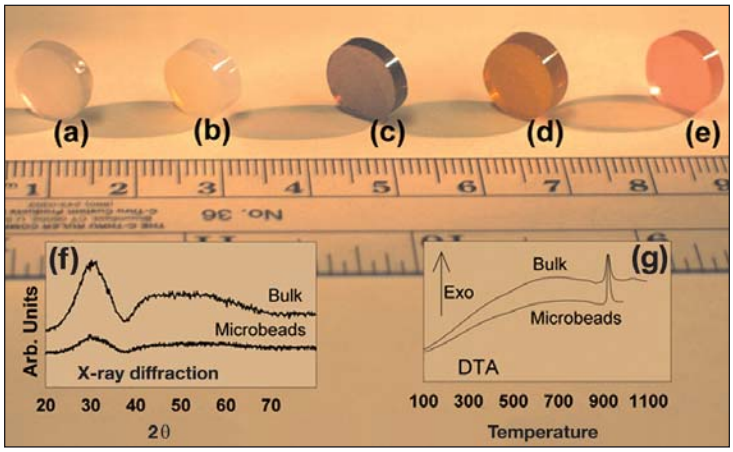

Figure 1. Bulk rare-earth aluminate glasses with the ALZ composition formed using the method described. No dopants were used for samples (a) and (b), while 5 wt% Nd_2O_3, Eu_2O_3, and Er_2O_3 were used for samples (c), (d), and e), respectively. Image (f) shows x-ray diffraction patterns, while (g) shows differential thermal analysis data for the microbead and bulk forms, revealing their amorphous nature and similar thermal behavior. Reprinted with permission from Nature ***430*** *(August 12, 2004) p. 762. ©2004 Nature Publishing Group.*

in the August 12 issue of *Nature* (p. 761), binary eutectic compositions of alumina and rare-earth oxide (Al_2O_3-RE_2O_3, RE = La, Gd, Y) as well as Al_2O_3:RE_2O_3:ZrO_2 (ALZ) ternary compositions were investigated. In their flame-spraying technique, particulate precursors were fed into a high-temperature hydrogen–oxygen flame, producing molten particles that were then quenched in water. Glassy beads of the material with diameters of less than 140 μm were obtained. Beads with diameters in the range of 75–109 μm (selected by sieving) were consolidated into bulk glasses by sintering the beads at a temperature within the kinetic window—between T_g (the glass-transition temperature) and T_x (the crystallization temperature). X-ray diffraction, differential thermal analysis, optical microscopy, and scanning electron microscopy revealed that the bulk glass that formed remained amorphous and transparent (see Figure 1).

The alumina-rich bulk glass was then heated above T_x for a short time to form a nanoscale glass–ceramic as a result of simultaneous crystallization and grain growth. The final microstructure contained ~100 nm crystalline grains, a finer and more homogeneous microstructure than that obtained using traditional methods. The glass–ceramics formed in this way also showed superior chemical, mechanical, and optical properties, as compared with silica-based glasses.

This technique yielded alumina-based glass–ceramic composites with superior fracture toughness, important for potential structural applications. This discovery of glass-forming ability and glass-converted nanoscale ceramics can be extended to other nonconventional bulk oxide systems as well, so long as a sufficiently wide kinetic window $\Delta T_x = T_x - T_g$ is available. The method could pave the path to numerous bulk oxide glasses and nanocrystalline ceramics.

GOPAL RAO

Composite Polymer–Carbon Nanotubes Function as Optoelectronic Memory Devices

In the past few years, interest in making nanoscale electronic devices from carbon nanotubes has skyrocketed, with the hopes of making devices that are smaller and more versatile. In the September issue of *Nano Letters* (p. 1587), A. Star from Nanomix Inc., G. Grüner from the University of California, Los Angeles, and co-workers report the fabrica-

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where he began his independent career in 1982.

Jagdish (Jay) Narayan (North Carolina State University) has received the **2004 Edward DeMille Campbell Memorial Lecture and Prize** of ASM International. He will deliver the Campbell lecture, "New Frontiers in Thin-Film Growth and Nanomaterials," at the ASM International Meeting in October in Columbus, Ohio.

Kyoko Nozaki (University of Tokyo) has received the John Wiley & Sons Inc. and the Society of Polymer Science, Japan (SPSJ), **2004 SPSJ–Wiley Award** for the article "Asymmetric Synthesis of Optically Active Polymers Catalyzed by Metal Complexes."

