Fe/Si nanoparticle acts as a "seed" and the Si filaments grow from the Fe/Si nanoparticle surface. This approach produced wires with a distribution of diameters ranging from 8–40 nm. In order to produce smaller-diameter wires, the researchers developed a post-synthesis approach. They used oxidation at elevated temperature to diffuse oxygen radially inward and shrink the Si crystalline core. Fractions were then separated according to the wire diameter using centrifugal separation. Using this method, the researchers produced a series of four crystalline Si nanowire samples whose most probable diameters were 4.5 ± 0.2 nm, 6.5 ± 0.3 nm, 9.5 ± 0.3 nm, and 23.1 ± 0.7 nm. The researchers probed the phonon bands in these nanowires using Raman spectroscopy at low enough laser intensity that temperature broadening was not a factor. Comparison of the Raman spectra of these Si nanowires showed that with decreasing diameter, the first-order Raman band at ~520 cm^{-1} develops a noticeable asymmetry to lower frequency, and the peak position downshifts.

The researchers analyzed their results based on an asymmetric line-shape model developed by Richter with an adjustable parameter (α) added to the theory that defines the width of the Gaussian phonon-confinement function. The researchers found that this parameter is not sensitive to diameter over the 4–25 nm range if they took into account the measured diameter distribution. This result is contradictory to the large range of reported α values. While attributing the difference to a variety of unknown conditions, the researchers said that the thickness and nature of the oxide coating on the wire might also impact the phonon confinement. That is, they said, the phonon in the crystalline core of the nanowire has to decay into phonons in the oxide shell. Therefore, the researchers suggested future experiments on hydrogen-terminated Si nanowires to see how hydrogen termination affects the value of the confinement parameter.

TAO XU

Bulk Metallic Glass Foam Achieves High Ductility

Metallic foams are currently used as ultralight structural materials. Bulk metallic glasses (BMGs) show exceptional strength and elasticity, in addition to other favorable properties, rendering them also useful for structural applications and potentially for biocompatible implants. A.H. Brothers and D.C. Dunand of Northwestern University considered, then, whether BMG foams offer unique opportunities in engineering structures or biomedical implants. They have found that Vit106 ($Zr_{57}Nb_5Cu_{15.4}Ni_{12.6}Al_{10}$) foam shows compressive properties not unlike ductile aluminum foam, despite a lack of ductility in monolithic Vit106. Furthermore, Vit106 contains neither precious metals nor toxic beryllium, and shows biocompatibility.

As reported in the February 18 issue of *Advanced Materials* (p. 484, DOI: 10.1002/adma.200400897), the researchers produced samples by crushing optical-grade BaF_2 and sieving it to produce and select 215–220 µm particles. These were then packed into graphite crucibles and sintered at 1250°C for 10 h under high vacuum. The 7-mm-diameter patterns were then placed in stainless steel crucibles and vacuum-dried at 300°C for 30 min. Vit106 charges were then combined with the BaF_2 patterns in preheated crucibles and melted. High-pressure argon gas was applied to the Vit106 surface to drive it into the BaF_2 pattern. After cooling, the Vit106/BaF_2 composite was ground to a desired size and the BaF_2 was leached out using nitric acid. Scanning electron microscope images of Vit106 foams of 4.5 mm diameter and 8.7 mm height show 78% open porosity with pore sizes of 212–250 µm. The thickness of all Vit106 struts is well below 1 mm, where high bending ductility is expected. X-ray diffraction shows that no crystalline phases were present in the foam. The researchers concluded that BMG foams can achieve high compressive ductility through strut bending, in sharp contrast to the brittle compressive behavior of BMG in monolithic form.

VIVEK RANJAN

Corrections

MRS Bulletin misprinted the sponsors of Symposium LL in the report on the 2004 Materials Research Society Fall Meeting (*MRS Bulletin* **30** [3] [March 2005] p. 239). Support to Symposium LL was given by the Army Research Office (United States of America) and the Engineering and Physical Sciences Research Council (United Kingdom). Following is the corrected report.

Materials Issues in Solid Free-Forming

Symposium LL brought together discussions addressing important issues related to free-forming and other parallel processing methods for advanced materials. The symposium opened with a special address titled "Electrospraying Wings of Molecular Elephants" by John Fenn (Virginia Commonwealth Univ.), 2002 Nobel Laureate in Chemistry. The presentation elucidated the electrospray technique and the significant advantage in the use for weighing large biomolecules. Several sessions followed, with invited papers from a host of eminent scientists from around the world. The first session covered the broad field of solid free-forming, with M. Edirisinghe (Queen Mary, Univ. of London), B. Derby (Univ. of Manchester and UMIST), A. Safari (Rutgers), and L. Iuliano (Politecnico di Torino) presenting talks on jet-based and other advanced materials-forming methods at both the nano- and micrometer scales. The following session covered 3D fabrication and applications (J. Beaman, Univ. of Texas; E. Sachs, MIT; Y. Gogotsi et al., Drexel). The second day started with a session on processing and fabrication of advanced materials (G. Babini and L. Settineri, Politecnico di Torino). The final session addressed electrohydrodynamic atomization and applications (J. De la Mora, Yale; K.L. Choy, Univ. of Nottingham; M. Brenner, Harvard, and I. Loscertales, Univ. of Malaga).

