

Buchbesprechung · Book Review

S. Komiya, *Synthesis of Organometallic Compounds*, first edition, 1997, 433 p., Chichester, New York, Weinheim, Brisbane, Singapore, Toronto, John Wiley & Sons, Inc., £ 29,95, ISBN 0 471 07195 2

The book was written by a team of authors, namely, K. Tsumi, K. Mashima, T. Ito, M. Hurano, A. Fukuoka, F. Ozawa, K. Maruoka, N. Miyaoura, T. Takeda, and S. Komiya, the editor. In the preface the authors state that this is a textbook for undergraduate students and researchers who are inexperienced in organometallic chemistry but want to enter this field. To come to the point, the book perfectly meets this demand.

The content is divided into two sections, the first section covers general concepts. The first two chapters provide a brief and excellent introduction to the field of organometallic chemistry. All important concepts (reaching from metal-halogen exchange, carbene complexes, agostic interaction, oxidative addition and so on to electron transfer) are explained and – as in all other chapters – numerous references are given. So the reader can easily look up details he is especially interested in. In the third chapter the electronic and steric effects (cone angle, bite angle) of the different types of ligands are described. The manipulation of air-sensitive compounds is the subject of the next chapter. Here lies a major advantage over many other textbooks on organometallic chemistry: the practical aspects are also discussed and examples of the single procedures are provided.

With chapter five the second section of the book begins. In this section the chemistry of the individual metals is described; representative experimental procedures for the preparation of important classes of organometallic compounds of the individual metal are included. Almost half of each chapter is devoted to these experimental procedures and often experimental tricks of the individual authors, which are not easy to find elsewhere, are included. Chapter five deals with scandium, yttrium and lanthanides (group 3). The next chapters follow the periodic table (chapter six: Ti, Zr, Hf; chapter seven: V, Nb, Ta; chapter eight: Cr, Mo, W; chapter nine: Mn, Re; chapter ten: Fe, Ru, Os; chapter eleven: Co, Rh, Ir; chapter twelve: Ni, Pd, Pt; chapter thirteen: Cu, Au, Zn), but some elements are skipped (actinides, Tc for obvious reasons; Ag, Hg). From chapter fourteen on important metals of the main groups are discussed: one chapter about the alkali metals (Li, Na, K), one about magnesium, one about boron and aluminum and the final chapter about silicon, tin and germanium.

Besides common ligands like cyclopentadienyl, carbon monoxide and alkyl, in each of the chapters of the second

section the most relevant organic ligands are discussed, *e.g.* carbene ligands for chromium and tantal, 1,3-diene ligands for iron, cobaltacyclopentadienes for cobalt, olefin complexes of nickel, π -allyl complexes of palladium and allylsilanes for silicon. Numerous examples of different applications in organic synthesis like asymmetric hydrogenation, cycloisomerization, carbometalation or hydroboration are also provided. Unfortunately some important applications of organometallic compounds are missing here, *e.g.* Grubbs' metathesis catalysts and Sharpless' aminohydroxylation are not mentioned at all.

At the end of each chapter one can find references. The literature was considered up to 1995, overall about 1500 citations are presented. At the end of the book there is an index which is short but pithy. It contains more than 500 well-chosen entries.

As one would expect for the first edition, there are several small mistakes, *e.g.* the wrong representation of the 2,2'-bipyridyl ligand in figure 2.22 on page 21, the incorrect drawing of the allene in scheme 6.2 on page 78, the "Ph" instead of "Rh" on the top of page 230 and the confusing "Pd₂(dba)₃" instead of "Pd(dba)₂" in the equation on the bottom of page 287. Usually, these would not cause any problem. But since the book was designed for beginners which will not immediately recognize such mistakes, the latter are more problematic here. Still, this should not cause serious problems because, if in doubt, the reader can look up the reference.

Unfortunately for beginners in organometallic chemistry is the fact that for only some name-reactions or name-reagents the names are mentioned. For instance one can find Riecke's magnesium, Schwartz's reagent, the Simmons-Smith reaction, Vaska's complex and Wilkinson's complex, but the Dewar-Chatt-Duncanson model, the Kumada coupling (!) and the Crabtree catalyst are described without mentioning these names. Especially amusing was the statement given on page 35 where one can read that the Schlenk technique (developed by W. Schlenk at the beginning of this century) was independently developed in Yamamoto's group (Akio Yamamoto, born in 1930) in Japan.

Overall, this book can warmly be recommended to all people who want to enter the field of organometallic chemistry. Even experienced organometallic chemists might discover some useful preparative procedures for classes of substrates with which they are not familiar yet.

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