

Monday, September 17, 2007

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

Keynote: Automotive Materials Outlook

Room: W2-62

Session Chair: Dale Wetzel, DaimlerChrysler

7:50 AM

Introductory Remarks

7:55 AM

Automotive Materials Outlook (Invited)

L. Williams*, DaimlerChrysler, USA

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

Processing and Properties of TRIP Steels

Room: W2-65

Session Chair: James Fekete, General Motors Corporation

8:30 AM

Introductory Remarks

8:40 AM

Increasing the Austenite Content of AHSS by Dual Stabilization Processing

G. M. Michal*, A. H. Heuer, Case Western Reserve University, USA

9:00 AM

Microstructural Evolution During Continuous Galvanizing and Final Mechanical Properties of High Al-Low Si TRIP Steels

M. Gomez*, I. Garcia, University of Pittsburgh, USA; D. M. Haezebrouck, United States Steel Corporation, USA; A. J. Deardo, University of Pittsburgh, USA

9:20 AM

Optimizing Microstructure for Fatigue Resistance in TRIP Steels

K. Findley*, D. P. Field, Washington State University, USA

9:40 AM

Alloying Effects and Properties of Low-Silicon Cold-Rolled TRIP-Aided Steels

C. Oh*, D. Suh, S. Park, S. Kim, Korea Institute of Machinery & Materials, South Korea; W. Kim, M. Moon, HYUNDAI HYSCO, South Korea

10:00 - 10:20 a.m.

Break

10:20 AM

Application of Niobium to Automotive Ultra High-Strength TRIP-Aided Steels with Bainitic Ferrite and/or Martensite Matrix

K. Sugimoto*, M. Murata, Shinshu University, Japan; Y. Mukai, Kobe Steel Ltd, Japan

10:40 AM

Role of Deformation Temperature on Transformation Induced Plasticity in Advanced TRIP Steel Sheet

X. Li*, A. Ghosh, University of Michigan, USA

11:00 AM

Tensile Behavior of TRIP Steel Studied by Synchrotron X-rays

J. Jung*, Z. Xu, H. Kim, S. Biroasca, B. C. De Cooman, POSTECH, South Korea

11:20 AM

Dynamic Behavior of TRIP and DP Steels in Tension at Different Temperatures

S. C. Curtze*, M. Hokka, V. Kuokkala, Tampere University of Technology, Finland; P. Peura, Rautaruukki Oyj, Finland

11:40 AM

Effect of Aluminum and Silicon Content on Oxidation and Decarburization of TRIP Steel Surfaces

T. Baum*, R. J. Fruehan, S. Sridhar, Carnegie Mellon, USA

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

Advanced Materials and Processes

Room: W2-63

Session Chair: Irina Kalish, General Motors

8:35 AM

Introductory Remarks

8:40 AM

Design and Manufacturing of a Thermoplastic Roof Access Door for a Mass Transit Bus

U. K. Vaidya*, S. Pillay, University of Alabama at Birmingham, USA; J. Serrano, Southern Company Services, USA

9:00 AM

Development and Use of Polyamide 6 Material for Automotive Safety Restraint System Components

N. Bokhari*, Autoliv Inc, USA; M. Huisman, DSM Engineering Plastics, USA

9:20 AM

Optimization of Energy Saving Materials and Compressed Insulating Layers in the Automotive Chemical Converters

E. Litovsky, V. Issouppov, J. Kleiman*, Integrity Testing Laboratory Inc., Canada; R. Latham, F. Lacin, A. Kotrba, K. Olivier, TENNECO, USA

9:40 AM

Advanced Materials for Heavy Vehicle Braking Systems

G. J. Grant*, D. Herling, Pacific Northwest National Laboratory, USA; Y. Naerheim, TMT, LLC, USA

10:00 - 10:20 a.m.

Break

10:20 AM

Advanced Gasar-Based Composites

L. Boyko*, Acuren Materials Engineering, Canada

10:40 AM

Aluminum Alloy Developments for Highly Stressed Diesel Engine Cylinderheads

J. F. Major*, Alcan Inc., Canada; M. Garat, G. Laslaz, Alcan Inc., France

11:00 AM

Study of Intrusion Bending for Steel Tubes with Thin Wall Thickness

H. Naoi*, N. Kitakami, Hosei University, Japan; M. Mizumura, Y. Kuriyama, Nippon Steel Corp., Japan

Monday AM

* Denotes Presenting Author

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

Next Generation Lightweight Materials - Mg and Ti

Room: W2-62

Session Chairs: Paul Krajewski, General Motors; Chongmin Kim, General Motors Corp.

8:35 AM

Introductory Remarks

8:40 AM

Developments in Wrought Magnesium Alloys & Low Cost Processing of Titanium (Invited)

C. B. Cowley*, CSIRO Light Metals Flagship, Australia

9:00 AM

The NanoMag(TM) Process to Manufacture High Strength/Density Mg Alloy Sheet

R. F. Decker*, S. Kulkarni, Thixomat, Inc., USA; A. Ghosh, B. Mansoor, The University of Michigan, USA

9:20 AM

Novel Eco-friendly Stannate-Based Conversion Coatings for Mg alloys

A. H. Makhlof*, B. Marx, D. P. Butt, D. Thomsen, P. Callahan, Boise State University, USA

9:40 AM

Corrosion of Newly Developed Mg Alloy in Chloride Containing Solution

B. M. Marx*, A. Makhlof, D. P. Butt, Boise State University, USA

10:00 - 10:20 a.m.

Break

10:20 AM

A Sonochemical Method for Producing Titanium Metal Powder

I. C. Halalay*, M. P. Balogh, GM R&D Center, USA

10:40 AM

Technical Cost Analysis of Modified Armstrong Process for Titanium Production

R. Roth*, R. Kirchain, MIT, USA

11:00 AM

Overview of the Armstrong Titanium Powder Process: Applications and Opportunities (Invited)

J. W. Sears*, South Dakota School of Mines & Technology, USA; S. Borys, T. Lyssenk, International Titanium Powder (ITP), USA

11:20 AM

Powder Metallurgy Techniques to Consolidate Armstrong Titanium and Pre-Alloyed Titanium Powders for Potential Automobile Applications

W. H. Peter*, C. A. Blue, Oak Ridge National Laboratory, USA; C. R. Scorey, Ametek, Inc, USA; W. Ernst, International Titanium Powder, USA; J. M. McKernan, Ametek, Inc, USA; J. O. Kiggans, Oak Ridge National Laboratory, USA; C. Yu, Ametek, Inc, USA

11:40 AM

Modification and Analysis of Titanium Powders Synthesized by the Armstrong Process

C. Lavender*, Y. Hovanski, K. Weil, Pacific Northwest National Laboratory, USA

Automotive: Automotive Light Metal Castings: Technology and Applications

Melt Treatment, Control and Casting Process Development

Room: W2-64

Session Chairs: Pavan Chintalapati, University of Alabama at Birmingham; Thomas Prucha, American Foundry Society

8:30 AM

Introductory Remarks

8:40 AM

Advanced Melting System Design for the Aluminum Foundry (Invited)

M. Osborne*, GM Powertrain, USA; C. Eckert, T. Meyer, M. Kinosz, Apogee Technologies, USA

9:20 AM

Effect of Applied Isostatic Pressure During Solidification on Static Mechanical Properties of Lost Foam Aluminum Castings (Invited)

P. P. Chintalapati*, J. A. Griffin, R. D. Griffin, H. E. Littleton, University of Alabama at Birmingham, USA

10:00 - 10:20 a.m.

Break

10:20 AM

Studies on the Surface Oxidation of Molten Aluminium – Silicon Alloys Using Laser as a Probe

K. R. Udupa*, NITK, Surathkal, India

10:40 AM

Hitchiner Lost Foam Casting of Magnesium Alloy

Q. Han*, Oak Ridge National Laboratory, USA; K. Currie, J. J. Droke, Tennessee Technological University, USA; R. Dinwiddie, P. Sklad, Oak Ridge National Laboratory, USA; G. V. Walford, Walford Technologies, Inc., USA; D. Nolan, Foseco Canada Inc., Canada

11:00 AM

Visualization of the Multiphase Flow in the Lost Foam Casting Process by Neutron Radiography and Image Processing

X. Luo, D. Penumadu*, University of Tennessee, Knoxville, USA

11:20 AM

Thixomolding of Net Shape Lightweight Automotive Parts

R. F. Decker, S. E. LeBeau*, Thixomat, Inc., USA

11:40 AM

Effect of Mg Content on the Rheology of Hypereutectic Al-Si Alloys in the Semi-Solid State

A. Hekmat Ardakan*, F. Ajersch, Ecole Polytechnique, Canada

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

Complex Hydrides I

Room: W2-66

Session Chair: Donald Siegel, Ford Motor Company

8:30 AM

Introductory Remarks

8:40 AM

High Capacity Hydrogen Storage Materials Development (Invited)

G. J. Thomas*, C. Read, G. Ordaz, S. Satyapal, U.S. Department of Energy, USA

9:20 AM

Metal Borohydrides for Hydrogen Storage Applications (Invited)

S. Orimo*, Y. Nakamori, H. Li, M. Matsuo, Tohoku University, Japan; K. Miwa, S. Towata, Toyota Central R&D Labs, Japan

10:00 - 10:20 a.m.

Break

10:20 AM

Theoretical Study on Complex Hydrides for Hydrogen Storage (Invited)

K. Miwa*, N. Ohba, S. Towata, Toyota Central R&D Labs., Inc., Japan; Y. Nakamori, S. Orimo, Tohoku University, Japan

11:00 AM

Development of Metal-N-H Systems for Hydrogen Storage (Invited)

P. Chen*, Z. Xiong, G. Wu, C. Yong, J. Hu, Y. Liu, Y. Chua, National University of Singapore, Singapore

11:40 AM

Thermodynamic and First-Principles Approach for the Metal Substituted Lithium Borohydrides($\text{Li}_x\text{M}_y\text{BH}_4$)

S. Lee*, D. Shin, Z. Liu, The Pennsylvania State University, USA

Electronic and Magnetic Properties: Ferroelectrics and Multiferroics

Magnetoelectric Composites

Room: D2-10

Session Chair: John Prater, Army Research Office

8:30 AM

Introductory Remarks

8:40 AM

Fabrication of Thick Hard Magnetic Coatings by Thermal Spray Technologies

B. Dzur, C. Zimmer*, G. Thomas, TU Ilmenau, Germany

9:00 AM

Analytical vs Experimental Data For Layered Magnetoelectric Materials (Invited)

G. Carman*, G. Chang, UCLA, USA

9:40 AM

A TEM Study of Thin Film Magnetoelectric Metal – Ceramic Nanocomposite Structures

M. A. Karmakar*, R. Mahajan, R. Islam, S. Priya, University of Texas at Arlington, USA

10:00 - 10:20 a.m.

Break

10:20 AM

BaTiO₃-(Ni,Zn)Fe₂O₄ Ferroelectric-Magnetic Ceramic Composites

L. Mitoseriu*, Al. I. Cuza Univ., Romania; V. Buscaglia, CNR, Italy; P. Nanni, Genoa University, Italy

10:40 AM

Grain Size Dependence of Magnetoelectric Coefficient in Pb(Zr_{0.52}Ti_{0.48})O₃ – 0.2 Ni_{0.8}Zn_{0.2}Fe₂O₄ System

R. A. Islam*, S. Priya, University of Texas at Arlington, USA

11:00 AM

Effect of Deposition Parameters on the Stoichiometry and Crystallization of Epitaxial BiMnO₃ Thin Films

S. Havelia*, P. A. Salvador, Carnegie Mellon University, USA

11:20 AM

Multilayer Magnetoelectric Nanostructures of CoFe₂O₄ – BaTiO₃

R. B. Mahajan*, H. Kim, R. Islam, M. Karmakar, S. Priya, University of Texas at Arlington, USA

11:40 AM

Closing Remarks Summary

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

Composition, Processing, Micro-/Nanostructure, and Property Relationships

Room: D2-09

Session Chairs: Danilo Suvorov, Jozef Stefan Institute; Rick Ubic, Boise State University; Dragan Uskokovic, Institute of Technical Sciences of the Serbian Academy of Sciences and Arts

8:30 AM

Introductory Remarks

8:40 AM

Controlled Designing of Fine Particles at the Molecular and Nano Level (Invited)

D. P. Uskokovic*, Institute of Technical Sciences of the Serbian Academy of Sciences and Arts, Yugoslavia

9:00 AM

Origin of Size Effect on Dielectric Properties of Barium Titanate Nanoparticles Originated from Mesoscopic Particle Structure (Invited)

S. Wada*, University of Yamanashi, Japan; T. Hoshina, A. Yazawa, H. Kakemoto, T. Tsurumi, Tokyo Institute of Technology, Japan; Y. Kuroiwa, Hiroshima University, Japan

9:20 AM

Preparation and Properties of Nano-crystalline Barium Titanate Powders via Water-based Ambient Conditions Sol Process

H. Maie, B. I. Lee*, Clemson Univ., USA

9:40 AM

Investigation of Interrelation Between Microstructure Characteristics and Dielectric Properties due to Addition of Ho₂O₃

V. V. Mitic*, Z. Nikolic, V. Paunovic, L. Vracar, L. Zivkovic, University of Nis, Yugoslavia

10:00 - 10:20 AM

Break

10:20 AM

An Understanding of the Grain-Boundary Chemistry of BaTiO₃-Based Dielectric Ceramics of Interest for Capacitor Applications (Invited)

J. P. Guha*, University of Missouri, USA

10:40 AM

Fabrication and Piezoelectric Properties of Potassium Niobate Based Lead-Free Ferroelectric Ceramics (Invited)

T. Takenaka*, K. Matsumoto, T. Hirose, Y. Hiruma, H. Nagata, Tokyo University of Science, Japan

11:00 AM

Preparation of Plate-like BaTiO₃ Particles and (111)-Textured Bulk Ceramics by Templated Grain Growth Process

T. Kimura*, T. Sato, Keio University, Japan

11:20 AM

Effect of Yb₂O₃ and Er₂O₃ on the Structure and Electrical Properties of BaTiO₃ Ceramics

V. V. Mitic*, Z. Nikolic, L. Vracar, V. Paunovic, L. Zivkovic, University of Nis, Yugoslavia

11:40 AM

Effects of DC Electric Fields on Dielectric Properties of BaTiO₃

D. Hahn*, Sungkyunkwan University, South Korea; J. Hong, Samsung Electromechanics, South Korea; Y. Han, Sungkyunkwan University, South Korea

Energy: Encapsulation and Immobilization of Hazardous and Nuclear Wastes Using Ceramics, Glass and Other Materials

Use of Analytical Techniques in Nuclear Waste Disposal I

Room: D2-12

Session Chair: Jinesh Jain, Washington Group International

8:30 AM

Introductory Remarks

8:40 AM

Analysis of Surrogate of Plutonium Oxide Residue Using Laser Induced Breakdown Spectroscopy

H. Zheng, F. Yueh, T. Miller, J. P. Singh*, Mississippi State University, USA; K. Zeigler, J. C. Marra, Savannah River National Laboratory, USA

9:20 AM

Key Elements of Characterizing Savannah River Site (SRS) High Level Waste (HLW) Sludge Insolubles Through Sampling and Analysis

S. H. Reboul*, B. A. Hamm, P. J. Hill, D. P. DiPrete, N. E. Bibler, W. R. Wilmarth, WSRC, USA

10:00 - 10:20 a.m.

