

Book Reviews

Physical Chemistry of Surfaces, 6th Edition. Arthur W. Adamson and Alice P. Gast. John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10158-0012, 1997. xxi, 784 pp., illustrations. \$79.95.

The first edition of *Physical Chemistry of Surfaces* by Arthur W. Adamson appeared in 1960 at the time I began teaching a graduate level course on the subject to students in pharmaceuticals. Since that time I have had the pleasure of using the next four editions, and of observing its continued value as a textbook and as a source of information. This sixth edition, now co-authored with Professor Adamson by Professor Alice P. Gast, comes at a time of significant expansion of our basic knowledge about surface-related phenomena, as well as in a period of rapid development of technology seeking to apply such basic principles. Therefore, the need for a broad-based book, emphasizing basic principles while illustrating applications to areas as diverse as material sciences, membrane biophysics and drug delivery is greater than ever.

This book, through all its editions, was intended to be a comprehensive textbook for upper-level undergraduates and graduate students in chemistry and related fields, with an emphasis on surfaces alone, rather than also including the related field of colloid science, often combined together in various texts. I am pleased to see that emphasis in this sixth edition continues to be on conveying in-depth fundamental information, and also on assisting students to learn through good examples and many quantitative problem sets. Those who have used earlier editions will recall many challenging problem sets, and this is still the case. To assist instructors, Professors Adamson and Gast have made available upon request a manual containing solutions to the various problems. Each chapter also contains a significant number of critical and up-to-date textual and general references (3,400 references in total). Indeed, the authors indicate in the preface that about 30% of the text, references and problems are new in this edition. With such a significant increase in the amount of new material covered and new references provided, it is not surprising that there are a number of errors that show up in the book, including the spelling of my name in one of the references. A list of such errata has been compiled by the authors and newer printings of the book will include the corrections.

A review of the various chapters reveals significant continuity with earlier editions concerning the sequence of topics and the level of coverage. Therefore we again see excellent coverage of thermodynamics of surfaces, surface tension, capillarity, long-range surface forces, adsorption, surface films, structure of solid surfaces, crystal nucleation and growth, and contact angles, all topics of significant importance to those of us actively involved in various applied areas of pharmaceuticals and drug delivery. In addition to these very fundamental topics, the book provides very good introductory coverage of some applied subjects such as lubrication and adhesion; wetting and detergency; emulsions, microemulsions, foams and aerosols; macromolecular surface films; Langmuir-Blodgett films; and chemisorption and catalysis. Although coverage in these areas can only serve as an introduction to those seeking more detailed

knowledge, it appears to me that the authors have reached about the right level for allowing the reader to move on into the primary literature of these fields. One small point with regard to sequencing of topics is the positioning of the chapters on the gas-solid interface and gas adsorption, which are placed at the end of the book as a prelude to the chapter on catalysis and chemisorption. In my experience I have found it useful to bring the fundamental issues related to gas adsorption into the earlier discussions of adsorption, particularly as they relate to the Langmuir and BET equations, surface area measurement, and solid surface energetics. Thus I would have preferred such fundamental discussion earlier in the sequence.

With respect to the utility of this book for those pharmaceutical scientists already working either in academia or in governmental or industrial research settings, there is no doubt in my mind that the basic principles and some of the applications presented in this new edition are essential to research in drug product development and drug delivery. One cannot meaningfully address materials characterization, solid-state stability, biocompatibility, and molecular recognition, just to name a few topics, without having the level of basic surface chemical understanding presented in this book. Therefore, I would strongly encourage the active scientist interested in such topics to have such a book on his or her desk. Most often, the teaching of surface phenomena to pharmaceuticals graduate students in schools of pharmacy is not developed with the scope and depth of this book; hence this may not be as useful as a course text for more integrated pharmaceuticals courses. However, students who wish to work in this field, and who have prepared themselves adequately in mathematics and physical chemistry will find this text enormously valuable in deepening their understanding of this very interesting and important scientific area. Given the relatively inexpensive price for such a comprehensive and useful book, I can recommend it most enthusiastically to students for this purpose.

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Enzyme and Microbial Biosensors: Techniques and Protocols. Ashok Mulchandani and Kim R. Rogers, Eds. Humana Press, 999 Riverview Drive, Suite 208, Totowa, NJ 07512, 1998. xii, 264 pp., illustrations. \$69.50.

Affinity Biosensors. Techniques and Protocols. Kim R. Rogers and Ashok Mulchandani, Eds., Humana Press, 999 Riverview Drive, Suite 208, Totowa, NJ 07512, 1998. xii, 249 pp., illustrations. \$69.50.

