The Investigation of Organic Reactions and their Mechanisms. Edited by H. Maskill. Blackwell: Oxford, 2006, hardcover, 392 pp, £ 99.50 / US\$ 199.99, ISBN 1-4051-3142-1.

Almost every research paper describing a synthesis of an organic molecule contains at least one scheme with an 'arrow-pushing' mechanism. Unfortunately, in most cases, the presented 'mechanism' is only a proposal that rationalizes the formation of the product, but has little support from actual experiments. Excellent textbooks about the investigation of organic reaction mechanisms have been published years ago, but most of these are now out of print or have not been updated with the dramatic scientific progress of the last twenty years. The book by Maskill fills this gap and provides valuable information for the practitioner who wants to characterize an organic chemical reaction and investigate its mechanism.

The editor and his author team of eminent physical organic chemists give the reader in 12 chapters an overview of contemporary theory and modern methods for the study of reaction mechanisms. The first hundred pages of the book are dedicated to the measurement and mechanistic interpretation of reaction kinetics. Gratifyingly, the authors supplement the presentation of this subject by many case studies, which help the reader to understand and appreciate the practical significance of the presented concepts. This theme is continued in the subsequent chapters that deal with reactions in multiphase systems, and the investigation of reactions by electrochemical, computational, and calorimetric methods. Two chapters deal with the investigation and characterization of reaction intermediates. Finally, the book concludes with treatments of the most important classes of catalytic reactions.

As usual for a multi-author book, the different chapters vary in their scientific and didactic quality. I especially liked the chapters about radical chemistry, catalysis by organometallic compounds, and computational methods. Although certain subjects could have been covered in more depth (e.g. only a single page is dedicated to Hammett analysis) and some important works have not been referenced, these are questions of taste and do not disturb the positive impression of this rather coherent book.

For whom is this book written? In the preface, the editor describes his book quite modestly as a 'guidebook for the trained chemist' who wants to investigate a reaction and its mechanism. I completely agree, but wish to add that I regard it also as the best contemporary book available on this topic. It requires some basic knowledge in physical organic chemistry, but it brings the reader to a more advanced level than, for example, the excellent book of Anslyn and Dougherty, which on the other hand is better suited as a textbook for students.

Every graduate student or chemist who is interested in the question of how organic reaction mechanisms can be investigated, will find many useful answers Maskill's book. Therefore, each chemistry library should keep a copy of this valuable source of information available.

R. Breinbauer, Institute of Organic Chemistry, University of Leipzig, Germany

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