Book Reviews

Electron Phenomena at Interfaces: Fundamentals, Measurements, and Applications. By Ayao Kitahara (Science University of Tokyo) and Akira Watanabe (Nara Women's University). Marcel-Dekker, Inc.: New York and Basel. 1984. xi + 463 pp. $94.25. ISBN 0-8247-7186-9.

This book contains a number of articles in the area of the double layer applied to electrokinetic phenomena, for example, emulsification.

The book is divided into three main parts. The first part, called Fundamentals, deals with "surface electricity"—a treatment of the basics of electrified interfaces; there follows a chapter on the double layer, one on the interaction of double layers with colloids, another on electrokinetics, and one on nonaqueous systems.

The second part of the book consists of three chapters on measurements, and then less than half of the book is devoted to the applications which deal, e.g., with detergents, pigments, and electrophoretic displays, among a total of 10 items.

Chapter 1, on basic aspects of electrified interfaces, reminds one to a degree of Parson's basic article of 1954 in the first edition of "Modern Aspects of Electrochemistry". The treatment is clear, but from time to time sloppy, as when the migration of ions is referred to as part of the thermodynamics of the situation. The double layer *is* represented with the water molecules in place, a characteristic of a modern book.

The double layer is treated in Chapter 2. It is rather a good treatment and includes a rational discussion of the oxide–aqueous solution interface. The basic differences of a Nernstian v. Sternian approach is not met, however, indeed understandably, because the total length of the article is only 30 pages.

Chapter 3 is a basic chapter on the stability of colloids. The detail is rather great, but it still dilutes solution treatment and is not directly applicable to practical situations. On the other hand, qualitatively, real situations are treated as, e.g., the polystein–latex system and the Alder transition.

Chapter 4 concerns electrokinetics: This is a clear and simple treatment, ending with a nonequilibrium thermodynamics approach. Finally, there is a chapter on nonaqueous solution which I found quite original.

A second section of the book on measurements is clear and should be of service to those who want to know what they are really doing.

The book is full of good diagrams. The English is clear and forceful, and 90% or more of the references are to Western literature. This is a good book for those who are interested in the colloidal situation in the widest sense and want to get at the basic theory.

John O'M. Bockris, *Texas A&M University*

Food Protein Chemistry: An Introduction for Food Scientists. By J. M. Regenstein and C. E. Regenstein (Cornell University). Academic Press: Orlando, FL. 1984. xii + 353 pp. $52.00. ISBN 0-12-585820-5.

The stated principal intent of this book is as a text for senior and first-year graduate food-science students. The title is somewhat misleading in that chemical reactions such as specific peptide cleavage or synthesis are considered only briefly and (for the most part) without structural diagrams. Reactions of amino acids, including the extremely important Maillard ("browning") reaction, which also occurs with peptides on cooking with sugars, are discussed in a brief appendix to Chapter 4.

The majority of the text is devoted to physical chemistry measurements and instrumental methods (e.g., electrophoresis, X-ray diffraction, dialysis). The book is, however, not intended as a lab manual, and descriptions of these techniques that would suffice to explain them to a neophyte are not always provided. For example, the definitions of electrophoresis and dialysis are assumed to either be known to the student or to be deducible from the context. Some observations are almost telegraphic: e.g. (p 21) "Any equilibrium constant equals the product of a reaction divided by the reactants." On the other hand, this reviewer was amused to find in the midst of an involved discussion of "isoionic point" the observation: "The pH of pure water is 7.0" (p 32).

The style of writing varies from formal to colloquial. The authors introduce several ideas in the form of questions for the student to ponder, unfortunately without giving the answers; there is also no answer section for the exercises which are provided at the ends of chapters. However, some literature references are cited. There is considerable "skipping around", the reader being told that concepts under discussion are explained more fully elsewhere in the text; fortunately, continuity can usually be achieved by consulting the index. A list of selected readings is provided.

This book appears to be a useful guide to the physical chemistry and general characterization of food proteins for those having or willing to acquire the necessary background. In itself it does not serve as a practical manual and must be supplemented by independent study and/or lecture material, and by "hands on" laboratory experience.

