Additions and Corrections

Spectroscopic Characterization of a Ternary Phosphatase−Substrate−Fluoride Complex. Mechanistic Implications for Dinuclear Hydrolases [*J. Am. Chem. Soc.* **1999**, *121*, 9235−9236]. XUEDONG WANG, RAYMOND Y. N. HO, ADAM K. WHITING, AND LAWRENCE QUE, JR.*

The incorrect supporting information was deposited for this manuscript. The correct material is provided here.

Supporting Information Available: Figure S1, giving steady-state kinetic data demonstrating that fluoride is an uncompetitive inhibitor; Figure S2, showing the EPR spectra of ternary fluoride complexes with slow substrates; Figure S3, showing the resonance Raman spectra of FeZnUf·PO_4 in H_2O and $H_2{}^{18}O$; and Tables S1 and S2, showing the EXAFS fits for FeZnUf·PO_4·F (PDF). This material is available free of charge via the Internet at http://pubs.acs.org.

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*Book Reviews **

Interfacial Dynamics. Surfactant Science Series. Volume 88. Edited by Nikola Kallay (University of Zagreb). Marcel Dekker: New York. 1999. x +742 pp. $195.00. ISBN 0-8247-0006-6

Under the very general title *Interfacial Dynamics*, this lengthy book contains discussions of a rather narrow spectrum of phenomena that occur mostly at (inorganic) solid−liquid interfaces and are based on electrostatic interactions.

The first chapters in the book introduce the classical theoretical treatments of electrolyte solutions, the structure and properties of water, and the thermodynamics of adsorption. Although one would like to see a more general introduction that contains more recent theoretical approaches and experimental techniques, these chapters nevertheless give a useful description of the thermodynamics of electrolytes, crystalline solids, and interfaces. In the next chapters, more practical aspects, such as the experimental results of adsorption of small organic molecules and metal ions on inorganic surfaces, are presented with various empirical models.

Following these chapters are interesting ones on electrostatics in nonaqueous media, immersion phenomena, and quantitative analysis of protein adsorption. The latter chapter also contains a brief description of adsorption on silica coated by a C-18 monolayer and is relevant for biomaterials and HPLC separation techniques. With the current explosion in applications in biotechnology and biomedicine, one would hope for more articles along these lines.

In the last third of the book, there is a review of crystallization and crystal growth, followed by useful papers on the kinetics of crystal dissolution, and a review on conductivity in microemulsions. The electrical properties of thin films in electrolyte solutions and thermosenstive gels, which present potentially valuable applications, are described in this section as is more applied research, such as the ecology of soil contamination with hydrophobic compounds and the use and role of surfactants in printing inks. Studies of the adsorption of simple ions and molecules on inorganic surfaces have been discussed extensively since the BET theory was put forth in 1930s, and many useful practical applications as well as products rely on this work. From this point of view, I would expect more articles on practical applications, such as in catalysis, ceramics, microelectronics, and biotechnology.

This book covers mostly older interfacial science, and modern theories, techniques, and applications are not presented adequately. Indeed, the majority of references date from the 1970s and 1980s. This was a period during which the adsorption of ions, atoms, and molecules onto inorganic surfaces was studied and modeled, whereas the adsorption of peptides, proteins, and cells on biological surfaces is currently becoming important, not only in basic studies but also in numerous applications. Biomaterials and coatings for various parenterally introduced devices and their resistance to protein adsorption seem to be the main focus of today's research. However, there are additional forces and interactions, especially when adsorbing surfaces are coated by specific polymers to reduce adsorption, that are currently being investigated. Adhesion of colloidal particles, cells, and their models (liposomes) also represents an important venue of interfacial dynamics. For a book in Marcel Dekker's "Surfactant Science Series", I would like to see more articles and data on adsorption studies of surfactants and their coating of various hydrophilic and hydrophobic surfaces.

