

INSA in 'reform mode'

The President of Indian National Science Academy (INSA), Goverdhan Mehta, recently stated that the Academy is in a 'reform mode'. There would be a sea change for 'measuring up to expectations' and for this structural changes in the functioning of INSA were underway, he said. These would include a restructured Council accomplished after a 'long time' and new Fellows to be elected with respect to their scientific contributions from 2001. Several initiatives have been implemented, he said. Important among them, was the Academy's role in popularizing science, by creating a science with society interface. This was now in the form of public lectures for school children. The

Academy's 19 local chapters were also replicating such lectures, he added. For furthering public understanding of science, there would be INSA lectures on public understanding. INSA has made a foray into science education, by recommending new curriculum for school children to the National Centre for Education Research and Training (NCERT). These recommendations, he felt, are likely to figure in future designing of course contents, as there was a 'passive reaction from them'.

The Academy has obtained for the first time, financial support from the doyens of the Indian industry, in the way of Endowments and Corpus, for example, the INSA-JRD Tata Fellow-

ship to 'promote south-south cooperation and to foster free mobility and exchange of scientists from the developing world'. This would enable S&T researchers from developing countries to pursue their work in Indian scientific research institutions. Details of this fellowship are available on the Academy's website <http://www.insa-india.org>. This fellowship is established from an Endowment received from Sir Dorabji Tata Trust. More such Endowments are in the pipeline to cover a wide range of activities, said Mehta, confident of more forthcoming support from the Indian industry.

Rice genome mapping from Syngenta

The Torrey Mesa Research Institute (TMRI), the genomics research centre for the agribusiness company, Syngenta, announced on 26 January 2001 in La Jolla, California, USA that it had in collaboration with Myriad Genetics Inc. completed the rice genome map. The company in its press release states that 'as well as the DNA sequence, the information now discovered includes

the regulatory DNA sequences controlling gene activity and the location of most of the genes'. Syngenta further states that rice genomics information will also be made available to the academic scientific community through collaboration agreements. Pertaining to the developing world, the communicate adds, 'where rice is a vital crop, Syngenta will work with local research

institutes to explore how this information can best be used to find crop improvements to benefit subsistence farmers'. Further, the release states, that 'it is our policy to provide such information and technology for use in products for subsistence farmers, without royalty or technology fees'.

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MEETING REPORTS

Quasicrystals and related materials*

The National Seminar cum Workshop on Quasicrystals and Related Materials is a precursor to the 8th International

Conference on Quasicrystals to be held in September 2002 at Bangalore. It was supported by CSIR, DST, DMRL, INSA and the Banaras Hindu University (BHU). There were 21 talks by as many speakers, who were invited from various parts of the country and abroad. The talks covered the latest developments in formation and stability, structure simulation and determination, property measurements and study of quasicrystals and related phases.

O. N. Srivastava (BHU, Varanasi) reviewed the work on quasicrystals (spread over ten years) at the Department of Physics, BHU, emphasizing on the Al and Ti/Zr bearing alloys. G. V. S. Sastry (BHU) reviewed some aspects of the decagonal quasicrystals. The occurrence of stable decagonal quasicrystals in Al-Cu-Co and Al-Co-Ni, while facilitating the study of the structure, has brought in additional complexities in terms of ordering.

*A report on the National Seminar cum Workshop on Quasicrystals and Related Materials held at the Banaras Hindu University (BHU), Varanasi during 11-12 November 2000 under the joint auspices of the Departments of Physics and Metallurgical Engineering, BHU.

