

Book Review

**New Frontiers in Asymmetric Catalysis Edited by Koichi Mikami (Tokyo Institute of Technology) and Mark Lautens (University of Toronto). J. Wiley and Sons, Inc.: Hoboken, NJ. 2007. xvi + 418 pp. \$100. ISBN 978-0-471-68026-0.**

Brian T. Connell

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This monograph is a survey of the state-of-the-art advances in asymmetric catalysis, a field that historically is relatively young but none-the-less quite far-reaching and important, not to mention diverse. The editors have chosen a wide array of experts to cover a broad range of topics in catalysis, such as transition metal, organo-, Bronsted acid, auto-, and bifunctional catalysis. Each author has been selective in the material covered, focusing mostly on new frontiers rather than presenting a historical perspective on the development of the reactions. Fortunately, references range from the 1980s to a few in 2006; thus, the important discoveries that have led to the current frontiers are generally referenced, even if they are not described in detail.

The first several chapters are devoted to discussion of rational ligand design. In Chapter 1, Ohkuma et al. discuss the ligand design for reduction catalysts in detail and provide excellent coverage and graphical representations of the structures of both favored and disfavored transition states for a number of catalytic systems. In a similar fashion, Yamada covers oxidation reactions in Chapter 2, and Shintani and Hayashi discuss C–C bond-forming reactions in Chapter 3. Nozaki follows up in the next chapter with a discussion of the activation of small molecules through asymmetric reactions, such as hydroformylation and related reactions, and Li and Li continue in Chapter 5 with a discussion of catalytic activation of C–C and C–H bonds, correctly noting the current, substantial limitations in this field.

In the next chapter, Mori describes recent developments in all varieties of metathesis reactions. This chapter is perhaps most notable for having the fewest examples of variants of asymmetric reactions available for a broadly useful reaction. This is followed by Kagan's very focused update on nonlinear effects and another chapter by Mikami and Aikawa on asymmetric (de)activation catalysis. Soai et al. discuss recent advances in asymmetric autocatalysis in Chapter 9, and Rovis provides a current review of a range of useful desymmetrizing reactions in Chapter 10. In the next two chapters, Lelais and MacMillan cover the rapid growth seen in the field of organocatalysis, and Ishihara and Yamamoto discuss a range of reactions catalyzed by Bronsted and Lewis acids, respectively. Finally, Shibasaki and Kanai complete the monograph by providing the latest results in the field of bifunctional acid/base catalysis.

The index is better than that found in most monographs as it includes named reactions, abbreviations for ligands, acronyms, and the names of the natural product target molecules discussed. Overall, the monograph is quite readable and provides an excellent and timely source of information on important recent advances in catalysis. It should serve as an excellent resource for students, faculty, or pharmaceutical researchers looking to solve a specific problem, because all the best current catalytic methods, regardless of subtype, are described. It would make a useful addition to a personal or institutional library, and the \$100 price tag puts it within reach of most potential users.

**Brian T. Connell**, *Texas A&M University*

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