Break

10:20 AM

Laser Ablation-Inductively Coupled Plasma-Atomic Emission Spectrometry (LA-ICP-AES): A Promising Tool for Monitoring Vitrification of Hanford Radioactive Waste

J. Jain*, A. V. Arakali, B. J. Kaiser, T. A. Lane, Washington Group International, USA; K. E. Zeigler, Savannah River National Laboratory, USA; M. L. Alexander, Pacific Northwest National Laboratory, USA

10:40 AM

New Generation Economy UV Laser Ablation System with Sample Changer and High Definition Camera View (Invited)

R. C. Fry*, J. W. Brady, M. Dyas, Spectra-LAse, Inc., USA; O. Rogerieux, S. Slutter, HORIBA Jobin Yvon, France

11:00 AM

Physical and Chemical Measurements Needed to Support Disposition of Savannah River Site (SRS) High Level Waste (HLW) Sludge

B. A. Hamm*, S. H. Reboul, P. J. Hill, N. E. Bibler, Washington Savannah River Company, USA

11:20 AM

Validation of New Process Control Analytical Methods for the Defense Waste Processing Facility (Invited)

C. J. Coleman*, T. B. Edwards, A. D. Marzolf, K. R. Hera, R. N. Mahannah, M. T. Feller, R. B. Spencer, Washington Savannah River Site, USA

Energy: Energy Materials

Thermoelectric Materials I

Room: D2-13

Session Chairs: Fatih Dogan, University of Missouri Rolla; Masanobu Awano, National Institute of Advanced Industrial Science and Technology

8:30 AM

Introductory Remarks

8:40 AM

Electrochemical Ceramic Reactor for Selective NO_x Reduction by Using Thermoelectric Power from Exhaust Heat Energy (Invited)

Y. Fujishiro*, K. Hamamoto, M. Awano, AIST, Japan, Japan

9:20 AM

Toward 50% Conversion Efficiency: What are the Materials Challenges and Can They be Met? (Invited)

D. M. Gruen*, Argonne National Laboratory, USA

10:00 - 10:20 a.m.

Break

10:20 AM

Thermoelectric Properties of CrSi₂-Si(Ge) Eutectic for Oxidizing Environment (Invited)

A. Sayir*, Case Western Reserve University, USA; F. Dynys, NASA Glenn, USA; A. Sehirlioglu, Case Western Reserve University, USA; T. Caillat, NASA Jet Propulsion Laboratory, USA

11:00 AM

A Review of Mechanical Properties for Thermoelectric Materials

B. D. Hall*, J. R. Johnson, E. D. Case, Michigan State University, USA

11:20 AM

SEM, X-Ray Diffraction, and BET Analysis of Dry and Wet Milled Lead-Antimony-Silver-Tellurium (LAST) thermoelectric materials

B. D. Hall*, F. Ren, J. R. Johnson, E. D. Case, Michigan State University, USA

11:40 AM

Effect of Thermal Fatigue on the Mechanical Properties of Lead-Antimony-Silver-Tellurium (LAST) Thermoelectric Materials

J. E. Ni*, F. Ren, E. D. Case, Michigan State University, USA; E. Lara-Curzio, A. Shyam, Oak Ridge National Laboratories, USA

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

Fuel Cells Plenary Session

Room: D2-14

Session Chairs: Prabhakar Singh, PNNL; Donald Collins, U.S. Dept. of Energy

8:30 AM

Introductory Remarks

8:40 AM

U.S. Department of Energy Fossil Energy Fuel Cell Program - Working Towards a Secure Energy Future (Invited)

W. Surdoval*, NETL, USA

9:20 AM

Fuel Cell Vehicle Technology Demonstration at Ford Motor Company

Mumjeeb Ijaz, Ford Motor Co.

10:00 - 10:20 a.m.

Break

10:20 AM

Power Electronics Materials and Switching Devices

Allen Hefner, NIST

11:00 AM

High Temperature Fuel Cell Development Activities at FuelCell Energy Corp. and Versa Power Systems, Inc.

Jody Doyon*, H. Ghezal-Ayagha, M. Farooque, FuelCell Energy Corp., USA; B. Borglum, E. Tang, Versa Power Systems, Inc., Canada

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

Automotive Materials: Keynote Session I

Room: D0-07B

Session Chair: Mark Stoudt, National Institute of Standards and Technology

8:30 AM

Introductory Remarks

8:40 AM

A Look at Fifty Years of Material Selection for Automotive Bodies (Invited)

J. N. Hall*, General Motors Corp., USA

9:20 AM

Automotive Lightweighting Materials (Invited)

J. A. Carpenter*, U.S. Department of Energy, USA

10:00 - 10:20 a.m.

Break

10:20 AM

High Performance Automotive Materials by Design (Invited)

G. B. Olson*, Northwestern University, USA

11:00 AM

Advanced Simulation Techniques – Exceeding Reality? (Invited)

K. Roll*, DaimlerChrysler AG, Germany

11:40 AM

Micrometer Scale Characterization of Advanced Alloy Mechanical Property Gradients (Invited)

R. Davies*, G. J. Grant, E. Stephens, Pacific Northwest National Laboratory, USA

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

Application of Atomistic Modeling for the Design of Materials I

Room: D0-05AB

Session Chair: Mark Asta, University of California - Davis

8:30 AM

Introductory Remarks

8:40 AM

Accelerated Materials Design using First Principles Computations (Invited)

G. Ceder*, MIT, USA

9:20 AM

Predictive Design of Materials Using Atomic-Scale Simulations (Invited)

J. Kieffer*, University of Michigan, USA

10:00 - 10:20 a.m.

Break

10:20 AM

Development of Flexible, Many-Body Potentials for Heterogeneous Interface Systems

J. Yu, S. R. Phillpot, S. B. Sinnott*, University of Florida, USA

10:40 AM

Atomistic Modeling of Low Temperature Dislocation Plasticity in α -Fe

Y. Li, N. S. Thirumalai*, M. J. Luton, P. A. Gordon, ExxonMobil Research and Engineering Company, USA; J. Li, A. Samanta, The Ohio State University, USA

11:00 AM

Inhomogeneous Absorption of Mixed Dislocations in an Asymmetric Tilt Boundary

J. W. Askin*, Ohio State University, USA; R. G. Hoagland, Los Alamos National Lab, USA; P. M. Anderson, Ohio State University, USA

11:20 AM

Forward and Inverse Computational Design of Anisotropic Nanocolloids for Self Assembly (Invited)

S. Glotzer*, University of Michigan, USA

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

Structure and Properties

Room: D0-03C

Session Chairs: Doreen Edwards, Alfred University; Sangtae Kim, University of California

8:30 AM

Introductory Remarks

8:40 AM

Structure, Defect Chemistry, and Transport Phenomena in Tunneled Titanates (Invited)

D. Edwards*, Alfred University, USA

Monday AM

9:20 AM

Three Dimensional CeO₂ Nanostructures: Synthesis, Characterizations and Electrical Property (Invited)

S. Kim*, C. Mitterbauer, J. Lee, N. D. Browning, H. Park, University of California, USA

10:00 - 10:20 a.m.

Break

10:20 AM

A Computational Modelling Study of Nickel Doped Alkaline Earth Titanates

M. Paul*, C. A. Catlow, R. J. Oldman, Royal Institution of Great Britain, United Kingdom

10:40 AM

Radiation-induced Defects in Tungsten and Evolution in Temperature: A Positron Annihilation Spectroscopy Study

A. Debelle*, M. Barthe, T. Sauvage, A. Gentils, P. Desgardin, V. Moineau, CERI-CNRS, France

11:00 AM

Thermodynamic Modeling of the Defect Chemistry in the La_{1-x}Sr_xCoO_{3-δ} Perovskite

J. E. Saal*, M. Yang, Z. Liu, The Pennsylvania State University, USA

11:20 AM

A Quantized Crystal Plasticity Finite Element Model of Nanocrystalline Metals

L. Li*, A. Peter, M. Lee, The Ohio State University, USA

11:40 AM

Dynamic Gate Charge Behaviors in n-Channel Power VDMOSFETs during HEFS and PBTI Stresses

M. Alwan*, LEMI, France

Fundamentals and Characterization: Phase Stability, Diffusion and Their Applications

First Principle Predictions of Phase Stability and Kinetics I

Room: D0-04ABC

Session Chairs: Dane Morgan, Univ. of Wisconsin - Madison; Raymundo Arroyave, Texas A&M University

8:30 AM

Introductory Remarks

8:40 AM

Cluster Expansion for Protein Design (Invited)

D. Morgan*, Univ. of Wisconsin - Madison, USA; F. Zhou, G. Ceder, G. Grigoryan, A. Keating, Massachusetts Institute of Technology, USA; S. Lustig, DuPont Central Research and Development, USA

9:20 AM

First Principles Modeling of Vibrational Electronic Entropy in Metallic Alloys (Invited)

V. Ozolins*, UCLA, USA; C. Wolverton, Northwestern University, USA

10:00 - 10:20 a.m.

Break

10:20 AM

First-Principles Study of the Vibrational and Electronic Mixing Entropy in Fe-Cr

N. Sandberg*, Royal Institute of Technology, Sweden

10:40 AM

Ab Initio Thermodynamic Properties of High-Temperature Cubic Intermetallics at Finite Temperatures

R. Arroyave, M. Williams*, Texas A&M University, USA

11:00 AM

Thermodynamic Modeling of the Mg-B-C System

A. Saengdeejing*, J. E. Saal, Z. Liu, The Pennsylvania State University, USA

11:20 AM

Temperature-Dependent Elastic Constants of Amorphous Ni

H. Zhang*, S. Shang, Y. Wang, L. Chen, Z. Liu, The Pennsylvania State University, USA

11:40 AM

Ab-initio and Thermodynamic Modeling of the Boron-Carbon System

J. E. Saal*, Z. Liu, The Pennsylvania State University, USA

Fundamentals and Characterization: What We can Learn from Failure Analysis

Tools & Techniques

Room: D0-01A

Session Chairs: Charles Morin, Engineering Systems, Inc.; Debbie Aliya, Aliya Analytical, Inc.; Larry Hanke, Materials Evaluation and Engineering Inc.

8:30 AM

Introductory Remarks

8:40 AM

Application of Reverse Engineering Created Models to Failure Analysis Investigations (Invited)

R. H. McSwain*, M. B. Hood, E. L. Van Iderstine, W. D. Carden, C. C. Coburn, McSwain Engineering, Inc., USA

9:20 AM

3D Surface Micro-texture/Wear Measurement and Analysis (Invited)

D. Cohen*, Michigan Metrology, LLC, USA

9:40 AM

SEM Analysis of Wear Particles from Orthopaedic Implants (Invited)

F. Billi*, Dept. Orthopaedic Surgery - David Geffen School of, USA; W. J. Mershon, Tescan USA, USA

10:00 - 10:20 a.m.

Break

10:20 AM

Stress-Strain Microprobe[®] System: A New Tool for Nondestructive Determination of Key Mechanical Properties (Invited)

F. Haggag*, Advanced Technology Corporation, USA

10:40 AM

Measurement of Thermal Residual Stress Using the Strain Gauge Method (Invited)

C. R. Morin*, D. E. Alexander, M. T. Kenner, G. J. Novak, Engineering Systems, Inc., USA

11:00 AM

Contact and Non-Contact Dimensional Analysis in Forensic Investigations (Invited)

E. L. Van Iderstine*, R. H. McSwain, W. D. Carden, C. C. Coburn, McSwain Engineering, Inc., USA

11:20 AM

The Use of Non-Contact Dimensional Characterization in an Automotive Component Failure Analysis Investigation (Invited)

D. Alexander*, C. Morin, J. Eganhouse, Engineering Systems Inc., USA; J. Mass, Diverse Dimensions, Inc., USA

Materials and Systems: Commonality of Phenomena in Composite Materials

Fiber Reinforced Composites I

Room: O2-37

Session Chairs: Nik Chawla, Arizona State University; Pedro Portella, Fed Inst Materials Res & Testing

8:30 AM

Introductory Remarks

8:40 AM

Fiber Reinforced Titanium Matrix Composites: Production, Mechanical Testing and Damage Characterization (Invited)

P. D. Portella*, Fed Inst Materials Res & Testing BAM, Germany; P. W. Peters, J. Hemptenmacher, German Aerospace Center DLR, Germany; B. Skrotzki, B. Mueller, M. Hentschel, Fed Inst Materials Res & Testing BAM, Germany

9:20 AM

Characterization of Long Fiber Thermoplastic/Metal Laminates (LML)

R. R. Kulkarni*, K. K. Chawla, U. K. Vaidya, M. C. Koopman, A. W. Eberhardt, University of Alabama at Birmingham, USA

9:40 AM

The Effect of Quaternary Mo Additions on the Tensile and Creep Behavior of Ti-24Al-17Nb-xMo Atomic Percent Alloys and their SiC Continuous Fiber-Reinforced Composites

J. P. Quast*, C. J. Boehlert, Michigan State University, USA

10:00 - 10:20 a.m.

