

MS&T '05 Technical Program

MONDAY AM

Coatings 2005: Thermal Barrier Coatings (TBCs) I

Program Organizers: Nitin P. Padture, Ohio State University; Lorraine F. Francis, University of Minnesota; Janet M. Hampikian, Boise State University; Narendra B. Dahotre, University of Tennessee

Monday AM Room: 317
September 26, 2005 Location: Convention Center

Session Chair: Nitin P. Padture, Ohio State University

9:00 AM Invited

Extending the Multi-Functional Role of High Temperature Coatings: Temperature and Heat Flux Sensing using Optical Luminescence: *David R. Clarke*¹; ¹University of California, Santa Barbara

9:40 AM

Nanoscale-Designed Thermal Barrier Coatings for Durable Protection of Turbine and Heat Engine Components: *Francis R. Chapman*¹; Sankar Sambasivan¹; ¹Applied Thin Films, Inc.

10:00 AM

Large Spatial Variations in Residual Stress of TGOs Measured by Confocal Photo-Stimulated Microspectroscopy (CPSM): *David B. Hovis*¹; Arthur H. Heuer¹; ¹Case Western Reserve University

10:20 AM Break

10:40 AM

EBPVD YSZ TBC Lives on No-Bond-Coat René N5: *Frederick S. Pettit*¹; Gerald H. Meier¹; *N. M. Yanar*¹; ¹University of Pittsburgh

11:00 AM

Effect of Starting Powder Morphology on the Stress-Relaxation of Stand-Alone YSZ Coatings: *Batur Ercan*¹; Rodney Trice¹; Keith Bowman¹; Graeme Dickinson²; Hsin Wang³; Wallace Porter³; ¹Purdue University; ²Praxair Surface Technologies; ³Oak Ridge National Laboratory

11:20 AM

Use of Indentation Fracture Tests to Investigate Toughness Loss Mechanisms in Thermal Barrier Coating Systems: *Jack Beuth*¹; Qin Ma¹; Frederick Pettit²; Gerald Meier²; Matthew Stiger²; ¹Carnegie Mellon University; ²University of Pittsburgh

11:40 AM

Vanadium Oxide Contaminant Threshold for Plasma-Sprayed 7wt.% Y₂O₃-ZrO₂ Thermal Barrier Coatings: *Zun Chen*¹; Rod Trice¹; Hsin Wang²; Wally Porter²; Scott Speakman²; Jane Howe²; ¹Purdue University; ²Oak Ridge National Laboratory

Coatings 2005: Hard Coatings I

Program Organizers: Nitin P. Padture, Ohio State University; Lorraine F. Francis, University of Minnesota; Janet M. Hampikian, Boise State University; Narendra B. Dahotre, University of Tennessee

Monday AM Room: 318
September 26, 2005 Location: Convention Center

Session Chair: Narendra B. Dahotre, University of Tennessee

9:00 AM

Tribology of Nanocrystalline Diamond Coatings: *Richard R. Chromik*¹; Kathryn J. Wahl¹; Leigh Winfrey²; Robert J. Nemanich²; ¹Naval Research Laboratory; ²North Carolina State University

9:20 AM

Transmission Electron Microscopy Studies of CVD Coatings for High Performance Cutting Tools: *Yan Cao*¹; Paul A. Salvadori¹; Zhigang Ban²; Bonnie Davis²; ¹Carnegie Mellon University; ²Kennametal, Inc.

9:40 AM Invited

Surface Science and Tribological Investigations of Sulfur-Doped Hydrogenated Carbon Films: *Yip-Wah Chung*¹; Christina Freyman¹; Yanfeng Chen¹; Bo Zhao¹; ¹Northwestern University

10:20 AM Break

10:40 AM Invited

Tribological Coatings for Automotive Applications: *Yang-Tse Cheng*¹; ¹General Motors R&D Center

11:20 AM

Growth of Epitaxial (100) TiN/AlN and TiN/Ti_{1-x}Al_xN Superlattice Films by Pulsed Laser Deposition: *Nitin Patel*¹; Paul A. Salvadori¹; Aharon Inspektor²; ¹Carnegie Mellon University; ²Kennametal Inc.

11:40 AM

Damage Occurring During Low Cycle Fatigue of a Coated Single Crystal Nickel-Base Superalloy SCB: *Svjetlana Stekovic*¹; ¹Linkoping University

Corrosion of High Alloy Weldments: Corrosion of High Alloy Welds

Program Organizers: John N. DuPont, Lehigh University; Yi-Ming Pan, Southwest Research Institute; Robert J. Hanrahan, National Nuclear Security Administration; Raul B. Rebak, Lawrence Livermore National Laboratory

Monday AM Room: 311
September 26, 2005 Location: Convention Center

Session Chair: John N. DuPont, Lehigh University

9:00 AM

Corrosion of Alloy 22, Type 316 Stainless Steel, and Ti-Grade 7 Crevices: *Aladar A. Csontos*¹; Darrell S. Dunn²; Yi-Ming Pan²; ¹U.S. Nuclear Regulatory Commission; ²CNWRA, Southwest Research Institute

9:20 AM Question and Answer Period

9:30 AM

Effect of Simulated Groundwater Chemistry on Stress Corrosion Cracking of Alloy 22 Weldments: *Kuang-Tsan K. Chiang*¹; Darrell S. Dunn¹; Yi-Ming Pan¹; Gustavo A. Cragnolino¹; ¹CNWRA, Southwest Research Institute

9:50 AM Question and Answer Period

10:00 AM

Immersion Corrosion Testing of Welded Plates of Ni-Cr-Mo Alloys: *Raul B. Rebak*¹; David V. Fix¹; ¹Lawrence Livermore National Laboratory

10:20 AM Question and Answer Period

10:30 AM

Localized Corrosion of Ni-Cr-Mo Alloy Weldments: *Kenneth J. Evans*¹; *Raul B. Rebak*¹; ¹Lawrence Livermore National Laboratory

10:50 AM Question and Answer Period

11:00 AM

Postweld Heat Treatment to Improve Localized Corrosion Resistance of Alloy 22 High-Level Waste Container Weldments: *Yi-Ming Pan*¹; Darrell S. Dunn¹; ¹CNWRA, Southwest Research Institute

11:20 AM Question and Answer Period

11:30 AM

Development of FeCrAl Weld Overlay Coatings for Corrosion Protection in Boilers with Low NO_x Burners: *John N. DuPont*¹; Jon Regina¹; Arnold Marder¹; ¹Lehigh University

11:50 AM Question and Answer Period

12:00 PM

High Temperature Oxidation Resistance of Welded Ferritic, Austenitic and Nickel Alloys for Balance of Plant (BOP) in Solid Oxide Fuel Cell (SOFC) Systems: *Rick D. Wilson*¹; Jeffrey A. Hawk¹; David E. Alman¹; ¹U.S. Department of Energy

12:20 PM Question and Answer Period

12:30 PM

Orbital Welding of Corrosion Resistant Materials for Bioprocess and Food Piping Applications: *Ken Kimbrel*¹; ¹Central States Industrial

12:50 PM Question and Answer Period

Creep Deformation and Fracture, Design, and Life Extension: Session I

Program Organizers: Rajiv S. Mishra, University of Missouri; James Calvin Earthman, University of California; Sai V. Raj, NASA Glenn Research Center; R. Viswanathan, Electric Power Research Institute

Monday AM Room: 306
September 26, 2005 Location: Convention Center

Session Chair: Rajiv S. Mishra, University of Missouri

9:00 AM Introductory Comments

9:05 AM Keynote

A Unified Theoretical and Practical Approach to Creep and Creep Fracture: *Brian Wilshire*¹; Howard Burt¹; ¹University of Wales Swansea

9:30 AM Invited

High Temperature Magnetic Strengthening of Ferromagnetic Materials: *Tadao Watanabe*¹; Sadahiro Tsurekawa¹; Kouichi Kawahara¹; ¹Tohoku University

9:50 AM Invited

Modelling of the High Temperature Creep Behavior of Dispersion Strengthened Alloys: Holger Saage¹; Juergen Eckert²; *Martin C. Heilmaier*¹; Jeffery C. Gibeling³; ¹Otto-von-Guericke University Magdeburg; ²TU Darmstadt; ³University of California

10:10 AM Invited

Creep of Zirconium and Zirconium Alloys at Temperatures up to 850°C: *Troy A. Hayes*¹; Michael E. Kassner²; ¹Exponent; ²University of Southern California

10:30 AM Break

10:40 AM Invited

Part II: Creep Fracture of Zirconium and Zirconium Alloys: *Troy A. Hayes*¹; Michael E. Kassner²; ¹Exponent; ²University of Southern California

11:00 AM Invited

Effects of Alloying and Thermal Treatment on Creep Anisotropy of Zircalloys: Application to In-Reactors Performance: *Indrajit Charit*¹; Jinyuan Yan²; Brian Wesley Marple²; K. Linga Murty²; ¹University of Missouri; ²North Carolina State University

11:20 AM

The Effect of Load Redistribution in Transient Plastic Flow: *Wei Gan*¹; Peihui Zhang²; Robert H. Wagoner¹; Glenn S. Daehn¹; ¹Ohio State University; ²EWI

11:40 AM

Power-Law Creep of Commercial-Purity Molybdenum Sheet: *James R. Ciulik*¹; Eric M. Taleff¹; ¹University of Texas

12:00 PM

Creep of Ultrafine-Grained and Nanocrystalline FCC Metals: *Wolfgang Blum*¹; Y. J. Li¹; ¹University of Erlangen
View complete technical program at <http://pcs.tms.org>

Current Topics in Electronic Packaging: Pb Free Solders, Thermal Management: Thermal Management and Thermal Interface Materials

Program Organizers: Eric J. Cotts, Binghamton University; C. Robert Kao, National Central University; Mark A. Palmer, Kettering University; K. N. Subramanian, Michigan State University; Paul Thomas Vianco, Sandia National Laboratories; K. M. Nair, Dupont de Nemours & Co Inc

Monday AM Room: 321
September 26, 2005 Location: Convention Center

Session Chairs: Gary Lehmann, Binghamton University; Deborah D.L. Chung, University at Buffalo

9:00 AM Introductory Comments

9:05 AM Invited

Thermal Interface Materials Containing Carbon Black and Their Outstanding Performance: Chia-Ken Leong¹; *Deborah D.L. Chung*¹; ¹University at Buffalo, State University of New York

9:35 AM

Heat Transport in Composite Thermal Interface Materials: *Gary L. Lehmann*¹; ¹State University of New York at Binghamton

9:55 AM

Manufacture of High Thermal Conductivity (+750W/mK) Cu-Graphite Composites using Particulate Additions and In-Situ Carbide Formation to Improve Wetting: *Glenn Sundberg*¹; Sravanthi Mallim¹; ¹University of Massachusetts Lowell

10:15 AM Break

10:30 AM

Enhanced Thermal Bondlines: Nanocomposite Thermal Interface Material and the Minimization of Bondline Thermal Resistance: *David F. Rae*¹; Michael J. Rightley²; John A. Emerson²; Jeffrey A. Galloway²; Dale L. Huber²; Eric J. Cotts¹; ¹Binghamton University; ²Sandia National Laboratories

10:50 AM

Experimental Evaluation of Thermal Spray Processes and Computational Modeling to Form Low Thermal Resistance Stacks for High Power Electronics: *Alaa A. Elmoursi*¹; Gary Eesley¹; Nilesh Patel¹; Bryan Gillispie¹; Bruce Myers²; Gary Oberlin²; ¹Delphi Research Laboratories; ²Delphi Electronics & Safety

11:10 AM

Thermal and Mechanical Performance of a Proposed High Performance Thermal Stack: Xiao-Gang Wang¹; *Alaa A. Elmoursi*¹; John R. Smith¹; Gary Eesley¹; Nilesh Patel¹; ¹Delphi Research Laboratories

11:30 AM

A Particle-Laden Polymeric Liquid as a Thermal Interface Material: Experiments and Modeling: *Drew A. Davidson*¹; Gary L. Lehmann¹; ¹Binghamton University

Defect Formation, Detection, and Elimination During Casting, Welding, and Solidification: Processing, Microstructure, Properties

Program Organizers: Mei Ling C. Clemens, Howmet Corporation; Joseph D. Puskar, Sandia National Laboratories; Mark R. Blankenau, Severstal NA; Srinath Viswanathan, Sandia National Laboratories; Qingyou Han, Oak Ridge National Laboratory

Monday AM Room: 333
September 26, 2005 Location: Convention Center

Session Chairs: Mei Ling C. Clemens, Howmet Corporation; Arun M. Gokhale, Georgia Institute of Technology

9:00 AM

Ultrasonic Degassing in Aluminum Alloys: Hanbing Xu¹; Thomas T. Meek¹; *Qingyou Han*²; ¹University of Tennessee; ²Oak Ridge National Laboratory

9:25 AM

On the Formation of Gas (Air) Induced Shrinkage Porosity in Pressure Die-Cast AM60 Mg-Alloy: *Soon Gi Lee*¹; Arun M. Gokhale¹; ¹Georgia Institute of Technology

9:50 AM

Variability in the Tensile Ductility of High-Pressure Die-Cast AE44 Mg-Alloy: *Soon Gi Lee*¹; Gautam R. Patel¹; *Arun M. Gokhale*¹; ¹Georgia Institute of Technology

10:15 AM

Quantitative Fractography of 17-4PH Stainless Steel Investment Castings: *Don F. Susan*¹; Tom Crenshaw¹; Richard P. Grant¹; Alice Kilgo¹; ¹Sandia National Laboratories

10:40 AM Break

10:50 AM

Characterization of Segregation in Compact Strip Casting Nb-Bearing HSLA Steel Slabs: *Mingjian Hua*¹; Anthony J. DeArdo¹; Ruizhen Wang²; Rod Marraccini³; C. Issac Garcia¹; ¹University of Pittsburgh; ²Central Iron and Steel Research Institute; ³Nucor Steel Berkeley

11:15 AM

Effect of Heat Treatment on Mechanical Properties of Liquid Metal Cooling Directionally Solidified GTD-444TM: *Stephen J. Balsone*¹; Ganjiang Feng¹; Drew Elliott¹; Jon Schaeffer¹; ¹General Electric Company

11:40 AM

A Study on the Casting Characteristics of the Propeller Using Mn-Cu Alloy: *Tae-Dong Park*¹; Sung-Mo Lee¹; Kyoung-Hoon Kim¹; Duk-Soo Park¹; ¹Hyundai Heavy Industries Company, Ltd.

12:05 PM

The Effects of CaF₂ for Thermodynamic Properties in Electro-Slag Remelting (ESR) Slag: *Chang Woo Seo*¹; ¹Pohang University of Science and Technology

Developments in Sheet Products for Automotive Applications: TRIP Steel

Program Organizers: James R. Fekete, General Motors Corporation; Roger Pradhan, Mittal Steel

Monday AM Room: 330
September 26, 2005 Location: Convention Center

Session Chairs: Jim Fekete, General Motors Corporation; Roger Pradhan, Mittal Steel

9:00 AM

Fundamental Study of the Austenite Formation and Decomposition in High Strength Low-Si, Al Added Nb-Mo TRIP Steels: *Jose Enrique Garcia-Gonzalez*¹; C. Issac Garcia¹; Anthony J. DeArdo¹; Mingjian Hua¹; ¹University of Pittsburgh

9:30 AM

Ultra High Strength C-Si-Mn-Nb-Mo TRIP-Aided Sheet Steels: *Koichi Sugimoto*¹; Toshiaki Matsumura¹; Shun-Ichi Hashimoto²; Yoh-Ichi Mukai³; ¹Shinshu University; ²CBMM Asia Company, Ltd.; ³Kobe Steel, Ltd.

10:00 AM

The Effect of Continuous Galvanizing Thermal Cycle on the Microstructure and Mechanical Properties of Two Multiphase TRIP-Assisted Steels: *Anne I.M. Mertens*¹; Joseph R. McDermid¹; ¹McMaster University

10:30 AM Break

10:45 AM

The Recrystallization Behavior and the Kinetics of Bainite Formation in TRIP Steel During Isothermal Holding: *Seongho Han*¹; C. Isaac Garcia²; Anthony J. De Ardo²; Kwanggeun Chin¹; ¹POSCO; ²University of Pittsburgh

11:15 AM

New Steel Chemistry Design for TRIP and Dual-Phase Structures: *Andrzej Kazimierz Lis*¹; Anthony J. DeArdo; ¹Czestochowa University of Technology

Electromagnetics in Materials Processing: Keynote Session

Program Organizers: Robert W. Hyers, University of Massachusetts; Douglas M. Matson, Tufts University; Daniel J. Williams, Inductoheat Inc

Monday AM Room: 319
September 26, 2005 Location: Convention Center

Session Chair: Robert W. Hyers, University of Massachusetts

9:00 AM Keynote

Electromagnetic Control of Liquid Metal Free Surfaces: *Jacqueline Etay*¹; ¹CNRS-EPM

9:45 AM Invited

Challenging Topics of Electromagnetic Processing of Materials: *Shigeo Asai*¹; ¹Nagoya University

10:15 AM Break

10:35 AM Invited

Activities on Applied MHD at Forschungszentrum Rossendorf: *Gunter Gerbeth*¹; ¹Rossendorf Research Center

11:05 AM Invited

Computational Modeling of Multiscale Phenomena in Magnetically-Stirred Solidifying Melts: *Ben Q. Li*¹; ¹Washington State University

11:35 AM Invited

An Optimal Method for 3-D Numerical Simulation of Electromagnetic Induction Heating Processes: *Nagy H. El-Kaddah*¹; Thinium T. Natarajan²; ¹University of Alabama; ²U.S. Steel Research and Technology Center

Failure Analysis: Historical Failures and Their Affect on Today's World

Program Organizers: Debbie Aliya, Aliya Analytical Inc; Dale E. Alexander, Engineering Systems Inc; David A. Moore, Packer Engineering

Monday AM Room: 310
September 26, 2005 Location: Convention Center

Session Chairs: Larry Hanke, Materials Evaluation and Engineering Inc; Daniel P. Dennies, Boeing Company

9:00 AM

A Forensic Analysis of the Sinking of the RMS Titanic: *Tim Foecke*¹; Jennifer Hooper-McCarty¹; ¹NIST

9:40 AM

The Hindenburg and the Hydrogen Economy: *McIntyre R. Louthan*¹; ¹Savannah River National Laboratory

10:20 AM

The Comet Fatigue Failures of 1953-1954: A Historical Review: *Julian Raphael*¹; ¹Columbus McKinnon

11:00 AM

Apollo 1 Capsule Fire and Its Affect on the Space Industry: *Daniel P. Dennies*¹; ¹Boeing Company

11:20 AM

Kansas City Hyatt Hotel Skywalk Collapse: *Charles R. Morin*¹; Chad R. Fischer¹; ¹Engineering Systems, Inc.

Ferrous Physical Metallurgy of Highly Alloyed Steels: Alloy/High Alloy Steels

Program Organizer: James P. Materkowski, Timken Latrobe Steel

Monday AM Room: 335
September 26, 2005 Location: Convention Center

Session Chair: Warren M. Garrison, Carnegie Mellon University

9:00 AM Introductory Comments

9:05 AM

A Discussion of the Effects of Gettering Sulfur as Particles of Carbosulfides on the Toughness of Ultra-High Strength Steels: *Warren M. Garrison*¹; ¹Carnegie Mellon University

9:25 AM

Development of Eglin Steel—A New, Ultrahigh-Strength Steel for Armament and Aerospace Applications: *John R. Paules*¹; ¹Ellwood National Forge Company

9:45 AM

The Effect of Primary Alloy Carbides on the Abrasive Wear Resistance of Selected Tool Steels: *Alojz Kajinic*¹; Andrzej Wojcieszynski¹; ¹Crucible Research

10:05 AM

Evaluation of Welded Pipeline Steel at Low Temperatures by Shear Punch Testing: *Rocco Varano*¹; Abdelbaset M. Elwazri¹; Gregg R. Stewart¹; Stephen Yue¹; John J. Jonas¹; ¹McGill University

10:25 AM Break

10:40 AM

Impact of Elemental Partitioning on TTT Diagrams in Alloy Steels: *Robert E. Hackenberg*¹; Gary J. Shiflet²; ¹Los Alamos National Laboratory; ²University of Virginia

11:00 AM

Thermodynamic Modeling of Volume and Bulk Modulus at High Temperature and High Pressure: *Qing Chen*¹; Anders Engström¹; Bo Sundman²; ¹Thermo-Calc Software AB; ²Royal Institute of Technology

11:20 AM

Experimental and Computational Analysis of a Superaustenitic Stainless Steel: *Alexis C. Lewis*¹; Andrew B. Geltmacher¹; David J. Rowenhorst¹; George Spanos¹; ¹Naval Research Laboratory

11:40 AM

Metallurgical Considerations in Diffusion-Alloying by Aluminum in Ferrous Alloys: *L. Chen*¹; ¹Engineered Materials Solutions

Fractures of Multicomponent Systems: High Performance Fibers and Fibrous Composites

Program Organizers: Bhaskar S. Majumdar, New Mexico Tech; Nikhilesh Chawla, Arizona State University; John J. Lewandowski, Case Western Reserve University

Monday AM Room: 307
September 26, 2005 Location: Convention Center

Session Chairs: Krishan K. Chawla, University of Alabama; Michael Zelin, Goodyear

9:00 AM Keynote

High-Performance Fibers: *Krishan K. Chawla*¹; ¹University of Alabama at Birmingham

9:35 AM Invited

Time/Temperature-Dependent Fracture Behavior of High Performance Ceramic Fibers: *James A. DiCarlo*¹; HeeMann Yun¹; ¹NASA Glenn Research Center

10:00 AM Invited

Elevated Temperature Cyclic Fatigue Behavior of High Performance Ceramic Fibers: *Matthew Kerr*¹; *Nikhilesh Chawla*¹; ¹Arizona State University

10:25 AM Invited

Some Aspects of Fracture Behavior of Small Diameter High-Strength Steel Wires: *Bamdad Pourladian*¹; ¹WRCA, Inc.

10:50 AM Break

11:05 AM Invited

A Mechanistic Model of Deformation and Damage in Woven SiC/SiC Composites: *J. Ahmad*¹; U. Santhosh¹; G. Ojard²; Y. Gowayed³; R. Miller²; R. John⁴; ¹Research Applications, Inc; ²Pratt & Whitney; ³Auburn University; ⁴Air Force Research Laboratory

11:30 AM Invited

Ductility of High Strength Steel Wires: *Michael Zelin*¹; ¹Goodyear Tire & Rubber Company

11:55 AM Invited

Impact Resistance of High Strength Woven Fabrics: *Yves Termonia*¹; ¹E.I. DuPont de Nemours

12:20 PM

A Damage Analysis off an 8 Harness Tape Wound Carbon Phenolic (TWCP) Subjected to Tension and Shear Loading: *Bartlomiej Jozef Benedikt*¹; Robert Hackett¹; Partha Rangaswamy¹; Matthew Lewis¹; ¹Los Alamos National Laboratory

Frontiers of Materials Science 2005: Innovative Materials and Manufacturing Tech and Fourteenth International Symposium on Processing and Fabrication of Advanced Materials (PFAM XIV): Composite Materials

Program Organizers: Reza Abbaschian, University of Florida; Srinath Viswanathan, Sandia National Laboratories; T. S. Srivatsan, University of Akron; Robert A. Varin, University of Waterloo

Monday AM Room: 308
September 26, 2005 Location: Convention Center

Session Chair: Holger Saage, Otto-von-Guericke University

9:00 AM

Simultaneous Synthesis and Densification of TiC-Steel Composites – Process Optimization: *Jiaren Jimmy Jiang*¹; Xing Yang Liu¹; ¹National Research Council of Canada

9:20 AM

Understanding the Role and Influence of Particulate Reinforcements in Influencing the Damping Behavior of Magnesium: T. S. Srivatsan¹; N. Srikanth²; Manoj Gupta²; S. Ugandhar²; ¹University of Akron; ²National University of Singapore

9:40 AM

Wear Mechanisms of Silicon Carbide Whisker Reinforced Aluminum Oxynitride Cutting Tool in Turning IN718: Russell L. Yeckley¹; *Shanghua Wu*¹; ¹Kennametal, Inc.

10:00 AM

Properties of Spodumen Containing Ceramics: *James A. Geodakyan*¹; Roger W. Cannon²; Aram K. Kostanyan¹; Karen J. Geodakyan¹; Svetlana T. Sagatelyan¹; Berta V. Petrosyan¹; ¹Institute of Materials Science; ²Rutgers State University

10:20 AM Break

10:40 AM

A Stereological Analysis of a Tib2-B4c Ceramic Matrix Composite Produced by Displacement Reaction: *Guruprasad Gireesh*¹; Tirimalai Srivatsan¹; R. Radhakrishnan²; ¹University of Akron; ²Materials Modification, Inc

11:00 AM

AFM Analysis of Aluminum Boron Composites: *Ruth G.I. Hidalgo*¹; Sandra Pedraza¹; Darya Marchany Rivera¹; O. M. Suárez¹; ¹University of Puerto Rico

11:20 AM

Properties of Friction Stirred BaTiO3 Reinforced Aluminum Matrix: *Manisha Dixit*¹; Rajiv S. Mishra¹; ¹University of Missouri-Rolla

11:40 AM

Determining Thermal Residual Stress in Tib2-B4c Ceramic Matrix Composite using the Finite Element Technique: *Guruprasad Gireesh*¹; Tirimalai Srivatsan¹; Xiaosheng Gao¹; G. Zhang¹; ¹University of Akron

Heat Treating for the 21st Century: Vision 2020 and New Materials Development: Heat Treatment Effects on Microstructure & Properties/Novel Heating Methods

Program Organizers: B. Lynn Ferguson, Deformation Control Technology, Inc.; Robert Hill, Solar Atmospheres of Western PA

Monday AM Room: 329
September 26, 2005 Location: Convention Center

Session Chair: B. Lynn Ferguson, Deformation Control Technology, Inc.

9:00 AM Cancelled

The Effect of Two-Step Annealing Treatment on the Mechanical Properties of a Maraging Steel

9:20 AM Cancelled

Effects of Solution Annealing Treatment Temperature on Mechanical Properties of a High Strength 16Ni-Co-Mo-Ti Maraging Steel

9:40 AM

The Effect of Induction Hardening on the Mechanical Properties of Steel with Controlled Prior Microstructures: *Jason J. Coryell*¹; David K. Matlock¹; John G. Speer¹; ¹Colorado School of Mines

10:00 AM Break

10:20 AM

Rapid Infrared Heat Treatment of Aluminum Cast Structures: *Puja Kadolkar*¹; Craig A. Blue¹; Qingyou Han¹; Paul C. Becker¹; ¹Oak Ridge National Laboratory

10:40 AM

A Novel, In-Situ Electro Heat Treatment Technique: Process Feasibility Studies: S. Parihar¹; A. Roy¹; R. C. Sharma¹; Rajiv Shekhar¹; ¹Indian Institute of Technology, Kanpur

11:00 AM

High Emissivity Coatings on Refractories for Energy Savings: *Kimberly Steiner*¹; Krishnaswamy Rangan¹; Sankar Sambasivan¹; ¹Applied Thin Films, Inc.

Integration of Theoretical, Computational and Experimental Studies of Interfaces and Microstructural Evolution: Grain Growth

Program Organizers: Gregory S. Rohrer, Carnegie Mellon University; Alain S. Karma, Northeastern University; Paul P. Wynblatt, Carnegie Mellon University; Anthony D. Rollett, Carnegie Mellon University; David J. Srolovitz, Princeton University; Diana Farkas, Virginia Tech; Dominique Chatain, Centre National de La Recherche Scientifique; Christopher F. Woodward, Air Force Research Laboratory

Monday AM Room: 309
September 26, 2005 Location: Convention Center

Session Chair: David Srolovitz, Princeton University

9:00 AM Invited

Unraveling the Mystery of the Lognormal Grain-Size Distribution in Normal Grain Growth: *Carl E. Krill*¹; ¹University of UIm

9:30 AM

Combined Atomistic and Mesoscopic Simulations of Abnormal Grain Growth in Single-Phase Materials: Kanishk Rastogi¹; Rakesh Behera²;

*Dorel Moldovan*¹; ¹Louisiana State University; ²University of Florida

9:50 AM

Characterization and Modeling of Grain Growth in a Ni-Base Superalloy: *Eric J. Payton*¹; Peter M. Sarosi¹; Yunzhi Wang¹; Deborah DeMania Whitis²; David Mourer²; Michael J. Mills¹; ¹Ohio State University; ²General Electric Company

10:10 AM

Modeling Beta Grain Growth in Ti-6Al-4V: Ning Ma¹; *Yunzhi Wang*¹; ¹Ohio State University

10:30 AM Break

10:50 AM Invited

Impact of Triple Junctions on Grain Boundary and Grain Growth Kinetics: Theory, Simulation and Experiment: *Dmitri A. Molodov*¹; Günter Gottstein¹; Lasar L. Shvindlerman¹; ¹RWTH Aachen University

11:20 AM

Dynamic Orientation Imaging of Recrystallization and Grain Growth: *Matthew M. Nowell*¹; Stuart I. Wright¹; David P. Field²; ¹TSL-EDAX; ²Washington State University

11:40 AM

Affinities among Grain Classes and Topological Events in 2D Grain Growth: *Alan P. Sprague*¹; Burton R. Patterson¹; ¹University of Alabama

Material Lightweights or Ultralights: Session I

Program Organizers: David D. Leon, Alcoa Inc; David Novotnak, Carpenter Powder Products

Monday AM

Room: 303

September 26, 2005 Location: Convention Center

Session Chairs: David D. Leon, Alcoa Inc; David Novotnak, Carpenter Powder Products

9:00 AM Introductory Comments by Symposium Chair

9:15 AM

Syntheses, Structure, Properties, and Prospective Application of Gas-Eutectic Porous Materials: *Vladimir Ivanovich Shapovalov*¹; ¹MER Corporation

9:40 AM

Weight Reduction in Aircrafts by Means of New Magnesium Castings: *Gurutze Arruebarrena*¹; Iñaki Hurtado¹; Achim Wendt²; Boris Bronfin³; ¹Mondragon Goi Eskola Politeknikoa; ²RWP GmbH; ³Magnesium Research Institute

10:05 AM

Metal Matrix Composite Processing for Producing Lightweight Structures: *Brian L. Gordon*¹; ¹Touchstone Research Laboratory

10:30 AM

Mechanical Properties of New Composite Metal Foams under Compressive Monotonic and Fatigue Loadings: *Afsaneh Rabiei*¹; Brian Neville¹; Nickolas Reese¹; Lakshmi Vendra¹; ¹North Carolina State University

10:55 AM Break

11:15 AM

Creep Properties of Syntactic Aluminum Foams: *Olivier Couteau*¹; David C. Dunand¹; ¹Northwestern University

11:40 AM

Hybrid Lightweight Multifunctional Structures: *Daniel R. Mumm*¹; ¹University of California, Irvine

12:05 PM

Pyramidal Core Sandwich Structures: Manufacturing, Experiment, and Modeling: *Jason R. Tice*¹; Marc Zupan¹; ¹University of Maryland Baltimore County

12:30 PM

Design Concepts of a 17-4 PH Stainless Steel Sandwiched Fan Blade with a Metal Foam Core: *Louis J. Ghosn*¹; Sai V. Raj¹; Bradley A. Lerch¹; Mohan G. Hebsur¹; ¹NASA

Materials and Life Management Issues: Evaluation Tools & Policy

Program Organizers: Julie Schoenung, University of California; Andrew Shapiro, Jet Propulsion Laboratory; Oladele Ogunseitan, University of California; Jean-Daniel Saphores, University of California

Monday AM

Room: 305

September 26, 2005 Location: Convention Center

Session Chairs: Julie Schoenung, University of California, Davis; Jean-Daniel Saphores, University of California, Irvine

9:00 AM Invited

Economic Input Output, Environmental Life Cycle Assessment and Heavy Metal Flows: *Chris Hendrickson*¹; Scott Matthews¹; ¹Carnegie Mellon University

9:30 AM Invited

Environmental Tools for Material and Process Selection: *Raymond L. Smith*¹; ¹U.S. Environmental Protection Agency

10:00 AM

Development of Standards for Testing of Declarable Substances in Materials: *Timothy McGrady*¹; ¹IMR Test Laboratories/ASTM International

10:25 AM Break

10:40 AM Invited

Materials Trends in Electronics - Life Cycle Implications: *Karsten Schischke*¹; Hansjoerg Grieser²; Jutta Mueller²; Herbert Reichl¹; ¹Technical University of Berlin; ²Fraunhofer IZM

11:10 AM

Toxic Use Reduction Act: Policy Recommendation for California: *Hai-Yong Kang*¹; Oladele Ogunseitan¹; Jean-Daniel M. Saphores¹; Andrew A. Shapiro²; Julie M. Schoenung¹; ¹University of California; ²Jet Propulsion Laboratory

11:35 AM

Heavy Metals Management Policy – Achievements and Outlook: *Sangwon Suh*¹; ¹Carnegie Mellon University

Materials for the Hydrogen Economy: Plenary Session

Program Organizers: John J. Petrovic, Los Alamos National Laboratory; Iver E. Anderson, Iowa State University; Thad Matthew Adams, Westinghouse Savannah River Company; Gary Sandrock, SunaTech Inc; Colleen F. Legzdins, Ballard Power Systems; Jeffrey W. Stevenson, Pacific Northwest National Laboratory; Z. Gary Yang, Pacific Northwest National Laboratory

Monday AM

Room: 407

September 26, 2005 Location: Convention Center

Session Chair: John J. Petrovic, Los Alamos National Laboratory

9:00 AM Introductory Comments by Plenary Session Chair

9:15 AM Plenary

Driving Toward a Hydrogen Economy - The Federal Government Role: *JoAnn Milliken*¹; ¹U.S. Department of Energy

9:35 AM Plenary

Material Needs for Hydrogen Production in a Hydrogen Economy: *Mark Paster*¹; ¹U.S. Department of Energy

9:55 AM Plenary

Materials Needs for a Hydrogen Economy: Hydrogen Delivery: *George Parks*¹; ¹ConocoPhillips

10:15 AM Break**10:35 AM Plenary**

The National Hydrogen Storage Project: *Sunita Satyapa*¹; *Carole Read*¹; *John Petrovic*²; ¹U.S. Department of Energy; ²Los Alamos National Laboratory (on assignment to DOE)

10:55 AM Plenary

Proton Exchange Membrane Fuel Cells for Vehicles: *Charles Stone*¹; ¹Ballard Power System

11:15 AM Plenary

Solid Oxide Fuel Cell Systems for Stationary Power Generation: *Timothy J. Rehg*¹; ¹GE Energy

11:35 AM Plenary

Basic Research Needs for the Hydrogen Economy: *Harriet Kung*¹; ¹DOE Office of Basic Energy Sciences

Modeling and Simulation of Titanium Technology: Theory and Practices: Modeling and Simulation of Titanium: Refinement and Processing I

Program Organizers: Ellen K. Cerreta, Los Alamos National Laboratory; Vasisht Venkatesh, Timet Corporation; F. Robert Dax, Concurrent Technologies Corporation; Jaimie S. Tiley, U.S. Air Force

Monday AM Room: 405
September 26, 2005 Location: Convention Center

Session Chair: Vasisht Venkatesh, Timet Corporation

9:00 AM Keynote

The Role of Microstructure Modeling in the Airframe Industry: *Rodney R. Boyer*¹; *Jaimie S. Tiley*²; *David U. Furrer*³; ¹Boeing Company; ²U.S. Air Force; ³Ladish Company Inc

9:35 AM

Mathematical Modeling of Reduction of Pellets of Titanium Dioxide during the FFC Process: *Pratish Kar*¹; *S. S. Edussuriya*¹; *James W. Evans*¹; ¹University of California, Berkeley

9:55 AM

Phase Field Model of Electrochemistry for the Ti-Mg-Cl Ternary System in the Subhalide Reduction Process: *Wanida Pongsaksawad*¹; *Adam Clayton Powell*¹; ¹Massachusetts Institute of Technology

10:15 AM Invited

Modeling of Microstructure Evolution in Titanium Alloys: *Laurentiu Nastac*¹; *F. Robert Dax*¹; ¹Concurrent Technologies Corporation

10:45 AM Break**11:00 AM Invited**

Single-Melt Plasma Arc Cold Hearth Melting - A Modeling Perspective: *Yuan Pang*¹; *Kuang-O Oscar Yu*²; *F. Robert Dax*¹; ¹Concurrent Technologies Corporation; ²RTI International Metals, Inc.

11:30 AM

Deformation Processing and Microstructural Evolution in a Near-Alpha Titanium Alloy: *Priti Wanjara*¹; *Mohammad Jahazi*¹; *Jean-Pierre Immarigeon*¹; ¹National Research Council Canada

11:50 AM

Modeling the Microstructure Evolution during Repeated Thermal Cycling of Ti-6Al-4V: *Shawn M. Kelly*¹; *Sudarsanam S. Babu*²; *Stan A. David*²; *T. Zacharia*²; *Stephen Kampe*³; ¹Pennsylvania State University; ²Oak Ridge National Laboratory; ³Virginia Tech

Near-Net-Shape Technologies: Powder Metallurgy and Rapid Manufacturing

Program Organizers: Kim W. Mitchiner, Sandia National Laboratories; Animesh Bose, Materials Processing, Inc.; David L. Bourell, University of Texas

Monday AM Room: 403
September 26, 2005 Location: Convention Center

Session Chair: David L. Bourell, University of Texas

9:00 AM

Assessment and Projections on Dimensional Capabilities of Powder Metallurgy Technologies and Needed Investments: *Randall M. German*¹; ¹Pennsylvania State University

9:30 AM

Sintering Titanium Powders: *Stephen James Gerdemann*¹; *David Alman*¹; ¹U.S. Department of Energy

9:55 AM

Powder Injection Molding of Hardmetals: *Animesh Bose*¹; ¹Materials Processing, Inc.