Symposium Support: Army Research Office (United States of America) and the Engineering and Physical Sciences Research Council (United Kingdom).

Nobel Laureate John Fenn (left) with Suwan Jayasinghe, lead symposium organizer.

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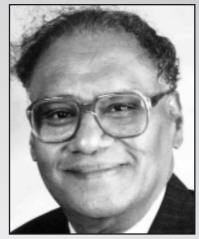
News of MRS Members/Materials Researchers

Dan David Prize Recognizes Materials Scientists' Impact on the Future


Robert Langer


C.N.R. Rao


George Whitesides

This year, the Dan David Prize has given a $1 million award for achievements in materials science, recognizing researchers' outstanding scientific impact on the future.

Headquartered at Tel Aviv University, Israel, the Dan David Prize annually awards three prizes for achievements having an outstanding scientific, technological, cultural, or social impact on the world. Each year, one field is chosen for each of three time dimensions—past, present, and future. The laureates for a given year are chosen from these fields.

For 2005, materials science was chosen to represent the future time dimension. Following a meeting of its distinguished Board at the University of La Sorbonne in Paris, the Dan David Prize announced three award recipients in this area: **Robert Langer** (Massachusetts Institute of Technology, USA) for having pioneered the development of tissue engineering and the creation of numerous novel biomaterials; **C.N.R. Rao** (Jawaharlal Nehru Centre, India), for his sustained record of scientific accomplishments in solid-state and materials chemistry; and **George Whitesides** (Harvard University, USA) for having bridged the fields of chemistry, chemical engineering, and biology to new heights through the development of novel functional materials and systems.

To foster the next generation of scholars, each laureate is to donate $15,000 as a scholarship to an outstanding doctoral candidate in materials science.

The awards will be presented at a ceremony to be held on May 23, 2005, at Tel Aviv University. The prize, established in 2001 and named after international businessman and philanthropist Dan David, is funded by the Dan David Foundation. David, inventor of automatic photo booths, is president of Photo Me International.

The Dan David Prize recognizes work in different fields each year. On the announcement of the 2005 recipients, David said, "This year, the winners of the Dan David Prize once again demonstrate exceptional accomplishment…. In the field of materials science, the Dan David Prize has recognized the exceptional contribution of scientists whose pioneering research offers a brighter future."

L'Oréal–UNESCO Award Promotes Women of Materials Science


Zohra Ben Lakhdar


Belita Koiller


Dominique Langevin


Myriam P. Sarachik


Fumiko Yonezawa

The L'Oréal–UNESCO for Women in Science Award has awarded $100,000 prizes to each of five materials scientists from five continents—Africa, Asia-Pacific, Europe, Latin America, and North America. According to the L'Oréal–UNESCO partnership, the contribution of women in science is underrepresented. One of the ambitions of the L'Oréal–UNESCO Awards is to help bridge this gap and bring international recognition to these exceptional scientists.

The 2005 awards go to **Zohra Ben Lakhdar** (University of Tunis, Tunisia), "for her experiments and models in infrared light spectroscopy and its applications to pollution detection and medicine"; **Belita Koiller** (Federal University of Rio de Janeiro, Brazil), "for her innovative theoretical research on electrons in disordered materials such as glass"; **Dominique Langevin** (University of Paris-Sud, France), "for her fundamental investigations of detergents, emulsions, and foams"; **Myriam P. Sarachik** (City College of New York, USA), "for important experiments on electrical conduction and the transition between metals and insulators"; and **Fumiko Yonezawa** (Keio University, Japan), "for her pioneering theory and computer simulations of amorphous semiconductors and liquid-metals."

The L'Oréal–UNESCO fellowship program, founded to encourage young women researchers in the life sciences, also branched out to other fields this year. Among the 15 fellows named is polymer scientist **Ketsiri Kueseng** (Walailak University, Thailand), for her work on the water- and oil-repellency of Thai silk. Kueseng has been reported missing since the tsunami of December 2004.

The awards were presented to the L'Oréal–UNESCO laureates on March 3 by Koïchiro Matsuura, UNESCO director-general, and Lindsay Owen-Jones, chair and CEO of L'Oréal. Nicole Ameline, French minister for parity and equality in the workplace, participated in the ceremony in her capacity as president of the Honorary Committee.

Pierre-Gilles de Gennes, 1991 Nobel Laureate in physics, presided over the evening's events in the presence of the members of the international jury and Christian de Duve, founding president of the awards and 1974 Nobel Laureate in medicine.

"I am interested by materials science," said de Gennes, "because this field does more than respond to a need; it creates new possibilities and, in terms of changing people's lives, it is an essential discipline."

The L'Oréal–UNESCO for Women in Science Awards, created in 1998, recognize the work of materials scientists for the first time this year and will continue to recognize materials scientists every two years. □

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