Break

10:20 AM

Failure of S2-Glass/Epoxy Composite Panels under Multi-Site Ballistic Impact (Invited)

U. K. Vaidya*, S. Bartus, L. Deka, University of Alabama at Birmingham, USA

11:00 AM

Microstructure and Fracture of Biomorphic Silicon Carbide-Aluminum Alloy Composites

T. E. Wilkes*, Northwestern University, USA; J. Pastor Cano, J. Llorca Martinez, Universidad Politecnica de Madrid, Spain; K. T. Faber, Northwestern University, USA

11:20 AM

A Study on the Application of Glass Fiber Mat Reinforced Thermoplastic Panel for a Scaffolding Floor

M. Ahn*, D. Kim, Y. Park, J. Joung, Hyundai Heavy Industries Co., Ltd., South Korea

11:40 AM

Effect of UV Exposure on the Microstructure and Mechanical Properties of Long Fiber Thermoplastic (LFT) Composites

A. Goel*, K. K. Chawla, U. K. Vaidya, D. Dean, M. C. Koopman, University of Alabama at Birmingham, USA

Materials and Systems: Glass and Optical Materials

Metallic Glasses

Room: O2-39

Session Chair: John Ballato, Clemson University

8:30 AM

Introductory Remarks

8:40 AM

Formation and Properties of Bulk Metallic Glasses in Ternary Ni-Nb-Zr Alloy System

Z. Zhu*, H. Zhang, B. Ding, Z. Hu, Institute of Metal Research, CAS, China, China

9:00 AM

Bulk Metallic Glasses and Synthesis by Chill Block Casting

N. S. Patki*, P. Kulakarni, S. Pawar, College of Engineering, India

9:20 AM

Experiments on High Strain-Rate Compression of a Zr-based Bulk Metallic Glass

G. Sunny*, V. Prakash, J. Lewandowski, Case Western Reserve University, USA

9:40 AM

Dynamic Response of a Zirconium-based Bulk Metallic Glass under Combined Pressure-shear Loading

F. Yuan*, V. Prakash, J. J. Lewandowski, Case Western Reserve University, USA

10:00 - 10:20 a.m.

Break

Novel Glasses and Fibers

Room: O2-39

Session Chair: Kathleen Richardson, Clemson University

8:30 AM

Introductory Remarks

10:40 AM

Processing and Characterization of Bulk Vitreous CdGe_xAs₂

B. R. Johnson*, B. J. Riley, J. V. Crum, S. K. Sundaram, R. M. Van Ginhoven, C. Seiferl, Pacific Northwest National Lab, USA; A. Aquino, D. Hebert, A. Rockett, University of Illinois at Urbana-Champaign, USA

11:00 AM

Infrared Spectra of Mixed Alkali Germanate Glasses

M. A. Ashton-Patton*, J. E. Shelby, New York State College of Ceramics, USA

11:20 AM

Elaboration and Characterization of Chalcogenide Photonic Crystal Fibers for Applications in Telecom and 3-5 microns Windows

F. Desevedavy*, P. Houzot, J. Troles, Laboratoire Verres et Ceramiques, UMR CNRS 6226, Universite de Rennes 1, France; F. Smehtala, Institut Carnot de Bourgogne, ICB UMR CNRS 5209, Universite de Bourgogne, France; L. Brilland, N. Traynor, PERFOS, 11 rue Louis de Broglie, France; G. Renversez, Institut Fresnel, UMR CNRS 6133, Universite Paul Cezanne Aix Marseille 3, France

11:40 AM

Synthesis and Densification of Lu₂SiO₅:Ce for Gamma-Ray Detection Applications

O. A. Graeve*, University of Nevada, Reno, USA; J. Tinsley, National Security Technologies, LLC, USA; B. Pearson, University of Nevada, Reno, USA

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

Introduction and Plenary I

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

Joe Farmer

8:40 AM

Characteristics and Applications of Fe-based Bulk Glassy Alloys Developed by Sendai Group (Invited)

A. Inoue*, Tohoku University, Japan

Synthesis, Characterization, Phase Stability & Neutronics I

Room: O2-40

Session Chair: Jor-Shan Choi, Lawrence Livermore National Laboratory

9:20 AM

Electronic Structure of Fe-Based Structural Amorphous Metals and Their Corrosion Properties

G. Shiflet*, S. Poon, University of Virginia, USA

10:00-10:20 a.m.

Break

10:20 AM

Assessing the Thermal Stability of Bulk Metallic Glasses for Nuclear Waste Applications (Invited)

K. Hildal, J. H. Perepezko*, University of Wisconsin-Madison, USA; L. Kaufman, Calphad Inc., USA

11:00 AM

Calculation of Kinetic Factors Controlling the Stability and Pourbaix Diagrams of HPCRM Alloys

L. Kaufman*, CALPHAD, Inc, USA; J. H. Perepezko, K. Hildal, University of Wisconsin, USA; J. Farmer, D. Day, Lawrence Livermore Labs, USA; N. Yang, Sandia National Labs, USA; D. Branagan, The NanoSteel Co, USA

11:20 AM

Maximizing the Glass Fraction in SAM2X5 HVOF Coatings (Invited)

D. Branagan*, The NanoSteel Company, USA; D. Swank, Idaho National Laboratory, USA; B. Meacham, The NanoSteel Company, USA

Materials and Systems: Thermal Shock Resistant Materials

Thermal Shock Resistant Materials I

Room: O2-38

Session Chair: Dinesh Agarwal, Pennsylvania State University

8:30 AM

Introductory Remarks

8:40 AM

Development of Advanced Ceramic Electrochemical Reactors and their Thermo-mechanical Properties (Invited)

M. Awano*, Y. Fujishiro, K. Hamamoto, T. Suzuki, T. Yamaguchi, National Institute of Advanced Industrial Science and Technology, Japan

9:20 AM

Probe Method for Local Uniformity within Particulate Filters

G. M. Crosbie*, Ford Motor Company, USA

9:40 AM

Development of a Thermal Shock Resistant ZrC-Mo Cermet for Ultra-High Temperature Applications

S. E. Landwehr*, G. E. Hilmas, W. G. Fahrenholtz, University of Missouri - Rolla, USA; I. G. Talmy, Naval Surface Warfare Center - Carderock Division, USA

10:00 - 10:20 a.m.

Break

10:20 AM

[NZP]: A Large Family of Low Thermal Expansion Materials (Invited)

D. Agrawal*, Pennsylvania State University, USA

11:00 AM

Thermal Shock Resistance of Silicon Carbide Derived from Wood

K. Pappacena*, K. T. Faber, Northwestern University, USA

11:20 AM

Plasma Spray Forming of Functionally Graded Yttria-Nickel-Alloy

S. Price*, D. Hirschfeld, New Mexico Institute of Mining and Technology, USA; K. Hollis, Los Alamos National Laboratory, USA

Nanotechnology: Nanostructured Ceramic Materials: Science and Technology

Synthesis and Processing of Nanopowders, Nanostructures, and Nanocomposites I

Room: W2-67

Session Chair: James Vartuli, GE Global Research

8:30 AM

Introductory Remarks

8:40 AM

Designed Multi-scale Materials: From Unique Properties to useful Applications (Invited)

C. Daniel*, Oak Ridge National Laboratory, USA

9:20 AM

Preparation of Nano-Crystalline Dense Ceramics from Nano-Tailored Perovskite Oxides Obtained via Low-Temperature Aqueous Synthesis (Invited)

M. Buscaglia, V. Buscaglia, CNR, Italy; L. Mitoseriu, Al. I. Cuza University, Romania; P. Nanni*, University of Genoa, Italy; M. Viviani, CNR, Italy

10:00 - 10:20 a.m.

Break

10:20 AM

In Situ Study of Formation of Agglomerates by Homogeneous Precipitation in Batch Reactor: Zinc Sulfide

M. Mekki Berrada*, F. Gruy, M. Cournil, Ecole des Mines, France

10:40 AM

Synthesis and Photocatalytic Activity of Brookite Phase TiO₂ Nanoparticles

R. Bhave, C. Nolph, S. Kaewgun, B. I. Lee*, Clemson University, USA

11:00 AM

Core-Shell Mixed-Metal Oxide Nanopowders Via Liquid-Feed Flame Spray Pyrolysis (LF-FSP)

M. Kim*, R. M. Laine, University of Michigan, USA

11:20 AM

Low Temperature Creep of Submicron and Nanograined Yttria Stabilized Tetragonal Zirconia Processed through Sinterforging

S. Ghosh*, A. H. Chokshi, Indian Institute of Science, India

11:40 AM

Two-Step Process to Prepare Cubic Hafnia, Zirconia, and Hafnia-Zirconia Nanoparticles

C. Lu, J. M. Raitano, S. Chan*, Columbia University, USA

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

Mechanics of Nanomaterials and Micro/Nanodevices - I

Room: W2-68

Session Chairs: Xiaodong Li, University of South Carolina; Ken Gall, Georgia Institute of Technology

8:30 AM

Introductory Remarks

8:40 AM

Measuring the Elastic Modulus and Residual Stress of Doubly-Clamped Bridges by Nanoindentation

E. Herbert, B. A. Crawford*, W. Oliver, MTS Nano Instruments, USA; G. Pharr, The University of Tennessee, USA

9:00 AM

Failure Mechanisms in Laser-Based Micro Bonding of Dissimilar Materials

G. Newaz*, T. Sultana, G. Auner, R. Baird, Wayne State University, USA; H. Herfurth, R. Patwa, Fraunhofer USA, USA

9:20 AM

Adhesion and Fracture in Non-Si Based MEMS (Invited)

D. F. Bahr*, M. S. Kennedy, J. D. Yeager, Washington State University, USA

10:00 - 10:20 a.m.

Break

10:20 AM

In-situ Observation of Deformation and Cracking of SnAgCu Lead Free Solder Alloy

Y. Sun*, Z. Xu, University of South Carolina, USA; J. Liang, EMC Corporation, USA; D. Shanguan, Flextronics, USA; X. Li, University of South Carolina, USA

10:40 AM

Developing Smart Liquids

Y. Qiao*, A. Han, University of California-San Diego, USA

11:00 AM

Effect of Vanadium Oxide Nanoparticles on Properties and Performance of Gold Thin Films (Invited)

R. P. Vinci*, T. Bannuru, Lehigh University, USA; S. Narksitpan, Chiang Mai University, Thailand; W. L. Brown, Lehigh University, USA

11:40 AM

Microscale Friction of Diamond-Like Carbon Coatings (Invited)

R. R. Chromik*, McGill University, Canada; K. J. Wahl, Naval Research Laboratory, USA

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

Properties of Fresh and Hardened Cement-Based Materials I

Room: O2-36

Session Chair: Joe Biernacki, Tennessee Technological University

8:30 AM

Introductory Remarks

8:40 AM

3D Geometric Descriptors of Internal Cracking in Mortar (Invited)

T. Zhang, Rensselaer Polytechnic Institute, USA; E. N. Landis*, University of Maine, USA; G. Nagy, Rensselaer Polytechnic Institute, USA

9:00 AM

Controlled Low Strength Materials Incorporating Cement Kiln Dust: A Feasibility Study

A. Loffy, K. M. Hossain*, M. Shehata, M. Lachemi, Ryerson University, Canada

9:20 AM

Evaluation of Clay Plasticizers for Extrusion of Cement-Based Materials

Y. Chen, L. J. Struble*, G. H. Paulino, University of Illinois at Urbana-Champaign, USA

9:40 AM

Dynamic Segregation of Self-Consolidating Concrete

L. Shen, L. Struble*, D. Lange, University of Illinois at Urbana-Champaign, USA

10:00 - 10:20 a.m.

Break

10:20 AM

Structural Rebuilding of Cementitious Materials Using Rheological and Particle Size Measurements

R. Ferron*, S. P. Shah, Northwestern University, USA

10:40 AM

Short-Term Tensile Creep of Ultra-High Performance Concrete

V. Y. Garas*, L. F. Kahn, K. Kurtis, Georgia Institute of Technology, USA

11:00 AM

Biofouling of Georgia's Highways: Microbial Identification and Mitigation

J. C. Kurth*, D. J. Giannantonio, P. A. Sobecky, K. E. Kurtis, Georgia Institute of Technology, USA

11:20 AM

Mechanical Performance of Concrete with Optimized Aggregate Gradation

M. D'Ambrosia*, D. Lange, University of Illinois, USA

11:40 AM

Determining Flocculation Strengths for Cement Paste

N. Tregger*, S. Shah, Northwestern University, USA

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

Joining of Steels (especially HSLA and AHSS) I

Room: O2-35

Session Chairs: Michael Kuntz, University of Waterloo; Michael Santella, Oak Ridge National Laboratory

8:30 AM

Introductory Remarks

8:40 AM

A General Discussion of the Resistance Spot Weldability of Advanced High Strength Steels for Automotive Applications (Invited)

S. C. Kelley*, Mittal Steel USA R&D, USA

9:20 AM

Continuous Cooling Transformation Diagrams in Welded Joints of High Strength Low Alloy Steels

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

Monday AM

9:40 AM

Friction Stir Spot Welding of Advanced High Strength Steels

M. Santella*, Oak Ridge National Laboratory, USA; G. Grant, Y. Hovanski, Pacific Northwest National Laboratory, USA

10:00 - 10:20 a.m.

