

pyrrolyl, phospholyl and borolyl derivatives all receive good coverage, though I was surprised that there were no examples of the increasingly common π -thiophene derivatives. In the last 10 years there has been a great surge in interest in carbenes derived from imidazoles, pyrazoles and triazoles, and this is reflected in the chapter on *N*-heterocyclic carbenes by Herrmann, Kohl and Schwarz, which describes around three dozen complexes of these ligands with the late transition metals. Oxo and alkoxy complexes of the heavier Group 6 metals appear with great regularity in the chemical literature, and Chapter 4 collects together the syntheses of several important examples of these classes of compound and describes the formation of adducts of the oxyhalides by reaction with Lewis bases. Chapter 5 is probably of least use to the general synthetic organometallic chemist as it focuses very narrowly on the formation of highly reduced tantalum carbonyls. However, if this is an area the reader works in he will find the chapter valuable, as several of the preparations described here represent improvements over the current literature methods. Chapter 6 is devoted to derivatives of TPPTS. One of the most useful aspects of this chapter is the detailed description of the gel permeation chromatographic apparatus used to perform the separation of the sulfonated phosphines and their derivatives. The final chapter describes the preparation of a miscellaneous range of complexes, including the ubiquitous (allyl)-chloropalladium(II) dimer. However, the main emphasis is on alkylidene complexes used for the catalysis of olefin metathesis and other reactions, and on the *bis*(imido) complexes described by Gibson and Brookhart for α -olefin polymerisation.

In conclusion, there will be few organometallic chemists who do not find a number of complexes of interest in this volume. In addition there are also many useful references to the primary literature, both in terms of the original preparations and the applications of some of the compounds described in the volume. If one is to criticize the book it would be on the relatively trivial grounds of the inconsistent way in which the information on the synthesis and subsequent characterization is presented (an almost inevitable consequence of the substantial number of contributing authors) and the fact that a number of typographical errors have crept in to the manuscript. Otherwise the volume comes highly recommended for any laboratory heavily committed to research in synthetic or catalytic organometallic chemistry.

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Silicon in organic, organometallic and polymer chemistry

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This book represents the first major text to treat silicon chemistry as a whole since Eaborn published his extensive invaluable coverage of the subject, *Organosilicon Compounds*, in 1960. It is to be expected, given the advances since that time, that the two books should fulfil rather different purposes. What is certain is that both will continue to serve those involved in silicon chemistry for some considerable time to come.

In his book the author has amazingly managed to give coverage to all major aspects of current interest in organosilicon chemistry. He comments that the focus here is on silicon compounds that are amenable to synthesis. Even within this constraint the level of coverage of different topics necessarily varies considerably. For example, there is a reasonably broad coverage of silicon reagents in organic synthesis, whereas coverage of amorphous silicas and their organically modified varieties is relatively concise.

The material in the book dealing with small-molecule chemistry is particularly skilfully presented, involving a gradual build up of carefully organized classes of compounds with successive chapters extensively cross-referenced to appropriate learning points (e.g. relating to bonding or mechanism) from previous chapters. Each chapter in the book is beautifully illustrated and extensively referenced.

In terms of organization, the material appears under three general themes, each further subdivided into chapters. Part 1 sets the scene regarding fundamentals in five chapters introducing the various classes of organosilicon compounds along with bonding models. This section includes an excellent account of the mechanistic features of substitution at silicon.

Part 2, in six chapters, focuses on silicon attached to atoms other than carbon, ranging from hydrogen to transition metals. Silyl protecting groups have seen extensive application in organic chemistry and thus feature prominently. One chapter is devoted to silicone chemistry, treating the complex features of synthesis and properties in relation to application. There is further discussion of topical issues relating to silicone implants in a later chapter. The coverage of other silicon polymers, such as polysilanes, polycarbosilanes and polysilazanes, is relatively concise but incorporates sufficient background, appropriate examples, and details of the limitations and applications of these polymers.

In Part 3, where the theme relates to silicon-carbon bonds, there is extensive coverage of routes leading to silicon-carbon bond formation in Chapter 12, followed in (the final) Chapter 16 by the reverse of this, namely strategies leading to silicon-carbon bond cleavage.

Examples of the various classes of rearrangements in organosilicon compounds (Chapter 15), as well as an account of the electronic effects of silyl groups on neighbouring reactive sites such as carbene, carbocation, carbanion and radical sites (Chapter 16), are also included in this section. Chapter 13 deals with a collection of topics associated with silicon in a biological environment and, therefore, is not directly connected to the theme of Part 3, but it is nevertheless essential in terms of inclusion in a book of this type. The topics range from the occurrence and metabolism of silica by marine organisms, through various bioactive organosilicon compounds, to biological applications and important current controversial issues relating to silicone polymers.

The book finishes in the thick of the chemistry with a collection of tables providing graphical details of reactions at silicon centres.

The author, in this mammoth undertaking, has achieved his aim and portrayed a vibrant and exciting field of silicon chemistry that impacts on organic, inorganic, bioinorganic, polymer, and materials chemistry and which presents a long-term challenge for chemists. Most people working in this field will wish to own a copy of this book. It should also be available in library chemistry book collections.

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