

Technical Meeting and Exhibition

MS&T21

MATERIALS SCIENCE & TECHNOLOGY

October 17–21, 2021 | Columbus, Ohio

PRELIMINARY TECHNICAL PROGRAM

The content in the preliminary program was generated on August 23, 2021. However, changes are still being implemented for the technical program. Please refer to the online session sheets for the most up-to-date information.



Topic Area/Symposium	Date	Time	Room	Page
Program Highlights				
MS&T21 Plenary Session	TUE	AM	Union Station Ballroom	46
MS&T21 Poster Session	TUE	AM & PM	EH B	88
ACerS Basic Science Division Robert B. Sosman Lecture	WED	PM	B130	74
ACerS Frontiers of Science and Society - Rustum Roy Lecture	TUE	PM	B130	47
ACerS GOMD Alfred R. Cooper Award Session	TUE	PM	B231	55
Acers Navrotsky Award for Experimental Thermodynamics of Solids	MON	AM	A221	29
ACerS/EPDC: Arthur L. Friedberg Ceramic Engineering Tutorial and Lecture	MON	AM	B130	13
Additive Manufacturing				
Additive Manufacturing: Advanced Characterization for Industrial Applications				
In-situ and Operando Techniques	MON	AM	A121	15
Structures and Material Properties	MON	PM	A121	33
On-Demand Oral Presentations	FRI	AM	VMR 1	102
Additive Manufacturing: Alloy Design to Develop New Feedstock Materials III				
Modeling and Experiments	MON	AM	A111	16
On-Demand Oral Presentations	FRI	AM	VMR 1	102
Additive Manufacturing: Large-Scale Metal Additive Manufacturing				
Poster Session	TUE	PM	EH B	96
Advanced Manufacturing Process	WED	AM	A114	63
Microstructure, Property, and Performance: Characterization and Simulation	WED	PM	A114	76
Additive Manufacturing: Mechanisms and Mitigation of Aqueous Corrosion and High-temperature Oxidation				
Corrosion Assessment of Additively Manufactured Parts I	WED	AM	A112	63
Corrosion Assessment of Additively Manufactured Parts II	WED	PM	A112	77
Additive Manufacturing: Processing, Microstructure and Material Properties of Titanium-based Materials				
Session I	MON	AM	A120	16
Session II	MON	PM	A120	33
Session III	TUE	PM	A120	51
Poster Session	TUE	PM	EH B	96
Session IV	WED	AM	A120	64
On-Demand Oral Presentations	FRI	AM	VMR 1	103
Additive Manufacturing of Metals: Equipment, Instrumentation and In-Situ Process Monitoring				
Process Monitoring and Modeling Methods	TUE	PM	A121	49
Imaging and Sensing Methods	WED	AM	A121	62
Novel Instrumentation	WED	PM	A121	75
On-Demand Oral Presentations	FRI	AM	VMR 1	102
Additive Manufacturing of Metals: ICME Gaps: Material Property and Validation Data to Support Certification				
Data Needs for Simulation: Material Property and Validation Data to Support Certification	MON	AM	A114	15
Data Acquisition: Material Property and Validation Data to Support Certification	MON	PM	A114	32
Data Applications: Material Property and Validation Data to Support Certification	TUE	PM	A114	50
Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development				
Al-based Alloys	MON	AM	A115	14
Ni-based Alloys	MON	PM	A115	32

Program At A Glance

Topic Area/Symposium	Date	Time	Room	Page
Ti-/Co-/Cr-/Cu-based Alloys	TUE	PM	A115	50
Other Miscellaneous Materials/Alloys	WED	AM	A115	62
Fe-based Alloys	WED	PM	A115	76
Additive Manufacturing: Miscellaneous	THUR	AM	A115	84
On-Demand Oral Presentations	FRI	AM	VMR 1	102
Additive Manufacturing Modeling and Simulation: Microstructure, Mechanics, and Process				
AM Modeling - Microstructures & Defects	MON	AM	A113	13
AM Modeling - Mechanical Properties	MON	PM	A113	30
AM Modeling - Machine Learning and Artificial Intelligence	TUE	PM	A113	48
Poster Session	TUE	PM	EH B	96
AM Modeling - Advanced Materials	WED	AM	A113	61
AM Modeling - On-Demand Oral Presentations	FRI	AM	VMR 1	101
AM Modeling - On-Demand Poster Presentations	FRI	AM	VPH	101
Additive Manufacturing of Ceramic-based Materials: Process Development, Materials, Process Optimization and Applications				
Session I: Extrusion-based AM	MON	AM	A112	14
Session II: Extrusion-based AM and Stereolithography	MON	PM	A112	31
Session III: Laser Powder Bed Fusion and Novel AM Processes	TUE	PM	A112	48
Poster Session	TUE	PM	EH B	96
On-Demand Oral Presentations	FRI	AM	VMR 1	101
Additive Manufacturing of High and Ultra-High Temperature Ceramics and Composites: Processing, Characterization and Testing				
Binder Jet 3D Printing, Post-processing, and Testing	MON	PM	A111	31
Laser-based Additive Manufacturing, New Methods, and Testing	TUE	PM	A111	49
Polymer-derived Ceramics (PDCs) and Novel Processing Methods	WED	AM	A111	61
Extrusion-based Additive Manufacturing Methods	WED	PM	A111	75
Late News Poster Session				
Additive Manufacturing	TUE	PM	EH B	97
On-Demand Additive Manufacturing Poster Session	FRI	AM	VPH	114
Artificial Intelligence				
Accelerating Materials Science with Big Data and Machine Learning				
Session I	MON	AM	A123	12
Session II	TUE	PM	A123	47
Poster Session	TUE	PM	EH B	95
On-Demand Oral Presentations	FRI	AM	VMR 2	100
On-Demand Poster Presentations	FRI	AM	VPH	101
AI for Big Data Problems in Advanced Imaging, Materials Modeling and Automated Synthesis				
Accelerating Discovery of Materials	MON	AM	A124	20
Artificial Intelligence for Automated Synthesis and Characterization	MON	PM	A124	37
On-Demand Oral Presentations	TUE	PM	VMR 2	105
Materials Informatics for Images and Multi-dimensional Datasets				
Session I	WED	AM	A124	70
Session II	WED	PM	A124	81
On-Demand Oral Presentations	FRI	AM	VMR 2	114
Late News Poster Session				
Artificial Intelligence	TUE	PM	EH B	97

Topic Area/Symposium	Date	Time	Room	Page
Biomaterials				
Next Generation Biomaterials				
Session I	MON	AM	A224	27
Session II	MON	PM	A224	43
Poster Session	TUE	PM	EH B	94
Session III	TUE	PM	A224	58
Session IV	WED	AM	A224	71
On-Demand Oral Presentations	FRI	AM	VMR 3	116
Porous Materials for Biomedical Applications				
Poster Session	TUE	PM	EH B	95
Session I	TUE	PM	A222	59
Surface Engineering and Characterization of Titanium and Titanium Alloys				
On-Demand Oral Sessions – Surface Engineering and Characterization of Titanium and Titanium Alloys	FRI	AM	VMR 3	119
Late News Poster Session				
Biomaterials	TUE	PM	EH B	94
Ceramic and Glass Materials				
Ceramic Matrix Composites				
Session I	MON	AM	B232	20
Session II	MON	PM	B232	37
Poster Session	TUE	AM	EH B	89
On-Demand Oral Presentations	FRI	AM	VMR 4	105
Ceramics and Glasses Modeling by Simulations and Machine Learning				
Poster Session	TUE	AM	EH B	89
Session I	WED	AM	B231	66
Session II	WED	PM	B231	78
Session III	THU	AM	B231	85
On-Demand Oral Presentations	FRI	AM	VMR 4	105
On-Demand Poster Presentations	FRI	AM	VMR 4	106
Engineering Ceramics: Microstructure-Property-Performance Relations and Applications				
Engineering Ceramics	TUE	PM	B233	55
On-Demand Mechanical Properties of Engineering Ceramics/Applications	FRI	AM	VMR 4	110
On-Demand Processing-Property Relations	FRI	AM	VMR 4	110
On-Demand Poster Presentations	FRI	AM	VPH	110
Glasses and Optical Materials: Current Issues and Functional Applications				
Dissolution and Mechanical Properties of Amorphous Solids	MON	AM	B231	23
Optical Properties and Processing of Amorphous Solids	MON	PM	B231	40
ACerS GOMD Alfred R. Cooper Award Session	TUE	PM	B231	55
On-Demand Oral Presentations	FRI	AM	VMR 4	111
Journal of the American Ceramic Society Awards Symposium				
Journal of the American Ceramic Society Awards Symposium I	WED	AM	B233	69
Journal of the American Ceramic Society Awards Symposium II	WED	PM	B233	81
Manufacturing and Processing of Advanced Ceramic Materials				
New Opportunities in Ceramic Processing I	MON	AM	B234	25
New Opportunities in Ceramic Processing II	MON	PM	B234	43

Program At A Glance

Topic Area/Symposium	Date	Time	Room	Page
Processing of Oxide Ceramics	TUE	PM	B234	57
Processing of Carbides, Borides, and Nitrides	WED	AM	B234	69
On-Demand Advanced Manufacturing Process of Ceramics	FRI	AM	VMR 4	114
Phase Transformations in Ceramics: Science and Applications				
Experimental Studies on Structure and Control I	MON	AM	B230	28
Experimental Studies on Structure and Control II	MON	AM	B230	44
Poster Session	TUE	AM	EH B	92
Computation and Predictions	TUE	PM	B230	58
Preceramic Polymers; Synthesis, Processing, Modeling, and Derived Ceramics				
Preceramic Polymers and Polymer Derived Ceramics I	WED	AM	B230	72
Preceramic Polymers and Polymer Derived Ceramics II	WED	PM	B230	82
On-Demand Oral Session: Preceramic Polymers	FRI	AM	VMR 4	117
On-Demand Poster Presentations	FRI	AM	VPH	118
Solid-state Optical Materials and Luminescence Properties				
Session I	WED	AM	B232	74
Session II	WED	PM	B232	83
Late News Poster Session				
Ceramic and Glass Materials	TUE	AM	EH B	91
Electronic and Magnetic Materials				
Advances in Dielectric Materials and Electronic Devices				
Processing/Analysis of Dielectrics & Piezoelectrics	MON	AM	B235	19
Magnetic Materials	MON	PM	B235	35
Poster Session	TUE	AM	EH B	89
Modeling	TUE	PM	B235	52
On-Demand Oral Presentations	FRI	AM	VMR 5	104
Functional Defects in Electroceramic Materials				
Session I: Defect Engineering in Ceramic Materials	WED	AM	B235	68
Session II: Defects in Energy Materials	WED	PM	B235	80
On-Demand Oral Presentations	FRI	AM	VMR 5	111
Late News Poster Session				
Electronic and Magnetic Materials	TUE	AM	EH B	91
Energy				
Advanced Characterization of Materials for Nuclear, Radiation, and Extreme Environments				
Fusion Materials and Metals	MON	AM	A215	17
Nuclear Fuels, Ceramics, and Corrosion	MON	PM	A215	34
Thermomechanical Testing and In Situ Environments	TUE	PM	A215	51
Data Intensive and Correlative Methods	WED	AM	A215	64
On-Demand Oral Presentations	FRI	AM	VMR 6	103
On-Demand Poster Presentations	FRI	AM	VPH	103
Energy Materials for Sustainable Development				
Energy Harvesting	MON	AM	A216	22
Solar Energy Conversion	MON	PM	A216	40
Storage Batteries I	TUE	PM	A216	54
Fuel Cells	WED	AM	A216	67
Capacitive, Chemical and Thermal Storage and Conversion	WED	PM	A216	79

Topic Area/Symposium	Date	Time	Room	Page
Storage Batteries II	THU	AM	A216	85
On Demand Energy Harvesting	FRI	AM	VMR 6	109
On Demand Storage and Conversion	FRI	AM	VMR 6	109
Hybrid Organic—Inorganic Materials for Alternative Energy				
On-Demand Hybrid Organic—Inorganic Materials for Alternative Energy	FRI	AM	VMR 6	112
Late News Poster Session				
Energy	TUE	PM	EH B	94
Fundamentals and Characterization				
Deformation-induced Phase Transformations				
Deformation-induced Phase Transformations	MON	PM	C172	39
Poster Session	TUE	AM	EH B	90
On-Demand Oral Presentations	FRI	AM	VMR 7	108
On-Demand Poster Presentations	FRI	AM	VPH	108
Emergent Materials under Extremes and Decisive In Situ Characterizations				
Materials Characterization at Extreme Conditions	WED	PM	C161A/161B	79
On-Demand Oral Presentations	FRI	AM	VMR 7	108
Grain Boundaries, Interfaces, and Surfaces in Ceramics: Fundamental Structure—Property—Performance Relationships				
Atomistic Approaches	MON	AM	C161A/161B	23
Continuum Approaches	MON	PM	C161A/161B	41
Poster Session	TUE	AM	EH B	90
Field Assisted Processes and Mechanics	TUE	PM	C161A/161B	55
On-Demand Oral Presentations	THU	AM	VMR 7	112
High Entropy Materials: Concentrated Solid Solutions, Intermetallics, Ceramics, Functional Materials and Beyond II				
Materials Discovery and Design I	MON	AM	C171	24
Materials Discovery and Design II	MON	PM	C171	41
Processing and Properties I	TUE	PM	C171	56
Processing and Properties II	WED	AM	C171	68
Theory and Modeling I	WED	PM	C171	80
Processing and Properties III	THU	AM	C172	86
Theory and Modeling II	THU	AM	C171	87
On-Demand Oral Presentations	FRI	AM	VMR 7	112
Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales III				
Session I	MON	AM	C160A/160B	24
Session II	MON	PM	C160A/160B	42
Poster Session	TUE	PM	EH B	90
Session III	WED	AM	C160A/160B	56
On-Demand Oral Session I	WED	PM	VMR 7	113
On-Demand Oral Session II	THU	AM	VMR 7	113
Materials vs Minerals: Bridging the Gap between Materials Science and Earth and Planetary Science				
Session I	WED	AM	B142/143	70
Nucleation of Solid-State Phase Transformations				
Nucleation of Solid-State Phase Transformations	MON	AM	C172	27
Poster Session	TUE	AM	EH B	91
On-Demand Oral Presentations	FRI	AM	VMR 7	118

Program At A Glance

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Probing Defect Properties and Behavior under Mechanical Deformation and Extreme Conditions				
Defect Properties and Behavior in Multicomponent Alloys	MON	AM	C170	28
In Situ and Advanced Characterization of Defects	MON	PM	C170	44
Defect-mediated Mechanical Performance and Damage Tolerance	TUE	PM	C170	60
Radiation Response and Defect Evolution I	WED	AM	C170	73
On-Demand Oral Session: Defect Property, Characterization, and Evolution	FRI	AM	VMR 7	118
Processing—Microstructure—Property Relationships of Titanium and Titanium Alloys				
Poster Session	TUE	AM	EH B	92
Session I	WED	AM	C160A/160B	73
Session II	WED	PM	C160A/160B	83
Late News Poster Session				
Fundamentals and Characterization	TUE	AM	EH B	91
Iron and Steel (Ferrous Alloys)				
Advancements in Steel Structural Refinement				
Advancements in Steel Structural Refinement	MON	AM	A211	18
Advances in Ferrous Metallurgy				
Advances in Ironmaking, Steelmaking, and Casting	MON	AM	A210	19
Advances in Steel Products	MON	PM	A210	36
Developments in Testing and Processing	TUE	PM	A210	53
On-Demand Oral Presentations	FRI	AM	VMR 8	104
Advances in Metallic Coated Advanced Steels				
Liquid Metal Embrittlement and Advances in Coating Production	MON	PM	A211	36
Poster Session	TUE	PM	EH B	97
On-Demand Oral Presentations	FRI	AM	VMR 8	104
Developments in Plate and Line Pipe Steels				
Developments in Plate and Line Pipe Steels	TUE	PM	A211	54
Fracture of Steels: New Approaches to Modeling and Experimental Characterization				
Poster Session	TUE	PM	EH B	97
Session I	WED	AM	A211	67
On-Demand Oral Presentations	FRI	AM	VMR 8	111
New Frontiers in Physical Metallurgy of Steels				
New Frontiers in Physical Metallurgy of Steels I	WED	AM	A210	71
New Frontiers in Physical Metallurgy of Steels II	WED	PM	A210	82
On-Demand Oral Presentations	FRI	AM	VMR 8	115
Late News Poster Session				
Iron and Steel (Ferrous Alloys)	TUE	PM	EH B	97
Materials-Environment Interactions				
Advanced Coatings for Wear and Corrosion Protection				
Session I	MON	AM	A220	18
Session II	MON	PM	A220	34
Poster Session	TUE	PM	EH B	93
Advanced Materials for Harsh Environments				
Session I	MON	PM	A223	35
Poster Session	TUE	PM	EH B	93
Session II	TUE	PM	A223	52

Topic Area/Symposium	Date	Time	Room	Page
Session III	WED	AM	A223	65
Session IV	WED	PM	A223	77
Session V	THU	AM	A223	85
On-Demand Oral Presentations	FRI	PM	VMR 9	104
Coatings to Protect Materials from Extreme Environments				
Environmental and Thermal Barrier Coatings	MON	AM	A222	21
Coatings and Surface Treatments for Extreme Environments	MON	PM	A222	38
Poster Session	TUE	PM	EH B	93
On-Demand Coatings for Extreme Environments	FRI	AM	VMR 9	106
On-Demand Poster Presentations	FRI	AM	VPH	106
Computation Assisted Materials Development for Improved Corrosion Resistance				
Poster Session	TUE	PM	EH B	93
A: Low Temperature Corrosion	WED	AM	A222	66
B: High Temperature Corrosion	WED	PM	A222	78
On-Demand Oral Presentations	FRI	AM	VMR 9	107
Progressive Solutions to Improve Corrosion Resistance for Nuclear Waste Storage				
Corrosion and Aspects of Environmentally Safe Processing of Nuclear Waste Storage Materials	THU	AM	A222	87
On-Demand Alternative Nuclear Waste Storage Materials and New Imaging Neutron Microscopy Technique for Nuclear Waste Storage Glass Corroded in Aqueous Solution	FRI	AM	VMR 9	119
Thermodynamics of Materials in Extreme Environments				
Thermodynamics of Nuclear Materials and Minerals	MON	AM	A221	29
Thermodynamics and Stabilities of Alloys and Ceramics	MON	PM	A221	46
Poster Session	TUE	PM	EH B	95
On-Demand: Thermodynamics and Stabilities of Alloys and Ceramics	FRI	AM	VMR 9	120
On-Demand: Thermodynamics of Nuclear Materials and Minerals	FRI	AM	VMR 9	121
Modeling				
Multi Scale Modeling of Microstructure Deformation in Material Processing				
Multi Scale Modeling of Microstructure Deformation in Material Processing	MON	AM	A122	26
On-Demand Oral: Multi Scale Modeling of Microstructure Deformation in Material Processing	FRI	AM	VMR 10	115
Phonon Properties of Materials: Modeling and Experimentation				
Session I	TUE	PM	A122	59
Session II	WED	PM	A122	72
Late News Poster Session				
Modeling	TUE	PM	EH B	98
Nanomaterials				
Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials				
1D Nanostructures	MON	PM	B240/241	38
Poster Session	TUE	AM	EH B	90
Nanocomposites & 2D Materials	TUE	PM	B240/241	53
Nanoparticles & Nanocomposites I	WED	AM	B240/241	66
Nanoparticles & Nanocomposites II	WED	PM	B240/241	78
On-Demand Oral Presentations	FRI	AM	VMR 11	107

Program At A Glance

Topic Area/Symposium	Date	Time	Room	Page
On-Demand Poster Presentations	TUE	AM	VPH	107
Mechanistic Insights into the Synergistic Properties of Nanocomposites				
Mechanistic Insights into the Synergistic Properties of Nanocomposites	TUE	PM	B242/243	57
On-Demand Oral Presentations	FRI	AM	VMR 11	114
On-Demand Poster Presentations	FRI	AM	VPH	115
Nanotechnology for Energy, Environment, Electronics, Healthcare and Industry				
Session I	MON	AM	B242/243	26
Session II	MON	PM	B242/243	43
On-Demand Oral Presentations	THU	AM	VMR 11	115
Late News Poster Session				
Nanomaterials	TUE	AM	EH B	91
Processing and Product Manufacturing				
13th International Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing				
Sustainable Manufacturing of Ceramics	MON	AM	A212	12
Novel Approaches to Sustainable Manufacturing I	MON	PM	A212	30
Poster Session	TUE	PM	EH B	92
Novel Approaches to Sustainable Manufacturing II	WED	AM	A212	47
On-Demand Novel Approaches to Sustainable Manufacturing	WED	PM	VMR 12	100
Advances in Surface Engineering				
Poster Session	TUE	PM	EH B	93
Advances in Surface Engineering	WED	AM	A214	65
On-Demand Advances in Surface Engineering	FRI	AM	VMR 12	105
Development of Light Weight Alloys and Composites				
Microstructure and Properties: Composites I	MON	AM	A214	22
Microstructure and Properties: Composites II	MON	PM	A214	39
Microstructure and Properties: Composites III	TUE	PM	A214	54
On-Demand Oral Presentations	FRI	AM	VMR 12	108
Light Metal Technology				
Magnesium and Joining Technology	MON	AM	A213	25
Forming Technology	MON	PM	A213	42
Powder Metallurgical Components in High Performance Applications				
Session I	TUE	PM	A213	59
On-Demand Oral Presentations	FRI	AM	VMR 12	117
Processing and Performance of Materials Using Microwaves, Electric and Magnetic Fields, Ultrasound, Lasers, and Mechanical Work: The Rustum Roy Symposium				
Session I	MON	AM	B233	29
Session II	MON	PM	B233	45
On-Demand Oral Presentations	FRI	AM	VMR 12	119
Synthesis, Characterization, Modeling and Applications of Functional Porous Materials				
Poster Session	TUE	PM	EH B	95
Functional Porous Materials	WED	PM	A212	84
On-Demand Oral Session: Functional Porous Materials	FRI	AM	VMR 12	120
Late News Poster Session				
Processing and Product Manufacturing	TUE	PM	EH B	94

Topic Area/Symposium	Date	Time	Room	Page
Special Topics				
ACerS Education and Professional Development Symposium				
Introduction to Education and Professional Development Opportunities	MON	AM	B142/143	13
ACerS Robert B. Sosman Award Symposium: Bridging the Gap between Atomistic and Continuum Approaches to Interface Science				
Sosman I	WED	AM	B130	60
Sosman II	WED	PM	B130	74
Curricular Innovations and Continuous Improvement of Academic Programs (and Satisfying ABET along the Way): The Elizabeth Judson Memorial Symposium				
Curricular Innovations and Accreditation	MON	AM	B140/141	21
Course Innovations	MON	PM	B140/141	39
On-Demand Oral Presentations	FRI	AM	VMR 13	107
Online Teaching Best Practices for the COVID Era and Beyond				
On-Demand Oral Presentations	FRI	AM	VMR 13	116
Research Lightning Talks				
Research Lightning Talks I	MON	PM	B142/143	45

Technical Meeting and Exhibition

MS&T21

MATERIALS SCIENCE & TECHNOLOGY

October 17–21, 2021 | Columbus, Ohio

PRELIMINARY TECHNICAL PROGRAM



PROCESSING AND MANUFACTURING

13th Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing – Sustainable Manufacturing of Ceramics

Sponsored by: ACerS Engineering Ceramics Division

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

Monday AM | October 18, 2021
A212 | Greater Columbus Convention Center

Session Chairs: Allen Apblett, Oklahoma State University; Luca Masi, Ansys Inc.

8:00 AM Invited

Sustainable Synthesis of Non-oxide Ceramics in Air: *Jesus Gonzalez-Julian¹*; Apurv Dash¹; Sylvain Badie¹; Robert Vassen¹; Olivier Guillon¹; ¹Forschungszentrum Jülich

8:40 AM

The Use of Waste Materials for the Manufacture of Ceramic Water Filters in Marginalized Communities: *Ian Nettleship¹*; Chuyuan Zheng¹; ¹University of Pittsburgh

9:00 AM Invited

Single Source Precursors for Lanthanum Phosphates: *Allen Apblett¹*; Mha Albqmi¹; ¹Oklahoma State University

9:30 AM

Bandgap Engineering of Epitaxial α -(Al_xGa_{1-x})₂O₃ Films Grown via the Spin-coating Method: *Iva Milisavljevic¹*; Yiquan Wu¹; ¹Alfred University

9:50 AM Break

10:10 AM Invited

The Printability of Ternary Metal Boride (MAB) Materials Using Laser Powder Bed Fusion: *Samuel Hocker¹*; Mackenzie Geigle²; Taylor Riedl²; Christian Forsberg²; Maharshi Dey²; Karen Taminger¹; Lopamudra Das³; Surojit Gupta²; Valerie Wiesner¹; Daniel Trieff²; ¹NASA Langley Research Center; ²University of North Dakota; ³National Institute of Aerospace

10:40 AM

Development of Energy Efficient Solid-state Material Processing Technologies for Sustainable Manufacturing: *Kumar Kandasamy¹*

11:00 AM

Green Method for Preparation of Inorganic Green Pigments: *Allen Apblett¹*; Travis Reed¹; ¹Oklahoma State University

ARTIFICIAL INTELLIGENCE

Accelerating Materials Science with Big Data and Machine Learning – Session I

Program Organizers: Huan Tran, Georgia Institute of Technology; Muratahan Aykol, Toyota Research Institute

Monday AM | October 18, 2021
A123 | Greater Columbus Convention Center

Session Chair: To Be Announced

8:00 AM Invited

Accelerating Discovery in Computational Materials Science Using CAMD: *Joseph Montoya¹*; ¹Toyota Research Institute

8:40 AM

Optimizing Mechanical Performance of Metamaterials through Machine Learning Generative Models: *Chandra Veer Singh¹*; Sahar Choukir²; ¹University of Toronto

9:00 AM

Semantic Segmentation of Plasma Transferred Arc Additively Manufactured NiBSi-WC Optical Microscopy Images Using a Convolutional Neural Network: *Dylan Rose¹*; Justin Forth²; Tonya Wolfe³; Ahmed Qureshi¹; Hani Henein¹; ¹University of Alberta; ²Consultant; ³Red Deer College

9:20 AM Invited

Considerations for Interpretability, Reliability, And Data-efficiency in Machine Learning Properties of Solid-state Materials: *Christopher Sutton¹*; ¹University of South Carolina

10:00 AM Break

10:20 AM Invited

Searching for New Ferroelectric Materials Browsing a High-throughput Phonon Database: Maksim Markov¹; Louis Alaerts²; Henrique Miranda¹; Guido Petretto¹; Wei Chen¹; Janine George¹; Eric Bousquet³; Philippe Ghosez³; Gian-Marco Rignanese¹; *Geoffroy Hautier²*; ¹UCLouvain; ²Dartmouth College; ³Université de Liège

11:00 AM

Machine Learning Accelerated Discovery of Single Atom Catalysts: *Chandra Veer Singh¹*; Zhi Wen Chen¹; Zhuole Lu¹; ¹University of Toronto

11:20 AM

Materials Graph Ontology for Improving the Standardization and Utilization of Materials Data: *Sven Voigt¹*; Surya Kalidindi¹; ¹Georgia Institute of Technology



SPECIAL TOPICS

ACerS Education and Professional Development Symposium – Introduction to Education and Professional Development Opportunities

Sponsored by: ACerS Education and Professional Development Council

Program Organizers: Jessica Rimsza, Sandia National Laboratories; Yolanda Natividad, American Ceramic Society; Ashley Hilmas, Air Force Research Laboratory

Monday AM | October 18, 2021
B142/143 | Greater Columbus Convention Center

Session Chairs: Jessica Rimsza, Sandia National Laboratories; Ashley Hilmas, Air Force Research Laboratory

8:00 AM
Grad School: An Entrée into the Knowledge Creation Enterprise: *Frank Zok*¹; ¹University of California, Santa Barbara

8:30 AM
Individual Benefits of Diversity in the Workplace: *Ryan McCarty*¹; Victoria Christensen²; ¹University of California Irvine; ²University of California Santa Barbara

9:00 AM
The Materialism Podcast: A New Medium for Materials Science Education: *Taylor Sparks*¹; Andrew Falkowski¹; ¹University of Utah

9:30 AM
Professional Development Opportunities with The American Ceramic Society: *Mark Mecklenborg*¹; ¹The American Ceramic Society

10:00 AM Break

10:20 AM
Tips on Making a Strong Awards Nomination Package: *Victoria Blair*¹; ¹DEVCOM Army Research Lab

10:50 AM
Real Innovation in the 21st Century – How Can Business Do It?: *Cullen Hackler*¹; ¹PEI

11:20 AM Panel Discussion: Experiences with EPDC and ACerS

SPECIAL TOPICS

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

Sponsored by: ACerS/Education and Professional Development Council

Monday AM | October 18, 2021
B130 | Greater Columbus Convention Center

9:00 AM Invited
Environmental Barrier Coatings – Enabling Materials for Extreme Environments: *Elizabeth Opila*¹; ¹University of Virginia

ADDITIVE MANUFACTURING

Additive Manufacturing Modeling and Simulation: Microstructure, Mechanics, and Process – AM Modeling - Microstructures & Defects

Sponsored by: TMS Computational Materials Science and Engineering Committee

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

Monday AM | October 18, 2021
A113 | Greater Columbus Convention Center

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

8:00 AM
Spattering and Associated Pore Formation Modeling for Laser Powder Bed Fusion of Inconel 718: *Qian Chen*¹; chaitanya Vallabh¹; Albert To¹; Xiayun Zhao¹; ¹University of Pittsburgh

8:20 AM
Mitigating Stray Grain Nucleation during the Laser Powder Bed Fusion of Single Crystal CMSX-4: *Runbo Jiang*¹; Zhongshu Ren²; Tao Sun²; Anthony Rollett¹; ¹Carnegie Mellon University; ²University of Virginia

8:40 AM
Cellular Automaton Simulation of Three-dimensional Microstructure Evolution during Powder Bed Fusion Additive Manufacturing: *Michael Moodispaw*¹; Cheng Gu¹; Alan Luo¹; Qigui Wang²; ¹Ohio State University; ²General Motors

9:00 AM
A Computational Approach for Establishing Microstructure-property Relationships for Additively Manufactured IN718: *An Nguyen*¹; Jason Mayeur¹; ¹The University of Alabama in Huntsville

9:20 AM
A Microstructure-informed Multiscale Computational Model for Additively Manufactured (AM) Metals and Alloys: *Chamara Herath*¹; Ajit Achuthan¹; ¹Clarkson University

9:40 AM
Defect Prediction thru Part-scale Simulation: *Shawn Hinnebusch*¹; Florian Dugast¹; Alaa Olleak¹; Albert To¹; ¹University of Pittsburgh

10:00 AM Break

10:20 AM
Multiscale Material Modeling of Laser Powder Bed Fusion Additive Manufacturing Soft Magnetic Composites: *Li Ma*¹; Caleb Andrew²; Ryan Carter¹; Ian McCue¹; Joe Sopcisak¹; Mitra Taheri²; ¹Johns Hopkins University Applied Physics Laboratory; ²Johns Hopkins University

11:00 AM
CFD Simulations for Additive Manufacturing: *Pareekshith Allu*¹; ¹Flow Science Inc.

11:20 AM

Thermal History of LPBF Components Towards Predicting As-built Material Properties: Martin Verhülsdonk¹; Simon Vervoort¹; *Mustafa Megahed*²; ¹Fraunhofer Institute for Laser Technology ILT; ²ESI Group

11:40 AM

Comparison of Commercial Additive Manufacturing Simulation Tools for Full Build Analysis: *Adam Gershen*¹; Charles Fisher¹; ¹Naval Surface Warfare Center, Carderock Division

ADDITIVE MANUFACTURING

Additive Manufacturing of Ceramic-based Materials: Process Development, Materials, Process Optimization and Applications — Session I: Extrusion-based AM

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

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

Monday AM | October 18, 2021

A112 | Greater Columbus Convention Center

Session Chairs: Rajendra Bordia, Clemson University; Xuan Song, University of Iowa

8:00 AM Invited

A Review of Extrusion-based AM via Robocasting: *Joe Cesarano*¹; ¹Robocasting Enterprises

8:30 AM

Extrusion-based Additive Manufacturing of Silicon Carbide: *Ruoyu Chen*¹; Adam Bratten¹; Joshua Rittenhouse¹; Haiming Wen¹; ¹Missouri University of Science and Technology

8:50 AM

Highly Loaded Aqueous Silicon Carbide Suspensions for Direct Ink Writing: *Tess Marconie*¹; Kyle Cox¹; Jeffrey Youngblood¹; Rodney Trice¹; ¹Purdue University

9:10 AM

The Influence of Print Layer Orientation on Silicon Carbide Formed via Direct Ink Writing: *Kyle Cox*¹; *Tess Marconie*¹; *Jeffrey Youngblood*¹; *Rodney Trice*¹; ¹Purdue University

9:30 AM

Examining the Changes in Micro-mechanical Properties of 3D Printed Cement Paste Using Grid Nanoindentation Coupled with SEM/EDS: *Michael Kosson*¹; *Lesa Brown*¹; *Florence Sanchez*²; ¹Vanderbilt University

9:50 AM Break

10:10 AM Invited

Additive Manufacturing of Ceramics for Aerospace Applications: *Lisa Rueschhoff*¹; *William Costakis*¹; *Connor Wyckoff*¹; *Matthew Dickerson*¹; *Michael Cinibulk*¹; ¹Air Force Research Laboratory

10:40 AM

Effect of Particle Morphology and Green Part Density on Microstructure Evolution and Mechanical Properties of Sintered Alumina Fabricated via Ceramic Fused Filament Fabrication (CF3): *Kameswara Pavan Ajarapu*¹; *Kavish Sudan*¹; *Kunal Kate*¹; ¹University of Louisville

11:00 AM

Out of the Lab: 3D Printing on Non-ideal Surfaces: *Domenic Cipollone*¹; *Javier Mena*¹; *Konstantinos Sierros*¹; *Edward Sabolsky*¹; ¹West Virginia University

11:20 AM

Improving Ceramic Additive Manufacturing via Machine Learning-enabled Closed-Loop Control: *Zhaolong Zhang*¹; *Richard Sisson*¹; *Jianyu Liang*¹; *Zhaotong Yang*¹; ¹Worcester Polytechnic Institute

ADDITIVE MANUFACTURING

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

Sponsored by:

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

Monday AM | October 18, 2021

A115 | Greater Columbus Convention Center

Session Chair: To Be Announced

8:00 AM

Additively Manufactured AlSi10Mg Thin Fins via Laser Powder Bed Fusion: A Parametric Analysis: *Adnen Mezghani*¹; *Abdalla Nassar*²; *Timothy Simpson*¹; ¹Pennsylvania State University; ²Applied Research Laboratory

8:20 AM

Effect of Direct Metal Laser Sintering Build Parameters on Defects and Ultrasonic Fatigue Performance of Additively Manufactured AlSi10Mg: *Robert Rhein*¹; *Qianying Shi*²; *Srinivasan Arjun Tekalur*¹; *J Wayne Jones*²; *Jason Carroll*¹; ¹Eaton Corporation; ²University of Michigan

8:40 AM

Effects of Process Parameters, Post-processing, and Defects on Tension and Fatigue Properties of LPBF AlSi10Mg: *Austin Ngo*¹; *Collin Sharpe*¹; *Varthula Jayasekera*²; *Brett Conner*²; *Holly Martin*²; *Christopher Tuma*¹; *John Lewandowski*¹; ¹Case Western Reserve University; ²Youngstown State University

9:00 AM

Effects of Process Parameters and Defects on S-N Fatigue of LPBF AlSi10Mg: *Collin Sharpe*¹; *Austin Ngo*¹; *Christopher Tuma*¹; *Michael Shinohara*¹; *Holly Martin*²; *John Lewandowski*¹; ¹Case Western Reserve University; ²Youngstown State University

9:20 AM

Microstructural and Strength Evolution during Aging of an Additively Manufactured Al-Cu-Mn-Zr Alloy: *Richard Michi*¹; *Kevin Sisco*²; *Sumit Bahl*¹; *Jonathan Poplawsky*¹; *Lawrence Allard*¹; *Ryan Dehoff*¹; *Alex Plotkowski*¹; *Amit Shyam*¹; ¹Oak Ridge National Laboratory; ²University of Tennessee, Knoxville



9:40 AM Break

10:00 AM

Process Optimization and Microstructural Analysis for Laser Powder Bed Fusion of AlMgZr Alloy: *Nellie Pestian*¹; Thomas Carmody¹; Daniel Satko¹; Evan Diewald²; Christian Gobert²; Anthony Rollett²; Jack Beuth²; Ayman Salem¹; Nam Phan³; Jan Kasprzak³; ¹MRL Materials Resources LLC; ²Carnegie Mellon University; ³Naval Air Systems Command

10:20 AM

Characterization of Near-eutectic Al-Ce with Sc and Zr Microadditions Processed by Rapid Laser Remelting: *Jovid Rakhmonov*¹; Clement Ekaputra¹; David Weiss²; David Dunand¹; ¹Northwestern University; ²Eck Industries, Inc.

10:40 AM

An Investigation of Elastic Properties of Coal-derived Graphene-reinforced Aluminum Nanocomposites Using Friction Stir Welding and Molecular Dynamics Simulations: *Saurav Kar*¹; Roop Mahajan¹; ¹Virginia Tech

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: ICME Gaps: Material Property and Validation Data to Support Certification – Data Needs for Simulation: Material Property and Validation Data to Support Certification

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

Program Organizers: Joshua Fody, NASA Langley Research Center; Edward Glaessgen, NASA Langley Research Center; Christopher Lang, NASA Langley Research Center; Greta Lindwall, KTH Royal Institute of Technology; Michael Sansoucie, NASA Marshall Space Flight Center; Mark Stoudt, National Institute of Standards and Technology

Monday AM | October 18, 2021
A114 | Greater Columbus Convention Center

Session Chairs: Joshua Fody, NASA; Christopher Lang, NASA

8:00 AM Introductory Comments

8:10 AM Keynote

ICME Gaps for Additive Manufacturing of Metals: *Anthony Rollett*¹; ¹Carnegie Mellon University

8:50 AM

High Temperature Material Property Data and Challenges to Thermal Process Model Predictions and In-Situ/Ex-Situ Measurements for Metallic Additive Manufacturing: *Joshua Fody*¹; Samuel Hocker¹; Joseph Zalameda¹; Wesley Tayon¹; ¹NASA Langley Research Center

9:10 AM

Determining Data Requirements to Quantify Porosity in the Laser Powder Bed Fusion Process: Mahya Shahabi¹; Caitlin Kean¹; Adrianna Yuen¹; Anthony Rollett²; *Sneha Prabha Narra*²; ¹Worcester Polytechnic Institute; ²Carnegie Mellon University

9:30 AM

Phase Field Informed Monte Carlo Texture Evolution Models for Additive Manufacturing Microstructure Simulation and the Need for Experimental Grain Competition Data: *Brodan Richter*¹; Joseph Pauza²; Anthony Rollett²; Edward Glaessgen¹; ¹NASA Langley Research Center; ²Carnegie Mellon University

9:50 AM Break

10:05 AM

CFD Modelling for AM Processes: *Pareekshith Allu*¹; ¹Flow Science Inc.

10:25 AM

Methods for Improved Part-scale Thermal Process Simulations in Laser Powder Bed Fusion: *Seth Strayer*¹; Florian Dugast¹; Alaaeldin Olleak¹; Shawn Hinnebusch¹; Joshua Fody²; Albert To¹; ¹University of Pittsburgh; ²National Aeronautics and Space Administration

10:45 AM

On Scan Path Knowledge for Model Informed Process Planning and Material Quality Predictions: Emil Duong¹; Lukas Masseling¹; Ulrich Thombansen¹; Christian Knaak¹; *Mustafa Megahed*²; ¹Fraunhofer Institute for Laser Technology ILT; ²ESI Group

11:05 AM

Experimental and Numerical Investigation of Pressureless Sintering for Binder Jetted Metal Parts: *Kaiwen Zhang*¹; Wei Zhang¹; Ryan Brune¹; Xu Zhang¹; Edward Herderick¹; ¹Ohio State University

11:25 AM Question and Answer Period

ADDITIVE MANUFACTURING

Additive Manufacturing: Advanced Characterization for Industrial Applications – In-situ and Operando Techniques

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee, TMS Additive Manufacturing Bridge Committee

Program Organizers: Nadia Kouraytem, University of Utah; Fan Zhang, National Institute of Standards and Technology; Lianyi Chen, University of Wisconsin-Madison

Monday AM | October 18, 2021
A121 | Greater Columbus Convention Center

Session Chair: To Be Announced

8:00 AM Introductory Comments

8:10 AM Invited

Operando Synchrotron X-ray Studies of Metal Additive Manufacturing: From Fundamentals to Industrial Applications: *Tao Sun*¹; ¹University of Virginia

8:40 AM

Characterizing Powder Spreading Dynamics in Powder Bed Fusion AM Process by High-speed X-ray Imaging: *Luis Escano*¹; Lianyi Chen¹; ¹University of Wisconsin - Madison

9:00 AM

Domain Adaption for Enhanced X-ray CT Reconstruction of Metal Additively Manufactured Parts: *Amir Ziabari*¹; Abhishek Dubey²; Singanallur Venkatakrishnan¹; Michael Sprayberry¹; Curtis Frederick³; Paul Brackman³; Philip Bingham¹; Ryan Dehoff¹; Vincent Paquit¹; ¹Oak Ridge National Laboratory; ²NIH; ³Carl Zeiss Industrial Metrology, LLC

9:20 AM

In-situ Quality Monitoring of PBF AM Parts: *Bernard Revaz*¹; ¹SENSIMA Inspection/AMIquam SA

9:40 AM

In-situ X-ray and Infra-red Monitoring for Defect Detection in Laser Powder Bed Fusion: *Benjamin Gould*¹; Sarah Wolff²; Kartie Nixon²; Jasdeep Singh¹; Aaron Greco¹; ¹Argonne National Laboratory; ²Texas A&M University

10:00 AM Break

10:20 AM

Understanding the Keyhole Dynamics in Laser Welding Using Time-resolved X-ray Imaging Coupled with Computer Vision and Data Analytics: *Joseph Aroh*¹; Jongchan Pyeon¹; Runbo Jiang¹; Benjamin Gould²; Andy Ramlatchan³; Anthony Rollett¹; ¹Carnegie Mellon University; ²Argonne National Laboratory; ³NASA Langley Research Center

10:40 AM

In-situ Characterization of Pore Formation Dynamics in Pulsed Wave Laser Powder Bed Fusion: *Seyed Mohammad Hojjatzadeh*¹; Qilin Guo¹; Niranjana Parab²; Minglei Qu¹; Luis Escano¹; Kamel Fezzaa²; Wes Everhart³; Lianyi Chen¹; ¹University of Wisconsin-Madison; ²Argonne National Laboratory; ³Department of Energy's Kansas City National Security Campus Managed by Honeywell FM&T

11:00 AM

A Machine-learning Based Framework for In-situ Detection of Potential Flaw Formation during Directed Energy Deposition, Metal Additive Manufacturing: Andrew Crook¹; Tyler Lott¹; *Nadia Kouraytem*¹; Som Dutta¹; ¹Utah State University

ADDITIVE MANUFACTURING

Additive Manufacturing: Alloy Design to Develop New Feedstock Materials III – Modeling and Experiments

Sponsored by: TMS Alloy Phases Committee

Program Organizers: Aurelien Perron, Lawrence Livermore National Laboratory; Joseph McKeown, Lawrence Livermore National Laboratory; Manyalibo Matthews, Lawrence Livermore National Laboratory; Peter Hosemann, University of California, Berkeley; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology

Monday AM | October 18, 2021

A111 | Greater Columbus Convention Center

Session Chair: Aurelien Perron, Lawrence Livermore National Laboratory

8:00 AM Invited

Multiscale Modeling of Rapid Solidification of Refractory HEAs: *Tatu Pinomaa*¹; Matias Haapalehto¹; Matti Lindroos¹; Anssi Laukkanen¹; ¹Vtt Technical Research Centre of Finland

8:30 AM

Insights into Additive Manufacturability and Microstructure Evolution from Simple Analytical Models: *Charles Smith*¹; Madeleine Johnson¹; Olivia DeNonno²; Luc Hagen¹; Daniel Gifford¹; Juan Gonzalez¹; Anthony Petrella¹; Zhenzhen Yu¹; Amy Clarke¹; Jonah Klemm-Toole¹; ¹Colorado School of Mines

8:50 AM

Additive Manufacturing Feasibility Investigation Using Single Track Study for the Fabrication of Borated Austenitic Stainless Steels via Laser Powder Bed Fusion: *Abhishek Mehta*¹; Devin Imholte²; Nicolas Woolstenhulme²; Daniel Wachs²; Yongho Sohn¹; ¹University of Central Florida; ²Idaho National Laboratory

9:10 AM

Grain Boundary Engineering of 316L Stainless Steel via Laser Powder Bed Fusion: *Matteo Seita*¹; Shubo Gao¹; ¹Nanyang Technological University

9:30 AM Invited

A High-throughput Method to Define New Feedstock Process Parameters in Additive Manufacturing: *Zahabul Islam*¹; Ankur Agrawal¹; Behzad Rankouhi¹; Frank Pfeifferkorn¹; Dan Thoma¹; ¹University of Wisconsin

10:00 AM Break

10:20 AM

Solidification Cracking in Binary Al-Cu Alloys (1.5, 3.0, 4.5, 6.0, and 10 wt.% Cu) Additively Manufactured by Laser Powder Bed Fusion: *Keegan Muller*¹; Thanh Huynh¹; Holden Hyer¹; Sharon Park¹; Le Zhou²; Jeongmin Woo¹; Abhishek Mehta¹; Brandon McWilliams³; Kyu Cho³; Yongho Sohn¹; ¹University of Central Florida; ²Marquette University; ³DEVCOM US Army Research Laboratory

10:40 AM

Development of Al-Ce Alloys for Additive Manufacturing Using the CALPHAD Method: *Emily Moore*¹; Zachary Sims¹; Hunter Henderson¹; Orlando Rios²; Scott McCall¹; David Weiss³; Aurélien Perron¹; ¹Lawrence Livermore National Laboratory; ²UT Knoxville; ³Eck Industries

ADDITIVE MANUFACTURING

Additive Manufacturing: Processing, Microstructure and Material Properties of Titanium-based Materials – Session I

Sponsored by: TMS Titanium Committee

Program Organizers: Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University; Peeyush Nandwana, Oak Ridge National Laboratory; Rongpei Shi, Lawrence Livermore National Laboratory

Monday AM | October 18, 2021

A120 | Greater Columbus Convention Center

Session Chair: Ola Harrysson, North Carolina State University

8:00 AM

A Machine Learning Model to Predict Tensile Properties of Ti6Al4V Parts Prepared by Selective Laser Melting with Hot Isostatic Pressing: *Zhaotong Yang*¹; Mei Yang¹; Richard Sisson¹; Yanhua Li¹; Jianyu Liang¹; ¹Worcester Polytechnic Institute

8:20 AM

An Infill Strategy for Eliminating Local Hot Spots in Ti64 Laser Powder Bed Fusion: Evan Diewald¹; Christian Gobert¹; *Jack Beuth*¹; ¹Carnegie Mellon University

8:40 AM Invited

Processing to Microstructure to Properties in Titanium: *Anthony Rollett*¹; ¹Carnegie Mellon University

9:20 AM

Effect of High Oxygen Content on the Tensile and Fatigue Performance of Selectively Laser Melted (SLM) Ti-6Al-4V in the Hot Isostatic Pressed (HIP) Condition: *Anne Osantowski*¹; Yuwei Zhai¹; Oscar Quintana¹; Weidong Tong¹; ¹Depuy Synthes

9:40 AM

Effect of Powder Feedstock Size on the Characteristics of Ti6Al4V Lightweight Features from Laser Powder Bed Fusion Additive Manufacturing: An Experimental Study: Sayed Saghaian¹; Jonah Hermes¹; *Li Yang*¹; ¹University of Louisville

10:00 AM Break

10:20 AM

Effects of Process Parameters on Fatigue Behavior and Defect Characteristics in LPBF Ti-6Al-4V: *Austin Ngo*¹; David Scannapieco¹; Hunter Taylor²; Ryan Wicker²; Joseph Pauza³; Anthony Rollett³; John Lewandowski¹; ¹Case Western Reserve University; ²University of Texas at El Paso; ³Carnegie Mellon University

10:40 AM

Fatigue Fracture Surface Defect Quantification for LPBF Additively Manufactured Ti-6Al-4V: *David Scannapieco*¹; Austin Ngo¹; Collin Sharpe¹; Hunter Taylor¹; Ryan Wicker¹; Joseph Pauza¹; Anthony Rollett¹; John Lewandowski¹; ¹Case Western Reserve University

11:00 AM

Mechanical Strength and Fatigue Performance of Laser Powder Bed Fusion Processed Hydride-dehydride Ti-6Al-4V Powders: *Mohammadreza Asherloo*¹; Melody Delpazir¹; Ziheng Wu²; Muktesh Paliwal³; Anthony Rollett²; Amir Mostafaei¹; ¹Illinois Institute of Technology; ²Carnegie Mellon University; ³Kymera International - Reading Alloys

ENERGY

Advanced Characterization of Materials for Nuclear, Radiation, and Extreme Environments – Fusion Materials and Metals

Sponsored by: TMS Nuclear Materials Committee

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

Monday AM | October 18, 2021

A215 | Greater Columbus Convention Center

Session Chairs: Michael Short, Massachusetts Institute of Technology; Cody Dennett, Idaho National Laboratory

8:00 AM Invited

Real-time Thermal Oxidation Process of PFM Tungsten Under Fusion-relevant Conditions Revealed by In-situ Environmental TEM: Maanas Togaru¹; Rajat Sainju¹; Lichun Zhang¹; Weilin Jiang²; *Yuanyuan Zhu*¹; ¹University of Connecticut; ²Pacific Northwest National Laboratory

8:20 AM Invited

Uncovering the Effect of Grain Boundary Dopants on Irradiation Induced Grain Growth Through In Situ Microscopy: *Jason Trelewicz*¹; William Cunningham¹; Danny Edwards²; Yuanyuan Zhu³; ¹Stony Brook University; ²Pacific Northwest National Laboratory; ³University of Connecticut

8:40 AM

Femtosecond Laser Induced Surface Damages in Tungsten and Tungsten Carbide in High Heat Flux Conditions: *Minsuk Seo*¹; Shukai Yu¹; Venkatraman Gopalan¹; Leigh Winfrey¹; ¹The Pennsylvania State University

9:00 AM

Effects of He on Nanoscale Mechanical Properties of Er: *Eric Lang*¹; Caitlin Taylor²; Riley Parrish¹; Patrick Price¹; Raj Tandon¹; Khalid Hattar¹; ¹Sandia National Laboratories; ²Los Alamos National Lab

9:20 AM Invited

Characterization of Materials Exposed to Coupled Nuclear Environments Using Positron Annihilation Spectroscopy and Electrical Impedance Spectroscopy: *Peter Hosemann*¹; Rasheed Auguste¹; Farida Selim²; Oskar Linke³; Maik Butterling³; Hong Chan⁴; Junsoo Han⁴; Jie Qiu¹; John Scully⁴; Ryan Schoell⁵; Djamel Kaoumi⁶; ¹University of California, Berkeley; ²Bowling Green University; ³Helmholz Zentrum Dresden Rossendorf; ⁴University of Virginia; ⁵North Carolina State University

9:40 AM Break

10:00 AM

Characterizing the Spatial and Temporal Evolution of Iron Thin Films during Coupled Irradiation and Corrosion: *Benjamin Derby*¹; Trevor Clark²; Junsoo Han³; Khalid Hattar²; John Scully³; Matthew Janish¹; Cortney Kreller¹; Nan Li¹; ¹Los Alamos National Laboratory; ²Sandia National Laboratory; ³University of Virginia

10:20 AM

Richtmyer-Meshkov Instability Testing and Accompanying Analysis: A Surface Sensitive Approach to High Strain Rate Testing of Irradiated Material without Bulk Volumes: *Calvin Lear*¹; David Jones¹; Daniel Martinez²; Jeremy Payton¹; Michael Prime³; Saryu Fensin¹; ¹Los Alamos National Laboratory

MATERIALS-ENVIRONMENT INTERACTIONS

Advanced Coatings for Wear and Corrosion Protection – Session I

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

Monday AM | October 18, 2021

A220 | Greater Columbus Convention Center

Session Chairs: Evelina Vogli, LM Group Holdings; Virendra Singh, Schlumberger

8:00 AM

Electroplated Ni-MMC Coatings as a Base Coating to Improve High Temperature Corrosion Caused by Sodiumvanadates: *Christoph Grimme*¹; Robin Kupec¹; Xabier Montero¹; Mathias Galetz²; ¹Dechema-Forschungsinstitut

8:20 AM

New Multidisciplinary Approach for Investigating Hot Corrosion Behavior in Thermal Barrier Coatings: *Guanlin Lyu*¹; JunSeong Kim¹; SeungCheol Yang¹; Yeon-Gil Jung¹; ¹Changwon National University

8:40 AM

Improved High Temperature Resistant MCrAlY Bond Coat by Grain Boundary Engineering: *Guan-Jun Yang*¹; ¹Xi'an Jiaotong University

9:00 AM

Advanced Coatings for Erosion, Abrasion and Combined Wear-corrosion Applications: *Eugene Medvedovski*¹; ¹Endurance Technologies Inc

9:20 AM

Aerosol Cold Spray Technology for Ceramic and Metal Coating Deposition: *Volf Leshchynsky*¹; Gregorz Kubicki²; Joanna Chojnacka²; Ahmed Elseddawy¹; Roman Maev¹; ¹IDIR; ²Lukasiewicz-INOP

9:40 AM

Combinatorial PVD Coatings on SiC-SiC for Boiling Water Reactor Conditions: *Ryan Schoell*¹; Joey Kabel²; Sebastian Lam³; Amit Sharma⁴; Petho Laszlo⁴; Peter Hosemann³; Djamel Kaoumi¹; ¹North Carolina State University; ²University of California Berkeley; ³University of California Berkeley; ⁴Empa

10:00 AM Break

10:20 AM

Amorphous Based PTA Weldings for Icy Surfaces: *Evelina Vogli*¹; Liang Hong²; Yan Chen²; John Kang¹; Rick Salas¹; ¹LM Group Holdings Inc.; ²Texas A&M University

10:40 AM

The Environmental Performance of Nitrided Corrosion Resistance Alloys in a Water – Glycol Hydraulic Fluid: *Virendra Singh*¹; Manuel Marya¹; ¹Schlumberger

11:00 AM

Properties of Ni-P-ZrC Nanocomposite Coatings for Corrosion Protection in the Oil and Gas Industry: *Abdul Shakoor*¹; Osama Fayyaz¹; Ahmed Radwan¹; Anwarul Hasan¹; Mostafa Sleim¹; Aboubakr Abdullah¹; ¹Qatar University

11:20 AM

Effects of Laser Remediation Treatments on Environmentally-assisted Cracking of 5xxx Aluminum Alloys and Ship Plates: *Yang Liu*¹; Benjamin Palmer¹; John Lewandowski¹; ¹Case Western Reserve University

11:40 AM

Investigations on the Effect of Open Atmosphere Laser-nitriding on Surface Mechanical and Elevated Temperature Fretting Wear Properties of A356-Alloy: *Achyuth Kulkarni*¹; Palani I.A.¹; Jayaprakash Murugesan¹; ¹IIT Indore

IRON AND STEEL (FERROUS ALLOYS)

Advancements in Steel Structural Refinement – Advancements in Steel Structural Refinement

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

Program Organizers: Charles Enloe, CBMM North America; Emmanuel De Moor, Colorado School of Mines; Jianfeng Wang, General Motors Global Research and Development; Jose Rodriguez-Ibabe, CEIT and TECNUN; Steven Jansto, Research and Development Resources

Monday AM | October 18, 2021

A211 | Greater Columbus Convention Center

Session Chair: To Be Announced

8:00 AM

New Modelling Tools for Nb Microalloyed Plate Rolling Design: Beatriz Pereda¹; Jose Rodriguez-Ibabe¹; Marcelo Rebellato²; *Pello Uranga*¹; ¹CEIT and TECNUN (University of Navarra); ²RMS

8:30 AM

Maximizing Strengthening Mechanisms in Continuously-annealed HSLA Steel: *Charles Enloe*¹; Fabio D'Aiuto²; Hardy Mohrbacher³; ¹CBMM North America; ²CBMM Europe; ³NiobelCon bvba

9:00 AM

Microalloyed Steel Precipitate Characterization by Automated TEM Image and EDS Analysis: *Roger Maddalena*¹; ¹Thermo Fisher Scientific

9:30 AM

Study of the Microstructural Refinement of a High Niobium Microalloyed Steel Under Controlled Hot Deformation: *Eduardo Pineda Martinez*¹; ¹The University of Sheffield

10:00 AM Break

10:20 AM

The Capability of Severe Plastic Deformation to Achieve High Strength and Toughness in Two High Strength Steel Alloys, Austenitic FeMnAl and Martensitic AF9628: *Matthew Vaughan*¹; Sezer Picak¹; Cafer Acemi¹; Richard Harris²; Peyman Samimi¹; Sean Gibbons²; Rachel Abrahams²; Robert Barber¹; Ibrahim Karaman¹; ¹Texas A&M University; ²Air Force Research Laboratory

ELECTRONIC AND MAGNETIC MATERIALS

Advances in Dielectric Materials and Electronic Devices — Processing/Analysis of Dielectrics & Piezoelectrics

Sponsored by: ACerS Electronics Division

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

Monday AM | October 18, 2021
B235 | Greater Columbus Convention Center

Session Chair: Amar Bhalla, University of Texas at San Antonio

8:00 AM

Unique IGa, Ta:BaTiO₃ Relaxor Based On Nanoscale Dipole Engineering: *Kaijie Ning*¹; Holly Shulman¹; Walter Schulze¹; Steven Tidrow¹; ¹Alfred University

8:20 AM

Structure and Domain Morphology of Quenched Na_{1/2}Bi_{1/2}TiO₃-BaTiO₃ Piezoceramics: Andreas Wohninstand¹; Ann-Katrin Fetzer¹; Hans-Joachim Kleebe¹; *Lalitha Kodumudi Venkataraman*¹; ¹Technical University of Darmstadt, Germany

8:40 AM

Zinc Oxide (ZnO): Inkjet Printing and Post-Processing Evaluation for Piezoelectric Applications: *Sean Garnsey*¹; Paul Flynn¹; Bryan Gamboa¹; Amar Bhalla¹; Ruyan Guo¹; ¹ECE/ COE, University of Texas at San Antonio

9:00 AM

Electroceramics with Ferroelectric Grain Boundaries via Cold Sintering: *Javier Mena Garcia*¹; Sinan Dursun¹; Kosuke Tsuji¹; Sun Hwi Bang¹; Zhongming Fan¹; Arnaud Ndayishimiye¹; Clive Randall¹; ¹Penn State University

9:20 AM

Production of High Temperature 3D Printed Ceramics for Sensing Applications: *Eleanore Rogenski*¹; Victoria Adams¹; Eric MacDonald²; Matthew Mullin³; Ian Small³; Pedro Cortes¹; ¹Youngstown State University; ²The University of Texas at El Paso; ³NASA

9:40 AM Break

10:00 AM

Effect of Deposition Humidity on the Properties of Solution-processed Indium Tin Oxide Films: *Sivaramkrishnan Sethuraman*¹; Rosario Gerhardt¹; ¹Georgia Institute of Technology

10:20 AM

Direct-writing of Embedded Flexible Sensors for Strain and Temperature Monitoring for Stretchable Applications: *Akshay Kakar*¹; Derrick Banerjee¹; Edward Sabolsky¹; Konstantinos Sierros¹; ¹West Virginia University

10:40 AM

Lead-free and Antiferroelectric Ceramics for Novel Energy and Heat-management Technologies: Brigita Rozic¹; Zouhair Hanani²; Soukaina Merselmiz²; Daoud Mezzane²; Mimoun El Marssi³; Hana Ursic¹; Rasa Pirc¹; Matjaz Spreitzer¹; *Zdravko Kutnjak*¹; ¹Jozef Stefan Institute; ²University Cadi Ayyad; ³University of Picardie Jules Verne

IRON AND STEEL (FERROUS ALLOYS)

Advances in Ferrous Metallurgy — Advances in Ironmaking, Steelmaking, and Casting

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

Program Organizers: Daniel Baker, General Motors Corporation; Emmanuel De Moor, Colorado School of Mines; Kishlay Mishra, Nucor Castrip Arkansas LLC; Lijia Zhao, ArcelorMittal Global R&D

Monday AM | October 18, 2021
A210 | Greater Columbus Convention Center

Session Chair: To Be Announced

8:00 AM

Cost Modeling and Life Cycle Analysis of Low-Emissions Iron Production: *Muntasir Shahabuddin*¹; Adam Powell¹; Yan Wang¹; Nikolaos Kazantzis¹; Brajendra Mishra¹; ¹Worcester Polytechnic Institute

8:20 AM

Thermodynamics and Kinetics of Coke Breeze Combustion Under Different Oxygen Content in Sintering Process: *Dongqing Wang*¹; ¹Shougang Group

8:40 AM

The Study and Optimization of Calcium Flux for Self-fluxed Pellets: *Xiangjuan Dong*¹; Wei Wu¹; Yu Cao²; Kai Wang²; Gele Qing³; Ming Li²; Wenwang Liu²; ¹Central Iron and Steel Research Institute; ²Shougang Jingtang United Iron & Steel Co, Ltd; ³Shougang Research Institute of Technology of Shougang Group Co., Ltd.

