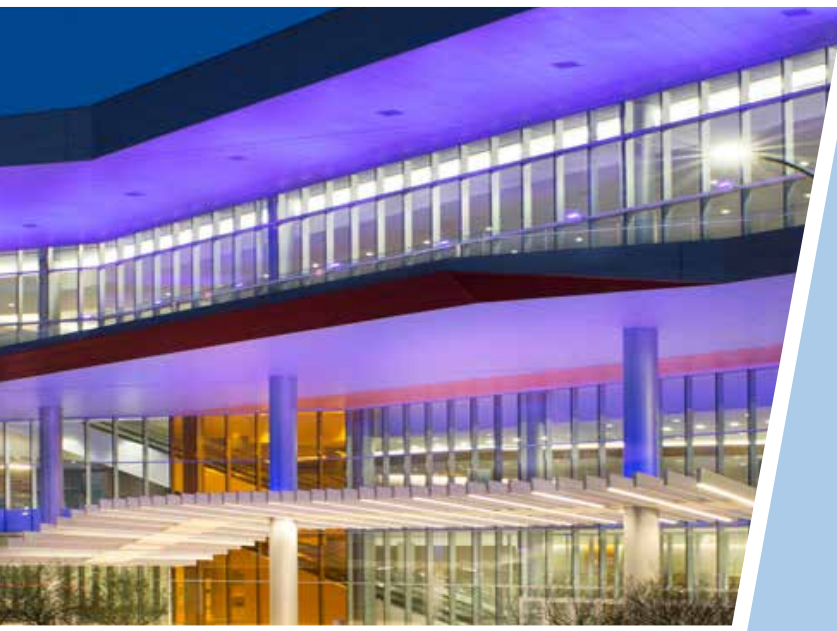


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TMS 2019

148th Annual Meeting & Exhibition



MOBILE-FRIENDLY TECHNICAL PROGRAM

March 10–14, 2019

**HENRY B. GONZÁLEZ
CONVENTION CENTER
SAN ANTONIO, TEXAS, USA**

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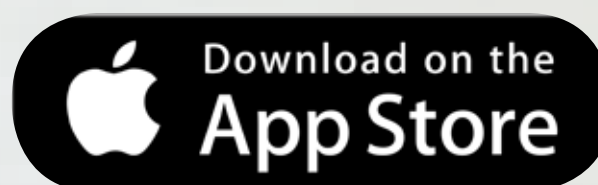
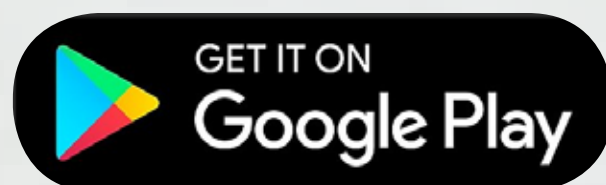
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POSTERS

MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing – Simulation of High Temperature Processes

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Tao Jiang, Central South University; Jiann-Yang Hwang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

Monday AM | March 11, 2019
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Session Chairs: Dean Gregurek, RHI AG Technology Center Leoben; Rafael Padilla, University of Concepcion

9:00 AM Introductory Comments

9:05 AM

A Mathematical Model for Carbon Loss of Blast Furnace Based on Traditional Engineering Method: *Shun Yao*¹; Shengli Wu¹; Bo Song¹; Mingyin Kou¹; Heng Zhou¹; ¹University of Science and Technology Beijing

9:25 AM

Study on Alkali Circulation Process and Its Influence on Coke Ratio in Blast Furnace: *Haokun Li*¹; Yijie Wang¹; Kexin Jiao¹; Jianliang Zhang¹; Rong Zhu¹; Hanjie Guo¹; ¹University of Science and Technology Beijing

9:45 AM Break

10:05 AM

The Pyrolysis of Methane and Carbon-steam Reaction in Copper Fire Refining: *Paul Mather*¹; Matthew Krane¹; ¹Purdue University

10:25 AM

Fuzzy Grey Relational Analysis for Electromagnetic Parameters of Induction Heating Process: *Pei Fu*¹; Ping Zhou¹; Tian Yang Zhao¹; Chenn Zhou²; Zhuo Chen¹; ¹Central South University; ²Purdue University Calumet

10:45 AM

Submerged Gas Injection Physical and CFD Modelling and Visualisation: *Kenneth Kaiser*¹; Mostafa Smadzadeh²; Leili Tafaghodi²; ¹Air Liquide Inc; ²University of British Columbia

11:05 AM

Modelling of Motion and Heat Transfer of Blast Furnace Dust Particle during Flash Reduction Process at High Temperature: Jin Xu¹; *Nan Wang*¹; Min Chen¹; ¹Northeastern University

11:25 AM

Numerical Simulation of Inclusion Removal in a Novel Tundish with Swirl Flow: *Jianchuan Yan*¹; Tao Li¹; Jun Liu¹; ¹ChongQing University

11:45 AM

Numerical Simulation Study on Design Optimization of Inner Cavity Dimensions of Large Capacity Tundish: *Yong Zhong*¹; Mingmei Zhu¹; Bing Huang¹; ¹ChongQing University

12:05 PM Concluding Comments

ENERGY & ENVIRONMENT

2019 Energy Technologies and Carbon Dioxide Management Symposium — Energy and Material Production

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

Program Organizers: Tao Wang, Nucor Castrip Arkansas; Xiaobo Chen, RMIT; Donna Guillen, Idaho National Laboratory; Lei Zhang, University of Alaska Fairbanks; Ziqi Sun, Queensland University of Technology; Cong Wang, Northeastern University; Nawshad Haque, Csiro; John Howarter, Purdue University; Neale Neelameggham, IND LLC

Monday AM | March 11, 2019

007D | Henry B. Gonzalez Convention Center

Session Chair: To Be Announced

8:00 AM

Effect of Dust in Flue Gas on Heat Transfer Efficiency: *Jiapeng Liang*¹; Haibin Zuo¹; Jingsong Wang¹; Yingli Liu¹; Wanlong Zhang¹; Shenhui Liu¹; ¹University of Science and Technology Beijing

8:20 AM

Analysis on Energy Efficiency and Optimization of Hot Blast Process:

*Chaozhen Cao*¹; *Yujie Meng*¹; *Fangxing Yan*¹; *Dianwei Zhang*²; *Xin Li*¹; *Fuming Zhang*¹; ¹Beijing Shougang International Engineering Technology Co., Ltd.; ²Shougang Research Institute of Technology

8:40 AM

Construction on Energy Flow Network of Modern Blast Furnace Ironmaking:

*Fuming Zhang*¹; ¹Shougang Group

9:00 AM

Feasibility of a District Heating System in Fjardabyggd Using Waste Heat from Alcoa Fjarðal:

*Leo Haraldsson*¹; *Maria Gudjonsdottir*¹; *Gestur Valgardsson*²; *Gudrun Saevarsdottir*¹; ¹Reykjavik University; ²EFLA Consulting Engineers

9:20 AM Break

9:40 AM

Phase Equilibria and Thermodynamics in the FeSO₄-CaSO₄ System:

*Fiseha Tesfaye*¹; *In-Ho Jung*²; *Mykola Moroz*¹; *Daniel Lindberg*³; *Leena Hupa*¹; ¹Åbo Akademi University; ²Seoul National University; ³Aalto University

10:00 AM

Research and Application on Waste Heat Recycling and Preheating Technology of Ironmaking Hot Blast Stove In China:

*Xin Li*¹; *Fuming Zhang*²; *Guangyu Yin*¹; *Chaozhen Cao*¹; ¹Beijing Shougang International Engineering Technology Co., Ltd.; ²Shougang Group

SPECIAL TOPICS

2019 EPD Distinguished Lecture — Distinguished Lecture

Sponsored by: TMS Extraction and Processing Division

Program Organizer: Cynthia Belt, Metals Energy Management LLC

Monday AM | March 11, 2019

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Session Chair: Cynthia Belt, Metals Energy Management LLC

8:00 AM Introductory Comments

8:05 AM

The Importance of Transient Phenomena in Metallurgical Processes: *Sridhar Seetharaman*¹; ¹Colorado School of Mines

8:45 AM Question and Answer Period

8:55 AM Break

SPECIAL TOPICS

2019 International Metallurgical Processes Workshop for Young Scholars (IMPROWYS 2019) — Electrometallurgy

Sponsored by: TMS Extraction and Processing Division

Program Organizers: Cong Wang, Northeastern University; Amy Clarke, Colorado School of Mines; Kinnor Chattopadhyay, University of Toronto; Bryan Webler, Carnegie Mellon University

Monday AM | March 11, 2019

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Funding support provided by: Korean Institute of Metals and Materials

Session Chair: Cong Wang, Northeastern University

9:00 AM Introductory Comments

9:10 AM Invited

Theoretical and Experimental Probing of the Molten State: *Antoine Allanore*¹; ¹MIT - DMSE

9:40 AM Break

10:00 AM Invited

The Utility of Liquid Metals in Electrometallurgical Processing of Used Nuclear Fuels for Recycling: *Hojong Kim*¹; ¹Pennsylvania State University

10:30 AM Invited

Dissolution Behavior of Solid SiO₂ in CaCl₂-based Molten Salts: *Xiao Yang*¹; *Kouji Yasuda*²; *Toshiyuki Nohira*²; *Fumitaka Tsukihashi*¹; ¹The University of Tokyo; ²Kyoto University

LIGHT METALS

2019 Light Metals Keynote Session — Aluminum Industry: Vision for the Next Decade

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

Program Organizer: Olivier Martin, Rio Tinto

Monday AM | March 11, 2019
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Session Chair: Olivier Martin, Rio Tinto

8:00 AM Introductory Comments

8:05 AM Keynote

The Aluminium Story: *Chris Bayliss*¹; ¹International Aluminium Institute

8:35 AM Keynote

China Aluminium Industry Picture: *Mo Xinda*¹; ¹China Nonferrous Metals Industry Association

9:05 AM Keynote

Products of the Future - Solutions for Shaping a Sustainable World: *Todd Summe*¹; ¹Novelis Inc.

9:35 AM Break

9:55 AM Keynote

Smelter of the Future: *Hans Erik Vatne*¹; ¹Norsk Hydro ASA

10:25 AM Keynote

The Aluminium Industry Revolution at the Door Step: *Vincent Christ*¹; ¹Elysis

10:55 AM Panel Discussion

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

2019 Symposium on Functional Nanomaterials: Synthesis, Integration, and Application of Emerging Nanomaterials — Nanomaterials for Energy and Environmental Applications

Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory; Jiyoung Chang, University of Utah; Pei Dong, George Mason University; Yong Lin Kong, University of Utah; Shengfeng Yang, Indiana University; Purdue University Indianapolis; SungWoo Nam, University of Illinois

Monday AM | March 11, 2019
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Session Chairs: Chang-Yong Nam, Brookhaven National Laboratory; Jung-Kun Lee, University of Pittsburgh; Pei Dong, George Mason University

8:00 AM Invited

Study for Stable and Flexible Perovskite Solar Cells: *Jung-Kun Lee*¹; ¹University of Pittsburgh

8:30 AM Invited

Direct Characterization of Molecular Ordering in Organic Semiconductors: How the Nanoscale Structure Defines Electronic and Photovoltaic Properties: Gabriel Calderon¹; Jared Johnson¹; Menglin Zhu¹; *Jinwoo Hwang*¹; ¹Ohio State University

9:00 AM

A Flexible Solar Cell/supercapacitor Integrated Energy Device: *Pei Dong*¹; Jun Lou²; ¹George Mason University; ²Rice University

9:20 AM

A New Class of Integrated Chalcogenide Nanocrystals and Thin Films for Solar Cell Applications: *Soubantika Palchoudhury*¹; Abdollah Arabshahi¹; Uday Gharge¹; Armel Boutchuen¹; Yasmin Foster¹; Dell Zimmerman¹; Hamad Alresheedi¹; ¹University of Tennessee Chattanooga

9:40 AM Break

9:50 AM Invited

Cobalt Oxide Electrocatalysts Doped with Various Transition Metals for Enhanced Oxygen Evolution Reaction: Changsoo Lee¹; Chanwon Jung¹; Pyuck-Pa Choi¹; *Hyuck Mo Lee*¹; ¹KAIST

10:20 AM Invited

Novel Synthesis Routes of Silicon/Carbon Nanocomposites for Lithium-ion Batteries with High Energy Density and Long Cycle Life: *Min Kyu Song*¹; ¹Washington State University

10:50 AM

Synthesis of Hybrid Nanocomposites of Nanostructured Co₃O₄ Interfaced with Reduced/nitrogen-doped Graphene Oxides for Selective Enhancements in Electrocalatytic and/or Supercapacitive Properties: *Erick Ribeiro*¹; Sheng Hu¹; Dibyendu Mukherjee¹; Bamin Khomami¹; ¹University of Tennessee Knoxville

11:10 AM

Gold Flower-like Structures:Excellent Candidates as Sensors: *Karine Mougín*¹; Delphine Faye²; Vincent Vignal³; Arnaud Buch⁴; ¹Institut De Science Des Matériaux De Mulhouse; ²CNES; ³ICB; ⁴CentraleSupelec

11:30 AM

Core/shell Nanoparticles via Inert Gas Condensation: Jeffrey Shield¹; *Zahra Ahmadi*¹; ¹University of Nebraska

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Materials Design for Sustainability and Energy Harvesting

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Monday AM | March 11, 2019

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Session Chair: Surojit Gupta, University of North Dakota

8:00 AM Invited

Materials Design for Energy and Sustainability: *Lan Li*¹; ¹Boise State University

8:25 AM

The Improvement in Conversion Efficiency of Phthalocyanine-based Organic Photovoltaics: *Miroslav Popovic*¹; Stevan Davidovich¹; Barney Simic-Glavaski¹; ¹University of California Berkeley

8:45 AM

Design of Novel Polymer Matrix Composites: *Surojit Gupta*¹; Maharshi Dey¹; Sabah Javaid¹; Kathryn Hall¹; ¹University of North Dakota

9:05 AM

Comparison of Solar Selective Absorbance Properties of TiN, TiNxOy and TiO2 Thin Films: Hanan Abd El-Fattah¹; *Iman El Mahallawi*²; Mostafa Shazly³; Waleed Khalifa¹; ¹Cairo University; ²Cairo University/ Adjunct The British University in Egypt; ³The British University in Egypt

9:25 AM

Carrier Separation in High-efficient Kesterite Thin-film Solar Cells Probed by Optical and Scanning Probe Investigation: *Juran Kim*¹; William Jo¹; Kee-Jeong Yang²; Dae-Hwan Kim²; Jin-Kyu Kang²; ¹Ewha Womans University; ²Daegu Gyeongbuk Institute of Science & Technology (DGIST)

9:45 AM Break

10:05 AM

An Ab Initio Study of the Electronic and Atomic Structure at the PCBM/CH₃NH₃PbI₃ Interface in Perovskite Solar Cells: *Rabi Khanal*¹; Nicholas Ayers¹; Soumik Banerjee²; Samrat Choudhury¹; ¹University of Idaho; ²Washington State University

10:25 AM

Electrochemically Driven Phase Transition: Observations and Mechanisms: *Xiao-Dong Zhou*¹; Emir Dogdibegovic²; Yudong Wang¹; ¹University of Louisiana at Lafayette; ²LBL

10:45 AM

Highly Efficient Chalcogenide Solar Cells on Flexible Polymers: Nanoscale Imaging of Optoelectronic Properties: *Juran Kim*¹; *William Jo*¹; Jihye Gwak²; Jae Ho Yun²; ¹Ewha Womans University; ²Korean Institute of Energy Research (KIER)

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Welding: Physical and Mechanical Metallurgy of Rapidly Solidified Metals — Computational Tools for Additive Manufacturing

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorganji, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Semiatin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

Monday AM | March 11, 2019
221A | Henry B. Gonzalez Convention Center

Session Chairs: Eric Lass, National Institute of Standards and Technology; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology

8:00 AM Invited

Considerations in the Penetration of Additive-produced Materials into Mainstream Production of Commercial, Industrial, and Defense Products – Metallurgy, Capability, and Overcoming Adversity.: *Eric Ott*¹; Amber Andreaco¹; David Abbott¹; Behrang Poorganji¹; ¹GE Additive

8:30 AM Invited

Application of ICME Tools and Methods to Additive Manufacturing Process Development and Component Qualification: *David Furrer*¹; Rebecca Runkle¹; Sergei Burlatsky²; ¹Pratt & Whitney; ²United Technologies Research Center

9:00 AM

Development of a Computational Model of Metal Additive Manufacturing: *Vu Nguyen*¹; Anthony Murphy¹; Gary Delaney¹; Peter Cook¹; Sharen Cummins¹; Paul Cleary¹; Patrick O'Toole¹; Dayalan Gunasegaram¹; Matthew Sinnott¹; ¹CSIRO

9:20 AM

Computational Modeling for Additive Manufacturing of Engine Components: *Terryl Wallace*¹; Christopher Lang¹; Kevin Wheeler²; Joshua Fody¹; ¹Nasa Langley Research Center; ²NASA Ames Research Center

9:40 AM Break

10:00 AM Invited

Modeling Process–structure–process Relationships in Additively Manufactured Alloys with Machine Learning and Materials Informatics:

*Branden Kappes*¹; *Senthamaruvi Moorthy*¹; *Henry Geerlings*²; *Nathan Johnson*¹; *Thomas Gallmeyer*¹; *Behnam Amin-Ahmadi*¹; *Rui Liu*³; *Xiaoli Zhang*¹; *Bryce Meredig*⁴; *Aaron Stebner*¹;

¹Colorado School of Mines; ²CoorsTek; ³Carnegie Mellon University; ⁴Citrine Informatics

10:30 AM

Development of a Microstructural-based Computational Model for Predicting the Mechanical Properties of Metals Manufactured by Additive Manufacturing:

*Mohsen Taheri Andani*¹; *Mohammad Reza Karamooz-Ravari*²; *Mohamad Ghodrati*³; *Reza Mirzaeifar*³; *Jun Ni*¹;

¹University of Michigan; ²Graduate University of Advanced Technology; ³Virginia Tech

10:50 AM

Geometry and Size Effect in Metal Additive Manufacturing and Relevant Processing Parameters Optimization:

*Jinquan Cheng*¹;

¹Composite Solutions and Digital Manuf

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications — Nuclear Components and Instrumentation

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: *Isabella Van Rooyen*, Idaho National Laboratory; *Subhashish Meher*, Idaho National Laboratory; *Indrajit Charit*, University of Idaho; *Somayeh Pasebani*, Oregon State University; *Chad Duty*, University of Tennessee

Monday AM | March 11, 2019

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Session Chair: *Isabella van Rooyen*, Idaho National Laboratory

8:00 AM Invited

Westinghouse Advanced Manufacturing Development:

*Clinton Armstrong*¹; ¹Westinghouse Electric Company

8:30 AM

Additive Manufacturing of Steels for Advanced Reactor Concepts:

*Niyanth Sridharan*¹; *Thersa Mary Green*²; *Frank Chen*¹; *Kevin Field*¹;

¹Oak Ridge National Laboratory; ²University of Wisconsin Madison

8:50 AM

Additive Manufacturing of Advanced Fuel Components for Commercial Reactors: *David Huegel*¹; Paula Freyer¹; Bill Cleary¹; Craig Amick¹; Zeses Karoutas¹; Clinton Armstrong¹; Peng Xu¹; ¹Westinghouse Electric Company

9:10 AM Invited

Additive Manufacturing of Instrumentation for Measuring Field Properties in Extreme Environments: *David Estrada*¹; ¹Boise State University

9:40 AM Break

10:00 AM

Additive Manufacturing for In-pile Instrumentation in Nuclear Test Reactors: *Michael McMurtrey*¹; Troy Unruh¹; Harish Subbaraman²; Eric Jankowski²; Lan Li²; David Estrada²; ¹Idaho National Laboratory; ²Boise State University

10:20 AM

Embedded Fiber Optic Sensors for In-core and In-pile Applications Enabled by Ultrasonic Additive Manufacturing: *Christian Petrie*¹; Niyanth Sridharan¹; Adam Hehr²; Mark Norfolk²; John Sheridan³; Sudarsanam Babu⁴; ¹Oak Ridge National Laboratory; ²Fabrisonic LLC; ³Sheridan Solutions LLC; ⁴University of Tennessee

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Microstructural Evolution and Phase Transformations — High Temperature Materials

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

Program Organizers: Bij-Na Kim, LPW Carpenter Additive; Eric Lass, National Institute of Standards and Technology; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Ryan Dehoff, Oak Ridge National Laboratory; Gerhard Fuchs, University of Florida; Chantal Sudbrack, QuesTek Innovations LLC

Monday AM | March 11, 2019
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Session Chairs: Bij-Na Kim, LPW Carpenter Additive; Katerina Christofidou, University of Cambridge

8:00 AM Introductory Comments

8:05 AM Invited

Advanced Alloy Design Tailored to Accommodate Additive Manufacturing Rapid Solidification: *Emma White*¹; Timothy Prost¹; Ralph Napolitano¹; Iver Anderson¹; ¹Iowa State University/Ames Laboratory

8:35 AM

An Integrated Computational Materials Engineering (ICME) Framework for AM718 Plus Post Processes: *Qiaofu Zhang*¹; Jiadong Gong¹; Greg Olson¹; ¹QuesTek Innovations LLC

8:55 AM

Microstructural Optimization and Mechanical Property Response of DMLM Rene 65: *Andrew Wessman*¹; Laura Dial²; Timothy Hanlon²; ¹GE Additive; ²GE Global Research

9:15 AM

Microstructural Evolution of Additively Manufactured Co-base Layer on Austenitic Stainless Steel: *Jinsung Jang*¹; Min Ha Shin¹; Chang Hee Han¹; Do-Hyang Kim²; Junhyun Kwon¹; ¹Korea Atomic Energy Research Institute; ²Yonsei University

9:35 AM Break

9:55 AM Invited

Microstructure Evolution During Additive Manufacturing of Niobium Silicide-based Alloys: *Hongbiao Dong*¹; ¹University of Leicester

10:25 AM

Modeling Residual Stress and Phase Evolution as a Function of Additive Manufacturing Process Parameters: Cornelia Altenbuchner¹; *Richard Otis*¹; Andrew Shapiro¹; ¹Jet Propulsion Laboratory

10:45 AM

In Situ Microstructure Evolution Characterization of Additive Manufactured U6Nb Under Load: *Eloisa Zepeda-Alarcon*¹; Amanda Wu²; Bjorn Clausen¹; Donald Brown¹; ¹Los Alamos National Laboratory; ²Lawrence Livermore National Laboratory

11:05 AM

In Situ and Time-resolved Diffraction Studies to Reveal Microstructural Transformations and Changes upon Heat

Treatment: *Klaus-Dieter Liss*¹; ¹Guangdong Technion - Israel Institute of Technology (GTIIT)

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development — Fundamentals in Alloy Design for AM I

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

Program Organizers: Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Hunter Martin, HRL Labs; Orlando Rios, Oak Ridge National Laboratory

Monday AM | March 11, 2019
221D | Henry B. Gonzalez Convention Center

Session Chairs: Behrang Poorganji, GE Additive; James Saal, Citrine Informatics

8:00 AM Introductory Comments: Alloy Design for AM - Behrang Poorganji, GE Additive

8:05 AM Invited

Genomic Materials Design: Alloys for Additive Manufacturing: *Greg Olson*¹; ¹Northwestern University & QuesTek Innovations LLC

8:35 AM

Development of Alloys for Additive Manufacturing using the Materials by Design® Methodology: *Martin Walbrühl*¹; *Ida Berglund*²; *Greta Lindwall*³; ¹QuesTek Europe AB; ²QuesTek Innovations LLC; ³KTH Royal Institute of Technology

8:55 AM

Application of CALPHAD Modeling Tools to the Exploration of Alternative Titanium Alloys for Additive Manufacturing: *Ryan Jennings*¹; *Ben Brown*¹; *Benjamin Sikora*¹; ¹Kansas City National Security Campus

9:15 AM

Development of a Thermodynamics-informed Materials Design Simulator: *Aurelien Perron*¹; *Patrice Turchi*¹; *Vincenzo Lordi*¹; *Joseph McKeown*¹; *Manyalibo Matthews*¹; ¹Lawrence Livermore National Laboratory

9:35 AM Break

9:55 AM

Integrated Computational Framework for Prediction of Solidification Reactions and Topologically Closed Packed Phases for New Alloy Design in Additive Manufacturing: *Amrita Mishra*; Gautam Priyadarshan¹; Yizhou Lu¹; ¹University of Mississippi

10:15 AM Invited

3D Insights on Additive Melt Pools: Implications for Alloy Design: Andrew Polonsky¹; McLean Echlin¹; N. Raghavan²; Ryan Dehoff²; Michael Kirka²; *Tresa Pollock*¹; ¹University of California, Santa Barbara; ²Oak Ridge National Laboratory

10:45 AM

Challenges and Underlying Mechanisms in Processing of Aluminum Alloys via Direct Metal Laser Melting (DMLM): *Vipul Gupta*¹; Laura Dial¹; P.R. Subramanian¹; Eric Ott²; ¹GE Global Research; ²GE Additive

11:05 AM

Aluminum-cerium-based Alloy Development for Laser Powder Bed Fusion: *Hunter Henderson*¹; Zachary Sims²; Michael Thompson²; Michael Kesler¹; Alex Plotkowski¹; Peeyush Nandwana¹; Frederick List¹; Scott McCall³; Tian Li³; David Weiss⁴; Ryan Ott⁵; Fanqiang Meng⁵; Ryan Dehoff¹; Orlando Rios¹; ¹Oak Ridge National Laboratory; ²University of Tennessee; ³Lawrence Livermore National Laboratory; ⁴Eck Industries, Inc.; ⁵Ames Laboratory

11:25 AM

Development of High Strength Al-Mg Alloy for Additive Technologies with Reduced Scandium Content: Viktor Mann¹; Alexander Krokhin¹; Dmitriy Ryabov¹; Sergey Polyakov²; Roman Vakhromov²; *Daria Daubarayte*²; Vladimir Korolev²; ¹RUSAL Global Management B.V.; ²Light Materials and Technologies Institute

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Solid State Processing of Metals and Ceramics — Bonding with Kinetic Energy

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

Program Organizers: James Paramore, US Army Research Laboratory; Amy Elliott, Oak Ridge National Laboratory; Matthew Dunstan, US Army Research Laboratory; Markus Chmielus, University of Pittsburgh; Nihan Tuncer, Desktop Metal

Monday AM | March 11, 2019
221B | Henry B. Gonzalez Convention Center

Session Chair: Nihan Tuncer, Desktop Metal

8:00 AM Invited

Impact-induced Solid State Bond at Micron Scale: Toward Additive Manufacturing via Kinetic Energy: *Mostafa Hassani-Gangaraj*¹; David Veysset¹; Keith Nelson¹; Christopher Schuh¹; ¹Massachusetts Institute of Technology

8:40 AM

Bonding Features and Microstructural Evolution in Cold Sprayed Metallic Coatings and Bulks: A New Materials Perspective: *Yu Zou*¹; ¹University of Toronto

9:00 AM

Ultrasonic Additive Manufacturing of Nanocrystalline Materials: *Austin Ward*¹; Zachary Cordero¹; ¹Rice University

9:20 AM

Net-shape Ambient Temperature Metal Additive Manufacturing using Acoustic Energy and Multi-material Printing Prospects: *Anagh Deshpande*¹; Keng Hsu¹; ¹University of Louisville

9:40 AM Break

10:00 AM

Development of a Low Earth Orbit Metal 3D Printing Capability with 30kHz Ultrasonic Additive Manufacturing (UAM): *Adam Hehr*¹; Mark Norfolk¹; Justin Wenning¹; Tracie Prater²; ¹Fabrisonic LLC; ²NASA Marshall Space Flight Center

10:20 AM

Binder Jetting Additive Manufacturing of Metallic Foam Structures: *Hadi Miyanaji*¹; Mark Atwater²; Kristopher Darling³; Ashwath Kumar¹; Vincent Hammond³; Christopher Williams¹; ¹Design, Research, and Education for Additive Manufacturing Systems Laboratory Department of Mechanical Engineering, Virginia Tech; ²Safety and Technology, Department of Applied Engineering, Millersville University; ³US Army Research Laboratory,

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session I

Sponsored by: TMS: Shaping and Forming Committee

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

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Session Chairs: Josh Kacher, Georgia Institute of Technology; Thomas Britton, Imperial College London

8:00 AM Invited

A Refined Template Matching Approach to Index Electron Backscatter Diffraction Patterns: Alex Foden¹; David Collins²; Angus Wilkinson³; *Thomas Britton*¹; ¹Imperial College London; ²University of Birmingham; ³University of Oxford

8:30 AM

Coherent Diffraction Imaging of Strain at the Nanoscale: *Ross Harder*¹; Mathew Cherukara¹; Andrew Ulvestad¹; ¹Argonne National Laboratory

8:50 AM

3D Characterization of Shock-induced Damage in Wrought Ta: *Paul Rottmann*¹; Andrew Polonsky¹; Marie-Agathe Charpagne¹; George Gray²; Tresa Pollock¹; ¹Materials Department, University of California, Santa Barbara; ²Dynamic Materials Properties, Testing, and Modeling, Los Alamos National Laboratory

9:10 AM

In Situ Measurement of Slip System Softening Resulting from Planar Slip in an Aluminum-Lithium Alloy: *Wesley Tayon*¹; Kelly Nygren²; Roy Crooks³; Darren Pagan²; ¹NASA Langley Research Center; ²Cornell High Energy Synchrotron Source; ³Black Laboratories, L.L.C.

9:30 AM Break

9:50 AM Invited

Understanding Fatigue-induced Dislocation Processes at Grain and Twin Boundaries: *Josh Kacher*¹; Yung Suk Jeremy Yoo¹; Pragna Bhaskar¹; ¹Georgia Institute of Technology

10:20 AM

Deformation and Degradation of Superelastic NiTi under Multiaxial Cyclic Loadings: *Wei Neng Hsu*¹; Efthymios Polatidis¹; Miroslav Smid¹; Ivo Kubena²; Steven Van Petegem¹; Helena Van Swygenhoven¹; ¹Paul Scherrer Institute; ²Institute of Physics of Materials ASCR

10:40 AM

Plastic Deformation of InSb Micro-pillars: A Comparative Study Between Spatially Resolved Laue and Monochromatic X-ray Micro-diffraction Maps: Tarik Sadat¹; Mariana Verezhak²; Pierre Godard¹; Pierre-Olivier Renault¹; Steven Van Petegem²; Vincent Jacques³; Ana Diaz²; Daniel Grolimund²; *Ludovic Thilly*¹; ¹University Of Poitiers; ²Paul Scherrer Institute; ³LPS-Orsay

11:00 AM

Texture Evolution of Warm Rolled Uranium Plate and its Effects on Formability: *Ryan Mier*¹; Cody Miller¹; Daniel Coughlin¹; Rodney McCabe¹; ¹Los Alamos National Laboratory

11:20 AM

In Situ EBSD Characterization of Lattice Rotation during Tensile Testing of Ti-6Al-4V: A Tool for the Analysis of Deformation Processes and Strain Partitioning: *Samuel Hemery*¹; Patrick Villechaise²; ¹Pprime Institute - ENSMA; ²Institute Prime - ENSMA

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Development in Rare Earth Permanent Magnets

Sponsored by: Federation of European Materials Societies (FEMS), TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Frank Johnson, Niron Magnetics, Inc.; Paul Ohodnicki, National Energy Technology Laboratory; Alex Leary, Nasa Grc; Orlando Rios, Oak Ridge National Laboratory; Alessandra Hool, ESM Foundation

Monday AM | March 11, 2019

225B | Henry B. Gonzalez Convention Center

Session Chair: Scott McCall, Lawrence Livermore National Laboratory

8:00 AM Invited

Prospect of $\text{Sm}(\text{Fe},\text{Co})_{12}$ -based Permanent Magnets: *Kazuhiro Hono*¹; ¹National Institute for Materials Science

8:30 AM Invited

Recent Progress in RFe_{12} -type Compounds for Permanent Magnet Applications: *Daniel Salazar*¹; ¹BCMaterials

9:00 AM

Nanocrystalline Multifunctional Pr-Co Compounds: Wassim Bouzidi¹; Thomas Bartoli¹; Alain Michalowicz¹; Jacques Moscovici¹; Najeh Mliki¹; *Lotfi Bessais*¹; ¹CNRS

9:20 AM

Effect of Magnetic Field Processing on CeCo-x Bulk Cast Magnets: *Michael Kesler*¹; Andriy Palasyuk²; Orlando Rios¹; Ryan Ott²; Ikenna Nlebedim²; Michael McGuire¹; ¹Oak Ridge National Laboratory; ²Ames Laboratory

9:40 AM Break

10:00 AM Invited

Development of Hard Magnetic Properties in Pr-Co-B Alloys: *Cajetan Ikenna Nlebedim*¹; Matthew Kramer¹; Michael McGuire²; Mariappan Paranthaman²; ¹Ames Laboratory; ²Oak Ridge National Laboratory

10:30 AM

Strategies to Improve Mechanical Strength of REPMs: *Baozhi Cui*¹; Jun Cui¹; ¹Ames Laboratory DOE

10:50 AM

New Rare Earths Reduced High Performance Magnets: *Andriy Palasyuk*¹; Tej Lamichhane²; Olena Palasyuk¹; Michael Onyszczak²; Sergey Bud'ko²; Paul Canfield²; ¹Ames Laboratory; ²Iowa State University

11:10 AM

Site Specific Magnetic Anisotropy in Rare Earth and Transition Metal Based Permanent Magnetic Materials: *Durga Paudyal*¹; Renu Choudhary¹; ¹Ames Laboratory

ELECTRONIC MATERIALS

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

Sponsored by: TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Kazuhiro Nogita, University of Queensland; Tae-Kyu Lee, Portland State University; Yan Li, Intel Corporation; Christopher Gourlay, Imperial College London; Zhi-Quan Liu, Chinese Academy of Sciences; Rahul Panat, Carnegie Mellon University; Albert T. Wu, National Central University; Andre Delhaise, Celestica; Mohd Arif Salleh, Universiti Malaysia Perlis

Monday AM | March 11, 2019
216A | Henry B. Gonzalez Convention Center

Session Chairs: Nilesh Badwe, Intel Corporation; Fu Guo, Beijing University of Technology

8:00 AM Introductory Comments

8:05 AM

Effect of Thermomigration-electromigration Coupling on Mass Transport in Cu Thin Films: Nalla Somaiah¹; Abhik Choudhury¹; Praveen Kumar¹; ¹Indian Institute of Science

8:25 AM

Electromigration and Thermally-induced Damage in Single and Bicrystal Sn Solder Joints Analyzed by Electron Backscatter Diffraction and X-ray Tomography: Marion Branch Kelly¹; Nikhilesh Chawla¹; ¹Arizona State University

8:45 AM

Effect of Reflow Profile on Microstructure and Mechanical Properties of Low Melting Alloy (SAC/SnBi): Mohammed Genanu¹; Faramarz Hadian¹; Octavie Lenignon Kouame¹; Michael Meilunas¹; Jim Wilcox¹; Eric Cotts¹; ¹Binghamton University

9:05 AM

Understanding Driving Forces and Mechanisms of Tin Whisker Formation Using Multi-physics Simulations in a Crystal Plasticity Framework: Aritra Chakraborty¹; Pratheek Shanthraj²; Philip Eisenlohr¹; ¹Michigan State University; ²The University of Manchester

9:25 AM Break

9:45 AM

Mechanical Reliability of Photovoltaic Cells under Cyclic Thermal Loading: Dipali Sonawane¹; Praveen Kumar¹; ¹Indian Institute of Science

10:05 AM

Mechanism of Electromigration Failure in Micro Solder Joint: Hossein Madanipour¹; Choong-un Kim¹; Yiram Kim¹; ¹University of Texas Arlington

10:25 AM

Effect of Strengthening Mechanism, Ageing and Shear Rate on Peak Force and Absorbed Energy of Tin-based Solder Balls Reflowed to a Copper Substrate: Keith Sweatman¹; Wayne Ng¹; Tetsuya Akaiwa¹; Pavithiran Narayanan¹; Tetsuro Nishimura¹; Takatoshi Nishimura¹; ¹Nihon Superior Co Ltd

10:45 AM

Microelasticity Modeling of Defects and Their Role in the Performance of Tin Solder Interconnects: Zachary Morgan¹; Yongmei Jin¹; Vahid Attari²; Raymundo Arroyave²; ¹Michigan Technological University; ²Texas A&M University

11:05 AM

Compression and Tension Stress Effect on Wafer Level Chip Scale Package Thermal Cycling Performance: Tae-Kyu Lee¹; Andy Hsiao¹; Mohamed Sheikh¹; ¹Portland State University

CHARACTERIZATION

Advanced Real Time Imaging – Iron and Steelmaking I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, US Department of Energy - National Energy Technology Laboratory; P. Chris Pistorius, Carnegie Mellon University; Candan Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zuotai Zhang, Southern University of Science and Technology; Neslihan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Saito, Kyushu University; Yongsug Chung, Korea Polytechnic University; Bryan Webler, Carnegie Mellon University

Monday AM | March 11, 2019

302B | Henry B. Gonzalez Convention Center

Session Chair: Jinichiro Nakano, United States Department of Energy National Energy Technology Laboratory

8:00 AM Keynote

Application of Confocal Scanning Laser Microscope at ArcelorMittal Global R&D: *Hongbin Yin*¹; ¹ArcelorMittal Global R&D

8:30 AM Invited

Visualization for Molten Slag Clogging Behavior during Softening and Melting of Slag Particles Packed Bed with Micro CT Observation: *Ko-ichiro Ohno*¹; Takayuki Maeda¹; Kazuya Kunitomo¹; ¹Kyushu University

9:00 AM

Wettability of Graphite-CaO·2Al₂O₃ Composites against Molten CaO-SiO₂-Al₂O₃-MgO Sags: *Ziyao Zhang*¹; Noritaka Saito¹; Kunihiro Nakashima¹; ¹Kyushu University

9:20 AM

A Novel Method of Surface Tension Test for Melt Slags Based on Hot Thermocouple Technique: *Zhe Wang*¹; Guanghua Wen¹; Ping Tang¹; Zibing Hou¹; ¹Chongqing University

9:40 AM Break

10:00 AM Invited

In Situ Observation on the Interactions of Non-metallic Inclusions on the Surface of Liquid Steel: *Youngjo Kang*¹; Piotr Scheller²; Kazuki Morita³; Sichen Du⁴; ¹Dong-A University; ²University of Science and Technology Beijing, China/TU Bergakademie Freiberg, Germany.; ³The University of Tokyo; ⁴Royal Institute of Technology

10:30 AM

Apparent Size of Liquid Inclusions at the Steel-gas Interface: Mauro Ferreira¹; *P. Chris Pistorius*¹; ¹Carnegie Mellon University

10:50 AM

The Effect of Viscosity of Liquid Slags on Wetting and Spreading Kinetics in Contact with MgO-C Refractory.: *Yongsug Chung*¹; Jong Oh Jo²; ¹Korea Polytechnic University; ²Hyundai Steel Company

MATERIALS PROCESSING

Advances in Surface Engineering — Session I

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Rajeev Gupta, The University of Akron; Sandip Harimkar, Oklahoma State University; Arif Mubarok, PPG Industries; Deepak Kumar, Baker Hughes, A GE Company; Tushar Borkar, Cleveland State University; Dong Lin, Kansas State University

Monday AM | March 11, 2019
210A | Henry B. Gonzalez Convention Center

Session Chairs: Kumar Sundaram, Novelis Corporation; Rajeev Gupta, The University of Akron; Sedigheh Rashidi, The University of Akron

8:00 AM Invited

The Roles of Al and Sn Alloying on Corrosion of Antimicrobial Cu-Al-Sn Alloys.: Mike Hutchison¹; Carol Glover¹; *John Scully*¹; ¹University of Virginia

8:20 AM

Interaction between Additive Manufacturing Defects and Two Corrosive Environments: *Holly Martin*¹; Brett Conner¹; ¹Youngstown State University

8:40 AM Invited

Graphene Coating: A Novel Nano Approach for Remarkable Corrosion Resistance: *Raman Singh*¹; ¹Monash Univeristy

9:00 AM

Influence of Heat Treatment on the Corrosion Resistance of AZ31B Cold Sprayed by AA7075: *Sugrib Shaha*¹; Yuna Xue¹; Xin Pang¹; Hamid Jahed¹; ¹University of Waterloo

9:20 AM Break

9:40 AM

Pulse Galvanostatic Electrodeposition of Ag-Cu Thin Film Coating with Advanced Mechanical and Corrosion Properties: *Nandita Kayal*¹; Sambedan Jena¹; Sourav Das¹; Arijit Mitra¹; Siddhartha Das¹; Karabi Das¹; ¹Indian Institute of Technology Kharagpur

10:00 AM

Study on the Microstructure and Thermal Corrosion Behavior of Nanostructured GH864 Superalloy: *Wenbin Ma*¹; ¹Beihang University

10:20 AM

Laser Shock Processing of Ceramic Materials: *Bai Cui*¹; Fei Wang¹; Xueliang Yan¹; Chenfei Zhang¹; Leimin Deng¹; Yongfeng Lu¹; Michael Nastasi¹; ¹University of Nebraska, Lincoln

10:40 AM

Effect of Powder Composition, Laser Power and Load Variation on the Wear Depth and Wear Volume of Hybrid Titanium Alloy MMCs.: *Franklin Ochonogor*¹; Esther Akinlabi¹; Kasongo Nyembwe¹; ¹University of Johannesburg

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering – Electronic, Atomistic, and Machine Learning Algorithms for Study and Design of Materials

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Prasanna Balachandran, University of Virginia; Douglas Spearot, University of Florida; Charudatta Phatak, Argonne National Laboratory; Srinivasan Srivilliputhur, University of North Texas

Monday AM | March 11, 2019
304A | Henry B. Gonzalez Convention Center

Session Chair: Mohsen Asle Zaeem, Colorado School of Mines

8:00 AM Introductory Comments

8:10 AM Invited

GPU-Enabled Algorithms for Ground-State and Excited-State Density Functional Tight Binding Simulations: *Bryan Wong*¹; M. Belen Oviedo¹; Sarah Allec¹; ¹University of California, Riverside

8:40 AM Invited

A Variational Principle for Mass Transport Calculations: *Dallas Trinkle*¹; ¹University of Illinois, Champaign

9:10 AM

Algorithms and Metrics for Characterization of Arbitrary Atomic Structures: *Dustin Doty*¹; *Brandon Snow*¹; Oliver Johnson¹; ¹Brigham Young University

9:30 AM Break

10:00 AM Invited

Applications of Machine Learning to Potential Development for Molecular Dynamics of Ti: *Christopher Barrett*¹; *Doyle Dickel*¹; ¹Mississippi State University

10:30 AM

A Multiscale Computational Framework for 2D Titanium Carbides (Ti_n+1C_n) MXenes: *Ning Zhang*¹; *Yu Hong*¹; *Mohsen Asle Zaeem*¹; ¹Colorado School of Mines

10:50 AM

Development, Testing, and Application of Physically-informed Artificial Neural Network Potentials for Silicon and Germanium Systems: *James Hickman*¹; *Ganga Purja Pun*²; *Francesca Tavazza*¹; *Yuri Mishin*²; ¹National Institute of Standards and Technology; ²George Mason University

ELECTRONIC MATERIALS

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

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Ensicaen University of Caen; Soon-Jik Hong, Kongju National University; Philippe Jund, Montpellier University; Lan Li, Boise State University; Takao Mori, Nims; Hsin-Jay Wu, National Sun Yat-sen University; Tiejun Zhu, Zhejiang University

Monday AM | March 11, 2019

216B | Henry B. Gonzalez Convention Center

Session Chairs: Sinn-wen Chen, National Tsing Hua University; Takao Mori, National Institute for Materials Science

8:00 AM Introductory Comments

8:05 AM Invited

Fabrication and Properties Evaluation of Thermoelectric Thin Films: *Takao Mori*¹; ¹NIMS

8:25 AM Invited

Advanced Materials for Efficient High Temperature Thermoelectric Power Generation: *Jean-Pierre Fleurial*¹; Sabah Bux¹; ¹Jet Propulsion Laboratory

8:45 AM Invited

Boosting the Thermoelectric Performance to New Borders: Thin Film Heusler Systems: *Ernst Bauer*¹; Bernhard Hinterleitner¹; Christoph Eisenmenger¹; Michael Stöger-Pollach¹; Naoyuki Kawamoto²; Yohei Kakefuda²; Takao Mori²; Yongpeng Shi³; Sami Ullah³; Qing Xie³; Xing-Qiu Chen³; ¹Vienna University of Technology; ²NIMS Tsukuba; ³Shenyang National Laboratory for Materials Science, Shenyang

9:05 AM

Progress towards the Development of High Temperature Advanced Thermoelectric Devices: Performance, Long Term Stability and Degradation Mechanisms: *Billy Li*¹; Samad Firdosy¹; Jong-Ah Paik¹; Ike Chi¹; Fivos Drymiotis¹; Michell Aranda¹; Obed Villalpando¹; Kevin Smith¹; George Nakatsukasa¹; Thierry Caillat¹; Vilupanur Ravi¹; Jean-Pierre Fleurial¹; ¹Jet Propulsion Laboratory

9:25 AM Invited

Customizing Ternary Co-Ge-Te Skutterudites to Boost Thermoelectric Performance: *Li-Chyong Chen*¹; Kuei-Hsien Chen²; Deniz Wong²; ¹National Taiwan University; ²Academia Sinica

9:45 AM Break

10:05 AM Invited

Properties and Applications of 2D semiconductors: *Kyeongjae Cho*¹; ¹University of Texas, Dallas

10:25 AM Invited

Effective Approaches for Dramatically Enhancing the Thermoelectric Properties of Various Oxide Ceramics Through Engineering the Grain Boundaries: *Xueyan Song*¹; Liang Liang¹; Cesar-Octavio Romo-De-La-Cruz¹; Sergio Paredes Navia¹; Cullen Boyle¹; Bryan Jackson¹; Alec Hinerman¹; Jacky Prucz¹; Yun Chen¹; ¹West Virginia University

CHARACTERIZATION

Atom Probe Tomography for Advanced Characterization of Metals, Minerals and Materials II — General Methods and Development

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

Program Organizers: Haiming Wen, Missouri University of Science and Technology; David Seidman, Northwestern University; Keith Knipling, Naval Research Laboratory; Gregory Thompson, The University of Alabama; Simon Ringer, University of Sydney; Arun Devaraj, Pacific Northwest National Laboratory; Gang Sha, Nanjing University of Science and Technology

Monday AM | March 11, 2019
303A | Henry B. Gonzalez Convention Center

Session Chairs: David Seidman, Northwestern University; Haiming Wen, Missouri University of Science & Technology

8:00 AM Introductory Comments

8:05 AM Invited

Bringing Atom Probe Tomography to a Manufacturing Environment: *Robert Ulfing*¹; David Reinhard¹; Tim Payne¹; Dan Lenz¹; Ty Prosa¹; Peter Clifton¹; Olivier Dulac¹; David Larson¹; ¹CAMECA Instruments Inc.

8:40 AM Invited

Selected Topics in Atom Probe Tomography: Yield and Reconstruction: *David Larson*¹; Brian Geiser¹; Ty Prosa¹; ¹Cameca

9:15 AM

Development and Application of an Integrated Framework of Hierarchical Density-based Cluster Analysis for Challenging Atom Probe Tomography Datasets: *Iman Ghamarian*¹; Emmanuelle Marquis¹; ¹University of Michigan

9:35 AM Break

9:55 AM Invited

Improving Atom Probe with Field Ion Microscopy: *Leigh Stephenson*¹; Shyam Katnagallu¹; Isabelle Mouton¹; Christoph Freysoldt¹; Dierk Raabe¹; Baptiste Gault¹; ¹Max Planck Institut für Eisenforschung

10:30 AM

In Situ Field Evaporation of Atom Probe Tomography Specimens Followed in Transmission Electron Microscopy: *Williams Lefebvre*¹; Antoine Normand¹; Celia Castro¹; François Vurpillot¹; ¹Normandie University UNIROUEN, INSA Rouen, CNRS, Groupe de Physique

des Matériaux, F-

10:50 AM Invited

Data Science for Atom Probe Tomography: *Krishna Rajan*¹;

¹University At Buffalo, State University of New York

BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces I

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

Program Organizers: Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Po-Yu Chen, National Tsing Hua University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines

Monday AM | March 11, 2019

217C | Henry B. Gonzalez Convention Center

Session Chairs: Candan Tamerler, University of Kansas; Po-Yu Chen, National Tsing Hua University

8:00 AM Keynote

Atomically Precise Manufacturing: *David Forrest*¹; ¹US Department Of Energy

8:40 AM

Polarized Raman Spectroscopy of Self-assembled Peptides for Characterization of Molecular Conformations: *Nao Koishihara*¹;

Takuma Narimatsu¹; Peiyong Li¹; Chen Chen¹; Yuhei Hayamizu¹;

¹Tokyo Institute of Technology

9:00 AM Keynote

Creating Functional Bionanomaterials By Influencing Biotic-

abiotic Interactions: Joseph Slocik¹; Zhifeng Kuang¹; Kristi Singh¹;

Patrick Dennis¹; *Rajesh Naik*¹; ¹Air Force Research Laboratory

9:40 AM Break

10:00 AM Keynote

A Decade of Research on Manufacturing at the Nano-bio

Interface: *Mohan Edirisinghe*¹; ¹University College London

10:40 AM

Unveiling the Ultrastructural and Mechanistic Aspects of Zebrafish Fin Regeneration by the PeakForce Quantitative Nanomechanical Mapping Technique: *Yang-Rong Shih*¹; Yung-Jen Chuang¹; Po-Yu Chen¹; ¹National Tsing Hua University

11:00 AM Invited

Controlling the Ionic Environment of Extracellular Fluid: *Marco Rolandi*¹; ¹University of California, Santa Cruz

BIOMATERIALS

Biological Materials Science — Biological and Natural Materials I

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

Program Organizers: Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama at Birmingham; Jing Du, Penn State University

Monday AM | March 11, 2019

217A | Henry B. Gonzalez Convention Center

Session Chairs: Rajendra Kasinath, DePuy Synthes, Johnson and Johnson; Steven Naleway, University of Utah

8:00 AM Introductory Comments

8:05 AM Keynote

Fracture, Disease and Therapies in Human Bone: *Robert Ritchie*¹; ¹University of California, Berkeley

8:45 AM

Computational Model of Bone lamella: *Mohammad Maghsoudi-Ganjeh*¹; Liqiang Lin¹; Xiaodu Wang¹; Xiaowei Zeng¹; ¹University of Texas at San Antonio

9:05 AM

Biological Tissue Stiffness Control by 2-Propanol and Moisture due to Collagen Fibril Intermolecular Spacing Changes: *Richard Haverkamp*¹; ¹Massey University

9:25 AM

3D Contact and Strain in Alveolar Bone Under Tooth/Implant Loading: *Yuxiao Zhou*¹; Chujie Gong¹; Mehran Hossaini-Zadeh²;

Jing Du¹; ¹Pennsylvania State University; ²Temple University

9:45 AM Break

10:05 AM Invited

Shear-punch Testing of Human Cranial Bone and Surrogate Materials: *Andrew Brown*¹; C. Allan Gunnarsson¹; Karin Rafaels¹; Stephen Alexander²; Thomas Plaisted¹; Tusit Weerasooriya¹; ¹U.S. Army Research Laboratory; ²SURVICE Engineering

10:35 AM

Study on the Toughening Mechanisms of Collagenous Materials by using Real-time X-ray Characterization and Imaging: *Wen Yang*¹; Haocheng Quan¹; Eric Schaible²; Robert Ritchie³; Marc Meyers¹; ¹University of California San Diego; ²Lawrence Berkeley National Laboratory; ³University of California, Berkeley

10:55 AM Invited

Bird Feathers and Bones: Ultralight Natural Materials: *Marc Meyers*¹; Eduard Arzt²; Pablo Zavattieri³; Horacio Espinosa⁴; ¹University of California, San Diego; ²INM - Leibniz Institute for New Materials; ³Purdue University; ⁴Northwestern University

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications – Thermodynamics and Structural Properties

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Yongfeng Zhang, Idaho National Laboratory; Xian-ming (David) Bai, Virginia Polytechnic Institute and State University; David Andersson, Los Alamos National Laboratory; Thierry Wiss, European Commission- JRC -Institute of Transuranium Elements

Monday AM | March 11, 2019
214A | Henry B. Gonzalez Convention Center

Session Chairs: David Andersson, Los Alamos National Laboratory; Haixuan Xu, University of Tennessee

8:00 AM Invited

Atomic Structure of Overstoichiometric Uranium Oxide: Insights from Molecular Dynamics Simulations with a Many Body Variable Charge Model: *Jean-paul Crocombette*¹; Aurélien Soulié²; ¹CEA Saclay DEN-SRMP; ²CEA Saclay DEN-SRMP

8:30 AM

Mechanisms for Diffusion of Uranium Interstitials in UO_2 : *Anders Andersson*¹; Xiang-Yang Liu¹; Topher Matthews¹; ¹Los Alamos National Laboratory

8:50 AM

Characterization of Defects Structures in Fast-reactor MOX Fuels: *Riley Parrish*¹; Assel Aitkaliyeva¹; ¹University of Florida

9:10 AM Invited

Structural Features in Mixed Uranium Oxides with Fluorite-related Structures: *Gianguido Baldinozzi*¹; ¹Laboratoire SPMS CNRS Centralesupelec and CEA DEN DMN SRMA

9:40 AM Break

10:00 AM Invited

Crystallographic and Electronic Structure in Ln-U-O Compounds: *Haixuan Xu*¹; Luis Casillas-Trujillo¹; Gianguido Baldinozzi²; Kurt Sickafus¹; ¹University of Tennessee; ²Centre National de la Recherche Scientifique

10:30 AM

Uranium Silicide-based Nuclear Fuel Phase Relations and Computed In-reactor Thermochemical Behavior: *Theodore Besmann*¹; Tashiema Wilson¹; Denise Lopes¹; Emily Moore¹; Vancho Kocevski¹; Joshua White²; Jacob McMurray³; Dongwon Shin³; Antoine Claisse⁴; Peng Xu⁴; ¹University Of South Carolina; ²Los Alamos National Laboratory; ³Oak Ridge National Laboratory; ⁴Westinghouse Company, LLC

10:50 AM

Effects of Different Cation Doping on the Physical Properties of $Gd_2Zr_2O_7$ Pyrochlores: *Fengai Zhao*¹; Xianming Bai¹; Haiyan Xiao²; Xiaotao Zu²; ¹Virginia Polytechnic Institute and State University; ²University of Electronic Science and Technology of China

11:10 AM

An Engineering Representation of the Thermal Conductivity of a UO_2 and BeO Composite Nuclear Fuel: *Ryan Brito*¹; Sean McDevitt¹; ¹Texas A&M University Department of Nuclear Engineering

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Characterization Method Development I

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Monday AM | March 11, 2019
212B | Henry B. Gonzalez Convention Center

Session Chair: Jian Li, CanmetMATERIALS

8:00 AM Introductory Comments

8:05 AM Invited

Development of Stereological Transfer Functions for Grain and Particle Size Characterization: *Eric Payton*¹; *Austin Gerlt*²; *Amanda Criner*¹; ¹Air Force Research Laboratory; ²UES, Inc

8:25 AM Invited

Commentary - Are There Still Places for Gallium FIB: *Jian Li*¹; ¹Canmetmaterials

8:45 AM

Towards the Materials Oscilloscope: In-situ and Time-resolved Diffraction from Metals Related to Thermo Mechanical Processes: *Klaus-Dieter Liss*¹; ¹Guangdong Technion - Israel Institute of Technology (GTIIT)

9:05 AM Invited

Development of Road Surface Scanning System Using Multiple Sensing Techniques: *Jeongguk Kim*¹; ¹Korea Railroad Research Institute

9:25 AM

Crystallizing Spherical Electron Backscatter Diffraction-Indexing and Cross Correlation: *Ralf Hielscher*¹; *Felix Bartel*¹; *Alex Foden*²; *Thomas Britton*²; ¹TU Chemnitz; ²Imperial College London

9:45 AM Break

10:00 AM

Viscosity Measurements of Ionic Liquid Lubricants for Space Applications: *Sayavur Bakhtiyarov*¹; ¹New Mexico Institute of Mining & Technology

10:20 AM

Convolutional Neural Networks for Accelerated Crystallographic Orientation Mapping: *Yu-Feng Shen*¹; Reeru Pokharel¹; Turab Lookman¹; Anil Kumar¹; Thomas Nizolek¹; ¹Los Alamos National Laboratory

10:40 AM

Structure of Nano-crystalline Thin Layers by Glancing Incidence X-ray Diffraction: *Gianguido Baldinozzi*¹; Vassilis Pontikis²; David Simeone¹; ¹Laboratoire SPMS CNRS Centralesupelec and CEA DEN DMN SRMA; ²CEA DRF Iramis

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Nanostructure and Characterization of Materials

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

**Monday AM | March 11, 2019
 006A | Henry B. Gonzalez Convention Center**

Session Chairs: Juan Pablo Escobedo-Diaz, University of New South Wales; Eric Herbert, Michigan Technological University

8:00 AM Introductory Comments

8:05 AM

Synthesis and Development of Sm Microalloyed Zr-Cu-Al Based Metallic Glasses and Their Nanocomposites: *Fatih Sikan*¹; *Huseyin*

*Basri Cerci*²; Yunus Eren Kalay¹; Ilkay Kalay²; ¹Middle East Technical University; ²Cankaya University

8:25 AM

Experimental Study on Pelletizing of Fine Grinding Hematite Ore Powder: *Tian Yunqing*¹; Qing Gele¹; ¹Research Institute of Technology, Shougang Group Corporation

8:45 AM

A Comparison between ZnO Hexagonal Micro/Nano Prisms Deposited on Aluminum and Glass Substrates: *Shadia Ikhmayies*¹; ¹Al Isra University

9:05 AM

Characterization of Nanocrystalline Electrodeposited Fe-C Coatings: *Jacob Nielsen*¹; Per Møller¹; Karen Pantleon¹; ¹The Technical University of Denmark

9:25 AM Break

9:40 AM

Microwave-assisted One-step Synthesis of FeCo/Graphene Nanocomposite for Microwave Absorption: *Jianhui Peng*¹; Zhiwei Peng¹; Liancheng Wang¹; Leixia Zheng¹; Zhongping Zhu¹; Guanghui Li¹; Tao Jiang¹; ¹Central South University

10:00 AM

Dynamic Normal Grain Growth (DNGG) in an Interstitial-free Steel: *Ryann Rupp*¹; Eric Taleff²; ¹Idhao National Laboratory; ²University of Texas At Austin

10:20 AM

Synthesis of Nickel/Sepiolite Nano Composite: Novel Catalytic and Antibacterial Nano Materials: Huaguang Wang¹; *Bowen Li*¹; ¹Michigan Tech University

CORROSION

Coatings and Surface Engineering for Environmental Protection — Corrosion Mechanisms & Performance Evaluations I

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Arif Mubarok, PPG Industries; Rajeev Gupta, The University of Akron; Raul Rebak, GE Global Research; Michael Mayo, PPG Industries; Brian Okerberg, PPG Industries

Monday AM | March 11, 2019

Session Chairs: Raul Rebak, GE Global Research; Arif Mubarok, PPG

8:00 AM Invited

Coating Performance and Atmospheric Corrosion Measurements: *Brandi Clark*¹; Fritz Friedersdorf¹; Jacob Wright¹; Liam Agnew¹; ¹Luna Innovations, Inc

8:40 AM

Corrosion Study of Cu-Ag Alloy in the Presence of Benzotriazole Inhibitor: *Hooman Rahman*¹; Efsthios Meletis¹; ¹Department of Materials Science and Engineering, University of Texas at Arlington

9:00 AM

Electrochemical Mechanism and Preparation of Cr-low Carbon Steel Composite in a NaCl-KCl-NaF-Cr₂O₃ Molten Salt: *Shixian Zhang*¹; Yungang Li¹; Kai Hu²; Xiaoping Zhao³; ¹North China University of Science and Technology; ²Chongqing University; ³Hebei College of Industry and Technology

9:20 AM

Influence of Surface States of Steels on Inhibition Performance of an Imidazoline-based Inhibitor in CO₂ Environments: Huanhuan Zhang¹; Xiaolu Pang¹; Huisheng Yang¹; Yanjing Su¹; *Kewei Gao*; ¹University of Science and Technology Beijing

9:40 AM Break

10:00 AM

Influence of Aluminum Concentration in Zinc Bath on Galvanizing Behavior of a Dual Phase High Strength Steel: *Kefan Chen*¹; Bin Li¹; Imran Aslam²; ¹University of Nevada, Reno; ²Mississippi State University

10:20 AM Invited

Diamond-like Carbon Coating for Drill Collars – Test Experiences: *Nausha Asrar*¹; Jeffrey Ham¹; ¹Schlumberger

MATERIALS DESIGN

Computational Materials Discovery and Design — Applications to Surfaces, Interfaces, and 2D Materials

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Oliver Johnson, Brigham Young University; Arunima Singh, Arizona State University; Jake Bair, Pacific Northwest National Laboratory; Christopher Weinberger, Colorado State University; Timofey Frolov, Lawrence Livermore National Laboratory; Ning Zhang, Colorado School of Mines; Fadi Abdeljawad, Clemson University; Richard Hennig, University of Florida; Mikhail Mendeleev, Ames Laboratory; Avinash Dongare, University of Connecticut

Monday AM | March 11, 2019
304C | Henry B. Gonzalez Convention Center

Session Chairs: Heather Murdoch, US Army Research Laboratory; Jake Bair, Pacific Northwest National Laboratory

8:00 AM Invited

Designer 2D Metals and Weyl Semimetals: *Prineha Narang*¹; ¹Harvard University

8:30 AM Invited

Exploration of Interfacial Transitions by Correlating Atomic Scale Microscopy with Atomistic Simulations: *Christian Liebscher*¹; Nicolas Peter¹; Thorsten Meiners¹; Gerhard Dehm¹; ¹Max-Planck-Institut

9:00 AM

A Screening of Pt Alloys with P-block Elements and the DFT Study of Alloying Effect for Oxygen Reduction Reaction: Jung Woo Choi¹; Soonho Kwon¹; *Hyuck Mo Lee*¹; ¹KAIST

9:20 AM

Superior Structural, Elastic and Electronic Properties of 2D Titanium Nitride MXenes Over Carbide MXenes: A Comprehensive First Principles Study: *Ning Zhang*¹; Yu Hong¹; Mohsen Asle Zaeem¹; ¹Colorado School of Mines

9:40 AM Break

10:00 AM

Computational Discovery and Design of 2D Transition Metal Dichalcogenide Heterostructures: *Lan Li*¹; ¹Boise State University

10:20 AM

Goniopolarity of Thermal Transport Behavior in Layered 2D Materials: *Yaxian Wang*¹; Joshua Goldberger¹; Joseph Heremans¹; Maxx Arguilla¹; Wolfgang Windl¹; Bin He¹; ¹Ohio State University

10:40 AM

Computational Design of Non-precious Transition Metal/ Nitrogen Doped Carbon as Effective Fuel Cell Electrocatalysts: *Guofeng Wang*¹; *Kexi Liu*¹; *Boyang Li*¹; ¹University of Pittsburgh

11:00 AM

Enhancement of Chemical Stability of Phosphorene and Heterostructures on Its Basis: Results of Ab-initio Modelling: *Andrey Kistanov*¹; *Elena Korznikova*²; ¹Nanyang Technological University; ²IMSP RAS

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Computational Discovery

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tournet, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

Monday AM | March 11, 2019

225C | Henry B. Gonzalez Convention Center

Session Chairs: Fadi Abdeljawad, Clemson University; Kristin Persson, University of California, Berkeley

8:00 AM Invited

Computational Discovery of Novel Structural and Functional Heusler Compounds: *Christopher Wolverton*¹; ¹Northwestern University

8:30 AM

A Review on the Thermodynamic Stability of Perovskite Cathode Materials in Presence of Atmosphere Impurities for Application in Solid Oxide Fuel Cells: *Shadi Darvish*¹; *Yu Zhong*¹; ¹Worcester Polytechnic Institute

8:50 AM

Thermodynamic Design of Dual Phase Steels within an Information-fusion Framework: *Richard Couperthwaite*¹; *Raymundo Arroyave*¹; *Ibrahim Karaman*¹; *Ankit Srivastava*¹; *Douglas*

Allaire¹; ¹Texas A&M University

9:10 AM Invited

Discovery and Design of Novel Materials for Energy Applications:

*Kristin Persson*¹; ¹University of California Berkeley

9:40 AM Break

10:00 AM Invited

Thermodynamic and Kinetic Descriptions of Multicomponent

Crystals: *Anton Van Der Ven*¹; John Thomas¹; Brian Puchala¹; Anirudh Natarajan¹; ¹University of California

10:30 AM

Design and Discovery of Ceramic Matrix Composites by Assessment of Inverse Phase Stability and Microstructural Evolution: *Elias Munoz*¹; Vahid Attari¹; Thien Duong¹; Raymundo Arroyave¹; ¹Texas A&M University

10:50 AM

First-principle Studies of Charged Point Defects in Two-dimensional Semiconductors: *Biswas Rijal*¹; Christoph Freysoldt²; Enrique Batista³; Ping Yang³; Richard Hennig¹; ¹University Of Florida; ²Max Planck Institute for Iron Research; ³Los Alamos National Laboratory

11:10 AM Invited

Phase Equilibria and Kinetics of Sodium Superionic Conductors:

*Shyue Ping Ong*¹; ¹University of California, San Diego

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Behavior of High Temperature Alloys – High Entropy Alloys and Strength Models

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

Program Organizers: Michael Titus, Purdue University; Qiang Feng, University of Science and Technology Beijing; Akane Suzuki, GE Global Research; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Sammy Tin, Illinois Institute of Technology; Martin Detrois, National Energy Technology Laboratory

Monday AM | March 11, 2019

301C | Henry B. Gonzalez Convention Center

Session Chairs: Michael Titus, Purdue University; Martin Detroids, National Energy Technology Laboratory

8:00 AM Invited

Single-crystal Mechanical Behavior of High- and Medium-entropy Alloys: Florian Fox¹; Pascal Thome¹; J. Pfetzing-Micklich¹; A. Kostka¹; Gunther Egger¹; *Easo George*²; ¹Ruhr University Bochum; ²Oak Ridge National Laboratory

8:30 AM Invited

Refractory High Entropy Alloys as Potential Candidates for High Temperature Applications beyond Ni Based Superalloys and Conventional Refractory Alloys: *Oleg Senkov*¹; Daniel Miracle¹; Todd Butler¹; Kevin Chaput¹; Raj Banerjee²; ¹Air Force Research Laboratory; ²University of North Texas

9:00 AM

Design, Mechanical Performance and Deformation Characteristics of a New ' Strengthened Ni-based Superalloy with High-entropy Matrix: *Martin Detroids*¹; Paul Jablonski¹; Stoichko Antonov²; Sammy Tin³; Jeffrey Hawk¹; ¹National Energy Technology Laboratory; ²University of Science and Technology Beijing; ³Illinois Institute of Technology

9:20 AM

Predictive Modeling of Temperature-dependent Hardness: *Hongyeun Kim*¹; Laszlo Kecskes²; Zi-Kui Liu¹; ¹Penn State University; ²Johns Hopkins University

9:40 AM Break

10:00 AM Invited

Solution Strengthening in FCC Random Alloys: *Varvenne Celine*¹; Guillaume Bracq²; Mathilde Laurent-Brocq²; William Curtin³; ¹Cnrs Aix-Marseille University; ²UPEC - CNRS; ³EPFL

10:30 AM Invited

Large Scale Atomistic Simulations of The Interaction of Glide Screw Dislocations with Twin Boundaries in FCC Bipillars: *Satish Rao*¹; Edwin Antillon¹; Brahim Akdim¹; Triplicane Parthasarathy¹; Christopher Woodward²; ¹UES, Inc.; ²U.S. Air Force Research Laboratory

11:00 AM

Intrinsic Nano Diffusion-couples for Studying High-temperature Diffusion in Compositionally-complex Superalloys: *Erdmann Spiecker*¹; Yolita Eggeler²; ¹University of Erlangen, Nürnberg; ²Universtity of Erlangen, Nürnberg

11:20 AM

Origin of the Significant Impact of Ta on the Creep Resistance of FeCrNi Alloys: *Xavier Sauvage*¹; Damien Magné¹; Mathieu Couvrat²; ¹CNRS - GPM - University Rouen Normandy; ²Manoir Industries

SPECIAL TOPICS

Diversity in STEM and Best Practices to Improve it — Best Practices and Lessons Learned

Program Organizers: Megan Cordill, Erich Schmid Institute; Matthew Korey, Purdue University; Jessica Krogstad, University of Illinois at Urbana-Champaign; Panthea Sepehrband, Santa Clara University

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301B | Henry B. Gonzalez Convention Center

Session Chairs: Megan Cordill, Erich Schmid Institute; Jessica Krogstad, University of Illinois, Urbana-Champaign

8:20 AM Introductory Comments

8:30 AM Invited

An Approach to Promote Equality and Diversity in a University Materials Department: *Angus Wilkinson*¹; ¹University of Oxford

9:00 AM Invited

Diversity in STEM: Retention, Graduation and Beyond: *Andrea Hodge*¹; ¹University of Southern California

9:30 AM Break

10:00 AM

Best Practices for Promoting Diversity in STEM through Outreach: Kaitlin Tyler¹; Nicole Johnson-Glauch¹; Leon Dean¹; *Jessica Krogstad*¹; ¹University of Illinois, Urbana Champaign

10:30 AM Invited

Half a Century of Diversifying TMS: *Carolyn Hansson*¹; ¹Univeersity of Waterloo

11:00 AM Invited

Navigate an Exciting STEM Career Journey through Diversity: *Isabella Van Rooyen*¹; ¹Idaho National Laboratory

MATERIALS PROCESSING

Freeze Linings: Myth and Reality — Freeze Lining I

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Juergen Schmidl, RHI Magnesita; Dean Gregurek, RHI Magnesita; Gerardo Alvear, Glencore Technology; Peter Hayes, University of Queensland; Mark Kennedy, Proval Partners SA; Maurits Van Camp, Umicore; Camilo Perez, RHI US Ltd; Stefan Luidold, University Of Leoben

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Session Chair: Juergen Schmidl, RHI Magnesita

8:00 AM Introductory Comments

8:05 AM

Basic Knowledge on Refractory Freeze Linings for Reviewing Post Mortem Studies Results: *Juergen Schmidl*¹; Dean Gregurek¹; Alfred Spanring¹; ¹RHI Magnesita

8:25 AM

Chemical Interactions between Slag and Refractory or Freeze-lining.: *Ata Fallah Mehrjardi*¹; Sina Mostaghel¹; Gerardo Alvear Flores¹; ¹Aurubis

8:45 AM

Influence of CaO/SiO₂/Al₂O₃ Ratio on the Melting Behaviour of SynCon Slags: *Dominik Hofer*¹; Stefan Luidold¹; Tobias Beckmann²; Frank Schulenburg³; ¹Montanuniversitaet Leoben; ²H.C. Starck Smelting GmbH & Co. KG; ³H.C. Starck GmbH

9:05 AM

Influence of Tap Hole Cooler Design on Matte-cooler Heat Transfer Coefficient and Freeze Lining Thickness: *Anton Ishmurzin*¹; Oliver Kuhnke¹; Daniel Kreuzer¹; ¹RHI Magnesita

9:25 AM Break

9:45 AM

Evolution of Freeze Linings in Multi-step Processes: *Tijl Crivits*¹; Ling Zhang²; Liugang Chen²; Annelies Malfliet²; ¹Umicore; ²KU Leuven

10:05 AM

Freeze Lining Refractories in Non-ferrous TSL Smelting Systems: *Stanko Nikolic*¹; Ben Hogg¹; Paul Voigt¹; ¹Glencore Technology

MATERIALS DESIGN

Gamma (FCC)/Gamma-Prime (L12) Co-Based Superalloys III — Mechanical Behavior

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

Program Organizers: Michael Titus, Purdue University; David Dye, Imperial College; Eric Lass, National Institute of Standards and Technology; Katelun Wertz, Air Force Research Laboratory; Christopher Zenk, Ohio State University

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206A | Henry B. Gonzalez Convention Center

Session Chairs: Eric Lass, National Institute of Standards and Technology; Christopher Zenk, The Ohio State University

8:00 AM Invited

Balancing the Property Suite in Co-base Superalloys: Sean Murray¹; Brent Goodlet¹; Colin Stewart¹; Carlos Levi¹; *Tresa Pollock*¹; ¹University of California, Santa Barbara

8:30 AM

Structural Evolution of a Single Crystal Co-base Superalloy during Creep at 1000°C/137 MPa: *Stoichko Antonov*¹; Song Lu¹; Longfei Li¹; Qiang Feng¹; ¹University of Science and Technology Beijing

8:50 AM

Creep Deformation Mechanisms and Compositional Changes in SX Co-base Superalloys Studied by Means of EM and APT: *Malte Lenz*¹; Yolita Eggeler¹; Julian Müller¹; Dorota Kubacka¹; Surendrar Makineni²; Christopher Zenk³; Nicklas Volz¹; Steffen Neumeier¹; Peter Felfer¹; Philip Wollgramm⁴; Gunther Eggeler⁴; Mathias Göken¹; Baptiste Gault²; Dierk Raabe²; Erdmann Spiecker¹; ¹University Erlangen Nuernberg; ²MPIE Düsseldorf; ³Ohio State University; ⁴Ruhr-Universität Bochum

9:10 AM

Effect of Tertiary Gamma Prime on the Creep Performance of a Developmental Co:Ni-Base Superalloy: *Ioannis Bantounas*¹; Vassili Vorontsov¹; Mark Hardy²; David Dye¹; ¹Imperial College London; ²Rolls-Royce Plc

9:30 AM Break

9:40 AM Invited

Wrought Co-base Superalloys – Mechanical Properties and Deformation Mechanisms: *Steffen Neumeier*¹; Mathias Göken¹; ¹University of Erlangen Nuernberg

10:10 AM Invited

Solute Segregation Effects at Planar Defects during Creep of CoNi-based Superalloys: Surendra Kumar Makineni¹; Malte Lenz²; Steffen Neumeier²; Erdmann Spiecker²; Dierk Raabe¹; *Baptiste Gault*¹; ¹Max-Planck-Institut für Eisenforschung GmbH; ²Friedrich-Alexander-Universität Erlangen-Nürnberg

10:40 AM

Crystal Plasticity Finite Element Approach to Modeling the Creep Behavior in Cobalt-based Superalloys: *Shahriyar Keshavarz*¹; Andrew Reid¹; Eric Lass¹; Carelyn Campbell¹; ¹National Institute of Standards and Technology

11:00 AM

Low Cycle Fatigue of Single Crystal γ' -Strengthened Co-based Superalloys at 750 °C in Air: *Sean Murray*¹; Jean-Charles Stinville¹; Robert Rhein¹; Patrick Callahan¹; Tresa Pollock¹; ¹University of California, Santa Barbara

11:20 AM

The Hunt for B and C in Grain Boundaries and their Role in Crack Tip Embrittlement: *Lucy Reynolds*¹; David Dye¹; Paraskevas Kontis²; Baptiste Gault²; Ioannis Bantounas¹; Mark Hardy³; ¹Imperial College; ²Max-Planck-Institut für Eisenforschung GmbH; ³Rolls-Royce plc

ENERGY & ENVIRONMENT

Green Materials Engineering: An EPD Symposium in Honor of Sergio Monteiro – Sustainable Ceramics

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Shadia Ikhmayies, Al Isra University; Jian Li, CanmetMATERIALS; Carlos Mauricio Vieira, State University of the North Fluminense; Fabio Braga, National Service of Industrial Apprenticeship (SENSI)

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008A | Henry B. Gonzalez Convention Center

Session Chairs: Felipe Lopes , UENF; Jheison Lopes , Instituto Militar de Engenharia

8:00 AM Introductory Comments

8:05 AM Keynote

Recycling of Blast Furnace Sludge into Clay Ceramic: *Carlos Fontes Vieira*¹; Lucas Amaral¹; Sergio Neves Monteiro¹; ¹State University of the North Fluminense

8:45 AM

Study of Incorporation of Fuel and Fluxing Wastes in Red Ceramics: Gabriela Barreto¹; Michelle Babisk¹; Geovana Delaqua¹; Monica Gadioli¹; *Carlos Maurício Vieira*¹; ¹Universidade Estadual do Norte Fluminense Darcy Ribeiro

9:05 AM

Technical Feasibility of Catalyst Waste as Raw Material for Ceramic Industry: *Lucas Amaral*¹; Geovana Carla Delaqua¹; Gabriela Teixeira¹; Ulisses Prado²; Sérgio Neves³; Carlos Maurício Vieira¹; ¹State University of Northern Rio de Janeiro; ²LINNING - Representation, Consulting and Projects; ³Military Engineering Institute

9:25 AM Break

9:35 AM

Incorporation of Dry Biomass of *Salvinia Auriculata* AUBL from Phytoremediation Process for Traditional Ceramics Production: *Geovana Carla Delaqua*¹; Lucas Amaral¹; Carlos Maurício Vieira¹; Sérgio Neves²; ¹Universidade Estadual do Norte Fluminense Darcy Ribeiro; ²Military Engineering Institute

9:55 AM

Evaluation of the Mechanical, Thermal and Swelling Behavior of Hydrogels Containing Clay Laponite RD: *Vinicius Dos Santos*¹; Angelica Zafalon¹; Luiz Komatsu¹; Vijaya Rangari¹; Ademar Lugão¹; Duclerc Parra¹; ¹Nuclear and Energy Research Institute

10:15 AM

Mechanical and Thermal Properties of Clay Filled Recycled Low Density Polyethylene: *Gerald Onyedika*¹; Genevive Onuegbu¹; Martin Ogwuegbu¹; ¹Federal University of Technology

10:35 AM

Physical and Mechanical Properties of Artificial Stone Produced with Granite Waste and Vegetable Polyurethane: Maria Luiza Gomes¹; Larissa Sobrinho¹; *Elaine Carvalho*¹; Rubén Sánchez Rodríguez¹; Carlos Maurício Vieira¹; Sérgio Neves Monteiro²;

¹Universidade Estadual do Norte Fluminense Darcy Ribeiro;
²Military Engineering Institute

MATERIALS PROCESSING

Heterogeneous and Gradient Materials (HGM III): Tailoring Mechanical Incompatibility for Superior Properties — Heterostructured Materials I: Strength and Ductility

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

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

Monday AM | March 11, 2019
209 | Henry B. Gonzalez Convention Center

Session Chairs: Yuntian Zhu, North Carolina State University; Xiaoxu Huang, Chongqing University; Kei Ameyama, Ritsumeikan University; Xiaolei Wu, Chinese Academy of Sciences

8:00 AM Introductory Comments

8:10 AM Invited

Strength and Ductility Improvements of an Mg Alloy with Heterogeneous Layered Structures: Xuan Luo¹; Tianlin¹; Guilin Wu¹; Niels Hansen²; *Xiaoxu Huang*¹; ¹Chongqing University; ²Technical University of Denmark

8:35 AM

Synergistic Strengthening and Work Hardening: Principles toward Superior Mechanical Properties of Heterostructured Materials: *Yuntian Zhu*¹; Xiaolei Wu²; ¹North Carolina State University; ²Institute of Mechanics, Chinese Academy of Sciences

8:55 AM Invited

A Contrast Study on the Mechanical Behavior and the Underlying Deformation Mechanisms of Homogeneous and Harmonic β -Ti Alloys under Simple Shear Loading Conditions: Guy Dirras¹; *Frédéric Momprou*²; David Tingaud¹; Cecile Marcelot²; Azziz Hocini¹; Kei Ameyama³; ¹University Paris 13; ²CEMES, CNRS; ³Ritsumeikan University

9:20 AM

Dynamically Reinforced Heterogeneous Grain Structure Prolongs Ductility in a Medium-entropy Alloy with Gigapascal Yield Strength: *Xiaolei Wu*¹; En Ma²; ¹Institute of Mechanics; ²Johns Hopkins University

9:40 AM Break

10:00 AM Invited

Mechanics of Heterogeneous Microstructures in 3D-printed Stainless Steel: *Ting Zhu*¹; ¹Georgia Institute of Technology

10:25 AM

Unique Mechanical Properties of Harmonic Structure Designed Materials: *Kei Ameyama*¹; ¹Ritsumeikan University

10:45 AM

Improving the Ductility of Nanostructured Metals by Heterogeneous Lamella Structures: *Guilin Wu*¹; Ling Zhang¹; Tianlin Huang¹; Xiaoxu Huang¹; ¹Chongqing University

11:05 AM Invited

Interface Affected Zone for Optimal Strength and Ductility in Heterogeneous Laminate: *Chongxiang Huang*¹; Yanfei Wang¹; Xiaolong Ma²; Yin Sheng³; Heinz Werner Hoepfel⁴; Mathias Goeken⁴; Xiaolei Wu⁵; Huajian Gao³; Yuntian Zhu²; ¹Sichuan University; ²North Carolina State University; ³Brown University; ⁴Friedrich-Alexander University of Erlangen-Nürnberg; ⁵Chinese Academy of Sciences

ADVANCED MATERIALS

High Entropy Alloys VII — Alloy Design and Thermal Properties

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Monday AM | March 11, 2019
207B | Henry B. Gonzalez Convention Center

Session Chairs: Chuang Dong, Dalian University of Technology; Eun Park, Seoul National University

8:00 AM Invited

Combinatorial Exploration of High Entropy Alloys: *Sebastian Kube*¹; David Uhl²; Amit Datye¹; Apurva Mehta³; Jan Schroers¹; ¹Yale University; ²Southern Connecticut State University; ³SLAC National Accelerator Laboratory

8:20 AM Invited

Non-equiatomic Refractory High-entropy Alloys Lead to Enhanced High-temperature Properties: *Shaolou Wei*¹; Cem Tasan¹; ¹Massachusetts Institute of Technology

8:40 AM Invited

CALPHAD Screening and Mechanical Behavior in the AlTiZrNbMo Alloy System: *Benjamin MacDonald*¹; Zhiqiang Fu¹; Fengwei Guo²; Yongwang Kang²; Xiaochang Xie²; Yizhang Zhou¹; Enrique Lavernia¹; ¹University of California Irvine; ²AECC Beijing Institute of Aeronautical Materials

9:00 AM

Effect of Stacking Fault Energy on Formability of Cr-Mn-Fe-Co-Ni Alloys: *JeongWon Yeh*¹; Kook Noh Yoon¹; Hyun Seok Oh¹; Sang Jun Kim¹; Eun Soo Park¹; ¹Seoul National University

9:20 AM Invited

Phase Separation and Segregation in Mechanically Alloyed and Long-term Annealed Refractory High Entropy Alloys: *Joshua Smeltzer*¹; B. Chad Hornbuckle²; Anit Giri²; Christopher Marvel¹; Kristopher Darling²; Jeffrey Rickman¹; Helen Chan¹; Martin Harmer¹; ¹Lehigh University; ²U.S. Army Research Laboratory

9:40 AM Break

10:00 AM Invited

Effects of Al Content on Air-oxidation Behavior of Ni₂FeCoCrAl_x High-entropy Superalloys: *Fu Pen Cheng*¹; Wu Kai¹; Feng Chih Chien¹; Chain Tsuan Liu²; Ji-Jung Kai³; ¹Institute of Materials Engineering, National Taiwan Ocean University, Keelung, Taiwan; ²Department of Mechanical Engineering, The Hong Kong Polytechnic University, Hong Kong; ³Department of Mechanical and Biomedical Engineering, The City University of Hong Kong

10:20 AM

Structure and Mechanical Property of Nanostructured Ta-Nb-V-W-Ti High Entropy Alloys Prepared by Powder Metallurgy: *Da Hye Song*¹; Jin Soo Park¹; Sang Jun Kim²; Eun Soo Park²; Jin Kyu Lee¹; ¹Kongju National University; ²Seoul National University

10:40 AM

Exploration of Phase Structure Evolution Induced by Alloying Elements in Ti-Al(-Nb) Alloys via a Chemical-short-range-order

Cluster Model: *Beibei Jiang*¹; Qing Wang¹; Chuang Dong¹; Peter K. Liaw²; ¹Dalian University of Technology; ² The University of Tennessee

11:00 AM

High Entropy Transition Metal Carbides: *Tyler Harrington*¹; Joshua Gild¹; Pranab Sarker²; Cormac Toher²; Olivia Dipppo¹; Eduardo Marin¹; Lucas Borowski¹; Christina Rost³; Jian Luo¹; Stefano Curtarolo²; Donald Brenner⁴; Kenneth Vecchio¹; ¹University of California San Diego; ²Duke University; ³University of Virginia; ⁴North Carolina State University

ADVANCED MATERIALS

High Entropy Alloys VII — Alloy Development and Applications I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Monday AM | March 11, 2019
206B | Henry B. Gonzalez Convention Center

Session Chairs: Peter Liaw, The University of Tennessee; Michael Gao, National Energy Technology Laboratory

8:00 AM Keynote

Fifteen Years of High Entropy Alloys – How Are We Doing?: *Daniel Miracle*¹; ¹Air Force Research Laboratory

8:30 AM Invited

High-entropy Functional Materials: Current Status and Outlook: *Michael Gao*¹; Daniel Miracle²; David Maurice¹; Xuehui Yan³; Yong Zhang³; Jeffrey Hawk¹; ¹National Energy Technology Lab; ²AF Research Laboratory; ³University of Science and Technology Beijing

8:50 AM Invited

High Entropy Alloy Foam: Open a New Era of Thermal Protection Utilizing Metals: Kook Noh Yoon¹; Khurram Yaqoob²; Je In Lee¹; Jinyeon Kim¹; Su Hyeon Kim³; DongEung Kim⁴; *Eun Soo Park*¹; ¹Seoul National University; ²National University of Sciences and Technology; ³Korea Institute of Materials Science ; ⁴Korea Institute

of Industrial Technology

9:10 AM Invited

Variable Chemical Order Opens a New “High Entropy” Playground:
*Evan Ma*¹; ¹Johns Hopkins University

9:30 AM Break

9:50 AM Invited

Refractory Complex Concentrated Alloys for High Temperature Applications: Challenges and Opportunities: *Oleg Senkov*¹; Daniel Miracle¹; Jean-Philippe Couzinié²; Stephane Gorsse³; Raj Banerjee⁴; ¹Air Force Research Laboratory; ²Université Paris Est, ICMPE (UMR 7182) CNRS-UPEC; ³CNRS, Université Bordeaux, ICMCB, UPR 9048; ⁴University of North Texas

10:10 AM Invited

Predictive Multiphase Evolution in Al-containing High-entropy Alloys: *Louis Santodonato*¹; Peter Liaw²; Raymond Unocic³; Hongbin Bei³; James Morris³; ¹Advanced Research Systems, Inc.; ²The University of Tennessee; ³Oak Ridge National Laboratory

10:30 AM Invited

Effects of Electronic Energy Deposition in Concentrated Solid Solution Alloys: *William Weber*¹; Eva Zarkadoula²; Aleksi Leino²; Ritesh Sachan²; Yanwen Zhang²; ¹University of Tennessee; ²Oak Ridge National Laboratory

10:50 AM Invited

Nanograin Formation in High-entropy Alloys by Severe Plastic Deformation: *Koichi Tsuchiya*¹; Jian Qiang¹; Haoyan Diao²; Peter Liaw²; ¹NIMS; ²University of Tennessee

11:10 AM Invited

Observation of Hexagonal Dendrite Formation in CoCrCuMnxTi HEAs: *Nicholas Derimow*¹; Reza Abbaschian¹; ¹University of California Riverside

ADVANCED MATERIALS

High Entropy Alloys VII — Structures and Modeling I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Monday AM | March 11, 2019
207A | Henry B. Gonzalez Convention Center

Session Chairs: James Morris, Oak Ridge National Laboratory; Michael Widom, Carnegie Mellon University

8:00 AM Invited

Information Theoretical Approaches to Entropy: *Michael Widom*¹; ¹Carnegie Mellon University

8:20 AM Invited

Dislocation Flow and the Nature of Obstacles in Equiatomic Alloys: *James Morris*¹; *Yuri Osetsky*¹; *George Pharr*²; ¹Oak Ridge National Laboratory; ²Texas A&M

8:40 AM Invited

Tailoring Local Chemical Order for Tunable Stacking Fault Energies in CrCoNi Medium-entropy Alloys: *Jun Ding*¹; *Qin Yu*¹; *Mark Asta*¹; *Robert Ritchie*¹; ¹Lawrence Berkeley National Laboratory

9:00 AM Invited

Finite Temperature Elastic Properties of CoCrFeNi from First Principles: *Yifeng Wu*¹; *Douglas Irving*¹; ¹North Carolina State University

9:20 AM Invited

How High are the Entropies of High Entropy Alloys?: *Kaituo Huo*¹; *Qikai Li*¹; *Mo Li*²; ¹University of Science and Technology Beijing; ²Georgia Institute of Technology; University of Science and Technology Beijing,

9:40 AM Break

10:00 AM Invited

Lattice Strain in a High Entropy Alloy from Model Interatomic Potentials: *Diana Farkas*¹; *Alfredo Caro*²; ¹Virginia Tech; ²George Washington University

10:20 AM Invited

First-principles Study of the Phase Stability in the Equiatomic CrMnFeCoNi Alloy: *Chin-Lung Kuo*¹; *Kang-Tien Hsieh*¹; ¹National

Taiwan University

10:40 AM

Phase Stability and Chemical Short-range Order in W-Ta-Cr-V-Ti High-entropy Alloys and Their Derivatives from First-principles Modelling Based on Cluster-expansion Method: Damian Sobieraj¹; Jan S. Wrobel¹; K.J. Kurzydowski¹; *Duc Nguyen-Manh*²; ¹Warsaw University of Technology; ²United Kingdom Atomic Energy Authority

11:00 AM Invited

Core Structure of $\frac{1}{2}\langle 111 \rangle$ Screw Dislocation in Ternary BCC High Entropy Alloys: First-principles Calculations: *Brahim Akdim*¹; Satish Rao¹; Christopher Woodward²; Edwin Antillon¹; Triplicane Parthasarathy¹; ¹UES Inc; ²Air Force Research Laboratory

MATERIALS DESIGN

Hume-Rothery Symposium – Bulk and Interfacial Thermodynamics of Complex Materials: Insights Derived from Integrating Modeling and Experiment – Interfacial Thermodynamics and Kinetics I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Raymundo Arroyave, Texas A&M University; Michael Gao, National Energy Technology Laboratory; Jeffrey Hoyt, McMaster University; Saryu Fensin, Los Alamos National Laboratory

Monday AM | March 11, 2019

304B | Henry B. Gonzalez Convention Center

Session Chairs: Raymundo Arroyave, Texas A&M University; Yang Yang, East China Normal University

8:00 AM Introductory Comments

8:05 AM Keynote

William Hume-Rothery Award Recipient: Order within Disordered Materials – Insights into the Nature and Impact of Short-range Order in Concentrated Solid Solutions: *Mark Asta*¹; ¹University of California, Berkeley; Lawrence Berkeley National Laboratory

8:40 AM Invited

Predicting the Interfacial Reactions Between Electrodes and Solid-state Electrolytes or Coatings: *Gerbrand Ceder*¹; ¹University of California Berkeley

9:10 AM Invited

Modeling Transitions at Interfaces: *Timofey Frolov*¹; ¹Lawrence Livermore National Laboratory

9:40 AM Break

10:00 AM Invited

Interface and Defect Free Energies from Atomistic Simulations: *Rodrigo Freitas*¹; ¹Stanford University

10:30 AM Invited

Ramifications of Interfacial Compositional Phase Transformations: *Stephen Foiles*¹; ¹Sandia National Laboratories

11:00 AM Invited

Asymmetric Line Segregation at Faceted Si Grain Boundaries: *Christian Liebscher*¹; *Andreas Stoffers*¹; *Masud Alam*¹; *Liverios Lymperakis*¹; *Oana Cojocaru-Mirédin*²; *Baptiste Gault*¹; *Jörg Neugebauer*¹; *Gerhard Dehm*¹; *Christina Scheu*¹; *Dierk Raabe*¹; ¹Max-Planck-Institut für Eisenforschung GmbH; ²RWTH Aachen University

11:30 AM Invited

Energetics of Non-stoichiometric Stacking Faults in Fe-Nb Alloys: An Ab Initio Study: *Ali Zendegani*¹; *Fritz Körmann*¹; *Joerg Neugebauer*¹; *Tilmann Hickel*¹; ¹Mpi Fur Eisenforschung

CHARACTERIZATION

Interfaces in Structural Materials: An MPMD Symposium in Honor of Stephen M. Foiles — Interatomic Potentials and Methods: A Joint Session with Computational Materials Discovery and Design

Sponsored by: The Minerals, Metals and Materials Society, TMS; Computational Materials Science and Engineering Committee

Program Organizers: *Fadi Abdeljawad*, Clemson University; *Eric Homer*, Brigham Young University; *Elizabeth Holm*, Carnegie Mellon University; *Mark Asta*, University of California, Berkeley

Monday AM | March 11, 2019

302C | Henry B. Gonzalez Convention Center

Session Chairs: *Elizabeth Holm*, Carnegie Mellon University; *Mikhail Mendeleev*, Ames Laboratory

8:00 AM Invited

Insights into Anharmonicity of Solids Using Moments: *Murray Daw*¹; ¹Clemson University

8:30 AM

Advances in Atomistic Methods for Material Design: Difan Zhang¹; *Susan Sinnott*¹; ¹Penn State University

8:50 AM

Materials Dynamics Descriptors Determined by Data: *Sven Rudin*¹; ¹Los Alamos National Laboratory

9:10 AM Invited

Development of Interatomic Potentials Using Physically-informed Artificial Neural Networks: Ganga P. Purja Pun¹; James Hickman²; Rohit Batra³; Rampi Ramprasad⁴; *Yuri Mishin*¹; ¹George Mason University; ²National Institute of Standards and Technology; ³University of Connecticut; ⁴Georgia Institute of Technology

9:40 AM Break

10:00 AM Invited

Beyond the Embedded Atom Method Era – the Future for Interatomic Potentials: *William Curtin*¹; R. Kobayashi²; Daniele Giofre³; Till Junge³; Michele Ceriotti³; ¹EpflSti Igm Lammm; ²Nagoya Tech; ³EPFL

10:30 AM Invited

Rational Design of Classical Interatomic Potentials: Eugene Ragasa¹; R. Seaton Ullberg¹; Richard Hennig¹; Christopher O'Brien²; Stephen Foiles²; *Simon Phillpot*¹; ¹University of Florida; ²Sandia National Laboratories

11:00 AM Invited

Quantum Mechanics Based Bond-order Potentials and Fundamental Understanding of Dislocation Mediated Plasticity in Refractory Bcc Metals: *Vaclav Vitek*¹; Yi-Shen Lin¹; ¹University of Pennsylvania

NUCLEAR MATERIALS

Irradiation Effects on Phase Transformations in Nuclear Reactor Materials – Pure and Binary Alloys

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Janelle Wharry, Purdue University; Kester Clarke, Colorado School of Mines; Julie Tucker, Oregon State University; Par Olsson, KTH Royal Institute of Technology; Dhriti Bhattacharyya, ANSTO; Mohsen Asle Zaeem, Colorado School of Mines; Arun Devaraj, Pacific Northwest National Laboratory

Monday AM | March 11, 2019
214B | Henry B. Gonzalez Convention Center

Session Chairs: Michael Short, Massachusetts Institute of Technology; Arun Devaraj, Pacific Northwest National Laboratory

8:00 AM Invited

Measuring Radiation Damage Using Stored Energy and Magnetism for Reactor Dose Measurement and Non-proliferation: Rachel Connick¹; Charles Hirst¹; Penghui Cao¹; Kangpyo So¹; Sara Ferry¹; R. Scott Kemp¹; *Michael Short*¹; ¹Massachusetts Institute of Technology

8:30 AM

Phase Field Modeling of Irradiation-induced Compositional Patterning in Immiscible Binary Alloy Systems: *Qun Li*¹; Pascal Bellon¹; Robert Averback¹; ¹University of Illinois Urbana Champaign

8:50 AM

Atomistic Modeling of Solute Redistribution in Radiation-resistant Solid Solutions: *Craig Daniels*¹; Pascal Bellon¹; Robert Averback¹; ¹University of Illinois

9:10 AM

Anomalous Segregation Induced by Void-solute Interactions under Neutron Irradiation: First-principles Modeling and Experimental Validation in W(Re,Os,Ta): *Duc Nguyen-Manh*¹; Jan Wrobel²; Michael Klimenkov³; Sergei Dudarev¹; ¹United Kingdom Atomic Energy Authority; ²Warsaw University of Technology; ³Karlsruhe Institute of Technology

9:30 AM Break

9:50 AM Invited

Irradiation Induced Composition Patterns and Segregation to Free Surfaces in Miscible Binary Solid Solutions: *Anter El-Azab*¹; Santosh Dubey²; ¹Purdue University; ²University of Petroleum and Energy Studies

10:20 AM

Binary Collision Approximation Modeling of Irradiation Damage: Iradina, an Alternative to SRIM: *Jean-paul Crocombette*¹; ¹CEA Saclay DEN-SRMP

10:40 AM

Irradiation Induced Phase Transformation in Nanocrystalline Au: *James Nathaniel*¹; Pranav Suri¹; Jon Baldwin²; Yongqiang Wang²; Khalid Hattar³; Nan Li²; Mitra Taheri³; ¹Drexel University; ²Los Alamos National Laboratory; ³Sandia National Laboratory

11:00 AM

Quantification of 1D vs 3D Defect Migration Behavior in Ion Irradiated Dilute Copper Base Binary Alloys: *Ling Wang*¹; Arunodaya Bhattacharya²; Chad Parish²; Spencer Kropf¹; David Martin¹; Brian Wirth¹; Steven Zinkle¹; ¹University of Tennessee; ²Oak Ridge National Laboratory

LIGHT METALS

Magnesium Technology 2019 — Keynote Session

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

Program Organizers: Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordon, University of Alabama; Dmytro Orlov, Lund University; Neale Neelameggham, IND LLC

Monday AM | March 11, 2019

005 | Henry B. Gonzalez Convention Center

Session Chairs: Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordon, University of Alabama

8:00 AM Introductory Comments

8:10 AM Keynote

Magnesium Alloy Sheet for Transportation Applications: *Christopher Romanowski*¹; ¹Danieli FATA Hunter

8:55 AM Keynote

Magnesium for Automotive: Status and Challenges: *Sarah Kleinbaum*¹; ¹US Department of Energy

9:40 AM Break

10:00 AM Keynote

Magnesium Process and Alloy Development for Applications in the Automotive Industry: *David Klaumuenzer*¹; ¹Volkswagen AG

10:45 AM Keynote

Thermally Activated Slip in Rare Earth Containing Mg-Mn-Ce Alloy, ME10, Compared with Traditional Mg-Al-Zn Alloy, AZ31: *Sean Agnew*¹; *Vikaas Bajikar*¹; *Jishnu Bhattacharyya*¹; *Nathan Peterson*¹; ¹University of Virginia

ENERGY & ENVIRONMENT

Materials for Molten Salt Energy Systems — Corrosion and Compatibility I

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

Program Organizers: Stephen Raiman, Oak Ridge National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Kumar Sridharan, University of Wisconsin-Madison; Judith Vidal, National Renewable Energy Laboratory; Michael Short, Massachusetts Institute of Technology

Monday AM | March 11, 2019

008B | Henry B. Gonzalez Convention Center

Session Chair: Kumar Sridharan, University of Wisconsin

8:00 AM Introductory Comments

8:05 AM

Changing a Community's Perception on the Viability of Chloride Salts as Heat Transfer Fluids for Concentrating Solar Power: *Levi Irwin*¹; ¹Mantech International

8:35 AM

Effect of Ni on the Corrosion Behavior of Haynes 230 Alloy in MgCl₂-KCl Salt: *Yuxiang Peng*¹; *Ramana Reddy*¹; ¹University of Alabama;

8:55 AM

In Situ Proton Irradiation Slows Corrosion in Molten FLiNaK+Eu Salt: *Weiyue Zhou*¹; *Michael Short*¹; ¹Massachusetts Institute of Technology

9:15 AM

Understanding Degradation of Structural Alloys in Molten Chloride Salts: *Stephen Raiman*¹; Jake McMurray¹; Richard Mayes¹; Matt Kurley¹; Jisue Moon¹; Claudia Rawn¹; ¹Oak Ridge National Laboratory

9:35 AM Break

9:55 AM

Corrosion of High Entropy Alloy CrFeMnNi in Molten FLiBe Salt: *Mohamed ElBakhshwan*¹; William Doniger¹; Cody Falconer¹; Michael Moorehead¹; Calvin Parkin¹; Kumar Sridharan¹; Adrien Couet¹; ¹University of Wisconsin Madison

10:15 AM

Carbon-metal Interactions in Molten FLiNaK: *Kevin Chan*¹; Preet Singh¹; ¹Georgia Institute of Technology

10:35 AM

Corrosion of Hastelloy-N in Molten FLiNaK Salt at 700°C: *Cody Falconer*¹; William Doniger¹; Raluca Scarlat¹; Kumar Sridharan¹; Adrien Couet¹; ¹University of Wisconsin, Madison

MATERIALS PROCESSING

Materials Processing Fundamentals — Modeling of Minerals and Metals Processing

Sponsored by: TMS: Process Technology and Modeling Committee

Program Organizers: Guillaume Lambotte, Boston Metal; Jonghyun Lee, Iowa State University; Antoine Allanore, MIT - DMSE; Samuel Wagstaff, Novelis

Monday AM | March 11, 2019

212A | Henry B. Gonzalez Convention Center

Session Chairs: Guillaume Lambotte, Boston Metal; Sam Wagstaff, Novelis

9:00 AM Introductory Comments

9:05 AM

Dynamic Current and Power Distributions in a Submerged Arc Furnace: *Yonatan Afework Tesfahunegn*¹; Thordur Magnusson²; Merete Tangstad³; Gudrun Saevarsdottir¹; ¹Reykjavik University; ²United Silicon ; ³NTNU

9:25 AM

CFD Modeling of the Combustion and Heat transfer in the Top Submerged Lance Smelter: *Daniele Obiso*¹; Sebastian Kriebitzsch¹; Michael Stelter²; Markus Reuter³; ¹CIC VIRTUHCON, TU Bergakademie Freiberg; ²TU Bergakademie Freiberg; ³HZDR, Freiberg

9:45 AM Break

10:05 AM

Modeling of Steel-slag-air Three-phase Flow in Continuous Casting Strand: Xubin Zhang¹; Wei Chen¹; *Lifeng Zhang*¹; Piotr Scheller¹; ¹University of Science & Technology Beijing

10:25 AM

Dynamic Modeling of Unsteady Bulging in Continuous Casting of Steel: *Zhelin Chen*¹; Hamed Olia²; Brian Thomas²; Joseph Bentsman¹; Bryan Petrus³; Madeline Rembold³; ¹University of Illinois, Urbana-Champaign; ²Colorado School of Mine; ³Nucor Steel Decatur

10:45 AM

Modeling on the Two-phase Flow in a Slab Continuous Casting Strand using Euler-Euler Approach: *Haichen Zhou*¹; Lifeng Zhang¹; ¹University of Science & Technology Beijing

11:05 AM

Flow Control in the Model of a Continuous Caster by using Contactless Inductive Flow Tomography: *Ivan Glavinic*¹; Shereen Abouelazayem²; Matthias Ratajczak¹; Dennis Schurmann¹; Sven Eckert¹; Frank Stefani¹; Jaroslav Hlava²; Thomas Wondrak¹; ¹Helmholtz Zentrum Dresden Rossendorf; ²Technical University of Liberec

11:25 AM

Optimization of the Flow Behavior of Molten Steel in Ultrahigh-speed Billet Continuous Casting Mold: *Pei Xu*¹; Dengfu Chen¹; Shixin Wu¹; Hengsong Yu¹; Mujun Long¹; Sheng Yu¹; Huamei Duan¹; ¹Chongqing University

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Processing Effects

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

Monday AM | March 11, 2019
215 | Henry B. Gonzalez Convention Center

Session Chairs: Assel Aitkaliyeva, University of Florida; Anne Campbell, Oak Ridge National Laboratory

8:00 AM Invited

Thermomechanical Processing to Improve the Fracture Toughness of HT-9 Steels for High-Dose Applications: *Thak Sang Byun*¹; Timothy Lach¹; Jung Pyung Choi¹; Stuart Maloy²; ¹Pacific Northwest National Laboratory; ²Los Alamos National Laboratory

8:30 AM

A Study on Tensile Behaviour and Microstructural Characteristics of Zircaloy-4 Processed through Swaging: Gaurav Singh¹; Srinivasa Rakesh¹; Abhishek Tiwari¹; R. Jayaganthan¹; KI Narayanan²; Chander Arora³; Dinesh Srivastava³; ¹IIT Madras; ²Nuclear Fuel Complex, Hyderabad; ³Nuclear Fuel Complex, Hyderabad

8:50 AM

Austenitic Oxide Dispersion Strengthened (ODS) Steels: Insights into their Microstructure and Mechanical Behavior: *Ankur Chauhan*¹; Tim Gräning¹; Dimitri Litvinov¹; Michael Rieth¹; Anton Möslang¹; Jarir Aktaa¹; ¹Karlsruhe Institute of Technology

9:10 AM

Development and Testing of Advanced Alloys for Very High Temperature and Dose Applications: *Osman Anderoglu*¹; Madhavan Radhakrishnan¹; Zhexian Zhang¹; Md. Mehadi Hassan¹; Eda Aydogan²; Connor Rietema³; Daniel Savage⁴; Justin Cheng⁵; Marko Knezevic⁴; Amy Clarke³; Kester Clarke³; Nathan Mara⁵; Yongqiang Wang²; Stuart Maloy²; ¹University of New Mexico; ²Los Alamos National Laboratory; ³Colorado School of Mines; ⁴University of New Hampshire; ⁵University of Minnesota

9:30 AM Break

9:50 AM Invited

Mechanical and Advanced Microstructural Analysis of Laser Beam Weldments Performed on Neutron-Irradiated 304 Austenitic Stainless Steel: *Jonathan Tatman*¹; Maxim Gussev²; Paula Freyer³;

Frank Garner⁴; ¹Electric Power Research Inst (EPRI); ²Oak Ridge National Laboratory; ³Westinghouse Electric Company; ⁴Texas A&M University

10:20 AM

Thermal Shock and In Situ Radial Strain Measurements: *Delia Perez-Nunez*¹; Sean McDeavitt¹; Luis Ortega¹; ¹Texas A&M University

10:40 AM

Mechanical and Microstructural Characterization of Three HT-9 Heats (ORNL, LANL and EBR II) after Side-by-side Neutron Irradiation at LWR and Fast Reactor Relevant Temperatures: *Ramprashad Prabhakaran*¹; Mychailo Toloczko¹; Dan Edwards¹; Kumar Sridharan²; ¹Pacific Northwest National Laboratory; ²University of Wisconsin

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior Related to Interface Physics III – Grain Boundaries I

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

Program Organizers: Jason Trelewicz, Stony Brook University; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht; Siddhartha Pathak, University of Nevada, Reno; Jordan Weaver, National Institute of Standards and Technology; Marc Legros, CEMES-CNRS

Monday AM | March 11, 2019

303C | Henry B. Gonzalez Convention Center

Session Chairs: Andrew Minor, University of California, Berkeley; Jason Trelewicz, Stony Brook University

8:00 AM

Effects of Elastic and Plastic Anisotropy on Grain Boundary Mediated Plasticity: A Phase Field Study: *Jakub Mikula*¹; Siu Sin Quek¹; Shailendra P. Joshi²; Tong Earn Tay³; Rajeev Ahluwalia¹; ¹A*Star; ²University of Houston; ³National University of Singapore

8:20 AM

Investigation of Deformation Mechanisms in Columnar Aluminum: *Marissa Linne*¹; Ajey Venkataraman²; Michael Sangid²; Samantha Daly³; ¹University of Michigan; ²Purdue University; ³University of California, Santa Barbara

8:40 AM Invited

Interface Defects Generated by Mechanical Loading Cause Early Fatigue Failure of Thin Cu Films: *Cynthia Volkert*¹; ¹University of Göttingen

9:10 AM Invited

A Framework for Grain Boundary Mode Selection via Compatible Shear Transformations: Ian Chesser¹; Brandon Runnels²; *Elizabeth Holm*¹; ¹Carnegie Mellon University; ²University of Colorado, Colorado Springs

9:40 AM Break

10:00 AM

Mechanical Behavior and Strengthening Mechanisms of Nanotwinned Al Alloys: *Xinghang Zhang*¹; Sichuang Xue¹; Qiang Li¹; Yifan Zhang¹; Jian Wang¹; ¹Purdue University

10:20 AM Invited

Defect Analysis and Evolution during In Situ TEM Nanomechanical Testing using Scanning Nanobeam Diffraction Imaging: *Andrew Minor*¹; ¹University of California, Berkeley

10:50 AM

Strength Statistics of Single Crystals and Metallic Glasses under Small Stressed Volumes: *Yanfei Gao*¹; ¹University of Tennessee

11:10 AM Invited

Conservative Motion of Sources of Grain Boundary Dislocations: An Effective Mechanism for Shear-coupled Grain Boundary Migration.: *Anna Serra*¹; Pablo Garcia-Müller²; ¹Universitat Politècnica de Catalunya; ²CIEMAT

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Micro- and Nanomechanical Testing in Harsh Environments — High Temperature Micromechanics I

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

Program Organizers: Verena Maier-Kiener, Montanuniversität Leoben; Sandra Korte-Kerzel, RWTH Aachen; Peter Hosemann, University of California; Afrooz Barnoush, Norwegian University of Science and Technology; Jeffrey Wheeler, ETH Zurich; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Monday AM | March 11, 2019

217B | Henry B. Gonzalez Convention Center

Session Chairs: Verena Maier-Kiener, Montanuniversität Leoben; Jon Molina-Aldaregu, Imdea Materials Institute

8:00 AM Invited

High-throughput Investigation of Strength and Creep in Mg Alloys through Micromechanical Testing: *Jon Molina-Aldareguia*¹; ¹Imdea Materials Institute

8:25 AM

Elevated Temperature Nanomechanical Characterization of Mg-nanocomposites: *Meysam Haghshenas*¹; Devendra Verma²; Manoj Gupta³; ¹University of North Dakota; ²Nanoscience Instruments; ³National University of Singapore

8:45 AM

Understanding bcc Mg under Extreme Conditions of Pressure, Temperature and High Strain Rates: *Manish Jain*¹; Marko Knezevic²; Nenad Velisavljevic³; Nathan Mara⁴; Irene Beyerlein⁵; Johann Michler⁶; Siddhartha Pathak¹; ¹University of Nevada, Reno; ²University of New Hampshire; ³Los Alamos National Laboratory; ⁴University of Minnesota, Minneapolis; ⁵University of California, Santa Barbara; ⁶EMPA Thun

9:05 AM

A Versatile Shear-based Method to Study Mechanical Properties of Metals at Small Scales: *Gan Feng*¹; Dinakar Sagapuram¹; ¹Texas A&M University

9:25 AM Break

9:45 AM Invited

Temperature and Strain-rate Dependence of the Mechanical Behavior of Freestanding Gold Thin Films: *Benoit Merle*¹; ¹University Erlangen-Nürnberg (FAU)

10:10 AM

Effect of Varying Interfaces on Strain Rate Sensitivity of Nanostructured Metals – A Case Study on Nickel: *Oliver Renk*¹; Verena Maier-Kiener²; Daniel Kiener²; Reinhard Pippan¹; ¹Erich Schmid Institute; ²Departement Physical Metallurgy and Materials Testing, Montanuniversität Leoben

10:30 AM

Creep Behavior of Thermally Stable Nanocrystalline NiW Alloy using High Temperature Nanoindentation.: *Prince Singh*¹; Zhiyuan Liang²; George Pharr²; Maarten de Boer¹; ¹Carnegie Mellon University; ²Texas A & M University

10:50 AM

Comparison of Soft Al-Zn-Mg-Cu and Hard W-Re Alloys: A High-Temperature Nanoindentation Study: *Johann Kappacher*¹; Alexander Leitner²; Helmut Clemens¹; Verena Maier-Kiener¹; ¹Department Physical Metallurgy and Materials Testing; ²Erich Schmid Institute for Materials Science

11:10 AM

Real-time Deformation in Cold Sprayed Aluminum Alloy at Elevated Temperatures by *In Situ* Nanoindentation: *Pranjal Nautiyal*¹; Cheng Zhang¹; Victor Champagne²; Benjamin Boesl¹; Arvind Agarwal¹; ¹Florida International University; ²U.S. Army Research Laboratory

MATERIALS DESIGN

Modeling and Simulation of Composite Materials — Session I

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

Program Organizers: Rakesh Behera, New York University; Dinesh Pinisetty, CSU Maritime Academy; Dzung Luong, New York University

Monday AM | March 11, 2019
303B | Henry B. Gonzalez Convention Center

Session Chairs: Pratik Dholabhai, Rochester Institute of Technology; Pavana Prabhakar, University Of Wisconsin-Madison; Rakesh Behera, New York University

8:00 AM Introductory Comments

8:20 AM Invited

Multi-scale Analysis for Predicting High-temperature Oxidation in Carbon/Carbon Ceramic Composites: *Pavana Prabhakar*¹; Vinay Damodaran²; ¹University of Wisconsin-Madison

8:40 AM

Surface Stress Driven Bending of Nanoscale Composite Plates: *R M Raghavendra*¹; Namrata Pachauri¹; Anandh Subramaniam¹; ¹Indian Institute of Technology Kanpur

9:00 AM

Application of UMAT in Abaqus on Short Fiber Composite Mechanics: *Yinglong Chen*¹; ¹The Dow Chemical Company

9:20 AM Break

10:00 AM

A Generalized Nature-Inspired Optimization Method: Additively Manufactured Materials with Superior Mechanical Performance: Mohamad Ghodrati¹; *Pinar Acar*¹; Reza Mirzaeifar¹; ¹Virginia Polytechnic Institute

10:20 AM Invited

Atomic-scale Structure and Stability of Dopant-defect Complexes at Misfit Dislocations in Complex Oxide Heterostructures: *Pratik Dholabhai*¹; ¹Rochester Institute of Technology

10:40 AM

A Simplified Composite Material Model to Evaluate Strip Twist/Warp Mechanism and Major Factors in the Flip-chip Packaging Reflow Process: Ching-Yu Lee¹; *You-Fu Wu*¹; Amir Reza Ansari Dezfoli¹; Wen-Dung Hsu¹; Tai-Sheng Wang²; Yi-Dao Wang²; Guan-Han Lin²; Peng-Yuan Cheng²; ¹National Cheng Kung University; ²Advanced Semiconductor Engineering Group

11:00 AM

Bending Properties of Bio-inspired Nanocomposites: *Raghuram Santhapuram*¹; Scott Muller¹; Arun Nair¹; ¹University of Arkansas

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XVIII — Advanced Electronic Interconnection

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Hiroshi Nishikawa, Osaka University; Shih-Kang Lin, National Cheng Kung University; Chaohong Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing Univ; Dajian Li, Karlsruhe Institute of Technology; Song-Mao Liang, Clausthal University of Technology; Ming-Tzer Lin, National Chung Hsing University; Zhi-Quan Liu, Institute of Metal Research, Chinese Academy of Sciences; Jaeho Lee, Hongik University; Yee-wen Yen, National Taiwan University of Science and Technology; Yuan Yuan, Chongqing University; Yu Zhong, Worcester Polytechnic Institute

Monday AM | March 11, 2019

217D | Henry B. Gonzalez Convention Center

Session Chairs: Chin-Ming Chen, National Chung Hsing University; Shin-kang Lin, National Cheng Kung University

8:00 AM Invited

Phase Determination of Low-melting In-Bi Alloy on Cu Substrates: *Albert T. Wu*¹; Chang-Meng Wang²; ¹National Central University; ²SHENMAO Technology, Inc.

8:20 AM

Development of Sn-Bi-In-Ga Quaternary Low-temperature Solder: Chih-han Yang¹; Shiqi Zhou²; Hiroshi Nishikawa²; *Shih-Kang Lin*¹; ¹National Cheng Kung University; ²Osaka University

8:40 AM

Interfacial Reactions in the Ga-doped Sn-0.7Cu/Cu Couples and Isothermal Sections of the Sn-Cu-Ga Ternary System: *Chih-Han Yang*¹; Yu-chen Liu¹; Yi-kai Kuo¹; Shih-kang Lin¹; ¹National Cheng-Kung University

9:00 AM Invited

Reactive Dissolution of Metallic Nanoparticles during Reflow and Its Effects on Microstructure and Properties of Lead Free Solder Joints: *A.S.Md Abdul Haseeb*¹; ¹University of Malaya

9:20 AM Break

9:40 AM

Improvement in Thermomechanical Reliability of Low Cost Sn-based BGA Interconnects by Cr Addition: *Jung-Hwan Bang*¹; Dong-Yurl Yu¹; Yong-Ho Ko¹; Hiroshi Nishikawa²; Chang-Woo Lee¹; ¹Korea Institute of Industrial Technology; ²Osaka University

10:00 AM

Reflowing Time Effect on Interfacial Reactions and Mechanical Properties between Sn-9wt%Zn, Sn-3.0wt%Ag-0.5wt%Cu Alloy Solder and Ag Substrate: *Chia-Yu Liu*¹; Yu-Chun Li¹; Chih-Ming Chen²; Ya-Jing Lee¹; Jia-Ying Dai¹; Yee-Wen Yen¹; ¹National Taiwan University of Science and Technology; ²National Chung Hsing University

10:20 AM

Formation and Growth of Intermetallic Compound Layer at Sn-Ag-Cu-Ni Solder/Cu Interface using Laser Process: *Hiroshi Nishikawa*¹; Ryo Matsunobu¹; ¹Osaka University

10:40 AM

Exploring Effective Charge in Electromigration Effect Using Machine Learning: *Yu-chen Liu*¹; Shih-kang Lin¹; Dane Morgan²;

¹National Cheng Kung University; ²University of Wisconsin, Madison

11:00 AM

Low-Temperature Bonding Using Silver Nanoparticles Paste for Electronics Packaging: *Yu-Chi Fang*¹; Fan-Yi Ouyang¹; ¹National Tsing Hua University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution – Phase Transformation in Non-ferrous Alloys I

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Yufeng Zheng, Ohio State University; Ashley Paz y Puente, University of Cincinnati; Juan Escobedo-Diaz, University of New South Wales; Dhriti Bhattacharyya, ANSTO; Rajarshi Banerjee, University of North Texas

Monday AM | March 11, 2019

225D | Henry B. Gonzalez Convention Center

Session Chairs: Mark Aindow, University of Connecticut; Yufeng Zheng, Ohio State University

8:00 AM

Shuffle Dominant Phase Transformation in Metastable Beta Titanium Alloys: *Yufeng Zheng*¹; Rajarshi Banerjee²; Dipankar Banerjee³; Hamish Fraser¹; ¹Ohio State University; ²University of North Texas; ³Indian Institute of Science

8:20 AM

Segregation and Phase Transformations along Superlattice Stacking Faults in Ni-based Superalloys and its Effect on Creep Strength: *Tim Smith*¹; Bryan Esser²; Brian Good¹; Catherine Rae³; David McComb²; Michael Mills²; ¹Glenn Research Center; ²Ohio State University; ³University of Cambridge

8:40 AM

Mechanical Response, Phase Transformation and Texture Evolution of Titanium Aluminide Processed by High-Pressure Torsion: *Megumi Kawasaki*¹; Jae-Kyung Han¹; Xi Li²; Rian Dippenaar²; Klaus-Dieter Liss³; ¹Oregon State University; ²University of Wollongong; ³Guangdong Technion - Israel Institute of Technology

9:00 AM

Compositional Influence on Microtube Formation in Ni-based Wires via the Kirkendall Effect: *Haozhi Zhang*¹; Ashley Paz Y Puentes¹; ¹University of Cincinnati

9:20 AM

Heat Treatment Strategies to Improve the Quasi Static and Dynamic Performance of Alpha+Beta Titanium Alloys: *Alireza Fadavi Boostani*¹; Shiraz Mujahid²; Andrew L. Oppedal¹; Cory Krivanec²; Wilburn R Whittington²; Paul G Allison³; Jishnu J. Bhattacharyya⁴; Sean Agnew⁴; Haitham El Kadiri²; ¹Center for Advanced Vehicular Systems; ²Mississippi State University; ³The University of Alabama; ⁴University of Virginia

9:40 AM Break

10:00 AM

Microstructural Evolution of Alpha Phase in High Strength Ti-5Fe-5Zr Alloy: *Tomoyuki Homma*¹; ¹Nagaoka University of Technology

10:20 AM

Determination of the Five Parameter Grain Boundary Character Distribution of Nanocrystalline Alpha-zirconium Thin Films using Transmission Electron Microscopy: *Iman Ghamarian*¹; Peyman Samimi²; Gregory Rohrer³; Peter Collins⁴; ¹University of Michigan; ²Texas A&M University; ³Carnegie Mellon University; ⁴Iowa State University

10:40 AM

Aging Behavior of Alloy 625 Plus: *Li-Jen Yu*¹; Iman Ghamarian¹; Grace Burke²; Emmanuelle Marquis¹; ¹University of Michigan; ²University of Manchester

11:00 AM

Design of Heusler-strengthened NiTi-based Shape Memory Alloys: *Chuan Liu*¹; Gregory Olson¹; ¹Northwestern University

MATERIALS PROCESSING

Rare Metal Extraction & Processing — Rare Metals I

Sponsored by: TMS: Hydrometallurgy and Electrometallurgy Committee

Program Organizers: Gisele Azimi, University of Toronto; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Takanari Ouchi, The University of Tokyo; Neale Neelameggham, IND LLC; You Qiang, University of Idaho; Alafara Baba, University of Ilorin

Monday AM | March 11, 2019
210B | Henry B. Gonzalez Convention Center

Session Chairs: Gisele Azimi, University of Toronto; Takanari Ouchi, University of Tokyo

8:00 AM

Cesium Extraction from the Taron Deposit in Argentina: New Developments: *David Dreisinger*¹; ¹University of British Columbia

8:35 AM

Feasibility of Copper Recovery from Spent Deposited Sludge of Transformer Oil (DSTO) for Industrial Applications: *Alafara Baba*¹; Joshua Ayodele¹; Oloduowo Ameen¹; Abdulrasaq Jimoh¹; Folahan Adekola¹; Abdul Alabi¹; Marili Zubair¹; Kuranga Ayinla¹; Abdullah Ibrahim¹; Mustapha Raji¹; Daud Olaoluwa¹; Aishat Abdulkareem¹; Fausat Olasinde²; ¹University of Ilorin; ²Chemistry Advance Research Centre, Sheda Science & Technology Complex, FCT, Abuja

9:00 AM

Leaching and Recovery of an Oxide Gold Concentrate using Ammoniacal Thiosulfate Solutions: *Zhonglin Dong*¹; Tao Jiang¹; Bin Xu¹; Yongbin Yang¹; Qian Li¹; ¹Central South University

9:25 AM Break

9:45 AM

A Multi-step Process for the Cleaner Utilization of Vanadium-bearing Converter Slag: *Junyi Xiang*¹; Guishang Pei¹; Qingyun Huang¹; Wei Lv¹; Mingrui Yang¹; Kai Hu¹; Xuewei Lv¹; ¹Chongqing University

10:10 AM

Efficient Extraction of V(V) in Aqueous Solution by Microemulsion System: *Yun Guo*¹; Danqing Li¹; Bing Xie¹; Hong-Yi Li¹; ¹Chongqing University

10:35 AM

A Novel Approach for Pre-concentrating Vanadium from Stone Coal: *Daya Wang*¹; Baijun Yan¹; ¹University of Science and Technology Beijing

11:00 AM

Study on the Roasting Mechanism of Vanadium-chromium Slag with Sodium Hydroxide: *Minmin Lin*¹; Chengjie Wang¹; Bing Xie¹; Hong-Yi Li¹; ¹Chongqing University

ADVANCED MATERIALS

Refractory Metals 2019 — (I) Mo and Nb; (II) Co-Re, Cr, and Nb-Si

Sponsored by: TMS: Refractory Metals Committee

Program Organizers: Eric Taleff, University of Texas at Austin; Martin Heilmaier, KIT Karlsruhe; Kevin Jaansalu, Royal Military College of Canada

Monday AM | March 11, 2019

205 | Henry B. Gonzalez Convention Center

Session Chairs: Eric Taleff, University of Texas at Austin; Martin Heilmaier, KIT Karlsruhe

8:00 AM

Correlating the Chemistry of Grain Boundaries in Molybdenum with Their Deformation Behaviour Using Atom Probe Tomography and Micromechanical Testing: *Severin Jakob*¹; Anna Ebner¹; Alexander Leitner²; Alexander Lorich³; Michael Eidenberger-Schober³; Wolfram Knabl³; Helmut Clemens¹; Verena Maier-Kiener¹; ¹Montanuniversität Leoben, Department Physical Metallurgy and Materials Testing; ²Montanuniversität Leoben, Department Materials Physics; ³Plansee SE

8:20 AM

Creep Substructure, Texture Evolution, and Dynamic Abnormal Grain Growth in a Mo Rod Material: *Philip Noell*¹; Eric Taleff²; ¹Sandia National Labs; ²The University of Texas at Austin

8:40 AM

Damage Initiation due to Efficient Generation, Stabilization and Transport of Vacancies in Body-centred-cubic Niobium Containing Oxygen Impurities: *Qing-Jie Li*¹; Howard Sheng²; Ju Li³; Evan Ma¹; ¹Johns Hopkins University; ²George Mason University; ³Massachusetts Institute of Technology

9:00 AM

Hot Isostatic Pressing of Niobium-based Refractory Alloys: *Calvin Mikler*¹; *Brian Welk*¹; *Gopal Viswanathan*¹; *Benjamin GeorGIN*¹; *Zachary Kloenne*¹; *Kevin Chaput*²; *John Foltz*³; *Hamish Fraser*¹; ¹The Ohio State University; ²Air Force Research Laboratory; ³ATI Specialty Alloys and Components

9:20 AM

Elevated-temperature Tensile Behavior of Niobium: *Emily Brady*¹; *Eric Taleff*¹; ¹University of Texas Austin

9:40 AM Break

9:50 AM

The Influence of C/Ta Ratio on Nanosized TaC Precipitates and Co Matrix in High Temperature Co-Re Based Alloys Studied by Neutrons and X-rays: *Ralph Gilles*¹; *Lukas Karge*¹; *Debashis Mukherji*²; *Pavel Strunz*³; *Premek Beran*³; *Michael Hofmann*¹; *Andreas Stark*⁴; *Joachim Roesler*²; ¹TU Muenchen; ²TU Braunschweig; ³Nuclear physics institute of the CAS; ⁴Helmholtz Zentrum Geesthacht

10:10 AM

Microstructure Evolution in Ni-containing Co-Re-Cr Alloys and Effects on Alloy Properties: *Katharina Esleben*¹; *Bronislava Gorr*¹; *Hans-Jürgen Christ*¹; *Debashis Mukherji*²; *Joachim Rösler*²; ¹Universität Siegen; ²TU Braunschweig

10:30 AM

Microstructure and Oxidation Behavior of Heat-treatable Cr-based Alloys: *Mathias Galetz*¹; *Anke Ulrich*¹; *Petra Pfitzenmeier*¹; *Uwe Glatzel*¹; ¹DECHEMA Forschungsinstitut

10:50 AM

Mechanically Activated Combustion Synthesis of Niobium Silicide Based Composites: *Reina Trevino*¹; *Edgar Maguregui*¹; *Evgeny Shafirovich*¹; ¹University of Texas at El Paso

11:10 AM

Influence of Composition of Nb-Si Based Alloy Substrates on the Microstructure and Oxidation Performance of Their Si-Al-Y Diffusive Coatings Prepared by Pack Cementation Technique: *Guo Xiping*¹; *Luo Yucheng*¹; *Yao Chengzhi*¹; *Qiao Yanqiang*¹; ¹Northwestern Polytechnical University

ENERGY & ENVIRONMENT

REWAS 2019: Disruptive Material Manufacturing - Scaling and

Systems Challenges

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

Program Organizers: Kaka Ma, Colorado State University; Iver Anderson, Iowa State University / Ames Laboratory; Sneha Prabha Narra, Worcester Polytechnic Institute; Fiseha Tesfaye, Åbo Akademi University; Elsa Olivetti, Massachusetts Institute of Technology; Gabrielle Gaustad, Alfred University

Monday AM | March 11, 2019
007C | Henry B. Gonzalez Convention Center

Session Chairs: Kaka Ma, Colorado State University; Sneha Prabha Narra, Worcester Polytechnic Institute

8:00 AM Introductory Comments

8:05 AM Invited

Metal Additive Manufacturing and Sustainable Materials Development: A Case Study in the Application of Alternative Feedstock Materials: Parnian Kiani¹; Katherine Terrassa¹; Blake Fullenwider²; Kaka Ma²; *Julie Schoenung*¹; ¹University of California, Irvine; ²Colorado State University

8:30 AM Invited

From Waste Steel to Weapons: Agile Production Enabled by Additive Manufacturing: Jianyu Liang¹; *Richard Sisson*¹; Diran Apelian¹; ¹Worcester Polytechnic Institute

8:55 AM

From Recycled Machining Waste to Useful Powders for Metal Additive Manufacturing: *Kaka Ma*¹; ¹Colorado State University

9:15 AM

Use of Non-spherical Hydride-Dehydride (HDH) Powders in Powder Bed Fusion Additive Manufacturing: Ziheng Wu¹; Rahi Patel¹; Joe Capone²; Muktesh Paliwal²; Jack Beuth¹; Anthony Rollett¹; *Sneha Prabha Narra*³; ¹Carnegie Mellon University; ²Ametek Specialty Metal Products; ³Worcester Polytechnic Institute

9:35 AM Break

9:55 AM

Recycling in Supply Chains for Tomorrow's Low-carbon Industries: *Adam Powell*¹; ¹Worcester Polytechnic Institute

10:15 AM

The Role of Manufacturing Variability on Environmental Impact: AlexandervanGrootel¹; JiyounChang¹; *Elsa Olivetti*¹; ¹Massachusetts Institute of Technology

10:35 AM

Manufacturing Materials Optimization Research at The REMADE Institute: Pradeep Rohatgi¹; *Alan Luo*²; Magdi Azer³; ¹University of Wisconsin; ²Ohio State University; ³University of Illinois

10:55 AM

Sustainable Nitrogen-based Fertilizer Production from Sun, Air, and Water: *Stephan Petersen*¹; Dorottya Guban²; Martin Roeb²; Josua Vieten²; Hanna Krüger²; Klaus Hack¹; Tatjana Jantzen¹; Martin Habermehl³; Markus Hufschmidt³; ¹GTT-Technologies; ²German Aerospace Center (DLR); ³aixprocess

11:15 AM

Metamorphic Manufacturing: Shaping the Future of On-Demand Components: *Glenn Daehn*¹; George Spanos²; ¹The Ohio State University; ²The Minerals, Metals, and Materials Society (TMS)

MATERIALS PROCESSING

Shape Casting: 7th International Symposium Celebrating Prof. John Campbell's 80th Birthday — Entrainment and Bifilms

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

Program Organizers: Murat Tiryakioglu, University of North Florida; William Griffiths, University of Birmingham; Mark Jolly, Cranfield University

Monday AM | March 11, 2019

006B | Henry B. Gonzalez Convention Center

Session Chair: Murat Tiryakioglu, University of North Florida

8:00 AM Introductory Comments

8:10 AM Keynote

Update on Bifilms - The Fundamental Defect in Metals: *John Campbell*¹; ¹University of Birmingham, UK

8:40 AM

Entrainment Defects in Cast Iron: *Zakareya Nashwan*¹; William Griffiths¹; ¹University of Birmingham, UK

9:05 AM

Measurement of Air Entrainment During Pouring of an Aluminum Alloy: Lucas Archer¹; Francisco Guerra¹; *Christoph Beckermann*¹;
¹University of Iowa

9:30 AM

Connecting Oxide Bifilms' Properties from Atomistic Simulations with Virtual Casting of Aluminum: *Jialin Liu*¹; Qigui Wang²; Yue Qi¹;
¹Michigan State University; ²General Motors Corporation

9:50 AM Break

10:10 AM

Numerical Process Modelling and Simulation of Campbell Running Systems Designs: Chengcheng Lyu¹; Michail Papanikolaou¹; *Mark Jolly*¹; ¹Cranfield University

10:30 AM

Synchrotron X-ray Real-time Studies of the Nucleation and Growth of Intermetallic Phases in Solidification: *Jiawei Mi*¹;
¹University of Hull

10:50 AM

Determination of Liquid Metal Quality with Deep Etching Method: *Furkan Tezer*¹; Özen Gürsoy¹; Mert Zoraga¹; Eray Erzi¹; Derya Dispinar¹; ¹Istanbul University

11:10 AM

Effect of Fe-Rich Intermetallics on Tensile Behavior of Al-Cu 206 Cast Alloys at Solid and Near-Solid States: *Kun Liu*¹; X. Cao²; A. Bolouri³; X. G. Chen¹; ¹University of Quebec; ²Aerosapce Manufacturing Technology Center, National Research Council Canada; ³University of the West of England

LIGHT METALS

Solidification Processing of Light Metals and Alloys: An MPMD Symposium in Honor of David StJohn — Grain Refinement

Sponsored by: TMS: Solidification Committee

Program Organizers: Mark Easton, RMIT University; Ma Qian, RMIT University (Royal Melbourne Institute of Technology); John Grandfield, Grandfield Technology Pty Ltd; Norbert Hort, Helmholtz-Zentrum Geesthacht; Mark Jolly, Cranfield University

Monday AM | March 11, 2019
006C | Henry B. Gonzalez Convention Center

Session Chairs: Mark Easton, RMIT University; Peter Schumacher, University of Leoben

8:00 AM Introductory Comments

8:10 AM Keynote

Heterogeneous Nucleation Sequence at the Interface of TiB₂ to Form Al: Jiehua Li¹; *Peter Schumacher*¹; ¹Montanuniversität Leoben

8:30 AM Keynote

Recent Advances in Understanding Early Stages of Solidification: *Zhongyun Fan*¹; ¹Brunel University

8:50 AM Invited

A Brief History of Grain Refinement: *Mark Easton*¹; Ma Qian¹; Michael Bermingham²; Peng Cao³; ¹RMIT University; ²University of Queensland; ³University of Auckland

9:10 AM Invited

Revealing the Heterogeneous Nucleation and Growth Behaviour of Grains in Inoculated Aluminium Alloys during Solidification: Yijiang Xu¹; Ragnvald Mathiesen¹; Daniele Casari¹; *YanJun Li*¹; ¹Norwegian University of Science and Technology

9:30 AM Break

9:50 AM Invited

Heterogeneous Nucleation in Peritectic Systems: *John Perepezko*¹; Rohit Trivedi²; ¹University of Wisconsin; ²Iowa State University

10:10 AM Keynote

Thermodynamics of Carbon and Carbides for Grain Refinement of Mg-alloys: *Rainer Schmid-Fetzer*¹; ¹Clausthal University of Technology

10:30 AM Invited

Crystallography of Phase Transformations in Solids and its Applications: *Ming-Xing Zhang*¹; ¹University of Queensland

10:50 AM Invited

Grain Refinement of Aluminum: A Review and Unsolved Mysteries: *Geoffrey Sigworth*¹; ¹GKS Engineering Services

MECHANICS & STRUCTURAL RELIABILITY

Thermo-mechanical Response of Materials Investigated through Novel in-situ Experiments and Modeling — Session I

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Robert Wheeler, Microtesting Solutions LLC; Dongchan Jang, Kaist; Amit Pandey, Granta Design/ANSYS; Josh Kacher, Georgia Institute of Technology; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Monday AM | March 11, 2019
301A | Henry B. Gonzalez Convention Center

Session Chairs: Saurabh Puri, Microstructure Engineering; Amit Pandey, Granta Design/ANSYS

8:00 AM Introductory Comments

8:10 AM Keynote

Evolving Methods in the Measurement of Micromechanical Properties of Materials: *Robert Wheeler*¹; *Amit Pandey*²; *Amit Shyam*³; *Thomas Stoughton*⁴; *Michael Uchic*⁵; *Paul Shade*⁵; *Lisa Rueschhoff*⁵; *matthew dickerson*⁵; *Mark Flores*⁵; *Nathaniel Sesar*⁵; *Torin Quick*⁵; *Andrew Sharits*⁵; ¹MicroTesting Solutions LLC; ²LG Fuel Cell Systems; ³Oak Ridge National Laboratory; ⁴General Motors Research and Development Center; ⁵Air Force Research Laboratory

8:50 AM Invited

In Situ Instrumentation and Microfabrication for Mechanical Testing of Thin Films at Elevated Temperatures: *Gi-Dong Sim*¹; *Joost Vlassak*²; ¹KAIST; ²Harvard University

9:20 AM

A Novel MEMS Stage for In Situ Thermomechanical Testing of Materials under Bending: *Mohamed Elhebeary*¹; *Taher Saif*²; ¹University of Illinois at Urbana-Champaign

9:40 AM Break

10:00 AM Invited

An Overview of the Research on TiAl Alloys: From Fundamental to Applications: *Seong-Woong Kim*¹; *Ji Young Kim*²; *Taegu Lee*³; *Seung-Hwa Ryu*³; *Eun Soo Park*⁴; *Jae Keun Hong*¹; *Seung Eon Kim*¹; ¹Korea Institute of Materials Science; ²Korea Institute of Materials Science; ³Seoul National University; ⁴Seoul National University

10:30 AM

Mechanical Behavior of Nanocrystalline NiTi Films with Highly Controlled Microstructures – Ex Situ and In Situ TEM Experiments: *Paul Rasmussen*¹; Rohit Sarkar¹; Jagannathan Rajagopalan¹; ¹Arizona State University

10:50 AM

Mechanical Properties Evaluation of Irradiated Duplex Stainless Steel by Nano Indentation and In Situ Nano Pillar Compression Test: *Hyeonsu Do*¹; Hyunmyung Kim¹; Changheui Jang¹; Dongchan Jang¹; ¹Kaist

11:10 AM

Deformation-Induced Martensitic Transformation in 304 Stainless Steel using In Situ TEM characterization: Effect of Ion Irradiation: *Djamel Kaoumi*¹; Francois-Ligori Paul²; ¹North Carolina State University; ²Phelma

MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing – Energy Efficient Clean Metallurgical Technologies

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Tao Jiang, Central South University; Jiann-Yang Hwang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

Monday PM | March 11, 2019

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Session Chairs: Shijie Wang, Rio Tinto Kennecott Utah Copper Corp; Yuanbo Zhang, Central South University

2:30 PM Introductory Comments

2:35 PM

Waste Toner Powder, a Potential Resource for Iron and Steelmaking Technologies: *James Dankwah*¹; Yvonne Owusu-Ansah¹; ¹University of Mines and Technology

2:55 PM

Preparation of High-carbon Metallic Briquette for Coke Saving in Blast Furnace: *Huiqing Tang*¹; Shihong Liu¹; ¹University of Science & Technology Beijing

3:15 PM

Study on the Migration of Alkali Metals in the Synthesis Process of Vanadium–nitrogen Alloy: *Deman Liu*¹; Jiang Diao¹; Guang Wang¹; Bing Xie¹; ¹Chongqing University

3:35 PM

Study of Siderite Fluidization Magnetization Roasting-magnetic Separation: *Zhao Qiang*¹; Xue Jilai¹; ¹University of Science and Technology Beijing

3:55 PM Break

4:15 PM

Strengthening Sodium Stannate Preparation from Cassiterite Concentrates and Na₂CO₃ Roasted in a Weak Reductive Atmosphere: *Yuanbo Zhang*¹; Benlai Han¹; Zijian Su¹; Bingbing Liu¹; Manman Lu¹; ¹Central South University

4:35 PM

Emission Profile of PM₁₀ and PM_{2.5} in Iron Ore Sintering Process and Control Technology: *Zhiyun Ji*¹; Xiaohui Fan¹; Min Gan¹; Xuling Chen¹; Wei Lv¹; Guojing Wang¹; Tao Jiang¹; ¹Central South University

4:55 PM

The Influence Mechanism of Nb on Hot Charging Crack in X60 Pipeline Steel: *Ping Shen*¹; Yanxin Wu¹; Juan Cheng¹; Qiankun Yang¹; Dong Zhang¹; Yang Wang¹; Jianxun Fu¹; ¹Shanghai University

5:15 PM

Viscosity Properties of Mold Flux under Low Frequency Electromagnetic Field: *Wei Qian*¹; Yu Wang¹; Lu-ming Zhao¹; ¹Chong Qing University

5:35 PM Concluding Comments

ENERGY & ENVIRONMENT

2019 Energy Technologies and Carbon Dioxide Management Symposium — Process and Waste Gas Operations

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

Program Organizers: Tao Wang, Nucor Castrip Arkansas; Xiaobo Chen, RMIT; Donna Guillen, Idaho National Laboratory; Lei Zhang, University of Alaska Fairbanks; Ziqi Sun, Queensland University of Technology; Cong Wang, Northeastern University; Nawshad Haque, Csiro; John Howarter, Purdue University; Neale Neelameggham, IND LLC

Monday PM | March 11, 2019
007D | Henry B. Gonzalez Convention Center

Session Chair: John Howarter, Purdue University

2:30 PM

CO₂ Utilization in the Refining Process of FeCr and FeMn: *Haijuan Wang*¹; *Xuan Wei*¹; *Cheng Li*¹; ¹University of Science and Technology Beijing

2:50 PM

Flare Gas Reduction by Connecting the Flash Gas Compressors as Series: *Farhad Fazlollahi*¹; ¹Purdue University/WorleyParsons Company

3:10 PM

High-temperature Online Reforming of Converter Gas with Coke Oven Gas: *Binglang Ren*¹; *Lin Lin*¹; *Jingsong Wang*¹; ¹University of Science and Technology Beijing

3:30 PM

Simultaneous CO₂ Sequestration of Korean Municipal Solid Waste Incineration Bottom Ash and Encapsulation of Heavy Metals by Accelerated Carbonation: *Thriveni Thenepalli*¹; *Ramakrishna Chilakala*¹; *Ahn Ji Whan*²; ¹Hanil Cement Co Ltd; ²Korea Institute Of Geosceinces And Miner

3:50 PM

Promoting Behaviors of Alkali Carbonates during CO₂ Capture of Lithium Orthosilicate: *Qian Xu*¹; ¹Shanghai University, China

SPECIAL TOPICS

2019 International Metallurgical Processes Workshop for Young Scholars (IMPROWYS 2019) — Metal Refining

Sponsored by: TMS Extraction and Processing Division

Program Organizers: Cong Wang, Northeastern University; Amy Clarke, Colorado School of Mines; Kinnor Chattopadhyay, University of Toronto; Bryan Webler, Carnegie Mellon University

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213B | Henry B. Gonzalez Convention Center

Funding support provided by: Korean Institute of Metals and Materials

Session Chairs: Kinnor Chattopadhyay, University of Toronto; M Akbar Rhamdhani, Swinburne University of Technology

2:30 PM Invited

Machine Learning Approaches to Describe and Classify Non-metallic Inclusions in Steel: Mohammad Abdulsalam¹; *Bryan Webler*¹; ¹Carnegie Mellon University

3:00 PM Invited

The Effects of FeO and Sulphur Concentration on the Spontaneous Emulsification of a Free Steel Droplet Suspended in Slag: Stephen Spooner¹; J. M. Warnett¹; M. A. Williams¹; Sridhar Seetharaman²; Z. Li¹; ¹University of Warwick; ²Colorado School of Mines

3:30 PM Invited

Microstructural Observation of Oxidised End-of-life Rare Earth Magnet: Muhamad Firdaus¹; *M Akbar Rhamdhani*¹; Kathie McGregor²; Mark Pownceby²; John Rankin¹; ¹Swinburne University of Technology; ²CSIRO

4:00 PM Break

4:20 PM Invited

Effect of Surface Active Elements on the Interaction between Refractory and Steel: Limei Cheng¹; *Lifeng Zhang*¹; Ying Ren¹; Wen Yang¹; ¹University of Science & Technology Beijing

4:50 PM Invited

Integration of Biomass Gasification in a Mixing Agent of CO₂ and H₂O and Waste Heat from Hot Slags: *Yongqi Sun*¹; ¹The University of Queensland

5:10 PM

Reaction Behavior of Al-killed Medium-manganese Steel with MgO Refractory: *Zhiyin Deng*¹; Lingzhong Kong¹; Liu Cheng¹; Miaoyong Zhu¹; ¹Northeastern University

5:30 PM

Effects of a Top-down Flow on Gas-solid Fluidization State in a Bubble Fluidized Bed: *Xu Han*¹; Liangying Wen¹; Shengyun Shi¹; Jiao Cao¹; Wenhuan Jiang¹; Meihuan Liu¹; Feng Lu¹; Jian Xu¹; Shengfu Zhang¹; ¹Chongqing University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

2019 Symposium on Functional Nanomaterials: Synthesis, Integration, and Application of Emerging Nanomaterials — Atomic Layer Deposition for Functional Nanomaterials

Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory; Jiyoung Chang, University of Utah; Pei Dong, George Mason University; Yong Lin Kong, University of Utah; Shengfeng Yang, Indiana University; Purdue University Indianapolis; SungWoo Nam, University of Illinois

Monday PM | March 11, 2019

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Session Chairs: Jin-Seong Park, Hanyang University; Jeffrey Elam, Argonne National Laboratory

2:30 PM Invited

Sequential Infiltration Synthesis for Functional Nanomaterials: *Jeffrey Elam*¹; ¹Argonne National Laboratory

3:00 PM Invited

Atomic Layer Deposition (ALD) on Cellulosic Products for New Functional Materials: *Mark Losego*¹; ¹Georgia Tech

3:30 PM

Improving Stability and Performance of Photoelectrochemical Water Splitting on Solution-processed Organic Semiconductor Thin Films by Ultrathin Metal Oxide Passivation via Atomic Layer Deposition: *Chang-Yong Nam*¹; ¹Brookhaven National Laboratory

3:50 PM Break

4:10 PM Invited

Ultra-thin Films Deposited by Atomic Layer Deposition (ALD) for Organic – Inorganic Perovskite Solar Cells and Photoelectrochemical Cells: *Hyunjung Shin*¹; ¹Sungkyunkwan University

4:40 PM Invited

Recent Progress on Metal Oxide Semiconductor Thin Film Transistor Applications via Atomic Layer Deposition Method: *Jin-Seong Park*¹; ¹Hanyang University

5:10 PM

Ambipolar Behavior Owing to ALD In-situ DEZ Treatment on In_{0.53}Ga_{0.47}As MOSFETs Devices: *Heber Hernandez Arriaga*¹; *Jiyoung Kim*¹; ¹The University of Texas at Dallas

5:30 PM

Realization of Spatially Addressable Library using Raman as Combinatorial Approach on Atomic Layer Deposition: *Harrison Kim*¹; *Si Joon Kim*¹; *Jaebeom Lee*¹; *Antonio Lucero*¹; *Jiyoung Kim*¹; ¹University of Texas Dallas

5:50 PM

Investigation of Hollow Cathode Plasma Enhanced Atomic Layer Deposition of Silicon Nitride (SiN_x) Thin Films: *Su Min Hwang*¹; *Antonio Lucero*¹; *Harrison Kim*¹; *Aswin Kondusamy*¹; *Si Joon Kim*¹; *Jiyoung Kim*¹; ¹The University of Texas At Dallas

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Energy Conversion with Emphasis on SOFCs I

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Monday PM | March 11, 2019

225A | Henry B. Gonzalez Convention Center

Session Chairs: Amit Pandey, Granta Design/ANSYS; Soumendra Basu, Boston University

2:30 PM Invited

Electrophoretically Deposited Copper Manganese Spinel Coatings for Prevention of Chromium Poisoning in Solid Oxide Fuel Cells: *Zhihao Sun*¹; *Ruofan Wang*¹; *Uday Pal*¹; *Srikanth Gopalan*¹; *Soumendra Basu*¹; ¹Boston University

2:55 PM

Observations on Accelerated Oxidation of a Ferritic Stainless Steel under Dual Atmosphere Exposure Conditions: *Michael Reisert*¹; Ashish Aphale¹; Prabhakar Singh¹; ¹University of Connecticut

3:15 PM

High-temperature Oxidation Behavior of Additive Manufactured Inconel 625: *Sedigheh Rashidi*¹; Amit Pandey²; Rajeev Gupta¹; ¹University of Akron; ²LG Fuel Cell Systems

3:35 PM

Cathode Poisoning and Mitigation in the Presence of Combined Cr and S Contaminants in SOFC: *Junsung Hong*¹; Su Jeong Heo¹; Ashish N. Aphale¹; Boxun Hu¹; Prabhakar Singh¹; ¹University of Connecticut

3:55 PM Break

4:15 PM

Coatings for Metallic Components of Solid Oxide Fuel Cell Systems: *Manoj Mahapatra*¹; Mark King¹; ¹University of Alabama at Birmingham

4:35 PM Invited

Self-cleaning Cathodes for Endurance to Chromium Poisoning: Michelle Sugimoto¹; Zhikuan Zhu¹; *Uday Pal*¹; Soumendra Basu¹; Srikanth Gopalan¹; ¹Boston University

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Energy Storage with Emphasis on Batteries I

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Monday PM | March 11, 2019

223 | Henry B. Gonzalez Convention Center

Session Chairs: Partha P. Mukherjee, Purdue University; Leela M. R. Arava, Wayne State University

2:30 PM Keynote

Battery Performance and Safety Aspects of Imposed Thermal Gradients: Rachel Carter¹; Connor Fear²; Aashutosh Mistry²; Partha Mukherjee²; *Corey Love*¹; ¹U.S. Naval Research Laboratory; ²Purdue University

3:00 PM

First Principles Calculations of Oxygen Diffusion in LSGM: *Abhinav Jain*¹; Dallas Trinkle¹; Ran Gao²; Lane Martin²; ¹University of Illinois Urbana Champaign; ²University of California Berkeley

3:20 PM

Hollow Sn Microspheres for Lithium-ion Battery: *Fuqian Yang*¹; ¹University of Kentucky

3:40 PM Keynote

Critical Size Scale and Effects of Transport Gradients on Plating in Li-ion Batteries: *Craig Arnold*¹; ¹Princeton University

4:10 PM Break

4:30 PM Invited

Toward New Electrode Materials for Energy Storage Devices: Synthesis via Chemical Pre-intercalation Approach: *Ekaterina Pomerantseva*¹; ¹Drexel University

4:55 PM

Mechanical Properties of Lithium Metal at the Macro- and Micro-scale: *Cole Fincher*¹; Daniela Ojeda²; Matt Pharr¹; ¹Texas A&M University; ²University of Central Florida

5:15 PM

Bi₂Mn₄O₁₀/C-N Nanocomposite as a New Sodium-Ion Battery Anode Material: Jing Zhan¹; *Yiyu Long*¹; ¹Central South University

ADDITIVE TECHNOLOGIES

Additive Manufacturing Joint Keynote Session

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizer: Ryan Dehoff, Oak Ridge National Laboratory

Monday PM | March 11, 2019

Lila Cockrell Theater | Henry B. Gonzalez Convention Center

2:30 PM Introductory Comments

2:35 PM Keynote

Solidification of Superalloys: From Single Crystals to Additive Manufacturing: Andrew Polonsky¹; *Tresa Pollock*¹; ¹University of California Santa Barbara

3:05 PM Keynote

Optimizing the Performance of Additively Manufactured Ti Alloy Components: Brian Welk¹; Samuel Kuhr¹; *Hamish Fraser*¹; ¹The Ohio State University

3:35 PM Keynote

Printable Alloys by Design: *Gregory Olson*¹; ¹Northwestern University & QuesTek Innovations LLC

4:05 PM Break

4:25 PM Keynote

Opportunities in Machine Learning for Additive Manufacturing: *Elizabeth Holm*¹; ¹Carnegie Mellon University

4:55 PM Keynote

Solidification and Solid-state Transformations during Metal Additive Manufacturing under Thermo-mechanical-chemical Transients: *Sudarsanam Babu*¹; ¹The University of Tennessee, Knoxville

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session II

Sponsored by: TMS: Shaping and Forming Committee

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

Monday PM | March 11, 2019
302A | Henry B. Gonzalez Convention Center

Session Chairs: Wolfgang Pantleon, Technical University of Denmark; Reza Alizadeh

2:30 PM Invited

Slip Transfer at Grain Boundaries in Pure Al: *R. Alizadeh*¹; T. Bieler²; J. Molina-Aldareguia¹; Javier LLorca³; ¹IMDEA Materials Institute; ²IMDEA Materials Institute & Michigan State University; ³Polytechnic University of Madrid & IMDEA Materials Institute

3:00 PM

Understanding Deformation Near Nanoscratches using HR-EBSD Measurements and CP-FEA Simulations: *Anna Kareer*¹; Edmund Tarleton¹; Sarah Hainsworth²; Angus Wilkinson¹; ¹University of Oxford; ²Aston University

3:20 PM

Accelerated Dictionary Based EBSD Indexing: *William Lenthe*¹; Saransh Singh¹; Marc De Graef¹; ¹Carnegie Mellon University

3:40 PM

A Multi-scale Characterization of Strain Localization in Ni-based Superalloys – combined HEDM and Dark Field X-ray Microscopy: *Sven Gustafson*¹; Wolfgang Ludwig²; Paul Shade³; Diwakar Naragani¹; Darren Pagan⁴; Carsten Detlefs²; Michael Sangid¹; ¹Purdue University; ²European Synchrotron Radiation Facility; ³Air Force Research Laboratory; ⁴Cornell High Energy Synchrotron Source

4:00 PM Break

4:20 PM

Quantifying Grain Size and Shape in Anisometric Structures by the Orientation Correlation Function: *Wolfgang Pantleon*¹; ¹Technical University of Denmark

4:40 PM

Robust Methodology for Combining High-energy X-ray Diffraction and 3D Electron Microscopy Methods to Elucidate Evolving Plastic Response of Polycrystalline Alloys: *Kelly Nygren*¹; McLean Echlin²; Andrew Polonsky²; Joseph Wendorf²; Jean-Charles Stinville²; Patrick Callahan²; Tresa Pollock²; Eric Miller³; Matthew Miller⁴; ¹Cornell High Energy Synchrotron Source; ²University of California Santa Barbara; ³Tufts University; ⁴Cornell University

5:00 PM

Elucidating the Role of Localized Deformation on Hydrogen Environment-assisted Cracking Susceptibility in a Precipitation-hardened Ni-base Superalloy: *Zachary Harris*¹; James Burns¹; ¹University of Virginia

5:20 PM

Characterization of Intragranular Deformation and Damage: *Veronica Livescu*¹; Cheng Liu¹; Bineh Ndefru¹; Ramon Martinez¹; Curt Bronkhorst¹; George Gray III¹; ¹Los Alamos National Laboratory

5:40 PM

Customized Polarized Optical Microscope for Determining C-axis Orientation of Alpha-titanium: *Ke-Wei Jin*¹; William Lenthe¹; Marc De Graef¹; ¹Carnegie Mellon University

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Alloy Development and Application of Magneto-thermal Materials

Sponsored by: Federation of European Materials Societies (FEMS), TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Frank Johnson, Niron Magnetics, Inc.; Paul Ohodnicki, National Energy Technology Laboratory; Alex Leary, Nasa Grc; Orlando Rios, Oak Ridge National Laboratory; Alessandra Hool, ESM Foundation

Monday PM | March 11, 2019
225B | Henry B. Gonzalez Convention Center

Session Chair: Ryan Ott, Ames Laboratory

2:30 PM Invited

A New Quantitative Criterion to Determine the Order of Phase Transitions: Application to Different Materials: *Victorino Franco*¹; Jia Yan Law¹; Alejandro Conde¹; ¹Universidad De Sevilla

3:00 PM Invited

Advantages and Disadvantages of Additive Manufacturing of Magnetocaloric Materials and Magnetic Shape Memory Alloys: *Markus Chmielus*¹; ¹University of Pittsburgh

3:30 PM Invited

Magnetic Cooling and Energy Harvesting Materials and Systems: *Raju Ramanujan*¹; ¹Nanyang Technological University

4:00 PM Break

4:20 PM Invited

Materials for Efficient Energy Conversion: *Ekkes Brueck*¹; ¹Delft University of Technology

4:50 PM

Optimization of Magnetocaloric Properties of Ball-Milled La(Fe, Co, Si)₁₃(H,C)_y: *Lotfi Bessais*¹; Valerie Paul-Boncour¹; ¹Cnrs

5:10 PM

The Effect of Additional Elements on the High-temperature Magnetocaloric Property of MnFe-based Alloys: *A-Young Lee*¹; Song-Yi Kim¹; Young-Do Kim²; Min-Ha Lee¹; ¹Korea Institute of Industrial Technology; ²Hanyang University

5:30 PM

Magnetocaloric Properties in Additive Manufactured Ni-Mn-Ga-Cu: *Erica Stevens*¹; Katerina Kimes¹; Daniel Salazar²; Rafael Rodriguez¹; Aaron Acierno¹; Patricia Lazpita²; Volodymyr Chernenko²; Markus Chmielus¹; ¹University of Pittsburgh; ²Basque Center for Materials, Applications, and Nanostructures

5:50 PM

Crystal Structure, Magnetization and Elastic Moduli of the Tb_{0.2}Dy_{0.8}Co₂ Compound: Dan Huang¹; *Jianrong Gao*¹; Jiaqiang Yan²; David Mandrus³; Veerle Keppens³; ¹Northeastern University, China; ²Oak Ridge National Laboratory; ³University of Tennessee at Knoxville

ELECTRONIC MATERIALS

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

Sponsored by: TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Kazuhiro Nogita, University of Queensland; Tae-Kyu Lee, Portland State University; Yan Li, Intel Corporation; Christopher Gourlay, Imperial College London; Zhi-Quan Liu, Chinese Academy of Sciences; Rahul Panat, Carnegie Mellon University; Albert T. Wu, National Central University; Andre Delhaise, Celestica; Mohd Arif Salleh, Universiti Malaysia Perlis

Monday PM | March 11, 2019
216A | Henry B. Gonzalez Convention Center

Session Chairs: Kazuhiro Nogita, The University of Queensland;
Sergey Belyakov, Imperial College London

2:30 PM Invited

Nucleation and Cyclic Twinning of Tin Droplets on Single Crystal Intermetallic Compounds: *Christopher Gourlay*¹; Zhaolong Ma¹; Jingwei Xian¹; Sergey Belyakov¹; ¹Imperial College London

3:00 PM

Effects of CuZnAl Memory Particles on the Microstructures and Property of Cu/Sn/Cu Solder Joints: *Liang Zhang*¹; ¹Jiangsu Normal University

3:20 PM

Orientation Relationships Between Cu₆Sn₅ and Ni₃Sn₄ in Electronic Solder Joints: *Yuchen Hsu*¹; Jingwei Xian²; Christopher Gourlay²; ¹Toshiba Corporation Manufacturing Engineering Center; ²Imperial College London

3:40 PM

Phase Transformation Induced Cracking in Solder Joints Containing Cu₆Sn₅: *Flora Somidin*¹; Hiroshi Maeno²; Quy Tran Xuan³; Stuart McDonald¹; Mohd Arif Anuar Mohd Salleh⁴; Xiaozhou Ye¹; Syo Matsumura²; Kazuhiro Nogita¹; ¹Nihon Superior Centre for the Manufacture of Electronic Materials (NS CMEM), School of Mechanical and Mining Engineering, The University of Queensland; ²The Ultramicroscopy Research Center, Kyushu University; ³Department of Applied Quantum Physics and Nuclear Engineering, Kyushu University; ⁴Centre of Excellence Geopolymer and Green Technology, School of Materials Engineering, Universiti Malaysia Perlis (UniMAP), Taman Muhibbah

4:00 PM Break

4:20 PM Invited

The Evolution of IMCs in Sn-based Solder Joints with Au/Ni/Cu Pads under Current Stressing: *Fu Guo*¹; Yu Tian¹; Limin Ma¹; Yishu Wang¹; ¹Beijing University of Technology

4:50 PM

Mechanical Assessment of Hexagonal-Cu₆Sn₅ Intermetallics and Multilayered Structures in Cu/Sn Joints Using Micro-Compression: *Jui-Yang Wu*¹; C. Robert Kao¹; ¹National Taiwan University

5:10 PM

Interfacial Reaction between Copper-tin Couple under High Pressure Environment: *Kuo-Shuo Huang*¹; Albert T. Wu¹; ¹National Central University

5:30 PM

Twinning and Refinement of Cu₆Sn₅ in Ni-containing Solders: *Jingwei Xian*¹; M.A.A. Mohd Salleh²; Sergey Belyakov¹; Te-Cheng Su¹; Guang Zeng¹; Kazuhiro Nogita³; Hideyuki Yasuda⁴; Christopher Gourlay¹; ¹Imperial College London; ²Universiti Malaysia Perlis (UniMAP); ³The University of Queensland; ⁴Kyoto University

CHARACTERIZATION

Advanced Real Time Imaging — Energy, Fuels, and Environment

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, US Department of Energy - National Energy Technology Laboratory; P. Chris Pistorius, Carnegie Mellon University; Candan Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zuotai Zhang, Southern University of Science and Technology; Neslihan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Saito, Kyushu University; Yongsug Chung, Korea Polytechnic University; Bryan Webler, Carnegie Mellon University

Monday PM | March 11, 2019

302B | Henry B. Gonzalez Convention Center

Session Chair: Zuotai Zhang, Southern University of Science and Technology

2:30 PM Invited

Rapid Radiation Damage Characterization with In Situ Dual Heterodyne Transient Grating Spectroscopy: Cody Dennett¹; Sara Ferry¹; Kangpyo So¹; Khalid Hattar²; Daniel Buller²; Kuba Anglin¹; *Michael Short*¹; ¹Massachusetts Institute of Technology; ²Sandia National Laboratory

3:00 PM Invited

In Situ Transmission Electron Microscopy Characterization of Irradiation Damage in Novel Nuclear Materials: *Osman El-Atwani*¹; Stuart Maloy¹; ¹Los Alamos National Laboratory

3:30 PM

In Situ Structural Variations of Individual Particles of an Al₂O₃-Supported Cu/Fe Spinel Oxygen Carrier during High-temperature Oxidation and Reduction: *W. H. Harrison Nealley*¹; Anna Nakano²; Jinichiro Nakano²; James Bennett³; ¹National Energy Technology

Laboratory/ORISE; ²National Energy Technology Laboratory/AECOM; ³National Energy Technology Laboratory

3:50 PM

Synthesis of Ordered Mesoporous Nano Materials from Coal Fly Ash: A Novel CO₂-assistant Precipitation Technology: *Feng Yan*¹; Jianguo Jiang¹; Zuotai Zhang²; ¹Tsinghua University; ²Southern University of Science and Technology

4:10 PM Break

4:30 PM Invited

In-operando Non-invasive Optical Visualization of Battery Reactions and Processes: *Nian Liu*¹; Yutong Wu¹; Peng Chen¹; ¹Georgia Institute of Technology

4:50 PM Invited

In Situ Interface Observation of Solution Growth of 4H-SiC at the Initial Growth Stage from Different Solvents: *Takeshi Yoshikawa*¹; Yao Yuchuan¹; Takumi Horiike¹; Sakiko Kawanishi²; ¹The University of Tokyo; ²Tohoku University

5:10 PM

Advanced In Situ Electron Microscopy Characterization of Hydrogen and Helium Evolution in Materials: *Caitlin Taylor*¹; Joshua Sugar¹; David Robinson¹; Samuel Briggs¹; Warren York¹; Brittany Muntifering¹; Noelle Catarineu¹; Khalid Hattar¹; ¹Sandia National Laboratories

