Book Reviews

Studies in Physical and Theoretical Chemistry 65. Structure and Reactivity in Reverse Micelles. By M. P. Pileni (Université Pierre et Marie Curie). Elsevier: Amsterdam and New York. 1989. xviii + 379 pp. $139.00. ISBN 0-444-88166-2.

This book concentrates on various chemical reactions in inverse micellar systems after their structure has been discussed in a few introductory chapters. In these the inverse micelles are put into perspective in the chapter of Barry Ninham with a discussion on the dilemma of physicists and well-defined amphiphilic association structure. This chapter is written with the usual elegance and wit of this author. Langevin's chapter on the structure of inverse micelles is focused on scattering techniques in a systematic and useful manner and mentions other methods such as electron microscopy and spectroscopy. The NMR method has, instead, its own chapter, as has fluorescence quenching. Both chapters are well-written.

The reactions in inverse micelles cover a large spectrum from femtosecond reactivity of excess electrons, via enzymotic reactions to the formation of solid particles (inorganic or polymers).

These chapters are extremely useful; for the first time information is now available about the rapidly expanding field of reactions in inverse micellar systems.

The book is strongly recommended for academic and industrial chemists with an interest in synthetic efforts. Inverse micellar solutions offer new and exciting avenues for the preparation of new materials along new synthetic routes. Water and hydrocarbon soluble substances can be made to react with each other as *if* in a one-phase system.

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Chemistry At Interfaces. By Finlay MacRitchie (CSIRO Division of Plant Industry). Academic: London and New York. 1990. x + 283 pp. $49.95. ISBN 0-12-464785-5.

Chemistry At Interfaces is a compact book, designed to be complementary to the several excellent books presently available on surface chemistry. At the same time the author proposes to present a different slant on the subject. Persons with little training in surface chemistry will find this book a good source of suggestions on how to set up experiments using interfacial techniques and ways to interpret results.

Having arisen primarily from work on catalysis, surface and interfacial science is now truly interdisciplinary, being of great importance in the general area of materials science and of particular importance in adhesives and composite materials. New and emerging technologies show promise of future importance in the fields of microelectronics and telecommunications, and biology and medicine. The author is sensitive to the possibilities of new applications in these areas.

Relevant theoretical concepts are dealt with in the first two chapters. Three chapters deal with the problems of purity and techniques of measuring a number of properties of thin films and monolayers with a variety of current techniques. These are followed by a chapter each on the properties of monolayers, physical processes at interfaces, chemical reactions at interfaces, and biological processes and reactions. A short chapter discussing future directions ends the book.

One of the most attractive features of *Chemistry At Interfaces* is the inclusion of suggested demonstrations and directions for performing them at the end of each chapter. Each chapter contains a problem set and complete solutions to these in the appendix. This should make the book attractive for use as a text for either a short course or as supplementary reading in a larger course on surface chemistry.

Chapter references are not exhaustive but will easily lead the reader into unfamiliar literature. A topical index is included.

Thomas A. Furtsch, *Tennessee Technological University*

Chromatography and Modification of Nucleosides. Part B: Biological Roles and Function of Modification. Edited by C. W. Gehrke and K. C. T. Kuo (University of Missouri—Columbia). Elsevier: Amsterdam and New York. 1990. xiv + 370 pp. $153.75. ISBN 0-444-88505-6.

Like Part A of this series, this book consists of ten self-contained chapters, each written by different contributors. The focus of this volume is on methods for synthesis of tRNA's and control of their biological function.

The subject matter of the chapters of this volume is much more interrelated than those in Part A. Many of the chapters discuss highly specialized research on tRNA synthesis and codon pattern recognition that appear to be targeted at experts in the field. Nevertheless, two chapters (the first and seventh) provide basic reviews on the synthesis and function of modified nucleosides in tRNA's that would be useful for scientists just entering this field. The last chapter, a review article on naturally occurring modified nucleosides in DNA, is particularly interesting and should stimulate more research in this area. The experimental details of all the chapters are very detailed, and the references are comprehensive.

While chromatographic methods are discussed in an ancillary manner in virtually all the chapters of this book, there is only one chapter (the fourth) that is focussed on an analytical method of any sort. The emphasis of this book is clearly more on molecular biology than on chromatography, and its inclusion in the *Journal of Chromatography Library* series by the publisher represents a potentially confusing departure from the focus of the preceding 44 volumes in this series. It might have been more appropriate to publish this book outside of the *Journal of Chromatography Library* series, where it could have been targeted toward a more appropriate audience, or to include some of the more general chapters as background information in Part A. Nevertheless, the material in this book is timely, comprehensive, and well-written. It is appropriate for molecular biologists and analytical biochemists working in the rapidly expanding areas of RNA and DNA modification.