Keith T. Buck, *Fries & Fries Division, Mallinckrodt, Inc.*

Powder Surface Area and Porosity. 2nd Edition. By S. Lowell and Joan E. Shields. Chapman and Hall: London and New York. 1984. xiii + 234 pp. $45.00. ISBN 0-421-2-240-6.

This text is one in the "Powder Technology Series" edited by B. Scarlett. Other titles currently available are "Particle Size Measurement" (T. Allen), "Surface Coatings, Volume 1: Raw Materials and their Usage" (Australian Oil and Color Chemists Assoc.), and "Hess's Paint Film Defects, Their Causes and Cure" (H. R. Hamburg and W. M. Morgans). Together with the "Particle Size Measurement" volume, "Powder Surface Area and Porosity" constitutes a survey of the practical fundamentals of routine powder surface characterization. The introduction to the new text makes clear that the authors have limited objectives in assembling this volume. These are stated as providing an introduction to the experimental techniques associated with surface area, porosity, and density measurements, as well as constituting a handbook giving practical guidance on making such measurements.

The volume is divided into two parts. Part 1 covers the relevant theories relating to typical surface area and porosity measurements. These include the gas adsorption theories of Langmuir and Brunauer, Emmett, and Teller, with their application to multi-point and one-point surface area measurements, a discussion of adsorbate cross-sectional areas, and the interpretation of adsorption studies in the determination of micro- and meso-porosity. In addition it includes an excellent and extensive treatment of the theories and results obtained by mercury porosimetry. Part 2 provides a comparative description of the various experimental techniques including volumetric equilibrium and dynamic adsorption measurements, a somewhat limited discussion of gravimetric adsorption techniques including McBain spirals and microbalances, mercury porosimetry methods, and various density measurements.

Examination of the treatment in this text reveals a heavy emphasis on the practical aspects accompanied by an adequate, but sometimes limited, theoretical treatment. Thus one may criticize the derivation of the Langmuir equation on the basis of a condensation/evaporation mechanism, particularly when it applies primarily to chemisorption. On the other hand, the discussion and evaluation of a multi-point vs. a one-point BET treatment is excellent, providing the reader with a quantitative understanding of the relative virtues and faults of the two approaches. The discussion of absorption hysteresis concentrates on that arising through capillary condensation, which is most frequently encountered, and ignores the less frequently observed sub-monolayer and open-loop hysteresis. In general porosity treatments described are comprehensive, even including detailed calculated examples, but omitting discussion of real, multiple-entry pore structures which do not conform with cylindrical or parallel plate pores. In short the test provides a state of the art approach to agreed measurements and data treatment of surface area, porosity, and density measurements but avoids, or does not discuss, gray or unchartered regions.

While this limited approach is completely in accordance with the authors' stated intent, one might have expected that it would be accompanied by a detailed and extensive list of references. In my opinion the references provided (164) are inadequate to provide the reader with rapid access to information on problem areas beyond the scope of the volume which are either briefly mentioned or omitted. Thus no mention is made of the extensive catalogue review of McClellan and Harnsberger [*J. Colloid Interface Sci.*, **23**, 577 (1967)], in the discussion of capillary condensation the fundamental review of Everett is omitted [*Characterization of Porous Solids*, London Soc. Chem. Ind., pp 229–251 (1979)] while the IUPAC definitions of pore structure [*Pure App. Chem.*, **31**, 579 (1971)] are not mentioned and no reference is made to the availability of "standard" surface area samples. It would also have been very helpful to have a separate list of general references providing broad in-depth coverage of the various topics. Nevertheless, in spite of this problem, the book does succeed in its stated objective of providing a practical handbook for surface area, porosity, and density characterization of powders and should be invaluable to the many industrial concerns involved in the

production and handling of powdered materials.

