Additions and Corrections

***In Situ* Observation of Self-Assembled Monolayer Growth** [*J. Am. Chem. Soc.* **1996**, *118*, 7861−7862]. J. T. WOODWARD AND D. K. SCHWARTZ*

Figures 1−3 were poorly reproduced in the original publication due to printing problems. These figures are reproduced below.

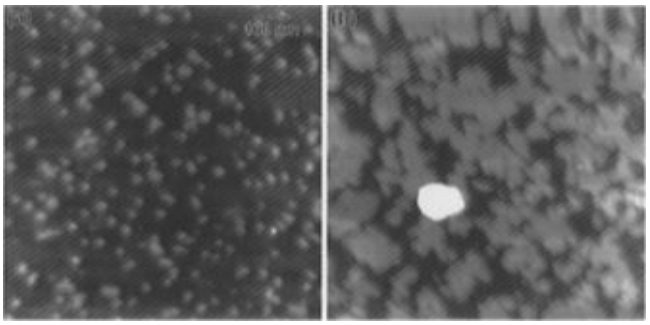

Figure 1. (a) AFM image obtained *in situ* during monolayer growth on mica in a 0.05 mM OPA solution after about 20 mins of exposure. The higher areas (lighter shades of gray) correspond to submonolayer islands of OPA whose tops are about 2 nm higher than the surrounding substrate. (b) AFM image of a different sample at a later stage of growth. The original islands have grown and coalesced. The large white particle near the center is typical of objects that were frequently seen in *in situ* images but were removed by rinsing since they were not observed on quenched films. They were often useful as location markers during growth.

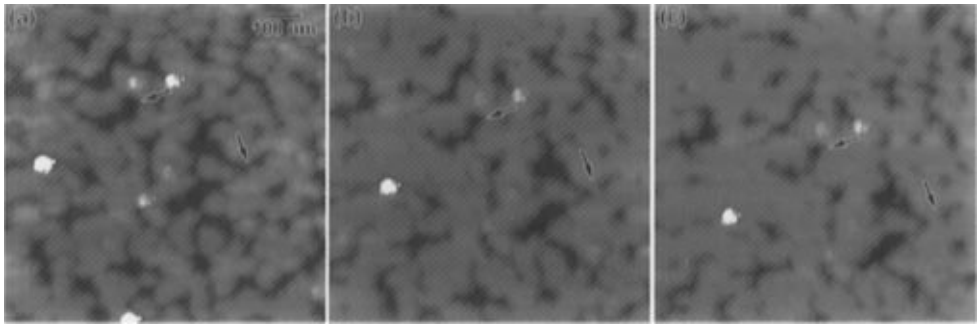

Figure 2. AFM images obtained *in situ* of a monolayer during growth in 0.10 mM OPA solution. (a) After only 5 min in solution, the coverage is much higher than expected due to material deposition from the solution/air interface. (b, c) The same area on the film (with some scanner drift) after an additional 3 and 7 min of exposure to solution, respectively. The holes that appeared in a are observed to fill-in gradually by film growth from the edges. The arrows guide the eye to the same positions on the film in each image. The darker borders surrounding the island edges may represent a real feature in the height profile-a sort of "ledge" at the island edge. However, as in any AFM image, the apparent profile of an edge is actually a convolution of the true profile and the (unknown) tip shape.

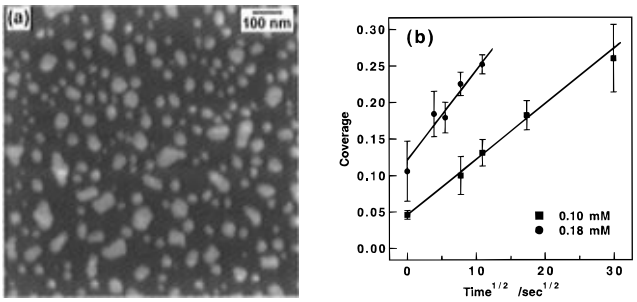

Figure 3. AFM image of a quenched monolayer that was exposed to 0.10 mM OPA in THF for 120 s. (b) The surface coverage of quenched films as a function of exposure time$^{1/2}$ for samples immersed in 0.18 mM solution (circles) and 0.10 mM solution (squares).