Bob R. Powell (GM Research and Development Center) has received the **GM 2003 John M. Campbell Award** for "fundamental studies of creep deformation in magnesium alloys."

Takeo Sasaki (Science University of Tokyo) has received the John Wiley & Sons Inc. and the Society of Polymer Science, Japan (SPSJ), **2004 SPSJ–Wiley Award** for the article "Photorefractive Effect of Liquid-Crystalline Materials."

Robert L. Snyder (Georgia Institute of Technology) has received the **2004 J.D. Hanawalt Award** from the International Centre for Diffraction Data (ICDD) in recognition of excellence in the field of x-ray powder diffraction.

Winnie Wong-Ng (National Institute of Standards and Technology) has received the **2004 McMurdie Award** from the International Centre for Diffraction Data (ICDD) in recognition of her contributions to the computer-aided evaluation of x-ray powder patterns and editing of the Powder Diffraction File, as well as her work in enhancing the accuracy of powder methods of x-ray crystallography.

The National Academy of Engineering (NAE) announced its list of innovative young engineers (ages 30–45) performing cutting-edge engineering research and technical work in a variety of disciplines selected to participate in the 10th annual Frontiers of Engineering symposium held in September, including MRS members:

Cameron Abrams, Drexel University

Valerie Leppert, University of California, Merced

John Muth, North Carolina State University

Hock Hg, Bell Laboratories, Lucent Technologies

Shawn Phillips, Air Force Research Laboratory Propulsion Directorate

Sujatha Ramanujan, Eastman Kodak Co.

Ainissa Ramirez, Yale University

Yang Shao-Horn, Massachusetts Institute of Technology

News of MRS Corporate Affiliates/Materials Institutions

The **Center for Biological and Environmental Nanotechnology** at Rice University (Houston, Texas) has received a $100,000 grant from the National Science Foundation to develop an introductory nanotechnology course titled "Nanotechnology: Content and Context," that is being offered jointly by the Departments of Chemistry and Anthropology this fall (*www.ruf.rice.edu/~cben*).

The **Center for Optical Materials Science and Engineering Technologies (COMSET)** at Clemson University was recently named a South Carolina Research Center of Economic Excellence and approved for a $10 million endowed professorship in optical materials (*http://comset.clemson.edu*).

The **Facilities for Materials Characterization** recently opened at Dalhousie University, Halifax, Nova Scotia, Canada, and are managed by the university's Institute for Research in Materials. The organization was developed to enhance the ability of academic, government, and industrial researchers to characterize materials (*www.irm.dal.ca/fmc.html*).

FEI Company announced that the **Ernst Ruska Center for Microscopy and Spectroscopy with Electrons** (Jülich, Germany) has selected it as a partner for developing the "next era of analytical microscopy" (*www.feicompany.com; www.er-c.org*).

Hysitron Inc. (Eden Prairie, Minn.) and **Lawrence Berkeley National Laboratory** (Livermore, Calif.) have been awarded a Department of Energy (DOE) Small Business Innovation Research (SBIR) grant for developing a quantitative *in situ* transmission electron microscope (TEM) nanoindentation apparatus. The purpose of this product is to quantitatively measure load and displacement with real-time TEM imaging in order to study the mechanical response of materials under stress or strain (*www.hysitron.com; www.llnl.gov*).

The **Oregon Nanoscience and Microtechnologies Institute (ONAMI)** held its grand opening in May 2004. ONAMI conducts research in nanoscience, materials characterization, microfluidics, and microfabrication and applies the research to both short- and long-term commercial opportunities. The institute is a combined effort of universities, high-tech industry, and national laboratories in Oregon. The facilities will be housed at the University of Oregon, Oregon State University, and Portland State University (*www.onami.us*).

Rapra Technology (Shrewsbury, U.K.), an independent polymer research and test house, has introduced a service called "polymer contents." There is no charge for this service, and it is custom-created to the needs of individual subscribers. Every month Rapra abstracts 400 journals, conference papers, and other publications. A digest of this information is available at http://www.polymercontents.com (*www.rapra.net*).

The **University of Oregon** (Eugene) has received a grant from the National Science Foundation to purchase a new scanning electron microscope configured for electron-beam lithography. The new system will upgrade and expand the capabilities of CAMCOR (the Center for Advanced Materials Characterization in Oregon), the university's nanoscience and materials science characterization and fabrication facility, which is open to researchers both on- and off-campus (*http://materialscience.uoregon.edu/*). □

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