

**Wednesday, September 19, 2007**

**Automotive: Advanced High-Strength and Other Specialty Sheet Steel Products for the Automotive Industry**

**Manufacturing with Advanced High Strength Steels I: Fracture in Bending and Edge-Stretching**

Room: W2-65

Session Chair: Matt Walp, DaimlerChrysler Corporation

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**The Effect of Microstructure on Hole Expansion in a Advanced High Strength Sheet Steels (Invited)**

R. J. Comstock\*, D. E. Brown, AK Steel, USA

**9:00 AM**

**Influence of Martensite Morphology on Damage Mechanism of Dual Phase Steels**

G. Avramovic-Cingara\*, Y. Ososkov, D. S. Wilkinson, M. Jain, McMaster University, Canada

**9:20 AM**

**Metallurgical Aspects Regarding the Stretching Edge of Advance High Strength Steel**

C. Chiriac\*, Mill Steel Co, USA

**9:40 AM**

**The Susceptibility to Shear Fracture in Bending of Advanced High Strength Sheet Steels**

A. W. Hudgins\*, D. Matlock, J. Speer, Colorado School of Mines, USA; J. Fekete, General Motors Corporation, USA; M. Walp, Daimler Chrysler Corporation, USA

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

**Continuous Bending under Tension (CBT): A New Sheet Metal Test Procedure for Evaluating Formability**

J. Benedyk\*, S. Mostovoy, Illinois Institute of Technology, USA

**10:40 AM**

**Influence of the Edge Conditions on the Hole Expansion Property of Dual-Phase and Complex-Phase Steels**

A. Karellova\*, C. Kremaszky, E. Werner, Technical University of Munich, Germany; T. Hebesberger, A. Pichler, B3E Research and Development, Austria

**11:00 AM**

**Influence of the Shear Cutting Process on Damage in a Laboratory Dual Phase Steels Developed for Automotive Application**

A. Dalloz\*, A. Gourgues-Lorenzon, A. Pineau, J. Besson, Ecole des Mines de Paris, ParisTech, France; T. Sturel, Arcelor Reasearch, France

**11:20 AM**

**Digital Image Correlation Studies of Advanced High Strength Steel Deformation and Fracture**

L. G. Hector\*, V. Savic, General Motors Research and Development Center, USA

**11:40 AM**

**Some Aspects of Thermo-Mechanical Properties of High Mn TWIP Steels Investigated by In-Situ Infrared Thermography**

L. Chen\*, H. Kim, S. Biroasca, B. C. De Cooman, POSTECH, South Korea

**Automotive: Automotive and Ground Vehicles: Applications of Materials to Vehicle Designs**

**Joining and Creation of Advanced Structures**

Room: W2-63

Session Chair: Gil Chapman, DaimlerChrysler (ret.)

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**Why Stick with Adhesive Bonding and Why Not**

G. B. Chapman\*, S. A. Titov, E. Y. Maeva, University of Windsor, Canada

**9:00 AM**

**Hook and Loop Advanced Technology Products (Invited)**

T. F. Hishon\*, Velcro Automotive Division, USA

**9:20 AM**

**Investigation of the Material Welding Using The High Speed Liquid Impact**

V. Samardzic\*, E. S. Geskin, New Jersey Institute of Technology, USA; G. Atanov, A. Semko, A. Kovaliov, Donetsk National Univesity, Ukraine

**9:40 AM**

**Friction Stir Blind Riveting - Process and Capabilities**

D. Gao, General Motors R & D Center, USA; U. Ersoy, University of Michigan, USA; R. Stevenson\*, P. Wang, General Motors R & D Center, USA

**10:00 AM**

**Microstructure and Mechanical Behavior of Friction Stir Welded AZ31 Mg Blank**

Q. Yang\*, K. Okamoto, Hitachi America, Ltd, USA; R. Wagoner, The Ohio State University, USA; K. Chung, Seoul National University, South Korea; C. Kim, General Motors R&D Center, USA

**Automotive: Automotive and Ground Vehicles: Materials and Processes for Vehicles**

**Tribology, Surfaces, Lubricants and Coatings I**

Room: W2-62

Session Chair: Arianna Morales, General Motors

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**Tribological Coatings for Automotive Applications**

M. H. Hans\*, Oerlikon Balzers Inc, USA

**9:00 AM**

**Surface Modification of Aluminum for Automotive Engine Application (Invited)**

N. B. Dahotre\*, University of Tennessee, USA

**9:20 AM**

**Thermally Sprayed Specialty Coatings for Motor Vehicles**

R. K. Betts\*, Cincinnati Thermal Spray, Inc., USA

**9:40 AM**

**The Effects of Boron Coating on Metallic Alloys for Automotive Applications**

R. S. Petrova\*, N. Suwattananont, NJIT, USA

\* Denotes Presenting Author

# MS&T'07<sup>®</sup>

10:00 - 10:20 a.m.

Break

10:20 AM

## Performance of Vitreous and Devitrifying Coatings as High Temperature Lubricants

A. R. Riahi\*, University of Windsor, Canada; A. T. Morales, General Motors R & D Center, USA; A. T. Alpas, University of Windsor, Canada

10:40 AM

## Enhancement of MQL Based Machining of Automotive Alloys Using Cutting Tools with DLC/Polymer Surface Treatments

J. Dosbaeva, G. Fox-Rabinovich, McMaster University, Canada; J. Dasch, GM R&D Center, USA; S. Veldhuis\*, McMaster University, Canada

11:00 AM

## High Temperature Wear and Adhesion of Magnesium AZ31 Alloy Against Tool Steel Material and Comparison with Aluminum Alloy

S. Das\*, University of Windsor, Canada; A. T. Morales, General Motors R&D Center, USA; A. T. Alpas, University of Windsor, Canada

11:20 AM

## Development of Thin Film Coatings for Dies used in Aluminum Pressure Die-casting of Automotive Components

J. Lin, B. Mishra\*, J. J. Moore, Colorado School of Mines, USA; P. Ried, Ried and Associates, LLC., USA

11:40 AM

## Analysis of Scuffed Al-Si Cylinder Bores: Effect of Alloy Microstructure on Wear Mechanisms

A. Edrissy\*, University of Windsor, Canada; T. Perry, General Motors Research and Development Center, USA; G. Xue, H. Yu, A. Alpas, University of Windsor, Canada

## Automotive: Automotive Light Metal Castings: Technology and Applications

### Alloy Development, Microstructure Evolution and Phase Transformation

Room: W2-64

Session Chairs: Long-Qing Chen, Penn State University; Mei Li, Ford Motor Co.

8:30 AM

Introductory Remarks

8:40 AM

### Experiments Coupled with Modeling to Establish the Mg-rich Phase Equilibria of Mg-Al-Ca (Invited)

H. Cao, C. Zhang, J. Zhu, G. Cao, S. Kou, University of Wisconsin-Madison, USA; R. Schmid-Fetzer, Clausthal University of Technology, Germany; Y. Chang\*, University of Wisconsin-Madison, USA

9:20 AM

### Modeling Precipitate Microstructure Evolution in Al-Alloys (Invited)

T. Wang, Y. Wang, J. Zhang, Penn State University, USA; S. Hu, Los Alamos National Laboratory, USA; C. Wolverton, Northwestern University, USA; Z. Liu, L. Chen\*, Penn State University, USA

10:00 - 10:20 a.m.

Break

10:20 AM

### Precipitation in Cast Al-Mg-Si Alloys from First-Principles (Invited)

C. Wolverton\*, Northwestern University, USA; Y. Wang, C. Ravi, H. Zhang, T. Wang, L. Chen, Z. Liu, Penn State University, USA

11:00 AM

### Application of Phase Diagram Calculation to the Development and Improvement of Light Metals

F. Zhang\*, Y. Yang, W. Cao, K. Wu, S. Chen, CompuTherm, LLC, USA; Y. Chang, University of Wisconsin-Madison, USA

11:20 AM

### Phase Field Simulation on the Growth of $\beta''$ Phase in an Al-Si-Mg Alloy

R. Zhang\*, M. Li, J. Allison, Ford Motor Company, USA

11:40 AM

### Characterization of Combinatorially Prepared Mixed-Phase Magnesium-Aluminum Thin Film Alloys

C. H. Olk\*, D. B. Haddad, General Motors Research Development & Planning, USA

## Automotive: High-Density Hydrogen Storage for Automotive Applications: Materials and Methods

### Tanks, Analysis, & Systems Engineering

Room: W2-66

Session Chair: George Thomas, U.S. Department of Energy

7:50 AM

Introductory Remarks

8:00 AM

### Storage of Hydrogen in Cryogenic Capable Pressure Vessels (Invited)

S. Aceves\*, G. Berry, A. Weisberg, F. Espinosa-Loza, T. Ross, Lawrence Livermore National Lab, USA

8:40 AM

### Survey of Solid State Hydride Tanks for Hydrogen Storage and Energy Conversion Applications (Invited)

R. C. Bowman\*, J. W. Reiter, Jet Propulsion Laboratory, USA; D. A. Mosher, United Technologies Research Center, USA; G. Thomas, Sandia National Laboratories (Retired), USA; D. L. Anton, Savannah River National Laboratory, USA

9:20 AM

### Effects of Metal Hydride Properties on the Performance of Hydrogen Storage Systems (Invited)

T. A. Johnson\*, Sandia National Labs, USA; S. W. Jorgensen, General Motors R&D, Planning and Fuel Cell Activities, USA; D. E. Dedrick, Sandia National Labs, USA

10:00 - 10:20 a.m.

Break

10:20 AM

### Energy Efficiency of On-board Hydrogen Storage (Invited)

J. O. Jensen\*, A. P. Vestbø, L. Qingfeng, N. J. Bjerrum, Technical University of Denmark, Denmark

11:00 AM

### Hydrogen Fuel Storage for Hydrogen Powered Vehicles at Ford Motor Co (Invited)

R. J. Natkin\*, Ford Motor Co, USA

11:20 AM

### Implementation Challenges and Optimization Strategies for On-board Compressed Hydrogen Storage Fueling

M. J. Veenstra\*, Ford Motor Company, USA

11:40 AM

### Practical Approaches to On Board Hydrogen Storage (Invited)

T. S. Abdel-Baset\*, DaimlerChrysler, USA

Wednesday AM

12:00 PM

**Metal Hydrides for Onboard Hydrogen Storage Systems (Invited)**

B. Chao\*, B. Huang, Y. Li, V. Myasnikov, R. Young, Ovonic Hydrogen Systems, USA

**Electronic and Magnetic Properties: Basic and Applied Needs for Superconductivity**

**Coated Conductors III**

Room: D2-11

Session Chairs: Paul Clem, Sandia National Laboratories; Winnie Wong-Ng, NIST

8:30 AM

**Introductory Remarks**

8:40 AM

**MOD YBCO Superconductors on Electrodeposited Biaxially Textured Buffer Layers (Invited)**

R. N. Bhattacharya\*, NREL, USA; Y. Xu, R. Bhattacharya, UES, Inc., USA

9:00 AM

**Thin-film Calorimetric Investigation of Interfacial Reactions in Coated-Conductor Materials (Invited)**

L. Cook\*, R. Cavicchi, W. Wong-Ng, R. Kummumaru, N. Bassim, M. Vaudin, M. Otani, P. Schenck, NIST, USA

9:20 AM

**A Novel Approach to Fabricate 3-5 Micron Thick REBCO Superconductor Films**

M. S. Bhuiyan\*, M. Paranthaman, S. Sathyamurthy, Oak Ridge National Laboratory, USA

9:40 AM

**Transmission Electron Microscopy of YBCO with Flux Pinning Additions**

F. J. Baca, N. A. Pierce, M. J. Mullins, M. F. Locke, A. D. Chaney, C. Varanasi, T. Haugan\*, P. N. Barnes, AFRL/PRPG, USA; J. Wu, R. Emergo, University of Kansas, USA; H. Wang, Texas A&M University, USA

10:00 - 10:20 a.m.

**Break**

10:20 AM

**Temperature Dependence of Total AC Loss In YBCO and BSCCO Superconducting Tapes (Invited)**

S. V. Pamidi\*, D. N. Nguyen, D. C. Knoll, J. Schwartz, Florida State University, USA

11:00 AM

**IBAD-MgO/LMO/MOCVD-YBCO Approach To High Performance YBCO Coated Conductors**

M. P. Paranthaman\*, T. Aytug, A. Goyal, P. M. Martin, Oak Ridge National Laboratory, USA; Y. Chen, X. Xiong, V. Selvamaniakam, SuperPower, Inc., USA

11:20 AM

**Flux Pinning Enhancements of YBCO with (M/123)<sub>x</sub>N Multilayer Films**

N. A. Pierce, T. Haugan\*, F. J. Baca, M. J. Mullins, M. F. Locke, I. Maartense, A. D. Chaney, P. N. Barnes, AFRL/PRPG, USA; H. Wang, Texas A&M University, USA; M. D. Sumption, The Ohio State University, USA

11:40 AM

**Measurement of AC Losses in Second-Generation HTS Conductors (Invited)**

M. Osofsky\*, Naval Research Laboratory, USA; R. J. Soulen, SFA Inc., USA; D. U. Gubser, Naval Research Laboratory, USA; T. Datta, University of South Carolina, USA

**Electronic and Magnetic Properties: Ferroelectrics and Multiferroics**

**Single Crystals, Epitaxy, and Domain Structures**

Room: D2-10

Session Chairs: Chonglin Chen, University of Texas at San Antonio; Shashank Priya, The University of Texas Arlington

8:30AM

**Introductory Remarks**

8:40 AM

**Frequency Dependence of Ferroelastic Domain Switching Behaviour of Piezoelectric Ceramics Under Cyclic Mechanical Loading Measured by Neutron Diffraction**

S. Imlao\*, UNSW, Australia; J. L. Jones, University of Florida, USA; M. Hoffman, UNSW, Australia

9:00 AM

**Application of Plan-view TEM in the Interface Characterization of the Heteroepitaxial Structures (Invited)**

J. Jiang\*, University of Texas at Arlington, USA; Z. Yuan, C. Chen, University of Texas at San Antonio, USA; E. Meletis, University of Texas at Arlington, USA

9:40 AM

**Phase-Field Simulations of Domain Structures in Ferroelectric Islands**

R. Wu\*, J. Zhang, S. Choudhury, Penn State University, USA; S. Hu, Los Alamos National Laboratory, USA; Y. Li, L. Chen, Penn State University, USA

10:00 - 10:20 a.m.

**Break**

10:20 AM

**Hydrothermal Synthesis and Characterization of Doped Sodium Bismuth Titanate Thin Films**

A. Kundu\*, A. Soukhokaj, Lehigh University, USA

10:40 AM

**In-situ X-Ray Analysis on Stress Relaxation of Epitaxial Hydrothermal Lead Titanate Thin Films**

H. Li, K. J. Bowman\*, E. B. Slamovich, Purdue University, USA

11:00 AM

**Residual Stress and Lattice Energy as a Function of Thickness in BST Thin Films**

W. D. Nothwang\*, J. Clayton, P. Chung, J. D. Demaree, S. G. Hirsch, U.S. Army Research Laboratory, USA

11:20 AM

**Temperature Insensitive Low Loss High Tunability Perovskite Oxide Thin Films for Tunable Device Applications (Invited)**

M. W. Cole\*, US Army Research Lab, USA; S. P. Alpay, S. Zhong, University of Connecticut, USA; E. Ngo, S. Hirsch, W. Nothwang, J. D. Demaree, G. Martin, US Army Research Lab, USA

12:00 PM

**Growth and Ferroelectric Characteristics of Fluoride Single Crystals for UV/VUV All Solid State Lasers**

K. Shimamura\*, E. Villora, S. Takekawa, K. Kitamura, National Institute for Materials Science, Japan; N. Ichinose, Waseda Univ., Japan

## **Electronic and Magnetic Properties: General Topics in Electroceramics**

### **Sosman Symposium - Electroceramics I**

Room: D2-15

Session Chairs: David Payne, University of Illinois at Urbana-Champaign; Matthew Frey, 3M Corporate Research Materials Laboratory

**8:30 AM**

#### **Introductory Remarks**

**8:40 AM**

#### **Progress in Flexoelectricity Driven Piezoelectric Ceramic Composites (Invited)**

L. Cross\*, J. Fu, W. Li, N. Li, Penn State University, USA

**9:20 AM**

#### **Pressure Induced FE-to-AFE Phase Transformation in Niobium Modified PZT95/5 Ceramics (Invited)**

P. Yang\*, Sandia National Laboratories, USA

**9:40 AM**

#### **Phase Transformation and Electric Field Tunable Pyroelectric Behavior of Sol-Gel Derived Pb(Nb,Zr,Sn,Ti)O<sub>3</sub> and (PbLa)(Zr,Sn,Ti)O<sub>3</sub> Antiferroelectric Thin Films (Invited)**

Z. Xu\*, W. Chan, City University of Hong Kong, Hong Kong

**10:00 AM**

#### **Ferroic Domain Features Studied by Thermal Wave Modulated Electro-Acoustic Imaging (Invited)**

R. Guo\*, Y. Lee, J. H. Wang, A. S. Bhalla, The Pennsylvania State University, USA

**10:20 AM**

#### **Development of Large-Sized (up to 4" diameter) PMN-PT Based Piezoelectric Crystals for Next Generation of Acoustic Transducers (Invited)**

P. Han\*, J. Tian, H. Pan, H. C. Materials Corporation, USA

**11:00 AM**

#### **Putting Piezoelectrics to Work: Energy Harvesting Power Solutions for Wireless Sensors (Invited)**

C. Lakeman\*, P. Fleig, T. Trainor, F. Unpingco, TPL Inc., USA

**11:20 AM**

#### **Doping of BiScO<sub>3</sub>-PbTiO<sub>3</sub> Based Ceramics for High Temperature Actuators (Invited)**

A. Sehirlioglu\*, A. Sayir, NASA Glenn Research Center, USA

**11:40 AM**

#### **Field-Induced Strain Behavior of Potassium Modified Sodium Bismuth Titanate Polycrystalline Ceramics (Invited)**

J. F. Carroll\*, D. A. Payne, University of Illinois at Urbana-Champaign, USA; M. Miyayama, Y. Noguchi, The University of Tokyo, Japan

## **Electronic and Magnetic Properties: International Symposium on Dielectric Materials: Design, Preparation and Applications**

### **Synthesis and Properties of Thin Films, Thick Films, Laminated, and Multilayer Materials and Devices**

Room: D2-09

Session Chairs: K. Nair, E.I. duPont de Nemours & Co., Inc.; Sea-Fue Wang, National Taipei University of Technology; Kazumi Kato, National Institute of Advanced Industrial Science and Technology (AIST)

