Spring 4-12-2015

Ultra-high Temperature Ceramics: Materials for Extreme Environment Applications III - CONFERENCE PROGRAM

George Franks
University of Melbourne

Carolina Tallon
University of Melbourne

Program

Ultra-high Temperature Ceramics:

Materials for Extreme Environment Applications III

An ECI Conference Series

April 12-16, 2015
Gold Coast, Australia

Co-Chairs

Dr. Carolina Tallon, The University of Melbourne

Prof. George Franks, The University of Melbourne

Engineering Conferences International
32 Broadway, Suite 314 - New York, NY 10004, USA
Phone: 1 - 212 - 514 – 6760
www.engconfintl.org – info@engconfintl.org

Outrigger Surfers Paradise
22 View Avenue
Surfers Paradise, QLD 4217
Tel: +61-7-5579-1000

Engineering Conferences International (ECI) is a not-for-profit global engineering conferences program, originally established in 1962, that provides opportunities for the exploration of problems and issues of concern to engineers and scientists from many disciplines.

Scientific Committee

Prof. Bill Fahrenholtz, Missouri University of Science & Technology, Rolla, US

Dr. Eric Wuchina, Naval Surface Warfare Center, W. Bethesda, MD, US

Prof. Jon Binner, University of Birmingham, UK

Dr. Laura Silvestroni, Institute of Science and Technology for Ceramics ISTEC, Italy

Prof. Yanchun Zhou, Aerospace Research Institute of Materials and Processing Technology, China

Dr. Sylvia Johnson, NASA-Ames Research Center

Previous conferences in this series

Ultra-High Temperature Ceramics:
Materials for Extreme Environment Applications
Aug. 3-8, 2008
Lake Tahoe, California
Conference Chairs:
Eric Wuchina, Naval Surface Warfare Center, USA
Alida Bellosi, Institute of Science & Technology for Ceramics, Italy

Ultra-High Temperature Ceramics:
Materials for Extreme Environment Applications II
May 13-18, 2012
Hernstein, Austria
Conference Chairs:
Bill Fahrenholtz, Missouri University of Science & Technology, USA
Bill Lee, Imperial College, London, UK
Eric Wuchina, Naval Surface Warfare Center, USA
Yanchun Zhou, Aerospace Research Inst. Of Materials & Processing Technology, China

With the support of Defence Materials Technology Centre (DMTC)

Conference endorsed by the American Ceramic Society

Sunday, April 12, 2015

17:00 - 19:00	Registration (Boulevard Pre Function/Foyer)
18:00 - 19:00	Welcome Reception
19:00 - 21:00	Dinner

Notes

• All technical sessions will be in Boulevard Ballroom 2 Poster session will be in Boulevard Pre Function/Foyer.

• Lunches and dinners will be in . Boulevard Ballroom 1. Breakfasts will be in the Deja View Restaurant.

• No recording, please! The use of any devices to capture images (e.g., camera or camera phones) or sound (e.g., tape and digital recorders) is strictly prohibited at all technical and poster sessions without the express written consent, obtained in advance, from ECI.

• Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).

• Speakers – Please leave at least 3-5 minutes for questions and discussion.

• Please do not smoke at any conference functions.

• Turn your mobile telephones to vibrate or off during technical sessions.

• Please write your name on your program so that it can be returned to you if lost or misplaced.

• After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.

Monday, April 13, 2015

	Breakfast (Deja View Restaurant): Opens 06:30
09:00 - 09:20	Opening Remarks (Carolina Tallon, Chair; Ram Darolia, ECI Liaison)
	Session Chair: Carolina Tallon, The University of Melbourne, Australia
	Plenary 1
09:20 - 10:20	**Sustained Hypersonic Flight – It's harder than Rocket Science** Michael Smart, The University of Queensland, Australia
10:20 - 10:50	Coffee break
	Session 1: Synthesis and Processing **Session Chair:** Laura Silvestroni, National Research Council of Italy, Italy
10:50 - 11:10	**Properties of HfC-SiC nano composites prepared using reactive spark plasma sintering** Sea Hoon Lee, Korea Institute of Materials Science, South Korea
11:10 - 11:30	**Processing and Characterisation of (Ta,Hf)C Ultra-High Temperature Ceramics** William E. Lee, Imperial College London, United Kingdom
11:30 - 11:50	**Synthesis and Static Oxidation Testing of Doped HfB2 Powders** Jon Binner, University of Birmingham, United Kingdom
11:50 - 12:20	Session 1 Discussion
12:20 - 13:30	Lunch
13:30 - 15:00	Free time/ad hoc discussion
	Session 2: Characterization **Session Chair:** William E. Lee, Imperial College London, United Kingdom
15:00 - 15:40	**Keynote 1** **Ultra-High Temperature Mechanical Properties of Zirconium Diboride-Based Ceramics** William Fahrenholtz, Missouri University of Science and Technology, USA
15:40 - 16:10	Coffee break
16:10 - 16:30	**Invited 1** **UHTC Development: Impact of Modern Characterisation Techniques** Daniel Riley, Institute of Materials Engineering, ANSTO, Australia
16:30 - 16:50	**A Diffusion-Based Oxidation and Multi Crack Growth Model to Predict Damage in Ultra-High Temperature Ceramics** Michele Pettina', Imperial College London, United Kingdom

Monday, April 13, 2015 (continued)

16:50 - 17:10	**High Temperature Ablation Rig Testing (HiTAR)** Sam Moricca, Australian Nuclear Science and Technology Organisation, Defence Materials Technology Centre, Australia
17:10 - 17:30	Session 2 Discussion
18:00 - 20:00	Dinner
20:00 - 21:00	Poster Session/Social Hour

