

Energy Materials 2017

TECHNICAL PROGRAM

ORGANIZING SOCIETIES:

TMS



TMS-Chinese Society for Metals-Federation of European Materials Societies Global Energy 2025 — Plenary Session

Sunday PM
February 26, 2017

Room: Pacific Ballroom 21-26
Location: Marriott Marquis Hotel

Session Chair: Jeremy Busby, Oak Ridge National Laboratory

6:00 PM Introductory Comments

6:05 PM Plenary

Grand Science Challenges to Energize a New Era of Innovation: *Harriet Kung*¹; ¹DOE Office of Basic Energy Sciences

6:35 PM Plenary

Advancement of Energy Industries and Related Critical Materials in China: *Zhiling Tian*¹; ¹Central Iron and Steel Research Institute (CISRI)

7:05 PM Plenary

Establishing Industrial Leadership of Europe in Advanced Materials for Low Carbon Energy: *Fabrice Stassin*¹; ¹EMIRI Association

7:35 PM Panel Discussion

8:00 PM Concluding Comments

Energy Materials 2017: Materials for Energy Conversion with Emphasis on SOFC — Session I

Sponsored by: Chinese Society for Metals

Program Organizers: Amit Pandey, Rolls Royce LG Fuel Cell Systems Inc.; Kyle Brinkman, Clemson University; Teruhisa Horita, AIST; Minfang Han, China University of Mining and Technology, Beijing

Monday AM
February 27, 2017

Room: 12
Location: San Diego Convention Ctr

Session Chairs: Amit Pandey, LGFCS; Kyle Brinkman, Clemson University

8:30 AM Introductory Comments

8:40 AM Invited

Low Temperature RAA Process for SOFC Stacks: *Jung Pyung Choi*¹; Jeffrey Stevenson¹; ¹Pacific Northwest National Laboratory

9:05 AM

Oxygen Reduction Reaction Mechanisms on Ruddlesden-Popper Cathodes for Intermediate-Temperature Solid Oxide Fuel Cells: Wenyuan Li¹; Bo Guan¹; Xinxin Zhang¹; *Xingbo Liu*¹; ¹West Virginia University

9:25 AM Invited

Oxygen Reduction Reaction at the Cathode of Solid Oxide Fuel Cell Enhanced with Oxide Particles: *Changrong Xia*¹; ¹University of Science and Technology of China

9:50 AM Break

10:10 AM

Analysis of the Effects of Chromium Poisoning on LSM-based Cathode Using Polarization Modeling and Impedance Measurements: Ruofan Wang¹; Manuel Würth²; Boshan Mo¹; *Uday Pal*¹; Srikanth Gopalan¹; Soumendra Basu¹; ¹Boston University; ²Technische Universität München

10:30 AM

Enhanced Performance of Doped Ceria Electrolyte by the Addition of Barium Carbonate in Solid Oxide Fuel Cells: *Tao Hong*¹; Devin Harkins¹; Kyle Brinkman¹; ¹Clemson University (CU)

10:50 AM

Mitigation of Chromium Poisoning in Solid Oxide Fuel Cells: *Jeffrey Fergus*¹; ¹Auburn University

Energy Materials 2017: Materials for Gas Turbines — Coatings

Sponsored by: Chinese Society for Metals

Program Organizers: Jeffrey Fergus, Auburn University; Ji Zhang, China Iron and Steel Research Institute Group

Monday AM
February 27, 2017

Room: 13
Location: San Diego Convention Ctr

Session Chairs: Sanjay Sampath, Stony Brook University; Jeffrey Fergus, Auburn University

8:30 AM Keynote

Multilayered, Multifunctional Thermal Barrier Coatings for Gas Turbine Engines: *Sanjay Sampath*¹; Vaishak Vishwanathan¹; Gopal Dwivedi¹; ¹Stony Brook University

9:10 AM Invited

Thermal Barrier Coatings for More Efficient Gas-Turbine Engines: *Nitin Padture*¹; ¹Brown University

9:40 AM

Evolution of the Thermal Conductivity of Sm₂Zr₂O₇ under CMAS Attack: Ahmet Bakal¹; Kai Roebbecke¹; Honglong Wang¹; Wenzhuo Deng¹; Xingxing Zhang¹; *Jeffrey Fergus*¹; ¹Auburn University

10:00 AM Break

10:20 AM Invited

The Effect of Superalloy and Coating Composition and Specimen Geometry on TBC Lifetime: *Bruce Pint*¹; ¹Oak Ridge National Laboratory

10:50 AM

Thermal Gradient Mechanical Fatigue Testing and Life Modeling of Thermal Barrier Coating Systems: *Zhongjiao Zhou*¹; Changpeng Li²; Guofeng Chen²; Xu Hua²; ¹Tsinghua University; ²Corporate Technology, Siemens

11:10 AM

Porous Yttria-stabilized Zirconia Microspheres for Advanced Reflective Thermal Barrier Coatings: *Ricardo Castro*¹; Pieter Stroeve¹; Roland Faller¹; Maria Perez-Page¹; Dereck Muche¹; ¹University of California, Davis

11:30 AM Invited

Electrodeposited MCrAlY Coatings for Gas Turbine Engine Applications: *Ying Zhang*¹; ¹Tennessee Technological University

Energy Materials 2017: Materials for Oil and Gas and AMREE Oil & Gas III — Harnessing Bulk Nanostructured Materials for Energy I

Sponsored by: Chinese Society for Metals

Program Organizers: Indranil Roy, Schlumberger; Chengjia Shang, University of Science and Technology Beijing

Monday AM
February 27, 2017

Room: 14A
Location: San Diego Convention Ctr

Session Chairs: Indranil Roy, Schlumberger; Partha Ganguly, Baker Hughes

8:30 AM Keynote

Stabilizing Nanostructures in Metals via Interface Architectures: *Ke Lu*¹; ¹Institute of Metal Research, Chinese Academy of Sciences

9:00 AM Invited

Scientific and Technological Foundations for Pilot Scale Production of Nanostructured Metals: *Terry Lowe*¹; ¹Colorado School of Mines

9:30 AM Invited

Bulk Nanomaterials with Superior Strength and Thermostability: *Ruslan Valiev*¹; Ilchat Sabirov²; Maxim Murashkin³; Nariman Enikeev³; ¹Laboratory for Mechanics of Bulk Nanomaterials, Saint Petersburg State University; ²IMDEA Materials Institute; ³Ufa State Aviation Technical University

10:00 AM Break

10:20 AM Keynote

The Four R's to Promote Ductility of Metallic Glasses: *Evan Ma*¹; ¹Johns Hopkins University

10:50 AM Invited

Iron-based Amorphous Metals for Impact and Corrosion Resistance Applications: The Effect of Pressure and Current on Devitrification Kinetics: *Olivia Graeve*¹; James Kelly²; Gauri Khanolkar³; Michael Rauls⁴; Andrea Hodge³; Veronica Eliasson³; ¹University of California San Diego; ²Alfred University; ³University of Southern California; ⁴California Institute of Technology

11:20 AM

The World of Water Reactive or Degradable Alloys: Oilfield, Defense, Bio-Medical and Beyond: *Indranil Roy*¹; ¹Schlumberger

11:50 AM

Sensitivity Variation of Nanomaterials at Different Operating Temperature Conditions: *Enobong Basse*¹; Philip Sallis²; Krishnamachar Prasad²; ¹Coventry University; ²Auckland University of Technology

Energy Materials 2017: Materials in Clean Power — Session I

Sponsored by: Chinese Society for Metals, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Sebastien Dryepondt, Oak Ridge National Laboratory; Zhengdong Liu, China Iron & Steel Research Institute Group; Jeffrey Fergus, Auburn University; Jeffrey Hawk, U.S. Department of Energy, National Energy Technology Laboratory; Ji Zhang, China Iron and Steel Research Institute Group

Monday AM
February 27, 2017

Room: 15A
Location: San Diego Convention Ctr

Session Chair: To Be Announced

8:30 AM Invited

Creep-Fatigue-Oxidation Interactions under Fossil Energy Service Conditions: *Sebastien Dryepondt*¹; Amit Shyam¹; Sumit Bahl²; Charles Hawkins¹; Dana McClurg¹; ¹Oak Ridge National Laboratory; ²Indian Institute of Science

9:00 AM

Microstructural Stability of High Cr Containing FeCrAl Alloys with Minor Alloying Additions: *Yukinori Yamamoto*¹; Bruce Pint¹; Benjamin Shassere²; Sudarsanam Babu²; ¹Oak Ridge National Laboratory; ²University of Tennessee

9:20 AM Invited

Effect of Pressure and Thermal Cycling on Compatibility in CO₂ for Concentrated Solar Power Applications: *Bruce Pint*¹; Robert Brese¹; James Keiser¹; ¹Oak Ridge National Laboratory

9:50 AM

The Composite Materials with Semiconductor and Ionic Conductor for Novel Low Temperature Solid Oxide Fuel Cells: *Xunying Wang*¹; Bin Zhu¹; ¹Hubei University

10:10 AM Break

10:30 AM Invited

The Impacts of Alternative Fuels and Associated High Water Vapor Content Environments on the Stability and Aging of Turbine Hot-Section Materials: *Daniel Mumm*¹; ¹University of California-Irvine

11:00 AM

Early Stage Oxidation of Alloy 617 in CO₂ Power Cycle Environments: *Richard Oleksak*¹; John Baltrus¹; Casey Carney¹; Jinichiro Nakano¹; Anna Nakano¹; Gordon Holcomb¹; Omer Dogan¹; ¹National Energy Technology Laboratory