**8:30 AM**

#### **Introductory Remarks**

**8:40 AM**

#### **Bottom-Up Fabrication of Columnar BaTiO<sub>3</sub> Films Using a Double Alkoxide Solution (Invited)**

K. Kato\*, K. Suzuki, National Institute of Advanced Industrial Science and Technology (AIST), Japan; S. Kayukawa, K. Tanaka, Nagoya Institute of Technology, Japan; Y. Guo, Toyohashi University of Technology, Japan

**9:00 AM**

#### **BaTiO<sub>3</sub> Thin Films on Metallic Substrates: Fabrication, Microstructure and Property (Invited)**

J. Jiang\*, University of Texas at Arlington, USA; Z. Yuan, J. Liu, J. Weaver, C. Chen, University of Texas at San Antonio, USA; B. Lin, V. Giurgiutiu, University of South Carolina, USA; R. Guo, A. Bhalla, Pennsylvania State University, USA

**9:20 AM**

#### **Morphology and Texture in Hydrothermally Derived Perovskite Powders and Thin Films (Invited)**

E. Slamovich\*, K. Bowman, H. Li, Purdue University, USA

**9:40 AM**

#### **Effect of Laser Wavelength for Heat-Treatment on PZT Films Prepared on Stainless-Steel Substrates by Aerosol Deposition**

S. Baba\*, H. Tsuda, J. Akedo, National Institute of Advanced Industrial Science and Technology (AIST), Japan

**10:00 - 10:20 a.m.**

#### **Break**

**10:20 AM**

#### **Fundamental Mechanism and Patterning Properties of Aerosol Deposition for Integration of Dielectric Layer (Invited)**

J. Akedo\*, National Institute of Advanced Industrial Science & Technology, Japan

**10:40 AM**

#### **High-k BaTiO<sub>3</sub> Thin Films for Embedded Capacitor Technology**

B. K. Roy\*, J. Cho, State Univ of New York at Binghamton, USA

**11:00 AM**

#### **Gas Permeability during Binder Removal in Laminated Barium Titanate Green Ceramic Tapes (Invited)**

S. J. Lombardo\*, J. Yun, University of Missouri, USA

**11:20 AM**

#### **Camber Development for Cofired Laminate of Ba<sub>3</sub>Nb<sub>4</sub>O<sub>15</sub>-BaTiO<sub>3</sub> / CaWO<sub>4</sub>-LaNbO<sub>4</sub>-TiO<sub>2</sub> Ceramics**

E. Kim\*, C. Jeon, D. Kim, Kyonggi University, South Korea

**11:40 AM**

#### **Improvement of Leakage Current of the Thin Amorphous BaSm<sub>2</sub>Ti<sub>4</sub>O<sub>12</sub> Film**

Y. Jeong\*, J. Lim, K. Hong, S. Nahm, Korea University, South Korea; H. Sun, Kunsan National University, South Korea; H. Lee, Korea Research Institute of Standards and Science, South Korea

## **Electronic and Magnetic Properties: Structure-Property Relationships of Multifunctional Oxide Thin Films and Interfaces**

### **Semiconductor Metal-oxides and Semiconductor/Metal-oxide Interfaces**

Room: D2-08

Session Chairs: Chonglin Chen, University of Texas at San Antonio; Arnold Allenic, The University of Michigan

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

#### **Role of Microstructure and Defects in p-Type ZnO Epilayers (Invited)**

A. Allenic\*, W. Guo, Y. Chen, The University of Michigan, USA; Y. Che, Z. Hu, B. Liu, IMRA America, Inc., USA; X. Pan, The University of Michigan, USA

**9:20 AM**

#### **Structure and Interdiffusion of Epitaxial ZnO/ZnMgO Nano-Layered Thin Films**

B. L. Stevens\*, S. A. Barnett, Northwestern University, USA

**9:40 AM**

#### **Photoluminescence of (0001) ZnO Epitaxially Grown on (111) Samarium Zirconate Template**

L. Stan\*, B. Kang, J. Lee, I. O. Usov, R. F. DePaula, P. N. Arendt, Q. Jia, Los Alamos National Laboratory, USA

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

#### **Structure-Property Relationship of Epitaxial p-Type Sb-Doped ZnO Thin Films**

W. Guo\*, A. Allenic, Y. Chen, X. Pan, Univ of Michigan, USA

**10:40 AM**

#### **Synthesis and Properties of p-Type Phosphorus-Doped ZnO by Plasma-Assisted Pulsed Laser Ablation**

A. Allenic\*, W. Guo, Y. Chen, G. Zhao, The University of Michigan, USA; Y. Che, Z. Hu, B. Liu, IMRA America, Inc., USA; X. Pan, The University of Michigan, USA

**11:00 AM**

#### **Advanced Nanoscaled Ion Conductors for Energy Application (Invited)**

I. Kosacki\*, Shell Exploration & Production, USA

**11:40 AM**

#### **Electrostatic Interactions in Nanometer-Thick Surficial Amorphous Films**

X. Shi\*, J. Luo, Clemson University, USA

## **Energy: Degradation of Materials for Application in Nuclear Power and Waste Management Systems**

### **Degradation of Materials for Application in Nuclear Waste Management Systems I**

Room: D2-12

Session Chairs: Brian Ikeda, University of Ontario Institute of Technology; Brian Marx, Boise State University

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

#### **Specimens Removed from the Long-Term Corrosion Test Facility at the Lawrence Livermore National Laboratory (Invited)**

D. V. Fix, R. B. Rebak\*, Lawrence Livermore National Laboratory, USA

**9:20 AM**

#### **Cathode Limitations on Localized Corrosion Propagation under Atmospheric Exposure: Analytical Modeling and Comparison to Experiment (Invited)**

Z. Chen\*, R. G. Kelly, University of Virginia, USA

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

#### **Stiffing and Arrest of Localized Corrosion of Ni-Cr-Mo Alloys**

J. H. Payer\*, Case Western Reserve University, USA; R. G. Kelly, University of Virginia, USA; X. Shan, A. S. Agarwal, U. Landau, Case Western Reserve University, USA; Z. Chen, University of Virginia, USA

**10:40 AM**

#### **Study of Crevice Corrosion Repassivation for Alloy 22 at 90C**

A. Mishra\*, G. S. Frankel, The Ohio State Univ., USA

**11:00 AM**

#### **Cathodic Capacity of Alloy 22 in Dust Deliquescence Brines**

P. K. Shukla\*, X. He, Center for Nuclear Waste Regulatory Analyses (CNWRA), USA; L. Yang, Southwest Research Institute®, USA; R. Pabalan, Center for Nuclear Waste Regulatory Analyses (CNWRA), USA; T. Ahn, U.S. Nuclear Regulatory Commission, USA

**11:20 AM**

#### **Study of Crevice Corrosion Using Multi-Electrode Arrays and Real-Life Crevice Characteristics**

F. Bocher\*, J. R. Scully, University of Virginia, USA; F. Presuel-Moreno, Florida Atlantic University, USA

**11:40 AM**

#### **Analysis of Polarization Resistance Data for Alloy 22. Effect of Temperature and Solution Composition**

B. E. Bullard, K. G. Mon, Areva NP, USA; G. C. De, Apogen SEA, USA; M. Sutton, R. B. Rebak\*, Lawrence Livermore National Laboratory, USA

## **Energy: Energy Materials**

### **Energy Materials and Technologies I**

Room: D2-13

Session Chairs: Kevin Howard, The Dow Chemical Company; Yoshinobu Fujishiro, AIST, Japan

**8:30 AM**

**Introductory Remarks**

Wednesday AM

# MS&T'07<sup>®</sup>

**8:40 AM**

## **Organic and Inorganic Nanomaterials: Synthesis, Characterization and Applications**

R. L. Vander Wal\*, G. M. Berger, V. M. Bryg, M. J. Kulis, USRA c/o NASA-Glenn, USA; G. W. Hunter, J. C. Xu, L. J. Evans, K. W. Street, T. J. Bencic, C. Hung, NASA-Glenn, USA

**9:00 AM**

## **Study on the Synthesis of LiFePO<sub>4</sub>: A Potential Cathode Material for Lithium Ion Batteries**

K. E. Howard\*, E. Swedberg, The Dow Chemical Company, USA

**9:20 AM**

## **Manganese Oxides Nanowall Structure Deposition and Lithium Intercalation Capacity Investigation**

D. Liu, Q. Zhang, P. Xiao, B. Garcia, Q. Guo, G. Cao\*, University of Washington, USA

**9:40 AM**

## **New Processes and Characterization of LiCoO<sub>2</sub> Chemistries for Li-Ion Batteries**

J. Al-Sharab\*, F. Cosandey, F. Badway, N. Pierre, G. Amatucci, Rutgers University, USA

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

## **Photocatalytic Study of Polymorphic Titania Synthesized by Ambient Condition Sol Process**

C. Nolph, B. Lee\*, S. Kaewgun, D. Sievers, R. Bhave, D. McKinney, C. Kucera, R. John, J. White, Clemson University, USA

**10:40 AM**

## **Antibacterial Properties and Photocatalytic Degradation of Methyl Orange of Brookite Phase Titanium Dioxide Nanoparticles**

S. Kaewgun, C. A. Nolph, R. R. Shah, B. I. Lee\*, Clemson University, USA

**11:00 AM**

## **Microwave High Temperature Materials Processing: The Certain Contribution to World's Energy Dilemma**

R. Roy\*, D. Agrawal, Penn State University, USA; M. Sato, National Institute for Fusion Science, Japan

**11:20 AM**

## **Laser Doping Fabrication of Energy Conversion Devices**

N. Quick\*, AppliCote Associates, LLC, USA; S. Bet, A. Kar, Univ. of Central Florida, USA

**11:40 AM**

## **Effects of Sintering Conditions on the Dielectric Properties of Nanostructured TiO<sub>2</sub> Ceramics**

S. Chao\*, F. Dogan, Univ of Missouri-Rolla, USA

## **Energy: Fuel Cells: Materials, Processing, Manufacturing and Power Management Technologies**

### **PEM Fuel Cells, Fuel Processing, and Catalysts**

Room: D2-14

Session Chairs: Ramana Reddy, The University of Alabama; Leon Shaw, University of Connecticut

**8:10 AM**

#### **Introductory Remarks**

**8:20 AM**

#### **Investigation of Elastomer Graphite Composite Material for PEM Fuel Cell Bipolar Plate**

E. Petrach, I. Abu-Isa, X. Wang\*, Oakland University, USA

**8:40 AM**

## **Electrochemical Properties of Chromium Electroplated and Thermally Nitrided Stainless Steel for a PEM Fuel Cell Bipolar Plate**

D. Nam\*, Rotem Company, South Korea; H. Lee, Seoul National University, South Korea

**9:00 AM**

## **Catalytic Partial Oxidation of Military Logistic Fuels**

T. G. Howell\*, T. L. Reitz, AFRL/PRPS, USA; R. D. Branam, Air Force Institute of Technology, USA; M. A. Rottmayer, AFRL/PRPS, USA; M. Fokema, Aspen Products Group Inc, USA; T. M. Jenkins, AFRL/PRPS, USA; C. T. Greene, AFRL/PROE, USA

**9:20 AM**

## **Analysis of Deactivation of Jet Fuel Reforming Catalysts**

A. S. Kataria\*, P. Ayyappan, M. Abraham, University of Toledo, USA

**9:40 AM**

## **Effect of Fuel Conditions on Performance of Novel PEMFC Flow Field Design**

V. V. Nikam\*, R. G. Reddy, The Univ of Alabama, USA

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

## **Modeling Platinum Loss in PEM Fuel Cell Cathodes**

D. Morgan\*, E. Holby, Univ. of Wisconsin - Madison, USA; Y. Shao-Horn, Mass. Inst. of Technology, USA

**10:40 AM**

## **Thermal Spray - 3D Printing Method Process Refinements; As Applied to Bi-Metallic Component Manufacturing for PEMFC**

B. Lyons\*, P. Mohanty, S. Das, University of Michigan, USA

**11:00 AM**

## **Long Nanofibers of Pt and Its Alloys for Fuel Cell Electrodes**

J. L. Shui\*, J. C. Li, University of Rochester, USA

**11:20 AM**

## **A Transmission Election Microscopy Investigation of Degradation Mechanisms in Carbon Supported Polymer Electrolyte Membrane Fuel Cell (PEMFC) Catalysts**

O. Ezekoye\*, University of Michigan, USA; C. H. Paik, The Ford Motor Company, USA; X. Pan, University of Michigan, USA

**11:40 AM**

## **Failure Mechanism of Niobium-Clad 304L Stainless Steel for PEMFC Bipolar Plate**

S. Hong\*, K. Weil, Pacific Northwest National Laboratory, USA

## **Fundamentals and Characterization: Characterization and Modeling of the Mechanical Performance of Advanced Alloys: Bridging the Data Gap**

### **Modelling the Mechanical Properties of Advanced Alloys**

Room: D0-07B

Session Chair: Daniel Green, University of Windsor

**8:30 AM**

#### **Introductory Remarks**

**8:40 AM**

#### **Computational Modeling of Deformed TiAl Microstructures with Microcracked Grain Boundaries**

T. R. Bieler\*, M. A. Crimp, Michigan State University, USA; F. Roters, D. Raabe, Max-Planck-Institut für Eisenforschung, Germany

Wednesday AM

**9:00 AM**

**Modeling the Influence of Grain-Level Matrix Inhomogeneity on Strain Localization in the Presence of Hard Particles**

X. Hu\*, D. S. Wilkinson, M. Jain, McMaster University, Canada; R. K. Mishra, General Motors Corporation, USA

**9:20 AM**

**Microstructural Evolution During Equal Channel Angular Extrusion of Titanium Aluminides- Simulation and Experimental Validation**

S. Sastry\*, P. Dhulipala, Washington University, USA

**9:40 AM**

**Stress Response of Advanced High Strength Steels using Tapered Tensile Specimens and Speckle Image Analysis**

J. Mullins, P. Hodgson, T. Hilditch\*, Deakin University, Australia

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

**Modeling Recrystallization Temperature from Microhardness Data**

D. R. Waryoba\*, P. N. Kalu, Florida State University, USA

**10:40 AM**

**Finite Element Analysis of the Phase Transformation Kinetics in Steel using Dilatometry**

Y. Cho\*, Seoul National University, South Korea; Y. Im, J. Lee, J. Ryu, POSCO, South Korea; H. Han, Seoul National University, South Korea

**11:00 AM**

**A Time-Dependent Restoration Model for Determining Restoration Kinetics of Heterogeneous Microstructure**

D. R. Waryoba\*, P. N. Kalu, Florida State University, USA

**11:20 AM**

**Effect of Defects on Mechanical Properties of Metallic Micro-Truss-Structured Materials using Finite Element Modeling**

Q. Li\*, University of Nevada, Reno, USA

**11:40 AM**

**Process Modeling for Fluid Cell Forming**

F. Ren\*, Z. Xia, Ford Motor Company, USA

**Fundamentals and Characterization:  
Discovery and Optimization of Materials through Computational Design**

**Continuum Theoretical and Numerical Analyses to Describe the Properties, Equilibrium, and Kinetics of Materials I**

Room: D0-05AB

Session Chair: Peter Voorhees, Northwestern University

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**Phase Field Modeling of Ferroelectric Films and Nanostructures (Invited)**

J. Slutsker\*, NIST, USA

**9:20 AM**

**Diffuse Interface Modeling of Grain Boundary Transitions (Invited)**

M. Tang\*, W. Carter, MIT, USA

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

**Modeling Realistic Two and Three-Dimensional Microstructures: The Effects of Microstructural Anisotropy on Percolative Processes**

M. Frary\*, L. Hindman, D. Shrader, A. Jain, Boise State University, USA

**10:40 AM**

**New Method for Modeling Strongly Anisotropic Systems (Invited)**

J. Lowengrub\*, University of California-Irvine, USA

**11:20 AM**

**Three-Dimensional Reconstruction of Dendritic Structures in a Nickel-Based Superalloy**

J. D. Madison\*, University of Michigan, USA; J. E. Spowart, Wright-Patterson Air Force Base, USA; D. Rowenhorst, Naval Research Laboratory, USA; T. M. Pollock, University of Michigan, USA

**11:40 AM**

**Parametric Studies using Realistic Virtual Microstructures of Metallic Composites**

A. Sreeranganathan\*, Y. Mao, H. Singh, A. Gokhale, Georgia Institute of Technology, USA

**Fundamentals and Characterization:  
Fundamentals of Brittle Fracture**

**Environmental Effects**

Room: D0-03A

Session Chair: John Mecholsky, University of Florida

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**Environmentally Enhanced Crack Growth in Brittle Materials**

S. Freiman\*, NIST, USA

**9:20 AM**

**Environmentally Enhanced Fracture of Glass (Invited)**

M. Tomozawa\*, Rensselaer Polytechnic Institute, USA

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

**Crack Tip Structure in Glasses (Invited)**

J. Guin\*, CNRS, France; S. Wiederhorn, NIST, USA

**11:00 AM**

**Fracture and Subcritical Cracking in Thin Film Glasses: Role of Glass Structure, Nanoporosity and Test Solution Chemistry (Invited)**

R. Dauskardt\*, Stanford University, USA

**11:40 AM**

**Bond Breaking and the Fracture Process (Invited)**

J. K. West\*, Vicus Technologies, LLC, USA

Wednesday AM



## **Fundamentals and Characterization: High Temperature Material Systems: Fatigue Mechanisms and Prognosis**

### **Role of Microstructure and Environment on Fatigue Life Variability in Ni-based Superalloy Disk Materials**

Room: D0-02AB

Session Chairs: James Larsen, Air Force Research Laboratory; K. S. Ravi Chandran, University of Utah

**8:30 AM**

#### **Introductory Remarks**

**8:40 AM**

#### **Competing Failure Modes in Fatigue – An Emerging Technology (Invited)**

G. T. Cashman\*, General Electric Aviation, USA

**9:20 AM**

#### **Bimodal Life Response in Dwell Notched Fatigue of a Disk Superalloy**

T. Gabb\*, J. Gayda, J. Telesman, NASA GRC, USA

**9:40 AM**

#### **Effect of Grain Size Distribution on the Fatigue Variability of Waspaloy**

M. L. Brogdon, University of Dayton Research Institute, USA; A. Rosenberger\*, US Air Force, USA

**10:00 - 10:20 a.m.**

#### **Break**

**10:20 AM**

#### **Probabilistic Fatigue Lifetime Simulation of a Nickel-Based Superalloy**

S. K. Jha\*, Universal Technology Corporation, USA; M. J. Caton, J. M. Larsen, US Air Force Research Laboratory, USA

**10:40 AM**

#### **Role of Grain Size on the Fatigue Variability of Nickel-Based Superalloys under Dwell-Loading**

M. Caton\*, Air Force Research Lab, USA; S. Jha, Universal Technology Corporation, USA; J. Larsen, Air Force Research Lab, USA

