Ulf Ackelid, Freemelt AB; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Ola Harrysson, North Carolina State University

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Session Chair: To Be Announced

8:00 AM Invited
Wire DED Process Monitoring and Controls: Andrzej Nycz1; Chris Masuo2; William Carter3; Derek Vaughan4; 1Oak Ridge National Laboratory

8:40 AM
Design of a Glovebox for In Situ Monitoring of a Directed Energy Deposition Process: Marwan Haddad1; Hui Wang2; Ethan Weinberg3; Ronald Sellers4; Karan Kankaria5; Mahsa Valizadeh6; Sarah Wolff7; 1Texas A&M University
9:00 AM
Identifying Melt Pool Dimensions and Melt Pool Variability in Laser Powder Feed Directed Energy Deposition Additive Manufacturing: Ryan Utz; Jose Loli; Brandon Abranovic; Jack Beuth; Sneha Narra; Carnegie Mellon University

9:20 AM
Melt Pool-Scale Process Monitoring of Laser Powder Bed Fusion: Christian Gobert; Guadalupe Guirarte; Syed Zia Uddin; David Guirguis; Jonathan Malen; Conrad Tucker; Jack Beuth; Carnegie Mellon University

9:40 AM Invited
In-situ Monitoring of the EBM Process: From Powder Bed Homogeneity to Thermal Signatures: Marco Grasso; Bianca Colosimo; Politecnico di Milano

10:20 AM Break

10:40 AM
Process Monitoring of Melt Pool Spatter at Melt Pool, Layer and Part Scales: Christian Gobert; Syed Zia Uddin; Brandon Abranovic; Jack Beuth; Carnegie Mellon University

11:00 AM
Automated Detection and Quantification of Spatter Generated During Laser Powder Bed Fusion Using Infrared Imaging and Computer Vision: Syed Zia Uddin; Nicholas O’Brien; Satbir Singh; Jack Beuth; Carnegie Mellon University

11:20 AM
Several Ways Ultrasound Can Be Used during Powder Bed Fusion: Christopher Kube; Nathan Kizer; Corey Dickman; Edward Reutzel; Penn State University

ADDITIVE MANUFACTURING

Additive Manufacturing: Mechanisms and Mitigation of Aqueous Corrosion and High-temperature Oxidation — Corrosion Behavior of Additively Manufactured Metals and Alloys

Sponsored by: TMS Corrosion and Environmental Effects Committee, TMS: Additive Manufacturing Committee

Program Organizers: Amir Mostafaei, Illinois Institute of Technology; Yashar Behnamian, University of Alberta; Mohsen Mohammadi, University of New Brunswick; Bryan Webler, Carnegie Mellon University; Kinga Unocic, Oak Ridge National Laboratory

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Session Chairs: Amir Mostafaei, Illinois institute of Technology; Bryan Webler, Carnegie Mellon University

8:00 AM
Corrosion Evaluation of Additively Manufactured Al-Cu-X Alloys: Jiheon Jun; Alex Plotkowskit; Amit Shyam; J. Haynes; Yi Feng Su; Oak Ridge National Laboratory

8:20 AM
Effect of Aging Treatment on Stress Corrosion Cracking Response of Cold Sprayed Al 6061 Alloy: Ryan Cochran; Shiraz Mujahid; Aulora Rusk; YubRaj Paudel; Marc Pepi; Peter Czech; Hongjoo Rhee; Center for Advanced Vehicular Systems at Mississippi State University; Army Research Laboratory; American Lightweight Materials Manufacturing Innovation Institute

8:40 AM
Corrosion and Environmental Fracture Susceptibility of EBM Ti-6Al-4V in Seawater: Matthew McMahon; Nicholas Pizzolato; Fatou Cisse; Eric Dau; Elissa Trueman; Naval Surface Warfare Center, Carderock Division

9:00 AM
Electrochemical Behavior of Additively Manufactured Non-spherical Ti-6Al-4V in Saline Water: Melody Delpazir; Mohammadreza Asherloos; Muktesh Paliwal; Amir Mostafaei; Illinois Institute of Technology; Kymera International

9:20 AM
Electrochemical Performance of Additively Manufactured 8620 Low Alloy Steel: Effect of Acetic Acid: Ezzul Haque Sabuz; Ishraq Shabib; Central Michigan University

9:40 AM
High Temperature Oxidation and Metal Dusting Resistance of AM Ni-based and Multi-principle Element Alloys: Emma White; Clara Schlereth; Mathias Galetz; DEHEMA Forschungsinstitut

10:00 AM Break

10:20 AM
Leveraging Additive Manufacturing to Co-design Mechanical Properties and Environmental Resistance: Rishi Pillai; Rebecca Kurfess; Yi Feng Su; QQ Ren; Soumya Nag; Oak Ridge National Laboratory

10:40 AM
Microstructural Characterization and High-Temperature Oxidation of Laser Powder Bed Fusion Processed Inconel 625: Emily Lewis; Nick Cruchley; Moataz Attallah; Sam Cruchley; University of Birmingham; Manufacturing Technology Centre (MTC)
**NUCLEAR ENERGY**

**Advanced Characterization of Materials for Nuclear, Radiation, and Extreme Environments III — In Situ Microscopy**

*Sponsored by:* TMS Nanomechanical Materials Behavior Committee, TMS Nuclear Materials Committee

**Program Organizers:** Cody Dennett, Idaho National Laboratory; Samuel Briggs, Oregon State University; Christopher Barr, Naval Nuclear Laboratory; Michael Short, Massachusetts Institute of Technology; Janelle Wharry, Purdue University; Cheng Sun, Idaho National Laboratory; Caitlin Taylor, Los Alamos National Laboratory; Khalid Hattar, Sandia National Laboratories; Yuanyuan Zhu, University of Connecticut

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**Session Chairs:** Samuel Briggs, Oregon State University; Cheng Sun, Idaho National Laboratory

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**8:00 AM Invited**

Utilizing In-situ Microscopy Techniques to Decipher the Microscale Dynamics of Materials in Extreme Environments: *Eric Long*

Samuel Briggs; Nathan Heckman; Anthony Monterrosa; Trevor Clark; Christopher Barr; Daniel Butler; Brad Boyce; Khalid Hattar; Sandia National Laboratories

**8:30 AM Invited**

In Situ Irradiation of TiO2 Nanotubes: *Hui Xiong*

Chao Yang; Tristan Olsen; Miu Lun Lau; Kassiopeia Smith; Janelle Wharry; Khalid Hattar; Yongqiang Wang; Wei-Ying Chen; Yaqiao Wu; Badri Narayanan; Min Long; Dewen Hou; Boise State University; Purdue University; Fifth Gait Technologies; Sandia National Laboratory; Los Alamos National Laboratory; Argonne National Laboratory; University of Louisville

**9:00 AM**

In-situ Investigation of PFM Tungsten Oxidation Using Atmospheric Environmental TEM (ETEM): *Yuanyuan Zhu*

University of Connecticut

**9:20 AM Invited**

Radiation Resistance of Metallic Glass Coatings of Crystalline Nanostructures: *Mehrdad Kianii*

Khalid Hattar; Wendy Gu; Yale University; Sandia National Laboratories; Stanford University

**9:50 AM Break**

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**10:10 AM**

High-temperature Stable Nanolamellar Transition Metal Carbides Derived from Two-dimensional MXenes for Extreme Environments: *Brian Wyatt*

Kartik Nemani; Annabelle Harding; Wyatt Highland; Babak Anasori; Indiana University - Purdue University Indianapolis

**10:30 AM Invited**

Machine Learning Algorithms for High-throughput Characterization of Structure and Microstructure of Metals for Extreme Environments: *Nishan Senanayake*

Thaddeus Rahn; Nathaniel Tomczak; Assel Aitkaliyeva; Jennifer Carter; Case Western Reserve University; University of Florida

**11:00 AM**

Microstructural Evolution of Alloy 718 under High Temperature In-situ Ion Irradiation with Machine Learning: *Stephen Taller*

Timothy Lach; Kai Sun; Oak Ridge National Laboratory; University of Michigan

**11:20 AM Invited**

Recent Innovations in Machine Learning-based Techniques for In-situ Microscopy Data Analysis: *Kevin Field*

Priyam Patki; Matthew Lynch; Ryan Jacobs; T.M. Kelsy Green; Robert Renfrow; Wei-Ying Chen; Dane Morgan; Christopher Field; University of Michigan; University of Wisconsin; Argonne National Laboratory; Theia Scientific, LLC

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**PROCESSING AND MANUFACTURING**

**Advanced Joining Technologies for Automotive Lightweight Structures — Self-piercing Riveting (SPR)**

*Sponsored by:* ACerS Manufacturing Division, TMS Aluminum Committee

**Program Organizers:** Yan Huang, Brunel University London; Carla Barbatti, Constellium; Yingchun Chen, Dura Automotive Systems

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**Session Chair:** Carla Barbatti, Constellium

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**8:00 AM Introductory Comments**

**8:05 AM Keynote**

Self-Pierce Riveting of Aluminium and Mixed Material Car Body Structures: *Paul Briskham*

Atlas Copco IAS Ltd

**8:45 AM Keynote**

Modelling, Simulation and Microstructural Investigation of the Self-piercing Riveted Joints: *Ebad Bagherpour*

Yan Huang; Brunel University London

**9:15 AM**

Investigation into the Effect of Interlock Area on the Strength of Self-Pierce Rivets: *Lewis Jepps*

Paul Briskham; University of Sheffield; Atlas Copco

**9:35 AM**

Influence of Process Parameters on Joint Formation and Load-bearing Capacity for a Versatile Self-piercing Riveting Process: *Fabian Kappe*

Mathias Bobbert; Gerson Meschut; Paderborn University

**9:55 AM Break**

**10:15 AM Invited**

Investigation of the Three-dimensional Stress State during Loading of Self-piercing Riveted Joints: *Mortaza Otroshti*

Gerson Meschut; Paderborn University

**10:45 AM**

Effect of Processing Parameters on the Mechanical Performance of High Velocity Riveted (HVR) Joints through Finite Element Modeling: *Daniel Ramirez Tamayo*

Lei Li; Benjamin Schuessler; Vineet Joshi; Ayoub Soulam; Pacific Northwest National Laboratories

**11:05 AM**

Solid Phase Joining of AA6061-T6 Joints via High Velocity Riveting: *Benjamin Schuessler*

Daniel Ramirez Tamayo; Sridhar Niverty; Lei Li; Ayoub Soulam; Vineet Joshi; Pacific Northwest National Laboratories
MATERIALS-ENVIRONMENT INTERACTIONS

Advanced Materials for Harsh Environments — Session III

Sponsored by: ACerS Electronics Division

Program Organizers: Navin Manjooran, Chairman, Solve; Gary Pickrell, Virginia Tech

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Session Chairs: Gary Pickrell, Virginia Tech; Navin Manjooran, Chairman, Solve

8:00 AM Introductory Comments

8:40 AM
Root Cause Spectroscopic Failure Investigation Aided by High Resolution SEM/EDS, FT-IR, XPS Instruments: Jeanette Vass1; 1Auto and Materials

9:00 AM
Silica Nanoparticles via Sol Gel Synthesis: A Concise Review on the Expulsion of Heavy Metals from Their Solution: Gregory Onaiwu1; Eribe Jonathan2; Iheanyi Odiachi2; Ikhuzaugbe Ifijen3; Omotelinse Oladele4; 1Benson Idahosa University; 2University of Benin; 3Delta State Polytechnic Ogwashi-Uku; 4Rubber Research Institute of Nigeria; 4Paramount TC, 34 Lafiaji Street Lagos

9:20 AM
Stress Corrosion Mitigation in Al-Mg via Zn-Rich Primers and Long-Term Performance Stability: Matthew McMahon1; Eric Dau1; Allison Akman1; Fatou Cisse1; 1Naval Surface Warfare Center, Carderock Division

9:40 AM
Titanium Coatings on Materials for Harsh Environments and Corrosion in Interaction with the Environment in Coke Production: Borys Sereda1; Iryna Kruhliak2; Dmytro Sereda2; Dmytro Kruhliak2; 1Dneprovsky State Technical University

10:00 AM Break

10:20 AM
Understanding Hydration-induced Cracking, Corrosion and Self-healing Mechanisms in Advanced Concrete Using Electron Microscopy and Quantitative Non-destructive 3D Mineral Characterization: Andy Hotwell1; Maadhav Kothari2; Edward Hill1; Tanvir Qureshi1; 1Carl Zeiss Microscopy LLC

10:40 AM Concluding Comments

IRON AND STEEL (FERROUS ALLOYS)

Advancements in Steel Structural Refinement — Session I

Sponsored by: AIST Metallurgy — Processing, Products & Applications Technology Committee

Program Organizers: Emmanuel De Moor, Colorado School of Mines; Jose Rodriguez-Ibabe, CEIT and TECNUN; Charles Enloe, CBMM North America

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Session Chairs: Emmanuel De Moor, Colorado School of Mines; Charles Enloe, CBMM

8:00 AM
Effect of Nb Microalloying on the HAZ Grain Growth Kinetics and Precipitation Dissolution during Welding: Iñigo Iturrioz1; Nerea Isastib; Jose Rodriguez-Ibabe2; Pello Urtza3; Nobuyuki Ishikawa4; Daichi Izumi5; Douglas Stalheim1; David Jarreta1; David Martin6; 1CEIT and TECNUN (University of Navarra); 2JFE Steel Corporation; 3DGS Metallurgical Solutions, Inc.; 4CBMM Asia

8:20 AM
Effect of Nb Precipitation in the Microstructure and Mechanical Properties of X80 Steel: Daniel Olguin Ramirez1; Eric Palmiere1; John Nutter1; Omar Garcia Rincon2; Juan Pedraza3; 1The University of Sheffield; 2Ternium Mexico

8:40 AM
Microalloying for Minimization of Mechanical Property Variation in 700 MPa Hot-Rolled Strip: Charles Enloe1; Kyle Vanover2; 1CBMM North America; 2Steel Dynamics, Inc.

9:00 AM
Effect of Nb on the Simulated HAZ Toughness of Low Carbon Heavy Gauge Linepipe Steels: Daichi Izumi1; Nobuyuki Ishikawa2; Nerea Isasti3; Jose Rodriguez-Ibabe3; Pello Urtza4; Douglas Stalheim5; David Jarreta6; David Martin7; 1JFE Steel Corporation; 2CEIT and University of Navarra; 3DGS Metallurgical Solutions, Inc.; 4CBMM Asia

9:20 AM
Phase Transformation Behavior of Fe-10wt.% Ni Steel Weld Metal: Daniel Bechetti1; Jennifer Semple1; Matthew Sinfield1; 1Naval Surface Warfare Center, Carderock Division

9:40 AM
Intercritical Annealing of HY Steel to Improve Impact Toughness: Jack Galuardi1; Emmanuel De Moor2; Kip Findley3; 1Colorado School of Mines

10:00 AM Break

10:20 AM
The Effect of Adding Minor Alloying Elements in Reducing the Prior Austenite Grain Size in High Yield Strength (HY) Steels: Aphrodite Strifas1; Matthew Fricht1; Sreeramamurthy Ankem1; 1University of Maryland
10:40 AM
High Cycle Fatigue Behavior of Nano-bainitic Steels: A Detailed Crack Initiation and Grain Boundary Study: Blessto B\textsuperscript{1}; Avanish Kumar\textsuperscript{2}; Aparna Singh\textsuperscript{1}; \textsuperscript{1}Indian Institute of Technology, Bombay; \textsuperscript{2}Indian Institute of Technology (ISM) Dhanbad

11:00 AM
In-situ Measurement of Surface Relief Effect during Displacive Transformation of Low-carbon Steel: Ruogu Hou\textsuperscript{1}; Junya Inoue\textsuperscript{1}; \textsuperscript{1}The University of Tokyo

CERAMIC AND GLASS MATERIALS

Advances in Dielectric Materials and Electronic Devices — Capacitors, Relaxors, Electrostriction, and Energy Applications

Sponsored by: ACerS Electronics Division

Program Organizers: Amar Bhalla, University of Texas; Ruyan Guo, University of Texas at San Antonio; Rick Ubic, Boise State University; Matjaž Spreitzer, Jožef Stefan Institute

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Session Chair: Matjaž Spreitzer, Jožef Stefan Institute

8:00 AM
Lead-free and Antiferroelectric Ceramics for Novel Energy and Heat-management Technologies: Brígita Rozič\textsuperscript{1}; Zouhair Hanani\textsuperscript{2}; Soukaina Merselmiz\textsuperscript{3}; Daoud Mezzane\textsuperscript{4}; Mimoun El Marssi\textsuperscript{5}; Hana Ursic\textsuperscript{1}; Rasa Pirc\textsuperscript{1}; Matjaž Spreitzer\textsuperscript{1}; Zdravko Kutnjak\textsuperscript{1}; \textsuperscript{1}Jožef Stefan Institute; \textsuperscript{2}University of Picardie Jules Verne

8:20 AM
PbZrO\textsubscript{3}-based Antiferroelectric Ceramics with Ultrahigh Energy Efficiency via Li\textsuperscript{+} and Bi\textsuperscript{3+} Co-doping: Binzhi Liu\textsuperscript{1}; Anand Gaur\textsuperscript{1}; Ethan Chaffee\textsuperscript{1}; Jun Cui\textsuperscript{1}; Xiaoli Tan\textsuperscript{1}; \textsuperscript{1}Iowa State University

8:40 AM
Survey of Simple Halide Perovskites Using NSMM: Steven Tidrow\textsuperscript{1}; \textsuperscript{1}Alfred University

9:00 AM
Remote Sensing Powered by a Stacked Piezoelectric Transducer Harvesting Vibrational Energy: Wasim Hafiz Dipon\textsuperscript{1}; Bryan Gamboa\textsuperscript{1}; Ruyan Guo\textsuperscript{1}; Amar Bhalla\textsuperscript{1}; \textsuperscript{1}University of Texas at San Antonio

9:20 AM
Large non-classical electrostriction in aliovalent and isovalent doped ceria: Maxim Varenikh\textsuperscript{1}; \textsuperscript{1}Weizmann Institute of Science

9:40 AM
Structure and Electrical Properties of Metratically Cubic PMN-PT Thin Films around the Morphotropic Phase Boundary: Matjaž Spreitzer\textsuperscript{1}; Urska Trstenjak\textsuperscript{1}; Nina Daneu\textsuperscript{1}; Iegeor Rafaelovsky\textsuperscript{2}; Jamal Belhadi\textsuperscript{2}; Aleksandar Mataz\textsuperscript{2}; Vid Bobnar\textsuperscript{2}; Jiri Hlinka\textsuperscript{2}; \textsuperscript{1}Jožef Stefan Institute; \textsuperscript{2}Institute of Physics of the Czech Academy of Sciences

10:00 AM Break

10:20 AM
Determining the Effect of Burn-in Process on Reliability of X7R Multilayer Ceramic Capacitors: Pedram Yousefian\textsuperscript{1}; Clive Randall\textsuperscript{1}; \textsuperscript{1}Penn State University

NANOMATERIALS


Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory; Jung-Kun Lee, University of Pittsburgh; Stephen McDonnell, University of Virginia

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Session Chairs: Chang-Yong Nam, Brookhaven National Laboratory; Christophe Vallee, SUNY Polytechnic Institute; Jiyoung Kim, University of Texas at Dallas

8:00 AM Keynote
From Atomic-scale Characterization to Atomic-scale Control of Thin Film Deposition Processes: James Engstrom\textsuperscript{1}; \textsuperscript{1}Cornell University

8:40 AM Invited
Resolving the Evolution of Atomic Layer Deposited Thin Film Growth by Continuous In Situ X-ray Absorption Spectroscopy: Mingzhao Liu\textsuperscript{1}; \textsuperscript{1}Brookhaven National Laboratory

9:10 AM Invited
Molecular Modeling of Atomic Layer Etching: Shenli Zhang\textsuperscript{1}; Yihan Huang\textsuperscript{1}; Guzcin Teltiker\textsuperscript{1}; Saravananpriany Srijaman\textsuperscript{1}; \textsuperscript{1}University of Chicago; \textsuperscript{2}University of California Davis; \textsuperscript{2}Lam Research

9:40 AM
First-Principles Studies of Atomic Layer Deposition: Lan Li\textsuperscript{1}; \textsuperscript{1}Boise State University

10:00 AM Break

10:15 AM Invited
Meta-Stable Phase Ferroelectric HfZrO\textsubscript{2} Films: Jiyoung Kim\textsuperscript{1}; \textsuperscript{1}University of Texas at Dallas

10:45 AM Invited
Microelectronics Application of Vapor-phase infiltration – Atomic Layer Deposition Derived Organic-Inorganic Hybridization Technique: Chang-Yong Nam\textsuperscript{1}; \textsuperscript{1}Brookhaven National Laboratory

11:15 AM Invited
Area Selective Atomic Layer Deposition of Silicon Oxide Using an Oxygen Plasma or Ozone with Copper as the Nongrowth Surface: Sumit Agarwal\textsuperscript{1}; \textsuperscript{1}Colorado School of Mines

11:45 AM Invited
Ions in PEALD Processes: from Material Modification to Selective Deposition: Christophe Vallee\textsuperscript{1}; Marceline Bonvalot\textsuperscript{2}; \textsuperscript{1}SUNY POLY; \textsuperscript{2}LTM - UGA

12:15 PM Invited
Area Selective Deposition of TaN for Back End of the Line Applications: Rudy Wojtech\textsuperscript{1}; \textsuperscript{1}IBM Research | Almaden
PROCESSING AND MANUFACTURING

Advances in Surface Engineering — Session II

**Sponsored by:** TMS Surface Engineering Committee

**Program Organizers:** Rajeswaran Radhakrishnan, Faraday Technology Inc; Timothy Hall, Faraday Technology Inc; Michael Roach, University of Mississippi Medical Center; Sandip Harimkar, Oklahoma State University; Tushar Borkar, Cleveland State University; Rajeev Gupta, North Carolina State University; Bharat Jasthi, South Dakota School of Mines & Technology

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**Session Chair:** Rajeswaran Radhakrishnan, Faraday Technology, Inc

8:00 AM
Control of Tin Coating Properties using Pulse and Pulse Reverse Electrodeposition: Holly Garich1; Tim Hall2; Brian Skinn1; Danny Liu1; 1Faraday Technology, Inc.

8:20 AM
Graded Coatings of IN 625 Alloy Reinforced with Ni3Al Precipitates Processed In-situ: Viviane Mazur1; Ana Sofia d'Oliveira2; Mauricio Mazur2; 1Universidade Tecnológica Federal do Paraná; 2Universidade Federal do Paraná

8:40 AM
Irreversible Bonding of Polymer-based Microfluidic Systems to Support Biological Experiments on the International Space Station (ISS): Annaliza Perez-Torres1; 1University of Kentucky/Space Tango

9:00 AM
Multiscale Surface Structure Formation on Fused Silica by Ultrafast Lasers: Kewei Li1; Xin Zhao1; 1Clemson University

9:20 AM
The Impact of Viscosity on Coating Atomization Patterns and Paint Lay Down: Michael Bonner1; 1Saint Clair Systems, Inc.

IRON AND STEEL (FERROUS ALLOYS)

Advances in Zinc-coated Sheet Steel Processing and Properties — Advances in Zinc-coated Sheet Steel Processing and Properties

**Sponsored by:** AIST Metallurgy — Processing, Products & Applications Technology Committee

**Program Organizers:** Joseph McDermid, McMaster University; Daniel Baker, General Motors Corporation

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**Session Chairs:** Joseph McDermid, McMaster University; Daniel S. Baker, General Motors Corp.

8:00 AM
Alleviation of Zn-assisted Liquid Metal Embrittlement in Austenitic-TWIP/martensitic-HSLA Steel Multi-layered Sheet Additively Manufactured by Directed Energy Deposition: Seok-Hyun Hong1; Duri-Ho Eo2; Sunghak Lee3; Jung-Wook Cho4; Sung-Joon Kim5; 1POSTECH/GIFT; 2KITECH

8:20 AM
Microstructure Evolution during Early Stages of Liquid Metal Embrittlement in an Advanced High-strength-steel: Yuki Ikeda1; Renliang Yuan6; Hassan Ghassemi-Armaki7; Anirban Chakraborty8; Jim Zuo2; Robert Maass9; 1Federal Institute for Materials Research and Testing (BAM); 2University of Illinois at Urbana-Champaign; 3General Motors R&D; 4Arcelor Mittal Global R&D

8:40 AM
The Interaction between Mn and Sn and Its Effects on the Selective Oxidation of Advanced High Strength Steels: Jonas Wagner1; Joseph McDermid1; 1Steel Research Centre, McMaster University

9:00 AM
Leaching Zinc Ions from Industrial Waste Ashes a Kinetic Study and Development of a Semi-empirical Model: Hilary Rutto1; Tumisang Seodigeng1; 1Vaal University of Technology

9:20 AM
Zinc Coatings and Their Control Using the New Integrated Indicator ECP-Zn: Borys Sereda1; Iryna Kruhlak2; Dmytro Sereda3; 1Dneprovsky State Technical University
ARTIFICIAL INTELLIGENCE

AI for Big Data Problems in Advanced Imaging, Materials Modeling and Automated Synthesis — AI and ML for Imaging and Characterization

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Mathew Cherukara, Argonne National Laboratory; Subramanian Sankaranarayanan, University of Illinois-Chicago; Badri Narayanan, University of Louisville

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Session Chairs: Mathew Cherukara, Argonne National Laboratory; Subramanian Sankaranarayanan, University of Illinois Chicago

8:00 AM
Deep Learning-based Algorithms for X-ray Microtomography Analysis: Unravelling Challenges for 4D Experiments: Hamid Torbati Sarraf1; Nikhilesh Chawla2; 1Purdue University

8:20 AM
Deep Neural Networks for Laser Absorptivity Prediction from Synchrotron X-ray Images: Runbo Ji1; Joseph Aroh2; Brian Simonds3; Tao Sun4; Anthony Rollett5; 1Carnegie Mellon University; 2National Institute of Standards and Technology; 3University of Virginia

8:40 AM
Estimation of Sub-micron Carbide Sizes and Morphologies in Dual-Phase Steels from Light Optical Micrographs Using Generative Adversarial Networks: Bo Lei1; Martin Müller2; Dominik Britz3; Frank Mücklich4; Elizabeth Holm5; 1Carnegie Mellon University; 2Saarland University

9:00 AM
Machine Learning Enabled Stacking Fault Energy Prediction in Concentrated Alloys: Dilipuneth Aditya1; Gaurav Arora2; 1University of Wyoming

9:20 AM
Phase Identification by Neural Networks Trained from Experimental and Theoretical Structure Data: Nam Le1; Michael Pekala2; Alexander New3; Eddie Gienger4; Janna Domenico5; Christine Piatko6; Elizabeth Pogue7; Tyrel McQueen8; Christopher Stiles9; 1Johns Hopkins University; 2Applied Physics Laboratory; 3University of Illinois

9:40 AM
Physics-informed Machine Learning for Selected Area Electron Diffraction Data Analysis: Yu Lin1; Nestor Zaluzec2; Xiaoting Zhong3; Jiadong Gong4; 1QuesTek Innovations LLC; 2Argonne National Laboratory; 3Lawrence Livermore National Laboratory

10:00 AM Break

10:20 AM
Real-time and Large FOV Ptychography through AlgEdge: Anakha Babu1; Tao Zhou2; Saugat Kandel3; Yi Jiang4; Yudong Yao5; Sinisa Veselii6; Zhengchun Liu7; Tekin Bicer8; Martin Holt9; Antonino Miceli10; Mathew Cherukara11; 1Argonne National Laboratory

10:40 AM
Neural Network Prediction of Dynamical Electron Back-Scattered Diffraction Patterns Based on Kinematical Patterns: Clement Lafond1; Marc De Graef2; 1CEA Saclay; 2Carnegie Mellon University

11:00 AM Question and Answer Period

FUNDAMENTALS AND CHARACTERIZATION

Alloy Phase Transformations at Elevated Temperatures — Session II

Sponsored by: TMS High Temperature Alloys Committee, TMS Phase Transformations Committee

Program Organizers: Dinc Erdeniz, University of Cincinnati; Benjamin Adam, Oregon State University; Jonah Klemm-Toole, Colorado School of Mines; Eric Lass, University of Tennessee-Knoxville; Ashley Paz y Puente, University of Cincinnati; Sophie Primig, University of New South Wales; Chantal Sudbrack, National Energy Technology Laboratory

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Session Chair: Sophie Primig, University of New South Wales

8:00 AM Invited
Impact of Manufacturing Processes on Phase Transformations in High-temperature Alloys: Some Thoughts Based on Representative Case Studies: Wei Xiong1; 1University of Pittsburgh

8:30 AM Invited
Examining the Influence of Nitride Precipitation on the Performance of Additively Manufactured Nickel Superalloys: Mark Stoudt1; James Zuback2; Andrew lams3; 1National Institute of Standards and Technology

9:00 AM
Solidification Modelling With CALPHAD: Process Applications of Equilibrium and Non-equilibrium Models and When to Use Them: Adam Hope1; Ben Sutton2; 1Thermo-Calc Software Inc

9:20 AM
In-situ Neutron Characterization of Thermomagnetic Processes Utilizing Direct Induction Heating: Zachary Tener1; Dante Quirinale2; Cory Fletcher3; Elijah Stevens4; Bart Murphy5; Gerry Ludtka6; Michael Kesler7; 1Oak Ridge National Laboratory; 2University of Florida

9:40 AM Invited
Metallic Alloy Microstructure Prediction and Control with Processing: Amy Clarke1; 1Colorado School of Mines

10:10 AM Break
10:30 AM Invited
Tracking Changes in Microstructure and Mechanical Properties of Electron Powder Bed Fusion Produced Inconel-738: Andrew Breen1; Bryan Lim2; Felix Theska3; Alec Day4; Sophie Primig5; Simon Ringer6; 1University of Sydney; 2University of New South Wales

11:00 AM
Phase Stability in Cast and Additively Manufactured Al-9 wt%Cu-6 wt%Ce Alloy: Alice Perrin1; Sumit Bahl2; Donovan Leonard3; Alex Piotkowski4; Amit Shyam5; Ryan DeHoff6; Ying Yang7; 1Oak Ridge National Laboratory
MATERIALS-ENVIRONMENT INTERACTIONS

Computation Assisted Materials Development for Improved Corrosion Resistance — Session I

Program Organizers: Rishi Pillai, Oak Ridge National Laboratory; Laurence Marks, Northwestern University

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Session Chairs: Rishi Pillai, ORNL; Laurence Marks, Northwestern University

8:00 AM Introductory Comments

8:10 AM Keynote
Computational Approaches to Designing and Predicting the High-Temperature Oxidation Behavior of Alloys: Brian Gleeson1; 1University of Pittsburgh

8:50 AM
Solute Effects on High Temperature Oxidation of Graphitic Cast Iron in Automotive Environments: Christopher Taylor1; Ngan Huynh1; 1The Ohio State University

9:00 AM
Oxidation Lifetime Modeling of FeCr and NiCr Foils in Hydrogen-fired Microturbines: Marie Romedenne1; Rishi Pillai1; Bruce Pint1; 1Oak Ridge National Laboratory

9:30 AM
Numerical Investigation of Molten Salt Corrosion Mitigation Strategies for Ni-Cr Alloys Using the Yellowjacket Tool: Chaitanya Bhave1; Michael Tonks1; 1University of Florida

9:50 AM Break

10:10 AM
A PRISMS-PF Based Application for Simulating Microgalvanic/Galvanic Corrosion in Alloys: Vishwaas Goel1; Yanjun Lyu1; David Montiel1; Katsuyo Thornton1; 1University of Michigan

10:30 AM
Water-Metal Interactions: Insights from Atomistic Simulations: Susan Sinnott1; 1Pennsylvania State University

10:50 AM
The Effect of Solute Capture on Chlorine Chemisorption: John Cavin1; James Rondinelli1; 1Northwestern University

11:10 AM
Predicting Hydrogen Diffusivity in Amorphous Titania Using Markov Chain Kinetic Monte Carlo Simulations: James Chapman1; Kyoung Kweon1; Nir Goldman1; Nathan Keilbar1; Tae Heo1; Brandon Wood1; 1Lawrence Livermore National Laboratory

11:30 AM
Multi-objective Optimization of CALPHAD and Empirical Models to Discover New High-temperature Metallic Glasses: Jerry Howard1; Leslie Mushongera1; Devicharan Chidambaram1; Krista Carlson1; 1University of Nevada, Reno

11:50 AM
Phase Identification and Characterization in a Mo-Si-B-Ti Alloy: Qingshan Dong1; John Perepezko1; Laurence Marks1; 1Northwestern University; 2University of Wisconsin-Madison

NANOMATERIALS

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials — Nanostructured Films & Properties

Sponsored by: ACerS Basic Science Division, ACerS Electronics Division, ACerS Engineering Ceramics Division

Program Organizers: Haitao Zhang, University of North Carolina at Charlotte; Gurpreet Singh, Kansas State University; Kathy Lu, Virginia Polytechnic Institute and State University; Edward Gorzkowski, Naval Research Laboratory; Jian Shi, Rensselaer Polytechnic Institute: Michael Naguib, Tulane University; Sanjay Mathur, University of Cologne

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Session Chairs: Edward Gorzkowski, Naval Research Laboratory; Haitao Zhang, University of North Carolina at Charlotte

8:00 AM Invited
Ferroelectricity in Hf0.5Zr0.5O2 Films – Processing Options to Achieve Better Ferroelectric Performance: Jacob Jones1; Alex Hsain1; Youghwan Lee1; Gregory Parsons1; 1North Carolina State University

8:30 AM Invited
Quantifying the Electrode Clamping Effect and Its Role on Phase Stability in Ferroelectric Hafnium Zirconium Oxide: Jon Ihlefeld1; Shelby Fields1; Truong Ca1; Samantha Jaszewski1; Kyle Kelley1; Helge Heinrich1; M. Henry1; Brian Sheldon1; 1University of Virginia; 2Brown University; 3Oak Ridge National Laboratory; 4Sandia National Laboratories

9:00 AM
Structural and Magnetic Properties of Fe-Ga-Zr Nanocrystalline Alloys: Mohammad Taudiul Islam1; Ria Nandwana1; Jonathan Healy1; Jenna Jaklich1; Bowen Dong1; Matthew Willard1; Alexander Yu2; Yumi Ijiri2; Emily Moore3; Scott McCall3; 1Case Western Reserve University; 2Oberlin College; 3Lawrence Livermore National Laboratory

9:20 AM
Optimizing Magnetostriction Coefficients in (FeGa)B Nanocrystalline Alloys: Jenna Jaklich1; Mohammad Taudiul Islam1; Matthew Willard1; Bowen Dong1; Alexander Yu2; Yumi Ijiri2; Emily Moore3; Scott McCall3; 1Case Western Reserve University; 2Oberlin College; 3Lawrence Livermore National Laboratory

9:40 AM Invited
Eliminating Artifactual Indentation Size Effects in Nanoindentation of Hard Ceramics: James Wollmershauser1; Boris Feigelson1; John Drazin1; Edward Gorzkowski1; Heonjune Ryu1; 1U.S. Naval Research Laboratory; 2UES, Inc.

