Organic Reaction Mechanisms: 40 Solved Cases; by M. Gómez Gallego and M. A. Sierra; Springer: Berlin, 2004, hardcover, 290 pp, € 53.45, 3-540-00352-5

Professors Gallego and Sierra have developed an original format for a reaction mechanism text or reference book. Rather than provide narrative descriptions of broad classes of reaction mechanisms, as is done in more traditional texts and reference volumes, the authors draw examples from the recent literature for presentation as 'case studies' for elucidating reaction mechanisms. The nature of each case varies, including reports of 'surprise' products of well-known reactions, as well as descriptions of mechanisms for new reactions or substantial modifications of understood reactions. The cases are divided into three levels, where Level 1 is comprised of fundamental examples, and Levels 2 and 3 include multifaceted, more complex problems. The case titles are generally descriptive of the type of reaction studied. In addition, each case includes a listing of 'key points', often including the methods employed in solving the problem, which provides additional areas for categorizing and indexing each study.

Within each individual study, the reader will find detailed, multi-page descriptions of the mechanism problems. Each case commences with the background for the reaction of interest, a description of the problem to solve, and a summary of pertinent data and observations. The case then proceeds through a detailed analysis of the data and observations, describing how to use various physical methods along the way. These discussion items provide analysis above and beyond what would be found in the primary literature, and, given the context of a problem, are generally more accessible than the examples included in classical physical organic chemistry textbooks. Following the discussion, a summary is given to tie together the pieces of the solution. Many cases also include follow-up questions to challenge the readers' understanding of the problem-solving strategy.

As a textbook, the formatting makes this book relatively easy to use. The problem is stated in italics at the beginning of each case, and is easily distinguished from the surrounding introductory text. The solution summary for each case is printed in blue text, which is easy to locate if the reader wishes to skip the discussion and academic exercises of each case. Since the book requires a solid understanding of both synthetic and physical organic chemistry, it may be best suited for use as a supplemental text alongside a more classical treatment of organic reaction mechanisms.

The discussion component of each case provides some use for this book as a reference volume. A wealth of techniques for solving mechanistic problems are covered, from molecular modeling to spectroscopy to kinetic studies, and their proper use is described in the context of a real experimental case. Again, the nontraditional format may be a benefit here, especially for young investigators or researchers unfamiliar with the physical methods employed. Further, the index allows reference users to search for cases of interest by method type, reaction type, and even reagent. Unfortunately, there is no cataloging of authors or citations.

In summary, this book provides an interesting approach to teaching organic reaction mechanisms, and will find great use as a supplemental text for advanced undergraduate and graduate physical organic chemistry courses. There is also potential for this to be a valuable reference piece, allowing for access to detailed and complex solutions to an interesting collection of mechanistic problems. Overall, this book highlights the many ways in which synthetic chemists employ physical methods on a routine basis, and may serve to introduce new methods into any chemist's repertoire.

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