Asymmetric Organocatalysis – Workbench Edition

Editors: Benjamin List and Keiji Maruoka
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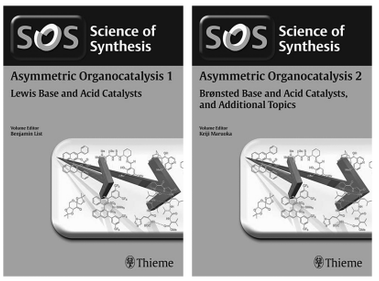

The area of organocatalysis has been one of the most dynamic and rapidly growing fields in organic synthesis over the last decade, largely due to its great potential for realizing highly complex, effective and selective asymmetric transformations. With its newest release "Asymmetric Organocatalysis", the Science of Synthesis Reference Library series now sets out to provide a comprehensive overview of its current state of the art.

"Asymmetric Organocatalysis", edited by Benjamin List and Keiji Maruoka, is published as a two-volume book with around 950 pages each, and intuitively divided into five main sections: Lewis base and acid catalysts in Volume 1, and Brønsted base and acid catalysts as well as additional topics in Volume 2. Both volumes are opened with graphical abstracts of the individual chapters and detailed tables of content. The different chapters are written by renowned and experienced experts, who are leaders in their respective fields, and deal with more specific topics – mostly a certain type of transformation or the synthesis of a class of organocatalysts – in detail. The chapters are very well ordered, which allows the reader to approach the book not only as an encyclopedia but also in a more textbook-like fashion.

Thus, the first section of Lewis base catalysis opens with classical enamine catalysis starting from the Hajos–Parrish–Eder–Sauer–Wiechert reaction, and the many applications of enamine catalysis for aldol, Mannich and Michael-type reactions. The α-functionalization of carbonyl compounds then leads to SOMO and iminium-ion catalysis, acyl-transfer catalysts (DMAP and non-DMAP like) and three chapters on carbene catalysis. The section closes with chapters on the (aza)-Morita–Baylis–Hillman reaction and phosphine catalysis for olefin activations. The following rather short section titled "Lewis acid catalysts" presents the asymmetric olefin epoxidation using chiral ketones, and a final chapter gives an overview of various other organic Lewis acids and their applications.

In Volume 2, the section of Brønsted base catalysis begins with a chapter on guanidine and amidine catalysts, before thoroughly dealing with the important class of *Cinchona* alkaloids and multifunctional derivatives thereof. The bigger part of volume two is however devoted to Brønsted acid catalysis, i.e. chiral phosphoric acid catalysts and, most importantly, hydrogen-bonding catalysts like thioureas. The "Additional Topics" section finally presents phase-transfer catalysts, solid-supported and peptide catalysts and contains chapters on mechanistic and computational studies of catalytic cycles. Chapters on cascade reactions, combinations of organocatalysis with metal and biocatalysis and industrial applications of organocatalysis complete Volume 2.

As is to be expected, "Asymmetric Organocatalysis" clearly focuses on synthetically useful transformations and procedures. Syntheses of actual catalysts are dealt with in separate chapters. Detailed reaction conditions are often presented in the form of representative experimental procedures, and many tables serve to illustrate the reaction scope and limitations. However, "Asymmetric Organocatalysis" is not a mere collection of useful reactions, but also offers brief yet highly useful comments on reaction mechanisms, possible transition states and explanations for the observed stereochemistry, with the usefulness of these comments clearly reflecting their high-profile authorships.

Generally, the information is very clearly structured into explanatory texts, reaction graphs and tables, and experimental procedures. The layout and graphical presentation is consistently excellent, as is the choice and quality of the presented information. Thus, doing focused research on selected topics is easy, and browsing through the chapters provides many ideas and inspirations even with no specific question in mind.

"Asymmetric Organocatalysis" certainly does not attempt to provide a complete overview of *all* the known reactions in the field – an attempt which due to the astronomic amounts of scientific literature would in all likelihood be futile anyways – but presents all the central aspects in this highly complex and sometimes convoluted area of research in a clear and concise fashion. Compared to other books in the area, "Asymmetric Organocatalysis" offers a remarkable high degree of information density, while still avoiding to get lost in a plethora of details. The struck balance between completeness and brevity makes the books highly useful for all chemists working in the field of organocatalysis, but also as a guide for advanced students and a valuable resource for teachers and lecturers.

In summary, Science of Synthesis' "Asymmetric Organocatalysis" provides a dependable source of high-quality information. While the hardbound edition comes at a rather steep price, it will most certainly be a safe asset to scientific libraries, dedicated workgroups and everyone with access to the online subscription of Science of Synthesis. Furthermore, a workbench edition priced at € 249.00 for a one and € 449.00 for both volumes, available from May 2012, provides an excellent value and an attractive offer also for smaller work groups.

In any case, the wealth and clarity of information in Science of Synthesis' "Asymmetric Organocatalysis" should encourage both specialists and non-experts in the field to take a look in this excellent overview and discover the ever-growing and fascinating world of asymmetric organocatalytic transformations.

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