Tuesday, April 14, 2015

	Breakfast (Deja View Restaurant): Opens 06:30
	Session 3: Barriers/Coatings/Porous **Session Chair:** Eric Wuchina, Naval Surface Warfare Center, USA
09:20 - 10:00	**Keynote 2** **Boride-carbide Systems: From UHTCs to CMCs** Carlos G. Levi, UCSB, USA
10:00 - 10:20	**Characterization of Ultra High Temperature Ceramic Coatings Deposited by Vacuum Plasma Spraying** Yeon Woo Yoo, Korea Institute of Materials Science, South Korea
10:20 - 10:50	Coffee break
10:50 - 11:10	**New Thermal Barrier Coatings for Advanced Turbine Engines** Hongbo Guo, Beihang University, China
11:10 - 11:30	**The Effect of Substrate Geometry Variations on the Formation and Topographical Properties of Plasma Sprayed Thermal Barrier Coatings** Mitchell L. Sesso, Swinburne University of Technology, Australia
11:30 - 11:50	**Orientation and Stress Relationship between Thermally Grown Rutile and Alumina formed during High Temperature Oxidation** Robbie J. Bennett, Cambridge University, United Kingdom
11:50 - 12:10	**Near-Net-Shaping and Microstructure-Properties Modelling of Multi-Scale Porous UHTC** Carolina Tallon, The University of Melbourne, Australia
12:10 - 12:30	Session 3 Discussion
12:30 - 13:30	Lunch
13:30 - 15:30	Free time/ad hoc discussion
	Session 4: Phase Stability **Session Chair:** Noritaka Saito, Kyushu University, Japan
15:30 - 16:10	**Keynote 3** **Metal-rich Ceramic Phase Stability and Microstructures in Group IV and V Carbides and Nitrides** Gregory B. Thompson, University of Alabama, USA
16:10 - 16:40	Coffee break
16:40 - 17:00	**Phase diagrams in the system boron-carbon-hafnium-zirconium** Theresa Davey, Imperial College London, United Kingdom
17:00 - 17:20	**In situ, high temperature, synchrotron studies on the oxidation of ZrB_2 and composites** Pankaj Sarin, Oklahoma State University, USA

Tuesday, April 14, 2015 (continued)

17:20 - 17:40	**Slip Regulation in Rocksalt Transition Metal Carbides** Nicholas DeLeon, The University of Alabama, USA
17:40 - 18:00	Session 4 Discussion
18:00	Dinner on own

Wednesday, April 15, 2015

	Breakfast (Deja View Restaurant): Opens 06:30
	Session 5: Fibers/Composites **Session Chair:** Jon Binner, University of Birmingham, United Kingdom
09:00 - 10:00	**Plenary 2** **UHTCMCs: short vs continuous fibers** Laura Silvestroni, National Research Council of Italy, CNR-ISTEC, Italy
10:00 - 10:20	**Application of Coatings for Fiber Protection in ZrB_2 Based UHTCMC Structures for Hypersonic Flight** Marius Nelson Kuetemeyer, DLR, Germany
10:20 - 10:40	**Development and Environment Relevant Testing of Ultra High Temperature Ceramic Matrix Composites based on Airbus Group C/SiC "SICARBON(TM)"** Stephan Schmidt-Wimmer, Airbus Defence & Space, Germany
10:40 - 11:10	Coffee break
	Session Chair: William Fahrenholtz, Missouri University of Science and Technology, USA
11:10 - 11:30	**An oxidation kinetic analysis of hot pressed zirconium carbide at high temperature** Claudia Gasparrini, Imperial College London, United Kingdom
11:30 - 12:10	**Keynote 4** **UHTC Composites: Processing, Performance and Future** Jon Binner, University of Birmingham, United Kingdom
12:10 - 12:30	Session 5 Discussion
12:30 - 19:00	Box Lunch/Optional Excursion/Free Time
19:00 – 22:00	***Conference Banquet*** Dinner Speaker Mark Hodges, Defence Materials Technology Centre (DMTC), Australia

Thursday, April 16, 2015

	Breakfast (Deja View Restaurant): Opens 06:30
	Session 6: Joining **Session Chair:** Gregory Thompson, University of Alabama, USA
09:00 - 09:40	**Keynote 5** **Joining of UHTC Boride Composites using Metallic Interlayer** Noritaka Saito, Kyushu University, Japan
09:40 - 10:00	**Effect of Ni-Nb Interlayer Thickness on Mechanical Property of HfB_2 Composite Joints** Kou Honda, Kyushu University, Japan
10:00 - 10:20	Session 6 Discussion
10:20 - 10:50	Coffee break
10:50 - 11:50	Wrap-up and planning
11:50	Box lunch and departures

Poster Presentations List

Poster Session Monday, 13 April, 2015, 20.00-21.00

1. **Application of spark plasma sintering for the synthesis of nano UHTC powders**
   Sea Hoon Lee, Korea Institute of Materials Science, South Korea

2. **Analysis of polycarbosilane precursors for the precursor impregnation and pyroysis process**
   Sea Hoon Lee, Korea Institute of Materials Science, South Korea

3. **Plasticity mechanisms in hafnium nitride at room and elevated temperature**
   Katherine Vinson, The University of Alabama, USA

4. **The effect mechanism of photon radiation on the heat insulation performance in ceramic thermal barrier coating at elevated temperature**
   Yue Ma, Beihang University, China

5. **A pressureless sintering process for preparing ultra-high temperature ZrB_2-SiC ceramics**
   Qi Li, Beijing Institute of Aeronautical Materials, China

6. **Thermal transport properties of $InFeZnO_4$–$YbFeZnO_4$ solid solutions**
   Yanling Pei, Beihang University, China