

Composites at Lake Louise 2017

Lake Louise, Canada
12 – 16 November 2017

Editors:

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Sunday, November 12, 2017

16:30 - 19:00	Conference Check-in (Red Room)
19:00 - 19:45	Low energy synthesis of ceramic powders and composites Waltraud M. Kriven, University of Illinois at Urbana-Champaign, USA
19:45 - 20:30	Nicholson Memorial Lecture Reaction flash sintering of multiphase ceramics Rishi Raj, University of Colorado at Boulder, USA
20:30 - 22:00	Reception (Red Room)

NOTES

- *Technical Sessions will be held in the Victoria Room. Poster sessions will be in the Sunroom.*
- *The ECI office will be in the Lefroy Room.*
- *Audio, still photo and video recording by any device (e.g., cameras, cell phones, laptops, PDAs, watches) is strictly prohibited during the technical sessions, unless prior permission has been granted by the author and 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, November 13, 2017

07:00 - 08:30 Breakfast

Functional Composites I - Electronic Materials and Devices

Session Chair: Waltraud M. Kriven, University of Illinois at Urbana-Champaign, USA

08:30 - 09:00 **Photoelectrochemical water splitting for solar energy conversion and storage**

Avner Rothschild, Technion - Israel Institute of Technology, Israel

09:00 - 09:30 **Controlling and characterizing microstructure in lithium-ion battery electrodes**

Gary M. Koenig, University of Virginia, USA

09:30 - 10:00 **The impact of charge/discharge rate on capacity fade on composite structured cathodes in lithium ion batteries**

Christopher Applett, Sandia National Laboratories, USA

10:00 - 10:30 **Improvement of electrochemical performance of SOFC composite electrode formed by EPD**

Hidenori Yahiro, Ehime University, Japan

10:30 - 11:00 Coffee Break

Functional Composites I - Electronic Materials and Devices (continued)

Session Chair: Avner Rothschild, Technion - Israel Institute of Technology, Israel

11:00 - 11:30 **Carbon nanotube-rich domain effects on bulk electrical properties of nanocomposites**

Chelsea S. Davis, Purdue University, USA

11:30 - 12:00 **Design of elastomeric composites for the additive manufacturing of robots**

Robert Shepherd, Cornell University, USA

12:00 - 12:30 **Adding some "Dirt" to "Clean" energy: Applying clay nanocomposites in solar cells**

Erik Spuerke, Sandia National Laboratories, USA

12:30 - 13:30 Lunch

13:30 - 19:00 *Ad hoc* discussions / Networking /Free time

Monday, November 13, 2017 (continued)

Structural Composites I - Polymer Composites

Session Chair: John Kieffer, University of Michigan, USA

19:00 - 19:30

Autonomous motility of polymer films coupled to stimuli gradients

Benjamin E. Treml, Air Force Research Laboratory, USA

19:30 - 20:00

PET – A semi-crystalline nanocomposite

Jay C. Hanan, Oklahoma State University, USA

20:00 - 20:30

In pursuit of blending polymers with carbon nanotubes

Marilyn Minus, Northeastern University, USA

20:30 - 21:00

Single-molecule fluorescence measurement of local polymer properties

James, A. Liddle, NIST, USA

Tuesday, November 14, 2017

07:00 - 08:30 Breakfast

Functional Composites II - Polymeric Materials

Session Chair: Erik Spoerke, Sandia National Laboratories, USA

08:30 - 09:00 **Structural Reconstitution in Polymer Matrix Composites and its Significance for Performance and Functionality**
John Kieffer, University Of Michigan, USA

09:00 - 09:30 **The Reduction of Platinum Consumption in Environmental Catalysts for Complete Oxidation of Volatile Organic Compounds**
Nobuhito Imanaka, Osaka University, Japan

09:30 - 10:00 **Structure and mechanical response of metallized electrospun polymeric mats and foams for filter applications**
David Bahr, Purdue University, USA

Functional Composites III - Modeling of Materials

Session Chair: Corinne E. Packard, Colorado School of Mines, USA

10:00 - 10:30 **Characterization and modeling of elastic modulus across the (Al, Sc)N system**
Corinne E. Packard, Colorado School of Mines, USA

10:30 - 11:00 Coffee Break

Bio Composites

Session Chair: Chelsea Davis, Purdue University, USA

11:00 - 11:30 **DNA-protein nanocomposites: Microscale structures with molecular precision**
James, A. Liddle, NIST, USA