9:00 AM

Structure Optimizations of Submerged Entry Nozzle in a Steel Slab Continuous Casting Mold: *Yushi Tian*¹; Lijun Xu²; Shengtao Qiu²; Rong Zhu¹; ¹University of Science and Technology Beijing; ²Central Iron & Steel Research Institute

9:20 AM

Impact of Alloy Composition on the Hot Ductility of Steel during Continuous Casting: *Alyssa Stubbers*¹; Thomas Balk¹; ¹University of Kentucky

ARTIFICIAL INTELLIGENCE

AI for Big Data Problems in Advanced Imaging, Materials Modeling and Automated Synthesis – Accelerating Discovery of Materials

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Mathew Cherukara, Argonne National Lab; Badri Narayanan, University of Louisville; Subramanian Sankaranarayanan, University of Illinois (Chicago)

Monday AM | October 18, 2021
A124 | Greater Columbus Convention Center

Session Chair: To Be Announced

8:00 AM Invited

De Novo Inverse Design of Nanoporous Materials by Machine Learning: *Mathieu Bauchy*¹; ¹University of California, Los Angeles

8:30 AM Invited

Tuning Optoelectronic Properties of Semiconductors with First Principles Modeling and Machine Learning: *Arun Kumar Mannodi Kanakkithodi*¹; *Maria Chan*²; ¹Purdue University; ²Argonne National Laboratory

9:00 AM

Understanding the Composition–property Relationship of Glasses Using Interpretable Machine Learning: *Ravinder Bhattoo*¹; *Suresh Bishnoi*²; *Mohd Zaki*³; *N. M. Anoop Krishnan*¹; ¹Indian Institute of Technology Delhi

9:20 AM

Machine Learning Polymer Property Prediction Models with Polymers Represented as Natural Language: *Christopher Kuenneth*¹; *Rampi Ramprasad*¹; ¹Georgia Institute of Technology

9:40 AM Invited

Aluminum Alloy Design Using Physics Informed Machine Learning: *Fatih Sen*¹; *Marat Latypov*¹; *Heath Murphy*¹; *Kyle Haines*¹; *Shruthi Raj*¹; *Aurele Mariaux*²; *Sazol Das*¹; *David Anderson*¹; *Debdutta Roy*¹; *Yudie Yuan*¹; *Vishwanath Hegadekatte*¹; ¹Novelis R&D Center, Kennesaw GA; ²Novelis R&D Center, Sierre, Switzerland

10:10 AM Break

10:30 AM

Refinements to the Production of Machine Learning Interatomic Potentials: *Jared Stimac*¹; *Jeremy Mason*¹; ¹University of California, Davis

10:50 AM Invited

Discovery of Novel Crystal Structures via Generative Adversarial Networks: *Taylor Sparks*¹; *Michael Alverson*¹; ¹University of Utah

CERAMIC AND GLASS MATERIALS

Ceramic Matrix Composites – Session I

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Narottam Bansal, NASA Glenn Research Center; Jacques Lamon, CNRS; Sung Choi, Naval Air Systems Command

Monday AM | October 18, 2021
B232 | Greater Columbus Convention Center

Session Chair: Marina Ruggles-Wrenn, Air Force Institute of Technology

8:00 AM Invited

Static Fatigue of Hi-Nicalon-S Fiber Tows at Elevated Temperature in Air and in Steam: *Scott Robertson*¹; *Marina Ruggles-Wrenn*¹; *Randall Hay*²; *Theodore Shillig*¹; *Ronald Mitchell*¹; *Brian Kroeger*¹; *Logan Gumucio*¹; ¹Air Force Institute of Technology; ²AFRL

8:40 AM Invited

Subcritical Crack Growth during Static Fatigue of Hi-Nicalon-S SiC Fiber: *Randall Hay*¹; *Marina Ruggles-Wrenn*²; ¹U.S. Air Force Research Laboratory; ²Air Force Institute of Technology

9:20 AM

Synchrotron Tomography of SiC/SiC Minicomposites to Observe and Quantify Damage Evolution: *Ashley Hilmas*¹; *Andrew Sharits*²; *Craig Przybyla*¹; *Robert Goldberg*³; *Amjad Almansour*³; ¹Air Force Research Laboratory; ²UES Inc; ³NASA Glenn Research Center

9:40 AM

Interfacial Fracture Toughness on SiC/SiC CMCs: *Oriol Gavaldà-Díaz*¹; *Luc Vandeperre*¹; *Eduardo Saiz*²; *Finn Giuliani*¹; ¹Imperial College London

10:00 AM Break

10:20 AM

Developments in Laser-CVD to Produce SiC and Si₃N₄ Fibers for CMC Reinforcement: *Mark Schaefer*¹; *Joseph Pegna*¹; *Kirk Williams*¹; *Jeff Vervlied*¹; ¹Free Form Fibers

10:40 AM

Effectiveness of Mechanical Reinforcement of Carbon Nanotubes on Boron Carbide Through In-situ High Loading Indentation: *Tyler Dolmetsch*¹; *Benjamin Boesl*¹; *Arvind Agarwal*¹; *Cheng Zhang*¹; ¹Florida International University

11:00 AM

Processing and Fabrication of a ZrO₂-CNT Composite: *Vicente Gerlin Neto*¹; *Cristian Barbosa Pereira*²; *Felipe Dias Faglioni*²; *Carlos Alberto Fonzar Pintão*³; *Carlos Alberto Fortulan*⁴; *Cesar Foschini*²; ¹Instituto Federal de Educação, Ciência e Tecnologia de São Paulo; ²Faculdade de Engenharia de Bauru - FEB/Unesp; ³Faculdade de Ciências de Bauru - FC/Unesp; ⁴Escola de Engenharia de São Carlos - EESC/USP

11:20 AM

The Effect of Nanosized Additives on the Properties of Silicon Carbide-based Materials: *Ihor Hnylytsia*¹

MATERIALS-ENVIRONMENT INTERACTIONS

Coatings to Protect Materials from Extreme Environments — Environmental and Thermal Barrier Coatings

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Kang Lee, NASA Glenn Research Center; Yutaka Kagawa, The University of Tokyo; Daniel Mumm, University of California, Irvine; Rodney Trice, Purdue University; Emmanuel Boakye, UES Inc.; Valerie Wiesner, NASA Langley Research Center; Edward Gorzkowski, Naval Research Laboratory; Scooter Johnson, Naval Research Laboratory

Monday AM | October 18, 2021
A222 | Greater Columbus Convention Center

Session Chairs: Rodney Trice, Purdue University; Kang Lee, NASA Glenn Research Center

8:00 AM

Break-away Oxidation in Ytterbium Silicate Environmental Barrier Coatings: *Kenneth Kane*¹; Eugenio Garcia²; Michael Lance¹; Cory Parker¹; Sanjay Sampath²; Bruce Pint¹; ¹Oak Ridge National Laboratory; ²Stony Brook University

8:20 AM

Effects of Topcoat Modifications on Bond Coat Oxidation, Internal Stresses, and Interface Toughness in Multilayer Si/Yb₂Si₂O₇ Environmental Barrier Coatings: *Benjamin Herren*¹; Chihpin Chuang²; Jonathan Almer²; Kang Lee³; Katherine Faber¹; ¹California Institute of Technology; ²Argonne National Laboratory, Advanced Photon Source; ³NASA Glenn Research Center

8:40 AM

Polymorph Stability and Thermal Expansion Tensors of Mixed and High Entropy Rare Earth Disilicates: *Alejandro Salanova*¹; Rachel Guarriello¹; Mackenzie Ridley¹; Cormac Toher²; Stefano Curtarolo²; Elizabeth Opila¹; Jon Ihlefeld¹; ¹University of Virginia; ²Duke University

9:00 AM

Evaluation of YbPO₄ as an Environmental Barrier Coating Candidate: *Mackenzie Ridley*¹; Bohuslava McFarland²; Cameron Miller¹; Elizabeth Opila¹; ¹University of Virginia; ²Pratt & Whitney

9:20 AM

Protocol for Selecting Exemplary Silicate Deposit Compositions for Evaluation of Thermal and Environmental Barrier Coatings: *Andrew Ericks*¹; Frank Zok¹; David Poerschke²; Carlos Levi¹; ¹University of California, Santa Barbara; ²University of Minnesota

9:40 AM

High Temperature Stability and Decomposition of Mixed Oxide and Sulfate CMFAS-type Deposits and Implications for Coating Degradation: *Eeshani Paresh Godbole*¹; Atharva Chikhalikar¹; David Poerschke¹; ¹University of Minnesota

10:00 AM Break

10:20 AM

Na₂SO₄ Interactions with Rare Earth Silicate Environmental Barrier Coatings: *Kristyn Ardrey*¹; Elizabeth Opila¹; ¹University of Virginia

10:40 AM

Protection of Yttria Stabilized Zirconia (YSZ) Surface from CMAS Attack by Sacrificial Layer of Si₃N₄: *Said Bakkar*¹; Elora Zucan¹; Tim Hossain²; Jacob Moldenhauer¹; Ellen Steinmiller¹; Will Flanagan¹; ¹University of Dallas; ²Ceriumlabs

11:00 AM

Understanding Modes of Mixed Deposit-Induced Degradation on Advanced Alloys and Bond Coat Systems: *Atharva Chikhalikar*¹; Eeshani Godbole¹; David Poerschke¹; ¹University of Minnesota, Twin Cities

SPECIAL TOPICS

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

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

Program Organizers: Alison Polasik, Campbell University; Susan Gentry, University of California, Davis; Jeffrey Fergus, Auburn University; Assel Aitkaliyeva, University of Florida; Kester Clarke, Colorado School of Mines; Subhadra Gupta, University of Alabama; Gregg Janowski, University of Alabama at Birmingham; M. Norton, Washington State University

Monday AM | October 18, 2021
B140/141 | Greater Columbus Convention Center

Session Chair: To Be Announced

8:00 AM Introductory Comments

8:05 AM

Changes in ABET Engineering General Criteria: *Jeffrey Fergus*¹; ¹Auburn University

8:25 AM

Preparing for an ABET Evaluation – Common Issues: *Jeffrey Fergus*¹; ¹Auburn University

8:45 AM

Universities, DOD Manufacturing Institutes and US Manufacturing-The MEEP Program: *Cindy Waters*¹; *Jeremy Chang*¹; ¹Carderock Division Naval Surface Warfare Center

9:05 AM

A Survey of the Changes Made for Online Teaching in Materials Science and Engineering Program: *Alison Polasik*¹; Kester Clarke²; ¹Campbell University; ²Colorado School of Mines

9:25 AM Break

9:40 AM Panel Discussion: Assessment and Accreditation Q&A

PROCESSING AND MANUFACTURING

Development of Light Weight Alloys and Composites – Microstructure and Properties: Composites I

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

Monday AM | October 18, 2021

A214 | Greater Columbus Convention Center

Session Chairs: Aashish Rohatgi, PNNL; Ramasis Goswami, NRL

8:00 AM Invited

Development of a High-temperature High Strength Aluminum Alloys by Microstructure Tuning: *Kamanio Chattopadhyay*¹; *Ujval Bansal*¹; *Mahander Singh*¹; *Shyam Sinha*¹; *Sukla Mondol*²; *Surendra Makineni*¹; ¹Indian Institute of Science; ²NIT Warangal

8:40 AM Invited

A Data-driven Analysis for Selection of Ti-based Alloys for Aircraft Landing Gear Beams and Future Directions: *Tanjore Jayaraman*¹; *Canumalla Ramachandra*²; ¹University of Michigan-Dearborn; ²Metallurgical Executive & Consultant

9:20 AM

Existing and Emerging Applications of Machine Learning in Design, Synthesis, and Characterization of Metal Matrix Composites: *Amir Kordijazi*¹; *Pradeep Rohatgi*¹; ¹University of Wisconsin-Milwaukee

9:40 AM

Energy Efficient Solid-state Alloying and Composite Manufacturing: *Kumar Kandasamy*¹

10:00 AM Break

10:20 AM Invited

Non-Rule-of-Mixtures Thermal Diffusivity in Core-Shell-based Nanocrystalline Composite Ceramics: *James Wollmershauser*¹; *Kevin Anderson*²; *Benjamin Greenberg*²; *Heonjune Ryou*¹; *Edward Gorzkowski*¹; *Boris Feigelson*¹; ¹U.S. Naval Research Laboratory; ²National Research Council Postdoctoral Research Fellow sited at U.S. Naval Research Laboratory

11:00 AM Invited

Precipitation of Stable Icosahedral Quasicrystalline Phase in Mg-Al-Zn Alloys: *Alok Singh*¹; *Takanobu Hiroto*¹; *Machiko Ode*¹; *Karel Tesar*²; *Hidetoshi Somekawa*¹; *Toru Hara*¹; ¹National Institute for Materials Science; ²Czech Technical University in Prague

11:40 AM

Coarsening of Strengthening Phases in Al(Cu) Alloys: Correlated Atomic-Resolution Microscopy and Composition Analysis: *Ujval Bansal*¹; *Mahander Singh*¹; *Shyam Sinha*¹; *Sukla Mondol*²; *Kamanio Chattopadhyay*¹; ¹Indian Institute of Science; ²NIT Warangal

12:00 PM

Microstructure and Mechanical Properties of a New Low-density Non-equiaxial AlSiCrMnFeNiCu High Entropy Alloy: *Yagnesh Shadangi*¹; *Vikas Shivam*¹; *Joysurya Basu*¹; *Kausik Chattopadhyay*¹; *Nilay Mukhopadhyay*¹; ¹IIT BHU

ENERGY

Energy Materials for Sustainable Development – Energy Harvesting

Sponsored by: ACerS Energy Materials and Systems Division

Program Organizers: Armin Feldhoff, Leibniz University Hannover; Kyle Brinkman, Clemson University; Krista Carlson, University of Utah; Eva Hemmer, University of Ottawa; Nikola Kanas, Norwegian University of Science and Technology; Kjell Wiik, Norwegian University of Science and Technology; Lei Zuo, Virginia Tech; Stephanie Lee, Stevens Institute of Technology; Muhammad Hajj, Stevens Institute of Technology; Mohammad Haik, Stevens Institute of Technology

Monday AM | October 18, 2021

A216 | Greater Columbus Convention Center

Session Chairs: Kyle Brinkmann, Clemson University; Krista Carlson, University of Nevada, Reno

8:00 AM Introductory Comments

8:20 AM Invited

Multi-modal Energy Harvesting-magnetic Field, Vibrations, Heat and Light: *Shashank Priya*¹; ¹Penn State

8:50 AM Invited

Interfacial Properties in Composite Nano-systems for Energy Harvesting: *Alberto Vomiero*¹; ¹Lulea University of Technology

9:20 AM

Energy Harvesting Floor from Commercial Cellulosic Materials for Self-powered Wireless Transmission Sensor System: *Long Gu*¹; ¹University of Wisconsin-Madison

9:40 AM

Implanted Battery-free Direct-current Micro-power Supply from In Vivo Breath Energy Harvesting: *Jun Li*¹; ¹University of Wisconsin-Madison

10:00 AM Break

10:20 AM

Cost-effective, Penetration/Corrosion-resistant Materials for the Containment of Earth-abundant Molten Chlorides for High-temperature Thermal Energy Storage for Concentrated Solar Power: *Liangjuan Gao*¹; *Elizabeth Laskowksi*¹; *Saeed Bagherzadeh*¹; *Mario Caccia*¹; *Michael Bichnevicius*²; *Qingzi Zhu*²; *Mehdi Pishahang*²; *Robert Cullen*³; *Kenneth McGowan*³; *Asegun Henry*³; *Kenneth Sandhage*¹; ¹Purdue University; ²Massachusetts Institute of Technology; ³Westmoreland Advanced Materials, Inc.

10:40 AM

Measurement of Density for Molten Fluoride Salt: *Jaewoo Park*¹; *Jinsuo Zhang*¹; ¹Virginia Tech

11:00 AM

Evaluation Recyclable Materials to Manufacture Wind Turbines Blades H-Darrieus: *Andres Olivera C.*¹; *Edwin Chica*¹; *Henry Colorado*¹; ¹Universidad de Antioquia

11:20 AM

Microstructure Prediction of the Laser Additive Manufacturing of Silicon-iron Soft Magnet: *Fukang Li*¹; *Kan Sun*¹; *Lei Zuo*¹; ¹Virginia Tech

CERAMIC AND GLASS MATERIALS

Glasses and Optical Materials: Current Issues and Functional Applications — Dissolution and Mechanical Properties of Amorphous Solids

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

Program Organizers: Jessica Rimsza, Sandia National Laboratories; Delia Brauer, Otto Schott Institute of Materials Research

Monday AM | October 18, 2021
B231 | Greater Columbus Convention Center

Session Chair: Jessica Rimsza, Sandia National Laboratories

8:00 AM Invited

Multi-scale Investigation of the Degradation Processes of Alkali Silicate Glasses in Atmospheric Conditions: *Fanny Alloteau*¹; Odile Majerus¹; Valentina Valbi¹; Isabelle Biron²; Patrice Lehuédé²; Daniel Caurant¹; Thibault Charpentier³; ¹PSL University, Chimie Paristech, CNRS, Institut de Recherche de Chimie Paris; ²Centre de Recherche et de Restauration des Musées de France; ³NIMBE, CEA, CNRS, Université Paris-Saclay, CEA Saclay

8:40 AM

X-ray Photoelectron Spectroscopy (XPS) for Improved Characterization of Glass Delamination Lamellae: *Douglas Meier*¹; ¹McCrone Associates, Inc.

9:00 AM

Interactive Corrosion between International Simple Glass (ISG) and Stainless Steel: *Chandi Mohanty*¹; Xiaolei Guo¹; Huseyin Kaya²; Stephane Gin³; Joseph Ryan⁴; John Vienna⁴; Seong Kim⁵; Jianwei Wang⁶; Jie Lian⁷; Gerald Frankel¹; ¹The Ohio State University; ²The Pennsylvania State University; ³CEA; ⁴Pacific Northwest National Laboratory; ⁵The Pennsylvania State University; ⁶Louisiana State University; ⁷Rensselaer Polytechnic Institute

9:20 AM

Revisiting the Atomic Structure of Glassy Silica by Force-enhanced Atomic Refinement: *Mathieu Bauchy*¹; ¹University of California, Los Angeles

FUNDAMENTALS AND CHARACTERIZATION

Grain Boundaries, Interfaces, and Surfaces in Ceramics: Fundamental Structure—Property—Performance Relationships — Atomistic Approaches

Sponsored by: ACerS Basic Science Division, ACerS Electronics Division

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

Monday AM | October 18, 2021
C161A/161B | Greater Columbus Convention Center

Session Chairs: Amanda Krause, University of Florida; Wayne Kaplan, TECHNION

8:00 AM Invited

Probing the Influence of Defects and Interfaces on Multiferroic Behavior Using Electron Energy-loss Spectroscopy: Nuria Bagues¹; Louise Colfer²; Lynette Keeney²; *David McComb*¹; ¹Ohio State University; ²Tyndall National Institute

8:40 AM Invited

Hetero-epitaxial Relationships and Atomic Structure at Ag/Ni Interfaces: *Dominique Chatain*¹; Paul Wynblatt²; Velimir Radmilovic³; Ulrich Dahmen⁴; ¹CNRS; ²Carnegie Mellon University; ³University of Belgrade; ⁴Lawrence Berkeley National Laboratory

9:20 AM

3-D Quantification of Grain Boundary Defect Chemistry Using TEM + APT: *Brian Gorman*¹; ¹Colorado School of Mines

9:40 AM

Geometrical Asymmetry Enabled Low Field Nucleation and Manipulation of Skyrmion at Magnetic Domain Boundaries in a Centro-symmetric Magnet: *Binbin wang*¹; Po-kuan Wu¹; Nuria Bagues¹; Qiang Zheng²; Jiaqiang Yan²; Mohit Randeria¹; David McComb¹; ¹The Ohio State University; ²Oak Ridge National Laboratory

10:00 AM Break

10:20 AM

Size-dependent Lattice Contraction in Nano-MnO: *Michael Ramsdell*¹; Jenna Pike²; Siu-Wai Chan¹; ¹Columbia University; ²OxEon Energy, LLC

FUNDAMENTALS AND CHARACTERIZATION
High Entropy Materials: Concentrated Solid Solutions, Intermetallics, Ceramics, Functional Materials and Beyond II – Materials Discovery and Design I

Sponsored by: TMS Alloy Phases Committee, TMS Mechanical Behavior of Materials Committee

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

Monday AM | October 18, 2021
C171 | Greater Columbus Convention Center

Session Chairs: Michael Gao, National Energy Technology Laboratory; Daniel Miracle, Air Force Research Laboratory

8:00 AM Keynote

Recreate New Life of the Periodic Table: High-entropy Alloys: *Jien-Wei Yeh*¹; ¹National Tsing Hua University

8:40 AM Invited

The High-temperature Shape Memory Properties of Non-equal Molar CuNiTiHfZr High-entropy Alloy: *CheWei Tsai*¹; Shan-Hsiu Chang²; Wei-Pin Kao²; Po-Ting Lin²; Kai-Yuan Hsiao²; Ming-Yen Lu²; Jien-Wei Yeh²; ¹National Tsing Hua University; ²National Tsing Hua University, Department of Materials Science and Engineering

9:00 AM Invited

Structure Design and Properties of Multiple-basis-element (MBE) Alloy Flexible Films: Hao Huang¹; Peter Liaw²; *Yong Zhang*¹; ¹University of Science and Technology Beijing; ²The University of Tennessee

9:20 AM

A Novel Soft-magnetic Single-phase B2-ordered Multi-principal Element Alloy: *Youxiang Ye*¹; Scott Lish¹; Liubin Xu²; Markus Wittmann²; Haixuan Xu²; Ian Baker¹; ¹Dartmouth College; ²Department of Materials Science and Engineering

9:40 AM Keynote

High-entropy and Multi-principle Element Materials: Distinguishing Features and Emerging Opportunities: *Daniel Miracle*¹; Stéphane Gorsse²; ¹Air Force Research Laboratory; ²CNRS, University of Bordeaux

10:20 AM Break
10:40 AM Invited

A High-throughput Strategy to Study Phase Stability and Mechanical Properties in Complex Concentrated Alloys: Mu Li¹; Zhaohan Zhang¹; Arashdeep Thind¹; Guodong Ren¹; Rohan Mishra¹; *Katharine Flores*¹; ¹Washington University in St. Louis

11:00 AM Invited

Computationally Guided High Entropy Alloy Discovery: *Kenneth Smith*¹; John Sharon¹; Ryan Deacon¹; Soumalya Sarkar¹; ¹Raytheon Technologies Research Center

11:20 AM Invited

Enabling High-strength and Oxidation-resistant Refractory Complex, Concentrated Alloys via Multi-fidelity Experiments and Simulations: *Michael Titus*¹; ¹Purdue University

FUNDAMENTALS AND CHARACTERIZATION
Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales III – Session I

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

Monday AM | October 18, 2021
C160A/160B | Greater Columbus Convention Center

Session Chairs: M Arul Kumar, Los Alamos National Laboratory; Nathan Mara, University of Minnesota

8:00 AM Invited

An Integrated Modeling-experiment Approach to Investigating Metallic Interfaces Containing 3D Character: *Nathan Mara*¹; Justin Cheng¹; Zezhou Li¹; Shuozhi Xu²; Youxing Chen³; Jonathan Poplawsky⁴; Nan Li⁵; Irene Beyerlein²; ¹University of Minnesota; ²University of California, Santa Barbara; ³University of North Carolina, Charlotte; ⁴Oak Ridge National Laboratory; ⁵Los Alamos National Laboratory

8:40 AM

Interactions between Dislocations and 3D Interfaces in a Cu/Nb System: *Shuozhi Xu*¹; Justin Cheng²; Zezhou Li²; Nathan Mara²; Irene Beyerlein¹; ¹University of California, Santa Barbara; ²University of Minnesota, Twin Cities

9:00 AM

Modeling Slip Transmission across Interface Using Dislocation Dynamics Simulations: *Aritra Chakraborty*¹; Abigail Hunter¹; Laurent Capolungo¹; ¹Los Alamos National Laboratory

9:20 AM

Confined Layer Slip in Nanolaminates: Effect of Interface Structure and Layer Thickness: *Wurong Jian*¹; Shuozhi Xu¹; Yanqing Su²; Irene Beyerlein¹; ¹University of California, Santa Barbara; ²Utah State University

9:40 AM

An Investigation of the Effect of Grain Boundary Parameters on the Slip System Level Hall-petch Coefficient for Basal and Prismatic Slip Systems in Mg-4Al: *Mohsen Taheri Andani*¹; Aaditya Lakshmanan¹; Veera Sundararaghavan¹; John Allison¹; Amit Misra¹; ¹University of Michigan

10:00 AM Break
10:20 AM

Investigating the Mechanical Properties of Grain Boundaries with Displacement Texture Analysis: *Anqi Qiu*¹; Ian Chesser²; Elizabeth Holm¹; ¹Carnegie Mellon University; ²George Mason University

10:40 AM

Automated Laue Pattern Analysis for Bragg Coherent Diffraction Imaging: *Yueheng Zhang*¹; Anthony Rollett¹; Robert Suter¹; ¹Carnegie Mellon University

PROCESSING AND MANUFACTURING

Light Metal Technology — Magnesium and Joining Technology

Sponsored by: TMS Titanium Committee

Program Organizers: Xiaoming Wang, Purdue University; Yufeng Zheng, University of Nevada-Reno

Monday AM | October 18, 2021
A213 | Greater Columbus Convention Center

Session Chair: To Be Announced

8:00 AM

Diffusion Bonding of Aluminum by applying oscillating Pressure: Martin Salge¹; Felix Gemse¹; Steffen Dahms¹; ¹Günter-Köhler-Institute GmbH

8:20 AM

An Investigation of Microstructure and Mechanical Properties of MWCNT Reinforced Magnesium AZ31 Alloy Composites with Friction Stir Processing: Kulbir Sandhu¹; Hazoor Sidhu¹; Gurpreet Singh¹; ¹Punjabi University

8:40 AM

Continuous Drive Friction Welding of AA6061 Rods Incorporating Graphene Nanoplatelets: Mohammed Tashkandi¹; ¹Northern Border University

9:00 AM

FE Simulation Validated by Experimental Investigation of Pure Magnesium Deformed by Equal Channel Angular Pressing: Microstructural Evolution, Plastic Deformation and Hardness Homogeneity: Waleed El-Garaihy¹; Abdurahman Alateyah¹; ¹Qassim University

9:20 AM

ECAP Strain Path Effect on Microstructure, Texture, and Mechanical Properties Evolution in Pure Magnesium: Prakash Gautam¹; Somjeet Biswas²; ¹India Institute of Technology Kharagpur; ²IIT Kharagpur

9:40 AM Break

10:00 AM

Modeling and Study of the Effect of High Cooling Rates during Crystallization on the Structure and Properties of the Mg-Zr-Nd Alloy Used for Implants: Nikita Aikin¹; Vadim Shalomeev¹; ¹Zaporozhye National Technical University

10:20 AM

Review on (Bio)Hydrometallurgy of Silicates an Emphasis on the Recovery of Rare Earth Elements: Yanjun Zhang; ¹

10:40 AM

Ultrasonic Effects on Plastic Deformation Behavior of AA2024: Jiarui Kang¹; Randy Cheng²; Xun Liu¹; Alan Taub²; ¹The Ohio State University; ²University of Michigan

CERAMIC AND GLASS MATERIALS

Manufacturing and Processing of Advanced Ceramic Materials — New Opportunities in Ceramic Processing

Sponsored by: ACerS Manufacturing Division

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

Monday AM | October 18, 2021
B234 | Greater Columbus Convention Center

Session Chairs: William Fahrenholtz, Missouri University of Science and Technology; Waltraud Kriven, University of Illinois at Urbana-Champaign

8:00 AM Invited

The Future of Manufacturing in Energy-intensive Industries: William Lee¹; Michael Rushton¹; Simon Middleburgh¹; Phylis Makurunje¹; ¹Bangor University

8:40 AM Invited

Recent Progress in Fusion Welding of Structural Ceramics and Composites: William Fahrenholtz¹; Greg Hilmas¹; Jeremy Watts¹; Jecce Jarman¹; ¹Missouri University of Science and Technology

9:20 AM

Surface Stengthening of Single-crystal Alumina by High-temperature Laser Shock Peening: Fei Wang¹; Xueliang Yan¹; Lei Liu¹; Michael Nastasi²; Yongfeng Lu¹; Bai Cui¹; ¹University of Nebraska Lincoln; ²Texas A&M University

9:40 AM Break

10:00 AM Invited

Flash Sintering of Ceramics: Towards Homogeneous Components with Improved Mechanical Properties: Richard Todd¹; Yasuhiro Kubota¹; Yinsheng Li¹; Simone Falco¹; Riccardo Torchio²; Piergiorgio Alotto²; ¹University of Oxford; ²University of Padova

10:40 AM

Comparison of Microstructural Evolution of Hydroxyapatite Powder Sintered by Microwave, SPS and Conventional Sintering: Anne Leriche¹; Pierre Lefeuvre¹; Védi Dupont²; Diana Vitiello³; Hamza Karouiti³; Anthony Thuault¹; David Smith³; Stéphane Hocquet²; ¹UPHF - LMCPA; ²BCRC; ³IRCER Limoges

11:00 AM Invited

Low Energy Syntheses of Ceramic Powders and Composites: Waltraud Kriven¹; ¹University of Illinois at Urbana-Champaign

11:40 AM

Textured UHTC Borides Using Extremely Low Magnetic Fields: Juan Diego Shirai¹; Carolina Tallon²; ¹Virginia Polytechnic Institute and State University; ²Department of Materials Science and Engineering, Virginia Polytechnic Institute and State University

MODELING

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

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

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

Monday AM | October 18, 2021
A122 | Greater Columbus Convention Center

Session Chairs: Krzysztof Muszka, AGH University of Science and Technology; Lukasz Madej, AGH University of Science and Technology; Danuta Szeliga, AGH University of Science and Technology

8:00 AM
Enabling Accurate Coarse-grained Atomistic Simulation of Defect Behavior in Random Alloys: *Kevin Chu*¹; Adrian Diaz²; Youping Chen³; David McDowell¹; ¹Georgia Institute of Technology; ²Los Alamos National Laboratory; ³University of Florida

8:20 AM
Finite Element Simulation of Grain Growth with an Arbitrary Grain Boundary Energy and Explicit Grain Boundary Representation: *Erdem Eren*¹; Jeremy Mason¹; ¹University of California, Davis

8:40 AM
Temperature and Texture Dependent Constitutive Modeling of AZ31 Sheet Magnesium: *Daniel Kenney*¹; Marcos Lugo¹; Jared Darius¹; ¹Liberty University - School of Engineering

9:00 AM
The Formation of Irradiation Induced Defects in NiTi and their Effects on the Martensitic Transformation: *Taiwu Yu*¹; Alejandro Hinojos¹; Daniel Hong²; Peter Anderson³; Michael Mills¹; Yunzhi Wang¹; ¹Ohio State University

9:20 AM
Microstructural Evolution from Hot Torsion Tests for Material Modeling and Parameterization: *Andrew Gilmore*¹; Xun Liu¹; ¹The Ohio State University

9:40 AM Break

10:00 AM
The Role of the Initial Digital Microstructure Generation Algorithm in the Cellular Automata Static Recrystallization Predictions: Mateusz Sitko¹; *Lukasz Madej*¹; ¹AGH University of Science and Technology

10:20 AM
Sensitivity Analysis, Identification and Validation of the Stochastic Model Describing Evolution of Microstructural Parameters during Hot Forming of Metallic Materials: *Danuta Szeliga*¹; Natalia Czyzewska¹; Konrad Klimczak¹; Jan Kusiak¹; Pawel Morkisz¹; Piotr Oprocha¹; Maciej Pietrzyk¹; Pawel Przybylowicz¹; ¹AGH University of Science and Technology

10:40 AM

Numerical Studies of the Effect of Phase Stability on the Deformation Behavior of FeMnNiCoMo High Entropy Alloy: Kamil Cichocki¹; Tomasz Koziel¹; Grzegorz Cios¹; Lukasz Madej¹; Piotr Bala¹; *Krzysztof Muszka*¹; ¹AGH University of Science and Technology

11:00 AM

Multi Scale Study of Coarsening and Rafting Behaviour in Ni-based Superalloys: *Rupesh Chafle*¹; Somnath Bhowmick¹; Rajdip Mukherjee¹; ¹Indian Institute of Technology Kanpur

NANOMATERIALS

Nanotechnology for Energy, Environment, Electronics, Healthcare and Industry — Session I

Sponsored by: ACeRS Electronics Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Gary Pickrell, Virginia Tech; Navin Manjooran, Solve Technology and Research, Inc.

Monday AM | October 18, 2021
B242/243 | Greater Columbus Convention Center

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

8:00 AM Introductory Comments

9:00 AM
The Electronic Properties of Microporous Silver Nanodumbbell Sheet and Associated Copper Oxide Nanocomposite Powder: *Olayemi Fakayode*¹; Thabo Nkambule¹; ¹University of South Africa - Science Campus

9:20 AM
Fabrication and Characterization of Tungsten Nanopowder for Hard Alloy Manufacturing: *Amir Abidov*¹; Ahror Fattahov¹; Ulugbek Ruziev¹; Ilhom Asadov¹; Abdullo Khursanov¹; Bum Sung Kim¹; Fayzullo Norkhodjaev¹; ¹"Almalyk MMC" JSC

9:40 AM

Viral Inactivation Using Localized UV Emission and Application in Self-cleaning PPE: *Udit Kumar*¹; Craig Neal¹; Candace Fox¹; Elayaraja Kolanthai¹; Griffith Parks¹; Sudipta Seal¹; ¹University of Central Florida

10:00 AM Break

10:20 AM

Design of TiO₂/Single-wall Carbon Nanotube Hybrid Photocatalyst with Enhanced Interfacial Contact and Performance: *Placidus Amama*¹; Ahmed Al Mayyahi¹; Brian Everhart¹; ¹Kansas State University

10:40 AM

Targeted Disinfection of Pathogenic Bacteria Using a Nanostructured Electrocatalytic Device: *Hammad Malik*¹; Rachel D'Agostini¹; Eian Brightwell¹; Dustin Williams¹; Swomitra Mohanty¹; Krista Carlson¹; ¹University of Utah

11:00 AM

First-principles Study of Substituent Effects on Squaraine Dyes: *German Barceñas*¹; Austin Biaggne¹; Bernard Yurke¹; William Knowlton¹; Lan Li¹; ¹Boise State University

11:20 AM Concluding Comments

BIOMATERIALS

Next Generation Biomaterials — Session I

Sponsored by: ACerS Bioceramics Division, TMS Biomaterials Committee

Program Organizers: Roger Narayan, University of North Carolina; Min Wang, University of Hong Kong; Shawn Allan, Lithoz America LLC

Monday AM | October 18, 2021
A224 | Greater Columbus Convention Center

Session Chairs: Soshu Kirihara, Osaka University; Akiyoshi Osaka, Okayama Univ; Masanori Kikuchi, National Institute for Materials Science

8:00 AM Invited

Addition of Antimicrobial Property to Hydroxyapatite/Collagen Bone-like Nanocomposite Utilizing Silver Nanoparticles: *Masanori Kikuchi*¹; ¹National Institute for Materials Science

8:20 AM Invited

Stereolithographic Additive Manufacturing of Dental Crowns with Functionally Distributed Translucencies: *Soshu Kirihara*¹; ¹Osaka University

8:40 AM Invited

Controlling the Nanoscale Architecture in Rare Earth Doped Nanoparticles for Applications in Nanomedicine: *Fiorenzo Vetrone*¹; ¹INRS, Université du Québec

9:00 AM Invited

Bioactive Borates Glasses Are Not Boring: *William Lepry*¹; ¹McGill University

9:20 AM Invited

Calcium Silicate & Calcium Aluminate Bioactive Cements: *Carolyn Primus*¹; ¹Primus Consulting

10:00 AM Break

10:20 AM Invited

Sustained Delivery of Anticancer and Antimicrobial Drugs through Hollow Silica Capsules as Transporters: *Eva Krakor*¹; *Isabel Gessner*¹; *Sanjay Mathur*¹; ¹University of Cologne

10:40 AM Invited

4D Bioprinting for Making Hierarchical Composite Scaffolds for Blood Vessel Regeneration: *Shangsi Chen*¹; *Min Wang*¹; ¹University of Hong Kong

11:00 AM Invited

Apatite Formation on 3d-printed Calcium Carbonate Honeycombs in Dilute Phosphate Solution: *Yanyan Sun*¹; *Guangxin Wang*¹; *Wuhui Li*¹; *Akiyoshi Osaka*¹; ¹Henan University of Science and Technology

11:20 AM Invited

Light-based Nanomedicine: Multimodal Diagnostics Combined with Drug-free Therapeutics: *Tanveer Tabish*¹; ¹Imperial College London

FUNDAMENTALS AND CHARACTERIZATION

Nucleation of Solid-State Phase Transformations — Nucleation of Solid-State Phase Transformations

Sponsored by: TMS Phase Transformations Committee

Program Organizers: Eric Lass, University of Tennessee-Knoxville; Sophie Primig, University of New South Wales; Keith Knipling, Naval Research Laboratory

Monday AM | October 18, 2021
C172 | Greater Columbus Convention Center

Session Chair: Eric Lass, University of Tennessee, Knoxville

8:00 AM Invited

Critical Nuclei at Hetero-phase Interfaces: *Rongpei Shi*¹; *Tae Wook Heo*¹; *Brandon Wood*¹; *Yunzhi Wang*²; ¹Lawrence Livermore National Laboratory; ²The Ohio State University

8:30 AM

Identification of Critical Nucleation Events by the Gromov-Wasserstein Distance: *Jeremy Mason*¹; *Sakura Kawano*¹; ¹University of California, Davis

8:50 AM

Formation of the γ'' -Ni₂(Cr, Mo, W) Phase during Two-step Heat Treatment in Haynes® 244® Alloy: *Thomas Mann*¹; *Michael Fahrman*²; *Michael Titus*¹; ¹Purdue University; ²Haynes International

9:10 AM

Investigation of Nucleation Mechanisms Associated with the Formation of Coprecipitates in Ni-based Superalloys: *Harihara Sriram*¹; *Semanti Mukhopadhyay*¹; *Michael Mills*¹; *Yunzhi Wang*¹; ¹Ohio State University

9:30 AM Break

9:50 AM

Modeling Microstructure Evolution Using the Steepest-entropy-ascent Quantum Thermodynamic Framework: *Jared McDonald*¹; *Michael von Spakovsky*²; *William Reynolds*²; ¹Virginia Polytechnic Institute; ²Virginia Polytechnic Institute and State University

10:10 AM

Observing the Solid-state Processes under Additive Manufacturing Conditions Inside the TEM: *Sriram Vijayan*¹; *Meiyue Shao*¹; *Avantika Gupta*¹; *Rohan Casukhela*¹; *Joerg Jinschek*¹; ¹The Ohio State University

10:30 AM

3-dimensional Observation of Bainite from Austenite Grain Boundary in 0.6wt% Carbon Steel: *Shotaro Jimbo*¹; *Shoichi Nambu*¹; ¹University of Tokyo

CERAMIC AND GLASS MATERIALS

Phase Transformations in Ceramics: Science and Applications – Experimental Studies on Structure and Control I

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

Program Organizers: Scott McCormack, University of California, Davis; Pankaj Sarin, Oklahoma State University; Sanjay V. Khare, University of Toledo; Waltraud Kriven, University of Illinois at Urbana-Champaign

Monday AM | October 18, 2021
B230 | Greater Columbus Convention Center

Session Chair: To Be Announced

8:00 AM Invited

Electrical Activation of the Martensitic Transformation in Zirconia: *Christopher Schuh*¹; Alan Lai¹; ¹Massachusetts Institute of Technology

8:30 AM Invited

Tailorable Porous CeO₂-Doped ZrO₂ as a Pathway to Superelastic and Shape-memory Ceramics: Laura Quinn¹; *Katherine Faber*¹; ¹California Institute of Technology

9:00 AM

Useful Energy Dissipation and Fatigue Resistance in Cyclically Loaded Superelastic Ceramic Granular Packings: *Hunter Rauch*¹; Joey Griffiths¹; David Garcia¹; Yan Chen²; Ke An²; Hang Yu¹; ¹Virginia Polytechnic Institute and State University; ²Oak Ridge National Lab

9:20 AM Invited

Phase Stability and Transformation in Borides Examined by X-ray Diffraction: *James Cahill*¹; ¹Lawrence Livermore National Laboratory

9:50 AM Break

10:10 AM

In-situ TEM Observation on the Motion of Phase Boundaries during Antiferroelectric Ferroelectric Transition: *Binzhi Liu*¹; Xinchun Tian¹; Lin Zhou²; Xiaoli Tan¹; ¹Iowa State University; ²U.S. Department of Energy

10:30 AM

Critical Parameters Controlling the Formation of High-entropy Oxides: Kuo-Pin Tseng¹; Benjamin Hulbert¹; Qun Yang¹; *Waltraud Kriven*¹; ¹University of Illinois at Urbana-Champaign

10:50 AM

Thermal Expansion and Phase Transformation in the Rare Earth Di-titanate System: *Benjamin Hulbert*¹; Scott McCormack²; Kuo-Pin Tseng¹; Waltraud Kriven¹; ¹University of Illinois at Urbana-Champaign; ²University of California Davis

FUNDAMENTALS AND CHARACTERIZATION

Probing Defect Properties and Behavior under Mechanical Deformation and Extreme Conditions – Defect Properties and Behavior in Multicomponent Alloys

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

Program Organizers: Zhe Fan, Lamar University; Tianyi Chen, Oregon State University; Shijun Zhao, City University of Hong Kong; Mitra Taheri, Johns Hopkins University; Yuri Osetskiy, Oak Ridge National Laboratory

Monday AM | October 18, 2021
C170 | Greater Columbus Convention Center

Session Chair: To Be Announced

8:00 AM Introductory Comments

8:20 AM Invited

Irradiation Response of FCC and BCC Compositionally Complex Alloys Using In-situ and Ex-situ Irradiations: *Adrien Couet*¹; Calvin Parkin¹; Michael Moorehead¹; Lin Shao²; Frank Garner¹; Lingfeng He³; Pengyuan Xiu³; Wei-Ying Chen⁴; Meimei Li⁴; Kumar Sridharan¹; ¹University of Wisconsin-Madison; ²Texas A&M University; ³Idaho National Laboratory; ⁴Argonne National Laboratory

8:50 AM

Measuring Elemental Segregation and Vacancy Migration Using Atom Probe Tomography: *Xing Wang*¹; Jonathan Poplawsky²; Yanwen Zhang³; Karren More²; ¹Pennsylvania State University; ²Oak Ridge National Laboratory; ³University of Tennessee

9:10 AM

Mechanical and Microstructural Responses of Severe-plastic Deformed High Entropy Alloys under Irradiation: *Spencer Doran*¹; Tracey Spoerer¹; Megumi Kawasaki¹; Youxing Chen²; Di Chen³; Tianyi Chen¹; ¹Oregon State University; ²University of North Carolina Charlotte; ³University of Huston

9:30 AM Break

9:50 AM Invited

How Does Defect Production in High-entropy Alloys Differ from Regular Metals?: *Kai Nordlund*¹; ¹University of Helsinki

10:20 AM

Effects of Annealing and Ion Irradiation on Helium Implanted NiCo and NiFe Concentrated Solid-solution Alloys: *Zhe Fan*¹; Xing Wang¹; Di Chen²; Yongqiang Wang²; Yuri Osetskiy¹; Hongbin Bei¹; William Weber³; Yanwen Zhang¹; ¹Oak Ridge National Laboratory; ²Los Alamos National Laboratory; ³The University of Tennessee

PROCESSING AND MANUFACTURING

Processing and Performance of Materials Using Microwaves, Electric and Magnetic Fields, Ultrasound, Lasers, and Mechanical Work: The Rustum Roy Symposium — Session I

Sponsored by: ACerS Basic Science Division, ACerS Manufacturing Division

Program Organizers: Morsi Mahmoud, King Fahd University of Petroleum & Minerals; Dinesh Agrawal, Pennsylvania State University; Guido Link, Karlsruhe Institute of Technology; Motoyasu Sato, Chubu University; Rishi Raj, University of Colorado; Christina Wildfire, National Energy Technology Laboratory; Zhiwei Peng, Central South University

Monday AM | October 18, 2021
B233 | Greater Columbus Convention Center

Session Chair: Christina Wildfire, National Energy Technology Laboratory

8:00 AM

Assessment of Homogeneity in Percolated Composite Samples: *Miriam Rath*¹; Rosario Gerhardt¹; ¹Georgia Institute of Technology

8:20 AM

Freeform Microcasting: Luciano Borasi¹; Enrico Casamenti¹; Raphael Charvet¹; Cyril Denereaz¹; Sacha Pollonghini¹; Lea Deillon¹; Yves Bellouard¹; *Andreas Mortensen*¹; ¹EPFL

8:40 AM

Electromagnetic Assisted Thermal Processing Enabling Spatially Selective Phase Transformation of Metal Amorphous Nanocomposites: *Ahmed Talaat*¹; Kevin Byerly²; David Greve²; Michael McHenry²; Paul Ohodnicki¹; ¹University of Pittsburgh; ²Carnegie Mellon University

9:00 AM

Solid State Joining of Dissimilar Single Crystal Ni-based Superalloys Using Field Assisted Sintering Technology (FAST): *Charis Lin*¹; Jogender Singh¹; Matthew Hogan¹; Namiko Yamamoto¹; ¹The Pennsylvania State University

9:20 AM

Novel Electrode Configuration Effects on the Microstructural Homogeneity of Flash Sintered Ceramics for Solid-state Battery Electrolytes: *Gareth Jones*¹; Chris Green²; Sherry Ghanizadeh²; David Pearmain²; Geoff West¹; Emma Kendrick³; Claire Dancer¹; ¹University of Warwick; ²Lucideon Ltd; ³University of Birmingham

9:40 AM Invited

Electric Current Processing of Additively Manufactured Ti-6Al-4V Alloy: *Daudi Waryoba*¹; Zahabul Islam¹; Ted Reutzel¹; Aman Haque¹; ¹Pennsylvania State University

10:10 AM Invited

Micro Flash Sintering for Additive Manufacturing of Ceramics: *Rubens Ingraci Neto*¹; Rishi Raj²; ¹Los Alamos National Laboratory; ²University of Colorado

MATERIALS-ENVIRONMENT INTERACTIONS

Thermodynamics of Materials in Extreme Environments — Thermodynamics of Nuclear Materials and Minerals

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

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

Monday AM | October 18, 2021
A221 | Greater Columbus Convention Center

Session Chairs: Xiaofeng Guo, Washington State University; Kyle Brinkman, Clemson University

8:00 AM Introductory Comments

8:10 AM Invited

ACerS Navrotsky Award for Experimental Thermodynamics of Solids: Advancing Solar-Driven Thermochemical Fuel Production Using Nonstoichiometric Perovskites: *Xin Qian*¹; ¹Georgia Institute of Technology

8:55 AM Invited

Effective Assessment and Thermodynamic Database Development for Potential Nuclear Reactor Molten Salt Systems: *Theodore Besmann*¹; Juliano Schorne Pinto¹; Jacob Yingling¹; Johnathan Ard¹; Mina Azizha¹; Matthew Christian¹; Amir Mofrad¹; Mahmut Aslani¹; Jake McMurray²; ¹University of South Carolina; ²Oak Ridge National Laboratory

9:25 AM

Thermodynamic Investigation of Multicomponent Chloride Molten Salts for Spent Fuel Processing: *Liangyan Hao*¹; Soumya Sridar¹; Elizabeth Sooby²; Wei Xiong¹; ¹University of Pittsburgh; ²University of Texas at San Antonio

9:45 AM Break

10:05 AM Invited

Thermodynamics in the Design and Performance of Glass: *Joseph Ryan*¹; ¹Pacific Northwest National Laboratory

10:35 AM Invited

Energetics of Fe₃O₄ – FeAl₂O₄ Spinel Solid Solution: *Alexandra Navrotsky*¹; ¹Arizona State University

11:05 AM

Influence of Local Charge and Magnetic Ordering on Point Defect Properties in Magnetite (Fe₃O₄): *Shivani Srivastava*¹; Blas Uberuaga²; Mark Asta³; ¹University of California Berkeley; ²Los Alamos National Laboratory; ³University of California Berkeley; Lawrence Berkeley National Laboratory

PROCESSING AND MANUFACTURING

13th Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing – Novel Approaches to Sustainable Manufacturing I

Sponsored by: ACerS Engineering Ceramics Division

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

Monday PM | October 18, 2021
A212 | Greater Columbus Convention Center

Session Chairs: Huong Le, Faraday Technology; Kathy Lu, Virginia Polytechnic Institute and State University

2:00 PM Invited

Addressing Advanced Sustainability with Materials Selection: *Luca Masi*¹; Mauricio Dwek¹; ¹Ansys Inc.

2:30 PM

Continuous Electrochemical Destruction of Contaminants of Emerging Concern (CECs) for Wastewater Treatment: *Huong Le*¹; Rajes Radhakrishnan¹; Brian Skinn¹; Timothy D Hall¹; Stephen Snyder¹; E. Jennings Taylor¹; Maria Inman¹; Chris Athmer²; ¹Faraday Technology; ²Terran Corporation

2:50 PM

Design of Novel Electrocoagulation Systems for Produced Water Treatment: *Stephen Polkowsky*¹; Pankaj Sarin¹; ¹Oklahoma State University

3:10 PM

Microstructural Evolution and Mechanical Properties of Shear Assisted Processing and Extrusion (ShAPE) Processed Aluminum Alloys: *Rajib Kalsar*¹; Xiaolong Ma¹; Jens Darsell¹; Miao Song¹; Nicole Overman¹; Keerti Kappagantula¹; Vineet Joshi¹; ¹Pacific Northwest National Laboratory

3:30 PM Break

3:50 PM

Performance Assessment of Sustainable Near-dry EDM Process during Machining of Micro-channels on Ni-Ti Based Shape Memory Alloys: Ramver Singh¹; Akshay Dvivedi¹; *Pradeep Kumar*¹; ¹Indian Institute of Technology (IIT), Roorkee

4:10 PM

Vibration and Mechanical Analysis of FDM Manufactured Soybean Hull Fiber/Polymer Composites: *Roshan Mishra*¹; Kunal Kate¹; Jagannadh Satyavolu¹; Osama Sultan Bu Aamiri¹; ¹University of Louisville

4:30 PM

Design of Novel Materials from Corn-based Precursors: *Surojit Gupta*¹; ¹University of North Dakota

ADDITIVE MANUFACTURING

Additive Manufacturing Modeling and Simulation: Microstructure, Mechanics, and Process – AM Modeling - Mechanical Properties

Sponsored by: TMS Computational Materials Science and Engineering Committee

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

Monday PM | October 18, 2021
A113 | Greater Columbus Convention Center

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

2:00 PM

Ductile Fracture of Ti-6Al-4V Made by Powder Bed Fusion Additive Manufacturing: *Allison Beese*¹; Alexander Wilson-Heid¹; ¹Pennsylvania State University

2:40 PM

Grain-scale Residual Stress Modeling in Wire Arc Additive Manufacturing of Haynes 282 Super Alloy: *Santanu Paul*¹; Wei Xiong¹; Albert To¹; ¹University of Pittsburgh

3:00 PM

Influence of Microstructure on Fatigue Crack Growth: An Combined Experiment and Model Investigation in EBM Nickel-Based Supper Alloy Haynes 282: *Jiahao Cheng*¹; Patxi Fernandez-Zelaia¹; Sebastien Dreyepont¹; Xiaohua Hu¹; Michael Kirka¹; ¹Oak Ridge National Laboratory

3:20 PM Break

3:40 PM

Part-level Fast Predictions of Residual Stresses during LPBF of Al-Mg-Zr Alloys Using Microstructure Informed Inherent Strain Method: *Abhishek Ramakrishnan*¹; Daniel Satko¹; Ayman Salem¹; Jan Kasprzak²; Nam Phan²; ¹MRL Materials Resources LLC; ²Naval Air Systems Command

4:00 PM

Distortion Modeling during Sintering of Binder Jet Printed Parts: *Basil Paudel*¹; Albert To¹; ¹University of Pittsburgh

4:20 PM

Modeling and Experimental Validation of Stresses in 3D Printed, Polymeric Biliary Stents: *Victoria Cordista*¹; Rebecca Lawson¹; Bailey Stanley¹; Sagar Patel¹; Joanna Thomas¹; ¹Mercer University

4:40 PM

Residual Stress Induced Cracking Modeling: *Kevin Glunt*¹; Wen Dong¹; Santanu Paul¹; Albert To¹; ¹University of Pittsburgh

5:00 PM

Improving the Mechanical Performance of AlSi10Mg Lattice Structures Manufactured by Laser Powder Bed Fusion (L-PBF): *Hend Alqaydi*¹; Nesma Aboulkhair¹; Sultan Alneyadi²; ¹Technology Innovation Institute; ²Pennsylvania state university

5:20 PM

Mechanical Properties of Ceramic Core with SiO₂-Na₂O-Al₂O₃ Ternary Binder System: *Hyunhee Choi*¹; Bong-Gu Kim¹; Eun-Hee Kim¹; Guanlin Lyu¹; Junseong Kim¹; Seung-Cheol Yang¹; Yeon-Gil Jung¹; ¹Changwon National University

ADDITIVE MANUFACTURING

Additive Manufacturing of Ceramic-based Materials: Process Development, Materials, Process Optimization and Applications — Session II: Extrusion-based AM and Stereolithography

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

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

Monday PM | October 18, 2021

A112 | Greater Columbus Convention Center

Session Chairs: Yiquan Wu, Alfred University; Xuan Song, University of Iowa

2:00 PM

Multifunctional Artificial Artery from Direct 3D Printing with Built-in Ferroelectricity and Tissue-Matching Modulus: *Jun Li*¹; ¹University of Wisconsin-Madison

2:20 PM

Direct-write 3D Printing of Electrodes for High Power Density Batteries: *Amjad Almansour*¹; Mrityunjay Singh²; Michael Halbig¹; Daniel Gorican³; ¹NASA Glenn Research Center; ²Ohio Aerospace Institute at NASA Glenn Research Center; ³HX5, LLC at NASA Glenn Research Center

2:40 PM

Additively Manufactured Carbon/Carbon Composites via Direct Ink Writing of Phenolic Resin Precursors: *Caitlyn Clarkson*¹; Connor Wyckoff¹; William Costakis¹; Matthew Dickerson¹; Hilmar Koerner¹; ¹Air Force Research Laboratory

3:00 PM Invited

The Influence of Processing on the Mechanical Properties of Additively Manufactured Ceramic Matrix Composites: *Mark O'Masta*¹; Ekaterina Stonkevitch¹; Kaleigh Porter¹; Phuong Bui¹; Natalie Larson²; Zak Eckel¹; Tobias Schaedler¹; ¹HRL Laboratories LLC; ²Harvard University

3:30 PM Break

3:50 PM

Additive Manufacturing of Yttrium-stabilized Zirconia Architectures with Stretch-dominated Mechanical Properties: *Hunter Rauch*¹; Kendall Knight¹; Huachen Cui²; Jake Yoder¹; Xiaoyu Zheng²; Hang Yu¹; ¹Virginia Polytechnic Institute and State University; ²University of California, Los Angeles

4:10 PM

Characterization of Anisotropic Structure of Additive Manufactured Ceramics: *Rosario Gerhardt*¹; Yifan Jin¹; Zev Greenberg¹; Shawn Allan²; ¹Georgia Institute of Technology; ²Lithoz America, LLC

4:30 PM Invited

3D Printing of Nd:YAG Laser Ceramics through Lithography-based Light Projection: *Guangran Zhang*¹; Yiquan Wu¹; ¹Alfred University

5:00 PM

Enhanced Piezocomposite Transducers with 3D Printed Piezoelectric PZT: *Shawn Allan*¹; Nicholas Voellm¹; Justin Tufariello²; Barry Robinson³; Alex Angilella²; Leslie Riesenhuber²; Brian Pazol³; ¹Lithoz America LLC; ²The MITRE Corporation; ³MSI Transducers Corp.

5:20 PM

Stereolithography Printing of Technical Ceramics and Its Applications: *Kenna Ritter*¹; Peter Durcan¹; ¹3DCERAM SINTO INC

ADDITIVE MANUFACTURING

Additive Manufacturing of High and Ultra-High Temperature Ceramics and Composites: Processing, Characterization and Testing — Binder Jet 3D Printing, Post-processing, and Testing

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Corson Cramer, Oak Ridge National Laboratory; Greg Hilmas, Missouri University of Science and Technology; Lisa Rueschhoff, Air Force Research Laboratory

Monday PM | October 18, 2021

A111 | Greater Columbus Convention Center

Session Chair: David Mitchell, Oak Ridge National Laboratory

2:00 PM Invited

Binder Jet Additive Manufacturing of Novel Design, High Temperature, Ceramic Heat Exchangers: *Benjamin Groth*¹; Jesse Blacker²; ¹ExOne

2:40 PM

Additive Manufacturing of Corrosion Resistant UHTC Materials for Chloride Salt-to-sCO₂ Brayton Cycle Heat Exchangers: *James Kelly*¹; Jeffery Haslam¹; Lauren Finkenauer¹; Michael Ross¹; Pratanu Roy¹; Du Nguyen¹; Joshua Stolaroff¹; ¹Lawrence Livermore National Laboratory

3:00 PM

Molten Chloride Salt Corrosion Testing of Ultra High Temperature Ceramics for High Temperature Heat Exchangers Fabricated by Additive Manufacturing Methods

: *Jeffery Haslam*¹; James Kelly¹; Joshua Stolaroff¹; Michael Ross¹; Stephen Raiman²; Bruce Pint³; Dino Sulemanovic³; ¹LLNL; ²Texas A&M University; ³ORNL

3:20 PM

Oxidation of 3D-printed SiC in Air and Steam Environments: *Kenneth Kane*¹; Padraig Stack²; Danny Schappel¹; Katherine Montoya³; Peter Mouche¹; Elizabeth Sooby³; Kurt Terrani¹; ¹Oak Ridge National Laboratory; ²University of Akron; ³University of Texas

ADDITIVE MANUFACTURING

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

Sponsored by:

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

Monday PM | October 18, 2021
A115 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM

Creation of Process Representative Flaws and Their Impact on the Mechanical Properties L-PBF Inconel 718: *Jacob Rindler*¹; David Schick²; Peter Daum³; Adam Sutton⁴; Michael Groeber¹; ¹Ohio State University; ²Proto Precision Additive; ³Rolls Royce; ⁴Lockheed Martin

2:20 PM

Effect of Standard Heat Treatments on IN718 LPBF Microstructure and the Suitability in High Temperature Applications: *Sandra Megahed*¹; Robin Oetzbach²; Steffen Hermsen¹; Stephan Ziegler¹; Johannes Henrich Schleifenbaum¹; ¹RWTH Aachen University; ²Oetzbach Edelstahl GmbH

2:40 PM

Effect of Heat Treatment and Functional Grading on Creep Behaviour of Additively Manufactured Inconel 718: *Vera Popovich*¹; Aditya Palawat¹; Evgenii Borisov²; Anatolii Popovich²; Ton Riemsлаг¹; ¹Delft University of Technology; ²Peter the Great Saint-Petersburg Polytechnic University

3:00 PM

The Material Quality of Samples Obtained by Selective Laser Melting Method from IN718 Alloy Powder: *Vladimir Klochikhin*¹; Pavel Kasay¹; Konstantin Balushok¹; Valeriy Shilo¹; *Valeriy Naumyk*²; ¹JSC «Motor Sich»; ²NU "Zaporizhzhya Polytechnic"

3:20 PM Break

3:40 PM

Heat Treatment Design of Haynes 282 Alloy Prepared by Wire-arc Additive Manufacturing: *Yuankang Wang*¹; Rafael Rodriguez De Vecchis¹; Wei Xiong¹; ¹University of Pittsburgh

4:00 PM

Mechanical Behaviour of Additively Manufactured Ni-based Superalloys at Room and Elevated Temperatures: *Amal Shaji Karapuzha*¹; Darren Fraser²; ¹Monash Centre for Additive Manufacturing (MCAM), Monash University; ²CSIRO

4:20 PM

Microstructure Development of Additively Manufactured Gamma Prime Strengthened Ni-based Superalloy Rene65: *Colleen Hilla*¹; Andrew Wessman²; Alber Sadek³; Hyeyun Song⁴; Wei Zhang¹; Michael Mills¹; ¹Ohio State University; ²University of Arizona; ³Edison Welding Institute; ⁴Edison Welding Institute

4:40 PM

Print Defects, Microstructure Evolution and Remnant Porosity for Binder-jet Printed 625 Alloy: *Ian Nettleship*¹; Chuyuan Zheng¹; Markus Chmielus¹; ¹University of Pittsburgh

5:00 PM

Mechanical Behavior of Ni-based Superalloy Single Crystals Produced via Electron Beam Melting AM: *Patxi Fernandez-Zelaj*¹; Quinn Campbell¹; Chris Ledford¹; Michael Kirka¹; Sebastien Dryepondt¹; ¹Oak Ridge National Laboratory

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: ICME Gaps: Material Property and Validation Data to Support Certification — Data Acquisition: Material Property and Validation Data to Support Certification

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

Program Organizers: Joshua Fody, NASA Langley Research Center; Edward Glaessgen, NASA Langley Research Center; Christopher Lang, NASA Langley Research Center; Greta Lindwall, KTH Royal Institute of Technology; Michael Sansoucie, NASA Marshall Space Flight Center; Mark Stoudt, National Institute of Standards and Technology

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Session Chairs: Jonathan Raush, University of Louisiana at Lafayette; Michael Sansoucie, NASA

2:00 PM Keynote

Providing a Rigorous Measurement Foundation for Modeling-Informed Qualification and Certification of Metal AM Components: *Lyle Levine*¹; Brandon Lane¹; Thien Phan¹; Fan Zhang¹; Mark Stoudt¹; Brian Simonds¹; David Deisenroth¹; ¹National Institute of Standards and Technology

2:40 PM

Capturing and Analyzing In-situ Data within the Directed Energy Deposition Process with DEDSmart: *Michael Juhasz*¹; Melanie Lang¹; ¹FormAlloy

3:00 PM

High Temperature Material Properties Measurement Capabilities of the NASA MSFC Electrostatic Levitation (ESL) Laboratory: *Michael Sansoucie*¹; ¹NASA Marshall Space Flight Center

3:20 PM

Electrostatic Levitation Experiments Quantifying the Thermophysical Properties of Inconel 625: *Gwendolyn Bracker*¹; Elizabeth Hodges¹; Ethan Walko¹; Madeline Scott¹; Michael SanSoucie²; Robert Hyers¹; ¹University of Massachusetts; ²NASA Marshall Space Flight Center

3:40 PM Break

4:00 PM Invited

Laser Energy Coupling during Metal Additive Manufacturing: *Brian Simonds*¹; ¹NIST

4:30 PM

Predicting Melt Properties Using Atomistic Simulations with a Highly Accurate Physically Informed Neural Network Interatomic Potential: *Vesselin Yamakov*¹; Yuri Mishin²; Edward Glaessgen³; ¹National Institute of Aerospace; ²George Mason University; ³NASA Langley Research Center

4:50 PM

An Analysis of the Dislocation Density of Inconel 718 Additive Manufacturing Powder: *Colby Azersky*¹; Sangho Jeon²; Peggy Cebe³; ¹NASA; ²Korea Research Institute of Standards and Science; ³Tufts University

5:10 PM Question and Answer Period

ADDITIVE MANUFACTURING

Additive Manufacturing: Advanced Characterization for Industrial Applications — Structures and Material Properties

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee, TMS Additive Manufacturing Bridge Committee

Program Organizers: Nadia Kouraytem, University of Utah; Fan Zhang, National Institute of Standards and Technology; Lianyi Chen, University of Wisconsin-Madison

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Session Chair: To Be Announced

2:00 PM Invited

Synchrotron Characterization of Hot Cracking and Related Topics: *Anthony Rollett*¹; Guannan Tang¹; Nadia Kouraytem²; Benjamin Gould³; Joseph Pauza¹; Ziheng Wu¹; Joseph Aroh¹; Runbo Jiang¹; Seunghee Oh¹; Srujana Yarasi¹; Ann Choi¹; Amit Verma¹; Rajib Halder¹; Andrew Huck¹; Zhening Yang¹; Amaranth Karra¹; ¹Carnegie Mellon University; ²Utah State University; ³Argonne National Laboratory

2:30 PM

Moisture Impacts in AM Metal Powders Characterized by Karl Fischer Oven Titration and Avalanche Rheometry: *Dave van der Wiel*¹; *Ethan Pawlak*¹; ¹NSL Analytical

2:50 PM

Investigation of the Protective Mixture Influence on the Heat Input Meaning for the Layered Electric Arc Surfacing of Aluminum Alloys AlSi5 and AlMg5: *Mikhail Gnatenko*¹; *Valeriy Naumyk*²; *Maria Matkowska*²; *Vadim Shalomeev*²; ¹JSK Motor Sich; ²NU "Zaporizhzhya Polytechnic"

3:10 PM

Gradient Alloy Heat Exchanger Manufacturing for Energy Applications: *Kevin Luo*¹; *Bob Markley*²; *Nadia Kouraytem*³; *Hailei Wang*³; ¹Formalloy Technologies, Inc.; ²3rd Dimension Industrial 3D Printing Co; ³Utah State University

3:30 PM Break

3:50 PM

Tensile Behavior of Metal AM Lattice Structures: *Benedict DiMarco*¹; *Jeremy Seidt*¹; *Ariel Gluck*; *Jacob Rindler*¹; *Edward Herderick*¹; ¹The Ohio State University

4:10 PM

The Effect of the Cross-sectional Area on the Microstructure and Mechanical Properties of AlSi10Mg Parts Manufactured by Laser Powder Bed Fusion (L-PBF): *Nujood Alshehri*¹; *Lewis Kindleyside*²; *Nesma Aboulkhair*¹; ¹TII; ²Khalifa University

4:30 PM

The Influence of the Characteristic Microstructure of Additively Manufactured AlSi10Mg on the Mechanical Behaviour at Various Strain Rates: *Natalia Ghisi*¹; *Henrique Ramos*¹; *Rafael Santiago*¹; *Wesley Cantwell*²; *Shwe Soe*³; *Peter Theobalde*⁴; *Nesma Aboulkhair*⁵; ¹TII; ²Khalifa University; ³University of the West of England; ⁴University of Cardiff; ⁵University of Nottingham

4:50 PM

Predicting Failure Location in Additively Manufactured Metals Using an Improved Void Descriptor Function: *Dillon Watring*¹; *Jake Benzing*²; *Orion Kafka*²; *Newell Moser*²; *Li-Anne Liew*²; *John Erickson*³; *Nikolas Hrabec*²; *Ashley Spear*¹; ¹University of Utah; ²National Institute of Standards and Technology; ³Sandia National Laboratories

5:10 PM Concluding Comments

ADDITIVE MANUFACTURING

Additive Manufacturing: Processing, Microstructure and Material Properties of Titanium-based Materials — Session II

Sponsored by: TMS Titanium Committee

Program Organizers: *Ulf Ackelid*, *Freemelt AB*; *Ola Harrysson*, *North Carolina State University*; *Peeyush Nandwana*, *Oak Ridge National Laboratory*; *Rongpei Shi*, *Lawrence Livermore National Laboratory*

Monday PM | October 18, 2021
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Session Chair: Anthony Rollett, Carnegie Mellon University

2:00 PM

An Automated Tool for Porosity Characterization and Classification in LPBF: *Evan Diewald*¹; *Jack Beuth*¹; ¹Carnegie Mellon University

2:20 PM

Time-resolved Characterization of Evolving Phase and Microstructure of Ti-6Al-4V during Laser Processing with Synchrotron X-ray Diffraction: *Seunghee Oh*¹; *Rachel Lim*²; *Joseph Aroh*¹; *Andrew Chuang*³; *Benjamin Gould*³; *Behnam Amin-Ahmadi*⁴; *Joel Bernier*⁵; *Tao Sun*⁶; *P. Chris Pistorius*¹; *Robert Suter*¹; *Anthony Rollett*¹; ¹Carnegie Mellon University; ²Penn State University; ³Argonne National Laboratory; ⁴Colorado School of Mines; ⁵Lawrence Livermore National Laboratory; ⁶University of Virginia

2:40 PM

Effect of Pores Present in Very Low Volume Fraction on Tensile Properties of Additively Manufactured Titanium Alloys: *Pankaj Kumar*¹; *K.S. Ravi Chandran*²; ¹University of New Mexico; ²University of Utah

3:00 PM

Modeling of True Stress-Strain in the Plastic Regime of Additively Manufactured Ti-6Al-4V: *Andrew Temple*¹; *Maria Quintana*¹; *Peter Collins*¹; ¹Iowa State University

3:20 PM Break

3:40 PM

On the Use of Energy Dispersive Spectroscopy to Inform on Local Property Variations and Defect Formation across AM Processes: *Katie O'Donnell*¹; Maria Quintana¹; Matthew Kenney¹; Andrew Temple¹; Scott Blazanian¹; Shraddha Vachhani¹; Peter Collins¹; ¹Iowa State University

4:00 PM

Thermohydrogen Refinement of Microstructure of AM Titanium Components

: *Michael Hurst*¹; James Paramore¹; Brady Butler¹; Daniel Lewis¹; Laura Moody¹; ¹United States Army Research Laboratory

4:20 PM

Processability, Microstructure and Mechanical Behaviour of Ti6246 Processed via LPBF: *Juan Colombo Pulgarin*¹; Maurizio Vedani¹; Carlo Biffi²; Diego Celentano³; ¹Politecnico di Milano; ²Consiglio Nazionale delle Ricerche; ³Pontificia Universidad Católica de Chile

4:40 PM

Reactivating Transformation Induced Plasticity (TRIP) in an Additively Manufactured β -Ti Alloy: *Srinivas Aditya Mantri*¹; MSKKY Nartu¹; Narendra Dahotre¹; Rajarshi Banerjee¹; ¹University of North Texas

ENERGY

Advanced Characterization of Materials for Nuclear, Radiation, and Extreme Environments – Nuclear Fuels, Ceramics, and Corrosion

Sponsored by: TMS Nuclear Materials Committee

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

Monday PM | October 18, 2021

A215 | Greater Columbus Convention Center

Session Chairs: Samuel Briggs, Oregon State University; Christopher Barr, US Naval Nuclear Laboratory

2:00 PM Invited

Characterization of Defects, Thermal Transport, and Elastic Properties in As-fabricated and Irradiated Single Crystal of ThO₂: *Marat Khafizov*¹; Saqeeb Adnan¹; Joshua Ferrigno¹; Vinay Chauhan¹; Amey Khanolkar²; Cody Dennett²; Yuzhou Wang; Kaustubh Bawane²; Linu Malakkal²; Miaomiao Jin³; Zilong Hua²; Chao Jiang²; Lingfeng He²; Chris Marianetti⁴; Anter El-Azab⁵; David Hurley²; ¹Ohio State University; ²Idaho National Laboratory; ³Pennsylvania State University; ⁴Columbia University; ⁵Purdue University

2:20 PM Invited

In Situ Ion Irradiation of Gadolinium Titanate: A Perspective on Microstructure and Memory: *Jessica Krogstad*¹; Nathan Madden¹; Matthew Janish²; James Valdez²; Blas Uberuaga²; ¹University of Illinois at Urbana-Champaign; ²Los Alamos National Laboratory

2:40 PM

Insight into the Impact of Irradiation on Vibrational Properties of AlN Using Raman Spectroscopy: *Saqeeb Adnan*¹; Yuzhou Wang²; Aleksandr Chernatynskiy³; Marat Khafizov¹; ¹The Ohio State University; ²Idaho National Laboratory; ³Missouri University of Science and Technology

3:00 PM

Optical Characterization of Defects in Proton Irradiated Fluorite Oxides: *Joshua Ferrigno*¹; Vinay Chauhan¹; Amey Khanolkar²; Lingfeng He²; David Hurley²; Marat Khafizov¹; ¹Ohio State University; ²Idaho National Laboratory

3:20 PM Break

3:40 PM Invited

Successful, Unsuccessful, and Partially-successful Attempts at Understanding Alloy Corrosion in Molten Salts: *Stephen Raiman*¹; ¹Texas A&M University

4:00 PM

Effect of Ion Irradiation on the Corrosion of 304SS in PWR Simulated Water Chemistry: *Fu-Yun Tsaï*¹; Ryan Schoell¹; Khalid Hattar²; Djamel Kaoumi¹; ¹North Carolina State University; ²Sandia National Laboratories

4:20 PM

Microstructural Characterization of Oxidized Tristructural Isotropic Particles (TRISO) in Various Gas Atmospheres: *Katherine Montoya*¹; Brian Brigham¹; Tyler Gerczak²; Elizabeth Sooby¹; ¹University of Texas at San Antonio; ²Oak Ridge National Laboratory

MATERIALS-ENVIRONMENT INTERACTIONS

Advanced Coatings for Wear and Corrosion Protection – Session II

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

Monday PM | October 18, 2021

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Session Chairs: Evelina Vogli, LM Group Holdings; Virendra Singh, Schlumberger

2:00 PM

The Effects of Graphene in Composite Polymer Coatings Against Inorganic Scales: *Manuel Marya*¹; Virendra Singh¹; Alireza Zolfaghari¹; ¹Schlumberger

2:20 PM

Direct Electrodeposition of Corrosion Resistant Coatings onto Aluminum Alloys: *Rajeswaran Radhakrishnan*¹; Timothy Hall¹; Maria Inman¹; Earl Jennings Taylor¹; Stephen Snyder¹; Cory Crowley²; ¹Faraday Technology Inc; ²Fermi National Accelerator Laboratory

2:40 PM

Galvanic Corrosion of AZ31B Ultrasonically-welded with Bare and Zn-coated Steels: *Jiheon Jun*¹; Jian Chen¹; Yong Chae Lim¹; Michael Brady¹; Donovan Leonard¹; Zhili Feng¹; ¹Oak Ridge National Laboratory

3:00 PM

Tribological Resistance and Anti-corrosive Properties of Cr-based Electrochemical Nano-composite Coatings Reinforced with Ytria Stabilised Zirconia and Carbon Nanotubes: *Pragya Tripathi*¹; Prvan Katiyar¹; Janakarajan Ramkumar¹; Kantesh Balani¹; ¹Indian Institute of Technology

3:20 PM Break

3:35 PM

Improved Coating Performance of REACH Compliant Trivalent Chromium Plating Process for Functional Applications: *Andrew Moran*¹; Tim Hall¹; Rajeswaran Radhakrishnan¹; Stephen Snyder¹; Maria Inman¹; EJ Taylor¹; Kamyar Ahmadi²; Stanko Brankovic²; George Bokisa³; Mark Feathers⁴; ¹Faraday Technology Inc.; ²University of Houston; ³Coventya International; ⁴U.S. Army Aviation and Missile Command

3:55 PM

Galvanic Corrosion Mitigation of CFRP-AZ31B Dissimilar Joint: *Yong Chae Lim*¹; Jiheon Jun¹; Jong Kahk Keum¹; Yuan Li¹; Donovan Leonard¹; Michael Brady¹; Zhili Feng¹; ¹Oak Ridge National Laboratory

4:15 PM

Oxidation Protection of Technical Ni-alloys by the Fluorine Effect: *Alexander Donchev*¹; Mathias Galetz¹; ¹DECHEMA-Forschungsinstitut

4:35 PM

Polymeric Coatings Embedded with Green Anti-corrosive Pigment for Corrosion Inhibition of Steel: *Muddasir Nawaz*¹; Abdul Shakoor¹; Ramazan Kahraman¹; M. F. Montemor²; ¹Qatar University; ²Universidade de Lisboa

4:55 PM

Controlled Release of Corrosion Inhibitors by Microencapsulation for Protection of Steel Reinforced Concrete: *Jacob Ress*¹; David Bastidas¹; Ulises Martin¹; Juan Bosch¹; ¹University of Akron

5:15 PM

High-performance Chrome Coatings to Protect Against Wear and Corrosion: *Borys Sereda*¹; *Dmytro Sereda*¹; ¹Dneprovsky State Technical University

MATERIALS-ENVIRONMENT INTERACTIONS

Advanced Materials for Harsh Environments — Session I

Sponsored by: ACerS Electronics Division

Program Organizers: Navin Manjooran, Solve Technology and Research, Inc.; Gary Pickrell, Virginia Tech

Monday PM | October 18, 2021

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

2:00 PM **Introductory Comments**

3:00 PM

Investigation of the Variables Affecting Hot Corrosion Test Results: *Preston Nguyen*¹; Brian Gleeson¹; ¹University of Pittsburgh

3:20 PM

Characterization and High Temperature Electrical Properties of Brazed Joints of La_{0.8}Sr_{0.2}CrO₃ with Nickel and Nickel Alloys: *Zhengtao Yang*¹; Javier Mena²; Jordan Conte³; Brian Jordan⁴; Katarzyna Sabolsky⁵; Kostas Sierros⁵; Edward Sabolsky¹; ¹West Virginia University

3:40 PM Break

4:00 PM

Evaluation of High Temperature Planar Passive Wireless Sensor Fabricated by Stereolithography Process: *Kavin Sivaneri Varadharajan Id*¹; Matthew Barre¹; Zachary Lynch¹; Engin Ciftiyurek¹; Katarzyna Sabolsky¹; Edward Sabolsky¹; Konstantinos Sierros¹; Daryl Reynolds¹; ¹West Virginia University

4:20 PM

Determining the Effect of Aerospace Environments on the Corrosion Fatigue Performance of AA7085-T7451: *Brandon Free*¹; Sarah Galyon Dorman²; Jason Niebuhr²; Nathan Houser²; Jenifer Locke¹; ¹The Ohio State University; ²SAFE Inc.