10:10 AM Break

10:30 AM Invited
Nanomechanical Behavior of Nanocrystalline Spinel at Elevated Temperature: Corinne Packard1; 1Colorado School of Mines

11:00 AM
Reduced Pressure Nanosintering during Environmentally-Controlled Pressure-Assisted Sintering: Kevin Anderson1; James Wollmershauser1; Boris Feigelson1; 1U.S. Naval Research Laboratory

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11:20 AM
Plateau-Rayleigh Instability with a Grain Boundary Twist: Omar Hussein1; Keith Coffman2; Khalid Hattar3; Eric Lang4; Shen Dillon5; Fadi Abdeljawad6; 1Clemson University; 2University of Illinois Urbana-Champaign; 3Sandia National Laboratories; 4University of California Irvine

11:40 AM
Effect of Strain on the Thermoelectric Properties of Epitaxial La0.8Sr0.2CoO3 Thin Films: Mohammad El Loubari1; Gene Yang1; David Hill2; Dongkyu Lee3; 1University of South Carolina

12:00 PM
Superior Mechanical and Functional Properties of Thin Film Materials with Terrace-defect Interface Induced Nanostructures: Jian Song1; Yue Liu1; Xinghang Zhang2; 1Shanghai Jiao Tong University; 2Purdue University

LIGHTWEIGHT ALLOYS

Development in Light Weight Alloys and Composites — Data Processing and Performance

Sponsored by: TMS Composite Materials Committee, TMS Materials Characterization Committee

Program Organizers: Ramasis Goswami, Naval Research Laboratory; Nikhil Gupta, New York University; Aashish Rohatgi, Pacific Northwest National Laboratory; Tanjore Jayaraman, University of Michigan-Dearborn

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Session Chair: Tanjore Jayaraman, University of Michigan-Dearborn

8:00 AM Invited
Single and Double Core-Shell Nanocomposite Bulk Ceramics in the Y2O3-ZrO2-Al2O3 System: Kevin Anderson1; Benjamin Greenberg2; James Wollmershauser3; Boris Feigelson4; 1U.S. Naval Research Laboratory

8:30 AM Invited
A Data-driven Search and Analysis for Selection of Ti-containing High Entropy Alloys for Aeronigne Applications: Tanjore Jayaraman1; Ramanchandra Canumallia1; 1University of Michigan-Dearborn; 2Weldaloy Specialty Forgings

9:00 AM Invited
Novel Materials Discovery on Li-Based Compounds Using Machine Learning: Suchismita Goswami1; V. Stanev2; H. Liang3; I. Takeuchi4; 1MEST; 2University of Maryland

9:20 AM
Selective Reinforcement of Structures Using Fiber Reinforced Aluminum: Brandon Coates1; 1Touchstone Research Laboratory

9:40 AM
Effect of Tin Addition on Mechanical and Corrosion Behavior of Mg-Zn-Si Alloy: Gaurav Gupta1; Saurav Ganguly2; Jayant Jain3; Sudhanshu Singh4; 1IIT Kanpur; 2CSIR-Institute of Minerals & Materials Technology (CSIR-IMMT); 3IIT Delhi

10:00 AM Break

10:20 AM
Laser Powder Bed Fusion of Highly-reinforced Aluminum Composite Powders Produced by Mechanical Alloying: Ethan Parsons1; 2MIT Lincoln Laboratory

10:40 AM
Influence of Graphene Nanosheets on Friction and Wear Behavior of Aluminum A380 Nanocomposite Produced by Powder Metallurgy: Hanielh Sajadpour1; Mohammad Alipour2; 3Tabriz University

11:00 AM
Investigation of Wear Behavior of A380 Aluminum Nanocomposite Reinforced with SiC Nanoparticles Produced by Powder Metallurgy Method: Ali Mohammadi1; Mohammad Alipour2; 3Tabriz University

SUSTAINABILITY, ENERGY, AND THE ENVIRONMENT

Energy Materials for Sustainable Development — Fuel Cells and Electrolyzers

Sponsored by: ACerS Energy Materials and Systems Division

Program Organizers: Krista Carlson, University of Nevada, Reno; Armin Feldhoff, Leibniz University Hannover; Kyle Brinkman, Clemson University; Eva Hemmer, University of Ottawa; Nikolai Kanas, Biosense Institute; Kjell Wilk, Norwegian University of Science and Technology; Lei Zuo, Virginia Tech; Joshua Tong, Clemson University; Daniëlle Benetti, Institut National de la Recherche Scientifique; Katherine Develops-Bagino, National Institute of Advanced Industrial Science and Technology; Soumi Chatterjee, Aditya Birla Science & Technology Company, Ltd

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Session Chairs: Armin Feldhoff, Leibniz University Hannover; Yu Zhong, Worcester Polytechnic Institute; Brigita Rožic, Jožef Stefan Institute

8:00 AM Invited
Experimental and Computational Investigations of the Multiple Impurities Effects on the SOFC Cathode Materials: Rui Wang1; Lucas Parent2; Srikanth Gopalan3; Yu Zhong4; 1Worcester Polytechnic Institute; 2University of Connecticut; 3Boston University

8:20 AM Invited
Fabrication Strategies for Lightweight and High-performance Tubular Solid Oxide Fuel Cells: Dhruba Panthi1; Yanhai Du2; 1Kent State University

8:40 AM
Machine Learning Methods for Predicting Microstructural Changes in Solid Oxide Cell Electrodes: Anna Sciazko1; Rena Yamagishi2; Yosuke Komatsu3; Zhufeng Ouyang4; Junya Ohnishi5; Katsuhiko Nishimura6; Naoki Shikazono7; 1The University of Tokyo

9:00 AM
Effect of Infiltrates on Cr-poisoning in Solid Oxide Fuel Cell Cathode Using Microstructurally Resolved HPC Simulations of Electrochemistry: Hokon Kim1; Jerry Mason2; William Epting2; Harry Abemathy3; Gregory Hackett4; Anthony Rollett5; Paul Salvador6; 1Carnegie Mellon University; 2National Energy Technology Laboratory
9:00 AM Break

CERAMIC AND GLASS MATERIALS

Glasses and Optical Materials: Current Issues and Functional Applications — Cooper Distinguished Lecture

*Sponsored by*: ACerS Basic Science Division, ACerS Glass & Optical Materials Division

*Program Organizers*: Doris Möncke, Alfred University; Mathieu Hubert, Corning Incorporated

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*Session Chair*: To Be Announced

8:00 AM Invited

Mechanical Properties of MAX Phases: Miladin Radovic1; Ankit Srivastava2; Rogelio Bentlew3; Hemant Rathod4; Zhiqiang Zhan5; 1Texas A&M University; 2University of Texas at Rio Grande Valley

8:30 AM Invited

Crack Healing Behavior Enhanced under DC Current in 8Y-CSZ: Koji Morita1; Fuki Naito2; Kohta Nambu1; Daisuke Terada1; Tomoharu Tokunaga1; Takahisa Yamamoto1; 1National Institute for Materials Science (NIMS); 2Chiba Institute of Technology; 3Kyushu University; 4Nagoya University

9:00 AM

Tunable Self-Assembly of 2D Carbide MXenes with Bulk Ultra High Temperature Ceramics: Nithin Chandran B S1; Yooran IM2; Srinivasa Kartik Nemani2; Ravi Kumar2; Babak Anasori2; 1IIT Madras, Chennai; 2Indiana University-Purdue University Indianapolis; 3IIT Madras
FUNDAMENTALS AND CHARACTERIZATION

Grain Boundaries, Interfaces, and Surfaces: Fundamental Structure-Property-Performance Relationships — Segregation

Sponsored by: ACerS Basic Science Division

Program Organizers: Shen Dillon, University of California, Irvine; Wolfgang Rheinheimer, Julich Research Center; Catherine Bishop, University of Canterbury; Ming Tang, Rice University; John Blenden; Purdue University; Wayne Kaplan, Technion - Israel Institute Of Technology; Melissa Santala, Oregon State University

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Session Chair: To Be Announced

8:00 AM
Computational Modeling of Surface Segregation Dynamics in Cu-Au Alloys: Guofeng Wang1; Siming Zhang2; 1University of Pittsburgh

8:20 AM
Quantification of the Charge Trapped at the Grain Boundaries of Ion Conducting Ceramics: Sergey Khodorov1; Igor Lobomirsky2; Sangtae Kim3; 1Weizmann Institute of Science; 2University of California, Davis

8:40 AM Invited
Predicting Grain Boundary States in Ferroelectrics: K.S.N. Vikrant1; R. Edwin Garcia2; Catherine Bishop3; 1IIT Delhi; 2Purdue University; 3University of California, Davis

9:10 AM
Surface Thermochemistry of TiO2 Doped with Alkaline Earth Metal Ions and Its Relationship with Nanostructure: Andre Da Silva1; Bruno Ramos2; Jefferson Bettini3; Ricardo Castro4; Douglas Gouveia5; 1University of São Paulo; 2Brazilian Nanotechnology National Laboratory; 3University of California, Davis

9:30 AM
Atomic Structure Analysis of Inversion Domain Boundary in MgO-doped AIN: Daiiki Kato1; 1The University of Tokyo

9:50 AM Break

10:10 AM Invited
Understanding Grain Boundary Properties and Transitions in Multiple Dimensions: Jian Luo1; 1University of California, San Diego

10:40 AM Invited
Vacancies and Other Grain-boundary Surfactants and Their Effect on Grain Growth: W Craig Carter1; Arun Baskaran2; Daniel Lewis3; Catherine Bishop4; 1Massachusetts Institute of Technology; 2IIT Delhi; 3Purdue University; 4University of California, Davis

11:10 AM
Atomistic and Gaussian Process Modeling of Solute Segregation in Metastable Grain Boundaries: Yasir Mahmood1; Maher Alghalayini2; Enrique Martinez3; Christiaan Paredis4; Fadi Abdeljawad5; 1Clemson University

11:30 AM
Effects of Interdiffusion on Cu/NI Semi-coherent Interface Properties: Alex Seliakov1; Kevin Chu2; David McDowell3; 1Georgia Institute of Technology

FUNDAMENTALS AND CHARACTERIZATION

High Entropy Materials: Concentrated Solid Solutions, Intermetallics, Ceramics, Functional Materials and Beyond III — Materials Discovery and Design

Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Yu Zhong, Worcester Polytechnic Institute; Michael Gao, National Energy Technology Laboratory; Xingbo Liu, West Virginia University; Peter Liaw, University of Tennessee; Jian Luo, University of California, San Diego; YiQuan Wu, Alfred University; Mitra Taheri, Johns Hopkins University; Amy Clarke, Colorado School of Mines

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Session Chairs: Bai Cui, University of Nebraska-Lincoln; Kun Wang, Alfred University

8:00 AM Keynote
High Entropy Alloys and NSF: Jonathan Madison1; 1National Science Foundation

8:30 AM Invited
Design of Multicomponent Rare-earth Sesquioxides for Thermal/Environmental Barrier Coatings: Kristyn Ardrey1; Mahboobe Jassas2; Mukil Ayyasamy3; Kang Wang4; Kevin Reuwer5; Jonathan Lau7; Carolina Talon1; Bi-Cheng Zhou1; Prasanna Balachandran1; Patrick Hopkins1; Elizabeth Opila1; 1University of Virginia; 2Virginia Tech; 3Commonwealth Center for Advanced Manufacturing

9:00 AM
Accelerated Discovery of Refractory High Entropy Materials by Machine Learning and High Throughput Experiments: Kun Wang1; Yonggang Yan2; 1Alfred University

9:20 AM
An Experimentally Driven High-throughput Approach to Design Refractory High-entropy Alloys: Chanho Lee1; Dongyue Xie2; Benjamin Derby1; Jon Baldwin1; Christopher Tandoc2; Osman Atwani1; Yong-Jie Hu2; Nan Li3; Saryu Fensin4; 1Los Alamos National Laboratory; 2Drexel University

9:40 AM
Development of Ni-based Medium Entropy Alloys Using THERMOCALC Software: Elyorjon Jumaev1; Ki Buem Kim2; Khilola Umarova3; Islam E. Hadary4; Turaboy Shermatov5; 1New Uzbekistan University; 2The Agency for Presidential Educational Institutions of the Republic of Uzbekistan

10:00 AM Break

10:20 AM Invited
Computationally Guided Design of FCC-based High Entropy Alloys: Kenneth Smith1; John Sharon2; Ryan Deacon3; Soumalya Sarkar4; Michael Gao5; 1Raytheon Technologies Research Center; 2National Energy Technology Laboratory

10:40 AM Invited
High-Entropy Carbidic Cermets: Transformative Materials for Extreme Environments: Bai Cui1; Fei Wang2; Xueliang Yan3; Yongfeng Lu4; 1University of Nebraska-Lincoln
11:00 AM
Effect of Short-range Ordering on Diffusion Properties in Complex Concentrated Alloys: Anus Manzoor1; Yongfeng Zhang1; 1University of Wisconsin-Madison

11:20 AM
Hardness of Thin Film High Entropy Transition Metal Ceramics: Nathaniel McIlwaine1; 1Penn State University

11:40 AM
High-throughput Design of High-performance Lightweight High-entropy Alloys: Rui Feng1; Chuan Zhang2; Michael Gao2; Zongrui Pei2; Fan Zhang2; Yan Chen2; Dong Ma3; Ke An3; Jonathan Poplawsky1; Lizihi Ouyang2; Yang Ren2; Jeffrey Hawk2; Michael Widom2; Peter Liao2; 1Oak Ridge National Laboratory; 2ComputerMellon University; 3National Energy Technology Laboratory; 4Songshan Lake Materials Laboratory; 5Tennessee State University; 6Argonne National Laboratory; 7Carnegie Mellon University

MATERIALS-ENVIRONMENT INTERACTIONS

High Temperature Oxidation of Metals and Ceramics — Oxidation of Metals and Accident Tolerant Fuel

Sponsored by: TMS Corrosion and Environmental Effects Committee

Program Organizers: Kenneth Kane, Oak Ridge National Laboratory; Elizabeth Sooby, University of Texas at San Antonio; Patrick Brennan, General Electric Research; Lavina Backman, U.S. Naval Research Laboratory; Kinga Unocic, Oak Ridge National Laboratory; Richard Oleksak, National Energy Technology Laboratory; David Shifler, Office of Naval Research; Raul Rebak, GE Global Research

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Session Chairs: Richard Oleksak, National Energy Technology Laboratory; Elizabeth Sooby, University of Texas - San Antonio

8:00 AM Invited
GE’s Accident Tolerant Fuel Cladding: An Overview of Accident Scenario Testing: Andrew Hoffman1; Raul Rebak1; Evan Dolley1; Rajnikant Umretiya1; Michael Worku1; 1GE Research

8:30 AM
Burst Behavior and Oxidation Resistance of Cr-coated Zircaloy-4 Accident Tolerant Fuel Cladding: Mackenzie Ridley1; Samuel Bell1; Ben Garrison1; Tim Graening1; Kenneth Kane1; 1Oak Ridge National Laboratory; 2University of Tennessee; 3Formerly ORNL, currently Applied Physics Laboratory

8:50 AM Invited
Material Compatibility in Supercritical CO2 at 450°-650°C: Bruce Pint1; Rishi Pillai1; Michael Lance1; James Keiser1; 1Oak Ridge National Laboratory

9:20 AM
The Effect of Pressure on the Oxidation of Steels in Direct-fired Supercritical CO2 Power Cycle Environments: Casey Carney1; Richard Oleksak1; Joseph Tylczak1; Omer Dogan1; 1LRST; 2NETL (retired); 3NETL

9:40 AM
Effect of Pressure on High-temperature Corrosion of Ni Alloys in Supercritical CO2 Containing Impurities: Richard Oleksak1; Casey Carney1; Joseph Tylczak1; Omer Dogan1; 1National Energy Technology Laboratory

10:00 AM Break

10:20 AM
Atomic Scale Dynamics of Initial Stage Copper Oxidation Using In Situ ETEM and Correlated DFT Simulations: Meng Li1; Matthew Curnan1; Richard Garza2; Stephen House3; Wissam Saidi4; Judith Yang5; 1University of Pittsburgh

10:40 AM Invited
High Temperature Oxidation Behavior of Fe- and Ni-Based Alloys Fabricated by Additive Manufacturing: Sebastien Dryepondt1; Marie Romedenne1; Rishi Pillai1; Kinga Unocic1; Bruce Pint1; 1Oak Ridge National Laboratory

11:10 AM
Study of the Pre-oxidation Effect on Long-term Oxidation Properties of Porous Fe22Cr Alloy: Damian Koszelow1; Sebastian Molin1; Agnieszka Drewniak1; Piotr Jasinski1; 1Gdansk University of Technology

11:30 AM
Alumina-scale Establishment Behavior on Ni-6Al-yCr-2X (y = 4, 6, 8; X = Nb, Ta, Re) Model Alloys during High-temperature Oxidation: Rafael Rodriguez De Vecchis1; Rishi Pillai2; Brian Gleeson3; 1University of Pittsburgh; 2Oak Ridge National Laboratory

11:50 AM
Effect of Microstructure on High-temperature Oxidation of Fe22Cr Materials: Study of Loose Powders, Sintered Porous Alloys and Dense Metallic Parts: Agnieszka Drewniak1; Damian Koszelow1; Sebastian Molin1; Piotr Jasinski1; 1Gdansk University of Technology

PROCESSING AND MANUFACTURING

Innovative Process Design and Processing for Advanced Structural Materials — Advanced Structural Materials

Program Organizers: Ju-Young Kim, UNIST; Jae-il Jang, Hanyang University; Sung-Tae Hong, University of Ulsan; Rongshan Qin, The Open University

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Session Chairs: Ju-Young Kim, UNIST; Jae-il Jang, Hanyang University

8:00 AM Break

8:20 AM
Uniaxial Tensile Behavior After Baking Treatment in a Low Carbon Steel Accompanying Inhomogeneous Plastic Yielding: Woojin Cho1; Byeong-Seok Jeong1; Eunjoo Shin1; Siwook Park1; Hyuntaek Na1; Heung Nam Han1; 1Seoul National University; 2Korea Atomic Energy Research Institute; 3POSCO Technical Research Laboratories

8:40 AM
On the Micromechanical Response of a Mild Steel during Abrupt Strain Path Changes (SPCs): Anastasia Vrettou1; Hiroto Kitaguchi2; Biao Cai2; Thomas Connolley1; David Collins1; 1University of Birmingham; 2Diamond Light Source Ltd
9:00 AM
A Study on Migrating Boundary Induced Plasticity Using Molecular Dynamics Simulation for Pure Iron: Simoon Sung1; Jaehoon Jang2; Yanghoo Kim3; Heung Nam Han4; 1Seoul National University; 2Korea Institute of Materials Science; 3Korea Institute of Industrial Technology

9:20 AM
Mechanisms Driving Defect Formation in High Power Laser Welding of Nickel Alloys: Mingze Gao1; Barnali Mondal2; Todd Palmer3; Tarasankar Debroy4; 1Penn State University

9:40 AM
Microstructure-based Fatigue Life Modeling Methodology for Ferritic-pearlitic Hypoeutectoid Steels: Yoon Sul Kim1; Minwoo Park2; Hyunky Kim3; Minwoo Kang4; Seunghyun Hong5; 1Pusan National University; 2Hyundai Motor Group

10:00 AM Break

10:20 AM
Tapered-rolling to Produce Mixed-mode Cracking Resistant Steels: C. Tasan6; Gianluca Roscioli7; 1Massachusetts Institute of Technology

10:40 AM
Effects of Mn and Grain Refinement on Hydrogen Embrittlement Resistance of FCC High-entropy Alloys: Motomichi Koyama1; Taein Kong Kong2; Haoyu Wang3; Kaneaki Tsuzuki4; Tomohiko Hojo5; Eiji Akiyama6; 1Tohoku University

11:00 AM Invited
Modern Supercomputing for Accelerating the Design of High-temperature Aluminum Alloys: Dongwon Shin7; 1Oak Ridge National Laboratory

11:20 AM
Atomic-scale Unique Interface Observation of η/Al in Al-Zn-Mg Alloy: Hwangsun Kim1; Howook Choi2; Juhyun Oh3; Ho Kwon4; Eun Soo Park5; Sungwoo Lee6; Gun-Do Lee7; Mhyoung Kim8; Heung Nam Han9; 1Seoul National University

11:40 AM
Virtual Thermo-mechanical Process Design of Metallic Materials by Integrating Crystal Plasticity and Phase Field Model: Kyung Mun Min1; Hyuk Jae Lee2; Heung Nam Han3; Myoung-Gyu Lee4; 1Seoul National University

MODELING

Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales IV — Session III

8:00 AM Invited
Direct Comparison of Microstructure-sensitive Fatigue Modeling Results to Situ High-energy X-ray Experiments: Veerappan Prithvirajan1; Priya Ravi1; Diwakar Naragani2; Michael Sangi1; 1Purdue University

8:30 AM
Crystal Plasticity Modeling of Ultrasonic Softening Effect Considering Anisotropy in the Softening of Slip Systems: Jiarui Kang1; Xin Liu2; Stephen Niezgoda3; 1Ohio State University

8:50 AM
Atomic Modeling of Twin Size Effect on the Localization of Cyclic Strain and Fatigue Crack Initiation in CrCoNi Medium-entropy Alloy: Veronika Mazanova1; Milan Heczko2; Mulaine Shih3; Connor Slone4; Easo George5; Jaroslav Polak6; Maryam Ghazisaeidi7; Michael Mills8; 1Ohio State University; 2Exponent; 3Oak Ridge National Laboratory; 4Institute of Physics of Materials CAS

9:10 AM
Prisms-plasticity: An Open Source Crystal Plasticity Finite Element Software: Mohammadreza Yaghoobi1; Zhe Chen2; Duncan A. Greeley3; Aadiyta Lakshmanan4; John E. Allison5; Veera Sundararaghavan6; 1University of Michigan

9:30 AM
Multi-scale Characterization of Monotonic and Cyclic Properties of Ultra-high Strength CrCoNi Medium-entropy Alloy with Heterogeneous Partially Recrystallized Microstructure: Milan Heczko1; Veronika Mazanova2; Connor Slone3; Mulaine Shih4; Tomas Krum5; Maryam Ghazisaeidi6; Easo George7; Jaroslav Polak8; Michael Mills9; 1Ohio State University; 2Exponent; 3Oak Ridge National Laboratory; 4Institute of Physics of Materials CAS; 5Oak Ridge National Laboratory

9:50 AM Break

10:10 AM Invited
Alloying Design and Deep Learning Applications for Concentrated and High-entropy-Driven Ni-based Superalloys: Ridwan Sakidja1; Marium Mou1; 1Missouri State University
Investigating Effects of Particles and Voids in Plastic Deformation of Al6061 Using Finite Element Simulations: Hojun Lim1; Philip Noell1; Raiyan Seede2; John Emery1; Kyle Johnson1; 1Sandia National Laboratories; 2Texas A&M University

Validation of Representative Volume Element (RVE) Finite Element Models of Dual Phase Steels Using SEM In-situ Tensile Tests and Digital Image Correlation (DIC): Alexander Bardelcik1; Quade Butler1; Amin Latifi Vanjani1; Hari Simha1; 1University of Guelph

Tailoring the Properties of Multi-phase Titanium Through the Use of Correlative Microscopy and Machine Learning: Gunnar Blaschke1; David Field1; Colin Merriman2; 1Washington State University; 2Idaho National Lab

MODELING Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales IV — Session IV

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee, TMS Materials Characterization Committee, TMS Nanomaterials Committee

Program Organizers: Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Levente Balogh, Queen’s University; Caizhi Zhou, University of South Carolina; Lei Cao, University of Nevada; Josh Kacher, Georgia Institute of Technology

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Session Chairs: Adrien Couet, University of Wisconsin-Madison; Brandon Wood, Lawrence Livermore National Laboratory

8:00 AM Invited Multiscale Modeling of the Microstructural Dependence of Degradation Initiation in Al and Ti: Brandon Wood1; Tuan Anh Pham2; Tae Wook Heo3; Christine Orme1; Jennifer Rodriguez2; James Chapman1; Tim Hsu1; Yakun Zhu1; Ryan Mullen1; Nir Goldman1; Seongkoo Cho1; Nathan Kellbart1; Kyoung Kweon1; 1LLNL

8:30 AM Calibration, Validation, and Application of a Digital Twin for a Standard End-chilled Plate Casting: Mohammad Daiepour1; Cayman Cushing1; Matthew Carragher1; Serge Nakhmanson1; Harold Brody1; 1UConn

8:50 AM Modelling of Quenching of Low Alloy Steels: Ashley Scarlett1; Eric Palmiere1; Daniel Cogswell1; 1The University of Sheffield

9:10 AM Experimental Data for Casting Process Simulation Validation: Jonah Duch1; Mathew Hayne1; Meghan Gibbs1; 1Los Alamos National Laboratory

9:30 AM Predicting Yield Strength in β-NiAl • Cu • VC Triple Nano-precipitate Strengthened Austenitic Steel: Colin Stewart1; Edwin Antillon2; Richard Fonda3; Keith Knipling4; Patrick Callahan5; Paul Lambert2; 1US Naval Research Laboratory; 2US Naval Surface Warfare Center, Carderock Division

9:50 AM Break

10:10 AM Invited Designing Stable 7L12 Co-precipitates in Cast and Additively Manufactured Al-Cu-Mn-Zr Alloys: Jonathan Poplawsky1; Richard Michi1; Lawrence Allard1; Sumit Bahl1; Dongwon Shin1; Alex Plotkowski1; Amit Shyam1; 1Oak Ridge National Laboratory

10:40 AM Monte Carlo Simulations for Synthetic Microstructure Generation of M23C6 Precipitation in 347H Stainless Steels: William Frazier1; Arun Sathanur1; Ram Devanathan1; Keerti Kappagantula1; 1Pacific Northwest National Laboratory

11:00 AM Nanoscale Plasticity in Irradiated Inhomogeneous Alloys: Yash Pachaury1; Anter El-Azab1; 1Purdue University

11:20 AM Invited A Blessing in Disguise: Irradiation Damage Helps Slow Down Alloy Corrosion Rate via Oxide Space Charge Compensation Effects: Adrien Couet1; Zefeng Yu1; Elizabeth Kautz1; Hongliang Zhang1; Anton Schneider1; Taeho Kim1; Yongfeng Zhang1; Sten Lambeets1; Arun Devaraj1; 1University of Wisconsin-Madison; 2Pacific Northwest National Laboratory

CERAMIC AND GLASS MATERIALS

Journal of the American Ceramic Society Awards Symposium — Journal of the American Ceramic Society Awards Symposium

Sponsored by: ACerS

Program Organizer: William Fahrenholtz, Missouri University of Science and Technology

Tuesday AM | October 11, 2022
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Session Chair: William Fahrenholtz, Missouri University of Science and Technology

8:00 AM Introductory Comments

8:10 AM Invited Historical and Basic Introduction to Antiferroelectrics: Clive Randall1; Ian Reaney2; Zhongming Fan3; Long-Qing Chen1; Susan Trollier-McKinstry1; 1Pennsylvania State University; 2University of Sheffield

8:30 AM Invited Flash Sintering: A Paradigm Shift for Processing of Ceramics: Tarini Prasad Mishra1; Rishi Raj1; Olivier Guillou1; Martin Bram1; 1Forschungszentrum Julich GmbH; 2University of Colorado Boulder
8:50 AM Invited
Synthesis of 8-MoO₃ Whiskers by Thermal Evaporation Method and Its Application in Production of ⁹⁹Mo/⁹⁹mTc: Chu Ngo; Tatsuya Suzuki; Dung Do; Tadachika Nakayama; Koichi Niihara; Hieu Nguyen; Hisayuki Suematsu; ¹Nagaoka University of Technology; ²National Institute for Materials Science (NIMS)

9:10 AM Invited
Observation of the Electromechanical Responses of (Na,K)NbO₃ under Combined External Mechanical and Thermal Fields: Neamul Khansur; Alexander Martin; Keiichi Hatano; Kenichi Kakimoto; Dominique De Ligny; Kyle Webber; ¹Friedrich-Alexander-Universität Erlangen-Nürnberg; ²Nagoya Institute of Technology; ³Taiyo Yuden Co., Ltd.

9:30 AM Invited
Synthesis, Densification, Microstructure, and Mechanical Properties of High-entropy Carbide Ceramics: Lun Feng; William Fahrenholtz; Gregory E. Hilmas; Wei-Ting Chen; ¹Missouri University of Science and Technology

9:50 AM Break

10:20 AM Invited
Unique Performance of Thermal Barrier Coatings Made of Yttria Stabilized Zirconia at Extreme Temperatures (> 1500°C): Robert Vassen; Daniel Emil Mack; Martin Tandler; Yoo Jung Sohn; Doris Sebold; Olivier Guillot; ¹Forschungszentrum Zulich GmbH

10:40 AM Invited
Micromechanics of Machining and Wear in Hard and Brittle Materials: Brian Lawn; Oscar Borrero-Lopez; Han Huang; Yu Zhang; ¹National Institute of Standards and Technology; ²Universidad de Extremadura; ³The University of Queensland; ⁴University of Pennsylvania

11:00 AM Invited
Initial Fragmentation and Granular Transition of Ceramics: Lori Graham-Brady; Amartya Bhattacharjee; Ryan Hurley; ¹Johns Hopkins University

11:20 AM Invited
Models for the Behavior of Boron Carbide in Extreme Dynamic Environments: Kaliat Ramesh; Lori Graham-Brady; William Goddard; Ryan Hurley; Andrew Tonge; Amartya Bhattacharjee; Joel Clemmer; Qinglei Zeng; Weixin Li; Yidi Shen; Qi An; ¹Johns Hopkins University; ²California Institute of Technology; ³DEVCOM Army Research Laboratory; ⁴Sandia National Laboratory; ⁵University of Nevada, Reno

11:40 AM Concluding Comments

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**LIGHTWEIGHT ALLOYS**

**Light Metal Technology — Light Metal Technology**

**Sponsored by:** TMS: Composite Materials Committee

**Program Organizers:** Xiaoming Wang, Purdue University; Peng Cao, The University of Auckland

**Tuesday AM | October 11, 2022**

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**Session Chair:** Christopher Rudolf, US Naval Research Laboratory

9:20 AM
Dielectric Behavior of Aluminum and its Relevance to Electrical Conduction and Stress/Strain Self-sensing: Deborah Chung; Xiang Xi; ¹State University of New York Buffalo

9:40 AM
Revealing Growth Mechanisms of Faceted Al₂Cu Intermetallic Compounds via High-speed Synchrotron X-ray Tomography: Zihan Song; Oxana Magdysyuk; Tay Sparks; Yu-Lung Chiu; Biao Cai; ¹University of Birmingham; ²Diamond Light Source Ltd

10:00 AM Break

10:20 AM
Towards Light Weight Structural Materials-optimized Processing of Nanocrystalline Mg-Al Alloys: Mohammad Umar Farooq Khatt; Taban Larimian; Tushar Borkar; Rajeev Gupta; ¹Texas A&M University; ²Cleveland State University; ³North Carolina State University

10:40 AM
Ultrafine-grained Magnesium Alloys Manufactured by Multi-axial Forging: Elucidating Mechanisms of Achieving Both High Strength and High Ductility: Devesh Misra; ¹University of Texas at El Paso

11:00 AM
Precipitation Hardening on Fracture Behavior of Extruded Mg10Gd Modified with Nd and La: Petra Maier; Norbert Hort; ¹University of Applied Sciences Stralsund; ²Helmholtz-Zentrum Hereon

11:20 AM
An Innovative Experimental Setup for the Electro-thermo-mechanical Characterization of Microscale Ti-6Al-4V Wires: Won June Cho; Maxwell Kulak; Chunghwan Kim; Eric Payton; Christopher Rudolf; Wonmo Kang; ¹Arizona State University; ²Air Force Research Laboratory; ³Naval Research Laboratory

11:40 AM
Residual Stresses in Multilayer Metal Sheets Produced by the Friction Assisted Lateral Extrusion Process: Claire Adams; Máté Sepsi; David Field; Laszlo Toth; ¹Washington State University; ²University of Miskolc; ³Université de Lorraine
CERAMIC AND GLASS MATERIALS

Manufacturing and Processing of Advanced Ceramic Materials — New Advances in Ceramic Processing II: Conventional vs. Additive Manufacturing

Program Organizers: Bai Cui, University of Nebraska-Lincoln; James Hemrick, Oak Ridge National Laboratory; Mike Alexander, Allied Mineral Products; Eric Faerson, Quad City Manufacturing Laboratory/Western Illinois University; Keith DeCarlo, Blasch Precision Ceramics

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Session Chairs: William Carty, Alfred University; Jian Luo, University of California, San Diego

8:00 AM Invited
A Comprehensive Approach to Ceramic Forming Processes: William Carty1; 1Alfred University

8:30 AM Invited
A Novel Approach to Estimate the Hamaker Constant of Ceramic Systems: Keith DeCarlo1; 1Blasch Precision Ceramics

9:00 AM
Impact of Embossing Geometry on the Replication Accuracy of Microchannels in Tape Cast Ceramics: Harrison Teutschbein1; Mingwei Xu1; Yue Qiu1; Chirag Kharangate1; James McGuffin-Cawley1; Jennifer Carter1; 1Case Western Reserve University

9:20 AM Invited
Open Platform Material Development for Additive UV Polymer Manufacturing: Greg Pugh1; 1Tethon

9:50 AM Break

10:10 AM Invited
Ceramic Binder Jetting Additive Manufacturing: Chao Ma1; Zhijian Pei1; 1Texas A&M University

10:40 AM
Multi-Material 3D Printing of Ceramics: Process Overview and Successful Trial Examples: Shawn Allan1; Martin Schwenkenwein2; Sebastian Geier2; Nicole Ross1; Nicholas Voellm1; Ryan Fordham1; 1Lithoz America, LLC; 2Lithoz GmbH

11:00 AM
Process Capability of Lithography-based Ceramic Manufacturing: Ryan Fordham1; Shawn Allan1; Nicholas Voellm1; Nicole Ross1; 1Lithoz America

BIOMATERIALS

Next Generation Biomaterials — Next Generation Biomaterials III

Sponsored by: ACerS Bioceramics Division

Program Organizers: Roger Narayan, University of North Carolina; Sanjiv Lalwani, Lynntech, Inc.

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Session Chairs: Krista Carlson, University of Nevada, Reno; Srimanta Barui, University of Connecticut Health; Masanori Kikuchi, National Institute for Materials Science

8:00 AM Invited
Probing of Binder-powder Interaction during 3D Binderjetting of Biomaterials Through Time Resolved Synchrotron X-ray Imaging: Srimanta Barui1; 1Indian Institute of Science, Bangalore, India

8:20 AM
Characterization of Hydroxyapatite Synthesized from Snail Shells Using the Sol-gel Technique: Jamiu Odusote1; Iyabo Oni1; Sarafadeen Kolawole1; 1University of Ilorin; 2Federal Polytechnic, Offa

8:40 AM Invited
Coating of Hydroxyapatite/Collagen Bone-like Nanocomposite by a Modified Electrophoretic Deposition Method and Its Biological Reaction: Masanori Kikuchi1; Tersuo Uchikoshi1; Kaori Iwanami-Kadowaki1; Hanae Arai1; Takeshi Ogasawara1; Masayoshi Uezono1; Keiji Moriyama1; 1National Institute for Materials Science; 2Tokyo Medical and Dental University

9:00 AM
Comparison of Various Post Coating Treatments on Plasma Sprayed HA Coatings: Tarun Goyal1; Manoj Mittal1; Jujhar Singh2; Gursharan Singh2; 1Jalandhar-Kapurthala Highway; 2Jalandhar-Kapurthala Highway

9:20 AM
Customized Zirconia Prosthetics by Ceramic Dough Shaping – Tailorable Porosity, Improved Strength and Aging Resistance: Venkata Sundep Seesala1; Santanu Dhara1; 1Indian Institute of Technology Kharagpur

9:40 AM
Development of Zirconium Diffusion Coatings for Tribological Applications of Titanium Alloys: Mathias Galetz1; Beyza Öztürk1; 1DECHEMA-Forschungsinstitut

10:00 AM Break

10:20 AM Invited
Electrocatalytic Probe for the Disinfection of Dental Pulp: Krista Carlson1; John Colombo1; 1University of Nevada, Reno

10:40 AM
Drug Loading and Release Properties of LSMO Nanoparticles Embedded in the Polymer Network: Sunita Keshri1; Sonali Biswas2; 1Birla Institute of Technology; 2K L University

11:00 AM
Effect of Heat Treatment on the Microstructural and Mechanical Properties of Ti6Al4V-equine Bone Nanocomposites: Jeong Wonki1; Shin Se Eun1; 1Sunchon National University
11:20 AM
Facile Synthesis of Single Phase Whitlockite; Could be the Best Substitute for Other Calcium Phosphates: Sadaf Batool1; Zakir Hussain1; 1National University of Sciences and Technology, H 12, Islamabad, Pakistan

LIGHTWEIGHT ALLOYS

Processing-Microstructure-Property Relationships of Titanium and Titanium Alloys — Session II

Sponsored by: TMS: Titanium Committee

Program Organizers: Yufeng Zheng, University of Nevada-Reno; Rongpei Shi, Lawrence Livermore National Laboratory; Benjamin Morrow, Los Alamos National Laboratory; Sriram Vijayan, The Ohio State University; Keyou Mao, Oak Ridge National Laboratory

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Session Chair: Ben Morrow, Los Alamos National Laboratory

8:00 AM Invited
Titanium Alloy Microstructures Produced by Additive Manufacturing and Deformation: Amy Clarke1; Benjamin Ellyson1; Alec Saville1; Chris Jasien1; Jake Benzing2; Adam Creuziger2; Sven Vogel2; Kamel Fezzaa2; Wayne Chen3; John Foltz3; 1Colorado School of Mines; 2National Institute of Standards and Technology; 3Los Alamos National Laboratory; 4Purdue University; 5ATI Specialty Materials

8:30 AM Invited
Insights from Three-dimensional Characterization of Twins in Titanium: Rodney McCabe1; Hi Vo1; Patrick Pinney1; Matthew Schneider1; M. Arul Kumar1; Carlos Tome1; Laurent Capolungo1; 1Los Alamos National Laboratory

9:00 AM Invited
Slip-twinning Interdependency in High-strength Alpha-beta Titanium Alloys: Shaolou Wei1; John Foltz1; Joseph Jankowski1; Bhuvir Nirudhoddi1; Luis Ruiz-Aparicio1; C. Tasan1; 1Massachusetts Institute of Technology; 2ATI Specialty Materials; 3ATI Specialty Rolled Products

9:30 AM Invited
Role of Oxygen on Phase Stability, Precipitation, and Deformation in Beta Titanium Alloys: Kathleen Chou1; Emmanuelle Marquis1; 1University of Michigan

10:00 AM Break

10:20 AM
Conventional Ti Alloys for Aeroengines And Aircraft Landing Gear Beams—a Data-driven Analysis for Selection of Ti-based Alloys and Future Directions: Ramachandra Canumalla1; Tanjore Jayaraman1; 1Weldaloy Specialty Forgings; 2University of Michigan-Debornar

10:40 AM
Dilatometric Study of Phase Transformations in Ti-407: Marco Ponce1; 1Centro de investigación de estudios avanzados del instituto politécnico nacional

11:00 AM
Enhancing Low-cycle Fatigue Life of Commercially-pure Ti By Deformation At Cryogenic Temperature: Geonhyeong Kim1; Seyed Amir Arsalan Shams1; Jae Nam Kim1; Jong Woo Won1; Seong Woo Choi1; Jae Keun Hong1; Chong Soo Lee1; 1Pohang University of Science and Technology (POSTECH); 2Korea Institute of Materials Science (KIMS)

11:20 AM
Microstructure Evolution and Mechanical Behaviour of Two Phase (α+β) Ti-6Al-4V Alloy : An Effect of Heat Treatment Temperature and Duration: Jagadeesh Babu S M1; Manjesh Kumar Mishra1; 1REVA University; 2Malaviya National Institute of Technology (MNIT) Jaipur

BIOMATERIALS

Society for Biomaterials: Biomaterial Applications — Biomaterials for Drug Delivery and Stimuli-responsive function

Program Organizers: Jessica Jennings, University of Memphis; Guillermo Ameer, Northwestern University; Danielle Benoit, University of Rochester; Jordan Gilmore, Clemson University

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Session Chair: Danielle Benoit, University of Rochester

8:00 AM Invited
Harnessing Perfluorocarbons to Enhance Oxygenation in Engineered Tissues: Nic Leipzig1; 1University of Akron

8:30 AM
Silanized Titanium for Delivery of Hydrophobic Therapeutic in Aqueous Environment: Zoe Harrison1; Joshua Bush1; Felio Perez1; Joel Bumgardner1; Tomoko Fujiwara1; Daniel Baker1; Jessica Jennings1; 1University of Memphis

