### Symposium 13: Advanced Ceramics and Composites for Sustainable Nuclear Energy and Fusion Energy

**Wednesday, January 30, 2013**

**Radiation Defects in Ceramics / Codes and Standards**

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<th>Time</th>
<th>Session</th>
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<td>1:30 PM-5:00 PM</td>
<td>Room: Ponce DeLeon</td>
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<td>Session Chair: TBA</td>
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<td><strong>1:30 PM</strong></td>
<td>(ICACC-S13-001-2013) Defect Stability and Mobility in Nano-engineered Silicon Carbide (Invited Speaker)</td>
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<td>Takuji Oda*, University of Tennessee, USA; Yanwen Zhang, Oak Ridge National Laboratory, USA; William J Weber, University of Tennessee, USA</td>
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<td><strong>2:00 PM</strong></td>
<td>(ICACC-S13-002-2013) Off-stoichiometric Sintering of Oxide Fuel and Fuel Surrogates</td>
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<td>J. B Henderson*, Netzsch Instruments North America LLC, USA</td>
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<td><strong>2:20 PM</strong></td>
<td>(ICACC-S13-003-2013) Effects of Ionization on Irradiation Damage in Silicate Ceramics</td>
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<td>William J Weber*, Marie Backman, University of Tennessee, USA; Yanwen Zhang, Oak Ridge National Laboratory, USA; Marcel Toulemonde, University of Caen, France</td>
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<td><strong>2:40 PM</strong></td>
<td>(ICACC-S13-004-2013) A Hybrid Model on Low Energy Ion Beam Induced Quantum Dot Structuring in GaAs</td>
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<td>Efrain Hernandez*, University of Michigan, USA; Veena Tikare, Sandia National Laboratory, USA; LuMin Wang, University of Michigan, USA</td>
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**3:00 PM**

Break

**3:20 PM**

(ICC-S13-005-2013) Test Methods for Hoop Tensile Strength of Ceramic Composite Tubes for Light Water Nuclear Reactor Applications (Invited Speaker)

Michael G Jenkins*, Bothell Engineering and Science Technologies, USA; Jonathan A Salem, NASA Glenn Research Center, USA

**3:40 PM**


Michael G Jenkins*, Bothell Engineering and Science Technologies, USA; Thomas L Nguyen, Levitas Consultants, USA

**4:00 PM**

(ICC-S13-007-2013) Advanced Cladding Inspection Using Innovative Optical Morphological Analysis

John E Garnier*, Michael V Glazoff, Sergey Rashkeev, Isabella J Van Rooyen, George W Griffith, Idaho National Laboratory, USA

**4:20 PM**

(ICC-S13-008-2013) New ASTM Committee C28 Material Specifications for Carbon-Carbon and SiC-SiC Composite for Nuclear Applications

Stephen T. Gonczy*, Gateway Materials Technology, USA; Yutai Katoh, Oak Ridge National Laboratory, USA

**4:40 PM**

(ICC-S13-009-2013) Round-Robin Interlaboratory Study for the Precision of Uniaxial Tensile Testing of Ceramic Composite Tubes

Stephen T. Gonczy*, Gateway Materials Technology, USA; Yutai Katoh, Oak Ridge National Laboratory, USA; Michael Jenkins, California State University, USA
Thursday, January 31, 2013

Ceramic Technology for Light Water Reactor Fuels

8:00 AM-12:10 PM
Room: Ponce DeLeon
Session Chair: TBA

8:00 AM
(ICACC-S13-010-2013) Advanced LWR Nuclear Fuel Cladding Development Status (Invited Speaker)
Shannon Bragg-Sitton*, Idaho National Laboratory, USA

8:30 AM
(ICACC-S13-011-2013) Probabilistic Failure Analysis for Wound Composite Ceramic Cladding Assembly
James Hemrick*, Edgar Lara-Curzio, Oak Ridge National Laboratory, USA

8:50 AM
(ICACC-S13-012-2013) Spark Plasma Sintering of high Thermal Conductivity UO2 and UO2-SiC Composites
Ghatu Subhash*, Lihao Ge, James Tulenko, Sungwan Yeo, Ronald Baney, University of Florida, USA

9:10 AM
Sungwhan Yeo*, Edward Mckenna, Ronald Baney, Ghatu Subhash, James Tulenko, University of Florida, USA

9:30 AM
(ICACC-S13-014-2013) Model Development of Advanced Nuclear Fuel Cladding with Reduced Hydrogen Pick-up
Sergey Rashkeev*, John E Garnier, Kevin M McHugh, George G Griffith, Michael V Glazoff, Idaho National Laboratory, USA

