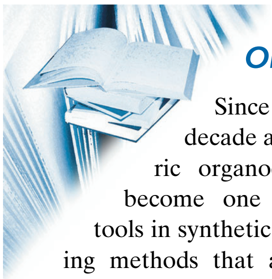
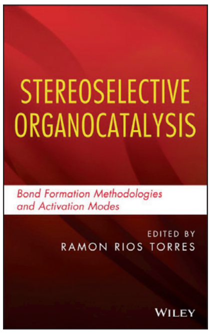


Stereoselective Organocatalysis



Stereoselective Organocatalysis
Bond Formation Methodologies and Activation Modes. Edited by Ramon Rios Torres. John Wiley & Sons, Hoboken, 2013. 674 pp., hardcover, € 156.00.—ISBN 978-1118203538

Since its renaissance about a decade ago, the field of asymmetric organocatalysis has grown to become one of the most powerful tools in synthetic organic chemistry, offering methods that are mild, practical, and generally simple for synthesizing functionalized molecules with high levels of enantiomeric purity.

Interestingly, in contrast to the many comprehensive books, reviews, special articles, and book chapters that cover this field of research, *Stereoselective Organocatalysis*, edited by Ramon Rios Torres, is original in the sense that it is centered around the nature of the bond that is formed by the organocatalytic process, rather than on the mode of activation, and that makes it particularly reader-friendly. With contributions from leading international experts, this book gives an excellent overview of modern asymmetric organocatalysis, through 17 critically written and well-organized chapters.

The first two chapters comprise a particularly accurate historical introduction, and a strongly didactic review describing the various types of activation: in Chapter 1, R. Rios and X. Companyó trace the origins of asymmetric organocatalysis back to the pioneering work of Bredig, Pracejus, Fisher, Marshall, and Kuhn, and the later work by Hajos, Parrish, Eder, Sauer, and Wiechert, while in Chapter 2 A. Moyano reviews methods ranging from aminocatalysis all the way through to hydrogen-bond activation.

The next seven chapters are devoted to the stereoselective formation of C–C bonds through specific reactions. These include the now legendary asymmetric organocatalytic aldol reaction (Chapter 3: D. Gryko and D. Walaszek), the enantioselective Mannich-type reaction (Chapter 4: A. Córdova), the organocatalytic Michael reaction (Chapter 5: Y. Zhang and W. Wang), the Diels–Alder cycloaddition (Chapter 6: J. Franzén), the chiral N-heterocyclic carbene-catalyzed reactions such as the benzoin condensation and the Stetter reaction (Chapter 7: X.-Y. Chen and S. Ye), and other types of reactions such as α-alkylations (Chapter 8: M. Remes and J. Vesely), and both the Friedel–Crafts and the Baylis–Hillman reactions (Chapter 9: Y.-X. Jia and T. Zhang).

A further four chapters deal with the organocatalytic formation of other types of bonds. These include C–N bonds (Chapter 11: A. Landa, R. López, A. Mielgo, M. Oiarbide, and C. Palomo), C–O bonds (Chapter 12: J. Alemàn and M. Tortosa), carbon–halogen bonds (Chapter 13: S. E. Brenner-Moyer), and C–S, C–Se, and C–B bonds (Chapter 14: G. Della Sala and A. Lattanzi). An alternative approach to the formation of all these bond types through enantioselective reduction is described in Chapter 15 (M. Benaglia, M. Bonsignore, and A. Genoni).

The fantastic developments achieved through the years have taken the field of asymmetric organocatalysis to a whole new level, so that synthetic chemists are now able to build a wide variety of bonds in a one-pot fashion through cleverly designed organocascades; this aspect is nicely covered in Chapter 10 (R. Rios, J. Esteban, and X. Companyó) and in Chapter 16 (D. Bonne, T. Constantieux, Y. Coquerel, and J. Rodriguez).

Finally, the last chapter (Chapter 17: Y. Ying and X. Jiang), which is (with Chapter 2) one that I particularly savor, reveals some very elegant applications of asymmetric organocatalysis in the synthesis of various complex natural products and pharmaceuticals, in particular MacMillan's synthesis of callipeltoside C and littoralisone, Hayashi's synthesis of citotrienin A and oseltamivir, and Nicolaou's synthesis of biyouyanagin and hirsutellone.

The book is nicely structured and the chapters are extensively supplemented by references, offering the reader a practical overview of the field of asymmetric organocatalysis. As a further improvement, the topics of organo-SOMO catalysis and organo-photoredox catalysis would have deserved to have their own chapters, while an additional chapter on organocatalytic enantioselective multicomponent reactions would have been a plus. Nonetheless, I personally enjoyed reading this book, which I believe will be useful to the entire synthetic community in both academia and industry. Congratulations to the editor and to all the authors for this nice piece of work.

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