D. A. Cadenhead, *State University of New York at Buffalo*

Chemical Carcinogens. 2nd Edition. ACS Monograph No. 182. Volumes 1 and 2. Edited by C. E. Searle (University of Birmingham). American Chemical Society: Washington, DC. 1984. xx + 1373 pp. $129.95. ISBN 0-8412-0869-7.

This ACS publication is an extensive revision of the single volume ACS Monograph 173, published in 1976. The 22 chapters by 34 total contributors cover individual subjects that are not particularly organized or integrated with respect to each other. Unfortunately, this lengthy publication does not provide a comprehensive coverage of the field of chemical carcinogenesis. Like its single volume predecessor, this edition does not appear to this reviewer to have been written with the interests of organic or bioorganic chemists in mind. The principal basis for this criticism is the appalling lack of sufficient use of structural formulae and reaction mechanisms. This is true for most of the chapters where such usage is so important. On the other hand, there are hundreds of pages devoted to tables that contain biological test data that are probably of no interest to most readers. The priorities for the most efficient and beneficial use of text space were poorly chosen.

Another weakness of this second edition, which was also most evident in the original edition, is the inconsistency in depth of coverage of the various subjects contained in individual chapters. The subjects of polynuclear aromatic hydrocarbons, *N*-nitroso compounds, direct acting carcinogens, halogenated organics, and aflatoxins were comprehensively reviewed in basically well-written chapters, while the aromatic amine carcinogens were reviewed in a relatively superficial manner. Unfortunately, the chapter on carcinogenic aromatic amines also contained numerous errors in structural figures and some factual errors in the text, and it also failed to adequately cover the more recent literature on this subject.

Some very important subjects in chemical carcinogenesis are painfully absent in this second edition. The important group of heterocyclic amines that are produced by the pyrolysis of amino acids was not covered in the chapter on aromatic amines or in the chapter on carcinogens in food or anywhere else in the book. This oversight is compounded by the neglect of any coverage of the thiono-sulfur compounds as carcinogens. The chapter on carcinogens in foods devoted only 5 lines to the subject of the carcinogenicity of naturally occurring C_6–C_3 chemicals, which include safrole. There are many excellent reviews in print on the subject of carcinogens in food that cover the subject much more thoroughly than does the chapter in this book. Surprisingly, no mention of the interaction of chemicals such as TCDD with the Ah locus receptor was made in the course of a rather lengthy chapter dealing with halogenated organic chemicals. In a monograph of this length, it might be expected that material on oxygen biochemistry and toxicology and on free radicals in toxicology would be desirable subject material. A separate chapter on bioactivation mechanisms in carcinogenesis, including a presentation of the fundamentals of xenobiotic metabolism would have been a useful addition.

Several of the chapters did not contribute significantly to the subject of chemical carcinogenesis, and would better have been incorporated into other chapters. Thus, a single chapter on historical aspects and epidemiology would have been more appropriate than three separate chapters.

On the positive side, a new chapter dealing with the topic of inhibition of chemical carcinogenesis was a good addition. This chapter in combination with a chapter on the bioassay for carcinogens and those chapters previously mentioned as being good reviews provide this monograph with at least some value as a source book for the researcher and educator.

The organic chemist or biochemist who is looking for good texts with which to learn about chemical carcinogenesis will not find this work to be particularly valuable as a guide to this complex subject. This reviewer was disappointed with this monograph because he was hoping to find a single publication that adequately dealt with the subject of chemical carcinogenesis. Unfortunately, this ACS monograph lacks sufficient coverage.

Michael D. Corbett, *University of Florida*

Methods in Enzymology. Volume 104. Enzyme Purification and Related Techniques. Part C. Edited by William B. Jakoby. Academic Press, Inc.: Orlando, FL. 1984. XXIV + 528 pp. $55.00. ISBN 0-12-182004-1.

