

## Book review

Advances in Asymmetric Synthesis (Volume 2), Alfred Hassner, ed., JAI Press, Greenwich, Connecticut, 1997. ISBN 1-55938-797-1, 328 pp., Price US\$ 128.50; UK £82.50.

Two years after the publication of volume 1 of this excellent series, volume 2, edited by Alfred Hassner has now appeared.

Three of the chapters will be of particular relevance to organometallic chemists. In the first of these, L.N. Pridden deals with asymmetric synthesis of non-racemic amines via diastereoselective additions of nucleophiles to chiral 1,3-oxazolidines which, in their ring-opened forms, are chiral imines. These surrogate chiral imines are themselves prepared from  $\alpha$ -amino acids and the review discusses how addition of Grignard and other organometallic reagents to them affords chiral amines in high chemical and optical yields. The effect of Lewis acid chelators on these reactions is discussed as is the use of the reactions in the synthesis of natural products and of chiral auxiliaries. This is a useful review of methodology which can afford useful chiral synthons in optically pure form and with predictable absolute configuration.

The second relevant chapter, written by A. Guigant, concerns the synthesis of  $\alpha,\alpha$ -disubstituted  $\beta$ -diketones and  $\beta$ -ketoesters from the corresponding monosubstituted compounds and their protected counterparts. Catalysis of Michael addition reactions by cinchona alkaloids, by chiral transition metal catalysts and by chiral crown ether complexes is discussed as is the use of transition metal and phase transfer catalysts in alkylation reactions. A large part of the review concentrates on the use of chiral  $\beta$ -ketoester enolates and of chiral enamines and chiral acetals derived from these compounds as the nucleophilic component in conjugate and non-conjugate addition reactions.

The most specifically organometallic chapter in the volume is that of H.B. Kagan and O. Riant on the preparation of chiral ferrocenes. These compounds are of interest as chiral catalysts, in liquid crystals and in non-linear optics and the authors present an excellent review of the syntheses of such compounds both with planar chirality and with lateral chirality using a large variety of chemical and biochemical methods.

The other three chapters, whilst of less direct interest to the organometallic chemist, will nevertheless be of considerable interest to a wider audience. Two chapters concern biocatalytic methods for the synthesis of pure chiral building blocks and target molecules. The first of these is by E. Santaniello and P. Ferraboschi and the second is by N.J. Turner and S.M. Roberts. Neither chapter attempts to be comprehensive but some good examples are shown and the reader will be encouraged to consider using biological methods of synthesis by following up some of the books and reviews cited in these chapters. A final chapter by E. Winterfeldt, C. Borm and F. Nerenz (the first in the book) considers the preparation of chiral cyclopentadienes and their application in the synthesis of chiral compounds using Diels Alder and retro-Diels–Alder reactions. These either show enantioselectivity themselves or asymmetric induction occurs in reactions on the Diels Alder adducts (some of which involve organometallic reagents). Retro-Diels–Alder reactions then regenerate the chiral cyclopentadiene and give new chiral synthons.

This compilation, lives up to the promise shown by volume 1 and will be of value to all chemists with an interest in asymmetric synthesis.

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