4:40 PM

Economically Alloyed High-speed Steel for Knives of Feeder Feeders of Glass Forming Machines: *Valeriy Mishchenko*¹; Sergiy Sheyko¹; Vldimir Tsyganov²; Olha Bolsun¹; Svitlana Mudra¹; ¹Zaporizhzhia National University; ²National University "Zaporizhzhia polytechnic"

5:00 PM **Concluding Comments**

ELECTRONIC AND MAGNETIC MATERIALS

Advances in Dielectric Materials and Electronic Devices — Magnetic Materials

Sponsored by: ACerS Electronics Division

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

Monday PM | October 18, 2021

B235 | Greater Columbus Convention Center

Session Chair: Rick Ubic, Boise State University

2:00 PM

Magnetocaloric Composites for High Efficiency Thermal Management: *Christopher Kovacs*¹; Timothy Haugan²; Michael McLeod³; Devin Grant⁴; ¹Scintillating Solutions LLC; ²Air Force Research Laboratory; ³University of Dayton Research Institute; ⁴Central State University

2:20 PM

Improvement of the Magnetic Characteristics of Materials Due to the Formation of Unidirectional Boundaries of Ferrite during Processing in SHS Conditions: *Borys Sereda*¹; Dmytro Sereda¹; Vitaly Volokh¹; ¹Dneprovsky State Technical University

2:40 PM

The influence of the Microstructure Obtained After Processing in SHS Conditions on the Magnetic Characteristics of Steels: *Borys Sereda*¹; *Dmytro Sereda*¹; Vitaly Volokh¹; ¹Dneprovsky State Technical University

3:00 PM

The Effect of Deformation of Low Alloy Steels Used in Metallurgy on Their Magnetic Characteristics: *Borys Sereda*¹; *Dmytro Sereda*¹; *Vitaly Volokh*¹; ¹Dneprovsky State Technical University

IRON AND STEEL (FERROUS ALLOYS)

Advances in Ferrous Metallurgy – Advances in Steel Products

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

Program Organizers: Daniel Baker, General Motors Corporation; Emmanuel De Moor, Colorado School of Mines; Kishlay Mishra, Nucor Castrip Arkansas LLC; Lijia Zhao, ArcelorMittal Global R&D

Monday PM | October 18, 2021
A210 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM

Studying Processing – Microstructure – Mechanical Property Correlation in a Multi-phase Advanced High Strength Steel: *Monowar Hossain*¹; *Sanjeev Sharma*²; *Yanwen Wang*²; *Daniel Stephens*²; *Nilesh Kumar*¹; ¹University of Alabama, Tuscaloosa; ²Nucor Steel Decatur, LLC

2:20 PM

High Strength Low Alloy Steels strengthened by Heusler precipitates: *Rafael Rodriguez De Vecchis*¹; *Minal Shah*¹; *Yuankang Wang*¹; *Xin Wang*¹; *Soumya Sridar*¹; *Zhangwei Wang*¹; *Wei Xiong*¹; ¹University of Pittsburgh

2:40 PM

The Effect of Jaw Plate Sectional Thickness on the Microstructure and Hardness of Hardfield Austenitic Manganese Steel for

Quarry Application: *Johnson Agunsoye*¹; *Ademola Agbeleye*¹; ¹University of Lagos

3:00 PM

Development of Fine Grained Steel for Cold Heading Application: *Deepan N*¹; *Manjini Sambandam*¹; ¹JSW Steel Ltd, Salem Works

IRON AND STEEL (FERROUS ALLOYS)

Advances in Metallic Coated Advanced Steels – Liquid Metal Embrittlement and Advances in Coating Production

Sponsored by: AIST: Metallurgy Processing Products and Applications Technology Committee, AIST: Galvanizing Technology Committee

Program Organizers: Joseph McDermid, McMaster University; Frank Goodwin, ILZRO

Monday PM | October 18, 2021
A211 | Greater Columbus Convention Center

Session Chairs: Joseph McDermid, McMaster University; Frank Goodwin, International Zinc Association

2:00 PM

Influence of Temperature on the Mechanical Behavior of TRIP1180 Spot Welds with Liquid Metal Embrittlement Cracks: *Kayla Molnar*¹; *Kip Findley*²; ¹Los Alamos National Laboratory; ²Colorado School of Mines

2:20 PM

Liquid Metal Embrittlement in TRIP and Martensitic Ultrahigh Strength Steels: *Pallavi Pant*¹; *Emmitt Fagerstrom*¹; *Benjamin Hilpert*²; *Holger Schubert*²; *Luke Brewer*¹; ¹The University of Alabama; ²Daimler AG

2:40 PM

Controlling the Microstructure of AHSS in a Galvanizing Line by Austenite Content Control - X-CAP® (X-ray Controlled Annealing Process): *Ulrich Sommers*¹; *Thomas Daube*¹; *Caesar Sasse*¹; *Michael Peintinger*²; *Cornelia Ionescu*³; *Frenk van den Berg*³; *Danique Fintelman*³; *Stefan Melzer*³; *Ernesto Montagna*⁴; *Horst Krauthäuser*⁵; *Tobias Terlau*⁵; *Alexandre Lhoest*⁶; *Olivier Pensis*⁶; *Jean-Pierre Crutzen*⁶; ¹SMS group GmbH; ²SMS group Inc.; ³Tata Steel Europe; ⁴SEGAL; ⁵IMS Messsysteme GmbH; ⁶Drever International

3:00 PM

Optimal Wavelength Selection for Improved Multi-wavelength Pyrometry of Advanced High Strength Steel: *Fatima Suleiman*¹; *Kaihsiang Lin*¹; *Kyle Daun*¹; ¹University of Waterloo

3:20 PM Break

3:40 PM

Galvanizing Sheet Steel Under SHS Conditions for the Development of Steel Microstructures: *Borys Sereda*¹; *Dmytro Sereda*¹; *Dmytro Kruglyak*¹; *Irina Kruglyak*¹; ¹Dneprovsky State Technical University

4:00 PM

A Study on Mechanical and Super-hydrophobic Behavior of the SiO₂@ZnO Nano Core-shell Based Polymeric Coating: *Jaya Verma*¹; *Deepak Kumar*¹; ¹IIT Delhi

4:20 PM

Use of the New Integrated Indicator ECP-Zn for Control Zinc Coating Obtaining Under SHS Conditions: *Borys Sereda*¹; *Dmytro Sereda*¹; *Irina Kruglyak*¹; ¹Dneprovsky State Technical University

ARTIFICIAL INTELLIGENCE

AI for Big Data Problems in Advanced Imaging, Materials Modeling and Automated Synthesis – Artificial Intelligence for Automated Synthesis and Characterization

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Mathew Cherukara, Argonne National Lab; Badri Narayanan, University of Louisville; Subramanian Sankaranarayanan, University of Illinois (Chicago)

Monday PM | October 18, 2021
A124 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM Invited

Deep Learning and Uncertainty Quantification for Automated Experiments: *Bobby Sumpter*¹; Ayana Ghosh¹; Maxim Ziatdinov¹; Sergei Kalinin¹; Ondrej Dyck¹; ¹Oak Ridge National Laboratory

2:20 PM Invited

Machine Learning for Automated Experiment in Scanning Probe and Electron Microscopy: *Sergei Kalinin*¹; ¹Oak Ridge National Laboratory

2:40 PM

Data Reconstruction and Generation in Additive Manufacturing Process Sensor Monitoring Using Matrix Completion with Recommender Systems: *Andy Ramlatchan*¹; Yaohang Li²; ¹NASA Langley Research Center; ²Old Dominion University

3:00 PM

Improving EBM NIR Image Analysis for Component Qualification a Statistical Learning Approach: *Michael Sprayberry*¹; John Ledford¹; Michael Kirka¹; ¹Oak Ridge National Laboratory

3:20 PM

Automated TEM Analysis of Nanoparticle Distribution in HSLA Steel: *Alexandra Allamon*¹; Thomas Balk¹; ¹University of Kentucky

3:40 PM Break

4:00 PM

A Deep Generative Model for Parametric EBSD Pattern Simulation: *Zihao Ding*¹; Marc Graef¹; ¹Carnegie Mellon University

4:20 PM

Image Registration via a Deep Learning Approach for Correlative Microscopy: *Yanqi Luo*¹; Nestor J Zaluzec¹; Mathew Cherukara¹; Xiaolan Wu²; Si Chen¹; ¹Argonne National Laboratory; ²Beijing University of Technology

4:40 PM Invited

Non-iterative Deep Learning for High-fidelity Microscopic Tomography: *Singanallur Venkatakrishnan*¹; Amir Koushyar Ziabari¹; Jacob Hinkle¹; Micheal Kirka¹; Jeffrey Warren¹; Hassina Bilheux¹; Vincent Paquit¹; Ryan DeHoff¹; ¹Oak Ridge National Laboratory

5:00 PM

Optimizing the Training of Convolutional Neural Networks for Image Segmentation: Benjamin Provencher¹; Aly Badran¹; Jonathan Kroll¹; *Mike Marsh*²; ¹University of Colorado; ²Object Research Systems

5:20 PM

Semantic Segmentation of Porosity in In-situ X-ray Tomography Data Using FCNs: *Pradyumna Elavarthi*¹; Arun Bhattacharjee¹; Anca Ralescu¹; Ashley Paz y Puento¹; ¹University of Cincinnati

5:40 PM

Machine-learning Based Algorithms for 4D X-ray Microtomographic Analysis: *Hamidreza T-Sarraf*¹; Sridhar Niverty¹; Nikhilesh Chawla¹; ¹Purdue University

CERAMIC AND GLASS MATERIALS

Ceramic Matrix Composites – Session II

Sponsored by: ACeRS Engineering Ceramics Division

Program Organizers: Narottam Bansal, NASA Glenn Research Center; Jacques Lamon, CNRS; Sung Choi, Naval Air Systems Command

Monday PM | October 18, 2021

B232 | Greater Columbus Convention Center

Session Chair: Yutai Katoh, Oak Ridge National Lab.

2:00 PM Invited

Ceramic Matrix Composite Technologies for Accident-tolerant Fuel Applications – Progress and Opportunities: *Yutai Katoh*¹; Takaaki Koyanagi¹; David Arregui-Mena¹; Peter Mouche¹; Ken Kane¹; Peng Xu²; Christian Deck³; ¹Oak Ridge National Laboratory; ²Idaho National Laboratory; ³General Atomics

2:40 PM

Synergistic Effects of Oxidation and Applied Load on SiC/BN/SiC Ceramic Matrix Composite Durability at Intermediate Temperatures: *Kaitlin Detwiler*¹; Marcus Dozer¹; *Elizabeth Opila*¹; ¹University of Virginia

3:20 PM

Oxidation of BN Coatings in SiC/SiC Composites: *Victoria Christensen*¹; Frank Zok¹; ¹University of California, Santa Barbara

3:40 PM Break

4:00 PM

Development of Low Temperature, Dense Nano-composite Material Combining Electrophoretic and Atomic Layer Deposition Technique: *Sumit Bhattacharya*¹; Michael Pellin¹; Abdellatif Yacout¹; ¹Argonne National Laboratory

4:20 PM

Developmental Efforts on Alternative Building Material using Kaolin-based Geopolymer from Local Sources in Nigeria: *Oluwafemi Adelabu*¹; Oluwagbenga Odewole²; Augustine Nsah²; Tolulope Akinbogun²; ¹University of Johannesburg; ²Federal University of Technology, Akure

4:40 PM

High Temperature Composites Based on Zirconia Cement. High Temperature Composites Based on Ceramic Cements: *Nickolai Iliukha*¹; ¹Kyiv University

MATERIALS-ENVIRONMENT INTERACTIONS

Coatings to Protect Materials from Extreme Environments — Coatings and Surface Treatments for Extreme Environments

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Kang Lee, NASA Glenn Research Center; Yutaka Kagawa, The University of Tokyo; Daniel Mumm, University of California, Irvine; Rodney Trice, Purdue University; Emmanuel Boakye, UES Inc.; Valerie Wiesner, NASA Langley Research Center; Edward Gorzkowski, Naval Research Laboratory; Scooter Johnson, Naval Research Laboratory

Monday PM | October 18, 2021

A222 | Greater Columbus Convention Center

Session Chairs: Daniel Mumm, University of California, Irvine; Edward Gorzkowski, Naval Research Laboratory

2:00 PM

Aerosol Deposition and Characterization of Sodium Niobate: *Eric Patterson*¹; Heonjune Ryou¹; Edward Gorzkowski¹; ¹U.S. Naval Research Laboratory

2:30 PM

In-Situ Ceramic Oxide Coating on Stainless Steels for Molten Salt Corrosion Prevention for Concentrated Solar Power Applications: *Animesh Kundu*¹; Sreya Dutta²; Chase Clapp¹; Hannah Clarkson¹; ¹Lehigh University; ²Dynalene, Inc

2:50 PM

Functionally Graded Corrosion Resistant Coatings for Molten Salt Reactor Systems: *Holly Garich*¹; Tim Hall¹; Stephen Raiman²; Bruce Pint³; ¹Faraday Technology; ²Texas A&M University; ³Oak Ridge National Laboratory

3:10 PM

Coatings for Improving the High Temperature Oxidation Resistance of Mo-based Systems

: *Katharina Beck*¹; Frauke Hinrichs²; Martin Heilmair²; Anke Ulrich¹; Mathias Galetz¹; ¹DECHEMA-Forschungsinstitut; ²Karlsruher Institut für Technologie

3:30 PM Break

3:50 PM

Effects of Laser Remediation Treatments on Global vs Local Environmentally-assisted Cracking of 5xxx Series Aluminum Alloy Ship Plate: *Yang Liu*¹; John Lewandowski¹; ¹Case Western Reserve University

4:10 PM

Electrodeposition of Functionally-graded Interlayers for Joining Plasma-facing Components and Heat-sinks for Nuclear Fusion Reactors: *Katherine Lee*¹; Brian Skinn¹; Steve Snyder¹; Maria Inman¹; ¹Faraday Technology, Inc.

4:30 PM

The Efficacy of Inorganic Zinc-Rich Primers to Mitigate Stress Corrosion Susceptibility in Al-Mg Alloys: *Matthew McMahon*¹; Allison Akman¹; Eric Dau²; ¹Naval Surface Warfare Center, Carderock Division; ²Vision Point Systems, LLC.

NANOMATERIALS

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials — 1D Nanostructures

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

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

Monday PM | October 18, 2021

B240/241 | Greater Columbus Convention Center

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

2:00 PM Invited

Self-Assembled Periodic Nanostructures of SrSnO₃ Using Martensitic Phase Transformations: *Bharat Jalan*¹; ¹University of Minnesota

2:40 PM

Growth Mechanism Study of Boron Carbide Nanowires: *Manira Akter*¹; Terry Xu¹; ¹University of North Carolina Charlotte

3:00 PM

Mechanism Study of Controlled Growth of Transition Metal Oxide Nanostructures: *Haitao Zhang*¹; ¹University of North Carolina at Charlotte

3:20 PM Break

3:40 PM

NiO Nanostructure Growth at High Temperature in Water Vapor via In-situ ESEM: *Boyi Qu*¹; Klaus van Benthem¹; ¹University of California Davis

4:00 PM

Nanotube Consolidations and Metal-PTFE Nanocomposites for Conformable Thermal and Electrical Interfaces: *Christopher Kovacs*¹; Timothy Haugan²; Robert Ansel³; ¹Scintillating Solutions LLC; ²Air Force Research Laboratory; ³Linseis Inc.

4:20 PM

Effect of Doping Carbon Nanotubes with Group III-V Compounds Using Floating Catalyst Method: *Anuptha Pujari*¹; Mark Schulz¹; ¹Nanoworld Laboratories, University of Cincinnati

SPECIAL TOPICS

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

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

Program Organizers: Alison Polasik, Campbell University; Susan Gentry, University of California, Davis; Jeffrey Fergus, Auburn University; Assel Aitkaliyeva, University of Florida; Kester Clarke, Colorado School of Mines; Subhadra Gupta, University of Alabama; Gregg Janowski, University of Alabama at Birmingham; M. Norton, Washington State University

Monday PM | October 18, 2021
B140/141 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM Introductory Comments

2:05 PM

Online Instruction of a Large Introductory Materials Course: A Partially Asynchronous Approach: *Jonathan Brown*¹; *Jenifer Locke*¹; ¹The Ohio State University

2:25 PM

Introduction to Materials Science and Engineering: an Online Course from a Student's Perspective: *Joseph Foster*¹; *Subhadra Gupta*¹; ¹University of Alabama

2:45 PM

Reframing Lab Courses to Improve Both Student Engagement and ABET Alignment: *Timothy Chambers*¹; ¹University of Michigan

3:05 PM Break

3:20 PM Panel Discussion: Discussion About the Future of Online Materials Education

FUNDAMENTALS AND CHARACTERIZATION

Deformation-induced Phase Transformations — Deformation-induced Phase Transformations

Program Organizers: Yangyang Zhao, Purdue University; Jonah Klemm-Toole, Colorado School of Mines; Amy Clarke, Colorado School of Mines; Janelle Wharry, Purdue University

Monday PM | October 18, 2021
C172 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM Invited

Ausforming of Ferritic M54 Ultra-high Strength Steel: *Suveen Mathaudhu*¹; *Yiwei Sun*²; *Joshua Edwards*¹; *Jeffrey Lin*³; *Thomas Kozmel*³; ¹Colorado School of Mines; ²Southeast University; ³Questek Innovations, LLC

2:40 PM

Influence of 3D Microstructure on Deformation-induced Martensitic Transformation Studied by In Situ High-energy Diffraction Microscopy and Crystal Plasticity Modeling: *Ye Tian*¹; *Xiaohui Tu*¹; *He Liu*²; *Ming Guan*¹; *Peter Kenesei*³; *Jun-Sang Park*³; *Robert Suter*²; *Todd Hufnagel*¹; ¹Johns Hopkins University; ²Carnegie Mellon University; ³Argonne National Laboratory

3:00 PM

Accounting for Phase Transformation in Plastic Anisotropy Modeling of SS316L: *Elizabeth Mamros*¹; *Jinjin Ha*¹; *Yannis Korkolis*; *Brad Kinsey*¹; ¹University of New Hampshire

3:20 PM

Analysis of Stress State of Plastic Medium Influence on Structural Transformations in Low-alloy Steels: *Anton Matiukhin*¹; *Sergey Sheyko*²; *Vldimir Tsyganov*¹; *Valeriy Naumyk*¹; *Anna Ben*¹; ¹Zaporizhzhia Polytechnic National University; ²Zaporizhzhia National University

3:40 PM Break

4:10 PM Invited

Intrinsic Coupling between Deformation Twinning and Phase Transformation in NiTi Shape Memory Alloys and Metastable Beta Ti-alloys: *Yipeng Gao*¹; *Qianglong Liang*¹; *Yufeng Zheng*¹; *Dong Wang*²; *Michael Mills*¹; *Hamish Fraser*¹; *Yunzhi Wang*¹; ¹Ohio State University; ²Xian Jiao Tong University

4:50 PM

Characterization of NiTi-based Shape Memory Alloys Using Ultrasound: *Trevor Grim*¹; *Olivia Palmieri*¹; *Reginald Hamilton*¹; *Andrea Arguelles*¹; ¹Penn State University

5:10 PM

Localized Phase Transformation at Stacking Faults and the Corresponding Alloy Design Strategy: *Longsheng Feng*¹; *Ashton Egan*¹; *Timothy Smith*²; *Shakthipriya Baskar*¹; *Michael Mills*¹; *Maryam Ghazisaeidi*¹; *Yunzhi Wang*¹; ¹The Ohio State University; ²NASA Glenn Research Center

PROCESSING AND MANUFACTURING

Development of Light Weight Alloys and Composites — Microstructure and Processing: Composites II

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

Monday PM | October 18, 2021
A214 | Greater Columbus Convention Center

Session Chairs: Nikhil Gupta, New York University, Tandon School of Engineering; Tanjore Jayaraman, College of Engineering and Computer Science, University of Michigan-Dearborn

2:00 PM Invited

Impact of Laser Shock Peening on Stress Corrosion Susceptibility in Al-Mg Alloys: *Eric Dau*¹; *William Golumbskie*²; *Matthew McMahon*²; ¹Vision Point Systems, LLC.; ²Naval Surface Warfare Center, Carderock Division

2:40 PM Invited

Surge for Design and Development of Low-density High Entropy Alloys and Composites: Nandini Singh¹; Yagnesh Shadangi¹; Vivek Kumar Pandey¹; Vikas Shivam¹; Nilay Mukhopadhyay¹; ¹Indian Institute of Technology (BHU) Varanasi

3:20 PM Invited

Low Cycle Fatigue Behavior of Conventional High Temperature Titanium Alloys for Aeroengine Applications: Ramachandra Canumalla¹; ¹Self employed

4:00 PM Break**4:20 PM**

Investigation of Microstructure, Interfaces and Mechanical Properties of Metal Matrix Composites: Ramasis Goswami¹; ¹Naval Research Laboratory

4:40 PM

Magnesium Alloy Composite with Metal Reinforced Particles Using Friction Stir Processing To Improve Mechanical Properties: Sangam Sangral¹; Jayaprakash Murugesan¹; Mahesh Patel¹; Achyuth Kulkarni¹; ¹Indian Institute of Technology Indore

5:00 PM

Solute and Precipitate Effects on Recrystallization Kinetics of Ce-containing Magnesium Alloys: Gillian Storey¹; Scott Sutton²; Dan Hartman²; Amy Clarke¹; Kester Clarke¹; ¹Center for Advanced Non-Ferrous Structural Alloys, Colorado School of Mines; ²Mag Specialties Inc.

5:20 PM

Inoculation of ML5 Cast Magnesium Alloy with Carbon Nano Powder: Spartak Makovskiy¹; Vadym Shalomeev²; Volodymyr Klochykhin¹; ¹Motor Sich JSC; ²National University Zaporozhye Polytechnica

5:40 PM

Insights into Metal-based Polymer Pyrolysis for In-situ MMC Production: Aaron Gladstein¹; Alan Taub¹; ¹University of Michigan

ENERGY

Energy Materials for Sustainable Development – Solar Energy Conversion

Sponsored by: ACerS Energy Materials and Systems Division

Program Organizers: Armin Feldhoff, Leibniz University Hannover; Kyle Brinkman, Clemson University; Krista Carlson, University of Utah; Eva Hemmer, University of Ottawa; Nikola Kanas, Norwegian University of Science and Technology; Kjell Wiik, Norwegian University of Science and Technology; Lei Zuo, Virginia Tech; Stephanie Lee, Stevens Institute of Technology; Muhammad Hajj, Stevens Institute of Technology; Mohammad Haik, Stevens Institute of Technology

Monday PM | October 18, 2021

A216 | Greater Columbus Convention Center

Session Chairs: Scott Mixture, Alfred University; Nicola Pinna, Humboldt University of Berlin

2:00 PM Invited

Multifunctional Materials for Solar Technologies: Federico Rosei¹; ¹INRS Centre for Energy, Materials and Telecommunications

2:30 PM Invited

Charge Extraction by Linearly Increasing Voltage (CELIV): From One-data Point Measurement to Mobility Mapping in Solar Energy Materials: Giovanni Fanchini¹; Noah Stoczek¹; Miguel Young¹; Tianhao Ouyang¹; Reg Bauld¹; ¹University of Western Ontario

3:00 PM

The Role of Amorphous TiO₂ Film in Performance of Si Photoanodes for Hydrogen Production by Photoelectrochemical Water Splitting: Mehrdad Abbasi Gharacheh¹; Jun Meng²; Yutao Dong²; Dane Morgan²; Xudong Wang²; Jinwoo Hwang¹; ¹The Ohio State University; ²University of Wisconsin-Madison

3:20 PM Break**3:40 PM Invited**

New Types of Oxides, Chalcogenide and Phosphide Catalyst for Water Splitting: Daniel Chua¹; ¹National University of Singapore

4:10 PM Invited

Engineering Nanoscale Semiconductor-catalyst Interfaces for Low-cost Carbon-free Technology: Flavio de Souza¹; ¹Brazilian Center for Research in Energy and Materials

4:40 PM Invited

Processing of Transparent and Luminescent Alumina Polycrystalline Ceramics Doped with Various Rare Earth Elements and Transition Metals: Karel Maca¹; Katarina Drdlikova¹; Daniel Drdlik¹; Robert Klement²; Dusan Galusek²; ¹CEITEC VUT; ²TrUAD

5:10 PM

Au NPs-decorated CeO₂-TiO₂ for Efficient Photoassisted CO Preferential Oxidation: Elisa Moretti¹; Mojtaba Gilzad Kohan²; Antonia Infantes Molina³; Alberto Vomiero²; ¹Ca' Foscari University of Venice; ²Lulea University of Technology; ³University of Málaga

CERAMIC AND GLASS MATERIALS

Glasses and Optical Materials: Current Issues and Functional Applications – Optical Properties and Processing of Amorphous Solids

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

Program Organizers: Jessica Rimsza, Sandia National Laboratories; Delia Brauer, Otto Schott Institute of Materials Research

Monday PM | October 18, 2021

B231 | Greater Columbus Convention Center

Session Chair: Jessica Rimsza, Sandia National Laboratories

2:00 PM

3D Printed Germania-titania-silica Glasses to Tune the Refractive Index and Abbe Number: Jungmin Ha¹; Koroush Sasan¹; Timothy Yee¹; Andrew Lange¹; Du Nguyen¹; Nikola Dudukovic¹; Oscar Herrera¹; Christopher Mah¹; Rebecca Dylla-Spears¹; ¹Lawrence Livermore National Laboratory

2:20 PM

Local Structural Effects on Divalent Europium in Glass Host Materials: Charles Bellows¹; ¹Alfred University

2:40 PM

Optical Properties of One-dimensional Nb₂O₅ Nanostructures Prepared by Electrospinning: *Tomasz Tansk¹; Weronika Smok¹; Marta Zaborowska¹; ¹Silesian University of Technology*

FUNDAMENTALS AND CHARACTERIZATION

Grain Boundaries, Interfaces, and Surfaces in Ceramics: Fundamental Structure—Property—Performance Relationships — Continuum Approaches

Sponsored by: ACerS Basic Science Division, ACerS Electronics Division

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

Monday PM | October 18, 2021
C161A/161B | Greater Columbus Convention Center

Session Chairs: Wolfgang Rheinheimer, Forschungszentrum Jülich; John Blendell, Purdue University

2:00 PM Invited

Abnormal Grain Growth in Nanocrystalline PdAu: The Case of the Fractal Fingerprint: *Raphael Zeller¹; Markus Fischer¹; Christian Braun²; Mingyan Wang¹; Rainer Birringer²; Carl Krill III¹; ¹Ulm University; ²Saarland University*

2:40 PM Invited

Microstructure-within-a-microstructure: Understanding Critical Structural Variations within Grain Boundary Networks: *Timothy Rupert¹; ¹University of California, Irvine*

3:20 PM Break

3:40 PM Invited

Elucidating Grain Boundary Motion with 4D Grain Growth Measurements Using Non-destructive X-ray Diffraction Grain Mapping: *Amanda Krause¹; ¹University of Florida*

4:20 PM Invited

Fast Grain-boundary Diffusion in Oxides: *Roger De Souza¹; ¹RWTH Aachen University*

5:00 PM Invited

Influence of Planar Defects on the Electrochemical Cycling and Diffusion of Li in Li_xMn₂O₄: *Torben Erichsen¹; Cynthia Volkert¹; ¹University of Goettingen*

5:40 PM

Effect of Sodium on the Processability and Mechanical Properties of Nanocrystalline

Magnesium Aluminate: *Isabella Loureiro Muller Costa¹; Ricardo Castro¹; Joice Miagava²; ¹University of California Davis; ²Insper – Institute of Education and Research*

FUNDAMENTALS AND CHARACTERIZATION

High Entropy Materials: Concentrated Solid Solutions, Intermetallics, Ceramics, Functional Materials and Beyond II — Materials Discovery and Design II

Sponsored by: TMS Alloy Phases Committee, TMS Mechanical Behavior of Materials Committee

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

Monday PM | October 18, 2021
C171 | Greater Columbus Convention Center

Session Chairs: Ian Baker, Dartmouth College; Keith Knipling, Naval Research Laboratory

2:00 PM Invited

Compositionally Complex Oxides: Synthesis, Characterization, Challenges, and Opportunities: *Veerte Keppens¹; ¹University of Tennessee*

2:30 PM Invited

High-throughput Design and Processing of MPEAs Using Additive Manufacturing: *Dan Thoma¹; Michael Niezgod¹; Phalgun Nelaturu¹; Zahabul Islam¹; Michael Moorehead¹; Adrien Couet¹; ¹University of Wisconsin-Madison*

2:50 PM

Diffusion Kerf Couples for Synthesis and Screening of Bulk Non-equimolar High Entropy Alloys: *Nagraj Kulkarni; ¹*

3:10 PM Invited

Refractory High Entropy Alloys with Balanced Properties Tailored for Service Conditions: *Andrew Detor¹; Scott Oppenheimer¹; James Ruud¹; Emily Cheng¹; ¹GE Research*

3:30 PM Invited

FeNiMnAl(Cr) Multi-principal Component Alloys: *Ian Baker¹; ¹Dartmouth College*

3:50 PM Break

4:00 PM Invited

Microstructures of Al_{2.7}CrFeMnV, Al_{2.7}CrFeTiV, and Al_{2.7}CrMnTiV High-entropy Alloys: *Keith Knipling¹; Patrick Callahan¹; ¹Naval Research Laboratory*

4:20 PM

Design of TWIP/TRIP Non-equimolar High-entropy Alloys: *Xin Wang¹; Rafael Tomás Rodríguez De Vecchis²; Chenyang Li³; Wei Chen³; Wei Xiong²; ¹University of Pittsburgh; ²Physical Metallurgy and Materials Design Laboratory, Department of Mechanical Engineering and Materials Science, University of Pittsburgh, Pittsburgh, PA, 15261, USA; ³Department of Mechanical, Materials and Aerospace Engineering, Illinois Institute of Technology, Chicago, IL, 60616 USA*

4:40 PM Invited

Ultrahigh-strength and Ductile High-entropy Alloys with Coherent Nano-lamellar Architectures: *Zengbao Jiao¹; ¹The Hong Kong Polytechnic University*

5:00 PM

Nanostructured Oxide-dispersion-strengthened CoCrFeMnNi High-entropy Alloys: Xiang Zhang¹; Fei Wang¹; Xing-Zhong Li¹; Khalid Hattar²; Bai Cui²; ¹University of Nebraska-Lincoln; ²Sandia National Laboratories

5:20 PM Invited

Exploring the Feasible High Entropy Alloy Space: *Raymundo Arroyave*¹; ¹Texas A&M University

5:40 PM

Development of Low-cost High Entropy Alloys through Alloy Mixing: *Karthikeyan Hariharan*¹; Katakam Sivaprasad¹; ¹National Institute of Technology, Tiruchirappalli

FUNDAMENTALS AND CHARACTERIZATION

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

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

Monday PM | October 18, 2021

C160A/160B | Greater Columbus Convention Center

Session Chairs: M Arul Kumar, Los Alamos National Laboratory; Aaron Tallman, Los Alamos National Laboratory

2:00 PM Invited

Developing Surrogate Models for Crystal Plasticity-based Creep by Leveraging Macroscale Constitutive Relations: *Aaron Tallman*¹; Laurent Capolungo¹; ¹Los Alamos National Laboratories

2:30 PM

Weldment Finite Element Modeling and Validation for Integration with CALPHAD Tools: *Daniel Bechetti*¹; Jacob Steiner¹; Charles Fisher¹; ¹Naval Surface Warfare Center, Carderock Division

2:50 PM

Predicting the Intermetallic Growth Kinetics in Cu-Sn-Ag Solder Joints Using Computational Approaches: *Ankita Roy*¹; Kumar Ankit¹; ¹Arizona State University

3:10 PM

Rapid Screening of High-throughput Ground State Predictions: *Sayan Samanta*¹; Axel van de Walle¹; ¹Brown University

3:30 PM Break

3:50 PM Invited

Lab-based Diffraction Contrast Tomography: Achieving Large Volume Grain Statistics for Full Field Modeling of Polycrystalline Materials: *Jun Sun*¹; Jette Oddershede¹; Florian Bachmann¹; Hrishikesh Bale²; William Harris³; Erik Lauridsen¹; ¹Xnovo Technology; ²Carl Zeiss X-ray Microscopy; ³Carl Zeiss Microscopy, LLC

4:30 PM

Physics-based Full-Field Fast Fourier Transform Modeling of Creep Behavior: Application to 347H Steel: *Mariyappan Arul Kumar*¹; Ricardo Lebensohn¹; Laurent Capolungo¹; ¹Los Alamos National Laboratory

4:50 PM

A Physics-based Crystal Plasticity Constitutive Model Incorporating the Dynamic Strain Aging: Application to 347H Steel: *Veerappan Prithvirajan*¹; Nathan Beets¹; M Arul Kumar¹; Bjorn Clausen¹; Ricardo Lebensohn¹; Laurent Capolungo¹; ¹Los Alamos National Laboratory

5:10 PM

Full-field Modeling of Vacancy Diffusion in a Crystal Plasticity Framework: *Aritra Chakraborty*¹; Nathan Beets¹; Mariyappan Arul Kumar¹; Ricardo Lebensohn¹; Laurent Capolungo¹; ¹Los Alamos National Laboratory

5:30 PM

Simulation of Creep and Uniaxial Strain in 316H Steel via a Fully Mechanistic Fast Fourier Transform Based Crystal Plasticity Constitutive Model: *Nathan Beets*¹; Laurent Capolungo¹; Mariyappan Arul Kumar¹; Ricardo Lebensohn¹; ¹Los Alamos National Laboratory

PROCESSING AND MANUFACTURING

Light Metal Technology – Forming Technology

Sponsored by: TMS Titanium Committee

Program Organizers: Xiaoming Wang, Purdue University; Yufeng Zheng, University of Nevada-Reno

Monday PM | October 18, 2021

A213 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM

Direct Tube Extrusion of Gas-atomized Aluminum Transition Alloy Powder via Shear Assisted Processing and Extrusion: *Xiao Li*¹; Tianhao Wang¹; Keerti Kappagantula¹; Scott Whalen¹; ¹Pacific Northwest National Laboratory

2:20 PM

Effect of Vacuum Level on Porosity and Mechanical Properties of Aluminum Alloys in High-pressure Die Casting: *Nicole Trometer*¹; Emre Cinkilic¹; Larry Godlewski²; Eben Prabhu²; Alan Luo²; ¹The Ohio State University; ²Ford Motor Company

2:40 PM

EPSC Model with Back Stress Development to Capture Multi-strain-path Behavior of AA6016-T4: *Rishabh Sharma*¹; Dane Sargeant¹; Sowmya Daroju²; Marko Kenezevic²; Michael Miles¹; David Fullwood¹; ¹Brigham Young University; ²University of New Hampshire

3:00 PM

Lattice Site Correspondence and Morphology of Al₆Mn Precipitate: *Yuchi Wang*¹; Yunzhi Wang¹; Daniel Freiberg²; Yang Huo²; Wendi Zhu²; Robert Williams¹; Mei Li²; ¹Ohio State University; ²Ford

3:20 PM Break

3:40 PM

Surface Modification of Steel Shells to Reduce the Use of Release Agents in Twin Roll Casting of Aluminum Alloys: *Martin Lauth*¹; Alexander Nienhaus²; Hanno Paschke³; Mirko Schaper¹; Olexandr Grydin¹; ¹University of Paderborn; ²TU Braunschweig; ³Fraunhofer Institute

4:00 PM

Comparison of Acoustic Softening Phenomenon in Tensile Tests and Incremental Sheet Forming: *Randy Cheng*¹; *Jiarui Kang*²; *Xun Liu*²; *Alan Taub*¹; ¹University of Michigan; ²The Ohio State University

4:20 PM

In-situ Observation the Growth of Fe-rich Phases during Al Alloys Solidification: *Yuliang Zhao*¹; ¹Dongguan University of Technology

4:40 PM

START: Rio Tinto's 'Nutrition Label' for Sustainable Aluminium: *Tao Wang*¹; ¹Rio Tinto

CERAMIC AND GLASS MATERIALS

Manufacturing and Processing of Advanced Ceramic Materials — New Opportunities in Ceramic Processing II

Sponsored by: ACerS Manufacturing Division

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

Monday PM | October 18, 2021

B234 | Greater Columbus Convention Center

Session Chairs: Ivar Reimanis, Colorado School of Mines; James Hemrick, Oak Ridge National Laboratory

2:00 PM Invited

Flash Sintering, Ultrafast Sintering without Electric Fields, and Electric Field Effects on Microstructural Evolution: *Jian Luo*¹; ¹University of California, San Diego

2:40 PM Invited

High Temperature Coatings for Concentrated Solar Power Receivers: *Julia Billman*¹; *Ivar Reimanis*¹; *Andrea Ambrosini*²; *Gregory Jackson*¹; ¹Colorado School of Mines; ²Sandia National Laboratory

3:20 PM

Selective Laser Sintering of Hexagonal Barium Titanate Ceramics: *Xiang Zhang*¹; *Fei Wang*¹; *Zhipeng Wu*¹; *Yongfeng Lu*¹; *Yan Chen*²; *Michael Nastasi*³; *Bai Cui*¹; ¹University of Nebraska-Lincoln; ²Oak Ridge National Laboratory; ³Texas A&M University

3:40 PM Break

4:00 PM Invited

Issues Related to the Manufacturing and Processing of Refractory Ceramic Materials: *James Hemrick*¹; ¹Oak Ridge National Laboratory

4:40 PM

Green State Joining of Silicon Carbide for High-temperature Applications: *Olivia Brandt*¹; *Rodrigo Orta Guerra*¹; *Rodney Trice*¹; *Jeffrey Youngblood*¹; ¹Purdue University

5:00 PM

Self-propagating High Temperature Synthesis of Chevrel Phase Compounds: *Milind Pawar*¹; ¹The Ohio State University

NANOMATERIALS

Nanotechnology for Energy, Environment, Electronics, Healthcare and Industry — Session II

Sponsored by: ACerS Electronics Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Gary Pickrell, Virginia Tech; Navin Manjooan, Solve Technology and Research, Inc.

Monday PM | October 18, 2021

B242/243 | Greater Columbus Convention Center

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

2:00 PM Introductory Comments

3:00 PM

Fabrication of Dendrite Structure Silver Nanowires / Polymer Nanocomposite for Transparent Flexible Pressure Sensor: *Zhiming Shen*¹; *Narongdet Sulatchaneenopdon*¹; *Hyoung-Won Son*¹; *Hisayuki Suematsu*¹; *Tadachika Nakayama*¹; ¹Nagaoka University of Technology

3:20 PM

Skin-wearable PDMS-based Electronic Decals by Aerosol Jet 3D Printing: *Jacob Brenneman*¹; *Derya Tansel*¹; *Gary Fedder*¹; *Rahul Panat*¹; ¹Carnegie Mellon University

3:40 PM Break

4:00 PM

Ceramic Pigments of the Garnet Type Synthesized by Utilization of Rice Husk Ash: *Irena Markovska*¹; *Tsvetan Dimitrov*²; *Fila Yovkova*¹; ¹University "Prof. Dr. Asen Zlatarov" -Burgas; ²Ruse University Angel Kanchev, Razgrad Branch

4:20 PM Concluding Comments

BIOMATERIALS

Next Generation Biomaterials — Session II

Sponsored by: ACerS Bioceramics Division, TMS Biomaterials Committee

Program Organizers: Roger Narayan, University of North Carolina; Min Wang, University of Hong Kong; Shawn Allan, Lithoz America LLC

Monday PM | October 18, 2021

A224 | Greater Columbus Convention Center

Session Chairs: Vuk Uskokovic, TardigradeNano LLC; Venu Varanasi, University of Texas at Arlington

2:00 PM Invited

Next Generation Biomaterials: Biomimicry and Structural Hierarchy: *Sharmila Mukhopadhyay*¹; ¹University of Maine

2:20 PM Invited

3D Binderjet Printing of Zirconia Based Bceramics, Innovative Processing Aspects and Challenges: *Srimanta Barui*¹; *Deepa Mishra*¹; *Gowtham N H*¹; *Bikramjit Basu*¹; ¹Indian Institute of Science Bangalore

2:40 PM

A Computational Model for Electrochemical Interaction: Root Canal Treatment Tool: *Remya Ampadi Ramachandran*¹; *Shwetha Khande*¹; *Li Wei*¹; *Ahish Shylendra*¹; *Amit Ranjan Trivedi*¹; *Qian Xie*¹; *Christine Wu*¹; *Mathew Mathew*¹; ¹University of Illinois at Chicago

3:00 PM

Bijels-derived Structures for Tissue Engineering Applications: *Min Wang*¹; ¹University of Hong Kong

3:20 PM Break**3:40 PM Invited**

Novel Colloidal Based Biomaterials for Investigating Cellular Mechanotransduction Mechanisms: *Ashley Brown*¹; ¹North Carolina State University and UNC Chapel Hill

4:00 PM

3 D Printing of Ion Responsive Hydrogel: *Abhishek Pachauri*¹; *Jeff Bates*¹; ¹University of Utah

4:20 PM Invited

Calcium Phosphate Nanoparticles as Intrinsic Inorganic Antimicrobials: *Vuk Uskokovic*¹; ¹University of California

4:40 PM

Effects of Thermal Stress on Calcium Phosphate Glass-derived Cements for Vital Pulp Therapy: *Jerry Howard*¹; *Jenna Young*¹; *John Colombo*²; *Steven Naleway*¹; *Krista Carlson*¹; ¹University of Utah; ²University of Nevada, Las Vegas

5:00 PM

Interfacial Adhesion and Surface Activity of Anodized Titanium Modified with SION and SiONP Surface Coatings: *Kamal Awad*¹; *Venu Varanasi*¹; ¹University of Texas at Arlington

CERAMIC AND GLASS MATERIALS

Phase Transformations in Ceramics: Science and Applications — Experimental Studies on Structure and Control II

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

Program Organizers: Scott McCormack, University of California, Davis; Pankaj Sarin, Oklahoma State University; Sanjay V. Khare, University of Toledo; Waltraud Kriven, University of Illinois at Urbana-Champaign

Monday PM | October 18, 2021

B230 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM Invited

Symmetry-mode Analysis of Phase Transitions in Solids: *Branton Campbell*¹; *Harold Stokes*²; ¹Brigham Young University; ²Brigham Young Univ

2:30 PM Invited

High Pressure Phase Transformations of Zircon-type Silicate Materials: *Xiaofeng Guo*¹; *Andrew Strzelecki*¹; *Xiaodong Zhao*¹; *Jason Baker*²; *Stella Chariton*³; *Vitali Prakapenka*³; *Hongwu Xu*⁴; ¹Washington State University; ²Lawrence Livermore National Laboratory; ³The University of Chicago; ⁴Los Alamos National Laboratory

3:00 PM Invited

New Insight into the Disorder Mechanism in Fluorite-related Ceramics: *Maik Lang*¹; ¹University of Tennessee

3:30 PM Break**3:50 PM Invited**

Initial Stages of Transformation of 2-D Assemblies of Nanosheets to Tunnel Structures: *Scott Misture*¹; ¹Alfred University

4:20 PM Invited

Revising the Onset Pressure for the Xenotime/Monazite Pressure-induced Phase Transition in DyPO₄ and Implications for other Rare Earth Orthophosphate Compositions: *Jai Sharma*¹; *Matthew Musselman*¹; *Corinne Packard*¹; *Bianca Haberl*²; ¹Colorado School of Mines; ²Oak Ridge National Laboratory

4:50 PM

Crystallographic Studies of the Leucite-pollucite System Synthesized by Geopolymer Crystallization: *Andrew Steveson*¹; *Waltraud Kriven*¹; ¹University of Illinois at Urbana-Champaign

5:10 PM

In-situ Phase Equilibria in the TiO₂-HfO₂-WO₃ System up to 1400°C: *Benjamin Hulbert*¹; *Dylan Blake*¹; *Waltraud Kriven*¹; ¹University of Illinois at Urbana-Champaign

FUNDAMENTALS AND CHARACTERIZATION

Probing Defect Properties and Behavior under Mechanical Deformation and Extreme Conditions — In Situ and Advanced Characterization of Defects

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

Program Organizers: Zhe Fan, Lamar University; Tianyi Chen, Oregon State University; Shijun Zhao, City University of Hong Kong; Mitra Taheri, Johns Hopkins University; Yury Osetskiy, Oak Ridge National Laboratory

Monday PM | October 18, 2021

C170 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM Invited

Imaging Electronic Properties of Ferroelectric Interfaces and Domain Walls via 4D STEM: *Christopher Addiego*¹; *Huaixun Huyan*¹; *Xiaoqing Pan*¹; ¹University of California Irvine

2:30 PM Invited

Ultra-high Strength and Plasticity Mediated by Partial Dislocations and Defect Networks: *Ruizhe Su*¹; *Dajla Neffati*²; *Yashashree Kulkarni*²; *Xinghang Zhang*¹; ¹Purdue University; ²University of Houston

3:00 PM

Probing Materials Properties across Scales with Scanning Diffraction in Transmission Electron Microscopy: *Wenpei Gao*¹; ¹North Carolina State University

3:20 PM

In-situ Study of Failure Defects in Cu/Nb Nanolaminates under Deformation: *Yifan Zhang*¹; Nan Li¹; Laurent Capolungo¹; Matt Schneider¹; Rodney McCabe¹; ¹Los Alamos National Laboratory

3:40 PM Break

4:20 PM Invited

In-situ Transmission Electron Microscopy of Intermittent Dislocation Activities and Deformation Mechanisms: *Jian Min Zuo*¹; Haw-Wen Hsiao¹; Yang Hu¹; Qun Yang¹; ¹University of Illinois

4:50 PM

The Effects of Sample-preparation-induced Defects on the Mechanical Properties of Single Crystal Aluminum Nano-pillars: *Yang Yang*¹; Sarah Wang²; Bin Xiang³; Sheng Yin²; Thomas Pekin²; Xiaoqing Li²; Ruopeng Zhang²; Kayla Yano⁴; David Hwang⁵; Mark Asta¹; Costas Grigoropoulos²; Frances Allen¹; Andrew Minor¹; ¹Lawrence Berkeley National Laboratory; ²UC Berkeley; ³USTC; ⁴PNNL; ⁵Stony Brook University

5:10 PM

In-situ Studies on Radiation Response of a Nanotwinned Steel: *Zhongxia Shang*¹; Tongjun Niu¹; Tianyi Sun¹; Sichuang Xue¹; Wei-Ying Chen²; Meimei Li²; Haiyan Wang¹; Xinghang Zhang¹; ¹Purdue University; ²Argonne National Laboratory

PROCESSING AND MANUFACTURING

Processing and Performance of Materials Using Microwaves, Electric and Magnetic Fields, Ultrasound, Lasers, and Mechanical Work: The Rustum Roy Symposium — Session II

Sponsored by: ACerS Basic Science Division, ACerS Manufacturing Division

Program Organizers: Morsi Mahmoud, King Fahd University of Petroleum & Minerals; Dinesh Agrawal, Pennsylvania State University; Guido Link, Karlsruhe Institute of Technology; Motoyasu Sato, Chubu University; Rishi Raj, University of Colorado; Christina Wildfire, National Energy Technology Laboratory; Zhiwei Peng, Central South University

Monday PM | October 18, 2021

B233 | Greater Columbus Convention Center

Session Chair: Daudi Waryoba, Penn State

2:00 PM

Specific Phenomena in Microwave Carbothermic Reduction of NiO: *Noboru Yoshikawa*¹; Kentarou Higashi¹; Taiki Kurokawa¹; Sergey Komarov¹; ¹Tohoku University

2:30 PM

Methodology for Scaling Microwave Catalyst in a Fixed Bed: *Christina Wildfire*¹; Yan Zhou¹; Christopher Marin¹; Doug Kauffman¹; Dushyant Shekhawat¹; ¹National Energy Technology Laboratory

3:00 PM Invited

Microwave Induced Rearrangement of the Active Sites on Supported Cr/SiO₂ Heterogeneous Catalysts: *Albert Stiegman*¹; Cera Hsu¹; ¹Department of Chemistry, Florida State University

3:40 PM Invited

Conditions for the Microwave Effect: *Motoyasu Sato*¹; *Shin Nakatani*¹; ¹Chubu University

4:20 PM Invited

Microwave Heating by Ferro-magnetic Resonance and Its Detection: *Noboru Yoshikawa*¹; Masaya Goto¹; ¹Tohoku University

SPECIAL TOPICS

Research Lightning Talks — Research Lightning Talks I

Sponsored by: ACerS President's Council of Student Advisors

Program Organizers: Victoria Christensen, University of California Santa Barbara; Michael Walden, Colorado School of Mines; Erin Louise Valenzuela, University of Birmingham; Katelyn Kirchner, Pennsylvania State University; Andrew Ericks, University of California, Santa Barbara

Monday PM | October 18, 2021

B142/143 | Greater Columbus Convention Center

Session Chair: Victoria Christensen, UC Santa Barbara

2:00 PM Introductory Comments

2:10 PM

Will Low-cost Ceramic Water Filters Really Work?: *Ian Nettleship*¹; ¹University of Pittsburgh

2:15 PM

Refractories for the Food Industry: *Ryan Hershey*¹; ¹Allied Mineral Products, Inc.

