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BOOK REVIEWS

The Aqueous Chemistry of the Elements. By George K. Schweitzer (University of Tennessee, Knoxville) and Lester L. Pesterfield (Western Kentucky University, Bowling Green). Oxford University Press: New York. 2010. xii + 434 pp. $99. ISBN 978-0-19-539335-4.

This book covers the aqueous solution chemistry of all the elements. To manage the enormity of the data, the authors have organized the information using E-pH diagrams, which "permit the systematic treatment of the empirical data with reference to the influences of pH, redox phenomena, free energy changes, insolubilities, and complexation on the solution properties of the elements and their compounds", to quote from the Preface. The book was intended to serve as a textbook for courses in descriptive inorganic chemistry or as a reference book for other fields, e.g., agriculture, analytical chemistry, environmental chemistry, etc., in which inorganic solution chemistry is used. A brief list of references and a subject index complete the book.

JA101400C

10.1021/ja101400c

Reactions at Solid Surfaces. By Gerhard Ertl (Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin, Germany). John Wiley & Sons, Inc.: Hoboken, NJ. 2009. x + 208 pp. $69.95. ISBN 978-0-470-26101-9.

This book, written by the 2007 Nobel Prize winner in Chemistry Gerhard Ertl, was developed from his Baker lectures given at Cornell University in Ithaca, NY in 2007. As he explains in the Preface, the text closely follows the lectures given, based on results from his own laboratory. Thus, he states "it is not a comprehensive review, but rather a subjective picture of the field covered, reactions at solid surfaces." Following an introduction to the basic principles, the remaining chapters cover surface structure and reactivity; dynamics of molecule/surface interactions; electronic excitations and surface chemistry; principles of heterogeneous catalysis; mechanisms of heterogeneous catalysis; oscillatory kinetics and nonlinear dynamics; and spatiotemporal self-organization in surface reactions. A brief subject index completes the book.

JA1014019

10.1021/ja1014019

Metal Catalysts in Olefin Polymerization. Topics in Organometallic Chemistry, Vol. 26. Edited by Zhibin Guan (University of California, Irvine). Springer-Verlag: Berlin, Heidelberg.2009. xii + 256 pp. $299. ISBN 978-3-540-87750-9.

This volume contains seven chapters that focus on various aspects of current research into olefin polymerization. The citations are current to at least mid-2008. As noted in the Preface, it is not a comprehensive review but instead highlights a variety of important examples. The first three chapters deal with catalyst systems based on early transition metals. They cover the development of phenoxyimine-based (FI) catalysts, hafnocene-based systems and chain-shuttling catalysis, and olefin block copolymers. The next three chapters cover catalysts based on late transition metals and include iron and cobalt bis(imino)pyridine-based systems, catalysts for the copolymerization of olefins and polar monomers, and systems based on cationic α-diimine Ni(II) and Pd(II) complexes. The final chapter is a review of atom-transfer radical polymerization.

Each chapter is authored or coauthored by well-recognized experts in the field. The material is well written and provides the reader with a considerable amount of interesting and useful factual information. There is a strong focus on ligand design and mechanistic insight throughout the volume. This book will be of interest to academics and industrial scientists involved in the design of catalysts for olefin polymerization and should be in the reference section of every good chemistry library.

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JA101590Z

10.1021/ja101590z

Electrochemistry of Porous Materials. By Antonio Doménech-Carbó (University of Valencia, Spain). CRC Press (an imprint of the Taylor & Francis Group): Boca Raton, FL.2010. xviii + 312 pp. $129.95. ISBN 978-1-4398-0633-3.

There has been increased interest in porous materials in recent years because they show great promise in several areas such as catalysis, energy conversion, and sensing. Electrochemistry plays a big role in such materials because it is essential for their synthesis, characterization, and applications. Doménech-Carbó provides us with a comprehensive reference for this topic.

Chapter 1 is a good introduction to porous materials, from their synthesis to their electrochemical characterization. Doménech-Carbó has realized how important phenomena like mass transport, capacitance, and resistance are for characterizing porous materials as well as how necessary the many related electrochemical techniques are for their analysis. However, his discussion of the analysis on the electrochemical techniques was general and did not include many of the unique properties and theoretical conditions applicable to these materials. This is understandable as a book based on the theoretical aspects alone would be a large work on its own. In that regard, many of the electrochemical descriptions are what would be expected in a general electrochemistry textbook and do not particularly pertain to porous electrodes. Readers expecting a detailed account of the theoretical aspects of their electrochemistry will not find it in this work. For example, when describing electrochemical impedance spectroscopy, the author fails to describe commonly known models for the EIS of porous materials such as that previously described by deLevie. Without a detailed analysis of porous electrodes, the chapter ends up with a too simple,

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too general description of electrochemical techniques that are presumably already known to the typical reader of this monograph.

The next two chapters also are a general overview of the electrochemical concepts required for an understanding of the electrochemistry of porous materials. The author discusses mass transport phenomena, apparent diffusion coefficients, and catalysis of these materials, making the reader aware of the electrochemical phenomena of porous materials, but does not provide content that contributes to a comprehensive theoretical understanding. Still, the first three chapters will provide the reader with the necessary tools for understanding the remaining chapters dealing with applications and types of porous materials.

Chapters 4−8 are an extensive review of the many types of materials used for the preparation of porous electrodes, ranging from silicates, metal−organic frameworks, porous oxides, porous carbons, and polymers. These chapters deal with the preparation of many of these materials as well as their electrochemical characterization. Chapters 9−12 focus on the application of porous electrodes in sensing, energy conversion, synthesis, and environmental remediation and provide a good review of the current work on these materials.

It is important to consider the book for what it is as much as for what it is not. In general, the book is an excellent resource for students and professionals interested in the applications of porous electrodes, their properties, and characterization. As noted above, however, it is not a theoretical description of the electrochemistry of porous electrodes, although the depth of the theoretical descriptions is suitable for a broad audience. The book offers a great number of references, well distributed from the very recent literature to seminal work on porous materials. The best description of the book is that it is a great survey or review on the electrochemistry of porous electrodes. As such, it will be a valuable reference for anyone interested in the electrochemical aspects of porous electrodes and should provide a great starting point for those interested in developing a greater depth of understanding.

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JA101710R

10.1021/ja101710r