

Modern Organocopper Chemistry; Edited by N. Krause; Wiley-VCH: Weinheim, 2002; hardback, 392 pp, \$125.00; ISBN 3-527-29773-1.

In ten chapters, this book edited by Norbert Krause presents a large cross-section of many of the most important preparative and mechanistic aspects of synthetic organocopper chemistry. The topic is, of course, very timely, given the publication date, 50 years after the pioneering paper by Gilman and coworkers on the preparation of lithium dimethylcuprate, and the authors indeed provide very insightful cross references to historical highlights of the impressive ascendancy of organocopper chemistry in the past four decades. Since the monumental effort by Lipshutz and Sengupta who covered the state-of-the-art of substitution, conjugate addition, carbo/metallo cupration, and other reactions comprehensively in *Organic Reactions* in 1992 and an Oxford University Press monograph edited by R. J. K. Taylor in 1994, this volume represents an ideal complement to the numerous more specialized review articles that have appeared in the primary literature. The authors are internationally renowned experts in organocopper chemistry, and all chapters are a pleasure to read. While there are a series of unavoidable omissions, it is clear that this book has much to offer to both the novice and the seasoned researcher who are interested in gaining a good overview of the subject. References uniformly cover developments to the end of 2000, and therefore discussions are quite up-to-date.

The question of appropriate solution and solid phase structural representations of organocopper compounds has been central to academic research in the field for the last twenty years, and it is therefore appropriate that the first chapter by Jastrzebski and van Koten is dedicated to this topic. These authors, as most others in this book, also offer a nice perspective on the history of organocopper chemistry and discuss the relevance of solid state versus solution phase structures and its implication on the reactivity of the reagents. Unfortunately, the rendering of the numerous black and white illustrations of x-ray structures could be improved, and, in particular, the absence of any color figures throughout the text is missed most here. Structure and mechanism are picked up again in the last chapter of the book by Mori and Nakamura, and while there is some overlap, for example in the discussion of higher order cyanocuprates, both chapters are overwhelmingly complementary and should most appropriately have been placed in direct sequence.

The majority of the text is dedicated to synthetic applications. Important recent developments of transmetalation reactions, which allow the use of more highly functionalized organocopper reagents are introduced in the second chapter

by Knochel and Betzemeier. The subsequent chapter by Dieter provides an extensive and well-tabulated coverage of heteroatomcuprates and α -heteroatomalkylcuprates, including all aspects of silylcupration of alkynes and allenes. The tables present a wealth of information on useful details such as the study of regioselectivity and the use of chiral ligands. Addition and substitution reactions are covered in several chapters; first in the context of oligo-ene substrates by Krause and Hoffmann-Röder. Subsequently, Breit and Demel analyze the diastereoselectivity of conjugate additions to enones and S_N2' -substitutions, and Karlström and Bäckvall discuss copper-mediated enantioselective substitution reactions and kinetic resolutions of substrates with allylic leaving groups. Very useful for novices in the field is a table on auxiliary-controlled diastereoselective conjugate additions of organocopper reagents in the former chapter, and a summary of stereochemical aspects of the opening of chiral α,β -unsaturated acetals in the latter. Feringa, Naasz, Imbos and Arnold provide a superb overview of copper-catalyzed enantioselective conjugate addition reactions of organozinc reagents in chapter 7. Finally, the coverage is rounded off by an expert and thoroughly documented essay by Lipshutz on copper(I)-mediated 1,2- and 1,4-reductions that also includes some experimental protocols, and a collage of impressive applications of organocopper chemistry in the synthesis of natural and unnatural products by Chouhan and Yamamoto.

The appearance of text and structures in this book is of high quality and very reader-friendly, even though the sometimes large, variations in font and bond size between schemes should have been corrected in the editorial process. There are only few errors, such as incorrect drawings of substituents in schemes, and both quantity and quality of references are excellent. The index covers cited authors as well as subject areas and, to a limited extent, compounds. As already mentioned, the coverage of topics in this book is reasonable but of course far from comprehensive. This reviewer would have welcomed a more thorough discussion of carbocupration, conjugate addition-enolate trapping, conjugate additions to substrates other than enones such as α,β -unsaturated esters, epoxide ring-openings, allylic substitutions of vinyl oxiranes and aziridines, and the preparation of organocopper reagents by direct insertion of Cu(0), etc. but this would have led at least to a doubling of the size of the volume. Overall, this book is a very valuable resource for students as well as seasoned synthetic chemists and can be highly recommended for institutional as well as personal purchase.

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