8:50 AM
Hybrid 3D Bioprinting of Tissue Engineering Scaffolds with Dual Delivery Capability for Anticancer Drugs: Jiahui Lai1; Man Hang Mathew Wong1; Min Wang1; 1University of Hong Kong

9:10 AM
Altering the Size of Doxorubicin Loaded DOPE:DOPC Liposomes to Target Cancer-Associated Fibroblasts and Utilizing Size-dependent Selective Targeting: Tanzeel Ur Rehman1; Madison Rubin1; Kaitlin Bratlie1; 1Iowa State University

9:30 AM Invited
Antimicrobial Biomaterials Target Intracellular Infection: Bingyun Li1; 1West Virginia University School of Medicine

10:00 AM Break

10:20 AM
Utilizing Thiolyne Click Chemistry to Target Cancer Cells Using Folate Conjugated Liposomes: Tanzeel Ur Rehman1; Kaitlin Bratlie1; Surya Mallapragada1; 1Iowa State University
10:40 AM Mechanical Performance Analysis of New Designs of Ultra-Thin Drug-Eluting Stents: Mohamed Ibrahim¹; Moataz Elsisy²; Chang Hun Kum³; Gyuhyun Jin⁴; San Hyun An⁴; Lynn Thuy Linh Chau⁵; Kara X. Nghiem⁶; Youngjae Chun¹; ¹University of Pittsburgh; ²Cairo University; ³OSSTEM CARDIOTEC Co., Ltd., Seoul; ⁴Daegu-Gyeongbuk Medical Innovation Foundation Laboratory Animal Center

11:00 AM Harnessing Biological Functions in Dental Materials: Canadan Tamerli⁴; Paulette Spencer¹; ¹University of Kansas

11:20 AM Rapid Fire Posters

CERAMIC AND GLASS MATERIALS

Solid-state Optical Materials and Luminescence Properties — Optical Materials and Luminescence Properties

Sponsored by: ACerS Basic Science Division

Program Organizers: YiQuan Wu, Alfred University; Jas Sanghera, Naval Research Laboratory; Akio Ikuesue, World-Lab, Co., Ltd; Rong-Jun Xie, Xiamen University; Mathieu Allix, Laboratoire CEMHTI; Liangbing Hu, ¹University of Maryland

Tuesday AM | October 11, 2022
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Session Chairs: YiQuan Wu, Alfred University; Akio Ikuesue, World-Lab, Co., Ltd

8:00 AM Invited Ultrafast High Temperature Sintering for Ceramic Membranes: Liangbing Hu¹; ¹University of Maryland

8:20 AM Invited Upconverting Er³⁺-doped Ytterbium-aluminum Garnet Ceramics: Dariusz Hreniak¹; Robert Tomala¹; Zhengfa Dai²; Daria Szweczyk³; Andzej Jezowski³; Jiang Li¹; ¹Institute of Low Temperature and Structure Research PAS; ²Institute of Low Temperature and Structure Research PAS 2 Shanghai Institute of Ceramics CAS; ³Shanghai Institute of Ceramics CAS

8:40 AM Invited Polycrystalline Ceramics for Lasers: Current Potential and Limits: Rémy Boulèsteix¹; Florian Delaunay¹; Lucas Vierrs¹; Alexandre Maître¹; ¹University of Limoges

9:00 AM Invited Designing Transparent Persistent Luminescence Coatings: from Processing to Shimmering Perspectives: Victor Ca CSTaing¹; Gabriel Lozano¹; Hernán Miguez¹; ¹CSIC

9:20 AM Invited Optimization of Y₃Al₅Ga₃O₁₂:Ce³⁺,Cr³⁺,Pr³⁺ Phosphors for Persistent Luminescence: Synthesis Methods, Spectroscopic Properties and Mechanism: Vitalii Boiko¹; Maria Luisa Saladino¹; Zhengfa Dai²; Francesco Armetta²; Dariusz Hreniak¹; ¹Institute of Low Temperature and Structure Research; ²University of Palermo

9:40 AM Fabrication and Properties of Y₂O₃ Based Ceramics: Shyam Bayya¹; Woohong Kim¹; Joshua Gild²; Tony Zhou¹; Adam Floyd³; Bryan Sadowski¹; Jas Sanghera¹; ¹Naval Research Laboratory; ²University Research Foundation; ³Jacobs

10:00 AM Break

10:20 AM Laser Processing of Glasses, Using the Memory of Glass to Characterize the Local Modifications: Michael Bergler¹; Ferdinand Werr²; Kristian Cvecek²; Alexander Veber²; Urs Eppelt³; Ludger Müller³; Michael Krauset³; Thomas Höche³; Michael Schmidt³; Dominique de Ligny³; ¹Friedrich-Alexander-Universität Erlangen-Nürnberg; ²Humboldt-Universität zu Berlin; ³Coherent Munich GmbH & Co. KG; ⁴Fraunhofer - Institut für Mikrostruktur von Werkstoffen und Systemen IMWS

10:40 AM Melt Processing of a Co-extruded LiCa₂Mg₂V₂O₇ Garnet onto a YAG Single Crystal for IR Laser Applications: John Drazin¹; Hyunjun Kim¹; Kathryn Doyle¹; Andrew Schlup¹; Cynthia Bowers¹; Randall Hay²; Kent Averett³; ¹UES Inc.; ²Materials and Manufacturing Directorate, Air Force Research Laboratory

11:00 AM Reusable Multilayer Photonic Nanostructured Coatings for Optical Limiting of High Energy Lasers: Christopher DeSuttle¹; Justin Reiss¹; Patrick Albert¹; Sergei Stepanoff²; Ryan Romesberg²; Josie Hoover²; William Urmann¹; Dax Hoffman¹; Jake Keiper¹; Michael Schmitt¹; Douglas Wolfe¹; ¹The Applied Research Laboratory at Penn State; ²Materials and Manufacturing Directorate, Air Force Research Laboratory

11:20 AM Development of Sc₂Mo₃O₁₂:Eu³⁺ as a Red Phosphor with Superior Thermally Enhanced Emission: Forough Jahanbazi¹; Yuanbing Mao¹; ¹Illinois Institute of Technology

FUNDAMENTALS AND CHARACTERIZATION


Sponsored by: ACerS Basic Science Division

Program Organizers: Lan Li, Boise State University; Winnie Wong-Ng, National Institute of Standards and Technology; Kevin Huang, University of South Carolina

Tuesday AM | October 11, 2022
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Session Chair: Kevin Huang, University of South Carolina

8:00 AM Invited Multilayer Coating with a Superhydrophobic Porous Top Layer for Carbon Steel Corrosion Protection: Fangming Xiang¹; David Hopkinson¹; ¹National Energy Technology Laboratory

8:30 AM Invited Enhanced Recovery of Platinum Group Elements Using Functionalized Silica Materials Coupled with Durable Carbon Storage via Mineralization: Greeshma Gadikota¹; Ruiyi Zheng²; Prince Ochonma¹; ¹Cornell University
9:00 AM  
Synthesis of Hierarchical Pore Structures Within Monolithic Silica:  
Karthikeyan Baskaran; Muhammad Ali; Casey Elliott; Brian Riley; Krista Carlson;  
1University of Nevada, Reno; 2Pacific Northwest National Laboratory

9:20 AM  
Synthesis, Processing and Characterization of Intermetallic Compounds in the Ni-Al And Ti-Al System When Producing Porous Materials:  
Borys Sereda; Iryna Kruhliak; Yuriy Belokon; Dmytro Sereda;  
1Dneprovsky State Technical University

9:40 AM Invited  
Electrochemically-induced Amorphous to Crystalline Transformation in Niobium Oxide Electrodes for Lithium-ion Batteries:  
Hui Xiong; Pete Barnes; Yunxing Zu; Kiev Dixon; Shuye Ping Ong;  
2Boise State University; 3Idaho National Laboratory; 4University of California – San Diego

10:10 AM Break

10:30 AM  
Preparation of Porous Ceramics as Substrates for Improved Sunlight-driven Photocatalysis:  
Bruno Ramos; Priscila Palharim; Carolina Gusmao; Andre Da Silva; Douglas Gouveia;  
1Laboratory for Ceramics Processing, University of Sao Paulo; 2Research Group in Advanced Oxidation Processes, University of Sao Paulo

10:50 AM  
Valorization of Waste to Energy Ash through Engineered Cellular Magmatics:  
Austin Stanfield; Cory Trivelpiece; Collin Wilkinson; Robert Bust; Thomas Adams;  
1Savannah River National Laboratory; 2Glass WRX

11:10 AM  
Luminescent Tb3+-Doped Fluorapatite/Agar Nanocomposite for Detecting UO22+, Cu2+, and Cr3+ Ions:  
Yuanbing Mao; Hongjuan Liu;  
1Illinois Institute of Technology

10:00 AM Break

10:20 AM Invited  
Hierarchical Microstructures: A Potential Route to Enhanced Stability in Structural Materials for Advanced Nuclear Reactors:  
Larry Aagesen; Subhashish Meher; Mark Carroll; Laura Carroll; Tresa Pollock;  
1Idaho National Laboratory; 2Federal-Mogul Powertrain; 3University of Michigan; 4University of California Santa Barbara

10:50 AM Invited  
Synchrotron High-energy X-ray Studies of Nuclear Structural Materials:  
Xuan Zhang; Meimei Li; Jonathan Almer; Jun-Sang Park; Peter Keneesi; Andrew Chuang; Aniket Tekawade;  
1Argonne National Laboratory

11:20 AM Invited  
Radiation Resistance of MAX and MAB Phase Materials:  
Izabela Szlufarska; Jianqi Xi; Jun Young Kim; Hongliang Zhang;  
1University of Wisconsin-Madison

8:00 AM  
Microstructural Evolution of High-throughput Additively Manufactured 316L Stainless Steel with Increasing Hafnium Dopsants:  
Laura Hawkins; Jingfan Yang; Miao Song; Daniel Schwen; Yongfeng Zhang; Lin Shao; Xiaoyuan Lou; Lingfeng He;  
1Texas A&M; 2Auburn University; 3University of Michigan; 4Idaho National Laboratory; 5University of Wisconsin-Madison
MATERIALS-ENVIRONMENT INTERACTIONS

Thermodynamics of Materials in Extreme Environments — Thermodynamics and Stabilities of Alloys and Ceramics

Sponsored by: ACerS Basic Science Division, ACerS Energy Materials and Systems Division

Program Organizers: Xiaofeng Guo, Washington State University; Kristina Lilova, Arizona State University; Kyle Brinkman, Clemson University; Alexandra Navrotsky, Arizona State University; Jake Amoroso, Savannah River National Laboratory; Xingbo Liu, West Virginia University; Gustavo Costa, NASA Glenn Research Center

Tuesday AM | October 11, 2022
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Session Chair: Kyle Brinkman, Clemson University

8:00 AM Invited
Persistence of Materials Under Extreme Conditions: Alexandra Navrotsky1; Arizona State University

8:30 AM
Design of High Melting Point Materials via Deep Learning and First Principles: Qijun Hong1; Arizona State University

8:50 AM
Thermo-mechanical Property Prediction of Materials Using a Python Based Interface with Quantum Espresso: Joseph Derrick1; Tejesh Dube1; Jing Zhang1; IUPUI MEE Department

9:10 AM Invited
There is More to Heat Capacity Measurements than Calculating Entropy: Brian Woodfield1; Brigham Young University

9:40 AM
High Temperature Boron, Lithium, Iron, and Nickel Aqueous Thermochemistry for Pressurized Water Nuclear Reactors: Jason Rizk1; Brian Wirth2; Los Alamos National Laboratory; University of Tennessee, Knoxville

10:00 AM Break

10:10 AM Invited
The Thermochemical Stability of Rare Earth Oxides and Silicates for Thermal/Environmental Barrier Coating Applications: Mackenzie Ridley1; Kristyn Ardrey1; Cameron Miller2; Kate Tomko2; Mahboobe Jassas2; Kang Wang2; Mukil Ayyasamy2; Prasanna Balachandran2; Bi-Cheng Zhou1; Patrick Hopkins2; Elizabeth Opila1; Oak Ridge National Laboratory; University of Virginia

10:40 AM
Measuring Interfacial Thermodynamics from High Temperature In situ TEM Based Bicrystals Tested under Mechanical Load: Shen Dillon1; University of California, Irvine

11:00 AM
Phase Diagrams of Metal-Nitrogen Compounds at High Pressure and High Temperature: Peter Kroll1; University of Texas at Arlington

11:20 AM
Phase Equilibria and Liquidus Surface in Ni Rich Ni-Nb-Se Alloys: Alexander George1; Jerome Downey2; Montana Tech

SPECIAL TOPICS

MS&T22 Plenary Session

Tuesday PM | October 11, 2022
Ballroom A | David L. Lawrence Convention Center

2:00 PM Welcome Comments

2:05 PM Introductory Comments

2:10 PM Plenary
ACerS Edward Orton, Jr. Memorial Lecture: Ceramic Particles for Precision Drug Delivery: Sanjay Mathur1; University of Cologne

2:50 PM Award Presentation

2:55 PM Introductory Comments

3:00 PM Plenary
AIST Adolf Martens Memorial Steel Lecture: Microstructure Engineering of High-Performance Steels: Matthias Militzer1; University of British Columbia

3:40 PM Award Presentation

3:45 PM Introductory Comments

3:50 PM Plenary
TMS/ASM Distinguished Lectureship in Materials and Society: Materials Research on Clean Energy: For the Sake of Our Grandchildren: Iver Anderson1; Ames Laboratory (USDOE), Iowa State University

4:30 PM Award Presentation

4:35 PM Concluding Comments
SUSTAINABILITY, ENERGY, AND THE ENVIRONMENT

14th Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing — Sustainable Processing of Ceramics and Composites II

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Surojit Gupta, University of North Dakota; Mritunjay Singh, Ohio Aerospace Institute; Tatsuki Ohji, National Institute of Advanced Industrial Science and Technology; Hisayuki Suehara, Nagaoka University of Technology; Enrico Bernardo, University of Padova; Rajiv Asthana, University of Wisconsin; Yi Qun Wu, Alfred University; Zhengyi Fu, Wuhan University of Technology; Allen Apblett, Oklahoma State University

Wednesday AM | October 12, 2022
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Session Chairs: Yi Qun Wu, Alfred University; Enrico Bernardo, University of Padova; Allen Apblett, Oklahoma State University; Jie Yin, Shanghai Institute of Ceramics Chinese Academy of Sciences

8:00 AM
Substrate Orientation and Rare-earth Doping Effects on the Bandgap Engineering of Epitaxial 8-(AlxGa1-x)2O3 Films: Iva Milisavljevic1; Yi Qun Wu1; 1Alfred University

8:20 AM Invited
Low Temperature Molten Salt and Microwave Co-assisted Synthesis of Advanced Ceramics for Demanding Applications: Shaowei Zhang1; 1University of Exeter

8:50 AM Invited
New Construction Materials from Engineered Alkali Activation of Waste Glasses: Giulia Tameni1; Hamada Elsayed1; Akansha Mehta2; Jozef Kraxner2; Loredana Contrafatto3; Enrico Bernardo1; 1University of Padova; 2Funglass, University of Trencin; 3University of Catania

9:20 AM Effect of RHA Biochar Calcination on Structural, Thermal, and Morphological Properties of BaO-B2O3-SiO2 Glass System-based Coatings: Nurullah Copoglu1; Bugra Gicie1; 1Yildiz Technical University

9:40 AM Application of Animal Bone Residue as Portland Cement Concrete Ingredient: Federico Morgen1; Gabriel Gonçalves1; Ismael Boechat1; Patrick do Nascimento1; Ruthy da Silva1; 1Uniredentor

10:00 AM Break

10:20 AM Invited
Rapid Fabrication of SiC Composites by Selective Laser Sintering and Direct Liquid Silicon Infiltration: Jie Yin1; Xuejian Liu1; Zhengren Huang1; 1Shanghai Institute of Ceramics Chinese Academy of Sciences

10:50 AM Invited
Green Routes to Materials Via Reaction of Metal Oxides with Aqueous Reagents: Allen Apblett1; 1Oklahoma State University

11:20 AM Design and Development of Novel Structural Materials from Biomass: Surojit Gupta1; 1University of North Dakota

SPECIAL TOPICS

50 Years of Characterizing Structural Ceramics and Glasses: Recognizing the Contributions of George Quinn — Standards/Mechanical Testing & Design

Sponsored by: ACerS

Program Organizers: Jeffrey Swab, Army Research Laboratory; Andrew Wereszczak, Oak Ridge National Laboratory

Wednesday AM | October 12, 2022
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Funding support provided by: Corning Inc., 3M, Orton, and Bomas

Session Chairs: Jeffrey Swab, US Army Research Laboratory; Andrew Wereszczak, Oak Ridge National Laboratory

8:00 AM Introductory Comments

8:10 AM Invited
On the Controversies during the Creation of Flexure Strength Standards MIL STD 1942 and ASTM C1161: George Quinn1; 1NIST

8:50 AM Invited
A Quintessential Standards Writer and the Tangible Benefits of Standards: Michael Jenkins1; Janine Gallego1; 1Bothell Engineering and Science Technologies

9:20 AM Invited
Static and Dynamic Compression Strength of Ceramics and Glasses: Jeffrey Swab1; John Pittari III1; Christopher Meredith1; 1Army Research Laboratory

9:50 AM Invited
Advanced Proof Testing for Structural Ceramics: Osama Jadaan1; Noel Nemeth1; Eric Baker1; 1University of North Florida; 2Retired; 3Connecticut Reserve Technologies

10:20 AM Break

10:40 AM Invited
Sectored-flexural and Rotational-Flexural-strength Testing of Brittle Material Cylinders and Tubes: Andrew Wereszczak1; Osama Jadaan1; Emily Steiner1; Brian Oistad1; Randy Wiles1; Brett Kuwik1; 1Oak Ridge National Laboratory; 2University of North Florida; 3Saint-Gobain Research North America; 4Johns Hopkins University

11:10 AM Invited
On the Elastic Isotropy of the Entropy-stabilized Oxide (Mg, Co, Ni, Cu, Zn)O Compound: Edgar Lara-Curzio1; Krishna Piltke1; Andres Marquez-Rossy1; Alexis Flores-Betancourt1; De Xin Chen1; Santosh KC1; Valentino Cooper1; 1Oak Ridge National Laboratory

11:40 AM Invited
Observations in Fracture Toughness Testing of Glasses and Optical Ceramics: Jonathan Salem1; 1NASA GRC
SPECIAL TOPICS

ACerS Robert B. Sosman Award Symposium: Advancing the Science of Materials for Extreme Environments — Session I

Sponsored by: ACerS Basic Science Division

Program Organizers: Yiquan Wu, Alfred University; Greg Hilmas, Missouri University of Science and Technology; Eric Wuchina, NSWCCD

Wednesday AM | October 12, 2022
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Session Chair: To Be Announced

8:00 AM Invited
Ultra-High Temperature Ceramic Research at Missouri S&T: Greg Hilmas1; William Fahrenholtz2; 1Missouri University of Science and Technology

8:30 AM Invited
NSWC Research on UHTCs: A 40+ year Perspective: Eric Wuchina1; Mark Opeka2; Inna Talty3; James Zaykoski1; Peter Kaczmarek2; 1NSWCCD; 2NSWCCD/Southern Research; 3NSWCCD/Retired

9:00 AM Invited
Regeneration, Co-generation and Generation via Ultra-High Temperature Ceramics: William Lee1; Michael Rushton2; Simon Middleburgh2; 1Bangor University and Imperial College London; 2Bangor University

9:30 AM Invited
Addressing Challenges to the Application of UHTCs in Extreme Environments: Michael Cinibulk1; 1AFRL

10:00 AM Break

10:20 AM Invited
Exploring Why Ultra-high Temperature Ceramic Ceramics Work in Extreme Environments: Laura Silvestroni1; Nicola Gilli1; Jeremy Watts2; William Fahrenholtz3; 1CNR - ISTEC; 2Missouri University of Science and Technology

10:50 AM Invited
The Peculiarities of Deformation in Transition Metal Carbides: Gregory Thompson1; Christopher Weinberger2; 1University of Alabama; 2Colorado State University

11:20 AM Invited
Vacancy Ordering in Zirconium Carbide: Theresa Davey1; Ying Chen1; 1Tohoku University

11:50 AM Invited
Effects of Liquid and Gas Phase Formation on Mechanisms of Ultra-high Temperature Ceramic Oxidation: Lavina Backman1; Connor Stephens2; Elizabeth Opila3; 1U.S. Naval Research Laboratory; 2University of Virginia

EDUCATION

ACerS/TMS Emerging Faculty Symposium — Faculty Life and Collaborations

Sponsored by: ACerS Education and Professional Development Council, TMS: Education Committee

Program Organizers: Ashley Hilmas, Air Force Research Laboratory; Tessa Davey, Tohoku University; Victoria Miller, University of Florida

Wednesday AM | October 12, 2022
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Session Chair: To Be Announced

8:30 AM Introductory Comments

8:35 AM Invited
A Department Chair Perspective on the Faculty Search Process: Kyle Brinkman1; 1Clemson University

9:05 AM Invited
Successfully Transitioning from a Teaching-Intensive to a Research-Intensive University while on the Tenure-Track: Janelle Wharry1; 1Purdue University

9:35 AM Invited
Contributing to Academic Culture as Individuals: Darryl Butt1; 1University of Utah

10:05 AM Break

10:25 AM Invited
Building Compassion and Human Bridges through Research Collaborations: Olivia Graeve1; Jorge Arróyave García de la Cadena1; Aranza Martínez López1; 1University of California San Diego

10:55 AM Invited
Life-Lessons from a Career Spent Interacting with International Professional Societies and Research Collaborations: Jon Binner1; 1University of Birmingham
### ADDITIVE MANUFACTURING

**Additive Manufacturing and Cellular/Lattice Structures: Designs, Realization and Applications — Cellular/Lattice Structures III**

**Sponsored by:** TMS Additive Manufacturing Committee, TMS Materials Characterization Committee

**Program Organizers:** Li Yang, University of Louisville; Allison Beese, Pennsylvania State University; John Carpenter, Los Alamos National Laboratory; Carolyn Seepersad, University of Texas at Austin; Miguel Aguilo, Morphorm LLC

**Wednesday AM | October 12, 2022**

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**Session Chair:** Miguel Aguilo, Morphorm LLC

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**8:00 AM**

Effect of Geometrical Characteristics on the Mechanical Properties of Co-Cr-Mo Triply Periodic Minimal Surface Lattices Fabricated by Laser-Powder Bed Fusion: So-Yeon Park1; Kyu-Sil Kim2; Bandar AlMangour3; Kee-Ahn Lee4; 1Inha University; 2Agency for Defense Development; 3King Fahd University of Petroleum & Minerals

**8:20 AM**

Fabrication, Microstructure and High Temperature Mechanical Properties of Inconel 718 Lattice Structures Manufactured by Laser Powder Bed Fusion: Tae-Hoon Kang1; Yongho Sohn2; Kee-Ahn Lee3; 1Inha University; 2University of Central Florida

**8:40 AM**

Synchronous Involvement of Topology and Microstructure to Design Additively Manufactured Lattice Structure: Kavan Hazeli1; 1The University of Arizona

**9:10 AM**

Effects of TiB2 in an Al-Cu-Sc Alloy in the Hybrid Investment Casting Process: Jose Dias Filho1; Yifan Li2; Aleeea Batooli; Ahmed Qureshi3; Hani Henein4; 1University of Alberta

**9:30 AM**

Localized Strain, Microstructure, and Property Control of Ti-5553 Lattice Materials: Caleb Andrews1; Jenny Wang2; Maria Strantza2; Manyalibo Matthews2; Mitra Taheri1; 1Johns Hopkins University; 2Lawrence Livermore National Laboratory

**9:50 AM**

Miura-Ori Based Metallic Structure for Large Deformation via Additive Manufacturing: Vanshita Singh1; Eric Heikkonen1; Sudarsanam Babu1; Michael Kirka2; 1University of Tennessee, Knoxville; 2Oak Ridge National Laboratory

**10:10 AM**

Break

**10:30 AM**

Enabling Novel Porous Noise Absorbers via Additive Manufacturing: Bhisham Sharma1; 1Wichita State University

**11:00 AM**

Interlocking Metasurfaces: A Joining Technology for Additive: Ophella Bolmir1; Benjamin Young2; Philip Noell3; Brad Boyce3; 1Sandia National Laboratories

**11:20 AM**

Multi-scale Simulations for Improving the Design of Additive Manufactured Shock Absorbers: Luiz Lima1; Nannan Song2; Kedar Malusare1; Kennedy Neves1; Flavio Souza1; 1Siemens

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**ADDITIVE MANUFACTURING**


**Program Organizers:** Jing Zhang, Indiana University – Purdue University Indianapolis; Brandon McWilliams, US Army Research Laboratory; Li Ma, Johns Hopkins University; Yeongil Jung, Changwon National University

**Wednesday AM | October 12, 2022**

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**Session Chairs:** Jing Zhang, Indiana University - Purdue University Indianapolis; Yeon-Gil Jung, Changwon National University; Li Ma, Johns Hopkins University Applied Physics Laboratory; Brandon McWilliams, CCDC Army Research Laboratory

**8:00 AM**

Energy and Microstructural Evolution of In-situ Alloyed Cu-4at% Cr -2 at% Nb via Laser Powder Bed Fusion: David Scannapieco1; David Ellis2; John Lewandowski1; 1Case Western Reserve University; 2NASA Glenn Research Center

**8:20 AM**

Microstructure Predictions in Additive Manufacturing from Analytical Solidification Models – A Critical Assessment of Simplifying Assumptions: Jonah Klemm-Toole1; Charles Smith2; Olivia DeNonno3; Matthew Schreiber1; Luc Hagen1; Gwilym Couch1; Zhenzhen Yu1; Kip Findley1; John Speer1; Joy Gocketl1; Amy Clarke1; Tony Petrella1; Craig Brice1; 1Colorado School of Mines

**8:40 AM**

Development of Rapid Solidification Model for Additive Manufacturing and Application to Al-Si Alloys: Minho Yun1; In-Ho Jung1; 1Seoul National University

**9:00 AM**

Modeling the Solidification Cracking Susceptibility of Additively Manufactured Alloys: Noah Sargent1; Soumya Sridar1; Richard Otis2; Wei Xiong1; 1University of Pittsburgh; 2Jet Propulsion Laboratory, California Institute of Technology

**9:20 AM**

Sparse Sampling for 3D Electron Backscatter Diffraction: Zachary Varley1; Gregory Rohrer2; Marc De Graef1; 1Carnegie Mellon University

**9:40 AM**

Printability and Failure Susceptibility of Different Powder Layer Thicknesses in Laser Powder Bed Fusion: Taylor Sundermann1; David Shoukr1; Peter Morcos2; Raymundo Arroyave1; Alaa Elwany2; Ibrahim Karaman1; 1Texas A&M University
ADDITIVE MANUFACTURING

Additive Manufacturing of High and Ultra-high Temperature Ceramics and Composites: Processing, Characterization and Testing — Composites and Reinforcements

**Sponsored by:** ACerS Young Professionals Network

**Program Organizers:** Corson Cramer, Oak Ridge National Laboratory; Lisa Rueschhoff, Air Force Research Laboratory; Greg Hilmas, Missouri University of Science and Technology

Wednesday AM | October 12, 2022
306 | David L. Lawrence Convention Center

**Session Chair:** Austin Martin, Navy Research Lab

**8:00 AM Invited**
Additive Manufacturing of Chopped Fiber Ultra-High Temperature Ceramic Composites: James Kemp1; Benjamin Lam1; Connor Wyckoff2; William Costakis1; Lisa Rueschhoff1; 1Air Force Research Laboratory

**8:30 AM**
AM of SiC:SiC Composites via Robocasting: John Stuecker1; Steve Bullock2; David Mitchell3; Tristin Anderson4; Hunter Berner5; Corson Cramer1; 1Robocasting Enterprises; 2Oak Ridge National Laboratories

**8:50 AM**
Strategies for Printing Fibers and Post-processing for Ceramic Matrix Composites (CMCs): Corson Cramer1; David Mitchell1; James Klett1; Vlastimil Kunc1; 1Oak Ridge National Laboratory

**9:10 AM**
Evaluating Extrusion Deposited Additively Manufactured Fiber-reinforced Thermoplastic Polymers as Carbon/Carbon Preforms: Edwin Romero1; Eduardo Barocio1; R. Pipes1; Rodney Trice1; 1Purdue University; 2The Composites Manufacturing and Simulation Center

**9:30 AM**
High-temperature Performance of LCVD SiC Fiber-Reinforced CMCs: Mark Schaefer1; Jeff Vervlied1; Kirk Williams1; Joseph Pegna1; 1Free Form Fibers

**9:50 AM Break**

**10:10 AM Invited**
Considerations for Additive Manufacturing of Ultra-high Temperature Ceramic Composites Using Preceramic Polymers: Brett Compton1; 1University of Tennessee

**10:40 AM**
Anisotropic Microstructures in Platelet-Seeded Silicon Carbide obtained via Direct Ink Writing: Tess Marconie1; Jeffrey Youngblood1; Rodney Trice1; 1Purdue University

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — High Temperature and Refractory Materials

**Program Organizers:** Prashanth Konda Gokuldoss, Tallinn University of Technology; Jurgen Eckert, Erich Schmid Institute of Materials Science; Zhi Wang, South China University of Technology

Wednesday AM | October 12, 2022
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**Session Chair:** To Be Announced

**8:00 AM**
Fabrication of High Temperature Parts Composed of Titanium-Zirconium-Molybdenum Alloy (TZM) Using Powder Bed Fusion (PBF): Michael Brand1; Robin Pacheco1; Colt Montgomery1; Kevin Le1; 1Los Alamos National Laboratory

**8:20 AM**
Temporary Coating to Improve Part Integrity and Post-Sintering Surface Roughness of Binder Jet Printed Tungsten Carbide-Cobalt Parts: Pierangeli Rodríguez De Vecchis1; Katerina Kimes2; Drew Elhassid3; Markus Chmielus1; 1University of Pittsburgh; 2Desktop Metal; 3General Carbide

**8:40 AM**
Fabrication of Molybdenum Based Refractory Alloys Using Additive Manufacturing: Christopher Ledford1; Patxi Fernandez-Zelaia1; Michael Kirka1; 1Oak Ridge National Laboratory

**9:00 AM**
Laser Powder Bed Fusion of Platinum-based Alloys for Industrial High Temperature Structural Applications: Biao Cai1; Selassie Dorvlo2; Ian Campbell3; Moataz Attallah3; Parastoo Jamshidi4; 1University of Birmingham; 2Cookson Gold

**9:20 AM**
Printability and Defects in W & W -alloys by Directed Energy Deposition: Amaranth Kara1; Maarten de Boer1; Bryan Webler2; 1Carnegie Mellon University

**10:00 AM Break**

**10:20 AM**
Laser Powder Bed Fusion of Pure Nb Powder and Nb+WC Powder Blend: Ana Sofia d’Oliveira1; Eloisa Cardozo2; Moataz Attallah3; 1Universidade Federal do Paraná; 2University of Birmingham

**10:40 AM**
Microstructure and Mechanical Properties of Co-based Superalloy with // Microstructure Fabricated by Laser Powder-bed Fusion: Hyeji Im1; Chuan Liu1; Carelyn Campbell2; David Dunand3; 1Northwestern University; 2NIST
11:00 AM
Sintering Process Optimization for FeCrAl and FeCrAl/Binder Composites for Use in Material Extrusion Additive Manufacturing: 
Amrita Lal1; Zachary Kennedy1; Josef Christ1; Saumladeep Jana1; 
1Pacific Northwest National Laboratory

11:20 AM
Suitability of CoCrFeMnNi3Alx High Entropy Alloys for Additive Manufacturing: Zachary Sims2; Aurelien Perron2; Alfred Amron2; Hunter Henderson2; Michael Thompson2; Max Neveu2; Orlando Rios2; Scott McCall2; 
1Lawrence Livermore National Laboratory; 2University of Birmingham; 3NUS, Singapore

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Other Non-ferrous Materials

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Jurgen Eckert, Erich Schmid Institute of Materials Science; Zhi Wang, South China University of Technology

Wednesday AM | October 12, 2022
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Session Chair: To Be Announced

8:00 AM
Copper Printing Capabilities via Binder Jet Printing: Sabina Kumar1; 
1Eaton Corporation

8:20 AM
Microstructure Evolution and Mechanical Properties of 3D Printed and Sintered Copper Parts: Kameswara Pavan Ajjarapu1; Luke Malone1; Carrie Barber1; Mark Barr1; Matteo Zanon1; Sundar Atre1; Kunal Kate1; 
1University of Louisville; 2Kymera International

8:40 AM
Post-process Heat Treatment Effects on Additive Manufactured Pure Copper: Wanxuan Teng1; Biao Cai1; Kenneth Na1; Stuart Jackson1; Ian Campbell1; 
1University of Birmingham; 2Renishaw PLC; 3Cookson Precious Metals Ltd

9:00 AM
Simplifying Post-Processing of Copper Alloys Using: Owen Hildreth1; Sanaz Yazdanparast1; 1Colorado School of Mines

9:20 AM
Development of High Pressure Heat Treatment for L-PBF F357: Chad Beamer1; Pontus Nilsson1; Andrew Wessman1; Donald Godfrey1; 
1Quintus Technologies LLC; 2University of Arizona; 3SLM Solutions Americas

9:40 AM
Influence of Post-Processing Techniques on Process-induced Defects in AM AISI10Mg and CP-Ti: Austin Ngo1; Hannah Sims1; John Lewandowski1; 1Case Western Reserve University

10:00 AM Break

10:20 AM
Laser-powder Bed Fusion and Mechanical Properties of Al18Co30Cr10Ni32 Eutectic Multi-Principal Element Alloy: Thinh Hyunh1; Abhishek Mehta1; Nemanja Klejstan2; Asif Mahmud2; Kevin Graydon1; Marko Knezevic1; Brandon McWilliams1; Kyu Cho1; Yongho Sohn1; 1University of Central Florida; 2University of New Hampshire; 3DEVCOM US Army Research Laboratory

10:40 AM
Stainless Steel and Aluminum Alloy Development for Highly Consistent and Isotropic Properties in Laser Powder Bed Fusion: Benjamin Rafferty1; Jeremy Iten1; Aaron Stebner2; Akansh Singh3; Brandon Kappes4; Sridhar Seetharaman1; Dyuti Sarker1; Soumya Mohan1; 1Elementum; 2Georgia Tech; 3Colorado School of Mines; 4KMMD; 5Arizona State University

11:00 AM
Additively Graded Materials for Thermal Management: Gianna Valentino1; Sharon Park2; Alex Lark3; Mo-Rigen He3; Kevin Hemker6; 
1Johns Hopkins Applied Physics Laboratory; 2Johns Hopkins University

11:20 AM
Framework for Designing Additively Manufactured Metallic Functionally Graded Materials: Allison Beese1; Zi-Kui Liu1; 1Pennsylvania State University

ADDITIVE MANUFACTURING

Additive Manufacturing of Titanium-based Materials: Processing, Microstructure and Material Properties — Ti-allyls

Program Organizers: Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University

Wednesday AM | October 12, 2022
305 | David L. Lawrence Convention Center

Session Chair: Ulf Ackelid, Freemelt

8:00 AM Invited
Hybrid Strategies to Increasing the Throughput of Electron Beam Selective Melting of Ti-allyls: Mootaz Attallah1; Riccardo Tosi1; Alex Leung2; Emmanuel Muzangaza1; Xipeng Tan3; 1University of Birmingham; 2University College London; 3NUS, Singapore

8:40 AM
Effect of Powder Morphology and Laser Scanning on Track Surface Characteristics of Laser-powder Bed Fusion of Ti-13%Nb-13%Zr Alloys: Fernando Landagra1; Jamil Guimaraes Junior1; 1University of São Paulo

9:00 AM
Additive Manufacturing of Titanium – Boron Carbide In-situ Composites: Mohan Sai Kiran Narti1; Srinivas Aditya Mantri1; Thomas W. Scharf1; Narendra Dahotre1; Rajarshee Banerjee1; 1University of North Texas

9:20 AM
Hydrogen-enabled Microstructural Engineering of Additively Manufactured Titanium Alloys: James Paramore1; Michael Hurst2; Matthew Dunstan3; Daniel Lewis3; Brady Butler3; 1US Army Research Laboratory; 2Texas A&M University

9:40 AM
Multi-stage Modeling of Fatigue of Ti-6Al-4V Fabricated by Different Additive Manufacturing Techniques: Lionardo Lado1; Mohammad Mahtabi1; 1University of Tennessee Chattanooga
10:00 AM  Break

10:20 AM  
**Stress State Dependent Fracture Behavior of Additively Manufactured Ti-6Al-4V Containing Internal Flaws:** Alexander Wilson-Heid; Eric Furton; Allison Beese; 1Penn State University

10:40 AM  
**Transmission Electron Microscopy Analysis of Cellular Structure of Laser Processed Metastable Ti-Nb Alloy:** Wenhao Lin; Eric Hoglund; Helge Heinrich; Ji Ma; 1University of Virginia

11:00 AM  
**Eggshell Based Ti6Al4V Hexagonal Lattice Structure for Human Bone Implants:** Riddhi Shukla; Lauri Kollo; Prashanth Gokuldoss; 1Tallinn University of Technology

**ADDITIVE MANUFACTURING**

**Additive Manufacturing: Equipment, Instrumentation and In-Situ Process Monitoring — Equipment, Instrumentation and In-Situ Process Monitoring II**

**Sponsored by:** TMS Additive Manufacturing Committee

**Program Organizers:** Ulf Ackelid, Freemelt AB; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Ola Harrysson, North Carolina State University

**Wednesday AM | October 12, 2022**

**304 | David L. Lawrence Convention Center**

**Session Chair:** To Be Announced

8:00 AM  Invited  
**Challenges and Opportunities for In-Situ Sensing during Electron Beam Powder Bed Fusion Additive Manufacturing:** Tim Horn; 1North Carolina State University

