

Foreword



At the outset, I wish with deep sense of gratitude to congratulate the editors and the authors for bringing out this volume on nonconventional solvents, which continue to attract a great deal of attention owing to their unique solvent properties, and more importantly due to much warranted and unavoidable global focus on discovering, developing and practicing sustainable synthetic methodologies for molecular synthesis and chemical processing industries. Today, it has become imperative to move fast toward eco-friendly synthetic methodologies, and desirably so the recent years have witnessed feverish endeavors toward design and development of solvent alternatives for applications in organic synthesis. In this perspective, this volume on *Non-conventional Solvents: Ionic Liquids, Deep Eutectic Solvents, Crown Ethers, Fluorinated Solvents, Glycols and Glycerol* (edited by Chhanda Mukhopadhyay and Bubun Banerjee) is a welcome addition.

Organized in nine chapters, the narrative of the book is built on sustainable chemistry, with a lot of acumen and with global perspectives based on the contributions made by different researchers. I believe that this book will prove to be a valuable resource for researchers in chemical sciences, both in academia and in industry, and in particular to those working toward discovering and developing new and improved eco-friendly methodologies for organic synthesis.

Chapter 1, "Synthesis of Bio-active Heterocycles Using Ionic Liquids," presents the use of ionic liquids (ILs) as reaction medium as well as catalyst for the efficient formation of C–N, C–O and C–S bonds. It also provides several examples of the synthesis of various heterocyclic molecules of biological importance using room temperature ILs avoiding toxic organic solvents, catalysts and ligands.

Chapter 2, "Synthesis of *Oxygen* and *Sulfur* Heterocycles Mediated by Ionic Liquids," presents an account of the utility and role of ILs as catalysts, medium and solvent in synthesizing various heterocyclic molecules containing sulfur and oxygen atoms. Also are presented in the chapter a brief history, importance, select methods of preparation and properties of ILs.

Chapter 3, “Supported Ionic Liquids for Advanced Catalytic Applications,” is an account of some of the most recent and progressive developments concerning supported ILs, from their elemental characteristics to their utilization in the synthesis of industrially significant organic compounds via catalytic pathways.

Chapter 4, “Recent Updates on Chiral Ionic Liquid-Mediated Asymmetric Organic Synthesis,” specifically deals with the chiral ILs and gives a nice account of their role in asymmetric reactions such as reductions, Michael addition, Aldol condensation, Diels–Alder reaction, etc.

Chapter 5, “Deep Eutectic Solvent-Mediated Organic Transformations,” articulates the superior and significant catalytic activity of eco-friendly and inexpensive deep eutectic solvents toward several organic transformations, reported particularly in the last ten years.

Chapter 6, “Role of Crown Ethers as Mediator in Various Chemical Reactions,” is devoted to a discussion of different roles the crown ethers play in effecting a wide range of chemical reactions and processes.

Chapter 7, “Fluorinated Alcohol-Assisted Preparation of Functional and Biologically Active Compounds,” discusses examples of various organic transformations performed in fluorinated alcohols, which promote the reactions due to their high ionizing power, low nucleophilicity and strong hydrogen-bonding ability, and are considered promising alternatives to conventional organic solvents.

Chapter 8, “PEG-Assisted Organic Transformation,” specifically discusses the merits of using different types of polyethylene glycols as reaction medium and also as catalyst and additive in organic reactions and synthesis.

Finally, Chapter 9, “Glycerol-Mediated Organic Transformations,” explores the uses of glycerol as an eco-friendly recyclable medium for developing environment-friendly synthetic procedures for the synthesis of various organic compounds.

Overall, presented in a reader-friendly manner, the book is an authoritative high-quality treatise of an important subject. A comprehensive and to-the-point account of various chemical aspects of select nonconventional solvents is described in the book. The technical material is presented with a reasonable degree of depth and breadth. Desirably, the book focuses both on the necessary basic concepts and on the application aspects together with numerous examples of the synthesis of organic molecules. The materials presented in the chapters will be very useful to readers for grasping facts clearly and understanding the issues of applications in the proper perspective. This book will also lift the academic spirit, standard and enthuse of the readers, particularly the young students toward learning and practicing more of the sustainable chemistry. The availability of this book will greatly facilitate easy learning, and I hope the book will reach the hands of all concerned stakeholders.

The editors and the authors of this volume deserve the heartfelt thanks of the community of researchers in chemical and allied sciences for making available well-

discerned and discussed materials on a subject of much contemporary interest. I convey my best wishes to the editors, the authors and all the readers.

Prof. Anil Kumar Singh,
Formerly Professor and Head, Department of Chemistry,
Indian Institute of Technology Bombay,
Powai, Mumbai – 400 076, India
Email: retinal@chem.iitb.ac.in