10:20 AM

Property Improvement of Near-Net Shape Nickel Base Superalloys via Hot Isostatic Pressing of Metal Powders: *Michael D. Sherwin*¹; *Jack D. Staite*¹; *Frank J. Rizzo*¹; *Mark S. Sperber*¹; ¹Crucible Compaction Metals

10:45 AM Break**11:15 AM**

Rapid Manufacturing Materials Fundamentals: *David L. Bourell*¹; *Joseph J. Beaman*¹; ¹University of Texas

11:45 AM

Laser Additive Manufacturing for Near-Net Shape: Overview and Applications: *James William Sears*¹; ¹South Dakota School of Mines & Technology

12:10 PM

Materials Development in ProMetal: *Howard A. Kuhn*¹; *Jianxin Liu*¹; ¹Ex One Corporation

12:35 PM

Metal Printing Process: A Rapid Manufacturing Process Based on Xerography using Metal Powders: *Casper Van der Eijk*¹; *Olav Åsebø*¹; *Øyvind Kolnes*¹; *Terje Mugaas*¹; *Roald Karlsen*¹; *Rune Skjvedal*¹; *Martin Syvertsen*¹; ¹SINTEF

Next Generation Biomaterials: Bioceramics I

Program Organizers: Roger J. Narayan, Georgia Institute of Technology; Sarit B. Bhaduri, Clemson University; Gary S. Fischman, National Materials Advisory Board

Monday AM Room: 320
September 26, 2005 Location: Convention Center

Session Chairs: Sarit Bhaduri, Clemson University; Gary Fischman, Consultant, Biomedical Applications of Materials

9:00 AM Invited

Next Generation Biomaterials: *Roger J. Narayan*¹; ¹Georgia Institute of Technology

9:20 AM Invited

Biomimetic Coating of Titanium Surfaces with Carbonated and Apatitic Calcium Phosphates: *A. Cuneit Tas*¹; *Sahil Jalota*¹; *Sarit Bhaduri*¹; ¹Clemson University

9:40 AM

Novel Ceramic and Polymer-Ceramic Composite Gel Matrices for Non-Viral Gene Delivery: *Hsu-Feng Ko*¹; Charles Sfeir¹; Prashant N. Kumta¹; ¹Carnegie Mellon University

10:00 AM Invited

Biphasic Calcium Phosphate (BCP) Bioceramics: *Racquel Z. LeGeros*¹; ¹New York University

10:20 AM Invited

Biomimetic Bone-Like Nanocomposites for Implants: *Antoni P. Tomsia*¹; ¹Lawrence Berkeley National Laboratory

10:40 AM Invited

Molecular Imprinting to Control Cell Responses: *David Puleo*¹; Rajeswari Itharaju¹; Kyoungmi Lee¹; ¹University of Kentucky

11:00 AM Invited

Mechanical Properties of Hydroxyapatite for Use in Tissue Engineering: The Influence of Osteoblast Culture: *Ian O. Smith*¹; Jeffrey A. Meganck²; Melissa J. Baumann¹; Eldon D. Case¹; Laura R. McCabe¹; Jaclyn N. Allar¹; ¹Michigan State University; ²University of Michigan

11:20 AM Invited

Novel CaHPO₄ and/or CaHPO₄·2H₂O Self-Setting Orthopedic Cements for Skeletal Repair: Tarang Desai¹; A. Cuneyt Tas¹; Sarit Bhaduri¹; ¹Clemson University

11:40 AM Invited

Phosphate Based Bone Cements: *Laurence C. Chow*¹; ¹Paffenbarger Research Center

12:00 PM Invited

Ceramics for Restorative Dentistry: Critical Aspects for Fracture and Fatigue Resistance: *Jeffrey Yates Thompson*¹; ¹University of North Carolina

Residual Stress, Deformation, and Distortion: Welding and Casting

Program Organizers: Zhili Feng, Oak Ridge National Laboratory; Mark R. Blankenau, SeverStal North America; Lawrence A. Lalli, Alcoa Inc

Monday AM Room: 316
September 26, 2005 Location: Convention Center

Session Chair: Zhili Feng, Oak Ridge National Laboratory

9:00 AM Introductory Comments

9:10 AM Invited

Overview of Welding Residual and Distortion Modeling: *Panagiotis (Pan) Michaleris*¹; ¹Pennsylvania State University

9:30 AM Invited

Mechanism of Localized Thermal Tensioning Effect in Preventing Buckling Distortions of Thin-Walled Weldments: *Qiao Guan*¹; Ju Li¹; ¹Beijing Aeronautical Manufacturing Technology Research Institute

9:50 AM

Prediction of Residual Stresses in Cast Aluminum Components: XuMing Su¹; John Lasecki¹; Larry Godlewski¹; *John E. Allison*¹; ¹Ford Motor Company

10:10 AM

Residual Stress Characterization by Neutron Diffraction: Ajit K. Roy¹; *Silpa Budugur Suresh*¹; Subhra Bandyopadhyay¹; Ronald B. Rogge²; Douglas Wells³; ¹University of Nevada, Las Vegas; ²Atomic Energy of Canada Limited; ³Idaho State University

10:30 AM Break

10:50 AM

Modeling Welding Distortion in Large and Complex Structures: *Panagiotis (Pan) Michaleris*¹; ¹Pennsylvania State University

11:10 AM

The Prediction of Welding Distortions using Shell Element-Based Elastic Analysis, Q-Weld: *Gonghyun Jung*¹; ¹EWI

11:30 AM

Characteristics and Control of Welding-Induced Out-of-Plane Distortion in Welded Thin Panels: Myoung-Soo Han¹; *Yoo-Cheol Jeon*¹; Jong-Man Han¹; ¹Daewoo Shipbuilding & Marine Engineering

11:50 AM

Numerical Analysis of Stresses and Strains Behavior in Trailing Heat Sink Mitigation Technique: *Farag Ashor Soul*¹; Zhang Zhang Yanhua¹; ¹Beijing University of Aeronautics and Astronautics

Roll Technology: Session I

Program Organizers: Ron Webber, Dofasco Inc; Philip C. Perry, Nippon Steel

Monday AM Room: 334
September 26, 2005 Location: Convention Center

Session Chairs: Jim Boyd, Cast and Forged Technologies Ltd; Tony Payling, Sarclad, North America LP

9:00 AM

A Study of the Effect of Surface Scanning Speed on the Detectability of Flaws in Rolls using an Automated Ultrasonic Testing Machine: *Peter Ganeff*¹; ¹Xtek, Inc.

9:20 AM

Advanced Service Technology for State of the Art Roll Grinders: *Michael Utsch*¹; ¹Waldrich Siegen GmbH

9:40 AM

Correlation Between the Load of Workrolls, Banding and Rolled-In Scale: *Thomas Reip*¹; Christian Kremaszky¹; Erik Parteder²; Herbert Sondermann²; Ewald Werner¹; ¹TU Muenchen; ²Voestalpine Stahl Linz GmbH

10:00 AM

Effect of Specific Force Distribution on Profile and Flatness of Hot Rolled Strips: *Eugene Nikitenko*¹; ¹U.S. Steel

10:20 AM

Influence of Different Roll Profiles to the Load Distribution and Edge Damages: *Weiguo Ji*¹; Marc Sebastian Schumacher¹; ¹Gontermann-Peipers GmbH

10:40 AM

Recent Developments in HSM Rougher Rolls – Risks and Chances: *Karl Heinz Ziehenberger*¹; Michael Windhager¹; ¹ESW

11:00 AM

Successful Strategy for HSS Rolls Implementation: Eduardo Cannizza¹; Edward J. Kerr²; Miguel Angelo de Carvalho¹; *Renato Rufino Xavier*¹; ¹Acos Villares; ²Consultant

11:20 AM

Influence of Grinding Wheel Density Variability on Roll Grinding Pattern: *Neville Whittle*¹; Robert Blake¹; Michelle Teichman¹; June Epp¹; David Coleman¹; Troy Smith¹; ¹Alcoa

Science and Technology of Powder Materials: Synthesis, Consolidation and Properties: Composite Materials

Program Organizers: Leon L. Shaw, University of Connecticut; Eugene Al Olevsky, San Diego State University; Fernand D. Marquis, South Dakota School of Mines & Technology; Iver E. Anderson, Iowa State University; James H. Adair, Pennsylvania State University; Jitendra P. Singh, Argonne National Laboratory

Monday AM Room: 301
September 26, 2005 Location: Convention Center

Session Chair: Marvin G. McKimpson, Michigan Technology University

9:00 AM

Advances in the Synthesis and Desiccation of Ceramic Matrix Composites: *Fernand D. Marquis*¹; ¹South Dakota School of Mines & Technology

9:20 AM

Ceramic-Metal Composites by Electrophoretic Deposition and Sintering: *Eugene Al Olevsky*¹; Margaret Stern²; Xuan Wang¹; Dmitry Chernyakhovskiy¹; ¹San Diego State University; ²Sun Microsystems

9:40 AM

CuSiC Metal Matrix Composites Fabricated by Quasi-Isostatic Forging of Cu Coated SiC Powders: The Effect of SiC Grain Size and Forging Pressure on Densification and Thermal Conductivity: *Glenn Sundberg*¹; Nirupama Kattamuri¹; ¹University of Massachusetts Lowell

10:00 AM

Dynamic Mechanical Analysis of Ferroelectric Ceramic Reinforced Metal Matrix Composites; Copper-Barium Titanate (CBT) System: *Ted A. Asare*¹; Jeffrey Schultz¹; Ben Poquette¹; Alex Aning¹; Stephen Kampe¹; ¹Virginia Tech

10:20 AM

Effect of Various Amount of Al₂O₃ Addition on the Flexural Strength, Fracture Toughness and Hardness of c-ZrO₂/Al₂O₃ Composites Used as an Electrolyte for Solid Oxide Fuel Cell: *Suleyman Tekeli*¹; Metin Gürtü¹; ¹Gazi University

10:40 AM

Do the Chemically Induced Disorder in Spinel Structure Affect the Sintering Kinetics?: *Prabeer Barpanda*¹; S. K. Behera²; S. K. Pratihari³; S. Bhattacharya³; ¹Rutgers University; ²Lehigh University; ³National Institute of Technology

11:00 AM

Particulate Composites of Aluminum with Intermetallic Reinforcements: *Gollapudi S. Murty*¹; Brian E. Joseph¹; ¹Touchstone Research Laboratory, Ltd.

11:20 AM

Ferroelectric Reinforced Metal Matrix Composites for Damping Applications: *Ben D. Poquette*¹; Jeffrey P. Schultz¹; Ted A. Asare¹; Alex O. Aning¹; Stephen Kampe¹; ¹Virginia Tech

11:40 AM

Shock-Wave Compaction of Boron Containing Composite Powders: *Nikoloz M. Chikhradze*¹; Fernand D. Marquis²; Karl P. Staudhammer³; Akaki B. Peikrishvili¹; Mikhael N. Chikhradze¹; G. Gapishvili¹; ¹Academy of Sciences of Georgia; ²South Dakota School of Mines & Technology; ³Los Alamos National Laboratory

The Physics and Materials Challenges for Integrated Optics - A Step in the Future for Photonic Devices: Session I

Program Organizers: Animesh Jha, University of Leeds; Andrew Bell, University of Leeds; Nuggehalli M. Ravindra, New Jersey Institute of Technology; Andy R. Harvey, Heriot Watt University

Monday AM Room: 302
September 26, 2005 Location: Convention Center

Session Chairs: Narsingh Bahadur Singh, Northrop Grumman Corporation; Aris Christou, University of Maryland

9:00 AM Invited

3D Displays Based on Deformable Polydimethylsiloxane (PMDS) Lenticulars: *Mostafa M. El-Ashry*¹; Henry Daniel Young¹; ¹Wright State University

9:20 AM Invited

Advanced Light Emissive Composite Materials for Integrated Optics: *Sergei L. Pyshkin*¹; John Ballato²; ¹Academy of Sciences; ²Clemson University

9:40 AM

Depositing Nano Materials and Biological Cells in Random Hole Optical Fibers: *Navin Jose Manjooran*¹; Gary R. Pickrell¹; ¹Virginia Tech

10:00 AM Invited

Integration of III-Nitrides with Silicon Based Micro- and Nanoelectronics: *Jagdish Narayan*¹; *Tom Rawdanowicz*²; ¹New Jersey Institute of Technology; ²North Carolina State University

10:20 AM Invited

Dielectric Constants for AlGaInAs Quaternary Semiconductor Alloys Grown by MBE for Bragg Mirror Applications: *Maria Linnick*¹; C. C. Zhang¹; *Aris Christou*¹; ¹University of Maryland

10:40 AM Invited

Design of Ternary Halides for Long Wavelength Infrared (LWIR) Applications: *Narsingh Bahadur Singh*¹; David Knuteson¹; Andre Berghmans¹; Nils Fernelius²; Frank Kenneth Hopkins²; ¹Northrop Grumman, ES; ²Air Force Research Laboratory

11:00 AM

Far-Infrared Studies of Silicon Related Structures using THz Spectroscopy: *Amartya Sengupta*¹; Aparajita Bandyopadhyay¹; John F. Federici¹; Nuggehalli M. Ravindra¹; ¹New Jersey Institute of Technology

11:20 AM

Radiative Properties of Quartz, Erbium Oxide and Silicon Carbide: *Nuggehalli M. Ravindra*¹; Sudhakar Shet¹; Vishal R. Mehta¹; Markus Rabus¹; Anthony T. Fiory¹; ¹New Jersey Institute of Technology

What Makes a Good Materials Engineer and How Best to Educate Them: What Makes a Good Materials Engineer: The Industrial Perspective

Program Organizers: Paul E. Cantonwine, Bechtel Bettis Inc; Kent D. Peaslee, University of Missouri-Rolla; Mark A. Palmer, Kettering University; Michael B. Connelly, Casey Products Inc

Monday AM Room: 315
September 26, 2005 Location: Convention Center

Session Chair: Paul E. Cantonwine, Bechtel Bettis Inc.

9:00 AM Introductory Comments

9:05 AM Keynote
Desirable Attributes of Materials Engineers for the 21st Century:
*James C. Williams*¹; ¹Ohio State University

10:00 AM Invited
What Makes a Good Materials Engineer: *Victoria Brady*¹; ¹DuPont

10:30 AM Invited
What Makes a Good Materials Engineer in the Aluminum Industry?:
*Gregory J. Hildeman*¹; ¹Alcoa Inc

11:00 AM Break

11:10 AM Invited
What Makes a Good Welding Engineer: *Lee Kvidahl*¹; ¹Northrop Grumman Ship Systems

11:40 AM Invited
What Makes a Good Materials Engineer in the Orthopedic Medical Device Industry?: *Dana J. Medlin*¹; ¹Zimmer

12:10 PM Invited
What the Well-Rounded Materials Manager Needs to Know: *Gordon H. Geiger*¹; ¹University of Arizona

Coatings 2005: Thermal Barrier Coatings (TBCs) II

Program Organizers: Nitin P. Padture, Ohio State University; Lorraine F. Francis, University of Minnesota; Janet M. Hampikian, Boise State University; Narendra B. Dahotre, University of Tennessee

Monday PM Room: 317
September 26, 2005 Location: Convention Center

Session Chair: Daniel Mumm, University of California, Irvine

2:00 PM Invited
Processing-Microstructure Relations in the Solution Plasma Spray Process for Making Thermal Barrier Coatings and Dense Coatings:
*Eric Jordan*¹; Maurice Gell¹; Liangde Xie¹; Baki Cetegen¹; Xing Ma¹; ¹University of Connecticut

2:40 PM
Microstructural Tailoring of Thermal Barrier Coatings (TBCs) for Reduced Thermal Conductivities: *Amol Dinkar Jadhav*¹; Nitin P. Padture¹; P. Miranzo²; E. H. Jordan³; M. Gell³; ¹Ohio State University; ²Instituto de Cerámica y Vidrio; ³University of Connecticut

3:00 PM
Nanostructured Coatings of Metastable Ceramics in the Zirconia-Alumina and the Zirconia-Yttria-Alumina Systems: Alexander L. Vasiliev¹; *Nitin P. Padture*²; Xinqing Ma³; ¹University of Connecticut; ²Ohio State University; ³Inframat Corporation

View complete technical program at <http://pcs.tms.org>

3:20 PM Break

3:40 PM Invited
Failure of EB-PVD Thermal Barrier Coating Systems under Cyclic Loading: *Uwe Schulz*¹; Klaus Fritscher¹; Wolfgang Brauel¹; Bernd Baufeld¹; ¹DLR, German Aerospace Center

4:20 PM
Effects of Mixed Temperatures and Hold Times on EB-PVD Thermal Barrier Coating Damage and Lifetime: *Swetha Sridharan*¹; Eric Jordan¹; Maurice Gell¹; ¹University of Connecticut

4:40 PM
Analysis of Localized Damage in EB-PVD/(Ni,Pt)Al Thermal Barrier Coatings: *Mei Wen*¹; Eric Jordan¹; Maurice Gell¹; ¹University of Connecticut

5:00 PM
In Situ Synchrotron Strain Measurements in Thermal Barrier Oxides: *Arun Reddy*¹; Boyd Veal²; Arvydas Paulikas²; Arthur Heuer¹; ¹Case Western Reserve University; ²Argonne National Laboratory

5:20 PM
Observations and Analyses of Cyclic Oxidation Behavior in Thermal Barrier Systems with NiCoCrAlY Bond Coats: *Sabine Faulhaber*¹; Anthony G. Evans¹; ¹University of California, Santa Barbara

Coatings 2005: Hard Coatings II

Program Organizers: Nitin P. Padture, Ohio State University; Lorraine F. Francis, University of Minnesota; Janet M. Hampikian, Boise State University; Narendra B. Dahotre, University of Tennessee

Monday PM Room: 318
September 26, 2005 Location: Convention Center

Session Chair: Paul A. Salvador, Carnegie Mellon University

2:00 PM
Microstructural Characterization of PVD TiAlN Monolithic and Multilayer Hard Coatings: *Yan Cao*¹; Nitin Patel¹; Paul A. Salvador¹; Aharon Inspektor²; Ron Penich²; Yixiong Liu²; ¹Carnegie Mellon University; ²Kennametal Inc.

2:20 PM
Impact of the Thermal Stability on the Mechanical and Tribological Behavior in Nano-Structured Hard PVD Coating Materials: *G. El Nayal*¹; ¹Institute of Materials Research

2:40 PM Invited
Nanocomposite Coatings: Structure and Properties: *Jeff T.H. DeHosson*¹; Damiano Galvan¹; Yutao Pei¹; ¹University of Groningen

3:20 PM Break

3:40 PM
Transition Metal Borides Produced by Solid State Diffusion: *Raghasudha Vangaveti*¹; Roumiana Petrova¹; Kranthi Kumar Pallegar¹; ¹New Jersey Institute of Technology

4:00 PM
Ab Initio Studies of Cubic Boron Nitride Bulk and Surface Properties: *Newton Eng Kin Ooi*¹; James B. Adams¹; ¹Arizona State University

4:20 PM Invited
Development of Multi-Component, Nanostructured, Nanocomposite Coatings for Tribological Applications: *John Jeremy Moore*¹; In-Wook Park¹; Jianliang Lin¹; Kwang Ho Kim²; Augusto O. Kunrath¹; Dalong Zhong¹; Andrey O. Voevodin³; Gary Doll⁴; Evgeny O. Levashov⁵; ¹Colorado School of Mines; ²Pusan National University; ³Air Force Research Laboratory; ⁴Timken Company; ⁵Moscow State Institute of Steel and Alloys

5:00 PM
The Characterization of Titanium Nitride Films under Controlled Atmosphere: *Hong-Ying Chen*¹; ¹Taichung Healthcare and Management University

5:20 PM

Effect of Porosity on the Coatibility of Powder Metal Parts PVD Technique: *Adem Kurt*¹; Mehmet Turker¹; Mustafa Kanlidag²; ¹Gazi University; ²Milli Egitim Bakanligi

Creep Deformation and Fracture, Design, and Life Extension: Session II

Program Organizers: Rajiv S. Mishra, University of Missouri; James Calvin Earthman, University of California; Sai V. Raj, NASA Glenn Research Center; R. Viswanathan, Electric Power Research Institute

Monday PM Room: 306
September 26, 2005 Location: Convention Center

Session Chair: James Calvin Earthman, University of California

2:00 PM Invited

Rare-Earth Additions to Al-Sc Alloys for Creep-Resistance Above 300°C: *David C. Dunand*¹; Marsha E. Van Dalen¹; Richard A. Karnesky¹; David N. Seidman¹; ¹Northwestern University

2:20 PM

Solute-Drag Creep Transient Dependence on Time and Strain: *Amanda Niazi*¹; Jung-Kuei (Brian) Chang¹; *Eric M. Taleff*¹; Paul E. Krajewski²; ¹University of Texas at Austin; ²General Motors Corporation

2:40 PM

Creep Behavior of an Ultrafine-Grained Cryomilled Al-Mg Alloy: *Bing Q. Han*¹; Enrique J. Lavernia¹; ¹University of California

3:00 PM

Development of Mg Alloys with Improved Creep Properties: *Abraham Robbie Rosen*¹; ¹Technion

3:20 PM Break

3:40 PM

Creep Model for Alloys Strengthened with Fine Coherent Precipitates and Coarse Incoherent Dispersoids: *Richard A. Karnesky*¹; David C. Dunand¹; ¹Northwestern University

4:00 PM

High Temperature Behavior of Ultrafine Grained Aluminum Alloys with High Volume Fraction of Dispersoids: *Rajiv S. Mishra*¹; Sachin P. Deshmukh¹; ¹University of Missouri

4:20 PM

Microstructural Evolution and High-Temperature Mechanical Properties of Nanoscale Precipitation-Strengthened Al-Zr and Al-Zr-Ti Alloys: *Keith E. Knipling*¹; David C. Dunand¹; David N. Seidman¹; ¹Northwestern University

4:40 PM

Effect of Stress State on Primary Creep Behavior of PM Al-Mg-Sc-Zr Alloys and Composites: *Sachin P. Deshmukh*¹; Rajiv S. Mishra¹; Kevin L. Kendig²; ¹University of Missouri; ²Air Force Research Laboratory

Current Topics in Electronic Packaging: Pb Free Solders, Thermal Management: Pb Free Solder Joints - Reliability

Program Organizers: Eric J. Cotts, Binghamton University; C. Robert Kao, National Central University; Mark A. Palmer, Kettering University; K. N. Subramanian, Michigan State University; Paul Thomas Vianco, Sandia National Laboratories; K. M. Nair, Dupont de Nemours & Co Inc

Monday PM Room: 321
September 26, 2005 Location: Convention Center

Session Chairs: C. Robert Kao, National Central University; Iver E. Anderson, Iowa State University

2:00 PM Invited

Lead Free Assembly Reliability Concerns: *Peter Borgesen*¹; ¹Universal Instruments Corporation

2:30 PM Invited

Thermal Aging Effects on Impact and Shear Strength of Tin-Silver-Copper-X Solder Joints: *Iver E. Anderson*¹; Joel Harringa¹; Sung K. Kang²; ¹Iowa State University; ²IBM Corporation

3:00 PM Invited

Applicability of Push-Off Shear Test of the Sessile Drop Samples as Express Test for the Solder Candidate Selection: *Natalia Sobczak*¹; ¹Foundry Research Institute

3:30 PM Break

3:45 PM

Low-Temperature Sintering of Nanoscale Metal Paste: A Lead-Free Die-Attach Solution for High-Performance and High-Temperature Electronic Packaging: *Guo-Quan Lu*¹; ¹Virginia Polytechnic Institute

4:15 PM

Aging Effects on Mixed SnPb/Pb-Free Solder Joints: *Richard Colfax*¹; Matt O'Keefe¹; David Drain¹; ¹University of Missouri Rolla

4:35 PM

Volume Effect on the Soldering Reaction Between SnAgCu Solders and Ni: C. E. Ho¹; C. Robert Kao¹; ¹National Central University

4:55 PM

Solidification Temperature and Microstructure Variations in SnAgCu Solders: *Lawrence P. Lehman*¹; Eric Cotts¹; ¹Binghamton University

5:15 PM

Temperature Dependent Mechanical Properties of Sn-Ag-X Solder Joints Reflowed at 215-225°C: *Mark A. Palmer*¹; ¹Kettering University

MONDAY PM

Defect Formation, Detection, and Elimination During Casting, Welding, and Solidification: Modeling

Program Organizers: Mei Ling C. Clemens, Howmet Corporation; Joseph D. Puskar, Sandia National Laboratories; Mark R. Blankenau, Severstal NA; Srinath Viswanathan, Sandia National Laboratories; Qingyou Han, Oak Ridge National Laboratory

Monday PM Room: 333
September 26, 2005 Location: Convention Center

Session Chairs: Srinath Viswanathan, Sandia National Laboratories; Qingyou Han, Oak Ridge National Laboratory

2:00 PM

Thermo-Mechanical Effects Near the Meniscus During Continuous Casting of Ultra-Low Carbon Steel: *Joydeep Sengupta*¹; Brian G. Thomas¹; ¹University of Illinois

2:25 PM

Modeling of Reoxidation Inclusion Formation during Filling of Steel Castings: Kent D. Carlson¹; *Christoph Beckermann*¹; ¹University of Iowa

2:50 PM

Development of a Hot Tear Indicator for Use in Casting Simulation: Charlie Monroe¹; *Christoph Beckermann*¹; ¹University of Iowa

3:15 PM Break

3:25 PM

CAFD Model for Solidification of Multicomponent Ni-Based Superalloys: *Ludovic Thuinet*¹; Peter D. Lee¹; Muthiah Ganesan¹; Yehia Youssef¹; ¹Imperial College London

3:50 PM

Stray Grain Formation in the Seed Region of Single Crystal Turbine Blades: *Xiaoli Yang*¹; Peter D. Lee¹; Malcolm McLean¹; Neil D'Souza²; ¹Imperial College London; ²Rolls-Royce plc

4:15 PM

Defects Prediction during Multi-Component Alloys Solidification: *Jianzheng Guo*¹; Mark T. Samonds¹; Zhu Jianzhong¹; ¹ESI US R&D

Developments in Sheet Products for Automotive Applications: TRIP Steels and Dual Phase Steels

Program Organizers: James R. Fekete, General Motors Corporation; Roger Pradhan, Mittal Steel

Monday PM Room: 330
September 26, 2005 Location: Convention Center

Session Chairs: John Speer, Colorado School of Mines; Matt Walp, DaimlerChrysler Corporation

2:00 PM

Transformation Behaviour and Mechanical Properties of Hot Rolled Dual Phase and TRIP Steels: *Dongsheng Liu*¹; Matthias Militzer¹; Warren Poole¹; ¹UBC

2:30 PM

Super Short Interval Multi-Pass Rolling Technology for Manufacturing Ultrafine-Grained Steel Sheet: *Kaori Miyata*¹; Masayuki Wakita¹; Suguhiro Fukushima¹; Manabu Etou¹; Tamotsu Sasaki¹; ¹Sumitomo Metal Industries, Ltd.

3:00 PM

Influence of Al Additions on Austenite Decomposition in a Continuous Annealed Dual-Phase Steel: *Olga A. Girina*¹; Nina M. Fonstein¹; ¹Mittal Steel

3:30 PM Break

3:45 PM

Development of Low-Carbon Nb-Bearing Dual-Phase Steels during Simulated CGL Processing Conditions: *C. Isaac Garcia*¹; K. Cho¹; Y. Gong¹; Anthony J. DeArdo¹; ¹University of Pittsburgh

4:15 PM

Rapid Heat Treatment of Dual Phase Steels: Melinda Westphal¹; J. David Embury¹; J. Douglas Boyd²; *Joseph R. McDermid*¹; ¹McMaster University; ²Queen's University

4:45 PM

Effect of C, Mn, Si, and Al Additions on the Mechanical Properties of a 980 MPa Tensile Strength, Cold Rolled, Advanced High Strength Steel: *Narayan Pottore*¹; Nina Fonstein¹; Indra Gupta¹; Debanshu Bhattacharya¹; ¹R & D Laboratories, Mittal Steel

Electromagnetics in Materials Processing: Electromagnetic Stirring, Levitation, and Forming

Program Organizers: Robert W. Hyers, University of Massachusetts; Douglas M. Matson, Tufts University; Daniel J. Williams, Inductoheat Inc

Monday PM Room: 319
September 26, 2005 Location: Convention Center

Session Chair: Ben Q. Li, Washington State University

2:00 PM

Experimental Results on the Fluid Flow in an Electromagnetically Driven Metallic Melt: *Andreas Cramer*¹; Kapil Varshney¹; Chaujoe Zhang¹; ¹Research Centre Rossendorf

2:20 PM

Electromagnetically Driven Convection Applied during Solidification of Pb-Sn Alloys: *Sven Eckert*¹; Bernd Willers¹; Petr A. Nikritjuk²; Kerstin Eckert²; Ulf Michel²; Gustav Zouhar²; ¹FZ Rossendorf; ²TU Dresden

2:40 PM

On the Intensification of Electromagnetic Stirring in Continuous Casting Facilities: *Ephim Golbraikh*¹; Irving Dardik; Herman Branover¹; Arkady Kapusta¹; Michael Khavkin¹; Shaul Lesin¹; Boris Mikhailovich¹; Raymond Thompson¹; ¹Energetics Technologies Ltd

3:00 PM

Fluid Flow Effects in Electromagnetically Levitated Droplets: *Robert W. Hyers*¹; ¹University of Massachusetts

3:20 PM Break

3:40 PM

Application of EM Levitation Processing: Fundamental Studies of Steel Rapid Solidification: Andrew Mueller¹; *James Burke*¹; David Fair¹; Douglas M. Matson¹; ¹Tufts University

4:00 PM

Numerical Model for Specific Heat Measurement of Electromagnetically Levitated Sample by Modulation Power Method: *Baojian Guo*¹; George Teodorescu¹; Deming Wang¹; Ruel A. Overfelt¹; ¹Auburn University

4:20 PM

Electromagnetic Metal Forming: *Glenn S. Daehn*¹; Vincent J. Vohnout¹; Mala Seth¹; Jianhui Shang¹; Manish Kamal¹; ¹Ohio State University

4:40 PM

Electromagnetic Formation Products from Composite Polymeric Materials: *I. E. Benevolenski*¹; ¹State Technical University to Izhevsk

Environmental Degradation of Non-Metallic Materials: Session I

Program Organizers: Raul B. Rebak, Lawrence Livermore National Laboratory; John N. DuPont, Lehigh University; Robert J. Hanrahan, National Nuclear Security Administration

Monday PM Room: 311
September 26, 2005 Location: Convention Center

Session Chair: Raul B. Rebak, Lawrence Livermore National Laboratory

2:00 PM

Corrosion and Crack Growth of Ceramics and Glasses: *Russell H. Jones*¹; ¹Pacific Northwest National Laboratory

2:20 PM

Ultra-High Temperature Stability of Unidirectionally Solidified Eutectic Oxides in High Water Vapor Pressure Environments: *Yoshihisa Harada*¹; Takayuki Suzuki¹; Kazumi Hirano¹; Narihito Nakagawa²; Yoshiharu Waku³; Ryuji Shirakawa⁴; Tokuo Teramoto⁴; ¹National Institute of Advanced Industrial Science & Technology; ²UBE Industries, Ltd; ³Engineering Research Association for High Performance Gas Turbine; ⁴University of Tsukuba

2:40 PM

A Study on Improvement of Compression Set of Fluoroelastomer (FKM) O-Ring for 2-Stroke Marine Diesel Engine: *Se Hern Oh*¹; Yong Hee Ahn¹; Sang Ek Lee¹; Joong Geun Youn¹; ¹Hyundai Heavy Industries Company, Ltd.

3:00 PM Break

3:20 PM

Effect of Ageing on the Creep-Rupture Behavior of a Glass-Fiber Composite Exposed to an Aqueous Environment: *John D. Wolodko*¹; Randy Petersen¹; ¹C-FER Technologies

3:40 PM

Accelerated Life Testing of Polymer Potting Compounds used in Truck Transmissions: Timothy L. Hoeller¹; John Shebuski²; ¹Triton College; ²DQR Testing

4:00 PM

Ion Beam Analysis of Lithium Hydride Hydrolysis: *Carol Haertling*¹; Robert Hanrahan, Jr.¹; Joseph Tesmer¹; ¹Los Alamos National Laboratory

4:20 PM

Environmental Influence on Fracture Strength of BeO Ceramic: *Chol Kyl Syn*¹; Robert A. Riddle¹; Patrick J. Harwood¹; Ronald F. Simandl²; ¹Lawrence Livermore National Laboratory; ²Y-12 National Security Complex

Failure Analysis: Joint Session with Joining of Monolithic Structures and Components I: Failure Analysis of Welds and Joints

Program Organizers: Debbie Aliya, Aliya Analytical Inc; Dale E. Alexander, Engineering Systems Inc; David A. Moore, Packer Engineering; Charles V. Robino, Sandia National Laboratories; Matthew Walp, DaimlerChrysler; Thomas J. Lienert, Los Alamos National Laboratory

Monday PM Room: 310
September 26, 2005 Location: Convention Center

Session Chairs: Tom Ackerson, Southern Research Institute; James Lane, MACTEC Engineering and Consulting Inc.

2:00 PM

Illustrative Case Studies in Weld-Related Failure: *Robert W. Warke*¹; ¹LeTourneau University

2:40 PM

Pitting Corrosion Failure of Welded AISI 304 Stainless Steel Tubing: *Keith Cline*¹; ¹MDE Engineers, Inc.

3:00 PM

Failure of a Roll-Formed Boiler Tube Joint During Hydrostatic Testing: *Thomas N. Ackerson*¹; ¹Southern Research Automotive

3:20 PM

Fillet Weld Failure of a Pollution Abatement Duct: *Dennis L. McGarry*¹; ¹FTI/SEA Consulting

3:40 PM

Failure Analysis of Braze Interfaces in Vacuum Devices: *Dylan Leber*¹; Irina Molodetsky¹; ¹Princeton Technology Center

4:00 PM

Liquid Metal Induced Embrittlement in Fuel Line Braze Joints: *Joseph Maciejewski*¹; ¹Applied Technical Services

4:20 PM

Failure Analysis of Brazed Plate Heat Exchangers in Lithium Chloride Service: *Michael E. Stevenson*¹; Jeffrey L. McDougall¹; Robyn L. Herman¹; ¹Metals & Materials Engineers

Ferrous Physical Metallurgy of Highly Alloyed Steels: Stainless Steels

Program Organizer: James P. Materkowski, Timken Latrobe Steel

Monday PM Room: 335
September 26, 2005 Location: Convention Center

Session Chair: Gary M. Michal, Case Western Reserve University

2:00 PM Introductory Comments

2:05 PM

Colossal Supersaturations Created by Low Temperature Carburization of Austenitic Steels: *Gary M. Michal*¹; Frank Ernst¹; Arthur H. Heuer¹; Harold Kahn¹; ¹Case Western Reserve University

2:25 PM

Carbide Formation in Low-Temperature-Carburized Austenitic Stainless Steels: *Frank Ernst*¹; Yan Cao¹; Gary M. Michal¹; Arthur H. Heuer¹; ¹CASE

2:45 PM

Enhanced Corrosion Resistance of Austenitic Stainless Steels Due to Low-Temperature Paraequilibrium Carburization: Kui Du¹; Amir Avishai¹; Hal Kahn¹; Gary Michal¹; Frank Ernst¹; *Arthur Heuer*¹; ¹Case Western Reserve University

3:05 PM

Enhanced Mechanical Properties in Austenitic Stainless Steels Due to Low Temperature Paraequilibrium Carburization: Nikhil Agarwal¹; Katie Day¹; Amir Avishai¹; *Hal Kahn*¹; Gary Michal¹; Frank Ernst¹; *Arthur Heuer*¹; ¹Case Western Reserve University

3:25 PM Break

3:35 PM

Austenite Formation in 2205 Duplex Stainless Steel: *Eric Schmidt*¹; Sridhar Seetharaman¹; ¹Carnegie Mellon University

3:55 PM

Microstructural Stability of 9-12 Cr Steels at Elevated Temperatures: *Omer N. Dogan*¹; Jeffrey A. Hawk¹; ¹U.S. Department of Energy

4:15 PM

Influence of Ce Surface Additions on the Oxidation Behavior of 9-12 Cr Steels: *David E. Alman*¹; W. Keith Collins¹; Omer N. Dogan¹; Jeffrey A. Hawk¹; Gordon R. Holcomb¹; Paul D. Jablonski¹; ¹U.S. Department of Energy

4:35 PM

Metal Dusting Induced Pitting in Alloy 800: *Aditya Putrevu*¹; Zuotao Zeng²; Ken Natesan²; Shailendra K. Varma¹; William G. Durrer¹; ¹University of Texas; ²Argonne National Laboratory

4:55 PM

The Influence of pH on the Passivation Behavior of 254SMO Stainless Steel in 3.5% NaCl Solution: C. T. Liu¹; J. K. Wu¹; ¹National Taiwan Ocean University

5:15 PM

Effect of Mo and Mn Additions on Tensile and Corrosion Behaviors of CD4MCU Cast Duplex Stainless Steels: *Younghwan Jang*¹; Sangshik Kim¹; Jaehyun Lee²; Kyubong Cho¹; Kiwon Kim¹; Junghwan Lee³; ¹Gyeongsang National University; ²Changwon National University; ³Korea Institute of Machinery and Materials

Fractures of Multicomponent Systems: Fracture and Modeling in Electronic Packaging

Program Organizers: Bhaskar S. Majumdar, New Mexico Tech; Nikhilesh Chawla, Arizona State University; John J. Lewandowski, Case Western Reserve University

Monday PM

Room: 307

September 26, 2005

Location: Convention Center

Session Chair: Yu-Lin Shen, University of New Mexico

2:00 PM Keynote

Simulation of Reliability and Failure of Electronic Packaging Materials: *Eliot Fang*¹; ¹Sandia National Laboratories

2:35 PM Invited

Deformation and Fracture Analyses of Solder Joints Under Constrained Shear: *Yu-Lin Shen*¹; ¹University of New Mexico

3:00 PM Invited

Thermo-Mechanically Induced Deformation and Damage in Interconnect Structures in Microelectronic Devices: *Indranath Dutta*¹; C. Park¹; V. Sarihan²; Shuwei Ma¹; ¹U.S. Naval Postgraduate School; ²Freescale Semiconductor

3:25 PM Break

3:45 PM Invited

Heterogeneous Deformation and Damage Nucleation in Lead Free Solder Joints: *Thomas R. Bieler*¹; Adwait U. Telang¹; ¹Michigan State University

4:10 PM

Modeling Thermal Fatigue Behavior in Electronic Packaging: *Xin Deng*¹; Nikhilesh Chawla¹; Tarun Amla²; ¹Arizona State University; ²Isola Laminates

4:30 PM

High Strength Cu-Ni-Sn Alloy for Electrical Connector Applications: *Joshua B. Caris*¹; John J. Stephens²; John J. Lewandowski¹; ¹Case Western Reserve University; ²Sandia National Laboratories

Frontiers of Materials Science 2005: Perspectives on Nanotechnology: Building on the ASM/TMS Distinguished Lecture

Program Organizers: Reza Abbaschian, University of Florida; Srinath Viswanathan, Sandia National Laboratories; T. S. Srivatsan, University of Akron; Robert A. Varin, University of Waterloo

Session Organizers: Jon Tirpak, ATI; Iver E. Anderson, Ames Laboratory

Monday PM

Room: 407

September 26, 2005

Location: Convention Center

Session Chair: William Madia, Battelle

2:00 PM Invited

Nanotechnology: Government's Role: *John H. Marburger*¹; ¹OSTP

2:40 PM Invited

Nanoscale Science Research and Our Energy Future: *Patricia M. Dehmer*¹; ¹U.S. Department of Energy

3:20 PM Invited

What are the Implications of Nanotechnology on Materials Engineering Education?: *James C. Williams*¹; ¹Ohio State University

4:00 PM Panel Discussion

Commercialization of Nano: Industrial Perspectives:

Steven Zylstra, Pittsburgh Technology Council, Moderator
David Diehl, PPG

Lawrence Friedman, Bayer MaterialScience

Todd Osman, U.S. Steel

Luis Vega, Alcoa

Integration of Theoretical, Computational and Experimental Studies of Interfaces and Microstructural Evolution: Grain Boundaries

Program Organizers: Gregory S. Rohrer, Carnegie Mellon University; Alain S. Karma, Northeastern University; Paul P. Wynblatt, Carnegie Mellon University; Anthony D. Rollett, Carnegie Mellon University; David J. Srolovitz, Princeton University; Diana Farkas, Virginia Tech; Dominique Chatain, Centre National de La Recherche Scientifique; Christopher F. Woodward, Air Force Research Laboratory

Monday PM

Room: 309

September 26, 2005

Location: Convention Center

Session Chair: Diana Farkas, Virginia Tech

2:00 PM Invited

Grain Boundary Segregation in Ionic Materials: Combined Experimental and Multiscale Modeling Studies: *Elizabeth C. Dickey*¹; Susan

B. Sinnott²; Michael W. Finnis³; ¹Pennsylvania State University; ²University of Florida; ³Queen's University of Belfast

2:30 PM

Lanthanide Arrangement at Prismatic Interfaces in Silicon Nitride: *Christian Dwyer*¹; Graham B. Winkelman¹; David J.H. Cockayne¹; ¹University of Oxford

2:50 PM

Theoretical Study of Native Defects, Impurities and Defect Complexes in Rutile TiO₂: Jun He¹; Michael M. Finnis²; *Susan B. Sinnott*¹; ¹University of Florida; ²Queen's University of Belfast

3:10 PM Invited

Grain Boundary Structures, Chemistry and Properties in Oxide Bicrystals: *Y. Ikuhara*¹; ¹University of Tokyo

3:40 PM Break

3:50 PM Invited

Calculation of Grain Boundary Stiffness and Mobility from Interface Fluctuations: *Stephen M. Foiles*¹; ¹Sandia National Laboratories

4:20 PM

First-Principles Study of Interfacial Boundaries in Ni-Ni₃Al: *Christopher F. Woodward*¹; Axel van de Walle²; Mark Asta²; ¹Air Force Research Laboratory; ²Northwestern University

4:40 PM

Grain Boundary Energy and Grain Growth in <111> Fiber-Textured Al Films: *Katayun Barmak*¹; Jihwan Kim¹; Changsoo Kim¹; Wayne E. Archibald¹; Gregory Rohrer¹; Anthony D. Rollett¹; Shlomo Ta'asan¹; David Kinderlehrer¹; Hao Zhang²; David J. Srolovitz²; ¹Carnegie Mellon University; ²Princeton University

Joining of Monolithic Structures and Components: Joint Session with Failure Analysis I: Failure Analysis of Welds and Joints

Program Organizers: Charles V. Robino, Sandia National Laboratories; Matthew Walp, DaimlerChrysler; Thomas J. Lienert, Los Alamos National Laboratory; Debbie Aliya, Aliya Analytical Inc; Dale E. Alexander, Engineering Systems Inc; David A. Moore, Packer Engineering

Monday PM Room: 310
September 26, 2005 Location: Convention Center

Session Chairs: Tom Ackerson, Southern Research Institute; James Lane, MACTEC Engineering and Consulting Inc.

