Book Reviews *

Iron Compounds in Organic Synthesis. By A. J. Pearson (Case Western Reserve University). Academic Press: London. 1994. xiv + 202 pp. $35.00. ISBN 0-12-548270-1.

This book contains a foreword, a brief preface, a detailed table of contents, six chapters organized by iron complex type, and a 13-page index of compounds and methods. The chapter titles, lengths, and number of references are as follows: Chapter 1. Iron Carbonyls in Synthesis (18 pp, 43 references); Chapter 2. Alkeneiron Complexes (16 pp, 21 references); Chapter 3. η^1 and η^3-Allyliron Complexes. η^1-Acyliron Complexes. Carbene Complexes (29 pp, 73 references); Chapter 4. Diene Complexes of Iron (29 pp, 71 references); Chapter 5. Dienyl Complexes of Iron (68 pp, 112 references); Chapter 6. Arene-Iron Complexes (23 pp, 29 references). Roughly 40% of the references are from the decade 1984−1994.

This book, the latest in the Academic Press Best Synthetic Methods Series, admirably fulfills the objective of the series: it provides sufficient information to encourage the reader to consider some iron-based synthetic methods. Simple discussions of iron reagent physical properties, stability on storage, methods for purification, and methods for destruction can be found throughout the discussion. Each chapter closes with 3−6 pages of experimental procedures ranging from milligram to multigram scales. With this information, one could enter Professor Pearson's laboratory as a student, postdoctoral fellow, or visitor and be able to recognize many of the procedures in progress.

A detailed discussion of bonding and, in the author's words, an "encyclopaedic discussion of organoiron chemistry" are not available in this concise format. While the chemistry of diene and dienyl complexes of iron receives a more rigorous analysis, some regio- and stereochemical results in other chapters are only deciphered after consulting the references provided.

New methods based on organotransition metal chemistry provide unique, versatile, and economically attractive solutions to both academic and industrial synthetic problems. In turn, organoiron chemistry has played a key role in the development of organotransition metal chemistry. This inexpensive text would be a valuable addition to the library of any synthetic chemist interested in the continued progress of organotransition metal chemistry during the next decade.

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Surface Electrochemistry: A Molecular Level Approach. By John O'M. Bockris (Texas A&M) and Shahed U. M. Khan (Duquesne University). Plenum Press: New York. 1993. xxxii + 1014 pp. $79.50. ISBN 0-306-44298-1.

This book covers most areas of modern electrochemistry, and thus its title, Surface Electrochemistry, is broader than many readers might imagine. The choice of title is presumed to reflect the importance that the authors appropriately place upon the role played by the electrode surface in all electrochemical systems. The book provides a good coverage of more recent electrochemical work in a wide range of areas, and I found the layout logical and appropriate. The first chapter focuses upon experimental aspects including surface analytical methods. The second chapter provides a complete coverage of interphasial structure. The following chapters cover electrode kinetics, quantum-oriented electrochemistry, photoelectrochemistry, organoelectrochemistry, bioelectrochemistry, and materials aspects, including corrosion. The final two chapters discuss electrochemical conversion and the storage of energy and the electrochemistry of cleaner environments. There is an extensive collection of references, including a complete set of reference relating to the authors' work.

While the first objective of the book, namely a review of recent work, is a typical approach in books of this type, the second objective makes this book distinctive. This second objective is to clearly identify the "founders of (and principal modern contributors to) the various fields". Indeed, this second objective provides the principal flavor of the book, and it extends into nearly all the material discussed. It is clearly of great importance to the authors to not only establish unequivocally who has or has not made seminal contributions but also make clear, where appropriate, their views on wider issues that relate to the practice of science including funding by the National Science Foundation of the United States, research funding by industry, actions of the United States Congress, the practices of the Nobel Prize Committee in selecting award winners, the correct approach to environmental issues, and other topics. It is this aspect of the book that will be of great interest to those who follow the sociology of the electrochemical community.

The content of the book, while it covers much of modern electrochemistry, is structured in a manner consistent with the authors' views regarding seminal contributions. Leading researchers are identified by both name and reference number throughout the text, and the contributors are identified by name and contribution in the index. Thus, in some cases, a couple of citations will be given (e.g., Albery—effect of ferricyanide on membrane potentials...), and in other cases (e.g., Bockris—pioneering measurements..., first atomic resolution in..., etc.), a whole page of citations will be given. Indeed, there is hardly a page of the book where the name Bockris does not appear several times.

