

# Preface

Heterocyclic *N*-oxides have gained in prominence in many areas of chemistry in the past several decades. In the area of organic synthesis, *N*-oxides have emerged as important substrates for regioselective functionalization of C–H bonds and cycloaddition reactions. There has also been a surge in interest in the catalytic, energetic, and photochemical properties of *N*-oxides. This volume seeks to provide an update on the recent advances in these important areas of chemistry of heterocyclic *N*-oxides. In the first chapter David E. Chavez gives an in-depth overview of the progress in the studies that aim to exploit the unique structural and electronic properties of *N*-oxides for the development of novel energetic materials (see chapter “Energetic Heterocyclic *N*-Oxides”). The moderate Lewis basicity of the oxygen atom in *N*-oxides has been employed in the design of catalysts for a variety of asymmetric transformations. Martin Kotora et al. examine the current state of the art in catalytic applications of heterocyclic *N*-oxides (see chapter “Pyridine *N*-Oxides and Derivatives Thereof in Organocatalysis”). *N*-Oxide functionality has emerged as a versatile directing group in the burgeoning field of C–H functionalization of N-heterocycles. David E. Stephens and Oleg V. Larionov survey recent advances in transition metal-catalyzed C–H functionalization of azine and azole *N*-oxides with the focus on transformations that retain the *N*-oxide functionality (see chapter “Transition Metal-Catalyzed C–H Functionalization of Heterocyclic *N*-Oxides”). Cycloaddition reactions of heterocyclic *N*-oxides play an important role in the synthesis of nitrogen-containing heterocycles. Rafał Loska discusses mechanisms and synthetic applications of cycloaddition reactions of azine and azole *N*-oxides (see chapter “Recent Advances in Cycloaddition Reactions of Heterocyclic *N*-Oxides”). The photoinduced transformations of heteroarene *N*-oxides have been intensively studied since the early days of heterocyclic chemistry. An excellent overview of the current status of photochemistry of *N*-oxides is given by James S. Poole (see chapter “Recent Advances in the Photochemistry of Heterocyclic *N*-Oxides and their Derivatives”).

The aim of this book is to shed light on some of the most exciting developments in the chemistry of heterocyclic *N*-oxides and to demonstrate the versatility of their

applications across a wide range of fields – from energetic materials to catalysis, and from photochemistry to organic synthesis.

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Oleg V. Larionov



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Larionov, O.V. (Ed.)

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