This volume is one of a continuing series of volumes devoted to analytical and practical methods in enzymology. The first volume of enzyme purification and related techniques appeared in 1971 (Volume 22) and a subsequent volume on affinity chromatography appeared in 1974 (Volume 34). The present volume (Volume 104) introduces a number of newer techniques and modifications of existing methods used in enzymology. The volume is divided into five sections: chromatography, electrophoresis, techniques for isolating membrane proteins, other systems designed for enzyme purification, and related techniques used in enzyme characterization. Several of the authors who contributed material for this volume also contributed articles in one of the two earlier related volumes.

The first section contains various chromatographic methods. Affinity chromatography, by Wilcheck et al. contains several methods to activate resins and to couple ligands to these activated resins. An extensive table listing 293 enzymes purified by affinity chromatography is present and referenced. A similar table lists 52 enzymes purified by immunoaffinity chromatography. These tables should be useful for other investigators to determine proper elution conditions. Newer purification methods using displacement chromatography and affinity chromatography on immobilized dyes are also included and contain many practical applications. The article on hydrophobic chromatography by Shaltiel is an update of an earlier presentation by the same author in Volume 34 of this series. While this particular article offers many practical suggestions and methods for screening suitable hydrophobic resins, it lacks current references (beyond 1980) and contains few references to the many proteins isolated by using hydrophobic chromatography. Several articles are included which deal with the various types and methods in HPLC chromatography: size exclusion, ion exchange, reverse phase, and affinity. The care of HPLC columns, by C. T. Wehr, should be of interest to novice and experienced HPLC users. The use of HPLC in the purification of proteins is increasing rapidly, and these articles offer many practical and useful protocols and suggestions. Another HPLC variation, hydrophobic interaction HPLC, was not included but has appeared frequently in the literature and in new products for HPLC.

Several articles on electrophoresis or related techniques are presented. These include preparative isoelectric focusing and isotachophoresis, affinity electrophoresis, locating enzymes in gels, gel protein stains for glycoproteins and phosphoproteins, a rapid gel protein stain using Coomassie Brilliant Blue G-250, and a highly sensitive silver stain method. All of these contain procedures, formulations, or tables for specific applications. The section on systems for polyacrylamide gel electrophoresis is a compilation and tabulation of the most frequently used electrophoretic conditions (Laemmli, Neville, Ornstein, and Davis) and can be used as a handy reference source. They are extremely beneficial and helpful. There are minor discrepancies between preparation of some stock solutions compared to those suggested by the manufacturers of electrophoretic equipment. Inclusion of the article by G. C. Ganzi on preparation of high purity laboratory water was timely. Considering the abundance of trace metals and organics in water, their effect on enzymes may be significant. In addition, the purity of water is critical for many experiments in molecular biology and should be useful to investigators in these areas. Two articles describe Western blotting and fluorography for detection of radioactivity. These two methods are becoming standard techniques used in protein characterization, isolation, and molecular biology. These articles are excellent sources for procedures and references, although recent reviews or original sources could be used for further details and discussions on methodology.

The remaining two sections deal with membrane proteins and other related systems. For investigators working with membrane proteins, the articles on solubilization of functional membrane proteins, purification of integral membrane proteins, reconstitution of membrane proteins, and separations of detergents from proteins are interesting and detailed. Some of these articles contain useful strategy protocols and information on protein detergent micelle interactions. Hjelmeland and Chrambach have also included a table listing the properties of the most common and newest detergents for solublizing proteins. The last section contains descriptions of protein precipitation with PEG, affinity partitioning, affinity precipitation, protein crystallization, and immunoadsorbent separation. Although these techniques are not as common as some classical separation techniques, they do offer alternative methods for isolating enzymes.

Collectively, these articles present novel and up-to-date methods for isolating and characterizing enzymes and proteins. This volume should be a handy and useful reference source to all investigators in these areas.

William H. Flurkey, *Indiana State University*

Solid State Chemistry and its Applications. By A. R. West (University of Aberdeen). John Wiley and Sons: New York. 1984. vii + 734 pp. $67.95. ISBN 0-471-90377-9.

