MRS MEETING SCENE
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2012 MRS Fall Meeting

2012 MRS Fall Meeting
November 25–30
Boston, Massachusetts

2012 MRS FALL MEETING

Sponsors

Meeting Day Three, Tuesday November 27

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Tuesday at the 2012 MRS Fall Meeting in Boston featured Robert Sinclair of Stanford University giving the David Turnbull Lectureship Award Presentation on the fascinating topic of "*In Situ* High Resolution Transmission Electron Microscopy of Material Reactions"—basically, watching materials reactions as they take place in an electron microscope sample stage. This is just another of many techniques that did not exist back when most of us were studying materials science in grad school.

In addition, representatives of NSF and the Defense Threat Reduction Agency (DTRA) of the U.S. Department of Defense gave their audiences the inside scoop on what types of research their agencies are looking to fund and how you can best approach them to get your piece of the funding pie.

Combined with the myriad talks going on in more than 50 technical symposia, these events made for a full and exciting day at the 2012 MRS Fall Meeting. And we're only about halfway through the week!

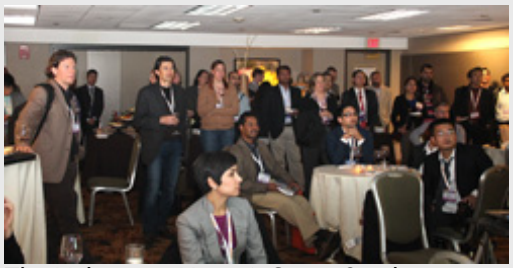
Sean Kelly of Georgia Tech for his Symposium OO poster "The Effects of High Pressure Dynamic Loading on Ni-Al Mixtures."

Sae Byeok Jo of Pohang University of Science and Technology for his Symposium W poster "Bandgap Engineering of Bilayer Graphene by Dual Molecular Doping."

TECHNICAL TALKS

Symposium E: Photovoltaic Technologies - Materials, Devices and Systems

In the past two days at Symposium E, many exciting reports on the progress of a broad range of photovoltaic materials, devices and systems were presented. The following are a few highlights of the Symposium. Harry Atwater (Caltech) shared his vision of achieving high solar cell efficiency beyond 50%; Paul Sharps (emcore) delivered an excellent overview of the current status of the development of the world's most efficient multifunction solar cells; and Lewis Fraas (JX Crystals) introduced the high efficiency GaSb IR cell for thermophotovoltaic (TPC) applications. Another interesting paper worth mentioning was presented by Ph.D. student Adem Yildirim from UNAM-National Nanotechnology Research Center, Bilkent University, Turkey. Yildirim described large-area, robust, broad-band and omnidirectional antireflective and superhydrophobic coatings based on nanostructured organically modified silica colloids that have been developed; these coatings enhance the efficiency of dye-sensitized solar cells (DSSCs) with important self-cleaning properties.



The Volunteer Meet & Greet Session generated a large turnout!

Symposium F: Oxide Thin Films for Renewable Energy Application

Engineering the Interface of Inverted Organic Solar Cells Comprising Al-doped ZnO to Enhance Photovoltage and Fill factor
Abay G. Dinku, The University of North Carolina at Chapel Hill

Abay Dinku and his colleagues have been working on quality improvement of transparent conductive oxides for energy efficient and stable solar cells. They deposited 13-15 nm Al-doped ZnO (AZO) by Pulsed Laser Deposition (PLD) and used it in solar cells with inverted device architecture. The efficiency was found to be 2.8%, but the open circuit voltage, Voc, and fill factor (FF) were very low compared to conventional PEDOT:PSS devices. This was the stimulus for Abay to further extend his work. He introduced N719 dye molecules on top of ZnO for interface modification. A very thin monolayer of dyes caused a blue shift in the binding energy of the exciton, and Voc was increased by the change in energetics. Device current was not affected, but open circuit voltage moved closer to the optimum point. This resulted in an increase in device efficiency.

Symposium O: Next-Generation Polymer-based Organic Photovoltaics

Opportunities for Organic Solar Cells to be Competitive at Generating Power on a Large Scale
Michael D. McGehee, Stanford University

This invited talk strategized on how organic photovoltaics (OPVs) can be re-examined such that they can be deployed in high power applications. In recent years, remarkable progress has been made in lowering the cost of silicon solar cells, which means that the tag line for OPV research can no longer be "replacing silicon." This talk proposed a hybrid approach in which OPVs and inorganic solar cell technologies like silicon and CIGS can co-exist inside hybrid tandem photovoltaic devices, which