

Saurabh S. SONI

Professor
Department of Chemistry
Sardar Patel University University



Biography

Dr. Soni, received M. Sc. & Ph. D. degree in Chemistry the Sardar Patel University in 1999 and 2003 respectively. He joined as Post Doctoral Research Fellow at Universite du Maine, France for two years. He is currently a professor in the Department of Chemistry, Sardar Patel University, India. He has published more than 45 journal papers and handled many major research projects funded by national funding agencies. He is recipient of CNRS fellowship (France), Fast Track Young Scientist Award (DST, New Delhi) and awarded with Fellow of American Chemical Society for Three Years. His area of research is dye sensitized solar cell, batteries, ionic liquids and their applications as catalyst and development of functional mesoporous materials.

Role of Effective Donors and Self-assembly in Organic Ionic Conductors for Efficient Dye Sensitized Solar Cell

Electrolyte is an important component which act as game changing player in third generation solar cells in general and Dye Sensitized Solar Cell in particular. Nowadays, organic ionic conductors received great attention due to easy processibility, better conductivity and cost effectiveness. But majority of the reported organic ionic conductors suffers with poor efficiency due to the relatively lower conductivity and required additives like Li-salts, TBP etc.

Recently, we developed a new series of solid organic ionic conductors which possess an effective donors moieties like phenothiazine/phenooxazine. Due to presence of these donors, ionic conductivity and light harvesting properties in the device increases and hence overall enhancement in efficiency is noticed. Self-assembly of organic molecules is an attractive approach for enhancement in conductivity of organic ionic conductor. We developed pipyridinium iodide based organic ionic conductor which self-assembled into organized structure that form ionic nano channels. These channels are capable for efficient ion transport and it is a sentinel approach to develop an effective, stable and robust electrolytes for energy harvesting devices like DSSCs. Moreover, these organic ionic conductors exhibit anisotropic conductivity which paves the way to assemble energy devices with greater efficiency. Both these approaches, i.e. presence of donors and self-assembled structure in an electrolyte promotes solid organic ionic conductor as a new class of solid electrolytes for DSSC and perovskite solar cells.