Jerome E. Haky, *Florida Atlantic University*

Chemical Carcinogens: Some Guidelines for Handling and Disposal in the Laboratory. By Marcel Castegnaro (International Agency for Research on Cancer) and Eric B. Sansone (NCI-Frederick Cancer Research Facility). Springer-Verlag: Heidelberg and New York. 1986. ix + 97 pp. $15.00. ISBN 0-387-16719-6.

This book presents a review of the field (up to 1986) concerning the safe handling of chemical carcinogens in the laboratory. As such, it is already a bit out of date. Nevertheless, it is a useful text for introducing the subject to laboratory personnel who will be involved in the handling, use, and disposal of chemical carcinogens. It is concise, informative, and easy to read, with a minimum of technical jargon. Topics covered include shipping and storage of chemical carcinogens, decontamination of spills, protocols for safe laboratory usage, the appropriate physical environment for carcinogen experiments, and an extensive section on methods of chemical treatment for in situ detoxification of aflatoxins, *N*-nitrosamines, *N*-nitrosamides, polycyclic aromatic hydrocarbons, hydrazines, aromatic amines, haloethers, and a number of commonly used antineoplastic agents. Hospital personnel will find the last section to be of particular interest.

The authors make reference to a large number of previous publications in this field, and the reader is referred to previous studies for much of the detail on certain topics (e.g. analytical methods for monitoring the levels of carcinogen contamination of laboratory surfaces). In general, the book seems to be written more for the research scientist working with significant amounts of potent chemical carcinogens. Some of the recommendations made would appear to be of lesser practicality in academic research departments using small amounts of suspected carcinogens of lower potency. For example, most laboratories working in either organic chemistry or molecular biology will use limited amounts of pure chloroform, a group 2B probable carcinogen. It would not appear practical to provide a specially designed room in every science building for the storage of all chloroform (and other low-potency suspected carcinogens) stocks, with consequent hazards in transport to individual laboratories for daily use.

Having said that, it should be emphasized that most of the safety procedures recommended in this book are as applicable for working with suspected, low-potency carcinogens as they are for known, high-potency chemical carcinogens. Any investigator working with such compounds would be well advised to learn about this subject.

Richard A. Nakashima, *Texas Tech University*

Synthetic Organic Electrochemistry. Second Edition. By Albert J. Fry (Wesleyan University). John Wiley & Sons: New York. 1989. xii + 339 pp. $55.00. ISBN 0-471-63396-8.

The second edition of Albert J. Fry's book on synthetic organic electrochemistry has appeared 17 years after the publication of the first

edition by Harper & Row in 1972. The first part of the book is devoted to electrochemical concepts and techniques. The introductory first chapter contains an overview of electrochemical concepts and terms. It is followed by three chapters covering the electrochemical principles, techniques for investigation of electrode reactions (including cyclic voltammetry, polarography, preparative scale electrolysis, and coulometry), and manipulation of experimental parameters. The second part of the book examines electrochemical reactions arranged by functional groups: cleavage of single bonds, reduction of multiple bonds, reduction of conjugated systems, and oxidation processes. These chapters represent excellent summaries of the respective areas of preparative organic electrochemistry, with the literature covered through early 1988. The advantages and disadvantages of electrochemical and other methods are often compared and discussed. The author emphasizes the synthetic aspects of organic electrochemistry while de-emphasizing the mechanistic literature. The penultimate chapter (chapter nine) in the book is the only new chapter in this edition. It is concerned with indirect electrolysis, i.e., electrocatalysis and electrogenerated reagents. Finally, the concluding chapter is devoted to electrochemical equipment and experiments, with a discussion of electrochemical cells, power sources, cyclic voltammetry, and coulometry. The appendix at the end of the book is a useful addition to the new edition. It lists the names and addresses of the various manufacturers of electrochemical cells, electrochemical instruments, electrode materials, cell dividers, and other materials, as well as the available consulting services.

Similarly as in the first edition, references are conveniently grouped together at the end of each chapter. Although an author index would be very helpful, only a subject index is provided at the end of the book, in the same fashion as in the first edition. The book is well-written and the discussion of the various topics is very readable. An updated version of the first edition, it provides an excellent coverage of preparative organic electrochemistry and will prove very useful to organic chemists and electrochemists alike.

Cyril Párkányi, *Florida Atlantic University*

Photometric Determination of Traces of Metals. Part IIB: Individual Metals, Magnesium to Zirconium. Fourth Edition. By Hiroshi Onishi (University of Tsukuba). John Wiley and Sons: New York. 1989. xxii + 821 pp. $179.95. ISBN 0-471-84694-5.