These two companion volumes in the Methods in Biotechnology Series seek to capture the latest developments in biosensor design by providing detailed protocols for sensor preparation and use. Step-by-step procedures are given for the immobilization of biological recognition elements and the assembly of the transducing element. The first volume deals with enzymes and whole cells and reflects the heavy historical emphasis on elec-

trochemical detection, potentiometric and amperometric as a means for following oxidation-reduction reactions. The second volume focuses on measurement of affinity reactions: antibody-antigen, receptors-agonists/antagonists, DNA intercalation, and xenobiotics-whole cells using a wide variety of techniques. Detection of the binding events is accomplished by optical, electrochemical, acoustic, and thermal methods. The preparation procedures are reasonably detailed and in many cases the sources of material are also specified.

As a source of "recipes" these two volumes succeed well. However, they should not in general be regarded as "texts" where one could learn about the fundamentals of the various techniques or get a real sense of the applicability of certain approaches. Only occasionally are performance data included, mentioning such matters as limits of detection, assay time, interferences, etc. The procedures given are necessarily quite application specific, and the reader will have to appreciate this point if a particular approach is to be adapted to a different application.

In spite of these reservations, the authors have done a good job in summarizing some of the important developments in the rapidly evolving field of biosensors. These two volumes will be useful to the reasonably sophisticated scientist seeking to solve a particular problem using these new techniques.

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Structure-Based Drug Design. Pandi Veerapandian, Ed. Marcel Dekker, Inc., 270 Madison Ave., New York, NY 10016-0602, 1997. xiii, 647 pp., illustrations. \$175.00

Drug design is one of the major research activities in medicinal chemistry, and one of the most rapidly growing sub-disciplines in the pharmaceutical sciences. Given the significance of molecular structure in drug design, a book on structure-based drug design should be of a priori interest to a large number of pharmaceutical scientists in various aspects of drug research and development. Not only does this book fulfill such expectations, it also comes with a bonus.

Indeed, the usual layout of modern books in this field is centered on methodology and techniques, e.g., algorithms to describe molecular structure, QSAR, and 3D-QSAR. Such books are of interest to workers in the field but remain of difficult access to other drug researchers. *Structure-Based Drug Design* is entirely original in that each of its chapters begins with the experimentally elucidated or homology-modeled 3D-structure of a pharmacodynamic target (enzyme or receptor, see below), and goes on to demonstrate in detail how this knowledge has been and can be used to design ligands and agents of high selectivity and efficacy. The abundant black-and-white illustrations in the book take the form of 3D structures of proteins and active sites, and the form of many 2D and 3D mechanistic schemes which are both informative and reader-friendly. As such, the book has much in common with the most modern textbooks in molecular biology and biochemistry, but its appeal does not stop here.

There is indeed a second characteristic of this book which adds considerably to its value, namely the nature of the nineteen

pharmacodynamic targets each of which is the topic of an individual chapter. The first three chapters are dedicated to AIDS and present HIV-1 protease, HIV-1 reverse transcriptase and retroviral integrase, respectively. There follows a chapter on bradykinin receptors and their antagonists. Four chapters on recent approaches in anticancer drug design examine in turn purine nucleoside phosphorylase inhibitors, matrix-metalloproteinase inhibitors, hydroxysteroid dehydrogenases, and ATP competitive specific inhibitors of protein kinases. The inhibition of aldose reductase forms a chapter centered on diabetes. This is followed by recent advances in the search for drugs to treat heart diseases, namely thrombin inhibitors, agents directed at coagulation factor Xa, modulators of sodium channel function, and renin inhibitors. The next chapters examine inhibitors of catechol O-methyltransferase as antiparkinsonian drugs, agents acting on glycolytic enzymes as antitrypanosomiasis drugs, immunomodulators based on the structure of interleukin-1, and interferon as a foundation for drug design. The last two pharmacodynamic chapters are on antiviral agents, namely compounds acting on influenza virus neuraminidase, and rhinoviral capsid-binding inhibitors. The three final chapters differ from all others in that they present novel methodologies rather than pharmacodynamic targets. These excellent chapters, which offer a fit ending to the book, are dedicated to the integration of structure-based design and directed combinatorial chemistry, structure-based combinatorial ligand design, and peptidomimetics and neopeptides.

The pharmacodynamic targets listed above are important and promising, and they cover a wide range of pathologies for which better drugs are badly needed. What remains unclear to this reviewer is the rationale behind the sequence of chapters. For example, why are anti-AIDS and antiviral drugs examined separately at both ends of the book? This however is a minor point which in no way diminishes the value of the work. A more serious shortcoming is the complete absence of color plates. These would have rendered the figures even clearer and more informative. Of course the production of color plates does not come cheap, but elegant solutions exist in the world of multimedia. Specifically, a CD-ROM containing color plates (and why not the full atomic coordinates of some of the discussed targets?) might have been produced and sold together with the book.

In summary, *Structure-Based Drug Design* is an outstanding source of knowledge, inspiration and delight. It is also a resonant proof that drug researchers are particularly fortunate scientists, being able both to uncover and contemplate the boundless complexities of Nature, and to actualize their awe by contributing to general health and well-being.

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Books Received

Analysis

The Essential Guide to Analytical Chemistry. Georg Schwedt. John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10158-0012, 1998. xii, 248 pp., illustrations. \$34.95.