Solid state chemistry is such a huge field that a thorough exposition requires a multivolume, multiauthor effort, such as the series edited by N. B. Hannay. In the book under review, the author wisely chose a more limited goal, namely an elementary exposition of the subject area addressed to undergraduates or postgraduates, as well as to workers in a variety of allied fields. The volume covers a variety of topics: preparative techniques, the use of physical measurements as diagnostic tools, X-ray

diffraction and crystallography, defects and nonstoichiometry, phase diagrams and phase transitions, ionic conductivity and solid electrolytes, band structures and associated electrical properties, magnetic properties, optical characteristics, glasses, cement and concrete, refractories, and organic materials. Nine appendices provide more detailed information on topics taken up in the text.

The material is carefully written up, with numerous figures and tables to help the reader along. At the end of every chapter there are references for further reading and a variety of relatively simple questions which render the book useful as a text in an introductory course to solid state chemistry. One of the strong points of the book is the clarity of the presentation and the absence of jargon; readers would have no difficulty in following the argumentation. Also, the mathematical background needed to deal with the subject matter is extremely modest, in consonance with the elementary exposition by the author.

This reviewer is unfortunately less impressed with the choice of the subject matter and the degree of coverage accorded to various topics. One can readily sympathize with the author who faces this serious selection problem; nevertheless, there are two questions that must be considered. Firstly, how well the author adheres to his own goals. While the subject of X-ray diffraction and crystallography as well as phase diagrams are adequately covered, his claims that "particular stress is laid on the electrical, magnetic, and optical properties of solids and their associated applications" and that "... the subject matter is covered in considerable depth" simply do not hold up. Direct-current conductivity measurements, thermoelectric phenomena, and Hall measurements—one of the basic set of tools for the study of electronic properties of materials—are accorded from 1 to 4 pages of text each. Optical properties, luminescence, and lasers are covered in fewer than 10 pages. The treatment of magnetic properties is purely descriptive, with only a bare-bones theoretical discussion.

A second question can be raised, namely whether topics of great significance have been inadequately handled or omitted altogether. This is admittedly a matter of subjective judgment; still, this reviewer misses several topics: discussions of crucible-less techniques in single-crystal growth such as the skull melter and arc melter, an adequate qualitative discussion of band structure diagram methods of the type provided by Goodenough, a careful distinction between itinerant and localized electron semiconductors (the reader is given only minimal help in this area), and the inclusion of electronic transitions in the chapter on phase transformations. Ordinary spectroscopy, IR and Raman scattering, UV spectroscopy, NMR, ESR, XRF, AEFS, EXAFS, ESCA, Auger spectra, EELS, and Mössbauer studies are all handled in 30 pages. The rather skimpy treatment of all of the above topics contrasts sharply with an entire chapter devoted to background information on the nature of the interaction of X-rays with solids and with a second full chapter showing how one interprets phase diagrams. Both of these topics properly belong to an undergraduate introductory course in physical chemistry. The author might have achieved a much better balance by omitting these extensive introductory reviews, thus freeing roughly 115 pages for a more adequate discussion of most of the neglected topics.

Thus, while the book can be highly recommended for the expositions that are taken up in detail, there are many important areas which have received only minimal, cursory coverage. Unfortunately, this limits the usefulness of the book as a comprehensive, introductory text.

J. M. Honig, *Purdue University*

Molecular Quantum Electrodynamics. An Introduction to Radiation–Molecule Interactions. By D. P. Craig (Australian National University) and T. Thirunamachandran (University College London). Academic Press: London. 1984. xi + 324 pp. $58.00.

It is a pleasure to recommend this new book, which sets extremely high standards in both writing and production. On account of the precise and concise presentation, it should prove useful as an advanced text, valuable as a personal reference book, and indispensable for any research library.

Assuming some background of the quantum mechanics of atoms and molecules, the authors begin with chapters on electrodynamics, the electromagnetic field in free space, particles and fields, and one-photon and two-photon absorptions and emissions. Here, and later, they emphasize the advantages of treating interactions with a quantized electromagnetic field. Chapters that follow include well-chosen applications to light-scattering interactions between molecules, chiral systems, nonlinear optical processes, multipolar electrodynamics, and self-interactions. Because much of their collaborative theoretical research of the past 10 or 15 years has been devoted to these and related applications, the authors speak with modern perspective and authority gained from experience. A striking example of their grouping of topics includes chiral discrimination, circular dichorism, optical rotation, and the *laser-induced* counterpart of each of these three phenomena.

