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Molecular Orbitals and Organic Chemical Reactions (Book Review)

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An excellent follow-up to the 1987 publication (*Tigers of the World: The Biology, Biopolitics, Management, and Conservation of an Endangered Species*, ed. by R. Tilson and U. Seal, CH, May'88), the 2010 edition continues the story of tiger conservation efforts. The 102 contributors represent a broad panel of distinguished international researchers, seven of which contributed to the original work. Some authors take a more personal approach in their writings, while others offer a more science-based perspective, but each chapter's terminology and research descriptions are layperson-friendly. There is very little repetition between the two editions; the first focused heavily on tigers in captivity, while the second emphasizes wild tiger conservation, history, economics, and political battles. Starting with "Fifty Years in the Tiger World," the book introduces readers to the tiger's plight and helps them to understand what infrastructures are necessary for their survival. Section 2, "Tiger Problems and Solutions," illustrates the historic and current contentions between man and tiger. The third and fourth sections explore the science behind tracking/counting tigers and regional status reports. The final section explores the next two decades of tiger habitat. Includes references, tables, figures, and photographs to further support the discussions. **Summing Up:** Highly recommended. ★★★ Academic, general, and professional audiences, all levels.—*K. K. Goldbeck, Virginia Polytechnic Institute and State University*

Chemistry

47-6873 QD461 2009-28760 CIP
Fleming, Ian. **Molecular orbitals and organic chemical reactions.** Wiley-Blackwell, 2010 (c2009). 360p bibl index afp ISBN 9780470746608, \$120.00; ISBN 9780470746592 pbk, \$57.95

This work by Fleming (emer., chemistry, Univ. of Cambridge, UK) is a follow-up to the author's popular *Frontier Orbitals and Organic Chemical Reactions* (1976). It is designed to give advanced undergraduate and graduate students in organic chemistry access to molecular orbital theory without the math or serious physical chemistry that usually goes with it. Fleming uses nonquantitative molecular orbital theory to explain many common phenomena in organic chemistry. As such, this is a very powerful tool for students of advanced organic chemistry. Much of what is taken simply on faith or with some hand waving in sophomore organic chemistry can be readily explained with molecular orbital theory, which is usually considered too advanced for students at that level. Though this book could be used as the primary textbook for a course solely on molecular orbitals in organic chemistry, it will more likely be used as a reference source for an advanced organic chemistry course for upper-level undergraduates or graduate students. **Summing Up:** Highly recommended. ★★★ Upper-division undergraduates through researchers/faculty.—*J. H. Glans, Sacred Heart University*

47-6874 QD561 MARC
Freemantle, Michael. **An introduction to ionic liquids.** Royal Society of Chemistry, 2010. 281p bibl index ISBN 9781847551610, \$79.95

Science writer Freemantle authored the March 30, 1998, *Chemical and Engineering News* article "Designer Solvents," which brought research into ionic liquids (ILs) into the scientific mainstream. In fact, 97 percent of the publications concerning ionic liquids have been written since that article was published. This well-crafted book by Freemantle is distinct from other recent volumes on the subject. The first work on the subject

by a single author, the book spans the history of IL research from its beginnings as a "quiet backwater of chemistry," where it was researched primarily in the electrochemical area, to one of extensive interest in almost all areas of chemistry. Indeed, compared to the early days of its relatively narrow focus in areas of electrochemistry, ILs are now looked at as designer and "green" reaction solvents for use in almost any area of scientific research. Freemantle's book begins with a review of IL synthesis and properties and then concisely describes the diverse applications and merits of ILs in many, if not all, of the areas in which they are currently used. This book is both scholarly and a great read. **Summing Up:** Highly recommended. ★★★ Lower-division undergraduates through professionals.—*P. G. Heiden, Michigan Technological University*

47-6875 QD411 2009-20537 CIP
Hartwig, John F. **Organotransition metal chemistry: from bonding to catalysis.** University Science Books, 2010. 1,127p bibl index afp ISBN 9781891389535, \$134.50

This reviewer is from the generation of chemists who learned transition metal organometallic chemistry from *Principles and Applications of Organotransition Metal Chemistry* by James P. Collman et al. (1987), an amazing work for both its coverage and referencing of material. However, more than 20 years of chemistry have passed since its initial publishing, and Hartwig (Univ. of Illinois, Urbana-Champaign) has now provided the book to be used by 21st-century chemists in this area. *Organotransition Metal Chemistry* builds from the structure of the earlier work, yet reads like an entirely new book. General topics include structure and bonding, ligand systems, reactions of organometallic systems, and transformations catalyzed by organometallic complexes. Each of the 22 chapters is extensively referenced, making this book a great resource even for experienced chemists. The work will be accessible to and helpful for upper-level undergraduates, but it will be essential for advanced audiences, from the beginning graduate student to the practicing organometallic chemist. **Summing Up:** Highly recommended. ★★★ Upper-division undergraduate through professional collections.—*S. S. Mason, University of Mount Union*

47-6876 QD272 2009-9694 CIP
Organic mass spectrometry in art and archaeology, ed. by Maria Perla Colombini and Francesca Modugno. Wiley-Blackwell, 2009. 493p bibl index ISBN 9780470517031, \$240.00

This volume edited by Colombini and Modugno (Univ. of Pisa, Italy) is a wonderful introduction, short course, and reference for multiple mass spectrometric techniques, including direct mass spectrometry as well as stable isotope and chemical imaging methods. This book approaches mass spectrometry from the perspective of cultural materials, and it provides detailed examples for sample preparation and analysis of a wide range of organic materials that have historically been found in works of art and in archaeological contexts. In addition, chapter contributors discuss modern organic materials that have been used in artistic works and in conservation to restore and preserve ancient objects. The book begins with an in-depth explanation of the properties of many organic materials commonly found in these settings (chapter 1) and a refresher on the function and basics of mass spectrometric methods (chapter 2). The remaining chapters describe methods for the characterization of resins, waxes, varnishes, binders, paints, and other organic residues. Contributors discuss organic compounds and analytical techniques at an undergraduate level with multiple easy-to-reference tables and charts. In addition, all chapters include extensive bibliographies for supplementary