11:20 AM

Nickel-doped Titania Nanotube Arrays and Their Application in Hydrogen Production: *Joaquin Tirano Vanegas*¹; Hugo Zea¹; Claudia Luhrs²; ¹Universidad Nacional de Colombia; ²Naval Postgraduate School

11:40 AM

Phase Relation Prediction for Ag_xCu_{1-x}Ga_yIn_{1-y}Se₂ PV Absorber Layers: Zhi Li¹; Christopher Muzzillo¹; Shun-li Shang²; Jianyun Shen³; Po-Hsin Liao¹; Zi-kui Liu²; *Timothy Anderson*¹; ¹University of Florida; ²Pennsylvania State University; ³General Research Institute For Nonferrous Metals

Energy Materials 2017: Materials for Energy Conversion with Emphasis on SOFC — Session II

Sponsored by: Chinese Society for Metals

Program Organizers: Amit Pandey, Rolls Royce LG Fuel Cell Systems Inc.; Kyle Brinkman, Clemson University; Teruhisa Horita, AIST; Minfang Han, China University of Mining and Technology, Beijing

Monday PM
February 27, 2017

Room: 12
Location: San Diego Convention Ctr

Session Chairs: Jung Choi, PNNL; Srikanth Gopalan, Boston University

2:00 PM Invited

Plasma Sprayed Protective Coatings on Metallic SOFC Interconnects: Interplay between Processing and Performance: *Sanjay Sampath*¹; Su Jung Han¹; Hwasoo Lee¹; ¹Stony Brook University

2:30 PM

Chromium Impurity Effects on SOFC Cathodes Using Half-cell Measurements: *Yiwen Gong*¹; Yuexing Zhu¹; Soumendra Basu¹; Uday Pal¹; Srikanth Gopalan¹; ¹Boston University

2:50 PM Invited

Development of Solid Oxide Fuel Cell Residential CHP System: *Yuya Takuwa*¹; Shuichi Inoue¹; Minoru Suzuki¹; ¹Osaka Gas Co.,Ltd

3:15 PM

Effect of Strontium Content and Strain on Surface Segregation in LSCF: Yang Yu¹; Karl Ludwig¹; Srikanth Gopalan¹; Uday Pal¹; *Soumendra Basu*¹; ¹Boston University

3:35 PM Break

3:55 PM

Fabrication and Operation of a 600W Anode-supported Tubular SOFC Stack: *Zhengguang Yu*¹; Shaorong Wang²; ¹Dongfang Turbine Co.,Ltd ; ²Shanghai Institute of Ceramics, Chinese Academy of Sciences

4:15 PM Invited

Phase Stability and Electrical Properties of La₂NiO₄: Rare-Earth Doped Ceria Composite Cathode Materials for Solid Oxide Fuel Cells: Deniz Cetin¹; Sophie Poizeau²; *Srikanth Gopalan*¹; ¹Boston University; ²Saint Gobain Northborough R&D Center

Energy Materials 2017: Materials for Gas Turbines — Hot Corrosion and New Materials

Sponsored by: Chinese Society for Metals

Program Organizers: Jeffrey Fergus, Auburn University; Ji Zhang, China Iron and Steel Research Institute Group

Monday PM
February 27, 2017

Room: 13
Location: San Diego Convention Ctr

Session Chairs: Brian Gleeson, University of Pittsburgh; Bruce Pint, Oak Ridge National Laboratory

2:00 PM

Development of a New High Strength and Hot Corrosion Resistant Directionally Solidified Superalloy DZ409: *Juntao Li*¹; Jiantao Wu¹;

Ping Yan¹; Jianxin Dong²; Lei Wang³; Qiang Zeng¹; ¹China Iron & Steel Research Institute Group; ²University of Science and Technology Beijing; ³Northeastern University

2:40 PM Invited

Deposit-Induced Hot Corrosion and Materials Design Strategies to Reduce Its Impact: *Brian Gleeson*¹; ¹University of Pittsburgh

3:10 PM Keynote

Development of High Strength Hot Corrosion Resistant Single Crystal Superalloys Based on Understanding the Effect of Key Elements on Hot Corrosion Behavior: Jianxiu Chang¹; Dong Wang¹; Langhong Lou¹; *Jian Zhang*¹; ¹Institute of Metal Research, Chinese Academy of Sciences

3:30 PM Break

3:50 PM Invited

Advanced Characterization of the Hot Corrosion Behavior of Gas Turbine Alloys under Burner Rig Test Exposures: *Maryam Zahiri Azar*¹; Kliah Soto Leytan¹; Daniel Mumm¹; ¹The University of California, Irvine

4:20 PM Invited

Efforts to Introduce TiAl Alloys for Gas Turbine Applications: *Ji Zhang*¹; Helena Oskarsson²; ¹China Iron and Steel Research Institute Group; ²Siemens Industrial Turbomachinery AB

4:50 PM

Effect of Alloying Elements (Cr and Al) in Nickel-based Alloys in Molten Sulfate Environments: *Kuldeep Kumar*¹; Hojong Kim¹; ¹The Pennsylvania State University

5:10 PM Invited

The Materials, Manufacturing and Equipments of the Large Disk Forgings for Industrial Gas Turbines: *Shichong Yuan*¹; ¹China National Erzhong Group Co.

Energy Materials 2017: Materials for Oil and Gas and AMREE Oil & Gas III — Harnessing Bulk Nanostructured Materials for Energy II

Sponsored by: Chinese Society for Metals

Program Organizers: Indranil Roy, Schlumberger; Chengjia Shang, University of Science and Technology Beijing

Monday PM
February 27, 2017

Room: 14A
Location: San Diego Convention Ctr

Session Chairs: Kripa Varanasi, MIT; Ting Chen, Massachusetts Institute of Technology

2:00 PM Keynote

Potential of Crystal Defects for Enhancing Bulk Functional Nanomaterials: *Michael Zehetbauer*¹; ¹University of Vienna

2:30 PM Invited

Gradient Materials: Microstructure, Texture and Properties: Jordan Moering¹; Xiaolei Wu²; *Yuntian Zhu*¹; ¹North Carolina State University; ²Institute of Mechanics, Chinese Academy of Sciences

3:00 PM Invited

High Temperature Shape Memory Alloys for Potential Applications in Oil and Gas Industry: *Ibrahim Karaman*¹; ¹Texas A&M University

3:30 PM Break

3:50 PM Keynote

The Microstructural Origin of the Multifunctional Properties of Energy Metals: *Niels Hansen*¹; ¹Technical University of Denmark

4:20 PM

Effect of Severe Plastic Deformation (SPD) Surface Treatment on Corrosion Resistance and Environmental Cracking (EC) Susceptibility of Various Alloys: Ting Chen¹; Manasa Varanasi¹; *Kripa Varanasi*²; ¹Massachusetts Institute of Technology

4:50 PM

Processing Aluminum 6061 by Equal Channel Angular Extrusion for Oil and Gas Applications: *Ramatou Ly*¹; Karl T. Hartwig¹; Homero Castaneda-Lopez¹; ¹University Texas A&M

Energy Materials 2017: Materials in Clean Power — Session II

Sponsored by: Chinese Society for Metals, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Sebastien Dryepondt, Oak Ridge National Laboratory; Zhengdong Liu, China Iron & Steel Research Institute Group; Jeffrey Fergus, Auburn University; Jeffrey Hawk, U.S. Department of Energy, National Energy Technology Laboratory; Ji Zhang, China Iron and Steel Research Institute Group

Monday PM
February 27, 2017

Room: 15A
Location: San Diego Convention Ctr

Session Chair: To Be Announced

2:00 PM Invited

High Temperature Oxidation of Ni-base Alloys and Stainless Steels in Supercritical CO₂ for Power Systems Applications: *Gordon Holcomb*¹; Ömer Dogan¹; Joseph Tylczak¹; Casey Carney²; Kyle Rozman¹; Jeffrey Hawk¹; ¹National Energy Technology Laboratory; ²National Energy Technology Laboratory, AECOM

2:30 PM

Corrosion of Energy System Materials in Supercritical Carbon Dioxide (sCO₂): *Benjamin Adam*¹; Lucas Teeter¹; Sebastien Teyssyre²; Julie Tucker¹; ¹Oregon State University; ²Idaho National Laboratory

2:50 PM

Manipulating Creep through Modifying Gamma Prime Coarsening Rate in Haynes 282 for A-USC Power Plants: *Jeffrey Hawk*¹; John Sears²; Paul Jablonski¹; ¹U.S. Department of Energy, National Energy Technology Laboratory; ²AECOM

3:10 PM

Defect Chemistry of Black Anatase TiO₂: An Ab Initio Study: *Heechea Choi*¹; Taeseup Song²; Seungchul Kim³; ¹Virtual Lab Inc. ; ²Yeungnam University; ³KIST

3:30 PM Break

3:50 PM Invited

Solid-State, High-Shear Manufacturing to Enable Lower Cost and Higher Performance Materials for Energy Conversion: *Glenn Grant*¹; David Catalini¹; Jens Darsell¹; Anthony Reynolds¹; Suveen Mathaudhu¹; ¹Pacific Northwest National Laboratory

4:20 PM

Transient Liquid Phase Bonding of Ni-based-superalloy-H230 for Microchannel Heat Exchanger for Application in Supercritical CO₂ Cycles: *Monica Kapoor*¹; Omer Dogan¹; Brian Paul²; Rajesh Saranam²; Patrick McNuff²; ¹National Energy Technology Lab; ²Oregon State University