**11:00 AM**

#### **Environmental Effects on the Crack Growth Behavior of the Nickel-base Superalloy ME3**

J. L. Evans\*, A. Saxena, University of Arkansas, USA; A. H. Rosenberger, Air Force Research Laboratory, USA

**11:20 AM**

#### **Intergranular Fracture of Allvac 718Plus at Intermediate Temperatures**

R. W. Hayes\*, Metals Technology Inc., USA

**11:40 AM**

#### **Fretting Fatigue Behavior OF IN100**

S. Mall\*, Air Force Institute of Technology, USA

## **Fundamentals and Characterization: International Symposium on Defects, Transport and Related Phenomena**

### **Transport and Relaxation**

Room: D0-03C

Session Chairs: Bernhard Roling, University of Marburg; Young Han, Sungkyunkwan University

**8:30 AM**

#### **Introductory Remarks**

**8:40 AM**

#### **Defect Chemical Analysis of CaF<sub>2</sub>/BaF<sub>2</sub> Heterolayers (Invited)**

X. Guo\*, I. Matei, J. Jamnik, J. Maier, Max-Planck-Institute for Solid State Research, Germany

**9:20 AM**

#### **The Relaxation Behavior of Oxygen Vacancies in Acceptor-doped BaTiO<sub>3</sub> (Invited)**

Y. Han\*, Sungkyunkwan University, South Korea

**10:00 - 10:20 a.m.**

#### **Break**

**10:20 AM**

#### **Spatially Resolved Characterization of Ion Transport in Solid Electrolytes by Means of Electrical Force Spectroscopy (Invited)**

B. Roling\*, University of Marburg, Germany; A. Schirmeisen, H. Bracht, A. Taskiran, University of Muenster, Germany

**11:00 AM**

#### **Anomalous Diffusion in Superionic Solids**

T. Ishii\*, Okayama University, Japan

**11:20 AM**

#### **ESR Kinetics in Irradiated Syndiotactic Polystyrene at Elevated Temperatures**

S. Lee\*, C. Lee, National Tsing Hua University, Taiwan; Y. Fu, Institute of Nuclear Energy Research, Taiwan

**11:40 AM**

#### **Modification of Crystal Lattice by Impurity Ordering in Gallium Phosphide**

S. L. Pyshkin\*, R. P. Zhitaru, Academy of Sciences, Moldova; J. M. Ballato, Clemson University, USA

## **Fundamentals and Characterization: Developments in Web-Based Materials Property Databases, Knowledge Management of Materials Information, and Materials Informatics for Accelerated Materials Discovery**

### **Data Content and Management**

Room: D0-06AB

Session Chair: Ursula Kattner, National Inst. of Standards & Technology

**8:30 AM**

#### **Introductory Remarks**

Wednesday AM

**8:40 AM**

**Paradigm Shift in Data Content and Informatic Infrastructure Required for Generalized Constitutive Modeling of Material Behavior (Invited)**

S. M. Arnold\*, NASA Glenn Research Center, USA

**9:20 AM**

**Design and Development of a Materials Information Database System with Application to Titanium Alloys**

A. Kumar\*, K. Chandran, University of Utah, USA

**9:40 AM**

**Best Practice For Materials Information Management**

W. Marsden\*, Granta, United Kingdom

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

**Materials Informatics: Data-driven Exploration of Radiation Detection Materials (Invited)**

K. F. Ferris\*, B. M. Webb-Robertson, Pacific Northwest National Laboratory, USA; D. M. Jones, Proximate Technologies, LLC, USA

**11:00 AM**

**Access to Reliable Information on Structure, Interactions and Properties of Non-Organic Materials (Invited)**

V. L. Karen\*, National Institute of Standards and Technology, USA

**Fundamentals and Characterization:  
Numerical, Mathematical and Physical  
Modeling Tools for Materials Processes**

**Numerical, Mathematical, and Physical  
Modeling Tools for Materials Processes I**

Room: D0-03D

Session Chairs: Patricio Mendez, Colorado School of Mines; Ben Li, University of Michigan

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**Progress in a Study of Bonding Mechanisms for Ultrasonic Consolidation**

C. Zhang, L. Li\*, Utah State University, USA

**9:20 AM**

**FEM Analysis of Weld Distortion in HSLA-65 Steel for Naval Applications**

J. Huang\*, Defence R&D Canada - Atlantic, Canada; Y. Gooroochurn, ESI North America, USA

**9:40 AM**

**Material Characterization Using Image-Based Meshing**

P. Young\*, University of Exeter, United Kingdom; R. Said, Simpleware Ltd., United Kingdom; A. Abdul-Aziz, NASA Glenn Research Center, USA; F. Murphy, Kx Simulation Technologies Inc., USA

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

**Non-equilibrium Transformation Diagrams of Advanced Engineering Alloys**

B. T. Alexandrov\*, J. C. Lippold, Ohio State University, USA

**11:00 AM**

**Heat Treatment Optimization of High Alloy Castings**

J. Farren\*, J. N. DuPont, Lehigh University, USA

**11:20 AM**

**Numerical Simulation of Kinetics of the Cobalt Gradient Change in WC-Co During Liquid Phase**

P. Fan\*, Z. Fang, University of Utah, USA; P. Prichard, Kennametal, USA; H. Sohn, University of Utah, USA

**11:40 AM**

**Back Pressure Assisted ECAE Processing**

S. Sastry\*, B. Pond, Washington University, USA

**Fundamentals and Characterization:  
Phase Stability, Diffusion and Their  
Applications**

**Oxidation and Diffusion**

Room: D0-04ABC

Session Chairs: Carelyn Campbell, National Institute of Standards and Technology; David Clarke, University of California, Santa Barbara

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**Diffusion Issues in High Temperature Oxidation and Coatings (Invited)**

B. A. Pint\*, ORNL, USA

**9:20 AM**

**Alloying Effects on the Oxidation and Phase Stability of Pt-Modified  $\gamma$ -Ni+ $\gamma'$ -Ni<sub>3</sub>Al-Based Alloys (Invited)**

A. Heidloff, T. Izumi, B. Gleeson\*, Iowa State University, USA

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

**Measured Activities of Al and Ni in  $\gamma$ (Ni) and  $\gamma$ -(Ni)<sub>3</sub>Al in the Ni-Al-Pt System**

E. Copland\*, NASA GRC / CWRU, USA

**10:40 AM**

**Transient Oxidation in Alumina-Forming Alloys**

H. El Kadiri\*, M. F. Horstemeyer, MSU, USA

**11:00 AM**

**Formation and Growth Kinetics of Sub-surface Oxide Features at the Aluminum-Sapphire Interface after Low Temperature Annealing**

S. Dutta\*, H. M. Chan, R. P. Vinci, Lehigh University, USA

**11:20 AM**

**Composition Changes Near the Oxide/Metal Interface During Oxidation of Recycled Steels Containing the Residual Elements Copper and Nickel**

B. A. Weblar\*, S. Sridhar, Carnegie Mellon University, USA

**11:40 AM**

**Effect of MnO<sub>2</sub> Additions on the Hot Corrosion Behavior of some Fe-, Co- and Ni-base Superalloys**

G. Goyal, Government College of Engineering & Technology, India; H. S. Sahhet\*, N. Bala, BBSBEC, Fatehgarh Sahib, India; S. Prakash, Indian Institute of Technology Roorkee, India

Wednesday AM

## **Fundamentals and Characterization: What We can Learn from Failure Analysis**

### **Emerging Materials & Processes**

Room: D0-01A

Session Chairs: Jeffrey Jansen, Stork Technimet; Daniel Dennies, The Boeing Company; Ronald Parrington, IMR Test Labs Inc.

**8:30 AM**

#### **Introductory Remarks**

**8:40 AM**

#### **Unexpected and Unusual Failures of Polymeric Materials (Invited)**

M. Ezrin\*, retired, USA

**9:20 AM**

#### **Failure Analysis of Gasoline Storage Assemblies (Invited)**

J. A. Jansen\*, Stork Technimet, USA

**9:40 AM**

#### **Plastic Materials for Automotive Applications: A Love/Hate Relationship (Invited)**

S. DeForest\*, IMR Test Labs, USA

**10:20 AM**

#### **Failure Analysis of Environmental Stress Cracking in Polyethylene Terephthalate Beverage Bottles**

E. Morrison\*, Ecolab, USA; A. Marini, Ball Metal Beverage Packaging Division, Americas, USA

**10:40 AM**

#### **Engineering Challenges of Emerging Processes (Invited)**

D. P. Dennies\*, The Boeing Company, USA

**11:20 AM**

#### **Failure Analysis of Fiber Reinforced Polymer Composites (Invited)**

B. D. Agarwal\*, B.D. Agarwal & Associates, Ltd., USA

## **Materials and Systems: Coatings as an Enabler of System Performance**

### **Coatings Via Spray Processes I**

Room: O2-38

Session Chairs: Dongming Zhu, NASA Glenn Research Center; H. Lin, Oak Ridge National Laboratory

**8:30 AM**

#### **Introductory Remarks**

**8:40 AM**

#### **Potential Impact of Thermal Barrier Coatings on Performance of Diesel Engines (Invited)**

M. Beardsley\*, O. Racek, Caterpillar Inc., USA

**9:20 AM**

#### **Process Optimization of Plasma-Sprayed YAG for Composite Thermal and Environmental Barrier Coatings**

C. Weyant\*, K. T. Faber, Northwestern University, USA

**9:40 AM**

#### **Transformation Kinetics of Plasma-Sprayed Ba and Sr-doped Aluminosilicate Coatings**

B. Harder\*, K. T. Faber, Northwestern University, USA; K. N. Lee, Rolls-Royce Corporation, USA

**10:00 - 10:20 a.m.**

#### **Break**

**10:20 AM**

#### **Cold Spray Technology (Invited)**

J. Karthikeyan\*, ASB Industries, USA

**11:00 AM**

#### **Cold Spray Corrosion Resistance Aluminum Coatings on Aluminum Alloys**

B. T. Golesich\*, Kuchera Defense Systems, USA; T. J. Eden, Pennsylvania State University, USA; M. M. Sharma, Bucknell University, USA

**11:20 AM**

#### **Solution Precursor Plasma Spray Dense TiO<sub>2</sub> Coatings**

D. Chen\*, E. H. Jordan, M. Gell, University of Connecticut, USA; X. Ma, Inframart Corporation, USA

**11:40 AM**

#### **Study of Suspension Plasma Sprayed Coatings for Thermal Barrier Applications**

K. VanEvery\*, M. Krane, R. Trice, Purdue University, USA; H. Wang, W. Porter, Oak Ridge National Lab, USA

## **Materials and Systems: Commonality of Phenomena in Composite Materials**

### **Nanocomposites II**

Room: O2-37

Session Chairs: Carl Boehlert, Michigan State University; Aldo Boccaccini, Imperial College London

**8:30 AM**

#### **Introductory Remarks**

**8:40 AM**

#### **Potential of Carbon Nanotubes for Developing Materials Far Lighter and Stronger than Today's Materials (Invited)**

S. Kumar\*, Georgia Institute of Technology, USA

**9:20 AM**

#### **Biocomposites for Tissue Engineering Scaffolds Based on Polymer-Ceramic Systems: The Effect of Materials Combination on Scaffold Performance (Invited)**

A. R. Boccaccini\*, J. Roether, O. Bretcanu, Imperial College London, United Kingdom; E. Verne, C. Vitale-Brovarone, Politecnico di Torino, Italy

**10:00 - 10:20 a.m.**

#### **Break**

**10:20 AM**

#### **Multifunctional Nanocomposite Materials: Modifying Mechanical, Thermal, Electrical and Barrier Properties of Polymers and Composites (Invited)**

L. T. Drzal\*, Michigan State University, USA

**11:00 AM**

#### **Effect of Room Temperature and Cryo Rolling on the Aging Behaviour of Al-4Cu-TiB<sub>2</sub> In-Situ Composites**

S. Kumar\*, S. V. Sarma, B. S. Murty, Indian Institute of Technology Madras, India

## **Materials and Systems: International Symposium on Ceramic Matrix Composites**

### **Oxide CMCs/Coatings**

Room: O2-43

Session Chair: Frank Zok, University of California

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**Oxide Composites with Interface-Controlled Toughness (Invited)**

J. Davis, D. B. Marshall\*, B. McCabe, O. Sudre, Teledyne Scientific, USA

**9:20 AM**

**Concepts for Durable Oxide Composites (Invited)**

F. W. Zok\*, University of California, USA

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

**Effect of Alloy Bath Composition on the Reactive Infiltration Processing of Co-Continuous Alumina-Metal Composites**

J. Everts\*, M. C. Breslin, G. S. Daehn, The Ohio State University, USA

**10:40 AM**

**Pore Structure Evolution and Stabilization in Yttria-Stabilized Zirconia**

M. E. Trahanovsky\*, A. Glaeser, University of California at Berkeley, USA

**11:00 AM**

**Characterization of 20% Gadolinia Stabilized Zirconia Thermal Barrier Coating**

L. C. Sagar\*, P. M. Jebaraj, Dr. Ambedkar Institute of Technology, India; S. Seetharamu, S. Vynatheya, Central Power Research Institute, India

**11:20 AM**

**Functional Intermediate Layers for the Improvement of Thermal Barrier Coatings Performance**

C. C. Lima\*, UNIMEP- Methodist University of Piracicaba, Brazil; J. M. Guilemany, University of Barcelona, Spain

**11:40 AM**

**Effect of Parameters on the Incorporation of Nano-Alumina in to Composite Nickel Electrodeposits**

L. M. O'Donoghue\*, M. J. Pomeroy, University of Limerick, Ireland

## **Materials and Systems: Iron-Based Amorphous Metals: An Important Family of High-Performance Corrosion-Resistant Materials**

### **Introduction and Plenary III**

Room: O2-40

Session Chairs: Joseph Farmer, Lawrence Livermore National Laboratory; Patrice Turchi, Lawrence Livermore National Lab; John Perepezko, University of Wisconsin-Madison

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**Iron-Based Amorphous Metals: The High Performance Corrosion Resistant Materials (HPCRM) Program (Invited)**

J. C. Farmer\*, Lawrence Livermore National Laboratory, USA

### **Atomization, Thermal Spray & Applications II**

Room: O2-40

Session Chairs: Daniel Branagan, The NanoSteel Company; John Perepezko, University of Wisconsin-Madison

**9:20 AM**

**Iron-Based Amorphous Coatings Produced by HVOF Thermal Spray Processing – Coating Structure and Properties (Invited)**

M. Beardsley\*, O. Racek, Caterpillar Inc., USA

**10:00-10:20 a.m.**

**Break**

**10:20 AM**

**Fabrication of Fe-Based Bulk Metallic Glass Components Using Laser Additive Manufacturing**

S. Kelly\*, Penn State University, USA

**10:40 AM**

**Optimizing Alloy Chemistry / Passive Oxide Layer in SAM2X5 HVOF Coatings (Invited)**

D. Branagan, The NanoSteel Company, USA; L. Kaufman\*, Calphad Inc., USA

**11:20 AM**

**Comparison of Crevice Corrosion of Fe-Based Amorphous Metal and Crystalline Ni-Cr-Mo Alloy**

X. Shan\*, H. M. Ha, J. H. Payer, Case Western Reserve University, USA

## **Materials and Systems: Next Generation Biomaterials: Advanced Processing, Characterization and Modeling of Materials for Medical Devices**

### **Processing and Characterization of Metallic Implant Materials**

Room: O2-39

Session Chair: Carl Boehlert, Michigan State University

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**Metallic Implants - Manufacturing Methods For Osteointegration and Current Issues (Invited)**

M. Kumar\*, Biomet Inc, USA

**9:20 AM**

**Preparation and In Vitro Biocompatibility of Laser Processed Porous Titanium**

W. Xue\*, V. Krishna, S. Bose, A. Bandyopadhyay, Washington State University, USA

**9:40 AM**

**Rapid Prototyping of Medical Devices**

W. Wei\*, University of North Carolina, USA; A. Ovsianikov, B. N. Chichkov, Laser Zentrum Hannover, Germany; A. Doraiswamy, R. J. Narayan, University of North Carolina, USA

**10:00 - 10:20 a.m.**

**Break**

Wednesday AM

**10:20 AM**

## **Fabrication of Co-29Cr-6Mo Alloy Powders for Surgical Implants by the Uniform Droplet Spray Process**

S. Roy\*, T. Ando, Northeastern University, USA; M. Ishida, M. Nishida, Fukuda Metal Foil & Powder Co. Ltd., Japan

**10:40 AM**

## **Superelastic NiTi Foams Produced by Powder Metallurgy**

D. Dunand\*, S. Oppenheimer, A. Bansiddhi, Northwestern University, USA

**11:00 AM**

## **Noninvasive Imaging of Microdamage in Bone (Invited)**

R. K. Roeder\*, Z. Zhang, R. D. Ross, M. D. Landrigan, H. Leng, University of Notre Dame, USA

**11:40 AM**

## **Bioactive Glass Tissue Engineering Scaffolds with Carbon Nanotube Coatings**

A. R. Boccaccini\*, O. Bretcanu, J. Cho, Q. Chen, J. Roether, Imperial College London, United Kingdom

## **Nanotechnology: Innovative 3D Nanoparticulate Material Processing**

### **Innovative Forming Techniques**

Room: W2-58

Session Chair: Kathy Lu, Virginia Polytechnic Institute and State University

**8:30 AM**

#### **Introductory Remarks**

**8:40 AM**

#### **Directed Assembly of Patterned Colloidal Films, Granules, and 3D Structures (Invited)**

J. A. Lewis\*, University of Illinois, USA

**9:20 AM**

#### **Cold Spray of Nano-Crystalline Aluminum**

A. C. Hall\*, Sandia National Laboratories, USA; T. Roemer, Ktech Corporation, USA; P. Yang, D. Gill, T. Buchheit, J. McCloskey, Sandia National Laboratories, USA

**9:40 AM**

#### **Bulk Amorphization of Equimolar Ni-Ti Alloy by Mechanical Alloying and Hot Isostatic Pressing**

N. Monseque\*, A. O. Aning, Virginia Tech, USA

**10:00-10:20am**

#### **Break**

**10:20 AM**

#### **Lithographic Techniques for the Production of Micro and Meso Inorganic Components**

D. Heaney\*, The Pennsylvania State University, USA

**10:40 AM**

#### **Synthesis of Bulk Equimolar Ni-Zr Amorphous Alloys**

K. Zhang\*, A. O. Aning, Virginia Tech, USA

**11:00 AM**

#### **Dry Deposition of Porous Thick Nanocomposites for Electrochemical Electrodes**

H. Abe\*, H. Shimoda, K. Sato, M. Naito, Osaka University, Japan

**11:20 AM**

#### **Novel Preparation of Pure Rare-earth Nanoparticles and Nanocrystalline Bulks**

J. Zhang\*, X. Song, N. Lu, E. Li, X. Yan, Beijing University of Technology, China

## **Nanotechnology: Materials Characterization at the Nanoscale: Instrumentation and Applications**

### **Electron- and Ion-Beam Instrumentation and Applications - I**

Room: W2-61

Session Chair: Hamish Fraser, Ohio State University

**8:30 AM**

#### **Introductory Remarks**

**8:40 AM**

#### **Recent Developments in Electron Optical Instrumentation for the Characterization of Materials on the Nanoscale (Invited)**

