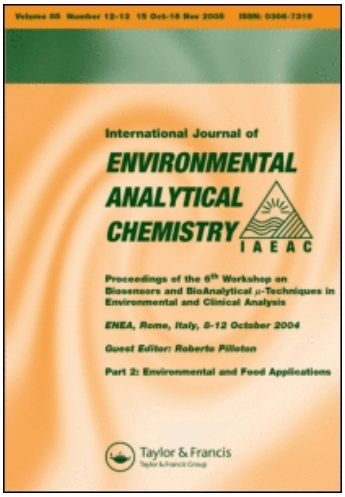

International Journal of Environmental Analytical Chemistry
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713640455

BOOK REVIEWS

J. Albaigés[a]
[a] CID-CSIC, Barcelona, Spain

To cite this Article Albaigés, J.(2008) 'BOOK REVIEWS', International Journal of Environmental Analytical Chemistry, 88: 5, 363 — 372
To link to this Article: DOI: 10.1080/03067310801932622
URL: http://dx.doi.org/10.1080/03067310801932622

Intern. J. Environ. Anal. Chem.
Vol. 88, No. 5, 20 April 2008, 363–372

Taylor & Francis
Taylor & Francis Group

BOOK REVIEWS

Soil in the Environment: Crucible of Terrestrial Life, by Daniel Hillel Amsterdam, NL: Academic Press, 2008, 320 pp., EUR 66.95; £45.99, ISBN 978-0-12-348536-6

The study of the soil has long been regarded as an essential component of agronomic science. The 15 chapters of the book describe the essential features and functions of different soil types, complex soil-water interactions, soil chemical attributes, soil productivity and water management for cultivation, soil biodiversity, soil erosion and pollution and the corresponding conservation and remediation procedures. The book concludes with two overviews on the role of soil in the mitigation of global warming and in the global food supply.

However, *Soil in the Environment* contains much more than a simple description of these topics. Driven by the author's passion and fascination for soil sciences, each chapter starts with a key sentence, from the Bible to Rudyard Kipling, and then brilliantly reveals the vital role that the soil fulfils in nature and in human life. How it interacts dynamically with the atmosphere and the lithosphere, how it influences the planet's climate and hydrological cycle, how it serves as the primary habitat for a community of living organisms and as a support of our food supply, and how it affects, at the end, the fate of humanity. The author judiciously claims that the future of our civilization depends critically on our ability to understand the nature and working of the soil and to manage it so as to avoid its degradation and to maintain its functioning and biological productivity. In summary, this unique book offers an encompassing perspective regarding the soil's impact on the environment, transcending traditionally separate disciplines as it links soil science with the larger environment

Organized in a very friendly format with colourful illustrations, comprehensive diagrams, examples, boxes, and key definitions in each chapter, it is a reference book to invite students and professors of soil science, ecology, forestry, hydrology, geography and all environmental sciences to think over the central role of soil in nature and in our life. Beyond a textbook, this work conveys the sense of surprise and excitement that impels the scientist's quest to comprehend the workings of nature, and to all those generally interested in environmental issues provides enjoyable reading.

Fundamentals of Air Pollution, 4th edition, by Daniel Vallero, Amsterdam, NL: Academic Press, 2008, 968 pp., EUR 69.95; £49.99, ISBN 978-0-12-373615-4

Fundamentals of Air Pollution is an important and widely used textbook in the environmental science and engineering community. This 4th edition has been updated

ISSN 0306–7319 print/ISSN 1029–0397 online

DOI: 10.1080/03067310801932622
http://www.informaworld.com

significantly in light of the numerous changes in the understanding of air pollution and the development of new technologies that have occurred in recent times. Although the fundamentals of the science underlying air pollution have not changed, their applications and the appreciation of their impacts have. Analytical procedures have evolved and improved, leading to a continuous decrease of the detection limits for most compounds, and acute and chronic effects have become better understood, breeding the transition from predominantly technology-based standards (maximum achievable control technologies – MACTs) to risk-based regulations and air quality standards.