4:40 PM Invited

Pb-Bi-Sb and Pb-Bi-Ge: Novel Alternative Alloys for Application as Heat-transport Fluids in Concentrated Solar Power Systems: *Miroslav Popovic*¹; Alan Bolind¹; Mark Asta¹; Peter Hosemann¹; Ruijie Shao¹; ¹UC Berkeley

Energy Materials 2017: Energy and Environmental Issues in Materials Manufacturing and Processing — Opportunities in the Steel Industry

Sponsored by: Chinese Society for Metals, TMS: Recycling and Environmental Technologies Committee
Program Organizers: Subodh Das, Phinix, LLC; Zhancheng Guo, University of Science and Technology Beijing; Minfang Han, China University of Mining and Technology, Beijing; Teruhisa Horita, AIST; Elsa Olivetti, Massachusetts Institute of Technology; Xingbo Liu, West Virginia University

Tuesday AM
February 28, 2017

Room: 14B
Location: San Diego Convention Ctr

Session Chair: Subodh Das, Phinix, LLC

8:30 AM Keynote

Green Development is the Future Direction for Chinese Steel Industry: *Chunxia Zhang*¹; Fangqin Shanguan¹; Haifeng Wang¹; Shourong Zhang²; Ruiyu Yin¹; ¹Central Iron & Steel Research Institute; ²Wuhan Iron and Steel (Group) Co. Ltd (WISCO)

9:00 AM Invited

The Combined Cycle Power Plant (CCPP) Used In Energy Conversion of Steel Smelting Production: *Chunqing Tan*¹; Xuezhi Dong¹; Yixiang Yuan¹; ¹Chinese Academy of Sciences

9:30 AM

Green Manufacturing Process of Shougang Jingtang Steel Plant: *Fuming Zhang*¹; Jianxin Xie¹; ¹Shougang Group

9:50 AM Invited

The Introduction and Process Optimization Research of Oxygen Blast Furnace Ironmaking Technology: *Qingguo Xue*¹; Zeshang Dong¹; Jingsong Wang¹; Zeyi Jiang¹; Haibin Zuo¹; Xuefeng She¹; Guang Wang¹; ¹University of Science and Technology Beijing

10:10 AM Break

10:30 AM

Prediction and Optimal Scheduling of Byproduct Gases in Steel Mill: Trends and Challenges: *Xiancong Zhao*¹; *Hao Bai*¹; Qi Shi¹; Zhancheng Guo¹; ¹State Key Laboratory of Advanced Metallurgy, University of Science and Technology Beijing

10:50 AM

Processing Non-Oriented Electrical Steels Using Inclined/Skew Rolling Schemes: *Youliang He*¹; Mehdi Sanjari¹; Erik J. Hilinski²; ¹Natural Resources Canada; ²Tempel Steel Co.

11:10 AM Invited

A Possible Way for Efficient Utilization of Coal Energy: The Combined Process of Ironmaking with Gasoline Synthesis and Electricity Generation: *Zhancheng Guo*¹; ¹University of Science and Technology Beijing

11:30 AM

Waste Energy Recovery Technology of Iron and Steel Industry in China: *Xu Zhang*¹; *Hao Bai*¹; Juxian Hao¹; Zhancheng Guo¹; ¹State Key Laboratory of Advanced Metallurgy, University of Science and Technology Beijing

Energy Materials 2017: Materials for Energy Conversion with Emphasis on SOFC — Session III

Sponsored by: Chinese Society for Metals
Program Organizers: Amit Pandey, Rolls Royce LG Fuel Cell Systems Inc.; Kyle Brinkman, Clemson University; Teruhisa Horita, AIST; Minfang Han, China University of Mining and Technology, Beijing

Tuesday AM
February 28, 2017

Room: 12
Location: San Diego Convention Ctr

Session Chairs: Soumendra Basu, Boston University; Teruhisa Horita, AIST

8:30 AM Invited

New Materials for Solid Oxide Fuel Cells: *Shriram Ramanathan*¹; ¹Purdue University

8:55 AM Invited

Investigation on Cathode Interlayer and Electrolyte for Improving Electric Power Efficiency of SOFCs: *Takaaki Somekawa*¹; Yoshio Matsuzaki¹; Yuya Tachikawa²; Hiroshige Matsumoto²; Shunsuke Taniguchi²; Kazunari Sasaki²; ¹Tokyo Gas Co., Ltd.; ²Kyushu University

9:20 AM Invited

Poisoning Mechanism and Performance Degradation at SOFC Cathode/Electrolyte Interfaces: *Teruhisa Horita*¹; Masahiro Ishiyama¹; Katherine Develos-Bagarinao¹; Haruo Kishimoto¹; Katsuhiko Yamaji¹; ¹AIST

9:40 AM

Phase Field Modelling of Microstructure and Conductivity Evolution of SOFC Electrodes: *Yinkai Lei*¹; Tianle Cheng¹; Youhai Wen¹; ¹National Energy Technology Laboratory

10:00 AM Break

10:20 AM

Reactive Synthesis of Spinel Contact Layers with Metallic Precursor Powders: *Jiahong Zhu*¹; Yutian Yu¹; ¹Tennessee Technological University

10:40 AM Invited

Electrophoretically Deposited Copper Manganese Spinel Coatings for Interconnections in Solid Oxide Fuel Cells: *Zhihao Sun*¹; Srikanth Gopalan¹; Uday Pal¹; *Soumendra Basu*¹; ¹Boston University

11:05 AM

Synthesis and Characterisation of Perovskite Type Anode Material and Its Tape Casting for IT-SOFC Application: *Subhajit Pan*¹; Ramesh Biswal¹; Koushik Biswas¹; ¹IIT Kharagpur

11:25 AM Invited

Modified SOFC Cermet Anodes for Improved Catalysis at High Fuel Utilization: *Paul Gasper*¹; *Yanchen Lu*¹; *Uday Pal*¹; *Soumendra Basu*¹; *Srikanth Gopalan*¹; ¹Boston University

Energy Materials 2017: Materials for Gas Turbines — Creep and Failure

Sponsored by: Chinese Society for Metals
Program Organizers: Jeffrey Fergus, Auburn University; Ji Zhang, China Iron and Steel Research Institute Group

Tuesday AM
February 28, 2017

Room: 13
Location: San Diego Convention Ctr

Session Chair: Ying Zhang, Tennessee Technological University

8:30 AM Invited

Alloy Development for Promoting γ/γ' Microstructural Stability and Creep Properties of Multi-component Co-base Superalloys: *Wendao Li*¹; *Haijing Zhou*¹; *Song Lu*¹; *Fei Xue*²; *Qiang Feng*¹; ¹University of Science and Technology Beijing; ²Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)

9:00 AM

Rafting Prediction Criterion and Creep Life for Nickel-based Single Crystal Superalloys under Multiaxial Stress States: *Zhixun Wen*¹; Huan Yang¹; Zhufeng Yue¹; Chengjiang Zhang¹; ¹Northwestern Polytechnical University

9:20 AM

Effect of C Addition on Creep and Microstructure Stability of Lamellar TiAl Alloys: *Xiwen Zhang*¹; Ji Zhang¹; Jing Zhu²; ¹China Iron and Steel Research Institute Group; ²Tsinghua University

9:40 AM

Revisiting the Sources of Creep Dislocations in Ni-base, Single Crystal Superalloys: *Farangis Ram*¹; Zhuangming Li²; Zailing Zhu³; Masood Hafez Haghghat²; Stefan Zaeferrer²; Dierk Raabe²; Roger Reed³; ¹Carnegie Mellon University; ²Max-Planck Institut für Eisenforschung GmbH; ³University of Oxford

10:00 AM Break

10:20 AM

Development Activities for the Manufacture of Rotor Forgings for Turbines in High Efficiency Power Plants: *Nikolaus Blaes*¹; B. Donth²; Andreas Diwo²; D. Bokelmann¹; M. Baues²; ¹Saarschmiede GmbH Freiformschmiede ; ²Saarschmiede GmbH Freiformschmiede

10:40 AM

Mechanisms of Fracture in Laser Powder Bed Additive Manufactured Superalloys: *Håkan Brodin*¹; Per Sandahl²; ¹Siemens Industrial Turbomachinery AB; ²Exova AB

11:00 AM

Wang: High Temperature Oxidation of the New Type γ' -strengthened Cobalt-base Superalloys: *Lei Wang*¹; Yang Liu¹; Bo Gao¹; Xiu Song¹; Shuyi Yang²; ¹Northeastern University; ²Shenyang University

Energy Materials 2017: Materials for Oil and Gas and AMREE Oil & Gas III — Technological Innovation for Efficiency Enhancements in Energy

Sponsored by: Chinese Society for Metals

Program Organizers: Indranil Roy, Schlumberger; Chengjia Shang, University of Science and Technology Beijing

Tuesday AM
February 28, 2017

Room: 14A
Location: San Diego Convention Ctr

Session Chair: Indranil Roy, Schlumberger

8:30 AM Keynote

Technological Innovation and Creative Destruction in the Energy Sector: *Ram Shenoy*¹; ¹RBR Group and Department of Energy

9:00 AM Keynote

Interfacial Engineering for Efficiency Enhancements in Energy-Water-Food: *Kripa Varanasi*¹; ¹Massachusetts Institute of Technology

9:30 AM Keynote

Shell's Game Changer - Delivering Disruptive Technologies through Partnership in Innovation: *Hani Elshahawi*¹; ¹Shell