C. Nielsen\*, JEOL USA Inc., USA

**9:20 AM**

#### **Use of Nanoscale Characterization to Identify the Mechanism of Nucleation of the Alpha Phase in the Matrix of Beta Stabilized Ti Alloys**

P. Collins, A. Genc, S. Nag, The Ohio State University, USA; R. Banerjee, University of North Texas, USA; H. L. Fraser\*, The Ohio State University, USA

**9:40 AM**

#### **Ultrahigh Resolution X-Ray Microcalorimeters for Improved Analysis of Nanometer-Scale Films and Particles (Invited)**

J. Ullom\*, J. Beall, W. Doriese, W. Duncan, L. Ferreira, G. Hilton, R. Horansky, B. Mates, N. Miller, G. O'Neil, C. Reintsema, D. Schmidt, L. Vale, Y. Xu, K. Irwin, S. Cho, NIST, USA

**10:00 - 10:20 a.m.**

#### **Break**

**10:20 AM**

#### **Characterization of Nanostructures with Single Atom Sensitivity through Aberration-Corrected STEM (Invited)**

S. Pennycook\*, M. Varela, M. Chisholm, A. Borisevich, A. Lupii, K. van Benthem, J. Tao, M. Oxley, S. Rashkeev, W. Luo, Oak Ridge National Laboratory, USA; J. McBride, S. Rosenthal, Vanderbilt University, USA; D. Sales, S. Molino, University of Cadiz, Spain; S. Pantelides, Vanderbilt University, USA

**11:00 AM**

#### **Measuring Progress at the Nanoscale (Invited)**

M. Thompson\*, FEI Company, USA

## **Nanotechnology: Nanomaterials for Electronic Applications**

### **Recent Developments in Nanoelectronics**

Room: O2-44

Session Chair: Sharmila Mukhopadhyay, Wright State University

**8:30 AM**

#### **Introductory Remarks**

**8:40 AM**

#### **Recent Developments in Nanomaterials and Nanotechnology (Invited)**

J. Narayan\*, North Carolina State university, USA

## Nanoscale Particles and Powders

Room: O2-44

Session Chair: Raj Singh, University of Cincinnati

**9:20 AM**

### Electronic Spectral Densities Characterization of Individual Quantum Dots

K. Kral\*, Inst. Phys. of ASCR, v.v.i., Czech Republic

**9:40 AM**

### Effect of Growth Conditions on the Morphology of Nanodots

N. B. Singh\*, S. McLaughlin, A. Margarella, D. Kahler, D. Knuteson, A. Berghmans, B. Wagner, J. Hawkins, Northrop Grumman Corporation, USA

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

### Nano-Scale Particles as Precursor for Fabrication of Thin Film Multi-Cation Oxide (YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-x</sub>) (Invited)

S. Mukhopadhyay\*, J. Su, V. Chintamaneni, Wright State University, USA

**11:00 AM**

### Iron Oxide Nanoparticles Supported onto Sepiolite as Novel Humidity Sensors

J. Tulliani\*, Politecnico di Torino, Italy; A. Esteban-Cubillo, CSIC, Spain; V. Naglieri, Politecnico di Torino, Italy; C. Pecharroman, J. S. Moya, CSIC, Spain

**11:20 AM**

### Effect of Si Content and Heat Treatment on Microstructure and Magnetic Properties of Mechanically Alloyed Fe-Si Powders

S. Miraghaei\*, P. Abachi, H. Madaah Hosseini, Sharif University of Technology, Iran

**11:40 AM**

### Preparation of Ultrafine BaTiO<sub>3</sub>-Based MLCC Powders via Chemical Coating and Nano Doping Routes

X. Wang\*, Z. Tian, J. Li, L. Shu, L. Li, Tsinghua University, China; T. Song, Samsung Electro-Mechanics Co.LTD, South Korea

## Nanotechnology: Nanostructured Ceramic Materials: Science and Technology

### Functional Behavior and Characterization of Nanomaterials

Room: W2-67

Session Chair: Albert Romano-Rodriguez, University of Barcelona

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

### Functional Nanophotonic Materials for Hybrid Use in Optoelectronics (Invited)

H. Demir\*, E. Mutlugun, S. Tek, S. Nizamoglu, I. Soganci, E. Sari, T. Ozel, I. Huyal, G. Zengin, C. Uran, Bilkent University, Turkey

**9:20 AM**

### Ceramic Nano-structures Without Lithography: Platforms for Chemical Sensing and Catalysis

S. A. Akbar\*, Ohio State University, USA; Y. Sehoon, KITECH, South Korea; M. Rauscher, Ohio State University, USA; K. Sandhage, Georgia Institute of Technology, USA; S. Dregia, Ohio State University, USA

**9:40 AM**

### Metal Oxide Nanostructures for Gas Sensing

R. L. Vander Wal\*, G. M. Berger, M. J. Kulis, V. M. Bryg, USRA c/o NASA-Glenn Research Center, USA; G. W. Hunter, J. C. Xu, L. J. Evans, NASA-Glenn Research Center, USA

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

### Photocatalytic Activity of TiO<sub>2</sub>/ZSM-5 Composites in the Presence of SO<sub>4</sub><sup>2-</sup> Ion

S. Jinawath\*, P. Sujaridworakun, W. Punpa, Chulalongkorn University, Thailand

**10:40 AM**

### Synthesis and Characterization of Nanostructured Magnesia-Yttria Nanocomposite

J. Al-Sharab\*, B. Kear, R. Sadangi, Rutgers University, USA

**11:00 AM**

### In-situ Investigation of Nucleation and Grain Growth of Sol-Gel Derived Oxide Thin Films by GISAXS

T. Sun\*, H. Hu, Z. Pan, Northwestern University, USA; J. Wang, Argonne National Laboratory, USA; V. P. Dravid, Northwestern University, USA

**11:20 AM**

### Comparison of the Mechanical and Optical Properties of MgO-Y<sub>2</sub>O<sub>3</sub> Composites Processed using Two Distinctly Different Synthesis/Processing Routes

J. Azurdia\*, R. M. Laine, University of Michigan, USA

**11:40 AM**

### Fracture Toughness and Toughening Behavior of a Silicon Nitride with Carbon Nanotube Additions

S. Santhanam\*, K. Jen, S. Pasupuleti, Villanova University, USA; M. Hecht, Z. Wing, Advanced Ceramics Manufacturing, USA

## Nanotechnology: Mechanics of Nanomaterials and Micro/Nanodevices - Experimental and Modeling

### Mechanics of Nanomaterials and Micro/Nanodevices-V

Room: W2-68

Session Chairs: Xiaodong Li, University of South Carolina; Dehua Yang, Hysitron, Inc.

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

### New Route for Achieving High Strength and High Deformability in Nanocrystalline Materials

Z. Shan\*, A. Cabot, A. M. Minor, Lawrence Berkeley National Laboratory, USA; D. C. Chrzan, University of California, Berkeley, USA; S. A. Asif, O. L. Warren, Hysitron Inc., USA; A. P. Alivisatos, Lawrence Berkeley National Laboratory, USA

**9:00 AM**

### Quantitative In-Situ TEM Nano-Compression Tests of AA6063 Aluminum Alloys

J. Ye\*, Lawrence Berkeley National Laboratory, USA; R. Mishra, General Motors Research and Development Center, USA; A. Minor, Lawrence Berkeley National Laboratory, USA

**9:20 AM**

### Plastic Flow of Amorphous Metal Nanopillars during Quantitative In Situ Nanocompression in a TEM (Invited)

E. Ma\*, Johns Hopkins University, USA; Z. Shan, Hysitron Inc., USA; Y. Cheng, Johns Hopkins University, USA; J. Li, Ohio State University, USA; A. Minor, National Center for Electron Microscopy, Lawrence Berkeley National Laboratory, USA; S. Asif, O. Warren, Hysitron Inc., USA

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

### Critical Inflections in the Mechanical Properties of Nanocrystalline Metals

J. Trelewicz\*, C. A. Schuh, Massachusetts Institute of Technology, USA

**10:40 AM**

**Deformation-induced Grain Coalescence in Nanocrystalline Material**

S. X. Mao\*, Z. Shan, J. M. Wiezorek, University of Pittsburgh, USA; J. A. Knapp, D. M. Follstaedt, Sandia National Laboratories, USA; E. A. Stach, Purdue University, USA

**11:00 AM**

**Evaluation of Properties of Grain Boundary during Phase Transition Using Indenter Method**

R. Kubota\*, A. Koizumi, Honda R&D Co., Ltd., Japan

**11:20 AM**

**Examining Small-Scale Plasticity Through in situ TEM Compression Tests (Invited)**

A. M. Minor\*, J. Ye, Lawrence Berkeley National Laboratory, USA; R. K. Mishra, General Motors Research and Development Center, USA; Z. W. Shan, S. Asif, O. L. Warren, Hysitron, Inc., USA

**Processing and Product Manufacturing: Advances in Cement-Based Materials: Manufacturing, Hydration, Admixture Interaction, Properties/Characterization, Modeling and Degradation/Durability**

**Hydration and Related Phenomena in Cement-based Systems**

Room: O2-36

Session Chair: Maria Juenger, The University of Texas at Austin

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**Nanoscale Studies of Cement Hydration During the Induction Period (Invited)**

J. Schweitzer\*, University of Connecticut, USA

**9:00 AM**

**Acceleration of the Hydration Kinetics of C3S and Cement Pastes by Seeding**

J. J. Thomas\*, H. M. Jennings, Northwestern University, USA; J. J. Chen, Lafarge Centre de Recherche, France

**9:20 AM**

**On the Mechanisms of Hydration of Tricalcium Silicate at Very Early Ages**

J. W. Bullard\*, NIST, USA

**9:40 AM**

**Kinetics of Portland Cement and Slag Blended Cement**

J. J. Biernacki, S. E. Mikel\*, Tennessee Technological University, USA; W. Hansen, University of Michigan, USA

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

**Monitoring of Hydration Processes in Cement Materials by Broadband Time-Domain-Reflectometry Dielectric Spectroscopy (Invited)**

N. E. Hager\*, R. C. Domszy, Material Sensing & Instrumentation, USA

**10:40 AM**

**A Model for Nucleation and Growth Kinetics of Tricalcium Silicate Hydration**

J. J. Thomas\*, Northwestern University, USA; J. W. Bullard, NIST, USA

**11:00 AM**

**Residual Strain in Hydrating Portland Cement**

J. J. Biernacki, S. E. Mikel\*, Tennessee Technological University, USA; T. Gnaeupel-Herold, National Institute for Standards and Technology, USA

**11:20 AM**

**Hydration Mechanism of Alkali-Activated Fine Slag Geopolymer**

Y. Zhao, Y. J. Zhang\*, D. Xu, Xi'an University of Architecture and Technology, China

**Processing and Product Manufacturing: Environmental Issues in the Material Science and Technology Industries**

**Green Materials and Processes**

Room: O2-41

Session Chair: Allen Apblett, Oklahoma State University

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**Green Alternative for the Preparation of Transition Metal Molybdates (Invited)**

M. Chehbouni\*, Southeastern Oklahoma State University, USA; A. W. Apblett, Oklahoma State University, USA

**9:20 AM**

**Cr(VI)-Free Chromate Conversion Coatings for Test and Measurement Instrumentation – A University/Industry Design Project Collaboration**

M. T. Powers\*, Agilent Technologies, USA; S. Sen, C. N. Cao, M. R. Fukui, D. Hok, F. Kuo, A. A. Maich, J. Merckling, J. T. Pham, N. J. Spada, E. G. Szkup, E. L. Vallejo, A. S. Williamson, F. Wu, J. D. Wu, University of California, Davis, USA

**9:40 AM**

**Sol-Gello Process for the Green Synthesis of Ceramics**

A. Apblett\*, A. Nichols, Oklahoma State University, USA

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

**Energy Efficient Lamination of Flat Glass via Radio Frequency Pressing**

S. M. Allan\*, M. Fall, H. S. Shulman, Ceralink Inc, USA

**10:40 AM**

**White-Light Fluorescence: A Green Application of Green Nanomaterials - High Surface Area ZnS and ZnS-SiO<sub>2</sub>**

A. P. Piquette\*, A. W. Apblett, Oklahoma State University, USA

**Processing and Product Manufacturing: Innovative Processing and Synthesis of Ceramics, Glasses and Composites**

**Sol-gel & Soft Chemistry Processing, Laminated Object Manufacturing, Functionally Graded Materials**

Room: O2-33

Session Chair: John Halloran, University of Michigan

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**Low Temperature Sintering of Zinc Titanate (ZnTiO<sub>3</sub>) Ceramics Prepared by Modified Sol-Gel Method**

S. S. Indrakanti\*, S. Kakumani, R. Mahakali, K. Chandramouli, National Institute of Technology, Warangal, India

**9:00 AM**

**Low Temperature Sintering of MgO-ZrO<sub>2</sub> Ceramics From Fine Powders Prepared Using Sol-Gel Process**

S. S. Indrakanti\*, National Institute of Technology, India

**9:20 AM**

**Low-Temperature Soft Chemical Synthesis of BaTiO<sub>3</sub> Nanoparticles**

B. K. Roy\*, J. Cho, State Univ of New York at Binghamton, USA

**9:40 AM**

**Optimum Process Parameters and Influencing Factors for Embedding SiC Fibres in Al 6061 O Matrix through Ultrasonic Consolidation**

D. Li\*, R. Soar, Loughborough University, United Kingdom

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

**Influence of Particle Size Distribution on the Stereolithography of Refractory Silica**

C. Bae\*, J. W. Halloran, University of Michigan, USA

**10:40 AM**

**Robocasting of Ceramic-Metal Composite Structures**

J. Xu\*, J. E. Smay, Oklahoma State University, USA; N. V. Jaumard, E. A. Friis, Kansas University, USA

**11:00 AM**

**Robocasting of Oxide Ceramic Composites**

J. Smay\*, Oklahoma State University, USA

**11:20 AM**

**Thermoreversible Gelcasting of Functionally Graded Alumina Preforms**

N. O. Shanti\*, K. T. Faber, Northwestern University, USA

**11:40 AM**

**Mechanical Properties of Green Bodies Produced via Thermoreversible Gelcasting**

M. Seitz\*, K. R. Shull, K. T. Faber, Northwestern University, USA

**Processing and Product Manufacturing:  
Joining of Advanced and Specialty Materials IX**

**Brazing and Other Joining Methods**

Room: O2-35

Session Chairs: Michael Powers, Agilent Technologies; Alan Meier, Alfred University

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**Use of Electrodeposited Coatings as Interlayers in Transient Liquid Phase Bonding**

R. K. Saha\*, T. I. Khan, University of Calgary, Canada

**9:00 AM**

**Progress in Joining of Materials with Reactive Multilayer Foils**

M. T. Powers\*, Agilent Technologies, USA; T. P. Weihs, D. Van Heerden, T. Rude, E. Besnoin, Y. Xun, Reactive NanoTechnologies, USA

**9:20 AM**

**Maintaining Work Hardening in Resistance Brazed Aluminum Alloy Periodic Cellular Metals**

E. Bele\*, B. B. Bouwhuis, G. D. Hibbard, University of Toronto, Canada

**9:40 AM**

**Brazing with Clad Ag-Cu-Ti Active Brazing Filler Metal**

L. Chen\*, Technical Materials, Inc., USA

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

**Brazing of Porous Aluminum Alloy 6101 to Monolithic Aluminum Alloy 6061 for Composite Sandwich Structures Used in Thermal Management Applications**

A. Bauer, A. M. Meier\*, Alfred University, USA; K. Weil, Pacific Northwest National Labs, USA

**10:40 AM**

**Reactive Air Brazing of ZTA to Ni Alloys with Ag-CuO Braze Alloys**

E. L. Prevost, A. DeMarco, B. MacMichael, A. M. Meier\*, Alfred University, USA; J. W. Hoffman, W. J. Walker, Federal-Mogul Corporation, USA

**11:00 AM**

**Bonding WC-Co Cermet and W-Ni-Fe Alloy to Form Hybrid Friction Stir Welding Tools**

J. Rodelas\*, R. S. Mishra, G. Hiltmas, University of Missouri - Rolla, USA

**11:20 AM**

**Considerations of Solder Coated Clad Metal Systems for Interconnects of Solar Si-Substrate Panels**

L. Chen\*, Technical Materials, Inc., USA; M. J. Gedeon, Brush Engineered Materials, USA

**Processing and Product Manufacturing:  
Lead-Free Solders: Emerging Issues in Manufacturing, Performance and Reliability**

**Pb-Free Solder Alloys: Microstructure Evolution**

Room: O2-42

Session Chairs: Carol Handwerker, Purdue University; Eric Cotts, Binghamton University - SUNY

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**Solidification and Microstructure of Ag-Cu-Sn Solder Alloys (Invited)**

D. Lewis\*, Rensselaer Polytechnic Institute, USA

**9:20 AM**

**Effect of Aging on the Melting Characteristics and Microstructures of Mixed Pb + Pb-Free Solders**

B. L. Brinkmeyer\*, M. J. O'Keefe, F. Wang, University of Missouri-Rolla, USA

**9:40 AM**

**The Nucleation Kinetics of Sn in Sn-Ag-Cu Solder Joints: Relation to Microstructure**

B. Arfaei\*, M. Benedict, E. Cotts, Binghamton University, USA

**10:00 - 10:20 a.m.**

**Break**

Wednesday AM

# MS&T'07<sup>®</sup>

**10:20 AM**

**Influence of Reflow Temperature, Cooling Rate and Composition on the Microstructural Evolution of SnAgCu Solder Joints (Invited)**

E. Cotts\*, Y. Xing, L. Lehman, Binghamton University - SUNY, USA

**11:00 AM**

**Effects of Processing Conditions on the Microstructure and Mechanical Properties of Cu6Sn5 Particle Reinforced Composite Solder Joint**

M. Han, X. Liu, F. Tai, Z. Xia, F. Guo\*, Beijing University of Technology, China

**11:20 AM**

**Film Thickness Effect on Whisker Growth**

J. A. Nychka\*, Y. Li, F. Yang, University of Kentucky, USA

**11:40 AM**

**In-Situ Observation of Voids in Solder Joints Using X-ray Microscopy**

Y. Yu\*, H. Kim, H. Lee, B. Kim, Samsung Electro-Mechanics Co., Ltd., South Korea

## ACerS Arthur L. Friedberg Memorial Lecture

Room: M2-30

**Introductory Remarks – James McCauley, Army Research Laboratory**

**10:30 AM**

**Materials Science and Engineering: A Rewarding Career (Invited)**

D. Richerson\*, University of Utah, USA

## Special Topics: Industry Track 2007

### Industry Track III

Room: D1

Session Chair: Richard Schorr, MetaMateria

**10:30 AM**

**Strategies for Intellectual Property Protection (Invited)**

M. A. Harper\*, R. W. Citkowski, Gifford Krass, USA

**11:10 AM**

**Patent Licenses and the Recent Supreme Court Medimmune Decision**

P. Fleischut\*, T. McBride, Senniger Powers, USA

**11:30 AM**

**United State Patent Law Update**

P. Fleischut\*, Senniger Powers, USA

## Steel: Recent Developments in Steel Processing

### Surface Treatment and Corrosion

Room: W2-69

Session Chair: John Paules, Ellwood Materials Tech.

