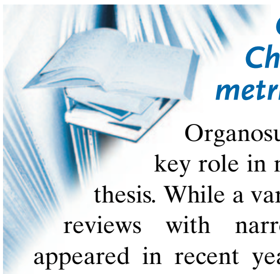

Organosulfur Chemistry in Asymmetric Synthesis

Organosulfur chemistry plays a key role in modern asymmetric synthesis. While a variety of more specialized reviews with narrower objectives have appeared in recent years on this subject, the present work provides a broad, thorough, and well-balanced coverage that will prove a valuable and timely asset to the organic chemistry community. The editors have assembled contributions from leading international experts to produce a well-organized and highly informative book.

The first two chapters, by Kagan and by Drabowicz and colleagues, cover the asymmetric synthesis of chiral sulfoxides and that of sulfinate esters, respectively. The sulfoxide group is central to the subject of this book, and Chapter 3 by García Ruano and colleagues provides a detailed review (over 100 pages) of asymmetric transformations mediated by it. The synthesis and applications of chiral dithioacetals (Page and Buckley), sulfur ylides (Brière and Metzner), sulfoximines (Worch, Mayer, and Bolm), and sulfinamides, including sulfinylimines (Senanayake, Han, and Krishnamurthy) are described in Chapters 4–7, respectively. The use of chiral sulfoxides as ligands in asymmetric catalysis is covered in Chapter 8 by Fernández and Khiar, while catalytic asymmetric reactions of alkenyl and β-keto sulfones are described by Carretero, Arrayás, and Adrio in Chapter 9. In contrast to sulfoxides, where the sulfur atom can be stereogenic, the sulfone moiety is achiral, but serves as an activating group for reactions promoted by chiral catalysts to afford the corresponding products enantioselectively. Carbanions stabilized by sulfenyl, sulfinyl, or sulfonyl groups can all be employed in asymmetric reactions, and are the topics of Chapters 10 (Nakamura and Toru), 11 (Volonterio and Zanda), and 12 (Gais), respectively. While the stereogenic sulfinyl group provides a direct means for stereocontrol of new centers created via the corresponding carbanions, enantioselective reactions of the analogous sulfenyl and sulfonyl species again require an external source of chirality (base, ligand, etc.) or an established stereocenter on the backbone of the substituent. The degree of configurational stability of such carbanions can lead to complex kinetic behavior, which is addressed in detail in these chapters. The last chapter, by Balcells and Maseras, provides rationales based on computational studies of some of the key phenomena encountered in earlier chapters.

In general, the book offers much more than a compilation of reactions and results. Most chapters also provide detailed mechanistic explanations for the observed stereoselectivity based on, for example, stereoelectronic, steric, conformational, and chelation effects, as well as reaction dynamics, as appropriate to each topic. Each chapter includes an introduction to provide historical context and useful references to earlier reviews and landmark developments. Most chapters end with a brief summary or conclusion. Literature coverage is up-to-date, with the majority of chapters citing references up to 2007. The 16-page index is sufficiently detailed to find specific information quickly and efficiently.

Although the book is generally well-written, with clear graphics and lucid explanations, occasional typographical errors are present, as well as a few instances of incorrect or inconsistent compound numbering and misspelled names of cited authors. There are some differences between chapters in the level of detail presented, as some authors focus on well-chosen examples of reactions or structures to illustrate key principles, whereas others provide tables of specific results. In general, however, the material and manner of presentation is appropriate for the subject of each chapter, and some differences in style are to be expected in a multi-author work such as this. The chapters are generally highly complementary, with a minimum of overlap. A minor exception is the rather similar discussion in Chapters 1 and 2 of the Andersen method for preparing pure enantiomers of sulfoxides from the respective diastereomers of menthol sulfinates, and of subsequent variations of this method (e.g., Scheme 1.3 covers similar ground to Equation 2.12 and Scheme 2.12, while Scheme 1.6 and 2.13 are also closely related).

Overall, this book is a considerable achievement by the authors and editors with respect to both scientific content and presentation. It defines the field as it now stands and will be of value to readers for many years to come. It is required reading for any researcher interested in organosulfur chemistry, as well as for the many organic chemists engaged in asymmetric organic synthesis in both academia and industry.

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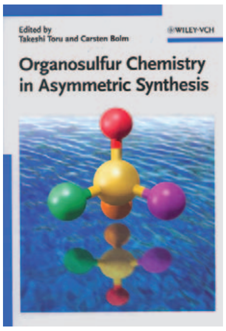

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