10:00 AM Break

10:20 AM Keynote

Accelerated Materials Innovation – Technology Enablers for enhanced reliability, efficiency and production in Oil & Gas: *Partha Ganguly*¹; ¹Baker Hughes

10:50 AM Keynote

Immigration Trends in the Energy Sector and Options for Professionals: *Rehan Alimohammad*¹; ¹Alimohammad & Zafar, PLLC

11:20 AM Panel Discussion Topic: Innovations and Materials as Technology Enablers for Improving Cost & Performance Efficiencies in

Energy

Panelists: Ram Shenoy, Kripa Varanasi, Hani Elshahawi, Partha Ganguly

Moderator: Indranil Roy

Energy Materials 2017: Energy and Environmental Issues in Materials Manufacturing and Processing — Opportunities in Aluminum Production, Waste Heat and Water Recovery

Sponsored by: Chinese Society for Metals, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Subodh Das, Phinix, LLC; Zhancheng Guo, University of Science and Technology Beijing; Minfang Han, China University of Mining and Technology, Beijing; Teruhisa Horita, AIST; Elsa Olivetti, Massachusetts Institute of Technology; Xingbo Liu, West Virginia University

Tuesday PM
February 28, 2017

Room: 14B
Location: San Diego Convention Ctr

Session Chair: Elsa Olivetti, MIT

2:00 PM

Numerical Approach for the Implementation of the Interaction of Pyrolysis Gases and Combustion Products in an Aluminium Melting Furnace: *Rukiye Gültekin*¹; Antje Rückert¹; Herbert Pfeifer¹; ¹IOB RWTH University

2:20 PM

Approach for Pyrolysis Gas Release Modelling and its Potential for Enhanced Energy Efficiency of Aluminium Remelting Furnaces: *Henning Bruns*¹; Antje Rückert¹; Herbert Pfeifer¹; ¹RWTH Aachen University

2:40 PM

Nitrate and Other Anion Removal from Waste Water Using the Hydroflex Technology: *David Dreisinger*¹; Gary Kordosky²; Mike Schrock²; Todd Beers²; Jianming Lu¹; Buming Chen¹; ¹University of British Columbia; ²Winner Water Services

3:00 PM Invited

Sustainability and Applicability of Light Metals Producing Processes: *Subodh Das*¹; Adam Gesing²; ¹Phinix, LLC; ²Gesing Consultants Inc.

3:30 PM Break

3:50 PM

The Influence of Water Vapour on the Fuming Rate in a Ferromanganese System: *Sarel Gates*¹; Gabriella Tranel²; Gerrit Kornelius¹; Ida Kero³; ¹University of Pretoria; ²Norwegian University of Science and Technology (NTNU); ³SINTEF Materials and Chemistry

4:10 PM

Fluoropolymer Coated Condensing Heat Exchangers for Low-grade Waste Heat Recovery: *Youliang He*¹; Afsaneh Edrisy²; Robert Triebe³; ¹Natural Resources Canada; ²University of Windsor; ³Thermal Energy International Inc.

4:30 PM

Study on Treatment of Chromium Slag by Metallurgical Sintering Process: *Qingcai Liu*¹; Fei Meng¹; Lijun Jiang¹; Ming Kong¹; Shan Ren¹; Guang Hu¹; Qi Zhao¹; ¹Chongqing University

Energy Materials 2017: Materials for Coal-Based Power — Session I

Sponsored by: Chinese Society for Metals

Program Organizers: Jeffrey Hawk, U.S. Department of Energy, National Energy Technology Laboratory; Zhengdong Liu, China Iron & Steel Research Institute Group; Sebastien Dryepondt, Oak Ridge National Laboratory

Tuesday PM Room: 12
February 28, 2017 Location: San Diego Convention Ctr

Session Chair: Jeffrey Hawk, U.S. Department of Energy, National Energy Technology Laboratory

2:00 PM Keynote

Advances in Materials Technology to Enable Advanced Supercritical (A-USC) and Supercritical CO₂ (sCO₂) Power Cycles: *John Shingledecker*¹; ¹Electric Power Research Institute

2:40 PM Invited

Corrosion Issues in Advanced Supercritical and Ultra Supercritical Coal Fired Boilers: *Bruce Pint*¹; ¹Oak Ridge National Laboratory

3:10 PM Invited

Materials for Advanced Ultra Supercritical Steam Turbines: *Philip Maziasz*¹; ¹Oak Ridge National Laboratory

3:40 PM Break

4:00 PM Invited

Heat Resistant Alloy Design: Process Considerations for Microstructural Stability and Long-term Creep Strength in Scaled-Up, Thick Wall Nickel Castings: Paul Jablonski¹; *Jeffrey Hawk*¹; ¹U.S. Department of Energy, National Energy Technology Laboratory

4:30 PM Invited

Ni-Fe Based Alloy GH984G Used for 700°C Coal-fired Power Plants: Changshuai Wang¹; Tingting Wang¹; Jianting Guo¹; *Lanzhang Zhou*¹; Haiping Zhao²; Songqian Xu²; ¹Institute of Metal Research, Chinese Academy of Sciences; ²Research Institute, Baoshan Iron&Steel Co., Ltd.

Energy Materials 2017: Materials for Gas Turbines — Microstructure and Processing

Sponsored by: Chinese Society for Metals

Program Organizers: Jeffrey Fergus, Auburn University; Ji Zhang, China Iron and Steel Research Institute Group

Tuesday PM Room: 13
February 28, 2017 Location: San Diego Convention Ctr

Session Chair: Jeffrey Fergus, Auburn University

2:00 PM Invited

Modeling the Diffusion of Minor Elements in Different MCrAlY – Superalloy Substrates at High Temperature: Krishna Jonnalagadda¹; Kang Yuan²; Xin-Hai Li³; *Ru Peng*¹; Yueguang Yu²; ¹Linkoping University; ²Beijing General Research Institute of Mining and Metallurgy; ³Siemens Industrial Turbomachinery

2:30 PM

On Healing Mechanism of Cast Porosities in Cast Ni-Based Superalloy by Hot Isostatic Pressing: *Yuan Chao*¹; Li Jie¹; Kai-Xin Dong¹; Guo Jianting¹; ¹Institute of Metal Research, Chinese Academy of Sciences

2:50 PM

Simulation of Precipitation Behavior of Nickel-based Superalloys: *Fan Zhang*¹; Weisheng Cao¹; Shuanglin Chen¹; Chuan Zhang¹; Jun Zhu¹; ¹CompuTherm, LLC

3:10 PM

Microstructures and Mechanical Properties of Ultrafine Grained Ni Based Superalloy Matrix Nanocomposites Fabricated by Powder

Metallurgy Route: Tian Xia¹; *Deliang Zhang*²; Jiantao Liu³; Yiwen Zhang³; ¹Shanghai Jiao Tong University, China; ²Northeastern University, China; ³Central Iron and Steel Research Institute

3:30 PM Break

3:50 PM

Rejuvenation of a Co Based Superalloy to Prevent the Quickest Microstructural Degradation during the Following Operating Cycle: *Erica Vacchieri*¹; Giacomo Roncallo²; Gabriele Cacciamani²; Alessio Costa²; ¹Ansaldo Sviluppo Energia S.p.A.; ²Chemistry Department, University of Genoa

4:10 PM

Rejuvenation Process Definition for IN792SX Gas Turbine Blades Aimed to Extend Their Expected Life: *Erica Vacchieri*¹; Paola Guarnone¹; Elena Bergaglio¹; ¹Ansaldo Sviluppo Energia S.p.A.

4:30 PM

Tensile Behavior of Inconel X-750: Effect of Heat Treatment: *Christopher Marsh*¹; Djamel Kaoum²; ¹University of South Carolina; ²North Carolina State University

4:50 PM

The Influence of Dendritic Segregation Degree to the Recrystallization Nucleation in U4720LI: *Jiayu Chen*¹; Jianxin Dong¹; ¹University of Science and Technology Beijing

5:10 PM

Grain Refinement of Cast FeAl-Alloys for Gas Turbine Blades: *Heiner Michels*¹; Thomas Brenker²; Laura Klinkenber³; Matthias Buenck¹; ¹Access e.V.; ²Other; ³RWTH Aachen University

Energy Materials 2017: Materials for Oil and Gas and AMREE Oil & Gas III — Hydrogen Effects on Materials in Energy

Sponsored by: Chinese Society for Metals

Program Organizers: Indranil Roy, Schlumberger; Chengjia Shang, University of Science and Technology Beijing

Tuesday PM Room: 14A
February 28, 2017 Location: San Diego Convention Ctr

Session Chairs: Hani Elshahawi, Shell Exploration & Production, Co.; Partha Ganguly, Baker Hughes

2:00 PM Keynote

Hydrogen-assisted Failure in Ni-base Superalloy 718 Studied under In-situ Hydrogen Charging: The Role of Localized Deformation in Crack Propagation: Z. Tarzimoghadam¹; *Dirk Ponge*¹; J. Klöwer²; Dierk Raabe¹; ¹Max-Planck-Institut für Eisenforschung GmbH; ²VDM Metals GmbH

2:30 PM Invited

Failure Conditions for Individual Grain Boundaries in a Ni-base Alloy Embrittled by H: *Michael Demkowicz*¹; ¹Texas A&M University

3:00 PM

A Combined Micromechanics/Materials Science Approach to Understanding High Temperature Hydrogen Attack: *Mohsen Dadfarnia*¹; May Martin¹; Petros Sofronis¹; David Moore²; Steve Orwig²; ¹University of Illinois Urbana-Champaign; ²BP

3:30 PM Break

3:50 PM

Hydrogen Embrittlement of High Strength Nickel-based Alloys in HP HT Applications: Ramgopal Thodla¹; *Brandon Rollins*¹; ¹DNV USA

4:15 PM

High Strength Nickel-based Alloys for HPHT Applications: *Ramgopal Thodla*¹; Brandon Rollins¹; Jeff Hawk²; Colum Holtam¹; ¹DNV USA; ²NETL

4:40 PM

High Strength Alloys for Oil and Gas Drilling Applications: *Robert Badrak*¹; Sergej Kolesov¹; William Howie¹; ¹Weatherford

5:05 PM

Research on the Pinpoint Controlling of CRA N08028 OCTG Microstructure and Properties: *Pan Dong*¹; Zhiqiang Yu²; Guangwei Fan¹; Genshu Zhou²; Pengsheng Yao³; Zhifang Zhang⁴; ¹Technology Center, Shanxi Taigang Stainless Steel Co., Ltd., ²State Key Laboratory for Mechanical Behavior of Materials, Xi'an Jiaotong University; ³Shanxi Taigang Stainless Steel Tubes & Pipes Co., Ltd.; ⁴Shanxi Taigang Stainless Steel Co., Ltd.

