PREFACE

When I was approached by Wiley to edit a book on ionic liquids in biotransformations and organocatalysis, the spontaneous question that quickly came to my mind was, *is there a gap for such a book*? The field of ionic liquids applied to biotransformations and organocatalysis has developed enormously during the last two decades. Therefore, the realization of a book that could gather, categorize, and provide an updated and complete state-of-the-art in these areas was clearly a demand. There are obviously several comprehensive reviews in the field, but I think none of them can cover the topic(s) in their widest extent. Thanks to the outstanding chapters of many world-class experts in the area, this book is now a reality that I hope will be a useful contribution for researchers in the field, both in academia and industry.

Since the beginning of my work as editor, I have made it clear in my mind that I do not want a book just covering uses of ionic liquids as solvents, albeit, of course, this topic is broad and very important (Chapters 3–7 and 9), nor a book regarding ionic liquids as "green solvents"—an unfortunate label that has surely brought more problems than advantages to ionic liquids (Chapters 1 and 7). In fact, many ionic liquids are not green, but their versatility and tunability makes us optimistic that it will be possible to combine greenness with the acquired know-how on advantages that ionic liquids may bring, for example, leading to the third generation of ionic liquids. Likewise, emerging deep-eutectic-solvents represent a promising option, and first uses in biotransformations are briefly discussed herein (Chapters 1, 5, and 7). In addition, an extensive updated state-of-the-art on toxicity and (bio)degradability of commonly used ionic liquids, together with protocols and rules applied for assessing these parameters, is provided in Chapter 7.

Quite remarkably, ionic liquids are more than mere solvents. They represent a fantastic academic tool for studying and understanding interactions with proteins, enzymatic mechanisms, and so on (Chapters 2 and 5); there are also a number of "non-solvent" approaches for practical applications, such as catalyst immobilization or activation, downstream processing, and catalyst grafting or coating (Chapters 8 and 10). Ionic liquids can also be smartly combined with other nonconventional solvents, such as supercritical fluids, or with innovative process design concepts (Chapter 4). Finally, some ionic liquids can be employed in whole-cell biotransformations, providing novel and promising approaches, including proof-of-principle for deep-eutectic-solvents and whole cells (Chapter 7).

I want to acknowledge a number of people who have made this book a reality. First of all, the greatest credits go obviously to the authors of this book, the actual and unique protagonists of this work (together with the ionic liquids!). Without their outstanding efforts, professionalism, and excellent and readily updated chapters, this project would have never been possible. Furthermore, I wish to thank Dr. Daniela Gamenara, Dr. Fabrizio Sibilla, and Dr. Andreas Buthe for many fruitful and stimulating discussions. Likewise, thanks are given to Prof. Dr. Roger Sheldon for writing the Foreword of this book. I am also indebted to Ms. Anita Lekhwani, Senior Acquisitions Editor at Wiley, for the interest and patience she has had and the hard work she has done throughout the editing process. And my thanks go as well to Dr. Edmund H. Immergut, Consulting Editor for Wiley and Wiley-VCH, for inviting me to edit this book and his trust and support during this time.

I must say that, overall, this project has been for me a fascinating and unforgettable adventure. I really hope that readers will find this book an attractive and useful tool for working in the field of ionic liquids, biotransformations, and organocatalysis. Suggestions for further improvements, data treatment, new topics, and so on are of course welcome for future editions of this work.

Pablo Domínguez de María
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