Break

10:20 AM

Mechanical Performance of Resistance Spot Welds in Dissimilar AHSS Combinations

V. H. Baltazar Hernandez*, I. Khan, M. Kuntz, N. Zhou, University of Waterloo, Canada

10:40 AM

Effect of Weld Microstructure on the Static and Impact Performance of RSW

M. I. Khan*, M. Kuntz, N. Y. Zhou, University of Waterloo, Canada

11:00 AM

Weldability and Performance of GMAW Joints of Advanced High Strength Steels

Z. Feng*, Oak Ridge National Laboratory, USA; J. Chiang, Ford Motor Company, USA; C. Jiang, AET Integration, Inc, USA; M. Kuo, Mittal Steel, USA

11:20 AM

Weld Lobe Development and Assessment of Weldability of Common Automotive Studs and Nuts with Drawn Arc Welding Process

S. Ramasamy*, Emhart Teknologies, USA; B. Patel, American Welding Society, USA

11:40 AM

Fatigue Performance of AHSS GMAW Weld Lap Joints

J. Sang*, C. Jiang, AET Integration, Inc., USA; D. Anderson, C. Potter, American Iron and Steel Institute, USA

Processing and Product Manufacturing: Surface Engineering Using Hybrid Plasma Assisted PVD and CVD Technologies

Nanostructured Coatings

Room: O2-41

Session Chair: Vladimir Gorokhovskiy, Arcomac Surface Engineering, LLC.

8:30 AM

Introductory Remarks

8:40 AM

Synthesis, Characterization and Properties of Multifunctional, Nanocomposite DLC-based Thin Films (Invited)

E. I. Meletis*, University of Texas at Arlington, USA

9:20 AM

Effect of CO₂ Gas on Deposition of Reactively Sputtered Carbon Thin Films

T. McKindra*, M. O'Keefe, University of Missouri-Rolla, USA

9:40 AM

Nanocrystalline Diamond Coated Cutting Tools

J. Hu, K. Chou*, University of Alabama, USA; R. G. Thompson, Vista Engineering Inc., USA

10:00 - 10:20 a.m.

Break

10:20 AM

Micro and Nano Scale Applications of Nanocrystalline Diamond Films (Invited)

A. Kumar*, H. Jeedigunta, Z. Xu, University of South Florida, USA

11:00 AM

Filtered Arc and Hybrid Filtered Arc Assisted Technologies for Corrosion and Wear Resistant Coatings

R. J. Smith*, H. Chen, W. Priyantha, M. Kopczyk, J. Lucas, K. Lund, Montana State University, USA; M. Finsterbusch, TU Ilmenau, Germany; P. Gannon, P. White, M. C. Deibert, Montana State University, USA; A. Kayani, Western Michigan University, USA; V. Gorokhovskiy, Arcomac Surface Engineering, LLC, USA; V. Shutthanandan, Pacific Northwest National Laboratory, USA

11:20 AM

Thermochemical Modeling of Filtered Arc Nanocomposite Oxide Coatings

P. Gannon*, M. Deibert, R. Smith, Montana State University, USA; V. Gorokhovskiy, Arcomac Surface Engineering, LLC, USA; B. Trusov, Moscow State Technical University, Russian Federation

11:40 AM

Combined Magnetron Sputtering and Ion Implantation: A High Energy Ion Assisted Deposition Method for Producing Nanostructured Coatings

C. Ruset*, E. Grigore, National Institute for Laser, Plasma and Radiation Physics, Romania

The Profound Influence of Tony Evans on Engineering Use of Structural Materials

Stability of Coatings Under Extreme Environmental Effects

Room: M2-29

Session Chair: Arthur Heuer, Case Western Reserve University

8:30 AM

Introductory Remarks

8:40 AM

Oxidation-Induced Stresses in Ni-base Alloys (Invited)

A. H. Heuer*, Case Western Reserve University, USA

9:20 AM

Recent Advances in Piezo-Spectroscopy: From Fundamentals to Applications (Invited)

D. R. Clarke*, University of California, Santa Barbara, USA

10:00 - 10:20 a.m.

Break

10:20 AM

Internal Stresses and Phase Stability in Multiphase Environmental Barrier Coatings (Invited)

K. T. Faber*, C. M. Weyant, B. J. Harder, Northwestern University, USA; J. D. Almer, Argonne National Laboratory, USA

11:00 AM

Designing Tougher TBCs: Opportunities and Implications (Invited)

T. A. Schaedler, R. M. Leckie, C. G. Levi*, University of California, Santa Barbara, USA

Steel: 4th International Symposium on Railroad Tank Cars

4th International Symposium on Railroad Tank Cars I

Room: W2-70

Session Chairs: Murali Manohar, Arcelor Mittal; Pat Whelan, BNSF Railway

8:30 AM

Introductory Remarks

8:40 AM

Charpy Energy and Fracture Toughness of Steel in Railroad Tank Cars (Invited)

F. Zakar*, National Transportation Safety Board, USA

9:20 AM

The Design of the Next Generation Rail Tank Car (Invited)

H. Ward*, The Dow Chemical Company, USA; P. Student, Union Pacific Railroad, USA; C. Hybinette, Union Tank Car Company, USA

10:00 - 10:20 a.m.

Break

10:20 AM

Development and Validation of an Inexpensive Puncture Test for Railroad Tank Car Steels

P. C. McKeighan*, Southwest Research Institute, USA; T. L. Anderson, SRT/Quest, USA

10:40 AM

Tank Car Steels to Improve Performance

R. D. Sims*, Sims Professional Engineers, USA

11:00 AM

Inspection Tool for Tank Car Thermal Protection System

S. Wong*, Transport Canada, Canada

Steel: Recent Developments in Steel Processing

Casting

Room: W2-69

Session Chairs: Brian Nelson, Dofasco Inc; Dengqi Bai, IPSCO Inc.

8:30 AM

Introductory Remarks

8:40 AM

Modeling of Segregation at the Concentric Solidification Technique

S. Aminorroaya*, R. Dippenaar, University of Wollongong, Australia

9:00 AM

In-situ Observation of the Delta-ferrite to Austenite Phase Transition in Fe-C Alloys

S. Niknafs*, R. Dippenaar, University of Wollongong, Australia

9:20 AM

Embrittlement Mechanisms at High Temperatures for a C-Mn Steel with High Residuals Content

J. Calvo*, UPC, Spain; A. Rezaeian, McGill University, Canada; J. Cabrera, UPC, Spain; S. Yue, McGill University, Canada

9:40 AM

The Effect of Ladle Chemistry on Solid-Solid Interface Migration Kinetics in Iron Alloys

E. D. Schmidt*, N. Kikuchi, S. Sridhar, Carnegie Mellon University, USA

10:00 - 10:20 a.m.

Break

10:20 AM

Influence of Al/Zr Ratio and Operating Parameters on SEN Clogging during Continuous Casting of Zr-bearing Steel

B. Mukhopadhyay*, S. K. Ray, A. K. Bandyopadhyay, K. Patwari, RDCIS, SAIL, India

10:40 AM

Effect of Mould Taper, Mn/S Ratio and EMS on Quality of Continuously Cast Bloom

B. Mukhopadhyay*, S. K. Ray, A. K. Bandyopadhyay, K. Patwari, RDCIS, SAIL, India

11:00 AM

Influence of the Casting Conditions on Slab Quality of Low Carbon Steel

G. Wen*, P. Tang, G. Luo, H. Xu, Chongqing University, China; Z. Chen, Meishan Iron & Steel Co. of Baosteel (Group), China

11:20 AM

Study on Slab Quality Improvement under Unsteady Casting Condition

Z. Chen*, Northeastern University, China; G. Wen, Chongqing University, China; M. Zhu, Northeastern University, China

ASM/TMS Distinguished Lecture

Room: O2-44

Introductory Remarks – Lawrence Wagner, ASM Board of Trustees; Kevin Hemker, TMS Public & Governmental Affairs Committee

1:00 PM

Overview Lectureship in Materials and Society

Alan Taub, General Motors Corp.

ASM/TMS Distinguished Lecture Session

Room: O2-44

2:00 PM

Well-to-Wheels Analysis of Advanced Vehicle Technologies and Transportation Fuels (Invited)

M. Wang*, Argonne National Laboratory, USA

2:30 PM

Material Selection for Lighter-Weight Vehicles (Invited)

J. Fillion*, DaimlerChrysler, USA

Break

3:15 PM

Advanced Batteries for Vehicle Electrification (Invited)

Y. Chiang*, Massachusetts Institute of Technology, USA

3:45 PM

Vehicle Electrification Fuel Cell Propulsion Progress and Challenges (Invited)

J. Bereisa*, General Motors Corporation, USA

4:15 PM

Panel Discussion

Alpha Sigma Mu Lecture

Room: M2-30

Introductory Remarks – ASM President

3:00 PM

Nanomechanics of Biological Cells and Human Disease States (Invited)

S. Suresh*, Massachusetts Institute of Technology, USA

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

Processing and Properties of Advanced High Strength and Specialty Steels I

Room: W2-65

Session Chair: Paul Belanger, DaimlerChrysler Corporation

2:00 PM

Introductory Remarks

2:10 PM

Functional Improvement of Automotive High Strength Steel Grades by Niobium Microalloying

H. Mohrbacher*, CBMM, Germany

2:30 PM

Effects of Chemical Compositions and Annealing Conditions on Formability and Microstructure of Automotive Dual Phase Steel Sheets

Y. Ahn*, H. Kang, K. Chin, POSCO Technical Research Laboratories, South Korea

2:50 PM

Effect of Si, C, and Mn on the Formation of Bainite in FB Steels

J. Zhang*, Z. Chen, Automotive Steels Institute, R&D Centre, Baosteel, China

3:10 PM

Over-ageing Effects on Dual Phase Steel Microstructure and Mechanical Properties

X. Tao*, H. Kim, S. Biroasca, B. C. De Cooman, POSTECH, South Korea

3:30 - 3:50 p.m.

Break

3:50 PM

Microstructural Evolution in a New Generation Complex-Phase Steel

S. Sarkar*, F. Fazeli, W. J. Poole, M. Militzer, The University of British Columbia, Canada

4:10 PM

Dilatometric Study of the Recent Heat Treatment Quench and Partitioning(Q&P) and Its Application to the Low Carbon Steel

S. Kim*, H. Kim, B. C. De Cooman, POSTECH, South Korea

4:30 PM

Development of a High Strength, High Toughness Bainitic Steel

S. K. Putatunda*, Wayne State University, USA

4:50 PM

Effect of Aluminum Content on the Mechanical Properties of Dual Stabilized Ti-Nb Interstitial Free High Strength Steel (IF-HSS)

A. J. DeArdo, C. Garcia*, University of Pittsburgh, USA; H. Kang, K. Chin, POSCO, South Korea

5:10 PM

The Behavior of Deep Drawability in TS 440MPa Grade Dual Phase Steel Sheets

S. Han*, Y. Ahn, POSCO Technical Research Laboratories, South Korea; I. Kim, Pusan National University, South Korea; K. Chin, POSCO Technical Research Laboratories, South Korea

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

Armor / Armored Vehicles

Room: W2-63

Session Chair: Jim Edler, DaimlerChrysler

2:00 PM

Introductory Remarks

2:10 PM

Ductile Iron Castings for Military Vehicle Applications

A. P. Druschitz*, Intermet Archer Creek Foundry, USA; D. C. Fitzgerald, CA Tooling, USA; B. Schmidt, SE&M, USA

2:30 PM

Considerations for Various Ceramics in Multilayer Composite Ground Vehicle Armor

M. J. Clauson*, D. N. Rose, E. N. Bankowski, US Army RDECOM TARDEC, USA

2:50 PM

Ballistic Materials for Armored Vehicles (Invited)

R. Lottey*, T. Turi, Algoma Steel, Canada

3:10 PM

Next Generation High Technology Alloy Steels for Lightweight Armor Systems

P. Thompson*, P. Novotny, Carpenter Technology Corporation, USA

3:30 - 3:50 p.m.

