

Organometallic Chemistry, An Overview, by John S. Thayer, Weinheim/Bergstrasse, VCH Publishers, 1988, xi + 170 pages, DM68, £23.45, ISBN 0-89573-121-5

I am sorry to say that this is not a very useful book. Its aim is to provide a potted introduction to organometallic chemistry for the person who already has a reasonably good background in chemistry. It is questionable whether anyone who would find most of the contents of this volume unfamiliar could be considered to have even a "reasonably" good background.

After a brief introduction, Chapter 2 discusses the metal-carbon bond and the routes for its synthesis. This is quite an interesting listing, but it is unfortunately little more than a listing. The most worrying feature of this section is that there is little indication of the scope (or in some instances the lack of generality) of the processes presented, with a single example being given in many cases. In Chapter 3 ionic metal-carbon bonds are considered; the most useful section is that on radical carbanions, which are frequently not well treated. Next comes a discussion of "Electron-Deficient" metal-carbon bonds. The author objects to this term, quite rightly, and one might reasonably ask why he then uses it in his title. The classical examples of these three-centre, two-electron bonds are of course to be found in alkylboranes and alkylaluminium compounds, but are also important in understanding the structures of organo-lithium, -magnesium and -beryllium compounds. The brief molecular orbital treatment given is at best misleading.

Chapter 5 moves on to consider metal-carbon σ -bonds, dealing first with the "reactive metals". There is a reasonable account of Grignard reagents, a brief description of Ziegler-Natta polymerisation and a very brief discussion of the σ -alkyl-transition metal compounds. The subsequent chapters deal with the "heavy metals" and the metalloids (boron, silicon, germanium, phosphorus, arsenic, selenium and tellurium). In the latter case I doubt the wisdom of including phosphorus or selenium, much less iodine. The metallic behaviour of these elements is a specialised topic, and space could have been saved here, to be used more profitably elsewhere. Chapters 8 and 9 discuss metal-carbon synergistic bonds, exemplified by metal carbonyls, carbene complexes, and derivatives of unsaturated hydrocarbons. Chapter 10 details polynuclear compounds, with particular reference to carbonyl clusters.

Chapters 11, 12 and 13 provide the distinctive feature of this book, focussing on organometallics in biology and the environment, with sections on medicinal uses, biochemical studies, toxicity and environmental transformations. The final chapter is an update of various of the earlier sections. Each chapter is provided with a good bibliography, and some useful references. The references run through 1985, and to 1986 in the update chapter. There are subject, author and compound indexes.

I was left wondering where one might find a market for this book. It is not suitable for even a one term course in organometallic chemistry, in either the UK or the US, and I felt that much of the treatment was extremely superficial, and trivialised the subject. The biological emphasis suggests that the book might be intended for students in biology or environmental science, and as background reading, I could see some value here. Chemistry students would, however, be well-advised to invest their money in one of several excellent textbooks of organometallic chemistry which have been published in the last few years.