Impurities Evaluation of Pharmaceuticals. Satinder Ahuja. Marcel Dekker, Inc., 270 Madison Ave., New York, NY 10016-0602, 1998. iv, 293 pp., illustrations. \$135.00.

Selected Contents

1. Analytical methodology
2. Synthesis-related impurities
3. Pharmaceutical formulation-related impurities
4. Kinetic and stability studies

Solid-Phase Extraction. Principles and Practice. E. M. Thurman and M. S. Mills. John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10158-0012, 1998. xix, 344 pp., illustrations. \$49.95.

A Complete Introduction to Modern NMR Spectroscopy. Roger S. Macomber. John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10158-0012, 1998. xvii, 382 pp., illustrations. Paper. \$49.95.

Thallium in the Environment. Jerome O. Nriagu, Ed. John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10158-0012, 1998. xiv, 284 pp., illustrations. \$89.95.

The Laboratory Companion. A Practical Guide to Materials, Equipment, and Technique. Gary S. Coyne. John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10158-0012, 1997. xviii, 527 pp., illustrations. \$59.95.

Dosage Forms

Pharmaceutical Dosage Forms: Disperse Systems, Volume 3, Second Edition, Revised and Expanded. Herbert A. Lieberman, Martin M. Rieger, and Gilbert S. Banker, Eds. Marcel Dekker, Inc., 270 Madison Avenue, New York, NY 10016-0602, 1998. xviii, 559 pp., illustrations. \$165.00.

Selected Contents

1. Specialized pharmaceutical emulsions (macro-, multi-, gel-emulsions)
2. Polymeric dispersions as drug carriers and film formers
3. Guide to equipment selection and operating techniques
4. Scale-up, quality assurance, and validation of dispersed systems

Development and Formulation of Veterinary Dosage Forms, Second Edition, Revised and Expanded. Gregory E. Hardee and J. Desmond Baggot, Eds. Marcel Dekker, Inc., 270 Madison Avenue, New York, NY 10016-0602, 1998. ix, 488 pp., illustrations. \$185.00.

Future Strategies for Drug Delivery with Particulate Systems. J. E. Diederichs and R. H. Müller, Eds. medpharm GmbH Scientific Publishers, Birkenwaldstr. 44, D-70191 Stuttgart, Germany, 1998. ix, 194 pp., illustrations. Paper. \$49.95.

Micelles, Microemulsions, and Monolayers. Science and Technology. Dinesh O. Shah, Ed. Marcel Dekker, Inc., 270 Madison Ave., New York, NY 10016-0602, 1998. xvii, 610 pp., illustrations. \$195.00.

Coated Pharmaceutical Dosage Forms. Kurt H. Bauer, Klaus Lehmann, Hermann P. Osterwald, and Gerhart Rothgang.

medpharm GmbH Scientific Publishers, Birkenwaldstr. 44, D-70191 Stuttgart, Germany, 1998. 280 pp., illustrations. \$119.95. Selected Contents

1. Trends in modern coating technology
2. Interactions between substrate and film
3. Biopharmaceutical aspects
4. Testing of coated dosage forms
5. Raw materials

Drug Therapy

Gastrointestinal Drug Therapy in the Elderly. James W. Cooper and William E. Wade, Eds. The Haworth Press, Inc., 10 Alice Street, Binghamton, NY 13904-1580, 1998. v, 114 pp., illustrations. \$29.95.

Geriatric Drug Therapy Intervention. James W. Cooper, Ed. The Pharmaceutical Products Press, 10 Alice Street, Binghamton, NY 13904-1580, 1997. v, 73 pp., illustrations. \$24.95.

Medicinal Chemistry

Introduction to Medicinal Chemistry. How Drugs Act and Why. Alex Gringauz. John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10158-0012, 1997. xiii, 721 pp., illustrations. \$89.95.

Principles of Process Research and Chemical Development in the Pharmaceutical Industry. Oljan Repic. John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10158-0012, 1998. xvi, 213 pp., illustrations. \$74.95.

Others

Phospholipid Signaling Protocols. Ian M. Bird, Ed. Humana Press, 999 Riverview Drive, Suite 208, Totowa, NJ 07512, 1998. xii, 380 pp., illustrations. \$79.50.

Chemicals and Long-Term Economic Growth. Insights from the Chemical Industry. Ashish Arora, Ralph Landau, and Nathan Rosenberg, Eds. John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10158-0012, 1998. ix, 564 pp., illustrations. \$69.95.

Wiley's English-Spanish Spanish-English Chemistry Dictionary. Steven M. Kaplan. John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10158-0012, 1998. viii, 530 pp., \$79.95.

Medical Writing in Drug Development. A Practical Guide for Pharmaceutical Research. Robert J. Bonk, Ph.D. The Pharmaceutical Products Press, 10 Alice Street, Binghamton, NY 13904-1580, 1998. xix, 139 pp., illustrations. Paper. \$19.95.

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