Break

3:50 PM

DEFBAR ZOULINE: Ground Vehicle Armor for Modern Warfighters

M. J. Clauson*, US Army RDECOM TARDEC, USA; R. Labrash, DEFBAR LLC, USA; J. Percival, University of Missouri, USA; D. N. Rose, US Army RDECOM TARDEC, USA

4:10 PM

Function-Oriented Design of Innovative Composite Materials for High Speed Impact

H. Wang*, Y. Cui, MKP Inc., USA; Z. Ma, University of Michigan, USA; D. Rose, US Army Tank-Automotive and Armaments, USA

4:30 PM

Steels for Ballistic Protections from Deutsche Edelstahlwerke

P. Grueneberg*, Deutsche Edelstahlwerke GmbH, Germany

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

Formability and Deformation

Room: W2-62

Session Chair: Paul Krajewski, General Motors

2:00 PM

Introductory Remarks

2:10 PM

Investigation of the Liquid Impact Based Macro, Meso and Micro Forming Processes

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

2:30 PM**Effect of Coating Thickness on Formability of Galvanized Interstitial-Free Steel Sheets (Invited)**

R. K. Digavalli*, IIT Delhi, India

2:50 PM**The Effect of Adhesion and Tensile Properties on the Formability of Laminated Steels**

R. Ruokolainen*, D. R. Sigler, General Motors R&D, USA

3:10 PM**Enhancing Aluminum Formability through Control of Dislocation Substructure**

R. K. Mishra*, A. Sachdev, General Motors R&D Center, USA; S. Saimoto, Queen's University, Canada; K. Inal, University of Waterloo, Canada

3:30 - 3:50 p.m.**Break****3:50 PM****Characterization and Formability of 5182-6111 TWBs**

E. Stephens*, R. Davies, G. Grant, Pacific Northwest National Laboratory, USA

4:10 PM**Quantitative Study of Aluminum Alloy 3003-H111 Sheet Forming Methods**

M. Zampaloni*, F. Pourboghrat, Michigan State University, USA; J. Carsley, General Motors Technical Research Center, USA

4:30 PM**Quality of Trimming and its Effect on Stretch Flanging of Automotive Panels (Invited)**

S. F. Golovashchenko*, Ford Research & Advanced Engineering, USA

4:50 PM**Prototype Coil Performance during Electromagnetic Forming of Aluminum Sheet**

R. Davies*, Pacific Northwest National Laboratory, USA; N. Bessonov, Oakland University, USA; S. Golovashchenko, Ford Research & Advanced Engineering, USA

Automotive: Automotive Light Metal Castings: Technology and Applications**Integrated Computational Materials Engineering, Computational Materials Design and Applications**

Room: W2-64

Session Chairs: Zi-Kui Liu, The Pennsylvania State University; Qigui Wang, GM

2:00 PM**Introductory Remarks****2:10 PM****Virtual Aluminum Castings: Integrated Computational Materials Engineering in the Automotive Industry (Invited)**

J. E. Allison*, Ford Motor Company, USA

2:50 PM**Study on Nucleation Model and Microstructure Simulation of Al-7wt%Si-0.5wt%Mg Alloy for Low Pressure Casting (Invited)**

B. Li, Q. Xu, B. Liu*, Tsinghua University, China

3:30 - 3:50 p.m.**Break****3:50 PM****Properties of Individual Phases by First-Principles Calculations and CALPHAD Modeling (Invited)**

Z. Liu*, The Pennsylvania State University, USA

4:30 PM**Casting Performance Analysis of Aluminium and Magnesium Alloy Wheels using the Virtual Casting Methodology**

R. J. Lee*, D. Singh, AUT University, New Zealand

4:50 PM**Computer Simulation of Yield Strength in Automotive Components**

E. Prabhu*, M. Li, Ford Motor Company, USA

5:10 PM**Thermal Growth and Its Application in Engine Operation Analysis**

X. Chen, Ford Motor Company, USA; P. Gustafson, University of Michigan, USA; M. Li, X. Su*, J. Allison, Ford Motor Company, USA

5:30 PM**Residual Stress Analysis of Air Cooled Aluminum Engine Cylinder Head**

X. Su*, J. Lasecki, J. Jan, C. Engler, J. Allison, Ford Motor Company, USA

Automotive: High-Density Hydrogen Storage for Automotive Applications: Materials and Methods**Complex Hydrides II**

Room: W2-66

Session Chair: Lennie Klebanoff, Sandia National Laboratories

2:00 PM**Introductory Remarks****2:10 PM****Development of Anionic Transition Metal Borohydride Complexes as Hydrogen Storage Materials (Invited)**

C. M. Jensen*, J. Eliseo, G. Severa, University of Hawaii, USA

2:50 PM**Nanostructured Materials for Hydrogen Storage (Invited)**

B. Clemens*, S. T. Kelly, Y. Lee, R. D. Kelekar, Stanford University, USA

3:30 - 3:50 p.m.**Break****3:50 PM****Magnesium Borohydride as a Hydrogen Storage Material (Invited)**

G. Soloveichik*, GE Global Research, USA

4:30 PM**Hydride Decomposition Enthalpy Estimates From Global Optimization of Complex Hydride Crystal Structures (Invited)**

E. Majzoub*, Sandia National Laboratories, USA; V. Ozolins, University of California, USA

Electronic and Magnetic Properties: Basic and Applied Needs for Superconductivity

YBCO and Flux Pinning

Room: D2-11

Session Chairs: Winnie Wong-Ng, NIST; Mariappan Paranthaman, Oak Ridge National Laboratory

2:00 PM

Introductory Remarks

2:10 PM

Status and Future Outlook of Superconductivity Program at DOE (Invited)

D. Haught^{*}, US Department of Energy, USA

2:30 PM

Enhancement and Analysis of Flux Pinning in YBa₂Cu₃O₇ Films by Nanoparticle-Modified Substrate Surfaces

T. Aytug^{*}, M. Paranthaman, H. M. Christen, K. Kim, S. H. Wee, K. J. Leonard, A. A. Gapud, P. M. Martin, A. Goyal, Oak Ridge National Laboratory, USA; A. O. Ijoduola, J. R. Thompson, University of Tennessee, USA; D. K. Christen, Oak Ridge National Laboratory, USA; R. Meng, I. Ruskova, University of Houston, USA; Y. L. Zuev, Oak Ridge National Laboratory, USA

2:50 PM

Manipulation of Pinning Properties in Superconducting Films through Different Approaches (Invited)

Q. Jia^{*}, Los Alamos National Lab, USA; D. B. Jan, Univ. of Michigan, USA; J. Y. Coulter, Los Alamos National Lab, USA; H. P. Sun, X. Q. Pan, Univ. of Michigan, USA; S. R. Foltyn, M. P. Maley, Los Alamos National Lab, USA

3:30 - 3:50 p.m.

Break

3:50 PM

Transport, Structural and Microstructural Characterization of High-Performance, Epitaxial Y_{1-x}Sm_xBa₂Cu₃O₇ Thick Films on IBAD MgO on Hastelloy Substrates

A. Goyal^{*}, J. Li, E. D. Specht, P. M. Martin, M. Paranthaman, Oak Ridge National Laboratory, USA

4:10 PM

Flux Pinning and Grain Boundary Enhancements of YBCO with Nanoscale Multilayer Films (Invited)

T. Haugan^{*}, N. A. Pierce, F. J. Baca, M. J. Mullins, T. A. Campbell, M. F. Locke, I. Maartense, A. D. Chaney, P. N. Barnes, The Air Force Research Laboratory, USA; H. Wang, Texas A&M Univ., USA; C. Kwon, California State Univ. Long Beach, USA; M. D. Sumption, The Ohio State Univ., USA

4:30 PM

Path for Improvements in Superconducting Materials by Understanding the Mechanism (Invited)

Q. Li^{*}, Brookhaven National Lab, USA

4:50 PM

Flux Pinning Mechanisms in YBCO+ BaSnO₃ Films and Properties of YBa₂Cu₃O_{7-x} Coated Conductors Processed with BaSnO₃ and Y₂BaCuO₅ Nanoparticles Using Dual Phase Sector PLD Target Method (Invited)

C. Varanasi^{*}, J. Burke, L. Brunke, University of Dayton Research Institute, USA; P. N. Barnes, Air Force Research Laboratory, USA; M. Sumption, The Ohio State University, USA; H. Wang, Texas A&M University, USA

Electronic and Magnetic Properties: Ferroelectrics and Multiferroics

Multiferroics, Nanoscale Structures and Properties

Room: D2-10

Session Chairs: Dwight Viehland, Virginia Tech; Chonglin Chen, University of Texas at San Antonio

2:00 PM

Introductory Remarks

2:10 PM

Phase-Field Simulations of Ferroelectric Domain Morphologies and Polarization Switching of Epitaxial BiFeO₃ Thin Films

J. Zhang^{*}, Y. Li, S. Choudhury, Penn State University, USA; Y. Chu, M. P. Cruz, F. Zavaliche, University of California, USA; Q. Jia, Los Alamos National Laboratory, USA; D. G. Schlom, Penn State University, USA; R. Ramesh, University of California, USA; L. Chen, Penn State University, USA

2:30 PM

Dielectric Studies on Ferromagnetic SrBi_{5-x}LaxFeTi₄O₁₈

S. V. Shambuni^{*}, Swarna Bharati Inst of Science and Technology, India; E. v. Ramana, T. Bhimasankaram, Osmania University, India

2:50 PM

Phase Transition Studies in Epitaxially Grown BiFeO₃ Thin Films by Raman Spectroscopy (Invited)

R. S. Katiyar^{*}, M. K. Singh, R. Palai, University of Puerto Rico, Puerto Rico

3:30 - 3:50 p.m.

Break

3:50 PM

Cryo In-Situ TEM Study of the Electric Field Induced Phase Transition in La-Substituted Pb(Mg_{1/3}Nb_{2/3})O₃ Ceramics

W. Qu^{*}, X. Zhao, X. Tan, Iowa State University, USA

4:10 PM

The Microstructure of Epitaxial BiFeO₃ Thin Films Grown on (001) and (111) SrTiO₃ Substrates

Y. Chen^{*}, X. Pan, University of Michigan, USA; J. Ihlefeld, D. Schlom, The Pennsylvania State University, USA

4:30 PM

Magnetism and Anisotropic Magnetoresistance in Charge-Ordering Na-Co-O System: Strong Spin-Charge Coupling and Spin Ordering (Invited)

X. Chen^{*}, University of Science & Technology of China, China

5:10 PM

Phase-Field Prediction of Enhanced Piezoelectric Response in Ferroelectric Islands

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

5:30 PM

Nanoscale Ferroelectric Domain Dynamics via 10 frame/sec SPM Imaging

R. Nath^{*}, N. Polomoff, K. Bagnoli, D. Shuman, M. Zhao, B. D. Huey, University of Connecticut, USA

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

Ferroelectric Relaxors, Single Crystals, and Novel Compositions

Room: D2-09

Session Chairs: Ruyan Guo, Penn State Univ; Satoshi Wada, University of Yamanashi; Toshio Ogawa, Shizuoka Institute of Science and Technology

2:00 PM

Introductory Remarks

2:10 PM

Relationships between Giant Piezoelectricity on k31 and k33 Modes in Relaxor Single Crystals (Invited)

T. Ogawa*, Shizuoka Institute of Science and Technology, Japan

2:30 PM

Dielectric Relaxation and Ferroelectric Phase Transition Behavior in PFW-PT Thin Films (Invited)

R. S. Katiyar*, N. M. Murari, A. Kumar, University of Puerto Rico, Puerto Rico

2:50 PM

Giant Dielectric Response in Ba(Fe_{1/2}Ta_{1/2})O₃ Ceramics (Invited)

X. Chen*, Z. Wang, Zhejiang University, China

3:10 PM

New Aspects on the Processing and Properties of Transparent Ferroelectric Ceramics (Invited)

D. Garcia*, E. R. Botero, F. B. Londono, R. Favaretto, J. de Souza, M. H. Lente, J. A. Eiras, Federal University of Sao Carlos, Brazil; A. S. Camargo, L. A. Nunes, University of Sao Paulo, Brazil; I. A. dos Santos, Maringa State University, Brazil

3:30 - 3:50 p.m.

Break

3:50 PM

Polarization Effect on the Voltage-Tunability of Na_{0.5}Bi_{0.5}TiO₃-Based Systems (Invited)

D. Suvorov*, M. Spreitzer, B. Jancar, Jozef Stefan Institute, Slovenia

4:10 PM

Crystal Oriented Piezoelectric Ceramics Prepared by Using a Rotating High Magnetic Field

S. Tanaka*, A. Makiya, Z. Kato, K. Uematsu, Nagaoka University of Technology, Japan

4:30 PM

Growth of Cubic Boron Nitride Thin Films on Silicon and, Polycrystalline and Single Crystal Diamond, by ECR-MPECVD

R. S. Kukreja*, R. N. Singh, University of Cincinnati, USA

4:50 PM

Novel Class of Capacitor Materials

G. D. Singh*, UP Power Corporation Ltd, India

5:10 PM

Growth, Characterization and Transport Properties of PbxZn_{1-x}S Mixed Crystals

R. Bhukya*, M. Nagabhushanam, E. Nagabhushan, ; K. Yadaiah, S.V. College, India

5:30 PM

Composition and Substrate Dependences of Dielectric Tunability in Bi-Zn-Nb-O Pyrochlore Films Prepared by MOCVD (Invited)

H. Funakubo*, S. Okaura, Tokyo Institute of Technology, Japan; H. Uchida, S. Koda, Sophia University, Japan; M. Osada, National Institute for Materials Science, Japan; K. Nishida, Kochi University of Technology, Japan

Energy: Encapsulation and Immobilization of Hazardous and Nuclear Wastes Using Ceramics, Glass and Other Materials

Use of Analytical Techniques in Nuclear Waste Disposal 2

Room: D2-12

Session Chair: Allen Apblett, Oklahoma State University

2:00 PM

Introductory Remarks

2:10 PM

Glovebox ICP – OES Instrumentation for the Analysis of Nuclear Materials

P. G. Brown*, Teledyne Leeman Labs, USA

2:50 PM

Utilizing Statistics to Determine How Much Sampling and Analysis is Warranted to Support Savannah River Site (SRS) High Level Waste (HLW) Sludge Batch Preparation

B. A. Hamm*, T. B. Edwards, S. H. Reboul, P. J. Hill, Washington Savannah River Company, USA

3:10 PM

Laser Induced Breakdown Spectroscopy (LIBS): Application to Slurry Sample

S. Oh, F. Yueh, J. P. Singh*, Mississippi State University, USA; K. Zeigler, D. Peeler, C. Herman, S. Marra, Savannah River National Laboratory (SRNL), USA

3:30 - 3:50 p.m.