8:40 AM  
**High-Speed Thermal Imaging of the Melt Pool in Laser Powder Bed Fusion:** Guadalupe Quirarte; Alexander Myers; Syed Uddin; Jack Beuth; Jonathan Malen; 1Carnegie Mellon University

9:00 AM  
**Using High-Speed Thermal Imaging to Understand Melt Pool Defects in Laser Powder Bed Fusion:** Alexander Myers; Guadalupe Quirarte; Syed Uddin; Jonathan Malen; Jack Beuth; 1Carnegie Mellon University

9:20 AM  
**Quantification of Melt Pool Variability for L-PBF Additive Manufacturing by High-Speed Imaging:** David Guirguis; Conrad Tucker; Jack Beuth; 1Carnegie Mellon University

9:40 AM  
**In-situ Process Monitoring, Synchronization and Mapping Laser Powder Bed Fusion Builds of Ti6Al4V:** Samuel Hochter; Brodan Richter; Joseph Zalameda; Wesley Tayon; Erik Frankforter; Peter Spaeth; Andrew Kitahara; 1NASA; 2National Institute of Aerospace

10:00 AM  Break

10:20 AM  
**Utilizing K-means Clustering on Thermal Images for Laser Powder Bed Fusion Additive Manufacturing:** Kevin Le; Colt Montgomery; Michael Brand; Robin Pacheco; Ryan Mier; 1Los Alamos National Laboratory

10:40 AM  
**In-situ Sensor Feature Engineering for Process Development of Energy Conversion Materials:** Joy Gockel; John Middendorf; Joe Walker; Vijayabarathi Ponnambalam; Saniya LeBlanc; Tanvi Banerjee; 1Colorado School of Mines; 2Open Additive, LLC; 3George Washington University; 4Wright State University

11:00 AM  
**Characterization of Laser Powder Bed Fusion Internal and Surface Defects as a Foundation for In Situ Monitoring:** Sean Dobson; Ashley Paz y Puente; 1University of Cincinnati

**NUCLEAR ENERGY**

**Advanced Characterization of Materials for Nuclear, Radiation, and Extreme Environments III — Spectroscopy/Tomography**

**Sponsored by:** TMS Nanomechanical Materials Behavior Committee, TMS Nuclear Materials Committee

**Program Organizers:** Cody Dennett, Idaho National Laboratory; Samuel Briggs, Oregon State University; Christopher Barr, Naval Nuclear Laboratory; Michael Short, Massachusetts Institute of Technology; Janelle Wharry, Purdue University; Cheng Sun, Idaho National Laboratory; Caitlin Taylor, Los Alamos National Laboratory; Khalid Hattar, Sandia National Laboratories; Yuanyuan Zhu, University of Connecticut

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**Session Chairs:** Janelle Wharry, Purdue University; Christopher Barr, Naval Nuclear Laboratory

8:00 AM  Invited  
**Dose Rate Dependent Radiation Enhanced Diffusion in Model Oxides:** Kayla Yano; Aaron Kohnert; Tiffany Kaspar; Sandra Taylor; Hysosim Kim; Yongqiang Wang; Daniel Schreiber; 1Pacific Northwest National Laboratory; 2Los Alamos National Laboratory

8:30 AM  
**Ion Irradiated ZrNb Alloys:** Nabil Daghouji; Huseyin Sener; Miroslav Karlik; Mauro Callisti; Tomas Polcar; 1Czech Technical University in Prague; 2Cambridge University

8:50 AM  
**Thermomechanical Characterization of Advanced Reactor Materials in High Temperature Gas Environments:** William Searight; Leigh Winfrey; 1Pennsylvania State University; 2SUNY Maritime College

9:10 AM  Invited  
**Materials in Extreme Environments Investigated with Positron Spectroscopy:** Rasheed Auguste; Peter Hosemann; M. Oskar Liedke; Maik Butterling; Farida Selim; Sebastian Lam; Djamel Kaoumi; Ho Lun Chan; Elena Romanovskaja; John Scully; 1University of California, Berkeley; 2Helmholtz-Zentrum Dresden - Rossendorf; 3Bowling Green State University; 4North Carolina State University; 5University of Virginia

9:40 AM  
**Emissivity Measurements for Characterization of Molten Salts:** Charmayne Lonergan; Jason Lonergan; 1Pacific Northwest National Laboratory

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10:00 AM Break

10:20 AM Invited
In Situ Monitoring of Heavy Liquid Metal and Molten Salt Corrosion under Irradiation with Proton-induced X-ray Emission (PIXE) Spectroscopy: Franziska Schmidt1; Matthew Chancey2; Chaitanya Pedditi3; Scott Parker4; Yongqiang Wang5; Peter Hosemann6; 1University of California Berkeley; 2Los Alamos National Laboratory

10:50 AM
Europium 3⁺ as a Structural Luminescent Probe in Calcined Ceria Pellets: Jacob Flowers5; Kelly Nash1; Elizabeth Sooby5; Sumeera Tek5; Julian Valdez5; 1University of Texas at San Antonio

11:10 AM
Correlating Irradiation Defect Models to Thermal Conductivity Evolution under Irradiation in ThO2: Joshua Ferrigno1; Saqeeb Adnan1; Amey Khandolkar1; Miaomiao Jin3; Kaustubh Bawane3; Linu Malakkal3; Erika Nosai4; Zilong Hua3; Lingfeng He3; David Hurley4; Marat Khafizov3; 1The Ohio State University; 2Idaho National Laboratory; 3Penn State University

PROCESSING AND MANUFACTURING

Advanced Joining Technologies for Automotive Lightweight Structures — Friction Stir Welding (FSW)

Sponsored by: ACerS Manufacturing Division, TMS Aluminum Committee

Program Organizers: Yan Huang, Brunel University London; Carla Barbatti, Constellium; Yingchun Chen, Dura Automotive Systems

Wednesday AM | October 12, 2022
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Session Chair: Yingchun Chen, Dura Automotive Systems

8:00 AM Invited
3D Process Modeling of Linear Friction Welding Using a Smoothed Particle Hydrodynamics Based Approach: Srujan Rokkam1; Quang Truong2; Donald Weaver2; 1Advanced Cooling Technologies Inc; 2Air Force Research Laboratory

8:30 AM Invited
Microstructural and Mechanical Property Change during Friction Element Welding: Ankit Varma1; Laine Mears1; Jongsook Choi1; Xin Zhao1; 1Clemson University

9:00 AM
Additive Friction Stir Deposition for Cladding and Repair of Lightweight Aluminum: Greg Hahn1; Hang Yu2; 1Virginia Polytechnic Institute and State University

9:20 AM
Friction Stir Lap Welding of 3T Al Sheets in a Robotic Platform: Piyush Upadhyay3; Hirishkesh Das3; Shivakant Shukla3; 3Pacific Northwest National Laboratory

9:40 AM
Microstructure and Properties of Mg/Mg and Mg/Al FSW Welds: Krzysztof Mroczka1; Stanislaw Dymek1; Adam Pietras1; Aleksandra Weglawska1; Carter Hamilton2; Mateusz Kopyscianski2; 1Cracow University of Technology; 2AGH University of Science and Technology in Krakow; 3The Lukasiewicz Research Network Institute of Welding; 4Miami University

MATERIALS-ENVIRONMENT INTERACTIONS

Advanced Materials for Harsh Environments — Session IV

Sponsored by: ACerS Electronics Division

Program Organizers: Navin Manjooran, Chairman, Solve; Gary Pickrell, Virginia Tech

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Session Chairs: Gary Pickrell, Virginia Tech; Navin Manjooran, Chairman, Solve

8:00 AM Introductory Comments

8:40 AM
Utilization of Acacia senegal for Rubber Processing Effluent Treatment: pH Variations and Optimum Dose determination: O. C Ize-Iyamu1; Ikhazuagbe Ifijen1; E.E Ukpebor2; O.K Ize-Iyamu2; I.O. Bakare3; A.O Ohifuemen4; N.U Udokpoh5; F.U Mohammed6; E.A Fagbemi7; 1Rubber Research Institute of Nigeria; 2Ambrose Alli University, Ekpoma.

9:00 AM
CMAS Interaction with Model YAlO3 Environmental Barrier Coatings: Effect of Y3Al5O12 Precipitation on Apatite Nucleation and Growth: Amanda Velazquez Plaza1; Amanda Krause1; 1University of Florida

9:20 AM
Far-Field Passive Wireless Sensors using Conductive Ceramic for High-Temperature Health Monitoring: Kevin Jordan1; Edward Sabolsky1; Jay Wilhelm2; Brian Jordan3; Kevin Sivaneri3; 1West Virginia University; 2Ohio University

9:40 AM
High Temperature Thick Film Sensor Development Based on Doped Lanthanum Chromites Refractory Semiconductors Materials: Javier Mena1; Edward Sabolsky2; Konstantinos Sierras3; Katarzyna Sabolsky3; Domenic Cipollone3; Victor Mendoza3; Anthony Abrahamian1; 1West Virginia University; 2Universidad del Norte

10:00 AM Break

10:20 AM
The Role of Residual Stress in Crystallographic Orientation Dependent Corrosion Rates of Aluminum: Junyeop Lee1; Eunkyung Lee2; 1National Korea Maritime and Ocean University

10:40 AM
An Investigation of High Temperature Corrosion Sensing for Coal-based Power Plant Operations: Brian Jordan1; Edward Sabolsky2; Daryl Reynolds3; Kavin Sivaneri3; Kevin Tennant3; Derek Hockenberry3; 1West Virginia University

11:00 AM Concluding Comments
SUSTAINABILITY, ENERGY, AND THE ENVIRONMENT

Advances and Challenges in Decarbonization of the Steel Industry — Session I

Sponsored by: AIST Metallurgy — Processing, Products & Applications Technology Committee

Program Organizers: Sridhar Seetharaman, Colorado School of Mines; Jeremy Jones, Continuous Improvement Experts Inc. (CIX Inc.); Zane Voss, Continuous Improvement Experts Inc. (CIX Inc.); Sunday Abraham, SSAB Americas; Ronald O’Malley, Missouri University of Science and Technology

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Session Chair: To Be Announced

8:00 AM
Comparative Analysis of Decarbonized Steel with Alternative Materials: Vaishnavi Vijay Rajulwar; Robert Stirling; Tova Jarnerud; Sridhar Seetharaman; 1Arizona State University

8:20 AM
Grid Interactive Hydrogen Steelmaking (GISH) – Towards Decarbonization of Steel Industry: Yuri Korobeinikov; Sridhar Seetharaman; Amogh Meshram; 1Arizona State University

8:40 AM
Controlling Processing Conditions and Microstructures to Mitigate Hot-Shortness in Steels with Elevated Cu: Lionel Promel; Henry Geerlings; Sridhar Seetharaman; Amy Clarke; Jonah Klemm-Toole; Kester Clarke; 1Colorado School of Mines

9:00 AM
Research and Development for Decarbonisation of the UK Steel Industry: Zushu Li; 1University of Warwick

9:20 AM
Modeling Guided Fabrication of Adsorptive Heat Exchanger for Carbon Capture: Dongsheng Li; Wei Liu; 1Advanced Manufacturing LLC; 2Molecule Works Inc.

9:40 AM
Carbon Reduction by Refractory Recycling and Sustainable Production Methods of Refractories: William Headrick; 1RHI Magnesita

ARTIFICIAL INTELLIGENCE

AI for Big Data Problems in Advanced Imaging, Materials Modeling and Automated Synthesis — AI for Materials Discovery II

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Mathew Cherukara, Argonne National Laboratory; Subramanian Sankaranarayanan, University of Illinois-Chicago; Badri Narayanan, University of Louisville

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Session Chairs: Subramanian Sankaranarayanan, University of Illinois Chicago; Badri Narayanan, University of Louisville

8:00 AM
AI-enabled Platform for Autonomous Experimentation and Materials Discovery: Henry Chan; Chengshi Wang; Jie Xu; Rohit Batra; Arun Baskaran; Maria Chan; Pierre Darancet; 1Argonne National Laboratory

8:30 AM
De Novo Inverse Design of Nanoporous Materials by Machine Learning: Mathieu Bauchy; 1University of California, Los Angeles

9:00 AM
Deep Learning Approaches for Accelerating Polymer Characterization: Tarak Patra; 1IIT Madras

9:30 AM
Multi-Fidelity Machine Learning for Perovskite Discovery: Arun Kumar Mannodi Kanakkithodi; 1Purdue University

10:00 AM Break

10:20 AM
Machine Learning for Accelerated Defect Dynamics in Materials: Ghausyam Pilania; Anjana Talapatra; Anup Pandey; Blas Uberuaga; Danny Perez; 1Los Alamos National Laboratory

10:50 AM
Understanding Atomic-scale Mechanisms of Defect Dynamics in Rare Earth Nickelates by Machine Learning and Quantum Simulations: Mirza Galib; Badri Narayanan; 1University of Louisville

11:20 AM Concluding Comments
FUNDAMENTALS AND CHARACTERIZATION

Alloy Phase Transformations at Elevated Temperatures — Session III

Sponsored by: TMS High Temperature Alloys Committee, TMS Phase Transformations Committee

Program Organizers: Dinc Erdeniz, University of Cincinnati; Benjamin Adam, Oregon State University; Eric Lass, University of Tennessee-Knoxville; Ashley Paz y Puente, University of Cincinnati; Sophie Primig, University of New South Wales; Chantal Sudbrack, National Energy Technology Laboratory

Wednesday AM | October 12, 2022
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Session Chair: Chantal Sudbrack, National Energy Technology Laboratory

8:00 AM Invited
Develop Precipitation-Strengthened Refractory High Entropy Alloys for Turbine Blades Applications above 1300 Degree Celsius: 
Michael Gao1; David Alman1; Chantal Sudbrack1; Paul Jablonski1; Vishnu Raghuraman2; Mike Widom2; Michael Kirka3; 1National Energy Technology Laboratory; 2Carnegie Mellon University; 3Oak Ridge National Laboratory

8:30 AM Invited
Precipitation Strengthening in BCC Al2.7CrMn TiV High-Entropy Alloys: 
Keith Knipling1; Patrick Callhan1; 1Naval Research Laboratory

9:00 AM Alternate Phase Transformation Paths in a Nb-50Ti Alloy in the Presence of Oxygen Interstitials: 
Ravit Silverstein1; Patrick Callhan1; Anton Van der Ven2; Carlos Levi3; 1University of California, Santa Barbara; 2University of California, Santa Barbara, California

9:20 AM Additive Manufacturing Design of Metal Matrix Composites of Stainless Steel 316 and Inconel 718: 
Dazheng Li1; Wei Xiong1; 1University of Pittsburgh

9:40 AM Invited
Precursor Metastable Phases and Their Influence on a Precipitation in the Metastable β-titanium Alloy, Ti-5Al-5Mo-5V-3Cr: 
Stoichkova Antonova1; Zachary Kloenenn2; Yufeng Zheng3; Rongpei Shi4; Hamish Fraser5; Baptiste Gauld6; 1National Energy Technology Laboratory; 2The Ohio State University; 3University of Nevada, Reno; 4Harbin Institute of Technology; 5Max-Planck-Institut fur Eisenforschung

10:10 AM Break

10:30 AM Study of Thermal Decomposition of γ′-Fe3N Using Molecular Dynamics Simulation: 
Jianxin Zhu1; Jian-Ping Wang1; 1University of Minnesota

10:50 AM Thermal Stability and Time-temperature-transformation Diagrams of Co-rich Nanocomposite Ribbons: 
Yuanhong Wang1; 1University of Pittsburgh

11:10 AM On the Shapes of Time-Temperature-Transformation Curves across Alloys and Reactions: 
Robert Hackenberg1; 1Los Alamos National Laboratory

SPECIAL TOPICS

Art and Cultural Heritage: Discoveries during the Pandemic Year — Session I

Sponsored by: ACerS Art, Archaeology, and Conservation Science Division

Program Organizers: Marie Jackson, University of Utah; Jamie Weaver, National Institute of Standards and Technology

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Session Chairs: Marie Jackson, University of Utah; Jamie Weaver, National Institute of Standards and Technology

8:00 AM Introductory Comments

8:10 AM Multiscale Imaging and Compositional Analysis Correlation of Heritage Science Materials: 
Michael Detisch1; Jillian Cramer1; W. Seales1; T. Balth1; 1University of Kentucky

8:50 AM Complementary Scientific Techniques for the Study of Mesoamerican Greenstone Objects: 
Willow Knight1; Faith Gantz1; Marcus Young1; Brigitte Kovacevich1; Dawn Crawford2; Elena Torok3; Fran Baas4; 1University of North Texas; 2University of Central Florida; 3Southern Methodist University; 4Dallas Museum of Art

9:10 AM Collaboration to Develop and Validate a Microanalytical Methodology to Analyze Early European Porcelains to Predict Firing Temperatures: 
Thomas Lam1; Grace Dunham2; Jessica Walthew1; Sarah Barack1; William Carty2; 1Smithsonian Institution; 2Alfred University

9:30 AM Acid Corrosion of Earthenware: Interactions between Aluminosilicates and Sulfur-Containing Adsorbents: 
Celia Chari1; Joseph Bennett2; Glenn Gates3; Zeev Rosenzweig4; Katherine Faber5; 1California Institute of Technology; 2University of Maryland, Baltimore County; 3The Walters Art Museum

9:50 AM Break

10:10 AM Keynote
Art Glass in Pittsburgh: A Creative Hub from Industrial Roots: 
Heather McElwee1; 1Pittsburgh Glass Center
10:50 AM
Binder and Volcanic Aggregate Transformations in the Mortar of Tomb of Caecilia Metella Concrete, 1C BCE, Rome: Marie Jackson; Linda Seymour; Nobumichi Tamura; Admir Masic; Gabriele Vola
1University of Utah; 2Simpson, Gumpertz & Heger; Lawrence Berkeley National Laboratory; 3Massachusetts Institute of Technology; 4Cimprogetti Srl

11:10 AM
Egyptian Blue: Experimental Assessment of Process Variability for Museum Exhibition: Julia Esakoff; Arumala Lere-Adams; John McClay; Travis Olds; Lisa Haney; Ciara Cryst
1Washington State University; 2Carnegie Museum of Natural History

NUCLEAR ENERGY

Ceramics for a New Generation of Nuclear Energy Systems and Applications — Ceramics for Nuclear Energy Application

Sponsored by: TMS Nuclear Materials Committee, ACerS Energy Materials and Systems (EMSD) Division

Program Organizers: Ming Tang, Clemson University; Enrique Martinez Saez, Clemson University; Yongfeng Zhang, University of Wisconsin; Krista Carlson, University of Nevada, Reno; Yuichi Katoh, Oak Ridge National Laboratory; Jean Paul Crocombette, CEA Saclay; Erofil Kardoulaki, Los Alamos National Laboratory; Levi Gardner, Argonne National Laboratory; Jian Shi, Xiamen University; Charmayne Lonergan, Pacific Northwest National Laboratory

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Session Chairs: Maik Lang, University of Tennessee; S. K. Sundaram, Alfred University

8:00 AM Invited
Additive Manufacturing of Ceramics for Nuclear Applications: S. K. Sundaram; 1Alfred University

8:30 AM Invited
Radiation Effects in Single-crystal High-entropy Oxides: Candice Kinsler-Fedon; Lauren Nuckols; Anamul Mir; Christopher Nelson; David Mandrus; Yanwen Zhang; Veerle Keppens; William Weber
1University of Tennessee; 2University of Huddersfield; 3Oak Ridge National Laboratory

9:00 AM
Radiation Damage of Ion-irradiated High Entropy Ceramics: Kun Wang; Yonggang Yan; Di Chen
1Alfred University

9:20 AM
Phonon Broadening in High Entropy Ceramic Carbide: Linu Malakhar; Kaustubh Bawane; Cody Dennet; Zilong Hua; Lingfeng He; Yongfeng Lu; Bai Cui
1Idaho National Laboratory; 2Commonwealth Fusion Systems; 3University of Nebraska-Lincoln

9:40 AM Invited
A Physics-Based Cluster Dynamics Model of Radiation-Enhanced Growth of Oxides: Aaron Kohnert; Edward Holby; Aimita Banerjee; Shivani Srivastava; Mark Asta; Blas Uberuaga; Los Alamos National Laboratory; 2IIT Jodhpur; 3University of California, Berkeley

10:10 AM Break

10:30 AM Invited
Characterization of Radiation Effects in Ceramics with Spallation Neutron Probes: Maik Lang; 1University of Tennessee

11:00 AM
Corrosion of SiC in Molten Salt and Liquid Lead: Huali Wu; Jinsuo Zhang
1Virginia Polytechnic Institute and State University

11:20 AM
Characterizing Effects of Aging Bismuth Laden Sorbents in NOx Atmosphere for Radiodiode Capture: Casey Elliott; Karthikeyan Baskaran; Muhammad Ali; Dave Cohrs; Brian Riley; Krista Carlson; 1University of Nevada Reno; 2PNNL

11:40 AM
Modeling Vibrational Modes in Raman Spectra of ThO2: Saqeeb Adnan; Joshua Ferrigno; Erika Nosal; Chao Jiang; Marat Khafizov; 1The Ohio State University; 2Idaho National Laboratory

NANOMATERIALS

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials — Energy Applications

Sponsored by: ACerS Basic Science Division, ACerS Electronics Division; ACerS Engineering Ceramics Division

Program Organizers: Hai Tao Zhang, University of North Carolina at Charlotte; Gurpreet Singh, Kansas State University; Kathy Lu, Virginia Polytechnic Institute and State University; Edward Gorzkowski, Naval Research Laboratory; Jian Shi, Renssleer Polytechnic University; Michael Naguib, Tulane University; Sanjay Mathur, University of Cologne

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Session Chairs: Gurpreet Singh, Kansas State University; Michael Naguib, Tulane University

8:00 AM Invited
An Axially Continuous Graphene-Copper Wire for Multifunctional Applications: Wonmo Kang; Hamzezhe Khashani; Chingwuan Kim; Christopher Rudolf; Keith Perkins; 1Arizona State University; 2Naval Research Laboratory

8:30 AM Invited
Controlled Synthesis of Robust Reusable Nanostructures for Thermal Management and Energy Efficiency: Sharmila Mukhopadhyay; 1University of Maine

9:00 AM
Synthesis of the Titanium Carbonitride MXenes and their Applications in Energy Storage: Anika Tabassum; Kun Liang; Ahmad Majed; Kaitlyn Prenger; Michael Naguib; 1Tulane University

9:20 AM
Role of Pre-Intercalation on the Electrochemical Performance of Ti3C2 MXene in Aqueous and Room Temperature Ionic Liquid Electrolyte (RTIL) Supercapacitors and in Sodium Ion Capacitors: Kaitlyn Prenger; Kun Liang; Alexander Brady; Michael Naguib; Robert Saccio; Hsii-Wen Wang; 1Tulane University; 2Oak Ridge National Laboratory
9:40 AM Invited  
Designing Atomically Precise Nanocatalysts for CO2 Electrochemical Reduction: Giannis Mpourmpakis; University of Pittsburgh

10:00 AM Break

10:30 AM  
Dopamine Assisted Phase Transformation and Electrochemical Charge Storage Properties of Vanadium Oxide/Carbon Composite Electrodes: Ryan Andris; Timofey Averianov; Ekaterina Pomerantseva; Drexel University

10:50 AM  
Computation-aided Developments of Highly Durable and Active Photoanodes and Electrocatalysts: Heechae Choi; University of Cologne

11:10 AM  
Towards the Synthesis of Semiconducting Materials for Photo(electro)catalysis in Energy Conversion: CO2 Reduction and CH4 Controlled Oxidation: Caue Ribeiro; Brazilian Agricultural Research Corporation - EMBRAPA

11:30 AM  
Synthesis of WO3-AgCl Thin Films for Application in Continuous Photocatalytic Microreactor: Priscila Hasse Palharim; Carla de Araújo Gusmão; Bruno Ramos; Antonio Carlos Silva Costa Teixeira; Universidade de São Paulo

11:50 AM  
Synthesis and Characterization of Copper Nanowire Array: Long Zhu; Fei Ren; Temple University

12:10 PM  
Development in Light Weight Alloys and Composites — Microstructure and Mechanical Properties

Sponsored by: TMS Composite Materials Committee, TMS Materials Characterization Committee

Program Organizers: Ramasis Goswami, Naval Research Laboratory; Nikhil Gupta, New York University; Aashish Rohatgi, Pacific Northwest National Laboratory; Tanjore Jayaraman, University of Michigan-Dearborn

Wednesday AM | October 12, 2022  
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Session Chairs: Ramachandra Canumalla, Weldaloy Specialty Processing; Nikhil Gupta, NYU

8:00 AM Invited  
Friction Stir Processing Based Local Microstructure Modification to Improve High-cycle Fatigue Properties of High-pressure Diecast Aluminum Alloy: Avik Samanta; Hirshikesh Das; Glenn Grant; Saumyadeep Jana; Pacific Northwest National Laboratory

8:30 AM  
Development of Hierarchical Aluminum-based Metal Matrix Composites Using Friction Extrusion: Rajib Kalsar; Benjamin Schuessler; Xiaolong Ma; Jens Darsell; Tianhao Wang; Sridhar Nivety; Lei Li; Ayoub Soulimi; Vineet Joshi; Pacific Northwest National Laboratory

8:50 AM  
Designing Al-Cu Alloy to Improve the Mechanical Properties and Thermal Stability via Micro-alloying with Cr Solute: Gihoon Moon; EunKyung Lee; Interdisciplinary Major of Maritime AI Convergence, Department of Ocean Advanced Materials Convergence Engineering, National Korea Maritime and Ocean University; National Korea Maritime and Ocean University

9:30 AM  
Recent Developments in Flux-Free Brazing of Aluminum Alloys: Andreas Kulovits; Harry Zonker; Michael Danz; Marvin Goins; Arconic

10:30 AM  
Solute Synergy Improved Thermal Stability of Nanotwinned Al Alloys: Nick Richter; Yifan Zhang; Mingyu Gong; Tongjun Niú; Bo Yang; Sichuang Xue; Jian Wang; Xinghang Zhang; Purdue University; Los Alamos National Laboratory; University of Nebraska-Lincoln; Pacific Northwest National Laboratory

10:50 AM  
The Effect of Graphene Nanosheets on Microstructure and Mechanical Properties of Aluminum A380 Nanocomposite Produced by Powder Metallurgy: Hanieh Sajjadpour; Mohammad Alipour; Tabriz University

8:00 AM Introductory Comments

8:10 AM Invited  
Structural Transformations Induced under Coupled Extreme Conditions: Malik Lang; University of Tennessee

8:40 AM Invited  
Characterization of Disordered Oxides with Neutron Total Scattering: Eric O’Quinn; University of Tennessee
9:10 AM Invited

In-Situ X-ray Absorption Spectroscopy of Actinide Speciation in Aqueous Fluids at Extreme Conditions: Robert Mayanovic1; Jason Baker1; Diwash Dhakal1; Nadib Akram1; Xiaofeng Guo1; Hakim Boukhalfa1; Cheng-Jun Sun1; Hongwu Xu2; Misouri State University; 1Los Alamos National Laboratory; 2Washington State University; 3Argonne National Laboratory

9:20 AM

A Thermodynamic and Properties Database for Permanent Magnetic Materials: Weiwei Zhang1; Paul Mason1; Thermo-Calc Software Inc.

9:40 AM Invited

Ab Initio Modeling of Ionic and Electronic Conductivity of La2NiO4+d Cathode Material for Solid Oxide Fuel Cell: Songge Yang1; Yu Zhong1; Worcester Polytechnic Institute

10:00 AM Break

10:20 AM

A Metal-insulator Transition in a Complex Oxide at T = 293K: Sepideh Akhbari1; Catholic University of America -Vitreous State Lab

10:40 AM Invited

Bandgap Engineering and Electrochemical Properties of Disordered LaFeO3 and Heterostructures: Uma Sharma1; Priyanka Jha1; Pardeep Jha1; Prabhakar Singh1; IIT (BHU) Varanasi

CERAMIC AND GLASS MATERIALS

Engineering Ceramics: Microstructure-Property-Performance Relations and Applications — Processing-Microstructure-Property Relations of Engineering Ceramics

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Young-Wook Kim, University of Seoul; Hua-Tay Lin, Guangdong University of Technology; Junichi Tatami, Yokohama National University; Michael Halbig, NASA Glenn Research Center

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Session Chairs: Yiquan Wu, Alfred University; Soshu Kirihara, Osaka University

8:00 AM Invited

Effect of Al Contained in Polymer Derived SiC Crystals on Creating Stable Crystal Grain Boundaries: Toshihiro Ishikawa1; Katsuya Niidome1; Rikoyama University of Science, Yamaguchi

8:30 AM Invited

Smart Powder Processing for High Performance Thermal Insulation Materials: Makio Naito1; Osaka University

9:00 AM Invited

Investigation of Local Mechanical Responses in Ceramic Materials Based on In Situ TEM Observations: Eita Tochigi1; The University of Tokyo

9:30 AM

Electrochemical Fabrication of Microstructure Engineered, Highly textured, Ultra-thick Ceramic Oxide Films for High Volumetric Energy Density Electrochemical Energy Storage: Arghya Patra1; Paul Braun1; University of Illinois Urbana Champaign

9:50 AM Break

10:10 AM

Porosity of Partially Sintered ZrB2 for Transpiration Cooling of Hypersonic Flight: Rowan Hedgecock1; Luc Vandeperre1; Imperial College London
10:30 AM
The Effects of Microstructure on the Properties of Reticulated Porous Ceramics: Jang-Hoon Ha; Jongman Lee; In-Hyuck Song; Korea Institute of Materials Science

10:50 AM
Fabrication of Porous Silica with Controllable Porosity via Freeze Casting: Mert Arslanoglu; Rahul Panat; Burak Oezdoganlar; Carnegie Mellon University

11:10 AM
Tin Oxide as a Model System for Sintering without Shrinkage – Monitoring Microstructure Evolution and Elastic Property Changes: Petra Simonova; Willi Pabst; Vojtech Necina; University of Chemistry and Technology, Prague

FUNDAMENTALS AND CHARACTERIZATION

Grain Boundaries, Interfaces, and Surfaces: Fundamental Structure-Property-Performance Relationships — Grain Growth

Sponsored by: ACerS Basic Science Division

Program Organizers: Shen Dillon, University of California, Irvine; Wolfgang Rheinheimer, Juelich Research Center; Catherine Bishop, University of Canterbury; Ming Tang, Rice University; John Blendell, Purdue University; Wayne Kaplan, Technion - Israel Institute Of Technology; Melissa Santala, Oregon State University

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Session Chair: To Be Announced

8:00 AM
Understanding the Microstructure and Migration Mechanisms of Terrace-defect Interfaces Using Multiscale Characterizing Methods: Jian Song; Yue Liu; Jian Wang; Shanghai Jiao Tong University; University of Nebraska-Lincoln

8:20 AM
In-situ TEM Observation on the Two Distinct Shear-coupled Migration Behaviors of One Mixed Grain Boundary: Zhengwu Fang; Scott Mao; Guoengfeng; University of Pittsburgh

8:40 AM
Migration Kinetics of Twinning Disconnections in Nanotwinned Cu: An In Situ HRTEM Deformation Study: Quan Li; Yue Liu; XiaoQin Zeng; Shanghai Jiao Tong University

9:00 AM Invited
Elucidating the Role of Grain Boundary Networks on Grain Growth in Textured Aluminia: Bryan Conry; Joel Harley; Michael Tonks; Michael Kesler; Amanda Krause; University of Florida; Oak Ridge National Laboratory

9:30 AM
Simulate Grain Growth with Machine Learning Techniques: Shaoxun Fan; Ming Tang; Fei Zhou; Rice University; Lawrence Livermore National Lab

10:00 AM Break

10:20 AM Invited
Thermodynamics vs Kinetics in Sintering and Grain Growth of Zirconia: Dopant Effects: Ricardo Castro; University of California, Davis

10:50 AM
Suppression of Abnormal Grain Growth in Alumina by Grain Boundary Engineering: Bryan Conry; Joel Harley; Michael Tonks; Michael Kesler; Amanda Krause; University of Florida; Oak Ridge National Laboratory

11:10 AM Invited
Learning the Grain Boundary Solute Drag Hypersurface: Fadi Abdeljawad; Malek Alkayyali; Clemson University

11:40 AM
Changes in the Energy of the Grain Boundary Network during Grain Growth in Polycrystals: Zipeng Xu; Robert Suter; Gregory Rohrer; Carnegie Mellon University

FUNDAMENTALS AND CHARACTERIZATION

High Entropy Materials: Concentrated Solid Solutions, Intermetallics, Ceramics, Functional Materials and Beyond III — Processing and Properties II

Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Yu Zhong, Worcester Polytechnic Institute; Michael Gao, National Energy Technology Laboratory; Xingbo Liu, West Virginia University; Peter Liaw, University of Tennessee; Jian Luo, University of California, San Diego; Yiquan Wu, Alfred University; Mitra Taheri, Johns Hopkins University; Amy Clarke, Colorado School of Mines

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Session Chairs: Hyoung Seop Kim, POSTECH; Zengbao Jiao, The Hong Kong Polytechnic University

8:00 AM Keynote
Exploring Properties and Relationships in High Entropy Alloys: David Shifler; Office of Naval Research

8:30 AM Invited
Grain Refinement and Nano-scale Precipitates in Non-equiatomic CoCrFeNiMo Medium-entropy Alloy: Hyong Seop Kim; Hyeonseok Kwon; Pohang University of Science and Technology

9:00 AM
Laser Welding of CoCrFeMnNi High Entropy Alloy to Inconel 718: Joao Oliveira; FCT-UNL

9:20 AM
Mechanical and Oxidation Behavior of HF-25Ta-5X Refractory Complex Concentrated Alloys: Eric Payton; Tinuade Daboiku; Satish Rao; Oleg Senkov; Air Force Research Laboratory

9:40 AM
Microstructural Characterization and Oxidation Resistance in Multi FCC Principal Element Alloys: Mckenna Hitter; Shailendra Varma; University of Texas at El Paso
3D Ink-extrusion Printing of CoCr(Cu)FeNi High-entropy Alloys Strengthened by Dual Precipitation: Jiaming Guo1; Zengbao Jiao1; 1The Hong Kong Polytechnic University

11:00 AM 3D Ink-extrusion Printing of CoCr(Cu)FeNi High-entropy: Dingchang Zhang1; Christoph Kenel1; David Dunand1; 1Northwestern University

11:40 AM High-temperature Oxidation and Mechanical Behavior of Ta-Ti-Cr Refractory Concentrated Alloys: Noah Welsh1; Maria Quintana1; Todd Butler2; Peter Collins1; 1Iowa State University; 2Air Force Research Laboratory, WPAFB

MATERIALS-ENVIRONMENT INTERACTIONS

High Temperature Oxidation of Metals and Ceramics — Environmental Barrier Coatings, Thermal Barrier Coatings, and Hypersonics

Sponsored by: TMS Corrosion and Environmental Effects Committee

Program Organizers: Kenneth Kane, Oak Ridge National Laboratory; Elizabeth Sooby, University of Texas at San Antonio; Patrick Brennan, General Electric Research; Lavina Backman, U.S. Naval Research Laboratory; Kingston, Oak Ridge National Laboratory; Richard Okeksak, National Energy Technology Laboratory; David Shiffer, Office of Naval Research; Reuben Reback, GE Global Research

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Session Chairs: Kingston, Oak Ridge National Laboratory; David Shiffer, Office of Naval Research

8:00 AM Invited Oxidation and Erosion Implications of CMAS on Environmental Barrier Coatings: Bryan Harder1; Kang Lee1; Michael Presby1; Benjamin Kowalski1; James Stokes1; John Setlock1; 1NASA Glenn Research Center; 2University of Toledo

8:30 AM Rare-earth Monosilicate Interactions with Calcium-magnesium Alumosilicate: Cameron Miller1; Elizabeth Opila1; 1University of Virginia

8:50 AM Investigating Fifth Oxide Effect on CMXAS Glass Properties: Clark Luckhardt1; Elizabeth Opila1; 1University of Virginia

FUNDAMENTALS AND CHARACTERIZATION

Inference-based Approaches for Material Discovery and Property Optimisation — Structure-Property Inference from Experiments

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee, TMS Chemistry and Physics of Materials Committee

Program Organizers: Felix Hofmann, University of Oxford; Michael Short, Massachusetts Institute of Technology; Cody Dement, Idaho National Laboratory; Mohamed Abdallah Reza, University Of Oxford; Daniel Mason, UK Atomic Energy Authority

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Session Chair: Felix Hofmann, University of Oxford

8:00 AM Introductory Comments

8:10 AM Invited Uncover Hidden Materials Properties with the Lens of Machine Learning: Mingda Li1; 1MIT

8:50 AM Comparing High-dose Simulated Irradiation in Tungsten to Experiments: Daniel Mason1; Max Boileininger1; Fredric Granberg2; Guanzhe He3; Felix Hofmann1; Sergei Dudarev2; 1UKAEA; 2University of Helsinki; 3Oxford University
9:10 AM Invited
Exploring the Evolution of Irradiation-induced Defects Through Their Energetic Signatures: Charles Hirst1; Fredric Granberg2; Boopathy Kombaiah3; Penghui Cao4; Scott Middelmas5; R. Scott Kemp5; Ju Li6; Kai Nordlund7; Michael Short1; 1University of Helsinki; 2University of Helsinki; 3University of Oxford; 4University of California, Irvine; 5University of South Carolina; 6Idaho National Laboratory; 7Massachusetts Institute of Technology

10:30 AM Multi-technique Characterisation of Ion-irradiation Effects on High-pressure-Torsion (HPT) Processed EUROFER-97: Kay Song1; Gregory Strangward-Pryce1; Abdallah Reza1; Guanze He1; David Yang1; Kenichiro Mizohata2; Felix Hofmann1; 1University of Oxford; 2University of Helsinki; 3University of Helsinki