MATERIALS PROCESSING

Advances in Surface Engineering — Session II

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Rajeev Gupta, The University of Akron; Sandip Harimkar, Oklahoma State University; Arif Mubarok, PPG Industries; Deepak Kumar, Baker Hughes, A GE Company; Tushar Borkar, Cleveland State University; Dong Lin, Kansas State University

Monday PM | March 11, 2019

210A | Henry B. Gonzalez Convention Center

Session Chairs: Arif Mubarok, PPG Industries; Deepak Kumar, Baker Hughes, a GE Company

2:30 PM Invited

Structurally Integrated, Damage Tolerant Coatings: *Sanjay Sampath*¹; Gregory Smith¹; ¹Stony Brook University

2:50 PM Invited

Influence of Stacking Fault Energy (SFE) and Post Heat Treatment on the Microstructure and Mechanical Properties of Cold Sprayed Aluminium Bronze Coatings: *Sundararajan G.*¹; Naveen Chavan²; Prita Pant³; Sudharshan Phani Pardhasaradhi²; ¹Indian Institute of Technology Madras; ²International Advanced Resch Center for Powder Metallurgy and New Materials; ³Indian Institute of Technology Bombay

3:10 PM

Computer Vision and Feature Selection Approach to Analyzing Rough Surfaces for Fatigue Crack Initiation: *Christopher Kantzos*¹; Anthony (Tony) Rollett¹; ¹Carnegie Mellon University

3:30 PM

Application of Shot Peening on $\alpha+\beta$ and β Titanium Alloys to Form Nanocrystalline Layers: *David Brice*¹; David Bahr¹; Kevin Trumble¹; ¹Purdue University

3:50 PM

Microstructural Simulation of Thermal Spray Coatings: Comparison with 3D Characterization: *Theron Rodgers*¹; Aaron Olson¹; Warren Davis¹; Andrew Vackel¹; Andrew Chuang²; Reeru Pokharel³; Don Brown³; Bjørn Clausen³; Timothy Ickes³; Nathan Moore¹; ¹Sandia National Laboratories; ²Argonne National Laboratory; ³Los Alamos National Laboratory

4:10 PM Break

4:30 PM

Surface Characterization of the As-built Ti-6Al-4V Parts Produced using Electron Beam Melting Technology (EBM): *Leila Ladani*¹; Md, Jamal Mian¹; ¹University of Texas at Arlington

4:50 PM

Nitrided Layers Investigated at the Atomic Scale by Atom Probe Tomography: *Frederic Danoix*¹; Raphaële Danoix¹; Andrius Martinavicius¹; Peter Jessner¹; Mohamed Gouné²; ¹Cnrs - Universite De Normandie Rouen; ²CNRS ICMCB

5:10 PM

Understanding the Effects of Lubricants/Coatings on Friction and Wear during Reciprocatory Sliding Motion at High Contact Pressures: *Dewika Mishra*¹; Farjana Sonia¹; Dinesh Srivastava²; G. Ganesha²; Utpal Singha²; Amartya Mukhopadhyay¹; ¹Indian Institute of Technology, Bombay; ²Nuclear Fuel Complex, Department of

Atomic Energy

5:30 PM

Microstructure and Mechanical Properties of Directed Vapor Deposited Mg-Mn Alloy Coatings: *Rakesh Kamath*¹; Yuan Li¹; Youxiong Ye¹; Derek Hass²; Hahn Choo¹; ¹University of Tennessee, Knoxville; ²Directed Vapor Technologies International

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Atomistic, Mesoscale, and Machine Learning Algorithms for Study and Design of Materials

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Prasanna Balachandran, University of Virginia; Douglas Spearot, University of Florida; Charudatta Phatak, Argonne National Laboratory; Srinivasan Srivilliputhur, University of North Texas

Monday PM | March 11, 2019

304A | Henry B. Gonzalez Convention Center

Session Chair: Srikanth Patala, North Carolina State University

2:30 PM Invited

Hybrid Atomistic-Continuum and Mesoscale-Continuum Approaches to Model the Microstructural Evolution during Laser Processing of Metallic Materials: Sergey Galitskiy¹; Dmitry Ivanov²; Avinash Dongare¹; ¹University of Connecticut; ²University of Kassel

3:00 PM

A Diffusive Molecular Dynamics Method for the Simulation of Long-Term Mass Transport in Nanomaterials: *Xingsheng Sun*¹; Pilar Ariza²; Michael Ortiz³; Kevin Wang¹; ¹Virginia Polytechnic Institute and State University; ²Universidad de Sevilla; ³California Institute of Technology

3:20 PM

Accelerated Quantum Molecular Dynamics for Chemical Reactions: *Enrique Martinez Saez*¹; Christian Negre¹; Romain Perriot¹; Marc Cawkwell¹; Danny Perez¹; Arthur Voter¹; Anders Niklasson¹; ¹Los Alamos National Laboratory

3:40 PM

Scale-bridging From the Atoms Up; Employing Machine Learning to Improve the Accuracy and Scalability of Molecular Dynamics: *Mitchell Wood*¹; Mary Alice Cusentino¹; Aidan Thompson¹; ¹Sandia National Laboratories

4:00 PM Break

4:30 PM

Designing High-strength Carbon-nanotube Polymer Composites Using Reinforcement Learning Algorithms Integrated with Molecular Dynamics Simulations: *Aowabin Rahman*¹; Matthew Radue²; Gregory Odegard²; Michael Czabaj¹; Ashley Spear¹; ¹University of Utah; ²Michigan Technological University

4:50 PM

Extended Common Neighbor Analysis to Characterize the Nucleation and Growth Mechanism of Deformation Twins in Polycrystalline HCP Microstructures: *Garvit Agarwal*¹; Avinash Dongare¹; ¹University of Connecticut

5:10 PM

Virtual Diffraction Analysis of Microstructural Features in Discrete Dislocation Dynamics Simulations: *Darshan Bamney*¹; Laurent Capolungo²; Douglas Spearot¹; ¹University of Florida; ²Los Alamos National Laboratory

ELECTRONIC MATERIALS

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

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Ensicaen University of Caen; Soon-Jik Hong, Kongju National University; Philippe Jund, Montpellier University; Lan Li, Boise State University; Takao Mori, Nims; Hsin-Jay Wu, National Sun Yat-sen University; Tiejun Zhu, Zhejiang University

Monday PM | March 11, 2019

216B | Henry B. Gonzalez Convention Center

Session Chairs: Tiejun Zhu, Zhejiang University; Philippe Jund, Université de Montpellier

2:30 PM Invited

Realizing High Thermoelectric Performance in Cubic GeTe via Sb-Doping: A First-Principles Study: Benjamin Chang¹; *Mei-Yin Chou*¹; ¹Academia Sinica

2:50 PM Invited

Influence of Defects on the Thermoelectric Properties of Materials: An Ab Initio Study: Alexandre Berche¹; *Philippe Jund*¹; ¹Montpellier University

3:10 PM Invited

Entropy Engineering in Multi-principal-element Alloyed SnTe: *Jian He*¹; Lipeng Hu²; ¹Clemson University; ²Shenzhen University

3:30 PM Invited

Electronic and Phononic Engineering for High Thermoelectric Performance: *David Singh*¹; ¹University of Missouri

3:50 PM Invited

Doping Effects on the Electronic Structures and Transport Properties of GeS-Type IV-VI Crystals: *Yue Chen*¹; ¹The University of Hong Kong

4:10 PM Break

4:30 PM Invited

New n-type half-Heusler Thermoelectric Materials: *Chenguang Fu*¹; Yintu Liu²; Federico Serrano-Sánchez¹; Xinbing Zhao²; Tiejun Zhu²; Claudia Felser¹; ¹Max Planck Institute for Chemical Physics of Solids; ²Zhejiang University

4:50 PM Invited

DFT Approach Toward Predicting TE Properties and Understanding their Relationships with the Charge Density Distribution: *Pascal Boulet*¹; Pingping Jiang¹; Hailong Yang¹; Marie-Christine Record¹; ¹Aix-Marseille University

5:10 PM Invited

Silicides Thermoelectric Modules: Performances and Challenges: Mahdi Mejri¹; Benoit Malard²; Yohann Thimont¹; Krunoslav Romanjek³; *Claude Estournes*⁴; ¹CIRIMAT/UT3-Paul Sabatier; ²CIRIMAT/ENSIACET; ³CEA-LITEN; ⁴CNRS/CIRIMAT

5:30 PM

The Scattering of Phonons by Edge Dislocations: *Yandong Sun*¹; Yanguang Zhou²; Jian Han¹; Ming Hu³; Ben Xu¹; ¹Laboratory of Advanced Materials, School of Materials Science and Engineering, Tsinghua University; ²University of California Los Angeles; ³University of South Carolina

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Aluminum Alloy Development

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

Program Organizer: Hiromi Nagaumi, Soochow University

Monday PM | March 11, 2019
007A | Henry B. Gonzalez Convention Center

Session Chair: Dmitry Sediako, University of British Columbia - Okanagan

2:30 PM Introductory Comments

2:35 PM Invited

Clustering Behavior of Al-Mg-Si Alloys with Ag and Cu Addition during Natural and Artificial Aging: *Zhihong Jia*¹; *Yaoyao Weng*¹; ¹Chongqing University

3:05 PM

Influence of Amine Additives on the Electrodeposition of Aluminum from AlCl₃- Dimethyl Sulfone Electrolytes: *Salah Salman*¹; *Sangjae Kim*²; *Kensuke Kuroda*²; *Masazumi Okido*²; ¹Al-Azhar University; ²Nagoya University

3:30 PM

Determination of the Intermetallic α -Phase Crystal Structure in Aluminum Alloys Solidified at Rapid Cooling Rates: *Joseph Jankowski*¹; *Michael Kaufman*¹; *Amy Clarke*¹; *Krish Krishnamurthy*²; *Paul Wilson*³; ¹Colorado School Of Mines; ²Honeywell; ³Boeing

3:55 PM

Comparison of the Effects of B₄C and SiC Reinforcement in Al-Si Matrix Alloys Produced via PM Method: *Yavuz Kaplan*¹; *Engin Tan*¹; *Hakan Ada*²; *Sinan Aksöz*¹; ¹Pamukkale University; ²Kastamonu University

4:20 PM Break

4:35 PM

The Effects Manganese (Mn) Addition and Laser Parameters on the Microstructure and Surface Properties of Laser Deposited Aluminium Based Coatings: *Olawale Fatoba*¹; *Stephen Akinlabi*¹; *Esther Akinlabi*¹; ¹University of Johannesburg

5:00 PM

Understanding the Role of Cu and Clustering on Strain Hardening and Strain Rate Sensitivity of Al-Mg-Si-Cu Alloys: Michael Langille¹; Bradley Diak²; Frederic De Geuser¹; Gilles Guiglionda³; Sami Meddeb⁴; Huan Zhao⁴; Baptiste Gault⁴; Dierk Raabe⁴; *Alexis Deschamps*¹; ¹Genoble Institute of Technology; ²Queen's University; ³Constellium CTEC; ⁴MPIE, Dusseldorf

5:25 PM

Production of the AA2196-TiB2 MMCs via PM Technology: *Engin Tan*¹; Yavuz Kaplan¹; Hakan Ada²; Sinan Aksöz¹; ¹Pamukkale University; ²Kastamonu University

5:50 PM

Retrogression-reaging Behavior in Aluminum AA6013-T6 Sheet: *Katherine Rader*¹; Jon Carter²; Louis Hector²; Eric Taleff¹; ¹University of Texas Austin; ²General Motors

LIGHT METALS

Aluminum Reduction Technology — Cell Technology Development and Modeling

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

Program Organizer: Marc Dupuis, GeniSim Inc

Monday PM | March 11, 2019
004 | Henry B. Gonzalez Convention Center

Session Chair: Steeve Renaudier, Rio Tinto

2:30 PM Introductory Comments

2:35 PM

How to Limit the Heat Loss of Anode Stubs and Cathode Collector Bars in Order to Reduce Cell Energy Consumption: *Marc Dupuis*¹; ¹GeniSim Inc

3:00 PM

Transformation of a Potline from Conventional to a Full Flexible Production Unit: Roman Düssel¹; *Albert Mulder*¹; Louis Bugnion²; ¹TRIMET Aluminium SE; ²KAN-NAK SA

3:25 PM

Modernisation of Sumitomo S170 cells at Boyne Smelters Limited: *Chris Corby*¹; Hao Zhang²; Madeleine Lewis¹; James Roberts¹; ¹Boyne Smelters; ²Pacific Aluminium

3:50 PM

Environmental Aspects of UC RUSAL's Aluminum Smelters Sustainable Development: *Viktor Buzunov*¹; Viktor Mann²; Vitaliy Pingin¹; Aleksey Zherdev³; Vyacheslav Grigoriev⁴; ¹RUSAL ETC; ²UC RUSAL; ³Rusal Etc; ⁴RUSAL SibVAMI

4:15 PM Break

4:30 PM

Copper Insert Collector Bar for Energy Reduction in 360 kA Smelter: *Amit Jha*¹; Amit Gupta¹; Vinay Tiwari²; Shashidhar Ghatnatti²; Kamal Pandey²; S.K. Anand²; ¹Aditya Birla Science and Technology Company Pvt Ltd; ²Hindalco Industries Ltd, Mahan Aluminium

4:55 PM

New Resource-saving Technologies for Lining the Cathode with Un-shaped Lining Materials: *Aleksandr Proshkin*¹; Vitaliy Pingin¹; Victor Mann¹; Yuri Shtefanyuk¹; Anton Orlov¹; ¹RUSAL

5:20 PM

Amperage Increase from 195kA to 240kA through Pot Upgrading: *Liu Ming*¹; Yang Xiaodong¹; Liu Yafeng¹; Lu Yanfeng¹; ¹SAMI

5:45 PM Concluding Comments

CHARACTERIZATION

Atom Probe Tomography for Advanced Characterization of Metals, Minerals and Materials II — Semiconductors and Lightweight Alloys

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

Program Organizers: Haiming Wen, Missouri University of Science and Technology; David Seidman, Northwestern University; Keith Knipling, Naval Research Laboratory; Gregory Thompson, The University of Alabama; Simon Ringer, University of Sydney; Arun Devaraj, Pacific Northwest National Laboratory; Gang Sha, Nanjing University of Science and Technology

Monday PM | March 11, 2019

303A | Henry B. Gonzalez Convention Center

Session Chairs: Gang Sha, Nanjing University of Science and Technology; Keith Knippling, Naval Research Laboratory

2:30 PM Invited

The Role of Atom Probe Tomography in Revealing the Semiconductor Physics of Nitride Alloys, Heterostructures and Devices: *James Speck*¹; ¹Materials Department

3:05 PM

Atomic-scale Chemical Analysis of Grain Boundaries and Surfaces of Nb₃Sn Coatings on Nb for Superconducting Radiofrequency Cavity Applications Using Atom Probe Tomography and High-resolution Scanning Transmission Electron Microscopy: *Jaeyel Lee*¹; Sam Posen²; Kai He¹; Zungang Mao¹; Zu Hawn Sung²; Yulia Trenikhina²; Sung-Il Baik¹; David Seidman¹; ¹Northwestern University; ²Fermi National Accelerator Laboratory

3:25 PM Invited

Characterization of a Si Fin FET Structure and Dopants Distributions by Atom Probe Tomography: *Rong Hu*¹; Jing Xue¹; Xingping Wu¹; Yanbo Zhang²; Huilong Zhu²; Gang Sha¹; ¹Nanjing University of Science and Technology; ²Institute of Microelectronics of Chinese Academy of Sciences

4:00 PM Break

4:20 PM Invited

Mechanisms of Beta-to-omega and Omega-assisted Alpha Phase Formation in Near Beta-titanium Alloys: *Tong Li*¹; Damon Kent²; Gang Sha³; Anna Ceguerra⁴; Matthew Dargusch⁵; Julie Cairney⁴; ¹Ruhr-Universität Bochum; ²University of the Sunshine Coast; ³Nanjing University of Science and Technology; ⁴University of Sydney; ⁵The University of Queensland

4:55 PM

Processing-microstructure-property Relationships of Fe and Al Modified Ti-Cr Alloys: *Joann Ballor*¹; Vahid Khademi¹; Harish Chakravarty¹; Masahiko Ikeda²; Jane Howe³; Takeshi Sunaoshi³; Arun Devaraj⁴; Carl Boehlert¹; ¹Michigan State University; ²Kansai University; ³Hitachi; ⁴Pacific Northwest National Laboratory

5:15 PM

Chemistry Stoichiometry of Titanium Carbide Crystals Grown in Different Metal Melts during Combustion Synthesis Revealed by Atom Probe Tomography: *Shenbao Jin*¹; Haokai Su¹; Gang Sha¹; ¹Nanjing University of Science and Technology

5:35 PM

Dynamic Precipitation of a 7075 Al Alloy under High-pressure Torsion Processing: Y Zhang¹; S Jin¹; X Liao²; M Murashkin³; R Valiev³; *Gang Sha*¹; ¹Nanjing University Of Science And Techno; ²The University of Sydney; ³Ufa State Aviation Technical University

BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces II

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

Program Organizers: Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Po-Yu Chen, National Tsing Hua University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines

Monday PM | March 11, 2019
217C | Henry B. Gonzalez Convention Center

Session Chair: Hendrik Heinz, University of Colorado

2:30 PM Keynote

The Impact of Structural Factors and Solvent Effects on Macromolecular Self-assembly at Interfaces: *Jim Deyoreo*¹; ¹Pacific Northwest National Laboratory; University of Washington

3:10 PM

Peptide Adsorption on Hydroxyapatite Surfaces and Implications on Shape and Mineralization: Impact of Sequence and Electrolyte pH: *Juan Liu*¹; Samuel Hoff¹; Sarah VanOosten²; Chandrani Pramanik¹; Tariq Jamil¹; Kyle Boone²; Candan Tamerler²; Hendrik Heinz¹; ¹University of Colorado Boulder; ²The University of Kansas

3:30 PM Keynote

Molecular Biomimetics: Engineered-peptide Guided Technology and Medicine: *Mehmet Sarikaya*¹; ¹University of Washington

4:10 PM Break

4:30 PM Invited

Bioelectronics Interface by Self-assembled Peptides on Two-dimensional Materials: *Yuhei Hayamizu*¹; ¹Tokyo Institute of Technology

BIOMATERIALS

Biological Materials Science — Biological and Natural Materials II

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

Program Organizers: Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama at Birmingham; Jing Du, Penn State University

Monday PM | March 11, 2019
217A | Henry B. Gonzalez Convention Center

Session Chairs: Jing Du, Penn State University; Vinoy Thomas, University of Alabama

2:30 PM Invited

Contributions of Intermolecular Bonding to the Strain Rate Response of Fish Scales: Sean Ghods¹; Emily Weller¹; Sarah Waddell¹; Hanyan Jiang²; E. Alex Ossa³; *Dwayne Arola*¹; ¹Univ of Washington; ²Southeast University; ³Universidad EAFIT

3:00 PM

A Structural Characterization of the Mechanical Properties of Porcine Skin: *Andrei Pissarenko*¹; Wen Yang¹; Haocheng Quan¹; Katherine Brown²; Alun Williams³; William Proud²; Marc Meyers¹; ¹University of California San Diego; ²Imperial College London; ³University of Cambridge

3:20 PM

Cuticle of the Armadillidium Vulgare: Microstructure and Mechanical Behavior: Nana Yamagata¹; Arthur Beausoleil¹; Kate Ericksen¹; Mitchell Nakaki¹; Junlan Wang¹; *Dwayne Arola*¹; ¹University of Washington

3:40 PM

On the Three-dimensional Structure and Mechanical Behavior of the Highly Porous Structure of Sea Urchin Spines: *Ling Li*¹; Ting Yang¹; Ziling Wu¹; Yunhui Zhu¹; ¹Virginia Polytechnic Institute

4:00 PM

Further Insights on the Damage Tolerance of the Crossed-lamellar Structure of Mollusk Shells: *Zhifei Deng*¹; Ling Li¹; ¹Virginia Tech, Department of Mechanical Engineering

4:20 PM Break

4:40 PM Invited

Effect of Orientation on Water-repellant Legs of Water-walking Insects: Georgia Hurchalla¹; Jaroslaw Drelich¹; ¹Michigan Technological University

5:10 PM

Revealing the Self-sharpening Mechanisms of Sea Urchin Teeth: In Situ Testing and Modeling: David Restrepo¹; Matthew Daly²; Alireza Zaheri³; Horacio Espinosa³; ¹The University of Texas at San Antonio; ²University of Illinois at Chicago; ³Northwestern University

5:30 PM

Shear Mechanics of the Boxfish Hexagonal Scutes: Maryam Hosseini¹; Sean Garner²; Steven Naleway³; Joanna McKittrick²; Pablo Zavattieri¹; ¹Purdue University; ²University of California San Diego; ³University of Utah

5:50 PM

The Fracture Toughness of Arapaima Giga Scales: Haocheng Quan¹; Wen Yang¹; Sheng Yin²; Robert Ritchie²; Marc Meyers¹; ¹University of California San Diego; ²University of California Berkeley

LIGHT METALS

Cast Shop Technology — EHS and Cast House Operation

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

Program Organizer: Pierre-Yves Menet, Constellium Technology Center

Monday PM | March 11, 2019
007B | Henry B. Gonzalez Convention Center

Session Chair: Arild Hakonsen, Hycast

2:30 PM Introductory Comments

2:35 PM

No Personnel in Hazard Zones: Arild Hakonsen¹; ¹Hycast As

3:00 PM

The Industrial Application of Molten Metal Analysis (LIBS): Caitlin Detwiler¹; James Herbert¹; Jorge Fernandez¹; Joseph Craparo²; Robert DeSaro²; ¹Altek Llc; ²Energy Research Company (ERCo)

3:25 PM

Sheet Ingot Casting Improvements at TRIMET Essen: *Nicholas Towsey*¹; *Andreas Luetzerath*¹; *Georg Scheele*¹; *Elmar Schoell*¹; ¹TRIMET Aluminium AG

3:50 PM Break

4:05 PM

Automated Billet Surface Inspection: *Jean-Pierre Gagne*¹; *Rémi St-Pierre*¹; *Pascal Côté*¹; *Francis Caron*²; ¹Stas Inc.; ²ALCOA

4:30 PM

Optical Emission Spectrometry (OES) Data-driven Inspection of Inclusions in Wrought Aluminium Alloys: *Varuzan Kevorkijan*¹; *Tomaž Šustar*²; *Irena Lesjak*¹; *Marko Degiampietro*¹; *Janez Langus*²; ¹Impol R in R d.o.o.; ²C3M

4:55 PM

Hydrogen Measurements Comparaison in EN-AW 5083 Alloy: *Luisa Marzoli*¹; *Federica Pascucci*²; *Giuseppe Esposito*¹; *Silvia Koch*¹; *Giulio Timelli*²; *Marcel Rosefort*¹; ¹Trimet Aluminium SE; ²DTG Università di Padova

5:20 PM

Refurbishment of a Rail-guided Casting Pit: A Case Study with Sierra Aluminium: *Jean Francois Desmeules*¹; *Shaun Hamer*²; *Shayne Seever*³; ¹Dynamic Concept; ²AluMore; ³Sierra Aluminum

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications — Fabrication and Characterization

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Yongfeng Zhang, Idaho National Laboratory; Xian-ming (David) Bai, Virginia Polytechnic Institute and State University; David Andersson, Los Alamos National Laboratory ; Thierry Wiss, European Commission- JRC -Institute of Transuranium Elements

Monday PM | March 11, 2019
214A | Henry B. Gonzalez Convention Center

Session Chairs: Lingfeng He, Idaho National Laboratory ; Michael Tonks, University of Florida

2:30 PM Invited

Mechanistic Mesoscale Simulation of UO₂ Sintering: Ian Greenquist¹; *Michael Tonks*²; Yongfeng Zhang³; ¹Pennsylvania State University; ²University Of Florida; ³Idaho National Laboratory

3:00 PM

Role of Grain Orientation and Grain Boundary Inclination during Sintering of UO₂: A Phase-field Study: *Sudipta Biswas*¹; Daniel Schwen¹; Vikas Tomar²; ¹Idaho National Laboratory; ²Purdue University

3:20 PM

Assessment of UO₂ Based Composites Fabricated via SPS: *Erofli Kardoulaki*¹; Ursula Carvajal Nunez¹; Andy Nelson¹; Darrin Byler¹; Bowen Gong²; Tiankai Yao²; Jie Lian²; Ken McClellan¹; ¹Los Alamos National Lab; ²Rensselaer Polytechnic Institute

3:40 PM Invited

Mesoscale Modeling of Grain Growth in Ceramics: *Karim Ahmed*¹; ¹Texas A&M University

4:10 PM Break

4:30 PM

Microstructural Characterization of Transmutation Nitride Fuels for Fast Reactors: *Lingfeng He*¹; Jason Harp¹; ¹Idaho National Laboratory

4:50 PM Invited

The Role of Dopant Charge State on Defect Chemistry and Grain Growth of Doped UO₂: *Michael Cooper*¹; Chris Stanek¹; David Andersson¹; ¹Los Alamos National Laboratory

5:20 PM

Characterization of Intragranular Creep Deformation in Uranium Dioxide: A Multicrystal Approach: *Benjamin Shaffer*¹; Pedro Peralta¹; ¹Arizona State University

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Characterization Method Development II

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Monday PM | March 11, 2019
212B | Henry B. Gonzalez Convention Center

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

2:30 PM Introductory Comments

2:35 PM Invited

Correlating Structure, Processing, and Properties of Disordered Materials for Electronic and Photovoltaic Applications: Gabriel Calderon¹; Jared Johnson¹; Menglin Zhu¹; Mehrdad Abbasi¹; Michelle Paquette²; Paul Rulis²; Nathan Oyler²; Ridwan Sakidja³; *Jinwoo Hwang*¹; ¹Ohio State University; ²University of Missouri - Kansas City; ³Missouri State University

2:55 PM Invited

Total Scattering and Reverse Monte Carlo for the Analysis of Local Effects in Alloys: *Lewis Owen*¹; Helen Playford²; Matthew Tucker³; Howard Stone¹; ¹University of Cambridge; ²ISIS Neutron and Muon Source; ³Oak Ridge National Laboratory

3:15 PM

An Application of Computer Vision for Exploring Processing-structure-property Relationships in a Scalable Materials Database Framework: *Andrew Kitahara*¹; Elizabeth Holm¹; ¹Carnegie Mellon University

3:35 PM

New HEDM Developments and Applications to In-situ Annealing Measurements: *He Liu*¹; Robert Suter¹; Yufeng Shen¹; ¹Carnegie Mellon University

3:55 PM

Structural Characterization of Four Chinese Bituminous Coals by X-ray Diffraction, Fourier-transform Infrared Spectroscopy and

X-ray Photoelectron Spectroscopy: *Shuxing Qiu*¹; Shengfu Zhang¹; Xiaohu Zhou¹; Rongjin Zhu¹; Guibao Qiu¹; Yue Wu¹; Guangsheng Suo¹; ¹Chongqing University

4:15 PM Break

4:30 PM Invited

Mapping Grain Morphology and Orientation by Laboratory Diffraction Contrast Tomography: Nicolas Gueninchault¹; Florian Bachmann¹; Hrishikesh Bale²; Jun Sun¹; William Harris²; Steve Kelly²; Christian Holzner¹; *Erik Lauridsen*¹; ¹Xnovo Technology Aps; ²Carl Zeiss Microscopy

4:50 PM Invited

In Situ Characterization at High Temperature of VDM Alloy 780 Premium to Determine Solvus Temperatures and Phase Transformations Using Neutron Diffraction and Small-angle Neutron Scattering: Cecilia Solis¹; Johannes Munke¹; Michael Hofmann¹; Sebastian Mühlbauer¹; Martin Bergner²; Bodo Gehrman³; Joachim Rösler²; *Ralph Gilles*¹; ¹Heinz Maier-Leibnitz Zentrum (MLZ) TU München; ²Institut für Werkstoffe, Technische Universität Braunschweig; ³VDM Metals International GmbH

5:10 PM Invited

Computational Database to Facilitate Discovery of 3D and 2D Materials with Technological Applications: *Kamal Choudhary*¹; Francesca Tavazza¹; ¹University Of Maryland (National Institute of Standards and Technology)

5:30 PM

Study of the Adsorption of Humic Acid with Zn²⁺ by Molecular Dynamic Simulation and Adsorption Experiments: *Shengpeng Su*¹; Yanfang Huang¹; Guihong Han¹; Zibiao Guo¹; Fengning Liu¹; ¹Zhengzhou University

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Construction Materials

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Monday PM | March 11, 2019
006A | Henry B. Gonzalez Convention Center

Session Chair: Jeongguk Kim, Korea Railroad Research Institute

2:30 PM Introductory Comments

2:35 PM
Microstructure Characterization of Portland Cement-based Pastes Exposed to an Organic Acid Solution: *Rancés Castillo Lara*¹;
¹Universidade Estadual do Norte Fluminense Darcy Ribeiro

2:55 PM
Use of Municipal Solid Waste Incinerator (MSWI) Fly Ash in Alkali Activated Slag Cement: *Huang Kang*¹; *Fan Xiaohui*¹; *Gan Min*¹; *Ji Zhiyun*¹; ¹Central South University

3:15 PM
Charpy Impact Tests Analysis on Polymer Composites, Epox Reinforced with (Palf) Fibers: *Maycon Gomes*¹; *Sergio Monteiro*²; *Carlos Vieira*³; *Livia Nunes*¹; ¹Instituto Federal Fluminense; ²Instituto Militar de Engenharia ; ³UENF

3:35 PM
Characterization of Water/Ethanol/Bentonite Dispersions: *Margarita Bobadilla*¹; *Thamyres Carvalho*¹; *Antonio Munhoz Junior*²; *Maria das Graças Silva-Valenzuela*²; *Francisco Valenzuela*¹;
¹Escola Politecnica Da U De Sao Paulo; ²Universidade Presbiteriana Mackenzie

CORROSION

Coatings and Surface Engineering for Environmental Protection — Corrosion Mechanism and Performance Evaluation II

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Arif Mubarak, PPG Industries; Rajeev Gupta, The University of Akron; Raul Rebak, GE Global Research; Michael Mayo, PPG Industries; Brian Okerberg, PPG Industries

Monday PM | March 11, 2019
224 | Henry B. Gonzalez Convention Center

Session Chairs: Michael Mayo, PPG Industries; Rajeev Gupta, The University of Akron

2:30 PM Invited

New Accelerated Corrosion Test Methods for Atmospheric Corrosion on Aluminum Aircraft: *Ekaterina Badaeva*¹; Nels Olson¹; James Kirchner¹; Maribel Locsin¹; Kyle Clayton¹; Jill Seebergh¹; ¹Boeing Company

3:10 PM

Investigating the Electrical Restance (ER) Technique for In-situ Structural Alloy Corrosion Monitoring within Supercritical CO₂ Power Cycles: *Matthew Walker*¹; ¹Sandia National Laboratories

3:30 PM

Seawater Corrosion Results for 11 Alloys Tested at the TAMUG Boat Basin Site: *Richard Griffin*; ¹

3:50 PM

Characterizing High-temperature Asphaltene Fouling and Corrosion of Ferrous Alloys: *Pralav Shetty*¹; Velu Subramani²; Paul Braun¹; Jessica Krogstad¹; ¹University of Illinois at Urbana-Champaign; ²BP Products North America Inc.

4:10 PM Break

4:30 PM

Corrosion Test Methods for New Materials and Mixed Material Assemblies: Brian Okerberg¹; *Laurent Deronne*¹; ¹PPG Industries

4:50 PM

Effect of Aluminizing on Cyclic Oxidation Behavior of 304H Stainless Steel at 650oC in Dry/Wet Air: *Fu Pen Cheng*¹; Wu Kai²; Ji-Jung Kai³; ¹National Taiwan Ocean University; ²Institute of Materials Engineering, National Taiwan Ocean University, Keelung, Taiwan; ³Department of Mechanical and Biomedical Engineering, The City University of Hong Kong, Kowloon, Hong Kong

5:10 PM

Investigation of Self-healing Properties of Cerium-based Conversion Coatings on Mg Alloys: Brent Williams¹; Lamia Nahar¹; Diana Galeano-Osorio²; *Carlos Castano Londono*¹; ¹Virginia Commonwealth University; ²Universidad Nacional Abierta y a Distancia

MATERIALS DESIGN

Computational Materials Discovery and Design — Applications for Defects and the Bulk I

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Oliver Johnson, Brigham Young University; Arunima Singh, Arizona State University; Jake Bair, Pacific Northwest National Laboratory; Christopher Weinberger, Colorado State University; Timofey Frolov, Lawrence Livermore National Laboratory; Ning Zhang, Colorado School of Mines; Fadi Abdeljawad, Clemson University; Richard Hennig, University of Florida; Mikhail Mendeleev, Ames Laboratory; Avinash Dongare, University of Connecticut

Monday PM | March 11, 2019

304C | Henry B. Gonzalez Convention Center

Session Chairs: Prineha Narang, Harvard University; Ning Zhang, Colorado School of Mines

2:30 PM Invited

Modeling Microstructural Evolution under Applied Magnetic Fields: *Heather Murdoch*¹; Philip Goins¹; Efrain Hernandez¹; ¹US Army Research Laboratory

2:50 PM

Phase-field Modeling of Stacked Dislocation Pile-ups in Face-centered Cubic Metals: *Shuozhi Xu*¹; Abigail Hunter²; Irene Beyerlein¹; ¹University of California, Santa Barbara; ²Los Alamos National Laboratory

3:10 PM

Elastic Properties of Bulk and Low-dimensional Materials Using DFT with Van Der Waals Functional: Kamal Choudhary¹; Gowoon Cheon²; Evan Reed²; *Francesca Tavazza*¹; ¹National Institute of Standard and Technology; ²Stanford University

3:30 PM

Correlate the Local Structural Characteristics with the Activation Energy of CuZr Metallic Glasses by Using Activation-relaxation Technique and Machine Learning Methods: *Liang Tian*¹; *Lin Li*¹; ¹University of Alabama

3:50 PM Break

4:10 PM

Learning to Twin: A Novel Application of Machine Learning to the Prediction of Twinning in Materials: *William Schill*¹; *Dingyi Sun*²; ¹California Institute of Technology; ²Brown University

4:30 PM

Simulations and Experiments of Template-directed Eutectic Solidification to Design Self-organizing Optical Metamaterials: *Erik Hanson*¹; *Ashish Kulkarni*²; *Julia Kohanek*²; *Paul Braun*²; *Katsuyo Thornton*¹; ¹University of Michigan; ²University of Illinois

4:50 PM

The Effects of β -stabilizers on α -phase Formation and Elastic Properties in Titanium Alloys: *Riyadh Salloom*¹; *Srinivasan Srivilliputhur*¹; ¹University of North Texas

5:10 PM

Tuning Martensitic Behavior Using Free Energy Landscape Engineering: *Saaketh Desai*¹; *Sam Reeve*¹; *Karthik Vishnu*¹; *Alejandro Strachan*¹; ¹Purdue University

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Novel Approaches

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tournet, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

Monday PM | March 11, 2019

225C | Henry B. Gonzalez Convention Center

Session Chairs: James Morris, Oak Ridge National Laboratory; Yu Zhong, Worcester Polytechnic Institute

2:30 PM Invited

Introducing a Novel Concept of High Entropy Ceramic (HEC) by Using Computational Thermodynamics: *Yu Zhong*¹; Hooman Sabarou¹; Xiaotian Yan¹; Mei Yang¹; Richard Sisson¹; ¹Worcester Polytechnic Institute

3:00 PM

Adiabatic Electron-Phonon Interactions in Vanadium and FeTi: *Fred Yang*¹; Olle Hellman¹; Jorge Muñoz²; Brent Fultz¹; ¹California Institute of Technology; ²The University of Texas at El Paso

3:20 PM

Computational and Experimental Studies of Anharmonic Phonons in Cuprite: *Claire Saunders*¹; Dennis Kim²; Olle Hellman¹; Hillary Smith¹; Doug Abernathy³; Brent Fultz¹; ¹California Institute of Technology; ²University of California, Los Angeles; ³Oak Ridge National Laboratory

3:40 PM

Universal Correlation between d-band Bimodality and Solute-defect Interactions in bcc Refractory Metals: *Yong-Jie Hu*¹; Ge Zhao²; Chaoming Yang¹; Xiaofeng Qian³; Liang Qi¹; ¹University of Michigan; ²The Pennsylvania State University; ³Texas A&M University

4:00 PM

Kinetic Monte Carlo Simulations of Structural Evolution of Additively Manufactured Materials: *Xiaowang Zhou*¹; Nancy Yang¹; Joshua Keng Yee¹; Jose Juan Chavez¹; ¹Sandia National Laboratories

4:20 PM Break

4:40 PM Invited

Thermotransport and Thermodynamics in Ternary Liquid Alloys: *Graeme Murch*¹; Irina Belova¹; Tanvir Ahmed¹; Zi-Kui Liu²; William Yi Wang³; Andreas Meyer⁴; ¹University of Newcastle; ²The Pennsylvania State University; ³Northwestern Polytechnical University; ⁴Institute of Materials Physics in Space

5:10 PM

DFT Study of C Diffusion in WC/W Interfaces Observed in WC/Co Tools after Ti-alloy Machining: *Emil Edin*¹; Andreas Blomqvist²; Rajeev Ahuja¹; ¹Uppsala University; ²Sandvik AB

5:30 PM

Atomic-level Insight into Oxygen Adsorption on (hkl) Platinum Surfaces and Implications for the Reactivity in the Oxygen Reduction Reaction: *Shiyi Wang*¹; *Enbo Zhu*²; *Yu Huang*²; *Hendrik Heinz*³; ¹Department of Biological and Chemical Engineering, University of Colorado Boulder; ²University of California, Los Angeles; ³University of Colorado Boulder

5:50 PM

Interplay between Magnetism and Defects Properties in bcc Fe-Mn Alloys: From First Principles to Finite Temperatures: *Anton Schneider*¹; *Chu-Chun Fu*¹; *Frederic Soisson*¹; *Cyrille Barreateau*²; ¹Service de Recherches de Métallurgie Physique, CEA, Paris-Saclay University, France; ²Service de Physique de l'Etat Condensé, CEA-CNRS, Université Paris-Saclay

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Behavior of High Temperature Alloys – Refractories, Intermetallics, and Mesoscopic Modeling

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

Program Organizers: Michael Titus, Purdue University; Qiang Feng, University of Science and Technology Beijing; Akane Suzuki, GE Global Research; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Sammy Tin, Illinois Institute of Technology; Martin Detrois, National Energy Technology Laboratory

Monday PM | March 11, 2019

301C | Henry B. Gonzalez Convention Center

Session Chairs: Akane Suzuki, GE Global Research; Jonathan Cormier, Institute P' - Departement de Physique et Mecanique des Materiaux

2:30 PM Invited

Creep Behavior of Intermetallic Mo-silicide Alloys: *Martin Heilmaier*¹; *Alexander Kauffmann*¹; *Camelia Gombola*¹; *Susanne Obert*¹; ¹KIT Karlsruhe

3:00 PM Invited

Recent Progresses on Lightweight High Temperature TiAl Intermetallic Alloys and Related Processing: *Junpin Lin*¹; *Yongfeng Liang*¹; *Laiqi Zhang*¹; *Jianping He*¹; ¹University of Science and Technology Beijing

3:30 PM

Sliding Wear of Nanocrystalline Nb-Ag at Elevated Temperatures: Evolution of Subsurface Microstructure and Its Correlation with Wear Performance: *Ren Fuzeng*¹; Kangjie Chu¹; ¹Southern University of Science and Technology

3:50 PM

High Temperature Creep of Alloy 709: Effect of Aging: Martin Taylor¹; Nicholas Shaber¹; Jose Ramirez¹; Anumat Sittiho¹; *Indrajit Charit*¹; Gabriel Potirniche¹; Robert Stephens¹; Michael Glazoff²; ¹University of Idaho; ²Idaho National Laboratory

4:10 PM Break

4:30 PM

Models of Long-Term Creep Behavior of High Performance Structural Alloys: *Changning Niu*¹; Abhinav Saboo¹; Qiaofu Zhang¹; Jiadong Gong¹; Jifeng Zhao¹; David Dunand²; Gregory Olson¹; ¹QuesTek Innovations, LLC; ²Northwestern University

4:50 PM

Benchmarking Multi-scale Models with Microtensile Experiments and 3D Microstructural Characterization of René 88DT: *David Eastman*¹; Paul Shade²; Michael Uchic²; George Weber¹; Akbar Bagri¹; Somnath Ghosh¹; Will Lenthe³; Tresa Pollock³; Kevin Hemker¹; ¹Johns Hopkins University; ²U.S. Air Force Research Laboratory; ³University of California, Santa Barbara

5:10 PM

Effect of Local Texture on Heterogeneous Plastic Strain Fields during High-Temperature Creep in Ni-based superalloys using Crystal Plasticity Finite Element Simulations: *Jean-Briac le Graverend*¹; ¹Texas A&M University

5:30 PM

Deformation Behavior and Constitutive Models for High Temperature Isothermal Compression of a Newly Type of Ni₃Al-based Superalloy: *Jiangwei Zhong*¹; Qingyan Xu¹; ¹Tsinghua University

SPECIAL TOPICS

Diversity in STEM and Best Practices to Improve it — Being Out in STEM

Program Organizers: Megan Cordill, Erich Schmid Institute; Matthew Korey, Purdue University; Jessica Krogstad, University of Illinois at Urbana-Champaign; Panthea Sepehrband, Santa Clara University

Monday PM | March 11, 2019
301B | Henry B. Gonzalez Convention Center

Session Chairs: Megan Cordill, Erich Schmid Institute; Matthew Korey, Purdue University

2:30 PM

The Minority Leaders Research Collaboration Program at the Air Force Research Laboratory Materials and Manufacturing Directorate: Overview, Experiences, and Lessons Learned: *Asheley Blackford*¹; Eric Payton¹; ¹U.S. Air Force Research Laboratory

3:00 PM Invited

TMS Summits on Diversity: What Have We Learned and Where Do We Go From Here?: *Jonathan Madison*¹; Jennifer Andrew²; Megan Brewster³; Amy Clarke⁴; Kristen Constant⁵; Oscar Dubon⁶; Emily Kinser⁷; Matthew Korey⁸; Natalie Larson⁹; Xavier Ochoa¹⁰; Michael Rawlings¹¹; Rosa Maria Rojas¹²; ¹Sandia National Laboratories; ²University of Florida; ³Launch Forth; ⁴Colorado School of Mines; ⁵Iowa State University; ⁶University of California, Berkeley; ⁷3M; ⁸Purdue University; ⁹University of California, Santa Barbara; ¹⁰McEwen Mining; ¹¹AAAS Fellow, NSF; ¹²University of Arizona

3:30 PM Invited

The Complexities of Being LGBTQ+ In the Workplace: *Roberta Beal*¹; ¹Los Alamos National Laboratory

4:00 PM Break

4:30 PM Invited

T Time: How to Welcome and Support People of All Genders: *K. Cunningham*¹; ¹ATI Specialty Alloys & Components

5:00 PM Invited

Coming Out in STEM: *Thomas Reeve*¹; ¹Purdue University

LIGHT METALS

Electrode Technology for Aluminum Production — Electrodes - Raw Materials and Paste Plant

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

Program Organizer: Lorentz Petter Lossius, Hydro Aluminium AS

Monday PM | March 11, 2019

006D | Henry B. Gonzalez Convention Center

Session Chairs: Stefan Vucic, Maschinenfabrik Gustav Eirich GmbH & Co; William Bishop, Oxbow Calciners; Ronald Logan, Sunstone Development

2:30 PM Introductory Comments

2:35 PM

Changing the Fineness of Calcined Petroleum Coke with Ball Race Mills: Jens-Peter Thiel¹; Jan Paepcke¹; Arne Hilck¹; ¹Claudius Peters Projects GmbH

3:00 PM

How to Appreciate the Coal Tar Pitch Impregnation on Coke Material?: Salima Belbachir¹; Christophe Bouché¹; Fabien Gaudière¹; Pierre-Louis Perrin¹; Quentin Bernabé²; Laurent Vonna²; Roger Gadiou²; Fabienne Virieux¹; ¹Fives Solios; ²Université de Haute Alsace

3:25 PM

A Study of Elastic and Crack Resistance Properties of the Anode Carbon Material: Dag Herman Andersen¹; Martin Walderhaug¹; Fabian Dedecker²; Sacha Emam²; ¹Hydro Aluminium; ²Itasca Consultants SAS

3:50 PM

Challenges and Opportunities of Vacuum Compaction: Lessons Learnt from Retrofitting EGA-JA Paste Plant to Vacuum Compaction: Bienvenu Ndjom¹; Muhammad Shafiq Malik¹; Ahmed Al Marzouqi¹; Tapan Kumar Sahu¹; Saleh Ahmed Rabba¹; Najeeba Al Jabri¹; ¹Emirates Global Aluminium

4:15 PM Break

4:30 PM

Carbon Block Tracking Package based on Vision Technology: Pierre Mahieu¹; Xavier Genin¹; Christophe Bouché¹; David Brismalein²; Hervé Pedroli²; Fabienne Virieux¹; ¹Fives Solios; ²Rio Tinto

4:55 PM

Physical and Chemical Characterization of Bio-pitch as a Potential Binder for Anode: Ying Lu¹; Roozbeh Mollaabbasi¹; Donald Picard¹;

Donald Ziegler²; Houshang Alamdari¹; ¹Université Laval; ²Alcoa Corporation

5:20 PM

Anode Quality Monitoring using Advanced Data Analytics: Vincent Bonnivard¹; Bilal Azenoud¹; *Ameline Bernard*²; Hervé Pedroli²; ¹PROBAYES; ²Rio Tinto

5:45 PM

Reactivity of Coke in Relation to Sulfur Level and Microstructure: *Gøril Jahrsengene*¹; Stein Rørvik²; Arne Petter Ratvik²; Lorentz Petter Lossius³; Richard Haverkamp⁴; Ann Mari Svensson¹; ¹NTNU - Department of Material Science and Engineering; ²SINTEF Industry; ³Hydro Aluminium AS, Primary Metal, Technology; ⁴Massey University - School of Engineering and Advanced Technology

MATERIALS PROCESSING

Freeze Linings: Myth and Reality — Freeze Lining II

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Juergen Schmidl, RHI Magnesita; Dean Gregurek, RHI Magnesita; Gerardo Alvear, Glencore Technology; Peter Hayes, University of Queensland; Mark Kennedy, Proval Partners SA; Maurits Van Camp, Umicore; Camilo Perez, RHI US Ltd; Stefan Luidold, University Of Leoben

Monday PM | March 11, 2019

211 | Henry B. Gonzalez Convention Center

Session Chair: Dean Gregurek, RHI Magnesita

2:30 PM

Practical Knowledge on Refractory Freeze Linings Collected from Post Mortem Studies: *Dean Gregurek*¹; Jürgen Schmidl¹; Alfred Spanring¹; ¹RHI Magnesita

2:50 PM

Use of Finite Element Analysis or Computation Fluid Dynamics for Estimation of Freeze Lining: *Allan MacRae*¹; ¹MacRae Technologies, Inc.

3:10 PM

High Temperature Corrosion of Magnesia based Refractory by Ferronickel Slags: *Christoph Sagadin*¹; Stefan Luidold¹; Christoph Wagner²; Christoph Pichler²; Alfred Spanring²; ¹Montanuniversität Cdl-Tm; ²RHI Magnesita

3:30 PM

Freeze-lining Formation in Submerged Arc Furnaces Producing Ferrochre Alloy in South Africa: *Joilet Steenkamp*¹; Quinn Reynolds¹; Markus Erwee¹; Stefan Swanepoel¹; ¹MINTEK

3:50 PM Break

4:10 PM

Designing Furnace Lining/Cooling Systems to Operate with a Competent Freeze Lining: *Hugo Joubert*¹; Isobel McDougall¹; ¹Tenova Pyromet

4:30 PM

Thermochemistry Analysis of Slag Freeze Lining and Refractory Interaction with Slag to Support Furnace Integrity: Evgueni Jak¹; Denis Shishin¹; Taufiq Hidayat¹; *Maksym Shevchenko*¹; Peter Hayes¹; ¹University of Queensland

MATERIALS DESIGN

Gamma (FCC)/Gamma-Prime (L12) Co-Based Superalloys III — Environmental Resistance and Processing

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

Program Organizers: Michael Titus, Purdue University; David Dye, Imperial College; Eric Lass, National Institute of Standards and Technology; Katelun Wertz, Air Force Research Laboratory; Christopher Zenk, Ohio State University

Monday PM | March 11, 2019

206A | Henry B. Gonzalez Convention Center

Session Chairs: Michael Titus, Purdue University; Katelun Wertz, Air Force Research Laboratory

2:30 PM Invited

Elucidating the Effects of Cr on the Microstructure, Oxidation Resistance and Mechanical Properties of Cobalt-based Superalloys: *Ding-Wen Chung*¹; Jacques Perrin Toinin¹; Daniel Ng¹; Eric Lass²; David Seidman¹; David Dunand¹; ¹Northwestern University; ²National Institute of Standards and Technology

3:00 PM Invited

An ICME-base Investigation of the Homogenization of a Novel VIM/VAR Co-Ni Superalloy: *Stephane Forsik*¹; Alberto Polar Rosas¹;

Ning Zhou¹; Gian Colombo¹; Tao Wang¹; Richard Smith¹; Akash Patel¹; Samuel Kernion¹; Mario Epler¹; ¹Carpenter Technology Corporation

3:30 PM

Exploration of Thermo-Mechanical Processing Parameters for a Polycrystalline γ - γ' Cobalt-base Alloy: *Katelun Wertz*¹; Donald Weaver¹; Eric Payton¹; Lee Semiatin¹; Michael Mills²; Stephen Niezgod²; ¹U.S. Air Force Research Laboratory; ²Ohio State University

3:50 PM Break

4:10 PM

The Formation of Protective Alumina on γ' -Strengthened Co-Ni-Al-Mo-Ta Alloys during Exposure at Elevated Temperatures: *Saurabh Das*¹; Mahander Singh¹; Om Gosain¹; Kamanio Chattopadhyay¹; ¹Indian Institute of Science

4:30 PM

Effect of Pre-deformation on the Aging Response of Co/Ni-base Superalloys: *Christopher Zenk*¹; Connor Slone¹; Katelun Wertz²; Michael Mills¹; ¹Ohio State University; ²U.S. Air Force Research Laboratory

4:50 PM

Thermophysical and Mechanical Properties of Multi-nary Single Crystalline Co-base Superalloys: *Nicklas Volz*¹; Steffen Neumeier¹; Mathias Göken¹; ¹Lehrstuhl für Allgemeine Werkstoffeigenschaften

ENERGY & ENVIRONMENT

Green Materials Engineering: An EPD Symposium in Honor of Sergio Monteiro — Natural Fiber Composites

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Shadia Ikhmayies, Al Isra University; Jian Li, CanmetMATERIALS; Carlos Mauricio Vieira, State University of the North Fluminense; Fabio Braga, National Service of Industrial Apprenticeship (SENSI)

Monday PM | March 11, 2019

008A | Henry B. Gonzalez Convention Center

Session Chairs: Lucio Nascimento, Instituto Militar de Engenharia; Fabio Garcia, Military Institute of Engineering

2:30 PM Introductory Comments

2:35 PM Keynote

Natural Fibers Reinforced Polymer Composites Applied in Ballistic Multilayered Armor for Personal Protection - An Overview: *Sergio Monteiro*¹; Jaroslaw Drelich²; ¹Military Institute of Engineering; ²Michigan Technological University

3:15 PM

Structure-property Relation of Epoxy Resin with Fique Fibers: Dynamic Behavior using Split-hopkinson Pressure Bar and Charpy Tests: *Julian Ruda*¹; Sergio Neves Monteiro²; Henry Colorado¹; ¹Universidad De Antioquia; ²Military Institute of Engineering

3:35 PM

Comparison of the Impact Properties of Composites Reinforced by Natural Fibers: *Felipe Perisse Duarte Lopes*¹; Carlos Fontes Vieira²; ¹State University of Northern Rio de Janeiro UENF; ²State University of Northern Rio de Janeiro

3:55 PM Break

4:05 PM

Impact Energy Evaluation of Natural Castor Oil Polyurethane Matrix Composites Reinforced with Jute Fabric: José Machado¹; Juliana Carvalho¹; Anna Neves¹; Felipe Lopes¹; Sérgio Monteiro¹; *Carlos Vieira*¹; ¹State University of Northern Rio de Janeiro

4:25 PM

Comparison of Interfacial Adhesion between Polyester and Epoxy Matrix Composites Reinforced with Fique Natural Fiber: *Michelle Oliveira*¹; Artur Camposo¹; Fábio Garcia¹; Luana Demosthenes¹; Larissa Nunes¹; Fábio Braga¹; Fernanda Luz¹; Sergio Monteiro¹; ¹Military Institute of Engineering

4:45 PM

Evaluation of the Projectile's Loss of Energy in Polyester Composite Reinforced with Fique Fabric: Artur Camposo Pereira¹; Sergio Monteiro¹; Michelle Oliveira¹; *Fabio da Costa Garcia Filho*¹; Foluke Salgado de Assis¹; ¹Military Institute of Engineering

MATERIALS PROCESSING

Heterogeneous and Gradient Materials (HGM III): Tailoring Mechanical Incompatibility for Superior Properties — Heterostructured Materials II: Processing and Properties

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

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

Monday PM | March 11, 2019
209 | Henry B. Gonzalez Convention Center

Session Chairs: Elias Aifantis, Aristotle University of Thessaloniki; Hyoung Seop Kim, Pohang University of Science and Technology; Nobuhiro Tsuji, Kyoto University; Jason Trelewicz, Stony Brook University

2:30 PM Invited
Superior Mechanical Properties in Alloys Having Heterogeneous Microstructures: *Nobuhiro Tsuji*¹; ¹Kyoto University

2:55 PM
How to Play with Grain Size and Texture to Tune Mechanical Properties of Architected Materials: The Case of Cu-Nb (Nano) composite Wires: *Ludovic Thilly*¹; Pierre-Olivier Renault¹; Florence Lecouturier²; ¹University Of Poitiers; ²LNCMI

3:15 PM
Deformation Instability in the Layered Steel Sheet: *Hyoung Seop Kim*¹; Jung Gi Kim¹; Hak Hyeon Lee¹; Sunghak Lee¹; ¹Postech

3:35 PM
Architected Steel Sheets through Localized Laser Processing: *Pierre Lapouge*¹; Justin Dirrenberger¹; Matthieu Schneider¹; ¹PIMM, Arts et Métiers-ParisTech/CNAM/CNRS UMR 8006

3:55 PM Break

4:15 PM
Gradient and Fractional/Fractal Models for Heterogeneous Plastic Flow at Micro/Nano Scales: *Elias Aifantis*¹; ¹Aristotle University of Thessaloniki

4:35 PM
Structural, Phase and Geometrical Heterogeneity in Metallic Materials Processed by Severe Plastic Deformation: *Alexander Zhilyaev*¹; Jose Maria Cabrera²; Terence Langdon³; ¹Laboratory for Mechanics of Gradient Nanomaterials, Nosov Magnitogorsk State

Technical University; ²Departamento de Ciencia de los Materiales e Ingeniería Metalúrgica, EEBE – Universitat Politècnica de Catalunya; ³Materials Research Group, Department of Mechanical Engineering, University of Southampton

4:55 PM

Interface Mediated Mechanistic Transitions in Crystalline-amorphous Nanolaminates: *Jason Trelewicz*¹; ¹Stony Brook University

5:15 PM Invited

Plastic Flow and Fracture in Harmonic-structured Materials: *Dmytro Orlov*¹; ¹Lund University

ADVANCED MATERIALS

High Entropy Alloys VII – Structures and Characterization

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Monday PM | March 11, 2019

207B | Henry B. Gonzalez Convention Center

Session Chairs: Michael Bakas, U.S. Army Research Office; Mitra Taheri, Drexel University

2:30 PM Invited

Precipitation and Strengthening in AlCoCrFeNi High Entropy Alloys as Studied by Atom Probe Tomography: *Keith Knipling*¹; Richard Michi²; Peter Liaw³; ¹Naval Research Laboratory; ²Northwestern University; ³The University of Tennessee, Knoxville

2:50 PM Invited

Microstructural Engineering in Refractory High Entropy Alloys: *Vishal Soni*¹; Bharat Gwalani¹; Talukder Alam¹; Oleg Senkov²; Daniel Miracle³; Rajarshi Banerjee¹; ¹University of North Texas; ²UES Inc; ³Air Force Research Laboratory

3:10 PM Invited

Measurement of Lattice Distortion in High Entropy Alloys: *Yi-Chia Chou*¹; Yi Chou¹; Chanho Lee²; Shih-Jie Lin³; Peter Liaw²; ¹National Chiao Tung University; ²University of Tennessee; ³National Tsing

Hua University & Department of Orthopaedic Surgery, Chang Gung Memorial Hospital, Chiayi

3:30 PM Invited

Surface Tension and Viscosity of FeCoCrNiTa and Al_{0.1}CoCrFeNi Measured by the Oscillating Drop Method in an Electromagnetic Processing Device under Reduced Gravity: Markus Mohr¹; *Rainer Wunderlich*¹; Peter Liaw²; Livio Battezzati³; Hans-Jörg Fecht¹; ¹Ulm University; ²The University of Tennessee; ³Università di Torino

3:50 PM Invited

Screening Ultra-high Temperature Refractory High Entropy Alloys: *William Yi Wang*¹; Haoxuan Wang¹; Deye Lin²; Jun Wang¹; Shun-Li Shang³; Jiang-Wei Wang⁴; Chengxiong Zou¹; Bin Tang¹; Hongchao Kou¹; Haifeng Song²; Chuang Dong⁵; Xidong Hui⁶; Zhenhai Xia¹; Yiguang Wang¹; Peter Liaw⁷; Jinshan Li¹; Zi-Kui Liu³; ¹Northwestern Polytechnical University; ²Institute of Applied Physics and Computational Mathematics, Beijing; ³Pennsylvania State University; ⁴Zhejiang University; ⁵Dalian University of Technology; ⁶University of Science and Technology Beijing; ⁷University of Tennessee, Knoxville

4:10 PM Break

4:30 PM Invited

Quantitative Analysis of Local Lattice Distortion in Refractory High-entropy Alloys: *Yang Tong*¹; Shijun Zhao¹; Hongbin Bei¹; Takeshi Egami¹; Yanwen Zhang¹; Fuxiang Zhang¹; ¹Oak Ridge National Laboratory

4:50 PM Invited

Microstructure and Property Characterization of High Entropy Alloy Using Advanced Transmission Electron Microscopy Techniques: *Mengkun Tian*¹; Chan Ho Lee²; Peter Liaw²; Joshua Kacher¹; ¹Georgia Institute of Technology; ²University of Tennessee, Knoxville

5:10 PM

Direct Observation on the Influence of Secondary Phases on the Oxidation Resistance of Al_xCoCrFeNi High Entropy Alloys Using an In-situ TEM Approach: *Elaf Anber*¹; Andrew Lang¹; Wayne Harlow¹; Dan Scotto D'Antuono¹; Haoyan Diao²; Peter Liaw²; Mitra Taheri¹; ¹Drexel university; ²University of Tennessee

ADVANCED MATERIALS

High Entropy Alloys VII — Structures and Mechanical Properties I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Monday PM | March 11, 2019
206B | Henry B. Gonzalez Convention Center

Session Chairs: Yanfei Gao, University of Tennessee, Knoxville; C. CEM Tasan, Massachusetts Institute of Technology

2:30 PM Invited

High or Medium Entropy Alloys: Bridging the Compositional Complexity and Mechanical/Physical Properties: *Yanfei Gao*¹; Hongbin Bei¹; ¹University of Tennessee

2:50 PM Invited

Mechanically- or Thermally-induced Forward / Reverse Transformations in a Metastable Dual-phase High-entropy Alloy: *C. Tasan*¹; Shaolou Wei¹; ¹Massachusetts Institute of Technology

3:10 PM Invited

BCC-FCC Interfacial Effects on Plasticity and Strengthening Mechanisms in High Entropy Alloys: *Jeff DeHosson*¹; ¹University of Groningen

3:30 PM Invited

Microstructural Analysis of High Entropy Alloys in Extreme Environments: *Mitra Taheri*¹; ¹Drexel University

3:50 PM

Atom Clusters Enhance Strength and Ductility in High-entropy Alloys: *Dengke Chen*¹; Qian Yu²; Ting Zhu¹; ¹Georgia Institute of Technology; ²Zhejiang University

4:10 PM Break

4:30 PM Invited

A heterostructured Single-phase High-entropy Alloy with an Outstanding Combination of Strength and Ductility: *Zhiqiang Fu*¹; Benjamin MacDonald¹; Zhiming Li²; Zhenfei Jiang³; Weiping Chen³; Yizhang Zhou¹; Enrique Lavernia¹; ¹University of California Irvine; ²Max-Planck-Institut für Eisenforschung; ³South China University of Technology

4:50 PM Invited

Possibility of Microstructure Control by Thermo-mechanically Controlled Processes in High Entropy Alloys: *Nobuhiro Tsuji*¹; Nokeun Park²; Tilak Bhattacharjee³; Shuhei Yoshida¹; Rajeshwar Eleti¹; Yu Bai¹; Shu Kurokawa¹; Pinaki Bhattacharjee⁴; ¹Kyoto University; ²Yeungnam University; ³ESISM, Kyoto University; ⁴Indian Institute of Technology Hyderabad

5:10 PM

Microstructures and Properties of As-Cast Al₂CrFeMnV, Al₂CrFeTiV, and Al₂CrMnTiV High Entropy Alloys: *Richard Michi*¹; Keith Knipling²; ¹Northwestern University; ²Naval Research Laboratory

5:30 PM Invited

Understanding Short-range Ordering in High-entropy Alloys: *Wei Chen*¹; George Kim¹; Chanho Lee²; Peter Liaw²; ¹Illinois Institute Of Technology; ²University of Tennessee

ADVANCED MATERIALS

High Entropy Alloys VII – Structures and Modeling II

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Monday PM | March 11, 2019

207A | Henry B. Gonzalez Convention Center

Session Chairs: Oleg Senkov, UES, Inc; Katharine Flores, Washington University

2:30 PM Invited

Identification of Single Phase, Multi-principal Element Alloys Using First-principles Calculations and High-throughput Experiments: Mu Li¹; Rohan Mishra¹; *Katharine Flores*¹; ¹Washington University

2:50 PM Invited

Simulations and Modelling of the Core Structure and Mobility of a/2[111] Dislocations in Ternary Multicomponent Alloys, TiZrNb, TiZr0.5Nb1.5 and TiZr1.5Nb0.5: *Satish Rao*¹; Brahim Akdim¹; Edwin Antillon¹; Christopher Woodward²; Oleg Senkov¹; ¹Ues Inc; ²Air Force Research Laboratory

3:10 PM

The Role of Short-range Order on the Dislocation Behavior in BCC and FCC Multicomponent Solid Solution Alloys Using Atomistic Simulations: *Edwin Antillon*¹; Satish Rao¹; Chirstopher Woodward²; Brahim Akdim¹; Triplicane Parthasarathy¹; ¹Ues Inc; ²AFRL

3:30 PM

Band Structure Theory of the BCC to HCP Burgers Distortion: *Bojun Feng*¹; Michael Widom¹; ¹Carnegie Mellon University

3:50 PM Break

4:10 PM

An Efficient Computational Method for Calculating Properties of Face-centered Cubic High Entropy Alloys: Alexandra Scheer¹; Joshua Strother²; *Chelsey Hargather*¹; ¹New Mexico Institute of Mining and Technology; ²New Mexico Institute of Mining and Techersity

4:30 PM

Deformation Behavior and Constitutive Law of CoCrFeMnNi Alloy and Its Variants: Julia Olszewska¹; *Julien Favre*¹; Anna Fraczkiewicz¹; Jean-Denis Mithieux²; ¹Mines Saint-Etienne; ²APERAM

4:50 PM Invited

Impact of Chemical Fluctuations and Interstitial Alloying on the Stacking Fault Energy of High Entropy Alloys from First Principles: *Yuji Ikeda*¹; Fritz Körmann¹; Jörg Neugebauer¹; ¹Max-Planck-Institut für Eisenforschung GmbH

5:10 PM

Computational and Machine Learning Approach to Determine Mechanical Properties of High Entropy Alloys Based on Ni-Mo-W-Re and Mo-Ta-Nb-W-Ti: Amrita Mishra¹; *Yizhou Lu*¹; Gautam Priyadarshan¹; ¹University of Mississippi

MATERIALS DESIGN

Hume-Rothery Symposium – Bulk and Interfacial Thermodynamics of Complex Materials: Insights Derived from Integrating Modeling and Experiment – Interfacial Thermodynamics and Kinetics II

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Raymundo Arroyave, Texas A&M University; Michael Gao, National Energy Technology Laboratory; Jeffrey Hoyt, McMaster University; Saryu Fensin, Los Alamos National Laboratory

Monday PM | March 11, 2019
304B | Henry B. Gonzalez Convention Center

Session Chairs: Timofey Frolov, Lawrence Livermore National Laboratory; Rodrigo Freitas, Stanford University

2:30 PM Invited

Rational Design of Surfaces and Nanoparticles Using Cluster Expansions: *Tim Mueller*¹; ¹Johns Hopkins University

3:00 PM Invited

Structure and Dynamics of Chemically Heterogeneous Metal-metal Solid-liquid Interfaces: Yang Yang¹; Mark Asta²; *Brian Laird*³; ¹East China Normal University; ²University of California - Berkeley; ³University of Kansas

3:30 PM Invited

Using Phase Field Simulations to Determine Grain Boundary Properties: Jin Zhang¹; Yubin Zhang¹; Henning Poulsen¹; *Peter Voorhees*²; ¹Danish Technical University; ²Northwestern University

4:00 PM Break

4:20 PM Invited

Kinetic Coefficients for Dipolar Molecular Crystal Growth from the Melt: *Yang Yang*¹; Xianqi Xu¹; Jeff Hoyt²; Brian Laird³; Mark Asta⁴; ¹East China Normal University; ²McMaster University; ³University of Kansas; ⁴UC Berkeley

4:50 PM Invited

Effect of Point Defects on Nucleation and Solid-liquid Interface Migration: Huajing Song¹; Yang Sun¹; Feng Zhang¹; *Mikhail Mendeleev*¹; Cai-Zhuang Wang¹; Kai-Ming Ho¹; ¹Ames Laboratory

5:20 PM Invited

Dendrite Orientation Transition Controlled by Liquid Composition: *Lei Wang*¹; Jeff Hoyt²; Nan Wang³; Nikolas Provatas⁴; Chadwick Sinclair¹; ¹The University of British Columbia; ²McMaster University; ³Northwestern Polytechnical University; ⁴McGill University

CHARACTERIZATION

Interfaces in Structural Materials: An MPMD Symposium in Honor of Stephen M. Foiles — Structure-property Linkages

Sponsored by: The Minerals, Metals and Materials Society, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Eric Homer, Brigham Young University; Elizabeth Holm, Carnegie Mellon University; Mark Asta, University of California, Berkeley

Monday PM | March 11, 2019
302C | Henry B. Gonzalez Convention Center

Session Chairs: Murray Daw, Clemson University; Simon Phillpot, University of Florida

2:30 PM Invited

From Computing Grain Boundary “Phase” Diagrams to Understanding Grain Boundary Embrittlement: Chongze Hu¹; Jian Luo¹; ¹University of California San Diego

3:00 PM

A Non-parametric Approach to Reconstruct Grain Boundary Energy from Triple Junction Geometries: Yu-Feng Shen¹; Xiaoting Zhong¹; He Liu¹; Robert Suter¹; Gregory Rohrer¹; ¹Carnegie Mellon University

3:20 PM

Formation Reactions of Intermetallic Compound Layers in Pure Fe / Molten Zn Diffusion Couple Held at 450\176C: Kwangsik Han¹; Inho Lee¹; Ikuo Ohnuma²; Yasuyuki Hayakawa³; Ryosuke Kainuma¹; ¹Tohoku University/Dept. Material Science; ²National Institute for Materials Science (NIMS); ³JFE Steel Co.

3:40 PM

Shear Induced Motion of Twin Boundaries in Mg via Disconnection Terrace Nucleation, Growth and Coalescence: Douglas Spearot¹; Laurent Capolungo²; Carlos Tome²; ¹University of Florida; ²Los Alamos National Laboratory

4:00 PM Break

4:20 PM Invited

Grain Boundary Phases in Bcc Metals: Timofey Frolov¹; Qiang Zhu²; Wahyu Setyawan³; Tomas Ooppelstrup¹; Richard Kurtz³; Jaime Marian⁴; Artem Oganov⁵; Rudd Rudd¹; ¹Lawrence Livermore National Laboratory; ²UNLV; ³PNNL; ⁴UCLA; ⁵Stony Brook University

4:50 PM

A New Approach for Interfacial Classification: Structural Descriptors of Atomistic Grain Boundaries: *Jacob Tavenner*¹; Garritt Tucker¹; Edward Kober²; ¹Colorado School Of Mines; ²Los Alamos National Laboratory

5:10 PM

Connecting Atomic and Crystallographic Structure-property Relationships of Grain Boundaries: Jonathan Priedeman¹; Conrad Rosenbrock¹; Oliver Johnson¹; *Eric Homer*¹; ¹Brigham Young University

5:30 PM

Characterization of Interfaces of Platinum Nanoparticles in Gamma Alumina Using Transmission Electron Microscopy and Density Functional Theory: *Arielle Clauser*¹; Kofi Oware Sarfo¹; Al Rise¹; Colin Ophus²; Raquel Giulian³; Líney Árnadóttir¹; Melissa Santala¹; ¹Oregon State University; ²National Center Electron Microscopy; ³Universidade Federal do Rio Grande do Sul

NUCLEAR MATERIALS

Irradiation Effects on Phase Transformations in Nuclear Reactor Materials — Fe and FeCr Based Alloys

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Janelle Wharry, Purdue University; Kester Clarke, Colorado School of Mines; Julie Tucker, Oregon State University; Par Olsson, KTH Royal Institute of Technology; Dhriti Bhattacharyya, ANSTO; Mohsen Asle Zaeem, Colorado School of Mines; Arun Devaraj, Pacific Northwest National Laboratory

Monday PM | March 11, 2019

214B | Henry B. Gonzalez Convention Center

Session Chairs: Julie Tucker, Oregon State University; Pär Olsson, KTH Royal Institute of Technology

2:30 PM Invited

Influence of Irradiation Conditions on Precipitation Behavior in Fe-Cr and Ni Alloys: Elaina Reese¹; Li-Jen Yu¹; Nathan Almirall²; Khalid Hattar³; Takuya Yamamoto²; G. Robert Odette²; M. Grace Burke⁴; *Emmanuelle Marquis*¹; ¹University of Michigan; ²University of California Santa Barbara; ³Sandia National Laboratory; ⁴University of Manchester

2:55 PM

Ion Irradiation Induced Alpha Prime Precipitate Formation in High Purity Fe-Cr Alloys: *Yajie Zhao*¹; Arunodaya Bhattacharya²; Steven Zinkle¹; ¹The University of Tennessee; ²Oak Ridge National Laboratory

3:15 PM

Heterogeneous Damage Structures in Neutron, Proton and Ion Irradiated FeCrAlloys: *Jack Haley*¹; Steve Roberts¹; Sergio Lozano-Perez¹; G. Odette²; ¹University of Oxford; ²University of California Santa-Barbara

3:35 PM

Atomic Scale Modeling of the Effect of Forced Atomic Reactions on the Thermodynamic and Kinetic Properties of Fe-based Alloys under Irradiation: *Liangzhao Huang*¹; Luca Messina²; Thomas Schuler¹; Maylise Nastar¹; ¹DEN-Service de Recherches de Métallurgie Physique, CEA, Université Paris-Saclay; ²KTH Royal Institute of Technology, Nuclear Engineering

3:55 PM Break

4:15 PM Invited

Kinetics of Point Defects under Irradiation: From Atomic to Cluster Scales: *Thomas Schuler*¹; Luca Messina²; Maylise Nastar¹; Pascal Bellon³; Dallas Trinkle³; Robert Averback³; ¹CEA/SRMP; ²KTH; ³University of Illinois at Urbana-Champaign

4:40 PM

Parametric Study of Swelling Behavior with Cluster Dynamics of 15Cr / 15Ni Austenitic Stainless Steels: *Adrien Vaugoude*¹; Thomas Jourdan²; M-H Mathon³; Dominique Thiaudiere⁴; Alexandre Legris⁵; Yann De Carlan¹; ¹DEN-Service de Recherches Métallurgiques Appliquées (SRMA), CEA; ²DEN-Service de Recherches de Métallurgie Physique (SRMP), CEA, Université Paris-Saclay; ³DRF – Laboratoire Léon Brillouin, CEA-CNRS, Université Paris-Saclay; ⁴Synchrotron SOLEIL - DiffAbs; ⁵Unité Matériaux et Transformations – UMR8207 (UMET), Centre National de la Recherche Scientifique – Université Lille 1

5:00 PM

Modeling Temperature Shift for Solute Clustering in T91 when Using Variable Dose Rate Irradiations: *Matthew Swenson*¹; Saheed Adisa¹; ¹University of Idaho

5:20 PM

Modeling Irradiation Induced Phase Transformations in the FeCrAl System: *Par Olsson*¹; Ebrahim Mansouri¹; Christophe Domain²; Luca Messina¹; Nicolas Castin³; ¹KTH Royal Institute of Technology; ²EDF R&D; ³SCK-CEN

5:40 PM

Microstructure Evolution in Irradiation-tolerant Ultrafine-grained Steels: *Haiming Wen*¹; Andrew Hoffman¹; Jiaqi Duan¹; ¹Missouri University of Science and Technology

LIGHT METALS

Magnesium Technology 2019 — Alloy Design and Casting

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

Program Organizers: Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordon, University of Alabama; Dmytro Orlov, Lund University; Neale Neelameggham, IND LLC

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Session Chairs: Mark Easton, RMIT University; Wilhelmus Sillekens, European Space Agency

2:30 PM

Bimodal Casting Process of Eco-Mg Series Alloys by Vertical High-speed Press Machine: *Fabrizio D'Errico*¹; ¹Politecnico Di Milano Politecnico Di Milano

2:50 PM

Investigation of the Evolution of the Microstructure in the Directionally Solidified Long-period-stacking-ordered (LPSO) Magnesium Alloy as a Function of the Temperature: Daria Drozdenko¹; *Kristian Mathis*²; Stefanus Harjo³; Wu Gong⁴; Kazuya Aizawa³; Michiaki Yamasaki¹; ¹Kumamoto University; ²Nuclear Physics Institute of the CAS; ³Japan Atomic Energy Agency; ⁴Kyoto University

3:10 PM

TEM Studies of In Situ Formation of MgO and Al₄C₃ During Thixomolding of AZ91 Magnesium Alloy Conducted at CO₂: *Lukasz Rogal*¹; Lidia Litynska-Dobrzynska¹; Boguslaw Baran¹; ¹Institute Of Metallurgy And Materials Sc

3:30 PM

FFF of Mg-alloys for Biomedical Applications: Martin Wolff¹; Torben Mesterknecht¹; Andre Bals¹; Thomas Ebel¹; *Regine Willumeit Romer*¹; ¹Helmholtz-Zentrum Geesthacht

3:50 PM

Effects of Gd/Y Ratio on the Microstructures and Mechanical Properties of Cast Mg-Gd-Y-Zr Alloys: *Jingli Li*¹; Di Wu¹; Rongshi Chen¹; ¹Institute of Metal Research, Chinese Academy of Sciences

4:10 PM Break

4:30 PM Poster Pitch Session

ENERGY & ENVIRONMENT

Materials for Molten Salt Energy Systems — Corrosion and Compatibility II

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

Program Organizers: Stephen Raiman, Oak Ridge National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Kumar Sridharan, University of Wisconsin-Madison; Judith Vidal, National Renewable Energy Laboratory; Michael Short, Massachusetts Institute of Technology

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Session Chair: Stephen Raiman, Oak Ridge National Laboratory

2:30 PM Introductory Comments

2:35 PM

Molten Salt Thermochemistry Applied to Corrosion in Molten Salts: *Raluca Scarlat*¹; ¹University of Wisconsin, Madison

3:05 PM

Holistic Understanding of Graphite Behavior in MSRE Environments: *Anne Campbell*¹; Timothy Burchell¹; Cristian Contescu¹; Nidia Gallego¹; James Keiser¹; Stephen Raiman¹; A. Lou Qualls¹; ¹Oak Ridge National Laboratory

3:25 PM

Fluorination of Nuclear Graphite IG-110 in Molten 2LiF-BeF₂ (FLiBe) Salt at 700 °C: *Huali Wu*¹; Francesco Carotti¹; Raluca Scarlat¹; ¹University of Wisconsin, Madison

3:45 PM

Compatibility of New And Commercial Alloys With Molten Salts: *James Keiser*¹; ¹Oak Ridge National Laboratory

4:05 PM Break

4:25 PM

Compatibility of Ni-Cr Alloys in Static and Flowing Commercial Molten Chloride Salt: *Bruce Pint*¹; Stephen Raiman¹; ¹Oak Ridge National Laboratory

4:45 PM

Understanding the Behavior of Metallic Materials in Molten Salts: *Dev Chidambaram*¹; ¹University of Nevada, Reno

MATERIALS PROCESSING

Materials Processing Fundamentals — Steel - Microstructure and Properties

Sponsored by: TMS: Process Technology and Modeling Committee

Program Organizers: Guillaume Lambotte, Boston Metal; Jonghyun Lee, Iowa State University; Antoine Allanore, MIT - DMSE; Samuel Wagstaff, Novelis

**Monday PM | March 11, 2019
 212A | Henry B. Gonzalez Convention Center**

Session Chairs: Antoine Allanore, MIT; Guillaume Lambotte, Boston Metal

2:30 PM Introductory Comments

2:35 PM

A New Alloy System Having Autogenous Grain Pinning at High Temperature: *Tihe Zhou*¹; Hatem Zurob²; Ronald O`Malley³; ¹Stelco, Inc.; ²McMaster University; ³Missouri University of Science & Technology

2:55 PM

Understanding the First Formation Stages of Nano-metallic Oxide Particles in ODS Steels: *Martin Owusu-Mensah*¹; Aurélie Gentils¹; Stéphanie Jublot-Leclerc¹; Vladimir Borodin²; Joel Ribis³; ¹CSNSM, University Paris-Sud, CNRS/IN2P3, Université Paris-Saclay, Orsay, France; ²NRC Kurchatov Institute and NRNU MEPhI, Moscow, Russia; ³DEN, SRMA, CEA, Université Paris-Saclay, Gif sur Yvette, France

3:15 PM

Effect of Casting Temperature on the Surface Finish of Grey Iron Castings: *Izudin Dugic*¹; ¹University Sweden

3:35 PM

Carbide Precipitation of TBM Cutter Ring Steel during Tempering: *Shaoying Li*¹; Hanjie Guo¹; Xiao Shi¹; Mingtao Mao¹; ¹University of Science and Technology Beijing

3:55 PM Break

4:15 PM

Study on Hot Deformation Behavior and Processing Map of a Cu-bearing 2205 Duplex Stainless Steel: *Tong Xi*¹; Chunguang Yang¹; Ke Yang¹; ¹Chinese Academy of Sciences

4:35 PM

Research on the L2 Control Model Technology of Double Cold Reduction during Continuous Annealing Process: Wei Guo¹; Hui Wang¹; Yanglong Li¹; Jie Wen¹; Meng Yu¹; Fengqin Wang¹; ¹Shougang Research Institute of Technology

4:55 PM

Research on Level 2 Rolling Model of Tin Plate Double Cold Reduction Process: *Hui Wang*¹; Wei Guo¹; Yanglong Li¹; Fei Chen¹; Jie Wen¹; Meng Yu¹; Qin Wang¹; ¹Shougang Research Institute of Technology

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Microstructure Effects I

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

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Session Chairs: Ramprashad Prabakharan, Pacific Northwest National Laboratory; Cody Miller, Los Alamos National Laboratory

2:30 PM Invited

Dose-dependent Ductile to Brittle Transition Temperature in Ferritic Polycrystalline Aggregates: A 3D Dislocation Dynamics Analysis: *Christian Robertson*¹; Yang Li¹; ¹CEA Université Paris-Saclay

3:00 PM

Investigating the Effects of Wear in Reactor Environments using Ion Irradiation: *Gene Lucadamo*¹; William Howland¹; Paolo Zafred¹; Justin Cook¹; Ram Bajaj¹; Richard Smith¹; ¹Naval Nuclear Laboratory

3:20 PM

Mechanical Properties and Microstructural Evaluation of a Pilgered Thin-walled OFRAC Tube for Fast Reactor Applications: *Caleb Massey*¹; David Hoelzer²; Philip Edmondson²; Maxim Gussev²; Anoop Kini³; Baptiste Gault³; Kurt Terrani²; Steven Zinkle¹; ¹University of Tennessee Knoxville; ²Oak Ridge National Laboratory; ³Max-Planck-Institut für Eisenforschung GmbH

3:40 PM

Mechanical Properties Retention of Accident Tolerant Fuel Cladding FeCrAl Alloys Following a Quenching Treatment.: *Raul Rebak*¹; Vipul Gupta¹; ¹GE Global Research

4:00 PM Break

4:20 PM Invited

Mechanical and Thermal Behavior of Graphite in Nuclear Reactor Applications: *Anne Campbell*¹; Timothy Burchell¹; Yutai Katoh¹; Josina Geringer¹; ¹Oak Ridge National Laboratory

4:50 PM

Procedures for the Interpolation of Orientation Distributions from Coarse Grid Experimental Measurements to Fine Grid Finite Element Meshes: *Timothy Barrett*¹; Adnan Eghtesad¹; Rodney McCabe²; Sven Vogel²; Marko Knezevic¹; ¹University of New Hampshire; ²Los Alamos National Laboratory

5:10 PM

The Study of Mechanical Behaviour of Materials for the Nuclear Reactor Components in SUSEN Hot Cells: *Mariia Zimina*¹; Petr Švrčula¹; Pavel Zháňal¹; Ondrej Libera¹; Stefan Zaunschirm²; Ondrej Srba¹; ¹Research Center Rež, Ltd.; ²University of Applied Sciences Upper Austria

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior Related to Interface Physics III — Grain Boundaries II

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

Program Organizers: Jason Trelewicz, Stony Brook University; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht; Siddhartha Pathak, University of Nevada, Reno; Jordan Weaver, National Institute of Standards and Technology; Marc Legros, CEMES-CNRS

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Session Chairs: Josh Kacher, Georgia Institute of Technology; Jordan Weaver, National Institute of Standards and Technology

2:30 PM

Understanding Mechanical Failure of Metal/ceramic Interfaces: Xiaoman Zhang¹; Yang Mu¹; Mohammad Dodaran¹; Shuai Shao¹; Wen Meng¹; Collin Wick²; Ramu Ramachandran²; ¹Louisiana State University; ²Louisiana Tech University

2:50 PM Invited

Understanding Local Deformation Processes in Al 6061 using a Multiscale Electron Microscopy Approach: Josh Kacher¹; Yung Suk Jeremy Yoo¹; ¹Georgia Institute of Technology

3:20 PM

Sulfur Induced Embrittlement in Nickel: A Molecular Dynamics Approach: Doruk Aksoy¹; Rémi Dingreville²; Douglas E. Spearot¹; ¹University of Florida; ²Sandia National Laboratories

3:40 PM

Examining Atomistic Simulations of Grain Boundary – Dislocation Interactions in FCC Nickel: Devin Adams¹; Eric Homer¹; David Fullwood¹; Robert Wagoner²; ¹Brigham Young University; ²Ohio State University

4:00 PM Break

4:20 PM

Systematic Adjustment of Nanotwin Density in Thin Ag Films: Shefford Baker¹; Nathaniel Rogers¹; Kenneth Shaughnessy¹; ¹Cornell University

4:40 PM Invited

Shear-coupled Grain Boundary Migration: Heterogeneous Disconnection Nucleation: Nicolas Combe¹; Frederic Momprou¹; Marc Legros¹; ¹CEMES-CNRS, University of Toulouse

5:10 PM

Strength and Deformation of Au@Ag and Au@Cu Core-Shell Nanocubes: *Mehrdad Kiani*¹; Yifan Wang¹; Wei Cai¹; Wendy Gu¹; ¹Stanford University

5:30 PM Invited

{10-12} Twinning Mechanism, Twin-slip and Twin-twin Interaction in Hexagonal Close-packed Magnesium: *Bin Li*¹; Peng Chen¹; ¹University of Nevada, Reno

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Micro- and Nanomechanical Testing in Harsh Environments — High Temperature and Cryogenic Micromechanics

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

Program Organizers: Verena Maier-Kiener, Montanuniversität Leoben; Sandra Korte-Kerzel, RWTH Aachen; Peter Hosemann, University of California; Afrooz Barnoush, Norwegian University of Science and Technology; Jeffrey Wheeler, ETH Zurich; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

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Session Chairs: Sandra Korte-Kerzel, RWTH Aachen; Jeff Wheeler, ETH Zurich

2:30 PM Invited

Deformation in the Intermetallic Mg₂Ca Laves Phase from Room-to High-Temperature: *James Gibson*¹; Christoffer Zehnder¹; Hanno Rempel¹; Dennis Gerber¹; Stefanie Sandlöbes¹; Sandra Korte-Kerzel¹; ¹RWTH Aachen

2:55 PM

High Temperature Nanomechanical Characterization of Transition Metal Carbides: Ming Chen¹; Davide Sangiovani²; Giacomo Po³; Suneel Kodambaka³; *Jeffrey Wheeler*¹; ¹Eth Zurich; ²Linköping University; ³University of California, Los Angeles

3:15 PM

Elevated Temperature Nano and Micro-impact of Hard PVD Coatings: *Ben Beake*¹; Luis Isern²; Jose Endrino²; ¹Micro Materials Ltd.; ²Cranfield University

3:35 PM

High Temperature Responses of Bulk Metallic Glasses in Nanoindentation: Lisa Kraemer¹; Verena Maier-Kiener²; Yannick Champion³; Reinhard Pippan¹; ¹Erich Schmid Institute; ²Montanuniversität Leoben; ³CNRS, SIMaP Grenoble

3:55 PM

Material Optimisation for Small Scale Bending Creep by Additive Manufacturing of Cantilevers: Syed Jalali¹; Faizan Hizazi¹; Jyotirmaya Kar¹; Praveen Kumar¹; Vikram Jayaram¹; ¹Indian Institute of Science

4:15 PM Break

4:35 PM Invited

Nanomechanical Characterization in Cryogenic Environments: Seok-Woo Lee¹; ¹University of Connecticut

5:00 PM

Ultrahigh Elastically Compressible Superconductor, CaKFe₄As₄: Gyuhong Song¹; Vladislav Borisov²; William Meier³; Keith Duso¹; John Sypek¹; Roser Valenti²; Paul Canfield³; Seok-Woo Lee¹; ¹University of Connecticut; ²Goethe University; ³Iowa State University

5:20 PM

Microindentation on Monocrystalline Materials at Low Temperatures: Shunbo Wang¹; ¹Jilin University

5:40 PM Invited

Thermally Activated Fracture Behavior at the Micron Scale: Johannes Ast¹; Szilvia Kalácska¹; Jakob Schwiedrzik¹; Johann Michler¹; Xavier Maeder¹; ¹Empa Materials Science & Technology

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XVIII — Phase Formation of Electronic Materials

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Hiroshi Nishikawa, Osaka University; Shih-Kang Lin, National Cheng Kung University; Chaohong Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing University; Dajian Li, Karlsruhe Institute of Technology; Song-Mao Liang, Clausthal University of Technology; Ming-Tzer Lin, National Chung Hsing University; Zhi-Quan Liu, Institute of Metal Research, Chinese Academy of Sciences; Jaeho Lee, Hongik University; Yee-wen Yen, National Taiwan University of Science and Technology; Yuan Yuan, Chongqing University; Yu Zhong, Worcester Polytechnic Institute

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Session Chairs: Song-Mao Liang, Clausthal University of Technology; Yuan Yuan, Chongqing University

2:30 PM Invited

Study of Metastable Phase Formation for Sputtered Thin Films: *Keke Chang*¹; ¹NIMTE, Chinese Academy of Sciences

2:50 PM

A Study of Nickel Metallization on Polyimide Films of Different Structures by All-Wet Process: *Tzu-Jung Liu*¹; Chih-Ming Chen¹; Ching-Hsuan Lin¹; Pei-Yu Wu¹; ¹National Chung Hsing University

3:10 PM

The Effects of Electrochemical Parameters on the Physical Properties of Ni-Alloy Electroplating for the High Wear Resistant Materials: Yong-Su Lee¹; Hong-Wook Chun¹; *Jaeho Lee*¹; ¹Hongik University

3:30 PM Invited

The Design of Magnesium-rare Earth Alloys Based on Thermodynamic Calculations: Qun Luo¹; *Qian Li*¹; ¹Shanghai University

3:50 PM Break

4:10 PM

Microstructure Evolution and Physics Properties of Low Silver Copper Alloy Wires during In Situ Composite Preparation: *Yuanwang Zhang*¹; Shusen Wang¹; Dawei Yao¹; ¹Shanghai Electric Cable Research Institute

4:30 PM

Growth of Nb₃Sn and Cu₃Al Intermetallic Phases by Reactive Diffusion Process: Choong-un Kim¹; *Geng Ni*¹; ¹University of Texas, Arlington

4:50 PM

Silanization Engineering for Silicon Metallization: *Ping-Heng Wu*¹; Yu-Zhong Lai¹; Chih-Ming Chen¹; ¹National Chung Hsing University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Phase Transformations in Ferrous Alloys

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Yufeng Zheng, Ohio State University; Ashley Paz y Puente, University of Cincinnati; Juan Escobedo-Diaz, University of New South Wales; Dhriti Bhattacharyya, ANSTO; Rajarshi Banerjee, University of North Texas

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Session Chairs: Juan Escobedo-Diaz, University of New South Wales; Sophie Primig, University of New South Wales

2:30 PM

Phase Transformations in LDX2404® Duplex Stainless Steel Subjected to Shock Loading: Raymond Miller¹; Zakaria Quadir²; Ali Ameri¹; Con Logos³; Paul Hazell¹; *Juan Escobedo-Diaz*¹; ¹University of New South Wales; ²Curtin University; ³Outokumpu

2:50 PM

Effect of Cooling Parameters in Long Steel Components during Quenching.: *Andrea Mireles-Ramos*¹; Francisco Garcia-Pastor¹; Francisco Acosta-González¹; Eddy Alfaro-López²; ¹CINVESTAV; ²Rassini Suspensiones S.A. de C.V.

3:10 PM

In Situ Characterization of Microstructure Evolution during the Partitioning Step of TRIP-assisted Bainitic Ferrite (TBF) Steel: Influence of Microalloying Addition: Zelie Tournoud¹; Patricia Donnadiou¹; Gilles Renou¹; Didier Huin²; *Alexis Deschamps*¹; ¹Genoble

Institute of Technology; ²ArcelorMittal Maizieres Research

3:30 PM

Advanced Thermo-mechanical Processing as Tool to Engineer Hierarchical Microstructures in Modern HSLA Steels: *Carina Ledermueller*¹; Sophie Primig¹; ¹University of New South Wales, Sydney

3:50 PM

Co-dependent Pathways of Thermal Aging Degradation of Cast Austenitic Stainless Steels Characterized by Atom Probe Tomography, Electron Microscopy, and Mechanical Testing: *Timothy Lach*¹; Arun Devaraj¹; David Collins¹; Emily Barkley¹; Thak Sang Byun¹; ¹Pacific Northwest National Laboratory

4:10 PM Break

4:30 PM

In Situ High Energy X-ray Diffraction Investigation of the Bainitic Transformation in Steels: *Sen Lin*¹; Peter Hedström¹; ¹KTH Royal Institute of Technology

4:50 PM

Effect of Silicon Content on the Dilatometric Behavior of a Medium-carbon Steel: *Alexis Gallegos-Pérez*¹; Octavio Vázquez-Gómez¹; José López-Soria¹; Héctor Vergara-Hernández¹; Edgar López-Martínez²; ¹Tecnológico Nacional de México / I.T. Morelia; ²Universidad del Istmo

5:10 PM

How Austenitic TRIP Steels Accommodate Strain under Multiaxial Loading: The Effect of Stacking Fault Energy and Deformation State.: *Efthymios Polatidis*¹; Miroslav Smid¹; Wei-Neng Hsu²; Tobias Panzner¹; Helena VanSwygenhoven²; ¹Paul Scherrer Institute; ²Paul Scherrer Institute/École Polytechnique Fédérale de Lausanne

5:30 PM

Transformation-resistant Plasticity Versus Transformation-induced Plasticity in a Cost-effective Lightweight Dual-phase Steel: *Jae Bok Seol*¹; Seon Hyeong Na¹; Hyoung Seok Park²; ¹POSTECH; ²Hyundai MOBIS

MATERIALS PROCESSING

Rare Metal Extraction & Processing — Rare Metals II

Sponsored by: TMS: Hydrometallurgy and Electrometallurgy Committee

Program Organizers: Gisele Azimi, University of Toronto; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Takanari Ouchi, The University of Tokyo; Neale Neelameggham, IND LLC; You Qiang, University of Idaho; Alafara Baba, University of Ilorin

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Session Chairs: Hojong Kim, The Pennsylvania State University; Shafiq Alam, University of Saskatchewan

2:30 PM

Supercritical Fluid Extraction for Urban Mining of Rare Earth Elements: Jiakai Zhang¹; John Anawati¹; Yuxiang Yao¹; *Gisele Azimi*¹; ¹University of Toronto

3:05 PM Keynote

Extraction of Rare Metals from NiMH Batteries: Kivanc Korkmaz¹; Åke Rasmuson¹; *Kerstin Forsberg*¹; ¹KTH Royal Institute of Technology

3:30 PM

Selective Precipitation of Th and Rare-earth Elements from HCl Leach Liquor: *Haydar Günes*¹; Hüseyin Eren Obuz¹; Murat Alkan¹; ¹Dokuz Eylül University

3:55 PM Break

4:15 PM

Improvement of The Pregnant Solution Arranging Method to Recover the Rare Earth Elements: *Tatyana Surkova*¹; Bagdaulet Kenzhaliyev¹; Ainur Berkinbayeva¹; Dinara Yessimova¹; ¹JSC Institute of Metallurgy and Ore Beneficiation

4:40 PM

Process Optimization of Reducing Ilmenite Using Carbon: Shiju Zhang¹; *Liu Songli*²; ¹Panzhuhua University; ²Yangtze Normal University

ADVANCED MATERIALS

Refractory Metals 2019 — (III) Welding and W Alloys; (IV) W, Re and Ru

Sponsored by: TMS: Refractory Metals Committee

Program Organizers: Eric Taleff, University of Texas at Austin; Martin Heilmaier, KIT Karlsruhe; Kevin Jaansalu, Royal Military College of Canada

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Session Chairs: Eric Taleff, The University of Texas at Austin; Kevin Jaansalu, Royal Military College of Canada

2:30 PM

Resistance Upset Welding of Refractory Metals: *Todd Leonhardt*¹; Ying Ko¹; Jerry Gould²; Nick Lance¹; ¹Rhenium Alloys Inc.; ²EWI

2:50 PM

Nanostructured Two-phase Tungsten Alloys for High Temperature Applications: *Alexander Knowles*¹; ¹University of Birmingham, UK

3:10 PM

Analyses of Intrinsic Ductility of W-Ta and W-Re Alloys Based on AB Initio Calculations: *Chaoming Yang*¹; Liang Qi¹; ¹University of Michigan

3:30 PM

Microstructural Changes and Related Surface Damage of Tungsten Rhenium Alloys Caused by Electron Beam Loading: *Maximilian Siller*¹; Alexander Leitner¹; Jürgen Schatte²; Helmut Clemens¹; Wolfram Knabl²; Verena Maier-Kiener¹; ¹Montanuniversität Leoben; ²Plansee SE

3:50 PM Break

4:10 PM

Fabrication of Ruthenium-Tungsten Alloy Wires by the Alloy-Micro-Pulling-Down Method: *Rikito Murakami*¹; Kei Kamada¹; Yasuhiro Shoji¹; Yuui Yokota¹; Shunsuke Kurosawa¹; Yuji Ohashi¹; Akihiro Yamaji¹; Masao Yoshino¹; Akira Yoshikawa¹; ¹Tohoku University

4:30 PM

Plastic Deformation Behavior of HCP Rhenium: Slip and Twinning: *M Arul Kumar*¹; Anil Kumar¹; Josh Kacher²; Rodney McCabe¹; Irene Beyerlein³; ¹Los Alamos National Laboratory; ²Georgia Institute of Technology; ³University of California, Santa Barbara

4:50 PM

Strength and Ductility of Powder Consolidated Ultrafine-grain Tantalum: *Zachary Levin*¹; *Xiaoxi Wang*²; *Murat Kaynak*³; *Ibrahim Karaman*³; *Karl Hartwig*³; ¹Air Force Research Laboratory; ²Xuzhou University of Technology; ³Texas A&M University

ENERGY & ENVIRONMENT

REWAS 2019: Secondary and Byproduct Sources of Materials, Minerals, and Metals — Secondary and Byproduct Beneficial Use

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

Program Organizers: Gabrielle Gaustad, Alfred University; Camille Fleuriault, Gopher Resource; Neale Neelameggham, IND LLC; Elsa Olivetti, Massachusetts Institute of Technology

Monday PM | March 11, 2019

007C | Henry B. Gonzalez Convention Center

Session Chairs: Elsa Olivetti, Massachusetts Institute of Technology; Sumedh Gostu, Air-Liquide

2:30 PM Introductory Comments

2:35 PM Invited

Introducing the Extraordinary Leuven Cement: Raw Materials, Process, Performance and First Real-life Applications: *Yiannis Pontikes*¹; ¹Ku Leuven

3:00 PM Invited

Ferro-alloy Production from Spent Petroleum Catalysts by Reductive Smelting and Selective Oxidation Processes: *Jong-Jin Pak*¹; *Do-Hyeong Kim*¹; *Min-Kyu Paek*²; *Yong-Dae Kim*³; ¹Hanyang University; ²Aalto University; ³Golden River Co.

3:25 PM

Reactivity of Crystalline Slags in Alkaline Solution: *Brian Traynor*¹; *Hugo Uvegi*¹; *Piyush Chaunsali*²; *Elsa Olivetti*¹; ¹Massachusetts Institute of Technology; ²IIT Madras

3:45 PM

Extraction of Zinc, Silver and Indium via Vaporization from Jarosite Residue: *Stefan Steinlechner*¹; *Jürgen Antrekowitsch*¹; ¹Montanuniversitaet Leoben

4:05 PM Break

4:25 PM

Efficient Utilization of Zinc Lead and Copper Containing By-products: *Juergen Antrekowitsch*¹; ¹University of Leoben

4:45 PM

Production of High Purity Mo and Fe-Mo Alloys from Recycled Mo Oxide and Mill Scale through Hydrogen Reduction: *Min-Kyu Paek*¹; *Do-Hyeong Kim*²; *Daniel Lindberg*¹; *Jong-Jin Pak*²; ¹Aalto University; ²Hanyang University

5:05 PM

Alkali Elution of Various Mineralogical Phases in Steelmaking Slag: *Zuoqiao Zhu*¹; *Xu Gao*¹; *Shigeru Ueda*¹; *Shin-ya Kitamura*¹; ¹Tohoku University

5:25 PM

Feasibility Assessment for Recycling Copper Slag as Ferrous By-products in FINEX®, an Alternative Ironmaking Process: *Moo Eob Choi*¹; *Taehyeok Kim*¹; ¹POSCO

5:45 PM

Development of Electromagnetic Interference Materials from Metallurgical Wastes: *Yong Fan*¹; ¹TU Freiberg

MATERIALS PROCESSING

Shape Casting: 7th International Symposium Celebrating Prof. John Campbell's 80th Birthday — Casting Defects and Their Characterization

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

Program Organizers: Murat Tiryakioglu, University of North Florida; William Griffiths, University of Birmingham; Mark Jolly, Cranfield University

Monday PM | March 11, 2019

006B | Henry B. Gonzalez Convention Center

Session Chair: Xinjin Cao, National Research Council Canada

2:30 PM

Determining Casting Defects in Thixomolding Mg Casting Part by Computed Tomography: *Jiehua Li*¹; *Bernd Oberdorfer*²; *Peter*

*Schumacher*¹; ¹Montanuniversität Leoben; ²Austrian Foundry Research Institute

2:55 PM

The Effect of the Addition of Transition Metals on Double Oxide Film Defects in an Al-Si-Mg Alloy: *William Griffiths*¹; Adrian Caden¹;

¹University of Birmingham, UK

3:20 PM

On Estimating Largest Defects in Castings: *Murat Tiryakioglu*¹;

Irisi Nini¹; ¹University of North Florida

3:40 PM

Ti Grain Refinement Myth and Cleanliness of A356 Melt: *Özen Gürsoy*¹; Eray Erzi¹; Derya Dispinar¹; ¹Istanbul University

4:00 PM Break

4:20 PM

On the Effects of Defects and Imperfections on Tensile Toughness of a Secondary Aluminium Alloy: *Jakob Olofsson*¹; Anton Bjurenstedt²; Salem Seifeddine¹; ¹Jonkoping University; ²Swerea

SWECAST

4:40 PM

The Myth of Hydrogen Pores in Aluminum Castings: *Murat Tiryakioglu*¹; ¹University of North Florida

5:00 PM

Casting Defect Analysis on Fracture Surface of 356 Aluminium Alloy: *Özen Gürsoy*¹; Eray Erzi¹; Derya Dispinar¹; ¹Istanbul University

5:20 PM

Investigation of Casting Quality Change of A356 by Duration in Liquid State: *Mikdat Gurtaran*¹; Muhammet Uludag¹; Derya

Dispinar²; ¹Bursa Technical University; ²Istanbul University

5:40 PM

Characterization of the Effect of Sr and Ti on Liquid Quality in Al8Si3Cu: *Muhammet Uludag*¹; Derya Dispinar²; Murat Tiryakiođlu³;

¹Bursa Technical University; ²Istanbul University; ³University of North Florida

LIGHT METALS

Solidification Processing of Light Metals and Alloys: An MPMD Symposium in Honor of David StJohn — In-situ Observation and Simulation of Grain Formation

Sponsored by: TMS: Solidification Committee

Program Organizers: Mark Easton, RMIT University; Ma Qian, RMIT University (Royal Melbourne Institute of Technology); John Grandfield, Grandfield Technology Pty Ltd; Norbert Hort, Helmholtz-Zentrum Geesthacht; Mark Jolly, Cranfield University

Monday PM | March 11, 2019
006C | Henry B. Gonzalez Convention Center

Session Chairs: Zhongyun Fan, Brunel University; Mark Jolly, Cranfield University

2:30 PM Keynote

4D Synchrotron Imaging Insights into Grain Formation: *Peter Lee*¹; *Biao Cai*²; *Mohammad Azeem*¹; *Enyu Guo*³; *David St John*⁴; ¹University College London; ²University of Birmingham; ³Dalian University of Technology; ⁴University of Queensland

2:50 PM Keynote

X-Ray Synchrotron Radiography Investigations of Primary and Secondary Phase Nucleation in Aluminium Alloys: *Enzo Liotti*¹; *Andrew Lui*¹; *Patrick Grant*¹; ¹University of Oxford

3:10 PM Invited

δ - γ transformation during / after δ dendritic solidification in Fe-C-Mn-Si alloys: time-resolved 2D / 3D imaging: *Hideyuki Yasuda*¹; *Takahiro Hashimoto*¹; *Naoki Sei*¹; *Kohei Morishita*¹; *Masato Yoshiya*²; ¹Kyoto University; ²Osaka University

3:30 PM

Four-phase Eutectic Topology in Solidification Rosettes: *Djar Oquab*¹; *Claudie Josse*²; *Arnaud Proietti*²; *Alessandro Pugliara*¹; *Jacques Lacaze*³; ¹CIRIMAT; ²UMS Castaing; ³CNRS

3:50 PM

In Situ Observation of Hyperbranched Dendrites in Aluminum Alloys: *Tiberiu Stan*¹; *Yue Sun*¹; *Kate Elder*¹; *Xianghui Xiao*²; *Peter Voorhees*¹; ¹Northwestern University; ²Argonne National Laboratory

4:10 PM Break

4:20 PM

In Situ Observation of Nanoparticle-enabled Diffusion Control by High-speed Synchrotron X-ray Imaging: *Joseph Volpe*¹; *Qilin Guo*¹; *Cang Zhao*²; *Lianghua Xiong*¹; *Tao Sun*²; *Lianyi Chen*¹; ¹Missouri University of Science & Technology; ²Argonne National Laboratory

4:40 PM Invited

Numerical Modeling of Heterogeneous Nucleation Behavior of Equiaxed Grains during Directional Solidification: *Lang Yuan*¹; David StJohn²; Arvind Prasad²; Peter Lee³; ¹University of South Carolina; ²The University of Queensland; ³University College London

5:00 PM Invited

Phase-field Studies of the Interplay between Nucleation and Growth in Light Metal Alloys: *Janin Eiken*¹; ¹Access E.V.

5:20 PM

Understanding Compositional Effects of Dendritic Solidification via Directional Solidification and Cellular Automaton Simulation: *Colin Ridgeway*¹; Cheng Gu¹; Alan Luo¹; ¹Ohio State University

5:40 PM

Heterogeneities in Homogeneous Nucleation during Solidification of Pure Metals by Atomistic Simulations: *Mohsen Asle Zaeem*¹; Avik Mahata²; Michael Baskes³; ¹Colorado School of Mines; ²Missouri University of Science and Technology; ³University of California, San Diego

MECHANICS & STRUCTURAL RELIABILITY

Thermo-mechanical Response of Materials Investigated through Novel in-situ Experiments and Modeling — Session II

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Robert Wheeler, Microtesting Solutions LLC; Dongchan Jang, Kaist; Amit Pandey, Granta Design/ANSYS; Josh Kacher, Georgia Institute of Technology; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Monday PM | March 11, 2019

301A | Henry B. Gonzalez Convention Center

Session Chairs: Robert Wheeler, Microtesting Solutions LLC; Somuri Prasad, Sandia National Laboratories

2:30 PM Keynote

Direct Visualization of Kirkendall Voids at Cu-Au Interfaces from In-situ TEM Heating Studies: *Somuri Prasad*¹; Paul Kotula¹; Fadi

Abdeljawad¹; ¹Sandia National Laboratories

3:10 PM

Dislocation Pile-ups at $\beta 1$ Precipitate Interfaces in Mg-rare Earth (RE) Alloys: *Zhihua Huang*¹; Amit Misra¹; John Allison¹; Chaoming Yang¹; Liang Qi¹; ¹University of Michigan

3:30 PM

Imaging Short Range Order in Ti-6Al with TEM/STEM Techniques: *Ruopeng Zhang*¹; Colin Ophus²; Thomas Pekin¹; Burak Ozdol²; Max Poschmann¹; Yu Deng³; Shraddha Vachhani⁴; Mark Asta¹; Daryl Chrzan¹; Andrew Minor¹; ¹University of California Berkeley; ²Lawrence Berkeley National Laboratory; ³Nanjing University; ⁴Bruker Nano Surfaces

3:50 PM

Nanoscale Plastic Wear of Olivine Investigated by In Situ TEM: *Eric Hintsala*¹; Sanjit Bhowmick¹; Douglas Stauffer¹; S. A. Syed Asif¹; ¹Bruker Nano Surfaces

4:10 PM Break

4:30 PM Keynote

A Multi-scale In Situ Approach to Understanding the Collective Deformation of Ferroelastic Polycrystalline Ceramics: Charles Smith¹; *Jessica Krogstad*¹; ¹University of Illinois Urbana-Champaign

5:10 PM

Deformation Mechanism Maps for Submicron Aluminum at Elevated Temperatures: *Degang Xie*¹; Rongrong Zhang¹; Zhiwei Shan¹; ¹Xian Jiaotong University

5:30 PM

Operando STEM Guide Catalyst Regeneration Method Development: *Kinga Unocic*¹; Jae-Soon Choi¹; Theodore Krause¹; Jeffrey Miller¹; Franklin Tao¹; Susan Habas¹; ¹Oak Ridge National Laboratory

SPECIAL TOPICS

TMS 2019 Annual Meeting & Exhibition — Plenary Session

Monday PM | March 11, 2019

Lila Cockrell Theater | Henry B. Gonzalez Convention Center

12:00 PM Introductory Comments

12:05 PM Plenary

The Next Materials Frontier for Flight: *Luana Iorio*¹; ¹GE Aviation

12:45 PM Concluding Comments

MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing – Fundamentals of Metallurgical Processes

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Tao Jiang, Central South University; Jiann-Yang Hwang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

Tuesday AM | March 12, 2019

208 | Henry B. Gonzalez Convention Center

Session Chairs: Jesse White, Elkem Carbon AS; Guanghui Li, Central South University

8:30 AM Introductory Comments

8:35 AM

Analysis of Reaction Mechanism on Poly-vinyl Chloride (PVC) Pyrolysis in the Presence of Nickel (II and III) Oxides: *Lan Hong*¹; *Wendi Zhang*¹; *Tailin Li*¹; ¹Soochow University

8:55 AM

The Effects of Grain Size of Magnesium Powders on the Metallothermic Production of Advanced Ceramics: *Murat Alkan*¹; *Haydar Günes*¹; *Hüseyin Eren Obuz*¹; ¹DEU

9:15 AM

Effects of Cr₂O₃, FeO and CaO/SiO₂ Ratio on the Apparent Viscosity of CaO-SiO₂-MgO-MnO-FeO-Cr₂O₃ Slags: *Bing Huang*¹; *Mingmei Zhu*¹; *Yong Zhong*¹; ¹Chong Qing University

9:35 AM

Thermodynamic Analysis of Carbothermic Reduction of Electric Arc Furnace Dust: *Qing Ye*¹; Zhiwei Peng¹; Lei Ye¹; Liancheng Wang¹; Robin Augustine²; Joonho Lee³; Yong Liu⁴; Mudan Liu⁴; Mingjun Rao¹; Gunaghui Li¹; Tao Jiang¹; ¹Central South University; ²Uppsala University; ³Korea University; ⁴Guangdong Provincial Key Laboratory of Development and Comprehensive Utilization of Mineral Resources

9:55 AM

Influence of Cr₂O₃ Content on Slag Viscosity under Different Melting States and Temperature Programs: *Yanling Zhang*¹; ¹University of Science & Technology Beijing

10:15 AM Break

10:35 AM

Influence of Mold Slags with Different Reactivities on the Erosion Rate of ZrO₂-C Bearing Submergence Entry Nozzle: *Xuesi Wang*¹; Qian Wang¹; Changping Zeng¹; Huazhi Yuan¹; ¹Chongqing University

10:55 AM

A New Method for Determining High-temperature Wettability of Bonding Phase: *Yijia Dong*¹; Li Guanghui¹; Chen Liu¹; Qiang Zhong¹; Hu Sun¹; Jun Luo¹; Tao Jiang¹; ¹Central South University

11:15 AM

Thermodynamic Modelling of Solidification and Viscosity studies of Titania Slag: *Saida Shaik*¹; Tarun Kundu¹; ¹IIT Kharagpur

11:35 AM Concluding Comments

ENERGY & ENVIRONMENT

2019 Energy Technologies and Carbon Dioxide Management Symposium — Nanomaterials and Catalysts

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

Program Organizers: Tao Wang, Nucor Castrip Arkansas; Xiaobo Chen, RMIT; Donna Guillen, Idaho National Laboratory; Lei Zhang, University of Alaska Fairbanks; Ziqi Sun, Queensland University of Technology; Cong Wang, Northeastern University; Nawshad Haque, Csiro; John Howarter, Purdue University; Neale Neelameggham, IND LLC

Tuesday AM | March 12, 2019

007D | Henry B. Gonzalez Convention Center

Session Chair: Neale Neelameggham, IND LLC

8:30 AM

Metal Oxides Nanostructures for Energy Applications: *Ziqi Sun*¹; ¹Queensland University of Technology

8:50 AM

Effect of Biomaterial (Citrullus Lanatus Peels) Nanolubricant on the Thermal Performance and Energy Consumption of R600a in Refrigeration System: *Oluseyi Ajayi*¹; ¹Covenant University

9:10 AM

Two-dimensional Materials and their Hybrids in Energy Applications: *Ting Liao*¹; *Ziqi Sun*¹; ¹Queensland University of Technology

9:30 AM

Calcium-looping Lime Production: An Energy-efficient and Cost-effective Approach for Decarbonisation of the Steelmaking Industry: *Sicong Tian*¹; ¹Macquarie University

9:50 AM Break

10:10 AM

Performance and Energy Consumption Analyses of R290/Bio-based Nanolubricant as a Replacement for R22 Refrigerant in Air-conditioning System: *Oluseyi Ajayi*¹; ¹Covenant University

10:30 AM

Characterizations of Manganese-based Desulfurated Sorbents for Flue Gas Desulfurization: *Yanni Xuan*¹; *Qingbo Yu*¹; *Kun Wang*¹; *Wenjun Duan*¹; ¹Northeastern University

SPECIAL TOPICS

2019 International Metallurgical Processes Workshop for Young Scholars (IMPROWYS 2019) – Solidification Processing

Sponsored by: TMS Extraction and Processing Division

Program Organizers: Cong Wang, Northeastern University; Amy Clarke, Colorado School of Mines; Kinnor Chattopadhyay, University of Toronto; Bryan Webler, Carnegie Mellon University

Tuesday AM | March 12, 2019

213B | Henry B. Gonzalez Convention Center

Funding support provided by: Korean Institute of Metals and Materials

Session Chairs: Bryan Webler, Carnegie Mellon University; Caizhi Zhou, Missouri University of Science and Technology

8:30 AM Invited

Containerless Materials Processing: *Jonghyun Lee*¹; ¹Iowa State University

9:00 AM Invited

Effect of Al Addition to Si-Cr Based Solvent for Solution Growth of Single Crystalline SiC: *Sakiko Kawanishi*¹; Hironori Daikoku²; Takeshi Yoshikawa²; ¹Tohoku University; ²The University of Tokyo

9:30 AM Invited

Thermophysical Properties and Atomic Structure of Metastable Liquid Ti-Ni Alloys: Haipeng Wang¹; *P. Zou*¹; B. Wei¹; ¹Northwestern Polytechnical University

10:00 AM Break

10:20 AM Invited

Prediction of Porosity Formation during Directional Solidification of Nickel-based Superalloys: *Junsheng Wang*¹; Keli Liu¹; ¹Beijing Institute of Technology

10:50 AM

A New Efficient Quantitative Multi-component Phase Field – Lattice Boltzmann Model for Simulating Ti6Al4V Solidified Dendrite under Forced Flow: *Weizhao Sun*¹; Yu Xie²; Rui Yan¹; Hongbiao Dong³; Tao Jing¹; ¹Key Laboratory for Advanced Materials Processing Technology, Ministry of Education, School of Materials Science and Engineering, Tsinghua University; ²State Key Laboratory of Development and Application Technology of Automotive Steel, Baoshan Iron & Steel Co., Ltd.; ³Department of Engineering, University of Leicester

11:10 AM

Recalescence and Segregation Phenomena during Equiaxed Dendritic Solidification of Fe-C Alloy: *Weiling Wang*¹; Shiwei Yin¹; Sen Luo¹; Miaoyong Zhu¹; ¹Northeastern University

11:30 AM

Special Metallurgical Characteristics of Al-Mg-Si Alloy Based on Sub-rapid Solidification Process: *Zetian Liu*¹; Cheng Wang¹; Huiyuan Wang¹; ¹Jilin University

11:50 AM

Nucleation of Heteroepitaxial Recrystallization in Polycrystalline Superalloys: *Brady Dowdell*¹; *Victoria Miller*¹; ¹North Carolina State University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

2019 Symposium on Functional Nanomaterials: Synthesis, Integration, and Application of Emerging Nanomaterials — Two-dimensional Nanomaterials I

Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory; Jiyoung Chang, University of Utah; Pei Dong, George Mason University; Yong Lin Kong, University of Utah; Shengfeng Yang, Indiana University; Purdue University Indianapolis; SungWoo Nam, University of Illinois

Tuesday AM | March 12, 2019

213A | Henry B. Gonzalez Convention Center

Session Chairs: SungWoo Nam, University of Illinois at Urbana-Champaign; Jie Yao, University of California, Berkeley

8:30 AM Invited

Solution Based Preparation of van der Waals Materials and their Heterostructures: *Jie Yao*¹; ¹University of California Berkeley

9:00 AM

High-throughput Optical Thickness and Size Characterization of 2D Materials: *William Dickinson*¹; *Hannes Schniepp*¹; ¹The College of William & Mary

9:20 AM

The Effect of Processing Conditions on the Growth of Transition Metal Dichalcogenides by Molecular Beam Epitaxy: *Peter Litwin*¹; *Stephen McDonnell*¹; ¹University of Virginia

9:40 AM Invited

Centimeter Scale Growth and Integration of 2D TMDs: Vertically-controlled 2D Layer Orientation and 2D/2D Hetero-stacking on Arbitrary Substrates: *Yeonwoong Jung*¹; ¹University of Central Florida

10:10 AM Break

10:30 AM Invited

Phase Engineering in a Novel Puckered Pentagonal 2D PdSe₂ for High Performance Single Material Electronic Devices: *Kai Xiao*¹; Akinola Oyedele¹; Shize Yang¹; Chenze Liu¹; Liangbo Liang¹; Alexander Puretzy¹; Bobby Sumpter¹; Gerd Duscher¹; Christopher Rouleau¹; David Geohegan¹; ¹Oak Ridge National Laboratory

11:00 AM

Experimental Motivation for the High Monolayer Selectivity of Covalent-bond Exfoliation of 2D Transition Metal Dichalcogenides: *Clarissa Towle*¹; Hannah Gramling¹; Mary Scott¹; Joel Ager²; ¹University of California, Berkeley; ²Lawrence Berkeley National Laboratory

11:20 AM

Theory of Thin Film Mediated Exfoliation of van der Waals Bonded Layered Materials: *Haoye Sun*¹; Eric Sirott¹; James Mastandrea¹; Hannah Gramling¹; Hayden Taylor¹; Yuzhi Zhou²; Joel Ager¹; Daryl Chrzan¹; ¹University of California, Berkeley; ²Laboratory of Computational Physics

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Functional Materials Including High-temperature Ceramics and Alloys

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Tuesday AM | March 12, 2019
225A | Henry B. Gonzalez Convention Center

Session Chairs: Jung Pyung Choi, Pacific Northwest National Laboratory; Paul Ohodnicki, National Energy Technology Laboratory

8:30 AM Keynote

Oxide-based Thermoelectric Generators enabled by Additive and Layered Manufacturing: *Sanjay Sampath*¹; Hwasoo Lee¹;

¹Stony Brook University

9:00 AM Invited

Functional Sensor Material and Device Development for Energy-related Sensing Applications: *Paul Ohodnicki*¹; ¹National Energy Technology Laboratory

9:25 AM Invited

Cold Spray Additive Manufacturing of Thermoelectric Generators: *Alexander Baker*¹; Richard Thuss²; Elissaios Stavrou¹; Joe Zaug¹; Scott McCall¹; Harry Radousky¹; ¹Lawrence Livermore National Laboratory; ²TTEC Thermoelectric Technologies

9:50 AM

Ceramic Encapsulated Metallic (CEM) High Temperature Phase Change Material for Energy Storage: *Brian Jolly*¹; Jake McMurray¹; Austin Schumacher¹; Stephen Raiman¹; Edgar Lara-Curzio¹; Chad Parish¹; ¹Oak Ridge National Laboratory

10:10 AM Break

10:30 AM

DOC Stabilized PVAc / MWCNTs Composites for Higher Thermoelectric Performance: Hussein Badr¹; Shadi Foad Saber¹; Mahmoud Sorour¹; *Iman El Mahallawi*²; Fawzi Elrefaie¹; ¹Cairo University; ²Cairo University/British University in Egypt

10:50 AM

Printable and Flexible Heterogeneous Nanostructures for Wearable Thermoelectrics: Zimeng Zhang¹; *Shiren Wang*¹; ¹Texas A&M University

11:10 AM

Sustainable Hydrogen Generation Enabled through Hydrolysis of Hierarchical Nanoporous Aluminum in Neutral Water: *Eric Detsi*¹; John Corsi¹; Jintao Fu¹; Zeyu Wang¹; ¹University of Pennsylvania

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Welding: Physical and Mechanical Metallurgy of Rapidly Solidified Metals — In Situ Process Monitoring

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorganji, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Semiatin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

Tuesday AM | March 12, 2019
221A | Henry B. Gonzalez Convention Center

Session Chair: Kester Clarke, Colorado School of Mines

8:30 AM Invited

In-situ Monitoring of Directed Energy Deposition and Its Impact on the Development of In-process Control: *Jian Cao*¹; ¹Northwestern University

9:00 AM

Differentiating Defect Types in LENS Metal AM via In Situ Pyrometer Process Monitoring: *Tom Stockman*¹; Judith Schneider²; Cameron Knapp¹; Caleb Horan¹; John Carpenter¹; Kevin Henderson¹; Brian Patterson¹; ¹Los Alamos National Laboratory; ²University of Alabama in Huntsville

9:20 AM

Process Analysis of Powder Bed AM Using Two Color Pyrometer Data: *John Mitchell*¹; Thomas Ivanoff¹; Daryl Dagel¹; Bradley Jared¹; Jon Madison¹; Laura Swiler¹; David Saiz¹; Josh Koepke¹; ¹Sandia National Laboratories

9:40 AM

Comparison of In-situ Pyrometer Analysis with Simulation in Powder Bed Printed Inconel 718: *Lev Chechik*¹; Iain Todd¹; ¹University of Sheffield

10:00 AM Break

10:20 AM

In-situ Melt Pool Monitoring Methodologies for the Laser Powder Bed Fusion Process: *Jack Beuth*¹; Brian Fisher¹; Luke Scime¹; ¹Carnegie Mellon University

10:40 AM

Quantifying Particle-melt Interactions via In-situ high Speed Imaging in Laser Engineered Net Shaping (LENS): *James Haley*¹; Parnian Kiani¹; Sen Jiang¹; Baolong Zheng¹; Julie Schoenung¹; Enrique Lavernia¹; ¹University of California Irvine

11:00 AM

Defect Detection in Metal Additive Manufacturing through Application of In-situ Diagnostics: Bradley Jared¹; *Jonathan Madison*¹; Laura Swiler¹; Thomas Ivanoff¹; Burke Kernen¹; Jay Carroll¹; Todd Huber¹; Manyalibo Matthews²; Forien Jean-Baptiste²; Chris Spadaccini²; Gabe Guss²; Philip Depond²; John Carpenter³; Tom Stockman³; Elena Garlea⁴; Phong Du⁵; Ben Brown⁵; ¹Sandia National Laboratories; ²Lawrence Livermore National Laboratory; ³Los Alamos National Laboratory; ⁴Y-12 National Security Complex; ⁵Kansas City National Security Campus

11:20 AM

High-resolution Powder Bed Scanner for In-line Defect Characterization: *Tan-Phuc Le*¹; Matteo Seita¹; ¹Nanyang Technological University Singapore

11:40 AM

In-situ Monitoring System for Electron Beam Freeform Fabrication Based on Visual Detection and Backscattered Electron Imaging: *Shuhe Chang*¹; ¹Tsinghua University

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications — Microstructure and Characterization

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Charit, University of Idaho; Somayeh Pasebani, Oregon State University; Chad Duty, University of Tennessee

Tuesday AM | March 12, 2019

223 | Henry B. Gonzalez Convention Center

Session Chairs: Subhashish Meher, Idaho National Laboratory; Chad Duty, University of Tennessee

8:30 AM Invited

Alloy 800/800H by Laser Powder Bed Fusion: *Xiaoyuan Lou*¹; Jingfan Yang¹; Miao Song²; Mi Wang²; Gary Was²; Raul Rebak³;

¹Auburn University; ²University of Michigan; ³GE Global Research

9:00 AM Invited

High Temperature Behavior of Additively Manufactured Inconel 625 Linked to Microstructure through In Situ Neutron Diffraction Experiments: Allison Beese¹; *Zhuqing Wang*²; Alexandru Stoica³; Dong Ma³; ¹Pennsylvania State University; ²Kennametal; ³Oak Ridge National Laboratory

9:30 AM

Effect of High Initial Dislocation Density Microstructure on the Strain Hardening and Anisotropy of Additively Manufactured 316L Stainless Steel: Jishnu Bhattacharyya¹; Fulin Wang¹; Md Shamsujjoha¹; James Fitz-Gerald¹; *Sean Agnew*¹; ¹University of Virginia

9:50 AM

Relations between Microstructure and Oxidation Resistance of an Additively Manufactured Nickel-based Superalloy: Zhenyu Liu¹; Satia Soltanattar¹; Brian Gleeson¹; *Guofeng Wang*¹; ¹University of Pittsburgh

10:10 AM Break

10:30 AM Invited

In-situ Characterization of Solidification: Insights for Understanding Additive Manufacturing: *Amy Clarke*¹; Joseph McKeown²; John Roehling²; Damien Turret³; Seth Imhoff⁴; John Gibbs⁴; Paul Gibbs⁴; Kamel Fezzaa⁵; Tao Sun⁵; Michelle Espy⁴; James Hunter⁴; Alain Karma⁶; ¹Colorado School of Mines; ²Lawrence Livermore National Laboratory; ³IMDEA Materials; ⁴Los Alamos National Laboratory; ⁵Argonne National Laboratory; ⁶Northeastern University

11:00 AM

In-situ Dual Beam Kr Irradiation and He Implantation in Additive Manufactured 316L SS: *Jing Hu*¹; Shilei Li²; Weiyang Chen¹; Pete Baldo¹; Mark Kirk¹; Meimei Li¹; ¹Argonne National Laboratory; ²University of Science and Technology Beijing

11:20 AM

Influence of Fine Solidification Microstructure on the Radiation Response of 316 Stainless Steels Produced by Laser Powder Bed Fusion and Directed Energy Deposition: *Gabriel Meric de Bellefon*¹; Kaila Bertsch¹; Dan Thoma¹; ¹University of Wisconsin Madison

11:40 AM

Microstructural Characterization of a Stainless Steel Component Manufactured via Additive Manufacturing: *Emmanuel Perez*¹; Jhonathan Rosales-Franco¹; Isabella Van Rooyen¹; George Griffith¹;

John Ralls²; Daniel Hebert²; ¹Idaho National Laboratory; ²Newport News Shipbuilding, A Division of Huntington Ingalls Industries

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Fatigue and Fracture III — Session I

Sponsored by: TMS: Additive Manufacturing Committee

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

Tuesday AM | March 12, 2019
221B | Henry B. Gonzalez Convention Center

Session Chair: Nima Shamsaei, Auburn University

8:30 AM Invited

A Summary of NASA's Efforts for the Development of Additive Manufacturing Metallic Materials: *Richard Russell*¹; Eric Burke¹; Robert Carter¹; Edward Glaessgen¹; Bryan Mcenerney²; Karen Taminger¹; Douglas Wells¹; ¹NASA; ²Jet Propulsion Laboratory

9:00 AM

Tensile, Creep and LCF Behavior of SLM Fabricated Inconel 718 in As-fabricated and HIPed Conditions: Sasidharan Periane¹; Arnaud Duchosal¹; Sébastien Vaudreuil²; Hicham Chibane³; *Jonathan Cormier*⁴; Rene Leroy¹; ¹Gabriel Lamé Laboratory, Université de Tours; ²Euro-Mediterranean University; ³INSA, Strasbourg; ⁴Institut P' - Département de Physique et Mécanique des Matériaux UPR CNRS 3346 ISAE-ENSMA

9:20 AM

Effect of Internal Hydrogen on the Mechanical Behavior of Additively Manufactured Stainless Steels: *Thale Smith*¹; Joshua Sugar¹; Christine Smudde²; Dorian Balch¹; Chris San Marchi¹; ¹Sandia National Laboratories; ²University of California, Davis

9:40 AM

Evolution of Defect Characteristics During In Situ Tensile Loading of a Laser Powder Bed Fusion Processed 316L Stainless Steel Alloy: A Synchrotron X-ray Tomography Study: *Hahn Choo*¹; Kin-Ling Sham¹; Xianghui Xiao²; Derek Morin³; Elena Garlea³; ¹University of Tennessee; ²Argonne National Laboratory; ³Y-12 National

Security Complex

10:00 AM Break

10:20 AM Invited

Fatigue Assessment of Additively Manufactured Materials by Means of the Local Strain Energy: *Filippo Berto*¹; ¹Norwegian University of Science and Technology

10:50 AM

A Microstructural Investigation on the Crack Initiation Behavior of an Additively Manufactured Austenitic Stainless Steel: *Jonathan Pegues*¹; Michael Roach²; Nima Shamsaei¹; ¹Auburn University; ²University of Mississippi Medical Center

11:10 AM

Multiaxial Fatigue Analysis of Additively Manufactured 17-4 PH Stainless Steel Notched Specimens: Filippo Berto¹; Ali Fatemi²; Nima Shamsaei³; *Seyed Mohammad Javad Razavi*¹; ¹Norwegian University of Science and Technology; ²University of Memphis; ³Auburn University

11:30 AM

About a Digital Twin for the Fatigue Approach of Additively Manufactured Components: *Rainer Wagener*¹; Matilde Scurria²; Benjamin Möller¹; Tobias Melz¹; ¹Fraunhofer Institute for Structural Durability and System Reliability LBF; ²Technische Universität Darmstadt

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Microstructural Evolution and Phase Transformations — Ni-based Systems I

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

Program Organizers: Bij-Na Kim, LPW Carpenter Additive; Eric Lass, National Institute of Standards and Technology; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Ryan Dehoff, Oak Ridge National Laboratory; Gerhard Fuchs, University of Florida; Chantal Sudbrack, QuesTek Innovations LLC

Tuesday AM | March 12, 2019

221C | Henry B. Gonzalez Convention Center

Session Chairs: Eric Lass, National Institute of Standards and Technology; Emma White, Iowa State University / Ames Laboratory

8:30 AM Invited

GE Additive – Exploring the Processing-microstructure Connection for Nickel-based Materials: *Deborah Whitis*¹; Theodore Anderson¹; Andrew Wessman¹; Laura Dial¹; ¹General Electric Company

9:00 AM

Microstructural Evolution in Nickel Alloy 718 Produced by Laser-powder Bed Fusion Additive Manufacturing: *Hyeyun Song*¹; Alber Sadek¹; Paul Boulware¹; Heimdall Mendoza¹; Rodrigo Enriquez¹; ¹EWI

9:20 AM

The Role of Homogenization in the Post-processing of Inconel 718 Made by Casting and Additive Manufacturing: Yunhao Zhao¹; Jian Liu¹; Albert To¹; *Wei Xiong*¹; ¹University of Pittsburgh

9:40 AM

Microstructural Stability of Haynes 282 Fabricated by Electron Beam and Selective Laser Melting: *Sebastien Dryepondt*¹; Mike Kirka¹; Kinga Unocic¹; ¹Oak Ridge National Laboratory

10:00 AM Break

10:20 AM Invited

Prismatic Geometries to Components: Challenges in Maintaining Properties and Microstructure in High Gamma Prime Ni-base Superalloys Fabricated by AM: *Michael Kirka*¹; Sebastien Dryepondt¹; Yousub Lee¹; Peeyush Nandwana¹; Andres Marques Rossy¹; Charles Hawkins¹; Charles Joslin¹; Obed Acevedo¹; ¹Oak Ridge National Laboratory

10:50 AM

Investigation of Post-processing Heat Treatment on the Mechanical and Microstructural Properties of Nickel-based Superalloy Inconel 718 Manufactured by Laser Powder-bed Fusion: *Thomas Gallmeyer*¹; Aaron Stebner¹; Behnam Aminahmadi¹; ¹Colorado School of Mines

11:10 AM

Quantification of Local and Global Residual Stresses in Additively Manufactured Inconel Alloys using Electron Microscopy Techniques: *Kathryn Small*¹; Zach Clayburn²; David Fullwood²; Mitra Taheri¹; ¹Drexel University; ²Brigham Young University

11:30 AM

Effect on Microstructure and Tensile Properties of LPBF IN718 Annealed at 1160 °C: *David Newell*¹; Ryan O'Hara¹; Greg Cobb¹; Ben Doane¹; ¹Air Force Institute of Technology/ENY

11:50 AM

The Microtexture and Tensile Properties of Continuous-wave and Quasi-continuous-wave Laser Powder Deposited Inconel 718: *Zhaoyang Liu*¹; Qiang Zhu¹; Lijun Song²; ¹Southern University of Science and Technology; ²Hunan University

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session III

Sponsored by: TMS: Shaping and Forming Committee

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

Tuesday AM | March 12, 2019

302A | Henry B. Gonzalez Convention Center

Session Chairs: Christoph Kirchlechner, Max-Planck-Institut; Daniel Caillard, Centre Natl De La Research Science

8:30 AM Invited

Kinetics of Dislocations, Solid Solution Hardening and Dynamic Strain Ageing in Fe and Fe Alloys: *Daniel Caillard*¹; ¹Centre Natl De La Research Science

9:00 AM

In Situ Characterization of Dislocation Motion during Hydrogen Diffusion in Steels: *Jinwoo Kim*¹; Haoxue Yan¹; Cemal Cem Tasan¹; ¹Massachusetts Institute of Technology

9:20 AM

Understanding the Alpha-omega Phase Transformation in Titanium and Zirconium using Spherical Nanoindentation and EBSD: *Cayla Harvey*¹; Jordan Weaver²; Ben Morrow³; M. Arul Kumar³; Irene Beyerlein⁴; Siddhartha Pathak⁵; ¹University of Nevada, Reno ; ²National Institute of Standards and Technology; ³Los Alamos

National Laboratory; ⁴University of California, Santa Barbara;
⁵University of Nevada, Reno

9:40 AM

Dislocation-type Evolution in Quasi-statically Compressed Polycrystalline Metals: *Chaoyi Zhu*¹; Tyler Harrington¹; Olivia Dippo¹; George Gray III²; Kenneth Vecchio¹; ¹University of California San Diego; ²Los Alamos National Laboratory

10:00 AM Break

10:20 AM Invited

Dislocation Slip Transmission through a Coherent $\Sigma 3\{111\}$ Copper Twin Boundary: Strain Rate Sensitivity, Activation Volume and Strength Distribution Function: *Nataliya Malyar*¹; *Blazej Grabowski*¹; *Gerhard Dehm*¹; *Christoph Kirchlechner*¹; ¹Max-Planck-Institut

10:50 AM

Characterization of Dislocation Evolution using Electron Channeling Contrast Imaging and its Effect on Superconducting Properties of Nb: *Mingmin Wang*¹; *Shreyas Balachandran*²; *Santosh Chetri*²; *Anatolii Polyanskii*²; *Peter Lee*²; *Chris Compton*³; *Thomas Bieler*¹; ¹Michigan State University; ²National High Magnetic Field Laboratory; ³Facility for Rare Isotope Beams

11:10 AM

In Situ Analysis of Dislocation/Grain Boundary Interactions in Mg Alloys: *Mohsen Taheri Andani*¹; *John Allison*¹; *Amit Misra*¹; ¹University of Michigan

11:30 AM

In Situ EBSD Study on the Influence of Constituent Particles on Dislocation Accumulation during Deformation of AA6451: *Yung Suk Jeremy Yoo*¹; *Sazol Das*²; *Richard Hamerton*²; *Josh Kacher*¹; ¹Georgia Institute of Technology; ²Novelis Inc.

11:50 AM

Nanoindentation for Identification of Phase Change in Nanoprecipitates: *Rebecca Wang*¹; *Jaclyn Cann*²; *Cem Tasan*²; ¹University of Oxford, Massachusetts Institute of Technology; ²Massachusetts Institute of Technology

ADVANCED MATERIALS

Advanced High-Strength Steels III — Microstructure, Processing, and Properties of Advanced High-Strength Steels I

Sponsored by: TMS: Steels Committee

Program Organizers: Amy Clarke, Colorado School of Mines; MingXin Huang, University of Hong Kong; C. Tasan, Massachusetts Institute of Technology; Kester Clarke, Colorado School of Mines; Ana Luiza Araujo, AK Steel Research & Innovation

Tuesday AM | March 12, 2019
205 | Henry B. Gonzalez Convention Center

Session Chairs: Xuejun Jin, Shanghai Jiao Tong University; Benjamin Ellyson, Colorado School of Mines

8:30 AM

Are Deformation Twins Important for Twinning-Induced Plasticity Steels?: *MingXin Huang*¹; ¹University of Hong Kong

8:50 AM

Orientation-dependent Deformation Mechanisms and Twin Boundary-associated Strengthening in Fe-Mn-C TWIP Steel Micro-Pillar: *WonSeok Choi*¹; Stefanie Sandlöbes²; Nataliya Malyar³; Christoph Kirchlechner³; Sandra Korte-Kerzel²; Gerhard Dehm³; Bruno De Cooman⁴; Dierk Raabe³; ¹Korea Advanced Institute of Science and Technology; ²RWTH Aachen University; ³Max-Planck-Institut für Eisenforschung GmbH; ⁴NLMK

9:10 AM

Effects of Strain Rates on the Mechanical Properties and Microstructure in Precipitation Hardening Twinning Induced Plasticity (TWIP) Steel: *Zhenli Mi*¹; Yonggang Yang¹; Zhen Wang¹; Dayuan Zhou¹; Huijian Li¹; ¹University of Science and Technology Beijing

9:30 AM

Kinetics of Deformation Processes in High-alloy Cast TRIP/TWIP Steels Determined by Acoustic Emission and Scanning Electron Microscopy: *Anja Weidner*¹; Robert Lehnert¹; Mikhail Linderov²; Alexei Vinogradov³; Horst Biermann¹; ¹TU Bergakademie Freiberg; ²Togliatti State University; ³Norwegian University of Science and Technology

9:50 AM Break

10:10 AM

Phase Transformation and Deformation Behavior in a TRIP Sheet Steel under Annealing and Tension by Real-time In Situ Neutron Diffraction: Dunji Yu¹; Yan Chen¹; Lu Huang²; *Ke An*¹; ¹Oak Ridge National Laboratory; ²United States Steel Corporation

10:30 AM

An In Situ Neutron Diffraction Study of Stress Partitioning and Dislocation Strengthening Behavior in TRIP-assisted Bainitic Steels: *Shihui He*¹; Mingxin Huang¹; Kangying Zhu¹; ¹The University of Hong Kong

10:50 AM

Tensile Deformation Behavior of 1 GPa-grade TRIP-aided Multi-microstructure Steels Studied by In Situ Neutron Diffraction: *Noriyuki Tsuchida*¹; Takaaki Tanaka²; Yuki Toji²; ¹University of Hyogo; ²JFE steel

11:10 AM

Dual Effects of Retained Austenite for Third Generation Advanced High Strength Steels: *Xuejun Jin*¹; Lianbo Luo¹; Wei Li¹; Yu Gong¹; Qi Lu²; Jeff Wang²; Charles Mathew Enloe³; Jason Coryell³; ¹Shanghai Jiao Tong University; ²China Science Lab of Global Research and Development, General Motors; ³Body and Closure Materials Engineering of Global Product Integrity, General Motors

11:30 AM

Deformation Behaviors in Multi-phase Steel Composed of Ferrite, Martensite and Retained Austenite: *Avala Lavakumar*¹; Myeongheom Park²; Nobuhiro Tsuji¹; ¹Department of Materials Science and Engineering, Kyoto University; ²Elements Strategy Initiative for Structural Materials (ESISM), Kyoto University

ENERGY & ENVIRONMENT

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

Sponsored by: Federation of European Materials Societies (FEMS), TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Frank Johnson, Niron Magnetics, Inc.; Paul Ohodnicki, National Energy Technology Laboratory; Alex Leary, Nasa Grc; Orlando Rios, Oak Ridge National Laboratory; Alessandra Hool, ESM Foundation

Tuesday AM | March 12, 2019

225B | Henry B. Gonzalez Convention Center

Session Chair: Paul Ohodnicki, National Energy Technology Laboratory

8:30 AM Invited

High Power-density Rotational Machine Design with Metal Amorphous Nanocomposite (MANC) Soft Magnetic Material (SMM)s and for Rare Earth Free Permanent Magnets: *Satoru Simizu*¹; Paul Ohodnicki²; Michael McHenry¹; ¹Carnegie Mellon University; ²National Energy Technology Laboratory

9:00 AM Invited

Nanocrystalline Materials for High Frequency Applications: Optimization of Inductors: *Christian Polak*¹; ¹Vacuumschmelze Gmbh & Co. Kg

9:30 AM

A Hybrid Multi-pole Fe₇₈Si₁₃B₉+FeSi₃ Soft Magnetic Core for Application in the Stators of Low-power PMSM Motors: *Przemyslaw Zackiewicz*¹; Roman Kolano¹; Aleksandra Kolano-Burian¹; Marek Hreczka¹; ¹Institute of Non-Ferrous Metals

9:50 AM

Tunable Transformer Leakage Inductance Using Strain Annealed Metal Amorphous Nanocomposite Cores: *Richard Beddingfield*¹; Paul Ohodnicki²; Kevin Byerly³; Subhashish Bhattacharya⁴; ¹North Carolina State University/National Energy Technology Laboratory; ²National Energy Technology Laboratory; ³AECOM, Contractor to the DOE / National Energy Technology Laboratory; ⁴North Carolina State University

10:10 AM Break

10:30 AM Invited

Commercial-scale Strain Annealing Efforts for Amorphous and Nanocrystalline Ribbon: *Eric Theisen*¹; ¹Metglas Inc

11:00 AM

Nanocomposite and Ferrite / Nanocomposite Hybrid Transformer Designs to Enable Medium Frequency Solid State Transformers and Grid-Tied Converters: *Paul Ohodnicki*¹; Kevin Byerly¹; Richard Beddingfield¹; Alex Leary²; Michael McHenry³; Ritwik Chattopadhyay⁴; Subhashish Bhattacharya⁴; Mark Judd⁵; ¹National Energy Technology Laboratory; ²NASA Glenn Research Center; ³Carnegie Mellon University; ⁴North Carolina State University; ⁵Eaton Corporation

11:20 AM

Permeability Engineering of Metal Amorphous Nanocomposite (MANC) Cores Through Strain Anneal Manufacturing: *Kevin Byerly*¹; Paul Ohodnicki¹; Seung-Ryul Moon¹; Alex Leary²; Vladimir Keylin²; Michael McHenry³; Satoru Simizu³; Byron Beddingfield⁴; Subhashish Bhattacharya⁴; ¹National Energy Technology Laboratory; ²NASA

GRC; ³Carnegie Mellon University; ⁴North Carolina State University

11:40 AM Invited

Tailoring of Magnetic Softness and Domain Wall Dynamics of Fe-rich Microwires by Stress Annealing.: *Arcady Zhukov*¹; Paula Corte-Leon¹; Mihail Ipatov¹; Lorena Gonzalez-Legarreta¹; Juan Blanco¹; Valentina Zhukova¹; ¹University Basque Country

ELECTRONIC MATERIALS

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

Sponsored by: TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Kazuhiro Nogita, University of Queensland; Tae-Kyu Lee, Portland State University; Yan Li, Intel Corporation; Christopher Gourlay, Imperial College London; Zhi-Quan Liu, Chinese Academy of Sciences; Rahul Panat, Carnegie Mellon University; Albert T. Wu, National Central University; Andre Delhaise, Celestica; Mohd Arif Salleh, Universiti Malaysia Perlis

Tuesday AM | March 12, 2019

216A | Henry B. Gonzalez Convention Center

Session Chairs: Mohd Mohd Arif Salleh, Universiti Malaysia Perlis; Christopher Gourlay, Imperial College London

8:30 AM Invited

Role of Bi, Sb and In in Microstructure Formation and Properties of Sn-Cu-Ni and Sn-Ag-Cu BGA Solder Joints: *Sergey Belyakov*¹; Tetsuro Nishimura²; Keith Sweatman²; Tetsuya Akaiwa²; Christopher Gourlay¹; ¹Imperial College London; ²Nihon Superior Co., Ltd.

9:00 AM

Effect of Ag on Mechanical Properties of Sn-Ag-Cu Micro-BGA Joints: *Hao Chen*¹; Tzu-Ting Chou¹; Collin Fleshman¹; Rui-Wen Song¹; Jenq-Gong Duh¹; ¹National Tsing Hua University

9:20 AM

Influence of Low Ga and P Additions on the Microstructure and Mechanical Properties of Sn-0.7Cu: *Sufian Nazri*¹; M. A. A. Mohd Salleh¹; H. Yasuda²; K. Nogita³; ¹Universiti Malaysia Perlis (UniMAP); ²Kyoto University; ³University of Queensland (UQ)

9:40 AM

Effect of Sn Nanoparticles on SAC Solder Paste Preparation and IMC Growth on Cu Substrate: *Evan Wernicki*¹; Zhiyong Gu¹; ¹University of Massachusetts Lowell

10:00 AM Break

10:20 AM

Study of the Solid-state Diffusion of Bi in Sn – The Effects of Temperature, High Diffusivity Pathways, and Bi Concentration: *Andre Delhaise*¹; Zhangqi Chen²; Doug Perovic¹; ¹University of Toronto; ²Ohio State University

10:40 AM

The Variation of Grain Structure and the Enhancement of Shear Strength in SAC305-0.1Ni/Cu and SAC1205-0.1Ni/Cu Solder Joint Before and After Aging: *Collin Fleshman*¹; Jenq-Gong Duh¹; ¹National Tsing Hua University

11:00 AM

Impression Creep of Sn-0.7Cu, Sn-3.8Ag, and Sn-3.8Ag-0.7Cu Lead-Free Solders: *Seyed Alireza Torbati Sarraf*¹; Reza Mahmudi²; Abdol Reza Gernmayeh³; ¹University of Southern California; ²University of Tehran; ³Islamic Azad University

11:20 AM

Effects of Sb Additions on the Mechanical Behavior of SAC-Bi Solder Alloys: *Mehran Maalekian*¹; Mert Çelikin²; ¹Mat-tech; ²University College Dublin

CHARACTERIZATION

Advanced Real Time Imaging – Thermodynamic and Mechanical Properties

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, US Department of Energy - National Energy Technology Laboratory; P. Chris Pistorius, Carnegie Mellon University; Candan Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zuotai Zhang, Southern University of Science and Technology; Neslihan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Saito, Kyushu University; Yongsug Chung, Korea Polytechnic University; Bryan Webler, Carnegie Mellon University

Tuesday AM | March 12, 2019

302B | Henry B. Gonzalez Convention Center

Session Chair: Zuotai Zhang, Southern University of Science And Technology

8:30 AM Invited

Surface Tension of High Temperature Liquids Evaluation with a Thermal Imaging Furnace: Andrew Caldwell¹; Mindy Wu¹; *Antoine Allanore*¹; ¹Massachusetts Institute of Technology

9:00 AM Invited

Real-time Deformation Mechanisms of Advanced Nanocomposites by High-Resolution In-situ Testing: *Arvind Agarwal*¹; Pranjal Nautiyal¹; ¹Florida International University

9:30 AM

Characterization of Localized Plastic Deformation Behaviors Associated with Dynamic Strain Aging In Pipeline Steels Using Digital Image Correlation: *Taylor Jacobs*¹; David Matlock²; Kip Findley²; ¹Los Alamos National Laboratory; ²Colorado School of Mines

9:50 AM

New Laue Micro-diffraction Setup for Real Time In Situ Microstructural Characterization of Materials under External Stress: *Dmitry Popov*¹; Stas Sinogeikin²; Changyong Park¹; Eric Rod¹; Jesse Smith¹; Rich Ferry¹; Curtis Kenney-Benson¹; Nenad Velisavljevic³; Guoyin Shen¹; ¹HPCAT; ²DAC Tools LLC; ³Los Alamos National Laboratory

10:10 AM Break

10:30 AM

Young Leaders International Scholar – JIM: An Approach for Solubility Measurement of SiC in Molten Silicon and Its Alloy by Real-time Interference Observation: *Sakiko Kawanishi*¹; Takeshi Yoshikawa²; Didier Chaussende³; Hiroyuki Shibata¹; ¹Tohoku University; ²The University of Tokyo; ³SIMaP

11:00 AM

In Situ Confocal Microscopy of P91 Steel under Short-term Creep in a High-temperature CO2 Environment: *Kyle Rozman*¹; Harrison Nealley¹; Jinichiro Nakano¹; Omer Dogan¹; Jeffrey Hawk¹; ¹National Energy Technology Laboratory

MATERIALS PROCESSING

Advances in Surface Engineering — Session III

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Rajeev Gupta, The University of Akron; Sandip Harimkar, Oklahoma State University; Arif Mubarok, PPG Industries; Deepak Kumar, Baker Hughes, A GE Company; Tushar Borkar, Cleveland State University; Dong Lin, Kansas State University

Tuesday AM | March 12, 2019

210A | Henry B. Gonzalez Convention Center

Session Chairs: Tushar Borkar, Cleveland State University; Dong Lin, Kansas State University

8:30 AM

Effect of Zr Content on Structure Property Relations of Ni-Zr Alloy Thin Films Processed by dc Magnetron Co-sputtering: *Bibhu Sahu*¹; Rahul Mitra¹; ¹Indian Institute of Technology, Kharagpur

8:50 AM

Effects of Process Parameters on the Zirconia Coating Prepared by Sol-gel and Electrodeposition Process: *Jian Dong*¹; Yanhui Sun¹; Bingsheng Dou¹; Feiyu He¹; Hongtao Huang²; Jianping Zhen²; ¹University of Science and Technology Beijing; ²China Institute of Atomic Energy

9:10 AM

Optimization of Slurry Aluminized 31V Alloy Coatings: *Beth Armstrong*¹; Sebastien Dryepondt¹; ¹Oak Ridge National Laboratory

9:30 AM

The Study of Slurry Erosion Wear Behavior of Coal Bottom Ash Slurry Handling Pipeline: *Satish More*¹; Sudeep Ingole²; Dhananjay Bhatt¹; Jyoti Menghani¹; ¹S V National Institute of Technology; ²Always Avant

9:50 AM Break

10:10 AM

Wear Characterization of Cemented Carbide Multipoint Cutting Tool Machining AISI 4140 at High Cutting Speed: Criteria for Materials Selection: Federico Gobber¹; Elisa Fracchia¹; *Mario Rosso*¹; ¹Politecnico Di Torino

10:30 AM

Pulsed Potentiostatic Deposition of Cu-Zn Alloy Coatings from Novel Glycerol-NaOH Based Electrolyte for Wear Resistance and Anti-corrosive Properties: *Sourav Das*¹; Sambedan Jena¹; Swastika Banthia¹; Arijit Mitra¹; Siddhartha Das¹; Karabi Das¹; ¹Indian Institute

of Technology, Kharagpur

10:50 AM

Study of the Effects of Bi-Nano Additives on the Mechanical Properties of Aisi 5130 Mild Steel during Machining: *Adeniran Afolalu*¹; ¹Covenant University

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering – Computational, Experimental, and Machine Learning Algorithms in Study and Design of Materials I

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Prasanna Balachandran, University of Virginia; Douglas Spearot, University of Florida; Charudatta Phatak, Argonne National Laboratory; Srinivasan Srivilliputhur, University of North Texas

Tuesday AM | March 12, 2019

304A | Henry B. Gonzalez Convention Center

Session Chairs: Garritt Tucker, Colorado School of Mines; Charudatta Phatak, Argonne National Laboratory

8:30 AM Invited

Gluing Together Multiscale Computational and Experimental Information Sources with Machine Learning: *Maxwell Hutchinson*¹; ¹Citrine Informatics

9:00 AM Invited

Data-driven Framework for Statistical Quantification of the Material Internal Structure: *Apaar Shankar*¹; *Surya Kalidindi*¹; ¹Georgia Institute of Technology

9:30 AM

Machine Learning of Phase-field Simulated Domain Structures of Ferroelectrics: *Samrat Choudhury*¹; *Isaac Curtis*¹; *Vishnu Boddeti*²; ¹University of Idaho; ²Michigan State University

9:50 AM

Formulation and Calculation of Rotationally Invariant Spatial Correlations for Microstructure Datasets: *Yuksel Yabansu*¹; *Ahmet*

Cecen¹; Surya Kalidindi¹; ¹Georgia Institute Of Technology

10:10 AM Break

10:30 AM Invited

Electron Microscopy Image Simulations for Phase Field and Discrete Dislocation Dynamics Defect Models: *Marc De Graef*¹;
¹Carnegie Mellon University

11:00 AM

A Generalized Statistical Microstructure Generation Framework:
*Ahmet Cecen*¹; Surya Kalidindi²; ¹ExxonMobil Chemicals Company;
²Georgia Institute of Technology

11:20 AM

Accurate Reconstruction of Large EBSD Datasets by Multi-modal Data Approach and an Evolutionary Algorithm: *Marie-Agathe Charpagne*¹; Florian Strub²; Tresa Pollock¹; ¹University of California Santa Barbara; ²Université de Lille, CNRS, Centrale Lille, Inria

11:40 AM

3D Microstructure Reconstruction Using Markov Random Fields: Validation of Microstructural Features: *Iman Javaheri*¹; Siddhartha Srivastava¹; Veera Sundararaghavan¹; ¹University of Michigan

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications VII — Session III

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Ensicaen University of Caen; Soon-Jik Hong, Kongju National University; Philippe Jund, Montpellier University; Lan Li, Boise State University; Takao Mori, Nims; Hsin-Jay Wu, National Sun Yat-sen University; Tiejun Zhu, Zhejiang University

Tuesday AM | March 12, 2019

216B | Henry B. Gonzalez Convention Center

Session Chairs: Hsin-jay Wu, National Sun Yat-Sen University; Albert T. Wu, National Central University

8:30 AM Invited

Development of Electroless Cobalt Diffusion Barrier for Medium-temperature Thermoelectric Module: *Albert T. Wu*¹; Hsien-Chien

Hsieh¹; Chun-Hsien Wang¹; ¹National Central University

8:50 AM Invited

The Role of Structure and Bonding on the Thermal Properties of Materials: *George Nolas*¹; ¹University of South Florida

9:10 AM Invited

Structure and Bonding in Phosphide Clathrate Thermoelectrics: *Kirill Kovnir*¹; ¹Iowa State University

9:30 AM

Interfacial Stability of Co-P Diffusion Barrier for Bi₂Te₃ Thermoelectric Module: *Chun Hsien Wang*¹; Hsien Chien Hsieh¹; Albert T. Wu¹; ¹National Central University

9:50 AM

Interfacial Reactions in Sn/Ag₂Se Couples: *Anbalagan Ramakrishnan*¹; Zi-yang Huang¹; Sinn-wen Chen¹; ¹Department of Chemical Engineering, National Tsing Hua University

10:10 AM Break

10:30 AM Invited

Unexpected Liquation Phenomena at Joints: *Sinn-wen Chen*¹; ¹Department of Chemical Engineering, National Tsing Hua University

10:50 AM Invited

Alloying Effect and Defect Control for Boosting the Thermoelectric Performance of Mg-based Compounds: *Weishu Liu*¹; ¹Southern University of Science and Technology

11:10 AM

Phase Diagrams of Thermoelectric Pb-Se-Sn-Te Quaternary System: *Tse-yang Huang*¹; Sinn-wen Chen¹; ¹Department of Chemical Engineering, National Tsing Hua University

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Microstructures and Mechanical Properties of Aluminum Alloys

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

Program Organizer: Hiromi Nagaumi, Soochow University

Tuesday AM | March 12, 2019

007A | Henry B. Gonzalez Convention Center

Session Chair: William Golumbskie, Naval Surface Warfare Center

8:30 AM Introductory Comments

8:35 AM

Advanced Characterization of the Cyclic Deformation and Damage Behavior in Al-Si-Mg Cast Alloys using Hysteresis Analysis and Alternating Current Potential Drop Method: *Jochen Tenkamp*¹; Kevin Bleicher¹; Sven Klute¹; Karin Chrzan¹; Alexander Koch¹; Frank Walther¹; ¹TU Dortmund University, Department of Materials Test Engineering (WPT)

9:00 AM

3-D Microstructural Distribution and Mechanical Analysis of HPDC Hypereutectic Al-Si Alloys via X-ray Tomography: *Jun Wang*¹; Shoumei Xiong¹; ¹Tsinghua University

9:25 AM

Conditions for Retrogression Forming Aluminum AA7075-T6 Sheet: *Katherine Rader*¹; Matthew Schick¹; Jon Carter²; Louis Hector²; Eric Taleff¹; ¹University of Texas Austin; ²General Motors

9:50 AM

Influence of Silicon Phase Particles on the Thermal Conductivity of Al-Si Alloys: *Wenping Weng*¹; Hiromi Nagaumi¹; Xiaodong Shen¹; Weizhong Fan¹; Xiaocun Chen¹; Xiaonan Wang¹; ¹Soochow University

10:15 AM Break

10:30 AM

Influence of Microstructure Development on Mechanical Properties of AlSi7MgCu Alloy: *Zdenka Zovko Brodarac*¹; Davor Stanic²; Letian Li³; ¹University of Zagreb Faculty of Metallurgy; ²CIMOS-P.P.C. Buzet/Croatia Polytechnic Pula - College of Applied Sciences; ³FEI Netherlands

10:55 AM

Fabrication and Characterization of Open Cell Aluminum Foams by Polymer Replication Method: *Ceren Yagsi*¹; Ozgul Keles²; ¹Ayazaga Campus; ²Istanbul Technical University

11:20 AM

The Effects of Solidification Cooling Rates on the Mechanical Properties of an Aluminum Inline-6 Engine Block: *Joshua Stroh*¹; Austin Piche¹; Dimitry Sediako¹; Anthony Lombardi²; Glenn Byczynski²; ¹UBC Okanagan; ²Nemak

LIGHT METALS

Aluminum Reduction Technology — Cell Design and Modelling

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

Program Organizer: Marc Dupuis, GeniSim Inc

Tuesday AM | March 12, 2019

004 | Henry B. Gonzalez Convention Center

Session Chair: Kristian Etienne Einarsrud, Norwegian University of Science and Technology (NTNU)

8:30 AM Introductory Comments

8:35 AM

A Transient Model of the Anodic Current Distribution in an Aluminum Electrolysis Cell: *Sébastien Guérard*¹; *Patrice Côté*¹; ¹Rio Tinto

9:00 AM

A Numerical Study of Gas Production and Bubble Dynamics in a Hall-Héroult Reduction Cell: *Alessandro Cubeddu*¹; *Varchavsi Nandana*¹; *Hendrik Gesell*¹; *Roman Gutt*¹; *Roman Düssel*²; *Uwe Janoske*¹; ¹Bergische Universität Wuppertal; ²TRIMET Aluminium SE

9:25 AM

Thermoelectrical Design of Startup Fuses for Aluminum Reduction Cells: *Andre Felipe Schneider*¹; *Donald Ziegler*²; *Timothée Turcotte*¹; *Daniel Richard*¹; *Pascal Lavoie*¹; *Ryan Soncini*²; *Jayson Tessier*³; ¹Hatch; ²Alcoa Technical Center; ³Alcoa

9:50 AM

Modelling Study of Exhaust Rate Impact on Heat Loss from Aluminium Reduction Cells: *Alexander Arkhipov*¹; *Ievgen Necheporenko*¹; *Alexander Mukhanov*¹; *Nadia Ahli*¹; *Khawla AlMarzooqi*¹; ¹Emirates Global Aluminium

10:15 AM Break

10:30 AM

Finite Element Analysis of a Cylindrical Cathode Collector Bars Design: *Olivier Lacroix*¹; *Richard Beeler*²; *Hicham Chaouki*¹; *Louis Gosselin*¹; *Mario Fafard*¹; ¹Université Laval; ²Alcoa Technical Center

10:55 AM

CFD Modeling of Alumina Diffusion and Distribution in Aluminum Smelting Cells: *Xiaozhen Liu*¹; Youjian Yang¹; Zhaowen Wang¹; Wenju Tao¹; Tuofu Li¹; Zhibin Zhao²; ¹Northeastern University; ²Shenyang Aluminum & Magnesium Engineering and Research Institute Co. Ltd.