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**NanoTech Surface Treatment Technology-NSTT-Reveals Spectacular Enhancement of Heat and Corrosion Resistance**

S. Ghosh\*, NanoTech Metallurgy, Inc., USA

**9:00 AM**

**Integrated Machining and Surface Modification of Steel Components**

L. Pappula, University College of Technology, India; S. Voleti, Sree Viswesvaraya Institute of Technology and Science, India; A. Ma\*, Deccan College of Engineering and Technology, India

**9:20 AM**

**Developments in Citric Acid Passivation of Stainless Steel**

R. Kremer\*, Stellar Solutions, USA

**9:40 AM**

**EIS Studies of Steel in Sulfide Polluted Sea Water**

A. H. Makhlof\*, Boise State University, USA; M. A. Shoeib, Central Metallurgical Research and Development Institute, CMRDI, Egypt; A. Sa'eh, University of Tripoli, Libya; Y. Barakat, Tabbain Institute for Metallurgical Studies, Helwan, Egypt

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

**Retrieving of Boronizing Coverings on Steel in Received in Self-Propagating High Temperature Synthesis Conditions**

S. P. Sheyko\*, Zaporizhzhian State Engineering Academy, Ukraine

**10:40 AM**

**Effect of Thermal Cycling on the Corrosion and Microstructures of Pliian Carbon Steels**

A. S. Elmaryami\*, The Higher Institute, Libya

## Steel: Steel Product Metallurgy and Applications

### Tool Steels

Room: W2-70

Session Chair: Debo Aichbhaumik, U.S. Dept. of Energy

**8:30 AM**

**Introductory Remarks**

**8:40 AM**

**Correlation Between Heat Treatment, Microstructure and Mechanical Properties of a Hot-work Tool Steel**

S. Mayer\*, C. Scheu, H. Leitner, H. Clemens, Montanuniversitaet Leoben, Austria; I. Siller, Bohler Edelstahl GmbH, Austria

**9:00 AM**

**Assessment of Material Properties on Bohler W360 Isobloc for Hot Work Tool Steel**

F. Lee\*, Bohler Uddeholm Ltd., Canada

**9:20 AM**

**Choosing Vancron Grades for Cold Work Metal Forming Tools**

F. Lee\*, Bohler Uddeholm Ltd., Canada

**9:40 AM**

**Enhancing Plastic Mould Steel Tooling Performance with Nimax**

F. Lee\*, Bohler Uddeholm Ltd., Canada

**10:00 - 10:20 a.m.**

**Break**

**10:20 AM**

**Investigation of the Influence of Deep Cryogenic Treatment on Residual Stresses in HCHC D2 Steels Using X-Ray Diffraction**

S. V. Lomte\*, Marathwada Institute of Technology, India

Wednesday AM

## ACerS Robert B. Sosman Award and Lecture

Room: D2-15

**1:00 PM**

### Electrical Ceramics: Microstructures, Thin Layers and Single Crystals (Invited)

D. A. Payne\*, University of Illinois at Urbana-Champaign, USA

## Special Topics: Industry Track 2007

### Industry Track IV

Room: D1

Session Chair: Richard Schorr, MetaMateria

**1:30 PM**

#### Teaming with Universities for Technology Development (Invited)

R. Schorr\*, MetaMateria, USA

**2:05 PM**

#### Enabling Applications with Ceramic Components (Invited)

R. Alexander\*, Association of American Ceramic Component Manufacturers, USA

**2:40 PM**

#### Nano Silver Materials Engineered for Printed Electronic and other Market Segments (Invited)

E. Groat\*, NanoDynamics, Inc., USA; M. Herman, Ames Goldsmith Corp., USA

## Automotive: Advanced High-Strength and Other Specialty Sheet Steel Products for the Automotive Industry

### Manufacturing With Advanced High Strength Steel II: Simulation, Springback, Joining, Tool Materials

Room: W2-65

Session Chair: Jim Warren, Arcelor Mittal Steel

**2:00 PM**

#### Introductory Remarks

**2:10 PM**

#### Failure Modes of Dual Phase Steel in Channel Draw and Calibration of FEA Predictability

C. Du\*, D. Zhou, DaimlerChrysler, USA; M. Huang, Mittal Syeel, USA

**2:30 PM**

#### Advanced Simulation Techniques – Exceeding Reality? (Invited)

K. Roll\*, DaimlerChrysler AG, Germany

**2:50 PM**

#### Assisted Springback Control Through the Use of Electromagnetics in DP 600

S. Golowin\*, The Ohio State University, USA; E. Iriondo, Fundacion Labein, Spain

**3:10 PM**

#### Modeling and Characterization of High Frequency Induction Welds in Advanced High Strength Steels

Y. Adonyi, LeTourneau University, USA; V. Jurko\*, A. Lesko, U. S. Steel Kosice, s.r.o., Slovakia

**3:30 - 3:50 p.m.**

Break

**3:50 PM**

#### Variability of Fatigue Strength of Spot Welded Specimens for Advanced and Traditional High Strength Steels

H. Kang\*, University of Michigan - Dearborn, USA; J. Bonnen, Ford Motor Company, USA; R. Mohan-Iyengar, Severstal North America, USA

**4:10 PM**

#### Multibody Spot Joining of Automotive Steel and Steel/Aluminum Combinations

M. P. Miles\*, K. Kohkonen, Brigham Young University, USA; S. Packer, R. Steel, Megastir Technologies, USA

**4:30 PM**

#### Copper Brazing Response of Some Advanced High Strength Steel Grades

R. Song\*, Colorado School of Mines, USA; J. G. Schroth, General Motors R&D Center, USA; J. G. Speer, D. K. Matlock, Colorado School of Mines, USA

**4:50 PM**

#### Clinch Joining of Advanced High Strength Sheet Steels

M. D. Tumuluru\*, US Steel, USA; S. Gnade, TOX-Pressotechnik LLC, USA

**5:10 PM**

#### Tool Steel Selection in Cold Forming Based on Microstructural Characteristics and the Stress Distribution in Tool

R. Hernandez, M. Riera, D. Casellas\*, CTM, Spain; B. Casas, I. Valls, Rovalma, S.A., Spain; J. Prado, CTM, Spain

## Automotive: Automotive and Ground Vehicles: Materials and Processes for Vehicles

### Tribology, Surfaces, Lubricants and Coatings II

Room: W2-62

Session Chair: Arianna Morales, General Motors

**2:00 PM**

#### Introductory Remarks

**2:10 PM**

#### Wear and Corrosion Properties of Iron Based High Hardness Weld Materials

O. Racek\*, B. M. Beardley, Caterpillar, Inc., USA

**2:30 PM**

#### The Fundamentals of Surface Engineering by Superfinishing using a Chemically Assisted Vibratory System

D. Wilmot\*, J. Rindt, B. Hoiland, J. Schell, Alion Science & Technology, USA; D. Mitton, University of North Dakota, USA

**2:50 PM**

#### Conductive Coatings for Stainless Steel Bipolar Plate for PEM Fuel Cells

G. V. Dadnech\*, M. Abd Elhamid, Y. Mikhail, General Motors, USA

**3:10 PM**

#### Solution Nitriding - A Cost Effective Case Hardening Process for Stainless Steels

J. Zhou\*, Ipsen, Inc., USA

**3:30 - 3:50 p.m.**

Break

**3:50 PM**

#### An Attempt to Simplify the Metal Pretreatment Prior to Painting in the Automotive Industry

W. J. VanOoij\*, P. H. Puomi, Z. Yin, University of Cincinnati, USA

Wednesday PM

**4:10 PM**

## **RSP Tooling Process Developments for Automotive Applications**

J. Knirsch\*, RSP Tooling, LLC, USA

**4:30 PM**

## **Tensile and Bend Bending Behavior of Polymer Rapid Prototype Materials Coated with Copper and Nickel**

D. Burns\*, M. Zupan, UMBC- University of Maryland Baltimore County, USA

## **Automotive: Automotive Light Metal Castings: Technology and Applications**

### **Welding, Joining, Machining, Failure and Durability Analysis**

Room: W2-64

Session Chairs: Susan Ward, Ford Motor Company; Jacob Zindel, Ford Motor Company

**2:00 PM**

#### **Introductory Remarks**

**2:10 PM**

#### **Joining Aluminum Castings for Automotive Applications (Invited)**

S. Ward\*, Ford Motor Company, USA

**2:50 PM**

#### **Friction Stir Welding, Spot Friction Welding, and Friction Stir Processing for Aluminum Materials (Invited)**

T. Pan\*, Ford Motor Company, USA; M. L. Santella, Oak Ridge National Laboratory, USA

**3:30 - 3:50 p.m.**

#### **Break**

**3:50 PM**

#### **Microstructural Effects on the Machinability of Cast 319 Al**

J. M. Boileau\*, Ford Motor Company, USA

**4:10 PM**

#### **The Effect of Silicon Particle Morphology in Maintaining Ultra-Mild Wear in Eutectic Al-Si Alloys**

M. Chen\*, University of Windsor, Canada; T. A. Perry, GM, USA; M. Elmadagli, A. T. Alpas, University of Windsor, Canada

**4:30 PM**

#### **Application of the Raman Technique to Measure Stress States in Individual Si Particles in a Cast Al-Si Alloy**

S. Harris\*, J. Boileau, A. O'Neill, X. Su, Ford Research and Advanced Engineering, USA; B. Majumdar, New Mexico Tech, USA

**4:50 PM**

#### **Development of ASTM Digital Reference Radiographic Images for Castings**

J. Griffin\*, University of Alabama at Birmingham, USA

**5:10 PM**

#### **In-situ Examination of Creation and Growth of Internal Voids in Cast Al Using Ultrasonics**

B. Ghaffari\*, S. Harris, X. Su, J. Boileau, Ford Motor Company, Research and Advanced Engineering, USA

**5:30 PM**

#### **Affordable Computed Tomography for 3D Analysis of Automotive Castings**

M. W. Colby, K. Brockdorf\*, phoenix|x-ray Systems + Services Inc., USA

## **Automotive: High-Density Hydrogen Storage for Automotive Applications: Materials and Methods**

### **Physisorptive Systems I**

Room: W2-66

Session Chair: Winnie Wong-Ng, NIST

**2:00 PM**

#### **Introductory Remarks**

**2:10 PM**

#### **Hydrogen Storage by Physisorption on Novel Porous Materials (Invited)**

M. Hirscher\*, B. Panella, Max-Planck-Institut fuer Metallforschung, Germany

**2:50 PM**

#### **Hydrogen Storage in Microporous Coordination Solids with Exposed Metal Sites (Invited)**

M. Dinca, S. S. Kaye, J. R. Long\*, University of California, Berkeley, USA

**3:30 - 3:50 p.m.**

#### **Break**

**3:50 PM**

#### **Comparison of Hydrogen Adsorption in Metal Organic Frameworks (Invited)**

A. Dailly\*, General Motors, USA

**4:30 PM**

#### **Synthesis of Novel Organometallic Fullerene Complexes for Vehicular Hydrogen Storage (Invited)**

A. C. Dillon\*, E. Whitney, C. Engtrakul, C. Curtis, P. Parilla, L. Simpson, K. O'Neil, Y. Zhao, Y. Kim, S. Zhang, National Renewable Energy Laboratory, USA

## **Automotive: Zinc Coated Steel Sheets**

### **Zinc Coated Sheet Steels Session 1**

Room: W2-69

Session Chair: Frank Goodwin, ILZRO

**2:00 PM**

#### **Introductory Remarks**

**2:10 PM**

#### **Changes in the Mechanical Properties of Galvanized TRIP Steels**

E. J. Petit\*, B. Bolle, Universite de Metz, France; I. Sriti, ENIM, France; M. Gilles, UMICORE Research, Belgium; J. Gilgert, Z. Azari, ENIM, France

**2:30 PM**

#### **Processing of TRIP Steels in Continuous Galvanizing Lines: Surface and Subsurface Oxidation Studies**

Y. Gong\*, H. Kim, S. Biroasca, B. C. De Cooman, POSTECH, South Korea

**2:50 PM**

#### **Effect of Continuous Galvanizing Heat Treatments on the Microstructure and Properties of Al-Si TRIP Steels**

E. Bellhouse\*, J. McDermid, McMaster University, Canada

**3:10 PM**

#### **Properties of Galvanized and Galvannealed Advanced High Strength Hot Rolled Steels**

R. Fourmentin\*, McMaster University, Canada; V. Gertsman, S. Dionne, Materials Technology Laboratory, Canada; J. R. McDermid, McMaster University, Canada; F. Goodwin, International Lead Zinc Research Organization, USA

3:30 - 3:50 p.m.

Break

3:50 PM

**Characterizing Reactive Wetting Kinetics of High-Mn Dual-Phase Steels in Hot-Dip Galvanizing Baths**

R. J. Meguerian\*, J. R. McDermid, McMaster University, Canada

4:10 PM

**Study of Relative Quantity of Fe-Zn Phases on Galvannealed Coating**

X. B. Yu\*, X. Y. Jin, Automotive Steel Institute, R&D Centre, Baoshan Iron & Steel Co. LTD, China; X. C. Mi, The Instrumental Analysis Center, R&D Centre, Baoshan Iron & Steel Co. LTD, China

**Electronic and Magnetic Properties: General Topics in Electroceramics**

**Sosman Symposium - Electroceramics II**

Room: D2-15

Session Chairs: David Payne, University of Illinois at Urbana-Champaign; Lorraine Francis, University of Minnesota

2:00 PM

Introductory Remarks

2:10 PM

**Energy Densities and Field Distribution in Diphasic Dielectrics (Invited)**

R. W. Schwartz\*, X. Lu, S. Patil, M. Koledintseva, University of Missouri-Rolla, USA

2:30 PM

**Relaxor Behavior in the Non Lead Ba(ZrxTi1-x)O3 Compositions (Invited)**

A. S. Bhalla\*, T. Maiti, R. Guo, Penn State University, USA

3:10 PM

**Multi-functional Materials with Polarization (Invited)**

D. Viehland\*, Virginia Tech, USA

3:30 PM

**Texture Engineering of Electroceramics; From Thin Films to Bulk (Invited)**

T. Tani\*, Toyota Central R&D Labs. Inc., Japan

3:50 PM

**Materials and Processing Issues in the Chemical Solution Deposition of Ultrathin Multilayer PLZT Capacitors (Invited)**

B. Tuttle\*, G. L. Brennecke, C. Parish, L. Brewer, Sandia National Laboratories, USA

4:10 PM

**Direct Write and Microcontact Printing for Chemical Solution Deposition of Electroceramics (Invited)**

P. Clem\*, Sandia National Laboratories, USA

4:30 PM

**Tantalizing Ceramics: Elucidation of Unusual Behavior in Ta<sub>2</sub>O<sub>5</sub> (Invited)**

G. Brennecke\*, Sandia National Laboratories, USA; D. A. Payne, University of Illinois at Urbana-Champaign, USA

4:50 PM

**High-Temperature, Solid Electrolyte-Based Sensing Elements for NO<sub>x</sub> and SO<sub>x</sub> (Invited)**

D. L. West\*, F. C. Montgomery, T. R. Armstrong, Oak Ridge National Laboratory, USA

5:10 PM

**Characterization of CeO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> Nano Composites for SOFC Applications (Invited)**

R. Chockalingam, H. Giesche, V. Amarakoon\*, Alfred University, USA

**Electronic and Magnetic Properties: International Symposium on Dielectric Materials: Design, Preparation and Applications**

**Dielectric and Piezoelectric Materials and Composites: Applications and Processing**

Room: D2-09

Session Chairs: Sharmila Mukhopadhyay, Wright State University; Christine Klemenz, University of Central Florida

2:00 PM

Introductory Remarks

2:10 PM

**Allow Me to Introduce You to "Lilly" – She is a Robot (Invited)**

Y. T. Tadesse\*, M. Vickers, S. Priya, University of Texas at Arlington, USA

2:30 PM

**Structural Health Monitoring of Elastic Materials using Impedance Spectroscopy**

V. Bedekar\*, S. Priya, University of Texas at Arlington, USA

2:50 PM

**Highly Epitaxial Ferroelectric Thin Films with Optimized Dielectric Properties for Tunable Microwave Wireless Device Applications (Invited)**

C. Chen\*, University of Texas at San Antonio, USA

3:10 PM

**Advanced Piezoelectric Crystals and Films for Frequency-Control Applications (Invited)**

C. F. Klemenz\*, University of Central Florida, USA

3:30 - 3:50 p.m.