10:50 AM Panel Discussion

MODELING

Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales IV — Session V

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee, TMS Materials Characterization Committee, TMS Nanomaterials Committee

Program Organizers: Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Levente Balogh, Queen’s University; Caizhi Zhou, University of South Carolina; Lei Gao, University of Nevada; Josh Kacher, Georgia Institute of Technology

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Session Chairs: Janelle Wharry, Purdue University; Ill Ryu, University of Texas at Dallas

8:00 AM Invited
Multi-scale and Multi-physical Model of Defect-driven Plasticity in Nanostructural Metals: Ill Ryu1; 1University of Texas at Dallas

8:30 AM
Influence of the Cross Slip Based Dynamic Recovery during Plane Strain Compression of Aluminium: Chaitali Patil1; Supriyo Chakraborty2; Stephen Nieszgod2; 1Ohio State University

8:50 AM
Atomistic Modeling of a Nano-precipitate Strengthened Alloy: Edwin Antillon1; Colin Stewart1; Noam Bernstein1; Michelle Johannes1; Richard Fonda1; Keith Knipling1; Patrick Callaham1; 1Naval Research Laboratory

9:10 AM
Atomistic Simulation of the Effect of Grains Misorientation on the Fatigue Nano-crack Growth in NiTi: Saeed Atollahi1; Mohammad J. Mahtabi1; 1University of Tennessee at Chattanooga

8:30 AM
Cold Sintering of Potassium Sodium Niobate, K0.5Na0.5NbO3: Koki Nakagawa1; Masato Iwasaki1; Clive A. Randall2; 1NGK Spark Plug Co.Ltd.; 2CEA

8:50 AM
Role of Processing and Microstructure on the Phase Transformation in High Entropy Oxides: Alexander Dupuy1; Julie Schoenung1; 1University of California, Irvine

9:30 AM
Leveraging Electron Microscopy to Inform Ab Initio Calculation: Deducing Surface Chemistry and Annealing Conditions from Equilibrium Tungsten Nanoparticle Shapes in Scandate Cathodes: MuJan Seif1; Xiaotao Liu2; John Balk3; Matthew Beck4; 1University of Kentucky

9:50 AM Break

10:10 AM Invited
Unexpected Deformation-Induced Martensitic Transformations in Ni-Cr Alloy 625: Janelle Wharry1; Caleb Clement2; Chao Yang3; 1Purdue University; 2MSE Supplies

10:40 AM
Interactions between Defects and Omega Phase in Ti via Molecular Dynamics and Phase Field Simulations: Khair Dang4; Darshan Banmney5; Carlos Tomè6; Laurent Capolungo7; 1Los Alamos National Laboratory

11:00 AM
Hybrid Ab Initio-machine Learning Simulation of Dislocation-defect Interactions: Petr Grigorev1; Alexandra Goryaeva2; James Kermode3; Mihai-Cosmin Marinica4; Thomas Swinburne5; 1Aix-Marseille Université / CNRS; 2CEA; 3University of Warwick; 4CNRS

11:20 AM Invited
Extended Core Structure of Planar Defects and Localized Phase Transformation in Crystalline Solids: Longsheng Feng1; Shakhipriya Baskar Kannan2; Ashton Egan3; Maryam Ghaziaei4; Mike Mills5; Yunzhi Wang6; 1Ohio State University

CERAMIC AND GLASS MATERIALS

Manufacturing and Processing of Advanced Ceramic Materials — Novel Processing of Oxide Ceramics I

Program Organizers: Bai Cui, University of Nebraska-Lincoln; James Hemrick, Oak Ridge National Laboratory; Mike Alexander, Allied Mineral Products; Eric Faierson, Quad City Manufacturing Laboratory/Western Illinois University; Keith DeCarlo, Blasch Precision Ceramics

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Session Chairs: Keith DeCarlo, Blasch Precision Ceramics; Fei Peng, Clemeson University

8:00 AM Invited
Fabrication and Microstructure Representation of Heterogeneous Gradient Complex Materials: Dongsheng Li1; Tom Maloney2; Seyed Niknam3; 1Advanced Manufacturing LLC; 2Skyre Inc; 3Western New England University

8:30 AM
Role of Processing and Microstructure on the Phase Transformation in High Entropy Oxides: Alexander Dupuy1; Julie Schoenung1; 1University of California, Irvine
9:10 AM
Development of CeO2 Stabilized ZrO2 Inks for DIW: Mia Kovac; Erin Koos; Jozef Vleugels; Annabel Braem; 1KU Leuven Department of Materials Engineering, Belgium; 2KU Leuven Department of Chemical Engineering, Belgium

9:30 AM Invited
Alumina-based Coatings for Metal-cutting Applications: Zhenyu Liu; 1Kennesetal Inc

10:00 AM Break

10:20 AM
Surface Area Reduction Behavior of Various Forming Methods of Alumina: Daniel Delia; William Carty; Hyojin Lee; 1Alfred University

10:40 AM
The Correlation of Mullite Formation in Porcelains with the Glass Formation Boundary: Hyojin Lee; William Carty; 1Alfred University

11:00 AM
Fabrication and Characterization of Dense Advanced Ceramic Coatings by Aerosol Deposition: Zhenying Yang; 1University of Toronto

ARTIFICIAL INTELLIGENCE

Materials Informatics for Images and Multi-dimensional Datasets — Session I

Sponsored by: ACerS Basic Science Division, ACerS Electronics Division

Program Organizers: Amanda Krause, Carnegie Mellon University; Alp Sehirlioglu, Case Western Reserve University; Daniel Ruscello, GE Research

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Session Chair: Amanda Krause, University of Florida

8:00 AM
FeCrAl Alloy Design Utilizing Literature, Experiments, High Throughput Characterization, and Machine Learning: Sandipp Krishnan Rav; Andrew Hoffman; Rajnikant Umretiya; Bojun Feng; Subhrajit Roychowdhury; Sayan Ghosh; Raul Rebak; 1GE Research

8:40 AM
Multimodal Data of Fatigue Fracture Surfaces for Analysis in a CNN: Katelyn Jones; Elizabeth Holm; Anthony Rollett; 1Carnegie Mellon University

9:00 AM
Establishing PSP Relationships with Microstructure Features Quantified Using Machine Learning: Joshua Stuchiner; 1NASA Glenn Research Center

9:20 AM
Machine Learning with Real-world Micrographs: A Study of Data Quality and Model Robustness: Xiaoling Zhong; Brian Gallagher; Keenan Eves; Emily Robertson; Terrell Mundhenk; Thomas Han; 1Lawrence Livermore National Laboratory

9:40 AM
Process-Structure-Property Relationships from Variational Autoencoders: Michael White; N.H. Govtham; Christopher Race; Philip Withers; Bikramjit Basu; 1University of Manchester; 2Indian Institute of Science

10:00 AM Break

10:20 AM
Polycrystal Graph Neural Network: Minyi Dai; Mehmet. Demirel; Xuanhan Liu; Yingyu Liang; Jia-Mian Hu; 1University of Wisconsin-Madison

10:40 AM
Automated Defect Identification for Tristructural Isotropic Fuels: Joseph Oncken; Nancy Lybeck; Jeffrey Phillips; Scott Niedzialek; Justin Coleman; 1Idaho National Laboratory; 2BWX Technologies

CERAMIC AND GLASS MATERIALS

Mesoscale Phenomena in Functional Polycrystals and Their Nanostructures — Electronic, Thermal and Optical Phenomena

Sponsored by: ACerS Electronics Division

Program Organizers: Serge Nakhmanson, University of Connecticut; Edward Gorzowski, Naval Research Laboratory; James Wollmershauser, U.S. Naval Research Laboratory; Seungbum Hong, KAIST; Javier Garay, UCSD; Pierre-Eymier Janolin, CentraleSupélec

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Session Chairs: Serge Nakhmanson, University of Connecticut; Edward Gorzowski, NRL; Javier Garay, UCSD

8:00 AM Keynote
A New Carbon Solid: Layered Amorphous Graphene — Its Structure, Cohesion and Space-projected Conductivity: Rajendra Thapa; Chinonso Ugwumadu; Kishor Nepal; Jason Tremblay; David Drabold; 1Ohio University

8:40 AM
Conduction in Aluminum with Graphite and Graphene Additives: Kishor Nepal; Chinonso Ugwumadu; Rajendra Thapa; Kashi Subedi; David Drabold; Keerti Kappagantula; 1Ohio University; 2Pacific NorthWest National Laboratory

9:00 AM
Structure, Charge Distribution and Electronic Transport Mechanism in Layered Amorphous Graphene: Rajendra Thapa; Chinonso Ugwumadu; Kishor Nepal; David Drabold; 1Ohio University

9:20 AM
Micro/Nanostructure Effects on Thermal Conductivity and Optical Light Transmission—Designing High Performance Laser Ceramics: Javier Garay; 1UCSD

9:40 AM Invited
Synthesis, Processing, and Properties of High Performance Lead Free Electro-optic Ceramics: Alexander Dupuy; Yasuhiro Kodera; Javier Garay; 1University of California, Irvine; 2University of California, San Diego
10:10 AM Break

10:30 AM Invited Fabrication and Properties of Multi-scale Architected Materials: Christopher Spadaccini; Lawrence Livermore National Laboratory

10:50 AM Invited Aerosol Deposition and Characterization of Complex Oxide Systems: Eric Patterson; Sara Mills; Heonjune Ryu; James Wollmershauser; Edward Gorzkowski; U.S. Naval Research Laboratory; ASEE Post Doc

11:10 AM Invited From Nanoparticles to Nanocrystalline Solids with New Functionalities: Thermoelectrics as a Case Study: Boris Feigelson; James Wollmershauser; Kevin Anderson; Benjamin Greenberg; Alan Jacobs; US Naval Research Laboratory

11:40 AM Modeling Thermoelectric Properties of Polycrystalline Materials at Mesoscale: Dharma Raj Basaula; Mohamad Daepour; Lukasz Kuna; John Mangeri; Boris Feygelson; Sergei Nakhmanson; University of Connecticut; U.S. Naval Research Laboratory; Luxembourg Institute of Science and Technology

12:00 PM Polycrystal-inspired Stochastic Mechanical Modeling of Complex, Heterogeneous Porous Microstructures: Mujan Seif; Matthew Beck; University of Kentucky

NANOMATERIALS

Nanotechnology for Energy, Environment, Electronics, Healthcare and Industry — Session I

Program Organizers: Navin Manjooran, Chairman, Solve; Gary Pickrell, Virginia Tech

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Session Chairs: Gary Pickrell, Virginia Tech; Navin Manjooran, Chairman, Solve

8:00 AM Introductory Comments

8:40 AM 3D Metal Oxide Magnetic Nanostructures for The Design of Nanosensors and Magnetic Actuators: Ojodamo Achadu; University of Warwick

9:00 AM Antibacterial Action of Gold Nanoparticles Against Various Types of Bacteria: A Concise Review: Ikhuazuagbe Ifijen; Best Atoe; Bala Anegbe; Jacob Jacob; Ukeme Archibong; Oscar Aghedo; Rubber Research Institute of Nigeria; Atoe Specialist Medical Centre Limited; Federal University; University of Benin

9:20 AM Electromagnetic Interference (Emi) Shielding Features of Gum Arabic Emulsified Superparamagnetic Lightweight Natural Rubber Latex/Fe3O4 Nanocomposite: Stanley Omorogbe; Ikhuazuagbe Ifijen; Areguamen Aigbodion; Doreen O. Omorogbe; Joy Iyamu; Omotehinse Orimisan; Rubber Research Institute of Nigeria; FCT UNIVERSAL BASIC EDUCATION BOARD, ABUJA, MUSHOOD ABIOLA WAY AREA 2, SECTION 1.P.M.B163 GARIKI ABUJA; University of Benin; Paramount PC

9:40 AM Manganese Removal from Aqueous Effluents Using Manganese Dioxide as Nanoabsorbent: Orfelinda Avalo Cortez; Melina Guadalupe Paccini Ramos; Miguel Jaime Martinez Coronel; Universidad Nacional de Ingenieria

10:00 AM Break

10:20 AM Silicon Nanocrystals - A Potential Candidate for Flexible Solar Cells: Muhammad Atif Makhdoom; University of the Punjab

10:40 AM Ternary Oxides Based on Cobalt, Iron, Copper Nanoparticles for Supercapacitor Electrode: A Review: Ikhuazuagbe Ifijen; Muniratu Maliki; Ibrahim Danjuma; Esther Ikhuoria; Areguamen Aigbodion; Rubber Research Institute of Nigeria; Edo University; University of Benin

11:00 AM Fabrication of Flexible Nanocomposites Based on PVC, Electrical and Magnetic Nano Fillers for the Shielding Against Unwanted Electromagnetic Waves: HM Fayzan Shahir; Khadija Zubair; Tingkai Zhao; Northwestern Polytechnical University

11:20 AM Removal of Copper (II) and Lead (II) from Hydrometallurgical Effluent onto Cellulose Nanocomposites: Mechanistic and Artificial Neural Network Modeling: Musamba Banza; Hilary Rutto; Tumisang Seodieng; Vaal University of Technology

11:40 AM Concluding Comments

BIOMATERIALS

Next Generation Biomaterials — Next Generation Biomaterials IV

Sponsored by: ACerS Bioceramics Division

Program Organizers: Roger Narayan, University of North Carolina; Sanjiv Lalwani, Lynntech, Inc.

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Session Chairs: Russell Lee Leonard, University of Tennessee Space Institute; Annaliza Perez-Torres, University of Kentucky

8:00 AM Invited Stereolithographic Additive Manufacturing of Ceramic Dental Crowns: Soshu Kirihara; Osaka University
8:20 AM Invited
Using Glass Ceramics to Improve the Detective Quantum Efficiency of Indirect Flat Panel Detector Systems: Russell Leonard1; Emily Moore2; Austin Thomas3; Lino Costa4; Brian Canfield5; Adrian Howansky6; Anthony Lubinsky7; Jacqueline Johnson8; 1University of Tennessee Space Institute; 2Stony Brook University Hospital; 3SUNY Stony Brook

8:40 AM
Microstructural and Mechanical Characterization of Three-dimensional Porous Titanium Carbide Structures Fabricated by Powder Technology: Joaquin Villalba-Guevara1; Ena Athenea Aguilar-Reyes2; Carlos Alberto León-Patiño3; 1Universidad Michoacana de San Nicolás de Hidalgo

9:00 AM
Structural Analysis of Silver and Copper Substituted Hydroxyapatite for Biomedical Applications: Sierra Kucko1; Timothy Keenan1; 1Alfred University

9:20 AM
The Potential of Pig Waste and Cassava Peel Biochar Blend for the Degradation of Petroleum Hydrocarbon in Crude Oil Contaminated Soil: Ita Uwidia1; Osalodion Uwidia1; Uzuazor Eyibara1; 1University of Benin

9:40 AM
Microscopic Characterizations of Cross-linked Gelatin Electrospun Nanofibrous Scaffolds: Fang Zhou1; Tobias Hedkete2; Christian E H Schmelzer3; Juliana Martins de Souza e Silva4; 1Carl Zeiss Microscopy; 2Fraunhofer Institute for Microstructure of Materials and Systems; 3Institute of Physics, Martin Luther University Halle-Wittenberg

10:00 AM Break

10:20 AM
Understanding Proton Diffusion in Biocompatible Polymer Membranes: Gloria Bazargan1; Daniel Gunlycke2; 1NRC Research Associate, US Naval Research Laboratory; 2Chemistry Division, US Naval Research Laboratory

10:40 AM
Prediction of Biomechanical Response in Periprosthetic Bone of the Hip Joint Using Machine Learning Approach: A Surrogate to Finite Element Method: Gowtham Nimmal Haribabu1; Bikramjit Basu1; 1Indian Institute of Science

11:00 AM
Shear Stress Duration and Magnitude Dependent Cell Viability in 3D Bioprinting: Sourav Mandal1; Liesbet Geris2; 1University of Liège, KULeuven
MATERIALS-ENVIRONMENT INTERACTIONS

**Progressive Solutions to Improve Corrosion Resistance of Nuclear Waste Materials — Molecular Dynamics Simulations and Machine Learning for Glass Corrosion, Glass Design and Canisters Lifetime**

**Sponsored by:** TMS Corrosion and Environmental Effects Committee. TMS: Nuclear Materials Committee

**Program Organizers:** Madeleine Jordache, Stevens Institute of Technology; Gary Pickrell, Virginia Tech; Bai Cui, University of Nebraska-Lincoln

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**Session Chairs:** Madeleine Jordache, Stevens Institute of Technology; Bai Cui, University of Nebraska-Lincoln; Gary Pickrell, Virginia Tech

9:45 AM Introductory Comments

9:50 AM Environmental Cracking Lifetime Prediction through the Development of Pitting and SCC Models for Nuclear Waste Storage Casks: Sarah Blust1; James Burns2; 1University of Virginia

10:10 AM Impact of Irradiation on The Properties of Calcium Silicate Hydrate (CSH) Gel Layer Formed After Aqueous Corrosion of Borosilicate Glasses: Amreen Jan1; N M Anoop Krishnan1; 1Indian Institute of Technology Delhi

10:30 AM Invited Characterization of Hydrated Aluminosilicate Gel from Glass Corrosion: Reaction Mechanism, Structure and Properties from Reactive Molecular Dynamics: Jincheng Du1; 1University of North Texas

11:00 AM Invited Predicting the Long-term Durability of Nuclear Waste Immobilization Glasses using Machine Learning: Mathieu Bauchy1; 1University of California, Los Angeles

11:30 AM Invited Designing Glasses for Nuclear Waste Immobilization with Al and ML: N M Anoop Krishnan1; 1Indian Institute of Technology Delhi

BIOMATERIALS

**Society for Biomaterials: Biomaterial Applications — Dental and Orthopaedic Biomaterials**

**Program Organizers:** Jessica Jennings, University of Memphis; Guillermo Amee, Northwestern University; Danielle Benoit, University of Rochester; Jordon Gilmore, Clemson University

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**Session Chair:** Jordon Gilmore, Clemson University

8:00 AM Invited Silver Doped Titanium Oxide Layers for Improved Photocatalytic Activity and Potential Antibacterial Properties of Titanium Implants: Aya Ali1; Amol Janorkar1; Mary Marquart1; Jason Griggs1; Joel Bumgardner1; Michael Roach1; 1University of Mississippi Medical Center, 2University of Memphis

8:30 AM Biodegradable Ceramic Coating on Lithium-Aluminum-Zinc (LAZ) and Lithium- Zinc (LZ) Magnesium Alloys Using Micro-arc Oxidation: Prashant Kumta1; John Ohodnicki1; Abhijit Roy1; 1University of Pittsburgh

8:50 AM Novel Biodegradable Porous Magnesium Alloy Scaffolds for Critical Sized Calvarial Bone Defect Reconstruction: Prashant Kumta1; Abhijit Roy1; Mubin Aral1; Matthew Criado1; John Ohodnicki1; Fatih Zor2; Vijay Gorantla2; Alejandro Almarza2; MaCalus Hogan1; 1University of Pittsburgh, 2Wake Forest University

9:10 AM In Vitro Biochemical Analysis of Bioactive Glass Ionomer Cement (45S5) with Citric Acid as Setting Modifier: Muhammad Uddin1; 1DOW University of Health Sciences (DUHS)

9:30 AM Bioactive Polyelectrolyte Layer by Layer Assembled Corrosion Resistant Coatings on Surface Treated MgAZ31 Alloys: Prashant Kumta1; Sangeetha Kunjukunju1; John Ohodnicki1; Abhijit Roy1; Boeun Lee1; Joe Candiello1; 1University of Pittsburgh

9:50 AM Break

10:10 AM Nanometric-sized Zirconias with Better Compromise between Translucency, Mechanical Properties and Aging Resistance for Dental Applications: Erica Roitero1; Helen Reveron1; Laurent Gremillard1; Vincent Garnier1; Christian Ritzberger1; Jérôme Chevalier1; 1Institut National de Sciences Appliquées (INSA) de Lyon, 2Ivoclar Vivadent AG

10:30 AM Exploring the Potential of Strontium Substituted Amorphous Calcium Phosphate and Dicalcium Phosphate Dihydrate Based Hydroxyapatite Forming Bone Cement: Prashant Kumta1; John Ohodnicki1; Abhijit Roy1; 1University of Pittsburgh

10:50 AM Hydroxyapatite Loaded with 2-heptylcyclopropane-1-carboxylic Acid Inhibits S. Aureus Biofilm Formation: Emily Coleman1; Isabella Bianca Reaño1; Rachel Wiley1; Daniel Baker1; J. Amber Jennings1; 1The University of Memphis

11:10 AM Rapid Fire Posters
IRON AND STEEL (FERROUS ALLOYS)

Steels for Sustainable Development — Hydrogen & New Applications

Sponsored by: TMS Steels Committee

Program Organizers: Ian Zuazo, ArcelorMittal Global R&D - Industeel; Matthias Militzer, University of British Columbia; Jonathan Klemm-Toole, Colorado School of Mines; Kester Clarke, ASPPRC Colorado School of Mines

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Session Chairs: Ian Zuazo, ArcelorMittal Global R&D - Industeel; Jonathan Klemm-Toole, Colorado School of Mines

8:00 AM Invited
Probing Hydrogen-assisted Phase Transformations in Austenitic Stainless Steels Using Synchrotron X-ray Diffraction: Samantha Lawrence1; Rjeju Pokharel1; Bjorn Clausen1; Donald Brown1; John Carpenter1; Mary O'Brien1; Christopher San Marchi1; Los Alamos National Laboratory; Sandia National Laboratories

8:30 AM Invited
Microstructural Engineering of High Mn Duplex Steel to Achieve Low-cost, High-performance Solutions for Hydrogen Storage and Delivery: Yuran Kong1; Allison Kosberg1; Pawan Kathayat1; Lawrence Cho1; Kip Findley1; John Speer1; Colorado School of Mines

9:00 AM
Development of Evaluation Method of Low Alloy Steel in Hydror Measurement Using Concurrent Cathodic Hydrogen Charging: Yoshirho Nishihara1; Ayaka Nozaki1; Hiroshi Okano1; Shusaku Takagi1; JFE steel corporation

9:20 AM
Influence of C and N on Hydrogen Embrittlement in 17Cr-10Ni-6Mn Stable Austenitic Stainless Steel: Yeonggeun Cho1; Hyung-Jun Choi1; Sung-Joon Kim1; Postech

9:40 AM
Mechanical Property Alterations through Hydrogen Trapping by Nanocarbide Dispersions in Steels: Bahram Rocky1; Shrestha Rakish2; Chris Marchi2; Ryan Wilkerson2; Chris Weinberger2; Steve Daniweicz2; Gregory Thompson2; University of Alabama; Sandia National Laboratories (SNL); National Aeronautics and Space Administration (NASA); Colorado State University (CSU)

10:00 AM Break

10:20 AM Invited
Low-density, Medium-Mn Steels for Lightweighting: Influence of Al content on Microstructure and Tensile Properties: Tomas Scuseria1; Kelcey Garza1; Dean Pierce1; Jerry Arnold1; Amy Clarke1; Kester Clarke1; Colorado School of Mines; Cleveland-Cliffs; Oak Ridge National Laboratory

10:40 AM
Evaluation of Heavy Gauges 690 MPa-class Offshore Steel Racks Required in Modern Wind Turbine Installation Vessels: David Quidort1; Anne Higelin1; Aurélien Chaize1; Sophie Perret1; Jean-Christophe Milek1; INDUSTEEL FRANCE

11:00 AM
Maximizing Scrap Recycling by Designing Cu Tolerant Steel Compositions: Henry Geerlings5; Lionel Promel5; Amy Clarke5; Kester Clarke5; Jonah Klemm-Toole5; Sridhar Seetharaman5; Colorado School of Mines

11:20 AM
Suitability of 17-4 PH Stainless Steels as Choice Material for Compression Pumps Used in CCS (Carbon Capture And Storage) Systems: José Calderón Hernandez2; Caruline De Souza Carvalho Machado2; Hercilio Gomes de Melo2; Helio Goldenstein2; São Paulo University

NUCLEAR ENERGY

Tackling Structural Materials Challenges for Advanced Nuclear Reactors — Advanced Manufacturing

Sponsored by: TMS Corrosion and Environmental Effects Committee, TMS Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Miaomiao Jin, Pennsylvania State University; Xing Wang, Pennsylvania State University; Karim Ahmed, Texas A&M University; Jeremy Bischoff, Framatome; Adrien Couet, University of Wisconsin-Madison; Kevin Field, University of Michigan; Lingfeng He, North Carolina State University; Raul Rebak, GE Global Research

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Session Chair: To Be Announced

8:00 AM
Electrodeposition of Functionally Graded Interlayers for Enhanced Diverter/Heatsink Bonding for Fusion Reactors: Holly Garich1; Katherine Lee1; Brian Skinn1; Faraday Technology, Inc.

8:20 AM
ICME and ML Modeling Framework of U-10%wt Mo Fabrication Processes: Ayoub Soulami1; William Frazier1; Yucheng Fu1; Lei Li1; Kyoo Sil Choi1; Zhijie Xu1; Vineet Joshi1; Pacific Northwest National Laboratory

8:40 AM Invited
Heavy Ion Irradiation Response of an Additively Manufactured 316L Stainless Steel: Xinghang Zhang1; Zhongxia Shang1; Cuncai Fan1; Lin Shao1; Thomas Voisin1; Y Wang1; Purdue University; Texas A&M University; Lawrence Livermore National Lab; University of California, Los Angeles

9:10 AM
Progress Toward Additive Manufacturing of Ferritic-martensitic, In situ Tempered Steels for Nuclear Applications: Calvin Lear1; Todd Steckley1; Mehmet Topsakal1; Simerjeet Gill1; Thomas Lienert3; Stuart Maloy4; Los Alamos National Laboratory; Brookhaven National Laboratory; Optomec; Pacific Northwest National Laboratory

9:30 AM Invited
Structural Material Design for Power Plants Using Additive Manufacturing: Wei Xiong1; University of Pittsburgh
10:00 AM Break

10:20 AM Phase Field Modeling of Hot Isostatic Pressing for Joining of Dissimilar Metals: Albert Lin; Yongfeng Zhang; 1University of Wisconsin - Madison

10:40 AM Understanding of Alloying Additions for Design of Gas Atomization Reaction Synthesis Produced Oxide Dispersoid Strengthened Alloys: Emma Cockburn

11:00 AM Studying Microstructural Evolution in an Oxide Dispersion Strengthened 14YWT Ferritic Steel Tube Manufactured using SolidStir™ Technology: Shubhrodey Bhownik; Pranshul Varshney; Osman El Atwani; Stuart Maloy; Kumar Kandasamy; Nilesh Kumar; 1University of Alabama, Tuscaloosa; 2Los Alamos National Lab; 3Pacific Northwest National Lab; 4Enabled Engineering

11:20 AM Invited Neutron Irradiation Effects in PM-HIP Nuclear Structural Alloys: Janelle Wharry; Caleb Clement; Yangyang Zhao; Sri Sowmya Panuganti; Yu Lu; Yaqiao Wu; Donna Guillian; David Gandy; 1Purdue University; 2Boise State University; 3Idaho National Laboratory; 4Electric Power Research Institute

10:00 AM Break

10:20 AM Processing of Native Minerals and Glasses for Clay-based Ceramics: Jenna Sayler; Katrina Donovan; Jon Kellar; 1South Dakota School of Mines and Technology

10:35 AM Question and Answer Period

10:40 AM Invited Funding Undergraduate Research in Glass at Coe College: Steve Feller; Mario Affatigato; 1Coe College

11:00 AM Question and Answer Period

11:25 AM Question and Answer Period

10:55 AM Beyond The Laboratories - How to Create a Thriving Community Around Science: Mario Affatigato; Steve Feller; Caio Bragatto; 1Coe College; 2Washington State University

11:00 AM Question and Answer Period

11:05 AM Novel Ceramics and Glass Science Course built to Engage Undergraduate Students Using Simulations and Art: Julie Donnelly; Rashi Sharma; Casey Schwarz; Matilynn Lam; 1University of Central Florida; 2Urisinus College

11:25 AM Question and Answer Period

SPECIAL TOPICS

50 Years of Characterizing Structural Ceramics and Glasses: Recognizing the Contributions of George Quinn — Mechanical Testing & Design/Fractography & Failure Analysis

Sponsored by: ACerS

Program Organizers: Jeffrey Swab, Army Research Laboratory; Andrew Wereszczak, Oak Ridge National Laboratory

Wednesday PM | October 12, 2022
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Funding support provided by: Corning Inc., 3M, Orton, and Bomas

Session Chairs: Andrew Wereszczak, Oak Ridge National Laboratory; James Varner, Alfred University

2:00 PM Invited Fracture Mechanics Implications of Complex Contact Damage on Measured Strength of Glass: Amber Tremper; Anthony Furstoss; Camden Isenberg; G. Scott Glassemann; 1Corning, Inc

2:30 PM Invited Interpretation of Zerodur® Strength Data: Jonathan Salem; 1NASA GRC

3:00 PM Invited Fractal Analysis of Brittle Fracture and Crack Branching: John Mecholsky; Daniel DeLellis; Nicholas Mecholsky; 1University of Florida; 2Catholic University of America

3:30 PM Break

3:50 PM Invited Failure Analysis of Sub-ballistic Contact in Glass: Erick Van Duyn; Kody Bornstein; Camden Isenberg; Amber Tremper; Robert Burguess; Steven DeMartino; G. Scott Glassemann; 1Corning, Inc
4:20 PM Invited
Failure Analysis of a Large SiC Component: Kristin Breder; Eric Buchovecky; Ryan Koseski; Saint-Gobain

4:50 PM Invited
On the 3rd Edition of the NIST Guide to Fractography of Ceramics and Glasses: George Quinn; NIST

SPECIAL TOPICS

ACerS Robert B. Sosman Award Symposium: Advancing the Science of Materials for Extreme Environments — Session II

Sponsored by: ACerS Basic Science Division

Program Organizers: Yiquan Wu, Alfred University; Greg Hilmas, Missouri University of Science and Technology; Eric Wuchina, NSWCCD

Wednesday PM | October 12, 2022
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Session Chair: To Be Announced

2:00 PM Invited
Progress in Manufacturing Ultra-High Temperature Ceramic Matrix Composites (UHTCMCS): Jon Binner; University of Birmingham

2:30 PM Invited
Thermodynamic Assessment of Zr-B-C-O System Applied to Ultra High Temperature Ceramic Processing & Oxidation: Erica Corral; University of Arizona

3:00 PM Invited
Exploring Microstructural Complexity in UHTCs for New Heat Management Strategies Using Cost-Effective Manufacturing Approaches: Carolina Tallon; Virginia Polytechnic Institute

3:30 PM Break

3:50 PM Invited
High-entropy Transition Metal Diborides: Local Structure vs. Long-range Chemical Homogeneity: Frederic Monteverde; Mattia Gaboardi; ISTE-CNR; Elettra-Sincrotrone Trieste S.C.p.A.

4:20 PM Invited
High-entropy Rare-earth Zirconates for Thermal Barrier Coatings with Low Thermal Conductivity and Graceful Behavior during CMAS Corrosion: Guo-Jun Zhang; Donghua University

SPECIAL TOPICS

ACerS Robert B. Sosman Award Symposium: Advancing the Science of Materials for Extreme Environments — Sosman Presentation

Sponsored by: ACerS Basic Science Division

Program Organizers: Yiquan Wu, Alfred University; Greg Hilmas, Missouri University of Science and Technology; Eric Wuchina, NSWCCD

Wednesday PM | October 12, 2022
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Session Chair: To Be Announced

1:00 PM Invited
Advancing the Science of Materials for Extreme Environments: William Fahrenholtz; Missouri University of Science and Technology

EDUCATION

ACerS/TMS Emerging Faculty Symposium — Funding, Mentorship, and Growth as Faculty Members

Sponsored by: ACerS Education and Professional Development Council, TMS: Education Committee

Program Organizers: Ashley Hilmas, Air Force Research Laboratory; Tessa Davey, Tohoku University; Victoria Miller, University of Florida

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Session Chair: To Be Announced

2:00 PM Invited
Integrating Scientific Writing into Undergraduate Level Traditional Engineering Courses: Mengying Liu; Washington and Lee University

2:30 PM Invited
Funding, Mentoring and Broadening Participation: Opportunities and Pathways: Jonathan Madison; National Science Foundation

3:00 PM Invited
The STEM Ambassador Program: Engaging Materials Scientists with Public Groups – Where They Live, Work, Recreate, and Gather: Nalini Nadkarni; Andrew George; Sara Yeo; University of Utah

3:30 PM Break

3:50 PM Invited
Navigating the National Science Foundation - Tips for Early Career Faculty and Researchers: Alexis Lewis; National Science Foundation
ADDITIVE MANUFACTURING


Program Organizers: Jing Zhang, Indiana University – Purdue University Indianapolis; Brandon McWilliams, US Army Research Laboratory; Li Ma, Johns Hopkins University; Yeongil Jung, Changwon National University

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Session Chairs: Brandon McWilliams, CCDC Army Research Laboratory; Li Ma, Johns Hopkins University Applied Physics Laboratory; Yeon-Gil Jung, Changwon National University; Jing Zhang, Indiana University - Purdue University Indianapolis

2:00 PM
Tailoring Formation of TCP Phases during Additively Manufactured Inconel 625 by CALPHAD-based Simulations with Experimental Validations: Hui Sun1; Shun-Li Shang2; Shipin Qin3; Allison Beese4; Zi-Kui Liu5; 1The Pennsylvania State University; 2Align Technology

2:20 PM
Discrete Element Method Based Simulations of Metal Powder Pouring and Raking Processes in Additive Manufacturing: Michael Fazzino1; Ummay Habiba2; Rainer Hebert3; Serge Nakhmanson4; 1University of Connecticut

2:40 PM
Planar and Full-Process Modeling of the Powder-Bed Fusion Ti-6Al-4V Columnar-to-Equiaxed Transition Behavior: Brodan Richter1; Joshua Pribel2; George Weber1; Samuel Hacker1; 1National Aerospace and Space Administration; 2National Institute of Aerospace

3:00 PM
Powder Bed Packing Density Dependence on Particle Size Distribution: Simulation and Experimental Analysis: Ummay Habiba1; Michael Fazzino2; Serge Nakhmanson3; Rainer Hebert4; 1University of Connecticut

3:20 PM
Rapid Qualification of Wire Feed Direct Energy Deposition Process Builds Using ICME Approach: Amit Verma1; Andrew Huck2; Rajib Halder3; Anthony Rollett4; 1Carnegie Mellon University

3:40 PM
Towards Qualification and Certification of Laser Powder Bed Fusion Ti-6Al-4V with In-Situ Process Monitoring and Automated Defect Detection: Andrew Kitahara1; Samuel Hacker2; Brodan Richter3; Wesley Tayon4; Joseph Zalameda5; Edward Gaessler6; 1National Institute of Aerospace; 2NASA Langley Research Center

4:00 PM Break

4:20 PM
The Effect of the Process Environment on Gas and Particle Entrainment in Laser Powder Bed Fusion: Michael Stokes1; Saad Khairallah2; Alexey Volkov3; Alexander Rubenchik4; 1The University of Alabama; 2Lawrence Livermore National Laboratory

4:40 PM
Thermomechanical Modeling of Axisymmetric Geometries for Laser Hot Wire Additive Manufacturing: Elizabeth Chang-Davidson1; Brandon Abramovic2; Jack Beuth3; 1Carnegie Mellon University

5:00 PM
Studying Melt Pool Variation and Its Effects on the Formation of Porous Defects via GPU-based Process Simulation: David Anderson1; Chaitanya Vallabhi2; Shawn Hinnebusch3; Xiayun Zhao4; Albert To5; 1University of Pittsburgh

5:20 PM
Anticipating Build Risk of Complex Geometries Using Commercial Additive Manufacturing Simulation Tools: Adam Gershen1; Matthew Dantin2; Charles Fisher3; 1Naval Surface Warfare Center, Carderock Division

5:40 PM
In Situ Confocal Imaging and Quantification of Defects in Binder-Jet Printed (BJP) Steel Parts: Pooja Maurya1; P. Chris Pistorius1; 1Carnegie Mellon University

ADDITIVE MANUFACTURING


Sponsored by: ACerS Basic Science Division, ACerS Engineering Ceramics Division, ACerS Manufacturing Division

Program Organizers: Lei Chen, University of Michigan-Dearborn; Xuan Song, University of Iowa; Xiangyang Dong, Missouri University of Science and Technology; Yiquan Wu, Alfred University; Paolo Colombo, University of Padova; Rajendra Bordia, Clemson University; Long-Qing Chen, Pennsylvania State University

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Session Chair: Lei Chen, University of Michigan-Dearborn

2:00 PM
Rapid Three-dimensional Printing of High-resolution Piezoelectric Structures Using Micro-CLIP: Siying Liu1; Wenbo Wang2; Luyang Liu3; Xiangfan Chen4; 1Arizona State University

2:30 PM
Modeling and Monitoring of Thermal Accumulation During Laser Powder Bed Fusion of Cemented Carbides: Alex Gourley1; Edgar Mendoza1; Rejia Jayan2; Jack Beuth3; 1Carnegie Mellon University

2:50 PM
Exploration of the Underlying Space in Microscopic Images via Deep Learning for Additively Manufactured Piezoceramics: Wenhua Yang1; Zhuo Wang2; Tiannan Yang3; Li He4; Xuan Song5; Yucheng Liu6; 1University of Michigan-Dearborn; 2University of Michigan; 3Pennsylvania State University; 4University of Iowa; 5University of Iowa; 6South Dakota State University
3:10 PM
SLA-based Additive Manufacturing of 3D Structures with Surface Activated Silicone Carbide-polymer Composite: M. M. Towfiqur Rahman1; Ahmed El-Ghanam1; Erina Baynojr Joyee1; 1University of North Carolina at Charlotte

3:30 PM Break

3:50 PM
Influence of Laser Processing Parameters on Thermoelectric and Microstructural Properties of Bi2Te3: Saniya LeBlanc1; Eric Fodran2; Eric Barnes2; Cagri Oztan1; 1Georgia Washington University; 2Northrop Grumman