11:20 AM

Study on Side Ledge Behavior under Current Fluctuations Based on Coupled Thermo-electric Model: Hongliang Zhang¹; *Qiyu Wang*¹; Jie Li¹; Hui Guo¹; Jingkun Wang¹; Tianshuang Li¹; ¹Central South University

11:45 AM Concluding Comments

CHARACTERIZATION

Atom Probe Tomography for Advanced Characterization of Metals, Minerals and Materials II — Steels and Ni Alloys

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

Program Organizers: Haiming Wen, Missouri University of Science and Technology; David Seidman, Northwestern University; Keith Knipling, Naval Research Laboratory; Gregory Thompson, The University of Alabama; Simon Ringer, University of Sydney; Arun Devaraj, Pacific Northwest National Laboratory; Gang Sha, Nanjing University of Science and Technology

Tuesday AM | March 12, 2019

303A | Henry B. Gonzalez Convention Center

Session Chairs: Gregory Thompson, University of Alabama; Keith Knipling, Naval Research Laboratory

8:30 AM Invited

Application of Atom Probe Tomography to Fundamental Issues of Steel Materials: *Jun Takahashi*¹; Kazuto Kawakami²; Yukiko Kobayashi¹; Kyohhei Ishikawa¹; Masaaki Fujioka¹; Naoyoshi Kubota²; ¹Nippon Steel & Sumitomo Metal Corporation; ²Nippon Steel & Sumikin Technology Corporation

9:05 AM

Atom Probe Analysis of Carbon and Nitrogen Redistribution during Heating of Soft Martensitic Stainless Steel: *Frederic Danoix*¹; Frank Niessen²; Matteo Villa²; Daniel Apel³; John Hald²; Marcel Somers²; ¹Cnrs - Universite De Normandie Rouen; ²Technical University of Denmark (DTU); ³Helmholtz-Zentrum für Materialien und Energie (HZB)

9:25 AM

Atom Probe Characterization of Nb-rich Nano-scale Precipitates in a High Strength Low Alloy Steel: *Kelvin Xie*¹; Andrew Breen²; Julie Cairney³; Simon Ringer³; ¹Texas A&M University; ²Max-Planck-Institut für Eisenforschung; ³University of Sydney

9:45 AM

Distribution of Alloying Elements in Weathering Steels Induced by Oxide Layer Formation: *Yidong Zhang*¹; Shen Bao Jin¹; Xiaohong Guo²; Gang Sha¹; ¹Nanjing University Science and Technology; ²Angang Steel Company Limited

10:05 AM Break

10:25 AM

Atom Probe Investigation of Gamma Alpha Transformation Interfaces in a Model Fe-Mn-C Alloy: *Olha Nakonechna*¹; Mohamed Gouné²; Helena Zapolsky¹; Didier Huin³; Frederic Danoix⁴; ¹UNIROUEN; ²CNRS ICMCB; ³ArcelorMittal; ⁴Cnrs - Universite De Normandie Rouen

10:45 AM Invited

Atom Probe Tomography Study of Trace Element Behavior and Secondary Phase Formation at Grain Boundaries of High Refractory Content Ni-based Superalloys: *Stoichko Antonov*¹; Wei Chen²; Dieter Isheim³; David Seidman⁴; Qiang Feng¹; Eugene Sun⁴; Sammy Tin²; ¹University of Science and Technology Beijing; ²Illinois Institute of Technology; ³Northwestern University; ⁴Rolls-Royce Corporation

11:20 AM

Thermal Evolution of Sputtered Nanostructured Mo-Au: *Joel Bahena*¹; J. Sebastian Riano¹; Mohammed Chelli²; Torben Boll²; Andrea Hodge¹; ¹University of Southern California; ²Karlsruhe Institute of Technology

BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces III

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

Program Organizers: Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Po-Yu Chen, National Tsing Hua University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines

Tuesday AM | March 12, 2019
217C | Henry B. Gonzalez Convention Center

Session Chairs: Candan Tamerler, University of Kansas; Hannes Schneipp, College of William and Mary

8:30 AM

Self-assembling Peptides: Guiding Functional Precision at the Hybrid Interfaces: *Candan Tamerler*¹; ¹University of Kansas

9:00 AM

A Portable Device for Point-of-need Production of Compartmentalised Micro/nanofibres for In Situ Drug Delivery: *CJ Luo*¹; ¹University College London

9:20 AM Invited

A Biologically Inspired Attachable, Self-standing Nanofibrous Membrane for Versatile Use in Oil-water Separation or Antifouling: *Seimei Shiratori*¹; ¹Keio University

9:50 AM

Predictive Modeling of Bionanomaterials from Picometers to Micrometers: *Hendrik Heinz*¹; ¹University of Colorado Boulder

10:20 AM Break

10:40 AM Invited

Optimum Geometries in Biological and Bio-inspired Sutured Interfaces: *Idris Malik*¹; *Mohammad Mirkhalaf*¹; *Francois Barthelat*¹; ¹McGill University

11:10 AM

Long Range Hierarchical Assembly of Pt Nanocubes – Insights from Measurements and Molecular Simulations of Nanoparticle Docking: *Shiyi Wang*¹; *Enbo Zhu*²; *Xucheng Yan*²; *Masoud Sobani*³; *Chen Wang*²; *Yuan Liu*²; *Xiangfeng Duan*²; *Hendrik Heinz*¹; *Yu Huang*²; ¹University of Colorado Boulder; ²University of California, Los Angeles; ³University of Akron

11:30 AM Invited

Spider Silk — A Hierarchical High-performance Material Based on Self-Assembly Starting at the Molecular Level: Qijue Wang¹; Hannes Schniepp¹; ¹The College of William & Mary

BIOMATERIALS

Biological Materials Science — Biomimetic and Bioinspired Materials

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

Program Organizers: Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama at Birmingham; Jing Du, Penn State University

Tuesday AM | March 12, 2019
217A | Henry B. Gonzalez Convention Center

Session Chairs: Rajendra Kasinath, DePuy Synthes, Johnson and Johnson; Steven Naleway, University of Utah

8:30 AM Invited

Segmentation and Architecture in Natural Materials: Discrete Element Models for Bioinspiration: *Francois Barthelat*¹; ¹McGill University

9:00 AM

Bioinspired Phase Transforming Architected Materials with Snap-through Instabilities: Yunlan Zhang¹; Kristiaan Hector¹; Mirian Velay¹; David Restrepo¹; Nilesh Mankame²; *Pablo Zavattieri*¹; ¹Purdue University; ²General Motors Research and Development

9:20 AM

Bioinspired Segmented Armor: Discrete Element Models, 3D Printing and Mechanical Tests: *Ali Shafei*¹; J. William Pro¹; Francois Barthelat²; ¹McGill University; ²McGill University

9:40 AM

Bioinspired Shark Teeth Serrated Edges for Penetration and Shearing: *John Wood*¹; M. Murphy²; H. Rhee²; A. McIntosh¹; M. Horstemeyer²; R. Prabhu²; ¹Mississippi State University; ²Center for Advanced Vehicular Systems

10:00 AM Break

10:20 AM

Bioinspired Microarchitected Materials by 3D Nanoparticle Printing: *M. Sadeq Saleh*¹; Chunshan Hu²; Rahul Panat¹; ¹Carnegie Mellon University; ²Washington State University

10:40 AM Invited

Bioinspired, Graphene/Metal Composites with Exceptionally High Strength and Toughness: Yunya Zhang¹; *Xiaodong Li*¹; ¹University of Virginia

11:00 AM

Bio-inspired Design of Soft-hard Integrated Materials: *Baoxing Xu*¹; ¹University of Virginia

ADVANCED MATERIALS

Bulk Metallic Glasses XVI – Alloy Development and Application

Sponsored by: TMS: Mechanical Behavior of Materials Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Gongyao Wang, Alcoa; Robert Maass, University of Illinois at Urbana-Champaign; Muhammad Rafique

Tuesday AM | March 12, 2019

206B | Henry B. Gonzalez Convention Center

Session Chairs: Peter Liaw, The University of Tennessee; William Johnson, California Institute of Technology

8:30 AM Keynote

Configurational Thermodynamics of Metallic Glasses: Can a Glass Melt?: *William Johnson*¹; Jong Na²; ¹California Institute of Technology; ²Glassimetal Technologies Inc.

9:00 AM Invited

Fe-based Bulk Metallic Glasses: Properties and Phase Formation: *Mihai Stoica*¹; Jörg Löffler¹; ¹ETH Zurich

9:20 AM Invited

3D Printing of Bulk Metallic Glasses: Is it a Rebirth or the End of BMG Research?: *Douglas Hofmann*¹; Punnathat Bordeenithikasem¹;

Scott Roberts¹; Andre Pate¹; ¹NASA JPL/Caltech

9:40 AM Invited

Metallic-glass: A Beneficial Coating for Enhancing Electrospun Polyacrylonitrile Membrane for Oil/Water Separation: Shewaye Temesgen Kassa¹; Chien-Chieh Hu¹; Jem-Kun Chen¹; *Jinn Chu*¹; ¹National Taiwan University of Science and Technology

10:00 AM Break

10:20 AM Invited

Cold Spray Deposition of an Iron-based Bulk Metallic Glass: Constance Ziemian¹; *Wendelin Wright*¹; David Cipoletti²; ¹Bucknell University; ²Bucknell University; Hydro Flask

10:40 AM Invited

Utilization of High Entropy Alloy Characteristics in Glass-forming Alloys: Jinyeon Kim¹; Hyun Seok Oh¹; Jinwoo Kim¹; Chae Woo Ryu¹; Geun Woo Lee²; Hye Jung Chang³; *Eun Soo Park*¹; ¹Seoul National University; ²Korea Research Institute of Standards and Science; ³Korea Institute of Science and Technology

11:00 AM Invited

Bulk Metallic Glass Inserts for Spacecraft Applications: *Punnathat Bordeenithikasem*¹; Robert Dillon¹; Douglas Hofmann¹; ¹NASA JPL/Caltech

11:20 AM Invited

Tailoring Phase Selection and Microstructure through Controlled Synthesis of Al-Sm Metallic Glasses: *Fanqiang Meng*¹; Yang Sun¹; Feng Zhang¹; Matthew Kramer¹; Ryan Ott¹; ¹Ames Laboratory

11:40 AM

Effective Way to Fabricate and Tailor Properties of a Laser-processed Bulk Metallic Glass: *Geunhee Yoo*¹; Tae Gyu Park¹; Jin Yeon Kim¹; Han Shin Choi²; Hwi Jun Kim²; Eun Soo Park¹; ¹Seoul National University; ²Korea Institute of Industrial Technology

LIGHT METALS

Cast Shop Technology — Casting and Cast House Products

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

Program Organizer: Pierre-Yves Menet, Constellium Technology Center

Tuesday AM | March 12, 2019

8:30 AM Introductory Comments

8:35 AM

Macrosegregation Modelling of Large Sheet Ingots Including Grain Motion, Solidification Shrinkage and Mushy Zone Deformation: *Dag Mortensen*¹; Øyvind Jensen¹; Gerd-Ulrich Gruen²; Andreas Buchholz²; ¹Institute For Energy Technology; ²Hydro Aluminium

9:00 AM

Effect of Reversing Rotational Magnetic Field on Grain Size Refinement: *Akihiro Minagawa*¹; Koichi Takahashi¹; Shin-ichi Shimasaki²; ¹UACJ Corporation; ²Kagawa College

9:25 AM

A Reduction in Hot Cracking via Microstructural Modification in DC Cast Billets: *Kathleen Bennett*¹; Elli Tindall¹; Sam Wagstaff¹; Kenzo Takahashi²; ¹Novelis Inc; ²Z-Mag

9:50 AM

Analysis of the Interplay between Thermo-solutal Convection and Equiaxed Grain Motion in Relation to Macrosegregation Formation in AA5182 Sheet Ingots: *Akash Pakanati*¹; Knut Omdal Tveito²; Mohammed M'Hamdi³; Hervé Combeau⁴; Miha Založnik⁴; ¹Norwegian University of Science & Technology; ²Hydro Research and Development Center; ³SINTEF Materials and Chemistry; ⁴Institut Jean Lamour

10:15 AM Break

10:30 AM

Grain Refinement of Commercial EC Grade 1370 Aluminum Alloy for Electrical Applications: *Massoud Hassanabadi*¹; Shahid Akhtar²; Lars Arnberg¹; Ragnhild E. Aune¹; ¹Norwegian University of Science and Technology (NTNU); ²Hydro Aluminium, Karmøy Primary Production, Håvik

10:55 AM

Effects of CO₂ Cover Gas and Yttrium Additions on the Oxidation of AlMg Alloys: *Nicholas Smith*¹; Wissam Saidi²; Brian Gleeson²; Anne Kvithyld³; Gabriella Tranell¹; ¹Norwegian University of Science and Tech; ²University of Pittsburgh; ³SINTEF

11:20 AM

Behaviour of Aluminium Carbide in Al-melts during Re-melting: *Mertol Gökelma*¹; Trygve Storm Aarnæs¹; Jürgen Maier²; Bernd Friedrich²; Gabriella Tranell¹; ¹Norwegian University of Science and Technology; ²RWTH Aachen University

11:45 AM

Study of Controllable Inclusion Addition Methods in Al Melt: *Jiawei Yang*¹; Sarina Bao²; Shahid Akhtar³; Yanjun Li¹; ¹Norwegian University of Science and Technology; ²SINTEF industri; ³Norsk Hydro

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications — Environmental Degradation

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Yongfeng Zhang, Idaho National Laboratory; Xian-ming (David) Bai, Virginia Polytechnic Institute and State University; David Andersson, Los Alamos National Laboratory; Thierry Wiss, European Commission- JRC -Institute of Transuranium Elements

Tuesday AM | March 12, 2019

214A | Henry B. Gonzalez Convention Center

Session Chairs: Xianming Bai, Virginia Tech; Izabela A. Szlufarska, University of Wisconsin

8:30 AM Invited

Computational Studies of Environmental Degradation of Silicon Carbide: *Izabela Szlufarska*¹; Jianqi Xi¹; Cheng Liu¹; Dane Morgan¹; ¹University of Wisconsin

9:00 AM

Characterization of the Hydrothermal Corrosion Behavior of SiC With and Without Corrosion Mitigation Coatings: *Peter Doyle*¹; Kurt Terrani²; Yutai Kato²; Stephen Raiman²; Steven Zinkle¹; ¹University of Tennessee Knoxville; ²Oak Ridge National Laboratory

9:20 AM

Microstructural Effects on the High-temperature Oxidation Resistance of Magnetron Sputtered Cr-Al-Si-N Coatings on Zirconium Substrates: *Han Zhu*¹; Yue Dong¹; Fangfang Ge¹; Feng Huang¹; Jun Yi²; ¹Ningbo Institute of Industrial Technology; ²Shanghai University

9:40 AM Invited

Nanostructured Ferritic Alloy-silicon Carbide Composites for Nuclear Applications: *Kathy Lu*¹; Kaustubh Bawane¹; Kaijie Ning¹; ¹Virginia Tech

10:10 AM Break

10:30 AM

Water Corrosion Resistance of Modified U₃Si₂: Lu Cai¹; Ed Lahoda¹; Frank Boylan¹; *Peng Xu*¹; Andrew Atwood¹; Robert Oelrich¹; Jie Lian²; ¹Westinghouse Electric Company; ²Rensselaer Polytechnic Institute

10:50 AM

Characterization of U-Si Accident-tolerant Fuels Using Neutron Imaging and Diffraction: *Sven Vogel*¹; Tashiema L. Wilson²; Adrian S. Losko¹; Joshua T. White¹; Kenneth J. McClellan¹; ¹Los Alamos National Laboratory; ²University of South Carolina

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Metallurgical Process

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spina, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Tuesday AM | March 12, 2019
212B | Henry B. Gonzalez Convention Center

Session Chair: Y. Eren Kalay, Middle East Technical University

8:30 AM Introductory Comments

8:35 AM

Effect of Firing Temperature on Iron Ore Pellet Reduction Swelling with Different Silica Content: *Gele Qing*¹; Qing Tian¹; Xin Li¹; Li Ma¹;

Wang Liu¹; ¹Shougang Group

8:55 AM

Effect of Metallic Iron Sinter Feed on Sinter Mineralogy and Quality: *Mingming Zhang*¹; Marcelo Andrade¹; ¹ArcelorMittal Global R&D

9:15 AM

Effect of Microstructure on Resistance to Buildups Formation of Carbon Sleeves in Continuous Annealing Furnace for Silicon Steel Production: *He Mingsheng*¹; Wangzhi Zhou¹; Xuecheng Gong²; Jing Zhang²; Jian Xu²; ¹R&D Center of Wuhan Iron & Steel Co., Ltd; ²Silicon Steel Division of Wuhan Iron & Steel Co., Ltd.

9:35 AM

Influence of Cr₂O₃ and Basicity on Viscosity of Ti-bearing Blast Furnace Slag: Guibao Qiu¹; *Jian Wang*¹; Shiyuan Liu¹; Qingjuan Li¹; ¹Chongqing University

9:55 AM

Raman Spectroscopy on the KBF₄-KF-KCl Molten Salt System: *Xianwei Hu*¹; Bo Li¹; Jiangyu Yu¹; Zhongning Shi¹; Bingliang Gao¹; Zhaowen Wang¹; ¹Northeastern University

10:15 AM Break

10:30 AM

Influence of Water Vapor on the Oxidation Behavior of a Hot Working Tool Steel for Applications in Roughing Mill Work Rolls: *Kai Fota*¹; Andreas Cestonaro²; Peter Heisterkamp²; Hartmut Jacke²; Frieder Spannagel²; Bronislava Gorr¹; Hans-Jürgen Christ¹; ¹Universität Siegen; ²Gontermann-Peipers GmbH

10:50 AM

Thermodynamic Characteristics of Ferronickel Slag Sintered in the Presence of Magnesia: *Foquan Gu*¹; Zhiwei Peng¹; Yuanbo Zhang¹; Huimin Tang¹; Lei Ye¹; Weiguang Tian²; Guoshen Liang²; Joonho Lee³; Mingjun Rao¹; Guanghui Li¹; Tao Jiang¹; ¹Central South University; ²Guangdong Guangqing Metal Technology Co. Ltd.; ³Korea University

11:10 AM

Characterization on the Properties of Calcium Stannates Synthesized under Different Atmospheres: *Benlai Han*¹; Zijian Su¹; Yuanbo Zhang¹; Bingbing Liu¹; Manman Lu¹; Tao Jiang¹; ¹Central South University

CORROSION

Coatings and Surface Engineering for Environmental Protection — Coatings for Corrosion Protection I

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Arif Mubarok, PPG Industries; Rajeev Gupta, The University of Akron; Raul Rebak, GE Global Research; Michael Mayo, PPG Industries; Brian Okerberg, PPG Industries

Tuesday AM | March 12, 2019
224 | Henry B. Gonzalez Convention Center

Session Chairs: Brian Okerberg, PPG; Raul Rebak, GE Global Research

8:30 AM Invited

Improvement of the High Temperature Oxidation Behavior of Ni-alloys by a Combined Al- Plus F-treatment: *Alexander Donchev*¹; Ali Solemani¹; Mathias Galetz¹; ¹DECHEMA-Forschungsinstitut

9:10 AM

Comparing the Corrosion Resistance Imparted by a Polyetherimide Coating on Magnesium and Steel: *Holly Martin*¹; ¹Youngstown State University

9:30 AM Invited

Protective Coating for Nuclear Fuel Claddings: Kiran Nimishakavi¹; Jeremy Bischoff¹; *John Strumpell*¹; ¹Framatome Inc.

10:10 AM Break

10:30 AM

Effect and Role of Alloyed Nb on the Air Oxidation Behaviour of Ni-Cr-Fe Alloys at 1000 °C: *Yaxin Xu*¹; *Wenya Li*¹; ¹Northwestern Polytechnical University

10:50 AM

Effect of Nickel Content on Mechanical Property and Corrosion Behaviour of Nickel-aluminium Bronze: *Fenfen Yang*¹; *Tongmin Wang*¹; *Enyu Guo*¹; *Huijun Kang*¹; *Zongning Chen*¹; ¹Dalian University of Technology

11:10 AM

Corrosion Phenomena in Powder-processed Icosahedral-phase-strengthened Aluminum Alloys: *Sarshad Rommel*¹; *Hannah Leonard*¹; *Thomas Watson*²; *Sonia Tulyani*³; *Mark Aindow*¹; ¹University of Connecticut; ²Pratt & Whitney; ³UTC Aerospace Systems

11:30 AM

Corrosion Properties of Steel Sheet with Zinc-base Alloyed Coatings: *Guangrui Jiang*¹; Ting Shang¹; ¹Shougang

MATERIALS DESIGN

Computational Approaches for Big Data, Artificial Intelligence and Uncertainty Quantification in Computational Materials Science – AI-based Investigation of Material Properties I

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Liang Qi, University of Michigan; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory; Adrian Sabau, Oak Ridge National Laboratory; Houlong Zhuang, Arizona State University ; Sugata Chowdhury, National Institute of Standards and Technology

Tuesday AM | March 12, 2019

305 | Henry B. Gonzalez Convention Center

Session Chair: Adrian Sabau, Oak Ridge National Laboratory

8:30 AM

Applying Machine Learning Techniques to Predict Precipitate Morphology for Alloy Design and Uncertainty Quantification: *Stephen DeWitt*¹; Brian Puchala¹; Katsuyo Thornton¹; John Allison¹; ¹University of Michigan

8:50 AM

Machine Learning to Predict Continuous Cooling Phase Transformations in Steels: *Peter Hedström*¹; Moshour Rahman²; Wangzhong Mu¹; Joakim Odqvist¹; ¹KTH Royal Institute of Technology; ²HiMat Engineering

9:10 AM Invited

Machine Learning for High-Temperature Alloy Design: High-Quality Data, Scientific Descriptors and Curve Fitting: *Dongwon Shin*¹; Bruce Pint¹; Govindarajan Muralidharan¹; Yukinori Yamamoto¹; Michael Brady¹; Jiheon Jun¹; Sangkeun Lee¹; J. Haynes¹; ¹Oak Ridge National Laboratory

9:40 AM

Optimization of Calibration Methods for a Reduced-order Structure Property Linkage of Polycrystalline Materials: Aaron Tallman¹; *Krzysztof Stopka*¹; Laura Swiler²; Yan Wang¹; Surya

Kalidindi¹; David McDowell¹; ¹Georgia Institute of Technology;
²Sandia National Laboratories

10:00 AM Break

10:20 AM Invited

A Machine Learning Exploration of Grain Boundary Mobility Mechanisms: *Srikanth Patala*¹; ¹North Carolina State University

10:50 AM

Steel Inclusion Classification Using Computer Vision and Machine Learning: *Nan Gao*¹; Mohammad Abdulsalam¹; Bryan Webler¹; Elizabeth Holm¹; ¹Carnegie Mellon University, Materials Science and Engineering

11:10 AM

A Reification Approach to Modeling Material Response by Fitting Johnson Cook Parameters: *Jaylen James*¹; Austin Gerlt²; Manny Gonzales²; Eric Payton²; Reji John²; Ibrahim Karaman¹; Raymundo Arroyave¹; Douglas Allaire¹; ¹Texas A&M University; ²Air Force Research Laboratory

11:30 AM

Automatminer: An Automatic Materials Science Machine Learning Tool for Benchmarking and Prediction: *Alexander Dunn*¹; Alireza Faghaninia²; Qi Wang²; Anubhav Jain²; Alex Ganose²; ¹University of California, Berkeley; ²Lawrence Berkeley Laboratory

MATERIALS DESIGN

Computational Materials Discovery and Design — Applications for Defects and the Bulk II

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Oliver Johnson, Brigham Young University; Arunima Singh, Arizona State University; Jake Bair, Pacific Northwest National Laboratory; Christopher Weinberger, Colorado State University; Timofey Frolov, Lawrence Livermore National Laboratory; Ning Zhang, Colorado School of Mines; Fadi Abdeljawad, Clemson University; Richard Hennig, University of Florida; Mikhail Mendeleev, Ames Laboratory; Avinash Dongare, University of Connecticut

Tuesday AM | March 12, 2019

304C | Henry B. Gonzalez Convention Center

Session Chairs: James Rondinelli, Northwestern University; Arunima Singh, Arizona State University

8:30 AM Invited

Machine Learning Guided Accelerated Search for New Materials with Experimental Data: *Prasanna Balachandran*¹; ¹University of Virginia

8:50 AM

Structure and Properties of High-mobility MoTe_{2-x} Phases: *Arunima Singh*¹; Ryan Beams²; Irina Kalish³; Sergiy Krylyuk⁴; Albert Davydov³; ¹Arizona State University; ²Food and Drug Administration; ³National Institute of Standards and Technology; ⁴Theiss Research

9:10 AM

eXtremeMAT: Computational Materials Discovery for Existing and Advanced FE Power Cycles: *Jeffrey Hawk*¹; David Alman¹; ¹National Energy Technology Laboratory, U.S. Department of Energy

9:30 AM

Machine-learning Phase Prediction of High-entropy Alloys: *Wenjiang Huang*¹; Pedro Martin¹; Houlong Zhuang¹; ¹Arizona State University

9:50 AM Break

10:10 AM

Machine Learned Defect Level Prediction for Lead-based Hybrid Perovskites: *Arun Kumar Mannodi Kanakkithodi*¹; Maria Chan¹; Michael Davis¹; ¹Argonne National Laboratory

10:30 AM

Prediction of the Strength of FeNiCrCo High Entropy Alloy Single Crystals: *Mohammad Asadikiya*¹; Vadym Drozd²; Yu Zhong¹; ¹Worcester Polytechnic Institute; ²Florida International University

10:50 AM

Presence of Chern Insulating and Weyl Semimetallic Phase in $\text{Bi}_2\text{MnSe}_4/\text{Bi}_2\text{Se}_3$ Multilayer Heterostructures: *Sugata Chowdhury*¹; Kevin Garrity¹; Joseph Hagmann¹; Curt Richter¹; Francesca Tavazza¹; ¹National Institute of Standards and Technology

11:10 AM

Density Functional Theory Study on the Complexation of La (III) Ion with Hydroxyamide Ligands: *Anindita Pati*¹; Tarun Kundu¹; Snehanshu Pal²; ¹IIT Kharagpur; ²NIT Rourkela

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Kinetics

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tournet, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

Tuesday AM | March 12, 2019

225C | Henry B. Gonzalez Convention Center

Session Chairs: Hesam Askari, University of Rochester; Marius Stan, Argonne National Laboratory

8:30 AM Invited

Phase-field Model of Oxidation: Kinetics: *Kyoungdoc Kim*¹; Quentin Sherman¹; Larry Aagesen²; Peter W. Voorhees¹; ¹Northwestern University; ²Idaho National Laboratory

9:00 AM

Hydrogen Diffusion in HCP Iron: A First-principles Study: *Satoshi Iikubo*¹; Kenji Hirata¹; Yui Kuroki¹; Shoya Kawano¹; Hiroshi Ohtani²; Motomichi Koyama³; Kaneaki Tsuzaki³; ¹Kyushu Institute Of Technology; ²Tohoku University; ³Kyushu University

9:20 AM

Simulated Hydrogen Diffusion in Nickel Grain Boundaries: *David Page*¹; Eric Homer¹; Katie Varela¹; Oliver Johnson¹; David Fullwood¹; ¹Brigham Young University

9:40 AM

First-principles Kinetic Monte Carlo Study of Temperature Effects on Pipe Diffusion in FCC Ni: *Luke Wirth*¹; Amir Farajian¹; Christopher Woodward²; ¹Wright State University; ²Air Force Research Laboratory

10:00 AM Break

10:20 AM

Phosphorus Effect on Vacancy-mediated Diffusion and Ordering Kinetics in Nickel Alloys: *Jia-Hong Ke*¹; George A. Young²; Julie D. Tucker¹; ¹Oregon State University; ²Dominion Engineering, Inc.

10:40 AM

First-principles Calculations of Factors Contributing to Non-dilute Impurity Diffusion Coefficients in Metals: *Chelsey Hargather*¹; Harrison Lee¹; John O'Connell¹; ShunLi Shang¹; Zi-Kui Liu¹; ¹New Mexico Institute of Mining and Technology

11:00 AM

Oxygen Diffusion in Zirconia with Kinetic Monte Carlo: *Thomas Schablitzki*¹; Ying Chen²; Tetsuo Mohri¹; ¹Institute for Materials Research, Tohoku University; ²Graduate School of Engineering, Tohoku University

11:20 AM

Kinetics Calculation and Analysis of AlN Precipitation in ML40Cr Steel Austenite: *Ziyi Liu*¹; Yanping Bao¹; Min Wang¹; ¹University of Science and Technology Beijing

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Behavior of High Temperature Alloys – Superalloys: Alloy Development and Fatigue

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

Program Organizers: Michael Titus, Purdue University; Qiang Feng, University of Science and Technology Beijing; Akane Suzuki, GE Global Research; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Sammy Tin, Illinois Institute of Technology; Martin Detrois, National Energy Technology Laboratory

Tuesday AM | March 12, 2019

301C | Henry B. Gonzalez Convention Center

Session Chairs: Sammy Tin, Illinois Institute of Technology; Martin Detrois, National Energy Technology Laboratory

8:30 AM Invited

Developing Alloy Compositions for Future High Temperature Disk Rotors: *Mark Hardy*¹; Katerina Christofidou²; Christos Argyrakis¹; Suyang Yu³; Hang-yue Li³; Alison Wilson²; Catherine Rae²; Paul Bowen³; Howard Stone²; ¹Rolls-Royce Plc; ²University of Cambridge; ³University of Birmingham

9:00 AM

Effect of Grain Boundary Serration on Creep Enhancement in a Nickel Alloy Inconel 600: *Yuanbo Tang*¹; Angus Wilkinson¹; Roger

Reed¹; ¹University of Oxford

9:20 AM

Stress Analysis and Structure Optimization of W-shaped Radiant Tube in Continuous Annealing Furnace: *Yanglong Li*¹; Shunming Liu²; Dawei Hou²; Wei Guo¹; Hui Wang¹; Meng Yu¹; ¹Shougang Research Institute of Technology; ²Shougang Jingtang United Iron & Steel Co., Ltd.

9:40 AM

On the Rapid Assessment of Mechanical Behaviour of a Prototype Nickel-Based Superalloy using Small-Scale Testing: *Sabin Sulzer*¹; Enrique Alabort¹; André Németh¹; Roger Reed¹; ¹University of Oxford

10:00 AM Break

10:20 AM Invited

A Fatigue Deformation Map to Quantify the Degree of Mesoscopic Cube Slip at Elevated Temperatures: Alberto Mello¹; Andrea Nicolas¹; *Michael Sangid*¹; ¹Purdue University

10:50 AM

Low Cycle Fatigue Performance of HAYNES 244 Alloy: *Michael Fahrman*¹; ¹Haynes International

11:10 AM

Fatigue and Creep Life Sensitivity to Processing Defects of a Third Generation Ni-based Single Crystal Superalloy: *Luciana Maria Bortoluci Ormastroni*¹; Lorena Mataveli Suave²; Jonathan Cormier¹; ¹Institut Pprime/ISAE-ENSMA; ²SAFRAN Tech

11:30 AM

Microstructure and Mechanical Behavior of MarM-509 Fabricated by Direct Metal Laser Sintering: *Nicholas Ferreri*¹; Saeede Ghorbanpour¹; Jonathan Bicknell²; Marko Knezevic¹; ¹University of New Hampshire; ²Turbocam International

LIGHT METALS

Electrode Technology for Aluminum Production — Electrodes - Baking

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

Program Organizer: Lorentz Petter Lossius, Hydro Aluminium AS

Tuesday AM | March 12, 2019

006D | Henry B. Gonzalez Convention Center

Session Chairs: Frank Hiltmann, COBEX GmbH; Jianhong Yang, Jiangsu University

8:30 AM Introductory Comments

8:35 AM

Development of a New Baking Furnace Design Concept without Headwall to Increase Anode Production Capacity: *Arnaud Bourcier*¹; Lise Lavigne¹; Yves Tremblay¹; Allan Graham²; Meaghan Noonan²; ¹Rio Tinto Aluminium; ²Pacific Aluminium

9:00 AM

Risk Assessment of Fire & Explosion Incident in Anode Baking Furnace and Operational Practices: *Suryakanta Nayak*¹; Kalpataru Samal¹; Pulak Patra¹; ¹Hindalco Industries Ltd.

9:25 AM

The Optimization of Soaking Time to Reduce Fuel Consumption while Keeping Good Baked Anode Quality: S.S. Sijabat¹; Ivan Ermisyam¹; *Firman Ashad*¹; Ivan Yudho¹; Daniel Hutahuruk¹; Ade Buandra¹; ¹Pt Indonesia Asahan Aluminium (Persero)

9:50 AM

Influence of Coke Calcining Level on Anode Real Density, Lc and Other Properties Using a Constant Baking Cycle: *Christopher Kuhnt*¹; Les Edwards²; Marvin Lubin²; Kevin Harp²; ¹Rutgers Germany GmbH; ²Rain Carbon, Inc.

10:15 AM Break

10:30 AM

In Situ Monitoring of Pit Gas Composition during Baking of Anodes for Aluminum Electrolysis: *Trond Brandvik*¹; Thor Anders Aarhaug²; Heiko Gaertner²; Arne Petter Ratvik²; Tor Grande¹; ¹NTNU Norwegian University of Science and Technology; ²SINTEF Industry

10:55 AM

Measurement of Anode Anisotropy by Micro X-ray Computed Tomography: *Stein Rørvik*¹; Lorentz Lossius²; Dag Herman Andersen²; ¹SINTEF Group; ²Hydro Aluminium

11:20 AM

Experimental Study on Preparation of Prebake Anodes with High Sulfur Petroleum Coke Desulfurized at High Temperatures: *Shoulei Gao*¹; ¹Sunstone Development

11:45 AM

Electrochemical Behaviour of Carbon Anodes Produced with Different Mixing Temperatures and Baking Levels – A Laboratory Study: Camilla Sommerseth¹; Rebecca Thorne²; Wojciech Gebarowski³; Arne Ratvik⁴; Stein Rørvik¹; Hogne Linga⁵; Lorentz Lossius⁵; *Ann Svensson*⁶; ¹SINTEF Industry; ²Norwegian Institute for Air Research; ³AGH University of Science and Technology; ⁴Sintef Industry; ⁵Hydro Aluminium AS; ⁶Norwegian University of Science and Technology

CORROSION

Environmentally Assisted Cracking: Theory and Practice – Hydrogen Embrittlement I

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

Program Organizers: Bai Cui, University of Nebraska Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc

Tuesday AM | March 12, 2019

214C | Henry B. Gonzalez Convention Center

Session Chairs: Ian Robertson, University of Wisconsin-Madison; Petros Sofronis, University of Illinois at Urbana-Champaign

8:30 AM Introductory Comments

8:40 AM Invited

Hydrogen-induced Intergranular Failure in FCC Equi-molar Alloys Explained: Kaila Bertsch¹; Kelly Nygren²; Shuai Wang³; Akihide Nagao⁴; Hongbin Bei⁵; *Ian Robertson*¹; ¹University of Wisconsin, Madison; ²Cornell University; ³Southern University of Science and Technology; ⁴JFE Steel; ⁵Oak Ridge National Laboratory

9:20 AM

Evolution of Dislocation Structure in the Presence of Hydrogen: *Shuai Wang*¹; Akihide Nagao²; Kaveh Edalati³; Zenji Horita³; Petros Sofronis⁴; Ian Robertson⁵; ¹Southern University of Science and Technology; ²JFE Steel Corporation; ³Kyushu University; ⁴University of Illinois at Urbana-Champaign; ⁵University of Wisconsin, Madison

9:40 AM

On the Trail of the Hydrogen Embrittlement by Novel Critical Experiments: *Afrooz Barnoush*¹; ¹Norwegian University of Science and Technology

10:00 AM

Hydrogen Assisted Fracture in Austenitic Stainless Steel Welds:

*Joseph Ronevich*¹; Chris San Marchi¹; Josh Sugar¹; Dorian Balch¹;

¹Sandia National Laboratories

10:20 AM Break

10:40 AM Invited

Mechanistic Model for Fatigue Crack Growth in the Presence of Hydrogen:

Seyedehzahra Hosseinisrani¹; Mohsen Dadfarnia¹;

Masanobu Kubota²; Akihide Nagao³; Brian Somerday⁴; *Petros*

*Sofronis*¹; Robert Ritchie⁵; ¹University of Illinois at Urbana-

Champaign; ²Kyushu University; ³JFE Steel Corporation; ⁴Southwest

Research Institute; ⁵University of California, Berkeley

11:20 AM

A Mechanistic Modelling Framework for Hydrogen Assisted

Cracking: *Emilio Martínez-Pañeda*¹; ¹University of Cambridge

MECHANICS & STRUCTURAL RELIABILITY

Fatigue in Materials: Multi-scale and Multi-environment Characterizations and Computational Modeling — Relationships Among Processing, Microstructure, and Fatigue Properties

Sponsored by: TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Jean-Briac le Graverend, Texas A&M University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Garrett Pataky, Clemson University; Filippo Berto, Norwegian University of Science and Technology

Tuesday AM | March 12, 2019

301B | Henry B. Gonzalez Convention Center

Session Chair: Filippo Berto, Norwegian University of Science and Technology

8:30 AM

Fatigue and Fracture Behavior of Gamma Titanium Aluminide Ti-

43.5Al-4Nb-1Mo-0.1B (TNM): *Hannah Sims*¹; Matthew Dahar²; Sesh

Tamirisakandala²; John Lewandowski¹; ¹Case Western Reserve

University; ²Arconic

8:50 AM

Simulation of Extrusion Growth and Microcrack Initiation for Type A and B Persistent Slip Bands: *Eyouiléki Awí¹*; Maxime Sauzay²; J. Hazan¹; ¹CEA & Université Paris Sorbonne; ²CEA

9:10 AM

Microstructure and Local Fatigue Property Assessment near Linear Friction Welds: *Christopher Magazzeni¹*; Jicheng Gong¹; Angus Wilkinson¹; ¹University of Oxford

9:30 AM

On the Evolution of Crack-tip γ' Precipitation at 750\176C in the New Nickel-based Superalloy AD730\8482: *Nicolas Mrozowski¹*; Guillaume Benoît²; Florence Hamon³; Jonathan Cormier²; Jean-Michel Franchet⁴; Anne-Laure Rouffié⁴; Gilbert Hénaff³; Patrick Villechaise³; ¹Safran TECH - Institut Pprime; ²ISAE ENSMA - Institut Pprime; ³CNRS - Institut Pprime; ⁴SAFRAN Tech

9:50 AM Break

10:10 AM

Effect of Local Texture on Heterogeneous Plastic Strain Fields during Low Cycle Fatigue in Ni-based Superalloys using Crystal Plasticity Finite Element Simulations: *Jean-Briac le Graverend¹*; ¹Texas A&M University

10:30 AM

Various Factors Affecting Fatigue Behaviors of TWIP Steels: *Hyokyung Sung¹*; Soojin Ahn²; Kwanho Lee¹; Woojin An¹; Sangshik Kim¹; Jehyun Lee³; ¹Gyeongsang National University; ²Gyeongsang National University; ³Changwon National University

10:50 AM

Nickel-Titanium-Hafnium Alloys Designed for Space-age Bearings: *Sean Mills¹*; Behnam Amin-ahmadi¹; Christopher Dellacorte²; Ronald Noebe²; Aaron Stebner¹; ¹Colorado School of Mines; ²NASA GRC

11:10 AM

Role of Surface Roughness on Fatigue Crack Initiation on Surface: *Calvin Tszeng¹*; ¹Santa Clara University

MATERIALS DESIGN

Gamma (FCC)/Gamma-Prime (L12) Co-Based Superalloys III — Alloy Development & Microstructural Evolution

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

Program Organizers: Michael Titus, Purdue University; David Dye, Imperial College; Eric Lass, National Institute of Standards and Technology; Katelun Wertz, Air Force Research Laboratory; Christopher Zenk, Ohio State University

Tuesday AM | March 12, 2019

206A | Henry B. Gonzalez Convention Center

Session Chairs: David Dye, Imperial College London; Katelun Wertz, Air Force Research Laboratory

8:30 AM Invited

Microstructural and Compositional Design of Multicomponent Co/Ni-based Superalloys using High-throughput Diffusion

Multiples: Wendao Li¹; Changdong Wei²; Longfei Li¹; Ji-Cheng Zhao²; *Qiang Feng*¹; ¹University of Science and Technology Beijing; ²The Ohio State University

9:00 AM Invited

Elemental Partitioning and Site-occupancy Behavior of Alloying Elements in γ/γ' -Strengthened Co-Ti based Alloys: *Pyuck-Pa Choi*¹; Hyeji Im¹; Boryung Yoo¹; Surendra Makineni²; Baptiste Gault²; Dierk Raabe²; ¹Korea Advanced Institute of Science and Technology; ²Max-Planck-Institut fuer Eisenforschung

9:30 AM

Partitioning Preferences of Alloying Elements and their Effect on the Stability of the $\gamma'/L1_2$ -phase in Co-base Superalloys: Li Wang¹; Yuzhi Li²; Michael Oehring¹; Uwe Lorenz¹; *Florian Pyczak*¹; ¹Helmholtz-Zentrum Geesthacht; ²Northwestern Polytechnical University

9:50 AM

$\gamma'+\gamma''$ Microstructures in W-free Co-Ta-V- and Co-Nb-V-based Systems: *Fernando Reyes Tirado*¹; David Dunand¹; ¹Northwestern University

10:10 AM Break

10:30 AM Invited

Development of Ni/Co Based Superalloys: CALPHAD and Materials Databases: *Suzana Fries*¹; ¹Ruhr University Bochum

11:00 AM

Towards Developing a New Generation of Cobalt Based Superalloys: *Kamanio Chattopadhyay*¹; Prafull Pandey¹; ¹Indian

Institute of Science

11:20 AM

The Effect of Long Term Exposure at Elevated Temperature on the Stability of a Novel Co-Ni Based Superalloy: *Ning Zhou*¹; Alberto Polar Rosas¹; Gian Colombo¹; Tao Wang¹; Stéphane Forsik¹; Samuel Kernion¹; Mario Epler¹; ¹Cartech

11:40 AM

A Rapid and Simplified Approach to Accurately Measure Single Crystal Elastic Constants: *Brent Goodlet*¹; Ben Bales¹; Leah Mills¹; Marie-Agathe Charpagne¹; Sean Murray¹; Linda Petzold¹; Tresa Pollock¹; ¹University of California, Santa Barbara

ENERGY & ENVIRONMENT

Green Materials Engineering: An EPD Symposium in Honor of Sergio Monteiro – Nano and Micro Green Composites

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Shadia Ikhmayies, Al Isra University; Jian Li, CanmetMATERIALS; Carlos Mauricio Vieira, State University of the North Fluminense; Fabio Braga, National Service of Industrial Apprenticeship (SENSI)

Tuesday AM | March 12, 2019

008A | Henry B. Gonzalez Convention Center

Session Chairs: Esperidiana Moura, Nuclear & Energy Research Institute; Afonso Azevedo, Instituto Federal Fluminense

8:30 AM Introductory Comments

8:35 AM Keynote

Application of Natural Nanoparticle in Polymeric Blend of HMSPP/SEBS for Biocide Activity: Luiz Komatsu¹; Angelica Zafalon¹; Vinicius Santos¹; Nilton Lincopan²; *Vijaya Rangari*³; Duclerc Parra¹; ¹Nuclear and Energy Research Institute; ²Institute of Biomedical Sciences; ³Tuskegee University

9:15 AM

The Potential of Micro- and Nano-sized Fillers Extracted from Agroindustry Residues as Reinforcements of Thermoplastic-based Biocomposites - A Review: *Esperidiana Moura*¹; ¹Nuclear & Energy Research Institute

9:35 AM

Thermal Characterization of a Nanobiocomposite for Use in Bone Defects: *Teresa Castillo*¹; *Leila Siqueira*¹; *Ruben Jesus Sanchez Rodriguez*¹; ¹State University of Northern Rio de Janeiro

9:55 AM Break

10:05 AM

3D Printing of Live Diatoms to Make Structures with Many Levels of Hierarchy: *John Gardner*¹; *Ben Lazarus*²; *Hannes Schniepp*²; ¹NASA Langley Research Center; ²College of William & Mary

10:25 AM

Impact Properties of Composites Reinforced by Bamboo Fibers with Polyurethane and Epoxy as Matrix: *Mariana Lopes*¹; *Juliana Carvalho*¹; *Felipe Lopes*¹; *Sérgio Monteiro*¹; *Carlos Vieira*¹; ¹State University of Northern of Rio de Janeiro

10:45 AM

Thermal Behavior of Epoxy Composites Reinforced with Figue Fabric by DSC: *Michelle Oliveira*¹; *Artur Camposo*¹; *Sergio Monteiro*¹; *Fabio Garcia*¹; *Luana Demosthenes*¹; ¹Military Institute of Engineering

11:05 AM

Chemical and Morphological Characterization of Guaruman Fiber: *Raphael Reis*¹; *Larissa Nunes*¹; *Verônica Cândido*²; *Sergio Monteiro*¹; ¹IME; ²Federal University of Pará – UFPA

MATERIALS PROCESSING

Heterogeneous and Gradient Materials (HGM III): Tailoring Mechanical Incompatibility for Superior Properties – Gradient Materials I: Mechanical Properties

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

Program Organizers: *Yuntian Zhu*, North Carolina State University; *Kei Ameyama*, Ritsumeikan University; *Irene Beyerlein*, University of California, Santa Barbara; *Yves Brechet*, Grenoble-INP; *Huajian Gao*, Brown University; *Hyoung Seop Kim*, Pohang University of Science and Technology; *Ke Lu*, Institute of Metal Research; *Xiaolei Wu*, Chinese Academy of Sciences

Tuesday AM | March 12, 2019

209 | Henry B. Gonzalez Convention Center

Session Chairs: Ke Lu, Chinese Academy of Sciences; David Field, Washington State University; Xinghang Zhang, Purdue University; Hatem Zurob, McMaster University

8:30 AM Invited

Strengthening and Work Hardening in Gradient Nanotwinned Metals: *Lei Lu*¹; ¹Institute of Metal Research, CAS

8:55 AM

Mechanical Behavior of Structurally Gradient Nickel Alloys: *Xinghang Zhang*¹; Jie Ding¹; Qiang Li¹; ¹Purdue University

9:15 AM Invited

The Design of High Strength, Ductility, and Impact Resistance of Compositionally and Microstructurally Graded Steel: *Bosco Yu*¹; Hamid Azizd¹; David Embury¹; Hatem Zurob¹; ¹McMaster University

9:40 AM

Enhanced Fatigue Strength and Lifetime in an Austenitic Stainless Steel with a Gradient Nanostructured Surface Layer: *Y.B. Lei*¹; *Z.B. Wang*¹; K. Lu¹; ¹Institute of Metal Research, CAS

10:00 AM Break

10:20 AM Invited

Microstructure and Mechanical Properties of Nano-Al and Mg Alloys and Composites with Heterogeneous and Gradient Structures: *Baolong Zheng*¹; Xin Wang¹; Yuntian Zhu²; Julie Schoenung¹; Enrique Lavernia¹; ¹University Of California, Irvine; ²North Carolina State University

10:45 AM

Gradient Microstructure and Mechanical Properties of a TiAl Alloy after High-temperature Torsion: *Yongfeng Liang*¹; Jie Ding¹; Jianping He¹; Junpin Lin¹; ¹University of Science and Technology Beijing

11:05 AM

Effect of Gradient Microstructures on Strength and Ductility of TRC AZ31: Maryam Jamalain¹; *David Field*¹; ¹Washington State University

11:25 AM Invited

Gradient Grained Nickel with Optimum Gradient on Mechanical Properties: *Li Yi*¹; ¹Institute of Metal Research, CAS

11:50 AM

Formation of Hard Intermetallic Phases in Zn-Mg Hybrids Processed by High-pressure Torsion: *David Hernández Escobar*¹;

Hakan Yilmazer²; Megumi Kawasaki³; Carl Boehlert¹; ¹Michigan State University; ²Yildiz Technical University; ³Oregon State University

ADVANCED MATERIALS

High Entropy Alloys VII — Structures and Mechanical Properties II

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Tuesday AM | March 12, 2019
207B | Henry B. Gonzalez Convention Center

Session Chairs: Easo George, Oak Ridge National Laboratory; E-Wen Huang, National Chiao Tung University

8:30 AM Keynote

Phase Instability and Mechanical Properties of the CrMnFeCoNi High-entropy Alloy: F. Fox¹; Y. Kalchev¹; S. Berglund¹; A. Kostka¹; G. Laplanche¹; G. Eggeler¹; *Easo George*²; ¹Ruhr University Bochum; ²Oak Ridge National Laboratory

9:00 AM Invited

Crystallographic Slip in a High-entropy Alloy: Quentin Rizzardi¹; Gregory Sparks¹; *Robert Maass*¹; ¹University of Illinois at Urbana-Champaign

9:20 AM Invited

Nanomechanical Studies of High-entropy Alloys: *Yu Zou*¹; ¹University of Toronto

9:40 AM

Microstructural Evolution and Influence of Grain Size on the Mechanical Properties of AlCoCrFeNi Single Phase High Entropy Alloy: Srinivas Dudala¹; Chenna Krishna S²; *Rajesh Korla*¹; ¹Indian Institute of Technology, Hyderabad; ²Vikram Sarabhai Space Centre, Trivandrum

10:00 AM Break

10:20 AM Invited

Balance of Strength-ductility in Ultrafine-grained (CoCrMnNi)₅₀Fe₅₀ Medium Entropy Alloy Having Fully Recrystallized Microstructure: Ibrahim Ondicho¹; *Nokeun Park*¹; ¹Yeungnam University

10:40 AM

Lattice Distortion and Its Effect on Mechanical Behavior in Single-phase Nb-Ta-Ti-V-Zr Refractory High-entropy Alloy Systems: *Chanho Lee*¹; Gian Song²; Wei Chen³; Michael Gao⁴; Yi Chou⁵; Yi-Chia Chou⁵; Jamieson Brechtel¹; Hahn Choo¹; Peter Liaw¹; ¹The University of Tennessee; ²Kongju National University; ³Illinois Institute of Technology; ⁴National Energy Technology Laboratory/AECOM; ⁵National Chiao Tung University

11:00 AM Invited

Recent Progresses in the Understanding of Metastable High-entropy Alloys: *Zhiming Li*¹; Jing Su¹; Wenjun Lu¹; Hong Luo¹; Zhangwei Wang¹; Xiaoxiang Wu¹; Dierk Raabe¹; ¹Max-Planck-Institut Fur Eisenforschung

11:20 AM

Advanced Manufacturing of High Entropy Alloys: *Andrew Kustas*¹; Shaun Whetten¹; Dave Keicher¹; Jake Mahaffey¹; Andrew Vackel¹; Dinakar Sagapuram²; Joseph Michael¹; Michael Chandross¹; Ping Lu¹; Nicolas Argibay¹; ¹Sandia National Laboratories; ²Texas A&M University

11:40 AM

Hydrogen Embrittlement and Diffusion Behavior of High Entropy Alloy (Co_{0.2}Cr_{0.2}Fe_{0.2}Mn_{0.2}Ni_{0.2}): *Junghoon Lee*¹; *Cheolho Park*¹; Namhyun Kang¹; Kyungmox Cho¹; Youngsang Na²; Hyoungseop Kim³; ¹Pusan National University; ²Korea Institute of Materials Science; ³Pohang University of Science and Technology

MATERIALS DESIGN

Hume-Rothery Symposium – Bulk and Interfacial Thermodynamics of Complex Materials: Insights Derived from Integrating Modeling and Experiment – Materials Design and Discovery I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Raymundo Arroyave, Texas A&M University; Michael Gao, National Energy Technology Laboratory; Jeffrey Hoyt, McMaster University; Saryu Fensin, Los Alamos National Laboratory

Tuesday AM | March 12, 2019
304B | Henry B. Gonzalez Convention Center

Session Chairs: Jeffrey Hoyt, McMaster University; Saryu Fensin, Los Alamos National Laboratory

8:30 AM Invited

Beyond Cluster Expansion: New Approaches for Alloys: *Gus Hart*¹; ¹Brigham Young University

9:00 AM Invited

The Materials Project for Computational Materials Design: *Kristin Persson*¹; ¹University of California, Berkeley

9:30 AM Invited

High Entropy Alloys from High Throughput Calculations: Understanding Material-specific Variations from Hume-Rothery Rules: *James Morris*¹; Louis Santodonato¹; M. Claudia Troparevsky¹; Ray Unocic¹; Hongbin Bei¹; Peter Liaw²; ¹Oak Ridge National Laboratory; ²University of Tennessee

10:00 AM Break

10:20 AM Invited

The Search for High Entropy Alloys: A High-throughput Ab-initio Approach: *Stefano Curtarolo*¹; Yoav Lederer²; Cormac Toher¹; Kenneth Vecchio³; ¹Duke University; ²NRCN; ³University of California, San Diego

10:50 AM Invited

Inverse Band Structure Design via Materials Informatics: Eric Isaacs¹; *Christopher Wolverton*¹; ¹Northwestern University

11:20 AM Invited

Implementation of the ICME Approach in a Master Course in Materials Science and Simulations: *Suzana Fries*¹; ¹Ruhr University Bochum

MATERIALS DESIGN

ICME Case Studies and Validation: Extreme Environments —

Session I

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: James Saal, Citrine Informatics; Mark Carroll, Federal-Mogul Powertrain; Xuan Liu, Pratt & Whitney; Dongwon Shin, Oak Ridge National Laboratory; Laurent Capolungo, Los Alamos National Laboratory

Tuesday AM | March 12, 2019

207A | Henry B. Gonzalez Convention Center

Session Chairs: James Saal, Citrine Informatics; Xuan Liu, Pratt & Whitney

8:30 AM Invited

Case Study in ICME Guided Materials Development: *Jerry Gibbs*¹; ¹US Department Of Energy

9:10 AM Invited

An Integrated Approach to Assess the CMAS Performance of T/EBCs: *Carlos Levi*¹; David Poerschke²; Collin Holgate¹; William Summers¹; Wesley Jackson³; ¹University of California Santa Barbara; ²University of Minnesota; ³United Technologies Research Center

9:50 AM

Integrated Numerical Modeling of Misoriented Grains in Directionally-solidified Ni-base Superalloy Castings and Its Application to Turbine Blades: Huijuan Dai¹; Durga Ananthanarayanan¹; Lang Yuan¹; *Shenyan Huang*¹; Jared Iverson¹; Patrick Willson¹; Mark Thompson¹; ¹GE Global Research

10:10 AM Break

10:30 AM Invited

ICME Approaches to Alloy Design for High-temperature Corrosion Resistance: *Brian Gleeson*¹; ¹University of Pittsburgh

11:10 AM

Systematic Analysis of the γ/γ' -micro- and Nanostructure Evolution with Increasing Temperature Exploiting a New Rapid Thermal Annealing Furnace Approach: *Dorota Kubacka*¹; Yolita Eggeler¹; Erdmann Spiecker¹; ¹Institute of Micro- and Nanostructure Research

11:30 AM

In Situ TEM Heating Experiments to Assess Chemical Evolution at Interfaces of - Strengthened Superalloys at High Temperatures: *Yolita Eggeler*¹; *Erdmann Spiecker*¹; ¹University Erlangen-Nuernberg

CHARACTERIZATION

Interfaces in Structural Materials: An MPMD Symposium in Honor of Stephen M. Foiles — Microstructural Evolution I

Sponsored by: The Minerals, Metals and Materials Society, TMS; Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Eric Homer, Brigham Young University; Elizabeth Holm, Carnegie Mellon University; Mark Asta, University of California, Berkeley

Tuesday AM | March 12, 2019

302C | Henry B. Gonzalez Convention Center

Session Chairs: Mark Asta, University of California, Berkeley; Jessica Krogstad, University of Illinois at Urbana-Champaign

8:30 AM Invited

Mobility of Stacking-order Domain Boundaries in Bilayer Graphene: *David Olmsted*¹; *Max Poschmann*¹; *Mark Asta*¹; ¹University Of California, Berkeley

9:00 AM

Stress Modulated Grain Boundary Mobility: *Derek Lontine*¹; *Oliver Johnson*²; ¹US Synthetic; ²Brigham Young University

9:20 AM

The Wide World of Grain Boundary Mode Selection: *Ian Chesser*¹; *Brandon Runnels*²; *Elizabeth Holm*¹; ¹Carnegie Mellon University; ²University of Colorado Colorado Springs

9:40 AM Invited

The How and Why of GB Dynamics: *David Srolovitz*¹; *Jian Han*²; ¹University of Hong Kong; University of Pennsylvania; ²University of Pennsylvania

10:10 AM Break

10:30 AM

Twin Boundary Facets in Three-dimensions: *Shujuan Wang*¹; *Rodney McCabe*¹; *Laurent Capolungo*¹; ¹Los Alamos National

Laboratory

10:50 AM

The Role of the Interface Stiffness Tensor on Grain Boundary Dynamics: *Fadi Abdeljawad*¹; Stephen Foiles¹; Adam Hinkle¹; Alex Moore¹; Christopher Barr¹; Nathan Heckman¹; Khalid Hattar¹; Brad Boyce¹; ¹Sandia National Laboratories

11:10 AM Invited

Measurements of Grain Boundary Energies and Curvatures in Polycrystalline Materials and their Influence on Microstructural Evolution: *Gregory Rohrer*¹; ¹Carnegie Mellon University

11:40 AM Invited

Interface Formation and Adhesion under In-Situ Transmission Electron Microscope: *Scott Mao*¹; Yang He¹; Chongmin Wang²; ¹University of Pittsburgh; ²Pacific Northwest National Laboratory

NUCLEAR MATERIALS

Irradiation Effects on Phase Transformations in Nuclear Reactor Materials — Nanoprecipitates and Nanoclusters

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Janelle Wharry, Purdue University; Kester Clarke, Colorado School of Mines; Julie Tucker, Oregon State University; Par Olsson, KTH Royal Institute of Technology; Dhriti Bhattacharyya, ANSTO; Mohsen Asle Zaeem, Colorado School of Mines; Arun Devaraj, Pacific Northwest National Laboratory

Tuesday AM | March 12, 2019

214B | Henry B. Gonzalez Convention Center

Session Chairs: Eda Aydogan, Los Alamos National Laboratory; Janelle Wharry, Purdue University

8:30 AM Invited

Evolution of Stresses and Strains in Nuclear Reactor Components: *Sergei Dudarev*¹; Daniel Mason¹; Edmund Tarleton²; Pui-Wai Ma¹; Andrea Sand³; ¹Ukaea; ²University of Oxford; ³University of Helsinki

9:00 AM

Irradiation Enhanced Precipitation Over a Wide Range RPV Steel Compositions: New Physically Based Embrittlement Chemistry Factors: *Nathan Almirall*¹; Peter Wells¹; Takuya Yamamoto¹; G. R. Odette¹; ¹University of California Santa Barbara

9:20 AM

Density Functional Theory Simulations of Solutes in Reactor Pressure Vessel Steels: *Thomas Whiting*¹; Daniel King¹; Patrick Burr²; Mark Wenman¹; ¹Imperial College London; ²University of New South Wales

9:40 AM

Irradiation-induced Precipitation in Ni-based Superalloys: *Li-Jen Yu*¹; Grace Burke²; Emmanuelle Marquis¹; ¹University of Michigan; ²University of Manchester

10:00 AM Break

10:20 AM Invited

Neutron Irradiation Studies on 14YWT Nanostructured Ferritic Alloys: *Eda Aydogan*¹; Jordan Weaver²; Ursula Carvajal-Nunez¹; Jonathan Gigax¹; Enrique Martinez Saez¹; David Krumwiede³; Peter Hosemann³; Tarik Saleh¹; Nathan Mara⁴; David Hoelzer⁵; Stuart Maloy¹; ¹Los Alamos National Laboratory; ²National Institute of Standards and Technology; ³University of California Berkeley; ⁴University of Minnesota; ⁵Oak Ridge National Laboratory

10:50 AM

Characterization of Microstructural Evolution of ODS Alloys after Thermal Aging Treatments and Ion Radiations: *Amal Issaoui*¹; Joel Ribis¹; Joel Malaplate¹; Alexandre Legris²; ¹CEA-Saclay -France; ²Université de Lille 1

11:10 AM

Ion Irradiation Induced Segregation and Precipitation in PH 13-8 Mo Steel: *Ce Zheng*¹; Peter Hosemann²; Djamel Kaoumi¹; ¹North Carolina State University; ²University of California

11:30 AM

The Investigation of Phase Stability of a Nanoprecipitate Steel Following Heavy Ion Irradiation: *Yao Li*¹; Tengfei Yang¹; Suihe Jiang²; Zhaoping Lu²; Steven Zinkle¹; ¹University of Tennessee; ²University of Science and Technology, Beijing

LIGHT METALS

Magnesium Technology 2019 — Thermomechanical Processing

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

Program Organizers: Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordon, University of Alabama; Dmytro Orlov, Lund University; Neale Neelameggham, IND LLC

Tuesday AM | March 12, 2019
005 | Henry B. Gonzalez Convention Center

Session Chairs: Norbert Hort, Helmholtz-Zentrum Geesthacht; Regine Willumeit Romer, Helmholtz-Zentrum Geesthacht

8:30 AM Invited

Evolution of Heterogeneous Microstructure of Equal-channel Angular Pressed Magnesium: *Qizhen Li*¹; ¹Washington State University

9:00 AM Invited

Novel Magnesium Alloy Processing via Shear-assisted Processing and Extrusion (ShAPE): *Suveen Mathaudhu*¹; Nicole Overman²; Scott Whalen²; Matthew Olzsta²; David Catalini²; Karen Kruska²; Jens Darsell²; Vineet Joshi²; Xiujuan "Hellen" Jiang²; Arun Devaraj²; Glenn Grant²; Cynthia Powell²; ¹UC Riverside / Pacific Northwest National Laboratory; ²Pacific Northwest National Laboratory

9:30 AM

Effect of the Extrusion Temperature on Microstructure, Texture Evolution and Mechanical Properties of Extruded Mg-2.49Nd-1.82Gd-0.19Zn-0.4Zr Alloy: *Lei Xiao*¹; Guangyu Yang¹; Shifeng Luo¹; Wanqi Jie¹; ¹Northwestern Polytechnical University

9:50 AM

Influence of Thermomechanical Treatment on Tension-compression Yield Asymmetry of Extruded Mg-Zn-Ca Alloy: *Patrik Dobron*¹; Marius Hegedüs¹; Juraj Olejník¹; Daria Drozdenko¹; Klaudia Horváth¹; Jan Bohlen²; ¹Charles University; ²Helmholtz-Zentrum Geesthacht, MagIC

10:10 AM Break

10:30 AM

Homogeneous Grain Refinement and Ductility Enhancement in AZ31B Magnesium Alloy Using Friction Stir Processing: *Vivek Patel*¹; Wenya Li²; Quan Wen²; Yu Su²; Na Li²; ¹Northwestern Polytechnical University, Pandit Deendayal Petroleum University; ²Northwestern Polytechnical University

10:50 AM

Microstructure and Texture Evolution during Hot Compression of Cast and Extruded AZ80 Magnesium Alloy: *Paresh Prakash*¹; Amir Hadadzadeh²; Sugrib Shaha¹; Mark Whitney¹; Mary Wells³; Hamid Jahed¹; Bruce Williams⁴; ¹Department of Mechanical and Mechatronics Engineering, University of Waterloo; ²Marine Additive Manufacturing Centre of Excellence (MAMCE), University of New Brunswick; ³College of Engineering and Physical Sciences, University of Guelph; ⁴CanmetMATERIALS, Natural Resources Canada

11:10 AM

A Review and Case-study on Mechanical Properties and Microstructure Evolution in Magnesium-steel Friction Stir Welding: *Suryakanta Sahu*¹; Omkar Thorat²; Raju Prasad Mahto¹; Surjya Kanta Pal¹; Prakash Srirangam³; ¹Indian Institute of Technology Kharagpur; ²Dr. Babasaheb Ambedkar Technological University; ³University of Warwick

SPECIAL TOPICS

Materials and Manufacturing Innovation Keynote: Autonomous Materials Research

Sponsored by: TMS: Materials Innovation Committee

Program Organizer: James Warren, National Institute of Standards and Technology

Tuesday AM | March 12, 2019
221D | Henry B. Gonzalez Convention Center

Session Chair: James Warren, National Institute of Standards and Technology

8:30 AM Introductory Comments

8:35 AM Keynote

Data, Disorder and Materials: *Stefano Curtarolo*¹; ¹Duke University

9:15 AM Keynote

Autonomous Experimentation Applied to Carbon Nanotube Synthesis: *Benji Maruyama*¹; Pavel Nikolaev²; Daylond Hooper³; Fred Webber¹; Kevin Decker²; Jason Poleski⁴; Michael Krein⁴; Richard Barto⁴; Ahmad Islam²; Rahul Rao²; ¹Air Force Research Laboratory; ²UES Inc.; ³InfoScitex, Inc.; ⁴Lockheed Martin Corporation

9:55 AM Break

10:10 AM Keynote

SARA: Scientific Autonomous Reasoning Agent to Accelerate Materials Discovery: *Carla Gomes*¹; ¹Cornell University

10:50 AM Keynote

Towards Autonomous Materials Research Systems: *Jason Hattrick-Simpers*¹; ¹National Institute of Standards and Technology

11:30 AM Panel Discussion

ENERGY & ENVIRONMENT

Materials for Molten Salt Energy Systems — Advanced Materials for Molten Salt Systems

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

Program Organizers: Stephen Raiman, Oak Ridge National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Kumar Sridharan, University of Wisconsin-Madison; Judith Vidal, National Renewable Energy Laboratory; Michael Short, Massachusetts Institute of Technology

Tuesday AM | March 12, 2019

008B | Henry B. Gonzalez Convention Center

Session Chair: Michael Short, Massachusetts Institute of Technology

8:30 AM

Cladded Components for Molten Salt Reactors: Chemical Compatibility, Mechanical Effects, and the Potential Advantages of Functionally Graded Properties and Multi-material Systems: *Mark Messner*¹; T.-L. Sham¹; George Young²; Zhili Feng³; ¹Argonne National Laboratory; ²Dominion Engineering; ³Oak Ridge National Laboratory

8:50 AM

Directed Energy Deposition Fabrication of Mo-coated 316 Stainless Steel Components for Molten Salt Applications: *Gabriel Meric de Bellefon*¹; Shiva Rudraraju¹; Dan Thoma¹; ¹University of Wisconsin, Madison

9:10 AM

High-temperature, High-efficiency Silicon Carbide TRIPLEX Receiver Tubes for Next Generation Molten Salt Concentrated Solar Power: *Matthew Walker*¹; John Malloy²; Herb Feinroth²; Ken Armijo¹; Cliff Ho¹; Amy Bohinsky¹; Julius Yellowhair¹; ¹Sandia National Laboratories; ²Ceramic Tubular Products LLC

9:30 AM

Preliminary Chemical Durability Testing of Molten Salt Waste Forms: *Richard Livingston*¹; Luis Ortega¹; Sean McDeavitt¹; ¹Texas A&M University

MATERIALS PROCESSING

Materials Processing Fundamentals — Alloys Processing and Properties Modeling

Sponsored by: TMS: Process Technology and Modeling Committee

Program Organizers: Guillaume Lambotte, Boston Metal; Jonghyun Lee, Iowa State University; Antoine Allanore, MIT - DMSE; Samuel Wagstaff, Novelis

Tuesday AM | March 12, 2019

212A | Henry B. Gonzalez Convention Center

Session Chairs: Sam Wagstaff, Novelis; Song Cai, Fort Wayne Metals

8:30 AM Introductory Comments

8:35 AM

Influence of Omega Phase on Super-elastic and Fatigue Properties of a Beta Ti Alloy: *Song Cai*¹; Jerermy Schaffer¹; ¹Fort Wayne Metals

8:55 AM

Numerical Modelling and Influence of Cu Addition on the Microstructure and Mechanical Properties of Additive Manufactured Ti-Cu-Al/Ti-6Al-4V Composite: Olawale Fatoba¹; *Esther Akinlabi*¹; Stephen Akinlabi¹; ¹University of Johannesburg

9:15 AM

Nonequilibrium Solidification of Zn-6wt.% Al Alloy: *Hongfa Hu*¹; ¹University of Windsor

9:35 AM

Creating Nano-precipitates and Ultra-fine Grains in Mg-9Al (wt.%) and Mg-6Al (wt.%) Alloys during Low-temperature Equal Channel Angular Extrusion (ECAE): *Suhas Eswarappa Prameela*¹; Vance Liu¹; Stephanie Hernandez¹; Matthew Fernandez¹; Laszlo Kecskes²; Tomoko Sano³; Timothy Weihs¹; ¹Johns Hopkins University; ²MatSys ; ³U.S. Army Research Laboratory

9:55 AM

High Cycle Fatigue Behaviour of Ultrafine Grained 5052 Al Alloy Processed Through Cryo-forging: *Yogesha KK*¹; Amit Joshi²; Raviraj Verma³; A Raja³; R Jayaganthan⁴; ¹National Institute of Engineering; ²G. B. Pant Institute of Engineering & Technology Pauri (Garhwal), India.; ³Indian Institute of Technology Roorkee; ⁴Indian Institute of Technology Madras

10:15 AM Break

10:35 AM

Mechanical Characteristics of Boron Nitride Nanotube and Magnesium Composites: *Mitchell Hopper*¹; ¹Florida International University

10:55 AM

Scalable Nanomanufacturing Approaches to Develop Advanced Metal Matrix Nanocomposites: *Pranjal Nautiyal*¹; Benjamin Boesl¹; Arvind Agarwal¹; ¹Florida International University

11:15 AM

Effect of Heat Treatment on Microstructure of Continuous Unidirectional Solidified Cu–Ni–Sn Alloy: *Jihui Luo*¹; Qin Li¹; Yanhui Chen¹; Shu Liu¹; Qiuyue Wen¹; Huimin Ding; ¹Yangtze Normal University

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Defect Evolution I

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

Tuesday AM | March 12, 2019

215 | Henry B. Gonzalez Convention Center

Session Chairs: Samuel Briggs, Oregon State University; Meimei Li, Argonne National Laboratory

8:30 AM Invited

Continuum Theory of Defects and Microstructure Evolution under Irradiation: *Anter El-Azab*¹; ¹Purdue University

9:00 AM

Understanding Deformation and Failure Mechanisms in Steels using High-Energy Synchrotron X-rays: *Meimei Li*¹; Xuan Zhang¹; Chi Xu²; Fallon Laliberte³; Jonathan Almer¹; Jun-Sang Park¹; Peter Kenesei¹; Xianghui Xiao¹; ¹Argonne National Laboratory; ²University of Florida; ³Rensselaer Polytechnic Institute

9:20 AM

EBSD and High Resolution EBSD Analysis of Strain-Induced Phenomena in Irradiated Austenitic Steels: *Maxim Gussev*¹; Keith Leonard¹; ¹Oak Ridge National Laboratory

9:40 AM

Irradiation Resistance of Mechanically Processed Zr-Nb Multilayers at Very High Doses: *Madhavan Radhakrishnan*¹; Daniel Savage²; Marko Knezevic²; Yongqiang Wang³; Nathan Mara⁴; Osman Anderoglu¹; ¹University of New Mexico; ²University of New Hampshire; ³Los Alamos National Laboratory; ⁴University of Minnesota

10:00 AM Break

10:20 AM Invited

Evolution of Hardening during Irradiation: Nanoindentation and Nanostructural Characterisation Approach: *M Grace Burke*¹; Alex Carruthers¹; ¹University of Manchester

10:50 AM

Multiscale Modeling of Dislocation/precipitate Interactions under Cyclic Loading: *Shuozhi Xu*¹; Irene Beyerlein¹; ¹University Of California, Santa Barbara

11:10 AM

Multiscale Modeling of Radiation-induced Cu Precipitation Hardening in Fe-0.1at.%Cu: *Xian-Ming Bai*¹; Yaxuan Zhang¹; ¹Virginia Polytechnic Institute

11:30 AM

On the Elementary Deformation Mechanisms Involved in the Singular Behavior of 15Cr-15Ni Fuel Cladding Tubes at Moderate Temperatures: *Emilien Curtet*¹; Bouzid Kedjar²; Patrick Olier¹;

Matthew Bono³; Elodie Rouesne¹; Frédéric Momprou⁴; Ludovic Thilly²; ¹DEN-Service de Recherches Métallurgiques Appliquées, CEA, Université Paris-Saclay; ²Institut Pprime, D1/Axe PDP; ³DEN-Service d'Etudes des Matériaux Irradiés, CEA, Université Paris-Saclay; ⁴CEMES-CNRS

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior Related to Interface Physics III — Nanocrystalline Materials I

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

Program Organizers: Jason Trelewicz, Stony Brook University; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht; Siddhartha Pathak, University of Nevada, Reno; Jordan Weaver, National Institute of Standards and Technology; Marc Legros, CEMES-CNRS

Tuesday AM | March 12, 2019
303C | Henry B. Gonzalez Convention Center

Session Chairs: Frederic Momprou, CEMES-CNRS; Marc Legros, CEMES-CNRS

8:30 AM
In situ TEM Nanofabrication and Mechanical testing of Metallic Nanowires: *Jiangwei Wang*¹; ¹Zhejiang University

8:50 AM
Investigating the Effect of Severe Surface Plastic Deformation on Sensitization and the Miniature Tensile Behavior of AA5083: *Denise Yin*¹; Heather Murdoch¹; B. Hornbuckle¹; Joseph Labukas¹; ¹U.S. Army Research Laboratory

9:10 AM Invited
Grain-boundary Based Deformation Mechanisms: An In Situ TEM Perspective: *Frederic Momprou*¹; Marc Legros¹; Nicolas Combe¹; ¹CEMES-CNRS

9:40 AM
Deformation-induced Precipitation in Highly-immiscible Alloys at Low Temperature: *Nirab Pant*¹; Nisha Verma¹; Robert Averback¹; Yinon Ashkenazy²; Pascal Bellon¹; ¹University of Illinois at Urbana, Champaign; ²Hebrew University of Jerusalem

10:00 AM Break

10:20 AM Invited

Defining Hetero-epitaxial Relationships of Films on Substrates: *Dominique Chatain*¹; Paul Wynblatt²; Anthony Rollett²; Ulrich Dahmen³; ¹CNRS, Aix-Marseille University; ²Carnegie Mellon University; ³Lawrence Berkeley National Laboratory

10:50 AM

Ultrahigh-strength Low Carbon Steel Produced by Severe Plastic Deformation of Martensite: *Andrea Bachmaier*¹; Timo Müller¹; Marlene Kapp²; Peter Felfer³; Reinhard Pippan¹; ¹Erich Schmid Institute, Austrian Academy of Sciences; ²Erich Schmid Institute; ³Department of Material Science and Engineering, Institute I, Friedrich-Alexander Universität Erlangen-Nürnberg

11:10 AM

Thermal Analysis of Electrodeposited Nano-grained Ni-Mo Alloys: *Yinong Shi*¹; Jian Hu²; K. Lu¹; ¹Imr Cas; ²School of Materials Science and Engineering, East China JiaoTong University

11:30 AM Invited

Changing Mechanical Properties of Nanoporous Metals by Surface Modification and the Impact of Capillarity: *Jürgen Markmann*¹; Nadiia Mameka¹; ¹Helmholtz-Zentrum Geesthacht

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Micro- and Nanomechanical Testing in Harsh Environments — Advances in Micromechanical Testing Techniques

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

Program Organizers: Verena Maier-Kiener, Montanuniversität Leoben; Sandra Korte-Kerzel, RWTH Aachen; Peter Hosemann, University of California; Afrooz Barnoush, Norwegian University of Science and Technology; Jeffrey Wheeler, ETH Zurich; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Tuesday AM | March 12, 2019

217B | Henry B. Gonzalez Convention Center

Session Chairs: Peter Hosemann, University of California, Berkeley; James Gibson, RWTH Aachen

8:30 AM Invited

Elevated Temperature Nanomechanical Mapping and Approaches to High-throughput Mechanical Testing of Fe-based Alloys: *Nathan Mara*¹; Douglas Stauffer²; Eric Hintsala²; Bartosz Nowakowski²; Youxing Chen¹; Jordan Weaver³; Siddhartha Pathak⁴; Ashley Reichardt⁵; Peter Hosemann⁵; ¹University of Minnesota; ²Bruker Nano Surfaces Division; ³National Institute of Standards and Technology; ⁴University of Nevada, Reno; ⁵University of California, Berkeley

8:55 AM

Mechanical High-temperature Characteristics of FCC/BCC Metal Nanocomposites Investigated by Means of Advanced Nanoindentation Techniques: *Alexander Leitner*¹; Verena Maier-Kiener¹; Daniel Kiener¹; ¹Montanuniversität Leoben

9:15 AM

Measuring Stress-strain Curves of Metals by Nanoindentation with a Frustum: *Jennifer Hay*¹; ¹Nanomechanics

9:35 AM Invited

High Speed Nanomechanical Property Mapping and Data Deconvolution: *Sudharshan Phani Pardhasaradhi*¹; Vignesh B¹; Siva Kumar G¹; Warren Oliver²; ¹ARCI; ²Nanomechanics Inc.

10:00 AM

In Operando High Speed Nanoindentation Mapping: *Eric Hintsala*¹; Douglas Stauffer¹; ¹Bruker Nano Surfaces

10:20 AM Break

10:40 AM Invited

Mapping Strains at High Temperature on Micromechanical Testpieces: *Thomas Edwards*¹; Fabio Di Gioacchino²; Robert Jones³; Gaurav Mohanty¹; Juri Wehrs¹; William Clegg²; Johann Michler¹; ¹EMPA; ²University of Cambridge; ³Rolls-Royce plc

11:05 AM

Exploring Grain Boundary-defect Interactions in Pt and Pt-Au using In Situ TEM High Cycle Fatigue: *Christopher Barr*¹; Khalid Hattar¹; ¹Sandia National Laboratories

11:25 AM

Dislocation Structure and GB Movement in W at RT during Grain Boundary Pop-in: *Karsten Durst*¹; Farhan Javaid¹; ¹TU Darmstadt

11:45 AM

Investigation of the Effects of Thermal Treatment and Coldwork on Grain Boundary Strength in Alloy 600 for Stress Corrosion Cracking: *Hi Vo*¹; Evan Still¹; Rasheed Auguste¹; Joey Kabel¹; Daniel

Schreiber²; Kiet Lam¹; Peter Chou³; Peter Hosemann¹; ¹University of California, Berkeley; ²Pacific Northwest National Laboratory; ³EPRI

MATERIALS DESIGN

Modeling and Simulation of Composite Materials — Session II

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

Program Organizers: Rakesh Behera, New York University; Dinesh Pinisetty, CSU Maritime Academy; Dzung Luong, New York University

Tuesday AM | March 12, 2019

303B | Henry B. Gonzalez Convention Center

Session Chairs: Donghwa Lee, Pohang University of Science and Technology; Vinamra Agrawal, Auburn University; Dinesh Pinisetty, CSU Maritime Academy

8:30 AM Invited

Microstructure Design Tool to Optimize the Thermal Conductivity of Composite Structures: Floyd Hilty¹; *Michael Tonks*¹; ¹University of Florida

8:50 AM Invited

Interface Control of Material Functionality: *Valentino Cooper*¹; ¹Oak Ridge National Laboratory

9:10 AM

Phase Field Damage Modeling of Mechanical Degradation in Polymer Composites under Hydro-thermomechanical Loading Conditions: *Vinamra Agrawal*¹; ¹Auburn University

9:30 AM Invited

Unraveling the Mechanisms of Nanostructural Self-assembly in Physical Vapor-deposited Immiscible Alloy Films: Rahul Raghavan¹; *Kumar Ankit*¹; ¹Arizona State University

9:50 AM Break

10:30 AM Invited

Multiscale Modeling of Transition Metal-chemically Modified Graphene Based Nanocomposites: *Krishna Muralidharan*¹; ¹University of Arizona

10:50 AM Invited

Unraveling the Dynamic Toughening Mechanisms of Bioinspired Composites under Extreme Loading Conditions: *Grace Gu*¹;

¹University of California, Berkeley

11:10 AM Invited

First-principles Investigation on Mn Segregation at Ferrite-cementite Interface: *Donghwa Lee*¹; Jae-Bok Seol¹; ¹Pohang

University of Science & Technology

11:30 AM

Graph Theoretic Analyses of Fiber-scale Data to Determine Defect Strength of Transversely Loaded Fiber-reinforced Composites:

*Siu Sin Quek*¹; Sridhar Narayanaswamy¹; Brian Cox²; ¹Institute of High Performance Computing; ²Arachne Consulting

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XVIII – Interfacial Reaction of Electronic Materials

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Hiroshi Nishikawa, Osaka University; Shih-Kang Lin, National Cheng Kung University; Chaohong Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing Univ; Dajian Li, Karlsruhe Institute of Technology; Song-Mao Liang, Clausthal University of Technology; Ming-Tzer Lin, National Chung Hsing University; Zhi-Quan Liu, Institute of Metal Research, Chinese Academy of Sciences; Jaeho Lee, Hongik University; Yee-wen Yen, National Taiwan University of Science and Technology; Yuan Yuan, Chongqing University; Yu Zhong, Worcester Polytechnic Institute

Tuesday AM | March 12, 2019

217D | Henry B. Gonzalez Convention Center

Session Chairs: Hiroshi Nishikawa, Osaka University; Zhi-Quan Liu, Institute of Metal Research, Chinese Academy of Sciences

8:30 AM Invited

Advanced Electroplating Technologies for 2.5D and 3D Chip Packaging Fabrication: *Wei-Ping Dow*¹; ¹National Chung Hsing

University

8:50 AM

Abnormal Growth of Intermetallic Compounds in Sn/Cu Diffusion

Pair: *Yiram Kim*¹; Hossein Madanipour¹; Choong-un Kim¹; ¹University of Texas, Arlington

9:10 AM

A Model to Describe Kinetics of Intermetallic Compound with Narrow Homogeneity Range: Cu-Sn System as an Example:

*Yuan Yuan*¹; Dajian Li²; Nele Moelans³; Fusheng Pan¹; ¹Chongqing University; ²Karlsruhe Institute of Technology ; ³KU Leuven

9:30 AM

The Investigation of the Interaction Between Co, Cu and Sn_{3.5}Ag under Thermomigration:

*Jou-Hsuan Li*¹; Fan-Yi Ouyang¹; Yuan-Ruei Hsu¹; ¹National Tsing Hua University

9:50 AM

Growth Behavior of Compounds during Reactive Diffusion between Solid Co and Liquid Sn-base Solders:

*Minho O*¹; Masanori Kajihara¹; ¹Tokyo Institute of Technology

10:10 AM Break

10:30 AM Invited

Interfacial Microstructure Variation of ENIG/SAC305 Solder Joint with Ni-P Electroless Plating Bath:

*Sehoon Yoo*¹; Wonil Seo¹; Sungwook Mhin¹; Young-Ho Kim²; ¹KITECH; ²Hanyang University

10:50 AM

Solder Joint Design Elements: Impact of Ni in Cu-alloys on Intermetallic Compound Formation and Properties:

*Christian Wieser*¹; Andreas Leineweber²; Werner Huegel¹; ¹Robert Bosch GmbH; ²TU Freiberg

11:10 AM

Interfacial Reactions between Lead-Free Solders and the Ni-xPd-yCo Alloys:

*Kuo Jung Chen*¹; Mei-Ting Lai¹; Chih-Ming Chen²; Yu-Chun Li¹; Yee-Wen Yen¹; ¹National Taiwan University of Science and Technology; ²National Chung Hsing University

11:30 AM

The Improvement of Solderability for Diamond/Al Composite by Electroless Plating of Ni-P Coating Film:

*Zhi-Quan Liu*¹; Qi-Yuan Shi¹; Hao Zhang²; ¹Institute of Metal Research, Chinese Academy of Sciences; ²Institute of Scientific and Industrial Research, Osaka University

11:50 AM

The Study on Currents Stress Effects of Electromigration on IMC Formation:

Ching Chun Chiu¹; Po-Hsun Wang¹; Wei-Jhen Chen¹;

Ming-Tzer Lin¹; ¹National Chung Hsing University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Phase Transformations in Steels and Non-ferrous Alloys

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Yufeng Zheng, Ohio State University; Ashley Paz y Puente, University of Cincinnati; Juan Escobedo-Diaz, University of New South Wales; Dhriti Bhattacharyya, ANSTO; Rajarshi Banerjee, University of North Texas

Tuesday AM | March 12, 2019

225D | Henry B. Gonzalez Convention Center

Session Chairs: Ashley Paz Y Puente, University of Cincinnati; Alexis Deschamps, Genoble Institute of Technology

8:30 AM

Recrystallization of a Niobium-stabilized Austenitic Stainless Steel: *Nicolas Cliche*¹; Eric Georges²; Philippe Petit²; Jean-Loup Heuzé³; Anne-Françoise Gourgues-Lorenzon⁴; Jacques Bellus²; Sylvain Ringeval¹; ¹CEA; ²Aubert & Duval; ³DGA; ⁴MINES ParisTech, PSL Research University, Centre des Matériaux, UMR CNRS 7633

8:50 AM

Influence of Strain Rates on the Stability of Retained Austenite under Tension-compression Loading in High Carbon Steel: *Amborish Banerjee*¹; B. Prusty¹; ¹University of New South Wales

9:10 AM

Laves Phase Stability of Creep Resistant FeCrAl Alloys at Elevated Temperature: *Chih-Hsiang Kuo*¹; Benjamin Shassere²; Jonathan Poplawsky²; Yukinori Yamamoto²; Sudarsanam Babu¹; ¹University of Tennessee; ²Oak Ridge National Laboratory

9:30 AM

Anomalous X-ray Diffraction from ω Particles in a Metastable β -Ti Alloy: *Jana Šmilauerová*¹; Petr Harcuba¹; Václav Holý¹; ¹Charles University

9:50 AM

In Situ Study of Transformation in NiTiNOL using Neutron and High Energy Diffraction Experiment: *Jinesh Dahal*¹; Aaron Stebner¹; ¹Colorado School Of Mines

10:10 AM Break

10:30 AM

Microstructural Evolution and Phase Transformations in U-10Mo Alloys with Varying Zr Content after Heat Treatments Relevant to the Monolithic Fuel Plate Fabrication Process: *Abhishek Mehta*¹; Nicholas Eriksson¹; Ryan Newell¹; Le Zhou¹; Esin Schulz¹; William Sprowes¹; Felipe Betancor¹; Youngjoo Park¹; Dennis Keiser, Jr.¹; Yongho Sohn¹; ¹University of Central Florida

10:50 AM

Negative and Positive Tailorable Thermal Expansion in Shape Memory Alloys: *Dominic Gehring*¹; Ibrahim Karaman¹; ¹Texas A&M University

11:10 AM

Oxygen Influence on Omega and Alpha Phase Transformations in Ti-Nb Alloys: *Kathleen Chou*¹; Emmanuelle Marquis¹; ¹University of Michigan

11:30 AM

Phase Identification and Microstructural Evolution of Al6061 Powder Using In-Situ TEM: *Benjamin Bedard*¹; Sriram Vijayan¹; Mark Aindow¹; ¹University of Connecticut

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Powder Processing of Bulk Nanostructured Materials — Densification Methods

Sponsored by: TMS: Powder Materials Committee

Program Organizers: Zachary Cordero, Rice University; Deliang Zhang, Shanghai Jiao Tong University; Brady Butler, US Army Research Laboratory; Ma Qian, RMIT University (Royal Melbourne Institute of Technology)

Tuesday AM | March 12, 2019

211 | Henry B. Gonzalez Convention Center

Session Chair: Brady Butler, Army Research Laboratory

8:30 AM Invited

Below 30 Nanometers: Unlocking the Potential of Very Small Grain Sizes in Dense Nanocrystalline Ceramics: *James Wollmershauser*¹; Boris Feigelson¹; Heonjune Ryou²; Eric Patterson¹; Edward Gorzkowski¹; ¹US Naval Research Laboratory; ²American Society for Engineering Education Postdoctoral Research Fellow sited at U.S. Naval Research Laboratory

9:00 AM

Control of Electric Current Pathway in Field-Assisted Sintering: *Eugene Olevsky*¹; Geuntak Lee¹; Elisa Torresani¹; ¹San Diego State University

9:30 AM

Kinetics and Densification Behavior during Reaction Sintering of Bulk Titanium Boride (TiB) Nanoceramics by Electric Field Activated Sintering: *K. S. Ravi Chandran*¹; Jun Du¹; ¹University of Utah

9:50 AM

Combustion Synthesis of Silicon-based Nanostructured Materials: *Sergio Cordova*¹; Rodrigo Mesta¹; Evgeny Shafirovich¹; ¹University of Texas, El Paso

10:10 AM Break

10:30 AM

Nano-carbon Reinforced Metal Matrix Composites Fabricated by Powder Metallurgy Process: *Katsuyoshi Kondoh*¹; Biao Chen²; Junko Umeda¹; ¹Osaka University; ²Northwestern Polytechnical University

10:50 AM

Requirements of NFPA 652 Standard on Combustible Dust: Are your Powder Processes Compliant?: *Vahid Ebadat*

11:10 AM

Laser-Assisted Cold Spray Deposition of Ferritic Oxide Dispersion Strengthened Alloys: *Dallin Barton*¹; William Story¹; B. Hornbuckle²; Kristopher Darling²; Luke Brewer¹; Gregory Thompson¹; ¹University of Alabama; ²US Army Research Laboratory

11:30 AM

Synthesis of Bulk Nanocrystalline Copper with Ultrasonic Powder Compaction: *Christopher Hareland*¹; Austin Ward¹; Zachary Cordero¹; ¹Rice University

11:50 AM

Bulk Nanostructured Rods from Gas Atomized AL-12.4TM Powder using Shear Assisted Processing and Extrusion (ShAPE): *Scott*

Whalen¹; Nicole Overman¹; Jens Darsell¹; Md. Reza-E-Rabby¹; Wayne Daye²; Tom Pelletiers²; ¹Pacific Northwest National Laboratory; ²Kymera International - SCM Metals

MATERIALS PROCESSING

Rare Metal Extraction & Processing — Rare Metals III

Sponsored by: TMS: Hydrometallurgy and Electrometallurgy Committee

Program Organizers: Gisele Azimi, University of Toronto; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Takanari Ouchi, The University of Tokyo; Neale Neelameggham, IND LLC; You Qiang, University of Idaho; Alafara Baba, University of Ilorin

Tuesday AM | March 12, 2019

210B | Henry B. Gonzalez Convention Center

Session Chairs: Shafiq Aalam, University of Saskatchewan; Gisele Azimi, University of Toronto

8:30 AM

Recovery of Manganese by Roasting-ammonia Leaching from Low-grade Manganese Carbonate Ores: *Zhongbing Tu*¹; Xiaoping Liang¹; Xiangguan Yang¹; Shilei Ren¹; Chengbo Wu¹; Yu Wang¹; ¹Chongqing University

8:55 AM

General Rules for Deep Purification of Low-grade Molybdenite Concentrates: *Junjie Yu*¹; Hu Sun¹; Jun Luo¹; Li Guanghui¹; Tao Jiang¹; ¹Central South University

9:20 AM

Production of High-purity Titanium Dioxide from Spent Selective Catalytic Reduction (SCR) Catalyst: Gyeonghye Moon¹; Jin-Hyung Kim¹; In-hyeok Choi¹; Hee-Nam Kang¹; Tae-Hyuk Lee¹; Jin-Young Lee¹; *Jungshin Kang*¹; ¹Korea Institute of Geoscience and Mineral Resources

9:45 AM

Reduction of TiCl₄ to TiH₂ with CaH₂ in Presence of Ni Powder: Mohammad Rezaei Ardani¹; Aws Sadoon Mohammed Al Janabi¹; Sanjith Udayakumar¹; *Sheikh Rezan*¹; M.N. Ahmad Fauzi¹; Abdul Rahman Mohamed¹; H.L. Lee¹; Ismail Ibrahim¹; ¹Universiti Sains Malaysia

10:10 AM Break

10:30 AM

Novel Application of Microwave Pre-Treatment for the Valorization of Rare Earth Elements from Phosphogypsum: Adrian Lambert¹; John Anawati¹; Mugdha Walawalkar¹; Jason Tam¹; *Gisele Azimi*¹; ¹University of Toronto

10:55 AM

Experimental Study on the Treatment of Zinc-containing Rotary Hearth Furnace Dust: *Shilei Ren*¹; Xiaoping Liang¹; Zhongbing Tu¹; Qian Tang¹; Xiangguan Yang¹; Yu Wang¹; ¹Chongqing University

11:20 AM

Synthesis of Tungsten Carbides by Reducing and Carbonizing WO₃ with CO: *Yijie Wu*¹; Jie Dang¹; Zepeng Lv¹; Run Zhang¹; ¹Chongqing University

ENERGY & ENVIRONMENT

REWAS 2019: Plenary Session

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

Program Organizers: Gabrielle Gaustad, Alfred University; Camille Fleuriault, Gopher Resource; Mertol Gökkelma, Norwegian University of Science and Technology; John Howarter, Purdue University; Randolph Kirchain, Massachusetts Institute of Technology; Kaka Ma, Colorado State University; Christina Meskers, Umicore; Neale Neelameggham, IND LLC; Elsa Olivetti, Massachusetts Institute of Technology; Adam Powell, Worcester Polytechnic Institute; Fiseha Tesfaye, Åbo Akademi University; Mingming Zhang, ArcelorMittal Global R&D

Tuesday AM | March 12, 2019

007C | Henry B. Gonzalez Convention Center

Session Chairs: Randolph Kirchain, Massachusetts Institute of Technology; Adam Powell, Worcester Polytechnic Institute

8:30 AM Plenary

Recycling of Critical Metals: *Toru Okabe*¹; Takanari Ouchi¹; ¹University of Tokyo

9:00 AM Plenary

Supply Chains for Battery Materials: *Ben Jones*¹; ¹CRU

9:30 AM Plenary

Implications of an Evolving Electronic Waste Stream: *Callie Babbitt*¹; ¹Rochester Institute of Technology

10:00 AM Break

10:20 AM Plenary

Is Sustainability Less Than the Sum of Its Parts?: *David Waggoner*¹; ¹Institute of Scrap Recycling Industries, Inc.

10:50 AM Plenary

Mineral Exploration of the Urban Mine: Dynamics of Aluminum Stocks and Flows: *Chris Bayliss*¹; ¹International Aluminum Institute

11:20 AM Plenary

A New Thinking in Metals Recycling: *Ramana Reddy*¹; ¹The University of Alabama

11:50 AM Plenary

Challenges of the Circular Economy: *Markus Reuter*¹; ¹Helmholtz-Institute Freiberg for Resource Technology

MATERIALS PROCESSING

Shape Casting: 7th International Symposium Celebrating Prof. John Campbell's 80th Birthday — Process Innovation and Modelling

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

Program Organizers: Murat Tiryakioglu, University of North Florida; William Griffiths, University of Birmingham; Mark Jolly, Cranfield University

Tuesday AM | March 12, 2019

006B | Henry B. Gonzalez Convention Center

Session Chair: William Griffiths, University of Birmingham

8:30 AM

The Nemak Cosworth Casting Process Latest Generation: *Glenn Byczynski*¹; Robert Mackay¹; ¹Nemak

8:55 AM

Campbellology for Runner System Design: *Fu-Yuan Hsu*¹; ¹National United University

9:20 AM**A Solidification Model with Application to AlSi-based Alloys:***Adrian Catalina*¹; Liping Xue¹; Charles Monroe²; ¹Flow Science, Inc.;²The University of Alabama**9:40 AM****Physical Modelling of Transport Phenomena in Asymmetrical****Multi-strand Tundish with Retaining Wall:** *Wei Xiao*¹; Yanping Bao¹;¹University of Science and Technology Beijing**10:00 AM Break****10:20 AM****The Validation of Feeder Modeling for Ductile Iron Castings:** *Fu-**Yuan Hsu*¹; Yu-Hung Chen¹; ¹National United University**10:40 AM****The Contactless Electromagnetic Sonotrode:** *Koulis Pericleous*¹;Valdis Bojarevics¹; Georgi Djambazov¹; Agnieszka Dybalska²;William Griffiths²; Catherine Tonry¹; ¹University of Greenwich;²University of Birmingham, UK**11:00 AM****Simulation Analysis Techniques for Investment Casting Process****of Ni-Base Superalloy Components:** *Kosuke Fujiwara*¹; HidetakaOguma¹; Masaki Taneike¹; Ikuo Okada¹; Kyoko Kawagishi²; TadaharuYokokawa²; Hiroshi Harada²; ¹Mitsubishi Heavy Industries, Ltd.;²National Institute for Materials Science**11:20 AM****Improvement in Metallurgical Properties of Gravity Die Cast****2024-T6 Aluminum Alloy via Cryogenic Process:** *Engin Tan*¹; SinanAksöz¹; Yavuz Kaplan¹; Hilal Can¹; Derya Dispinar²; ¹PamukkaleUniversity; ²Istanbul University**11:40 AM****Melt Cleaning Efficiency of Various Fluxes for A356 Alloy:** *Caglar**Yuksel*¹; Ugur Aybarc²; Eray Erzi³; Derya Dispinar³; Mustafa Cigdem⁴;¹Ataturk University; ²CMS; ³Istanbul University; ⁴Yildiz Technical

University

LIGHT METALS**Solidification Processing of Light Metals and Alloys: An MPMD
Symposium in Honor of David StJohn — Shape Casting and
Defects**

Sponsored by: TMS: Solidification Committee

Program Organizers: Mark Easton, RMIT University; Ma Qian, RMIT University (Royal Melbourne Institute of Technology); John Grandfield, Grandfield Technology Pty Ltd; Norbert Hort, Helmholtz-Zentrum Geesthacht; Mark Jolly, Cranfield University

Tuesday AM | March 12, 2019
006C | Henry B. Gonzalez Convention Center

Session Chairs: Peter Lee, University College London; Diran Apelian, Worcester Polytechnic Institute

8:30 AM Keynote

Porosity in Castings: *Mark Jolly*¹; ¹Cranfield University

8:50 AM Keynote

Twin-roll Casting of Mg Alloys: *Nack Kim*¹; ¹Pohang University of Science and Technology

9:10 AM Invited

Practical Experiences Using Knowledge to Solve Mysterious Problems: *Salvador Valtierra*¹; ¹Namak

9:30 AM Invited

Effects of Si Macrosegregation of the Constitutive Behaviour of A356: *Hatef Khadivinassab*¹; *Daan Maijer*¹; *Steve Cockcroft*¹; ¹University of British Columbia

9:50 AM Invited

Modelling of Shrinkage-induced Species Macrosegregation in A356 Aluminum Wheel Casting: *Pan Fan*¹; *Steve Cockcroft*¹; *Daan Maijer*¹; *Lu Yao*¹; *Carl Reilly*²; *Andre Phillion*³; ¹University of British Columbia; ²Cast Analytics Inc.; ³McMaster University

10:10 AM Break

10:30 AM Keynote

Prediction of Hot Tearing “Down Under” the Root of Dendrites during Direct Chill Casting: *Niloufar Khodaei*¹; *Andre Phillion*¹; ¹McMaster University

10:50 AM Invited

Deformation and Defect Formation in Partially Solid Alloys: *Christopher Gourlay*¹; *Te-Cheng Su*¹; *Catherine O'Sullivan*¹; *Hideyuki Yasuda*²; ¹Imperial College London; ²Kyoto University

11:10 AM

Study on the Hot Tearing Susceptibility of Mg-Gd Binary Magnesium Alloy: *Guangyu Yang*¹; *Shifeng Luo*¹; *Zhen Zou*¹; *Wanqi Jie*¹; ¹Northwestern Polytechnical University

11:30 AM

Compositional Templating for Heterogeneous Nucleation of Intermetallic Compounds: *Zhongping Que*¹; *Zhongyun Fan*¹; *Yun Wang*¹; ¹Brunel University

MECHANICS & STRUCTURAL RELIABILITY

Thermo-mechanical Response of Materials Investigated through Novel in-situ Experiments and Modeling — Session III

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Robert Wheeler, Microtesting Solutions LLC; Dongchan Jang, Kaist; Amit Pandey, Granta Design/ANSYS; Josh Kacher, Georgia Institute of Technology; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Tuesday AM | March 12, 2019

301A | Henry B. Gonzalez Convention Center

Session Chairs: Saurabh Puri, Microstructure Engineering; Arunabha Roy, University of Michigan-Ann Arbor

8:30 AM Introductory Comments

8:35 AM Keynote

Dislocation Dynamics Simulation for Predicting Precipitation Strengthening in Mg-Nd Alloys: *Arunabha Mohan Roy*¹; *Chaoming Yang*¹; *Zhihua Huang*¹; *Amit Misra*¹; *John Allison*¹; *Liang Qi*¹; ¹University of Michigan

9:15 AM

In Situ Micro-mechanical Characterization and Multiscale Modeling of Thermo-mechanical Properties of Micro-architected Tungsten Coating: *Quan Jiao*¹; *Jiahao Cheng*¹; *Gi-Dong Sim*²; *Jaafar El-Awady*¹; ¹The Johns Hopkins University; ²KAIST

9:35 AM

Diffuse Interface Approach to Modeling Crystal Plasticity with Accommodation of Grain Boundary Sliding: *Tianle Cheng*¹; Youhai Wen²; Jeffrey Hawk²; ¹National Energy Technology Laboratory / AECOM; ²National Energy Technology Laboratory

9:55 AM

Nano-mechanics-based Characterization of Radiation-tolerance for Reduced-activation Ferritic/Martensitic (RAFM) Steel: *Ye-Eun Na*¹; Woojin Jeong²; Myung-Gyu Lee²; Dongchan Jang¹; ¹KAIST; ²Seoul National University

10:15 AM Break

10:35 AM

Modeling the Contribution of Deformation Twinning to the Temperature and Rate Dependent Strength of Tantalum: *Anik Faisal*¹; Christopher Weinberger¹; ¹Colorado State University

10:55 AM

The Connection Between Ideal Strengths and Deformation Mechanisms in BCC Refractory Metals: *Chaoming Yang*¹; Liang Qi¹; ¹University of Michigan

11:15 AM

Mesoscale Simulation of Microstructure Dependent Failure in Hydrided Zircaloy Structure: *Hao Wang*¹; Vikas Tomar¹; ¹Purdue University

11:35 AM

Modelling of Grain Boundary Segregation and Precipitation in Multi-component Al Alloys Subjected to Heat Treatment: *Dongdong Zhao*¹; Sylvain Gouttebroze²; Jesper Friis²; Yanjun Li¹; ¹Norwegian University of Science and Technology; ²SINTEF

LIGHT METALS

TMS-DGM Symposium on Lightweight Metals: A Joint US-European Symposium on Challenges in Light Weighting the Transportation Industry — Aluminum

Sponsored by: DGM (Deutsche Gesellschaft für Materialkunde eV), TMS: Magnesium Committee, TMS: Aluminum Committee

Program Organizers: Eric Nyberg; Wilhelmus Sillekens, European Space Agency; Juergen Hirsch, Hydro Aluminium Rolled Products GmbH; Norbert Hort, Helmholtz-Zentrum Geesthacht

Tuesday AM | March 12, 2019
006A | Henry B. Gonzalez Convention Center

Session Chairs: Wilhelmus Sillekens, European Space Agency; Juergen Hirsch, Hydro Aluminium Rolled Products

8:30 AM Introductory Comments

8:40 AM

A Novel Flexible SSM and HPDC Equipment to Process Secondary Aluminium Alloys for Decarbonising Lightweight Parts in Automotive Sector: *Fabrizio D'Errico*¹; *Guido Perricone*²; *Mattia Alemani*²; ¹Politecnico Di Milano Politecnico Di Milano; ²Brembo Spa

9:00 AM

The Effects of Strontium Addition on the Microstructures and Mechanical Properties of Al-7Si Alloy Reinforced with In-situ Al₃Ti Particulates: *Siming Ma*¹; *Xiaoming Wang*¹; ¹Purdue University

9:20 AM

Mechanical and Microstructural Characterization of Ultrasonic Metal Welded Large Cross Section Aluminum Wire/Copper Terminal Joints: *Andreas Gester*¹; *Guntram Wagner*¹; *Ingo Kesel*²; *Friedhelm Guenter*²; ¹Technische Universität Chemnitz; ²Robert Bosch GmbH Renningen

9:40 AM

The Dependence of Local Strain Distribution on Quench Rate for Extruded Al-Mg-Si-Mn-Fe Alloys: *Warren Poole*¹; *Mojtaba Mansouri*¹; *Nick Parson*²; *Mei Li*³; ¹University of British Columbia; ²Rio Tinto Aluminium; ³Ford Motor Company

10:00 AM Break

10:20 AM

The Effect of through Thickness Texture Variation on the Anisotropic Mechanical Response of an Extruded Al-Mn-Fe-Si Alloy: *Jingqi Chen*¹; *Nick Parson*²; *Warren Poole*¹; ¹University of British Columbia; ²Rio Tinto Aluminium

10:40 AM

Increasing the Strength and Electrical Conductivity of AA6101 Aluminum by Nanostructuring: Rilee Meagher¹; Mathew Hayne¹; Julie DuClos¹; Casey Davis¹; Terry Lowe¹; Tamás Ungár²; *Babak Arfaei*³; ¹Colorado School of Mines; ²Eötvös University; ³Ford Motor Company

11:00 AM

Assessing the Impact of Texture and its Gradients on the Forming Limits of an AA6xxx Sheet Alloy: *Jishnu Bhattacharyya*¹; Nathan Peterson¹; Richard Burrows²; David Anderson²; Fatih Sen²; Vishwanath Hegadekatte²; Sean Agnew¹; ¹University of Virginia; ²Novelis Inc

MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing — High Temperature Processing

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Tao Jiang, Central South University; Jiann-Yang Hwang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

Tuesday PM | March 12, 2019

208 | Henry B. Gonzalez Convention Center

Session Chairs: Zhiwei Peng, Central South University; Elsa Olivetti, Massachusetts Institute of Technology

2:00 PM Introductory Comments

2:05 PM

The Reduction Performance of the Ca₂(Fe_{2-x}Al_x)O₅ Solid Solution: *Fei Liao*¹; Xing-Min Guo¹; ¹University of Science and Technology Beijing

2:25 PM

Determination of Minimum Practical Sintering Temperature of Potential HEA Alternative Binders for Cemented Carbides: *Jannette Chorney*¹; Jerome Downey¹; Grant Wallace¹; Marc D'Aberle¹; ¹Montana Tech

2:45 PM

Effects of Temperature and Alkali Carbonates on Graphitization and Metallurgical Properties of Coke: *Rongjin Zhu*¹; Shengfu Zhang; Guangsheng Suo¹; Yue Wu¹; Xiaohu Zhou¹; Shuxing Qiu¹; ¹Chongqing University

3:05 PM

Field-assisted Sintering of Nickel-based Superalloy Powder for High Temperature Hybrid Turbine Disk Applications: *Charis Lin*¹; Sebastian Niuman¹; Namiko Yamamoto¹; Anil Kulkarni¹; Jogender Singh¹; ¹Penn State University

3:25 PM Break

3:45 PM

Sintering Test Research of High Proportion Limonite: *Zhao Qiang*¹; ¹University of Science and Technology Beijing

4:05 PM

Stainless Steel Extrusions and Cold Draw Process to Achieve Properties for Elevated Temperature Applications: Debajyoti Maitra¹; *Cody Traylor*¹; Phani Gudipati¹; ¹Plymouth Tubing Company

4:25 PM Concluding Comments

SPECIAL TOPICS

2019 International Metallurgical Processes Workshop for Young Scholars (IMPROWYS 2019) — Powder Metallurgy and Additive Manufacturing

Sponsored by: TMS Extraction and Processing Division

Program Organizers: Cong Wang, Northeastern University; Amy Clarke, Colorado School of Mines; Kinnor Chattopadhyay, University of Toronto; Bryan Webler, Carnegie Mellon University

Tuesday PM | March 12, 2019

213B | Henry B. Gonzalez Convention Center

Funding support provided by: Korean Institute of Metals and Materials

Session Chairs: Gang Chen, University of Science and Technology Beijing; Hojong Kim, Pennsylvania State University

2:00 PM Invited

Product Driven Process Research for AM Powder Production: Ali Asgarian¹; Eric (Cheng Tse) Wu¹; *Kinnor Chattopadhyay*¹; ¹University of Toronto

2:30 PM Invited

Preparation and Formation Mechanism of Dispersed Er₂O₃ Doped Mo Super-fine Powders and Agglomerated La₂O₃ Doped Mo Powders: *Jinshu Wang*¹; ¹Beijing University of Technology

3:00 PM Invited

Sintering of Titanium Alloys from the Core-shell Structured Titanium@ Metal Powders: *Yafeng Yang*¹; Shaofu Li¹; ¹Institute of Processing Engineering Chinese Academy of Science

3:30 PM Break

3:50 PM Invited

Static Magnetic Field has Impact on Solidification Structure of Metallic Samples Fabricated via Additive Manufacturing: *Jiang Wang*¹; Zhongming Ren¹; ¹Shanghai University

4:20 PM Invited

Cost-affordable Ti Powders for Additive Manufacturing Treated by Fluid-bed: *Gang Chen*¹; Wangwang Ding¹; Mingli Qin¹; Wei Cai²; Xuanhui Qu¹; ¹University of Science and Technology Beijing; ²Stanford University

4:50 PM

New Insights into Interfacial Reactions between CBN and Cu-Sn-Ti Active Filler Metals: *Yonggang Fan*¹; Cong Wang¹; ¹Northeastern University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

2019 Symposium on Functional Nanomaterials: Synthesis, Integration, and Application of Emerging Nanomaterials — Two-dimensional Nanomaterials II

Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory; Jiyoung Chang, University of Utah; Pei Dong, George Mason University; Yong Lin Kong, University of Utah; Shengfeng Yang, Indiana University; Purdue University Indianapolis; SungWoo Nam, University of Illinois

Tuesday PM | March 12, 2019

213A | Henry B. Gonzalez Convention Center

Session Chairs: Stephen McDonnell, University of Virginia; Yeonwoong Jung, University of Central Florida

2:00 PM Invited

2D and Layered Metal Chalcogenide Semiconductors: Growth, Electronic Structure, Light-matter Interactions: *Peter Sutter*¹; ¹University of Nebraska-Lincoln

2:30 PM Invited

2D Flexible Electronics and Graphene Electronic Tattoo: *Deji Akinwande*¹; ¹University of Texas - Austin

3:00 PM

Distinctive Optoelectronic Signatures of Energy Transfer and Charge Transfer in Quantum-dot-sensitized Two-dimensional Semiconductors Probed by Scanning Photocurrent Microscopy: *Chang-Yong Nam*¹; ¹Brookhaven National Laboratory

3:20 PM

Stress Dependent Phase Transition in Monolayer MoTe₂: *Wei Gao*¹; ¹The University of Texas at San Antonio

3:40 PM Break

4:00 PM Invited

Wafer-scale Epitaxial Growth of Transition Metal Dichalcogenides by Gas Source CVD: *Joan Redwing*¹; Xiaotian Zhang¹; Tanushree Choudhury¹; Mikhail Chubarov¹; ¹Pennsylvania State University

4:30 PM Invited

The Emergence of Multifunctional Two-dimensional Materials: *Jun Lou*¹; ¹Rice University

5:00 PM

Mechanical Instability-driven Architecturing of Atomically-thin Materials: *SungWoo Nam*¹; ¹University of Illinois

5:20 PM

Thermal Stability of Metal/TMD Interfaces: Keren Freedy¹; *Stephen McDonnell*¹; ¹University of Virginia

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Energy Storage with Emphasis on Batteries II

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Tuesday PM | March 12, 2019
225A | Henry B. Gonzalez Convention Center

Session Chairs: Partha P. Mukherjee, Purdue University; George Nelson, University of Alabama, Huntsville

2:00 PM Keynote

Defining Conduction Pathways in Cathode Materials: Resolving Logjams through Atomistic Design and Mesoscale Structuring: *Sarbajit Banerjee*¹; ¹Texas A&M University

2:30 PM Invited

Multiscale Analysis of Lithium Ion Battery Materials Using X-ray Tomography: Thushananth Rajendra¹; Prehit Patel¹; *George Nelson*¹; ¹University of Alabama in Huntsville

2:55 PM Keynote

Lithium Battery Characterization Using Neutron Imaging Techniques: *Hassina Bilheux*¹; Robert Schmidt¹; Jagjit Nanda¹; Nancy Dudney¹; Jean Bilheux¹; ¹Oak Ridge National Laboratory

3:25 PM Break

3:45 PM

Exploiting Piezoelectrochemical Phenomena in Lithium-ion Batteries for Low Frequency Mechanical Energy Harvesting and Storage: Craig Arnold¹; Juliane Preimesberger¹; *Seung-Yeon Kang*¹; ¹Princeton University

4:05 PM

In Situ Electrochemical Dilatometry Study of Capacity Fading in Nanoporous Ge-based Na-ion Battery Anode during Sodiation-desodication Cycles: *Manni Li*¹; Eric Detsi¹; ¹University of Pennsylvania

4:25 PM

Mechanistic Understanding of Multi-modal Degradation in Li-ion Battery Electrodes: *Ankit Verma*¹; Partha Mukherjee¹; ¹Purdue University

4:45 PM Invited

Elucidating the Role of Mesoscale Morphology on Lithium-ion Battery Mechanical and Electrochemical Performance through Mesoscale Simulation: *Scott Roberts*¹; Dan Bolintineanu¹; Mark Ferraro¹; Jeremy Lechman¹; David Noble¹; Ishan Srivastava¹; Bradley Trembacki¹; ¹Sandia National Laboratories

SPECIAL TOPICS

Acta Materialia Symposium — Acta Materialia Award Session

Program Organizer: Carolyn Hansson, University of Waterloo

Tuesday PM | March 12, 2019

217C | Henry B. Gonzalez Convention Center

Session Chair: Carolyn Hansson, University of Waterloo

3:15 PM Introductory Comments

3:25 PM Invited

Acta Materialia Gold Medal Lecture: Stabilizing Nanostructures in Metals: *Ke Lu*¹; ¹Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences

3:45 PM Question and Answer Period

3:55 PM Invited

Acta Materialia Silver Medal Lecture: Generation of Interfacial Dislocations Loops to Overcome the Nucleation Barrier of Tetrahedron Shaped Precipitates: *Xavier Sauvage*¹; ¹Groupe de Physique des Matériaux, CNRS, Université Rouen Normandie

4:15 PM Question and Answer Period

4:25 PM Invited

Acta Materialia Hollomon Award for Materials and Society Lecture: When Science Matters: *Alexander King*¹; ¹Iowa State University

4:45 PM Question and Answer Period

5:00 PM

An Update on Materialia and on the Preprint Server MatSciRN: *Christopher Schuh*¹; ¹Massachusetts Institute of Technology

5:30 PM Wine and Cheese Reception

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Welding: Physical and Mechanical Metallurgy of Rapidly Solidified Metals — Process, Structure, and Properties I

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorganji, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Semiatin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

Tuesday PM | March 12, 2019

221A | Henry B. Gonzalez Convention Center

Session Chair: David Bourell, University of Texas

2:00 PM

3D Characterization of Solidification-induced Orientation Gradients in Additively Manufactured Stainless Steel: *Andrew Polonsky*¹; William Lenthe²; McLean Echlin¹; Veronica Livescu³; George Gray³; Tresa Pollock¹; ¹University of California, Santa Barbara; ²Carnegie Mellon University; ³Los Alamos National Laboratory

2:20 PM

Build Environment Pressure Effects on SLM Processing of 316L Stainless Steel: *Jonathan Gibbs*¹; Stuart Baker²; Ryan Penny³; Christoph Meier⁴; David Griggs³; A. John Hart³; ¹U.S. Naval Academy; ²U.S. Air Force Research Laboratory; ³Massachusetts Institute of Technology; ⁴Technical University of Munich

2:40 PM

The Effect of Welding Process Parameters on Microstructure, Creep Strength and Fracture Toughness of 22V Submerged Arc Weldments: *Harrison Whitt*¹; Michael Kottman²; Ben Schaeffer²; Michael Mills¹; ¹Ohio State University; ²The Lincoln Electric Company

3:00 PM

Print Pattern Impact on the Material Properties of Metal Big Area Additively Manufactured Multi-layered Steel Interfaces: *Eric Tenuta*¹; Andrzej Nycz²; Mark Noakes²; Srdjan Simunovic²; Markus Piro¹; ¹University of Ontario Institute of Technology; ²Oak Ridge National Laboratory

3:20 PM

Thermal Modeling of Maragani Flow in the Melt pool for SS 17-4 PH Stainless Steel in Selective Laser Melting: *Yi Shu*¹; Daniel Galles²; Xiaohan Zhang¹; Wei Cai¹; Adrian Lew¹; ¹Stanford University; ²Oak Ridge Institute for Science and Education

3:40 PM Break

4:00 PM

Effect of Thermal Cycles on the Microstructure of 17-4 PH Stainless Steel Parts Prepared by Selective Laser Melting: *Yu Sun*¹; Mark Aindow¹; Rainer Hebert¹; ¹University of Connecticut

4:20 PM

Laser Additive Repair of Cast Ni-Al-Bronze Components: *Xinjin Cao*¹; P. Wanjara¹; J. Gholipour¹; Y. Wang²; ¹National Research Council Canada-Aerospace; ²Defence Research and Development Canada

4:40 PM

Morphological Features of Melt Pool in Selective Laser Melting of Inconel 738LC Alloy: *Teresa Guraya*¹; Amir Safwan Anuar²; Sarat Singamneni²; Zhan Chen²; ¹University of the Basque Country; ²Auckland University of Technology

5:00 PM

Development of Tailor-made Properties via Additive Manufacturing of Functionally Graded Inconel 718: *V.A. Popovich*¹; E. V. Borisov²; V. Sh. Sufiarov²; A. A. Popovich²; ¹Delft University of Technology; ²Peter the Great Saint-Petersburg Polytechnic University

5:20 PM

Quantifying Microstructure Variability in Large-scale 3D Printed Metals Using Optical Microscopy: *Matteo Seita*¹; Ekta Jain¹; ¹Nanyang Technological University

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications — Design, Process Optimization and Qualification

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Charit, University of Idaho; Somayeh Pasebani, Oregon State University; Chad Duty, University of Tennessee

Tuesday PM | March 12, 2019
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Session Chair: Somayeh Pasebani, Oregon State University

2:00 PM Invited

Impact of Powder Feedstock Compositions on the Additive Manufacturing of Corrosion Resistant Alloys for Energy Applications: *Todd Palmer*¹; ¹Pennsylvania State University

2:30 PM

Electrical Resistivity of Pure Copper Processed by Medium-powered Laser Powder Bed Fusion Additive Manufacturing for Use in Electromagnetic Applications: *Leonidas Gargalis*¹; Cassidy Sibernagel¹; Richard Hague¹; Ian Ashcroft¹; Phill Dickens¹; ¹University of Nottingham, Center for Additive Manufacturing

2:50 PM

Powder Surface Characterization toward Powder Feedstock Screening for AM: *Timothy Prost*¹; Dapeng Jing²; Michael Kirka³; Emma White¹; Iver Anderson¹; ¹Ames Laboratory; ²Iowa State University; ³Oak Ridge National Laboratory

3:10 PM Invited

Binder Jetting Materials for Energy Applications: *Corson Cramer*¹; Parans Paranthaman¹; Hsin Wang¹; Kashif Nawaz¹; Amy Elliott¹; ¹Oak Ridge National Laboratory

3:40 PM Break

4:00 PM Invited

Recent Progress in Testing and Qualification of PM-HIP Alloys for Nuclear Applications: *Janelle Wharry*¹; Michael Pavel²; Zachary Kroll¹; Esteban Bautista³; Alexander Bullens¹; Donna Guillen⁴; Lucille Giannuzzi⁵; Elizabeth Getto⁶; Darren Pagan⁷; Paula Freyer⁸; David Gandy⁹; ¹Purdue University; ²University of Alabama; ³California State University - Northridge; ⁴Idaho National Laboratory; ⁵L.A. Giannuzzi & Associates; ⁶US Naval Academy; ⁷Cornell University; ⁸Westinghouse Electric Company, LLC; ⁹Electric Power Research Institute

4:30 PM

Design for Additive Manufacturing of a Novel Heat Exchanger:

*Adrian Sabau*¹; Bart Murphy¹; Keith Carver¹; Frederick List¹; Yarom Polsky¹; ¹Oak Ridge National Laboratory

4:50 PM

Thermoelectric Higher Manganese Silicide: Synthesized, Sintered and Shaped Simultaneously by Selective Laser Sintering/

melting Additive Manufacturing Technique: *Yohann Thimont*¹; Lionel Presmanes¹; Vincent Baylac¹; Philippe Tailhades¹; David Berthebaud²; Franck Gascoin²; ¹CIRIMAT; ²Laboratoire CRISMAT UMR 6508 CNRS ENSICAEN

5:10 PM

Laser Additive Manufacturing of Thermoelectric Materials:

Haidong Zhang¹; Panagiotis Rammos¹; *Saniya LeBlanc*¹; ¹George Washington University

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Fatigue and Fracture III — Session II

Sponsored by: TMS: Additive Manufacturing Committee

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

Tuesday PM | March 12, 2019

221B | Henry B. Gonzalez Convention Center

Session Chair: Mohsen Seifi, ASTM International

2:00 PM Invited

Criticality of Porosity Defects on the Fatigue Life of Wire + Arc

Additive Manufactured Titanium Alloy: *Xiang Zhang*¹; ¹Coventry University

2:30 PM

Effect of the Surface Finish on the Cyclic Behavior of Additively

Manufactured AlSi10Mg: *Matilde Scurria*¹; Benjamin Möller²; Rainer Wagener²; Tobias Melz²; ¹TU Darmstadt; ²Fraunhofer Institute for Structural Durability and System Reliability LBF

2:50 PM

The Relationship of Processing Parameters to Surface Roughness and Fatigue Life in Additive Manufacturing: *Joy Gockel*¹; Luke Sheridan¹; Bo Whip¹; Eric Tatman¹; Brittanie Koerper¹; ¹Wright State University

3:10 PM

Effect of Heat Treatments on Fatigue Properties of Ti-6Al-4V and 316L Produced by Laser Powder Bed Fusion in as Built Surface Condition: *Antonio Cutolo*¹; Chola Elangeswaran¹; Charlotte de Formanoir¹; Gokula Muralidharan²; Brecht Van Hooreweder¹; ¹KU Leuven; ²3D Systems

3:30 PM Break

3:50 PM Invited

Fatigue Crack Growth Properties of Selective Laser Melting Produced Alloy 718 at Ambient and Elevated Temperatures: *Jamie Kruzic*¹; Halsey Ostergaard¹; ¹UNSW Sydney

4:20 PM

The Effects of Microstructure and Material Length Scales on the Fatigue Crack Growth Rates for Thin Wall Additive Manufactured Components: *Richard Russell*¹; Jacob Hochhalter²; David Dawicke³; Edward Glaessgen¹; Douglas Wells¹; ¹NASA; ²University of Utah; ³Analytical Services and Materials, Inc.

4:40 PM

Fatigue Crack Initiation and Growth Behavior in Additively Manufactured 17-4 PH Stainless Steel: *Pooriya Dastranjy Nezhadfar*¹; Shuai Shao²; Steve Daniewicz³; Nam Phan⁴; Nima Shamsaei¹; ¹Auburn University; ²Louisiana State University; ³University of Alabama; ⁴U.S. Naval Air System Command (NAVAIR)

5:00 PM

The Effects of Powder Recycling on the Mechanical Properties of Additively Manufactured Materials: *Arash Soltani-Tehrani*¹; Jonathan Pegues¹; Jaikp Mallory²; John Robertson²; Ramesh Ramakrishnan³; Mohsen Seifi⁴; Nima Shamsaei¹; ¹Auburn University; ²Delta Air Lines, Inc.; ³Delta Air Lines, Inc.; ⁴Case Western Reserve University/ASTM International

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Microstructural Evolution and Phase Transformations — Ni-based Systems II

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

Program Organizers: Bij-Na Kim, LPW Carpenter Additive; Eric Lass, National Institute of Standards and Technology; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Ryan Dehoff, Oak Ridge National Laboratory; Gerhard Fuchs, University of Florida; Chantal Sudbrack, QuesTek Innovations LLC

Tuesday PM | March 12, 2019
221C | Henry B. Gonzalez Convention Center

Session Chairs: Chantal Sudbrack, QuesTek Innovations, LLC; Gerhard Fuchs, University of Florida

2:00 PM Invited

The Microstructural Evolution of CM247LC Manufactured through Selective Laser Melting: *Katerina Christofidou*¹; Nick Jones¹; Ed Pickering²; Yogiraj Pardhi³; Neil Jones³; Howard Stone¹; ¹University of Cambridge; ²University of Manchester; ³Rolls-Royce plc

2:30 PM

Influence of Different Heat Treatments on the Microstructure and Mechanical Properties of Additively Manufactured IN718: *Benedikt Diepold*¹; Martin Pröbstle¹; Steffen Neumeier¹; Mathias Göken¹; ¹Friedrich-Alexander University Erlangen-Nürnberg

2:50 PM

Integrated Computational Modeling of Selective Laser Melting of Inconel 718: *Kubra Karayagiz*¹; Luke Johnson¹; Mohamad Mahmoudi¹; Hannah Boon¹; Alaa Elwany¹; Ji Ma¹; Ibrahim Karaman¹; Raymundo Arroyave¹; ¹Texas A&M University

3:10 PM

Microstructural Response to Heat Treatment of Blown Powder Inconel 625: *Myles Fullen*¹; Judy Schneider¹; Paul Gradl²; ¹University of Alabama At Huntsville; ²NASA Marshall Space Flight Center

3:30 PM Break

3:50 PM

The Effects of Heat Treatments on Microstructure, Texture, and Mechanical Properties Evolution in IN718 Cubes Additively Manufactured by Laser Powder Bed Fusion: *Runbo Jiang*¹; *Anthony Rollett*¹; ¹Carnegie Mellon University

4:10 PM

How Dependent are the Microstructure Evolutions of AM Alloys on the Local Geometry and Thermal Conditions of the Build?:

*Fan Zhang*¹; Lyle Levine¹; Mark Stoudt¹; Carelyn Campbell¹; Andrew Allen¹; ¹National Institute of Standards and Technology

4:30 PM

Microstructure and Mechanical Response of SLM IN718 Printed under Ar, N₂, He Gases:

*Glenn Bean*¹; David Witkin¹; Tait McLouth¹; Dhruv Patel¹; Rafael Zaldivar¹; ¹The Aerospace Corporation

4:50 PM

Quantifying Bimetallic Joints Formed Using Directed Energy Deposition Processes:

*Jordan Terrell*¹; Judy Schneider¹; Paul Gradl²; ¹University of Alabama at Huntsville; ²NASA Marshall Space Flight Center

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development — Fundamentals in Alloy Design for AM II

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

Program Organizers: Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Hunter Martin, HRL Labs; Orlando Rios, Oak Ridge National Laboratory

Tuesday PM | March 12, 2019

221D | Henry B. Gonzalez Convention Center

Session Chairs: Orlando Rios, Oak Ridge National Laboratory; Ida Berglund, QuesTek Innovations

2:00 PM Invited

Nanostructured Metal Parts through Green Body 3D Printing and Sintering:

*Christopher Schuh*¹; ¹Massachusetts Institute of Technology

2:30 PM

Coupling the Calculation of Phase Diagrams and Machine Learning to Search for Printable Alloys:

*Minh-Son Pham*¹; ¹Imperial College London

2:50 PM

Additive Manufacturing of Aluminum Alloys from Multiple Series Via Nanofunctionalization:

*Julie Miller*¹; Brennan Yahata¹; Randall

Schubert¹; John Martin¹; Jacob Hundley¹; ¹Hrl Laboratories, Llc

3:10 PM Invited

Data-driven Design of Alloys for Additive Manufacturing: *Bryce Meredig*¹; ¹Citrine Informatics

3:40 PM Break

4:00 PM

Progress of Developing Addalloy™, High-performance Aluminum Alloys for Additive Manufacturing: *Joe Croteau*¹; Seth Griffiths²; Christian Leinenbach²; David Seidman³; David Dunand³; Nhon Vo¹; ¹NanoAl LLC; ²Empa; ³Northwestern University

4:20 PM

3D Printed Ultrastrong and Ultratough Metallic Architectures: *Wen Chen*¹; Cheng Zhu²; Thomas Voisin²; Scott McCall²; Andrew Pascall²; Joshua Kuntz²; Eric Duoss²; Christopher Spadaccini²; ¹University of Massachusetts, Amherst; ²Lawrence Livermore National Laboratory

4:40 PM

Additive Manufacturing of 304 Stainless Steel Oxide Dispersion Alloy via Selective Laser Melting: *Milad Ghayoor*¹; Kijoon Lee¹; Yujuan He²; Chih-hung Chang²; Brian K. Paul¹; Somayeh Pasebani¹; ¹School of Mechanical, Industrial and Manufacturing Engineering, Oregon State University; ²School of Chemical, Biological, and Environmental Engineering, Oregon State Univeristy

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session IV

Sponsored by: TMS: Shaping and Forming Committee

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

Tuesday PM | March 12, 2019

302A | Henry B. Gonzalez Convention Center

Session Chairs: Daniel Coughlin, Los Alamos National Laboratory; Daniel Savage, University Of New Hampshire

2:00 PM

3D Observation of Plastic Slip Localization in a Ti-7Al Alloy Using X-ray Topotomography: *Patrick Callahan*¹; Jean Stinville¹; Aude Mulard²; Wolfgang Ludwig³; Henry Proudhon⁴; Tresa Pollock¹; ¹University of California Santa Barbara; ²Safran; ³MATEIS, INSA Lyon; ⁴MINES ParisTech

2:20 PM

The Shear Response of Beryllium as a Function of Temperature and Strain Rate: *Carl Cady*¹; Cheng¹; Carl Trujillo¹; George Gray¹; ¹Los Alamos National Laboratory

2:40 PM

Discerning Multiaxial Stress Gradients Using High Energy X-rays and Finite Elements: *Christopher Budrow*¹; Matt Miller¹; Paul Dawson¹; ¹Cornell University

3:00 PM

Micro-cantilever Tests of Asymmetry in Tensile and Compressive Slip Properties in Alpha Titanium: *Jicheng Gong*¹; Angus Wilkinson¹; ¹University of Oxford

3:20 PM

Cold Creep of Ti Alloys: In Situ Synchrotron Diffraction and Crystal Plasticity Finite Element Analysis: *Yi Xiong*¹; Phani Karamched¹; Chi-Toan Nguyen²; Christopher Magazzeni¹; David Collins³; Edmund Tarleton¹; Angus Wilkinson¹; ¹University of Oxford; ²University of Manchester; ³University of Birmingham

3:40 PM Break

4:00 PM

Effect of Microtextured Regions on the Early Plastic Deformation of Ti-6Al-4V: EVP-FFT Simulations of Realistic Polycrystals Reconstructed Using 3D EBSD: *Samuel Hemery*¹; Azdine Nait-Ali¹; Mikael Gueguen²; Joseph Wendorf³; McLean Echlin³; Jean-Charles Stinville³; Tresa Pollock³; Patrick Villechaise²; ¹Pprime Institute - ENSMA; ²Pprime Institute - CNRS; ³University of California, Santa Barbara

4:20 PM

A New Mechanism of Strain Transfer in Polycrystals: *Fabio Di Gioacchino*¹; Thomas Edwards²; Garth Wells³; William Clegg¹; ¹Department of Materials Science and Metallurgy, University of Cambridge; ²EMPA – Swiss Federal Laboratories for Materials Science and Technology; ³Department of Engineering, University

of Cambridge

4:40 PM

In Situ X-ray Diffraction and High-resolution DIC of a High Work-hardening Ti-6Al-4V Prepared by Electron-beam Melting: *Karl Sofinowski*¹; Solange Vivés²; Charlotte De Formanoir²; Ivo Kubena³; Steven Van Petegem¹; Stéphane Godet²; Helena Van Swygenhoven¹; ¹Paul Scherrer Institute; ²Université Libre de Bruxelles; ³Academy of Sciences of the Czech Republic

5:00 PM

Effect of Basal Precipitates on Non-basal Deformation Mechanisms: a Micro-compression Study of Single Crystal Mg-9Al (wt%) Pillars: *Xiaolong Ma*¹; Quan Jiao¹; Laszlo Kecskes¹; Jaafar El-Awady¹; Timothy Weihs¹; ¹Johns Hopkins University

5:20 PM

Microstructure and Deformation Behavior of CP Titanium with Different Oxygen Contents: *Joo-Hee Kang*¹; Jun-Yeol Chae²; Ji Hoon Kim²; Eun-Young Kim¹; Chan Hee Park¹; Chang-Seok Oh¹; ¹Korea Institute of Materials Science; ²Pusan National University

ADVANCED MATERIALS

Advanced High-Strength Steels III – Microstructure, Processing, and Properties of Advanced High-Strength Steels II

Sponsored by: TMS: Steels Committee

Program Organizers: Amy Clarke, Colorado School of Mines; MingXin Huang, University of Hong Kong; C. Tasan, Massachusetts Institute of Technology; Kester Clarke, Colorado School of Mines; Ana Luiza Araujo, AK Steel Research & Innovation

Tuesday PM | March 12, 2019

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Session Chairs: Joseph McDermid, McMaster University; Virginia Judge, Colorado School of Mines

2:00 PM

Effect of Electrode Degradation on Liquid Metal Embrittlement Cracking in Resistance Spot welding of Advanced High Strength Steels: Kaiser Mahmud¹; Siva Prasad Murugan¹; Yeongdo Park¹; ¹Dong-Eui University

2:20 PM

Microscale Observations of Liquid Metal Embrittlement in TRIP Steels: *Daniel Massie*¹; Mark Barkey¹; Benjamin Hilpert²; Holger Schubert²; Luke Brewer¹; ¹University of Alabama; ²TecFabrik Daimler AG

2:40 PM

Effect of Intercritical Annealing Parameters and Surface Active Element (Sn) Addition on the Mechanical Properties of a Medium Mn Third Generation Advanced High Strength Steel: *Kazi Mahmudul Haque Bhadhon*¹; Joseph McDermid¹; Frank Goodwin²; ¹McMaster University; ²International Zinc Association

3:00 PM

Atomistic and First Principles Simulation of Fe/Fe₃Al₈ System: *Kefan Chen*¹; Bin Li¹; ¹University of Nevada, Reno

3:20 PM Break

3:40 PM

Cyclic Austenite-to-Ferrite and Ferrite-to-Austenite Phase Transformations in Fe-C-Mn-Si Alloy: Phase-Field and Experimental Studies: *Rihito Ikuta*¹; Akinori Yamanaka¹; Takahiko Kohtake²; Masahito Segawa³; ¹Tokyo University of Agriculture and Technology; ²Nippon Steel & Sumitomo Metal Corporation; ³ITOUCHU Techno-Solutions Corporation

4:00 PM

Stabilizing Austenite via a Core-Shell Structure in the Medium Mn Steel: *Xinhao Wan*¹; Hao Chen¹; Zhigang Yang¹; Chi Zhang¹; ¹Tsinghua University

4:20 PM

The Influence of Multi-step Partitioning on the Microstructure and Mechanical Properties of High Strength-high Ductility Medium-manganese Steels: Kun Li¹; *Bing Yu*¹; S. Liu²; R.D.K. Misra¹; ¹UTEP; ²Shanghai Jiatong University

4:40 PM

Effect of CGL-compatible Heat Treatments on the Mechanical Properties of a Medium-Mn Third-generation Advanced High Strength Steel: *Daniella Pallisco*¹; Joseph McDermid¹; Frank Goodwin²; ¹McMaster University; ²International Zinc Association

5:00 PM

Synthesis and Characterization of Low Density Manganese Steel for Automotive Applications: *Sudipta Mohapatra*¹; Karabi Das¹; ¹Indian Institute of Technology Kharagpur

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Additive Manufacturing and Advanced Processing of Magnetic Materials

Sponsored by: Federation of European Materials Societies (FEMS), TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Frank Johnson, Niron Magnetics, Inc.; Paul Ohodnicki, National Energy Technology Laboratory; Alex Leary, Nasa Grc; Orlando Rios, Oak Ridge National Laboratory; Alessandra Hool, ESM Foundation

Tuesday PM | March 12, 2019
225B | Henry B. Gonzalez Convention Center

Session Chair: Richard Beddingfield, North Carolina State University

2:00 PM Invited

3D Printing of Magnets Using Fused Deposition Modeling and Selective Laser Melting: *Christian Huber*¹; Dieter Suess¹; ¹University of Vienna

2:30 PM Invited

Additive Manufacturing of High Performance Anisotropic NdFeB Permanent Magnets: *Mariappan Paranthaman*¹; Kinjal Gandha²; Brian Sales¹; Vlastamil Kunc¹; Cajetan Nlebedim²; ¹Oak Ridge National Laboratory; ²Ames Laboratory

3:00 PM Invited

Additive Manufacturing of Soft Ferromagnetic Alloys: *Andrew Kustas*¹; Don Susan¹; Kyle Johnson¹; Shaun Whetten¹; Tomas Babuska²; Joseph Michael¹; Mark Rodriguez¹; Daryl Dagel¹; Chris Fancher³; Jeff Rodelas¹; Dave Keicher¹; John Curry¹; Brandon Krick²; Nicolas Argibay¹; ¹Sandia National Laboratories; ²Lehigh University; ³Oak Ridge National Laboratory

3:30 PM Break

3:50 PM

Additive Manufacturing of Soft Magnetic Supermalloys: *Srinivas Aditya Mantri*¹; Sriswaroop Dasari¹; Varun Chaudhary²; Raju Ramanujan²; Rajarshi Banerjee¹; ¹University of North Texas; ²Nanyang Technological University

4:10 PM Invited

Exploring Processing Parameters for Soft Magnetic Composites Fabricated by Additive Manufacturing: *Mitra Taheri*¹; ¹Drexel University

4:40 PM Invited

Laser Additive Manufacturing of Magnetic Materials: *Tushar Borkar*¹; Raj Banerjee²; Raju Ramanujan³; ¹Cleveland State University; ²University of North Texas; ³Nanyang Technological University

5:10 PM Invited

Production of Highly Coercive Net Shape Magnets with Additive Manufacturing: *Scott McCall*¹; Alexander Baker¹; Sarah Baker¹; Matthew Worthington¹; Joshua Kuntzq¹; Christine Orme¹; ¹Lawrence Livermore National Laboratories

ELECTRONIC MATERIALS

Advanced Microelectronic Packaging, Emerging Interconnection Technology, and Pb-free Solder – 3D Microelectronic Packaging and Emerging Interconnects I

Sponsored by: TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Kazuhiro Nogita, University of Queensland; Tae-Kyu Lee, Portland State University; Yan Li, Intel Corporation; Christopher Gourlay, Imperial College London; Zhi-Quan Liu, Chinese Academy of Sciences; Rahul Panat, Carnegie Mellon University; Albert T. Wu, National Central University; Andre Delhaise, Celestica; Mohd Arif Salleh, Universiti Malaysia Perlis

Tuesday PM | March 12, 2019

216A | Henry B. Gonzalez Convention Center

Session Chairs: Albert Wu, National Central University; Won-Sik Hong, Korea Electronics Technology Institute (KETI)

2:00 PM Invited

A Novel Joining Process for the Die-attachment of Next-generation Power Devices: *Hao Zhang*¹; Seungjun Noh¹; Zhi-quan Liu²; Caifu Li¹; Norio Asatani¹; Yukiharu Kimoto¹; Aiji Suetake¹; Shijo Nagao¹; Tohru Sugahara¹; Katsuaki Suganuma¹; ¹The Institute of Scientific and Industrial Research, Osaka University; ²Institute of Metal Research, Chinese Academy of Sciences

2:30 PM

A Study on Electrical Conductivity of Micro Friction Stir Welded Dissimilar Sheets for Hybrid Electric Vehicles (HEVs): *Omkar Mypati*¹; Surjya Pal¹; Prakash Srirangam²; ¹IIT Kharagpur; ²Warwick Manufacturing Group

2:50 PM

Multi-phase-field Modeling for Next-generation Interconnect Devices Based on TSVs: *Vahid Attari*¹; Raymundo Arroyave¹; Zachary Morgan²; Yungmei Jin²; ¹Texas A&M University; ²Michigan Technological University

3:10 PM

Kinetic Monte Carlo Model for Improved Electroplating of TSVs in 3DIC: *Bharathi Srinivasan*¹; ¹Institute of High Performance Computing

3:30 PM Break

3:50 PM

Stress Measurement for Highly <111>-Oriented Nanotwinned Cu by Synchrotron X-ray: *Wang I-Ju*¹; Chih Chen¹; ¹National Chiao Tung University

4:10 PM

Low Resistance Cu-to-Cu Joints using Highly <111>-Oriented Nanotwinned Copper: *Kai Cheng Shie*¹; Jing-Ye Juang¹; Shih-Yang Chang¹; Chih Chen¹; ¹National Chiao Tung University

4:30 PM

Low Temperature Cu-to-Cu Direct Bonding with Thin Gold Capping on Highly <111>-Orientated Nanotwinned Cu Films: *Yu-Ting Wu*¹; Chih Chen¹; ¹National Chiao Tung University

4:50 PM

Electrodeposition of Large-scale Nanotwinned Copper Pillar within through Silicon via: *Zhi-Quan Liu*¹; Fu-Long Sun¹; ¹Institute of Metal Research, Cas

CHARACTERIZATION

Advanced Real Time Imaging — Iron and Steelmaking II

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, US Department of Energy - National Energy Technology Laboratory; P. Chris Pistorius, Carnegie Mellon University; Candan Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zuotai Zhang, Southern University of Science and Technology; Neslihan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Saito, Kyushu University; Yongsug Chung, Korea Polytechnic University; Bryan Webler, Carnegie Mellon University

Tuesday PM | March 12, 2019

302B | Henry B. Gonzalez Convention Center

Session Chairs: Chris Pistorius, Carnegie Mellon University; Bryan Webler, Carnegie Mellon University

2:00 PM Invited

Observation of Crystallization Behavior for Silicate Supercooled Liquids on Metallic Substrates under Different Oxygen Partial Pressure: *Sohei Sukenaga*¹; Masanori Tashiro¹; Hiroyuki Shibata¹; ¹IMRAM, Tohoku University

2:30 PM Invited

Observation of the Reaction between Iron Ore and Metallurgical Fluxes for Improved Pre-reduction: *J Whiston*¹; Stephen Spooner¹; K Meijer²; Z. Li¹; ¹WMG, University of Warwick; ²Tata Steel Europe

3:00 PM

In Situ Observation of Initial Stages of Oxide-scale Formation on Steel at 1150 \176C: *Ming Zhong*¹; Yining He¹; Elyce Milligan¹; Chris Pistorius¹; Bryan Webler¹; ¹Carnegie Mellon University

3:20 PM Invited

In Situ Observation of Non-metallic Inclusions in the System Steel-slag-refractory: Set-up, Limitations and Results: *Susanne Michelic*¹; Uxia Dieguez Salgado¹; Christian Bernhard¹; ¹Montanuniversitaet Leoben

3:50 PM Break

4:10 PM

In Situ Study on the Transformation Behavior of Ti-bearing Slags in the Oxidation Atmosphere: *Yongqi Sun*¹; Zuotai Zhang²; ¹University of Queensland; ²Southern University of Science and Technology

4:30 PM

Dissolution of Sapphire and Alumina-magnesia Particles in CaO-SiO₂-Al₂O₃ Liquid Slags: Hamed Abdeyazdan¹; *Neslihan Dogan*²; Raymond Longbottom¹; M Akbar Rhamdhani³; Michael Chapman⁴; Brian Monaghan¹; ¹University of Wollongong; ²McMaster University; ³Swinburne University of Technology; ⁴BlueScope Ltd.