Energy Materials 2017: Energy and Environmental Issues in Materials Manufacturing and Processing — Energy and Environmental Issues in Materials Manufacturing and Processing III

Sponsored by: Chinese Society for Metals, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Subodh Das, Phnix, LLC; Zhancheng Guo, University of Science and Technology Beijing; Minfang Han, China University of Mining and Technology, Beijing; Teruhisa Horita, AIST; Elsa Olivetti, Massachusetts Institute of Technology; Xingbo Liu, West Virginia University

Wednesday AM Room: 14B
March 1, 2017 Location: San Diego Convention Ctr

Session Chair: To Be Announced

8:30 AM

Enhanced Thermoelectric ZT Constantan Alloy by Cryorolling: *Huijun Kang*¹; Daquan Liu¹; Jinling Li¹; Tongmin Wang¹; ¹Dalian University of Technology

8:50 AM

Thermoelectric Properties of La-doped SrTiO₃ Materials Prepared by Mechanical Alloying: *Daquan Liu*¹; Huijun Kang¹; Jinling Li¹; Tongmin Wang¹; ¹Dalian University of Technology

9:10 AM

Mechanical Analysis of Raceway Formation in Bulk Bed of Blast Furnace: Qiuming Wang¹; Yuanxiang Lu¹; Zeyi Jiang¹; ¹University of Science and Technology Beijing

9:30 AM

Energy Savings in Aluminium Sand Casting Foundries: *Hamid Ahmad Mehrabi*¹; ¹Cranfield University

Energy Materials 2017: Materials for Coal-Based Power — Session II

Sponsored by: Chinese Society for Metals

Program Organizers: Jeffrey Hawk, U.S. Department of Energy, National Energy Technology Laboratory; Zhengdong Liu, China Iron & Steel Research Institute Group; Sebastien Dryepondt, Oak Ridge National Laboratory

Wednesday AM Room: 12
March 1, 2017 Location: San Diego Convention Ctr

Session Chair: Omer Dogan, NETL, U.S. Department of Energy

8:30 AM Keynote

Creep Strength and Oxidation Resistance of Industrially Made G115 Steel Pipe: *Zhengdong Liu*¹; HanSheng Bao¹; Zhengzong Chen¹; Songqian Xu²; Hanping Zhao²; Qijiang Wang²; ¹China Iron & Steel Research Institute Group; ²BaoSteel

9:10 AM Invited

Evolution of Precipitates of 25Cr-20Ni-3Cu3WbN Austenitic Heat Resistant Steel during 973K Aging: *Hansheng Bao*¹; Zhengdong Liu¹; Zhengzong Chen¹; Zhaobo Tian¹; ¹Central Iron & Steel Research Institute

9:40 AM Invited

Heat Resistant Advanced 9% Cr Steel for Fossil Energy Power Generation: *Jeffrey Hawk*¹; Paul Jablonski¹; Kyle Rozman²; ¹U.S.

Department of Energy, National Energy Technology Laboratory; ²ORISE

10:10 AM Break

10:30 AM

Creep of Alumina-forming Austenitic Stainless Steels: *I. Baker*¹; Natalie Afonina¹; Bin Hu¹; Geneva Trotter¹; S.J. Kernion²; ¹Dartmouth College; ²Carpenter Technology

10:50 AM

Accelerated Creep Test for New Steels and Welds: *Stan Mandziej*¹; ¹Advanced Materials Analysis

11:10 AM

The Reliability Analysis of 12Cr1MoVG and T23 Used for USC Boilers Water Wall: *Xiaoli Lu*¹; Yu Wang¹; Jianyong Wang¹; Kaiying Yang¹; Chongbin Wang¹; Jiongxiang Wang¹; ¹Shanghai Boiler Works.Ltd

Energy Materials 2017: Materials for Nuclear Energy — Materials for Nuclear Applications I

Sponsored by: Chinese Society for Metals

Program Organizers: Raul Rebak, GE Global Research; Zhengdong Liu, China Iron & Steel Research Institute Group; Peter Hosemann, University of California Berkeley; Jian Li, CanmetMATERIALS

Wednesday AM Room: Miramar
March 1, 2017 Location: Marriott Marquis Hotel

Session Chair: Raul Rebak, GE Global Research

8:30 AM Keynote

Is There a Role for Advanced Materials in Light Water Reactors?: *Kurt Terrani*¹; Steven Zinkle²; L.L. Snead³; ¹Oak Ridge National Laboratory; ²University of Tennessee, Knoxville; ³Massachusetts Institute of Technology

9:10 AM Keynote

Development of a Novel Structural Material (SIMP steel) for Nuclear Equipment with Balanced Resistances to High Temperature, Radiation and LBE Corrosion: *Yiyin Shan*¹; Wei Yan¹; Wei Wang¹; Quanqiang Shi¹; Ke Yang¹; Zhiguang Wang¹; ¹Institute of Metal Research, Chinese Academy of Sciences

9:50 AM

Enhancing the High-Cycle Fatigue Property of 316 Austenitic Stainless Steels through Introduction of Mechanical Twins by Cold-Drawing: *Xingfei Xie*¹; ¹Shanghai Jiao Tong University

10:10 AM Break

10:25 AM Invited

Research and Development of Pressure Vessel Steels for Advanced Pressurized Water Reactors in China: *Xikou He*¹; Zhengdong Liu¹; Wenhui Zhang²; Deli Zhao³; Ying Luo⁴; Xiaobin Wang⁵; ¹China Iron & Steel Research Institute Group; ²China First Heavy Industries; ³China First Heavy Industries; ⁴Nuclear Power Institute of China; ⁵Nuclear Power Institute of China

11:05 AM

Bonding Characteristics and Site Occupancies of Si Atoms in M6C Carbides from First Principles and Experimental Study: *Li Jiang*¹; ¹Shanghai Institute of Applied Physics, Chinese Academy of Sciences

11:25 AM

Ductile Phase Toughening of 90-97W-NiFe Heavy Alloys: *Md Ershadul Alam*¹; G. R. Odette¹; ¹University of California, Santa Barbara

11:45 AM

Investigation of Oxidation/Carburisation Mechanisms of 9Cr Ferritic Steel Heat Exchanger Tubes: *Sabrina Yan*¹; Scott Doak¹; Aya Shin²; Jonathan Pearson²; Rebecca Higginson¹; ¹Loughborough University; ²EDF Energy Generation

12:05 PM Invited

Comparison of Corrosion Properties of Alloy 800 and Alloy 690 by In-situ Scratching Repassivation Behavior in High-temperature Pressurized

Water: *En-Hou Han*¹; Jiazhen Wang¹; Jianqiu Wang¹; ¹Institute of Metal Research, Chinese Academy of Sciences

Energy Materials 2017: Materials for Oil and Gas and AMREE Oil & Gas III — Materials, Interfaces and Innovations for Hostile Oil and Gas / Energy I

Sponsored by: Chinese Society for Metals

Program Organizers: Indranil Roy, Schlumberger; Chengjia Shang, University of Science and Technology Beijing

Wednesday AM
March 1, 2017

Room: 14A
Location: San Diego Convention Ctr

Session Chairs: Chengjia Shang, University of Science and Technology Beijing; Samantha McBride, Massachusetts Institute of Technology

8:30 AM Keynote

Microstructure and Properties of High Performance Pipeline Steels: *Lei Zheng*¹; ¹Baoshan Iron & Steel Co. Ltd.