See Failure Analysis Symposium on page 109 for schedule.

Materials and Life Management Issues: Life Cycle Assessment Case Studies

Program Organizers: Julie Schoenung, University of California; Andrew Shapiro, Jet Propulsion Laboratory; Oladele Ogunseitan, University of California; Jean-Daniel Saphores, University of California

Monday PM Room: 305
September 26, 2005 Location: Convention Center

Session Chairs: Andrew Shapiro, Jet Propulsion Laboratory; Oladele Ogunseitan, University of California, Irvine

2:00 PM Invited

Sustainable Process Design for Nanomanufacturing: *Jacqueline A. Isaacs*¹; ¹Northeastern University

2:30 PM

Life Cycle Assessment (LCA) of WC-Co Cermet Fabrication: *Yuhong Xiong*¹; Ki Lau¹; Xiaoying Zhou¹; Julie M. Schoenung¹; ¹University of California, Davis

2:55 PM

Material Lifecycle Issues in Supplying OEM Automotive Assemblies: *Edward Cataldo*¹; ¹Federal-Mogul

3:20 PM Break

3:40 PM Invited

Life-Cycle Impacts of Lead- and Lead-Free Solders used in Electronics Manufacturing: *Jack Geibig*¹; ¹University of Tennessee

4:10 PM

Evaluation of Lead-Free Solders by Integrating Environmental Impact, Cost, Reliability, and Customer Preferences: *Xiaoying Zhou*¹; Koki Shimohashi¹; Julie M. Schoenung¹; ¹University of California, Davis

4:35 PM

Environmentally Benign Materials for Electronics: A Review of Current Developments and Emerging Technologies: *John Lincoln*¹; Oladele Ogunseitan¹; Jean Daniel Saphores¹; Julie Schoenung¹; Hilary Nixon¹; Andrew Shapiro²; ¹University of California; ²Caltech Jet Propulsion Laboratory

Materials for the Hydrogen Economy: Hydrogen Storage I

Program Organizers: John J. Petrovic, Los Alamos National Laboratory; Iver E. Anderson, Iowa State University; Thad Matthew Adams, Westinghouse Savannah River Company; Gary Sandrock, SunaTech Inc; Colleen F. Legzdins, Ballard Power Systems; Jeffrey W. Stevenson, Pacific Northwest National Laboratory; Z. Gary Yang, Pacific Northwest National Laboratory

Monday PM Room: 302
September 26, 2005 Location: Convention Center

Session Chair: Gary Sandrock, SunaTech Inc.

2:00 PM Invited

Compressed Hydrogen Storage Systems: *Neel Sirosh*¹; ¹Quantum Technologies

2:20 PM Invited

Cryogenic Hydrogen Storage: *Salvador Aceves*¹; Gene D. Berry¹; ¹Lawrence Livermore National Laboratory

MONDAY PM

2:40 PM **Invited**

DOE Metal Hydride Center of Excellence and Hydrogen Storage Materials Research at Sandia National Laboratories: *James Wang*¹; Jay Keller¹; ¹Sandia National Laboratories

3:00 PM **Invited**

Aluminum Hydride as a Hydrogen Storage Medium for Vehicles: *James J. Reilly*¹; Gary Sandrock²; Jason Greatz¹; Wei-Min Zhou¹; James Wegrzyn¹; ¹Brookhaven National Laboratory; ²SunaTech, Inc.

3:20 PM **Break**

3:40 PM **Invited**

Chemical Hydrogen Storage: *William Tumas*¹; David Thorn¹; Anthony Burrell¹; R. Thomas Baker¹; ¹Los Alamos National Laboratory

4:00 PM **Invited**

Activities in the DOE Center of Excellence for Carbon-Based Hydrogen Storage Materials: *Michael Heben*¹; ¹National Renewable Energy Laboratory

4:20 PM

Advanced Hydrogen Storage Functions of Mixed Complex Hydrides: Yuko Nakamori¹; Akihito Ninomiya¹; Gaku Kitahara¹; *Shin-Ichi Orimo*¹; ¹IMR-Tohoku University

4:40 PM **Invited**

Integrated Hydrogen Storage and Delivery Using Organic Liquid Carriers: *Alan Cooper*¹; ¹Air Products and Chemicals, Inc.

5:00 PM

CVD-Based Combinatorial Approach for Hydrogen Storage Materials: *Nagraj S. Kulkarni*¹; Theodore M. Besmann¹; Richard J. Kasica¹; ¹Oak Ridge National Laboratory

5:20 PM

The Effect of Nanoparticle and Nanograin Size as well as Phase Content on the Desorption Properties of Nanostructured Metal Hydrides: *Tom Czujko*¹; Robert A. Varin¹; Chun Chiu¹; Zbig Wronski²; ¹University of Waterloo; ²Natural Resources Canada

Materials for the Hydrogen Economy: Hydrogen Production & Delivery I

Program Organizers: John J. Petrovic, Los Alamos National Laboratory; Iver E. Anderson, Iowa State University; Thad Matthew Adams, Westinghouse Savannah River Company; Gary Sandrock, SunaTech Inc; Colleen F. Legzdins, Ballard Power Systems; Jeffrey W. Stevenson, Pacific Northwest National Laboratory; Z. Gary Yang, Pacific Northwest National Laboratory

Monday PM Room: 303
September 26, 2005 Location: Convention Center

Session Chair: Iver E. Anderson, Ames Laboratory (USDOE)

2:00 PM **Invited**

Materials for Hydrogen Separation and Photoelectrochemical Production: *Arlene Anderson*¹; Roxanne Garland¹; ¹U.S. Department of Energy

2:20 PM **Invited**

Palladium Coated Vanadium Alloy Membranes for Hydrogen Separation: *Stephen N. Paglieri*¹; David R. Pesiri²; Robert C. Dye¹; Thomas J. Venhaus¹; Dhanesh Chandra²; Craig R. Tewell⁴; Ronny C. Snow¹; ¹Los Alamos National Laboratory; ²Essex Technology Group, LLC; ³University of Nevada, Reno; ⁴Sandia National Laboratory

2:40 PM **Invited**

Materials Selection Criteria for the Design of Inorganic Membranes for the Purification and Production of Hydrogen: *Brian Bischoff*¹; Roddie R. Judkins¹; ¹Oak Ridge National Laboratory

3:00 PM

Materials Challenge for ExxonMobil's Advanced Steam Reforming Process: *John F. Brody*¹; Frank Hershkowitz¹; Paul Berlowitz¹; ¹ExxonMobil Research & Engineering

3:20 PM **Break**

3:40 PM

Hydrogen Production from used Lube Oil via Supercritical Steam Reformation: *Karthikeyan Kallupalayam Ramasamy*¹; Ali T-Raissi¹; ¹Florida Solar Energy Center

4:00 PM

Characterization of Alloy 800H for Heat Exchanger Applications: Ajit Kumar Roy¹; *Vinay Virupaksha*¹; Raghunandan Karamcheti¹; Lalit Savalia¹; Narendra Kothapalli¹; ¹University of Nevada, Las Vegas

4:20 PM

Characterization of Palladium-Copper Membrane Surfaces Following H₂S Exposure: *Bret H. Howard*¹; Bryan D. Morreale¹; ¹U.S. Department of Energy National Energy Technology Laboratory

4:40 PM

A Progress Report on the UNLV Research Foundation University Consortium for Materials Compatibility and Performance: *Anthony Edward Hechanova*¹; Ajit Roy²; Per Peterson³; Ronald Ballinger⁴; Bunsen Wong⁵; Merrill Wilson⁶; ¹University of Nevada, Las Vegas Research Foundation; ²University of Nevada, Las Vegas; ³University of California, Berkeley; ⁴Massachusetts Institute of Technology; ⁵General Atomics; ⁶Ceramtec, Inc.

5:00 PM

Metallurgical and Corrosion Characterization of Structural Materials for the National Hydrogen Initiative: Ajit K. Roy¹; *Radhakrishnan Santhanakrishnan*¹; Ancila V. Kaiparambil¹; Bunsen Wong²; Gottfried Besenbruch²; Lloyd Brown²; ¹University of Nevada, Las Vegas; ²General Atomics

Materials for the Hydrogen Economy: Fuel Cells I

Program Organizers: John J. Petrovic, Los Alamos National Laboratory; Iver E. Anderson, Iowa State University; Thad Matthew Adams, Westinghouse Savannah River Company; Gary Sandrock, SunaTech Inc; Colleen F. Legzdins, Ballard Power Systems; Jeffrey W. Stevenson, Pacific Northwest National Laboratory; Z. Gary Yang, Pacific Northwest National Laboratory

Monday PM Room: 304
September 26, 2005 Location: Convention Center

Session Chair: Colleen Legzdins, Ballard Power Systems

2:00 PM **Invited**

Advanced Materials for Proton Exchange Membranes: *James E. McGrath*¹; ¹Virginia Tech

2:20 PM **Invited**

Developing Gas Diffusion Layer for High Current Density Application via Pore-Level Modeling and Experiments: *Chao-Yang Wang*¹; Puneet Sinha¹; Partha P. Mukherjee¹; Fuqiang Liu¹; ¹Pennsylvania State University

2:40 PM **Invited**

Thermally Nitrided Metallic Bipolar Plates for Proton Exchange Membrane Fuel Cells: Michael P. Brady¹; Bing Yang¹; *Peter Tortorelli*¹; Karen More¹; Heli Wang²; John Turner²; ¹Oak Ridge National Laboratory; ²National Renewable Energy Laboratory

3:00 PM

Hydrogen Utilization in Polymer Electrolyte Membrane Fuel Cell with Corrugated Sheet Copper Alloy Bipolar/End Plates: *Vaibhav Vilas Nikam*¹; Ramana G. Reddy¹; ¹University of Alabama

3:20 PM **Break**

3:40 PM

Contaminant Release and Degradation of Heat Exchanger Materials in a Deionized Water Coolant for use in Proton Exchange Membrane Fuel Cell Systems: *Sylvie Dionne*¹; Wenyue Zheng¹; Brian Cheadle²; Feng

Liang²; ¹Department of Natural Resources Canada; ²Dana Canada Corporation

4:00 PM

Catalysts and Sensors for Fuel Cell Systems: *Scott L. Swartz*¹; Christopher T. Holt¹; Edward M. Sabolsky¹; Gene Arkenberg¹; Steve Cummings¹; ¹NexTech Materials, Ltd.

4:20 PM

Metallic Bipolar Plates for Direct Methanol Fuel Cells (DMFC): *Biswa R. Padhy*¹; Ramana G. Reddy¹; ¹University of Alabama

4:40 PM

Novel Elevated-Temperature Hydrogen Sensors from Carbon Nanotubes: *Anil Anali*¹; Rishi Raj¹; ¹University of Colorado

5:00 PM

Hydrogen Gas Sensing Characteristics of Doped Titanium Oxides: R. C. Xie¹; X. Y. Cui²; J. K. Shang¹; ¹University of Illinois; ²Institute of Metal Research

Modeling and Simulation of Titanium Technology: Theory and Practices: Modeling and Simulation of Titanium: Refinement and Processing II

Program Organizers: Ellen K. Cerreta, Los Alamos National Laboratory; Vasisht Venkatesh, Timet Corporation; F. Robert Dax, Concurrent Technologies Corporation; Jaimie S. Tiley, U.S. Air Force

Monday PM Room: 405
September 26, 2005 Location: Convention Center

Session Chair: F. Robert Dax, Concurrent Technologies Corporation

2:00 PM Invited

Experimental Verification of CFD Model for Vacuum Arc Remelting of Ti-6Al-4V Ingots: *Ramesh S. Minisandram*¹; Rodney L. Williamson²; Robert G. Erdmann³; ¹ATI Allvac; ²Sandia National Laboratories; ³University of Arizona

2:30 PM Invited

Utilisation of a Mathematical Model of VAR to Study the Influence of Magnetic Stirring on the Remelting of Timetal 6-4 Alloy: *Alain Jardy*¹; Andrew Wilson²; ¹Ecole des Mines; ²Timet UK

3:00 PM

Current Status of Microstructure and Damage Models in the Primary Production of Titanium Alloys: *Vasisht Venkatesh*¹; Andrew Wilson²; Stephen P. Fox¹; ¹Timet Corporation; ²Timet UK Ltd

3:20 PM

A Novel Neural Network Modeling Tool Applied to Titanium Alloy Processing: *Stephen Thaler*¹; David Furrer²; ¹Imagination Engines, Inc; ²Ladish Company, Inc.

3:40 PM Break

4:00 PM

Use of Modeling to Improve Titanium Machining: *Nishant Saini*¹; Troy D. Marusich¹; Kerry J. Marusich¹; Rahul Aphale¹; Luis Zamorano¹; ¹Third Wave Systems, Inc

4:20 PM

Surface Hardening of Ti Alloys by Gas-Phase Nitridation Under Kinetic Control: *Lizhi Liu*¹; *Frank Ernst*¹; Gary M. Michal¹; Arthur H. Heuer¹; ¹CASE

4:40 PM

Production TiCl₄ using Combined Fluidized Bed by Titanium Slag Containing High-Level CaO and MgO: *Zhangfu Yuan*¹; ¹Chinese Academy of Sciences

Near-Net-Shape Technologies: Metal Fused Deposition and Modeling

Program Organizers: Kim W. Mitchiner, Sandia National Laboratories; Animesh Bose, Materials Processing, Inc.; David L. Bourell, University of Texas

Monday PM Room: 403
September 26, 2005 Location: Convention Center

Session Chair: Animesh Bose, Materials Processing, Inc.

2:00 PM

LENS Fabrication of Nb-Si (Ti,Cr) Alloys: *Ryan Dehoff*¹; Peter M. Sarosi¹; Peter C. Collins¹; Hamish M. Fraser¹; Michael J. Mills¹; ¹Ohio State University

2:30 PM

Comparison Study of Microstructures of H13 Tool Steel Produced by Laser Cladding and Laser Consolidation: *Jianyin Chen*¹; Lijue Xue¹; ¹National Research Council Canada

2:55 PM

Near-Net-Shaped LENS Processed PH13-8Mo Steel: Properties and Microstructure: *John E. Smugeresky*¹; Baolong Zheng²; Yizhang Zhou²; Enrique J. Lavernia²; ¹Sandia National Laboratories; ²University of California, Davis

3:20 PM

Microstructure and Properties of LENS Deposited WC-Co Cermets: *Yuhong Xiong*¹; Baolong Zheng¹; John E. Smugeresky²; Leonardo Ajdelsztajn¹; Julie M. Schoenung¹; ¹University of California, Davis; ²Sandia National Laboratories

3:45 PM Break

4:15 PM

A Process Map Approach for Understanding Steady-State and Transient Response of Melt Pool Size in Laser-Based Additive Manufacturing Processes: *Jack Beuth*¹; Pruk Aggarangsi¹; ¹Carnegie Mellon University

4:45 PM

Using Numerical Modeling to Predict Deposition Conditions for a LENS[®] Processed Bulk Metallic Glass: Baolong Zheng¹; Riqing Ye¹; *John E. Smugeresky*²; Yizhang Zhou¹; Julie M. Schoenung¹; Enrique J. Lavernia¹; ¹University of California, Davis; ²Sandia National Laboratories

5:10 PM

Analytical and Numerical Modeling to Investigate the Effects of Process Variables and Size-Scale on Solidification Microstructure in Laser-Deposited Materials: *Srikanth Bontha*¹; Nathan W. Klingbeil¹; ¹Wright State University

5:35 PM

Simulation of Melt Pool Geometry and Solidification Microstructure in Laser Deposited Ti-6Al-4V: *Deepika Gaddam*¹; *Nathan W. Klingbeil*¹; *Srikanth Bontha*¹; ¹Wright State University

Next Generation Biomaterials: Bioceramics II

Program Organizers: Roger J. Narayan, Georgia Institute of Technology; Sarit B. Bhaduri, Clemson University; Gary S. Fischman, National Materials Advisory Board

Monday PM Room: 320
September 26, 2005 Location: Convention Center

Session Chairs: Jeffrey Thompson, University of North Carolina; Prashant Kumta, Carnegie Mellon University; Afsaneh Rabiei, North Carolina State University

2:00 PM Invited

Mechanisms of Fracture and Fatigue in Teeth and Bone: Aspects of Aging, Disease and Therapeutic Treatments: *Robert O. Ritchie*¹; R. K. Nalla²; J. J. Kruzic³; J. H. Kinney⁴; ¹University of California; ²Lawrence Berkeley National Laboratory; ³Oregon State University; ⁴Lawrence Livermore National Laboratory

2:20 PM Invited

A Study of Phase Stability and Mechanical Properties of Hydroxylapatite – Nanophase α -Alumina Composites: *Zafer Evis*¹; Robert H. Doremus²; ¹Middle East Technical University; ²Rensselaer Polytechnic Institute

2:40 PM Invited

Nanostructured Calcium Phosphates for Non-Viral Gene Delivery: *Dana Olton*¹; Mary E. Wilson¹; Todd H. Rogers¹; Jinhua Li²; Corrine Chalovich²; Prashant Kumta¹; Charles Sfeir²; ¹Carnegie Mellon University; ²University of Pittsburgh

3:00 PM Invited

Nanostructured Ceramics for Medical Applications: *Roger J. Narayan*¹; ¹Georgia Institute of Technology

3:20 PM Invited

Microstructure Study of Porous Hydroxyapatite using Confocal Laser Scanning Microscopy: *Fei Ren*¹; Ian Orland Smith¹; Melissa J. Baumann¹; Eldon D. Case¹; ¹Michigan State University

3:40 PM Invited

Microstructure, Mechanical Properties and Biological Responses to Functionally Graded HA Coatings: *Afsaneh Rabiei*¹; Travis Blalock¹; Brent Thomas¹; Brad Hartman¹; Jerry Cuomo¹; Y. Yang²; Joo Ong²; ¹North Carolina State University; ²University of Tennessee Health Science Center

4:00 PM Invited

In Vitro Evaluation of Osteoblast Proliferation on Zinc-Doped Tricalcium Phosphate: *Sahil Jalota*¹; *A. Cuneyt Tas*¹; Sarit Bhaduri¹; ¹Clemson University

4:20 PM Invited

Microcracking in Hydroxyapatite as Related to Bone Tissue Engineering: *Eldon D. Case*¹; *Ian O. Smith*¹; Melissa J. Baumann¹; ¹Michigan State University

4:40 PM Invited

Novel Synthesis and Characterization of Mg-Substituted Calcium Phosphates for Non-Viral Gene Delivery: *Donghyun Lee*¹; Charles Sfeir¹; Prashant N. Kumta¹; ¹Carnegie Mellon University

5:00 PM

Use of SiC-C Composite Fiber as a Microelectrode for Biological Sensing: *Sherjang Singh*¹; Relva C. Buchanan¹; ¹University of Cincinnati

Residual Stress, Deformation, and Distortion: Deformation and Machining

Program Organizers: Zhili Feng, Oak Ridge National Laboratory; Mark R. Blankenau, Severstal North America; Lawrence A. Lalli, Alcoa Inc

Monday PM Room: 316
September 26, 2005 Location: Convention Center

Session Chair: Lawrence A. Lalli, ASM International Pittsburgh Chapter

2:00 PM Introductory Comments

2:05 PM

Measurement of Residual Stresses in Ti-6Al-4V for the Aerospace Industry when Turning the Surface with Applying High-Pressure Cooling: *Manouchehr Vosough*¹; Inge Svenningsson¹; ¹AB Sandvik Coromant

2:25 PM

Investigation of Residual Metal Deformation in the Course of Ballistic Testing: *Veljko Samardzic*¹; Oleg P. Petrenko¹; Ernest S. Geskin¹; Roumiana Petrova¹; ¹New Jersey Institute of Technology

2:45 PM

Residual Stress Analysis of a Co-Extruded Solid Oxide Fuel Cell Platform: *Raymond Oh*¹; Iuliana Dragomir-Cernatescu¹; Robert L. Snyder¹; Joe K. Cochran¹; ¹Georgia Institute of Technology

3:05 PM

Residual Stresses in Flowformed Ti-6Al-4V Alloy Tubes: *Ibrahim Ucak*¹; Gabriel J. Hostetter¹; Hao Dong¹; Mehmet N. Gungor¹; Wm. Troy Tack¹; ¹Concurrent Technologies Corporation

3:25 PM Break

3:45 PM

Influence of the Microstructure of Forged and Machined Parts on the Residual Stresses: *Olivier Bomont*¹; Alain D'Acunto¹; Christophe Lescalier¹; *Anne Bomont*²; Mario Confente²; ¹Ensam de Metz; ²Mittal Steel Europe R&D

4:05 PM

Finite Element Modeling of the Relationship Between Microstructural Features and the Strength in WC-Co Composites: *Chang-Soo Kim*¹; Ted R. Massa²; Gregory S. Rohrer¹; ¹Carnegie Mellon University; ²Kennametal Incorporated

4:25 PM

Effects of Sandblasting on Fatigue and Corrosion Properties of Pure Titanium: *Xiuping Jiang*¹; Xuanyi Wang²; Jinxia Li¹; Dongyang Li²; Chi-Sing Man¹; Michael Shepard³; Tongguang Zhai¹; ¹University of Kentucky; ²University of Alberta; ³Air Force Research Laboratory

4:45 PM

The Study of Crack Closure Phenomena after Overload using Neutron Diffraction: *Yinan Sun*¹; Yulin Lu¹; H. Choo¹; P. K. Liaw¹; G. Wang¹; D. W. Brown²; C. Hubbard³; ¹University of Tennessee; ²Los Alamos National Laboratory; ³Oak Ridge National Laboratory

Roll Technology: Panel Discussion - Roll & Roll Shop Tolerances

Program Organizers: Ron Webber, Dofasco Inc; Philip C. Perry, Nippon Steel

Monday PM Room: 334
September 26, 2005 Location: Convention Center

Session Chair: Philip C. Perry, Nippon Steel

2:00 PM Panel Discussion:

Industry experts will lead a discussion on roll and roll shop tolerances (ie. surface finish, TIR, eccentricity for all types of Hot and Cold Mill rolls).

Science and Technology of Powder Materials: Synthesis, Consolidation and Properties: Nanomaterials

Program Organizers: Leon L. Shaw, University of Connecticut; Eugene Al Olevsky, San Diego State University; Fernand D. Marquis, South Dakota School of Mines & Technology; Iver E. Anderson, Iowa State University; James H. Adair, Pennsylvania State University; Jitendra P. Singh, Argonne National Laboratory

Monday PM Room: 301
September 26, 2005 Location: Convention Center

Session Chair: Fernand D.S. Marquis, South Dakota School of Mines and Technology

2:00 PM Invited

Novel Dry Nanopowder Processing for Producing Efficient Thermal Insulator: *Hiroya Abe*¹; Isamu Abe¹; Kazuyoshi Sato¹; Makio Naito¹; ¹Osaka University

2:20 PM

A Nearly Pure Monoclinic Nanocrystalline Zirconia: *Yu-Li Chen*¹; Gong-Yi Guo²; ¹Shanghai University; ²Shanghai Jiao Tong University

2:40 PM

A Novel Technique for Porous Structural Ceramic Manufacturing using Biological Agents and Nano Particles: *Navin Jose Manjooran*¹; Erica Hartsell¹; Gary R. Pickrell¹; ¹Virginia Tech

3:00 PM Invited

Incremental Nanotechnology: Opportunities and Trends: *A. Piers Newbery*¹; Bing Q. Han¹; Enrique J. Lavernia¹; ¹University of California at Davis

3:20 PM

Sintering Behavior of Silver Nano-Particle Inks Deposited by Maskless Mesoscale Material Deposition (M3D): James William Sears¹; *Jacob Colvin*¹; Michael Carter¹; Oleg Starovoytov¹; ¹South Dakota School of Mines & Technology

3:40 PM

Sintering of Nanocrystalline WC-Co Powders: *Xu Wang*¹; Praveen Maheshwari¹; Zhigang Fang¹; ¹University of Utah

4:00 PM

Synthesis of χ -Fe₅C₂ Nanoplatelets in High Pressure Low Temperature CO+H₂ Atmosphere: *Pablo Guillermo Caceres-Valencia*¹; ¹University of Puerto Rico-Mayaguez

What Makes a Good Materials Engineer and How Best to Educate Them: Historical and Philosophical Perspective on Materials Education

Program Organizers: Paul E. Cantonwine, Bechtel Bettis Inc; Kent D. Peaslee, University of Missouri-Rolla; Mark A. Palmer, Kettering University; Michael B. Connelly, Casey Products Inc

Monday PM Room: 315
September 26, 2005 Location: Convention Center

Session Chair: Paul E. Cantonwine, Bechtel Bettis Inc.

2:00 PM Invited

The Ever Changing Curricula in Materials Science and Engineering: *Morris E. Fine*¹; Mark Hersam¹; ¹Northwestern University

2:40 PM Invited

Welding and Joining in Materials Engineering Education: *Glen R. Edwards*¹; John Lippold²; John DuPont³; David Olson¹; Stephen Liu¹; ¹Colorado School of Mines; ²Ohio State University; ³Lehigh University

3:10 PM Invited

Polymer Science and Engineering at the University of Akron: *Frank N. Kelley*¹; ¹University of Akron

3:40 PM Break

4:00 PM Invited

Evolution of Technical Education at the New York State College of Ceramics: *Pat LaCourse*¹; ¹New York State College of Ceramics, Alfred University

4:30 PM Invited

Materials Education at the University of Florida: *Reza Abbaschian*¹; ¹University of Florida

5:00 PM Invited

Materials Education at the University of Missouri-Rolla: Educating Metallurgical and Ceramic Engineers: *Kent D. Peaslee*¹; ¹University of Missouri-Rolla

Coatings 2005: Oxidation/Environmental Barrier Coatings I

Program Organizers: Nitin P. Padture, Ohio State University; Lorraine F. Francis, University of Minnesota; Janet M. Hampikian, Boise State University; Narendra B. Dahotre, University of Tennessee

Tuesday AM Room: 317
September 27, 2005 Location: Convention Center

Session Chair: Janet M. Hampikian, Boise State University

9:00 AM Invited

Development and Confirmation of a Lifetime Model for Aluminide Coatings on Fe-Base Alloys: *Bruce A. Pint¹; Ying Zhang²; ¹Oak Ridge National Laboratory; ²Tennessee Technological University*

9:40 AM

Enhanced Oxidation Resistance by Reactive Element Additions to Ni Based Alloys with Low Cr Contents via Surface Treatment: *Paul D. Jablonski¹; David E. Alman¹; ¹U.S. Department of Energy*

10:00 AM

Microstructure and Oxidation Resistance of Nanostructured Cu-Cr Coatings: *Kuang-Tsan K. Chiang¹; James Arps¹; Ronghua Wei¹; ¹Southwest Research Institute*

10:20 AM Break

10:40 AM Invited

Residual Stresses in Oxide-Based Environmental Barrier Coatings: *Katherine T. Faber¹; ¹Northwestern University*

11:20 AM

Polymer Derived Ceramic Composites as Environmental Barrier Coatings on Steel: *Jessica Torrey¹; Rajendra Bordia¹; Srinivasa Rao Boddapati¹; ¹University of Washington*

11:40 AM

Thermochemical Compatibility of Yttrium Silicate Coatings in Heat Shield Applications: *Hans J. Seifert¹; Damian M. Cupid¹; Olga Fabrichnaya²; ¹University of Florida; ²Max-Planck-Institut fuer Metallforschung*

Coatings 2005: Functional Coatings

Program Organizers: Nitin P. Padture, Ohio State University; Lorraine F. Francis, University of Minnesota; Janet M. Hampikian, Boise State University; Narendra B. Dahotre, University of Tennessee

Tuesday AM Room: 318
September 27, 2005 Location: Convention Center

Session Chair: Yip-Wah Chung, Northwestern University

9:00 AM

Perovskite Based Protective Coatings for Solid Oxide Fuel Cell Metallic Interconnects: *Christopher D. Johnson¹; Randall Gemmen¹; James Poston¹; Chad Schaeffer¹; Nina Orlovskaya²; ¹U.S. Department of Energy, National Energy Technology Laboratory; ²Drexel University*

9:20 AM

Ultra Low Pressure Plasma Spraying of Conductive and Non-Conductive Coatings for Electrical Devices: *Christopher M. Weyant¹; Bradley R. Cash¹; Aaron C. Hall¹; ¹Sandia National Laboratory*

9:40 AM Invited

Advanced Coatings with Embedded Electronics and Sensors: *Sanjay Sampath¹; ¹State University of New York*

10:20 AM Break

10:40 AM

The Effect of the Top Electrode on the Resistive Switching Properties of Electrode-SrZrO₃-SrRuO₃ Heterostructures: *Sukwon Choi¹; Hwansoo Lee¹; James A. Bain¹; Paul A. Salvador¹; ¹Carnegie Mellon University*

11:00 AM

Degradation of ITO Coatings Due to Exposure to Hyperthermal Atomic Oxygen: *Long Li¹; Fengting Xu¹; Judith C. Yang¹; ¹University of Pittsburgh*

11:20 AM

Effects of Cr₂O₃ Dopants and Secondary Phases on the Electrical Properties of Low Voltage Zinc Oxide Film Varistors by Sol-Gel Route: *Haibo Zhang¹; Shenglin Jiang¹; ¹Huazhong University of Science and Technology*

11:40 AM

Microstructure and Electrical Properties of Ho-Doped BaTiO₃ Sputtered Films: *Cheng-Hui Wu¹; Jinn Chu¹; Sea-Fu Wang²; ¹National Taiwan Ocean University; ²National Taipei University of Technology*

Copper for the 21st Century: Session I

Program Organizer: David L. Ellis, NASA Glenn Research Center

Tuesday AM Room: 305
September 27, 2005 Location: Convention Center

Session Chair: David L. Ellis, NASA Glenn Research Center

9:00 AM Introductory Comments

9:05 AM

180 Exchange Behaviour of Copper Oxide in Different Structural Environment and Its Correlation with Catalytic Activity in Methane Oxidation: *Mohan Keraba Dongare¹; Erhard Kemnitz²; ¹National Chemical Laboratory; ²Humboldt-University*

9:25 AM

Role of Cathode Oxide Films in Copper Electrodeposition: *Byung-Hak Choe¹; Hyun-Ku Chang²; Jong K. Lee³; ¹Kangnung National University; ²Sung Kyun Kwan University; ³Michigan Technological University*

9:45 AM

Copper Alloys for Human Infectious Disease Control: *Harold T. Michels¹; Sandra A. Wilks²; Jonathan O. Noyce²; C. William Keevil²; ¹Copper Development Association Inc; ²University of Southampton*

10:05 AM

Development of Deformation Microtwins in Cu-Ni-Mn Continuously Cast Alloys: *Pablo Guillermo Caceres-Valencia¹; ¹University of Puerto Rico-Mayaguez*

10:25 AM

The Production of Nano-Particle Dispersed Bulk Cu by Severe Deformation Process: *Shih-Chin Chang¹; Kai-Wen Hsiao¹; ¹National Tsing-Hua University*

10:45 AM Break

11:00 AM

CuAlNi Alloys for Shape Memory Applications: *Albert C. Kneissl¹; Elfriede Unterweger¹; Gorazd Lojen²; ¹University of Leoben; ²University of Maribor*

11:20 AM

GIGALLOY and HYPER CORSON: *Naohiko Era¹; Yasutaka Sugawara¹; Kazuhiko Fukamachi¹; ¹Nippon Mining & Metals Co., Ltd.*

11:40 AM

Mechanical Behavior of Cu-Based Bulk Metallic Glasses: *John J. Lewandowski¹; Awlah Awadallah¹; Paul Wesseling¹; Wei Hua Wang²; Yi Liu¹; ¹Case Western Reserve University; ²Chinese Academy of Sciences*

12:00 PM

Design of a Cu-Based Alloy using Cr₂Nb Precipitates: *Gary M. Michal¹; David L. Ellis²; ¹Case Western Reserve University; ²NASA Glenn Research Center*

12:20 PM

Observations of a Cast Cu-Cr-Zr Alloy: David L. Ellis¹; ¹NASA Glenn Research Center

Creep Deformation and Fracture, Design, and Life Extension: Session III

Program Organizers: Rajiv S. Mishra, University of Missouri; James Calvin Earthman, University of California; Sai V. Raj, NASA Glenn Research Center; R. Viswanathan, Electric Power Research Institute

Tuesday AM Room: 306
September 27, 2005 Location: Convention Center

Session Chair: R. Viswanathan, Electric Power Research Institute

9:00 AM Keynote

Present Status and Future Prospects of NIMS Creep Data Sheet Project: Kazuhiro Kimura¹; ¹National Institute for Materials Science

9:25 AM

Development of a Framework for Presentation and Design Analysis of Creep Rupture Data Using the CES Materials Selection Software: David A. Woodford¹; Andrew Miller²; ¹MPa, Inc.; ²Granta Design Limited

9:45 AM Invited

Research and Development of Advanced Ferritic Steels for Thick Section Boiler Components in USC Power Plant at 650°C: Fujio Abe¹; ¹National Institute for Materials Science

10:05 AM

Room and Elevated Temperature Mechanical Behavior of 9-12% Cr Steels with Mn and Si Additions for Oxidation Resistance: Jeffrey A. Hawk¹; Omer N. Dogan¹; David E. Alman¹; Paul D. Jablonski¹; ¹U.S. Department of Energy

10:25 AM Break

10:40 AM

Alloy Additions for Improved Creep-Rupture Properties of a Cast Austenitic Alloy: John P. Shingledecker¹; Philip J. Maziasz¹; Neal D. Evans¹; Michael J. Pollard²; ¹Oak Ridge National Laboratory; ²Caterpillar Technical Center

11:00 AM

Mechanism of Type IV Failure in Weldment of a Mod. 9Cr-1Mo Steel: Jae-Seung Lee¹; Kouichi Maruyama¹; Isamu Nonaka²; Takuya Ito²; ¹Tohoku University; ²IHI Company, Ltd.