MATERIALS PROCESSING

Advances in Surface Engineering — Session IV

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Rajeev Gupta, The University of Akron; Sandip Harimkar, Oklahoma State University; Arif Mubarak, PPG Industries; Deepak Kumar, Baker Hughes, A GE Company; Tushar Borkar, Cleveland State University; Dong Lin, Kansas State University

Tuesday PM | March 12, 2019

210A | Henry B. Gonzalez Convention Center

Session Chairs: Sandip Harimkar, Oklahoma State University; Dong Lin, Kansas State University

2:00 PM

Microstructural Analysis of Aluminum-Molybdenum Surface Composites by Friction Stir Processing: Mahesh P.¹; *Amit Arora*¹; ¹Indian Institute of Technology, Gandhinagar

2:20 PM

Surface Chemistry after Spot-by-spot Laser-interference Processing of AA 5128 Alloy: *Adrian Sabau*¹; Meyer Harry¹; Claus Daniel¹; ¹Oak Ridge National Laboratory

2:40 PM

Determining Conditions and Mechanisms for Barium Desorption from Scandate Cathode Surfaces: *Mujan Seif*¹; Thomas Balk¹; Matthew Beck¹; ¹University of Kentucky

3:00 PM

Dry Sheet Metal Forming Through Selective Oxidized Tool Surfaces: Bernd-Arno Behrens¹; Deniz Yilkiran¹; Simon Schöler¹; Sven Hübner¹; Kai Möhwald¹; *Fahrettin Özkaya*¹; ¹Leibniz University Hannover

3:20 PM

Effect of Process Parameters on Surface Properties of Laser Hardened Cast Iron: *Santosh Wagh*¹; Sudeep Ingole²; Dhananjay Bhatt¹; Jyoti Menghani¹; M Rathod³; ¹S V National Institute of Technology; ²Always Avant; ³College of Engineering, Pune

3:40 PM Break

4:00 PM

Characterization of Deposits on Oil-refining Process Equipment: *John Garcia*¹; William McCaffrey¹; John Nychka¹; ¹University of Alberta

4:20 PM

Heat Treatment of Gas Atomized Powders for Cold Spray Deposition: *Luke Brewer*¹; William Story¹; Tian Liu¹; ¹University of Alabama

4:40 PM

On Improvement in Surface Integrity of μ -EDMed Ti-6Al-4V Alloy by μ -ECM Process: Ramver Singh¹; Akshay Dvivedi¹; *Pradeep Kumar*¹; ¹Indian Institute of Technology, Roorkee

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering – Computational, Experimental, and Machine Learning Algorithms in Study and Design of Materials II

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Prasanna Balachandran, University of Virginia; Douglas Spearot, University of Florida; Charudatta Phatak, Argonne National Laboratory; Srinivasan Srivilliputhur, University of North Texas

Tuesday PM | March 12, 2019

304A | Henry B. Gonzalez Convention Center

Session Chair: Charudatta Phatak, Argonne National Laboratory

2:00 PM

Video Games & Crowd Sourcing: Algorithm Development for Materials Design: *Christopher Adair*¹; Alexandra Bradford¹; Michael

McCullough¹; Jedediah Lion¹; Seth Holladay¹; Derek Hansen¹; Oliver Johnson¹; ¹Brigham Young University

2:20 PM

Validation of High-resolution Calculations to Inform Continuum Model Development: *Garry Maskaly*¹; Donald Sandoval¹; Elias Clark¹; ¹Los Alamos National Laboratory

2:40 PM

Predictions of Field Fluctuations in Heterogeneous Materials: *Miroslav Zecevic*¹; Ricardo Lebensohn¹; ¹Los Alamos National Laboratory

3:00 PM

Spectral Homogenization Modeling of Heterogeneous Materials: *Aitor Cruzado*¹; Javier Segurado²; Amine Benzerga¹; ¹Texas A&M University; ²Technical University of Madrid

3:20 PM Break

3:50 PM

Identify Rare Atomic-Scale Events Using Machine Learning on Mesoscale Data: *Philip Goins*¹; Brian DeCost²; Efrain Hernandez-Rivera¹; ¹Army Research Laboratory; ²National Institute of Standards and Technology

4:10 PM

U-SLADS: Unsupervised Learning Approach For Dynamic Dendrite

Sampling: Nicola Ferrier¹; Yan Zhang¹; Xiang Huang¹; Emine Gulsoy²; *Charudatta Phatak*¹; ¹Argonne National Laboratory; ²Northwestern University

4:30 PM

Automated Algorithm for Quantifying Nanoscale Precipitates in Superalloy 718 using High-Resolution SEM Imaging: Nishan Senanayake¹; Timothy Smith²; Peter Bonacuse²; Richard Rogers²; *Jennifer Carter*¹; ¹Case Western Reserve University; ²NASA Glenn Research Center

4:50 PM

Quantitative Electron Diffraction Simulations of Quasicrystals: Comparison with Experiments and Approximant Phases: *Saransh Singh*¹; Marc De Graef¹; ¹Carnegie Mellon University

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications VII — Session IV

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Ensicaen University of Caen; Soon-Jik Hong, Kongju National University; Philippe Jund, Montpellier University; Lan Li, Boise State University; Takao Mori, Nims; Hsin-Jay Wu, National Sun Yat-sen University; Tiejun Zhu, Zhejiang University

Tuesday PM | March 12, 2019

216B | Henry B. Gonzalez Convention Center

Session Chairs: Hsin-jay Wu, National Sun Yat-Sen University; Franck Gascoin, Ensicaen University of Caen

2:00 PM Invited

Exploratory Research Project “Conpothe”: Achievements and Thoughts: *Franck Gascoin*¹; Stefan Maier²; Robin Lefevre³; ¹Crismat Cnrs; ²Aachen University; ³Aarhus University

2:20 PM Invited

TiNiSn-based High-Entropy Thermoelectrics with High ZT~1.5: *Peter Rogl*¹; Matthias Guerth¹; Philipp Sauerschnig¹; Jan Vrestal²; Vitaliy Romaka³; Gerda Rogl⁴; Andrij Grytsiv⁴; Kunio Yubuta⁵; Ernst Bauer⁶; ¹Universitaet Wien; ²Masaryk University; ³Lviv Polytechnic National University; ⁴Christian Doppler Laboratory for Thermoelectricity Vienna; ⁵Tohoku University ; ⁶TU-Wien

2:40 PM Invited

Superior Thermoelectric Performance of n-type Mg₃Sb₂-Mg₃Bi₂ Alloyed Materials for Low-mid Temperature: *G. Jeffrey Snyder*¹; Kazuki Imasato¹; ¹Northwestern University

3:00 PM

Thermal Superinsulating Materials with Integrated Thermoelectric Properties: *Jérémy Guazzagaloppa*¹; Cédric Huillet²; Fabrice Chopard²; Philippe Jund¹; ¹Montpellier University; ²Hutchinson

3:20 PM Invited

High Thermoelectric Figure-of-merit in In-doped β-Zn₄Sb₃: *Hsin-Jay Wu*¹; Hui-Yi Su¹; ¹National Sun Yat-sen University

3:40 PM Break

4:00 PM Invited

Prospective Cryogenic Temperature Thermoelectric Materials: BiSb Alloys: *Joseph Poon*¹; ¹University Of Virginia

4:20 PM

HPT Processing, a New Way to Produce High ZT Skutterudites: *Gerda Rogl*¹; *Andriy Grytsiv*²; *Michael Zehetbauer*³; *Ernst Bauer*²; *Peter Rogl*¹; ¹CDL University Vienna Austria; ²CDL,TU Wien; ³University Vienna

4:40 PM

Custom Pyrolytic Graphite-steel Thermocouple for High Temperature Measurements: *Abdul-Sommed Hadi*¹; *Bryce Hill*²; ¹Montana Technical University; ²Montana Technological University

5:00 PM

Thermal Stability of Doped CoSb₃ based Skutterudites: *Pavel Broz*¹; *Frantisek Zelenka*¹; *Jan Vrestal*¹; *Jiri Bursik*²; *Gerda Rogl*³; *Peter Rogl*³; ¹Masaryk University, CEITEC MU; ²Institute of Physics of Materials, Czech Academy of Sciences; ³Institute of Materials Chemistry, University of Vienna

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Behavior of Casting Alloys

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

Program Organizer: Hiromi Nagaumi, Soochow University

Tuesday PM | March 12, 2019

007A | Henry B. Gonzalez Convention Center

Session Chair: X. Grant Chen, Department of Applied Sciences Université du Québec à Chicoutimi

2:00 PM Invited

Study on Tensile Behavior of High Vacuum Die-cast AlSiMgMn Alloys: *Haidong Zhao*¹; *Fei Liu*¹; *Chen Hu*¹; *Runsheng Yang*¹; *Fengzhen Sun*²; ¹South China University of Technology; ²Imperial College London

2:30 PM

The Effect of Manganese and Strontium on Iron Intermetallics in Recycled Al-7% Si Alloy: *James Mathew*¹; *Prakash Srirangam*¹; ¹WMG

2:55 PM

The Effect of Thermo-mechanical Processing on the Microstructure and Mechanical Properties of Modified SIMA Treated Al-7Si Alloy: Chandan Choudhary¹; Durbadal Mandal¹; Kanai Lal Sahoo²; ¹NIT Durgapur; ²CSIR-NML, Jamshedpur

3:20 PM

Elevated-temperature Low Cycle Fatigue Behaviors of Al-Si 356 and 319 Foundry Alloys: S. Chen¹; Kun Liu¹; X. G. Chen¹; ¹University of Quebec at Chicoutimi

3:45 PM Break

4:00 PM

High Conductivity AlSi7Mg (A356) Alloys – Market, Production, Optimization and Development: Takeshi Saito¹; Petter Åsholt¹; Leonhard Heusler¹; Thomas Balkenhol¹; Kjetil Steen¹; ¹Hydro Aluminium

4:25 PM

Die-casting and Recyclability of LREE Aluminum-Cerium Alloys: Zachary Sims¹; Hunter Henderson²; David Weiss³; Michael Thompson²; Michael Kesler²; Ryan Ott⁴; Fanqiang Meng⁴; Eric Stromme⁵; Sam Kassoumeh⁶; James Evangelista⁶; Gerald Begley⁷; Orlando Rios²; Ananth Iyer⁸; Heejong Lim⁹; ¹University of Tennessee; ²Oak Ridge National Laboratory; ³Eck Industries; ⁴Ames National Laboratory; ⁵U.S. Navy; ⁶Shiloh Industries; ⁷Tennessee Tooling and Engineering; ⁸Purdue University; ⁹University of Seoul

4:50 PM

Influence of Die Soldering on Die Erosion and Soldering Layer between Al Melts and Die in Al-Si-Fe Alloys: Jong Min Kim¹; Jeong IL Youn¹; Young Jig Kim¹; ¹Sungkyunkwan University

LIGHT METALS

Aluminum Reduction Technology — Joint Session Alumina Feeding and Alumina Scale Formation

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

Program Organizer: Marc Dupuis, GeniSim Inc

Tuesday PM | March 12, 2019

004 | Henry B. Gonzalez Convention Center

Session Chair: Jayson Tessier, Alcoa

2:00 PM Introductory Comments

2:05 PM

Alumina Feeding and Raft Formation: Raft Collection and Process Parameters: *Sindre Engzelius Gylver*¹; Nina Helene Omdahl²; Ann Kristin Prytz³; Astrid Johanne Meyer³; Lorentz Petter Lossius³; Kristian Etienne Einarsrud¹; ¹Norwegian University of Science and Technology; ²Alcoa Mosjøen; ³Hydro Aluminium

2:30 PM

Evolution of Mechanical Resistance of Alumina Raft Exposed to the Bath in Hall-Héroult Cells: *Sandor Poncsak*¹; Lovatiana Rakotondramanana¹; Laszlo Kiss¹; Thomas Roger¹; Sebastien Guérard²; Jean François Bilodeau²; ¹University of Quebec at Chicoutimi; ²CRDA Rio Tinto Aluminium

2:55 PM

Dynamic Modelling of Alumina Feeding in an Aluminium Electrolysis Cell: *Valdis Bojarevics*¹; ¹University of Greenwich

3:20 PM

Development of a Mathematical Model to Follow Alumina Injection: *Thomas Roger*¹; Laszlo Kiss¹; Sandor Poncsak¹; Kirk Fraser²; Sébastien Guérard³; Jean-François Bilodeau³; ¹Université du Québec à Chicoutimi; ²CNRC; ³CRDA Rio Tinto Aluminum

3:45 PM Break

4:00 PM

The Micro- and Macrostructure of Alumina Rafts: Sindre Engzelius Gylver¹; Nina Helene Omdahl²; Stein Rørvik³; Ingrid Hansen¹; Andrea Nautnes¹; Sofie Nilsen Neverdal¹; *Kristian Etienne Einarsrud*¹; ¹Norwegian University of Science and Technology; ²Alcoa Mosjøen; ³SINTEF Industry

4:25 PM

Alumina Scale Composition and Growth Rate in Distribution Pipes: *Ingrid Haugland*¹; Ole Kjos¹; Arne Røyset²; Per Erik Vullum²; Thor Aarhaug¹; Maths Halstensen³; ¹Sintef; ²SINTEF AS; ³University of South-Eastern Norway

4:50 PM

Investigation on Scale Formation in Aluminium Industry by Means of a Cold-finger: *Daniel Clos*¹; Petter Nekså²; Sverre Johnsen³; Ragnhid Aune¹; ¹Norwegian University of Science and Technology; ²SINTEF Energy; ³SINTEF Materials and Chemistry

5:15 PM Concluding Comments

CHARACTERIZATION

Atom Probe Tomography for Advanced Characterization of Metals, Minerals and Materials II – High-entropy Alloys and Nuclear Materials

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

Program Organizers: Haiming Wen, Missouri University of Science and Technology; David Seidman, Northwestern University; Keith Knipling, Naval Research Laboratory; Gregory Thompson, The University of Alabama; Simon Ringer, University of Sydney; Arun Devaraj, Pacific Northwest National Laboratory; Gang Sha, Nanjing University of Science and Technology

Tuesday PM | March 12, 2019
303A | Henry B. Gonzalez Convention Center

Session Chairs: Arun Devaraj, Pacific Northwest National Laboratory; Haiming Wen, Missouri University of Science & Technology

2:00 PM Invited

Coupled Atom Probe Tomography – Transmission Electron Microscopy Investigation of Microstructural Inversion in a Refractory High Entropy Alloy: Vishal Soni¹; Talukder Alam¹; Bharat Gwalani¹; Oleg Senkov²; Daniel Miracle³; *Rajarshi Banerjee*¹; ¹University of North Texas; ²UES Inc; ³Air Force Research Laboratory

2:35 PM

APT Characterization of Irradiation-induced Segregation and Precipitation in Al_xCoCrFeNi High Entropy Alloys: *Tengfei Yang*¹; Wei Guo²; Jonathan Poplawsky²; Rong Hu³; Gang Sha³; Dongyue Li⁴; Songqin Xia⁴; Yong Zhang⁴; Yugang Wang⁵; Steven Zinkle¹; ¹University of Tennessee; ²Oak Ridge National Laboratory; ³Nanjing University of Science and Technology; ⁴University of Science and Technology Beijing; ⁵Peking University

2:55 PM

Effects of Severe Plastic Deformation and Irradiation on Segregation and Precipitation in Ultrafine-grained Steels Studied Using Atom-probe Tomography: *Andrew Hoffman*¹; Haiming Wen¹; ¹Missouri University of Science & Technology

3:15 PM

Analysis of Hydrogen Isotopes in Zircalloy-4 Using Atom Probe Tomography: *Arun Devaraj*¹; Elizabeth Kautz¹; Daniel Perea¹; Bruce Arey¹; John Hardy¹; Bradley Johnson¹; David Senior¹; ¹Pacific Northwest National Laboratory

3:35 PM Break

3:55 PM Invited

Atomic Scale Analysis of Grain Boundary Deuteride Growth Front in Zircalloy-4: A.J. Breen¹; I. Mouton¹; W. Lu¹; Siyang Wang²; A. Szczepaniak¹; P Kontis¹; L.T. Stephenson¹; A.K. da Silva¹; C. Liebscher¹; D Raabe¹; Thomas Britton²; M. Herbig¹; *Baptiste Gault*¹; ¹Max-Planck-Institut für Eisenforschung; ²Imperial College London

4:30 PM

APT and STEM Analysis of a Metallic Nuclear Fuel to Reveal the Influence of Thermomechanical Processing on Their Microstructural Evolution: *Arun Devaraj*¹; Elizabeth Kautz¹; Libor Kovarik¹; Saumyadeep Jana¹; Curt Lavender¹; Vineet Joshi¹; ¹Pacific Northwest National Laboratory

4:50 PM Invited

Using Atom Probe Tomography to Understand Neutron Irradiated Effects in High Temperature Superconductors for Nuclear Fusion Applications: *Philip Edmondson*¹; ¹Oak Ridge National Laboratory

BIOMATERIALS

Biological Materials Science — Bioenabled Materials and Systems

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

Program Organizers: Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama at Birmingham; Jing Du, Penn State University

Tuesday PM | March 12, 2019

217A | Henry B. Gonzalez Convention Center

Session Chairs: David Restrepo, University of Texas San Antonio; Jing Du, Penn State University

2:00 PM Keynote

Functional Hybrid Material Systems Designed by Guided Biofabrication: *Candan Tamerler*¹; ¹University of Kansas

2:40 PM

A Nacre-like Glass that Surpasses the Impact Resistance of Tempered Glass: *Zhen Yin*¹; Florent Hannard¹; Francois Barthelat²; ¹McGill University; ²Mcgill University

3:00 PM

Nanoscale Toughening Mechanisms in the Cell Walls of Wood: Mona Maass¹; Holger Militz¹; *Cynthia Volkert*¹; ¹University of Goettingen

3:20 PM

Discrete Element Models of Crack Propagation and Toughness in Idealized, Enamel-inspired Composites: *John Pro*¹; Francois Barthelat¹; ¹McGill University

3:40 PM Break

4:00 PM Invited

Using Biomineralization Routes to Build Cancer Testbeds: *Kalpana Katti*¹; MD Shahjahan Molla¹; Sumanta Kar¹; Dinesh Katti¹; ¹North Dakota State University

4:30 PM

In Vivo Evaluation of Electrochemically Deposited Collagen Biomaterial for Soft Tissue Healing: *Xingguo Cheng*¹; ¹Southwest Research Institute

4:50 PM

Processing of a Formable Bioactive Glass Composite for Bone Tissue Scaffolding: *Caitlin Guzzo*¹; John Nychka¹; ¹University of Alberta

5:10 PM

3D Printed Nanocomposite for Interstitial Hyperthermia of Cancer Cells: *Kwabena Kan-Dapaah*¹; John Obayemi²; Ali Salifu²; Nima Rahbar²; Wole Soboyejo²; ¹University Of Ghana; ²Worcester Polytechnic Institute

ADVANCED MATERIALS

Bulk Metallic Glasses XVI — Structures and Mechanical Properties

Sponsored by: TMS: Mechanical Behavior of Materials Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Gongyao Wang, Alcoa; Robert Maass, University of Illinois at Urbana-Champaign; Muhammad Rafique

Tuesday PM | March 12, 2019
206B | Henry B. Gonzalez Convention Center

Session Chairs: Takeshi Egami, The University of Tennessee, Knoxville; Frans Spaepen, Harvard University

2:00 PM Keynote

Why Liquid Becomes Glass?: *Takeshi Egami*¹; ¹University of Tennessee

2:30 PM Invited

Two-way Tuning of Structural Order in Metallic Glasses: *Qiaoshi Zeng*¹; ¹Hpstar

2:50 PM Invited

High Pressure Quenched Metallic Glasses: *Wojciech Dmowski*¹; Stanislaw Gierlotka²; Yoshihiko Yokoyama³; Takeshi Egami¹; ¹University of Tennessee; ²Institute of High Pressure Physics; ³Tohoku University

3:10 PM Invited

The High-iron Content Fe-based Amorphous Alloys with Good Soft Magnetic Property: *Ke-Fu Yao*¹; Ji-Li Jia¹; Ling-xiang Shi¹; Jin-Feng Li¹; ¹Tsinghua University

3:30 PM Break

3:50 PM Keynote

On the Fracture Toughness of Bulk-metallic Glasses: *Robert Ritchie*¹; Jun Ding²; Mark Asta¹; Bernd Gludovatz³; Thomas Pekin¹; Andrew Minor¹; ¹University of California; ²Lawrence Berkeley National Laboratory; ³University of New South Wales

4:20 PM Invited

On the Fracture Toughness and Fatigue Strength of Ni-based Glasses: *Bernd Gludovatz*¹; Edwin Chang²; Mingxi Zheng²; Sara Messina²; Jong Na³; Maximillien Launey³; Marios Demetriou³; William Johnson⁴; ¹UNSW Sydney; ²University of California, Berkeley; ³Glassimetal; ⁴Caltech

4:40 PM Invited

In Situ Deformation Behavior of Bulk Metallic Glass Composites at Small Length-scales: Saideep Muskeri¹; Vahid Hasannaemi¹; *Sundeeep Mukherjee*¹; ¹University of North Texas

5:00 PM Invited

Guiding and Deflecting Cracks in Bulk Metallic Glasses to Increase Damage Tolerance: *Jun Yi*¹; Wei Hua Wang²; John Lewandowski³; ¹Shanghai University; ²Chinese Academy of Sciences, Beijing; ³Case Western Reserve University

5:20 PM Invited

Microstructure and Fracture Toughness Evolution a Zr-based Bulk Metallic Glass after Thermomechanical Processing: *Jamie Kruzic*¹; Bosong Li¹; Bernd Gludovatz¹; Anna Ceguerra²; Keita Nomoto¹; Simon Ringer²; Shenghui Xie³; ¹UNSW Sydney; ²University of Sydney; ³Shenzhen University

5:40 PM

Origin of Anelasticity in Metallic Glasses: Coupling of Intrinsic Energy Dissipation and External Stimuli: *Yue Fan*¹; ¹University Of Michigan, Ann Arbor

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications — Irradiation Effect

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Yongfeng Zhang, Idaho National Laboratory; Xian-ming (David) Bai, Virginia Polytechnic Institute and State University; David Andersson, Los Alamos National Laboratory; Thierry Wiss, European Commission- JRC -Institute of Transuranium Elements

Tuesday PM | March 12, 2019

214B | Henry B. Gonzalez Convention Center

Session Chairs: Thierry Wiss, European Commission; Jian Wang, University of Nebraska

2:00 PM Invited

Effects of Electronic Energy Loss on Irradiation Damage Production and Evolution in Ceramics: *William Weber*¹; Eva Zarkadoula²; Yanwen Zhang²; ¹University of Tennessee; ²Oak Ridge National Laboratory

2:30 PM

Strength-suctility-irradiation Tolerance of Nanostructured Fe – Amorphous Ceramic SiOC Composites: *Jian Wang*¹; Qing Su¹; Kaisheng Ming¹; Chao Gu¹; Michael Nastasi¹; ¹University of Nebraska–Lincoln

2:50 PM Invited

Defects and Microstructure Evolution in Oxides under Irradiation: *Anter El-Azab*¹; Thomas Hochrainer²; ¹Purdue University; ²Technische Universität Graz

3:20 PM

SiC-SiC Fiber Composites for Accident-tolerant Fuel Applications: Micromechanical Study of Radiation and Temperature Effects: *Yevhen Zayachuk*¹; David Armstrong¹; Christian Deck²; Peter Hosemann³; ¹University of Oxford; ²General Atomics; ³University of California, Berkeley

3:40 PM Break

4:00 PM Invited

Dynamic Structures Resulting from Ion Radiation Interactions with Porous Ceramics: Nathan Madden¹; Khalid Hattar²; *Jessica Krogstad*¹; ¹University of Illinois, Urbana-Champaign; ²Sandia National Laboratory

4:30 PM

Radiation Damage Studies in Plutonium Containing Ceramics: *Thierry Wiss*¹; Oliver Dieste¹; Emanuele De Bona¹; Alessandro Benedetti¹; Ondrej Benes¹; Jean-Yves Colle¹; Dragos Staicu¹; Rudy Konings¹; Vincenzo Rondinella¹; ¹JRC Karlsruhe

4:50 PM

Visualizing Stress Distribution of Irradiated and Corroded SiC Using Nano-mechanical Raman Spectroscopy: *Hao Wang*¹; Debapriya Mohanty¹; Vikas Tomar¹; ¹Purdue University

5:10 PM

Radiation Effects on SiC/SiC Composites for Nuclear Energy Application: *Shradha Agarwal*¹; William Weber¹; ¹University of Tennessee and Oak Ridge National Laboratory

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Process and Characteristics of Advanced Ceramics and Glasses I

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Tuesday PM | March 12, 2019
212B | Henry B. Gonzalez Convention Center

Session Chairs: Huazhang Zhai, Beijing Institute of Technology; Bowen Li, Michigan Technological University

2:00 PM Introductory Comments

2:05 PM Invited

Microscale Investigation of Fracture Strength in Hot Pressed Silicon Carbide: *Daniel Magagnosc*¹; Brian Schuster¹; ¹U.S. Army Research Laboratory

2:25 PM Invited

Preparation and Adsorption Properties of Ultrathin Boron Nitride Nanosheets: *Huazhang Zhai*¹; ¹Beijing Institute of Technology

2:45 PM

Structure, Phase Composition, and Properties of Ceramics Based on AlMgB14, Obtained from Various Powders: *Iliia Zhukov*¹; Pavel Nikitin¹; Alexander Vorozhtsov¹; ¹Tomsk state university

3:05 PM

TEM Observations of the Effect of Boron Content on the Amorphization of Boron Carbide: *Ankur Chauhan*¹; Mark Schaefer²; Sisi Xiang³; Kelvin Xie³; Vladislav Domnich²; Richard Haber²; Kevin Hemker¹; ¹Johns Hopkins University; ²Rutgers University; ³Texas A & M University

3:25 PM Break

3:40 PM

Ultra-high Strength Above 10 GPa and Short-range Atomic Order of Amorphous Boron: *Jessica Maita*¹; Gyuho Song¹; Mariel Colby¹; Seok-Woo Lee¹; ¹University Of Connecticut

4:00 PM

Micropillar Compression Study of Plastic Deformation in Silicate Glasses: *Shefford Baker*¹; Zachary Rouse¹; Sanjit Bhowmick²; Praveena Manimunda²; Nicole Wiles¹; S.A. Syed Asif²; Thomas Wyrobek²; ¹Cornell University; ²Bruker Nano Surfaces

4:20 PM

Macroporous Ceramics Derived from Particle-stabilized Emulsions: *Jinhong Li*¹; Zhiwei Yang¹; Xiang Wang¹; ¹China University of Geosciences (Beijing)

4:40 PM

Thermal Conductivity Measurements of Materials from Insulating Polymer to Highly Conductive Graphite Film: *Heng Wang*¹; Akhan Tleoubaev¹; Justin Wynn¹; Silviu Apostolescu¹; Daniele Paganelli¹; Louis Waguespack¹; Piero Scotto¹; ¹TA Instruments

CORROSION

Coatings and Surface Engineering for Environmental Protection — Coatings for Corrosion Protection II

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Arif Mubarak, PPG Industries; Rajeev Gupta, The University of Akron; Raul Rebak, GE Global Research; Michael Mayo, PPG Industries; Brian Okerberg, PPG Industries

Tuesday PM | March 12, 2019

224 | Henry B. Gonzalez Convention Center

Session Chairs: Michael Mayo, PPG Industries; Brian Okerberg, PPG Industries

2:00 PM Invited

Design and Performance of REACH-compliant Coating Systems for Aerospace Applications: *Weilong Zhang*¹; Mike Kryzman¹; George Zafiris¹; ¹United Technologies Research Center

2:40 PM Invited

Novel Amorphous Thermal Sprayed Coatings: *Evelina Vogli*¹; ¹LM Group Holdings Inc

3:20 PM

Recent Innovations in Electrodeposited Coatings: *Kevin Sylvester*¹; Chris Dacko¹; Mike Mayo¹; Brian Okerberg¹; ¹PPG

3:40 PM Break

4:00 PM

Corrosion Performance of Polymer Nanocomposite Coatings on Aluminum Alloy in Saline Environment: *Junqing Zhang*¹; Lei Zhang¹; Cheng-fu Chen¹; ¹University of Alaska Fairbanks

4:20 PM

Fabrication and Characterization of Cold Sprayed Coating for Highly Corrosive High Temperature Conditions: *Harminder Singh Chouhan*¹; ¹Guru Nanak Dev University, Regional Campus, Jalandhar, Punjab, India

MATERIALS DESIGN

Computational Approaches for Big Data, Artificial Intelligence and Uncertainty Quantification in Computational Materials Science — AI-based Investigation of Material Properties II

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Liang Qi, University of Michigan; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory; Adrian Sabau, Oak Ridge National Laboratory; Houlong Zhuang, Arizona State University ; Sugata Chowdhury, National Institute of Standards and Technology

Tuesday PM | March 12, 2019

305 | Henry B. Gonzalez Convention Center

Session Chair: Houlong Zhuang, Arizona State University

2:00 PM Invited

Accelerating Discovery of Compositionally Complex Amorphous Structural Alloys: *Apurva Mehta*¹; ¹SLAC National Accelerator Laboratory

2:30 PM

Artificial Intelligent and Simulation Nano Structure of Ceramic: *Habibollah Aminirastabi*¹; Fatemeh Karimidehcheshmeh¹; Gouli Ji¹; ¹Xiamen University

2:50 PM

Cloud-based Surrogate Models for Composite Materials: *Marat Latypov*¹; Amil Khan¹; Christian Lang¹; Kristian Kvilekval¹; Andrew Polonsky¹; McLean Echlin¹; Irene Beyerlein¹; B.S. Manjunath¹; Tresa

Pollock¹; ¹University of California, Santa Barbara

3:10 PM

Max Phase Thermo-mechanical Approximation via Machine Learning: *Daniel Saucedo*¹; Raymundo Arroyave¹; ¹Texas A&M University

3:30 PM Break

3:50 PM Invited

Machine-learning-aided Design of Metallic Glasses: *Logan Ward*¹; ¹University of Chicago

4:20 PM

Reduced Order Crystal Plasticity Modelling for ICME Using a Machine Learning Approach: *Mengfei Yuan*¹; Sean Paradiso²; Bryce Meredig²; Stephen Niezgoda¹; ¹Ohio State University; ²Citrine Informatics

4:40 PM

Research Progress in Machine Learning Building Layered Material Model and Predicting Thermoelectric Performance: *Lihao Chen*¹; Ben Xu²; Ke Bi¹; ¹Beijing University of Posts and Telecommunications; ²Tsinghua University

5:00 PM

Unsupervised Segmentation of Microstructures: *Bo Lei*¹; Elizabeth Holm¹; ¹Carnegie Mellon University

MATERIALS DESIGN

Computational Materials Discovery and Design — Computational Methods for Materials Discovery and Design I

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Oliver Johnson, Brigham Young University; Arunima Singh, Arizona State University; Jake Bair, Pacific Northwest National Laboratory; Christopher Weinberger, Colorado State University; Timofey Frolov, Lawrence Livermore National Laboratory; Ning Zhang, Colorado School of Mines; Fadi Abdeljawad, Clemson University; Richard Hennig, University of Florida; Mikhail Mendeleev, Ames Laboratory; Avinash Dongare, University of Connecticut

Tuesday PM | March 12, 2019

304C | Henry B. Gonzalez Convention Center

Session Chairs: Jeremy Mason, University of California, Davis; Timofey Frolov, Lawrence Livermore National Laboratory

2:00 PM Invited

Learning from Correlations Based on Local Structure: Rare-earth Nickelates Revisited: *James Rondinelli*¹; ¹Northwestern University

2:20 PM Invited

Materials Informatics for Autonomous Materials Design: *Kristofer Reyes*¹; Krishna Rajan¹; ¹University at Buffalo-State University of New York

2:40 PM

Accelerating Hierarchical Materials Discovery and Design through a Combined Machine Learning and Experimental Framework: *Grace Gu*¹; Chun-Teh Chen²; Deon Richmond²; Markus Buehler²; ¹UC Berkeley; ²Massachusetts Institute of Technology

3:00 PM

Computational Characterization Using the Local Spectroscopy Data Initiative (LSDI): *Shyam Dwaraknath*¹; Sophia Hayes²; Shyue Ong³; Kristin Persson¹; ¹Lawrence Berkeley National Laboratory; ²Washington University, St. Louis; ³University of California, San Diego

3:20 PM Break

3:40 PM

Materials Discovery under Electrochemical Conditions: *Mira Todorova*¹; Sudarsan Surendralal¹; Joerg Neugebauer¹; ¹Mpi Fuer Eisenforschung

4:00 PM

A Python-based Toolkit for Material Design: *Shengyen Li*¹; Steven Mates¹; Mark Stoudt¹; Carelyn Campbell¹; ¹National Institute of Standards and Technology

4:20 PM

Optimizing Elastic Moduli of the Silicate Glasses through High-throughput Atomistic Modeling and Machine Learning Techniques: *Yong-Jie Hu*¹; Ge Zhao²; Tyler Del Rose¹; Liang Qi¹; ¹University of Michigan; ²The Pennsylvania State University

4:40 PM

Towards an Autonomous Efficient Materials Discovery Framework: An Example of Optimal Experiment Design under Model Uncertainty: *Anjana Talapatra*¹; Shahin Boluki¹; Xiaoning Qian¹; Raymundo Arroyave¹; Edward Dougherty¹; ¹Texas A & M University

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Phase Transformations

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Touret, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

Tuesday PM | March 12, 2019
225C | Henry B. Gonzalez Convention Center

Session Chairs: Damien Touret, IMDEA Materials; Chad Sinclair, University of British Columbia

2:00 PM Invited

Soft Phonon Modes as a Predictor of Structural Grain Boundary Phase Transformations?: *Chad Sinclair*¹; *Louis Hebrard*¹; ¹University of British Columbia

2:30 PM

Developing Accurate Models of Phase Transformations from First-principles: *Anirudh Raju Natarajan*¹; *Anton Van der Ven*¹; ¹University of California, Santa Barbara

2:50 PM

Atomic-scale Phase Field Investigation of Ordering in Metamagnetic Shape Memory Alloys: *Yuhao Wang*¹; *Vahid Attari*¹; *Thien Duong*¹; *Daniel Salas*¹; *Ibrahim Karaman*¹; *Raymundo Arróyave*¹; ¹Texas A&M University

3:10 PM Invited

Chemically Heterogeneous Transition Metal Dichalcogenide Monolayers under Strain: Bend, Shuffle, and Slip: *Mikko Haataja*¹; ¹Princeton University

3:40 PM Break

4:00 PM Invited

Modeling Mechanisms in Rapid Solidification Using Structural Phase Field Crystal Theories: *Nikolas Provatas*¹; ¹McGill University

4:30 PM

Study of Dendrite Growth under Forced Convection in Superalloy Solidification by Multiphase-field Coupled Lattice Boltzmann Method: *Cong Yang*¹; *Qingyan Xu*¹; *Baicheng Liu*¹; ¹Tsinghua University

4:50 PM

Phase Transformations in Al Alloys Using Computational Thermodynamic and Kinetic Modeling: *Kyle Fitzpatrick-Schmidt*¹; *Victor Champagne*²; *Danielle Cote*¹; ¹Worcester Polytechnic Institute; ²US Army Research Laboratory

5:10 PM

Three-dimensional Modeling of Bubble-dendrite Interactions under Microgravity and Terrestrial Conditions: *Seyed Amin Nabavizadeh*¹; *Mohsen Eshraghi*²; *Sergio Felicelli*¹; ¹University of Akron; ²California State University

5:30 PM

Thermodynamics and Coarsening of Solid Sn in Pb-Sn Liquid Mixtures Using Hybrid Molecular Dynamics and Monte Carlo Simulations: *Seyyed Alireza Etesami*¹; *Mohamed Laradji*¹; *Ebrahim Asadi*¹; ¹University of Memphis

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Behavior of High Temperature Alloys – Superalloys: Creep

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

Program Organizers: Michael Titus, Purdue University; Qiang Feng, University of Science and Technology Beijing; Akane Suzuki, GE Global Research; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Sammy Tin, Illinois Institute of Technology; Martin Detrois, National Energy Technology Laboratory

Tuesday PM | March 12, 2019

301C | Henry B. Gonzalez Convention Center

Session Chairs: Qiang Feng, University of Science and Technology Beijing; Michael Titus, Purdue University

2:00 PM Invited

Deformation Processes in γ' and γ' / γ'' Strengthened Ni-Base Superalloys: *Michael Mills*¹; ¹Ohio State University

2:30 PM

Deformation Mechanisms of γ' and γ'' Precipitates in IN718 Ni-based Superalloys: *Longsheng Feng*¹; *Duchao Lv*²; *Donald McAllister*¹; *Michael Mills*¹; *Yunzhi Wang*¹; ¹Ohio State University; ²Computherm LLC

2:50 PM

Dislocation Core Behavior in Ni-based Superalloys: *Anne Marie Tan*¹; *Christopher Woodward*²; *Dallas Trinkle*³; ¹University of Florida; ²U.S. Air Force Research Laboratory; ³University of Illinois at Urbana, Champaign

3:10 PM

Effects of Eta Phase on the High Temperature Creep Behavior of Nimonic 263: *Walter Milligan*¹; *Ninad Mohale*¹; *Paul Sanders*¹; *Calvin White*¹; *John Shingledecker*²; ¹Michigan Technological University; ²Electric Power Research Institute

3:30 PM Break

3:50 PM

3D Modeling of Microstructure Evolution in Ni-based Superalloys under Creep Loading: *Maeva Cottura*¹; *Benoît Appolaire*²; *Alphonse Finel*³; *Yann Le Bouar*³; ¹Institut Jean Lamour & LEM, Onera, CNRS; ²Institut Jean Lamour; ³LEM, Onera, CNRS

4:10 PM

Role of Lattice Misfit in the Stability of Ni-based Single Crystal Superalloys: A Phase Field Study: *Harikrishnan Rajendran*¹; *Jean-Briac le Graverend*¹; ¹Texas A&M University

4:30 PM

Probing Creep Deformation Using High Temperature Nanoindentation and Bulk Mechanical Testing: *Ashton Egan*¹; *Jiashi Miao*¹; *Connor Slone*¹; *Maryam Ghazisaedi*¹; *Yunzhi Wang*¹; *Stephen Niezgod*¹; *Michael Mills*¹; ¹Ohio State University

4:50 PM

Deformation Behavior of a Metal-weld Exposed to High-Temperature CO₂-rich Environment: *Sajedur Akanda*¹; *Reyixiati Repukaiti*¹; *Kyle Rozman*¹; *Ömer Dogan*¹; *Jeffrey Hawk*¹; ¹National Energy Technology Laboratory

LIGHT METALS

Electrode Technology for Aluminum Production — Cathodes and Electrode Technology

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

Program Organizer: Lorentz Petter Lossius, Hydro Aluminium AS

Tuesday PM | March 12, 2019
006D | Henry B. Gonzalez Convention Center

Session Chairs: Eirik Hagen, Hydro Aluminium AS, Primary Metal, Technology; Ronald Logan, Sunstone Development

2:00 PM Introductory Comments

2:05 PM
Carbon Cathode Wear in Aluminium Electrolysis Cells: *Samuel Senanu*¹; Tor Grande¹; Arne Petter Ratvik²; Zhaohui Wang²; ¹Norwegian University of Science and Technology; ²SINTEF Industry

2:30 PM
Observation on the Creep and Cracking of Graphite Cathode in Laboratory Aluminum Electrolysis: Yunfei Lian¹; Jilai Xue¹; Cheng Zhang¹; Xuan Liu¹; Haipeng Li¹; ¹University of Science and Technology Beijing

2:55 PM Concluding Comments

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Stress Corrosion Cracking I

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

Program Organizers: Bai Cui, University of Nebraska Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc

Tuesday PM | March 12, 2019
214C | Henry B. Gonzalez Convention Center

Session Chairs: Gary Was, University of Michigan; Xiaoyuan Lou, Auburn University

2:00 PM Invited

Mechanisms Behind Irradiation Assisted Stress Corrosion Cracking: *Gary Was*¹; ¹University of Michigan

2:40 PM

Crack Growth Rate and Fracture Toughness of Irradiated Austenitic Stainless Steel Weld: *Yiren Chen*¹; Chi Xu²; Yong Yang²; Wei-ying Chen¹; Bogdan Alexandreanu¹; Ken Natesan¹; Appajosula Rao³; ¹Argonne National Laboratory; ²University of Florida; ³U.S. Nuclear Regulatory Commission

3:00 PM

Fracture Mechanics-based Study of Stress Corrosion Cracking of SS304 Dry Storage Canister for Spent Nuclear Fuel: *Leonardi Tjayadi*¹; Nilesh Kumar²; K.L. Murty¹; ¹North Carolina State University; ²University of Alabama

3:20 PM

Mechanisms of Mitigating Chloride-Induced Stress Corrosion Cracking in Austenitic Steels by Laser Shock Peening: *Xueliang Yan*¹; Fei Wang¹; Leimin Deng¹; Chenfei Zhang¹; Yongfeng Lu¹; Michael Nastasi¹; Bai Cui¹; ¹University of Nebraska, Lincoln

3:40 PM Break

4:00 PM Invited

Environmental Cracking of Laser-fused Alloys under Non-irradiated and Irradiated Conditions: *Xiaoyuan Lou*¹; Mi Wang²; Miao Song²; Gary Was²; Rebek Raul³; ¹Auburn University; ²University of Michigan; ³GE Global Research

4:40 PM

Bulk nc-Materials with Tailored Density Enables Design of Retrievable Corrosion Sensors: *Ting Chen*¹; Anuvind Akula²; Ram Shenoy²; Saadedine Tebbal¹; Indranil Roy²; ¹WellDiver, SET Laboratories; ²WellDiver, UniPolar Technology

5:00 PM

Modelling the Effect of Iodine at Stress Corrosion Crack Tips in Zirconium Using Hybrid Quantum Mechanics/molecular Dynamics Simulations: *Vlad Podgurschi*¹; ¹Imperial College London

MECHANICS & STRUCTURAL RELIABILITY

Fatigue in Materials: Multi-scale and Multi-environment Characterizations and Computational Modeling — Data-driven Investigations of Fatigue

Sponsored by: TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Jean-Briac le Graverend, Texas A&M University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Garrett Pataky, Clemson University; Filippo Berto, Norwegian University of Science and Technology

Tuesday PM | March 12, 2019
301B | Henry B. Gonzalez Convention Center

Session Chair: Ashley Spear, University of Utah

2:00 PM Keynote

Materials-specific Machine Learning: Fatigue Modeling and Beyond: *Bryce Meredig*¹; ¹Citrine Informatics

2:40 PM

A Data-driven Approach to Describe Fatigue Damage Evolution and Crack Initiation in a BCC Steel Microstructure: *Ali Riza Durmaz*¹; Thomas Straub¹; Christoph Eberl¹; ¹Fraunhofer IWM

3:00 PM Invited

Uncertainty, Probabilistic, and Statistical Modeling: *D. Gary Harlow*¹; ¹Lehigh University

3:20 PM Break

3:40 PM Invited

Surface Roughness Parameters as Predictive Damage Indices for Crack Initiation and Small Crack Propagation: *Jalal Fathi Sola*¹; Randall Kelton¹; Efstathios Meletis¹; *Haiying Huang*¹; ¹University of Texas, Arlington

4:00 PM

Linking Fatigue Probability Distributions to Coupled Microstructure Attributes Surrounding Fatigue Hot-Spots: *Adrienne Muth*¹; Surya Kalidindi¹; Adam Pilchak²; Reji John²; David McDowell¹; ¹Georgia Institute of Technology; ²U.S. Air Force Research Laboratory

4:20 PM

Virtual Testing for Fiber Reinforced Composites Coupled with Multimodal NDE Monitoring: *Brian Wisner*¹; Mohammadreza Bahadori¹; Mira Shehu¹; Melvin Mathew¹; Harsh Baid²; Frank Abdi²; Antonios Kontsos¹; ¹Drexel University; ²AlphaSTAR Corporation

4:40 PM

Complex 3D Microstructure and Short Crack Growth Correlation by a Surrogate Model in Ti-6Al-4V: *Meysam Hassanipour*¹; Shinta Watanabe¹; Kyosuke Hirayama¹; Hiroyuki Toda¹; Han Li¹; Kentaro Uesugi¹; Akihisa Takeuchi¹; ¹Kyushu University

SPECIAL TOPICS

Frontiers of Materials Research: A Decadal Survey — Outputs and Discussion

Sponsored by: TMS: Materials Innovation Committee

Program Organizer: James Warren, National Institute of Standards and Technology

**Tuesday PM | March 12, 2019
 221D | Henry B. Gonzalez Convention Center**

Session Chairs: James Warren, National Institute of Standards and Technology; Kevin Hemker, Johns Hopkins University

12:15 PM Introductory Comments Presenter: James Warren, National Institute of Standards and Technology

12:20 PM Invited Presentation on the Decadal Survey Outputs: *Kevin Hemker*¹; ¹Johns Hopkins University

12:40 PM Panel Discussion: Panel Discussion moderated by Steven Zinkle, University of Tennessee. Panelists include: Linda Horton, Department of Energy; Ian Robertson, University of Wisconsin; Linda Sapochak, National Science Foundation; Susan Sinnott, Pennsylvania State University; and Mark Weaver, University of Alabama

ENERGY & ENVIRONMENT

Green Materials Engineering: An EPD Symposium in Honor of Sergio Monteiro — Properties and Characterization of Green Materials

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Shadia Ikhmayies, Al Isra University; Jian Li, CanmetMATERIALS; Carlos Mauricio Vieira, State University of the North Fluminense; Fabio Braga, National Service of Industrial Apprenticeship (SENSI)

Tuesday PM | March 12, 2019
008A | Henry B. Gonzalez Convention Center

Session Chairs: Sergio Monteiro, Military Institute of Engineering, IME; Luis Silva, IME

2:00 PM Introductory Comments

2:05 PM Keynote

Fish Skin: A Natural Inspiration for Novel Materials and Coatings: Adam Drelich¹; *Jaroslav Drelich*¹; ¹Michigan Technological University

2:45 PM

Mechanical and Morphological Properties of Eucalyptus Fibers: Juliana Soares de Faria¹; *Felipe Perisse Duarte Lopes*¹; Carlos Fontes Vieira¹; Sergio Neves Monteiro¹; ¹State University of Northern of Rio de Janeiro

3:05 PM

Optimization of Torrefaction Parameters for *Tectona grandis* for High Energetic Yields: *Jamiu Odusote*¹; Adekunle Adeleke¹; Olumuyiwa Lasode¹; Madhurai Malathi²; Dayananad Paswan²; ¹University of Ilorin; ²CSIR-National Metallurgical Laboratory

3:25 PM Break

3:35 PM

Characterization of Arapaima Fish Scales and Related Reinforced Epoxy Matrix Composites by XRD, EDS and SEM: *Wendell Bruno Almeida Bezerra*¹; Sergio Neves Monteiro¹; Michelle Souza Oliveira¹; Fábio Da Costa Garcia Filho¹; Luana Cristyne Da Cruz Demosthenes¹; Luís Carlos da Silva¹; ¹Military Institute of Engineering

3:55 PM

Piassava Fibers: Morphologic and Spectroscopic Aspects: *Fabio Garcia Filho*¹; Michelle Oliveira¹; Luana Demosthenes¹; Sergio Monteiro¹; Fernanda Luz¹; Artur Pereira¹; ¹Military Institute of Engineering

4:15 PM

Structural Characterization of Figue Fabric Reinforcing Epoxy Matrix Composites by XRD and SEM Analysis: *Michelle Oliveira*¹; Artur Camposo¹; Fábio Garcia¹; Luana Demosthenes¹; Fábio Braga¹; Fernanda Luz¹; Sergio Monteiro¹; ¹Militar Institute of Engineering

MATERIALS PROCESSING

Heterogeneous and Gradient Materials (HGM III): Tailoring Mechanical Incompatibility for Superior Properties — Gradient Materials II: Property and Processing

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

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

Tuesday PM | March 12, 2019

209 | Henry B. Gonzalez Convention Center

Session Chairs: Suveen Mathaudhu, University of California, Riverside; Bin Yang, University of Science and Technology Beijing; Troy Topping, California State University, Sacramento; Somuri Prasad, Sandia National Laboratories

2:00 PM Invited

Mechanical Performance and Thermal Stability of Gradient-structured Copper: Sina Shahrezaei¹; *Suveen Mathaudhu*¹; ¹University of California, Riverside

2:25 PM

Characterization and Analysis of Functionally Graded Metallic Plates for Use in Personal Ballistic Protection: *Troy Topping*¹; Samuel Garrison-Terry¹; Elizabeth Keys¹; ¹California State University, Sacramento

2:45 PM Invited

Enhanced Stability of Nano-grained Metals below a Critical Size: *Xiuyan Li*¹; K. Lu¹; ¹Institute of Metal Research C.A.S.

3:10 PM

Radiation and Corrosion Resistances of 316LN Austenitic Stainless Steel by Rotationally Accelerated Shot Peening: *Bin*

Yang¹; Xudong Chen¹; Yuntian Zhu²; Yusheng Li³; ¹University of Science and Technology Beijing; ²North Carolina State University; ³Nanjing University of Science and Technology

3:30 PM

Mechanical Properties and Failure Mechanisms of Gradient Nanoporous Materials: *Paulo Branicio*¹; ¹University of Southern California

3:50 PM Break

4:10 PM Invited

Usual Gradients Leading to Unusual Benefits: Two Case Studies: *C. Tasan*¹; S.M.T. Mousavi¹; Zhiyuan Liang¹; Dingshun Yan²; Jian Lu³; Mingxin Huang⁴; ¹Massachusetts Institute of Technology; ²Chinese Academy of Sciences; ³City University of Hong Kong; ⁴The University of Hong Kong

4:35 PM

The Mechanical Properties Investigation of Gradient Materials Processed by Surface Mechanical Attrition Treatment (SMAT): *Xinkun Zhu*¹; ¹Kunming University of Science & Technology

4:55 PM Invited

Gradient Microstructures in Single Crystals Induced by Sliding Contact: *Somuri Prasad*¹; Joseph Michael¹; Corbett Battaile¹; Bhaskar Majumdar²; ¹Sandia National Laboratories; ²New Mexico Institute of Technology

5:20 PM

Plastic Deformation Behavior of Laser-processed Nanoscale Al-Al₂Cu Eutectic Alloy: *Shujuan Wang*¹; Guisen Liu²; Qing Su²; Dongyue Xie²; Gu Chao²; Jian Wang²; Amit Misra³; ¹Los Alamos National Laboratory; ²University of Nebraska, Lincoln; ³University of Michigan

ADVANCED MATERIALS

High Entropy Alloys VII — Alloy Development and Applications II

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Tuesday PM | March 12, 2019

207B | Henry B. Gonzalez Convention Center

Session Chairs: Carl Koch, North Carolina State University; Robert Ritchie, University of California

2:00 PM Keynote

Low Density High Entropy Alloys: A Review: *Carl Koch*¹; ¹North Carolina State University

2:30 PM Keynote

Damage-tolerance in CrCoNi-based Medium/High-entropy Alloys: *Robert Ritchie*¹; Jun Ding²; Mark Asta¹; Bernd Gludovatz³; Easo George⁴; Qian Yu⁵; ¹University of California; ²Lawrence Berkeley National Laboratory; ³University of New South Wales; ⁴Oak Ridge National Laboratory; ⁵Zhejiang University

3:00 PM Invited

High-throughput Materials Design Using CALPHAD-based Informatics Tools: *Chuan Zhang*¹; Fan Zhang¹; Rui Feng²; Michael Gao³; Peter Liaw²; ¹Computherm LLC; ²University of Tennessee; ³National Energy Technology Laboratory

3:20 PM Invited

ICME Design of a Corrosion Resistant HEA for Harsh Environments: *Pin Lu*¹; James Saal¹; Greg Olson¹; Tianshu Li²; Orion Swanson²; Gerald Frankel²; Angela Gerard³; Kathleen Quiambao³; John Scully³; ¹QuesTek Innovations; ²The Ohio State University; ³University of Virginia

3:40 PM Break

4:00 PM

Design of Advanced Light-weight High-entropy Alloys for High-temperature and Cost-effective Applications: Rui Feng¹; Chuan Zhang²; Michael Gao³; Fan Zhang²; *Peter Liaw*¹; ¹University of Tennessee, Knoxville; ²CompuTherm LLC; ³National Energy Technology Laboratory

4:20 PM Invited

Designing of Coherent Microstructure with Cuboidal B2 Nanoprecipitation Strengthening in BCC-based High-entropy Superalloys: *Qing Wang*¹; Beibei Jiang¹; Xiaona Li¹; Chuang Dong¹; Peter K. Liaw²; ¹Dalian University of Technology; ²University of Tennessee

4:40 PM Invited

Solidification Processing and Microstructural Development in High-entropy Alloys: *Reza Abbaschian*¹; Nicholas Derimow¹; Abraham Munitz²; Louis Santodonato³; ¹University of California, Riverside; ²Nuclear Research Center, Negev; ³Oak Ridge National Laboratory

5:00 PM Invited

A Novel Dual-phase Gradient Material of High-entropy Alloy Prepared by Spark Plasma Sintering: *Wei Zhang*¹; Mingyang Zhang¹; Fangzhou Liu¹; Yingbo Peng²; Yong Liu¹; ¹Central South University; ²Nanjing Agricultural University

MATERIALS DESIGN

Hume-Rothery Symposium – Bulk and Interfacial Thermodynamics of Complex Materials: Insights Derived from Integrating Modeling and Experiment – Materials Design and Discovery II

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Raymundo Arroyave, Texas A&M University; Michael Gao, National Energy Technology Laboratory; Jeffrey Hoyt, McMaster University; Saryu Fensin, Los Alamos National Laboratory

Tuesday PM | March 12, 2019

304B | Henry B. Gonzalez Convention Center

Session Chairs: Michael Gao, National Energy Technology Laboratory; Jeffrey Hoyt, McMaster University

2:00 PM Invited

Challenges in Scale-bridging Computational Materials Science: *Alain Karma*¹; ¹Northeastern University

2:30 PM Invited

Interfacing Ab Initio Calculations, Calphad Models, Thermodynamic Databases, Web Interfaces and Visualization Tools: *Axel VanDeWalle*¹; Ruoshi Sun¹; Qijun Hong¹; Sara Kadkhodaei¹;

Chiraag Nataraj¹; Helena Liu¹; Sayan Samanta¹; Siya Zhu¹; ¹Brown University

3:00 PM Invited

Uncertainty Quantification for Solute Transport Modeling: *Dallas Trinkle*¹; ¹University of Illinois Urbana Champaign

3:30 PM Break

3:50 PM Invited

Machine Learning Applications in Materials Modeling, Data and Imaging: *Dane Morgan*¹; ¹University of Wisconsin

4:20 PM

Rethinking Diffusivity of Ni50Al50 Melt under Extreme Conditions: An Ab Initio Molecular Dynamics Study: *William Yi Wang*¹; Jian Tang²; Xiangyi Xue²; Deye Lin³; Tanvir Ahmed⁴; Jun Wang²; Bin Tang²; Shun-Li Shang⁵; Xingyu Gao³; Irina Belova⁴; Haifeng Song³; Graeme Murch⁴; Jinshan Li²; Zi-Kui Liu⁵; ¹Northwestern Polytechnical University; ²Northwestern Polytechnical Univ; ³Institute of Applied Physics and Computational Mathematics, Beijing; ⁴University of Newcastle; ⁵Pennsylvania State University

MATERIALS DESIGN

ICME Case Studies and Validation: Extreme Environments — Session II

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: James Saal, Citrine Informatics; Mark Carroll, Federal-Mogul Powertrain; Xuan Liu, Pratt & Whitney; Dongwon Shin, Oak Ridge National Laboratory; Laurent Capolungo, Los Alamos National Laboratory

Tuesday PM | March 12, 2019

207A | Henry B. Gonzalez Convention Center

Session Chairs: James Saal, Citrine Informatics; Dongwon Shin, Oak Ridge National Laboratory

2:00 PM Invited

Resisting Attack by Hot CO₂: A Comparison of Fe- and Ni-base Alloys: *David Young*¹; Jianqiang Zhang¹; ¹University of New South

Wales

2:40 PM Invited

Design and Analysis of Mesoscale Reduced Order Models for Predicting Microstructure Evolution in Extreme Environments: Aaron Kohnert¹; James Stewart²; Laurent Capolungo¹; *Remi Dingreville*²; ¹Los Alamos National Laboratory; ²Sandia National Laboratories

3:20 PM Break

3:40 PM Invited

Predicting Behavior and Designing Alloys for Extreme Environments: *Bruce Pint*¹; ¹Oak Ridge National Laboratory

4:20 PM Invited

Design of Creep-resistant, Alumina-forming Ferrous Alloys with ICME Approach: *Yukinori Yamamoto*¹; Michael Brady¹; Govindarajan Muralidharan¹; Bruce Pint¹; Dongwon Shin¹; Sangkeun Lee¹; Michael Santella²; Philip Maziasz²; ¹Oak Ridge National Laboratory; ²Oak Ridge National Laboratory (Retired)

5:00 PM

Materials for Extreme Environments: The Role of Data Analytics: *Ram Devanathan*¹; Jovan Araiza¹; Jennifer Bauer²; Gary Black¹; Michael Gao²; Michael Glazoff³; Lianshan Lin⁴; Thomas Lograsso⁵; Turab Lookman⁶; Pratik Ray⁵; Vyacheslav Romanov²; Kelly Rose²; Arun Sathanur¹; Dongwon Shin⁴; Ashley Weber¹; Yukinori Yamamoto⁴; Jeffrey Hawk²; ¹Pacific Northwest National Laboratory; ²National Energy Technology Laboratory; ³Idaho National Laboratory; ⁴Oak Ridge National Laboratory; ⁵Ames Laboratory; ⁶Los Alamos National Laboratory

CHARACTERIZATION

Interfaces in Structural Materials: An MPMD Symposium in Honor of Stephen M. Foiles — Microstructural Evolution II

Sponsored by: The Minerals, Metals and Materials Society, TMS; Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Eric Homer, Brigham Young University; Elizabeth Holm, Carnegie Mellon University; Mark Asta, University of California, Berkeley

Tuesday PM | March 12, 2019

302C | Henry B. Gonzalez Convention Center

Session Chairs: Fadi Abdeljawad, Clemson University; Gregory Rohrer, Carnegie Mellon University

2:00 PM Invited

Phase Transformation Strengthening in High Entropy Alloys: *Maryam Ghazisaeidi*¹; Changning Niu¹; Carlyn LaRosa¹; Jiashi Miao¹; Michael Mills¹; ¹Ohio State University

2:30 PM

Coupling of the Trajectory of Grain Boundaries with the Diffusion-controlled Growth Dynamics of Alloys: *Silvere Akamatsu*¹; Sabine Bottin-Rousseau²; Supriyo Ghosh³; Alain Karma⁴; Mathis Plapp¹; ¹CNRS; ²Sorbonne University; ³TAM University; ⁴NEU

2:50 PM

Atomic-level Description of Grain Boundary Structure and Dynamics in Al-based Alloy: *Marcela Trybula*¹; Pawel Zieba¹; ¹Institute Metallurgy and Materials Science PAS

3:10 PM Invited

Grain Boundary Diffusivity in Nanocrystalline Metals: Stability and Transport: *Jessica Krogstad*¹; ¹University of Illinois, Urbana-Champaign

3:40 PM Break

4:00 PM

Solid-liquid Interface Migration in Terbium: Kinetics vs. Thermodynamics: *Mikhail Mendeleev*¹; Feng Zhang¹; Huajing Song¹; Yang Sun¹; Cai-Zhuang Wang¹; Kai-Ming Ho¹; ¹Ames Laboratory

4:20 PM

Phase Transformations in Nanocrystalline Fe Alloys: Interface Generation and Thermal Stability: *Dor Amram*¹; Christopher Schuh¹; ¹Massachusetts Institute of Technology

4:40 PM

Kinematic Accessibility and Thermodynamic Stability of Geometrically Complex Grain Boundaries: *Logan Ware*¹; Daniel Suzuki¹; Zachary Cordero¹; ¹Rice University

5:00 PM

Phase Competition during Solidification of Terbium: *Huajing Song*¹; Mikhail Mendeleev¹; ¹Ames Laboratory US Department of Energy

ENERGY & ENVIRONMENT

Materials for Molten Salt Energy Systems — Thermodynamics and Electrochemistry

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

Program Organizers: Stephen Raiman, Oak Ridge National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Kumar Sridharan, University of Wisconsin-Madison; Judith Vidal, National Renewable Energy Laboratory; Michael Short, Massachusetts Institute of Technology

Tuesday PM | March 12, 2019

008B | Henry B. Gonzalez Convention Center

Session Chair: Jinsuo Zhang, Virginia Polytechnic Institute and State University

2:00 PM Introductory Comments

2:05 PM

Modeling Molten Salt Chemical Behavior for Nuclear Reactor Applications: *Theodore Besmann*¹; Johnathan Ard¹; Jacob McMurray²; ¹University of South Carolina; ²Oak Ridge National Laboratory

2:35 PM

Electrochemistry to Understand and Control Materials Corrosion in Molten Li₂BeF₄ (FLiBe) Salt: *William Doniger*¹; Mohamed Elbakhshwan¹; Cody Falconer¹; Karl Britsch¹; Adrien Couet¹; Kumar Sridharan¹; ¹University of Wisconsin, Madison

2:55 PM

Thermodynamics Coupled Molten Salt Reactor Performance Simulations: *Jacob McMurray*¹; Theodore Besmann²; Jonathan Ard²; Ben Collins¹; Ben Betzler¹; Bernie Fitzpatrick³; Markus Piro³; Stephen Raiman¹; Lou Qualls¹; ¹Oak Ridge National Laboratory; ²University of South Carolina; ³University of Ontario Institute of Technology

3:15 PM

Chromium Corrosion Properties in Molten Salt: Fundamental Data Measurement and Salt Structure Identification: *Jinsuo Zhang*¹; Yafei Wang¹; ¹Virginia Polytechnic Institute and State University

3:35 PM Break

3:55 PM

Use of Carbon Tetrachloride to Remove Trace Oxide and Lower Corrosivity of Molten Chloride Salts: *James Kurley*¹; Richard Mayes¹; Stephen Raiman¹; Phillip Halstenberg¹; Abbey McAlister¹; ¹Oak Ridge National Laboratory

4:15 PM

Electrochemical Properties of Tellurium in Molten Salts: Soluble-insoluble Transition Behavior: *Hojong Kim*¹; Timothy Lichtenstein¹; ¹Pennsylvania State University

4:35 PM

Effect of Purification Procedures on Electrochemistry of Molten NaCl-KCl-MgCl₂: *Michael Simpson*¹; Nicole Orabona¹; ¹University of Utah

MATERIALS PROCESSING

Materials Processing Fundamentals — Multiphysics - Process and Properties Modeling

Sponsored by: TMS: Process Technology and Modeling Committee

Program Organizers: Guillaume Lambotte, Boston Metal; Jonghyun Lee, Iowa State University; Antoine Allanore, MIT - DMSE; Samuel Wagstaff, Novelis

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Session Chairs: Jonghyun Lee, Iowa State University; Antoine Allanore, MIT

2:00 PM Introductory Comments

2:05 PM Invited

The Materials Science Laboratory – Electromagnetic Levitator on the International Space Station: A Case Study with the Alloy Ti-48Al-2Cr-2Nb: *Rainer Wunderlich*¹; M Mohr¹; U Hecht²; R Hyers³; D Matson⁴; G Lohöfer⁵; O Shuleshova⁶; H.-J. Fecht¹; ¹Ulm University; ²ACCESS e.V.; ³University of Massachusetts; ⁴Tufts University; ⁵Institut für Materialphysik im Weltraum; ⁶IFW Dresden

2:25 PM

Modeling of Fluid Flow Effects on Experiments Using Electromagnetic Levitation in Reduced Gravity: *Gwendolyn Bracker*¹; Xiao Xiao²; Jonghyun Lee³; Dieter Herlach⁴; Markus Rettenmayr⁵; Marcus Reinartz⁵; Stefan Burggraf⁶; Douglas Matson⁷; Robert Hyers¹; ¹University of Massachusetts; ²Tufts University; ³Iowa State University; ⁴Institut für Experimentalphysik IV, Ruhr-Universität Bochum and Institut für Materialphysik im Weltraum, Deutsches Zentrum für Luft- und Raumfahrt; ⁵Otto-Schott-Institut für Materialforschung, Friedrich-Schiller-Universität; ⁶Institut für Materialphysik im Weltraum, Deutsches Zentrum für Luft- und Raumfahrt; ⁷Tufts University

2:45 PM

Investigation of Non-linear Effects in Viscosity Measurements by the Oscillating Drop Method in an Electromagnetic Levitation Device under Reduced Gravity Conditions: *Rainer Wunderlich*¹; Markus Mohr¹; ¹Ulm University

3:05 PM

Short Range Order of Supersaturated Sodium Sulfate Solution: *Jonghyun Lee*¹; Yong Chan Jo²; Sai Katamreddy¹; Geun Woo Lee²; ¹Iowa State University; ²Korea Institute of Standards and Science

3:25 PM

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

3:45 PM Break

4:05 PM

Optimal Stator Design for Oxide Films Shearing Found By Physical Modelling: *Agnieszka Dybalska*¹; Dmitry Eskin²; Jayesh Patel²; ¹Birmingham University; ²Brunel University

4:25 PM

Reassessment of the Numerical Modeling of Equiaxed Solidification: *John Coleman*¹; Matthew Krane¹; ¹Purdue University

4:45 PM

The Lattice Boltzmann Approach to Microstructural Convective Transport Simulations Using Parallel Cellular Automata: *Andrew Kao*¹; Matthew Alexandrakis¹; Ivars Krastins¹; Teddy Gan¹; Koulis Pericleous¹; ¹University Of Greenwich

5:05 PM

An Analysis of Heat Transfer in the Planar Flow Casting Process of Noncrystalline Metals: *Joseph Mattson*¹; ¹Cornell University

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Early Career

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

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Session Chairs: Clarissa Yablinsky, Los Alamos National Laboratory; Julie Tucker, Oregon State University

2:00 PM Invited

Deformation Mechanisms in a Candidate FeCrAl Alloy and Its Weldment after Neutron Irradiation: *Dalong Zhang*¹; Maxim Gussev¹; Samuel Briggs²; Philip Edmondson¹; Yukinori Yamamoto¹; Kevin Field¹; ¹Oak Ridge National Laboratory; ²Oregon State University

2:20 PM Invited

Effect of Friction Stir Welding on Microstructure Evolution on In Situ and Ex Situ Self-ion Irradiated MA956: *Elizabeth Getto*¹; Nicholas Nathan¹; Samuel Briggs²; Khalid Hattar²; Brad Baker¹; ¹United States Naval Academy; ²Sandia National Laboratories

2:40 PM Invited

Additively Manufactured Grade 91 Steel for Reactor Applications: *Benjamin Eftink*¹; Daniel Vega²; Yung Yoo¹; Matthew Janish¹; Eda Aydogan¹; Todd Steckley¹; Mark Ortega¹; Carl Cady¹; Thomas Lienert¹; Stuart Maloy¹; ¹Los Alamos National Laboratory; ²Department of Energy

3:00 PM Invited

Visco-plastic Self Consistent (VPSC) Modeling of Deformation Processing of NFA-1 14YWT Thin-walled Tubing: *Soupitak Pal*¹; Irene Beyerlein¹; Eshradul Alam¹; John Lewandowski²; Stuart Maloy³; Robert Odette¹; ¹University of California, Santa Barbara; ²Case Western Reserve University; ³Los Alamos National Laboratory

3:20 PM Break

3:40 PM Invited

Correlation between the Microstructure of Precipitations and Their Mechanical Contributions with and without Radiation Damage: *Tianyi Chen*¹; Lizhen Tan²; Ying Yang²; Rigen-Mo He³; Beata Tyburska-püschel³; Kumar Sridharan³; ¹Oregon State University; ²Oak Ridge National Laboratory; ³University of Wisconsin-Madison

4:00 PM Invited

Quantitative In-situ TEM Nanomechanical Testing of Model and Nuclear Relevant Engineering Alloys: *Christopher Barr*¹; Khalid Hattar¹; ¹Sandia National Laboratories

4:20 PM Invited

Experimental and Modeling Study of Deformation Mechanisms in Irradiated ZIRLO: *Samuel Briggs*¹; Pierre-Alexandre Juan²; Brittany Muntiferling²; Hui Yang³; Marko Knezevic⁴; Remi Dingreville²; Jianmin Qu³; Khalid Hattar²; ¹Oregon State University; ²Sandia National Laboratories; ³Tufts University; ⁴University of New Hampshire

4:40 PM Invited

Mechanical Properties of Tungsten Irradiated with a Thermal Neutron Shield: *Lauren Garrison*¹; Yutai Katoh¹; Akira Hasegawa²; Takeshi Miyazawa²; ¹Oak Ridge National Laboratory; ²Tohoku University

5:00 PM Invited

Damage and Fracture of Nuclear Materials under Extreme Conditions: From Nuclear Graphite to TRISO Fuel Particles: *Dong Liu*¹; Steven Knol²; Mark Davies³; Arjan Vreeling²; Saurabh Kabra⁴; Houzheng Wu⁵; Martin Kuball¹; Harold Barnard⁶; Robert Ritchie⁶; ¹University of Bristol; ²NRG; ³USNC; ⁴Rutherford Appleton Laboratory; ⁵Loughborough University; ⁶Lawrence Berkeley National Laboratory

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior Related to Interface Physics III — Nanocrystalline Materials II

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

Program Organizers: Jason Trelewicz, Stony Brook University; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht; Siddhartha Pathak, University of Nevada, Reno; Jordan Weaver, National Institute of Standards and Technology; Marc Legros, CEMES-CNRS

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Session Chairs: Jeffrey Wheeler, ETH Zurich; Erica Lilleodden, Helmholtz-Zentrum Geesthacht

2:00 PM

Multifunctional Properties of Nanostructured Al Stabilized by Ca Grain Boundary Segregations and Intermetallic Particles: *Xavier Sauvage*¹; *Fabien Cuvilly*¹; *Alan Russell*²; *Kaveh Edalati*³; ¹CNRS-GPM - University Rouen Normandy; ²Department of Materials Science and Engineering, Iowa State University and Ames Laboratory of the US Department of Energy; ³International Institute for Carbon-Neutral Energy Research and Kyushu University

2:20 PM Invited

Role of Interfaces in Nanoscale Deformation Mechanisms of Shape Memory Yttria Stabilized Tetragonal Zirconia: *Mohsen Asle Zaeem*¹; *Ning Zhang*¹; ¹Colorado School of Mines

2:50 PM

An Experimental and Atomistic Simulation Study of Strain Rate Deformation in Amorphous Ni-Zr Alloyed Thin Film: *Bibhu Sahu*¹; *Amlan Dutta*²; *Rahul Mitra*²; ¹Indian Institute of Technology, Kharagpur; ²Indian Institute of Technology Kharagpur

3:10 PM

Rejuvenation of Nanocrystalline Metals: *Glenn Balbus*¹; *McLean Echlin*¹; *Charlette Grigorian*²; *Christoph Gammer*³; *Oliver Renk*³; *Verena Maier-Kiener*⁴; *Daniel Kiener*⁴; *Timothy Rupert*²; *Tresa Pollock*¹; *Daniel Gianola*¹; ¹University of California, Santa Barbara; ²University of California, Irvine; ³Erich Schmid Institute for Materials Science, Austrian Academy of Sciences; ⁴Montanuniversität Leoben

3:30 PM Break

3:50 PM

Atomistic Mechanisms on Interface- and Surface-Mediated Coble-Type Creep in Nanostructured Metals: *Scott Mao*¹; *Li*

Zhong¹; Jiangwei Wang²; Yang He¹; ¹University of Pittsburgh; ²Zhejiang University

4:10 PM Invited

In Situ Micromechanical Testing of Ni Thin Films for Understanding the Deformation Behaviour at Grain Boundaries:

*Dhriti Bhattacharyya*¹; Alan Xu¹; Michael Saleh¹; Lyndon Edwards¹;

¹Australian Nuclear Science and Technology Organization

4:40 PM

Unexpected Behavior of Stiffness and Thermal Expansion in Nano-particles: *Siu-Wai Chan*¹; ¹Columbia University

5:00 PM Invited

Influence of Ion Beam Assisted Deposition (IBAD) on Interface Stability in PVD Thin Films: Yuan Xiao¹; Ming Chen¹; Huan Ma²;

Ralph Spolenak²; *Jeffrey Wheeler*¹; ¹ETH Zurich; ²EMPA

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

**Micro- and Nanomechanical Testing in Harsh Environments —
Micromechanical Testing under Extreme Conditions**

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

Program Organizers: Verena Maier-Kiener, Montanuniversität Leoben; Sandra Korte-Kerzel, RWTH Aachen; Peter Hosemann, University of California; Afrooz Barnoush, Norwegian University of Science and Technology; Jeffrey Wheeler, ETH Zurich; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

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Session Chairs: Afrooz Barnoush, Norwegian University of Science and Technology; Samantha Lawrence, Los Alamos National Laboratory

2:00 PM Invited

Probing Hydrogen-deformation Interactions in Additively Manufactured Stainless Steel using Synchrotron X-rays: *Samantha Lawrence*¹;

Reeju Pokharel¹; Bjørn Clausen¹; Donald Brown¹; John Carpenter¹;

Chris San Marchi²; ¹Los Alamos National Laboratory;

²Sandia National Laboratories

2:25 PM

Environmental TEM Study of Hydrogen Effect on the Evolution of Irradiation-induced Dislocation Loops in α -Fe at Elevated Temperature: *Longchao Huang*¹; Zhangjie Wang²; Degang Xie²; Zhiwei Shan²; ¹Xi'an Jiaotong University; ²Xi'an Jiaotong University

2:45 PM

Evaluation of Hydrogen Embrittlement of Technical Relevant Alloy Systems by Means of Electrochemical Nanoindentation: *Anna Ebner*¹; Patrick Lebernegg¹; Alexander Leitner²; Helmut Clemens¹; Reinhard Pippan²; Verena Maier-Kiener¹; ¹Department Physical Metallurgy and Material Testing; ²Erich Schmid Institute of Materials Science

3:05 PM

In Situ Scanning Electron Microscopy for Microstructural and Micro-mechanical Characterization during Hydrogen-charging: *Jinwoo Kim*¹; Cemal Cem Tasan¹; ¹Massachusetts Institute of Technology

3:25 PM Break

3:45 PM Invited

Hydrogen-dislocation Interaction in Al and Fe Revisited by Quantitative Mechanical Tests Inside TEM: *Degang Xie*¹; Longchao Huang¹; Evan Ma²; Ju Li³; Zhiwei Shan¹; ¹Xian Jiaotong University; ²John Hopkins University; ³Massachusetts Institute of Technology

4:10 PM

Virtual Experiments: Discrete Dislocation Plasticity Simulations of Hydrogen in Microcantilevers: Haiyang Yu¹; Alan Cocks¹; *Edmund Tarleton*¹; ¹Univeristy of Oxford

4:30 PM

Multiscale 3D Investigation of Environmental Barrier Coatings and Damage in Angle-interlocked Ceramic Matrix Composite under In Situ Loading: *Hrishikesh Bale*¹; Aly Badran²; Robert Ritchie³; David Marshall²; ¹Carl Zeiss X-ray Microscopy; ²University of Colorado, Boulder; ³University of California, Berkeley

4:50 PM

Nanotwinned Al-Fe Solid Solution Alloys with High Strength and Enhanced Thermal Stability: *Qiang Li*¹; Sichuang Xue¹; Yifan Zhang¹; Jian Wang²; Haiyan Wang¹; Xinghang Zhang¹; ¹Purdue University; ²University of Nebraska, Lincoln

5:10 PM Invited

Under Pressure: Deformation of Metallic Nanocrystals up to 20 GPa: *Wendy Gu*¹; Abhinav Parakh¹; ¹Stanford University

MATERIALS DESIGN

Modeling and Simulation of Composite Materials — Session III

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

Program Organizers: Rakesh Behera, New York University; Dinesh Pinisetty, CSU Maritime Academy; Dzung Luong, New York University

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Session Chairs: Chandra Veer Singh, University of Toronto; Brandon Runnels, Brandon Runnels University Of Colorado Colorado Springs; Dung Dinh Luong, New York University

2:00 PM Invited

Modeling Composites and Microstructure Evolution with MOOSE/MARMOT in Nuclear Materials: *Daniel Schwen*¹; Sebastian Schunert¹; Larry Aagesen¹; Andrea Jokisaari¹; Yongfeng Zhang¹; ¹Idaho National Laboratory

2:20 PM Invited

Atomic Structure and Solute Segregation at Semi-coherent Metal/Oxide Interfaces: *Samrat Choudhury*¹; Blas Uberuaga²; ¹University of Idaho; ²Los Alamos National Laboratory

2:40 PM

Atomistic to Continuum Modeling of Metalized Polyvinylidene Fluoride with Aluminum Nanoparticles: *Brandon Runnels*¹; ¹University of Colorado, Colorado Springs

3:00 PM

Multiscale Modeling of the Elasto-plastic Behavior of Architected and Nanostructured Cu-Nb Composite Wires and Comparison with Neutron Diffraction Experiments: *Tang Gu*¹; David McDowell¹; ¹Georgia Institute of Technology

3:20 PM Break

4:00 PM Invited

Multiscale Synergistic Damage Mechanics Methodology for Predicting Progressive Failure in Composite Structures: *Chandra Veer Singh*¹; ¹University of Toronto

4:20 PM Invited

Novel Stress-assisted Structural Transformation in Mo/Cu and Plasticity Enhancement Bicontinuous Intertwined Materials: Lijie He¹; Niaz Abdolrahim¹; ¹University of Rochester

4:40 PM

Hybrid Nanocomposite Bio-Inspired from Bone: Mohammad Maghsoudi-Ganjeh¹; Liqiang Lin¹; Xiaodu Wang¹; Xiaowei Zeng¹; ¹University of Texas at San Antonio

5:00 PM

Atomistic Simulation Studies of the Sulphide Minerals with the Pentlandite Structure.: Mofuti Mehlaphe¹; Phuti Ngoepe¹; ¹University of Limpopo

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Nanoarchitected and Morphology-controlled Nanoporous Materials — NP Materials-mechanical Behavior I

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

Program Organizers: Niaz Abdolrahim, University of Rochester; John Balk, University of Kentucky; Michael Demkowicz, Texas A&M University; Christoph Eberl, Fraunhofer IWM

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Session Chairs: Diana Farkas, Virginia Polytechnic Institute; Wendy Gu, Stanford University

2:00 PM Invited

Mechanical Response of Au Nano-foams from Atomistic Simulations: Diana Farkas¹; ¹Virginia Polytechnic Institute

2:30 PM

A Modified Scaling Law for Stiffness of Nanoporous Materials Accounting for Bending and Stretching Modes of Nodes and Ligaments: Haomin Liu¹; Niaz Abdolrahim¹; ¹University of Rochester

2:50 PM

Tensile Behavior of Stitched Log-pile Cellular Structures Fabricated via Direct Laser Writing: Alina Garcia Taormina¹; Andrea Hodge¹; ¹University of Southern California

3:10 PM Invited

Mechanical Properties of Metallic Nanocubes: Bimetallic Interfaces and Porosity: *Wendy Gu*¹; Mehrdad Kiani¹; Radhika Patil¹; ¹Stanford University

3:40 PM Break

4:10 PM

Modified Gibson-Ashby Model Accounting for Network Coordination Derived from Stochastic Modeling of the Mechanical Behavior of Nanoporous Materials: *Mujan Seif*¹; Thomas Balk¹; Matthew Beck¹; ¹University of Kentucky

4:30 PM

Controlling Effect of Ligaments and Nodes Morphology on the Deformation Behavior of Nanoporous Cu with Varying Relative Density: *Lijie He*¹; Muhammad Hadi¹; Haomin Liu¹; Niaz Abdolrahim¹; ¹University of Rochester

4:50 PM

Shear Band Suppression in High-strength Cu/Mo Nanocomposites with Hierarchical Heterogeneous Structures: *Yuchi Cui*¹; Benjamin Derby¹; Amit Misra¹; ¹University of Michigan, Ann Arbor

5:10 PM

Solid-shell/Porous-core Amorphous Carbon Nanospheres: *Baoxing Xu*¹; ¹University of Virginia

ELECTRONIC MATERIALS

Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XVIII — Phase Stability of Energy Materials

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Hiroshi Nishikawa, Osaka University; Shih-Kang Lin, National Cheng Kung University; Chaohong Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing Univ; Dajian Li, Karlsruhe Institute of Technology; Song-Mao Liang, Clausthal University of Technology; Ming-Tzer Lin, National Chung Hsing University; Zhi-Quan Liu, Institute of Metal Research, Chinese Academy of Sciences; Jaeho Lee, Hongik University; Yee-wen Yen, National Taiwan University of Science and Technology; Yuan Yuan, Chongqing University; Yu Zhong, Worcester Polytechnic Institute

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Session Chairs: Dajian Li, Karlsruhe Institute of Technology ; Yu Zhong, Worcester Polytechnic Institute

2:00 PM Invited

Study on the Phase Diagrams of Bi-Te Binary and Bi-Te-RE (Yb, La, Ce, Nd, Sm, Tb, Er) Ternary Systems: *Ligang Zhang*¹; Mingyue Tan¹; Cun Mao¹; Libin Liu¹; ¹Central South University

2:20 PM

Phase Diagrams of the Bi-In-Se-Te Quaternary System: *Sinn-wen Chen*¹; Yi-cheng Lin¹; ¹National Tsing Hua University

2:40 PM

Solid-state Interfacial Reactions of Sn Solder Joints with Bi₂Te₃-based Thermoelectric Materials: *Chaohong Wang*¹; Mei-hau Li¹; ¹National Chung Cheng University

3:00 PM

Investigation into Phase Transformation of (La,Sr)_y(Cr_{1-x},Fe_x)O₃/YSZ for Dual-phase Oxygen Transport Membranes: *Hooman Sabarou*¹; Boxun Hu²; Prabhakar Singh²; Yu Zhong¹; ¹Worcester Polytechnic Institute; ²University of Connecticut

3:20 PM

Thermodynamic Investigation into the Chemical Stability of LSCrF-ScSZ: *Hooman Sabarou*¹; Yu Zhong¹; ¹Worcester Polytechnic Institute

3:40 PM Break

4:00 PM

Thermodynamic Stability of LiMn_{2-x}M_xO₄ Spinels with Multivalent Transition-Metal-Substitutions: *Dajian Li*¹; Weibin Zhang¹; Keke Chang²; Hans Seifert¹; ¹Karlsruhe Institute of Technology; ²Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences

4:20 PM

Understanding Cation Diffusion Pathways and Roadblocks in Polymorphs of V₂O₅: *Yuting Luo*¹; Sarbajit Banerjee¹; ¹Texas A&M University

4:40 PM

Effect of Tungsten Doping on the Structure and Electronic Properties of Gallium Oxide: *Vishal Zade*¹; Mallesham Bandi¹; Ramana Chintalapalle¹; ¹University of Texas, El Paso

5:00 PM

Size Dependence of Nucleation Controlled Hysteresis in Free-Standing VO₂ Rods: *Heidi Clarke*¹; Bill Caraway¹; Diane Sellers¹; Erick Braham¹; Raymundo Arroyave¹; Sarbajit Banerjee¹; Patrick Shamberger¹; ¹Texas A&M University

5:20 PM

Effect of Inorganic Additives on Sintered Cu Conductive Thick Film: *Jyun Yang Wang*¹; Cheng-Yi Liu¹; ¹National Central University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Modelling and Simulation of Phase Transformations in Alloys

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Yufeng Zheng, Ohio State University; Ashley Paz y Puente, University of Cincinnati; Juan Escobedo-Diaz, University of New South Wales; Dhriti Bhattacharyya, ANSTO; Rajarshi Banerjee, University of North Texas

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225D | Henry B. Gonzalez Convention Center

Session Chairs: Matthew Steiner, University of Cincinnati; Christopher Weinberger, Colorado State University

2:00 PM

Interfacial Energetics and Structure Analysis of the Ferrite-Cementite and Austenite-Cementite Microstructures of Steel Using Empirical Potentials: *Matthew Guziowski*¹; Shawn Coleman¹; Christopher Weinberger²; ¹U.S. Army Research Laboratory; ²Colorado State University

2:20 PM

Phase-Field Simulation of Intermetallic Phase Precipitation in a High-Al Alloyed Lightweight High-strength Steel: *Carsten Drouven*¹; Wenwen Song¹; Wolfgang Bleck¹; ¹RWTH Aachen University

2:40 PM

Dimensionality in Coarsening at the Critical Composition: *W. Beck Andrews*¹; Peter Voorhees²; Katsuyo Thornton¹; ¹University

of Michigan; ²Northwestern University

3:00 PM

Ostwald Ripening of Spheroidal Particles in Multicomponent Alloys: *Kyoungdoc Kim*¹; Peter W. Voorhees¹; ¹Northwestern University

3:20 PM

Beyond Hillert, Mullins and Modified Mean Field: A Case for a Stochastic Grain Growth Model: *Alex Moser*¹; Chandra Pande¹; ¹U.S. Naval Research Laboratory

3:40 PM Break

4:00 PM

The Development of Continuum-based Models of Interface Energetics in Steels as a Function of Temperature: *Christopher Weinberger*¹; Matthew Guziowski²; Shawn Coleman²; ¹Colorado State University; ²U.S. Army Research Laboratory

4:20 PM

Mesoscale Modeling of Grain Boundary Migration Driven by Crystallographically Informed Energy and Mobility: *Brandon Runnels*¹; ¹University of Colorado, Colorado Springs

4:40 PM

Nucleation Kinetic Path: An Application of the Thermodynamic Extremum Principle: *Manon Bonvalet*¹; Thomas Philippe²; John Ågren³; ¹KTH Royal Institute of Technology; ²Ecole Polytechnique - CNRS; ³KTH Royal Institute of Technology

5:00 PM

Phase Transformation Strengthening in Metastable FCC Materials: *Carlyn Larosa*¹; Changning Niu¹; Jiashi Miao¹; Michael Mills¹; Maryam Ghazisaeidi¹; ¹Ohio State University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Powder Processing of Bulk Nanostructured Materials — Nanostructured Metals

Sponsored by: TMS: Powder Materials Committee

Program Organizers: Zachary Cordero, Rice University; Deliang Zhang, Shanghai Jiao Tong University; Brady Butler, US Army Research Laboratory; Ma Qian, RMIT University (Royal Melbourne Institute of Technology)

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2:00 PM

Phase Transformations and Phase Separation in Nanocrystalline Fe Alloys: Thermal Stability and Densification Behavior: *Dor Amram*¹; Christopher Schuh¹; ¹Massachusetts Institute of Technology

2:30 PM

Effect of Boron on Processing and Consolidation of Tungsten Nanopowders: *Brady Butler*¹; Scott Middlemas²; Eric Klier¹; James Paramore¹; Daniel Casem¹; Kevin Hemker³; ¹US Army Research Laboratory; ²Idaho National Laboratory; ³Johns Hopkins University

2:50 PM

Fabrication of Bulk Nanostructured Materials with High Toughness through Simple Powder Processing: *Olivia Donaldson*¹; Timothy Rupert¹; ¹University of California, Irvine

3:10 PM

Mechanical Properties of Gas-atomized and Hot-extruded Aluminum Alloys: *Joe Croteau*¹; David Seidman²; David Dunand²; Nhon Vo¹; ¹NanoAl LLC; ²Northwestern University

3:30 PM

Effect of the Milling and Parameters of Sintering of the Ti-15Mo Powder on the Microstructure and Mechanical Properties: Anna Terynková¹; Kristína Bartha¹; Jirí Kozlík¹; Tomáš Chráska²; Josef Stráský¹; *Miloš Janecek*¹; ¹Charles University; ²Institute of Plasma Physics

3:50 PM Break

4:10 PM

Novel Pathways to Low Cost Titanium Manufacturing: From Powder to Part: *Stefan Gulizia*¹; Peter King¹; Saden Zahiri¹; Christian Doblin¹; Mark Styles¹; Andrew Urban¹; Alejandro Vargas Uscategui¹; Leon Prentice¹; ¹CSIRO Manufacturing

4:30 PM

Microstructure Evolution and Mechanical Properties of Medical Material Mg-3Zn Alloy Prepared by Semi-solid Powder Injection Moulding: *Xia Luo*¹; Chao Fang¹; Zhou Fan¹; Bensheng Huang¹; Jun Yang¹; ¹Southwest Petroleum University

Rare Metal Extraction & Processing — Rare Metals IV

Sponsored by: TMS: Hydrometallurgy and Electrometallurgy Committee

Program Organizers: Gisele Azimi, University of Toronto; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Takanari Ouchi, The University of Tokyo; Neale Neelameggham, IND LLC; You Qiang, University of Idaho; Alafara Baba, University of Ilorin

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Session Chair: Baba Alafara, University of Ilorin

2:00 PM

New Dissolution Process of Iridium to Hydrochloric Acid: *Yuto Kobayashi*¹; Shota Yamada¹; Takashi Nagai¹; ¹Chiba Institute of Technology

2:25 PM

Leaching of Tellurium and Bismuth from the Dashuigou Tellurium Deposit in H₂SO₄ and FeCl₃ Media: *Lixiong Shao*¹; Jiang Diao¹; Liang Liu¹; Bing Xie¹; ¹Chongqing University

2:50 PM

Development in Rare Earth Metal Reduction Technologies: A Review: *Fangyu Liu*¹; Matthew Earlam¹; Patrick Taylor¹; ¹Colorado School of Mines

3:15 PM

Study on Thiosulfate Leaching of Gold by Cycling Barren Solution: *Yongbin Yang*¹; Lai Meixiang¹; Qiang Zhong¹; Qian Li¹; Bin Xu¹; Tao Jiang¹; ¹Central South University

LIGHT METALS

REWAS 2019: Cast Shop Recycling Technologies — Cast Shop and Recycling

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

Program Organizers: Mertol Gökelma, Norwegian University of Science and Technology; Elsa Olivetti, Massachusetts Institute of Technology; Gabrielle Gaustad, Alfred University

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007B | Henry B. Gonzalez Convention Center

Session Chair: Mertol Gökelma, Norwegian University of Science and Technology

2:00 PM Introductory Comments

2:05 PM Invited

LIBS Based Sorting - A Solution for Automotive Scrap: *Georg Rombach*¹; ¹Hydro Aluminium Rolled Products GmbH

2:35 PM

Positive Material Identification (PMI) Capabilities in the Metals Secondary Industry: An Analysis of XRF and LIBS Handheld Analyzers: *Leslie Brooks*¹; Gabrielle Gaustad²; ¹Rochester Institute of Technology; ²Alfred University

3:00 PM

The Vertical Floatation Decoater for Efficient, High Metal Yield Decoating and Delacquering of Aluminum Scrap: *Robert De Saro*¹; Sam Luke²; ¹Energy Research Co.; ²DG Marshall Associates, Inc.

3:25 PM

A Method for Assessment of Recyclability of Aluminum from Incinerated Household Waste: *Mertol Gökelma*¹; Ingrid Meling¹; Ece Soylu²; Anne Kvithyld³; Gabriella Tranell¹; ¹Norwegian University of Science and Technology; ²Istanbul Technical University; ³SINTEF Materials and Chemistry

3:50 PM Break

4:05 PM

Isothermal Hot Pressing of Skimmed Aluminium Dross: Influence of the Main Processing Parameters on In-house Molten-metal Recovery: *Varuzan Kevorkijan*¹; ¹Impol R in R d.o.o.

4:30 PM

Manufacturing of Hydrogen on Demand Using Aluminum Can Scrap with Near Zero Waste: *Jed Checketts*¹; Neale Neelameggham²; ¹Natrium Hydroxide Corporation; ²IND LLC.

4:55 PM

Aluminum Alloys in Autobodies: Sources and Sinks: *Ayomipo Arowosola*¹; *Gabrielle Gaustad*²; ¹Rochester Institute of Technology; ²Alfred University

ENERGY & ENVIRONMENT

REWAS 2019: Secondary and Byproduct Sources of Materials, Minerals, and Metals — Electronics and Battery Recycling

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

Program Organizers: *Gabrielle Gaustad*, Alfred University; *Camille Fleuriault*, Gopher Resource; *Neale Neelameggham*, IND LLC; *Elsa Olivetti*, Massachusetts Institute of Technology

Tuesday PM | March 12, 2019
007C | Henry B. Gonzalez Convention Center

Session Chair: *Camille Fleuriault*, Gopher Resource

2:00 PM

Li-Cycle – A Case Study in Integrated Process Development: *Boyd Davis*¹; *Kevin Watson*¹; *Alain Roy*¹; *Ajay Kochhar*²; *Darcy Tait*²; ¹Kingston Process Metallurgy Inc.; ²Li-Cycle Corp.

2:20 PM

Lithium Ion Batteries, How to Generate Value Out of End of Life Mobile Units: *Christer Forsgren*¹; ¹Stena Recycling International AB

2:40 PM

Advances in Lithium-ion Battery Electrolytes: Prospects and Challenges in Recycling: *Joseph Hamuyuni*¹; *Fiseha Tesfaye*²; ¹Aalto University; ²Åbo Akademi University

3:00 PM

An Overview of the Recycling Processes and Technologies for Spent Lithium-Ion Batteries: *Haruka Pinegar*¹; *York Smith*¹; ¹University of Utah

3:20 PM Break

3:40 PM

Increasing Lead Battery Performance Efficiency: *Timothy Ellis*¹; John Howes²; ¹RSR Technologies, Inc.; ²Redland Energy Group

4:00 PM Invited

Outotec Solutions for E-scrap Processing: *Stephen Hughes*¹; Jan Stål¹; Mikael Jåfs¹; Hannu Johto¹; Janne Karonen¹; ¹Outotec

4:25 PM

Rare Earth Magnet Recovery from Hard Drives by Preferential Degradation: *Brandon Ott*¹; ¹Colorado School of Mines

4:45 PM

Selective Reduction and Separation of Europium from Mixed Rare-earth Oxides Recovered from Waste Fluorescent Lamp Phosphors: *Mark Strauss*¹; Brajendra Mishra¹; Gerard Martins²; ¹Worcester Polytechnic Institute; ²Colorado School of Mines

MATERIALS PROCESSING

Shape Casting: 7th International Symposium Celebrating Prof. John Campbell's 80th Birthday — Properties of Castings

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

Program Organizers: Murat Tiryakioglu, University of North Florida; William Griffiths, University of Birmingham; Mark Jolly, Cranfield University

Tuesday PM | March 12, 2019

006B | Henry B. Gonzalez Convention Center

Session Chair: Mark Jolly, Cranfield University

2:00 PM

Characterization of Lead Sheet Manufactured using Traditional Sand-casting Technique: *Arun Prabhakar*¹; Konstantinos Salonitis¹; Mark Jolly¹; ¹Cranfield University

2:25 PM

On the Intrinsic and Extrinsic Microstructure-Property Effects in Cast Aluminum Alloys: *Murat Tiryakioglu*¹; ¹University of North Florida

2:50 PM

Measurement of Residual Strain in the Cylinder Bridge of High Pressure Die Cast A383 Engine Blocks Using Neutron Diffraction:

*Tao Liu*¹; Chris Fancher²; Jeffrey Bunn²; Vishweshwar Arvikar³; Ilya Levin³; Laurentiu Nastac¹; Luke Brewer¹; ¹University of Alabama; ²Oak Ridge National Laboratory; ³Nemak Alabama

3:10 PM

Relation Between Microstructure and Tensile Properties of V and B added Al-7Si Alloy:

*Ozkan Kesen*¹; Ahmet Filiz¹; Selim Temel¹; Özen Gürsoy¹; Eray Erzi¹; Derya Dispinar¹; ¹Istanbul University

3:30 PM Break

3:50 PM

The Effect of Friction Stir Processing on Bifilms & Structural Quality in A356 Alloy Castings:

*Murat Tiryakioglu*¹; Nelson Netto¹; Paul Eason¹; ¹University of North Florida

4:10 PM

Effect of Copper and Nickel Addition on Mechanical Properties of A356 Alloy and Assessment of Mechanism of Pore Formation:

Kerim Yildirim¹; Johannes Brachmann¹; *Derya Dispinar*²; Andreas Buhrig-Polaczek¹; Uwe Vroomen¹; ¹RWTH; ²Istanbul University

4:30 PM

Aluminum Alloy with High Mg Content: Casting Studies for Microstructural Evolution, Phase Formation and ThermoPhysical Properties with Different Alloying Elements:

*Armagan Gul*¹; Özen Gürsoy²; Özkan Kesen²; Eray Erzi²; Derya Dispinar²; Eyup Kayali³; ¹Renault; ²Istanbul University; ³Istanbul Technical University

4:50 PM

Correlation between Melt Quality and Machinability of Al9Si3Cu HPDC Alloy:

*Halil Kalkan*¹; Özen Gürsoy²; Ömer Vardar²; Eray Erzi²; Derya Dispinar²; ¹Mercedes Benz; ²Istanbul University

5:10 PM

Change in Sr Modification by Duration and Its Effect on Mechanical Properties of A360 and A413 Alloy:

*Inal Duygun*¹; Özen Gürsoy¹; Eray Erzi¹; Derya Dispinar¹; ¹Istanbul University

LIGHT METALS

Solidification Processing of Light Metals and Alloys: An MPMD Symposium in Honor of David StJohn — External Fields and the Columnar to Equiaxed Transition

Sponsored by: TMS: Solidification Committee

Program Organizers: Mark Easton, RMIT University; Ma Qian, RMIT University (Royal Melbourne Institute of Technology); John Grandfield, Grandfield Technology Pty Ltd; Norbert Hort, Helmholtz-Zentrum Geesthacht; Mark Jolly, Cranfield University

Tuesday PM | March 12, 2019

006C | Henry B. Gonzalez Convention Center

Session Chairs: Ma Qian, RMIT University; Gui Wang, University of Queensland

2:00 PM Keynote

Mechanisms of Primary Intermetallic Refinement by Ultrasonic Processing: *Dmitry Eskin*¹; *Feng Wang*¹; *Iakovos Tzanakis*²; *Jiawei Mi*³; ¹Brunel University; ²Oxford Brookes University; ³University of Hull

2:20 PM

Influence of AlN Nanoparticles on Creep Resistance of Elektron21 Alloy Prepared by Intensive Melt Shearing: *Hong Yang*¹; *Yuanding Huang*¹; *Karl Kainer*¹; *Norbert Hort*¹; *Hajo Dieringa*¹; ¹Helmholtz-Zentrum Geesthacht

2:40 PM

Grain Initiation Behaviour and its Effect on Grain Refinement: *Feng Gao*¹; *Zhongyun Fan*¹; ¹Brunel University

3:00 PM

Simulating the As-cast Microstructure of an Al-2Cu Alloy Formed under Ultrasonic Treatment: *Gui Wang*¹; *Paul Croaker*²; *Matthew Dargusch*¹; *Damian McGuckin*³; *David StJohn*¹; ¹University of Queensland; ²University of New South Wales; ³Pacific Engineering Systems International

3:20 PM Break

3:40 PM Invited

Promoting the Columnar-to-Equiaxed Transition and Grain Refinement of Ti alloys during Additive Manufacturing: *Michael Bermingham*¹; ¹University of Queensland

4:00 PM Invited

Prediction of the Columnar to Equiaxed Transition in Bottom Cooled Aluminum Copper Cylinders: *Thomas, J. Williams*¹; *Christoph Beckermann*¹; ¹University of Iowa

4:20 PM

Directional Solidification to form Nanoscale Eutectic Microstructures in Al-Cu Thin Films: *Eli Sullivan*¹; John Tomko¹; Patrick Hopkins¹; Jerrold Floro¹; ¹University of Virginia

4:40 PM

Measurements of Microstructure Evolution and Kinetics during Laser-induced Rapid Solidification of Al-based Alloys: *Joseph McKeown*¹; John Roehling¹; Seth Griffiths²; Kai Zweiacker²; Amy Clarke³; Christian Leinenbach²; Jörg Wiezorek⁴; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory; ²Empa - Swiss Federal Laboratories for Materials Science and Technology; ³Colorado School of Mines; ⁴University of Pittsburgh

5:00 PM

Grain Refinement of Al-7Si through Addition of an Al-V-B Master Alloy: *Yunhu Zhang*¹; C.Y. Ye¹; Y.P. Shen¹; W. Chang¹; D.P. Wang¹; D StJohn²; G. Wang²; Q.J. Zhai¹; ¹Shanghai University; ²The University of Queensland

MECHANICS & STRUCTURAL RELIABILITY

Thermo-mechanical Response of Materials Investigated through Novel in-situ Experiments and Modeling — Session IV

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Robert Wheeler, Microtesting Solutions LLC; Dongchan Jang, Kaist; Amit Pandey, Granta Design/ANSYS; Josh Kacher, Georgia Institute of Technology; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Tuesday PM | March 12, 2019

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Session Chairs: Saurabh Puri, Microstructure Engineering; Auger Thierry, CNRS/ENSAM/CNAM

2:00 PM Keynote

Elastic Strains from Laue XRay Microdiffraction on Bi-crystal: Pouya Tajdary¹; Emeric Plancher¹; *Auger Thierry*¹; Véronique Favier¹; Olivier Castelnau¹; Julien Stodolna²; Odile Robach³; Claire Maurice⁴; Vincent Michel¹; Jean-Baptiste Marijon¹; Johan Petit⁵; Dominique Loiseau²; Ngoc-Lam Phong¹; ¹CNRS/ENSAM/CNAM; ²EDF; ³CEA;

⁴EMSE; ⁵Université Paris 10

2:40 PM

Measurement of the Thermal Expansion of Ti-7Al Using High Energy X-ray Diffraction Microscopy: *Rachel Lim*¹; Darren Pagan²; JYPeterKo²; Anthony Rollett¹; ¹Carnegie Mellon University; ²Cornell High Energy Synchrotron Source

3:00 PM

Mechanical Behavior of Austenitic Alloy 709: Synchrotron X-Ray vs. Neutron Diffraction Characterization: *Yuchen Zhao*¹; Jun-Sang Park²; Jonathan Almer²; Djamel Kaoumi¹; ¹North Carolina State University Department of Nuclear Engineering; ²Argonne National Laboratory

3:20 PM

Measuring Elastic and Plastic Anisotropies of a Metastable β -titanium Alloy, Timetal 18, by In Situ High Energy X-ray Diffraction (HEXRD): *Jishnu Bhattacharyya*¹; Darren Pagan²; Sriramya Nair²; Ricardo Lebensohn³; Anthony Rollett⁴; Haitham El-Kadiri⁵; Sean Agnew¹; ¹University of Virginia; ²Cornell University; ³Los Alamos National Laboratory; ⁴Carnegie Mellon University; ⁵Mississippi State University

3:40 PM Break

4:00 PM

Revealing the Role of Microstructure Architecture on Strength and Ductility of Ni Microwires by In Situ Synchrotron X-Ray Diffraction: Ravi Purushottam¹; Abhinav Arya²; Girish Bojjawar Bojjawar²; Steven Van Petegem³; Henry Proudhon⁴; Céline Gérard⁵; Loïc Signor⁵; Satyam Suwas²; Atul Chokshi²; *Ludovic Thilly*¹; ¹University of Poitiers; ²IISc-Bangalore; ³Paul Scherrer Institute; ⁴Mines Paris Tech; ⁵Institut Pprime CNRS-Université de Poitiers-ISAE ENSMA

4:20 PM

Four-Dimensional (4D) Characterization of Thermal Cycling Damage in Sintered Nano-Silver Solder by X-ray Microtomography: Irene Lujan Regalado¹; Tarun Amla¹; Jason Williams¹; Yanghe Liu²; Ercan M. Dede²; Shailesh Joshi²; *Nikhilesh Chawla*¹; ¹Arizona State University; ²Toyota Research Institute of North America

4:40 PM

In Situ Synchrotron X-ray Microtomography of Stress Corrosion Cracking in 304 SS under Humid Air Environment: *Ryan Schoell*¹; Peter Kenesei²; Jonathan Almer³; Djamel Kaoumi¹; ¹North Carolina State University; ²Argonne National Laboratory; ³Argonne National Laboratory

LIGHT METALS

TMS-DGM Symposium on Lightweight Metals: A Joint US-European Symposium on Challenges in Light Weighting the Transportation Industry — Magnesium

Sponsored by: DGM (Deutsche Gesellschaft für Materialkunde eV), TMS: Magnesium Committee, TMS: Aluminum Committee

Program Organizers: Eric Nyberg; Wilhelmus Sillekens, European Space Agency; Juergen Hirsch, Hydro Aluminium Rolled Products GmbH; Norbert Hort, Helmholtz-Zentrum Geesthacht

Tuesday PM | March 12, 2019
006A | Henry B. Gonzalez Convention Center

Session Chairs: Eric Nyberg; Norbert Hort, Helmholtz-Zentrum Geesthacht

2:00 PM

Influences of SiC Particle Additions on the Grain Refinement of Mg-Zn Alloys: Yuanding Huang¹; Jian Gu¹; Sihang You¹; Karl Kainer¹; Norbert Hort¹; ¹Helmholtz-Zentrum Geesthacht

2:20 PM

Effect of Split Sleeve Cold Expansion on the Residual Stress, Texture and Fatigue Life of Rolled AZ31B Magnesium Alloy: Sasan Faghieh¹; Sugrib Shaha¹; Seyed Behravesheh¹; Hamid Jahed¹; ¹University of Waterloo

2:40 PM

A Theory for Designing Ductile Materials with Anisotropy: Amine Benzerga¹; ¹Texas A & M University

3:00 PM Concluding Comments

MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing — Extraction and Recovery of Metals

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Tao Jiang, Central South University; Jiann-Yang Hwang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

Wednesday AM | March 13, 2019
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Session Chairs: Tao Jiang, Central South University; Onuralp Yucel, Istanbul Technical University

8:30 AM Introductory Comments

8:35 AM

Effect of Semiconductor Bornite on the Bioleaching of Chalcopyrite by Moderately Thermophiles: Kexin Chang¹; Yansheng Zhang¹; Libo Cao¹; Tengfei Li¹; ¹Central South University

8:55 AM

Study on Volatilizing Tin from Tin-bearing Middling by Carbothermic Reduction in Rotary Kiln: Jianfa Jing¹; Yufeng Guo¹; Feng Chen¹; Fuqiang Zheng¹; Lingzhi Yang¹; ¹Central South University

9:15 AM

Isothermal Sulfation Roasting of Nickel Sulfide Minerals in a Static Air Atmosphere: Lizhen Wei¹; Caixiang Yu¹; Guangshi Li¹; Xiaolu Xiong¹; Hongwei Cheng¹; Qian Xu¹; Xionggang Lu¹; ¹Shanghai University

9:35 AM

Manganese Partition between Slag and Liquid Metal in LD Converter: Abdelrhman Hassan¹; ¹Tabbin Institute for Metallurgical Studies

9:55 AM Break

10:15 AM

Study on Preparation of Active Zinc Oxide from Zinc Ferrite by Calcified-roasting and Ammonia Complex Method: Zeqiang Xie¹; Yufeng Guo¹; Tao Jiang¹; Feng Chen¹; Fuqiang Zheng¹; Lingzhi Yang¹; ¹Central South University

10:35 AM

Thermal Transformations of Main Components in Molybdenite Concentrates under SO₂-containing Atmosphere: *Hu Sun*¹; Li Guanghui¹; Junjie Yu¹; Jun Luo¹; Mingjun Rao¹; Tao Jiang¹; ¹Central South University

10:55 AM

Study on Phase Conversion from Zinc Ferrite to Zinc Oxide by Magnetic Roasting: *Chao Wang*¹; Yufeng Guo¹; Yujia Tan¹; Feng Chen¹; Zeqiang Xie¹; Linlin Zhang¹; ¹Central South University

11:15 AM

A Novel Method of Recovering Rare Earths from Bayan Obo Rare-earth Concentrate under Super-gravity Field: *Xi Lan*¹; Jintao Gao¹; Zhancheng Guo¹; ¹University of Science and Technology Beijing

11:35 AM Concluding Comments

SPECIAL TOPICS

2019 International Metallurgical Processes Workshop for Young Scholars (IMPROWYS 2019) – Physical and Mechanical Metallurgy

Sponsored by: TMS Extraction and Processing Division

Program Organizers: Cong Wang, Northeastern University; Amy Clarke, Colorado School of Mines; Kinnor Chattopadhyay, University of Toronto; Bryan Webler, Carnegie Mellon University

**Wednesday AM | March 13, 2019
 213B | Henry B. Gonzalez Convention Center**

Funding support provided by: Korean Institute of Metals and Materials

Session Chairs: Amy Clarke, Colorado School of Mines; Haiwen Luo, University of Science & Technology Beijing

8:30 AM Invited

Effect of the Crystallographic Orientation on the Void Growth during Creep of Superalloys: *Caizhi Zhou*¹; Tianju Chen¹; Ridwan Sakidja²; Wai-Yim Ching³; ¹Missouri University of Science And Technology; ²Missouri State University; ³University of Missouri, Kansas City

8:50 AM Invited

Effects of Element Segregation/depletion and Precipitates on Grain Boundary Strength of Alloys: *Lingfeng He*¹; Mukesh Bachhav¹; Daniel Murray¹; Xiang Liu¹; Emmanuel Perez¹; Wen Jiang¹; Cheng Sun¹; Sebastien Teysseyre¹; Xianming Bai²; ¹Idaho National Laboratory; ²Virginia Polytechnic Institute and State University

9:10 AM Invited

Precipitation Strengthened Al-Er-Sc-Zr-Si Alloys Modified with V, Nb, or Ta: *Dinc Erdeniz*¹; Anthony De Luca²; David Seidman²; David Dunand²; ¹Marquette University; ²Northwestern University

9:30 AM Invited

Resistance Spot Welding of Medium-Mn TRIP Steel with Excellent Mechanical Properties: *Haiwen Luo*¹; Shuoshuo Li¹; David Yang²; ¹University of Science and Technology Beijing; ²Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences

9:50 AM Break

10:10 AM Invited

Abnormal Mechanical Properties Development of 1.25 Cr-0.5Mo Steel after Simulated Postweld Heat Treatment: Yang Shen¹; *Cong Wang*¹; ¹Northeastern University

10:30 AM Invited

Strain Rate Effects on the Plasticity Mechanisms and Work Hardening of Metallic Micropillars: *Matthew Daly*¹; Zhaowen Lin¹; Horacio Espinosa¹; ¹Northwestern University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

2019 Symposium on Functional Nanomaterials: Synthesis, Integration, and Application of Emerging Nanomaterials — Functional Thin Film Materials

Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory; Jiyoung Chang, University of Utah; Pei Dong, George Mason University; Yong Lin Kong, University of Utah; Shengfeng Yang, Indiana University; Purdue University Indianapolis; SungWoo Nam, University of Illinois

Wednesday AM | March 13, 2019

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Session Chairs: Chang-Yong Nam, Brookhaven National Laboratory; Jang-Sik Lee, Pohang University of Science and Technology

8:30 AM Invited

Assessment of Thin Films and Nanomaterials Functionality using Multimodal Approach: *Iliia Ivanov*¹; Eric Muckley¹; ¹Oak Ridge National Laboratory

9:00 AM Invited

Emerging Memory Devices with Metal-halide Perovskite Materials: *Jang-Sik Lee*¹; ¹POSTECH

9:30 AM

Ferroelectricity in Hafnium Zirconate using Tungsten Capping Layer: *Jaidah Mohan*¹; Si Joon Kim¹; Jiyoung Kim¹; ¹University of Texas at Dallas

9:50 AM

Pinning of Structural Transition in VO₂ Thin Films: *Adele Moatti*¹; Ritesh Sachan¹; John Prater¹; Jagdish Narayan¹; ¹North Carolina State University

10:10 AM Break

10:30 AM Invited

Advances in MOCVD Production of Complex Materials from Single-source Precursors: Phase Pure Metal Phosphide Thin Films: *Kenton Whitmire*¹; Desmond Schipper¹; Andrew Leitner¹; ¹Rice University

11:00 AM

Influence of Layer Thickness on Microstructure and Optical Properties of AlN/SiO₂ and AlN/Ag Nanomultilayers: *Chelsea Appleget*¹; Andrea Hodge¹; ¹University of Southern California

11:20 AM

Emergence of High-temperature Superconductivity in B-doped Q-carbon: *Ritesh Sachan*¹; Anagh Bhaumik²; Siddharth Gupta²; Jagdish Narayan²; ¹U.S. Army Research Office; ²North Carolina State University

11:40 AM

A Novel Synthesis Method for Independent Control of Grain Size, Dispersion and Phase Composition of Thin Films: *Paul Rasmussen*¹; Rohit Sarkar¹; Jagannathan Rajagopalan¹; ¹Arizona State University

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Energy Conversion with Emphasis on SOFCs II

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Wednesday AM | March 13, 2019

225A | Henry B. Gonzalez Convention Center

Session Chairs: Jung Pyung Choi, Pacific Northwest National Laboratory; Xingbo Liu, West Virginia University

8:30 AM Invited

Laser 3D Printing of SOFC: *Jian Liu*¹; Shaofei Cheng¹; Shuang Bai¹; ¹PolarOnyx Inc

8:55 AM

High Pressure Co-electrolysis of CO₂/H₂O in Tubular Solid Oxide Electrolysis Cells: *Muhammad Taqi Mehran*¹; Tak-Hyoung Lim²; ¹School of Chemical and Materials Engineering, National University of Sciences and Technology (NUST), Islamabad, Pakistan; ²Korea Institute of Energy Research (KIER)

9:15 AM Invited

Infiltration of Nickel Nanoparticles in Ni/YSZ Solid Oxide Fuel Cell Anodes for Improved Performance: Yanchen Lu¹; Paul Gasper¹; Boshan Mo¹; Uday Pal¹; Srikanth Gopalan¹; *Soumendra Basu*¹; ¹Boston University

9:40 AM

Phase Field Simulation of Ni Coarsening in SOFC Anodes in Dry and Humid Atmospheres: *Yinkai Lei*¹; Tian-Le Cheng¹; You-Hai Wen¹; ¹National Energy Technology Laboratory

10:00 AM Break

10:20 AM Invited

(M, Mn)3O₄ Spinel for Advanced Electrical Conductive layer for SOFC Stacks: *Jung Pyung Choi*¹; Jeffry Stevenson¹; Jeff Bonnett¹; Nathan Canfield¹; Lorraine Seymour¹; Viviana Luxa Gervasio¹; ¹Pacific Northwest National Laboratory

10:45 AM

Nondestructive 3D Analysis of Solid Oxide Fuel Cells by Lab-based X-ray Nanotomography – Towards Computational Integrity: Stephen Kelly¹; Sandrine Ricote²; Alexis Dubois²; *William Harris*¹; John Berger²; Robert Kee²; ¹Carl Zeiss X-ray Microscopy; ²Colorado School of Mines

11:05 AM Invited

Impact of the Humidity on the Nanostructure Degradation of Ionic Conductor YSZ from Electrodes of SOFCs upon Electrochemical Operation: *Xueyan Song*¹; Yun Chen¹; Harry Abernathy²; Gregory Hackett²; Yueying Fan²; Shiwoo Lee²; Kirk Gerdes²; ¹West Virginia University; ²National Energy Technology Laboratory

11:30 AM

Density Functional Theory Modeling of the Cation Impurity Diffusivity and Solubility in $\text{La}_{1-x}\text{Sr}_x\text{MnO}_{3\pm d}$ (LSM) for Solid Oxide Fuel Cells: *Yueh-Lin Lee*¹; Yuhua Duan¹; Dane Morgan²; Dan Sorescu¹; Harry Abernathy¹; Gregory Hackett¹; ¹National Energy Technology Laboratory; ²University of Wisconsin, Madison

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Welding: Physical and Mechanical Metallurgy of Rapidly Solidified Metals – Process, Structure, and Properties II

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorganji, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Semiatin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

Wednesday AM | March 13, 2019

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Session Chair: Mark Stoudt, National Institute of Standards and Technology

8:30 AM

Parametric Optimization of Laser-based Powder Bed Fusion for Gas Atomized Al-Zn-Mg-Sc-Zr Alloy: *Le Zhou*¹; Holden Hyer¹; Sharon Park¹; Thinh Huynh¹; Brandon McWilliams²; Kyu Cho²; Katherine Rice³; Yimeng Chen⁴; Alexander Giddings⁴; Yongho Sohn¹; ¹University of Central Florida; ²U.S. Army Research Laboratory; ³CAMECA Instruments, Inc.; ⁴CAMECA Instruments Inc

8:50 AM

Multiscale Advanced Characterization of Microstructures Formed during the Additive Manufacturing of Aluminium-silicon Alloys: Microstructure-process Relationship and Aging Effect: *Williams Lefebvre*¹; Grégory Rose¹; Fabien Cuvilly¹; Eric Baustert²; ¹Normandie University, GPM, UNIROUEN, INSA Rouen, CNRS; ²Volum-e/MMB

9:10 AM

Effects of Recycling Al10SiMg Alloy Powders in the Selective Laser Melting Process: *Sharon Park*¹; Holden Hyer¹; Le Zhou¹; Thinh Huynh¹; Edward Dein¹; Brandon McWilliams²; Kyu Cho²; Yongho Sohn¹; ¹University of Central Florida; ²U.S. Army Research Laboratory

9:30 AM

Characterization of Rapidly Solidified Aluminum Alloy Microstructures: *Chloe Johnson*; John Roehling¹; Yaofeng Guo²; Francisco Coury²; Joe Jankowski²; Adam Stokes²; Michael Kaufman²; Joe McKeown¹; Amy Clarke²; ¹Lawrence Livermore National Laboratory; ²Colorado School of Mines

9:50 AM

Plasticity and Damage Mechanisms in Ti-6Al-4V Printed with Selective Laser Melting: *Atieh Moridi*¹; Ali Gökhan Demir²; Barbara Previtali²; Bianca Colosimo²; John Hart¹; Cem Tasan¹; ¹Massachusetts Institute of Technology; ²Politecnico di Milano

10:10 AM Break

10:30 AM

Exploring the Limits of Thin Section Builds in Laser Powder Bed Fusion Process: *Ziheng Wu*¹; Sneha Prabha Narra¹; Jack Beuth¹; Anthony Rollett¹; ¹Carnegie Mellon University

10:50 AM

Enhanced Ultrasonic Characterization of Metal Additively Manufactured Parts Using Hybrid Capabilities: *Luz Sotelo*¹; Michael Sealy¹; Joseph Turner¹; Cody Kanger¹; Haitham Hadidi¹; ¹University of Nebraska - Lincoln

11:10 AM

Mechanisms of Melt Pool Evolution under Constant Input Energy Density in Laser Powder Bed Fusion Additive Manufacturing Process: *Qilin Guo*¹; Cang Zhao²; Minglei Qu¹; Lianghua Xiong¹; Luis Escano¹; S. Mohammad Hojjatzadeh¹; Niranjana Parab²; Kamel Fezzaa²; Wes Everhart³; Tao Sun²; Lianyi Chen¹; ¹Missouri University of Science & Technology; ²Argonne National Laboratory; ³Honeywell FM&T

11:30 AM

Development of Process Parameters for a Low-cost Wire Arc Additive Manufacturing System: Miguel Navarro¹; Amer Matar¹; Vladimir Pena¹; *Mohsen Eshraghi*¹; ¹California State University, Los Angeles

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications — Process Development and Modeling

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Charit, University of Idaho; Somayeh Pasebani, Oregon State University; Chad Duty, University of Tennessee

Wednesday AM | March 13, 2019

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Session Chairs: Indrajit Charit, University of Idaho; Chad Duty, University of Tennessee

8:30 AM Invited

Predictive Modeling of Process Parameter-microstructure-property Relationships of Additive Manufactured Parts: *Yung Shin*¹; Neil Bailey¹; Christopher Katinas¹; ¹Purdue University

9:00 AM

Phase-field Modeling of Dendritic Solidification for Additive Manufacturing Applications: *Larry Aagesen*¹; Stephanie Pitts¹; Richard Martineau¹; ¹Idaho National Laboratory

9:20 AM

Topology Optimization of Additively Manufactured Architected Materials and Components for Energy Systems: Reza Behrou¹; *James Guest*¹; ¹Johns Hopkins University

9:40 AM

Quantifying the Effect of Local Texture Optimization on Additive Manufactured Structural Components: *Andrea Rovinelli*¹; Mark Messner¹; T.-L. Sham¹; ¹Argonne National Laboratory

10:00 AM Break

10:20 AM Invited

Development and Optimization of Various Steels with ICME for Laser Powder Bed Fabrication Production: *Ida Berglund*¹; Thomas Kozmel¹; Abhinav Saboo¹; Amit Behera¹; Pin Lu¹; Chantal Sudbrack¹; Jason Sebastian¹; ¹QuesTek Innovations, LLC

10:50 AM

Evolution of the Grain Morphology due to Solidification during Additive Manufacturing: *Sudipta Biswas*¹; Daniel Schwen¹; Yongfeng Zhang¹; ¹Idaho National Laboratory

11:10 AM

Laser Powder-bed Fusion of Type 304 Stainless Steel: Ferrite-austenite Transformation: *Alicia Gauffin*¹; *Lonnie Smith*¹; P. Chris Pistorius¹; ¹Carnegie Mellon University

11:30 AM

Site-specific Property Maps of Additively Manufactured SS316L Using a Mesoscale, Multi-physics Modeling Framework: *Nadia Kouraytem*¹; Carl Herriott¹; Xuxiao Li¹; Wenda Tan¹; Vahid Tari²; Ben Anglin²; Anthony Rollett²; Ashley Spear¹; ¹University of Utah; ²Carnegie Mellon University

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Applications of Solidification Fundamentals – Microstructure Evolution

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Alex Plotkowski, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Air Force Research Laboratory; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Wenda Tan, University of Utah

Wednesday AM | March 13, 2019

224 | Henry B. Gonzalez Convention Center

Session Chairs: Lang Yuan, University of South Carolina; Wenda Tan, University of Utah

8:30 AM

Phase-field Modeling of Additive Manufacturing Cellular Solidification Microstructures: *Supriyo Ghosh*¹; Li Ma²; Nana Ofori-Opoku²; Mark Stoudt²; Lyle Levine²; Jonathan Guyer²; ¹Texas A&M University; ²National Institute of Standards and Technology

8:50 AM

Phase-field Modeling of Microstructure Evolution of Binary and Multicomponent Alloys during Selective Laser Melting (SLM) Process: *Ali Ramazani*¹; Julia Kundin²; Christian Haase³; Ulrich Prahl⁴; ¹University of Michigan; ²Ruhr-University Bochum; ³RWTH-Aachen University; ⁴University of Freiberg

9:10 AM

Experimental and Simulation Study of Solidification and Microstructural Evolution of Ti and Ni Based Alloys for Laser Based Additive Manufacturing: *Jonathan Raush*¹; Sanjeev Tulasigeri¹; Congyuan Zeng²; Shengmin Guo²; ¹University of Louisiana at Lafayette; ²Louisiana State University

9:30 AM

Phase Field Simulation of Microstructure Evolution in Direct Metal Laser Sintering of AlSi10Mg: Hossein Azizi¹; Nikolas Provatas²; *Mohsen Mohammadi*¹; ¹University of New Brunswick; ²McGill University

9:50 AM Break

10:10 AM

Simulation of Solidification Microstructures under AM Thermal Conditions - Investigation of Solute Trapping Models in Phase Field Simulations: *Bala Radhakrishnan*¹; Sarma Gorti¹; John Turner¹; ¹Oak Ridge National Laboratory

10:30 AM

Influence of Lattice Mismatch and Nucleation Anisotropy on Inoculating Efficiency at Various Cooling Rates: Insights into Grain Refinement of Additively Manufactured Metals: Zhuo Wang¹; Yaohong Xiao¹; Pengwei Liu¹; Yanzhou Ji²; Mark Horstemeyer¹; Yi Wang²; Haley Doude¹; *Lei Chen*¹; ¹Mississippi State University; ²Pennsylvania State University

10:50 AM

Solidification Simulation of Metal Additive Manufacturing with Phase-field Modeling: *Jiwon Park*¹; Chang-Seok Oh¹; ¹Korea Institute Of Materials Science

Additive Manufacturing of Metals: Fatigue and Fracture III — Session III

Sponsored by: TMS: Additive Manufacturing Committee

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

Wednesday AM | March 13, 2019
221B | Henry B. Gonzalez Convention Center

Session Chair: Nik Hrabe, National Institute of Standards and Technology

8:30 AM Invited

Mechanical Testing Results from MIDAS: Material Informed Digital Design Demonstration for Additive Structures: *William Musinski*¹; Michael Groeber¹; Paul Shade¹; Edwin Schwalbach¹; Sean Donegan¹; Daniel Sparkman¹; Michael Uchic¹; Jonathan Miller¹; ¹US Air Force Research Laboratory

9:00 AM

Effect of Microstructure and Defects on the Fatigue Performance of Additively Manufactured 2205 Duplex Stainless Steel: *Jayme Keist*¹; Andrew Iams¹; Griffin Jones¹; Todd Palmer¹; ¹Pennsylvania State University

9:20 AM

Predicting the Integrity of Additively Manufactured Nickel Alloys: *Jeffrey Rossin*¹; Michael Groeber²; Bill Musinski²; Jonathan Miller²; Samantha Daly¹; Tresa Pollock¹; ¹University of California Santa Barbara; ²US Air Force Research Laboratory

9:40 AM

Effect of Microstructure and Internal Defects on the Cyclic Deformation and Damage Behavior in Additively (SLM) Manufactured Al-Si Alloys: Shafaqat Siddique¹; Mustafa Awd¹; Felix Frömel¹; *Jochen Tenkamp*¹; Frank Walther¹; ¹TU Dortmund University, Department of Materials Test Engineering (WPT)

10:00 AM Break

10:20 AM Invited

A Data-driven Approach to Investigate the Influence of Process Parameters on Fatigue Life of Additively Manufactured Metals:

Ashley Spear¹; Dillon Watring¹; Nadia Kouraytem¹; ¹University of Utah

10:50 AM

Investigating Local Microstructure Response During Crack Initiation and Propagation in DMLS IN718 Subjected to High Cycle Fatigue Loading: Priya Ravi¹; Diwakar Naragani¹; Michael Sangid¹; Jun-Sang Park²; Peter Kenesei²; ¹Purdue University; ²Argonne National Laboratory

11:10 AM

Fracture and Fatigue Properties of Titanium Alloy (Ti6Al4V) Parts Made Using Laser Powder Bed Fusion (LPBF) Additive Manufacturing Process: Scott Halliday¹; Prahalad Rao²; Jeffrey Shield³; Ashley Spear⁴; Branden Kappes⁵; Sandip Harimkar⁶; ¹Navajo Technical University; ²University of Nebraska; ³University of Nebraska-Lincoln; ⁴University of Utah; ⁵Colorado School of Mines; ⁶Oklahoma State University

11:30 AM

Fatigue Life Prediction of Additively Manufactured IN718 Using Crystal Plasticity Modeling with Experimental Validation: Veerappan Prithvirajan¹; Michael Sangid¹; ¹Purdue University

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Microstructural Evolution and Phase Transformations — Fe-based Systems

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

Program Organizers: Bij-Na Kim, LPW Carpenter Additive; Eric Lass, National Institute of Standards and Technology; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Ryan Dehoff, Oak Ridge National Laboratory; Gerhard Fuchs, University of Florida; Chantal Sudbrack, QuesTek Innovations LLC

Wednesday AM | March 13, 2019

221C | Henry B. Gonzalez Convention Center

Session Chairs: Suresh Babu, The University of Tennessee, Knoxville; Constaninos Goulas, Rotterdam Fieldlab Additive Manufacturing / TU Delft

8:30 AM Invited

Cryomilled 17-4 Stainless Steel Powder as Feedstock for Additive Manufacturing: *Franklyn Kellogg*¹; Andelle Kudzal²; Josh Taggart-Scarff¹; Ryan Rogers³; Brandon McWilliams²; ¹SURVICE Engineering; ²US Army Research Laboratory; ³Bowhead Support

9:00 AM

The Effects of Nitrogen on the Microstructure of Precipitation Hardenable Martensitic Stainless Steels for Additive Manufacturing: *Eric Lass*¹; ¹National Institute of Standards and Technology

9:20 AM

Microstructure Evolution in Direct Metal Laser Sintered Corrax Maraging Stainless Steel: *Amir Hadadzadeh*¹; Babak Shalchi Amirkhiz²; Jian Li²; Mohsen Mohammadi¹; ¹Marine Additive Manufacturing Centre of Excellence-University of New Brunswick; ²CanmetMATERIALS-Natural Resources Canada

9:40 AM

Synchrotron X-ray Imaging of 4140 Steel Laser Powder Bed Fusion: Andrew Bobel¹; Anil Sachdev¹; Tyson Brown¹; Whitney Poling¹; Robert Kubic¹; *Louis Hector*¹; Tao Sun²; Benjamin Gould²; Aaron Greco²; Isaac Chelladurai³; ¹General Motors Global R&D Center; ²Argonne National Laboratory; ³Brigham Young University

10:00 AM Break

10:20 AM

From Powder to Part: On the Microstructural and Phase Stability in Steel Builds: *Bij-Na Kim*¹; David San Martin²; Pedro EJ Rivera-Diaz-del-Castillo³; ¹LPW Technology / Lancaster University; ²CENIM-CSIC; ³Lancaster University

10:40 AM

Tailoring Microstructure of Steel Alloys in Selective Laser Melting: *Mahdi Jamshidinia*¹; Behrang Poorganji¹; ¹GE Additive

11:00 AM

Controlling Defects and Microstructure Evolution in Single Tracks: *Saad Khairallah*¹; Rongpei Shi¹; Jianchao Ye¹; Alexander Rubenchik¹; Aiden Martin¹; Nicholas Calta¹; Tien Roehling¹; John Roehling¹; Josephn McKeown¹; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory

11:20 AM

Inclusion Evolution in Additive Manufactured 316L Stainless Steel Using Laser Metal Deposition Process: Du-Rim Eo¹; *Jung-Wook Cho*¹; Sun-Hong Park²; ¹POSTECH; ²Research Institute of Industrial Science and Technology(RIST)

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development — Functional Materials for AM

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

Program Organizers: Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Hunter Martin, HRL Labs; Orlando Rios, Oak Ridge National Laboratory

**Wednesday AM | March 13, 2019
 221D | Henry B. Gonzalez Convention Center**

Session Chairs: Orlando Rios, Oak Ridge National Laboratory; Minh-Son Pham, Imperial College London

8:30 AM Invited

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

9:00 AM

Mitigating Melt Pool Balling Defects through Alloy Compositional Changes and Processing Changes: *Jack Beuth*¹; Zachary Francis¹; Debomita Basu¹; Nicholas Jones¹; Bryan Webler¹; ¹Carnegie Mellon University

9:20 AM

Composition Refinement for Functional Gradient Printing Methodology: *Olga Eliseeva*¹; Tanner Kirk¹; Raymundo Arroyave¹; Richard Malak¹; Alaa Elwany¹; Ibrahim Karaman¹; ¹Texas A&M University

9:40 AM

Laser Powder Bed Fusion of Fe-Si Soft-Magnetic Materials: *Alex Plotkowski*¹; Fred List¹; Jason Pries¹; Benjamin Stump¹; Ryan Dehoff¹; ¹Oak Ridge National Laboratory

10:00 AM

Alloy Design for Biomedical Applications in Additive Manufacturing: *Kay-Peter Hoyer*¹; Mirko Schaper¹; ¹Paderborn University

10:20 AM Break

10:40 AM Invited

Alloy Design of Ti-based Metallic Glass for Additive Manufacturing and EIGA Processes: *Hwi-Jun Kim*¹; Sung-Uk Hong¹; Min-Ha Lee¹; Min-Cheol Kang¹; ¹KITECH

11:10 AM

Additive Manufacturing of Metal Trenching and Excavating Tools for Future NASA Landers: *Douglas Hofmann*¹; Punnathat Bordeenithikasem¹; Andre Pate¹; Samad Firdosy¹; Chris Yahnker¹; Cecily Sunday¹; Morgan Hendry¹; ¹NASA JPL/Caltech

11:40 AM

In Situ Alloying of High-entropy Alloy Compositions through Additive Manufacturing: *Michael Moorehead*¹; Kaila Bertsch¹; Dan Thoma¹; Calvin Parkin¹; Adrien Couet¹; Kumar Sridharan¹; ¹University of Wisconsin-Madison

12:00 PM

Characterization of Cu-Sn-Ti based Metal-Diamond Composites Fabricated by Selective Laser Melting: Xiaoshuang Li¹; Adriaan Spierings²; Konrad Wegener³; *Christian Leinenbach*¹; ¹Empa - Materials Science And Technology; ²Inspire AG; ³ETH Zurich

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session V

Sponsored by: TMS: Shaping and Forming Committee

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

Wednesday AM | March 13, 2019

302A | Henry B. Gonzalez Convention Center

Session Chairs: Robert Maass, University of Illinois at Urbana-Champaign; Peter Hedström, KTH Royal Institute of Technology

8:30 AM Invited

Characterization of Deformation Behaviour of Fe-Cr-Ni Alloys with Different Austenite Stabilities: *Peter Hedström*¹; *Ye Tian*¹; *Benjamin Neding*¹; ¹KTH Royal Institute of Technology

9:00 AM

Microstructural Evolution of Ti-7Al Under Cyclic Loading: *Rachel Lim*¹; *Vahid Tari*¹; *Darren Pagan*²; *Yufeng Shen*¹; *Robert Suter*¹; *Anthony Rollett*¹; ¹Carnegie Mellon University; ²Cornell High Energy Synchrotron Source

9:20 AM

A Temperature Sensitivity Study of Non-proportional Strain-paths Using In Situ X-ray Diffraction: *David Collins*¹; *Richard Todd*²; *Angus Wilkinson*²; ¹University of Birmingham; ²University of Oxford

9:40 AM

Coupling Experiments and Simulation to Understand Local Deformation Mechanism in Ni Micro-wire: *Ravi Purushottam*¹; *Céline Gérard*²; *Loïc Signor*²; *Abhinav Arya*³; *Girish Bojjawar*³; *Satyam Suwas*³; *Atul Chokshi*³; *Ludovic Thilly*¹; ¹University of Poitiers; ²Institut Pprime CNRS-Université de Poitiers-ISAE ENSMA; ³IISc-Bangalore

10:00 AM Break

10:20 AM Invited

Non-trivial Scaling Exponents of Avalanches in Crystal Plasticity: *Robert Maass*¹; ¹University of Illinois At Urbana-Champaign

10:50 AM

Investigation of Improved Ductility in Mg-Ca Alloy through In Situ EBSD and 3DXRD Experiments: *Leyun Wang*¹; *Gaoming Zhu*¹; *Zhounuo Tong*¹; ¹Shanghai Jiao Tong University

11:10 AM

316L Stainless Steel Subjected to Shear: *Ramon Martinez*¹; *Veronica Livescu*¹; *William Blumenthal*¹; *Clarissa Yablinsky*¹; *Christopher Baxter*¹; *Hashem Mourad*¹; *Curt Bronkhorst*¹; ¹Los Alamos National Laboratory

11:30 AM

3D Characterization of Nano-scale Precipitates in Shape-memory Alloys: *Dexin Zhao*¹; *Tejas Umale*¹; *Jobin Joy*¹; *Ibrahim Karaman*¹; *Lagoudas Dimitris*¹; *Kelvin Xie*¹; ¹Texas A&M University

11:50 AM

Study of Heterogeneous Deformation and Estimation of Surface Dislocation Density in Hexagonal Titanium: *Harsha Phukan*¹; *Thomas Bieler*¹; *Chen Zhang*¹; *Ruqing Xu*²; *Philip Eisenlohr*¹; *Martin*

Crimp¹; Carl Boehlert¹; ¹Michigan State University; ²Argonne National Laboratory

ADVANCED MATERIALS

Advanced High-Strength Steels III — Microstructure, Processing, and Properties of Advanced High-Strength Steels III

Sponsored by: TMS: Steels Committee

Program Organizers: Amy Clarke, Colorado School of Mines; MingXin Huang, University of Hong Kong; C. Tasan, Massachusetts Institute of Technology; Kester Clarke, Colorado School of Mines; Ana Luiza Araujo, AK Steel Research & Innovation

Wednesday AM | March 13, 2019
205 | Henry B. Gonzalez Convention Center

Session Chairs: Kester Clarke, Colorado School of Mines; Melissa Thrun, Colorado School of Mines

8:30 AM

In Situ Investigation of the Iron Carbide Precipitation Process in a Fe-C-Mn-Si Q&P Steel: *Sebastien Allain*¹; *Angéline Poulon-Quintin*²; *Samy Aoued*²; *Magali Bouzat*³; *Michel Soler*³; *Jean-Christophe Hell*³; *Frédéric Danoix*⁴; *Mohamed Gouné*²; *Guillaume Geandier*⁵; ¹Institut Jean Lamour / Mines Nancy; ²ICMCB; ³ArcelorMittal Maizières Research; ⁴GPM; ⁵Institut Jean Lamour

8:50 AM

Into the Quenching & Partitioning of a 0.2C Steel: an In Situ Synchrotron Study: *Pierre Huyghe*¹; *Matteo Caruso*²; *Jean-Louis Collet*²; *Sylvain Dépinoy*¹; *Stephane Godet*¹; ¹Universite Libre De Bruxelles; ²CRM Group

9:10 AM

Revealing the Effect of Fast-heating on the Microstructure and Mechanical Properties of Cold-rolled Q&P Steels: *Geng Liu*¹; *Hao Chen*¹; ¹Tsinghua University

9:30 AM

Effect of Strain Rate on the Austenite Mechanical Stability in QP980 Steel: *Ming Wang*¹; *Binbin He*¹; *Mingxin Huang*¹; ¹The University of Hong Kong

9:50 AM Break

10:10 AM

Micro-mechanics of Plasticity and Damage in 3rd Generation Advanced High Strength Steel: Mei-Mei Wang¹; *Jean-Christophe Hell*²; Cem Tasan³; ¹Max-Planck-Institut für Eisenforschung; ²Arcelormittal Global R&D; ³Massachusetts Institute of Technology

10:30 AM

The Influence of Transformation Induced Plasticity on Damage Development in QP1500: *Concetta Pelligra*¹; Javad Samei¹; David Wilkinson¹; ¹McMaster University

10:50 AM

Low Temperature Deformation and Fracture Behaviors of a 1400 MPa Quenching and Partitioning Steel: *Zhou Wang*¹; Mingxin Huang¹; ¹The University of Hong Kong

11:10 AM

Development of Advanced High Strength Steels for Automobile Applications: Francys Barrado¹; *Tihe Zhou*¹; David Overby¹; Peter Badgley¹; Christopher Martin-Root¹; Sarah Zhang¹; Richard Zhang¹; ¹Research Department, Stelco Inc.

11:30 AM

Tailoring the Strength and Ductility by Different Transformation Procedures in 0.47C- and 0.19C- TRIP Steels: *Yongfeng Shen*¹; ¹Northeastern University

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — FEMS-TMS Joint Session on Critical Materials in Magnet Supply Chains

Sponsored by: Federation of European Materials Societies (FEMS), TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Frank Johnson, Niron Magnetics, Inc.; Paul Ohodnicki, National Energy Technology Laboratory; Alex Leary, Nasa Grc; Orlando Rios, Oak Ridge National Laboratory; Alessandra Hool, ESM Foundation

Wednesday AM | March 13, 2019

225B | Henry B. Gonzalez Convention Center

Session Chair: Orlando Rios, Oak Ridge National Laboratory

8:30 AM

Critical Raw Materials: Current Challenges in Europe and Beyond:
*Alessandra Hool*¹; ¹ESM Foundation

8:50 AM Invited

Availability of Raw Materials for Magnets: Short- and Long-term Considerations: *Roderick Eggert*¹; ¹Colorado School Of Mines

9:20 AM Invited

Canadian Rare Earth Elements R&D Program: *Janice Zinck*¹; Ian London²; ¹Natural Resources Canada, CanmetMINING; ²Canadian Rare Earth Elements Network (CREEN)

9:50 AM Break

10:10 AM Invited

Accelerated Development of Substitutes for Critical Materials in Clean Energy Technologies: *Thomas Lograsso*¹; ¹Ames Laboratory

10:40 AM Invited

A State of the Art Life Cycle Assessment of Rare Earth Elements:
*Gwendolyn Bailey*¹; *Dieuwertje Schrijvers*²; *Rita Schulze*³; *Anne Marie Slyvestre*⁴; *James Joyce*⁵; *Benjamin Sprecher*³; *Ehsan Vahidi*⁶; *Wim Dewulf*¹; *Karel Van Acker*¹; ¹Katholieke University, Leuven; ²Université de Bordeaux; ³Leiden University; ⁴Lynas; ⁵KTH; ⁶Purdue University

11:10 AM

Critical Raw Materials in Nanoelectronic Devices: *Atsufumi Hirohata*¹; *Günter Reiss*²; *Laszlo Szunyogh*³; *Ulrich Nowak*⁴; *Koki Takanashi*⁵; *Kanta Ono*⁶; ¹University of York; ²University of Bielefeld; ³Budapest University of Technology and Economics; ⁴University of Konstanz; ⁵Tohoku University; ⁶High Energy Accelerator Research Organization

ADVANCED MATERIALS

Advanced Materials and Reservoir Engineering for Extreme Oil & Gas Environments III — Session I

Sponsored by: TMS: Energy Conversion and Storage Committee

Program Organizers: Indranil Roy, UniPolar Technology Inc; Ting Chen Roy, Welldiver; Partha Ganguly, Baker Hughes GE

Wednesday AM | March 13, 2019

206A | Henry B. Gonzalez Convention Center

Session Chairs: Indranil Roy, UniPolar Technology Inc; Ting Chen Roy, Welldiver

8:30 AM Invited

What Makes Grain Boundaries Resistant to Hydrogen Embrittlement?: *Michael Demkowicz*¹; ¹Texas A&M University

9:00 AM Invited

Integrated Computational Materials Engineering – New Paradigms in Materials Design and Selection for Corrosion: *Christopher Taylor*¹; ¹DNV GL USA Inc. and Fontana Corrosion Center, The Ohio State University

9:30 AM

Life Predictions of Elastomeric Materials Using Compressive Stress Relaxation Test Method: *Wayne Furlan*¹; ¹Baker Hughes

9:50 AM

Coating for Downhole Scale-build Up Prevention: *Deepak Kumar*¹; Zhiyue Xu¹; ¹Baker Hughes, a GE Company

10:10 AM Break

10:30 AM

Nanotracers for Oil and Gas Applications: *Sankaran Murugesan*¹; Radhika Suresh¹; Devesh Agrawal¹; Valery Khabashesku¹; Qusai Darugar¹; ¹Baker Hughes

10:50 AM

Technology Cross-pollination Leads to Design of Flowable Sensors for Reservoir Monitoring: *Ting Chen Roy*¹; Ram Shenoy²; Indranil Roy³; Jing Zhou³; ¹WellDiver/SET Laboratories Inc.; ²WellDiver; ³Rice University

11:10 AM

Improve Production and Significantly Reduce OPEX: *Wayne Furlan*¹; ¹Baker Hughes

ELECTRONIC MATERIALS

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

Sponsored by: TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Kazuhiro Nogita, University of Queensland; Tae-Kyu Lee, Portland State University; Yan Li, Intel Corporation; Christopher Gourlay, Imperial College London; Zhi-Quan Liu, Chinese Academy of Sciences; Rahul Panat, Carnegie Mellon University; Albert T. Wu, National Central University; Andre Delhaise, Celestica; Mohd Arif Salleh, Universiti Malaysia Perlis

Wednesday AM | March 13, 2019
216A | Henry B. Gonzalez Convention Center

Session Chairs: Andre Delhaise, Celestica; Rahul Panat, Carnegie Mellon University

8:30 AM

High Thermally Conducting Polymer-based Films with Magnetic Field-assisted Aligned Hexagonal Boron Nitride for Flexible Electronic Encapsulation: *Jie Yuan*¹; Zhi-Quan Liu¹; ¹Institute of Metal Research, Chinese Academy of Sciences

8:50 AM

Soldering of Core-shell Multi-Segment Nanowires for Nanoscale Interconnection: *Edward Fratto*¹; Jirui Wang¹; Hongwei Sun¹; Zhiyong Gu¹; ¹University of Massachusetts Lowell

9:10 AM

Boron Nitride Nanotube-based Composites for Thermal Management: *Hannes Schniepp*¹; ¹The College of William & Mary

9:30 AM

Developing Seed Layer for Electroplating of Vertically Aligned Carbon Nano Tubes: *Leila Ladani*¹; Garrison Frost¹; ¹University of Texas at Arlington

9:50 AM Break

10:10 AM

Transient Response of Composite PCMs to Periodic Heat Pulses: *Michael Deckard*¹; Alison Hoe¹; Jonathan Felts¹; Patrick Shamberger¹; ¹Texas A&M University

10:30 AM

The Interaction of Ga-based Alloys and Cu Substrates at Low Temperatures: *Shiqian Liu*¹; Stuart McDonald¹; Keith Sweatman²; Tetsuro Nishimura²; Kazuhiro Nogita¹; ¹Nihon Superior Centre for the Manufacture of Electronic Materials (NS CMEM), School of Mechanical and Mining Engineering, The University of Queensland;

²Nihon Superior Co., Ltd.

10:50 AM

A Preliminary Study of Oxide Film Break-down during Ultrasonic Wire Bonding: *Calvin Tszeng*¹; Panthea Sepehrband¹; ¹Santa Clara University

11:10 AM

Study of Thiourea-sulfur Compound Co-deposited in Ni(P) and its Effect on Ni(P) Surface Corrosion: *Chen-Yu Wu*¹; Cheng-Yi Liu¹; An-Lun Liu²; Min-lung Cheng²; Chih-yuan Hsiao²; ¹National Central University; ²Taiwan Uyemura

CHARACTERIZATION

Advanced Real Time Imaging — Additive Manufacturing and Biomaterials

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, US Department of Energy - National Energy Technology Laboratory; P. Chris Pistorius, Carnegie Mellon University; Candan Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zuotai Zhang, Southern University of Science and Technology; Neslihan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Saito, Kyushu University; Yongsug Chung, Korea Polytechnic University; Bryan Webler, Carnegie Mellon University

Wednesday AM | March 13, 2019

302B | Henry B. Gonzalez Convention Center

Session Chairs: Yongsug Chung, Korea Polytechnic University; Candan Tamerler, University of Kansas

8:30 AM

In Situ Characterization of Hot Cracking Using Dynamic X-ray Radiography: *Po-Ju Chiang*¹; Runbo Jiang¹; Ross Cunningham¹; Niranjana Parab²; Cang Zhao²; Kamel Fezzaa²; Tao Sun²; Anthony Rollett¹; ¹Carnegie Mellon University; ²Argonne National Laboratory

8:50 AM

High Resolution 4D X-ray Tomography of Dendrite Growth in Aluminum Alloys: *Tiberiu Stan*¹; Yue Sun¹; Kate Elder¹; Xianghui Xiao²; Peter Voorhees¹; ¹Northwestern University; ²Argonne National Laboratory

9:10 AM

Determination of Temperature Distribution in and around the Melt Pool during Laser Powder Bed Fusion by Hyperspectral Thermal Imaging: *Nicholas Calta*¹; Gabe Guss¹; Dongxia Qu¹; Saad Khairallah¹; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory

9:30 AM

New Insights on Liquid Metal Breakup from High Speed Image Analysis during Close Coupled Gas Atomization: *Jordan Tiarks*¹; Trevor Riedemann¹; Emma White¹; Iver Anderson¹; ¹U.S. Department of Energy, Ames Laboratory

9:50 AM Break

10:10 AM

Analysis of Chlorpropamide's Polymorphic Transformation Using In Situ Mechanical Raman Spectroscopy during Tableting: *Vikas Kumar Reddy Yettella*¹; Heejun Park¹; Abhijeet Dhiman¹; Vikas Tomar¹; Qi Zhou¹; ¹Purdue University

10:30 AM

High-frequency Ultrasound Analysis in Both Experimental and Computation Level to Understand the Microstructural Change in Soft Tissues: *Leila Ladani*¹; Koushik Paul¹; Jeremy Stromer²; ¹University of Texas at Arlington; ²University of Connecticut

MATERIALS DESIGN

Advances in Computational Methods for Damage Mechanics and Failure Phenomena — Computational Modeling of Failure: Novel Methods

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Michael Tonks, University of Florida; Remi Dingreville, Sandia National Laboratories; Jaafar El-Awady, Johns Hopkins University

Wednesday AM | March 13, 2019

303C | Henry B. Gonzalez Convention Center

Session Chairs: Amine Benzerga, Texas A&M University; Katsuyo Thornton, University of Michigan

8:30 AM Introductory Comments

8:35 AM Invited

A New Automated Computational Framework for Simulating the Failure Response of Materials with Complex Microstructures: *Soheil Soghrati*¹; Anand Nagaragan¹; Ming Yang¹; Bowen Liang¹; Hossein Ahmadian¹; Weijie Mai¹; ¹The Ohio State University

9:05 AM Invited

A Parameter-free Top-down Approach to Ductile Fracture Simulations: *Amine Benzerga*¹; ¹Texas A & M University

9:35 AM

A Nonlinear Dynamics Approach to Oxide Breakdown in the Stochastic Model of Zirconium Alloy Corrosion: *Richard Smith*¹; ¹Naval Nuclear Laboratory

9:55 AM Break

10:15 AM Invited

Computational Modeling of Fracture in Ceramic Nuclear Fuel: Comparison of Methods and Validation Needs: *Benjamin Spencer*¹; Wen Jaing¹; Hailong Chen¹; ¹Idaho National Laboratory

10:45 AM Invited

The Smoothed Boundary Method for Mechanics of Anisotropic Materials for Energy Storage: Alexander Chadwick¹; Doaa Taha¹; Erik Hanson¹; Hui-Chia Yu²; *Katsuyo Thornton*¹; ¹University of Michigan; ²Michigan State University

11:15 AM

Engineering Microcracked Ceramic Metamaterials: *Ryan Cooper*¹; ¹University of Connecticut

11:35 AM Invited

Design of Supercompressible Material by Artificial Intelligence and Additive Manufacturing: *Miguel Bessa*¹; ¹Delft University of Technology

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Atomistic and MesoScale Algorithms in Study and Design of Materials

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Prasanna Balachandran, University of Virginia; Douglas Spearot, University of Florida; Charudatta Phatak, Argonne National Laboratory; Srinivasan Srivilliputhur, University of North Texas

Wednesday AM | March 13, 2019
304A | Henry B. Gonzalez Convention Center

Session Chairs: Mohsen Asle Zaeem, Colorado School of Mines; Vahid Tari, Eaton Corporate Research & Technology

8:30 AM Invited

Coupling CPFEM with Phase Field Modeling from Crack Propagation in Polycrystalline Materials: *Somnath Ghosh*¹; Jiahao Cheng¹; Ahmad Shahba¹; ¹Johns Hopkins University

9:00 AM

A Phase Field Model for Dislocation Evolution in Heterogeneous Media: *Shuozhi Xu*¹; Abigail Hunter²; Irene Beyerlein¹; ¹University Of California, Santa Barbara; ²Los Alamos National Laboratory

9:20 AM

Algorithm to Include Inertia in FFT-based Micromechanical Modelling of Heterogeneous Materials: *Ricardo Lebensohn*¹; ¹Los Alamos National Laboratory

9:40 AM

Multi-Information Source Fusion and Optimization to Realize ICME: Application to Dual Phase Materials: *Seyede Ghoreishi*¹; Abhilash Molkeri¹; Raymundo Arroyave¹; Douglas Allaire¹; *Ankit Srivastava*¹; ¹Texas A&M University

10:00 AM Break

10:30 AM

Extension of SPPARKS' Hybrid Potts-phase Field Model to Include Anisotropic Grain Boundaries: *Efrain Hernandez-Rivera*¹; Philip Goins¹; Heather Murdoch¹; ¹US Army Research Laboratory

10:50 AM

A Crystal Plasticity Model for Dynamic Recrystallization in Ti-6Al-4V Alloy: *Arunabha Mohan Roy*¹; Riddhiman Bhattacharya¹; John Allison¹; Veera Sundararaghavan¹; ¹University of Michigan-

Ann Arbor

11:10 AM

Numerical Simulation of Ti6-Al4-V Alloy Diffusion Bonding Process Based on Molecular Dynamics: *Xiaogang Liu*¹; Haiding Guo¹; Yongji Zuo¹; ¹College of Energy and Power Engineering, Nanjing University of Aero and Astro

11:30 AM

Scaling Relationships to Model the Evolution of Microstructure of Metallic Powder Particles at the Mesoscales Using Quasi-Coarse-Grained Dynamics Simulations: *Avinash Dongare*¹; ¹University of Connecticut

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications VII — Session V

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Ensicaen University of Caen; Soon-Jik Hong, Kongju National University; Philippe Jund, Montpellier University; Lan Li, Boise State University; Takao Mori, Nims; Hsin-Jay Wu, National Sun Yat-sen University; Tiejun Zhu, Zhejiang University

Wednesday AM | March 13, 2019

216B | Henry B. Gonzalez Convention Center

Session Chairs: Yoshisato Kimura, Tokyo Institute of Technology; Lan Li, Boise State University

8:30 AM Invited

Tuning Transition Metal Dichalcogenide Heterostructure Transport Properties: *Lan Li*¹; ¹Boise State University

8:50 AM Invited

Strain Tuning of Thermoelectric Properties of 2D TMDCs: The Case of TiSe₂: Safoura Nayebsadeghi¹; Mona Zebarjadi¹; *Keivan Esfarjani*¹; ¹University of Virginia

9:10 AM Invited

Applications of Aberration-corrected TEM on Thermoelectric Materials: *Binghui Ge*¹; Yumei Wang²; ¹Anhui University; ²Institute of Physics, CAS

9:30 AM

Intrinsic Phase Stability and Microstructural Evolution of Elastically Stressed $Mg_{2-x}Sn_{1-x}$ Thermoelectric System: *Vahid Attari*¹; *Su-In Yi*¹; *Choongho Yu*¹; *Raymundo Arroyave*¹; ¹Texas A&M University

9:50 AM

Phonon Spectroscopy in Inhomogeneous Materials: *Raphael Hermann*¹; ¹Oak Ridge National Laboratory

10:10 AM Break

10:30 AM Invited

Effects of Vacancy-site Occupancy on Thermoelectric and Mechanical Properties of Half-Heusler $ZrNiSn$ and $Zr(Ni,Co)Sn$: *Yoshisato Kimura*¹; *Yaw Wang Chai*¹; ¹Tokyo Institute of Technology

10:50 AM Invited

Screening Promising Thermoelectric Materials in Binary Chalcogenides through High-Throughput Computations: *Yongsheng Zhang*¹; ¹Institute Of Solid State Physics, Cas

11:10 AM Invited

Computational Screening of Tens of Thousands of Compounds as Potential Thermoelectrics and their Experimental Followup: *Anubhav Jain*¹; ¹Lawrence Berkeley National Laboratory

11:30 AM

Mechanical Characterization and Microstructural Evolution of Reactively-brazed Half-Heusler/Inconel/Aluminum/Copper Interfaces: *Sonika Gahlawat*¹; *Kenneth White*¹; ¹University of Houston

11:50 AM

In Situ TEM Study of Transition Metal Oxides Based Hole-selective Contacts Employed in Silicon Solar Cells: *Haider Ali*¹; *Supriya Koul*¹; *Geoffrey Gregory*¹; *Akihiro Kushima*¹; *Kristopher Davis*¹; ¹University of Central Florida

LIGHT METALS

Alumina & Bauxite — Bayer Process and Non-conventional Processing

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

Program Organizer: Sebastien Fortin, Rio Tinto - Aluminium Technology Solutions - ARDC

Wednesday AM | March 13, 2019
006A | Henry B. Gonzalez Convention Center

Session Chairs: Roberto Seno, Companhia Brasileira de Alumínio (CBA); Lance Myers, Alcoa; James Vaughan, University of Queensland; Marie-Louise Bouchard, Rio Tinto

8:30 AM Introductory Comments

8:35 AM

Advances in Beneficiation of Low-grade Bauxite: *Lala Sukla*¹; Archana Pattanaik¹; Debabrata Pradhan¹; ¹Siksha 'O' Anusandhan University

9:00 AM

Leaching Kinetics of Thermally-activated, High Silica Bauxite: *Hong Peng*¹; Steven Peters²; James Vaughan¹; ¹University of Queensland; ²University of Bath

9:25 AM

Rheological Improvements in Alumina Industry Clarification Circuits: *Lawrence Andermann*¹; Adrian Mullins Mullins²; Cameron Smyth²; Clive Roscoe¹; ¹Solenis; ²Rio Tinto Aluminum

9:50 AM

Improving the Reliability of Fluidized Bed Alumina Calciners by Suitable Refractory Lining Selection: *Mariana Braulio*¹; Jose Cunha²; Austin Maxwell²; Dean Whiteman²; Victor Pandolfelli³; ¹cast Materials Consultancy; ²Alcoa; ³Federal University of São Carlos

10:15 AM Break

10:30 AM Keynote

Valorization of Bauxite Residue: A Challenge That Leads to a Mentality Shift and Eventually Innovation: *Yiannis Pontikes*¹; ¹KU Leuven

11:10 AM

Synchronous Desulfurization and Desilication of Low-grade and High-sulfur Bauxite by a Flotation Process: *Wencui Chai*¹; *Guihong Han*¹; Yanfang Huang¹; Yijun Cao¹; Jiongtian Liu¹; ¹Zhengzhou University

11:35 AM

Preparing Alumina by Electrolytic Method from Sulfuric Acid Leachate of Coal Fly Ash: *Yuan Shi*¹; Kai-xi Jiang¹; Zhang Tingan¹; Guo-zhi Lyu¹; ¹Northeastern University

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Simulations and Studies of Processing

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

Program Organizer: Hiromi Nagaumi, Soochow University

Wednesday AM | March 13, 2019
007A | Henry B. Gonzalez Convention Center

Session Chair: Hiromi Nagaumi, Soochow University

8:30 AM Introductory Comments

8:35 AM

Coupled Fluid Flow and Heat Transfer Analysis of Ageing Heat Furnace: Mircea Popa¹; Ioan Sava¹; *Marin Petre*¹; Catalin Ducu²; Sorin Moga²; Alexandra Necola¹; Constantin-Nicusor Draghici¹; ¹ALRO; ²University of Pitesti

9:00 AM

The Influence of the Distance Between the Plate and the Top Nozzles during the Soft Quenching Process of the 6061 Aluminium Alloy Plates: Gheorghe Dobra¹; Ioan Sava¹; *Carmen Stanica*¹; Marin Petre¹; Catalin Ducu²; Sorin Moga²; Cristian Florescu¹; ¹ALRO; ²University of Pitesti

9:25 AM

Numerical Investigation on the Motion of Free-floating Crystals during DC Casting of Aluminum Alloys: *Qipeng Dong*¹; Hiromi Nagaumi¹; Haitao Zhang²; Tianpeng Qu¹; Jingkun Wang³; ¹Soochow University; ²Northeastern University; ³China Hongqiao Group Limited

9:50 AM

Numerical Modelling, Microstructural Evolution and Characterization of Laser Cladded Al-Si-Sn Coatings on Ti-6Al-4V Alloy: *Olawale Fatoba*¹; Esther Akinlabi¹; Stephen Akinlabi¹; Mutiu Erinoshola¹; ¹University of Johannesburg

10:15 AM Break

10:30 AM

The Influence of Quenching and Stretching Process Conditions of Aluminium Alloy Plates on Residual Stresses: Gheorghe Dobra¹; Ioan Sava¹; *Cristian Stanescu*¹; Catalin Ducu²; Sorin Moga²; Decebal Dorin Balasoiu¹; Dan Ion Paun¹; ¹ALRO; ²University of Pitesti

10:55 AM

Characteristics of Surface Properties of Aluminum Flat Products Related with Different Annealing Temperature and Cleaning Properties: *Emel Çaliskan*¹; Kaan Ipek¹; Ahmet Seisoglu¹; Erdem Güler¹; Ali Ulus¹; ¹Teknik Alüminyum San. Tic. A.S.

11:20 AM

Comparative Electrochemical and Intergranular Corrosion-resistance Testing of Wrought Aluminium Alloys: *Varuzan Kevorkijan*¹; Irena Lesjak¹; Marko Degiampietro¹; Lucija Skledar¹; Teja Krumpak¹; ¹Impol R in R d.o.o.

11:45 AM

Nature of Grain Boundary Precipitates and Stress Corrosion Behavior in Al 7075 and 7079 Alloys: *Ramasis Goswami*¹; ¹Naval Research Laboratory

LIGHT METALS

Aluminum Reduction Technology — Joint Session with Electrode Technology

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

Program Organizer: Marc Dupuis, GeniSim Inc

Wednesday AM | March 13, 2019

004 | Henry B. Gonzalez Convention Center

Session Chairs: Ali Jassim, EGA; Bjørn Petter Moxnes, Hydro Aluminium Sunndal Metal Plant

8:30 AM Introductory Comments

8:35 AM

Dry Barrier Powder Performance Update: *Richard Jeltsch*¹; ¹Jeltsch Consulting

9:00 AM

Investigation of Refractory Degradation in Hall-Héroult Cell:

Bhavya Narang¹; *Shanmukh Rajgire*¹; Amit Gupta¹; Mahesh Sahoo²; J.P. Nayak²; ¹Aditya Birla Science and Technology Company Pvt. Ltd.; ²Hindalco Industries Ltd.

9:25 AM

Thermogravimetric Analysis of Thermal Insulating Materials

Exposed to Sodium Vapor: *Raymond Luneng*¹; Zhaohui Wang²; Arne Petter Ratvik²; Tor Grande¹; ¹Norwegian University of Science and Technology; ²SINTEF Industry

9:50 AM Break

10:05 AM

Innovative Anode Coating Technology to Reduce Anode Carbon

Consumption in Electrolysis Cells: *Ali Jassim*¹; Najeeba Al Jabri¹; Saleh Ahmed Rabbaa¹; Edouard Gerard Mofor¹; Jamil Jamal Wazir Eddin¹; ¹EGA

10:30 AM

Theory and Practice of High Temperature Gas Baking Technology

for Aluminium Electrolysis Cells: *Xudong Wang*¹; Yingwu Li¹; Chengbo Wu¹; Yinbo Zhang¹; ¹Zhengzhou Jingwei Technology Industry Co., Ltd

10:55 AM Concluding Comments

BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces IV

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

Program Organizers: Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Po-Yu Chen, National Tsing Hua University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines

Wednesday AM | March 13, 2019

217C | Henry B. Gonzalez Convention Center

Session Chairs: Hendrik Heinz, University of Colorado; Candan Tamerler, University of Kansas

8:30 AM Invited

Structure / Property Relationships in Biomaterials at the Nanoscale: *Federico Rosei*¹; ¹INRS Centre for Energy, Materials and Telecommunications

9:00 AM

Nanoclusters with T1 MRI Enhancement for Imaging-guided Drug Delivery: *Yuping Bao*¹; ¹University of Alabama

9:20 AM Invited

Nanostructured Diamond for Medical Device Applications: *Roger Narayan*¹; ¹University of North Carolina

9:50 AM

Engineered Peptide Coupled Polymer Composites for Antimicrobial Adhesive-dentin Interface: *Sheng-Xue Xin*¹; Kyle Boone¹; Leon Song¹; Sarah VanOosten¹; Paulette Spencer¹; Candan Tamerler¹; ¹University of Kansas

10:10 AM Break

10:30 AM Keynote

Phase-change Materials for Controlled Release and Related Biomedical Applications: Da Huo¹; Jiajia Xue¹; Chunlei Zhu¹; *Younan Xia*¹; ¹Georgia Institute of Technology and Emory University

11:10 AM

Adhesion of Neuron-like Cells on Single-layer MoS₂ towards Electrical Detection of Cell Activity: *Kazuki Yatsu*¹; Tomoko Ohnishi¹; Takakazu Seki¹; Hironaga Noguchi¹; Sayaka Tezuka¹; Yuhei Hayamizu¹; ¹Tokyo Institute of Technology

11:30 AM Invited

Interdisciplinary Strategies for Engineering at Nanoscale: *Handan Acar*¹; ¹Stephenson School of Biomedical Engineering, University of Oklahoma

ADVANCED MATERIALS

Bulk Metallic Glasses XVI — Synthesis and Mechanical Properties

Sponsored by: TMS: Mechanical Behavior of Materials Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Gongyao Wang, Alcoa; Robert Maass, University of Illinois at Urbana-Champaign; Muhammad Rafique

Wednesday AM | March 13, 2019
206B | Henry B. Gonzalez Convention Center

Session Chair: Juergen Eckert, Erich Schmid Institute of Materials Science; Xie Xie, FCS US LLC

8:30 AM Keynote

Mechanical Measurements on Colloidal Crystals and Glasses: J. Terdik¹; David Weitz¹; *Frans Spaepen*¹; ¹Harvard University

9:00 AM Keynote

Improving the Tensile Ductility of Bulk Metallic Glasses by Controlling Heterogeneities: *Jurgen Eckert*¹; ¹Erich Schmid Inst of Materials Science

9:30 AM Keynote

Determining Metastable Phases in Metallic Alloys via Ultrafast Calorimetry: *Jörg Löffler*¹; ¹ETH Zurich

10:00 AM Invited

Synthesis and Properties of BMG Type Nanoglasses by Thin Film Deposition in Comparison with HPT: *Hans Fecht*¹; ¹Ulm University

10:20 AM Break

10:40 AM Invited

Deformation of Bulk Metallic Glasses: Strain Softening or Hardening?: *Jie Pan*¹; Yi Li¹; ¹Chinese Academy of Sciences, Institute of Metal Research

11:00 AM Invited

Super High Dense Zr-based Bulk Metallic Glass Induced by High Pressure Treatment over T_g: *Rui Yamada*¹; Yuki Shibazaki²; Yasuto Abe¹; Wookha Ryu¹; Junji Saida¹; ¹Frontier Research Institute for Interdisciplinary Sciences, Tohoku University; ²National Institute for Materials Science

11:20 AM Invited

Small-scale Plasticity of Quasicrystals: Similarity and Difference from Metallic Glasses: *Yu Zou*¹; ¹University of Toronto

11:40 AM

Surface Patterning by Thermoplastic Forming of Ni-free Ti-based Bulk Metallic Glasses: *Mariana Calin*¹; *Supriya Bera*¹; *Baran Sarac*²; *Juergen Eckert*³; ¹IFW Dresden; ²Austrian Academy of Sciences ; ³Austrian Academy of Sciences

12:00 PM Invited

Overcoming the Ductility and Strength Trade-off via Precise Controlling of Microstructure of Al-based Glassy Alloys: *Wan Kim*¹; *Eun Soo Park*¹; ¹Seoul National University

LIGHT METALS

Cast Shop Technology: Energy Joint Session — Cast Shop Technology: Energy Joint Session

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

Program Organizers: Pierre-Yves Menet, Constellium Technology Center; Mark Jolly, Cranfield University; Valmiro Sa Neto, Praxair Inc; Cynthia Belt, Metals Energy Management LLC

Wednesday AM | March 13, 2019

007B | Henry B. Gonzalez Convention Center

Session Chairs: Cynthia Belt, Metals Energy Management LLC; Mark Jolly, Cranfield University

8:30 AM Introductory Comments

8:35 AM

Aluminum Holding Furnace Optimal Design Using the CFD Method and Factorial Approach: *Mohamed Hassan*¹; *Saeed Alshehhi*²; *Cindy Belt*³; ¹Khalifa University of Science and Technology; ²Khalifa University of Science and Tech; ³Metals Energy Management LLC

9:00 AM

Artificial Intelligence to Optimize Melting Processes: An Approach Combining Data Acquisition and Modeling: *Amin Rostamian*¹; *Stéphane Lesquereux*²; *Marc Bertherat*³; *Michel Rappaz*⁴; ¹Novamet SàRL; ²GAP Engineering SA; ³Constellium; ⁴MRC-Consulting Michel Rappaz

9:25 AM

Oxy-fuel Technologies for Improved Efficiency in Aluminum Scrap Melting: *Xavier Paubel*¹; *Stewart Jepson*²; *Frank Rheker*¹;

Sarah Juma¹; Dietmar Wieck¹; William Ollerton²; ¹AIR LIQUIDE;
²AIRGAS

9:50 AM Break

10:05 AM

Electromagnetic Transfer and Circulation (ETAC) of Molten Aluminium Metal and Its Alloys: *Robert Fritzs*¹; Jim Grayson¹;
¹Pyrotek, EMP Technologies Limited

10:30 AM

Optimized Electromagnetic Stirring in Aluminium Melting and Holding Furnaces: *Joakim Andersson*¹; ¹ABB Ab

CHARACTERIZATION

Characterization of Materials through High Resolution Imaging — Imaging I

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

Program Organizers: Ross Harder, Argonne National Laboratory; Richard Sandberg, Los Alamos National Laboratory; Xianghui Xiao, Argonne National Laboratory; Brian Abbey, La Trobe University; Saryu Fensin, Los Alamos National Laboratory; Ana Diaz, Paul Scherrer Institut; Mathew Cherukara, Argonne National Laboratory

Wednesday AM | March 13, 2019

303A | Henry B. Gonzalez Convention Center

Session Chair: Xianghui Xiao, Argonne National Laboratory

8:30 AM Invited

Ultrahigh-speed X-ray Imaging for Studying Materials Structure Dynamics: *Tao Sun*¹; Kamel Fezzaa¹; ¹Argonne National Laboratory

9:00 AM Invited

Advances in Fatigue Crack Growth Characterization via In Situ Phase Contrast Tomography Imaging: *Michael Sangid*¹; Michael Waddell¹; Stephen Carter¹; Kevin Walker²; Xianghui Xiao³; ¹Purdue University; ²Defence Science and Technology Group; ³Argonne National Laboratory

9:20 AM

In Situ Loading of Engineered Materials during X-ray 3D Tomographic Imaging: *Brian Patterson*¹; Kevin Henderson¹; Nikolaus

Cordes¹; Matthew Herman¹; Lindsey Kuettner¹; Trevor Shear¹; Cynthia Welch¹; Paul Welch¹; Axinte Ionita¹; Nikhilesh Chawla²; Jason Williams²; Kamel Fezzaa³; Tao Sun³; Xianghui Xiao³; ¹Los Alamos National Laboratory; ²Arizona State University; ³Argonne National Laboratory

9:40 AM Invited

Bridging Nano- and Micro-scales in Electrochemical Energy Technologies with X-ray Computed Tomography: *Iryna Zenyuk*¹; ¹University of California Irvine

10:00 AM Break

10:20 AM Invited

Recent Development of Full-field X-ray Microscope at NSLS-II - A Case of Battery Research: *Mingyuan Ge*¹; David Scott Coburn¹; Evgeny Nazaretski¹; Kazimierz J. Gofron¹; Huijuan Xu¹; Weihe Xu¹; Zhijian Yin¹; Wah-Keat Lee¹; ¹Brookhaven National Laboratory

10:40 AM Invited

Revealing the Growth Dynamics of Nature's Forbidden Crystals: Insung Han¹; Nancy Senabulya¹; Haiping Sun¹; Xianghui Xiao²; *Ashwin Shahani*¹; ¹University of Michigan; ²Argonne National Laboratory

11:00 AM Invited

X-ray Coherent Surface Scattering Imaging for Surface 3D Imaging and Material Characterization: *Miaoqi Chu*¹; Zhang Jiang¹; Tao Sun¹; Jin Wang¹; ¹Advance Photon Source

11:20 AM Invited

Identification and Visualization of Chemical Outliers through Scientific Data Mining in Nanoscale Spectro-microscopic Study of NMC Electrode: *Enyuan Hu*¹; Yijin Liu²; Xiao-Qing Yang³; ¹Brookhaven National Laboratory; ²SLAC National Accelerator Laboratory; ³Brookhaven National Laboratory

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Process and Characteristics of Advanced Ceramics and Glasses II

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Wednesday AM | March 13, 2019
212B | Henry B. Gonzalez Convention Center

Session Chairs: Shadia Ikhmayies, Al Isra Univeristy; Tomoko Sano, Army Research Laboratory

8:30 AM Introductory Comments

8:35 AM

Estimating the Thermal Conductivity of Uranium and Uranium –Zirconium Alloys with High Porosity: *Luis Ortega*¹; Karyn Stern¹; Brandon Blamer²; Sean McDeavitt¹; ¹Texas A&M University; ²X Energy LLC

8:55 AM

Nanoindentation of Commercial PVD Hard Coatings at Elevated Temperatures and High Strain Rates: *Kurt Johanns*¹; Warren Oliver¹; ¹Nanomechanics Inc

9:15 AM

Measurement of Hydrogen Vapor Pressure over Two-phase Zirconium/Zirconium Hydride Material between 300°C and 450°C: *Kenneth Geelhood*¹; Walter Luscher¹; ¹Pacific Northwest National Laboratory

9:35 AM

Characterization of Modified Nickel Silicate Anode Material for Lithium Ion Batteries: *Yunyun Wei*¹; Guihong Han¹; Yanfang Huang¹; Duo Zhang¹; ¹Zhengzhou University

9:55 AM Break

10:10 AM

The Influence of Microstructure and Emissivity of NiO Doped Fe₃O₄ Spinel Structure on Near and Middle Infrared Radiation: Jian Zhang¹; *Hao Bai*¹; Xu Zhang¹; Huanmei Yuan¹; Zefei Zhang¹;

Liyun Yang¹; ¹University of Science and Technology

10:30 AM

Preparation and Characterization of PBAT/PLA Biofoams Reinforced with Bio Calcium Carbonate: *Elizabeth Cardoso*¹; Sandra Scagliusi¹; Duclerc Parra¹; Ademar Lugão¹; ¹Ipen - Instituto De Pesquisas Energetica

10:50 AM

Incorporation of Silver Nanoparticles in Zinc Oxide Matrix In Polyester Thermoplastic Elastomer (TPE-E) Aiming Antibacterial Activity: Leonardo Marchini¹; *Duclerc Parra*¹; Vijaya Rangari²; ¹IPEN; ²Center for Advanced Materials Science and Engineering Tuskegee University

11:10 AM

Elucidating Reaction Mechanisms for the Synthesis of SiC-based Composite Matrices: *Ravit Silverstein*¹; Frank Zok¹; Carlos Levi¹; ¹Materials Department, University of California, Santa Barbara, California

MATERIALS DESIGN

Computational Approaches for Big Data, Artificial Intelligence and Uncertainty Quantification in Computational Materials Science — Big Data

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Liang Qi, University of Michigan; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory; Adrian Sabau, Oak Ridge National Laboratory; Houlong Zhuang, Arizona State University ; Sugata Chowdhury, National Institute of Standards and Technology

Wednesday AM | March 13, 2019

305 | Henry B. Gonzalez Convention Center

Session Chairs: Ankit Agrawal, Northwestern University; Huan Tran, University of Connecticut

8:30 AM Invited

Machine Learning of Materials Synthesis by Data Extraction from over 3 Million Research Papers: *Gerbrand Ceder*¹; ¹University of California, Berkeley

9:00 AM

Application of Natural Language Processing to TMS Abstracts to Understand the Direction of Computational Materials Design: *Efrain Hernandez-Rivera*¹; Jason Hattrick-Simpers²; Brian DeCost²; Amy Trost³; Aaron Kusne²; ¹U.S. Army Research Laboratory; ²National Institute of Standards and Technology; ³University of Maryland

9:20 AM Invited

Materials Informatics and Big Data: Realization of 4th Paradigm of Science in Materials Science: *Ankit Agrawal*¹; Alok Choudhary¹; ¹Northwestern University

9:50 AM

Investigation of Deformation Twinning in Mg Alloy during In-situ Compression Using Clustering and Computer Vision: *Zhe Chen*¹; Samantha Daly¹; ¹University of California, Santa Barbara

10:10 AM Break

10:30 AM Invited

Polymer Genome: An Informatics Platform for Rational Polymer Dielectrics Design and Beyond: *Rampi Ramprasad*¹; ¹Georgia Tech

11:00 AM

Materials Science Learning and Discovery from Large-scale Text Mining: *Leigh Weston*¹; Vahe Tshitoyan¹; John Dagdelen¹; Kristin Persson¹; Gerbrand Ceder¹; Anubhav Jain¹; ¹Lawrence Berkeley National Laboratory

11:20 AM

Materials Platform for Data Science: From Big Data towards Materials Genome: *Evgeny Blokhin*¹; Pierre Villars²; ¹Tilde Materials Informatics; ²Material Phases Data System

11:40 AM

Cloud-based Infrastructure for Big Data in the Materials Domain: *David Elbert*¹; Nick Carey¹; Tamas Budavari¹; Gerard Lemson¹; Alex Szalay¹; Tyrel McQueen¹; K.T. Ramesh¹; ¹Johns Hopkins University

MATERIALS DESIGN

**Computational Materials Discovery and Design —
 Computational Methods for Materials Discovery and Design II**

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Oliver Johnson, Brigham Young University; Arunima Singh, Arizona State University; Jake Bair, Pacific Northwest National Laboratory; Christopher Weinberger, Colorado State University; Timofey Frolov, Lawrence Livermore National Laboratory; Ning Zhang, Colorado School of Mines; Fadi Abdeljawad, Clemson University; Richard Hennig, University of Florida; Mikhail Mendeleev, Ames Laboratory; Avinash Dongare, University of Connecticut

Wednesday AM | March 13, 2019

304C | Henry B. Gonzalez Convention Center

Session Chairs: Prasanna Balachandran, University of Virginia; Arunima Singh, Arizona State University

8:30 AM Invited

Microstructure Stabilization and the Herring Condition: *Jeremy Mason*¹; Erdem Eren¹; ¹University of California, Davis

8:50 AM Invited

Interpretable Machine Learning for Polycrystal Plasticity Micromechanics: Ankita Mangal¹; *Elizabeth Holm*¹; ¹Carnegie Mellon University

9:10 AM

Predicting Small-scale Plasticity in Single Crystal Micropillars via Machine Learning: *Jamie Gravell*¹; Junho Cho¹; Seungjoon Lee²; Ill Ryu¹; ¹University of Texas at Dallas; ²John Hopkins University

9:30 AM

A Statistical Dislocation-mediated Crystal Plasticity Model for Predicting Size Effects on the Yield Strength of Single and Polycrystalline Metals: *Yejun Gu*¹; David Eastman¹; Kevin Hemker¹; Jaafar El-Awady¹; ¹Johns Hopkins University

9:50 AM Break

10:10 AM

Intrinsic Ductility of Alloys from Nonlinear Elasticity Theory: *Ian Winter*¹; Daryl Chrzan¹; ¹University Of California Berkeley

10:30 AM

The Representation of Five-parameter Grain Boundary Functions Using Harmonics: *Srikanth Patala*¹; Jeremy Mason²; ¹North Carolina State University; ²University of California Davis

10:50 AM

New Spectral Graph Theoretic Metrics for Grain Boundary Network Design: *Christopher Adair*¹; Oliver Johnson¹; ¹Brigham Young University

11:10 AM

3D Reconstruction of Microstructure from Surface Images Using Graph Theoretic Approaches: *Siddhartha Srivastava*¹; Iman Javaheri¹; Veera Sundararaghavan¹; ¹University Of Michigan

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Phase Prediction and Stability

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Turret, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

Wednesday AM | March 13, 2019
225C | Henry B. Gonzalez Convention Center

Session Chairs: Joel Berry, University of Pennsylvania; Maryam Ghazisaeidi, Ohio State University

8:30 AM Invited

Multi-cell Monte Carlo (MC)² Method for Phase Prediction in Multicomponent Alloys: *Maryam Ghazisaeidi*¹; Changning Niu¹; ¹Ohio State University

9:00 AM

Investigation of Al-Co-Fe and Al-Cu-Fe Phase Diagrams over the Whole Composition Range: *Lilong Zhu*¹; Sujeily Soto-Medina¹; Richard Hennig¹; Michele Manuel¹; ¹University of Florida

9:20 AM

Finding the Zeta Phase: *Christopher Weinberger*¹; Hang Yu²; Xiao-Xiang Yu³; Gregory Thompson³; ¹Colorado State University; ²Drexel University; ³University of Alabama

9:40 AM

Re-visit to Cu-Au First-principles Thermodynamics: *Tetsuo Mohri*¹; ¹Tohoku University

10:00 AM

Reassessment of Zn-rich Corner Phase Diagrams in the Zn-Fe-Al Ternary System: *Inho Lee*¹; Kwangsik Han¹; Ikuo Ohnuma²; Ryosuke Kainuma¹; ¹Tohoku University; ²National Institute for Materials Science (NIMS)

10:20 AM Break

10:40 AM Invited

The Formation and Structure of Fe-Mn-Ni-Si Solute Clusters and G-phase Precipitates in Steels: *Daniel King*¹; Patrick Burr²; Simon Middleburgh³; Thomas Whiting¹; M. Burke⁴; Mark Wenman¹; ¹Imperial College London; ²University of New South Wales; ³Bangor University; ⁴Manchester University

11:10 AM

Theoretical Calculation of Thermodynamic Properties of Liquid Transition-metal Alloys with Perturbation Theory: *Shun Ueda*¹; Kazuki Morita¹; ¹University of Tokyo

11:30 AM

Understanding of DO₂₂ Ordering and Stability of Cu₃Al Phase in Cu-Al Binary Alloys: *Choong-un Kim*¹; Khaled Hirmas¹; ¹University of Texas, Arlington

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Behavior of High Temperature Alloys — Superalloys: Microstructural Evolution and Advanced Characterization

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

Program Organizers: Michael Titus, Purdue University; Qiang Feng, University of Science and Technology Beijing; Akane Suzuki, GE Global Research; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Sammy Tin, Illinois Institute of Technology; Martin Detrois, National Energy Technology Laboratory

Wednesday AM | March 13, 2019

301C | Henry B. Gonzalez Convention Center

Session Chairs: Qiang Feng, University of Science and Technology Beijing; Jonathan Cormier, Institut P' - Departement de Physique et Mecanique des Materiaux

8:30 AM Invited

Role of Micro-pores in Single Crystal Nickel-based Superalloys: *Jian Zhang*¹; ¹Institute of Metal Research

9:00 AM

Effects of Mo Additions on γ -Ni/ η -Ni₃Ti Lattice Mismatch in Nickel-base Alloys: *Satoru Kobayashi*¹; ¹Tokyo Institute of Technology

9:20 AM

Overheating Effects on Microstructural Evolution and Non-isothermal Creep Behavior of a Directionally Solidified Superalloy: *Wenrui An*¹; *Satoshi Utada*²; *Xiaotong Guo*¹; *Weiwei Zheng*¹; *Jonathan Cormier*²; *Qiang Feng*¹; ¹University Science and Technology Beijing; ²ENSMA - Institut Pprime - UPR CNRS 3346

9:40 AM

Microstructure Evolution and Recrystallization during Creep Loading on Pre-deformed Ni-based SX Superalloy: *Satoshi Utada*¹; *Jonathan Cormier*²; *Patrick Villechaise*²; *Florence Hamon*²; *Sarah Hamadi*³; *Joël Delautre*³; ¹ISAE-ENSMA/Institut Pprime/SAFRAN Aircraft Engines; ²ISAE-ENSMA/Institut Pprime; ³SAFRAN Aircraft Engines

10:00 AM Break

10:20 AM Invited

Understanding Deformation Mechanisms in Superalloys through Atomic Scale Microanalysis: *Paraskevas Kontis*¹; *Surendra Makineni*¹; *Xiaoxiang Wu*¹; *Jaber Mianroodi*¹; *Pratheek Shanthraj*²; *Jonathan Cormier*³; *Dierk Raabe*¹; *Baptiste Gault*¹; ¹Max-Planck-Institut für Eisenforschung GmbH; ²School of Materials, The University of Manchester; ³Institut Pprime, Physics and Mechanics of Materials Department

10:50 AM

Residual Stress Relaxation in Ni-based Superalloys at High Temperature by Real-time Neutron Diffraction: *Yan Chen*¹; *Iuliana Cernatescu*²; *Robert Goetz*²; *Alexandru Stoica*¹; *Lee Semiatin*³; *Ke An*¹; ¹Oak Ridge National Laboratory; ²Pratt & Whitney; ³U.S. Air Force Research Laboratory

11:10 AM

Quantifying Stress Relaxation of a Single Crystal Nickel-base Superalloy during Casting Relevant Thermal Cycles: *David*

*Collins*¹; Neil D'Souza²; Ayan Bhowmik³; Chinnapat Panwisawas⁴; ¹University of Birmingham; ²Rolls-Royce plc; ³Rolls-Royce@NTU Corporate Lab, Nanyang Technological University; ⁴University of Oxford

11:30 AM

Tensile Properties and Fracture Behavior of ATI 718Plus Alloy at Room and Elevated Temperatures: *Michael Kattoura*¹; Gopal Viswanathan²; Seetha Ramaiah Mannava¹; Dong Qian³; Vijay Vasudevan¹; ¹University of Cincinnati; ²Ohio State University; ³University of Texas at Dallas

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Hydrogen Embrittlement II

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

Program Organizers: Bai Cui, University of Nebraska Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc

Wednesday AM | March 13, 2019

214C | Henry B. Gonzalez Convention Center

Session Chairs: John Scully, University of Virginia; Brian Somerday, Southwest Research Institute

8:30 AM Invited

Insights Regarding Hydrogen Embrittlement Susceptibility and Mitigation in Structural Materials through Improved Understanding of Hydrogen-metal Interactions: *John Scully*¹; ¹University of Virginia

9:10 AM

The Relationship between Overpotential and Hydrogen Content in Pure Ni under Electrochemical Charging: *Lai Jiang*¹; Michael Demkowicz¹; ¹Texas A&M University

9:30 AM

Microstructural Behaviour on the Hydrogen-embrittlement Resistance of Offshore-platform Ferritic Steels using In Situ Slow Strain Rate Testing: *Namhyun Kang*¹; Cheolho Park¹; Hanji Park¹; Yang Do Kim¹; Myung Hyun Kim¹; Stephen Liu²; Dae-Geun Nam³; Kyung-Mox Cho¹; ¹Pusan National University; ²Colorado School of Mines; ³Korea Institute of Industrial Technology

9:50 AM Break

10:10 AM Invited

A Comprehensive View of Gaseous Hydrogen-assisted Cracking:
*Brian Somerday*¹; ¹Southwest Research Institute

10:50 AM

Effect of Stress State on Hydrogen Embrittlement in Alloy 718:
*Fassett Hickey*¹; *Brian Somerday*¹; *John Macha*¹; ¹Southwest Research Institute

11:10 AM

The Effect of Hydrogen and Aging Condition on the Deformation and Fracture Behavior of a Precipitation-hardened Ni-base Superalloy: *Zachary Harris*¹; *Michael Ritzo*¹; *Sean Agnew*¹; *James Burns*¹; ¹University of Virginia

MECHANICS & STRUCTURAL RELIABILITY

Fatigue in Materials: Multi-scale and Multi-environment Characterizations and Computational Modeling — Fatigue Characterization Using Advanced Experimental Methods in 2D and 3D

Sponsored by: TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Jean-Briac le Graverend, Texas A&M University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Garrett Pataky, Clemson University; Filippo Berto, Norwegian University of Science and Technology

Wednesday AM | March 13, 2019

301B | Henry B. Gonzalez Convention Center

Session Chair: Antonios Kontsos, Drexel University

8:30 AM

3D Characterization of Microtexture in Ti64: *Joseph Wendorf*¹; *Jean-Charles Stinville*¹; *Andrew Polonsky*¹; *McLean Echlin*¹; *Tresa Pollock*¹; ¹University of California, Santa Barbara

