are described along with their application to spectroscopic measurements. Measurement models that are used to assess the error structure are described and compared with process models used to extract physical properties.

Part VI: Overview (Chapter 23), the shortest part, gives a philosophy for EIS that integrates experimental observation, model development, and error analysis. The authors' approach differs from the usual sequential approach to developing models for given impedance spectra by emphasizing the advantages of obtaining supporting observations to guide model selection, the use of error analysis to guide regression strategies and experimental design, and the use of models to guide selection of new experiments. They illustrate this approach by citing examples from the scientific literature. This final chapter of the book illustrates that selection of models, even those based on physical principles, requires both error analysis and additional experimental verification.

Part VII: Reference Material includes an appendix on complex integration methods that are required for understanding the derivation of the Kramers–Kronig relationships, as well as lists of tables, examples, and symbols. The 297 references, some as recent as 2007, include books, articles, and dissertations, many by the authors themselves. The index (six double-column pages) provides a user-friendly means of finding specific information. Meticulously numbered mathematical equations, tables, figures, and diagrams appear throughout the text to clarify the material.

The authors present the subject in a manner that facilitates the sequential development of understanding and expertise, either in a formal course or in self-study. Throughout the book, illustrative examples in the form of questions followed by answers demonstrate how the principles that have been described can be applied to problems. In this way the student can try to solve the problems before reading the answers. Also, homework problems, suited for self-study or study under the supervision of an instructor, are given in each chapter. Important equations and relationships are identified and collected in easily accessible tables. An easily recognized icon—an elephant—appears frequently at the bottom of a page where a critical concept is first mentioned, to remind the student that it should be remembered. The elephant also serves to remind the reader of the parable of the blind wise men and the elephant, which is quoted in the introductory section to emphasize the philosophy that impedance spectroscopy cannot be used as a stand-alone technique.

Another book on the subject, *Impedance Spectroscopy: Emphasizing Solid Materials and Systems*, edited by J. R. Macdonald (John Wiley & Sons, New York, 1987), and its successor, *Impedance Spectroscopy: Theory, Experiment, and Applications*, edited by E. Barsoukov and J. R. Macdonald (Wiley-Interscience, New York, 2005), are excellent research monographs. However, as I have emphasized, the work by Orazem and Tribollet is a textbook, which deals with fundamentals in greater detail, provides less material on applications, but also includes a variety of pedagogical aids. Scientific professionals will probably want to have both volumes on their bookshelves, but the work by Orazem and Tribollet is better suited for students and beginners in the use of impedance spectroscopy. In short, the books are complementary rather than competitive.

While admitting that impedance spectroscopy is "just an experimental technique", Orazem and Tribollet justify the need for a full semester-long course on impedance spectroscopy by stating: "In our view, impedance spectroscopy represents the confluence of a significant number of disciplines, and successful training in the use and interpretation of impedance requires a coherent education in the application of each of these disciplines to the subject. In addition to learning about impedance spectroscopy, the student will gain a better understanding of a general philosophy of scientific inquiry" (p. xviii).

I agree with their view, and I am pleased to recommend their book to professionals and graduate students in a variety of disciplines such as electrochemistry, materials science, physics, and electrical and chemical engineering, and to others concerned with the topics that I cited in the first paragraph of this review.

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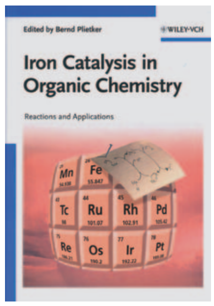
Iron Catalysis in Organic Chemistry

Iron, as the most abundant transition metal on the face of our earth, plays a pivotal role in biological electron transfer and redox processes. However, the organic chemists' toolkit contains only a handful of well-established iron catalysis methodologies. Under the editorial supervision of Bernd Plietker (University of Stuttgart), an excellent monograph on *Iron Catalysis in Organic Chemistry* has come to fruition. It is the clear ambition of this work to familiarize the catalysis community with the advantages and adventures that lie within the realm of



Iron Catalysis in Organic Chemistry
Reactions and Applications. Edited by Bernd Plietker. Wiley-VCH, Weinheim 2008. 279 pp., hardcover € 129.00.—ISBN 978-3527319275

iron catalysis for organic synthesis. The book covers subjects that range from the basics of iron complexes to biological aspects and to the full repertoire of organic transformations. Plietker has managed to secure an impressive line-up of authors to contribute to this book.

The first chapter, by Knölker et al., deals with the organometallic background of iron complex syntheses, with a special emphasis on fundamental properties and reactivities of olefin and carbonyl complexes.

Biomimetic applications of heme and nonheme iron-containing proteins to oxidation reactions are discussed by Müller and Bröring. With the help of selected examples, the reader is guided through mechanistic aspects of dioxygenase-, monooxygenase-, and peroxygenase-catalyzed reactions. Heme-containing cytochromes P450 (and mutants from protein engineering) have been shown to oxidize a large variety of organic substrates, but suffer from their insolubility and the lack of suitable reductants to replace the expensive NADPH.

The development of C–H and C–C oxidation reactions from the early Gif and Kharasch systems to modern epoxidation and aziridination reactions is described by Bolm and coauthors. While hydrocarbon oxidations involve free-radical intermediates, pyridine ligands have been shown to induce heterolytic O–O cleavage in epoxidation and dihydroxylation reactions. Laschat and coauthors give a topical summary of allylic oxidations that are still at an early stage, whereas oxidative allylic aminations with hydroxylamines or nitrobenzene are already showing promising results. Sulfoxidations with simple iron catalysts are a well-established method for the synthesis of disulfides and (chiral) sulfoxides.

Beller and coauthors contribute two chapters highlighting the use of homogeneous iron catalysts for double bond hydrogenations and iron-catalyzed aromatic substitution reactions. Although some advances have been made in the design of active iron catalysts for the hydrogenation of olefins, they are still far from matching the effectiveness of rhodium- and iridium-based systems. Most recently, iron-catalyzed asymmetric hydrosilylations have been realized with up to 99% *ee* for some substrates. A variety of aromatic C–H functionalizations by electrophilic aromatic substitutions can be performed with iron catalysts, including Friedel–Crafts-type alkylations with alcohols and alkenes. This area of research is currently evolving rapidly with the advent of efficient C–N, C–O, and C–S bond-forming reactions.

Iron-catalyzed cross-coupling reactions of organic halides using Grignard compounds are one of the most striking recent innovations in sustainable catalysis. Leitner carefully traces this success story, from its origins in the work of Kochi to the current state of the art, and describes numerous synthetic applications and mechanistic rationales. Progress in the field of iron-catalyzed substitution reactions is covered by Plietker. In particular, low-valent ferrate complexes have been shown to facilitate allylic nucleophilic substitutions. By proper choice of the nature of nucleophile and catalyst, excellent regio- and stereoselectivities can be obtained.

Christoffers and coauthors review the vast area of applications of Lewis-acidic iron salts to carbonyl and conjugate addition reactions and heterocycle syntheses. The development of mild reaction conditions for the conjugate addition of carbon nucleophiles to Michael systems is especially interesting. The final chapter by Hilt and coauthors gives a concise overview of the use of iron catalysts in various cycloaddition and cyclization reactions, including Alder–ene, Diels–Alder, aziridination, epoxidation, and ring-expansion reactions.

The book is carefully organized and well endowed with a wealth of synthetic possibilities and the hottest developments in this competitive research area. This book will draw the attention of the catalysis community to the fact that modern iron catalysts are poised to take on the competition from established metal catalysts. Plietker deserves credit for this nice piece of work, and the book will have a prime spot on my shelf.

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