

This article was downloaded by:

On: 17 January 2011

Access details: *Access Details: Free Access*

Publisher *Taylor & Francis*

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



## International Journal of Environmental Analytical Chemistry

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713640455>

### Book Reviews

J. Albaiges<sup>a</sup>

<sup>a</sup> CID-CSIC, Barcelona, Spain

**To cite this Article** Albaiges, J.(2005) 'Book Reviews', International Journal of Environmental Analytical Chemistry, 85: 3, 223 – 229

**To link to this Article:** DOI: 10.1080/03067310500042228

**URL:** <http://dx.doi.org/10.1080/03067310500042228>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article may be used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

## Book Reviews

HANDBOOK OF SPECTROSCOPY, edited by G. Gauglitz and T. Vo-Dinh, Vols. 1 and 2, 599 and 538 pages, respectively, Wiley-VCH, Weinheim, FRG (2003). ISBN 3-527-29782-0. US\$ 435.00.

The Handbook is designed to provide a straightforward introduction to spectroscopy, including the most recent advances in instrumentation and methods, as well as applications in important areas. The Handbook also provides a clear, integrated, and objective account of the wealth of information that can be derived from spectra. The sequence of chapters covers the entire range of the electromagnetic spectrum and the physical mechanisms involved, from rotation processes in molecules to phenomena in the nucleus.

The Handbook contains 24 chapters, which are grouped in different sections, encompassing: Sample Preparation and Sample Pretreatment; Optical Spectroscopy, Nuclear Magnetic Resonance Spectroscopy, Mass Spectroscopy, Elemental Analysis and Surface Analysis Techniques; applications in Bioanalysis, Environmental Analysis and Process Control; Hyphenated Techniques; and General Data Treatment: Data Bases/Spectra Libraries.

The Handbook indicates to the researcher and the practising spectroscopist how to select the most suitable technique for a specific application, how to adopt the optimal methods of sample preparation and spectra recording, and how to interpret the results. Where appropriate, the Handbook also guides the reader to selected compilations of important data.

This book will be of interest to scientists, engineers, manufacturers, teachers, and students. Research scientists, analytical scientists, environmental investigators, and industrial engineers, who are often confronted with the ever-increasing complexity of real-life sample analysis, will find a readily accessible source of information and authoritative guidance on how to best apply currently available spectroscopic techniques to their particular fields of interest and to their specific applications.

HANDBOOK OF SIZE EXCLUSION CHROMATOGRAPHY AND RELATED TECHNIQUES, edited by Chi-san Wu, 694 pages. Marcel Dekker Inc., New York, USA (2004). ISBN 0-8247-4710-0. US\$ 195.00.

This is the second edition of the *Handbook* first published in 1995 to fill the need for a book dedicated to the practical applications of size exclusion chromatography (SEC).

This technique has evolved steadily since its development in the 1960s, and remains of high interest for determining the molecular weight and molecular weight distribution of polymers accurately, precisely, and efficiently. This second edition incorporates the important developments in SEC in the years since 1995. It covers methods of column and mobile phase selection, recent calibration approaches, detector capabilities, specific substances including copolymers, polyamides, natural and synthetic rubbers, polyvinyl alcohol and acetate, lignin derivatives, proteins, starch, asphalt and current challenges associated with SEC technologies.

Most chapters in this new edition have been updated and six new chapters have been added, covering high-speed SEC, SEC of low molecular weight materials, and the extended family of techniques from two-dimensional liquid chromatography to high osmotic pressure chromatography. Therefore, the title has been expanded to *Handbook of Size Exclusion Chromatography and Related Techniques* to reflect these significant additions.

Authors from universities and industries with years of experience in either specific areas of SEC or its applications have contributed to provide the state-of-the-art of the field.

**MODERN PRACTICE OF GAS CHROMATOGRAPHY**, 4th Edition, edited by R. L. Grob and E. F. Barry, 1043 pages, John Wiley & Sons, Hoboken, NJ, USA (2004). ISBN 0-471-22983-0. £ 45.00.