8:50 AM

High Cycle Thermal Fatigue of Austenitic Stainless Steel Investigated via Hybrid Multiview Correlation: *Yanjun Wang*¹; *François Hild*¹; *Ludovic Vincent*¹; ¹Université Paris-Saclay

9:10 AM

High Cycle Fatigue in Microcompression of Gamma-TiAl Using Digital Image Correlation Strain Mapping: *Thomas Edwards*¹; Fabio Di Gioacchino²; Amy Goodfellow²; William Clegg²; ¹Swiss Federal Laboratories for Materials Science and Technology (EMPA); ²University of Cambridge

9:30 AM

Nucleation of Persistent Slip Bands and Crack Initiation in Fatigue of FCC Microcrystals: *Steven Lavenstein*¹; Jaafar El-Awady¹; ¹Johns Hopkins University

9:50 AM Break

10:10 AM

Quantitative Measurements of Cyclic Slip Irreversibility in Nickel Base Superalloys: *Jean-Charles Stinville*¹; P. G. Callahan¹; M. P. Echlin¹; V. Valle²; T. M. Pollock¹; ¹University of California, Santa Barbara; ²Université de Poitiers - ENSMA

10:30 AM

Temperature and Microstructural Dependence of Dwell Fatigue in Near-Alpha Titanium Alloys: *Michelle Harr*¹; Samantha Daly²; Adam Pilchak³; ¹University of Michigan; ²University of California, Santa Barbara; ³U.S. Air Force Research Laboratory

10:50 AM

Examining Sub-Grain-level Plasticity and Fatigue Crack Growth Using High Energy X-ray Diffraction Microscopy and Crystal Plasticity Finite Element Modeling: *William Musinski*¹; Paul Shade¹; Mark Obstalecki¹; Todd Turner¹; David Menasche²; Joel Bernier³; Sirina Safriet⁴; Darren Pagan⁵; Peter Kenesei⁶; Jun-Sang Park⁶; Jon Almer⁶; ¹U.S. Air Force Research Laboratory; ²Hamiltonian Group; ³Lawrence Livermore National Laboratory; ⁴University of Dayton Research Institute; ⁵Cornell High Energy Synchrotron Source; ⁶Argonne National Laboratory

11:10 AM

The Influence of Alloying and Grain Size on Cyclic Twinning, Cyclic Stress-strain Response and Low Cycle Fatigue Behavior in Magnesium: *Aeriel Murphy-Leonard*¹; Darren Pagan²; John Allison³; ¹University of Michigan/Naval Research Laboratory; ²Cornell High Energy Synchrotron Source; ³University of Michigan

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Fracture Processes of Thin Films and Nanomaterials — Fracture of Functional and Structural Materials

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

Program Organizers: Daniel Kiener, University of Leoben; Megan Cordill, Erich Schmid Institute; Johannes Ast, Empa, Swiss Federal Laboratories for Materials Science and Technology; Brad Boyce, Sandia National Laboratories

Wednesday AM | March 13, 2019
217B | Henry B. Gonzalez Convention Center

Session Chairs: Daniel Kiener, Montanuniversität Leoben; Benoit Merle, University Erlangen-Nürnberg

8:30 AM Invited

Understanding Interface Failure and Fracture in Silicon Carbide Composites: *David Armstrong*¹; ¹University of Oxford

8:50 AM

Reliable Lead-free Solders for Harsh Environments: Microstructure and Fracture Behaviour: *Chaowei Du*¹; Rafael Soler¹; Bernhard Voelker²; Kurt Matoy³; Johannes Zechner⁴; Gregor Langer³; Christoph Kirchlechner¹; Gerhard Dehm¹; ¹Max-Planck Institut für Eisenforschung; ²Institute of materials chemistry, RWTH-Aachen; ³Infineon Technologies Austria AG; ⁴Kompetenzzentrum Automobil- und Industrieelektronik GmbH

9:10 AM

Experimental Characterization of Commercial Thermal Barrier Coating Systems: *Jalil Alidoost*¹; Brian Hazel²; Elisa Zaleski²; Doug Konitzer³; Ming Fu³; Kevin Hemker¹; ¹Johns Hopkins University; ²Pratt & Whitney; ³General Electric

9:30 AM

Multi-scale Study of the Deformation Mechanisms of p-type Half-Heusler $\text{Hf}_{0.44}\text{Zr}_{0.44}\text{Ti}_{0.12}\text{CoSb}_{0.8}\text{Sn}_{0.2}$ Nanostructured Thermoelectric Alloy: Matthieu Aumand¹; Ken White²; *Ludovic Thilly*¹; ¹University of Poitiers; ²University of Houston

9:50 AM Break

10:10 AM Invited

Nanoindentation of Silicate Glasses at Loads Near the Cracking Threshold: *George Pharr*¹; Yvonne Dieudonne¹; Benjamin Hackett²; Brittnee Mound²; ¹Texas A&M University; ²University of Tennessee

10:30 AM

In Situ TEM Fracture Experiments at RT: *Inas Issa*¹; Daniel Kiener¹;
¹Department Materials Physics, Montanuniversität Leoben

10:50 AM

Interactions between Surface Topography, Multilayers, Nano-microstructure, Friction and Defects with Respect to Fracture Behavior and Safe Design of Diamond-like Carbon Thin Films: *Anssi Laukkanen*¹; Tom Andersson¹; Matti Lindroos¹; Kenneth Holmberg¹; ¹VTT Technical Research Center of Finland

11:10 AM

Relationships between Deformation Fields and Fracture in Heterogeneous Network Thin Films: *Yoon Joo Na*¹; Christopher Muhlstein¹; ¹Georgia Institute of Technology

MATERIALS PROCESSING

Friction Stir Welding and Processing X — Dissimilar Materials

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

Wednesday AM | March 13, 2019

210B | Henry B. Gonzalez Convention Center

Session Chairs: Yuri Hovanski, Brigham Young University; Guntram Wagner, University of Chemnitz

8:30 AM

Comparison of Dissimilar Aluminum Alloys Joined by Friction Stir Welding with Conventional and Bobbin Tools: *Paul Goetze*¹; Mateusz Kopyscianski²; Carter Hamilton¹; Stanislaw Dymek²;
¹Miami University; ²AGH University of Science and Technology

8:50 AM

Friction Stir Welding of Aluminum to ECO AZ31 Magnesium Alloy with Penetration of the Tool into the Bottom Layer: *Reza Beygi*¹; Kiarash Torabi¹; Ghasem Eisaabadi B.¹; Majid Zarezadeh Mehrizi¹; *Shae Kwang Kim*²; ¹Arak University; ²Korea Institute of Industrial Technology

9:10 AM

Microstructural and Mechanical Properties of Friction Stir Welding of Dissimilar Lap Joint of Metallurgically Immiscible CuCrZr and SS 316L: *Pankaj Sahlot*¹; Saurabh Nene²; Michael Frank²; Rajiv Mishra²; Amit Arora³; ¹PDPU Gandhinagar and IIT Gandhinagar; ²University of North Texas; ³IIT Gandhinagar

9:30 AM Invited

Promising High Speed Welding Techniques for Joining Polymers to Metals and Underlying Joining Mechanisms: *Fengchao Liu*¹; Pingsha Dong¹; ¹University of Michigan

9:50 AM Break

10:10 AM

Effect of Tool Eccentricity on Dissimilar Friction Stir Welding of 5052-6061 Aluminum Alloys: *Luqman Hakim Ahmad Shah*¹; Seyedhossein Sonbolestan¹; Scott Walbridge¹; Adrian Gerlich¹; ¹University of Waterloo

10:30 AM

Joining of Magnesium to Reinforced Polymers using Friction Stir Interlocking: *Piyush Upadhyay*¹; Md. Reza Rabby¹; Scott Whalen¹; ¹Pacific Northwest National Laboratory

10:50 AM

Ultrasound Enhanced Friction Stir Welding (USE-FSW) of Hybrid Aluminum/Steel-joints: *Marco Thomä*¹; Guntram Wagner¹; Benjamin Straß²; Bernd Wolter²; Sigrid Benfer³; Wolfram Fürbeth³; ¹Chemnitz University of Technology; ²Fraunhofer Institute for Nondestructive Testing IZFP Saarbrücken; ³DECHEMA Forschungsinstitut

11:10 AM

Effect of Stress Concentration on Strength and Fracture Behavior of Dissimilar Material Joints: *Tianhao Wang*¹; Rajiv Mishra¹; ¹University of North Texas

11:30 AM

Microstructure and Mechanical Properties of Dissimilar Ti/Mg Joint Fabricated by Friction Stir Welding: *Jeong-Won Choi*¹; Huihong Liu¹; Kohsaku Ushioda¹; Hidetoshi Fujii¹; ¹Osaka University

MATERIALS PROCESSING

Friction Stir Welding and Processing X — High Melting Temperature Materials

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

Wednesday AM | March 13, 2019
210A | Henry B. Gonzalez Convention Center

Session Chairs: Tracy Nelson, Brigham Young University; Hidetoshi Fujii, Osaka University

8:30 AM Invited

Friction Stir Welding of Fibre-reinforced Titanium Composites for Aerospace Structures: *Jonathan Martin*¹; Craig Blacker²; Kathryn Beamish¹; Advenit Makaya³; ¹Twi, Ltd.; ²TISICs, Ltd.; ³European Space Agency

8:50 AM Invited

Microstructure and Mechanical Properties of the Friction Stir Welded Ultra-fine Grained CP Titanium: Jae-Deuk Kim¹; Chang KeunChun²; JaekeunHong³; YutakaSato⁴; *Yeongdo Park*¹; ¹Dong-Eui University; ²Research Institute of Industrial Science & Technology; ³Korea Institute of Materials Science; ⁴Tohoku University

9:10 AM

Friction Stir Welding of Medium Mn Steel: *Seung-Joon Lee*¹; Yufeng Sun¹; Hidetoshi Fujii¹; Jeongho Han²; ¹Osaka University; ²Chungnam National University

9:30 AM Invited

Friction Stir Welding of Steel with Laser Melting: *Yoshiaki Morisada*¹; Takuya Wada¹; Hidetoshi Fujii¹; ¹Osaka University

9:50 AM Break

10:10 AM Invited

An Investigation into the Effects of Stir Zone Chemistry on Fracture Toughness in Friction Stir Welded Pipeline Grade Steel: *Michael Eff*¹; Jerry Gould¹; Jianqing Su¹; ¹EWI/Ohio State University

10:30 AM Invited

Plastic Flow Behavior and Mechanical Properties in Double-sided Friction Stir Weld of Advanced High Strength Steel Sheets: *Muneo Matsushita*¹; Daiki Yamagishi¹; Hiroshi Matsuda¹; Yoshiaki Murakami¹; ¹JFE Steel Corporation

10:50 AM Invited

Effects of Grain Refinement on Tensile Properties for Friction Stir Welds of CoCrFeMnNi High Entropy Alloys: *Sangwon Park*¹; Namhyun Kang¹; Youngsang Na²; Hyoungseop Kim³; ¹Pusan National University; ²Korea Institute of Materials Science; ³Pohang University of Science and Technology

11:10 AM

Wear Mechanism for H13 Steel Tool during Friction Stir Welding of CuCrZr Alloy: *Pankaj Sahlot*¹; Rajiv Mishra²; Amit Arora³; ¹PDPU Gandhinagar and IIT Gandhinagar; ²University of North Texas; ³IIT Gandhinagar

11:30 AM

Low Cost Fabrication of Tungsten-rhenium Alloys for Friction Stir Welding Applications: *Jordan Terrell*¹; Judy Schneider¹; Todd Leonhardt²; Dennis Tucker³; ¹University of Alabama; ²Rhenium Alloys; ³NASA Marshall Space Flight Center

ENERGY & ENVIRONMENT

Green Materials Engineering: An EPD Symposium in Honor of Sergio Monteiro — Biomass in Armor Composites

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Shadia Ikhmayies, Al Isra University; Jian Li, CanmetMATERIALS; Carlos Mauricio Vieira, State University of the North Fluminense; Fabio Braga, National Service of Industrial Apprenticeship (SENSI)

Wednesday AM | March 13, 2019

008A | Henry B. Gonzalez Convention Center

Session Chairs: Carlos Vieira, State University of North Fluminense; Elaine Carvalho, State University of the Northern Rio de Janeiro

8:30 AM Introductory Comments

8:35 AM Keynote

Izod Impact Test on Epoxy Composites Reinforced with Mallow Fibers: Lucio Cassiano Nascimento¹; Sérgio Monteiro¹; *Ulisses Costa*¹; Luana Demosthenes¹; ¹Military Institute of Engineering

8:55 AM

Evaluation on the Design of Piassava Fiber Reinforcement Epoxy Matrix Composite for Ballistic Application: *Fabio Garcia Filho*¹;

Sergio Monteiro¹; Michelle Oliveira¹; Luana Demosthenes¹; ¹Military Institute of Engineering

9:15 AM

Ballistic Test of Multilayered Armor with Intermediate Polyester Composite Reinforced with Fique Fabric: Artur Camposo Pereira¹; Foluke de Assis¹; Luana Cristyne da Cruz Demosthenes¹; Fabio da Costa Garcia Filho¹; *Sergio Neves Monteiro*¹; ¹Military Institute of Engineering

9:35 AM

Ballistic Tests of Epoxy Matrix Composites Reinforced with Arapaima Fish Scales: *Luis Carlos Silva*¹; Michelle Oliveira¹; Luana Demosthenes¹; Wendell Bezerra¹; Sergio Monteiro¹; ¹Military Institute of Engineering

9:55 AM Break

10:05 AM

Evaluation of Buriti Fabric as Reinforcement of Polymeric Matrix Composite for Ballistic Application as Multilayered Armor System: Luana Demosthenes¹; Sergio Monteiro¹; Lucio Nascimento¹; *Fabio Filho*¹; Michelle Oliveira¹; Leandro Demosthenes²; Artur Pereira¹; Fernanda Luz¹; Edio Lima JR¹; ¹Military Intitute Engineering; ²UFAM

10:25 AM

Evaluation of the Absorbed Energy and Velocity Limits of Reinforced Epoxy Composites with Mallow Natural Fibers Used in Ballistic Protection: Lucio Nascimento¹; *Sérgio Monteiro*¹; Jheison dos Santos¹; Luana Demosthenes¹; Ulisses Oliveira¹; ¹Military Institute of Engineering

10:45 AM

Fique Fiber-reinforced Epoxy Composite for Ballistic Armor Against 7.62 mm Ammunition: *Michelle Oliveira*¹; Artur Camposo¹; Fernanda Luz¹; Fábio Braga¹; Lucio Nascimento¹; Édio Lima Jr.¹; Sergio Monteiro¹; Fabio Garcia¹; Luana Demosthenes¹; ¹Militar Institute of Engineering

MATERIALS PROCESSING

Heterogeneous and Gradient Materials (HGM III): Tailoring Mechanical Incompatibility for Superior Properties — Structural Design, Processing and Properties

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

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

Wednesday AM | March 13, 2019
209 | Henry B. Gonzalez Convention Center

Session Chairs: Mingxin Huang, University of Hong Kong; Soo-Hyun Joo, Tohoku University; Xiuyan Li, Institute Of Metal Research

8:30 AM Invited

Alloy Design by Dislocation Engineering: *MingXin Huang*¹;
¹University of Hong Kong

8:55 AM

Deformation Microstructure and Mechanism of Ni during Refined into Extremely Fine Nano-grains: *Zhaoping Luo*¹; Xiaokai Guo¹; Xin Zhou¹; Jianxin Hou¹; Xiuyan Li¹; Ke Lu¹; ¹Institute of Metal Research, Chinese Academy of Sciences

9:15 AM

Formation of Low Angle Boundary-dominated Nanolaminated Structures in Pure Al: *Xiaochun Liu*¹; Wei Xu¹; Ke Lu¹; ¹Institute of Metal Research

9:35 AM Invited

Evolution of Heterogeneous Structure and Phase Transformation Behavior during Liquid Metal Dealloying: *Soo Hyun Joo*¹; Hidemi Kato¹; Takeshi Wada¹; ¹Tohoku University

10:00 AM

The Effects of Microstructural Heterogeneity and Porosity Distribution on the Evolution of Plastic Anisotropy and Failure under Uniaxial Tension of Additively Manufactured AlSi10Mg Alloy by Selective Laser Melting: Waqas Muhammad¹; Abhijit Brahme¹; Raja Mishra²; *Kaan Inal*¹; ¹University of Waterloo; ²General Motors Research & Development Center

10:20 AM Break

10:40 AM Invited

Severe Deformation of a Lamellar Microstructure: Pearlitic Steel as a Case Study: Steffen Brinckmann¹; *Gerhard Dehm*¹; ¹Max-Planck-Institute

11:05 AM

Small-volume Aluminum Alloys with Native Oxide Shell Deliver Unprecedented Strength and Toughness: *Weizhong Han*¹; ¹Xi'an Jiaotong University

11:25 AM

Structural Design of Synthetic Honeycombs with the Introduction of Heterogeneously Distributed 5-7 Defects and Arrays: *Bosco Yu*¹; David Wilkinson¹; Hatem Zurob¹; ¹McMaster University

ADVANCED MATERIALS

High Entropy Alloys VII – Thermal and Other Properties I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Wednesday AM | March 13, 2019

207B | Henry B. Gonzalez Convention Center

Session Chairs: Veerle Keppens, University of Tennessee; Joseph Poon, University of Virginia

8:30 AM Invited

High-entropy Oxides: A Path to Novel Materials with Enhanced Functionality: *Veerle Keppens*¹; ¹University of Tennessee

8:50 AM Invited

Radiation Effects in Concentrated Solid Solution Alloys: *Yanwen Zhang*¹; Gihan Velisa¹; Shijun Zhao¹; Ke Jin¹; Ritesh Sachan¹; Yury Osetskiy¹; Chenyang Lu²; Lumin Wang²; William Weber³; ¹Oak Ridge National Laboratory; ²University of Michigan; ³University of Tennessee

9:10 AM Invited

High Entropy Alloy Phases Mined From Phase Diagrams: *Joseph Poon*¹; Qi Jie¹; ¹University of Virginia

9:30 AM Invited

Self-diffusion in High-entropy Alloys: *Gerhard Wilde*¹; ¹Uni Muenster

9:50 AM Invited

Surface Degradation of High Entropy Alloys – Corrosion, Erosion, and Wear Behavior and Mechanisms: Aditya Ayyagari¹; Jibril Shittu²; *Sundeeep Mukherjee*²; ¹University of North Texas; ²University of North Texas

10:10 AM Break

10:30 AM Invited

In Situ Ion Irradiation on Al-Co-Cr-Fe-Ni High Entropy Alloys: *Jing Hu*¹; ¹Argonne National Laboratory

10:50 AM Invited

Correlating He Bubble Segregation in APT Data to Radiation Tolerance for Single-phase Concentrated Solid-solution Alloys (SP-CSAs): *Jonathan Poplawsky*¹; Xing Wang¹; Wei Guo²; Ke Jin³; Hongbin Bei³; Yongqiang Wang⁴; William Weber³; Yanwen Zhang³; Karren More¹; ¹Center for Nanophase Materials Sciences, Oak Ridge National Laboratory; ²Materials Science Research and Development, Timken World Headquarters; ³Materials Science and Technology Division, Oak Ridge National Laboratory; ⁴Materials Science and Technology Division, Los Alamos National Laboratory

11:10 AM Invited

Determination of Transformation Pathways in High Entropy Alloys with B2/bcc Phase Combinations: Jake Jensen¹; John Sosa²; Brian Welk³; Gopal Viswanathan³; Sam Kuhr³; Rongpei Shi⁴; Yunzhi Wang³; *Hamish Fraser*³; ¹Thermo Fisher Scientific, Inc.; ²MIPAR Software; ³Ohio State University; ⁴Lawrence Livermore National Laboratory

11:30 AM Invited

Deformation of Single-phase Small-scale HEAs at Cryogenic Temperatures: *Julia Greer*¹; Adenike Giwa¹; Zachary Aitken²; Yong-Wei Zhang²; Peter Liaw²; ¹California Institute of Technology; ²Institute for High Performance Computing

MATERIALS DESIGN

Hume-Rothery Symposium – Bulk and Interfacial Thermodynamics of Complex Materials: Insights Derived from

Integrating Modeling and Experiment — CALPHAD and Ab-initio Studies of Phase Equilibria

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Raymundo Arroyave, Texas A&M University; Michael Gao, National Energy Technology Laboratory; Jeffrey Hoyt, McMaster University; Saryu Fensin, Los Alamos National Laboratory

Wednesday AM | March 13, 2019
304B | Henry B. Gonzalez Convention Center

Session Chair: Raymundo Arroyave, Texas A&M University

8:30 AM Invited

CALPHAD Modeling, Moving Forward: *Ursula Kattner*¹; ¹National Institute of Standards and Technology

9:00 AM Invited

OpenCalphad - Thermodynamics for Phase Diagrams and Simulations: *Bo Sundman*¹; *Christophe Sigli*²; *Catalina Heresi*³; ¹Instn; ²Constellium CRV; ³Ruhr University Bochum

9:30 AM Invited

Beyond Modeling of Phase-based Properties: *Zi-Kui Liu*¹; ¹Pennsylvania State University

10:00 AM Break

10:20 AM Invited

Modelling Structural Materials in Realistic Environments by Ab Initio Thermodynamics: *Joerg Neugebauer*¹; *Mira Todorova*¹; *Blazej Grabowski*¹; *Tilmann Hickel*¹; ¹MPI fuer Eisenforschung

10:50 AM Invited

Stability of Cu₆Sn₅, a First-principles Study: *Gautam Ghosh*¹; ¹Northwestern University

11:20 AM

Phase Stability and Magnetic Properties of Fe-Cr-Ni-Mn High Entropy Alloys from First-principles and Monte-Carlo Simulations: *Mark Fedorov*¹; *Jan S. Wrobel*¹; *Antonio Fernandez-Caballero*²; *K.J. Kurzydowski*¹; *Duc Nguyen-Manh*³; ¹Warsaw University of Technology; ²University of Manchester; ³United Kingdom Atomic Energy Authority

MATERIALS DESIGN

ICME Case Studies and Validation: Extreme Environments — Session III

Sponsored by: TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

Program Organizers: James Saal, Citrine Informatics; Mark Carroll, Federal-Mogul Powertrain; Xuan Liu, Pratt & Whitney; Dongwon Shin, Oak Ridge National Laboratory; Laurent Capolungo, Los Alamos National Laboratory

Wednesday AM | March 13, 2019
207A | Henry B. Gonzalez Convention Center

Session Chairs: Mark Carroll, Federal-Mogul Powertrain; Laurent Capolungo, Los Alamos National Laboratory

8:30 AM Invited

Thermodynamic Properties in Ni Based Alloys Using a First Principles Renormalized Potential: *Ryoji Sahara*¹; *Toshio Osada*¹; *Swastibrata Bhattacharyya*¹; *Kaoru Ohno*¹; ¹National Institute for Materials Science

9:00 AM

An ICME Method for Predicting Phase Transformation and Microstructural Evolution in Advanced High Pressure Die Casting Magnesium Alloys: *Zhenjie Yao*¹; *Tracy Berman*¹; *John Allison*¹; ¹University of Michigan

9:20 AM

Bonding Mechanisms for Single Particle Impact during Cold Spray of Aluminum Powders: *Sumit Suresh*¹; *Jie Chen*¹; *Seok-Woo Lee*¹; *Mark Aindow*¹; *Harold Brody*¹; *Victor Champagne*²; *Avinash Dongare*¹; ¹University Of Connecticut; ²U.S. Army Research Laboratory

9:40 AM

Data Mining Methods for Characterization of Creep of Ti-X Alloys: A First-principles Study: *Ying Zhang*¹; *Jinshan Li*¹; *William Yi Wang*¹; *Chengxiong Zou*¹; *Bin Tang*¹; *Jun Wang*¹; *Hongchao Kou*¹; ¹Northwestern Polytechnical University

10:00 AM Break

10:20 AM

Integrated Modelling of Microstructure Evolution for Yield Strength Prediction in Aluminum Alloys: *Qianying Shi*¹; Tracy Berman¹; Jacob Garves¹; Chal Park¹; John Allison¹; ¹University Of Michigan

10:40 AM

Modeling of Sheet Metal Forming Based on Implicit Embedding of the Elasto-plastic Self-consistent Formulation in Finite Elements: Application to Cup Drawing of Al6022-T4: *Timothy Barrett*¹; Milovan Zecevic¹; Marko Knezevic¹; ¹University of New Hampshire

11:00 AM

Revealing the Solutes Effects and Strengthening Mechanisms of Ti-X Alloys through High-throughput First-principles Calculations: *Chengxiong Zou*¹; Jinshan Li¹; William Yi Wang¹; Ying Zhang¹; Bin Tang¹; Jun Wang¹; Hongchao Kou¹; ¹School of Materials Science and Engineering, Northwestern Polytechnical University

11:20 AM

Texture Evolution and Hardening Behavior during Thermomechanical Processing of an Al-Li Alloy: *Tracy Berman*¹; Arunabha Roy¹; Chal Park¹; Veera Sundararaghavan¹; John Allison¹; ¹University of Michigan

11:40 AM

Enhanced Hardening due to FCC-HCP Transformation in Medium-entropy CrCoNi Alloy: Supriyo Chakraborty¹; Connor Slone²; Jiashi Miao²; Easo George³; Michael Mills²; *Stephen Niezgod*²; ¹Ohio state University; ²Ohio State University; ³University of Tennessee

CHARACTERIZATION

Interfaces in Structural Materials: An MPMD Symposium in Honor of Stephen M. Foiles — Mechanical Behavior I: A Joint Session with Mechanical Behavior Related to Interfacial Physics III

Sponsored by: The Minerals, Metals and Materials Society, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Eric Homer, Brigham Young University; Elizabeth Holm, Carnegie Mellon University; Mark Asta, University of California, Berkeley

Wednesday AM | March 13, 2019

302C | Henry B. Gonzalez Convention Center

Session Chairs: Saryu Fensin, Los Alamos National Laboratory; Eric Homer, Brigham Young University

8:30 AM Invited

Atomic Level Investigation of the Structure and Mechanical Behavior of α/β Interfaces and Twin Boundaries in Titanium Alloys: *Michael Baskes*¹; Doyl Dickel¹; ¹Mississippi State University

9:00 AM

An Atomistic Study of the Deformation Behavior of Bulk Titanium Alloys: *Tonya Stone*¹; Parshu Bhusal¹; Doyl Dickel¹; Mark Horstemeyer¹; ¹Mississippi State University

9:20 AM

Grain Boundary Segregation Strengthening in Nanocrystalline Aluminum Alloys: *Wenbo Wang*¹; *Jason Trelewicz*¹; ¹Stony Brook University

9:40 AM

Mechanical Response of Nano Scale Bicontinuous Copper Molybdenum with Varying Feature Sizes: *Nathan Beets*¹; Yuchi Cui²; Diana Farkas¹; Amit Misra²; ¹Virginia Polytechnic Institute and State University; ²University of Michigan

10:00 AM

Understanding the Mechanical Behavior of Nanotwinned Ni-Mo-W Films for High Temperature MEMS Applications: *Gianna Valentino*¹; Pralav Shetty²; Jessica Krogstad²; Timothy Weihs¹; Kevin Hemker¹; ¹Johns Hopkins University; ²University of Illinois at Urbana-Champaign

10:20 AM Break

10:40 AM Invited

Role of Grain Boundaries in Polycrystal Plasticity: *Richard LeSar*¹; John Graham²; Laurent Capolungo²; ¹Iowa State University; ²Los Alamos National Laboratory

11:10 AM Invited

Unraveling the Mechanistic Origins of Deformation and Strain Accommodation in Nanocrystalline Materials: *Garritt Tucker*¹; Ankit Gupta¹; Satish Rajaram²; Gregory Thompson³; ¹Colorado School of Mines; ²Drexel University; ³University of Alabama

11:40 AM

Connecting Grain Boundary Properties to the Response of Tantalum under Shock Compression and Release: *Eric Hahn*¹;

Saryu Fensin¹; Tim Germann¹; ¹Los Alamos National Laboratory

12:00 PM Invited

Void Formation at Boundaries under Incipient Spall Conditions:

*Anthony Rollett*¹; Evan Lieberman²; David Menasche³; Ricardo Lebensohn²; Robert Suter¹; ¹Carnegie Mellon University; ²Los Alamos National Laboratory; ³Hamiltonian Group

NUCLEAR MATERIALS

Irradiation Effects on Phase Transformations in Nuclear Reactor Materials — Ceramics and Fuels

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Janelle Wharry, Purdue University; Kester Clarke, Colorado School of Mines; Julie Tucker, Oregon State University; Par Olsson, KTH Royal Institute of Technology; Dhriti Bhattacharyya, ANSTO; Mohsen Asle Zaeem, Colorado School of Mines; Arun Devaraj, Pacific Northwest National Laboratory

Wednesday AM | March 13, 2019

214B | Henry B. Gonzalez Convention Center

Session Chairs: Mohsen Asle Zaeem, Colorado School of Mines; Hui Xiong, Boise State University

8:30 AM Invited

Ion Irradiation Effects on Structural and Electrochemical Charge Storage Properties of Electroceramic Materials for Lithium-Ion Batteries: *Hui Xiong*¹; Kassiopeia Smith¹; Andreas Savva¹; Janelle Wharry²; Yongqiang Wang³; ¹Boise State University; ²Purdue University; ³Los Alamos National Laboratory

9:00 AM

Nanotube/Nanowire as Effective Defect Sinks in Metals: Atomistic Simulations and In Situ Ion Radiation Transmission Electron Microscopy: Kangpyo So¹; Penghui Cao¹; Yang Yang¹; Jonggil Park²; Mingda Li¹; Long Yan²; Jing Hu³; Meimei Li³; Eduardo Bringa⁴; Young Hee Lee²; *Michael Short*¹; Ju Li¹; ¹Massachusetts Institute of Technology; ²Sungkyunkwan University; ³Argonne National Laboratory; ⁴Universidad Nacional de Cuyo

9:20 AM

A Novel Dual-step Nucleation Pathway in Silicon Carbide under Neutron Irradiation: *Subhashish Meher*¹; Isabella van Rooyen¹; ¹Idaho National Laboratory

9:40 AM Invited

Phase Transformations in Neutron Irradiated Metallic Fuels:

*Maria Okuniewski*¹; Jonova Thomas¹; Alejandro Figueroa¹; Gyuchul Park¹; Walter Williams¹; ¹Purdue University

10:10 AM Break

10:30 AM

Microstructural Defects Induced by Phase Transformations in Uranium Alloys:

*Yipeng Gao*¹; ¹Idaho National Laboratory

10:50 AM

Effects of Neutron Irradiation on Phase Transformations in U-Mo Alloys:

*Dennis Keiser*¹; Jan-Fong Jue¹; Jian Gan¹; Brandon Miller¹; Adam Robinson¹; ¹Idaho National Laboratory

11:10 AM

Theoretical Predictions, Atomistic Simulations and Experimental Observations of Void and Gas Bubble Superlattice Formation under Irradiation:

*Yongfeng Zhang*¹; Yipeng Gao¹; Cheng Sun¹; Daniel Schwen¹; Chao Jiang¹; Lingfeng He¹; Jian Gan¹; David Sprouster²; Lynne Ecker³; ¹Idaho National Laboratory; ²Brookhaven National Laboratory ; ³Brookhaven National Laboratory

11:30 AM

Xe Segregation at Grain Boundaries in U₃Si₂:

*Benjamin Beeler*¹; David Andersson²; Michael Cooper²; Michael Baskes²; Yongfeng Zhang¹; ¹Idaho National Laboratory; ²Los Alamos National Laboratory

LIGHT METALS

Magnesium Technology 2019 — Corrosion and Surface Protection

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

Program Organizers: Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordon, University of Alabama; Dmytro Orlov, Lund University; Neale Neelameggham, IND LLC

Wednesday AM | March 13, 2019

005 | Henry B. Gonzalez Convention Center

Session Chairs: J. Brian Jordon, University of Alabama; Chaitanya Kale, Arizona State University

8:30 AM Invited

Effect of Alloying with Rare-earth Metals on the Degradation of Magnesium Alloys Studied Using a Combination of Isothermal Calorimetry and Pressure Measurements: Lars Wadsö¹; Norbert Hort²; *Dmytro Orlov*¹; ¹Lund University; ²Helmholtz-Zentrum Geesthacht

8:50 AM

Galvanically Graded Interface: A Computational Model for Mitigating Galvanic Corrosion between Magnesium and Mild Steel: Kurt Spies¹; *Vineet Joshi*¹; Vilayanur Viswanathan¹; Ayoub Soulami¹; Yuri Hovanski¹; ¹Pacific Northwest National Laboratory

9:10 AM

Iron Content in Relationship with Alloying Elements and Corrosion Behaviour of Mg3Al Alloys: *Ha Nguyen*¹; Jongil Kim²; Young Min Kim³; Bong Sun You³; ¹Korea University of Science and Technology; ²Chungnam National University; ³Korea Institute of Materials Science

9:30 AM

Microstructure, Corrosion and Mechanical Properties of Mg-Si Alloys as Biodegradable Implant Material: *Weidan Wang*¹; Ke Yang²; Yuanding Huang¹; Norbert Hort¹; ¹Helmholtz-Zentrum Geesthacht; ²Institute of Metal Research

9:50 AM

The Influence of Temperature and Medium on Corrosion Response of ZE41 and EZ33: *Marwa AbdelGawad*¹; Ali Chaudhry¹; Bilal Mansoor¹; ¹Texas A&M University at Qatar

10:10 AM Break

10:30 AM

Alloy Design Strategy of the Native Anti-corrosion Magnesium Alloy: *Yuan Yuan*¹; Fusheng Pan¹; Bin Jiang¹; Jiajia Wu¹; Tao Chen¹; ¹Chongqing University

10:50 AM

Corrosion Bending Fatigue of RESOLY® and WE43 Magnesium Alloy Wires: *Petra Maier*¹; Adam Griebel²; Matthias Jahn¹; Maximilian Bechly¹; Roman Menze³; Jeremy Schaffer²; ¹Stralsund University of Applied Sciences; ²Fort Wayne Metals; ³MeKo Laserstrahl-Materialbearbeitungen e.K.

11:10 AM

Sacrificial Cathodic Protection of Mg Alloy AZ31B by an Mg-5Sn Surface Alloy: *Carol Glover*¹; Taylor Cain¹; John Scully¹; ¹University of Virginia

MATERIALS PROCESSING

Materials Processing Fundamentals — Extractive Process and Thermodynamic Modeling

Sponsored by: TMS: Process Technology and Modeling Committee

Program Organizers: Guillaume Lambotte, Boston Metal; Jonghyun Lee, Iowa State University; Antoine Allanore, MIT - DMSE; Samuel Wagstaff, Novelis

Wednesday AM | March 13, 2019
212A | Henry B. Gonzalez Convention Center

Session Chairs: Fiseha Tesfaye, Abo Akademi University; Jake McMurray, Oak Ridge National Laboratory

8:30 AM Introductory Comments

8:35 AM

An Investigation on Electrodeposition of Titanium in Molten LiCl-KCl: Chenyao Li¹; Jianxun Song¹; Shaolong Li¹; Xuepeng Li¹; Yongchun Shu¹; Jilin He¹; ¹Zhengzhou University

8:55 AM

A Scalable Gibbs Minimization Model for Solvent Extraction Applied to Rare Earths Separation: Chukwunwike Iloeje¹; Diane Graziano¹; Joe Cresko²; ¹Argonne National Lab; ²US Department of Energy

9:15 AM

Effect of Ultrasound on the Extraction of Silicon and Aluminum from Metallurgical Slag of Laterite Nickel Ore: Pengju Zhang¹; Jilai Xue¹; Xuan Liu¹; Donggen Fang¹; ¹School of Metallurgical and Ecological Engineering

9:35 AM

Thermal Stability and Thermodynamics of the Ag₂ZnGeS₄ Compound: Mykola Moroz¹; Fiseha Tesfaye¹; Pavlo Demchenko²; Myroslava Prokhorenko³; Daniel Lindberg⁴; Oleksandr Reshetnyak²; Leena Hupa¹; ¹Abo Akademi University; ²Ivan Franko National University of Lviv; ³Lviv Polytechnic National University; ⁴Aalto university

9:55 AM Break

10:15 AM

Thermochemical Data of Selected Phases in the FeOx-FeSO4-Fe2(SO4)3 System: *Fiseha Tesfaye*¹; In-Ho Jung²; Min-Kyu Paek³; Mykola Moroz¹; Daniel Lindberg³; Leena Hupa¹; ¹Åbo Akademi University; ²Seoul National University; ³Aalto University

10:35 AM

The Effect of Heat Treatment on FePt/Fe₂O₃ and FePt/Cu Magnetic Performance: *Naidu Seetala*¹; Deidre Henderson¹; Jumel Jno-Baptiste¹; Hao Wen²; Shengmin Guo²; ¹Grambling State University; ²Louisiana State University

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Creep, Fatigue, and Fracture

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

Wednesday AM | March 13, 2019

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Session Chairs: Clarissa Yablinsky, Los Alamos National Laboratory; Janelle Wharry, Purdue University

8:30 AM Invited

Irradiation Induced Creep in FCC Alloys Measured Using In Situ TEM: *Shen Dillon*¹; Gowtham Jawaharram¹; Christopher Barr²; Khalid Hattar²; ¹University of Illinois; ²Sandia National Laboratories

9:00 AM

Characterization of Creep-fatigue Crack Propagation in Alloy 709 at High Temperatures Using Computational Simulations and Experimental Testing: *Jose J. Ramirez*¹; Gabriel Potirniche¹; Robert Stephens¹; Indrajit Charit¹; Nicholas Shaber¹; Martin Taylor¹; ¹University of Idaho

9:20 AM

Compressive Creep of Porous γ -phase Uranium Metal: *Karyn Stern*¹; Luis Ortega¹; Sean McDeavitt¹; ¹Department of Nuclear

Engineering, Texas A&M University

9:40 AM

On the Remarkable Fracture Toughness of 90 to 97W-NiFe Alloys Revealing Powerful New Ductile Phase Toughening Mechanisms: *Md Ershadul Alam*¹; G R Odette¹; ¹University of California Santa Barbara

10:00 AM Break

10:20 AM

Creep-fatigue Interaction of Fe-25Ni-20Cr Austenitic Stainless Steel (Alloy 709): *Abdullah Alomari*¹; Nilesh Kumar¹; Korukonda Murty¹; ¹North Carolina State University

10:40 AM

Experiments and Modeling of Mechanical Behaviour of Zircaloy-4 under Monotonic and Cyclic Loading for Research on Stress Corrosion Cracking: *Yuqing Ding*¹; Gregory Kasprick¹; Sterling St Lawrence¹; ¹Canadian Nuclear Laboratories

11:00 AM

In Situ TEM Clamped Beam Fracture of Irradiated Fe-9%Cr ODS: *Kayla Yano*¹; Janelle Wharry¹; ¹Purdue University

11:20 AM

Understand the Phase Transformation and Mechanical Behavior of Thermally Aged and Neutron Irradiated Duplex Stainless Steels Using High-energy X-ray Beamline Experiments: *Yu Lu*¹; Shilei Li²; Yiren Chen³; Yong Yang¹; ¹University of Florida; ²University of Science and Technology Beijing; ³Argonne National Laboratory

MATERIALS DESIGN

Modeling and Simulation of Composite Materials — Session IV

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

Program Organizers: Rakesh Behera, New York University; Dinesh Pinisetty, CSU Maritime Academy; Dzung Luong, New York University

Wednesday AM | March 13, 2019

303B | Henry B. Gonzalez Convention Center

Session Chairs: Peng Zhao, Panzhihua University; Masanori Enoki, Tohoku University; Rakesh Behera, New York University

8:30 AM

Accounting for Slip Localization at the Grain Scale in Polycrystal Homogenization Applied to FCC Metals and Alloys: Maxime Sauzay¹; Diogo Goncalves²; *Bertrand Sicaud*¹; Jérôme Hazan¹; ¹Cea Université Paris-Saclay; ²Cea Cadarache

8:50 AM

Monte Carlo Simulation for Clustering Behavior between Interstitial and Substitutional Elements in Iron: *Masanori Enoki*¹; Hiroshi Ohtani¹; ¹Tohoku University

9:10 AM

Mesoscopic Model of Free Surface in a Continuous Casting Mould: *Peng Zhao*¹; ¹Panzhuhua University

9:30 AM

Dispersion Corrected Density Functional Theory Studies on PVDF/Hydrated Aluminium Nitrate Composite System: *Ranjini Sarkar*¹; Tarun Kundu¹; ¹Indian Institute of Technology Kharagpur

9:50 AM Break

10:30 AM

Heat Transfer in Lamellar Phase Change Material Composite Heatsinks: *Delia Perez-Nunez*¹; Patrick Shamberger¹; Alison Hoe¹; ¹Texas A&M University

10:50 AM

Molecular Dynamics Simulation of the Structure and Transport Properties of xKF-yNaF-zAlF₃: Jie Li¹; *Hui Guo*¹; Hongliang Zhang¹; Rucai Li²; Qiyu Wang¹; JingKun Wang¹; Tianshuang Li¹; ¹Central South University; ²Eastern Airlines Technic Co. Ltd. Wuhan Branch

11:10 AM

Transient Heat Transfer in Phase Change Material Composites: *Alison Hoe*¹; Michael Deckard¹; Achutha Tamraparni¹; Alaa Elwany¹; Jonathan Felts¹; Patrick Shamberger¹; ¹Texas A&M University

11:30 AM Concluding Comments

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Nanoarchitected and Morphology-controlled Nanoporous Materials — Structure Properties-radiation

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

Program Organizers: Niaz Abdolrahim, University of Rochester; John Balk, University of Kentucky; Michael Demkowicz, Texas A&M University; Christoph Eberl, Fraunhofer IWM

Wednesday AM | March 13, 2019
214A | Henry B. Gonzalez Convention Center

Session Chairs: Antonia Antoniou, Georgia Institute of Technology; Erkin Seker, University of California, Davis

8:30 AM Invited

Applications of Nanoporous Metals to Semiconductor Device Interconnects: *Antonia Antoniou*¹; *Vanessa Smet*¹; ¹Georgia Institute of Technology

9:00 AM Invited

On the Structure-activity Correlation of Catalytic Nanoporous Gold: *Yi Ding*¹; ¹Tianjin University of Technology

9:30 AM

Graphene-carbon Nanotube Aerogel As 'Organic' Thermoelectrochemical Energy Harvesters: Synthesis, Structure and Properties: *Sanju Gupta*¹; *R. Meek*¹; ¹Western Kentucky University

9:50 AM Break

10:20 AM Invited

Microfabricated Nanoporous Gold Morphology Libraries for the Study of Structure-property Relationships: *Erkin Seker*¹; ¹University of California, Davis

10:50 AM

Effect of Process Conditions on the Hierarchical Structure of UCT Manganese Oxide: *Bahareh Deljoo*¹; *Tahereh Jafari*¹; *Ran Miao*¹; *Mu-Ping Nieh*¹; *Steven Suib*¹; *Mark Aindow*¹; ¹University of Connecticut

11:10 AM

In Situ TEM Study on the Radiation Response of Nanostructured Cu with Nanovoids: *Cuncai Fan*¹; *Jin Li*¹; *Youxing Chen*²; *Xinghang Zhang*¹; ¹Purdue University; ²University of Minnesota

11:30 AM

Graphene-based 'Hybrid' Aerogels with Carbon Nanotubes: Mesoporous Network Functionality Promoted Defect Density and Electrochemical Activity Correlations: *Sanju Gupta*¹; ¹Western

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Phase Transformation in Non-ferrous Alloys II

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Yufeng Zheng, Ohio State University; Ashley Paz y Puente, University of Cincinnati; Juan Escobedo-Diaz, University of New South Wales; Dhriti Bhattacharyya, ANSTO; Rajarshi Banerjee, University of North Texas

Wednesday AM | March 13, 2019
225D | Henry B. Gonzalez Convention Center

Session Chairs: Tushar Borkar, Cleveland State University; Timothy Weihs, Johns Hopkins University

8:30 AM

Experimental and Theoretical Examinations of Dynamic Precipitation in a Mg-9Al (wt.%) Alloy during Low-temperature Equal Channel Angular Extrusion (ECAE): Xiaolong Ma¹; Suhas Eswarappa Prameela¹; Peng Yi¹; Matthew Fernandez¹; Nicholas Krywopusk¹; Laszlo Kecskes²; Tomoko Sano³; Michael Falk¹; *Timothy Weihs*¹; ¹Johns Hopkins University; ²MatSys; ³U.S. Army Research Laboratory

8:50 AM

Interplay of Stacking Faults and Clusters during Formation of Long Period Stacking Ordered Structures in Mg-TM-Y Alloy: *Hiroshi Okuda*¹; Kohei Kintsu¹; Michiaki Yamasaki²; Yoshihito Kawamura²; ¹Kyoto University; ²Kumamoto University

9:10 AM

Mechanisms of Phase Stabilization in AlCuMnZr (ACMZ) Alloys: *Amit Shyam*¹; Dongwon Shin¹; Patrick Shower¹; Lawrence Allard¹; Jonathan Poplawsky¹; Yukinori Yamamoto¹; James Morris¹; James Haynes¹; ¹Oak Ridge National Laboratory

9:30 AM

Mechanistic Insights on the Enhanced Environmental Stability of Sputtered Deposited Nanograined Alloys: *Pralav Shetty*¹;

Megan Emigh¹; Jessica Krogstad¹; ¹University of Illinois at Urbana-Champaign

9:50 AM

Transformation Pathways and Microstructural Evolution in Shock-loaded and Reshocked Zr and Ti: *Benjamin Morrow*¹; David Jones¹; Cayla Harvey²; Ellen Cerreta¹; ¹Los Alamos National Laboratory; ²University of Nevada, Reno

10:10 AM Break

10:30 AM

Understanding the Role of Microstructure on High Pressure Phase Transformation in Zirconium: *M Arul Kumar*¹; N Hilairet²; Yanbin Wang³; Rodney McCabe¹; Irene Beyerlein⁴; Laurent Capolungo¹; Carlos Tome¹; ¹Los Alamos National Laboratory; ²CNRS-UMET, Université Lille; ³Argonne National Laboratory; ⁴University of California Santa Barbara

10:50 AM

A Unified Theory for Deformation-induced Transformations (TRIP/TWIP) in Titanium and Ferrous Alloys: *Madeleine Bignon*¹; Pedro Rivera-Diaz-Del-Castillo²; Emmanuel Bertrand¹; Franck Tancret¹; ¹Université de Nantes; ²University of Lancaster

11:10 AM

Atom Probe Tomography and Scanning Transmission Electron Microscopy Correlative Characterization of In Situ Evolution of Precipitation Structure upon Ageing in an Al-Zn-Mg-Cu Alloy: *Williams Lefebvre*¹; ¹Normandie University, UNIROUEN, INSA Rouen, CNRS, Groupe de Physique des Matériaux, F-

11:30 AM

Discontinuous Precipitation in U10Mo Alloy: Reaction Kinetics, Effect of Prior γ -UMo Microstructure, and the Effect of Ternary Alloying Addition: *Saumyadeep Jana*¹; Arun Devaraj¹; Lucas Sweet¹; Curt Lavender¹; Vineet Joshi¹; ¹Pacific Northwest National Laboratory

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Powder Processing of Bulk Nanostructured Materials — Powder Synthesis

Sponsored by: TMS: Powder Materials Committee

Program Organizers: Zachary Cordero, Rice University; Deliang Zhang, Shanghai Jiao Tong University; Brady Butler, US Army Research Laboratory; Ma Qian, RMIT University (Royal Melbourne Institute of Technology)

Wednesday AM | March 13, 2019
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Session Chair: Ma Qian, RMIT University

8:30 AM

The Role of Dehydrogenation in Powder Sintering Involving TiH₂: *Gang Chen*¹; Peng Cao²; Klaus-Dieter Liss³; Graeme Auchterlonie⁴; Xuanhui Qu¹; ¹University of Science and Technology, Beijing; ²The University of Auckland; ³Israel Institute of Technology; ⁴University of Queensland

9:00 AM

Inhomogeneous Mechanical Alloying during Ball Milling of Fe alloys: How Grain Boundary Segregation Prevails over Extreme Deformation: *Dor Amram*¹; Christopher Schuh¹; ¹Massachusetts Institute of Technology

9:20 AM

Inhomogeneity of Strain in Metal Particulates Produced by Modulation-assisted Machining: *Indrani Biswas*¹; James Mann²; Srinivasan Chandrasekar¹; Kevin Trumble¹; ¹Purdue University; ²University of West Florida

9:40 AM

As-Atomized Spherical GARS Powder for Direct Shape Forming of Fe-based ODS Alloys by Cold Spray Deposition: *Iver Anderson*¹; Emma White¹; Timothy Prost¹; Timothy Eden²; Todd Palmer²; ¹Iowa State University; ²Pennsylvania State University

10:00 AM Break

10:20 AM

Density Separation of Mixed Carbide Colloids via Standing Wave Physics: *Trenin Bayless*¹; Grant Wallace¹; Jerome Downey¹; ¹Montana Tech

10:40 AM

Fabrication, Characterization, and Optimization of Cold-crucible based Rapidly Solidified Ti Powders: Sardar Farhat Abbas¹; Bin Lee²; Daekyeom Kim²; Young Il Kim²; Sanghyun Lee²; Taek-Soo Kim²; ¹University of Science and Technology; ²Korea Institute of

Industrial Tech

11:00 AM

Synthesis of TiHx Powders from Titanium Alloy Shavings by Thermohydrogen Processing: Zhongqi Liu¹; Junhao Li¹; Qinfeng Ruan¹; *Ruigang Wang*¹; ¹University of Alabama

ELECTRONIC MATERIALS

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

Sponsored by: TMS: Thin Films and Interfaces Committee

Program Organizers: Pooran Joshi, Oak Ridge National Laboratory; Ravindra Nukkehalli, New Jersey Institute of Technology; Jud Ready, Georgia Institute of Technology; Anming Hu, University of Tennessee; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Wenchao Zhou, University of Arkansas

Wednesday AM | March 13, 2019

217D | Henry B. Gonzalez Convention Center

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

8:30 AM Invited

Conformal and Embedded Electronics in 3D: *Mike Renn*¹; ¹Optomec

9:00 AM Invited

Additive Manufacturing of High Performance Rare Earth Permanent Magnets: Prospects and Challenges: *Mariappan Paranthaman*¹; ¹Oak Ridge National Laboratory

9:30 AM Invited

Additive Manufacturing of Functional Electronics and Ingestible Biomedical Devices: *Yong Lin Kong*¹; ¹University of Utah

10:00 AM Break

10:20 AM Invited

Adaptive 3D-Printed Liquid Metal Electronics: *Christopher Tabor*¹; ¹Air Force Research Laboratory

10:50 AM

3D Printing of Polymer-based Gasochromic, Thermochromic and Piezochromic Sensors: *Patrick Dzisah*¹; *Nuggehalli Ravindra*¹; ¹New Jersey Institute of Technology

11:10 AM Invited

3D Printed High Performance Sensors: *Rahul Panat*¹; *Md Taibur Rahman*¹; *Matthew Schrandt*²; *Michael Renn*²; *M. Sadeq Saleh*¹; *Chih-Yang Cheng*¹; *Chintalapalle Ramana*³; ¹Carnegie Mellon University; ²Optomec Inc.; ³University of Texas, El Paso

11:40 AM

Electronic Tongue Sensing with a Six-sensor Array for Multi Flavors Detection: *Yongchao Yu*¹; *Pooran Joshi*²; *Jayne Wu*¹; *Anming Hu*¹; ¹University of Tennessee; ²Oak Ridge National Laboratory

BIOMATERIALS

Recent Developments in Biological, Structural and Functional Thin Films and Coatings — Biomedical and Polymeric Applications

Sponsored by: TMS: Thin Films and Interfaces Committee

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

Wednesday AM | March 13, 2019

217A | Henry B. Gonzalez Convention Center

Session Chairs: *Adele Carrado*, Strasbourg University; *Nancy Michael*, University of Texas Arlington

8:30 AM Keynote

Examining the Long-Term Adhesion Strength of Chitosan Bonded to Titanium when Exposed to Heated Simulated Body Fluid: *Holly Martin*¹; *Lauren DeBow*¹; *Patrick McWhorter*¹; *Snjezana Balaz*¹; ¹Youngstown State University

9:10 AM Invited

Duplex Surface Treatments for Improving the Tribological Properties of Titanium Alloys: *Brandon Strahin*¹; *Gary Doll*¹; ¹University of Akron

9:35 AM

Fractured Oxide Films on Metals as Reservoir for Biological Agents to Create Antibacterial Surfaces: *Jesus Morales Espejo*¹; Susana Díaz A.¹; Lia Stanciu¹; David Bahr¹; ¹Purdue University

9:55 AM

Characterization and Properties Study of Cu and Ag Inclusion in Zr-Ti Matrix for Biomedical Application: *Akib Jabed*¹; Ishraq Shabib¹; Waseem Haider¹; ¹Central Michigan University

10:15 AM Break

10:35 AM Invited

Structural, Magnetic, and Cytotoxicity Studies on CoFe₂O₄ Nanoparticles for Biomedical Applications: *Yesappa Kolekar*¹; Sumayya Ansari¹; Chintalapalle Ramana²; ¹Savitribai Phule Pune University, Pune; ²University of Texas, El Paso

11:00 AM

Polymer Brushes: Routes Toward Biomedical Implants: Melania Reggente¹; Sebastien Kriegel²; Patrick Masson²; Genevieve Pourroy²; Jacques Farber²; Heinz Palkowski³; *Adele Carrado*²; ¹EPFL SB ISIC LNB; ²IPCMS - CNRS; ³Institute of Metallurgy TU Clausthal

11:20 AM

Assembly of Glass Particles and Copolymer Latex on the Surface of Silicone Oil and Hallbrite Liquid: *Kinnari Shah*¹; Nuggehalli Ravindra²; ¹LaGuardia Community College; ²New Jersey Institute of Technology

11:40 AM

Force Field for Molybdenum Disulfide and Molybdenum Diselenide to Compute Bulk and Interfacial Properties with Electrolytes and Biomacromolecules in High Accuracy: *Juan Liu*¹; Jin Zeng¹; Zewei Wang¹; Jiajun Chen²; Jim de Yoreo²; Yu Huang³; Hendrik Heinz¹; ¹University of Colorado, Boulder; ²Pacific Northwest National Laboratory; ³University of California, Los Angeles

ENERGY & ENVIRONMENT

REWAS 2019: Education and Workforce Development

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

Program Organizers: Adam Powell, Worcester Polytechnic Institute; Christina Meskers, Umicore; Elsa Olivetti, Massachusetts Institute of Technology; Gabrielle Gaustad, Alfred University

Wednesday AM | March 13, 2019
007D | Henry B. Gonzalez Convention Center

Session Chairs: Adam Powell, Worcester Polytechnic Institute; Christina Meskers, Umicore

8:30 AM Introductory Comments

8:35 AM Invited

Sustainable Electronics: An Action-based Graduate Program: *Carol Handwerker*¹; ¹Purdue University

9:00 AM

The Contribution of Industry to STEM Education and Lifelong Learning: *Tom Hennebel*¹; Christina Meskers¹; Maurits Van Camp¹; ¹Umicore, Belgium

9:20 AM

Sustainability as a Lens for Traditional Material Science Curriculums: *Gabrielle Gaustad*¹; ¹Alfred University

9:40 AM Invited

Sustainability through Selection: *Uday Pal*¹; ¹Boston University

10:05 AM Break

10:25 AM Invited

How to Nurture Young Talents in the Materials Sector: *Gijs Du Laing*¹; ¹Ghent University

10:50 AM Invited

Corrosion Education for Materials Life Extension: Pathway to Improvement in Resource Productivity: *Brajendra Mishra*¹; ¹Worcester Polytechnic Institute

11:15 AM

Material Oriented Product Development by QFD4Mat Material Selection Strategy Approach: *Fabrizio D'Errico*¹; ¹Politecnico Di Milano Politecnico Di Milano

11:35 AM Invited

EIT Raw Materials Academy – Educating and Inspiring the Lifecycle of Innovators: *Wesley Crock*¹; Rima Dapous¹; ¹EIT Raw Materials GmbH

ENERGY & ENVIRONMENT

REWAS 2019: Rethinking Production

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

Program Organizers: John Howarter, Purdue University; Mingming Zhang, ArcelorMittal Global R&D; Gabrielle Gaustad, Alfred University; Elsa Olivetti, Massachusetts Institute of Technology

Wednesday AM | March 13, 2019

007C | Henry B. Gonzalez Convention Center

Session Chairs: John Howarter, Purdue University; Mingming Zhang, ArcelorMittal

8:30 AM Invited

Recycling Steel Manufacturing Wastewater Treatment Solid Wastes via In-process Separation with Dynamic Separators: *Naiyang Ma*¹; ¹Arcelor Mittal

8:55 AM Invited

Metal-rich Byproduct Processing: Flexible Smelting for Responsible Recycling: *Joshua Montenegro*¹; ¹Conesus LLC.

9:20 AM

In Furnace Dross Pressing - IFDP: *David Roth*¹; Michael Rockstroh²; ¹GPS Global Solutions; ²RIA Cast House Engineering GMBH

9:45 AM

TAHA Dross Processing: A Proven Technology for Processing Dross with Great Aluminum Recoveries and Zero Waste: Frank Pollmann¹; *David Roth*²; ¹TAHA International; ²GPS Global Solutions

10:05 AM Break

10:25 AM

Tannic Acid – A Novel Intumescent Agent for Epoxy Systems: *Matthew Korey*¹; Alexander Johnson¹; William Webb¹; John

Howarter¹; ¹Purdue University

10:45 AM

Sustainable Use of Precious and Rare Metals through Biotechnological Recycling: Norizo Saito¹; Toshiyuki Nomura¹; Yasuhiro Konishi¹; ¹Osaka Prefecture University

11:05 AM

Effect of CO Partial Pressure on Extraction of Alumina from Coal Fly Ash during Carbothermal Reduction Process: Yang Xue¹; Wenzhou Yu¹; Zhixiong You¹; Xuwei Lv¹; ¹Chongqing University

11:25 AM

Removal of Sulfur from Copper Smelting Slag by CO₂: Yun Wang¹; Rong Zhu¹; Shaoyan Hu¹; Hongyang Wang¹; Yaguang Guo²; ¹University of Science & Technology, Beijing; ²China ENFI Engineering Co., Ltd.

LIGHT METALS

Scandium Extraction and Use in Aluminum Alloys – Scandium Markets and Extraction

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

Program Organizers: Nigel Ricketts, Altrius Engineering Services; John Grandfield, Grandfield Technology Pty Ltd

Wednesday AM | March 13, 2019

006D | Henry B. Gonzalez Convention Center

Session Chair: Nigel Ricketts, Altrius Engineering Services

8:30 AM Introductory Comments

8:35 AM Panel Discussion: Scandium supply, markets and applications

9:35 AM

Aluminium-Scandium Alloy Production via the Metalysis Process: Ian Mellor¹; Lyndsey Benson¹; Melchiorre Conti¹; Luke Benson Marshall¹; Stephen Repper¹; Nader Khan¹; ¹Metalysis Ltd.

10:00 AM

Scandium Solvent Extraction: Nigel Ricketts¹; ¹Altrius Engineering Services

10:25 AM Break

10:40 AM

Improved Technology of Scandium Recovery from Solutions of Bauxite Residue Carbonation Leaching: *Andrey Panov*¹; Olga Petrakova¹; Aleksander Kozyrev¹; Aleksander Suss¹; Sergey Gorbachev¹; ¹Rusal

11:05 AM

Refining Technology of Scandium Concentrate Obtained from Bauxite Residue: *Andrey Panov*¹; Aleksander Suss¹; Aleksander Kozyrev¹; Sergey Gorbachev¹; Olga Petrakova¹; ¹Rusal

11:30 AM

Experimental Study of Pre-concentration from Silicate Containing Rare Earth Ore with Scandium by Magnetic Separation: Peng Yan¹; *Guifang Zhang*¹; Bo Li¹; Lei Gao¹; Zhe Shi²; Hua Wang¹; Yindong Yang²; ¹Kunming University of Science and Technology; ²University of Toronto

SPECIAL TOPICS

Science Policy within the Materials Research Community — Science Policy for Materials Research

Sponsored by: TMS: Education Committee

Program Organizers: Kathleen Chou, University of Michigan; Ashley Hilmas, University of Michigan; Peter Meisenheimer, University of Michigan; Max Powers, University of Michigan; Brian Tobelmann, University of Michigan

Wednesday AM | March 13, 2019

008B | Henry B. Gonzalez Convention Center

Session Chairs: Kathleen Chou, University of Michigan; Ashley Hilmas, University of Michigan; Peter Meisenheimer, University of Michigan

9:00 AM Invited

Opportunities and Trends in Materials Engineering Research Funding at the National Science Foundation: *Alexis Lewis*¹; ¹National Science Foundation

9:30 AM Invited

Role of Public-private Initiatives in Scientific Research: *Alan Taub*¹; ¹University of Michigan

10:00 AM Break

10:20 AM Invited

The MGI and Materials Research Policy: *James Warren*¹; ¹National Institute of Standards and Technology

10:50 AM Invited

Program Management in a Federal Agency: *John Vetrano*¹; ¹US Department of Energy

11:20 AM Invited

The Interplay of Materials Research, Advocacy, and Policy Development: *Charles Ward*¹; ¹Air Force Research Laboratory

LIGHT METALS

Solidification Processing of Light Metals and Alloys: An MPMD Symposium in Honor of David StJohn — Magnesium Alloys

Sponsored by: TMS: Solidification Committee

Program Organizers: Mark Easton, RMIT University; Ma Qian, RMIT University (Royal Melbourne Institute of Technology); John Grandfield, Grandfield Technology Pty Ltd; Norbert Hort, Helmholtz-Zentrum Geesthacht; Mark Jolly, Cranfield University

Wednesday AM | March 13, 2019

006C | Henry B. Gonzalez Convention Center

Session Chairs: Eric Nyberg, Brunel University; Norbert Hort, Helmholtz-Zentrum Geesthacht

8:30 AM Keynote

Influence of Microstructure Evolution during Twin-roll Casting on the Properties of Magnesium Sheets: *Karl Kainer*¹; Gerrit Kurz¹; Sven Pakulat¹; Dietmar Letzig¹; ¹Helmholtz Zentrum Geesthacht

8:50 AM Invited

Size Effects in Mg Alloys: Why Refinement is Well Worth It: *Matthew Barnett*¹; ¹Deakin University

9:10 AM Invited

Corrosion Behavior of Mg, Al and Ti: *Guang-Ling Song*¹; ¹Xiamen University

9:30 AM Invited

Prospects for Magnesium as an Engineering Material: *Trevor Abbott*¹; ¹Magontec Ltd.

9:50 AM Invited

Predicting Microsegregation and Microstructural Evolution in Advanced High Pressure Die Cast Magnesium Alloys: Tracy Berman¹; Zhenjie Yao¹; Mei Li²; *John Allison*¹; ¹University of Michigan; ²Ford Motor Company

10:10 AM Break

10:20 AM Keynote

Hot Tearing in Magnesium Alloys: *Norbert Hort*¹; Jiangfeng Song²; Mark Easton³; ¹Helmholtz-Zentrum Geesthacht; ²Chongqing University; ³RMIT University

10:40 AM Invited

Solidification of Aluminum and Magnesium Alloys: Modeling and Experiments: *Alan Luo*¹; ¹Ohio State University

11:00 AM Invited

Deformation Behavior of Magnesium Single Crystals: *Kwang Seon Shin*¹; ¹Seoul National University

11:20 AM Invited

Controlling the Eutectic Microstructures of Mg based Alloys for Functional Properties: *Kazuhiro Nogita*¹; Stuart McDonald¹; Manjin Kim¹; Xuan Tran²; Syo Matsumura²; ¹University of Queensland; ²Kyushu University

11:40 AM Invited

Advanced Characterization of Precipitates in Light Alloys: *Jian-Feng Nie*¹; ¹Monash University

MECHANICS & STRUCTURAL RELIABILITY

Thermo-mechanical Response of Materials Investigated through Novel in-situ Experiments and Modeling — Session V

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Robert Wheeler, Microtesting Solutions LLC; Dongchan Jang, Kaist; Amit Pandey, Granta Design/ANSYS; Josh Kacher, Georgia Institute of Technology; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Wednesday AM | March 13, 2019

301A | Henry B. Gonzalez Convention Center

Session Chairs: Josh Kacher, Georgia Tech; Yan Li, California State University, Long Beach

8:30 AM Keynote

Ex Situ and In Situ Cyclic Crack Propagation in Microscale Tests on Pt-Ni-Al Bond Coats: Kaustubh Venkatraman¹; *Vikram Jayaram*¹; ¹Indian Institute of Science

9:10 AM

In Situ Digital Image Correlation and Acoustic Emission Monitoring of Mechanically and Thermally Loaded Ceramic Materials: *Michal Knapek*¹; Jakub Kušnír¹; Tomáš Húlan²; František Chmelík¹; Patrik Dobron¹; Štefan Csáki¹; ¹Charles University; ²Constantine the Philosopher University in Nitra

9:30 AM

In Situ Digital Image Correlation and Infrared Thermal Measurements During Shear Deformation of Tantalum: *Thomas Nizolek*¹; James Valdez¹; Cheng Liu¹; Michael Torrez¹; George Gray¹; ¹Los Alamos National Laboratory

9:50 AM

Digital Volume Correlation for Volumetric Characterization of Material Changes: Alexander Hall¹; Jan Giesebrecht²; Kamel Madi²; *Trevor Lancon*¹; ¹Thermo Fisher Scientific; ²3Dmagination

10:10 AM Break

10:30 AM

Experimental and Numerical Analyses of the Uniaxial Shakedown Behavior of 316 Stainless Steel: *Ismail Cinoglu*¹; Ali Charbal¹; Natasha Vermaak¹; ¹Department of Mechanical Engineering and Mechanics, Lehigh University

10:50 AM

Creep-fracture in OFHC Copper Evaluated using In Situ HR-ESBSD: *Philip Noell*¹; Jay Carroll¹; Brad Boyce¹; ¹Sandia National Laboratories

LIGHT METALS

Ultrasonic Processing of Liquid and Solidifying Alloys — Fundamental Studies of Ultrasonic Processing

Sponsored by: TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS: Aluminum Committee, TMS: Process Technology and Modeling Committee

Program Organizers: Dmitry Eskin, Brunel University; Laurentiu Nastac, University of Alabama; Koulis Pericleous, University of Greenwich; Iakovos Tzanakis, Oxford Brookes University

Wednesday AM | March 13, 2019
006B | Henry B. Gonzalez Convention Center

Session Chairs: Dmitry Eskin, Brunel University London; Jiawei Mi, University of Hull

8:30 AM Introductory Comments

8:40 AM Invited

Investigation on Acoustic Streaming during Ultrasonic Irradiation in Aluminum Melts: *Takuya Yamamoto*¹; *Sergey Komarov*¹; ¹Tohoku University

9:05 AM

Acoustic Cavitation Measurements and Modeling in Liquid Aluminum: *Iakovos Tzanakis*¹; *Gerard Lebon*²; *Tunky Subroto*²; *Dmitry Eskin*²; *Koulis Pericleous*³; ¹Oxford Brookes University; ²Brunel University London; ³University of Greenwich

9:25 AM

Understanding the Highly Dynamic Phenomena in Ultrasonic Melt Processing by Ultrafast Synchrotron X-ray Imaging: *Jiawei Mi*¹; *Dmitry Eskin*²; *Thomas Connolley*³; *Kamel Fezzaa*⁴; ¹School of Engineering University Of Hull; ²Brunel University London; ³Diamond Light Source; ⁴Advanced Photon Source

9:45 AM

The Influence of Ultrasound on the Microstructure Formation during Solidification of A356 Ingots Processed via a 2-Zone Induction Melting Furnace: *Yang Xuan*¹; *Aqi Dong*¹; *Laurentiu Nastac*¹; ¹The University of Alabama

10:05 AM Break

10:30 AM

Resonance from Contactless Ultrasound in Alloy Melts: *Catherine Tonry*¹; *Valdis Bojarevics*¹; *Agnieszka Dybalska*²; *Georgi Djambazov*¹; *William Griffiths*²; *Koulis Pericleous*¹; ¹University of Greenwich; ²University of Birmingham

10:50 AM

In Situ Tomographic Observation of Dendritic Growth in Mg/Al Matrix Composites: *Enyu Guo*¹; Andre Phillion²; Zongning Chen¹; Huijun Kang¹; Tongmin Wang¹; Peter Lee³; ¹Dalian University of Technology; ²McMaster University; ³University College London

11:10 AM

Anomalous Nucleation in Undercooled Melts Processed by Electromagnetic Levitation: *Robert Hyers*¹; Jie Zhao¹; Gwendolyn Bracker¹; Rainer Wunderlich²; Hans Fecht²; ¹University of Massachusetts; ²Universität Ulm

11:30 AM

Modeling of the Effect of Ultrasonic Frequency and Amplitude on Acoustic Streaming: *Young Ki Lee*¹; Jeong IL Youn¹; Young Jig Kim¹; ¹Sungkyunkwan University

11:50 AM

Mechanisms of Grain Formation during Ultrasonic Solidification of Commercial Purity Magnesium: *Nagasivamuni Balasubramani*¹; Gui Wang¹; Matthew Dargusch¹; David St John¹; ¹University of Queensland

MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing – Ironmaking and Steelmaking

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Tao Jiang, Central South University; Jiann-Yang Hwang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

Wednesday PM | March 13, 2019

208 | Henry B. Gonzalez Convention Center

Session Chairs: Baojun Zhao, University of Queensland; Zhancheng Guo, University of Science and Technology Beijing

2:00 PM Introductory Comments

2:05 PM

Sintering Characteristic and Consolidation Behavior of Chromite Fines: Xiaohui Fan¹; *Guojing Wong*¹; Min Gan¹; Xuling Chen¹; Zhiyun Ji¹; Xunwei Zhou¹; Tao Jiang¹; ¹Central South University

2:25 PM

Construction and Practice on Energy Flow Network of New Generation Recyclable Iron and Steel Manufacturing Process: *Fuming Zhang*¹; ¹Shougang Group

2:45 PM

Dependency of Microstructure and Inclusions on the Different Growth Rate for Directionally Solidified Non-quenched and Tempered Steel: *Hui Liu*¹; Jianbo Xie¹; Honggang Zhong¹; Qijie Zhai¹; Jianxun Fu¹; ¹Shanghai university

3:05 PM

Development and Improvement of Submerged Lance Converting & Refining Furnace of Dongying Fangyuan's Two-step Process: *Zhi Wang*¹; Yongmao Zhou²; Qinmeng Wang²; Wuzhao Du¹; Wenzhao Cui¹; ¹Dongying Fangyuan Nonferrous Metals Co Ltd; ²Central South University

3:25 PM Break

3:45 PM

Development of Offshore Steel for High Heat Input Welding: Xiaodong Ma¹; Peng Zhang²; Tingliang Dong²; Feng Wang²; *Baojun Zhao*¹; ¹The University of Queensland; ²Hebei Iron and Steel Group Co., Ltd.

4:05 PM

Slag Basicity: What Does It Mean?: Geoffrey Brooks¹; Mohammad Hasan¹; *Akbar Rhamdhani*¹; ¹Swinburne University of Technology

4:25 PM

Flow Field and Inclusion Removal in a Continuous Casting Tundish with Channel Type Induction Heating: *Haiyan Tang*¹; Jin Wen Liu¹; Jia Quan Zhang¹; Hong Xiao²; Hai Ying Yao²; Shuo Zhang¹; Luzhao Guo¹; Guang Hui Wu¹; ¹University of Science and Technology, Beijing; ²Electromagnetic Center, Hunan Zhongke Electric Co., Ltd

4:45 PM

Investigation on Clogging of Submerged Entry Nozzles for GCr15 Bearing Steels: Gong Cheng¹; *Lifeng Zhang*¹; Wenbo Wang¹; Qiangqiang Wang²; Piotr Roman Scheller¹; ¹University of Science and Technology, Beijing; ²Chongqing University

5:05 PM Concluding Comments

SPECIAL TOPICS

**2019 Institute of Metals Lecture/Robert Franklin Mehl Award
— Presentation of Award and Lecture**

Wednesday PM | March 13, 2019
303C | Henry B. Gonzalez Convention Center

Session Chair: Marc Meyers, University of California, San Diego

12:15 PM Introductory Comments

12:20 PM Keynote

Revisiting 'Steady-State' Monotonic and Cyclic Deformation:
Emphasizing the Quasi -Stationary State of Deformation: *Hael
Mughrabi*¹; ¹University of Erlangen-Nuernberg

SPECIAL TOPICS

**2019 International Metallurgical Processes Workshop for
Young Scholars (IMPROWYS 2019) — Early Career Professional
Forum**

Sponsored by: TMS Extraction and Processing Division

Program Organizers: Cong Wang, Northeastern University;
Amy Clarke, Colorado School of Mines; Kinnor Chattopadhyay,
University of Toronto; Bryan Webler, Carnegie Mellon University

Wednesday PM | March 13, 2019
213B | Henry B. Gonzalez Convention Center

Funding support provided by: Korean Institute of Metals and
Materials

Session Chairs: Yongqi Sun, University of Queensland; Weiling
Wang, Northeastern University

2:00 PM

**Effect of MgO Content on the Properties of Magnesia Fluxed
Pellets:** Yuzhu Zhang¹; *Weixing Liu*¹; Aimin Yang¹; Jie LI¹; ¹North
China University of Science and Technology

2:20 PM

Effect of Quenching Temperature on Mechanical Properties and Microstructure Of High Nitrogen Martensitic Stainless Steel:

*Xin Cai*¹; Xiao Hu¹; Dian Li¹; ¹Institute of Metal Research, Chinese Academy of Sciences

2:40 PM

Heating Rate Effects on Austenitization from Ferrite-cementite Structure during Continuous Heating:

*Geng Liu*¹; Hao Chen¹; ¹Tsinghua University

3:00 PM

Modification of Inclusions in High Strength Low Alloyed Steels:

*Keyan Miao*¹; Muhammad Nabeel¹; Neslihan Dogan¹; ¹McMaster University

3:20 PM Break

3:40 PM

Numerical Simulation of Three-phase Flow of Gas-stirring Micro-phenomenon during Ladle Furnace Process:

Libin Zhu¹; *Wei Liu*¹; Shfueng Yang¹; Jingshe Li¹; Feng Wang¹; Xueliang Zhang¹; ¹University of Science & Technology Beijing

4:00 PM

The Effect of pH and Temperature during Carbonation Process on Spent Die Cleaning Solution from Aluminium Extrusion Industry:

*Ahmed Aadli*¹; ¹Aluminium company of Egypt

4:20 PM

The Structure Evolution Mechanism of Electrodeposited Ni Films on Steel Substrate Depending on Current Density:

*XiangTao Yu*¹; ¹University of Science and Technology Beijing

4:40 PM

Improvement of Center Segregation in Continuously Cast Blooms by Convex Roll Soft Reduction:

*Liang Li*¹; Xiao Zhao¹; Peng Lan¹; Zhanpeng Tie¹; Haiyan Tang¹; Jiaquan Zhang¹; ¹University of Science and Technology Beijing

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

2019 Symposium on Functional Nanomaterials: Synthesis, Integration, and Application of Emerging Nanomaterials — Additive Manufacturing and General Nanomaterials

Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory; Jiyoung Chang, University of Utah; Pei Dong, George Mason University; Yong Lin Kong, University of Utah; Shengfeng Yang, Indiana University; Purdue University Indianapolis; SungWoo Nam, University of Illinois

Wednesday PM | March 13, 2019
213A | Henry B. Gonzalez Convention Center

Session Chairs: Yong Lin Kong, University of Utah; Jiyoung Chang, University of Utah

2:00 PM

Additive Manufacturing of 2D/3D Biological Platform using Functional Nanofibers for Cell/tissue Engineering: *Jiyoung Chang*¹; ¹University Of Utah

2:20 PM

Synthesis of Biochar and 3D Printing of Sustainable Biochar Recycled PET Composite: *Vijaya Rangari*¹; Mohanad Idrees¹; Shaik Jjeelani¹; ¹Tuskegee University

2:40 PM

Multiscale Additive Manufacturing of Functional Devices: *Yong Lin Kong*¹; ¹University of Utah

3:00 PM

Nano-manufacturing of Highly-uniform OD/1D/2D Metamaterials via Large-scale Self-assembly: *Michael Cai Wang*¹; Matthew Gole¹; Juyoung Leem¹; Wayne Lin¹; Rachel Ziran Zhou¹; Catherine Murphy¹; SungWoo Nam¹; ¹University of Illinois at Urbana-Champaign

3:20 PM Break

3:40 PM Invited

Low-cost Zeta Potentiometry using Solute Gradients: *Sangwoo Shin*¹; ¹University of Hawaii at Manoa

4:10 PM Invited

Energy Transport and Dissipation at the Nanoscale: *Woochul Lee*¹; ¹University of Hawaii at Manoa

4:40 PM Invited

Growth and Characterizations of Si and Ge Heterostructures in Multi-dimensional Architectures: *Jinkyung Yoo*¹; ¹Los Alamos National Laboratory

5:10 PM

Hybrid Nanoscale Architectures: Plasmonic and Magnetic Induced Heating Applications: *Simona Hunyadi Murph*¹; ¹Savannah River National Laboratory and University of Georgia

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Energy Storage with Emphasis on Batteries III

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Wednesday PM | March 13, 2019
225A | Henry B. Gonzalez Convention Center

Session Chairs: Leela M. R. Arava, Wayne State University; George Nelson, University of Alabama, Huntsville

2:00 PM Keynote

Future Battery System Modeling and Diagnostics for Automotive Application: *Yuichiro Tabuchi*¹; ¹Nissan Motor Co., Ltd

2:30 PM Invited

Biomass Carbon Enabled, High Performance Lithium-sulfur Batteries: *Xiaodong Li*¹; ¹University of Virginia

2:55 PM

3D Printed Hierarchically-porous Microlattice Electrode Materials for Exceptionally High Specific Capacity and Areal Capacity Lithium Ion Batteries: *M. Sadeq Saleh*¹; Jie Li²; Jonghyun Park²; Rahul Panat¹; ¹Carnegie Mellon University; ²Missouri University of Science and Technology

3:15 PM

In-situ Measurements of Stress Evolution in Composite Sulfur Cathodes: *Yuwei Zhang*¹; Matt Pharr¹; ¹Texas A&M university

3:35 PM Break

3:55 PM

Investigating the Performance of NMC-532 Cathode Materials Operating Different Voltages: *Dila Sivlin*¹; *Ozgul Keles*¹; *Billur Deniz Karahan*²; *Ali Abouimrane*³; ¹Istanbul Technical University; ²Istanbul Medipol University; ³Qatar Environment and Energy Research Institute

4:15 PM

Understanding Heterogeneous Electrocatalysis of Lithium Polysulfides: *Naresh Thangavel*¹; *Kiran Mahankali*¹; *Leela Arava*¹; ¹Wayne State University

4:35 PM Invited

Understanding Hollow Metal Oxide Nanomaterial Formation with In Situ Transmission Electron Microscopy: *Lei Yu*¹; *Ruixin Han*¹; *Xiahan Sang*²; *Jue Liu*²; *Katharine Page*²; *Beth Guiton*¹; ¹University of Kentucky; ²Oak Ridge National Laboratory

5:00 PM Invited

Reliability and Degradation Mechanism of Li-ion Batteries under Grid Services: *Daiwon Choi*¹; *Alasdair Crawford*¹; *Vilayanur Viswanathan*¹; *David Reed*¹; *Vincent Sprenkle*¹; ¹Pacific Northwest National Laboratory

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Welding: Physical and Mechanical Metallurgy of Rapidly Solidified Metals — Defects and Residual Stresses

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorganji, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Semiatin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

Wednesday PM | March 13, 2019

221A | Henry B. Gonzalez Convention Center

2:00 PM Invited

Healing of Stripe Boundary Defects in Direct Metal Laser Melting of Ti-64: *Kevin Chaput*¹; Edwin Schwalbach¹; Sean Donegan¹; Michael Groeber¹; ¹Air Force Research Laboratory

2:30 PM

Knit Line Microstructural and Tensile Effects in Various Selective Laser Melting (SLM) Additive Manufactured (AM) Alloys: *Ryan Anderson*¹; Stephen Cooke¹; Joseph Sims¹; ¹ASRC Federal Astronautics

2:50 PM

Defect Signatures for Metal Laser Powder Bed Fusion: *Bradley Jared*¹; Jonathon Madison¹; Laura Swiler¹; David Saiz¹; Joshua Koepke¹; John Mitchell¹; Daryl Dagel¹; Thomas Ivanoff¹; ¹Sandia National Laboratories

3:10 PM

Effects of Volumetric Energy Density on Microstructure, Texture, and Defect Characteristics in a Laser Powder Bed Fusion Processing: *Hahn Choo*¹; Kin-Ling Sham¹; Michael Koehler¹; Xianghui Xiao²; Yang Ren²; Manyalibo Matthews³; Elena Garlea⁴; ¹University of Tennessee; ²Argonne National Laboratory; ³Lawrence Livermore National Laboratory; ⁴Y-12 National Security Complex

3:30 PM Break

3:50 PM

Defects, Phases Identification and Control in Directed Energy Deposited Inconel 625+TiC Metal Matrix Composites: *Baolong Zheng*¹; Sen Jiang¹; James Haley¹; Bingqing Chen²; Jiayu Liang²; Shuai Huang²; Yizhang Zhou¹; Enrique Lavernia¹; Julie Schoenung¹; ¹University of California, Irvine; ²Beijing Institute of Aeronautical Materials

4:10 PM

Local Residual Stress Measurement of AM Materials at the Micron Scale: *Joseph Newkirk*¹; Elizabeth Burns¹; ¹Missouri University of Science and Technology

4:30 PM

Predicting Residuals Stress of AM Parts as a Function of SLM Process Parameters Using Experiments and Simulation: *Umberto Scipioni Bertoli*¹; Cornelia Altenbuchner²; Richard Otis²; Eleftherios Gdoutos³; Andrew Shapiro²; Julie Schoenung¹; ¹University of California Irvine; ²NASA JPL; ³California Institute of Technology

4:50 PM

Comparison of Reduced Order Numerical Residual Stress Predictions to Neutron Diffraction Measurements of Laser Powder Bed Fusion Parts: *Kyle Johnson*¹; Donald Brown²; Bjorn Clausen²; Bradley Jared¹; Kurtis Ford¹; Joseph Bishop¹; ¹Sandia National Laboratories; ²Los Alamos National Laboratory

5:10 PM

Uncertainty Quantification of Powder Bed Fusion Distortion and Residual Stress Predictions: Piyush Ranade¹; Brijesh Kumar¹; Alonso Peralta¹; *Mustafa Megahed*²; ¹Honeywell Aerospace; ²Esi Group

ADDITIVE TECHNOLOGIES

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

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Alex Plotkowski, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Air Force Research Laboratory; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Wenda Tan, University of Utah

Wednesday PM | March 13, 2019

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Session Chairs: Kevin Chaput, Air Force Research Laboratory; Alex Plotkowski, Oak Ridge National Laboratory

2:00 PM Invited

Multi-scale Simulation of Solidification Microstructure Evolution in a Binary Alloy during Laser Additive Manufacturing: *Yachao Wang*¹; Jing Shi¹; ¹University of Cincinnati

2:30 PM

Shaping Laser Beam for Microstructural Control during Metal Additive Manufacturing: *Rongpei Shi*¹; Saad Khairallah¹; Tien Roehling¹; Joseph Mckeown¹; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory

2:50 PM

Effects of Scan Pattern on Solidification Condition and Resultant Grain Structure in Electron Beam Additive Manufacturing: A Model-based Investigation: *Wenda Tan*¹; Shardul Kamat¹; Xuxiao Li¹; Benjamin Stump²; Alex Plotkowski²; ¹University Of Utah; ²Oak

Ridge National Laboratory

3:10 PM

Microstructure and Mechanical Property Prediction of Additively Manufactured H13 Tool Steel via Integrated Computational Materials Modeling: Neil Bailey¹; *Yung Shin*¹; ¹Purdue University

3:30 PM Break

3:50 PM

Prediction of Solidification Microstructure for Powder Bed Fusion Additive Manufacturing: Antonio Magana¹; Ryan Lenart¹; *Mohsen Eshraghi*¹; ¹California State University, Los Angeles

4:10 PM

Calibrated Monte Carlo Models of Microstructure Evolution for Additive Manufacturing: *Theron Rodgers*¹; Daniel Moser¹; Fadi Abdeljawad²; Mario Martinez¹; Kurtis Ford¹; Bradley Trembacki¹; Kyle Johnson¹; John Mitchell¹; Jonathan Madison¹; ¹Sandia National Laboratories; ²Clemson University

4:30 PM

Combined Molecular Dynamics and Phase Field Simulation Study of Directional Solidification of NiTi Alloy: *Sepideh Kavousi*¹; Brian Novak¹; Dorel Moldovan¹; ¹Louisiana State University

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Fatigue and Fracture III — Session IV

Sponsored by: TMS: Additive Manufacturing Committee

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

Wednesday PM | March 13, 2019

221B | Henry B. Gonzalez Convention Center

Session Chair: John Lewandowski, Case Western Reserve University

2:00 PM Invited

A Statistical Framework to Qualify the Low Cycle Fatigue Performance of Additively Manufactured Steel Replacement

Parts: *Aaron Stebner*¹; ¹Colorado School Of Mines

2:30 PM

A New Perspective on Visualizing the Elastic Limit and the Necessity of 6D Limit Hypersurfaces: *Zachary Brunson*¹; Aaron Stebner¹; ¹Colorado School of Mines

2:50 PM

Surface Roughness Effects on Rotating-bending Fatigue Behavior of Additive Manufactured Stainless Steel 316L: *Ross Wykoff*¹; Jutima Simsiriwong¹; ¹University of North Florida

3:10 PM Invited

Qualification Research and the Effects of Defects Studies in Laser Powder Bed Fusion of AlSi10Mg: *Brett Conner*¹; ¹Youngstown State University

3:40 PM Break

4:00 PM

Fatigue Behavior of Selective Laser Melted Porous Iron in Air and in Simulated Body Fluid: *Yageng Li*¹; Xiangyu Zhang²; Karel Lietaert³; Marius Leeflang¹; Behdad Pouran⁴; Harrie Weinans⁴; Jie Zhou¹; Amir Zadpoor¹; ¹Delft University of Technology; ²Tsinghua University; ³3D Systems Leuven; ⁴University Medical Center Utrecht

4:20 PM

Finite Element Failure Analysis of Lattice Structures: *Behzad Bahrami Babamir*; Andrew Minor¹; Hesam Askari²; Kavan Hazeli¹; ¹University of Alabama in Huntsville; ²The University of Rochester

4:40 PM

Fracture Toughness and Fatigue Strength of Selective Laser Melted Aluminium-Silicon: An Overview: *Leonhard Hitzler*¹; Enes Sert²; Markus Merkel³; Andreas Öchsner²; Ewald Werner¹; ¹Technical University Munich; ²Esslingen University of Applied Sciences; ³Aalen University of Applied Sciences

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Microstructural Evolution and Phase Transformations — Al- and Cu-based Systems

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

Program Organizers: Bij-Na Kim, LPW Carpenter Additive; Eric Lass, National Institute of Standards and Technology; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Ryan Dehoff, Oak Ridge National Laboratory; Gerhard Fuchs, University of Florida; Chantal Sudbrack, QuesTek Innovations LLC

Wednesday PM | March 13, 2019
221C | Henry B. Gonzalez Convention Center

Session Chairs: Mohsen Asle Zaeem, Colorado School of Mines; Mark Jepson, Loughborough University

2:00 PM Invited

Microstructure Evolution in Nickel Aluminium Bronze Produced by Wire Arc Additive Manufacturing for Marine Applications: *Constantinos Goulas*¹; *Wei Ya*²; *Marcel Hermans*³; *Ian Richardson*³; ¹Rotterdam Fieldlab Additive Manufacturing / TUDelft; ²Rotterdam Fieldlab Additive Manufacturing / University of Twente; ³TU Delft

2:30 PM

The Morphology, Crystallography, and Chemistry of Phases in Wire-arc Additively Manufactured Nickel Aluminum Bronze: *Dharmendra Chalasani*¹; *Amir Hadadzadeh*¹; *Babak Shalchi Amirkhiz*²; *Mohsen Mohammadi*¹; ¹Marine Additive Manufacturing Centre of Excellence; ²CanmetMATERIALS

2:50 PM

Local Variations in Dissolved Si and Mechanical Properties within Additively Manufactured AlSi10Mg Parts: *John Fite*¹; *Tim Weihs*¹; *John Slotwinski*¹; ¹Johns Hopkins University

3:10 PM

Operando Quantification of the Phase Transformations in Additive Manufacturing: *Samuel Clark*¹; *Chu Lun Alex Leung*¹; *Yunhui Chen*¹; *Lorna Sinclair*²; *Sebastian Marussi*²; *Andre Phillion*³; *Leigh Stanger*⁴; *Jon Willmott*⁴; *Mohammed Azeem*¹; *Robert Attwood*⁵; *Margie Olbinado*⁶; *Alexander Rack*⁶; *Veijo Honkimäki*⁶; *Peter Lee*¹; ¹University College London; ²University of Manchester; ³McMaster University; ⁴University of Sheffield; ⁵Diamond Light Source; ⁶European Synchrotron Radiation Facility

3:30 PM Break

3:50 PM

Microstructure Evolution in Al-Ce and Al-Co Systems During Laser Glazing: *Cain Hung*¹; Yu Sun¹; Sanjeev Nayak¹; Rainer Hebert¹; Pamir Alpay¹; ¹University of Connecticut

4:10 PM

Effect of Single Pass Laser Surface Treatment on Microstructure Evolution of Inoculated Zr_{47.5}Cu_{45.5}Al₅Co₂ and Non Inoculated Zr₆₅Cu₁₅Al₁₀Ni₁₀ Bulk Metallic Glass Matrix Composites: *Muhammad Rafique*¹; Milan Brandt¹; ¹RMIT University

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development — Structural Alloy Design for AM I

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

Program Organizers: Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Hunter Martin, HRL Labs; Orlando Rios, Oak Ridge National Laboratory

Wednesday PM | March 13, 2019

221D | Henry B. Gonzalez Convention Center

Session Chairs: Eric Ott, GE Additive; Hunter Martin, HRL Labs

2:00 PM Invited

Nickel-base Superalloy Design for Direct Metal Laser Melting: *Laura Dial*¹; Timothy Hanlon¹; Voramon Dheeradhada¹; Vipul Gupta¹; Andrew Wessman²; ¹GE Global Research; ²GE Additive

2:30 PM

The Development of a First-generation Gamma Prime Strengthened Nickel-based Superalloy for High Temperature Applications: *Andre Nemeth*¹; David Crudden¹; Sabin Sulzer²; Paul Bagot²; Michael Moody²; Roger Reed²; ¹Oxmet Technologies Ltd; ²University of Oxford

2:50 PM

Design of Gamma-prime Strengthened Co-based Superalloys for Additive Manufacturing Applications: *Eric Lass*¹; ¹National Institute of Standards and Technology

3:10 PM

Design and Development of WSU 100 Nickel-base Superalloy for Additive Manufacturing: *Guru Dinda*¹; Abhishek Ramakrishnan¹; Husam Alrehaili¹; Praveen Sreeramagiri¹; Ajay Bhagavatam¹; ¹Wayne State University

3:30 PM

Development of Superelastic Nickel-Titanium-Hafnium Alloys for Additive Manufacturing: *Behnam Aminahmadi*¹; Tom Duerig²; Ronald Noebe³; Aaron Stebner¹; ¹Colorado School Of Mines; ²Confluent Medical Technologies; ³NASA Glenn Research Center

3:50 PM Break

4:10 PM Invited

Materials Development for Solid-state Additive Manufacturing Processes: *Olaf Andersen*¹; Thomas Studnitzky¹; Bernd Kieback²; ¹Fraunhofer IFAM; ²Technische Universität Dresden

4:40 PM

Aluminum-cerium Alloys Tailored to the Direct Metal Write (DMW) Additive Manufacturing (AM): *Max Neveau*¹; Michael Kesler¹; Hunter Henderson¹; Zachary Sims¹; William Carter¹; Tian Li²; Orlando Rios¹; ¹Oak Ridge National Laboratory; ²Lawrence Livermore National Laboratory

5:00 PM

New Al-Ce Alloys for Additive Manufacturing: *Ryan Dehoff*¹; Alex Plotkowski¹; List Fred¹; Peeyush Nandwana¹; Hunter Henderson¹; Rios Orlando¹; ¹Oak Ridge National Laboratory

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Solid State Processing of Metals and Ceramics — Extrusion, Powder Lithography, Direct Write

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

Program Organizers: James Paramore, US Army Research Laboratory; Amy Elliott, Oak Ridge National Laboratory; Matthew Dunstan, US Army Research Laboratory; Markus Chmielus, University of Pittsburgh; Nihan Tuncer, Desktop Metal

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223 | Henry B. Gonzalez Convention Center

Session Chair: James Paramore, United States Army Research Laboratory

2:00 PM Invited

Additive Manufacturing using Ordered Powder Lithography: *Matthew Holcomb*¹; ¹Grid Logic Incorporated

2:40 PM Invited

Processing and Print Parameters in BMD-based Additive Manufacturing: *Alexander Barbat*¹; ¹Desktop Metal

3:20 PM Break

3:40 PM

Shaping, Debinding and Sintering as a Low Cost Additive Manufacturing Method of Solid Metal Compounds: *Yvonne Thompson*¹; Joamin Gonzalez-Gutierrez²; Christian Kukla²; Peter Felfer¹; ¹WWI FAU Erlangen; ²Montanuniversität Leoben

4:00 PM

Sintering Kinetics in Direct Ink Write Additive Manufacturing: A Mesoscopic Modeling Approach: *Fadi Abdeljawad*¹; Dan Bolintineanu²; Adam Cook²; Harlan Brown-Shaklee²; Christopher DiAntonio²; Dan Kammler²; Allen Roach²; ¹Clemson University; ²Sandia National Laboratories

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session VI

Sponsored by: TMS: Shaping and Forming Committee

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

Wednesday PM | March 13, 2019

302A | Henry B. Gonzalez Convention Center

Session Chairs: Samantha Daly, University of California, Santa Barbara; Shujuan Wang, Los Alamos National Laboratory

2:00 PM Invited

Experimental and Numerical Characterization of Local Stresses Associated with Twinning in HCP Magnesium: *Carlos Tome*¹; M Arul Kumar¹; Hareesh Tummala¹; Yue Liu²; Rodney McCabe¹; Bjorn Clausen¹; Laurent Capolungo¹; Wenjun Liu³; Jon Tischler³; Jian Wang⁴; ¹Los Alamos National Laboratory; ²Shanghai Jiao Tong University; ³Argonne National Laboratory; ⁴University of Nebraska-Lincoln

2:30 PM

Crystal Plasticity Model for Discrete Evolution of Deformation Twinning in HCP Metals and Alloys: *Satyapriya Gupta*¹; Philip Eisenlohr¹; ¹Michigan State University

2:50 PM

A Statistical Analysis of Twinning in Rare Earth Magnesium Alloy WE43 Using Fully Automated Post-processing in MTEX: *Daniel Savage*¹; Saeede Ghorbanpour¹; William Feather¹; Marko Knezevic¹; ¹University of New Hampshire

3:10 PM

Deformation Twinning under Stress Gradient in Body-centered Cubic Tantalum and Niobium: *Kui Du*¹; Binbin Jiang¹; Aidong Tu¹; Hao Wang¹; Hengqiang Ye¹; ¹Institute Of Metal Research, Cas

3:30 PM Break

3:50 PM Invited

Characterizing Microstructure-property Relationships through Microscale Strain Mapping and Large Data Analysis: Zhe Chen¹; *Samantha Daly*¹; ¹Univeristy of California, Santa Barbara

4:20 PM

Fundamental Issues Associated with {11-22} Twinning in Titanium: *Mingyu Gong*¹; Dongyue Xie¹; Shun Xu¹; Shunjuan Wang²; Christophe Schuman³; Jean-Sébastien Lecomte³; Jian Wang¹; ¹University of Nebraska-Lincoln; ²Los Alamos National Laboratory; ³Universite de Lorraine

4:40 PM

In Situ High Resolution TEM on Twinning Nucleation in BCC Crystals: *Scott Mao*¹; Jiangwei Wang²; ¹University of Pittsburgh; ²Zhejiang University

5:00 PM

Three-dimensional Nature of {0-112} Deformation Twin in Magnesium: *Pengzheng Tang*¹; Mingyu Gong²; Yue Liu¹; Rodney McCabe³; Jian Wang²; Carlos Tomé³; ¹Shanghai Jiao Tong University; ²University of Nebraska-Lincoln; ³Los Alamos National Laboratory

5:20 PM

Microstructural Evaluation of the Onset of Deformation Twinning in FCC Metals at High Strain Rate: *Daniel Foley*¹; Kyle Matthews¹; Cassandra Pate¹; Nicholas Savino¹; Asher Leff²; Marc De Graef³; Mitra Taheri¹; ¹Drexel University; ²Army Research Laboratory, Adelphi Laboratory Center; ³Carnegie Mellon University

5:40 PM

Deformation Behavior during Bending in AA6xxx Alloys: *Sin Ting Cynthia Chang*¹; Miroslav Smid¹; Ivo Kubena²; Samy Hocine¹; Helena Van Swygenhoven¹; ¹Paul Scherrer Institute; ²Institute of Physics of Materials ASCR

ADVANCED MATERIALS

Advanced High-Strength Steels III — High-Performance Steels I

Sponsored by: TMS: Steels Committee

Program Organizers: Amy Clarke, Colorado School of Mines; MingXin Huang, University of Hong Kong; C. Tasan, Massachusetts Institute of Technology; Kester Clarke, Colorado School of Mines; Ana Luiza Araujo, AK Steel Research & Innovation

Wednesday PM | March 13, 2019

205 | Henry B. Gonzalez Convention Center

Session Chairs: C. Tasan, Massachusetts Institute of Technology; Eric Payton, Air Force Research Laboratory

2:00 PM

Characterization and Modeling of Martensitic Transformation Crystallography Toward Improved Reconstruction of Prior Austenite Microstructures: *Eric Payton*¹; Alexander Brust²; Stephen Niezgod²; ¹Air Force Research Laboratory; ²Ohio State University

2:20 PM

High Angular Resolution Electron Backscatter Diffraction Studies of Tetragonality in Fe-C Martensitic Steels: *Angus Wilkinson*¹; Tomohito Tanaka²; ¹University Of Oxford; ²Nippon Steel & Sumitomo Metal Corporation

2:40 PM

Effect of Carbon Content on Strengthening Behavior with Grain Refinement on Lath Martensite Structure: *Hiroyuki Kawata*¹; Yoshiaki Honda¹; Kengo Takeda¹; ¹Nippon Steel & Sumitomo Metal

Corporation

3:00 PM

Effects of Short-time Tempering on Mechanical and Microstructural Behavior in Medium Carbon, High Strength Steel: *Virginia Judge*¹; John Speer¹; Amy Clarke¹; ¹Colorado School of Mines

3:20 PM Break

3:40 PM

Ausforming and Tempering of a Computationally Designed Ultra-high Strength Steel: *Yiwei Sun*¹; Johny Quan¹; Karl Mattlin²; Darrell Herling²; Thomas Kozmel³; Suveen Mathaudhu¹; ¹University of California Riverside; ²Pacific Northwest National Laboratory; ³QuesTek Innovations LLC

4:00 PM

Exploring Novel Design Guidelines for Advanced Wear-resistant Steels: *Gianluca Roscioli*¹; Cemal Tasan¹; ¹Massachusetts Institute of Technology

4:20 PM

In Situ Study of Phase Transformations in Electrodeposited Fe–C Coating: *Jacob Nielsen*¹; Per Møller¹; Karen Pantleon¹; ¹The Technical University of Denmark

4:40 PM

Characterization of FeMnAl Steel Structure-processing-properties Relationships: *Katherine Sebeck*¹; Ian Toppler¹; Demetrios Tzelepis¹; Krista Limmer²; Daniel Field²; Matthew Rogers¹; ¹TARDEC; ²ARL

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Development and Application of Soft Magnetic Materials for Transformers and Inductors

Sponsored by: Federation of European Materials Societies (FEMS), TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Frank Johnson, Niron Magnetics, Inc.; Paul Ohodnicki, National Energy Technology Laboratory; Alex Leary, Nasa Grc; Orlando Rios, Oak Ridge National Laboratory; Alessandra Hool, ESM Foundation

Wednesday PM | March 13, 2019
225B | Henry B. Gonzalez Convention Center

Session Chair: Kevin Byerly, National Energy Technology Laboratory

2:00 PM Invited

FeNi-based Metal Amorphous Nanocomposite (MANC) Soft Magnetic Materials (SMM) for Motor Applications: *Michael McHenry*¹; Natan Aronhime¹; Satoru Simizu¹; Paul Ohodnicki¹; Kevin Byerly¹; ¹Carnegie Mellon University

2:30 PM Invited

High Resistivity Magnetic Grain Boundary Nano-inclusions for Concurrent Ultra Low Loss and Sustained High Permeability in Ferrite Inductor Cores: *Parisa Andalib*¹; Alexander Sokolov¹; Afam Nwokolo¹; David Pleateau¹; Charles Evans¹; Justin Paik¹; William Fowle¹; Vincent Harris¹; ¹Northeastern University

3:00 PM

High Temperature Performance of Soft Magnetic Nanocomposites: *Alex Leary*¹; Vladimir Keylin¹; Grant Feichter¹; Ron Noebe¹; Randy Bowman¹; ¹NASA GRC

3:20 PM

Magnetic Properties of Single Crystalline Itinerant Ferromagnet AlFe_2B_2 : *Tej Lamichhane*¹; Li Xiang¹; Qisheng Lin²; Tribhuwan Pandey³; David Parker³; Tae-Hoon Kim²; Lin Zhou²; Matthew Kramer²; Sergey Bud'ko¹; Paul Canfield¹; ¹Iowa State University; ²Ames Laboratory; ³Oak Ridge National Laboratory

3:40 PM Break

4:00 PM

Melt Spun Flake Pressed Fe-6.5%Si Bulk Soft Magnet with Superior Magnetic and Mechanical Properties: *Gaoyuan Ouyang*¹; Brandt Jensen²; Kevin Dennis²; Wei Tang²; Chaochao Pan¹; Jun Cui¹; ¹Iowa State University; ²Ames Laboratory

4:20 PM

Minnealloy: A New Soft Magnetic Material with High Saturation Flux Density: Md Mehedi¹; Yanfeng Jiang²; *Bin Ma*²; Pranav Suri¹; David Flannigan¹; Jianping Wang¹; ¹CEMS, University of Minnesota; ²ECE, University of Minnesota

4:40 PM Invited

Phase Evolution of Nanostructured Fe-Si-Al-based Intermetallic Phases in Soft Magnetic Alloys: *Matthew Willard*¹; Maria Daniil²; ¹Case Western Reserve University; ²Bard High School Early College

5:10 PM Invited

Soft Magnetic Fe(Co)-based Nanocrystalline Alloys for Applications at Elevated Temperatures: *Ivan Skorvanek*¹; Branislav Kunca¹; Frantisek Andrejka¹; Jozef Marcin¹; Peter Svec²; ¹Institute Of Experimental Physics Sas; ²Institute of Physics SAS

ADVANCED MATERIALS

Advanced Materials and Reservoir Engineering for Extreme Oil & Gas Environments III – Session II

Sponsored by: TMS: Energy Conversion and Storage Committee

Program Organizers: Indranil Roy, UniPolar Technology Inc; Ting Chen Roy, Welldiver; Partha Ganguly, Baker Hughes GE

Wednesday PM | March 13, 2019

206A | Henry B. Gonzalez Convention Center

Session Chairs: Ting Chen Roy, Welldiver; Indranil Roy, UniPolar Technology Inc

2:00 PM Invited

Corrosion of Al0.1CoCrFeNi High Entropy Alloy in a Molten Eutectic Salt: Vilupanur Ravi¹; J. Logier¹; A. Jalbuena¹; R. Mishra²; Xinyi Wang³; *J. Earthman*³; ¹California State Polytechnic University, Pomona; ²University of North Texas; ³University of California, Irvine

2:30 PM Invited

Hot Isostatic Pressing for Oil & Gas Applications and Corrosion Resistant Materials: *Magnus Ahlfors*¹; ¹Quintus Technologies

3:00 PM

Corrosion Evaluation of Oilfield Alloys by Means of Various Techniques: *Ting Chen*¹; Saadedine Tebbal¹; Antonio Hernandez¹; ¹SET Laboratories Inc.

3:20 PM

Synthesis of Disruptive Technologies and Innovations in Nanomaterials for Economizing Oil & Gas Operations: Ting Chen Roy¹; Ram Shenoy²; *Indranil Roy*³; Jing Zhou³; ¹WellDiver/SET Laboratories Inc.; ²WellDiver; ³Rice University

3:40 PM Break

4:00 PM

Disintegrable Metals and Field Applications – The State of Technology: *Zhiyue Xu*¹; Zihui Zhang¹; ¹Baker Hughes, a GE Company

4:20 PM

Response of four Dissolvable Alloy to Oilfield Brines in Comparison to its Commercial Counterparts: Ting Chen Roy¹; Ram Shenoy²; *Anuvind Akula*³; Vanessa Finzetto²; Indranil Roy⁴; Jing Zhou⁴; ¹WellDiver/SET Laboratories Inc.; ²WellDiver; ³University of Houston; ⁴Rice University

ELECTRONIC MATERIALS

Advanced Microelectronic Packaging, Emerging Interconnection Technology, and Pb-free Solder – 3D Microelectronic Packaging and Emerging Interconnects II

Sponsored by: TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Kazuhiro Nogita, University of Queensland; Tae-Kyu Lee, Portland State University; Yan Li, Intel Corporation; Christopher Gourlay, Imperial College London; Zhi-Quan Liu, Chinese Academy of Sciences; Rahul Panat, Carnegie Mellon University; Albert T. Wu, National Central University; Andre Delhaise, Celestica; Mohd Arif Salleh, Universiti Malaysia Perlis

Wednesday PM | March 13, 2019

216A | Henry B. Gonzalez Convention Center

Session Chairs: Yan Li, Intel Co.; Chih Chen, National Chao Tung University

2:00 PM Invited

Pressure and Pressureless Silver Sintering of SiC MOSFET Power Module with Si₃N₄ Direct Bonded Copper: *Won Sik Hong*¹; Mi Song Kim¹; Chulmin Oh¹; ¹Korea Electronics Technology Institute

2:30 PM

Direct Bonding of Nanotwinned Ag Thin Films at Low Temperature: *Leh-Ping Chang*¹; Fan-Yi Ouyang¹; Shin-Yi Huang²; ¹National Tsing Hua University; ²Industrial Technology Research Institute

2:50 PM

Study the Microstructure Evolution of Cu/In and Cu/In/Ni for Fine Pitch Interconnects: *Yi-Wun Wang*¹; Han-Tang Hung¹; Yu-Shan Chiu¹; C.R. Kao¹; ¹National Taiwan University

3:10 PM

Low-temperature and Pressureless Cu-to-Cu Bonding By Microfluidic Electroless Interconnection Process: *Han-Tang Hung*¹; S. Yang¹; I A. Weng¹; C. R. Kao¹; ¹National Taiwan University

3:30 PM Break

3:50 PM

Microstructural Evolution of High (111)-Oriented Nanotwinned Copper during Annealing and Low Temperature Cu-Cu Direct Bonding Process: *Yung-Ting Tai*¹; Fan-Yi Ouyang¹; Yu-Shien Lu¹; Leh-Ping Chang¹; ¹National Tsing Hua University

4:10 PM

Chip-to-chip Cu Direct Bonding in N₂ Ambient with (111)-Oriented Nanotwinned Cu Microbumps: *Jing-Ye Juang*¹; Kai-Cheng Shie¹; Yu-Jin Li¹; Po-Ning Hsu¹; K. N. Tu¹; Chih Chen¹; ¹National Chiao Tung University

4:30 PM

Low Temperature Cu-to-Cu Direct Bonding with Chemical Mechanical Planarized Highly <111>-orientated Nanotwinned Cu Films: *Hong-Che Liu*¹; Chih Chen¹; ¹National Chiao Tung University

CHARACTERIZATION

Advanced Real Time Imaging — Iron and Steelmaking III

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, US Department of Energy - National Energy Technology Laboratory; P. Chris Pistorius, Carnegie Mellon University; Candan Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zuotai Zhang, Southern University of Science and Technology; Neslihan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Saito, Kyushu University; Yongsug Chung, Korea Polytechnic University; Bryan Webler, Carnegie Mellon University

Wednesday PM | March 13, 2019

302B | Henry B. Gonzalez Convention Center

Session Chair: Neslihan Dogan, McMaster University

2:00 PM Invited

Effect of CaO Substitution with BaO in Steelmaking-based Slags for Development of Fluorine-free Slag Refining: Zhanjun Wang¹; Il Sohn¹; ¹Yonsei University

2:30 PM

Study of Mold Flux Heat Transfer Property by Using Thermal Imaging Enhanced Inferred Emitter Technique: Kaixuan Zhang¹; Wanlin Wang¹; Haihui Zhang¹; ¹Central South University

2:50 PM

Sub-rapid Solidification Study by Using Droplet Solidification Technique: Cheng Lu¹; Wanlin Wang¹; ¹Central South University

3:10 PM

Time Evolution of AHSS Oxidation: Mary Story¹; Bryan Webler¹; ¹Carnegie Mellon University

3:30 PM Break

3:50 PM

Comparison of Dissolution Kinetics of Non-metallic Inclusions in Steelmaking Slags: Mukesh Sharma¹; Neslihan Dogan¹; ¹McMaster University

4:10 PM

Imaging Pyrometry – An Overview: Ravindra Nugehalli¹; ¹New Jersey Institute of Technology

MATERIALS DESIGN

Advances in Computational Methods for Damage Mechanics and Failure Phenomena – Crystal Plasticity Methods I

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Michael Tonks, University of Florida; Remi Dingreville, Sandia National Laboratories; Jaafar El-Awady, Johns Hopkins University

Wednesday PM | March 13, 2019
303C | Henry B. Gonzalez Convention Center

Session Chairs: Jeffrey Lloyd, US Army Research Laboratory; Marat Latypov, University of California, Santa Barbara

2:00 PM Invited

Shape and Size-dependent Micropolar Crystal Plasticity for the Role of Annealing Twins in Micromechanics of Ni-base Superalloys: *Marat Latypov*¹; Jean-Charles Stinville¹; Jason Mayeur²; Tresa Pollock¹; Irene Beyerlein¹; ¹University of California, Santa Barbara; ²CFD Research Corporation

2:30 PM

A Multiphysics, Mesoscale Framework to Predict the Effect of Diffusion on Creep-fatigue Life for High Temperature Applications: *Andrea Rovinelli*¹; Mark Messner¹; David Parks²; T.-L. Sham¹; ¹Argonne National Laboratory; ²Massachusetts Institute of Technology

2:50 PM

Glissile Dislocation Junction Reactions in Continuum Dislocation Dynamics: *Peng Lin*¹; Vignesh Vivekanandan¹; Grethe Winther²; Anter El-Azab¹; ¹Purdue University; ²Technical University of Denmark

3:10 PM

Intergranular Fracture Prediction via Multi-scale Simulations: *Bertrand Sicaud*¹; Laurent Van Brutzel¹; Maxime Sauzay¹; ¹CEA

3:30 PM Break

3:50 PM Invited

Understanding the Role of Rate Dependence, Temperature Dependence, and Hardening on the Localization and Failure of Solid Alloy Bars under Torsion: *James Foulk*¹; Wei-Yang Lu¹; Huiqing Jin¹; Jakob Ostien¹; ¹Sandia National Laboratories

4:20 PM

High-throughput Crystal Plasticity Simulations of Intergranular Damage and Failure: Thao Nguyen¹; DJ Luscher²; *Justin Wilkerson*¹; ¹Texas A&M University; ²Los Alamos National Laboratory

4:40 PM

Simulating Particle-initiated Failure in Strongly Anisotropic Metals: *Jeffrey Lloyd*¹; ¹US Army Research Laboratory

5:00 PM

Macro-zone Size Effect in Ti Alloys Computed with FFT-based CrystalEVP Simulations: *Azdine Nait-ali*¹; Samuel Hémery¹; ¹Institut Pprime

5:20 PM

Eulerian Formulation for Brittle Fragmentation Using Continuum Damage Mechanics: *Vinamra Agrawal*¹; ¹Auburn University

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering – Applications of Algorithms for Study and Design of Materials

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Prasanna Balachandran, University of Virginia; Douglas Spearot, University of Florida; Charudatta Phatak, Argonne National Laboratory; Srinivasan Srivilliputhur, University of North Texas

Wednesday PM | March 13, 2019
304A | Henry B. Gonzalez Convention Center

Session Chair: Vahid Tari, Eaton Corporate Research & Technology

2:00 PM

Phase-field Modeling of the Effect of Deformed State on Recrystallization in Metals: *Ahmed Hamed*¹; Larry Aagesen²; Grethe Winther³; David Hurley²; Anter El-Azab¹; ¹Purdue University; ²Idaho National Laboratory; ³Technical University of Denmark

2:20 PM

Viscoplastic Self-consistent Modeling of High Speed Machining of Dual Phase Ti-6Al-4V Using the Mechanical Threshold Stress Flow Stress Model: *Jason Allen*¹; Eric Hoar¹; Elham Mirkoohi¹; Peter Bocchini²; Anthony Rollett³; Steven Liang¹; Hamid Garmestani¹; ¹Georgia Institute of Technology; ²The Boeing Company; ³Carnegie Mellon University

2:40 PM

Buoyancy-induced Flow Pattern during Dendritic Solidification: *Elaheh Dorari*¹; Mohsen Eshraghi²; Sergio Felicelli¹; ¹The University of Akron; ²California State University, Los Angeles

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications VII — Session VI

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Ensicaen University of Caen; Soon-Jik Hong, Kongju National University; Philippe Jund, Montpellier University; Lan Li, Boise State University; Takao Mori, Nims; Hsin-Jay Wu, National Sun Yat-sen University; Tiejun Zhu, Zhejiang University

Wednesday PM | March 13, 2019

216B | Henry B. Gonzalez Convention Center

Session Chairs: Sinn-wen Chen, National Tsing Hua University; Chien-Neng Liao, National Tsing Hua University

2:00 PM Invited

Materials Informatics of Thermoelectric Materials Using Big Literature Data: *Yukari Katsura*¹; Masaya Kumagai²; Takushi Kodani¹; Riku Sato¹; Yuki Ando³; Sakiko Gunji¹; Yoji Imai³; Kaoru Kimura¹; Koji Tsuda¹; ¹University of Tokyo, NIMS; ²RIKEN, Sakura Internet Inc.; ³RIKEN, NIMS

2:20 PM Invited

Nowotny Chimney Ladder Phases for Thermoelectric Applications: *Xi Chen*¹; ¹The University of Texas at Austin

2:40 PM Invited

Current-induced Boundary Modification and Precipitation in Telluride Based Thermoelectric Materials: *Chien-Neng Liao*¹; Yao-Hsiang Chen¹; Chun-Yen Lan¹; ¹National Tsing Hua University

3:00 PM Invited

Optical Properties of Thermoelectric Materials: *Peng Jiang*¹; ¹Dalian Institute of Chemical Physics, Chinese Academy of Sciences

3:20 PM Invited

Origin of the Ultralow Thermal Conductivity in Single-crystalline SnSe: *Pai-Chun Wei*¹; Cheng-Rong Hsing²; Ching-Ming Wei²; ¹King Abdullah University of Science and Technology; ²Academia Sinica

3:40 PM Break

4:00 PM Invited

Suppression of Atom Motion and Metal Deposition in Mixed Ionic/Electronic Conductors: *Pengfei Qiu*; Xun Shi¹; Lidong Chen¹; ¹Shanghai Institute of Ceramics, Chinese Academy of Sciences

4:20 PM Invited

Neutron Scattering Study on the Lattice Thermal Conductivity of Sb-doped ZrNiSn: *Jie Ma*¹; Qingyong Ren¹; Chenguang Fu²; Jiong Yang³; Tiejun Zhu⁴; ¹Shanghai Jiao Tong University; ²Max Planck Institute for Chemical Physics of Solids; ³Shanghai University; ⁴Zhejiang University

4:40 PM Invited

Lattice Dynamics of Layered AMg₂Pn₂ Zintl Compounds: *Alexandra Zevalkink*¹; Wanyue Peng¹; Guido Petretto²; Geoffroy Hautier²; ¹Michigan State University; ²U. Louvain

5:00 PM

Oxide Formation Mechanism and their Effect on the Microstructure and Thermoelectric Properties of p-Type Bi_{0.5}Sb_{1.5}Te₃ Alloys: *May Likha Lwin*¹; Peyala Dharmiah¹; Babu Madavali¹; Lee Chul-Hee¹; Shin Dong-won¹; Jeong Kwang-yong¹; Hong Soon-Jik¹; ¹Kongju National University

5:20 PM Concluding Comments

LIGHT METALS

Alumina & Bauxite — Bauxite Residue: Management and Valorization

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

Program Organizer: Sebastien Fortin, Rio Tinto - Aluminium Technology Solutions - ARDC

Wednesday PM | March 13, 2019
006A | Henry B. Gonzalez Convention Center

Session Chairs: Katy Tsesmelis, International Aluminium Institute; Markus Graefe, Emirates Global Aluminium; Talitha Santini, The University of Western Australia; Sumedh Gostu, Air-Liquide

2:00 PM Introductory Comments

2:05 PM

Use of Two Filtration Stages for Bauxite Residue: Roberto Seno¹; Rodrigo Moreno¹; *Heri Nakamura*¹; ¹CBA

2:30 PM

Environmental Friendly Transformation Of The First And Oldest Alumina Refinery In The World: *Laurent Guillaumont*¹; ¹Alteo Gardanne

2:55 PM

Accelerating Bauxite Residue Remediation with Microbial Biotechnology: *Talitha Santini*¹; K. Warren²; M. Raudsepp³; N. Carter²; A. Chiu²; J. Hamilton²; S. Couperthwaite⁴; G. Southam²; G.W. Tyson²; L.A. Warren⁵; ¹The University of Western Australia; The University of Queensland; ²The University of Queensland; ³The University of Queensland; The University of Alberta; ⁴Queensland University of Technology; ⁵The University of Toronto

3:20 PM

Simulation and Experiment Study on Carbonization Process of Calcified Slag with Different Ventilation Modes: *Guanting Liu*¹; Yan Liu¹; Xiaolong Li¹; Weihua Sun¹; Zimu Zhang¹; Zhang Tingan¹; ¹Northeastern University

3:45 PM Break

4:00 PM

An Ecological Approach to the Rehabilitation of Bauxite Residue: Elisa Di Carlo¹; *Ronan Courtney*¹; ¹University of Limerick

4:25 PM

Quantitative X-ray Diffraction Study into Bauxite Residue Mineralogical Phases: *John Vogrin*¹; Harrison Hodge¹; Talitha

Santini²; Hong Peng¹; James Vaughan¹; ¹The University of Queensland; ²The University of Western Australia

4:50 PM

Technospheric Mining of Rare Earth Elements and Refractory Metals from Bauxite Residue: *Gisele Azimi*¹; ¹University of Toronto

5:15 PM

Migration of Iron, Aluminum and Alkali Metal within Pre-reduced-smelting Separation of Bauxite Residue: Jian Pan¹; *Siwei Li*¹; Deqing Zhu¹; Jiwei Xu¹; Jianlei Chou¹; ¹Central South University

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Characterizations and Applications of Aluminum Alloys

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

Program Organizer: Hiromi Nagaumi, Soochow University

Wednesday PM | March 13, 2019

007A | Henry B. Gonzalez Convention Center

Session Chair: Zhihong Jia, Chongqing University

2:00 PM Introductory Comments

2:05 PM

Effect of Mg and Si Content in Aluminum Alloys on Friction Surfacing Processing Behavior: *Jonas Ehrich*¹; Arne Roos²; Stefanie Hanke¹; ¹Universität Duisburg-Essen; ²Helmholtz-Zentrum Geesthacht

2:30 PM

Mechanical Properties Evolution for 8xxx Foil Stock Materials by Alloy Optimization-literature Review and Experimental Research: *Erik Santora*¹; Josef Berneder¹; Florian Simetsberger¹; Martin Doberer²; ¹AMAG Rolling GmbH; ²Constantia Teich GmbH

2:55 PM

Effects of Zr Additions on Structure and Microhardness Evolution of Eutectic Al-6Ni Alloy: *Chanun Suwanpreecha*¹; Phromphong Pandee¹; Ussadawut Patakham²; David Dunand³; Chaowalit Limmaneevichitr¹; ¹King Mongkut's University of Technology Thonburi; ²National Metal and Materials Technology Center; ³Northwestern University

3:20 PM

Microstructure and Mechanical Properties of an Al-Zr-Er High Temperature Alloy Microalloyed with Tungsten: *Amir R. Farkoosh*¹; David Dunand¹; David N. Seidman¹; ¹Northwestern University

3:45 PM Break

4:00 PM

Effect of Nickel Foil Thickness on Microstructure and Microhardness of Steel/ Aluminium Alloy Dissimilar Laser Welding Joints: *Xiaonan Wang*¹; Xiaming Chen¹; Wenping Weng¹; Hiromi Nagaumi¹; ¹Soochow University

4:25 PM

Residual Stress Characterization for Marine Gear Cases in As-cast and T5 Heat Treated Conditions with Application of Neutron Diffraction: *Joshua Stroh*¹; Dimitry Sediako¹; ¹UBC Okanagan

LIGHT METALS

Aluminum Reduction Technology — Fundamentals in Cell Behavior, Inert Anodes and other Research

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

Program Organizer: Marc Dupuis, GeniSim Inc

Wednesday PM | March 13, 2019

004 | Henry B. Gonzalez Convention Center

Session Chairs: Mark Dorreen, University of Auckland; Zhaohui Wang, SINTEF

2:00 PM Introductory Comments

2:05 PM

Transfer Processes in the Bath of High Amperage Aluminium Reduction Cell: Peter Polyakov¹; *Andrey Yasinskiy*²; Andrey Zavadyak³; Andrey Polyakov²; Iliya Puzanov³; Yuri Mikhalev²; Sergey Shakhrai²; Nikita Sharypov²; Olga Yushkova²; ¹Light Metals Ltd; ²Siberian Federal University; ³RUSAL ETC

2:30 PM

Microstructure and Properties Analysis of Aluminium Smelter Crust: *Shanghai Wei*¹; Jingjing Liu¹; Chathuni Ranaweera¹; Tania Groutso²; Mark Taylor¹; ¹NZ Product Accelerator, Department

of Chemical and Materials Engineering; ²Light Metal Research Centre, University of Auckland

2:55 PM

Sideledge in Aluminium Cells: Further Considerations Concerning the Trench at the Metal-bath Boundary: *Asbjorn Solheim*¹; Eirik Hjertenæs²; Kati Tschöpe²; Marian Kucharik²; Nancy Holt²; ¹SINTEF Industry; ²Hydro Aluminium

3:20 PM

In Situ Evolution of the Frozen Ledge under Cold Anode: *Donald Picard*¹; Jayson Tessier²; Dany Gauthier²; Houshang Alamdari¹; Mario Fafard¹; ¹Université Laval; ²Alcoa Corporation

3:45 PM Break

4:00 PM

Aluminum Electrolysis with Multiple Vertical Non-consumable Electrodes in a Low Temperature Electrolyte: *Guðmundur Gunnarsson*¹; Guðbjörg Óskarsdóttir¹; Sindri Frostason¹; Jón Magnússon²; ¹Innovation Center Iceland; ²Arctus Metals ehf.

4:25 PM

Anode Overvoltages on the Industrial Carbon Blocks: Peter Polyakov¹; *Andrey Yasinskiy*²; Andrey Polyakov²; Andrey Zavadyak³; Yuri Mikhalev²; Iliya Puzanov³; ¹Light Metals Ltd; ²Siberian Federal University; ³RUSAL ETC

4:50 PM

Development of a Drag Probe for In-situ Velocity Measurement of Molten Aluminum in Electrolysis Cell: Samaneh Poursaman¹; *Mounir Baiteche*¹; Donald Picard¹; Donald Ziegler²; Louis Gosselin¹; Mario Fafard¹; ¹Aluminium Research Centre - REGAL, Laval University; ²Alcoa Primary Metals, Alcoa Technical Center

5:15 PM Concluding Comments

BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Bionano Interfaces V

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

Program Organizers: Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Po-Yu Chen, National Tsing Hua University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines

Wednesday PM | March 13, 2019
217C | Henry B. Gonzalez Convention Center

Session Chairs: Hendrik Heinz, University of Colorado; Kalpana Katti, North Dakota State University

2:00 PM Invited

Collagen-mineral Interactions Impact Macroscale Properties of Fibril in Bone: *Dinesh Katti*¹; Kalpana Katti¹; ¹North Dakota State University

2:30 PM Invited

Atomic Scale Chemical Imaging of Interfaces and Interphases in Tooth Biominerals: *Derk Joester*¹; ¹Northwestern University

3:00 PM Invited

The Interaction of Gold Nanoparticles with Biomolecules: Insights from Atomistic and Multiscale Simulations: *Stefano Corni*¹; ¹University of Padova

3:30 PM Break

3:50 PM Invited

Atomistic Simulations of Long Time-scale Phenomena at Bio-hybrid Interfaces: *Lucio Colombi Ciacchi*¹; ¹University of Bremen

4:20 PM Invited

Predicting Spatial Organization of Amino Acids and Peptides on Graphene Surfaces: *Tiffany Walsh*¹; ¹Deakin University

4:50 PM

Binding Mechanisms of All 20 Natural Amino Acids to (hkl) Facets of Hydroxyapatite as a Function of pH: *Sam Hoff*¹; Juan Liu¹; Hendrik Heinz¹; ¹University of Colorado Boulder

BIOMATERIALS

Biological Materials Science — Biomaterials (Implants and Devices)

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

Program Organizers: Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama at Birmingham; Jing Du, Penn State University

Wednesday PM | March 13, 2019
007D | Henry B. Gonzalez Convention Center

Session Chairs: Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama

2:00 PM Invited

Damage Tolerance in Dental Restorative Materials: *Jamie Kruzic*¹; Carina Tanaka¹; ¹UNSW Sydney

2:30 PM

Dental Materials through Microstructural Control of Phosphates: *Steven Naleway*¹; Jerry Howard¹; Isaac Nelson¹; John Colombo¹; Krista Carlson¹; ¹University of Utah

2:50 PM

Developments in Bioabsorbable BioMg 250 Mg Alloy: *Jake Edick*¹; Raymond Decker¹; Stephen LeBeau¹; ¹nanoMAG, LLC

3:10 PM

Investigation of Biodegradable Zn-Li-Cu Alloys for Orthopaedic and Cardiovascular Applications: *Jacob Young*¹; Ramana Reddy¹; ¹University Of Alabama

3:30 PM Break

3:50 PM Invited

Nanoparticles Guided Non-classical Antibiofilm Efficacy for Tissue Engineering: *Anil Kishen*¹; ¹University of Toronto

4:20 PM Invited

Bioactive Ceramic Glasses: Extracting More Value from an Existing Material: *John Nychka*¹; ¹University of Alberta

4:50 PM Invited

Shape Optimization of Dental Restorations: *Alex Fok*¹; ¹University of Minnesota

5:20 PM

Low Temperature Air Plasma Modification of Electrospun Soft Materials and Bio-interfaces: *Vinoy Thomas*¹; Bernabe Tucker¹;

Kunning Xu²; Paul Becker¹; Yogesh Vohra¹; ¹University Of Alabama At Birmingham; ²University of Alabama in Huntsville

5:40 PM

Solution Deposited Hydroxyapatite: Meeting the Need for Conformal Coatings for Porous Metal Implants: *Rajendra Kasinath*¹; Stephanie Vass¹; Haibo Qu¹; Danny Etensohn¹; Bryan Smith¹; ¹DePuy Synthes (Johnson and Johnson)

ADVANCED MATERIALS

Bulk Metallic Glasses XVI — Structures and Modeling I

Sponsored by: TMS: Mechanical Behavior of Materials Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Gongyao Wang, Alcoa; Robert Maass, University of Illinois at Urbana-Champaign; Muhammad Rafique

Wednesday PM | March 13, 2019

206B | Henry B. Gonzalez Convention Center

Session Chairs: Wediong Li, The Goodyear Tire and Rubber Co.; Katharine Flores, Washington University

2:00 PM Invited

Making Glassy Solids Ductile at Room Temperature by Imparting Flexibility into Their Amorphous Structure: *Evan Ma*¹; ¹Johns Hopkins University

2:20 PM Invited

Structural and Thermomechanical Heterogeneities in Shear Banding Dynamics in Metallic Glasses: *Xue Wang*¹; *Yanfei Gao*¹; ¹University Of Tennessee

2:40 PM Invited

Are Hints about Glass Forming Ability Hidden in the Liquid Structure?: *Juan Wang*¹; *Ryogo Suzuki*¹; *Anupriya Agrawal*¹; *Katharine Flores*¹; ¹Washington University

3:00 PM Invited

Chemical Variation Induced Nanoscale Spatial Heterogeneity in Metallic Glasses: *Neng Wang*¹; *Feng Yan*¹; *Lin Li*¹; ¹University of Alabama

3:20 PM Break

3:40 PM Invited

Combining Modeling with 4D STEM to Explore the Nanoscale Origins of Structure-property Relationship in Metallic Glasses: *Pengyang Zhao*¹; *Ju Li*²; *Jinwoo Hwang*¹; *Yunzhi Wang*¹; ¹The Ohio State University; ²Massachusetts Institute of Technology

4:00 PM

Simulations on Shear Banding in Ultra-thin Metallic Glasses: *Guang-Ping Zheng*¹; ¹Hong Kong Polytechnic University

4:20 PM

Deformation Mechanism of Nanostructured Metallic Glass: *Sara Adibi Sedeh*¹; ¹Texas A&M University

4:40 PM Invited

Sample-size and Temperature Effects in Deformation Behavior of Bulk Metallic Glasses: *Chandra Sekhar Meduri*¹; *Golden Kumar*¹; ¹Texas Tech University

LIGHT METALS

Cast Shop Technology — Melt Treatment

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

Program Organizer: Pierre-Yves Menet, Constellium Technology Center

Wednesday PM | March 13, 2019

007B | Henry B. Gonzalez Convention Center

Session Chair: Johannes Morscheiser, Aleris Rolled Products Germany

2:00 PM Introductory Comments

2:05 PM

Furnace Atmosphere and Dissolved Hydrogen in Aluminium: *Martin Syvertsen*¹; *Anne Kvithyld*²; *Eilif Gundersen*³; *Inge Johansen*³; *Thorvald Engh*⁴; ¹SINTEF Materials and Chemistry; ²SINTEF Industry; ³Hydro Aluminium; ⁴Norwegian University of Science and Technology

2:25 PM

Miniature Vacuum Degassing System: *Allen Chan*¹; Ray Peterson²; ¹Praxair, Inc.; ²Real Alloy LLC

2:45 PM

Impact of the Filter Roughness on the Filtration Efficiency for Aluminum Melt Filtration: *Claudia Voigt*¹; Björn Dietrich¹; Mark Badowski²; Margarita Gorshunova²; Gotthard Wolf¹; Christos G. Aneziris¹; ¹TU Bergakademie Freiberg; ²Hydro Aluminium Rolled Products GmbH

3:05 PM

Influence of the Wetting Behavior on the Aluminum Melt Filtration: *Claudia Voigt*¹; Lisa Ditscherlein¹; Eric Werzner¹; Tilo Zienert¹; Rafal Nowak²; Urs Peuker¹; Natalia Sobczak²; Christos Aneziris¹; ¹TU Bergakademie Freiberg; ²Foundry Research Institute

3:25 PM Break

3:40 PM

Aluminium Filtration of Bonded Particle Filters: *Britt Elin Gihleengen*¹; Terje Haugen²; Inge Johansen²; Eilif Gundersen²; Shahid Akhtar²; Ulrik Aalborg Eriksen³; Sarina Bao⁴; Martin Syvertsen⁴; Anne Kvithyld⁴; ¹Hycast; ²Hydro; ³Norwegian University of Science and Technology; ⁴SINTEF Materials and Chemistry

4:00 PM

Evaluation of Filtration Efficiency of Ceramic Foam Filters (CFF) Using a Hydraulic Water System: *Massoud Hassanabadi*¹; Petr Bilek²; Shahid Akhtar³; Ragnhild E. Aune¹; ¹Norwegian University of Science and Technology (NTNU); ²Technical University of Liberec; ³Hydro Aluminium, Karmøy Primary Production

4:20 PM

Drain Free Filtration (DFF) – A New CFF Technology: *Ulf Tundal*¹; Idar Steen¹; Åge Strømsvåg¹; Terje Haugen²; John Olav Fagerlie²; Arild Håkonsen²; ¹Hydro Aluminium; ²Hycast AS

4:40 PM

Laboratory Scale Study of Reverse Priming in Aluminium Filtration: *Tanja Pettersen*¹; Martin Syvertsen¹; Sarina Bao¹; Freddy Syvertsen²; Britt Elin Gihleengen³; Ulf Tundal⁴; ¹SINTEF Industry; ²Syvertsen Støperikonsult; ³Hycast AS; ⁴Hydro Aluminium

5:00 PM

Estimation of Aluminum Melt Filtration Efficiency Using Automated Image Acquisition and Processing: *Hannes Zedel*¹; Robert Fritsch²; Ragnhild Aune³; ¹Carl von Ossietzky University of Oldenburg; ²Pyrotek, EMP Technologies Limited; ³Norwegian University of Science and Technology

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications — In Reactor Fuel Behavior

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Yongfeng Zhang, Idaho National Laboratory; Xian-ming (David) Bai, Virginia Polytechnic Institute and State University; David Andersson, Los Alamos National Laboratory; Thierry Wiss, European Commission- JRC -Institute of Transuranium Elements

Wednesday PM | March 13, 2019
214B | Henry B. Gonzalez Convention Center

Session Chairs: Andrea Jokisaari, Idaho National Laboratory; Isabella J. Van Rooyen, Idaho National Laboratory

2:00 PM Invited

A Model of Fission Gas Release and Swelling in UO₂ for Engineering Fuel Analysis: *Giovanni Pastore*¹; *Lelio Luzzi*²; *Paul Van Uffelen*³; ¹Idaho National Laboratory; ²Politecnico di Milano; ³European Commission, JRC-Karlsruhe

2:30 PM

Revisiting the Diffusion Mechanism of Helium in UO₂: A DFT+U Study: *Xiang-Yang Liu*¹; *David Andersson*¹; ¹Los Alamos National Laboratory

2:50 PM Invited

Multi-scale Modeling of Fission Gas Release in UO₂ Nuclear Fuel: *Larry Aagesen*¹; *Yongfeng Zhang*¹; *Daniel Schwen*¹; *Michael Tonks*²; *Giovanni Pastore*¹; ¹Idaho National Labs; ²University of Florida

3:20 PM

Neutron Irradiation Performance of Chemical Vapor Deposited SiC Fuel Systems at High Temperatures and Burnups: *Isabella Van Rooyen*¹; *Karen Wright*¹; *Thomas Lillo*¹; *Subhashish Meher*¹; *William Skerjanc*¹; *Yong Yang*²; *Fei Gao*³; ¹Idaho National Laboratory; ²University of Florida; ³University of Michigan

3:40 PM Break

4:00 PM Invited

Irradiation Effects on Nuclear Fuel: *Vincenzo Rondinella*¹; *Thierry Wiss*¹; *Dimitrios Papaioannou*¹; *Dragos Staicu*¹; *Stephane Bremier*¹;

Ondrej Benes¹; Paul Van Uffelen¹; ¹EC-JRC

4:30 PM

Probing the Thermodynamic and Kinetic Factors Leading to the Development of High Burnup Structure in UO₂: *Andrea Jokisaari*¹; ¹Idaho National Laboratory

4:50 PM

Microstructural and Micro-chemical Comparisons of AGR-1 and AGR-2 TRISO UCO Fuel Kernels Irradiated in the Advanced Test Reactor: *Zhenyu Fu*¹; Lingfeng He²; Isabella Rooyen²; Yong Yang¹; ¹University of Florida; ²Idaho National Laboratory

5:10 PM

Characterization of the Irradiation Effects in Nuclear Graphite: *José Arregui-Mena*¹; Philip Edmondson¹; Robert Worth²; Cristian Contescu¹; Timothy Burchell¹; Yutai Katoh¹; ¹Oak Ridge National Laboratory; ²The University of Manchester

CHARACTERIZATION

Characterization of Materials through High Resolution Imaging – Imaging II

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

Program Organizers: Ross Harder, Argonne National Laboratory; Richard Sandberg, Los Alamos National Laboratory; Xianghui Xiao, Argonne National Laboratory; Brian Abbey, La Trobe University; Saryu Fensin, Los Alamos National Laboratory; Ana Diaz, Paul Scherrer Institut; Mathew Cherukara, Argonne National Laboratory

Wednesday PM | March 13, 2019

303A | Henry B. Gonzalez Convention Center

Session Chair: Mathew Cherukara, Argonne National Laboratory

2:00 PM Invited

Exploring Ion-irradiation Damage Using Bragg Coherent X-ray Imaging and 3D Transmission Electron Microscopy: *Felix Hofmann*¹; Nicholas Phillips¹; Hongbing Yu¹; Ross Harder²; Wenjun Liu²; ¹University of Oxford; ²Argonne National Laboratory

2:30 PM Invited

Three-dimensional Imaging of Vortex Phases in Ferroic Materials: *Dmitry Karpov*¹; Ross Harder²; Turab Lookman³; Edwin Fohtung⁴;

¹New Mexico State University; ²Argonne National Laboratory; ³Los Alamos National Laboratory; ⁴New Mexico State University/ Los Alamos National Laboratory

2:50 PM

Multi-reflection Bragg Coherent Diffractive Imaging of Real-world Materials Samples: *Nicholas Phillips*¹; Ross Harder²; Wenjun Liu²; Ruqing Xu²; Gareth Hughes¹; James Douglas¹; Paul Bagot¹; Felix Hofmann¹; ¹University of Oxford; ²APS - Argonne National Laboratory

3:10 PM

Direct Observation of Point to Parallel Array Cu GB Segregation Behavior in Al Alloy 7075: *Prakash Parajuli*¹; Ruben Mendoza-Cruz¹; Arturo Ponce¹; Miguel Yacamán¹; ¹University of Texas at San Antonio

3:30 PM Break

3:50 PM

3D Mapping of Subgrains with High Resolution 3DXRD: *Mustafacan Kutsal*¹; Marta Majkut¹; Can Yildirim¹; Phil Cook¹; Yubin Zhang²; Jon Wright¹; Carsten Detlefs¹; Henning Poulsen²; ¹European Synchrotron Radiation Facility; ²Technical University of Denmark

4:10 PM

High Throughput Nano-size Precipitates Characterization of Steels with Unprecedented Statistics: Transmission Kikuchi Diffraction on Extraction Replicas: *Arunodaya Bhattacharya*¹; Chad Parish¹; Jean Henry²; Ying Yang¹; Lizhen Tan¹; Yutai Katoh¹; ¹Oak Ridge National Laboratory; ²CEA-Saclay

4:30 PM Invited

Multimodal Imaging Using Hard X-ray Speckle: *Marie-Christine Zdora*¹; ¹Diamond Light Source, University College London

4:50 PM

Deformation Behavior of Functionally Graded Polymeric Foams Using X-ray Tomography: *Arun Sundar Singaravelu*¹; Jason Williams¹; Mark Henderson²; Chris Holmes³; Nikhilesh Chawla¹; ¹Center for 4D Materials Science, Arizona State University; ²Future Team, Adidas; ³Future Team, Adidas AG

5:10 PM

A Fast Algorithm for Improving Reconstruction Quality with Incomplete Tomography Data: *Xianghui Xiao*¹; Ronald Agyei²; Michael Sangid²; ¹Argonne National Laboratory; ²Purdue University

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Non-ferrous Metals and Processes

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Wednesday PM | March 13, 2019
212B | Henry B. Gonzalez Convention Center

Session Chairs: Jiann-Yang Huang, Michigan Technological University; Pasquale Russo Spena, Politecnico di Torino

2:00 PM Introductory Comments

2:05 PM Invited

Predicting Ultrasound Resonance of Polycrystalline Materials by Multiscale Modeling: Application to Nickel-base Superalloys: *Marie-Agathe Charpagne*¹; Marat Latypov¹; Brent Goodlet¹; Mason Souther¹; Ben Bales¹; Mickael Kirka²; Tresa Pollock¹; ¹University of California Santa Barbara; ²Oak Ridge National Laboratory

2:25 PM

Thermodynamic Measurement Al-Li Alloy by Mass Spectrometry: Yuto Kobayashi¹; *Takashi Nagai*¹; ¹Chiba Institute Of Technology

2:45 PM

Adsorption Behavior of Cu() to Silica-humics Composite Aerogels: *Guihong Han*¹; Pengfei Tang¹; Hongyang Wu¹; Jun Ma¹; Xiaomeng Yang¹; Yongsheng Zhang¹; ¹Zhengzhou University

3:05 PM

A Combinatorial Investigation of Cu-Nb Metallic Glass Thin Films: *Mohammad Abboud*¹; Amir Motallebzadeh²; Sezer Ozerinc¹; ¹Middle East Technical University; ²Koç University

3:25 PM Break

3:40 PM

Inter and Transgranular Nucleation and Growth of Voids in Shock Loaded Copper Bicrystals: *Elizabeth Fortin*¹; Benjamin Shaffer¹; Saul Opie¹; Matthew Catlett²; Pedro Peralta¹; ¹Arizona State University; ²Los Alamos National Laboratory

4:00 PM

Identification of the Crystal Structure of the Ti_4Pt_3 Compound—Preliminary Results: *Karem Tello*¹; Raul Cardoso-Gil²; Fernanda Arancibia¹; Claudio Aguilar¹; Nubia Caroca-Canales²; Michael Kaufman³; ¹University Tecnica Federico Santa Maria; ²Max-Planck-Institut für Chemische Physik fester Stoffe; ³Colorado School of Mines

4:20 PM

Influence of Strain Rate and Microstructure on the Substructure Evolution and Mechanical Properties of Ti-407: *Zachary Kloenne*¹; Gopal Viswanathan¹; Matt Thomas²; M.H. Lorreto³; Hamish Fraser¹; ¹The Ohio State University; ²TIMET; ³University of Birmingham

4:40 PM

Deformation Mechanisms of Mg-Zn-Y Alloys with LPSO Phase Studied by Various In-situ Methods: *Klaudia Horvath*¹; Daria Drozdenko¹; Kristián Máthis¹; Jan Capek²; Gerardo Garcés³; Dong Ma⁴; Ke An⁴; Patrik Dobron¹; ¹Charles University; ²Lab Neutron Scattering & Imaging, Paul Scherrer Institut; ³CENIM-CSIC; ⁴Chemical and Engineering Materials Division, Spallation Neutron Source, Oak Ridge National Laboratory

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Polymer and Composite Materials

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Wednesday PM | March 13, 2019
212A | Henry B. Gonzalez Convention Center

Session Chairs: Sergio Monteiro, UENF; Jinhong Li, China University of Geosciences

2:00 PM Introductory Comments

2:05 PM

Two Fibers Used in the Colombian Amazonia and Its Uses as Potential Reinforcement for Composite Materials: *Henry Colorado*¹; Claudio Aguilar²; ¹Universidad De Antioquia; ²Universidad Técnica Federico Santa María

2:25 PM

Visualizing Stress Distribution of Ceramic/Epoxy Composite under Non-linear Deformation Using Micro-mechanical Raman Spectroscopy: *Abhijeet Dhiman*¹; Chandra Prakash¹; Vikas Tomar¹; ¹Purdue University

2:45 PM

Development and Characterization of Epoxy Based Polymer Matrix Hybrid Composite Using Chicken Feather, Coir Fiber and Egg Shell Powder: Saju Kuriakose¹; Sandesh Kiran Swamidas¹; *Rajaprakash Mruthunjayappa*¹; ¹University Visvesvaraiyah College of Engineering (UVCE), Bangalore University

3:05 PM

Flexural Mechanical Characterization of Polyester Composites Reinforced with Sisal Fabric: *Frederico Margem*¹; Sergio Monteiro²; Andre Gomes¹; Glenio Daniel¹; Vinicius Barbosa¹; Alexandre Amorin¹; Victor Souza¹; ¹Uniredentor; ²IME

3:25 PM Break

3:40 PM

Cost Evaluation of Polymeric Composites Reinforced by Natural Fibers: *Felipe Perisse Duarte Lopes*¹; Carlos Fontes Vieira¹; ¹UENF

4:00 PM

Influence of Albizzia Lebbeck Benth Pods Particulate on Mechanical Properties of Low Density Polyethylene: *Oluwashina Gbenedor*¹; Emmanuel Akpan²; Festus Osabumwenre¹; Samson Adeosun¹; ¹University of Lagos; ²Institut fur Verbundwerkstoffe

MATERIALS DESIGN

Computational Approaches for Big Data, Artificial Intelligence and Uncertainty Quantification in Computational Materials Science — AI Applied to General Materials Science

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Liang Qi, University of Michigan; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory; Adrian Sabau, Oak Ridge National Laboratory; Houlong Zhuang, Arizona State University ; Sugata Chowdhury, National Institute of Standards and Technology

Wednesday PM | March 13, 2019

305 | Henry B. Gonzalez Convention Center

Session Chair: Anubhav Jain, LBNL

2:00 PM Invited

An Autonomous Characterization System for Limited-data Experimental Materials Screening: Composition Spread Thin Film Experiments: *Brian DeCost*¹; Heshan Yu²; Xiaohang Zhang²; Seunghun Lee²; Yangang Liang²; Jason Hattrick-Simpers¹; Ichiro Takeuchi²; Aaron Kusne¹; ¹National Institute of Standards and Technology; ²University of Maryland

2:30 PM

A Machine Learning Framework to Improve nanoHUB Prediction Capabilities Using Existing Tool Data: *Saaketh Desai*¹; Sam Reeve¹; Alejandro Strachan¹; ¹Purdue University

2:50 PM Invited

Characterizing the Likelihood of Success of Using Machine Learning to Design Novel Materials: *Yoolhee Kim*¹; ¹Citrine Informatics

3:20 PM

Perspectives on the Impact of Machine Learning, Deep Learning, and Artificial Intelligence on Materials, Processes, and Structures Engineering: *Dennis Dimiduk*¹; *Elizabeth Holm*²; *Stephen Niezgoda*³; ¹BlueQuartz Software LLC; ²Carnegie Mellon University; ³The Ohio State University

3:40 PM Break

4:00 PM Invited

Developing Fast-running Simulations Models for Manufacturing Using Deep Learning: *Victor Castillo*¹; ¹Lawrence Livermore National Laboratory

4:30 PM Invited

Software Tools, Crystal Descriptors, and Applications of Machine Learning Applied to Materials Design: *Anubhav Jain*¹; ¹Lawrence Berkeley Laboratory

5:00 PM

Towards Predictive Synthesis of Computer-designed Inorganic Materials: *Muratahan Aykol*¹; ¹Toyota Research Institute

MATERIALS DESIGN

Computational Materials Discovery and Design — Computational Methods for Materials Discovery and Design III

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Oliver Johnson, Brigham Young University; Arunima Singh, Arizona State University; Jake Bair, Pacific Northwest National Laboratory; Christopher Weinberger, Colorado State University; Timofey Frolov, Lawrence Livermore National Laboratory; Ning Zhang, Colorado School of Mines; Fadi Abdeljawad, Clemson University; Richard Hennig, University of Florida; Mikhail Mendeleev, Ames Laboratory; Avinash Dongare, University of Connecticut

Wednesday PM | March 13, 2019
304C | Henry B. Gonzalez Convention Center

Session Chair: Oliver Johnson, Brigham Young University

2:00 PM

Building Microstructure Evolution Linkages for Sintering of Polycrystalline Ceramics: *Yuksel Yabansu*¹; *Veronika Rehn*²; *Johannes Hotzer*²; *Britta Nestler*²; *Surya Kalidindi*¹; ¹Georgia Institute Of Technology; ²Karlsruhe Institute of Technology

2:20 PM

A Machine Learning Approach for Process Optimization of Polycrystalline Materials: *Pinar Acar*¹; ¹Virginia Tech

2:40 PM

Reduced-order Model for Microstructure Evolution Simulation in Solid Oxide Fuel Cell with Dynamic Discrepancy Reduced Modeling: *Yinkai Lei*¹; *Tian-Le Cheng*¹; *You-Hai Wen*¹; *David Mebane*²; ¹National Energy Technology Laboratory; ²West Virginia University

3:00 PM

Grain Growth in Ytria-doped Alumina - A Simulation Study: *Philip Goins*¹; *William Frazier*¹; ¹U.S. Army Research Laboratory

3:20 PM Break

3:40 PM

CALPHAD-guided Alloy Design and Processing of Novel Ceramics and Cermets in Titanium-Boron System: *K. S. Ravi Chandran*¹; *Jun Du*¹; *Vikas Jindal*²; *Anthony Sanders*³; ¹University of Utah; ²IIT-BHU; ³Ortho Development Corporation

4:00 PM

Multi-objective Design of Functionally Graded Materials in Multicomponent Alloy Systems: *Tanner Kirk*¹; *Olga Eliseeva*¹; *Richard Malak*¹; *Raymundo Arroyave*¹; *Ibrahim Karaman*¹; ¹Texas A&M University

4:20 PM

Optimisation of Plasticity-induced Transformations and Strengthening in TRIP/TWIP Titanium Alloys: *Madeleine Bignon*¹; *Pedro Rivera Díaz-del-Castillo*²; *Gérard Ramstein*¹; *Emmanuel Bertrand*¹; *Franck Tancret*¹; ¹Université de Nantes; ²University of Lancaster

PHYSICAL METALLURGY

**Computational Thermodynamics and Kinetics —
 Microstructural Evolution I**

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tournet, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

Wednesday PM | March 13, 2019
225C | Henry B. Gonzalez Convention Center

Session Chairs: Emine Gulsoy, Northwestern University; Efrain Hernandez-Rivera, U.S. Army Research Laboratory

2:00 PM Invited

The Thermodynamic and Kinetic Effects of Microalloying Elements in Al-Cu Alloys: *Patrick Shower*¹; James Morris¹; Dongwon Shin¹; Amit Shyam¹; ¹Oak Ridge National Laboratory

2:30 PM

Stabilization of Intermetallic Precipitates against Coarsening through Interface Engineering: A Phase-field Study: *Sourabh Kadambi*¹; Fadi Abdeljawad²; Srikanth Patala¹; ¹North Carolina State University; ²Clemson University

2:50 PM Invited

Toward Equilibrium: *Marius Stan*¹; Noah Paulson¹; ¹Argonne National Laboratory

3:20 PM Invited

Effect of Magnetic Field on Microstructure Evolution: *Philip Goins*¹; Heather Murdoch¹; Efrain Hernandez-Rivera¹; Mark Tschopp¹; ¹U.S. Army Research Laboratory

3:50 PM Break

4:10 PM

A Thermodynamically Consistent Phase-field Modeling Framework for Micro-elasto-viscoplasticity: *Youhai Wen*¹; Tianle Cheng¹; ¹National Energy Technology Laboratory

4:30 PM

Modeling of Volume Diffusion Controlled Phase Transformations in Multiphase Multicomponent Alloy Systems by Minimization of Gibbs Energy: *Anders Salwén*¹; ¹InnoXinetix AB

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Behavior of High Temperature Alloys – Superalloys: Processing and Environmental-Assisted Mechanisms

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

Program Organizers: Michael Titus, Purdue University; Qiang Feng, University of Science and Technology Beijing; Akane Suzuki, GE Global Research; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Sammy Tin, Illinois Institute of Technology; Martin Detrois, National Energy Technology Laboratory

Wednesday PM | March 13, 2019
301C | Henry B. Gonzalez Convention Center

Session Chairs: Sammy Tin, Illinois Institute of Technology; Akane Suzuki, GE Global Research

2:00 PM

Influence of Thermomechanical Processing and Hot Deformation on Microstructural Evolution towards Building a Comprehensive Model for Metadynamic Recrystallization Kinetics in Alloy IN625: *Benjamin Adam*¹; *Graham Tewksbury*¹; *John Walters*²; *Chris Bergner*³; ¹Portland State University; ²Scientific Forming Technology Corporation; ³Forging Defense Manufacturing Consortium

2:20 PM

Hot Forging of a Nickel-base Superalloy – dynamic Recrystallisation and Deformation Mechanisms in ATI 718Plus®: *Christiane Kienl*¹; *Christos Argyrakis*²; *Cathie Rae*¹; ¹University of Cambridge; ²Rolls-Royce plc.

2:40 PM

Processing and Microstructural Conditions Contributing to Abnormal Grain Growth in Ni-based Superalloys: *Byron McArthur*; *Amy Clarke*¹; *Kester Clarke*¹; *Michael Kaufman*¹; *Kevin Severs*²; ¹Colorado School of Mines; ²Allegheny Technologies Incorporated

3:00 PM

Microstructure and Mechanical Properties of Rotary Friction Welding of a New Wrought Ni-Fe Based Superalloy: *Yaxin Xu*¹; *Wenya Li*¹; ¹Northwestern Polytechnical University

3:20 PM Break

3:40 PM

Tribological Behavior of Alloys 800H and 617 at Elevated Temperatures and in Impure Helium Environments: *Valentin Pauly*¹; Malcolm Clark¹; Joseph Kern¹; Carter Tesch¹; Oyelayo Ajayi²; Dileep Singh²; David Grierson¹; Kumar Sridharan¹; ¹University of Wisconsin, Madison; ²Argonne National Laboratory

4:00 PM

Effect of Multiaxiality and Oxidation on the Kinetics of Microstructural Instabilities in Nickel-based Single Crystal Superalloys for Extreme Environment: *Seungjun Lee*¹; Jean Briac le Graverend¹; ¹Texas A&M University

4:20 PM

Effect of the Environment and Pre-cracked Non-metallic Inclusions on Lifetime Variability of AD730™: *Adèle Govaere*¹; Florence Hamon²; Anne-Laure Rouffié³; Jean-Michel Franchet³; Jonathan Cormier⁴; Patrick Villechaise²; ¹SAFRAN Tech & Institut Pprime; ²CNRS - Institut Pprime; ³SAFRAN Tech; ⁴ISAE-ENSMA & Institut Pprime

4:40 PM

High Temperature Oxidation of Co-base Superalloys: Investigating the 3D Structures of Oxide Scales by Means of X-ray NanoCT, FIB Tomography and Analytical TEM: *Malte Lenz*¹; Nadine Buchinger¹; Jan Rosiwal¹; Yolita Eggeler¹; Silvan Englisch¹; Janis Wirth¹; Martin Weiser¹; Sannakaisa Virtanen¹; Erdmann Spiecker¹; ¹University Erlangen, Nuernberg

SPECIAL TOPICS

Effective Business Improvement Methodologies for the Minerals, Metals, and Materials Industries

Program Organizers: Barry Sadler, Net Carbon Consulting Pty Ltd; Eric Schmidt, Vallourec Star; Robert Hyers, University of Massachusetts

Wednesday PM | March 13, 2019

303B | Henry B. Gonzalez Convention Center

Session Chair: Barry Sadler, Net Carbon Consulting Pty Ltd

2:00 PM Introductory Comments

2:10 PM

Case Studies of Continuous Improvement Projects in the Metals Industry: *Cynthia Belt*¹; ¹Metals Energy Management, LLC

2:40 PM

The Value of Investigating and Trending Minor Failures to Prevent Major Incidents: Jedediah Redman¹; *Nicholas Cherolis*²; Daniel Benac¹; Dorothy Shaffer¹; ¹Baker Engineering and Risk Consultants; ²Baker Engineering and Risk Consultants, Inc.

3:10 PM

Process Stability – The Key to Improvement in Mining, Smelting and Process Industries: *Keith Sinclair*¹; ¹Sinclair Associates, Inc.

3:40 PM Break

4:00 PM

Business Development Strategies and Approaches in Minerals, Metals and Materials - an Industrial Gas Supplier's Perspective: *Adrian Deneys*¹; ¹Praxair, Inc.

