

## Book Reviews\*

**Aquatic Humic Substances. Influence on Fate and Treatment of Pollutants. Advances in Chemistry Series 219.** Edited by I. H. Suffet (Drexel University) and Patrick MacCarthy (Colorado School of Mines). American Chemical Society: Washington. 1989. xxx + 864 pp. \$109.95. ISBN 0-8412-1428-X.

Humic substances are organic materials derived from decomposition of plant and animal matter, but they do not belong to the classes proteins, polysaccharides, polynucleotides, fats, etc. They are peaty materials, consisting mostly of carbon, hydrogen, and oxygen, plus small amounts of nitrogen, phosphorus, and sulfur. Since they occur over all the earth, in both soils and water, their importance is very great. Nevertheless, their precise structure remains enigmatic, because they have not so far been separated into indisputably pure component compounds.

The present volume consists of invited and contributed papers given at a symposium held at the National American Chemical Society Meeting held in Denver in 1987, and some additional chapters to provide balance. The 45 chapters are typeset, and are arranged under several headings: "Characterization", "Environmental Impacts", "Interactions in Natural Waters with Organic Contaminants", "Interactions in Natural Water with Inorganic Contaminants", "Influences of Coagulation Processes on Water Treatment", "Sorption onto Activated Carbon: Influences on Water Treatment", "Influences of Ozonation and Chlorination Processes on Water Treatment", and "Influences of Ion-Exchange and Membrane Processes on Water Treatment". The special importance of humic substances in pollution control and treatment is a major theme. The unusually extensive index (27 pages) enhances the value of this work as a reference.

**Oxygen. International Thermodynamic Tables of the Fluid State. Volume 9.** By W. Wagner (Ruhr-Universität Bochum) and K. M. de Reuck (Imperial College). Blackwell: Oxford and Palo Alto. 1988. xvii + 231 pp. \$52.00. ISBN 0-632-01476-8.

This volume is a compendium on the thermodynamic properties of liquid oxygen, and consists of 70 pages of text and seven tables of numerical data. About a third of the text is devoted to discussion of experimental results and the rest to equations of state and the construction of the tables. The whole is a project of the IUPAC Commission on Thermodynamics and Thermochemistry, executed by the Sub-Committee on Thermodynamic Tables. It thus represents the most up to date and most reliable, self-consistent, and comprehensive treatment of equilibrium thermodynamic properties agreed upon internationally.

**Advances in Nonlinear Spectroscopy (Advances in Spectroscopy. Volume 15).** Edited by R. J. H. Clark (University College London) and R. E. Hester (University of York). John Wiley & Sons: Chichester and New York. 1988. xix + 363 pp. \$159.00. ISBN 0-471-91652-8.

This book is a review of coherent Raman spectroscopies, covering recent developments and applications. Seven chapters are included, each with its own authors, covering (in order) coherent Raman spectroscopy of gases, Raman-amplification spectroscopy, high-resolution CARS and inverse Raman spectroscopy, polarization-CARS spectroscopy, quantitative CARS spectroscopy, condensed-phase CARS, and impulsive stimulated light scattering. With the exception of the last topic, the methods are all based on the third-order nonlinear susceptibility. Practicing spectroscopists in these research areas will find little new in these chapters. However, the book serves well as a resource for workers in slightly different fields, or who are entering the area of nonlinear spectroscopy. The references provide all readers with an efficient route to the most important recent work.

The emphasis is on presenting background theory and describing experimental applications (through 1986) for each variant of the nonlinear experiment. Each chapter accomplishes these goals, including brief discussion of experimental results from several example systems. Especially noteworthy are the practical advice of Chapter 2 on Raman gain and inverse Raman experiments and the balanced treatment of advantages and difficulties of quantitative CARS experiments in Chapter 5.

Clearly, the topics of the first six chapters are closely related, arising from different applications of the third-order nonlinear susceptibility. Each chapter begins with a presentation of fundamental nonlinear

spectroscopy theory, with a significant amount of repetition. The result is a set of valuable self-sufficient chapters, but with few discussions of interrelationships.