The coverage of this book is unique and effective. The price does not seem too high for a volume of its quality and likely longevity.

K. Keith Innes, *State University of New York at Binghamton*

Principles and Practice of Analytical Chemistry. Second Edition. By F. W. Fifield and D. Kealey (Kingston Polytechnic). The Blackie Group: London; distributed in the USA by Heyden & Son, Inc.: Philadelphia. 1983. xii + 462 pp. $24.00. ISBN 0-7002-0283-8.

The authors of this book indicated that they intended to provide a unified view of modern analytical chemistry and its applications, with an emphasis on the industrial laboratory. The range of topics which is covered is very broad, beginning with data evaluation and proceeding through the classical methods, separations, spectrometry (both atomic and molecular), radiochemical techniques, and automated analysis and ending with the use of computers and microprocessor control of instrumentation. Since the entire text is only about 450 smallish (6 × 9 in.) pages, it is apparent that most topics can be discussed only briefly. In addition, some techniques, such as electron paramagentic resonance, are omitted entirely. Other major areas, such as electrochemical techniques, are limited to the more common methods. In some instances, however, the authors have chosen to expand the discussion somewhat, e.g., the field of high performance liquid chromatography, but the enlarged discussion is still brief when compared to larger, more complete textbooks.

The reviewer can recommend the book as a source of brief discussions of many of the various techniques used in analytical chemistry. Problems (6–12) can be found at the end of the individual chapters.

Alan F. Krivis, *University of Akron*

Polymeric Stabilization of Colloidal Dispersions. By Donald H. Napper (University of Sydney, Australia). Academic Press: London and New York. 1983. XVI + 328 pp. $65.00. ISBN 0-12-513980-2.

This volume is the third in the series of monographs entitled "Colloid Science", edited by R. H. Ottewill and R. L. Rowell. In his preface, Napper notes that this text is an elaboration upon a short course of lectures presented to MSc students at the University of Bristol. No prior knowledge of colloid or polymer science is assumed, and indeed Chapters 1 (Basic Concepts of Colloid Stability), 3 (Polymer Solution Thermodynamics), and 4 (The Conformation of Polymer Molecules) provide brief introductions for novices.

Polymer chains can impart stability to colloids by steric stabilization (conferred by macromolecules which are attached to the particles' surfaces) or by depletion stabilization (conferred by macromolecules which are free in solution). Chapter 2 commences with early (ca. 3000 BC) applications of steric stabilization and closes with brief descriptions of the best steric stabilizers (amphipathic block or graft copolymers) and methods for preparing the dispersions. Chapters 5 through 14 deal with many additional aspects of steric stabilization: theories of its origin, experimental methods for studying and factors affecting flocculation, direct measurement of polymer chain interactions by the use of crossed mica cylinders, etc. Chapters 15 and 17 deal in similar fashion with the much more recent phenomenon (first observed experimentally in 1975) of depletion stabilization.

This book serves a valuable function in providing an up-to-date survey of the fundamental and applied aspects of the stabilization of colloidal dispersions by polymers. It should find a considerable audience among both academic and industrial colloid scientists.

Lee Magid, *The University of Tennessee*

Advances in Infrared and Raman Spectroscopy. Volume 11. Edited by R. J. H. Clark (University College, London) and R. E. Hester (University of York). John Wiley and Sons: New York. 1984. xix + 383 pp. $98.00. ISBN 0471-26267-6.

This volume belongs to a well-established series whuch has as its major objectives the presentation of critical review articles in infrared and Raman spectroscopy and the integration of theory and practice. It will have wide appeal because of the application of these techniques in many branches of research in the science and engineering fields. This particular volume focuses on the recent advances which have arisen from the study of large molecules, particularly systems of biological interest.