4:30 PM Demonstration

4:50 PM Panel Discussion

5:20 PM Concluding Comments

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Environmentally Assisted Embrittlement and Failure

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

Program Organizers: Bai Cui, University of Nebraska Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc

Wednesday PM | March 13, 2019
214C | Henry B. Gonzalez Convention Center

Session Chairs: Reiner Kirchheim, University of Göttingen; Jian Luo, University of California, San Diego

2:00 PM Invited

Plasticity and Fracture Affected by the Uptake of Chemical Elements from the Environment: *Reiner Kirchheim*¹; ¹University of Goettingen

2:40 PM

The Effect of Hydrogen on the Plastic Deformation of Metals as Predicted from Discrete Dislocation Dynamics Simulations: *Yejun Gu*¹; *Jaafar El-Awady*¹; ¹Johns Hopkins University

3:00 PM

Environmental Influences on Crack Formation and Fracture Mechanical Behavior of a Beta-stabilized Gamma-TiAl Alloy: *Christian Loeffl*¹; *Holger Saage*¹; *Mathias Göken*²; ¹University of Applied Sciences Landshut; ²Friedrich-Alexander-University Erlangen-Nürnberg

3:20 PM

Environmentally-assisted Cracking of a Ni-based Superalloy Closure Weld in the Presence of Rocket Propellant: *David Dawicke*¹; *Jacob Hochhalter*²; *Mark McClure*³; *Mika Myers*³; *James Burns*⁴; *Kirk Sneddon*⁵; *Heather Hickman*⁶; *Richard Russell*⁷; ¹Analytical Services & Materials, Inc.; ²NASA Langley Research; ³NASA White Sands Test Facility; ⁴University of Virginia; ⁵Arde Inc.; ⁶NASA Glenn Research Center; ⁷NASA Kennedy Space Center

3:40 PM Break

4:00 PM Invited

A Review of Grain Boundary Adsorption, Wetting and Transformations: Implications in Liquid Metal and Grain Boundary Embrittlement and Beyond: *Jian Luo*¹; ¹University of California, San Diego

4:40 PM

Liquid Metal Embrittlement of Austenitic Steels: Recent Results: *Auger Thierry*¹; *Bassem Barkia*¹; *Jean-Louis Courrouau*²; *Fosca Di Gabriele*³; *Anna Hojna*³; *Michal ChoCholousek*³; ¹CNRS/ENSAM/CNAM; ²CEA; ³CVR

5:00 PM

Liquid Metal Embrittlement of Engineering Alloys by eGain: Data-driven Experimental Design Using Sequential Learning: *Justin Norkett*¹; *Victoria Miller*¹; ¹North Carolina State University

MECHANICS & STRUCTURAL RELIABILITY

Fatigue in Materials: Multi-scale and Multi-environment Characterizations and Computational Modeling — Load and

Environment Interaction Effects on the Mechanical Response during Fatigue

Sponsored by: TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Jean-Briac le Graverend, Texas A&M University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Garrett Pataky, Clemson University; Filippo Berto, Norwegian University of Science and Technology

Wednesday PM | March 13, 2019
301B | Henry B. Gonzalez Convention Center

Session Chair: Jean-Briac le Graverend, Texas A&M University

2:00 PM

Characterization of the Effects of High Altitude Environments on Dislocation Structure Evolution during Fatigue Loading of 7075-T651: *Adam Thompson*¹; Zachary Harris¹; James Burns¹; ¹University of Virginia

2:20 PM

Probabilistic Dwell Fatigue Life Prediction in Microtextured Ti-6Al-4V: *Sushant Jha*¹; Joseph Tucker²; James Larsen³; Reji John³; Adam Pilchak³; ¹University of Dayton Research Institute; ²Exponent, Inc.; ³U.S. Air Force Research Laboratory

2:40 PM

Invitro Fatigue Behavior of NiTi Shape Memory Wire: *Lakhindra Marandi*¹; Indrani Sen¹; ¹Indian Institute of Technology Kharagpur

3:00 PM

Short Crack Growth of Metastable Austenitic and Martensitic Stainless Steels under Hydrogen Influence: *Sven Brück*¹; Volker Schippl¹; Hans-Jürgen Christ¹; Claus-Peter Fritzen¹; Martina Schwarz²; Stefan Weihe²; ¹Universitaet Siegen; ²Universität Stuttgart

3:20 PM Break

3:40 PM

Twinning in (α+β) Titanium Alloy Submitted to Dwell Fatigue Loading: *Cyril Lavogiez*¹; Samuel Hémery¹; Patrick Villechaise¹; ¹Pprime Institute

4:00 PM Invited

Experimental and Computational Studies of Crack Growth in Steel Alloy 709 at Elevated Temperatures under Fatigue and Creep Loading: *Gabriel Potirniche*¹; Jose Ramirez¹; Nicholas Shaber¹; Martin Taylor¹; Robert Stephens¹; Indrajit Charit¹; ¹University of Idaho

4:20 PM

The Fatigue Life of AISI 4140 in the VHCF Regime at High Temperatures: *Alexander Schmiedel*¹; Horst Biermann¹; Anja Weidner¹; ¹TU Bergakademie Freiberg

4:40 PM

Creep-fatigue Deformation in 9-Cr1MoV Base Metal and Weldments: *Harrison Whitt*¹; Tyler Payton¹; Wei Zhang¹; Michael Mills¹; ¹Ohio State University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Fracture Processes of Thin Films and Nanomaterials – Thin Film and Interface Fracture

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

Program Organizers: Daniel Kiener, University of Leoben; Megan Cordill, Erich Schmid Institute; Johannes Ast, Empa, Swiss Federal Laboratories for Materials Science and Technology; Brad Boyce, Sandia National Laboratories

**Wednesday PM | March 13, 2019
 217B | Henry B. Gonzalez Convention Center**

Session Chairs: Megan Cordill, Erich Schmid Institute of Materials Science; Corinne Packard, Colorado School of Mines

2:00 PM Invited

Analysis of Fracture Surface Morphology in Microscale GaAs and Ge Films: *Corinne Packard*¹; ¹Colorado School of Mines

2:20 PM

Interfacial Fracture Toughness of GaN Film on Diamond Substrate for Application in Ultra-high Power Radio Frequency Devices: *Dong Liu*¹; Stephen Fabes²; Daniel Francis³; Martin Kuball¹; ¹University of Bristol; ²University Of Oxford; ³Akash Systems

2:40 PM

Dependence of the Fracture Toughness of Freestanding Metallic Thin Films on their Yield Strength and Microstructure: *Benoit Merle*¹; *Eva Preiß*¹; *Mathias Göken*¹; ¹University Erlangen, Nürnberg

3:00 PM

Alloying Effects on Ductility of Nanostructured Cu-X (X = Zr and W) Thin Films: *Jiantuo Zhao*¹; *Jinyu Zhang*¹; *Gang Liu*¹; *Jun Sun*¹; ¹Xi'an Jiaotong University

3:20 PM Invited

Impact of Alloying and Interfaces on Fracture Toughness of Transition Metal Nitrides and Borides: *Paul Mayrhofer*¹; ¹TU Wien

3:40 PM Break

4:00 PM Invited

In Situ Stable Fracture of Ceramic Interfaces Tested under Environmental Conditions: *Giorgio Sernicola*¹; *Finn Giuliani*¹; ¹Imperial College London

4:20 PM

In Situ Fracture of Reliability Relevant Interfaces in Microelectronic Devices: *Markus Alfreider*¹; *Johannes Zechner*²; *Daniel Kiener*¹; ¹University of Leoben; ²KAI Kompetenzzentrum Automobil- und Industrieelektronik GmbH

MATERIALS PROCESSING

Friction Stir Welding and Processing X — Controls and Inspection

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

Wednesday PM | March 13, 2019

210B | Henry B. Gonzalez Convention Center

Session Chair: Glenn Grant, Pacific Northwest National Laboratory

2:00 PM Panel Discussion: Learn from the founders - More than

100 years of experience in academic friction stir related research

3:00 PM Invited

Developing and Deploying FSW&P through Standardization:
*Dwight Burford*¹; ¹Joining Innovations, LLC

3:20 PM

Economics of Commercialization: An Industrial Case Study of How to Resolving CAPEX and OPEX Barriers: *Dale Fleck*¹; ¹MegaStir

3:40 PM Break

4:00 PM

Advances in Signal Processing for Friction Stir Welding Temperature Control: *Brandon Taysom*¹; Carl Sorensen¹; ¹Brigham Young University

4:20 PM Invited

Improved Techniques Tool Temperature Measurement, Reporting and Interpretation: *Kenneth Ross*¹; Scott Whalen¹; Md Reza-E-Rabby¹; Martin McDonnell²; ¹Pacific Northwest National Laboratory; ²U.S. Army - TARDEC

4:40 PM

Using Spindle Speed vs Spindle Power as the Manipulated Variable for Temperature Control in Friction Stir Welding: *Brandon Taysom*¹; Carl Sorensen¹; ¹Brigham Young University

5:00 PM

Intermittent Flow of Material and Force Based Defect Detection during Friction Stir Welding of Aluminum Alloys: *Daniel Franke*¹; Michael Zinn¹; Frank Pfefferkorn¹; ¹University of Wisconsin, Madison

5:20 PM

Realization of Conventional, Stationary Shoulder and Dual Rotation FSW with an Adaptive FSW Spindle Construction: *Michael Grätzel*¹; Konstantin Schick-Witte¹; Jean Pierre Bergmann¹; ¹Technische Universität Ilmenau

MATERIALS PROCESSING

Friction Stir Welding and Processing X — Lightweight Materials

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

Wednesday PM | March 13, 2019
210A | Henry B. Gonzalez Convention Center

Session Chairs: David Yan, San Jose State University; Enkhsaikhan Boldsaikhan, Wichita State University

2:00 PM Panel Discussion: Learn from the founders - More than 100 years of experience in academic friction stir related research

3:00 PM Invited

High Speed Friction Stir Lap Welding of Al Alloys: Piyush Upadhyay¹; Xiao Li²; Tim Roosendaal²; ¹Pacific Northwest National Laboratory; ²Pacific Northwest National Laboratory

3:20 PM

Processing and Properties of Engineered Metal Matrix Composites Produced Via Co-Extrusion for High-temperature Friction Stir Welding: Paul Brune¹; Jeremy Watts¹; Gregory Hilmas¹; ¹Missouri University of Science and Technology

3:40 PM Break

4:00 PM Invited

Friction Stir Welding of Lap Joints using New Al-Li Alloys for Stringer-skin Joints: Egoitz Aldanondo¹; Ekaitz Arruti¹; Alberto Echeverria¹; Iñaki Hurtado²; ¹IK4-LORTEK; ²Mondragon Unibertsitatea, Faculty of Engineering (MU-ENG)

4:20 PM

Tool Shoulder End Features on Material Flow and Mechanical Properties during Friction Stir Welding of Al-Mg-Si Alloy: Krishna Kishore Mugada¹; Kumar Adepu²; ¹Gayatri Vidya Parishad College of Engineerin; ²NIT Warangal

4:40 PM Invited

Improving Porous TC4/UHMWPE Friction Spot Welding Joint through Controlling Welding Temperature and Force: Muyang Jiang¹; Ke Chen¹; Binxi Chen¹; Min Wang²; Lanting Zhang¹; Aidang Shan¹; ¹Shanghai Jiao Tong University; ²SShanghai Jiao Tong University

5:00 PM

Production of AlSi12CuNiMg/ Al₂O₃ Micro/Nanodispersed Surface Composites Using Friction Stir Processing for Automotive Applications.: Lavinia Tonelli¹; *Mohamed Refat*²; Stefania Toschi¹; Mohamed Ahmed³; Essam Ahmed³; Alessandro Morri¹; Iman El-Mahallawi⁴; Lorella Ceschini¹; ¹University of Bologna; ²British University in Egypt; ³Suez University; ⁴Cairo University

MATERIALS PROCESSING

Heterogeneous and Gradient Materials (HGM III): Tailoring Mechanical Incompatibility for Superior Properties — Deformation, Fracture and Fatigue

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

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

Wednesday PM | March 13, 2019
209 | Henry B. Gonzalez Convention Center

Session Chairs: Irene Beyerlein, University of California, Santa Babara; Lei Lu, Institute of Metal Research; Yunzhi Wang, Ohio State University; Shoichi Kikuchi, Shizuoka University

2:00 PM Invited

Fatigue Crack Initiation and Propagation Behaviors in CP Titanium and Ti-6Al-4V Alloy with a Bimodal Harmonic Structure: *Shoichi Kikuchi*¹; Yoshikazu Nakai²; ¹Shizuoka University; ²Kobe University

2:25 PM

Propagating Instabilities in Architected Materials: *Antoine-Emmanuel Viard*¹; Samuel Forest²; Justin Dirrenberger¹; ¹PIMM Arts et Métiers ParisTech; ²Mines ParisTech

2:45 PM

Localized Corrosion Behaviour and Surface Softening of AA7150 after Ultrasonic Shot Peening: *Qingqing Sun*¹; Qingyou Han²; ¹IMR CAS; ²Purdue University

3:05 PM

Low Temperature Deformation of Cu/Nb Nanolaminates: Rolf Schaarschuch¹; Lutz Hollang¹; Carl-Georg Oertel¹; Irene Beyerlein²; Nathan Mara³; *Werner Skrotzki*¹; ¹TU Dresden; ²University of California, Santa Barbara; ³University of Minnesota

3:25 PM

Pre-tension Effect on Cyclic Response of Cu with Highly Oriented Nano-scale Twins: *Qingsong Pan*¹; Haofei Zhou²; Huajian Gao²; Lei Lu¹; ¹Institute of Metal Research, Chinese Academy of Sciences; ²School of Engineering, Brown University

3:45 PM Break

4:05 PM Invited

Fracture Behavior of Metal-ceramic and Metal-metal Nanolaminates: *Jon Molina-Aldareguia*¹; ¹Imdea Materials Institute

4:30 PM

Transition from the Thickness-dependent to Thickness-independent Strength in the Nano-twinned Metals: *Caizhi Zhou*¹; Sixie Huang¹; Irene Beyerlein²; ¹Missouri University of Science And Technology; ²University of California, Santa Barbara

4:50 PM

Regulating Shear-dominant Displacive Processes by Nano-scale Concentration Modulations: Jiaming Zhu¹; Dong Wang²; Yipeng Gao³; Tongyi Zhang¹; *Yunzhi Wang*³; ¹Hong Kong University of Science and Technology; ²Xi'an Jiao Tong University; ³Ohio State University

5:10 PM

Mechanical Interface Energies within Gradient Plasticity, Nanoindentation and Molecular Dynamics: *Katerina Aifantis*¹; ¹University of Florida

ADVANCED MATERIALS

High Entropy Alloys VII — Structures and Mechanical Properties III

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Wednesday PM | March 13, 2019
207A | Henry B. Gonzalez Convention Center

Session Chairs: Jeffrey Hawk, National Energy Technology Laboratory; Haruyuki Inui, Kyoto University

2:00 PM Invited

Metastability Driven Hierarchical Microstructural Engineering: Overview of Strength-ductility Paradigms in Complex Concentrated Alloys: *Rajiv Mishra*¹; S. Nene¹; M. Frank¹; M. Komarasamy¹; S. Sinha¹; K. Liu¹; S. Shukla¹; ¹University of North Texas

2:20 PM Invited

Deformation Behavior of High Entropy Ceramics: *Kenneth Vecchio*¹; Tyler Harrington¹; Josh Gild¹; Pranab Sarker²; Cormac Toher²; Olivia Dipppo¹; Eduardo Marin¹; Lucas Borowski¹; Jian Luo¹; Stefano Curtarolo²; Donald Brenner³; ¹University of California, San Diego; ²Duke University; ³North Carolina State University

2:40 PM Invited

Small-scale Plastic Deformation of High Entropy Alloys: Mayur Pole¹; Saideep Muskeri¹; Vahid Hasannaemi¹; *Sundeep Mukherjee*¹; ¹University of North Texas

3:00 PM Invited

Single-crystal Mechanical Properties of Equiatomic CrMnFeCoNi High-entropy Alloy and Its Derivative Equiatomic Quaternary and Ternary Medium-entropy Alloys: *Haruyuki Inui*¹; Easo George²; ¹Kyoto University; ²Oak Ridge National Laboratory

3:20 PM

Enhancing Strength and Strain Hardenability via Deformation Twinning in Fcc-based High Entropy Alloys Reinforced with Intermetallic Compounds: *Deep Choudhuri*¹; Bharat Gwalani¹; Mageshwari Komarasamy¹; Srivilliputhur Srinivasan¹; Rajiv Mishra¹; Rajarshi Banerjee¹; ¹University of North Texas

3:40 PM Break

4:00 PM Invited

Creep Performance of Single Phase FCC High Entropy Alloys: Kyle Rozman¹; Martin Detrois¹; Paul Jablonski¹; Michael Gao¹; Jeffrey Hawk¹; ¹National Energy Technology Laboratory

4:20 PM Invited

Neutron Scattering Mapping to Investigate the Fatigue-crack Propagation in an Equiatomic CoCrFeMnNi High-entropy Alloy: Bo-Hong Lai¹; Rui Feng²; Soo Yeol Lee³; Yao-Jen Chang⁴; Stefanus Harjo⁵; Yuan-Wei Chang¹; Yu-Lih Huang¹; Chu-Chun Kao¹; Hung-Sheng Chou¹; Liaw Peter²; An-Chou Yeh⁴; E-Wen Huang¹; ¹National Chiao Tung University; ²University of Tennessee; ³Chungnam National University; ⁴National Tsing Hua University; ⁵J-PARC Center, Japan Atomic Energy Agency

4:40 PM

On the Nature of Plastic Flow in CoCrFeMnNi Alloy under High-velocity Shear Deformation: Shwetabh Yadav¹; Andrew Kustas²; Nicolas Argibay²; Dinakar Sagapuram¹; ¹Texas A&M University; ²Sandia National Laboratories

ADVANCED MATERIALS

High Entropy Alloys VII — Thermal and Other Properties II

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Wednesday PM | March 13, 2019

207B | Henry B. Gonzalez Convention Center

Session Chairs: Jaimie Tiley, AFOSR/RTA1; David Shifler, Office of Naval Research

2:00 PM Invited

Radiation Effects in High Entropy Alloys: Similarities and Differences with Conventional Alloys: Steven Zinkle¹; Tengfei Yang¹; Congyi Li¹; ¹University of Tennessee

2:20 PM

Phase Stability and Solid Solution Strengthening in Fcc High-entropy Alloys Investigated by a Diffusion Couple Approach: *Karsten Durst*¹; Enrico Bruder¹; Tom Keil¹; ¹TU Darmstadt

2:40 PM

Diffusion in Fcc AlCoCrFeNi High Entropy Alloys: *Abhishek Mehta*¹; Le Zhou¹; Yongho Sohn¹; ¹University of Central Florida

3:00 PM Invited

Transformation Induced Softening and Plasticity in High Entropy Alloys: *Jia Li*¹; Qihong Fang¹; Bin Liu²; Yong Liu²; ¹State Key Laboratory of Advanced Design and Manufacturing for Vehicle Body, Hunan University; ²State Key Laboratory of Powder Metallurgy, Central South University

3:20 PM Invited

High-entropy Metal Diborides and Fluorite/Pervoskite Oxides: *Jian Luo*¹; Joshua Gild¹; Tyler Harrington¹; Sicong Jiang¹; Kenneth Vecchio¹; Cormac Toher²; Pranab Sarker²; Stefano Curtarolo²; Jeffrey Braun³; Lavina Backman³; Patrick Hopkins³; Elizabeth Opila³; Samuel Daigle⁴; Donald Brenner⁴; Jon-Paul Maria⁵; ¹University of California, San Diego; ²Duke University; ³University of Virginia; ⁴North Carolina State University; ⁵Pennsylvania State University

3:40 PM Break

4:00 PM

Phase Transformations of HfNbTaTiZr High Entropy Alloy at Intermediate Temperature: *Shuying Chen*¹; Peter K Liaw¹; Jien-Wei Yeh²; ¹University of Tennessee; ²National Tsing Hua University

4:20 PM

Phase Formation and Magnetic Properties of FeMnCoCrAl Based High Entropy Alloy Thin Films: *Marshal Amalraj*¹; ¹RWTH Aachen University

4:40 PM

Investigation of Interdiffusion in High Entropy Alloys: Mohammad Afkuzzaman¹; Irina Belova¹; *Graeme Murch*¹; ¹University of Newcastle

5:00 PM

Radiation Resistant High Entropy Alloys for Fast Reactor Cladding Applications: *Anna Kareer*¹; David Armstrong¹; Angus Wilkinson¹; ¹University of Oxford

Hume-Rothery Symposium – Bulk and Interfacial Thermodynamics of Complex Materials: Insights Derived from Integrating Modeling and Experiment – Fundamental Thermodynamics and Kinetics of Alloys

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Raymundo Arroyave, Texas A&M University; Michael Gao, National Energy Technology Laboratory; Jeffrey Hoyt, McMaster University; Saryu Fensin, Los Alamos National Laboratory

Wednesday PM | March 13, 2019
304B | Henry B. Gonzalez Convention Center

Session Chair: Michael Gao, National Energy Technology Laboratory

2:00 PM Invited

Thermal Expansion Anomalies of Silicon Originate Primarily from Phonon Anharmonicity with Zero-point Energy: *Brent Fultz*¹; Dennis Kim¹; Olle Hellman¹; ¹California Institute of Technology

2:30 PM Invited

Precursors to Frustration in the Lattice Dynamics of Ferroic Materials: *Michael Manley*¹; ¹Oak Ridge National Laboratory

3:00 PM Invited

Thermodynamics of Dynamically Unstable Crystals: *Anton Van Der Ven*¹; John Thomas¹; Maxwell Radin¹; Jonathon Bechtel¹; ¹University of California, Santa Barbara

3:30 PM Break

3:50 PM Invited

Chemical Short Range Order in Molten Ni Based Superalloys: *Christopher Woodward*¹; James Lill²; Michael Wodom³; ¹U.S. Air Force Research Laboratory; ²Engility, Inc.; ³Carnegie Mellon University

4:20 PM Invited

The Chemical Potentials of Atoms and Vacancies in Mechanically Stressed Solids: *Yuri Mishin*¹; ¹George Mason University

4:50 PM Invited

Insights into the Oxidation Mechanisms of Ti and Ni Alloys: Talia Barth¹; Paul Chao¹; Kathleen Chou¹; Peng-Wei Chu¹; *Emmanuelle Marquis*¹; ¹University of Michigan

CHARACTERIZATION

Interfaces in Structural Materials: An MPMD Symposium in Honor of Stephen M. Foiles — Mechanical Behavior II: A Joint Session with Mechanical Behavior Related to Interfacial Physics III

Sponsored by: The Minerals, Metals and Materials Society, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Eric Homer, Brigham Young University; Elizabeth Holm, Carnegie Mellon University; Mark Asta, University of California, Berkeley

Wednesday PM | March 13, 2019
302C | Henry B. Gonzalez Convention Center

Session Chairs: Richard LeSar, Iowa State University; Anthony Rollett, Carnegie Mellon University

2:00 PM Invited

Mesosopic Studies of Dislocation Interactions with Biphase Interfaces: *Irene Beyerlein*¹; *Shuozhi Xu*¹; *Abigail Hunter*²; ¹University of California Santa Barbara; ²Los Alamos National Laboratory

2:30 PM

Atomistic Simulations of Interaction between Basal <a> Dislocations and Three-dimensional Twins in Magnesium: *Mingyu Gong*¹; *Guisen Liu*¹; *Jian Wang*¹; *Laurent Capolungo*²; *Carlos Tomé*²; ¹University of Nebraska-Lincoln; ²Los Alamos National laboratory

2:50 PM Invited

Effect of Grain Boundary Structure on its Dynamic Response Using Molecular Dynamics: *Saryu Fensin*¹; *Timothy Frolov*²; ¹Los Alamos National Laboratory; ²Lawrence Livermore National Laboratory

3:20 PM Invited

Tailoring Mechanical Behavior with One- and Two-dimensional Complexions: *Timothy Rupert*¹; ¹University of California Irvine

3:50 PM Break

4:10 PM

Deformation Mechanisms in Nanocrystalline Pt-Au: Competition of Grain Boundary Embrittlement and Compositional Crack Arrest: *Nathan Heckman*¹; *Stephen Foiles*¹; *Christopher O'Brien*¹; *Michael Chandross*¹; *Christopher Barr*¹; *Nicolas Argibay*¹; *Khalid*

Hattar¹; Ping Lu¹; David Adams¹; Brad Boyce¹; ¹Sandia National Laboratories

4:30 PM

Effect of a Vertical Twin Boundary on the Mechanical Property of Bicrystalline Copper Micropillars: *DeAn Wei*¹; Haidong Fan²; Jing Tang²; Xu Zhang¹; ¹Southwest Jiaotong University; ²Sichuan University

4:50 PM

Atomic Structure of Gamma/Alpha₂ Interface and its Influence on Plastic Deformation of Lamellar TiAl Alloys: Aidong Tu¹; Chunyu Teng²; *Hao Wang*¹; Dongsheng Xu¹; Yun Fu²; Zhanyong Ren²; Rui Yang¹; ¹Chinese Academy of Sciences; ²AVIC China Aero-Polytechnology Establishment

LIGHT METALS

Magnesium Technology 2019 — Fundamentals, Mechanical Behavior, Twinning, Plasticity, Texture and Fatigue I

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

Program Organizers: Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordon, University of Alabama; Dmytro Orlov, Lund University; Neale Neelameggham, IND LLC

Wednesday PM | March 13, 2019

005 | Henry B. Gonzalez Convention Center

Session Chairs: Sean Agnew, University of Virginia; Petra Maier, Stralsund University of Applied Sciences

2:00 PM Invited

Evolution of the Intermetallic Particle Distribution in Thixomolded Magnesium Alloys: Benjamin Anthony¹; Brady Dowdell¹; *Victoria Miller*¹; ¹North Carolina State University

2:30 PM Invited

Revealing the Role of Combined Loading on the Tension-compression Asymmetry in a Textured AZ31 Magnesium Alloy: *Chaitanya Kale*¹; Kiran Solanki¹; ¹Arizona State University

3:00 PM

An Investigation of Detwinning Behavior of In-plane Compressed E-form Mg Alloy during the In Situ Tensile Test: *Jaiveer Singh*¹; Min-Seong Kim¹; Seong-Eum Lee¹; Joo-Hee Kang²; Shi-Hoon

Choi¹; ¹Sunchon National University; ²Korea Institute of Materials Science

3:20 PM

Characterization of Staggered Twin Formation in HCP Magnesium: *M Arul Kumar*¹; Brandon Leu²; Paul Rottmann²; Luoning Ma³; Irene Beyerlein²; ¹Los Alamos National Laboratory; ²University of California Santa Barbara; ³Johns Hopkins University

3:40 PM Break

4:00 PM

Dislocation Behavior and Grain Boundary Segregation of Mg-Zn Alloys: *Hyo-Sun Jang*¹; Byeong-Joo Lee¹; ¹Pohang University of Science and Technology (POSTECH)

4:20 PM

Effect of Hot Working on the High Cycle Fatigue Behavior of WE43 Rare Earth Magnesium Alloy: *Saeede Ghorbanpour*¹; Brandon McWilliams²; Marko Knezevic¹; ¹Department of Mechanical Engineering, University of New Hampshire; ²Weapons and Materials Research Directorate, US Army Research Laboratory

4:40 PM

Effect of Solute Atoms on the Twinning Deformation in Magnesium Alloys: *Jing Tang*¹; Wentao Jiang¹; Xiaobao Tian¹; Haidong Fan¹; ¹Sichuan University

5:00 PM

First-principles Investigation of the Effects of Solutes on the Ideal Shear Resistance and Electronic Properties of Magnesium: *Pulkit Garg*¹; Ilaksh Adlakha²; Kiran Solanki¹; ¹Arizona State University; ²Indian Institute of Technology, Madras

5:20 PM

Inverse Optimization to Design Processing Paths to Tailor Formability of Mg Alloys: *Wahaz Nasim*¹; Joshua Herrington¹; Amine Benzerga¹; Jyhwen Wang¹; Ibrahim Karaman¹; ¹Texas A&M University

NUCLEAR MATERIALS

**Mechanical Behavior of Nuclear Reactor Components —
Microstructure Effects II**

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

Wednesday PM | March 13, 2019
215 | Henry B. Gonzalez Convention Center

Session Chairs: Eda Aydogan, Los Alamos National Laboratory; Xian-Ming Bai, Virginia Polytechnic Institute

2:00 PM Invited

Mechanical Property Changes in Ni-based Alloys with Long Range Order Formation: *Julie Tucker*¹; Fei Teng¹; Nicholas Aerne¹; Li-Jen Yu²; Emmanuelle Marquis²; Hi Vo³; Peter Hosemann³; ¹Oregon State University; ²University of Michigan-Ann Arbor; ³University of California-Berkeley

2:30 PM

Deformation Behavior and Microstructural Evolution of Depleted Uranium - 10 wt% Molybdenum: *Cody Miller*¹; Rodney McCabe¹; Daniel Coughlin¹; ¹Los Alamos National Laboratory

2:50 PM Invited

Amorphous Intergranular Films for Improved Performance Under Irradiation: *Timothy Rupert*¹; Jennifer Schuler¹; Brad Boyce²; Khalid Hattar²; ¹University of California Irvine; ²Sandia National Laboratories

3:20 PM

Directional Dependence of Irradiated Damage in W: *Byeongchan Lee*¹; Youhwan Jo¹; ¹Kyung Hee University

3:40 PM Break

4:00 PM

Mechanical and Structural Transformation of Tungsten Implanted with He Ions: *Mehdi Balooch*¹; Frances Allen¹; David Frazer¹; Peter Hosemann¹; ¹University of California, Berkeley

4:20 PM

In-situ Observations of the Role of Stress-state on Strain to Failure of Non-hydrided and Hydrided Zircaloy-4: *Brian Cockeram*¹; Kwai Chan²; Bruce Kammenzind¹; ¹Nnl Bettis Laboratory; ²Southwest Research Institute

4:40 PM

A New RPV High Fluence Low Flux RPV Embrittlement Model for the International Surveillance Database: *Takuya Yamamoto*¹; Peter Wells¹; Nathan Almirall¹; G. Robert Odette¹; ¹University of California Santa Barbara

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Nanoarchitected and Morphology-controlled Nanoporous Materials — Metamaterials-MOFs-nano Arcitected

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

Program Organizers: Niaz Abdollahim, University of Rochester; John Balk, University of Kentucky; Michael Demkowicz, Texas A&M University; Christoph Eberl, Fraunhofer IWM

Wednesday PM | March 13, 2019
214A | Henry B. Gonzalez Convention Center

Session Chair: Christoph Eberl, Fraunhofer IWM

2:00 PM Invited

Tunable and Multi-functional 3D Printed Mechanical Metamaterials: *Kathryn Matlack*¹; Ignacio Arretche¹; Connor Pierce¹; Chaitanya Nimmagadda¹; ¹University of Illinois at Urbana-Champaign

2:30 PM Invited

Three-dimensional (3D) Nano-architected Meta-materials: *Julia Greer*¹; Andrey Vyatskikh¹; Carlos Portela¹; Xiaoxing Xia¹; Kai Narita¹; ¹California Institute of Technology

3:00 PM

Programmable Mechanical Metamaterials by Structural Hierarchy: Matthew Berwind¹; *Chris Eberl*¹; ¹Fraunhofer Society

3:20 PM Break

3:50 PM

Laser Ablation Synthesis in Solution (LASiS) as a Facile Strategy for the Synthesis of Metal Organic Frameworks (MOFs) with Tunable Size and Morphology.: *Erick Ribeiro*¹; Seyyed Ali Davari¹; Sheng Hu¹; Dibyendu Mukherjee¹; Bamin Khomami¹; ¹University of Tennessee, Knoxville

4:10 PM Invited

New Nanoarchitected Materials via Liquid Metal Dealloying: *Jonah Erlebacher*¹; Bernard Gaskey¹; Alyssa Chuang¹; Gina Greenidge¹; ¹Johns Hopkins University

4:40 PM

Towards Digitally Controlled Hierarchical Nanoporous Architectures: *Juergen Biener*¹; ¹Lawrence Livermore National Laboratory

5:00 PM

Processing of Novel Pseudomorphic Cu-Mo Hierarchies in Thin Film Nanoarchitectures: *Benjamin Derby*¹; Yuchi Cui¹; Jon Baldwin²; Raymundo Arroyave³; Michael Demkowicz³; Amit Misra¹; ¹University of Michigan; ²Los Alamos National Laboratory; ³Texas A&M University

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution – Phase Transformation in Non-ferrous Alloys III

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Yufeng Zheng, Ohio State University; Ashley Paz y Puente, University of Cincinnati; Juan Escobedo-Diaz, University of New South Wales; Dhriti Bhattacharyya, ANSTO; Rajarshi Banerjee, University of North Texas

Wednesday PM | March 13, 2019

225D | Henry B. Gonzalez Convention Center

Session Chairs: Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization; Alexander Zhilyaev, Nosov Magnitogorsk State Technical University

2:00 PM

In Situ and Time-resolved Diffraction Studies to Track Metals under Phase Transformations and Microstructural Evolution: *Klaus-Dieter Liss*¹; ¹Guangdong Technion - Israel Institute of Technology

2:20 PM

Microstructure Evolution and Mechanical Properties of Heavily Cold-rolled and Subsequently Heat-treated Cu-3wt.%Ti with Nano-lamellar Structure: *Kenji Koike*¹; Kester Clarke¹; Amy Clarke¹; ¹Colorado School of Mines

2:40 PM

Microstructure Evolution in Large-grained, Fully-solutionized Mg-9Al (wt%) Alloy during Uniaxial Compression at Elevated Temperatures: *Suhas Eswarappa Prameela*¹; Steven Lavenstein¹; Roshan Plamthottam¹; Jaafar El-Awady¹; Laszlo Kecskes²; Tomoko Sano³; Timothy Weihs¹; ¹Johns Hopkins University; ²MatSys ; ³U.S. Army Research Laboratory

3:00 PM

Phase Microstructure Evolution Observed by Local Magnetic Force Microscopy in (Mn,Fe)₂(P,Si): *Timothy Brown*¹; Patrick Shamberger¹; ¹Texas A&M University

3:20 PM

Shape Memory Behavior of Ni49.5Ti50.5 Processing-Induced Strain Glass Alloys: Robert Wheeler¹; Jesse Smith¹; Nathan Ley¹; *Anit Giri*²; Marcus Young¹; ¹University of North Texas; ²U.S. Army Research Laboratory

3:40 PM Break

4:00 PM

Age-hardening of AlMg Alloys with Additions of Zn and Cu: *Lukas Stemper*¹; Bernhard Mitas¹; Thomas Kremmer¹; Steffen Otterbach²; Peter Uggowitzer³; Stefan Pogatscher¹; ¹Montanuniversität Leoben; ²Audi AG; ³ETH Zürich

4:20 PM

Shape Memory Properties of NiTi-based Nanoparticles Fabricated by Phase-separation and Dealloying: *Ji Young Kim*¹; So Yeon Kim¹; Sang Jun Kim¹; Wook ha Ryu²; Eun Soo Park¹; ¹Seoul National University; ²Tohoku University

4:40 PM

Phase Transformations of Ti-Nb-Zr-O Biomedical Alloy Prepared by Spark Plasma Sintering: *Jiri Kozlik*¹; Josef Stráský¹; Tomas Chraska²; Miloš Janecek¹; ¹Charles University; ²Czech Academy of Science

5:00 PM

Phase Transformations in Metastable \946-Ti alloys: *Petr Hrcuba*¹; Jana Smilauerova¹; Pavel Zhanal¹; ¹Charles University in Prague

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Powder Processing of Bulk Nanostructured Materials — Nanocomposites

Sponsored by: TMS: Powder Materials Committee

Program Organizers: Zachary Cordero, Rice University; Deliang Zhang, Shanghai Jiao Tong University; Brady Butler, US Army Research Laboratory; Ma Qian, RMIT University (Royal Melbourne Institute of Technology)

Wednesday PM | March 13, 2019
211 | Henry B. Gonzalez Convention Center

Session Chair: Dor Amram, Massachusetts Institute of Technology

2:00 PM

Synthesis of Bulk Metal Matrix Nanocomposites Reinforced by Nanodiamonds: *Andrea Bachmaier*¹; *Andreas Katzensteiner*¹; *Reinhard Pippan*¹; ¹Erich Schmid Institute, Austrian Academy of Sciences

2:20 PM

Designing C/CNT-coated Ti-6Al-4V Powders for High-performance Nano-sized TiC and CNT Synergistically Reinforced Ti-6Al-4V Composites: *Yafeng Yang*¹; *Shaofu Li*¹; ¹Institute of Processing Engineering Chinese Academy of Science

2:40 PM

Carbon Nanotube Coated Conductors: *Terry Holesinger*¹; *Pouria Khanbolouki*²; *Mehran Tehrani*²; ¹Los Alamos National Laboratory; ²University of New Mexico

3:00 PM

Multi-scale Mechanical Properties of a Titanium-Boron Nitride Nanotube (BNNT) Composite Synthesized by Spark Plasma Sintering: *Jenniffer Bustillos*¹; *Pranjal Nautiyal*¹; *Cheng Zhang*¹; *Benjamin Boesl*¹; *Arvind Agarwal*¹; ¹Florida International University

3:20 PM Break

3:40 PM

A Cationic-specie-hybridized Micro-scale Framework of Copper Phthalocyanine: *Jia-Lin Hsu*¹; *Kai-Wei Liu*¹; ¹Texas A&M Transportation Institute

4:00 PM

Reactive Spark Plasma Sintering of BCN Phase from 2D Graphene - Boron Nitride Nanosheets: Microstructural Evolution and Tribological Properties: *Archana Loganathan*¹; Amit Sharma²; Pranjali Nautiyal¹; Satyam Suwas²; Benjamin Boesl¹; Arvind Agarwal¹; ¹Florida International University; ²Indian Institute of Science

4:20 PM

Microstructure of β -FeSi₂ - Si_{1-y}Ge_y Thermoelectric Nanocomposites by React/Transform Spark Plasma Sintering: Naiming Liu¹; Wade Jensen¹; Mona Zebarjadi¹; *Jerrold Floro*¹; ¹University of Virginia

ELECTRONIC MATERIALS

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

Sponsored by: TMS: Thin Films and Interfaces Committee

Program Organizers: Pooran Joshi, Oak Ridge National Laboratory; Ravindra Nugehalli, New Jersey Institute of Technology; Jud Ready, Georgia Institute of Technology; Anming Hu, University of Tennessee; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Wenchao Zhou, University of Arkansas

Wednesday PM | March 13, 2019

217D | Henry B. Gonzalez Convention Center

Session Chairs: Konstantinos Sierros, West Virginia University; Megan Cordill, Erich Schmid Institute for Materials Science

2:00 PM Invited

Develop Solution-based, Direct-printing Processes of Inorganic Semiconductors for Electronics and Energy Applications: *Chih-hung Chang*¹; Rajiv Malhotra²; Kostas Sierros³; ¹Oregon State University; ²Rutgers University; ³West Virginia University

2:30 PM Invited

Highly Conductive Wiring and Reliable Bonding for Stretchable Electronics: *Cai-Fu Li*¹; Hao Zhang¹; Wanli Li¹; Tohru Sugahara¹; Zhi-Quan Liu²; Katsuaki Suganuma¹; ¹Osaka University; ²Institute of Metal Research, Chinese Academy of Sciences

3:00 PM Invited

Ink Design for Continuous Direct Writing: Controlling Complex Metal-Oxide Mesostructures: *Maria Torres Arango*¹; Konstantinos Sierros²; ¹Brookhaven National Laboratory; ²West Virginia University

3:30 PM Break

3:50 PM Invited

3D Printing of Pharmaceuticals and Transdermal Drug Delivery – An Overview: *David Bird*¹; Emel Eker²; Nuggehalli Ravindra³; ¹US Army ARDEC; ²Secaucus High School; ³New Jersey Institute of Technology

4:20 PM

Formulation of Curable Resins Utilized in Stereolithography: *David Bird*¹; Elbert Caravaca¹; Joseph Laquidara¹; Keith Luhmann¹; Nuggehalli Ravindra²; ¹US Army ARDEC; ²New Jersey Institute of Technology

4:40 PM Invited

Dissolvable Tattoo Sensors from Advanced Manufacturing and Materials: *Huanyu Cheng*¹; ¹Pennsylvania State University

5:10 PM

Surface Force-driven Direct Ink Writing of Titanium Dioxide Thin Films for Photovoltaics: *Guy Cordonier*¹; Joeseeph Bright¹; Nianqiang Wu¹; Konstantinos Sierros¹; ¹West Virginia University

5:30 PM

A “Press and Go” Fabrication Technique for a Flexible Biofuel Cell Patch for Power Generation and Glucose Sensing: *Biao Leng*¹; Nuggehalli Ravindra¹; Zafar Iqbal¹; ¹New Jersey Institute of Technology

BIOMATERIALS

Recent Developments in Biological, Structural and Functional Thin Films and Coatings — Functional Films and Coatings I

Sponsored by: TMS: Thin Films and Interfaces Committee

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

Wednesday PM | March 13, 2019

217A | Henry B. Gonzalez Convention Center

Session Chairs: Nuggehalli M Ravindra, New Jersey Institute of Technology; Heinz Palkowski, Clausthal University of Technology

2:00 PM Keynote

Recent Developments in Hafnia-based Thin Film Memristors: *Ashfaq Adnan*¹; *Adrian Martinez*¹; ¹University of Texas, Arlington

2:35 PM Invited

3D Printed Metal Films: *Md. Taibur Rahman*¹; *Rahul Panat*¹; *Chintalapalle V. Ramana*²; ¹Carnegie Mellon University; ²University of Texas, El Paso

3:05 PM

Characterization of Self-lubricating Coatings Deposited by Plasma Enhanced Magnetron Sputtering: *Forest Thompson*¹; *Frank Kustas*²; *Kent Coulter*³; *Grant Crawford*¹; ¹South Dakota School of Mines and Technology; ²NanoCoatings, Inc.; ³Southwest Research Institute

3:25 PM Break

3:45 PM Keynote

Control of Friction and Adhesion at Nanoscale: How Surface Heterogeneities can Affect Interfacial Forces?: *Karine Mougín*¹; ¹Institut De Science Des Matériaux De Mulhouse

4:20 PM Invited

Friction Conditions on Deep Drawing Tool Radii When Using Volatile Media as Lubrication Substitute: *Gerd Reichardt*¹; *Mathias Liewald*¹; ¹University of Stuttgart

4:45 PM Invited

Investigation of Friction and Adhesion Behavior of Textured Workpieces and Coated Tools under Dry Tribological Contact: *T. Bergs*¹; *P. Mattfeld*¹; *D. Trauth*¹; *R. Mannens*¹; *K. Bobzin*¹; *Rafael Hild*¹; ¹IOT RWTH Aachen

5:10 PM

Effects of Emissivity on Combustion Behavior of Energetic Materials: *Elbert Caravaca*¹; *David Bird*¹; *Henry Grau*¹; *Viral Panchal*¹; *Nuggehalli Ravindra*²; ¹US Army ARDEC; ²New Jersey Institute of Technology

ENERGY & ENVIRONMENT

REWAS 2019: Secondary and Byproduct Sources of Materials,

Minerals, and Metals — Circularity and Materials Availability

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

Program Organizers: Gabrielle Gaustad, Alfred University; Camille Fleuriault, Gopher Resource; Neale Neelameggham, IND LLC; Elsa Olivetti, Massachusetts Institute of Technology

Wednesday PM | March 13, 2019
007C | Henry B. Gonzalez Convention Center

Session Chair: Gabrielle Gaustad, Alfred University

2:00 PM

Circular Cities, E-mobility and the Metals Industry – A World in Transition: *Christina Meskers*¹; Mark Caffarey¹; Maurits Van Camp¹; ¹Umicore

2:20 PM

The Role of Scrap Recycling in the USA, for the Circular Economy: A Case Study of Copper Scrap Recycling: *Phillip Mackey*¹; Nubia Cardona Valencia²; ¹Mackey Technologies; ²Deltamet Consultants

2:40 PM

Comparing Secondary and Byproduct Sources of Rare Earth Metals: *Gabrielle Gaustad*¹; Alexandra Leader²; Eric Williams²; Saptarshi Das²; ¹Alfred University; ²Rochester Institute of Technology

3:00 PM

Cobalt Criticality and Availability in the Wake of Increased Electric Vehicle Demand: A Short-term Scenario Analysis: *Danielle Beatty*¹; Xinkai Fu²; Michele Bustamante²; Gabrielle Gaustad³; Callie Babbitt⁴; Randolph Kirchain²; Richard Roth²; Elsa Olivetti²; ¹University of Utah; ²Massachusetts Institute of Technology; ³Alfred University; ⁴Rochester Institute of Technology

3:20 PM Break

3:40 PM

Mining Value from Waste Initiative: Towards a Low Carbon and Circular Economy: *Janice Zinck*¹; Bryan Tisch¹; ¹Natural Resources Canada

4:00 PM

Exploring Drivers of Copper Supply and Demand Using a Dynamic Market Simulation: Jingshu Zhang¹; Omar Swei²; Richard Roth¹; *Randolph Kirchain*¹; ¹Massachusetts Institute of Technology;

²University of British Columbia

4:20 PM

Towards a Solid Waste Economy in Colombia: An Analysis with Respect to Other Leading Economies and Latin America: Julian Rúa-Restrepo¹; Gloria Echeverri²; *Henry Colorado*¹; ¹Universidad De Antioquia; ²Universidad Autónoma Latinoamericana Unaula

LIGHT METALS

Scandium Extraction and Use in Aluminum Alloys – Aluminium Scandium Alloys

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

Program Organizers: Nigel Ricketts, Altrius Engineering Services; John Grandfield, Grandfield Technology Pty Ltd

Wednesday PM | March 13, 2019

006D | Henry B. Gonzalez Convention Center

Session Chair: Timothy Langan, Clean TeQ

2:00 PM Introductory Comments

2:05 PM

Grain Refinement of Al₄CuTi based Alloy with Zr, Sc, Er and TiB₂: Jiehua Li¹; *Peter Schumacher*¹; ¹Montanuniversität Leoben

2:30 PM

Optimised Composition and Process Design to Develop Sc-enhanced Wrought Al-Si Alloys: *Jayshri Dumbre*¹; Timothy Langan²; Thomas Dorin³; Nick Birbilis¹; ¹Monash University; ²Clean TeQ Ltd.; ³Deakin University

2:55 PM

Developments in Aluminum-scandium-ceramic and Aluminum-Scandium-Cerium Alloys: *David Weiss*¹; ¹ECK Industries Inc.

3:20 PM Break

3:35 PM

Developing an Optimised Homogenisation Process for Sc and Zr Containing Al-Mg-Si Alloys: *Steven Babaniaris*¹; Mahendra Ramajayam¹; Lu Jiang¹; Timothy Langan²; Thomas Dorin¹; ¹Deakin University - Institute for Frontier Materials; ²Clean TeQ Ltd.

4:00 PM

Effect of Scandium on Wire Arc Additive Manufacturing of 5 Series Aluminium Alloys: *Andrew Sales*¹; Nigel Ricketts²; ¹AML Technologies; ²Altrius Engineering Services

4:25 PM

Heat Treatments for Precipitation of Scandium-containing Dispersoids in Si-containing Aluminum Alloys: *Timothy Langan*¹; Avishan Shomali²; Pinaki Mukherjee²; Thomas Wood²; Paul Sanders³; ¹Cleanteq; ²Michigan Technological University; ³Michigan Technological University

4:50 PM

Effect of Mg Content on Al₃Sc-dispersoid Formation in Cast Billets of Al-Mg- Sc Alloys: *Paul Sanders*¹; Tom Wood¹; Carson Williams¹; Tim Langan²; ¹Michigan Technological University; ²Clean TeQ Holdings Limited

SPECIAL TOPICS

Science Policy within the Materials Research Community — Getting Involved in Science Policy

Sponsored by: TMS: Education Committee

Program Organizers: Kathleen Chou, University of Michigan; Ashley Hilmas, University of Michigan; Peter Meisenheimer, University of Michigan; Max Powers, University of Michigan; Brian Tobelmann, University of Michigan

Wednesday PM | March 13, 2019

008B | Henry B. Gonzalez Convention Center

Session Chairs: Kathleen Chou, University of Michigan; Ashley Hilmas, University of Michigan; Peter Meisenheimer, University of Michigan

2:00 PM Invited

Advocating the Vital Importance of Support for Materials Research and Engineering Education in our Representative Democracy: *Iver Anderson*¹; ¹Iowa State University, Ames Laboratory

2:30 PM Invited

How Science Policy Really Gets Done in Congress: *Scott Litzelman*¹; ¹2017-2018 TMS-MRS Congressional Science and Engineering Fellow

3:00 PM Invited

From the Lab to The Hill: How to Get a Job in Policy and What You'll Do When You Get There: *Edward Herderick*¹; ¹Ohio State University

3:30 PM Break

3:50 PM Panel Discussion: The panelist include Iver E. Anderson, Iowa State University/Ames Laboratory; Edward D. Herderick, Ohio State University; and John Allison, University of Michigan.

4:55 PM Concluding Comments

ELECTRONIC MATERIALS

Solar Cell Silicon — Properties, Impurities, and Refining

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Shadia Ikhmayies, Al Isra University; Neale Neelameggham, IND LLC; York Smith, University of Utah; Leili Tafaghodi, University of British Columbia

Wednesday PM | March 13, 2019

008A | Henry B. Gonzalez Convention Center

Session Chair: Shadia Ikhmayies, Al Isra University

2:00 PM Introductory Comments

2:05 PM

The Influence of Boron Dopant on the Structural and Mechanical Properties of Silicon: First Principles Study: *Shadia Ikhmayies*¹; Yasemin Çiftci²; ¹Al Isra University; ²Gazi University

2:25 PM

The Influence of Phosphorus Dopant on the Structural and Mechanical Properties of Silicon: *Shadia Ikhmayies*¹; Yasemin Çiftci²; ¹Al Isra University; ²Gazi University

2:45 PM

Simple and High-effective Purification of Metallurgical Grade Silicon through Metal Assisted Chemical Leaching: Fengshuo Xi¹; Shaoyuan Li¹; *Wenhui Ma*¹; Kuixian Wei¹; Jijun Wu¹; Keqiang Xie¹; Yun Lei¹; Zhengjie Chen¹; Jie Yu¹; Xiaohan Wan¹; Bo Qin¹; ¹Kunming University of Science and Technology

3:05 PM

Boron Removal from Molten Silicon by Ammonia Gas Blowing: *Xuanyi He*¹; *Zhiyuan Chen*¹; *Kazuki Morita*¹; ¹University of Tokyo

3:25 PM

Slag Refining of Ferrosilicon Alloys using SiO₂-Al₂O₃-CaO Ternary System: *Ozair Rajani*¹; *Leili Tafaghodi*¹; *Ali Hosseinpour*¹; ¹University of British Columbia

LIGHT METALS

Solidification Processing of Light Metals and Alloys: An MPMD Symposium in Honor of David StJohn – Titanium Alloys and Research Partnerships

Sponsored by: TMS: Solidification Committee

Program Organizers: Mark Easton, RMIT University; Ma Qian, RMIT University (Royal Melbourne Institute of Technology); John Grandfield, Grandfield Technology Pty Ltd; Norbert Hort, Helmholtz-Zentrum Geesthacht; Mark Jolly, Cranfield University

Wednesday PM | March 13, 2019

006C | Henry B. Gonzalez Convention Center

Session Chairs: Matthew Dargusch, University of Queensland; John Grandfield, Grandfield Technology Pty Ltd

2:00 PM Invited

A History of the Global Light Metals Alliance: *Jennifer Jackman*¹; *Kumar Sadayappan*¹; *Mark Easton*²; ¹CanmetMATERIALS; ²RMIT University

2:20 PM Invited

Capability Through Collaboration: The Defence Materials Technology Centre: *Matthew Dargusch*¹; ¹University of Queensland

2:40 PM Invited

The CAST Cooperative Research Centre: Lessons for Research Collaboration: *John Grandfield*¹; *Mark Easton*²; ¹Grandfield Technology Pty Ltd.; ²RMIT University

3:00 PM

Developing Sustainable Metallic Materials through Industry and Research Collaboration: *Zhongyun Fan*¹; ¹Brunel University

3:20 PM Break

3:40 PM Keynote

Identifying and Understanding the Influence of Columnar Beta-phase Boundaries on the Tensile and Fatigue Properties of Additively Manufactured Ti-6Al-4V Alloy: *Ma Qian*¹; Huiping Tang²; Jian Wang²; ¹RMIT University (Royal Melbourne Institute of Technology); ²Northwest Institute for Non-ferrous Metal Research

4:00 PM

Composition Optimization and Solidification Behavior of Cast High Temperature Titanium Alloy: *Hongchao Kou*¹; Tingting Huang¹; Fengming Qiang¹; Zhigang Sun¹; ¹Northwestern Polytechnical University

4:20 PM

R & D of New Titanium Alloys In China: *Yongqing Zhao*¹; ¹Northwest Institute for Nonferrous Metal Research

4:40 PM Invited

Selective Laser Melting: Case Studies in Aluminium and Titanium Alloys: *Peng Cao*¹; Ruidi Li²; Tiecui Yuan²; ¹The University of Auckland; ²Central South University

5:00 PM

High Strength Ti-6Al-4V Composites by In Situ Generated Stable Nanoparticles: Soumya Vinod¹; *Baburaj Eranezhuth*¹; Laverne Smith¹; Jun Guan²; Viktor Hadjiev²; Kenneth White²; James Meen²; ¹Clarkson Aerospace Corporation; ²University of Houston

5:20 PM Concluding Comments

MECHANICS & STRUCTURAL RELIABILITY

Thermo-mechanical Response of Materials Investigated through Novel in-situ Experiments and Modeling — Session VI

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

Program Organizers: Saurabh Puri, Microstructure Engineering; Robert Wheeler, Microtesting Solutions LLC; Dongchan Jang, Kaist; Amit Pandey, Granta Design/ANSYS; Josh Kacher, Georgia Institute of Technology; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Wednesday PM | March 13, 2019

301A | Henry B. Gonzalez Convention Center

Session Chairs: Dongchan Jang, KAIST; Robert Wheeler, Microtesting Solutions LLC

2:00 PM Keynote

Use of Raman Spectroscopy to Study Plastic Deformation in Silicate Glasses: *Shefford Baker*¹; Nicole Wiles¹; Zachary Rouse¹; Sanjit Bhowmick²; Praveena Manimunda²; Thomas Wyrobek²; S.A. Syed Asif²; ¹Cornell University; ²Bruker Nano Surfaces

2:40 PM

Combining Raman Spectroscopy and Nanoindentation to Probe Temperature and Pressure Induced Structural Changes: *Praveena Manimunda*¹; Eric Hintsala¹; Douglas Stauffer¹; Sanjit Bhowmick¹; Syed Asif¹; ¹Bruker Nano Surfaces

3:00 PM

Mechanical Properties of Mg-LPSO Alloys during Hot Deformation: *Daria Drozdenko*¹; Kristián Máthis²; Michiaki Yamasaki¹; Yoshihito Kawamura¹; ¹Kumamoto University; ²Charles University

3:20 PM

Monitoring Fabrication and Operation of Ceramic Materials by the Acoustic Emission Technique: *Frantisek Chmelik*¹; Michal Knapek¹; Patrik Dobron¹; Stefan Csáki¹; Peter Minárik¹; ¹Charles University

3:40 PM

Curling in Bi-component Applications: *Akanksha Garg*¹; Yinglong Chen¹; Pavan Valavala¹; Fabricio Arteaga Larios¹; Jill Martin¹; ¹The Dow Chemical Company

4:00 PM Break

4:20 PM

Thermo-mechanical Damage Evolution of Energetic Materials in Elevated Temperature Environments: *Judith Brown*¹; William Erikson¹; Marcia Cooper¹; Shuyue Guo¹; Scott Roberts¹; Dan Bolintineanu¹; ¹Sandia National Laboratories

4:40 PM

In Situ Studies of a Micron-scale Impact-induced Thermo-mechanical Failure: *Mostafa Hassani-Gangaraj*¹; David Veysset¹; Keith Nelson¹; Christopher Schuh¹; ¹Massachusetts Institute of Technology

5:00 PM

In-situ Investigation of Thermo-mechanical Properties of a Free-standing Boron Nitride Nanotube Buckypaper: *Pranjal Nautiyal*¹;

Cheng Zhang¹; Benjamin Boest¹; Arvind Agarwal¹; ¹Florida International University

LIGHT METALS

Ultrasonic Processing of Liquid and Solidifying Alloys — Mechanisms and Applications of Ultrasonic Processing

Sponsored by: TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS: Aluminum Committee, TMS: Process Technology and Modeling Committee

Program Organizers: Dmitry Eskin, Brunel University; Laurentiu Nastac, University of Alabama; Koulis Pericleous, University of Greenwich; Iakovos Tzanakis, Oxford Brookes University

Wednesday PM | March 13, 2019
006B | Henry B. Gonzalez Convention Center

Session Chairs: Laurentiu Nastac, University of Alabama; Iakovos Tzanakis, Oxford Brookes University

2:00 PM Introductory Comments

2:05 PM Invited

Development and Application of Large-sized Sonotrode Systems for Ultrasonic Treatment of Molten Aluminum Alloys: *Sergey Komarov*¹; Takuya Yamamoto¹; ¹Tohoku University

2:30 PM

Altering the Microstructure Morphology by Ultrasound Melt Processing during 6XXX Aluminium DC-Casting: *Georges Salloum-Abou-Jaoude*¹; Dmitry Eskin²; G.S.B. Lebon²; Carla Barbatti¹; Philippe Jarry¹; Martin Jarrett¹; ¹Constellium; ²Brunel University London

2:50 PM

Effect of Acoustic Streaming on Degassing Level of A356 Al Alloy by Ultrasonic Melt Treatment: *Jeong-Il Youn*¹; Young Ki Lee¹; Young Jig Kim¹; Ja Uk Koo²; ¹Sungkyunkwan University; ²DR AXION

3:10 PM Invited

Cellular Automation Finite Element Modeling of the Evolution of the As-cast Microstructure of an Ultrasonically Treated Al-2Cu Alloy: *Gui Wang*¹; Paul Croaker²; Matthew Dargusch¹; Damian McGuckin³; David StJohn¹; ¹The University of Queensland; ²University of New South Wales; ³Pacific Engineering Systems International

3:35 PM Break

4:05 PM

In Situ Detection of Non-Metallic Inclusions in Aluminum Melt (1xxx) - Comparison Between a Newly Developed Ultrasonic Technique and LiMCA and PoDFA Method: *Friederike Feikus*¹; Florian Funken¹; Thomas Waschkies²; Andreas Buehrig-Polaczek¹; ¹Foundry Institute RWTH Aachen University; ²Fraunhofer Institute for Nondestructive Testing (IZFP)

4:25 PM

Crystallization Behavior of Iron-containing Intermetallic Compounds in Al-Si Alloy under Ultrasonic Treatment: *Yubo Zhang*¹; Tongmin Wang¹; Tingju Li¹; ¹Dalian University of Technology

4:45 PM

Microstructure and Mechanical Properties of Dispersion-strengthened Aluminum-magnesium Alloys Obtained Using Ultrasonic Treatment of Melt: *Alexander Vorozhtsov*¹; Anton Khrustalev¹; Ilya Zhukov¹; Alexander Kozulin¹; Evgeny Alifirenko²; ¹Tomsk State University; ²The Federal State Unitary Enterprise "Central Research Institute of Structural Materials "Prometey" Named by I.V. Gorynin of National Research Center "Kurchatov Institute"

MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing – Preparation of Alloys and Materials I

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Tao Jiang, Central South University; Jiann-Yang Hwang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

Thursday AM | March 14, 2019

208 | Henry B. Gonzalez Convention Center

Session Chairs: Jerry Downey, Montana Tech of The University of Montana; Chenguang Bai, Chongqing University

8:30 AM

Effects of Electrolytic Parameters on the Preparation of Al-Sc Master Alloy in Na_3AlF_6 - K_3AlF_6 - AlF_3 Melt: *Kai Yang*¹; Zhongliang Tian¹; Xun Hu¹; Yanqing Lai¹; Jie Li¹; ¹Central South University

8:50 AM

Investigation of the Effect of Tri-nano Additives on Wear Rate and Hardness of AISI 5130 Steel during Machining: *Adeniran Afolalu*¹; ¹Covenant University

9:10 AM

Numerical Simulation Study on the Position Layout of the Permeable Brick at the Bottom of 300t Reblown Converter: *Yun Huang*¹; ¹Chong Qing University

9:30 AM

Optimization of Zn-Al-Fe Alloy Vacuum Distillation Experiments by Response Surface Methodology: *Zhenghao Pu*¹; Yifu Li¹; Bin Yang¹; Huan Zhang¹; ¹Kunming University of Science and Technology

9:50 AM Break

10:10 AM

Study on Separation of Sn-Sb Alloy by Vacuum Distillation: *Yanjun You*¹; Zhenghao Pu¹; Yifu Li¹; Bin Yang¹; Junjie Xu¹; ¹Kunming University of Science and Technology

10:30 AM

TCOX: Predicting Complex Metallurgical Processes for Steel and Slag Interactions: Lina Kjellqvist¹; *Paul Mason*²; ¹Thermo-Calc Software AB; ²Thermo-Calc Software Inc

10:50 AM

Statistical Optimization of Tungsten Carbide Synthesis Parameters: *Grant Wallace*¹; Jerome Downey¹; Jannette Chorney¹; Trenin Bayless¹; Katie Schumacher¹; ¹Montana Tech

MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing — Treatment and Recycling of Wastes

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Tao Jiang, Central South University; Jiann-Yang Hwang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

Thursday AM | March 14, 2019
209 | Henry B. Gonzalez Convention Center

Session Chairs: Zhiwei Peng, Central South University; Camille Fleuriault, Gopher Resource

8:30 AM Introductory Comments

8:35 AM

Effect of Chemical Composition on the Crystallization Behavior of Rare Earth Phase in Slag: *Tengfei Ma*¹; Fu Feng¹; Xuefeng She¹; Jingsong Wang¹; Qingguo Xue¹; ¹University of Science & Technology Beijing

8:55 AM

Effects of Steel Scrap Oxidation on the Scrap Preheating Process in an Electric Arc Furnace: Guangwu Tang¹; Yuchao Chen¹; Armin Silaen¹; Yury Krotov²; *Chenn Zhou*¹; ¹Purdue University Northwest; ²Steel Dynamics Inc.

9:15 AM

Enriching and Separating Iron Impurity from Galvanizing Dross by Super-gravity Technology: *Anjun Shi*¹; Zhe Wang¹; Lei Guo¹; Zhancheng Guo¹; ¹University of Science and Technology Beijing

9:35 AM

Industrial Practice and Process Improvement of RHF Process in China: *Chaozhen Cao*¹; Fangxin Yan¹; Xin Li¹; Fuming Zhang¹; ¹Beijing Shougang International Engineering Technology Co., Ltd.

9:55 AM

Study on Modification of Inclusions in 16MnCrS5 Gear Steel by Mg Content: *Qiankun Yang*¹; Zhiqi Zeng¹; Juan Cheng¹; Dong Zhang¹; Ping Shen¹; Yang Wang¹; Jianxun Fu¹; ¹Shanghai University

10:15 AM Break

10:35 AM

Parameters of the Metallic Calcium Reduction from Magnesium Production Residues: Kerem Tasyurek¹; *Onuralp Yücel*¹; Mehmet Bugdayci²; ¹Istanbul Technical University; ²Yalova University

10:55 AM

Production of Premium Grade Iron Nuggets from the Pudo Iron Ores Using End-of-life Rubber Tyres as Reductant: *James Dankwah*¹; James Dankwah¹; Jessica Dankwah¹; Emmanuel Abotar¹; Pramod Koshy¹; ¹University of Mines and Technology

11:15 AM

Smelting Studies for Recovery of Iron from Red Mud: *Ender Keskinilic*¹; Saeid Pournaderi²; Ahmet Geveci³; Yavuz A. Topkaya³; ¹Atilim University; ²Agri Ibrahim Cecen University; ³Middle East Technical University

11:35 AM

Optimization on Drying of Acid Leaching Slag by Microwave Heating Using Response Surface Methodology: *Xuemei Zheng*¹; Aiyuan Ma¹; Hairong Gao¹; Xiaoling Li¹; Xianzhu He¹; Min Sun¹; Fengjiao Gu¹; ¹Liupanshui Normal University

11:55 AM

Research on Comprehensive Recovery and Harmless Treatment Process of Copper Smelting Slag: *Dongbo Li*¹; Yaguang Guo¹; Shuaibiao Liang¹; Deng Ma¹; ¹China ENFI Engineering Corporation

12:15 PM Concluding Comments

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Energy Conversion with Emphasis on SOFCs III

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Thursday AM | March 14, 2019

225A | Henry B. Gonzalez Convention Center

Session Chairs: Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University

8:30 AM Invited

Measuring Chromium in SOFC Systems: *Jeffrey Fergus*¹; ¹Auburn University

8:55 AM Invited

Poisoning and Recovery Mechanism of SOFC Cathode: *Teruhisa Horita*¹; ¹Aist

9:20 AM Invited

Rare Earth Nickelate Cathodes for Air Independent Operation of Solid Oxide Fuel Cells: *Srikanth Gopalan*¹; Jane Banner¹; ¹Boston University

9:45 AM Break

10:05 AM Invited

Heterostructuring Using Core-Shell Nanosynthesis: *Srikanth Gopalan*¹; Ben Levitas¹; ¹Boston University

10:30 AM

Atomic Scale Study of the Anti-vortex Domain Structure in Polycrystalline Ferroelectric: *Xiaobao Tian*¹; *Xiaoqiao He*²; *Haidong Fan*¹; ¹Sichuan University; ²City University of Hong Kong

10:50 AM Invited

Electrophoretic Deposition of Gadolinium-doped Ceria as a Barrier Layer on Yttrium-stabilized Zirconia Electrolyte for Solid Oxide Fuel Cells: *Shanshan Hu*¹; *Wenyuan Li*¹; *Xingbo Liu*¹; ¹West Virginia University

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Welding: Physical and Mechanical Metallurgy of Rapidly Solidified Metals — Properties

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorganji, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Semiatin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

Thursday AM | March 14, 2019
221A | Henry B. Gonzalez Convention Center

Session Chair: Daniel Coughlin, Los Alamos National Laboratory

8:30 AM Invited

Examination of the Influence of Additive Processing on the Mechanical Properties and Corrosion of Alloy 625: *Richard Ricker*¹; Mark Stoudt¹; Lyle Levine¹; Eric Lass¹; Thien Phan¹; Daniel Ng¹; ¹National Institute of Standards & Technology

9:00 AM

The Creep Behavior of Additively Manufactured Inconel 625: *Kwangtae Son*¹; Michael Kassner¹; Lyle Levine²; Thien Phan²; Mark Stoudt²; Kee-Ahn Lee³; ¹University of Southern California; ²National Institute of Standards and Technology; ³Inha University

9:20 AM

Evolution of Deformation Structures Across Length Scales from Fabrication to Fracture in Additively Manufactured 316L Stainless Steel: *Kaila Bertsch*¹; Gabriel Meric de Bellefon¹; Behzad Rankouhi¹; Dan Thoma¹; ¹University of Wisconsin-Madison

9:40 AM

Characterization of Anisotropy within Additively Manufactured Titanium for Topology Optimization: *Matthew Vaughn*¹; Justin Unger¹; Andrew Gaynor²; Brandon McWilliams²; James Guest¹; Kevin Hemker¹; ¹Johns Hopkins University; ²U.S. Army Research Laboratory

10:00 AM Break

10:20 AM

Microstructure and Hardness Evaluation of Al Alloys after a Single Laser Scan in Powder Bed Fusion: *Holden Hyer*¹; Le Zhou¹;

Abhishek Mehta¹; Yongho Sohn¹; ¹University of Central Florida

10:40 AM

Effect of Post Processing on Additively Manufactured WE43 Magnesium Alloy: *Leila Sorkhi*¹; James Tomich²; Joshua Hammell²; Fernando Vazquez¹; Grant Crawford¹; ¹Department of Materials and Metallurgical Engineering, South Dakota School of Mines and Technology; ²Additive Manufacturing Laboratory, South Dakota School of Mines and Technology

11:00 AM

Structure / Property (Constitutive and Dynamic Strength / Damage) Characterization of Additively Manufactured (AM) Tantalum: *George Gray*¹; Veronica Livescu¹; Carl Trujillo¹; Daniel Martinez¹; David Jones¹; ¹Los Alamos National Laboratory

11:20 AM

Effect of Substrate Heating and Beam Focus on Changes in Phase Fraction and Texture in an E-beam AM Ti-6Al-4V Alloy: *Rakesh Kamath*¹; Kin-Ling Sham¹; Hahn Choo¹; Sean Yoder²; Ryan Dehoff²; Yang Ren³; Xianghui Xiao³; ¹University Of Tennessee Knoxville; ²Oak Ridge National Laboratory; ³Argonne National Laboratory

11:40 AM

A Study of Plasma Transfer Arc –Additive Manufacturing Using 17-4 PH Powders: *Sandy El Moghazi*¹; Tonya Wolfe¹; Hani Henein¹; Leijun Li¹; ¹University of Alberta

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Applications of Solidification Fundamentals — Process-microstructure Relationships I

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Alex Plotkowski, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Air Force Research Labroatory; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Wenda Tan, University of Utah

Thursday AM | March 14, 2019

224 | Henry B. Gonzalez Convention Center

Session Chairs: Michael Kirka, Oak Ridge National Laboratory; Lee Yousub, Oak Ridge National Laboratory

8:30 AM

Controlling Residual Stress through Changes to Thermal History in Additively Manufactured SS316L: *John Roehling*¹; William Smith¹; Gabriel Guss¹; Bey Vrancken¹; Joseph McKeown¹; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory

8:50 AM

Processing-structure Relationships from 3D Characterization of Electron Beam Melted Inconel 718: *Andrew Polonsky*¹; Narendran Raghavan²; McLean Echlin¹; Michael Kirka²; Ryan Dehoff²; Tresa Pollock¹; ¹University of California, Santa Barbara; ²Oak Ridge National Laboratory

9:10 AM

Evolution of a Gradient Microstructure in Direct Metal Laser Sintered AlSi10Mg: *Amir Hadadzadeh*¹; Babak Shalchi Amirkhiz²; Brian Langelier³; Jian Li²; Mohsen Mohammadi¹; ¹Marine Additive Manufacturing Centre of Excellence-University of New Brunswick; ²CanmetMATERIALS-Natural Resources Canada; ³Canadian Centre for Electron Microscopy (CCEM)-McMaster University

9:30 AM

Microstructure-properties Relationships for Alloy Hastelloy X Fabricated by Additive Manufacturing: *Sebastien Dryepondt*¹; Mike Kirka¹; Fred List¹; ¹Oak Ridge National Laboratory

9:50 AM

Microstructure Modeling in Wire Arc Additive Manufacturing Process: *Ranadip Acharya*¹; Alex Staroselsky¹; John Sharon¹; Kenneth Smith¹; Michael Klecka¹; Tahany El-Wardany¹; William Tredway¹; ¹Utc Research Center

10:10 AM Break

10:30 AM

Solidification of Additively Manufactured Nanofunctionalized Metals: *Mark O'Masta*¹; Eric Clough¹; Jacob Hundley¹; John Martin¹; ¹HRL Laboratories

10:50 AM

The Effect of Process Parameters on Microstructural Evolution in Reduced-dimensionality Samples during Additive Manufacturing: *Kaila Bertsch*¹; Bailey Kuehl¹; Dan Thoma¹; ¹University of Wisconsin-Madison

11:10 AM

Effect of a Vertical Magnetic Field on the Microstructure and Tensile Properties of AlSi10Mg Alloy Produced via Laser Additive Manufacturing: *Dafan Du*¹; Anping Dong¹; Da Shu¹; Baode Sun¹; ¹Shanghai Jiao Tong University

11:30 AM

The Effect of Applied Magnetic Field on Laser Additive Manufacturing: *Andrew Kao*¹; *Teddy Gan*¹; *Ivars Krastins*¹; *Biao Cai*²; *Koulis Pericleous*¹; ¹University of Greenwich; ²University of Birmingham

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Fatigue and Fracture III – Session V

Sponsored by: TMS: Additive Manufacturing Committee

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

Thursday AM | March 14, 2019
221B | Henry B. Gonzalez Convention Center

Session Chair: Nik Hrabe, National Institute of Standards and Technology

8:30 AM Invited

Additive Materials Behavior: Fatigue Case Studies: *Amber Andreaco*¹; *Eric Ott*¹; *Rajendra Kelkar*¹; ¹GE Additive

9:00 AM

Effect of Laser Shock Peening Processing Parameters on the Microstructure, Residual Stress, and Fatigue Behavior of Additive Manufactured CoCr Alloy: *Micheal Kattoura*¹; *Jan Kaufman*²; *Boetang Twum Donkor*¹; *Seetha Ramaiah Mannava*¹; *Vijay Vasudevan*¹; ¹University of Cincinnati; ²HiLASE Centre

9:20 AM

The Effect of Heat Treatment and Alloying of Ni-Ti Alloy with Copper on Improving Its Fatigue Life: *Wisam Abu Jadayil*¹; *Duaa Sehan*¹; ¹American University of Ras Al Khaimah

9:40 AM

Role of Multi-scale Microstructural Features in Tensile, Compressive, Fatigue, and Fracture Behavior of Direct Metal Laser Sintered Inconel-718: *Nicholas Ferreri*¹; *Saeede Ghorbanpour*¹; *Jonathan Bicknell*²; *Sven Vogel*³; *Marko Knezevic*¹; ¹University of New Hampshire; ²Turbocam International; ³Los Alamos National

Laboratory

10:00 AM Break

10:20 AM Invited

Sources of Scatter in the Fatigue Behavior of Ti-6Al-4V Fabricated via Electron Beam Melting: *Peeyush Nandwana*¹; Sean Yoder¹; Vincent Paquit¹; Michael Kirka¹; Ercan Cakmak¹; Sudarsanam Babu¹; Ryan Dehoff¹; ¹Oak Ridge National Laboratory

10:50 AM

Implications of Post-processing Induced Microstructural Changes on the Deformation and Fracture Behavior of Additively Manufactured Ti6Al4V Alloy: *Lara Draelos*¹; Xinzhu Zheng¹; Ryan Dehoff²; Peeyush Nandwana²; Ankit Srivastava¹; ¹Texas A&M University; ²Oak Ridge National Laboratory

11:10 AM

Manipulation of Defects, Crystallographic Texture and Tensile Properties in Additively Manufactured Ti-6Al-4V Parts: *Jake Benzing*¹; Nikolas Hrabe¹; Ryan White¹; Magnus Ahlfors²; ¹National Institute of Standards and Technology - Boulder, CO; ²Quintus Technologies

11:30 AM

Effects of Hot Isostatic Pressing Temperature on the Static and Dynamic Properties of Selective Laser Melted Ti-6Al-4V Solid Material: *Oscar Quintana*¹; William Relue¹; Nia Hightower¹; ¹DePuy Synthes

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Microstructural Evolution and Phase Transformations — Ti-based Systems

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

Program Organizers: Bij-Na Kim, LPW Carpenter Additive; Eric Lass, National Institute of Standards and Technology; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Ryan Dehoff, Oak Ridge National Laboratory; Gerhard Fuchs, University of Florida; Chantal Sudbrack, QuesTek Innovations LLC

Thursday AM | March 14, 2019

221C | Henry B. Gonzalez Convention Center

8:30 AM Invited

Processing - microstructure - property Relationships in EBM processed Ti-6Al-4V: *Soumya Nag*¹; *Richard DiDomizio*¹; *Mallikarjun Karadge*¹; *Ian Spinelli*¹; *David Bogdan*¹; *Voramon Dheeradhada*¹; *Mattias Fager*²; *Jessica Shepard*²; *Isak Elfstrom*²; ¹GE Global Research; ²GE Additive

9:00 AM

Micromechanical Behavior and Thermal Stability of a Dual-phase $\alpha+\alpha'$ Titanium Alloy Produced by Additive Manufacturing: *Charlotte de Formanoir*¹; *Sébastien Allain*²; *Guilhem Martin*³; *Frédéric Prima*⁴; *Yves Bréchet*³; *Stephane Godet*⁵; ¹KU Leuven; ²Université de Lorraine; ³Université de Grenoble; ⁴Chimie ParisTech; ⁵Université Libre De Bruxelles

9:20 AM

Hydrogen-enabled Heat Treatment for Improving the Mechanical Properties and Reliability of Additively Manufactured Titanium Alloy Components: *James Paramore*¹; *Brady Butler*¹; *Jonathan Ligda*¹; *Nathaniel Saenz*¹; *Matthew Dunstan*¹; ¹United States Army Research Laboratory

9:40 AM

Towards Building Tailored Microstructures in Additively Manufactured Ti-6Al-4V Alloy by Combining a Mesoscale Phase Field Model with a Continuum Scale Thermal Finite Element Model: *Patrick O'Toole*¹; *Dayalan Gunasegaram*¹; *Anthony Murphy*¹; *Vu Nguyen*¹; *Sharen Cummins*¹; ¹Commonwealth Scientific Industrial Research Organisation (CSIRO)

10:00 AM Break

10:20 AM

Phase-field Simulation of Microstructure Evolution during Additive Manufacturing of Ti-6Al-4V Alloys: *Yanzhou Ji*¹; *Lei Chen*²; *Long-Qing Chen*¹; ¹Pennsylvania State University; ²Mississippi State University

10:40 AM

Microstructure Investigation of Ti-6Al-4V Builds with Superior Ductility Produced by Direct Laser Melting: *Kun Yang*¹; *Geoff de Looze*¹; *Robert Wilson*¹; ¹Metal Industries, CSIRO Manufacturing

11:00 AM

Prediction of the Resultant Phases and Hardness of Laser Direct Deposited Ti6Al4V: *Shunyu Liu*¹; *Kyung-Min Hong*¹; *Christopher Katinas*¹; *Yung Shin*¹; ¹Purdue University

11:20 AM

Production of Ti-6Al-4V Alloy by 3D Electron Beam Melting Technique and Development of its Post Treatments: *Merve Nur Dogu*¹; *Ziya Esen*²; *Arcan F. Dericioglu*¹; *Evren Tan*³; *Berkay Gümüs*³; ¹Middle East Technical University; ²Cankaya University; ³ASELSAN

11:40 AM Concluding Comments

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development — Structural Alloy Design for AM II

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

Program Organizers: Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Hunter Martin, HRL Labs; Orlando Rios, Oak Ridge National Laboratory

**Thursday AM | March 14, 2019
 221D | Henry B. Gonzalez Convention Center**

Session Chairs: Andrew Wessman, GE Additive; Sneha Prabha Narra, Worcester Polytechnic Institute

8:30 AM

Innovative Design of Metallic Materials using Additive Manufacturing: *Dan Thoma*¹; *Behzad Rankouhi*¹; *Krishnan Suresh*¹; *Janine Erickson*¹; *Kaila Bertsch*¹; *Gabriel Meric De Bellefon*¹; ¹University of Wisconsin - Madison

8:50 AM

Al Alloy Design for Additive Manufacturing: *Mageshwari Komarasamy*¹; *Kaimiao Liu*¹; *Le Zhou*²; *Holden Hyer*²; *Yongho Sohn*²; *Rajiv S. Mishra*¹; ¹University of North Texas; ²University of Central Florida

9:10 AM

Surface Inoculation of Aluminium Powders for Additive Manufacturing Guided by Differential Fast Scanning Calorimetry: *Lennart Tasche*¹; *Kay-Peter Hoyer*¹; *Evgeny Zhuravlev*²; *Guido Grundmeier*¹; *Mirko Schaper*¹; *Olaf Keßler*³; ¹Paderborn University; ²University of Rostock, Competence Center °CALOR; ³University of Rostock

9:30 AM

Additive Manufacturing Alloys: Fabrication of Aluminum Matrix Composites: *Jakob Hamilton*¹; Mouda Tung²; Ola Harrysson²; Shalabh Gupta³; Iris Rivero⁴; Christopher Rock²; ¹Iowa State University; ²North Carolina State University; ³Ames Laboratory; ⁴Rochester Institute of Technology

9:50 AM

Solubility of Ni, Co and Mn in a Lightweight Al-based High Temperature Intermetallic Phase: *Sujeily Soto-Medina*¹; Biswas Rijal¹; Lilong Zhu¹; Richard Hennig¹; Michele Manuel¹; ¹University of Florida

10:10 AM Break

10:30 AM

Microstructure and Mechanical Properties of Novel α/β Titanium Alloys Designed for Additive Manufacturing: *Marco Simonelli*¹; Nesma Aboulkhair¹; Yau Yau Tse²; Adam Clare¹; Richard Hague¹; ¹University Of Nottingham; ²Loughborough University

10:50 AM

Understanding the Transitional Properties of Laser Deposited, Compositionally Graded Structures: *Himanshu Sahasrabudhe*¹; ¹Michigan State University

11:10 AM

Advantages of Novel Al-Si Alloy with Cu Additive for Printing Parts via SLM Process: Viktor Mann¹; Alexander Krokhin¹; Roman Vakhromov²; Dmitriy Ryabov¹; Vladimir Korolev²; Daria Daubarayte²; *Ivan Mikhailov*²; ¹RUSAL Global Management B.V.; ²Light Materials and Technologies Institute

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Solid State Processing of Metals and Ceramics — Binder Jetting I

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

Program Organizers: James Paramore, US Army Research Laboratory; Amy Elliott, Oak Ridge National Laboratory; Matthew Dunstan, US Army Research Laboratory; Markus Chmielus, University of Pittsburgh; Nihan Tuncer, Desktop Metal

**Thursday AM | March 14, 2019
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Session Chair: Amy Elliott, Oak Ridge National Laboratory

8:30 AM

Densification of H13 Tool Steel Components Fabricated via Binder Jet Additive Manufacturing for Tooling Applications: *Peeyush Nandwana*¹; Derek Siddel¹; Chris Shafer¹; Amy Elliott¹; ¹Oak Ridge National Laboratory

8:50 AM

Binder Development in Binder Jet Additive Manufacturing for Sand-casting: *Dustin Gilmer*¹; Michelle Lehmann¹; Amy Elliott²; Tomonori Saito²; ¹University of Tennessee; ²Oak Ridge National Laboratory

9:10 AM

Determination of Saturation Limits in Binder Jetting: *Nathan Crane*¹; Jeremy Crane¹; ¹University of South Florida

9:30 AM

Binder Development for Binder Jet Additive Manufacturing: Dustin Gilmer¹; Michelle Lehmann¹; Amy Elliott¹; *Tomonori Saito*¹; ¹Oak Ridge National Laboratory

9:50 AM Break

10:10 AM

The Effect of Powder Characteristics on the Binder Jet Process: Derek Siddel¹; Chris Shafer¹; Desarae Goldsby¹; Peeyush Nandwana¹; *Amy Elliott*¹; ¹Oak Ridge National Laboratory

10:30 AM

Binder Jetting Printing of Functional Ceramics: Luis Chavez¹; Carlos Diaz¹; Christian Rodarte¹; David Espalin¹; Ryan Wicker¹; *Yirong Lin*¹; ¹University of Texas at El Paso

10:50 AM

Mitigating Distortion During Sintering of Binder-jet Printed Ceramics: *Lynnora Grant*¹; Magdi Alameen¹; C. Higgs¹; Zachary Cordero¹; ¹Rice University

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Session VII

Sponsored by: TMS: Shaping and Forming Committee

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

Thursday AM | March 14, 2019
302A | Henry B. Gonzalez Convention Center

Session Chairs: M Arul Kumar, Los Alamos National Laboratory; Rodney McCabe, Los Alamos National Laboratory

8:30 AM

Three-dimensional Microstructure Effect on Twin Nucleation and Growth in HCP Metals: *Rodney McCabe*¹; Shujuan Wang¹; Thomas Nizolek¹; Arul Mariyappan¹; ¹Los Alamos National Laboratory

8:50 AM

Intra-grain Elastic Strain Reconstruction from Near-field High Energy X-ray Diffraction Microscope Data: *Yu-Feng Shen*¹; He Liu¹; Robert Suter¹; ¹Carnegie Mellon University

9:10 AM

The Competition between Deformation Twin Nucleation and Thickening in Nanostructured FCC Materials: *Matthew Daly*¹; Ashok Kumar²; Glenn Hibbard²; Chandra Veer Singh²; ¹University of Illinois at Chicago; ²University of Toronto

9:30 AM

Study of Temperature Dependence of Plasticity in β -tin and Titanium using Nanoindentation and Constitutive Modelling: *Zhuowen Zhao*¹; Aritra Chakraborty¹; Thomas Bieler¹; Jon Molina-Aldareguia²; Martin Crimp¹; Philip Eisenlohr¹; ¹Michigan State University; ²IMDEA Materials

9:50 AM Break

10:10 AM

To Twin or Not to Twin in Boron Carbide: *Kelvin Xie*¹; Rich Haber²; Jim McCauley³; Kevin Hemker³; ¹Texas A&M University; ²Rutgers University; ³Johns Hopkins University

10:30 AM

Understanding the Mechanical Response of Brittle Single Crystals Combining Micromechanic Analyses and Simulations:

Manuel Gruber¹; Alexander Leitner¹; Peter Supancic¹; *Daniel Kiener*¹;
Raul Bermejo¹; ¹University of Leoben

10:50 AM

Effect of Severe Shear Deformation and Crystal Orientation on the Local Hardness of Ti-6Al-4V Chips Obtained from Turning using Nanoindentation Mapping and Electron Backscatter Diffraction Mapping: *Jiawei Lu*¹; Thomas Bieler¹; Patrick Kwon¹; ¹Michigan State University

11:10 AM

Quantifying In-plane Deformation by Integrating Indentation and Digital Image Correlation: *Mengying Liu*¹; Ian McCue¹; Michael Demkowicz¹; ¹Texas A&M University

11:30 AM

Stress Obtained from Digital Image Correlation for Two Dimensional Microstructures: *Benjamin Cameron*¹; Cem Tasan¹; ¹Massachusetts Institute of Technology

11:50 AM

On the Shear Band Nucleation and Flow Transitions in Cutting of Metals: *Shwetabh Yadav*¹; Dinakar Sagapuram¹; ¹Texas A&M University

ADVANCED MATERIALS

Advanced High-Strength Steels III — High-Performance Steels II

Sponsored by: TMS: Steels Committee

Program Organizers: Amy Clarke, Colorado School of Mines; MingXin Huang, University of Hong Kong; C. Tasan, Massachusetts Institute of Technology; Kester Clarke, Colorado School of Mines; Ana Luiza Araujo, AK Steel Research & Innovation

Thursday AM | March 14, 2019
205 | Henry B. Gonzalez Convention Center

Session Chairs: Katherine Sebeck, TARDEC; MingXin Huang, University of Hong Kong

8:30 AM

Phase Transformations in High-nickel Steel Weld Deposits with a Non-equilibrium Hierarchical Microstructure: *Amir Farkoosh*¹; Daniel Bechetti²; Matthew Sinfield²; Jeffrey Farren²; David

Seidman³; ¹Northwestern University; ²Naval Surface Warfare Center; ³Northwestern University

8:50 AM

High-alloy CrMnNi Cast Steel Studied by Nano Indentation: *Robert Lehnert*¹; Anja Weidner¹; Mykhaylo Motylenko¹; Horst Biermann¹; ¹Technische Universität Freiberg

9:10 AM

Dynamic Deformation Behavior of an Fe-Ni-C High Strength, High Toughness Steel: *Ian Harding*¹; Sharvan Kumar¹; ¹Brown University

9:30 AM

The Stability of Precipitated Austenite in Fe-10Ni-0.5 Mn-0.1C Steel: *Ian Harding*¹; Isabelle Mouton²; Baptiste Gault²; Dierk Raabe²; Sharvan Kumar¹; ¹Brown University; ²Max Planck Institut für Eisenforschung GmbH

9:50 AM Break

10:10 AM

Effect of Aging on the Microstructural Evolution in a New Design of Maraging Steels with Carbon: Peng Gong¹; *William Rainforth*¹; ¹The University of Sheffield

10:30 AM

Rapid Screening of Mechanical Responses of Lath Martensite in a New Generation of Maraging Steels: Effect of B and Nb: *Sepideh Parvinian*¹; Surya Kalidindi¹; Hamid Garmestani¹; ¹Georgia Institute of Technology

10:50 AM

Interplay of Microstructure and Deformation Behavior in Low Lattice Misfit Precipitates-Containing 19Ni3Mo1.5Ti Maraging Steel: *Kun Li*¹; Bing Yu¹; R.D.K. Misra¹; ¹UTEP

11:10 AM

High-strength T91 Ferritic/Martensitic Steel by Thermo-mechanical Treatment: *Zhongxia Shang*¹; Jie Ding¹; Cuncai Fan¹; Miao Song²; Jin Li¹; Qiang Li¹; Sichuang Xue¹; Karl Hartwig³; Xinghang Zhang¹; ¹Purdue University; ²University of Michigan; ³Texas A&M University

11:30 AM

Structure and Properties of Oxide Dispersion Strengthened Austenitic Stain Less Steels: P Sai Karthik¹; *Vijay Ravula*¹; M Ramakrishna¹; A.V.Reddy¹; G Sundararajan¹; ¹International Advanced Research Centre Arci

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Development in Rare Earth Free Permanent Magnets

Sponsored by: Federation of European Materials Societies (FEMS), TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Frank Johnson, Niron Magnetics, Inc.; Paul Ohodnicki, National Energy Technology Laboratory; Alex Leary, Nasa Grc; Orlando Rios, Oak Ridge National Laboratory; Alessandra Hool, ESM Foundation

Thursday AM | March 14, 2019
225B | Henry B. Gonzalez Convention Center

Session Chair: Hunter Henderson, Oak Ridge National Laboratory

8:30 AM Invited

Exploring New Magnetic Materials Using Bottom-up Processing: *Jeffrey Shield*¹; ¹University of Nebraska

9:00 AM Invited

Permanent Magnets Based on MnAl: Microstructure, Magnetic Properties and Thermal Stability: *Thomas G. Woodcock*¹; ¹IFW Dresden

9:30 AM

Investigation of Heat Treating, Powder Processing, and Properties of Gas Atomized High Ti alnico and Co-lean Alnico for Use in Permanent Magnet Motors: *Emily Rinko*¹; Iver Anderson²; Aaron Kassen¹; Emma White²; Wei Tang²; Lin Zhou²; Jason Pries³; Matthew Kramer²; ¹Iowa State University; ²Ames Laboratory; ³Oak Ridge National Laboratory

9:50 AM Break

10:10 AM Invited

Recent Advances in Theoretical and Experimental Study of Rare-earth-free a-Fe₁₆N₂ Magnet: Bin Ma¹; *Jianping Wang*¹; Md Mehedi¹; Yanfeng Jiang¹; ¹ECE, University of Minnesota

10:40 AM Invited

Role of Solidification and Phase Selection in Magnet Alloy Production: *Matthew Kramer*¹; ¹Ames Laboratory

ELECTRONIC MATERIALS

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

Sponsored by: TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Kazuhiro Nogita, University of Queensland; Tae-Kyu Lee, Portland State University; Yan Li, Intel Corporation; Christopher Gourlay, Imperial College London; Zhi-Quan Liu, Chinese Academy of Sciences; Rahul Panat, Carnegie Mellon University; Albert T. Wu, National Central University; Andre Delhaise, Celestica; Mohd Arif Salleh, Universiti Malaysia Perlis

Thursday AM | March 14, 2019
216A | Henry B. Gonzalez Convention Center

Session Chairs: Zhi-Quan Liu, Chinese Academy of Sciences; Liang Zhang, Jiangsu Normal University; Kazuhiro Nogita, The University of Queensland

8:30 AM

Role of Surface Chemistry of Solder Particles in Performance of Solder Pastes: *Amir H. Nobari*¹; Arslane Bouchemit²; Ana Da Silva Marques¹; Sylvain St-Laurent¹; Gilles L'Espérance²; ¹5N Plus Inc - Micro Powders; ²École Polytechnique de Montréal

8:50 AM

Micro-structure and Properties of Cu-0.3wt.%Ag Alloy Ultra-fine Wires: *Shusen Wang*¹; Yuanwang Zhang¹; Dawei Yao¹; ¹Shanghai Electric Cable Research Institute Co., Ltd.

9:10 AM

Length Scale of the Cellular Microstructure Tailoring Tensile Properties of Zn-20wt.%Sn-2wt.%Cu Solder Alloy: Cesar Mangualde¹; Rodrigo Reyes¹; *José Spinelli*¹; ¹Universidade Federal de São Carlos - UFSCar

9:30 AM

Refined Manufacturing Acceleration Process (ReMAP) M3: Thermal Preconditioning and Restoration of Bismuth-containing Lead-free Solder Alloys: *Andre Delhaise*¹; Polina Snugovsky¹; Jeffrey Kennedy¹; David Hillman²; Stephan Meschter³; David Adams²; Milea Kammer⁴; Warren Harper⁴; Marianne Romansky¹; Joseph Juarez⁴; Ivan Straznicky⁵; Ivan Tan¹; Ivan Matijevic⁶; Leonid Snugovsky⁶; Mikaella Brillantes⁶; Ross Wilcoxon²; Doug Perovic⁶; ¹Celestica;

²Rockwell-Collins; ³BAE Systems; ⁴Honeywell Aerospace; ⁵Curtiss-Wright; ⁶University of Toronto

9:50 AM Break

10:10 AM

The Microstructure Evolution and Oxidation Characteristics of Sn58Bi Solder Joints under the Oxidizing Environment: *Yishu Wang*¹; Limin Ma¹; Fu Guo¹; ¹Beijing University of Technology

10:30 AM

The Thermomechanical Reliability at High Temperatures of Pb Free Solders: *Faramarz Hadian*¹; Harry Schoeller²; Eric Cotts¹; ¹Binghamton University; ²Universal Instruments Corporation

10:50 AM Concluding Comments

CHARACTERIZATION

Advanced Real Time Imaging – Phase Transformation I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, US Department of Energy - National Energy Technology Laboratory; P. Chris Pistorius, Carnegie Mellon University; Candan Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zuotai Zhang, Southern University of Science and Technology; Neslihan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Saito, Kyushu University; Yongsug Chung, Korea Polytechnic University; Bryan Webler, Carnegie Mellon University

Thursday AM | March 14, 2019

302B | Henry B. Gonzalez Convention Center

Session Chairs: Noritaka Saito, Kyusyu University; Hideyuki Yasuda, Kyoto University

8:30 AM Invited

Characterising Local Phase Transformations and Kinetics using In Situ High Voltage TEM: *Kazuhiro Nogita*¹; Flora Somidin¹; Hiroshi Maeno²; Xuan Tran²; Stuart McDonald¹; M.A.A. Mohd Salleh³; Syo Matsumura²; ¹University of Queensland; ²Kyushu University; ³Universiti Malaysia Perlis

9:00 AM

Time-resolved Fast-tomography for Observing Solidification in Metallic Alloys: *Hideyuki Yasuda*¹; Yuta Tomiyori¹; Takuya Kawarasaki¹; Yuichi Kato¹; Kohei Morishita²; Kentaro Kajiwara³; Akihisa Takeuchi³; Kentaro Uesugi³; ¹Kyoto University; ²Kyushu University; ³JASRI/SPring-8

9:30 AM

Combined Synchrotron Radiography and EBSD Studies of Solder Joint Solidification.: *Jingwei Xian*¹; Sergey Belyakov¹; M.A.A. Mohd Salleh²; Kazuhiro Nogita³; Hideyuki Yasuda⁴; Christopher Gourlay¹; ¹Imperial College London; ²Universiti Malaysia Perlis (UniMAP); ³The University of Queensland; ⁴Kyoto University

9:50 AM Invited

Characterization of Microstructural Development by Combining High Temperature Microscopy with Differential Thermal Analysis: *Suk-Chun Moon*¹; Dominic Phelan¹; Rian Dippenaar¹; ¹University of Wollongong

10:20 AM Break

10:40 AM

Quantitative Thermal Analysis of Solidification in a High-temperature Laser-scanning Confocal Microscope: *Dasith Liyanage*¹; Suk-Chun Moon¹; Madeleine Du Toit¹; Rian Dippenaar¹; ¹University of Wollongong

11:00 AM

In Situ Investigation of Pt-Rh Thermocouple Degradation by P-bearing Gases: *Anna Nakano*¹; Jinichiro Nakano¹; James Bennett²; ¹U.S. Department of Energy National Energy Technology Laboratory/ AECOM; ²U.S. Department of Energy, National Energy Technology Laboratory

MATERIALS DESIGN

Advances in Computational Methods for Damage Mechanics and Failure Phenomena — Atomistic and Coarse-grained Methods

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Michael Tonks, University of Florida; Remi Dingreville, Sandia National Laboratories; Jaafar El-Awady, Johns Hopkins University

Thursday AM | March 14, 2019
301C | Henry B. Gonzalez Convention Center

Session Chairs: Avinash Dongare, University of Connecticut; Kiran Solanki, Arizona State University

8:30 AM Invited

Atomistic Simulation Methods for Computing Character Angle and Stress-State Dependent Dislocation Properties: *Douglas Spearot*¹; Khanh Dang¹; ¹University of Florida

9:00 AM

Role of Interstitial Oxygen Impurity Effects on Macroscopic Deformation and Fatigue Behavior of Commercially Pure Titanium: Benyamin Bazehhour¹; Chaitanya Kale¹; *Kiran Solanki*¹; ¹Arizona State University

9:25 AM

Variational and Multiscale Modeling of Amorphous Silica Glass: *William Schill*¹; Michael Ortiz¹; ¹California Institute of Technology

9:50 AM Invited

Quasi-coarse-grained Dynamics Simulations to Investigate the Mechanisms of Void Nucleation and Evolution during Dynamic Failure of Multiphase Metallic Materials at the Mesoscales: *Avinash Dongare*¹; Sergey Galitskiy¹; Marco Echeverria¹; Sumit Suresh¹; ¹University of Connecticut

10:20 AM Break

10:40 AM

Modeling the Nucleation, Growth and Coalescence Behavior of Voids during Spall Failure of Al Microstructures at Mesoscales using Quasi-Coarse-Grained Dynamics (QCGD) Simulations: *Garvit Agarwal*¹; Avinash Dongare¹; ¹University of Connecticut

11:00 AM

Modeling of Spall Behavior of Aluminum due to Laser Induced Shock at the Mesoscales: *Sergey Galitskiy*¹; Dmitriy Ivanov²; Avinash Dongare¹; ¹University of Connecticut; ²University of Kassel

11:20 AM

Kinetics of Micro-structure Evolution and Failure of Mg with Supersaturated Vacancies: *Sara Adibi Sedeh*¹; Justin Wilkerson¹; ¹Texas A&M University

MATERIALS DESIGN

Advances in Computational Methods for Damage Mechanics and Failure Phenomena – Non-local Methods: Peridynamics and Phase-field

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Michael Tonks, University of Florida; Remi Dingreville, Sandia National Laboratories; Jaafar El-Awady, Johns Hopkins University

Thursday AM | March 14, 2019
303C | Henry B. Gonzalez Convention Center

Session Chairs: Srujan Rokkam, ACT Inc; Michael Tonks, University of Florida

8:30 AM Invited

Peridynamic Analysis of Material Failure: *Stewart Silling*¹; ¹Sandia National Laboratories

9:00 AM

A Generalized Peridynamic Framework for Modeling Corrosion Mechanics, Damage and Failure in Metallic Alloys: *Srujan Rokkam*¹; Masoud Behzadinasab²; Max Gunzburger³; Nam Phan⁴; Kishan Goel⁴; ¹Def-Aero R&D Group, ACT Inc.; ²Def-Aero, Advanced Cooling Technologies Inc; ³Florida State University; ⁴Naval Air Systems Command

9:20 AM

A Simplified Nonlocal Multiphysics Model for Local Corrosion: *Eitan Lees*¹; Sachin Shanbhag¹; Srujan Rokkam²; Max Gunzburger¹; ¹Florida State University; ²Def-Aero, Advanced Cooling Technologies Inc

9:40 AM

A Stabilized Hypoelastic Constitutive Correspondence Model for Peridynamics: *Masoud Behzadinasab*¹; John Foster¹; ¹University of Texas at Austin

10:00 AM Break

10:20 AM

A Modified Phase-field Model for Quantitative Simulation of Crack Propagation in Single-phase and Multi-phase Materials: Arezoo Emdadi¹; *Mohsen Asle Zaeem*²; ¹Missouri University of Science and Technology; ²Colorado School of Mines

10:40 AM

Uncertainty Quantification and Validation of a UO₂ Phase Field Fracture Model: *Chaitanya Bhave*¹; Michael Tonks¹; Jie Lian²; ¹University of Florida; ²Rensselaer Polytechnic Institute

11:00 AM

Phase-field Modeling of Coupled Amorphization and Fracture in Boron Carbide: *Lei Cao*¹; ¹University of Nevada, Reno

11:20 AM

Phase-field Modeling of Microstructure Dependent Fracture in Anisotropic UO₂ Polycrystals: *Wen Jiang*¹; Larry Aagesen¹; Yongfeng Zhang¹; ¹Idaho National Laboratory

11:40 AM

Effect of Multi-gating System on Solidification of Molten Metals in Spur Gear Casting: A Simulation Approach: *Oluseyi Ajayi*¹; Enesi Salawu¹; ¹Covenant University, Ota, Nigeria

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Casting and Solidification

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

Program Organizer: Hiromi Nagaumi, Soochow University

Thursday AM | March 14, 2019

007A | Henry B. Gonzalez Convention Center

Session Chair: Dmitry Eskin, Brunel University

8:30 AM Introductory Comments

8:35 AM

Comparison of Diversified Casting Methods on Mechanical and Microstructural Properties of 5754 Aluminum Alloy for Automotive Applications: *Ali Malcioglu*¹; Cisem Dogan¹; Canan

Inel¹; ¹Asas Aluminyum San. Tic. A.S

9:00 AM

The Effect of High Speed Direct Chill Casting on Microstructure and Mechanical Properties of Al-Mg-Si-Fe Alloy: *Haitao Zhang*¹; Dongtao Wang²; Jianzhong Cui²; Hiromi Nagaumi¹; Weizhong Fan³; ¹Soochow University; ²Northeastern University; ³Guangdong Hongbang Metal Aluminum Co.,Ltd

9:25 AM

Multi-component High Pressure Die Casting (M-HPDC): Temperature Influence on the Bond Strength of Metal-plastic-hybrids Manufactured by M-HPDC: *Patrick Messer*¹; Arthur Bulinger¹; Uwe Vroomen¹; Andreas Bührig-Polaczek¹; ¹RWTH Aachen University

9:50 AM

On Microstructures, Textures and Formability of AA6xxx Alloy Sheets from DC and CC Processing: *Xiyu Wen*¹; Randall Bowers¹; Shridas Ningileri¹; ¹Secat Inc

10:15 AM Break

10:30 AM

Prototyping of a High Pressure Die Cast Al-Si Alloy Using Plaster Mold Casting to Replicate Corresponding Mechanical Properties: *Toni Bogdanoff*¹; Ehsan Ghassemali¹; Martin Riestra¹; Salem Seifeddine¹; ¹Jonkoping University

10:55 AM

Reduction of Aluminium Ingot Cooling Time in DC Casting Process: *Josée Colbert*¹; André Larouche¹; ¹Rio Tinto

11:20 AM

Impact of the Main Casting Process Parameters on Floating Crystals in Al Alloys DC-Cast Ingots: *Mousa Javidani*¹; Martin Fortier¹; Josée Colbert¹; ¹Rio Tinto

LIGHT METALS

Aluminum Reduction Technology — Environmental Issues including PFC Emissions

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

Program Organizer: Marc Dupuis, GeniSim Inc

Thursday AM | March 14, 2019

8:30 AM Introductory Comments

8:35 AM

Understanding of Co-evolution of PFC Emissions in EGA Smelter with Opportunities and Challenges to Lower the Emissions: *Ali Jassim*¹; *Sergey Akhmetov*¹; *Abdalla Ahmed Alzarooni*¹; *Daniel Whitfield*¹; *Barry Welch*²; ¹EGA; ²UNSW

9:00 AM

Results from Fluoride Emission Reduction Projects in Alcoa Baie-Comeau: *Stephan Broek*¹; *Yves Béliveau*²; *Stephen Lindsay*²; *Julie Dontigny*¹; *Sylvain Bouthillier*¹; *Carl Dore*¹; *Diego Oitaben*¹; ¹Hatch Ltd; ²Alcoa

9:25 AM

Validation of PFC Slope at Alcoa Canadian Smelters with Anode Effect Assessment and Future Implications to Add Low Voltage Emissions into Total PFC Emissions: *Christine Dubois*¹; *Luis Espinoza-Nava*¹; *Eliezer Batista*¹; *Alexandre Martin-Dubreuil*¹; ¹Alcoa

9:50 AM

SPL as a Carbon Injection Source in an EAF: A Process Study: *Vishnuvardhan Mambakkam*¹; *Robert Alicandri*¹; *Kinnor Chattopadhyay*¹; ¹University of Toronto

10:15 AM Break

10:30 AM

Migration Behavior of Fluorides in Spent Potlining during Vacuum Distillation Method: *Nan Li*¹; *Lei Gao*²; *Kinnor Chattopadhyay*³; ¹Hong He University; ²Kunming University of Science and Technology; ³University of Toronto

10:55 AM

HF and SO₂ Multipoint Monitoring on Large Gas Treatment Centers (GTCs) with Prewarning Abilities: *Anders Sorhuus*¹; *Sivert Ose*¹; *Eivind Holmefjord*¹; ¹GE Power

11:20 AM

DFT Study on COS Oxidation Reaction Mechanism: *Jie Li*¹; *Tianshuang Li*¹; *Hongliang Zhang*¹; *Jingkun Wang*¹; *Kena Sun*¹; *Jin Xiao*¹; ¹Central South University

BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces VI

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

Program Organizers: Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Po-Yu Chen, National Tsing Hua University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines

Thursday AM | March 14, 2019

217C | Henry B. Gonzalez Convention Center

Session Chairs: Candan Tamerler, University of Kansas; Hendrik Heinz, University of Colorado

8:30 AM

Engineered Enzyme/Gold Biomaterial Interface Offers Improved Catalytic Stability: *Rachel Litz*¹; Mark Richter¹; Candan Tamerler¹; ¹University of Kansas

8:50 AM

Generation of Nanoparticle-embedded Honeycomb like Porous Scaffolds via a Microfluidic T-junction: *Xinyue Jiang*¹; Merve Gultekinoglu¹; Cem Bayram¹; Kezban Ulubayram¹; Mohan Edirisinghe¹; ¹University College London

9:10 AM Invited

Bio Nano Data Convergence: Establishment of a Biomaterials Ontology: *Rebecca Reiss*¹; Terry Lowe²; ¹New Mexico Institute of Mining and Technology; ²Colorado School of Mines

9:40 AM

Biomimetic Wrinkle Graphene Surfaces with Switchable Adhesion: *Yiyang Wan*¹; Yong Gao²; Zhenhai Xia²; ¹University Of North Texas; ²Northwestern Polytechnical University

10:00 AM Break

10:20 AM

Mechanics of Collagen Fibril-CNT Composites: *Marco Fielder*¹; Arun Nair¹; ¹University of Arkansas

10:40 AM

Transparent Titanium Dioxide Nanotubes: Processing, Characterization, and Application in Establishing Cellular Response Mechanisms: *Jevin Meyerink*¹; Divya Kota¹; Scott Wood¹; Brandon Scott¹; Robert Anderson¹; Grant Crawford¹; ¹South Dakota School of Mines & Technology

BIOMATERIALS

Biological Materials Science — Biorelated Applications

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

Program Organizers: Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama at Birmingham; Jing Du, Penn State University

Thursday AM | March 14, 2019

007D | Henry B. Gonzalez Convention Center

Session Chairs: Rajendra Kasinath, DePuy Synthes, Johnson and Johnson; David Restrepo, University of Texas San Antonio

8:30 AM

Antibacterial Mechanism of Cu-bearing Stainless Steel: Xinrui Zhang¹; *Chunguang Yang*¹; Ke Yang¹; ¹Institute Of Metal Research

8:50 AM

Trends in Technology of Operative Antibiotic Therapy: A Review: *Matthew Siegel*¹; Daniel Li¹; Elan Volchenko¹; Rachel Bergman²; Fei Yang³; Dawei Li³; Decheng Wu³; ¹Northwestern University; ²University of Michigan; ³Chinese Academy of Sciences

9:10 AM

Freeze Casting Using Tri-axial Magnetic Field Control to Fabricate Materials Inspired by Bone: *Isaac Nelson*¹; Taylor Ogden¹; Paul Wadsworth¹; Max Mroz¹; Jake Abbott¹; Steven Naleway¹; ¹University of Utah

9:30 AM

Selective Laser Melted Biodegradable Porous Iron: *Yageng Li*¹; Holger Jahr²; Karel Lietaert³; Prathyusha Pavanram²; Aytac Yilmaz¹; Laura Fockaert¹; Marius Leeflang¹; Behdad Pouran⁴; Yaiza Gonzalez-Garcia¹; Harrie Weinans⁴; Johannes Mol¹; Jie Zhou¹; Amir Zadpoor¹; ¹Delft University of Technology; ²University Hospital RWTH Aachen; ³3D Systems Leuven; ⁴University Medical Center

Utrecht

9:50 AM

Accelerating Degradation Rate and Enhanced Osseointegration of Zn Compositing with Mg: *Yufeng Zheng*¹; ¹Peking University

10:10 AM Break

10:30 AM

Accumulation of Biofilm on Ti-6Al-4V Alloy Fabricated Using Additive-layer-manufacturing: *Mari Koike*¹; Tetsuro Horie¹; Richard Mitchell²; Toru Okabe³; ¹The Nippon Dental University; ²University of Kentucky College of Dentistry; ³Baylor College of Dentistry

10:50 AM

Computational Investigation of Mechanical Behavior of Staggered Composites: *Liqiang Lin*¹; Mohammad Maghsoudi Ganjeh¹; Xiaodu Wang¹; Xiaowei Zeng¹; ¹University of Texas at San Antonio

11:10 AM

Magnesium Based Microfabricated Biodegradable Power Source Transient Implantable Devices: *Zia Ur Rahman*¹; Waseem Haider¹; ¹Central Michigan University

11:30 AM

Electrochemical Corrosion Protocol for Biomaterial Alloys: *Vineeth Kumar Gattu*¹; Javier Obregon²; J Ernesto Indacochea²; William Ebert¹; ¹Argonne National Laboratory; ²University of Illinois at Chicago

ADVANCED MATERIALS

Bulk Metallic Glasses XVI — Thermal and Other Properties

Sponsored by: TMS: Mechanical Behavior of Materials Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Gongyao Wang, Alcoa; Robert Maass, University of Illinois at Urbana-Champaign; Muhammad Rafique

Thursday AM | March 14, 2019

206B | Henry B. Gonzalez Convention Center

Session Chairs: Robert Maass, University of Illinois at Urbana-Champaign; Fan Zhang, CompuTherm LLC

8:30 AM Invited

Stress- and Temperature-driven Structural Dynamics in a Zr-based Metallic Glass: Amlan Das¹; Robert Maass¹; ¹University of Illinois at Urbana-Champaign

8:50 AM Invited

Evaluation of the Glass Forming Ability of Multi-component Bulk Metallic Glasses by High Throughput Calculation: Fan Zhang¹; Chuan Zhang¹; Weisheng Cao¹; Shuanglin Chen¹; ¹CompuTherm LLC

9:10 AM Invited

Bulk Metallic Glasses: Correlations between Structure, Stability & Glass Forming Ability: Kevin Laws¹; Daniel Miracle²; Dmitri Louzguine-Luzgin³; ¹University of New South Wales; ²Air Force Research Laboratory; ³Tohoku University

9:30 AM

Probing Heat Generation during Shear Band Operation by Localized Boiling: David Brennhagen¹; Konstantinos Georgarakis²; Yoshihiko Yokoyama³; Koji Nakayama³; Lars Arnberg¹; Ragnhild Aune¹; ¹Ntnu; ²Cranfield University; ³Tohoku University

9:50 AM Break

10:10 AM Invited

Bulk Metallic Glasses as Highly Catalytic Materials: Vahid Hasannaeimi¹; Sundeep Mukherjee¹; ¹University of North Texas

10:30 AM Invited

Modulating Crystallinity of a Ti-Zr-Based Composite Bulk Metallic Glass Matrix: Kevin Kaufmann¹; Tyler Harrington¹; Mojtaba Samiee¹; Xiao Liu¹; Huikai Cheng²; Kenneth Vecchio¹; ¹University of California San Diego; ²Thermo Fisher Scientific

10:50 AM Invited

Effect of Oxygen on the Glass Formation and Mechanical Properties of Industrial Grade Zr Based Bulk Metallic Glasses: Y.X. Wang¹; Li Yi¹; ¹Institute of Metal Research, CAS

11:10 AM

Phase Equilibria of the Cu-Zr-Ti Ternary System at 703°C and the Thermodynamic Assessment and Metallic Glass Region Prediction of the Cu-Zr-Ti Ternary System: Chu Hsuan Wang¹; Gita Novian Hermana¹; Chih Hung Lin¹; Hsien Ming Hsiao²; Yee Wen Yen¹; ¹Taiwan Tech; ²Taiwan Institute of Nuclear Energy Research

Cast Shop Technology – Continuous Casting

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

Program Organizer: Pierre-Yves Menet, Constellium Technology Center

Thursday AM | March 14, 2019
007B | Henry B. Gonzalez Convention Center

Session Chair: Kai Karhausen, Hydro Aluminium Rolled Products GmbH

8:30 AM Introductory Comments

8:35 AM

Horizontal Single Belt Casting of Aluminum Sheet Alloys: *Roderick Guthrie*¹; *Mihaiela Isac*¹; ¹McGill Metals Processing Centre

9:00 AM

Cast Strip Surface Topography Study and Thermomechanical Processing of 1050 Alloy Produced by One Copper Shell Roll Caster: *Dionisios Spathis*¹; *John Tsiros*¹; *Andreas Mavroudis*¹; ¹Hellenic Aluminum Industry

9:25 AM

Influence of Strip Thickness on As-cast Material Properties of Twin-roll Cast Aluminum Alloys: *Vakur Akdogan*¹; *Cemil Isiksacan*¹; *Hatice Mollaoglu Altuner*¹; *Onur Birbasar*¹; *Mert Günyüz*¹; ¹Assan Aluminum

9:50 AM

Softening Behavior of Direct Chill and Twin-roll Cast AA 3105 Alloy: *Mert Gülver*¹; *Onur Meydanoglu*¹; *Cemil Isiksaçan*¹; ¹Assan Aluminyum San. Ve Tic. As

CHARACTERIZATION

Characterization of Materials through High Resolution Imaging – Modeling and Computation for High Resolution Imaging

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

Program Organizers: Ross Harder, Argonne National Laboratory; Richard Sandberg, Los Alamos National Laboratory; Xianghui Xiao, Argonne National Laboratory; Brian Abbey, La Trobe University; Saryu Fensin, Los Alamos National Laboratory; Ana Diaz, Paul Scherrer Institut; Mathew Cherukara, Argonne National Laboratory

Thursday AM | March 14, 2019
303A | Henry B. Gonzalez Convention Center

Session Chair: Richard Sandberg, Los Alamos National Laboratory

8:30 AM Invited
Deep Learning of Inverse Problems in Scanning Transmission Electron Microscopy/Scattering: *Nouamane Laanait*¹; ¹Oak Ridge National Laboratory

9:00 AM Invited
Coherent Diffraction Imaging at High X-ray Energies: *S Maddali*¹; J. -S. Park¹; P. Kenesei¹; J. Almer¹; W. Cha¹; R. Harder¹; Y. Nashed¹; S. O. Hruszkewycz¹; ¹Argonne National Laboratory

9:20 AM Invited
Computational Investigation of Limits of Bragg Coherent Diffraction Imaging: *Hande Ozturk*¹; ¹Ozyegin University

9:40 AM
STEM Diffraction Contrast Image Simulations for Complex Dislocation Configurations: *Joseph Tessmer*¹; Saransh¹; Marc De Graef¹; ¹Carnegie Mellon University

10:00 AM Break

10:20 AM Invited
Deep Neural Networks for Feature Extraction and Image Reconstruction from Coherent X-ray Diffraction Imaging Data: *Mathew Cherukara*¹; Youssef Nashed¹; Ross Harder¹; ¹Argonne National Laboratory

10:40 AM Invited
Learning CDI Reconstructions with Backpropagation: *Youssef Nashed*¹; ¹Argonne National Laboratory

11:00 AM

Multi-angle Bragg Projection Ptychography with Probe Retrieval:

*Peng Li*¹; Felix Hofmann²; Steven Leake³; Marc Allain⁴; Virginie Chamard¹; ¹Institut Fresnel, CNRS; ²University of Oxford; ³European Synchrotron Radiation Facility; ⁴Institut Fresnel, Aix-Marseille University

11:20 AM Invited

Sparse Dictionary Learning Methods for Coherent X-ray Diffractive Imaging: *Ashish Tripathi*¹; Brendt Wohlberg¹; Richard Sandberg¹;

¹Los Alamos National Laboratory

11:40 AM

Photoelastic Ptychography for Anisotropic Imaging of Optically Transparent Samples: Guido Cadenazzi¹; Nicholas Anthony¹; *Brian Abbey*¹; ¹La Trobe University

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Analysis of Surfaces and Interfaces

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spina, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Thursday AM | March 14, 2019

212A | Henry B. Gonzalez Convention Center

Session Chairs: John Carpenter, Los Alamos National Laboratory; Zhiwei Peng, Central South University

8:30 AM Introductory Comments

8:35 AM Invited

A Forward Model for Rapid Characterization of Grain Orientations in α -Ti Using Polarized-light: *Brahim Akdim*¹; Christopher Woodward²; Michael Uchic²; ¹UES Inc/Air Force Research Laboratory; ²Air Force Research Laboratory

8:55 AM

Analyzing Preferential Localized Corrosion along Coherent Twin Boundaries in Pure Nickel via EBSD and Micro-CT: *Mengying Liu*¹; Matteo Seita²; Michael Demkowicz¹; ¹Texas A&M University; ²Nanyang Technological University

9:15 AM

Friction Stir Welding of Aluminum Alloys and Steels: Issues and Solutions: *Mian Wasif Safeen*¹; Pasquale Russo Spina¹; ¹Free University of Bozen-Bolzano

9:35 AM

Characterization of Interfacial Bond Surfaces in Explosively Bonded 304L Stainless Steel: *Thomas Ivanoff*¹; Olivia Underwood¹; Jonathan Madison¹; Lisa Deibler¹; Jeffrey Rodelas¹; ¹Sandia National Laboratories

9:55 AM

Surface Tension, Specific Heat and Eutectic Solidification of Substantially Undercooled Liquid Ti-Si Alloy: *Kai Zhou*¹; Bingbo Wei¹; ¹Northwestern Polytechnical University

10:15 AM

Magnetic Characterization of CarTech® Hypocore™ Alloy at Cryogenic Temperatures: Vamsi Meka¹; Eric Fitterling²; *Tanjore Jayaraman*¹; ¹University of Michigan-Dearborn; ²Carpenter Technology Corporation

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Ferrous Materials and Processes

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spina, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

**Thursday AM | March 14, 2019
 212B | Henry B. Gonzalez Convention Center**

Session Chairs: Mingming Zhang, ArcelorMittal; Donato Firrao, Politecnico di Torino

8:30 AM Introductory Comments

8:35 AM Invited

Is the 200 ksi Limit Still Valid for Mechanical Applications of Quenched and Tempered Steels?: *Donato Firrao*¹; *Paolo Matteis*¹; *Antonio De Sario*²; ¹Politecnico Di Torino; ²VI.MI. Fasteners

8:55 AM Invited

Evolution of Precipitates during Rolling and Annealing Process in Non-oriented Electrical Steel: *Qiang Ren*¹; *Lifeng Zhang*¹; *Yan Luo*¹; *Lin Cheng*²; *Piotr Roman Scheller*¹; ¹University of Science & Technology Beijing; ²Shougang Zhixin Qian'an Electromagnetic Materials Co., Ltd.

9:15 AM

Structure and Magnetic Properties of a Medium-entropy Fe₄₆Co₃₄Ni₂₀ Alloy Powder: *Anuj Rathi*¹; *Ganesh Varma Thotakura*¹; *Tanjore Jayaraman*¹; ¹University of Michigan-Dearborn

9:35 AM

Characterization of Water- and Gas- Atomized 17-4 PH Stainless Steel Powder Precursors for Additive Manufacturing: *Harish Irrinki*¹; *Satya Ganti*²; *Rachel Reed*²; *Veeraraghavan Sundar*²; *Sundar Atre*¹; ¹University of Louisville; ²UES Inc

9:55 AM Break

10:10 AM

Evolution of Microstructure and Mechanical Properties of 20Cr13 under Cavitation Erosion: *Guiyan Gao*¹; ¹Beihang University

10:30 AM

Fe-Co-2V Soft Ferromagnetic Alloy Characterization and Constitutive Model Development: *Kyle Johnson*¹; *Bo Song*¹; *Brett Sanborn*¹; *Jay Carroll*¹; *Don Susan*¹; *Andrew Kustas*¹; *Scott Grutzik*¹; *Adam Brink*¹; ¹Sandia National Laboratories

10:50 AM

The Influence of Strain Rate and Temperature on the Shear Response of 1018 Steel: *Roberta Beal*¹; *George T. (Rusty) Gray III*¹; *Veronica Livescu*¹; ¹Los Alamos National Laboratory

11:10 AM

Investigating the Mechanical Response under Quasi-static Compression of Cold Rolled Lean Duplex Stainless Steel 2101:

Tayla Nankivell¹; *Juan Escobedo-Diaz*¹; Ali Ameri¹; Zakaria Quadir²; Con Logos³; ¹University of New South Wales; ²Curtin University; ³Outokumpu

11:30 AM

Exploring Accurate Structure, Composition and Mechanical Properties of Carbides in High Tungsten Iron-base Alloy: High-throughput Mapping and DFT Calculations: *Yujie Meng*¹; Xiaoyu Chong²; Jing Feng²; ¹Nanomechanics Inc; ²Kunming University of Science and Technology

11:50 AM

Preparation of Magnesium Aluminum Ferrite Spinel by Microwave Sintering: *Huimin Tang*¹; Zhiwei Peng¹; Foquan Gu¹; Lei Ye¹; Liancheng Wang¹; Leixia Zheng¹; Weiguang Tian²; Mingjun Rao¹; Guanghui Li¹; Tao Jiang¹; ¹Central South University; ²Guangdong Guangqing Metal Technology Co. Ltd

MATERIALS DESIGN

Computational Approaches for Big Data, Artificial Intelligence and Uncertainty Quantification in Computational Materials Science – Uncertainty Quantification and AI-model Development in Atomistic Simulations

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Liang Qi, University of Michigan; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory; Adrian Sabau, Oak Ridge National Laboratory; Houlong Zhuang, Arizona State University ; Sugata Chowdhury, National Institute of Standards and Technology

Thursday AM | March 14, 2019

305 | Henry B. Gonzalez Convention Center

Session Chair: Xiaofeng Qian, Texas A&M University

8:30 AM Invited

High-performance Computing in Artificial Neural Networks Atomistic Simulations: *Vesselin Yamakov*¹; Edward Glaessgen²; Yuri Mishin³; ¹National Institute of Aerospace; ²NASA Langley Research Center; ³George Mason University

9:00 AM

Automated Sensitivity Analysis for High-throughput Ab Initio Calculations: *Jan Janssen*¹; Tilmann Hickel¹; Joerg Neugebauer¹; ¹Max-Planck-Institute

9:20 AM

Addressing Uncertainty Associated with Classical Interatomic Potential Choice: *Lucas Hale*¹; Zachary Trautt¹; ¹National Institute of Standards and Technology

9:40 AM Invited

Modeling Complex Phenomena in 2D Materials Using First-principles Theory Based Machine Learning Force Fields: Yang Yang¹; Hongxiang Zong²; Hua Wang¹; Xiaodong Ding²; *Xiaofeng Qian*¹; ¹Texas A&M University; ²Xi'an Jiaotong University

10:10 AM Break

10:30 AM

Machine Learning with Force-field Inspired Descriptors for Materials: Fast Screening and Mapping Energy Landscape: *Kamal Choudhary*¹; Brian DeCost¹; Francesca Tavazza¹; ¹University of Maryland (National Institute of Standards and Technology)

10:50 AM

GB Property Localization: Inference and Uncertainty Quantification of GB Structure-property Models from Indirect Polycrystal Measurements: Christian Kurniawan¹; David Fullwood¹; Eric Homer¹; *Oliver Johnson*¹; ¹Brigham Young University

11:10 AM

Workflow for High-throughput Atomistic Models of Ceramic Interfaces: *Shawn Coleman*¹; Matthew Guziewski¹; Caleb Carlin¹; ¹U.S. Army Research Laboratory

PHYSICAL METALLURGY

**Computational Thermodynamics and Kinetics —
 Microstructural Evolution II**

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tournet, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

Thursday AM | March 14, 2019
225C | Henry B. Gonzalez Convention Center

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

8:30 AM

Parallel Computing Enhanced Phase-field Method; GPGPU and OpenMP: *Kunok Chang*¹; ¹Kyung Hee University

8:50 AM

Modeling the Widmanstätten lath Structure in Zr Quenched from the Beta Phase: *Richard Smith*¹; Linda Rishel¹; ¹Naval Nuclear Laboratory

9:10 AM

Physics of Point Defects and Defect Clusters in fcc and bcc Metals: *Daniel Vizoso*¹; Chaitanya Deo¹; Remi Dingreville²; ¹Georgia Institute of Technology; ²Sandia National Laboratories

9:30 AM

Experimental Investigations and Thermodynamic Modeling of the Al-Cr-Fe System: *Maximilian Rank*¹; Peter Franke¹; Hans J. Seifert¹; ¹Karlsruhe Institute of Technology (KIT)

9:50 AM

The Effect of Solute Concentration on the Phase Formation in Ni Based Superalloys: *You Rao*¹; Maryam Ghazisaeidi¹; ¹Ohio State University

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Nuclear Materials and Radiation Effects

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tournet, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

Thursday AM | March 14, 2019
301A | Henry B. Gonzalez Convention Center

Session Chair: Andrea Jokisaari, Idaho National Laboratory

8:30 AM Invited

Nanoprecipitate Structures in Driven Immiscible Ternary Alloy Systems: *Pascal Bellon*¹; Qun Li¹; Robert Averback¹; ¹University of Illinois Urbana-Champaign

9:00 AM

Origin of Phase Segregation in Irradiated High-entropy Alloys: Multi-scale Modelling from Ab-initio Hamiltonian and Experimental Validation in W-Ta-Cr-V System: *Duc Nguyen-Manh*¹; Damian Sobieraj²; Jan S. Wrobel²; Osman El Atwani³; Arun Deveraj³; Enrique Martinez Saez³; ¹United Kingdom Atomic Energy Authority; ²Warsaw University of Technology; ³Los Alamos National Laboratory

9:20 AM

New Helium Bubble Growth Mode at a Symmetric Grain-boundary in Tungsten: Accelerated Molecular Dynamics Study: *Xiang-Yang Liu*¹; Blas Uberuaga¹; Danny Perez¹; Art Voter¹; ¹Los Alamos National Laboratory

9:40 AM Invited

Mesosopic Scale Models for Out of Equilibrium Microstructure Evolution: *Nana Ofori-Opoku*¹; ¹Canadian Nuclear Laboratories

10:10 AM Break

10:30 AM Invited

Computational Thermodynamics and Kinetics for Nuclear Applications at Idaho National Laboratory: *Andrea Jokisaari*¹; Larry Aagesen¹; Daniel Schwen¹; Benjamin Beeler¹; Chao Jiang¹; Sebastian Schunert¹; Yongfeng Zhang¹; ¹Idaho National Laboratory

11:00 AM

Thermodynamics and Kinetics of Noble Gas Atoms in bcc Transition Metals: *Chao Jiang*¹; Yongfeng Zhang¹; Yipeng Gao¹; Jian Gan¹; ¹Idaho National Laboratory

11:20 AM

Computational Study of Hydrogen Behavior in Long-term Dry Stored Spent Fuel Cladding: *Kunok Chang*¹; ¹Kyung Hee University

11:40 PM

Tensile and Thermal Creep Behavior of a Novel Copper Alloy for Fusion Energy Applications: *Ling Wang*¹; Ying Yang²; Ce Zheng³; Lance Snead⁴; Steven Zinkle¹; ¹University Of Tennessee; ²Oak Ridge National Laboratory; ³North Carolina State University; ⁴Stony Brook University

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Environmentally Assisted Cracking in Aluminum Alloys

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

Program Organizers: Bai Cui, University of Nebraska Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc

Thursday AM | March 14, 2019

214C | Henry B. Gonzalez Convention Center

Session Chairs: Nikhilesh Chawla, Arizona State University; Bai Cui, University of Nebraska-Lincoln

8:30 AM Invited

Probing Mechanisms of Corrosion in Aluminum Alloys by Correlative Tomography and Microscopy: *Nikhilesh Chawla*¹; Sridhar Niverty¹; Jacob Graber¹; Tyler Stannard¹; Francesco De Carlo²; Xianghui Xiao²; Vincent De Andrade²; ¹Arizona State University; ²Advanced Photon Source

9:10 AM

Degradation and Stress Corrosion Cracking in Highly Sensitized Al-Mg During Overly Cathodic Polarization: *Matthew McMahon*¹; John Scully¹; James Burns¹; ¹University of Virginia

9:30 AM

Nanoscale 4D Microstructural Characterization of Corrosion in Aluminum Alloys using Transmission X-Ray Microscopy (TXM): *Sridhar Niverty*¹; Jacob Graber¹; C.Shashank Kaira¹; Vincent De Andrade²; Francesco De Carlo²; Nikhilesh Chawla¹; ¹Arizona State University; ²Argonne National Laboratory

9:50 AM

Direct Evidence of Pit to Crack Transition in Al 7075: *Ramasis Goswami*¹; Attilio Arcari²; ¹U.S. Naval Research Laboratory; ²Excet Inc., Corrosion Science and Engineering

10:10 AM Break

10:30 AM

Environmentally Assisted Cracking in Field-retrieved 5XXX Aluminum Alloys: *Benjamin Palmer*¹; John Lewandowski¹; ¹Case Western Reserve University

10:50 AM

Accounting for Intra-temper Sensitization Variations within 5XXX Series Aluminum Alloys in Predictive Modeling: *Matthew Steiner*¹; Likun Sun¹; ¹University of Cincinnati

11:10 AM

Role of Mechanical Deformation on the Corrosion Susceptibility of Al7075 Aluminum Alloy: *Vikrant Beura*¹; Chaitanya Kale¹; Kiran Solanki¹; ¹Arizona State University

11:30 AM

Role of Deformation on the Localized Corrosion Behavior of Aluminum 5083 Alloy: *Chaitanya Kale*¹; Vikrant Beura¹; Cyril Williams²; Kiran Solanki¹; ¹Arizona State University; ²U.S. Army Research Laboratory

MECHANICS & STRUCTURAL RELIABILITY

Fatigue in Materials: Multi-scale and Multi-environment Characterizations and Computational Modeling — Multi-scale and Multi-physics Models in Fatigue to Better Predict Behavior and Lifetime

Sponsored by: TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Jean-Briac le Graverend, Texas A&M University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Garrett Pataky, Clemson University; Filippo Berto, Norwegian University of Science and Technology

Thursday AM | March 14, 2019
301B | Henry B. Gonzalez Convention Center

Session Chair: Jean-Briac le Graverend, Texas A&M University

8:30 AM

Micromechanical Modeling of Inclusion Induced Fatigue Damage in High Strength Martensitic Steels: *Matti Lindroos*¹; Anssi Laukkanen¹; Tom Andersson¹; ¹Vtt Research Center of Finland

8:50 AM

A Self-consistent Parametric Homogenization Framework for Fatigue in Ni-based Superalloys: *George Weber*¹; Max Pinz¹; Akbar Bagri¹; Somnath Ghosh¹; ¹Johns Hopkins University

9:10 AM

Atomistic-based Analysis of Fatigue Crack Propagation Mechanisms in FCC Metals: *Eyouiléki Awí*¹; Maxime Sauzay¹; Laurent Van Brutzel¹; Zhengxuan Fan²; Olivier Hardouin Duparc³; ¹The French Atomic Energy and Alternative Energies Commission; ²ONERA, The French Aerospace Laboratory; ³Ecole Polytechnique

9:30 AM Invited

Simulation of Fatigue Crack Propagation in Complex Al2024T351 Structures: *Henry Proudhon*¹; Raphaël Cusset¹; Marta Dragon-Louiset²; Vincent Jacques²; Laura Bonne²; Farida Azzouz¹; Jacques Besson¹; ¹Mines Paristech Centre Des Materiaux; ²Dassault Aviation

9:50 AM Break

10:10 AM

A Multi-scale Model for Fatigue Crack Initiation in Polycrystalline Titanium Alloys: *Shravan Kotha*¹; Ozturk Deniz¹; Adam Pilchak²; Somnath Ghosh¹; ¹Johns Hopkins University; ²Air Force Research Laboratory

10:30 AM

The Deformation Behaviors of Commercially Pure Titanium Grade 1 and Grade 2 Sheets under Monotonic and Cyclic Loading: Chao Ma¹; Peidong Wu²; Takayuki Hama³; Xiaoqian Guo¹; Xianbiao Mao¹;

*Huamiao Wang*⁴; ¹China University of Mining and Technology; ²McMaster University; ³Kyoto University; ⁴Shanghai Jiao Tong University

10:50 AM

Finding the Physical Basis for Fatigue Crack Growth: Accounting of Mean Stress Effects through the Concept of Change in Net-section Strain Energy: *K. S. Ravi Chandran*¹; ¹University of Utah

11:10 AM

Verification & Validation of Computational Models Associated with the Mechanics of Materials: *George Spanos*¹; Steve WaiChing Sun²; ¹The Minerals, Metals & Materials Society (TMS); ²Columbia University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Fracture Processes of Thin Films and Nanomaterials – Local Fracture Processes: Insights from Experiments and Modeling

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

Program Organizers: Daniel Kiener, University of Leoben; Megan Cordill, Erich Schmid Institute; Johannes Ast, Empa, Swiss Federal Laboratories for Materials Science and Technology; Brad Boyce, Sandia National Laboratories

Thursday AM | March 14, 2019
217B | Henry B. Gonzalez Convention Center

Session Chairs: Daniel Kiener, Montanuniversität Leoben; Bernhard Völker, Max-Planck-Institut für Eisenforschung

8:30 AM Invited

Improving Mechanical Properties of Mixed Transition Metal Carbide Reinforcements in Steel: Lionel Michelet¹; Marta Fornabaio¹; *Goran Zagar*¹; Lea Deillon¹; Andreas Mortensen¹; ¹École Polytechnique Fédérale de Lausanne

8:50 AM

Designing New Hard Coating Material Systems Utilizing AB Initio DFT Calculations: *Bernhard Völker*¹; Rafael Soler²; Stefan Gleich²; Jan-Ole Achenbach³; Christoph Kirchlechner²; Christina Scheu²; Gerhard Dehm²; Jochen M. Schneider¹; ¹RWTH Aachen University; ²Max-Planck-Institut für Eisenforschung GmbH; ³Materials Chemistry, RWTH Aachen University

9:10 AM Invited

From Quantum to Continuum Mechanics: Studying the Fracture Toughness of Transition Metal Nitrides and Oxynitrides: James Gibson¹; Holger Rueß¹; Shahed Rezaei¹; Marcus Hans¹; Denis Music¹; Stephan Wulfinghoff¹; Stefanie Reese¹; Jochen Schneider¹; *Sandra Korte-Kerzel*¹; ¹RWTH Aachen University

9:30 AM

Using the Steady-state Work Density Gradient Crack Tip Parameter to Characterize Steady State Crack Growth in Metal Thin Films: Wade Lanning¹; Syed Javaid¹; *Christopher Muhlstein*¹; ¹Georgia Institute of Technology

9:50 AM

Size Dependent Fracture Behaviors of Metallic Glass Nanolaminates: *Xinghang Zhang*¹; Zhe Fan²; Jian Wang³; ¹Purdue University; ²OakRidgeNationalLaboratory; ³UniversityofNebraska, Lincoln

10:10 AM Break

10:30 AM Invited

InSituTransmissionElectronMicroscopyObservationonFracture Process of High Entropy Alloys: *Qian Yu*¹; Qiaoqian Fu¹; Robert Ritchie²; Bernd Gludovatz²; Easo George³; ¹Zhejiang University; ²Lawrence Berkeley National Laboratory; ³Oak Ridge National Laboratory

10:50 AM

Interface Control of Fracture in Multilayer Films: *Cynthia Volkert*¹; ¹University of Goettingen

11:10 AM

In Situ TEM on Crack Growth and Dislocation Shielding in Metallic Thin Foils: *Scott Mao*¹; ¹University of Pittsburgh

11:30 AM

Unravelling the Role of Interfaces on the Shock Response of Nanocrystalline Cu/Ta Alloys: *Jie Chen*¹; Avinash Dongare¹; ¹University of Connecticut

MATERIALS PROCESSING

Friction Stir Welding and Processing X — Derivative Technologies

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

Thursday AM | March 14, 2019
210A | Henry B. Gonzalez Convention Center

Session Chairs: Kenneth Ross, Pacific Northwest National Laboratory; Jonathan Martin, TWI Ltd.

8:30 AM Invited

Assessing the Performance of Aluminum Alloy Heat Exchangers Manufactured by Stationary Shoulder Friction Stir Channeling: *Joao Gandra*¹; ¹TWI, Ltd.

8:50 AM

Copper-graphite Composite Wire Made by Shear-assisted Processing and Extrusion: *Xiao Li*¹; Glenn Grant¹; Chen Zhou²; Hongliang Wang²; Thomas Perry²; James Schroth²; ¹Pacific Northwest National Laboratory; ²General Motors

9:10 AM

Joining AA7099 to Ni-Cr-Mo Steel Using Friction Stir Dovetailing: *Md Reza-E-Rabby*¹; Scott Whalen¹; Kenneth Ross¹; Martin McDonnell²; ¹Pacific Northwest National Laboratory; ²U.S. Army Tank Automotive Research Development and Engineering Center

9:30 AM

Fatigue and Fracture of Solid-state Additive Manufacturing of Aluminum Alloy 6061: *Benjamin Rutherford*¹; Dustin Avery¹; Brian Jordon¹; ¹University of Alabama

9:50 AM Break

10:10 AM

Fatigue Behavior of Friction Stir Welding and Additive Friction Stir Deposition Repair Methods for Aluminum Alloys: *Conner Cleek*¹; Dustin Avery¹; Brian Jordon¹; Paul Allison¹; ¹University of Alabama

10:30 AM Invited

Material Flow and Microstructure Evolution in Corner Friction Stir Welding of 5083 Al Alloy using Ad-stir Technique: *Kunitaka Masaki*¹; Hiroshi Saito¹; Koji Nezaki¹; Shoko Kitamoto²; Yutaka Sato²; Hiroyuki Kokawa²; ¹IHI Corporation; ²Tohoku University

10:50 AM

Additive Friction Stir Deposition of Metals and Composites: *Hang Yu*¹; ¹Virginia Polytechnic Institute

11:10 AM

Joining of Lightweight Dissimilar Materials by Friction Self-pierce Riveting: *Yong Chae Lim*¹; Charles Warren¹; Jian Chen¹; Zhili Feng¹; ¹Oak Ridge National Laboratory

MATERIALS PROCESSING

Friction Stir Welding and Processing X — Simulation

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

Thursday AM | March 14, 2019

210B | Henry B. Gonzalez Convention Center

Session Chairs: Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

8:30 AM Invited

Use of the TPM Model to Illuminate Differences between Conventional and Stationary Shoulder FSW: *Tony Reynolds*¹; ¹University of South Carolina

8:50 AM

Numerical Model to Estimate Tool Wear and Worn-out Pin Shape during Friction Stir Welding of CuCrZr Alloy: *Pankaj Sahlot*¹; Amit Arora²; ¹PDPU Gandhinagar, INDIA and IIT Gandhinagar; ²IIT Gandhinagar

9:10 AM Invited

Probing Tool Durability in Stationary Shoulder Friction Stir Welding: *Buchibabu Vicharapu*¹; Huihong Liu¹; Hidetoshi Fujii¹; Ninshu Ma¹; Amitava De²; ¹Osaka University; ²Indian Institute of Technology Bombay

9:30 AM Invited

On the Material Bonding Behaviors in Friction Stir Welding: *Gaoqiang Chen*¹; Han Li¹; Qingyu Shi¹; ¹Tsinghua University

9:50 AM Break

10:10 AM Invited

Mechanical Characterization of the Interface Obtained in Friction-stir-welded Joints using Cohesive Zone Modeling: *Varun Gupta*¹; Erin Barker²; Piyush Upadhyay²; Darrell Herling²; ¹Pacific Northwest National Laboratory; ²Pacific Northwest National Laboratory

10:30 AM

Investigation of Interfacial Diffusion during Dissimilar Friction Stir Welding: *Nikhil Gotawala*¹; Amber Shrivastava¹; ¹Indian Institute of Technology, Bombay

10:50 AM

Effect of Actual Thermo-physical Properties on Heat Transfer and Material Flow for Dissimilar Weld– Al 6061-T6 and AZ31: Amit Singh¹; Pankaj Sahlot¹; *Amit Arora*¹; ¹Indian Institute of Technology, Gandhinagar

11:10 AM

Probing Texture Evolutions during Friction Stir Processing of a Mg Alloy: In Situ, Real-time Neutron Diffraction Study: *Yuan Li*¹; Ke An²; Zhili Feng²; Hahn Choo¹; ¹University of Tennessee; ²Oak Ridge National Laboratory

ADVANCED MATERIALS

High Entropy Alloys VII — Alloy Development and Applications III

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Thursday AM | March 14, 2019

207B | Henry B. Gonzalez Convention Center

Session Chairs: Jim Hu, Honda R&D Americas, Inc.; Hyoung Kim, POSTECH

8:30 AM Invited

Design of High-strength High-entropy Alloys: *Hyoung Seop Kim*¹; Jongun Moon¹; Jae Wung Bae¹; Jeong Min Park¹; ¹Postech

8:50 AM Invited

Efficient Exploration of the High Entropy Alloy Composition-phase Space: *Raymundo Arroyave*¹; *Anas Abu-Odeh*²; *Tanner Kirk*¹; *Richard Malak*¹; ¹Texas A & M University; ²University of California-Berkeley

9:10 AM Invited

Fcc/B2 Precipitation Hardenable AlXCoCrFeNi High Entropy Alloy Microstructures: Single Phase Fcc vs. Dual Phase Fcc-bcc: *Bharat Gwalani*¹; *Sindhura Gangireddy*¹; *Deep Choudhuri*¹; *Rajiv S Mishra*¹; *Rajarshi Banerjee*¹; ¹University of North Texas

9:30 AM Invited

Development of Oxide-dispersion Strengthening Medium Entropy Alloy: *Bin Liu*¹; *Yong Liu*¹; *Ao Fu*¹; *Yong Yang*²; *Qigong Fang*³; ¹Central South University; ²City University of Hongkong; ³HUNAN University

9:50 AM Break

10:10 AM Invited

Development of Oxidation Resistant Refractory High Entropy Alloys for High Temperature Structural Applications: *Bronislava Gorr*¹; *Franz Mueller*¹; *Steven Schellert*¹; *Hans Christ*¹; *Hans Chen*²; *Alexander Kauffmann*²; *Martin Heilmaier*²; ¹University of Siegen; ²Karlsruher Institut fuer Technologie (KIT)

10:30 AM Invited

Hierarchical Microstructure and Strengthening Mechanisms of a CoCrFeNiMn High Entropy Alloy Additively Manufactured by Selective Laser Melting: *Zhiguang Zhu*¹; *Quy-bau Nguyen*¹; *Peter K. Liaw*²; *Mui-ling Nai*¹; *Jun Wei*¹; ¹Singapore Institute of Manufacturing Technology; ²The University of Tennessee

10:50 AM

Production of AlCoCrFeNiME Based High Entropy Alloys via Self Propagating High Temperature Synthesis: *Murat Alkan*¹; *Esra Dokumaci*¹; *Berkay Türkoglu*¹; *Aslihan Kara*¹; *Büsra Aksu*¹; *Dilan Ugurluer*¹; ¹DEU

11:10 AM

Synthesis and Characterization of Nanocrystalline Fe_{26.67}Co_{26.67}Ni_{26.67}Al₁₀Si₁₀ Alloy Powders: *Kathem Bazzi*¹; *Anuj Rathi*¹; *Vamsi Meka*¹; *Ramasis Goswami*²; *Tanjore Jayaraman*¹; ¹University of Michigan-Dearborn; ²Naval Research Laboratory

11:30 AM

Effect of Al and Si Additions on the Microstructure Evolution during Thermomechanical Treatments of the Equimolar CoCrFeMnNi Alloy: *Dorian Hachet*¹; *Stéphane Gorsse*²; *Stéphane*

Godet¹; ¹Université Libre de Bruxelles; ²CNRS, Univ. Bordeaux, ICMCB

ADVANCED MATERIALS

High Entropy Alloys VII — Mechanical and Other Properties I

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Thursday AM | March 14, 2019

207A | Henry B. Gonzalez Convention Center

Session Chairs: Marc Meyers, University of California, San Diego; Tirumalai Srivatsan, The University of Akron

8:30 AM Invited

Superior Dynamic Behavior of CrCoNi-based High-entropy Alloys: *Marc Meyers*¹; Zezhou Li¹; Shiteng Zhao²; Bingfeng Wang³; Yong Liu³; Peter Liaw⁴; Robert Ritchie²; ¹University of California, San Diego; ²Lawrence Berkeley Laboratory; ³Central South University; ⁴University of Tennessee

8:50 AM Invited

Unprecedented Strength–ductility Synergy in Ultrafine-grained Eutectic High-entropy Alloys by Inheriting the Lamellar Nature: *Yunbo Zhong*¹; Peijian Shi¹; Tianxiang Zheng¹; Zhongming Ren¹; Xueling Hou²; Jianchao Peng²; Pengfei Hu²; Yanfei Gao³; Weili Ren¹; Peter Liaw³; ¹State Key Laboratory of Advanced Special Steel & Shanghai Key Laboratory of Advanced Ferrometallurgy & School of Materials Science and Engineering, Shanghai University; ²Laboratory for Microstructures, Shanghai University; ³Department of Materials Science and Engineering, University of Tennessee

9:10 AM Invited

High-throughput Methods For Predicting And Characterizing The Strength Of Single-phase High Entropy Alloys: *Michael Kaufman*¹; Francisco Coury¹; Paul Wilson²; John Copley¹; Yaofeng Guo¹; Amy Clarke¹; ¹Colorado School of Mines; ²Boeing

9:30 AM

Low-cycle Fatigue Behavior of a Multiphase High-entropy Alloy: *Rui Feng*¹; Xie Xie¹; Dunji Yu²; Yan Chen²; Ke An²; Peter Liaw¹;

¹University of Tennessee, Knoxville; ²Oak Ridge National Laboratory

9:50 AM

Low Temperature Deformation of CrMnFeCoNi High-entropy Alloy: *Dan Sathiaraj G*¹; R Schaarschuch¹; C-G Oertel¹; E.P George²; W Skrotzki¹; ¹Institute of Solid State and Materials Physics, Dresden University of Technology; ²Oak Ridge National Laboratory

10:10 AM Break

10:30 AM Invited

High Throughput Corrosion Screening of Al-CoCrFeNi Combinatorial High Entropy Alloys: *Yunzhu Shi*¹; Rui Feng²; Philip Rack²; Bin Yang³; Ying Zhao¹; Peter Liaw²; ¹Chinese Academy of Science, Shenzhen Institute of Advanced Technology; ²The University of Tennessee; ³University of Science and Technology Beijing

10:50 AM Invited

Deformation Modes and Strength-ductility Combination of FCC-structured High-entropy Alloys: *Jian Wang*¹; Kaisheng Ming²; ¹University of Nebraska–Lincoln; ²Beihang University

11:10 AM Invited

Nuclear and Magnetic Phase Stability of FCC-to-HCP Transformation-induced Plasticity High Entropy Alloy and Its Effect on Work-hardening Behavior: Sichao Fu¹; Hongbin Bei¹; Tao Zou¹; Zheng Gai¹; Tingkun Liu¹; Dunji Yu¹; Yan Chen¹; *Ke An*¹; ¹Oak Ridge National Laboratory

11:30 AM

Size-affected Plasticity in Eutectic High Entropy Alloy Nanocomposite: *Zhaoyi Ding*¹; Q. He¹; D. Chung¹; Q. Wang²; Y. Yang¹; ¹City University of Hong Kong; ²City University of Hong Kong/Shanghai University

ADVANCED MATERIALS

High Entropy Alloys VII — Structures and Mechanical Properties IV

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Thursday AM | March 14, 2019
008B | Henry B. Gonzalez Convention Center

Session Chairs: Paul Jablonski, National Energy Technology Laboratory; Rajarshi Banerjee, University of North Texas

8:30 AM Invited

Ultra-high Strength and Anomalous Hardening in FCC Medium / High Entropy Alloys: *Connor Slone*¹; *Jiashi Miao*¹; *Easo George*¹; *Michael Mills*¹; ¹Ohio State University

8:50 AM Invited

Size Effect and Strain-rate Sensitivity of Fcc Alloys – From Single Elements to High Entropy: *Yuan Xiao*¹; *Ralph Spolenak*¹; *Jeffrey Wheeler*¹; ¹ETH Zurich

9:10 AM

Effect of Annealing on Microstructure and Mechanical Properties Al-Nb-Hf-Sc-Ti-Zr High Entropy Alloy: *Lukasz Rogal*¹; *Piotr Bobrowski*¹; *Fritz Körmann*¹; *Blazej Grabowski*¹; ¹Institute of Metallurgy And Materials Sc

9:30 AM Invited

Microstructure and Mechanical Properties of High-entropy Alloy Co₂₀Cr₂₆Fe₂₀Mn₂₀Ni₁₄ Processed by High-pressure Torsion at 77 K and 300 K: *Jongun Moon*¹; *Yuanshen Qi*²; *Elena Tabachnikova*³; *Yuri Estrin*⁴; *Soo-Hyun Joo*⁵; *Hyoung Seop Kim*¹; ¹POSTECH; ²Technion – Israel Institute of Technology; ³B. Verkin Institute for Low Temperature Physics and Engineering of National Academy of Sciences of Ukraine; ⁴Monash University; ⁵Tohoku University

9:50 AM Invited

Strain-rate Effect on the Tensile Behavior of CoCrFeNi and CoCrFeMnNi High Entropy Alloys: *Mitra Shabani*¹; *Joseph Indeck*²; *Garrett Pataky*¹; *Kavan Hazeli*²; *Paul Jablonski*³; ¹Clemson University; ²University of Alabama - Huntsville; ³National Energy Technology Laboratory

10:10 AM Break

10:30 AM Invited

Thermomechanical Processing to Achieve High Strength in an FCC Based High Entropy Alloy via L12 Precipitation: *Sriswaroop Dasari*¹; Bharat Gwalani¹; Vishal Soni¹; Abhinav Jagetia¹; Rajarshi Banerjee¹; ¹University of North Texas

10:50 AM Invited

Microstructural Refinement and Deformation Twinning during Equal Channel Angular Extrusion of Equiatomic CoCrFeMnNi HEA at Elevated Temperatures: *Sezer Picak*¹; Havva Cansu Yilmaz²; Yuri I. Chumlyakov³; Ibrahim Karaman²; ¹Department of Mechanical Engineering, Texas A&M University; ²Department of Materials Science and Engineering, Texas A&M University; ³Tomsk State University, Siberian Physical Technical Institute

11:10 AM Invited

Laser Processing as a High-throughput Method to Investigate Microstructure-processing Relationships in a High Entropy Alloy: *Mu Li*¹; Rohan Mishra¹; Katharine Flores¹; ¹Washington University in St. Louis

MATERIALS DESIGN

ICME Education in Materials Science and Mechanical Engineering – ICME Education in Materials Science and Mechanical Engineering

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

Program Organizers: Wei Xiong, University of Pittsburgh; Michele Manuel, University of Florida; Danielle Cote, Worcester Polytechnic Institute; Mohsen Asle Zaeem, Colorado School of Mines; Krista Limmer, US Army Research Laboratory

Thursday AM | March 14, 2019
304A | Henry B. Gonzalez Convention Center

Session Chairs: Mohsen Asle Zaeem, Colorado School of Mines; Krista Limmer, US Army Research Laboratory; Michele Manuel, University of Florida; Danielle Cote, Worcester Polytechnic Institute; Alexis Lewis, National Science Foundation

8:30 AM Invited

Education in Computational Thermodynamics, ICME and Materials Design – The KTH Experience: *John Agren*¹; ¹Royal Institute of Technology

8:50 AM Invited

Opportunities and Challenges for Implementing ICME in University Education: *David McDowell*¹; ¹Georgia Institute of Technology

9:10 AM Invited

Cross Society Integration of ICME within the Digital Engineering Paradigm of Aerospace Engineering: *Michael Sangid*¹; John Matlik²; Ben Thacker³; Charles Ward⁴; Mat French²; Sankaran Mahadevan⁵; Nathan Hartman¹; ¹Purdue University; ²Rolls-Royce Corporation; ³Southwest Research Institute; ⁴Air Force Research Laboratory; ⁵Vanderbilt University

9:30 AM Invited

Perspectives on ICME Education from a Converted Empiricist: *William Hamm*¹; ¹Materials Design

9:50 AM Invited

Computational Materials Science and Engineering Education: Present and Future: Raúl Enrique¹; Mark Asta²; *Katsuyo Thornton*¹; ¹University of Michigan; ²University of California, Berkeley

10:10 AM Break

10:25 AM Invited

Education of Thermodynamics, CALPHAD, and ICME: *Zi-Kui Liu*¹; ¹Pennsylvania State University

10:45 AM Invited

ICME Applied in the Undergraduate Capstone Senior Design Sequence: *Paul Sanders*¹; ¹Michigan Technological University

11:05 AM Invited

Integrating Computational Materials Engineering into the Curriculum - Challenges and Options: *Vilupanur Ravi*¹; ¹Cal Poly Pomona

11:25 AM Invited

ICME Education at Northwestern: *Greg Olson*¹; ¹Northwestern University & QuesTek Innovations LLC

11:45 AM Panel Discussion Coordinated by Dr. Alexis Lewis

CHARACTERIZATION

Interfaces in Structural Materials: An MPMD Symposium in Honor of Stephen M. Foiles — Interface-defect Interactions I

Sponsored by: The Minerals, Metals and Materials Society, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Eric Homer, Brigham Young University; Elizabeth Holm, Carnegie Mellon University; Mark Asta, University of California, Berkeley

Thursday AM | March 14, 2019
302C | Henry B. Gonzalez Convention Center

Session Chairs: Mitra Taheri, Drexel University; Garritt Tucker, Colorado School of Mines

8:30 AM Invited

Correlative Studies of Segregation at Grain Boundaries and Heterophase Interfaces at an Atomic Scale: *David Seidman*¹; ¹Northwestern University

9:00 AM

Modelling of Equilibrium and Non Equilibrium Boron Segregation at Austenitic Grain Boundaries: *Frederic Danoix*¹; Nicolas Rolland²; Claire Debreux²; Thomas Sourmail³; Simon Catteau³; Didier Blavette²; ¹Cnrs - Universite De Normandie Rouen; ²UNIROUEN; ³Ascometal

9:20 AM

Solute Effects on Twin Nucleation and Growth in Ti alloys: *Mohammad Shahriar Hooshmand*¹; Maryam Ghazisaeidi¹; ¹Ohio State University

9:40 AM Invited

Loss of Stability in Nanocrystalline Alloys by Grain Boundary Desegregation: *Christopher Schuh*¹; Dor Amram¹; Zengbao Jiao¹; Wenting Xing¹; Malik Wagih¹; ¹Massachusetts Institute of Technology

10:10 AM Break

10:30 AM Invited

Defect Interactions with Semi-coherent Interfaces in Ionic Materials: *Blas Uberuaga*¹; Pratik Dholabhai²; Enrique Martinez¹; Kedarnath Kolluri¹; Xiang-Yang Liu¹; ¹Los Alamos National Laboratory; ²Rochester Institute of Technology

11:00 AM

Effect of Zn and H on Grain Boundary Embrittlement in Al: *Oleg Kontsevoi*¹; Gregory Olson¹; ¹Northwestern University

11:20 AM

Nonequilibrium Molecular Dynamics Simulations of Ejecta Formation in Helium-implanted Copper: *Rachel Flanagan*¹; Saryu Fensin²; Timothy Germann²; Marc Meyers¹; ¹University Of California, San Diego; ²Los Alamos National Laboratory

11:40 AM

The Role of Nb₃Sn/Nb Interface on Microstructural Defects in Nb₃Sn Coatings on Nb for Superconducting Radiofrequency Cavities: *Jaeyel Lee*¹; Sam Posen²; Zugang Mao¹; Yulia Trenikhina²; Kai He¹; Daniel Hall³; Matthias Liepe³; David Seidman¹; ¹Northwestern University; ²Fermi National Accelerator Laboratory; ³Cornell University

SPECIAL TOPICS

International Round Table on Materials Criticality — How Industry Manages Criticality

Sponsored by: ESM Foundation; co-sponsored by: The Federation of European Materials Societies

Program Organizer: Alessandra Hool, ESM Foundation

Thursday AM | March 14, 2019

007C | Henry B. Gonzalez Convention Center

Session Chair: Alessandra Hool, ESM Foundation

8:30 AM Introductory Comments

Invited speakers include:

Roderick Eggert, Colorado School of Mines and the Critical

Materials Institute

James Robert Goddin, Granta Design Ltd.