Several talks focused on the forming ability and the stability criteria for quasicrystals. Based on irradiation experiments, M. Vijayalakshmi (IGCAR, Kalpakkam) argued for the 'random tiling model', which stresses on the entropy for stabilization. S. Ranganathan (Tohoku University, Japan) spoke about the formation of quasicrystals in alloys having bulk metallic glass-forming abilities. It is important to note here that such a behaviour is not observed in normal metallic glasses. The stabilization of quasicrystals by Si in Al-Cu-Cr alloys and the formation of decagonal and digonal phases with different ordering in Al-Cu-Co-Ni alloys were presented by R. S. Tiwari (BHU) and A. K. Pramanick (BHU), respectively. A surprising discovery of formation of a decagonal phase in Si was reported by A. K. Singh (BHU).

R. K. Mandal (BHU) discussed a shift in emphasis from direct space description to diffraction in Euclidean crystallography. M. Mihalkovic (Germany) described the modelling of the structure of the Al-Ni-Co decagonal phase from pair potentials and Monte Carlo simulations. Recently there has been excitement over the structural description of the two-dimensional quasicrystal – the decagonal phase – using only one tile, a decagon, instead of two rhombic tiles. The structure is generated by allowing two kinds of well-defined overlaps between neighbouring decagons. E. Lord (IISc, Bangalore) talked on generalization and decoration of the 'quasi unit cell'. Experimental results on the decagonal structure were presented by E. Abe (NRIM, Japan), who has used high-angle annular dark field technique

(HAADF) in the transmission electron microscope for studying the structure of the Al-Ni-Co decagonal phase. The HAADF technique highlights the position of heavier atoms. The structure has been interpreted in terms of single overlapping decagonal tiles. He also announced the synthesis of a stable binary icosahedral phase in his laboratory in Cd-Yb system on behalf of A. P. Tsai. The generation of pentagonal and trigonal tiles was shown by Anandh Subramaniam (IISc, Bangalore) using projection formalism. In a novel approach Arvind Sinha (NML, Jamshedpur) presented an algorithm for the growth of a Penrose tiling by fractal geometry.

K. Edagawa (University of Tokyo, Japan) showed results of his studies on Al-Ni-Co decagonal single crystals by scanning tunnelling microscopy (STM), to demonstrate that the ten-fold surface was rough with monoatomic height layers, while the two-fold surfaces were smooth. Gas molecules have a tendency to stick to sites with a high local symmetry on the ten-fold surface. In phase-sensitive radiographic studies, H. Klein (France) showed that the pores in Al-Pd-Mn icosahedral quasicrystal cannot be related to growth parameters, growth methods and chemical composition. However, argon gas was found to have a role in the pore formation. Quasicrystals show intriguing electronic and magnetic properties. Ratnamala Chatterjee (IIT Delhi) talked on probing the electronic properties of quasicrystals by swift heavy ions. Studies on the surface electronic structure of the Al-Mn-Pd icosahedral phase were reported by S. R. Barman (IUC, Indore). He showed the existence of extended states in this

class of icosahedral phase which is otherwise believed to be critical. Through microhardness measurements, N. K. Mukhopadhyay (BHU) argued the near isotropic behaviour in the hardness, which ranged from about 9 to 7.8 GPa on the ten-fold and the two-fold surfaces, respectively of the Al-Cu-Co-Si decagonal phase. This is unlike the behaviour of resistivity which displays anisotropic behaviour.

Studies on the rational approximants – the crystalline phases closely related to quasicrystals – were covered in two talks. Alok Singh (IGCAR, Kalpakkam) brought out the importance of hexagonal phases in Zn-Mg-rare earth alloys and showed the relationship of these phases to the quasicrystals. M. A. Shaz (BHU) described the existence of a new kind of structure which is a modification of the icosahedral structure with tetrahedral symmetry, with no discernible periodicities in Ti-Fe-Ni-Si alloys. Among related materials, C. D. Dwivedi and K. Mukhopadhyay (DMSRDE, Kanpur) described their experiments on synthesis of fullerenes and carbon nanotubes.

To summarize, the two-day seminar cum workshop on quasicrystals and related materials was well represented by experts in this area from institutions all over the country and abroad. The exchange of views held at the meeting was invigorating for further progress in this field of research.

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