JA965421O

S0002-7863(96)05421-2

Book Reviews *

Cytochrome P450 Structure, Mechanism, and Biochemistry, 2nd ed. Edited by Paul R. Oritz de Montellano (University of California, San Francisco). Plenum: New York. 1995. xi + 631 pp. $125.00. ISBN 0-306-45141-7.

The second edition of this book on cytochrome P450s is timely and of high quality. The range of topics covered is broad and thorough as befits a protein family which serves such a wide variety of functions in both prokaryotic and eukaryotic organisms. The structure and function of these proteins have interested chemists, biochemists, and physiologists for decades, and the interdisciplinary quest to understand them and their biological action is evident from the table of contents. Topics range from model systems in which the mechanisms of the oxidative reactions catalyzed by cytochrome P450 are explored through primary and three-dimensional structural comparison of structures to the hormonal and genetic regulation of cytochrome P450s. Each chapter is written by one or more experts in the field of cytochrome P450 being addressed; each is well written and well illustrated. One of the most impressive aspects of the contributions is the extent to which the published literature is covered. A worker new to any aspect of the field of cytochrome P450 research could rely on this volume as the entry to the history and current status of this research area. Experienced cytochrome P450 investigators will benefit from the chapters outside their usual focus; each begins with a thoughtful introduction and ends with a summary which usually includes commentary on future research directions. The individual contributions are clearly interrelated but are not overly redundant. The volume contains a very useful and annotated appendix updating an earlier summary of the structures and functions of known cytochrome P450s. This volume should be on at least one bookshelf of each laboratory engaged in the study of cytochrome P450, whether the focus is on protein structure, oxidative mechanisms, or the physiology of xenobiotic or steroid metabolism.

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JA965506P

S0002-7863(96)05506-0

Nanotechnology: Molecularly Designed Materials. Edited by Gan-Moog Chow (Naval Research Laboratory) and Kenneth E. Gonsalves (University of Connecticut). ACS: Washington, DC. 1996. ix + 413 pp. $114.95. ISBN 0-8412-3392-6.

ACS Symposium Series No. 622. Developed from a symposium sponsored by PMSE, at the 210th National Meeting, Chicago, IL, August 20−25, 1995. This volume provides a chemistry-oriented overview of nanoscience and nanotechnology. The cutting edge of research in vapor phase synthesis, metal colloids in polymers and membranes, nanostructure semiconductors, nanostructure metals, nanocomposites, nanostructure ceramics, and sol−gel-derived materials is presented. The recent interedisciplinary progress in the control of unique properties of nanostructure materials by rational design in synthesis and processing is described.

JA965692Z

S0002-7863(96)05692-2

Green Chemistry: Designing Chemistry for the Environment. Edited by Paul T. Anastas and Tracy C. Williamson (U.S. Environmental Protection Agency). ACS: Washington, DC. 1996. xii + 251 pp. $89.95. ISBN 0-8412-3399-3.

ACS Symposium Series No. 626. Developed from a symposium sponsored by the Division of Environmental Chemistry, Inc., at the 208th National Meeting of the American Chemical Society, Washington, DC, August 21−25, 1994. This volume presents the alternative environmental benign syntheses and processes for chemical manufacturing. It introduces green chemistry technologies, including biotechnology for pollution prevention. The book presents alternative environmental benign reaction conditions for chemical manufacturing, and it discusses the use of catalysis for pollution prevention.

JA9656917

S0002-7863(96)05691-0

Innovations in Supercritical Fluids: Science and Technology. Edited by Keith W. Hutchenson (DuPont Central Research & Development) and Neil R. Foster (University of New South Wales). ACS: Washington, DC. 1995. x + 469 pp. $129.95. ISBN 0-8412-3324-1.

ACS Symposium Series No. 608. Developed from a symposium held at the American Institute of Chemical Engineers Annual Meeting, San Francisco, CA, November 13−18, 1994. This volume presents an overview of supercritical fluid science and technology with emphasis on developments in solubility and modeling. It provides comprehensive coverage of current research, including molecular reactions and simulations, phase behavior, chemical reactions in supercritical fluids, supercritical water oxidation, and forest products including fundamental kinetics and modeling, simulations of hydrogen bonding and solvation, catalysis, use of conventional oxidants, corrosion issues, reactor design, and mapping of critical curve phase boundaries.

