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Book Review

EDITED BY M. SCHLOSSER

Organometallics in synthesis—a manual (second edition)

Wiley, 2002, 1243 pp.
price £65.
ISBN 0470-84159-1 (paperback)

Organometallics in Synthesis—A Manual presents the theory and 'hands-on' protocols for use in modern synthetic laboratories. This long awaited second edition—the manual was first published in 1994—maintains the goal of the original book, to teach the basic concepts and techniques of organometallic chemistry through in the words of the author, 'useful hints, rules of thumb, and . . . carefully selected working procedures'. This is a thoroughly revised edition, almost double in size of the original, which features updated and reworked chapters to incorporate new applications and synthetic protocols, with four additional chapters on the chemistry of tin, zinc, zirconium, chromium and iron.

The usual layout of material covered in the book follows the title's philosophy, the use of organometallics in the synthesis of organic molecules. Accordingly, an overview of the underlying chemistry for each group of organometallic compounds is discussed, followed by a section describing their applications in the synthesis of target organic molecules. Each section incorporates boxed recipes of several representative examples followed by practical advice, e.g. on equipment and the suitability of reagents and substrates for the transformation in question. It is perhaps this practical aspect of the book that makes it most useful, rather than being a comprehensive review of the metal's organometallic chemistry.

There are 10 chapters in the book covering the organometallic chemistry of the alkali and alkaline-earth metals, main group elements (B, Al and Sn) and transition metals (Zn, Cu, Ti, Zr, Fe, Cr and Pd). In over 1200 pages the organometallic compounds of these elements are discussed, giving numerous synthetic procedures, including useful starting materials. The first chapter (352 pp.) on organoalkali chemistry by M. Schlosser discusses in great detail the properties, behaviour and reactivity of alkali metals. There are numerous tables (166 of them to be precise!) listing experimental conditions for the generation of organometallic reagents; representative working procedures and purity tests included. This is followed by a new chapter from J. Marshall discussing the chemistry of organotin compounds (122 pp.), focusing on ionic rather than free radical reactions involving tin. The next two chapters on boron (69 pp.) and aluminium (43 pp.) organometallic compounds, by K. Smith and by H. Yamamoto respectively, are largely unchanged from the first edition. These are followed by an excellent new chapter on organozinc written by E. Nakamura, focusing, amongst other aspects of zinc chemistry, on the properties and uses of zinc reagents in relation to that of lithium and magnesium reagents. The following chapters are on the transition organometallic chemistry of copper (B. H. Lipshutz, 151 pp.) and titanium (M. T. Reetz, 107 pp.). The emphasis here is on the use of these metals in carbon–carbon and carbon–heteroatom bond formation. The organozirconium chemistry (78 pp.) is covered by E. Negishi, followed by M. Semmelhack's chapter on iron and chromium compounds (119 pp.). Finally, the last chapter of the book, by L. S. Hegedus, covers palladium-catalysed reactions (95 pp.).

In conclusion, Schlosser's manual can be used as a valuable introduction for researchers new to a particular area of research, e.g. postgraduates, and also serves as an essential reference handbook for more experienced researchers in the field.

Athanasia Dervisi
School of Chemistry Cardiff University, UK

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