11:20 AM

Finite Element Simulation of the Creep Behaviour of 9% Chromium Steels Based on Micro-Mechanical Considerations: Nikolaus Böck¹; Franz Kager¹; ¹ARCS Research

11:40 AM

Creep Behaviour and Microstructural Evolution in the Reduced Activation Ferritic/Martensitic 9Cr1WV Ta Eurofer'97 Steel: Pilar Fernández¹; Ana María Lancha¹; Jesús Lapeña¹; ¹CIEMAT

12:00 PM

Assessment of Remaining Creep Life of Service Exposed 12X1MΦ Steel: Brahm Deo Tripathi¹; ¹Research & Development Centre for Iron and Steel

Current Topics in Electronic Packaging: Pb Free Solders, Thermal Management: Pb Free Solder Joints - Mechanical Properties

Program Organizers: Eric J. Cotts, Binghamton University; C. Robert Kao, National Central University; Mark A. Palmer, Kettering University; K. N. Subramanian, Michigan State University; Paul Thomas Vianco, Sandia National Laboratories; K. M. Nair, Dupont de Nemours & Co Inc

Tuesday AM Room: 321
September 27, 2005 Location: Convention Center

Session Chairs: Nikhilesh Chawla, Arizona State University; Eric J. Cotts, Binghamton University

9:00 AM Invited

Mechanisms of Low Cycle Fatigue in Sn-3.8Ag-0.7Cu Alloy: Jian-Ku Shang¹; Q. L. Zeng²; L. Zhang²; Z. G. Wang²; ¹University of Illinois; ²Institute of Metal Research

9:30 AM

Examination of Sn Electrodeposit on Substrates Not Forming Intermetallic Compounds: Maureen E. Williams¹; Kil-Won Moon¹; Christian E. Johnson¹; William J. Boettinger¹; ¹NIST

9:50 AM Invited

Microstructure-Based Modeling of Pb-Free Solders: Nikhilesh Chawla¹; Rajen S. Sidhu¹; ¹Arizona State University

10:20 AM Invited

The Creep of Sn Solder Joints: K. O. Lee¹; John W. Morris¹; Fay Hua²; ¹University of California; ²Intel Corporation

10:50 AM Break

11:00 AM Invited

Mechanical Properties of Intermetallic Compounds Common to Soldering Applications: Richard R. Chromik¹; ¹Lehigh University

11:30 AM

Effects of Microstructural Refinement on Mechanical Properties of Sn-3.8Ag-0.7Cu Alloy: Q. S. Zhu¹; Z. G. Wang¹; J. K. Shang²; ¹Institute of Metal Research; ²University of Illinois

11:50 AM

A Nano/Micro-Indentation Approach to Study Tin Whisker Formation on Tin Plated Component Leads: Xiaodong Li¹; Zhi-Hui Xu¹; Jin Liang²; ¹University of South Carolina; ²EMC Corporation

Defect Formation, Detection, and Elimination During Casting, Welding, and Solidification: Quality, Inspection, and Joining

Program Organizers: Mei Ling C. Clemens, Howmet Corporation; Joseph D. Puskar, Sandia National Laboratories; Mark R. Blankenau, Severstal NA; Srinath Viswanathan, Sandia National Laboratories; Qingyou Han, Oak Ridge National Laboratory

Tuesday AM Room: 333
September 27, 2005 Location: Convention Center

Session Chairs: Mark Blankenau, Severstal NA; Joseph D. Puskar, Sandia National Laboratories

9:00 AM

Utilizing NDE Methods for Steel Casting Performance: David Powelett¹; ¹Steel Founders' Society of America

9:25 AM

Visual Assessment of Casting Surface Quality: Gokcer 'Mike' Daricilar¹; Frank Peters¹; Malcolm Blair²; ¹Iowa State University; ²Steel Founders' Society of America

9:50 AM

Friction Stir Processing to Improve the Surface Properties of Aluminum and Magnesium Castings: Michael L. Santella¹; Zhili Feng¹; Cassandra M. Degen²; Tsung-Yu Pan³; ¹Oak Ridge National Laboratory; ²South Dakota School of Mines & Technology; ³Ford Motor Company

10:15 AM Break

10:25 AM

The Required Stress Relieving of Flash Welded 300M Tube Prior to Destructive Testing: Scott Maitland¹; ¹Goodrich Landing Gear

10:50 AM

Microstructural Characterization of TLP Bonded Inconel 617 Alloy: Farzad Jalilian¹; Mohammad Jahazi²; Robin A.L. Drew¹; ¹McGill University; ²Aerospace Manufacturing Technology Center, NRC

11:15 AM

Weld-Braze Defects and Microstructure of Laser Joined Steel-Aluminum Mixed Materials: Holger Laukant¹; Clemens Wallmann¹; Uwe Glatzel¹; ¹University of Bayreuth

11:40 AM

The Effects of Hold Time and Preheating on the Quality of Resistance Spot Welding of 50Mo-50Re Alloy Sheets: Jianhui Xu¹; Tongguang Zhai¹; John Farrell²; Mike Effgen²; ¹University of Kentucky; ²Semicon Associates

Developments in Sheet Products for Automotive Applications: Dual Phase and Other High Strength Steels

Program Organizers: James R. Fekete, General Motors Corporation; Roger Pradhan, Mittal Steel

Tuesday AM

Room: 330

September 27, 2005

Location: Convention Center

Session Chairs: Isaac Garcia, University of Pittsburgh; Mark Blankenau, Severstal NA

9:00 AM

Cold-Rolling of Ferritic-Martensitic/ Martensitic Microstructures: An Alternative Way to Grain Refinement: Ewald Werner¹; Prodomos Tshipouridis¹; Christian Kremaszky¹; Ernst Tragl²; Andreas Pichler²; ¹Technical University of Munich; ²Voestalpine Stahl Linz

9:30 AM

Beneficial Effects of Niobium Addition on Zn-Coated 590 DP Steel Sheets: Shunichi Hashimoto¹; ¹CBMM Asia Company, Ltd.

10:00 AM

Effect of Cool Deformation in Low Carbon Microalloyed Steels: Abdelbaset Elwazri¹; Fulvio Siciliano²; Dengqi Bai³; Stephen Yue¹; ¹McGill University; ²Reference Metals Company, Inc.; ³IPSCO, Inc

10:30 AM Break

10:45 AM

The Development of a New Fe-Mn-C Austenitic Steel for Automotive Applications: C. Scott¹; N. Guelton¹; S. Allain¹; M. Faral¹; ¹Arcelor Research SA

11:05 AM

Niobium Alloyed High Strength Steels for Automotive Applications: Hardy Mohrbacher¹; ¹Niobium Products Company

11:35 AM

A Research Study on the Production of Advanced High Strength Steels (ULSAB-VAC) in Mobarakeh Steel Company (MSC), Applied in Auto Structural Parts for the Optimization of Auto Fuel Performance: Shahrokh Pourmostadam¹; ¹Mobarakeh Steel Company

Electromagnetics in Materials Processing: Electromagnetic Heat Treatment and Microwave Processing

Program Organizers: Robert W. Hyers, University of Massachusetts; Douglas M. Matson, Tufts University; Daniel J. Williams, Inductoheat Inc

Tuesday AM

Room: 319

September 27, 2005

Location: Convention Center

Session Chair: Daniel J. Williams, Inductoheat Inc

9:00 AM

Controlling Induction Heating Magnetic Fields with Flux Field Concentrators: Tom Learman¹; ¹Alpha 1

9:20 AM

Insitu Pasty Welds and Deformation Analysis on Welded Tube Using Eddy Currents: John Paul Wallace¹; Robert Siegfried²; ¹Casting Analysis Corporation; ²Adelphi University

9:40 AM

Spectral Normal Emissivity of Electromagnetically Heated Ni at High Temperature: George Teodorescu¹; Peter D. Jones¹; Baojian Guo¹; Ruel A. Overfelt¹; ¹Auburn University

10:00 AM Cancelled

The Effect of Reformed Iron-Rich Phase in Aluminum on Electromagnetic Separation

10:20 AM Break

10:40 AM

Microwave and Millimeter-Wave Processing of Materials: David Lewis¹; M. A. Imam¹; Ralph W. Bruce²; Arne W. Fliflet¹; ¹Naval Research Laboratory; ²RWBruce Associates

11:00 AM

Molecular Dynamics Study of the Effect of Microwaves on TiO₂ Mobility: Niall English¹; Karl Johnson²; Dan Sorescu¹; ¹National Energy Technology Laboratory; ²University of Pittsburgh

11:20 AM

Comparison of Microwave and Conventional Processing of Ni-Fe Manganites: Juan Aguilar¹; Zarel Valdez¹; Moisés Hinojosa¹; Bernard Durand²; Sophie Guillemet²; ¹Universidad Autonoma de Nuevo Leon; ²Universite Paul Sabatier

11:40 AM

Phase Transformation and Diffusion in Fe-Based Alloys in a High Magnetic Field: Xinjiang Hao¹; Hideyuki Ohtsuka¹; ¹National Institute for Materials Science

Failure Analysis: Tools and Techniques in Failure Analysis

Program Organizers: Debbie Aliya, Aliya Analytical Inc; Dale E. Alexander, Engineering Systems Inc; David A. Moore, Packer Engineering

Tuesday AM

Room: 310

September 27, 2005

Location: Convention Center

Session Chairs: Debbie Aliya, Aliya Analytical, Inc.; Mark B. Hood, McSwain Engineering, Inc.

9:00 AM

Application of Hazard and Operability Studies (HAZOPS) to Failure Analysis: Mark N. Bailey¹; ¹MacInnis Engineering

9:20 AM

Microbially-Influenced Corrosion, Victaulic Couplings, Water Treatment and DNA Studies: *Donald L. Gibbon*¹; Mehrooz Zamanzadeh¹; Edward S. Larkin¹; ¹MATCO, Inc.

9:40 AM

Gamma Radiography as a Tool in Failure Analysis: *Alan A. Johnson*¹; ¹Metals Research, Inc.

10:00 AM

The Interaction of Test Methods and Failure Criteria: *Michael Fox*¹; David W. Levinson²; Richard Hastings²; ¹Chemical Accident Reconstruction Services, Inc.; ²University of Arizona

10:20 AM

Characterization of Ship Hull Steel Plates after Explosive Loading and Conventional Mechanical Testing: Christian Klingler¹; Dietmar Klingbeil¹; Werner Oesterle¹; *Pedro Dolabella Portella*¹; ¹Federal Institute for Materials Research & Testing BAM

10:40 AM

Engineering Evaluation of Fatigue Striations in the Aircraft Engine Industry: *Nicholas Edward Cherolis*¹; ¹Rolls-Royce Corporation

11:00 AM

Performance of Automotive Side Glazing in Rollover Collisions: *Stephen Allen Batzer*¹; ¹Renfroe Engineering, Inc.

11:20 AM

Stereographic Imaging in Failure Analysis: *Richard McSwain*¹; ¹McSwain Engineering

11:40 AM

Failure Analysis by Auger Electron Spectroscopy (AES): *Patrick J. McKeown*¹; ¹Evans East

Ferrous Physical Metallurgy of Highly Alloyed Steels: General/Low Alloy/HSLA Steels

Program Organizer: James P. Materkowski, Timken Latrobe Steel

Tuesday AM

Room: 335

September 27, 2005 Location: Convention Center

Session Chair: James P. Materkowski, Timken Latrobe Steel

9:00 AM **Introductory Comments**

9:05 AM

Influence of Thermomechanical Treatments on the Mechanical Properties and the Microstructure of Lean Chemistry HSLA-100 Steel Plates: *Sanjay Kumar Dhua*¹; ¹Steel Authority of India, Ltd.

9:30 AM

Combining Morphological and Crystallographic Analyses in Three Dimensions to Study Coarse Martensite in Low Carbon Steels: *David J. Rowenhorst*¹; George Spanos¹; ¹Naval Research Laboratory

9:55 AM

Copper Precipitation Strengthening in Steels Revisited: *Dieter Isheim*¹; Morris E. Fine¹; David N. Seidman¹; ¹Northwestern University

10:20 AM **Break**

10:35 AM

Effect of Precipitates on Deformation of Niobium Steels in the Two-Phase Range of Temperatures: *Maciej Pietrzyk*¹; Roman Kuziak²; Barbara Niznik¹; ¹Akademia Gorniczno-Hutnicza; ²Institute for Ferrous Metallurgy

11:00 AM

The Effect of Hot Deformation on the Microstructure and Mechanical Properties in a Nb and V Microalloyed Steel Containing Cu: Liandeng Yao¹; *Kaiming Wu*²; ¹Baoshan Iron and Steel Company Limited; ²Wuhan University of Science and Technology

11:25 AM

Three-Dimensional Observation of Microstructure Development in a Low Carbon Steel Weld Deposit: *Kaiming Wu*¹; Masato Enomoto²; ¹Wuhan University of Science and Technology; ²Ibaraki University

Fractures of Multicomponent Systems: Mechanisms and Modeling of Damage and Fracture in Composites

Program Organizers: Bhaskar S. Majumdar, New Mexico Tech; Nikhilesh Chawla, Arizona State University; John J. Lewandowski, Case Western Reserve University

Tuesday AM

Room: 307

September 27, 2005 Location: Convention Center

Session Chairs: Daniel B. Miracle, U.S. Air Force; John J. Lewandowski, Case Western Reserve University

9:00 AM **Invited**

Matrix Cracking from Short, Fiber-Bridged Cracks in Brittle-Matrix Composites: *Dinesh K. Shetty*¹; ¹University of Utah

9:25 AM **Invited**

Finite Element Based Modeling of Damage Nucleation in Multi-Component Systems: *Arun Gokhale*¹; Arun Sreeranganathan¹; Yuxiong Mao¹; ¹Georgia Institute of Technology

9:50 AM

Effect of Particle Clustering on the Fatigue Behavior of SiC Particle Reinforced Al Matrix Composites: Xin Deng¹; *Nikhilesh Chawla*¹; Fei Tang²; Iver E. Anderson²; B. Glesson²; ¹Arizona State University; ²Iowa State University

10:10 AM **Invited**

Fracture of Discontinuously-Reinforced Aluminum (DRA): The Role of Microstructural Homogeneity: *Jonathan Edward Spowart*¹; Garth B. Wilks²; ¹UES Inc; ²Pennsylvania State University

10:35 AM **Break**

10:55 AM **Invited**

Analysis of Material Design of Carbon Foam Ligament at Nano Scale for Optimal Stiffness: *Ajit K. Roy*¹; Khalid Lafdi²; ¹Air Force Research Laboratory; ²University of Dayton Research Institute

11:20 AM

Measurement and Modeling of Internal Stress and Damage in Al-Si Alloys: Bing Ye¹; *Bhaskar S. Majumdar*¹; Steve Harris²; Somnath Ghosh³; ¹New Mexico Tech; ²Ford Research Laboratories; ³Ohio State University

11:40 AM

Surface Nano-Deformation of Particulate-Reinforced Ti Composite by In-Situ AFM Observation: Y. Tanaka¹; *Jenn-Ming Yang*²; Y. Kagawa³; ¹National Institute for Materials Science; ²University of California, Los Angeles; ³University of Tokyo

12:00 PM

Relationship Between Microstructure and Fracture Mechanism in Discontinuously Reinforced Aluminum: *Garth B. Wilks*¹; Jonathan E. Spowart²; ¹Pennsylvania State University; ²UES, Inc.

TUESDAY AM

Frontiers of Materials Science 2005: Innovative Materials and Manufacturing Tech and Fourteenth International Symposium on Processing and Fabrication of Advanced Materials (PFAM XIV): Functional Nanomaterials and Micromanufacturing

Program Organizers: Reza Abbaschian, University of Florida; Srinath Viswanathan, Sandia National Laboratories; T. S. Srivatsan, University of Akron; Robert A. Varin, University of Waterloo

Tuesday AM Room: 308
September 27, 2005 Location: Convention Center

Session Chair: Oleg Senkov, UES, Inc.

9:00 AM

A New Nanoscale-Designed Oxide Material for Thermal Protection: *Francis R. Chapman*¹; Sankar Sambasivan¹; ¹Applied Thin Films, Inc.

9:20 AM

Application of Controlled Mechanical Alloying and Annealing for the Synthesis of Nanocrystalline Magnesium Diboride (MgB₂) Metallic Superconductor: *Robert A. Varin*¹; Chun Chiu¹; Simon Lee¹; ¹University of Waterloo

9:40 AM

Development of Bulk Nanostructured Copper with Superior Hardness for Use as an Interconnect Material in Electronic Packaging: *M. Y. Pan*¹; A. A.O. Tay¹; K. Vaidyanathan¹; Manoj Gupta¹; T. S. Srivatsan²; ¹National University of Singapore; ²University of Akron

10:00 AM

Influence of Particle Addition on the Formation of Ag₃Sn Phase in the Eutectic Sn-3.5% Solder: *Dechao Lin*¹; T. Srivatsan¹; G. X. Wang¹; R. Kovacevic²; ¹University of Akron; ²Southern Methodist University

10:20 AM Break

10:40 AM

Materials Issues in Micro-Manufacturing: *David L. Bourell*¹; ¹University of Texas

11:00 AM

Micro-Manufacturing: Making Small Things with Small Machines: *Khershed P. Cooper*¹; ¹Naval Research Laboratory

11:20 AM

Micro Scale Ultrasonic Vibration Machining of Hard and Brittle Materials: *Xiao Hu*¹; Zuyuan Yu¹; Kamlakar P. Rajurkar¹; ¹University of Nebraska

11:40 AM

An International Assessment of Micro-Manufacturing Technology: *Kornel Ehmman*¹; Richard DeVor²; ¹Northwestern University; ²University of Illinois at Urbana-Champaign

12:00 PM

Recent Advances in Microforming: Science, Technology and Applications: *Jian Cao*¹; ¹NSF & Northwestern University

History and Archaeology of Materials: Evaluations of Steel and Copper Alloys of Historical Significance in the United States

Program Organizers: Gregory J. Hildeman, Alcoa Inc; Michael R. Notis, Lehigh University; Aaron Shugar, Lehigh University

Tuesday AM Room: 402
September 27, 2005 Location: Convention Center

Session Chairs: Gregory J. Hildeman, Alcoa Inc; Michael R. Notis, Lehigh University; Aaron Shugar, Lehigh University

9:00 AM

Right Here in Pittsburgh: Roebling's and the World's First Wire-Rope Suspension Structure, 1845: *Donald L. Gibbon*¹; ¹MATCO, Inc.

9:40 AM

Investigation of the Steel Used at Fallingwater: *Louise Dean*¹; Cara Armstrong²; ¹Westmoreland Mechanical Testing & Research; ²Western Pennsylvania Conservancy

10:20 AM Break

10:40 AM

The Copper of the Statue of Liberty: *Jean-Marie Welter*¹; ¹KM Europa Metal

11:10 AM

Metallurgical Analysis and Conservation Efforts of the Wreck of the USS Arizona: *Tim Foecke*¹; ¹National Institute of Standards and Technology

11:40 AM

Analysis of Spikes from the Carson and Colorado Railroad: *Louise Dean*¹; ¹Westmoreland Mechanical Testing & Research

Integration of Theoretical, Computational and Experimental Studies of Interfaces and Microstructural Evolution: Solid-Liquid Interfaces

Program Organizers: Gregory S. Rohrer, Carnegie Mellon University; Alain S. Karma, Northeastern University; Paul P. Wynblatt, Carnegie Mellon University; Anthony D. Rollett, Carnegie Mellon University; David J. Srolovitz, Princeton University; Diana Farkas, Virginia Tech; Dominique Chatain, Centre National de La Recherche Scientifique; Christopher F. Woodward, Air Force Research Laboratory

Tuesday AM Room: 309
September 27, 2005 Location: Convention Center

Session Chair: Dominique Chatain, Centre de Recherche sur la Matière Condensée et les Nanosciences— CNRS

9:00 AM Invited

Atomic-Scale Simulations of the Properties of Rough and Faceted Crystal-Melt Interfaces: *Mark D. Asta*¹; Dorel Buta¹; Deyan Sun²; Jeff Hoyt³; Tomorr Haxhimali⁴; Alain Karma⁴; ¹Northwestern University; ²East China Normal University; ³Sandia National Laboratories; ⁴Northeastern University

9:30 AM Invited

Probing the Interface of Mesoporous Metals in Electrolytes: *Jonah Erlebacher*¹; ¹Johns Hopkins University

10:00 AM Invited

Structure Evolution and Release Behavior in Controlled Drug Delivery Devices: *David M. Saylor*¹; James A. Warren²; Thomas Wanner³; ¹FDA; ²National Institute of Standards and Technology; ³George Mason University

Integration of Theoretical, Computational and Experimental Studies of Interfaces and Microstructural Evolution: Poster Session

Program Organizers: Gregory S. Rohrer, Carnegie Mellon University; Alain S. Karma, Northeastern University; Paul P. Wynblatt, Carnegie Mellon University; Anthony D. Rollett, Carnegie Mellon University; David J. Srolovitz, Princeton University; Diana Farkas, Virginia Tech; Dominique Chatain, Centre National de La Recherche Scientifique; Christopher F. Woodward, Air Force Research Laboratory

Tuesday AM Room: 309
September 27, 2005 Location: Convention Center

Session Chair: Alain Karma, Northeastern University

3D Grain Growth Simulation Considering Solute Segregation and Solute Drag on Migrating Grain Boundaries: *Michael Changhua Gao*¹; Jason Gruber¹; Mitra Taheri¹; Tricia Bennett¹; Anthony D. Rollett¹; ¹Carnegie Mellon University

A Diffuse Interface Theory for Interfacial Phase Transitions in Single Phase Polycrystalline Alloys: Ming Tang¹; *Catherine M. Bishop*²; W. Craig Carter¹; ¹Massachusetts Institute of Technology; ²Massachusetts Institute of Technology/Oxford University

A Parametric Study of Grain Growth in an Idealized Metal Casting: *Christopher G. Roberts*¹; S. L. Semiatin²; Anthony D. Rollett¹; ¹Carnegie Mellon University; ²Air Force Research Laboratory

A Study on the Correlation Between Electronic Structure and Bond Character for LaNi₅ Alloy and Its Hydride: *Jin Guo*¹; Wenlou Wei¹; Liqin Xu¹; ¹Guangxi University

A Theoretical and Experimental Study of the Growth and Coarsening of Primary Alloy Carbides in CPM Rex M4 Tool Steel: *Alojz Kajinic*¹; Paul Mason²; Anders Engstrom³; ¹Crucible Research; ²Thermo-Calc Software, Inc.; ³Thermo-Calc Software AB

Application of Computational Kinetic Models, In-situ Time-Resolved X-Ray Diffraction and Local Electrode Atom Probe Microanalysis to Describe Nonequilibrium Microstructural Evolution in Structural Alloys: *Sudarsanam S. Babu*¹; Eliot D. Specht¹; Michael K. Miller¹; John M. Vitek¹; John W. Elmer²; Todd A. Palmer²; Stan A. David¹; ¹Oak Ridge National Laboratory; ²Lawrence Livermore National Laboratory

Atomistic Simulation of Surface Dislocation Injection on Au (001) Surface: *Chun-Wei Pao*¹; Henny W. Zandbergen²; David J. Srolovitz¹; ¹Princeton University; ²Delft University of Technology

Atomistic Simulations of Grain Sub-Division under High Strain: *Sundar Amancherla*¹; Diana Farkas²; Ramkumar Oruganti¹; P. R. Subramanian³; ¹GE India Technology Center; ²Virginia Tech; ³GE Global Research Center, Niskayuna

Austenite-Bainite Transformation Mechanism in Step Austempering of Ductile Irons: Silvia Vasseva¹; *Lydia Vassileva*²; ¹Institute of Metal Science; ²Technical University of Sofia

Comparison of Experimentally Observed and Simulated Growth Rates in Systems of Faceted Crystals: *Tomoko Sano*¹; Gregory Rohrer¹; ¹Carnegie Mellon University

Coupled Surface and Grain Boundary Dynamics: *Arkady Vilenkin*¹; Amy Novick-Cohen²; Jakob Kanel²; ¹Hebrew University of Jerusalem; ²Technion-IIT

Deformation Microstructure in Fe-Si Steel under Plain Strain Compression: *Dejan Stojakovic*¹; Roger Doherty¹; Surya Kalidindi¹; ¹Drexel University

Effect of Duplex Particle Structure on Recrystallization of Twin Roll Cast AA3105: *Naiyu Sun*¹; Burton R. Patterson¹; Jaakko P. Suni²; Eider A. Simiell²; Hasso Weiland²; Lawrence F. Allard³; ¹University of Alabama; ²Alcoa, Inc.; ³Oak Ridge National Laboratory

Evolution of Antiphase Domain (APD)/Nanolamellar Complex Structure in Ti-Al Single Crystals: *Yuichiro Koizumi*¹; Kazuki Iwamoto¹; Nobuhiro Tsuji¹; Yoritoshi Minamino¹; ¹Osaka University

Evolution of Faceted and Low Angle Like Boundaries during Sintering of Cemented Tungsten Carbides: *Vineet Kumar*¹; Z. Zak Fang¹; Stuart Wright²; Matt Nowell²; ¹University of Utah; ²TSL/EDAX

Evolution of the Grain Boundary Character Distribution during Grain Growth: *Herbert M. Miller*¹; Gregory S. Rohrer¹; Jason Gruber¹; Francine Papillon¹; Tomoko Sano¹; Chang-Soo Kim¹; ¹Carnegie Mellon University

Hot Pressing of Micron and Submicron Zirconia Powders: *Chiraporn Auechaitanukul*¹; W. Roger Cannon¹; ¹Rutgers University

Hot Pressing of Nanophase Al₂O₃-ZrO₂ and MgAl₂O₄-ZrO₂ Micron-Sized Powders: *H. Keshavan*¹; Anders Petersson¹; W. Roger Cannon¹; ¹Rutgers University

Liquid Metal Embrittlement of Grain Boundaries in Binary Alloys: *Ho-Seok Nam*¹; David J. Srolovitz¹; Mikhail I. Mendeleev²; ¹Princeton University; ²Ames Laboratory

Micromechanics Modeling for Incubation and MSC/PSC Growth for Aluminum Alloy under the Influence of Microscale Inclusion Particles: *Yibin Anna Xue*¹; Mary Hall Dale¹; Mark Horstemeyer¹; ¹Mississippi State University

Microstructural Development in Age Hardening Cu-Ti Alloys: *Nan Boonyachut*¹; Yingguo Peng¹; William A. Soffa²; David E. Laughlin¹; ¹Carnegie Mellon University; ²University of Virginia

Microstructural Evolution in Titanium Alloys: *Sujoy Kar*¹; Rajarshi Banerjee²; Eunha Lee¹; Daniel Huber¹; Dhriti Bhattacharyya¹; Peter C. Collins¹; Gopal Babu Viswanathan¹; Hamish L. Fraser¹; ¹Ohio State University; ²University of North Texas

Microstructure and Deformation Study of Aged Inconel 740: *Quanyan Wu*¹; John Shingledecker²; Robert Swindeman²; Vijay K. Vasudevan¹; ¹University of Cincinnati; ²Oak Ridge National Laboratory

Modeling Coarsening in Liquid Phase Sintered Materials using 3D Monte Carlo Simulation: *Sukbin Lee*¹; Anthony Rollett¹; ¹Carnegie Mellon University

Modelling of Texture Development in Polycrystalline Fe-Ga Magnetostrictive Materials: *Leon M. Cheng*¹; Rosaura Ham-Su¹; ¹Defense Research & Development Canada - Atlantic

Modelling Texture Evolution and Kinetics during Recrystallization in Aluminum: *Abhijit P. Brahme*¹; Joseph Fridy²; David Saylor¹; Anthony D. Rollett¹; ¹Carnegie Mellon University; ²Alcoa Technical Center

Phase Field Crystal Model: Grain Boundary Structure, Segregation Pattern, and Grain Boundary Migration: *Ning Ma*¹; Ken Elder²; Yunzhi Wang¹; ¹Ohio State University; ²Oakland University

Precipitation Modeling of Carbonitrides in Austenite during Hot Rolling: *Zeng Yu*¹; ¹Baosteel

Quantitative Comparison of Ginzburg-Landau Theory and Molecular Dynamics Simulations for BCC-Liquid Free-Energies and Crystalline Anisotropies: *Kuo-An Wu*¹; Alain Karma¹; Mark Asta¹; Jeffrey J. Hoyt²; ¹Northeastern University; ²Sandia National Laboratories

Recovery and Recrystallization of Tantalum after Severe Plastic Deformation: *Vladimir I. Levit*¹; Charles E. Wickersham¹; Andrew Payzant²; ¹Cabot Thin Films; ²Oak Ridge National Laboratory

Role of Interfaces in Determining Phase Stability in Nanoscale Multilayers: *Rajarshi Banerjee*¹; Arda Genc²; Gregory Thompson³; Hamish L. Fraser²; ¹University of North Texas; ²Ohio State University; ³University of Alabama

Stereological Recovery of Five-Parameter Grain Boundary Character Distributions from EBSD Maps: *Chang-Soo Kim*¹; Jason Gruber¹; Gregory S. Rohrer¹; ¹Carnegie Mellon University

The Models for Calculating Transformation and Properties of Plate Steels: *Sihai Jiao*¹; Wei Wang¹; Cong Wang¹; ¹Baoshan Iron & Steel Company, Ltd.

TUESDAY AM

The Texture Evolution of the Hot Bands of Continuous Cast AA 3004 Aluminum Alloy under Different Temperatures: *Qiang Zeng*¹; Tony Zhai¹; Xiyu Wen¹; ¹University of Kentucky

Three-Step Method for the Growth of Ultra-Flat Epitaxial Pt Films on Ceramic Substrates: Modeling Epitaxial Seed Grain Growth through a Polycrystalline Matrix: *Andrew J. Francis*¹; Christopher G. Roberts¹; Yan Cao¹; Anthony D. Rollett¹; Paul A. Salvador¹; ¹Carnegie Mellon University

Joining of Monolithic Structures and Components: Solid-State Joining Processes

Program Organizers: Charles V. Robino, Sandia National Laboratories; Matthew Walp, DaimlerChrysler; Thomas J. Lienert, Los Alamos National Laboratory

Tuesday AM Room: 311
September 27, 2005 Location: Convention Center

Session Chair: Leijun Li, Utah State University

9:00 AM

Analysis of Cold Pressure Bonding at Gold-Gold Interface in Thermal Switches: *Leijun Li*¹; ¹Utah State University

9:20 AM

Biomaterials Joining by Plastic Deformation Process: Dileep Singh¹; Felipe Guitierrez-Mora²; Cinta Lorenzo-Martin¹; Jules L. Routbort¹; *Eldon Case*³; ¹Argonne National Laboratory; ²Universidad de Sevilla; ³Michigan State University

9:40 AM

Characterization of Mechanical Properties of Friction Stir Welded Carbon Steels with Stress-Strain Microprobe: Hyunwoo Jin¹; *Adnan Ozeekin*¹; Jay Y. Koo¹; Raghavan Ayer¹; Narasimha-Rao V. Bangaru¹; ¹ExxonMobil Research & Engineering Corporation

10:00 AM

Correlations Amongst Processing Parameters, Microstructure and Mechanical Properties for Friction Stir Welded 2024 Aluminum Alloy: *Vikas Dixit*¹; Rajiv S. Mishra¹; D. R. Bolser²; R. J. Lederich²; R. Talwar²; D. L. Ballard³; ¹University of Missouri, Rolla; ²Boeing – Phantom Works; ³Air Force Research Laboratory

10:20 AM Break

10:40 AM

Effect of Interfacial Microstructure on Strength of Dissimilar Joint of Aluminum Alloys and Steels for Light-Weight Auto Body: *Hiroki Imaeda*¹; Miki Kondo¹; Akio Hirose¹; Kojiro F. Kobayashi¹; ¹Osaka University

11:00 AM

Mechanical Properties, Microstructure and Void Characterization of Friction Stir Processed AA 5052: *Michelle Adams-Hughes*¹; Peter N. Kalu¹; Namas Chandra¹; ¹FAMU-FSU College of Engineering

11:20 AM

Tracing Material Flow Paths in Friction Stir Welds: *Johnny Ray Sanders*¹; Judy Schneider¹; Arthur Nunes²; ¹Mississippi State University; ²NASA Marshall Space Flight Center

11:40 AM

Orbital Friction Welding of High Carbon Steel: *Mehran Maalekian*¹; Yassar Ghanimi¹; Horst Cerjak¹; ¹Graz University of Technology

Materials Applications for Homeland Security: Session I

Program Organizers: Alton D. Romig, Sandia National Laboratories; Vinayak P. Dravid, Northwestern University; Andrew Shapiro, Jet Propulsion Laboratory; Oladete Ogunseitan, University of California; Jean-Daniel Saphores, University of California; T. J. Allard, Sandia National Laboratories

Tuesday AM Room: 406
September 27, 2005 Location: Convention Center

Session Chairs: Alton D. Romig, Sandia National Laboratories; Vinayak P. Dravid, Northwestern University; T. J. Allard, Sandia National Laboratories

9:00 AM Invited

Science and Technology for Homeland Security: *Penrose C. Albright*¹; ¹United States Government

10:00 AM Invited

Materials and Analysis for Forensics: *Jim Wildey*¹; ¹National Transportation Safety Board

10:40 AM Invited

An Overview of Biodefense Activities at DHS: *John Vitko*¹; ¹United States Government

11:00 AM

Integrated Electronic Detection Approach to Biological Warfare Agents using Cantilever Arrays as Hybrid/Parallel Biomechanical Systems: *Gajendra S. Shekhawat*¹; Soo-Hyun Tark¹; Vinayak P. Dravid¹; ¹Northwestern University

11:20 AM

Enhancing Border and Building Security by using Self-Sensing Concrete: *Sihai Wen*¹; *Deborah D.L. Chung*¹; ¹University at Buffalo, State University of New York

Materials for the Hydrogen Economy: Hydrogen Storage II

Program Organizers: John J. Petrovic, Los Alamos National Laboratory; Iver E. Anderson, Iowa State University; Thad Matthew Adams, Westinghouse Savannah River Company; Gary Sandrock, SunaTech Inc; Colleen F. Legzdins, Ballard Power Systems; Jeffrey W. Stevenson, Pacific Northwest National Laboratory; Z. Gary Yang, Pacific Northwest National Laboratory

Tuesday AM Room: 302
September 27, 2005 Location: Convention Center

Session Chair: James C. Wang, Sandia National Laboratories

9:00 AM Invited

Development of Metal Hydrides for Space Applications and Energy Storage: *Robert C. Bowman*¹; ¹Jet Propulsion Laboratory

9:20 AM Invited

Developments of NaAlH₄ as an In-Situ Reversible Hydrogen Storage Media: *Donald L. Anton*¹; Xia Tang¹; Daniel Mosher¹; ¹United Technologies

9:40 AM

Development of Complex Hydrides: *Ragayy Zidan*¹; Kirk Shanahan¹; Ming Au¹; David Hathcock¹; ¹Savannah River Technology Center

10:00 AM

Synthesis and Characterization of Novel Alanates and AlH₃ Polymorphs: Jason A. Graetz¹; Yongjae Lee¹; James Reilly¹; Thomas Vogt¹; ¹Brookhaven National Laboratory

10:20 AM Break

10:40 AM

Thermodynamic Modeling of Sodium Alanates: Caian Qiu¹; Susanne M. Opalka²; Donald L. Anton²; Gregory B. Olson³; ¹QuesTek Innovations LLC; ²United Technology Research Center; ³Northwestern University

11:00 AM

Combined Experimental-Theoretical Investigations of the Na–Li–Al–H System: Susanne Marie Opalka¹; Ole M. Lovvik²; Hendrik W. Brinks³; Bjørn C. Hauback³; Donald L. Anton¹; ¹United Technologies Research Center; ²University of Oslo; ³Institute for Energy Technology

11:20 AM

Hydrogen Dynamics during the Decomposition Reactions of Alanates: Rosario Cantelli¹; Oriole Palumbo¹; Annalisa Paolone¹; Craig M. Jensen²; Sessa S. Srinivasan²; Reyna M. Ayabe²; ¹Università di Roma "La Sapienza"; ²University of Hawaii

11:40 AM

Atomic and Electronic Structure of Alkali Borohydrides: An Ab Initio Study: Nicholas G. Kioussis¹; William Gempel¹; Dimitrios A. Papaconstantopoulos²; ¹California State University Northridge; ²Naval Research Laboratory

12:00 PM

Hydrogen Storage in TiFe_{0.70-x}Mn_{0.20-x} (0 ≤ x ≤ 0.15) Metal Hydrides: Sylvain Challe¹; Michel Latroche¹; Fabien Heurtaux²; ¹LCMTR - CNRS; ²Renault

Materials for the Hydrogen Economy: Hydrogen Production & Delivery II

Program Organizers: John J. Petrovic, Los Alamos National Laboratory; Iver E. Anderson, Iowa State University; Thad Matthew Adams, Westinghouse Savannah River Company; Gary Sandrock, SunaTech Inc; Colleen F. Legzdins, Ballard Power Systems; Jeffrey W. Stevenson, Pacific Northwest National Laboratory; Z. Gary Yang, Pacific Northwest National Laboratory

Tuesday AM

Room: 303

September 27, 2005

Location: Convention Center

Session Chair: Thad M. Adams, Savannah River National Laboratory

9:00 AM Invited

High Pressure Hydrogen Transfer through Steel Pipeline: Issues, Challenges, and Path Forward: Sudarsanam S. Babu¹; James G. Blencoe¹; Larry M. Anovitz¹; Zhili Feng¹; Paul S. Korinko²; ¹Oak Ridge National Laboratory; ²Westinghouse Savannah River Company

9:20 AM Invited

Hydrogen Pipeline Steels: Robert Zawierucha¹; Kang Xu¹; Mahendra Rana¹; ¹Praxair Inc

9:40 AM Invited

Materials for Hydrogen Delivery: Embrittlement Problems and Remediation: Petros Sofronis¹; Ian M. Robertson¹; ¹University of Illinois, Urbana-Champaign

10:00 AM Invited

Hydrogen-Assisted Fracture of Ferritic Steels for High-Pressure Gas Storage and Delivery Applications: Brian Somerday¹; Dorian Balch¹; Chris San Marchi¹; ¹Sandia National Laboratories

10:20 AM Break

10:40 AM

Hydrogen Permeation Resistant Coatings: Paul S. Korinko¹; Gregory Creech¹; ¹Savannah River National Laboratory

11:00 AM

Glassy Barrier Coatings for Hydrogen Infrastructure Needs: Krishnaswamy K. Rangan¹; Sankar Sambasivan¹; ¹Applied Thin Films Inc

11:20 AM

Effect of Hydrogen on Ductile Fracture of a Carbon Steel: Zhili Feng¹; Stan A. David¹; Suresh Babu¹; ¹Oak Ridge National Laboratory

11:40 AM

Hydrogen Embrittlement of Selected Pipeline Steels: Govindarajan Muralidharan¹; J. P. Strizak¹; F. Haggag²; D. Stalheim³; S. K. Das⁴; I. Robertson⁵; P. Sofronis⁵; ¹Oak Ridge National Laboratory; ²Advanced Technology Corporation; ³Oregon Steel Mills; ⁴Secat Inc; ⁵University of Illinois

12:00 PM

The Removal of Sulfur Compounds from Natural Gas Using Ambient Sorbents: Gokhan Alptekin¹; Robert Amalfitano¹; Sarah J. DeVoss¹; Rita Dubovik¹; ¹TDA Research

Materials for the Hydrogen Economy: Fuel Cells II

Program Organizers: John J. Petrovic, Los Alamos National Laboratory; Iver E. Anderson, Iowa State University; Thad Matthew Adams, Westinghouse Savannah River Company; Gary Sandrock, SunaTech Inc; Colleen F. Legzdins, Ballard Power Systems; Jeffrey W. Stevenson, Pacific Northwest National Laboratory; Z. Gary Yang, Pacific Northwest National Laboratory

Tuesday AM

Room: 304

September 27, 2005

Location: Convention Center

Session Chair: Jeffrey W. Stevenson, Pacific Northwest National Laboratory

9:00 AM Invited

Advances in Solid Oxide Fuel Cell Technology at Siemens Westinghouse: Shailesh D. Vora¹; ¹Siemens Westinghouse Power Corporation

9:20 AM Invited

Long-Term Performance of Lanthanum Ferrite SOFC Cathodes: Steven Simmer¹; Jeffrey Stevenson¹; Michael Anderson¹; ¹Pacific Northwest National Laboratory

9:40 AM Invited

Metallic Alloy Interconnects for Solid Oxide Fuel Cells – Issues Regarding Chromium Oxide Volatility: James M. Rakowski¹; ¹Allegheny Ludlum

10:00 AM Invited

Oxidation Problems Associated with Interconnects in Solid Oxide Fuel Cells: Gerald H. Meier¹; Frederick S. Pettit¹; ¹University of Pittsburgh

10:20 AM Break

10:40 AM

Reaction Infiltration of Stable, High Performance Fuel Cell Electrodes: Craig Jacobson¹; Chun Lu¹; Tal Sholklipper¹; Xuan Chen²; Steve Visco¹; Lutgard De Jonghe²; ¹Lawrence Berkeley National Laboratory; ²University of California, Berkeley

11:00 AM

Sr- and Co-Doped Lanthanum Ferrite Perovskite-Type Materials as Low Temperature SOFC Cathodes: John N. Kuhn¹; Umit S. Ozkan¹; ¹Ohio State University

11:20 AM

Curvature and Its Origins in Tape Cast Solid Oxide Fuel Cells: Wenxia Li¹; Nam Jin¹; Matthew Seabaugh²; Kathy Sabolsky²; Scott Swartz²; John Lannutti¹; ¹Ohio State University; ²NexTech Materials

11:40 AM

Progress Towards a Metal Supported SOFC System: Craig Jacobson¹; Lutgard De Jonghe¹; Steven Visco¹; ¹Lawrence Berkeley National Laboratory

TUESDAY AM

12:00 PM

Thermomechanically Driven Behavior in SOFC Seals: Alex S. Tsai¹; Wenxia Li; Matthew Seabaugh¹; Kathy Hasinka¹; Peter Hall; *John Lannutti*¹; ¹Ohio State University

Modeling and Simulation of Titanium Technology: Theory and Practices: Phase Transformation and Microstructure Development in Ti and Its Alloys I

Program Organizers: Ellen K. Cerreta, Los Alamos National Laboratory; Vasisht Venkatesh, Timet Corporation; F. Robert Dax, Concurrent Technologies Corporation; Jaimie S. Tiley, U.S. Air Force

Tuesday AM Room: 405
September 27, 2005 Location: Convention Center

Session Chair: Jaimie S. Tiley, U.S. Air Force

9:00 AM Invited

Overview of Ti Modeling Activities at AFRL: *Jay Tiley*¹; Michael Glavicic²; S. L. Semiatin¹; ¹Air Force Research Laboratory; ²UES Inc.