JA965606V

S0002-7863(96)05606-5

Antibody Expression and Engineering. Edited by Henry Y. Wang (University of Michigan) and Tadayuki Imanada (Osaka University). ACS: Washington, DC. 1995. xii + 154 pp. $54.95. ISBN 0-8412-3314-4.

ACS Symposium Series No. 604. Developed from a symposium sponsored by the Division of Biochemical Technology, at the 207th National Meeting of the American Chemical Society, San Diego, CA, March 13−17, 1994. The volume examines monoclonal antibody (MAb) synthesis. It discusses expression of MAbs in various mammalian systems. It includes a review of research on the expression of antibody fragments in various microbial systems. The book describes the use of catalytic antibodies for a variety of applications, and it reviews applications of MAbs and its fragments.

JA9656006

S0002-7863(96)05600-4

Industrial Organic Chemicals. By Harold A. Wittcoff (Chemical Systems, Inc.) and Bryan G. Reuben (South Bank University). Wiley: New York. 1996. xxiv + 531 pp. $74.95. ISBN 0-471-54036-6.

The authors describe the process pathways by which a small number of organic chemical raw materials are converted to a complex array of intermediate and product species. Fossil carbon is the primary source of feed materials for organic chemical manufacturing; natural gas and petroleum crudes are preferred sources, but coal has the potential for great long-term contributions. Natural products play limited roles in organic chemical manufacturing, in general, but are a major factor in the specialty and pharmaceutical chemical industries. Methane, two-, three- and four-carbon olefins, benzene, toluene, and xylenes, derived from energy streams, are the precursors for most manufactured organic chemicals.

Petroleum refining has the low value and large volume characteristics of bulk inorganic chemical manufacturing, well illustrated by sulfuric acid, phosphate fertilizers, and ammonia. This subject book stresses the integration of higher value, lesser volume organic chemical manufacturing with natural gas recovery and petroleum refining. Favorable economics, dictated by consumer demand and feed stream availability, are central to the dedication of a significant fraction of refinery output to petrochemical purposes. Although specific economic factors vary in importance, over short periods of time, general economic

*Unsigned book reviews are by the Book Review Editor.

considerations in process and product selection are substantially less variable. Thus, many of the economic factors discussed in this book will remain valid and contribute to a longevity that many economics-oriented texts do not achieve.

Chapter 1 describes the characteristics of chemical manufacturing, on a global basis, and emphasizes the strong correlation between industrial productivity and national development. Regulations and product distributions specific to the United States are central to this part of the book. Chapter 2 is a welcome overview of petroleum refining; physical separations and basic chemical reactions are explained in some depth. The synergisms and conflicts that influence allocation of capacity to gasoline and petrochemical feed streams are clarified by this discussion. Molecular rearrangements and catalyst selection are coupled to desired products and the "feed stock availability" cited above.

Chapters 3−9 present chemistry and process design, including the critical contributions of catalysts, on the basis of principal raw materials, i.e., the primary chemical building blocks identified in the first paragraph. Thus, Chapter 3 is devoted to the chemicals and polymers derivable from ethylene. In each case, manufacturing "trees" and process sequences are clear and the need for integration of ultimate product distribution with raw material availability is made obvious. Conventional unit process information is organized in a rational structure and portrays manufacturing relationships clearly.

This subject book is "must" reading for students in chemical engineering and applied chemistry, especially those with an interest in organic chemical manufacturing. It provides classic background on the commercial exploitation of chemical reactions. Heat and mass transfer limitations, catalytic selectivity, control and monitoring requirements, and equipment capabilities are addressed with thoroughness and appropriate detail. However, the authors have created an environment in which individual process dynamics are viewed within the context of parallel and competing processes to achieve desired product diversity. In addition, the book will prove very helpful to engineers and scientists who look to practical organic chemical syntheses and uses for professional growth; it provides a wealth of technical information in a broad industrial perspective.

