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Redefining the role of ionic liquids in the context of green chemistry: Supramolecularorgano-catalysis

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The adverse effect of the uses and generation of chemicals in the environment, humans, and the eco-system has urged the environment protecting agency to enforce rules and regulation that have made a renaissance in chemical research. Sustainability has become the hallmark of modern development in chemistry with increasing influence of green chemistry tools in chemistry research based organisation. The major aspect to implement green chemistry principles resides in the solvent use and the prime concern is to use green reaction media. Ionic Liquids (ILs) are hailed as future green solvents. However, combustibility and cytotoxicity of some ILs raise concern regarding their safe use as reaction medium. The fact that ILs can drastically alter the course of an organic reaction non-attainable with other reaction medium places ILs as a novel class of materials. The role of ILs in fostering sustainable chemistry development can be redefined through their non-solvent uses opening a new era of organo-catalysis. A molecular level understanding on how ILs influence organic reactions would promote their rational non-solvent applications has been the area of interest of this research group and is the context of present deliberation. The catalytic role of ILs has been revealed as ambiphilic dual activation by a relay of 'cooperative hydrogen bond and charge-charge interactions' in a variety of organic transformations. These offer in-depth analysis as to why all ILs are not equally effective for organo-catalytic uses and constitute a mass-spectrometry-based catalyst selection model by identification/quantification of the supramolecular assemblies involved during the organo-catalysis by ILs.

Biography

Asit K Chakraborti has completed his PhD at the age of 30 years from IACS, Kolkata, India and Postdoctoral studies from Clemson and Purdue Universities, USA. He is the Head of the Department of Medicinal Chemistry at NIPER, a premier pharmaceutical institute of national importance in India. He has published more than 138 papers in reputed journals, two book chapters, filed 36 patents, guided 31 Doctoral and 91 Masters' research students and is editorial board member of reputed journals. He has received several awards and honors and is the Fellow of the Royal Society of Chemistry and Indian Academy of Sciences.

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