4:10 PM
Micro-Cold Spray: Effect of Particle Impact Velocity on SiC Film Morphology: Derek Davies1; Michael Gammage2; Michael Becker2; John Koto2; Desiderio Kovan1; 1University of Texas at Austin; 2CCDC DEVCOM Army Research Laboratory

4:30 PM
Oxidation Behavior of Additively Manufactured SiC-SiOC Composites: Machenzie Ridley1; Trevor Aguirre2; Corson Cramer2; 1Oak Ridge National Laboratory

4:50 PM
Structural Characterization of the 3D Printed Ceramic Composite Materials: Saja Al-ajrash; Charles Browning1; 1University of Dayton

ADDITIVE MANUFACTURING

Additive Manufacturing of High and Ultra-high Temperature Ceramics and Composites: Processing, Characterization and Testing — New Methods and Characterization

Sponsored by: ACerS Young Professionals Network

Program Organizers: Corson Cramer, Oak Ridge National Laboratory; Lisa Rueschhoff, Air Force Research Laboratory; Greg Hilmas, Missouri University of Science and Technology

Wednesday PM | October 12, 2022
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Session Chair: Lisa Rueschhoff, Air Force Research Laboratory

2:00 PM Invited
Heterogeneous Lattice Structure Ceramic-Refractory Metal Materials Created via Additive Manufacturing: David Mitchell1; Corson Cramer1; Trevor Aguirre1; Steven Bullock1; Christopher Ledford2; Michael Kirka1; Austin Schumacher1; 1Oak Ridge National Laboratory

2:30 PM Invited
Optimizing Functionally Graded ZrB2-Mo Components by Ceramic On-Demand Extrusion (CODE): Austin Martin1; Clare Sabata2; Jeremy Watts3; Gregory Hilmas2; Ming Leu4; Tieshu Huang5; 1Missouri University of Science and Technology; 2Kansas City National Security Campus, Honeywell Federal Manufacturing & Technologies

3:00 PM Invited
Laser-induced Slip Casting for Additive Manufacturing of Large Ceramic Components: Shawn Allan1; Yannik Zieger2; Martin Schwentenwein3; Johannes Homa4; 1Lithoz America LLC; 2Lithoz GmbH

3:30 PM Break

3:50 PM
In-Bath 3D Printing of Preceramic Polymers: Majid Minar1; 1Arizona State University

4:10 PM
Micro and Nanostructured Compositing Approaches to Green Body Strengthening of Polymer-Derived UHTC: Justin Hendrix2; Matthew Laskoski1; 1Naval Research Lab

4:30 PM
Oxidation Behavior of Additively Manufactured SiC-SiOC Composites: Machenzie Ridley1; Trevor Aguirre2; Corson Cramer2; 1Oak Ridge National Laboratory

4:50 PM
Structural Characterization of the 3D Printed Ceramic Composite Materials: Saja Al-ajrash; Charles Browning1; 1University of Dayton

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Other Materials

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Jurgen Eckert, Erich Schmid Institute of Materials Science; Zhi Wang, South China University of Technology

Wednesday PM | October 12, 2022
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Session Chair: To Be Announced

2:00 PM
Novel High-Manganese TRIP/TWIP Steel Wire Feedstocks for Use in Wire Arc Additive Manufacturing: Jamie McIntyre1; William Lansing1; Zhenzhen Yu3; Eric Lass4; Jon Klemm-Toole1; 1Colorado School of Mines; 4University of Tennessee Knoxville

2:20 PM
Parameter Exploration and Controlled Defect Studies in High Deposition Rate Wire Arc Directed Energy Deposition of 316L for Pressure Retaining Components: Luc Hagen1; Zhenzhen Yu3; Stephen Tate3; Jon Klemm-Toole1; 1Colorado School of Mines; 4Electric Power Research Institute

2:40 PM
Reduction in Shrinkage of Binder Jet Printed Large Stainless-Steel Parts Using Novel Metal Powders: Alex Paterson1; Kyle Myers2; Adam Bartel3; Austin Peters4; 1Desktop Metal / ExOne; 2Electric Power Research Institute

3:00 PM
Systematic Approach to Determining Ideal Process Parameters for Low Alloy Steels in Directed Energy Deposition: Jose Loli1; Bryan Webler1; Maarten De Boer1; Jack Beuth1; 1Carnegie Mellon University

3:20 PM Break

3:40 PM
Extraordinary Combination of Strength and Ductility in an Additively Manufactured Fe-based Medium Entropy Alloy through the In-Situ Formed Nanoprecipitate: Farahnaz Hatflang1; Eun Seong Kim1; Yoon-Uk Heo2; Hyoung Seop Kim2; 1Pohang University of Science and Technology

4:00 PM
Automated Serial Sectioning for Validation of X-ray Computed Tomography of Additively Manufactured Alloys: Veeraraghavan Sundar1; Griffin Jones2; Rachel Reed1; Jayme Keist1; 1UES Inc.; 2PSU / ARL
4:20 PM
On the Utility of Using Volumetric Energy Density for Microstructure and Defect Predictions in Laser Powder Bed Fusion Additive Manufacturing: Charles Smith1; Elias Roll1; Olivia DeNonno1; Matthew Schreiber1; Anthony Petrella1; Craig Brice1; Joy Gocket1; Amy Clarke1; Jonah Klemm-Toole1; 1Colorado School of Mines

Parametric Study of Additive Manufacturing Using Martian Regolith Metals Recovered with Ionic Liquids: Blake Stewart1; Haley Doude1; Shiraz Mujahid1; Eric Fox2; Jennifer Edmundson1; Morgan Abney3; Hongjoo Rhee1; 1Mississippi State University; 2Marshall Space Flight Center; 3Langley Research Center

5:00 PM
The Role of Nucleation in Determining the Microstructure Development in Rapidly Solidified Alloys: Nima Najafizadeh1; Yijia Gu1; 1Missouri University of Science and Technology

Tortuosity and Flow Characterization towards 3D Binder-Jet Printed N95 Mask Filter: Aaron Acierno1; Teddi Sedlar1; Erica Erickson1; Markus Chmielus1; 1University of Pittsburgh

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Processing and Characterization

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Jurgen Eckert, Erich Schmid Institute of Materials Science; Zhi Wang, South China University of Technology

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Session Chair: To Be Announced

2:00 PM
Laser Powder Bed Fusion Process: Effect of Laser Remelting/Scanning/Pulsing/Shaping: Prashanth Konda Gokuldoss1; Tallinn University of Technology

Design New Feedstock Materials for Additive Manufacturing Using a Commercial Alloy Powder Mixture: Daozheng Li1; Wei Xiong2; 1University of Pittsburgh

2:40 PM
High Power and Temperature In-situ Alloying of Metal Powder Blends via Laser Powder Bed Fusion: Federico Bosio1; Chinmay Phutela1; Aliya Alhammadi1; Nesma Aboulkhair1; 1Technology Innovation Institute

3:00 PM
Exceptional Ductility Induced by The Intrinsic Grain Boundary Engineering: Lin Gao1; Wenhao Lin1; Zhongshu Ren1; Ma Ji1; Tao Sun1; 1University of Virginia
Influence of Substrate Condition and Initial Residual Stresses on Wire Fed Electron Beam Additive Deposition: Fatih Sikan; Priti Wanjara; Javad Gholipour Baradari; Mathieu Brochu; 1McGill University; 1National Research Council Canada

Modelling the Additive Manufacturing of a Titanium-based Hip Implant: Lalshana Mohee; 1ANSYS Granta

Process Window Approach for Qualification of Laser Powder Bed Fusion: Anthony Rollett; Jack Beuth; John Lewandowski; Sneha Narra; Kenji Shimada; Craig Brice; Frank Medina; Ryan Wicker; Elizabeth Holm; Albert To; Kirk Rogers; Ayman Salem; 1Carnegie Mellon University; 1Case Western University; 1Colorado School of Mines; 1University of Texas El Paso; 1University of Pittsburgh; 1Barnes Global Advisors; 1Materials Resources LLC

Role of Build Orientation and Layers on Microstructure and Multi-scale Mechanical Properties of Wire Arc Additive Manufactured Commercially Pure Titanium: Tanaji Paul; Blanca Palacios; Tyler Dolmetsch; Cheng Zhang; Benjamin Boes; Arvind Agarwal; 1Florida International University

Spatially Resolving Structure-Behavior Relations in Additive Manufactured Adaptive Materials: Arnab Chatterjee; Reginald Hamilton; 1Penn State

Manipulating Fatigue Life in L-PBF with Contour Control: Christian Gobert; Austin Ngo; David Scannapieco; John Lewandowski; Jack Beuth; 1Carnegie Mellon University; 1Case Western Reserve University

In-situ Process Monitoring of Laser Powder Bed Fusion Using Thermionic Emission Detection: Aiden Martin; Philip DePond; John Fuller; Saad Khairallah; Justin Angus; Gabe Guss; Manyalibo Matthews; 1Lawrence Livermore National Laboratory

Real-time, High-speed and High-resolution Multi- and Hyperspectral Imaging of Powder Bed Fusion: Steven Storch; Mark Foster; Nathan Drenkov; Brendan Croom; Milad Alemmohammad; Christopher Stiles; Bobby Mueller; Michael Pekala; Mary Dafron; Ryan Carter; Dylan Madisetti; 1JHU/APL; 2Johns Hopkins University

Instrumenting an EOS M290 with a Smart Build-Plate: Adam Hehr; Mark Norfolk; Ben Stefanko; Jason Riley; Megan Bax; Plamen Petkov; Ryan Zvanut; Tristan Cullum; 1Fabrisonic LLC; 2Kansas City National Security Campus

Microstructure Control during Wire and Arc Additive Manufacturing: Joao Oliveira; 1FCT-UNL

Investigating the Use of In-situ Weld Pool Characteristics and Temperature Measurements for Monitoring Part Quality in Wire Arc Additive Manufacturing: Ryan Utz; Jack Beuth; Chris Pistorius; Sneha Narra; 1Carnegie Mellon University

Optimization of Laser Powder Bed Fusion AM through Process Gas Control: Jacque Berkson; Antonio Ramirez; 1The Ohio State University

Exploring Synchronized Dual Laser Scan Strategies for Increased Productivity of Laser Powder Bed Fusion: Lars Vanmunster; Tom Kerkhofs; Bey Vrancken; 1KU Leuven

Advanced Joining Technologies for Automotive Lightweight Structures — Resistance and Ultrasonic Spot Welding Plus (RSW & USW, etc.)

Sponsored by: ACerS Manufacturing Division, TMS Aluminum Committee

Program Organizers: Yan Huang, Brunel University London; Carla Barbatti, Constellium; Yingchun Chen, Dura Automotive Systems

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Session Chair: Paul Briskham, Atlas Copco IAS UK Ltd

Developing Unified Resistance Spot Welding Method for Reliable Joining of Similar and Dissimilar Automotive Lightweight Materials: Shanglu Yang; 1Shanghai Institute of Optics and Fine Mechanics

Dissimilar Metal Joining Using Ultrasonic Aided Spot Welding: Muhammad Atif Makhdoom; 1University of The Punjab

Integrating an Interlayer Technology Approach to Advanced Materials While Resistance Spot Welding: Liya Amanuel; Bryan Lara; Antonio Ramirez; 1The Ohio State University
3:20 PM
Fatigue Analyses of Dissimilar Aluminum-Steel Clinch Joints for Lightweight Construction: Lars Ewenz\textsuperscript{1}; Sebastian Schöne\textsuperscript{1}; Martina Zimmermann\textsuperscript{1}; \textsuperscript{1}TU Dresden

3:40 PM Break

4:00 PM
A Novel Approach to Determine Intermetallic Formation and Growth in the Aluminum-Iron System Using Resistance-based Diffusion Couples: Michael Eff\textsuperscript{1,2}; Wei Zhang\textsuperscript{3}; Jerry Gould\textsuperscript{4}; Antonio Ramirez\textsuperscript{5}; \textsuperscript{1,2,3}EWI; \textsuperscript{4}The Ohio State University; \textsuperscript{5}The Ohio State University

4:20 PM
Dissimilar Materials Welding between AA6061 and CFRP Utilizing Vaporizing Foil Actuator Welding: YuHyeong Jeong\textsuperscript{1}; Kyuchsul Jeong\textsuperscript{2}; Wonju Lee\textsuperscript{3}; Hyung-gyu Kim\textsuperscript{4}; Jonghun Yoon\textsuperscript{5}; \textsuperscript{1}Hanyang University

ARTIFICIAL INTELLIGENCE

AI for Big Data Problems in Advanced Imaging, Materials Modeling and Automated Synthesis — AI for Materials Design

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Mathew Cherukara, Argonne National Laboratory; Subramanian Sankaranarayanan, University of Illinois-Chicago; Badri Narayanan, University of Louisville

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Session Chairs: Mathew Cherukara, Argonne National Laboratory; Badri Narayanan, University of Louisville; Subramanian Sankaranarayanan, University of Illinois Chicago

2:00 PM
A Novel Training Methodology for Phase Segmentation of Steel Microstructures Using a Deep Learning Algorithm: Nikhil Chaurasia\textsuperscript{1}; Shikhari Jha\textsuperscript{2}; Sandeep Sangal\textsuperscript{3}; \textsuperscript{1}Indian Institute of Technology Kanpur

2:20 PM
Data-driven Search for Promising Intercalating Ions and Layered Materials for Metal-ion Batteries: Shayan Parida\textsuperscript{1}; C. Barry Carter\textsuperscript{2}; Awanish Mishra\textsuperscript{3}; Arthur Dobley\textsuperscript{4}; \textsuperscript{1}University of Connecticut; \textsuperscript{2}EaglePicher Technologies

2:40 PM
Hybrid GNN Approach to Industrial Time Series and IoT Applications: Atish Bocchi\textsuperscript{1}; \textsuperscript{1}SPSA DIGITAL

3:00 PM
Multi-property Graph Networks for Novel Materials Discovery: Alexander New\textsuperscript{1}; Nam Le\textsuperscript{2}; Michael Pekala\textsuperscript{1}; Kyle McElroy\textsuperscript{1}; Janna Domenico\textsuperscript{1}; Christine Piatko\textsuperscript{1}; Elizabeth Pogue\textsuperscript{1}; Tyrel McQueen\textsuperscript{1}; Christopher Stiles\textsuperscript{1}; \textsuperscript{1}Johns Hopkins University Applied Physics Laboratory; \textsuperscript{2}Johns Hopkins University

3:20 PM Break

3:40 PM
Rapid Metallic Alloy Development Leveraging Machine Learning: Nhon Vo\textsuperscript{1}; Ha Bui\textsuperscript{2}; \textsuperscript{1}NanoAL LLC; \textsuperscript{2}Amatrium Inc.
NUCLEAR ENERGY

Ceramics for a New Generation of Nuclear Energy Systems and Applications — Nuclear Waste Management

Sponsored by: TMS Nuclear Materials Committee, ACerS Energy Materials and Systems (EMSD) Division

Program Organizers: Ming Tang, Clemson University; Enrique Martinez Saez, Clemson University; Yongfeng Zhang, University of Wisconsin; Krista Carlson, University of Nevada, Reno; Yusai Katoh, Oak Ridge National Laboratory; Jean Paul Crocombe, CEA Saclay; Erolfi Kardoulaki, Los Alamos National Laboratory; Levi Gardner, Argonne National Laboratory; Jian Zhang, Xiamen University; Charmayne Lonergan, Pacific Northwest National Laboratory

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Session Chairs: Krista Carlson, University of Nevada, Reno; Jake Amoroso, Savannah River National Laboratory

2:00 PM Invited
Development of Novel TRU-containing Ceramics for Nuclear Waste Immobilization: Jake Amoroso1, Savannah River National Laboratory

2:30 PM Invited
Environmental Degradation of Ceramic Materials in Nuclear Energy Systems: Hwasung Yeom1, Kumar Sridharan1, University of Wisconsin Madison

3:00 PM
Single Component Variations in Glass Ceramic Waste Forms: Ryan Kissinger1, Lawrence Livermore National Laboratory

3:20 PM Break

3:40 PM Invited
Sulfur Retention of Low Activity Waste Glasses: Austin Stanfield1, Jake Amoroso2, Savannah River National Laboratory

4:10 PM
Bismuth Loaded Carbon Foam as an Effective Radio Iodine Sorbent: Karthikeyan Baskaran1, Casey Elliott1, Muhammad Ali1, Hamid Malik1, Brian Riley2, Krista Carlson1, University of Nevada, Reno; Pacific Northwest National Laboratory

4:30 PM
Synthesis and Characterization of Super Occluded LiCl-KCl in Zeolite-4A as a Chloride Salt Waste Form Intermediate: Allison Horward1, Krista Carlson2, Tae-Sic Yoo3, Guy Frederickson3, Mike Patterson3, Michael Simpson1, University of Utah; University of Nevada-Reno; Idaho National Laboratories

NANOMATERIALS

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials — Heterostructures & Polymer-Derived Ceramics

Sponsored by: ACerS Basic Science Division, ACerS Electronics Division, ACerS Engineering Ceramics Division

Program Organizers: Haitao Zhang, University of North Carolina at Charlotte; Gurpreet Singh, Kansas State University; Kathy Lu, Virginia Polytechnic Institute and State University; Edward Gorzkowski, Naval Research Laboratory; Jian Shi, Rensselaer Polytechnic Institute; Michael Nagliub, Tulane University; Sanjay Mathur, University of Cologne

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Session Chairs: Kathy Lu, Virginia Tech; Gurpreet Singh, Kansas State University

2:00 PM Invited
Bioceramic Cellular Solids: Structure, Mechanics, and Formation: Ling Li1, Virginia Polytechnic Institute

2:30 PM Invited
The Many Faces of “Free” Carbon in Polymer-Derived Ceramics: Peter Kroll1, University of Texas at Arlington

3:00 PM
Inquiry of SiOC Structural Evolution via Synchrotron X-ray and Reactive Force Field Simulation: Kathy Lu1, Yue Zhou1, Harrison Cheney1, Ni Yang1, Virginia Polytechnic Institute and State University

3:20 PM Break

3:40 PM
Building Better Lithium-ion Battery Anodes with Enhanced Capability and Cycling Efficiency Using MoSe2/SiOC Freestanding Structure: Sonjoy Dey1, Gurpreet Singh1, Kansas State University

4:00 PM
Using a Reactive Hydrogen Atmosphere to attain Polymer-Derived SiCN ceramics: Akshada Hande1, Peter Kroll1, University of Texas Arlington

4:20 PM
Non-hydrolytic Sol-gel Chemistry to Functional Hybrid Materials: Nicola Pinna1, Humboldt-Universitaet Zu Berlin

4:40 PM
Novel Carbyne based materials for Gas Sensing: Fabrication and Characterization: Mohamad-Anas Hejazi1, Osman Eksik2, Cigdem Tasdelen-Yücedag2, Caner Ulu2, Andrey Brigadin3, Alexander Lukin4, Levent Trabzon4, Istanbul Teknik University; Gebze Teknik University; Swissimpianti Sagl; Western-Caucasus Research Center
LIGHTWEIGHT ALLOYS

Development in Light Weight Alloys and Composites — Microstructure, Processing and Mechanical Properties

Sponsored by: TMS Composite Materials Committee, TMS Materials Characterization Committee

Program Organizers: Ramasis Goswami, Naval Research Laboratory; Nikhil Gupta, New York University; Aashish Rohatgi, Pacific Northwest National Laboratory; Tanjore Jayaraman, University of Michigan-Dearborn

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Session Chairs: Tanaji Paul, Florida International University; Aashish Rohatgi, PNNL

2:00 PM Tailoring Microstructure and Corrosion Behavior of an Al-Cu-Mg-Ni Alloy Varying Solidification Cooling Rate: Talita Vida1; Joyce Santos1; Adilson Rodrigues1; Noe Cheung2; Amauri Garcia3; Crystopher Brito4; 1State University of Sao Paulo; 2Federal Institute of Education, Science and Technology of Sao Paulo; 3University of Campinas

2:20 PM Influence of Alkaline Earth Metals on Structure Formation and Magnesium Alloys Properties: Volodymyr Tsyganov1; Vadim Shalomeev2; Sergei Sheyko3; 1Zaporizhzhia Polytechnic National University; 2Zaporizhzhia National University

2:40 PM Enhancing the Strength of Al-B4C Composites: Ramasis Goswami1; 1Naval Research Laboratory

3:00 PM The Effect of Si on Tungsten Aluminide Formation and Growth: Henry Young1; Raghavan Srinivasan2; Ammar Alyasari3; 1Wright State University; 2Middle Technical University

3:20 PM Investigation of the Residual Stress on AlSi10MnMg Alloy with Various Grain Size: Minjeong Jeon1; Eunkyung Lee1; 1Korea Maritime and Ocean University

3:40 PM Break

4:00 PM Self-assembly and In-situ X-ray Diffraction Characterization of Two-dimensional Ti3C2Tx MXene in Al Matrices for Additive Manufacturing: Brian Wyatt1; Babak Anasori2; 1Indiana University - Purdue University Indianapolis

4:20 PM Improving the Strength of AlCoCrNi Dual-phase High-entropy Alloy through Chemical Transformation: Zulfya Usmonova1; Nurislombek Mahkamjonkhajozoda1; Malikabonu Sobirova1; Jakhongir Bakhrov1; Elyorjon Jumaev1; 1New Uzbekistan University

CERAMIC AND GLASS MATERIALS

Dislocations in Ceramics: Processing, Structure, Mechanics, and Functionality — Dislocations in Ceramics: Mechanics and Functionality

Program Organizers: Xufei Fang, Technische Universität Darmstadt; Till Frömling, Technische Universität Darmstadt; Lukas Porz, Norwegian University of Science and Technology; Wolfgang Rheinheimer, Julich Research Center; Atsutomo Nakamura, Osaka University

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Session Chairs: Wolfgang Rheinheimer, Julich Research Center; Xufei Fang, Technische Universität Darmstadt

2:00 PM Invited In Situ Observation of Fracture Dominated by a Single Dislocation and Its Governing Mechanics: Takashi Sumigawa1; 1Kyoto University

2:30 PM Understanding and Engineering Dislocations in Oxides at Room Temperature: Xufei Fang1; 1Technische Universität Darmstadt

2:50 PM Effects of Light Illumination on the Dislocation-mediated Plasticity in Single-crystalline ZnO: Yan Li1; Xufei Fang2; Elta Tochigi3; Yu Oshima4; Katsuuyuki Matsunaga5; Atsutomu Nakamura6; 1Osaka University; 2Technical University of Darmstadt; 3The University of Tokyo; 4Nagoya University

3:10 PM Conceptual Framework for Dislocation Mechanics in Ceramics: Lukas Porz1; 1Norwegian University of Science and Technology

3:30 PM Break

3:50 PM Invited Atomistic and Multiscale Computational Analysis of the Connection between Dislocation Slip and Ionic Transport in Plastically Deformed Oxides: Liming Xiong1; 1Iowa State University

4:20 PM Charged Dislocations in Ionic Ceramics: Equilibrium and Kinetics: Edwin Garcia1; Vikrant Karra2; 1Purdue University; 2Indian Institute of Technology

4:40 PM Dislocation-Modified Photoelectric Properties of Oxide Ceramics: Mehrzad Soleimany1; Maximilian Kissel2; Lukas Porz2; Till Frömling3; Marin Alexe4; Jürgen Rödel5; 1Technical University of Darmstadt; 2Norwegian University of Science and Technology; 3University of Warwick
FUNDAMENTALS AND CHARACTERIZATION

Emergent Materials under Extremes and Decisive In Situ Characterizations — Extreme Conditions

Sponsored by: ACerS Basic Science Division

Program Organizers: Xiaofeng Guo, Washington State University; Hongwu Xu, Los Alamos National Laboratory; Xujie Lu, Center for High Pressure Science & Technology Advanced Research; Hua Zhou, Argonne National Laboratory; Judith Driscoll, University of Cambridge

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Session Chair: Xiaofeng Guo, Washington State University

2:00 PM Invited
In Situ Microstructural Characterization of Metallic Nuclear Fuels: Tiankai Yao1; Kaustubh Bawane 1; Sriram Vijayan 2; Amey Khanolkar 1; Fidelma Giulia Di Lemma 1; Lingfeng He1; 1Idaho National Laboratory; 2The Ohio State University

2:30 PM Invited
The Role of Anisotropic Diffusion on the Bubble/Void Superlattice Formation in Metals: Cheng Sun1; 1Idaho National Laboratory

3:00 PM Invited
Understanding Surface Radiation Damage in Concentrated Solid-Solution Alloys by Nanoindentation: Youxing Chen1; Liqiang Yang1; Yanwen Zhang2; Nan Li3; 1University of North Carolina at Charlotte; 2Oak Ridge National Laboratory; 3Los Alamos National Laboratory

3:30 PM Break

SUSTAINABILITY, ENERGY, AND THE ENVIRONMENT

Energy Materials for Sustainable Development — Thermal Conversion

Sponsored by: ACerS Energy Materials and Systems Division

Program Organizers: Krista Carlson, University of Nevada, Reno; Armin Feldhoff, Leibniz University Hannover; Kyle Brinkman, Clemson University; Eva Hemmer, University of Ottawa; Nikola Kanas, BioSense Institute; Kjell Wiik, Norwegian University of Science and Technology; Lei Zhuo, Virginia Tech; Joshua Tong, Clemson University; Danielle Benett, Institut National de la Recherche Scientifique; Katherine Develos-Bagarinoa, National Institute of Advanced Industrial Science and Technology; Soumi Chatterjee, Aditya Birla Science & Technology Company, Ltd

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Session Chairs: Jianhua Tong, Clemson University; Javier Garay, University of California San Diego

2:00 PM Thermoplastic Elastomers for High Performance Barocaloric Cooling: Naveen Weerasekera1; Kameswara Pavan Ajjarapu 1; Kavish Sudan1; Gamini Sumanasekera1; Kunal Kate1; Bikram Bhatia1; 1University of Louisville

2:20 PM Invited
Caloric Materials for New Heat-management Technologies: Dejvid Crešnar1; Matic Morgan1; Boštjan Zalar1; Samo Kralj2; Zdravko Kutnjak1; Gregor Skacej1; Brígita Rozic3; 1Jozef Stefan Institute; 2University of Maribor; 3University of Ljubljana

2:50 PM Invited
Electronic Structure Calculations of Materials Converting Energy: Thermoelectrics and Ion Batteries: Janusz Tobola1; Michal Rybski1; Kamil Kutorasinski1; Janina Molenda1; 1AGH University of Science and Technology

3:20 PM Break

3:40 PM The Development of a Machine Learning Guided Process for the Additive Manufacturing of Thermoelectric Materials: Connor Headley1; Roberto Herrera del Valle1; Ji Ma1; Prasanna Balachandran1; Vijiabaranthi Ponnambalami1; Saniya LeBlanc1; Dylan Kirsch1; Joshua Martin1; 1University of Virginia; 2George Washington University; 3National Institute of Standards and Technology

4:00 PM Thermoelectric Properties of Additively Manufactured Fe3Al2Si3: Babak Alinejad1; Amir Mostafaei1; 1Illinois Institute of Technology

4:20 PM Multi-Layer Numerical Modeling of Selective Laser Melting Based Additive Manufacturing of Thermoelectric Powders: Jagannath Suresh1; Lei Zuo1; 1Virginia Tech

4:40 PM Invited
Calcium Cobaltate Based Composite Ceramics for Thermoelectric Energy Harvesting: Armin Feldhoff1; Zhijun Zhao1; Mario Wolf1; Matthias Jakob1; Oliver Ockler1; Richard Hinterding1; 1Leibniz University Hannover; 2University of Leipzig
CERAMIC AND GLASS MATERIALS

**Engineering Ceramics: Microstructure-Property-Performance Relations and Applications — Properties and Applications of Engineering Ceramics and Composites**

*Sponsored by:* ACerS Engineering Ceramics Division

**Program Organizers:** Young-Wook Kim, University of Seoul; Hua-Tay Lin, Guangdong University of Technology; Junichi Tatami, Yokohama National University; Michael Halbig, NASA Glenn Research Center

**Wednesday PM | October 12, 2022**

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**Session Chair:** Michael Halbig, NASA

**2:00 PM**
Manufacturing and Performance of Grain Textured Piezoelectric Ceramics for Acoustic Applications: *Mark Fanton*; Joshua Fox; Beecher Watson; Christopher Eadie; Richard Meyer; Penn State University

**2:20 PM**
Development of Textured Piezoelectric Ceramics for High-bandwidth Applications: *Beecher Watson*; Mark Fanton; Richard Meyer; Penn State University

**2:40 PM**
Crack-path Formation in SiC/SiC Composites: *Zubaer Hossain*; University of Delaware

**3:00 PM**
Refractory Cements and Composites Materials Based on Them in System BaO-Al2O3-SiO2: *Nicholai Ilukha*; Kyiv University

**3:20 PM** Break

**3:40 PM**
Role of Electrostatic Potential Energy in Carbon Nanotube Strengthened Cement Paste: *Muhammad Azeem*; University of Sharjah

**4:00 PM**
Development of Process-Structure-Property-Performance Relationships for the Advancement of Hard Ceramics Employing FAST and HiPIMS: *Christopher DeSalle*; Caillin Ryan; Robert Slapikas; Ryan Sweny; Simon Divilov; Hagen Eckert; Corey Oses; Marco Esters; Stefano Curtarolo; Donald Brenner; William Fahrenholtz; Jon-Paul Maria; Cormac Toher; Eva Zurek; Douglas Wolfe; The Applied Research Laboratory at Penn State; Duke University; North Carolina State University; Missouri University of Science & Technology; Pennsylvania State University; University of Texas at Dallas; University at Buffalo

FUNDAMENTALS AND CHARACTERIZATION

**Grain Boundaries, Interfaces, and Surfaces: Fundamental Structure-Property-Performance Relationships — Processing and Microstructure**

*Sponsored by:* ACerS Basic Science Division

**Program Organizers:** Shen Dillon, University of California, Irvine; Wolfgang Rheinheimer, Julich Research Center; Catherine Bishop, University of Canterbury; Ming Tang, Rice University; John Blendell, Purdue University; Wayne Kaplan, Technion - Israel Institute Of Technology; Melissa Santala, Oregon State University

**Wednesday PM | October 12, 2022**

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**Session Chair:** To Be Announced

**2:00 PM Invited**
Measurements of 3D Microstructures to Determine Grain Boundary Velocities in Polycrystals: *Gregory Rohrer*; Carnegie Mellon University

**2:30 PM**
Grain Growth Study of Strontium Titanate: Comparison between High Energy X-ray Diffraction Microscopy and Simulation: *Vivekanand Muralikrishnan*; He Liu; Lin Yang; Robert Suter; Michael Tonks; Gregory Rohrer; Amanda Krause; University of Florida; Carnegie Mellon University

**2:50 PM Invited**
Characterizing Interface Diffusion Mechanisms in Al and Al-Si Alloys via Atomistic Simulations: *Ian Chesser*; Raj Koju; Yuri Mishin; George Mason University

**3:20 PM**
Grain Boundary Character and Relative Energy Distributions in Nanocrystalline Metallic Films: *Matthew Patrick*; Gregory Rohrer; Katayun Barmak; Columbia University; Carnegie Mellon University

**3:40 PM Break

**4:00 PM**
Blacklight Sintering of Ceramics: *Rheinheimer Wolfgang*; Lukas Porz; Michael Scherer; Lovro Fulanovic; Till Frömling; Jürgen Rödel; Olivier Guillou; Forschungszentrum Jülich; Norwegian University of Science and Technology; TU Darmstadt

**4:30 PM**
Prospects of Blacklight Sintering: Preliminary Considerations on Scaling and Energy Efficiency: *Lukas Porz*; Michael Scherer; Lovro Fulanovic; Till Frömling; Jürgen Rödel; Wolfgang Rheinheimer; Norwegian University of Science and Technology; Technical University of Darmstadt; Forschungszentrum Jülich GmbH

**4:50 PM**
Fundamental Structure-Property-Performance Relationships of Unidirectional Grain Boundaries, Interfaces, and Surfaces during SHS Processing: *Borys Sereda*; Iryna Kruhliak; Dmytro Sereda; Vitaliy Voloh; Dneprovsky State Technical University
FUNDAMENTALS AND CHARACTERIZATION

High Entropy Materials: Concentrated Solid Solutions, Intermetallics, Ceramics, Functional Materials and Beyond III — Materials Discovery and Design II & Theory and Modeling II

Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Yu Zhong, Worcester Polytechnic Institute; Michael Gao, National Energy Technology Laboratory; Xingbo Liu, West Virginia University; Peter Liaw, University of Tennessee; Jian Luo, University of California, San Diego; Yiqian Wu, Alfred University; Mitra Taheri, Johns Hopkins University; Amy Clarke, Colorado School of Mines

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Session Chairs: Prashant Singh, Ames Laboratory of US DOE; Mitra Taheri, JOHNS HOPKINS UNIVERSITY

2:00 PM Invited
Theory-guided Design of Refractory Alloys for Ultra-high-temperature Applications: Prashant Singh1; Gaoyuan Ouyang1; Matthew J Kramer1; Jun Cui1; Duane D Johnson1; 1Ames Laboratory

2:20 PM Invited
Composition-property Relationships in High-Entropy Boride Ceramics: Lun Feng1; William Fahrenholtz2; Gregory E. Hilmas3; 1Michigan University of Science and Technology

2:40 PM
Rational Design of Light-weight, Corrosion Resistant AlCrFeMnNi Steels for Structural Marine Applications: Jarrod Gesualdi1; Hojong Kim1; 1Pennsylvania State University

3:00 PM
Towards to an ICME Approach for the Discovery of the Lightweight High Entropy Alloys: Shengyen Li1; Jianliang Lin1; John Macha1; Mirella Vargas1; Michael Miller1; 1Southwest Research Institute

3:20 PM Break

3:40 PM
High-throughput Approach for Stacking Fault Energies in HEAs: Jize Zhang1; Yu Zhong1; 1Worcester Polytechnic Institute

4:00 PM
Investigation of Kinetics of Dislocation Glide during Low Cycle Fatigue of the Equiatomic CrMnFeCoNi High Entropy Alloy: Dayane Oliveira1; Easo George1; Jeffrey Gibeling1; 1University of California, Davis; 2Oak Ridge National Laboratory

4:20 PM
Thermodynamic Modelling and Simulation of Compositional Modulation in Ternary Medium Entropy Alloy: Saumya Jha1; Krishanu Biswas1; 1Indian Institute of Technology Kanpur

4:40 PM
Atomic Mobility Assessment of the fcc Ternary Co–Cr–Mn Alloy: Sri Pragna Pendem1; Nobufumi Uehshima1; Katsunari Oikawa1; 1Tohoku University

5:00 PM
Deformation Behavior of Nanocrystalline NbMoTaW, BCC High Entropy Alloy using Classical Molecular Dynamics Simulations: Abu Anand1; Chandra Singh1; 1University of Toronto

MATERIALS-ENVIRONMENT INTERACTIONS

High Temperature Oxidation of Metals and Ceramics — Oxidation of Ceramics and HEA/Refractory Alloys

Sponsored by: TMS Corrosion and Environmental Effects Committee

Program Organizers: Kenneth Kane, Oak Ridge National Laboratory; Elizabeth Sooby, University of Texas at San Antonio; Patrick Brennan, General Electric Research; Lavina Backman, U.S. Naval Research Laboratory; Kinga Ungoc, Oak Ridge National Laboratory; Richard Oleksak, National Energy Technology Laboratory; David Shifler, Office of Naval Research; Raul Rebak, GE Global Research

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Session Chair: Lavina Backman, Naval Research Laboratory

2:00 PM Invited
Alumina Forming MAX Phases: Current Status and Future Perspectives: Miladin Radovic1; Yexiao Chen1; DongGi Ha1; James Smialek2; Texas A&M University; 3ASM; 4NASA Glenn

2:30 PM
Design of Ultra-high Temperature Ceramics for Oxidation Resistance: Niquana Smith1; Elizabeth Opila1; 1University of Virginia

2:50 PM
High Temperature Oxidation Behavior of Ta vs TaC: Connor Stephens1; Elizabeth Opila1; 1University of Virginia

3:10 PM
Evaluating the Oxidation Behavior of 1300C Capable Nb-Si-based Alloys: Patrick Brennan1; Rebecca Casey1; Chen Shen1; Scott Oppenheimer1; Bernard Bewlay1; Akane Suzuki1; 1General Electric Research

3:30 PM Break

3:50 PM
High Temperature Oxidation Behavior of Equimolar NbTiZr: Charlotte Brandenburg1; David Beaudry1; Michael Waters1; Lauren Walters1; Elaf Anber1; Jean-Philippe Couznie1; Loic Perriere1; Mitra Taheri1; James Rondinelli1; Elizabeth Opila1; 1University of Virginia; 2Johns Hopkins University; 3Northwestern University; 4Institut de Chimie et des Matériaux Paris-Est

4:10 PM
Microstructure, High Temperature Oxidation and Mechanical Properties of Fe-Cr-Ni-Al Medium Entropy Alloy: Yu Jin Hong1; Kyu-Sik Kim1; Young-Sang Na1; Ka-Ram Lim1; Kee-Ahn Lee1; 1Inha University; 2Agency for Defense Development; 3Korea Institute of Materials Science

4:30 PM
Thermochemical Stability of High Entropy Rare Earth Oxide (HERO) Coatings for Refractory Alloys: Kristyn Ardrey1; Elizabeth Opila1; Patrick Hopkins1; Bicheng Zhou1; Prasanna Balachandran1; 1University of Virginia
4:50 PM
High-temperature Oxidation-resistant Mechanism of Refractory High Entropy Alloy: Kun Wang; Yonggang Yan; Alfred University

5:10 PM
A Computational Investigation of the Early Stages of Degradation of High Entropy Alloy Surfaces: Adib Samin; Tyler Dolezal; Air Force Institute of Technology

