

*Program*

# **Sub-Micron and Nanostructured Ceramics**

**June 7-12, 2009**

**Cheyenne Mountain Conference Center  
Colorado Springs, Colorado, USA**

**Conference Chairs**

**L. Kabacoff**  
ONR

**S. Beermann-Curtin**  
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**Professor T. Tsakalacos**  
Rutgers University



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**Sunday, June 7, 2009**

16:00 - 18:00	Registration (Lower Lobby)
18:00 – 19:00	Reception (Remingtons I)
19:00 – 20:30	Dinner

**Notes**

- Technical Sessions will be in the Centennial Ballroom
- Meals will be in the Mountain View Restaurant
- Audiotaping, videotaping and photography of presentations are strictly prohibited.
- Speakers – Please leave at least 5 minutes for questions and discussion.
- Please do not smoke at any conference functions.
- Turn your cellular telephones to vibrate or off during technical sessions.
- Be sure to make any corrections to your name/contact information on the Master Participant List or confirm that the listing is correct. A corrected copy will be sent to all participants after the conference.

**Monday, June 8, 2009**

07:00 – 08:00 Breakfast

08:00 – 08:15 **Welcome and Announcements**

**Session I: SYNTHESIS AND PROCESSING I**

Session Chair: Thomas Tsakalakos, Rutgers University

08:15 – 08:55 SOLUTION BASED SYNTHESIS AND PROPERTIES OF NANOSTRUCTURED COMPOSITES AND CERAMICS (Invited)  
Gunnar Westin, Uppsala University, Sweden

08:55 – 09:20 NANOSTRUCTURED POWDER FABRICATION USING COMBUSTION SYNTHESIS  
Eric Jordan, University of Connecticut, USA

09:20 – 10:00 SYNTHESIS AND PROCESSING OF ADVANCED NANOSTRUCTURED CERAMICS FOR FUNCTIONAL APPLICATIONS  
Ganesh Scanden, NEI Co., USA

10:00 - 10:30 Coffee Break

10:30 – 10:55 SYNTHESIS AND PROCESSING OF NANOSTRUCTURED B-C-N PHASES  
Steven Tse, Rutgers University, USA

10:55 – 11:20 SYNTHESIS AND PERFORMANCE OF CARBON SPECIES SYNTHESIZED ON THE SURFACE OF CARBIDES  
Arvid Casler, Carbon Derivative Technologies, USA

11:20 – 11:45 PROCESSING AND CHARACTERIZATION OF STRUCTURAL NANO-CERAMIC COMPOSITES WITH INTERESTING MECHANICAL PROPERTIES  
Amiya K. Mukherjee, University of California – Davis, USA

11:45 – 12:10 SELF-ASSEMBLED MONOLAYERS OF CERAMIC PARTICLES  
Hyun Jun Kim, Rutgers University, USA

12:10 – 15:15 Lunch and Discussions

15:15 – 15:40 HIGH PRESSURE CONSOLIDATION OF  $Y_2O_3$ -MgO NANOPOWDERS  
Oleg Voronov, Diamond Materials Inc, USA

15:40 – 16:05 GRAIN SIZE REDUCTION VIA PRESSURE-INDUCED REVERSIBLE PHASE TRANSFORMATION IN  $Y_2O_3$   
Bernard Kear, Rutgers University, USA

**Session II: FUNCTIONAL MATERIALS I**

Session Chair: Lawrence Kabacoff, ONR

- 16:05 – 16:30 EFFECT OF CERAMIC NANOPARTICLES ON THE VISCOSITY AND THERMAL CONDUCTIVITY OF WATER AND ETHYLENE GLYCOL/WATER MIXTURES  
Jules Routbort, Argonne National Laboratory, USA
- 16:30 – 16:55 SACCHARIDES IN RHEOLOGY OF NANO ALUMINA SUSPENSIONS: MAGIC OR SCIENCE?  
Mufit Akinc, Iowa State University, USA
- 16:55 – 17:35 EXTREME ENVIRONMENTS OF THE NEXT GENERATION ENERGY SYSTEMS AND THE ROLE OF NANOCOATING IN ENHANCING MATERIAL PERFORMANCE  
Nicholas Simos, Brookhaven National Laboratory, USA
- 19:00 – 20:30 Dinner

**Tuesday, June 9, 2009**

07:00 – 08:00 Breakfast

08:00 – 08:15 Announcements

**Session III: MECHANICAL PROPERTIES II**

Session Chair: Eric Jordan, University of Connecticut

08:15 – 08:55 MICROSTRUCTURAL ANALYSIS AND IN SITU NANOINDENTATION OF ALUMINA-ZIRCONIA-MAGNESIA SPINEL NANOCOMPOSITES IN A TEM (Invited)  
Haiyan Wang, Texas A&M University, USA

