Interfacial and Processing Sciences

News Notes

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Environmental and Molecular Sciences Laboratory
Pacific Northwest National Laboratory

News Notes, established to help keep our Users and others who have had a connection with us up-to-date on activities, events, capabilities, and interesting results, including short summaries of the work of users.

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In this issue:

- **EMSL 2000 Update: Early registration deadline is May 15.**
- **EMSL User Summaries**

Outstanding Program at EMSL2000 Nanoscience and Nanotechnology Symposium

We are delighted at the variety and quality of speakers who are to make presentations at the *Nano* symposium during EMSL2000. We expect many interactions among the speakers, EMSL Users and potential Users, and PNNL staff. These interactions will help all of us prepare for the National Nanoscience Initiative.

Symposia Speakers (June 21 and Morning June 22)

Dr. Lynn Boatner, Oak Ridge National Laboratory, *"Smart" and "Active" Near-Surface Nanocomposites Formed Using Ion-Beam Techniques*

Dr. Bruce Bunker, Sandia National Laboratories, *Molecular Switching of Surface Chemistry for Microanalytical Systems*

Professor Tom Dickinson, Washington State University, *Scanning Force Microscope Studies of Nanometer Surface Modification of Inorganic Materials: Combining Mechanical and Chemical Stimuli*

Professor James L. Gole, Georgia Institute of Technology, *Silicon Based Nanostructures and Nanowires*

Professor Jan Hoh, Johns Hopkins University School of Medicine, *Spatially Resolved Force Spectroscopy on Biological Surfaces*

Dr. Berry Jonker, Naval Research Laboratory, *Spin-Dependent Behavior in Quantum Device Structures*

Dr. Jun Liu, Pacific Northwest National Laboratory, *Molecular Assembly Approach Towards Multifunctionalized Nanoscale Materials*

Dr. Joel Schnur, Naval Research Laboratory, *Sub-Micron Lipid Tubules and their Applications*

Professor Galen Stucky, University of California at Santa Barbara, *Multiphase Assembly of Nanoscale Materials*

Professor Zhong Wang, Georgia Institute of Technology, *Assembly of Nanoparticles and Carbon Nanotubes*

Professor Jin Zhang, University of California at Santa Cruz, *Optical Nanometer Materials*

Plenary Session (June 22 Afternoon)

Professor Viola Vogel, University of Washington, "*Learning Lessons from Nature in Nanomechanics*".

Tutorial on Scanning Probe Methods and other Nanodimensional Methods

This June 20 nanoscience related tutorial will include presentations and in laboratory demonstrations. It will be a useful introduction to some EMSL Use capabilities and staff.

EMSL2000 Information and Registration

An online registration form and additional meeting information can be found at http://www.emsl.pnl.gov. The early registration fee deadline is May 15.

EMSL User Summaries

Investigations of Organic Light Emitting Diode Materials and Foam Stability **-** Professor Allen Johnson and student John Thornton from the University of Nevada and Los Vegas have used the Quantum 2000 XPS system to look at two problems. Allen and John summarized their spring visit as follows:

We investigated the aging behavior of two foams: a standard toluene diisocyanate polyurethane formulation and a new proposed polyurethane formulation using the Quantum 2000 to do small spot chemical state analysis. We found that the new formulation had higher decomposition at equivalent environmental aging. We are using the advanced sample neutralization and small spot capabilities to handle the challenging foam samples.

We are also examining organic light emitting device materials. We are monitoring process contamination and failure modes of fabricated devices. We are using the photoemission data from the Quantum 2000 in conjunction with photoabsorption data from the Advanced Light Source at LBNL to fully characterize the electronic states of the material to understand the changes in light emission as a function of material composition. The small spot capability of the Quantum 2000 will have strong utility in the diagnosis of failed devices.

MBE Growth of β-MoO_3(001) **-** Professor Eric Altman, from the Department of Chemical Engineering at Yale University, is finishing a sabbatical visit to EMSL. During this visit he has been working with EMSL staff members Scott Chambers and Yong Liang to synthesize, by MBE, and characterize single-crystal films of β-MoO_3(001) on $LaSrAlO_3$(001). Pure and mixed-metal Mo oxides are industrially important partial oxidation catalysts for the conversion of methanol to formaldehyde. β-MoO_3(001) is a model surface that will allow important molecular-level mechanistic details regarding the precise role of Mo cations to be elucidated, and the effect of their local environment on their catalytic activity to be determined. Professor Altman plans to use methods he has learned in EMSL in his research program at Yale.