

Preface

The fast depleting non-renewable energy resources and fast growing climatic changes due to CO₂ emission from the usage of fossil fuel has given impetus to shift attention towards alternate energy resources based on green technology across the globe. Therefore, the development of batteries, supercapacitors and fuel cells has taken centre stage of activity in the area of solid state ionics. Batteries and supercapacitors have great potential to be used as stationary power sources as both can deliver as well as store energy with great efficiency. Batteries can also be used as power source in hybrid vehicles for controlling the emission. Fuel cells have been another area of intense research activities as they can make an excellent mobile and stationary power source of proven high efficiency and green emission. Various types of fuel cells namely, PEMFCs, SOFCs, AFCs, PAFCs, and MCFCs, fall within the ambit of development plan. Accordingly, the goals of current research in solid state ionics are focused on the development of new electrode and electrolyte materials, and new techniques for material preparation and device fabrication, as well as towards fundamental research.

Indian solid state ionics community substantially contributes to almost all the above areas viz, development of new electrochemical material or device, through their theoretical and experimental research. The National Conference on Solid State Ionics, held biennially, brings different groups together and serves as a platform for exchange of ideas and building of collaborations. In the ninth version of this series conference, significant representations were observed in terms of quality and quantity of presentations. The presence of young researchers, particularly, brings a great hope for the future in this exciting area of research.

This special issue of the Indian Journal of Pure and Applied Physics on “Recent Advances in Solid State Ionics” contains selected papers presented at Ninth National Conference on Solid State Ionics (NCSSI-9) held at Jaypee Institute of Information Technology, Noida, India from 15 to 17 December, 2011. The conference was organized by Department of Physics and Materials Science and Engineering, Jaypee Institute of Information Technology, in collaboration with Indian Solid State Ionics Society. The conference was financially sponsored by Jaypee Institute of Information Technology, Defence Research and Development Organization (DRDO), New Delhi, India, Council of Scientific and Industrial Research (CSIR), New Delhi, India, Indian National Science Academy (INSA), New Delhi, India, and Department of Science and Technology (DST), New Delhi, India.

The special issue includes 21 research papers on a variety of subjects like, polymer electrolytes, ion conducting glasses, electrode materials, composites and mixed conductors after rigorous reviewing process.

As Guest Editor, I take this opportunity to thank the authors for submitting their manuscripts and the reviewers for their valuable comments and suggestions to ensure the high scientific standard of the articles. I would also like to express my gratitude Dr S A Hashmi and Dr Amita Chandra, Department of Physics and Astrophysics, Delhi University, Delhi, for their continued support starting from the early stage of planning to the publication of this special issue. Mr Sahshi Dhraran Nair deserves special appreciation for his painstaking approach for designing, formatting and editing the photographs. We also thank Mr Abhishek Kumar, Research Intern for the editorial assistance. Finally, I thank Mrs Poonam Bhatt, Editor, Indian Journal of Pure and Applied Physics for her sincere efforts and full cooperation in bringing out this special issue.

D K Rai
Guest Editor
Department of Physics and
Materials Science and Engineering
Jaypee Institute of Information Technology, Noida