

Lithium Compounds in Organic Synthesis

Organolithium compounds are undisputedly one of the most frequently used classes of reagents in organic synthesis, accordingly all organic chemists are well aware of their importance.

However, the general treatment of this important class of compounds is often simplified and it is easy to get the impression that we nowadays know everything worth knowing. That is clearly not the case and the book *Lithium Compounds in Organic Synthesis* edited by the highly reputable lithium organic chemists Renzo Luisi and Vito Capriati shows that ongoing progress in this area is vibrant. The aim of this book, of about 540 pages and 18 chapters is to provide a useful resource for newcomers and active researchers involved in organic synthesis using organolithium compounds, whether working in academia or industry. It is divided into two parts, where the first part deals with fundamentals of organolithium compounds and gives a comprehensive overview of the latest developments in the field. Chapters 1 and 2 give an introduction to structures and reactivity of organolithium compounds via X-ray and modern computational chemistry. Chapters 3 and 4 covers less routine but novel NMR techniques for the studies of organolithium compounds and their reactivity, i.e. rapid-injection NMR, diffusion-oriented spectroscopy, and solid state NMR. Chapter 5 is devoted to the mixed complexes, and gives access to a variety of mixed complexes with a fascinating diversity in reactivity. This includes chiral ligands that induce asymmetry, organometallic species that increases the reactivity and those that enable chemoselective transformations.

The second part, which is considerably more comprehensive than the first part consists of a little more than 10 chapters deals with new lithium-based synthetic methodologies as well as novel synthetic applications of functionalized lithium compounds. Chapters 6–9 comprise a flavor of important oxygen-, nitrogen-, and sulfur-bearing lithium compounds in modern synthesis.

There is also a chapter devoted to advances in the chemistry of chiral lithium amides over the last 10–15 years, which provide a summary of basic properties, nucleophilic ability, and their use as chiral ligands and advances in structural determinations. The latter deals with the complexity often encountered with aggregation, both of homo- and

heterometal complexes. Chapter 10 covers advances in carbolithiation, with examples of different carbolithiation reactions, both asymmetric and sp^2 reactions.

Compelling insight into modern synthesis using organolithium compounds is covered in chapters 11–16. Here a number of synthetic important reactions and reagents are covered, e.g. reductive lithiation and multilithiated compounds, dearomatization and aryl migration, lithium–boron chemistry as a synergistic strategy, lithiated aza-heterocycles, and lithium compounds in cross-coupling reactions.

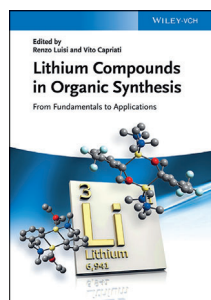
There is also chapter 17 on microreactor technology applied in lithium chemistry. Flow microreactors are ideal for many organolithium reactions and this is an area with high potential for future developments. The editors have also very insightfully added chapter 18 on practical aspects of organolithium chemistry. This is a very useful chapter for readers with no or little previous experience from practical work involving very sensitive organolithium species.

Each of the chapters in this book have been written by real experts, who have a strong background in the field and who have provided information about their own and others cutting edge discoveries as well as providing the basic foundations that dictates the reactivity of these compounds. Altogether the book will clearly function as a “handbook” for newcomers in the field that may save lots of frustrating time trying to understand, utilize and learn how to treat these compounds and mixtures inert and safe and explore their full potential. The book will also provide a good source of inspiration for further studies in the field. Although with my own background I feel that studies and understanding of aggregate, structure, and reactivity are a little underrepresented instead the main focus is devoted to the development of synthetic reactions, which largely reflects the interests of the editors.

In summary, the book is generally easy to read and each of the rather short chapters provides a good overview of the different aspects of organolithium compounds. I strongly recommend it for all synthetic organic chemists.

Göran Hilmersson
Department of Chemistry and Molecular Biology
University of Gothenburg (Sweden)

DOI: 10.1002/anie.201409264



Lithium Compounds in Organic Synthesis
From Fundamentals to Applications. Edited by Renzo Luisi and Vito Capriati. Wiley-VCH, Weinheim, 2014. 576 pp., hardcover, € 159.00.—ISBN 978-3527333431