2:20 PM

Paths to 3D Printing Carbon and Carbon Composites: *Caitlyn Clarkson*¹; Connor Wyckoff¹; William Costakis¹; Matthew Dickerson¹; Hilmar Koerner¹; ¹Air Force Research Laboratory

2:25 PM

Using Unsupervised Learning to Understand Thin Film Growth: *Kimberly Gliebe*¹; Alp Sehirlioglu¹; ¹Case Western Reserve University

2:30 PM

Direct Ink Writing with Highly Loaded Aqueous Silicon Carbide Suspensions: *Tess Marconie*¹; Kyle Cox¹; Jeffrey Youngblood¹; Rodney Trice¹; ¹Purdue University

2:35 PM

Germanium Photodiodes for Capture of High Energy X-rays: *Joseph Wood*¹; Klaus van Benthem¹; Charles Hunt¹; ¹University of California Davis

2:40 PM

Joining of Silicon Carbide for High-temperature Applications: *Olivia Brandt*¹; Rodrigo Orta Guerra¹; Rodney Trice¹; Jeffrey Youngblood¹; ¹Purdue University

2:45 PM

Impression Behavior of Highly Resilient Polyethylene Glycol/Polydimethylsiloxane Hydrogels: *Annaliza Perez-Torres*¹; Fuqian Yang¹; Ipek Sacligil²; Gregory Tew²; ¹University of Kentucky; ²University of Massachusetts, Amherst

2:50 PM

Oxygen Triclusters and Five-coordinated Alumina Species in Calcium-aluminosilicate Glasses: *Sierra Astle*¹; Rebecca Welch¹; John Mauro¹; ¹Penn State University

2:55 PM Break**3:15PM**

Robust Heat Resistant Superhydrophobic Coatings Fabricated by Functionalized Nanoparticles: *Anna Schmidt-Verma*¹; Thomas Fischer¹; Sanjay Mathur¹; ¹Universität zu Köln

3:20 PM

Perfecting Steel Processing in the 21st Century: *Alyssa Stubbers*¹; Thomas Balk¹; ¹University of Kentucky

3:25 PM

Superalloy Development for Specific Applications: A Low CTE Alloy: *Thomas Mann*¹; ¹Purdue University

3:30 PM

Bigger, Faster, Stronger: Is It Possible for Flash Sintering to Densify Large Ceramic Samples Homogeneously?: *Gareth Jones*¹; ¹University of Warwick

3:35 PM

Impact of Modifier Field Strength on the Mechanical Response of Single Modifier Aluminoborosilicate Glasses: *Aubrey Fry*¹; John Mauro¹; ¹Penn State University

MATERIALS-ENVIRONMENT INTERACTIONS

Thermodynamics of Materials in Extreme Environments – Thermodynamics and Stabilities of Alloys and Ceramics

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

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

Monday PM | October 18, 2021

A221 | Greater Columbus Convention Center

Session Chairs: Kristina Lilova, Arizona State University; Xiaofeng Guo, Washington State University

2:00 PM Invited

Stability of Multicomponent Rare Earth Silicates for Environmental Barrier Coating Application: Mackenzie Ridley¹; Cameron Miller¹; Rebekah Webster¹; Hans Olson¹; Alejandro Salanova¹; Kathleen Tomko¹; Jon Ihlefeld¹; Cormac Toher²; Patrick Hopkins¹; *Elizabeth Opila*¹; ¹University of Virginia; ²Duke University

2:30 PM Invited

Directions of Zero Thermal Expansion in Anisotropic Oxides: *Scott McCormack*¹; William Wheeler²; Benjamin Hulbert²; Waltraud Kriven²; ¹University of California, Davis; ²University of Illinois at Urbana-Champaign

3:00 PM

A First-principles-based Study of Oxidation Thermodynamics in Refractory High Entropy Alloys: *Adib Samin*¹; ¹Air Force Institute of Technology

SPECIAL TOPICS

MS&T21 Plenary Session – MS&T21 Plenary Session

Tuesday AM | October 19, 2021

Union Station Ballroom | Greater Columbus Convention Center

8:00 AM Welcome Comments**8:05 AM Introductory Comments****8:10 AM Plenary**

AIST Adolf Martens Memorial Steel Lecture: Iron: The Ubiquitous Element: *Anil Sachdev*¹; ¹General Motors Global Research and Development

8:50 AM Award Presentation**8:55 AM Introductory Comments****9:00 AM Plenary**

TMS Institute of Metals/Robert Franklin Mehl Award for MS&T21: New Superalloys in the Co-Ni Design Space for 3D Printing: *Tresa Pollock*¹; ¹University of California, Santa Barbara

9:40 AM Award Presentation**9:45 AM Introductory Comments****9:50 AM Plenary**

ACerS Edward Orton, Jr. Memorial Lecture: Turning Down the Heat in Sintering to Enable the Unification of all Materials: *Clive Randall*¹; ¹Pennsylvania State University

10:30 AM Award Presentation**10:35 AM Concluding Comments**

PROCESSING AND MANUFACTURING

13th Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing – Novel Approaches to Sustainable Manufacturing II

Sponsored by: ACerS Engineering Ceramics Division

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

Tuesday PM | October 19, 2021
A212 | Greater Columbus Convention Center

Session Chair: Surojit Gupta, University of North Dakota

2:00 PM

A Comparative Study of Vibration Signatures of FDM 3D Printers under Different States of Operation: *Roshan Mishra*¹; *Kunal Kate*¹; ¹University of Louisville

2:20 PM

A Study of the Effects of Printing Conditions on the Surface Texture for 3D Printed PLA Using Factorial Design: *Daniel Foust*¹; *Katherine Kinney*¹; *Elizabeth Zell*²; *Matt Caputo*³; ¹Penn State Shenango; ²Idaho National Laboratory; ³Younstown State University

2:40 PM

A Sustainable and Energy-efficient Electrochemical Technology for Dewatering of Cellulosic Nanomaterials: *Huong Le*¹; *Santosh Vijapur*¹; *Timothy D. Hall*¹; *E. Jennings Taylor*¹; *Maria Inman*¹; *Stephen Snyder*¹; *Kim Nelson*²; ¹Faraday Technology; ²AVAPCO LLC

3:00 PM

Low-cost Ceramic Composite Membranes for Ultrafiltration of Produced Water: *Christine Watson*¹; *Pankaj Sarin*¹; *V. V. Rohit Bukka*¹; ¹Oklahoma State University

ARTIFICIAL INTELLIGENCE

Accelerating Materials Science with Big Data and Machine Learning – Session II

Program Organizers: Huan Tran, Georgia Institute of Technology; Muratahan Aykol, Toyota Research Institute

Tuesday PM | October 19, 2021
A123 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM

Characterization of Microscopic Deformation of Materials Using Deep Learning Methods: *Kavindu Wijesinghe*¹; *Janith Wann*¹; *Natasha Banerjee*¹; *Sean Banerjee*¹; *Ajit Achuthan*¹; ¹Clarkson University

2:20 PM

Studying the Efficiency of Neural Networks in Modeling Fission Gas Release in UO₂ Nuclear Fuel: *Joshua McDonald*¹; *Md Ali Muntaha*¹; *Michael Tonks*¹; ¹University of Florida

2:40 PM

A Data-driven Simulator for High-throughput Prediction of Electromigration-mediated Damage in Polycrystalline Interconnects: *Peichen Wu*¹; *William Farmer*¹; *Kumar Ankit*¹; ¹Arizona State University

3:00 PM

Predicting Glass Behaviour from Optical Microscopy Images Using Interpretable Machine Learning: *Ankur Agrawal*¹; *Mohd Zakri*²; *Ravinder Bhattoo*³; *N. M. Anoop Krishnan*¹; ¹Indian Institute of Technology Delhi

3:20 PM Invited

Data Science as Bridge – Materials Characterization and Modeling
Maria Chan **Center for Nanoscale Materials, Argonne National Laboratory:** *Maria Chan*¹; ¹Argonne National Laboratory

SPECIAL TOPICS

ACerS Frontiers of Science and Society: The Rustum Roy Lecture

Sponsored by: ACerS

Tuesday PM | October 19, 2021
B130 | Greater Columbus Convention Center

1:00 PM Invited

Advanced Ceramics for Energy and Environmental Technology: *Alexander Michaelis*¹; ¹Fraunhofer Institute for Ceramic Technologies & Systems IKTS

ADDITIVE MANUFACTURING

Additive Manufacturing Modeling and Simulation: Microstructure, Mechanics, and Process — AM Modeling - Machine Learning and Artificial Intelligence

Sponsored by: TMS Computational Materials Science and Engineering Committee

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

Tuesday PM | October 19, 2021
A113 | Greater Columbus Convention Center

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

2:00 PM

Deep Learning Prediction of Stress Fields in Additively Manufactured Metals with Intricate Defect Networks: *Brendan Croom*¹; Michael Berkson¹; Bobby Mueller¹; Michael Presley¹; Steven Storck¹; ¹JHU Applied Physics Laboratory

2:20 PM

Deep Reinforcement Learning for Defect Mitigation in Laser Powder Bed Fusion: *Francis Ogoke*¹; Amir Barati Farimani¹; ¹Carnegie Mellon University

2:40 PM

Online Characterization of Melt Pool Dimensions Using Acoustic Monitoring and Deep Learning: *Evan Diewald*¹; Christian Gobert¹; ¹Carnegie Mellon University

3:00 PM

Machine Learning – Assisted Navigation in the Additive Manufacturing Design Space: *Maher Alghalayini*¹; Surya Kalidindi²; Chris Paredis¹; Fadi Abdeljawad¹; ¹Clemson University; ²Georgia Institute of Technology

3:20 PM

Process Consistency in Laser Powder Bed Fusion Observed Through Large Scale Single Bead Melt Pool Measurements: *Christian Gobert*¹; Evan Diewald¹; Jack Beuth¹; ¹Carnegie Mellon University

3:40 PM

Generation of Synthetic Ti64 Laser Powder Bed Fusion Microstructures: *Joseph Pauza*¹; Anthony Rollett¹; ¹Carnegie Mellon University

4:00 PM

Melt Pool Scale Modeling of Austenitic Stainless Steel Solidification Features in Laser Powder Bed Fusion: *Joseph Aroh*¹; P. Chris Pistorius¹; Anthony Rollett¹; ¹Carnegie Mellon University

4:20 PM

Preparation of Ceramic Green Body with Uniform Density through Living Properties of Cycloaliphatic Epoxy Resins in DLP(Digital Light Processing) 3D Printing of Ceramics: *Hye-Yeong Park*¹; SeungHwa Jeong¹; Haeun Kim¹; DongHyun Kim¹; Janghyeok Pyeon¹; SeungCheol Yang¹; Yeon-Gil Jung¹; ¹Changwon National University

ADDITIVE MANUFACTURING

Additive Manufacturing of Ceramic-based Materials: Process Development, Materials, Process Optimization and Applications — Session III: Laser Powder Bed Fusion and Novel AM Processes

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

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

Tuesday PM | October 19, 2021
A112 | Greater Columbus Convention Center

Session Chair: Xuan Song, University of Iowa

2:00 PM Invited

Towards Direct Additive Manufacturing of Ceramics by Selective Laser Flash Sintering: *Desiderio Kovar*¹; ¹University of Texas at Austin

2:30 PM

Mechanical Properties and Ionic Conductivity of Li₂O-AL₂O₃-TiO₂-P₂O₅ Prepared Using Laser Powder Bed Fusion: *Katherine Acord*¹; Alexander Dupuy¹; Olivia Donaldson¹; Xin Wang¹; Timothy Rupert¹; James Wu²; Qian Chen³; Julie Schoenung¹; ¹University of California, Irvine; ²NASA Glenn Research Center; ³Jet Propulsion Laboratory

2:50 PM Invited

Machine-learning-based Microstructure-property Prediction Enabled by High-throughput Ceramic Sample-array Preparation Using Integrated Additive/Subtractive Manufacturing: Xiao Geng¹; Jianan Tang¹; Dongsheng Li²; Yunfeng Shi³; Rajendra Bordia¹; Jianhua Tong¹; Xiao Hai¹; *Fei Peng*¹; ¹Clemson University; ²Advanced Manufacturing LLC; ³Rensselaer Polytechnic Institute

3:20 PM

Binder-free Additive Manufacturing of Ceramics Using Hydrothermal-assisted Jet Fusion: Fan Fei¹; Levi Kirby¹; *Xuan Song*¹; ¹University of Iowa

3:40 PM Break

4:00 PM

Direct-Ink-Writing and Cold-Sintering of ZnO Ceramics: *Russell Maier*¹; Igor Levin¹; Lawrence Friedman¹; Andrew Allen¹; Abhay Goyal¹; Nicos Martys¹; ¹National Institute of Standards and Technology

4:20 PM

Direct-writing by Micro Cold Spray of Yttria (Y2O3) Films: *Aidan Moyers*¹; Michael Becker¹; Desiderio Kovar¹; ¹The University of Texas at Austin

4:40 PM

Micro-cold Spray: Influence of SiC Nanoparticle Impact Angle on Deformation Behavior: *Derek Davies*¹; Michael Gammage²; Michael Becker¹; John Keto¹; Desiderio Kovar¹; ¹The University of Texas at Austin; ²CCDC DEVCOM Army Research Laboratory

5:00 PM

Structure and High Temperature Mechanics of Binder Jet 3D Printed Ceramic Compacts Treated with Reactive Precursors: *Lynnora Grant*¹; C. Higgs III¹; Zachary Cordero²; ¹Rice University; ²Massachusetts Institute of Technology

5:20 PM

Bulk Ferroelectric Metamaterial with Giant Piezoelectric Coefficients and Biomimetic Mechanical Property from Additive Manufacturing: *Jun Li*¹; ¹University of Wisconsin-Madison

ADDITIVE MANUFACTURING

Additive Manufacturing of High and Ultra-High Temperature Ceramics and Composites: Processing, Characterization and Testing – Laser-based Additive Manufacturing, New Methods, and Testing

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Corson Cramer, Oak Ridge National Laboratory; Greg Hilmas, Missouri University of Science and Technology; Lisa Rueschhoff, Air Force Research Laboratory

Tuesday PM | October 19, 2021

A111 | Greater Columbus Convention Center

Session Chair: Trevor Aguirre, Oak Ridge National Laboratory

2:00 PM Invited

Additive Slurry Drying as a Novel Method for Realizing Large Ceramic Components Using AM: *Johannes Homa*¹; Yannik Zieger¹; Martin Schwentenwein¹; ¹Lithoz GmbH

2:40 PM

Additive Manufacturing of ZrB₂-ZrSi₂ Composites Using an Electron Beam Melting (EBM) Process: *Cheryl Xu*¹; ¹North Carolina State University

3:00 PM

Deposition of UHTC Coatings on Refractory Substrates by Directed Energy Methods: *Zlatomir Apostolov*¹; Noam Eliaz²; Michael Cinibulk¹; ¹Air Force Research Laboratory; ²Tel Aviv University

3:20 PM Break

3:40 PM

Process Development and Optimization for The Laser Powder Bed Fusion of WC-Ni Cermets Composites: *Edgar Mendoza Jimenez*²; Baby Reesha-Jayan¹; Jack Beuth¹; ¹Carnegie Mellon University

4:00 PM

Investigation of Oxidation Behavior of ZrB₂-SiC Composites under Different Partial Pressures of Oxygen: *Rubia Hassan*¹; Rishabh Kundu²; Kantesh Blaani¹; ¹Indian Institute of Technology Kanpur; ²National Institute of Technology Rourkela

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Equipment, Instrumentation and In-Situ Process Monitoring – Process Monitoring and Modeling Methods

Sponsored by:

Program Organizers: Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University

Tuesday PM | October 19, 2021

A121 | Greater Columbus Convention Center

Session Chair: Sneha Prabha Narra, Carnegie Mellon University

2:00 PM Invited

Combined In-situ Monitoring of Meltpool, Powder Layer, and Part Topography for Laser Powder Bed Fusion (LPBF) Based Metal Additive Manufacturing: *Xiyun Zhao*¹; ¹University of Pittsburgh

2:40 PM

Melt Pool Level Flaw Detection in Laser Hot Wire Additive Manufacturing Using a Trained Convolutional Long Short Term Memory Autoencoder: *Brandon Abranovic*¹; Sulagna Sarkar¹; Jack Beuth¹; ¹Carnegie Mellon University

3:00 PM

Studying the Effect of Inert Gases on Thermal Behavior in Laser Powder Bed Fusion Using In Situ Monitoring and Similarity Analysis: *Sujana Chandrasekar*¹; Fred List²; Sabina Kumar¹; Keith Carver²; Jamie Coble¹; Vincent Paquit²; Sudarsanam Babu¹; ¹University of Tennessee; ²Oak Ridge National Laboratory

3:20 PM

Materials Characterization of Anomalies Identified Through In-situ Process Monitoring Data Analytics: *Jonathan Ciero*¹; Dylan Christman¹; Kyle Ryan²; Shuchi "SK" Khurana³; Thomas Spears²; Joy Gockel¹; ¹Wright State University; ²Open Additive, LLC; ³Addiguru

3:40 PM

Machine Learning for Identification of Local Heat Accumulation in Additive Manufacturing: *David Guirguis*¹; Syed Zia Uddin¹; Conrad Tucker¹; Jack Beuth¹; ¹Carnegie Mellon University

4:00 PM

Machine Learning Enabled In-situ Process Monitoring of Steel Directed Energy Deposition for Tuning of Microstructure and Meeting Geometric Tolerances: *Brett Diehl*¹; Clara Mock²; Lester Hitch²; Brandon McWilliams²; ¹Oak Ridge Associated Universities; ²CCDC Army Research Laboratory

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development – Ti-/Co-/Cr-/Cu-based Alloys

Sponsored by:

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

Tuesday PM | October 19, 2021
A115 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM

Designing a Beta Titanium Alloy with High Strength and Low Stiffness via Additive Manufacturing: Yi Dan Wang¹; Sravya Tekumalla²; Matteo Seita¹; ¹Nanyang Technological University

2:20 PM

The Significant Impact of Grain Refiner on Additively Manufactured TiAl Intermetallic Alloy: Danni Huang¹; Mingxing Zhang¹; Ming Yan²; ¹The University of Queensland; ²Southern University of Science and Technology

2:40 PM

Microstructure Optimization and Cracks Reduction in Cobalt Based Superalloys Processed by Directed Energy Deposition: Thibaut Froeliger¹; Louise Toulabi¹; Didier Locq¹; Edouard Chauvet²; Arnaud Ferrandez²; Rémy Dendievel³; ¹ONERA; ²Poly-Shape; ³Univ. Grenoble Alpes, CNRS, Grenoble INP, SIMaP

3:00 PM

Tensile Deformation Behavior of Additively Manufactured Co-Cr-Mo Lattice Structures: Bandar AlMangour¹; So-Yeon Park²; Kyu-Sik Kim²; Dariusz Grzesiak³; Kee-Ahn Lee²; ¹King Fahd University of Petroleum and Minerals; ²Inha University, Incheon; ³West Pomeranian University of Technology

3:20 PM

Microstructural Development of In-situ Alloyed CoCrFeMnNi High Entropy Alloy Fabricated via Laser Powder Bed Fusion: Peng Chen¹; Moataz Attallah¹; Ming Yan²; ¹University of Birmingham; ²Southern University of Science and Technology

3:40 PM Break

4:00 PM

Evaluation of In-situ Alloyed, Additively Manufactured GRCo-42: David Scannapieco¹; David Ellis²; John Lewandowski¹; ¹Case Western Reserve University; ²NASA Glenn Research Center

4:20 PM

Physical and Mechanical Properties of Aluminium Bronze - Stainless Steel Binary Alloy after Laser Metal Deposition: Konstantin Makarenko¹; Oleg Dubinin¹; Igor Shishkovsky¹; ¹Skolkovo Institute of Science and Technology

4:40 PM

Oxide Layer Delamination during Single Cu Microparticle Impacts at High-velocity: Ahmed Alade Tihamiyu¹; Yuchen Sun¹; Keith Nelson¹; Christopher Schuh¹; ¹Massachusetts Institute of Technology

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: ICME Gaps: Material Property and Validation Data to Support Certification – Data Applications: Material Property and Validation Data to Support Certification

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

Program Organizers: Joshua Fody, NASA Langley Research Center; Edward Glaessgen, NASA Langley Research Center; Christopher Lang, NASA Langley Research Center; Greta Lindwall, KTH Royal Institute of Technology; Michael Sansoucie, NASA Marshall Space Flight Center; Mark Stoudt, National Institute of Standards and Technology

Tuesday PM | October 19, 2021
A114 | Greater Columbus Convention Center

Session Chairs: Mark Stoudt, NIST; Seth Strayer, University of Pittsburgh; Ed Glaessgen, NASA

2:00 PM Keynote

Critical Issues and Gaps in Testing and Characterization Data for Computational Materials in Qualification and Certification of Additively Manufactured Metallic Materials: Michael Gorelik¹; Edward Glaessgen²; ¹Federal Aviation Administration; ²NASA Langley Research Center

2:40 PM Invited

Lessons Learned from Calibration and Validation of Process Models for Laser Powder Bed Fusion: Albert To¹; Florian Dugast¹; Seth Strayer¹; Wen Dong¹; Xuan Liang¹; Qian Chen²; Hai Tran¹; Shawn Hinnebusch¹; Xavier Jimenez¹; ¹University of Pittsburgh

3:10 PM

Transferability of Terrestrial Development of Metal Additive to Extraterrestrial Applications: Judy Schneider¹; ¹University of Alabama at Huntsville

3:30 PM Invited

ICME Gap Analysis for Materials Design and Process Optimization in Additive Manufacturing: Wei Xiong¹; ¹University of Pittsburgh

4:00 PM Invited

Enabling Quality Assurance by Completing the Process-Property-Performance Paradigm for Additive Manufacturing: Peter Collins¹; ¹Iowa State University

4:30 PM

An ICME Approach for Designing Appropriate Heat Treatments in Additively Manufactured Nitrogen Atomized 17-4PH Stainless Steel: James Zuback¹; Mark Stoudt¹; Daniel Gopman¹; Maureen Williams¹; Carelyn Campbell¹; ¹NIST

4:50 PM Question and Answer Period

ADDITIVE MANUFACTURING

Additive Manufacturing: Processing, Microstructure and Material Properties of Titanium-based Materials – Session III

Sponsored by: TMS Titanium Committee

Program Organizers: Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University; Peeyush Nandwana, Oak Ridge National Laboratory; Rongpei Shi, Lawrence Livermore National Laboratory

Tuesday PM | October 19, 2021
A120 | Greater Columbus Convention Center

Session Chair: Ulf Ackelid, Freemelt AB

2:00 PM

Examining the Role of Parent Grain Orientations on the Texture and Physical Properties of Additively Manufactured Ti 6-4 Alloys: *Michael Hjelmstad¹; Pat Trimby¹; ¹Oxford Instruments*

2:20 PM

High Throughput Characterization and Testing of EBM Ti-6Al-4V Parts to Understand Process-Structure-Property Linkages: *Avantika Gupta¹; Sriram Vijayan¹; Meiyue Shao¹; Rohan Casukhela¹; Joerg Jinschek¹; ¹The Ohio State University*

2:40 PM

Influence of Thermal Treatments on the Microstructure and Mechanical Properties of Ti-6Al-4V Built by Electron Beam Melting (EBM): *K.S.N. Sessa¹; Kenta Yamanaka¹; Kenta Aoyagi¹; Akihiko Chiba¹; ¹Institute for Materials Research, Tohoku University*

3:00 PM

On the Use of Defects as Microstructural Informants in EBM Ti-6Al-4V: *Katie O'Donnell¹; Maria Quintana¹; Matthew Kenney¹; Peter Collins¹; ¹Iowa State University*

3:20 PM

Surface Analysis and Microstructure Characterization of Electron Beam Melted (EBM) Ti-6Al-4V: *Jared Darius¹; Daniel Kenney¹; Marcos Lugo¹; ¹Liberty University*

3:40 PM

Use of Small Geometry Specimens to Determine the Fracture and Fatigue Crack Growth Properties of Additively Manufactured Ti-6Al-4V via DED Technique for Repair: *Sammy Ojo¹; Sulochana Shrestha¹; Joseph El Rassi¹; Manigandan Kannan¹; Gregory Morscher¹; Andrew Gyekenyesi¹; Onome Scott-Emuakpor¹; ¹University of Akron*

4:00 PM

Vibration Bending Fatigue Analysis of Additively Repaired Ti-6Al-4V Airfoil Blades: *Lucas Smith¹; Onome Scott-Emuakpor²; Joy Gockel³; Dino Celli²; Brian Runyon²; ¹Ohio Aerospace Institute; ²Air Force Research Laboratory; ³Wright State University*

4:20 PM

Influence of Foreign-Object Damage on the High Cycle Fatigue Properties of Direct Energy Deposition Repaired Ti-6Al-4V: *Sulochana Shrestha¹; Manigandan Kannan¹; Gregory Morscher¹; Andrew Gyekenyesi²; Onome Scott-Emuakpor³; ¹University of Akron; ²Ohio Aerospace Institute; ³Aerospace Systems Directorate*

ENERGY

Advanced Characterization of Materials for Nuclear, Radiation, and Extreme Environments – Thermomechanical Testing and In Situ Environments

Sponsored by: TMS Nuclear Materials Committee

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

Tuesday PM | October 19, 2021
A215 | Greater Columbus Convention Center

Session Chairs: Cody Dennett, Idaho National Laboratory; Khalid Hattar, Sandia National Laboratories

2:00 PM Invited

The Influence of Defects' Mechanical Stability on Microscale Plasticity and Failure: *Hi Vo¹; Peter Hosemann²; ¹University of California-Berkeley; ²University of California-Berkeley*

2:20 PM Invited

Development of In-situ Atomic Scale Defect Spectroscopy during Ion Irradiation: *Farida Selim¹; A Jones¹; Y Wang²; S Agarwal¹; H Kim²; P Hosemann³; B Uberuaga²; ¹Bowling Green State University; ²Los Alamos National Laboratory; ³University of California Berkeley*

2:40 PM

In-situ Radiological Containment Sample Environments: A review of Capability and Compromises at X-ray and Neutron Sources: *D. Travis Carver¹; ¹Los Alamos National Laboratory*

3:00 PM

Finding a Balance in FeCrAl Alloys: Utilizing Advanced Characterization, Testing, and Machine Learning to Balance Properties: *Andrew Hoffman¹; Vipul Gupta¹; Daniel Ruscitto¹; Bojun Feng¹; Sayan Ghosh¹; Raul Rebak¹; ¹GE Research*

3:20 PM Invited

Revealing Hidden Defects via Stored Energy Measurements of Radiation Damage: *Charles Hirst¹; Fredric Granberg²; Penghui Cao³; Scott Middlemas⁴; R. Scott Kemp¹; Ju Li¹; Kai Nordlund²; Michael Short¹; ¹Massachusetts Institute of Technology; ²University of Helsinki; ³University of California, Irvine; ⁴Idaho National Laboratory*

3:40 PM Invited

Moduli Measurements of Fuels and Cladding Materials via Resonant Ultrasound Spectroscopy: *Tarik Saleh¹; Mathew Hayne¹; Scarlett Widgeon Paisner¹; Joshua White¹; ¹Los Alamos National Laboratory*

4:00 PM

In Situ Transient Grating Spectroscopy for Rapid Radiation Tolerance Characterization: *Benjamin Dacus¹; ¹Massachusetts Institute of Technology*

MATERIALS-ENVIRONMENT INTERACTIONS

**Advanced Materials for Harsh Environments —
Session II**

Sponsored by: ACerS Electronics Division

Program Organizers: Navin Manjooran, Solve Technology and Research, Inc.; Gary Pickrell, Virginia Tech

Tuesday PM | October 19, 2021
A223 | Greater Columbus Convention Center

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

2:00 PM Introductory Comments

3:00 PM

Robust Heat Resistant Superhydrophobic Coatings Fabricated by Functionalized Nanoparticles: *Anna Schmidt-Verma*¹; Thomas Fischer¹; Sanjay Mathur¹; ¹Universität zu Köln

3:20 PM

Finite Element Corrosion Model and Experimental Characterization of Austenitic Stainless-Steel Engine Valves Oxidized in CO₂ at 700 °C: *Iman Abdallah*¹; Louis Bailly-Salins¹; Xueyang Wu²; Robert Ullberg²; Taeho Kim¹; Mohamed ElBakshwan¹; Mark Carroll³; John Perepezko¹; Wen Jiang⁴; Simon Phillpot²; Michael Tonks²; Adrien Couet¹; ¹UW-Madison; ²University of Florida; ³Tenneco; ⁴Idaho National Laboratory (INL)

3:40 PM

Microstructure and Mechanical Properties of Friction Stir Welded Haynes 282: *Mageshwari Komarasamy*¹; Christopher Smith¹; Jens Darsell¹; Woongjo Choi¹; Saamyadeep Jana¹; Anand Kulkarni²; Kyle Stoodt²; Glenn Grant¹; ¹Pacific Northwest National Laboratory; ²Siemens Corporation

4:00 PM

Novel Non-aqueous Gelcasting of UHTCs for Advanced Complex Shape Manufacturing: *Julia Goyer*¹; Carolina Tallon¹; ¹Virginia Tech

4:20 PM

High Temperature Mixed Deposit and Oxidation Degradation of a Coated and Uncoated Ni-based Superalloys: *Matthew Kovalchuk*¹; Brian Gleeson¹; ¹University of Pittsburgh

4:40 PM

Features of the Formation of the Structure and Properties of Corrosion-resistant Steel during Heat Treatment: *Valeriy Mishchenko*¹; Olha Bolsun¹; Svitlana Mudra¹; Sergy Sheyko¹; ¹Zaporizhzhia National University

5:00 PM Concluding Comments

ELECTRONIC AND MAGNETIC MATERIALS

Advances in Dielectric Materials and Electronic Devices — Modeling

Sponsored by: ACerS Electronics Division

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

Tuesday PM | October 19, 2021
B235 | Greater Columbus Convention Center

Session Chair: Ruyan Guo, University of Texas at San Antonio

2:00 PM

Investigation of Electroplated 3D Printed Antennas: *Muneer Barnawi*¹; Trenton Cersoli¹; Kerry Johnson¹; Edward Burden¹; Eric MacDonald¹; Pedro Cortes¹; ¹Youngstown State University

2:20 PM

NSMM Modeling of Materials, Including Dipole Engineered Novel Relaxors: *Steven Tidrow*¹; ¹Alfred University

2:40 PM

Sensitivity Analysis on the Application of Direct Piezo-electric Effect Using the Finite-element Extended Complex Variable Method: *Carlos Acosta*¹; Jose de los Santos Guerra²; Ruyan Guo³; Amar Bhalla³; ¹Inghieri Solutions LLC; ²Universidade Federal de Uberlandia; ³University of Texas at San Antonio

3:00 PM

Topological Insulator Design for Quantum Computers Targeting BSTS Single Crystal Fabrication: *Husain Alnaser*, ¹

3:20 PM Invited

Neural Networks, Graph Approach and Fractals Application on Electronics Parameters Determination and Prediction in Perovskite Ceramics: *Vojislav Mitic*¹; Ivana Radovic²; Branislav Randjelovic³; Srdjan Ribar⁴; Cristine Serpa⁵; Ivana Ilic⁶; Aleksandar Stajcic⁷; Vesna Paunovic⁸; Branislav Vlahovic⁸; ¹University Nis; ²University of Belgrade, Department of Physical Chemistry, 'VINCA' Institute of Nuclear Sciences – National Institute of the Republic of Serbia; ³University of Nis; University of K. Mitrovica, Faculty of Teachers Education; ⁴University of Belgrade; ⁵ISEL - Instituto Superior de Engenharia de Lisboa do Instituto Politécnico de Lisboa; ⁶University of Nis; ⁷University of Belgrade, Center of Microelectronic Technologies, Institute of Chemistry, Technology and Metallurgy – National Institute of the Republic of Serbia; ⁸North Carolina Central University (NCCU)



IRON AND STEEL (FERROUS ALLOYS)

Advances in Ferrous Metallurgy – Developments in Testing and Processing

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

Program Organizers: Daniel Baker, General Motors Corporation; Emmanuel De Moor, Colorado School of Mines; Kishlay Mishra, Nucor Castrip Arkansas LLC; Lijia Zhao, ArcelorMittal Global R&D

Tuesday PM | October 19, 2021
A210 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM

Effect of Alloying Content on Fractional Softening Behavior and Microstructural Evolution During Double-twist Torsion Testing of Microalloyed Steels: *Trevor Ballard*¹; Emmanuel De Moor¹; ¹Advanced Steel Processing and Products Research Center, Colorado School of Mines

2:20 PM

The Effect of Energy-power Parameters of Hot Rolling on Structure and Properties of Low Alloyed Steels: *Valeriy Mishchenko*¹; Sergiy Sheyko¹; Vadim Shalomeev¹; ¹Zaporizhzhia National University

2:40 PM

Reducing the Effects of Texture on Phase Fraction Measurement of Retained Austenite Using X-ray Diffraction: *Michael Cox*¹; Adam Creuziger²; Kip Findley¹; ¹Colorado School of Mines; ²National Institute of Standards and Technology

3:00 PM

3D Non-destructive Characterization of Texture Evolution in Electrical Steels with Lab-based Diffraction Contrast Tomography: *Jun Sun*¹; Florian Bachmann¹; Jette Oddershede¹; Hrishikesh Bale²; William Harris³; Erik Lauridsen¹; ¹Xnovo Technology; ²Carl Zeiss X-ray Microscopy; ³Carl Zeiss Microscopy, LLC

3:20 PM

Hole Expansion Performance of Three High Strength Steels: Observation of Room Temperature Strain Ageing Phenomena: *Rachael Stewart*¹; ¹Cleveland-Cliffs Steel Corporation

NANOMATERIALS

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials – Nanocomposites & 2D Materials

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

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

Tuesday PM | October 19, 2021
B240/241 | Greater Columbus Convention Center

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

2:00 PM Invited

Supercrystalline Nanocomposites: Boosting and Controlling the Mechanical Behavior of These New Multifunctional Materials: *Diletta Giuntini*¹; Buesra Bor²; Alexander Plunkett²; Berta Domenech²; Gerold Schneider²; ¹Eindhoven University of Technology; ²Hamburg University of Technology

2:40 PM

Integration of 2D Nanomaterials and Functional Polymers for Unconventional 3D Fabrication: *Weinan Xu*¹; Pratik Kasbe¹; Shan Liu¹; ¹University of Akron

3:00 PM Invited

2d Crystalline Donors and Acceptors: Modulation Doping in Atomically-thin Heterostructures: *Erik Henriksen*¹; ¹Washington University in St. Louis

3:30 PM Invited

Effects of Layer Thickness and Constituent Material on the Wear and Corrosion Resistance of Nanostructured Multilayers: *Wenbo Wang*¹; *Wenjun Cai*¹; ¹Virginia Polytechnic Institute and State University

4:00 PM

Thickness-dependent Piezoelectric Property of Two-dimensional Zinc Oxide Nanosheets with Unit Cell Resolution: *Corey Carlos*¹; Yizhan Wang¹; Jingyu Wang¹; Jun Li¹; Xudong Wang¹; ¹University of Wisconsin - Madison

4:20 PM

From Mono- to Multilayers: Adjustable Layer Thickness of Hexagonal Boron Nitride Thin Films: *Rene Weißing*¹; Mattias Grosch¹; Thomas Fischer¹; Sanjay Mathur¹; ¹University of Cologne / Institute of Inorganic Chemistry

PROCESSING AND MANUFACTURING

Development of Light Weight Alloys and Composites – Microstructure and Properties: Composites III

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

Tuesday PM | October 19, 2021

A214 | Greater Columbus Convention Center

Session Chairs: Tanjore Jayaraman, College of Engineering and Computer Science, University of Michigan-Dearborn; Ramasis Goswami, NRL

2:00 PM

Development of Bulk Nanocrystalline Aluminum Materials with Enhanced Mechanical Properties: *Pradeep Menezes*¹; Sridhar Lanka¹; Raven Maccione¹; Bhaskar Vadlamani¹; Manoranjan Misra¹; ¹University of Nevada Reno

2:30 PM

Tensile Properties of Epoxy Composites Reinforced with Continuous Mixed Natural Fibers: *Frederico Margem*¹; Niander Aguiar¹; Fernanda Rangel¹; João Dornelas¹; ¹Uniredentor

3:00 PM

Effect of Copper Contents on Corrosion of High Performance ACMZ Cast Aluminum Alloys: *Jiheon Jun*¹; Amit Shyam¹; J. Allen Haynes¹; Yi Feng Su¹; ¹Oak Ridge National Laboratory

3:30 PM

Prediction of Wear Characteristics of Aluminium-Bronze Clay (AlB-Clay) Composite Using Fitted Linear Regression Technique: *Ademola Agbeleye*¹; Adeyanju Sosimi¹; Olusegun Oyekeye¹; ¹University of Lagos

4:00 PM

The Effect of Multiple Age Treatment on Mechanical Properties of 7075 Al Alloy: *AHM Esfakur Rahman*¹; Issam Abu-Mahfouz¹; Amit Banerjee¹; ¹Pennsylvania State University Harrisburg

IRON AND STEEL (FERROUS ALLOYS)

Developments in Plate and Line Pipe Steels – Developments in Plate and Line Pipe Steels

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

Program Organizers: Daniel Baker, General Motors Corporation; Ashish Singh, Nucor Steel Arkansas; Pello Uranga, CEIT and TECNUN (University of Navarra)

Tuesday PM | October 19, 2021

A211 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM

Modified Charpy V-notch Testing of Wind Tower Steels: *Keith Taylor*¹; Laura Dawson²; Matthew Werner¹; ¹SSAB Americas; ²Virginia Polytechnic Institute and State University

2:20 PM

Optimization of Strength and Toughness for Hot-forged Bainitic Medium Carbon Steel using RSM: *Iman El Mahallawi*¹; Tamer Mohamed²; Abdelwahab Hussein²; Ahmed Shash³; Taha Mattar⁴; ¹Cairo University/ Adjunct The British University in Egypt; ²The British University in Egypt; ³Cairo University/ seconded German University in Cairo; ⁴Central Metallurgical Research and Development Institute (CMRDI)

2:40 PM

The Formation of Structure and Properties of Low-alloyed Steels in Hot Deformation Process: *Valeriy Mishchenko*¹; Sergiy Sheyko¹; Vadim Shalomeev²; ¹Zaporizhzhia National University; ²National University "Zaporizhzhia Polytechnic"

ENERGY

Energy Materials for Sustainable Development – Storage Batteries I

Sponsored by: ACerS Energy Materials and Systems Division

Program Organizers: Armin Feldhoff, Leibniz University Hannover; Kyle Brinkman, Clemson University; Krista Carlson, University of Utah; Eva Hemmer, University of Ottawa; Nikola Kanas, Norwegian University of Science and Technology; Kjell Wiik, Norwegian University of Science and Technology; Lei Zuo, Virginia Tech; Stephanie Lee, Stevens Institute of Technology; Muhammad Hajji, Stevens Institute of Technology; Mohammad Haik, Stevens Institute of Technology

Tuesday PM | October 19, 2021

A216 | Greater Columbus Convention Center

Session Chairs: Jeffrey Fergus, Auburn University; Monica Ferraris, Politecnico di Torino

2:00 PM Invited

Challenges and Opportunities of Oxide-based Cathodes for Aqueous Zn-ion Batteries: *Kevin Huang*¹; ¹University of South Carolina

2:30 PM Invited

Non-hydrolytic Sol-gel Chemistry to Functional Hybrid Materials: *Nicola Pinna*¹; ¹Humboldt-Universitaet Zu Berlin

3:00 PM

Dense NASICON-type LAGP Ceramics with 2D MoS₂ Interlayer for All-solid-state Lithium Metal Batteries: *Seung Jin Baek*¹; Eunho Cha¹; Dong Gyu Kim¹; Do-Kyung Kim¹; ¹Korea Advanced Institute of Science & Technology

3:20 PM

Reducing the Sintering Temperature of Ceramic Solid-State Batteries with the Cold Sintering Process: *Zane Grady*¹; Joo-Hwan Seo¹; Arnaud Ndayishimiye¹; Clive Randall¹; ¹The Pennsylvania State University

3:40 PM

In-situ Precipitation Processing of High-ionic Conductivity LTP/PEO Solid Electrolyte for Lithium-ion Batteries: *Guangyu Wang*¹; John Kieffer¹; ¹University of Michigan

4:00 PM Invited

Nanoscale Geometry and Point Defects in Supercapacitor Electrodes: *Scott Mixture*¹; ¹Alfred University

4:20 PM

Doping Study of Nanoscale Lithium Cobalt Oxide Surfaces and Grain Boundaries: *Spencer Dahl*¹; Blas Uberuaga²; Ricardo Castro¹;

¹University of California, Davis; ²Los Alamos National Laboratory

CERAMIC AND GLASS MATERIALS

Engineering Ceramics: Microstructure-Property-Performance Relations and Applications — Engineering Ceramics

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Young-Wook Kim, University of Seoul; Hua-Tay Lin, Guangdong University of Technology; Junichi Tatami, Yokohama National University

Tuesday PM | October 19, 2021

B233 | Greater Columbus Convention Center

Session Chairs: Ivar Reimanis, Colorado School of Mines; Eugene Medvedovski, Endurance Technologies Inc.

2:00 PM Invited

Tracking the State of Transition Elements Ni and Fe in Oxide

Microstructures: Michael Knight¹; *Ivar Reimanis*²; Dylan Jennings¹; Sandrine Ricote¹; Wolfgang Rheinheimer²; ¹Colorado School of Mines; ²Julich Research Center

2:30 PM Invited

Advanced Ceramics and Coatings for Mineral and Oil & Gas Processing: *Eugene Medvedovski*¹; ¹Endurance Technologies Inc

3:00 PM

Mechanical Properties of Nanocrystalline Ceramics: *Heonjune Ryou*¹; Kevin Anderson¹; John Drazin²; Edward Gorzkowski¹; Boris Feygelson¹; James Wollmershauser¹; ¹U.S. Naval Research Laboratory; ²Washington State University

CERAMIC AND GLASS MATERIALS

Glasses and Optical Materials: Current Issues and Functional Applications — ACerS GOMD Alfred R. Cooper Award Session

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

Program Organizers: Jessica Rimsza, Sandia National Laboratories; Delia Brauer, Otto Schott Institute of Materials Research

Tuesday PM | October 19, 2021

B231 | Greater Columbus Convention Center

Session Chair: Steve Martin, Iowa State University

2:00 PM Introductory Comments

2:10 PM Invited

Cooper Distinguished Lecture: Structure and Ion Dynamics in Glass: *Efstratios Kamitsos*¹; ¹Theoretical and Physical Chemistry Institute, National Hellenic Research Foundation

2:50 PM Question and Answer Period/Presentation of Award

3:00 PM Invited

Cooper Scholar: Study of the Anomalous Viscosity in Invert NaPSO Glass for the Development of Thin Solid-state Electrolytes: *Jacob Lovi*¹; ¹Iowa State University

3:20 PM Question and Answer Period/Presentation of Award

3:30 PM Invited

Cooper Scholar 1st Runner-up: Relationship between Number of Non-bridging Oxygens and Ionic Conductivity Discontinuity in xLi₂O-(1-x) B₂O₃, with x = 0.67: *Graham Beckler*¹; ¹Coe College

3:50 PM Question and Answer Period/Presentation of Award

4:00 PM Invited

Cooper Scholar 2nd Runner-up: Solution-processed Telluride Glass for Far-infrared Applications: *Lauren Moghimi*¹; ¹University of Arizona

4:20 PM Question and Answer Period/Presentation of Award

FUNDAMENTALS AND CHARACTERIZATION

Grain Boundaries, Interfaces, and Surfaces in Ceramics: Fundamental Structure—Property—Performance Relationships — Field Assisted Processes and Mechanics

Sponsored by: ACerS Basic Science Division, ACerS Electronics Division

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

Tuesday PM | October 19, 2021

C161A/161B | Greater Columbus Convention Center

Session Chairs: Xufei Fang, TU Darmstadt; Timofey Frolov, Lawrence Livermore National Laboratory

2:00 PM Invited

Triggering the Catalytic Activity of SrTiO₃-based Ceramics by Electric-field-assisted Treatments: *Simone Mascotto*¹; ¹University of Hamburg

2:40 PM Invited

An Investigation of the Role of Interfaces in Flash Sintering: *Richard Todd*¹; Yasuhiro Kubota¹; Jaspreet Singh¹; Michael Moody¹; ¹University of Oxford

3:20 PM

On the Role of Plasticity in High Heating Rate Sintering: Does Flash Sintering Involve Plastic Flow?: *Rheinheimer Wolfgang*¹; Xin Phuah²; Lukas Porz³; Michael Scherer³; Jaehun Cho²; Haiyan Wang²; ¹Forschungszentrum Jülich; ²Purdue University; ³TU Darmstadt

3:40 PM

Hall-petch Behavior in Stoichiometric and Al-rich Nanocrystalline ZnAl₂O₄: *Luis Sotelo Martin*¹; Ricardo Castro¹; ¹University of California, Davis

4:00 PM

Surface and Fracture Energy in Layered Ceramics: *Oriol Gavaldà-Díaz*²; Katharina Marquardt¹; Eduardo Saiz²; Finn Giuliani¹; ¹Imperial College London

FUNDAMENTALS AND CHARACTERIZATION

High Entropy Materials: Concentrated Solid Solutions, Intermetallics, Ceramics, Functional Materials and Beyond II – Processing and Properties I

Sponsored by: TMS Alloy Phases Committee, TMS Mechanical Behavior of Materials Committee

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

Tuesday PM | October 19, 2021

C171 | Greater Columbus Convention Center

Session Chairs: Oleg Senkov, Air Force Research Laboratory; Michael Mills, Ohio State University

2:00 PM Invited

Microstructure and Mechanical Properties of Hf-27Ta and Hf-21Ta-21X (X is Nb, Mo or W) Alloys: *Oleg Senkov*¹; Tinuade Daboiku¹; Todd Butler¹; Michael Titus²; Noah Philips³; Eric Payton¹; ¹Air Force Research Laboratory; ²Purdue University; ³ATI Specialty Alloys and Components

2:20 PM Invited

Insights into the Deformation Processes of a Refractory Complex Concentrated Alloy Exhibiting B2-type Order: Jean-Philippe Couzine¹; Milan Heczko²; Veronika Mazanova²; Oleg Senkov³; Rajarshi Banerjee⁴; Maryam Ghazisaeidi⁵; *Michael Mills*⁶; ¹Université Paris Est & Center for Electron Microscopy and Analysis, The Ohio State University; ²Center for Electron Microscopy and Analysis, The Ohio State University; ³Materials and Manufacturing Directorate, Air Force Research Laboratory, Wright-Patterson AFB; ⁴University of North Texas; ⁵The Ohio State University; ⁶Center for Electron Microscopy and Analysis, The Ohio State University

2:40 PM

Deformation Mechanisms of Nanocrystalline Refractory BCC High Entropy Alloys: *Chandra Veer Singh*¹; Abu Anand¹; ¹University of Toronto

3:00 PM Invited

Deformation Behavior in the Refractory High-entropy Alloys: *Chanho Lee*¹; George Kim²; Yi Chou³; Michael Gao⁴; Ke An⁵; Gian Song⁶; Yi-Chia Chou³; Wei Chen²; Saryu Fensin¹; Peter Liaw⁷; ¹Los Alamos National Laboratory; ²Illinois Institute of Technology; ³National Chiao Tung University; ⁴National Energy Technology Laboratory/Leidos Research Support Team; ⁵Oak Ridge National Laboratory; ⁶Kongju National University; ⁷University of Tennessee

3:20 PM

A Low-temperature Chemical/Powder Metallurgical Route for Generating Fine-grained Refractory Complex Concentrated Alloys: *Kenneth Sandhage*¹; Sona Avetian¹; Mario Caccia¹; Michael Titus¹; ¹Purdue University

3:40 PM

Deformation of Refractory Multi-principal Element Alloy Nanopillars: *Yanqing Su*¹; ¹Utah State University

4:00 PM Invited

Creep Performance of Various Single Phase FCC CoCrFeNi Family of High Entropy Alloys: Kyle Rozman¹; Martin Detrois¹; Paul Jablonski¹; *Michael Gao*¹; Jeffery Hawk¹; ¹National Energy Technology Laboratory

4:20 PM

The Cyclic Plastic Strain Localization and the Fatigue Crack Initiation in Equiatomic CrCoNi Medium-entropy Alloy: *Veronika Mazanova*¹; Milan Heczko¹; Connor Slone²; Shih Mulaine¹; Easo P. George³; Maryam Ghazisaeidi¹; Jaroslav Polak⁴; Michael J. Mills¹; ¹The Ohio State University; ²Exponent; ³Oak Ridge National Laboratory; ⁴Institute of Physics of Materials CAS

4:40 PM

The Cyclic Plastic Response and the Fatigue Induced Microstructural Changes of Equiatomic CrCoNi Medium-entropy Alloy: *Milan Heczko*¹; Veronika Mazanova¹; Connor Slone²; Ivo Kubena³; Mulaine Shih¹; Tomáš Kruml³; Easo George⁴; Maryam Ghazisaeidi¹; Jaroslav Polak³; Michael Mills¹; ¹The Ohio State University; ²Exponent; ³Institute of Physics of Materials CAS; ⁴Oak Ridge National Laboratory

5:00 PM Invited

Discontinuous Precipitation Leading to Nano-rod Intermetallic Precipitates in High Entropy Alloys Results in an Excellent Strength-ductility Combination: *Sriswaroop Dasari*¹; Abhishek Sharma¹; Bharat Gwalani¹; Yao-Jen Chang²; Abhinav Jagetia¹; Vishal Soni¹; Stephane Gorsse³; An-Chou Yeh²; Rajarshi Banerjee¹; ¹University Of North Texas; ²National Tsing Hua University; ³University of Bordeaux

5:20 PM

Deformation Mechanisms in the Medium Entropy Alloy CoCrNi: Effects of Lattice Distortion and Chemical Short-range Order: *Wurong Jian*¹; Shuozhi Xu¹; Yanqing Su²; Irene Beyerlein¹; ¹University of California, Santa Barbara; ²Utah State University

FUNDAMENTALS AND CHARACTERIZATION

Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales III – Session III

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

Tuesday PM | October 19, 2021

C160A/160B | Greater Columbus Convention Center

Session Chairs: Bjorn Clausen, Los Alamos National Laboratory; Ben Morrow, Los Alamos National Laboratory

2:00 PM Invited

In-situ Scattering Experiments Facilitating Development and Validation of Constitutive and Process Models: *Bjorn Clausen*¹; Donald Brown¹; D. Travis Carver¹; ¹Los Alamos National Laboratory

2:40 PM

Effect of Twin-twin Junctions on Slip-twin Interactions and Twin-twin Intersections: *Jiaxiang Wang*¹; M.Arul Kumar²; Krishna Yaddanapudi³; Subhash Mahajan³; Irene Beyerlein¹; ¹University of California, Santa Barbara; ²Los Alamos National Laboratory; ³University of California, Davis

3:00 PM

The Interactions between Basal-precipitates and Propagating Twin Tips in AZ91: *Brandon Leu*¹; Mariyappan Kumar²; Irene Beyerlein²; ¹University of California-Santa Barbara; ²Los Alamos National Lab

3:20 PM Invited

Applications of an Efficient Elasto-visco-plastic Self-consistent Polycrystal Model Interfaced with a Finite Element Framework: Youngung Jeong¹; *Carlos Tome*²; Bohye Jeon¹; Mooyeong Joo¹; ¹Changwon National University; ²Los Alamos National Laboratory

4:00 PM

Fluctuations in the Generalized Planar Fault Energy Landscape in Concentrated FCC Solid Solutions: *Matthew Daly*¹; Ritesh Jagatramka¹; Chu Wang¹; ¹University of Illinois-Chicago

4:20 PM

First-principles Study of the Effect of Al and Hf Impurities on Co₃W Antiphase Boundary Energies: *Chiraag Nataraj*¹; Ruoshi Sun²; Christopher Woodward³; Axel van de Walle¹; ¹Brown University; ²University of Virginia; ³Air Force Research Lab

4:40 PM

Thermodynamic Modeling of the Ga-Ni System Using the Third Generation Gibbs Free Energy Function for Pure Elements: *Liangyan Hao*¹; Chen Shen²; Hongbin Zhang²; Wei Xiong¹; ¹University of Pittsburgh; ²Technische Universität of Darmstadt

5:00 PM Invited

Co-development of Experiment and Simulation to Observe Dynamic Behavior in Metals in Complex Loading Environments: *Benjamin Morrow*¹; Virginia Euser¹; Clarissa Yablinsky¹; Nicholas Denissen¹; ¹Los Alamos National Laboratory

CERAMIC AND GLASS MATERIALS

Manufacturing and Processing of Advanced Ceramic Materials — Processing of Oxide Ceramics

Sponsored by: ACerS Manufacturing Division

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

Tuesday PM | October 19, 2021

B234 | Greater Columbus Convention Center

Session Chairs: Yiquan Wu, Alfred University; Fei Peng, Clemson University

2:00 PM Invited

Ultra-fast Laser Sintering of Alumina and the Microstructure Prediction Based on Machine Learning: Xiao Geng¹; Jianan Tang¹; Dongsheng Li²; Yunfeng Shi³; Rajendra Bordia¹; Jianhua Tong¹; Hai Xiao¹; *Fei Peng*¹; ¹Clemson University; ²Advanced Manufacturing LLC; ³Rensselaer Polytechnic Institute

2:40 PM Invited

Effects of Sintering Additive and Oxygen Partial Pressure on Solid-state Single-crystal Growth of YAG Ceramics: *Iva Milisavljevic*¹; Guangran Zhang¹; Yiquan Wu¹; ¹Alfred University

3:20 PM

A Novel Room-temperature Synthesis Technique for Producing High-density Electroceramic Composites: *Evan Smith*¹; Rick Ubic¹; ¹Boise State University

3:40 PM

Development Calcium Doped La(Cr_{0.2}Co_{0.2}Fe_{0.2}Mn_{0.2}Ni_{0.2})O₃ High Entropy Perovskite Oxides: *Sai Ram Gajjala*¹; Rasit Koc¹; ¹Southern Illinois University

4:00 PM

Manufacturing of Structurally Flat and Chemically Pure Large-scale Ba-based Proton Conducting Electrochemical Cells: Dong Ding¹; Wei Wu¹; *Wuxiang Feng*²; Haixia Li³; Congrui Jin²; Frank Chen³; ¹Idaho National Laboratory; ²University of Nebraska-Lincoln; ³University of South Carolina

4:20 PM

Unique Technological Advantages and Progress towards Manufacturing Scale-up: *Sun Hwi Bang*¹; Clive Randall¹; ¹Pennsylvania State University

4:40 PM

Mechanical Properties of La₂Zr₂O₇/ZrO₂ Composites Prepared by Coating of ZrO₂ Sol: *Bong-Gu Kim*¹; Hyun-Hee Choi¹; GuanLin Lyu¹; JangHyeok Pyeon¹; Jung-Hun Son¹; SeungCheol Yang¹; Yeon-Gill Jung¹; ¹Changwon national university

NANOMATERIALS

Mechanistic Insights into the Synergistic Properties of Nanocomposites — Mechanistic Insights into the Synergistic Properties of Nanocomposites

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

Program Organizers: Vuk Uskokovic, University of California; Dragan Uskokovic, Institute of Technical Sciences of the Serbian Academy of Sciences and Arts

Tuesday PM | October 19, 2021

B242/243 | Greater Columbus Convention Center

Session Chair: Vuk Uskokovic, TardigradeNano LLC

2:00 PM

Processing and Mechanical Properties of 3YSZ-Al₂O₃ Core-Shell Nanocomposite Ceramics: *Kevin Anderson*¹; Benjamin Greenberg¹; James Wollmershauser¹; Boris Feigelson¹; ¹U.S. Naval Research Laboratory

BIOMATERIALS

Next Generation Biomaterials — Session III

Sponsored by: ACerS Bioceramics Division, TMS Biomaterials Committee

Program Organizers: Roger Narayan, University of North Carolina; Min Wang, University of Hong Kong; Shawn Allan, Lithoz America LLC

Tuesday PM | October 19, 2021
A224 | Greater Columbus Convention Center

Session Chairs: Eva Krakor, University of Cologne; Anna Bull, University of Tennessee Space Institute; Begoña Ferrari, Instituto de Cerámica y Vidrio del CSIC

2:00 PM Invited
A Breath Test for COVID-19: *Pelagia Gouma*¹; ¹The Ohio State University

2:20 PM Invited
Reducing Intraoperative Fogging of Laparoscopes with Diamond-like Carbon Thin Films: *Anna Bull*¹; Christopher Haycock²; Chad Bond³; Russell Leonard³; Todd Giorgio²; Jacqueline Johnson³; ¹University of Tennessee Space Institute; ²Vanderbilt University; ³UT Space Institute

2:40 PM
Investigation of Biodegradable Mg-Li Quaternary Alloys with Improved Uniform Degradation: *Chiamaka Okafor*¹; Norman Munroe²; ¹Florida International University

3:00 PM
Impression Behavior of Highly Resilient Polyethylene Glycol/polydimethylsiloxane Hydrogels: *Annaliza Perez-Torres*¹; Fuqian Yang¹; Ipek Sacligil²; Gregory Tew²; ¹University of Kentucky; ²University of Massachusetts, Amherst

3:20 PM Invited
Combating Plastic Waste Accumulation through Innovative Biodegradable Superabsorbent Polymers Used in Disposable Consumer Products: *Jeffrey Bates*¹; ¹University of Utah

3:40 PM
Additive Manufacturing of PLA-based Composites Using a Colloidal Feedstock: Biodegradable and Permanent Scaffolds in Medical Applications: *Begoña Ferrari*¹; Ana Ferrandez-Montero¹; Alvaro Eguiluz²; Antonio Javier Sanchez-Herencia¹; ¹Instituto de Cerámica y Vidrio, CSIC

4:00 PM
Enzymes Immobilized on Nanocarriers for the Degradation of Synthetic Polymers: *Eva Krakor*¹; Sanjay Mathur¹; Isabel Gessner¹; Michael Wilhelm¹; ¹University of Cologne

4:20 PM
Comparative Evaluation of Nutrient Composition in Cow Horn waste and Some Commercially Available Fish Feed as Supplement in Aquaculture: *Ita Uwidia*¹; Osalodion Uwidia¹; ¹University of Benin

CERAMIC AND GLASS MATERIALS

Phase Transformations in Ceramics: Science and Applications — Computation and Predictions

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

Program Organizers: Scott McCormack, University of California, Davis; Pankaj Sarin, Oklahoma State University; Sanjay V. Khare, University of Toledo; Waltraud Kriven, University of Illinois at Urbana-Champaign

Tuesday PM | October 19, 2021
B230 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM Invited
Prediction of Diffusion-less Phase Transformations: *Randall Hay*¹; Emmanuel Boakye²; Pavel Mogilevsky²; Thomas Key²; ¹U.S. Air Force Research Laboratory

2:30 PM
Order-disorder Relationships in Zirconium Carbides: *Theresa Davey*¹; Ying Chen¹; ¹Tohoku University

3:00 PM
Effects of S Doping on the Mechanical and Opto-electronic Properties of Cu₂CdGeSe₄: Victor Barone¹; Bishal Dumre¹; Randall Ellingson¹; Sanjay Khare¹; ¹The University of Toledo

3:20 PM
Computation of Fracture, Twinning, and Amorphization in Anisotropic Single and Polycrystalline Real-structured B₄C Using Phase Field Approaches in the Finite Element Method: *Benhour Amirian*¹; Bilen Abali²; Mali Moshtaghion³; Jonathan Ligda⁴; Debjoy Mallick⁵; James Hogan¹; ¹University of Alberta; ²Technische Universität Berlin; ³Spanish Ministry of Science and Innovation; ⁴DEVCOM Army Research Laboratory; ⁵Amy Research Laboratory

3:40 PM
Nanostructured Spinel Ferrite Ceramics: Structure and Magnetic Properties: *Suraj Mullurkara*¹; Y. Wang¹; A. Talaat¹; W. Xiong¹; J.K. Lee¹; P.R. Ohodnicki¹; ¹University of Pittsburgh

4:00 PM
Containerless Processing and Characterization of Potential Host Crystals for Photorefractive Devices: *Elizabeth Hodges*¹; Michael SanSoucie²; Robert Hyers¹; ¹University of Massachusetts-Amherst; ²NASA

MODELING

Phonon Properties of Materials: Modeling and Experimentation — Session I

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee, TMS: Energy Conversion and Storage Committee

Program Organizers: Murali Gopal Muraleedharan, Oak Ridge National Laboratory; Zhe Cheng, University of Illinois at Urbana-Champaign; Kiarash Gordiz, Massachusetts Institute of Technology

Tuesday PM | October 19, 2021
A122 | Greater Columbus Convention Center

Session Chair: Murali Gopal Muraleedharan, Oak Ridge National Laboratory

2:00 PM Introductory Comments

2:05 PM Invited
Materials Informatics for Phonon Transport Properties: *Junichiro Shiomi*¹; ¹The University of Tokyo

2:35 PM Invited
Transfer Learning for Phonon and Thermal Property Predictions: Zeyu Liu¹; *Tengfei Luo*¹; ¹University of Notre Dame

3:05 PM Break

3:25 PM Invited
High-temperature Heat Transport in Anharmonic Systems at the Nanoscale: *Keivan Esfarjani*¹; ¹University of Virginia

3:55 PM Invited
Phonons and Twisting Symmetries in Non-symmorphic Materials: *Lucas Lindsay*¹; ¹Oak Ridge National Laboratory

BIOMATERIALS

Porous Materials for Biomedical Applications — Session I

Sponsored by: ACerS Bioceramics Division

Program Organizers: Usman Liaqat, National University of Sciences and Technology; Chuanbin Mao, University of Oklahoma; Mingying Yang, Zhejiang University

Tuesday PM | October 19, 2021
A222 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM
Fabrication of a Sensitive and Fast Response Electrochemical Sensor Based on Ag/In₂O₃ Composite Derived from MIL-68 for Glucose Sensing: *Dooa Arief*¹; Zakir Hussain¹; ¹School of Chemical and Materials Engineering (SCME)

2:40 PM

Non-enzymatic Glucose Sensing Using AG/MOFs Decorated MWCNTs: *Elizbit*¹; *Usman Liaqat*¹; Zakir Hussain¹; Mutawara Baig¹; ¹National University of Sciences and Technology

2:20 PM

Corrosion of Mechanically Milled, Annealed, and Biocompatible Magnesium Alloys for Osteopathic Tissue Regeneration: *Adam Rutherford*¹; Mark Atwater¹; Julian Tse Lop Kun¹; ¹Liberty University

3:00 PM

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

3:20 PM

Synthesis and Characterization of Porous Diopside Scaffold Synthesized Using Rice Husk as a Space Holder Material for Orthopedic Application: *Mayank Yadav*¹; Vaibhav Pandey¹; Jyoti Kumari¹; Kalyani Mohanta¹; Vinay Singh¹; ¹Indian Institute of Technology (BHU), Varanasi

PROCESSING AND MANUFACTURING

Powder Metallurgical Components in High Performance Applications — Session I

Sponsored by: TMS Powder Materials Committee

Program Organizers: Peng Cao, The University of Auckland; Hanadi Salem, American University in Cairo; Paul Prichard, Kennametal Inc.; Matthew Osborne, Global Advanced Metals; James Paramore, US Army Research Laboratory

Tuesday PM | October 19, 2021
A213 | Greater Columbus Convention Center

Session Chair: James Paramore, United States Army Research Laboratory

2:00 PM

Development of Resistance Based Sintering for Metal Powders: *Jerry Gould*¹; James Cruz¹; ¹Edison Welding Inst

2:20 PM

Thermodynamic Model for Predicting the Embodied Energy of Titanium Alloys Produced by Powder Metallurgy: *James Paramore*¹; Brady Butler¹; Matthew Dunstan¹; ¹US Army Research Laboratory

2:40 PM

Dispersing Tailored Nanoparticles through Powder Metallurgy Consolidation: *Bahrum Rocky*¹; Rofiques Salehin²; Christopher Weinberger²; Steve Daniewicz¹; Gregory Thompson¹; ¹University of Alabama; ²Colorado State University

FUNDAMENTALS AND CHARACTERIZATION

Probing Defect Properties and Behavior under Mechanical Deformation and Extreme Conditions – Defect-mediated Mechanical Performance and Damage Tolerance

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

Program Organizers: Zhe Fan, Lamar University; Tianyi Chen, Oregon State University; Shijun Zhao, City University of Hong Kong; Mitra Taheri, Johns Hopkins University; Yury Osetskiy, Oak Ridge National Laboratory

Tuesday PM | October 19, 2021
C170 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM Invited

Designing Metal and Amorphous Ceramic Composites for Extreme Conditions: *Jian Wang*¹; Binqiang Wei¹; ¹University of Nebraska-Lincoln

2:30 PM

Estimating the Strengthening Parameters for Irradiated Alloys Using Atomic Scale Dislocation Dynamics: *Osetskiy Yury*¹; ¹Oak Ridge National Laboratory

2:50 PM

Investigating Deformation Mechanisms in Ni-based Superalloys with Compact "L" Coprecipitates: *Semanti Mukhopadhyay*¹; Hariharan Sriram¹; Richard DiDomizio²; Andrew Detor²; Robert Hayes³; Gopal B. Viswanathan¹; Yunzhi Wang¹; Michael Mills¹; ¹The Ohio State University; ²GE Global Research Center; ³Metals Technology Inc.

