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Book reviews

The Chemistry of the Metal–Carbon Bond. Volume 4. The Use of Organometallic Compounds in Organic Synthesis; edited by F.R. Hartley, Wiley, Chichester etc., 1987, viii + 1349 pages. £199.00, ISBN 0-471-90888-6

This is the latest addition to the highly regarded series entitled 'The Chemistry of Functional Groups', under the general editorship of S. Patai, and is of considerable and direct interest to organometallic chemists. It is in two parts, with Part 1 concerned with the preparation and use of main group organometallics in organic synthesis, and consisting of six chapters dealing with the following elements: Li (mainly), Na, K, Rb, Cs (J.L. Wardell, 157 pages); Mg, Be, Ca, Sr, Ba (C.L. Raston and G. Salem, 147 pages); B (D.S. Matteson 103 pages); Al (P.A. Chaloner, 61 pages); Tl (S. Uemura, 66 pages); Si (E.W. Colvin, 83 pages). The authors have done a remarkably good job of summarizing such massive amounts of information in relatively few pages and yet keeping their accounts clear and easily readable. The balance of the distribution of space between the elements covered seems appropriate, but it is puzzling that there is no account of organotin compounds (since their use in organic synthesis has been judged extensive enough to justify the recent publication of a whole book on that topic alone), and some mention of zinc and mercury compounds might also have been expected.

Part 2 deals with the use of transition metal organometallics in organic synthesis. (In contrast to the treatment for main group elements the methods of preparation of the organometallics are not described.) It is much less comprehensive, only the elements Fe (D. Astruc, 117 pages), Rh (F.H. Jardine, 85 pages), and Ni (K. Tamao and M. Kumada, 69 pages) being dealt with in detail. Other chapters are on the specific topics of: transition metal-stabilized carbocations in organic synthesis (A.J. Pearson, 90 pages); hydrogenation (D. Parker, 68 pages), mechanism of homogeneous hydrogenation (F.H. Jardine, 22 pages); saturated carbon–hydrogen bond activation. J.R. Chipperfield and D.E. Webster, 90 pages); and supported metal complex catalysts (F.R. Hartley, 62 pages). There would clearly be material for a supplementary volume dealing with other relevant aspects of organotransition chemistry; e.g. the use of palladium compounds, asymmetric catalysis, and catalysed oxidations.

The book maintains the high standard of the Patai series. It is well produced, with space used very effectively, so that a large number of words (and/or diagrams) are packed into each page without any loss of clarity. All practising organometallic chemists should have access to this volume and its companion volumes (Volumes 1–3) in this series that deal with the metal–carbon bond, and most organic chemists would also benefit considerably from their availability.

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