Break

3:50 PM

**Microstructural Evolution and Microwave Dielectric Properties of Hexagonal Ba(Ti<sub>1-x</sub>M<sub>x</sub>)O<sub>3</sub> Ceramic (Invited)**

S. Wang\*, Y. Wu, National Taipei University of Technology, Taiwan

4:10 PM

**Microstructure and Dielectric Properties of Barium Strontium Titanate Derived by Sol-Gel (Invited)**

H. Manuspiya\*, G. Panomsuwan, Chulalongkorn University, Thailand; H. Ishida, Case Western Reserve University, USA; A. Bhalla, Pennsylvania State University, USA

4:30 PM

**Microwave Dielectric Properties of Solid Solutions of AB<sub>2</sub>O<sub>6</sub> (A=Ni, Mg, Zn, B=Nb, Ta) and TiO<sub>2</sub>**

E. Kim\*, S. Seo, Kyonggi University, South Korea; H. Ohsato, Nagoya Institute of Technology, Japan

4:50 PM

**Sintering Condition of Diopside for Microwave/Millimeterwave Dielectrics**

H. Ohsato\*, M. Terada, Nagoya Institute of Technology, Japan; K. Kawamura, Taiyo Yuden Co. Ltd., Japan; I. Kagomiya, K. Kakimoto, Nagoya Institute of Technology, Japan

## **Electronic and Magnetic Properties: Perovskite Material Engineering**

### **Nano-scale Engineering A: Bulk Material and Properties**

Room: D2-11

Session Chair: John Prater, Army Research Office

**2:00 PM**

#### **Introductory Remarks**

**2:10 PM**

#### **Future Opportunities in Materials Design (Invited)**

J. T. Prater\*, Army Research Office, USA

**2:50 PM**

#### **High Resolution Neutron Diffraction Studies of Phase Transitions in Perovskite Oxides (Invited)**

B. J. Kennedy\*, The University of Sydney, Australia

**3:30 - 3:50 p.m.**

**Break**

**3:50 PM**

#### **Effects of Domain Structure on Macroscopic Properties of Polar Perovskites (Invited)**

A. Sehirlioglu\*, NASA Glenn Research Center, USA; P. Han, H. C. Materials Corporation, USA; D. A. Payne, University of Illinois, USA

**4:30 PM**

#### **Novel Properties of Atomically Designed Perovskites**

B. Dabrowski\*, O. Chmaissem, S. Kolesnik, L. Suescun, J. Mais, Northern Illinois University, USA

**5:10 PM**

#### **Ferroelasticity and Hysteresis in LaCo(Mn, Fe, Cr)O<sub>3</sub> Based Perovskites (Invited)**

N. Orlovskaya\*, University of Central Florida, USA

## **Electronic and Magnetic Properties: Structure-Property Relationships of Multifunctional Oxide Thin Films and Interfaces**

### **Structural and Magnetic Properties of Metal-oxides**

Room: D2-08

Session Chairs: Wayne Kaplan, Technion; Menka Jain, Los Alamos National Laboratory

**2:00 PM**

#### **Introductory Remarks**

**2:10 PM**

#### **Electron and Spin Correction in Colossal Magnetoresistive Manganites (Invited)**

Y. Zhu\*, J. He, Brookhaven National Lab, USA; B. Budhani, Indian Institute of Technology Kanpur, India; C. Jooss, University of Goettingen, Germany; L. Wu, M. Schofield, M. Beleggia, Brookhaven National Lab, USA

**2:50 PM**

#### **Solution Approach for the Growth of Rare Earth Manganite Thin Films (Invited)**

M. Jain\*, F. Ronning, M. Hundley, T. Park, J. D. Thompson, A. K. Burrell, T. M. McCleskey, B. Matorov, L. Civale, Q. X. Jia, Los Alamos National Laboratory, USA

**3:30 - 3:50 p.m.**

**Break**

**3:50 PM**

#### **Room-Temperature Ferromagnetism in Manganese-Doped Gallium Oxide (Invited)**

F. Oba\*, H. Hayashi, R. Huang, H. Ikeno, Kyoto University, Japan; S. Sonoda, Kyoto Institute of Technology, Japan; I. Tanaka, Kyoto University, Japan

**4:30 PM**

#### **Investigation of Resistive Switching in Manganese Based Perovskite Thin Films**

J. Meador\*, S. Choi, Carnegie Mellon University, USA; R. Hussin, J. Bain, Carnegie Mellon University, USA; M. Skowronski, P. Salvador, Carnegie Mellon University, USA

## **Energy: Degradation of Materials for Application in Nuclear Power and Waste Management Systems**

### **Degradation of Materials for Application in Nuclear Waste Management Systems II**

Room: D2-12

Session Chairs: Raul Rebak, Lawrence Livermore National Laboratory; Pavan Shukla, Southwest Research Institute

**2:00 PM**

#### **Introductory Remarks**

**2:10 PM**

#### **Stress Corrosion Cracking of Copper under Possible Used-Fuel Geological Repository Conditions (Invited)**

B. M. Ikeda\*, University of Ontario Institute of Technology, Canada; C. D. Litke, Whiteshell Laboratories, AECL, Canada

**2:50 PM**

#### **Oxide Film Composition and Defects on Alloy 22 and Their Influence on its Corrosion Properties**

J. Noel\*, D. Zagidulin, P. Jakupi, B. Sherar, X. Zhang, D. W. Shoesmith, University of Western Ontario, Canada

**3:10 PM**

#### **Variation in Susceptibility of Alloy-22 to Localized Corrosion after Various Heat Treatments**

S. Vadwlas, G. M. Larios, A. Manavbasi, A. Jacques, M. Taylor, L. McMillion, J. C. LaCombe\*, University of Nevada Reno, USA

**3:30 - 3:50 p.m.**

**Break**

**3:50 PM**

#### **An Ellipsometric Study of Oxide Formation/Dissolution on Iron in Borate Solutions**

B. M. Marx\*, Boise State University, USA; D. D. Macdonald, Pennsylvania State University, USA

**4:10 PM**

#### **A Study of Stress Corrosion Cracking in Carbon Steel Nuclear Waste Storage Tanks**

C. S. Scott\*, F. Gui, S. Brossia, J. Beavers, CG Technologies, USA; G. Edgemon, ARES Corporation, USA; K. Boomer, H. Berman, CH2MHILL, USA; G. Frankel, Ohio State University, USA

**4:30 PM**

#### **Formation and Dissolution of the Passive Film on Carbon Steel**

X. Wei\*, Z. Xueyuan, W. Clara, The University of Western Ontario, Canada

4:50 PM

**Evolution of Fluid Chemistry Inside a Waste Package Due to Carbon Steel, Stainless Steel, and Simulated High-Level Waste Glass Corrosion**

X. He\*, V. Jain, D. Pickett, P. Bertetti, Southwest Research Institute, USA

5:10 PM

**DOE-STD 3013 Plutonium Package Studies**

K. A. Dunn\*, G. T. Chandler, T. M. Stefek, N. C. Iyer, Savannah River National Laboratory, USA

**Energy: Energy Materials**

**Energy Materials and Technologies II**

Room: D2-13

Session Chairs: Fatih Dogan, University of Missouri Rolla; Yoshinobu Fujishiro, AIST, Japan

2:00 PM

**Introductory Remarks**

2:10 PM

**Fossil Fuels as Hydrogen Ores for Energy and Carbon Ores for Materials**

J. W. Halloran\*, Z. Guerra, University of Michigan, USA

2:30 PM

**Kinetics of Supercritical Water Reforming of Ethanol to Hydrogen**

J. E. Wenzel\*, J. W. Picou, M. J. Factor, S. Lee, University of Missouri-Rolla, USA

2:50 PM

**Diffusion in Hollow Glass Microspheres (HGM) for the Recovery and Purification of Hydrogen from H<sub>2</sub>/Ar and H<sub>2</sub>/CO<sub>2</sub> Gas Streams**

J. S. Rich\*, J. E. Shelby, Alfred University, USA

3:10 PM

**Processing and Properties of Fabricated Carbons from Coke and Coal Tar Pitch**

A. Wiratmoko\*, J. W. Halloran, University of Michigan, USA

3:30 - 3:50 p.m.

**Break**

3:50 PM

**Statistical Design, Modeling, and Viscosity Testing of Coal Gasification Slags**

A. Fluegel, S. Cooley, J. Crum, A. Gallegos, J. Matyas\*, S. Sundaram, Pacific Northwest National Laboratory, USA

4:10 PM

**Experimental Study of Refractory Corrosion by Molten Slag in Slagging Gasifiers**

J. Matyas\*, A. B. Gallegos, J. V. Crum, A. Fluegel, K. S. Sundaram, Pacific Northwest National Laboratory, USA

4:30 PM

**Mineralization as a Method for Carbon Sequestration**

J. Stringer\*, Izambard, USA; G. M. Bond, New Mexico Tech, USA

4:50 PM

**Mineralogical Sequestration of Carbon Dioxide Through Aqueous Processing of Steelmaking Slag**

C. H. Rawlins\*, S. N. Lekakh, V. L. Richards, K. D. Peaslee, University of Missouri-Rolla, USA

**Energy: Fuel Cells: Materials, Processing, Manufacturing and Power Management Technologies**

**Sealing, Contact, Stack Manufacturing, and Balance of Plants of SOFC**

Room: D2-14

Session Chairs: Raj Singh, University of Cincinnati; Paul Jablonski, U.S. Dept. of Energy

2:00 PM

**Introductory Remarks**

2:10 PM

**Glass Composites Engineered for Use as Reliable Seals in Solid Oxide Fuel Cells**

E. L. Corral\*, R. E. Loehman, Sandia National Laboratories, USA

2:30 PM

**Candidate Alloys for Cost-Effective, High-Efficiency, High-Temperature Compact/Foil Heat-Exchangers**

N. D. Evans\*, P. J. Maziasz, J. P. Shingledecker, B. A. Pint, Y. Yamamoto, Oak Ridge National Laboratory, USA

2:50 PM

**Adhesion Strength Between Glass Sealing and Metallic Interconnect of SOFC**

S. Hong\*, J. Choi, K. Weil, Pacific Northwest National Laboratory, USA

3:10 PM

**Development of Candidate Silver Cermet Contact Materials for the Cathode Side in the Solid Oxide Fuel Cell**

T. B. Sheppard\*, B. S. Kang, West Virginia University, USA

3:30 PM

**Robust Copper Braze for Hermetic Sealing of Solid Oxide Fuel Cells**

S. W. Sofie\*, D. Ator, Montana State University, USA

3:50 PM

**Comparison of Vacuum Plasma Spray (VPS) and Low Pressure Plasma Spray (LPPS) for Deposition of Yttria-stabilized Zirconia (YSZ)**

N. Spinhirne\*, D. Hirschfeld, New Mexico Tech, USA; R. Williamson, A. Hall, Sandia National Laboratories, USA

**Fundamentals and Characterization: Characterization and Modeling of the Mechanical Performance of Advanced Alloys: Bridging the Data Gap**

**Characterization of Advanced Alloys-I**

Room: D0-07B

Session Chair: Eric Taleff, The University of Texas at Austin

2:00 PM

**Introductory Remarks**

2:10 PM

**Tensile Response of Titanium at Reasonably High Strain Rates and Temperatures**

M. Quinlan\*, P. Phelan, University of Limerick, Ireland

Wednesday PM

**2:30 PM**

## **In-Situ Electron Backscattered Diffraction Mapping During Tensile-Creep Testing of Advanced Alloys**

C. J. Boehlert\*, Michigan State University, USA; M. Nowell, S. Wright, EDAX-TSL, Inc., USA

**2:50 PM**

## **Residual Stress Distributions in Laser Shock Peened Aero Engine Alloys Studied by High Energy Synchrotron X-ray Diffraction**

Y. Zhao, A. S. Gill, University of Cincinnati, USA; J. Almer, Y. Ren, Argonne National Laboratory, USA; D. Lahrman, LSP Technologies, USA; S. R. Mannava, V. K. Vasudevan\*, University of Cincinnati, USA

**3:10 PM**

## **A Simple Indentation Measurement Technique for Surface Mechanical Property Evaluation**

C. Feng\*, B. S. Kang, West Virginia University, USA

**3:30 - 3:50 p.m.**

**Break**

**3:50 PM**

## **The Effect of Microstructure on the Tensile Properties and Failure of Haynes® 25 Alloy After Aging at Elevated Temperatures**

E. K. Cerreta\*, M. Stout, J. Teague, Los Alamos National Laboratory, USA

**4:10 PM**

## **A Study of Aging Effects on Hardness and Tensile Properties of 2219 Aluminum Alloy**

I. Jabeen\*, R. Ahmad, Punjab University, Pakistan

**4:30 PM**

## **The Effects of Two-Step Aging Treatments on Microstructure, Mechanical Properties and Fracture Mechanisms in the C-458 Al-Li Alloy**

A. S. Gill, University of Cincinnati, USA; K. K. Sankaran, Boeing Co., USA; D. J. Evans, WPAFB, USA; V. K. Vasudevan\*, University of Cincinnati, USA

**4:50 PM**

## **Hydrogen Embrittlement in 6063 Aluminum Alloy**

R. A. Siddiqui\*, S. Z. Qamar, T. Pervez, Sultan Qaboos University, Oman

## **Fundamentals and Characterization: Discovery and Optimization of Materials through Computational Design**

### **Continuum Theoretical and Numerical Analyses to Describe the Properties, Equilibrium, and Kinetics of Materials II**

Room: D0-05AB

Session Chair: Ming Tang, MIT

**2:00 PM**

**Introductory Remarks**

**2:10 PM**

### **Grain Growth in Three Dimensions: Simulation and Experiment (Invited)**

M. P. Gururajan, I. McKenna, Northwestern University, USA; D. Rowenhorst, Naval Research Laboratories, USA; N. Ma, Ohio State University, USA; S. Hao, Northwestern University, USA; G. Spanos, Naval Research Laboratories, USA; Y. Wang, Ohio State University, USA; P. W. Voorhees\*, Northwestern University, USA

**2:50 PM**

### **The Application of Computational Methods for Materials Design (Invited)**

V. Tikare\*, Sandia National Laboratories, USA

**3:30 PM**

## **A Computational Model to Determine Chemical Uniformity of Rare Earth-Doped Ceramics**

J. H. Czerepinski\*, Rutgers, the State University of New Jersey, USA; P. R. Mort, Procter & Gamble, USA; G. A. Kumar, V. A. Greenhut, R. E. Riman, Rutgers, the State University of New Jersey, USA

## **Fundamentals and Characterization: Fundamentals of Brittle Fracture**

### **Microelectronics & Nanoscale**

Room: D0-03A

Session Chair: Stephen Freiman, NIST

**2:00 PM**

**Introductory Remarks**

**2:10 PM**

### **Fundamentals of Crack Growth and Their Use in Reliability Predictions for Brittle Components (Invited)**

R. F. Cook\*, NIST, USA

**2:50 PM**

### **Cyclic Load-Induced Weakening and Strengthening of MEMS Silicon (Invited)**

R. Ballarini\*, University of Minnesota, USA

**3:30 - 3:50 p.m.**

**Break**

**3:50 PM**

### **Fracture in Silicon (Invited)**

C. L. Muhlstein\*, The Pennsylvania State University, USA; O. N. Pierron, The Georgia Institute of Technology, USA

**4:30 PM**

### **Fracture in Piezoelectric Materials (Invited)**

R. Singh\*, University of Cincinnati, USA

**5:10 PM**

### **Fracture in Electromechanical Ceramics (Invited)**

J. L. Jones\*, University of Florida, USA

## **Fundamentals and Characterization: High Temperature Material Systems: Fatigue Mechanisms and Prognosis**

### **Role of Microstructure and Environment on Fatigue of Turbine Engine Materials II**

Room: D0-02AB

Session Chairs: Joseph Rigney, GE Aviation; Andrew Rosenberger, US Air Force

**2:00 PM**

**Introductory Remarks**

**2:10 PM**

### **Physics-Based Dwell Fatigue Prediction Model for Gas Turbine Disk Alloys at Elevated Temperatures**

V. Bhamidipati\*, G. Krishnan, R. Holmes, R. Tryon, Vextec Corp., USA

**2:30 PM**

**Impact of Additional  $\gamma'$  Strengthening and Grain Structure on the Strength and Fatigue Life of Oxide Dispersion Strengthened (ODS) Ni-Base Superalloys**

M. Nganbe\*, University of Ottawa, Canada; M. Heilmaier, Otto-von-Guericke University Magdeburg, Germany; M. Schaper, Technische Universität Dresden, Germany

**2:50 PM**

**A TEM Study of the Deformation Structures Developed During LCF of a Ni-Base Superalloy**

R. R. Unocic\*, C. A. Yablinsky, The Ohio State University, USA; D. Bhattacharyya, Los Alamos National Lab, USA; K. M. Flores, J. C. Williams, M. J. Mills, The Ohio State University, USA

**3:10 PM**

**Cyclic Oxidation Failure Regimes**

J. L. Smialek\*, NASA Glenn Research Center, USA

**3:30 - 3:50 p.m.**

**Break**

**3:50 PM**

**Failure Modes in High Temperature Fatigue of Single Crystal Superalloys (Invited)**

P. K. Wright\*, J. Rigney, GE Aviation, USA

**4:30 PM**

**High Cycle Fatigue Damage Development in a Single Crystal Superalloy (Invited)**

T. Pollock\*, J. Yi, J. Jones, D. Kumah, N. Husseni, R. Clarke, University of Michigan, USA

**Fundamentals and Characterization: International Symposium on Defects, Transport and Related Phenomena**

**Defect-Related Phenomena I**

Room: D0-03C

Session Chairs: Monika Backhaus-Ricoult, Corning Incorporated; Thomas Mason, Northwestern University

**2:00 PM**

**Introductory Remarks**

**2:10 PM**

**Influence of Local Defect Chemistry on the Oxygen Incorporation in SOFC Cathodes (Invited)**

M. Backhaus-Ricoult\*, Corning Incorporated, USA

**2:50 PM**

**Solid-State Wetting and Activated Sintering in Ni-Doped Mo**

X. Shi\*, J. Luo, Clemson University, USA

**3:10 PM**

**Oxygen Nonstoichiometry of B-site Doped LaCrO<sub>3</sub> Perovskite-type Oxides**

M. Oishi\*, K. Sato, K. Yashiro, T. Kawada, J. Mizusaki, Tohoku University, Japan

**3:30 - 3:50 p.m.**

**Break**

**3:50 PM**

**Nonstoichiometry, Conductivity, and Defect Equilibrium of BaCe<sub>0.9</sub>(Nd or Y)<sub>0.1</sub>O<sub>3</sub> and Some Other Proton Conducting Perovskite-Type Oxides (Invited)**

J. Mizusaki\*, M. Oishi, S. Akoshima, T. Kudo, K. Sato, K. Yashiro, IMRAM, Tohoku University, Japan; T. Kawada, Graduate School of Environmental Studies, Tohoku University, Japan

**4:30 PM**

**Positron Annihilation Lifetime Spectra in some Titanates**

E. Vance\*, J. Hanna, Australian Nuclear Science and Technology Organisation, Australia; J. Hadley, Georgia State University, USA

**Fundamentals and Characterization: Developments in Web-Based Materials Property Databases, Knowledge Management of Materials Information, and Materials Informatics for Accelerated Materials Discovery**