3:10 PM

Survey of Defect Absorption Effects in Grain Boundaries: *Larissa Woryk*¹; David Srolovitz²; Jian Han²; ¹University of Pennsylvania; ²City University of Hong Kong

3:30 PM

Influence of Microstructural Variation on Spall Failure of Al7085: *Dung-Yi Wu*¹; Chengyun Miao¹; Christopher DiMarco¹; K.T. Ramesh¹; Todd C. Hufnagel¹; ¹Johns Hopkins University

3:50 PM Break

4:10 PM Invited

Irradiation Defects and Strain-induced Martensitic Transformations: *Janelle Wharry*¹; Chao Yang¹; Yangyang Zhao¹; Keyou Mao²; Yash Pachaury²; Anter El-Azab¹; ¹Purdue University; ²Oak Ridge National Laboratory

4:40 PM

Defect Evolution and Nanomechanical Properties of Neutron Irradiated Austenitic Steels: *Tianyi Chen*¹; Mack Cullison¹; ¹Oregon State University

5:00 PM

Local Phase Transformation Strengthening in Ni-based Superalloys: *Ashton Egan*¹; Fei Xue²; Timothy Smith³; Longsheng Feng¹; Shakthipriya Baskar¹; Emmanuelle Marquis²; Yunzhi Wang¹; Maryam Ghazisaeidi¹; Michael Mills¹; ¹Ohio State University; ²University of Michigan; ³NASA Glenn Research Center

5:20 PM

Phase-field Modeling of Electromigration-mediated Void Migration and Coalescence under Mechanical and Current-stressing in Interconnect Lines: *William Farmer*¹; Sree Vemulapalli¹; Kumar Ankit¹; ¹Arizona State University

SPECIAL TOPICS

ACerS Robert B. Sosman Award Symposium: Bridging the Gap between Atomistic and Continuum Approaches to Interface Science – Sosman I

Sponsored by: ACerS Basic Science Division

Program Organizer: John Blendell, Purdue University

Wednesday AM | October 20, 2021
B130 | Greater Columbus Convention Center

Session Chair: John Blendell, Purdue University

8:00 AM Introductory Comments

8:10 AM Invited

Stressing Surfaces and Interfaces to Change Microstructure: *Klaus van Benthem*¹; ¹University of California, Davis

8:40 AM Invited

Atomic Structure of Two Phases of a Cu Tilt Grain Boundary Resolved by Scanning Transmission Electron Microscopy: *Gerhard Dehm*¹; Thorsten Meiners¹; Jazmin Duarte¹; Timofey Frolov²; Christian Liebscher¹; ¹MPI Eisenforschung; ²Lawrence Livermore National Laboratory

9:10 AM Invited

Interface Analysis in the Scanning Transmission Electron Microscope: *David McComb*¹; ¹Ohio State University

9:40 AM Break

10:00 AM Invited

Charged Interfaces: Equilibrium, Phase Transitions, and Microstructural Evolution: *KSN Vikrant*¹; *Edwin Garcia*¹; ¹Purdue University

10:30 AM Invited

Microstructure Evolution in Thin Film Yttria-doped Barium Zirconate: *Dylan Jennings*¹; *Ivar Reimanis*¹; Sandrine Ricote¹; Jose Santiso²; ¹Colorado School of Mines; ²Catalan Institute of Nanoscience and Nanotechnology, ICN2

11:00 AM Invited

FCC Films on c-sapphire: Why Do Single Elements and High Entropy Alloys Adopt the Same Orientation Relationships?: *Dominique Chatain*¹; ¹CNRS

11:30 AM Invited

Combining Atomistic to Thermodynamic Modeling with Machine Learning and Advanced Microscopy to Understand General Grain Boundaries and Interfaces: *Jian Luo*¹; ¹University of California, San Diego



ADDITIVE MANUFACTURING

Additive Manufacturing Modeling and Simulation: Microstructure, Mechanics, and Process — AM Modeling - Advanced Materials

Sponsored by: TMS Computational Materials Science and Engineering Committee

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

**Wednesday AM | October 20, 2021
A113 | Greater Columbus Convention Center**

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

8:00 AM

Process Maps and Models For Highly Filled Polymers In Powder Fused Filament Fabrication (PF3) 3D Printing: *Kameswara Pavan Ajarapu*¹; Roshan Mishra¹; Ji-Hae Kim¹; Kunal Kate¹; ¹University of Louisville

8:20 AM

The Interplay between Constituent Material and Architectural Disorder in Bioinspired Honeycomb Structures: *Sahar Choukir*¹; Chandra Veer Singh¹; ¹University of Toronto

8:40 AM

Modeling Collapse Behavior in Large-scale Thermoset Additive Manufacturing: *Stian Romberg*¹; Chris Hershey²; John Lindahl²; Abrian Abir³; Michael DeVinney⁴; Chad Duty¹; Vlastimil Kunc²; Brett Compton³; ¹University of Tennessee, Knoxville; Oak Ridge National Laboratory; ²Oak Ridge National Laboratory; ³University of Tennessee, Knoxville; ⁴

9:00 AM

Gas Adsorption Analysis in 3D Printed Metal Organic Frameworks: *Tejesh Dube*¹; Hye-Yeong Park²; Yeon-Gil Jung²; Jing Zhang¹; ¹Indiana University – Purdue University Indianapolis; ²Changwon National University

9:20 AM

Interfacial Properties in 3D Printed Stainless Steel Coated with Epoxy: *Xuehui Yang*¹; Sugrim Sagar¹; Tejesh Dube¹; Alan Jones¹; Jing Zhang¹; ¹Indiana University – Purdue University Indianapolis

ADDITIVE MANUFACTURING

Additive Manufacturing of High and Ultra-High Temperature Ceramics and Composites: Processing, Characterization and Testing — Polymer-derived Ceramics (PDCs) and Novel Processing Methods

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Corson Cramer, Oak Ridge National Laboratory; Greg Hilmas, Missouri University of Science and Technology; Lisa Rueschhoff, Air Force Research Laboratory

**Wednesday AM | October 20, 2021
A111 | Greater Columbus Convention Center**

Session Chair: Ben Lamm, Oak Ridge National Laboratory

8:00 AM

Advanced Polymer-derived (Ultra)-high-temperature Resistant Ceramics and Ceramic Nanocomposites for Additive Manufacturing: *Ralf Riedel*¹; ¹TU Darmstadt

8:30 AM

Innovative Route for the 3D Printing of Hybrid Silicon Carbide/Carbon Fiber Nanocomposites: *Saja Al-ajrash*

8:50 AM

High Temperature Properties of Polymer-derived Ceramic Matrix Composites Fabricated via Additive Manufacturing: *Tobias Schaedler*¹; Kayleigh Porter²; Phuong Bui¹; Ekaterina Stonkevitch¹; Mark O'Masta¹; ¹HRL Laboratories LLC

9:20 AM Break

9:40 AM

Additive Manufacturing (AM) of Polymer-derived Ceramic Composites by Extrusion in a Thixotropic Bath: *Majid Minary*¹; ¹University of Texas at Dallas

10:00 AM

Strategies for Printing Continuous Fibers and Post-processing for Ceramic Matrix Composites (CMCs): *Corson Cramer*¹; Vipin Kumar¹; Ryan Duncan¹; David Mitchell¹; Vlastimil Kunc¹; ¹Oak Ridge National Laboratory

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Equipment, Instrumentation and In-Situ Process Monitoring — Imaging and Sensing Methods

Sponsored by:

Program Organizers: Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University

Wednesday AM | October 20, 2021
A121 | Greater Columbus Convention Center

Session Chair: Ulf Ackelid, Freemelt AB

8:00 AM Invited

Dynamics of Laser-powder-metal Interactions in L-PBF Captured by High Speed Imaging: *Manyalibo Matthews*¹; ¹Lawrence Livermore National Laboratory

8:40 AM

High-speed Observations and Quantification of Spatter in Laser Powder Bed Fusion: *Christian Gobert*¹; Jack Beuth¹; Evan Diewald¹; ¹Carnegie Mellon University

9:00 AM

Advancing Measurement Science of Laser Powder Bed Fusion (LPBF) Process Monitoring Applying Thermal Imaging: *Guadalupe Quirarte*¹; Syed Zia Uddin¹; ¹Carnegie Mellon University

9:20 AM

Plenoptic Imaging for In-situ PIV and Melt Pool Monitoring in Laser Directed Energy Deposition: *James Haley*¹; Thomas Feldhausen¹; Vincent Paquit¹; ¹Oak Ridge National Laboratory

9:40 AM

Quantification of Melt Pool Variability for L-PBF Additive Manufacturing of AF-9628 Steel: *David Guirguis*¹; Conrad Tucker¹; Jack Beuth¹; ¹Carnegie Mellon University

10:00 AM Break

10:20 AM Invited

Innovative and Practical Approaches to Laser Powder Bed Fusion Sensing and Process Enhancement: *John Middendorf*¹; ¹Open Additive

11:00 AM

In-situ Sensing in Processing Parameter Development for Bismuth Telluride Bulk Part Fabrication Using Laser Powder Bed Fusion: *Kelly Rickert*¹; Joy Gockel¹; Sabrina D'Alesandro¹; Saniya LeBlanc²; Tanvi Banerjee³; Alexander Groeger¹; Joe Walker³; John Middendorf³; ¹Wright State University; ²George Washington University; ³Open Additive

11:20 AM

Laser Powder Bed Fusion of Tall Thin Walled Structures: Dimensional Inaccuracy Due to Local Buckling, and In Situ Infrared Imaging for Early Failure Detection: *Syed Zia Uddin*¹; Jack Beuth¹; ¹Carnegie Mellon University

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Other Miscellaneous Materials/Alloys

Sponsored by:

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

Wednesday AM | October 20, 2021
A115 | Greater Columbus Convention Center

Session Chair: To Be Announced

8:00 AM

3D Printing of the Half-Heusler Alloy Nb_{1-x}CoSb, A Case for Ternary Thermoelectric Materials: *Muath Almaliki*¹; David Dunand¹; G. Jeffrey Snyder¹; ¹Northwestern University

8:20 AM

Critical Crystallization Properties of an Industrial-Grade Zr-based Metallic Glass-Forming Alloy Used in Additive Manufacturing Measured with Fast Scanning Calorimetry: *Danielle Kimmel*¹; *Juergen Schawe*²; ¹Mettler Toledo

8:40 AM

Defect Free Pure Molybdenum Processed through Electron Beam Melting: *Patxi Fernandez-Zelaia*¹; Chris Ledford¹; Elizabeth Ellis²; Quinn Campbell¹; Andres Marquez Rossy¹; Michael Kirka¹; Donovan Leonard¹; ¹Oak Ridge National Laboratory; ²Y-12 National Security Complex

9:00 AM

Development of Pure Magnesium Stochastic Foams by Additive Manufacturing: *Bandar AlMangour*¹; Yu-Jin Hwang²; Kyu-Sik Kim³; Dariusz Grzesiak⁴; Kee-Ahn Lee³; ¹King Fahd University of Petroleum and Minerals; ²Inha University, Incheon ; ³Inha University, Incheon; ⁴West Pomeranian University of Technology

9:20 AM

Fabrication of Pure Tungsten Using Electron Beam Powder Bed Fusion: *Christopher Ledford*¹; Michael Kirka¹; Patxi Fernandez-Zelaia¹; Julio Ortega Rojas¹; Andres Marquez Rossy¹; Yutai Kato¹; ¹Oak Ridge National Laboratory

9:40 AM Break

10:00 AM

Understanding the Microstructure and Magnetic Properties of the L-PBF Nd-Fe-B Permanent Magnetic Material: *Julan Wu*¹; ¹University of Nottingham

10:20 AM

Design of Wire-arc Additive Manufacturing of Functionally Graded Alloy from P91 Steel to Inconel 740H Superalloy Using High-throughput Method: *Xin Wang*¹; Soumya Sridar¹; Michael Klecka²; Wei Xiong¹; ¹University of Pittsburgh; ²Raytheon Technologies Research Center

10:40 AM

Effect of Heat Treatment on Stainless Steel 420 And Inconel 718 Multi-material Structures Fabricated Laser Directed Energy Deposition: *Beytullah Aydogan*¹; Himanshu Sahasrabudhe¹; ¹Michigan State University

11:00 AM

Process-property Relationships of Additively Manufactured Multi-material NiZnCu-ferrite Soft Magnetic Composites: *Caleb Andrews*¹; Li Ma²; Ryan Carter²; Ian McCue²; Joseph Sopcisak²; Mitra Taheri¹; Johns Hopkins University; ²The Johns Hopkins University Applied Physics Laboratory

ADDITIVE MANUFACTURING

Additive Manufacturing: Large-Scale Metal Additive Manufacturing – Advanced Manufacturing Process

Program Organizers: Yousub Lee, Oak Ridge National Laboratory; Antonio Ramirez, Ohio State University; Yashwanth Bandari, Meltio Inc.; Duckbong Kim, Tennessee Technological University; Wei Zhang, Ohio State University

Wednesday AM | October 20, 2021

A114 | Greater Columbus Convention Center

Session Chairs: Duckbong Kim, Tennessee Technological University; Yashwanth Bandari, Meltio3d

8:00 AM

Manufacturing Large Scale Metal Parts via AM – Current and Future Directions: *Andrzej Nycz*¹; ¹Oak Ridge National Laboratory

8:40 AM

A Proposed Sustainable Framework to Assess Wire Arc Additive Manufacturing Efficiency in Processing of Different Mechanical Components: *Mohamed Fawzy Mohamed*¹; Ahmed Salem¹; Ahmed Elskatay¹; Hanadi Salem¹; ¹The American University in Cairo

9:00 AM

An Investigation of the Properties of Stamping Tool Inserts Manufactured Using a Novel Wire Deposition Additive Manufacturing Process: *Joy Forsmark*¹; Alan Gillard¹; Sal Barriga²; Adam LaDelpha²; Henry Merrow²; Brian McCabe²; ¹Ford Motor Company; ²Digital Alloys

9:20 AM

Development of 3D Metal Printing for Toolmaking: *Felix Gemse*¹; Danny Lubosch²; Olaf Penning³; Edgar Fries⁴; Enrico Danz⁵; ¹Günter-Köhler-Institute GmbH; ²Gefertec GmbH; ³Hermann Fliess & Co. GmbH; ⁴Fraunhofer Institute for Production Systems and Design Technology IPK; ⁵SWM Werkzeugfabrik GmbH & Co.KG

9:40 AM

Hybrid Metal Manufacturing of Large Freeform Geometries: *Bradley Jared*¹; William Hamel¹; Tony Schmitz¹; Joshua Penney¹; Leah Jacobs¹; Aaron Cornelius¹; Jake Dvorak¹; Michael Buckley¹; Greg Corson¹; Eduardo Miramontes¹; ¹University of Tennessee, Knoxville

10:00 AM Break

10:20 AM

Industrialization of Blown-powder Directed Energy Deposition of Titanium Alloys for Aerospace Applications: *Nicholas Krutz*¹; Michael Andersen¹; Chris Williams¹; Laura Dial²; Chelsea Edge²; ¹GE Aviation; ²GE Research

10:40 AM

Novel Thermal Management Technique for Additive Manufacturing: *Robert Griffiths*¹; David Garcia²; Hang Yu¹; ¹Virginia Polytechnic Institute; ²Pacific Northwest National Laboratory

11:00 AM

High Deposition Rate Wire Arc Directed Energy Deposition of 316L for Pressure Retaining Components in Nuclear Applications: *Luc Hagen*¹; Stephen Tate²; Zhenzhen Yu¹; Jonah Klemm-Toole¹; ¹Colorado School of Mines; ²EPRI

ADDITIVE MANUFACTURING

Additive Manufacturing: Mechanisms and Mitigation of Aqueous Corrosion and High-temperature Oxidation – Corrosion Assessment of Additively Manufactured Parts I

Program Organizers: Amir Mostafaei, Illinois Institute of Technology; Yashar Behnamian, University of Alberta; Bryan Webler, Carnegie Mellon University

Wednesday AM | October 20, 2021

A112 | Greater Columbus Convention Center

Session Chairs: Amir Mostafaei, Illinois Institute of Technology; Bryan Webler, Carnegie Mellon University

8:00 AM

Effect of Post Processing on the Corrosion Behavior of Selective Laser Melted Nickel Based Super Alloy in Acidic Environment: *Mythreyi O V*¹; R Jayaganthan¹; B K Nagesha²; ¹IIT Madras; ²ISRO, GTRE

8:30 AM

SCC Behavior of IN 718 in BWR Conditions: *Amanda Leong*¹; Jinsuo Zhang¹; George Pabis²; ¹Virginia Tech; ²Nova Tech

9:00 AM

Environmentally Assisted Cracking of AM718 Wire Arc Additively Deposited AM 718 – Role of Processing and Microstructure: *Ramgopal Thodla*¹; Badri Narayanan²; Hannah Sims²; Ben Schaeffer²; ¹DNV; ²Lincoln Electric

9:30 AM

Performance Evaluation of Oxidized Inconel 625 Made by Laser-assisted Additive Manufacturing: *Grace De Leon Nope*¹; Juan Alvarado-Orozco²; Guofeng Wang¹; Brian Gleeson¹; ¹University of Pittsburgh; ²CIDESI

10:00 AM Break

10:20 AM

Fabrication and High-temperature Degradation Behavior of NiCoCrAl Alloy Using Laser Additive Manufacturing: *Aaron O'Neil*¹; Himanshu Sahasrabudhe¹; ¹Michigan State University

10:50 AM

Assessing the Printability and Oxidation Resistance of AM Built Al_xCoCrFeNi with Directed Energy Deposition: *Jose Lolí*¹; Bryan Webler¹; Maarten De Boer¹; Jack Beuth¹; ¹Carnegie Mellon University

ADDITIVE MANUFACTURING

Additive Manufacturing: Processing, Microstructure and Material Properties of Titanium-based Materials – Session IV

Sponsored by: TMS Titanium Committee

Program Organizers: Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University; Peeyush Nandwana, Oak Ridge National Laboratory; Rongpei Shi, Lawrence Livermore National Laboratory

Wednesday AM | October 20, 2021
A120 | Greater Columbus Convention Center

Session Chair: To Be Announced

8:00 AM

Additive Manufacturing of Shape Memory NiTi Alloys with High Building Rates: *Jianing Zhu*¹; Evgenii Borisov²; Eduard Farber²; Marcel Hermans²; Vera Popovich¹; ¹Delft University of Technology; ²Peter the Great Saint-Petersburg Polytechnic University

8:20 AM

Melt Pool Characterization and Numerical Simulation in Selective Laser Melting of NiTi Powder: *Stanislav Chernyshikhin*¹; Igor Shishkovsky¹; ¹Skolkovo Institute of Science and Technology

8:40 AM

Additive Manufacturing of Titanium – Boron Carbide In Situ Composites: *Mohan Sai Kiran Nartu*¹; Srinivas Aditya Mantri¹; Thomas Scharf¹; Brandon Mc Williams²; Kyu Cho²; Narendra Dahotre¹; Rajarshi Banerjee¹; ¹University of North Texas; ²CCDC U.S. Army Research Laboratory

9:00 AM

Comparison of Mechanical Properties for Ti-Ta Vertically and Horizontally Graded Interfaces in Laser Powder Bed Fusion: *Cherish Lesko*¹; Joseph Walker²; John Middendorf²; Joy Gockel¹; ¹Wright State University; ²Arctos Technology Solutions

9:20 AM

Multi-scale Strain, Microstructure, and Solidification Behavior of Ti-5553 Architected Lattice Melt Pools: *Caleb Andrews*¹; Maria Strantz²; Tae Wook Heo²; Nicholas Calta²; Rongpei Shi²; Manyalibo Matthews²; Mitra Taheri¹; ¹Johns Hopkins University; ²Lawrence Livermore National Laboratory

9:40 AM

Effects of Process Parameters on Fracture and Fatigue of High Deposition Rate Laser Hot Wire Processed CP-Ti Grade 2: *Hannah Sims*¹; John Lewandowski¹; ¹Case Western Reserve University

10:00 AM Break

10:20 AM

Mechanical Behavior of Additive Manufacture of Titanium Alloys Produced with HDH Powder: *Fernando Landgraf*¹; Josué Farah²; Claudio Schoen¹; Jamil Guimarães Jr¹; Willy Moraes¹; Mario Bocalini Jr³; Railson Falcão³; Marcelo Moreira³; Henrique Oliveira⁴; Victor Chastinet⁴; ¹University of Sao Paulo; ²SENAI -SP; ³IPT- Instituto de Pesquisas Tecnológicas; ⁴ISI-Laser-SC

10:40 AM

Mechanical Properties as a Function of Material State for Additively Manufactured Ti-5Al-5V-5Mo-3Cr: *Andrew Temple*¹; Madison Harrington¹; Peter Collins¹; ¹Iowa State University

11:00 AM

Microstructural Instability in Additively Manufactured Gamma-TiAl Alloy: *Johnson Jacob*¹; Darren Fraser¹; Stefan Gulizia¹; ¹CSIRO

11:20 AM

Performance of Titanium Alloy Lattice Structures in Quasi-static and High Strain Rate Environments: *John Carpenter*¹; Ben Brown²; Nathan Johnson³; Don Brown¹; David Jones¹; Borys Drach⁴; Jonathan Pegues⁵; Manyalibo Matthews⁶; ¹Los Alamos National Laboratory; ²Kansas City National Security Campus; ³SLAC National Accelerator Laboratory; ⁴New Mexico State University; ⁵Sandia National Laboratories; ⁶Lawrence Livermore National Laboratory

ENERGY

Advanced Characterization of Materials for Nuclear, Radiation, and Extreme Environments – Data Intensive and Correlative Methods

Sponsored by: TMS Nuclear Materials Committee

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

Wednesday AM | October 20, 2021
A215 | Greater Columbus Convention Center

Session Chairs: Janelle Wharry, Purdue University; Cheng Sun, Idaho National Laboratory

8:00 AM Invited

Correlated Scattering and Microscopy Techniques for In-situ and Ex-situ Rapid Clustering Determination in Activated Materials: *Kevin Field*¹; Samuel Briggs²; Caleb Massey³; Dalong Zhang⁴; Kenneth Littrell³; ¹University of Michigan; ²Oregon State University; ³Oak Ridge National Laboratory; ⁴Pacific Northwest National Laboratory

8:20 AM Invited

Imaging Nanostructural Heterogeneities and Vacancy Supersaturation in Ni-20Cr after Corrosion in Molten Salt: *Yang Yang*¹; Weiyue Zhou²; Shen Yin³; Sarah Wang⁴; Qin Yu³; Matthew J. Olszta⁵; Daniel K. Schreiber⁵; Jim Ciston³; Robert O. Ritchie³; Mark Asta³; Ju Li²; Michael P. Short²; Andrew M. Minor³; ¹Pennsylvania State University; ²MIT; ³Lawrence Berkeley National Laboratory; ⁴UCB; ⁵PNNL

8:40 AM

Multi-scale Characterization of Silicon Carbide Oxidation: *Adam Bratten*¹; Haiming Wen¹; Visharad Jalan¹; ¹Missouri University of Science and Technology

9:00 AM

Europa Lander Contamination Control: Materials Testing and Numerical Simulation in a Flight Like Environment: *Anthony Wong*¹; ¹Jet Propulsion Lab, California Institute of Technology

9:20 AM Break

9:40 AM Invited

Utilizing a Dynamic Segmentation Convolutional Neural Network for Microstructure Analysis: *Stephen Toller¹; Luke Scime¹; Kurt Terrani¹*;

¹Oak Ridge National Laboratory

10:00 AM

A Closer Observation to the Precipitation Behavior of Proton Irradiated Dual Phase 308L Weldment Filler Materials: *Zhen Li¹; Xun Zhan¹; Weicheng Zhong¹; Benjamin Sutton²; Brent Heuser¹*; ¹University of Illinois at Urbana-Champaign; ²Electric Power Research Institute

10:20 AM

Deep Learning Pipeline for Cavity Segmentation in Transmission Electron Microscopy: *Chun Yin Wong¹; Xing Wang²; Zhe Fan³; Karren More⁴; Sergei Kalinin⁴; Maxim Ziatdinov⁴*; ¹University of Tennessee, Knoxville; ²The Pennsylvania State University, Oak Ridge National Laboratory; ³Lamar University, Oak Ridge National Laboratory; ⁴Oak Ridge National Laboratory

MATERIALS-ENVIRONMENT INTERACTIONS

Advanced Materials for Harsh Environments – Session III

Sponsored by: ACerS Electronics Division

Program Organizers: Navin Manjooran, Solve Technology and Research, Inc.; Gary Pickrell, Virginia Tech

Wednesday AM | October 20, 2021

A223 | Greater Columbus Convention Center

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

8:00 AM Introductory Comments

9:00 AM

Towards a Fundamental Understanding of Surface Interactions and Degradation Mechanism in Bio-feedstock-induced Corrosion: *Soheil Daryadel¹; Deborah Liu¹; Hyosung An¹; Samyukta Shrivastav¹; Siddhesh Shevade²; Tom Eason²; Qian Chen¹; Daniel Krogstad¹; Jessica Krogstad¹*; ¹University of Illinois at Urbana-Champaign; ²BP

9:20 AM

Electrical, Microstructural and Thermomechanical Properties of Doped-LaCrO₃ Ceramics for High Temperature Electronics and Sensing Applications: *Javier Mena¹; Edward Sabolsky¹; Katarzyna Sabolsky¹; Konstantinos Sierros¹; Kavin Sivaneri Varadharajan Idhaim¹*; ¹West Virginia University

9:40 AM

High-temperature Stability and Phase Transformations of Titanium Carbide (Ti₃C₂T_x) MXene: *Srinivasa Kartik Neman¹; Brian Wyatt¹; Bowen Zhang¹; Babak Anasori¹*; ¹Integrated Nanosystems Development Institute (INDI), IUPUI

10:00 AM Break

10:20 AM

Oxidation Behavior of IN100 Superalloy between 840 - 1120 K: *Sebastian Lech¹; Agnieszka Wusatowska-Sarnek²; Adam Kruk¹*; ¹AGH University of Science and Technology; ²Pratt & Whitney

10:40 AM

Corrosion Behaviors of Carbon Steels and Cr-bearing Steels in Supercritical CO₂: *Kaiyang Li¹; Yimin Zeng¹*; ¹CanmetMATERIALS, Natural Resources Canada

11:00 AM Concluding Comments

PROCESSING AND MANUFACTURING

Advances in Surface Engineering – Advances in Surface Engineering

Sponsored by: TMS Surface Engineering Committee

Program Organizers: Rajeswaran Radhakrishnan, Faraday Technology Inc; Brian Skinn, Faraday Technology, Inc.; Timothy Hall, Faraday Technology Inc; Michael Roach, University of Mississippi Medical Center; Sandip Harimkar, Oklahoma State University; Tushar Borkar, Cleveland State University; Rajeev Gupta, North Carolina State University

Wednesday AM | October 20, 2021

A214 | Greater Columbus Convention Center

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

8:00 AM

Ageing of TPU-Enamel Hybrid Structures Made by Material Extrusion under Static Load in Humid Environment: *Hartwig Schneider¹; Sven Hartwig¹; Klaus Dilger¹*; ¹TU Braunschweig

8:20 AM

Engineering of Wearproof Surface by Management of Mechanical-Chemical Phenomena in Zone Contact: *Volodymyr Tsyganov¹; Richard Mokhnach¹*; ¹"Zaporizhzhia Polytechnic" National University

8:40 AM

Erosion Resistant and Passively Emitting Composite Coatings for Space Charge Mitigation Applications: *Rajeswaran Radhakrishnan¹; Danny Liu¹; Timothy Hall¹; Maria Inman¹; Earl Jennings Taylor¹; Stephen Snyder¹; Matthew Robertson²; Trace Taylor²; JR Dennison²*; ¹Faraday Technology Inc; ²Utah State University

9:00 AM

Methodological Principles of Engineering Surface Stainless Steel at Treatment Cutting with a Polymer: *Volodymyr Tsyganov¹; Sergey Sheyko²*; ¹"Zaporizhzhia Polytechnic" National University; ²Zaporizhzhia National University

9:20 AM

Non-linear Through-hole Fabrication by Electrochemical Machining: *Andrew Moran¹; Brian Skinn¹; Tim Hall¹; Stephen Snyder¹; Michael Horonzy²; Victor Alderman¹*; ¹Faraday Technology Inc.; ²Republic Anode Fabricators

CERAMIC AND GLASS MATERIALS

Ceramics and Glasses Modeling by Simulations and Machine Learning – Session I

Sponsored by: ACerS Glass & Optical Materials Division

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

Wednesday AM | October 20, 2021
B231 | Greater Columbus Convention Center

Session Chairs: Mathieu Bauchy, UCLA; Peter Kroll, UT Arlington; Anoop Krishnan, IIT Delhi

8:00 AM

Information Extraction Pipeline for Glasses: An NLP Based Approach: Vineeth Venugopal¹; Sourav Sahoo¹; Mohd Zaki¹; Nitya Nand Gosvami¹; N. M. Anoop Krishnan¹; ¹IIT DELHI

8:20 AM

A Machine-learning Based Hierarchical Framework to Discover Novel Scintillator Chemistries: Anjana Talapatra¹; Blas Uberuaga¹; Christopher Stanek¹; Ghanshyam Pilia¹; ¹Los Alamos National Laboratory

8:40 AM

Kinetic Monte Carlo Simulation of Glasses Aided by Machine Learning: Ajay Annamareddy¹; ¹University of Wisconsin - Madison

MATERIALS-ENVIRONMENT INTERACTIONS

Computation Assisted Materials Development for Improved Corrosion Resistance – A: Low Temperature Corrosion

Program Organizers: Rishi Pillai, Oak Ridge National Laboratory; Laurence Marks, Northwestern University

Wednesday AM | October 20, 2021
A222 | Greater Columbus Convention Center

Session Chair: To Be Announced

8:00 AM Introductory Comments

8:05 AM Invited

Factors That Influence Materials Corrosion and How Modeling May Predict These Effects: David Shifler¹; ¹Office of Naval Research

8:35 AM

Back to the Basics: Revisiting Copper to Build Thermodynamic Corrosion Models: Lauren Walters¹; Liang-Feng Huang²; James Rondinelli¹; ¹Northwestern University; ²Ningbo Institute of Materials Technology and Engineering

8:55 AM

Computational Modeling of Corrosion and Mechanical Failure in Magnesium-Aluminum Vehicle Joints: Kubra Karayagiz¹; Adam Powell¹; Qingli Ding¹; Brajendra Mishra¹; ¹Worcester Polytechnic Institute

9:15 AM

Development of a Damage Function for Galvanic Corrosion Degradation of Coated Al Alloy Systems: Mahdi Jokar¹; Gerald Frankel¹; ¹Ohio State University

9:35 AM

Morphological Stability of Electrostrictive Thin Films: Jin Zhang¹; Peter Voorhees¹; ¹Northwestern University

NANOMATERIALS

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials – Nanoparticles & Nanocomposites I

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

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

Wednesday AM | October 20, 2021
B240/241 | Greater Columbus Convention Center

Session Chairs: Edward Gorzkowski, Naval Research Laboratory; Kathy Lu, Virginia Tech

8:00 AM Invited

Controlling Synthesis of Nanostructures with Nanoscale Phase Diagrams: Ricardo Castro¹; ¹University of California, Davis

8:40 AM Invited

Controlling Grain Growth with Anisotropic Interfacial Energy and Heterogeneous Segregation: Amanda Krause¹; ¹University of Florida

9:10 AM

Single Acid One-pot Process as an Effective Method for Controlled Generation of Coal-derived Graphene Quantum Dots (GQDs): Saurav Kar¹; Roop Mahajan¹; ¹Virginia Polytechnic Institute and State University

9:30 AM

Low Temperature Synthesis of Metastable Tetragonal Yttria Doped Hafnia T-(Y-HfO₂) Nanoparticles Through Mechanochemical Processing and Annealing: Zhanlin Qiu¹; Cheng-han Li¹; Joerg Jinschek¹; Pelagia-Irene (Perena) Gouma¹; ¹Ohio State University

9:50 AM Break

10:10 AM Invited

Design of Nanoparticles from Environmentally Benign Precursors: Surojit Gupta¹; ¹University of North Dakota

10:40 AM

Surface Oxidation Behavior of FeNi-based Metal Amorphous Nanocomposite (MANC) for High Speed Motor Applications: James Egbu¹; Paul Ohodnicki²; Ruishu Wright³; John Baltrus³; Michael McHenry¹; ¹Carnegie Mellon University; ²University of Pittsburgh; ³National Energy Technology Laboratory

11:00 AM

Mechanisms of Hillock Formation and Nanostructural Self-assembly during Vapor-deposition of Phase-separating Alloy Films: Rahul Raghavan¹; Kumar Ankit¹; ¹Arizona State University

ENERGY

Energy Materials for Sustainable Development – Fuel Cells

Sponsored by: ACerS Energy Materials and Systems Division

Program Organizers: Armin Feldhoff, Leibniz University Hannover; Kyle Brinkman, Clemson University; Krista Carlson, University of Utah; Eva Hemmer, University of Ottawa; Nikola Kanas, Norwegian University of Science and Technology; Kjell Wiik, Norwegian University of Science and Technology; Lei Zuo, Virginia Tech; Stephanie Lee, Stevens Institute of Technology; Muhammad Hajj, Stevens Institute of Technology; Mohammad Haik, Stevens Institute of Technology

Wednesday AM | October 20, 2021
A216 | Greater Columbus Convention Center

Session Chairs: Julia Zaikina, Iowa State University; Karel Maca, Brno University of Technology

8:00 AM Invited

Proton Transport in the Ba_{0.8}Ca_{0.2}NdInO₄ Mixed Oxide Ion Conductor: Stephen Skinner¹; Yu Zhou¹; ¹Imperial College London

8:30 AM

Magnesium-air Fuel Cell and MgO Electrolyzer: Hongyi Sun¹; Armaghan Telgerafchi²; Madison Rutherford²; Gabriel Espinosa²; Lucien Wallace²; Adam Powell²; ¹University of Maryland, College Park; ²Worcester Polytechnic Institute

8:50 AM

Fabrication of Microstructurally Engineered Composite Electrodes for SOFC Applications through Additive Manufacturing: Edward Sabolsky¹; Joshua Tenney¹; Gunes Yakaboylu²; Jordan Conte²; Michael Jones²; Irene Fontana³; Katarzyna Sabolsky²; Harry Abernathy⁴; Gregory Hackett⁵; ¹US Department of Energy- National Energy Technology Laboratory; ²West Virginia University; ³West Virginia University; ⁴University of Genoa; ⁵US Department of Energy- National Energy Technology Laboratory; NETL Support Contractor; ⁶US Department of Energy- National Energy Technology Laboratory

9:10 AM

Improving Intermediate-temperature Solid Oxide Fuel Cell Anode Performance with Metal and MIEC Nanocatalyst Infiltration: Jillian Rix¹; Boshan Mo¹; Uday Pal¹; Srikanth Gopalan¹; Soumendra Basu¹; ¹Boston University

9:30 AM Break

9:50 AM

Nano-Catalyst Enhanced Solid Oxide Fuel Cell Anodes for Increased Stability within Hydrocarbon Containing Fuels: Saad Waseem¹; Edward Sabolsky¹; Katarzyna Sabolsky¹; Richard Hart²; Seunghyuck Hong²; ¹West Virginia University; ²GE Research

10:10 AM

Liquid Metal Anode Direct Carbon Fuel Cell: Steven Jacek¹; Christian Faria¹; Adam Powell¹; Boyd Davis²; Yu Zhong¹; Uday Pal³; Soumendra Basu³; ¹Worcester Polytechnic Institute; ²Kingston Process Metallurgy; ³Boston University

IRON AND STEEL (FERROUS ALLOYS)

Fracture of Steels: New Approaches to Modeling and Experimental Characterization – Session I

Sponsored by: TMS Steels Committee

Program Organizers: Louis Hector, General Motors Global Technical Center; Ana Luiza Araujo, AK Steel Research & Innovation; Matthias Militzer, University of British Columbia; Amy Clarke, Colorado School of Mines

Wednesday AM | October 20, 2021
A211 | Greater Columbus Convention Center

Session Chair: Ana Araujo, CBMM

8:00 AM

Applied Potential Influence on Stress Corrosion Cracking Susceptibility of 316LN Stainless Steel Rebars in Simulated Concrete Pore Solution with Chlorides: Ulises Martin¹; Jacob Röss¹; Juan Bosch¹; David M. Bastidas¹; ¹University of Akron

8:20 AM Invited

Fracture Anisotropy of SS-304L Tubes under Biaxial Loading: Madhav Baral¹; Yannik Korkolis²; ¹University of New Hampshire; ²The Ohio State University

8:50 AM

Local Micromechanical Properties of Inclusions in Ferrous Alloys: Alejandra Slagter¹; Joris Everaerts¹; Léa Deillon¹; Andreas Mortensen¹; ¹EPFL

9:10 AM Keynote

The Mechanics of Size Effect in Brittle Fracture of Steel: Connecting the Change in Strain Energy and Its Planar Dissipation to Rationalize the Size-effect: K. S. Ravi Chandran¹; ¹University of Utah

9:50 AM

Peculiarities of Mechanics Destruction Tribojoints at a Difficult Dynamic Loading
: Volodymyr Tsyganov¹; Sergey Sheyko²; ¹Zaporizhzhia Polytechnic National University; ²Zaporizhzhia National University

ELECTRONIC AND MAGNETIC MATERIALS

**Functional Defects in Electroceramic Materials –
Session I: Defect Engineering in Ceramic Materials**

Sponsored by: ACerS Electronics Division

Program Organizers: Hui Xiong, Boise State University; Hua Zhou, Argonne National Laboratory

**Wednesday AM | October 20, 2021
B235 | Greater Columbus Convention Center**

Session Chairs: Claire Xiong, Boise State University; Hua Zhou, Argonne National Lab

8:00 AM Introductory Comments

8:05 AM Invited

Accelerated Synthesis and In-situ X-ray Pair Distribution Functions of Substituted Vanadium Dioxide: *Vicky Doan-Nguyen*¹; ¹Ohio State University

8:35 AM Invited

Let Thermodynamics do Interfacial Engineering: *Jian Luo*¹; ¹University of California, San Diego

9:15 AM

Ceramics Are Brittle. Can Dislocations Change That?: *Lukas Porz*¹; *Arne Klomp*¹; *Xufei Fang*¹; *Ning Li*²; *Can Yildirim*³; *Carsten Detlefs*³; *Enrico Bruder*¹; *Marion Höfling*¹; *Wolfgang Rheinheimer*⁴; *Eric Patterson*⁵; *Peng Gao*²; *Karsten Durst*¹; *Atsutomu Nakamura*⁶; *Karsten Albe*¹; *Hugh Simons*⁷; *Jürgen Rödel*¹; ¹Technical University of Darmstadt; ²Peking University; ³European Synchrotron Radiation Facility; ⁴Forschungszentrum Jülich; ⁵US Naval Research Laboratory; ⁶Osaka University; ⁷Technical University of Denmark

9:35 AM

Defect Chemistry of Na_{0.5}Bi_{0.5}TiO₃-based Ceramics: *Sebastian Steiner*¹; *Leonie Koch*¹; *An-Phuc Hoang*¹; *Max Gehringer*¹; *Karsten Albe*¹; *Till Frömling*¹; ¹Technische Universität Darmstadt

FUNDAMENTALS AND CHARACTERIZATION

High Entropy Materials: Concentrated Solid Solutions, Intermetallics, Ceramics, Functional Materials and Beyond II – Processing and Properties II

Sponsored by: TMS Alloy Phases Committee, TMS Mechanical Behavior of Materials Committee

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

**Wednesday AM | October 20, 2021
C171 | Greater Columbus Convention Center**

Session Chairs: Yanwen Zhang, Oak Ridge National Laboratory; Todd Butler, Air Force Research Laboratory

8:00 AM

Irradiation Damage in (Zr_{0.25}Ta_{0.25}Nb_{0.25}Ti_{0.25})C High-entropy Carbide Ceramics: *Fei Wang*¹; *Xueliang Yan*¹; *Tianyao Wang*²; *Yaqiao Wu*³; *Lin Shao*²; *Michael Nastasi*²; *Yongfeng Lu*⁴; *Bai Cui*¹; ¹University of Nebraska Lincoln; ²Texas A&M University; ³Boise State University

8:20 AM Invited

Radiation Effects in High Entropy Alloys: *Shradha Agarwal*¹; *Steven Zinkle*¹; ¹University of Tennessee

8:40 AM

Understanding the Nature of Passivation Film of a TRIP Fe₃₉Mn₂₀Co₂₀Cr₁₅Si₅Al₁ (at.%) High Entropy Alloy in 3.5 wt.% NaCl Solution: *Pranshu Varshney*¹; *Nilesh Kumar*¹; ¹University of Alabama-Tusaloosa

9:00 AM

Stress-corrosion of Al_{0.1}CoCrFeNi High Entropy Alloy in a Molten Eutectic Salt: *Xinyi Wang*¹; *Madison McGrann*¹; *James Earthman*¹; ¹University of California-Irvine

9:20 AM

Amorphous Bands Induced by Low Temperature Tension in a Non-equiatomical CrMnFeCoNi Alloy: *Jian Wang*¹; *Kaisheng Ming*²; ¹University of Nebraska-Lincoln; ²Hebei University of Technology

9:40 AM Break

10:00 AM Invited

Oxidation Behavior of Concentrated Refractory Alloys: *Todd Butler*¹; *Tinuade Daboiku*¹; *Oleg Senkov*¹; ¹Air Force Research Laboratory

10:30 AM Invited

Enhanced Oxidation Resistance of (Mo₉₅W₅)₈₅Ta₁₀(TiZr)₅ Refractory Metal Multi-principal Element Alloy Up to 1300°C: *Ranran Su*¹; *Hongliang Zhang*²; *Gaoyuan Ouyang*³; *Longfei Liu*²; *Jun Cui*³; *Duane Johnson*³; *John Perepezko*²; ¹University of Wisconsin-Madison; ²Department of Materials Science and Engineering, University of Wisconsin-Madison; ³Ames Laboratory, U.S. Department of Energy at Iowa State University

10:50 AM

Influence of Refractory Ternary Additions on the Oxidation Behavior of HfTa-based Alloys: *Tinuade Daboiku*¹; Oleg Senkov¹; Todd Butler²; ¹UES, Inc.; ²Air Force Research Laboratory

11:10 AM

The Formation of Complex Ternary Oxides in Refractory Complex Concentrated Alloys: *Logan Ware*¹; Brahim Akdim²; Christopher Woodward³; Tinuade Daboiku²; Todd Butler³; Oleg Senkov²; Samuel Kuhr³; Noah Philips⁴; Michael Titus¹; ¹Purdue University; ²UES Inc.; ³Air Force Research Laboratory; ⁴ATI Specialty Alloys and Components

CERAMIC AND GLASS MATERIALS

Journal of the American Ceramic Society Awards Symposium — Journal of the American Ceramic Society Awards Symposium I

Sponsored by: ACerS

Program Organizer: William Fahrenholtz, Missouri University of Science and Technology

Wednesday AM | October 20, 2021
B233 | Greater Columbus Convention Center

Session Chairs: William Fahrenholtz, Missouri University of Science and Technology; Jonathon Foreman, American Ceramic Society

8:00 AM Introductory Comments

8:10 AM Invited

A Novel Strategy to Strengthen Alumina-carbon Refractories for Flow Control of Molten Steel: Zhe Chen¹; Wen Yan¹; *Stefan Schafföner*²; Yajie Dai¹; Qiang Wang¹; Guangqiang Li¹; ¹Wuhan University of Science and Technology; ²University of Bayreuth

8:40 AM Invited

A Thermodynamics-guided Framework to Design Spherical Lightweight Aggregate from Waste Coal Combustion Ash: *Mohammad Balapour*¹; Thiha Thway¹; Rathin Rao¹; Newell Moser²; Edward Garboczi²; Yick Hsuan¹; Sabrina Spataro¹; Yaghoob Farnam¹; ¹Drexel University; ²National Institute of Standards and Technology

9:10 AM Invited

Direct Ink Writing (DIW) of Hierarchical Porous Alumina Stabilized Emulsions: Rheology and Printability: *George Franks*¹; Shareen Chan¹; Mitchell Sesso²; ¹University of Melbourne; ²La Trobe University

9:40 AM Break

10:00 AM Invited

Effect of Moisture on the Oxidation Behaviour of ZrB₂: *Ravisankar Naraparaju*¹; ¹German Aerospace Center

10:30 AM Invited

Processing of MAX Phases: From Synthesis to Applications: *Jesus Gonzalez-Julian*¹; ¹Forschungszentrum Jülich

CERAMIC AND GLASS MATERIALS

Manufacturing and Processing of Advanced Ceramic Materials — Processing of Carbides, Borides, and Nitrides

Sponsored by: ACerS Manufacturing Division

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

Wednesday AM | October 20, 2021
B234 | Greater Columbus Convention Center

Session Chairs: Brian Leonard, University of Wyoming; Fei Wang, University of Nebraska-Lincoln

8:00 AM Invited

Low Temperature Synthesis Methods for Nanoparticle Carbides: *Brian Leonard*¹; ¹University of Wyoming

8:40 AM

Aqueous Colloidal Processing of WC Based Materials with Alternative Metals as Sintering Aids or Binder: *Antonio Javier Sanchez-Herencia*¹; Macarena Garcia-Ayala¹; Begoña Ferrari¹; Jose Ygnacio Pastor²; ¹Institute for Ceramic and Glass; ²ETSI Caminos-UPM

9:00 AM

Leveraging Computational Thermodynamics for Guiding SiC-ZrC Chemical Vapor Deposition Process Development: *Benjamin Lamm*¹; Jian Peng²; Jake McMurray²; Dongwon Shin²; David Mitchell²; ¹Oak Ridge National Laboratory; ²Materials Science and Technology Division, Oak Ridge National Laboratory

9:20 AM

Bulk Amorphous SiCN Produced through Plasma Synthesis and Spark Plasma Sintering: *Steven Herzberg*¹; Suveen Mathaudhu¹; Lorenzo Mangolini¹; ¹University of California, Riverside

9:40 AM

Chemical Vapor Deposition of Zirconium-silicon-carbon Compositions: *David Mitchell*¹; Benjamin Lamm¹; Michael Lance¹; Kevin Cooley¹; Ercan Cakmak¹; Todd Groff¹; ¹Oak Ridge National Laboratory

10:00 AM Break

10:20 AM

Development of New Synthesis Route for Environmentally Friendly Thermoelectric Rare Earth Borocarbonitrides for Upcoming Carbon-neutral Society: *Hyoung-Won Son*¹; Takao Mori²; Masatoshi Takeda¹; David Berthebaud²; Philipp Sauerchnig³; Quansheng Guo²; Tadachika Nakayama¹; ¹Nagaoka University of Technology; ²National Institute for Materials Science; ³National Institute of Advanced Industrial Science and Technology

10:40 AM

Pressureless Sintered SiC Formed via Thermoplastic Fugitive Binders for High-temperature Applications: *Rodrigo Orta Guerra*¹; Olivia Brandt¹; Rodney Trice¹; Jeffrey Youngblood¹; ¹Purdue University

11:00 AM

Spark Plasma Joining of HfB₂-ZrB₂-SiC Composites Using Ni as a Filler: *Shipra Bajpai*¹; Alok Bhaduria¹; T. Venkateswaran²; Sudhanshu Singh¹; Kantesh Balani¹; ¹Indian Institute of Technology Kanpur; ²Vikram Sarabhai Space Centre/ISRO

11:20 AM

Analysis of Crystal Structure in Calcium and Strontium Hexaborides with Lithium Popancies: *Alan Hirales*¹; Olivia Graeve¹; ¹University of California San Diego

ARTIFICIAL INTELLIGENCE

Materials Informatics for Images and Multi-dimensional Datasets — Session I

Sponsored by: ACerS Basic Science Division, ACerS Electronics Division

Program Organizers: Amanda Krause, University of Florida; Alp Sehirlioglu, Case Western Reserve University; Daniel Ruscitto, General Electric

Wednesday AM | October 20, 2021

A124 | Greater Columbus Convention Center

Session Chair: Amanda Krause, University of Florida

8:00 AM Invited

Machine Learning and Image Processing Techniques for Materials Evaluation: *Roger French*¹; Benjamin Pierce¹; ¹Case Western Reserve University

8:30 AM

Understanding PSP Linkages from Multi-Dimensional Datasets Using Microstructural Informatics Approaches: *Rohan Casukhela*¹; Sriram Vijayan²; Avantika Gupta²; Joerg Jinschek²; ¹The Ohio State University; ²The Ohio State University, Department of Materials Science and Engineering

8:50 AM

Quantitative Comparisons of 2D Microstructures with the Wasserstein Metric: *Ethan Suwandi*¹; Jeremy Mason¹; ¹University of California Davis

9:10 AM Invited

Understanding Degradation and Failure Mechanisms by Multiscale and Multiresolution Electron Microscopy: *Josh Kacher*¹; ¹Georgia Institute of Technology

9:40 AM Break**10:00 AM**

Spatial and Statistical Representation of Strain Localization as a Function of the 3D Microstructure Using Multi-modal and Multi-scale Data Merging: *Marie Charpagne*¹; J.C. Stinville¹; Andrew T. Polonsky²; McLean P. Echlin¹; Kelly Nygren³; Dalton Shadle³; Matthew P. Miller³; Tresa M. Pollock⁴; ¹University of California, Santa Barbara; ²Sandia National Laboratories; ³Cornell University

10:20 AM

Building a Database of Fatigue Fracture Images to train a CNN: *Katelyn Jones*¹; Paul Shade²; William Musinski²; Reji John²; Adam Pilchak²; Anthony Rollett¹; Elizabeth Holm¹; ¹Carnegie Mellon University; ²Air Force Research Laboratory

FUNDAMENTALS AND CHARACTERIZATION

Materials vs Minerals: Bridging the Gap between Materials Science and Earth and Planetary Science — Session 1

Sponsored by: ACerS

Program Organizers: Jessica Rimsza, Sandia National Laboratories; Krishna Muralidharan, The University of Arizona ; Thomas, The University of Arizona

Wednesday AM | October 20, 2021

B142/143 | Greater Columbus Convention Center

Session Chairs: Jessica Rimsza, Sandia National Laboratories; Krishna Muralidharan, University of Arizona; Thomas Zega, University of Arizona

8:00 AM

Coupling Aberration Corrected STEM and DFT to Determine the Crystal Chemistry of Hironite for Application to Early Solar System Thermodynamics: *Pierre-marie Zanetta*¹; Venkat Manga²; Yao-Jen chang²; Tarunika Ramprasad¹; Thomas Zega²; ¹University of Arizona; ²Lunar and Planetary Laboratory, The University of Arizona.

8:20 AM

Modeling Thermodynamics of Condensation of Fe-Ti-bearing Byroxenes Relevant to the Early Solar System: *Venkateswara Manga*¹; Thomas Zega¹; ¹Lunar and Planetary Laboratory/University of Arizona

8:40 AM

Chemical Pathways for Formation of Carbon Nanostructures from Graphite: Implications for Circumstellar and Solar-system Carbon: *Abhishek Thakur*¹; Krishna Muralidharan¹; Thomas Zega¹; Lucy Ziury¹; ¹University of Arizona

9:00 AM

Solid Phase Plasticity Mechanisms in Metals and Rocks during Shear Deformation: *Suveen Mathaudhu*¹; Arun Devaraj²; ¹Colorado School of Mines / Pacific Northwest National Laboratory; ²Pacific Northwest National Laboratory

9:20 AM Break**9:40 AM**

Pressure and Temperature Effects on the Dihedral Angle of Salt-Brine Systems: *Jessica Rimsza*¹; Kristopher Kuhlman¹; ¹Sandia National Laboratories

10:00 AM

Investigation of Variable Manganese and Nickel Content on Ductile Iron Castings Utilizing Ionic Liquids Isolated Iron and Bosch Carbon: *Blake Stewart*¹; Haley Doude¹; Jennifer Edmunson²; Eric Fox²; Morgan Abney³; Paul Hintze²; Jeffrey Mehan²; Hongjoo Rhee¹; ¹Mississippi State University; ²Marshall Space Flight Center; ³Langley Research Center

10:20 AM Concluding Comments

IRON AND STEEL (FERROUS ALLOYS)

New Frontiers in Physical Metallurgy of Steels — New Frontiers in Physical Metallurgy of Steels I

Sponsored by: AIST: MPPA Committee, TMS Steels Committee

Program Organizers: Matthias Militzer, University of British Columbia; Pello Uranga, CEIT and TECNUN (University of Navarra); Jonah Klemm-Toole, Colorado School of Mines; Amy Clarke, Colorado School of Mines; Amit Behera, QuesTek Innovations LLC

Wednesday AM | October 20, 2021
A210 | Greater Columbus Convention Center

Session Chair: To Be Announced

8:00 AM Invited

Microstructural Engineering and Accelerated Test Method Development to Achieve Low Cost, High Performance Solutions for Hydrogen Storage and Delivery: *Kip Findley*¹; John Speer²; Lawrence Cho³; Pawan Kathayat¹; Yuran Kong¹; Chris San Marchi²; Brian Kagay²; Samantha Lawrence³; Joseph Ronevich²; Ashok Saxena⁴; ¹Colorado School of Mines; ²Sandia National Laboratory; ³Los Alamos National Laboratory; ⁴WireTough Cylinders

8:40 AM

Microstructural Modeling and Design in Triple Nano-precipitate Strengthened Austenitic Steel: *Colin Stewart*¹; Richard Fonda²; Keith Knipling²; Patrick Callahan²; ¹NRC Associate at the US Naval Research Laboratory; ²US Naval Research Laboratory

9:10 AM

Tribological Characterization of Silicon Stainless Steel Alloys: *Prince Setia*¹; K Thomas Tharian²; T Venkateswaran²; Sudhanshu Shekhar Singh¹; Shashank Shekhar¹; ¹Indian Institute of Technology Kanpur; ²Indian Space Research Organization

9:40 AM Break

10:00 AM

Numerical Study of Parameters Effect on Freeboard Combustion in an Electric Arc Furnace: *Qingxuan Luo*¹; Yuchao Chen¹; Armin Silaen¹; Chenn Zhou¹; ¹Purdue University Northwest

10:30 AM

Improving the Fatigue Performance of Nitrided Steels with Amorphous and Crystalline Precipitates: *Jonah Klemm-Toole*¹; Kip Findley¹; ¹Colorado School of Mines

11:00 AM

Simulation of the Nitriding and Ferritic Nitrocarburizing (FNC) Processes: *Mei Yang*¹; Haoxing You¹; Richard Sisson¹; ¹Worcester Polytechnic Institute

BIOMATERIALS

Next Generation Biomaterials — Session IV

Sponsored by: ACerS Bioceramics Division, TMS Biomaterials Committee

Program Organizers: Roger Narayan, University of North Carolina; Min Wang, University of Hong Kong; Shawn Allan, Lithoz America LLC

Wednesday AM | October 20, 2021
A224 | Greater Columbus Convention Center

Session Chairs: Emiyl Lazarus, Rochester Institute of Technology; Hamdy Ibrahim, University of Tennessee Chattanooga; Sandra Musu Jusu, Worcester Polytechnic Institute

8:00 AM

Alginate Core Polyurethane Shape Memory Foam Composite with Antimicrobial Properties for Negative Pressure Wound Therapy: *Emily Lazarus*¹; Iris V. Rivero¹; ¹Rochester Institute of Technology

8:20 AM

Comparison of Various Post Coating Treatments on Plasma Sprayed HA Coatings: *Manoj Mittal*¹; *Tarun Goyal*¹; ¹IK Gujral Punjab Technical University Jalandhar

8:40 AM

Corrosion Assessment of Rare Earth Elements and Magnesium-based Nanocomposites for Bio-implant Applications: *Moataz Abdalla*¹; *Austin Sims*¹; *Meysam Haghshenas*²; *Manoj Gupta*³; *Hamdy Ibrahim*¹; ¹University of Tennessee at Chattanooga; ²University of Toledo; ³National University of Singapore

9:00 AM

Hierarchical Hybrid Carbon Nanotube Enhanced Bioscaffolds for Wound Healing: *Soham Parikh*¹; *Wenhu Wang*²; *Tyler Nelson*³; *Courtney Sulentic*¹; *Sharmila Mukhopadhyay*²; ¹Wright State University; ²The University of Maine; ³Wright-Patterson Air Force Base

9:20 AM

Impact of Wall Thickness and Pores Size Variation on Hydroxyapatite Based Triply Periodic Minimal Surfaces: *Islam Bouakaz*¹; *David Grossin*²; *Gregory Nolens*¹; ¹CERHUM; ²Institut National Polytechnique de Toulouse

9:40 AM

Stretchable Ion Responsive Hydrogel with Controlled Response: *Abhishek Pachauri*¹; *Jeff Bates*¹; ¹University of Utah

10:00 AM Break

10:20 AM

In Vivo And In Vitro Evaluation of PLGA-PEG Microspheres Loaded with LHRH-Targeted Drugs for Effective Breast Cancer Treatment. : *Sandra Jusu*¹; *John Obayemi*¹; *Ali Salifu*¹; *Chukwudalu Nwazojie*²; *Vanessa Uzonwanne*¹; *Olushola Odusanya*³; *Winston Soboyejo*¹; ¹Worcester Polytechnic Institute; ²African University of Science and Technology; ³Sheda Science and Technology Complex (SHESTCO)

10:40 AM

Light-adaptive Dynamic DNA-based Hydrogel: *Joonas Ryssy*¹; *Sesha Manuguri*¹; *Anton Kuzyk*¹; ¹Aalto University

11:00 AM

Innovative Solutions to Produce Bioceramic Implants by 3D Printing:
Kenna Ritter¹; Peter Durcan¹; ¹3DCERAM SINTO INC

11:20 AM

Synthesis of Three-dimensional Ceramic Microlattices by Aerosol Jet Nanoparticle Printing and their Use in Cancer Biomarker Detection:
Bin Yuan¹; Chunshan Hu¹; Azahar Ali¹; Rahul Panat¹; ¹Carnegie Mellon University

MODELING

Phonon Properties of Materials: Modeling and Experimentation – Session II

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee, TMS: Energy Conversion and Storage Committee

Program Organizers: Murali Gopal Muraleedharan, Oak Ridge National Laboratory; Zhe Cheng, University of Illinois at Urbana-Champaign; Kiarash Gordiz, Massachusetts Institute of Technology

Wednesday AM | October 20, 2021

A122 | Greater Columbus Convention Center

Session Chair: Murali Gopal Muraleedharan, Oak Ridge National Laboratory

8:00 AM Introductory Comments

8:05 AM

Experimental and Computational Thermal Conductivity Reduction in Single Crystal Thorium Dioxide from Lattice Defects: Cody Dennett¹; Marat Khafizov²; Anter EL-Azab³; David Hurley¹; ¹Idaho National Laboratory; ²Ohio State University; ³Purdue University

8:25 AM

Understanding Ionic Conduction Mechanisms in Glassy Electrolytes Using MD Vibrational Analysis: Cameran Beg¹; John Kieffer¹; ¹University of Michigan

8:45 AM

Tailoring Thermal Transport in Insulators Using Energetic Ions: Vinay Chauhan¹; Joshua Ferrigno¹; Saqeeb Adnan¹; Zhandos Utegulov²; Cody Dennett³; Amey Khanolkar³; Zilong Hua³; Lingfeng He³; David Hurley³; Marat Khafizov¹; ¹Ohio State University; ²Nazarbayev University; ³Idaho National Laboratory

9:05 AM Concluding Comments

CERAMIC AND GLASS MATERIALS

Preceramic Polymers; Synthesis, Processing, Modeling, and Derived Ceramics – Preceramic Polymers and Polymer Derived Ceramics I

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Matthew Dickerson, Air Force Research Laboratory; Gurpreet Singh, Kansas State University; Paolo Colombo, University of Padova; Günter Motz, Universität Bayreuth

Wednesday AM | October 20, 2021

B230 | Greater Columbus Convention Center

Session Chair: Matthew Dickerson, Air Force Research Laboratory

8:00 AM Introductory Comments Organizers' Remarks

8:10 AM Invited

UV Curable Preceramic Polymers and their Application in Additive Manufacturing: Tobias Schaedler¹; Kayleigh Porter¹; Mark O'Masta¹; Ekaterina Stonkevitch¹; Zak Eckel¹; Phuong Bui¹; ¹HRL Laboratories LLC

8:40 AM

Preceramic Polymer Organization via Block Copolymer Templating: John Bowen¹; Lisa Rueschhoff²; Shahryar Mooraj³; Jacob Goodman⁴; Emily Davidson⁵; Benito Roman-Manso⁵; K. L. Martin¹; Scott Schiffres⁴; Wen Chen³; Matthew Dickerson²; Jennifer Lewis⁵; ¹UES Inc.; ²Air Force Research Lab; ³University of Massachusetts Amherst; ⁴Binghamton University; ⁵Harvard University

9:00 AM

Impact of Preceramic Polymer Architecture on Derived Ceramics: Timothy Pruyn¹; Matthew Dickerson¹; Brandon Ackley¹; ¹Materials and Manufacturing Directorate

9:20 AM

Preparation of ZrC-embedded Glass-like Carbon Wires via Thermal Decomposition of Metal Organic Frameworks: Kaitlyn Shirey¹; Brittany Bonnett²; Xiaozhou Yang²; Amanda Morris²; Carolina Tallon²; ¹Virginia Polytechnic Institute; ²Virginia Tech

9:40 AM Break

10:00 AM

Laser and Furnace Pyrolyzed Organosilazane-based Glass/ZrO₂ Composite Coating Systems: A Comparison: Alexander Horcher¹; Katja Tangermann-Gerk²; Walter Krenkel¹; Günter Motz¹; ¹University of Bayreuth; ²Bayerisches Laserzentrum Erlangen

10:20 AM

X-ray Computed Tomography Investigation of CMC Densification via Polymer Infiltration and Pyrolysis: Derek King¹; Thomas Key¹; Connor Wycoff¹; Craig Przybyla²; Michael Cinibulk²; ¹UES Inc.; ²AFRL

FUNDAMENTALS AND CHARACTERIZATION

Probing Defect Properties and Behavior under Mechanical Deformation and Extreme Conditions — Radiation Response and Defect Evolution I

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

Program Organizers: Zhe Fan, Lamar University; Tianyi Chen, Oregon State University; Shijun Zhao, City University of Hong Kong; Mitra Taheri, Johns Hopkins University; Yury Osetskiy, Oak Ridge National Laboratory

Wednesday AM | October 20, 2021
C170 | Greater Columbus Convention Center

Session Chair: To Be Announced

8:00 AM Invited

Radiation Enhanced Diffusion in Fe₂O₃ and Cr₂O₃: Kayla Yano¹; Aaron Kohnert²; Amitava Banerjee²; Danny Edwards¹; Edward Holby²; Tiffany Kaspar¹; Hyosim Kim²; Sandra Taylor¹; Yongqiang Wang²; *Blas Uberuaga*²; Daniel Schreiber¹; ¹Pacific Northwest National Laboratory; ²Los Alamos National Laboratory

8:30 AM

Impact of Grain Boundary and Surface Diffusion on Fission Gas Release in UO₂ Nuclear Fuel Using a Phase Field Model: *Md Ali Muntaha*¹; Dong-Uk Kim¹; Michael Tonks¹; ¹University of Florida

8:50 AM Invited

Long-range One-dimensional Glide of Defect Clusters in Irradiated Materials: Experimental Evidence and Consequences: *Steven Zinkle*¹; Ling Wang²; Yan-Ru Lin¹; ¹University of Tennessee; ²Oak Ridge National Lab

9:20 AM Invited

The Role of Anisotropy on the Defect Self-organization in Metals under Irradiation: *Cheng Sun*¹; ¹Idaho National Laboratory

9:50 AM Break

10:10 AM Invited

Surprisingly High Irradiation-induced Defect Mobility in Fe₃O₄ as Revealed through In Situ Transmission Electron Microscopy: *Djamel Kaoui*¹; Martin Owusu-Mensah¹; Angelica Lopez Morales¹; Kayla Yano²; Tiffany Kaspar²; Daniel Schreiber²; Blas Uberuaga³; ¹North Carolina State University; ²Pacific Northwest National Laboratory; ³Los Alamos National Laboratory

10:40 AM Invited

Multimodal and Multiscale Defect Characterization and Property Correlation for Nuclear Fuel and Materials via Advanced Post Irradiation Examination Techniques: *Peng Xu*¹; ¹Idaho National Laboratory

FUNDAMENTALS AND CHARACTERIZATION

Processing—Microstructure—Property Relationships of Titanium and Titanium Alloys — Session I

Sponsored by: TMS Titanium Committee

Program Organizers: Yufeng Zheng, University of Nevada-Reno; Rongpei Shi, Lawrence Livermore National Laboratory; Michael Gram, Titanium Metals Corporation

Wednesday AM | October 20, 2021
C160A/160B | Greater Columbus Convention Center

Session Chairs: Yufeng Zheng, University of Nevada Reno; Rongpei Shi, Lawrence Livermore National Laboratory

8:00 AM Invited

Exploiting Structural and Compositional Instabilities in Titanium Alloys to Optimize Microstructure/Property Interrelationships in Samples Fabricated by Additive Manufacturing: Brian Welk¹; Nevin Taylor¹; Zachary Kloenne¹; Yufeng Zheng²; Rajarshi Banerjee³; *Hamish Fraser*¹; ¹The Ohio State University; ²University of Nevada-Reno; ³University of North Texas

8:30 AM Invited

Regulating Elastic and Plastic Deformation by Heterogeneous Microstructure Design in Ti-alloys: *Yunzhi Wang*¹; ¹Ohio State University

9:00 AM Invited

Influence of Athermal vs. Isothermal Omega Precipitation and Alpha Precipitation on TRIP/TWIP Deformation Mechanisms in Metastable Beta Ti alloys (invited): Srinivas Aditya Mantri¹; Abhishek Sharma¹; Riyadh Salloom¹; MSKKY Nartu¹; Sriswaroop Dasari¹; Srinivasan Srivilliputhur¹; *Rajarshi Banerjee*¹; ¹University of North Texas

9:30 AM

Nano-scale α Phase and Fine-scale Alpha Precipitation in a Metastable Beta Ti-5Al-5Mo-5V-3Cr Alloy: Dian Li¹; Stoichko Antonov²; Rongpei Shi³; Zachary Kloenne⁴; Hamish Fraser⁴; *Yufeng Zheng*⁵; ¹University of Nevada-Reno; ²Max-Planck-Institut für Eisenforschung GmbH; ³Lawrence Livermore National Laboratory; ⁴Ohio State University; ⁵University of Nevada-Reno

9:50 AM Break

10:10 AM

A Data-driven Analysis for Selection and Use of Conventional Ti Alloys for Aeroengine Applications and Future Directions: *Tanjore Jayaraman*¹; Ramachandra Canumalla²; ¹University of Michigan-Dearborn; ²Metallurgical Executive & Consultant

10:30 AM

The BMG to Ti Weld, a Pool for Microstructure: Property Characterization: Dan Sorensen¹; Eric Hintsala²; Jesse Pischlar³; Joseph Stevick⁴; Bernie Li³; Daniel Kiener⁵; Jason Meyers⁶; Antonio Ramirez⁷; *Douglas Stauffer*²; Robert Ritchie⁸; ¹Boston Scientific; ²Bruker Nano Surfaces & Metrology; ³Medtronic; ⁴Hummingbird Scientific; ⁵Montanuniversität, Leoben; ⁶University of Minnesota; ⁷Ohio State University; ⁸University of California, Berkeley

10:50 AM

Role of Novel Highly-indexed Twinning in Hierarchical a Microstructure in Metastable β Ti-5Al-5Mo-5V-3Cr Alloy: *Dian Li¹; Wenrui Zhao¹; Xing Zhang²; Stoichko Antonov³; Yiliang Liao²; Yufeng Zheng¹; ¹University of Nevada, Reno; ²Iowa State University; ³Max-Planck-Institut für Eisenforschung GmbH*

11:10 AM

The Composition-processing-microstructure-property Relationships of Fe and Al Modified Ti-Cr Alloys: *Joann Ballor¹; Jonathan Poplawsky²; Elizabeth Kautz³; Bharat Gwalani³; Arun Devaraj³; Masahiko Ikeda⁴; Carl Boehlert¹; ¹Michigan State University; ²Oak Ridge National Laboratory; ³Pacific Northwest National Laboratory; ⁴Kansai University*

CERAMIC AND GLASS MATERIALS

Solid-state Optical Materials and Luminescence Properties – Session I

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

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

Wednesday AM | October 20, 2021
B232 | Greater Columbus Convention Center

Session Chairs: Yiquan Wu, Alfred University; Jas Sanghera, Naval Research Laboratory

8:00 AM Invited

Crystallization from Glass: Application to Transparent Glass-ceramics: *Mathieu Allix¹; Cecile Genevois¹; Emmanuel Veron¹; Michael Pitcher¹; ¹Laboratoire CEMHTI*

8:20 AM Invited

Non Rule-of-mixtures Thermal Expansion in Core-shell Based Nanocrystalline Composite Ceramics: *James Wollmershauser¹; Kevin Anderson²; Benjamin Greenberg²; Heonjune Ryoo¹; Edward Gorzkowski¹; Boris Feigelson¹; ¹U.S. Naval Research Laboratory; ²National Research Council Postdoctoral Research Fellow sited at U.S. Naval Research Laboratory*

8:40 AM

Processing of Rare Earth Doped Ga₂O₃ Transparent Ceramics: *Jiao Li¹; Yiquan Wu¹; ¹Alfred University*

9:00 AM Invited

Additive Manufacturing of Tailored Laser Gain Media: *Steve Payne¹; Zachary Seeley¹; Nerine Cherepy¹; Thomas Rudzik¹; Tyler Wineger¹; Ian Phillips¹; Alex Drobshoff¹; Tim Yee¹; ¹Lawrence Livermore Lab*

9:20 AM Invited

A Review of Synthesis and Processing Methodologies in a Nanocomposite Material System for Infrared Laser Gain Media: *Victoria Blair¹; Steven Kilczewski¹; Zackery Fleischman¹; ¹DEVCOM Army Research Lab*

9:40 AM Break

10:00 AM

Optical Basicity of Oxynitrides: *Doris Möncke¹; Sharafat Ali²; Bo Jonson²; Efstratios Kamitsos³; ¹Alfred University; ²Linnaeus University; ³National Hellenic Research Foundation*

10:20 AM

Highly Transparent MgGa₂O₄ and Ni Doped MgGa₂O₄ Semiconducting Ceramics: *Guangran Zhang¹; Yiquan Wu¹; ¹Alfred University*

SPECIAL TOPICS

ACerS Robert B. Sosman Award Symposium: Bridging the Gap between Atomistic and Continuum Approaches to Interface Science – Sosman Presentation

Sponsored by: ACerS Basic Science Division

Program Organizer: John Blendell, Purdue University

Wednesday PM | October 20, 2021
B130 | Greater Columbus Convention Center

Session Chair: John Blendell, Purdue University

1:00 PM Invited

Combining Atomistic and Continuum Approaches Towards Understanding Interfaces: *Wayne Kaplan¹; ¹Technion - Israel Institute of Technology*

SPECIAL TOPICS

ACerS Robert B. Sosman Award Symposium: Bridging the Gap between Atomistic and Continuum Approaches to Interface Science – Sosmann II

Sponsored by: ACerS Basic Science Division

Program Organizer: John Blendell, Purdue University

Wednesday PM | October 20, 2021
B130 | Greater Columbus Convention Center

Session Chair: Carol Handwerker, Purdue University

2:00 PM Invited

Grain Boundaries in the Wild: *Gregory Rohrer¹; ¹Carnegie Mellon University*

2:30 PM Invited

Stress-Induced Interface Instability in Battery Electrode Materials: *Ming Tang¹; ¹Rice University*

3:00 PM Invited

Tracing Impurities at Surfaces and Interfaces of Renewable Energy Materials: *Christina Scheu¹; Joohyun Lim¹; Se-Ho Kim¹; Raquel Aymerich Armengol¹; Rajib Sahu¹; Olga Kasian¹; Leigh T. Stephenson¹; Baptiste Gault¹; ¹Max-Planck-Institut fuer Eisenforschung GmbH*



3:30 PM Break

3:50 PM Invited

Surface Segregation in Multicomponent High Entropy Alloys: A Comparison between Atomistic Simulations and a Simple Analytical Model: *Paul Wynblatt¹*; Dominique Chatain²; ¹Carnegie Mellon University; ²Aix-Marseille Univ, CNRS, CINAM

4:20 PM Invited

Disconnections, Faceting, Solutes and Their Impact on Grain Boundary Migration in Ceramics: *Rheinheimer Wolfgang¹*; Hadas Sternlicht²; ¹Forschungszentrum Jülich; ²Brown University

4:50 PM Invited

Mechanistic Insights into the Effect of Heating Rate on Sintering and Sintering Stress Evolution: *Shen Dillon¹*; ¹University of Illinois

ADDITIVE MANUFACTURING

Additive Manufacturing of High and Ultra-High Temperature Ceramics and Composites: Processing, Characterization and Testing — Extrusion-based Additive Manufacturing Methods

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Corson Cramer, Oak Ridge National Laboratory; Greg Hilmas, Missouri University of Science and Technology; Lisa Rueschhoff, Air Force Research Laboratory

Wednesday PM | October 20, 2021

A111 | Greater Columbus Convention Center

Session Chair: Corson Cramer, Oak Ridge National Laboratory

2:00 PM

Additive Manufacturing of High-performance Advanced Ceramics by the Ceramic On-demand Extrusion (CODE) Process: *Ming Leu¹*; ¹Missouri University of Science and Technology

2:30 PM

AM of UHTCs at LLNL: *James Cahill¹*; ¹Lawrence Livermore National Laboratory

3:00 PM

Pathways to Additively Manufacture Ultra-high Temperature Ceramic Composites: *James Kemp¹*; Zlatomir Apostolov²; Brett Compton¹; Lisa Rueschhoff³; ¹The University of Tennessee, Knoxville; ²Air Force Research Laboratory; ³Air Force Research Laboratory

3:20 PM Break

3:40 PM

Additive Manufacturing Of ZrB₂-SiC Heat Exchanger Geometries by Ceramic on Demand Extrusion: *Nicholas Timme¹*; Marharyta Lakusta¹; Jeremy Watts¹; Gregory Hilmas¹; William Fahrenholtz¹; Ming Leu¹; David Lipke¹; ¹Missouri University of Science and Technology

4:00 PM

Ceramic On-demand Extrusion (CODE) of Functionally Graded ZrB₂-Mo: *Austin Martin¹*; Sachin Choudhary¹; Jeremy Watts¹; Gregory Hilmas¹; Ming Leu¹; Tieshu Huang²; ¹Missouri University of Science and Technology; ²NNSA's Kansas City National Security Campus

4:20 PM

Additive Manufacturing of Silicon Nitride Using a Slurry Approach: *Beth Armstrong¹*; Corson Cramer¹; Benjamin Lamm¹; Trevor Aguirre¹; David Mitchell¹; ¹Oak Ridge National Laboratory

4:40 PM

Additive Manufacturing of Aqueous Based Silicon Nitride Suspensions via Direct Writing: *William Costakis¹*; Connor Wyckoff¹; Lisa Rueschhoff¹; ¹Air Force Research Labs

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Equipment, Instrumentation and In-Situ Process Monitoring — Novel Instrumentation

Sponsored by:

Program Organizers: Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University