In the first chapter, I. W. Levin deals with a topic which is centrol to molecular biology and reviews the role of vibrational spectroscopy in studies of the structure and functionality of membrane assemblies. The sensitivity of frequency, intensity, and bandwidth measurements to structural changes is described. The structure and dynamics of phospholipid bilayers and lipid–protein interactions are also reviewed.

The recent experimental and theoretical advances in vibrational optical activity are described in the second chapter, by L. A. Nafie. While the ultimate sensitivity in both infrared and Raman methods is required, these two techniques yield complementary information on vibrational transitions in chiral molecules.

Resonance Raman spectroscopy is particulary useful for the study of

mixed-valence linear chain complexes of metals such as platinum and palladium, and such applications are described by R. J. H. Clark in Chapter 3. The topics covered include the intensity enhancement of particular vibrational Raman bands by intervalence electronic transitions in one-dimensional polymeric complexes and the relationship between resonance Raman band intensity and the nature of the associated excited state.

The application of resonance Raman spectroscopy to the study of conjugated macromolecules is described in Chapter 4 by D. N. Batchelder and D. Bloor. The significance of excitation profiles is stressed. This article also shows how conjugated macromolecular backbone vibrations couple ground-state and electronically excited configurations.

Chapter 5, by M. Lutz, shows how much has been achieved through resonance Raman studies of photosynthesis, particularly due to the abundance of natural chromophores which exist in photosynthetic membrane and its subunits and which serve as convenient resonance Raman probes. Scientists engaged in studies of solar energy conversion will find this article of particular interest.

In the last chapter, G. Zerbi provides a critical review of the state of the art in vibrational spectroscopy of very large molecules. The theoretical and computational methods now available for the analysis of vibrational modes and molecular dynamics of large systems are stressed, in order to provide a more solid foundation for the "spectroscopic evidence" frequently invoked in the interpretation of the spectra of large and complex molecules.

This will be a valuable reference volume for advanced students and scientists engaged in spectroscopic research in many fields.

Peter J. Krueger, *University of Calgary*

Water Analysis. Volume III. Organic Species. Edited by R. A. Minear (The University of Tennessee) and L. H. Keith (Radian Corporation). Academic Press: New York. 1984. xii + 456 pp. $69.00. ISBN 0-12-498303-0.

The first two volumes of this three-part series on water analysis deal with the analysis of inorganics in water. This third volume is organized into seven chapters covering a somewhat disconcerting assortment of topics ranging from measurement of biological oxygen demand to mass spectrometry. The unifying feature is, of course, the determination of organic species in water. The text is a contribution from six different groups of chemists and engineers. As with just about every edited book, there seem to be gaps in the overall coverage of the subject. Everyone who has ever edited a book knows how difficult it is to coordinate a general topic with a minimum of overlap and a maximum of coverage and assure some homogenuity at the same time. The editors have been only moderately successful in this respect. In four of the chapters, references are listed in alphabetical order whereas in the remaining three chapters they are arranged in numerical order. Another striking disparity is that the most recent references in the first two chapters go back only to 1976, whereas some of the other chapters, notably Chapters 4 and 5 dealing with gas chromatography and mass spectrometry, include references up to 1984.

The first two chapters, which are contributed by engineers, deal with the description of what may be termed "macro analytical methods". Mathematical modeling of processes and special techniques for the determination of oxygen in water are emphasized. Testing methods are described in great detail, and there is a wealth of information on instrumentation for both laboratory and field use. Chapter 3 treats the difficult subject of sampling in the very broad sense. Methodologies concerning sample concentration, fractionation, storage, and the like are discussed in great detail. Although somewhat dated, this chapter provides an excellent overview over the wide range of sample preparation and enrichment methodology.

