

## Book review

### *Ferrocenes. Homogeneous Catalysis, Organic Synthesis, Materials Science*

Antonio Togni and Tamio Hayashi (eds.). VCH, Weinheim, 1995, 540 + xix pages, DM248.00.  
ISBN 3-527-29048-6

The subtitles of this book are important; it is not an attempt to cover all aspects of ferrocene chemistry but a collection of ten specialist chapters which, to some extent, reflect the editors' own interests. The book is divided somewhat arbitrarily into three parts: Homogeneous Catalysis; Organic Synthesis — Selected aspects; and Materials Science.

That the depth of treatment and comprehensiveness of such a multiauthor effort varies widely is probably unavoidable. Each chapter has been written by acknowledged experts and will prove valuable to readers seeking information on the selected topic. It is thus worthwhile listing these topics with brief comments:

Chapter 1: 1,1'-Bis(diphenylphosphino) ferrocene — Coordination Chemistry, Organic Synthesis, and Catalysis, by K.-S. Gan and T.S.A. Hor is one of the longest (100 pages), with over 450 references, reflecting the intense interest which has been shown in the complexes of this chelating ligand. It is a condensed, but on the whole readable account, packed with useful information. Structural data are collected in two tables to which there is no reference in the index!

Chapter 2: Asymmetric Catalysis with Chiral Ferrocenylphosphine Ligands (40 pages) is by T. Hayashi, himself one of the main contributors to this highly topical subject. It deals with both the synthesis and varied uses of these catalysts in expert fashion, and skillfully avoids excessive overlap with chapters 1 and 4. Since these catalysts seem likely to provide the most valuable and lasting uses of ferrocene derivatives, this account will be read with interest by all synthetic organic chemists.

Chapter 3: Enantioselective Addition of Dialkylzinc to Aldehydes Catalyzed by Chiral Ferrocenyl Aminoalcohols by Y. Butsugan, S. Araki and M. Watanabe deals with its rather restricted topic in 30 pages and in

such detail that the reader will hardly have to refer back to the original literature cited.

Part 2 begins with chapter 4: Chiral Ferrocene Derivatives. An Introduction, by G. Wagner and R. Herrmann. Most of the likely readers of this book may find that they have little new to learn from this chapter, while the true novice should certainly read it before chapters 2 and 3. The authors start badly by attributing to Westman and Rinehart (1962) the first resolution of a planar chiral ferrocene derivative; the credit rightly belongs to J.B. Thomson (Tetrahedron Letters 1959, 26). Their statement (bottom of p. 176) ..“the leaving group of any  $\alpha$ -ferrocenylalkyl compound... will always depart in the direction away from the iron atom (exo)...” ignores the fact that the rigid fused systems have been used to show that both exo and endo groups are readily lost to give the same chiral cation. They also misname such a fused system as a “1,2-ferrocenophane” (p. 199, 1.10). These, however, are minor criticisms of a chapter which treats selected aspects of chiral ferrocene chemistry in an interesting fashion.

Chapter 5: Ferrocene Compounds Containing Heteroelements, by M. Herberhold, manages to convey in 60 pages and very readable fashion much of the basic chemistry of the ferrocene system. It should appeal to a less narrowly specialised readership than the other contributions to the book and is very up-to-date.

Chapter 6: Macrocycles and Cryptands Containing the Ferrocene Unit, by C.D. Hall, is an authoritative account of a topic which has aroused much attention in the past ten years, although the work has failed to reveal the hoped-for unique properties and the interest may soon fade.

Chapter 7: Electrochemical and X-ray Structural Aspects of Transition Metal Complexes Containing Redox-Active Ferrocene Ligands, by P. Zanella (why in the part on Synthesis?) deals with an amazingly diverse range of metal complexes with ferrocenyl groups which in some cases seem to be only accidental appendages. Although the electrochemical data are described more fully than the structures, this is essentially an apparently comprehensive and certainly useful catalogue of both.

The author's comments are likely to be read with interest only by electrochemists and crystallographers.

Part 3 contains three relatively brief chapters:

Chapter 8: Ferrocene-Containing Charge-Transfer Complexes. Conducting and Magnetic Materials, by A. Togni; Chapter 9: Ferrocene-Containing Thermotropic Liquid Crystals, by R. Deschenaux and J.W. Goodby; and Chapter 10: Synthesis and Characterization of Ferrocene-Containing Polymers, by K.E. Gonsalves and X. Chen. These are clearly directed at the specialist reader in the respective field. Each presents a balanced and up-to-date picture of the state of the art. The polymer chapter concentrates somewhat on the more recent work, clearly advising the reader to consult earlier reviews.

The book is attractively produced with clear dia-

grams to the standard which chemists have come to expect. Despite the fact that a majority of the authors are not native English speakers, it is (with the exception of a few minor lapses) written in good English throughout. It will be well used in libraries serving organometallic chemists, but at the price will find few individual buyers.

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