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BOOK REVIEW

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Book Review of Micro Reaction Technology in Organic Synthesis

Micro Reaction Technology in Organic Synthesis. By Charlotte Wiles (Chemtrix BV, The Netherlands) and Paul Watts (Universtiy of Hull, U.K.). CRC Press (an imprint of Taylor & Francis Group): Boca Raton, FL. 2011. xxii + 432 pp. $139.95. ISBN 978-1-4398-2471-9.

The use of microreactors for organic synthesis, in both academia and industry, has increased dramatically over the past few years, as evidenced by the steadily growing number of publications in this rapidly developing field. In addition to a significant number of review articles, many books have already been published on the subject of microreaction technology and flow chemistry in the past decade. This new book by Wiles and Watts, two well-known experts in the field, not only covers flow chemistry in classical chip-based "microreactors" but also includes "mesofluidic" examples in tube and coil-based systems, although this is perhaps not evident from the title of the book.

In contrast to some of the other books available on this subject, this is clearly a book written by chemists for chemists. In a relatively short and easy-to-follow introductory chapter, the fundamentals of microreaction technology, including fabrication of devices, pumping and mixing issues, and advantages/disadvantages, are explained with the synthetic chemist in mind. In each of the subchapters, the reader is pointed toward appropriate key references, review articles, or other books that provide further details on the subject. In a particularly useful section, some of the latest commercially available continuous flow reactors are described.

The subsequent seven chapters are chemistry driven and provide an in-depth discussion on the use of flow reactors in organic synthesis. The majority of the examples are from the past 10 years, with the most recent references (~500 in total) published in mid-2010. The book is therefore very up to date and captures the latest advances in the field. The inclusion of a significant number of data in conference proceedings, not readily accessible to the nonspecialist, leads to a very comprehensive coverage of the subject. In general, the discussion of synthetic transformations is rich in detail and supported by a substantial number of tables, schemes, and figures to help the reader understand why microreaction technology/flow chemistry was used, what reactor type was employed, and what the advantages over the batch process were.

In addition to the main chapters of the book on the applications of synthetic microreactor/flow chemistry involving gas-phase (Chapter 2), liquid-phase (Chapter 3), and multiphase systems (Chapter 4), there are also shorter chapters on performing electrochemistry and photochemistry in flow (Chapter 5), manipulating particles and droplets (Chapter 6), and using separation/purification techniques (Chapter 8). Industrial applications of microreactor technology are discussed in a separate section (Chapter 7). These include a number of elegant multistep syntheses of prominent drug molecules (or intermediates) of relevance to the pharmaceutical industry.

In summary, this is a well-thought-out and nicely constructed book that has been carefully written with its audience in mind. Despite the surprisingly large number of printing errors in this first edition (especially in the schemes), I can warmly recommend this book and expect it to end up on the shelves of most laboratories of researchers interested in microreaction technology and flow chemistry.

C. Oliver Kappe
Karl Franzens University of Graz

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