In conclusion, I believe that this book provides a valuable resource for researchers involved in classical investigations of adsorption of low-molecular-weight entities on inorganic surfaces and accompanying theories and empirical models. However, a broader scope, more modern experimental techniques, and recent theoretical and computational approaches as well as relevant applications, especially in catalysis and biotechnology, would have strengthened the value of this volume.

D. D. Lasic, *Liposome Consultations*

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The Organic Chemistry of Enzyme-Catalyzed Reactions. By Richard B. Silverman (Northwestern University). Academic Press: San Diego. 2000. xviii + 718 pp. $89.95. ISBN 0-12-643745-9

A common topic of conversation among enzymologists for many years has revolved around what textbooks were available for a course that emphasizes the mechanistic aspects of biological catalysis. While the physical and structural aspects of enzymes are well represented in current texts and monographs, no replacement for Walsh's *Enzymatic Reaction Mechanisms* (1979, out of print) had been published that presented a comparable perspective of organic chemistry until now. Silverman's newest contribution will serve as an outstanding text and reference on the reaction mechanisms of enzymes. Despite his contention that this is no standard enzymology text, it may easily serve as the foundation for an advanced course on contemporary topics of substrate recognition, activation, and catalytic turnover. His treatment of the topic should also appeal to a broad range of organic, medicinal,

and biological chemists who desire an up-to-date and succinct overview of the field. A judicious choice of examples illustrates each subject and avoids an encyclopedic cataloguing of enzymes that may act on different substrates but proceed through equivalent mechanisms. Similarly, the most salient experimental data have been well integrated into a discussion of each process. Silverman successfully highlights some of the most sophisticated advances of the past decade while still covering the basic tenets of enzymology. By its own admission, the text does not attempt to be comprehensive and excludes certain areas, including nucleic acid processing and RNA catalysis, that do not necessarily offer unique reaction mechanisms for a chemist.

As the title implies, organic chemistry rather than biochemistry is the dominant theme in the book's overall organization and content. Chapters are divided among reaction types such as substitutions (Chapter 6) and aldol and Claisen reactions (Chapter 11) rather than net transformations, such as carbon−carbon bond formation or cleavage. Consequently, the chemistry of certain coenzymes is not always treated in a single section but instead is revealed over multiple chapters. The experimental approaches employed in mechanism determination are typically introduced as they arise in discussion. Radiolabels are presented with chymotrypsin, the first enzyme covered, and stable isotopes soon follow in the description of carboxypeptidase A. Many other important techniques, including those based on partial reactions, stereochemistry, kinetic isotope effects, site-directed mutagenesis, reaction inhibition, linear free-energy relationships, and various spectroscopies, are distributed at a frequency that does not overwhelm the focus on enzymatic reactions. This format does not prevent quick access to a particular method, concept, or fact since an excellent index has been provided. Numerous references to the literature are also included at the end of each chapter, and citations range from the historic works of Michaelis and Menten, Baeyer and Villiger, and Sumner to publications as recent as 1999. A brief summary of enzyme kinetics has been relegated to an appendix, which may either delight or disappoint readers depending on their scientific persuasion. This section does not contain a formal introduction to kinetic isotope effects, and readers new to the field may need supplementary information to fully appreciate their widespread inclusion in this text. All will be cheered by a second appendix containing a fine series of problems (with solutions) for each chapter.