08:55 – 09:20 3D QUANTITATIVE PHASE ANALYSIS AND STRAIN MAPPING OF NANOSTRUCTURED COATINGS BY SYNCHROTRON EDXRD: A NEW APPROACH TO MATERIALS CHARACTERIZATION  
E.K. Akdogan, Rutgers University, USA

09:20 – 09:45 NANOCERAMICS: USE OF CARBON NANOTUBES IN CERAMIC SYSTEMS  
Enrique Barrera, Rice University, USA

09:45 – 10:10 SUPERHARDNESS AND SUPERPLASTICITY OF BRITTLE NANOMATERIALS  
Rostislav A. Andrievskiy, Russian Academy of Sciences, Russia

10:10 – 10:35 Coffee Break

10:35 – 11:15 AN EIGENSTRAIN ANALYSIS OF MECHANICAL PROPERTIES IN NANOSTRUCTURED CERAMIC COATINGS BY SYNCHROTRON PROBE (Invited)  
Thomas Tsakalakos, Rutgers University, USA

11:15 – 11:55 SYNTHESIS, PROCESSING, AND PROPERTIES OF TAC-TAB2-C CERAMICS  
Ina Talmy, Naval Surface Warfare Center, Carderock, USA

11:55 – 12:20 MICROSTRUCTURE RENDERING AND RECONSTRUCTION FOR MODELING AND SIMULATION OF NANO- AND POLY-CRYSTALLINE MATERIALS  
Mo Li, Georgia Institute of Technology, USA

12:20 – 15:00 Lunch and Discussions

**Session IV: PROCESSING AND PROPERTIES**

Session Chair: Bernard Kear, Rutgers University

15:00 – 15:40 MECHANICAL PROPERTIES OF MIDWAVE IR NANOCOMPOSITE OPTICAL CERAMICS (Invited)  
C. Scott Nordahl, Raytheon IDS, USA

15:40 – 16:05 FINE GRAIN POLYCRYSTALLINE ALUMINA  
Marina Pascucci, CERANOVA, USA

16:05 – 16:45 HIGH STRENGTH ULTRAFINE ALUMINA CERAMIC  
Lin Huang, University of California – Davis, USA

16:45 – 17:10 SCRATCH-INDUCED DUCTILE-TO-BRITTLE TRANSITION IN ULTRAFINE ALUMINA CERAMIC  
Julie Schoenung, University of California – Davis, USA

17:10 – 17:35 FORMATION OF AN OXYGEN-DEFICIENT  $Y_2O_3$  PHASE UNDER HIGH PRESSURE  
J.F. Al-Sharab, Rutgers University, USA

19:00 – 20:30 Dinner

**Wednesday, June 10, 2009**

07:00 – 08:00 Breakfast

08:00 – 08:15 Announcements

**Session V: COATINGS**

Session Chair: Mark Croft, Rutgers University

08:15 – 08:55 DENSE NANOSTRUCTURED OXIDE COATINGS AND PREFORMS MADE BY THERMAL SPRAY PROCESSES (Invited)  
Maurice Gell, University of Connecticut, USA

08:55 – 09:20 WEAR OF NANOSTRUCTURED TITANIUM OXIDE COATINGS  
George Kim, Perpetual Technologies, Canada

09:20 – 10:00 FROM SCIENCE TO SERVICE...MARINE MACHINERY SOLUTIONS VIA ENABLING TECHNOLOGY  
Ken Scandell, Naval Surface Warfare Center, USA

10:00 – 10:30 Coffee Break

10:30 – 10:55 PLASMA SPRAYED ALUMINUM OXIDE-CARBON NANOTUBE COMPOSITE COATINGS WITH IMPROVED FRACTURE TOUGHNESS AND WEAR RESISTANCE  
Arvind Agarwal, Florida International University, USA

10:55 – 11:20 MICROSCOPIC STRAIN MAPPING IN NANOSTRUCTURED AND MICROSTRUCTURED ALUMINA-TITANIA COATINGS UNDER 4-POINT COMPRESSIVE AND TENSILE BENDING  
A. Ignatov, Rutgers University, USA

11:20 – 12:00 TRANSPARENT FILMS OF EUROPIUM OXIDE NANOCRYSTALS VIA ELECTROPHORETIC DEPOSITION  
James Dickerson III, Vanderbilt University, USA

