

# Solid State and Materials Chemistry

## Foreword

It gives us immense pleasure to present this Special Issue of the Proceedings of the Indian Academy of Sciences (Chemical Sciences) to mark the Silver Jubilee of the Solid State and Structural Chemistry Unit (SSCU), Indian Institute of Science, Bangalore. This Unit was created by Professor C N R Rao, FRS, at the Institute in 1976, to give a major thrust to the then emerging discipline of solid state and structural chemistry.

Over the years, the Unit has grown from strength to strength under the dynamic leadership of Professor Rao and the sincere and hard work of dedicated faculty and students, to become a vibrant place for the pursuit of excellence in the broad area of condensed matter science, encompassing both chemistry and physics as well as experiment and theory. Moreover, the alumni of the Unit have gone on to other centres of research and teaching in the country and established themselves as successful practitioners of science in their own right. It was felt that an appropriate way to celebrate the Silver Jubilee is to bring out a Special Issue of a journal wherein both faculty and alumni of SSCU present their current research activity. It was indeed gratifying that we received an overwhelming response from the faculty and alumni to our invitation seeking their contribution to the Special Issue.

The Special Issue contains more than a score of articles describing a myriad variety of research activities in solid state science, which are at the very frontiers of current international activity. The topics covered include: self-assembly of complex inorganic solids having open architectures, nanotubes and nanowires, relaxation in binary mixtures, electron–electron interactions in chemical bonds, lithium-ion conducting perovskite oxides, *ab initio* structure determination using powder X-ray diffraction, epitaxial oxide films, quantum phenomena in magnetic nanoclusters, real space visualization of bonding effects of  $s^2$  lone pair electrons, vibrational spectroscopic studies of glasses with NASICON chemistry, properties of ferromagnetic double perovskite  $\text{Sr}_2\text{FeMoO}_6$ , impedance behaviour of metal hydride electrodes, conformations of hydrocarbon chains in intercalates of layered solids, diffusion of hydrocarbons in confined media, simulation study of water, effects of hydrogen bonds on the dynamics of water, dielectric properties of Mg/Nb/Ta oxides, self-assembling bilayers in palladium thiolates, morpholinium intercalated vanadophosphates, synthesis and properties of  $\text{MoSi}_2$ -based engineering ceramics, ceria–zirconia solid solutions, applications of self-assembled monolayers, and anionic clays – the many ways of making them. The diversity, depth and range of topics are indeed remarkable, reflecting the interdisciplinary nature of research activity of the faculty and alumni of SSCU.

We wish to place on record our sincere thanks to all the authors for their excellent contributions. We also thank the Indian Academy of Sciences and in particular Professor S S Krishnamurthy, Editor of the journal, for kindly agreeing to bring out this Special Issue.

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