

## Book Reviews

**Iron Compounds in Organic Synthesis.** By A. J. Pearson. Academic Press: London, 1994, 201 pp., hardback £ 35. ISBN 0-12-548270-1.

The present new book on *Iron Compounds in Organic Synthesis* by A. J. Pearson is the latest edition in the series *Best Synthetic Methods* by Academic Press and follows recent treatments of *Tellurium in Organic Synthesis* by N. Petragnani and *Lanthanides in Organic Synthesis* by T. Imamoto. The series has been launched in 1985 with *Palladium Reagents in Organic Synthesis* by R. F. Heck.

The book is divided in six chapters and contains an index of compounds and methods. At the end of each chapter, a list of about 10 selected examples of very useful experimental procedures concerning the chemistry of this chapter are provided along with the references.

The first chapter describes the use of iron carbonyls (pentacarbonyliron, nonacarbonyldiiron, and dodecacarbonyltriiron) in organic synthesis. The applications discussed in detail are double bond isomerizations, dehalogenations, functional group interconversions, and carbon monoxide insertions.

The first part of chapter two deals with the synthesis and reactivity of neutral alkeneiron (tetracarbonyl[ $\eta^2$ -alkene]iron complexes). The second part treats cationic alkeneiron complexes, the so-called [Fp- $\eta^2$ -alkene]<sup>+</sup> complexes (where Fp = Fe(CO)<sub>2</sub>- $\eta^5$ -C<sub>5</sub>H<sub>5</sub>). Reactions of these cationic olefin complexes with nucleophiles as well as the stereoselectivity of the products are discussed.

Chapter three summarizes the chemistry of  $\eta^1$ -allyl-Fp complexes,  $\eta^3$ -allyliron complexes,  $\eta^1$ -acyliron complexes, and ironcarbene complexes. Synthetic methods discussed in this chapter include the [3+2] cycloaddition chemistry of allyl-Fp developed by Rosenblum, the stereoselective synthesis of lactones *via* ferrelactones applied by Ley, as well as enantioselective syntheses using the optically pure [ $\eta^5$ -Cp(CO)(PPh<sub>3</sub>)Fe]- $\eta^1$ -acetyl complex described by Davies.

The chapters four and five represent the major part of the book (98 pages), which of course also reflects the research interests of the author. Chapter four describes the chemistry and synthetic applications of tricarbonyl( $\eta^4$ -1,3-diene)iron complexes. In these complexes the tricarbonyliron fragment is used as a protecting group for reactive dienes, as a stereodirecting group because of its sterical demand, for the activation of dienes towards nucleophilic additions, and for the stabilization of labile diene systems. Chapter five combines the chemistry of cationic tricarbonyl( $\eta^5$ -pentadienyl)iron complexes and of ferrocene derivatives. Due to their strong electrophilicity the cationic dienyl-tricarbonyliron complexes offer ample opportunities for the formation of carbon-carbon and carbon-heteroatom bonds by reaction with the appropriate nucleophiles. This fact is exemplified by what can be only a limited selection (because of the space limitation) of applications to organic synthesis. The section dealing with ferrocene derivatives includes the synthetic applications of optically pure ferrocenephosphines which are useful chiral ligands for asymmetric catalysis (*e.g.* the Hayashi coupling).

In the final chapter of the book the chemistry of arene-iron complexes is described. It is shown that nucleophilic additions to CpFe-arene complexes and to bis(arene)iron complexes are potentially useful for organic synthesis.

The book is well organized and written in an understandable way also to the non-specialist. It covers the literature until 1992. Only few mistakes were found and only few things are missing. In conclusion, it represents a very nice actual survey on organoiron compounds in synthesis and provides useful experimental procedures. The book is written by one of the leading researchers in the field which is reflected in its high quality. It is strongly recommended to everyone who is interested in organoironchemistry.

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