**Cyber Infrastructure and Data Distribution**

Room: D0-06AB

Session Chair: Terry Wong, Pratt & Whitney Rocketdyne

**2:00 PM**

**Introductory Remarks**

**2:10 PM**

**Development and Use of Taxonomies for Information Access in the Materials Science Realm (Invited)**

S. Fahrenholz-Mann\*, ASM International, USA

**2:50 PM**

**Development of Information Platform for Data Exchange between Heterogeneous Material Data Resources**

T. Ashino\*, Toyo University, Japan; N. Oka, The University of Tokyo, Japan

**3:10 PM**

**Supporting Materials Strategy - Realizing the Value from a Materials Property Database**

A. H. Fairfull\*, Granta Design Ltd, United Kingdom

**3:30 - 3:50 p.m.**

**Break**

**3:50 PM**

**MAPTIS - Materials and Processes Technical Information System (Invited)**

P. Allison, B. L. Henrie\*, NASA Marshall Space Flight Center, USA

**4:30 PM**

**Cyber Infrastructure and Materials Informatics (Invited)**

K. Rajan\*, Iowa State University, USA

**5:10 PM**

**Electronic Materials Data to Support Detailed Structural Analysis (Invited)**

E. J. Sharp\*, The Boeing Company, USA

Wednesday PM



## **Fundamentals and Characterization: Numerical, Mathematical and Physical Modeling Tools for Materials Processes**

### **Numerical, Mathematical, and Physical Modeling Tools for Materials Processes II**

Room: D0-03D

Session Chairs: Patricio Mendez, Colorado School of Mines; Ben Li, University of Michigan

**2:00 PM**

#### **Introductory Remarks**

**2:10 PM**

#### **Simulation of Spot Welding for Advanced High Strength Steels (Invited)**

S. Subramaniam\*, Ford Motor Company, USA

**2:50 PM**

#### **Recent Advances in Process Modeling Applications**

R. Shankar\*, A. Bandar, C. Fischer, J. Walters, Scientific Forming Technologies Corporation, USA

**3:10 PM**

#### **Finite Element Simulation of the Joining Process of Glass Feedthroughs for Medical Devices**

M. Reiterer\*, B. Tischendorf, J. Taylor, Medtronic, Inc., USA

**3:30 - 3:50 p.m.**

**Break**

**3:50 PM**

#### **Finite Element Simulation for Densification and Deformation of a Variety of Sintering Powder Compacts under Several Macro-Conditions**

H. Camacho\*, P. E. Garcia, C. A. Martinez, IIT-UACJ, Mexico; A. Garcia, InterCeramic Technological Center, Mexico; R. K. Bordia, University of Washington, USA

**4:10 PM**

#### **A Cellular Automaton Model for Grain Growth**

S. Raghavan, S. S. Sahay\*, Tata Research Development and Design Centre, India

**4:30 PM**

#### **Optimization of Multi-Pass Hot Rolling Scheduling Using a Genetic Algorithm**

C. Hernandez Carreon\*, Instituto Politecnico Nacional, CICATA-Altamira, Mexico; H. Fraire Huacuja, Instituto Tecnológico de Ciudad Madero, Mexico; K. Espiella Fernandez, Instituto Politecnico Nacional, CICATA-Altamira, Mexico; L. Cruz Reyes, Instituto Tecnológico de Ciudad Madero, Mexico; J. Mancilla Tolama, Instituto Politecnico Nacional, CICATA-Altamira, Mexico

**4:50 PM**

#### **Studying Tunnel-like Defect in Friction Stir Welding Process Using Computational Fluid Dynamics**

H. Atharifar\*, D. Lin, R. Kovacevic, Southern Methodist University, USA

## **Fundamentals and Characterization: Phase Stability, Diffusion and Their Applications**

### **Interdiffusion Measurements and Modeling**

Room: D0-04ABC

Session Chairs: John Morral, The Ohio State University; Yongho Sohn, University of Central Florida

**2:00 PM**

#### **Introductory Remarks**

**2:10 PM**

#### **Inter-Diffusion Driven Swelling of Aluminide Coatings (Invited)**

D. R. Clarke\*, University of California, Santa Barbara, USA

**2:50 PM**

#### **Modeling Diffusion Reactions between Ni-base Superalloys and B2-Bond Coats (Invited)**

C. Campbell\*, National Institute of Standards and Technology, USA

**3:30 - 3:50 p.m.**

**Break**

**3:50 PM**

#### **Diffusion Analysis of Cu-Sn System**

S. Kumar\*, C. A. Handwerker, M. A. Dayananda, Purdue University, USA

**4:10 PM**

#### **Instrument Error Propagation in the Determination of Linear Ternary Multicomponent Diffusion Coefficients**

A. V. Jaques\*, J. C. LaCombe, University of Nevada, Reno, USA

**4:30 PM**

#### **Ternary Interdiffusion in Ni3Al with Ir Additions**

N. Garimella, University of Central Florida, USA; M. Ikeda, Kobe Steel Co. Ltd., Japan; M. Ode, H. Murakami, National Institute of Materials Science, Japan; Y. Sohn\*, University of Central Florida, USA

**4:50 PM**

#### **Phase Constituents in Al-Rich U-Mo-Al Alloys**

E. Perez, B. Yuan, J. Liu, A. Ewh, Y. Sohn\*, University of Central Florida, USA; D. D. Keiser, Idaho National Laboratory, USA

## **Fundamentals and Characterization: What We can Learn from Failure Analysis**

### **Corrosion, Wear and Coatings**

Room: D0-01A

Session Chairs: Terry Gabel, Swagelok Company; Elizabeth Huber, Stork Metallurgical Consultants, Inc.

**2:00 PM**

#### **Introductory Remarks**

**2:10 PM**

#### **The Causes for Corrosion, Explosion and Catastrophic Failure of a Sulfuric Acid Storage Tank (Invited)**

D. Benac\*, K. Thomas, BakerRisk, USA

**2:50 PM**

#### **An Investigation of Microbiologically Induced Corrosion of Hypercompressor Slider Bearings**

P. Redmond\*, Southwest Research Institute, USA; G. R. Becker, S. Birnbaum, Applied Becker Consulting, USA

**3:10 PM**

#### **More Than Rust: Corrosion Products and Failure Analysis**

M. G. Burns\*, Stork Metallurgical Consultants, Inc., USA

**3:30 - 3:50 p.m.**

**Break**

**3:50 PM**

#### **Corrosion Coupon Measurements: Myth vs Reality (Invited)**

M. Hineman\*, M. J. Danko, Engineering Systems Inc., USA

**4:10 PM**

#### **Use of Electrochemical Testing to Predict Corrosion Life in a Galvanic Couple for Failure Analysis Assistance (Invited)**

D. McGarry\*, SEA Ltd, USA; M. Iannuzzi, DNV, USA

Wednesday PM

4:30 PM

**Evaluation of Electrocoat Edge Corrosion Failures of Automotive Stampings and Correlation to Surface Geometry/Topography (Invited)**

T. N. Ackerson\*, Metals & Materials Engineers, USA

4:50 PM

**Critical Influence Water Component for Copper Cooling Power Generation**

A. Reani\*, S. Kumorobekti, H. N. Rivai, T. A. Nurjianto, M. Dinah, Indonesia Power Co., Inc., Indonesia

**Materials and Systems: Coatings as an Enabler of System Performance**

**Coatings Via Spray Processes II**

Room: O2-38

Session Chairs: Daniel Mumm, University of California, Irvine; David Hovis, Case Western Reserve University

2:00 PM

**Introductory Remarks**

2:10 PM

**Consolidation of Composite Materials and Deposition of Composite Coatings by the Kinetic Spray Process**

B. Gillispie\*, Z. Zhao, S. Khalid, T. Han, J. Smith, Delphi Corporation, USA

2:30 PM

**Structure-Property Relationship in Particle Reinforced Metal-Matrix Composites made by Low Pressure Gas Dynamic Spray**

R. Gr. Maev\*, V. Leshchynsky, K. Y. Sastry, University of Windsor, Canada

2:50 PM

**A Novel Thermal Spray System for Nanoparticle Embedded Functionally Gradient Materials (FGM)**

A. D. Roche\*, Midwest Thermal Spray, USA; P. Mohanty, University of Michigan - Dearborn, USA; D. Sartor, Midwest Thermal Spray, USA

3:10 PM

**Functionally Graded Refractory Metal-Carbide Composites by Plasma Spraying**

J. Stanisic\*, J. Stanisic, P. Mohanty, University of Michigan - Dearborn, USA; T. Sudarshan, Materials Modification, Inc, USA

3:30 - 3:50 p.m.

**Break**

**Bondcoat/Oxidation**

Room: O2-38

Session Chair: Daniel Mumm, University of California, Irvine

3:50 PM

**Advancements in the Development of Modified  $\gamma$ -Ni+ $\gamma^2$ -Ni<sub>3</sub>Al Bond Coatings (Invited)**

B. Gleeson\*, Iowa State University, USA

4:30 PM

**Assessment of Pre-Oxidation Effects on TGO Growth Kinetics**

A. T. Duong, M. D. Weeks, D. R. Mumm\*, University of California, Irvine, USA

4:50 PM

**Correlation of Residual Stress Mapping with Microstructural Features in Thermally Grown Oxides**

D. B. Hovis\*, A. H. Heuer, Case Western Reserve University, USA

5:10 PM

**Advanced Coatings for Oxidation Resistance and Durability of Graphitic Structures**

A. Karumuri, E. A. Lutz\*, A. Maleszewski, E. Winegar, A. Mazur, Wright State University, USA

**Materials and Systems: Copper and Copper Alloys for Emerging Technologies**

**Copper Alloy Technology I**

Room: O2-37

Session Chair: William Spiegelberg, Brush Wellman Inc.

2:00 PM

**Introductory Remarks**

2:10 PM

**Bend Formability – Characterization and Performance (Invited)**

L. Wojnicz\*, J. P. Stainbrook, Molex Inc., USA; P. W. Robinson, K. Funke, Olin Brass, USA; S. Theobald, Wieland-Werke AG, Germany

2:50 PM

**The Effect of Copper Alloy Substrates on Tin Whiskers (Invited)**

F. Dunlevey\*, Brush Wellman Inc., USA

3:10 PM

**Fundamental and Applied Aspects of Newly Developed Cu-Al-Mn-Based Shape Memory Alloys**

T. Omori\*, Y. Sutou, R. Kainuma, K. Ishida, Tohoku University, Japan

3:30 - 3:50 p.m.

**Break**

3:50 PM

**Effect of Antimicrobial Copper Alloys on Human Pathogens (Invited)**

H. T. Michels\*, Copper Development Association, USA

4:30 PM

**Forming Characteristics of GRCop-84**

G. M. Michal\*, A. Awadallah, Case Western Reserve University, USA; D. L. Ellis, NASA Glenn Research Center, USA

4:50 PM

**Comparison of the Isothermal Oxidation Behavior of As-Cast Cu-17%Cr and Cu-17%Cr-5%Al**

S. V. Raj\*, NASA Glenn Research Center, USA; D. L. Humphrey, ASRC Aerospace, USA

**Materials and Systems: International Symposium on Ceramic Matrix Composites**

**Composites/Matrices**

Room: O2-43

Session Chair: Aldo Boccaccini, Imperial College London

2:00 PM

**Introductory Remarks**

2:10 PM

**Inorganic Matrix Composites Containing Carbon Nanotubes: Processing and Characterization (Invited)**

A. R. Boccaccini\*, J. Cho, Imperial College London, United Kingdom; K. Katarzyna, Warsaw University of Technology, Poland; E. Garcia, CIDETEC, Spain; M. Shaffer, Imperial College London, United Kingdom

2:50 PM

**Controlling Thermal Expansion of Polymer Nanocomposites Using Cubic Zirconium Tungstate**

G. R. Sharma\*, M. R. Coleman, C. Lind, The University of Toledo, USA

Wednesday PM

# MS&T'07<sup>®</sup>

**3:10 PM**

## **Fabrication and Microstructure of Symmetrical and Asymmetrical HA/316L Fibre Biological Functionally Gradient Materials**

Z. Jianpeng\*, R. Jianming, Z. Zhongcheng, L. Jijin, H. Baiyun, C. Qiyuan, Central South University, China

**3:30 - 3:50 p.m.**

**Break**

**3:50 PM**

## **Composition and Properties of Aluminous Oxy-Nitrides**

G. Sabine\*, S. Thierry, M. Francis, CNRS, France

**4:10 PM**

## **Prediction of a New Damage Tolerant Ceramic, Y<sub>2</sub>SiO<sub>5</sub>, by First-Principles Investigations**

J. Wang\*, National Institute for Materials Science, Japan; Y. Zhou, Institute of Metal Research, China; T. Ohno, National Institute for Materials Science, Japan

**4:30 PM**

## **Preparation of Li-Al-Ni-Mn-O Ceramic Matrix Composites and Their Electrical Properties**

C. Kao\*, K. Liu, National Cheng Kung University, Taiwan

**4:50 PM**

## **A Comparative Study of Tool Material for Friction Stir Welding of Al-MMCs Reinforced with CB4**

T. Prater\*, Vanderbilt University, USA; T. Lienert, Los Alamos National Laboratory, USA; G. Cook, A. Strauss, J. Davidson, D. DeLapp, P. Fleming, T. Bloodworth, D. Lamlein, Vanderbilt University, USA; M. Bement, Los Alamos National Laboratory, USA

**5:10 PM**

## **Oxidation Behavior of Polymer Derived SiAlCN Ceramics at 1400C**

Y. Wang\*, Northwestern Polytechnical University, China

## **Materials and Systems: Iron-Based Amorphous Metals: An Important Family of High-Performance Corrosion-Resistant Materials**

### **Synthesis, Characterization, Phase Stability & Neutronics III**

Room: O2-40

Session Chair: Patrice Turchi, Lawrence Livermore National Lab

**2:00 PM**

#### **Introductory Remarks**

Raul Rebak

**2:10 PM**

#### **XRD Technique: A Way to Disseminate Structural Changes in Iron Based Amorphous Materials**

C. K. Saw\*, T. Lian, S. D. Day, J. C. Farmer, Lawrence Livermore Nat. Lab., USA

### **Mechanical Properties & Damage Tolerance II**

Room: O2-40

Session Chair: Robert Bayles, Naval Research Laboratory

**2:30 PM**

#### **Influence of Deposition Process on Microstructure and Property Evolution in High Performance Iron Alloy**

V. Varadaraajan\*, University of Michigan, USA; A. Hart, US Army, USA; P. Mohanty, University of Michigan, USA

**2:50 PM**

#### **Characterization of Corrosion Resistant Amorphous Metal Materials Subsequent to Mechanical Deformation**

J. J. Haslam\*, J. C. Farmer, S. D. Day, P. Hailey, T. Lian, Lawrence Livermore National Laboratory, USA; L. F. Aprigliano, Consultant, USA

**3:10 PM**

#### **Mechanical and Environmental Performance of Thermal Sprayed Iron-Based Amorphous Coatings**

R. Bayles\*, Naval Research Laboratory, USA

**3:30 PM**

#### **Evaluation of the Wear Characteristics of Continuously Cast Ductile Iron and AISI 1144 Steel With and Without Q & T Heat Treatment**

P. R. Gangasani\*, Dura Bar, USA

**3:50 - 4:00**

**Break**

**4:00 PM**

#### **Panel Discussion on Research Needs to Facilitate High-Volume Applications of Fe-Based Amorphous Metals**

**5:00 PM**

#### **Closing Remarks**

Joe Farmer

## **Materials and Systems: Next Generation Biomaterials: Advanced Processing, Characterization and Modeling of Materials for Medical Devices**

### **Processing and Characterization of Bioceramics**

Room: O2-39

Session Chair: Ryan Roeder, University of Notre Dame

**2:00 PM**

#### **Introductory Remarks**

**2:10 PM**

#### **Preparation, Microstructure and Properties of Freeze-cast Hydroxyapatite Scaffolds**

Q. Fu\*, M. N. Rahaman, F. Dogan, University of Missouri-Rolla, USA; S. B. Bal, University of Missouri, Columbia, USA

**2:30 PM**

#### **Hydroxyapatite Reinforced Polyetheretherketone for Bone Ingrowth Scaffolds**

G. L. Converse\*, R. K. Roeder, University of Notre Dame, USA

**2:50 PM**

#### **Enhanced Osteoconductivity of Porous Orthopaedic Implants through Local Delivery of Bisphosphonates (Invited)**

R. Wang\*, Y. Hu, K. Duan, W. Y. Kim, D. S. Garbuz, B. Mari, H. M. Burt, T. R. Oxland, C. P. Duncan, University of British Columbia, Canada

**3:30 - 3:50 p.m.**

**Break**

**3:50 PM**

#### **Porous Ceramics for Bioreactor Cores**

I. Nettleship\*, C. Pekor, E. Magee, D. McKeel, J. Gerlach, University of Pittsburgh, USA

**4:10 PM**

#### **Mesoporous Calcium Silicate Ceramics for Drug Delivery**

W. Xue\*, A. Bandyopadhyay, S. Bose, Washington State University, USA

Wednesday PM

**4:30 PM**

**Morphology-Enhanced Low Temperature Sintering of Nanocrystalline Hydroxyapatite**

J. Wang, L. Shaw\*, University of Connecticut, USA

**4:50 PM**

**Protocol to Develop Crack-Free Biomimetic Coatings on Ti6Al4V Substrates**

S. Jalota\*, Clemson University, USA; S. B. Bhaduri, University of Toledo, USA; A. Tas, Yeditepe University, Turkey

**5:10 PM**

**Development of Novel Surface Treatments to Render Alumina Bioactive**

S. Jalota\*, Clemson University, USA; S. B. Bhaduri, University of Toledo, USA; A. Tas, Yeditepe University, Turkey

**Nanotechnology: Innovative 3D Nanoparticulate Material Processing**

**Nano-Sintering**

Room: W2-58

Session Chair: Alex Aning, Virginia Tech

**2:00 PM**

**Introductory Remarks**

**2:10 PM**

**Identification of Sintering Mechanisms during Nano-Particle Sintering (Invited)**

V. Tikare\*, Sandia National Laboratories, USA

**2:50 PM**

**New Measure of Microstructural Scale in Sintered Nanocrystalline Powders**

T. Chen\*, I. Nettlehip, University of Pittsburgh, USA; T. R. Hinklin, K. G. Ewsuk, Sandia National Laboratories, USA

**3:10 PM**

**Molecular Dynamics Simulations of Nanometer Scale Flamespray Deposition**

E. B. Webb\*, Sandia National Laboratories, USA

**3:30-3:50pm**

**Break**

**3:50 PM**

**Sintering of Nano-Particulate Material through Photonic Curing**

J. W. Sears\*, M. Carter, South Dakota School of Mines & Technology, USA

**4:10 PM**

**Low Temperature Densification and Coarsening of Patterned Nanostructured Silver by Laser Ablation of Nanoparticles**

A. D. Albert, C. Huang, M. F. Becker, J. W. Keto, D. Kovar\*, University of Texas at Austin, USA

**4:30 PM**

**Field Assisted Sintering Technology in Review**

O. Van der Biest\*, K. Vanmeensel, K. Sastry, L. Froyen, J. Vleugels, K. U. Leuven, Belgium

**Nanotechnology: Materials Characterization at the Nanoscale: Instrumentation and Applications**

**Electron- and Ion-Beam Instrumentation and Applications - II**

Room: W2-61

Session Chair: Angus Wilkinson, University of Oxford

**2:00 PM**

**Introductory Remarks**

**2:10 PM**

**The Future of the SEM in Nanoscience and Nanometrology (Invited)**

D. C. Joy\*, Oak Ridge National Laboratory, USA

**2:50 PM**

**Nanoscale Mapping of Elastic Strains Using Electron Back Scatter Diffraction**

A. J. Wilkinson\*, University of Oxford, United Kingdom; G. Meaden, BLG Productions, United Kingdom; D. J. Dingley, TSL/EDAX, USA

**3:10 PM**

**The Helium Ion Microscope: Technical Introduction and Applications (Invited)**

W. B. Thompson\*, J. Notte, L. Stern, ALIS Division of Carl Zeiss SMT, USA

**3:30 - 3:50 p.m.**

**Break**

**Surface Properties**

Room: W2-61

Session Chair: Angus Wilkinson, University of Oxford

**4:30 PM**

**A Study on Silver Nano Composites as Mercury Sorbents**

L. Yan\*, F. Chen, Z. Xu, S. M. Kuznicki, R. E. Wasylshen, University of Alberta, Canada

**4:50 PM**

**Gas Permeability in Nanoporous Substrates**

S. J. Lombardo\*, J. Yun, K. Krishnamurthy, University of Missouri, USA

**Nanotechnology: Nanomaterials for Electronic Applications**

**Nanocomposites, Devices and Applications**

Room: O2-44

Session Chair: K. Nair, E.I. duPont de Nemours & Co., Inc.