9:30 AM

Modeling of Microstructures and Mechanical Properties of $\alpha + \beta$ Ti Based Alloys: *Jianzheng Guo*¹; Mark T. Samonds¹; ¹ESI U.S. R&D

9:50 AM

Optimization of Mechanical Behavior via Microstructural Design: *Riqing Ye*¹; Bing Q. Han¹; Yaojun Lin¹; Enrique J. Lavernia¹; ¹University of California

10:10 AM Invited

Application of the Thermodynamic Modeling Tool for the Predictions of Titanium Alloy Properties: *Fan Zhang*¹; S. L. Chen¹; Y. Austin Chang²; David U. Furrer³; Vasisht Venkatesh⁴; Jaimie S. Tiley⁵; ¹Computherm, LLC; ²University of Wisconsin; ³Ladish Company Inc; ⁴Timet Corporation; ⁵Air Force Research Laboratory/MLLMP

10:40 AM Break

11:00 AM Invited

Modelling Techniques for Micro-Structural Prediction in Titanium Alloys: *Jeff Brooks*¹; Martin Rist²; Andrew Wilson³; ¹QinetiQ Ltd; ²Open University; ³Timet UK

11:30 AM

Montage-Based Serial Sectioning to Determine the Spatial Distribution of TiB Whiskers in Ti-6Al-4V-TiB Composite: *Scott I. Lieberman*¹; Arun Gokhale¹; ¹Georgia Institute of Technology

11:50 AM

3D Modeling Study of Recrystallization and Grain Growth in Inhomogeneously Strained Polycrystallines: *Orest Ivasishin*¹; Sergiy Shevchenko¹; Nikita Vasiliev¹; Lee Semiatin²; ¹NAS of Ukraine; ²Air Force Research Laboratory

Nanomaterials: Nanomaterials Synthesis and Characterization

Program Organizers: Jeremy W. Burdon, Medtronic Inc; C. Suryanarayana, University of Central Florida; William M. Mullins, U.S. Army

Tuesday AM Room: 404
September 27, 2005 Location: Convention Center

Session Chair: C. Suryanarayana, University of Central Florida

9:00 AM

Development of a Novel Aqueous Sol-Gel Technique for Synthesis of Nanostructured Ceramic Powders: *Narendra N. Ghosh*¹; ¹University of Kentucky

9:20 AM

Fabrication and Fiber Mechanics of Nanofibers Produced by a Modified Wet Spinning Technique: *Murali K. Gorantla*¹; Srinivas Mellacheruvu¹; Henry Daniel Young¹; ¹Wright State University

9:40 AM

FEM of Nanoindentation on Micro and Nano Crystalline Ni: Analysis of Factors Affecting Hardness and Modulus Values: *Raja Mahesh Pothapragada*¹; Reza A. Mirshams¹; ¹University of North Texas

10:00 AM

Formation of Oxide Nanostructures by Low Temperature Oxidation by *in situ* UHV-TEM: *Li Sun*¹; Judith C. Yang¹; ¹University of Pittsburgh

10:20 AM Break

10:40 AM Invited

Simulation of Heat Transfer Enhancement in Silica Nanoparticle Suspensions: *Ranganathan Kumar*¹; Xuan Wu¹; ¹University of Central Florida

11:20 AM

Use of Scanning Probe Microscope (SPM) in Nanostructures Formation: *Gaurav Gupta*¹; ¹National Institute of Technology Warangal

11:40 AM

Nanoscale Mechanical Testing and Mechanical Machining of Zero- and One-Dimensional Nanobuilding Blocks: *Xiaodong Li*¹; ¹University of South Carolina

Near-Net-Shape Technologies: Applications

Program Organizers: Kim W. Mitchiner, Sandia National Laboratories; Animesh Bose, Materials Processing, Inc.; David L. Bourell, University of Texas

Tuesday AM Room: 403
September 27, 2005 Location: Convention Center

Session Chairs: Animesh Bose, Materials Processing, Inc.; David L. Bourell, University of Texas

9:00 AM

Freeform Fabrication of 3D Tissue Scaffolds: *Wei Sun*¹; ¹Drexel University

9:30 AM

Tissue Engineering Using Direct Write Technologies: *James William Sears*¹; ¹South Dakota School of Mines & Technology

9:55 AM

Direct-Write Fabrication with Fine Particle Suspensions: *Joe Cesarano*¹; ¹Sandia National Laboratories

10:20 AM

Low-Cost Wet-Spray Coatings for Wear and Corrosion Protection: *Gopal S. Revankar*¹; ¹Deere & Company

TUESDAY AM

10:45 AM Break

11:15 AM

Empirical Models of the Effect of MIM Processing Parameters on Weights, Dimensions, and Properties of Ferrous Parts: J. Alan Sago¹; Joseph W. Newkirk¹; ¹University of Missouri, Rolla

11:45 AM Cancelled

Fabrication Processes and Thermal Stability of MGC Components

12:10 PM

Counter-Gravity Investment Casting of Ni-Base Superalloys Using Inert Atmosphere: Sanjay Shendye¹; Blair King¹; Paul McQuay²; ¹Metal Casting Technology, Inc.; ²Hitchiner Manufacturing Company, Inc.

12:35 PM

The Effect of EMBR on Metallurgical Behavior in Mold and Slab Quality: Guangmu Liu¹; Kaiming Wu²; ¹Lianyuan Iron and Steel Company; ²Wuhan University of Science and Technology

Next Generation Biomaterials: Novel Materials for Tissue Engineering

Program Organizers: Roger J. Narayan, Georgia Institute of Technology; Sarit B. Bhaduri, Clemson University; Gary S. Fischman, National Materials Advisory Board

Tuesday AM Room: 320
September 27, 2005 Location: Convention Center

Session Chairs: Paul Calvert, University of Massachusetts; Douglas Chrisey, Naval Research Laboratory

9:00 AM Invited

Biologic Scaffolds for Regenerative Medicine: Stephen F. Badylak¹; ¹University of Pittsburgh

9:20 AM Invited

Biopolymer Deposition for Freeform Fabrication of Hydrogel Tissue Constructs: Wei Sun¹; ¹Drexel University

9:40 AM Invited

Electrospun Scaffolds for Tissue Engineering: John Lannutti¹; ¹Ohio State University

10:00 AM Invited

Direct Writing of Advanced Biomaterials: Roger J. Narayan¹; Boris Chichkov²; Douglas B. Chrisey³; ¹Georgia Institute of Technology; ²Laser Zentrum Hannover e.V.; ³Naval Research Laboratory

10:20 AM Invited

Inkjet Printing of Proteins and Cells: Paul Calvert¹; Skander Limem¹; David Kaplan²; H. J. Jin²; ¹University of Massachusetts; ²Tufts University

10:40 AM Invited

Drop-on Demand Printing of Cells and Materials for Designer Hybrid Tissue Constructs: Thomas Boland¹; ¹Clemson University

11:00 AM Invited

Tissue Engineering Scaffolds for Nerve Regeneration Manufactured by Ink-Jet Technology: Delia Radulescu¹; Sanjay Dhar²; Christine M. Young²; David Taylor¹; Hans-Jochen Trost¹; Gregory R.D. Evans²; ¹MicroFab Technologies, Inc.; ²University of California - Irvine

11:20 AM Invited

Inkjet Printing of 2D and 3D Spatial Hormone Patterns: Phil Campbell¹; ¹Carnegie Mellon University

11:40 AM Invited

Laser Processing of Living Biomaterials: How Can We Leverage Nature's Nanotechnology? Douglas B. Chrisey¹; ¹Naval Research Laboratory

Residual Stress, Deformation, and Distortion: Heat Treatment and Other Processing

Program Organizers: Zhili Feng, Oak Ridge National Laboratory; Mark R. Blankenau, SeverStal North America; Lawrence A. Lalli, Alcoa Inc

Tuesday AM Room: 316
September 27, 2005 Location: Convention Center

Session Chair: Lawrence A. Lalli, ASM International Pittsburgh Chapter

9:00 AM Introductory Comments

9:05 AM

Distortion of Vacuum Carburized Steel by Systematic Variation in Processing Parameters: Hunter Swenson¹; David K. Matlock¹; John Speer¹; Greg Fett²; Mike Prime³; ¹Colorado School of Mines; ²Dana Corporation; ³Los Alamos National Laboratory

9:25 AM

Modeling Residual Stresses and Distortion during Heat Treatment and Machining: Ravi Shankar¹; Yanlin Yin¹; Wei-Tsu Wu¹; Shesh Srivatsa²; Kong Ma³; Dave Furrer⁴; ¹Scientific Forming Technologies Corporation; ²GE Aircraft Engines; ³Rolls Royce Corporation; ⁴Ladish Company

9:45 AM

FEM Simulation of the Residual Stress in Steel Plates Experienced Accelerated Cooling: Sihai Jiao¹; Xuelian Yin¹; ¹Baoshan Iron & Steel Co., Ltd.

10:05 AM

Experimental Study of Stress-Phase Transformation Coupling Model Developed via Monoaxial Loading Tests: Wei Shi¹; ¹Tsinghua University

10:25 AM Break

10:45 AM

Tracking and Modeling Distortion Evolution in Bearing Components after Heat Treatment: E. Buddy Damm¹; Krich Sawamiphakdi¹; ¹Timken Company

11:05 AM

COMPACT – A Concurrent Approach to Manufacturing Induced Part Distortion in Aerospace Components: Sjoerd van der Veen¹; Stephen Crump²; Richard Burguete²; Julien Boselli³; ¹Alcan Aerospace; ²Airbus UK; ³Alcan Research Centre CRV

11:25 AM

Operating Experience with an Online Measurement System for Mechanical Properties within a Hot-Dip Galvanizing Line: Thomas Dornseifer¹; Matthias Irle²; ¹EMG USA Inc.; ²EMG Automation GmbH

11:45 AM

Stress-Induced Domain Behaviors under Earth's Magnetic Field: En Yang¹; LuMing Li¹; Xing Chen¹; ¹Tsinghua University

TUESDAY AM

Roll Technology: Training Seminar

Program Organizers: Ron Webber, Dofasco Inc; Philip C. Perry, Nippon Steel

Tuesday AM Room: 334
September 27, 2005 Location: Convention Center

Session Chair: Ted Kerr, Metallurgical Engineering Services

9:00 AM Panel Discussion:

A short course based on the Rolls for the Metalworking Industries book will be presented. Topics will include NDT techniques for rolls (W. Hill, Dofasco) and the manufacture and usage of cast and forged rolls.

Science and Technology of Powder Materials: Synthesis, Consolidation and Properties: Powder Making and Processing

Program Organizers: Leon L. Shaw, University of Connecticut; Eugene Al Olevsky, San Diego State University; Fernand D. Marquis, South Dakota School of Mines & Technology; Iver E. Anderson, Iowa State University; James H. Adair, Pennsylvania State University; Jitendra P. Singh, Argonne National Laboratory

Tuesday AM Room: 301
September 27, 2005 Location: Convention Center

Session Chair: Iver Anderson, Iowa State University

9:00 AM Invited

Consolidation of Powder-Processed Alloys: *C. Suryanarayana*¹; ¹University of Central Florida

9:20 AM

Ceramic Nanopowders Produced from Precursors by the Self-Splintering Technology: *Olena Smuk*¹; *Olena Smuk*¹; *Emanuil Prylutsky*²; *Ljudmila Domasevich*²; ¹Royal Institute of Technology; ²I. M. Frantsevich Institute for Problems of Materials Science

9:40 AM

Clean Powder Processing and Resulting Mechanical Property Advantages: *William R. Thompson*¹; ¹Thom-Tek, LLC

10:00 AM

Current Development and Opportunities Using the Impulse Atomization Technique: *Hani Henein*¹; ¹University of Alberta

10:20 AM

Powder Selection for Electrophoretic Deposition: *David G. Brandon*¹; *Martin Zarbov*²; *Nissim Cohen*²; *Assaf Thon*²; ¹Technion - Israel Institute of Technology; ²Cerel, Ceramic Technologies Ltd

10:40 AM

Production of Submicron-Sized, Nanostructured Metallic Powder: *Leon L. Shaw*¹; *Hong Luo*¹; ¹University of Connecticut

11:00 AM

Rapid Solidification Microstructures in Aluminum-Silicon Gas Atomized Powder: *Iver E. Anderson*¹; *Eren Kalay*¹; *Scott Chumbley*¹; *Rohit Trivedi*¹; ¹Iowa State University

11:20 AM

Formation of Ultrafine Copper Powders from Cu(OH)₂ Slurry: *Jong-Gwan Ahn*¹; *Hai Hoang*¹; *Dong-Jin Kim*¹; *Jaeryeong Lee*¹; *Chong-Oh Kim*²; *Hun S. Chung*¹; ¹Korea Institute of Geoscience & Mineral Resources; ²Chungnam National University

What Makes a Good Materials Engineer and How Best to Educate Them: Outreach and K-12 Issues

Program Organizers: Paul E. Cantonwine, Bechtel Bettis Inc; Kent D. Peaslee, University of Missouri-Rolla; Mark A. Palmer, Kettering University; Michael B. Connelly, Casey Products Inc

Tuesday AM Room: 315
September 27, 2005 Location: Convention Center

Session Chair: Kent D. Peaslee, University of Missouri-Rolla

9:00 AM Invited

Materials as the Gateway to Learning Science: A Key Opportunity for the Emerging Materials Coalition: *Rustum Roy*¹; *Thomas G. Stoebe*²; ¹Pennsylvania State University; ²University of Washington

9:30 AM Invited

Materials as the Gateway for Science, Engineering and Technology: A Plan for Improving in K-14 Science and Technology Education: *Donald L. Evans*¹; *Thomas G. Stoebe*²; ¹Arizona State University; ²University of Washington

10:00 AM Invited

Materials Science Program Impact at the High School Level: *Thomas G. Stoebe*¹; ¹University of Washington

10:30 AM

Involvement of Graduate Student Volunteers in Engineering Educational Outreach through ASM Materials Camp: *Ryan M. Deacon*¹; *Clifford A. Prescott*¹; *Neil D. Hurley*¹; *Wojciech Z. Misiolek*¹; *Richard P. Vinci*¹; ¹Lehigh University

10:50 AM Break

11:00 AM

Materials Engineering Education in a Developing Nation: The Nigerian Perspective: *Celestine Kamma*¹; ¹University of Lagos

11:20 AM

Experiential Materials Science Outreach and Training – A Description of Successful Activities and Programs Targeting Minority Populations in New Mexico: *Diane E. Albert*¹; ¹Diane Albert Consulting

11:40 AM Invited

Resource Center for Materials Education: *Thomas G. Stoebe*¹; *John Rusin*²; ¹University of Washington; ²Edmonds Community College

12:00 PM

ASM Materials Education Foundation: Preparing Engineers for the Future: *Thomas G. Stoebe*¹; *Aziz Asphahani*²; *Charles Hayes*³; ¹University of Washington; ²Carus Chemical Co.; ³ASM Materials Education Foundation

Application of Materials Science to Military Systems: Symposium Introductory Session

Program Organizers: Douglas Deason, U.S. Army; Rodney R. Boyer, Boeing Company

Tuesday PM Room: 319
September 27, 2005 Location: Convention Center

Session Chair: Rodney R. Boyer, Boeing Company

2:00 PM

Can Software Help Materials Engineers Work Smarter?: *Will M. Marsden*¹; ¹Granta

2:20 PM

Transition of Technology Using the Metals Affordability Initiative: *Jaimie S. Tiley*¹; ¹U.S. Air Force

2:40 PM

Accelerated Aging and Lifetime Prediction in U-Nb Alloys: *Robert E. Hackenberg*¹; Heather M. Volz¹; Robert D. Field¹; W. Larry Hulst¹; David F. Teter¹; Donald Brown¹; Mark A.M. Bourke¹; Dan J. Thoma¹; ¹Los Alamos National Laboratory

3:00 PM

The Application of Laser Powder Deposition for Repair and Manufacturing of DoD Components: *James William Sears*¹; Seth Miller¹; Aaron C. Costello¹; Jerrod Roalstad¹; ¹South Dakota School of Mines & Technology

3:20 PM

Production Laser Peening of High Strength Materials: *Lloyd Hackel*¹; Jon Rankin²; Michael R. Hill²; Kim Ngoc T. Tran³; ¹Metals Improvement Company; ²University of California, Davis; ³NSWC-Cardecro

3:40 PM

Shaped-Charge Jet Stability Calculations: The Role of Initial and Boundary Conditions: *Mukul Kumar*¹; James Stolken¹; ¹Lawrence Livermore National Laboratory

4:00 PM

Progress in Imaging and Visualization of Impact Damage with XCT: *Joseph Michael Wells*¹; ¹JMW Associates

4:20 PM

Single-Melt PAM Processed Forged Ti6Al-4V Bell Housings for Lightweight 155mm Howitzer: *Mustafa Guclu*¹; Ibrahim Ucok¹; Hao Dong¹; Chris Hatch²; ¹Concurrent Technologies Corporation; ²Lightweight 155mm Joint Program Management Office

Automation & Control/Advanced OnLine Metallurgical Models/Sensors: Session I

Program Organizers: Dave F. Farson, Ohio State University; Brian Nelson, Dofasco Inc; E. Buddy Damm, Timken Company; Matthew J. Merwin, U.S. Steel; Wanlin Wang, Carnegie Mellon University

Tuesday PM Room: 335
September 27, 2005 Location: Convention Center

Session Chair: Dave F. Farson, Ohio State University

2:00 PM

Inline Measurements of Texture and Recrystallization on Aluminum Alloys: *André Moreau*¹; Christophe Bescond¹; Stéphane Bolognini¹; Martin Lord¹; Silvio E. Kruger¹; Chi-Sing Man²; ¹National Research Council of Canada; ²University of Kentucky

2:20 PM

An Intelligent Control System for Die Thermal Management: *Tiebao Yang*¹; Henry Hu¹; Xiang Chen¹; Yeou-Li Chu²; Patrick Cheng²; ¹University of Windsor; ²Ryobi Die Casting (USA) Inc.

2:40 PM

Studies on Development of Real-Time Adaptive-Model-Based Feedback Control for Resistance Spot Welding: *John Chen*¹; Dave F. Farson¹; ¹Ohio State University

3:00 PM

Model of Radiative Heat Transfer Phenomena in Solid Mold Flux Phase during Continuous Casting: *Wanlin Wang*¹; Alan W. Cramb¹; ¹Carnegie Mellon University

3:20 PM Break

3:40 PM

Thermal Imaging and Control of Electron Beam Freeform Fabrication (EBF3): *William H. Hofmeister*¹; Robert A. Hafley²; Karen M. Taminger²; Kim S. Bey²; ¹Vanderbilt University; ²NASA Langley Research Center

4:00 PM

X-Ray Observation of Phosphorus Vaporization from Steelmaking Slag and Suppression Method of Phosphorus Reversion in Liquid Iron: *Min Oh Suk*¹; Seon-Hyo Kim¹; ¹Pohang University of Science and Technology

4:20 PM

Online Measurement of the Surface Roughness of Steel Strip: *Thomas Dornseifer*¹; Matthias Irle Irle²; ¹EMG USA Inc.; ²EMG Automation GmbH

4:40 PM

State Estimation in Advanced Control of Solidification: *Beathe Furenes*¹; *Bernt Lie*¹; ¹Telemark University College

Coatings 2005: Oxidation/Environmental Barrier Coatings II

Program Organizers: Nitin P. Padture, Ohio State University; Lorraine F. Francis, University of Minnesota; Janet M. Hampikian, Boise State University; Narendra B. Dahotre, University of Tennessee

Tuesday PM Room: 317
September 27, 2005 Location: Convention Center

Session Chair: Rajendra Bordia, University of Washington

2:00 PM Invited

Coated Refractory Metal Sheet for On-Orbit Repair of Space Shuttle Leading Edges: *James A. Nesbitt*¹; Frank Ritzert¹; ¹NASA

2:40 PM

Characterization of Interfacial Instabilities in Solid Oxide Fuel Cell Materials Sets: *Daniel R. Mumm*¹; ¹University of California, Irvine

3:00 PM

Tantalum and Tantalum Carbide Layers on Graphite: Preparation, Thermal Effects and Stability: *Avi Raveh*¹; Shmuel Barzilai¹; *Daniel Moreno*¹; R. Adler²; Roni Shneck²; ¹NRCN; ²Ben-Gurion University

3:20 PM Break

3:40 PM

Boride Coating on Graphite Anode for Calcium Molten Salt Electrolysis: *Guisheng Zeng*¹; Xie Gang¹; Dajin Yang¹; ¹Kunming University of Science and Technology

TUESDAY PM

Coatings 2005: Mechanical Properties of Coatings

Program Organizers: Nitin P. Padture, Ohio State University; Lorraine F. Francis, University of Minnesota; Janet M. Hampikian, Boise State University; Narendra B. Dahotre, University of Tennessee

Tuesday PM Room: 317
September 27, 2005 Location: Convention Center

Session Chair: Eric Jordan, University of Connecticut

4:00 PM Invited

Stresses in Thin Films: Islands, Surface Stress & Non-Equilibrium Surfaces: Chun-Wei Pao¹; David J. Srolovitz¹; ¹Princeton University

4:40 PM Invited

Grain Boundary Induced Stresses in Polycrystalline Coatings and Thin Films: Brian W. Sheldon¹; ¹Brown University

5:20 PM

Microscale Characterization of NiCrAlY Coating for High Strength High Conductivity Copper Alloy: Piyush Jain¹; Sai V. Raj²; George Thom³; Kevin J. Hemker¹; ¹Johns Hopkins University; ²NASA Glenn Research Center; ³Plasma Processes, Inc

5:40 PM

Wrinkling of a Two-Layer Polymer Coating: Soumendra Basu¹; Aaron Bergstreser¹; Lorraine F. Francis¹; L. E. Scriven¹; Alon McCormick¹; ¹University of Minnesota

Coatings 2005: Coatings on Steel

Program Organizers: Nitin P. Padture, Ohio State University; Lorraine F. Francis, University of Minnesota; Janet M. Hampikian, Boise State University; Narendra B. Dahotre, University of Tennessee

Tuesday PM Room: 318
September 27, 2005 Location: Convention Center

Session Chair: G. Sundararajan, International Advanced Research Centre for Powder Metallurgy and New Materials

2:00 PM

The Role of Particle Size and Shape in the Fracture Resistance of Anti-Corrosion Coatings for Steels: Jack Beuth¹; Steven Bianculli²; ¹Carnegie Mellon University; ²U.S. Steel

2:20 PM

Kinetic Metallization™ A Field Repair Process for IVD Aluminum Coatings on High Strength Steels: Ralph M. Tapphorn¹; Jeff Henness¹; ¹Inovati

2:40 PM

Surface Modification of Resistance Welding Electrodes by Electro-Spark Deposited Coatings: Nigel S. Scotchmer¹; Zheng Chen²; Norman Zhou²; ¹Huys Industries Limited; ²University of Waterloo

3:00 PM

Evaluation of Alternative Coatings for Cadmium-Plated Rail Clips: Raj K. Singh¹; ¹ERICO, Inc.

3:20 PM Break

3:40 PM

Hf-Modified Aluminide Coatings on Ferritic and Austenitic Alloys for Power Generation Applications: Yongqing Wang¹; Ying Zhang¹; Bruce A. Pint²; J. A. Haynes²; ¹Tennessee Technological University; ²Oak Ridge National Laboratory

4:00 PM

Plasma Nitrided AISI 4016 Steel for Use in Rail Freight Truck Centre Bearings: Matthew Franklin¹; Shao Wei Huang¹; Kiet Tieu¹; Tara Chandra¹; ¹University of Wollongong

4:20 PM

Wear Behaviour of a Liquid Nitrided Cold Work (Cr-Mo-V) Tool Steel: Georgios Pantazopoulos¹; Dimitrios Kanakis²; Solon Antoniou²; John Sideris³; ¹Halcor SA Metal Works; ²TEI of Piraeus; ³Uddeholm S.A. Steel Trading Company

4:40 PM

Carbide Layers Produced on Steel Surface in Vacuum Chromizing Process: Ewa Maria Kasprzycka¹; Jan Senatorski¹; Aleksander Nakonieczny¹; Tomasz Babul¹; Bogdan Bogdanski¹; ¹Institute of Precision Mechanics

5:00 PM

Composite Layers Produced on Steel Surface in Vacuum Titanizing Process Combined with the Electrolytic Deposition of Cobalt: Ewa Maria Kasprzycka¹; ¹Institute of Precision Mechanics

5:20 PM

Ultra-Thin Transparent Inorganic Films Using Low-Cost Roll-to-Roll Process: Sankar Sambasivan¹; Johan Abadie¹; Julie Wessling¹; Krishnaswamy Rangan¹; ¹Applied Thin Films, Inc.

Copper for the 21st Century: Session II

Program Organizer: David L. Ellis, NASA

Tuesday PM Room: 305
September 27, 2005 Location: Convention Center

Session Chair: Joanna R. Groza, University of California

2:00 PM

Copper Metal Matrix Composite Produced by Ceramic Fiber Reinforcement of a Copper-Based Exothermic Welding Material: Ward Judson¹; ¹ERICO, Inc.

2:20 PM

Effect of Particulate SiC on Thermophysical and Thermomechanical Properties of OFHC Copper Based MMC's: Aditya Putrevu¹; V. V. Bhanu Prasad²; Veerredhi Vasudeva Rao³; ¹University of Texas; ²Defense Metallurgical Research Laboratory; ³Sreenidhi Institute of Science & Technology

2:40 PM

Fabrication of Copper Matrix Composites Reinforced by Single-Walled Carbon Nanotubes: Qiang Zeng¹; Kenneth Wilson¹; Yildiz Bayazitoglu¹; Enrique Barrera¹; ¹Rice University

3:00 PM

Texture and Hardness Evolution of a Roll-Bonded Cu-Nb Composite: Chao Voon Samuel Lim¹; Anthony D. Rollett¹; ¹Carnegie Mellon University

3:20 PM Break

3:40 PM

Overview of Application-Directed R&D in the Copper Industry: Hal Stillman¹; ¹International Copper Association

4:00 PM

Inventions under Joint Development Agreements and the New U.S. "CREATE" Law: Paul I. Fleischut¹; Jessica X. Monachello¹; ¹Senniger Powers

4:20 PM

Scenario Analysis of Copper Futures: Amit Kapur¹; Thomas E. Graedel²; ¹University of Michigan; ²Yale University

4:40 PM

The Stocks and Flows of Copper: Thomas E. Graedel¹; Robert Gordon¹; ¹Yale University

Creep Deformation and Fracture, Design, and Life Extension: Session IV

Program Organizers: Rajiv S. Mishra, University of Missouri; James Calvin Earthman, University of California; Sai V. Raj, NASA Glenn Research Center; R. Viswanathan, Electric Power Research Institute

Tuesday PM Room: 306
September 27, 2005 Location: Convention Center

Session Chair: Gunther F. Eggeler, Ruhr University

2:00 PM Invited

Platinum Base Superalloys - Alloy Development, Microstructure, Misfit, Creep Behavior: *Uwe Glatzel*¹; Markus Wenderoth¹; Stefan Vorberg²; Bernd Fischer²; Yoko Yamabe-Mitarai³; Hiroshi Harada³; Rainer Voelkl¹; ¹University Bayreuth; ²University of Applied Sciences; ³National Institute for Materials Science, Tsukuba

2:20 PM Invited

Mechanical Properties of Ir-15HF-xZr Ternaries with fcc/L12 or L12/L12 Two-Phase Structure at Room and High Temperatures: *Jiangbo Sha*¹; Yoko Yamabe-Mitarai¹; Hiroshi Harada¹; ¹National Institute for Materials Science

2:40 PM

Non-Contact Creep Resistance Measurement for Ultra-High-Temperature Materials: *Jonghyun Lee*¹; Richard C. Bradshaw¹; Jan R. Rogers²; Thomas J. Rathz³; James J. Wall⁴; Hahn Choo⁴; Peter K. Liaw⁴; Robert W. Hyers¹; ¹University of Massachusetts; ²NASA MSFC; ³University of Alabama Huntsville; ⁴University of Tennessee

3:00 PM

The Small Punch (SP) Creep Testing of Low Alloy Steels: *G. C. Stratford*¹; K. Kobayashi²; J. Klaput³; ¹University of Wales Swansea; ²Chiba University; ³Cracow University of Technology

3:20 PM Break

3:40 PM

Creep Properties of Active Braze Alloys Containing Eutectic Ag-Cu and Ag Matrix Phases: *John J. Stephens*¹; Evan C. Dudley¹; Joshua B. Caris¹; ¹Sandia National Laboratories

4:00 PM

Tensile Creep Fracture of Polycrystalline Near-Stoichiometric NiAl: *Sai V. Raj*¹; ¹NASA Glenn Research Center

4:20 PM

High Temperature Mechanical Properties of RuAl-Based Ternary Alloys: *Fang Cao*¹; Tresa M. Pollock¹; ¹University of Michigan

4:40 PM Panel Discussion:

Discussion on Future International Creep Symposium

Current Topics in Electronic Packaging: Pb Free Solders, Thermal Management: Pb Free Solder Joints - Phase Transformations

Program Organizers: Eric J. Cotts, Binghamton University; C. Robert Kao, National Central University; Mark A. Palmer, Kettering University; K. N. Subramanian, Michigan State University; Paul Thomas Vianco, Sandia National Laboratories; K. M. Nair, Dupont de Nemours & Co Inc

Tuesday PM Room: 321
September 27, 2005 Location: Convention Center

Session Chairs: Thomas R. Bieler, Michigan State University; Sinn-Wen Chen, National Tsing Hua University

2:00 PM Invited

Properties of Low Temperature Solder Sn-Ag-In-Bi: *Katsuaki Suganuma*¹; T. Imanishi¹; K. S. Kim¹; M. Ueshima²; ¹Osaka University; ²Senju Metals Industries Company, Ltd

2:30 PM

The Effect of Au Thickness on the Massive Spalling of Intermetallic Compound During Soldering Reaction of the SnAgCu Solders on the Au/Ni Surface Finish: W. C. Luo¹; C. E. Ho¹; S. C. Yang¹; *C. Robert Kao*¹; ¹National Central University

2:50 PM

An Assessment of Grain Boundary Character in Thermomechanically Cycled Lead Free Solder Joints: *Thomas R. Bieler*¹; Larry P. Lehman²; L. Zavalij²; Y. Xing²; Eric J. Cotts²; ¹Michigan State University; ²Binghamton University

3:10 PM Invited

Phase Evolution and Diffusion Path in the Flip Chip Sn-3.0Ag-(0.5 or 1.5)Cu Solder Bump during Aging: *Guh-Yaw Jang*¹; *Jenq-Gong Duh*¹; Szu-Wei Lu²; Jen-Chuan Chen³; ¹National Tsing Hua University; ²TSMC Ltd.; ³ASE

3:40 PM Break

3:55 PM Invited

Phase Equilibria of the In-Sn-Cu System and the In-Sn/Cu Interfacial Reactions: *Sinn-Wen Chen*¹; Ting-Ying Chung¹; Shih-Kang Lin¹; Ching-Feng Yang¹; ¹National Tsing Hua University

4:25 PM

Electric Current Effect for Interfacial Microstructure of Sn-Ag-Cu Solder Balls in BGA Package: *Ker-Chang Hsieh*¹; Sheng-Chih Lin¹; ¹National Sun Yat Sen University

4:45 PM

Electromigration Study on Cu-Sn Interconnections: *Tae-Kyu Lee*¹; J. W. Morris, Jr.¹; Fay Hua²; ¹University of California, Berkeley; ²Intel Corporation

5:05 PM

Wetting of Engineered Microstructures by Sn-Ag-Cu Alloy: J. J. Guo¹; C. Z. Liu¹; J. K. Shang²; ¹Institute of Metal Research; ²University of Illinois

TUESDAY PM

Developments in Ferrous Long and Forged Products: Process Technology and Process Metallurgy

Program Organizer: E. Buddy Damm, Timken Company

Tuesday PM Room: 333
September 27, 2005 Location: Convention Center

Session Chair: E. Buddy Damm, Timken Company

2:00 PM

Hot Ductility Behaviour in a Peritectic Steel Tested in Reheat and Melting Condition: *Ahmad Rezaeian*¹; Faramarz Zarandi¹; Steve Yue¹; Dengqi Bai²; ¹McGill University; ²Research & Development, IPSCO Inc.