12:00 – 13:00 Lunch

13:00 Optional Excursion / Free time

19:00 – 20:30 Dinner



**Thursday, June 11, 2009**

07:00 – 08:00 Breakfast

08:00 – 08:15 Announcements

**Session VI: FUNCTIONAL MATERIALS II**

Session Chair: George Kim, Perpetual Technologies

- 08:15 – 08:55 TOWARDS RATIONAL TAILORING OF FUNCTIONAL AND STRUCTURAL NANOSTRUCTURED CERAMICS (Invited)  
Nitin P. Padture, Ohio State University, USA
- 08:55 – 09:20 OPTICAL MODELING AND CHARACTERIZATION OF THE SPECTRAL TRANSMITTANCE AND SCATTER OF  $Y_2O_3$ -MGO NANOCOMPOSITE OPTICAL CERAMICS  
Brian J. Zelinski, Raytheon Missile Systems, USA
- 09:20 – 10:00 ENGINEERING CERAMIC NANOPHOSPHORS FOR OPTICAL APPLICATIONS  
Mei-Chee Tan, Rutgers University, USA
- 10:00 – 10:30 Coffee Break
- 10:30 – 10:55 FLAME SYNTHESIS OF TUNGSTEN OXIDE NANOSTRUCTURES: MORPHOLOGY AND LOCAL GROWTH CONDITIONS  
Steven Tse, Rutgers University, USA
- 10:55 – 11:20 HIGH RESOLUTION STRUCTURAL AND CHEMICAL ANALYSIS OF FUNCTIONAL NANOSTRUCTURED  $TiO_2$   
Michel L. Trudeau, Hydro-Quebec Research Institute, Canada
- 11:20 – 11:45 VAPOR SYNTHESIS OF TUNGSTEN OXIDE NANOFIBERS  
J.F. Al-Sharab, Rutgers University, USA
- 12:00 – 15:05 Lunch / Discussions
- 15:05 – 15:30  $LIX_zR_yO_z$  TRI-OXIDE SYNTHESIS WITH DIFFERENT COMPOSITION AND CRYSTAL PHASE  
Qin-Hui Zhang, East China University of Science and Technology, P. R. China
- 15:30 – 15:55 ELABORATION AND PROPERTIES OF NANOSTRUCTURED SILICON BASED MATERIAL IRAMIS SPAM-LFP  
Nathalie Herlin-Boime, CEA Saclay - IRAMIS SPAM-LFP, France

**Thursday, June 11, 2009 (continued)**

**16:00 - 18:00 Session VII: Poster Session**

1. SOLUTION SYNTHESIS OF MgO, Y<sub>2</sub>O<sub>3</sub>, AND 50:50 MgO:Y<sub>2</sub>O<sub>3</sub>  
Robert Deutsch, Rutgers University, USA
2. NON-DESTRUCTIVE EVALUATION OF RESIDUALSTRESSES IN NANOSTRUCTURE COATINGS BY SYNCHROTON RADIATION  
Nazia Ahmed, Rutgers University, USA
3. FINITE ELEMENT MODELING FOR NONLINEAR MECHANICAL BEHAVIOR IN TiO<sub>2</sub> COATING ON GRID-BLASTED TITANIUM SUBSTRATES  
Julie Gimenez, Rutgers University, USA
4. MECHANICAL BEHAVIOR OF TiO<sub>2</sub> COATING ON GRID-BLASTED TITANIUM SUBSTRATES BY ENERGY DISPERSIVE X-RAY DIFFRACTION  
Luigi Balarinni, Rutgers University, USA
5. THE EFFECT OF CHEMICAL MODIFICATION ON THE THERMO-MECHANICAL PROPERTIES OF NANOCHANNEL GLASS MATERIALS  
Edward P. Gorzkowski, Naval Research Laboratory

20:00 – 22:00 Conference Banquet

**Friday, June 12, 2009**

07:00 – 08:00 Breakfast

08:00 – 08:15 Announcements

**Session VIII: SYNTHESIS AND PROCESSING III (continued)**

Session Chairs: Arvind Agarwal, Florida International University

08:15 – 08:55 CHEMICAL PHASE AND VALENCE STUDIES OF PLASMA SPRAYED COATINGS: X-RAY ABSORPTION SPECTROSCOPY RESULTS (Invited)  
Mark Croft, Rutgers University, USA

08:55 – 09:35 SHROUDED-PLASMA PROCESSING OF NANOSTRUCTURED POWDERS AND COATINGS  
Vijay Shukla, Rutgers University, USA

09:35 – 10:05 Coffee Break

10:05 – 10:45 FUNCTIONAL CERAMICS - PROCESSING FOR IMPROVED OPTICAL, ELECTRICAL, AND THERMAL PROPERTIES (Invited)  
Amiya K. Mukherjee, University of California – Davis, USA

10:45 – 11:25 PROCESSING AND PROPERTIES OF NANOSTRUCTURED  $Y_2O_3$ -MgO CERAMICS  
R.K. Sadangi, Rutgers University, USA

11:25 – 11:40 Closing Remarks

12:00 Lunch and Adjournment