Break

3:50 PM

Analyses Supporting Closure of Savannah River Site (SRS) Underground Tanks Used for Radioactive Waste Storage

S. H. Reboul*, H. Q. Tran, B. A. Martin, J. L. Newman, K. H. Rosenberger, P. J. Hill, WSRC, USA

4:10 PM

Metallo-organic Processes for Encapsulation of Radionuclides in Ceramic Waste Forms

A. Apblett*, Oklahoma State University, USA

4:30 PM

Development of a New Zirconolite Base Glass-Ceramic for Immobilization of Radioactive Waste

M. Mahmoudysepahr*, V. Marghussian, J. Javadpour, Iran University of Science and Technology, Iran; H. Kazemian, Jaber Ibn Hayan Research Labs, Iran

4:50 PM

Accelerated Weathering of Fluidized Bed Steam Reformation Material under Hydraulically Unsaturated Conditions

E. M. Pierce*, Pacific Northwest National Laboratory, USA

Monday PM

Energy: Energy Materials

Thermoelectric Materials II

Room: D2-13

Session Chairs: Fred Dynys, NASA Glenn; Ali Sayir, NASA Glenn Research Center

2:00 PM

Temperature Dependence of Elastic Moduli of LAST/LAST-T Thermoelectric Materials

F. Ren*, E. D. Case, Michigan State University, USA; R. M. Trejo, E. Lara-Curzio, Oak Ridge National Laboratories, USA; E. J. Timm, Michigan State University, USA

2:20 PM

Mechanical Properties of LAST (Lead-Antimony-Silver-Tellurium) Thermoelectric Materials Fabricated via Slow-Cool Casting

F. Ren*, B. D. Hall, J. E. Ni, E. D. Case, E. J. Timm, H. J. Schock, Michigan State University, USA

2:40 PM

Developing Ultrahigh Performance Thermoelectric Systems

Y. Qiao, A. Han*, UCSD, USA

Characterization Methods

Room: D2-13

Session Chairs: Marie-Helene Berger, MinesParis ParisTech; Fred Dynys, NASA Glenn

3:50 PM

Introductory Remarks

4:00 PM

The State of the Art and the Art of the Possible Using X-Ray Diffraction Residual Stress Measurement Technologies in Power Generation

J. Pineault, Proto Mfg. Inc., USA; R. Drake*, Proto Mfg. Ltd., Canada; M. Belassel, M. Brauss, Proto Mfg. Inc., USA

4:20 PM

Fracture Mechanical Characterization of Porous Cordierite Ceramics

A. Shyam*, E. Lara-Curzio, T. R. Watkins, Oak Ridge National Laboratory, USA

4:40 PM

A Micro-Indentation Method for Degradation Evaluation of TBC Bond Coat

C. Feng, West Virginia University, USA; M. Alvin, National Energy Technology Laboratory, USA; B. S. Kang*, West Virginia University, USA

5:00 PM

Heat Capacities Measurements of Li-Based Hydrogen Storage Materials

S. C. Divi*, R. Chellappa, D. Chandra, University of Nevada, USA

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

Cell Materials, Performance, Degradation, Manufacturing of High Temperature FCs I

Room: D2-14

Session Chairs: Arumugam Manthiram, University of Texas at Austin; Ayyakkannu Manivannan, U.S. Dept. of Energy

2:00 PM

Introductory Remarks

2:10 PM

Effect of Natural Gas Composition on Stability of Solid Oxide Fuel Cells

D. Bierschenk*, M. Pillai, Y. Lin, S. Barnett, Northwestern University, USA

2:30 PM

Effect of Catalytic Nanoparticles on Anode Performance in Solid Oxide Fuel Cells

B. Angoua*, J. Reding, E. Slamovich, Purdue University, USA

2:50 PM

Evaluation of New Ni-Fe/YSZ Composites as Solid Oxide Fuel Cell Anode Material

J. L. Batey*, Tennessee Technological University, USA

3:10 PM

Optimization of Screen Printed LSM-YSZ Cathodes

M. Wandel*, A. Kaiser, M. Mogensen, Risø National Laboratory, Technical University of Denmark – DTU, Denmark

3:30 - 3:50 p.m.

Break

3:50 PM

Structure-Performance Correlations for Mixed-Conducting SOFC Cathodes

A. T. Duong*, D. R. Mumm, University of California, Irvine, USA

4:10 PM

Electrode-Electrolyte Stability in Solid Oxide Fuel Cells

J. W. Fergus*, Auburn University, USA

4:30 PM

Cost-Effective Synthesis of α -LiAlO₂ Powder for Molten Carbonate Fuel Cell Matrices

H. Choi*, J. Lee, S. Hyun, Yonsei University, South Korea; H. Im, Korea Electric Power Research Institute, South Korea

4:50 PM

Thermodynamic Modeling and Testing of SC-SOFC Ni Anode in a H₂/O₂ Environment

I. D. Kellogg*, U. O. Koylu, V. Petrovsky, F. Dogan, University of Missouri-Rolla, USA

5:10 PM

Liquid Tin Anode Solid Oxide Fuel Cell Anode Polarization and Performance

M. Koslowski*, T. Tao, M. Slaney, L. Bateman, CellTech Power LLC, USA

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

Automotive Materials: Keynote Session II

Room: D0-07B

Session Chair: Edmund Chu, Alcoa Technical Center

2:00 PM

Introductory Remarks

2:10 PM

**Evolution of Software for Large Scale Numerical Simulations
(Invited)**

J. O. Hallquist*, LSTC, USA

2:50 PM

Digital Body Development System (Invited)

R. J. Gerth*, Center for Automotive Research, USA

3:10 PM

**New Lightweight Materials - A Stamping CAE Perspective
(Invited)**

L. B. Chappuis*, Ford Motor Company, USA

3:30 - 3:50 p.m.

Break

3:50 PM

**Direct Measurement of the Evolution of the Multiaxial Yield Loci
With Increasing Plastic Strain Level in Sheet Metal (Invited)**

T. Foecke*, M. Iadicola, S. Banovic, NIST, USA

4:10 PM

Springback Prediction in Metal Forming Simulation (Invited)

C. Sa*, General Motors, USA

4:30 PM

**Failure Mechanisms and Prediction for Dual-Phase Steels
(Invited)**

C. Xia*, Ford Motor Company, USA

4:50 PM

**Crack Initiation and Propagation in Advanced High Strength
Steels (Invited)**

X. Wu*, Y. Zhang, Y. Liu, Wayne State University, USA

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

Application of Atomistic Modeling for the Design of Materials II

Room: D0-05AB

Session Chair: Anton Van der Ven, The University of Michigan

2:00 PM

Introductory Remarks

2:10 PM

**Ab-Initio Molecular Dynamics Simulations of Molten
Superalloys (Invited)**

M. Asta*, University of California at Davis, USA; D. Trinkle, University of Illinois at Urbana-Champaign, USA; C. Woodward, Air Force Research Laboratory, USA

2:50 PM

**The Effects of Hydrostatic Pressure, and Near-Neighbor [Pb-O]
Divacancy Pairs, on the Ferroelectric-Relaxor Transition in
Pb(Sc_{1/2}Nb_{1/2})O₃ (Invited)**

B. P. Burton*, S. Tinte, E. Cockayne, NIST, USA

Computational Materials Science and its Impact in the Education of Future Gen- erations of Materials Scientists and Engineers

Room: D0-05AB

Session Chairs: Edwin Garcia, Purdue University; Katsuyo Thornton, University of Michigan

3:40 PM

Introductory Remarks

3:50 PM

**Cybertools for Materials Research, Education, and
Collaboration (Invited)**

S. Glotzer*, C. R. Iacovella, University of Michigan, USA

4:10 PM

Innovations in Materials Design Education (Invited)

G. B. Olson*, Northwestern University, USA

4:50 PM

Models for Teaching Materials Modeling (Invited)

M. Asta*, University of California at Davis, USA

5:10 PM

**Deploying Computational Science and Engineering Learning
Experiences in Introductory Engineering and Materials Science
Courses (Invited)**

M. L. Falk*, University of Michigan, USA

5:30 PM

**MatCASE: Building the Foundation for Materials Design
(Invited)**

Z. Liu*, The Pennsylvania State University, USA

Fundamentals and Characterization: Frontiers in Materials Science: Materials for Sports and Medicine

Implant Performance

Room: D0-03A

Session Chairs: Srinath Viswanathan, University of Alabama; Hamish Fraser, Ohio State University

2:00 PM

Introductory Remarks

2:10 PM

**Nanostructured Titanium: Application in Dental Implants
(Invited)**

H. Rack*, Clemson University, USA; J. Petruzzelka, VSB-Tech. Univ Ostrava, Czech Republic; L. Dluhos, Timplant, Czech Republic; D. Hrusak, FN Plzen, Czech Republic; J. Sochova, Timplant, Czech Republic; I. Semenova, R. Z. Valiev, Ufa State Aviation Technical University, Russian Federation; Y. Zhu, T. Lowe, Los Alamos National Laboratory, USA

2:50 PM

**Laser Deposited Functionally Graded Unitized Implants
(Invited)**

S. Nag*, The Ohio State University, USA; R. Banerjee, University of North Texas, USA; H. Fraser, The Ohio State University, USA

3:30 - 3:50 p.m.

Break

3:50 PM

Design and Development of Metal – Polymer Film Systems for Flexible Electrodes Used in Cortical Mapping

J. D. Yeager, D. F. Bahr*, D. M. Rector, Washington State University, USA

4:10 PM

Finite Element Analysis of PMMA Reinforced Osteoporotic Femurs

M. N. Shaw*, Mayo Clinic, USA; M. E. Bolander, Mayo Clinic College of Medicine, USA; K. E. Bennet, S. McEligot, Mayo Clinic, USA; J. T. Bronk, Mayo Clinic College of Medicine, USA; M. J. Burke, D. M. Dragomir-Daescu, Mayo Clinic, USA

4:30 PM

Structural Diagnostics for Osseointegrated Implants: Achieving a Successful Solid Foundation for Advanced Prosthetics

J. C. Earthman*, University of California, USA

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

Transport I

Room: D0-03C

Session Chairs: Harry Tuller, MIT; Michael Schroeder, RWTH Aachen

2:00 PM

Introductory Remarks

2:10 PM

Role of Mixed Valent Ions in Mixed Conducting Ceria (Invited)

H. L. Tuller*, MIT, USA

2:50 PM

Transport Studies of Novel Non-d¹⁰ P-type Transparent Conducting Oxides ZnM₂O₄ (M=Rh, Ir)

S. Wansom*, N. Mansourian-Hadavi, T. O. Mason, Northwestern University, USA

3:10 PM

Simultaneous Measurements of Electrical Conductivity and Seebeck Coefficient in Yb³⁺-Doped BaPrO₃

S. Mimuro, K. Tanaka, Y. Oyama, University of Tokyo, Japan; K. Kobayashi, National Institute for Materials Science, Japan; S. Yamaguchi*, University of Tokyo, Japan

3:30 - 3:50 p.m.

Break

3:50 PM

Modelling of Oxygen Permeation through BaFe_xCo_yZr_zO_{3-δ} Hollow Fiber Membranes (Invited)

Y. Byun, M. Schroeder*, RWTH Aachen, Germany

4:30 PM

Novel Approach to Local Electrical Property Determination in Nanocrystalline YSZ

N. H. Perry*, T. O. Mason, Northwestern University, USA

4:50 PM

Study of Self Diffusion of Iron and Nitrogen Simultaneously in Amorphous Iron Nitride

S. Chakravarty*, UGC-DAE Consortium For Scientific Research, India; M. Gupta, UGC-DAE Consortium for Scientific Research, India; S. Rajagopalan, A. K. Balamurugan, A. K. Tyagi, Indira Gandhi Centre For Atomic Research, India

Fundamentals and Characterization: Phase Stability, Diffusion and Their Applications

First Principle Predictions of Phase Stability and Kinetics II

Room: D0-04ABC

Session Chairs: Nils Sandberg, Physics; Anton Van der Ven, The University of Michigan

2:00 PM

Introductory Remarks

2:10 PM

First-Principles Prediction of Phase Stability, Diffusion Coefficients and Phase Transformations in Non-Dilute, Multi-Component Solids (Invited)

A. Van der Ven*, The University of Michigan, USA

2:50 PM

Precipitation Kinetics in Steel: From Atomistic Modelling to Analytic Laws (Invited)

P. Maugis*, Arcelor Research, France

3:30 - 3:50 p.m.

Break

3:50 PM

Alpha Particle Diffusion in Molybdenum

O. Runevall*, N. Sandberg, Royal Institute of Technology, Sweden

4:10 PM

A Study of Diffusion with Surfaces in Substitutional Alloy Systems

H. Yu*, D. Yeon, A. Van der Ven, K. Thornton, University of Michigan, USA

4:30 PM

Self-Diffusion in Niobium

C. Lagerstedt*, N. Sandberg, Royal Institute of Technology, Sweden

4:50 PM

Thermodynamics of Nonequilibrium Partitioning During Crystallization of Highly Undercooled Al-Sm Melts

S. Zhou*, Ames Laboratory-US DOE, USA; R. E. Napolitano, Iowa State University, USA

5:10 PM

First-Principles Investigations of Temperature-Dependent Bulk and Surface Phonon Properties of Copper: Implications for the Origin of Melting

S. Shang*, Y. Wang, Z. Liu, Pennsylvania State University, USA

Fundamentals and Characterization: What We can Learn from Failure Analysis

Automotive Systems and Components

Room: D0-01A

Session Chairs: Debbie Aliya, Aliya Analytical, Inc.; Tim A. Jur, Engineering Design & Testing Corp.; Alan Johnson, Metals Research Inc.