**2:00 PM**

**Introductory Remarks**

**2:10 PM**

**Nanocomposites for Electromagnetic Applications via 3D Self-Assembly (Invited)**

A. Goyal\*, S. Wee, Oak Ridge National Laboratory, USA

**2:50 PM**

**Shape Memory Polymer Nanocomposites Actuated by Resistive Heating (Invited)**

S. C. Jana\*, University of Akron, USA; G. A. Jimenez, National University of Costa Rica, Costa Rica; S. Gunes, University of Akron, USA

Wednesday PM

3:30 - 3:50 p.m.

Break

3:50 PM

### Nano-scaled Graphene Platelets (NGPs): An Emerging Class of Functional Nano Materials (Invited)

B. Z. Jang\*, Wright State University, USA; A. Zhamu, Nanotek Instruments, Inc., USA

4:30 PM

### Nano PbTiO<sub>3</sub> Adhering to Micron Fe<sub>2</sub>O<sub>3</sub> Particles and Its Microwave Absorbing Properties

W. Zhihui\*, H. Chuanxi, P. Qinghua, Beijing University of Technology, China

4:50 PM

### Application of a Nanoporous Material to Improve the Downhole Temperature Survival Time for Oil & Gas Logging Sensors

S. Rafie\*, Baker Hughes Inc., USA

5:10 PM

### Nanocrystalline Material for High Frequency Electronic Applications

P. Ruuskanen\*, Tampere University of Technology, Finland; S. Aalto, Technical Research Centre of Finland, Finland

5:30 PM

### AFM Study of Immobilized Bacteriophage and Its Interactions with Bacteria

H. Handa\*, S. Gurczynski, M. P. Jackson, G. Auner, G. Mao, Wayne State University, USA

## Nanotechnology: Nanostructured Ceramic Materials: Science and Technology

### Nanotubes, Nanorods, Nanowires, and Other 1-D Structures

Room: W2-67

Session Chair: Claus Daniel, Oak Ridge National Laboratory

2:00 PM

Introductory Remarks

2:10 PM

### Fabrication Strategies and Electrical Characterization of Nanodevices Contacted Using Focused Ion Beam Techniques (Invited)

A. Romano-Rodriguez\*, F. Hernandez-Ramirez, A. Tarancon, O. Casals, D. Prades, J. Morante, University of Barcelona, Spain; S. Barth, S. Mathur, University of Wuerzburg, Germany

2:50 PM

### Fabrication of Carbon Nanofiber (CNF)/SiAlON Composites by Pulsed Electric-Current Pressure Sintering and Their Mechanical and Electrical Properties

K. Hirota\*, Doshisha University, Japan

3:10 PM

### Manufacturing of a Boron Carbide - Carbon Nanotube Nanocomposite by Spark Plasma Sintering

A. Datye\*, K. Wu, Florida International University, USA; H. Lin, Oak Ridge National Laboratory, USA; W. Li, Florida International University, USA; Z. Munir, University of California, USA

3:30 - 3:50 p.m.

Break

3:50 PM

### Selective Deposition and Size-Dependent Physical Property of Metal and Metal Oxide Nanowires in Electrochemical Cells

H. Shin, Korea Advanced Institute of Science and Technology, South Korea; J. Song\*, Korea Research Institute of Standards and Science, South Korea; J. Yu, Korea Advanced Institute of Science and Technology, South Korea

4:10 PM

### Oxide Nano-Coatings to Enhance the Growth of Carbon Nanotubes on Large Uneven Substrates

I. T. Barney\*, Wright State University, USA

4:30 PM

### Formation of Graphene Sheets and Carbon Nanotubes on SiC

G. Z. Cambaz, G. Yushin, Y. Gogotsi\*, Drexel University, USA

4:50 PM

### Controlled Growth of Silicon Carbide Nanowires

H. W. Shim\*, H. Huang, Rensselaer Polytechnic Institute, USA

5:10 PM

### Growth of Boron Nitride Nanowires/Nanotubes by Catalyst Assisted Microwave Plasma Chemical Vapor Deposition

L. Guo\*, R. N. Singh, University of Cincinnati, USA

## Nanotechnology: Mechanics of Nanomaterials and Micro/Nanodevices - Experimental and Modeling

### Mechanics of Nanomaterials and Micro/Nanodevices-VI

Room: W2-68

Session Chairs: Ping Xiao, University of Manchester; Zhiwei Shan, Hysitron Inc.

2:00 PM

Introductory Remarks

2:10 PM

### Interphases and Processing Techniques in Polymer Nanocomposites

R. Thillaiyan\*, C. Brinson, Northwestern University, USA

2:30 PM

### Quantifying the Interfacial Effect on the Load Transfer Behavior of Multiwall Nanotube/Polycarbonate Composites

R. K. Duncan\*, J. B. Bult, Rensselaer Polytechnic Institute, USA; R. Qiao, Northwestern University, USA; L. S. Schadler, Rensselaer Polytechnic Institute, USA; L. C. Brinson, Northwestern University, USA

2:50 PM

### Mechanical Testing of Coated Ceramic Particles Using Nano-Indentation (Invited)

P. Xiao\*, J. Tan, University of Manchester, United Kingdom

3:30 - 3:50 p.m.

Break

3:50 PM

### Nanoindentation Behavior of Ultrathin Polymeric Films (Invited)

F. Yang\*, University of Kentucky, USA

4:30 PM

### Brillouin Light Scattering Investigation of Layer-by-Layer Assembled Nano-Composites

L. Sui\*, P. Podsiadlo, N. A. Kotov, J. Kieffer, University of Michigan, USA

4:50 PM

### Tough, Transparent Polyurethane/Clay Nanocomposites

A. Kaushik\*, P. Podsiadlo, A. Waas, E. Arruda, N. Kotov, University of Michigan, USA

5:10 PM

### Deformation Mechanisms in Nanolayered Metallic Composites (Invited)

A. Misra\*, Los Alamos National Lab, USA

## **Processing and Product Manufacturing: Environmental Issues in the Material Science and Technology Industries**

### **Environmental Issues**

Room: O2-41

Session Chair: Alan Piquette, Oklahoma State University

**2:00 PM**

#### **Introductory Remarks**

**2:10 PM**

#### **Structural and Electrical Properties of Mercury Ferrites (Invited)**

P. D. Zade, National Institute of Miners' Health (NIMH), India; D. M. Dharmadhikari\*, National Environmental Engineering Research Institute (NEERI), Nagpur, India

**2:50 PM**

#### **Robustness of Materials Selection Decisions Using Various Life-Cycle Assessment Methods**

A. N. Allen\*, Massachusetts Institute of Technology, USA; S. Das, Secat, Inc, USA; F. Field, R. Kirchain, Massachusetts Institute of Technology, USA

**3:10 PM**

#### **Novel Mechanical Process for CRT Glass Recycling**

F. La Marca\*, S. De Arcangelis, N. Magliozzi, Sapienza University of Rome, Italy

**3:30 - 3:50 p.m.**

#### **Break**

**3:50 PM**

#### **Feasibility Study of Recycling Techniques for Zinc Hydrometallurgical Waste**

S. Jiemsirilers\*, Chulalongkorn University, Thailand; P. Thavorniti, National Metals and Materials Technology Center, Thailand

**4:10 PM**

#### **Remediation and Recovery of Uranium from Water Using Tungsten Trioxide**

H. M. Albusaidi\*, A. Apblett, Oklahoma State University, USA

**4:30 PM**

#### **Minimization of Waste Gypsum from the Production of Titanium Dioxide**

R. Greaves\*, A. Atkinson, M. Tyrer, M. Rogers, Imperial College London, United Kingdom; P. Claisse, Coventry University, United Kingdom

**4:50 PM**

#### **Green Technology for Extraction of Aluminum from Ores and Recycling of Ceramics**

A. Apblett\*, Oklahoma State University, USA

## **Processing and Product Manufacturing: Innovative Processing and Synthesis of Ceramics, Glasses and Composites**

### **Processing & Structure-Property Relationships**

Room: O2-33

Session Chair: Tatsuki Ohji, National Institute of Advanced Industrial Science and Technology

**2:00 PM**

#### **Introductory Remarks**

**2:10 PM**

#### **Templates and Gradients for Novel Microstructure Tailoring (Invited)**

G. Messing\*, R. Pavlacka, N. Juwondo, Penn State University, USA; A. Studart, L. Gauckler, ETH, Switzerland; L. Kupp, Penn State University, USA

**2:50 PM**

#### **Re-firing of Yttria Ceramics: Microstructural Benefits**

S. Ma\*, S. R. Karavadi, S. Wu, C. J. Kiely, M. P. Harmer, H. S. Caram, Lehigh University, USA

**3:10 PM**

#### **Role of Dopants and Sintering Atmosphere on Crystallization and Densification of Aluminosilicate Aggregate**

W. G. Luscher\*, B. E. Scheetz, J. R. Hellmann, The Pennsylvania State University, USA; B. A. Wilson, Carbo Ceramics, USA

**3:30 - 3:50 p.m.**

#### **Break**

**3:50 PM**

#### **Microstructural Design and Processing of Porous Ceramics for Unique Mechanical Properties (Invited)**

T. Ohji\*, National Institute of Advanced Industrial Science and Technology, Japan

**4:30 PM**

#### **Effect of Soluble Polymers on the Microstructure of Freeze Cast Ceramic**

C. Pekor\*, I. Nettlehip, University of Pittsburgh, USA

**4:50 PM**

#### **Synthesis and Mechanical Property of Superhard Transition Metal Borides**

H. Chung\*, M. Weinberger, J. Levine, S. Tolbert, R. B. Kaner, J. Yang, University of California Los Angeles, USA

**5:10 PM**

#### **High Density Magnetic Compaction Technique for Processing Ceramic Powders**

L. P. Franks, U.S. Army RDECOM-TARDEC, USA; B. Chelluri\*, E. Knoth, IAP Research Inc., USA

**5:30 PM**

#### **Synthesis of the Lithium-Aluminum-Cobalt-Manganese Oxide Composites and Their Electrical Properties**

C. Kao\*, K. Liu, National Cheng Kung University, Taiwan

## **Processing and Product Manufacturing: Joining of Advanced and Specialty Materials IX**

### **Joining of Ceramics**

Room: O2-35

Session Chairs: Alan Meier, Alfred University; Viola Acoff, The University of Alabama

**2:00 PM**

#### **Introductory Remarks**

**2:10 PM**

#### **Effect of High-Temperature Oxidizing and Reducing Atmosphere Exposure on a Novel Composite Braze Sealing Material**

J. Choi\*, J. Kim, K. Weil, Pacific Northwest National Laboratory, USA

**2:30 PM**

#### **Transformation of WC in Ni-based Alloy Coating by Vacuum Melting**

Z. Wang\*, A. Yang, D. He, J. Jiang, F. Guo, Beijing University of Technology, China

**2:50 PM**

#### **Pd-Ag-CuO Air Braze Alloy for Ceramic Joining**

J. Darsell\*, Washington State University, USA; K. Weil, Pacific Northwest National Laboratory, USA

**3:10 PM**

#### **Experimental Complex for Investigations of High Temperature Behaviour of Molten Metals in Contact with Refractory Materials**

N. Sobczak\*, R. Nowak, W. Radziwill, Foundry Research Institute, Poland

**3:30 - 3:50 p.m.**

#### **Break**

**3:50 PM**

#### **Interaction Between Liquid Aluminum and MgAl<sub>2</sub>O<sub>4</sub> Single Crystals**

R. Nowak\*, N. Sobczak, W. Radziwill, Foundry Research Institute, Poland; E. Sienicki, Motor Transport Institute, Poland

**4:10 PM**

#### **Joining of Lanthanum Calcium Ferrite to Itself and Other Materials Using a Transient Liquid Phase Process**

P. G. Callahan\*, D. P. Butt, Boise State University, USA

**4:30 PM**

#### **Alloy Depletion and Martensite Formation During Glass-to-Metal Joining of Austenitic Stainless Steels**

D. F. Susan\*, M. Perricone, C. V. Robino, J. R. Michael, B. B. McKenzie, Sandia National Laboratories, USA

**4:50 PM**

#### **Improved Metal-Ceramic Joining Using Laser-assisted Surface Modification**

S. Paranjape\*, University of Houston, USA; D. Starikov, N. Medelci, Integrated Micro Sensors Inc., USA; E. G. Baburaj, Clarkson Aerospace Corporation, USA; F. Attia, C. Joseph, A. Bensaoula, University of Houston, USA

## **Processing and Product Manufacturing: Lead-Free Solders: Emerging Issues in Manufacturing, Performance and Reliability**

### **Pb-Free Solder Alloys: Phase Transformations and Reliability**

Room: O2-42

Session Chairs: Thomas Bieler, Michigan State University; Daniel Lewis, Rensselaer Polytechnic Institute

**2:00 PM**

#### **Introductory Remarks**

**2:10 PM**

#### **The Effect of Contamination on the Solidification Behavior of Solders (Invited)**

K. Ursula\*, K. Moon, National Institute of Standards and Technology, USA; C. Handwerker, Purdue University, USA

**2:50 PM**

#### **Process Control of Lead-Free Soldering by X-Ray Inspection**

K. Brockdorf\*, M. W. Colby, phoenix|x-ray Systems + Services Inc., USA

**3:10 PM**

#### **Controlling SAC+X Solder Joint Microstructure through Undercooling**

J. Walleser\*, Iowa State University, USA; I. E. Anderson, J. Harringa, F. Laabs, Ames Lab, USA

**3:30 - 3:50 p.m.**

#### **Break**

**3:50 PM**

#### **Thermal Aging Effects of Solder Joints made from Sn-Ag-Cu-X (SAC+X) Alloys with Low X Concentrations (Invited)**

I. E. Anderson\*, Ames Laboratory, USA; J. Walleser, Iowa State University, USA; D. Rehbein, A. Kracher, J. Harringa, Ames Laboratory, USA

**4:30 PM**

#### **Electromigration Reliability of Flip Chip Sn<sub>3.0</sub>Ag<sub>0.5</sub>Cu/Sn<sub>57</sub>Bi<sub>1</sub>Ag Combination Solder Joint**

J. Choi\*, H. Ham, H. Han, Y. Kim, D. Lee, S. Choi, Samsung Electronics, South Korea

**4:50 PM**

#### **Development of Pb-Free Nanoparticle Solders for Microelectronic Packaging**

K. A. Grossklaus, C. A. Handwerker\*, E. A. Stach, Purdue University, USA; R. R. Revur, S. Sengupta, MetaMateria Partners, USA; H. Hwang, Indium Corporation of America, USA

**5:10 PM**

#### **Morphology and Growth of Intermetallics at the Interface of Sn-based Solders and Cu with Different Surface Finishes**

R. Zhang, H. Shen, F. Tai, Z. Xia, F. Guo\*, Beijing University of Technology, China

## **Steel: Steel Product Metallurgy and Applications**

### **Product Metallurgy I**

Room: W2-70

Session Chair: Roger Pradhan, Arcelor Mittal Steel

**2:00 PM**

#### **Introductory Remarks**

**2:10 PM**

#### **The Transformation Characteristics of M/A Constituents in Nb-Ti Microalloyed Steel with Low Mn Additions**

M. Hua\*, University of Pittsburgh, USA; Q. Sha, Anshan Iron & Steel Group, China; C. Garcia, A. J. DeArdo, University of Pittsburgh, USA

**2:30 PM**

#### **Microstructure of Nanoscale Cu and M<sub>2</sub>C Carbide Precipitates in a High Strength Low Carbon Steel**

M. Mulholland\*, D. Seidman, Northwestern University, USA

**2:50 PM**

#### **Limited - Hardenability Steels and New Technologies of Heat Treating Them**

N. Kobasko\*, IQ Technologies, Inc., USA

**3:10 PM**

#### **Development of Structural Steel Plates with High Deformability by Microstructure Control of Dual Phase Produced by on Line Heating Process**

K. Ueda\*, S. Endo, N. Shikanai, T. Ito, JFE Steel Corporation, Japan

**3:30 - 3:50 p.m.**

**Break**

**3:50 PM**

#### **Study of the Grain Size Effect on the Deformation Behavior of Microalloyed Steels**

K. Muszka\*, J. Majta, AGH University of Science and Technology, Poland; P. D. Hodgson, Deakin University, Australia

**4:10 PM**

#### **Effect of Hydrogen Charging and Baking on the Charpy Impact Properties of 4340 Steel**

K. Mori, E. Iriarte, O. Perez, H. Ruiz, T. Choi, P. Stoyanov, J. Foyos, J. Ogren, Loyola Marymount University, USA; E. W. Lee, Naval Air Systems Command, USA; O. S. Es-Said\*, Loyola Marymount University, USA

**4:30 PM**

#### **Fatigue Performance of High Temperature Vacuum Carburized Nb-Modified Steel**

R. E. Thompson\*, D. K. Matlock, J. G. Speer, Colorado School of Mines, USA

**4:50 PM**

#### **Performance and Microstructural Development of Standard and Enhanced Rebar Deformed under Quasi-Static and Dynamic Shear Loading**

L. M. Dougherty\*, E. K. Cerreta, G. T. Gray, C. P. Trujillo, M. F. Lopez, Los Alamos National Laboratory, USA

**5:10 PM**

#### **Cyclic Plasticity of Steel under Seismic Load Conditions**

C. Seal\*, M. A. Hodgson, W. Ferguson, The University of Auckland, New Zealand