Multicomponent Reactions; edited by J. Zhu and H. Bienaymé; Wiley-VCH: Weinheim, **2005**, hardcover, 468 pp, € 149, ISBN 3-527-30806-7

The development of multicomponent reactions (MCRs) is one of the frontier areas of modern organic synthesis due to their outstanding and unique role in the preparation of molecular libraries. Although a fair number of reviews have been published dealing with various aspects of the topic, this book represents the first monograph on the subject. Both the editors and the selected panel of authors are recognized experts in the field, and the timeliness and significance of this work cannot be overstressed.

Although MCRs have a long history that goes back to the discovery of the Strecker reaction in 1850, the recognition of their strategic value can be attributed to the work of the recently deceased Ivar Ugi, who worked primarily in the field of isocyanide-based MCRs. Maybe for this reason, after a brief introduction by the editors, the book starts with a block of three chapters devoted to this topic, although previous familiarity with the basic aspects of the Paserini and Ugi reactions is assumed. In this block, Chapter 1 provides an interesting and concise introduction to asymmetric isocyanide-based MCRs; Chapter 2 is not really concerned with examples of MCRs, but is devoted to a useful discussion of synthetically relevant transformations that can be performed on products of the Paserini and Ugi reactions; and Chapter 3 treats several aspects of the design and discovery of new MCRs based on isocyanide chemistry. Overall, the discussion of isocyanide-based MCRs is interesting and thought-provoking, although the inclusion of an initial section containing basic information on the reactions themselves, in the systematic style employed in Chapter 2 for the postcondensation transformations, would have been very useful for readers. The next two chapters provide excellent summaries of particular reactions related to the multicomponent synthesis of heterocycles – Chapter 4 deals with the Biginelli dihydropyrimidine synthesis and Chapter 5 with the synthetic application of the domino Knoevenagel–hetero-Diels–Alder processes. Three more chapters follow that describe MCRs based on particular types of reactions, starting with an interesting, although partial, discussion of free-radical-mediated MCRs in Chapter 6, followed by a concise discussion of the emerging topic of MCRs mediated by organoboron compounds (Chapter 7), and another of metal-catalyzed MCRs, with emphasis on palladium-catalyzed reactions (Chapter 8). Chapter 9 is an excellent introduction to the modern and exciting topic of asymmetric organocatalysis in MCRs, and is followed by an interesting commentary on experimental designs and computational methods aimed at finding new MCRs in Chapter 10, the shortest in the book. Chapter 11 deals with the applications of MCRs in drug discovery. Although it is a useful summary of the topic, the shift of focus from reactions to their applications unavoidably leads to some overlap with previous chapters. Chapter 12 provides an outstanding description of the application of MCRs to natural product synthesis, proving the usefulness of MCRs in target-oriented synthesis. The final chapter, dealing with the modified Sakurai and related reactions, is too long in comparison with others.

In a multi-authored book of this type, the choice of topics is debatable and it is always possible to find gaps in the coverage, which do not necessarily detract from the overall value of the work. Nevertheless, the virtual exclusion of many of the classical MCRs, such as those associated with the names of Strecker, Mannich, and Hantzsch, is surprising, and perhaps it would have been preferable to devote Chapter 4 to a more balanced discussion of the traditional MCRs rather than to single out the Biginelli reaction. Another important omission is that of a chapter providing a general introduction to MCRs.

In spite of the above minor criticisms, this book contains an enormous wealth of information and will be an indispensable reference work for all synthetic chemists, more specifically to those interested in diversity-oriented and parallel synthesis. Overall, the chapters are of high quality in terms of content and are well written. The presentation of the book is very good, as expected from a Wiley-VCH volume, although chemical structures are not always homogeneous in appearance, a common problem with multi-authored works. In conclusion, this work is highly recommended to synthetic chemists interested in MCRs, although it leaves room for a more balanced, introductory level book on the subject.

J. Carlos Menéndez, Universidad Complutense, Madrid, Spain

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