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BOOK REVIEWS

**Bioinorganic Chemistry: Cellular Systems and Synthetic Models.** Edited by Eric C. Long (Indiana University-Purdue University Indianapolis) and Michael J. Baldwin (University of Cincinnati). American Chemical Society (distributed by Oxford University Press): Washington, DC. 2009. xi + 254 pp. $150.00. ISBN 978-0-8412-6975-0.

This book was developed from a symposium entitled "Bioinorganic Chemistry" held during the 39th Meeting of the Central Region of the American Chemical Society in May 2007. In general, it covers current research in bioinorganic chemistry in the areas of cellular systems and synthetic models with six chapters falling under the heading of the former and eight under the latter. A sampling of chapters in each category includes "Biosynthesis and Regulation of the Heme A Biosynthetic Pathway" by Hegg and "Studies into the Metal Chemistry of the Carbaporphyrinoids: Insights into the Biological Choice of Porphyrin" by Ziegler. Author and subject indices complete the book.

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**Ionic Liquids in Chemical Analysis.** Edited by Mihkel Koel (Tallinn University of Technology, Estonia). From the series: Analytical Chemistry. Edited by Charles H. Luchmüller (Duke University, USA). CRC Press (an imprint of the Taylor & Francis Group): Boca Raton, FL. 2009. xxxii + 414 pp. $149.95. ISBN 987-1-4200-4646-5.

Research on ionic liquids spans all domains of chemical science and even beyond. In addition to numerous general and focused review articles, many books have appeared during the past five years on selected topics, e.g., synthesis, physical chemistry, electrochemistry, green chemistry, and more. This book, the first one devoted exclusively to the role of ionic liquids in chemical analysis, therefore, fulfills a need in an area that is very active with regard to their application. However, this book may perhaps capture the interest of a much broader community than originally intended.

Chapter 1, which is a significant section of the book, is a very thorough review of ionic liquids in which the author, Domanska, covers all important parameters relevant to the understanding of their physicochemical properties and application in chemical analysis, e.g., viscosity, phase equilibrium, miscibility, and activity coefficients. I must emphasize that the author took great care in presenting the enormous amount of experimental data that have been gathered with the goal of establishing relationships between the structure of cations/anions and the properties obtained for the ionic liquids. I appreciate the style in which the data are presented and the detailing of the techniques and experiments employed to obtain the data. Chapter 2 nicely complements the preceding one by presenting the structure of ionic liquids, which is important for predicting the interactions solutes will have with the components of the melt. These chapters, which should be of interest to all researchers with an interest in ionic liquids, provide the readers with the fundamental knowledge needed to understand the very essence of ionic liquids and go well beyond the topic of chemical analysis.

The remaining chapters cover all domains of analytical chemistry where ionic liquids could potentially be applied, i.e., electrochemical sensors, extraction, chromatography, mass spectrometry, spectroscopy, and microfluidics. The authors of these various chapters highlight significant developments with pertinent and recent literature and convey the importance of fundamental research to develop task-specific ionic liquids. The book is therefore well balanced between molecular interpretations of the solute−solvent interactions and applications of ionic liquids in separation science (Chapters 4−7) or mass spectrometry (Chapter 14), for example. Both the strengths and weaknesses or limitations of ionic liquids in such applications are also described.

To conclude, I recommend this book to analytical chemists whose research involves ionic liquids but also to those who have not yet considered ionic liquids as a part of the solution to their analytical problems, as both will find its contents relevant. It is a clear example of the wide possibilities of innovations that can arise in the exciting but challenging field of research on ionic liquids.

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**Inorganic Rings and Polymers of the p-Block Elements: From Fundamentals to Applications.** By Tristam Chivers (University of Calgary, Canada) and Ian Manners (University of Bristol, UK). Royal Society of Chemistry: Cambridge. 2009. xii + 336 pp. $109. ISBN 978-1-84755-906-7.

Forty years or so ago, interest in main group chemistry, in general, and the chemistry of the p-block elements, in particular, was limited in comparison to that devoted to the d-block elements. In recent decades, however, there has been a virtual explosion of research on the p-block elements. On the conceptual side, one of the reasons for this renewed emphasis is the observation of a wide variety of bonding environments, such as stable, multiply bonded systems that were previously thought to be rare or transient in nature. Of equal importance has been the application of these systems in the areas of polymer and materials chemistry. Chivers and Manners, two productive and highly respected scholars, have produced a very approachable monograph that presents the current state of knowledge of inorganic rings and polymers from both fundamental and applied perspectives.

The text has several valuable general chapters followed by surveys of groups 13 through 16. The general chapters are useful as stand-alone sections and lay the groundwork for the more

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specific discussions that follow. The most widely employed approaches to synthesis are covered in the chapter on synthetic methods. The following chapter on methods of characterization is wisely limited to methods that have proven especially valuable in this area, i.e., X-ray, chromatography, mass spectrometry, and NMR, ESR, vibrational, and UV−vis spectroscopies. The chapter on electronic structure and bonding should be singled out as a particularly clear, useful, and up-to-date coverage of a topic that can be difficult to grasp. Other general chapters cover such topics as paramagnetic inorganic rings, inorganic macrocycles, and the use of rings as ligands. The general section is concluded with a good chapter on polymer synthesis and characterization for those not well versed in polymer science.

The remainder of the monograph consists of chapters on the specific chemistry of groups 13 through 16. The reader will find both traditionally discussed systems, such as borazines, phosphazenes, sulfur homocycles, etc., and more recently recognized systems. Whenever appropriate, specific applications are noted, ranging from single-source CVD precursors and preceramic materials to specialty polymers. The fact that the coverage is not comprehensive—nor could it be in one accessible volume—means that researchers in this area could cite some omissions that they feel are important. I, for one, would have preferred to see more on cyclolinear and cyclomatrix polymers because of their importance in the formation of ceramics. Coverage of polymers with inorganic rings as substituents is also absent. Such omissions are inevitable, however, when one has to make choices due to limited space.

In summary, this book is concise, well written, and clearly illustrated. The references are current, with an emphasis on recent work. The broadness of the coverage makes this book a valuable addition to the personal library of inorganic chemists and those interested in the chemistry of materials. The clarity of the writing and the balance of topics are such that the book would also be suitable for adoption as a textbook in an upper-division or graduate course.

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**Compendium of Organic Synthetic Methods, Volume 12.** By Michael B. Smith (The University of Connecticut, Storrs). John Wiley & Sons, Inc.: Hoboken, NJ. 2009. xviii + 576 pp. $150. ISBN 978-0-471-44530-2.

This book presents useful functional group transformations and carbon−carbon bond-forming reactions drawn from the literature during 2002−2004. It covers the preparations of alkynes; acid derivatives; alcohols; aldehydes; alkyls, methylenes, and aryls; amides; amines; esters; ethers, epoxides, and thioethers; halides and sulfonates; hydrides; ketones; nitriles; alkenes; and oxides. There is also an entire chapter devoted to the preparation of difunctional compounds. The book opens with a list of abbreviations and indices of monofunctional compounds and difunctional compounds, and it concludes with an author index.

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