2:00 PM

Introductory Remarks

2:10 PM**Fatal Highway Accident Possibly Caused by the Fracture of a Pearlitic Gray Cast Iron Brake Drum (Invited)**

A. A. Johnson*, Metals Research Inc., USA; R. J. Storey, University of Louisville, USA

2:50 PM**Failure Analysis of Friction Weld (FRW) in Truck Axle Application**

Y. Huang*, Key Safety Systems, Inc., USA; J. Yang, The Coldheading Company, USA

3:10 PM**Use of Metallurgical Analysis to Pinpoint a Brake Problem and the Cause of a Bus Fire**

R. A. Hargis*, T. A. Jur, Engineering Design & Testing Corp., USA

Break**3:50 PM****Analysis of Transport Trailer Front End Structures**

R. D. Harris*, P. V. Young, Engineering Design & Testing Corp., USA

4:30 PM**Failure Analysis of Automotive Suspension Coil Springs**

Y. Prawoto*, M. Ikeda, S. K. Marville, NHK International, USA; A. Nishikawa, NHK Spring Corp, Japan

4:50 PM**Design Philosophies for Automotive Structural Applications (Invited)**

D. Aliya*, Aliya Analytical, Inc., USA

Materials and Systems: Commonality of Phenomena in Composite Materials**Nanocomposites I**

Room: O2-37

Session Chairs: Nikhil Koratkar, RPI; Yu-Lin Shen, University of New Mexico

2:00 PM**Introductory Remarks****2:10 PM****Indentation Response of Nanolayered Composites: A Continuum Modeling Perspective (Invited)**

Y. Shen*, G. Tang, University of New Mexico, USA; N. Chawla, D. Singh, Arizona State University, USA

2:50 PM**Deformation Behavior of Nanolayered Metal-Ceramic Laminated Composites**

D. R. Singh*, N. Chawla, Arizona State University, USA; G. Tang, Y. Shen, The University of New Mexico, USA

3:10 PM**Improved Fatigue Behavior of Alumina/Epoxy Nanocomposites**

S. Zhao*, L. S. Schadler, Rensselaer Polytechnic Institute, USA; H. Hillborg, T. Auletta, ABB Corporate Research, Sweden

3:30 - 3:50 p.m.**Break****3:50 PM****Characterizing Interfacial Friction Damping in Carbon Nanotube Composites (Invited)**

N. Koratkar*, Rensselaer Polytechnic Institute, USA

4:30 PM**Using the Interface to Control Polymer Nanocomposite Properties (Invited)**

L. Schadler*, Rensselaer Polytechnic Institute, USA; S. L. Lewis, Applied Nanoworks, USA; Y. Li, Rensselaer Polytechnic Institute, USA; P. Akcora, S. K. Kumar, Columbia University, USA; B. C. Benicewicz, Rensselaer Polytechnic Institute, USA

Materials and Systems: Glass and Optical Materials**ACerS Alfred R. Cooper Session and Award**

Room: O2-39

Session Chairs: Prabhat Gupta, Ohio State University; Arun Varshneya, Alfred University

2:00 PM**Introductory Remarks****2:10 PM****Life and Science of Al Cooper (Invited)**

A. H. Heuer*, Case Western Reserve University, USA

2:50 PM**Alfred R. Cooper: Topological Tales (Invited)**

A. Wright*, University of Reading, United Kingdom

3:30 - 3:50 p.m.**Break****3:50 PM****A.R. Cooper's Contributions to Glass Technology (Invited)**

M. Cable*, University of Sheffield, United Kingdom

4:30 PM**Ion-Exchange in Glass (Invited)**

G. Frischat*, Technische Universitaet Clausthal, Germany

Cooper Student Award Ceremony**Prabhat Gupta and Arun Varshneya****Materials and Systems: Iron-Based Amorphous Metals: An Important Family of High-Performance Corrosion-Resistant Materials****Corrosion Resistance I**

Room: O2-40

Session Chair: Joe Payer, Case Western Reserve University

2:00 PM**Introductory Remarks**

Joe Payer

2:10 PM**Iron-Based Metallic Glasses with Exceptional Localized Corrosion Resistance in Chloride-Based Solutions (Invited)**

R. Huang, D. Horton, F. Bocher, J. R. Scully*, University of Virginia, USA

2:40 PM**Corrosion Resistance of Fe-Based Amorphous Metals:****Fe_{49.7}Cr_{17.7}Mn_{1.9}Mo_{7.4}W_{1.6}B_{15.2}C_{3.8}Si_{2.4}, Fe₄₈Mo₁₄Cr₁₅Y₂C₁₅B, and Other Compositions (Invited)**

J. C. Farmer*, J. J. Haslam, S. D. Day, T. Lian, C. K. Saw, P. D. Hailey, J. Choi, R. B. Rabak, Lawrence Livermore National Laboratory, USA; J. H. Payer, Case Western Reserve University, USA

3:30 - 3:50 p.m.

Break

3:50 PM

Industrial Environmental Testing of Coupons and Prototype Cylinders Coated With Iron-Based Amorphous Alloys

R. B. Rebak*, Lawrence Livermore National Laboratory, USA; L. F. Aprigliano, Consultant, USA; D. Day, T. Lian, J. C. Farmer, Lawrence Livermore National Laboratory, USA

4:10 PM

Examination of Galvanic Action between Fe-Based Amorphous Metals and Commercial Alloys

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

4:30 PM

Effects of Various Alloying Elements on the Corrosion Performance of High-Boron Iron-Based Amorphous Metals: Studies of Nickel, Molybdenum and Yttrium

T. Lian*, S. D. Day, P. D. Hailey, J. Choi, J. C. Farmer, Lawrence Livermore National Laboratory, USA

Mechanical Properties & Damage Tolerance I

Room: O2-40

Session Chair: John Lewandowski, Case Western Reserve University

4:50 PM

Thermal Exposure Effects on Mechanical Behavior of Iron-Based Metallic Glass

A. Shamimi*, J. J. Lewandowski, Case Western Reserve University, USA

5:10 PM

Quasi-static and Dynamic Compression of Fe-based Bulk Metallic Glass

G. Sunny*, A. Shamimi, V. Prakash, J. Lewandowski, Case Western Reserve University, USA

Materials and Systems: Thermal Shock Resistant Materials

Thermal Shock Resistant Materials II

Room: O2-38

Session Chairs: Dinesh Agarwal, Pennsylvania State University; Rama Nageswaran, Smaht Ceramics, Inc.

2:00 PM

Introductory Remarks

2:10 PM

Thermal Shock Resistance in Particulate Reinforced Ceramics (Invited)

V. Ravi*, California State Polytechnic University, USA; T. D. Claar, LightWeight Solutions, Inc., USA

2:50 PM

Analysis of Thermal Stress in a Honeycomb Structure (Invited)

M. Miyazaki*, NGK Insulators, Ltd., Japan

Nanotechnology: Materials Characterization at the Nanoscale: Instrumentation and Applications

Particulate Materials

Room: W2-61

Session Chair: James Adair, Penn State University

2:00 PM

Introductory Remarks

2:10 PM

Nanoparticle Characterization for Improving Material Properties (Invited)

M. Naito*, H. Abe, Osaka University, Japan

2:50 PM

Characterization of Particle Size Distribution of Nano-scale Tungsten Powders and Ultra-fine Tungsten Powders by Small Angle X-ray Scattering Method

Z. Lihui*, S. Guang Jie, Shanghai University, China; L. Yi Xiong, S. Dave, Kennametal Inc., USA

3:10 PM

Nanocrystalline (Co,Ni)Al₂O₄ Spinel Powder by Mechanical Milling of Quasicrystalline Material

T. P. Yadav*, Banaras Hindu University, India; N. K. Mukhopadhyay, BHU, India; R. S. Tiwari, O. N. Srivastava, Banaras Hindu University, India

3:30 - 3:50 p.m.

Break

3:50 PM

Characterization at each Hierarchical Manufacturing Scale of Processing for 3D Mesoscale Structures from Nanoparticulates (Invited)

J. H. Adair*, Penn State University, USA

4:30 PM

Behavior of Ultra Fine Particles in Electric Field

J. Shibata*, D. Yamashita, N. Murayama, Kansai University, Japan

4:50 PM

Controlled Deposition of Gold Nanoparticles at Sub-Monolayer Coverage

C. Lin*, G. Mao, Wayne State University, USA

Nanotechnology: Nanostructured Ceramic Materials: Science and Technology

Biomaterials, Self-assembly, Arrayed, and Nanoporous Material

Room: W2-67

Session Chair: Paolo Nanni, University of Genoa

2:00 PM

Introductory Remarks

2:10 PM

Inorganic Nano-Vehicle for Drug and Gene Delivery (Invited)

J. Choy*, Ewha Womans University, South Korea

2:50 PM

Molecular Engineering Toward Novel Superstructured Functional Nanomaterials (Invited)

M. Z. Hu*, Oak Ridge National Laboratory, USA

3:30 - 3:50 p.m.

Break

3:50 PM

Synthesis of Novel, Nanoporous, High Surface-Area, Amorphous MgO Aerogels

W. Dong*, California State Polytechnic University, Pomona, USA

4:10 PM

Synthesis and Characterization of Meso-Macroporous ZrO₂-Al₂O₃ mixed Oxides by Template-Method

M. E. Contreras Garcia*, J. Ortiz Landeros, Universidad Michoacana de San Nicolas de Hidalgo, Mexico

4:30 PM

AFM Study of Aspirin Crystallization on Lipid Bilayer

H. Handa*, Wayne State University, USA; D. Chen, Nanjing University, China; G. Mao, Wayne State University, USA; W. Dong, Jilin University, China; D. G. Kurth, H. Mohwald, Max Planck Institute of Colloids and Interfaces, Germany

4:50 PM

Elaboration and Chemical Nanoanalysis of Highly Nanostructured Porous Templates Obtained by Anodic Aluminium Oxide Growth

F. Le Coz, L. Arurault*, UPS, France

5:10 PM

Fabrication of Nanofluidics for Single Protein Molecule Detection

X. Li*, W. Hofmeister, Univ. of Tennessee Space Inst., USA

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

Mechanics of Nanomaterials and Micro/Nanodevices-II

Room: W2-68

Session Chairs: Scott Mao, University of Pittsburgh; Yu Qiao, UCSD

2:00 PM

Introductory Remarks

2:10 PM

Fatigue Properties and Microstructural Correlations of Ultra-Fine Grained 5083 Aluminum Alloys

J. L. Walley*, J. C. Gibeling, E. Lavernia, University of California, USA

2:30 PM

Friction Stir Welding of Ultrafine Grained Al 5083 Alloy Produced by Cryomilling

J. L. Walley*, University of California, Davis, USA; T. Reynolds, University of South Carolina, USA; E. Lavernia, University of California, Davis, USA

2:50 PM

Demonstration of a Significant Size Effect in the Mechanical Behavior of Nanostructured Copper (Invited)

Y. Zhao, Los Alamos National Lab, USA; C. Xu, T. G. Langdon, University of Southern California, USA; Y. T. Zhu*, Los Alamos National Lab, USA

3:30 - 3:50 p.m.

Break

3:50 PM

Fracture and Strength of Bulk Metallic Glassy Materials (Invited)

Z. Zhang*, Institute of Metal Research, China

4:30 PM

Mechanical Properties of Nanocrystalline Materials (Invited)

J. C. Li*, University of Rochester, USA

5:10 PM

Impression Creep Behavior of Nanocrystalline Materials

S. Gollapudi, K. V. Rajulapati, K. M. Youssef, I. Charit, C. C. Koch, R. Scattergood, K. L. Murty*, NC State University, USA

5:30 PM

Deformation and Fatigue Crack Growth in Nanocrystalline Platinum

R. A. Meiron*, T. Clark, The Pennsylvania State University, USA; R. Polcawich, J. Pulskamp, M. Dubey, Army Research Laboratory, USA; C. L. Muhlstein, The Pennsylvania State University, USA

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

Properties of Fresh and Hardened Cement-Based Materials II

Room: O2-36

Session Chair: Joseph Biernacki, Tennessee Technological University

2:00 PM

Introductory Remarks

2:10 PM

Distributed Cracking and Tensile Response of Fabric Reinforced Cement Composite Laminates

B. Mobasher*, C. Soranakom, Arizona State University, USA

2:30 PM

Formwork Pressure of Self Consolidating Concrete

D. Lange*, F. Tejada-Dominguez, B. Birch, University of Illinois, USA

2:50 PM

Durability of Carbon Nanofiber Reinforced Cementitious Composites

C. Ince, A. Borwankar, F. Sanchez*, Vanderbilt University, USA

ACerS Cements Division Della Roy Lecture

Room: O2-36

Session Chair: Joseph Biernacki, Tennessee Technological University

3:50 PM

Next Horizon in Advanced Cement-Based Materials (Invited)

S. P. Shah*, Northwestern University, USA

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

Microwave & Plasma Processing and Electrophoresis

Room: O2-33

Session Chair: Gary Del Regno, Alfred University

2:00 PM

Introductory Remarks

2:10 PM

Preparation of Yttria-Stabilized Zirconia Thin Films on Strontium-Doped LaMnO₃ Cathode Substrates via Aqueous Electrophoretic Deposition for Solid Oxide Fuel Cells

J. Chergng*, J. Chen, W. Lin, D. Chueh, Mingchi University of Technology, Taiwan

2:30 PM

Microwave Induced Solid State Synthesis of Sodium β -Alumina

J. R. Carpenter*, G. E. Del Regno, Alfred University, USA

2:50 PM

Investigation of CuO Stabilized Zirconia as an Electrolyte for Solid Oxide Fuel Cell Applications

L. B. Crumley, G. E. Del Regno*, Alfred University, USA

3:10 PM

Microwave Synthesis of Rare Earth Stabilized and Other Selected Oxide Stabilized Zirconia for Electrolyte Application in SOFC

B. J. Striker*, G. E. Del Regno, Alfred University, USA

3:30 - 3:50 p.m.

