Materials Research Science and Engineering Center

Annual Meeting

August 30, 2007. Pancoe-ENH Pavilion, Abbott Auditorium

8:30 a.m. Monica Olvera de la Cruz
Director's Overview

Session I: Synergistic Linear and Nonlinear Phenomena in Multifunctional Oxide Ceramic Systems
9:00 a.m. Vinayak Dravid
Soft Routes to Hard Ceramics: Patterning and Characterization of Multifunctional Oxides
9:20 a.m. Bruce Wessels
Ferroic and Multiferroic Thin Films and Heterostructures
9:35 a.m. Arthur Freeman
Quantum Computational Approach to IRG-1: From TCO's to Multiferroics
9:50 a.m. Scott Barnett
Novel Transparent Conducting Oxide Thin Films
10:05 a.m. Thomas Mason
The Brick Layer Model Revisited: Introducing the nano-Grain Composite Model (n-GCM)
10:20 a.m. Kenneth Poeppelmeier
New Electrode Materials for Next-Generation Inorganic and Organic Photovoltaic Cells

10:35 a.m. break

Session II: Novel Methods for Nanostructured Polymer Blends and Composites
10:50 a.m. Kenneth Shull
Thermoreversible Gels as Model Soft Solids: Structure, Mechanical Response and Applications in Materials Processing
11:10 a.m. John Torkelson
Novel Processes for Microstructured and Nanostructured Polymer Blends and Nanocomposites
11:25 a.m. Katherine Faber
Soft Processing of Hard Materials
11:40 a.m. SonBinh Nguyen
Reliable Synthetic Strategies for Preparing Functional Polymer-Inorganic Nanoparticle Composites

Session III: Biomaterials
11:55 a.m. Samuel Stupp
Self-Assembly of Bioactive Nanostructures

12:10 p.m. Private Lunch for Faculty and Industrial Affiliates (Cohen Dining Room, Tech L482)

Session III (continued)
1:10 p.m. John Marko
Functional Biomaterials

Session IV: Plasmonics: Fundamentals and New Tools
1:25 p.m. Richard Van Duyne
New Tools: Spatially Correlated Plasmon Microscopy and Spectroscopy
1:45 p.m. Teri Odom
Pyramidal Nanostructures
2:00 p.m. Chad Mirkin
Plasmonic Structures Made By On-Wire Lithography
2:15pm George Schatz
Plasmonics
2:30 p.m. Robert Chang
Plasmonic Arrays: a Study on Fabrication, Phenomena, and Applications

2:45 p.m. break

Session V: Multi-Scale Structure-Property-Processing Relationships in Hybrid Nanoelectronic Materials

3:00 p.m. Mark Hersam

Nanoscale Characterization of Hybrid Nanoelectronic Materials using Scanning Probe Microscopy

3:20 p.m. Michael Bedzyk

X-ray Characterization of Hybrid Nanoelectronic Materials

3:35 p.m. Tamar Seideman

Current-Driven Dynamics in Molecular-Scale Electronics: From Nanochemistry to New Forms of Molecular Machines

3:50 p.m. – 5:30 p.m. Poster Session – graduate students and postdoctoral fellows (Pancoe 2nd floor café)

Low-Voltage High-Frequency Electro-Optic Modulators based on Novel Transparent Conducting Oxide Structures
Fei Yi, Seng-Tiong Ho

Electrical Properties and Defect Chemistry of Nanocrystalline Anatase Titanium Dioxide
E. Mitchell Hopper, Thomas O. Mason

Theoretical Models of Bifunctional Multilayers
Norm Tubman, Dan Wells, Don Ellis

A Comparative Study of Cubic $PbZrO_3$ and $SrTiO_3$ Containing Single F-Centers: Ab Initio Simulations
Yu F. Zhukhovskii, S. Piskunov, E.A. Kotomin, E. Heifets, D.E. Ellis

First-Principles Study of Multiferroic Properties of Fe3O4/SrTiO3 and Fe3O4/BaTiO3 [001] Superlattices
Minsik Park, Art Freeman

Predicting the Topologies of Copolymers Using Mechanistic Modeling
Andrew S. Cho, Lin Wang, Linda J. Broadbelt

Property Enhancement in Polypropylene/Multiwalled Carbon Nanotube Composites: Melt Mixing vs. Solid State Shear Pulverization
Saswati Pujari, Ramanathan Thillayan, Kosmas Kasimatis, John M. Torkelson, Catherine L. Brinson, Wesley R. Burghardt

Study of Thermoreversible Gelcast Porous Titanium
Kendra A. Erk, David C. Dunand, Kenneth R. Shull

Confinement and Interfacial Effects on Structural Relaxation of Thin Polymer Films Above, Below, and at the Glass Transition
Rodney D. Priestley, Koji Fukao, Linda J. Broadbelt, and John M. Torkelson

Structural Relaxation Behavior in Polymer Nanocomposites
Anny L. Flory, Ramanathan Thillaiyan, L. Catherine Brinson

A Chemical Approach Towards the Development of Robust Self-Assembling Nanofibers
Lorraine Hsu, Samuel I. Stupp

Self-assembly of Metal Nanoparticles into Plastic Nanostructures
Rafal Klajn, Bartosz A. Grzybowski

TEM Study of Ag Nanoparticles with Applications in LSPR and SMSERS
Y. Wang, L.J. Sherry, R.P. Van Duyne, L.D. Marks

Dipole Radiation in the Presence of Multilayer Thin Films
Lan Luan, P. R. Sievert, B. Watkins, W. Mu, Z. Hong, J. B. Ketterson

Near-field Study on Localization and Propagation of Optical Excitations in Semicontinuous Metal Films
Heeso Noh, Katyayani Seal, Vladimir M.Shalaev, Xiang Zhang, Andrey Sarychev, Charles Z. Ying, R.P.H. Chang, Hui Cao

Current-Induced Effects at Surfaces: The Energy Flow Dynamics of Dissipation and Desorption
Ryan Jorn, Tamar Seideman

Development of Solution Processable Thiophene-Based Organic Semiconductors Exhibiting High Electron Mobility in Field-Effect Transistors
Joseph A. Letizia, Antonio Facchetti, Mark A. Ratner, Tobin J. Marks

Determining the Conductance of Single Molecules
David Q. Andrews, Gemma C. Solomon, Richard P. Van Duyne, Mark A. Ratner

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