The fourth edition of *Modern Practice of Gas Chromatography* continues to be the standard reference in the field and contains a number of changes from the first three editions. It incorporates the most recent developments in the technique. The book is organized in three sections dealing with Theory and basics; Techniques and instrumentation; and Applications. The theory and basics of GC covers what is necessary to the beginner for this technique, basically column selection, optimization of separations and computer assistance and high speed or fast gas chromatography. The techniques and instrumentation section is greatly detailed and includes updated information on detectors, mobile phase and inlet systems, GC-MS techniques and requirements for qualitative and quantitative analysis. Finally, the application chapters cover topics that would be of interest to most people utilizing the gas chromatographic technique, such as sample preparation, physicochemical measurements, validation and QA/QC of chromatographic methods, together with applications in the fields of petroleum and petrochemistry, and clinical, pharmaceutical, environmental and forensic sciences.

This new and largely illustrated edition represents an all-inclusive text that may be used for university courses as well as short courses.

**TIME-RESOLVED INVERSE GAS CHROMATOGRAPHY AND ITS APPLICATIONS**. A. Katsanos and G. Karaiskakis, 180 pages, HNB Publishing, New York (2004). ISBN 0-9728061-0-5. US\$ 54.00.

Time-resolved chemistry allows the study of chemical kinetics - the mechanism of structural changes - and the identification of important but easily overlooked transient structural intermediates. This monograph shows how time-resolved inverse gas chromatography can be used to record such properties as time adsorption energies, local

monolayer capacities, local isotherms, energy distribution functions, adsorption rates with lateral molecular interactions, surface diffusion coefficients, effectiveness factors in heterogeneous catalysis, and surface energy-all on heterogeneous surfaces of solids. The time-resolved character of the methods described, the heterogeneity of the chromatographic surfaces, and the relevant measurements and calculations are explained. The last chapter explores some important practical applications of time-resolved IGC in various scientific and industrial fields. All physicochemical quantities mentioned can be easily calculated by six simple computer programs, incorporated at the end and also in a disk accompanying the book.

The book will appeal to chromatographers, materials scientists, and investigators of heterogeneous catalysis and interfacial science, as well as researchers and postgraduate students in analytical and environmental chemistry.

**QUALITY ASSURANCE IN ANALYTICAL CHEMISTRY. TRAINING AND TEACHING**, edited by B. W. Wenclawiak, M. Koch and E. Hadjicostas, 280 pages with a CD-ROM. Springer, Heidelberg, FRG (2004). ISBN 3-540-40578-X. € 49.95. US\$ 69.95.

This textbook is part of the EURACHEM initiative aiming at promoting best laboratory practices (<http://www.eurachem.ul.pt>). On the way for high quality measurements there are external quality assurance (QA) requirements on the quality management system (e.g., accreditation, certification, GLP, ...), internal QA tools (e.g., method validations, use of CRM, ...) and external QA measures (e.g., interlaboratory tests). This book covers all these topics, from basic fundamentals such as statistics, detection limits, traceability and measurement of uncertainty, through specific guidance on method validation and use of control charts, in a form that can be used for training, teaching and continuing studies. The CD-ROM accompanying the book contains course materials of 10 experienced specialists in the field with more than 750 overheads (graphics and text) as ready-to-use PowerPoint documents for presentations without any of with little modification. There are also extensive lists of references to the guides and standards that can be used to amplify the notes given with each slide. Cross-references are given if there is more detailed treatment in other chapters.

Training of analysts and potential analysts in quality assurance techniques is a major task for universities and industrial and government laboratories. Re-training is also necessary since the quest for improvements in quality seems to be never ending. The book will serve as an advanced textbook for analytical chemistry students and professionals in industry and service laboratories and as a reference text and excellent source of course materials for lecturers.