Break

3:50 PM

Ion Exchange Coloring of Soda-Lime-Silica Glass in a 2.45GHz Microwave Field

D. J. Vuono*, G. E. Del Regno, Alfred University, USA

4:10 PM

Microwave Processing of Polymer Derived Ceramics from Actively Seeded Precursor

S. C. Zunjarrao*, Oklahoma State University, USA; P. Dyjak, 16 Alton Rd, USA; J. D. Metzger, 1411 Peachtree Lane, USA; R. P. Singh, Oklahoma State University, USA

4:30 PM

Microwave Assist Technology for Ceramic Firing

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

4:50 PM

Improved High Temperature Susceptors for Microwave Heating

N. A. Vandervoort*, M. Fall, H. Shulman, S. Allen, Ceralink Inc, USA

5:10 PM

Thermal Conductivity Characteristics of SiC Particulate- Reinforced Aluminum Alloys by Plasma Spraying

K. Euh*, S. Kang, Korea Institute of Machinery and Materials, South Korea

5:30 PM

Plasma Facility for Basalt Filaments Production

T. Svintradze*, Georgian Technical University, Georgia; F. Marquis, Naval Postgraduate School, USA; J. Mostaghimi, University of Toronto, Canada; Z. Batkhadze, M. Gelenidze, Z. Chankvetadze, D. Gelenidze, Georgian Technical University, Georgia; E. Bakuradze, Kutaisi State University, Georgia

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

Joining of Steels (especially HSLA and AHSS) II

Room: O2-35

Session Chairs: Thomas Lienert, Los Alamos National Lab; James Quinn, General Motors

2:00 PM

Introductory Remarks

2:10 PM

TEM and Nanoindentation Study of the Weld Zone Microstructure of a Diode-Laser Joined Automotive TRIP Steel (Invited)

J. Chen*, K. Sand, University of Alberta, Canada; M. Xia, University of Waterloo, Canada; O. Colin, M. Reza, University of Alberta, Canada; M. Kuntz, Y. Zhou, University of Waterloo, Canada; D. Mitlin, University of Alberta, Canada

2:50 PM

The Auto/Steel Partnership Investigation of Arc Welding Processes Applied to Advanced High Strength Steels (Invited)

D. Maatz*, E. Young, M. Soter, J. Dolfi, RoMan Engineering, USA

3:30 - 3:50 p.m.

Break

3:50 PM

Thermal Simulation of HAZ Cooling Rates in Laser Welded DP Steels

J. Drabik*, N. Richards, University of Manitoba, Canada; E. Biro, Dofasco, Canada; M. Kuntz, N. Zhou, University of Waterloo, Canada

4:10 PM

High Temperature Brazing of Monolithic 430 to Porous 430L Stainless Steel for Hydrogen Separation Applications

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

4:30 PM

Experimental and Numerical Investigation on Thermal Distortions in Thin Structural Steel Plates under Pulsed Laser

M. Mahapatra, L. Li*, Utah State University, USA

4:50 PM

Influence of Laser Welding on the Formability of AHSS Steels

N. Sreenivasan*, M. Kuntz, N. Zhou, University of Waterloo, Canada

5:10 PM

Fusion Zone Hardness of Advanced High Strength Steel and its Relation to Tensile Properties with Diode Laser Welding

M. Xia*, M. Kuntz, University of Waterloo, Canada; Z. Tian, Central Iron and Steel Research Institute, China; N. Y. Zhou, University of Waterloo, Canada

5:30 PM

Addition of Hydrogen Trap Sites to Improve the Weldability of Fe-Al-Cr Based Weld Overlays for Low NO_x Boilers

K. Adams*, J. N. DuPont, Lehigh University, USA

Processing and Product Manufacturing: Surface Engineering Using Hybrid Plasma Assisted PVD and CVD Technologies

Emerging Technologies; CVD and Plasma Surface Treatments

Room: O2-41

Session Chair: Richard Smith, Montana State University

2:00 PM

Introductory Remarks

2:10 PM

Universal Hybrid Deposition Process to Coat Plastic Materials (Invited)

W. Munz*, SVSvacuum coating technologies, Germany

2:50 PM

Plasma-based Chemical Vapor Deposition Based Transparent Coatings for Aircraft Passenger Windows

K. Larson*, V. S. Sundaram, The Boeing Company, USA

3:10 PM

Large Area Filtered Arc and Hybrid Deposition Technologies for Erosion and Corrosion Protection of Turbine Engine Components

V. Gorokhovskiy*, J. Wallace, C. Bowman, Arcocomac Surface Engineering, LLC, USA; V. Champagne, M. Pepi, US Army Research Laboratory, USA

3:30 - 3:50 p.m.

Break

3:50 PM

Investigation of Plasma Enhanced Chemically Vapor Deposited Tantalum on High Strength Steels

Y. Suh*, W. Chen, S. Maeng, R. A. Levy, New Jersey Institute of Technology, USA; H. Thridandam, K. S. Cuthill, T. R. Gaffney, Air Products and Chemicals, Inc., USA

4:10 PM

Duplex Treatment of Dental Instruments

Y. Cheng*, American Eagle Instrument Inc, USA; V. Gorokhovskiy, Arcocomac Surface Engineering LLC, USA

4:30 PM

Comparison Between Two Methods on Plasma Nitriding: Ion Nitriding and Cathodic Cage Nitriding

C. Alves*, R. M. Sousa, F. O. Araujo, J. A. da Silva, Universidade Federal do Rio Grande do Norte, Brazil

4:50 PM

Carbonitriding of Materials in Ammonia and Corgon Medium

A. P. Zumbilev*, TU-Sofia Branch Plovdiv, Bulgaria

The Profound Influence of Tony Evans on Engineering Use of Structural Materials

Atomistics of Interfaces and Fractures

Room: M2-29

Session Chair: Manfred Ruehle, MPI for Metals Research

2:00 PM

Introductory Remarks

2:10 PM

Structure, Composition and Bonding at Metal/Ceramic Interfaces: Approaching the Atomic Level (Invited)

M. Ruehle*, MPI for Metals Research, Germany; K. van Benthem, S. Oh, Oak Ridge National Laboratory, USA; E. Tchernochova, Jozef Stefan Institute, Slovenia; C. Scheu, Montan Universitaet Leoben, Austria; F. Ernst, Case Western Reserve University, USA

2:50 PM

Effects of Impurity and Additive Element Segregation on γ - Ni(Al)/Al₂O₃ Interfacial Adhesion: A First-Principles Study (Invited)

Y. Jiang, J. R. Smith*, A. Evans, University of California, USA

3:30 - 3:50 p.m.

Break

3:50 PM

The Effect of Interfaces on Local Properties in Ceramics (Invited)

D. Bonnell*, University of Pennsylvania, USA

4:30 PM

Atomic Mechanisms of Liquid Metal Spreading (Invited)

A. P. Tomsia*, E. Saiz, Lawrence Berkeley National Lab, USA

Special Topics: Journal of Undergraduate Materials Research

Journal of Undergraduate Materials Research

Room: D0-02AB

Session Chair: Ben Poquette, Virginia Tech

2:00 PM

Introductory Remarks

2:10 PM

Materials Research Opportunities for Undergraduates (Invited)

U. D. Venkateswaran*, National Science Foundation, USA

2:30 PM

Characterization and Applications of Electrolessly Plated Graphite Foams with Nanoparticle Additions

M. Asaro*, J. Mueller, P. Dykema, B. Poquette, Virginia Tech, USA

2:50 PM

Microstructural Analysis and Growth Mechanisms of Silicon Beads Using Fluidized Bed Methods

M. M. Reynolds*, D. Bahr, G. Norton, Washington State University, USA

3:10 PM

9L Single Cells Patterned on Chemically Modified Surfaces by Competitive Adhesion

J. Tey*, F. Asphahani, M. Zhang, University of Washington, USA

3:30 - 3:50 p.m.

Break

3:50 PM

Investigating the Effect of Different Bonding Techniques on the Fracture Toughness of Fiber-Reinforced Polymer Composite Joints through both Testing and Modeling

F. P. Cook*, S. A. Kyriakides, N. Shah, S. W. Case, J. J. Lesko, A. Zhou, D. M. Peairs, Virginia Tech, USA

4:10 PM

Processing of Porous Hydroxyapatite for Use in Artificial Organs

A. D. Finoli*, I. Nettleship, University of Pittsburgh, USA

4:30 PM

Enhancement of Wear Resistance of a Nickel-Based Alloy via Surface Nanocrystallization

M. Manjarres*, L. L. Shaw, University of Connecticut, USA; R. M. DeCrescenzo, Glastonbury High School, USA

4:50 PM

Development of Single Chamber Solid Oxide Fuel Cells with Porous Samaria Doped Ceria Electrolytes

F. Dogan, V. Petrovsky, N. Goss*, University of Missouri-Rolla, USA

5:10 PM

Analyzing the Mechanical Behavior of Ionically Bonded Crystals with Respect to Crystal Chemistry and Volume Defect Orientation

S. Kipatrick*, K. Findley, Washington State University, USA; P. Doty, Sandia Labs, USA

5:30 PM

Car Emblems: Materials Aspects in Historical Perspective

M. Zelin*, D. Anderson, L. Britton, K. Zelin, J. Troyer, Car Emblems Museum, USA

5:50 PM

Temperature Control and Compression Die Attachment for a Material Testing System (MTS) 858 Mini Bionix Machine

C. P. Navas*, A. Datye, K. Wu, Florida International University, USA

Steel: 4th International Symposium on Railroad Tank Cars

4th International Symposium on Railroad Tank Cars II

Room: W2-70

Session Chairs: William Heitmann, Arcelor Mittal; Frank Zakar, National Transportation Safety Board

2:00 PM

Introductory Remarks

2:10 PM

Effects of Niobium, Titanium and Nitrogen on the Microstructure and Mechanical Properties of Normalized Tank Car Steel Plates

M. Manohar*, W. Heitmann, Arcelor Mittal, USA

2:30 PM

The Influence of Inclusion Content on Charpy Impact Performance

R. C. Klug*, A. D. McKisic, Trintity Industries Inc., USA

2:50 PM

The Influence of Sulfur Concentration Below 0.006% Along With Sulfide Shape Control on the Charpy V-Notch Properties of Normalized and Stress Relieved TC128 Grade B Steel Plate

W. E. Heitmann*, Arcelor Mittal, USA; F. Feher, Arcelor Mittal, USA; C. Hybinette, Union Tank Car Co., USA; M. Manohar, Arcelor Mittal, USA

3:10 PM

As-Rolled Plate Product with Improved Yield Strength, Toughness, and Weldability for Pressurized Railroad Tank Cars

R. Bodnar*, IPSCO Steel, USA; F. Hamad, C. Penniston, S. Roysum, IPSCO Steel, Canada

3:30 - 3:50 p.m.

Break

3:50 PM

High-Strength, Low-Carbon, Copper-Precipitation-Strengthened Steel for Tank Car Application

S. Vaynman*, M. E. Fine, Northwestern University, USA; S. P. Bhat, Arcelor Mittal USA R&D Center, USA; C. Hybinette, Union Tank Car Company, USA

4:10 PM

Processing Alternatives for Optimized Strength and Toughness Balance of ASTM A709 HPS W Composition

A. K. De*, Arcelor Mittal USA Research and Development Center, USA; F. C. Feher, Mittal Steel USA, BH, USA; W. Heitmann, M. Manohar, Arcelor Mittal USA Research and Development Center, USA

4:30 PM

Characterization of the HAZ Microstructure in ASTM A 709 HPS-100W Steels

A. Biswas*, P. Nash, S. Chupatanakul, Illinois Institute of Technology, USA

Steel: Recent Developments in Steel Processing

Processing and Modeling

Room: W2-69

Session Chairs: Matthew Merwin, United States Steel; Abdelbaset Elwazri, McGill University

2:00 PM

Introductory Remarks

2:10 PM

Skin-Pass Rolling of Steel Strip Using Liquid Nitrogen

G. Plicht, H. Schillak, M. Lin*, R. Edwards, Air Products and Chemicals, Inc., USA; H. Hofinghoff, T. Demski, C. D. Walzholz GmbH, Germany

2:30 PM

Deformation Characteristics of Oxide Scale in Hot Rolling by Scale Transfer Method Using Vacuum Hot Rolling Mill

A. Segawa, T. Taguchi*, Kanazawa Institute of Technology, Japan

2:50 PM

Validity of Heat Transfer Coefficient based on Cooling Time and Cooling Rate Curve on Jominy End Quench Test

A. Sugianto*, M. Narazaki, M. Kogawara, Utsunomiya University, Japan

3:10 PM

Efficient Cyclic Thermal Processing of Materials

S. S. Sahay*, Tata Research Development and Design Centre, India

3:30 - 3:50 p.m.

Break

3:50 PM

Application of the Life Cycle Modeling to Forging of Connecting Parts

L. Madej*, Akademia Gorniczo-Hutnicza, Poland; R. Kuziak, Institute for Ferrous Metallurgy, Poland; M. Packo, D. Szeliga, S. Weglarczyk, M. Pietrzyk, Akademia Gorniczo-Hutnicza, Poland

4:10 PM

Standardized and Computer Controlled Packing Philosophy (DCPP) for Steel

J. Rajagopalan*, T. Aijo, Pesmel North America, USA

4:30 PM

Efficiency Improvements in Oxygen Steelmaking through Improved Materials of Construction

L. C. Boyd*, Energy Industries of Ohio, USA; V. K. Sikka, Oak Ridge National Laboratory, USA

4:50 PM

Numerical Thermal and Mechanical Analysis of Graphite Electrode in EAF during Steady State Operation

R. Rafieei*, A. Kermanpur, F. Ashrafizadeh, Isfahan University of Technology, Iran