

17th MRSI-AGM 2006 Focused on “Bio, Biomedical and Natural Materials”

The Materials Research Society of India (MRSI), Lucknow Chapter and the University of Lucknow organized the 17th Annual General Meeting of MRSI on February 12–16, 2006. The meeting included a symposium on “Bio, Biomedical and Natural Materials” and was preceded by a meeting of the Asia Pacific Academy of Materials (APAM), India Chapter. The AGM meeting, drawing nearly 300 participants, also featured Medal lectures, MRSI honor lectures, and MRSI-ICSC award lectures.

The general meeting of APAM was followed by lectures from Rajiv Raman (Banaras Hindu University) on “Form of Mendelian Factors to Nanotubes” and H.L. Bhat (Indian Institute of Science, Bangalore) on “Crystal Growth, Structural, Transport, and Magnetic Properties of Hole-Doped Rare-Earth Manganites.”

C.N.R. Rao, director of the Jawaharlal Nehru Centre for Advanced Scientific Research in Bangalore, presented the inaugural address of the 17th MRSI-AGM. R.A. Mashellkar, president of MRSI and director general of the Council of Scientific and Industrial Research, followed with the keynote address. Both researchers emphasized the importance of emerging new materials that are finding wide applications, particularly in the fields of medicine, microelectronics, and the life sciences.

In the first session of the symposium, five lectures were delivered that addressed subjects ranging from blood-compatible materials to biological activity of paclitaxel polymer conjugate with polyethylene glycol. Paclitaxel is a powerful tool in anticancer therapy. In the area of blood compatibility of materials, speakers discussed the endothelialization of surfaces and surface modifications to enhance the efficiency of cardiovascular devices. The use of biomaterials was mainly based on drugs such as hormone analogs and polymeric implants such as RISUG. With the biomedical sector in India growing at an estimated rate of 7% per year, wide applications for clinically compatible materials are being found in catheters, vascular grafts, and mammary implant sutures.

During the week, theme lectures were given on a variety of subjects such as phase transitions in biomaterials, membrane ceramides, characterization of pharmaceutical compounds using vibrational spectroscopy, and biomedical applications of plastics. Additional lectures covered the characterization of natural and synthetic polymer gels by means of polarized small-angle light scattering, the mea-



Materials Research Society of India officers and award recipients for 2006. Front row (left to right): Nair K.G. Muraleedharan (Indira Gandhi Centre for Atomic Research, Kalpakkam), B.P. Kashyap (Indian Institute of Technology, Mumbai), Poonam Tandon (Lucknow University), G. Sundararajan (Advanced Research Centre International, Hyderabad), A.K. Shukla (Central Electrochemical Research Institute, Karaikudi), R.A. Mashellkar (President, MRS-India), N. Kumar (Raman Research Institute, Bangalore), Sharada Srinivasan (National Institute of Advanced Studies, Bangalore), A.K. Ganguli (Indian Institute of Technology, Delhi), Thomas K. George (Regional Research Laboratory, Trivandrum), and A. Patra (Central Glass and Ceramic Research Institute, Kolkata); and back row (left to right): S. Sampath (Indian Institute of Science, Bangalore), S. Srikanth (National Metallurgical Laboratory, Madras Centre, Chennai), Siddhartha Das (Indian Institute of Technology, Kharagpur), S.M. Shivaprasad (National Physical Laboratory, New Delhi), Pati K. Swapan (Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore), and R.C. Budhani (Indian Institute of Technology, Kanpur).

surement of electrical and magnetic properties of modified DNA, novel materials, and ecofriendly approaches for biomaterials. Invited speakers discussed hydrogen-bonded polymers in water, liquid chromatography of macromolecules, and molecular modeling of nanoporous aluminosilicates. Aluminosilicates are an important class of chemical compound due to their wide applicability in many industries. Presentations were also given on topics such as “Heteroepitaxial Growth of Low-Dimensional Phases and Nanostructures,” “Phases and Faces of Bronzes: Archaeometallurgical Insights,” and “Recrystallization Behavior and Mechanical Properties of Some Aluminum Packaging Alloys.”

Presentations in the poster session were classified as “Bio and Biomedical Materials and Nature Materials,” “Ceramics and Glasses,” “Composites,” “Electronic and Electrical Materials,” “Magnetic Materials,” “Material Characterizations,” “Metals and Alloys,” “Nanomaterials,” and “Polymers and Miscellaneous.” The posters on crystal structure and dynamics of important biomacromolecules were of special interest to attendees. Posters that attracted maximum attention addressed the application of nanoscale particles to subjects as diverse as the manufacture of aluminum foils to

applications of nanoscale engines for drug delivery. Several posters dealt with the synthesis and characterization of dielectric, superconducting, and magnetic behavior in emerging materials. Computer simulations of model materials with desired properties also generated much interest among the participants.