9:00 AM

Advanced Duplex Stainless Steels for Extreme Oil-Gas Environments: *Pasi Kangas*¹; Guocai Chai¹; ¹Sandvik Materials Technology

9:30 AM

Development of High-strength and High Corrosion-resistant Ni-Cr-Al Alloy for Drilling Tools: *Yoshihiko Koyanagi*¹; Hiroyuki Takabayashi¹; Shigeki Ueta¹; ¹Daido Steel Co., Ltd./R&D center

10:00 AM Break

10:20 AM Invited

Investigation on the Weldability of High-strength Steels Used for Low Temperature Environment: *Chengjia Shang*¹; Xuelin Wang¹; ¹University of Science and Technology Beijing

10:50 AM

Novel Cu-bearing Antibacterial Pipeline Steels for Microbiologically Induced Corrosion Control: *Xianbo Shi*¹; Yiyin Shan¹; Wei Yan¹; Wei Wang¹; Zhenguo Yang¹; Ke Yang¹; ¹Institute of Metal Research, Chinese Academy of Sciences

11:20 AM

Development of Cr-based Duplex Alloy for Corrosive Environments I: Evaluation of Mechanical Properties and Pitting Potential: *Masafumi Nojima*¹; Tomonori Kimura¹; Makoto Ogata¹; Naoya Toko¹; Kosuke Kuwabara¹; ¹Hitachi, Ltd. Research & Development Group

11:45 AM

Development of Cr-based Duplex Alloy for Corrosive Environments II: Evaluation of Corrosion Resistance in Boiling Sulfuric Acid: *Tomonori Kimura*¹; Masahumi Nojima¹; Makoto Ogata¹; Naoya Tokoo¹; Kosuke Kuwabara¹; ¹HITACHI, Ltd

12:10 PM

Effect of Residual Stress on Aging Precipitation Behavior of Oil-grade Alloy 718: *Zhongnan Bi*¹; Hailong Qin¹; Jinhui Du¹; Ji Zhang¹; ¹Central Iron and Steel Research Institute, China

Energy Materials 2017: Materials for Coal-Based Power — Session III

Sponsored by: Chinese Society for Metals

Program Organizers: Jeffrey Hawk, U.S. Department of Energy, National Energy Technology Laboratory; Zhengdong Liu, China Iron & Steel Research Institute Group; Sebastien Dryepondt, Oak Ridge National Laboratory

Wednesday PM
March 1, 2017

Room: 12
Location: San Diego Convention Ctr

Session Chairs: Kyle Rozman, NETL; Richard Oleksak, National Energy Technology Laboratory

2:00 PM Invited

Developing a Crystal Plasticity Model for Nickel Based Turbine Alloys Based on the Discrete Element Method: *Jamie Kruzic*¹; Agnieszka Truszkowska²; Qin Yu²; Alex Greaney³; Matthew Evans²; ¹UNSW Australia; ²Oregon State University; ³University of California, Riverside

2:30 PM Invited

Predicting Microstructure-Creep Resistance Correlation in High Temperature Alloys Over Multiple Time Scales: *Vikas Tomar*¹; ¹Purdue University

3:00 PM Invited

The SMARTER Project – Science of Multicomponent Alloys: Roadmap for Theoretical and Experimental Research: *M. Kramer*¹; Pratik Ray¹; Duane Johnson¹; ¹Iowa State University

3:30 PM Break

3:50 PM Invited

Modeling Long-term Creep Performance for Welded Nickel-base Superalloy Structures for Power Generation Systems: *Chen Shen*¹; Monica Soare¹; Pengyang Zhao¹; Vipul Gupta¹; Shenyan Huang¹; Suzuki Akane¹; Yunzhi Wang¹; ¹GE Global Research

4:20 PM Invited

Solid State Joining of Creep Strength Enhanced Ferritic Steels: *Glenn Grant*¹; Jens Darsell¹; Arun Devaraj¹; ¹Pacific Northwest National Laboratory

Energy Materials 2017: Materials for Nuclear Energy — Materials for Nuclear Applications II

Sponsored by: Chinese Society for Metals

Program Organizers: Raul Rebak, GE Global Research; Zhengdong Liu, China Iron & Steel Research Institute Group; Peter Hosemann, University of California Berkeley; Jian Li, CanmetMATERIALS

Wednesday PM
March 1, 2017

Room: Miramar
Location: Marriott Marquis Hotel

Session Chair: Jian Li, CanmetMATERIALS

2:00 PM Invited

Fuel Cladding Materials for Supercritical Water Cooled Reactor: *Wenyue Zheng*¹; ¹Canmet Materials

2:40 PM

Development of the 12Cr2Mo1R Steel Plate for Metal Internal Equipment for Demonstration Project of High Temperature Gas-cooled Reactor: *Hanqian Zhang*¹; Huibin Liu¹; ¹Baoshan Iron & Steel Company

3:00 PM

EBSD and TEM Assessment of Deformation Localization in 718 Alloy: *Aida Amroussia*¹; Keith Leonard²; Maxim Gussev²; Jacqueline Stevens³; ¹Michigan State University; ²Oak Ridge National Laboratory; ³AREVA Inc.

3:20 PM

Microstructure Evolution of a Reactor Pressure Vessel Steel during High-temperature Tempering: *Chuanwei Li*¹; Jianfeng Gu¹; Lizhan Han¹; Qingdong Liu¹; ¹Shanghai Jiao Tong University

3:40 PM Break**3:55 PM**

Thermal Conductivity Reduction of Tungsten Plasma Facing Material Due to Helium Plasma and Cu²⁺ Ion Irradiation: *Shuang Cui*¹; Michael Simmonds¹; Joseph Barton¹; Yongqiang Wang²; Russ Doerner¹; George Tynan¹; Renkun Chen¹; ¹UCSD; ²LANL

4:15 PM

Effects of Fe Concentration on Ion-irradiation Induced Defect Evolution and Hardening in Ni-Fe Binary Alloys: *Ke Jin*¹; Wei Guo²; Mohammad Ullah¹; Yanwen Zhang¹; William Weber³; Jonathan Poplawsky²; Hongbin Bei¹; ¹Materials Science & Technology Division, Oak Ridge National Laboratory; ²Center for Nanophase Materials Sciences, Oak Ridge National Laboratory; ³University of Tennessee

4:35 PM

Impact of Neutron Irradiation on Helium Desorption Behavior in Iron: *Xunxiang Hu*¹; Kevin Field¹; David Woodley²; Yutai Katoh¹; ¹ORNL; ²University of Michigan

4:55 PM

Size Effects in Ion-irradiated 800H Steel at High Temperatures Utilizing Nanoindentation and Microcompression Testing: *Anya Prasithipayong*¹; Shraddha Vachhani²; Scott Tumey³; Andrew Minor⁴; Peter Hosemann²; ¹Department of Materials Science and Engineering, University of California, Berkeley; ²Hysitron, Inc.; ³Center of Accelerator Mass Spectrometry, Lawrence Livermore National Laboratory; ⁴Department of Materials Science and Engineering, University of California, Berkeley; National Center for Electron Microscopy, The Molecular Foundry, Lawrence Berkeley National Laboratory; ⁵Department of Nuclear Engineering, University of California, Berkeley

5:15 PM

Understanding Transuranic Binding Mechanisms and Speciation on Stainless Steel: *Tim Kerry*¹; Clint Sharrad¹; Andreas Geist²; Dieter Schild²; ¹University of Manchester; ²Institute for Nuclear Waste Disposal

Energy Materials 2017: Materials for Oil and Gas and AMREE Oil & Gas III — Materials, Interfaces and Innovations for Hostile Oil and Gas / Energy II

Sponsored by: Chinese Society for Metals

Program Organizers: Indranil Roy, Schlumberger; Chengjia Shang, University of Science and Technology Beijing

Wednesday PM
March 1, 2017

Room: 14A
Location: San Diego Convention Ctr

Session Chairs: Ramatou Ly, University Texas A&M; Leonid Rapoport, MIT

2:00 PM Invited

Development of Polymer-based Composite Coatings for the Gas Exploration Industry: *Brajendra Mishra*¹; Ali Chaudhry¹; ¹Worcester Polytechnic Institute

2:30 PM

Where the Polymer Meets the Oilfield: *Huilin Tu*¹; ¹Schlumberger

2:55 PM

Mineral Scale Fouling Under Boiling: Fundamentals to Mitigation: *Susmita Dash*¹; Leonid Rapoport¹; Navdeep Dhillon¹; Kripa Varanasi¹; ¹Massachusetts Institute of Technology

3:20 PM

Interfacial Engineering for Suppressing Mineral Scale Fouling: *Samantha McBride*¹; Susmita Dash¹; Sami Khan¹; Kripa Varanasi¹; ¹Massachusetts Institute of Technology

3:45 PM Break**4:00 PM**

Co-relation of Microstructural Features with Tensile and Toughness Characteristics of X70 Grade Steel: *Tushal Kyada*¹; *Raghu Shant*

*Jonnalagadda*¹; Rajesh K Goyal¹; Tribhuwan Singh Kathayat¹; ¹Welspun Corp. Ltd

4:25 PM Invited

Development and Applications of New Generation Ni-containing Cryogenic Steels in China: *Zhen-yu Liu*¹; Meng Wang¹; Jun Chen¹; Guodong Wang¹; ¹Northeastern University

4:50 PM

Anisotropic Behaviors for X100 High Grade Pipeline Steel under Stress Constraints: *Kun Yang*¹; Ting Sha²; Ming Yang³; Chen Shang³; Qiang Chi¹; ¹Tube Goods Research Institute; ²The No.771 Institute of Ninth Academy of China Aerospace Science and Technology Corporation; ³Petrochina West Pipeline Company

5:15 PM

Material Selection-Evaluation Testing and Challenge of the Aluminum Alloy Drill Pipe in China: *Chun Feng*¹; Caihong Lu¹; ¹China National Petroleum Corporation

5:40 PM Invited

The Research and Development of Low Cost 21.4mm/22mm X80 Hot Rolled Strip Based on Austenite Grain Condition Optimizing: *Chengliang Miao*¹; Chengjia Shang²; Zheng Chen³; Fei Li⁴; Yang Cui⁴; Xiaohe Yang³; ¹Shougang Research Institute of Technology; ²University of Science and Technology; ³Shougang Jingtang United Iron & Steel Co. Ltd.; ⁴Shougang Research Institute of Technology

Energy Materials 2017: Materials for Coal-Based Power — Session IV

Sponsored by: Chinese Society for Metals

Program Organizers: Jeffrey Hawk, U.S. Department of Energy, National Energy Technology Laboratory; Zhengdong Liu, China Iron & Steel Research Institute Group; Sebastien Dryepondt, Oak Ridge National Laboratory

Thursday AM
March 2, 2017

Room: 12
Location: San Diego Convention Ctr

Session Chair: Gordon Holcomb, National Energy Technology Laboratory

8:30 AM Invited

A New Austenitic Heat-Resisting Steel SP2215 for 620-630°C USC Boiler Tubing Application: *Xishan Xie*¹; ¹University of Science and Technology Beijing

9:10 AM

Development of Wrought Ni-Cr-Al Alloy with High Temperature Corrosion Resistance: *Yoshihiko Koyanagi*¹; Hiroyuki Takabayashi¹; Shigeki Ueta¹; ¹Daido Steel Co., Ltd.