Atsufumi Hirohata, University of York

Christina Meskers, Umicore

David Jarvis, HipTec AS

Nikolaos Michailidis, Aristotle University of Thessaloniki

Min-Ha Lee, Korea Institute of Industrial Technology

Armin Reller, ESM Foundation

Steven Young, University of Waterloo

NUCLEAR MATERIALS

Irradiation Effects on Phase Transformations in Nuclear Reactor Materials — Multicomponent Alloys and Advanced Characterization Techniques

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Janelle Wharry, Purdue University; Kester Clarke, Colorado School of Mines; Julie Tucker, Oregon State University; Par Olsson, KTH Royal Institute of Technology; Dhriti Bhattacharyya, ANSTO; Mohsen Asle Zaeem, Colorado School of Mines; Arun Devaraj, Pacific Northwest National Laboratory

Thursday AM | March 14, 2019

214B | Henry B. Gonzalez Convention Center

Session Chairs: Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organisation; Kester Clarke, Colorado School of Mines

8:30 AM Invited

Irradiation Effects on Precipitation in Multiconstituent Steels: *G. Robert Odette*¹; *Nathan Almirall*¹; *Peter Wells*¹; *Takuya Yamamoto*¹; *Emmanuelle Marquis*²; *Shipeng Shu*³; *Dane Morgan*³; *Jia-Hong Ke*⁴; *Huubin Ke*⁵; ¹University of California Santa Barbara; ²University of Michigan; ³University of Wisconsin-Madison; ⁴Oregon State University; ⁵Ohio State University

8:55 AM

Irradiation Responses of Al_{0.3}CoCrFeNi High Entropy Alloy at Elevated Temperatures: *Tengfei Yang*¹; *Wei Guo*²; Jonathan Poplawsky²; Dongyue Li³; Ling Wang¹; Yao Li¹; Zhanfeng Yan⁴; Yong Zhang³; Yugang Wang⁴; Steven Zinkle⁵; ¹Department of Nuclear Engineering, University of Tennessee; ²Center for Nanophase Materials Sciences, Oak Ridge National Laboratory; ³State Key Laboratory for Advanced Metals and Materials, University of Science and Technology Beijing; ⁴State Key Laboratory of Nuclear Physics and Technology, Center for Applied Physics and Technology, Peking University; ⁵Department of Nuclear Engineering, University of Tennessee, Knoxville

9:15 AM

Comparing Irradiation Effects in High Entropy Alloys and 316H Stainless Steel: *Wei-Ying Chen*¹; Yiren Chen¹; Naoyuki Hashimoto²; Jonathan Poplawsky³; Xiang Liu⁴; Jien-Wei Yeh⁵; Wei Guo³; Ko-Kai Tseng⁵; Krishnamurti Natesan¹; ¹Argonne National Laboratory; ²Hokkaido University; ³Oak Ridge National Laboratory; ⁴Idaho National Laboratory; ⁵National Tsing Hua University

9:35 AM

High Irradiation Resistance and Elemental Segregation in Nanocrystalline W-based Refractory High Entropy Alloy: *Osman El-Atwani*¹; Meimei Li²; Nan Li¹; Arun Devaraj³; Duc Nguyen-Manh⁴; Stuart Maloy¹; Enrique Martinez¹; Matthew Schneider¹; ¹Los Alamos National Lab; ²Argonne National Laboratory; ³Pacific Northwest National Laboratory; ⁴United Kingdom Atomic Energy Authority

9:55 AM Break

10:15 AM Invited

Using Advanced Microscopy Methods to Understand Phase Transformations in Irradiated Materials: *Philip Edmondson*¹; ¹Oak Ridge National Laboratory

10:40 AM

Irradiation Assisted Strain-induced Phase Transformation in Neutron Irradiated Austenitic 304L Stainless Steel Laser Weldments: *Keyou Mao*¹; Cheng Sun²; Paula Freyer³; Frank Garner⁴; Janelle Wharry¹; ¹Purdue University; ²Idaho National Laboratory; ³Westinghouse Electric Company LLC.; ⁴Texas A&M University

11:00 AM

In-situ X-ray Study of the Deformation Wave Phenomenon in a Neutron-irradiated 316 Stainless Steel: *Xuan Zhang*¹; Meimei Li¹; Chi Xu²; Yiren Chen¹; Jun-Sang Park¹; Jonathan Almer¹; ¹Argonne National Laboratory; ²University of Florida

11:20 AM

In Situ TEM Studies on the Stability of Nanotwinned Metals and Alloys under Irradiation at Elevated Temperature: *Cuncaï Fan*¹; Jin Li¹; Zhongxia Shang¹; Youxing Chen²; Sichuang Xue¹; Haiyan Wang¹; Xinghang Zhang¹; ¹Purdue University; ²University of Minnesota

11:40 AM

Microstructural and Mechanical Properties of Crystalline Materials Containing He-bubble Superlattice: *Miroslav Popovic*¹; Mehdi Balooch¹; Peter Hosemann¹; ¹University of California Berkeley

LIGHT METALS

Magnesium Technology 2019 — Fundamentals, Mechanical Behavior, Twinning, Plasticity, Texture and Fatigue II

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

Program Organizers: Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordon, University of Alabama; Dmytro Orlov, Lund University; Neale Neelameggham, IND LLC

Thursday AM | March 14, 2019

005 | Henry B. Gonzalez Convention Center

Session Chairs: Chamini Mendis, Brunel University; Domonkos Tolnai, Helmholtz-Zentrum Geesthacht

8:30 AM

Recent Progress in Development and Applications of Mg Alloy Thermodynamic Database: *Rainer Schmid-Fetzer*¹; ¹Clausthal University of Technology

8:50 AM

Hardening Effects of Precipitates with Different Shapes on the Twinning in Magnesium Alloys: *Haidong Fan*¹; Jaafar El-Awady²; Dierk Raabe¹; ¹Max-Planck-Institut Für Eisenforschung; ²Johns Hopkins University

9:10 AM

Isometric Tilt Grain Boundaries and Solute Segregation in a Deformed Mg-Zn-Ca Alloy: *Yuman Zhu*¹; Jian-Feng Nie¹; ¹Monash University

9:30 AM

Metallography of Mg Alloys: *Norbert Hort*¹; Victor Floss²; Sarkis Gavras¹; Gert Wiese¹; Domonkos Tolnai¹; ¹Helmholtz-Zentrum Geesthacht; ²Helmut Schmidt University

9:50 AM

Microstructural and Mechanical Properties of High Shear Material Deposition of Rare Earth Magnesium Alloy WE43: Zack McClelland¹; *Dustin Avery*²; C.J.T. Mason²; Oscar Rivera²; Chris Leah²; Paul Allison²; J.B. Jordon²; R.L. Martens²; Nanci Hardwick³; ¹US Army ERDC; ²The University of Alabama; ³MELD Manufacturing

10:10 AM Break

10:30 AM

Modeling the 3D Plastic Anisotropy of a Magnesium Alloy Processed Using Severe Plastic Deformation: *Joshua Herrington*¹; Yazid Madi²; Jacques Besson³; Amine Benzerga¹; ¹Texas A&M University; ²Mines ParisTech & EPF; ³Mines ParisTech

10:50 AM

Multiaxial Cyclic Response of Low Temperature Closed-die Forged AZ31B Mg Alloy: Dwayne Toscano¹; *Sugrib Shaha*¹; Seyed Behravesh¹; Bruce Williams²; Hamid Jahed²; ¹University of Waterloo; ²Canmet MATERIALS

11:10 AM

Thermo-mechanical Processing of EZK Alloys in a Synchrotron Radiation Beam: *Domonkos Tolnai*¹; Marie-Anne Dupont²; Serge Gavras¹; Kristián Máthis³; Klaudia Horváth³; Andreas Stark¹; Norbert Schell¹; ¹Helmholtz-Zentrum Geesthacht; ²University of Bordeaux; ³Charles University

11:30 AM

Unveiling the Role of Super-jogs and Dislocation Induced Atomic-shuffling on Controlling Plasticity in Magnesium: Kinshuk Srivastava¹; Satish Rao¹; *Jaafar El-Awady*¹; ¹Johns Hopkins University

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Defect Evolution II

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

Thursday AM | March 14, 2019
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Session Chairs: Laurent Capolungo, Los Alamos National Laboratory; Phil Edmondson, Oak Ridge National Laboratory

8:30 AM Invited

Effects of Irradiation on the Kinetics of Precipitation in Fe-Cr-C Alloys: *Frederic Soisson*¹; *Estelle Meslin*¹; *Olivier Tissot*¹; ¹Cea Saclay

9:00 AM

Investigation of Radiation Temperature and Straining Temperature Effects on the Screw Dislocation Mobility Evolution in Irradiated Ferritic Grains Using 3D Dislocation Dynamics: *Yang Li*¹; *Christian Robertson*¹; *Xianfeng Ma*²; *Biao Wang*²; ¹DEN-Service de Recherches Métallurgiques Appliquées, CEA, Université Paris-Saclay; ²Sino-French Institute of Nuclear Engineering and Technology, Sun Yat-sen University

9:20 AM

Property-property Correlations of Tensile, Shear-punch, Hardness Measurements and Microstructure Property Relations from the UCSB ATR2 Experiment Database: *Takuya Yamamoto*¹; *Nathan Almirall*¹; *Peter Wells*¹; *Kirk Fields*¹; *David Gragg*¹; *G. Robert Odette*¹; ¹University of California Santa Barbara

9:40 AM

Radiation Effects on HT9 Tempered Martensitic Steels as a Function of Nitrogen Content and Deformation: *Eda Aydogan*¹; *Bjorn Clausen*¹; *Donald Brown*¹; *Matthew Chancey*¹; *Yongqiang Wang*¹; *Daniel Coughlin*¹; *Cody Miller*¹; *Stuart Maloy*¹; ¹Los Alamos National Laboratory

10:00 AM Break

10:20 AM Invited

The Role of Non-equilibrium Grain Boundary Structure in Radiation Tolerance and Thermal Stability: *Mitra Taheri*¹; ¹Drexel University

10:50 AM

The Effect of Grain Boundaries and Second-phase Particles on Notch-tip Hydride Reorientation in Zirconium Alloys: *Said El Chamaa*¹; Mark Wenman¹; Catrin Davies¹; ¹Imperial College London

11:10 AM

Strength and Ductility Enhancement of T91 Ferritic/Martensitic Steel by Partial Tempering Treatment: Zhongxia Shang¹; Jie Ding¹; Cuncai Fan¹; Miao Song²; Jin Li¹; Qiang Li¹; Sichuang Xue¹; Karl Hartwig³; *Xinghang Zhang*¹; ¹Purdue University; ²University of Michigan; ³Texas A&M University

11:30 AM

Thermal and Irradiation Climb in Discrete Dislocation Dynamics: *Aaron Kohnert*¹; Laurent Capolungo¹; ¹Los Alamos National Laboratory

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior Related to Interface Physics III — Nanocomposites I

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

Program Organizers: Jason Trelewicz, Stony Brook University; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht; Siddhartha Pathak, University of Nevada, Reno; Jordan Weaver, National Institute of Standards and Technology; Marc Legros, CEMES-CNRS

Thursday AM | March 14, 2019

304B | Henry B. Gonzalez Convention Center

Session Chairs: Nikhilesh Chawla, Arizona State University; Nathan Mara, University of Minnesota

8:30 AM

Shock Response of Cu/Ta Multilayered Systems at the Atomic Scales: *Jie Chen*¹; Suveen Mathaudhu²; Naresh Thadhani³; Avinash Dongare¹; ¹University of Connecticut; ²University of California, Riverside; ³Georgia Institute of Technology

8:50 AM

Mechanical Properties of Amorphous Silicon Nanoparticles: Dimitrios Kilymis¹; *Celine Gerard*¹; Laurent Pizzagalli¹; ¹Institut Pprime - Cnrs

9:10 AM Invited

Recent Developments in Micromechanical Analysis of Nanostructured Materials: Low Temperatures, High Strain Rates, and Novel Sample Geometries: *Jakob Schwiedrzyk*¹; ¹Empa

9:40 AM

The Effect of Coherent Interface on Strain-rate Sensitivity of Cu-based Nanolayers: *Kunming Yang*¹; Yue Liu¹; Engang Fu²; Xinghang Zhang³; ¹Shanghai Jiao Tong University; ²Peking University; ³Purdue University

10:00 AM Break

10:20 AM Invited

Interface-morphology Effects on Nanomechanical Behavior of Co-sputtered Cu-Mo Thin Films: *Amit Misra*¹; ¹University of Michigan

10:50 AM

Deformation Behavior of Nanolayered Metal/Ceramic Composites under Tensile Loading: Microstructural and Size Effects: Somya Singh¹; R. Berlia¹; L.W. Yang²; A.J. Palomares²; J. Llorca²; K. Baldwin³; N. Mara⁴; J. Rajagopalan¹; J.M. Molina-Aldareguia²; *N. Chawla*¹; ¹Arizona State University; ²IMDEA Materials Institute; ³Los Alamos National laboratory; ⁴University of Minnesota

11:10 AM

The Role of 3D Interface Structure in Plastic Deformation of Cu/Nb Nanocomposites: *Youxing Chen*¹; Justin Cheng¹; Jon Baldwin²; Nan Li²; Jason Myers¹; Richard Hoagland²; Xiang-Yang Liu²; Nathan Mara¹; ¹University of Minnesota; ²Los Alamos National Laboratory

11:30 AM Invited

Identifying Deformation and Fracture Processes in Interface-dominated Materials: *Daniel Kiener*¹; Inas Issa¹; Markus Alfreider¹; Michael Wurmshuber¹; Otmar Kolednik²; Verena Maier-Kiener¹; ¹University of Leoben; ²Austrian Academy of Sciences

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Nanoarchitected and Morphology-controlled Nanoporous Materials — Synthesis

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

Program Organizers: Niaz Abdolrahim, University of Rochester; John Balk, University of Kentucky; Michael Demkowicz, Texas A&M University; Christoph Eberl, Fraunhofer IWM

Thursday AM | March 14, 2019
214A | Henry B. Gonzalez Convention Center

Session Chairs: Eric Detsi, University of Pennsylvania; Lorenzo Valdevit, University of California, Irvine

8:30 AM Invited

Hierarchical Bulk Nanoporous Aluminum for On-board Hydrogen Generation by Hydrolysis: *Eric Detsi*¹; John Corsi¹; Jintao Fu¹; Zeyu Wang¹; ¹University of Pennsylvania

9:00 AM

Synthesis of Mesoporous Copper Oxide (CuO) using Inverse Micelle Method for Non-enzymatic Biosensors: *Sung Gue Heo*¹; Won-Sik Yang¹; Kyoung-Tae Park¹; Taek-Soo Kim¹; Kyoung Mook Lim¹; Soong Ju Oh²; Seok-Jun Seo¹; ¹Korea Institute of Industrial Technology; ²Korea University

9:20 AM

Fabrication of Np Metals using Thermal Dealloying in Vacuum: Maria Kosmidou¹; Tyler Maxwell¹; Michael Detisch¹; *Nicolas Briot*¹; T. John Balk¹; ¹University of Kentucky

9:40 AM Invited

Processing and Mechanical Performance of Carbon-based Nano-architected Materials: *Lorenzo Valdevit*¹; ¹University of California, Irvine

10:10 AM Break

10:40 AM

PH-Controlled Dealloying Route to Hierarchical Bulk Nanoporous Zn Derived from Metastable Alloy for Hydrogen Generation by Hydrolysis of Zn in Neutral Water: *Jintao Fu*¹; Eric Detsi¹; ¹University of Pennsylvania

11:00 AM

Magic Oxygen in Metallic Glasses: Tuning Cu-Ag Porous Nanomembrane into Nanoporous Ag-Cu@Ag Core-shell Alloy: *Xue Liu*¹; Ke-Fu Yao²; ¹Institute of Materials, China Academy of Engineering Physics; ²Tsinghua University

11:20 AM

Nanoporous Au by Free-corrosion Dealloying in Water: Heng Wei¹; Zeyu Wang¹; Jintao Fu¹; Eric Detsi¹; ¹University of Pennsylvania

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Phase Transformation in Non-ferrous Alloys IV

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Yufeng Zheng, Ohio State University; Ashley Paz y Puente, University of Cincinnati; Juan Escobedo-Diaz, University of New South Wales; Dhriti Bhattacharyya, ANSTO; Rajarshi Banerjee, University of North Texas

Thursday AM | March 14, 2019

225D | Henry B. Gonzalez Convention Center

Session Chairs: Tomoyuki Homma, Nagaoka University of Technology; Klaus-Dieter Liss, Guangdong Technion - Israel Institute of Technology (GTIIT)

8:30 AM

Phase Transformations and Evolution of Rapid Solidification Microstructures in Al-Cu Alloys during Sequences of Laser-induced Rapid Thermal Transients: *Vishwanadh Bathula*¹; Jorg Wiezorek¹; Joseph McKeown²; ¹University of Pittsburgh; ²Lawrence Livermore National Laboratory

8:50 AM

Exploring Phase Transformations in the Au-Zn-Al System: *Taylor Jacobs*¹; Seth Imhoff¹; Sven Vogel¹; Mark Ortega¹; Chris Baxter¹; Eunice Solis¹; Sendin Bajric¹; Carlos Archuleta¹; Meghan Gibbs¹; Clarissa Yablinsky¹; ¹Los Alamos National Laboratory

9:10 AM

Enhanced Athermal e-Martensite in Co-Cr Alloys under Rapid Solidification Conditions.: *Hugo Lopez*¹; Ana Ramirez-Ledesma²; Julio Juarez-Islas²; ¹University of Wisconsin; ²Universidad Nacional Autónoma de México

9:30 AM

Thermo-mechanical Property Design through Computational Modeling for Advanced Powder Metallurgy: *Derek Tsaknopoulos*¹; Bryer Sousa¹; Danielle Cote¹; Victor Champagne²; ¹Worcester Polytechnic Institute; ²U.S. Army Research Laboratory

9:50 AM

Superelasticity and Superplasticity in Shape Memory Yttria Stabilized Tetragonal Zirconia Nanoparticles: *Ning Zhang*¹; Mohsen Asle Zaeem¹; ¹Colorado School of Mines

10:10 AM Break

10:30 AM

Order-disorder Morphologies in Rapidly Solidified Ni₃Ge Intermetallic: *Nafisul Haque*¹; Robert Cochrane¹; Andrew Mullis¹; ¹University of Leeds

10:50 AM

Superplastic Behavior of a Modified 3000 Series Aluminum Alloy: *Francisco Flores*¹; Davaadorj Bayansan¹; David Seidman²; David Dunand²; Nhon Vo¹; ¹NanoAl LLC; ²Northwestern University

11:10 AM

Precipitation Hardening of Supersaturated Al-Sc-Zr Produced via Melt-Spinning: *Yang Yang*¹; Paul Sanders¹; ¹Michigan Technological University

11:30 AM

Microstructural and Mechanical Property of Ti - STS Dissimilar Joints by Brazing with Zr-Ti Metallic Glass Filler and Intermediate Layers: *Jin Soo Park*¹; Da Hye Song¹; Jin Kyu Lee¹; ¹Kongju National University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Powder Processing of Bulk Nanostructured Materials — Structural Evolution and Thermal Stability

Sponsored by: TMS: Powder Materials Committee

Program Organizers: Zachary Cordero, Rice University; Deliang Zhang, Shanghai Jiao Tong University; Brady Butler, US Army Research Laboratory; Ma Qian, RMIT University (Royal Melbourne Institute of Technology)

Thursday AM | March 14, 2019

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Session Chair: To Be Announced

8:30 AM

Structural Evolution in Fe-Cr alloys – The Effect of Processing: *Lukas Weissitsch*¹; Martin Stückler¹; Stefan Wurster¹; Andrea Bachmaier¹; ¹Erich Schmid Institute of Materials Science of the Austrian Academy of Sciences

8:50 AM

Thermal Stability Facilitated by Diamantane on Triple Junctions in Bulk Nanocrystalline Aluminum Alloys: *James Earthman*¹; Ali Yousefiani²; Torben Boll³; Martin Heilmaier³; ¹University of California, Irvine; ²Boeing Research & Technology; ³Karlsruhe Institute of Technology

9:10 AM

Influences of Interstitial and Extrusion Temperature on Grain Boundary Segregation, Y-Ti-O Nanofeatures, and Mechanical Properties of Ferritic Steels: *Nana Adomako*¹; Jeoung Kim¹; Jae Bok Seol²; Daniel Haley³; David Hoelzer⁴; ¹Hanbat National University; ²POSTECH; ³University of Oxford; ⁴Oak Ridge National Laboratory

9:30 AM

Effect of Rare Earth Oxides on the Microstructure and Mechanical Behavior of Fe-Cr Based Alloys Processed via Spark Plasma Sintering: *Arnab Kundu*¹; Indrajit Charit¹; Brian Jaques²; Chao Jiang³; ¹University of Idaho; ²Boise State University; ³Idaho National Laboratory

9:50 AM Break

10:10 AM

High Magnetic Properties of Nd-Fe-B Sintered Magnets using Multiple Sintering Process: *Dongwon Shin*¹; Soon Jik Hong¹; Dong Su Kim¹; ¹Kongju National University

10:30 AM

Numerical Simulation and Validation of Gas and Molten Metal Flows in Close-coupled Gas Atomization: *Franz Hernandez*¹; Bo Kong¹; Trevor Riedemann¹; Jordan Tiarks¹; Jonathan Regele²; Thomas Ward³; Iver Anderson¹; ¹Ames Laboratory of US DOE; ²Los Alamos National Laboratory; ³Iowa State University

ELECTRONIC MATERIALS

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

Sponsored by: TMS: Thin Films and Interfaces Committee

Program Organizers: Pooran Joshi, Oak Ridge National Laboratory; Ravindra Nugehalli, New Jersey Institute of Technology; Jud Ready, Georgia Institute of Technology; Anming Hu, University of Tennessee; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Wenchao Zhou, University of Arkansas

Thursday AM | March 14, 2019

217D | Henry B. Gonzalez Convention Center

Session Chairs: Wenchao Zhou, University of Arkansas; Tolga Aytug, Oak Ridge National Laboratory

8:30 AM Invited

Direct-write Flexible Sensors for Energy Efficient Wireless Sensor Network: *Pooran Joshi*¹; Teja Kuruganti¹; Stephen Killough¹; Yongchao Yu²; Aravind Mikkilineni¹; Anming Hu²; ¹Oak Ridge National Laboratory; ²University of Tennessee, Knoxville

9:00 AM Invited

Electro-mechanical Methods to Determine the Reliability of Flexible Electronics: *Megan Cordill*¹; ¹Erich Schmid Institute

9:30 AM

Advancing the Understanding of Continuous Direct-write Printing by Operando Coherent X-ray Scattering: *Maria Torres Arango*¹; Ruipeng Li¹; Gregory Doerk¹; Lutz Wiegart¹; ¹Brookhaven National Laboratory

9:50 AM Invited

3D Printing of Hierarchical Multifunctional Foams: *Konstantinos Sierros*¹; ¹West Virginia University

10:20 AM Break

10:40 AM

Fabrication of Optically Transparent Glass via a Microfluidic-assisted Sol-gel 3D-print: *Yujuan He*¹; Alvin Chang¹; Chih-hung Chang¹; ¹Oregon State University

11:00 AM Invited

Some Research Work on a Novel "Double-pulse Laser Micro Sintering" Process: Hanyu Song¹; Zheng Kang¹; Ze Liu¹; *Benxin Wu*¹; ¹Purdue University

11:30 AM Invited

Direct Ink Writing of Wearable Thermoresponsive Supercapacitors: *Yayue Pan*¹; Yizhou Jiang¹; ¹University of Illinois, Chicago

BIOMATERIALS

Recent Developments in Biological, Structural and Functional Thin Films and Coatings — Functional Films and Coatings II

Sponsored by: TMS: Thin Films and Interfaces Committee

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

Thursday AM | March 14, 2019

217A | Henry B. Gonzalez Convention Center

Session Chairs: Chintalapalle Ramana, University of Texas El Paso; Nuggehalli M Ravindra, New Jersey Institute of Technology

8:30 AM Keynote

Tailoring Thermal Properties through Ion Beam Modifications: *Khalid Hattar*¹; Ethan Scott²; Cody Dennett³; Christopher Saltonstall¹; Thomas Beechem¹; Patrick Hopkins²; Michael Short³; ¹Sandia National Laboratories; ²University of Virginia; ³Massachusetts Institute of Technology

9:10 AM Invited

Tuning Structural, Electrical and Optical Properties of Al-doped ZnO Thin Films by Pulse DC/DC Reactive Magnetron Co-sputtering: *Lirong Sun*¹; John Grant¹; John Jones¹; Neil Murphy¹; ¹Air Force Research Laboratory

9:40 AM

Fabrication and Characterization of Oxide Thin Films for Energy Related Applications: *Ramana Chintalapalle*¹; ¹University of Texas, El Paso

10:00 AM Break

10:20 AM Keynote

Engineering Second-order Nonlinear Optical Materials by Pulsed Laser Deposition with In Situ Ellipsometry: *John Jones*¹; Cristian Orozco²; Nanthakishore Makeswaran²; Ekaterina Poutrina³; Oded Rabin⁴; Cynthia Bowers⁵; Lirong Sun¹; Chintalapalle Ramana²; Augustine Urbas¹; ¹Air Force Research Laboratory; ²University of Texas, El Paso; ³UES; ⁴University of Maryland; ⁵Wright State University

11:00 AM

Structural, Optical and Electrical Property Evaluation of RF-Sputtered Molybdenum Thin Films: *Anil Krishna Battu*¹; Vishal Zade¹; Ramana Chintalapalle¹; ¹University of Texas, El Paso

11:20 AM

Self Healing in Materials: An Overview: *Samaha Hossain*¹; Nuggeshalli Ravindra¹; ¹New Jersey Institute of Technology

ELECTRONIC MATERIALS

Solar Cell Silicon — Slag, Recycling, and Photovoltaics

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Shadia Ikhmayies, Al Isra University; Neale Neelameggham, IND LLC; York Smith, University of Utah; Leili Tafaghodi, University of British Columbia

Thursday AM | March 14, 2019

008A | Henry B. Gonzalez Convention Center

Session Chair: York Smith, University of Utah

8:30 AM Introductory Comments

8:35 AM Invited

Physical Separation Methods to Recovery Solar Si for Recycling: *York Smith*¹; ¹University of Utah

9:15 AM

Wettability Behavior of Si/C and Si-Sn Alloy/C System: *Yaqiong Li*¹; Lifeng Zhang¹; ¹University of Science & Technology Beijing

9:35 AM

Recycling Silicon Kerf as a Feedstock for Solar Silicon Production: *Jan-Philipp Mai*¹; ¹JPM Industries

9:55 AM Break

10:15 AM

Transmission Electron Microscopy Study of DIO₃ and UVo Cleaned Silicon Surfaces for Solar Cell Applications: *Haider Ali*¹; Sara Bakhshi¹; Ngwe Zin¹; Winston Schoenfeld¹; Kristopher Davis¹; ¹University of Central Florida

10:35 AM

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

10:55 AM

Diving Deep into Silane Pyrolysis Chemistry to Enable New Silicon-refining Reactor Technologies: Guro Wyller¹; Anjitha S G¹; Marte Skare¹; Hallgeir Klette¹; *Thomas Preston*¹; ¹Insitutt for Energiteknikk

MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing — Preparation of Alloys and Materials II

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Tao Jiang, Central South University; Jiann-Yang Hwang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

**Thursday PM | March 14, 2019
 208 | Henry B. Gonzalez Convention Center**

Session Chair: Mingming Zhang, ArcelorMittal Global R&D

2:00 PM Introductory Comments

2:05 PM

Experimental Study on the Mechanism of Lead Vapor Condensation Under Vacuum: *Huan Zhang*¹; Zhenghao Pu¹; Yifu Li¹; Junjie Xu¹; Baoqiang Xu¹; Bin Yang¹; ¹Kunming University of Science and Technology

2:25 PM

Effect of Ce Treatment on the Composition of Nucleation Inclusion in Ti-Mg Complex Deoxidized C-Mn Steel: *Zhen Liu*¹; Bo Song¹; Longfei Li¹; Zeyun Cai¹; Xiaokang Cui¹; ¹University of Science and Technology Beijing

2:45 PM

Effects of La Addition on Inclusions, Microstructures and High Temperature Mechanical Properties of As-cast FeCrAl Alloys: Yang He¹; Jianhua Liu¹; *Yindong Yang*²; Alex McLean²; ¹University of Science and Technology Beijing; ²University of Toronto

3:05 PM

Fabrication of Co-Cr-Mo Alloy Fibers from the Melt by Unidirectional Solidification, and their Microstructure and Mechanical Properties: *Yuui Yokota*¹; Takayuki Nihei²; Masao Yoshino¹; Akihiro Yamaji¹; Yuji Ohashi¹; Shunsuke Kurosawa¹; Kei Kamada¹; Akira Yoshikawa¹; ¹Tohoku University; ²C&A Corporation

3:25 PM

Removal of Copper from Fe-Cu Alloy by Using Iodine: Yuichi Takamatsu¹; *Takashi Nagai*¹; ¹Chiba Institute Of Technology

3:45 PM Concluding Comments

MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing – Utilization of Complex Ores

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Tao Jiang, Central South University; Jiann-Yang Hwang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

Thursday PM | March 14, 2019

209 | Henry B. Gonzalez Convention Center

Session Chairs: Ender Keskinilic, Atilim University; Bin Yang, University of Science and Technology Beijing

2:00 PM Introductory Comments

2:05 PM

Application and Mechanism of Dolomite in High Magnesium Pellets: Feiyu Meng¹; *Tao Jiang*¹; Qiang Zhong¹; Qian Li¹; Yongbin Yang¹; Guanghui Li¹; ¹Central South University

2:25 PM

Correlation between Reduction Degree and Softening and Melting Properties of Pellets: *YuZhu Pan*¹; Jingsong Wang¹; ¹University of Science and Technology Beijing

2:45 PM

Effect of TiO₂ on the Viscous Behavior of the CaO-SiO₂-14 Mass% Al₂O₃-8 Mass% MgO-TiO₂ Slag: *Zhengde Pang*¹; Yuyang Jiang¹; Xuewei Lv¹; Zhiming Yan¹; Wenchao He¹; ¹Chongqing University

3:05 PM

Formation of Calcium Ferrites in Sintering Process of Raw Materials with Fe₂O₃-CaO-TiO₂: *Xingmin Guo*¹; Yan-Bo Chen¹; Nan Xiang¹; ¹University of Science and Technology Beijing

3:25 PM Break

3:45 PM

Granulation of Semisteel by Rotary Disc Atomizer: *Wenchao He*¹; Xuewei Lv¹; Feifei Pan¹; Xueqin Li¹; Zhiming Yan¹; Zhengde Pang¹; ¹Chongqing University

4:05 PM

Dissolution Kinetics of Titanium in Carbon-saturated Iron: *Leizhang Gao*¹; Tongxiang Ma¹; Zhiming Yan¹; Meilong Hu¹; ¹Chongqing University

4:25 PM

Study on the Three-dimensional Distribution of Sulfide in High Sulfide Steel: *Dong Zhang*¹; Ping Shen¹; Yang Wang¹; Qian-kun Yang¹; Juan Cheng¹; Jian-xun Fu¹; ¹Shanghai University

4:45 PM Concluding Comments

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Energy Storage with Emphasis on Batteries IV

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Thursday PM | March 14, 2019
225A | Henry B. Gonzalez Convention Center

Session Chairs: Partha P. Mukherjee, Purdue University; George Nelson, University of Alabama, Huntsville

2:00 PM Keynote

Understanding Gas Evolving Reactions and the Effects of Gaseous Products on Li ion Cycle Life: *Shen Dillon*¹; ¹University of Illinois

2:30 PM Invited

Local Structure and Capacity Fade Correlations in Cathode Materials for Multivalent-ion Intercalation: *Christopher Patridge*¹; ¹D'Youville College

2:55 PM Invited

Sculpting Atomically Disordered Oxides for Fast Ion Conduction: *Ritesh Sachan*¹; Yanwen Zhang²; Matthew Chisholm²; William Weber³; ¹Army Research Office; ²Oak Ridge National Laboratory; ³University of Tennessee

3:20 PM

One Dimensional Nanomaterials for Emerging Energy Storage: *Liqiang Mai*¹; ¹Wuhan University of Technology

3:40 PM Break

4:00 PM Keynote

Tuning Ionic Mobility in Solid Electrolytes via Lattice Disorder: *Donald Siegel*¹; Kwangnam Kim¹; ¹University of Michigan

4:30 PM

Iron Doped Gallium Oxide (Ga_{2-x}Fe_xO₃): Structure, Chemistry and Dielectric Properties: *Swadipta Roy*¹; Mallesh Bandi¹; Vaithiyalingam Shutthanandan²; Suntharampillai Thevuthasan²; Ramana C.V¹; ¹University of Texas El Paso; ²Pacific Northwest National Laboratory

4:50 PM

High Energy in situ SR-XRD Studies of Pure Pb, Pb-Bi, and Pb-Ba Foils at Elevated Temperatures: Matthew Carl¹; *Michael Wall*¹; Jesse Smith¹; Matthew Raiford²; Tim Ellis²; Yang Ren³; Rick Reidy¹; Marcus Young¹; ¹University of North Texas; ²RSR Technologies; ³Argonne National Laboratory

5:10 PM

Modeling Thermal Resistance of the Interface between Mechanically Contacting Surfaces: *Seyed Aria Hosseini*¹; Seshu Nimmala²; Jackson Harter³; Todd Palmer³; Eric Lenz²; Alex Greaney¹; ¹University of California, Riverside; ²Lam Research Corporation; ³Oregon State University

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Energy Storage with Emphasis on Batteries V

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

Thursday PM | March 14, 2019

213B | Henry B. Gonzalez Convention Center

Session Chair: Partha P. Mukherjee, Purdue University

2:00 PM Invited

Understanding the Mesoscopic Phase Transformation Kinetics in Intercalation Compounds: Liang Hong¹; Kaiqi Yang¹; *Ming Tang*¹; ¹Rice University

2:20 PM

Internal Resistance Temperature Detector Based Solution for Lithium-ion Battery Thermal Events Prediction, Prevention and Control: *Bing Li*¹; Mihit Parekh¹; Ryan Adams¹; Vikas Tomar¹; Vilas Pol¹; ¹Purdue University

2:40 PM

Operando Transmission Electron Microscopy Study of Lithium Storage Mechanisms in Nanoporous Metals: *John Corsi*¹; Eric Stach¹; Eric Detsi¹; ¹University of Pennsylvania

3:00 PM

Aprotic Li/O₂ Batteries: Reactions and Products in Different Electrolytes: Matthias Augustin¹; Per Erik Vullum²; Fride Vullum-Bruer¹; *Ann Mari Svensson*¹; ¹Norwegian University of Science and Technology; ²SINTEF Materials and Chemistry

3:20 PM Break

3:40 PM

Li-ion Capacitors: Combining Energy and Power Densities: *Ganguli Babu*¹; Keiko Kato¹; Pulickel Ajayan¹; ¹Rice University

4:00 PM

Synthesis and Electrocatalytic Properties of Ni-Fe Layered Double Hydroxide Nanomaterials: Mengxin Miao¹; Xiaobo Han¹; Rulong Jia¹; Wei Ma¹; Guihong Han¹; ¹Zhengzhou University

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Welding: Physical and Mechanical Metallurgy of Rapidly Solidified Metals — In Situ Synchrotron Measurements

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorganji, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Semiatin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

Thursday PM | March 14, 2019

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Session Chair: John Carpenter, Los Alamos National Laboratory

2:00 PM Invited

Capturing Microstructure and Defect Formation during Laser Additive Manufacturing Using Synchrotron Imaging: *Peter Lee*¹; Chu Lun Alex Leung¹; Sam Clark¹; Yunhui Chen¹; Lorna Sinclair¹; Sebastian Marussi²; Azeem Mohammed¹; Margie Olbinado³; Robert

Atwood⁴; Iain Todd⁵; ¹University College London; ²University of Manchester; ³ESRF; ⁴Diamond Light Source; ⁵University of Sheffield

2:30 PM

In Situ and Operando Synchrotron Quantification of Transient Defect Dynamics during Additive Manufacturing of Ti-6Al-4V: *Yunhui Chen*¹; Lorna Sinclair²; Samuel Clark¹; Chu Lun Alex Leung¹; Sebastian Marussi²; Robert Atwood³; Margie Olbinado⁴; Alexander Rack⁴; Iain Todd⁵; Peter Lee¹; ¹University College London; ²The University of Manchester; ³Diamond Light Source; ⁴European Synchrotron Radiation Facility; ⁵The University of Sheffield

2:50 PM

Effects of Residual Stress on Additively Manufactured Stainless Steel: In-situ Synchrotron Experiment and Crystal Plasticity Modeling: *Yin Zhang*¹; Wen Chen²; Tomas Voisin²; Morris Wang²; Ting Zhu¹; ¹Georgia Institute of Technology; ²Lawrence Livermore National Laboratory

3:10 PM

In Situ Characterization of Deformation Mechanisms in L-PBF 316L Stainless Steels: *Thomas Voisin*¹; Wen Chen¹; Jean-Baptiste Forien¹; Yinmin Wang¹; ¹Lawrence Livermore National Laboratory

3:30 PM Break

3:50 PM

In-situ Dynamic X-ray Radiography Combined with Multi-physics Numerical Modeling to Elucidate Laser-induced Keyhole Dynamics in SS304: *Nadia Kouraytem*¹; Xuxiao Li¹; Ross Cunningham²; Cang Zhao³; Anthony Rollett²; Tao Sun³; Ashley Spear¹; Wenda Tan¹; ¹University of Utah; ²Carnegie Mellon University; ³Argonne National Laboratory

4:10 PM

Monitoring AM Process of Ni-based Superalloys Using High-energy X-ray Diffraction: *Chih-Pin Chuang*¹; Tao Sun¹; Niranjana Parab¹; Cang Zhao¹; Yan Gao²; William Carter²; Peter Kenesei¹; Jun-Sang Park¹; Jonathon Almer¹; ¹Argonne National Laboratory; ²GE Global Research Center

4:30 PM

Investigation of the Complex Thermal Exposure of AM Processes Utilizing High Spatio-temporal In-situ DTEM and In-situ Synchrotron X-ray Techniques for Aluminum Based Alloys: *Kai Zwiack*¹; Seth Griffith¹; Xiaoshuang Li¹; Christoph Kenel²; Daniel Grolimund³; Dario Ferreira Sanchez³; Joseph McKeown⁴; Christian Leinenbach¹; ¹Empa, Swiss Federal Laboratories for Materials Science and Technology; ²Northwestern University, Department of Materials Science and Engineering; ³Paul Scherrer Institut,

Swiss Light Source; ⁴Lawrence Livermore National Laboratory, Condensed Matter and Materials Division

4:50 PM

A Miniaturized Device for In-situ X-rays Investigation during Selective Laser Melting: *Samy Hocine*¹; Daniel Grolimund¹; Steven Van Petegem¹; Helena Van Swygenhoven¹; ¹Paul Scherrer Institute

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Welding: Physical and Mechanical Metallurgy of Rapidly Solidified Metals – Novel Materials and Applications

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorganji, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Semiatin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

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Session Chair: Judy Schneider, University of Alabama at Huntsville

2:00 PM Invited

Metallic Alloys Development for Additive Manufacturing Using Gas Atomization and Selective Laser Melting: *Yongho Sohn*¹; Le Zhou¹; ¹University of Central Florida

2:30 PM Invited

Development of Ti-based Materials Tailored to Laser Additive Manufacturing: *Guillermo Requena*¹; Pere Barriobero Vila¹; Joachim Gussone¹; Jan Haubrich¹; Ulrike Hecht²; Angelos Theofilatos²; ¹DLR; ²Access

3:00 PM

Printability and Deformation Behaviour of CrMnFeCoNi High-entropy Alloy Made by Laser Powder Bed Fusion: *Minh-Son Pham*¹;

¹Imperial College London

3:20 PM

Microstructures and Properties of Tungsten Alloys Prepared Using Laser Melting Deposition Process: Guomin Le¹; Shiyu Ma¹; Yingpei Wang¹; Chun Li²; *Xue Liu*³; ¹Institute of Materials; ²North China University of Technology; ³China Academy of Engineering Physics

3:40 PM Break

4:00 PM

Effect of Process Parameters on Additively Manufactured Shape Memory Alloys: *Alejandro Hinojos*¹; Soheil Saedi²; Narges Shayesteh Moghaddam³; Ehsan Saghaian⁴; Mohammadreza Nematollahi⁴; Haluk Karaca⁵; Mohammad Elahinia⁴; Michael Mills¹; ¹The Ohio State University; ²The University of Arkansas at Little Rock; ³The University of Texas at Arlington; ⁴The University of Toledo; ⁵University of Kentucky

4:20 PM

Forming Abrupt Dissimilar Metal Junctions by Additive Manufacturing Techniques: Nick Jones¹; Wenliang Li¹; Jack Beuth¹; *Maarten De Boer*¹; ¹Carnegie Mellon University

4:40 PM

Characterization of Interfacial Bond Properties of Additively Manufactured Cladded Surfaces Using Scanning Vibrating Electrode Technique: *Pratik Murkute*¹; Somayeh Pasebani²; Burkan Isgor¹; ¹Oregon State University; ²Oregon State University, Advanced Technology and Manufacturing Institute

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Applications of Solidification Fundamentals — Process-microstructure Relationships II

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Alex Plotkowski, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Air Force Research Laboratory; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Wenda Tan, University of Utah

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2:00 PM Invited

Mechanisms of Morphological Defect Creation in Metal Additive Manufacturing: *Manyalibo Matthews*¹; Nicholas Calta¹; Aiden Martin¹; Philip DePond¹; Gabe Guss¹; Saad Khairallah¹; Wayne King¹; Alexander Rubenchik¹; Tony van Buuren¹; ¹Lawrence Livermore National Laboratory

2:30 PM

Unravelling Cracking Phenomena during Laser Additive Manufacturing of Ni-based Superalloy by Multi-modal Imaging: *Chu Lun Alex Leung*¹; Samuel Clark¹; Sebastian Marussi²; Leigh Stanger³; Margie Olbinado⁴; Sam Tammam-Williams³; Yunhui Chen¹; Lorna Sinclair¹; Alexander Rack⁴; Jon Willmott³; Iain Todd³; Peter Lee¹; ¹University College London; ²University of Manchester; ³University of Sheffield; ⁴European Synchrotron Radiation Facility

2:50 PM

Rapid Solidification Dynamics in Laser Powder Bed Fusion Additive Manufacturing Process: *Lianghua Xiong*¹; Cang Zhao²; Qilin Guo¹; Luis Escano¹; Minglei Qu¹; Seyed Hojjatzadeh¹; Niranjana Parab²; Kamel Fezzaa²; Wes Everhart³; Tao Sun²; Lianyi Chen¹; ¹Missouri University of Science and Technology; ²Advanced Photon Source, Argonne National Laboratory; ³Department of Energy's Kansas City National Security Campus Managed by Honeywell FM&T

3:10 PM

Powder Flow, Melting and Solidification Process in Additive Manufactured Ni-based Metal Matrix Composites: *Sen Jiang*¹; Baolong Zheng¹; James Haley¹; Bingqing Chen²; Jiayu Liang²; Shuai Huang²; Julie Schoenung¹; Enrique Lavernia¹; ¹University of California Irvine; ²Beijing Institute of Aeronautical Materials

3:30 PM Break

3:50 PM

Microstructural Selection for Lattice Structures Using Deposition Optimisation and Cooling Rate Control in Laser Powder Bed Fusion of 316L Stainless Steel: *Filippo Vecchiato*¹; Paul Hooper¹; Mark Wenman¹; ¹Imperial College London

4:10 PM

Finite Element Analysis of Particle Pushing during Selective Laser Melting of AlSi10Mg/AlN Composites: *Marjan Nezafati*¹; Ali Bakhshinejad¹; Pradeep Rohatgi¹; Benjamin Church¹; ¹University of Wisconsin

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Applications of Solidification Fundamentals — Process Modeling

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Alex Plotkowski, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Air Force Research Laboratory; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Wenda Tan, University of Utah

Thursday PM | March 14, 2019
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Funding support provided by: **Additive Manufacturing Committee**

Session Chairs: Andrew Kustas, Sandia National Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory

2:00 PM
Computationally Efficient Thermo-mechanical Modelling in Metal Additive Manufacturing: *Yabin Yang*¹; ¹Sun Yat-Sen University

2:30 PM
Non-equilibrium Solidification Path Estimation for Additive Manufacturing: *Abhishek G.S.*¹; Durga Ananthanarayanan²; Debashis Kar²; Abhik Choudhury³; Shyamprasad Karagadde¹; Sanjay K Sondhi²; ¹Indian Institute of Technology Bombay; ²GE India Industrial Pvt. Ltd.; ³Indian Institute of Science

2:50 PM
Fast Solution Strategies for Transient Heat Conduction Predictions in Powder Bed Fusion Additive Manufacturing: *Alexander Wolfer*¹; Carlos Ruvalcaba¹; Richard Otis²; Saad Khairallah³; Kevin Wheeler⁴; Dogan Timucin⁴; Andy Anderson³; Andrew A. Shapiro²; Jean-Pierre Delplanque¹; ¹University of California, Davis; ²Jet Propulsion Laboratory, California Institute of Technology; ³Lawrence Livermore National Laboratory; ⁴NASA Ames Research Center

3:10 PM
Laser Interaction with Surface in Powder Bed Melting Process and Its Impact on Temperature Profile, Bead and Melt Pool Geometry: *Leila Ladani*¹; Faiyaz Ahsan¹; ¹University of Texas at Arlington

3:30 PM Break

3:50 PM

The Microscale Interaction Mechanism Between Laser and Metal Powder in Additive Manufacturing: Simulation and Experiment: Hongze Wang¹; Yu Zou¹; ¹University of Toronto

4:10 PM

Sensitivity of Thermal Predictions to Uncertain Fluid Properties in Additive Manufacturing of Superalloys: Alex Plotkowski¹; John Coleman²; Benjamin Stump¹; Matthew Krane²; Jarred Heigel³; Richard Ricker³; Lyle Levine³; Ryan Dehoff¹; ¹Oak Ridge National Laboratory; ²Purdue University; ³National Institute of Standards and Technology

4:30 PM Invited

The Effect of the Addition of Grain Refiners to the Microstructure of Aluminium Alloys in Laser-based Solidification Processing: Mitesh Patel¹; Dong Qiu¹; Mark Gibson¹; Gui Wang²; David StJohn²; Mark Easton¹; ¹RMIT University; ²University of Queensland

4:50 PM

Overcoming Edge and Over-hang Effect in Metal Additive Manufacturing by Process Parameters and Deposition Strategy Design: Jinquan Cheng¹; ¹Composite Solutions and Digital Manufacturing

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Fatigue and Fracture III — Session VI

Sponsored by: TMS: Additive Manufacturing Committee

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

Thursday PM | March 14, 2019

221B | Henry B. Gonzalez Convention Center

Session Chair: Steve Daniewicz, University of Alabama

2:00 PM Invited

Fatigue Behavior of Aluminum Alloys Fabricated by Solid-state Additive Manufacturing: J. Brian Jordon¹; Paul Allison¹; Dustin

Avery¹; Ben Rutherford¹; ¹The University of Alabama

2:30 PM

Tensile, Compressive, Cyclic, and Fracture Behavior of Direct Metal Laser Sintered Ti64: *Saeede Ghorbanpour*¹; Brandon McWilliams²; Marko Knezevic¹; ¹University of New Hampshire; ²US Army Research Laboratory

2:50 PM

Non-destructive Mechanical Testing of Additive Manufactured Materials: Soheil Safari loaliyan¹; *Steve Palkovic*¹; Parth Patel¹; Simon Bellemare¹; ¹Massachusetts Materials Tehcnologies

3:10 PM

Influence of Process Parameters on Fracture Toughness of AlSi10Mg Alloy Fabricated through Laser Beam Melting: *Srinivasa Rakesh*¹; Priyanka Nadig²; Nilesh Vasa¹; Jayaganthan R¹; ¹Indian Institute of Technology Madras; ²Intech DMLS Private Limited

3:30 PM Break

3:50 PM

Exploring the Effect of Size on IN718 Parts Produced by Powder Bed Fusion: Oliver Holzmond¹; Guofeng Wang²; *Xiaodong Li*¹; ¹University of Virginia; ²University of Pittsburgh

4:10 PM

Why 3D-printing at the Beach is not the Perfect Work-life Balance: Some Observations on Moisture Effects in Metal Powders: *Noah Philips*¹; Nicholas Cunningham¹; ¹ATI

4:30 PM

The Role of As-printed Defects and Microstructural Heterogeneities in EBM-PBF Ti-6Al-4V: Tensile Testing and Characterization at Appropriate Length Scale: *Nik Hrabe*¹; Jake Benzing¹; Li-Anne Liew¹; Ryan White¹; Frank DelRio¹; ¹Fracture and Fatigue Group, ACMD, MML, NIST-Boulder

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development — Structural Alloy Design for AM III

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

Program Organizers: Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Hunter Martin, HRL Labs; Orlando Rios, Oak Ridge National Laboratory

Thursday PM | March 14, 2019
221D | Henry B. Gonzalez Convention Center

Session Chairs: James Saal, Citrine Informatics; Mahdi Jamshidinia, GE Additive

2:00 PM

Gamma Titanium Aluminide Doped with Niobium: Aerospace Applications: *Monnamme Tlotleng*¹; ¹Council for Science & Industrial Research

2:20 PM

Gas Atomization and Selective Laser Melting of Zr-Modified AA5083 Alloy: *Le Zhou*¹; Holden Hyer¹; Sharon Park¹; George Benson¹; Guilherme Gottsfritz¹; Yongho Sohn¹; ¹University of Central Florida

2:40 PM

In Situ Formation of Oxides through Exposure to a Reactive Gas Atmosphere During Selective Laser Melting: *Michael Haines*¹; Nicolas Peter²; Eric Jäggle²; Dierk Raabe²; Sudarsanam Babu¹; ¹University of Tennessee Knoxville; ²Max-Planck-Institut für Eisenforschung GmbH

3:00 PM

In Situ Synthesis of Bulk Metallic Glass Materials in a Periodic Structure by Using Laser Direct Deposition: Shunyu Liu¹; *Yung Shin*¹; ¹Purdue University

3:20 PM Break

3:40 PM

Optimization of Additive Manufacturing Process for ODS Zr-based Alloy Design: *Hyun-gil Kim*¹; Il-hyun Kim¹; Yang-il Jung¹; Byung-Kwon Choi¹; ¹Korea Atomic Energy Research Institute

4:00 PM

Modeling Evaporation in Powder Bed Processing of Inconel and Ti6Al4V Material: *Leila Ladani*¹; Faiyaz Ahsan¹; Jafar Razmi¹; ¹University of Texas at Arlington

4:20 PM

Composition Control in Laser Powder Bed Fusion Additive Manufacturing Through Differential Evaporation: *Meelad Ranaiefar*¹; Ibrahim Karaman¹; Alaa Elwany¹; Raymundo Arroyave¹; ¹Texas A&M University

4:40 PM

Strain Hardening and Load Transfer in Additively Manufactured Interpenetrating Composites: *Abdel Moustafa*¹; Zachary Cordero¹; ¹Rice University

5:00 PM

Properties of Additively Manufactured High Alloy CrMnNi TRIP Steel Produced by Electron Beam Melting: Christina Burkhardt¹; Anja Weidner¹; Johannes Günther²; Thomas Niendorf²; *Horst Biermann*¹; ¹TU Bergakademie Freiberg; ²Universität Kassel

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Solid State Processing of Metals and Ceramics — Binder Jetting II

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

Program Organizers: James Paramore, US Army Research Laboratory; Amy Elliott, Oak Ridge National Laboratory; Matthew Dunstan, US Army Research Laboratory; Markus Chmielus, University of Pittsburgh; Nihan Tuncer, Desktop Metal

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Session Chair: Markus Chmielus, University of Pittsburgh

2:00 PM

Binder Jet Additive Manufacturing and Pressureless Melt Infiltration of Large, Complex WC-Co Parts: *Corson Cramer*¹; Amy Elliott¹; ¹Oak Ridge National Laboratory

2:20 PM

Microstructure and Mechanical Properties of Binder Jet 3D Printed Co-Cr-Mo Biomedical Alloy: *Amir Mostafaei*¹; Pierangeli Rodriguez De Vecchis¹; Markus Chmielus¹; ¹University of Pittsburgh

2:40 PM

Microstructure and Mechanical Properties of Binder Jet 3D Printed Stellite 6: *Pierangeli Rodriguez De Vecchis*¹; Sumant Wasule²; Amir

Mostafaei¹; Markus Chmielus¹; ¹University of Pittsburgh; ²Indian Institute of Technology

3:00 PM

Net-shaping and Densification of Boron Carbide via Binder Jetting Followed by Pressureless Infiltration: *Amy Elliott*¹; Desarae Goldsby¹; Bianca Haberl¹; Garrett Granroth¹; David Anderson¹; ¹Oak Ridge National Laboratory

3:20 PM

Densification Kinetics of Binder Jet 3D Printed Parts from Gas-atomized Alloy 625 Powder: *Amir Mostafaei*¹; Pierangeli Rodriguez De Vecchis¹; Ian Nettleship¹; Markus Chmielus¹; ¹University of Pittsburgh

3:40 PM Break

4:00 PM

Sintering and Densification Kinetics of Binder Jet 3D Printed Structural and Functional Materials: Amir Mostafaei¹; Pierangeli Rodriguez de Vecchis¹; Erica Stevens¹; Rafael Rodriguez De Vecchis¹; *Markus Chmielus*¹; ¹University of Pittsburgh

4:20 PM

Ductile Fracture in Sintering Materials: In Situ Observations and Discrete Element Simulations: *Joseph Carazzone*¹; Michael Bonar¹; Zachary Cordero¹; ¹Rice University

4:40 PM

Modeling the Effects of Thermal Creep and Sintering in Binder Jet Printed Parts with the Material Point Method: *Jay Billings*¹; ¹Oak Ridge National Laboratory

ADVANCED MATERIALS

Advanced High-Strength Steels III — Mechanical Properties of Advanced High-Strength and Microalloyed Steels

Sponsored by: TMS: Steels Committee

Program Organizers: Amy Clarke, Colorado School of Mines; MingXin Huang, University of Hong Kong; C. Tasan, Massachusetts Institute of Technology; Kester Clarke, Colorado School of Mines; Ana Luiza Araujo, AK Steel Research & Innovation

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Session Chairs: Amy Clarke, Colorado School of Mines; Chloe Johnson, Colorado School of Mines

2:00 PM

Hydrogen Effects on Elastic Properties of Advanced High-strength Steels: *Jinwoo Kim*¹; Haoxue Yan¹; Cemal Cem Tasan¹; ¹Massachusetts Institute of Technology

2:20 PM

Effect of Hydrogen on Grain Refinement Behavior of Pure Fe by High-pressure Torsion-straining: *Hirokazu Sato*¹; Yoshikazu Todaka¹; Koichi Sato²; Nozomu Adachi¹; ¹Toyohashi University of Technology; ²Kagoshima University

2:40 PM

Over Five-times Improved Elongation-to-fracture of 1180 Dual-Phase Steel by Continuous-bending-under-tension: *Marko Knezevic*¹; Camille Poulin¹; ¹University of New Hampshire

3:00 PM

Comparison of Formability and Microstructural Evolution of C106 Copper and 316L Stainless Steel: *Scott Taylor*¹; Iain Masters¹; Zushu Li¹; Hiren Kotadia¹; ¹WMG

3:20 PM Break

3:40 PM

Use of In Situ Methods to Study Damage Processes in DP1300 with V Additions: *David Wilkinson*¹; Javad Samei¹; Linfeng Zhou¹; ¹McMaster University

4:00 PM

Structural and Microstructural Influence on Deformation and Fracture of Dual-phase Steels: *Xinzhu Zheng*¹; Shmuel Osovski²; Ankit Srivastava¹; ¹Texas A&M University; ²Technion - Israel Institute of Technology

4:20 PM

Effect of Niobium on Microstructure and Mechanical Properties of Nb-Ti Microalloyed Carbide-free Bainitic Steels: *Xi Chen*¹; Fuming Wang¹; Changrong Li¹; Shuai Liu¹; ¹University of Science and Technology Beijing

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Development and Application of Soft Magnetic Materials for Electric Machines

Sponsored by: Federation of European Materials Societies (FEMS), TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Frank Johnson, Niron Magnetics, Inc.; Paul Ohodnicki, National Energy Technology Laboratory; Alex Leary, Nasa Grc; Orlando Rios, Oak Ridge National Laboratory; Alessandra Hool, ESM Foundation

Thursday PM | March 14, 2019
225B | Henry B. Gonzalez Convention Center

Session Chair: Michael Kesler, Oak Ridge National Laboratory

2:00 PM Invited

Enabling 6.5% Silicon Electric Steel for Motor Application: *Jun Cui*¹; Ouyang Gaoyuan¹; Brandt Jensen²; Chad Macziewski¹; Kevin Dennis²; Senlin Cui¹; Valery Levitas¹; Tao Ma²; Lin Zhou²; Matt Kramer²; ¹Iowa State University; ²Ames Laboratory

2:30 PM Invited

Extremely Thin Large Grain Fe-Co for High Power Devices: *Zafer Turgut*¹; Audry Lee²; Jeremy Shin²; Alex Leary³; John Horwath¹; Gregory Kozlowski⁴; ¹Air Force Research Laboratory; ²University of Illinois at Urbana–Champaign; ³NASA/GRC; ⁴Wright State University

3:00 PM

Templated Austenitization for Tuned Flux Paths in a Dual Phase, High Cr Steel for Electric Rotor Applications: *Hunter Henderson*¹; Min Zou²; Frank Johnson²; Craig Bridges¹; Michael Brady¹; Michael McGuire¹; Michael Kesler¹; Orlando Rios¹; ¹Oak Ridge National Laboratory; ²General Electric

3:20 PM Break

3:40 PM

Reducing Porosity and Cracks in Fe-Si Soft Magnetic Parts Processed by Selective Laser Melting: *Leonidas Gargalis*¹; Ian Ashcroft¹; Richard Hague¹; Michael Galea¹; ¹University of Nottingham, Center for Additive Manufacturing

4:00 PM

Microstructural Design through Application of Magnetic Field during Electrodeposition: *Heather Murdoch*¹; Denise Yin¹; Efraín Hernández-Rivera¹; Anit Giri¹; ¹US Army Research Laboratory

4:20 PM

Production of High-resistivity Electrical Steel Alloys by Substitution of Si with Al and Cr: *Brhayan Puentes Rodriguez*¹; David Brice¹; James Mann²; Srinivasan Chandrasekar¹; Kevin Trumble¹; ¹Purdue University; ²University of West Florida

CHARACTERIZATION

Advanced Real Time Imaging — Phase Transformation II

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, US Department of Energy - National Energy Technology Laboratory; P. Chris Pistorius, Carnegie Mellon University; Candan Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zuotai Zhang, Southern University of Science and Technology; Neslihan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Saito, Kyushu University; Yongsug Chung, Korea Polytechnic University; Bryan Webler, Carnegie Mellon University

Thursday PM | March 14, 2019

302B | Henry B. Gonzalez Convention Center

Session Chairs: Anna Nakano, United States Department of Energy National Energy Technology Laboratory; Jinichiro Nakano, United States Department of Energy National Energy Technology Laboratory

2:00 PM Invited

In Situ Observations of Rapid Solidification of Undercooled Melts using a High-speed Camera: *Jianrong Gao*¹; ¹Northeastern University, China

2:30 PM

In Situ Measurement of Solute Partition Coefficients in Fe-Cr-Ni-Mo-Cu Alloys by Using X-ray Imaging and X-ray Fluorescence Analysis: *Yusuke Kobayashi*¹; Hidekazu Todoroki¹; Kento Dohara²; Cheolhee Nam²; Kohei Morishita³; Hideyuki Yasuda²; ¹Nippon Yakin Kogyo Co., Ltd.; ²Kyoto University; ³Kyushu University

2:50 PM Panel Discussion

3:10 PM Concluding Comments

MATERIALS DESIGN

Advances in Computational Methods for Damage Mechanics and Failure Phenomena — Crystal Plasticity Methods II

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Michael Tonks, University of Florida; Remi Dingreville, Sandia National Laboratories; Jaafar El-Awady, Johns Hopkins University

Thursday PM | March 14, 2019
303C | Henry B. Gonzalez Convention Center

Session Chairs: Michael Sangid, Purdue University; Ill Ryu, The University of Texas at Dallas

2:00 PM Invited

Microstructural Predictions of Thermo-mechanical Fracture of H.C. P. Alloys: *Mohammed Zikry*¹; I. Mohammed¹; ¹North Carolina State University

2:30 PM

Multiscale Mechanics of Ductile Damage in HCP Materials: *Shailendra Joshi*¹; Padmeya Indurkar²; ¹University of Houston; ²National University of Singapore

2:50 PM

Parametrically Homogenized Continuum Damage Mechanics (PHCDM) Model for Composites from Micromechanical Analysis: *Xiaofan Zhang*¹; Zhiye Li¹; Daniel O'Brien²; Somnath Ghosh¹; ¹Johns Hopkins University; ²U.S. Army Research Laboratory

3:15 PM

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

3:35 PM Break

3:55 PM

Initializing Residual Stresses in Crystal Plasticity Simulations and its Validation Using High Energy X-ray Diffraction Experiments: *Kartik Kapoor*¹; Diwakar Naragani¹; Michael Sangid¹; ¹Purdue University

4:15 PM

Modelling the Role of Inclusions and Debonded Region on the Fatigue Performance of Ni-based Superalloys: *Ritwik Bandyopadhyay*¹; Michael Sangid¹; Jonathan Dubke²; ¹Purdue University; ²Rolls-Royce Meridian Center

4:35 PM

Self-healing of Low Angle Grain Boundaries by Vacancy Diffusion and Dislocation Climb: *Yejun Gu*¹; Yang Xiang²; David Srolovitz³; Jaafar El-Awady¹; ¹Johns Hopkins University; ²Hong Kong University of Science and Technology; ³University of Pennsylvania

4:55 PM

Probing Defect-controlled Deformation Mechanisms via Multiscale Discrete Defect Element Method: Taejoon Park¹; Cuong Nguyen²; Farhang Pourboghrat¹; *Ill Ryu*²; ¹The Ohio State University; ²The University of Texas at Dallas

5:15 PM

Computational Investigation of Crack-induced Hot-spot Generation in Energetic Composites: *Liqiang Lin*¹; Justin Wilkerson²; Xiaowei Zeng¹; ¹University of Texas at San Antonio; ²Texas A&M University

5:35 PM Concluding Comments

LIGHT METALS

Aluminum Reduction Technology — Cell Operations, Control and Improvements

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

Program Organizer: Marc Dupuis, GeniSim Inc

Thursday PM | March 14, 2019

004 | Henry B. Gonzalez Convention Center

Session Chair: Roman Düssel, TRIMET Aluminium SE

2:00 PM Introductory Comments

2:05 PM

Lengthy Power Interruptions and Pot Line Shutdowns: *Alton Tabereaux*¹; Stephen Lindsay²; ¹Consultant; ²Alcoa Inc.

2:30 PM

High Amperage Operation at Alcoa Deschambault Booster Section: Jayson Tessier¹; *Patrice Doiron*¹; Donald Ziegler¹; ¹Alcoa

2:55 PM

Potroom Operations Contributing to Fugitive Roof Dust Emissions from Aluminium Smelters: *David Wong*¹; Margaret Hyland²; Nursiani Tjahyono¹; David Cotton¹; ¹University of Auckland; ²Victoria University of Wellington

3:20 PM

Advancement in Control Logic of HINDALCO Low Amperage Pots: *Shanmukh Rajgire*¹; Amit Jha¹; Amit Gupta¹; Manoj Chulliparambil¹; Saroj Choudhary²; Gaurav Verma²; Vibhav Upadhyay²; Senthil Nath²; ¹Aditya Birla Science and Technology Company (P) Ltd; ²Hindalco Industries Ltd, Renukoot

3:45 PM Concluding Comments

ADVANCED MATERIALS

Bulk Metallic Glasses XVI — Structures and Characterization

Sponsored by: TMS: Mechanical Behavior of Materials Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Gongyao Wang, Alcoa; Robert Maass, University of Illinois at Urbana-Champaign; Muhammad Rafique

Thursday PM | March 14, 2019

207A | Henry B. Gonzalez Convention Center

Session Chairs: E-Wen Huang, National Chiao Tung University; Matthew Kramer, Ames Laboratory

2:00 PM Invited

In Situ Observations and Quantification of Metastable States from Amorphous Alloys: *Matthew Kramer*¹; Fanqiang Meng¹; Lin Zhou¹; Ryan Ott¹; ¹Ames Laboratory

2:20 PM Invited

Total Scattering Studies of Phase Transformation Kinetics in Metallic Glasses: *Dong Ma*¹; Alexandru D. Stoica¹; ¹Oak Ridge National Laboratory

2:40 PM Invited

X-ray Diffraction Study of the Correlation between LTR Density and Plasticity of Bulk Metallic Glasses: *Hui Wang*¹; Wojciech Dmowski¹; Zengquan Wang¹; Yoshihiko Yokoyama²; Hongbin Bei³; Takeshi Egami¹; ¹University of Tennessee, Knoxville; ²Tohoku University; ³Oak Ridge National Laboratory

3:00 PM Invited

Correlating Structural Heterogeneity to Properties of Metallic Glasses Using 4-Dimensional Scanning Transmission Electron Microscopy: Soohyun Im¹; Jared Johnson¹; Gabriel Calderon¹; Menglin Zhu¹; Pengyang Zhao¹; Geun Hee Yoo²; Eun Soo Park²; Yunzhi Wang¹; *Jinwoo Hwang*¹; ¹Ohio State University; ²Seoul National University

3:20 PM Break

3:40 PM Invited

Structure and Dynamics of Metallic Liquids: *Zengquan Wang*¹; Wojciech Dmowski¹; Hui Wang¹; Takeshi Egami¹; ¹University of Tennessee, Knoxville

4:00 PM Invited

Resolving Zr-based Bulk-metallic-glass Composite Distribution with High Fracture and Yield Strength by X-ray Nanodiffraction Mapping: *Bo-Kai Chen*¹; Pei-Hua Tsai²; Jason Shian-Ching Jang²; Ching-Shun Ku³; Ching-Yu Chiang³; Shang-Ju Chiu³; Chia-Hsien Lin³; Hung-Sheng Chou¹; E-Wen Huang¹; ¹Department of Materials Science and Engineering, National Chiao Tung University; ²Institute of Materials Science and Engineering, National Central University; ³National Synchrotron Radiation Research Center

4:20 PM

Shockwave Consolidation to Create Bulk Metallic Glass: *David Nemir*¹; Jan Beck¹; Lawrence Murr¹; Yirong Lin²; Luis Chavez²; ¹Txl Group, Inc.; ²University of Texas at El Paso

ADVANCED MATERIALS

Bulk Metallic Glasses XVI — Structures and Modeling II

Sponsored by: TMS: Mechanical Behavior of Materials Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Gongyao Wang, Alcoa; Robert Maass, University of Illinois at Urbana-Champaign; Muhammad Rafique

Thursday PM | March 14, 2019
206B | Henry B. Gonzalez Convention Center

Session Chairs: Alan Needleman, Texas A&M University; Mo Li, Georgia Institute of Technology

2:00 PM Invited

Discrete Shear Transformation Zone Plasticity: Babak Kondori¹; Manish Vasoya¹; A. Benzerga¹; *Alan Needleman*¹; ¹Texas A&M

2:20 PM Invited

Pure Shear Deformation and Induced Mechanical Responses in Metallic Glasses: Zhukun Zhou¹; Hao Wang²; *Mo Li*³; ¹Central South University; Georgia Institute of Technology; ²Shenzhen University; ³Georgia Institute of Technology; Central South University

2:40 PM Invited

Local Volume as a Robust Structural Measure and Its Connection to Icosahedral Content in a Model Binary Amorphous System: *Peter Derlet*¹; ¹Paul Scherrer Institute

3:00 PM Invited

Modeling Metallic Glass Structural Evolution on Long Timescales: *Thomas Hardin*¹; Christopher Schuh¹; ¹Massachusetts Institute of Technology

3:20 PM Invited

Effect of Oxygen on the Glass Forming Ability of Bulk Metallic Glasses: *Zi-Kui Liu*¹; Brandon Bocklund¹; Cheng Wang¹; Shun-Li Shang¹; Robert Dillon²; Richard Otis²; Stephen Hales²; ¹Pennsylvania State University; ²California Institute of Technology

3:40 PM Break

4:00 PM

Perturbation Analysis of Amorphous Alloy Formation: *Rahul Basu*

4:20 PM

Machine Learning Framework to Resolve Structural Origin of Heterogeneous Deformation in Metallic Glasses: *Qi Wang*¹;

Anubhav Jain¹; ¹Lawrence Berkeley National Laboratory

4:40 PM Invited

Machine Learning Prediction of Elastic Properties and Glass Forming Ability of Bulk Metallic Glasses: *San-Qiang Shi*¹; Jie Xiong¹; Tong-Yi Zhang²; ¹Hong Kong Polytechnic University; ²Shanghai University

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications – Thermophysical Properties and Irradiation

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Yongfeng Zhang, Idaho National Laboratory; Xian-ming (David) Bai, Virginia Polytechnic Institute and State University; David Andersson, Los Alamos National Laboratory; Thierry Wiss, European Commission- JRC -Institute of Transuranium Elements

Thursday PM | March 14, 2019

214B | Henry B. Gonzalez Convention Center

Session Chairs: Yongfeng Zhang, Idaho National Laboratory; Ahmed Hamed, Purdue University

2:00 PM

Phonon-based Lattice Thermal Conductivity of Uranium Dioxide: *Ahmed Hamed*¹; Anter El-Azab¹; ¹Purdue University

2:20 PM

First Principles Prediction of Thermal Conductivity in Irradiated LiAlO₂: Seyed Aria Hosseini¹; Nicholas Whitman²; Todd Palmer²; *P. Alex Greaney*¹; ¹University of California, Riverside; ²Oregon State University

2:40 PM

Fouling Resistant, Foulant-agnostic Coatings for Nuclear Reactors and Geothermal Systems: *Cigdem Toparli*¹; Max Carlson¹; Alexander Slocum¹; Michael Short¹; ¹Massachusetts Institute of Technology

3:00 PM

Radiation Tolerance and Helium Swelling Resistance in Amorphous SiOC: *Qing Su*¹; Michael Nastasi¹; ¹University of Nebraska-Lincoln

3:20 PM Break

3:40 PM

Influence of the Miscibility Gap in the Evolution of the Microstructure in UO₂-based Fuel Doped with Nd: *Bernardo Herrero*¹; Fabienne Audubert¹; Yves Pontillon¹; Lionel Desgranges¹; Gianguido Baldinozzi²; Nicolas Clavier³; Martiane Cabié⁴; ¹CEA; ²ECP; ³CNRS; ⁴Université Aix-Marseille

4:00 PM

Revealing Anisotropic Swelling Trends in Irradiated Hexagonal/Trigonal Materials: *Arunodaya Bhattacharya*¹; Steven Zinkle²; Chad Parish¹; Takaaki Koyanagi¹; Yutai Kato¹; ¹Oak Ridge National Laboratory; ²University of Tennessee, Knoxville, Oak Ridge National Laboratory

CHARACTERIZATION

Characterization of Materials through High Resolution Imaging – Imaging III

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

Program Organizers: Ross Harder, Argonne National Laboratory; Richard Sandberg, Los Alamos National Laboratory; Xianghui Xiao, Argonne National Laboratory; Brian Abbey, La Trobe University; Saryu Fensin, Los Alamos National Laboratory; Ana Diaz, Paul Scherrer Institut; Mathew Cherukara, Argonne National Laboratory

Thursday PM | March 14, 2019

303A | Henry B. Gonzalez Convention Center

Session Chair: Ross Harder, Argonne National Laboratory

2:00 PM Invited

Hard X-ray Coherent Diffraction Imaging Using Nanoscale Focusing Optics: *Martin Holt*¹; ¹Argonne National Laboratory

2:30 PM Invited

Multi-modal 3D Imaging of LiNi_{1-x-y}Mn_xCo_yO₂ Cathode Material with Concentration-gradient: *Xiaojing Huang*¹; Seongmin Bak¹; Hanfei Yan¹; Mingyuan Ge¹; Evgeny Nazaretski¹; Xiao-qing Yang¹; Yong Chu¹; ¹Brookhaven National Laboratory

2:50 PM

Materials Characterisation via Optical Ptychographic Imaging: Principles and Applications: *Guido Cadenazzi*¹; Nick Anthony²; Eugeniu Balaur¹; Keith Nugent¹; Brian Abbey¹; ¹La Trobe University; ²Istituto Italiano di Tecnologia

3:10 PM Invited

Understanding Catalyst Complexity at Synchrotron Light Sources Using Hard X-ray Ptychography and Tomography: *Thomas Sheppard*¹; Yakub Fam¹; Johannes Becher¹; Ana Diaz²; Mirko Holler²; Arne Wittstock³; Gerald Falkenberg⁴; Andreas Schropp⁴; Christian Schroer⁴; Jan-Dierk Grunwaldt¹; ¹Karlsruhe Institute of Technology (KIT); ²Paul Scherrer Institute (PSI); ³University of Bremen; ⁴Deutsches Elektronen-Synchrotron (DESY)

3:30 PM Break

3:50 PM

Examining Dzyaloshinskii Domain Walls in Asymmetric Pt/Co/Ni/Ir Superlattices Using Lorentz TEM: *Maxwell Li*¹; Marc De Graef¹; Vincent Sokalski¹; ¹Carnegie Mellon University

4:10 PM

Investigation of Helium Precipitates in Ta(Ti)/Zr(Ti) Composites Made by Solid Metal Dealloying: *Sisi Xiang*¹; Ian McCue¹; Yongqiang Wang²; Kelvin Xie¹; Michael Demkowicz¹; ¹Texas A&M University; ²Los Alamos National Laboratory

4:30 PM

Measurements of Irradiation Induced 3D Strain Field at the Nanoscale with X-ray Bragg Coherent Diffraction Imaging: *Richard Sandberg*¹; Mathew Cherukara²; Reiju Pokharel¹; Eric Hahn¹; Wonsuk Cha²; Ross Harder²; Saryu Fensin¹; ¹Los Alamos National Laboratory; ²Argonne National Laboratory

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Characterization and Synthetic Process of Materials

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Thursday PM | March 14, 2019

212B | Henry B. Gonzalez Convention Center

Session Chairs: Andrew Brown, Army Research Laboratory; Ramasis Goswami, Naval Research Laboratory

2:00 PM Introductory Comments

2:05 PM Invited

Enhancing Microstructural Segmentation of Electron Backscatter Diffraction Data Using Multivariate Statistical Analysis: *Angus Wilkinson*¹; David Collins²; Yevhen Zayachuk¹; Rajesh Korla³; Arantxa Vilalta-Clemente⁴; ¹University of Oxford; ²University of Birmingham; ³IIT Hyderabad; ⁴Université de Normandie Rouen

2:25 PM Invited

Advances in Scratch Characterization of Automotive Clearcoats: *Pierre Morel*¹; Linqian Feng²; Nadia Benhamida³; Warren Denning¹; Brandon Frye¹; Andrew Detwiler²; Leslie Baker²; Deepanjan Bhattacharya²; ¹Anton Paar USA; ²Eastman Chemical Company; ³Hyundai-Kia America

2:45 PM

Microwave-assisted Solid-state Synthesis of Fluorinated Hydroxyapatite: *Qian Peng*¹; Huimin Tang¹; Zhangui Tang¹; Zhiwei Peng¹; ¹Central South University

3:05 PM

Properties of ZnO Micro/Nano Structures on Aluminum Substrates: *Shadia Ikhmayies*¹; Hassan Juwhari²; Bashar Lahlouh²; ¹Al Isra University; ²University of Jordan

3:25 PM

Synthesis and Electrochemical Properties of Molybdenum Disulfide/Graphene Composites: Guihong Han¹; Wei Wang¹; Yanfang Huang¹; Yongqian Duan¹; *Weijun Peng*¹; ¹Zhengzhou

University

3:45 PM Break

4:00 PM

Construction of Form-stable Composite Phase Change Materials with Simultaneously Enhanced Latent Heat and Heat Transfer via Efficient Synergistic Effect between Expanded Vermiculite and Carbon Nanotubes: *Yong Deng*¹; Jinhong Li¹; ¹China University of Geosciences (Beijing)

4:20 PM

Advancements in the Understanding of Damage Accumulation and Fracture of Brittle Materials: *Tomoko Sano*¹; Brendan Koch²; Calvin Lo²; Timothy Walter¹; James Hogan²; ¹US Army Research Laboratory; ²University of Alberta

4:40 PM

Synthesis and Characterization of PVP/CaCO₃-Ag Blend Hydrogel by Gamma Irradiation: Study of Drug Delivery System and Antimicrobial Activity: *Angelica Zafalon*¹; Vinícius dos Santos¹; Luiz Komatsu¹; Ademir Lugão¹; Vijaya Rangari²; Temesgen Samuel²; Duclerc Parra¹; ¹Ipen-Usp; ²Tuskegee University

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Mineral Processing and Extraction

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spina, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

Thursday PM | March 14, 2019

213A | Henry B. Gonzalez Convention Center

Session Chairs: Mingsheng He, Baowu Iron & Steel Group; Chenguang Bao, Chongqing University

2:00 PM Introductory Comments

2:05 PM

Microplastics: A Novel Method for Surface Water Sampling and Sample Extraction in Elechi Creek, Rivers State, Nigeria: Example Briggs¹; *Esperidiana de Moura*²; Helio Furusawa²; Marycel Elena Cotrim²; Emeka Oguzie¹; Ademar Lugao²; ¹Federal University of Technology, Owerri, Imo-State, Nigeria; ²Instituto de Pesquisas Energeticas e Nucleares

2:25 PM

Leaching Zinc from Crystallization Slag by Acid Leaching: Process Optimization Using Response Surface Methodology: *Guojiang Li*¹; Yongguang Luo¹; Tingfang Xie¹; ¹Yunnan Chihong Zn & Ge Co., Ltd,

2:45 PM

Study on Recovery of Zinc from Metallurgical Solid Waste Residue by Ammoniacal Leaching: *Ma Aiyuan*¹; Xuemei Zheng¹; Shengyou Shi¹; Haiye He¹; Yanhong Rao¹; Guoyan Luo¹; Fang Lu¹; ¹Liupanshui Normol University

3:05 PM

Optimization of Fine Ilmenite Flotation Performed with Collectors: *Yankun Wu*¹; Shengpeng Su¹; Weijun Peng¹; Yongsheng Zhang¹; Guixia Fan¹; Guihong Han¹; Yijun Cao¹; ¹Zhengzhou University

3:25 PM Break

3:40 PM

Catalytic Effect of Ferric Iron on the Bioleaching of Arsenopyrite Concentrates by Moderate Thermophile *Sulfobacillus thermosulfidooxidans*: *Duorui Zhang*¹; Yu Deng¹; Jinlan Xia¹; Zhenyuan Nie¹; Lizhu Liu¹; Yidong Zhao²; Lili Zhang³; Hongying Yang⁴; ¹Key Lab of Biometallurgy of Ministry of Education of China, School of Minerals Processing and Bioengineering, Central South University; ²Beijing Synchrotron Radiation Facility, Institute of High Energy Physics, Chinese Academy of Sciences; ³Shanghai Synchrotron Radiation Facility, Shanghai Institute of Applied Physics, Chinese Academy of Sciences; ⁴School of Metallurgy, Northeastern University

4:00 PM

Arsenic Reduction and Cobalt Removal in the Arsenic-containing Leachate from Alkali Leaching of Arsenic-containing Cobalt/Nickel Residue: *Jinxi Qiao*¹; Shuang Long²; Zhiqiang Liu³; Xintao Sun¹; Zhaoming Sun¹; Hualei Miao²; Jingyang Chen²; Ailiang Chen¹; ¹Central South University; ²Zhuzhou Smelter Group Company Limited; ³Guangdong Research Institute of Rare Metals

MATERIALS DESIGN

Computational Approaches for Big Data, Artificial Intelligence and Uncertainty Quantification in Computational Materials Science — Uncertainty Quantification for Micro- and Macro-scale Modeling

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Liang Qi, University of Michigan; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory; Adrian Sabau, Oak Ridge National Laboratory; Houlong Zhuang, Arizona State University ; Sugata Chowdhury, National Institute of Standards and Technology

Thursday PM | March 14, 2019
305 | Henry B. Gonzalez Convention Center

Session Chair: Liang Qi, University of Michigan

2:00 PM

Evaluation and Representation of Uncertainty in Thermodynamic Phase Diagrams: *Noah Paulson*¹; Brandon Bocklund²; Zi-Kui Liu²; Marius Stan¹; ¹Argonne National Laboratory; ²Pennsylvania State University

2:20 PM

Efficient Propagation of Uncertainty From CALPHAD to Multiphysics Phase Field Microstructure Simulations: *Pejman Honarmandi*¹; Vahid Attari¹; Isaac Benson¹; Raymundo Arroyave¹; Douglas Allaire¹; ¹Texas A & M University

2:40 PM

Bayesian CALPHAD: From Uncertainty Quantification to Model Fusion: *Pejman Honarmandi*¹; Thien Duong¹; Seyede Fatemeh Ghoreishi¹; Douglas Allaire¹; Raymundo Arroyave¹; ¹Texas A&M University

3:00 PM

Impact of Uncertainty Quantification in Automated CALPHAD Modeling on the Design of Additively Manufactured Functionally-graded Alloys: *Brandon Bocklund*¹; Lourdes Bobbio¹; Richard Otis¹; ShunLi Shang¹; Allison Beese¹; Zi-Kui Liu¹; ¹Pennsylvania State University

3:20 PM Break

3:40 PM

Uncertainty Quantification in Microstructural Reconstruction of Additively Manufactured Materials: *Pinar Acar*¹; Veera Sundararaghavan²; ¹Virginia Tech University; ²University of Michigan

4:00 PM

Uncertainty Quantification in Solidification Modeling of Additive Manufacturing: *Supriyo Ghosh*¹; E. Chin²; J. Knap²; D. Allaire¹; R. Arroyave¹; ¹Texas A&M University; ²Army Research Laboratory

4:20 PM

Comprehensive Quality Assurance of Additive Manufacturing Ti-6Al-4V by Learning from Prior Studies: *Sen Liu*¹; Branden Kappes¹; Aaron Stebner¹; Xiaoli Zhang¹; ¹Colorado School of Mines

4:40 PM

Quantifying Uncertainty in High Strain Rate Materials Strength with Bayesian Inference: *David Rivera*¹; Jason Bernstein¹; Katie Schmidt¹; Nathan Barton¹; Ana Kupresanin¹; Jeff Florando¹; ¹Lawrence Livermore National Laboratory

5:00 PM

Error Estimation for Stress Distributions and Macroscale Yield Prediction in Polycrystalline Alloys: *Kamalika Chatterjee*¹; Robert Carson¹; Paul Dawson¹; ¹Cornell University

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Mechanics

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tournet, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

Thursday PM | March 14, 2019

225C | Henry B. Gonzalez Convention Center

Session Chairs: Shawn Coleman, US Army Research Laboratory; Izabela Szlufarska, University of Wisconsin - Madison; Zhe Liu, University of Melbourne

2:00 PM Invited

Phase-field Modeling of Swelling and Fracture of Lithium-silicon Electrode Materials: *Alain Karma*¹; *Ata Mesgarnejad*¹; ¹Northeastern University

2:30 PM

Dislocation Climb and Jog Nucleation in Molecular Dynamics: *Anas Abu-Odeh*¹; *Maeva Cottura*¹; *Mark Asta*¹; ¹University of California Berkeley

2:50 PM

Solute-dislocation Interactions in Mg from First Principles: < c+a > and Twinning Dislocations with Flexible Boundary Conditions: *Michael Fellingner*¹; *Dallas Trinkle*¹; ¹University of Illinois Urbana-Champaign

3:10 PM Invited

Trends in Stability and Mechanical Response of Metallic Glasses: *Izabela Szlufarska*¹; *George Bokas*¹; *Lei Zhao*¹; *Chaiyapat Tangparajoen*¹; ¹University of Wisconsin

3:40 PM Break

4:00 PM Invited

A First-principles Computational Study of Segregation of Sn and Si Solutes into Fully Coherent Cu {111} Twin Boundary: *Zhe Liu*¹; ¹The University of Melbourne

4:30 PM

Near-a TRIP Titanium Alloy Design: *Fan Meng*¹; *Gregory Olson*¹; ¹Northwestern University

4:50 PM

Estimation of Thermal Expansion Using Nonlinear Elasticity Theory: *Ian Winter*¹; *Daryl Chrzan*¹; ¹University of California Berkeley

CORROSION

Environmentally Assisted Cracking: Theory and Practice — Stress Corrosion Cracking II

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

Program Organizers: Bai Cui, University of Nebraska Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc

Thursday PM | March 14, 2019
214C | Henry B. Gonzalez Convention Center

Session Chairs: Yong Yang, University of Florida; Srujan Rokkam, Advanced Cooling Technologies Inc

2:00 PM

Cracking and Fatigue Resistance of High-strength Nickel Alloys in Oilfield Applications: *Bing Han*¹; ¹Schlumberger

2:20 PM

Similar and Dissimilar Metal Weld Failures in Hydrocracking Service at a Refinery: *Sudhakar Mahajanam*¹; Cesar Espinoza¹; Yenny Cubides²; ¹Pinnacle Advanced Reliability Technologies; ²Texas A&M University

2:40 PM

Physics-based Modeling of Corrosion Crack Dynamics Using Meshless Peridynamics Approach: *Srujan Rokkam*¹; Max Gunzburger²; Masoud Behzadinasab¹; Sachin Shanbhag²; Michael Brothers¹; Nam Phan³; Kishan Goel³; ¹Def-Aero, Advanced Cooling Technologies Inc; ²Florida State University; ³U.S. Naval Air Systems Command

3:00 PM

The Effect of Localized Stresses and Heterogeneous Strains on Galvanic Corrosion in AA7050: *Andrea Nicolas*¹; Alberto Mello¹; Michael Sangid¹; ¹Purdue University

3:20 PM

Influence of Tempering Treatment on Precipitation Behavior, Microstructure, Dislocation Density and Hydrogen Induced Ductility Loss in High Vanadium Hot-rolled X80 Pipeline Steel: *Longfei Li*¹; Bo Song¹; Zeyun Cai¹; Zhen Liu¹; Xiaokang Cui¹; ¹University of Science & Technology Beijing

3:40 PM Concluding Comments

MECHANICS & STRUCTURAL RELIABILITY

Fatigue in Materials: Multi-scale and Multi-environment

Characterizations and Computational Modeling – Crack Initiation and Propagation during Fatigue

Sponsored by: TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

Program Organizers: Jean-Briac le Graverend, Texas A&M University; Ashley Spear, University of Utah; Antonios Kontsos, Drexel University; Garrett Pataky, Clemson University; Filippo Berto, Norwegian University of Science and Technology

Thursday PM | March 14, 2019
301B | Henry B. Gonzalez Convention Center

Session Chair: Garrett Pataky, Clemson University

2:00 PM Invited

Initiation and Early Growth of Fatigue Cracks: *Jaroslav Polak*¹;
¹Institute of Physics of Materials

2:40 PM

Fatigue Crack Growth in Pure Al Films: *Syed Javaid*¹; Wade Lanning¹; Christopher Muhlstein¹; ¹Georgia Institute of Technology

3:00 PM

Fatigue Crack Growth Behavior of CrCoFeNiMn and CrCoFeNi High Entropy Alloys: *Garrett Pataky*¹; William Williams¹; Diana Burden¹; Daniel Collins¹; Samuel Jenkins¹; Martha Piness¹; ¹Clemson University

3:20 PM

Fatigue Life Assessment of Microstructurally-thin Pressure Vessel Metallic Liners: *Jacob Hochhalter*¹; David Dawicke²; Timothy Ruggles³; William Leser⁴; Patrick Leser⁴; Heather Hickman⁵; Richard Russell⁶; ¹University of Utah; ²Analytical Services & Materials, Inc.; ³National Institute of Aerospace; ⁴NASA Langley Research; ⁵NASA Glenn Research Center; ⁶NASA Kennedy Space Center

3:40 PM Break

4:00 PM

Influence of the Stress Ratio on the Long Crack Propagation Behavior of Aluminum Wrought Alloys in the Very High Cycle Fatigue Regime: *Fatih Bülbül*¹; Marcel Wicke²; Tina Kirsten³; Angelika Brückner-Foit²; Martina Zimmermann³; Hans-Jürgen Christ¹; ¹Universität Siegen; ²Universität Kassel; ³Technische Universität Dresden

4:20 PM

Investigation of Load Frequency Effect on Plasticity-induced Crack Closure during Fatigue and Creep-fatigue Crack Growth in Steels at High Temperatures: *Jose J. Ramirez*¹; Gabriel Potirniche¹; Robert Stephens¹; Indrajit Charit¹; Nicholas Shaber¹; Martin Taylor¹; ¹University of Idaho

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Fracture Processes of Thin Films and Nanomaterials — Size Effects on Fracture Processes in Monolithic and Multilayer Materials

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

Program Organizers: Daniel Kiener, University of Leoben; Megan Cordill, Erich Schmid Institute; Johannes Ast, Empa, Swiss Federal Laboratories for Materials Science and Technology; Brad Boyce, Sandia National Laboratories

Thursday PM | March 14, 2019
217B | Henry B. Gonzalez Convention Center

Session Chairs: Megan Cordill, Erich Schmid Institute of Materials Science; Bo-Shiuan Li, University of Oxford

2:00 PM Invited

Investigating Plasticity Effects on Fracture at the Microscale: The Ductile to Brittle Transition (DBT): *Nathan Mara*¹; Kevin Schmalbach¹; Youxing Chen¹; Eric Hintsala²; William Gerberich¹; ¹University of Minnesota; ²Bruker Nano Surfaces Division

2:20 PM

Understanding Brittle-to-ductile Transition Using Micro-fracture Tests and HR-EBSD: *Bo-Shiuan Li*¹; David Armstrong¹; Angus Wilkinson¹; Steve Roberts¹; ¹University of Oxford

2:40 PM

The Meso-scale Fracture Behavior of Single Crystalline Tungsten Based on Femtosecond Laser Processed Samples: *Manuel Pfeifenberger*¹; Markus Alfreider²; Anton Hohenwarter²; Daniel Kiener²; Reinhard Pippan¹; ¹Erich Schmid Institute; ²Department of Materials Physics

3:00 PM

Can We Measure the Crack Length during in Elastic Plastic Fracture Reliably at the Micron Scale? A Case Study in

Nanocrystalline Tungsten: *Ashish Kumar*¹; Christoph Kirchlechner¹; Steffen Brinckmann¹; Gerhard Dehm¹; ¹Max-Planck-Institut für Eisenforschung GmbH

3:20 PM

Impact of Internal Defects on the Deformation of Nanocrystalline Materials: *Caizhi Zhou*¹; Sixie Huang¹; ¹Missouri University of Science and Technology

3:40 PM Break

4:00 PM Invited

Enhanced Fracture Toughness of Mg/Nb Laminated Composites: *Nan Li*¹; Youxing Chen²; Siddhartha Pathak³; Jian Wang⁴; Amit Misra⁵; Nathan Mara²; ¹Los Alamos National Laboratory; ²University of Minnesota; ³University of Nevada, Reno; ⁴University of Nebraska-Lincoln; ⁵University of Michigan, Ann Arbor

4:20 PM

Constituent Constraining Effects on the Microstructural Evolution and Fracture Behaviors of Crystalline/amorphous Nanolaminates: *Yaqiang Wang*¹; Jinyu Zhang¹; Gang Liu¹; Jun Sun¹; ¹Xi'an Jiaotong University

4:40 PM

Mechanical Deformation of AlN-Ag Nano Multilayers: *Angelica Saenz-Trevizo*¹; Chelsea Appleget¹; Andrea Hodge¹; ¹University of Southern California

MATERIALS PROCESSING

Friction Stir Welding and Processing X — Friction Stir Processing

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

Thursday PM | March 14, 2019

210B | Henry B. Gonzalez Convention Center

Session Chair: Rajiv Mishra, University of North Texas

2:00 PM Panel Discussion: Learn from Industrial Experts - What

answers do they need from research?

3:00 PM

Achieving Forced Mixing in Cu-based Immiscible Alloys via Friction Stir Processing: *Mageshwari Komarasamy*¹; Ryan Tharp¹; Subhasis Sinha¹; Saket Thapliyal¹; Rajiv S. Mishra¹; ¹University of North Texas

3:20 PM

Direct Application of Friction Stir Processing to Weld Toes of High-strength Low-alloy Steel Joints: *Hajime Yamamoto*¹; Yoshikazu Danno¹; Kazuhiro Ito¹; Yoshiki Mikami¹; Hidetoshi Fujii¹; ¹Osaka University

3:40 PM Break

4:00 PM

Exceptional Fatigue Strength in Cast Aluminum Alloy A339 Modified by Friction Stir Processing: *Kaimiao Liu*¹; Mageshwari Komarasamy¹; Rajiv Mishra¹; Glenn Grant¹; ¹University of North Texas

4:20 PM

Stationary Shoulder Friction Stir Processing: A Low Heat Input Grain Refinement Technique for Magnesium Alloy: *Vivek Patel*¹; Wenya Li²; Quan Wen²; Yu Su²; Na Li²; ¹Northwestern Polytechnical University, Pandit Deendayal Petroleum University; ²Northwestern Polytechnical University

4:40 PM

Friction Stir Processing (FSP) of Multiwall Carbon Nanotubes and Boron Carbide Reinforced Aluminum Alloy (Al 5083) Composites: *Mahmood Khan*¹; Syed Husain²; Shahid Akhtar³; Ragnild Aune¹; ¹NTNU; ²Institute of Space Technology; ³Norsk Hydro

MATERIALS PROCESSING

Friction Stir Welding and Processing X — Friction Stir Spot Welding

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

**Thursday PM | March 14, 2019
210A | Henry B. Gonzalez Convention Center**

Session Chairs: Yuri Hovanski, Brigham Young University; Jorge Dos Santos, Helmholtz-Zentrum Geesthacht

2:00 PM Panel Discussion: Learn from Industrial Experts - What answers do they need from research?

3:00 PM Invited

Simulation of High Speed Refill Friction Stir Spot Welding in AA 6111: *Michael Miles*¹; Yuri Hovanski¹; J. Wu¹; B. Larsen¹; ¹Brigham Young University

3:20 PM Invited

Welding Multilayer Materials by Refill Friction Stir Spot Welding: *Uceu Suhuddin*¹; Dennis Gera¹; Nelson Alcantara²; Jorge dos Santos¹; ¹Helmholtz Zentrum Geesthacht; ²Federal University of São Carlos

3:40 PM Break

4:00 PM Invited

Refill Friction Stir Spot Joining of Aerospace Aluminum Alloys with Additional Corrosion-inhibitive Compounds: *Enkhsaikhan Boldsaikhan*¹; Shintaro Fukada²; Mitsuo Fujimoto²; Kenichi Kamimuki²; Hideki Okada²; ¹Wichita State University; ²Kawasaki Heavy Industries

4:20 PM Invited

Friction Stir Spot Welding of Ti-6Al-4V Alloy Plates: Weldability, Microstructure, and Mechanical Integrity: *Hyojin Park*¹; Yong Chae Lim²; Hahn Choo¹; Suhong Zhang¹; Anming Hu¹; Scott Rose³; Zhili Feng²; ¹University of Tennessee; ²Oak Ridge National Laboratory; ³Boeing Research and Technology

4:40 PM

Process Time Reduction in Friction Stir Spot Welded EN AW 1050 and EN CW 004A Dissimilar Joints: *Tobias Köhler*¹; Anna Regensburg¹; Michael Grätzel¹; Moritz Loehlein¹; Jean Pierre Bergmann¹; ¹Technische Universität Ilmenau

ADVANCED MATERIALS

High Entropy Alloys VII — Synthesis and Mechanical Properties

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Thursday PM | March 14, 2019
207B | Henry B. Gonzalez Convention Center

Session Chairs: Louis Santodonato, Oak Ridge National Laboratory; Bernd Gludovatz, UNSW Sydney

2:00 PM

High Temperature Creep Behavior of Face-centered Cubic High Entropy Alloys: Min-Gu Jo¹; *Jin Yoo Suh*¹; Woo-Sang Jung²; Heung Nam Han³; ¹Korea Institute of Science and Technology; ²Korea Institute of Science and Technology; ³Seoul National University

2:20 PM Invited

On Microstructure Optimization and Deformation Mechanisms at Different Strain Rates in a Precipitation Strengthened Eutectic High Entropy Alloy: *Bharat Gwalani*¹; Sindhura Gangireddy¹; Rajiv S Mishra¹; Rajarshi Banerjee¹; ¹University of North Texas

2:40 PM Invited

On the Fracture Behavior of TRIP, TWIP and Dual-phase High-entropy Alloys between RT and LN Temperatures: *Bernd Gludovatz*¹; Yokasundery Muniandy¹; Hyun Seok Oh²; Eun Soo Park²; Robert Ritchie³; ¹UNSW Sydney; ²Seoul National University; ³Lawrence Berkeley National Laboratory

3:00 PM Invited

Dislocation and Atomic-scale Investigation of Deformation Mechanisms in High-entropy Alloy CoCrFeMnNi at High Strain Rates: *Daniel Foley*¹; Shang-Hao Huang¹; Elaf Anber¹; Christopher Barr²; Andrew Lang¹; Leslie Lamberson¹; Mitra Taheri¹; ¹Drexel University; ²Sandia National Laboratories

3:20 PM Invited

A Comparative High Pressure Study of MoNbTaVW and Polycrystalline Tungsten: *Shizhong Yang*¹; Tahj Delasbour¹; Oleg Starovoytov¹; David Young¹; Ebrahim Khosravi¹; Shengmin Guo¹; ¹Southern University and A&M College

3:40 PM Break

4:00 PM Invited

High Entropy Alloys with Hexagonal Close-packed Structure Derived from Thin Film Combinatorial Approach: *Artashes Ter-Sahakyan*¹; Azin Akbari¹; Thomas Balk¹; ¹University of Kentucky

4:20 PM

On Exceptional Stability of Dislocations in HEAs from CoCrFeMnNi Family: *Anna Fraczkiewicz*¹; Julia Olszewska¹; Michal Proz¹; Marc Legros²; ¹Mines St-Etienne / Sms / Lgf Umr 5307; ²CEMES CNRS

5:00 PM

Refractory High Entropy Alloys Containing Non-metallic Elements: Aeran Roh¹; Hanuel Kim¹; Seungjin Nam¹; *Hyunjoo Choi*¹; ¹Kookmin University

4:40 PM

Integrated Experimental and Computational Investigation of Strengthening in MnFeCoNi-based Alloys: Dongsheng Wen¹; Chia-Hsiu Chang¹; Sae Matsunaga¹; *Michael Titus*¹; ¹Purdue University

ADVANCED MATERIALS

High Entropy Alloys VII — Thermal and Other Properties III

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

Thursday PM | March 14, 2019

008B | Henry B. Gonzalez Convention Center

Session Chairs: Qing Wang, Dalian University of Technology; An-Chou Yeh, National Tsing Hua University

2:00 PM Invited

Martensitic Transformations and Shape Memory Characteristics of (TiZrHf)₅₀Ni₂₅Co₁₀Cu₁₅ High Entropy Shape Memory Alloy: *Chih-Hsuan Chen*¹; Yue-Jin Chen¹; ¹National Taiwan University

2:20 PM

Microstructural Flexibility in Metastable High Entropy Alloys upon Friction Stir Processing: *Saurabh Nene*¹; Michael Frank¹; Subhasis

Sinha¹; Kaimiau Liu¹; Rajiv Mishra¹; Brandon Macwilliams²; Kyu Cho²; ¹University of North Texas; ²U.S. Army Research Laboratory

2:40 PM

Thermal Stability of Low Neutron Cross-section Nb-Ti-V-Zr High-entropy Alloys for Nuclear Applications: *Daniel King*¹; Simon Middleburgh²; Tim Lucey³; Michael Cortie⁴; Gregory Lumpkin⁵; Alexander Knowles¹; ¹Imperial College London; ²Bangor University; ³Weir Minerals; ⁴University of Technology Sydney; ⁵Australian Nuclear Science and Technology Organisation

3:00 PM Invited

High Throughput Solid Solution Strengthening Exploration of High Entropy Alloys: *Francisco Coury*¹; Kester Clarke¹; Claudio Kiminami²; Michael Kaufman¹; Amy Clarke¹; ¹Colorado School of Mines; ²Universidade Federal de Sao Carlos

3:20 PM Break

3:40 PM Invited

Resistance-temperature Behavior of AlxCoCrFeNi High Entropy Alloy Films: *Xiaona Li*¹; Chenyu Wang¹; Qing Wang¹; Yue Ma¹; Peter Liaw²; Chuang Dong¹; ¹Dalian University Of Technology; ²The University of Tennessee

4:00 PM

Crystallographically Degenerate B2 Precipitation in a Plastically Deformed Fcc-based High Entropy Alloy: *Deep Choudhuri*¹; Rajiv Mishra¹; ¹University of North Texas

4:20 PM

Elastic Dipoles of Point Defects in HEAs: *Varvenne Celine*¹; Emmanuel Clouet²; ¹Cnrs Aix-Marseille University; ²CEA Saclay

4:40 PM

Entropy Contributions to Phase Stability in Concentrated Random Solid Solutions: Anus Manzoor¹; *Dilpuneet Aidhy*¹; ¹University of Wyoming

CHARACTERIZATION

Interfaces in Structural Materials: An MPMD Symposium in Honor of Stephen M. Foiles — Interface-defect Interactions II

Sponsored by: The Minerals, Metals and Materials Society, TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Eric Homer, Brigham Young University; Elizabeth Holm, Carnegie Mellon University; Mark Asta, University of California, Berkeley

Thursday PM | March 14, 2019

302C | Henry B. Gonzalez Convention Center

Session Chairs: David Seidman, Northwestern University; Blas Uberuaga, Los Alamos National Laboratory

2:00 PM Invited

Grain Boundary Microscopic Degrees of Freedom: The Key(s) to Understanding Radiation Damage: *Mitra Taheri*¹; ¹Drexel University

2:30 PM

Irradiation and Mechanical Behavior of Nanocrystalline Alloys with Amorphous Intergranular Films: *Jennifer Schuler*¹; Christopher Barr²; Samuel Briggs²; Nathan Heckman²; Khalid Hattar²; Brad Boyce²; Timothy Rupert¹; ¹University of California Irvine; ²Sandia National Laboratories

2:50 PM

Absorption of Radiation-Induced Point Defects at Crystal/Amorphous, Metal/Covalent Interfaces: *Sanket Navale*¹; Michael Demkowicz¹; ¹Texas A&M University

3:10 PM

Helium Bubble Formation at Iron-oxide Interfaces in Nanostructured Ferritic Alloys: *Tiberiu Stan*¹; Yuan Wu²; Jim Ciston³; Takuya Yamamoto²; G.R. Odette²; ¹Northwestern University; ²University of California Santa Barbara; ³Lawrence Berkeley National Laboratory

3:30 PM Break

3:50 PM

Molecular Dynamics Study of the Contact Behavior of FCC Metallic Substrates: *Milad Khajehvand*¹; Panthea Sepehrband¹; ¹Santa Clara University

4:10 PM

High-strength Nanotwinned Al Solid Solution Alloys: *Yifan Zhang*¹; Qiang Li¹; Sichuang Xue¹; Jie Ding¹; Dongyue Xie²; Cuncai Fan¹; Ruizhe Su¹; Jin Li¹; Han Wang¹; Haiyan Wang¹; Jian Wang²; Xinghang Zhang¹; ¹Purdue University; ²University of Nebraska-Lincoln

4:30 PM

Interactions of Interstitials with Coherent Twin Boundary in Al: A Comprehensive First-principles Study: *William Yi Wang*¹; Jin Sun²; Chengxiong Zou¹; Quanmei Guan²; Deye Lin³; Jian Tang¹; Liang Zhang⁴; Bin Tang¹; Jun Wang¹; Hongchao Kou¹; Jianying Hou²; Jijun Ma²; Jinshan Li¹; ¹Northwestern Polytechnical University; ²CRRC Tangshan Co., LTD, Tangshan; ³Institute of Applied Physics and Computational Mathematics, Beijing; ⁴Shanghai Research Institutes of Materials

SPECIAL TOPICS

International Round Table on Materials Criticality — How Industry Manages Criticality

Sponsored by: ESM Foundation; co-sponsored by: The Federation of European Materials Societies

Program Organizer: Alessandra Hool, ESM Foundation

Thursday PM | March 14, 2019
007C | Henry B. Gonzalez Convention Center

Session Chair: Alessandra Hool, ESM Foundation

2:00 PM Introductory Comments

Round Table Discussion

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Small Scale Testing

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

Thursday PM | March 14, 2019
215 | Henry B. Gonzalez Convention Center

Session Chairs: Khalid Hattar, Sandia National Laboratory; Tarik Saleh, Los Alamos National Laboratory

2:00 PM Invited

An Overview of Small Scale Mechanical Property Measurements on Irradiated Steels: *Tarik Saleh*¹; *Stuart Maloy*¹; *Takuya Yamamoto*²; *Tobias Romero*¹; *Matthew Quintana*¹; *G. Odette*²; ¹Los Alamos National Laboratory; ²University of California, Santa Barbara

2:30 PM

In Situ Micromechanical Testing of He²⁺ Ion Irradiated Ni and Ni Based Superalloys for Gen IV Nuclear Reactors: *Dhriti Bhattacharyya*¹; *Alan Xu*¹; *Michael Saleh*¹; *Tao Wei*¹; *Mihail Ionescu*¹; ¹Australian Nuclear Science and Technology Organization

2:50 PM

Multiscale Modeling for Nanoindentation of Zirconium Using an Atomistic-to-continuum Coupling Method: *Yuqing Ding*¹; *Vineet Bhakhri*¹; *Sterling St Lawrence*¹; *Edmanuel Torres*¹; ¹Canadian Nuclear Laboratories

3:10 PM

Combined Nanomechanical and High-resolution Microscopy to Understand Plasma-surface Interactions in Fusion Energy Materials: *Chad Parish*¹; *Kun Wang*¹; *Thomas Song*¹; *Matthew Baldwin*²; *Russell Doerner*²; ¹Oak Ridge National Laboratory; ²University of California San Diego

3:30 PM Break

3:50 PM

The Effect of Helium-implantation on the Deformation Behaviour of Tungsten: X-ray Micro-diffraction & Crystal-plasticity: *Suchandrima Das*¹; *Edmund Tarleton*¹; *Ruqing Xu*²; *Wenjun Lui*²; *Felix Hofmann*¹; ¹University of Oxford; ²Argonne National Laboratory

4:10 PM

Micropillar Compression of Hydrogen Containing Zircaloy-4 at Temperatures to Explore the Performance of Nuclear Fuel Cladding: *Siyang Wang*¹; *Finn Giuliani*¹; *Ben Britton*¹; ¹Imperial College London

4:30 PM

Micromechanical Investigation of Irradiation Effects in Beryllium: *Viacheslav Kuksenko*¹; *Chris Densham*²; *Patrick Hurh*³; *Steve Roberts*⁴; ¹UK Atomic Energy Authority; ²Rutherford Appleton Laboratory; ³Fermi National Accelerator Laboratory; ⁴University of Oxford

4:50 PM

Development of a Micropillar Compression Study for MAX Phases in Nuclear Applications: *Julia Pürstl*¹; Thomas Edwards²; William Clegg¹; ¹University of Cambridge; ²Swiss Federal Laboratories for Materials Science and Technology (EMPA)

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior Related to Interface Physics III — Nanocomposites II

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

Program Organizers: Jason Trelewicz, Stony Brook University; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht; Siddhartha Pathak, University of Nevada, Reno; Jordan Weaver, National Institute of Standards and Technology; Marc Legros, CEMES-CNRS

Thursday PM | March 14, 2019

304B | Henry B. Gonzalez Convention Center

Session Chairs: Antonia Antoniou, Georgia Institute of Technology; Siddhartha Pathak, University of Nevada, Reno

2:00 PM Invited

Understanding Plasticity of Nanoscale Al-Al₂Cu Eutectic: *Jian Wang*¹; Shujuan Wang²; Guisen Liu³; Amit Misra²; ¹University of Nebraska–Lincoln; ²University of Michigan; ³University of Nebraska, Lincoln

2:30 PM

Breakdown of the Superplastic Behaviour of Zn-22Al at the Nanoscale: *Mathias Göken*¹; Patrick Feldner¹; Benoit Merle¹; ¹Friedrich Alexander, University Erlangen Nürnberg

2:50 PM

Influence of Interface Structure and Chemistry on the Mechanics of Finite Cracks of Phase Boundaries under Irradiation: *Remi Dingreville*¹; Elton Chen¹; Chaitanya Deo²; ¹Sandia National Laboratories; ²Georgia Institute of Technology

3:10 PM

Mechanical Behavior of Core-shell Nanostructures: *Raghuram Santhapuram*¹; Douglas Spearot²; Arun Nair¹; ¹University of Arkansas; ²University of Florida

3:30 PM Break

3:50 PM Invited

Deformation Behavior and Strength of Bulk Zr/Nb Nanolayered Composites: *Marko Knezevic*¹; Daniel Savage¹; Nan Li²; Jordan Weaver³; Nathan Mara⁴; Rodney McCabe²; Sven Vogel²; Irene Beyerlein⁵; ¹University of New Hampshire; ²Los Alamos National Laboratory; ³National Institute of Standards and Technology; ⁴University of Minnesota; ⁵University of California at Santa Barbara

4:20 PM

DFT Study of High Order Elastic Constants and Electronic Properties of Borophene: *Ali Ramazani*¹; Mahdi Faghihnasiri²; Homayoun Jafari³; Mostafa Shabani⁴; Sina Malakpour Estalaki⁵; Ronald G Larson⁶; ¹Massachusetts Institute of Technology; ²Young Researchers and Elite Club; ³Iran University of Science and Technology; ⁴Shahrood University of Technology; ⁵University of Notre Dame; ⁶University of Michigan, Ann Arbor

4:40 PM Invited

Unraveling Material and Geometrical Effects in Nanoporous Platinum: *Antonia Antoniou*¹; ¹Georgia Institute of Technology

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Nanoarchitected and Morphology-controlled Nanoporous Materials — NP Materials-structure Properties-mechanical Behavior II

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

Program Organizers: Niaz Abdolrahim, University of Rochester; John Balk, University of Kentucky; Michael Demkowicz, Texas A&M University; Christoph Eberl, Fraunhofer IWM

Thursday PM | March 14, 2019

214A | Henry B. Gonzalez Convention Center

Session Chairs: Xinghang Zhang, Purdue University; David Bahr, Purdue University

2:00 PM Invited

Novel Deformation Mechanism of Small-volume Copper Containing High Density of Helium Bubbles: *Weizhong Han*¹; ¹Xi'an Jiaotong University

2:30 PM

Characterization of Nanoporous Metals after Nanoindentation through 3D Reconstruction: *Nicolas Briot*¹; T. John Balk¹; ¹University of Kentucky

2:50 PM Invited

In Situ Irradiation Studies of Nanoporous Metals: *Xinghang Zhang*¹; Jin Li¹; Cuncai Fan¹; ¹Purdue University

3:20 PM Break

3:50 PM Invited

Microstructure Evolution of Nanoporous Gold during Dealloying: Insights from Atomistic Modeling: *Dinh Bao Nam Ngô*¹; Yong Li²; Jürgen Markmann¹; Jörg Weissmüller²; ¹Helmholtz-Zentrum Geesthacht; ²Hamburg University of Technology

4:20 PM Invited

Copper-nickel Alloy Foams from Polymer Templates: *David Bahr*¹; Changeun Kim¹; Raheleh Rahimi¹; Ioannis Mastroarakos¹; ¹Purdue University

4:50 PM

Real-time USAXS and WAXS Studies of Morphology Evolution in 3D Nanoporous Gold during Electrochemical Dealloying: *Sam Welborn*¹; John Corsi¹; Alexander Proschel¹; Eric Detsi¹; ¹University of Pennsylvania

5:10 PM

3D-morphology of Multimodal Porous Cu Fabricated via Chemical De-alloying Method: *Lijie Zou*¹; Mingyuan Ge²; Chonghang Zhao¹; Wah-Keat Lee²; Fei Chen³; Yu-chen Karen Chen-Wiegart¹; ¹Stony Brook University; ²Brookhaven National Laboratory; ³Wuhan University of Technology

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Phase Transformation in Non-ferrous Alloys V

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Yufeng Zheng, Ohio State University; Ashley Paz y Puente, University of Cincinnati; Juan Escobedo-Diaz, University of New South Wales; Dhriti Bhattacharyya, ANSTO; Rajarshi Banerjee, University of North Texas

Thursday PM | March 14, 2019

225D | Henry B. Gonzalez Convention Center

Session Chairs: Megumi Kawasaki, Oregon State University; Hugo Lopez, University of Wisconsin

2:00 PM

Size Effect of NbTi Filament on the Interfacial Reaction and Properties of Lead-free Superconducting Solder Joints: *Sangeeta Santra*¹; Timothy Davies¹; Junliang Liu¹; Guillaume Matthews¹; Chris Grovenor¹; Susannah Speller¹; ¹University of Oxford

2:20 PM

Study of Phases Demonstrating Potential Hardening Effect in New Nickel-base Superalloys for Turbine Discs Application: *Laurane Finet*¹; Vladimir A. Esin¹; Loïc Nazé¹; Vincent Maurel¹; ¹MINES ParisTech, PSL Research University

2:40 PM

The Effect of Pre-stretch Deformation on the Precipitation and Microstructural Evolution in Zircaloy-4 Alloy during Aging: *Shuo Li*¹; Baifeng Luan¹; Qing Liu¹; ¹Chongqing University

3:00 PM

The Influence of Hot Deformation and Subsequent Aging on the Mechanical Properties of the Nickel Superalloy 625.: *Simon Malej*¹; Jožef Medved²; Barbara Šetina Batic¹; Franc Tehovnik¹; Jaka Burja¹; Franci Vode¹; Arh Boštjan¹; Matjaž Godec¹; ¹Institute of Metals and Technology; ²Faculty of Natural Sciences and Engineering

3:20 PM Break

3:40 PM

Precipitation Mechanism of Irradiation Induced Nb-rich Particles in ZrNb Alloys: *Zefeng Yu*¹; Adrien Couet¹; Mukesh Bachhav²; ¹University of Wisconsin, Madison; ²Idaho National Laboratory

4:00 PM

Structural Evolution of Dislocation Dipoles and Their Strengthening Effect in Deformed Gamma-TiAl: *Hao Wang*¹; Yan He¹; Zhao Liu¹; Gang Zhou¹; Chunguang Bai¹; David Rodney²; Fritz Appel³; Dongsheng Xu¹; Rui Yang¹; ¹Institute of Metal Research, Chinese Academy of Sciences; ²Institut Lumière Matière, Université Lyon 1; ³Institute for Materials Research, Helmholtz-Zentrum Geesthacht

4:20 PM

Thermal Decomposition of Quasicrystals in Powder-processed Icosahedral-phase-strengthened Aluminum Alloys: *Hannah Leonard*¹; Sarshad Rommel¹; Sriram Vijayan¹; Thomas Watson²; Sonia Tulyani³; Mark Aindow¹; ¹University of Connecticut; ²Pratt & Whitney; ³UTC Aerospace Systems

4:40 PM

The Formation of Faceted Spirals during Directional Eutectic Solidification: *Saman Moniri*¹; Ashwin Shahani¹; ¹University of Michigan

ELECTRONIC MATERIALS

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

Sponsored by: TMS: Thin Films and Interfaces Committee

Program Organizers: Pooran Joshi, Oak Ridge National Laboratory; Ravindra Nugehalli, New Jersey Institute of Technology; Jud Ready, Georgia Institute of Technology; Anming Hu, University of Tennessee; Tolga Aytug, Oak Ridge National Laboratory; Konstantinos Sierros, West Virginia University; Wenchao Zhou, University of Arkansas

Thursday PM | March 14, 2019
217D | Henry B. Gonzalez Convention Center

Session Chairs: Anming Hu, University of Tennessee; Yong Kong, The University of Utah

2:00 PM Invited

In Situ Real Time Defect Detection and Residual Stress Measurement in Additive Manufacturing: *Xiaodong Li*¹; ¹University of Virginia

2:30 PM

Advances in 2D Material Processing and Application: A Direct-ink Writing Approach Employing Graphene-based Inks for Facile Gas Sensor Patterning and Fabrication: *Harrison Loh*¹; Andrew Graves¹; Charter Stinespring¹; Konstantinos Sierros¹; ¹West Virginia University

2:50 PM

Materials Integration for Flexible Electronics: Transparent Supercapacitors: *Lydia Skolrood*¹; Tolga Aytug¹; Matthew Rager¹; Forrest Brown¹; Wesley Higgins¹; Gabriel Veith¹; Hui Wang¹; Zachary Hood¹; Christopher Rouleau¹; Pooran Joshi¹; ¹Oak Ridge National Laboratory

3:10 PM

Aerosol Jet Printing of Dielectric Polymer Blend for Applications in Flexible CNT Thin Film Transistors: *Alan Phillips*¹; Yongchao Yu²; Justine Valka¹; Nance Ericson¹; Pooran Joshi¹; ¹Oak Ridge National Laboratory; ²University of Tennessee

3:30 PM Break

3:50 PM Invited

Intercalation of Van Der Waals Layers for Multifunctional Applications: *Sina Najmaei*¹; Chinedu Ekuma¹; Madan Dubey¹; ¹US Army Research Laboratory

4:20 PM

Patterning of ZnO Quantum Dots and Poly(methyl methacrylate) Hybrids: *Kathy Lu*¹; Yifeng Lin¹; Richey Davis¹; ¹Virginia Polytechnic Institute

4:40 PM

MARS-Magnetic Augmented Rotation System: *Vishwas Danthi Shivaram*¹; Roulei Liu¹; Navjot Panchhi¹; Laila Al-qarni¹; Rayan Daroowalla²; Shuang Du¹; Yan Liu¹; Tiansee Chow³; Nuggehalli Ravindra¹; ¹New Jersey Institute of Technology; ²Paramus High School; ³Energy Technology Development Inc.

BIOMATERIALS

Recent Developments in Biological, Structural and Functional Thin Films and Coatings — Functional Films and Coatings III

Sponsored by: TMS: Thin Films and Interfaces Committee

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

Thursday PM | March 14, 2019
217A | Henry B. Gonzalez Convention Center

Session Chairs: Gerald Ferblantier, Strasbourg University; Chintalapalle Ramana, University of Texas El Paso

2:00 PM Keynote

High Resolution Ion Beam Analysis of Materials: Past, Present and Future: *Vaithiyalingam Shutthanandan*¹; ¹Pacific Northwest National Laboratory

2:35 PM

Evaluation of Transparent WO₃/Mo/WO₃ Multilayer Thin Films: *Alba Leyva*¹; Anil Krishna Battu¹; Nanthkishore Makeswaran¹; Ramana Chintalapalle¹; ¹University of Texas, El Paso

2:55 PM

Effect of Refractory Metal Incorporation on Structure and Properties of β -Ga₂O₃: A Case Study of Molybdenum Incorporated β -Ga₂O₃ Films: *Anil Krishna Battu*¹; Cristian Orozco¹; Ramana Chintalapalle¹; ¹University of Texas, El Paso

3:15 PM Keynote

Ultra-low-energy Ion Beam Synthesis for Nanotechnology and Nanostructures.: *Marzia Carrada*¹; Caroline Bonafos¹; P. Benzo¹; Gérard Ben Assayag¹; B. Pecassou¹; ¹CEMES

3:50 PM Break

4:10 PM

Structural and Optical Properties of Silicon Doped Quantum Dots in Silicon Oxynitride Thin Films Prepared by Plasma Enhanced CVD.: *Gerald Ferblantier*¹; Fabien Ehrhardt¹; Dominique Muller¹; Daniel Mathiot¹; ¹Icube Laboratory

4:30 PM

Engineering Interfacial Stresses For Optimum Silicon Band-Edge emission: *Sufian Abedrabbo*¹; Nugehalli Ravindra²; Anthony Fiory²; ¹Khalifa University of Science And Technology; ²New Jersey Institute of Technology

4:50 PM

Uncooled Microbolometers – An Overview: Sita Rajyalaxmi Marthi¹; Asahel Bañobre¹; Nuggehalli Ravindra¹; ¹New Jersey Institute of Technology

POSTER SESSIONS WITH PRESENTERS

The poster sessions are divided into 2 separate presentation times and grouped by topic area.

POSTER SESSION I

Monday, March 11

5:30 to 7:00 p.m.

- Additive Technologies
- Biomaterials
- Corrosion
- Light Metals
- Materials Processing
- Mechanics and Structural Reliability
- Nuclear Materials
- Special Topics

POSTER SESSION II

Tuesday, March 12

5:30 to 7:00 p.m.

- Advanced Materials
- Energy & Environment
- Characterization
- Electronic Materials
- Materials Design
- Nanostructured & Heterostructured Materials
- Physical Metallurgy

Poster presenters should stand by their poster during their designated presentation time.

MATERIALS PROCESSING

10th International Symposium on High Temperature Metallurgical Processing — Poster Session

Sponsored by: TMS: Pyrometallurgy Committee

Program Organizers: Tao Jiang, Central South University; Jiann-Yang Hwang, Michigan Technological University; Dean Gregurek, RHI Magnesita; Zhiwei Peng, Central South University; Jerome Downey, Montana Technological University; Baojun Zhao, University of Queensland; Onuralp Yucel, Istanbul Technical University; Ender Keskinilic, Atilim University; Rafael Padilla, University of Concepcion; Elsa Olivetti, Massachusetts Institute of Technology; Camille Fleuriault, Gopher Resource

Monday PM | March 11, 2019

Hall 3 | Henry B. Gonzalez Convention Center

E-49: A Literature Review of Heat Capacity Measurement Methods: *Guishang Pei*¹; Junyi Xiang¹; Gang Li¹; Shanshan Wu¹; Feifei Pan¹; Xuwei Lv¹; ¹Chongqing University

E-50: A Study on the Supersonic Jet Behavior for the Improvement of Dephosphorization Efficiency in Converter Process: *Jeong Han*¹; ¹Inha University

E-51: Application of Offgas Analysis on Predicting Carbon Content of End-point during Steelmaking Process: *Rong Cheng*¹; *Jiongming Zhang*¹; Liangjin Zhang¹; Haitao Ma¹; ¹University of Science and Technology Beijing

E-52: Calcination of Strontium Carbonate in Rotary Kiln Furnace: *Rasit Sezer*¹; Emre Yilmaz²; Selim Ertürk²; Cüneyt Arslan²; ¹Karadeniz Technical University; ²Istanbul Technical University

E-53: CFD Study on Pulverized Coal Combustion Behavior in the Raceway of an Oxygen Blast Furnace: *Junming Wu*¹; Zhenfeng Zhou¹; Xing Peng¹; Jingsong Wang¹; ¹University of Science and Technology Beijing

E-54: Determination of Effect of Li₂O on the Structure of CaO-Al₂O₃ Based Slag by Molecular Dynamics Simulation and Raman Spectrum: *Sai Wang*¹; Shengping He¹; Boran Jia¹; Qian Wang¹; ¹Chongqing University

E-55: Dissolution Reaction of Earthy Graphite in Liquid Steel:

Hongyan Yan¹; Xiaojun Hu²; Chao Luo³; *Jinglong Liang*¹; KuoChih Chou²; ¹College of Metallurgy and Energy, North China University of Science and Technology; ²State Key Laboratory of Advanced Metallurgy, University of Science and Technology Beijing; ³Hesteel Group Tangsteel Company

E-56: Effect of Al on the Formation of IAF in Al-Ti-Mg Deoxidized and RE-treated Steel: *Xiaokang Cui*¹; Bo Song¹; Zhen Liu¹; Longfei Li¹; ¹University of Science & Technology Beijing

E-57: Effect of H₂/CO Ratio on Gas Consumption and Energy Utilization Rate of Gas-based Direct Reduction Process: *Chenyang Xu*¹; Zheng Anyang¹; Zhang Jianliang¹; Wang Rongrong¹; Li Yang¹; Wang Yaozu¹; Liu Zhengjian¹; ¹University of Science and Technology Beijing

E-58: Effects of Particle Size of Coke on Iron Ore Sintering Process: *Huaiying Ma*¹; Wen Pan¹; Lei Liu²; Zhidong Zhang²; Chunlai Wang²; ¹Research Institute of Technology, Shougang Group Corporation; ²Shougang Qian'an Steel Company

E-59: Electrical Conductivity of TiO₂-FeO-X(SiO₂, CaO) Ternary High Titania Slag: *Kai Hu*¹; Shengping Li¹; Junyi Xiang¹; Xuwei Lv¹; ¹Chongqing University

E-60: Experimental Study on Dechlorination of Cold-rolling Sludge at High Temperature Roasting: *Yi Li*¹; Hongwei Cheng¹; Guangshi Li¹; Xiaoyong Mei¹; Xionggang Lu¹; Qian Xu¹; ¹Shanghai University

E-61: Extraction Process of Antimony from Stibnite by Electrothermal Volatilization: *Dongbo Li*¹; Xiaohua Yang¹; ¹China ENFI Engineering Corporation

E-62: Generation Kinetics of Perovskite in Calcium Ferrite-titania Reaction: *Cheng Yi Ding*¹; Gang Li¹; ¹Chongqing University

E-63: Influence Factors Analysis on Scavenging of Chlorine Impurity from Crude Titanium Sponge: *Li Liang*¹; Dachun Liu²; ¹Panzhuhua Iron&Steel Research Institute; ²Kunming University of Science and Technology

E-65: Low Grade Phosphorus-containing Iron Ore for the Removal of Cu(II) Ion from Wastewater: Xiaoli Yuan¹; Dongshan Zhou¹; Wentang Xia¹; *Qingyun Huang*¹; ¹Chongqing University of Science and Technology

E-66: Mechanism of the Chlorination Roasting of Nickel Sulfide Concentrate with Ammonium Chloride: *Xiaoyong Mei*¹; Hongwei Cheng¹; Cong Xu¹; Guangshi Li¹; Xionggang Lu¹; Qian Xu¹; ¹Shanghai

University

E-67: Numerical Simulation Investigation on the Flow and Temperature Fields in Tundish with Gas Injection into Ladle Shroud: *Wang Zhou*¹; Tao Zhang²; San-Xing Chen¹; ¹Chongqing CEPREI Industrial Technology Research Institute; ²Chongqing University of Education

E-68: Rapid Surface Quenching Technology and its Computing Model of Micro-alloy Steel: *Cheng Juan*¹; Yang Qiankun¹; Wang Yang¹; Zhang Dong¹; Shen Ping¹; Fu Jianxun¹; ¹Shanghai University

E-69: Recovery of Zinc from Oxide-sulphide Zinc Ore through Oxidation and Chelation: *Kun Yang*¹; Shwei Li¹; Libo Zhang¹; Jinhui Peng¹; ¹Kunming University of Science and Technology

E-70: Roasting Behavior and Mechanism of Oxidized Pellets by Blended Hematite and Magnetite Concentrate: Zhang Zhongwu¹; Yu Zhengwei¹; Xiang Aiping¹; Li Yafei¹; Lei Jie¹; Long Hongming¹; ¹Anhui University of Technology

E-71: Structure-property Correlations of Al₂O₃SiO₂ Substitution in Blast Furnace Slag: *Zhiming Yan*¹; Xuwei Lv¹; Ramana Reddy²; Zhengde Pang¹; Wenchao He¹; ¹Chongqing University; ²The University of Alabama

E-72: Optimization of Continuous Casting Process of 23MnNiCrMo54 Steel: Yang Wang¹; Ping Shen¹; Juan Cheng¹; Qiankun Yang¹; Dong Zhang¹; Jianxun Fu¹; ¹Shanghai University

E-73: Study of Surface Temperature of Continuously Cast Slab by Machine Vision: *Junpeng Liu*¹; Ke Xu¹; Dongdong Zhou¹; Peng Zhou¹; ¹University of Science & Technology Beijing

E-74: Study on Energy Utilization of High Phosphorus Oolitic Hematite by Gas-based Shaft Furnace Reduction and Electric Furnace Smelting Process: *Hui Sun*¹; ¹Shenwu Technology Group Corp Co.,Ltd.

E-75: Study on the Effect of Different CO₂-O₂ Mixture Gas Blowing Modes on Vanadium Oxidation: *Zhenglei Guo*¹; Yu Wang¹; Qi Lu¹; Shuchao Wang¹; ¹Chongqing University

E-76: The Effects of Solute and Particles on the Microstructure Changes during Directional Annealing in an Ni-Al System: *Chao Yang*¹; Ian Baker¹; ¹Thayer School of Engineering at Dartmouth College

E-77: Thermodynamic Analysis of Precipitation of La-O-S-As Inclusions in Steel: *Congxiao Li*¹; Hongpo Wang¹; Bin Bai¹; Lei

Zhang¹; ¹Chongqing University

E-78: Thermodynamics of Spinel Solid Solutions: *Sergey Shornikov*¹; ¹Vernadsky Institute of Geochemistry of RAS

E-79: Thermogravimetric and Kinetic Analyses of Co-combustion of Chlorine-containing Anthracite/bituminous Coal Blends: *Cui Wang*¹; ¹University of Science and Technology Beijing

SPECIAL TOPICS

2019 International Metallurgical Processes Workshop for Young Scholars (IMPROWYS 2019) — Student Poster Session

Sponsored by: TMS Extraction and Processing Division

Program Organizers: Cong Wang, Northeastern University; Amy Clarke, Colorado School of Mines; Kinnor Chattopadhyay, University of Toronto; Bryan Webler, Carnegie Mellon University

Monday PM | March 11, 2019

Hall 3 | Henry B. Gonzalez Convention Center

Funding support provided by: Korean Institute of Metals and Materials

H-1: Corrosion Behavior Mechanism of Super Duplex-stainless Steel in Simulated Seawater Desalination Environment: *Yangang Zhang*¹; Zhangfu Yuan¹; Xiangtao Yu¹; ¹University of Science and Technology Beijing

H-2: Development of Bio Treated-oil Palm Fiber Reinforced Kaolin Matrix Composites for Building Bricks Application: *Muideen Adebayo Bodude*¹; Olasunkanmi Adegbuyi¹; Nnaji Ruth Nkiruka¹; ¹University of Lagos

H-3: Effect of Roll Surface Profile on Thermal-mechanical Behavior of Continuously Cast Bloom in Soft Reduction Process: *Liang Li*¹; Xiao Zhao¹; Peng Lan¹; Zhanpeng Tie¹; Haiyan Tang¹; Jiaquan Zhang¹; ¹University of Science and Technology Beijing

H-4: The Influence of Bath Additives on the Microstructure, Mechanical Properties and Thermal Stability of Nanocrystalline Ni Films Processed by Electrodeposition: *Tamás Kolonits*¹; Zsolt Czigány²; László Péter³; Imre Bakonyi³; Jeno Gubicza¹; ¹ELTE Eötvös Loránd University; ²Institute of Technical Physics and Materials Science, Hungarian Academy of Sciences; ³Wigner Research

Centre for Physics, Hungarian Academy of Sciences

H-5: Thermodynamic Study on Substitution of CO₂ for Ar or O₂ in AOD Smelting Process: *Rongyue Wang*¹; Zhangfu Yuan¹; Xiangtao Yu¹; Jingxia Liu²; ¹University of Science and Technology Beijing; ²Peking University

SPECIAL TOPICS

2019 Technical Division Student Poster Contest — Extraction and Processing Division (EPD) Graduate Students

Sponsored by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

**Monday PM | March 11, 2019
Hall 3 | Henry B. Gonzalez Convention Center**

SPG-1: Dissolution Behavior of ZnFe₂O₄-Fe₃O₄ Spinel Solid Solutions in Acid: *Marian Nida Lumongsod*¹; Kazuki Hara¹; Takahiro Miki¹; Yasushi Sasaki¹; Tetsuya Nagasaka¹; ¹Tohoku University

SPG-2: Optimization of Platinum Leaching from Spent Catalysts Using Response Surface Methodology: *Yunji Ding*¹; Shengen Zhang¹; ¹University of Science and Technology Beijing

SPG-3: Thermochemical and Electrochemical Properties of Nd-Bi Alloys by Electromotive Force and Complementary Measurements: *Timothy Lichtenstein*¹; Nadia Elbaar¹; Hojong Kim¹; ¹Pennsylvania State University

SPECIAL TOPICS

2019 Technical Division Student Poster Contest — Functional Materials Division (FMD) Graduate Students

Sponsored by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

**Monday PM | March 11, 2019
Hall 3 | Henry B. Gonzalez Convention Center**

SPG-4: A First-principles Exploration of the Effects of Supercell Size, Exchange-correlation Functional, and Vibrational Entropy on Self-diffusion in FCC Metals: *John O`Connell*¹; Chelsey Hargather¹; Kristin Mackowski¹; ¹New Mexico Institute of Mining & Technology

SPG-5: Thermophysical Properties Characterization of a Novel Multicomponent Molten Salt: *Matias Castro*¹; Daniel Faundez¹; Nissim Deij¹; Cristobal Martinez¹; Alvaro Videla¹; ¹Pontificia Universidad Católica de Chile

SPG-6: Thickness Controlled Graphene Growth on Textured Cu-Ni (Cu_xNi_{1-x}, x = 0.5 – 1.0) Alloy Foils: *Gurjinder Kaur*¹; Vijayesh Kumar²; K.S. Suresh³; Indranil Lahiri¹; ¹Nanomaterials and Applications Lab, Department of Metallurgical and Materials Engineering, Indian Institute of Technology Roorkee; ²Centre of Excellence: Nanotechnology, Indian Institute of Technology Roorkee; ³Department of Metallurgical and Materials Engineering Indian Institute of Technology Roorkee

SPECIAL TOPICS

2019 Technical Division Student Poster Contest — Functional Materials Division (FMD) Undergraduate Students

Sponsored by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

Monday PM | March 11, 2019
Hall 3 | Henry B. Gonzalez Convention Center

SPU-2: Atomic and Electronic Structure of Perovskite Surface and Interfaces for Photovoltaic Applications: *Nicholas Ayers*¹; Anirban Naskar¹; Rabi Khanal¹; Samrat Choudhury¹; ¹University of Idaho

SPU-3: Coating Porous-wall, Hollow Glass Microspheres for Security Printing Applications: *Jordan Brito*¹; Forest Thompson²; Grant Crawford²; ¹Texas A&M University; ²South Dakota School of Mines & Technology

SPU-4: Effect of Varying Time and Temperature on Carbon Nanotube Growth: *Tyler Knapp*¹; Jud Ready¹; ¹Georgia Tech

Research Institute

SPU-5: Electrodeposition of Tungsten Oxide Hydrates on 2D and 3D Substrates for High Power Electrochemical Energy Storage: *Ellie Scott*¹; James Mitchell¹; Veronica Augustyn¹; ¹North Carolina State University

SPU-6: Exploring Different Methods to Increase Efficiency of CZTS for Solar Cell Applications: *Lily Turaski*¹; Jud Ready²; ¹Georgia Institute of Technology; ²Georgia Tech Research Institute

SPU-7: Simulating Oxygen Vacancies in Energy Materials: *Benjamin Shindel*¹; Peter Crozier¹; Ethan Lawrence¹; Tara Boland¹; ¹Arizona State University

SPU-8: The Effect of the Substrate on the MoS₂ Catalyzed Hydrogen Evolution Reaction: *Grace Matthews*¹; ¹North Carolina State University

SPU-23: Developing a Compact Neutron Beam Radiography and 3D Tomography System for Non-Destructive Material Characterization: *Calvin Downey*¹; ¹Worcester Polytechnical Institute

SPU-24: Enhanced Efficiency of Non-toxic, Easily-processable Bi₂S₃ Thin Film Solar Cells Using Close-space Sublimation to Achieve Highly Controllable Crystal Orientation: *Emily Molstad*¹; ¹Worcester Polytechnic Institute

SPU-25: Metal Oxide Photoelectrodes for Water Decontamination: *Salvador Alvarado Olivo*¹; ¹Worcester Polytechnic Institute

SPECIAL TOPICS

2019 Technical Division Student Poster Contest — Light Metals Division (LMD) Graduate Students

Sponsored by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

Monday PM | March 11, 2019
Hall 3 | Henry B. Gonzalez Convention Center

SPG-7: Conventional and Low Phosphorous Ceramic Foam Filters (CFFs) - Chemical Reactivity and Thermal Stability: *Are Bergin*¹;

Robert Fritzsche²; Shahid Akhtar³; Lars Arnberg²; Ragnhild E. Aune²; ¹Norwegian University of Science and Technology & Hydro ASA; ²Norwegian University of Science and Technology; ³Hydro ASA

SPG-8: Effect of Elastic/Plastic Strain on Corrosion Behavior of Aluminum Alloy 7075: *Hamidreza Habibollahi Najaf Abadi*¹; Brendy Rincon Troconis¹; ¹University of Texas at San Antonio

SPG-9: Formation of Alumina Rafts in a Lab Scale Furnace: *Sindre Engzelius Gylver*¹; Kristian Einarsrud¹; ¹Norwegian University of Science and Technology

SPG-10: Mechanical Behavior of Novel Al₃BC/Al Composites via Micropillar Compression: *Yongfeng Zhao*¹; Arun Sundar S. Singaravelu²; Qingdong Zhang²; Xiangfa Liu³; Nikhilesh Chawla²; ¹Arizona State University; Shandong University; ²Arizona State University; ³Shandong University

SPG-11: Modeling of the Effect of Porosities and Powder Particle of Additive Manufacturing Materials: *Md Salah Uddin*¹; Brahmananda Pramanik¹; ¹Montana Technological University

SPG-12: Oxidation of AlMgSi Alloys in CO₂-Air Atmospheres: *Cathrine Solem*¹; Gabriella Tranell¹; Ragnhild E. Aune¹; ¹Norwegian University of Science and Technology (NTNU)

SPG-13: Study of Confined Rolling of Magnesium Alloys to Improve Mechanical Properties: *Pavitra Krishnan*¹; Zhigang Xu²; Sergey Yarmolenko²; Jag Sankar²; Laszlo Kecskes³; Qiuming Wei¹; ¹UNCC; ²NC A&T University; ³HEMI, JHU

SPG-14: Ultrastrong, Deformable and Thermally Stable Nanostructured Al Alloy Coatings with Solute Supersaturation: *Qiang Li*¹; Xinghang Zhang¹; Jian Wang²; Shuai Shao³; Haiyan Wang¹; ¹Purdue University; ²University of Nebraska–Lincoln; ³Louisiana State University

SPECIAL TOPICS

2019 Technical Division Student Poster Contest — Light Metals Division (LMD) Undergraduate Students

Sponsored by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

Monday PM | March 11, 2019

Hall 3 | Henry B. Gonzalez Convention Center

SPU-9: Aluminum-cerium Alloys Treated with Niobium Diboride Nanoparticles for Aerospace Applications: *Julie Colon*¹; Manny De Jesus¹; Carolina Ramos¹; Raúl Vega¹; Oscar Marcelo Suárez¹; ¹University of Puerto Rico Mayaguez

SPU-10: Heat Treatment Optimization of Al-Ce Based Alloys Using Differential Scanning Calorimetry: *Ramon Padin*¹; Manny De Jesus¹; O.M. Suarez¹; ¹University of Puerto Rico at Mayaguez

SPU-11: The Effect of Fibrous Geometry on Thermomechanical Behavior of Phenolic Impregnated Carbon Ablators for Use in Thermal Protection Systems: *Katherine Moody*¹; Skylar Mays¹; Mujan Seif¹; Matthew Beck¹; ¹University of Kentucky

SPECIAL TOPICS

2019 Technical Division Student Poster Contest — Materials Processing and Manufacturing Division (MPMD) Graduate Students

Sponsored by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

Monday PM | March 11, 2019
Hall 3 | Henry B. Gonzalez Convention Center

SPG-15: Aluminizing of Austenitic Stainless Steel - Thermodynamic and Kinetic Modeling: *Deepali Patil*¹; Vilupanur Ravi¹; ¹California State Polytechnic University, Pomona

SPG-16: Characterization of Steel Powder Produced from Battlefield Scrap for Additive Manufacturing.: *Christopher Massar*¹; Bryer Sousa¹; ¹Worcester Polytechnic Institute

SPG-17: Effect of Heat Treatment on Selective Laser Melted Alloy 625: Microstructure and Corrosion Behavior: *Christopher Faraj*¹; Samad Firdosy²; Andre Pate²; Vilupanur Ravi¹; ¹California State Polytechnic University, Pomona; ²Jet Propulsion Laboratory, California Institute of Technology

SPG-18: Experimental Characterization and Modelling of Aluminum Alloy AA3103 for Complex Single and Double Strain-

path Changes: *Jisheng Qin*¹; ¹OSU

SPG-19: Extrusion Based 3D Printing of Metallic and Ceramic Scaffolds Using Particle-based Liquid Inks: *Kameswara Pavan Ajjarapu*¹; *Safa Khodabakhsh*¹; *Ashley Paz y Puente*¹; ¹University of Cincinnati

SPG-20: Fabrication of Ni-Ti-Zr Shape Memory Microwires via Co-deposition of Ti and Zr on Pure Ni Wires: *Ajith Achuthankutty*¹; *Arun Bhattacharjee*¹; *Ashley Paz y Puente*¹; ¹University of Cincinnati

SPG-21: Improving the Microstructure of LPBF IN718 through Supersolvus Solution Treatment: *David Newell*¹; *Ryan O'Hara*¹; *Greg Cobb*²; *Anthony Palazotto*¹; ¹Air Force Institute of Technology; ²ORISE

SPG-22: Mini-fatigue Testing of a Laser Additive Manufactured IN-625 Alloy: *Shivakant Shukla*¹; *Mageshwari Komarasamy*¹; *Kumar Kandasamy*²; *Rajiv Mishra*¹; ¹University of North Texas; ²Oerlikon Metco

SPG-23: Predictive Finite Element Simulations of Grain Growth: *Erdem Eren*¹; *Jeremy Mason*¹; ¹University of California, Davis

SPG-24: Probabilistic Methodology for the Analysis and Reconstruction of Parent Microstructures from EBSD Maps of Transformation Products: *Alexander Brust*¹; ¹Ohio State University

SPG-25: Study of Al₁₁Ce₃ Distribution in Aluminum Matrix Produced via Centrifugal Casting: *Manny de Jesus-Lopez*¹; *William Crespo-Martínez*¹; *Ángel Torres-Gonzalez*¹; *Karnia Ramos-Ortiz*¹; *Oscar Suárez*¹; ¹University of Puerto Rico, Mayaguez

SPG-26: The Effect of Secondary Phases, Grain Orientations, and Grain Boundaries on the Nanomechanical Behavior of Rapidly Solidified Al Alloyed Powders: *Bryer Sousa*¹; *Caitlin Walde*¹; *Derek Tsaknopoulos*¹; *Christopher Massar*¹; *Victor Champagne*²; *Danielle Cote*¹; ¹Worcester Polytechnic Institute; ²US Army Research Lab

SPG-27: Uncertainty Quantification of FEM Simulations for the Material Performance of Extruded Ferritic Steel: *Denielle Ricciardi*¹; *Stephen Niezgodá*¹; *Marko Knezevic*²; *Miroslav Zecevic*²; ¹The Ohio State University; ²The University of New Hampshire

SPECIAL TOPICS

2019 Technical Division Student Poster Contest — Materials Processing and Manufacturing Division (MPMD) Undergraduate

Students

Sponsored by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

Monday PM | March 11, 2019
Hall 3 | Henry B. Gonzalez Convention Center

SPU-12: Alginate Particle Fabrication Using Vibration Assisted Drop Generation: *Brandon Wells*¹; Alejandro Alcaraz Ramirez¹; Carlos Martinez¹; ¹Purdue University

SPU-13: Anodizing Bicycle Spokes in Hot Sodium Hydroxide: *Sara Franco*¹; Eric Galindo¹; T.David Burleigh¹; ¹New Mexico Institute of Mining & Technology

SPU-14: Fabrication of a Porous Zn Metal Via Selective Dissolution of an Al-Zn Alloy in NaOH Aqueous Solutions: *Kenneth Silva-Reyes*¹; Juan Carlos Vargas-Martinez¹; Keishlyann Baez-Cruz¹; Johnattan Velazquez-Diaz¹; Oscar Marcelo Suarez¹; ¹University of Puerto Rico, Mayaguez

SPU-15: Improvements to the Production of Tungsten Carbide through the Mathematical Modeling and Statistical Optimization of Production Parameters: *Marc D'Aberle*¹; Jerome Downey¹; Grant Wallace¹; Jannette Chorney¹; Katie Schumacher¹; ¹Montana Tech of the University of Montana

SPU-16:
Investigation of the Effect of Laser Power on Defects, Texture, and Tensile Behavior of Additively Manufactured 316L Stainless Steel Using In-situ Synchrotron X-ray Computed Tomography and Diffraction: *Logan White*¹; ¹University of Tennessee Knoxville

SPU-17: Size Effect in Microparticle Impact Bonding: *Ian Dowding*¹; Mostafa Hassani-Gangaraj²; David Veysset²; Christopher Schuh²; ¹North Carolina State University; ²Massachusetts Institute of Technology

SPECIAL TOPICS

2019 Technical Division Student Poster Contest — Structural Materials Division (SMD) Graduate Students

Sponsored by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

Monday PM | March 11, 2019

Hall 3 | Henry B. Gonzalez Convention Center

SPG-28: Creep Behavior of a Precipitation Hardened Complex Concentrated Alloy: *Priyanshi Agrawal*¹; Bharat Gwalani¹; Mageshwari Komarasamy¹; Rajiv Mishra¹; Rajarshi Banerjee¹; ¹University of North Texas

SPG-29: Development of Fe-9Cr ODS Alloy via High Energy Ball Milling and Spark Plasma Sintering for Fast Reactor Cladding Material: *Arnab Kundu*¹; Nathan Jerred¹; Indrajit Charit¹; ¹University of Idaho

SPG-30: Digital Volume Correlation Applied in Strain Mapping of Shoulder Bone Under Loading: *Yuxiao Zhou*¹; Chujie Gong¹; Gregory Lewis¹; April Armstrong¹; Jing Du¹; ¹Pennsylvania State University

SPG-31: Hydrogen Behaviour in a Duplex Stainless Steel: *Zoha Ghorani*¹; Goroh Itoh¹; Afshin Yousefi¹; ¹Ibaraki University

SPG-32: Influence of γ' - γ'' Co-precipitation on the Mechanical Properties and Coarsening Kinetics of IN718 Variant Superalloys: *Semanti Mukhopadhyay*¹; Christopher Zenk¹; Lonsheng Feng¹; Robert Hayes¹; Richard DiDomizio¹; Mallikarjun Karadge¹; Yunzhi Wang¹; Michael Mills¹; ¹Ohio State University

SPG-33: Interfacial Reactions in the Sn-9Zn Solder and Cu-Be Alloy (Alloy 25) Couples: *Kuo Jung Chen*¹; Jing Shiun Chang¹; Yu-Chun Li¹; Yee-wen Yen¹; ¹National Taiwan University of Science and Technology

SPG-34: Machine Learning Predictions of Irradiation Embrittlement: *Yu-chen Liu*¹; Henry Wu²; Tam Mayeshiba²; Benjamin Afflerbach²; Ryan Jacobs²; Josh Perry²; Jerit George²; Josh Cordell²; Jinyu Xia²; Hao Yuan²; Aren Lorenson²; Haotian Wu²; Matthew Parker²; Fenil Doshi²; G. Robert Odette³; Dane Morgan²; ¹National Cheng Kung University; ²University of Wisconsin-Madison; ³University of California, Santa Barbara

SPG-35: Magnetic and Nanostructural Investigation of Magnetite Nanoparticles at High-Temperatures up to 800 °C for Nuclear Applications: *Lokendra Khanal*¹; Mostafa Ahmadzadeh²; John

McCloy²; You Qiang¹; ¹University of Idaho; ²Washington State University

SPG-36: Microstructures and Mechanical Properties of a 3D Printed Ti-6Al-4V Alloy: *Punit Kumar*¹; Upadrasta Ramamurthy²; ¹Indian Institute of Science Bangalore; ²Nanyang Technological University

SPG-37: Multi-scale Mechanical Behavior of Three-dimensional Graphene Foam-based Shape Memory Epoxy Composites: *Adeyinka Idowu*¹; Pranjal Nautiyal¹; Mitchell Hopper¹; Benjamin Boesl¹; Arvind Agarwal¹; ¹Florida International University

SPG-38: Predicting Complete Microstructural Evolution in Ni-based Single Crystal Superalloys: *Harikrishnan Rajendran*¹; Jean-Briac le Graverend¹; ¹Texas A&M University

SPG-39: Prediction of Metallic Glass Formation Regions of the Al-Ni-Zr Ternary System Using Calculation of Phase Diagram Method: *Chia-Yu Liu*¹; Yung-Chin Lan¹; Po-Cheng Kuo¹; Yee-wen Yen¹; ¹National Taiwan University of Science and Technology

SPG-40: Properties and Performance of Additive Manufactured Titanium with TiB Reinforcement: *Liza-Anastasia DiCecco*¹; Afsaneh Edrisy¹; ¹University of Windsor

SPG-41: Self-consistent Description of Metastable Phase Competition during Devitrification of Al-Sm Binary Alloy: *Shubhra Jain*¹; Shihuai Zhou²; Fanqiang Meng²; Ralph Napolitano¹; ¹Department of Materials Science and Engineering, Iowa State University; ²Division of Materials and Engineering, Ames Laboratory, DOE

SPG-42: Thermal Stability of Ultrafine-grained FeCrAl Alloy Processed by Equal-channel Angular Pressing or High-pressure Torsion: *Maalavan Arivu*¹; Andrew Hoffman²; Jiaqi Duan¹; Haiming Wen³; ¹Department of Materials Science and Engineering, Missouri University of Science and Technology; ²Department of Nuclear Engineering, Missouri University of Science and Technology; ³Department of Materials Science and Engineering, Department of Nuclear Engineering, Missouri University of Science and Technology

SPECIAL TOPICS

2019 Technical Division Student Poster Contest — Structural Materials Division (SMD) Undergraduate Students

Sponsored by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

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SPU-18: Diffusion within the 14-Frequency Model in Silver: *Kristin Mackowski*¹; ¹New Mexico Institute of Mining & Technology

SPU-19: Fabrication of Aluminum Welding Fillers Reinforced with Niobium Diboride Nanoparticles for Aerospace Applications: *Amir Gomez Perez*¹; Norman Burgos¹; Andres Calle¹; Oscar Marcelo Suarez¹; ¹University of Puerto Rico Mayaguez

SPU-20: Identifying Damage Initiation of Woven Fiberglass Composites Under Compression: *Isabella Mendoza*¹; Ariana Paradiso¹; Leslie Lamberson¹; ¹Drexel University

SPU-21: Microstructure and Mechanical Properties of Al_{0.4}CoCrFeNi High Entropy Alloy: *Jadzia Graves*¹; Anumat Sittiho¹; Indrajit Charit¹; Rajiv Mishra²; ¹University of Idaho; ²University of North Texas

SPU-22: Study of Dopants in U-Zr Metallic Fuels for Limiting Fuel-Cladding-Chemical-Interaction: *Nicholas Ayers*¹; Rabi Khanal¹; Nathan Jerred¹; Indrajit Charit¹; Michael Benson²; Robert Mariani²; Samrat Choudhury¹; ¹University of Idaho; ²Idaho National Laboratory

SPECIAL TOPICS

2019 Technical Division Young Professional Poster Contest — Extraction and Processing Division (EPD)

Sponsored by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

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YP-1: Study on the Properties and Mineralization Process of a Cu-Ni Bearing Industry Sludge: *Mudan Liu*; Yong Liu¹; Zhiqiang Chen¹; Zhiyuan Ma¹; ¹Guangdong Institute of Resource Comprehensive Utilization

SPECIAL TOPICS

2019 Technical Division Young Professional Poster Contest — Light Metals Division (LMD)

Sponsored by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

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YP-3: Analysis and Interpretation about Evaluation and Atomic Vibration of New Raman Active Modes from CDW Phase in of Layered 2H-TaX₂ (X=S, Se): *Sugata Chowdhury*¹; ¹National Institute of Standards and Technology

YP-4: PAH Emissions from the Metallurgical Industry: *Kamilla Arnesen*¹; ¹Norwegian University of Science & Technology

SPECIAL TOPICS

2019 Technical Division Young Professional Poster Contest — Materials Processing and Manufacturing Division (MPMD)

Sponsored by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

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YP-5: Fatigue Characterization and Microstructure-sensitive Modeling of Extruded and Friction Stir Welded Aluminum Lithium Alloy 2099: *Abby Cisko*¹; Brian Jordon²; ¹US Army Engineer Research and Development Center; ²University of Alabama

SPECIAL TOPICS

2019 Technical Division Young Professional Poster Contest — Structural Materials Division (SMD)

Sponsored by: TMS Extraction and Processing Division, TMS Functional Materials Division, TMS Light Metals Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division

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YP-7: Flaw Tolerance of Shape Memory Yttria-stabilized Tetragonal Zirconia Polycrystals: *Ning Zhang*¹; Mohsen Asle Zaeem¹; ¹Colorado School of Mines

YP-8: The Guiding Principles of the Dopants Selection to Immobilize Lanthanide Fission Products in Uranium-based Metallic Fuels: *Rabi Khanal*¹; Nathan Jerred¹; Michael Benson²; Robert Mariani²; Indrajit Charit¹; Samrat Choudhury²; ¹University of Idaho; ²Idaho National Laboratory

ADDITIVE TECHNOLOGIES

Additive Manufacturing and Welding: Physical and Mechanical Metallurgy of Rapidly Solidified Metals — Poster Session

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Allison Beese, Pennsylvania State University; Eric Lass, National Institute of Standards and Technology; David Bourell, University of Texas; John Carpenter, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Behrang Poorganji, GE Additive; Judy Schneider, University of Alabama at Huntsville; Lee Semiatin, US Air Force Research Laboratory; Mark Stoudt, National Institute of Standards and Technology; Chantal Sudbrack, QuesTek Innovations LLC

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A-1: A Comparison Study of Microstructures and Mechanical

Properties of Additively Manufactured Titanium Alloys: *Thomas Voisin*¹; *Jean-Baptiste Forien*¹; *Yinmin Wang*¹; ¹Lawrence Livermore National Laboratory

A-3: Additive Manufacturing of 17-4PH Stainless Steel on Ti-6Al-4V Using Pure Vanadium Interlayer: *Nana Adomako*¹; *Jeoung Kim*¹; *Sanghoon Noh*²; ¹Hanbat National University; ², Korea Atomic Energy Research Institute

A-5: Comparison of Ex Situ X-ray Tomography and In Situ Monitoring to Gain Control over Defects during Laser Powder Bed Fusion: *Jean-Baptiste Forien*¹; *Philip Depond*¹; *Gabe Guss*¹; *Bradley Jared*²; *Jonathan Madison*²; *Elena Garlea*³; *Hahn Choo*⁴; *Kin-Ling Sham*⁴; *Manyalibo Matthews*¹; ¹Lawrence Livermore National Laboratory; ²Sandia National Laboratories; ³Y-12 National Security Complex; ⁴University of Tennessee

A-6: Effect of Cryo-rolling on Microstructure and Tribological Behaviour of Spray Formed Al-Si Alloy: *Surendra Chourasiya*¹; *Gaurav Gautam*¹; *Devendra Singh*¹; ¹Indian Institute of Technology, Roorkee

A-8: Effects of Beam Oscillation on Porosity & Intermetallic Compounds Formation of Electron Beam Welded DP600 Steel to Al-5754 Alloy Joints: *Soumitra Dinda*¹; *Prakash Srirangam*²; *Gour Gopal Roy*¹; ¹Indian Institute of Technology Kharagpur; ²Warwick Manufacturing Group

A-9: Effects of La₂O₃ Addition on the Brazing Dissimilar Joints of WC-Co/1Cr13: A Combined Experimental and Computational Thermodynamics Study: *Yaohong Xiao*¹; *Yi Wang*²; *Keqin Feng*³; *Lei Chen*¹; ¹Mississippi State University; ²The Pennsylvania State University; ³Sichuan University

A-10: Effects of Ultrasonic Micro-forging on 304 Stainless Steel Fabricated by WAAM: *Laibo Sun*¹; ¹Harbin Engineering University

A-11: Evolution of Weld Interface during Rotary Friction Welding between Stainless Steel and Medium Carbon Steel: *Murali Mohan Cheepu*¹; *Woo-Seong Che*¹; ¹Department of Mechatronics Engineering, Kyungsung University

A-12: Experimental Investigation of High Strength Steels Welded Using High Yield Electrodes for Commercial Vehicle Application: *Ramya Gopalakrishnan*¹; *Dhanasekaran S*¹; *Srinivasan S*¹; ¹Ashok leyland

A-13: Interface Microstructural Characterization of Titanium to Stainless Steel Dissimilar Friction Welds: *Murali Mohan Cheepu*¹; *V Muthupandi*²; *Woo-Seong Che*³; ¹Department of Mechatronics

Engineering, Kyungsoong University; ²Department of Metallurgical and Materials Engineering, National Institute of Technology Tiruchirappalli; ³Kyungsoong University

A-14: Mechanical Property Characterization of Single Scan Laser Tracks of Nickel Super Alloy 625 by Nanoindentation: *Jordan Weaver*¹; Meir Kreitman¹; Jarred Heigel¹; M. Donmez¹; ¹National Institute of Standards and Technology

A-15: Metallurgical Characteristics of Laser Peened 17-4 PH SS Processed by LENS Technique: *Ipfi Mathoho*¹; Esther Akinlabi¹; Nana Arthur²; Tlotleng Monamme²; Bathusile Masina²; ¹University of Johannesburg; ²CSIR

A-16: Microstructural Refinement Using Tailored Beam Shapes during Laser Additive Manufacturing: *Tien Roehling*¹; John Roehling¹; Saad Khairallah¹; Gabe Guss¹; Rongpei Shi¹; Joseph McKeown¹; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory

A-17: Microstructural Study of Soft Metals Produced by Liquid Metal Jetting: *Yaakov Idell*¹; Jason Jeffries¹; Andrew Pascall¹; Kerri Blobaum¹; ¹Lawrence Livermore National Laboratory

A-19: On the Role of Bimodal Powder Size Distribution on Mechanical Properties and Microstructure of Laser Melted 316L Stainless Steel: *Hannah Coe*¹; Somayeh Pasebani¹; ¹Oregon State University

A-20: Superior-ductility Direct Laser Melted 316L Stainless Steel from New and Recycled Powders and Different Laser Spot Sizes: Kun Yang¹; Geoff Delooze¹; *Robert Wilson*¹; ¹Metal Industries, CSIRO Manufacturing

A-21: The Development of Cementless Orthopedic Implants by 3D Printing: *Taeyang Kwak*¹; Myungjae Lee²; Yeonbeom Heo¹; Hoonyoung Ban¹; Hansol Seo³; Dohyung Lim¹; ¹Department of Mechanical Engineering, Sejong University; ²Intec Corporation co. Ltd.; ³Samsung Medial Center

A-22: The Effect of Extrusion Process on the Mechanical Properties of AM AlSi10Mg: *Adi Ben-Artzy*¹; Arie Bussiba²; Gal Hadad¹; ¹Ben Gurion University; ²N.R.C.N

A-23: Transient Dynamics of Powder Spattering in Laser Powder Bed Fusion Additive Manufacturing Process Revealed by In-situ High-speed High-energy X-ray Imaging: *Qilin Guo*¹; Cang Zhao²; Luis Escano¹; Zachary Young¹; Lianghua Xiong¹; Kamel Fezzaa²; Wes Everhart³; Ben Brown³; Tao Sun²; Lianyi Chen¹; ¹Missouri University of Science and Technology; ²Argonne National Laboratory;

³Honeywell FM&T

ADDITIVE TECHNOLOGIES

Additive Manufacturing for Energy Applications — Student Poster Session

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Isabella Van Rooyen, Idaho National Laboratory; Subhashish Meher, Idaho National Laboratory; Indrajit Charit, University of Idaho; Somayeh Pasebani, Oregon State University; Chad Duty, University of Tennessee

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Session Chair: Indrajit Charit, University of Idaho

A-24: Additively-manufactured Nanostructured Copper: *Jeffrey Graham*¹; Kumar Sridharan²; Benjamin Maier²; Hwasung Yeom²; Peter Hosemann¹; David Hoelzer³; Stuart Maloy⁴; ¹Department of Nuclear Engineering, University of California Berkeley; ²University of Wisconsin, Madison; ³Oak Ridge National Laboratory; ⁴Los Alamos National Laboratory

A-25: Fabrication of Cr Cladded Zr-alloys Using Solid State Powder Spray Additive Manufacturing Technology: *Benjamin Maier*¹; Hwasung Yeom¹; Greg Johnson¹; Tyler Dabney¹; Kumar Sridharan¹; ¹University of Wisconsin-Madison

A-26: Investigation of Manufacturing Oxide Dispersion Strengthened (ODS) Steel Fuel Cladding Tubes Using Cold Spray Technology: *Mia Lenling*¹; Hwasung Yeom¹; Benjamin Maier¹; Greg Johnson¹; Kumar Sridharan¹; Peter Hosemann²; David Hoelzer³; Stuart Maloy⁴; Jeff Graham²; ¹University of Wisconsin Madison; ²University of California-Berkeley; ³Oak Ridge National Laboratory; ⁴Los Alamos National Laboratory

A-27: Investigation of Process Parameter Optimization for 316L: *Luis Nunez*¹; Federico Sciammarella¹; Porfirio Navar¹; David Williams¹; Mark Sliwka¹; Thomas Corbett¹; Daniel Pulscher¹; ¹Northern Illinois University

A-28: Prototyping of a Laboratory-scale Cyclone Separator for Biofuel Production from Biomass Feedstocks Using a Fused Deposition Modeling Printer: *Sam Hansen*¹; ¹University of Idaho

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Applications of Solidification Fundamentals — Poster Session

Sponsored by: TMS: Additive Manufacturing Committee

Program Organizers: Alex Plotkowski, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Kevin Chaput, Air Force Research Laboratory; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Wenda Tan, University of Utah

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A-29: Additive Manufactured 316L Stainless Steel for Biomedical Applications: *Waseem Haider*¹; Jahangir Khan Lodhi¹; ¹Central Michigan University

A-30: In Situ Low Cost Stereovision Analysis of Spatter: *Christopher Barrett*¹; Carolyn Carradero¹; Evan Harris¹; Eric MacDonald¹; Brett Conner¹; ¹Youngstown State University

A-32: Powder Packing Density and its Impact on SLM-based Additive Manufacturing: *Taher Abu-Lebdeh*¹; Ransford Dampthey¹; Vincent Lamberti²; Sameer Hamoush¹; ¹North Carolina A&T State University; ²Y-12 National Security Complex

A-33: Quantifying Laser-matter Interactions and Their Impact on Defect Formation during Additive Manufacturing of Ti-6Al-4V Using In Situ Synchrotron X-ray Imaging: *Lorna Sinclair*¹; Yunhui Chen¹; Chu Lun Alex Leung¹; Samuel Clark¹; Sebastian Marussi²; Sam Tammam-Williams³; Leigh Stanger³; Robert Atwood⁴; Margie Olbinado⁵; Alexander Rack⁵; Jon Willmott³; Iain Todd³; Peter Lee¹; ¹University College London; ²University of Manchester; ³University of Sheffield; ⁴Diamond Light Source Ltd.; ⁵European Synchrotron Radiation Facility

A-34: Texture Mapping in Electron Beam Welded Dissimilar Cu-SS Joints by Neutron Diffraction: *Soumitra Dinda*¹; Jyotirmaya Kar¹; Prakash Srirangam²; Winfried Kockelmann³; Gour Gopal Roy¹; ¹Indian Institute Of Technology Kharagpur; ²University of Warwick; ³ISIS Facility

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Fatigue and Fracture III — Poster Session

Sponsored by: TMS: Additive Manufacturing Committee

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

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Session Chair: Nik Hrabe, National Institute of Standards and Technology

A-35: Effect of Adding Yttrium on the Inclusion Modification and Impact Toughness of E36 Shipbuilding Steel: *Xiaojun Xi*¹; Maolin Ye¹; Shufeng Yang¹; Jingshe Li¹; ¹University of Science and Technology Beijing

ADDITIVE TECHNOLOGIES

Additive Manufacturing of Metals: Microstructural Evolution and Phase Transformations — Poster Session

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

Program Organizers: Bij-Na Kim, LPW Carpenter Additive; Eric Lass, National Institute of Standards and Technology; Mohsen Asle Zaeem, Colorado School of Mines; Sudarsanam Babu, The University of Tennessee, Knoxville; Ryan Dehoff, Oak Ridge National Laboratory; Gerhard Fuchs, University of Florida; Chantal Sudbrack, QuesTek Innovations LLC

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A-36: Effect of Different Aqueous Electrolytes on Corrosion Resistance of Selective Laser Melted Ti-6Al-4V Alloy: *Ashutosh Sharma*¹; Minseok Oh¹; A.K. Srivastava²; Yu Hwan Kim³; Byungmin Ahn¹; ¹Ajou University; ²OP Jindal University, Raigarh, C.G., India;

³Z3DFAB Corp

A-37: Effect of Shielding Gas Flow Rate on Inclusion Evolution and Mechanical Property: *Du-Rim Eo*¹; Jung-Wook Cho¹; Sun-Hong Park²; ¹Pohang University of Science and Technology(POSTECH); ²Research Institute of Industrial Science and Technology(RIST)

A-38: Finite Element Simulation of Temperature Distribution in a Selective Laser Melting Process: *Luis Arturo Reyes Osorio*¹; Roberto Cabriales¹; Omar López-Botello²; Patricia Zambrano Robledo¹; ¹Universidad Autonoma De Nuevo Leon; ²Instituto Tecnológico y de Estudios Superiores de Monterrey

A-39: Form Mechanism of Electron-beam Additive Manufacturing of Shaped Titanium Alloy with Thin-walled and Complex Structure: *Shifeng Liu*¹; Xin Yang¹; Yaojia Ren¹; ¹Xi'an University of Architecture and Technology

A-40: Improvement of the Mechanical Properties of Inconel 718 Fabricated by Selective Laser Melting (SLM): *Seren Özer*¹; Güney Bilgin¹; Ziya Esen²; Arcan Dericioglu¹; ¹Middle East Technical University; ²Cankaya University

A-41: Microstructural Evolution Modeling for Selective Laser Sintering: *Yulan Li*¹; Erin Barker¹; ¹Pacific Northwest National Laboratory

A-42: Ni-TiB₂ Composite for Additive Technology of Direct Metal Deposition: *Vladimir Promakhov*¹; Mansur Ziatdinov¹; Aleksandr Zhukov¹; Olga Korsmik²; ¹Tomsk State University; ²Saint Petersburg State Marine Technical University

A-44: Twin Formation and Deformation Induced Phase Transformation in 304L Stainless Steel Fabricated by Selective Laser Melting: *Zhiguang Zhu*¹; Quy-bau Nguyen¹; Mui-ling Nai¹; Jun Wei¹; ¹Singapore Institute of Manufacturing Technology

ADDITIVE TECHNOLOGIES

Additive Manufacturing: Materials Design and Alloy Development — Poster Session

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

Program Organizers: Behrang Poorganji, GE Additive; James Saal, Citrine Informatics; Hunter Martin, HRL Labs; Orlando Rios, Oak Ridge National Laboratory

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A-45: Additive Manufacturing of Commercial Metastable β -Ti alloys: *Srinivas Aditya Mantri*¹; Eugene Ivanov²; Rajarshi Banerjee¹; ¹University of North Texas; ²Tosoh SMD Inc.

A-46: Bone Growth Investigation around Additive Manufacturing Metal-ceramics Composite: *Wei Chang*¹; Chun-Chieh Wang²; Shao-Ju Shih³; Nien-Ti Tsou¹; Kuan-Ying Tseng¹; Pei-Yi Tsai¹; Wei-Qin Huang⁴; Jo-Chi Tseng⁵; Hung-Sheng Chou¹; E-Wen Huang¹; ¹Department of Materials Science and Engineering, National Chiao Tung University; ²National Synchrotron Radiation Research Center; ³Department of Materials Science and Engineering, National Taiwan University of Science and Technology; ⁴Laser and Additive Manufacturing Technology Center (LAMC) Industrial Technology Research Institute (ITRI); ⁵Deutsches Elektronen-Synchrotron (DESY), Germany

A-47: CFD Modelling in Additive Manufacturing Processes: Pareekshith Allu¹; *Liping Xue*¹; ¹Flow Science Inc.

A-48: Gas-phase Alloying and Sintering Kinetics of 3D Printed Nickel Scaffolds: *Safa Khodabakhsh*¹; Ashley Paz y Puente¹; ¹University of Cincinnati

A-49: Integrated Computational and Experimental Study of an Additively Manufactured Hot-work Tool Steel: *Chia-Ying Chou*¹; Greta Lindwall¹; Joakim Odqvist¹; Annika Borgenstam¹; ¹KTH Royal Institute of Technology

A-50: Machine Learning Method for Parameter Development: *Voramon Dheeradhada*¹; Natarajan Chennimalai Kumar¹; Laura Dial¹; Vipul Gupta¹; Tim Hanlon¹; Joe Vinciquerra¹; ¹GE Global Research

A-51: Mechanical Behavior and Microstructure of Porous Ti Using TiC as Reinforcement: *Shiyuan Liu*¹; Jian Wang¹; Tengfei Lu¹; Guibao Qiu¹; Hao Cui¹; ¹Chongqing University

A-52: Mechanical Testing of Additively Manufactured IN625

Thin-walled Elements: *Arunima Banerjee*¹; Matthew Vaughn¹; Jamie Guest¹; Kevin Hemker¹; Michael Groeber²; Jonathan Miller²; William Musiniski²; Edwin Schwalbach²; Paul Shade²; ¹Johns Hopkins University; ²Air Force Research Laboratory

A-53: Phase Separation in 3D Printing: Opportunity Towards Ordered Metallic Porous Structures without Templates: *Xue Liu*¹; ¹Institute of Materials, China Academy of Engineering Physics

A-54: Process Optimization and Performance of Different Lattice Structures of 316L Stainless Steel by Selective Laser Melting (SLM): *Xiaojing Sun*¹; ¹Harbin Engineering University

A-55: Processing of Haynes® 282® Alloy by Laser Powder Bed Fusion Technology: *Robert Otto*¹; Vegard Brøtan¹; Amin S. Azar¹; Olav Åsebø¹; ¹SINTEF

A-56: Reduction of Micro-Cracking in Inconel 718 Processed by Selective Laser Melting: *Viridiana Lince Quintanilla*¹; Rigoberto Guzman¹; Omar Lopez²; Patricia Zambrano¹; ¹Universidad Autonoma de Nuevo León; ²Instituto Tecnológico de Estudios Superiores de Monterrey

A-57: Role of Particle Size Distribution, Layer-thickness and Process Parameters on the Performance of Materials Processed by Direct Metal Laser Melting (DMLM): *Vipul Gupta*¹; Kate Gurnon¹; Laura Dial¹; Rajendra Kelkar²; ¹GE Global Research; ²GE Additive

A-58: The Super Powder: Using Computer Vision and Machine Learning to Create a Framework for Associating Powder Characteristics with Properties for Additive Manufacturing: *Srujana Rao Yarasi*¹; Anna Smith¹; Elizabeth Holm¹; Anthony Rollett¹; ¹Carnegie Mellon University

MATERIALS PROCESSING

Advances in Surface Engineering — Poster Session

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Rajeev Gupta, The University of Akron; Sandip Harimkar, Oklahoma State University; Arif Mubarok, PPG Industries; Deepak Kumar, Baker Hughes, A GE Company; Tushar Borkar, Cleveland State University; Dong Lin, Kansas State University

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E-1: Corrosion and Wear Resistance of PTFE-Al₂O₃ Coatings Deposited on Aluminium Alloy by a Microblasting Process: *Atinuke Oladoye*¹; James Carton²; Ahmad Baroutaji²; Muhammed Obeidi²; Joseph Stokes²; Barry Twomey²; Abdul Olabi²; ¹Metallurgical & Materials Engineering, University of Lagos, Akoka, Nigeria; ²Dublin City University

E-3: Microstructure and Wear Properties of Cold Sprayed Nanodiamond Aluminum Composite Coating: *Archana Loganathan*¹; Sara Rengifo¹; Alexander Hernandez¹; Yusuf Emirov¹; Cheng Zhang¹; Benjamin Boesl¹; Jeganathan Karthikeyan²; Arvind Agarwal¹; ¹Florida International University; ²ASB Industries

E-4: Surface Enhancement of Mild Steel with ZrO₂ Composite Induced Zinc Based Electrolyte by Electrodeposition Technique: *Ojo Sunday Fayomi*¹; ¹Covenant University

E-5: The Wear Behavior of Thermally Sprayed Al-TiC Composite Coatings on the Carbon Steel Substrate: *Rasoul Jamshidi*¹; Omid Bayat¹; Akbar Heidarpour¹; Hamed Aghamohammadi¹; ¹Hamedan University of Technology

LIGHT METALS

Alumina & Bauxite — Poster Session

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

Program Organizer: Sebastien Fortin, Rio Tinto - Aluminium Technology Solutions - ARDC

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Session Chair: Sebastien Fortin, Rio Tinto Aluminium Technology Solutions - ARDC

D-1: Application of Ozonation for the Degradation of Organic Compounds of Bayer Liquor: *Miguel Soplin*¹; Denise Espinosa¹; Marcela Baltazar¹; ¹Universidade de Sao Paulo

D-2: Assessment of the Surface Hydrophilicity and Characterization of Alumina Oxidized at Different Temperatures: *Naouel Hezil*¹; Mamoun Fellah²; ¹Abbes Laghrour Khenchela University; ²Tribology & Materials Group, Laboratory of Foundry,

Annaba University

D-3: Intensified Desilication-Bayer Process Extract Alumina from High Alumina Fly Ash: Gong Yanbing¹; Sun Junmin¹; Zhang Tingan¹; Lu Guozhi¹; ¹Northeastern University

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Poster Session I - Development of Aluminum Alloy Processing

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

Program Organizer: Hiromi Nagaumi, Soochow University

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D-39: Development of High Thermal Conductivity Aluminum Alloys for the Integrated Plastic / Metal Molding (IMKS): *Hyun Kyu Lim*¹; Wonseok Yang¹; Young Ok Yoon¹; Shae K. Kim¹; ¹Korea Institute of Industrial Technology

D-40: Effect of Alloying Elements on the Thermal Conductivity and Other Properties of Aluminum Alloys Developed as Casting Alloys: *Wonseok Yang*¹; Bonghwan Kim¹; Shae K. Kim¹; Hyun Kyu Lim¹; Do Hyang Kim²; ¹Korea Institute of Industrial Technology; ²Yonsei University

D-41: Effect of Cu Addition on the Microstructure, Mechanical and Thermal Properties of an Al-Si Piston Alloy: *Suwaree Chankitmunkong*¹; Dmitry Eskin²; Chaowalit Limmaneevichitr¹; ¹King Mongkut's University of Technology Thonburi; ²Brunel University London

D-42: Effect of Mn on Microstructure and Isochronal Aging of Al-Ni-Sc Alloys: *Phromphong Pandee*¹; Chanun Suwanpreecha¹; Chaowalit Limmaneevichitr¹; ¹King Mongkut's University of Technology Thonburi

D-43: Effect of Rare Earth Metal on Microstructure and Mechanical Properties of Aluminum alloys Processed by Extrusion: *Hyo-Sang Yoo*¹; Yong-Ho Kim¹; Hyeon-Taek Son¹; ¹Korea Institute of Industrial Technology

D-44: Effects of Alloying Elements on Mechanical and Thermal

Characteristics in Al-Si-Mg-(Cu) Foundry Alloys for Automotive Engine Components: *Seweon Choi*¹; Yumi Kim¹; Youngchan Kim¹; Changseog Kang¹; ¹KITECH

D-45: Effects of Sc and Zr Addition on Microstructure and Mechanical Properties of Al-3Cu-2Li Alloy: *Yang Wang*¹; ¹Harbin Engineering University

D-46: Effects of the Strontium Addition on Microstructure Mechanical Properties of Sand Casting A356 Alloy during Solution Treatment: *Myounggyun Kim*¹; ¹Research Institute of Industrial Science

D-47: Effects on Microstructure Evolution of Al-9Si-0.3Mg Alloy by Pyrometallurgically Produced Sr Master Alloy: *Ibrahim Goksel Hizli*¹; Derya Dispinar¹; ¹Istanbul University

D-48: High Strength and Corrosion Resistant Al Alloys at High Temperature: *Irena Paulin*¹; Borut Žužek¹; Peter Cvahte²; Matjaž Godec¹; ¹IMT; ²IMPOL

D-49: Improvement of the Mechanical Properties of the Aluminum Alloy 7075 by ARB: *Omar Velazquez Carrillo*¹; Francisco García Pastor¹; ¹CINVESTAV

D-50: Investigation of the Microstructure and Mechanical Properties of Cast AA7068 Hybrid Nanocomposite Reinforced with GNPs and SiC: *Mohammad Alipour*¹; ¹University of Tabriz

D-51: Microstructure Characterization and Properties of Cast Al-Si-Fe-Zn Alloys with High Thermal Conductivity: Chun Zou¹; Gu Zhong¹; Chu Qiu¹; Xinghui Gui¹; ¹Chinalco Materials Application Research Institute Co., Ltd. Suzhou Branch

D-52: Modification of A7075 Alloy for Improved Extrudability: *Se-Hoon Kim*¹; Jae-Hyuck Shin¹; Min-Sang Kim¹; Jin-Pyeong Kim¹; Si-Young Sung¹; Beom-Suck Han¹; ¹Korea Automotive Technology Institute

D-53: Relationship between Si Content and Activation Energy of Si Precipitation in Al-Si Alloys: *Yu-Mi Kim*¹; Se-Weon Choi¹; Young-Chan Kim¹; Chang-seog Kang¹; ¹KITECH

D-54: Strengthening Behaviour of Al-Si Alloy Containing Oxygen Atoms: *Jeheon Jeon*¹; Donghyun Bae¹; ¹Yonsei University

D-55: Study on Microstructure and Mechanical Properties of Al-Zn-Cu Based Alloys with Additive Elements using Extrusion: *Yong-Ho Kim*¹; Hyo-Sang Yoo¹; Hyeon-Taek Son¹; ¹Korea Institute

of Industrial Technology

D-56: The Effect of Ag on the Microstructures and Properties of Al-Mg Alloys: *Haitao Zhang*¹; Bo Zhang²; ¹Northeastern University; ²China Hongqiao Group Limited

LIGHT METALS

Aluminum Alloys, Processing and Characterization — Poster Session II - Characterizations of Aluminum Alloys

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

Program Organizer: Hiromi Nagaumi, Soochow University

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D-57: Effect of Multi-pass Friction Stir Welding on the Microstructure, Mechanical and Wear Properties of AA6061/CNTs Nanocomposites: *Mohammad Alipour*¹; Ali Ghasemi²; Ali Shakiba³; ¹University of Tabriz; ²Islamic Azad University Tehran North Branch; ³University of Tehran

D-59: Evaluation of β -phase Formation in 5xxx Aluminum Alloys: *William Golumbfskie*¹; Emily Holcombe¹; Kyle Matthews²; Daniel Foley²; Mitra Taheri²; ¹Naval Surface Warfare Center, Carderock Division; ²Drexel University

D-60: Examination of Formability Properties of 6xxx Alloy Extruded Profiles for the Automotive Industry: *Athanasios Vazdirvanidis*¹; Sofia Papadopoulou¹; George Pantazopoulos¹; Andreas Rikos¹; Gregory Simeonidis²; ¹ELKEME S.A.; ²EEM S.A.