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S0002-7863(96)05602-8

Laboratory Techniques in Electroanalytical Chemistry, 2nd Edition. Edited by Peter T. Kissinger (Purdue University) and William R. Heineman (University of Cincinnati). Dekker: Monticello, NY. 1996. xxii + 986 pp. $79. ISBN 0-8247-9445-1.

The second edition of *Laboratory Techniques in Electroanalytical Chemistry* has been "revised and expanded", according to the subtitle. It is difficult to improve on an already good product, but in this case, the editors have succeeded. This book is touted as a "reference/text" intended to help the beginning researcher get started in electroanalytical chemistry. The book is well-organized, with the first five chapters devoted to electrochemical fundamentals, followed by chapters on instrumentation, cells, electrodes and solvents. Chapters on more specialized topics follow.

The level of discussion in the "text" chapters (2−5) is appropriate for a graduate student beginning work in electroanalytical chemistry. The editors have taken a non-mathematical, intuitive approach to presenting the fundamental correlations among mass transport, concentration gradients, and current response for the varied techniques used by the modern electroanalytical chemist. This approach is to be applauded and is more likely to spark (and keep) the novice reader's interest and enthusiasm than the mathematics-heavy approach of other books on the subject. The figures illustrating the concepts are of high quality and complement the discussion well. However, this portion of the book often reads too much like a classroom lecture, with many questions posed to the reader and then left unanswered. This pedagogical device is inappropriate for a reading audience not in a classroom or without access to experienced sources. This is particularly acute in the chapter devoted to analog instrumentation, which takes an annoyingly condescending turn when the author indicates that if a certain point is not obvious, "...there is no point in continuing with this material".

As a reference, the book succeeds very well. It is written by a "who's who" of electroanalytical chemists. It is, for the most part, relevant and up-to-date on topics, although it appears that in some cases the updating of references has been casual, at best. Several wholly new chapters are welcome additions in the second edition. The chapters on microelectrodes and chemically modified electrodes, in particular, are essential in order to bring the overall presentation up to date. Chapters on electrochemistry at reduced temperatures, electroanalytical chemistry in molten salts, and electroorganic synthesis are also new to this edition. Of particular interest to the electroanalytical community may be the section on electroenzymatic reactions as applied to biosensors.

Several other chapters from the first edition have been extensively revised, often with new authors. Particularly notable is the chapter on carbon electrodes, which now provides a thoroughly updated discussion of structure, properties, and electrode preparation methods for each type of commonly used carbon electrode material. The chapter on film electrodes has also been expanded, with the section on fabrication vastly improved from the first edition. Also substantially updated are the chapters on electrode mechanisms of transition metal complexes, electrochemical preconcentration, and vacuum line techniques. The chapter on electrochemical detection in liquid chromatography has been expanded to include capillary electrophoresis.

As evidenced in the one-third increase in number of pages (from the first edition), the state of the art in electroanalytical chemistry is still progressing. At some point, the book's editors will have to perform triage on topics. The inclusion of little-used techniques (derivative stationary electrode voltammetry, chronopotentiometry) serves more to distract the novice than to demonstrate important fundamentals and would be better left out. It may be heresy to say this, but the discussion of polarography and mercury electrodes might also be left out without detracting from the book.

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JA965572R

S0002-7863(96)05572-2

Emerging Technologies in Hazardous Waste Management IV. Edited by D. William Tedder (Georgia Institute of Technology) and Frederick G. Pohland (University of Pittsburgh). ACS: Washington, DC. 1994. 325 pp. $89.95. ISBN 0-8412-2857-4.

ACS Symposium Series No. 554. Developed from a symposium sponsored by the Division of Industrial and Engineering Chemistry, Inc., of the American Chemical Society at the Industrial and Engineering Chemistry Special Symposium, Atlanta, Georgia, September 21−23, 1994. This book focuses on remediation technologies for soils and sediments, waste minimization and management technologies, and radioactive and mixed-waste management. The use of bacteria in controlling the migration of heavy metals in soils and water is described. Chapters describing green manufacturing processes designed to avoid the production of hazardous wastes are included. Computer applications of waste management issues are reviewed.

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