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Book reviews

Organic Reactions. Volume 48, L.A. Paquette (ed. in chief), Wiley, New York, 1996, pp. 880, UK £75.00, ISBN 0-471-14699-4

This volume is the latest addition to this classical series of in-depth discussions of organic reactions, and it lives up to the high standard set by its predecessors. It is of particular relevance to organometallic chemists. It consists of only two chapters, one on the Katsui–Sharpless epoxidation of allylic alcohols and the other on radical cyclisation reactions. As always, the subjects are presented with the experimentalist firmly in mind; detailed experimental details are given, in addition to tables that include all of the examples of the reaction that the authors have been able to find.

The chapter on the Katsui–Sharpless epoxidation reaction, written by T. Katsui and V.S. Martin, deals with the use of the titanium(IV)-tartrate catalyst in asymmetric epoxidations, in kinetic resolution of racemic allylic alcohols, and in oxidation of sulfides, selenides and amines. The mechanism of the reaction is briefly discussed, and scope and limitations are dealt with from the point of view of substrates, catalyst modification, stereoselectivity, chemoselectivity, regioselectivity and product stability. Both stoichiometric and catalytic reactions are discussed, as is application of the reaction to allylic, and homo-, bishomo- and trishomo-allylic alcohols and unfunctionalised olefins. There is a section on synthetic applications of the products of the reaction, and the method is briefly compared with other available methods for the preparation of non-racemic epoxides. The section on experimental conditions gives an in-depth discussion of the preparation of catalyst, the nature of the peroxide used, and the effects of solvent, molecular sieves, reaction conditions and work-up on the reaction. Full experimental details are given for a series of reactions of stoichiometric and catalytic epoxidations of various allylic alcohols, and kinetic resolution of allylic alcohols, as well as an example of asymmetric oxidation of a sulfide. There are nearly 200 pages of tabulated examples and 834 references.

The chapter on radical cyclisation reactions, by Giese et al. from the University of Basel, is timely. It begins with sections on mechanism and regio- and stereochemistry which introduce the key features of the method in forming a variety of useful ring compounds.

A section on scope and limitations indicates the most popular methods for conducting radical cyclisations, and metal hydride initiation is dealt with, in addition to fragmentation, thiohydroxamate, atom transfer, radical coupling and redox methods. Sequential or tandem reactions are also discussed, and the method is compared with other cyclisation methodology. As usual, a series of well chosen examples of experimental procedures are given and there are 472 pages of tabulated examples and 997 references.

This volume, like its companions, is a ‘‘must’’ for any chemistry library and, at £75.00, represents extremely good value for money.

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Enantioselective Reactions in Organic Chemistry, O. Cervinka, Ellis Horwood, London, 1995, pp. 194, UK £88.95, ISBN 0-13-276239-0

This book, published by Ellis Horwood in association with Academia, Prague, is a translation by Z. Prochazka from the Czech original. The book has an interesting format, being divided into two distinct sections, each of which has its own combined reference section.

The first section (Chapters 1–7) deals with the theoretical and historical aspects of the subject, simple notions of chirality, conformational analysis and nomenclature being assumed of the reader. In this section there are chapters on methods of resolution of enantiomers and behaviour of enantiomers under chiral conditions. These lead to a chapter on asymmetric reactions and Cram, Felkin–Ahn, Cornforth and Prelog models are discussed, as are attempts at quantitative evaluation of asymmetric induction. This introductory section finishes with a discussion of reactions in which the chiral component is used in stoichiometric amounts,

and various organometallic reactions such as the Meerwein-Ponndorf-Verley reduction, organoborane reductions, Grignard reactions and modified chiral lithium aluminium hydride reagent reductions are included here.

The second half of the book (Chapters 9–17) contains a chapter on asymmetric reactions catalysed by transition metal complexes. This includes asymmetric hydrogenation, hydrosilylation, hydroformylation and isomerisation, and the nature of ligands and their synthesis are discussed. There is also a chapter on reactions which use a chiral auxiliary reagent. Such topics as Sharpless epoxidation and oxidation, asymmetric hydroboration, asymmetric Diels Alder reactions, use of lithium enolates, enantioselective aldol condensations and addition of organometallic reagents to aldehydes and ketones are among those discussed here. There are also very brief chapters on the 'chiral pool' and on enantioselective reactions catalysed by enzymes.

This book is an excellent primer to the subject, with well chosen references to direct the reader to more advanced discussion of the individual topics. There are some typographical errors, perhaps inevitable in a translated work. The main drawback is that the price of £88.95 for 194 pages will deter most of its potential readership from purchasing a personal copy.

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