Part IIB is the final section of Volume 3 in the *Wiley's Chemical Analysis* monograph series. Part I (General Aspects), 1978, coauthored with Ernest Birger Sandell, and Part IIA (Individual Metals, Aluminum to Lithium), 1986, have both received high marks in reviews in the pages of this journal. Three earlier editions were authored by Ernest Birger Sandell under the title *Colorimetric Determinations of Traces of Metals*, first published in 1944.

By "photometric" is meant any method whose ultimate measurement is made with a spectrophotometer (or filter photometer) in the visible range, while "trace" can mean 0.1% (as in the case of Mg in aluminum alloys) down to ppb (μg/L).

In the preface to the present volume, the author says, "An effort was made to keep the aim of previous editions of presenting a limited number of useful methods", but he does not explain the criteria for selection of these "useful methods". Naturally, many of them existed in the previous editions; but the wealth of descriptive and explanatory detail that accompany the selected procedural instructions suggest that he must often have chosen procedures with which he has first-hand experience.

The book is organized with one chapter per element. Almost every chapter begins with a sentence or two that represents a distillation of the author's wisdom regarding that element's analysis. In many cases this is a descriptive statement, as in Chapter 23, "To a large extent the separation of manganese from other heavy metals requires the use of reagents that remove these and leave manganese behind in aqueous solution. Extraction methods are generally preferable." In other cases, advise as to the best strategy is given, as in Chapter 37, "Traces of sodium are best determined by atomic emission ... spectrometry or atomic absorption spectrometry." The reader who needs guidance when faced with an unfamiliar new analysis problem should find these introductions quite helpful.

Each chapter introduction is followed by sections on separation methods, determination methods, and applications. Usually, precipitation, ion-exchange (or other chromatographic), and extraction methods, color-producing reactions, and typical contexts (biomaterials, geomaterials, alloys, water, soil, etc.) for the element are discussed, including detailed procedures for many methods.

References are given for all the methods and procedures mentioned in the book, so each chapter's bibliographic notes run to scores (in some cases, hundreds) of items. The vast majority of references are to literature published since 1960. (The previous, third, edition of Part II was published in 1959.) Russian, Chinese, and Japanese journal sources are cited frequently, along with the European and American sources.

Tables of specific methods for specific situations are used throughout. They are very effective in conveying the crucial information in a rapidly accessible form, including literature references. Separation methods (especially ion-exchange), colorimetric reagents, and applications are usually given their own tables. The optimum and detection-limit amounts of analyte element for each method are easily estimated from Onishi's tables of Sensitivities for Colorimetric Methods, found in every chapter.

These volumes are a rich mine of general guidelines and detailed procedures for dealing with the non-routine trace-element analysis problem. And even in a laboratory that possesses the most modern instrumentation, there will be those cases where FAAS, ICP, NAA, XRF, or PDQ is not so practical (as when a single element must be determined at trace levels on a routine basis) and colorimetry may be the optimum approach. Many chemists, for whom trace-metal analysis is not a daily task, will find *Photometric Determination of Traces of Metals* is a fascinating study in the history of chemistry "progress". It reveals what a great amount of painstaking work by chemists, past and present, on the separation and measurement of trace levels of metallic elements has been superceded by instrument-intensive, computer-driven methods. As in so many other areas of our lives, we may be letting "high tech" get between us and our appreciation of the real world.

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Biomedical Magnetic Resonance Imaging. Principles, Methodology and Applications. By F. Wehrli and D. Shaw (General Electric Medical Systems) and J. B. Kneeland (Medicinal College of Wisconsin). VCH: New York. 1988. xvii + 601 pp. $95.00. ISBN 0895-73349-8.

This multiauthored book gives a general background, as well as a wide scope of the most recent applications of NMR in biology and medicine. Biomedical aspects of NMR have been studied extensively in recent years, and this book reviews many of the most important articles on the subject.

As to its contents, the book is addressed principally to people involved in medical research in that the technical information about instrumentation and its related theoretical background are rather limited. A new and interesting topic was the chapter on magnetopharmaceuticals. This very important class of contrast agents, which may affect the final image as well as the apparatus itself, is now undergoing intense evaluation. The subject is new to books on NMR imaging and thus is a unique feature here.

Addressing a more technical area, the local ("surface") coil approach to human body imaging is relatively new in experimental and commercial instrument development. It can produce local high-resolution images that may be very useful in some diagnostic problems. Of course, further evaluation, particularly from clinical applications, will decide.

More than half of this book is devoted to clinical aspects of NMR imaging applications for different parts of the human body. This information is of particular interest for medical researchers either currently engaged in NMR imaging or planning to start dealing with this technique.

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