The authors make clear in the introduction that, while some writers of textbooks feel that their task is best accomplished by giving the consensus view in the various branches of the field, it has been their intention to place their material a few years ahead of the consensus. This approach presumably explains why the authors have chosen to downplay much of the work in the study of the surface chemistry of electrodes. In this respect, the authors make clear that they view *in situ* methods, i.e. those that collect their surface chemical information by techniques that probe the electrode surface in its (normally aqueous) electrochemical environment, as superior to *ex situ* methods, i.e. those that require the electrode to be removed into a vacuum system before surface analysis. This view is based upon a concern that the transfer into vacuum causes changes such as removal of solvent and unwanted deposition of dissolved material from the electrochemical solution onto the surface. However, both *in situ* and *ex situ* surface analytical methods receive only brief discussion, especially in the latter case. Thus, the authors cover practically no work in the *ex situ* surface analytical area, except for work carried out by Professor Bockris and co-workers. One presumes that the justification for this is that one of the authors, Professor Bockris, considers himself to be the pioneer in *ex situ* studies. It would seem appropriate to this reviewer to acknowledge that there were several workers (the major contributions by Hubbard and co-workers receive minimal attention) in the early 1970s who were working on the application of surface science to electrochemical surfaces, and indeed to this reviewer's knowledge, the first paper published in this area was by Winograd in 1971. The result of the authors' approach is that the book provides such superficial coverage of *ex situ* techniques that little can be learned, and indeed, there are some potentially unhelpful aspects of the approach. Thus, the reference to "indicated frequency" with respect to Auger spectra is confusing as Auger spectra are usually discussed in terms of kinetic energy. Also, statements such as "the binding energy of the core-shell electrons increases as the charge on the ion becomes more positive" in relation to X-ray photoelectron core shifts is potentially misleading as this generalization is not true in a number of important cases. There is not much more coverage of *in situ* methods, most of whose application to electrochemical systems is claimed to have been pioneered by Bockris and co-workers (radiotracer methods, ellipsometry, surface conductance measurements of adsorption, and Mössbauer). What this reviewer found especially disappointing was that there was no attempt by the authors to indicate the relative depth of surface probed and surface chemical information content of the *ex situ* and *in situ* methods. Nowhere was it indicated that many *in situ* methods are not inherently surface sensitive, and certainly *in situ* methods frequently do not provide the same information available from *ex situ* methods. This reviewer takes the view that *both* approaches have very important roles to play, and that it is unreasonable to attempt to eliminate *ex situ* studies, since they have the capability to provide important information that is simply not available by current *in situ* methods. Surface electrochemistry is such an important and complex area that an appropriate understanding of the area demands that we use all the effective tools that are available.

This book is a major work by two authors with a wide electrochemical experience, one of whom has certainly been a prolific contributor

*Unsigned book reviews are by the Book Review Editor.

to a wide range of important electrochemical areas. While the book covers much fine work, the authors' unusual approach is likely to limit the attractiveness of the book. Thus, this reviewer would hesitate to recommend the book for a graduate class because of his view that the book lacks the balance and appropriate content suitable for such a course. Readers who share the authors' views would not agree, will certainly enjoy the book, and would presumably share the view that the authors are several years ahead of the consensus. There will be many who may find the authors' attribution of credit and evaluation of various areas to be controversial and the strong emphasis of this aspect something of a "turn off" that makes the reading of this book less enjoyable than it would otherwise be.

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Molecular and Biomolecular Electronics. Advances in Chemistry Series 240. Edited by Robert R. Birge (Syracuse University). American Chemical Society: Washington, DC. 1994. xii + 596 pp. $41.00. ISBN 0-8412-2698-9.

Based in part on the International Symposium on Molecular and Biomolecular Electronics of the American Chemical Society held in New York, in August of 1991, this volume provides a perspective on the interdisciplinary, international research effort in the relatively new field of molecular electronics. Chapters 1−6 provide overviews and fundamentals, Chapters 7−12 cover linear and nonlinear molecular photonics, Chapters 13−18 discuss systems based on self-assembly, and Chapters 19−23 cover protein-based systems and devices. Author, affiliation, and subject indexes conclude.

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Inorganic Experiments. Edited by J. Derek Wollins (Loughborough University of Technology). VCH: Weinheim, Germany. 1994. xv + 286 pp. $90.00. ISBN 3-527-29235-7.

Detailed descriptions of more than 60 experiments are presented in this book, ranging from undergraduate to graduate level and covering organometallic, main group, solid state, and coordination chemistries. The contents are divided into introductory, intermediate, and advanced experiments, with an index. Exercises, questions, and hints to further reading are included.

JA945168X

Catalysis of Organic Reactions. Edited by Mike G. Scaros and Michael L. Prunier (G. D. Searle). Marcel Dekker: New York. 1995. xx + 599 pp. $195.00. ISBN 0-8247-9364-1.

Based on the proceedings of the 15th Conference on Catalysis of Organic Reactions, this study highlights both theoretical and practical aspects and emphasizes applications in industrial processes. It contains over 1000 bibliographic citations and 250 tables, drawings, and photographs. More than 180 experts from industry and academia examine the hydrogenation process and hydrogenations, heterogeneous catalysis, asymmetric synthesis, oxidations, hydroformylation, catalyst design, and zeolites.

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