Book Reviews

Practical Microwave Synthesis for Organic Chemists. By C. Oliver Kappe, Doris Dallinger, and S. Shaun Murphree. Wiley-VCH, Weinheim, Germany, 2009. x + 299 pp. 17.5 × 24.5 cm. ISBN 978-3-527-32097-4. $80.00.

The authors have produced a gem of a book, and in an area where coherent practical training is lacking, this book is a welcome addition. The current rapid expansion of applications of microwave-assisted organic synthesis makes the authors' work timely, and they reference their content to the primary research literature through 2007. The writing is very clear (though not always concise), and illustrations include numerous black and white photographs that augment the "hands-on" perspective offered to the reader.

Introductory chapters furnish historical and theoretical background of microwave-assisted organic synthesis, with microwave theory offered in a moderately technical style that should be readily accessible to broad audiences. A thorough review of the currently available equipment in Chapter 3 provides remarkable detail on the available functions and features of microwave reactor equipment and accessories from each manufacturer, complete with schematics of the innards and comparisons of various distinctions in design, such as different waveguide orientations and facilities for handling multiple parallel reactions. This section will be a great help to interested parties who need to navigate the selection and purchase of a suitable microwave reactor in the near term, but unlike the rest of the book it may become outdated rather quickly. Techniques for processing samples, in closed versus open vessel, in dry media or various types of solvents, in sequential and parallel modes for libraries, scale-up via flow or batch methods, and related practical issues, are next discussed with attention to points of industrial relevance. In Chapter 5, an overview of practical advice for the "microwave chemistry novice" is attempted, and indeed it is overflowing with practical hints, but at 40+ pages it is not quite condensed enough completely to suit its objective. A highlight of Chapter 5 is a large compendium of answers to frequently asked questions, likely to be bookmarked and well-worn in most copies of this book.

The authors conclude with case studies, which are presented for a variety of scenarios that one might encounter in real-world applications, such as heterogeneous catalysis, reactions with gaseous compounds, solid phase synthesis, statistical optimization, and scale-up. These case studies are presented with detailed experimental procedures, in a style reminiscent of *Organic Syntheses*, and indeed according to the authors, each method has been independently checked for reproducibility by a team of undergraduate students. Although the book itself is probably neither suitable nor intended as a textbook for direct use in undergraduate instruction, one can easily imagine these checked procedures serving as inspiration for development of undergraduate lab experiments. This is a strong chapter with perhaps the most enduring impact, as it offers smooth and convenient paths for beginner entry which will in turn promote broader applications of microwave-assisted organic synthesis.

Practical Microwave Synthesis for Organic Chemists makes a very strong contribution to the practical literature of organic synthesis and will likely be a valued addition to the personal libraries of specialists in this area. Beyond that, all chemistry libraries should include this book, as it is enthusiastically recommended reading for academic researchers, instructional staff, and industrial organic synthesis groups engaged in (or contemplating) the use of microwaves in organic synthesis.

Gregory K. Friestad

Department of Chemistry
The University of Iowa
Iowa City, Iowa 52242

JM900537M

10.1021/jm900537m