9:50 AM
Break

10:10 AM
(ICACC-S13-015-2013) Accident Tolerance of SiC-matrix based Fuels (Invited Speaker)
Lance Snead*, Kurt Terrani, Ting Cheng, Karren L More, ORNL, USA

10:40 AM
(ICACC-S13-016-2013) Silicon Carbide Recession Kinetics in High-Pressure Steam at Elevated Temperature
Ting Cheng*, Peter F Tortorelli, Karren L More, Oak Ridge National Lab, USA

11:10 AM
(ICACC-S13-017-2013) High Temperature Steam Corrosion of Complex Silicates for Nuclear Applications: I. Theory/Modeling Study
Sergey Rashkeev*, John E Garnier, Kevin M McHugh, George G Griffith, Michael V Glazoff, Idaho National Laboratory, USA

11:30 AM
(ICACC-S13-018-2013) High Temperature Steam Corrosion of Cladding for Nuclear Applications: II. Experimental
Kevin M McHugh*, John E Garnier, Sergey Rashkeev, Michael V Glazoff, George W Griffith, Sergey Rashkeev, Idaho National Laboratory, USA

11:50 AM
(ICACC-S13-019-2013) NITE SiC Processing for Nuclear Applications
Kurt Terrani*, Jim Kiggans, Yutai Katoh, Lance Snead, Oak Ridge National Laboratory, USA
Joining / Irradiation and Environmental Effects I / Fabrication and Processing of Ceramic Functional Materials

1:30 PM-6:10 PM
Room: Ponce DeLeon
Session Chair: TBA

1:30 PM
(ICACC-S13-020-2013) Glass-ceramics as joining materials for nuclear applications (Invited Speaker)
Monica Ferraris*, Valentina Casalegno, Stefano Rizzo, Milena Salvo, Politecnico di Torino, Italy; Darina Blagoeva, NRG, Netherlands

2:00 PM
(ICACC-S13-021-2013) A Novel Composite Brazing Approach for Joining Silicon Carbide
Edward D Herderick*, EWI, USA

2:20 PM
(ICACC-S13-022-2013) Evaluation of Engineered Microstructures for Enhanced Reliability in Nuclear Grade Joints
Hesham Khalifa*, Christian P Deck, Christopher Hill, Christina A Back, General Atomics, USA

2:40 PM
(ICACC-S13-023-2013) Radiation Stability of Silicon Carbide Joints Made by Various Bonding Methods
Yutai Katoh*, Oak Ridge National Laboratory, USA; Tatsuya Hinoki, Kyoto University, Japan; Monica Ferraris, Politecnico di Torino, Italy; Charles H Henager, Pacific Northwest National Laboratory, USA

3:00 PM
Break

3:20 PM
(ICACC-S13-024-2013) Effect of irradiation and chemical interaction on select MAX phases for Gen IV reactors (Invited Speaker)

Darin Joseph Tallman*, Grady W Bentzel, Drexel University, USA; Elizabeth Hoffman, Robert Sindelar, Gordon Kohse, Savannah River National Lab, USA; Michel W Barsoum, Drexel University, USA

3:50 PM
(ICACC-S13-025-2013) Displacive Radiation-Induced Structural Contraction in Nanocrystalline ZrN
Fengyuan Lu, RPI, USA; Mengbing Huang, The University at Albany-The State University of New York, USA; Fereydoon Namavar, University of Nebraska Medical Center, USA; Rodney C Ewing, University of Michigan, USA; Jie Lian*, RPI, USA

4:10 PM
(ICACC-S13-026-2013) Thermal gas conductance model based on the Thermal Diffusion Column Separation (TDCS) mechanism
Sergey Rashkeev*, John E Garnier, George W Griffith, Michael V Glazoff, Kevin M McHugh, Idaho National Laboratory, USA

4:30 PM
(ICACC-S13-027-2013) Oxidation behavior of UO2 in air
Kiichi Suzuki*, Japan Atomic Energy Agency, Japan; Andrew T Nelson, Los Alamos National Laboratory, USA; Takeo Sunaoshi, Inspection Development Company, Japan; Kenneth J McClellan, Los Alamos National Laboratory, USA; Masato Kato, Japan Atomic Energy Agency, Japan

4:50 PM
(ICACC-S13-028-2013) Spark Plasma Sintering Fabrication of Urania/Carbo Nanotube Composites
Andrew Robert Cartas*, Lihaeo Ge, Sungwan Yeo, Jim Tulenko, Ron Bane, Ghatu Subhash, University of Florida, USA

5:10 PM
(ICACC-S13-029-2013) Silver-functionalized silica aerogel: A novel benchmark for capturing and immobilization of iodine-129 from fuel reprocessing off-gas
Josef Matyas*, Glen Fryxell, Pacific Northwest National Lab, USA