In line with these developments, the book is organized in seven parts dealing with air pollution essentials (e.g. the history of air pollution, the scales of the problem), the physics and chemistry of air pollution (air pollution systems and processes, air quality, the strategies of air pollution control, sources of air pollution), risks from air pollution (effects on human health and welfare effects on vegetation and animals, effects on materials and structures, on the atmosphere, soil, and water bodies and long-term effects on the planet), measurement and monitoring of air pollution (air sampling, analysis and measurement of pollutants, air pollution monitoring and surveillance, air pathways from hazardous waste sites), air pollution modelling (the meteorological bases of atmospheric pollution, fate and transport of air pollutants, modelling exposures, air pollution climatology), the regulatory control of air pollution (air quality criteria and standards, indoor air quality, emission standards, the elements of regulatory control, organizations for air pollution control), and preventing and controlling air pollution (engineering control concepts, control devices and systems, control of mobile and stationary sources, source sampling and monitoring, the future of air pollution). Numerous MACTs have been included in this part, such as secondary lead smelting, petroleum refining, aerospace manufacturing, marine vessel loading, ship building, printing and publishing, elastomer production, offsite waste operations and thermoplastic polymers production. Each section concludes with suggested reading and questions for self-assessment.

In summary, this excellent and comprehensive work provides a multidisciplinary overview of the many varied aspects related to air pollution, making it an indispensable reference for those who need to know more about air pollution management, legislation and engineering control technologies. This will also be a reference text book for students in advanced studies in air pollution and control taught in departments of environmental sciences and engineering and public health.

Introduction to Environmental Forensics, 2nd edition, edited by Brian L. Murphy and Robert D. Morrison, Amsterdam, NL: Academic Press, 2007, 776 pp., EUR 82.95; £57.99, ISBN 978-0-12-369522-2

The same authors published in 2005 the book *Environmental Forensics. Contaminant Specific Guide*, with the purpose of providing a contaminant-specific resource for investigating and solving the questions of when a contaminant release occurred, the origin of the release, and a basis for apportioning liability among multiple responsible parties (*IJEAC*, **86**, 1031, 2006). The present book is a complementary reference designed to provide the reader with a methodological organization of the forensic tools available, considering that the most successful forensic investigations rely on the approach of selecting the most applicable techniques from numerous methodologies.

The book starts with two chapters on applications of environmental forensics and site history, the first tool of environmental forensics. Specific forensic methods are presented in the following chapters dealing with photogrammetry, photointerpretation and digital imaging and mapping, statistical tools, including Principal Components Analysis and Receptor Models for source apportionment, chemical fingerprinting methods, gas-chromatography-combustion-isotope ratio mass spectrometry, laser ablation inductively coupled mass spectrometry (LA-ICPMS), manual- and computer-controlled scanning electron microscope (SEM) techniques and X-ray diffraction. The book concludes with a presentation of several emerging forensic techniques. Numerous examples and case studies are provided to illustrate the application of these forensic techniques in environmental investigations.

This exciting reference, written by leading experts, offers detailed information on chemical "fingerprinting" techniques applicable to ground water, soils, sediments and air, plus an in-depth look at petroleum hydrocarbons. It gives the environmental scientist, engineer, legal specialist and consultant a complete toolbox for conducting forensic investigations; and archaeologists, hydrochemists and geochemists useful guidelines in dating sources of pollution.

Oil Spill Environmental Forensics: Fingerprinting and Source Identification, edited by Zhendi Wang and Scott A. Stout, 620 pages. Amsterdam, NL: Academic Press, 2007, 620 pp., EUR 100.00, £69.99, ISBN 978-0-12-369523-9

Chemical fingerprinting has played an important role in the rapidly advancing field of environmental forensics of oil spills. Significant advances in chemical fingerprinting, driven by both the application of petroleum exploration and production geochemistry principles and by advancements in analytical methods and instrumentation, have resulted in the use of fingerprinting in nearly all oil spill investigations worldwide.

Oil Spill Environmental Forensics provides the most complete view available of the various techniques used to identify the source of an oil spill. The contributions cover both new and emerging chemical fingerprinting technologies and the application and refinement of proven technologies in sufficient detail so as to reasonably represent the state-of-the-science of oil spill fingerprinting and source identification. The sequence of chapters includes an introduction of the methods for and factors affecting chemical fingerprints of petroleum, oil spill investigation sampling design, specific chemical fingerprinting features (biomarkers, sulfur-bearing PAHs, and stable isotopes) and instrumentation (GC x GC), data analysis techniques (emerging CEN protocol, quantitative methods and multivariate analysis), biodegradation effects on and biological uptake of petroleum, fuel chemistry and non-chemical oil spill identification techniques (transport modelling and remote sensing). Finally, three case studies are described in detail, namely the *Exxon Valdez* incident in Alaska in 1989, oil spills in the Strait of Malacca (Malaysia) and the evaluation of hydrocarbon sources in Guanabara Bay (Brazil). The authors chronicle both the successes and limitations of the techniques used for each of these events.