FUNDAMENTALS AND CHARACTERIZATION

Inference-based Approaches for Material Discovery and Property Optimisation — Structure-Property Inference from Simulations

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee, TMS Chemistry and Physics of Materials Committee

Program Organizers: Felix Hofmann, University of Oxford; Michael Short, Massachusetts Institute of Technology; Cody Dennett, Idaho National Laboratory; Mohamed Abdallah Reza, University Of Oxford; Daniel Mason, UK Atomic Energy Authority

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Session Chair: Michael Short, MIT

MODELLING

Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales IV — Session VI

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee, TMS Materials Characterization Committee, TMS: Nanomaterials Committee

Program Organizers: Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Levente Balogh, Queen’s University; Caizhi Zhou, University of South Carolina; Lei Cao, University of Nevada; Josh Kacher, Georgia Institute of Technology

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401 | David L. Lawrence Convention Center
Session Chairs: Marc De Graef, Carnegie Mellon University; Andrea Hodge, University of Southern California

2:00 PM Invited
Combinatorial Synthesis and High-throughput Characterization for Alloy Systems: Andrea Hodge; University of Southern California

2:30 PM
Third Generation Thermodynamic Modelling of the Ga-Mn-Ni System: Liangyan Hao; Wei Xiong; University of Pittsburgh

2:50 PM
Molecular Dynamics Analysis and Optimization of Ultra High Temperature Ceramic (UHTC) Compositions for Propulsion: Robert Slapikas; Anindya Ghoshal; Luis Bravo; Muthuvel Murugan; Ryan Mccowan; Patrick Albert; Justin Reiss; Petr Kolonin; Susan Sinnott; Douglas Wolfe; Penn State; U.S. Army Research Laboratory; Applied Research Laboratory, The Pennsylvania State University

3:10 PM
First-principles Study on Understanding Point Defects and Impurities in Aluminum: Cassidy Atkinson; Lesley Frame; Sanjeev Nayak; Pamir Alpay; University of Connecticut

3:30 PM Invited
Examination of Computed Aluminum Grain Boundary Structures and Interface Energies that Span the 5D Space of Crystallographic Character: Eric Homer; Gus Hart; Braxton Owens; Derek Hensley; Jay Spendlove; Lydia Serafin; Brigham Young University

4:00 PM Break

4:20 PM
Predictive Phase-field Modeling of Nucleation and Growth of B1 Precipitates during Aging of Mg-Nd Alloys: David Montiel; Stephen DeWitt; Qianying Shi; Zhihua Huang; Katsuyo Thornton; John Allison; University of Michigan

4:40 PM
Propagation of Uncertainty in Molecular Dynamic Simulations of Polycrystalline Nickel: Meizhong Lyu; Anqi Qiu; Elizabeth Holm; Carnegie Mellon University

5:00 PM Invited
CERAMIC AND GLASS MATERIALS

Manufacturing and Processing of Advanced Ceramic Materials — Novel Processing of Oxide Ceramics II

Program Organizers: Bai Cui, University of Nebraska-Lincoln; James Hemrick, Oak Ridge National Laboratory; Mike Alexander, Allied Mineral Products; Eric Faierson, Quad City Manufacturing Laboratory/ Western Illinois University; Keith DeCarlo, Blasch Precision Ceramics

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Session Chairs: Yan Chen, Oak Ridge National Lab; Chao Ma, Texas A&M

2:00 PM Invited
Neutron Scattering Visualizing Defects Generation and Structure Recovery in Ball-milled Spinel Oxide: Yan Chen1; Ke An1; 1Oak Ridge National Laboratory

2:30 PM
Characterization of Early Stage Sintering in Hydroxyapatite via Thermal Conductivity Measurements: Anne Leriche1; Benoit Nait-Al1; David Smith2; 1UPHF - LMCPA; 2IRCER

Investigation of Electrical Properties of BaTiO3-PEEK Composite Processed by Cold Sintering: Toshiki Obazaki1; Clive Randall2; 1KYOCERA Corporation; 2The Pennsylvania State University

3:00 PM
Thermal and Mechanical Properties of Freeze-tape Cast Derived Ceramic-metal Composites: Amanda Marotta1; Stephen Sofie2; 1Montana State University

3:30 PM Break

3:50 PM Invited
Ultrafast High Temperature Sintering of Ceramic Materials for High Temperature Applications: Hua Xie1; Ji-Cheng Zhao1; David Clarke2; Jian Luo3; Liangbing Hu1; 1University of Maryland, College Park; 2Harvard University; 3University of California San Diego

A Polyvinyl Pyrrolidone Based Binder for PZT Ceramics: Eric Neuman1; Emma MacLaughlin1; Catherine Colletti1; Jada Beltran1; 1Sandia National Laboratories

Preparation of BaTiO3 Composites by Cold Sintering Process: Tatsushi Nunokawa1; Clive Randall2; 1The Pennsylvania State University

Passive pH Control Using Ceramic Particles: Alicia Mayville1; William Carty1; 1New York State College of Ceramics at Alfred University

CERAMIC AND GLASS MATERIALS

Manufacturing and Processing of Advanced Ceramic Materials — Processing of Carbides, Borides, and Nitrides

Program Organizers: Bai Cui, University of Nebraska-Lincoln; James Hemrick, Oak Ridge National Laboratory; Mike Alexander, Allied Mineral Products; Eric Faierson, Quad City Manufacturing Laboratory/ Western Illinois University; Keith DeCarlo, Blasch Precision Ceramics

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Session Chairs: Surojit Gupta, University of North Dakota; Dongsheng Li, Advanced Manufacturing LLC

2:00 PM Invited
Current Progress in Synthesis and Design of Ternary Phases: Surojit Gupta1; 1University of North Dakota

Ultra-fast Densification of UHTC ZrB2: Santanu Mondal1; Juan Shiraishi2; Sreenivasulu Gollapudi3; Carolina Galdeano4; Jie-Fang Li5; Dwight Viehland6; 1Virginia Polytechnic Institute

Investigation of Lamination Approaches for SiC-filled Thermoplastic Polymer Blends: Olivia Brandt1; Rodrigo Orta2; Rodney Trice2; Jeffrey Youngblood4; 1Purdue University

The Optimization of Field Assisted Sintering Technology and Processing for Ultrahigh Temperature Ceramics for Extreme Environments: Patrick Albert1; Erik Furton2; Petr Kolonin3; Robert slapikas4; Allison Beese5; Douglas Wolfe6; 1The Pennsylvania State University; 2The Applied Research Laboratory at Penn State

3:30 PM Break

3:50 PM Development of Textured UHTC Borides Using Extremely Low Magnetic Fields: Juan Diego Shiraishi1; Ben Dilling2; Carolina Tallon3; 1Virginia Tech

4:10 PM
Densification and Phase Analysis of Zirconium Carbide Ceramics with Different Carbon Contents: Yue Zhou1; Jeremy Watts2; William Fahrenholtz3; Greg Hilmas4; 1Missouri University of Science and Technology
ARTIFICIAL INTELLIGENCE

Materials Informatics for Images and Multi-dimensional Datasets — Session II

Sponsored by: ACerS Basic Science Division, ACerS Electronics Division

Program Organizers: Amanda Krause, Carnegie Mellon University; Alp Sehirlioglu, Case Western Reserve University; Daniel Ruscitto, GE Research

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Session Chair: Amanda Krause, University of Florida

2:00 PM
Materials Data Science for Reliability: Data Handling
Laura Bruckman1; 1Case Western Reserve University

2:40 PM
Data-driven High-throughput Experimentation Using Combinatorial Material Science Methods and Machine Learning
Lars Banho1; Yury Lysogorskiy1; Phillip Maffettone2; Daniel Olds2; Ralf Drautz2; Alfred Ludwig2; 1Ruhr University Bochum; 2Brookhaven National Laboratory

3:20 PM
Break

3:40 PM
Neighborhood Maps for Discovery of Novel Materials in Reduced Dimensions Using Machine Learning
Suchismita Goswami1; V. Stanev2; H. Liang3; I. Takeuchi3; 1MEST; 2UMD

4:00 PM
Machine Learning Enabled Reproducible Data Analysis for Electron Microscopy
Xiaoting Zhong1; Nestor Zaluzec2; Yu Lin3; Jiadong Gong4; 1Lawrence Livermore National Laboratory; 2Argonne National Laboratory; 3QuesTek Innovations

4:20 PM
Computer Vision Applications in Materials Science and Engineering
Aroba Saleem1; Idris Jeelani1; 1University of Florida

4:40 PM
Combining Limited Image and Tabular Data to Understand Failure Modes in Metals
Jonathan Owens2; Andrew Detor1; Jason Parolini2; Daniel Ruscitto1; 1GE Global Research; 2GE Gas Power

CERAMIC AND GLASS MATERIALS

Mesoscale Phenomena in Functional Polycrystals and Their Nanostructures — Dielectric and Magnetic Phenomena

Sponsored by: ACerS Electronics Division

Program Organizers: Serge Nakhmanson, University of Connecticut; Edward Gorzkowski, Naval Research Laboratory; James Wollmershauser, U.S. Naval Research Laboratory; Seungbum Hong, KAIST; Javier Garay, UCSD; Pierre-Eymeric Janolin, CentraleSupélec

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Session Chairs: Seungbum Hong, KAIST; John Mangeri, LIST; James Wollmershauser, NRL

2:00 PM
Invited
Strain-induced Novel Quantum and Ionic Phenomena in Oxide Heterostructures
Honyung Lee1; 1Oak Ridge National Laboratory

2:30 PM
Invited
Optimization of Metal/Ferroelectric/Insulator/Semiconductor Capacitor Toward Reliable Gate Stacks of Field-effect-transistors
Min Hyuk Park1; 1Seoul National University

3:00 PM
Invited
Visualization of Polar Slush Structure in Relaxor Ferroelectrics by Angle-resolved Lateral PFM
Kanghyun Chu1

3:20 PM
Invited
Modeling the Relaxor Dielectric Dispersion of Ba(1-x)Sr(x)TiO3 with a Local Phase Field Method
Ashok Gurung1; S. Pamir Alpay1; Serge Nakhmanson1; 1University of Connecticut; 2Luxembourg Institute of Science and Technology

3:40 PM
Break

4:00 PM
Invited
Coupled Multiferroic Phase Field Models for BiFeO3: Domain Topologies and Order Parameter Dynamics
John Mangeri1; 1Luxembourg Institute of Science and Technology

4:30 PM
Invited
Mesoscale Magnetic Imaging of Functional Materials
Ilya Sochnikov2; Bochao Xu1; Joshua Bedard1; Jacob Franklin1; 1University of Connecticut

4:50 PM
Invited
Field-assisted Sintering of FeCo/MnZn Ferrite Core-Shell Structured Particles
Bowen Dong1; Haobo Wang2; Matthew Willard3; Gabriel Santillan4; Andrew Sherman3; 1Case Western Reserve University; 2Powdermet

5:10 PM
Invited
Supercrystals as Hybrid Nanostructured Materials with Tailored Mechanical and Magnetic Properties
Diletta Giuntini1; 1Eindhoven University of Technology
CERAMIC AND GLASS MATERIALS

Phase Transformations in Ceramics: Science and Applications — Session II

Program Organizers: Pankaj Sarin, Oklahoma State University; Scott Mccormack, University of California, Davis; Waltraud Kriven, University of Illinois at Urbana-Champaign; Theresa Davey, Tohoku University; Sanjay V. Khare, University of Toledo

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Session Chairs: Waltraud Kriven, University of Illinois at Urbana-Champaign; Pankaj Sarin, Oklahoma State University

2:00 PM
Microstructural Evolution of Single Crystal CoTi2O5: A Study Combining Experiment and Simulation: Junyan Zhang1; Connor McNamara1; Animesh Kundu1; Helen Chan1; Jeffrey Rickman1; 1Lehigh University

2:30 PM
Single Crystal Growth and Characterization of Magnetic Ceramics Using the Laser Heated Pedestal Growth Process: Edward Hoffman1; 1University of Pittsburgh

2:50 PM
Study Toward Size Dependent Solid State Phase Transition between \( \text{-WO}_3 \) and \( \text{e-WO}_3 \) via In Situ Cryogenic Raman Spectroscopy: Owen Abe1; Zanlin Qiu1; Zexu Chen1; Joerg Jinschek2; Pelagia-Irene Gouma1; 1Ohio State University; 2Denmark Technical University

MATERIALS-ENVIRONMENT INTERACTIONS

Progressive Solutions to Improve Corrosion Resistance of Nuclear Waste Materials — Thermal History Effects on Borosilicate Glasses and Glass Ceramics and Canisters Stress Corrosion Cracking Mitigation

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

Program Organizers: Madeleine Jordache, Stevens Institute of Technology; Gary Pickrell, Virginia Tech; Bai Cui, University of Nebraska-Lincoln

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Session Chairs: Madeleine Jordache, Stevens Institute of Technology; Bai Cui, University of Nebraska - Lincoln; Gary Pickrell, Virginia Tech

2:00 PM Introductory Comments

2:05 PM Invited
SCC of Nuclear Waste Canisters: Mechanisms and Mitigation: Janelle Wharry1; Haozheng Qu1; Timothy Montoya4; Jason Taylor4; Kyle Johnson6; Rebecca Schaller4; Eric Schindelholz2; 1Purdue University; 2Sandia National Laboratories; 4VRC Metal Systems; 6The Ohio State University

2:25 PM Invited
From Preferential Bonding to Phase Separation in Boro-silicate Glasses: Doris Mönche1; 1Alfred University

2:55 PM Invited
Microstructural Development and Chemical Durability of a Borosilicate Glass-ceramic Waste-form: Richard Brow1; Nicholas Roberts3; Paul Porter3; Jarrod Crum3; 1Missouri University of Science and Technology; 3Pacific Northwest National Lab

IRON AND STEEL (FERROUS ALLOYS)

Steels for Sustainable Development — Renewables & Power Generation

Sponsored by: TMS Steels Committee

Program Organizers: Ian Zuazo, ArcelorMittal Global R&D - Industeel; Matthias Militzer, University of British Columbia; Jonah Klemm-Toole, Colorado School of Mines; Kester Clarke, ASPPRC Colorado School of Mines

Wednesday PM | October 12, 2022
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Session Chairs: Ian Zuazo, ArcelorMittal Global R&D - Industeel; Kester Clarke, Colorado School of Mines

2:00 PM Invited
Steel Developments for the Global Energy Transition: Andrew Gingell1; Sylvain Pillot1; 1Industeel

2:30 PM Invited
The Essence of Mo and Ni Alloying in Steels for Renewable Power Generation: Hardy Mohrbacher1; 1NiobelCon bvba

3:00 PM
Exploring the Impact of N Solubility and Trace Elements on the Creep Properties of P92 Steel: Stoitchko Antonov1; Martin Detrois1; Paul Jablonski1; 1National Energy Technology Laboratory

3:20 PM
Cyclic Deformation and Strain Localization of Ferrite-pearlite Low Alloy Steel under Low-cycle Fatigue: Shutong Zhang1; Rafael Arthur Giorjao1; Jacque Berksen1; Antonio J. Ramirez1; 1Ohio State University

3:40 PM Break

4:00 PM
Through Thickness Microstructural Features for Optimum Ductility Performance in High Pressure Gaseous Hydrogen Pipelines: Douglas Stalheim1; Andrew Stilka2; Aaron Litschewski2; 1DGS Metallurgical Solutions, Inc.; 2NIST; 3CBMM North America

4:20 PM
Effects of Austenitizing Temperature on the Mechanical Properties of Nano-structured Bainitic Steel: Bharesh Chhajed1; Kushal Mishra1; Kritika Singh1; Aparna Singh1; 1Indian Institute of Technology Mumbai; 1Helmholtz Zentrum

4:40 PM
Corrosion Assessments of P91 Under Partial Upgrading of Bitumen: Xue Han1; Yimin Zeng1; 1CanmetMATERIALS/Natural Resources Canada
FUNDAMENTALS AND CHARACTERIZATION


Sponsored by: ACerS Basic Science Division

Program Organizers: Lan Li, Boise State University; Winnie Wong-Ng, National Institute of Standards and Technology; Kevin Huang, University of South Carolina

Wednesday PM | October 12, 2022
334 | David L. Lawrence Convention Center

Session Chair: Lan Li, Boise State University

2:00 PM Invited
Hybrid Pore Formation in Microporous Cu Spheres: Mark Atwater¹; Braden Jones²; ¹Liberty University

2:20 PM
Effect of Nanoparticle Size on the Mechanical Properties of Nanoparticle Assemblies: Gang Feng¹; Lu An²; ¹Villanova University

2:40 PM
Investigating the Effect of the Aspect Ratio on the Elasticity of a Porous Material: Naji Mashrafi¹; Matthew Beck¹; ¹University of Kentucky

3:00 PM
Development and Application of a Multi-scale Simulation Toolkit to Model Fibrous Materials Properties: Adnan Taqi¹; Matthew Beck¹; ¹University of Kentucky

3:20 PM Break

3:40 PM
Scalable Metamaterial Synthesis via Colloidal Assembly: Bradley Straka¹; Haydn Wadley¹; ¹The University of Virginia

4:00 PM
Numerical Simulation for Optimization of the Density Distribution of Insulated Pipe in the District Heat Pipe Network: Van Doi Truong¹; Hyung-kyu Kim¹; Jooyong Kim¹; Hae-Yong Lee¹; Jonghun Yoon¹; ¹Hanyang University; ²Frontier Research & Training Institute, Korea District Heating Corporation (KDHC); ³BK21 FOUR ERICA-ACE Center, Hanyang University

NUCLEAR ENERGY

Tackling Structural Materials Challenges for Advanced Nuclear Reactors — Mechanical Behaviors

Sponsored by: TMS Corrosion and Environmental Effects Committee, TMS Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Miaomiao Jin, Pennsylvania State University; Xing Wang, Pennsylvania State University; Karim Ahmed, Texas A&M University; Jeremy Bischoff, Framatome; Adrien Couet, University of Wisconsin-Madison; Kevin Field, University of Michigan; Lingfeng He, North Carolina State University; Raul Rebak, GE Global Research

Wednesday PM | October 12, 2022
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Session Chair: To Be Announced

2:00 PM
Deformation Behaviour of Ion-irradiated FeCr – A Nanoindentation Study: Kay Song¹; Hongbing Yu²; Phani Karamched³; Kenichiro Mizohata³; David Armstrong³; Felix Hofmann¹; ¹University Of Oxford; ²Canadian Nuclear Laboratories; ³University of Helsinki

2:20 PM Invited
Mechanical Behavior of Additively Manufactured Steels with Monotonic and Graded Microstructures: Thak Sang Byun¹; Maxim Gussev¹; Timothy Lach¹; ¹Oak Ridge National Laboratory

2:50 PM Invited
Computer Modeling of Oxidation-induced Grain Boundary Embrittlement in Nickel: Ziqi Xiao¹; Xian-Ming Bai¹; ¹Virginia Polytechnic Institute and State University

3:20 PM Break

3:40 PM
Influence of Interface and Pre-Existing Damage in Strain and Defect Evolution in Irradiated HCP and BCC Materials Subjected to Thermo-mechanical Loads and Irradiation: the Role of Microstructure: Laurent Capolungo¹; Arul Kumar¹; Andrea Rovinelli¹; Ricardo Lebensohn¹; ¹Los Alamos National Laboratory

4:30 PM Invited
Microplasticity of Irradiated Inhomogeneous Alloys: Anter El-Azab¹; Yash Pachaury¹; ¹Purdue University

5:00 PM
Influence of Interface and Pre-Existing Damage in Strain and Defect Evolution in Irradiated HCP and BCC Materials: Nabil Daghboj¹; Huseyin Sener¹; Mauro Callisti²; Miroslav Karlik²; Tomas Polcar²; ¹Czech Technical University in Prague; ²Cambridge University
**POSTER SESSION**
with Presenters

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<td>Poster Installation</td>
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<td><strong>Monday, October 10</strong></td>
<td>Poster Installation (if you cannot set-up your poster on Sunday)</td>
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<td>General Poster Removal</td>
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SUSTAINABILITY, ENERGY, AND THE ENVIRONMENT

14th Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing — Poster Session

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Surojit Gupta, University of North Dakota; Mritunjay Singh, Ohio Aerospace Institute; Tatsuki Ohji, National Institute of Advanced Industrial Science and Technology; Hisayuki Suematu, Nagaoka University of Technology; Enrico Bernardo, University of Padova; Rajiv Asthana, University of Wisconsin; Yiquan Wu, Alfred University; Zhengyi Fu, Wuhan University of Technology; Allen Apblett, Oklahoma State University

Monday PM | October 10, 2022
Ballroom B | David L. Lawrence Convention Center

Trash to Treasure - Utilization of Electronic Waste as Precursors in Advanced Technologies: Anurag Bajpai1; Chandra Tiwary1; Krishanu Biswas1; 1IIT Kanpur

A Review of Minerals for Design of Sustainable Materials: Surojit Gupta1; 1University of North Dakota

A Review on the Utilization of Fly Ash: Arshdeep Kang1; 1TIET

Adapting the Shape Section to Improve the Structural Performance of Ribbed and Sandwich Lightweight Reinforced Concrete Slabs: Taif Khasro1; Ashraf Alfeehan1; 1Mustansiriyah University

Characterization of a Natural Mixed Fibers Functional Groups by Infrared Spectroscopy: Frederico Margem1; João Dornelas1; 1Uniredentor

Compressive and Microstructure of Alkali Activated Groundnut Shell Ash Containing Metakaolin: Usman Muazu1; Jamilu Usman1; Adejo Adejo Jecob1; 1Federal Polytechnic, Kaura Namoda; 2Ahmadu Bello University, Zaria; 3Ahmadu Bello University, Zaria

Effect of Sodium Silicate/ Sodium Hydroxide Ratio on Compressive Strength and Microstructure of Kankara Metakolin Based Geopolymer: Jacob Adejo1; Usman Muazu1; Jamilu Usman1; 1Ahmadu Bello University; 2Kaura Namoda Polytechnic

Enhancing the Mechanical Properties of Concrete with Partial Replacement of Fine Aggregate with Waste Glass and Coarse Aggregate with Waste Tyre: Olasehinde Stephen1; Clement Gonah1; Adele Garkida1; Yusuf Amartey1; 1Ahmadu Bello University, Zaria; 2Kaduna State

Evaluation of Dewatering Behavior of Alumina Green Body by a Combined OCT/TG/FT-IR System and Thermomechanical Analysis: Mariko Minami1; Junichi Tatami1; Motoyuki Iijima1; 1Yokohama National University

Fabrication of Blue-light Emitted and Transparent Lu0.25SiAlON:Ce3+ Ceramics: Kohei Aminaka1; Junichi Tatami1; Motoyuki Iijima1; Takuma Takahashi1; 1Yokohama National University; 2Kanagawa Institute of Industrial Science and Technology

Fly Ash Bricks: An Ecofriendly Construction Material, Its Properties and Uses in Different Environmental Areas (A Review): Manpreet Chahal1; Onkar Sidhu1; 1Village Ghamoor ghat PO Rampura Gujran; 2Punjabi University, Patiala

Green Synthesis of ZnO Nanoparticles Using Lemongrass Extract and Measurement of Their Antibacterial Activities: Tjokorde Samadhi1; Vita Wonoputri1; David Widagdo1; Selli Astuti1; 1Faculty of Industrial Technology, Institut Teknologi Bandung

Influence of Glass Waste Filler on the Density and Flame Retardant Properties of Sawdust Reinforced Composite Ceiling Board: Kator Jomboh1; Andrew Adejo1; Adele Garkida1; 1University of Maiduguri, Borno State; 2Federal University of Lafia, Nigeria; 3Ahmadu Bello University, Zaria

Purification of an Indigenous Barite Mineral for Sustainability of Operation in the Nigerian Oil and Gas Industries: Alafara Baba1; Abdul Alabi1; Fausat Akanji1; 1University of Ilorin; 2Kwara State University, Malete; 3SHEDA Science and Technology Complex

Recovery of Rare Earth Elements from e-waste Using EDTA Functionalized Chitosan: Shruti Srivastava1; Anurag Bajpai1; Krishanu Biswas1; 1IIT Kanpur

Solar Energy Sizing for an Irrigation System for Field Maintenance: Frederico Margem1; Daniel Gallo1; Pablo da Silva1; Jefferson Matheus Lopes1; 1Uniredentor

Sustainable Waste Processing Through Modular Anaerobic Digestion: Dylan Lew1; 1Ecotone Renewables

BIOMATERIALS

3D Printing of Biomaterials and Devices — Poster Session

Sponsored by: ACerS Bioceramic Division

Program Organizers: Sahar Vahabzadeh, Northern Illinois University; Susmita Bose, Washington State University; Amit Bandyopadhyay, Washington State University; Mukesha Kumar, LincoTek Medical; Mangal Roy, Indian Institute of Technology - Kharagpur (IIT-Kgp)

Monday PM | October 10, 2022
Ballroom B | David L. Lawrence Convention Center

Surface Treatment of Titanium by Alkali treatment and Magnesium Deposition for Orthopedic Application: Sahar Vahabzadeh1; Dexter Kling1; Paige Bothwell1; 1Northern Illinois University
ADDITIVE MANUFACTURING

Additive Manufacturing and Cellular/Lattice Structures: Designs, Realization and Applications — Poster Session

Sponsored by: TMS Additive Manufacturing Committee, TMS Materials Characterization Committee

Program Organizers: Li Yang, University of Louisville; Allison Beese, Pennsylvania State University; John Carpenter, Los Alamos National Laboratory; Carolyn Seepersad, University of Texas at Austin; Miguel Agullo, Morphon LLC

Monday PM | October 10, 2022
Ballroom B | David L. Lawrence Convention Center

Cytotoxicity of Strontium Calcium Polyphosphate on MC3T3-E1 Cells in 3D Printed Alginate/Collagen Scaffolds: Sally Lee; Serin Ahn; Chris Mathew; Abdulkhali Badran; Shebin Tharakan; Shams Khondkar; Michael Hadjiargyrou; Azhar Ilyas; New York Institute of Technology

ADDITIVE MANUFACTURING


Program Organizers: Jing Zhang, Indiana University – Purdue University Indianapolis; Brandon McWilliams, US Army Research Laboratory; Li Ma, Johns Hopkins University; Yeongil Jung, Changwon National University

Monday PM | October 10, 2022
Ballroom B | David L. Lawrence Convention Center

Session Chairs: Yeon-Gil Jung, Changwon National University; Li Ma, Johns Hopkins University; Brandon McWilliams, CCDC Army Research Laboratory; Jing Zhang, Indiana University – Purdue University Indianapolis

A Data-driven Approach to Identify Structural Characteristics that Connect Macroscale Material Properties: Matthew Beck; Mir Al-Masud; Ryan Griffith; Naji Mashrafi; University of Kentucky

Computational Fluid Dynamics Data-driven Heat Source Model for Finite Element Process Simulation in Laser Powder Bed Fusion Additive Manufacturing: Seth Strayer; Florian Dugast; Albert To; University of Pittsburgh

Corrosion and Mechanical Properties of Additively Manufactured 316L Stainless Steel Coated with Epoxy: Xuehui Yang; Francisco Rodriguez; Hyun-Hee Choi; Yeon-Gil Jung; Alan Jones; Jing Zhang; Indiana University – Purdue University Indianapolis; Changwon National University

Design and Mechanical Properties of 3D Printed Bioinspired Honeycomb Structures: Francisco Rodriguez; Jing Zhang; Indiana University – Purdue University Indianapolis

Development a Customized Inkjet 3D Printer for Ceramic Component Fabrication: Haoyee Yeong; Zhen Hong Tan; Aizat Zazlan; Ben Louie Yap; Jing Zhang; Indiana University – Purdue University Indianapolis

Fabrication and Characterizations of 3D Printed Lithium-Ion Battery Electrodes: Eli Kindomba; Jing Zhang; Indiana University – Purdue University Indianapolis

Layerwise Thermal Process Simulation for Laser Powder Bed Fusion: Calibration and Validation with Infrared Camera: Shawn Hinnebusch; Alaa Oleak; Christopher Barrett; Seth Strayer; Florian Dugast; Albert To; University of Pittsburgh; Open Additive, LLC

Modeling of Fatigue Behavior of 3D Printed Polycrystal Metals: Sanhet Kulkarni; Jing Zhang; Indiana University – Purdue University Indianapolis

Reducing the Order of a Kinetic Monte Carlo Potts Solidification Model with Machine Learning: Gregory Wong; Anthony Rollett; Gregory Rohrer; Carnegie Mellon University

Smoothed Particle Hydrodynamics Modeling of Charpy Impact Test of A36 Steel: Sugrim Sagar; Jing Zhang; Indiana University – Purdue University Indianapolis

Thermal Barrier Coating with Additively Manufactured Nickel Base Superalloy Substrate: Tejesh Dube; Junseong Kim; Yeon-Gil Jung; Jing Zhang; Indiana University – Purdue University Indianapolis; Changwon National University

Utilizing Virtual Reality to Help Educate Additive Manufacturing: Josh Hole; Shambhuraj Wadhule; Jing Zhang; Indiana University – Purdue University Indianapolis

ADDITIVE MANUFACTURING


Sponsored by: ACerS Basic Science Division, ACerS Engineering Ceramics Division, ACerS Manufacturing Division

Program Organizers: Lei Chen, University of Michigan-Dearborn; Xuan Song, University of Iowa; Xiangyang Dong, Missouri University of Science and Technology; Yiquan Wu, Alfred University; Paolo Colombo, University of Padova; Rajendra Bordia, Clemson University; Long-Qing Chen, Pennsylvania State University

Monday PM | October 10, 2022
Ballroom B | David L. Lawrence Convention Center

Session Chair: Lei Chen, University of Michigan-Dearborn

Direct Writing of Textured Ceramic Materials: Matthew Michie; Jacob Schlessier; Eric Dupuis; NSWC Crane

Evaluation of Reliability of Using Combined Rheological Methods for the Development of Ceramic Materials for 3D Printing: Francisco Lima; Heitor Bernardo; Valdecir Guarion; Roberto Cesar Oliveira Romano; Rafael Pileggi; University of Sao Paulo; Instituto de Pesquisas Tecnológicas

Sponsored by: TMS Additive Manufacturing Committee, TMS Materials Characterization Committee

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Utilizing Virtual Reality to Help Educate Additive Manufacturing: Josh Hole; Shambhuraj Wadhule; Jing Zhang; Indiana University – Purdue University Indianapolis

ADDITIVE MANUFACTURING


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Utilizing Virtual Reality to Help Educate Additive Manufacturing: Josh Hole; Shambhuraj Wadhule; Jing Zhang; Indiana University – Purdue University Indianapolis

ADDITIVE MANUFACTURING


Sponsored by: ACerS Basic Science Division, ACerS Engineering Ceramics Division, ACerS Manufacturing Division

Program Organizers: Lei Chen, University of Michigan-Dearborn; Xuan Song, University of Iowa; Xiangyang Dong, Missouri University of Science and Technology; Yiquan Wu, Alfred University; Paolo Colombo, University of Padova; Rajendra Bordia, Clemson University; Long-Qing Chen, Pennsylvania State University

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Nanomechanical Characterization of 3D Printed Ceramics: Bryan Regan1; Shuhan Zhang1; Nicole Ross2; Nicholas Voellm2; Ryan Fordham2; Shawn Allan2; Udo Schwarz2; Amit Datye1; 1Yale University; 2Lithoz

Rheological Study of 3D Printable All-inorganic Thermoelectric Inks for Direct Writing of Micro-thermoelectric Generator: Han Gi Chae1; 1Ulsan National Institute of Science and Technology

ADDITIVE MANUFACTURING

Additive Manufacturing of Titanium-based Materials: Processing, Microstructure and Material Properties — Poster Session

Program Organizers: Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University

Monday PM | October 10, 2022
Ballroom B | David L. Lawrence Convention Center

Characteristics of Ti-6Al-4V Component Fabricated by Laser Powder Bed Fusion Process: Youngil Son1; Seok-Jae Lee2; 1Advanced Propulsion Technology Center, Agency for Defense Development; 2Jeonbuk National University

Linking Processing Conditions to Defect Structures, Microstructure, and Mechanical Behavior in Ti-6Al-4V Fabricated by Laser Powder Bed Fusion: Qixiang Luo1; Allison Beese1; 1Pennsylvania State University

ADDITIVE MANUFACTURING

Additive Manufacturing: Equipment, Instrumentation and In-Situ Process Monitoring — Poster Session

Sponsored by: TMS Additive Manufacturing Committee

Program Organizers: Ulf Ackelid, Freemelt AB; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Ola Harrysson, North Carolina State University

Monday PM | October 10, 2022
Ballroom B | David L. Lawrence Convention Center

Development of an IEP Apparatus for 3D Printing of Thermoelectric Material: Weixiao Gao1; Fei Ren1; 1Temple University

In-process Microstructure Sensing of Gr91 Powder Bed Fusion Parts Using Ultrasonics: Nathan Kizer1; Christopher Kube1; Edward Reutzel1; Corey Dickman1; 1Penn State University

Real-time Process Monitoring for Multivariate Statistical Process Control in Powder Bed Fusion Metal Additive Manufacturing: Venkatavaradan Sunderarajan1; Suman Das1; 1Georgia Institute of Technology

PROCESSING AND MANUFACTURING

Advanced Joining Technologies for Automotive Lightweight Structures — Poster Session

Sponsored by: ACerS Manufacturing Division, TMS Aluminum Committee

Program Organizers: Yan Huang, Brunel University London; Carla Barbatti, Constellium; Yingchun Chen, Dura Automotive Systems

Monday PM | October 10, 2022
Ballroom B | David L. Lawrence Convention Center

Development of a Process Signal Based Self-piercing Rivet Joint Quality Prediction Model Using CNN: Mingyu Kim1; Taehyun Lee2; Seungwhan Lee3; Donghyuck Kam1; 1Korea Institute of Industrial Technology; 2Hanyang University

Optimization of Joining HDPE Rods by Continuous Drive Friction Welding: Mohammed Tashkandi1; Nidhal Becheikh1; 1Northern Border University

MATERIALS-ENVIRONMENT INTERACTIONS

Advanced Materials for Harsh Environments — Poster Session

Sponsored by: ACerS Electronics Division

Program Organizers: Navin Manjooran, Chairman, Solve; Gary Pickrell, Virginia Tech

Monday PM | October 10, 2022
Ballroom B | David L. Lawrence Convention Center

Session Chairs: Gary Pickrell, Virginia Tech; Navin Manjooran, Chairman, Solve

Heat-Resistant Nickel Alloy 3- Modification with Titanium Carbide Ultrafine Powders: Vladimir Klochikhin1; Sergey Danilov1; Dmytro Tomkin1; Valeriy Naumyk2; 1JSC Motor Sich; 2NU Zaporizhzhya Polytechnic

Modeling of High-efficiency Heat Exchanger Pipe with Twisted Tape Inserts: Kshitija Salvi1; Jing Zhang1; 1Indiana University – Purdue University Indianapolis

Rhenium Free Heat-resistant Monocrystalline Nickel Alloy Development: Evgeniy Milonin1; Valeriy Naumyk2; Pavel Malinovskiy1; 1JSC Motor Sich; 2NU Zaporizhzhya Polytechnic
IRON AND STEEL (FERROUS ALLOYS)

Advancements in Steel Structural Refinement — Poster Session

**Sponsored by:** AIST Metallurgy — Processing, Products & Applications Technology Committee

**Program Organizers:** Emmanuel De Moor, Colorado School of Mines; Jose Rodriguez-Ibabe, CEIT and TECNUN; Charles Enloe, CBMM North America

**Monday PM | October 10, 2022**

Ballroom B | David L. Lawrence Convention Center

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Secondary Hardening and Tempering Kinetics in a Medium-carbon-low Alloy Cr-Mo Steel: Perla Díaz-Villaseñor; Octavio Vázquez-Gómez; Edgar López-Martínez; Pedro García-González; Héctor Vergara-Hernández; Tecnológico Nacional de México / I.T. Morelia; Universidad del Istmo

Study on Strength and Toughness Matching of 1000 MPa Ultra-high Strength Steel: Xuewei Zhang; State Key Laboratory for Advanced Metals and Materials, University of Science and Technology Beijing

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CERAMIC AND GLASS MATERIALS

Advances in Dielectric Materials and Electronic Devices — Poster Session

**Sponsored by:** ACerS Electronics Division

**Program Organizers:** Amar Bhalla, University of Texas; Ruyan Guo, University of Texas at San Antonio; Rick Ubic, Boise State University; Matjaž Spreitzer, Jožef Stefan Institute

**Monday PM | October 10, 2022**

Ballroom B | David L. Lawrence Convention Center

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Electrical Characterization of Vanadium and Yttrium Co-Doped BaTiO3: Andrew Aumen; Elizabeth Dickey; Carnegie Mellon University

Fabrication of a Pressure Sensor Using Inkjet Printed Metal-organic Frameworks and Interdigitated Electrodes: Melinda Duong; Sean Garnsey; Paul Flynn; Amar Bhalla; Ruyan Guo; University of Texas at San Antonio

Nanoscale Dipole Engineering of Barium Titanate Using Dysprosium-Tantalum and Holmium-Tantalum Dipoles: Victoria Pellegrino; Steven Tidrow; Alfred University

Neural Network Design for Video Based Automation of Drop-on-Demand Inkjet Drop Formation Optimization: Maximilian Estrada; Ruyan Guo; Amar Bhalla; Sean Garnsey; Paul Flynn; Wasim Dipon; Matthew Trippy; Melinda Duong; Carlos Acosta; Bryan Gamboa; Max Estrada

Structural and Dielectric Properties Relationship in Strontium-Tantalum Based Oxide Ceramics for DRA applications: Matthew Julian; Mouad Barzani; Mohamad Haydoura; Ratiba Benzerqa; Laurent Le Gendre; Ala Sharaiha; Francois Cheviré; Claire Le Paven; Université de Rennes, CNRS, IETR-UMR 6164, F-35000 Rennes, France; Université de Rennes, CNRS, ISCR-UMR 6226, F-35000 Rennes, France