D-61: Improvements for The Recognition Rate of Surface Defects of Aluminum Strips: *Xiaoming Liu*¹; Ke Xu¹; Dongdong Zhou¹; ¹University of Science and Technology Beijing

D-62: Influence of CNTs Nanoparticles Incorporation to Friction Stir Welded 6061 Aluminum Alloy on the Microstructure and Shear Punch Properties: *Mohammad Alipour*¹; Ali Ghasemi²; Ali Shakiba³; ¹University of Tabriz; ²Islamic Azad University Tehran North Branch; ³University of Tehran

D-63: Investigation of Mechanical Properties for 7075 Aluminum Alloy using Friction Stir Welding (FSW) Reinforced with CNTs:

*Mohammad Alipour*¹; Ali Ghasemi²; Ali Shakiba³; ¹University of Tabriz; ²Islamic Azad University Tehran North Branch; ³University of Tehran

D-64: Mechanical Characterization of Cold Sprayed Aluminum Alloy Powders Using In Situ Micropillar Compression and Tension: *Tyler Flanagan*¹; Benjamin Bedard¹; Mark Aindow¹; Avinash Dongare¹; Harold Brody¹; Aaron Nardi²; Victor Champagne²; Seok-Woo Lee¹; ¹University of Connecticut; ²Army Research Laboratory

D-65: Microstructure and Surface Finish Evolution During Incremental Sheet Forming of AA 7075: *Maya Nath*¹; Ankush Bansal¹; Jaekwang Shin¹; Randy Cheng¹; Mihaela Banu¹; Alan Taub¹; ¹University of Michigan

D-66: Microstructures and Mechanical Properties of Low Si Content Al-Si-Mg Alloy: *Jia Lina*¹; Zhang Hu¹; Zhou Li¹; ¹Beihang University

D-67: Primary Si Refinement in Hyper-eutectic Al-Si Alloys Using Metal-oxide Particles: *Jaehyuck Shin*¹; Sehoon Kim¹; Jinpyeong Kim¹; Gyeongseok Joo¹; Siyoung Sung¹; Beomsuck Han¹; ¹Korea Automotive Technology Institute

D-68: Production of Commercially Pure Aluminum Electrical Conductor Strips via a Single-step, Machining-based Technique: *Mohammed Issahaq*¹; Xiaolong Bai¹; Srinivasan Chandrasekar¹; Kevin Trumble¹; ¹Purdue University

D-69: The Effects of T6 Heat Treatment and Extrusion Process on the Microstructure and Wear Behavior of Al7068 Aluminum Matrix Hybrid Nanocomposites Reinforced with GNPs and SiC Nanoparticles: *Mohammad Alipour*¹; ¹University of Tabriz

D-70: The Preparation Methods and Application of Aluminum Foam: Xia Duan¹; *Zhiwei Dai*¹; Rong Xu¹; Ronghui Mao¹; Binna Song¹; ¹Soochow University

D-71: The Role of In Situ Stacking Faults in the Deformation Mechanism of I-Al: *Miran Joo*¹; Jeheon Jeon¹; Donghyun Bae¹; ¹Yonsei University

D-72: Through-thickness Strain Gradient in a Hot Rolled Al-Mg Alloy Obtained by Nanoindentation and Glancing Angle X-ray Diffraction: *Sepideh Parvinian*¹; Eric Hoar¹; Mehdi Shafiei²; John Hunter²; Hamid Garmestani¹; ¹Georgia Institute of Technology; ²Novelis Global Research and Technology Center

Aluminum Reduction Technology — Poster Session

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

Program Organizer: Marc Dupuis, GeniSim Inc

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D-4: Study on the Preparation of Lithium Carbonate from Lithium-rich Electrolyte: *Wei Wang*¹; *Weijie Chen*¹; *Yuzhi Li*¹; *Kejing Wang*¹; ¹Henan University of Science and Technology

D-6: The Application of the “Remote Data-diagnosis Technology Service” (RDTS) for Aluminum Pot Line: *Hong Bo*¹; *Tian Qinghong*¹; *Yi Xiaobing*¹; *Xie Zhuojun*¹; ¹Chalieco Gami

D-7: Study on Stress Distribution and Configuration Optimization of Lining Structure for Aluminum Reduction Cell: *Jing Liu*¹; *Yungang Ban*¹; *Yu Mao*¹; *Qingchen Yang*¹; *Jihong Mao*¹; *Hui Dong*¹; *Fei Dong*¹; ¹Northeastern University Engineering & Research Institute Co Ltd

BIOMATERIALS

Bio-Nano Interfaces and Engineering Applications — Poster Session

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

Program Organizers: Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Po-Yu Chen, National Tsing Hua University; Hendrik Heinz, University of Colorado Boulder; Terry Lowe, Colorado School of Mines

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B-15: The Optimization of the Process Parameters of Direct Energy Deposition (DED) 3D Printing in the Manufacture of CoCr-Ti Interface with Ti Porous Layer for Cementless Implants: *HunYeong Ban*¹; *TaeYang Kwak*¹; *JoonHo Wang*²; *ChungHee Sonn*²; *EuiYub Jung*²; *HanSol Seo*²; *DoHyoung Lim*¹; ¹Sejong University;

BIOMATERIALS

Biological Materials Science — Poster Session

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

Program Organizers: Rajendra Kasinath, DePuy Synthes (Johnson and Johnson); Steven Naleway, University of Utah; Vinoy Thomas, University of Alabama at Birmingham; Jing Du, Penn State University

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Session Chairs: Rajendra Kasinath, DePuy Synthes, Johnson and Johnson; Jing Du, Penn State University; David Restrepo, The University of Texas at San Antonio

B-1: 3D Printing Bioinspired Composite Materials with Ultrasound Directed Self-assembly: *Paul Wadsworth*¹; Isaac Nelson¹; Taylor Ogden¹; Steven Naleway¹; ¹University of Utah

B-2: A Biodegradable Fe-based Material Alloyed with S, P and Ag with Surface Modification by Laser Ablation: *Matjaz Godec*¹; Aleksandra Kocijan¹; Irena Paulin¹; Crtomir Donik¹; Jaka Burja¹; Peter Gregorcic²; ¹Institute Of Metals And Technology; ²University of Ljubljana

B-3: Calcium Phosphate Microspheres: A Novel Approach to Calcium Phosphate Cements: *Jerry Howard*¹; Isaac Nelson¹; John Colombo¹; Steven Naleway¹; Krista Carlson¹; ¹University of Utah

B-4: Controlled Antibiotic-loaded, Drug-eluting Implants for Osteomyelitis: *Daniel Li*¹; Elan Volchenko¹; Rachel Bergman²; Matt Siegel¹; Pravin Vence¹; Fei Yang³; Decheng Wu³; ¹Northwestern University; ²University of Michigan; ³Chinese Academy of Sciences

B-5: Copper Recovery from Printed Circuit Boards from Smartphones through Bioleaching: Lidiane Andrade¹; Carlos Rosario¹; Mariana Carvalho¹; Denise Espinosa¹; *Jorge Tenório*¹; ¹LAREX

B-6: Dependence of the Ferrovandium Power as Additive on Mechanical Property in Porous Ti: Guibao Qiu¹; *Jian Wang*¹; Shiyuan

Liu¹; Yilong Liao¹; Chenguang Bai¹; ¹Chongqing University

B-7: Effect of Compaction Pressure on Porosity and Mechanical Properties of Porous Titanium as Bone Substitute Materials: Guibao Qiu¹; *Qingjuan Li*¹; Shiyuan Liu¹; Tengfei Lu¹; ¹Chongqing University

B-8: Effect of Sintering Temperature on Tribological Behaviour of Ti-Ni Alloy for Biomedical Applications: *Fellah Mamoun*¹; Hezil Naouel²; Mohammed Abdul Samad³; ¹Mechanical Engineering Department, ABBES Laghrour- Khenchela University; ²Materials sciences department , ABBES Laghrour - Khenchela University; ³KFUPM University

B-9: Impact of Ligand Composition on Protein Corona Formation around Au Nanoparticles: *Sam Hoff*¹; Desiré Di Silvio²; Sergio Moya²; Ronald Ziolo³; Hendrik Heinz¹; ¹University of Colorado Boulder; ²CIC biomaGUNE; ³Centro de Investigación en Química Aplicada

B-11: Nanoscale Porous Bioinspired Materials through Ice and Ultrasound Templating: *Max Mroz*¹; Taylor Ogden¹; Isaac Nelson¹; Milo Prisbrey¹; Bart Raeymaekers¹; Steven Naleway¹; ¹University of Utah

B-12: Structural Basis for the Damage Tolerance of the Low-density Cellular Structure of Cuttlebone: *Ting Yang*¹; Ling Li¹; ¹Virinia Tech

B-13: The Development of Nanoclay-hydroxyapatite Composite Scaffolds for Bone Tissue Engineering: *Solaleh Miar*¹; Sergio Montelongo¹; Akhilesh Gaharwar²; Teja Guda¹; ¹University of Texas at San Antonio; ²Texas A&M University

B-14: The Effect of Milling Time on Structural, Friction, and Wear Behavior of Hot Isostatically Pressed Ti- Ni Alloys for Orthopedic Applications: *Fellah Mamoun*¹; Hezil Naouel²; Mohammed Abdul Samad³; Tuahami Mohamed Zne⁴; Alex Montagne⁵; Alain Iost⁵; Alberto Mejias⁵; Stephania Kosman⁵; ¹Mechanical Engineering Department, ABBES Laghrour- Khenchela University; ²Materials Sciences Department , ABBES Laghrour - Khenchela University; ³KFUPM University; ⁴Annaba University; ⁵MSMP, ENSAM Lille

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications — Poster Session

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Yongfeng Zhang, Idaho National Laboratory; Xian-ming (David) Bai, Virginia Polytechnic Institute and State University; David Andersson, Los Alamos National Laboratory; Thierry Wiss, European Commission- JRC -Institute of Transuranium Elements

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G-1: A Three-degree-of-freedom Representation of the Five-degree-of-freedom Grain Boundary Energy Space for Uranium Dioxide: *Emily Togagae*¹; Evan Hansen¹; Youngfeng Zhang²; Sean Masengale¹; Chandler Williams¹; Axel Seoane¹; ¹BYUI; ²Idaho National laboratory

G-2: Irradiation Effects on Reactor Concrete Structures: *José Arregui-Mena*¹; Alan Giorla¹; G Jellison¹; Elena Tajuelo-Rodriguez¹; Christa Torrence²; Masaki Kawai³; Yann Le Pape¹; Thomas Rosseel¹; ¹Oak Ridge National Laboratory; ²Texas A&M University; ³Mitsubishi Research Institute

G-3: Summary of In-situ Tritium Measurements from TMIST-3A: *Walter Luscher*¹; David Senior¹; Gary Hoggard²; Kevin Clayton²; ¹Pacific Northwest National Laboratory; ²Idaho National Laboratory

G-4: Thermochemical Investigation of (Fe,Cr,Al)₃O₄ Spinel: *Can Agca*¹; Jake McMurray²; Joerg Neuefeind²; Alexandra Navrotsky¹; ¹Peter A. Rock Thermochemistry Laboratory; ²Oak Ridge National Laboratory

G-5: Void Dynamics in Porous Thin Films under Ion Irradiation: *Anter El-Azab*¹; ¹Purdue University

CORROSION

Coatings and Surface Engineering for Environmental Protection — Poster Session

Sponsored by: TMS: Surface Engineering Committee

Program Organizers: Arif Mubarok, PPG Industries; Rajeev Gupta, The University of Akron; Raul Rebak, GE Global Research; Michael Mayo, PPG Industries; Brian Okerberg, PPG Industries

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Session Chairs: Arif Mubarok, PPG Industries; Rajeev Gupta, The University of Akron; Raul Rebak, GE Global Research

C-2: A Study of Cl Adsorption on Hydroxylated Cr₂O₃ Passive Film Using Density Functional Theory(DFT): *Kofi Oware Sarfo*¹; Pratik Vinod Murkute¹; Burkan O. Isgor¹; Yongfeng Zhang²; Julie D. Tucker¹; Líney Árnadóttir¹; ¹Oregon State University; ²Idaho National laboratory

C-3: Ceramic Materials as Corrosion Protective Agents for Urethanic Films on Steel ABNT 1020 Fosphotated: *Goncalo Siqueira*¹; Fabio Esper¹; Rocio Hernandez¹; Leonardo Silva¹; José Mauro Oliveira¹; Wanderley Costa¹; Helio Wiebeck¹; ¹USP

C-4: Corrosion Behavior of Aluminum Alloy AA7075 Cold Sprayed Coatings: *Ozymandias Agar*¹; Anne Alex¹; Luke Brewer¹; ¹University of Alabama

C-5: Localized Corrosion Behaviour of AA7150 after Ultrasonic Shot Peening: Corrosion Depth vs. Impact Energy: *Qingqing Sun*¹; Qingyou Han²; ¹IMR CAS; ²Purdue University

C-6: Mechanisms of Oxidation of Pure and Si-segregated \945-Ti Surfaces: *Somesh Bhattacharya*¹; Ryoji Sahara¹; Kyosuke Ueda²; Takayuki Narushima²; ¹National Institute For Materials Science; ²Tohoku University

C-7: Mechanistic Understanding of Corrosion-inhibition in Graphene/Polyetherimide Nanocomposites: From Tortuosity to Galvanic Corrosion: *Rachel Davidson*¹; Sarbajit Banerjee¹; ¹Texas A&M University

C-8: Salt Test Methods and Controls as a Study of Corrosion in Polluted Areas: *Goncalo Siqueira*¹; Emilio da Silva¹; Gabriel Santos¹; Allan Muniz Souza¹; Helio Wiebeck¹; ¹USP

C-9: Study of Mechanisms of Cobalt Electrodeposition by Means of Potentiodynamic Polarization Curves: Marli Ohba¹; Tatiana Scarazzato²; *Denise Espinosa*²; Jorge Alberto Tenório²; Zehbour Panossian¹; ¹Institute for Technological Research; ²University of Sao Paulo

C-10: The Effects of Addition of TiO₂ Nanoparticles on the Corrosion and Tribological Performance of the Thermally Spared Aluminum Coatings: *Nooshin Salimi*¹; Omid Bayat¹; Akbar Heidarpour¹; Hamed Aghamohammadi¹; Rasoul Jamshidi¹;

¹Hamedan University of Technology

C-11: The Effect of α - α' Phase Separation due to Thermal Aging on Corrosion Behavior of Duplex Stainless Steels: *Pratik Murkute*¹; Kofi Sarfo¹; Thomas Wood¹; Gerardo Zavalsa¹; Yongfeng Zhang²; Liney Arnadottir¹; Julie Tucker¹; Burkan Isgor¹; ¹Oregon State University; ²Idaho National Laboratory

C-12: Towards Novel Structural Material Candidates for Application in Liquid Metals: A Behavior of Nb, Ti-V and Fe-Cr-Al Alloys in Pb and Pb-Bi Eutectic: *Miroslav Popovic*¹; Natalia Rubio¹; Peter Hosemann¹; ¹University of California Berkeley

MECHANICS & STRUCTURAL RELIABILITY

Deformation and Damage Behavior of High Temperature Alloys — Poster Session

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

Program Organizers: Michael Titus, Purdue University; Qiang Feng, University of Science and Technology Beijing; Akane Suzuki, GE Global Research; Jonathan Cormier, ENSMA - Institut Pprime - UPR CNRS 3346; Sammy Tin, Illinois Institute of Technology; Martin Detrois, National Energy Technology Laboratory

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F-1: Evaluation of Thermomechanical Properties of Mechanically Alloyed UFG Nickel-Yttrium: *Soundarya Srinivasan*¹; Chaitanya Kale¹; Billy Chad Hornbuckle²; Kris Darling²; Kiran Solanki¹; ¹Arizona State University; ²U.S. Army Research Laboratory

F-2: High Temperature Deformation Behavior in Hierarchical and Single Precipitate Strengthened Ferritic Alloys by In Situ Neutron Diffraction Studies: *Gian Song*¹; Zhiqian Sun²; Lin Li²; Bjørn Clausen³; Shu Yan Zhang⁴; Yanfei Gao²; Peter Liaw²; ¹Kongju National University; ²University of Tennessee; ³Los Alamos National Laboratory; ⁴Rutherford Appleton Laboratory

LIGHT METALS

Electrode Technology for Aluminum Production — Poster

Session

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

Program Organizer: Lorentz Petter Lossius, Hydro Aluminium AS

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Session Chair: Michel Hurlimann, R&D Carbon Ltd.

D-9: Study Finer Fines in Anode Formulation (Case Study: Almahdi Hormozal Aluminium Smelter): *Mohsen Amerisiahooei*¹; Alireza Fardani²; ¹Almahdi-South Hormoz Aluminium; ²Almahdi-South Hormoz Aluminium Smelter

MATERIALS PROCESSING

Friction Stir Welding and Processing X — Poster Session

Sponsored by: TMS: Shaping and Forming Committee

Program Organizers: Yuri Hovanski, Brigham Young University; Rajiv Mishra, University of North Texas; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; David Yan, San Jose State University

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E-6: Conditions for Superplasticity in Precipitation and Strain Hardened Aluminium Alloys before and after Friction Stir Processing: *Sweta Saroj*¹; Murshid Imam¹; ¹Indian Institute of Technology, Patna

E-7: Connecting Residual Stresses with Friction Stir Welding Conditions and Pseudo-heat Index: *Ning Zhu*¹; Luke Brewer¹; ¹University of Alabama

E-8: Durability of Friction Stir Welding Tool at High Temperature: *Rahul Kesharwan*¹; Murshid Imam¹; Chiranjit Sarkar¹; ¹Indian Institute of Technology, Patna

E-9: Effect of Tool Shape and Rotational Speed on the Mechanical Properties and Microstructures of Friction Stir Spot Welding in

Advanced High Strength Steel: *Jong Gun Lee*¹; Hyun Jun Park¹; Sang Ho Uhm²; Seung Boo Jung¹; ¹Sungkyunkwan University; ²POSCO

E-10: Friction Stir Welding and Characterization of Magnesium Alloy to Steels: *Xiujuan Jiang*¹; *Piyush Upadhyay*²; Nathan Canfield¹; Tim Roosendaal¹; ¹Pacific Northwest National Laboratory; ²Pacific Northwest National Laboratory

E-11: Friction Stir Welding of Al/C Composites: *Seeun Shin*¹; Seungjoon Lee²; Hidetoshi Fujii²; ¹Sunchon National University; ²JWRI

E-12: Hierarchically Microstructured Magnesium WE43-B4C-Y2O3 Surface Composite through Friction Stir Processing: *Kaimiao Liu*¹; Saket Thapliyal¹; Neil MacDonald¹; Tianhao Wang¹; Shivakant Shukla¹; Rajiv Mishra¹; ¹University of North Texas

E-13: Influence of Travel Speed on Microstructural Features and Mechanical Properties of but Joints Friction Stir Welded SAF 2205 Duplex Stainless Steel: *Mohamed Ahmed*¹; Mohamed El-Sayed Seleman²; Mahmoud Elkady³; ¹British University, Egypt; ²Suez University; ³Suez Thermal Power Plant

E-14: Investigation on the Corrosion and Wear Behavior of Al6061 by Friction Stir Processing with Amorphous and Crystalline States of the SiO₂ Nanoparticles: *Rasoul Jamshidi*¹; Hamed Aghamohammadi¹; Mehrdad Nemat¹; Akbar Heidarpour¹; Yoosef Mazaheri¹; ¹Hamedan University of Technology

E-15: Microstructure and Corrosion Properties of Friction Stir Processed Aluminum Alloys: Devuri Venkateswarlu¹; Murali Mohan Cheepu²; *P. Nageswara Rao*¹; Devireddy Krishnaja³; ¹Marri Laxman Reddy Institute of Technology and Management, Telangana; ²Kyungsung University, Busan; ³Institute of Aeronautical Engineering, Telangana

E-16: Modelling of the Post Processed Tensile Test in Friction Stir Processed of 7075 Aluminum Alloy Incorporated with Multiwall Carbon Nanotube: *Seyed Sajad Mirjavadi*¹; AMS Hamouda²; Ali Ghasemi³; ¹University of Tehran Tehran Iran; ²Qatar University; ³Azad University

E-17: Post Processed Shear Punch Test modeling of Friction Stir Processed AZ81 Magnesium Alloy Incorporated with Multiwall Carbon Nanotube: *Seyed Sajad Mirjavadi*; ¹

E-18: Reduction of Process Forces during Friction Stir Welding with Varying Probe Geometries: *Michael Grätzel*¹; Michael Hasieber¹; Torsten Löhn¹; Jean Pierre Bergmann¹; ¹Technische Universität

E-19: Temperature Monitoring and Cooling Rate in Friction Stir Welding of Steels: *Md Anwar Ali Anshari*¹; Murshid Imam¹; Vishwanath Chintapenta²; ¹Indian Institute of Technology, Patna; ²Indian Institute of Technology, Hyderabad

General Poster Session

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H-6: A Study on the Mechanical Properties of Glass Fiber-epoxy Vinylester Composite with Pultrusion Process depends on Exposure time in Salt Spray Corrosion Environment: *MyeongHan Yoo*¹; Min Seok Moon¹; Jongll Rho¹; JoonHyuk Song¹; NaRa Park¹; JeHaOh¹; YoonHyuk Bang¹; ¹Korea Institute of Carbon Convergence

H-7: Applying Nanotechnology to Separation of Fluoride Gas with Oxygen by Carbon Nano Tube (Monte Carlo Simulation): *Mohsen Amerisiahooei*¹; ¹Almahdi-South Hormoz Aluminium

H-8: Barrierless Cu-alloy Seed Integration for Improved Reliability in Solder Bump Flip Chip Applications: *Chon-Hsin Lin*¹; ¹Asia Pacific Institute of Creativity

H-9: Rapid Solidification of Impulse Atomized Al-Si-Sc: *Akankshya Sahoo*¹; Hani Henein¹; Abdoul-Aziz Bogno¹; William Hearn²; ¹University of Alberta; ²Chalmers University of Technology

H-10: CFD-simulation of Siphone for Primary Aluminum Production: *Mohsen Amerisiahooei*¹; ¹Almahdi-South Hormoz Aluminium

H-11: Control of TiC Particle Size in Combustion Synthesis Method for Reinforcement Particle: *Yuichiro Murakami*¹; Isao Matsui¹; Naoki Omura¹; ¹National Institute of Advanced Industrial Science And Technology

H-12: Corrosion Resistance of Hot Dipping Al-Zn-Si and Zn-Al-Mg-Si Alloy Coating: *Hui Li*¹; ¹North China University of Science and Technology

H-13: Creation of Mechanical Behaviour Diagrams of Twin Roll Cast Aluminum Flat Products Depending on Different Thermomechanical Processes: *Kaan Ipek*¹; Özen Gürsoy¹; Eray

Erzi¹; Derya Dispinar¹; ¹Istanbul University

H-14: The Role of Scientific Publishers in Addressing Gender Disparity in Academic Publishing: *Joe D'Angelo*¹; Marlene Silva¹; Rachel Herbert¹; ¹Elsevier

H-15: Degradation of Organic Pollutant by Advanced Oxidation using the Fenton System Fe (II) / H₂O₂: *Naouel Hezil*¹; Mamoun Fellah²; ¹Abbes Laghrour Khenchela University, Algeria; ²Tribology & Materials Group, Laboratory of Foundry, Annaba University, Algeria

H-16: Determination of Mechanical Properties of Boron Oxide Particle Reinforced Aluminum Alloy Matrix Composites: *Serap Kekec*¹; Özen Gürsoy¹; Eray Erzi¹; Mert Zoraga¹; Derya Dispinar¹; ¹Istanbul University

H-17: Development of the Sub-frame with Magnesium Alloy through the High-pressure Die-cast Process: *Min Seok Moon*¹; MyeongHan Yoo¹; NaRa Park¹; JoonHyuk Song¹; Jongll Rho¹; JeHa Oh¹; WonTae Kim¹; YoonHyuk Bang¹; ¹Korea Institute of Carbon Convergence Technology

H-18: Effect of Bias Voltage on Structure, Morphology and Hardness of ZrN Coating Deposited by Reactive Magnetron Sputtering: *Reza Madanipoor*¹; Masood Hasheminiasari¹; Seyed Morteza Masoudpanah¹; ¹IUST

H-19: Effect of Decarbonization Annealing Times on Recrystallization Microstructure, Texture and Magnetic Properties of Nb-containing Grain-oriented Silicon Steel: *Yunli Feng*¹; ¹North China University of Science and Technology

H-20: Effect of Heat Treatment Parameters on Hardness and Microstructure of AISI 4140 and AISI 4150 Steels: Beste Payam¹; *Selim Erturk*¹; Cuneyt Arslan¹; ¹Istanbul Technical University

H-21: Encapsulation of Gold Nanorods with Porphyrins for the Potential Treatment of Cancer and Bacterial Diseases: Nthabeleng Hlapisi¹; Tshwafo Montaung¹; Linda Linganiso¹; Oluwatobi Oluwafemi² *Sandile Songca*³; ¹University of Zululand; ²University of Johannesburg; ³University of KwaZulu-Natal

H-22: Evolution Behavior of Thermally Formed d-ferrite in Modified 9Cr-1Mo Steel Weld Zone: Nam-hyun Jung¹; Nam-hyun Kang¹; Kwangho Kim¹; Ikmin Park¹; *Kyung Mox Cho*¹; ¹Pusan National University

H-23: Experimental Investigation of AA6061 Composites Reinforced With Fly Ash Fabricated By Friction Stir Processing:

*Jyoti Menghani*¹; Sudeep Ingole²; Nikhil Phulari¹; S Pamdya¹; Satish More¹; Dhananjay Bhatt¹; ¹S.V. National Institute of Technology; ²Always Avant

H-24: Fabrication and Mechanical Property Analysis of Nanosphere Ti-Zr-Ni Quasicrystal: *Geunhee Yoo*¹; Ji Young Kim¹; Eun Soo Park¹; ¹Seoul National University

H-25: High Entropy Alloy Coatings for Erosion Resistance - A Review: *Jyoti Menghani*¹; Sudeep Ingole²; Dhananjay Bhatt¹; Satish More¹; Akash Vyas¹; C Paul³; ¹S.V. National Institute of Technology; ²Always Avant; ³Raja Ramanna Centre for Advanced Technology

H-26: Joining of Titanium and Stainless Steel Alloys via the Application of Refractory Metal Interlayers: *Katherine Namola*¹; Antonio Ramirez¹; Jerry Gould²; ¹Ohio State University; ²EWI/Ohio State University

H-27: Mechanical Property Characterization of Carbon Fiber Reinforced 6063 Alloy: *Anil Alten*¹; Özen Gürsoy¹; Eray Erzi¹; Gökçe Hapci Agaoglu¹; Derya Dispinar¹; Gökhan Orhan¹; ¹Istanbul University

H-28: Microstructure and Mechanical Properties of Beryllium-copper Alloy Plate Modified by Friction Stir Processing: *Kwangjin Lee*¹; ¹KITECH

H-29: Molecular Dynamics Simulations of Carbon Fibers Reinforced Within Polyethylene used to Quantify Decohesion of the Interfacial Region: *Sultana Ababtin*¹; Mark Horstemeyer²; Michael Baskes¹; Sungkwang Mun³; Andrew Bowman¹; ¹Mississippi State University; ²Center for Advanced Vehicular Systems (CAVS); ³Center for Advanced Vehicular Systems (CAVS)

H-30: Molten Salt Electrolytic Extraction of Dysprosium using NdFeB Magnet Scraps: *Kim Jong Ho*¹; ¹Rist

H-31: Morphology and Mechanical Properties of Bagasse Nano Particles Reinforced Epoxy Composites: *Suleiman Hassan*¹; Victor Aigbodion¹; ¹University of Lagos

H-32: New Tool for Friction Stir Processing: *Harith Aljobory*¹; ¹Steel Industries Co.

H-33: Performance of Low Cost 3D Printed Pylon in Lower Limb Prosthetic Device: *Fariborz Tavangarian*¹; Camila Proano¹; Caleb Zolko¹; ¹Pennsylvania State University

H-34: Phase-field Modeling of Metal Corrosion with Passive Film Formation in Electrolyte: *San-Qiang Shi*¹; Talha Ansari¹; ¹Hong

Kong Polytechnic University

H-35: Production of Sr Master Alloy by Pyrometallurgical and its Modification Capability: *Ibrahim Goksel Hizli*¹; Rasit Sezer²; Ozen Gursoy¹; Cunevt Arslan³; Derya Dispinar¹; Selim Erturk³; ¹Istanbul University; ²Karadeniz Technical University; ³Istanbul Technical University

H-36: Research on Influence of Inclusion Size for IGF Inducing in Different Grain Size for Ti-Mg Shipbuilding Steel: *Ligen Sun*¹; Huirong Li¹; Liguang Zhu¹; ¹North China University of Science and Technology

H-37: Sand Casting Of Ze41 Mg Alloy: *Ilhan Aygun*¹; Erhan Körpe¹; Özen Gürsoy²; Eray Erzi²; Derya Dispinar²; ¹VIG Metal; ²Istanbul University

H-38: Sequential Leaching Characteristics of Chromium in AOD Slag-based Cementitious Materials: *Ya-jun Wang*¹; Jun-guo Li²; Ya-nan Zeng²; Xiao-yu Li²; ¹Northeastern University; ²North China University of Science and Technology

H-39: Strengthening Mechanisms Contribution of Formation of UFG Low C Microalloyed Steel and Structure Properties Correlation: *Sumit Ghosh*¹; Suhrit Mula¹; ¹Indian Institute of Technology, Roorkee

H-40: Study on the Reaction Behavior of Hydrochloric Acid Containing Titanium Blast Furnace Slag: *Jinglong Liang*¹; Hui Li¹; ¹North China University of Science and Technology

H-41: Study on Ultrasonic-assisted Metal 3D printing (UAM3P) for Making Alloys Printable without Defects: *Saeed Bagherzadeh*¹; Qingyou Han¹; Yanfei Liu¹; ¹Purdue University

H-42: The Creep-fatigue Behavior of a Directionally Solidified Ni-based Superalloy DZ445 at 900 °C with High Strain Range: *Biao Ding*¹; Weili Ren¹; Jianchao Peng¹; Tianxiang Zheng¹; Jianbo Yu¹; Zhongmin Ren¹; Yunbo Zhong¹; ¹Shanghai University

H-43: The Edge Dislocation Climbing Mechanism for He Bubble Growth in W: *Hongxian Xie*¹; ¹Osaka University

H-44: The Effect of Electromagnetic Stirring on the Continuous Casting of Hypereutectic Al-Si Alloy Billets: *Kim Jong Ho*¹; ¹Rist

H-45: The Effect of Sr Modification on Mechanical Properties and Corrosion Behavior of A360 alloy: *Inal Duygun*¹; Gökçe Hapci Agaoglu¹; Özen Gürsoy¹; Eray Erzi¹; Gökhan Orhan¹; Derya Dispinar¹;

¹Istanbul University

H-46: Thermodynamic and Kinetic Analysis of Inhomogeneous Distribution of Solute on Precipitations in as Cast Nb-V-Ti Microalloyed Steel: *Ya-nan Zeng*¹; Jun-guo Li²; Ya-jun Wang³; ¹North China University of Science and Technology; ²North China University of Science and Technology; ³Northeastern University

H-47: Thermoelectric Properties of Amorphous Ti₅₀Cu₂₈Ni₁₅Sn₇-dispersed Bi_{0.4}Sb_{1.6}Te₃ Fabricated by Mechanical Alloying and Vacuum Hot Pressing: *Pee-Yew Lee*¹; ¹National Taiwan Ocean University

H-48: Tunable Thermal Expansion Behavior in TbCo₂ Based Alloys: *Zhanning Liu*¹; ¹University of Science and Technology Beijing

H-49: Understanding Tip Material Selection Impact on High Temperature Nanoindentation: *Samuel Bacon*¹; Richard Anthony¹; Phil Webb¹; Kurt Johanns¹; Warren Oliver¹; ¹KLA-Tencor

H-50: Utilization of Primary Steelmaking Slag as a Medium for Remediation of Arsenic Contaminated Groundwater: Sumit Suman¹; K.Abhilash Simhachalam¹; *Somnath Basu*¹; ¹Indian Institute of Technology, Bombay

H-51: ZrO₂ Doping Effects on the Mechanical and Structural Properties of Nanostructured Forsterite: *Fariborz Tavangarian*¹; Dakota Mattison¹; ¹Pennsylvania State University

H-52: Microstructural Characterization of Co-sputtered Cu-Ta Alloys as a Function of Processing Conditions: *Max Powers*¹; ¹University of Michigan

H-53: Heterogeneous Structure Hypereutectic Al- 20 wt.%Si by Laser Surface Remelting: *Huai-Hsun Lien*¹; Amit Misra¹; ¹University of Michigan

H-54: Deformation Mechanisms of Crystalline Silicon Nitride Nanomembranes: *Ali Khourshaei Shargh*¹; Niaz Abdolrahim¹; ¹University of Rochester

H-55: Fracture of Adhesively Bonded Joints between Dissimilar Substrates under Shear: Modelling versus Experiment: *Sina Askarinejad*¹; Norman Fleck¹; ¹Cambridge University

H-56: Limits on Transformation Strains for Non-negative Dissipation: *Manish Vasoya*¹; Babak Kondori¹; Amine Benzerga¹; Alan Needleman¹; ¹Texas A&M University

MATERIALS PROCESSING

Heterogeneous and Gradient Materials (HGM III): Tailoring Mechanical Incompatibility for Superior Properties — Poster Session

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

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

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E-20: Aluminum Sandwich with Heterogeneous Density-graded Open-cell Foam Core: *Vasanth Shunmugasamy*¹; Bilal Mansoor¹; ¹Texas A&M University at Qatar

E-21: Controlled Microporosity for Two-phase Flow via Powder Bed Fusion: *Scott Roberts*¹; Ben Furst¹; Stefano Cappucci¹; Eric Sunada¹; ¹Jet Propulsion Laboratory

E-22: Delamination Studies of Nb-Cu Laminated Composites Processed by Accumulative Roll Bonding: Cesar Mariscal Hernandez¹; Rayana Snene²; Kenneth Liechti²; *Francisco Garcia-Pastor*¹; ¹Cinvestav Unidad Saltillo; ²The University of Texas at Austin

E-23: Design of Non-equiatomic FeNiCoAl-based High Entropy Alloys with Heterogeneous Lamella Structure towards Strength-ductility Synergy: *Cheng Zhang*¹; Chaoyi Zhu¹; Tyler Harrington¹; Kenneth Vecchio¹; ¹University of California San Diego

E-24: Development of a Production Chain for Cu-bilayer Products: *Tim Mittler*¹; Thomas Greß¹; Wolfram Volk¹; ¹Technische Universität München

E-25: Effect of Grain Size on Mechanical Properties of Dual Phase Steels Composed of Ferrite and Martensite: *Myeong-heom Park*¹; Akinobu Shibata¹; Nobuhiro Tsuji¹; ¹Kyoto university

E-26: Effect of Martensite Distribution on Deformation Behaviors of Dual-phase Steel: *Ryota Matsubayashi*¹; Myeong-heom Park¹; Nobuhiro Tsuji¹; ¹Kyoto University

E-28: Friction Stir Processing and Alloying: A Novel Technique for Fabricating Heterogeneous and Gradient Materials: *Tianhao Wang*¹; Rajiv Mishra¹; ¹University of North Texas

E-29: Improved Balance between High Strength and High Electrical Conductivity of Copper Alloys through Two-step Cryorolling and Aging: *Rengeng Li*¹; Enyu Guo¹; Huijun Kang¹; Tongmin Wang¹; ¹Dalian University of Technology

E-30: Influence of Ultrasonic Shot-peening on the High and Low Cycle Fatigue Properties in 2205 Duplex Stainless Steel: *Yixin Liu*¹; Yufei Jia¹; Xiancheng Zhang¹; ¹East China university of Science and Technology

E-31: Mechanical Behavior and Microstructural Evolution in Gradient Structured Copper Processed through Torsion: *Nageswara Rao Palukuri*¹; Susmitha Modem¹; Abhishek Kumar²; Rahul Singh²; Venkateswarlu Devuri³; ¹Marri Laxman Reddy Institute of Technology and Management; ²Mothilal Nehru Institute of Technology, Allahabad; ³Mlritm, Hyderabad

E-32: Mesoscale Study of the Strength and Ductility in Gradient Materials: *Lei Cao*¹; ¹University of Nevada, Reno

E-33: Mesostructure Effects on the Hypervelocity Impact Response of Additively Manufactured Interpenetrating Phase Composites: *Lauren Poole*¹; Matthew French¹; William Yarberr¹; Zachary Cordero¹; ¹Rice University

E-34: Strong and Ductile Electrodeposited Bulk Nanocrystalline Nickel: *Yao Yao Jiang*¹; Kai Hu¹; Jing Zhao¹; Jun Yi¹; ¹Laboratory for Microstructures, Institute of Materials, Shanghai University

E-36: Ultra-high Strength and Ductility in a Ni-Cr-Co Superalloy with a Heterogeneous Structure: *Connor Slone*¹; Jiashi Miao¹; Michael Mills¹; ¹Ohio State University

NUCLEAR MATERIALS

Irradiation Effects on Phase Transformations in Nuclear Reactor Materials — Poster Session

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Janelle Wharry, Purdue University; Kester Clarke, Colorado School of Mines; Julie Tucker, Oregon State University; Par Olsson, KTH Royal Institute of Technology; Dhriti Bhattacharyya, ANSTO; Mohsen Asle Zaeem, Colorado School of Mines; Arun Devaraj, Pacific Northwest National Laboratory

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Session Chairs: Janelle Wharry, Purdue University; Kester Clarke, Colorado School of Mines; Julie Tucker, Oregon State University; Pär Olsson, KTH Royal Institute of Technology; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organisation; Mohsen Asle Zaeem, Colorado School of Mines; Arun Devaraj, Pacific Northwest National Laboratory

G-7: Effects of High Dose Si Ion Irradiation on Aluminum Alloys: *Ziv Ungarish*¹; *Benedicte Kapusta*²; *Pierre Gavaille*²; ¹Negev Nuclear Research Center; ²DEN-Service d'Etudes des Matériaux Irradiés, CEA, Université Paris-Saclay, F-91191, Gif-sur-Yvette

G-8: In Situ Dual Beam Kr Irradiation and He Implantation in High Entropy Alloys: *Jing Hu*¹; *Weiying Chen*¹; *Pete Baldo*¹; *Mark Kirk*¹; *Meimei Li*¹; ¹Argonne National Laboratory

G-9: Influence of Stored Energy in Ferritic ODS Alloys on the Recrystallization Behavior: *Yann De Carlan*¹; *Benjamin Hary*¹; *Joel Ribis*¹; *Amal Issaoui*¹; *Adrien Vaugoude*¹; *Roland Loger*¹; *Thierry Baudin*¹; ¹CEA

G-11: Irradiation Induced Phase Transformation of Metastable Alloys: *Arun Devaraj*¹; *Osman El-Atwani*²; *Libor Kovarik*¹; *Meimei Li*³; *Vishal Soni*⁴; *Rajarshi Banerjee*⁴; *Vaithiyalingam Shutthanandan*¹; ¹Pacific Northwest National Laboratory; ²Los Alamos National Laboratory; ³Argonne National Laboratory; ⁴University of North Texas

G-12: Low Temperature Radiation Damage and Microstructure Evolution of d-phase 239PuGa Alloys by Neutron Diffraction: *Alice Smith*¹; *Jianzhong Zhang*¹; *Bjørn Clausen*¹; *Sven Vogel*¹; *Franz Freibert*¹; *Donald Brown*¹; ¹Los Alamos National Laboratory

G-13: Mesoscale Modeling of High Burn-up Structure (HBS) Formation and Evolution in Metallic Fuels: *Fergany Badry*¹; *Mohammad Abdoelatef*¹; *Sudipta Biswas*²; *Andrea Jokisaari*²; *Daniel Schwen*²; *Yongfeng Zhang*²; *Karim Ahmed*¹; ¹Texas A&M

University; ²Idaho National Laboratory

G-14: Microstructural Characterization of High-entropy Alloy Ion Irradiated at Cryogenic Temperatures: *Michael Moorehead*¹; Calvin Parkin¹; Lingfeng He²; Jing Hu³; Meimei Li³; Adrien Couet¹; Kumar Sridharan¹; ¹University of Wisconsin-Madison; ²Idaho National Laboratory; ³Argonne National Laboratory

G-15: Microstructural Response of ODS-EUROFER Steel to High Dose Ion Implantation of Helium and Hydrogen: *Olga Emelianova*¹; Aurelie Gentils¹; Maria Ganchenkova²; Yuriy Yagodzinsky³; Evgenii Malitckii³; Vladimir Borodin⁴; Pavel Vladimirov⁵; Anton Moeslang⁵; Igor Golovchanskiy⁶; ¹CSNSM, Univ Paris-Sud, CNRS/IN2P3, Université Paris-Saclay; ²National Research Nuclear University MEPhI; ³Aalto University School of Engineering; ⁴National Research Center «Kurchatov Institute»; ⁵Institute for Applied Materials - Applied Materials Physics, Karlsruhe Institute of Technology; ⁶National University of Science and Technology MISIS

G-17: Using Image Analysis to Quantify the Microstructural Changes during Irradiation of U-Mo Fuels with Different Mo Contents: *Charlyne Smith*¹; Assel Aitkaliyeva¹; Brandon Miller²; Dennis Keiser²; ¹University of Florida; ²Idaho National Laboratory

LIGHT METALS

Magnesium Technology 2019 — Poster Session

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

Program Organizers: Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordon, University of Alabama; Dmytro Orlov, Lund University; Neale Neelameggham, IND LLC

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Session Chairs: Eric Nyberg; J. Brian Jordon, University of Alabama

D-10: Comparison of Corrosion Behavior in Mg-x Al Alloys Containing Ca and Y: *Bong Sun You*¹; Jong il Kim²; Ha Nguyen³; Young Min Kim¹; ¹Korea Institute of Materials Science; ²Chungnam National University; ³Korea University of Science & Technology

D-11: Correlation between Lattice Reorientation and Nature of Alloying Elements in Ti and Mg via ab Initio Calculations: *Gang*

Zhou¹; Hao Wang¹; ¹Institute of Metal Research Chinese Academy of Sciences

D-12: Deformation Behavior of a Reticular Structured Mg-O-9Al Alloy

Developed by the Phase Separation Process: *Donghyun Bae*¹; Seung Won Kang¹; ¹Yonsei University

D-13: Development of Magnesium and Magnesium Alloy Materials through Press and Sinter Processing: *Steven Johnson*¹; Jason Alvarez¹; ¹Central Connecticut State University

D-14: Development of Manufacturing Processes for Magnesium Sheet: *Amjad Javaid*¹; Frank Czerwinski¹; ¹Canmet, Natural Resources Canada

D-15: Effect of Baffle Plate on Separation Performance in Magnesium Electrolysis Cell Based on Thermo-electro-magneto-hydrodynamics Coupling Model: *Cheng-Lin Liu*¹; Qian-Wen Zhao¹; Jian-Guo Yu¹; ¹East China University of Science and Technology

D-16: Effect of Temperature, Strain Rate, and Strain on Grain Refinement and Texture Development during Dynamic Recrystallization of AZ31B Mg Alloy: *Yuan Li*¹; Zhenggang Wu²; Peijun Hou¹; Zhili Feng²; Yang Ren³; Hahn Choo¹; ¹University of Tennessee; ²Oak Ridge National Laboratory; ³Argonne National Laboratory

D-17: Elucidation of Growth Mechanisms and Control of Morphology in Electrodeposited Magnesium Thin Films: *Rachel Davidson*¹; Sarbajit Banerjee¹; ¹Texas A&M

D-18: Forging of Mg-3Sn-2Ca-0.4Al Alloy Assisted by its Processing Map and Validation through Analytical Modeling: *Pitcheswara Rao Kamineni*¹; K. Suresh²; Y.V.R.K. Prasad³; Dharmendra Chalasani⁴; Norbert Hort⁵; ¹City University of Hong Kong; ²Bharathiar University; ³processingmaps.com; ⁴University of New Brunswick; ⁵Helmholtz-Zentrum Geesthacht

D-19: Formation of Basal Texture Variations in AZ31 Magnesium Alloy during Extrusion: *Rongshi Chen*¹; M. Jiang²; H Yan¹; C. Xu³; T. Nakata³; S. Kamado³; E. Han¹; ¹Institute of Metal Research, Chinese Academy of Sciences; ²Institute of Metal Research, Chinese Academy of Sciences & Shenzhen University; ³Nagaoka University of Technology

D-21: In Situ Characterization of the Deformation Mechanisms Present in Biaxially Loaded Magnesium Alloys: *Zachary Brunson*¹;

Aaron Stebner¹; ¹Colorado School of Mines

D-22: Influence of CNTs Nanoparticles on the Microstructure and Mechanical Properties of Friction Stir Welded AZ81 Magnesium Alloy: *Mohammad Alipour*¹; Ali Ghasemi²; Ali Shakiba³; ¹University of Tabriz; ²Islamic Azad University Tehran North Branch; ³University of Tehran

D-23: Mechanical and Corrosion Properties of ECAP-processed Mg ZK60 Alloy: *Francisco Farias Gonzalez*¹; Francisco García¹; ¹cinvestav

D-24: On the Microstructure Characterization and Shear Punch Properties of the AZ81 Magnesium Alloy Welded by FSW: *Mohammad Alipour*¹; Ali Ghasemi²; Ali Shakiba³; ¹University of Tabriz; ²Islamic Azad University Tehran North Branch; ³University of Tehran

D-26: Refill Friction Stir Spot Welding of High Strength 7050 Aluminum Alloy: *Uceu Suhuddin*¹; Jorge dos Santos¹; ¹Helmholtz Zentrum Geesthacht

D-27: Sequential Double Twinning Associated with Twin-twin Interactions in Shocked Hexagonal Metals: *Shun Xu*¹; ¹University of Nebraska-Lincoln

D-28: Study of the Mechanical Properties and Formability of Binary Mg-xCa/RE Alloys: *Young-Wook Chae*¹; Jun-Ho Park¹; Jae-Joong Kim¹; Jaiveer Singh²; Min-Seong Kim²; Shi-Hoon Choi²; ¹POSCO; ²Sunchon National University, Suncheon

D-29: Tailoring Twin Boundary Mobility in Magnesium and its Alloys: *Yujie Cui*¹; Yunping Li²; Yuichiro Koizumi³; Akihiko Chiba¹; ¹Tohoku University; ²Central South University; ³Osaka University

D-30: Texture and Microstructure Evolution of AZ31 Mg Sheet during Tensile Draw-bending: *Jaehyung Cho*¹; G. Y. Lee¹; K.J. Yeom¹; ¹Korea Institute of Materials Science

D-31: Texture Evolution and Recrystallization of Cold-rolled Mg-Al-Zn-Ca Alloy Sheets: Su Mi Jo¹; Yohan Go¹; Jong Il Kim²; Bong Sun You³; *Young Min Kim*³; ¹Korea University of Science and Technology; ²Chungnam National University; ³Korea Institute of Materials Science

D-32: The Effect of Alloy Elements on Oxidation Behavior of Magnesium Alloys: Jiajia Wu¹; Yuan Yuan¹; Fusheng Pan¹; Hans Seifert²; ¹Chongqing University; ²Karlsruhe Institute of Technology

D-33: The Relationship between Long-period Stacking-ordered

Structure (LPSO) and Deformation Behavior at Different Strain Rates in Magnesium Rare Earth Alloys: *Kun Li*¹; R.D.K. Misra¹; ¹University of Texas at El Paso

D-34: Twinning-detwinning in Shock Compressed UFG AMX602 Magnesium via Time-resolved In-situ Synchrotron X-Ray Diffraction: *Cyril Williams*¹; Chaitanya Kale²; Kiran Solanki²; ¹U.S. Army Research Laboratory; ²Arizona State University

MATERIALS PROCESSING

Materials Processing Fundamentals — Poster Session

Sponsored by: TMS: Process Technology and Modeling Committee

Program Organizers: Guillaume Lambotte, Boston Metal; Jonghyun Lee, Iowa State University; Antoine Allanore, MIT - DMSE; Samuel Wagstaff, Novelis

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E-38: High-temperature Study of Perovskite Evaporation: *Sergey Shornikov*¹; ¹Vernadsky Institute of Geochemistry of RAS

E-39: Numerical Simulation of Agglomeration Behavior of Sintered Raw Materials during High-speed Mixing: *Shanshan Wu*¹; Guishang Pei¹; Gang LI¹; Xuwei LV¹; ¹Chongqing University

E-40: Overview of Electrically Activated Reactive Synthesis (EARS) Of nanotube reinforced intermetallics: *Kaitlin Kehl*¹; Vanessa Bundy¹; Mehul Chauhan¹; Prathmesh Modi¹; John Walker¹; Kevin Yokota¹; Greg Essayan¹; Saman Sharifi¹; Stephanie Halbert¹; K. Morsi¹; ¹San Diego State University

E-41: Tensile Properties and Microstructure of Squeeze Cast Magnesium Matrix Composite Reinforced with 35 Vol. % of Al₂O₃ Fibers: *Hongfa Hu*¹; ¹University Of Windsor

E-42: The Application Prospect of Microwave Sintering Technology in the Preparation of Ti - Base Composite Materials: Xu Wang¹; Yilong Liao¹; Ling Xie¹; *Qiang Su*¹; ¹Mingde College of Guizhou University

E-43: Ultrasound for Next-generation Alloy Casting: *Bitong Wang*¹; Andrew Caldwell²; Antoine Allanore²; Douglas Kelley¹; ¹University

NUCLEAR MATERIALS

Mechanical Behavior of Nuclear Reactor Components — Poster Session

Sponsored by: TMS: Nuclear Materials Committee

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Assel Aitkaliyeva, University of Florida; Khalid Hattar, Sandia National Laboratories; Janelle Wharry, Purdue University; Laurent Capolungo, Los Alamos National Laboratory; Eda Aydogan, Los Alamos National Laboratory

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Session Chair: Clarissa Yablinsky, Los Alamos National Laboratory

G-18: Comparison of In-situ Micro- and Ex-situ Meso-scale Tensile Testing for Evaluation of Mechanical Properties of Stainless Steels: *Tanvi Ajantiwalay*¹; Hi Vo²; Peter Hosemann²; Assel Aitkaliyeva¹; ¹University of Florida; ²University of California Berkley

G-19: Damage Evolution Characterized with In Situ Ion Beam Irradiation Transient Grating Spectroscopy: *Cody Dennett*¹; Khalid Hattar²; Michael Short¹; ¹Massachusetts Institute of Technology; ²Sandia National Laboratories

G-20: Grain Boundary Oxidation and Gas Release on Irradiated UO₂: *Geoffrey Beausoleil*¹; Daniel Wachs¹; ¹Battelle Energy Alliance

G-21: Interaction between the Hydrogen Retention and Dislocation Reconstruction in Tungsten: a QM/MD Study: *Yinan Wang*¹; Ben Xu¹; Wei Liu¹; ¹Tsinghua University

G-22: Investigating the Effects of Existing Damage on Primary Damage Formation in Zirconium: *Jesse Carter*¹; Richard Smith¹; ¹Bettis Laboratory

G-23: Investigation of Susceptibility of A533B Steel to Temper Embrittlement: *Mikhail Sokolov*¹; ¹Oak Ridge National Laboratory

G-24: Irradiation Resistance of Advanced Ferritic/Martensitic Steel at High Irradiation Doses and Temperatures: *Md Mehadi*

*Hassan*¹; Connor Rietema²; Madhavan Radhakrishnan¹; Zhexian Zhang¹; Kester Clarke²; Amy Clarke²; Eda Aydogan³; Yongqiang Wang³; Osman Anderoglu¹; ¹University of New Mexico; ²Colorado School of Mines; ³Los Alamos National Laboratory

G-25: Irradiation Resistance of ARB Processed CuNb Nanolayered Composites at Very High Doses and Temperatures: *Zhexian Zhang*¹; Madhavan Radhakrishnan¹; Md Hassan¹; Nathan Mara²; Yongqiang Wang³; Osman Anderoglu¹; ¹University of New Mexico; ²University of Minnesota; ³Los Alamos National Laboratory

G-26: Microstructural Evolution of High Density W-Cermets Exposed to Flowing Hydrogen at Temperatures Exceeding 2000 K: *William Carpenter*¹; Kelsa Benensky²; Marvin Barnes²; Dennis Tucker²; ¹South Dakota School of Mines & Technology; ²NASA Marshall Spaceflight Center

G-27: Towards Accurate Molecular Dynamics Simulations of Helium Bubble Nucleation in Palladium Tritide: *Xiaowang Zhou*¹; Norman Bartelt¹; Ryan Sills¹; ¹Sandia National Laboratories

G-28: Ultrastrong and Ductile Amorphous Si-O-Calloys: *Kaisheng Ming*¹; Qing Su¹; Jian Wang¹; ¹University of Nebraska, Lincoln

MATERIALS PROCESSING

Rare Metal Extraction & Processing — Poster Session

Sponsored by: TMS: Hydrometallurgy and Electrometallurgy Committee

Program Organizers: Gisele Azimi, University of Toronto; Hojong Kim, Pennsylvania State University; Shafiq Alam, University of Saskatchewan; Takanari Ouchi, The University of Tokyo; Neale Neelameggham, IND LLC; You Qiang, University of Idaho; Alafara Baba, University of Ilorin

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Session Chair: Gisele Azimi, University of Toronto

E-44: Recovery of Scandium by Leaching Process from Brazilian Red Mud: Amilton Botelho Junior¹; Raquel Costa¹; Denise Espinosa¹; *Jorge Tenório*¹; ¹University of São Paulo

E-45: Sorption of Uranium with the Application of New Modified Sorbents Based on Natural Minerals: Ainur Berkinbayeva¹;

*Bagdaulet Kenzhaliyev*²; Tatyana Surkova¹; Marzhan Chukmanova¹;
¹JSC Institute of Metallurgy and Ore beneficiation; ²JSC The Kazakh National Research Technical University after K.I. Satpaev»

E-46: Research on the Carbothermic Reduction Procedure of SrSO₄ with Carbon: *Siming Chen*¹; Dongping Duan¹; Xingwu Zou¹;
¹Chinese Academy of Sciences

MATERIALS PROCESSING

Shape Casting: 7th International Symposium Celebrating Prof. John Campbell's 80th Birthday — Poster Session

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

Program Organizers: Murat Tiryakioglu, University of North Florida; William Griffiths, University of Birmingham; Mark Jolly, Cranfield University

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E-47: Aluminum Matrixed Graphene Reinforced Composite Materials: *Okan Aydin*¹; Aziz Kocaveli¹; Özen Gürsoy¹; Eray Erzi¹; Derya Dispinar¹; ¹Istanbul University

E-48: Influence of Melt Quality on the Fluidity of AlSi12Fe: Ibrahim Goksel Hizli¹; *Meltem Salkir*¹; Ibrahim Kalkan¹; Derya Dispinar¹;
¹Istanbul University

LIGHT METALS

Solidification Processing of Light Metals and Alloys: An MPMD Symposium in Honor of David StJohn — Poster Session

Sponsored by: TMS: Solidification Committee

Program Organizers: Mark Easton, RMIT University; Ma Qian, RMIT University (Royal Melbourne Institute of Technology); John Grandfield, Grandfield Technology Pty Ltd; Norbert Hort, Helmholtz-Zentrum Geesthacht; Mark Jolly, Cranfield University

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D-37: Analysis of the High Purity Aluminum Purification Process Using Zone-refining Technique: *Heli Wan*¹; Baoqiang Xu¹; Jinyang Zhao¹; Bin Yang¹; Yongnian Dai¹; ¹National Engineering Laboratory for Vacuum Metallurgy

LIGHT METALS

TMS-DGM Symposium on Lightweight Metals: A Joint US-European Symposium on Challenges in Light Weighting the Transportation Industry — Poster Session

Sponsored by: DGM (Deutsche Gesellschaft für Materialkunde eV), TMS: Magnesium Committee, TMS: Aluminum Committee

Program Organizers: Eric Nyberg; Wilhelmus Sillekens, European Space Agency; Juergen Hirsch, Hydro Aluminium Rolled Products GmbH; Norbert Hort, Helmholtz-Zentrum Geesthacht

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D-35: Development of New Magnesium Alloy Strengthened by Nano Second Phase Precipitation: *Yuansheng Yang*¹; Tianjiao Luo¹; Minglin He¹; Shaozhen Zhu¹; Jixue Zhou²; Shouqiu Tang²; ¹Institute of Metal Research, Chinese Academy of Sciences; ²Advanced Materials Institute, Shandong Academy of Sciences

D-36: Issues of Castability of Magnesium Alloys: *Norbert Hort*¹; Muhammad Bilal¹; Mark Easton²; Hajo Dieringa¹; ¹Helmholtz-Zentrum Geesthacht; ²RMIT University

ENERGY & ENVIRONMENT

2019 Energy Technologies and Carbon Dioxide Management Symposium — Poster Session

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

Program Organizers: Tao Wang, Nucor Castrip Arkansas; Xiaobo Chen, RMIT; Donna Guillen, Idaho National Laboratory; Lei Zhang, University of Alaska Fairbanks; Ziqi Sun, Queensland University of Technology; Cong Wang, Northeastern University; Nawshad Haque, Csiro; John Howarter, Purdue University; Neale Neelameggham, IND LLC

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I-21: Characterization of Polymeric Solutions with TiO_2 Photocatalytic Conversion Efficiency Exposed to Different CO_2 Sources: Aline Hernández¹; Natalia Loera¹; Gerardo Pérez²; Francisco Blockstrand³; ¹Facultad de Ingeniería, Universidad Anáhuac México; ²Fototecnologías Sostenibles para México, S. A. de C. V.; ³Piur

I-22: Vinylic and Waterproofing Paint with TiO_2 as Photocatalytic Active Effects in *Lolium perenne* Germination: Aline Hernández¹; Natalia Loera¹; Gerardo Pérez²; Francisco Blockstrand³; ¹Facultad de Ingeniería, Universidad Anáhuac México; ²Fototecnologías Sostenibles para México, S. A. de C. V.; ³Piur

I-23: Comparison between *Lactuca sativa* L. and *Lolium perenne*: Phytoextraction Capacity of Ni, Fe and Co from Galvanoplastic Industry: Aline Hernández¹; Natalia Loera¹; María Contreras¹; Luis Fischer¹; Diana Sánchez¹; ¹Facultad de Ingeniería, Universidad Anáhuac México

I-24: Determination of Limiting Current Density, Plateau Length and Ohmic Resistance of a Heterogeneous Membrane for the Treatment of Industrial Wastewaters with Copper Ions in Acid Media: Kayo Barros¹; Jorge Tenório¹; Valentín Pérez-Herranz²; Denise Espinosa¹; ¹University of São Paulo (USP); ²Universitat Politècnica de València (UPV)

I-25: Effect of pH and Potential in Chemical Precipitation of Copper by Sodium Dithionite: Iara Anes¹; Amilton Botelho Junior¹; Jorge Tenório¹; Denise Espinosa¹; ¹Escola Politécnica da Universidade de São Paulo

I-26: Influence of Proportion of Pellet on Burden Distribution: Jiansheng Chen¹; Haibin Zuo¹; Jingsong Wang¹; Qingguo Xue¹; Jiapeng Liang¹; ¹University of Science and Technology Beijing

I-27: Post-combustion Carbon Capture Technology Using CO_2

Separative Membrane and Their Industrial Application: *Jung Lee*¹; Jong-Ho Moon¹; Dahun Lee¹; Woong Jin Oh¹; Jeong-gu Yeo¹; ¹Korea Institute of Energy Research

I-28: Preparation and Characterization of Manganese-based Catalysts for Removing NO under Low Temperatures: *Kaijie Liu*¹; Qingbo Yu¹; Junbo San¹; Zhicheng Han¹; Qin Qin¹; ¹Northeastern University

I-29: Study of Separation between CO with H₂ on Carbon Nanotube by Monte Carlo Simulation in Aluminum Smelter: *Mohsen Amerisiahooei*¹; ¹Almahdi-Souh Hormoz Aluminium

I-30: The Characterizations of Hydrogen From Steam Reforming of Bio-oil Model Compound in Granulated Blast Furnace Slag: *Xin Yao*¹; Qingbo Yu¹; Guowei Xu¹; Qin Qin¹; Ziwen Yan¹; ¹Northeastern University

I-31: Thermodynamic and Economic Assessment of an Air-Brayton/ORC Combined Cycle for Microreactors: Joseph Litrel¹; *Donna Guillen*²; Michael McKellar³; ¹Georgia Institute of Technology; ²Idaho National Laboratory; ³University of Idaho

I-32: Determination of Crystallite Size and Its Effect on Sulfur Content, CO₂ Reactivity, and Specific Electrical Resistance of Coke: *Mohsen Amerisiahooei*¹; Borzu Bahrvand¹; ¹Almahdi-South Hormoz Aluminium Smlter

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

2019 Symposium on Functional Nanomaterials: Synthesis, Integration, and Application of Emerging Nanomaterials — Poster Session: General Functional Nanomaterials

Sponsored by: TMS: Nanomaterials Committee

Program Organizers: Chang-Yong Nam, Brookhaven National Laboratory; Jiyoung Chang, University of Utah; Pei Dong, George Mason University; Yong Lin Kong, University of Utah; Shengfeng Yang, Indiana University; Purdue University Indianapolis; SungWoo Nam, University of Illinois

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Session Chairs: Chang-Yong Nam, Brookhaven National Laboratory; Jiyoung Chang, University of Utah; Pei Dong, George Mason University; Yong Lin Kong, University of Utah; SungWoo Nam, University of Illinois at Urbana-Champaign

N-1: Adsorption of Fluoride Gases in Aluminum Production Using Nano Technology: *Mohsen Amerisiahooei*¹; ¹Almahdi-South Hormoz Aluminium

N-3: Biosynthesis and Deposition of Golden Nanoparticles (AuNPs) on Activated Carbon: Laura Garcia-Hernandez¹; Jaqueline Ramirez-Castro¹; Begoña Aguilar-Perez¹; *Pedro Alberto Ramirez-Ortega*¹; Mizraim-Uriel Flores-Guerrero¹; Diana Arenas-Islas²; ¹Universidad Tecnológica de Tulancingo; ²Universidad Autónoma de Baja California

N-4: Crystallization and Melting of Polar and Nonpolar Polymer Chains on Graphene Oxide-substrate: *Wei Gao*¹; *Arman Ghasemi*¹; ¹University of Texas at San Antonio

N-5: Effect of the Synthetic Parameter on the Cytotoxicity of CdTe/CdSe Nanoparticles against Osteosarcoma Cell Line: *Vuyelwa Ncapayi*¹; Sandile Songca²; Samuel Oluwafemi³; ¹ Walter Sisulu University; ² University of Zululand ; ³University of Johannesburg

N-6: Engineered Nanocomposite Material Properties through Embedding of Smaller Nanoparticles in a Polymer Matrix: *Sanju Gupta*¹; A. Henson¹; ¹Western Kentucky University

N-7: Experimental Study on Competitive Adsorption of SF6 Decomposed Components on Nitrogen Doped TiO2 Nanotubes Sensor: *Jun Zhang*¹; Xiaoxing Zhang¹; Hao Cui¹; Guozhi Zhang²; ¹State Key Laboratory of Power Transmission Equipment & System Security and New Technology, Chongqing University; ²School of Electrical Engineering, Wuhan University

N-9: Fabrication of Monodispersed Needle-sized Hollow Core Polystyrene Microspheres: Stanley Omorogbe¹; *Esther Ikhuoria*²; Hilary Ifijen¹; Aireguamen Aigbodion¹; Aline Simo³; Malik Maaza³; ¹Rubber Research Institute of Nigeria; ²University of Benin, Benin City, Nigeria; ³Nanosciences African Network (NANOAFNET), iThemba LABS-National Research Foundation

N-10: Ferroelectric Properties of Low Temperature Hf0.5Zr0.5O2 Films: *Si Joon Kim*¹; Jaidah Mohan¹; Harrison Kim¹; Jiyoung Kim¹; ¹University of Texas Dallas

N-11: High-performance Field Emission Characteristics of Protruded GO and rGO Sheets on CuO and Cu Nanorods: *Gurjinder*

*Kaur*¹; Raj Kumar¹; Indranil Lahiri¹; ¹Nanomaterials and Applications Lab, Department of Metallurgical and Materials Engineering, Indian Institute of Technology Roorkee

N-12: Hydrangea-like VS4 Microspheres: A Novel Structure Material for High Performance Electrochemical Capacitor Electrode: *ZhengWu Peng*¹; Junkai Feng¹; Bing Xie¹; Hong-Yi Li¹; ¹Chongqing University

N-13: Mechanical and Chemical Strengthening of Ceramic Foams by Graphene Oxide Incorporation: *Pratish Rao*¹; Krishna Muralidharan¹; Moe Momayez¹; ¹University of Arizona, Tucson

N-14: Molecular Dynamics Investigation of Ternary AgCuNi Alloy Particles: *Serzat Safaltin*¹; Sebahattin Gurmen¹; ¹Istanbul Technical University

N-15: Preparation and Properties of Novel Graphene Composites: Wanlong Zhang¹; *Haibin Zuo*¹; Jingsong Wang¹; Yingli Liu¹; Yajie Wang¹; ¹University of Science and Technology Beijing

N-17: Role of Growth Rate on the Properties of TiN Thin Films: *Manosi Roy*¹; Dhananjay Kumar¹; ¹North Carolina A & T State University

N-18: Self-assembly of Different VOx Network with Complex Morphologies Prepared by Semi-green Hydrothermal Approach: *Stanley Omorogbe*¹; Esther Ihkuoria²; Hilary Ifijeh¹; Charles Esene¹; ¹Rubber Research Institute of Nigeria; ²University of Benin

N-20: Ternary Quantum Dots – Porphyrin Bio-conjugates: Imaging and Cytotoxicity Studies in Leukaemia (THP-1) Cancer Cell Lines: *Ncediwe Tsolekile*¹; Mangaka Matoetoe¹; Sandile Songca²; Samuel Oluwafemi³; ¹Cape Peninsula University of Technology; ² University of Zululand ; ³University of Johannesburg

N-21: Understanding the Origin of Ferromagnetism in Akaganeite Nano-sticks: *Seok-Jun Seo*¹; Hesan Khalid¹; Sung Gue Heo¹; Won Sik Yang¹; Kyoung-Tae Park¹; Taek-Soo Kim¹; Kyoung Mook Lim¹; ¹Korea Institute of Industrial Technology

ENERGY & ENVIRONMENT

5th Symposium on Advanced Materials for Energy Conversion and Storage — Poster Session

Sponsored by: TMS: High Temperature Alloys Committee

Program Organizers: Amit Pandey, Granta Design/ANSYS; Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Kyle Brinkman, Clemson University; Jung Pyung Choi, Pacific Northwest National Laboratory; Soumendra Basu, Boston University; Paul Ohodnicki, National Energy Technology Laboratory

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Session Chair: Surojit Gupta, University of North Dakota

I-33: Conversion of Soybean Waste to Activated Carbon Spheres for Electrical Double Layer Capacitors: *Fuqian Yang*¹; ¹University of Kentucky

I-34: Enhanced ZT in Si by Using SiC Dispersoids to Tune Both Electrical and Phonon Transport Properties: *Seyed Aria Hosseini*¹; Jackson Harter²; Devin Coleman¹; Todd Palmer²; Lorenzo Mangolini¹; Alex Greaney¹; ¹University Of California, Riverside; ²Oregon State University

I-35: Facile Synthesis of Mesoporous NiCo₂O₄ Fibers with Enhanced Photocatalytic Performance for the Degradation of Organic Dyes under Visible Light Irradiation: Yuchi Wan¹; Jun Chen¹; *Jing Zhan*¹; Yalin Ma¹; ¹Central South University

CHARACTERIZATION

Advanced Characterization Techniques for Quantifying and Modeling Deformation — Poster Session

Sponsored by: TMS: Shaping and Forming Committee

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

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K-1: Additive Manufactured Metal Lattices for Large Deformation and Crush Applications: S. Luong¹; S.D. Meshram¹; S. Basso¹; J. Singh¹; M. Tarusna¹; Mamidala Ramulu¹; Junlan Wang¹; Mitchell Mellor²; *Dwayne Arola*¹; ¹University of Washington; ²The Boeing Company

K-2: Analysis of Microscopic Strain Distribution in Steel Bar with Load by Neutron: *Tomohiro Ikeda*¹; Andrew Payzant²; Jeffrey Bunn²; Christopher Fancher²; Alan Seid³; Tatsuya Okayama¹; Takashi Katsurai¹; ¹Honda R&D Co., Ltd.; ²Oak Ridge National Laboratory; ³Honda R&D America Inc.

K-3: Atomistic Thermodynamic Force Calculation for Deformation Prediction: *Mulaine Shih*¹; Michael Mills¹; Maryam Ghazisaeidi¹; Peter Anderson¹; ¹Ohio State University

K-4: Deformation Driven Grain Growth in ECAE processed AZ31B: *Nicholas Krywopusk*¹; Laszlo Kecskes¹; Timothy Weihs¹; ¹Johns Hopkins University

K-5: Effect of Microstructure and Martensite Formation on the Residual Stress Development and Formability of Metastable Austenitic Stainless Steel: *Peijun Hou*¹; Yuan Li¹; Dongchul Chae²; Jun-Sang Park³; Yang Ren³; Ke An⁴; Hahn Choo¹; ¹The University of Tennessee; ²POSCO Technical Research Laboratory; ³Argonne National Laboratory; ⁴Oak Ridge National Laboratory

K-7: Insights into In-plane Compression Testing of Aluminum Alloy 2024 and AISI 1008 Steel Sheet Materials: *Dilip Banerjee*¹; Mark Ladicola¹; Chris Calhoun¹; William Luecke¹; ¹National Institute of Standards and Technology

K-8: Measuring the Partitioning of Plastic Strain in Precipitate-strengthened Alloys: Robert Jones¹; *Fabio Di Gioacchino*¹; Hojun Lim²; Thomas Edwards³; Caspar Schwalbe¹; Corbett Battaile²; William Clegg¹; ¹Department of Materials Science and Metallurgy, University of Cambridge; ²Department of Computational Materials and Data Science, Sandia National Laboratories; ³EMPA – Swiss Federal Laboratories for Materials Science and Technology

K-9: Modeling Crystal Plasticity of Niobium: *Eureka Pai Kulyadi*¹; Philip Eisenlohr¹; Krishnendu Mukherjee²; Thomas Bieler¹; ¹Michigan State University; ²Council of Scientific and Industrial Research-National Metallurgical Laboratory

K-10: Modeling the Critical Dynamic Recrystallization of a Ti-22Al-25Nb Alloy during Hot Compression Deformation: *Yu Sun*¹;

Lianxi Hu¹; ¹Harbin Institute of Technology

K-11: Multiscale Quantitative Mapping of Deformation on Grain Level with X-ray Microscopy: *Mustafacan Kutsal*¹; Can Yildirim¹; Phil Cook¹; Carsten Detlefs¹; Henning Poulsen²; ¹European Synchrotron Radiation Facility; ²Technical University of Denmark

K-12: Quasi-plastic Zone Characterization of Regular and Si-doped Boron Carbide: *Sisi Xiang*¹; Bruce Yang²; Richard Haber²; Kelvin Xie¹; ¹Texas A&M University; ²Rutgers University

K-13: Role of Hierarchical Martensitic Microstructure on Localized Deformation and Fracture of an Lath-martensitic Steel under Impact Loading at Different Temperatures: *Arya Chatterjee*¹; Abhijit Ghosh²; Debalay Chakrabarti³; Rahul Mitra³; ¹School of Engineering, Brown University; ²Indian Institute of Technology Indore; ³Indian Institute of Technology Kharagpur

K-14: Simple and Accurate Method to Calculate Circular Dichroism Spectra of Peptides and Proteins in Molecular Dynamics Simulations: *Juan Liu*¹; Zewei Wang¹; Shiyi Wang¹; Carole Perry²; Candan Tamerler³; Hendrik Heinz¹; ¹University of Colorado Boulder; ²Nottingham Trent University; ³University of Kansas

K-15: Stacking Fault Energies in Austenitic Stainless Steels: *Benjamin Neding*¹; Peter Hedström¹; ¹Royal Institute of Technology

K-16: Understanding Fundamental Mechanisms of Abrasive Wear: An In-Situ Study: *Gianluca Roscioli*¹; Cemal Tasan¹; ¹Massachusetts Institute of Technology

ADVANCED MATERIALS

Advanced High-Strength Steels III — Poster Session

Sponsored by: TMS: Steels Committee

Program Organizers: Amy Clarke, Colorado School of Mines; MingXin Huang, University of Hong Kong; C. Tasan, Massachusetts Institute of Technology; Kester Clarke, Colorado School of Mines; Ana Luiza Araujo, AK Steel Research & Innovation

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J-1: Characterization of Advanced High Strength Steel Using

Microalloying Elements: *Osama Afify*¹; Ahmed Abdelaziz¹; Ayman Fathy²; Ahmed Gomaa²; ¹Materials Engineering Department, German University(GUC) in Cairo; ²Ezz Flat Steel, Ain El-Sokhna

J-2: Effect of Inclusions Modified by Y-based Rare Earth on the Corrosion Behavior of EH36 Shipbuilding Steel: *Maolin Ye*¹; Xiaojun Xi¹; Libin Zhu¹; Shufeng Yang¹; Jingshe Li¹; ¹University of Science and Technology Beijing

J-3: Effect of Prior Ni Plating on Selective Oxidation Behavior and Galvanisability of High Strength Steel: Guangrui Jiang¹; *Haiquan Wang*¹; ¹Shougang

J-4: Microstructure and Mechanical Properties of Intercritical Annealed Multiphase Ultrahigh Strength Steel: *Liu Huasai*¹; ¹Shougang Research Institute of Technology

J-5: Research on the Microstructure and Mechanical Properties of 980MPa Complex Steel: *Chun Qian Xie*¹; ¹Shougang Research Institute of Technology

J-6: The Effect of Ni and Cu Addition on Mechanical Behavior of Thermomechanically Controlled Processed HSLA X100 Steels: *Alireza Hosseini Far*¹; *Seyyed Hashem Mousavi Anijdan*²; M Abbasi³; ¹Department of Materials Engineering, Science and Research Branch, Islamic Azad University; ²Islamic Azad University; ³2KNT University of Technology

J-7: The Influence of Pre-plating on the LME Phenomenon of DP980 during the Spot-welding Based on the Three-point Bending Test: *Xue Bai*¹; Yun Han¹; Guangrui Jiang¹; Yinghua Jiang¹; ¹Shougang Research Institute of Technology

J-8: Thermodynamic Properties of Mn and C in TWIP Steel Smelting: *Huaizhuang Luan*¹; Jianbin Chen¹; Jinguang Li¹; ¹Shanghai Institution of Technology

ENERGY & ENVIRONMENT

Advanced Magnetic Materials for Energy and Power Conversion Applications — Poster Session

Sponsored by: Federation of European Materials Societies (FEMS), TMS Functional Materials Division, TMS: Magnetic Materials Committee

Program Organizers: Frank Johnson, Niron Magnetics, Inc.; Paul Ohodnicki, National Energy Technology Laboratory; Alex Leary, Nasa Grc; Orlando Rios, Oak Ridge National Laboratory; Alessandra Hool, ESM Foundation

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Session Chair: Alex Leary, Glenn Research Center

I-36: Crystallization and Hot Extrusion Densification of Amorphous Nd₂Fe₁₄B and Nanocrystalline α -Fe Powders Fabricated by Mechanical Milling: *Jufu Jiang*¹; *Ying Wang*¹; ¹Harbin Institute of Technology

I-37: Effects of Nitrogen Additions on Soft Magnetic Properties of Fe-based Amorphous Alloy: *Song-Yi Kim*¹; *A-young Lee*¹; *Hwi-Jun Kim*¹; *Min-Ha Lee*¹; ¹Korea Institute of Industrial Technology

I-38: Engineering of Magnetic Properties of Co-rich Microwires by Joule Heating: *Paula Corte-Leon*¹; *Valentina Zhukova*¹; *Mihail Ipatov*¹; *Juan Blanco*²; *Julian Gonzalez*¹; *Arcady Zhukov*¹; ¹Dept Phys Mater, University Basque Country; ²Dept Appl Phys, University Basque Country

I-39: Magnetocaloric Effect of Sintered Binder Jet 3D Printed Ni-Mn-Ga-Cu for Efficient Magnetic Refrigeration: *Rafael Rodriguez De Vecchis*¹; *Erica Stevens*¹; *Markus Chmielus*¹; ¹University of Pittsburgh

I-40: Micromagnetic Simulation for Exchange Coupling Effect and Magnetic Properties of SmCo₅/ α -Fe Nanocomposite Magnets: *Lianxi Hu*¹; *Yu Sun*¹; *Yuan Yuan*¹; ¹Harbin Institute of Technology

I-41: Structure and Magnetic Properties of Magnetically Soft Fe₆₇Co₂₀B₁₃ Alloy after Crystallisation of Amorphous Ribbon by Ultra-Rapid Annealing: *Maciej Kowalczyk*¹; *Jaroslawn Ferenc*¹; *Jaroslawn Kusmierczyk*¹; *Przemyslaw Zackiewicz*²; *Aleksandra Kolano-Burian*²; *Tadeusz Kulik*¹; ¹Warsaw University of Technology; ²Institute of Non-Ferrous Metals

I-42: The Influence of Mn Chemical Partitioning on the Partial Crystallization Behavior in CoFeMnSiBNb Soft Magnetic Materials: *Alicia Wadsworth*¹; *Kayla Cole*¹; *Abhishek Srivastava*¹; *Alex Leary*²; *Ronald Noebe*²; *Tim Mewes*¹; *Claudia Mewes*¹; *Gregory Thompson*¹;

¹University of Alabama; ²NASA GRC

ELECTRONIC MATERIALS

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

Sponsored by: TMS: Electronic Packaging and Interconnection Materials Committee

Program Organizers: Kazuhiro Nogita, University of Queensland; Tae-Kyu Lee, Portland State University; Yan Li, Intel Corporation; Christopher Gourlay, Imperial College London; Zhi-Quan Liu, Chinese Academy of Sciences; Rahul Panat, Carnegie Mellon University; Albert T. Wu, National Central University; Andre Delhaise, Celestica; Mohd Arif Salleh, Universiti Malaysia Perlis

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Session Chairs: Christopher Gourlay, Imperial College London; Kazuhiro Nogita, The University of Queensland

L-1: A Study on TLP Bonding Using Metal-deposited Preforms for Power Modules of Automobile: *Seungju Baek*¹; Gyu-Won Jeong¹; Dae Young Park¹; Byung-Suk Lee¹; Han-Bo-Ram Lee²; Yong-Ho Ko¹; ¹Korea Institute of Industrial Technology; ²Incheon National University

L-2: Interfacial Phenomena Between Liquid Ga-based Alloys and Ni Substrate: *Tomasz Gancarz*¹; Katarzyna Berent²; Norbert Schell³; Robert Chulist¹; ¹Institute of Metallurgy and Materials Science PAS; ²AGH University of Science and Technology, Academic Centre for Materials and Nanotechnology, Krakow, Poland; ³Institute of Materials Research, Helmholtz-Zentrum Geesthacht, Max-Planck, Germany

L-3: Microstructure Formation in Sn-Cu Based Lead-free Solder Paste Transient Liquid Phase Sintering during Soldering on Different Substrate: R. Mohd Said¹; *M.A.A. Mohd Salleh*¹; M.I.I. Ramli¹; M.N. Derman¹; N. Saud¹; H. Yasuda²; K. Nogita³; ¹Universiti Malaysia Perlis; ²Kyoto University; ³The University of Queensland (UQ)

L-4: Multi-phase-field Simulation of Electromigration in Polycrystalline Interconnect Line: *Akimitsu Ishii*¹; Akinori

Yamanaka¹; ¹Tokyo University of Agriculture and Technology

L-5: PCB Surface Finish in Press-fit Interconnections: *Chulmin Oh*¹; Sangjoo Oh¹; Won Sik Hong¹; ¹Korea Electronics Technology Institute

CHARACTERIZATION

Advanced Real Time Imaging — Poster Session

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Jinichiro Nakano, US Department of Energy - National Energy Technology Laboratory; P. Chris Pistorius, Carnegie Mellon University; Candan Tamerler, University of Kansas; Hideyuki Yasuda, Kyoto University; Zuotai Zhang, Southern University of Science and Technology; Neslihan Dogan, McMaster University; Wanlin Wang, Central South University; Noritaka Saito, Kyushu University; Yongsug Chung, Korea Polytechnic University; Bryan Webler, Carnegie Mellon University

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K-17: Real-time Imaging of Laser-induced High-velocity Microparticle Impacts: *David Veysset*¹; Yuchen Sun¹; Mostafa Hassani-Gangaraj¹; Steven Kooi¹; Alex Hsieh²; Alexei Maznev¹; Shawn Cole²; Randy Mrozek²; Joseph Lenhart²; Jan Andzelm²; Christopher Schuh¹; Keith Nelson¹; ¹Massachusetts Institute of Technology; ²U.S. Army Research Laboratory

MATERIALS DESIGN

Advances in Computational Methods for Damage Mechanics and Failure Phenomena — Poster Session

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Srujan Rokkam, Def-Aero, Advanced Cooling Technologies Inc; Michael Tonks, University of Florida; Remi Dingreville, Sandia National Laboratories; Jaafar El-Awady, Johns Hopkins University

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Session Chair: Srujan Rokkam, ACT Inc.

M-1: A Platform for Crystal Plasticity Finite Element Coding with FEniCS: *Fabio Di Gioacchino*¹; ¹Department of Materials Science and Metallurgy, University of Cambridge

M-2: Validation of a 3D Numerical Model for Stability Analysis of Deep Excavations in Soil: *Yasletty Zamora Hernández*¹; Aldo Durand Farfán¹; ¹Universidade Estadual do Norte Fluminense Darcy Ribeiro

MATERIALS DESIGN

Algorithm Development in Materials Science and Engineering — Poster Session

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

Program Organizers: Mohsen Asle Zaeem, Colorado School of Mines; Garritt Tucker, Colorado School of Mines; Prasanna Balachandran, University of Virginia; Douglas Spearot, University of Florida; Charudatta Phatak, Argonne National Laboratory; Srinivasan Srivilliputhur, University of North Texas

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Session Chair: Mohsen Asle Zaeem, Colorado School of Mines

M-4: Predicting Mechanical Properties of Cold-rolled and Recrystallized Metals by Coupled Crystal Plasticity and Phase-field Model: *Kyung Mun Min*¹; Woojin Jeong¹; Pil-Ryung Cha²; Heung Nam Han¹; Seung-Hyun Hong³; Myoung-Gyu Lee¹; ¹Seoul National University; ²Kookmin University; ³Hyundai Motor Company

ELECTRONIC MATERIALS

Alloys and Compounds for Thermoelectric and Solar Cell Applications VII — Student Poster Session

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, Ensicaen University of Caen; Soon-Jik Hong, Kongju National University; Philippe Jund, Montpellier University; Lan Li, Boise State University; Takao Mori, Nims; Hsin-Jay Wu, National Sun Yat-sen University; Tiejun Zhu, Zhejiang University

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Session Chair: Sinn-wen Chen, National Tsing Hua University

L-6: Carrier Mobility of Mg₂Si, PbTe and SnTe from First Principles Calculations: Fanchen Meng¹; Jinlong Ma²; Jian He¹; Wu Li²; ¹Clemson University; ²Shenzhen University

L-7: Evaluation of Ni-P Diffusion Barrier for Thermoelectric Materials: Chun Hsien Wang¹; Wen Chih Lin¹; Albert T. Wu¹; ¹National Central University

L-8: First-principles Study of the Layered Thermoelectric Material TiNBr: Shuofeng Zhang¹; Ben Xu¹; ¹Tsinghua University

L-9: High Thermoelectric Performance in La-doped n-type Mg₃Sb_{1.5}Bi_{0.5}: Kazuki Imasato¹; Max Wood¹; G. Jeffrey Snyder¹; ¹Northwestern University

L-10: On the Thermoelectric Properties of REB₆₆ (RE = rare earth) Compounds for High-temperature Applications: Philipp Sauerschnig¹; Jean-Baptiste Vaney¹; Takaho Tanaka¹; Toetsu Shishido²; Takao Mori¹; ¹NIMS; ²Tohoku University

L-11: Phase Diagrams of Material Systems with Quasicrystalline Phases: Pei-chia Lo¹; Tse-yang Huang¹; Tzu-ning Kuo¹; Anbalagan Ramakrishnan¹; Sinn-wen Chen²; ¹Department of Chemical Engineering, National Tsing Hua University; ²Department of Chemical Engineering, National Tsing Hua University; High Entropy Materials Center, National Tsing Hua University

L-12: Phase Formation of Zn₄Sb₃ in Spark Plasma Sintering and Thermoelectrical Study: Yamei Liu¹; Dongwang Yang²; Myles McKenna¹; Jian He¹; Xinfeng Tang²; ¹Clemson University; ²Wuhan University of Technology

L-13: Thermoelectric Properties of Y_xAl_yB₁₄ Prepared by Reactive Spark Plasma Sintering: Hyoun-Won Son¹; Quansheng Guo¹;

ADVANCED MATERIALS

Bulk Metallic Glasses XVI — Poster Session

Sponsored by: TMS: Mechanical Behavior of Materials Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Yanfei Gao, University of Tennessee; Hahn Choo, University of Tennessee; Yunfeng Shi, Rensselaer Polytechnic Institute; Gongyao Wang, Alcoa; Robert Maass, University of Illinois at Urbana-Champaign; Muhammad Rafique

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J-9: Adjacent Indentation Investigation on Shear Bands Interaction of Metallic Glass via Molecular Dynamics Simulations: *Dan Zhao*¹; Hongwei Zhao¹; ¹Jilin University

J-10: An Analysis of Configuration Entropy Effect on the Properties in a Series of Equiatomic Ratio Metallic Glasses: *Jung Soo Lee*¹; Hyun Seok Oh¹; Wan Kim¹; Jin Yeon Kim¹; Eun Soo Park¹; Jia Lun Gu²; KeFu Yao²; Budaraju Srinivasa Murty³; ¹Seoul National University; ²Tsinghua University; ³Indian Institute of Technology Madras

J-11: Deformation and Hardening Behavior in the Amorphous Alloys and Quasicrystal with the Same Chemical Compositions: *Wan Kim*¹; Eun Soo Park¹; ¹Seoul National University

J-12: EBSD Microstructure Mapping of Zr_{47.5}Cu_{45.5}Al₅Co₂ Bulk Metallic Glass Matrix Composite to Ascertain the Effect of Inoculation in Promoting Crystallinity: *Muhammad Rafique*¹; Milan Brandt¹; Mark Easton¹; ¹RMIT University

J-13: Effect of Intrinsic Factors on Size-dependent Deformation Behavior of Metallic Glasses: *Ji Young Kim*¹; So Yeon Kim¹; Jin Woo Kim²; Eun Soo Park¹; ¹Seoul National University; ²Massachusetts Institute of Technology

J-15: Fabrication of Micro- and Nanoscale Metallic Glassy Tubes: *Jing Zhao*¹; Yao Yao Jiang¹; Kai Hu¹; Jun Yi¹; ¹Laboratory for Microstructures, Institute of Materials, Shanghai University

J-16: Glass Formation and Crystallization in CuZrAl Alloys: *Ivan*

Kaban¹; ¹IFW Dresden

J-17: High Strength Nanostructured Mg-based Alloy through Optimized Crystallization of Rapidly Quenched Amorphous Precursors: Hyun-Ah Kim¹; Song-Yi Kim¹; A-Young Lee¹; *Min-Ha Lee*¹; ¹KITECH

J-18: Tensile Behavior of Cu-coated Pd40Cu30Ni10P20 Metallic Glassy Wire: *Kai Hu*¹; Ishtiaqiu Hussain²; Yao Yao Jiang¹; Chan K.C³; Jun Yi¹; ¹Laboratory for Microstructures, Institute of Materials, Shanghai University; ²Department of Chemistry, Karakoram International University; ³Department of Industrial and System Engineering, The Hong Kong Polytechnic University

CHARACTERIZATION

Characterization of Materials through High Resolution Imaging — Poster Session

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

Program Organizers: Ross Harder, Argonne National Laboratory; Richard Sandberg, Los Alamos National Laboratory; Xianghui Xiao, Argonne National Laboratory; Brian Abbey, La Trobe University; Saryu Fensin, Los Alamos National Laboratory; Ana Diaz, Paul Scherrer Institut; Mathew Cherukara, Argonne National Laboratory

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K-18: High-resolution Multi-modal Imaging Capability at the Hard X-ray Nanoprobe Beamline of NSLS-II: *Xiaojing Huang*¹; Hanfei Yan¹; Evgeny Nazaretski¹; Mingyuan Ge¹; Petr Ilinski¹; Yong Chu¹; ¹Brookhaven National Laboratory

CHARACTERIZATION

Characterization of Minerals, Metals, and Materials — Poster Session

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Bowen Li, Michigan Technological University; Jian Li, CanmetMATERIALS; Shadia Ikhmayies, Al Isra University; Mingming Zhang, ArcelorMittal Global R&D; Yunus Kalay, Middle East Technical University; John Carpenter, Los Alamos National Laboratory; Jiann-Yang Hwang, Michigan Technological University; Sergio Monteiro, Military Institute of Engineering; Chenguang Bai, Chongqing University; Juan Escobedo-Diaz, University of New South Wales; Pasquale Russo Spena, Politecnico di Torino; Ramasis Goswami, Naval Research Laboratory

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Session Chair: Y. Eren Kalay, Middle East Technical University

K-19: A Study of the Load Stages by the Displacement of Mortars Composed of Ornamental Stone Residues by the Method of Squeeze Flow: Pamela Moreira¹; Leticia Ciribelli¹; Gustavo Xavier¹; Jonas Alexandre¹; Gabrielly Azevedo¹; Afonso Azevedo²; Sergio Monteiro¹; Euzébio Zanelato¹; Markssuel Marvila¹; ¹UENF; ²Instituto Federal Fluminense

K-20: Alloying and Annealing Effects on Grain Boundary Character Evolution of Al Alloy 7075 Thin Films: An ACOM-TEM Analysis: Prakash Parajuli¹; Ruben Mendoza-Cruz¹; Miguel Yacamán¹; Arturo Ponce¹; ¹University of Texas at San Antonio

K-21: Alpha Alumina Synthesis Using Gamma-alumina Powders: Antonio Munhoz¹; Gustavo Galhardo¹; Fernando dos Santos Ortega²; Nelson Batista de Lima³; Dênisson Angelotti Moraes¹; Leila Figueiredo de Miranda¹; Francisco Rolando Valenzuela-Díaz⁴; ¹U.P.Mackenzie; ²FEI; ³IPEN; ⁴USP

K-22: An Investigation of Mechanical and Thermal Properties of Polypropylene Reinforced with Different Clays: Alex Monteiro¹; Daili Barreira¹; Jaqueline Silva¹; Rene Oliveira¹; Francisco Valenzuela Díaz²; Esperidiana Moura¹; ¹Nuclear & Energy Research Institute; ²University of Sao Paulo

K-23: Analysis by Thermoelectric Potential of a Nitrided Steel: Ariosto Medina¹; Claudio Aguilar²; Luis Béjar¹; Héctor Carreón¹; Joaquín Oseguera³; ¹Universidad Michoacana de San Nicolás de Hidalgo; ²Universidad Técnica Federico Santa María; ³Instituto Tecnológico y de Estudios Superiores de Monterrey Campus

Estado de México

K-24: Analysis of Relationship between Properties of Mechanically Alloyed Powders and Corresponding Process Parameters: *Jovana Ruzic*¹; *Nikolay Stoimenov*¹; *Stanislav Gyoshev*¹; *Dimitar Karastoyanov*¹; ¹IICT - Bulgarian Academy of Sciences

K-25: Analysis of Rheological Behavior by the Method Squeeze Flow in Mortars Incorporated with Ornamental Stone Residue: *Gustavo Xavier*¹; *Gabrielly Azevedo*¹; *Pamela Moreira*¹; *Leticia Ciribelli*¹; *Afonso Azevedo*²; *Jonas Alexandre*¹; ¹UENF; ²Instituto Federal Fluminense

K-26: Analysis of the Feasibility of the Use Waste from the Foundry Process in Green Sands in the Manufacturing of Soil-cement Blocks: *Niander Cerqueira*¹; *Victor Souza*¹; *Guilherme Coutinho*¹; *Lucas Silva*¹; ¹Centro Universitário Redentor

K-27: Analysis of the Life Extension of ASTM a-36 Steel Structures Using the Concepts of Fracture Mechanics: *Kayan Carneiro*¹; *Victor Souza*¹; *Niander Cerqueira*¹; *Lucas Costa*¹; *Amanda Lima*¹; *Afonso Azevedo*¹; *Daniel Gallo*¹; ¹UNIRENTOR

K-28: Analysis of the Thermal Behavior of Buriti Fiber: *Luana Demosthenes*¹; *Sergio Monteiro*¹; *Lucio Nascimento*¹; *Michelle Oliveira*¹; *Fabio Filho*¹; ¹Military Institute Engineering

K-29: Application of Gas Pycnometry for Measurement of Absolute Specific Mass, Open Porosity and Cellulose Content in Mallow Natural Fibers: *Lucio Nascimento*¹; *Sérgio Monteiro*¹; *Jheison dos Santos*¹; *Luana Demosthenes*¹; *Ulisses Oliveira*¹; ¹Instituto Militar de Engenharia

K-30: Automated Optical Microstructural Characterization of Thermal and Cold Spray Coatings: *Satya Ganti*¹; *Elizabeth Jenkins*¹; *William Davis*¹; *Veeraraghavan Sundar*¹; ¹UES Inc

K-31: Ceramic Properties: Clay Smectite Synthetic: *Thamyres de Carvalho*¹; *Camila Maggi*¹; *Margarita Bobadilla*¹; *Edemario Hidelbrando*²; *Maria Silva-Valenzuela*¹; *Roberto Neves*²; *Francisco Valenzuela - Diaz*¹; ¹Polytechnic School of the University of São Paulo; ²Federal University of Pará

K-32: Chemical and Instrumental Characterization of a Sulphosalt Lead Type Jamesonite: *M Reyes Perez*; *Francisco Barrientos*; *Miguel Perez Labra*; *Julio Juarez Tapia*; *Elia Palacios Beas*; *Ivan Reyes Domínguez*; *Mizraim Flores Guerrero*; *Michell Teja Ruiz*; *Carlos Gutiérrez García*; ¹

K-33: Characterization of a Composite of High Impact Polystyrene,

Pseudoboehmite and Graphene Oxide: *Antonio Munhoz*¹; Caroline Valadão Pacheco¹; Henrique Tadeu T. S. Melo²; Renato Meneghetti Peres¹; Leonardo Gondim de Andrade e Silva³; Leila Figueiredo de Miranda¹; Marcos Romero Filho¹; ¹U.P.Mackenzie; ²UNIGEL; ³IPEN

K-34: Characterization of Antistatic Packaging Based on PET/rGO: *Leila Miranda*¹; Antonio Munhoz Junior¹; Terezinha Masson¹; Leonardo Andrade e Silva¹; Karl Friehe¹; ¹Universidade Presbiteriana Mackenzie

K-35: Characterization of Fique Fibers Functional Groups by Infrared Spectroscopy: *Artur Campos Pereira*¹; Sergio Monteiro²; Michelle Oliveira²; Foluke de Assis²; ¹Uenf Rio De Janeiro; ²Military Institute of Engineering

K-36: Characterization of Oxides from Al-Mg-Zn Alloys with Heat Treatment, with Scanning Electron Microscopy and Fluorescence Microscopy: Aline Hernández¹; Bernardo Campillo²; Sergio Serna³; Álvaro Torres⁴; *Natalia Loera*¹; ¹Facultad de Ingeniería, Universidad Anáhuac México; ²Facultad de Química, Universidad Nacional Autónoma de México; ³UAEM; ⁴CENIDET

K-37: Characterization of Printed Circuit Boards of Obsolete (PCBs) Aimed at the Production of Copper Nanoparticles: *Thamiris Martins*¹; Karen Gomes²; Carlos Rosario¹; *Denise Espinosa*¹; Jorge Tenório¹; ¹University of São Paulo; ²Faculdades Oswaldo Cruz

K-38: Comparative Analysis of Dynamic Impact Tests between the Charpy V - Notch Test and the Drop Tower Test: *Juan Escobedo-Diaz*¹; Chaitanya Gunturi¹; Md. Islam Ashraful¹; ¹University of New South Wales

K-39: Comparative Study of the Use of Rice Husk Ashes and Graphite as Fillers in Polypropylene Matrix Composites: Alex Monteiro¹; Daili Barreira¹; Rene Oliveira¹; Suellen Bartolomei¹; *Esperidiana Moura*¹; ¹Nuclear & Energy Research Institute

K-41: Development of Biocomposite Materials from Biodegradable Polymer and Bio-hydroxyapatite Derived from Eggshells for Biomedical Applications: Pedro Reis¹; Julyana Santana¹; Rene Oliveira¹; Vijaya Rangari¹; Felipe Lourenço¹; *Esperidiana Moura*¹; ¹Inst De Pesquisas Energéticas E Nucleares

K-42: Development of Methodology for the Characterization and Incorporation of Waste from the Paper Industry in Cementitious Materials: *Afonso Azevedo*¹; Jonas Alexandre²; Markssuel Marvila²; Euzébio Zanelato²; Beatryz Mendes³; Niander Cerqueira²; Sergio Monteiro⁴; Gustavo Xavier²; Leonardo Pedroti³; Victor Souza⁵;

¹Instituto Federal Fluminense; ²UENF; ³UFV; ⁴IME; ⁵Uniredentor

K-43: Differences in Properties of Pro-degradant Added PP and Gamma Irradiated PP under Environmental Aging: Rebeca Romano¹; Washington Oliani¹; Vijaya Kumar²; Duclerc Parra¹; Ademar Lugão¹; ¹Nuclear Energy Research Inst – IPEN/USP; ²Tuskegee University

K-44: Discussion on the Measures of Intelligent Manufacturing in Steel Industry of China: Dongdong Zhou¹; Ke Xu¹; Peng Zhou¹; ¹University of Science and Technology Beijing

K-45: Effect of Phosphate Antioxidant on Resisting to Buildups Formation of Carbon Sleeves in Continuous Annealing Furnace for Silicon Steel Production: He Mingsheng¹; Bowen Li²; Xuecheng Gong³; Jing Zhang³; Wangzhi Zhou¹; Jian Xu³; ¹R&D Center of Wuhan Iron & Steel Co., Ltd; ²Department of Materials Science and Engineering, Michigan Technological University; ³Silicon Steel Division of Wuhan Iron & Steel Co., Ltd.

K-46: Effect of the Incorporation of Iron Ore Tailings on the Properties of Clay Bricks: Beatryz Mendes¹; Leonardo Pedroti¹; Rita de Cássia Alvarenga¹; Mauricio Paulo Fontes¹; Pedro Drumond¹; Anderson Pacheco¹; Márcia Lopes¹; Afonso Azevedo²; ¹Federal University of Viçosa; ²State University of Northern Rio de Janeiro

K-47: Effect Study of the Incorporation of the Green Lake Clay in the Polypropylene Homopolymer Properties: Jorge Sales¹; Angel Ortiz¹; Patricia Poveda¹; Francisco R. Valenzuela-Diaz²; Leonardo Silva¹; ¹Instituto de Pesquisas Energéticas e Nucleares - IPEN-CNEN/SP; ²Universidade de São Paulo, Escola Politécnica, Dep. de Eng. Metalúrgica e de Materiais

K-48: Electron Beam Effect on the Thermal and Mechanical Properties Analysis of DGEBA/EPDM Compound: Anderson Mesquita¹; Ian Cavalcante¹; Leonardo Silva¹; ¹Instituto De Pesquisas Energéticas E Nucleares - IPEN

K-49: Energy Absorption by Aluminum Foam After Ballistic Impact: Fabio Garcia Filho¹; Sergio Monteiro¹; Luana Demosthenes¹; Michelle Oliveira¹; ¹Military Institute of Engineering

K-50: Evaluation of Technological Properties of Soil-cement Blocks Using Experimental Design of Mixtures: Afonso Azevedo¹; Jonas Alexandre²; Markssuel Marvila²; Euzébio Zanelato²; Gustavo Xavier²; Niander Aguiar²; Victor Souza³; Thuanny Lima⁴; Sergio Monteiro⁴; ¹Instituto Federal Fluminense; ²UENF; ³Uniredentor; ⁴IME

K-51: Evaluation of the Adhesion of Mortar to Substrates by Vertical Launching: Euzebio Zanelato¹; Jonas Alexandre¹; Afonso Azevedo¹; Markssuel Marvila¹; Sergio Monteiro¹; Gustavo Xavier¹; ¹UENF

K-52: Exploration of Humic as the Binder of Silicon-based Anode for Lithium-ion Batteries: Shuzhen Yang¹; Guihong Han¹; Yanfang Huang¹; Jiongtian Liu¹; ¹Zhengzhou University

K-53: High-resolution Transmission Electron Microscopy of Interfacial Phases at Twin Boundaries in β Titanium Alloys: Jian Sun¹; ¹Shanghai Jiao Tong University

K-54: Impact Response of Bamboo *Guadua Angustifolia* Kunth: Julian Rua¹; Mario Buchely²; Henry Colorado¹; ¹Universidad De Antioquia; ²Missouri University of Science and Technology

K-55: Incorporation of EVA Residue for Production of Lightweight Concrete: Raiza Machado¹; Luiz Pereira¹; Euzebio Zanelato²; André Manhães¹; Markssuel Marvila¹; Afonso Azevedo¹; Jonas Alexandre²; Sergio Monteiro³; Lucio Petrucci¹; ¹UCAM; ²UENF; ³IME

K-57: Investigation of Equipment Wear Issues in Biomass Pre-processing and Pre-treatment: Jun Qu¹; James Keiser¹; Vicki Thompson²; Erik Kuhn³; Ed Wolfrum³; ¹Oak Ridge National Laboratory; ²Idaho National Laboratory; ³National Renewable Energy Laboratory

K-58: Investigation on Mechanical Behaviors of Polyamide 11 Reinforced with Halloysite Nanotubes: Danae Francisco¹; Lucilene Paiva²; Wagner Aldeia³; Ademar Lugao³; Esperidiana Moura¹; ¹Nuclear & Energy Research Institute; ²Institute for Technological Research of State of São Paulo, IPT; ³Institute for Technological Research of State of São Paulo, IPT

K-59: Magnetic, Mossbauer and Structure Studies of Exchange Bias in Fe₃O₄-Gamma-Fe₂O₃ Core-Shell Nanoparticles of Fixed Core Diameter and Variable Shell Thicknesses: Imaddin Al-Omari¹; I. Obaidat²; C. Nayek²; K. Manna³; G. Bhattacharjee⁴; A. Gismelseed¹; ¹Sultan Qaboos University; ²United Arab Emirates University; ³Max-Planck-Institute for Chemical Physics of Solids; ⁴Saha Institute of Nuclear Physics

K-61: Measurement of SnO₂ Nanoparticles Coating on Titanium Oxide Nanotube Arrays Using Grazing Incidence X-ray Diffraction: Tang Yunhui¹; Bo Wang¹; Hongyi Li¹; Mingsheng He²; ¹Beijing University of Technology; ²R&D Center of WISCO

K-62: Microstructural and Mechanical Characterization of the Low Carbon Steel Nitrided at Different Condition: Ariosto Medina¹;

Claudio Aguilar²; Luis Béjar¹; Jesús Valdes¹; Joaquín Oseguera³; ¹Universidad Michoacana de San Nicolás de Hidalgo; ²Universidad Técnica Federico Santa María; ³Instituto tecnológico y de Estudios Superiores de Monterrey Campus Estado de México

K-63: Microstructural Characterisation of a High Strength Steel Subjected to Localised Blast Loading: *Simon Higgs*¹; Ali Ameri¹; Brodie McDonald²; Wayne Hutchinson¹; Huon Bornstein²; Juan Escobedo-Diaz¹; ¹University of New South Wales; ²DST-G

K-65: Mining Waste Used as Ceramic Coating on Aluminum Alloy: *Maria Lucia Antunes*¹; Carime Souza¹; Renan Moraes¹; Elidiane Rangel¹; Nilson Cruz¹; Antonio Munhoz²; ¹Sao Paulo State University (UNESP); ²Mackenzie - Universidade Presbiteriana Mackenzie

K-66: Mortars with Pineapple Fibers for Use in Structural Reinforcement: Markssuel Marvila¹; Jonas Alexandre¹; Afonso Azevedo¹; Euzébio Zanelato¹; Sergio Monteiro²; Daiane Cecchin³; Lucas Amaral¹; ¹Universidade Estadual do Norte Fluminense Darcy Ribeiro; ²Instituto Militar de Engenharia; ³UFF

K-67: Multilayered Armor System with Guaruman Fiber Composite: *Raphael Reis*¹; Larissa Nunes¹; Fabio Filho¹; Sergio Monteiro¹; ¹IME

K-68: Obtainment and Characterization of Nanocellulose from Sugarcane Bagasse: Marcus Seixas¹; *Esperidiana Moura*²; Hélio Wiebeck¹; ¹University of Sao Paulo; ²IPEN

K-69: Performance of Epoxy Matrix Reinforced with Fique Fibers in Pullout Tests: *Michelle Oliveira*¹; Artur Camposo¹; Fabio Garcia¹; Luana Demosthenes¹; Sergio Monteiro¹; ¹Militar Institute of Engineering

K-70: Physical Property of Molten Al₂O₃ and ZrO₂ Measured by Aerodynamic Levitation Technique: *Toshiki Kondo*¹; Hiroaki Muta¹; Ken Kurosaki¹; Yuji Ohishi¹; ¹Osaka University

K-71: Production and Characterization of a Hybrid Composite of Polypropylene Reinforced with Piassava (*Attalea funifera* Martius) Fiber and Light Green Clay Nanocomposites: *Sabrina Correia*¹; Pedro Cruz²; Tasson Rodrigues³; Alex Monteiro²; Francisco Valenzuela Díaz¹; Esperidiana Moura²; ¹University of Sao Paulo; ²Nuclear & Energy Research Institute; ³Butantan Institute

K-72: Properties of Residual Green Sand and the Possibility of Using it in the Production of Pressed Blocks: Victor Souza¹; *Niander Cerqueira*¹; Lucas Silva¹; Guilherme Coutinho¹; Amanda Lima¹; ¹Centro Universitário Redentor

K-73: Proposal of Dosing of Mortars Using Simplex Network:

Markssuel Marvila¹; Jonas Alexandre¹; Afonso Azevedo¹; Euzébio Zanelato¹; Sergio Monteiro²; Niander Cerqueira¹; ¹Universidade Estadual do Norte Fluminense Darcy Ribeiro; ²IME

K-74: Recycled Gypsum Particles Incorporation in Recycled Expanded Polystyrene by Biodegradable Solvent – Preparation and Characterization: *Suellen Bartolomei*¹; Esperidiana Moura²; Helio Wiebeck¹; ¹University of Sao Paulo; ²Nuclear & Energy Research Institute

K-76: Structural Analysis of Sintered Products of BaTiO₃ Doped with Sm³⁺: *J.P. Hernández-Lara*¹; Miguel Perez-Labra¹; C.C. Gutierrez-Hernández¹; F. R. Barrientos-Hernández¹; J. A. Romero-Serrano²; A. Hernández-Ramírez²; M. Reyes-Pérez¹; J. C. Juárez-Tapia¹; V. E. Reyes-Cruz¹; ¹UAEH Mexico; ²ESIQIE-IPN México

K-78: Study of the Electrical Properties of rGO Obtained by Different GO Reduction Methods: *Leila Miranda*¹; Paulo Victor Gomes¹; Fabio Jesus Almeida¹; Leonardo Andrade e Silva²; Antonio Munhoz Junior²; Terezinha Masson²; ¹Universidade Presbiteriana Mackenzie; ²Instituto de Pesquisas Energéticas e Nucleares

K-79: Study of the Influence of Organic Peroxide and Elastomeric Modifier in the Mechanical and Flow Properties of the Recycled Polypropylene: *Patricia Poveda*¹; *Leonardo Silva*¹; ¹University of Sao Paulo

K-80: Study on Powder and 3D Printing Properties of 316L Stainless Steel Prepared by Vacuum Gas Atomization: *Likun Li*¹; ¹Wuhan Iron and Steel Research Inst

K-81: Synthesis and Ferroelectric Properties of BaTiO₃-based Ceramics Doped with La³⁺ by Solid State Route: *Barrientos Hernández Francisco Raúl*¹; Pérez Labra Miguel¹; Juárez Tapia Julio César¹; Reyes Pérez Martín¹; Hernández Lara Juan Pablo¹; Cardoso Legorreta Edgar¹; ¹Universidad Autónoma del Estado de Hidalgo

K-82: Synthesis and Structural Characterization of Europium Titania (Eu₂TiO₅): *Juan Pablo Hernandez Lara*¹; Miguel Perez Labra¹; Francisco Raúl Barrientos Hernández¹; Aurelio Hernández Ramírez²; José Antonio Romero Serrano²; Martin Reyes Peréz¹; Julio Cesar Juárez Tapia¹; A. M. Teja-Ruiz¹; ¹Aactym-Uaeh; ²ESIQIE-IPN

K-83: The Comparison of Mechanical Properties on Ni-base Superalloy Casting Alloys for A-USC Power Generation Application: *Jaihyun Park*¹; ¹Rist

K-84: The Properties of the Soil in the Municipal Area of Campos Dos Goytacazes - Rj, Brazil, and the Possibility of Its Use in the Production on Pressed Blocks: *Niander Cerqueira*¹; Victor Souza²;

Guilherme Coutinho²; Lucas Silva²; Afonso Azevedo¹; Daniel Gallo²; Euzébio Zanelato¹; ¹Uenf; ²UNIRENTOR

K-86: Thermal Conductivity of Liquid Phase Al-Si Alloys: *Yifan Sun*¹; Hiroaki Muta¹; Ken Kurosaki¹; Yuji Ohishi¹; ¹Osaka University

K-88: Thermophysical Properties of Molten Zr-O Measured by Electrostatic Levitation: *Kouta Kurokawa*¹; Hiroaki Muta¹; Ken Kurosaki¹; Yuji Ohishi¹; ¹Osaka University

K-89: Waste Electrical and Electronic Equipment (WEEE) Added to Concrete: *Maria Lucia Antunes*¹; Flavia Almeida¹; Paulo Oliveira²; Sandro Mancini¹; Antonio Munhoz³; Afonso Azevedo⁴; ¹Sao Paulo State University (UNESP); ²Uniso Universidade de Sorocaba; ³Mackenzie - Universidade Presbiteriana Mackenzie; ⁴IFF - Instituto Federal fluminense

MATERIALS DESIGN

Computational Approaches for Big Data, Artificial Intelligence and Uncertainty Quantification in Computational Materials Science — Poster Session

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Liang Qi, University of Michigan; Francesca Tavazza, National Institute of Standards and Technology; Christopher Woodward, Air Force Research Laboratory; Adrian Sabau, Oak Ridge National Laboratory; Houlong Zhuang, Arizona State University; Sugata Chowdhury, National Institute of Standards and Technology

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M-5: Efficacy of a Mathematical Model in Mimicking Trabecular Bone Structures Using Deep Learning Techniques: Neda Shafiei¹; Joel Gomez¹; Edward Guo²; *Xiaodu Wang*¹; ¹UTSA; ²Columbia University

M-6: Material Parameter Estimation for Phase-field Model of Binary Alloy Solidification Using EnKF-based Data Assimilation: *Kazuki Takahashi*¹; Akinori Yamanaka¹; Kengo Sasaki²; ¹Tokyo University of Agriculture and Technology; ²Kozo Keikaku Engineering Inc.

M-8: Prediction of Biaxial Tensile Deformation Behavior of

Aluminum Alloy Using Crystal Plasticity Finite Element Method and Machine Learning: *Kohta Koenuma*¹; Akinori Yamanaka¹; Toshihiko Kuwabara¹; ¹Tokyo University of Agriculture and Technology

M-9: Sequential Experiments Design for Acceleration the Developments of NiTi-based Shape Memory Alloys: *Sen Liu*¹; Behnam Amin-Ahmadi¹; Branden Kappes¹; Aaron Stebner¹; Xiaoli Zhang¹; ¹Colorado School of Mines

M-10: Thermocouple Temperature Measurement and Thermal Modelling of Zircaloy-4 during Electron Beam Welding: *Lord Nayak*¹; ¹Indian Institute of Technology Kharagpur

MATERIALS DESIGN

Computational Materials Discovery and Design — Poster Session

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Oliver Johnson, Brigham Young University; Arunima Singh, Arizona State University; Jake Bair, Pacific Northwest National Laboratory; Christopher Weinberger, Colorado State University; Timofey Frolov, Lawrence Livermore National Laboratory; Ning Zhang, Colorado School of Mines; Fadi Abdeljawad, Clemson University; Richard Hennig, University of Florida; Mikhail Mendeleev, Ames Laboratory; Avinash Dongare, University of Connecticut

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M-12: Electric Properties of Isovalently Substituted Bi₂O₂Se: A Computational Study: *Kerong Hu*¹; Jian Han¹; Ben Xu¹; ¹Tsinghua University

PHYSICAL METALLURGY

Computational Thermodynamics and Kinetics — Poster Session

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Fadi Abdeljawad, Clemson University; Hesam Askari, University of Rochester; Emine Gulsoy, Northwestern University; Joel Berry, University of Pennsylvania; Damien Tournet, IMDEA Materials; Mohsen Asle Zaeem, Colorado School of Mines; James Morris, Oak Ridge National Laboratory

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O-2: Ab Initio Study on the Oxidation Mechanism of Millerite: Xiaolu Xiong¹; Xionggang Lu¹; Guangshi Li¹; Hongwei Cheng¹; Qian Xu¹; Shenggang Li²; ¹Shanghai University; ²Key Laboratory of Low-Carbon Conversion Science and Engineering, Shanghai Advanced Research Institute, Chinese Academy of Sciences

O-3: Diffusion Kinetics of Vacancy in Hydrogen Environment: First-principles and Molecular Dynamics Modeling and Simulation: Jun-Ping Du¹; W. T. Geng²; Kazuto Arakawa³; Shigenobu Ogata²; ¹Kyoto University; ²Osaka University; ³Shimane University

O-4: Effect of Substituted Atoms for Stacking Fault Formation in LPSO System: Shoya Kawano¹; Satoshi Iikubo¹; ¹Kyushu Institute of Technology

O-5: Kinetic Model of Silica Dissolution in CaO-SiO₂-MgO-Al₂O₃ Slag System: Haifei An¹; Jie Li¹; Aimin Yang¹; Weixing Liu¹; Can Tian¹; ¹North China University of Science and Technology

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Fracture Processes of Thin Films and Nanomaterials — Poster Session

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

Program Organizers: Daniel Kiener, University of Leoben; Megan Cordill, Erich Schmid Institute; Johannes Ast, Empa, Swiss Federal Laboratories for Materials Science and Technology; Brad Boyce, Sandia National Laboratories

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Session Chairs: Daniel Kiener, Montanuniversität Leoben; Megan Cordill, Erich Schmid Institute of Materials Science

N-22: Cohesive and Adhesive Failure of Cu-Zr Amorphous Films on Polyimide Substrates: Effects of Deformation-induced Devitrification: *Kai Wu*¹; Jinyu Zhang¹; Gang Liu¹; Jun Sun¹; ¹Xi'an Jiaotong University

N-23: Dislocation-induced Ratcheting Failure in Single Crystalline Face Centered Cubic Thin Films: *Nicole Aragon*¹; Ill Ryu¹; ¹University of Texas at Dallas

N-24: Factors Controlling Thin Film Adhesion of Nanocrystalline NiW Alloys: *Longchang Ni*¹; Ryan Pocratsky¹; Maarten de Boer¹; ¹Carnegie Mellon University

N-25: Planarity of Deformation and Representative Volume Elements of Heterogenous Network Thin Films: *Sarah Paluskiewicz*¹; Christopher Muhlstein¹; ¹Georgia Institute of Technology

N-26: Tearing and Damage Evolution in Al Thin Films: *Camilla Johnson*¹; Syed Javaid¹; Wade Lanning¹; Christopher Muhlstein¹; ¹Georgia Institute of Technology

N-27: Zones of Active Plasticity: The Three Damage Zones in Ductile Tearing of Metallic Thin Films: *Syed Javaid*¹; Wade Lanning¹; Christopher Muhlstein¹; ¹Georgia Institute of Technology

MATERIALS DESIGN

Gamma (FCC)/Gamma-Prime (L12) Co-Based Superalloys III — Poster Session

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

Program Organizers: Michael Titus, Purdue University; David Dye, Imperial College; Eric Lass, National Institute of Standards and Technology; Katelun Wertz, Air Force Research Laboratory; Christopher Zenk, Ohio State University

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M-13: Diffusion in FCC Co-rich Co-Cr-Ni-Ta Alloys: *Kil-Won Moon*¹;

M. E. Williams¹; C. E. Campbell¹; ¹National Institute of Standards and Technology

M-14: Effects of Cr and Al Additions on the Microstructure and Mechanical Properties of Co-Ti-W Based Alloys: *Boryung Yoo*¹; Hye Ji Im¹; Jae-Bok Seol²; Pyuck-Pa Choi¹; ¹KAIST; ²NINT

M-15: The Effect of Titanium on the Tungsten-free Cobalt-base superalloys: *Semanti Mukhopadhyay*¹; Prafull Pandey²; Surendra Makineni³; Krishanu Biswas⁴; Kamanio Chattopadhyay²; Dierk Raabe³; Baptiste Gault³; ¹Ohio State University; ²Indian Institute of Science; ³Max-Planck-Institut für Eisenforschung GmbH; ⁴Indian Institute of Technology, Kanpur

ENERGY & ENVIRONMENT

Green Materials Engineering: An EPD Symposium in Honor of Sergio Monteiro — Poster Session

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Shadia Ikhmayies, Al Isra University; Jian Li, CanmetMATERIALS; Carlos Mauricio Vieira, State University of the North Fluminense; Fabio Braga, National Service of Industrial Apprenticeship (SENSI)

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I-43: Artificial Stones from Marble Waste: *Ruben Jesus Rodriguez*¹; Fernanda Souza¹; Tcharllis Dimartini¹; Carlos E. Ribeiro²; ¹Universidade Estadual Do Norte Fluminens E; ²Instituto Federal do Espirito Santo

I-44: Charpy Impact Test of Polymeric Composites with Epoxy Resin Reinforced by Jute Fabric: José Machado¹; Juliana Carvalho¹; Anna Carolina Neves¹; Felipe Lopes¹; Sérgio Monteiro¹; *Carlos Vieira*¹; ¹State University of Northern of Rio de Janeiro

I-45: Development of Silicate Glasses with Granite Waste: Michelle Babisk¹; Vinicius Gomes¹; *Carlos Mauricio Vieira*¹; Francisco Vidal¹; Monica Gadioli¹; Juraci Sampaio¹; ¹State University of Northern Rio de Janeiro

I-46: Evaluation of Feldspathic Rock Waste on the Production of Structural Ceramics with Greater Value Added: *Lucas Amaral*¹; Geovana Carla Delaqua¹; Micaela Nicolite¹; Carlos Maurício Vieira¹;

Sérgio Neves²; ¹State University of Northern Rio de Janeiro; ²Military Engineering Institute

I-47: Evaluation of Mechanical, Thermal, and Hydrophobic Properties in Blends before and after the Incorporation of Organic Compound and SiO₂: Julio Harada¹; Alana Souza¹; Daniel Rocha¹; *Leonardo Silva*²; Derval Rosa¹; ¹UFABC; ²IPEN

I-48: Evaluation of the Mechanical Characteristics of Geopolymerized Ceramic from Granulated Blast Furnace Slag: Kátia Faria¹; *Carlos Mauricio Fontes Vieira*¹; Wesley Macario Ferreira¹; Marcos Yuri Silva Fagundes¹; ¹Universidade Estadual Norte Fluminense Darcy Ribeiro

I-49: Flexural Test of Composite Eco-friendly Composites Reinforced by Piassava Fiber: *Juliana Carvalho*¹; Juliana Faria¹; Felipe Lopes¹; Sérgio Monteiro¹; Carlos Vieira¹; ¹State University of Northern of Rio de Janeiro

I-50: Influence of Eletrofunded Alumina Residue on Red Ceramic Properties: Micaela Nicolite¹; *Lucas Amaral*¹; Geovana Carla Delaqua¹; Fernando Vernilli²; Carlos Maurício Vieira¹; Sérgio Neves³; ¹State University of Northern Rio de Janeiro; ²University of Sao Paulo; ³Military Engineering Institute

I-51: Izod Impact Testing Composites with Vegetal Polyurethane Matrix Reinforced by Cotton Fabric: Carolina Ribeiro¹; Juliana Carvalho¹; Felipe Lopes¹; Sérgio Monteiro¹; *Carlos Vieira*¹; ¹State University of Northern of Rio de Janeiro

I-52: Mechanical Resistance of Artificial Stone Composite Using Waste from Fluorescent Lamp Glass in Polymeric Matrix: Lucas Martins¹; Elaine Carvalho¹; *Carlos Maurício Vieira*¹; Larissa Ribeiro¹; ¹State University of Northern of Rio de Janeiro

I-53: Performance of Natural Curaua Non-woven Fabric Composites as Stand-alone Targets against Standard 9 mm and 7.62 mm Projectiles: *Fabio Braga*¹; Michelle Oliveira²; Fabio Garcia Filho²; Sergio Monteiro²; Édio Lima Jr.²; ¹Faculty of the National Service of Industrial Apprenticeship (SENAI); ²Military Institute of Engineering

I-54: Reuse Of Quarry And Industrial Waste For The Production Of Artificial Ornamental Stones: Carlos Agrizzi¹; *Carlos Maurício Vieira*¹; Elaine Carvalho¹; Mônica Gadioli²; ¹UENF; ²CETEM

I-55: Reuse of Quarry Waste in Artificial Stone Production with using Vacuum, Compression and Vibration: Elaine Carvalho¹; Juan Peixoto Barroco Magalhães¹; Rubén Sánchez Rodríguez¹; Eduardo Carvalho¹; Sérgio Neves Monteiro²; *Carlos Maurício Vieira*¹; ¹State

University of the Northern Rio de Janeiro;²IME-Military Engineering Institute

I-56: Reuse of the Iron Ore Residue through the Production of Coating: Elaine Carvalho¹; Larissa Ribeiro¹; Maria Luiza Menezes Gomes¹; Mônica Borlini¹; *Carlos Maurício Vieira*¹; Sérgio Neves Monteiro²; ¹State University of the Northern Rio de Janeiro; ²IME-Military Engineering Institute

I-57: Soda-lime Glass Waste Utilization for Red Ceramic Production: Pâmela Busch¹; *Lucas Amaral*¹; Geovana Carla Delaqua¹; Carlos Maurício Vieira¹; Sérgio Neves²; ¹State University of Northern Rio de Janeiro; ²Military Engineering Institute

I-58: Study of the Effect of Incorporation of Laminated Flat Glass' Waste in a Polymeric Matrix: Maria Luiza Gomes¹; Juan Peixoto¹; Elaine Carvalho¹; Rubén Sánchez Rodríguez¹; *Carlos Maurício Vieira*¹; Renan Guimarães¹; ¹Universidade Estadual do Norte Fluminense Darcy Ribeiro

I-59: Study of the Incorporation of Waste from the Paper Industry in Ceramic Tiles: *Afonso Azevedo*¹; Beatryz Mendes²; Markssuel Marvila³; Jonas Alexandre³; Euzébio Zanelato³; Gustavo Xavier³; Niander Cerqueira³; Sergio Monteiro⁴; Thuanny Lima³; ¹Instituto Federal Fluminense; ²UFV; ³UENF; ⁴IME

I-60: Study of the Technological Properties of Multiple Mortar use with Efficient Addition of Rock Waste: Micaela Nicolite¹; *Lucas Amaral*¹; Geovana Carla Delaqua¹; Markssuel Marvila¹; Jonas Alexandre¹; Carlos Maurício Vieira¹; Sérgio Neves²; ¹State University of Northern Rio de Janeiro; ²Military Engineering Institute

I-61: Technological Properties of Brick Waste-based Geopolymer: Kátia Faria¹; *Carlos Mauricio Fontes Vieira*¹; Dylmar Dias¹; Marcos Yuri Silva Fagundes¹; Wesley Macario Ferreira¹; ¹Universidade Estadual Norte Fluminense Darcy Ribeiro

I-62: Use of Waste of Ornamental Stone in Ceramic Mass Incorporation in Brazil: Maria Angélica Kramer Sant'Ana Sant'Ana¹; Mônica Castoldi Borlini Gadioli¹; Michelle Pereira Babisk²; Elaine Carvalho²; *Carlos Maurício Vieira*²; ¹Mineral Technology Center; ²State University of the Northern Rio de Janeiro

ADVANCED MATERIALS

High Entropy Alloys VII — Poster Session

Sponsored by: TMS: Alloy Phases Committee

Program Organizers: Xie Xie, FCA US LLC; Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; E-Wen Huang, National Chiao Tung University; Gongyao Wang, Alcoa Technical Center; Srivatsan Tirumalai, The University of Akron

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J-19: A Comparative Study of Critical Pitting Temperature (CPT) of CoCrFeNi and CoCrFeNiMn High Entropy Alloys: *Hamid Torbati-Sarraf*¹; Mitra Shabanisamghabady¹; Garrett J. Pataky¹; Paul Jablonski²; Amir Poursaei¹; ¹Clemson University; ²National Energy Technology Laboratory

J-20: A Thermodynamic Modelling of Spinodal Decomposition Solid-solution Phases in the Al-Cu-Fe-Mn High-entropy Alloy System: *Hyeon-Seok Do*¹; Jongun Moon¹; Hyoung Seop Kim¹; Byeong-Joo Lee¹; ¹Pohang Institute of Science & Technology

J-21: Calphad Modeling and Microstructure Stability of Novel Refractory High Entropy Alloys NbMoCrTiAl and TaMoCrTiAl: *Franz Mueller*¹; Bronislava Gorr¹; Hans-Jürgen Christ¹; Hans Chen²; Alexander Kauffmann²; Martin Heilmaier²; ¹Universität Siegen; ²Karlsruher Institut für Technologie (KIT)

J-22: Combinatorial Screening Approach in Developing Non-equiatomic High Entropy Alloys: *Azin Akbari*¹; Artashes Ter-Isahakyan¹; T John Balk¹; ¹University of Kentucky

J-23: Computational Design of High Strength High-entropy Alloys: *Won-Mi Choi*¹; Yong Hee Jo¹; Sunghak Lee¹; Byeong-Joo Lee¹; ¹Pohang Institute of Science & Technology

J-24: Deformation-induced Amorphization Generates a Novel Serrated Behavior in an FCC Structured High-entropy Alloy: *Kaisheng Ming*¹; Xiaofang Bi²; Jian Wang¹; ¹University of Nebraska-Lincoln; ²Beihang University

J-25: Effect of Annealing Heat Treatment on Microstructural Evolution and Tensile Behavior of Al_{0.5}CoCrFeMnNi High-entropy Alloy: *Jeong Min Park*¹; Jongun Moon¹; Jae Wung Bae¹; Jaimyun Jung¹; Sunghak Lee¹; Hyoung Seop Kim¹; ¹Pohang University of Science and Technology

J-26: Effect of Composition on Microstructure and Deformation

Behavior of Thin Film AlCoCrFeNi-based High-entropy Alloys: *Seungjin Nam*¹; Junyeon Hwang²; Jaebeom Lee³; Jiyoung Kim³; Moon Kim³; Hyunjoo Choi¹; ¹Kookmin University; ²Korea Institute of Science and Technology; ³The University of Texas at Dallas

J-27: Effect of Stress Triaxiality and Strain Rate on the Failure Behavior of Cr-Mn-Fe-Co-Ni Alloys: *JeongWon Yeh*¹; Kook Noh Yoon¹; Hyun Seok Oh¹; Sang Jun Kim¹; Eun Soo Park¹; ¹Seoul National University

J-28: Effects of Ti and Al Additions on Irradiation Behavior of FeMnNiCr Based High Entropy Alloys: *Andrew Hoffman*¹; Haiming Wen¹; Li He²; Kumar Sridharan²; ¹Missouri University of Science & Technology; ²University of Wisconsin

J-29: Extreme Stereochemically-driven Magnetic Disorder in Entropy-stabilized Oxides: *Peter Meisenheimer*¹; Logan Williams¹; Emmanouil Kioupakis¹; John Heron¹; ¹University of Michigan

J-30: Fabrication and Characterization of Non-equiatomic AlZnCuFeSi High Entropy Alloy by Mechanical Alloying: *Ashutosh Sharma*¹; Minseok Oh¹; Min Chul Oh¹; Byungmin Ahn¹; ¹Ajou University

J-31: First-principles Methods of Investigating Elastic Properties and Stacking Fault Energies in Refractory BCC High-entropy Alloys: *Joshua Strother*¹; Alexandra Scheer¹; Chelsey Hargather¹; ¹New Mexico Institute of Mining & Technology

J-32: First-principles Prediction of AlCo and AlNi Phase Diagrams: *Yang Huang*¹; Michael Widom¹; ¹Carnegie Mellon University

J-33: High-throughput Experimental Design of High-entropy Alloys: *Antoine Hilhorst*¹; Pierre Bille¹; Audrey Favache¹; Pascal Jacques¹; ¹UCLouvain - iMMC

J-35: Investigate the Microstructural Evolution and Mechanical-properties Improvement of Two Refractory High-entropy Alloy Systems: *Xuesong Fan*¹; Chanho Lee¹; Peter Liaw¹; ¹The University of Tennessee

J-36: Investigation of Interdiffusion in Fe-Ni-Co-Cr-Mn System: *Vivek Verma*¹; Kaustubh Kulkarni¹; ¹Indian Institute Of Technology Kanpur

J-37: Mechanical Behavior and Phase Evolution in the MnFeCoNiCu High Entropy Alloy System: *Benjamin MacDonald*¹; Zhiqiang Fu¹; Lakshmi Sravani Mantha²; Julia Ivanisenko²; Weiping Chen³; Yizhang Zhou¹; Christian Kübel²; Horst Hahn²; Enrique Lavernia¹; ¹University of California Irvine; ²Karlsruhe Institute of Technology;

³South China University of Technology

J-38: Microstructural Evolution and Mechanical Properties of Quaternary AlCoCrNi High Entropy Alloy: Elyorjon Jumaev¹; *Ki Buem Kim*¹; Jin Kyu Lee²; Hyo Soo Lee³; ¹Sejong University; ²Kongju National University; ³Korea Institute of Industrial Technology

J-39: Microstructural Evolution of a Transformation Induced Plasticity High Entropy Alloy upon Friction Stir Processing: *Michael Frank*¹; Saurabh Nene¹; Subhasis Sinha¹; Kaimiao Liu¹; Rajiv Mishra¹; Kyu Cho¹; Brandon McWilliams¹; ¹University of North Texas

J-40: Molecular Dynamics Simulations on the Mechanical Behavior of AlCoCrCu0.5FeNi High-entropy Alloy Nanopillars: *Wei Li*¹; Jing Tang¹; Qingyuan Wang¹; Haidong Fan¹; ¹Sichuan University

J-41: On the Characterization of the Exceptional Fracture Toughness of CrMnFeCoNi High Entropy Alloy: *Antoine Hilhorst*¹; Thomas Pardoën¹; Pascal Jacques¹; ¹UCLouvain - iMMC

J-42: On the Transformation-induced Plasticity in Non-equiatomic FeCoNiCr Medium-entropy Alloys: *Jae Wung Bae*¹; Jaimyun Jung¹; Jeong Min Park¹; Jung Gi Kim¹; Ji Hyun Moon¹; Stefanus Harjo²; Hyung Seop Kim¹; ¹Center for High Entropy Alloys, Pohang University of Science and Technology (POSTECH); ²Japan Proton Accelerator Research Complex

J-43: Orientation and Carbon Content Dependence of Twinning in Single Crystalline FeMnCoCrNi High-entropy Alloys: *Sezer Picak*¹; Peyman Samimi²; Irina V. Kireeva³; Yuri I. Chumlyakov³; Ibrahim Karaman²; ¹Department of Mechanical Engineering, Texas A&M University; ²Department of Materials Science and Engineering, Texas A&M University; ³Tomsk State University, Siberian Physical Technical Institute

J-44: Phase-field Modelling of Transformation Pathway in High-entropy Alloys (HEAs): *Kamal Nath Kadirvel*¹; Yunzhi Wang¹; Hamish Fraser¹; Taiwu Yu¹; Longsheng Feng¹; Jacob Jensen¹; ¹Ohio State University

J-45: Production and Characterization of Reduced Graphene Oxide/FeNiCoCu High Entropy Alloy Nanocomposites: *Serzat Safaltin*¹; Burak Kucukelyas²; Sebahattin Gürmen¹; ¹Istanbul Technical University; ²Bursa Technical University

J-46: Role of Alloying Elements on the Phase Stability and Soft Magnetic Properties of AlFeCoCrMn High Entropy Alloys: *Chanwon Jung*¹; Ku Kang¹; Amalraj Marshal²; Konda Pradeep³; Jae-Bok Seol⁴; Hyuck Mo Lee¹; Pyuck-Pa Choi¹; ¹Korea Advanced Institute

of Science and Technology (KAIST); ²RWTH Aachen University; ³Indian Institute of Technology Madras; ⁴National Institute for Nanomaterials Technology (NINT) POSTECH

J-47: Si-content-dependent Microstructures and Mechanical Properties of (AlCrTiZrNb)-Six-N High Entropy Films: *Wei Li*¹; Jingrui Niu¹; ¹University of Shanghai for Science and Technology

J-48: Study of Serrated Plastic Deformation of Equiatomic CoCrFeMnNi at Cryogenic Temperatures: Aditya Srinivasan Tirunilai¹; Jan Sas²; Klaus-Peter Weiss²; Hans Chen¹; David Geissler³; Jens Freudenberger⁴; *Martin Heilmaier*¹; Alexander Kauffmann¹; ¹Institute for Applied Materials, Karlsruhe Institute of Technology; ²Institute for Technical Physics, Karlsruhe Institute of Technology; ³Leibniz Institute for Solid State and Materials Research Dresden; ⁴Leibniz Institute for Solid State and Materials Research Dresden

J-49: The Effects of Minor Alloying Elements on the He Bubble Formation Resistance of FeCoNiCr-based High-entropy Alloys: *Da Chen*¹; Yang Tong¹; Bin Han¹; Yilu Zhao¹; Jing-Jung Kai²; ¹City University of Hong Kong; ²City University of Hong Kong; National Tsing-Hua University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Mechanical Behavior Related to Interface Physics III — Poster Session

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

Program Organizers: Jason Trelewicz, Stony Brook University; Nathan Mara, University of Minnesota; Erica Lilleodden, Helmholtz-Zentrum Geesthacht; Siddhartha Pathak, University of Nevada, Reno; Jordan Weaver, National Institute of Standards and Technology; Marc Legros, CEMES-CNRS

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N-29: Application of Small Scale Mechanical Testing to Link Interface Properties to Macroscopic Hysteresis Behavior of SiC/SiC Composites: *Joseph Kabel*¹; Darren Parkison¹; Christian Deck²; Yutai Kato³; Peter Hosemann¹; ¹University of California, Berkeley; ²General Atomics; ³Oak Ridge National Laboratory

N-31: Atomistic Study of the Graphene Nanobubbles: *Petr*

*Zhilyaev*¹; *Evgeny Iakovlev*¹; *Iskander Akhatov*¹; ¹Skolkovo Institute for Science and Technology

N-32: Characterization of Microstructure Instability in Ultra-fine Grained Aluminum Films via In-situ TEM Deformation with Automated Crystal Orientation Mapping (ACOM): *Benjamin Shaffer*¹; *E Izadi*¹; *Saul Opie*¹; *Vikram Bathala*¹; *Jagannathan Rajagopalan*¹; *Pedro Peralta*¹; ¹Arizona State University

N-33: Creep of Freestanding Nanocrystalline NiW Thin Films using an Innovative MEMs Test Platform: *Ryan Pocratsky*¹; *Longchang Ni*¹; *Maarten de Boer*¹; ¹Carnegie Mellon University

N-34: Deformation Mechanisms of Nanocrystalline Cu-Ta Alloys: *Raj K. Koju*¹; *Kiran Solanki*²; *Kris A. Darling*³; *Yuri Mishin*¹; ¹George Mason University; ²Arizona State University; ³U.S. Army Research Laboratory

N-35: Effect of Imperfections on the Energetic and Mechanical Characteristics of Semi-coherent Interfaces: *Mohammad Dodaran*¹; *Dorel Moldovan*¹; *Wenjin Meng*¹; *Shuai Shao*¹; ¹Louisiana State University

N-36: Effect of Orientation, Interface Structure, and Interface Chemistry on the Mechanical Response of Pearlite: *Matthew Guziewski*¹; *Shawn Coleman*¹; *Christopher Weinberger*²; ¹U.S. Army Research Laboratory; ²Colorado State University

N-37: Engineering Metal-MAX Multilayered Nanocomposites: Hierarchical Microstructures for Tunable Strength and Toughness: *Siddhartha Pathak*¹; *Garritt Tucker*²; ¹University of Nevada, Reno; ²Colorado School of Mines

N-38: Investigating the Local Fatigue Properties of Materials and Interfaces in Small Dimensions by Dynamic Micropillar Compression: *Benoit Merle*¹; ¹University Erlangen-Nürnberg

N-39: Investigating the Thermo-mechanical Stability of Grain Boundaries in Nanocrystalline Alloys: *Ankit Gupta*¹; *Gregory Thompson*²; *Garritt Tucker*¹; ¹Colorado School of Mines; ²University of Alabama

N-40: Investigation of Metal/ceramic Interface Toughness for Design of Novel Material: *Maeva Cottura*¹; *Mark Asta*²; ¹University of California, Berkeley & Institute Jean Lamour; ²University of California, Berkeley

N-41: Magnetic Flux Trapping at Grain Boundaries in Niobium: A First-principles Study: *Pulkit Garg*¹; *Lance Cooley*²; *Thomas Bieler*³; *Kiran Solanki*¹; ¹Arizona State University; ²Florida State

University; ³Michigan State University

N-42: Mechanical Behavior of Nanotwinned Metals under Micropillar Compression: An In Situ Study: *Jin Li*¹; Tongjun Niu¹; Jie Ding¹; Jaehun Cho¹; Sichuang Xue¹; Zhe Fan¹; Yifan Zhang¹; Haiyan Wang¹; Xinghang Zhang¹; ¹Purdue University

N-43: Probing the Friction Behavior of BCC Metals: *Adam Hinkle*¹; John Curry¹; Andrew Kustas¹; Nicolas Argibay¹; Michael Chandross¹; ¹Sandia National Laboratory

N-44: Qualitative Analysis and Modelling of Deformation in Proton Irradiated Nanocrystalline Copper Tantalum Alloy: *Priyam Patki*¹; Yaqiao Wu²; Janelle Wharry¹; ¹Purdue University; ²Boise State University, Centre for Advanced Energy Studies

N-46: Role of Nanocrystalline Interfaces on the Shock Response and Spall Failure of nanocrystalline nanocomposite Al-Si Systems at the Atomic Scales: *Sumit Suresh*¹; Marco Echeverria¹; Avinash Dongare¹; ¹University of Connecticut

N-47: Tensile Deformation Behavior and Inelastic Strain Recovery in Cu/Co Nanolaminates: *Rohit Berlia*¹; Jagannathan Rajagopalan¹; ¹Arizona State University

N-48: Texture Evolution in Accumulative Rolled Bonded Mg-Nb Composites from Polycrystal to Single Crystal Layers: *Daniel Savage*¹; Irene Beyerlein²; Rodney McCabe³; John Carpenter³; Nathan Mara⁴; Sven Vogel³; Nan Li³; Marko Knezevic¹; ¹University of New Hampshire; ²University of California, Santa Barbara; ³Los Alamos National Laboratory; ⁴University of Minnesota, Minneapolis

N-50: Thermal Stability of Metal-Polymer Interfaces: Barbara Putz¹; Christoph Gammer¹; *Megan Cordill*¹; ¹Erich Schmid Institute for Materials Science

N-51: Tuning the Mechanical Behaviour of Nanocrystalline Austenitic Steel by Proton Irradiation: *Markus Alfreider*¹; Peter Hosemann²; Daniel Kiener¹; ¹University of Leoben; ²University of California, Berkeley

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Micro- and Nanomechanical Testing in Harsh Environments — Poster Session

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

Program Organizers: Verena Maier-Kiener, Montanuniversität Leoben; Sandra Korte-Kerzel, RWTH Aachen; Peter Hosemann, University of California; Afrooz Barnoush, Norwegian University of Science and Technology; Jeffrey Wheeler, ETH Zurich; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

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N-52: Mechanical Behavior of Flash-sintered Yttria Stabilized Zirconia via In Situ Microcompression Tests at Elevated Temperatures: *Xinghang Zhang*¹; Jaehun Cho¹; Amiya Mukherjee¹; R. García¹; Haiyan Wang¹; ¹Purdue University

MATERIALS DESIGN

Modeling and Simulation of Composite Materials — Poster Session

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

Program Organizers: Rakesh Behera, New York University; Dinesh Pinisetty, CSU Maritime Academy; Dzung Luong, New York University

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M-16: Multiscale Modeling of Graphene Nanobubbles: *Evgeny Iakovlev*¹; Petr Zhilyaev¹; Iskander Akhatov¹; ¹Skolkovo Institute of Science and Technology

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Nanoarchitected and Morphology-controlled Nanoporous Materials — Poster Session

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

Program Organizers: Niaz Abdolrahim, University of Rochester; John Balk, University of Kentucky; Michael Demkowicz, Texas A&M University; Christoph Eberl, Fraunhofer IWM

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N-53: Controllable Metal Nanostructures by Thermoplastic Drawing of Metallic Glasses: *Zhonglue Hu*¹; Golden Kumar¹; ¹Texas Tech University

N-54: High-performance Hybrid Electrode Decorated by Well-aligned Nanograss Arrays for Glucose Sensing: *Rui Li*¹; Xiongjin Liu¹; Hui Wang¹; Yuan Wu¹; Zhaoping Lu¹; ¹University of Science and Technology, Beijing

N-55: Mechanical Behavior of Inverse Opals: Mengqi Su¹; Lu An²; Gang Feng²; *Di Zhang*¹; ¹Valparaiso University; ²Villanova University

N-56: Numerical Investigation of Structure-property Relationship in Porous Materials in Terms of Morphology and Topology: *Dongmyung Jung*¹; Yongwoo Kwon¹; ¹Hongik University

N-57: Synthesis of Spherical Strontium Carbonate Powders by Hydrothermal Method: *Xing Wu Zou*¹; Dongping Duan¹; Siming Chen¹; Shuxuan Wang¹; ¹Qinghai Institute of Salt Lakes, Chinese Academy of Sciences

PHYSICAL METALLURGY

Phase Transformations and Microstructural Evolution — Poster Session

Sponsored by: TMS: Phase Transformations Committee

Program Organizers: Sophie Primig, University of New South Wales; Deep Choudhuri, University of North Texas; Klaus-Dieter Liss, Guangdong Technion – Israel Institute of Technology; Megumi Kawasaki, Oregon State University; Matthew Steiner, University of Cincinnati; Yufeng Zheng, Ohio State University; Ashley Paz y Puente, University of Cincinnati; Juan Escobedo-Diaz, University of New South Wales; Dhriti Bhattacharyya, ANSTO; Rajarshi Banerjee, University of North Texas

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O-7: Compositional Effects on Secondary Phases in Al Alloy Powders: *Kyle Fitzpatrick-Schmidt*¹; Victor Champagne²; Danielle Cote¹; ¹Worcester Polytechnic Institute; ²US Army Research Laboratory

O-8: Corner Instability in Single Crystalline Thin Film : A Phase Field Study: *Miral Verma*¹; Rajdip Mukherjee¹; ¹Indian Institute of Technology Kanpur

O-9: Determination of Phase Transformations and Microstructure Evolution of Zr-based Alloys During Thermal Processing: *Clinique Brundidge*¹; John Seidensticker¹; Linda Rishel¹; Tyler Tenkku¹; ¹Naval Nuclear Laboratory

O-10: Development of an Optimized Castable Nanostructured Alloy: *Tim Graening*¹; Lizhen Tan²; Ying Yang²; Yutai Kato²; ¹Karlsruhe Institute of Technology; ²Oak Ridge National Laboratory

O-11: Effect of Cooling Rate of Pb-2.7Sb Alloys on Microstructural Parameters and Corrosion Resistance in Salt Water: *Quentin Boyadjian*¹; Pascal Paillard¹; ¹Institut des Matériaux Jean Rouxel (Nantes)

O-12: Effect of Phosphorus on the Phase Stability of γ - γ' Ni-base Superalloy: *Linhao Li*¹; ¹Illinois Institute of Technology

O-13: Effect of Sm Content and Solidification Rate on Microstructure of SmFe Alloy: *Kun Liu*¹; Yunli Feng¹; Chunyan Song¹; ¹North China University of Science and Technology

O-14: Enhanced Precipitation of Dispersoids and Age Hardening Precipitates in Aluminium Alloys by Cd Addition: *YanJun Li*¹; Feng Qian¹; Dongdong Zhao¹; Shenbao Jin²; Eva Mørtzell¹; Calin Marioara³; Sigmund Andersen³; Gang Sha²; ¹Norwegian University

of Science and Technology; ²Nanjing University of Science and Technology; ³SINTEF Materials and Chemistry

O-15: Eutectic Microstructures in Dilute Al-Ce and Al-Co Alloys: *Yu Sun*¹; Cain Hung¹; Rainer Hebert¹; Mark Aindow¹; ¹University of Connecticut

O-16: Evaluation of Microstructural Instability at Interface of HIP Bonded Single Crystal and Polycrystalline Nickel Superalloys: *Benjamin Georgan*¹; Hamish Fraser¹; ¹Ohio State University

O-17: Evolution of Dendritic Morphology under HPMO Treatment: *Huicheng Li*¹; Yuxiang Liu¹; Qijie Zhai¹; ¹Shanghai University

O-18: Fabrication and Characterization of (111)-Oriented and Nanotwinned Cu by Periodic Reverse Electrodeposition: *Kuan-Ju Chen*¹; ¹National Chiao Tung University

O-19: Influence of Elastic Stresses on the Homogeneous Precipitation Mechanisms in the Cu-Ag System: Manon Bonvalet¹; *Xavier Sauvage*²; Didier Blavette²; ¹KTH Royal Institute of Technology; ²CNRS - GPM - University Rouen Normandy

O-20: Influence of Local Lattice-level Covalent Character on Diffusion and Precipitation in a Highly Creep-resistant Mg-Nd-Zn Alloy: *Deep Choudhuri*¹; S Srinivasan¹; M Gibson²; Y Zheng³; H Fraser³; R Banerjee¹; ¹University of North Texas; ²CSIRO; ³Ohio State University

O-21: In-situ Observation of Melting and δ Phase Transformation in Duplex Stainless Steel: *Yang Liu*¹; Yanhui Sun¹; ¹University of Science and Technology Beijing

O-22: Large Scale Phase-field Crystal Simulation of Polycrystalline Grain Growth using GPU Supercomputer: *Akinori Yamanaka*¹; ¹Tokyo University of Agriculture And Technology

O-23: Mesoscale Modeling of Recrystallization and Grain Growth in Two-phase Alloys: Mohammad Abdoelatef¹; Fergany Badry¹; *Karim Ahmed*¹; ¹Texas A&M University

O-24: Microstructural Evolution in An Aluminum-copper System Processed by High-pressure Torsion: *Guangyuan Liang*¹; Jae-Kyung Han¹; Terence Langdon²; Megumi Kawasaki¹; ¹Oregon State University; ²University of Southampton

O-25: Microstructural Evolution of a Transformation in Which There is an Exclusion Zone around Each Nucleus: *Paulo Rios*¹; Harison Ventura¹; André Alves¹; Wesley Assis¹; Elena Villa²;

¹Universidade Federal Fluminense; ²University of Milan

O-26: Microstructure and Properties in Sputtered Beta Ta Thin Films: *Shefford Baker*¹; Elizabeth Ellis¹; Shangchen Han¹; Markus Chmielus²; ¹Cornell University; ²University of Pittsburgh

O-29: Predicting the Effect of Crystallography on the Performance of High Temperature Shape Memory Alloys Subjected to Viscoplastic Deformations: *Pawan Chaugule*¹; Jean-Briac Le Graverend¹; ¹Texas A&M University

O-30: Prediction of Isothermal Phase Transformation Kinetics using Continuous Cooling Data: *Jeong Min Kim*¹; Jae-Hyeok Shim²; Kyung Jong Lee¹; ¹Hanyang University; ²Korea Institute of Science and Technology

O-31: Recovery Softening of Cryogenically Deformed AlMg and AlMgSi Alloys: *Belinda Gruber*¹; Florian Grabner²; Thomas Kremmer¹; Stefan Kirnstötter³; Florian Spieckermann¹; Robin Schäublin⁴; Peter Uggowitzer⁴; Stefan Pogatscher¹; ¹Montanuniversität Leoben; ²Leichtmetallkompetenzzentrum Ranshofen GmbH; ³AMAG Rolling GmbH; ⁴ETH Zürich

O-32: Size Effects on Hysteresis in Electrochemically Deposited Thick Film NiMnSn Heusler Alloys: *Yijia Zhang*¹; Julia Billman¹; Patrick Shamberger¹; ¹Texas A&M University

O-33: Strain Induced Orientation Morphology and Kinetics Behaviors of Nanoscale Phase in FeCr Alloys: *Yongsheng Li*¹; Shujing Shi¹; ¹Nanjing University of Science and Technology

O-34: Study on Microstructure and Properties of Heat Affected Zone in Titanium Microalloyed Steel: Mujun Long¹; *Jingjun Zhao*¹; Qinzheng Wang¹; Junsheng Cao¹; Dengfu Chen¹; Huamei Duan¹; Shixin Wu¹; Tao Liu¹; ¹Chongqing University

O-35: Synthesis, Microstructure and Mechanical Properties of Ti/Al Multi-layered Composites with the Hierarchical Structure: *Xiong Wan*¹; Yanjin Xu²; Baoshuai Han²; Weizhao Sun¹; Tao Jing¹; ¹Tsinghua University; ²AVIC Manufacturing Technology Institute, Beijing

O-36: Synthesis of Intermetallic-based Aluminum Matrix Nanocomposites through High-pressure Torsion: *Jae-Kyung Han*¹; Dong-Hyun Lee²; Jae-il Jang³; Terence Langdon⁴; Megumi Kawasaki¹; ¹Oregon State University; ²Max-Planck-Institut für Eisenforschung GmbH; ³Hanyang University; ⁴University of Southampton

O-37: The Effect of Temperature on the Suppression of Twinning

in A-axis Textured Magnesium and Magnesium Alloys: Roshan Plamthottam¹; *Steven Lavenstein*¹; Suhas Eswarappa Prameela¹; Tim Weihs¹; Jaafar El-Awady¹; ¹Johns Hopkins University

O-39: Thermo-mechanical Simulation of Solid-state Welding in Ti-17: *Samuel Kuhr*¹; Gopal Viswanathan¹; Thomas Broderick²; Hamish Fraser¹; ¹Ohio State University; ²GE Aviation

O-40: Thermodynamic Properties of Si-B Alloys Determined by Solid State Heterogeneous Phase Equilibrium: *Muhammad Imam*¹; Ramana Reddy¹; ¹University of Alabama

O-41: Titanium Oxidation Under Low Partial Pressures of Oxygen: *Mayela Aldaz-Cervantes*¹; Paul Rottmann¹; N.S. Harsha Gunda¹; Anton Van der Ven¹; Carlos Levi¹; ¹University of California, Santa Barbara

O-42: Transformation Kinetics in Zircaloy-4 Weldments: Sarah Baker¹; Andrew Moffat¹; *Helen Taylor*²; ¹Frazer-Nash Consultancy; ²Rolls-Royce plc

O-43: Twin-mediated FCC to B2 Transformations in a Fcc-based Complex Concentrated Alloy: *Deep Choudhuri*¹; Rajarshi Banerjee¹; Rajiv Mishra¹; ¹University of North Texas

O-44: Twinning in Micro and Nanoscale Pillars – Size Effect in Cu–Ni–Al Shape Memory Alloy: *Marek Vronka*¹; Miroslav Karlík²; Jozef Veselý³; Jan Manák¹; Oleg Heczko¹; ¹Institute of Physics of the Czech Academy of Sciences; ²Czech Technical University; ³Charles University

O-45: X-ray Tomography Study of Wire Size Effect on Kirkendall Pore Evolution in Ti-coated Nickel Wires: *Arun Bhattacharjee*¹; Ajith Achuthankutty¹; Aaron Yost²; Dinc Erdeniz²; David Dunand²; Ashley Paz y Puente¹; ¹University of Cincinnati; ²Northwestern University

NANOSTRUCTURED AND HETEROSTRUCTURED MATERIALS

Powder Processing of Bulk Nanostructured Materials — Poster Session

Sponsored by: TMS: Powder Materials Committee

Program Organizers: Zachary Cordero, Rice University; Deliang Zhang, Shanghai Jiao Tong University; Brady Butler, US Army Research Laboratory; Ma Qian, RMIT University (Royal Melbourne Institute of Technology)

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N-58: Densification Behavior and Mechanism of an EP741NP Superalloy by Hot Pressing: *Yuan Yuan*¹; Xiaoyun Feng¹; Lianxi Hu¹; ¹Harbin Institute of Technology

N-59: Effects of Si Addition on Microstructure and Mechanical Properties of the Sintered Al-Cr-Si Alloy by using Gas-atomization and Spark Plasma Sintering: *Hyeon-Taek Son*¹; Yong-Ho Kim¹; Hyo-Sang Yoo¹; ¹Korea Institute of Industrial Technology

N-60: Fabrication and Mechanical Property of Binder Free WC and WC-Co Hard Materials for a Cutting Tool Application by Pulsed Current Activated Sintering Method: *Jeong Han Lee*¹; Hyun-Kuk Park¹; Jun-Ho Jang¹; Sung-Kil Hong²; Ik-Hyun Oh¹; ¹Korea Institute of Industrial Technology; ²Chonnam National University

N-61: Powder Properties of High-entropy Alloys Powders Fabricated by Rapid Solidification Process: *Kwang Yong Jeong*¹; Soon Jik Hong¹; Chul Hee Lee¹; Su Sung Ahn¹; Hyeon Jeong You¹; ¹Kong Ju National University

N-62: Property Evaluation and Thermal Conductivity of Cu-flake Graphite Material Composite use of Electroless Plating and Pulse Current Activated Sintering Process: *Junho Jang*¹; Ik-Hyun Oh¹; Hyun-Kuk Park¹; Jeong-han Lee¹; Jae-won Lim²; ¹Korea Institute of Industrial Technology; ²Jeonbuk University

N-63: The Influence of Mechanical Activation on the Synthesis of Ca₂MgSi₂O₇: *Fariborz Tavangarian*¹; Caleb Zolko¹; ¹Pennsylvania State University

N-64: Ultrafine Grained AZ61Mg/Ti Composite with High Mechanical Strength: *Lianxi Hu*¹; Huan Yu¹; Yu Sun¹; ¹Harbin Institute of Technology

ENERGY & ENVIRONMENT

REWAS 2019: Rethinking Production — Poster Session

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

Program Organizers: John Howarter, Purdue University; Mingming Zhang, ArcelorMittal Global R&D; Gabrielle Gaustad, Alfred University; Elsa Olivetti, Massachusetts Institute of Technology

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Session Chair: Fiseha Tesfaye, Åbo Akademi University

I-1: Degradation of Ore Colector with Photo-Oxidation UV/H₂O₂ and Photo-Fenton: Isabela Alves¹; Marcela Baltazar¹; Denise Espinosa¹; *Jorge Tenório*¹; ¹University of São Paulo

I-2: Influence of Metallic Impurities on Solvent Extraction of Cobalt and Nickel from a Laterite Waste Liquor: Paula Aliprandini¹; Mónica Jimenez Correa¹; Jorge Tenório¹; *Denise Espinosa*¹; ¹University of Sao Paulo

I-4: Isolation of Cyanide-degrading Bacteria from Cassava-processing Effluent: Amzy Vallenas-Arévalo¹; Carlos Rosario¹; Marcela Baltazar¹; Denise Espinosa¹; *Jorge Tenório*¹; ¹University of São Paulo

ENERGY & ENVIRONMENT

REWAS 2019: Secondary and Byproduct Sources of Materials, Minerals, and Metals — Poster Session

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

Program Organizers: Gabrielle Gaustad, Alfred University; Camille Fleuriault, Gopher Resource; Neale Neelameggham, IND LLC; Elsa Olivetti, Massachusetts Institute of Technology

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Session Chair: Fiseha Tesfaye, Åbo Akademi University

I-5: Concentration of a Synthetic Solution Containing Cobalt (II), Manganese (II), Magnesium (II) and Chromium (III) from Nickel Laterite Processing Using Ion Exchange Membrane Electrodialysis: Gustavo Feijoo¹; Tatiana Scarazzato¹; Jorge Tenório¹; *Denise Espinosa*¹; ¹University of São Paulo, Polytechnic School

I-7: Distribution and Chemical Species of Chromium in the EAF Dust from Stainless Steel Plant: Zhi Li¹; *Guojun Ma*¹; Xiang Zhang¹; ¹Wuhan University of Science and Technology

I-8: Effect of Bentonite on the Stabilization and Mechanical Strength of Bricks Made of Peruvian Electric Arc Furnace Dusts: *Mery Gómez-Marroquín*¹; ¹Universidad Nacional de Ingeniería

I-9: Effect of Coal Ratio on Preparation of Si-Ti-Fe Alloy by Carbothermic Reduction with Coal Fly Ash: *Kun Wang*¹; Yan Liu¹; Song Qi¹; Jun Hao¹; Zhi-he Dou¹; Li-ping Niu¹; Zhang Tingan¹; ¹Northeastern University

I-10: Effect of Contact Time on the Recovery of Metals from the Mining Effluent of Lateritic Nickel by Chelating Resin Dowex XUS43605: *Isadora Perez*¹; Jorge Alberto Tenório¹; Denise Espinosa¹; ¹Galo Antonio Carrillo Le Roux

I-11: Experimental Study on Phosphorus Vaporization for Converter Slag by SiC Reduction: *Xue Yuekai*¹; Shuhuan Wang¹; Dingguo Zhao¹; Chenxiao Li¹; ¹North China University of Science and Technology

I-12: Process of Removing Arsenic from Copper Smelted Acid: *Sun Lifa*¹; ¹Kunming University of Science and Technology

I-14: Research on Mechanism of Residual Iron Oxides in Preparation of Tailings Glass Ceramics: *Jing Li*¹; Lian Ying Xu¹; Qi Wang¹; ¹University of Science & Technology Liaoning

I-15: Research on Thermogravimetric-differential Scanning Calorimetry of Spent Lithium Iron Phosphate Batteries Cathode Plate: *Yafei Jie*¹; ¹Central South University

I-16: Structural Polymer Foams Prepared from Paper Mill Sludge Cellulose Nanofibers and Poly Vinyl Alcohol by Crosslinking Using Directional Freezing: *Cynthia Adu*¹; Mark Jolly¹; ¹Cranfield University

I-17: Study of Precursor Preparation of Battery Grade Lithium Iron Phosphate: Li-li Zhang¹; *Ting-an Zhang*¹; Wei-guang Zhang¹;

¹Northeastern University

I-18: Study on Vacuum Pyrolysis Process of Cathode Sheets from Spent Lithium Ion Batteries: *Weilun Li*¹; ¹Central South University

I-19: Synthesis of CuNP's on A304 SS from E-wastes: Perla Trejo Bustillos¹; *Pedro Ramirez Ortega*¹; Mauricio Islas Hernández¹; Laura García Hernández¹; ¹Universidad Tecnológica De Tulancingo

I-20: Waste Tire Rubber Powders Based Composite Materials: Carlos Revelo¹; Mauricio Andres Correa¹; Claudio Aguilar²; *Henry Colorado*¹; ¹Universidad De Antioquia; ²Universidad Técnica Federico Santa María

ELECTRONIC MATERIALS

Solar Cell Silicon — Poster Session

Sponsored by: TMS: Materials Characterization Committee

Program Organizers: Shadia Ikhmayies, Al Isra University; Neale Neelameggham, IND LLC; York Smith, University of Utah; Leili Tafaghodi, University of British Columbia

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L-14: Effect of Sodium Salt Addition in CaO-SiO₂ Slag System on Separation and Purification of Silicon Kerf: *Jijun Wu*¹; Wenhui Ma¹; ¹Kunming University of Science & Technology

L-15: Shape Control of Silver Particles Electrochemically Recovered from Crystalline Silicon Solar Cell by Changing Current Density: Jun-Kyu Lee¹; *Jin-Seok Lee*¹; Young-Soo Ahn¹; Gi-Hwan Kang¹; ¹Korea Institute of Energy Research