A brief history of enzymes and their characteristics is presented in chapter 1 along with a practical outline of the chemical and physical basis of biological catalysis. Common to many texts, the fundamental principles of enzymology are addressed next during a review of group transfer reactions, including hydrolysis, amination, and phosphorylation (Chapter 2). Here and throughout the book, mechanistic alternatives are well illustrated, and their analysis is often animated with references to cogent model systems and active site structure. Oxidation and reduction in the absence and presence of coenzymes are described in Chapters 3−5. Although the basic strategies of enzymes are often demonstrated by classical examples, the commentary has been updated with such issues as stereoelectronics, low barrier hydrogen bonds, and radical clocks. The current status of some of the more recently discovered coenzymes is also examined in sections focusing on the unique role of pyridoxal phosphate in deoxygenation and the chemistry supported by a range of quinone-based coenzymes and other redox centers. Substitution reactions covered in Chapter 6 are arranged along the mechanistic classifications of S_N1, S_N2, S_N2', S_NAr, and electrophilic aromatic substitution. Carboxylations and decarboxylations are surveyed in Chapters 7 and 8 and provide the first introduction to vitamin K, biotin, and thiamin pyrophosphate as well as the more typical functions of pyridoxal phosphate. A chapter on isomerization (Chapter 9) is organzied by type of transformation, such as hydrogen shift, *cis*/*trans* isomerization, and phosphoryl migration. Characterization of eliminations and additions (Chapter 10) is similarly divided between *anti* and *syn* reactions. The final three chapters (11−13) are devoted to processes involving carbon−carbon bond formation, degradation, and rearrangement and offer important advances in the general mechanisms known to promote these transformations. The abundance of information presented by this text would be impractical to cover in a single semester. Consequently, instructors will enjoy selecting their favorite subset of topics for personal emphasis.

Silverman should be congratulated for publishing yet another book of high quality and significance. This newest contribution to enzymology should quickly become the standard for mechanistic studies. Ample figures and schemes enliven each section, and all aspects of the text have been composed with great precision. Silverman simultaneously elucidates both the experimental approaches and results that constitute much of enzymology.

Steven Rokita, *University of Maryland*

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Polymer Membranes for Gas and Vapor Separation: Chemistry and Materials Science. Edited by B. D. Freeman (North Carolina University) and I. Pinnau (Membrane Technology and Research, Inc.). American Chemical Society: Washington, DC (Distributed by Oxford University Press). 1999. x +326 pp. $120.00. ISBN 0-8412-3605-4

The 22 chapters of this volume complete one of two compilations derived from the September 1997 Chemistry and Materials Science of Synthetic Membranes symposium held in Las Vegas. The contributions include a summary of the fundamentals of gas separation using polymers and an overview of vapor- and gas-selective polymers that are used commercially. The overview is followed by descriptions of the chemistry and materials science associated with each of these classes of polymers, with the focus being on their structure−property relationships.

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High-Resolution NMR Techniques in Organic Chemistry. Tetrahedron Organic Chemistry Series Volume 19. By Timothy D. W. Claridge (Dyson Perrins Laborotory, Oxford). Pergamon: Oxford. 1999. ix + 384 pp. Hardbound $134.50, ISBN 0-08-042799-5. Paperback $49.50, ISBN 0-08-042798-7.

This timely book is written in the tradition of the now classic work of A. Derome, *Modern NMR Techniques for Chemical Research*, and I believe that it will have the same importance today as Derome's book did a decade ago.

Chapters 1 and 2 are introductions to such topics as pulse sequence nomenclature, the vector model, spin relaxation, and mechanisms for relaxation. Chapter 3 concerns many of the practical aspects of NMR, including acquisition, processing, sample preparation, calibration, and performance tests. Chapter 4 discusses 1D techniques, such as spin decoupling, spectral editing, polarization transfer, and quadrapolar nuclei. Chapters 5 and 6 examine 2D correlation spectroscopy, COSY, TOCSY, and Inadequate techniques, and Chapter 7 explores *J*-resolved spectroscopy. The final chapter, Chapter 8, covers both 1D and 2D aspects of nuclear Overhauser spectroscopy.

The explanations are clear and concise with liberal use of the vector model and diagrams. The references are well done and up-to-date. This book is a practical guide for the beginner as well as a launching pad for the NMR enthusiast. It should be found in every NMR facility.

Ben Shoulders, *The University of Texas*

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[*]Unsigned book reviews are by the Book Review Editor.