Synthesis of BT-BNT and BT-BNTN Relaxors by 2D Nanosheets Wrapping Methods: Taeyeong Song; Hanwool Kim; Do-Kyun Kwon; Korea Aerospace University

NANOMATERIALS

Advances in Emerging Electronic Nanomaterials: Synthesis, Enhanced Properties, Integration, and Applications — Poster Session

**Sponsored by:** TMS: Nanomaterials Committee

**Program Organizers:** Chang-Yong Nam, Brookhaven National Laboratory; Jung-Kun Lee, University of Pittsburgh; Stephen McDonnell, University of Virginia

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**Session Chairs:** Chang-Yong Nam, Brookhaven National Laboratory; Jung-Kun Lee, University of Pittsburgh; Stephen McDonnell, University of Virginia

A Molecular Dynamics Study of Additive Nanomanufacturing: Revealing Sintering Mechanisms: Dourna Jamshideasli; Shuai Shao; Masoud Mahjouri-Samani; Nima Shamsaei; Auburn University

Optical Conductivities of 2D Molybdenum Nitride: Mono and Bilayers: Amani Ramanathan

Optical Engineering of Pbs Colloidal Quantum Dot Solar Cells Via Fabry-Perot Resonance and Distributed Bragg Reflectors: Sumin Bae; University of Pittsburgh

Preferred Orientation of Bismuth Vanadate Films Grown by Pulsed Laser Deposition: Joseph Damian; University of Pittsburgh

Study on Nanostructured Molybdenum Carbide for Hydrogen Evolution Reaction: Anqi Wang; University of Pittsburgh

Toward Scalable Fabrication of Stable Metal Halide Perovskite Solar Cells Through Inkjet Printing and Antisolvent Bathing: Marc Migliozzi; University of Pittsburgh
IRON AND STEEL (FERROUS ALLOYS)

Advances in Ferrous Metallurgy — Poster Session

Sponsored by: AIST Metallurgy — Processing, Products & Applications Technology Committee

Program Organizers: Siddhartha Biswas, Big River Steel; Daniel Baker, General Motors Corporation; Lijia Zhao, Northeastern University

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Application and Improvement of COREX Process in China: Zheng Liu1; Su-ju Hao1; Wu-feng Jiang1; He Bo1; 1North China University of Science and Technology

Simulation Study on the Influence of Magnesia-carbon Material Embedded in Electrode on the Current Distribution and Temperature Distribution: Zhaozhao Yan1; Jiongming Zhang1; Yanbin Yin1; Huayang Liu1; Xingxing Wu1; Jiazheng Zhan1; 1University of Science and Technology Beijing

FUNDAMENTALS AND CHARACTERIZATION

Alloy Phase Transformations at Elevated Temperatures — Poster Session

Sponsored by: TMS High Temperature Alloys Committee, TMS Phase Transformations Committee

Program Organizers: Dinc Erdeniz, University of Cincinnati; Benjamin Adam, Oregon State University; Jonah Klemm-Toole, Colorado School of Mines; Eric Lass, University of Tennessee-Knoxville; Ashley Paz y Puente, University of Cincinnati; Sophie Primig, University of New South Wales; Chantal Sudbrack, National Energy Technology Laboratory

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Multiscale Modeling of Solidification Processes for Metal & Alloys: Mohammad Daeipour1; Mohammad Ishtiyaq1; Ashok Gurung1; Serge Nakhmanson1; Harold Brody1; 1University of Connecticut

ARTIFICIAL INTELLIGENCE

AI for Big Data Problems in Advanced Imaging, Materials Modeling and Automated Synthesis — Poster Session

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee

Program Organizers: Mathew Cherukara, Argonne National Laboratory; Subramanian Sankaranarayanan, University of Illinois-Chicago; Badri Narayanan, University of Louisville

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Autonomous Closed Loop Synthesis of Gold Nanorods via a Modular Chemical-Handling Robotic Platform: Morgan Chen1; Ari Fiorino1; Aarti Singh1; Reea Jayan1; 1Carnegie Mellon University

Logistics Box Recognition in Robotic Industrial De-palletizing Procedure with Systematic RGB-D Image Processing Supported by Multiple Deep Learning Method: Jonghun Yoon1; Jooyeop Han1; Thong Nguyen1; Hyunggyu Kim1; 1Hanyang University

SPECIAL TOPICS

Art and Cultural Heritage: Discoveries during the Pandemic Year — Poster Session

Sponsored by: ACerS Art, Archaeology, and Conservation Science Division

Program Organizers: Marie Jackson, University of Utah; Jamie Weaver, National Institute of Standards and Technology

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Session Chairs: Marie Jackson, University of Utah; Jamie Weaver, National Institute of Standards and Technology

A XRD Study of Arabian Kohl: Beauty, Health and Cultural Heritage: Amall Ramanathan1; Maha Aqra2; 1The University of Jordan; 2National Center for Research and Development, Amman

Standard Artifacts: Reference Materials for Glass Cultural Heritage Research: Jamie Weaver1; 1National Institute of Standards and Technology

Logistics Box Recognition in Robotic Industrial De-palletizing Procedure with Systematic RGB-D Image Processing Supported by Multiple Deep Learning Method: Jonghun Yoon1; Jooyeop Han1; Thong Nguyen1; Hyunggyu Kim1; 1Hanyang University
CERAMIC AND GLASS MATERIALS

Ceramics and Glasses Modeling by Simulations and Machine Learning — Poster Session

Sponsored by: ACerS Glass & Optical Materials Division

Program Organizers: Mathieu Bauchy, University of California, Los Angeles; Peter Kroll, University of Texas at Arlington; N. M. Anoop Krishnan, Indian Institute of Technology Delhi

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Session Chair: Mathieu Bauchy, UCLA

Development of Structural Descriptors to Predict Dissolution Rate of Volcanic Glasses: Molecular Dynamic Simulations: Kai Gong; Elsa Olivetti; Massachusetts Institute of Technology

Molecular Dynamic Simulations of Polymer Derived Ceramics: Harrison Chaney; Kathy Lu; Virginia Tech

NUCLEAR ENERGY

Ceramics for a New Generation of Nuclear Energy Systems and Applications — Poster Session

Sponsored by: TMS Nuclear Materials Committee, ACerS Energy Materials and Systems (EMSD) Division

Program Organizers: Ming Tang, Clemson University; Enrique Martinez Saez, Clemson University; Yongfeng Zhang, University of Wisconsin; Krista Carlson, University of Nevada, Reno; Yutai Katoh, Oak Ridge National Laboratory; Jean Paul Crocombette, CEA Saclay; Erofil Kardoulaki, Los Alamos National Laboratory; Levi Gardner, Argonne National Laboratory; Jian Zhang, Xiamen University; Charmayne Lonergan, Pacific Northwest National Laboratory

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Session Chair: Ming Tang, Academic

Development and Characterization of Ga/Ta Doped Li$_7$La$_3$Zr$_2$O$_{12}$ for Direct LiT Electrolysis: Rahul Rajeev; Shraddha Jadhava; Brenda Garcia-Diaz; Christopher Dandeneau; Dale Hitchcock; Kyle Brinkman; Clemson University; Savannah River National Laboratory

Evaluation of In-Flow Mechanical Robustness of Metal-Functionalized Porous Silica Materials: Muhammad Ali; Karthikeyan Baskaran; Casey Elliott; Dave Cohrs; Brian Riley; Krista Carlson; University of Reno; Pacific Northwest National Laboratory

Preparation of High Entropy Zirconate and Titanite Pyrochlores and Further Radiation Damage Study: Adam Gootgeld; Roberto Menchaca; Ming Tang; Clemson University

NANOMATERIALS

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials — Poster Session

Sponsored by: ACerS Basic Science Division, ACerS Electronics Division, ACerS Engineering Ceramics Division

Program Organizers: Haitao Zhang, University of North Carolina at Charlotte; Gurpreet Singh, Kansas State University; Kathy Lu, Virginia Polytechnic Institute and State University; Edward Gorzkowski, Naval Research Laboratory; Jian Shi, Rensselaer Polytechnic University; Michael Naguib, Tulane University; Sanjay Mathur, University of Cologne

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Session Chair: Ming Tang, Academic

Carbon Fiber-reinforced CMCs for Ultra-high Temperature Applications: Shakir Bin Mujib; Sonjoy Dey; Gurpreet Singh; Kansas State University

Electrodeposition of MnO2 Nanosheet Networks for Charge Storage: Yuxuan Sun; Nathaniel Skeelee; Abraham Ebunu; Madeleine Flint; Kun Wang; Scott Misture; Alfred University

Fast Microwave-assisted Synthesis of Nanosstructured High Entropy Spinel: Andre Cardoso; Claudia Perdomo; Rodolfo Gunnewiek; Beatriz Foschiani; Julia Xaraba; Federal University of Sao Carlos

Lithium Storage Capacity of Carbon-rich Polymer-derived Ceramic Electrodes: Shakir Bin Mujib; Sonjoy Dey; Gurpreet Singh; Kansas State University

Optoelectronic Properties of Molybdenum Disulphide: Freestanding Mono and Bilayers: Amall Ramanathan; The University of Jordan

Synthesis of Nanoscale Layered Oxides for Charge Storage Applications: Abraham Ebunu; River Pao; Flint Madeleine; Kun Wang; Scott Misture; Alfred University

The Synaptic Devices Based on Ferroelectric Hf0.7Zr0.3O2 Thin Film: Hojin Lee; Joonbong Lee; Taekjib Choi; Sejong University
SUSTAINABILITY, ENERGY, AND THE ENVIRONMENT

Energy Materials for Sustainable Development — Poster Session

**Sponsored by:** ACerS Energy Materials and Systems Division

**Program Organizers:** Krista Carlson, University of Nevada, Reno; Armin Feldhoff, Leibniz University Hannover; Kyle Brinkman, Clemson University; Eva Hemmer, University of Ottawa; Nikola Kanas, BioSense Institute; Kjell Wilk, Norwegian University of Science and Technology; Lei Zuo, Virginia Tech; Joshua Tong, Clemson University; Danielle Benetti, Institut National de la Recherche Scientifique; Katherine Develos-Bagarinao, National Institute of Advanced Industrial Science and Technology; Soumi Chatterjee, Aditya Birla Science & Technology Company, Ltd

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CERAMIC AND GLASS MATERIALS

Engineering Ceramics: Microstructure-Property-Performance Relations and Applications — Poster Session

**Sponsored by:** ACerS Engineering Ceramics Division

**Program Organizers:** Young-Wook Kim, University of Seoul; Hua-Tay Lin, Guangdong University of Technology; Junichi Tatami, Yokohama National University; Michael Halbig, NASA Glenn Research Center

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**Session Chair:** Young-Wook Kim, University of Seoul

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**Characteristics of YSZ-WC Composite Ceramics:** Seongwon Kim; Hyeong-Tae Kim; 1Korea Institute of Ceramic Engineering and Technology

Crystal orientation dependence of mechanical properties of 8-Si3N4 grains in high thermal conductive silicon nitride ceramics measured using microcantilever beam specimens: Mami Tanabe; Junichi Tatami; Motoyuki Iijima; Hiromi Nakano; Tatsuki Ohji; Tukahiko Yahagi; Takuma Takahashi; Daichi Minami; 1Yokohama National University; 2Toyoohashi University of Technology; 3Kanagawa Institute of Industrial Science and Technology

High Energy X-ray Characterization and Modeling of Residual Strain Evolution in a Ceramic-metal Composite: John Ferguson; Armand Beaudoin; Gregory Scofield; J. Y. Peter Kob; Kelly Nygren; Yujie Wang; Kenneth Sandhage; Michael Sangid; 1Purdue University; 2Cornell High Energy Synchrotron Source

Polymer Derived Ceramics for High Temperature Applications: Muhammed Younas; 1School of Metallurgy and Materials

TIG-Brazing of Ti3AlC2/Ti2AlC MAX Phase Composite: Y. Hadij; N. Chikker; A. Haddad; A. Benamor; Mohamed Hadji; 1University of Bida

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**CERAMIC AND GLASS MATERIALS**

Glasses and Optical Materials: Current Issues and Functional Applications — Poster Session

**Sponsored by:** ACerS Basic Science Division, ACerS Glass & Optical Materials Division

**Program Organizers:** Doris Möncke, Alfred University; Mathieu Hubert, Corning Incorporated

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Flow Dissolution of Lithium Disilicate Glass under Aqueous Conditions: Ben Dillinger; Carlos Suhchital; David Clark; Virginia Polytechnic Institute and State University

Liquid-Liquid Transitions in Strontium Tellurite Melts: Rajinder Kaur; 1GNDU, Amritsar
Natural Glasses – Findings from an Undergraduate Project:  
*Martine Héritier*; Doris Möncke; Jessica Domino; Lucas Greiner; *Alfred University*

*Studying the Scratch-induced Damage of Graphene-coated Silica Glass by Molecular Dynamics Simulations: Saurav Sahoo; Utkarsh Tiwari; Romit Kaware; Sajid Mannan; Nitya Gosvami; N. M. Anoop Krishnan; *Indian Institute of Technology (IIT) Delhi*

Sulfur Blue Glasses – S₃; Anion Charge Transfer Transitions: Lucas Greiner; Jacob Kaspryk; Doris Möncke; *Alfred University*

*Tungsten Borate – A Replacement for Lead in Glass: Elizabeth Tsehrehs; Alexis Clare; *Alfred University*

**Unusual High Oxidation States of Transition Metal Ions in Silicate Glasses of High Optical Basicity: Trivalent Co³⁺ and Ni²⁺**: Lucas Greiner; Jacob Kaspryk; Randall Youngman; Alix Clare; Doris Möncke; *Alfred University; Corning Inc.*

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**FUNDAMENTALS AND CHARACTERIZATION**

Grain Boundaries, Interfaces, and Surfaces: Fundamental Structure-Property-Performance Relationships — Poster Session  
**Sponsored by**: AICerS Basic Science Division

*Program Organizers*: Shen Dillon, University of California, Irvine; Wolfgang Rheinheimer, Julich Research Center; Catherine Bishop, University of Canterbury; Ming Tang, Rice University; John Blendell, Purdue University; Wayne Kaplan, Technion - Israel Institute Of Technology; Melissa Santala, Oregon State University

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**Effect of Interfacial Microstructure on Tensile Property and Fracture Behaviour of Bicrystal and Polycrystal Fe/Ni Interface: Sien Liu; Shoichi Nambu; *The University of Tokyo***

**Fundamentals of Recrystallization in Binary Nb-Alloys: Will Waliser; M. Carl; Kester Clarke; Amy Clarke; *Colorado School of Mines***

**Grain Boundary Energy Variation Related to the GBPD in Forsterite, Mg₂SiO₄, as a Function of Grain Size: Alexandra Austin; Marina Sedlak; Louise Rossett; Sanae Koizumi; Katharina Marquardt; *Imperial College; University of Tokyo***

**Investigating the Relationship between Magnetic Barkhausen Noise, Microhardness, and Microstructural Development during Aging in HY-80 Steel: Michael Roberts; Jason Schibler; Charles D’Ambra; Michele Manuel; Thomas Krause; Aroba Saleem; *University of Florida; Royal Military College of Canada***

**Mesoscale Modeling for Time Dependent Grain Boundary Evolution: Lucero Lopez; Meizhong Lyu; Anqi Qui; Elizabeth Holm; *Carnegie Mellon University***

**Molecular Dynamics Study of the Deformation Behavior of Metallic Substrates under Shear/Vibration: Milad Khajehvand; Henri Seppänen; Panthea Sepehrband; *Santa Clara University; Kulicke & Soffa Industries, Inc.*

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**Viscoelastic Bandgap and Thermal Transport in Inorganic-organic Nanolaminates: Rajan Khadka; Pawel Keblinski; Rensselaer Polytechnic Institute**

**FUNDAMENTALS AND CHARACTERIZATION**

High Entropy Materials: Concentrated Solid Solutions, Intermetallics, Ceramics, Functional Materials and Beyond III — Poster Session  
**Sponsored by**: TMS: Nanomaterials Committee

*Program Organizers*: Yu Zhong, Worcester Polytechnic Institute; Michael Gao, National Energy Technology Laboratory; Xingbo Liu, West Virginia University; Peter Liaw, University of Tennessee; Jian Luo, University of California, San Diego; Yiquan Wu, Alfred University; Mitra Taheri, Johns Hopkins University; Amy Clarke, Colorado School of Mines

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**Characterization of Microstructure and Properties of Al₂FeCoNiCu High-entropy Alloy: Lucy Hunter; Matthew Kestenbaum; Juan Palominos; Ryan Thompson; Mohsen Kivy; California Polytechnic State University**

**Development of Oxide Melt Solution Calorimetry for High Entropy Ceramics: Stuart Ness; Scott McCormack; University of California, Davis**

**Exploration of High-ductility Ternary Refractory High-entropy Alloys Using First-principle Calculations and Machine Learning: Hye-Sun Jang; Jin-Woong Lee; Kee-Sun Sohn; Jiwon Park; Chang-Seok Oh; Korea Institute of Materials Science (KIMS); Sejong University**

**High-throughput Design, Synthesis and Characterization of W-based Refractory High-entropy Alloys: Cafer Acem; William Treherm; Eli Norris; Brent Vela; Raymundo Arroyave; Ibrahim Karaman; Texas A&M University**

**High Throughput Multi-principal Element Alloy Exploration Using a Novel Composition Gradient Sintering Technique: Brady Bresnahan; David Poerschke; University of Minnesota**

**Nanocomposites of High Entropy Alloy (HEA) with Molybdenum Disulphide (MoS₂) for Enhancing the gas Sensing Properties: Bidesh Mondal; Nirmal Kumar; Krishanu Biswas; IIT Kanpur; South Bank University**

**Study on Texture Evolution In Cold Rolled High Entropy Alloy during Annealing: Lalit Kaushik; Jaiveer Singh; Joo-Hee Kang; Dong-Ik Kim; Jin-Yoo Suh; Shi-Hoon Choi; Sunchon National University; Indian Institute of Technology Jodhpur; Korea Institute of Materials Science; Korea Institute of Science and Technology; Sunchon National University, Suncheon**

**The Effect of Local Composition on the Initiation Mechanism of Adiabatic Shear Banding in WFeNiMo: Sarah O’Brien; Matthew Beck; University of Kentucky**
High Temperature Oxidation of Metals and Ceramics — Poster Session

Sponsored by: TMS Corrosion and Environmental Effects Committee

Program Organizers: Kenneth Kane, Oak Ridge National Laboratory; Elizabeth Sooby, University of Texas at San Antonio; Patrick Brennan, General Electric Research; Lavina Backman, U.S. Naval Research Laboratory; Kinga Unocic, Oak Ridge National Laboratory; Richard Oteksak, National Energy Technology Laboratory; David Shiffer, Office of Naval Research; Raúl Rebak, GE Global Research

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Oxidation Behaviour of Ultra-high Temperature Polymer-derived Ceramic-matrix Composites: Elia Zancan1; 1University of Birmingham

PROCESSING AND MANUFACTURING

Innovative Process Design and Processing for Advanced Structural Materials — Poster Session

Program Organizers: Ju-Young Kim, UNIST; Jae-il Jang, Hanyang University; Sung-Tae Hong, University of Ulsan; Rongshian Qin, The Open University

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Session Chairs: Ju-Young Kim, UNIST; Sukbin Lee, UNIST

Automated Process Design for Heat Shrink Casing of Welded Parts of Buried District Heating Pipe: Hyung-Gyu Kim1; Jooyong Kim2; Hae-Yong Lee3; Jonghun Yoon4; 1Hanyang University; 2Korea District Heating Corporation (KDHCI)/Frontier Research & Training Institute

Developing NiTi for a Stable Two-way Shape Memory Behavior: Mitchell Bauer1; Mohammad Mahtabi2; 1University of Tennessee at Chattanooga

Development of a Gradient Structural Material Using Electrically Assisted Pressure Joining of Fe-Mn-Al-C Lightweight Steels: Siihan Lee1; Howook Choi2; Chanwoo Jeong3; Joohn Moon4; Heung Nam Han1; 1Seoul National University; 2Changwon National University

Development of a Self-heated Composite Tool for Out of Autoclave and Out of Oven Cure of Thin Ply Composite Structures: Dwayne R. Morgan1; 1Touchnose Research Laboratory

Development of Highly Stretchable and Impermeable Encapsulation by Applying Wavy-structure to Thermally Grown Silicon Dioxide: Hangeul Kim1; Gyeong-Seok Hwang1; Hyeonji Yoo2; Sohyeon Lee3; Ju-Young Kim4; 1UNIST

Discontinuous Yielding Behavior Due to Twinning Accompanied by Abnormal Grain Growth in Fine-grained Copper: Byeong-Seok Jeong1; Woonjin Cho2; Siwook Park3; Leeju Park4; keunho Lee5; Heung Nam Han1; 1Seoul National University; 2Agency for Defense Development

Effect of Heat Treatment in 9% Ni Steels on Cryogenic Impact Toughness: Younghoon Kim1; Eunji Song2; Sohyeon Lee3; Minho Park2; Hyunbo Shim4; Ju-Young Kim5; 1UNIST; 2Seoul National University; 3Institute for Conservation Engineering, University of Ulsan; 4Hyundai Steel

Enhanced Flaw-tolerance of Nanoporous Gold with Grain Boundary Plasticity: Eunji Song1; Younghoon Kim1; Gyeong-Seok Hwang1; Ju-Young Kim1; 1UNIST

FE-based Virtual DMAs for Characterization of Viscoelastic Behavior in Composite Materials: Luiz Lima1; Nannan Song2; Kennedy Neves3; Kedar Malusare4; Flavio Souza5; 1Siemens

Friction Assisted Dissimilar Solid State Joining of Aluminum and Copper Pipes: Ji-Won Kang1; Sung Tae Hong2; Si Hwan Lee3; Heung-Nam Han4; 1University of Ulsan; 2Seoul National University

Improvement of Structural Stability and Characterization of Nanoscale Defects in Amorphous Alumina Thin Film: Jeong-Hyun Woo1; Gyeong-Seok Hwang2; Hyeonji Yoo3; Ju-Young Kim4; 1UNIST

Integrated Welding and Thermal Processing for Ferritic/Martensitic Steels: Daniel Cod2; Joseph McCrink2; 1KVA Stainless/University of San Diego; 2KVA Stainless

MatILDa® - Application of a User-oriented Material Database: Michael Kruse1; Margarita Bambach2; Kristin Hetas2; Doris Wehage2; 1Friedrich Kocks GmbH & Co. KG; 2GTM- Gesellschaft für metallurgische Technologie- und Softwareentwicklung mbH

Microstructure and Deflection Behavior of Diffusion Bonded Fe-Ni-Mo/Invar Bimetallic Strips: Gin Kyu Lee1; JunHee Han2; Dae-Guen Kim1; Jae-Yeol Jeon2; Jae-Young Song3; Jin Kyu Lee4; 1Kongju National University; 2Korea Institute of Industrial Technology; 3Institute for Advanced Engineering; 4Shin Saeng Metal Ind.

Porous Silicon Carbide (SiC) for Composite Core Sandwich Structures: Ji-Hang Kang1; 1Touchstone Research Laboratory

Solid-state Bulk Joining of Dissimilar Metal Alloys by Electrically Assisted Pressure Joining: Shengwei Zhang1; Thanh Thuong Do1; Bui Thi Tu Anh1; Sung-Tae Hong2; Howook Choi3; Heung Nam Han1; 1University of Ulsan; 2Seoul National University

Study on the Behavior of Fine Particles by the Vibration of the Medium with Polluted Air Inside the Rigid Housing: Hyo-Soo Lee1; Hai-Joong Lee1; Tae-Hoon Park1; Ki-Buem Kim2; Taek-Jib Choi3; Jin-Kyu Lee4; 1KITECH; 2Sejong University; 3Kongju National University

The Friction and Product Quality in Dry Metal Forming with Volatile Media: Lihong Cai1; Jinheol Kim1; Kun Gao2; Shengwei Zhang3; Suntae Hong4; 1University of Ulsan
ARTIFICIAL INTELLIGENCE

Materials Informatics for Images and Multi-dimensional Datasets — Poster Session

Sponsored by: ACerS Basic Science Division, ACerS Electronics Division

Program Organizers: Amanda Krause, Carnegie Mellon University; Alp Sehirlioglu, Case Western Reserve University; Daniel Ruscitto, GE Research

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Session Chair: Alp Sehirlioglu, Case Western Reserve University

3D Computer Vision and Machine Learning for Porosity Analysis in Additive Manufacturing: Daniel Diaz1; Yuheng Nie1; Anthony Rollett1; Elizabeth Holm1; 1Carnegie Mellon University

Adversarial Networks for Synthetic Microstructure Generation to Establish Process-structure Linkage: Gowtham Nimmal Haribabu1; Michael White1; Jeyapriya T J1; Christopher Race1; Philip Withers1; Bikramjit Basu1; 1Indian Institute of Science; 2University of Manchester

CERAMIC AND GLASS MATERIALS

Mesoscale Phenomena in Functional Polycrystals and Their Nanostructures — Poster Session

Sponsored by: ACerS Electronics Division

Program Organizers: Serge Nakhmanson, University of Connecticut; Edward Gorzkowski, Naval Research Laboratory; James Wollmershauser, U.S. Naval Research Laboratory; Seungbum Hong, KAIST; Javier Garay, UCSD; Pierre-Eymeric Janolin, CentraleSupélec

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Asymmetric Tribology of Symmetric Polarization: Seongwoo Cho1; Iaroslav Gaponenko2; Kumara Cordero-Edwards2; Jordi Barceló-Mercader3; Irene Arias4; Jwon Yeom5; Loic Musy6; Céline Lichtensteiger7; Gustau Catalan8; Patrycja Paruch1; Seungbum Hong1; 1KAIST; 2University of Geneva; 3Univestitat Politècnica de Catalunya; 4ICN2

Machine-learned Large-scale Model for Layered Amorphous Graphene: A Study of Its Structure and Thermodynamics: Chinonso Ugwumadu1; Rajendra Thapa2; Kishor Nepal1; David Drabold3; Jason Trembly1; 1Ohio University

Mesoscale Modeling of Domain Wall Behavior in Perovskite Ferroelectrics: Charles Schwarz1; Ashok Gurung1; John Mangeri2; Serge Nakhmanson1; 1University of Connecticut; 2Luxembourg Institute of Science and Technology

FUNDAMENTALS AND CHARACTERIZATION

Metal Powder Synthesis and Processing — Poster Session

Sponsored by: TMS Powder Materials Committee

Program Organizers: James Paramore, US Army Research Laboratory; Iver Anderson, Iowa State University Ames Laboratory; Kyle Tsaknopoulos, Worcester Polytechnic Institute

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Session Chair: James Paramore, United States Army Research Laboratory

Powder Production of Structural or Functional Two-phase from Metal Materials with an Intermetallic Structure: Borys Sereda1; Iryna Kruhlia2; Dmytro Sereda1; Yurii Belokon1; Dmytro Kruhlia1; 1Dneprovsky State Technical University

Deep Learning of Novel Cu/Ni/O Interatomic Potentials to Study CuNi Alloy Surface Segregation and Oxidation with Correlated Environmental TEM Verification: Richard Garza1; Meng Li1; Judith Yang1; Wissam Saidi1; 1University of Pittsburgh

Using Computer Vision and Machine Learning to Characterize Melt Pool Geometry in Additive Manufacturing: Han Chien1; Bo Lei1; Bryan Webler1; Elizabeth Holm1; 1Carnegie Mellon University
MODELING

Multi Scale Modeling of Microstructure Deformation in Material Processing — Poster Session

Sponsored by: AIST Metallurgy — Processing, Products & Applications Technology Committee

Program Organizers: Łukasz Madej, AGH University of Science and Technology; Jaimie Tiley, Oak Ridge National Laboratory; Krzysztof Muszka, AGH University of Science and Technology; Danuta Szeliga, AGH University of Science and Technology

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Session Chair: Danuta Szeliga, AGH University

NANOMATERIALS

Nanotechnology for Energy, Environment, Electronics, Healthcare and Industry — Poster Session

Program Organizers: Navin Manjooran, Chairman, Solve; Gary Pickrell, Virginia Tech

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Session Chairs: Gary Pickrell, Virginia Tech; Navin Manjooran, Chairman, Solve

BIOMATERIALS

Next Generation Biomaterials — Poster Session

Sponsored by: ACF Ceramics Division

Program Organizers: Roger Narayan, University of North Carolina; Sanjiv Lalwani, Lynntech, Inc.

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Session Chair: Roger Narayan, University of North Carolina

CERAMIC AND GLASS MATERIALS

Phase Transformations in Ceramics: Science and Applications — Poster Session

Program Organizers: Pankaj Sarin, Oklahoma State University; Scott McCormack, University of California, Davis; Waltraud Kriven, University of Illinois at Urbana-Champaign; Theresa Davey, Tohoku University; Sanjay V. Khare, University of Toledo

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Environmental Conical Nozzle Levitator Equipped with Dual Lasers: Fox Thorpe; Elizabeth Sobalvarro Converse; Jesus Rivera; Harry Charalambous; Scott McCormack; Lawrence Livermore National Laboratory; University of California, Daivs

Relationship of Bonding Strength with Stability of Ternary Oxide Phases of MgSnO3: A First-principles Study: Bishal Dumre; Sanjay Khare; University of Toledo

LBM-CA Simulation for Prediction of Dendritic Growth in Solidification of Binary Alloy: Wonjoo Lee; YHyeong Jeong; Howon Lee; Seong-hoon Kang; Jonghun Yoon; Hanyang University; Korea Institute of Materials Science
**PROCESSING AND MANUFACTURING**


*Sponsored by:* ACerS Basic Science Division, ACerS Manufacturing Division

*Program Organizers:* Morsi Mahmoud, King Fahd University of Petroleum & Minerals; Dinesh Agrawal, Pennsylvania State University; Guido Link, Karlsruhe Institute of Technology; Motoyasu Sato, Chubu University; Rishi Raj, University of Colorado; Christina Wildfire, National Energy Technology Laboratory; Zhiwei Peng, Central South University

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**Ballroom B | David L. Lawrence Convention Center**

**Effect of Plasma Shielding in Laser Irradiation of Metal Targets with Bursts of Ultrashort Pulses:** Michael Stokes1; Zhibin Lin2; Alexey Volkov1; 1The University of Alabama; 2MKS Instruments Inc

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**SPECIAL TOPICS**

**Resisting Degradation from the Environment: A Symposium Honoring Carolyn M. Hansson’s Research and Pioneering Experiences as a Woman in STEM — Poster Session**

*Sponsored by:* TMS: Corrosion and Environmental Effects Committee, TMS: Steels Committee

*Program Organizers:* Jenifer Locke, Ohio State University; Brendy Rincon Troconis, University of Texas at San Antonio; Ashley Paz y Puente, University of Cincinnati; George Gray, Los Alamos National Laboratory; Suveen Mathaudhu, Colorado School of Mines; David Shifler, Office of Naval Research

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**Cell-scaffold Interactions in Bijels-derived Porous Membranes:** Haoran Sun1; Min Wang2; 1University of Hong Kong

**Modeling a Portable Ventilator Design for Optimal Performance:** Yafeng Li1; Lei Wang1; Peng Yi2; Francisco Rodriguez2; Jing Zhang2; 1Tiangong University; 2Indiana University – Purdue University Indianapolis

**Osteoblast Cell Interaction with Iron-deposited Titanium for Orthopedic Applications:** Enosh Lim1; Paige Bothwell1; Sahar Vahabzadeh1; 1Northern Illinois University

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**BIOMATERIALS**

**Society for Biomaterials: Biological Response to Materials and Material’s Response to Biological Environments — Poster Session**

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*Program Organizers:* Thomas Dziubla, University of Kentucky; Christopher Siedlecki, Penn State College of Medicine; Jeffrey Capadona, Case Western Reserve University; Lynne Jones, Johns Hopkins Orthopaedics

**Monday PM | October 10, 2022**

**Ballroom B | David L. Lawrence Convention Center**

**Influence of the Substrate Microstructure on the Nanostructured Layer Formation in Ti-10Mo-3Sn Alloys:** Guilherme Bueno1; Isabela Alves1; Mariana Mello1; Alessandra Cremasco1; 1Unicamp

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**BIOMATERIALS**

**Society for Biomaterials: Biomaterial Applications — Poster Session**

*Program Organizers:* Jessica Jennings, University of Memphis; Guillermo Ameer, Northwestern University; Danielle Benoit, University of Rochester; Jordon Gilmore, Clemson University

**Monday PM | October 10, 2022**

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**5:00 PM  Please refer to “Talks to Introduce Posters I and II” in the program for the poster titles**
BIOMATERIALS

Society for Biomaterials: Biomaterial Applications in Today’s Industry: Development, Translation & Commercialization — Poster Session

**Program Organizers:** Bob Hastings, Depuy Synthes, J&J; SuPing Lyu, Medtronic

**Monday PM | October 10, 2022**  
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Color Lens Fabricated from Pad Printing: *Anthony Chen*¹; *Shihua Chen*²; *Yongjun Chen*³; *Qi Lou*⁴; ¹Jiangsu Caikang Ltd; ²Johns Hopkins University; ³JH Research USA; ⁴Oculus Ltd

CERAMIC AND GLASS MATERIALS

Solid-state Optical Materials and Luminescence Properties — Poster Session

**Sponsored by:** ACerS Basic Science Division

**Program Organizers:** *Yiquan Wu*, Alfred University; *Jas Sanghera*, Naval Research Laboratory; *Akio Ikese*, World-Lab. Co., Ltd; *Rong-Jun Xie*, Xiamen University; *Mathieu Allix*, Laboratoire CEMHTI; *Kiyoshi Shimamura*, National Institute for Materials Science; *Liangbi Su*, Shanghai Institute of Ceramics; *Dariusz Hreniak*, Institute of Low Temperature and Structure Research

**Monday PM | October 10, 2022**  
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Crystallite Growth of Eu-doped Lanthanum Zirconate Pyrochlores Investigated via XRD Line Broadening: *Petra Simonova*¹; *Roman Skala*²; *Jan Mrazek*³; *Willi Pabst*¹; ¹University of Chemistry and Technology, Prague; ²Institute of Geology of the Czech Academy of Sciences; ³Institute of Photonics and Electronics of the Czech Academy of Sciences

Red-emitting Iridium(III) Complex Dispersed in Latex and PMMA Polymeric Films and their Application as Phosphor-converted UV LED: *Felipe Canisares*¹; *Sergio Antonio Lima*²; *Ana Maria Pires*³; *Airtorn Bispo-Jr*⁴; *Vytor Oliveira*⁵; ¹UNESP; ²UNICAMP

IRON AND STEEL (FERROUS ALLOYS)

Steels for Sustainable Development — Poster Session

**Sponsored by:** TMS Steels Committee

**Program Organizers:** *Ian Zuazo*, ArcelorMittal Global R&D - Industeel; *Matthias Miltzer*, University of British Columbia; *Jonah Klemm-Toole*, Colorado School of Mines; *Kester Clarke*, ASPPRC Colorado School of Mines

**Monday PM | October 10, 2022**  
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A Unique Approach to Study the Multiaxial Creep Behaviour of 304HCu SS by Varying Notch Angle for a Given Root Radius: *Kanhu Sahoo*¹; *G.V Reddy*²; *T. Sakhiveth*³; *Guest Faculty at IGIT, Sarang.* ¹Head of CSS; ²SO(E). IGCAR, Kalpakkam

Development of Ultra-high Strength TWIP Steel with Increased Corrosion Resistance: *Pavel Podany*¹; *Tomas Studecky*¹; *Tomas Gregor*¹; ¹COMTES FHT a.s.

FUNDAMENTALS AND CHARACTERIZATION

Synthesis, Characterization, Modeling and Applications of Functional Porous Materials — Poster Session

**Sponsored by:** ACerS Basic Science Division

**Program Organizers:** *Lan Li*, Boise State University; *Winnie Wong-Ng*, National Institute of Standards and Technology; *Kevin Huang*, University of South Carolina

**Monday PM | October 10, 2022**  
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**Session Chair:** *Lan Li*, Boise State University

Carbon Fibers Based Ultra-porous Epoxy Composites for Planar Multilayer Absorber Application: *Hanadi Breiss*¹; *Aicha El Assal*²; *Fatimazza Benzerza*³; *Ala Shariha*³; *Ali Harmouch*²; *Akil Jrad*²; ¹University of Rennes, IETR; ²Université Libanaise, EDST

Synthesis and Application of MOF in CO2 Adsorptive Processes in Pressurized Systems: *Tamires Menezes*¹; *Kátilla Santos*²; *Elton Franceschi*²; *Gustavo Borges*²; *Cláudio Dariva*²; *Silvia Egues*³; *Juliana De Conto*¹; *Cesar Santana*¹; *Tiradentes University

Variation in the Bulk Elasticity of Nanoporous Materials from Solid Structure Mechanical Properties: *Ryan Griffith*¹; *Naji Mashrafi*¹; *Matthew Beck*²; ¹University of Kentucky
MATERIALS-ENVIRONMENT INTERACTIONS

Thermodynamics of Materials in Extreme Environments — Poster Session

Sponsored by: ACerS Basic Science Division, ACerS Energy Materials and Systems Division

Program Organizers: Xiaofeng Guo, Washington State University; Kristina Lilova, Arizona State University; Kyle Brinkman, Clemson University; Alexandra Navrotsky, Arizona State University; Jake Amoroso, Savannah River National Laboratory; Xingbo Liu, West Virginia University; Gustavo Costa, NASA Glenn Research Center

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Session Chair: Kristina Lilova, Arizona State University

Effect of Desulfurizer on Hot Metal Pretreatment: Liang Tian1; Wufeng Jiang1; Suju Hao1; Yuzhu Zhang1; 1North China University of Science and Technology

Investigation of the Thermodynamics of Intermetallic Materials in the Simulation of Synthesis in the Ti-Al system: Borys Sereda1; Iryna Kruhliak1; Dmytro Sereda1; Yuriy Belokon1; 1Dneprovsky State Technical University
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