**ENVIRONMENTAL MONITORING AND CHARACTERIZATION**, edited by J. F. Artiola, I. L. Pepper and M. L. Brusseau, 410 pages, Elsevier, Amsterdam, NL (2004). ISBN 0-12-064477-0. £ 45.00.

The purpose of this textbook is to document the latest methodologies of environmental monitoring and site characterization important to society and human health and welfare. Basic principles of monitoring and characterization, including statistical methods for data analysis and geostatistics, field surveys and mapping, and automated

data acquisition, are described for different environments. Sampling techniques for making field measurements in soil, vadose zone, water, and atmospheric environments are illustrated. This includes real-time monitoring, temporal and spatial issues, and the issues of scale of measurement. Then, a general approach to monitoring and characterization of physical, chemical and biological properties and the most relevant environmental processes is presented. An overview of physical, chemical and microbiological contaminants is provided in the following chapters. The book also puts into perspective site-specific remediation techniques that are appropriate for localized environments as well as full-scale ecosystem restoration. Finally, general applications of environmental monitoring are discussed, including risk assessment and environmental regulations.

Key features of the book include:

- The concept of integrating environmental monitoring into site characterization.
- The integration of physical, chemical, and biological processes.
- Numerous real-life case studies.
- Examples of problems, calculations, and thought-provoking questions.

The book advances the state-of-the-art by not only documenting how to monitor the environment, but also referring the reader to other more detailed comprehensive books. This nicely illustrated book should be useful at the senior undergraduate level, as well as to students initiating graduate studies in environmental sciences.

**ANALYTICAL ADVANCES FOR HYDROCARBON RESEARCH**, edited by C. S. Hsu, 463 pages, Kluwer Academic/Plenum Publishers, New York, USA (2003). ISBN 0-306-47476-X. US\$ 125.00.

The book provides a comprehensive compilation of the latest developments in analytical techniques for the characterization of petroleum hydrocarbons. The first chapters present methods for estimation of physical properties of hydrocarbon and petroleum fractions and advances in elemental composition analysis. The analysis of complex hydrocarbon mixtures by high- and low-resolution MS for compound type distributions is described in Chapter 4. An ingenious method of using thin-layer chromatography (TLC) for hydrocarbon type analysis of middle distillates is reported in Chapter 5, particularly the use of berberine impregnated silica plate for the detection of saturated hydrocarbons by fluorescence. Chapter 6 describes the analyses of fuels using GC, SFC, HPLC and TLC. The use of 2-dimensional GC for fuel analysis is briefly introduced. Chapter 7 selectively reviews temperature-programmed retention indices for GC and GC-MS analysis of distillate fuels, and high temperature simulated distillation GC analysis of residual oils and their upgraded products. Chapter 8 focuses on the analysis of sulfur species, including elemental sulfur, using MS, tandem mass spectrometry (MS-MS), and GC-MS. Chapter 9 describes the applications of GC-MS and GC-MS-MS for the characterization of petroleum biomarkers. Chapter 10 gives a comprehensive review of the applications of molecular and isotopic compositions of light hydrocarbons in oil and gas exploration.

Chapters 11 to 13 illustrate the uses of advanced mass spectrometric methods for molecular-level characterization of aliphatic, aromatic and polar fractions, and high boiling residues. The analysis of crude oils and heavy fractions, including fractionation,

chromatographic separations, and molecular, microscopic and x-ray spectroscopic analyses is reviewed in Chapter 14. Chapter 15 highlights some of the recent improvements in nuclear magnetic resonance (NMR) instrumentation that impacts on hydrocarbon characterization, such as higher magnetic fields, facile implementation of pulsed gradient and on-line coupling with chromatography (such as HPLC-NMR, SFC-NMR, etc.).

