

Ceramic and Composite Materials Center

Fall 2007 Industrial Advisory Board Meeting

October 16-18, 2007

Rutgers University

Tuesday, October 16 — Pre-meetings

Center for Ceramic Research Building - Room 201 - Nanoscale Ceramic Subgroup Meeting

Fiber Optics Auditorium - Ceramic Armor Sub Group Meeting

12:45-12:50 Welcome, Rich Haber

12:50-1:10 Review of New SiC Initiative for Mirror Applications, including review of Air Force Sponsored Workshop on October 10, 2007.

Invited Speakers:

1:10-1:40 1) Daniele Coralli, Sacmi Inc, Imola, Italy
Review of Sacmi's Advanced Forming Technologies, From Pressure Casting, Dry Bag Isostatic Pressing, Robotic Handling to Firing

1:40-2:10 2) Robert Aalund, Metal Processing Systems Inc, Elk Grove, IL
Review of Spark Plasma Sintering for Advanced Materials

2:10-2:40 3) Jim McCauley, ARL
The Army's Future Needs in Ceramic Armor

2:40-3:10 Dale Niesz, Rutgers
Are Microstructure Defects the Root Cause of Variability in Ballistic Performance?

3:10-3:40 Coffee Break

3:40-4:15 Review of the Army Materials Center of Excellence

4:15-5:30 Review of the Recently Completed NDE Project and Discussion of Future Project Suggestions for the Armor Thrust

5:30-6:30 Reception - Fiber Optics Lobby

Wednesday, October 17 — Technical Review — Fiber Optics Auditorium

7:45 Registration & Continental Breakfast — Fiber Optics Lobby

8:15 Welcome, Rich Haber

8:30 Introductory Remarks, Ed Clancy, NSF

TECHNICAL REVIEW — Rutgers Site

8:40 Pattern Formation for Nanoparticle Monolayers on Silicon, D. Birnie

9:00 Bulk Assembly of Nano Titania, R. Haber

9:20 Chemical Uniformity in Ceramic Powder Processing, R.Riman

10:00 Molecular Simulations of the Effect of Composition and Structure of Intergranular Films, S.Garofalini

10:20 Break

10:40 CCMC/CNDE TIE Program Review, R. Roberts (CNDE/Iowa State University), R.Haber

11:00 Defining Microstructural Tolerance Limits of Defects for SiC and Al₂O₃ Armor, R. Haber, D. Niesz

11:20 Effect of B₄C Microstructures on Ballistic Performance, R.Haber

11:40 Non-Destructive Evaluation of Ceramic Armor, R.Haber

12:00-1:00 Lunch, Busch Campus Faculty Dining Facility

1:00-1:20 Behavior of Disordered B₄C Under Stress, M. Chhowalla, D. Niesz

1:20-1:40 Sintering Model for the Densification of Non-oxide Ceramics, J. Matthewson, D. Niesz

1:40-2:40 Review of Penn State Research Activities, Jim Adair
1. Synthesis and Processing of Ceramic and Metal Colloids for MesoScale Components and Devices

2:40-3:00 Break

- 3:00-4:30 Review of University of New Mexico Research Activities, Abhaya Datye and Plaman Atanassov
1. Sintering of Heterogeneous Catalysts
 2. Fabrication of anodic aluminum oxide microstructures with alternating regions of porous aluminum oxide and aluminum metal
 3. Bio-Fuel Cells - Enzyme-Catalyzed Oxygen Reduction Reaction
 4. Oxidation Resistance of Carbonaceous Materials - Plamen Atanassov
 5. In Situ Analysis of Nucleation and Growth during Atomic Layer Deposition of Copper Barrier & Seed Films
 6. Fabrication of Pd-Based Hydrogen Separation and Storage Materials - Tim Ward
- 4:30-5:30 POSTER COMPETITION - Fiber Optic Lobby
- 6:00-9:00 Banquet - Brower Commons Dining Hall, College Avenue Campus
-

Wednesday, October 18 - INDUSTRIAL ADVISORY BUSINESS MEETING – Fiber Optics Auditorium

- 8:00 Continental Breakfast
- 8:30 Site Review UNM, Abhaya Datye
- 8:45 Site Review Rutgers, Rich Haber
- 9:00 Site Review Penn State, Jim Adair
- 9:15 NSF Evaluator Review, Jim Buckmelter
- 10:00 NSF Comments
- 10:15 Break
- 10:30 Technical Session and Strategic Planning
- 11:00 IAB Closed Session
- 12:00 Meeting Adjourns

Wednesday, October 18 - Concurrent with the IAB Meeting will be two separate tour/demonstrations for Non-IAB Members.

- 9:00 Malvern Instrument Laboratory:
The first is from Malvern Instruments who has entered into a collaborative

arrangement with the CCR. Malvern has provided a state of the art facility that includes rotational and capillary rheometry, laser scattering particle size analysis and zeta potential analysis. A demonstration of this facility will be shown with particular emphasis on how this is being utilized in Center projects.

10:00

Resodyn Mixing Facility:

Resodyn is a new member of the CCMC. They are collaborating with Prof. Riman on a new type of mixing facility for fine particle suspensions. A demonstration of a novel mixing technology that uses high-intensity, low-frequency, acoustic energy to mix will be provided. The advanced mixing technology can thoroughly and rapidly mix gases, liquids, solids, and powders without the use of impellers. This new technology, called ResonantAcoustic® Mixing (RAM), is enabling new product and process innovations. The technology is well suited for laboratory through industrial scale mixing. The demonstration will show how effectively the RAM mixer can mix powders of disparate particle sizes, very viscous compounds, and highly loaded formulations.

11:00

Tours of the Rutgers Facilities:

Tours will be provided for Members wishing to inspect specific laboratories. At the meeting a sign up sheet will be provided. The tours should last for one hour.

12:00

Meeting Adjourns