5:30 PM
(ICACC-S13-030-2013) Mechanical Properties of Porous Silicon Carbide Composites Following Exposure at Elevated Temperature in Air
Tatsuya Hinoki*, Kazuya Shimoda, Kyoto University, Japan; Susumu Maeta, Norifumi Konishi, GUNZE LIMITED, Japan; Kazuoki Toyoshima, Kyoto University, Japan; Taichi Kawahara, Akihiro Sato, GUNZE LIMITED, Japan

5:50 PM
(ICACC-S13-031-2013) Modifications of Microstructure and Pore Morphology of Lithium Orthosilicate Pebbles during Sintering
D. Mandal*, D. Sen, S. Mazumder, S. Ramnathan, Bhabha Atomic Research Centre, India

Friday, February 1, 2013
Irradiation and Environmental Effects II & III

8:00 AM-12:00 PM
Room: Ponce DeLeon
Session Chair: TBA

8:00 AM
(ICACC-S13-032-2013) Environmental Effect on the Oxidation of CVD SiC Ceramics and Composites (Invited Speaker)
Weon-Ju Kim*, Daejong Kim, Ji Yeon Park, Korea Atomic Energy Research Institute, Republic of Korea

8:30 AM
(ICACC-S13-033-2013) Biaxial mechanical behavior of SiC/SiC composite tubes
Fabien Bernachy-Barbe*, Lionel Gelebart, CEA, France; Jerome Crepin, Mines ParisTech, France; Michel Bornert, Ecole des Ponts ParisTech, France

8:50 AM
(ICACC-S13-034-2013) Dimensional changes and flexural behavior of neutron irradiated 2D carbon fiber reinforced SiC matrix composite
Chunghao Shih*, Yutai Katoh, Oak Ridge National Laboratory, USA; John Steinbeck, Physical Sciences Inc., USA

9:10 AM
(ICACC-S13-035-2013) Tensile and Interfacial Properties of Unidirectional Advanced SiC/SiC Minicomposites
Kazumi Ozawa*, Takashi Nozawa, Hiroyasu Tanigawa, Japan Atomic Energy Agency, Japan; Yutai Katoh, Lance L Snead, Oak Ridge National Laboratory, USA

9:30 AM
(ICACC-S13-036-2013) The Use of Additives to Improve SiC-SiC Composites for Nuclear Applications
Christian P Deck*, Hesham E Khalifa, Christopher Hill, Christina A Back, General Atomics, USA

9:50 AM
Break

10:10 AM
(ICACC-S13-037-2013) Microstructural behavior of SiC/SiC composites under ion irradiation environment (Invited Speaker)
Nihed Chaabane*, Marion Le Flem, Thierry Vandenberghe, Stéphane Urvoy, CEA Saclay, France; Paul Dumas, Synchrotron SOLEIL, France; Yves Serruys, CEA Saclay, France

10:40 AM
(ICACC-S13-038-2013) Radiation effects in thick Gd2O3 films used for neutron detection
Daniel Grave*, Zachary Hughes, Joshua Robinson, Douglas Wolfe, Penn State University, USA

11:00 AM
(ICACC-S13-039-2013) Magnesium phosphate cements for nuclear waste encapsulation
William Montague*, Imperial College London, United Kingdom; Martin Hayes, National Nuclear Laboratory, United Kingdom; Luc Jean Vandeperre,
Dimensional stability of graphite under ion-irradiation
Makoto Nonaka*, Sosuke Kondo, Tatsuya Hinoki, Kyoto University, Japan

Temperature dependence of the contraction rates of the nuclear-grade graphite
Sosuke Kondo*, Tatsuya Hinoki, Kyoto University, Japan; Masatoshi Okuda, Takashi Takagi, IBIDEN CO., LTD., Japan

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**Wednesday, January 30, 2013**

**S13 Poster Session**

5:00 PM-7:30 PM
Room: Ocean Center

Ab initio molecular dynamics simulations of recoil events in thoria
Bin Liu*, Oak Ridge National Laboratory, USA; Haiyan Xiao, The University of Tennessee, USA; Yanwen Zhang, Oak Ridge National Laboratory, USA; William J Weber, The University of Tennessee, USA

Effects of Size and Geometry on the Equibiaxial Flexural Test of Fine Grained Nuclear Graphite
Chunghao Shih*, Yutai Katoh, Oak Ridge National Laboratory, USA; Takashi Takagi, Ibiden, Japan

Effect of Neutron Irradiation on Bonded Fiber Silicon Carbide Composite
Yutai Katoh*, Kazumi Ozawa, Sosuke Kondo, Oak Ridge National Laboratory, USA; Yoshiyuki Kawaharada, Shinichi Higuchi, Toshiba, Japan