Wednesday PM | October 20, 2021

A121 | Greater Columbus Convention Center

Session Chair: Joy Gockel, Colorado School of Mines

3:00 PM Invited

Ultrasonics for Monitoring Melt Pool Dynamics and Solidification: *Christopher Kube¹*; Jared Gillespie¹; Tao Sun²; Cang Zhao³; Niranjana Parab⁴; Anthony Rollett⁵; ¹The Pennsylvania State University; ²University of Virginia; ³Tsinghua University; ⁴Intel Corporation; ⁵Carnegie Mellon University

3:40 PM

Functionally Graded Material Development by Leveraging Ultrasonic Grain Refinement in Additive Manufactured Nickel 718: *Nathaniel McNeese¹*; Satish Rajaram²; Mark Warchol²; Brian Wisner¹; ¹Ohio University; ²Texas Research Institute-Austin

4:00 PM

Laser Powder Bed Fusion of Inconel 718 with High-temperature Buildplate Preheating: Effects on Powder Sintering and Part Distortion: *Nicolas Tan¹*; Anna Hayes¹; Krishna Muralidharan¹; Barrett Potter¹; Gregory Colvin¹; ¹University of Arizona

ADDITIVE MANUFACTURING

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

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

Wednesday PM | October 20, 2021
A115 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM

Binder Jet Printing of Austenitic 316L Stainless Steel: Processing, Densification, Microstructure, and Mechanical Properties: *Mohammad Jamalkhani Khameneh¹; Amir Mostafaei¹; ¹Illinois Institute of Technology*

2:20 PM

Effects of Controlled Porosity on Additively Manufactured Stainless Steel 316L Subject to Dynamic Loading: *Katie Koube¹; Kevin Lamb²; Taylor Sloop¹; Sudarsanam Babu²; Naresh Thadhani¹; Josh Kacher¹; ¹Georgia Institute of Technology; ²University of Tennessee Knoxville*

2:40 PM

Deformation Mechanisms in 316L Stainless Steel Fabricated by Additive and Additive + Subtractive (Hybrid) Manufacturing: *Rangasayee Kannan¹; Peeyush Nandwana¹; Thomas Feldhausen¹; ¹Oak Ridge National Laboratory*

3:00 PM

Influence of the Cellular Subgrain Feature in Additively Manufactured 316L Stainless Steel on Mechanical Properties: *Janiith Wanniarachchi¹; John Michopoulos²; Ajit Achuthan¹; ¹Clarkson University; ²Naval Research Laboratory*

3:20 PM

Nonlinear Ultrasonic Methods for Nondestructive Evaluation of Additively Manufactured 316L Stainless Steel: *Madison Sithkiewicz¹; Anna Hayes¹; SeHyuk Park¹; Tribikram Kundu¹; Krishna Muralidharan¹; ¹University of Arizona*

3:40 PM Break

4:00 PM

Microstructural Evolution in Maraging Steels: From Powder to Additive Manufacturing: *Seyedamirreza Shamsdin¹; Mohsen Mohammadi¹; ¹UNB*

4:20 PM

Mechanical Properties and Metallurgical Characteristics of H13 Tool Steel Additively Manufactured in Low Vacuum and Heated Condition: *Shinji Matsushita¹; Hirotsugu Kawanaka¹; Hyakka Nakada¹; Steven Osma¹; Yusuke Yasuda¹; Seung Hwan Park¹; ¹Hitachi Ltd.*

4:40 PM

Creep Behavior of an Additive Manufactured Ferritic/Martensitic (FM) Grade-91 Steel: *Mahmoud Hawary¹; K. Murty¹; ¹North Carolina State University*

5:00 PM

Nano and Macro Mechanical Properties of Additively and Traditionally Manufactured 17-4 PH Stainless Steel: *Hisham Abusalma¹; Mohammad Sepahi¹; Sandeep Khadka¹; Dana Ingalsbe¹; Natalia Esparragoza¹; Matthew Rosser¹; Xiaoqing Wang¹; *Hamid Eisazadeh¹; ¹Old Dominion University**

5:20 PM

Effect of Atomizing Gas on the Microstructure and Properties of Additively Manufactured 17-4 Precipitation Hardening Steel: *Kaushalendra Singh¹; George Abott¹; Atieh Moridi¹; ¹Cornell University*

5:40 PM

Use of Water Atomized Powder with Non-spherical Morphology in a Laser Powder Bed Fusion Additive Manufacturing Process: *Mahya Shahabi¹; Tianyu Zhu¹; Jagannath Jayachandran¹; Sneha Prabha Narra²; ¹Worcester Polytechnic Institute; ²Carnegie Mellon University*

ADDITIVE MANUFACTURING

Additive Manufacturing: Large-Scale Metal Additive Manufacturing — Microstructure, Property, and Performance: Characterization and Simulation

Program Organizers: Yousub Lee, Oak Ridge National Laboratory; Antonio Ramirez, Ohio State University; Yashwanth Bandari, Meltio Inc.; Duckbong Kim, Tennessee Technological University; Wei Zhang, Ohio State University

Wednesday PM | October 20, 2021
A114 | Greater Columbus Convention Center

Session Chairs: Yousub Lee, Oak Ridge National Laboratory; Antonio Ramirez, The Ohio State University; Wei Zhang, The Ohio State University

2:00 PM

Wire Arc Processing of Stainless Steels; Microstructure and Properties: *Patxi Fernandez-Zelai¹; Quinn Campbell¹; Chris Ledford¹; Michael Kirka¹; Andrzej Nycz¹; Mark Noakes¹; Lonnie Love¹; ¹Oak Ridge National Laboratory*

2:30 PM

Effect of Inhomogeneous Grain Size on the Deformation Characteristics of Bimetallic Additively Manufactured Structure (BAMS) of 316L Austenitic Stainless Steel and Inconel 625: *Rumman Ahsan¹; Xuesong Fan²; Jonathan Poplawsky³; Peter Liaw²; Duck Bong Kim¹; ¹Tennessee Technological University; ²University of Tennessee, Knoxville; ³Oak Ridge National Laboratory*

2:50 PM

Microstructure Modification of GMAW-DED 316L Stainless Steel: *Jacob Rindler¹; Antonio Ramirez¹; ¹Ohio State University*

3:10 PM

Towards Understanding Microstructure Evolution during Wire Arc Additive Manufacturing of Maraging 250 Thin-wall Parts: *Yao Xu¹; Brajendra Mishra¹; Sneha Narra¹; ¹Worcester Polytechnic Institute*

3:30 PM

Wire + Arc Additive Manufacturing (WAAM) of Al_{0.1}CoCrFeNi High-Entropy Alloy (HEA): *Rumman Ahsan¹; Xuesong Fan²; Jonathan Poplawsky³; Peter Liaw²; Duck Bong Kim¹; ¹Tennessee Technological University; ²University of Tennessee, Knoxville; ³Oak Ridge National Laboratory*

3:50 PM Break

4:10 PM

Process Development for Laser Hot Wire Additive Manufacturing of Ti-6Al-4V: *Elizabeth Chang-Davidson*¹; Brandon Abranovic¹; Jack Beuth¹; ¹Carnegie Mellon University

4:30 PM

Moving Heat Source Process Simulation for Wire Arc Additive Manufacturing via a Mesh-free Method and GPU Computing: *Xavier Jimenez*²; Florian Dugast¹; Albert To¹; ¹University of Pittsburgh

4:50 PM

A Machine Learning-based Geometric Compensation Method for Metal Additive Manufacturing: *Wen Dong*¹; Albert To¹; ¹University of Pittsburgh

5:10 PM

Thermo-mechanical FEM Modeling and Machine Learning of Distortion on Overhang Structure in Laser Powder Bed Fusion Additive Manufacturing: *Xuesong Gao*¹; Tyler High¹; Jesse Zhu²; Wei Zhang¹; Hyeyun Song³; ¹The Ohio State University; ²Cornell University; ³Edison Welding Institute

ADDITIVE MANUFACTURING

Additive Manufacturing: Mechanisms and Mitigation of Aqueous Corrosion and High-temperature Oxidation – Corrosion Assessment of Additively Manufactured Parts II

Program Organizers: Amir Mostafaei, Illinois Institute of Technology; Yashar Behnamian, University of Alberta; Bryan Webler, Carnegie Mellon University

Wednesday PM | October 20, 2021
A112 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM

High Temperature Oxidation Behavior of Additively Manufactured ZrB₂-30vol%SiC in CO₂: *Marharyta Lakusta*¹; Nicholas Timme²; William Fahrendholtz²; Jeremy Watts²; Gregory Hilmas²; David Lipke²; ¹Missouri University of Science and Technology; ²Missouri University of Science and Technology

2:30 PM

Influence of Heat Treatment on Electrochemical Behavior of Additively Manufactured 7050 Aluminum Alloy: *Rupesh Rajendran*¹; Kevin Chasse²; Preet Singh¹; ¹Georgia Institute of Technology; ²Northrop Grumman Mission Systems

3:00 PM

Electrochemical Behavior of Additively-manufactured Steels: *Mohammad Jamalkhani Khameneh*¹; Amir Mostafaei¹; ¹Illinois Institute of Technology

3:30 PM Break

3:50 PM

Corrosion Behavior of Additively Manufactured Parts Made Using Non-spherical Ti-6Al-4V Powder in 3.5 wt% NaCl Solution: Sourabh Bagji¹; Muktesh Paliwal²; Anthony Rollett³; *Amir Mostafaei*¹; ¹Illinois Institute of Technology; ²Kymera International - Reading Alloys; ³Carnegie Mellon University

4:20 PM

Laser Shock Peening Effect on 5xxx Sensitization and Exfoliation of 5XXX series Aluminum Alloys: Saba N. Esmaeely¹; Allison Akman²; Gabriella Marino¹; *Jenifer Locke*¹; ¹The Ohio State University; ²Naval Surface Warfare Center,

4:50 PM

Corrosion Behavior of Laser Powder Bed Fusion Processed Ti-6Al-4V in Different Electrolytes: *Melody Delpazir*¹; Muktesh Paliwal²; Marcella Vaicik¹; Amir Mostafaei¹; ¹Illinois Institute of Technology; ²Kymera International - Reading Alloys

MATERIALS-ENVIRONMENT INTERACTIONS

Advanced Materials for Harsh Environments – Session IV

Sponsored by: ACerS Electronics Division

Program Organizers: Navin Manjooran, Solve Technology and Research, Inc.; Gary Pickrell, Virginia Tech

Wednesday PM | October 20, 2021
A223 | Greater Columbus Convention Center

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

2:00 PM Introductory Comments

3:00 PM

Passive Wireless Sensors for Real Time Temperature and Corrosion Monitoring of Coal Boiler Components Under Flexible Operation: *Brian Jordan*¹; Kavin Idhiam¹; Zachary Lynch¹; Daryl Reynolds¹; Edward Sabolsky¹; ¹WVU

3:20 PM

Development of High Performance H₂ Permeation Barrier Coating with Good Thermal Cycling Resistance: *Sumit Bhattacharya*¹; Yinbin Miao¹; Nicholas Stauff¹; Taek Kim¹; Abdellatif Yacout¹; ¹Argonne National Laboratory

3:40 PM Break

4:00 PM

Enhancing the Hardness and Corrosion Resistance of Ni-based Alloys with Thermomechanical Processing: *Haruka Shima*¹; Manami Mori²; Kenta Yamanaka¹; Kazuo Yoshida¹; Akihiko Chiba¹; ¹Tohoku University; ²National Institute of Technology, Sendai College

4:20 PM

Influence of Alkaline Earth Metals on Structure Formation, Mechanical and Special Properties of Aircraft Casting from Magnesium Alloys: Vadim Shalomeev¹; Sergei Sheyko¹; *Ievgeniia Chetvertak*¹; ¹National University "Zaporizhska Politecnics"

4:40 PM

Microstructural Stability at Elevated Temperature of the Ni-based Electron Beam Welded Superalloys Dissimilar Joint: Oskar Dziuba¹; Grzegorz Cempura¹; *Agnieszka Wusatowska-Sarnek*²; Adam Kruk¹; ¹AGH University of Science and Technology; ²Pratt & Whitney

5:00 PM Concluding Comments

CERAMIC AND GLASS MATERIALS

Ceramics and Glasses Modeling by Simulations and Machine Learning – Session II

Sponsored by: ACerS Glass & Optical Materials Division

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

Wednesday PM | October 20, 2021
B231 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM

Fusing Experimental and Simulation Datasets in Machine Learning for Predicting Glass Properties: *Mathieu Bauchy*¹; ¹University of California, Los Angeles

2:20 PM Panel Discussion: Challenges and Opportunities in Machine Learning for Materials

MATERIALS-ENVIRONMENT INTERACTIONS

Computation Assisted Materials Development for Improved Corrosion Resistance – B: High Temperature Corrosion

Program Organizers: Rishi Pillai, Oak Ridge National Laboratory; Laurence Marks, Northwestern University

Wednesday PM | October 20, 2021
A222 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM Introductory Comments

2:20 PM

Modeling of High-temperature Corrosion of Zirconium Alloys Using the eXtended Finite Element Method (X-FEM): *Louis Bailly-Salins*¹; Léo Borrel¹; Wen Jiang²; Benjamin Spencer²; Koroush Shirvan³; Adrien Couet¹; ¹University of Wisconsin - Madison; ²Idaho National Laboratory; ³Massachusetts Institute of Technology

2:40 PM

Hydrothermal Corrosion of Silicon Carbide: *Jianqi Xi*¹; Dane Morgan¹; Izabela Szlufarska¹; ¹University of Wisconsin-Madison

3:00 PM

Solubility Based Prediction of Corrosion in Molten Chloride Salts: *Cory Parker*¹; Rishi Pillai¹; Dino Sulejmanovic¹; Bruce Pint¹; ¹Oak Ridge National Laboratory

3:20 PM

Understanding and Reducing Bias in Machine Learning to Enhance Its Predictive and Extrapolative Capabilities: Application to the Oxidation Kinetics and Spallation Behavior of High-temperature NiCr-based Alloys: *Marie Romedenne*¹; Rishi Pillai¹; Jian Peng¹; Bruce Pint¹; Allen Haynes¹; Govindarajan Muralidharan¹; Dongwon Shin¹; ¹Oak Ridge National Laboratory

NANOMATERIALS

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials – Nanoparticles & Nanocomposites II

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

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

Wednesday PM | October 20, 2021
B240/241 | Greater Columbus Convention Center

Session Chairs: Kathy Lu, Virginia Tech; Edward Gorzkowski, Naval Research Laboratory

2:00 PM

Bulk Nanostructured Ceramics Research at the US Naval Research Lab: *Edward Gorzkowski*¹; James Wollmershauser¹; Eric Patterson¹; Heonjune Ryou¹; Kevin Anderson¹; Boris Feigelson¹; ¹Naval Research Laboratory

2:20 PM Invited

Polymer Derived Ceramics and Composites- From Nanoscale to Bulk Properties: *Lisa Rueschhoff*¹; Zlatomir Apostolov¹; Matthew Dickerson¹; Michael Cinibulk¹; ¹Air Force Research Laboratory

2:50 PM Invited

Polymer-Derived Ceramic Nanocomposites for Applications at High Temperatures and in Harsh Environments: *Emanuel Ionescu*¹; ¹TU Darmstadt

3:20 PM

Sintering, Structure, and Properties of Y₂O₃-ZrO₂-Al₂O₃ Core-Shell Nanocomposite Ceramics: *Kevin Anderson*¹; Benjamin Greenberg¹; Mason Wolak¹; James Wollmershauser¹; Boris Feigelson¹; ¹U.S. Naval Research Laboratory



FUNDAMENTALS AND CHARACTERIZATION

Emergent Materials under Extremes and Decisive <I>In Situ</I> Characterizations — Materials Characterization at Extreme Conditions

Sponsored by: ACerS Basic Science Division

Program Organizers: Hongwu Xu, Los Alamos National Laboratory; Xiaofeng Guo, Washington State University; Xujie Lu, Center for High Pressure Science & Technology Advanced Research; Hua Zhou, Argonne National Laboratory; Judith Driscoll, University of Cambridge

Wednesday PM | October 20, 2021
C161A/161B | Greater Columbus Convention Center

Session Chairs: Hongwu Xu, Los Alamos National Laboratory; Xiaofeng Guo, Washington State University; Hua Zhou, Argonne National Laboratory

2:00 PM Invited

In-Situ Synchrotron X-ray Absorption Spectroscopic Investigations of Actinide Speciation under Hydrothermal Conditions: *Robert Mayanovic*¹; Jason Baker²; Diwash Dhakal¹; Nadib Akram¹; Xiaofeng Guo³; Hakim Boukhalfa²; Cheng-Jun Sun⁴; Hongwu Xu²; ¹Missouri State University; ²Los Alamos National Laboratory; ³Washington State University; ⁴Argonne National Laboratory

2:20 PM Invited

Novel Properties in Cuprates Prepared by High Pressure Oxygen Synthesis: *Steven Conradson*¹; ¹Jozef Stefan Institute

2:40 PM

New Approach Toward Enhanced Understanding of the Phase Transformation in Anodically Formed Titanium Oxide Nanotubes during Annealing: *Hammad Malik*¹; Brian Devener¹; Jerry Howard¹; Swomitra Mohanty¹; Krista Carlson¹; ¹University of Utah

3:00 PM

In-situ Two-dimensional X-ray Diffraction (XRD2) Studies On High-temperature Phase Transformations of 2D Titanium Carbide (Ti₃C₂T_x) MXene: Brian Wyatt¹; *Srinivasa Kartik Neman*¹; Bowen Zhang¹; Babak Anasori¹; ¹Integrated Nanosystems Development Institute (INDI), IUPUI

3:20 PM Invited

Proton Irradiation Effects in Additively Manufactured 316L Stainless Steels: *Cheng Sun*¹; Michael McMurtrey¹; ¹Idaho National Laboratory

3:40 PM Break

4:00 PM

Temperature Measurements in Radiation Environments Using Piezoelectric Surface Acoustic Wave Resonators: *Maha Yazbeck*¹; Ryan Chesser¹; Yuzhou Wang²; Marat Khafizov¹; ¹The Ohio State University; ²Idaho National Lab

4:20 PM

Investigation of Kirkendall Pore Formation and Evolution Using 4D Spatio-Temporal X-ray Tomography and Deep Learning: *Arun Bhattacharjee*¹; Pradyumna Elavarthi¹; Anca Ralescu¹; Ashley Paz y Puente¹; ¹University of Cincinnati

4:40 PM

Quantifying H₂ Evolution from Metal Hydrides in High Temperature Environments Using a Quadrupole Mass Spectrometer: *Brian Brigham*¹; Cole Moczygemba¹; Kenneth Kane²; Xunxiang Hu²; Elizabeth Sooby¹; ¹University of Texas at San Antonio; ²Oak Ridge National Laboratory

ENERGY

Energy Materials for Sustainable Development — Capacitive, Chemical and Thermal Storage and Conversion

Sponsored by: ACerS Energy Materials and Systems Division

Program Organizers: Armin Feldhoff, Leibniz University Hannover; Kyle Brinkman, Clemson University; Krista Carlson, University of Utah; Eva Hemmer, University of Ottawa; Nikola Kanas, Norwegian University of Science and Technology; Kjell Wiik, Norwegian University of Science and Technology; Lei Zuo, Virginia Tech; Stephanie Lee, Stevens Institute of Technology; Muhammad Hajj, Stevens Institute of Technology; Mohammad Haik, Stevens Institute of Technology

Wednesday PM | October 20, 2021
A216 | Greater Columbus Convention Center

Session Chairs: Yang Bai, University of Oulu; Ekaterina Pomerantseva, Drexel University

2:00 PM Invited

Recent Advances and Material Challenges in Up-scaling SOEC: *Peter Hendriksen*¹; ¹Technical University of Denmark

2:30 PM Invited

Thermomagnetic Transport in 2D Layered Materials: *Mona Zebarjadi*¹; Md. Sabbir Akhanda¹; Emad Rezaei¹; ¹University of Virginia

3:00 PM Invited

Synthesis of New Antimonides for Thermoelectric Applications: *Julia Zaikina*¹; ¹Iowa State University

3:20 PM

Enhancement of Thermoelectric Properties of Bismuth Sulfide by Halide Substitution: *Farheen Anjum*¹; ¹IIT Kanpur

3:40 PM Problem/Solution Forum

ELECTRONIC AND MAGNETIC MATERIALS

**Functional Defects in Electroceramic Materials –
Session II: Defects in Energy Materials**

Sponsored by: ACerS Electronics Division

Program Organizers: Hui Xiong, Boise State University; Hua Zhou, Argonne National Laboratory

**Wednesday PM | October 20, 2021
B235 | Greater Columbus Convention Center**

Session Chairs: Claire Xiong, Boise State University; Hua Zhou, Argonne National Lab

2:00 PM Introductory Comments

2:05 PM Invited

Defect-promoted Sulfur Cathode for Highly Stable Sodium-sulfur Batteries: *Weiyang Li*¹; ¹Dartmouth College

2:35 PM Invited

Understanding Lithium Plating in Graphite and Silicon for Fast Charging Li-ion Battery: *Tao Gao*¹; ¹University of Utah

3:05 PM Break

3:25 PM Invited

Irradiation-enhanced Electrochemical Performance of TiO₂ Anode Material: *Janelle Wharry*¹; Chao Yang¹; Tristan Olsen²; Hui (Claire) Xiong²; Kassiopeia Smith³; Yongqiang Wang⁴; Khalid Hattar⁵; Yaqiao Wu²; Dmitri Tenne²; Sheng Cheng²; ¹Purdue University; ²Boise State University; ³National Institute of Standards and Technology; ⁴Los Alamos National Laboratory; ⁵Sandia National Laboratories

3:55 PM

Dislocations as “Self-dopants” in Functional Oxides, Exemplified for TiO₂: *Qaisar Muhammad*¹; Lukas Porz¹; Atsutomo Nakamura²; Katsuyuki Matsunaga²; Marcus Rohnke³; Jürgen Janek³; Till Frömling¹; Jürgen Rödel¹; ¹Technical University of Darmstadt; ²Nagoya University; ³Justus Liebig University

FUNDAMENTALS AND CHARACTERIZATION

High Entropy Materials: Concentrated Solid Solutions, Intermetallics, Ceramics, Functional Materials and Beyond II – Theory and Modeling I

Sponsored by: TMS Alloy Phases Committee, TMS Mechanical Behavior of Materials Committee

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

**Wednesday PM | October 20, 2021
C171 | Greater Columbus Convention Center**

Session Chairs: Mike Widom, Carnegie Mellon University; Stefano Curtarolo, Duke University

2:00 PM Invited

To Mix, or not to Mix: Progresses in Entropy Descriptors: *Stefano Curtarolo*¹; ¹Duke University

2:30 PM Invited

Theories for Predicting Simple Solid Solution High-entropy Alloys: Classification, Accuracy, and Important Factors Impacting Accuracy: Jian-Hong Li¹; *Ming-Hung Tsai*¹; An-Chen Fan¹; ¹National Chung Hsing University

2:50 PM Invited

Exploring the Chemical and Structural Phase Space of High Entropy Alloys with Ab Initio Calculations and Machine Learning Potentials: *Fritz Koermann*¹; ¹Tu Delft

3:10 PM Invited

Development of Interatomic Potentials for Highly Concentrated/Entropy-stabilized Systems: *Ridwan Sakidja*¹; Andrew Duff²; Bikash Timalina¹; Tyler McGilvry-James¹; ¹Missouri State University; ²Daresbury Laboratory

3:30 PM Invited

Ab Initio Modeling on the Elastic Properties of Al-Co-Cr-Fe-Ni High Entropy Alloys: A Case Study with FCC Phase: Songge Yang¹; *Yu Zhong*¹; ¹Worcester Polytechnic Institute

3:50 PM Break

4:10 PM Invited

First-principles Predictions of Chemical Short-range Order in High Entropy Alloys: *Michael Widom*¹; ¹Carnegie Mellon University

4:40 PM Invited

The Role of Composition and Static Displacements on Phase Stability of BCC High Entropy Alloys: German Samolyuk¹; Yuri Osetsky¹; Malcolm Stocks¹; *James Morris*²; ¹Oak Ridge National Lab; ²Ames Laboratory

5:00 PM Invited

Temperature-dependent Configurational Entropy Calculations for Refractory High-entropy Alloys: *Chiraag Nataraj*¹; Axel van de Walle¹; Amit Samanta²; ¹Brown University; ²Lawrence Livermore National Lab

5:20 PM Invited

Phase-field Modelling of Transformation Pathways and Microstructural Evolution in MPEAs (Multi Principal Element Alloys): Kamalnath Kadirvel¹; Jacob Jensen¹; Zachary Kloenne¹; Rajarshi Banerjee²; Hamish Fraser¹; Yunzhi Wang¹; ¹Ohio State University; ²University of North Texas

5:40 PM

Atomistic Simulations of the Structure and Mechanical Properties of Grain Boundaries in High Entropy Alloys: Fadi Abdeljawad¹; ¹Clemson University

CERAMIC AND GLASS MATERIALS

Journal of the American Ceramic Society Awards Symposium — Journal of the American Ceramic Society Awards Symposium II

Sponsored by: ACerS

Program Organizer: William Fahrenholtz, Missouri University of Science and Technology

Wednesday PM | October 20, 2021
B233 | Greater Columbus Convention Center

Session Chairs: William Fahrenholtz, Missouri University of Science and Technology; Jonathon Foreman, American Ceramic Society

2:00 PM Invited

In-Situ Resistance Degradation & Switching of Bulk YSZ & STO Single Crystals: Ana Alvarez¹; I-Wei Chen¹; ¹University of Pennsylvania

2:30 PM Invited

Glassy Ga-Te Binaries: Structure and Properties for Phase-change Memory Applications: Andrey Tverjanovich¹; Maria Bokova²; Chris Benmore³; Daniele Fontanari Fontanari²; Anton Sokolov²; Mohammad Kassem²; Maxim Khomenko⁴; Eugene Bychkov⁵; ¹Institute of Chemistry, Saint Petersburg State University; ²Université du Littoral Côte d'Opale; ³Advanced Photon Source, Argonne National Laboratory; ⁴ILIT RAS-Branch of the FSRC "Crystallography and Photonics" RAS; ⁵Université du Littoral Côte d'Opale; ILIT RAS-Branch of the FSRC "Crystallography and Photonics" RAS

3:00 PM Break

3:30 PM Invited

Domain Walls in Ferroelectrics: Sukriti Mantri¹; John Daniels¹; ¹University of New South Wales

4:00 PM Invited

Relaxor Characteristics and Electromechanical Response under High Field for Sodium Bismuth Titanate-based Ceramics: Shuaishuai Bian¹; Zhenxing Yue¹; ¹Tsinghua University

4:30 PM Concluding Comments

ARTIFICIAL INTELLIGENCE

Materials Informatics for Images and Multi-dimensional Datasets — Session II

Sponsored by: ACerS Basic Science Division, ACerS Electronics Division

Program Organizers: Amanda Krause, University of Florida; Alp Sehrioglu, Case Western Reserve University; Daniel Ruscitto, General Electric

Wednesday PM | October 20, 2021

A124 | Greater Columbus Convention Center

Session Chair: Amanda Krause, University of Florida

2:00 PM Invited

Machine Learning Ferroelectrics: Bayesianity, Parsimony, and Causality: Sergei Kalinin¹; ¹Oak Ridge National Laboratory

2:30 PM Invited

Open-source Hyper-dimensional Materials Analytics Using Hyperspy: Joshua Taillon¹; ¹National Institute of Standards and Technology

3:00 PM

Multivariate Statistical Analysis (MVSA) for Hyperspectral Images: Chuong Nguyen¹; Alp Manavbasi¹; ¹Novelis

3:20 PM Break

3:40 PM Invited

Graph Neural Networks for an Accurate and Interpretable Prediction of the Properties of Polycrystalline Materials: Minyi Dai¹; Mehmet Demirel¹; Yingyu Liang¹; Jiamian Hu¹; ¹University of Wisconsin-Madison

4:10 PM

Characterization of Additively Manufactured ZrB₂-SiC Ultra High Temperature Ceramics via X-ray Microtomography: Pratish Rao¹; Jonghyun Park¹; Jeremy Watts¹; William Fahrenholtz¹; Gregory Hilmas¹; David Lipke¹; ¹Missouri University of Science and Technology

4:30 PM

Computational or Experimental? Interpreting X-ray Absorption and Diffraction Contrast for Massive Non-destructive 3D Grain Mapping of Metals in Laboratory CT: Andy Holwell¹; Hrishikesh Bale²; ¹Carl Zeiss Microscopy Ltd.; ²Carl Zeiss Microscopy Inc.

IRON AND STEEL (FERROUS ALLOYS)

New Frontiers in Physical Metallurgy of Steels — New Frontiers in Physical Metallurgy of Steels II

Sponsored by: AIST; MPPA Committee, TMS Steels Committee

Program Organizers: Matthias Militzer, University of British Columbia; Pello Uranga, CEIT and TECNUN (University of Navarra); Jonah Klemm-Toole, Colorado School of Mines; Amy Clarke, Colorado School of Mines; Amit Behera, QuesTek Innovations LLC

Wednesday PM | October 20, 2021
A210 | Greater Columbus Convention Center

Session Chair: To Be Announced

2:00 PM Invited

Nanoscale Investigation of Austenite/ferrite Interfaces in Medium Carbon Fe-Mn-C Steels at Different Inter-critical Temperatures: *Olha Nakonechna*¹; Fredric Danoix²; Helena Zapolsky²; Didier Huin³; Nicolas Charbonnier³; Lionel Germain⁴; Mohamed Gouné⁵; ¹University of Rouen Normandy; ²CNRS/GPM; ³ArcelorMittal research SA; ⁴Université de Lorraine; ⁵Université de Bordeaux

2:40 PM

Microstructure and Toughness Correlation in High Strength Q&T Boron Steels Microalloyed with Nb and Mo: Irati Zurutuza¹; Nerea Isasti¹; Eric Detemple²; Volker Schwinn²; Hardy Mohrbacher³; *Pello Uranga*⁴; ¹CEIT and TECNUN (University of Navarra); ²Dillinger Hüttenwerke; ³NiobelCon bvba

3:10 PM

Obtaining High Strength Ductility Combination by Quenching and Partitioning of Rolled Low Carbon Steel Sheet: *Alok Singh*¹; Basudev Bhattacharya²; Somjeet Biswas³; ¹Indian Institute of Technology Kharagpur; ²Tata Steel Limited, India; ³IIT Kharagpur

CERAMIC AND GLASS MATERIALS

Preceramic Polymers; Synthesis, Processing, Modeling, and Derived Ceramics — Preceramic Polymers and Polymer Derived Ceramics II

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Matthew Dickerson, Air Force Research Laboratory; Gurpreet Singh, Kansas State University; Paolo Colombo, University of Padova; Günter Motz, Universität Bayreuth

Wednesday PM | October 20, 2021
B230 | Greater Columbus Convention Center

Session Chair: Gurpreet Singh, Kansas State University

2:00 PM Invited

Atomistic Simulations of Polymer Pyrolysis: *Peter Kroll*¹; ¹University of Texas at Arlington

2:30 PM

Effect of Pendant Groups on the Mass Yield, Density and Process Modeling of Polycarbosilanes during Pyrolysis: *Thomas Key*¹; Garth Wilks²; Michael Cinibulk²; ¹UES Inc; ²Materials & Manufacturing Directorate, Air Force Research Laboratory, RXCC

2:50 PM

Isoconversional Methods and Kinetic Reaction Models for Cure Modelling of Commercial Pre-ceramic Polymers and their Blends: *Zlatomir Apostolov*¹; Elizabeth Heckman²; Michael Cinibulk¹; ¹Air Force Research Laboratory; ²Wright State University

3:10 PM

Organics Matter: Common Features in Energetics of Polymer Derived Ceramics, Metal Organic Frameworks, and other Hybrid Materials: *Alexandra Navrotsky*¹; ¹Arizona State University

3:30 PM Break

3:50 PM

Thermal and Rheological Properties of Preceramic Polymer Grafted Nanoparticles: *Kara Martin*¹; Ravichandran Kollarigowda²; Caitlyn Clarkson³; Christina Thompson⁴; Subramanian Ramakrishnan²; Matthew Dickerson⁵; ¹UES, Inc; ²FAMU-FSU College of Engineering; ³NRC Research Associateship Program; ⁴Southwest Ohio Council for Higher Education (SOCHE) Program; ⁵Air Force Research Lab

4:10 PM Invited

Molecules, Polymers, and Rings: Preceramic Compounds for AsB Formation: *Brandon Ackley*¹; Rory Waterman²; ¹ARCTOS Technology Solutions; ²University of Vermont

4:40 PM

Superparamagnetic Silicon Carbonitride Ceramic Fibers through In-situ Generation of Iron Silicide Nanoparticles: *Guenther Motz*¹; Antoine Viard¹; Birgit Weber¹; Samuel Bernard²; ¹University of Bayreuth; ²CNRS IRCER Limoges

5:00 PM

Evolutive State and Damage Modeling and Characterization for PIP-based Hypersonic Vehicle Materials: *Rick Hall*¹; Zlatomir Apostolov¹; Ashley Hilmas¹; George Jefferson¹; Vikas Varshney¹; Michael Cinibulk¹; Robert Brockman²; Rebecca Hoffman²; Thomas Key³; Derek King³; ¹Air Force Research Laboratory; ²University of Dayton Research Institute; ³UES

FUNDAMENTALS AND CHARACTERIZATION

Processing—Microstructure—Property Relationships of Titanium and Titanium Alloys — Session II

Sponsored by: TMS Titanium Committee

Program Organizers: Yufeng Zheng, University of Nevada-Reno; Rongpei Shi, Lawrence Livermore National Laboratory; Michael Gram, Titanium Metals Corporation

Wednesday PM | October 20, 2021
C160A/160B | Greater Columbus Convention Center

Session Chairs: Michael Gram, Titanium Metals Corporation; Yufeng Zheng, University of Nevada Reno

2:00 PM

Computational Polarized-Light Microscopy for Microtextured Regions Characterization in Titanium Alloys: *Matthew Dahar*¹; Sesh Tamirisakandala¹; Dan Satko²; Ayman Salem²; ¹Howmet Aerospace; ²Materials Resources, LLC

2:20 PM

Computational Polarized Light Microscopy for Orientation-based Quality Control: *Daniel Satko*¹; Thomas Carmody¹; Chasen Ranger¹; Sesh Tamirisakandala²; Matthew Dahar²; Ayman Salem¹; ¹MRL Materials Resources LLC; ²Howmet Aerospace

2:40 PM

Strain Energy Density Fatigue Assessment of Ti-6Al-4V for Plain and Notched Geometries

: *Jeremy Massie*¹; Casey Holycross²; Joy Gockel¹; ¹Wright State University; ²Air Force Research Laboratory

3:00 PM

Obtaining High Strength-ductility Combination in Titanium by Microstructure and Texture Engineering through Multiaxial Plane-strain Forging: *Devesh Chouhan*¹; Somjeet Biswas²; ¹Indian Institute of Technology KGP; ²IIT KGP

3:20 PM

Deformation Behavior of Ti-Ni-Fe Based Ternary B2 Pseudo Binary Intermetallic: *Subha Panda*¹; Jayant Jain²; Sudhanshu Singh³; ¹Indian Institute of Technology Kanpur; ²IIT Delhi; ³IIT Kanpur

CERAMIC AND GLASS MATERIALS

Solid-state Optical Materials and Luminescence Properties — Session II

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

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

Wednesday PM | October 20, 2021
B232 | Greater Columbus Convention Center

Session Chairs: Yiquan Wu, Alfred University; Jas Sanghera, Naval Research Laboratory

2:00 PM Invited

Searching Nitride Luminescent Materials for Applications in High Luminance Lighting and Sensing: *Rong-Jun Xie*¹; ¹Xiamen University

2:20 PM Invited

Er-doped YbAG Transparent Ceramics: Thermal and Upconverting Properties: *Dariusz Hreniak*¹; Zhengfa Dai¹; Robert Tomala¹; Jiang Li²; Daria Szewczyk¹; Andrzej Jezowski¹; ¹Institute of Low Temperature and Structure Research; ²Key Laboratory of Transparent and Opto-Functional Inorganic Materials, Shanghai Institute of Ceramics, Chinese Academy of Sciences

2:40 PM Invited

Oxide Thermometers Based on Cr³⁺ Luminescence with High Sensitivity: *Setsumi Tanabe*¹; Michele Back¹; ¹Kyoto University

3:00 PM Invited

Versatile Non-cubic Transparent Ceramics Applicable to Broad Wavelength Region: Ho Jin Ma¹; *Do-Kyung Kim*¹; ¹Korea Advanced Institute of Science & Tech

3:20 PM

Micro- and Submicro-defects in Magneto-optical Crystal CeF₃: *Dongsheng Yuan*¹; Encarnación G. Villora²; Kiyoshi Shimamura²; ¹National Institute for Materials Science; ²NIMS

3:40 PM Break

4:00 PM

Effect of Samarium Doping on the Phase Stability and Optical Properties of Agro-food Waste-derived Calcium Silicates

: *Manmeet Kaur*¹; Kulvir Singh¹; ¹SPMS, Thapar Institute of Engineering and Technology

4:20 PM Invited

Comonomer Isomers Result in LWIR-Transmitting ORMOCALC Polymers: *Darryl Boyd*¹; Vinh Nguyen¹; Frederic Kung²; Jason Myers¹; Daniel Gibson¹; Colin Baker¹; Woohong Kim¹; Jasbinder Sanghera¹; ¹US Naval Research Laboratory; ²University Research Foundation

4:40 PM Invited

A Green Chemistry Approach for the Preparation of Lanthanide Doped Alkaline-earth Fluoride Nanoparticles: Chiara Cressoni¹; Nicola Da Roit; Emil Milan¹; Francesca Parolini²; Mariapina D'Onofrio²; Giacomo Lucchini¹; *Adolfo Speghini*¹; ¹University of Verona and INSTM; ²University of Verona

5:00 PM Invited

A Review of Sharp Indentation to Probe Contact Damage in Glass: Brian Davis¹; *Ivar Reimanis*¹; Amanda Bellafatto¹; Amber Tremper²; Scott Glaesemann²; ¹Colorado School of Mines; ²Corning Incorporated

5:20 PM Invited

Enhancing Strength in Nanocrystalline Transparent Ceramics: *Ricardo Castro*¹; ¹University of California, Davis

5:40 PM Invited

Impact of the Sintering Pressure on the Persistent Luminescence Observed in Garnet and Aluminate Ceramics: *Pawel Gluchowski*¹; Kamila Rajfur²; Daniela Kujawa²; Magdalena Krawczyk³; Simona Veltri¹; Vitalii Boiko¹; Robert Tomala¹; ¹Institute of Low Temperature and Structure Research PAS; ²Wroclaw University of Technology; ³Wroclaw University

PROCESSING AND MANUFACTURING

Synthesis, Characterization, Modeling and Applications of Functional Porous Materials — Functional Porous Materials

Sponsored by: ACerS Electronics Division, ACerS Engineering Ceramics Division

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

Wednesday PM | October 20, 2021

A212 | Greater Columbus Convention Center

Session Chairs: Kevin Huang, University of South Carolina; Winnie Wong-Ng, National Institute of Standards and Technology (NIST)

2:00 PM Invited

Selected Pillared Cyanonickelate Based Metal Organic Frameworks (MOFs) for CO₂ Capture Applications: *Winnie Wong-Ng*¹; Jeffrey Culp²; Yu-Sheng Chen³; Daniel Siderius¹; Eric Cockayne¹; Lan Li⁴; ¹National Institute of Standards and Technology; ²NETL; ³University of Chicago; ⁴Boise State University

2:30 PM Invited

New Strategies for Defects Formation and Amorphization of Metal-organic Frameworks: *Tomce Runcevski*¹; ¹Southern Methodist University

3:00 PM Invited

Functional Applications of Porosity in Complex Crystals: *Lawrence Cook*¹; Greg Brewer¹; Winnie Wong-Ng²; Daniel Siderius²; ¹Catholic University of America; ²National Institute of Standards and Technology

3:30 PM Invited

Porous Organic Polymer-based Nanotraps for Water Purification: *Shengqian Ma*¹; ¹University of North Texas

4:00 PM Break**4:20 PM Invited**

Recent Advances in High Temperature Multiphase Solid/Molten Carbonate Membranes for CO₂ Capture and Conversion: *Kevin Huang*¹; ¹University of South Carolina

4:50 PM

Charge Transfer Kinetics on Microporous Polysulfone-copper Oxide Nanocomposite Surface: *Olayemi Fakayode*¹; Thabo Nkambule¹; ¹University of South Africa - Science Campus

5:10 PM

Integrated Multi-characterization Approach to Understand Pore Size Distributions in Natural Porous Materials: *V. V. Rohit Bukka*¹; Pankaj Sarin¹; ¹Oklahoma State University

5:30 PM

Microporous Copper Spheres: Processing, Morphology, and Application: *Braden Jones*¹; Beck Boan¹; Mark Atwater¹; ¹Liberty University

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Additive Manufacturing: Miscellaneous

Sponsored by:

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

Thursday AM | October 21, 2021

A115 | Greater Columbus Convention Center

Session Chair: To Be Announced

8:00 AM

Additive Manufacturing of Metallic Materials: Mechanical Properties: *Prashanth Konda Gokuldoss*¹; ¹Tallinn University of Technology

8:20 AM

Advancements in High Pressure Heat Treatment for AM Parts: *Chad Beamer*¹; ¹Quintus Technologies

8:40 AM

Avoiding Deleterious Phase Formation in Abrupt Interface Bonding of Multi-material Structures: *Nicholas Jones*¹; Jack Beuth¹; Maarten de Boer¹; ¹Carnegie Mellon University

9:00 AM

Controlling High Temperature Mechanical Performance of Superalloys Fabricated via Laser Powder Bed Fusion through Processing Parameter Variation: *Nicholas Lamprinakos*¹; Joseph Pauza¹; Anthony Rollett¹; ¹Carnegie Mellon University

9:20 AM

Effects of Extrusion-based Additive Manufacturing on Thermoelectric Transport in Nickel and Bismuth: *Victoria Stotzer*¹; Christian Apel¹; Sarah Watzman¹; Ashley Paz y Puente¹; ¹University of Cincinnati

9:40 AM

Functionally Graded Materials Designed by In Situ Site-specific Texture Control during Laser Powder Bed Fusion: *Karl Sofinowski*¹; Mallory Wittwer¹; Matteo Seita²; ¹Nanyang Technological University

10:00 AM Break

10:20 AM

Influence of Bead's Geometry on the Residual Stresses, Structure and Mechanical Behavior in Wire Arc Additive Manufacturing: Ahmed Elsokaty¹; Sameha Sadek¹; Maha Elsaied¹; Omar Gadalla¹; Hadeer Achraf¹; *Hanadi Salem*¹; ¹American University in Cairo

10:40 AM

Location-specific Fatigue Life Predictions in AM Parts Using Physics-based Models within an ICME Framework: *Manisha Banker*¹; Ayman Salem¹; Daniel Satko¹; Jan Kasprzak²; Nam Phan²; ¹MRL Materials Resources LLC; ²Naval Air Systems Command

11:00 AM

Low Pressure Cold Spray Additive Manufacturing of Molds and Dies: *Roman Maev*¹; Volf Leshchynsky¹; Ahmed Elseddawy¹; Emil Strumban¹; John Wladarski¹; ¹IDIR

11:20 AM

Microstructural and Electrochemical Properties of Additively Manufactured Alloys: Ali Raza¹; *Sohaib Khan*²; Waseem Haider¹; ¹Central Michigan University; ²Islamic University of Madinah

MATERIALS-ENVIRONMENT INTERACTIONS

Advanced Materials for Harsh Environments — Session V

Sponsored by: ACerS Electronics Division

Program Organizers: Navin Manjooran, Solve Technology and Research, Inc.; Gary Pickrell, Virginia Tech

Thursday AM | October 21, 2021

A223 | Greater Columbus Convention Center

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

8:00 AM Introductory Comments

9:00 AM

Corrosion Behaviors of Alloys in High Temperature Supercritical CO₂ with Impurity: Yimin Zeng¹; *Kaiyang Li*¹; ¹NRCan, Canada

9:20 AM

Assessment of Conductive Sites on Carbon Fiber Reinforced Polymer Composite Using Different Electrochemical Experimental Methods: *Priyanka Adapala*¹; ¹The Ohio State University

9:40 AM Break

10:00 AM

Scandium-containing Filler Material for Welding Aircraft Castings Made of High-temperature Magnesium-based Alloy: Vadim Shalomeev¹; Sergei Sheyko²; *Ievgeniia Chetvertak*¹; ¹National University "Zaporizhska Politecnics"; ²Zaporizhzhia National University

10:20 AM Concluding Comments

CERAMIC AND GLASS MATERIALS

Ceramics and Glasses Modeling by Simulations and Machine Learning — Session III

Sponsored by: ACerS Glass & Optical Materials Division

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

Thursday AM | October 21, 2021

B231 | Greater Columbus Convention Center

Session Chairs: Mathieu Bauchy, UCLA; Peter Kroll, UT Arlington; Anoop Krishnan, IIT Delhi

8:00 AM

Ceramics from Polymers -- Results of Ab Initio Molecular Dynamic Simulations: *Peter Kroll*¹; ¹University of Texas at Arlington

8:20 AM

Bayesian Optimization of Silicon Nitride Empirical Potentials: *Tobias Kroll*¹; Peter Kroll¹; ¹University of Texas at Arlington

8:40 AM

Development of a Reactive Force Field (ReaxFF) for Simulation of Polymer-derived Ceramics: *Shariq Haseen*¹; Peter Kroll¹; ¹University of Texas at Arlington

ENERGY

Energy Materials for Sustainable Development — Storage Batteries II

Sponsored by: ACerS Energy Materials and Systems Division

Program Organizers: Armin Feldhoff, Leibniz University Hannover; Kyle Brinkman, Clemson University; Krista Carlson, University of Utah; Eva Hemmer, University of Ottawa; Nikola Kanas, Norwegian University of Science and Technology; Kjell Wiik, Norwegian University of Science and Technology; Lei Zuo, Virginia Tech; Stephanie Lee, Stevens Institute of Technology; Muhammad Hajj, Stevens Institute of Technology; Mohammad Haik, Stevens Institute of Technology

Thursday AM | October 21, 2021

A216 | Greater Columbus Convention Center

Session Chairs: Kevin Huang, University of South Carolina; Mona Zebarjadi, University of Virginia

8:00 AM Keynote

Lessons Learned from Materials Enriching Sustainable Energy Storage Solutions: *Ekaterina Pomerantseva*¹; ¹Drexel University

8:40 AM Invited

Recovery of Lithium from Geothermal Brines and Minerals: *Mariappan Paranthaman*¹; ¹Oak Ridge National Laboratory

9:10 AM Invited

The Role of Lithium Site Occupancy on Lithium-Ion Conductivity of Tantalum-Doped Lithium Lanthanum Zirconium Oxide Garnet: *Jeffrey Ferguson¹; Xingxing Zhang¹; Auburn University*

9:40 AM

One-step Synthesis of Carbon-coated LiCoPO₄ Nanopowders for High Voltage Battery Cathodes: *V. V. Rohit Bukka¹; Pankaj Sarin¹; Oklahoma State University*

10:00 AM Break**10:20 AM**

Transition-metal-mediated Thermal Stability of Spinel Cathode in Li-ion Battery by In Situ Neutron Scattering: *Yan Chen¹; Ke An¹; Oak Ridge National Laboratory*

10:40 AM

Effects of Processing Conditions on Hybrid Organic-Inorganic Solid Electrolytes: *Vazrik Keshishian¹; John Kieffer¹; Vazrik Keshishian*

11:00 AM

A Novel Bi-functional Oxygen Catalyst, NBRO, for Rechargeable Air Battery: Preparation, Characterization, and Catalytic Activity: *Hayato Suzuki¹; Kentaro Kozasa¹; Masatsugu Morimitsu¹; Doshisha University*

FUNDAMENTALS AND CHARACTERIZATION

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

Sponsored by: TMS Alloy Phases Committee, TMS Mechanical Behavior of Materials Committee

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

Thursday AM | October 21, 2021

C172 | Greater Columbus Convention Center

Session Chairs: Bai Cui, University of Nebraska-Lincoln; Yu Zhong, Worcester Polytechnic Institute

8:00 AM

Behavior of Compositionally Complex Ceramic Matrix Composites in Molten Salt Environments under Biaxial Stresses: *Wylie Simpson¹; James Earthman¹; University of California Irvine*

8:20 AM

Control of Local Distortions in High-entropy Oxides: *Keivan Esfarjani¹; Jonathan Kaufman¹; University of Virginia*

8:40 AM

Microstructure and Phase Stability of High Entropy (RE)PO₄ Monazite-structured Ceramics: *Nadjia Motley¹; Adriana Mejia¹; Yingjie Yang¹; Daniel Mumm¹; Martha Mecartney¹; University of California, Irvine*

9:00 AM

Surface Enhancement of Multi-principal Element Alloys by Gas Nitriding: *Yu-Hsuan Lin¹; David Poerschke¹; University of Minnesota*

9:20 AM

Structural and Mechanical Properties of High Entropy Metal-nitride: *Saro San¹; Wai-Yim Ching²; University of Missouri¹; University of Missouri Kansas City*

9:40 AM

Thermal Conductivity Reduction in (Zr_{0.25}Ta_{0.25}Nb_{0.25}Ti_{0.25})C High Entropy Carbide from Extrinsic Lattice Defects: *Cody Dennett¹; Fei Wang²; Bai Cui²; Idaho National Laboratory¹; University of Nebraska-Lincoln*

10:00 AM Break**10:20 AM**

Multi-component High Entropy Ultra-high Temperature Carbides: Solid-solution to High-entropy Phase Formation: *Ambreen Nisar¹; Tyler Dolmetsch¹; Tanaji Paul¹; Cheng Zhang¹; Benjamin Boest¹; Arvind Agarwal¹; Florida International University*

10:40 AM

The Dynamic and Sensing Performance of 3D Printed Functionally Graded Elastomeric Lattice Structures: *Charles Dwyer¹; Joao Garretto¹; Gina Morrison¹; Jae-Won Choi²; Eric MacDonald³; Pedro Cortes¹; Youngstown State University¹; University of Akron²; The University of Texas at El Paso*

11:00 AM

Temperature Dependent Mechanical Behavior of the Au-Zn-Al Ternary System: *Taylor Jacobs¹; Seth Imhoff¹; Los Alamos National Laboratory*

11:20 AM

The Research Thermoplastic Deformation Modes of Dual-phase Special Alloys for Obtaining Rational Intermetallic Structure: *Borys Sereda¹; Dmytro Sereda¹; Irina Kruglyak¹; Yuriy Belokon²; Dneprovsky State Technical University¹; Zaporizhzhya National University*

11:40 AM

Interstitial Induced Transformations in Nb-Ti Alloys: *Ravit Silverstein¹; Anirudh Natarajan¹; Raphaële Clément¹; Anton Van der Ven¹; Carlos Levi¹; University of California, Santa Barbara*

FUNDAMENTALS AND CHARACTERIZATION

High Entropy Materials: Concentrated Solid Solutions, Intermetallics, Ceramics, Functional Materials and Beyond II – Theory and Modeling II

Sponsored by: TMS Alloy Phases Committee, TMS Mechanical Behavior of Materials Committee

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

**Thursday AM | October 21, 2021
C171 | Greater Columbus Convention Center**

Session Chairs: Dilpuneet Aidhy, University Of Wyoming; Ganesh Balasubramanian, Lehigh University

8:00 AM Invited

Data-enabled Additive Manufacturing of High-entropy Alloys: Ganesh Balasubramanian¹; ¹Lehigh University

8:30 AM Invited

Data-driven Design of Refractory High-entropy Alloys: George Kim¹; Chanho Lee²; Peter Liaw³; Wei Chen¹; ¹Illinois Institute of Technology; ²Los Alamos National Lab; ³University of Tennessee

8:50 AM

A Systematic Analysis of Phase Stability in Refractory High Entropy Alloys Utilizing Linear and Non-linear Cluster Expansion Models: Chiraag Nataraj¹; Edgar Josué Landinez Borda²; Axel van de Walle¹; Amit Samanta²; ¹Brown University; ²Lawrence Livermore National Lab

9:10 AM Invited

Atomic Transport by Point Defects and Clusters in Concentrated Alloys: Osetskiy Yury¹; Laurent Béland²; Alexander Barashev³; Yanwen Zhang⁴; ¹Oak Ridge National Laboratory; ²Queen's University; ³University of Michigan; ⁴University of Tennessee

9:30 AM Invited

Joint Prediction of Mechanical Properties of Alloys with Enhanced Fidelity through Integration of Machine Learning (Data Analytics) and Multiscale Modeling: Baldur Steingrímsson¹; Peter Liaw²; Jaafar El-Awady³; ¹Imagars LLC; ²University of Tennessee; ³John Hopkins University

9:50 AM Break

10:10 AM Invited

Predicting Fundamental Properties of BCC Refractory Multicomponent Alloys Using Electronic Descriptors and Statistical Learning: Yong-Jie Hu¹; Christopher Tandoc¹; Liang Qi²; ¹Drexel University; ²University of Michigan

10:40 AM Invited

Machine Learning Enabled Defect Energies in Concentrated Alloys: Gaurav Arora¹; Anus Manzoor¹; Dilpuneet Aidhy¹; ¹University of Wyoming

11:00 AM Invited

Local Ordering and Defect Evolution in Body-centered Cubic (BCC) Multi-principal Element Alloys: Shijun Zhao¹; ¹City University of Hong Kong

11:20 AM Invited

Mapping Elastic Properties of Fcc Al-Co-Cr-Fe-Ni HEAs Using the CALPHAD Approach Aided by Ab initio Calculations: Chuan Zhang¹; Song-Ge Yang²; Yu Zhong²; Shuang-Lin Chen¹; Song-Mao Liang¹; Fan Zhang¹; ¹CompuTherm LLC; ²Worcester Polytechnic Institute

11:40 AM Invited

Determination of Fluctuations in Local Composition, Strain and Lattice Distortions in Multi-principal Component Alloys Using Advanced Transmission Electron Microscopy: Jian Min Zuo¹; Haw-Wen Hsiao¹; Yu-Tsun Shao¹; Qun Yang¹; Yang Hu¹; ¹University of Illinois

MATERIALS-ENVIRONMENT INTERACTIONS

Progressive Solutions to Improve Corrosion Resistance for Nuclear Waste Storage – Corrosion and Aspects of Environmentally Safe Processing of Nuclear Waste Storage Materials

Sponsored by: TMS Corrosion and Environmental Effects Committee, ACerS Glass & Optical Materials Division

Program Organizers: Madeleine Jordache, Stevens Institute of Technology; Gary Pickrell, Virginia Tech

**Thursday AM | October 21, 2021
A222 | Greater Columbus Convention Center**

Session Chairs: Madeleine Jordache, Stevens Institute of Technology; Gary Pickrell, Virginia Tech

10:20 AM Introductory Comments

10:25 AM

Using Stress Modelling to Understand Effects of Pit Morphology on Stress Corrosion Cracking Initiation in Austenitic Stainless Steels: Alana Parey¹; ¹The Ohio State University

10:45 AM

A Geopolymer for Hanford Secondary Waste: Sepideh Akhbari¹; Weiliang Gong¹; Werner Lutze¹; Ian Pegg¹; ¹Catholic University of America -Vitreous State Lab

11:05 AM Invited

Understanding Corrosion of Nuclear Waste Glasses through Molecular Dynamics Simulations and Quantitative Structural Property Relationship Analysis: Jincheng Du¹; ¹University of North Texas

11:35 AM Invited

Predicting Zeolites' Stability during the Corrosion of Nuclear Waste Immobilization Glasses: Mathieu Bauchy¹; ¹University of California, Los Angeles

Technical Meeting and Exhibition

MST21

MATERIALS SCIENCE & TECHNOLOGY

October 17–21, 2021 | Columbus, Ohio

POSTER SESSION WITH PRESENTERS

The poster sessions are divided into 3 separate presentation times and grouped by topic area. Poster presenters should stand by their poster during their designated presentation time.

POSTER SESSION I

Tuesday, October 19
11:00 a.m. to 12:00 p.m.

- Ceramic and Glass Materials
- Electronic and Magnetic Materials
- Fundamentals and Characterization
- Nanomaterials

POSTER SESSION II

Tuesday, October 19
12:00 p.m. to 1:00 p.m.

- Biomaterials
- Energy
- Materials-Environment Interactions
- Processing and Manufacturing

POSTER SESSION III

Tuesday, October 19
4:45 p.m. to 5:45 p.m.

- Additive Manufacturing
- Artificial Intelligence
- Iron and Steel (Ferrous Alloys)
- Modeling

ELECTRONIC AND MAGNETIC MATERIALS

Advances in Dielectric Materials and Electronic Devices — Poster Session

Sponsored by: ACerS Electronics Division

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

11:00 AM to 12:00 PM
Tuesday AM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Dielectric NDE for On-line Cure Monitoring and Defect Detection in Engineered Composites: *William Flynn*¹; Bryan Gamboa¹; Sean Garnsey¹; Ruyan Guo²; Amar Bhalla¹; ¹University of Texas at San Antonio

Electric and Dielectric Characterization of [Cu, 2Ta] Dipole Substituted BaTiO₃ Ceramics: *Noah Smith*¹; Trisha Whaley¹; Victoria Pellegrino¹; Kaijie Ning¹; Holly Shulman¹; Walter Schulze¹; Steven Tidrow¹; ¹Alfred University

Features on the Structural Phase Transition in La-modified AgNbO₃ Lead-free Ceramics: Karine Felix Santos de Jesús¹; Atair Carvalho da Silva¹; Yanela Mendez-González²; Ruyan Guo³; Amar Bhalla³; *Jose de los Santos Guerra*¹; ¹Universidade Federal de Uberlandia; ²Universidad de La Habana; ³The University of Texas at San Antonio

Graphs Theory and Electrophysical Parameters Characterization: *Vojislav Mitic*¹; Aleksandar Stajic²; Branislav Randjelovic¹; Srdjan Ribar³; Bojana Markovic³; Maria Cebela⁴; Ivana Radovic⁵; Hans Fecht⁶; ¹University Nis; ²University of Belgrade, Center of Microelectronic Technologies, Institute of Chemistry, Technology and Metallurgy – National Institute of the Republic of Serbia, Belgrade; ³University of Belgrade; ⁴University of Belgrade, 'VINCA' Institute of Nuclear Sciences – National Institute of the Republic of Serbia, Belgrade; ⁶University Ulm, Institute of Functional Nanosystems FNS,

Multimethodological Characterization of Bismuth-substituted Hydroxyapatite Ceramics: *Asmaa El Khouri*

Nanoscale Dipole Engineered [Y, Ta] BaTiO₃ Ceramics For Relaxor-like Ferroelectrics: *Victoria Pellegrino*¹; Trisha Whaley¹; Noah Smith¹; Kaijie Ning¹; Holly Shulman¹; Walter Schulze¹; Steven Tidrow¹; ¹Alfred University

Novel Dipole-pair [Zn, W] Substituted BaTiO₃ Ceramic Relaxor: *Trisha Whaley*¹; Noah Smith¹; Victoria Pellegrino¹; Kaijie Ning¹; Holly Shulman¹; Walter Schulze¹; Steven Tidrow¹; ¹Alfred University

Observations from Testing Dielectric Elastomers in Uniaxial Tension: *Carolyn Haase*¹; Hector Medina¹; ¹Liberty University

Study and Physical Characterization of Hybrid PVDF/Ceramic Composites: *Evaristo Alexandre Falcão*¹; Atair Carvalho da Silva²; Yanela Mendez-González³; Ruyan Guo⁴; Amar Bhalla⁴; Jose de los Santos Guerra²; ¹Universidade Federal da Grande Dourados; ²Universidade Federal de Uberlandia; ³Universidade de La Habana; ⁴The University of Texas at San Antonio

CERAMIC AND GLASS MATERIALS

Ceramic Matrix Composites — Poster Session

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Narottam Bansal, NASA Glenn Research Center; Jacques Lamon, CNRS; Sung Choi, Naval Air Systems Command

11:00 AM to 12:00 PM
Tuesday AM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Session Chair: Narottam Bansal, NASA Glenn Research Center

High Performance Oxide-Oxide CMCs: *Linh Nguyen*¹; ¹Applied Thin Films, Inc.