9:30 AM Invited

Materials Performance in Supercritical CO₂ in Comparison with Atmospheric Pressure CO₂ and Supercritical Steam: *Gordon Holcomb*¹; Joseph Tylczak¹; Casey Carney²; Ömer Dogan¹; ¹National Energy Technology Laboratory; ²National Energy Technology Laboratory, AECOM

10:10 AM Break**10:30 AM**

Study of Localized Under-coal Ash Deposit Corrosion of Inconel 740 Alloy Using High Temperature Electrochemical Sensor: Naing Naing Aung¹; *Xingbo Liu*¹; ¹West Virginia University

10:50 AM Invited

Towards Predicting Reactive-element Tolerances in the Compositional Design of Al₂O₃-scale Forming Alloys and Coatings: B. C. Zhou¹; A. Ross¹; T. Gheno²; X. L. Liu¹; G. Lindwall¹; B. Gleeson²; *Zi-Kui Liu*¹; ¹The Pennsylvania State University; ²University of Pittsburgh

Energy Materials 2017: Materials for Nuclear Energy — Environmental Effects

Sponsored by: Chinese Society for Metals

Program Organizers: Raul Rebak, GE Global Research; Zhengdong Liu, China Iron & Steel Research Institute Group; Peter Hosemann, University of California Berkeley; Jian Li, CanmetMATERIALS

Thursday AM
March 2, 2017

Room: Miramar
Location: Marriott Marquis Hotel

Session Chairs: Zhengdong Liu, China Iron & Steel Research Institute Group; Yiyin Shan, Institute of Metal Research, Chinese Academy of Sciences

8:30 AM Invited

Environmental Assisted Cracking of the Additively Manufactured Austenitic Stainless Steel in High Temperature Water: *Xiaoyuan Lou*¹; Paul Emigh¹; Michelle Othon¹; ¹GE Global Research

9:10 AM Invited

Effect of Steam Pressure on the Oxidation Behaviour of Alloy 625: *Shengli Jiang*¹; Xiao Huang²; Wenjing Li³; Pei Liu⁴; ¹Institute of Metal Research, Chinese Academy of Sciences; ²Carleton University; ³Canadian Nuclear Laboratories; ⁴CANMET

9:50 AM

First Principles Investigations of Alternative Nuclear Fuels: *Barbara Szpunar*¹; Linu Malakkal¹; Ericmoore Jossou¹; J.A. Szpunar¹; ¹University of Saskatchewan

10:10 AM Break

10:25 AM

Calculation of Phase Equilibria and Properties in Multi-Component Molten Salt Systems: *Shuanglin Chen*¹; Weisheng Cao¹; Fan Zhang¹; Chuan Zhang¹; Jun Zhu¹; ¹CompuTherm LLC

10:45 AM

IASCC Behavior of Nickel-based Alloys in Light Water Reactors (LWRs): *Mi Wang*¹; Miao Song¹; Gary Was¹; ¹University of Michigan

11:05 AM

Oxidation of Alloy 690 in Simulated Pressurized Water Reactor Primary Environment: *Wenjun Kuang*¹; Miao Song¹; Peng Wang¹; Gary Was¹; ¹University of Michigan

11:25 AM

Compatibility Research of Fission Product Tellurium and Alloy N in Molten Salt Reactor: *Z.J. Li*¹; ¹Shanghai Institute of Applied Physics CAS

11:45 AM

Friction Stir Processing of Degraded Austenitic Stainless Steel Nuclear Fuel Dry Cask Storage System Canisters: *Ben Sutton*¹; Kenneth Ross²; Glenn Grant²; Gary Cannell³; Greg Frederick¹; Robert Couch¹; ¹Electric Power Research Institute; ²Pacific Northwest National Laboratory; ³Fluor Enterprises, Inc.

Energy Materials 2017: Materials for Coal-Based Power — Session V

Sponsored by: Chinese Society for Metals

Program Organizers: Jeffrey Hawk, U.S. Department of Energy, National Energy Technology Laboratory; Zhengdong Liu, China Iron & Steel Research Institute Group; Sebastien Dryepondt, Oak Ridge National Laboratory

Thursday PM
March 2, 2017

Room: 12
Location: San Diego Convention Ctr

Session Chair: Jeffrey Hawk, U.S. Department of Energy, National Energy Technology Laboratory

2:00 PM Invited

Alloy Design of Creep-resistant High Entropy Alloys for Elevated-Temperature Applications: *Peter Liaw*¹; Haoyan Diao²; Chuan Zhang³; Fan Zhang³; Karin Dahmen⁴; ¹The University of Tennessee; ²The University of Tennessee; ³CompuTherm, LLC.; ⁴University of Illinois at Urbana-Champaign

2:40 PM

Continued Development of a Cast Superalloy, IN740 for Advanced Power Generation Applications: *Kyle Rozman*¹; Jeff Hawk¹; Paul Jablonski¹; ¹National Energy Technology Laboratory

3:00 PM Invited

Creep Behavior and Microstructural Stability in Cast γ' Strengthened Nickel Superalloys: *Jeffrey Hawk*¹; John Sears²; Paul Jablonski¹; ¹U.S. Department of Energy, National Energy Technology Laboratory; ²AECOM

3:35 PM Break

3:55 PM

Design and Performance of Nickel-Base Alloys Strengthened by Eta Phase Precipitates: *Walter Milligan*¹; Calvin White¹; Paul Sanders¹; John Shingledecker²; Daniel Purdy²; ¹Michigan Technological University; ²Electric Power Research Institute

4:15 PM Invited

Materials and Manufacturing Challenges for Components of Supercritical CO₂ Power Systems: *Omer Dogan*¹; ¹DOE National Energy Technology Laboratory

4:50 PM Invited

Micro Creep and Fatigue Behaviors in an Advanced Austenitic Stainless Steel: *Guocai Chai*¹; ¹Sandvik Materials Technology

Energy Materials 2017: Materials for Nuclear Energy — Accident Tolerant Fuels & Irradiation Effects

Sponsored by: Chinese Society for Metals

Program Organizers: Raul Rebak, GE Global Research; Zhengdong Liu, China Iron & Steel Research Institute Group; Peter Hosemann, University of California Berkeley; Jian Li, CanmetMATERIALS

Thursday PM
March 2, 2017

Room: Miramar
Location: Marriott Marquis Hotel

Session Chair: Peter Hosemann, University of California Berkeley

2:00 PM

Advanced ODS FeCrAl Alloys for Accident-tolerant Fuel Cladding: *Sebastien Dryepondt*¹; Caleb Massey¹; Philip Edmondson¹; Kurt Terrani¹; ¹Oak Ridge National Laboratory

2:20 PM

Minimizing Hydrogen Diffusion through FeCrAl Alloy Accident Tolerant Fuel Cladding: *Raul Rebak*¹; Young Kim¹; ¹GE Global Research

2:40 PM

The Mechanical Response of Advanced Claddings during Proposed Reactivity Initiated Accident Conditions: *Mahmut Cinbiz*¹; Nicholas

Brown¹; Kurt Terrani¹; Rick Lowden¹; Donald Erdman III¹; ¹Oak Ridge National Laboratory

3:00 PM

Systematic Studies on Dispersoid Stability and Swelling Resistance in ODS Alloys under Ion Irradiation Conditions: Hyosim Kim¹; Jonathan Gigax¹; Tianyi Chen¹; Frank Garner¹; *Lin Shao*¹; ¹Texas A&M University

3:20 PM

In-situ Observation on the Oxides Stability under Laser and/or Electron Beams Irradiations in 9Cr-ODS Steel: *Wang Hui*¹; Yang Zhanbing²; Yang Subing¹; Watanabe Seiichi³; Shibayama Tamaki³; ¹University of Science & Technology Beijing; ²School of Metallurgical and Ecological Engineering, State Key Laboratory of Advanced Metallurgy, University of Science and Technology Beijing; ³Centre for Advanced Research of Energy and Materials, Faculty of Engineering, Hokkaido University

3:40 PM Break

3:55 PM

A Preliminary Investigation on the Phase Transformation Kinetics Behavior of an U-10wt%Mo Cast and Homogenized Alloy: *Saumyadeep Jana*¹; Arun Devaraj¹; Vineet Joshi¹; Curt Lavender¹; ¹PNNL