2:20 PM

The Mathematical Model of Formation of the Cross-Sectional Wall Thickness Non-Uniformity during Longitudinal Plugless Tube Rolling: *Gennady I. Gulyayev*¹; Yury G. Gulyayev²; Yevgeny I. Shyfrin²; Nataliya Yu Kvitka³; Krich Sawamiphakdi⁴; ¹Ya.Ye. Osada State Tube Institute; ²Nizhnedneprovsk Tube Works; ³National Metallurgical Academy of Ukraine; ⁴Timken Company

2:40 PM

Influence of the Die Reduction Section Generatrix Profile upon the Plugless Tube Drawing Parameters: *Gennady I. Gulyayev*¹; Yury G. Gulyayev²; Yevgeny I. Shyfrin²; Sergey A. Chukmasov³; Nataliya Yu Kvitka³; ¹Timken Company; ²Institute for Development; ³National Metallurgical Academy of Ukraine

3:00 PM

Recent Developments in Process Simulation of Long Products: *Dave Lambert*¹; Jaebong Yang¹; Abhish Samant¹; Yanling Yin¹; ¹SFTC

3:20 PM Break

3:40 PM

Refinement of Ferrite Grain Size Through Particle Stimulated Nucleation (PSN) Mechanism in Heavy Steel Sections: *K. F. Al Hajeri*¹; C. I. Garcia¹; M. J. Hua¹; A. J. DeArdo¹; ¹University of Pittsburgh

4:00 PM

High Temperature Deformation Processing of AISI Type 316L(N) Stainless Steel: *Utpal Borah*¹; P. V. Sivaprasad¹; Srinivasan Venugopal¹; S. L. Mannan¹; Baldev Raj¹; ¹Indira Gandhi Center for Atomic Research

4:20 PM

Alloy Design and Production of the High Strength Forged Rudder Stock for Ship Stern Part: *Young-Cheol Yoon*¹; In-Ho Kim¹; Joong-Geun Youn¹; ¹Hyundai Heavy Industries Co. Ltd.

Developments in Sheet Products for Automotive Applications: Other Topics - I

Program Organizers: James R. Fekete, General Motors Corporation; Roger Pradhan, Mittal Steel

Tuesday PM Room: 330
September 27, 2005 Location: Convention Center

Session Chairs: Brian Nelson, Dofasco, Inc.; Debo Aichbhaumik, U.S. Department of Energy

2:00 PM

Role of Niobium on the Segregation Behavior of Phosphorus and Manganese in High Strength IF Sheet Steels for Automotive Use: *Tsung-Rong Chen*¹; Calixto Isaac Garcia²; Anthony J. DeArdo²; ¹China Steel Corporation; ²University of Pittsburgh

2:30 PM

Effect of Manganese Content on the Development of (111) Transformation Texture in 0.03% Ti-Bearing Extra-Low Carbon Steel Sheets: *Masatoshi Sudo*¹; ¹Kanazawa Institute of Technology

3:00 PM

Aluminum and Vanadium Competition for Nitrogen in CSP Sheet Steels: *Jennifer Ann Garrison*¹; John G. Speer¹; Robert Glodowski²; Keith P. Williams³; ¹Colorado School of Mines; ²Stratcor; ³Nucor

3:30 PM Break

3:45 PM

Decarburization and Scaling on the Surface of TRIP Steels during Intercritical Annealing: *Sridhar Seetharaman*¹; Casper Thorning¹; Asa Brodin¹; ¹Carnegie Mellon University

4:15 PM

The Zn-Rich Corner of the Zn-Al-Fe Phase Diagram for Use in Continuous Galvanizing: *Matthew H. Kaye*¹; Joseph R. McDermid²; William T. Thompson¹; ¹Royal Military College of Canada; ²McMaster University

4:45 PM

An Investigation to the Effects of Si on the Oxide-Scale Adhesion Behaviour of Low Carbon Steels during Reheating Process: *Majid Baderestani*¹; *Alireza Shokouhi*¹; Abbas Zarei-Hanzaki¹; ¹Tehran University

Failure Analysis: Failure Analysis of Non-Metallic Materials and Components

Program Organizers: Debbie Aliya, Aliya Analytical Inc; Dale E. Alexander, Engineering Systems Inc; David A. Moore, Packer Engineering

Tuesday PM Room: 310
September 27, 2005 Location: Convention Center

Session Chairs: Ronald James Parrington, IMR Test Laboratories Inc.; Michael Stevenson, Metals & Materials Engineers

2:00 PM

Fracture-Initiating Flaws in Glasses and Ceramics: *James R. Varner*¹; ¹Alfred University

2:40 PM

Injection Molding Process Contributions to Plastic Part Failure: *Stanley F. DeForest*¹; ¹IMR Test Laboratories

3:00 PM

An Overview of Glass Fracture and Failure Analysis: *Richard C. Bradt*¹; ¹University of Alabama

3:40 PM

Evaluation of the Failure of a Polyethylene Natural Gas Service Pipeline: *Donald Duwall*¹; ¹Engineering Systems Inc.

4:00 PM

What Are Polymers and Why Do They Fail?: *Ronald James Parrington*¹; ¹IMR Test Laboratories

4:40 PM

Failure Analysis of Plastic Power Equipment Gasoline Tanks: *Jeffrey A. Jansen*¹; ¹Stork Technimet

Fractures of Multicomponent Systems: Fracture Mechanisms of Alloys and Composites

Program Organizers: Bhaskar S. Majumdar, New Mexico Tech;
Nikhilesh Chawla, Arizona State University; John J. Lewandowski,
Case Western Reserve University

Tuesday PM Room: 307
September 27, 2005 Location: Convention Center

Session Chairs: Bhaskar S. Majumdar, New Mexico Tech;
Jonathan Edward Spowart, UES Inc

2:00 PM

Microstructural Effects on the Ductility in Cast 319 Aluminum: *James M. Boileau*¹; Gary M. Frank²; Stephan J. Harris¹; Ann O'Neill¹; ¹Ford Motor Company; ²ELM International

2:20 PM

Fracture of Metallic Nanolaminate Materials: *Amit Misra*¹; Richard G. Hoagland¹; ¹Los Alamos National Laboratory

2:40 PM

Influence of Grain Boundary Engineering Processing on Fracture Processes: *Mukul Kumar*¹; Bryan Reed¹; ¹Lawrence Livermore National Laboratory

3:00 PM

Void Coalescence and Ductile Fracture: *James Bandstra*¹; *Donald Koss*²; ¹University of Pittsburgh-Johnstown; ²Pennsylvania State University

3:20 PM Break

3:40 PM Invited

Damage of Fibre Reinforced Titanium Matrix Composites: *Pedro Dolabella Portella*¹; Bernd Mueller¹; Burkhard Guenther¹; Manfred Hentschel¹; Joerg Hempenmacher²; ¹Federal Institute for Materials Research & Testing BAM; ²DLR

4:05 PM

Fracture Criteria for Multi-Component Metalcutting Tools: *Paul D. Prichard*¹; A. T. Santhanam¹; ¹Kennametal, Inc.

4:25 PM

Effects of Changes in Specimen Geometry and Loading Rate on a Bulk Metallic Glass: *George Sunny*¹; Vikas Prakash¹; John J. Lewandowski¹; ¹Case Western Reserve University

4:45 PM

Tensile Fractography of Ti-6Al-4V-TiB Composite: *Scott I. Lieberman*¹; Arun Gokhale¹; Sesh Tamirisakandala²; ¹Georgia Institute of Technology; ²Air Force Research Laboratory

Frontiers of Materials Science 2005: Innovative Materials and Manufacturing Tech and Fourteenth International Symposium on Processing and Fabrication of Advanced Materials (PFAM XIV): Intermetallics and Advanced Metallics

Program Organizers: Reza Abbaschian, University of Florida;
Srinath Viswanathan, Sandia National Laboratories; T. S.
Srivatsan, University of Akron; Robert A. Varin, University of
Waterloo

Tuesday PM Room: 308
September 27, 2005 Location: Convention Center

Session Chair: Wojciech Misiolek, Lehigh University

2:00 PM Invited

Mechanical Alloying of Mo-Si-B Alloys: *M. Krüger*¹; *Martin Heilmaier*¹; *H. Hilbig*¹; *H. Heyse*¹; *Holger Saage*²; ¹Otto-von-Guericke University; ²University of Waterloo

2:20 PM

An Overview of the Microstructure and Mechanical Behavior and of Multi-Phase Fe-Ni-Mn-Al Alloys: *Ian Baker*¹; *M. W. Wittmann*¹; *J. Hanna*¹; *S. Lish*¹; *P. R. Munroe*²; *S. P. Ringer*³; *D. Saxey*³; *R. Zheng*³; ¹Dartmouth College; ²University of New South Wales; ³Australia Key Centre for Microscopy and Microanalysis

2:40 PM

An Artificial Neural Network Material Model Implemented within Finite Element Analysis for Prediction of High Temperature Rheological Behavior of Nickel Aluminide: *Brian S. Kessler*¹; *A. Sherif El-Gizawy*¹; *Khaled B. Morsi*²; ¹University of Missouri; ²San Diego State University

3:00 PM

One-Step Reaction and Consolidation of Structural Ceramics and Intermetallics: *Dat V. Quach*¹; *Lia A. Stanciu*²; *Vladimir Y. Kodash*¹; *Joanna R. Groza*¹; ¹University of California, Davis; ²Purdue University

3:20 PM Break

3:40 PM Invited

Recent Advances in Development of Bulk Metallic Glasses: *Oleg N. Senkov*¹; *Daniel B. Miracle*²; ¹Air Force Research Laboratory, UES Inc.; ²Air Force Research Laboratory

4:00 PM

Defect Reduction and Improved Casting Quality in Large Ni-Base Superalloy Casting via the Liquid-Metal Cooling (LMC) Directional Solidification Technique: *Andrew J. Elliott*¹; *Tresa M. Pollock*²; *Michael F. X. Gigliotti*³; *Ganjiang Feng*¹; *Stephen J. Balsone*¹; *Jon C. Schaeffer*¹; ¹GE Energy; ²University of Michigan; ³GE Global Research

4:20 PM

Image Quality Analysis and Its Application in Characterizing Complex Microstructure of Steels: *Jinghui Wu*¹; *Mingjian Hua*¹; *C. Issac Garcia*¹; *Anthony J. DeArdo*¹; ¹University of Pittsburgh

4:40 PM Invited

A New Austenitic Structural Steel: *Susil K. Putatunda*¹; ¹University of Akron

TUESDAY PM

History and Archaeology of Materials: Evaluations of Materials from an Historical and Cultural Context

Program Organizers: Gregory J. Hildeman, Alcoa Inc; Michael R. Notis, Lehigh University; Aaron Shugar, Lehigh University

Tuesday PM Room: 402
September 27, 2005 Location: Convention Center

Session Chairs: Gregory J. Hildeman, Alcoa Inc; Michael R. Notis, Lehigh University; Aaron Shugar, Lehigh University

2:00 PM

Crucible Damascus Steel: Origins and Influence: *Ann Feuerbach*¹; ¹Hofstra University

2:40 PM

The Sacred in Mesoamerican Materials: *Guillermo Salas*¹; Maria Eugenia Noguez¹; Jose G. Ramirez¹; ¹UNAM, Facultad de Quimica

3:20 PM Break

3:40 PM

About the Prehispanic Au-Pt 'Sintering' Technique for Making Alloys: *Maria Eugenia Noguez*¹; Rachel Garcia¹; Guillermo Salas¹; Teresita Robert¹; Jose G. Ramirez¹; ¹UNAM, Facultad de Quimica

4:10 PM

Archaeological Coloured Glass Cakes from Petra Church and Their Implications: *Fatma Marii*¹; Thilo Rehren¹; ¹University College London

4:40 PM

Study of Metal Threads and Metallic Decorations Used in Byzantine - Greek Orthodox Ecclesiastical Textiles: *Anna Karatzani*¹; Thilo Rehren²; ¹University College London; ²Institute of Archaeology UCL

Integration of Theoretical, Computational and Experimental Studies of Interfaces and Microstructural Evolution: Phase Boundaries

Program Organizers: Gregory S. Rohrer, Carnegie Mellon University; Alain S. Karma, Northeastern University; Paul P. Wynblatt, Carnegie Mellon University; Anthony D. Rollett, Carnegie Mellon University; David J. Srolovitz, Princeton University; Diana Farkas, Virginia Tech; Dominique Chatain, Centre National de La Recherche Scientifique; Christopher F. Woodward, Air Force Research Laboratory

Tuesday PM Room: 309
September 27, 2005 Location: Convention Center

Session Chair: Mark Asta, Northwestern University

2:00 PM Invited

The Kinetic and Thermodynamic Properties of Interfaces from Equilibrium Fluctuations: *Jeffrey J. Hoyt*¹; Stephen M. Foiles¹; Chandler A. Becker²; Mark D. Asta²; Alain Karma³; ¹Sandia National Laboratories; ²Northwestern University; ³Northeastern University

2:30 PM Invited

Modifications to the Stability of Boundary Particles Due to Boundary Anisotropy: *Ellen Jane Siem*¹; W. Craig Carter¹; Sam M. Allen¹; ¹Massachusetts Institute of Technology

3:00 PM

Temporal Evolution of Nanometer-Sized Cu-Rich Precipitates in High-Strength Low-Carbon Steels and Interfacial Segregation of Ni, Al and Mn: *Dieter Isheim*¹; Morris E. Fine¹; David N. Seidman¹; ¹Northwestern University

3:20 PM Break

3:30 PM

Anisotropic Growth Morphologies: Theory, Experiment, & Simulation: *Danxu Du*¹; *David J. Srolovitz*¹; ¹Princeton University

3:50 PM Invited

Stable Intergranular Films in a Phase Field Model: *Catherine M. Bishop*¹; Rowland Cannon²; W. Craig Carter³; ¹Massachusetts Institute of Technology/Oxford University; ²Lawrence Berkeley National Laboratory; ³Massachusetts Institute of Technology

4:20 PM

Maximizing Surface Area to Volume Ratio: *David G. Brandon*¹; Boaz Turner²; Nissim Cohen²; Assaf Thon²; ¹Technion - Israel Institute of Technology; ²Cerel, Ceramic Technologies Ltd

4:40 PM

Aging Model for Aluminum Alloys: Theta Prime Precipitates in Al-Cu: *Wei Wang*¹; Shenyang Hu²; Long-Qing Chen³; Joanne L. Murray¹; Hasso Weiland¹; ¹Alcoa Technical Center; ²Los Alamos National Laboratory; ³Pennsylvania State University

Joining of Monolithic Structures and Components: Fusion Welding and Brazing

Program Organizers: Charles V. Robino, Sandia National Laboratories; Matthew Walp, DaimlerChrysler; Thomas J. Lienert, Los Alamos National Laboratory

Tuesday PM Room: 311
September 27, 2005 Location: Convention Center

Session Chair: Jin Yong Kim, Pacific Northwest National Laboratory

2:00 PM

The Effect of High Temperature Exposure in the Reducing or Oxidizing Atmosphere on Ceramic Joints Brazed with Silver-Copper Oxide: *Jin Yong Kim*¹; John S. Hardy¹; K. Scott Weil¹; ¹Pacific Northwest National Laboratory

2:20 PM

Microstructure Evolution in Single Crystal Nickel Base Superalloy Welds - A Local Electrode Atom Probe Microanalysis: *Sudarsanam S. Babu*¹; Michael K. Miller¹; John M. Vitek¹; Stan A. David¹; ¹Oak Ridge National Laboratory

2:40 PM

Room Temperature Hermetic Sealing of Microelectronic Packages with Nanoscale Multilayer Reactive Foils: *Mike Powers*¹; Jai Subramanian²; Jonathan Levin²; Tim Rude²; Omar Knio²; David Van Heerden²; ¹Agilent Technologies; ²Reactive NanoTechnologies

3:00 PM

Examination of the Laser-Arc Interaction during Laser-GMAW Hybrid Welding: *Shawn M. Kelly*¹; Edward W. Reutzel¹; Eric J. Whitney¹; Jay F. Tressler¹; Richard P. Martukanitz¹; ¹Pennsylvania State University

3:20 PM Break

3:40 PM

Advanced Fusion Based Joining Technologies: *Israel Stoll*¹; Richard P. Martukanitz²; Kyle L. Williams¹; ¹Alcoa Inc; ²Pennsylvania State University

4:00 PM

Fatigue Performance of Weld Repaired D357 Cast Aluminum Alloy: *Leijun Li*¹; Zhiyoung Liu²; Michael Snow³; ¹Los Alamos National Laboratory; ²Utah State University; ³GSC Foundries

4:20 PM

Transient Liquid Phase Brazing Properties of Austenitic Stainless Steel: Doug Queheillalt¹; Haydn Wadley¹; Kirsten Lipetzky²; Y.V. Murty³; ¹University of Virginia; ²NAVAIR; ³CMI Inc.

4:40 PM

The Mechanism of Flux Assisted Arc Welding in Austenitic Stainless Steel Welds: Sheang-Wen Shyu¹; Her-Yueh Huang²; Kuang-Hung Tseng³; Chang-Pin Chou²; ¹National United University; ²National Chiao Tung University; ³Metal Industries Research & Development Center

Materials Applications for Homeland Security: Session II

Program Organizers: Alton D. Romig, Sandia National Laboratories; Vinayak P. Dravid, Northwestern University; Andrew Shapiro, Jet Propulsion Laboratory; Oladete Ogunseitan, University of California; Jean-Daniel Saphores, University of California; T. J. Allard, Sandia National Laboratories

Tuesday PM Room: 406
September 27, 2005 Location: Convention Center

Session Chairs: Alton D. Romig, Sandia National Laboratories; Vinayak P. Dravid, Northwestern University; T. J. Allard, Sandia National Laboratories

2:00 PM **Invited**

Decontamination Needs of First Responders: Vincent Doherty¹; ¹FDNY Fire Academy

2:40 PM

Antimicrobial Characteristics of Quaternary Oxide Photocatalysts: P. G. Wu¹; R. C. Xie¹; J. K. Shang¹; ¹University of Illinois

3:00 PM

Cerablak™ Thin films for Protection Against Bio-Fouling of Metal, Glass, and Ceramic Surfaces: Krishnaswamy K. Rangan¹; Sankar Sambasivan¹; ¹Applied Thin Films, Inc.

3:20 PM **Break**

3:40 PM **Invited**

Infrastructure Protection Needs: Timothy J. Lowenberg¹; ¹Washington Military

4:20 PM

Low Cost Antibacterial/Antifungal Coating Materials for Homeland Security Applications: Jiann-Yang James Hwang¹; Bowen Li¹; ¹Michigan Technological University

Materials for the Hydrogen Economy: Hydrogen Storage III

Program Organizers: John J. Petrovic, Los Alamos National Laboratory; Iver E. Anderson, Iowa State University; Thad Matthew Adams, Westinghouse Savannah River Company; Gary Sandrock, SunaTech Inc; Colleen F. Legzdins, Ballard Power Systems; Jeffrey W. Stevenson, Pacific Northwest National Laboratory; Z. Gary Yang, Pacific Northwest National Laboratory

Tuesday PM Room: 302
September 27, 2005 Location: Convention Center

Session Chair: John J. Petrovic, Los Alamos National Laboratory

2:00 PM **Invited**

Hydrogen Adsorption in Metal-Organic Frameworks: Omar Yaghi¹; ¹University of Michigan

2:20 PM

Hydrogen Storage in Metal Organic Frameworks: Predictions from Computer Simulations: Karl Johnson¹; Giovanni Garberoglio²; ¹University of Pittsburgh; ²National Energy Technology Laboratory

2:40 PM **Invited**

Hydrogen Storage and Delivery via Sodium Borohydride: Ying Wu¹; ¹Millennium Cell Inc.

3:00 PM **Invited**

Functional Hydrogen Storage Materials for Mobile Applications: Oliver Gutfleisch¹; Stefania Doppiu¹; Ludwig Schultz¹; ¹IFW Dresden

3:20 PM **Break**

3:40 PM

Bonding Mechanism and Stability of Lithium Hydrides: Yan Song¹; X. Guo¹; ¹Queen Mary, University of London

4:00 PM

Effects of Mechanical Activation on Lithium Amide/Imide Transition and Hydrogen Sorption/Desorption: Ruiming Ren¹; Tippawan Markmaitree¹; Leon L. Shaw¹; Z. Gary Yang²; ¹University of Connecticut; ²Pacific Northwest National Laboratory

4:20 PM

Ammonia-Borane Complexes for Hydrogen Storage: Nahid Mohajeri¹; Ali T-Raissi¹; ¹Florida Solar Energy Center

4:40 PM

Hydrogen Storage on Porous Coordination Polymers: Jeffrey T. Culp¹; Bradley Bockrath¹; Milton Smith¹; Edward Bittner¹; ¹U.S. Department of Energy National Energy Technology Laboratory

5:00 PM

Novel Perhydrides for Hydrogen Storage: Jiann-Yang James Hwang¹; Shangzhao Shi¹; ¹Michigan Technological University

5:20 PM

Hydrogen Storage in Carbide Derived Carbons: Ranjan K. Dash¹; Gleb Yushin¹; Giovanna Laudisio²; Taner Yildirim³; John Fischer²; Yury Gogotsi¹; ¹Drexel University; ²University of Pennsylvania; ³National Institute of Standards and Technology

Materials for the Hydrogen Economy: Hydrogen Production & Delivery III

Program Organizers: John J. Petrovic, Los Alamos National Laboratory; Iver E. Anderson, Iowa State University; Thad Matthew Adams, Westinghouse Savannah River Company; Gary Sandrock, SunaTech Inc; Colleen F. Legzdins, Ballard Power Systems; Jeffrey W. Stevenson, Pacific Northwest National Laboratory; Z. Gary Yang, Pacific Northwest National Laboratory

Tuesday PM Room: 303
September 27, 2005 Location: Convention Center

Session Chair: Brian L. Bischoff, Oak Ridge National Laboratory

2:00 PM

Surface Engineering of Sliding Contacts in the Hydrogen Service Environment: James D. Holbery¹; Russ Jones¹; Rick Williford¹; John Abrefah¹; Peter Blau²; Laura Riester²; Tom Gallant¹; ¹Pacific Northwest National Laboratory; ²Oak Ridge National Laboratory

2:20 PM

Hydrogen Storage as Metal Ammine Salts - Towards an Ammonia-Based Hydrogen Economy: Rasmus Zink Sørensen¹; Claus Hviid Christensen¹; Tue Johannessen¹; Ulrich Quaade¹; Jens K. Nørskov¹; ¹Technical University of Denmark

2:40 PM

Mathematical Modeling of Flow Stratification in Natural Gas/Hydrogen Pipelines: Laurentiu Nastac¹; Paul Wang¹; F. Robert Dax¹; Eileen Schmura¹; James Arthur¹; ¹Concurrent Technologies Corporation

TUESDAY PM

3:00 PM

Micro-Tubular Solid Oxide Fuel Cells Running Off Landfill Gas: *Jakub Pusz¹*; Nigel M. Sammes¹; Roberto Bove²; ¹University of Connecticut; ²University of Perugia

3:20 PM Break

3:40 PM

Advanced Dense Ni-Ti-(Nb, V, Ta) Metallic Membranes: Microstructures and Properties: *Thad Matthew Adams¹*; John Mickalonis¹; Andrew Duncan¹; ¹Savannah River National Laboratory

4:00 PM

Synthesis and Characterization of Ni-Ba(Ce_{1-x}Y_x)O₃ Cermets for Hydrogen Separation Membranes: *Jiaping Han¹*; Karthikeyan Lakshminarayanan¹; Sam Friesen¹; Hugo Schmidt¹; Gregory W. Coffey²; Larry R. Pederson²; Peter C. Rieke²; ¹Montana State University; ²Pacific Northwest National Laboratory

4:20 PM

Structural and Transport Properties of La(B1,B2)O3 (B1, B2 = Fe, Mn, Cu and Ni): *Xiao-Dong Zhou¹*; Q. Cai²; Brett Scarfino¹; J. Yang¹; W. Yelon¹; W. James¹; Harlan U. Anderson¹; ¹University of Missouri, Rolla; ²University of Missouri, Columbia

4:40 PM

Fabrication and Characterization of Hydrogen Separation Membranes of Doped Ceramic Oxide Perovskite Structures: *Mohamed M. Elbaccouch¹*; Ali T-Raissi¹; ¹University of Central Florida

5:00 PM

Transition Metal Macrocyclic Catalyst and Hydroxyl Ion Exchange Membrane (HEM) for Alkaline Water Electrolysis: *Donald L. Pile¹*; ¹Sandia National Laboratories

Materials for the Hydrogen Economy: Fuel Cells III

Program Organizers: John J. Petrovic, Los Alamos National Laboratory; Iver E. Anderson, Iowa State University; Thad Matthew Adams, Westinghouse Savannah River Company; Gary Sandrock, SunaTech Inc; Colleen F. Legzdins, Ballard Power Systems; Jeffrey W. Stevenson, Pacific Northwest National Laboratory; Z. Gary Yang, Pacific Northwest National Laboratory

Tuesday PM Room: 304
September 27, 2005 Location: Convention Center

Session Chair: Z. Gary Yang, Pacific Northwest National Laboratory

2:00 PM

Crofer 22APU Alloy Development for Interconnect Applications in Solid Oxide Fuel Cells (SOFC): *Ralf Hojda¹*; Larry Paul²; ¹ThyssenKrupp VDM GmbH; ²ThyssenKrupp VDM USA Inc

2:20 PM

Investigation of Clad Metals for SOFC Interconnect Applications: *L. Chen¹*; Z. G. Yang²; G. Xia²; J. W. Stevenson²; ¹Engineered Materials Solutions; ²Pacific Northwest National Laboratory

2:40 PM

Oxidation Behavior of Metallic Interconnects in SOFCs: *Z. Gary Yang¹*; Guanguang Xia¹; Prabhakar Singh¹; Jeffrey Stevenson¹; ¹Pacific Northwest National Laboratory

3:00 PM

Thermochemical and Thermomechanical Degradation of Metal/Ceramic Interfaces in Intermediate-Temperature SOFC Systems: *Sungbo Shim¹*; *Daniel R. Mumm¹*; ¹University of California, Irvine

3:20 PM Break

3:40 PM

Identification and Development of Ni-Based Alloys for Potential SOFC Interconnect Applications: *Z. Gary Yang¹*; Guanguang Xia¹; Prabhakar Singh¹; Jeffrey W. Stevenson¹; Leigh Chen²; ¹Pacific Northwest National Laboratory; ²Engineered Materials Solutions, Inc.

View complete technical program at <http://pcs.tms.org>

4:00 PM

Interfacial Fracture Testing to Evaluate the Durability of SOFC Interconnect Alloys: *Jack Beuth¹*; Nandhini Dhanaraj¹; Gerald Meier²; Frederick Pettit²; Julie Hammer²; Scott Laney²; ¹Carnegie Mellon University; ²University of Pittsburgh

4:20 PM

Surface Modification of Ferritic Stainless Steels for SOFC Interconnect Applications: *Z. Gary Yang¹*; Guanguang Xia¹; Gary D. Maupin¹; Steve Simmer¹; Jeffrey W. Stevenson¹; ¹Pacific Northwest National Laboratory

4:40 PM

Reducing the Chromium Vaporization from Stainless Steel and Improving Chromium Tolerance of SOFC Cathodes: *Craig Jacobson¹*; Hideto Kurokawa¹; Mike Tucker¹; Lutgard De Jonghe¹; Steve Visco¹; ¹Lawrence Berkeley National Laboratory

5:00 PM

High Temperature Oxidation Resistance and Surface Electrical Conductivity of Stainless Steel with and without Filtered Arc-Assisted Electron Beam Hybrid Co-Mn-O Coatings: *Paul E. Gannon¹*; Max Deibert¹; ¹Montana State University

Modeling and Simulation of Titanium Technology: Theory and Practices: Phase Transformation and Microstructure Development in Ti and Its Alloys II

Program Organizers: Ellen K. Cerreta, Los Alamos National Laboratory; Vasisht Venkatesh, Timet Corporation; F. Robert Dax, Concurrent Technologies Corporation; Jaimie S. Tiley, U.S. Air Force

Tuesday PM Room: 405
September 27, 2005 Location: Convention Center

Session Chair: Ellen K. Cerreta, Los Alamos National Laboratory

2:00 PM

Three-Dimensional Reconstruction of Alpha Laths in α/β Titanium Alloys by Serial Sectioning with a FEI NOVA: *Robert E.A. Williams¹*; Michael Uchic²; Dennis Dimiduk²; Hamish L. Fraser¹; ¹Ohio State University; ²Air Force Research Laboratory

2:20 PM

Development and Validation of Kinetic Model for Grain Boundary Alpha Thickening in Ti-6Al-4V: *Ning Ma¹*; Gangshu Shen²; Dave Furrer²; Yunzhi Wang¹; ¹Ohio State University; ²Ladish Company, Inc.

2:40 PM Invited

Modeling Microstructure Evolution in Ti-6Al-4V: *Ning Ma¹*; *Yunzhi Wang¹*; ¹Ohio State University

3:10 PM

Grain Refinement in Cast Titanium Alloys via Trace Addition of Boron: *Sesh Tamirisa¹*; Jaimie S. Tiley²; Radhakrishna B. Bhat³; Daniel B. Miracle²; ¹Ohio University; ²U.S. Air Force; ³UES Inc

3:30 PM Break

3:50 PM Invited

Alpha to Omega in Titanium Alloys: Martensitic Phase Transitions at the Atomic Length Scale: *Dallas R. Trinkle¹*; Richard Hennig²; Srilliputhur G. Srinivasan³; Robert C. Albers³; John W. Wilkins²; ¹U.S. Air Force; ²Ohio State University; ³Los Alamos National Laboratory

4:20 PM

High-Pressure Phase Synthesis of Titanium Using a Femtosecond Laser: *Kouhei Yamamoto¹*; Tomokazu Sano¹; Akio Hirose¹; Kojiro F. Kobayashi¹; Osami Sakata²; Yasuaki Okano³; Katsuya Oguri³; Hidetoshi Nakano³; ¹Osaka University; ²Japan Synchrotron Radiation Research Institute, SPring-8; ³NTT Basic Research Laboratory

4:40 PM

Modeling of the Transformation Kinetics of the β to $\alpha+\beta$ Transformation in Ti-4.5Fe-6.8Mo-1.5Al Based on Dilatometric Results and

the Morphology of the α Plates: *Stefan van Bohemen*¹; Menno van der Laars¹; Jilt Sietsma¹; Sybrand van der Zwaag¹; ¹Delft University of Technology

5:00 PM

The Effect of TMP Parameters on the Occurrence of a Phase Dynamic Globularization and Mechanical Properties in Ti-6Al-4V Alloy: *Amir Reza Shahab*¹; ¹University of Tehran

Nanomaterials: Nanocomposites

Program Organizers: Jeremy W. Burdon, Medtronic Inc; C. Suryanarayana, University of Central Florida; William M. Mullins, U.S. Army

Tuesday PM Room: 404
September 27, 2005 Location: Convention Center

Session Chair: Awadh B. Pandey, Pratt & Whitney

2:00 PM **Invited**

Design and Fabrication of Bulk Exchange-Coupled Nanocomposite Magnets by Shock-Compression Processing: *Naresh N. Thadhani*¹; Zhiqiang Jin²; Ping Liu²; ¹Georgia Institute of Technology; ²University of Texas at Arlington

2:40 PM

Densification and Grain Growth during Sintering of Nanoscaled WC-Co Composite Powder: *Zhigang Zak Fang*¹; Xu Wang¹; ¹University of Utah

3:00 PM

Microstructure Evolution and Mechanical Behavior of Nanoscale Al₂O₃-Al Composite: *Jixiong Han*¹; Yong-Ching Chen²; Vijay K. Vasudevan¹; ¹University of Cincinnati; ²Cummins Inc.

3:20 PM

A Simple Way to Make Super-Tough Bamboo-Like Polymer/Silicon Nanocomposites: *Xiaodong Li*¹; Hai Ni¹; Hongsheng Gao¹; Thien-Phap Nguyen²; ¹University of South Carolina; ²Institut des Matériaux Jean Rouxel

3:40 PM **Break**

4:00 PM

Improved Optical Clarity of Melt Intercalated Polymer Nanocomposites: *Anand Mudulari*¹; Harish Nathani¹; Devesh K. Misra¹; ¹University of Louisiana at Lafayette

4:20 PM

Synthesis and Characterization of Chitosan-Fe₃O₄ Nanocomposites: *Moisés Hinojosa*¹; Virgilio González¹; Marco Antonio Garza¹; Juan Francisco Luna¹; Patricia Lara¹; Marleth Mena¹; ¹Universidad Autónoma de Nuevo León

4:40 PM

Structural and Mechanical Characterization of Nanoclay-Reinforced Agarose Nanocomposites: *Xiaodong Li*¹; Hongsheng Gao¹; Wally A. Scrivens¹; Dongling Fei¹; Michael A. Sutton¹; Anthony P. Reynolds¹; Michael L. Myrick¹; ¹University of South Carolina

5:00 PM

High Modulus Nanocomposites: *Yijun Wang*¹; James J. Lee¹; Isabel K. Lloyd¹; Otto C. Wilson²; Van P. Thompson³; Marc A. Rosenblum⁴; ¹University of Maryland, College Park; ²Catholic University of America; ³New York University College of Dentistry; ⁴University of Medicine & Dentistry of New Jersey

Next Generation Biomaterials: Biomedical Polymers and Metals

Program Organizers: Roger J. Narayan, Georgia Institute of Technology; Sarit B. Bhaduri, Clemson University; Gary S. Fischman, National Materials Advisory Board

Tuesday PM Room: 320
September 27, 2005 Location: Convention Center

Session Chairs: Richard Spontak, North Carolina State University; Jonathan Wilker, Purdue University

2:00 PM

Cationic Polysaccharides for Gene Delivery: *Avi Jacob Domb*¹; ¹Hebrew University of Jerusalem

2:20 PM **Invited**

Biological Materials from the Sea: Protein Cross-Linking in Mussel Adhesives: *Mary Sever*¹; Jaime Weisser¹; Stephen Howell¹; *Jonathan Wilker*¹; ¹Purdue University

2:40 PM **Invited**

Shape Memory Polymers for Biomedical Applications: *Ken Gall*¹; ¹University of Colorado

3:00 PM **Invited**

Elasticity of Crosslinked Biopolymer Networks: *T. C. Lubensky*¹; ¹University of Pennsylvania

3:20 PM **Invited**

Self-Assembly of Sphere Micelles: *Randall D. Kamien*¹; ¹University of Pennsylvania

3:40 PM **Invited**

Laser Processing of Mussel Adhesive Protein Analog Adhesive Thin Films: *Anand Doraiswamy*¹; ¹Georgia Institute of Technology

4:00 PM **Invited**

Advanced Materials in Interventional Cardiology: *Janet M. Hampikian*¹; ¹Boise State University

4:20 PM **Invited**

Comparison of Biomedical Characteristics of Ti-15Al-33Nb(at.%) and Ti-22Al-28Nb(at.%) with Ti-6Al-4V(wt.%): *Carl J. Boehlert*¹; J. A. Quast¹; M. J. Baumann¹; ¹Michigan State University

4:40 PM **Invited**

Stimuli-Responsive Protein Hydrogels Stabilized by Silk Fibroin: *Eun Seok Gill*¹; David Frankowski¹; Samuel Hudson¹; *Richard J. Spontak*¹; ¹North Carolina State University

5:00 PM

Electrocoating of Stainless Steel Stents for the Extended Release of Paclitaxel: *Avi Jacob Domb*¹; R. Okner¹; A. Ezra¹; A. Swed¹; ¹Hebrew University of Jerusalem

Residual Stress, Deformation, and Distortion: Measurement Methods

Program Organizers: Zhili Feng, Oak Ridge National Laboratory; Mark R. Blankenau, SeverStal North America; Lawrence A. Lalli, Alcoa Inc

Tuesday PM Room: 316
September 27, 2005 Location: Convention Center

Session Chair: Hasso Weiland, Alcoa Technical Center

2:00 PM **Introductory Comments**

TUESDAY PM

2:05 PM

A Bayesian Solution for Determining the Dislocation Types Populations in Deformed Crystalline Materials from X-Ray Line Profile Analysis: *Iuliana Dragomir-Cernatescu*¹; Nicholas Armstrong²; Robert L. Snyder¹; ¹Georgia Institute of Technology; ²University of Technology Sydney

2:25 PM **Invited**

Development of a Nanoindentation-Based Nanoscale Residual Stress Measurement Technique and Its Applications to Solid Surfaces and Thin Films: *Xiaodong Li*¹; Zhi-Hui Xu¹; ¹University of South Carolina

2:45 PM

Feasibility of Simultaneous In-Situ Stress and Temperature Measurement using Neutron Diffraction Technique: *Zhili Feng*¹; Wan C. Woo²; Xun-Li Wang¹; Camden Hubbard¹; Choo Hahn²; Stan A. David¹; ¹Oak Ridge National Laboratory; ²University of Tennessee

3:05 PM

Laser-Ultrasonic Measurements of Residual Stresses on Aluminum Surfaces Treated by Low Plasticity Burnishing: *André Moreau*¹; Chi-Sing Man²; ¹National Research Council of Canada; ²University of Kentucky

3:25 PM **Break**

3:45 PM

Measurement of Macroscopic Residual Stress and Resulting Distortion during Machining: *Christian Kremaszky*¹; Ewald Werner¹; Martin Stockinger²; ¹TU-Munich; ²Böhler Schmedetechnik GmbH & Co KG

4:05 PM

Low Coherence Interferometry as Probe of Spatially Resolved Stress Tensor: *Wojtek J. Walecki*¹; Alexander Pravdivstev¹; Manuel Santos¹; Ann Koo¹; ¹FSM

4:25 PM

Residual Stress Effects in Fatigue Crack Growth Analysis: *Ronald Holtz*¹; ¹Naval Research Laboratory

4:45 PM

Earth's Magnetic Field: A Leading Role in the Evaluation of Residual Stress Using Surface Magnetic Method: *Xing Chen*¹; LuMing Li¹; En Yang¹; ¹Tsinghua University

Science and Technology of Powder Materials: Synthesis, Consolidation and Properties: Processing/Structure/Property Relationships

Program Organizers: Leon L. Shaw, University of Connecticut; Eugene Al Olevsky, San Diego State University; Fernand D. Marquis, South Dakota School of Mines & Technology; Iver E. Anderson, Iowa State University; James H. Adair, Pennsylvania State University; Jitendra P. Singh, Argonne National Laboratory

Tuesday PM Room: 301
September 27, 2005 Location: Convention Center

Session Chair: Eugene A. Olevsky, San Diego State University

2:00 PM

Influence of Post-Aging on the Microstructure and Properties of Sm₂(Co, Fe, Cu, Zr)₁₇ Magnets: *Qingjun Zheng*¹; Sike Xia¹; Tongguang Zhai¹; Jeff Whillite²; Michael P. Effen²; ¹University of Kentucky; ²Semicon Associate

2:20 PM

Microstructure and Properties of Titanium Alloys Synthesized from Hydrogenated Titanium Powders: *Orest Ivasishin*¹; Dmytro Savvakina¹; Ilyia Belov¹; ¹NAS of Ukraine

2:40 PM

Microstructures and Densification by Creep in Rapidly Solidified Alumina-Zirconia-Based Materials: *Anders Petersson*¹; Hrishikesh Keshavan¹; W. Roger Cannon¹; ¹State University of New Jersey

3:00 PM

Structure-Property Relationships in Spherodized Aluminosilicate Powders: *Walter G. Luscher*¹; John R. Hellmann¹; Barry E. Scheetz¹; ¹Pennsylvania State University

3:20 PM

Advanced Friction Materials for Automotive Brake Pads: *Samir Elomari*¹; Arvind Sundarajan²; ¹Advanced Materials Technologies; ²Applied Materials, Inc.

