Asymmetric Organocatalysis: From Biomimetic Concepts to Applications in Asymmetric Synthesis; by A. Berkessel and H. Gröger; Wiley-VCH: Weinheim, **2005**, hardcover, 440 pp, € 149, ISBN 3-527-30517-3

Asymmetric Organocatalysis – a new powerful methodology for the catalytic production of enantiomerically pure organic compounds and one of the fastest growing and competitive research areas in synthetic organic chemistry today. The number of organocatalytic reactions is steadily increasing and new asymmetric reactions which proceed with high enantioselectivities and in excellent yields are constantly being reported. That the reactions can usually be performed in wet solvents under an aerobic atmosphere in the presence of inexpensive, readily available and non-toxic organocatalysts offers a great practical advantage. This novel type of catalysis is especially attractive for the preparation of compounds that do not tolerate metal contamination.

To take into account the rapid progress in the area, this book on *Asymmetric Organocatalysis* emerged timely and represents an excellent state-of-the-art summary of the organocatalytic methodology available up to early/middle 2004.

The contents of this book are arranged overall on 440 pages and in 14 main chapters, each with a list of references at the end, providing the reader with an easy access to more detailed information if required. A comprehensive list of contents, which allows one to locate quickly the type of reaction catalyzed, is given.

The book starts with an interesting introduction to the field of organocatalysis and an overview of the new basic aspects of asymmetric synthesis with organic catalysts. The advantages of solving problems of enantioselectivity by employing reactions catalyzed by selected chiral organic molecules are emphasized.

Further, the structure of the book and general mechanisms in organocatalysis ('covalent' and 'non-covalent' catalysis) are described in Chapter 2.

Chapter 3 is devoted to nucleophilic substitution at aliphatic carbons and concludes with contributions covering aspects of the development of highly efficient organocatalysts for α-alkylation of α-amino acid derivatives, cyclic ketones and acyclic substrates, as well as halogenation of alkane C–H bonds.

Chapters 4–7 focus on nucleophilic addition to C=C, C=N, C=O, N=N, N=O double bonds. Readers may be amazed to learn about the wide variety of developed chiral organocatalysts for different transformations including Michael, Mannich, Morita–Baylis–Hillman, Darzens, Stetter, aldol, hydrocyanation, and allylation reactions. To the reader's delight, all historical aspects are included. In the chapter on cycloaddition reactions, the reader is informed, for instance, that the first organocatalytic asymmetric Diels–Alder reaction was reported in 1989 by Kagan et al., who investigated alkaloid bases, prolinol, and *N*-methylephedrine as organocatalysts and the first highly enantioselective [4+2]-cycloaddition reaction was developed in 2002 by the MacMillan group, who used amino acid derived organocatalysts, such as imidazolidinones, as catalysts. Different types of cycloaddition reactions which are based on use of organocatalysts are further described.

The recent trends in the field of enantioselective protonation reactions are demonstrated in chapter 9.

It is apparent from chapters 10 and 11 that huge advances in the fields of asymmetric organocatalytic reduction and oxidation reactions have been achieved in the recent years. Emphasis is placed upon key developments, which are illustrated with attractive and useful examples. Among them, the Corey–Bakshi–Shibata reduction stands out; this is the most widely applied procedure and affords excellent results for a wide range of ketones and is, therefore, one of the highly topical themes in this context.

Chapters 12 and 13 cover the important recent developments in kinetic resolution of racemic alcohols and amines, and organocatalytic enantioselective anhydride transformations.

In the last chapter, special attention is given to the increasing interest of chemical industry in organocatalytic reactions as a potential solution for large-scale applications. The beneficial impact of organocatalytic reactions on large-scale production of chiral building blocks is discussed by considering selected case studies such as Juliá–Colonna-type epoxidation, hydrocyanation of imines, alkylation of cyclic ketones and glycinates and the Hajos–Parrish–Eder–Sauer–Wiechert reaction.

The appendix contains typical examples of organocatalysts together with their reaction scope and valuable information on their availability.

On the whole, the authors succeeded in covering a very broad range of reactions that are catalyzed by organic catalysts, and offer readers an excellent overview of the current situation in the field of asymmetric organocatalysis.

This book can be recommended for all scientists working in the area of asymmetric catalysis, whether in industrial research and development or at the universities. Postgraduate students and postdoctoral researchers who have begun work on this rapidly growing field would derive considerable benefit from reading it.

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