With clear, comprehensive, well illustrated and referenced presentations, the individual chapters in this book will provide environmental consultants, scientists and engineers with ready access to a comprehensive overview of oil spill fingerprinting and source identification thus providing a suitable and up-to-date reference and source of citations for years to come.

Forensic Analysis on the Cutting Edge: New Methods for Trace Evidence Analysis, edited by Robert D. Blackledge, Hoboken, NJ, USA: John Wiley & Sons Ltd, 2007, 446 pp., £52.95, ISBN 978-0-471-71644-0

Forensic analysis is aimed at providing unequivocal proofs of an association between a suspect and a victim or crime scene. In its various chapters, written by scientists who are recognized experts in their specialty areas, the book provides real-world, up-to-date information on state-of-the-art methodologies, tools and techniques for trace-evidence characterization. The term "trace" does not only imply here the exchange of a small amount of material between two parts in contact. In its broadest concept a "trace" is thought of as something left behind, a vestige of a prior interaction, a record that a forensic specialist will intend to decode and interpret.

With a variety of carefully selected case studies, the book illustrates the potential of a wide array of analytical techniques (e.g. FTIR, UV, GC/MS, APCI, DART, LC, LC/MS/MS, MALDI/TOF, ICP/MS, X-ray fluorescence and diffraction, ELISA, DNA analysis, isotope analysis, etc.) for the recognition and interpretation of types of trace evidence that may occur in non-routine cases. The broad range of evidence types covered is only a very small portion of the possible trace-evidence types that can be expected to be encountered as trace evidence. The topics covered are: the characterization of glitter particles as evidence in criminal cases, forensic analysis of automotive airbag contact; ink analysis by UV laser desorption MS; chemical characterization of condom traces as evidence of sexual assaults; chemical detection methods of bloodstain, dyes or pepper spray; applications of cathodoluminescence and "direct analysis in real time" MS in forensic science; analysis of dyes in fibres by MS; characterization of surface-modified fibres; smokeless powders; glass cuts and pressure sensitive tapes; discrimination of forensic analytical chemical data by multivariate statistics; and forensic applications of stable isotope ratio analysis.

The book will be most useful to practicing forensic scientists (criminalists) engaged in trace-evidence analysis and to university students of forensic science. Hopefully, forensic science laboratories will be inspired to develop expertise with trace evidence and contribute to the field. Besides these directly concerned users, others including attorneys, judges and even mystery writers will be able to extract from it useful information and ideas.

Quality Assurance in Analytical Chemistry, by Elizabeth Prichard and Vicki Barwick, Chichester, UK: John Wiley & Sons Ltd, 2007, 293 pp., £80.00, ISBN 978-0-470-01203-1

The need for reliable measurements, carried out in a cost-effective way, brings new demands on analytical scientists. Analysts are required to measure samples more quickly in many different matrices, often with the analyte present at a very low concentration. In addition, the customers of analytical laboratories are also requiring some third-party evidence proving the reliability of the laboratory. This is why knowledge of quality assurance and quality control is important and similar titles have been published recently by Wiley (see *IJEAC*, **48**, 223, 2008).

This book provides an introduction to the factors to be considered in order to set up processes and procedures which will facilitate the production of reliable and

defensible data. After an introduction about the need for reliable results, the general principles of QA/QC are discussed, with special reference to the features of different ISO Standards and good laboratory practices (GLP). The representativeness of samples through adequate sampling plans as well as the influence of sample handling and storage on data quality follows. The next three chapters deal with the factors to be considered when selecting an analytical method, like the importance of method validation, the traceability of measurements, and the essentials of statistics in data treatment, including the assessment of the uncertainty of the results. The final chapters are devoted to laboratory benchmarking, including proficiency testing schemes, documentation and its management, and management quality, such as internal quality audits.

This book offers analysts a new learning route to achieving the quality objectives in their work and employers a convenient way to introduce quality assurance procedures.

The book is suitable for all laboratory staff involved in chemical measurements, accreditation bodies, those involved in making decisions based on analytical results, students of analytical science and those responsible for the implementation of QA/QC procedures in laboratories.