Chapters 4 and 5 deal with gas chromatography and mass spectrometry. These chapters are perhaps the strongest contributions of this volume. Chapter 4, written by a team of well-known Swiss scientists, introduces capillary column gas chromatography, from the ground up. It is full of practical recommendations and applications examples. The chapter on mass spectrometry may be considered by some as too far moved from practice. It does, however, set the tone for future trends and developments and very convincingly points out the role of mass spectrometry in the analysis of trace organics. Chapters 6 and 7 deal with HPLC and infrared spectrometry. Both contributions are up to date and rather comprehensive. Fourier transform/IR spectroscopy unfortunately has been covered in only about two pages, which is hardly indicative of the importance this technique presently occupies, especially in conjunction with GC and LC.

In spite of some shortcomings, the book makes a valuable contribution to any laboratory dealing with water analysis in general and the analysis of trace organics in particular. Its relatively high price unfortunately will relegate this book to the shelves of libraries rather than the desks of individuals involved in water analysis.

Wolfgang Bertsch, *The University of Alabama*

A Guide to the HPLC Literature. Volume 1: 1966–1979. By H. Colin, A. M. Krstulovic, J.-L. Excoffier, and G. Guiochon (Ecole Polytechnique). John Wiley & Sons: New York. 1984. xi + 947 pp. $125.00. ISBN 0-471-87993-2.

This book is the first of a series to be published by these authors. Each volume will consist of a compilation of references related to HPLC theory and applications. The intent is to provide a more organized summary of publications in the field by publication date and subject than is currently available from any other source. References are grouped by subject into seven sections containing a total of 56 chapters. The authors have been necessarily arbitrary in selecting section and chapter topics, but a single reference may appear in several different chapters. The user is therefore less likely to miss important references. As such, this volume is probably the most comprehensive compilation available in this form and will be invaluable to users who wish to quickly scan the literature for a given time period. However, this should not be considered a replacement for a thorough database search. The authors correctly caution the user that classification is based on keywords in titles only. The importance of an informative title becomes evident after examining the listings in this book. A minor complaint concerns the subject index at the end of the book. Subjects are listed for individual sections, rather than for the entire compilation. This is an inconvenience when searching topics which may appear in several chapters. Overall, the authors have done an admirable job of compiling and organizing references for one of the most prolific areas of chemical research.

Merlin K. L. Bicking, *State University of New York at Buffalo*

Concepts in Analytical Chemistry. By S. M. Khopkar (Indian Institute of Technology, Bombay). John Wiley & Sons, Inc.: New York. 1984. xvi + 369 pp. $24.95. ISBN 0470-27490-5.

In the preface the author states, "The present book is intended to serve as a text book for postgraduate students majoring in analytical chemistry". This I assume means a person who has a good foundation in the basic theory and application of analytical techniques. The book is made up of 33 chapters covering all the major areas of analytical chemistry. In addition there are answers to the problems, an appendix with tables of atomic weights and standard electrode potentials, and author and subject indexes.

The treatment of each topic is very abbreviated; thus, a reader must have a good background in the topics or he will come away with little information. There is no listing of equilibrium constants for weak acids or bases, complexes other than EDTA, and slightly soluble compounds.

The references cited, for the most part, are very old. Many of the books referenced were published in the 1940's and 1950's. There are a number of very good up-to-date reference books on the market, and this fact is a negative aspect of the book.

A large number of topics have been placed in these 369 pages. Some are treated well; others are only touched upon. I am afraid the book will be of little use to those persons with a weak background in analytical chemistry. This group of persons includes a large percentage of bachelor degree graduates.

Another of the purposes of the book was "to serve as reference manual for practicing analytical chemist". If this is correct, then each topic covered should have had some information concerning the following: (a) when to use the technique, (b) when not to use it, and (c) accuracy and precision capabilities. These aspects I found to be lacking. The chapter for reliability of analytical data would have been more current if topics such as student-t test, variance ratio testing for precision, quality assurance, and quality control were addressed. These latter topics are essential in an analytical laboratory. The reviewer also expected a better treatment of sampling with current references.

Overall I feel the book has an audience and a use; however, I do not think it is of much use to practicing or graduate analytical chemists, especially in the United States.

Robert L. Grob, *Villanova University*