The final chapter, on impulsive scattering on picosecond and femto-second timescales, may at first seem disjoint from the rest of the book. When one realizes, however, that the goals of the impulsive scattering measurements involve measurement of vibrational modes of materials (e.g. phonon modes of crystals and rapid relaxations in liquid solutions), the relationship with Raman methods is clear. This chapter serves as a good introduction to the theory of the scattering experiment and to the recent applications of this method to very fast processes in solids and solutions.

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### Books on Applied Subjects

**Advances in Chemical Engineering. Volume 14.** Edited by James Wei (Massachusetts Institute of Technology) et al. Academic: San Diego and New York. 1988. vii + 326 pp. \$75.00. ISBN 0-12-008514-3.

The three chapters in this volume are the following: "Analysis and Synthesis of Resilient Heat Exchange Networks", "Catalytic Hydrodemetallation of Petroleum", and "The Safety Matrix: People Applying Technology to Yield Safe Chemical Plants and Products".

**Ecotoxicology: Problems and Approaches.** Edited by Simon A. Levin (Cornell University) et al. Springer-Verlag: New York and Berlin. 1989. xii + 547 pp. \$49.00. ISBN 0-387-96762-1.

Ecotoxicology, states the preface, "is the science that seeks to predict the impacts of chemicals upon ecosystems". This book of 18 contributed chapters treats the subject from four aspects: "Problems and Approaches", "Responses of Ecosystems to Chemical Stress", "Methods and Models", and "Ecotoxicological Decision Making".

**Molecular Biology and Genetics of Childhood Cancers. Approaches to Neuroblastoma.** Edited by Mels Sluysers (Netherlands Cancer Institute) and P. A. Vouïte. John Wiley & Sons: Chichester and New York. 1988. 129 pp. \$49.95. ISBN 0-470-21237-3.

The nine chapters in this book range between a general introduction and surgery, but they touch on tumor markers, molecular genetics, chromosome abnormalities, and radionuclides in treatment.

**Phosphorus Chemistry in Everyday Living. 2nd Edition.** By Arthur D. F. Toy and Edward N. Walsh. American Chemical Society: Washington. 1987. xiv + 362 pp. \$24.95. ISBN 0-8412-1002-0.

As its title suggests, this 21-chapter volume presents a broad overview of the chemistry of Phosphorus. It covers both the purely biochemical functions of phosphorus (e.g., its purpose in DNA, RNA, ATP) as well as its many industrial uses, with an emphasis on the latter—16 of its 21 chapters are devoted to phosphorus' industrial applications.

These 16 chapters deal with the uses of phosphorus in the following: Foods; Dentrifices and Pharmaceutical Tableting; Fertilizers; Detergents; Flame Retardants; Water Treatment; Eutrophication; Metal Treating; Polymers; Plating; Insecticides, Herbicides, and Fungicides; and miscellaneous industrial uses of both organic and inorganic phosphorus compounds.

This book is a general source for information on phosphorus chemistry, intended for chemical executives, chemical sales people, practicing chemists, and college students and their professors. It is made even more useful by its end-of-chapter references (new to this edition) and its detailed (15 page) index.

### Volumes of Proceedings

**Trace Elements in Man and Animals.** Edited by C. F. Mills, I. Bremner, and J. K. Chesters. Commonwealth Agricultural Bureaux: Farnham Royal, England. 1985. xxv + 997 pp. ISBN 0-85198-553-X.

The title conference was held in Scotland in 1984. This book of proceedings opens with an unsettling color photograph of a child pitifully suffering from severe zinc deficiency, but it is at least a refreshing change to find the absence of chemicals, rather than their presence, taking the rap for the ills of man. Once past this and some similar material, one encounters 15 (sic!) pages of a table of contents, in which are listed the introductory lectures, contributed papers, and "workshops". The subject index is appropriately long (19 pp).

\*Unsigned book reviews are by the Book Review Editor.