3:40 PM

Effect of Alloy Composition on Cryomilling Behavior: *Adam J. Maisano*¹; Jeffrey P. Schultz¹; Alexander O. Aning¹; Stephen L. Kampe¹; ¹Virginia Tech

4:00 PM

Tribological Behavior of Al-Fe Powder Metallurgy Metal Matrix Composite Materials under Low Contact Loads: *Asaad Abdel Naeem Mazen*¹; ¹El Menia University

Springback in Sheet Metal Forming Applications: Session I

Program Organizers: Michael P. Miles, Brigham Young University; Mark R. Stoudt, National Institute of Standards & Technology

Tuesday PM Room: 334
September 27, 2005 Location: Convention Center

Session Chair: Mark R. Stoudt, National Institute of Standards & Technology

2:00 PM **Keynote**

Sheet Springback: *Robert H. Wagoner*¹; ¹Ohio State University

2:30 PM **Invited**

Combined Isotropic-Kinematic Hardening Models for Sheet Metal Forming and Springback: Kwansoo Chung¹; Myoung-Gyu Lee¹; Daeyong Kim¹; *Michael L. Wenner*²; Chongmin Kim²; ¹Seoul National University; ²GM Research and Development

3:00 PM **Invited**

Springback Prediction and Its Usefulness in an Industrial Perspective: *Alf Andersson*¹; ¹Volvo Cars Body Components

3:30 PM **Break**

3:50 PM

Characterization and Control of the Springback of Advanced High Strength Steel: *Mai Huang*¹; ¹Mittal Steel

4:10 PM

Springback in Double Curvature Forming of Stainless Steel Plates- Part I: Experimental Evaluation: *Utpal Borah*¹; Srinivasan Venugopal¹; P. V. Sivaprasad¹; Sridhar Venugopal¹; R. Nagarajan¹; S. L. Mannan¹; Baldev Raj¹; ¹Indira Gandhi Center for Atomic Research

4:30 PM

Springback in Double Curvature Forming of Stainless Steel Plates - Part II: Finite Element Analysis: *Utpal Borah*¹; P. V. Sivaprasad¹; Srinivasan Venugopal¹; S. K. Ray¹; S. L. Mannan¹; Baldev Raj¹; ¹Indira Gandhi Center for Atomic Research

4:50 PM

Integration and Validation of Springback Compensation Tools in PAM-STAMP2G: *Varadaraju Gandikota*¹; Bruce Rodewald¹; Fouad El Khaldi²; David Ling²; ¹ESI North America; ²ESI Group

What Makes a Good Materials Engineer and How Best to Educate Them: University Course and Program Development

Program Organizers: Paul E. Cantonwine, Bechtel Bettis Inc; Kent D. Peaslee, University of Missouri-Rolla; Mark A. Palmer, Kettering University; Michael B. Connelly, Casey Products Inc

Tuesday PM Room: 315
September 27, 2005 Location: Convention Center

Session Chair: Kent Peaslee, University of Missouri-Rolla

2:00 PM Invited

Education Trends in Materials Science and Engineering - Enrollments, Degrees, Gender, Ethnicity and Research Expenditures: *Richard W. Heckel*¹; ¹Engineering Trends

2:20 PM

Leveraging the "Traditional" MSE Degree with an Intensive Communications-Across-the-Curriculum Program: *Stephen Kampe*¹; Marie C. Parette¹; Christine Burgoyne¹; David Clark¹; ¹Virginia Tech

2:40 PM

Materials Engineering Education in a Mechanical Engineering Curriculum: *Devdas M. Pai*¹; Jagannathan Sankar¹; ¹North Carolina A&T State University

3:00 PM

What Makes a Good Materials Learning Experience in a Technology Program: Arif Sirinterlikci¹; *John M. Mativo*¹; ¹Ohio Northern University

3:20 PM Break

3:30 PM

Freshmen Engineering Education: Hands-On Team Projects Utilizing Polymer-Matrix Composite Materials: *Gregg M. Janowski*¹; Uday Viadya¹; ¹University of Alabama, Birmingham

3:50 PM

Development and Results from an Undergraduate Materials Course Targeted at Non-Engineering Students: *David F. Bahr*¹; M. Grant Norton¹; ¹Washington State University

4:10 PM

Introducing Students to Materials Science and Engineering: *Jeffrey C. LaCombe*¹; Matthew B. Koss²; Mary E. LaCombe¹; Eric L. Wang¹; ¹University of Nevada; ²College of the Holy Cross

4:30 PM

Best Teaching Practices in Materials Engineering Education: 2005 and Beyond: *David I. Spang*¹; ¹DeepTechSketch Technologies, Inc.

4:50 PM

Training the Eco-Conscious Materials Engineer for the Future: *Katherine C. Chen*¹; Linda Vanasupa¹; Blair London¹; Rich Savage¹; ¹California Polytechnic State University

Application of Materials Science to Military Systems: Missile & Rocket Applications

Program Organizers: Douglas Deason, U.S. Army; Rodney R. Boyer, Boeing Company

Wednesday AM Room: 319
September 28, 2005 Location: Convention Center

Session Chair: Douglas Deason, U.S. Army Space & Missile Defense Command

9:00 AM
Thermomechanical and Oxidative Response of Non-Oxide Ceramics in Rocket Nozzle Environments: *Eric Wuchina*¹; Mark Opeka¹; Kent Buesking²; ¹NSWCCD; ²MR&D

9:20 AM
Silicon Carbide Ceramics for Aerospace Applications- Processing, Microstructure, and Property Assessments: *Douglas Deason*¹; Greg Hilmas²; Andrew A. Buchheit; Bill Fahrenholtz; ¹U.S. Army; ²University of Missouri, Rolla

9:40 AM
Improving the Thermal Shock Resistance of SiC-Based Ceramics: *Andrew A. Buchheit*¹; William Fahrenholtz¹; Greg Hilmas¹; ¹University of Missouri-Rolla

10:00 AM
Inorganic Polymer Laminates for Hypersonic Radome Applications: *John J. Dignam*¹; Karim Gabriel¹; ¹Mentis Sciences, Inc.

10:20 AM
New Ultra High Strength Aluminium Alloy Applied in Small Rocket Motor Tubes: *Ola Jensrud*¹; ¹Raufoss Technology & Industrial Management AS

10:40 AM
Properties of Liquid Hydrogen Turbopump Impeller Preforms Made of a Super-High Strength Aluminum Alloy: *Oleg N. Senkov*¹; Raul E. Perez²; ¹UES Inc., Air Force Research Laboratory; ²Boeing Company

11:00 AM
In-Situ Nanocomposite Ceramic Coatings for TPS: *Kimberly Steiner*¹; Krishnaswamy Rangan¹; Julie Wessling¹; Johan Abadie¹; Sankar Sambasivan¹; ¹Applied Thin Films, Inc.

11:20 AM
Development of Continuous Fiber Reinforced Reaction Bonded Silicon Nitride Composites for Hypersonic Radome Applications: *Karim Gabriel*¹; John J. Dignam¹; Robert Katz²; ¹Mentis Sciences, Inc.; ²R.N.K. Associates

Coatings 2005: Processing I

Program Organizers: Nitin P. Padture, Ohio State University; Lorraine F. Francis, University of Minnesota; Janet M. Hampikian, Boise State University; Narendra B. Dahotre, University of Tennessee

Wednesday AM Room: 317
September 28, 2005 Location: Convention Center

Session Chair: Sharmila M. Mukhopadhyay, Wright State University

9:00 AM
Growth and Characterization of Plasma Nano-Coatings for Surface Modification of Complex Shaped Nano-Structured Materials: *Pratik P. Joshi*¹; Sharmila M. Mukhopadhyay¹; ¹Wright State University

9:20 AM
Nano-Scale Plasma Coatings for Surface Modification of Carbon Structures: *Rajasekhar V. Pulikollu*¹; Sharmila M. Mukhopadhyay¹; ¹Wright State University

9:40 AM Invited
Thermal Spraying of Polymer and Metal Particles: Comparison of Particle Heating and Deformation: *Richard A. Cairncross*¹; Milan Ivosevic¹; Richard Knight¹; ¹Drexel University

10:20 AM Break

10:40 AM
A New Aluminum Plating Technology for Fasteners: David C. Goss¹; *Fernando J. Gómez*²; ¹Textron Fastening Systems; ²Akzo Nobel Polymer Chemicals

11:00 AM
Manufacture of Wear Resistant Titanium Components with a Functionally Graded Surface Layer of Tungsten Carbide/Titanium: *Vladimir Ivanovich Shapovalov*¹; ¹MER Corporation

11:20 AM Invited
Micro Arc Oxidation (Mao) Coatings on Aluminium Alloys: *G. Sundararajan*¹; L. Rama Krishna¹; ¹International Advanced Research Centre for Powder Metallurgy and New Materials

Coatings 2005: Biomedical Coatings

Program Organizers: Nitin P. Padture, Ohio State University; Lorraine F. Francis, University of Minnesota; Janet M. Hampikian, Boise State University; Narendra B. Dahotre, University of Tennessee

Wednesday AM Room: 318
September 28, 2005 Location: Convention Center

Session Chair: Lorraine F. Francis, University of Minnesota

9:00 AM Invited
Medical Coatings for Orthopedic Devices: *Klaas de Groot*¹; ¹University of Twente

9:40 AM
Multi-Scaled Textured Coatings for Biomechanical Applications: *Narendra B. Dahotre*¹; Anil Kurella¹; ¹University of Tennessee

10:00 AM
Collagen Fibrillogenesis on Ti-6Al-4V: *Michelle Gerritsen*¹; Janet M. Hampikian¹; William B. Knowlton¹; Julia Thom Oxford¹; ¹Boise State University

10:20 AM Break

10:40 AM Invited
Biomimetic Nano-Crystalline Apatite Coating for Medical Application: *Panjian Li*¹; ¹DePuy Orthopaedics

Copper for the 21st Century: Session III

Program Organizer: David L. Ellis, NASA

Wednesday AM Room: 305
September 28, 2005 Location: Convention Center

Session Chair: Gary M. Michal, Case Western Reserve University

9:00 AM Introductory Comments

9:05 AM
Kinetic Metallization™ of High Temperature Protective Coatings for Copper Alloys: *Ralph M. Tapphorn*¹; Jeff Hennessy¹; ¹Inovati

9:25 AM

Protective Coatings for Cu-Based Rocket Thrust Chambers Deposited by Kinetic Metallization: *James A. Nesbitt*¹; ¹NASA

9:45 AM

Oxidation Resistant Cu-Cr Coatings for a Copper-Based Alloy GRCop-84: *David Grimm*¹; *Kuang-Tsan K. Chiang*²; *James A. Nesbitt*³; ¹Boeing Company; ²Southwest Research Institute; ³NASA Glenn Research Center

10:05 AM

Wear-Resistant PVD Metallic Nanocomposite Coatings Based on the Low-Miscibility Copper-Chromium System: *Kostas Kanakis*¹; *Mark Baker*²; *Miguel Monclus*²; *Allan Matthews*¹; *Adrian Leyland*¹; ¹University of Sheffield; ²University of Surrey

10:25 AM

Protective Coatings for GRCop-84 (Cu-8at.%Cr-4Nb): *Sai V. Raj*¹; *Raymond C. Robinson*²; *Louis J. Ghosh*³; *James A. Nesbitt*¹; *George Thom*⁴; *J. Karthikeyan*⁵; ¹NASA Glenn Research Center; ²QSS, Inc.; ³Ohio Aerospace Institute; ⁴Plasma Processes, Inc.; ⁵ASB Industries, Inc.

10:45 AM Break

11:00 AM

Cold Spray Processing of Copper and Copper Alloys: *Jegan Karthikeyan*¹; *Albert Kay*¹; ¹ASB Industries, Inc

11:20 AM

VPS Process for Copper Components in Thrust Chamber Assemblies: *Sandra Elam*¹; *Richard Holmes*¹; *Robert Hickman*¹; *Tim McKechnie*²; *George Thom*²; ¹NASA; ²Plasma Processes, Inc.

11:40 AM

Advances in Pressure Die Casting of High-Conductivity Copper: *John George Cowie*¹; *Dale T. Peters*¹; *Edwin F. Brush*¹; *Kenneth P. Young*²; *Elliot Brown*²; *Chris Rice*²; ¹Copper Development Association Inc; ²Vforge

12:00 PM

Semi-Solid Metal (SSM) Forming of Copper Alloys: *Elliot L. Brown*¹; *Chris Rice*¹; *Ken Young*¹; ¹VForge, Inc.

Creep Deformation and Fracture, Design, and Life Extension: Session V

Program Organizers: *Rajiv S. Mishra*, University of Missouri; *James Calvin Earthman*, University of California; *Sai V. Raj*, NASA Glenn Research Center; *R. Viswanathan*, Electric Power Research Institute

Wednesday AM

Room: 306

September 28, 2005

Location: Convention Center

Session Chair: *Michael J. Mills*, Ohio State University

9:00 AM Invited

Miniature Creep Testing of a Single Crystal Superalloy in the 1000°C Range: *Gotthard Maelzer*¹; *Robert W. Hayes*¹; *Thomas Mack*²; *Gunther F. Eggeler*¹; ¹Ruhr Universitat; ²MTU Aero Engines

9:20 AM

Internal Stress Evolution in a [001] Oriented Directionally Solidified Superalloy during Creep: *Shuwei Ma*¹; *Donald Brown*²; *Bjorn Clausen*²; *Bhaskar S. Majumdar*³; ¹Naval Postgraduate School; ²Los Alamos National Laboratory; ³New Mexico Tech

9:40 AM

Microstructural Evolution and Its Effect on the Mechanical Properties during Thermal Exposure in a Ni-Base Superalloy CM247LC: *Baig Gyu Choi*¹; *In Soo Kim*¹; *Doo Hyun Kim*¹; *Chang Yong Jo*¹; ¹KIMM

10:00 AM

Influence of High Temperature Creep Damage on Low Cycle Fatigue of CMSX-4: *Pedro Dolabella Portella*¹; *Alexander Epishin*¹; *Thomas Link*²; *Udo Brueckner*¹; *Hellmuth Klingelhoeffer*¹; ¹Federal Institute for Materials Research & Testing BAM; ²Technical University Berlin

10:20 AM Break

10:40 AM

Effect of γ' Shearing Mechanisms on Creep in Ni-Based Superalloy Disk Materials: *Raymond R. Unocic*¹; *Peter M. Sarosi*¹; *G. B. Viswanathan*¹; *Karthikeyan Subramanian*¹; *Deborah DeMania Whitis*²; *Michael J. Mills*¹; ¹Ohio State University; ²General Electric Company

11:00 AM

Hold-Time Effect on the Elevated-Temperature Crack Growth Behavior of Three Superalloys: HAYNES® 230, HASTELLOY® X, and HAYNES® 188: *Yulin Lu*¹; *P. K. Liaw*¹; *G. Y. Wang*¹; *M. L. Benson*¹; *S. A. Thompson*²; *J. W. Blust*²; *P. F. Browning*²; *A. K. Bhattacharya*²; *J. M. Aurrecoechea*²; *D. L. Klarstrom*³; ¹University of Tennessee; ²Solar Turbines, Inc.; ³Haynes International, Inc.

11:20 AM

Oxidation Assisted Crack Growth of Ni-Based Superalloys: *Jeffrey L. Evans*¹; *Ashok Saxena*²; ¹Engineering Institute; ²University of Arkansas

11:40 AM

The Effect of Porosity on Creep Behavior of Carbon-Containing Single Crystal Ni-Base Superalloys: *Elyssa R. Cutler*¹; *Gerhard Edmund Fuchs*¹; ¹University of Florida

Developments in Ferrous Long and Forged Products: Product Metallurgy

Program Organizer: *E. Buddy Damm*, Timken Company

Wednesday AM

Room: 333

September 28, 2005

Location: Convention Center

Session Chair: *Craig Darragh*, Timken Company

9:00 AM

Study of Precipitation of Niobium Carbide in Low Carbon Steel Using FE-SEM: *Abdelbaset Elwazri*¹; *Rocco Varano*¹; *Fulvio Siciliano*²; *Dengqi Bai*³; *Stephen Yue*¹; ¹McGill University; ²Reference Metals Company, Inc.; ³IPSCO, Inc

9:20 AM

Influence of Induction Tempering on Microstructural Evolution and Mechanical Behavior of a Low Alloy Steel: *Jose M. Rodriguez-Ibabe*¹; *Laida Mendizabal*¹; ¹CEIT

9:40 AM

On the Relationship between Microstructural Changes Induced during High Strain Amplitude Fatigue Loading and Fatigue Softening in Multiphase Medium Carbon Microalloyed Steel: *Sankaran Shanmugam*¹; *K. A. Padmanabhan*²; *Devesh K. Misra*¹; ¹University of Louisiana, Lafayette; ²University of Hyderabad

10:00 AM

Some Physical Metallurgy Aspects of Niobium- and Vanadium-Microalloyed Steels for Structural Beams: *Sankarana Shanmugam*¹; *Devesh K. Misra*¹; *Todd Mannering*²; *Dhiren Panda*²; *Steve Jansto*³; ¹University of Louisiana, Lafayette; ²Nucor-Yamato Steel; ³Reference Metals

10:20 AM Break

10:40 AM

Rotating Bending Fatigue Initiation as a Function of Surface Finish and Melt Practice: *E. Buddy Damm*¹; ¹Timken Company

11:00 AM

Direct Observation of Austenite Formation and Decomposition in 4xxx Iron Alloys: *Eric Schmidt*¹; *Sridhar Seetharaman*¹; ¹Carnegie Mellon University

11:20 AM

Understanding Strength-Toughness Combination of Microalloyed Steels Processed for Large Structural Applications through Stereological Analysis: *Raghunath R. Thridandapani*¹; *Sankaran Shanmugam*¹; *Devesh K. Misra*¹; *Todd Mannering*²; *Dhiren Panda*²; *Steve Jansto*³; ¹University of Louisiana, Lafayette; ²Nucor-Yamato Steel; ³Reference Metals

WEDNESDAY AM

11:40 AM

Design of High Strength Microstructures in Carbon Steels by Thermomechanical Treatment: *Celestine Kamma*¹; Kenneth Kanayo Alaneme²; ¹University of Lagos; ²Federal University of Technology, Akure

Developments in Sheet Products for Automotive Applications: Other Topics - II

Program Organizers: James R. Fekete, General Motors Corporation; Roger Pradhan, Mittal Steel

Wednesday AM Room: 330
September 28, 2005 Location: Convention Center

Session Chair: TBA

9:00 AM

On the Precipitation Behavior of an Aluminum Auto-Body Sheet: *Reza Shahbazian Yassar*¹; David P. Field¹; ¹Washington State University

9:30 AM

Influence of Particle Distribution on Formability and Fracture of Automotive AA5754 Sheet: *Jidong Kang*¹; Xinjian Duan¹; Mukesh Jain¹; David S. Wilkinson¹; ¹McMaster University

10:00 AM

Fracture and Deformation Behaviour of Laser Weld-Brazed Steel-Aluminium Joints: *Holger Laukant*¹; Clemens Wallmann¹; Uwe Glatzel¹; ¹University of Bayreuth

10:30 AM Break

10:45 AM

Characterization of High Strength Steels Strain Rate Effects in Automotive Impact: *Srdjan Simunovic*¹; David Meuleman²; Phani Kumar V.V. Nukala¹; ¹ORNL; ²General Motors Corporation

11:15 AM

Material Properties Considering Strain Rate Effect - Test Data Processing: *Wayne Li*¹; ¹Ford

11:45 AM

Application of an Activity Based Cost Model from Steelmaking Through Stamping Operation: *Steven G. Jansto*¹; Hardy Mohrbacher²; ¹Reference Metals Company, Inc.; ²Niobium Products Company, GmbH

Failure Analysis: Failure Analysis of Components Subject to High Temperatures

Program Organizers: Debbie Aliya, Aliya Analytical Inc; Dale E. Alexander, Engineering Systems Inc; David A. Moore, Packer Engineering

Wednesday AM Room: 310
September 28, 2005 Location: Convention Center

Session Chairs: Aaron Tanzer, Siemens Westinghouse; Gerhard E. Fuchs, University of Florida

9:00 AM

Effects of Temperature on Failure Modes for a Nickel-Base Disk Superalloy: *Timothy P. Gabb*¹; Jack Telesman¹; Pete T. Kantzos²; James W. Smith³; ¹NASA; ²Ohio Aerospace Institute; ³QSS Group, Inc.

9:20 AM

Failure Analysis on a Burst Steam Tube: *Suat H. Tuncel*¹; ¹TUNCCEL Muhendislik

9:40 AM

Failure Analysis of Turbine Blade Shroud Cracking in a Directionally Solidified Alloy: Mark Spisiak¹; ¹Power Systems Mfg.

10:00 AM

Characterization of High Temperature Oxidation of 2.25 Cr-1Mo Boiler Tube Steel and Its Weldments in Air at 900°C: *Ravindra Kumar*¹; Vindhya K. Tiwari²; S. Prakash¹; ¹Indian Institute of Technology Roorkee; ²University of Wisconsin

10:20 AM

Effect of Elemental Redistribution on the Failure of Centrifugally Cast HK40 Alloy: *Pablo Guillermo Caceres-Valencia*¹; ¹University of Puerto Rico-Mayaguez

10:40 AM

A Workability Criterion for the Transformed Adiabatic Shear Band Phenomena during Cold Heading of 1038 Steel: Amar Sabih¹; Abdelbaset M. Elwazri¹; James A. Nemes¹; Steve Yue¹; ¹McGill University

11:00 AM

Failure Analysis of an Elevator Rope: *Erhan Ulvan*¹; John Zirnhelt¹; Barry Woit¹; ¹Canspec Group, Inc.

11:20 AM

Failure Analysis Case Study: Casting Defects in Directionally Solidified Gas Turbine Blades: *Michael Harris Allen*¹; Reade R. Clemens¹; Joseph G. Hillebrand¹; ¹Pratt & Whitney

11:40 AM

Correlation Between Silica and Chloride Water Monitoring and Boiler Condition for Steam Power Plant: *Anna Reani*¹; Murti Tusli¹; ¹Pembangkitan Listrik Jawa Bali, Company, Ltd, UBP Muara Karang

Failure Analysis: Joint Session with Joining of Monolithic Structures and Components II: Design Issues in Failure of Weldments

Program Organizers: Debbie Aliya, Aliya Analytical Inc; Dale E. Alexander, Engineering Systems Inc; David A. Moore, Packer Engineering; Charles V. Robino, Sandia National Laboratories; Matthew Walp, DaimlerChrysler; Thomas J. Lienert, Los Alamos National Laboratory

Wednesday AM Room: 311
September 28, 2005 Location: Convention Center

Session Chair: Thomas J. Lienert, Los Alamos National Laboratory

See *Joining of Monolithic Structures and Components* on page 142 for schedule.

WEDNESDAY AM

Fractures of Multicomponent Systems: Fracture and Fatigue of Multicomponent Systems

Program Organizers: Bhaskar S. Majumdar, New Mexico Tech; Nikhilesh Chawla, Arizona State University; John J. Lewandowski, Case Western Reserve University

Wednesday AM Room: 307
September 28, 2005 Location: Convention Center

Session Chairs: Nikhilesh Chawla, Arizona State University; Carl J. Boehlert, Michigan State University

9:00 AM

Improving the Ductility of Molybdenum by Spinel (MgAl₂O₄) Particles: *Joachim H. Schneibel*¹; Harry M. Meyer¹; ¹Oak Ridge National Laboratory

9:20 AM

Fracture of Bulk Metallic Glass-W Composites: *Alan Vormelker*¹; Mostafa Shazley¹; Laszlo Kecskes²; John J. Lewandowski¹; ¹Case Western Reserve University; ²Army Research Laboratory

9:40 AM

Tensile Deformation and Fracture Behaviors of Ti-Al-Nb Intermetallic Alloys: *Yong Mao*¹; Masuo Hagiwara¹; Shiqiong Li²; ¹National Institute for Materials Science; ²Central Iron & Steel Research Institute

10:00 AM

Tensile Strength of Porous Monolithic Alumina and Alumina/Zirconia Particulate Composites: *Fei Ren*¹; Eldon D. Case¹; ¹Michigan State University

10:20 AM Break

10:40 AM

Characterization of Mechanical and Fracture Properties of Zirconium Alloys by Small Punch Test and Ball Indentation Test: *Bibhu Narayan Rath*¹; Ramashankar Shrivastaw¹; V. P. Jathar¹; E. Ramadasan¹; K. C. Sahoo¹; ¹BHBHA Atomic Research Centre

11:00 AM

Microstructure Effects on Fracture and Fatigue of Advanced Nb-Si Alloys: *Mostafa Shazley*¹; Yi Liu¹; John J. Lewandowski¹; ¹Case Western Reserve University

11:20 AM

Evolution of Surface Deformation during Dynamic Embrittlement of High Strength Low Alloy Steels: *Harish Nathani*¹; *Sankaran Shanmugam*¹; Devesh K. Misra¹; ¹University of Louisiana at Lafayette

11:40 AM

Fatigue Crack Initiation and Propagation in a 2XXX Al-Alloy: *Jinxia Li*¹; Xiuping Jiang¹; Matthew Garratt²; Gary H. Bray²; Tongguang Zhai¹; ¹University of Kentucky; ²Alcoa

Frontiers of Materials Science 2005: Innovative Materials and Manufacturing Tech and Fourteenth International Symposium on Processing and Fabrication of Advanced Materials (PFAM XIV): Advanced Metallics and Machining

Program Organizers: Reza Abbaschian, University of Florida; Srinath Viswanathan, Sandia National Laboratories; T. S. Srivatsan, University of Akron; Robert A. Varin, University of Waterloo

Wednesday AM Room: 308
September 28, 2005 Location: Convention Center

Session Chair: Ian Baker, Thayer School of Engineering

9:00 AM Invited

Improving Processing of Aluminum Alloys through Application of Process Engineering Models: *Wojciech Z. Misiolek*¹; Richard M. Kelly²; ¹Lehigh University; ²Werner Co.

9:20 AM

The Effect of Equal Channel Angular Extrusion (ECAE) on the Mechanical Properties of Aluminum Alloys: *Christopher J. Hovane*¹; Roger Doherty¹; Surya Kalidindi¹; Ayman Salem²; Lee Semiatin²; ¹Drexel University; ²Air Force Research Laboratory; Universal Technology Corporation

9:40 AM

Clad Metals Engineered for Performance: *L. Chen*¹; C. S. Chang¹; C. Tuffile¹; ¹Engineered Materials Solutions

10:00 AM

Beta-21S Titanium Alloy Sheet Welding for Helicopter Exhaust Application: *Cyrille Ferdinand*¹; Talal Masri²; Jacques Alain Petit²; Jean-Claude Ganza³; ¹EXAMECA/Ecole Nationale d'Ingénieurs de Tarbes; ²Ecole Nationale d'Ingénieurs de Tarbes; ³EXAMECA

10:20 AM Break

10:40 AM

High-Pressure Phase Synthesis of Iron Using Femtosecond Laser-Driven Shock Wave: *Tomokazu Sano*¹; Akio Hirose¹; Kojiro F. Kobayashi¹; Osami Sakata²; Yasuaki Okano³; Katsuya Oguri³; Hidetoshi Nakano³; ¹Osaka University; ²Japan Synchrotron Radiation Research Institute/SPring-8; ³NTT Basic Research Laboratories

11:00 AM

Extrusion Processing of Ti-6Al-4V: *Mehmet N. Gungor*¹; Ibrahim Uco¹; Lawrence S. Kramer¹; Hao Dong¹; Wm. Troy Tack¹; ¹Concurrent Technologies Corporation

11:20 AM

New Surface Treatment Technology Demonstrating Reduced Friction and Wear on Samples Tested via Pin-On-Disc: *Jane Elizabeth Buehler*¹; Kay D. Bowles¹; ¹Kinetitec

11:40 AM Invited

Material Response through Acoustic Emission for Quality Control in Machining of Polymeric Composites: *L. Vijayaraghvan*¹; *S. Arul*¹; *S. K. Malhotra*¹; ¹Indian Institute of Technology, Madras

WEDNESDAY AM

Integration of Theoretical, Computational and Experimental Studies of Interfaces and Microstructural Evolution: Surfaces and Grain Boundaries

Program Organizers: Gregory S. Rohrer, Carnegie Mellon University; Alain S. Karma, Northeastern University; Paul P. Wynblatt, Carnegie Mellon University; Anthony D. Rollett, Carnegie Mellon University; David J. Srolovitz, Princeton University; Diana Farkas, Virginia Tech; Dominique Chatain, Centre National de La Recherche Scientifique; Christopher F. Woodward, Air Force Research Laboratory

Wednesday AM Room: 309
September 28, 2005 Location: Convention Center

Session Chair: Paul Wynblatt, Carnegie Mellon University

9:00 AM Invited

The Role of Surface Anisotropy in Grain Boundary Grooving: *Eugen Rabkin*¹; Leonid Klinger¹; Angelina Gabelev¹; Yaron Amoyal¹; Valery Semenov²; ¹Technion; ²Institute of Solid State Physics

9:30 AM Invited

Interface Morphology and Thermodynamics from Dewetting Experiments: *Wayne David Kaplan*¹; Hila Sadan¹; ¹Technion - Israel Institute of Technology

10:00 AM

Interfaces and Orientation Relationship of Pb Particles Solidified on Cu: *Dominique Chatain*¹; Daniel Galy²; Jean-Philippe Monchoux¹; ¹Centre National de La Recherche Scientifique; ²Synergie4

10:20 AM

Multiscale Simulation of Copper Oxidation: *Alan J.H. McGaughey*¹; Simon R. Phillpot²; Susan B. Sinnott²; Judith C. Yang³; ¹University of Florida and University of Pittsburgh; ²University of Florida; ³University of Pittsburgh

10:40 AM Break

11:00 AM Invited

The Coupling between Grain Boundary Motion and Shear Deformation: *J. W. Cahn*¹; *Y. Mishin*²; A. Suzuki²; J. E. Taylor³; ¹National Institute of Standards and Technology; ²George Mason University; ³New York University

11:30 AM

An Experimental and Theoretical Study of Microstructure Evolution during Sliding: *Hong Jin Kim*¹; Andrew Emge¹; Karthikeyan Subramanian¹; David Rigney¹; ¹Ohio State University

12:00 PM

A Slip Based Definition of Grain Boundary Character for Predicting Grain Boundary Fracture: *Thomas R. Bieler*¹; Deepak Kumar¹; B. C. Ng¹; Martin A. Crimp¹; ¹Michigan State University

Joining of Monolithic Structures and Components: Joint Session with Failure Analysis II: Design Issues in Failure of Weldments

Program Organizers: Charles V. Robino, Sandia National Laboratories; Matthew Walp, DaimlerChrysler; Thomas J. Lienert, Los Alamos National Laboratory; Debbie Aliya, Aliya Analytical Inc; Dale E. Alexander, Engineering Systems Inc; David A. Moore, Packer Engineering

Wednesday AM Room: 311
September 28, 2005 Location: Convention Center

Session Chair: Thomas J. Lienert, Los Alamos National Laboratory

9:00 AM

Weld Failures Often Stem from the Violation of Basic Design Principles: *Omer W. Blodgett*¹; ¹Lincoln Electric Company

9:40 AM

Failure Analysis of Automotive Spot Welds: *Jeffrey L. Evans*¹; Stephen A. Batzer¹; ¹Engineering Institute

10:00 AM

The Real Reason (Root Cause) Why the Chair Welds Failed: *Charles J. Young*¹; Kent L. Johnson¹; Kenneth M. Smith¹; ¹Engineering Systems, Inc.

10:20 AM Break

10:40 AM

Deep Fryer Failure Analysis: *Ronald James Parrington*¹; ¹IMR Test Laboratories

11:00 AM

Computer-Aided Detection System and Its Application for Metal Joints Under Cyclic Loading: *Yiming Tan*¹; Feina Du²; Ortwin Hahn²; Claus J. Hipp¹; ¹University of Applied Sciences Suedwestfalen; ²University Paderborn

11:20 AM

Failure Analyses of Beryllium Copper Bourdon Tubes: *Kei-Peng Jen*¹; Dexiao Hao¹; Liqun Xu¹; ¹Villanova University

Modeling and Simulation of Titanium Technology: Theory and Practices: Microstructure Property Correlation in Titanium and Its Alloys

Program Organizers: Ellen K. Cerreta, Los Alamos National Laboratory; Vasisht Venkatesh, Timet Corporation; F. Robert Dax, Concurrent Technologies Corporation; Jaimie S. Tiley, U.S. Air Force

Wednesday AM Room: 405
September 28, 2005 Location: Convention Center

Session Chair: Ellen K. Cerreta, Los Alamos National Laboratory

9:00 AM

Microstructure-Property Relationships in Titanium Boride Reinforced Titanium Alloys: *Davion Hill*¹; *Rajarshi Banerjee*²; Daniel Huber¹; Peter Chancellor Collins¹; Jaimie Tiley³; Hamish L. Fraser¹; ¹Ohio State University; ²University of North Texas; ³Wright Patterson Air Force Base

9:20 AM Invited

Development and Application of Mechanical Property Models for Titanium Alloy Component Design and Manufacture: *David U. Furrer*¹; Gangshu Shen¹; ¹Ladish Company Inc

9:50 AM

Micromechanical Properties of Individual Phases in Ti+TiB Metal-Matrix Composites: *Davion Hill*¹; Rajarshi Banerjee²; Peter C. Collins¹; Jaimie Tiley³; Michael D. Uchic³; Hamish L. Fraser¹; ¹Ohio State University; ²University of North Texas; ³Wright Patterson Air Force Base

10:10 AM

Modeling of Crystallographic Texture Evolution and Anisotropic Stress-Strain Response in High Purity Titanium and Commercially Pure Titanium: *Xianping Wu*¹; Surya Kalidindi¹; Roger Doherty¹; Ayman Salem²; Carl Necker³; ¹Drexel University; ²Air Force Research Laboratory; ³Los Alamos National Laboratory

10:30 AM

Neural Network Modeling of Mechanical Properties of Alpha/Beta Titanium Alloys Based on Composition and Microstructural Features: *Sujoy Kar*¹; Thomas K. Searles¹; Joshua Tuggle¹; Gopal Babu Viswanathan¹; Rajarshi Banerjee²; Hamish L. Fraser¹; ¹Ohio State University; ²University of North Texas

10:50 AM Break

11:10 AM

Mechanistic Modeling and Prediction of Fatigue Response and Life Variability in $\alpha + \beta$ Ti Alloys: *Kwai S. Chan*¹; Michael P. Enright¹; ¹Southwest Research Institute

11:30 AM

Crack Initiation/Propagation Induced Duality in Fatigue Variability and the Life-Limiting Mechanism in an $\alpha + \beta$ Titanium Alloy: *Sushant K. Jha*¹; James M. Larsen²; Andrew H. Rosenberger²; ¹Universal Technology Corporation; ²U.S. Air Force Research Laboratory

11:50 AM

Determination of Microstructure-Fatigue Lifetime Relationships for Ti-6Al-4V: *Alison Polasik*¹; Sushant Jha²; Michael J. Mills¹; James M. Larsen²; Hamish L. Fraser¹; ¹Ohio State University; ²Air Force Research Laboratory

Nanomaterials: Nanofilms, Devices and Applications I

Program Organizers: Jeremy W. Burdon, Medtronic Inc; C. Suryanarayana, University of Central Florida; William M. Mullins, U.S. Army

Wednesday AM

Room: 404

September 28, 2005 Location: Convention Center

Session Chairs: Jeremy W. Burdon, Medtronic Inc

9:00 AM Invited

Nanoscale Patterning of Polymeric Materials for Molecular Manipulation in Confined Spaces: *Frederic Zenhausern*¹; ¹Arizona State University

9:40 AM

Manipulation of Polystyrene Microparticles using Microchannel Glass: *Ravi Mamillapalli*¹; Ronald Tonucci²; Henry Daniel Young¹; ¹Wright State University; ²Naval Research Laboratories

10:00 AM

Nanoscale Design Methodology for Ultra-Thin Solution-Derived Films: *Krishnaswamy K. Rangan*¹; Kimberly Steiner¹; Johan G. Abadie¹; Julie Wessling¹; Sankar Sambasivan¹; ¹Applied Thin Films, Inc

10:20 AM Break

10:40 AM

Integration of Carbon Nanotubes with MEMS Through Standard Photolithographic Techniques: *David F. Bahr*¹; Coralee Grant McCarter¹; Devon McClain²; Jun Jiao²; Robert Richards¹; C. D. Richards¹; ¹Washington State University; ²Portland State University

11:00 AM

Engineered Adsorption on Carbon Nanostructured Materials: *Mostafa M. El-Ashry*¹; Maher S. Amer¹; ¹Wright State University

11:20 AM

Fabrication of Aluminum Matrix Composites Reinforced with Carbon Nanotubes: *Dominique Poirier*¹; Céline Goujon¹; Raynald Gauvin¹; Robin Drew¹; ¹McGill University

11:40 AM

Electrophoretic Deposition of Barium Titanate Nanoparticles onto Micropatterned Substrate: *Yong Jun Wu*¹; Juan Li¹; Makoto Kuwabara¹; ¹Kyushu University

Next Generation Biomaterials: Natural Materials

Program Organizers: Roger J. Narayan, Georgia Institute of Technology; Sarit B. Bhaduri, Clemson University; Gary S. Fischman, National Materials Advisory Board

Wednesday AM

Room: 320

September 28, 2005 Location: Convention Center

Session Chairs: Rena Bizios, Rensselaer Polytechnic Institute; Dawn Bonnell, University of Pennsylvania

9:00 AM Invited

Connections Among Structure, Cell Mechanical Response and Human Disease States: *Subra Suresh*¹; J. P. Mills¹; Ming Dao¹; ¹Massachusetts Institute of Technology

9:20 AM Invited

Molecular Biomimetics: Genetically Engineered Peptide-Based Molecular Constructs for Nanobiotechnology: *Mehmet Sarikaya*¹; ¹University of Washington

9:40 AM Invited

Utilizing Inorganic Materials to Understand Smart Organic Materials: The Living Cell: *Philip LeDuc*¹; ¹Carnegie Mellon University

10:00 AM Invited

Probing Molecular Interactions in Bone Biomaterials: Through Molecular Dynamics and Fourier Transform Infrared Spectroscopy: *Kalpana S. Katti*¹; Rahul Bhowmik¹; Devendra Verma¹; Dinesh R. Katti¹; ¹North Dakota State University

10:20 AM Invited

Imaging of Cancellous Bone Pore Structure Using Two Types of Laser Scanning Confocal Microscopy (LSCM): *Ian O. Smith*¹; Fei Ren¹; Melissa J. Baumann¹; Eldon D. Case¹; ¹Michigan State University

10:40 AM Invited

Predicting and Optimizing the Mechanical Behavior of Freeform Scaffold Bundles Using Finite Element Analysis: *Ian Nieves*¹; Jay V. Calvert¹; James Calvin Earthman¹; ¹University of California, Irvine

11:00 AM

Studies of Toughening of Natural Materials: *Sara L. Walter*¹; H. Song¹; B. Flinn¹; G. Mayer¹; ¹University of Washington

Process Heating/Reheating: Process Heating I

Program Organizers: Arvind Thekdi, E3M Inc; Nathan Abboud, Timken Company

Wednesday AM Room: 329
September 28, 2005 Location: Convention Center

Session Chair: Nathan E. Abboud, Timken Company

9:00 AM Introductory Comments

9:10 AM

Reconsideration of Natural-Gas Immersion Burners to Melt Recycled Aluminum: *John A. Clark*¹; Arvind Thekdi²; Sridas Ningiler³; Qingyou Han⁴; ¹U.S. Department of Energy; ²E3M, Inc.; ³Secat, Inc.; ⁴Oak Ridge National Laboratory

9:30 AM Question and Answer Period

9:40 AM

Modeling Process Heating for Cost Reduction: *Ravi Shankar*¹; John Walters¹; Wei-Tsu Wu¹; ¹Scientific Forming Technologies Corporation

10:00 AM Question and Answer Period

10:20 AM

Accurate Temperature Measurement for Energy Savings: *Ralph A. Felice*¹; ¹FAR Associates

10:40 AM Question and Answer Period

10:50 AM

Direct Flame Impingement for the Efficient and Rapid Heating of Ferrous and Nonferrous Shapes: *John Wagner*¹; Harry Kurek¹; Yuroslav Chudnovsky¹; German Malikov²; Vladimir Lisienko²; ¹Gas Technology Institute; ²Regional Ural Department of Academy of Engineering Sciences

11:10 AM Question and Answer Period

Science and Technology of Powder Materials: Synthesis, Consolidation and Properties: Sintering

Program Organizers: Leon L. Shaw, University of Connecticut; Eugene Al Olevsky, San Diego State University; Fernand D. Marquis, South Dakota School of Mines & Technology; Iver E. Anderson, Iowa State University; James H. Adair, Pennsylvania State University; Jitendra P. Singh, Argonne National Laboratory

Wednesday AM Room: 301
September 28, 2005 Location: Convention Center

Session Chair: Leon Shaw, University of Connecticut

9:00 AM Invited

Liquid Phase Sintering - Agreement of Experiments and Models: *Randall M. German*¹; John L. Johnson¹; Seong Jin Park¹; Jose Manuel Martin Garcia¹; ¹Pennsylvania State University

9:20 AM

A Novel Method to Grow Silicon Nitride Whiskers during Sintering: *Shinwoo Kim*¹; Changsam Kim²; ¹Hoseo University; ²Korea Institute of Science and Technology

9:40 AM

CPM IV HIP/Clad Material for Die Casting: *Joseph Muha*¹; James Kowalczyk²; Harry Albright³; Andrzej Wojcieszynski¹; ¹Crucible Research; ²Kapex; ³H&V Enterprises, Inc.