Effect of Doping on the Structural and Morphological Properties of Hydroxyapatite and β -tricalcium Phosphate Ceramics: *Asmaa El Khouri*; ¹

CERAMIC AND GLASS MATERIALS

Ceramics and Glasses Modeling by Simulations and Machine Learning — Poster Session

Sponsored by: ACerS Glass & Optical Materials Division

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

11:00 AM to 12:00 PM
Tuesday AM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Molecular Dynamic Characteristic Temperatures for Predicting Metallic Glass Forming Ability: *Lane Schultz*¹; Dane Morgan¹; Izabela Szlufarska¹; Benjamin Afflerbach¹; ¹University of Wisconsin-Madison

Deciphering the Viscosity of Glass Materials with Machine Learning: *Yu Song*¹; Mathieu Bauchy¹; ¹University of California, Los Angeles

The Energy Landscape Governs Ductility in Disordered Materials: *Mathieu Bauchy*¹; ¹University of California, Los Angeles

NANOMATERIALS

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials — Poster Session

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

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

11:00 AM to 12:00 PM
Tuesday AM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Layered Metal Monochalcogenides as Electrodes for Electrochemical Energy Storage Applications: *Shakir Bin Mujib*¹; Gurpreet Singh¹; ¹Kansas State University

Low Temperature Synthesis of Solvothermally Grown Ga₂O₃ Thin Films on FTO Substrates Enabling Various Functional Applications: *Siddhartha Suman*¹; Mukurala Nagaraju¹; Lokanath Mohapatra¹; Aditya Bhardwaj¹; Ajay Kushwaha¹; ¹Indian Institute of Technology

FUNDAMENTALS AND CHARACTERIZATION

Deformation-induced Phase Transformations — Poster Session

Program Organizers: Yangyang Zhao, Purdue University; Jonah Klemm-Toole, Colorado School of Mines; Amy Clarke, Colorado School of Mines; Janelle Wharry, Purdue University

11:00 AM to 12:00 PM
Tuesday AM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Bimetallic Billets for Magnesium-thermal Production of High Quality Sponge Titanium: *Valeriy Mishchenko*¹; Svitlana Mudra¹; Olha Bolsun¹; Sergiy Sheyko¹; ¹Zaporizhzhia National University

High-cut Steel Property Researches For Taps' Manufacture: *Anton Matiukhin*¹; Anna Ben¹; Vitalii Shyrokobokov¹; Sergey Sheyko¹; Elena Kulabneva¹; ¹"Zaporizhzhia Polytechnic" National University

FUNDAMENTALS AND CHARACTERIZATION

Grain Boundaries, Interfaces, and Surfaces in Ceramics: Fundamental Structure—Property—Performance Relationships — Poster Session

Sponsored by: ACerS Basic Science Division, ACerS Electronics Division

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

11:00 AM to 12:00 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

A Novel Probe for Grain Boundary Characterization on the Mesoscopic Scale: Lab-based Diffraction Contrast Tomography: *Jun Sun*¹; Jette Oddershede¹; Hrishikesh Bale²; Florian Bachmann¹; William Harris³; Erik Lauridsen¹; ¹Xnovo Technology; ²Carl Zeiss X-ray Microscopy; ³Carl Zeiss Microscopy, LLC

The Effect of High Energy Diffraction Microscopy (HEDM) and Laboratory Diffraction Contrast Tomography (LabDCT) Resolution on Measured Grain Growth Parameters in Strontium Titanate (SrTiO₃): *Vivekanand Muralikrishnan*¹; Jette Oddershede²; He Liu³; Bryan Conry¹; Florian Bachmann²; Robert Suter³; Amanda Krause¹; ¹University of Florida; ²Xnovo Technology ApS; ³Carnegie Mellon University

FUNDAMENTALS AND CHARACTERIZATION

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

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

11:00AM to 12:00 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Life Prediction of High Temperature Alloys Subject to Coupled Thermomechanical Fatigue-creep Condition: *Abhilash Gulhane*¹; Harshal Dhamade¹; Tejesh Dube¹; Jing Zhang¹; ¹Indiana University - Purdue University Indianapolis



SPECIAL TOPICS

Late News Poster Session — Ceramic and Glass Materials

11:00 AM to 12:00 PM
Tuesday AM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

3D Printed Hybrid Scaffolds for Bone and Cartilage Regeneration: From Design to In Vivo Studies: *Francesca Tallia*¹; Agathe Heyraud¹; Julian Jones¹; ¹Imperial College London

Effect of Boria on the Oxidation Behavior of Aluminum Nitride: *Celia Char*¹; Katherine Faber¹; ¹California Institute of Technology

Luminescence Thermometry – a Fad or a Challenge?: *Malgorzata Sójka*¹; Marcin Runowski²; Przemyslaw Wozny²; Luis Carlos³; Eugeniusz Zych¹; Stefan Lis²; ¹University of Wroclaw; ²Adam Mickiewicz University; ³University of Aveiro

Preparation and Structural Evolution of Si(O)CN Fibers Prepared via Hand Spinning of a Modified Silazane Oligomer: *Ellie Christman*¹; Christel Gervais²; Gurpreet Singh³; Himanshu Jain¹; ¹Lehigh University; ²Sorbonne University; ³Kansas State University

Ultra-high Temperature Ceramic Matrix Composites via Polymer-derived Route: *Elia Zancan*¹; ¹University of Birmingham

SPECIAL TOPICS

Late News Poster Session — Electronic and Magnetic Materials

11:00 AM to 12:00 PM
Tuesday AM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Hydrogen Induced Photodarkening of Cu-doped B-Ga2O3 Czochralski Single Crystals: *Jani Jesenovec*¹; Christopher Pansegrau¹; Cassandra Remple¹; Jesse Huso²; Matthew McCluskey¹; John McCloy¹; ¹Washington State University; ²Klar Scientific

SPECIAL TOPICS

Late News Poster Session — Fundamentals and Characterization

11:00 AM to 12:00 PM
Tuesday AM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

An Extended Forming Limit Curve between Uniaxial Tension and Shear: *Miroslav Urbánek*¹; ¹COMTES FHT

Extrinsic Size Effects on Fracture Behaviour of Copper: *Hrushikesh Sahasrabudhe*¹; Anirban Patra¹; Nagamani Jaya Balila¹; ¹India Institute of Technology Bombay

Investigating Mechanical Response of a Commercial Aluminum Alloy 6xxx as a Function of Recrystallized Grain Fractions: *Ahmed Mohamed*¹; Khaled Adamb²; Mohammed Aldlemy³; ¹College of Mechanical Engineering Technology; ²Kennesaw State University; ³College of Mechanical Engineering Technology, Benghazi, Libya

Nanoindentation studies on Friction Stir Processed Dual Phase High Entropy Alloy: *Neelam Meena*¹; Gourav Rao²; Nithyanand Prabhu¹; ¹IIT BOMBAY; ²Naval Materials Research Labroatory

Polyurea Tensile Tests at High Strain Rates: *Frederick Heim*¹; Sidney Chocron¹; Arthur Nicholls¹; Lynsey Reese²; ¹Southwest Research Institute; ²US Navy NAVFAC

SPECIAL TOPICS

Late News Poster Session — Nanomaterials

11:00 AM to 12:00 PM
Tuesday AM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Efficient Fields Emission from Carbon Nanostructure Hybrids with CuO Nanorods and CNTs: *Gurjinder Kaur*¹; Indranil Lahiri¹; ¹Indian Institute of Technology, Roorkee

Resilient SiOC/Epoxy Nanocomposites: *Tulsi Patel*¹; Robert Wheeler¹; Derek King¹; Andrew Sharits¹; Ryan Nielsen²; Pania Newell²; Lisa Rueschhoff¹; ¹Air Force Research Laboratory; ²University of Utah

Spectroscopic Studies of Nd³⁺ Doped KY3F10 Nanoparticles: *Sangeetha Balabhadra*¹; Michael Reid¹; Jon-Paul Wells¹; ¹University of Canterbury

FUNDAMENTALS AND CHARACTERIZATION

Nucleation of Solid-State Phase Transformations — Poster Session

Sponsored by: TMS Phase Transformations Committee

Program Organizers: Eric Lass, University of Tennessee-Knoxville; Sophie Primig, University of New South Wales; Keith Knipling, Naval Research Laboratory

11:00 AM to 12:00 PM
Tuesday AM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Structure Influenced Rapid Hydrogenation Using Metal-acid Contacts on Crystallographically Oriented VO₂ Thin Films: *Komal Mulchandani*¹; Ankit Soni²; Krushna Mavani³; ¹Indian Institute of Technology Indore, Rajeev Gandhi Govt. P. G. College, Mandsaur (M.P.); ²Indian Institute of Technology Delhi; ³Indian Institute of Technology Indore

CERAMIC AND GLASS MATERIALS

Phase Transformations in Ceramics: Science and Applications – Poster Session

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

Program Organizers: Scott McCormack, University of California, Davis; Pankaj Sarin, Oklahoma State University; Sanjay V. Khare, University of Toledo; Waltraud Kriven, University of Illinois at Urbana-Champaign

11:00 AM to 12:00 PM
Tuesday AM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Structure, Electronic and Optical Properties of Ternary Nitride Phases of MgSnN₂: A First-principles Study: *Bishal Dumre*¹; Daniel Gall²; Sanjay Khare³; ¹The University of Toledo; ²Rensselaer Polytechnic Institute

Understanding the Effect of Aliovalent Doping on Phase Transformations and Thermo-physical Properties in RENbO₄: Daniel Lowry¹; *Pankaj Sarin*¹; ¹Oklahoma State University

FUNDAMENTALS AND CHARACTERIZATION

Processing—Microstructure—Property Relationships of Titanium and Titanium Alloys – Poster Session

Sponsored by: TMS Titanium Committee

Program Organizers: Yufeng Zheng, University of Nevada-Reno; Rongpei Shi, Lawrence Livermore National Laboratory; Michael Gram, Titanium Metals Corporation

11:00 AM to 12:00 PM
Tuesday AM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Hierarchical Twinning Microstructure in the Metastable β Ti-24Nb-4Zr-8Sn Alloy: *Wenrui Zhao*¹; Dian Li¹; Yufeng Zheng¹; ¹University of Nevada, Reno

Analysis of Temperature Factor Influence on the Nature of the Titanium Alloy Deformation during Extrusion: *Anton Matiukhin*¹; Anna Ben¹; Vitalii Shyrokobokov¹; Sergey Sheyko¹; Elena Kulabneva¹; ¹"Zaporizhzhia Polytechnic" National University

PROCESSING AND MANUFACTURING

13th Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing – Poster Session

Sponsored by: ACerS Engineering Ceramics Division

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

12:00 PM to 1:00 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Biomass Derived SiO₂: Different Waste Resources and Extraction Methods: *Damandeep Kaur*¹; O.P. Pandey¹; M.S. Reddy¹; ¹Thapar Institute of Engineering & Technology

Effect of Steam Injection on Reduction of Dioxin Emission from the Commercial-scale Sintering Plant: *Zhengyun Fan*¹; Wen Pan¹; Shiqi Zhao¹; ¹Shougang Research Institute of Technology

Metallurgical Quality Analysis of High Nb TiAl Alloy Cast Ingot Prepared by BaZrO₃ Crucible: *Xuexian Zhang*¹; Guangyao Chen¹; Bao Hua Duan¹; Yuchen Yang¹; ¹Shanghai University

Optimization of the Ratio of Air and Fuel in Ignition Chamber of Sintering Machine: *Yapeng Zhang*¹; Wen Pan¹; Jingjun Zhao²; Shaoguo Chen¹; Huaiying Ma¹; Zhixing Zhao¹; ¹Research Institute of Iron & Steel, Shougang Group Co., LTD Research Institute of Technology; ²Ironmaking Department, Shougang Jingtang United Iron & Steel Co., Ltd

Research on West Pilbara Fines (WPF) Utilization under Deep Bed Sintering: *Wen Pan*¹; Shaoguo Chen¹; Yapeng Zhang¹; ¹Research Institute of Iron & Steel, Shougang Group Co., LTD Research Institute of Technology

Reform and Practice of Energy Saving and Consumption Reduction Technology of 500 t/d Beckenbach Annular Lime Kiln: *Yapeng Zhang*¹; Wen Pan²; Zhenping Miao¹; Shaoguo Chen²; Huaiying Ma²; Zhixing Zhao²; ¹Shougang Group; ²Research Institute of Iron & Steel, Shougang Group Co., LTD Research Institute of Technology

Study on Application of King Ore Fines in Sintering Process of Shougang Jingtang Plant: *Shaoguo Chen*¹; Wen Pan¹; Yapeng Zhang¹; Xiaochen Zhang¹; Bin Ji¹; Zhixing Zhao¹; ¹Shougang Research Institute of Technology

MATERIALS-ENVIRONMENT INTERACTIONS

Advanced Coatings for Wear and Corrosion Protection – Poster Session

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

12:00 PM to 1:00 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Session Chair: Evelina Vogli, LM Group Holdings

Increase of Wearproofness Steel Surface as a Result Mechanochemical Influence Polymethylmethacrylat: *Volodymyr Tsyganov*¹; ¹"Zaporizhzhia Polytechnic" National University

Increased Efficiency Serfising Diffusion Metalization of Cast Iron and Steel Chemical Equipment Parts: Svetlana Kondrashova¹; Egor Saprykin¹; *Valeriy Naumyk*²; Sergey Sheyko³; ¹Berdiansk Mechanical Engineering College of National University "Zaporizhzhia Polytechnic"; ²NU "Zaporizhzhya Polytechnic"; ³Zaporizhzhia National University

Novel Spray-on TBC Coating with Outstanding Wear and Corrosion Protection: *Linh Nguyen*¹; ¹Applied Thin Films, Inc.

Production Aluminized Alloyed Coatings for Protection Against Wear and Corrosion: *Borys Sereda*¹; Dmytro Sereda¹; Irina Kruglyak¹; ¹Dneprovsky State Technical University

Hot Corrosion Behavior of Yb₂O₃-Gd₂O₃-Y₂O₃ Co-Stabilized Zirconia in Thermal Barrier Coatings with a Lewis Neutral Layer: *Junseong Kim*¹; Dowon Song²; Guanlin Lyu¹; Janghyeok Pyeon¹; SeungCheol Yang¹; Yeon-Gil Jung¹; ¹Changwon National University; ²Hanyang University

MATERIALS-ENVIRONMENT INTERACTIONS

Advanced Materials for Harsh Environments – Poster Session

Sponsored by: ACerS Electronics Division

Program Organizers: Navin Manjoooran, Solve Technology and Research, Inc.; Gary Pickrell, Virginia Tech

12:00 PM to 1:00 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Development of Porous Silicon Nitride for Hypersonic RF Window Applications: *Averyonna Kimery*¹; ¹Purdue University

PROCESSING AND MANUFACTURING

Advances in Surface Engineering – Poster Session

Sponsored by: TMS Surface Engineering Committee

Program Organizers: Rajeswaran Radhakrishnan, Faraday Technology Inc; Brian Skinn, Faraday Technology, Inc.; Timothy Hall, Faraday Technology Inc; Michael Roach, University of Mississippi Medical Center; Sandip Harimkar, Oklahoma State University; Tushar Borkar, Cleveland State University; Rajeev Gupta, North Carolina State University

12:00 PM to 1:00 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Session Chair: Rajeswaran Radhakrishnan, Faraday Technology Inc

Novel Rosette-like Formations on Ti Surfaces with Nanosize "Petal" Features: *Hector Medina*¹; ¹Liberty University

Effect of Laser Shock Peening on Residual Stress Distribution of 304 Austenitic Steel: *Danbi Song*¹; Ryoohan Kim¹; Jeong Suh¹; Dongsig Shin¹; ¹Korea Institute of Machinery and Materials

MATERIALS-ENVIRONMENT INTERACTIONS

Coatings to Protect Materials from Extreme Environments – Poster Session

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Kang Lee, NASA Glenn Research Center; Yutaka Kagawa, The University of Tokyo; Daniel Mumm, University of California, Irvine; Rodney Trice, Purdue University; Emmanuel Boakye, UES Inc.; Valerie Wiesner, NASA Langley Research Center; Edward Gorzkowski, Naval Research Laboratory; Scooter Johnson, Naval Research Laboratory

12:00 PM to 1:00 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Self-generated Tribo-coatings on Glass from Nano-dispersions in Aqueous Medium: *Sourav Sahoo*¹; Om Khatri²; N. M. Anoop Krishnan¹; Nitya Gosvami¹; ¹Indian Institute of Technology (IIT) Delhi; ²CSIR-Indian Institute of Petroleum

MATERIALS-ENVIRONMENT INTERACTIONS

Computation Assisted Materials Development for Improved Corrosion Resistance – Poster Session

Program Organizers: Rishi Pillai, Oak Ridge National Laboratory; Laurence Marks, Northwestern University

12:00 PM to 1:00 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Development of Rhenium Free Heat-resistant Nickel Alloy for the Cast Blades Production by the Method of Directional Crystallization: *Evgeniy Milonin*¹; Konstantin Balushok²; Pavel Malinovskiy¹; Valeriy Naumyk²; Vadim Shalomoev²; Sergey Sheyko³; ¹JSC «Motor Sich»; ²NU «Zaporizhzhya Polytechnic»; ³Zaporizhzhia National University

Predictive Modeling of Microstructure Induced Variations in the Sensitization Response of 5XXX Aluminum Alloys: *Likun Sun*¹; Syeda Noor E Sumaiya¹; Matthew Steiner¹; ¹University of Cincinnati

SPECIAL TOPICS

Late News Poster Session – Biomaterials

12:00 PM to 1:00 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Biocompatible Ceramic Powders Designed for SLS Applications: An Optimisation Study: *Christos Softas*¹; Sooraj Nandyala¹; Md Towhidul Islam²; Ifty Ahmed²; Artemis Stamboulis¹; ¹University of Birmingham; ²University of Nottingham

Effect of Copyrolysis on the Composition of Soursop (*Annona muricata*) and Mango (*Mangifera indica*) Seeds Bio-oil: *Esther Ikhuoria*¹; Joshua Onaifo¹; ¹University of Benin

SPECIAL TOPICS

Late News Poster Session – Energy

12:00 PM to 1:00 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Computational Fluid Dynamics Modeling of Enhanced Convective Heat Transfer Using Twisted Tape Insert: *Kshitija Kshitija*¹; Tejesh Dube¹; Jian Zhang¹; Jing Zhang¹; ¹Indiana University – Purdue University Indianapolis

Correlation between Shear Strength and PU Foam Density with Respect to Aging Time in District Heating Pipe: *Hyung-Gyu Kim*¹; Jaehoon Park¹; Jooyong Kim²; Hae-Yong Lee²; Jonghun Yoon¹; ¹Hanyang University; ²Korea District Heating Corporation (KDHC)/ Frontier Research & Training Institute

Development of Metal Oxide Dispersed Ferritic Stainless as Interconnect Material for Solid Oxide Fuel Cells: *Rak-Hyun Song*¹; TaeHun Kim¹; Dong Woo Joh¹; Seung-Bok Lee¹; Tak-Hyoung Lim¹; ¹Korea Institute of Energy Research

SPECIAL TOPICS

Late News Poster Session – Processing and Manufacturing

12:00 PM to 1:00 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Porous Metal Micro-pillars by Thermomechanical Molding: *Shweta Jagdale*¹; Golden Kumar¹; ¹University of Texas at Dallas

BIOMATERIALS

Next Generation Biomaterials – Poster Session

Sponsored by: ACerS Bioceramics Division, TMS Biomaterials Committee

Program Organizers: Roger Narayan, University of North Carolina; Min Wang, University of Hong Kong; Shawn Allan, Lithoz America LLC

12:00 PM to 1:00 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

4D Printed Shape Morphing PDLLA-co-TMC/GelMA Scaffolds for Tissue Regeneration: Xiaodie Chen¹; Jiahui Lai¹; *Min Wang*¹; ¹University of Hong Kong

A Skin Testing Diagnostic Device: *Anthony Annerino*¹; Pelagia-Iren Gouma¹; ¹The Ohio State University

Bridging the Gap: Nerve Regeneration on Microfilaments of a Zn-Fe Alloy: *Sarah Pixley*¹; Avi Leon²; Tomer Ron²; Kevin Little¹; Eli Aghion²; ¹University of Cincinnati; ²Ben-Gurion University

Metal Release from a Biomedical CoCrMo Alloy in Mixed Protein Solutions under Static and Sliding Conditions – Effects of Protein Aggregation and Metal Precipitation: *Zheng Wei*¹; Valentin Romanovski²; Luimar Filho³; Cecilia Cecilia³; Yolanda Hedberg¹; ¹Western University; ²National Academy of Sciences of Belarus; ³Uppsala University

Non-clinical Method For Diagnosing Cystic Fibrosis: *Cassidy Holdeman*¹; ¹University of Utah

BIOMATERIALS

Porous Materials for Biomedical Applications — Poster Session

Sponsored by: ACerS Bioceramics Division

Program Organizers: Usman Liaqat, National University of Sciences and Technology; Chuanbin Mao, University of Oklahoma; Mingying Yang, Zhejiang University

12:00 PM to 1:00 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

3D Printing Seamless Hydrogels for In-vivo Pressure Sensing Devices:

Ashwin Velraj¹; Jeffrey Bates¹; ¹University of Utah

In vitro Investigation and Characterization of Resorption and Degradation Behavior of X-Ca-alginate Aerogels for Tissue Scaffold Applications:

Martina Rodriguez Sala¹; Grigorios Raptopoulos²; Patrina Paraskevopoulou²; Firouzeh Sabri¹; ¹The University of Memphis; ²National and Kapodistrian University of Athens

PROCESSING AND MANUFACTURING

Synthesis, Characterization, Modeling and Applications of Functional Porous Materials — Poster Session

Sponsored by: ACerS Electronics Division, ACerS Engineering Ceramics Division

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

12:00 PM to 1:00 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Session Chair: Lan Li, Boise State University

ScSZ-MC Dual-phase Tubular Membrane for Pre-combustion CO₂ Capture:

Shichen Sun¹; Kevin Huang¹; ¹University of South Carolina

Geopolymer Adsorbents for Harvesting N and P from Poultry Litter:

Gizem Topal¹; Pankaj Sarin¹; V.V. Rohit Bukka¹; ¹Oklahoma State University

MATERIALS-ENVIRONMENT INTERACTIONS

Thermodynamics of Materials in Extreme Environments — Poster Session

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

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

12:00 PM to 1:00 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Session Chairs: Kristina Lilova, Arizona State University; Xiaofeng Guo, Washington State University

Design of Ultra-high Temperature Ceramics for Oxidation Resistance:

Niquana S¹; Elizabeth Opila Opila¹; ¹University of Virginia

ARTIFICIAL INTELLIGENCE

Accelerating Materials Science with Big Data and Machine Learning — Poster Session

Program Organizers: Huan Tran, Georgia Institute of Technology; Muratahan Aykol, Toyota Research Institute

4:45 PM to 5:45 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Developing Physics-based Descriptors for Property Prediction in Oxide Glasses: *Suresh Bishnoi¹; Ravinder Ravinder¹; N. M. Anoop Krishnan¹; ¹Indian Institute of Technology, Delhi*

Machine Learning to Predict Mechanical Properties of Steel Alloys Based on Chemical Composition and Heat Treatment Process: *Yutao Wang¹; ¹WPI*

Rashba Spin Splitting and Photocatalytic Properties of GeC-MSSe (M=Mo, W) Van Der Waals Heterostructures: *Haleem Ud Din¹; ¹Abbottabad University of Science & Technology*

Thermo-mechanical Property Prediction of High-temperature Materials Using a Python Based Interface With Quantum Espresso: *Joseph Derrick¹; Michael Golub¹; Jing Zhang¹; ¹Indiana University – Purdue University Indianapolis*

ADDITIVE MANUFACTURING

Additive Manufacturing of Ceramic-based Materials: Process Development, Materials, Process Optimization and Applications – Poster Session

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

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

4:45 PM to 5:45 PM

Tuesday PM | October 19, 2021

Exhibit Hall B | Greater Columbus Convention Center

Properties of LiNbO₃ Films Deposited by Micro-Cold Spray at Varying Angles of Impact: *Stephen Bierschenk*¹; Michael Becker¹; Susanne Lee²; Desiderio Kovar¹; ¹The University of Texas at Austin; ²L3Harris Technologies, Inc.

ADDITIVE MANUFACTURING

Additive Manufacturing Modeling and Simulation: Microstructure, Mechanics, and Process – Poster Session

Sponsored by: TMS Computational Materials Science and Engineering Committee

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

4:45 PM to 5:45 PM

Tuesday PM | October 19, 2021

Exhibit Hall B | Greater Columbus Convention Center

Session Chair: Jing Zhang, Indiana University - Purdue University Indianapolis

Creep Modeling of 3D Printed Nickel Based Superalloy: *Harshal Dhamade*¹; Abhilash Gulhane¹; Tejesh Dube¹; Jing Zhang¹; ¹Indiana University – Purdue University Indianapolis

Design A Syringe Pump Extruder Type 3D Bioprinter: *Haoyee Yeong*¹; Eli Kindomba²; Bavly Shehata¹; Alyaa Idris¹; Jing Zhang¹; ¹Indiana University – Purdue University Indianapolis

Finite Element Modeling of Coating Thickness Prediction in Electron Beam Physical Vapor Deposition Process: *Anvesh Dhulipalla*¹; Yafeng Li²; Sugrim Sagar²; Jian Zhang¹; Xuehui Yang¹; Dan Koo¹; Hye-Yeong Park³; Yeon-Gil Jung³; Jing Zhang¹; ¹Indiana University – Purdue University Indianapolis; ²Tiangong University; ³Changwon National University

Modeling Charpy Impact Property of 3D Printed 718 Nickel Alloys Using the Smoothed Particle Hydrodynamics Method: *Sugrim Sagar*¹; Jian Zhang¹; Jing Zhang¹; ¹Indiana University – Purdue University Indianapolis

Reinforcement Learning Aided Simulations for Determining Process Parameters for Optimizing Microstructure in LPBF Additive Manufacturing Parts: *Junwon Seo*¹; Joseph Pauza¹; Anthony Rollett¹; ¹Carnegie Mellon University

Student Design Project of Design a Mechanical Ventilator Prototype during the Pandemic: *Francis Iloje*¹; Sunday Folorunso¹; Haoyee Yeong¹; Eli Kindomba¹; Yafeng Li²; Jing Zhang¹; ¹Indiana University – Purdue University Indianapolis; ²Tiangong University

Virtual Reality Modules of 3D Printing Laboratories for Additive Manufacturing Education: *Cooper Zuranski*¹; Shambhuraj Wadghule¹; Jing Zhang¹; ¹Indiana University – Purdue University Indianapolis

ADDITIVE MANUFACTURING

Additive Manufacturing: Large-Scale Metal Additive Manufacturing – Poster Session

Program Organizers: Yousub Lee, Oak Ridge National Laboratory; Antonio Ramirez, Ohio State University; Yashwanth Bandari, Meltio Inc.; Duckbong Kim, Tennessee Technological University; Wei Zhang, Ohio State University

4:45 PM to 5:45 PM

Tuesday PM | October 19, 2021

Exhibit Hall B | Greater Columbus Convention Center

Robotic Gas Metal Arc Pulse DED Methods for Large Aluminum Structures: *Jack Canaday*¹; Dennis Harwig¹; ¹Ohio State University

ADDITIVE MANUFACTURING

Additive Manufacturing: Processing, Microstructure and Material Properties of Titanium-based Materials – Poster Session

Sponsored by: TMS Titanium Committee

Program Organizers: Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University; Peeyush Nandwana, Oak Ridge National Laboratory; Rongpei Shi, Lawrence Livermore National Laboratory

4:45 PM to 5:45 PM

Tuesday PM | October 19, 2021

Exhibit Hall B | Greater Columbus Convention Center

Characterization of Stresses as a Function of AM Processing Parameters in Commercially Pure Ti: *Claire Adams*¹; Kellen Traxel¹; Amit Bandyopadhyay¹; David Field¹; ¹Washington State University



IRON AND STEEL (FERROUS ALLOYS)

Advances in Metallic Coated Advanced Steels — Poster Session

Sponsored by: AIST: Metallurgy Processing Products and Applications Technology Committee, AIST: Galvanizing Technology Committee

Program Organizers: Joseph McDermaid, McMaster University; Frank Goodwin, ILZRO

4:45PM to 5:45 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Session Chair: Frank Goodwin, International Zinc Association

Reduction of the Internal and External Oxidation of the Charge during Galvanizing Under SHS Conditions: *Borys Sereda¹; Dmytro Sereda¹; Irina Kruglyak¹; ¹Dneprovsky State Technical University*

IRON AND STEEL (FERROUS ALLOYS)

Fracture of Steels: New Approaches to Modeling and Experimental Characterization — Poster Session

Sponsored by: TMS Steels Committee

Program Organizers: Louis Hector, General Motors Global Technical Center; Ana Luiza Araujo, AK Steel Research & Innovation; Matthias Miltzer, University of British Columbia; Amy Clarke, Colorado School of Mines

4:45PM to 5:45 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Impact of Welding Parameters on Microstructure and Fracture Characteristics: *Devin McGill¹; Travis Welt¹; ¹University of St. Thomas*

SPECIAL TOPICS

Late News Poster Session — Additive Manufacturing

4:45 PM to 5:45 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Additively Manufactured 718 Ni Alloys with Oxide Nanoparticles: *Benjamin Stegman¹; Xinghang Zhang¹; Haiyan Wang¹; Bo Yang¹; Zhongxia Shang¹; Jie Ding¹; Tianyi Sun¹; William Jarosinski¹; Jack Lopez¹; ¹Purdue University*

CALPHAD-based Alloy Design and Uncertainty Quantification for Additive Manufacturing: *Xin Wang¹; Soumya Sridar¹; Wei Xiong¹; ¹University of Pittsburgh*

Direct Powder-bed Selective Laser Sintering/melting of Zirconia-based Ceramics and their Assembly with Metals as Multi-materials: *Eren Özmen¹; ¹Toulouse INP*

Effect of Heat Treatment on Microstructure and Corrosion Behavior of Additively Manufactured 7050 Aluminum Alloy: *Rupesh Rajendran¹; Preet Singh¹; ¹Georgia Institute of Technology*

Fabrication of Doped β -tricalcium Phosphate Bioceramics by Robocasting for Bone Repair Applications: *Nicolas Somers¹; Florian Jean¹; Marie Lasgorceix¹; Anthony Thuault¹; Fabrice Petit²; Sandra Balvay³; Christelle Der Loughian³; Claire Gaillard³; Laurent Gremillard³; Anne Leriche¹; ¹LMCPA/UPHF; ²Belgian Ceramic Research Center; ³I2B/Mateis-INSA Lyon*

Hybrid Additive/Subtractive System of Ceramic Materials: Investigation of Powder, Process and Innovative Post-treatments: *Qirong Chen¹; Enrique Juste¹; Marie Lasgorceix²; Fabrice Petit¹; Anne Leriche²; ¹Belgium Ceramic Research Centre; ²Laboratoire des Matériaux Céramiques et Procédés Associés*

Texture Evolution during the High Temperature Heat Treatment of Additively Manufactured IN718: *Selda Nayir¹; Bertrand Max²; Simon Perusin²; Todd Palmer¹; ¹Pennsylvania State University; ²IRT Saint Exupéry, Institut de Recherche Technologique*

SPECIAL TOPICS

Late News Poster Session — Artificial Intelligence

4:45 PM to 5:45 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

LSTM Model to Predict Low-cycle Fatigue in IN718: *Jacob Keesler-Evans¹; Ansan Pokharel¹; Terence Musho¹; ¹West Virginia University*

Unsupervised Machine Learning for Spatio-temporal Characterization of Ultrafast Electron Microscopy Datasets: *Arun Baskaran¹; Faran Zhou¹; Thomas Gage¹; Haihua Liu¹; Ilke Arslan¹; Haidan Wen¹; Maria Chan¹; ¹Argonne National Laboratory*

SPECIAL TOPICS

Late News Poster Session — Iron and Steel (Ferrous Alloys)

4:45 PM to 5:45 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Ceramic Filter Micropores as Retention Sites for Liquid Inclusions: *Soumava Chakraborty¹; Ronald O'Malley¹; Laura Bartlett¹; ¹Missouri Univ of Science & Technology*

Development of Austenitic Stainless Steel with TWIP Effect: *Pavel Podany¹; ¹COMTES FHT*

Introducing Heusler Fe₂SiTi Intermetallic as a New Strengthening Precipitate for High Strength Low Alloy Steels: *Rafael Rodriguez De Vecchis*¹; Xin Wang¹; Soumya Sridar¹; Zhangwei Wang²; Wei Xiong¹; ¹University of Pittsburgh; ²Max-Planck-Institut für Eisenforschung GmbH

Understanding the Load Response Behavior of Martensite, Bainite and Accompanied Retained Austenite in a High Carbon Bearing Steel: *Mohanchand Paladugu*¹; Daniel Foster²; Enrique Jimenez-melero²; Lee M. Rothleutner¹; R. Scott Hyde¹; ¹The Timken Company; ²Materials Performance Centre, Department of Materials, The University of Manchester, UK

SPECIAL TOPICS

Late News Poster Session — Modeling

4:45 PM to 5:45 PM
Tuesday PM | October 19, 2021
Exhibit Hall B | Greater Columbus Convention Center

Fatigue Analysis of a Spring Coil Structure under Cyclic Loading Conditions: *Sunday Folorunso*¹; Jian Zhang¹; Tejesh Dube¹; Jing Zhang¹; ¹Indiana University – Purdue University Indianapolis

Finite Element Modeling of Sheet Metal Bending Process: *Sunket Kulkarni*¹; Tejesh Dube¹; Jian Zhang¹; Jing Zhang¹; ¹Indiana University – Purdue University Indianapolis

Grain Size-texture Coupling in Crystal Plasticity Finite Element Modeling : Application to Magnesium Alloys: *Aaditya Lakshmanan*¹; Mohsen Andani¹; Veera Sundararaghavan¹; Amit Misra¹; John Allison¹; ¹University Of Michigan

Reactive Phase Formation: Kinetics and Associated Microstructure Evolution: Connor McNamara¹; Helen Chan¹; *Jeffrey Rickman*¹; ¹Lehigh University

Understanding Mechanical Behavior of Basketball Hoops Using Finite Element Modeling: *Luc Rulinda*¹; Jian Zhang¹; Tejesh Dube¹; Jing Zhang¹; ¹Indiana University – Purdue University Indianapolis

Technical Meeting and Exhibition

MS&T21

MATERIALS SCIENCE & TECHNOLOGY

October 17–21, 2021 | Columbus, Ohio

ON-DEMAND PRESENTATIONS

The following are details to help prepare for the program if you are presenting in the virtual on-demand option:

- The on-demand presentations are scheduled to be available beginning Friday, October 22 starting at 8:00 a.m. EDT.
- The presentations will be available to view through November 30, 2021.
- Presentations will be pre-recorded.
- All presentations and events will be scheduled in Eastern Daylight Time (UTC-4:00).

PROCESSING AND MANUFACTURING

13th Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing – On-Demand Novel Approaches to Sustainable Manufacturing

Sponsored by: ACerS Engineering Ceramics Division

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

Friday AM | October 22, 2021
Virtual Meeting Room 12 | MS&T Virtual

Sustainable Processing of Composite Materials: *Daniel Kopp*¹; Kevin Blinn²; Jun Wang²; Daniel McMullen²; Surojit Gupta³; Richard Riman¹; ¹Rutgers University; ²RRTC Inc.; ³University of North Dakota

Gelation-freezing Derived Mullite Thermal Insulators Prepared by Reaction Sintering with Various Types of Alumina Nanofibers and Silica: *Manabu Fukushima*¹; ¹National Institute of Advanced Industrial Science and Technology

High Temperature Interaction of IN718 on Heated Buildplate: *Nicolas Tan*¹; ¹University of Arizona

Preparation of BaZrO₃/Y₂O₃ Composite Refractory and Study on Its Interface Reaction with Ti₂Ni Alloy: *Xiao Hou*¹; Feihai Yu¹; Yucheng Yang¹; Guangyao Chen¹; ¹Shanghai University

Preparation of Tin Nanosized Powder by Pulsed Wire Discharge: *Hisayuki Suematsu*¹; Souma Yamamoto¹; Thi Do¹; Tadachika Nakayama¹; ¹Nagaoka University of Technology

Room-temperature Densification of MgO Ceramics with Nitride Phosphor Particles: *Junichi Tatami*¹; Emi Takahashi¹; Takuma Takahashi¹; ¹Yokohama National University

Smart Powder Processing for Sustainable Society: *Makio Naito*¹; Takahiro Kozawa¹; Akira Kondo¹; ¹Osaka University

Polymer Derived Coatings for Corrosion Protection of Steels: *Kathy Lu*¹; ¹Virginia Polytechnic Institute and State University

First-principles Studies of Adsorption and Diffusion of Metal on a-Al₂O₃ for Advanced Manufacturing Applications: *Austin Biagge*¹; Lan Li¹; ¹Boise State University

Study on the Interfacial Reaction between BaZrO₃ Refractories and Zr Amorphous Alloys: *Feihai Yu*¹; Guangyao Chen¹; Xiao Hou¹; Yuchen Yang¹; Chonghe Li¹; ¹Shanghai University

ARTIFICIAL INTELLIGENCE

Accelerating Materials Science with Big Data and Machine Learning – On-Demand Oral Presentations

Program Organizers: Huan Tran, Georgia Institute of Technology; Muratahan Aykol, Toyota Research Institute

Friday AM | October 22, 2021
Virtual Meeting Room 2 | MS&T Virtual

Bridging the Gap between Literature Data Extraction and Domain Specific Materials Informatics: *Elsa Olivetti*¹; ¹Massachusetts Institute of Technology

Slip Band Characterization with Microtensile Testing Using Digital Image Processing: *Anthony Lombardi*¹; Elim Schenck¹; Subhasish Malik¹; Ajit Achuthan¹; Sean Banerjee¹; Natasha Banerjee¹; ¹Clarkson University

Scalable Gaussian Processes for Predicting the Optical, Physical, Thermal, and Mechanical Properties of Inorganic Glasses Using Compositions for Large Datasets: *Suresh Bishno*¹; Ravinder Ravinder¹; Hargun Singh Grover¹; Hariprasad Kodamana¹; N. M. Anoop Krishnan¹; ¹Indian Institute of Technology, Delhi

Molecular Dynamics Simulation Using Lagrangian Neural Networks: *Ravinder Bhattoo*¹; N. M. Anoop Krishnan¹; ¹Indian Institute of Technology Delhi

Deep Learning-enabled Prediction of Mechanical Properties of Metallic Microlattice Structures Using Uniaxial Compression Videos: *Akanksh Shetty*¹; Chunshan Hu¹; Mohammad Sadeq Saleh¹; Jack Beuth¹; Rahul Panat¹; Amir Farimani¹; ¹Carnegie Mellon University

Data Infrastructure and Automation: The Drivers of Materials Innovation: *Vinay Hegde*¹; ¹Citrine Informatics

Learning Synthesis: Engineering Metal Nanoclusters for Specific Material Properties: *Ryan McCarty*¹; ¹University of California Irvine

Designing Alloys with Process-mapping AI Pre-trained on Empirical Knowledge: *Vyacheslav Romanov*¹; ¹National Energy Technology Laboratory

There is No Time for Science as Usual: *Alan Aspuru-Guzik*¹; ¹University of Toronto

Multi-target Prediction of Concrete Engineering Properties Based on a Single Deep Learning Model: *Yu Song*¹; Gaurav Sant¹; Mathieu Bauchy¹; ¹University of California, Los Angeles

Application of Machine Learning in Predicting the Tensile Properties and Creep Behavior of Metals: *Mahmoud Hawary*¹; Abdullah Alomari²; ¹North Carolina State University; ²King Abdulaziz City for Science and Technology

Machine Learning in 2D Materials: Benchmarking Crystal Graph Based Convolutional Neural Network (CGCNN) for Open Databases: *Shreeja Das*¹; Raj Kishore¹; Mihir Sahoo¹; S Swayamjyoti¹; Anthony Yoshimura²; Nikhil Koratkar³; Saroj Nayak¹; Kisor Sahu¹; ¹Indian Institute of Technology Bhubaneswar; ²Livermore National Laboratory; ³Rensselaer Polytechnic Institute

ARTIFICIAL INTELLIGENCE

Accelerating Materials Science with Big Data and Machine Learning — On-Demand Poster Presentations

Program Organizers: Huan Tran, Georgia Institute of Technology; Muratahan Aykol, Toyota Research Institute

Friday AM | October 22, 2021
Virtual Poster Hall | MS&T Virtual

Topology Optimization for Two-phase Composites Using Active Learning Based Gaussian Process Regression: *Tanu Pittie*¹; Suresh Bishnoi²; N. M. Anoop Krishnan¹; ¹Indian Institute of Technology (IIT), Delhi

ADDITIVE MANUFACTURING

Additive Manufacturing Modeling and Simulation: Microstructure, Mechanics, and Process — AM Modeling - On-Demand Oral Presentations

Sponsored by: TMS Computational Materials Science and Engineering Committee

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

Friday AM | October 22, 2021
Virtual Meeting Room 1 | MS&T Virtual

Session Chair: Jing Zhang, Indiana University - Purdue University Indianapolis

Grain Refinement and Mechanical Properties for AISI304 Stainless Steel Single-tracks by Laser Melting Deposition: Mathematical Modelling versus Experimental Results: *Muhammad Arif Mahmood*¹; Andrei C. Popescu²; Mihai Oane³; Diana Chioibas¹; Gianina Popescu-Pelin¹; Carmen Ristoscu¹; Ion N. Mihailescu¹; ¹National Institute for Laser, Plasma and Radiation Physics (INFLPR)

Numerical Simulations of Fracture Tests of Uncharged and Hydrogen-charged Bend Specimens of Additively Manufactured 304 Stainless Steel Using Nodal Release Method and Cohesive Zone Model: *Shengjia Wu*¹; Shin-Jang Sung¹; Jwo Pan¹; Paul Korinko²; ¹University of Michigan; ²Savannah River National Laboratory

Phase-field Modeling of Solute Trapping During Rapid Solidification: An Insight for Additive Manufacturing: *Nima Najafzadeh*¹; Yijia Gu¹; ¹University of Missouri Science and Technology

Inherent Strain Method for Residual Stress Prediction in Ferritic-austenitic Steel Structure Fabricated by Directed Energy Deposition: *Zhengtong Shan*¹; Minh Tien Tran¹; Huai Wang²; Sun-Kwang Hwang³; Dong-Kyu Kim¹; ¹University of Ulsan; ²Chinese Academy of Sciences; ³Korea Institute of Industrial Technology

ADDITIVE MANUFACTURING

Additive Manufacturing Modeling and Simulation: Microstructure, Mechanics, and Process — AM Modeling - On-Demand Poster Presentations

Sponsored by: TMS Computational Materials Science and Engineering Committee

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

Friday AM | October 22, 2021
Virtual Poster Hall | MS&T Virtual

Model the Initiation of Hot Cracking during Laser Welding of Al6061: *Guannan Tang*¹; Anthony Rollett¹; ¹Carnegie Mellon University

ADDITIVE MANUFACTURING

Additive Manufacturing of Ceramic-based Materials: Process Development, Materials, Process Optimization and Applications — On-Demand Oral Presentations

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

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

Friday AM | October 22, 2021
Virtual Meeting Room 1 | MS&T Virtual

Session Chair: Xuan Song, University of Iowa

Mesoscale Modeling of Sintering Kinetics in Direct Ink Write Additive Manufacturing: *Fadi Abdeljawad*¹; ¹Clemson University

3D Printed Ceramic Acoustic Liners for Aircraft Noise Reduction: *David Nevarez-Saenz*¹; Ted Adler¹; Wei Wei¹; Bhisham Sharma¹; ¹Wichita State University

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Equipment, Instrumentation and In-Situ Process Monitoring — On-Demand Oral Presentations

Program Organizers: Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University

Friday AM | October 22, 2021
Virtual Meeting Room 1 | MS&T Virtual

Defect Recognition and Improvement in Ti-6Al-4V Fabrication by In-situ Monitoring and Feedback System of Directed Energy Deposition LAMDA 200: *Lingxiao Ouyang*¹; Kenta Aoyagi¹; Yuji Imamiya²; Akihiko Chiba¹; ¹Tohoku University; ²Mitsubishi Heavy Industries Machine Tool Co., Ltd.

ADDITIVE MANUFACTURING

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — On-Demand Oral Presentations

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

Friday AM | October 22, 2021
Virtual Meeting Room 1 | MS&T Virtual

Effects of Laser Polishing Parameters on Surface Roughness of Additively Manufactured Stainless Steel 316L Parts: *Daniil Panov*¹; Oleg Oreshkin²; Igor Shishkovsky¹; ¹Skolkovo Institute of Science and Technology; ²National Research Nuclear University MEPhI

Detection and Classification of Internal Defects from Surface Morphology Data of Additively Manufactured Parts: *Yunwei Gui*¹; Kenta Aoyagi¹; Huakang Bian¹; Akihiko Chiba¹; ¹Tohoku University

Cryogenic Mechanical Properties of CrCoNi Medium Entropy Alloy Produced by Selective Laser Melting with Hot Isostatic Pressing: *Tri Hoang Nguyen*¹; Minh Tien Tran¹; Kyung-Hwan Jung²; Ho Won Lee³; Sun-Kwang Hwang²; Dong-Kyu Kim¹; ¹University of Ulsan; ²Korea Institute of Industrial Technology; ³Korea Institute of Materials Science

ADDITIVE MANUFACTURING

Additive Manufacturing: Advanced Characterization for Industrial Applications — On-Demand Oral Presentations

Sponsored by: TMS Advanced Characterization, Testing, and Simulation Committee, TMS Additive Manufacturing Bridge Committee

Program Organizers: Nadia Kouraytem, University of Utah; Fan Zhang, National Institute of Standards and Technology; Lianyi Chen, University of Wisconsin-Madison

Friday AM | October 22, 2021
Virtual Meeting Room 1 | MS&T Virtual

Thermo-mechanical Behavior of AM and Wrought IN718 Under High-strain-rate Tensile Deformation: *Owen Kingstedt*¹; John Varga²; S-Danial Salehi¹; ¹University of Utah; ²Sandia National Laboratory

ADDITIVE MANUFACTURING

Additive Manufacturing: Alloy Design to Develop New Feedstock Materials III — On-Demand Oral Presentations

Sponsored by: TMS Alloy Phases Committee

Program Organizers: Aurelien Perron, Lawrence Livermore National Laboratory; Joseph McKeown, Lawrence Livermore National Laboratory; Manyalibo Matthews, Lawrence Livermore National Laboratory; Peter Hosemann, University of California, Berkeley; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology

Friday AM | October 22, 2021
Virtual Meeting Room 1 | MS&T Virtual

Spherical Micro/Macro Indentation Stress-strain Curves for Additive Manufacturing Materials Design: *Jordan Weaver*¹; Patxi Fernandez-Zelaia²; Houshang Yin³; Xiaoyuan Lou³; ¹National Institute of Standards and Technology; ²Oak Ridge National Laboratory; ³Auburn University

ADDITIVE MANUFACTURING

Additive Manufacturing: Processing, Microstructure and Material Properties of Titanium-based Materials – On-Demand Oral Presentations

Sponsored by: TMS Titanium Committee

Program Organizers: Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University; Peeyush Nandwana, Oak Ridge National Laboratory; Rongpei Shi, Lawrence Livermore National Laboratory

Friday AM | October 22, 2021
Virtual Meeting Room 1 | MS&T Virtual

Cavitation Peening for Improvement of Fatigue Strength of Additive Manufactured Metals: *Hitoshi Soyama*¹; ¹Tohoku University

Laser Additive Manufacturing Under Reactive Atmosphere: An Approach to Fabricate Ultra-high Strength Commercially Pure Titanium Without Sacrificing Ductility: *Dawei Wang*¹; *Ming Yan*¹; ¹Southern University of Science and Technology

ENERGY

Advanced Characterization of Materials for Nuclear, Radiation, and Extreme Environments – On-Demand Oral Presentations

Sponsored by: TMS Nuclear Materials Committee

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

Friday AM | October 22, 2021
Virtual Meeting Room 6 | MS&T Virtual

Session Chair: Caitlin Taylor, Los Alamos National Laboratory

Unraveling Solute-solvent Interactions in Molten Salt Environments Using X-ray Absorption Spectroscopy: *Simerjeet Gill*¹; ¹Brookhaven National Lab

Speciation of Metal Ion Solutes in Molten Salt Matrices for Reactor Applications using Advanced Spectroscopy Techniques: *Ruchi Gakhar*¹; *Michael Woods*¹; *Simerjeet Gill*²; *Anatoly Frenkel*³; *Mehmet Topsakal*²; ¹Idaho National Laboratory; ²Brookhaven National Lab; ³Stonybrook University

Radiation Damage Suppression in AISI-316 Steel Nanoparticles: Implications for the Design of Future Nuclear Materials: *Emily Aradi*¹; *Matheus Tunes*²; *Jacob Lewis-Fell*³; *Graeme Greaves*³; *Steven Donnelly*³; *Jonathan Hinks*³; ¹University of Manchester; ²Montanuniversitaet Leoben; ³University of Huddersfield

High Temperature Mechanical Properties of WC/W2C Composites Fabricated by Reactive Sintering of Powders Colloidally Processed: *Antonio Javier Sanchez-Herencia*¹; *Macarena Garcia-Ayala*¹; *Sandra Tarancon*²; *Begoña Ferrari*¹; *Jose Ygnacio Pastor*²; ¹Institute for Ceramic and Glass; ²ETSI Caminos-UPM

Material Degradation Pathways of UO₂ under Oxygen, Humidity, and Temperature Probed by XAFS: *Juejing Liu*¹; *Aiping Chen*²; *Joanne Stubbs*³; *Peter Eng*³; *Hongwu Xu*²; *Steven Conradson*¹; *Xiaofeng Guo*¹; ¹Washington State University; ²Los Alamos National Laboratory; ³University of Chicago

Crystal Structure of U₃Si₂, USi and U₃Si₅ Uranium-Silicide Phases Based on Time-of-Flight Neutron Diffraction Measurements: *Tashiema Ulrich*¹; *Sven Vogel*¹; *Joshua White*¹; ¹Los Alamos National Laboratory

ENERGY

Advanced Characterization of Materials for Nuclear, Radiation, and Extreme Environments – On-Demand Poster Presentations

Sponsored by: TMS Nuclear Materials Committee

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

Friday AM | October 22, 2021
Virtual Poster Hall | MS&T Virtual

Session Chairs: Emily Aradi, University of Manchester; Cody Dennett, Idaho National Laboratory

Effect of Dilute Magnetism in a Topological Insulator: *Firoza Kabir*¹; ¹University of Central Florida

Modeling of Graphite Oxidation in Water Vapor Ingress Accidental Conditions for High Temperature Gas-cooled Reactors: *Yi Je Cho*¹; *Kathy Lu*¹; ¹Virginia Tech

Prediction Thermo-physical Characteristics Nickel-based Superalloys Directional Crystallization: *Alexander Glotka*¹; *Vadim Olshanskii*¹; ¹Zaporizhzhia Polytechnic National University

Tensile Performance of Diffusion Bonded AA6061-AA6061 Cladding-Cladding Interface for Application in U-10Mo Monolithic Fuel Plates: *Abhishek Mehta*¹; *Jeongmin Woo*¹; *Jeffrey Giglio*²; *Jan-Fong Jue*²; *Dennis Keiser*²; *James Cole*²; *Yongho Sohn*¹; ¹University of Central Florida; ²Idaho National Laboratory

The Effect of Rotary Swaging on Zirconium Alloys and its Microstructure Property Correlation: *Gaurav Singh*¹; *Raviraj Verma*¹; *K I Vishnu Narayanan*²; *Umesh Kumar Arora*²; *R. Jayaganthan*¹; ¹Indian Institute of Technology Madras; ²NFC Hyderabad

MATERIALS-ENVIRONMENT INTERACTIONS

Advanced Materials for Harsh Environments — On-Demand Oral Presentations

Sponsored by: ACerS Electronics Division

Program Organizers: Navin Manjooran, Solve Technology and Research, Inc.; Gary Pickrell, Virginia Tech

Friday AM | October 22, 2021
Virtual Meeting Room 9 | MS&T Virtual

Investigation of Automotive Materials Compatibility for Regenerative Fuels – Oxymethylene Dimethyl Ether (OME): *Ruediger Reitz*¹; ¹Technische Universität Darmstadt

Structural Response of Si (111) and Diamond/Si (111) to 193 nm and 5 ns Laser Pulses: *Chaoya Han*¹; ¹University of Delaware

Influence of the Gas Composition on the Metal Dusting Attack of Oxide Forming Alloys: *Clara Schlereth*¹; Anke Ulrich¹; Mathias Galetz²; ¹DECHEMA-Forschungsinstitut

ELECTRONIC AND MAGNETIC MATERIALS

Advances in Dielectric Materials and Electronic Devices — On Demand Oral Presentations

Sponsored by: ACerS Electronics Division

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

Friday AM | October 22, 2021
Virtual Meeting Room 5 | MS&T Virtual

Session Chair: Matjaz Spreitzer, Jozef Stefan Institute

Electrical and Dielectric Behaviour of Li-substituted Potassium Sodium Niobate System: *Maryam Azadeh*¹; Till Froemling¹; Ze Xu²; Yixuan Liu²; Ke Wang²; ¹TU Darmstadt; ²Tsinghua University

Effect of Fluoride Substitution on the Morphology and Electrical Properties of Dielectric Storage Material: *Narsingh Singh*¹; *Laxman Singh*²; Dinesh Prajapati²; Narayan Singh²; Fow-Sen Choa¹; Bradley Arnold¹; Kamdeo Mandal²; Lisa Kelly¹; Atendra Kumar²; ¹University of Maryland Baltimore County; ²Indian Institute of Technology, BHU

Comparison of Chemical Treatments for the Modification of VHB 4910's Mechanical Properties: *Isaac Liu*¹; Hector Medina¹; ¹Liberty University

Epitaxial SrTiO₃ Thin Films on Semiconductor Substrates: *Matjaz Spreitzer*¹; ¹Jožef Stefan Institute

IRON AND STEEL (FERROUS ALLOYS)

Advances in Ferrous Metallurgy — On-Demand Oral Presentations

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

Program Organizers: Daniel Baker, General Motors Corporation; Emmanuel De Moor, Colorado School of Mines; Kishlay Mishra, Nucor Castrip Arkansas LLC; Lijia Zhao, ArcelorMittal Global R&D

Friday AM | October 22, 2021
Virtual Meeting Room 8 | MS&T Virtual

New Roll Alloys Concepts Using in Finishing Stands of Rebar Rolling: Babak Nazari¹; *Adel Sheikhhosseini*¹; Hossein Zakerinia¹; ¹CSMETAL/Chodan Sazan

Evaluation of Different Austenitization Sub-Models for 22MnB5 Steel Using Bayesian Model Selection Technique: *Boxuan Zhao*¹; Constantin Chiriac²; Kyle Daun¹; ¹University of Waterloo; ²Ford Motor Company

Radiative Properties of Al-Si Coated 22MnB5 Steel: *Cameron Klassen*¹; Boxuan Zhao¹; Kyle Daun¹; ¹University of Waterloo

Effect of CO₂ Injection into Blast Furnace Tuyeres on Smelting Parameters: *Juanjuan Jiang*¹; Rong Zhu¹; Shengtao Qiu²; ¹University of Science and Technology Beijing; ²Central Iron and Steel Research Institute

Research on the Phosphate Capacity of CaO-FeO-MgO-SiO₂-MnO-TiO₂-V₂O₅-P₂O₅ Slags: *Yun Zhou*¹; Rong Zhu¹; Kai Dong¹; ¹University of Science and Technology Beijing

IRON AND STEEL (FERROUS ALLOYS)

Advances in Metallic Coated Advanced Steels — On-Demand Oral Presentations

Sponsored by: AIST: Metallurgy Processing Products and Applications Technology Committee, AIST: Galvanizing Technology Committee

Program Organizers: Joseph McDermid, McMaster University; Frank Goodwin, ILZRO

Friday AM | October 22, 2021
Virtual Meeting Room 8 | MS&T Virtual

Insight into the Mechanism of Liquid Metal Embrittlement in Resistance Spot Welding of Zn-coated Dual Phase Steel: The Role of Boron and Silicon: *Elahe Akbari*¹; Philipp Kürnsteiner¹; Peter Oberhumer¹; Günter Hesser¹; Heiko Groiss¹; Martin Arndt²; Martin Gruber²; Robert Sierlinger²; ¹Christian Doppler Laboratory for Nanoscale Phase Transformations, Center of Surface and Nanoanalytics, Johannes

Kepler University Linz; ²Voestalpine Stahl GmbH

Liquid Metal Embrittlement of 3rd Generation Advanced High Strength Steel Driven by Nano-intermetallic Phase Formation Along Grain Boundaries: Yuki Ikeda¹; Anirban Chakraborty²; Hassan Ghassemi-Armaki²; Robert Maass¹; ¹Federal Institute for Materials Research and Testing (BAM); ²ArcelorMittal Global Research and Development

PROCESSING AND MANUFACTURING

Advances in Surface Engineering – On-Demand Advances in Surface Engineering

Sponsored by: TMS Surface Engineering Committee

Program Organizers: Rajeswaran Radhakrishnan, Faraday Technology Inc; Brian Skinn, Faraday Technology, Inc.; Timothy Hall, Faraday Technology Inc; Michael Roach, University of Mississippi Medical Center; Sandip Harimkar, Oklahoma State University; Tushar Borkar, Cleveland State University; Rajeev Gupta, North Carolina State University

Friday AM | October 22, 2021
Virtual Meeting Room 12 | MS&T Virtual

Session Chairs: Holly Garich, Faraday Technology, Inc; Rajeswaran Radhakrishnan, Faraday Technology, Inc.

High Adhesive Joint Durability of Aluminum Alloys with Chemical Free Treatments: John Ho¹; Alp Manavbasi¹; ¹Novelis

Influences of Varied Electro-discharge Machining Operations on Surface Conditions of a Nickel-Base Superalloy: Tim Gabb¹; T. Smith¹; J. Telesman¹; C. Kantzos²; R. Rogers¹; D. Brinkman²; T. Ubienski²; ¹NASA Glenn Research Center; ²HX5 Sierra, LLC

Ionic Polymer-Metal Composite (IPMC) Degradation Study and Solution Considerations for Biomimetic Thin-film Actuator Applications: Allison Arnold¹; Kavin Sivaneri Varadharajan Idhiam¹; Lisa Hilgar¹; William Brion¹; Edward Sabolsky¹; Ji Su²; ¹West Virginia University; ²NASA Langley Research Center

Mechanical Ball Milling of Gas Atomized Ti48Al2Cr2Nb Powder for Preventing Smoking in Electron Beam Additive Manufacturing Process: SeungKyun Yim¹; Huakang Bian²; Keiji Yanagihara²; Kenta Aoyagi²; Akihiko Chiba²; ¹Tohoku University; ²Institute for Materials Research, Tohoku University

Surface Evolution and Corrosion Behavior of Cu-doped Carbide-reinforced Martensitic Steels in a Sulfuric Acid: Kenta Yamanaka¹; Manami Mori²; Kazuo Yoshida¹; Akihiko Chiba¹; ¹Tohoku University; ²National Institute of Technology, Sendai College

ARTIFICIAL INTELLIGENCE

AI for Big Data Problems in Advanced Imaging, Materials Modeling and Automated Synthesis – On-Demand Oral Presentations

Sponsored by: TMS: Computational Materials Science and Engineering Committee

Program Organizers: Mathew Cherukara, Argonne National Lab; Badri Narayanan, University of Louisville; Subramanian Sankaranarayanan, University of Illinois (Chicago)

Friday AM | October 22, 2021
Virtual Meeting Room 2 | MS&T Virtual

Prediction of Dynamic Properties of LiF and FLiBe Molten Salts with DeepPot Network Potentials: Alejandro Rodriguez²; Hu Ming¹; ¹University of South Carolina

CERAMIC AND GLASS MATERIALS

Ceramic Matrix Composites – On-Demand Oral Presentations

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Narottam Bansal, NASA Glenn Research Center; Jacques Lamon, CNRS; Sung Choi, Naval Air Systems Command

Friday AM | October 22, 2021
Virtual Meeting Room 4 | MS&T Virtual

Tribological Performance of HfB2-ZrB2 Based Ultra High Temperature Ceramics Consolidated via Spark Plasma Sintering: Shruti Dubey¹; Kantesh Balani¹; Ambreen Nisar²; Shikha Awasthi³; ¹Indian Institute of Technology; ²Florida International University; ³Indian Institute of Science Bangalore

CERAMIC AND GLASS MATERIALS

Ceramics and Glasses Modeling by Simulations and Machine Learning – On-Demand Oral Presentations

Sponsored by: ACerS Glass & Optical Materials Division

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

Friday AM | October 22, 2021
Virtual Meeting Room 4 | MS&T Virtual

Looking for Order in Disorder: Topological Data Analysis of Glass Structure: Morten Smedskjaer¹; Søren Sørensen¹; Christophe Biscio¹; Lisbeth Fajstrup¹; Mathieu Bauchy²; ¹Aalborg University; ²University of California, Los Angeles

Application of Machine Learning to Novel Ceramic Material Discovery: *Kenneth Vecchio*¹; Kevin Kaufmann¹; William Mellor¹; ¹University of California, San Diego

Decomposing the Strength of Hydrated Cement Compositions by Machine Learning: *Yu Song*¹; Gaurav Sant¹; Mathieu Bauchy¹; ¹University of California, Los Angeles

Machine Learning as a Tool to Accelerate the Design of Nuclear Waste Glasses with Enhanced Sulfur Loadings: *Taihao Han*¹; Xinyi Xu²; Jie Huang¹; Albert A. Kruger³; Aditya Kumar¹; Ashutosh Goel²; ¹Missouri University of Science and Technology; ²Rutgers, The State University of New Jersey; ³U.S. Department of Energy, Office of River Protection

Elemental DeepPot Neural Networks and Applications to Ceramics: *Alejandro Rodriguez*²; Ming Hu¹; ¹University of South Carolina

Structural Prediction of Actinide-bearing Hollandites for Nuclear Waste Forms: *Amir Mofrad*¹; Matthew Christian¹; Juliano Schorne-Pinto¹; Theodore Besmann¹; ¹University of South Carolina

Graph ODE for Learning Dynamic Systems: *Yizhou Sun*¹; Wei Wang¹; Zijie Huang¹; ¹UCLA

Toward Revealing Full Atomic Picture of Nanoindentation Deformation Mechanisms in Li₂O-2SiO₂ Glass-ceramics: *Binghui Deng*¹; ¹Corning Inc

Elucidating Compositional Governance of Optical Properties Oxide Glasses Using Interpretable Machine Learning: *Mohd Zakri*¹; Vineeth Venugopal¹; Ravinder Bhattoo¹; Suresh Bishnoi¹; Sourabh Kumar Singh¹; Amarnath R. Allu²; Jayadeva¹; N. M. Anoop Krishnan¹; ¹Indian Institute of Technology Delhi; ²Glass Division, CSIR-Central Glass and Ceramic Research Institute, Kolkata

Impact of Irradiation on the Properties of Gel Layer Formed After Aqueous Corrosion of Borosilicate Glasses: *Amreen Jan*¹; N.M Anoop Krishnan¹; ¹Indian Institute of Technology Delhi

CERAMIC AND GLASS MATERIALS

Ceramics and Glasses Modeling by Simulations and Machine Learning – On-Demand Poster Presentations

Sponsored by: ACerS Glass & Optical Materials Division

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

Friday AM | October 22, 2021
 Virtual Poster Hall | MS&T Virtual

Effect of Polydispersity on the Fracture Properties of Calcium-Silicate-Hydrate Gel: *Ashish Yadav*¹; N.M. Anoop Krishnan¹; ¹Indian Institute of Technology (IIT), Delhi

Modeling Polaron Hopping in Ternary Spinel Oxides: *Maytal Caspary Toroker*¹; ¹Technion - Israel Institute of Technology

Development of a Transferable Inter-atomic Potential for Boroaluminosilicate Glasses: *Rajesh Kumar*¹; N M Anoop Krishnan¹; ¹Indian Institute of Technology Delhi

MATERIALS-ENVIRONMENT INTERACTIONS

Coatings to Protect Materials from Extreme Environments – On-Demand Coatings for Extreme Environments

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Kang Lee, NASA Glenn Research Center; Yutaka Kagawa, The University of Tokyo; Daniel Mumm, University of California, Irvine; Rodney Trice, Purdue University; Emmanuel Boakye, UES Inc.; Valerie Wiesner, NASA Langley Research Center; Edward Gorzkowski, Naval Research Laboratory; Scooter Johnson, Naval Research Laboratory

Friday AM | October 22, 2021
 Virtual Meeting Room 9 | MS&T Virtual

Session Chair: Emmanuel Boakye, UES Inc.