Chapters 16 and 17 broadly cover the use of matrix-assisted laser desorption/ionisation (MALDI) for heavy hydrocarbons and hydrocarbon polymers. More discussions of this technique and the utilization of ultrahigh-resolution Fourier-transform ion cyclotron resonance mass spectrometers (FT/ICR/MS) are introduced in Chapter 17. Chapter 18 reviews the applications of x-ray absorption spectroscopy, particularly x-ray absorption fine structure (XAFS), extended XAFS (EXAFS) and x-ray near edge structure (XANES), for the characterization of heavy hydrocarbon matrices, polymers/rubbers and hydrocarbon synthesis catalysts.

The book is easy to read, with high-quality illustrations and good literature coverage. Therefore, it is strongly recommended to people working in the analytical characterization of hydrocarbons, in the area of petroleum industry and research concerned with exploration, production and refining, as well as with environmental related issues.

**BIOACCUMULATION IN MARINE ORGANISMS.** Effect of Contaminants from Oil Well Produced Water, by J. M. Neff, 452 pages, Elsevier, Amsterdam, NL (2002), ISBN 0-08-043716-8. € 160.00.

This new edition continues to be a reference work in the area. It summarizes the bioavailability and marine ecotoxicology of metal and organic contaminants that may occur in oil well produced water at concentrations significantly higher than those in ambient seawater and advances the concept that bioavailability evaluation must be included in all ecological risk assessments and other environmental assessments of chemical contaminants in marine and freshwater ecosystems. The contaminants of concern include arsenic, barium, cadmium, chromium, copper, lead, mercury, radium isotopes, zinc, monocyclic aromatic hydrocarbons, polycyclic aromatic hydrocarbons, phenols, and bis(2-ethylhexyl)phthalate.

The book is organized in three parts. The first part deals with the sources, volumes, composition, and fates in the marine environment of produced water. The second part begins with a brief discussion of the mechanisms of bioaccumulation and food chain transfer of metal and organic contaminants in the marine environment and reviews our current understanding of the process of bioaccumulation of chemicals by freshwater and marine organisms. The final section of the book, which encompasses 13 chapters, is a discussion of the importance of produced water as a source of organic and inorganic chemical residues in the tissues of marine animals living near off-shore oils and gas platforms. Over 1800 references on the most recent publications on the concentrations of several of these chemicals in the different marine compartments, and particularly in tissues of marine organisms from throughout the world are summarized.

This excellent book will be of value to environmental scientists in the oil and gas industry; marine toxicologists and ecological risk assessors in academia, government, and industry; as well as to government regulatory agencies concerned with marine environmental protection.

ENVIRONMENTAL LABORATORY EXERCISES FOR INSTRUMENTAL ANALYSIS AND ENVIRONMENTAL CHEMISTRY, by F. M. Dunnivant, 330 pages, John Wiley & Sons, Hoboken, NJ, USA (2004). ISBN 0-471-48856-9. £ 47.50.

This manual is a stand-alone summary of laboratory work for environmental chemistry students. It presents a richly detailed set of classroom tested experiments along with background information, safety precautions, a list of chemicals and solutions needed, some data collection sheets, and a set of blank pages for the student to compile results and write a summary of findings. The documented procedures are arranged in a way that instructors can select which level of documentation is suitable for their course.

The laboratory exercises are designed to teach environmental chemistry and instrumental analysis simultaneously. The experiments are organized by sample media into sections of air, water, hazardous waste, sediment/soil, and wet techniques. The laboratory experiments emphasize sampling, extraction and instrumental analysis. Illustrative examples are: monitoring the presence of hydrocarbons in air around gasoline stations or chlorinated pesticides in water samples, determination of Henry's Law constants or clay-water distribution coefficients, determination of BOD of sewage influents or metals from hazardous wastes, etc. The manual also includes a set of pollutant fate and transport simulation exercises in rivers and streams, lake and groundwater systems, and atmosphere, which are becoming more and more necessary in environmental chemistry courses.

In addition to its comprehensive presentation of laboratory exercises, this manual emphasizes the essential of statistical analysis. A widely applicable spreadsheet exercise increases understanding of data analysis techniques and correct instrumentation calibration. An electronic copy of the spreadsheets is included with the instructor's edition. Interactive software packages for pollutant fate and transport simulations, fate and the pC-pH simulator, are also included with the text.