10:00 AM Invited

Grain Growth during Sintering of Perovskite Ceramics: *Doh-Yeon Kim*¹; ¹Seoul National University

10:20 AM

Microstructural Evolution and Grain Growth of Cemented Tungsten Carbide during Sintering at Solid State Temperatures: *Vineet Kumar*¹; Praveen Maheshwari¹; Z. Zak Fang¹; Stuart Wright²; Matt Nowell²; ¹University of Utah; ²TSL/EDAX

10:40 AM

Ni and Fe Activators: Their Influences on Sintering Behaviors of W and Adhesion of Co-Sintered W/Al₂O₃ Compacts: *Yuttanant Boonyongmaneerat*¹; Thomas W. Eagar¹; Christopher A. Schuh¹; ¹Massachusetts Institute of Technology

11:00 AM

Sintering at the Allotropic Transformation Temperature: *Donald Heaney*¹; ¹Pennsylvania State University

11:20 AM

Simulation of Multi-Axial Compaction of Granular Media from Loose to High Relative Densities: *Antonios Zavaliangos*¹; Adam T. Procopio²; ¹Drexel University; ²Merck & Co., Inc.

Springback in Sheet Metal Forming Applications: Session II

Program Organizers: Michael P. Miles, Brigham Young University; Mark R. Stoudt, National Institute of Standards & Technology

Wednesday AM Room: 334
September 28, 2005 Location: Convention Center

Session Chair: Thomas Gnaeupel-Herold, National Institute of Standards and Technology

9:00 AM Keynote

Springback Predictability and Die Compensation in Sheet Metal Stampings: *Edmund Chu*¹; ¹Alcoa Inc

WEDNESDAY AM

9:30 AM Invited

Experimental Measurement of Multiaxial Yield Loci: *Mark A. Jadicola*¹; Tim Foeckel¹; ¹National Institute of Standards and Technology

10:00 AM Invited

Springback and Springback Control of Advanced High Strength Steels: *Ming F. Shi*¹; ¹U.S. Steel

10:30 AM Break

10:50 AM Invited

Springback Simulation with Pseudo-Elastic Effects: A Non-Conventional Plasticity Approach: *Cedric Xia*¹; ¹Ford Motor Company

11:20 AM

Use of Electromagnetic Impulse to Control Springback: *Jianhui Shang*¹; Vincent Vohnout¹; Ederne Iriando²; Scott Golowin¹; Glenn S. Daehn¹; ¹Ohio State University; ²Labein

11:40 AM

Effect of Pre-Straining on the Apparent Young's Modulus of Bake-Hardenable High Strength Steels: *Taina Vuoristo*¹; Veli-Tapani Kuokkala¹; Sven Curtze¹; Pasi Peura²; ¹Tampere University of Technology; ²Ruukki Production

12:00 PM

First-Order Springback Behavior of Advanced High Strength Steels: *Brandon M. Hance*¹; ¹U.S. Steel

What Makes a Good Materials Engineer and How Best to Educate Them: Teaching, Education Technology and Accreditation

Program Organizers: Paul E. Cantonwine, Bechtel Bettis Inc; Kent D. Peaslee, University of Missouri-Rolla; Mark A. Palmer, Kettering University; Michael B. Connelly, Casey Products Inc

Wednesday AM

Room: 315

September 28, 2005

Location: Convention Center

Session Chair: Mark A. Palmer, Kettering University

9:00 AM

Innovative On-Line Learning of Ferrous Metallurgy: Peter J. Goodhew¹; *David John Naylor*²; ¹University of Liverpool; ²IISI

9:20 AM

Educating Materials Engineers: *David G. Brandon*¹; ¹Technion - Israel Institute of Technology

9:40 AM

The Value of Laboratory Exercises: A Metallurgical Engineer's Perspective: *Jeffrey L. Evans*¹; ¹Engineering Institute

10:00 AM

Technology-Assisted Formative Assessment in an Introductory Materials Course: *Chrysanthe Demetry*¹; ¹Worcester Polytechnic Institute

10:20 AM

The Design-Led Approach to Materials Education: *Helen McLachlan*¹; Patrick David Coulter¹; Mike Ashby²; ¹Granta Design Limited; ²Cambridge University

10:40 AM Break

11:00 AM

Accreditation of Materials Science and Engineering Programs: *Mark A. Palmer*¹; *Ashok Saxena*²; ¹Kettering University; ²University of Arkansas

11:20 AM Panel Discussion

Application of Materials Science to Military Systems: Aircraft, Ground Vehicles, & Naval Applications

Program Organizers: Douglas Deason, U.S. Army; Rodney R. Boyer, Boeing Company

Wednesday PM

Room: 319

September 28, 2005

Location: Convention Center

Session Chair: Timothy Langan, Surface Treatment Technologies

2:00 PM

Structural Use of Aluminum in Naval Ships: *Catherine Wong*¹; ¹NSWCCD

2:20 PM

Understanding Damage Accumulation upon AA7075-T6 Used in Airframes from a Microstructural Point-of-View: *Nick Birbilis*¹; Mary Katherine Cavanaugh¹; Rudolph G. Buchheit¹; ¹Ohio State University

2:40 PM

On the Statistical Digital Representation of 7075-T651 Aluminum Used in Wing Panel Construction of a Naval Airplane: *Stephen D. Sintay*¹; Anthony D. Rollett¹; Robert M. Campman¹; ¹Carnegie Mellon University

3:00 PM

Testing and Validation of Composite Components for Military Assets: *Rob Mason*¹; Lawrence A. Gintert¹; Micheal Miller¹; Don Skelton²; ¹Concurrent Technologies Corporation; ²U.S. Army

3:20 PM

Use of Titanium in Naval Systems: *Catherine Wong*¹; ¹NSWCCD

3:40 PM

Implementation of UT Hardness Tester for Titanium Fabrication: *Martin S. Kaffenbarger*¹; ¹Northrop Grumman

4:00 PM

Fatigue Life Risk Mitigation of High Temperature Superconductors for Naval Motors and Generators: *Ronald Holtz*¹; ¹Naval Research Laboratory

4:20 PM

"Net-to-Shape" Ceramic Fibrous Mat for Industrial and Defense Applications: *Steve Kirkwood*¹; Dino Militello¹; Jozsef Hepp¹; Ken Kratsch¹; Edward J.A. Pope¹; ¹MATECH

Coatings 2005: Processing II

Program Organizers: Nitin P. Padture, Ohio State University; Lorraine F. Francis, University of Minnesota; Janet M. Hampikian, Boise State University; Narendra B. Dahotre, University of Tennessee

Wednesday PM

Room: 317

September 28, 2005

Location: Convention Center

Session Chair: James A. Nesbitt, NASA

2:00 PM

Wear Resistant Brazed Claddings from Engineered Polymer Suspensions: *Donald W. Bucholz*¹; Kevin M. Singer¹; ¹Conforma Clad Inc

2:20 PM

Corrosion Resistant and High Temperature Coatings from Preceramic Polymers: *Yigal Blum*¹; Brent MacQueen¹; ¹SRI International

2:40 PM

Effect of Preheating Temperature on the Deposition Rate of the TiCN Layer: *Zhi-Jie Liu*¹; Peter Leicht²; Yi-Xiong Liu²; *Zi-Kui Liu*¹; ¹Pennsylvania State University; ²Kennametal, Inc.

3:00 PM

Multifunctional Aluminophosphate Films for Protection of Advanced Alloys in Harsh Environments: *Julie Wessling*¹; Johan Abadie¹; Krishnaswamy Rangan¹; Kimberly Steiner¹; Francis Chapman¹; Sankar Sambasivan¹; ¹Applied Thin Films, Inc.

3:20 PM Break

3:40 PM

New Technologies Advance ElectroSpark Deposition Capabilities: *Jeffrey A. Bailey*¹; Roger N. Johnson¹; John T. Munley¹; Walter R. Park¹; John E. Kelley²; ¹Pacific Northwest National Laboratory; ²Advanced Surfaces & Processes, Inc.

4:00 PM

Kinetic Metallization™ Coating Development System: Ralph M. Tapphorn¹; *Howard Gabel*¹; Richard Frickmann¹; ¹Inovati

4:20 PM

Kinetic Metallization™ of WC-Co Coatings: Ralph M. Tapphorn¹; *Howard Gabel*¹; Jeff Henness¹; ¹Inovati

4:40 PM

Improvement of Thermal Conductivity of Plasma-Sprayed Al Matrix Composites by Hot Pressing: *Kwangjun Euh*¹; Suk Bong Kang¹; ¹Korea Institute of Machinery & Materials

Copper for the 21st Century: Session IV

Program Organizer: David L. Ellis, NASA

Wednesday PM

Room: 305

September 28, 2005 Location: Convention Center

Session Chair: Jong K. Lee, Michigan Technological University

2:00 PM

Fabrication and Testing of EB-PVD Thermal Barrier Coatings for Rocket Combustion Chambers: *Uwe Schulz*¹; Klaus Fritscher¹; ¹DLR, German Aerospace Center

2:20 PM

Comparison of GRCop-84 to Other Aerospace Cu Alloys: *Henry C. de Groh*¹; David Ellis¹; William Loewenthal²; ¹NASA Glenn Research Center; ²Ohio Aerospace Institute, NASA Glenn Research Center

2:40 PM

Comparison of the Fatigue Behaviors of Copper Alloys: *Bradley A. Lerch*¹; David L. Ellis¹; ¹NASA

3:00 PM

Creep Characteristics of a Cu-8Cr-4Nb Alloy: Mark W. Decker¹; Lawrence G. Vetraino¹; Jennifer L. Walley¹; Joanna R. Groza¹; *Jeffery C. Gibeling*¹; ¹University of California

3:20 PM Break

3:40 PM

Mechanical Properties of HIP Cu-8Cr-4Nb: *Matthew H. Ferry*¹; Eric S. Bono¹; Ulrike K. Habel¹; Joseph F. Muha¹; ¹Crucible Research

4:00 PM

Microstructural Characterization of As-Extruded GRCop-84: *Chika Okoro*¹; Peter Kalu¹; David Ellis²; ¹FAMU-FSU College of Engineering; ²NASA Glenn Research Center at Lewis Field

4:20 PM

Influence of Processing on the Microstructure of Cu-8Cr-4Nb: *Lawrence G. Vetraino*¹; Anita Garg²; Jennifer Walley¹; Christopher A. Faconti¹; Jennifer Heelan¹; Joanna R. Groza¹; *Jeffery C. Gibeling*¹; ¹University of California; ²NASA

4:40 PM

Forming Characteristics of GRCop-84: *Gary M. Michal*¹; Awlah Awadallah¹; David L. Ellis²; ¹Case Western Reserve University; ²NASA Glenn Research Center

5:00 PM

Fabrication of GRCop-84 Rocket Thrust Chambers: *William Loewenthal*¹; David L. Ellis²; ¹Ohio Aerospace Institute; ²NASA Glenn Research Center

Creep Deformation and Fracture, Design, and Life Extension: Session VI

Program Organizers: Rajiv S. Mishra, University of Missouri; James Calvin Earthman, University of California; Sai V. Raj, NASA Glenn Research Center; R. Viswanathan, Electric Power Research Institute

Wednesday PM

Room: 306

September 28, 2005 Location: Convention Center

Session Chair: Sai V. Raj, NASA Glenn Research Center

2:00 PM Invited

Dopant Effect on High Temperature Plasticity in Oxide Ceramics: Grain Boundary Chemistry-Related Phenomena: *Hidehiro Yoshida*¹; Keijiro Hiraga¹; Akihide Kuwabara²; Takahisa Yamamoto³; Yuichi Ikuhara³; Taketo Sakuma⁴; ¹National Institute for Materials Science; ²Kyoto University; ³University of Tokyo; ⁴National Institute for Academic Degrees and University Evaluation

2:20 PM Invited

Effect of Dispersed Particles on Creep and Activation Energy of Granular Ice: *Ian Baker*¹; Min Song¹; David M. Cole²; ¹Dartmouth College; ²U.S. Army Cold Regions Research and Engineering Laboratory

2:40 PM Invited

An Analysis of Creep Mechanisms in Superplastic Yttria-Stabilized Zirconia: *N. Balasubramanian*¹; Terence G. Langdon²; ¹R. V. College of Engineering; ²University of Southern California

3:00 PM

Tensile Creep Behavior of a Potential Ceramic Oxygen Separation Material: *Kent N. Hutchings*¹; David L. Shellemans²; Richard E. Tressler²; ¹Ceramatec; ²Pennsylvania State University

3:20 PM Break

3:40 PM

Monte Carlo Model of Creep Damage in Ceramic Matrix Composite Lamina: *Dennis N. Coon*¹; ¹University of Wyoming

4:00 PM

Predicting the Creep Response of Polyphenylsulfone for Application as Building Structural Members: *Dennis L. McGarry*¹; Jocelyn M. Seng²; Ravi K. Devalapura²; ¹FTI/SEA Consulting; ²Owens Corning

4:20 PM

Impression and Compression Creep Testing of SiAlON Ceramics: *Kevin M. Fox*¹; Elizabeth C. Dickey¹; David J. Green¹; Russell Yeckley²; John R. Hellmann¹; ¹Pennsylvania State University; ²Kennametal, Inc.

4:40 PM

Room Temperature Creep of LiF Single Crystals under Static and Cyclic Loading Conditions: James Calvin Earthman¹; T. Kvamme²; K. J.C. Chou¹; ¹University of California; ²Lockheed Martin Corporation

Failure Analysis: Interdisciplinary Investigations

Program Organizers: Debbie Aliya, Aliya Analytical Inc; Dale E. Alexander, Engineering Systems Inc; David A. Moore, Packer Engineering

Wednesday PM Room: 310
September 28, 2005 Location: Convention Center

Session Chairs: Roch J. Shipley, Packer Engineering Inc.; Irving Lee Pack, Interscience Inc.

2:00 PM

Legal Principles for Expert Testimony: *James C. English*¹; ¹LeBoeuf, Lamb, Greene & MacRae

2:40 PM

Will the Real CSI Please Stand Up?: *Terry Mills*¹; ¹McSwain Engineering, Inc.

3:20 PM

Fire Investigations- An Overview of the Process Utilizing Case Studies: *Irvine W. Lee Pack*¹; ¹Interscience, Inc.

3:40 PM

Materials Examination of the Vertical Stabilizer from American Airlines Flight 587: *Matthew R. Fox*¹; Carl R. Schultheisz¹; James Reeder²; Brian Jensen²; ¹National Transportation Safety Board; ²NASA Langley Research Center

4:00 PM

Engineering Forensics at Youngstown State University: *Robert A. McCoy*¹; ¹Youngstown State University

Frontiers of Materials Science 2005: Innovative Materials and Manufacturing Tech and Fourteenth International Symposium on Processing and Fabrication of Advanced Materials (PFAM XIV): Metal Forming and Machining

Program Organizers: Reza Abbaschian, University of Florida; Srinath Viswanathan, Sandia National Laboratories; T. S. Srivatsan, University of Akron; Robert A. Varin, University of Waterloo

Wednesday PM Room: 308
September 28, 2005 Location: Convention Center

Session Chair: T. S. Srivatsan, University of Akron

2:00 PM Invited

Development and Evaluation of Asbestos-Free Friction Materials for Automotive Applications: V. Sampath¹; ¹University of Akron

2:20 PM

Development of New Conceptual TMCP Process for High Strength Steels by Applying Heat Treatment Immediately after Accelerated Cooling: *Toyohisa Shinmiya*¹; Nobuyuki Ishikawa¹; Shigeru Endo¹; Haruo Nakamichi¹; ¹JFE Steel Corporation

2:40 PM

The Comprehensive Diagram Showing Characteristics of All Alloy Systems(1)-Periodicity: *Yoshiharu Mae*¹; ¹Maetech

3:00 PM

The Comprehensive Diagram Showing Characteristics of All Alloy Systems(2)-Solubility: *Yoshiharu Mae*¹; ¹Maetech

3:10 PM

The Comprehensive Diagram Showing Characteristics of All Alloy Systems(5)-Resistivity Increase: *Yoshiharu Mae*¹; ¹Maetech

3:20 PM Break

3:40 PM Invited

Development of MoSi₂-Si₃N₄ In situ Composites by Reaction of Molybdenum with Silicon Nitride: *R. V. Krishnarao*¹; ¹University of Akron

4:00 PM

Defects Constrained Drilling of Polymeric Composites through Strain Toughening: L. Vijayaraghvan¹; S. Arul¹; S. K. Malhotra¹; ¹Indian Institute of Technology, Madras

4:20 PM

An Understanding of Surface Integrity Studies during Reaming: M. S. Shunmugam¹; P. G. Mathews²; ¹University of Akron; ²Indian Institute of Technology

4:40 PM

Influence of Die Angle on Containerless Extrusion of CP Titanium Rods: Srinivasan Kuppaswamy¹; Venugopal Pasupathi¹; ¹IIT, Madras, Chennai

5:00 PM

The Influence of Wire-Electro Discharge Machining for Machining a Titanium Alloy: M. S. Shunmugam¹; Shajan Kuriakose²; ¹University of Akron; ²Indian Institute of Technology

5:20 PM

Growth of GaInSb Thin Films for Infrared Detectors Using Hot-Wall Epitaxy: *Partha Bir Barman*¹; ¹SLIET

Integration of Theoretical, Computational and Experimental Studies of Interfaces and Microstructural Evolution: Microstructure Evolution and Texture Development

Program Organizers: Gregory S. Rohrer, Carnegie Mellon University; Alain S. Karma, Northeastern University; Paul P. Wynblatt, Carnegie Mellon University; Anthony D. Rollett, Carnegie Mellon University; David J. Srolovitz, Princeton University; Diana Farkas, Virginia Tech; Dominique Chatain, Centre National de La Recherche Scientifique; Christopher F. Woodward, Air Force Research Laboratory

Wednesday PM Room: 309
September 28, 2005 Location: Convention Center

Session Chair: Tony Rollett, Carnegie Mellon University

2:00 PM

Theory and Simulation Issues in Microstructural Evolution: *David Kinderlehrer*¹; Katayun Barmak¹; Gregory Rohrer¹; Anthony Rollett¹; Shlomo Ta'asan¹; ¹Carnegie Mellon University

2:20 PM

Scaling of a Monte Carlo Grain Growth Model: *Yujie Wu*¹; Qiang Yu²; Sven Esche¹; ¹Stevens Institute of Technology; ²New Dimension

2:40 PM

Three-Dimensional Microstructural Evolution: Theoretical, Computational, and Experimental Studies: *Ke-Gang Wang*¹; Martin E. Glicksman¹; Krishna Rajan¹; ¹Rensselaer Polytechnic Institute

3:00 PM

Coupled Surface Diffusion and Motion by Mean Curvature from a Diffuse Interface Model: *Amy Novick-Cohen*¹; Lydia Peres Hari¹; ¹Technion-IIT

3:20 PM Break

3:40 PM

Texture Development during Grain Growth: Jason Gruber¹; Denise C. George²; Andrew P. Kuprat²; Gregory S. Rohrer¹; Anthony D. Rollett¹; ¹Carnegie Mellon University; ²Los Alamos National Laboratory

4:00 PM

Spectral Methods for Capturing Crystallographic Texture Evolution: Hari Kishore Duvvuru¹; Surya R. Kalidindi¹; ¹Drexel University

4:20 PM

Evolution and Stability of Grain Boundary Engineered Microstructures: Mukul Kumar¹; ¹Lawrence Livermore National Laboratory

4:40 PM

Modeling Grain Growth in Cu Thin Films and Lines: David P. Field¹; Nojin Park²; John E. Sanchez³; Matthew M. Nowell⁴; Paul R. Besser⁵; ¹Washington State University; ²Kumoh National Institute of Technology; ³Unity Semiconductor; ⁴TexSEM Laboratories/EDAX; ⁵Advanced Micro Devices

Modeling and Simulation of Titanium Technology: Theory and Practices: Modeling and Simulation of Titanium: Physical and Mechanical Property Prediction

Program Organizers: Ellen K. Cerreta, Los Alamos National Laboratory; Vasisht Venkatesh, Timet Corporation; F. Robert Dax, Concurrent Technologies Corporation; Jaimie S. Tiley, U.S. Air Force

Wednesday PM Room: 405
September 28, 2005 Location: Convention Center

Session Chair: Ellen K. Cerreta, Los Alamos National Laboratory

2:00 PM Invited

Mechanical Properties and Constitutive Modeling for Ti-6Al-4V and TiAl Alloys: Shuh-Rong Chen¹; Ellen Cerreta¹; George T. (Rusty) Gray¹; ¹Los Alamos National Laboratory

2:30 PM

Anisotropic Plasticity and Cavity Growth during Tensile and Upset Forging of Ti-6Al-4V: Thomas R. Bieler¹; Perikles Dimitr Nicolaou²; Robert L. Goetz³; S. L. Semiatin³; ¹Michigan State University; ²SEB Industrial Minerals; ³Air Force Research Laboratory

2:50 PM

Microstructure Based 2D/3D Finite Element Modeling of the Mechanical Response of Ti-6Al-4V-TiB Metal Matrix Composites: Arun Sreeranganathan¹; Scott Lieberman¹; Arun Gokhale¹; ¹Georgia Institute of Technology

3:10 PM

Modeling Flow Curves and Adiabatic Shear Band Formation in Commercially Pure Titanium Using Finite Element Method: Utpal Borah¹; Srinivasan Venugopal¹; S. L. Mannan¹; ¹Indira Gandhi Center for Atomic Research

3:30 PM Break

3:50 PM

Prediction of Creep Behavior of Ti-6Al-4V on the Basis of Microstructure-Dependent Models: Dhriti Bhattacharyya¹; Sujoy Kar¹; John J. Schirra²; Michael F. Savage²; Walter W. Milligan³; David L. McDowell⁴; Hamish L. Fraser¹; Michael J. Mills¹; ¹Ohio State University; ²Pratt & Whitney; ³Michigan Technological University; ⁴Georgia Institute of Technology

4:10 PM

Residual Stress Effects on the Fatigue Variability of an a+b Titanium Alloy: Sushant K. Jha¹; Reji John²; James M. Larsen²; ¹Universal Technology Corporation; ²U.S. Air Force Research Laboratory

4:30 PM

Effect of Microstructure on Oxidation Resistance of Ti-Al-Nb-X(X=W,Cr): Xiaofei Ding¹; Yi Tan²; Fugang Wang¹; ¹Dalian University of Technology; ²University of California

4:50 PM

Microstructure, Tensile Deformation and Fracture Behaviors of Ti₂AlNb Alloys: Yong Mao¹; Masuo Hagiwara¹; Shiqiong Li²; ¹National Institute for Materials Science; ²Central Iron & Steel Research Institute

Nanomaterials: Nanofilms, Devices and Applications II

Program Organizers: Jeremy W. Burdon, Medtronic Inc; C. Suryanarayana, University of Central Florida; William M. Mullins, U.S. Army

Wednesday PM Room: 404
September 28, 2005 Location: Convention Center

Session Chair: William M. Mullins, U.S. Army

2:00 PM Invited

Increasing the Scale of Nano-Materials: A. Piers Newbery¹; Bing Q. Han; Enrique J. Lavernia; ¹University of California at Davis

2:40 PM

Correlation of Morphology and Microstructure Evolution Nanometer Grain-Sized Au/Cr Films Subject to Annealing: David Miller¹; Cari Herrmann¹; Hans Maier²; Steve George¹; Conrad Stoldt¹; Ken Gall¹; ¹University of Colorado; ²University of Paderborn

3:00 PM

Fabrication of Nanostructured Shape Memory Alloys by the Cold Rolling Technique: Prateek Maheshwari¹; Vivek Singh¹; ¹Punjab Engineering College

3:20 PM

Development of Ultra High Strength and Nano-Grained Metals by Accumulative Roll Bonding: Ravi Chauhan¹; Hemant Sharma¹; V. C. Srivastava²; ¹Punjab Engineering College; ²National Metallurgical Laboratory

3:40 PM Break

4:00 PM Invited

Mechanisms for Hydrogen Reaction of Nanocrystalline Magnesium Hydride with Oxide Catalysts: Thomas Klassen¹; Gagik Barkhordarian¹; Pierre-Alexandre Huhn¹; Martin Dornheim¹; Rüdiger Bormann¹; ¹GKSS Research Center

4:40 PM

The Magnetic Behavior of Nanocrystalline Nickel Ferrites: The Effect of Surface Roughness and Aspect Ratio on Anisotropy: Harish Nathani¹; Jagdish Rawat¹; Devesh K. Misra¹; ¹University of Louisiana

5:00 PM

Plastic Deformation in Nanostructured Bimodal Materials: Riqing Ye¹; Bing Q. Han¹; Enrique J. Lavernia¹; ¹University of California

5:20 PM

High Strength Aluminum Alloys Containing Nanoparticles for Rocket Engine Applications: Awadh B. Pandey¹; ¹Pratt & Whitney

Next Generation Biomaterials: Nanostructured Materials for Medical Applications

Program Organizers: Roger J. Narayan, Georgia Institute of Technology; Sarit B. Bhaduri, Clemson University; Gary S. Fischman, National Materials Advisory Board

Wednesday PM Room: 320
September 28, 2005 Location: Convention Center

Session Chairs: Mehmet Sarikaya, University of Washington; Kalpana Katti, North Dakota State University

2:00 PM Invited

Linking Proteins, Nanoparticles and Micro Electrodes: Multi Component Nanostructures as Functional Devices: *Dawn Bonnell*¹; ¹University of Pennsylvania

2:20 PM Invited

Purification and Optical Properties of Biofunctionalized Carbon Nanotubes: *Mark C. Hersam*¹; ¹Northwestern University

2:40 PM Invited

The Design and Synthesis of MRI Contrast Agents for Imaging Enzyme Activity: *Niren Murthy*¹; *Jihua Hao*¹; *Amy Rebecca Guinn*¹; ¹Georgia Institute of Technology

3:00 PM Invited

Thin-Film and Solution Self-Assembled Nanostructured Materials: *Andrew Shreve*¹; *Andrew Dattelbaum*¹; *James Werner*¹; *Gabriel Montano*¹; *Mac Brown*; *Hsing-Lin Wang*¹; *Atul Parikh*²; ¹Los Alamos National Laboratory; ²University of California, Davis

3:20 PM Invited

Design Strategies for the Next Generation of Nanophase Materials for Biomedical Applications: *Rena Bizios*¹; ¹Rensselaer Polytechnic Institute

3:40 PM Invited

DNA-Based Materials for Enzyme Recycling and Fluorescent Labeling: *Bruce Armitage*¹; *Gary D. Patterson*¹; *Rong Cao*¹; *Zhenyu Gu*¹; *Andrea Benven*¹; *Alan S. Waggoner*¹; *Byron Ballou*¹; ¹Carnegie Mellon University

4:00 PM Invited

Antimicrobial Activity of Composite Nanoparticles Consisting of Titania Photocatalytic Shell and Nickel Ferrite Magnetic Core: *Jagdish Rawat*¹; *Subhasis Rana*¹; *Devesh K. Misra*¹; ¹University of Louisiana at Lafayette

4:20 PM Invited

Micro/Nanoscale Polymer Processing for Biomedical Applications: *James Lee*¹; ¹Ohio State University

4:40 PM Invited

Advanced Materials for Drug Delivery and Biosensors Based on Magnetic Label Detection: *Galina Kurlyandskaya*¹; *Vladimir Levit*²; ¹Universidad del Pais Vasco UPV-EHU; ²Cabot Thin Films

Process Heating/Reheating: Process Heating II

Program Organizers: Arvind Thekdi, E3M Inc; Nathan Abboud, Timken Company

Wednesday PM Room: 329
September 28, 2005 Location: Convention Center

Session Chair: Arvind Thekdi, E3M, Inc.

2:00 PM Introductory Comments

2:10 PM

Developments in High Flux Direct Immersion Heating for Aluminum Processing: *C. Edward Eckert*¹; ¹Apogee Tech Inc

2:30 PM Question and Answer Period

2:40 PM

Acceleration of Precipitation Process in AA6061 after Severe Plastic Deformation (SPD): *Balakrishna Cherukuri*¹; *Raghavan Srinivasan*¹; *Prabir Kanti Chaudhury*²; ¹Wright State University; ²Orbital Sciences Corporation

3:00 PM Question and Answer Period

3:20 PM

Designing Multiphase Medium Carbon Steel for Spring Steel Based on Fracture Mechanics Approach: *Yunan Prawoto*¹; *A. Tange*²; *M. Ikeda*¹; *N. Sato*¹; *I. Otani*¹; *S. Manville*¹; ¹NHK International Company; ²NHK Spring Company

3:40 PM Question and Answer Period

3:50 PM

The Effect of Cold Rolling on the Spheroidization Kinetics of High Carbon Pearlitic Steels: *Young-Roc Im*¹; *Kyooyoung Lee*¹; *Gyosung Kim*¹; ¹POSCO

4:10 PM Question and Answer Period

Science and Technology of Powder Materials: Synthesis, Consolidation and Properties: Thermomechanical Processing

Program Organizers: Leon L. Shaw, University of Connecticut; Eugene Al Olevsky, San Diego State University; Fernand D. Marquis, South Dakota School of Mines & Technology; Iver E. Anderson, Iowa State University; James H. Adair, Pennsylvania State University; Jitendra P. Singh, Argonne National Laboratory

Wednesday PM Room: 301
September 28, 2005 Location: Convention Center

Session Chair: James H. Adair, Pennsylvania State University

2:00 PM

Thermomechanical Processing of P/M FeAl Alloy: *Tomasz Sleboda*¹; *Peter Hale*²; *Roger N. Wright*²; *Norman S. Stoloff*²; *David J. Duquette*²; ¹AGH University of Science and Technology; ²Rensselaer Polytechnic Institute

2:20 PM

Strategic Debinding of Organic-Ceramic Injection Molded Components: *Christopher DiAntonio*¹; *Pin Yang*¹; *George Burns*¹; ¹Sandia National Laboratories

2:40 PM

Processing and Characterization of Dense Thin Sheets of Gamma Titanium Aluminide: *Alicia G. Adams*¹; *Mohamed N. Rahaman*¹; *Rollie*

E. Dutton²; ¹University of Missouri, Rolla; ²Air Force Research Laboratory

3:00 PM Invited

Processing and Forming Advanced Materials Using Electrohydrodynamic Jets: *Mohan J. Edirisinghe*¹; ¹Queen Mary, University of London

3:20 PM

Processing and Characterization of Oxide Dispersion Strengthened Alloy 803: *Marvin G. McKimpson*¹; Matthew T. King¹; ¹Michigan Technological University

3:40 PM

The Direct Powder Rolling Process for Producing Titanium and Titanium Alloy Foils, Sheets and Plates: *Vlad Duz*¹; Vladimir Moxson¹; ¹ADMA Products, Inc.

4:00 PM

Processing of Amorphous Ni-W Reinforced Ni Matrix Composites: *C. Alex Wensley*¹; Alex O. Aning¹; Jeffrey Schultz¹; Stephen Kampe¹; ¹Virginia Tech

Springback in Sheet Metal Forming Applications: Session III

Program Organizers: Michael P. Miles, Brigham Young University; Mark R. Stoudt, National Institute of Standards & Technology

Wednesday PM Room: 334
September 28, 2005 Location: Convention Center

Session Chair: Cedric Xia, Ford Motor Company

2:00 PM Invited

Using Dynamic Modulus Analysis to Understand Springback: *Richard E. Ricker*¹; ¹National Institute of Standards & Technology

2:30 PM Invited

Through-Thickness Measurement of Springback Stresses: *Thomas Gnaeupel-Herold*¹; ¹National Institute of Standards & Technology

3:00 PM

New Experimental Device of Evaluating Springback in Sheet Metal Forming: *Ping Sun*¹; José Joaquim de Almeida Grácio¹; Jorge Augusto Fernandes Ferreira¹; ¹University of Aveiro

3:20 PM Break

3:40 PM

Springback in Deep Drawn High Purity Niobium for Superconductor Cavities: *Fredrick B. Hoff*¹; Tomas Gnaeupel-Herold²; Ganapati R. Myneni³; Peter Kneise³; Mark R. Stoudt²; Bjorgvin Hjorvarsson⁴; Richard E. Ricker²; ¹Old Dominion University; ²National Institute of Standards & Technology; ³Thomas Jefferson National Accelerator Facility; ⁴Uppsala University

4:00 PM

Case Studies Where Springback Issues Were Resolved for Aluminum Circles: *Nick H. Singleton*¹; Udham Singh¹; Nicasio L. Velante¹; ¹GARMCO

4:20 PM

Springback in Commercial Mg AZ31-H24 Measured by 3 Point Bend Strain Recovery: Abraham Munitz¹; David J. Pitchure²; *Richard E. Ricker*²; ¹Israel Atomic Energy Commission; ²National Institute of Standards & Technology

4:40 PM

Sheet Forming Simulation and Springback Prediction for AHSS Automotive Components: *Michael Pereira*¹; Alireza Asgari¹; Bernard Rolfe¹; Matthew Dingle¹; Peter Hodgson¹; ¹Deakin University

What Makes a Good Materials Engineer and How Best to Educate Them: Professional Registration

Program Organizers: Paul E. Cantonwine, Bechtel Bettis Inc; Kent D. Peaslee, University of Missouri-Rolla; Mark A. Palmer, Kettering University; Michael B. Connelly, Casey Products Inc

Wednesday PM Room: 315
September 28, 2005 Location: Convention Center

Session Chair: Mark Palmer, Kettering University

2:00 PM Invited

What it Means to be a Professional Engineer: Mark A. Palmer¹; *David A. Shifler*²; ¹Kettering University; ²Naval Surface Warfare Center

2:20 PM

What Makes a Good Engineer and How to Best Educate Them: Passing the PE Exam for Metallurgical Engineers: *John R. Reagan*¹; ¹NASA Glenn Research Center

2:40 PM Panel Discussion