Modelling Oxygen Permeability through Top Coat and Thermally Grown Oxide in Dense Yb₂Si₂O₇ Environmental Barrier Coatings: *Kuiying Chen*¹; ¹NRC

Obtaining Surface Titanium Coatings for Enhance the Material Performance in SHS Conditions: *Borys Sereda*¹; Dmytro Sereda¹; Irina Kruglyak¹; ¹Dneprovsky State Technical University

Obtaining Surface Coatings Providing Protection Against High Temperatures in the Production of Coke: *Borys Sereda*¹; *Dmytro Sereda*¹; ¹Dneprovsky State Technical University

MATERIALS-ENVIRONMENT INTERACTIONS

Coatings to Protect Materials from Extreme Environments – On-Demand Poster Presentations

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Kang Lee, NASA Glenn Research Center; Yutaka Kagawa, The University of Tokyo; Daniel Mumm, University of California, Irvine; Rodney Trice, Purdue University; Emmanuel Boakye, UES Inc.; Valerie Wiesner, NASA Langley Research Center; Edward Gorzkowski, Naval Research Laboratory; Scooter Johnson, Naval Research Laboratory

Friday AM | October 22, 2021
 Virtual Poster Hall | MS&T Virtual

Thermal and Mechanical Properties of Y₃(Nb_{1-x}Ta_x)O₇ as a Material for Thermal Barrier Coating: *Janghyeok Pyeon*¹; Dowon Song²; Gualin Lyu¹; Junseong Kim¹; Seungcheol Yang¹; Yeongil Jung¹; ¹Changwon National University; ²Hangyang University

MATERIALS-ENVIRONMENT INTERACTIONS

Computation Assisted Materials Development for Improved Corrosion Resistance – On-Demand Oral Presentations

Program Organizers: Rishi Pillai, Oak Ridge National Laboratory; Laurence Marks, Northwestern University

Friday AM | October 22, 2021
Virtual Meeting Room 9 | MS&T Virtual

Modelling Alkoxide Corrosion Initiation of Pure-aluminum in Ethanol with Integrated Simulation-based Experimental Methods: *Visheet Arya*¹; ¹MPA-IfW TU Darmstadt

First Steps Towards a Coupled Thermodynamic-kinetic Model to Predict Sulfate Deposit Induced Hot Corrosion of Aluminized Ni-based Superalloys: *Yaping Wang*¹; Rishi Pillai²; Elena Yazhenskikh¹; Michael Müller¹; Dmitry Naumenko¹; ¹Forschungszentrum Jülich; ²Oak Ridge National Laboratory

Modelling Microstructural Evolution of Aluminide Coatings on Ni-based Superalloys: *Wencai Leng*¹; Dmitry Naumenko¹; Rishi Pillai²; ¹Forschungszentrum Jülich GmbH; ²Oak Ridge National Laboratory

NANOMATERIALS

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials – On-Demand Oral Presentations

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

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

Friday AM | October 22, 2021
Virtual Meeting Room 11 | MS&T Virtual

Surface-engineered CeO₂ Nanocrystals: Catalysis and Beyond: *Ruigang Wang*¹; ¹The University of Alabama

2D Material and van der Waal Heterostructure Nanoelectromechanical Systems (NEMS): *Philip Feng*¹; ¹University of Florida

Ti₃C₂ MXene-polyvinyl Alcohol Hybrids for Photothermal Self-healing: *Yi Je Cho*¹; Kathy Lu¹; ¹Virginia Tech

Nanocrystalline Refractory Ceramic Synthesis Using High Char Polymers: *Matthew Laskoski*¹; Boris Dyatkin¹; Tristan Butler¹; ¹US Naval Research Lab

Universal Approach towards Metal Chalcogenide Materials from Molecular Building Blocks: *Veronika Brune*¹; Sanjay Mathur¹; ¹University of Cologne

Nanomaterials Synthesis Using Alkaline Glucose Solution: *Olayemi Fakayode*¹; Thabo Nkambule¹; ¹University of South Africa - Science Campus

NANOMATERIALS

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials – On-Demand Poster Presentations

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

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

Friday AM | October 22, 2021
Virtual Poster Hall | MS&T Virtual

A Comparative Study of Tantalum Disulfide as Lithium-ion and Potassium-ion Batteries: *Davi Marcelo Soares*¹; Gurpreet Singh¹; ¹Kansas State University

Tungsten Ditelluride, A Semimetal Transition Metal Dichalcogenide as Active Material for Monovalent-ion Battery Electrodes: *Davi Marcelo Soares*¹; Gurpreet Singh¹; ¹Kansas State University

SPECIAL TOPICS

Curricular Innovations and Continuous Improvement of Academic Programs (and Satisfying ABET along the Way): The Elizabeth Judson Memorial Symposium – On-Demand Oral Presentations

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

Program Organizers: Alison Polasik, Campbell University; Susan Gentry, University of California, Davis; Jeffrey Fergus, Auburn University; Assel Aitkaliyeva, University of Florida; Kester Clarke, Colorado School of Mines; Subhadra Gupta, University of Alabama; Gregg Janowski, University of Alabama at Birmingham; M. Norton, Washington State University

Friday AM | October 22, 2021
Virtual Meeting Room 13 | MS&T Virtual

An Innovative and Integrated Approach to Materials Selection and Simulation for Engineering Education: *Lakshana Mohee*¹; Nicola Stefanij¹; ¹ANSYS Granta

Assessment of Ceramic Higher Education Curricula in Nigeria and Prospects for 21st Century Learners: *Oluwafemi Adelabu*¹; ¹Federal University of Technology, Akure

Virtually Teaching Materials Science Topics in 20 Minutes: *Kaitlin Tyler*; Alfred Oti¹; ¹Ansys

Integrating Problem Based Learning into a Metals Processing Class: *Peter Collins*¹; ¹Iowa State University

Traditional Learning Techniques Combined with Modern Technology: *David Labyak*¹; Kevin Johnson¹; Nicholas Hendrickson¹; ¹Michigan Technological University

Mobile Teaching to Create Curiosity and Creativity in Generation Z: *Raghu Echempati*¹; Kamesawara Rao Chellapilla²; ¹Kettering University; ²IP Consultant, Gopakumar Nair & Associates (Mumbai)

FUNDAMENTALS AND CHARACTERIZATION

Deformation-induced Phase Transformations — On-Demand Oral Presentations

Program Organizers: Yangyang Zhao, Purdue University; Jonah Klemm-Toole, Colorado School of Mines; Amy Clarke, Colorado School of Mines; Janelle Wharry, Purdue University

Friday AM | October 22, 2021
Virtual Meeting Room 7 | MS&T Virtual

Engineering Microstructures for Conventionally and Additively Manufactured Ni-based Superalloys: *Felix Theska*¹; Nima Haghdadi¹; Sophie Primig¹; ¹UNSW Sydney

FUNDAMENTALS AND CHARACTERIZATION

Deformation-induced Phase Transformations — On-Demand Poster Presentations

Program Organizers: Yangyang Zhao, Purdue University; Jonah Klemm-Toole, Colorado School of Mines; Amy Clarke, Colorado School of Mines; Janelle Wharry, Purdue University

Friday AM | October 22, 2021
Virtual Poster Hall | MS&T Virtual

Wire Size Effect on the Nucleation of Fatigue Cracks Near Non-metallic Inclusions in Superelastic Nitinol: *Parisa Shabani Nezhad*¹; Jacob Rusch¹; John Moore¹; Dinc Erdeniz²; ¹Marquette University; ²University of Cincinnati

PROCESSING AND MANUFACTURING

Development of Light Weight Alloys and Composites — On-Demand Oral Presentations

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

Friday AM | October 22, 2021
Virtual Meeting Room 12 | MS&T Virtual

Grain Boundary Relaxation in Nanocrystalline Aluminum: *Leslie Mushongera*¹; Wenye Ye¹; Jake Hohli¹; Pradeep Menezes¹; Mano Misra¹; ¹University of Nevada Reno

FUNDAMENTALS AND CHARACTERIZATION

Emergent Materials under Extremes and Decisive <I>In Situ</I> Characterizations — On-Demand Oral Presentations

Sponsored by: ACerS Basic Science Division

Program Organizers: Hongwu Xu, Los Alamos National Laboratory; Xiaofeng Guo, Washington State University; Xujie Lu, Center for High Pressure Science & Technology Advanced Research; Hua Zhou, Argonne National Laboratory; Judith Driscoll, University of Cambridge

Friday AM | October 22, 2021
Virtual Meeting Room 7 | MS&T Virtual

Session Chairs: Xiaofeng Guo, WSU; Hua Zhou, ANL; Hongwu Xu, LANL


Nanomechanic Characterizations with Diamond-Anvil Cell Techniques: *Bin Chen*¹; Xiaoling Zhou²; Jianing Xu²; Hongliang Dong¹; Yanju Wang¹; Zongqiang Feng³; Xiaoxu Huang³; ¹Center for High Pressure Science and Technology Advanced Research; ²Harbin Institute of Technology; ³Chongqing University

Nanoparticles Under High Pressure: Assembly and Formation of Active Nanostructures: *Hongyou Fan*¹; ¹Sandia National Labs

Photoindentation: A New Route to Understanding Dislocation Behavior in Light: *Atsutomo Nakamura*¹; *Xufei Fang*²; Ayaka Matsubara¹; Eita Tochigi³; Yu Oshima¹; Tatsushi Saito¹; Tatsuya Yokoi¹; Yuichi Ikuhara³; Katsuyuki Matsunaga¹; ¹Nagoya University; ²Technische Universität Darmstadt; ³The University of Tokyo

Pulsed Electrodeposition with Electrochemical Mediator in Molten Salt: *Daniel Molina*¹; Jeff Eakin¹; Cornelius Ivory¹; ¹Washington State University

Structure and Composition of Novel Nitride Materials Synthesized at Extreme Conditions of High Pressure and High Temperature Determined by Single-crystal X-ray Diffraction and Raman Spectroscopy: *Alexander Goncharov*¹; ¹Earth and Planets Laboratory, Carnegie Institution for Science



Far-From-Equilibrium Processing of Materials under Extreme Conditions: *Eric O'Quinn*¹; Alexandre Solomon¹; Casey Corbridge¹; Antonio Fuentes²; Maik Lang¹; ¹University of Tennessee; ²Cinvestav Unidad Saltillo

ENERGY

Energy Materials for Sustainable Development – On Demand Energy Harvesting

Sponsored by: ACerS Energy Materials and Systems Division

Program Organizers: Armin Feldhoff, Leibniz University Hannover; Kyle Brinkman, Clemson University; Krista Carlson, University of Utah; Eva Hemmer, University of Ottawa; Nikola Kanas, Norwegian University of Science and Technology; Kjell Wiik, Norwegian University of Science and Technology; Lei Zuo, Virginia Tech; Stephanie Lee, Stevens Institute of Technology; Muhammad Hajj, Stevens Institute of Technology; Mohammad Haik, Stevens Institute of Technology

Friday AM | October 22, 2021
Virtual Meeting Room 6 | MS&T Virtual

Controlling Conductivity in Ferroelectric Oxides at the Nanoscale: *Dennis Meier*¹; ¹Norwegian University of Science and Technology, NTNU

Domain-wall Contribution to Weak-field Properties of Lead-based Relaxor Ferroelectrics: *Tadej Rojac*¹; Mirela Dragomir¹; Mojca Otonicar¹; ¹Jozef Stefan Institute

Multifunctional Complex Oxide Heterostructures: *Nini Pryds*¹; ¹Technical University of Denmark

Structure-Photophysics-Function Relationship of Perovskite Solar Cells: *He Wang*¹; ¹University of Miami

Glasses as Energy Materials for a Sustainable Development: *Monica Ferraris*¹; Milena Salvo¹; Federico Smeacetto¹; ¹Politecnico di Torino - Italy

Strategies for Enhancement of Energy Storage in Pb-free Ferroic Ceramics for Sustainable Development: Ge Wang¹; Zhilun Lu¹; Dawei Wang²; *Antonio Feteira*³; Ian Reaney¹; ¹University of Sheffield; ²Shenzhen Institutes of Advanced Technology; ³Sheffield Hallam University

Sustainable Carbon Nanomaterials in Energy Applications: *Rafik Naccache*¹; ¹Concordia University

Opto-electric, Opto-mechanical and Opto-thermo-electric Control of Ferroelectric Domains for Multi-source Energy Harvesting and Sensing: *Yang Bai*¹; ¹University of Oulu

Experimental and Computational Investigations of the Multiple Impurities Effect on the SOFC Cathode Materials: Rui Wang¹; Lucas Parent¹; *Yu Zhong*¹; ¹Worcester Polytechnic Institute

Enhanced Conductivity Aluminum Composites for Electric Grid Applications: *Aditya Nittala*¹; Lloyd Furuta²; Kashi Subedi²; Xiao Li¹; WoongJo Choi¹; David Drabold²; Alex Poznak³; Frank Kraft²; Keerti Kappagantula¹; ¹Pacific Northwest National Laboratory; ²Ohio University; ³Hydro Innovation & Technology

The Electrical Conductivity and Defect Chemistry of Co, Sc-doped BaZrO₃: *Hiroki Uehara*¹; Akihiro Ishii¹; Itaru Oikawa¹; Hitoshi Takamura¹; ¹Tohoku University

ENERGY

Energy Materials for Sustainable Development – On Demand Storage and Conversion

Sponsored by: ACerS Energy Materials and Systems Division

Program Organizers: Armin Feldhoff, Leibniz University Hannover; Kyle Brinkman, Clemson University; Krista Carlson, University of Utah; Eva Hemmer, University of Ottawa; Nikola Kanas, Norwegian University of Science and Technology; Kjell Wiik, Norwegian University of Science and Technology; Lei Zuo, Virginia Tech; Stephanie Lee, Stevens Institute of Technology; Muhammad Hajj, Stevens Institute of Technology; Mohammad Haik, Stevens Institute of Technology

Friday AM | October 22, 2021
Virtual Meeting Room 6 | MS&T Virtual

Corrosion Assessment of Duplex Stainless Steels as Candidate Constructional Materials for Pyrolysis Oils Storage and Transportation: Yimin Zeng¹; *Xue Han*¹; ¹CanmetMATERIALS/Natural Resources Canada

Advancing Lithium Batteries: An Interdisciplinary Approach: *Nils Peter Wagner*¹; ¹SINTEF

Solid State Batteries – from Interfaces to High Energy Density: *Jihui Yang*¹; ¹University of Washington

Li-ion Cells Using Polyanion Based Cathode Materials for Enhanced Energy Density: *Palani Balaya*¹; Vishwanathan Ramar¹; Hwang Sheng Lee¹; ¹National University of Singapore

Complex Phase Transformations Observed in Na Storage Materials: *Jae Chul Kim*¹; ¹Stevens Institute of Technology

Chemistry of Thermoelectric Materials: *Yuri Grin*¹; ¹Max-Planck-Institut für Chemische Physik fester Stoffe

Half-Heusler Alloys: Promising Materials For Mid-To-High Temperature Thermoelectric Conversion: *Joseph Poon*¹; Mousumi Mitra¹; Peter Thomas²; Kai Yang²; ¹University of Virginia; ²Novus Energy Technologies

Electronic Doping of Semiconductor Thermoelectric Nanostructures with Isoelectronic Dopants: *Ayaskanta Sahu*¹; ¹New York University

Tuning the Thermoelectric Performance of CaMnO₃-based Ceramics by Controlled Exsolution and Micro-structuring: *Nikola Kanas*¹; Benjamin Williamson²; Richard Hinterding³; Mari-Ann Einarsrud²; Sverre Selbach²; Armin Feldhoff³; Kjell Wiik²; ¹BioSense Institute; ²NTNU; ³Leibniz University

Synthesis and Performance Evaluation of Nano TiO₂ (Anatase) Dispersed on Ti₃C₂-Mxene as High-performance Anode for Lithium-ion Batteries: *Hanan Tariq*¹; Abdul Shakoor¹; Jeffin Abraham¹; Siham Alqaradawi¹; Ramzan Kahraman¹; ¹Qatar University

CERAMIC AND GLASS MATERIALS

Engineering Ceramics: Microstructure-Property-Performance Relations and Applications – On-Demand Mechanical Properties of Engineering Ceramics/Applications

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Young-Wook Kim, University of Seoul; Hua-Tay Lin, Guangdong University of Technology; Junichi Tatami, Yokohama National University

Friday AM | October 22, 2021
Virtual Meeting Room 4 | MS&T Virtual

Session Chairs: Junichi Tatami, Yokohama National University; Eita Tochigi, University of Tokyo

In Situ and Atomic-scale Investigations of Mechanical Responses in Oxide Crystals: *Eita Tochigi*¹; ¹The University of Tokyo

TiB₂-TiC Based Materials with Fine Microstructure and Improved Mechanical Properties: *Zhezhen Fu*¹; ¹University of Wisconsin Platteville

Strengthening and Toughening of Titanium Boride (TiB) Ceramic Material by Metallurgical Control of the Composition of Metallic Phase: *Jun Du*¹; *K.S. Ravi Chandran*¹; ¹University of Utah

Nonlinear Continuum Damage Model for Unidirectional Laminate Based Ceramic Matrix Composites: *Craig Przybyla*¹; *Jean-François Maire*²; *Emmanuel Baranger*³; *Frédéric Laurin*²; ¹Air Force Research Laboratory; ²Office National d'Etudes et de Recherches Aéropatiales (ONERA); ³ENS Paris-Saclay

Atomistic Modelling of Dynamic Failure in Boron Carbide: Multi-scale Modeling for Materials Design: *Junhao Chang*¹; *Benhour Amirian*¹; *Matthew Guziewski*²; *James Hogan*¹; ¹University of Alberta; ²Army Research Laboratory

Triboluminescence of AlN:Mn and CaAlSiN₃:Eu Ceramics: *Junichi Tatami*¹; *Kentaro Iwai*¹; *Motoyuki Iijima*¹; ¹Yokohama National University

Characterization of Clay Ceramics from Areas Near to the Thar Desert, India: Towards Water Filtration Application: *Sunil Duhan*¹; *Meraj Warsi*¹; *Himanchal Bharadwaj*¹; *Pankaj Jakhar*¹; *Amrita Nighojkar*¹; *Vinayak Shedekar*²; *Anand Plappally*¹; ¹IITJ; ²The Ohio State University

CERAMIC AND GLASS MATERIALS

Engineering Ceramics: Microstructure-Property-Performance Relations and Applications – On-Demand Poster Presentations

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Young-Wook Kim, University of Seoul; Hua-Tay Lin, Guangdong University of Technology; Junichi Tatami, Yokohama National University

Friday AM | October 22, 2021
Virtual Poster Hall | MS&T Virtual

Discrete Element Modeling of Machining Process for Thermal Barrier Coating: *Jian Zhang*¹; *Dan Koo*¹; *Hye-Yeong Park*²; *Yeon-Gil Jung*²; *Jing Zhang*¹; ¹Indiana University – Purdue University Indianapolis; ²Changwon National University

Engineering Mineral Porosity as a Method for Studying Weathering Rates In Water-rock Systems: *William Taylor*¹; *Brian Gorman*¹; *Alexis Navarre-Sitchler*¹; ¹Colorado School of Mines

Low Temperature Pressureless Sintering of Silicon Carbide Ceramics with Aluminum Nitride-Yttria-Ceria-Magnesia: *Eun Seo Kang*¹; *Young-Wook Kim*¹; ¹The University of Seoul

CERAMIC AND GLASS MATERIALS

Engineering Ceramics: Microstructure-Property-Performance Relations and Applications – On-Demand Processing-Property Relations

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Young-Wook Kim, University of Seoul; Hua-Tay Lin, Guangdong University of Technology; Junichi Tatami, Yokohama National University

Friday AM | October 22, 2021
Virtual Meeting Room 4 | MS&T Virtual

Session Chairs: Tohru Suzuki, National Institute for Materials Science; Csaba Balazsi, Hungarian Academy of Sciences

Investigation and Fabrication of High Thermal Conductivity Silicon Nitride Ceramics: *Hyun Min Lee*¹; *Jung Hoon Kong*²; *Do-Kyung Kim*²; ¹Samsung Electromechanics; ²Korea Advanced Institute of Science & Tech

Nanocarbon Added Silicon Nitrides: *Csaba Balazsi*¹; *Katalin Balazsi*¹; ¹Centre for Energy Research, Eotvos Lorand Research Network, Hungary

Fabrication of Transparent Polycrystalline Ceramics by Colloidal Processing and SPS: *Tohru Suzuki*¹; ¹National Institute for Materials Science

Mechanical, Thermal, and Electrical Properties of Pressureless Sintered SiC Ceramics with BN and C Additives: *Young-Wook Kim*¹; *Rohit Malik*¹; ¹University of Seoul



Relationship between the Microstructure and the Mechanical Properties of the MWCNTs Reinforced Potassium-based Metakaolin Alkali Activated Materials: *Jiaxin Chen*¹; Ange-Therese Akono¹; ¹Northwestern University

Control of Thermal, Electrical, and Mechanical Properties of Porous SiC Ceramics via Doping: *Shynar Kultayeva*¹; Young-Wook Kim¹; In-Hyuck Song²; ¹University of Seoul; ²Korea Institute of Materials Science

IRON AND STEEL (FERROUS ALLOYS)

Fracture of Steels: New Approaches to Modeling and Experimental Characterization – On-Demand Oral Presentations

Sponsored by: TMS Steels Committee

Program Organizers: Louis Hector, General Motors Global Technical Center; Ana Luiza Araujo, AK Steel Research & Innovation; Matthias Militzer, University of British Columbia; Amy Clarke, Colorado School of Mines

Friday AM | October 22, 2021
Virtual Meeting Room 8 | MS&T Virtual

Predicting the Influence of Microstructure on the Strength and Fracture Resistance of Advanced High Strength Steels: *Allan Bower*¹; ¹Brown University

ELECTRONIC AND MAGNETIC MATERIALS

Functional Defects in Electroceramic Materials – On-Demand Oral Presentations

Sponsored by: ACerS Electronics Division

Program Organizers: Hui Xiong, Boise State University; Hua Zhou, Argonne National Laboratory

Friday AM | October 22, 2021
Virtual Meeting Room 5 | MS&T Virtual

Dislocation-based Nanomechanics in Functional Oxides: A Case Study on SrTiO₃: *Xufei Fang*¹; Kuan Ding¹; Stephan Janocha¹; Christian Minnert¹; Till Frömling¹; Karsten Durst¹; Atsutomu Nakamura²; Jürgen Rödel¹; ¹Technische Universität Darmstadt; ²Nagoya University

Leveraging Structure and Energetics to Enhance Electrochemical Kinetics in Batteries: *Kai He*¹; ¹Clemson University

Modeling the Electrical Double Layer at Solid-state Electrochemical Interfaces: *Yue Qi*¹; Michael Swift²; James Swift³; ¹Brown University; ²Michigan State University; ³Northern Arizona University

CERAMIC AND GLASS MATERIALS

Glasses and Optical Materials: Current Issues and Functional Applications – On-Demand Oral Presentations

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

Program Organizers: Jessica Rimsza, Sandia National Laboratories; Delia Brauer, Otto Schott Institute of Materials Research

Friday AM | October 22, 2021
Virtual Meeting Room 4 | MS&T Virtual

Fracture Toughness of Zeolitic Imidazolate Framework Glasses: *Morten Smedskjær*¹; Theany To¹; Søren Sørensen¹; Tao Du¹; Yuanzheng Yue¹; Mathieu Bauchy²; ¹Aalborg University; ²University of California, Los Angeles

Viscoelastic Relaxation in Silica via Reactive Molecular Dynamic Simulations: *Jessica Rimsza*¹; Scott Grutzik¹; ¹Sandia National Laboratories

High-resolution Characterization of Glass Corrosion by Atom Probe Tomography: *Daniel Schreiber*¹; Daniel Perea¹; Joseph Ryan¹; ¹Pacific Northwest National Laboratory

Growth of Single Crystal Fibers from Polycrystalline Source Rods Using Laser Heated Pedestal Methods: *Dolendra Karki*¹; Edward Clover Hoffman¹; Bo Liu²; Paul R. Ohodnicki¹; ¹University of Pittsburgh; ²Zhejiang lab

Novel Oxide Glasses Via Non-traditional Processing: *Adam Floyd*¹; Vinh Nguyen²; Daniel Rhonehouse²; Robel Bekele³; Jason Myers²; Daniel Gibson²; Shyam Bayya²; Rick Kim²; Jesse Frantz²; Jasbinder Sanghera²; ¹Jacobs Technology, Inc; ²U.S. Naval Research Laboratory; ³University Research Foundation

Comparison of Spinel Produced by SPS and Traditional Pressing Techniques: *Adam Floyd*¹; Noor Qadri²; Bryan Sadowski¹; Guillermo Villalobos²; Shyam Bayya²; Rick Kim²; Syed Qadri²; Jasbinder Sanghera²; ¹Jacobs Technology Inc.; ²U.S. Naval Research Laboratory

Glasses for Multiband Optics: *Daniel Gibson*¹; Vinh Nguyen²; Daniel Rhonehouse²; Adam Floyd²; Shyam Bayya²; Jasbinder Sanghera²; ¹563882; ²U.S. Naval Research Laboratory

Study of Silica Glass Structural Properties under Compression Shockwave Using Reactive Force Field: *Ashish Yadav*¹; Vaibhav Bihani¹; N.M. Anoop Krishnan¹; ¹Indian Institute of Technology (IIT), Delhi

Chalcogenides and Chalcopyrites; Growth of Multinary Crystals and Glasses for Lasers and Hyperspectral Imagers: *Narsingh Singh*; Ian Emge¹; Pooja Gautam²; Krishna Machuga¹; Fow-Sen Choa¹; Bradley Arnold¹; Lisa Kelly¹; Brian Cullum¹; Raghav Rai³; ¹University of Maryland Baltimore County; ²Indian Institute of Technology, BHU; ³Applied Novel Devices Inc

FUNDAMENTALS AND CHARACTERIZATION

Grain Boundaries, Interfaces, and Surfaces in Ceramics: Fundamental Structure—Property—Performance Relationships — On-Demand Oral Presentations

Sponsored by: ACerS Basic Science Division, ACerS Electronics Division

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

Friday AM | October 22, 2021
Virtual Meeting Room 7 | MS&T Virtual

Interface Migration: From Grain Boundary Structure to Microstructure Evolution: *David Srolovitz*¹; Jian Han¹; Marco Salvalaglio²; ¹City University of Hong Kong; ²TU Dresden

Dislocation and Grain Boundary Interaction in Oxides: Slip Transmission or Cracking?: *Kuan Ding*¹; Wolfgang Rheinheimer²; Wenzhen Xia³; Christian Dietz¹; Enrico Bruder¹; Karsten Durst¹; Atsutomu Nakamura⁴; Xufei Fang¹; ¹TU Darmstadt; ²Forschungszentrum Jülich; ³Max-Planck-Institut für Eisenforschung; ⁴Nagoya University

Dislocation Content of Grain Boundary Phase Junctions and Its Relation to Grain Boundary Excess Properties: *Timofey Frolov*¹; Douglas Medlin²; Mark Asta³; ¹Lawrence Livermore National Laboratory; ²Sandia National Laboratory; ³University of California Berkeley

FUNDAMENTALS AND CHARACTERIZATION

High Entropy Materials: Concentrated Solid Solutions, Intermetallics, Ceramics, Functional Materials and Beyond II — On-Demand Oral Presentations

Sponsored by: TMS Alloy Phases Committee, TMS Mechanical Behavior of Materials Committee

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

Friday AM | October 22, 2021
Virtual Meeting Room 7 | MS&T Virtual

Designing High-entropy Intermetallics: Machine Learning Models and Validation: *Joseph Poon*¹; Jie Qi¹; ¹University of Virginia

ENERGY

Hybrid Organic—Inorganic Materials for Alternative Energy — On-Demand Hybrid Organic—Inorganic Materials for Alternative Energy

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

Program Organizers: Andrei Jitianu, Lehman College, City University of New York; Lisa Klein, Rutgers University; Lia Stanciu, Purdue University; Mihaela Jitianu, William Paterson University

Friday AM | October 22, 2021
Virtual Meeting Room 6 | MS&T Virtual

Challenges and Opportunities of Polymer Nanodielectrics for Electric Energy Storage: *Lei Zhu*¹; ¹Case Western Reserve University

Interface Engineering of Nanostructured Conductive Polymers and 2D Materials for Ultrathin and Flexible Energy Storage Devices: *Weinan Xu*¹; Muxuan Yang¹; Xiongyu Luo¹; ¹University of Akron

Proton-conducting Oxides for Energy Conversion: *Chuanheng Duan*¹; ¹Kansas State University

Application of Hybrid Photoanode Structures in Dye Sensitized Solar Cells (DSSCs): *Pawel Jarka*¹; Tomasz Tanski¹; Wiktor Matysiak¹; Aleksandra Drygala¹; ¹Silesian University of Technology

Grain Boundary Passivation for Enhancing Stability of Hybrid Perovskite Solar Cells: *Chang-Yong Nam*¹; ¹Brookhaven National Laboratory

Oxide Nanosheets in Hybrid Structures: *Alp Sehrioglu*¹; Kevin Pachuta¹; Maria Escamilla²; Katelynn Edgehouse¹; Emily Pentzer²; ¹Case Western Reserve University; ²Texas A&M

Translational Research in Energy Storage: Opportunities for Flow Battery Science: *James McKone*¹; Tejal Sawant¹; Becca Segel¹; Zachary Parr¹; Carissa Yim¹; Thomas Henry¹; ¹University of Pittsburgh

Ligand-protected Nanoclusters: Structurally-controlled Tunable Catalysts: *Giannis Mpourmpakis*¹; ¹University of Pittsburgh

Enhancement of Viscoelastic Properties of MR-elastomer by Iron Particle Chain Structures for Adaptive Vibration Control: *Narongdet Sulatchaneenopdon*¹; Hyoung-Won Son¹; Anak Khantachawana²; Jon Garcia-Barruetaña³; María Jesús Elejabarrieta³; Tsutomu Takahashi¹; Hisayuki Suematsu¹; Koichi Niihara¹; Tadachika Nakayama¹; ¹Nagaoka University of Technology; ²King Mongkut's University of Technology; ³University of Deusto

FUNDAMENTALS AND CHARACTERIZATION

Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales III – On-Demand Oral Session I

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

Friday AM | October 22, 2021
Virtual Meeting Room 7 | MS&T Virtual

Session Chairs: Jon Molina-Aldareguia, Imdea Materials Institute; M Arul Kumar, Los Alamos National Laboratory

Yield Point Phenomena in Single Crystal BCC and FCC Metals: *David Fullwood*¹; Josh Tsai²; Tristan Russell¹; Guowei Zhou²; Robert Wagoner³; Eric Homer¹; ¹Brigham Young University; ²Shanghai Jiao Tong University; ³Ohio State University

Two-scale Simulation of Plastic eformation in BCC Metals: Combination of Atomistic Simulation and Dislocation Dynamics: *Sergei Starikov*¹; Vasily Tseplyaev²; Matous Mrovec¹; ¹ICAMS, Ruhr University Bochum; ²Grunberg Institut and Institute for Advanced Simulation

The Use of Diffusion Couples and Micropillar Compression to Determine Alloying Effects on the CRSS for Slip and Twinning in Mg Alloys: *Jon Molina-Aldareguia*¹; Na Li¹; Jingya Wang¹; Javier LLorca¹; ¹Imdea Materials Institute

Transformation-induced Plasticity in Omega Titanium: *Amir Hassan Zahiri*¹; Jamie Ombogo¹; Tengfei Ma¹; Pranay Chakraborty¹; Lei Cao¹; ¹University Of Nevada Reno

Analysis of Single Crystal Ni3Al Double Edge-crack Specimen for Various Crystallographic Orientations: *Suman Paik*¹; B K Dutta¹; N Naveen Kumar²; R Tewari²; ¹Homi Bhabha National Institute; ²Bhabha Atomic Research Centre

Combining DICTRA Simulations with In-situ TEM Experiments to Optimize Metallic Powder Heat Treatments: *Kyle Tsaknopoulos*¹; Matthew Gleason¹; Grace Fitzpatrick-Schmidt¹; Danielle Cote¹; ¹Worcester Polytechnic Institute

FUNDAMENTALS AND CHARACTERIZATION

Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales III – On-Demand Oral Session II

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

Friday AM | October 22, 2021
Virtual Meeting Room 7 | MS&T Virtual

Session Chairs: Deep Choudhuri, New Mexico Institute of Mining and Technology; D Biswas, IIT Kharagpur

Extension Twin Induced Strain Hardening and Texture Evolution in AM30 Alloy: Experiments and Crystal Plasticity Modelling: *D Biswas*¹; ¹India Institute of Technology Kharagpur

Formation of {112 $\bar{2}$ } Contraction Twins in Titanium through Reversible Martensitic Phase Transformation: *Amir Hassan Zahiri*¹; Jamie Ombogo¹; Lei Cao¹; ¹University of Nevada Reno

Phase-field Simulations of Translation of Grains in Strain-energy-driven Grain Growth: *Guanglong Huang*¹; David Montiel¹; Matthew Higgins¹; Jiwoong Kang¹; Ning Lu¹; Ashwin Shahani¹; Katsuyo Thornton¹; ¹University of Michigan

An Integrated Numerical Approach to Investigate the Effect of Grain-scale Heterogeneities on the Anisotropy of Polycrystalline Metals: *Kyung Mun Min*¹; Hyukjae Lee¹; Heung Nam Han¹; *Myoung-Gyu Lee*¹; ¹Seoul National University

Modeling the Composition of Primary Carbides in the System Ni-11.5Cr-5Co-3.6Al-4.5Ti-7W-0.8Mo-0.06C: *Alexander Glotka*¹; ¹Zaporizhzhia Polytechnic National University

A Microstructural Model for Creep-fatigue Damage in Grade 91 Steel: *Ajey Venkataraman*¹; Andrea Rovinelli¹; Mark Messner¹; ¹Argonne National Laboratory

Design of an Austenitic Steel Weldment System Using ICME: *Daniel Bechetti*¹; Paul Lambert¹; Matthew Sinfield¹; Charles Fisher¹; ¹Naval Surface Warfare Center, Carderock Division

Deformation of Lamellar FCC-B2 Nanostructures Containing Kurdjumov-Sachs Interfaces: Relation between Interfacial Structure and Plasticity: *Deep Choudhuri*¹; Srivilliputhur Srinivasan²; Rajiv Mishra²; ¹New Mexico Institute of Mining and Technology; ²University of North Texas

SPECIAL TOPICS

Late News Poster Session — On-Demand Additive Manufacturing Poster Session

Friday AM | October 22, 2021
Virtual Poster Hall | MS&T Virtual

Scanning Strategies Investigation for Powder Bed Selective Laser Processing of Alumina: *Mohamed Abdelmoula*¹; Giovanni Urruth²; Gökhan Küçükçtürk³; Enrique Juste³; Fabrice Petit³; ¹Gazi University; ²Marion Technologies; ³Belgium Ceramic Research Center

SPECIAL TOPICS

Late News Poster Session — On-Demand Fundamentals and Characterization Poster Session

Friday AM | October 22, 2021
Virtual Poster Hall | MS&T Virtual

Microstructural Conditioning to Reveal Prior Austenitic Grain Using the Oxidation Method: David Fernandez-Sanchez¹; Alexis Gallegos-Perez¹; Octavio Vázquez-Gómez¹; Pedro Garnica-Gonzalez¹; Hector Vergara-Hernandez¹; *Antonio Oliver-Reynoso*²; ¹Tecnológico Nacional de México / I.T. Morelia; ²Tecnológico Nacional de México / I.T. Morelia

CERAMIC AND GLASS MATERIALS

Manufacturing and Processing of Advanced Ceramic Materials — On-Demand Advanced Manufacturing Process of Ceramics

Sponsored by: ACerS Manufacturing Division

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

Friday AM | October 22, 2021
Virtual Meeting Room 4 | MS&T Virtual

Session Chairs: Tatsuki Ohji, National Institute of Advanced Industrial Science and Technology; Bai Cui, University of Nebraska-Lincoln

Progress of Silicon Nitride: Processing, Structure and Property: *Tatsuki Ohji*¹; You Zhou¹; Hiroyuki Miyazaki¹; Hideki Hyuga¹; Kiyoshi Hirao¹; ¹National Institute of Advanced Industrial Science and Technology

Making Pre-stressed Ceramics with High Strength and High Damage Tolerance: Yiwang Bao¹; Fenghua Kuang¹; Yi Sun²; Yueming Li²; Detian Wan²; Zongyang Shen²; Delong Ma¹; *Lingfeng He*³; ¹China Building Materials Academy; ²Jingdezhen Ceramic Institute; ³Idaho National Laboratory

Luminescence Thermometry - Striving a Breakthrough: *Eugeniusz Zych*¹; Paulina Bolek¹; Małgorzata Sójka¹; Dagmara Kulesza¹; Joanna Trojan-Pięga¹; ¹University of Wrocław

Dispersion Studies of Alumina Toughened Zirconia Powders: *Berfu Goeksel*¹; Bart Van Meerbeek¹; Erin Koos¹; Jozef Vleugels¹; Annabel Braem¹; ¹KU Leuven

ARTIFICIAL INTELLIGENCE

Materials Informatics for Images and Multi-dimensional Datasets — On-Demand Oral Presentations

Sponsored by: ACerS Basic Science Division, ACerS Electronics Division

Program Organizers: Amanda Krause, University of Florida; Alp Sehirlioglu, Case Western Reserve University; Daniel Ruscitto, General Electric

Friday AM | October 22, 2021
Virtual Meeting Room 2 | MS&T Virtual

Training Deep-learning Models with 3D Microstructure Images to Predict Location-dependent Mechanical Properties in Additive Manufacturing: *Ashley Spear*¹; Carl Herriott¹; ¹University of Utah

NANOMATERIALS

Mechanistic Insights into the Synergistic Properties of Nanocomposites — On-Demand Oral Presentations

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

Program Organizers: Vuk Uskokovic, University of California; Dragan Uskokovic, Institute of Technical Sciences of the Serbian Academy of Sciences and Arts

Friday AM | October 22, 2021
Virtual Meeting Room 11 | MS&T Virtual

Laser-deposited Films Containing Silver Nanoparticles for Antimicrobial Applications: *Roger Narayan*¹; ¹University of North Carolina

NANOMATERIALS

Mechanistic Insights into the Synergistic Properties of Nanocomposites — On-Demand Poster Presentations

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

Program Organizers: Vuk Uskokovic, University of California; Dragan Uskokovic, Institute of Technical Sciences of the Serbian Academy of Sciences and Arts

Friday AM | October 22, 2021
Virtual Poster Hall | MS&T Virtual

Synergistic Effect of SiC and Carbon-based Flame Retardant Additives on Mechanical and Thermal Stability of Polypropylene Based Nanocomposites: *Shruti Dubey*¹; *Kantesh Balani*¹; *J. Ramkumar*¹; *Surya Singh*¹; ¹Indian Institute of Technology

MODELING

Multi Scale Modeling of Microstructure Deformation in Material Processing — On-Demand Oral: Multi Scale Modeling of Microstructure Deformation in Material Processing

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

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

Friday AM | October 22, 2021
Virtual Meeting Room 10 | MS&T Virtual

Session Chair: Krzysztof Muszka, AGH University

Hot Deformation Microstructure and Processing Map of Cast Ni-based Superalloy IN-100: *Yusaku Hasebe*¹; *Takehito Hagsawa*²; *Satoru Ohsaki*²; *Kazuya Kubo*²; *Cheng Yang*²; *Kenta Aoyagi*²; *Kenta Yamanaka*²; *Akihiko Chiba*²; ¹The Japan Steel Works LTD; ²Japan

Multi Scale Modeling with Microstructure Characteristics of Martensitic Steel for Rolling Contact Fatigue Life Prediction: *Jinheung Park*¹; *Kijung Lee*¹; *Soonwoo Kwon*²; *Myoung-gyu Lee*¹; ¹Seoul National University; ²Hyundai Motor Company

Crystal Plasticity-based Forming Limit Prediction for Ultra-thin Bipolar Plate for Proton Exchange Membrane Fuel Cells: *Minh Tien Tran*¹; *Dae Ho Lee*¹; *Huai Wang*²; *Ho Won Lee*³; *Dong-Kyu Kim*¹; ¹University of Ulsan; ²Chinese Academy of Sciences; ³Korea Institute of Materials Science

Crystal Plasticity Modeling of Twin Variant Selection in HCP Magnesium: *Adwitiya Rao*¹; *Anirban Patra*¹; ¹IIT Bombay

Study of Near Boundary Gradient Zones in an Aluminum Alloy Using Strain Gradient Crystal Plasticity and Experiments: *Namit Pai*¹; *Indradev Samajdar*¹; *Anirban Patra*¹; ¹Indian Institute of Technology Bombay

Using Martensite Crystallography to Determine Transformation: Induced Deformation of Ferrite In Dual-phase Steels: *Vibhor Atreya*¹; *Cornelis Bos*²; *Maria Santofimia*¹; ¹Delft University of Technology; ²Tata Steel R&D

NANOMATERIALS

Nanotechnology for Energy, Environment, Electronics, Healthcare and Industry — On-Demand Oral Presentations

Sponsored by: ACerS Electronics Division, TMS: Mechanical Behavior of Materials Committee

Program Organizers: Gary Pickrell, Virginia Tech; Navin Manjooan, Solve Technology and Research, Inc.

Friday AM | October 22, 2021
Virtual Meeting Room 11 | MS&T Virtual

Substituent Effects on the Solubility and Electronic Properties of the Cyanine Dye Cy5: *Austin Biaggne*¹; *Jeunghoon Lee*¹; *William Knowlton*¹; *Bernard Yurke*¹; *Lan Li*¹; ¹Boise State University

Dissolution of Atherosclerosis Plaque in Human Coronary Artery Induced by Nanobubbles: *Ao Li*¹; *James Earthman*²; ¹University of California Irvine; ²UCIrvine

IRON AND STEEL (FERROUS ALLOYS)

New Frontiers in Physical Metallurgy of Steels — On-Demand Oral Presentations

Sponsored by: AIST: MPPA Committee, TMS Steels Committee

Program Organizers: Matthias Militzer, University of British Columbia; Pello Uranga, CEIT and TECNUN (University of Navarra); Jonah Klemm-Toole, Colorado School of Mines; Amy Clarke, Colorado School of Mines; Amit Behera, QuesTek Innovations LLC

Friday AM | October 22, 2021
Virtual Meeting Room 8 | MS&T Virtual

Nano-precipitation and Resultant Surface Hardening by Nitriding of Ferrous Alloys: *Goro Miyamoto*¹; *Tadashi Furuahara*¹; ¹Tohoku University

Relationship between Fatigue Strength and Microstructure of Carburized Steel Tempered at Different Temperature: *Takuya Kita*¹; *Kazumasa Yasuda*¹; *Junya Asaoka*¹; *Goro Miyamoto*²; *Tadashi Furuahara*²; ¹Denso Corporation; ²Tohoku University

Austenite Decomposition during Hot-strip Rolling of Microalloyed Low-carbon Steel: *Wing Shan Tam*¹; *Matthias Militzer*¹; ¹The University of British Columbia

Austenite Decomposition in the Coarse Grain Heat Affected Zone of X80 Line Pipe Steel: *Sabyasachi Roy*¹; Matthias Miltzer¹; Warren Poole¹; ¹The University of British Columbia

New Approach to Producing High Alloy Steels: *Hatem Zurob*¹; Zachary Detweiler²; Daniel Bullard²; ¹McMaster University; ²Arcanum Alloys

BIOMATERIALS

Next Generation Biomaterials — On-Demand Oral Presentations

Sponsored by: ACerS Bioceramics Division, TMS Biomaterials Committee

Program Organizers: Roger Narayan, University of North Carolina; Min Wang, University of Hong Kong; Shawn Allan, Lithoz America LLC

Friday AM | October 22, 2021
Virtual Meeting Room 3 | MS&T Virtual

Additive Manufacturing of Microstructured and Nanostructured Active Medical Devices: *Roger Narayan*¹; ¹University of North Carolina

Hybrid Nanomanufacturing for Wearable Intelligence: *Wenzhuo Wu*¹; ¹Purdue University

FUNDAMENTALS AND CHARACTERIZATION

Nucleation of Solid-State Phase Transformations — On-Demand Oral Presentations

Sponsored by: TMS Phase Transformations Committee

Program Organizers: Eric Lass, University of Tennessee-Knoxville; Sophie Primig, University of New South Wales; Keith Knipling, Naval Research Laboratory

Friday AM | October 22, 2021
Virtual Meeting Room 7 | MS&T Virtual

Effect of Cooling Rate and Austenitic Grain Size on the Austenite Decomposition Kinetics in a Low-carbon Steel: Carlos Alberto Barajas-Miguel¹; Octavio Vázquez-Gómez¹; Antonio Oliver-Reynoso¹; Edgar López-Martínez²; Héctor Javier Vergara-Hernández¹; ¹Tecnológico Nacional de México/ I.T. Morelia; ²Universidad del Istmo

SPECIAL TOPICS

Online Teaching Best Practices for the COVID Era and Beyond — On-Demand Oral Presentations

Sponsored by: ACerS Electronic Division

Program Organizers: B. Reeya Jayan, Carnegie Mellon University; Jennifer Andrew, University of Florida

Friday AM | October 22, 2021
Virtual Meeting Room 13 | MS&T Virtual

Session Chair: B. Reeya Jayan, Carnegie Mellon University

Closer Together: Remote Learning in Virtual Reality: *Stephan Caspar*¹; ¹Carnegie Mellon University

Debunking the Hidden Curriculum in Online STEM Courses: A Depiction of Three Latinx Engineering Educators: *Idalis Villanueva-Alarcón*¹; John Mendoza-García¹; Sinda Rivera-Jiménez¹; ¹University of Florida

Engagement in Online Discussion and Teamwork in Teaching Undergraduate MSE Classes: *Hui Xiong*¹; ¹Boise State University

Failure to Disrupt: Why Technology Alone Can't Transform Education: *Justin Reich*¹; ¹MIT

Photonics Workforce Training Using Game-based Learning and Interactive Desktop Simulations: *Erik Verlage*¹; ¹Massachusetts Institute of Technology

Practical "Hands-on" Electron Microscopy Training at a Distance: Stephen Boona¹; Daniel Veghte¹; Ari Blumer¹; Frank Scheltens¹; Daniel Huber¹; *David McComb*¹; ¹Ohio State University

Virtual Learning in Minecraft: Using a Game to Teach Materials Engineering: *B. Reeya Jayan*¹; Chad Hershock¹; Michael Melville¹; ¹Carnegie Mellon University

Working Together Apart: Design Thinking and Sustainable Engineering Design Projects Online: *Nancy Ruzycski*¹; ¹University of Florida

PROCESSING AND MANUFACTURING

Powder Metallurgical Components in High Performance Applications — On-Demand Oral Presentations

Sponsored by: TMS Powder Materials Committee

Program Organizers: Peng Cao, The University of Auckland; Hanadi Salem, American University in Cairo; Paul Prichard, Kennametal Inc.; Matthew Osborne, Global Advanced Metals; James Paramore, US Army Research Laboratory

Friday AM | October 22, 2021
Virtual Meeting Room 12 | MS&T Virtual

Session Chair: Peng Cao, University of Auckland

Cemented Carbides with Complex Binder Alloys: *Yong Liu*¹; ¹Central South University

Development of Eco-friendly POM Binder System for High Strength Ti-MIM: *Keemi Lim*¹; Muhammad Hayat¹; Peng Cao¹; ¹The University of Auckland

Fabrication of Titanium and Titanium Alloy Components by Thermomechanical Powder Consolidation: *Deliang Zhang*¹; ¹Northeastern University

High-strength Titanium Matrix Composites Reinforced with In Situ Polycarbosilane-derived TiC Particle: *Xin Lu*¹; Yu Pan¹; ¹University of Science and Technology Beijing

Microstructural Uniformity during Sintering, Thermal-plastic Processing and Recrystallization of Tungsten: *Lin Zhang*¹; Xingyu Li¹; Xuanhui Qu¹; ¹University of Science and Technology Beijing

Selective Laser Melting of Metallic Glass Powder to Improve Chemical and Mechanical Performance of Magnesium: *Xiyu Yao*¹; ¹Southern University of Science and Technology

Synthesis of Low-oxygen Titanium towards Achieving Strength-ductility Synergy: *Kumar Jena*¹; Ying Xu¹; Peng Cao¹; ¹University Of Auckland

Synthesis, Sintering and Mechanical Behavior of Ultra-fine Low-oxygen Titanium Powder: *Ying Xu*¹; Kumar Jena¹; Peng Cao¹; ¹The University of Auckland

Effect of Manufacturing Parameters on Inoculated PM Tool Steel Properties: Randa Habib¹; Ayman Elsayed¹; Saiid Anwar¹; Bahaa Salah¹; Taha Mattar¹; ¹Central Metallurgical Research and Development Institute

CERAMIC AND GLASS MATERIALS

Preceramic Polymers; Synthesis, Processing, Modeling, and Derived Ceramics — On-Demand Oral Session: Preceramic Polymers

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Matthew Dickerson, Air Force Research Laboratory; Gurpreet Singh, Kansas State University; Paolo Colombo, University of Padova; Günter Motz, Universität Bayreuth

Friday AM | October 22, 2021
Virtual Meeting Room 4 | MS&T Virtual

Session Chair: Gunter Motz, Universität Bayreuth

Novel Hydrogen Chemisorption Properties of Polymer-derived Amorphous SiAlN Compounds: *Yuji Iwamoto*¹; ¹Nagoya Institute of Technology

Embedded Direct Ink Writing of Freeform Ceramic Components: *Kai Huang*¹; Hamada Elsayed¹; Giorgia Franchin¹; Paolo Colombo¹; ¹University of Padova

Thermomechanical Performance of a Novel Class of Ultra-high Temperature Polymer Derived La Containing Zr-B-C(O) Ceramics: *Gokul Gopakumar*¹; Ganesh T¹; Renjith Devasia²; Ravi Kumar¹; ¹Indian Institute of Technology Madras; ²Vikram Sarabhai Space Centre

Processing of SiCN Polymer-derived Ceramics: *Majid Minary*¹; ¹University of Texas at Dallas

Polymer-derived UHTC Synthesis: *Matthew Laskoski*¹; ¹US Naval Research Lab

Study on Manufacturing of Silsesquiazane Derived Hierarchically Porous Silicon Carbonitride Ceramics with Aligned Macropore by Freeze-casting Method: *Tae-Hwan Huh*¹; Young-Je Kwark¹; ¹Soongsil University

Additive Manufacturing of Hybrid Polymer-derived Ceramics via Core-shell Direct-ink Writing: *Robert Pack*¹; James Kemp¹; Brett Compton¹; ¹University of Tennessee Knoxville

Metal-coordinated Preceramic Polymer Hairy Nanoparticles for Ultra-high Temperature Structural Materials: *Maria Parvulescu*¹; Kara Martin²; Christina Thompson²; Matthew Dickerson²; ¹Air Force Research Laboratory; ²AFRL

SiOC Coatings on Yttria Stabilized Zirconia Microspheres Using a Fluidized Bed Coating Process: *Sanjay Kumar*¹; Kathy Lu¹; ¹Virginia Polytechnic Institute and State University

Synthesis and 3D Printing of Antibacterial Polymer-derived Bioceramic Scaffolds for Bone Engineering Applications: Joelle El Hayek¹; Laurence Soussan¹; Philippe Miele¹; Mikhael Bechelany¹; *Christelle Salameh*¹; ¹Institut Européen des Membranes

CERAMIC AND GLASS MATERIALS

Pre-ceramic Polymers; Synthesis, Processing, Modeling, and Derived Ceramics – On-Demand Poster Presentations

Sponsored by: ACerS Engineering Ceramics Division

Program Organizers: Matthew Dickerson, Air Force Research Laboratory; Gurpreet Singh, Kansas State University; Paolo Colombo, University of Padova; Günter Motz, Universität Bayreuth

Friday AM | October 22, 2021
Virtual Poster Hall | MS&T Virtual

Session Chair: Joe Bowen, Air Force Research Laboratory

Fabrication of SiOC Fibermats via Electrospinning and their Applications in Energy Storage Systems: *Shakir Bin Mujib*¹; Gurpreet Singh¹; ¹Kansas State University

Investigation of Polymer Derived SiOC/Carbon Nanotube Electrodes for Na-ion Batteries: *Mabel Anstine*¹; Shakir Bin Mujib¹; Gurpreet Singh¹; ¹Kansas State University

Porous SiOC/SiC Ceramics via an Active-filler Catalyzed Polymer-derived Method: *Advaith Rau*¹; Kathy Lu¹; ¹Virginia Polytechnic Institute and State University

Synthesis of Precursor Derived Si(B)CN Ceramic Coating for High-temperature Applications: *Lanie Mannebach*¹; Shakir Bin Mujib¹; Gurpreet Singh¹; ¹Kansas State University

FUNDAMENTALS AND CHARACTERIZATION

Probing Defect Properties and Behavior under Mechanical Deformation and Extreme Conditions – On-Demand Oral Session: Defect Property, Characterization, and Evolution

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

Program Organizers: Zhe Fan, Lamar University; Tianyi Chen, Oregon State University; Shijun Zhao, City University of Hong Kong; Mitra Taheri, Johns Hopkins University; Yury Osetskiy, Oak Ridge National Laboratory

Friday AM | October 22, 2021
Virtual Meeting Room 7 | MS&T Virtual

Defect Absorption at Grain Boundaries: A Grain Boundary Structure Perspective: *David Srolovitz*¹; Jian Han¹; Larissa Woryk²; Mitra Taheri³; Jaime Marian⁴; ¹City University of Hong Kong; ²University of Pennsylvania; ³Johns Hopkins University; ⁴University of California, Los Angeles

Automated Defect Detection in Electron Microscopy with Machine Learning: *Dane Morgan*¹; Ryan Jacobs¹; Mingren Shen¹; Kevin Field²; ¹University of Wisconsin-Madison; ²University of Michigan

Effects of Cr On 1/2<111> to <100> Loop Transformation in Concentrated Fe-Cr Alloys under Irradiation: *Xian-Ming Bai*¹; ¹Virginia Polytechnic Institute and State University

A Statistical Approach for Atomistic Calculations of Vacancy Formation Energy and Chemical Potentials in Concentrated Solid-solution Alloys: *Yongfeng Zhang*¹; Anus Manzoor²; Chao Jiang³; Dilpuneet Aidhy²; ¹University of Wisconsin-Madison; ²University of Wyoming; ³Idaho National Laboratory

Defect Properties and Deformation Mechanisms of Multi-component Intermetallics: *Shijun Zhao*¹; ¹City University of Hong Kong

Irradiation-induced Self-organization of the Microstructure in Irradiated Alloys and Its Influence on Mechanical Properties: *Pascal Bellon*¹; Qun Li¹; Gabriel Bouobda Moladje¹; Sung-Eun Kim¹; Soumyajit Jana¹; Robert Averback¹; ¹University of Illinois at Urbana-Champaign

Machine Learning Driven In-situ TEM with Ion Irradiation: *Meimei Li*¹; ¹Argonne National Laboratory

Lattice Distortion in NbTaTiV and NbTaTiVZr Refractory High-entropy Alloys: Chanho Lee¹; Yi Chou²; George Kim³; Michael Gao⁴; Ke An⁵; Jamieson Brechtel⁵; Chuan Zhang⁶; Wei Chen³; Jonathan Poplawsky⁵; Gian Song⁷; Yi-Chia Chou²; *Peter Liaw*⁸; ¹Los Alamos National Laboratory; ²National Chiao Tung University; ³Illinois Institute of Technology; ⁴National Energy Technology Laboratory/Leidos Research Support Team; ⁵Oak Ridge National Laboratory; ⁶Computherm LLC; ⁷Kongju National University; ⁸University of Tennessee

Synchrotron High-energy X-ray Studies of Nuclear Structural Materials: Deformation and Additive Manufacturing: *Xuan Zhang*¹; Meimei Li¹; Jonathan Almer¹; Jun-Sang Park¹; Peter Kenesei¹; Andrew Chuang¹; ¹Argonne National Laboratory

The Role of Interfaces in Mechanical Response and Radiation Resistance of Ceramics: *Izabela Szlufarska*¹; Hongliang Zhang¹; Jianqi Xi¹; Xing Wang¹; ¹University of Wisconsin-Madison


Switching the Fracture Toughness of Single Crystal ZnS by Light Irradiation: Tingting Zhu¹; Kuan Ding¹; Anahid Amiri¹; Yu Oshima²; Enrico Bruder¹; Robert Stark¹; Karsten Durst¹; Katsuyuki Matsunaga²; Atsutomu Nakamura²; *Xufei Fang*¹; ¹Technische Universität Darmstadt; ²Nagoya University

Effects of Electronic Structures on Defect and Mechanical Properties of BCC Multicomponent Alloys: Yong-Jie Hu¹; *Liang Qi*²; ¹Drexel university; ²University of Michigan

The Impact of Elastic Anisotropy on Hydride Morphology in Zirconium: Pierre-Clement Simon¹; *Michael Tonks*²; Arthur Motta¹; Long-Qing Chen¹; Mark Daymond³; ¹Pennsylvania State University; ²University of Florida; ³Queen's University

Impact of Carbon Nanotube Defects on Fracture Mechanisms in Ceramic Nanocomposites: *Yingchao Yang*¹; Brian Sheldon²; Izabela Szlufarska³; Jun Lou⁴; ¹University of Maine; ²Brown University; ³University of Wisconsin; ⁴Rice University

Studying Radiation Effects in Nuclear Fuels via Advanced Characterization and Modeling: *Lingfeng He*¹; Kaustubh Bawane¹; Tiankai Yao¹; Pengyuan Xiu¹; Marat Khafizov²; Miaomiao Jin³; Chao Jiang¹; Cody Dennett¹; Zilong Hua¹; Anter El-Azab⁴; David Hurley¹; Jian Gan¹; ¹Idaho National Laboratory; ²The Ohio State University; ³Pennsylvania State University; ⁴Purdue University



Elemental Partitioning Behavior among Precipitates in Alumina-forming-austenitic Stainless Steel: *Qing-Qiang Ren*¹; David Hoelzer¹; Michael Lance³; Yukinori Yamamoto¹; Michael Brady¹; Jonathan Poplawsky¹; ¹Oak Ridge National Laboratory

Enhanced Load Transfer and Ductility in Al-9Ce Alloy through Heterogeneous Lamellar Microstructure Design by Cold Rolling and Annealing: *Chi Zhang*¹; ¹Shanghai Jiao Tong University

Deformation Microstructure of Ferritic/Martensitic Steels after Spallation Neutron Irradiation: *Kun Wang*¹; ¹Alfred University

PROCESSING AND MANUFACTURING

Processing and Performance of Materials Using Microwaves, Electric and Magnetic Fields, Ultrasound, Lasers, and Mechanical Work: The Rustum Roy Symposium — On-Demand Oral Presentations

Sponsored by: ACerS Basic Science Division, ACerS Manufacturing Division

Program Organizers: Morsi Mahmoud, King Fahd University of Petroleum & Minerals; Dinesh Agrawal, Pennsylvania State University; Guido Link, Karlsruhe Institute of Technology; Motoyasu Sato, Chubu University; Rishi Raj, University of Colorado; Christina Wildfire, National Energy Technology Laboratory; Zhiwei Peng, Central South University

Friday AM | October 22, 2021
Virtual Meeting Room 12 | MS&T Virtual

Characterizing the Kinetics of Isothermal Microwave-assisted Chemical Syntheses (IMACS): Application of a Unified Process Kinetic Equation (UPKE): *Boon Wong*¹; ¹Retired

MATERIALS-ENVIRONMENT INTERACTIONS

Progressive Solutions to Improve Corrosion Resistance for Nuclear Waste Storage — On-Demand Alternative Nuclear Waste Storage Materials and New Imaging Neutron Microscopy Technique for Nuclear Waste Storage Glass Corroded in Aqueous Solution

Sponsored by: TMS Corrosion and Environmental Effects Committee, ACerS Glass & Optical Materials Division

Program Organizers: Madeleine Jordache, Stevens Institute of Technology; Gary Pickrell, Virginia Tech

Friday AM | October 22, 2021
Virtual Meeting Room 9 | MS&T Virtual

Session Chairs: Madeleine Jordache, Stevens Institute of Technology; Gary Pickrell, Virginia Tech

Particulars of Crystallization of Glass-ceramics for Nuclear Waste Storage: *Edgar Zanotto*¹; ¹Federal University of Sao Carlos

Neutron Microscope Based on Wolter Optics for Imaging Hydrogen Distribution in Glass: *Boris Khaykovich*¹; Daniel Hussey²; Suzanne Romaine³; Kiranmayee Kilaru⁴; Brian Ramsey⁴; ¹Massachusetts Institute Of Technology; ²NIST; ³Harvard-Smithsonian Center for Astrophysics; ⁴NASA

BIOMATERIALS

Surface Engineering and Characterization of Titanium and Titanium Alloys — On-Demand Oral Sessions — Surface Engineering and Characterization of Titanium and Titanium Alloys

Program Organizers: Silvia Spriano, Politecnico di Torino; Yolanda Hedberg, KTH Royal Institute of Technology; James Noel, University of Western Ontario; Sara Ferraris, Politecnico Di Torino Disat; Fernando Warchomicka, Graz University of Technology

Friday AM | October 22, 2021
Virtual Meeting Room 3 | MS&T Virtual

Session Chairs: Silvia Spriano, Politecnico di Torino- DISAT; Yolanda Hedberg, Western University, London, Ontario, Canada; James Noel, Western University, London, Canada; Sara Ferraris, Politecnico di Torino - DISAT; Fernando Warchomicka, Graz University of Technology

Introductory Comments: Yolanda Hedberg, James Noel

Effect of Various Reciprocating Geometries on Tribological Properties of SS 304 and Ti6Al4V under Dry and Lubricated Conditions: *Chinmayee Nayak*¹; Rishabh Kundu²; Rajneesh Pandey³; Kantesh Balani¹; ¹Indian Institute of Technology, Kanpur; ²National Institute of Technology, Rourkela; ³Maulana Azad National Institute of Technology, Bhopal

Observations on the Mechanically Assisted Crevice Corrosion of Titanium: Single Asperity Tribocorrosion of Titanium Alloy and Selective Dissolution of Beta Phase of Ti-6Al-4V in Physiologically Representative Conditions: *Jeremy Gilbert*¹; Annsley Mace¹; Michael Kurtz¹; Dongkai Zhu¹; Yangping Liu¹; ¹Clemson-MUSC Bioengineering Program

Role of Patient Factors on Corrosion and Failure of Retrieved Metallic Artificial Hip and Knee Joint Implants: *Saman Nikpour*¹; Anastasia Codirenzi²; Matthew Teeter²; Yolanda Hedberg¹; ¹Western University; ²Western University Hospital

Influence of Water Vapor on Metal and Oxygen Transport in Oxide Scale and Alpha-case Formation in Pure Titanium: *Beyza Öztürk*¹; Lukas Mengis¹; Daniel Dickes²; Uwe Glatzel²; Mathias Galetz¹; ¹DECHEMA Research Institute; ²University of Bayreuth

Electrophoretic Deposition, Microstructure and Properties of Multicomponent Sodium Alginate-based Coatings on Titanium Biomaterials: *Tomasz Moskalewicz*¹; Maciej Warcaba¹; Marcin Kot¹; Zoya Hadzhieva²; Aldo R. Boccaccini²; ¹AGH University of Science and Technology; ²University of Erlangen-Nuremberg

Growing Integration Layer [GIL] Strategy for Direct Formation of Bio-active Ceramic Coating on Metallic Alloy: *Masahiro Yoshimura*¹; Chi Huang Huang²; ¹National Cheng Kung University; Tokyo Institute of Technology; ²National Cheng Kung University

Plasma Electrolytic Oxidation of Titanium Alloys with Electron Beam Designed Topography: Hugo Mora Sanchez¹; Florian Pixner²; Ricardo Buzolin²; Raul Arrabal¹; *Fernando Warchomicka*²; Endzhe Matykina¹; ¹Universidad Complutense de Madrid; ²Graz University of Technology

Enhancing Differentiation of Preosteoblast on Selective Laser Melting Titanium Implants Treated with Mixed Acid and Heat: *Phuc Le*¹; Seine A. Shintani¹; Hiroaki Takadama¹; Morihiro Ito¹; Tatsuya Kakutani¹; Hisashi Kitagaki¹; Shuntaro Terauchi¹; Takaaki Ueno¹; Hiroyuki Nakano¹; Yoichiro Nakajima¹; Kazuya Inoue¹; Tomiharu Matsushita¹; Seiji Yamaguchi¹; ¹Chubu University

PROCESSING AND MANUFACTURING

Synthesis, Characterization, Modeling and Applications of Functional Porous Materials — On-Demand Oral Session: Functional Porous Materials

Sponsored by: ACerS Electronics Division, ACerS Engineering Ceramics Division

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

Friday AM | October 22, 2021
Virtual Meeting Room 12 | MS&T Virtual

Session Chair: Lan Li, Boise State University

Probing the Mechanisms of Reactive Capture and Conversion of CO₂ into Inorganic Carbonates Using Architected Calcium and Magnesium Silicates: Greeshma Gadikota¹; Tianhe Yin¹; Xun Gao¹; Hassnain Asgar¹; ¹Cornell University

Hydrogen-bonded Organic Framework Materials for Gas Separation: *Wei Zhou*¹; ¹National Institute of Standards and Technology

Layer-by-layer Assembled Polymer/MOF Membrane for H₂/CO₂ Separation: *Fangming Xiang*¹; David Hopkinson¹; ¹National Energy Technology Laboratory

Small Molecules as Guests in Metal-organic Frameworks: *Craig Brown*¹; ¹National Institute of Standards and Technology

Thermodynamics of Molybdenum Oxide Clusters Encapsulated in Zeolite Y: *Xianghui Zhang*¹; Vitaliy Goncharov¹; Cody Cockreham¹; Esra Mertsoy¹; Hui Sun²; Su Ha¹; Jean-Sabin McEwen¹; Xiaofeng Guo¹; Di Wu¹; ¹Washington State University; ²East China University of Science and Technology

Structure and CO₂ Adsorption Sites in the Flexible Coordination Polymer Ni-Dbm-Bpy from DFT: *Eric Cockayne*¹; Winnie Wong-Ng¹; Andrew Allen¹; ¹National Institute of Standards and Technology

Electrochemically-induced Amorphous to Crystalline Transformation in Niobium Oxide Electrodes for Lithium-ion Batteries: Pete Barnes¹; Yuxing Zuo²; Kiev Dixon¹; Sungsik Lee³; Dewen Hou¹; Justin Connell³; Hua Zhou³; Shyue Ping Ong²; *Hui Xiong*¹; ¹Boise State University; ²University of California San Diego; ³Argonne National Laboratory

Material Characterization Testing of Synthetic Granular Composites Used in Equine Sports Surfaces: *John Bridge*¹; Charles Liu¹; Elijah Leonen¹; Kris Weisshaupt²; Kaleb Dempsey³; ¹University of Washington; ²MAP Laboratories LLC; ³Racing Surfaces Testing Lab

Chemical-aided Synthesis of Anorthite-sodalite-afghanite Porous Ceramics from Granite-clay-plantain Peel Mix: *Odevole Oluwagbenga*¹; Kashim Bolaji¹; Akinbogun Lawrence¹; Folorunso Oladayo¹; ¹Federal University of Technology.

MATERIALS-ENVIRONMENT INTERACTIONS

Thermodynamics of Materials in Extreme Environments — On-Demand: Thermodynamics and Stabilities of Alloys and Ceramics

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

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

Friday AM | October 22, 2021
Virtual Meeting Room 9 | MS&T Virtual

Session Chairs: Kristina Lilova, Arizona State University; Gustavo Costa, NASA Glenn Research Center

Incorporation of Thorium and Uranium in the Monazite Structure by Wet Chemistry Route: Synthesis, Sintering and Long-term Behavior: *Nicolas Dacheux*¹; Danwen Qin²; Alison Roche¹; Adel Mesbah³; Nicolas Clavier³; Stephanie Szenknect⁴; Renaud Podor³; ¹University of Montpellier; ²ENSCM; ³CNRS; ⁴CEA


In-situ Hydrothermal Synthesis Calorimetry on Nonclassical Pathways of Nickel-aluminum Layered Double Hydroxide (NiAl-LDH) Formation: Xianghui Zhang¹; Cody Cockreham¹; Esra Mertsoy¹; Hui Sun²; Xiaofeng Guo¹; Hongwu Xu³; *Di Wu*¹; ¹Washington State University; ²East China University of Science and Technology; ³Los Alamos National Laboratory

Strength, Deformation, and Equation of State of Tungsten Carbide to 66 GPa: *Benjamin Brugman*¹; Feng Lin²; Mingda Lv³; Curtis Kenney-Benson⁴; Dmitry Popov⁴; Lowell Miyagi²; Susannah Dorfman³; ¹Arizona State University; ²University of Utah; ³Michigan State University; ⁴HPCAT, Argonne National Lab

Determination of the Activation Energy of the Formation of Intermetallic Compounds in the Ni-Al and Ti-Al System upon Receipt of Special Alloys: Borys Sereda¹; *Dmytro Sereda*¹; Yuriy Belokon²; ¹Dneprovsky State Technical University; ²Zaporizhzhya National University

Thermodynamic Properties of Special Alloys of the Ti-Al System Formed under SHS Conditions: *Borys Sereda*¹; Dmytro Sereda¹; Dmytro Kruglyak²; Yuriy Belokon²; ¹Dneprovsky State Technical University; ²Zaporizhzhya National University

Thermal and Microstructural Evolutions in Kerogen-rich Marcellus Shale: *Cody Cockreham*¹; Xianghui Zhang¹; Miu Lun Lau²; Min Long²; Xiaofeng Guo¹; Hongwu Xu³; Di Wu¹; ¹Washington State University; ²Boise State University; ³Los Alamos National Laboratory



High-temperature Structure and Thermodynamics of Cerium Silicates, $A\text{-Ce}_2\text{Si}_2\text{O}_7$, and $\text{Ce}_{4.67}(\text{SiO}_4)_3\text{O}$: *Andrew Strzelecki*¹; Kyle Kriegsman²; Paul Estevenon³; Vitaliy Goncharov²; Jianming Bai⁴; Stephanie Szenknect³; Adel Mesbah³; Di Wu²; John McCloy⁵; Nicolas Dacheux³; Xiaofeng Guo²; ¹Washington State University; ²Alexandra Navrotsky Institute for Experimental Thermodynamics, Washington State University; ³ICSM, Univ Montpellier, CNRS, CEA, ENSCM, Site de Marcoule; ⁴National Synchrotron Light Source II, Brookhaven National Laboratory; ⁵Mechanical and Materials Engineering, Washington State University

MATERIALS-ENVIRONMENT INTERACTIONS

Thermodynamics of Materials in Extreme Environments — On-Demand: Thermodynamics of Nuclear Materials and Minerals

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

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

Friday AM | October 22, 2021
Virtual Meeting Room 9 | MS&T Virtual

Session Chairs: Xiaofeng Guo, Washington State University; Gustavo Costa, NASA Glenn Research Center

Thermodynamics of An-Cl Complexes at High Temperature and Pressure: *Ping Yang*¹; Xiaobin Zhang¹; Morgan Kelley¹; Jason Baker¹; Hakim Boukhalfa¹; Artaches Migdisov¹; Hongwu Xu¹; ¹Los Alamos National Laboratory

Dissolution of Uranium Based Dioxide in Nitric Acid: Impact of Fission Products and Microstructure: *Nicolas Dacheux*¹; Thomas Barral²; Thibault Kaczmarek²; Malvina Massonnet²; Laurent Claparede¹; Nicolas Clavier³; Stephanie Szenknect²; Renaud Podor³; ¹University of Montpellier; ²CEA; ³CNRS

Thermophysical Modeling of Molten Chlorides and Fluorides: *Can Agca*¹; Jake McMurray¹; Shane Henderson¹; Robert Lefebvre¹; Kaitlin Johnson¹; ¹Oak Ridge National Laboratory

Thermodynamic Properties of Fluoride Molten Salts from Modeling and Simulations: *Shunli Shang*¹; Jorge Paz Soldan Palma¹; Brandon Bocklund¹; Nathan Smith¹; Yi Wang¹; Hojong Kim¹; Zi-Kui Liu¹; ¹Penn State University

Energetics of K-,Ga- Titanate Hollandites: *Nancy Birkner*¹; Mingyang Zhao¹; Kyle Brinkman¹; ¹Clemson University

Energetics of La, Nd-containing Hydroxylbastnaesite ($\text{La}_{1-x}\text{Nd}_x\text{CO}_3\text{OH}$) Solid Solutions: *Vitaliy Goncharov*¹; Haylea Nisbet²; Andrew Strzelecki¹; Chris Benmore³; Hongwu Xu²; Artaches Migdisov²; Xiaofeng Guo¹; ¹Washington State University; ²Los Alamos National Laboratory; ³Argonne National Laboratory

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