11:30 - 12:00 **In-vivo evaluation of biocompatibility of biodegradable Fe-Mn materials**
Sabrina Huang, Purdue University, USA

12:00 - 12:30 ***In-silico* design of nanocomposite scaffolds for bone regeneration**
Dinesh Katti, North Dakota State University, USA

Tuesday, November 14, 2017 (continued)

12:30 - 13:00 **Processing-structure-property relationships in cellulose nanocrystal/poly(ethylene-co-vinyl alcohol) composites**
Meisha L. Shofner, Georgia Institute of Technology, USA

13:00 - 14:00 Lunch

14:00 - 15:00 **Poster Session**

Auxetic behavior of fiber networks: Paper and nonwoven fabrics
Meisha L. Shofner, Georgia Institute of Technology, USA

A study on the failure prediction of composite laminates in bending
Jinsung Kim, Korea Aerospace University, South Korea

**High-temperature behavior in entropy-stabilized oxide
(Mg_{0.2}Co_{0.2}Ni_{0.2}Cu_{0.2}Zn_{0.2})O**
Waltraud M. Kriven, University of Illinois at Urbana-Champaign, USA

15:00 - 19:00 *Ad hoc* discussions / Networking / Free Time

19:00 - 21:30 Banquet

Wednesday, November 15, 2017

07:00 - 09:00 Breakfast

Structural Composites II - Mechanical Properties

Session Chair: Jay C. Hanan, Oklahoma State University, USA

09:00 - 09:30 **Using reaction kinetics to deduce the fiber-matrix interface/interphase in glass fiber/epoxy/amine composites**
Gale Holmes, National Institute of Standards and Technology, USA

09:30 - 10:00 **Micromechanical analysis of influence of voids and interface properties on ultimate strength of composite laminates**
Mehdi Naderi, Technical Data Analysis, USA

10:00 - 10:30 **A unified numerical framework for modeling interactive failure modes in a single edge notched laminated composite under tension**
Wooseok Ji, Ulsan National Institute of Science and Technology, South Korea

10:30 - 11:00 Coffee Break

Structural Composites II - Mechanical Properties (continued)

Session Chair: Nima Rahbar, Worcester Polytechnic Institute, USA

11:00 - 11:30 **High temperature mechanical properties of BN particle dispersion SiC composites**
Tatsuya Hinoki, Kyoto University, Japan

11:30 - 12:00 **Oxidation, scale crystallization, and strength of SiC fiber after oxidation in air, steam, and low pO₂**
Randall Hay, Air Force Research Lab, Materials Directorate, USA

12:00 - 13:30 Lunch

13:30 - 19:00 *Ad hoc* discussions / Networking / Free Time

Wednesday, November 15, 2017 (continued)

Structural Composites III – Processing

Session Chair: Randall Hay, Air Force Research Lab, Materials Directorate, USA

- 19:00 - 19:30 **Process-structure-property relationships of additively manufactured model sandstone**
Kevin Hodder, University of Alberta, Canada
- 19:30 - 20:00 **Novel graded honeycombs fabricated by material extrusion additive manufacturing**
Brett G. Compton, University of Tennessee, USA
- 20:00 - 20:30 **Enhancing the sustainability of high performance fiber composites**
Daniel F. Schmidt, University of Massachusetts Lowell, USA
- 20:30 - 21:00 **Delamination of ceramic top coat accelerated by CMAS in an EB-PVD thermal barrier coating specimen**
Masakazu Okazaki, Nagaoka University of Technology, Japan

Thursday, November 16, 2017

07:00 - 08:30 Breakfast

Structural Composites IV - Processing and Phase Diagrams

Session Chair: Brett G. Compton, University of Tennessee, USA

08:30 - 09:00 **Powder-based processing of highly-loaded platelet-reinforced composites**
Rafael Libanori, ETH Zurich, Laboratory for Complex Materials, Switzerland

09:00 - 09:30 **Bioinspired design of structural and thermal materials**
Nima Rahbar, Worcester Polytechnic Institute, USA

09:30 - 10:00 **In-situ phase diagram determination of the $\text{HfO}_2\text{-Ta}_2\text{O}_5$ binary up to 3000°C**
Waltraud M. Kriven, University of Illinois at Urbana-Champaign, USA

12:00 - 13:00 Lunch and Departures