DETECTION TECHNOLOGIES FOR CHEMICAL WARFARE AGENTS AND TOXIC VAPORS, by Y. Sun and K. Y. Ong, 272 pages, CRC Press, Boca Raton, USA (2004). ISBN 1-56670-668-8. £ 68.99.

Incidents in which chemical warfare agents (CWAs) and toxic industrial chemicals (TICs) are deployed have become of increasing public concern and a challenge for analytical and environmental chemists. The book offers the most comprehensive resource available on the subject for technical and emergency response personnel.

After a brief historical introduction, the book provides a comprehensive list of TICs classified in terms of hazards and their physical, chemical and toxicological properties. Then, it includes a review of governmental policies and programs including US federal detection requirements and the rationale for preparedness and response. General criteria for the evaluation of commercially available detection devices and safety risk assessment for released materials are also given. In this respect, the book conveys techniques developed for generating vapours and closely imitating potential environmental effects in a laboratory setting, specifically for the testing and evaluation of hand-held, portable and remote devices.

The book discusses the principles, instrumentation and context for applying technologies such as ion mobility spectrometry, flame photometry, infrared spectroscopy, surface acoustic wave and electrochemical sensors, colorimetric chemistry, photoionization

and flame ionization to the detection of TICs and lethal CWAs. Finally, future trends in CWA and TIC detection are summarized.

The book will be of interest to emergency responders and counter-terrorism experts, researchers in CWAs, environmental and occupational health and safety professionals.

ENVIRONMENTAL CHEMISTRY, by S. E. Manahan, 783 pages, CRC Press, Boca Raton, USA (2004). ISBN 1-56670-633-5. £ 68.99.

This is the 8th edition of the book, which has been totally updated, including several major concepts that are proving essential to the practice of environmental chemistry at the beginning of the new millennium. These consist of the concept of the anthrosphere as a distinct sphere of the environment, the practice of industrial ecology as it applies to chemical science, and the emerging area of green chemistry. In keeping with contemporary concerns, a new chapter has been added discussing terrorism, red chemistry, and threats to the environment.

Chapter 1 serves as an introduction to environmental science, technology and chemistry. Chapter 2 defines and discusses the anthrosphere and industrial ecosystems, and their relationship to environmental chemistry. It introduces the important concept of green chemistry-sustainable chemical science and technology. Chapters 3 through 8 deal with aquatic chemistry. Chapters 9 through 14 discuss atmospheric chemistry. Chapters 15 and 16 deal with the geosphere, the latter emphasizing soil and agricultural chemistry. Included in the discussion of agricultural chemistry is the important and controversial new area of transgenic crops. Chapters 17 through 20 cover several aspects of industrial ecology and how it related to material and energy resources, recycling, and hazardous waste. Chapters 21 through 23 cover the biosphere. Chapter 21 is an overview of biochemistry with an emphasis on environmental aspects, chapter 22 introduces and outlines the topic of toxicological chemistry, and Chapter 23 discusses the toxicological chemistry of various classes of chemical substances. Chapters 24 through 27 deal with environmental chemical analysis, including water, wastes, air, and xenobiotics in biological materials. Chapter 28, "Terrorism, Red Chemistry, and Threats to the Environment" discusses a topic of great contemporary interest. It begins with a discussion of the vulnerable infrastructure and goes on to discuss the vital need to protect food, water, and energy supplies and transportation systems.

Each chapter contains an extensive list of key references, largely over 2000, and a section of questions and problems to assist teachers and students in assessing and understanding the material presented. This is a reference book, highly recommended for students and professors involved in specialized courses on environmental chemistry, and for those individuals interested in getting a general knowledge of this multidisciplinary science.

J. Albaiges  
*CID-CSIC, Barcelona, Spain*