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Book reviews

The Organometallic Chemistry of the Transition Metals

Robert H Crabtree
John Wiley and Sons, New York, 1992
440 pages. £16.50/$29.70. ISBN 0471 57388 4

This book is the paperback version of a hardback text published in 1988. The book comprises 16 Chapters: Introduction; General properties of organometallic complexes; The metal–carbon and metal–hydrogen bonds; Ligand substitution reactions; Complexes of pi-bound ligands; Oxidative addition and reductive elimination; Insertion and elimination: Nucleophilic and electrophilic addition; Homogeneous catalysis; Characterization of organometallic compounds; Carbenes, metathesis and polymerization; The activation of small molecules; Clusters and the metal–metal bond; Applications to organic synthesis; Oxidation and high-oxidation state complexes; Bioorganometallic chemistry. Each chapter is relatively self-contained and includes a set of problems and answers and some appropriate references.

The book is intended for senior undergraduate and graduate courses in North America and would be appropriate for second- and third-year undergraduate courses in the UK as well as for an introduction to postgraduate work.

The book is based on a course of lectures given by Professor Crabtree at Yale University and appears to be a transcription of the author's lecture notes. The personalized style, e.g. 'We will now . . .' makes the book very much more readable than most other more formal textbooks and this is a point in the book's favour. However, although basic lecture courses and introductory books can retain much of the same format and content from year to year, science moves on at an ever-increasing pace. It is disappointing, therefore, that Professor Crabtree and the publishers did not take account of this point when launching the paperback version. This book, which is published in 1992, is limited to references from 1985/1986!

In the opinion of this reviewer, and bearing in mind the limitations of student budgets, the original text should have been published in 1988 in a paperback rather than a hardback version; however, given that a paperback version was anticipated some years later, a second edition, especially for the paperback version, covering review articles and journal articles up to 1991/1992, should have been produced. For an introductory book such as this, only a modest amount of work would have been needed but it would have made all the difference giving a book that has relevance for teaching for 1992–1996; one may compare, similarly, the relevance of the original text for 1988–1992 with the relevance of this paperback, which is dated and really cannot be recommended.

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Organic Synthesis via Organometallics

Karl Dötz and Reinhard Hoffmann (eds)
Vieweg, 1992
332 pages. £37.50.
ISBN 3528 08947 4

This book, which is a compilation of contributions presented at a symposium in Marburg in 1990 aimed at increasing the dialogue between inorganic and organic chemists in this common area, reinforces this aim and as such is a very welcome addition to the chemical literature. It comprises 17 chapters.

Three chapters are devoted to polymerization reactions. Grubbs describes the preparation of polymers of predetermined structure through organometallic intermediates, using living ring-opening metathesis polymerizations as examples. Keim *et al.* report the use of homogeneous palladium catalysts containing chiral bidentate phosphine ligands to achieve the enantioselective telomerization of 1,3-dienes with formaldehyde, β-diketones, β-ketoesters and nitroalkanes. Brintzinger describes the development of chiral ansa-metallocene derivatives for α-olefin polymerization.

Two chapters discuss different ways to activate benzylic positions towards substitution by attachment to organometallic fragments. Fischer describes benzylidene complexes of $(CO)_5M$ (M = Cr, W) as C_1 (actually C_7) sources to effect, for example, the conversion of olefins to cyclopropanes, or thioketones to thi-iranes. Astruc *et al.* describe the use of cationic iron moieties to activate aromatic compounds towards catalytic and stoichiometric benzylic substitution reactions.

The applications of cyclohexadiene and cyclohexadienyl complexes to organic synthesis form the basis of three chapters. Knölker reports the trapping of cyclohexadienyl iron tricarbonyl cations with electron-rich arenes followed by oxidative cyclization as a useful methodology for the synthesis of some carbazole alkaloids. Stephenson *et al.* describe the trapping of cyclohexadienyl iron tricarbonyl cations by electron-rich olefins and arenes and by stabilized carbanions and alkylcuprates with particular emphasis on the control of the regioselectivity. Eilbracht *et al.* show that cyclohexadienes, via the Lewis-acid-promoted carbonylation of their iron tricarbonyl complexes, may be elaborated