A number of posters received awards at the meeting. One of these was based on the superhydrophilic and photocatalytic properties of sol-gel thin films of TiO₂. The average transmission of coated glass in the visible wavelength range was greater than 70%. A poster on [Pb(Mg_{1/3}Nb_{2/3})O₃]-xPbTiO₃ attracted much interest because of the material’s piezoelectric behavior and actuator applications. Another poster that received an award focused on cardanol-based adhesives on different substrates. Cardanol, a meta-substituted phenol, is the main ingredient of the liquid from cashews. The main outcome of this research was on the effectiveness of a blend of neoprene and phenol-cardanol for a resin system for bonding substrates. Nanotechnology by solution chemistry was the topic of another award poster. The solution chemistry approach allows the synthesis of silver nanoparticles/powders that dissolve (redisperse) in high concentration in organic solvents.

University of Lucknow Celebrates 85th Anniversary During MRSI-AGM 2006

As a part of the 85th anniversary celebration of the University of Lucknow, public lectures were delivered by C.N.R. Rao, director of the Jawaharlal Nehru Centre for Advanced Scientific Research in Bangalore, and R.A. Mashellkar, president of the Materials Research Society of India and director general of the Council of Scientific and Industrial Research. Rao spoke on "Science for Our Future," and Mashellkar discussed the topic of "Making High Technology Work for the Poor."

According to Rao, science must aim not only at the economic development of a country but also at training the workforce in areas of cutting-edge technologies. He emphasized that globalization has made science and technology very competitive, and in order to survive, Indian research must advance to the frontiers of science and technology. In 1947, he said, India and China were more or less at par with each other; but in the last 25–30 years, China has marched far ahead of India. Rao emphasized that a very important ingredient in moving India ahead is the driving force of nationalism and commitment to the cause of the country. He insisted that the leaders in scientific research develop this commitment.

Mashellkar said that simple technologies, when designed and adopted by villagers and farmers, can completely transform the quality of life in this social sector. Technological innovations and social policies must go hand in hand, he said. He further emphasized that literacy is an important component for the social development of any society. Currently, India has 200 million people who are illiterate—70 million men and 130 million women. It is a Herculean task to make them literate, Mashellkar said, but it must be done for India's strength and welfare. He also emphasized the importance of intellectual-property rights, stating that India must strengthen its research and educational institutions and become intellectually self-reliant.

This permits the material's application in optoelectronic devices. Another award poster dealt with the stabilization of high temperature of orthorhombic CaCO_3 using a reverse micelles source of calcium oxide nanoparticles. This presentation dealt with materials with ultrafine grain sizes and a high volume fraction of interfaces leading to improved electrical, magnetic, and mechanical properties. The method outlined has been applied to the synthesis of CaCO_3 and CaO_2 nanoparticles.

Among the Medal lectures, four

addressed the synthesis and application of nanoparticles and nanorods to photonic devices and in nonlinear optical materials. These are of current interest because of their potential applications in optoelectronics and multiphoton processes. The remaining Medal lectures were delivered on the topics of "Superconductivity and Magnetism in Oxide-Based Epitaxial Heterostructures," "The Use of Energy Accelerators in Materials Research," "Vibrational Dynamics of Polymers and Computational Physical

Chemistry," and "Molecular Simulations of Polymers at Various Levels," along with Medal lectures on interfacial studies using exfoliated graphite and exfoliated graphite oxide, deviation from ideal microstructure and its correlation with flow-property during superplastic deformation, and the effect of mechanical activation of some minerals and metals on their physical properties and phase transformations.

N. Kumar (Raman Research Institute, Bangalore) delivered the **Distinguished Materials Scientist of the Year** award lecture on supersolids. **G. Sundarajan** (Advanced Research Centre International, Hyderabad) and **A.R. Shukla** (Central Electrochemical Research Institute, Karaikudi) delivered the **MRSI-ICSC Superconductivity and Materials Science Annual Prize** lectures on "The Detonation Spray Coating" and "Lightweight Lead-Acid Batteries: Yoking Materials Science to Electrochemistry," respectively. **M. Deepa** (National Physical Laboratory) was awarded the **G.C. Jain Memorial Prize** for her lecture on "High-Performance Li^+ Conducting Gel Polymeric Electrolytes for Electrochromic Smart Windows."

The conference ended with the awards ceremony and valedictory comments by V.P. Kamboj of the Central Drug Research Institute and P.K. Seth of Bio-Technology Park. The MRSI-Lucknow Chapter, founded recently by R.P. Singh, Vice Chancellor of the University of Lucknow, was largely responsible for the successful organization of the 17th MRSI-AGM.

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