4:15 PM

First Principles Study of Electronic Structure and Thermo-mechanical Properties of the Components of Accident Tolerant Nuclear Fuel: UO₂ and UB₂: *Ericmoore Jossou*¹; Linu Malakkal¹; Dotun Oladimeji¹; Barbara Szpunar¹; Jerzy Szpunar¹; ¹University of Saskatchewan

4:35 PM

Irradiation Defects in UO₂, CeO₂ and (U, Ce)O₂ Leached in Oxidizing Water: An In-situ Raman Study: *Ritesh Mohun*¹; Lionel Desgranges¹; Christophe Jégou¹; Sandrine Miro¹; Patrick Simon²; Aurélien Canizarès²; Nicole Raimboux²; ¹CEA (French Alternative Energies and Atomic Energy Commission), France; ²CNRS (French National Centre for Scientific Research), France

4:55 PM

Comparative Study of Thermal Conductivity of SiC and BeO from Ab Initio Calculations: *Linu Malakkal*¹; Barbara Szpunar¹; Jerzy Szpunar¹; ¹University of Saskatchewan

5:15 PM

Morphology of Y-Ti Nano-oxides in ODS Alloys Irradiated with High Energy Heavy Ions: Vladimir Skuratov¹; Alexander Sohatsky¹; *Jacques O'Connell*²; Kateryna K. Kornieieva¹; Jan Neethling²; Alexey Volkov³; Maxim Zdorovets⁴; ¹FLNR JINR; ²CHRTEM, Nelson Mandela Metropolitan University; ³Nazarbaev University; ⁴Institute of Nuclear Physics, Astana, Kazakhstan

Energy Materials 2017: Energy and Environmental Issues in Materials Manufacturing and Processing — Poster Session

Sponsored by: Chinese Society for Metals, TMS: Recycling and Environmental Technologies Committee

Program Organizers: Subodh Das, Phinix, LLC; Zhancheng Guo, University of Science and Technology Beijing; Minfang Han, China University of Mining and Technology, Beijing; Teruhisa Horita, AIST; Elsa Olivetti, Massachusetts Institute of Technology; Xingbo Liu, West Virginia University

Monday PM
February 27, 2017

Room: Hall B1
Location: San Diego Convention Ctr

C-1: Preparation of Battery-grade Ferrous Oxalate by Screening of Reaction Conditions: Keyu Zhang¹; Xiaoyan Yang¹; Jian Wu¹; *Yaochun Yao*¹; ¹Kunming University of Science and Technology

C-2: Synthesis and Characterization of Electrodes Made from Banana Peel for Multivalent Batteries: Tazmin Mumu¹; *Ramesh K. Guduru*¹; ¹Lamar University

Energy Materials 2017: Materials for Coal-Based Power — Poster Session

Sponsored by: Chinese Society for Metals

Program Organizers: Jeffrey Hawk, U.S. Department of Energy, National Energy Technology Laboratory; Zhengdong Liu, China Iron & Steel Research Institute Group; Sebastien Dryepondt, Oak Ridge National Laboratory

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C-3: Atomic-scale Modeling of Point Defects, Phase Stability, and the Formation Mechanism of Z Phases CrMN (M=V, Nb, Ta): Daniel Urban¹; *Christian Elsaesser*¹; ¹Fraunhofer IWM Freiburg

C-5: Fireside Corrosion Behaviors of Inconel 740 H Superalloy in Various SO₂ Contents: *Jintao Lu*¹; 'Xi' an Thermal Power Research Institute Co., Ltd.

C-6: High Cycle Fatigue Behavior of HAYNES282 Superalloy: *Ming Yang*¹; ¹Dongfang Electric Corporation. Dongfang Turbine Co.LTD

C-7: Recent Development in the Characteristics of Alloy 625 for A-USC Steam Turbine Castings: *Wenlong Yu*¹; Songfeng Liu¹; Yu Wang¹; Lingen Sun¹; ¹Shanghai Turbine Company, Ltd.

C-8: The Effect of W and Mo Addition on the Microstructure and Mechanical Properties of GY200 Ni-based Alloy: *Zhihua Gong*¹; Gang Yang²; ¹Inner Mongolia University of Science & Technology; ²Central Iron and Steel Research Institute

Energy Materials 2017: Materials for Energy Conversion with Emphasis on SOFC — Poster Session

Sponsored by: Chinese Society for Metals

Program Organizers: Amit Pandey, Rolls Royce LG Fuel Cell Systems Inc.; Kyle Brinkman, Clemson University; Teruhisa Horita, AIST; Minfang Han, China University of Mining and Technology, Beijing

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February 27, 2017

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C-9: Composition Effects on the Characteristics of Glass Sealants for Intermediate Temperature Solid Oxide Fuel Cell Applications: *Sea-Fue Wang*¹; Yung-Fu Hsu¹; Zu-You Liu¹; ¹National Taipei University of Technology

C-10: Effect of Sn on the Microstructure and Mechanical Properties of AM90 Extruded Alloy: *K Song*¹; FS Pan²; LB Wang¹; CH Duan¹; Hua Du¹; Ying Luo¹; J She¹; L Wu¹; ¹Nuclear Power Institute of China; ²Chongqing University

Energy Materials 2017: Materials for Gas Turbines — Poster Session

Sponsored by: Chinese Society for Metals

Program Organizers: Jeffrey Fergus, Auburn University; Ji Zhang, China Iron and Steel Research Institute Group

Monday PM
February 27, 2017

Room: Hall B1
Location: San Diego Convention Ctr

Session Chair: Jeffrey Fergus, Auburn University

C-11: Effect of Thermal Debinding and Sintering Conditions on Mechanical Properties of Silica-based Ceramic Cores: *Jeong-gu Yeol*¹; JeongSoo Park¹; Young-Hwan Kim¹; ¹Korea Institute of Energy Research

C-12: Microstructures and Deposition Mechanisms of Thermal Barrier Coatings Produced by PS-PVD: *Xiaohu Yuan*¹; ¹DongFang Turbine Co.,

Ltd., DongFang Electric Corporation

C-13: Mullitization of Fused Silica on Silica-based Ceramic Cores by Colloidal Alumina Infiltration: *Jeong-gu Yeo*¹; JeongSoo Park¹; Young-Hwan Kim¹; ¹Korea Institute of Energy Research

C-14: Solidification Behavior and Microstructure of Inconel 625 Superalloy under Electromagnetic Field: Tao Wang¹; Fei Wang¹; *Engang Wang*¹; ¹Northeastern University, China

C-15: Study on the Undercoolability and Single Crystal Castability of Nickel-Based Superalloys: *Wang Haiwei*¹; Ma De-Xin¹; Yang Gong-xian¹; Gong Xiu-fang¹; Zhang Qiong-yuan¹; ¹Dongfang Turbine Co., Ltd.

C-16: Temperature Dependence of the Fracture Behavior of X-750 Alloy and Effect of Heat Treatment: *Christopher Marsh*¹; Djamel Kaoumi²; ¹University of South Carolina; ²North Carolina State University

Energy Materials 2017: Materials for Nuclear Energy — Poster Session

Sponsored by: Chinese Society for Metals

Program Organizers: Raul Rebak, GE Global Research; Zhengdong Liu, China Iron & Steel Research Institute Group; Peter Hosemann, University of California Berkeley; Jian Li, CanmetMATERIALS

Monday PM
February 27, 2017

Room: Hall B1
Location: San Diego Convention Ctr

Session Chair: Raul Rebak, GE Global Research

C-17: Effect of Heat Treatments on the Microstructure and Mechanical Properties of Zr-1NB-1SN-0.1Fe Alloy used in the Nuclear Industry: Dielle Costa¹; Daniele Baeta¹; Monica Rezende¹; *Neil Medeiros*¹; ¹UFF

C-18: Effects of Irradiation on Thermal Conductivity of Nickel Alloys: Mandeep Singh¹; *Linu MalakkaF*; Aseem Chauhan²; Jerzy Szpunar²; Michael P Bradely²; M Chicoine³; ¹PEC University of Technology; ²University of Saskatchewan; ³University of Montreal

C-19: Reduced Deuterium Retention in Simultaneously Damaged and Annealed Tungsten: *Michael Simmonds*¹; Yongqiang Wang²; Russell Doerner¹; Joseph Barton¹; Matthew Baldwin¹; George Tynan¹; ¹Center for Energy Research at UCSD; ²Los Alamos National Laboratory

C-20: Studies of the Differential Thermal Analysis and Microstructural Characterization of Gd-containing Stainless Steel: *Wu Zhaoyu*¹; Xiao Xueshan²; ¹Panzhuhua University; ²Shanghai University

Energy Materials 2017: Materials in Clean Power — Poster Session

Sponsored by: Chinese Society for Metals, TMS: Corrosion and Environmental Effects Committee

Program Organizers: Sebastien Dryepondt, Oak Ridge National Laboratory; Zhengdong Liu, China Iron & Steel Research Institute Group; Jeffrey Fergus, Auburn University; Jeffrey Hawk, U.S. Department of Energy, National Energy Technology Laboratory; Ji Zhang, China Iron and Steel Research Institute Group

Monday PM
February 27, 2017

Room: Hall B1
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C-21: Novel Hydrogen Storage Reaction Pathway of LiBH₄+MgH₂ Mixtures Enabled by Ball Milling and Aerosol Spraying: *Zhao Ding*¹; Leon L. Shaw¹; Jie Li¹; ¹Illinois Institute of Technology

C-22: Pyrolysis of Different Wood Species Investigated by TGA-GC-MS: *Ekkehard Post*¹; ¹NETZSCH Geraetebau GmbH

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