Chemometrics: Statistics and Computer Application in Analytical Chemistry, 2nd edition, by Mattias Otto, 328 pages. Weinheim, Germany: Wiley-VCH Verlag GmbH & Co., 2007, 328 pp., £45.00 ISBN 978-3-527-31418-8

This textbook is a completely revised and enlarged version of the 1st edition, and concerns the major topics in statistical-mathematical evaluation of chemical, especially analytical, measurements. The book is divided into five chapters. In the first, the subjects of chemometrics and their application areas are introduced. Chapter 2 provides the statistical fundamentals required to describe chemical data and to apply statistical tests. The methods of signal processing for filtering data and for characterizing data as time series are the subject of Chapter 3. In Chapter 4, the methods for effective experimentation based on experimental design and optimization are covered. The methods are outlined in such a way that they can be equally applied to optimize a chemical synthesis, an analytical procedure or a drug formulation. The methods of pattern recognition and the assignment of data sets in the sense of classification are presented in Chapter 5. After introducing the methods of data preprocessing the typical chemometric methods for analysis of multidimensional data are outlined. Chapter 6 is dedicated to the modelling of relationships ranging from straight-line regression to methods of multiple and nonlinear regression analysis. In Chapter 7, analytical databanks are discussed, i.e., the computer accessible representation of chemical structures and spectra including the use of LIMS systems. More recent developments in chemometrics are considered in Chapter 8, including the fundamentals of artificial intelligence, the application of expert systems, of neural networks, of the theory of fuzzy sets and of genetic algorithms. The most important methods for internal and external quality assurance, for validation, accreditation and for good laboratory practices are covered in Chapter 9. In the Appendix the reader will find statistical tables, recommendations for software and an introduction to linear algebra. The application of chemometric methods should be made easier by following the learning objectives found in each chapter, the 90 or so worked examples and by the questions and problems at the end of each chapter.

The textbook is not only written for chemometrics courses within the chemistry curriculum, but also for students of pharmacy, biochemistry and ecology, as well as for scientists in industry and research institutes.

Mass Spectrometry: Principles and Applications, 3rd edition, by Edmond de Hoffmann and Vincent Stroobant, Chichester, UK: John Wiley & Sons Ltd, 489 pp., £34.95, ISBN 978-0-470-03311-1

Mass spectrometry: *Principles and Applications* is an excellent reference and source of information on this continuously evolving technique. This extensively revised edition incorporates most of the developments that have taken place since the time of the 2nd edition (2001) until now. Starting from the very foundations of mass spectrometry, the book goes over the different instrumental components, like ion sources, mass analyzers, detectors and computers, with an increased coverage of the most recent techniques developed up to today. New instruments such as linear traps, Orbitrap, TOF/TOF, ICR/FTMS and hybrid configurations, new atmospheric ionization techniques (e.g. atmospheric pressure photoionization ionization – APPI, desorption electrospray ionization – DESI, direct analysis in real time – DART) and matrix-assisted laser desorption ionization (MALDI) are very well described. Improved accuracy in low-mass determination, even at low resolution, improvements in sensitivity, better detection limits and more efficient tandem mass spectrometry even on high-molecular-mass compounds are some of the main achievements discussed and illustrated with numerous applications. Particular emphasis is given to the newer methods for the analysis of non-volatile compounds such as peptides, oligonucleotides, oligosaccharides, phospholipids, bile salts, etc.

All instrumental aspects are clearly described and remarkably well illustrated. The reader will also find the necessary information for the interpretation of data. A series of graduated exercises allow the reader to check his/her understanding of the subject. Numerous tables of useful data and references are given for those who wish to go deeper into some subjects. Important Internet addresses are also provided. In summary, this complete overview will prove useful to students, teachers and researchers looking for the latest mass spectrometric techniques and applications. Indeed, a book that should be in concerned academic libraries.

Introduction to Mass Spectrometry: Instrumentation, Applications and Strategies for Data Interpretation, 4th edition, by J. Throck Watson and O. David Parkman, Chichester, UK: John Wiley & Sons Ltd, 2007, 818 pp., £65.00. EUR 99.90, ISBN 978-0-470-51634-8

This completely revised and updated edition provides an easy-to-read guide to a wide variety of concepts in mass spectrometry. It covers strategies for data interpretation, fundamental operating principles of instrumentation, and representative applications for all areas of organic, environmental and biomedical mass spectrometry.

The introductory chapter offers a conceptual and historical perspective on the development of mass spectrometry. The physical instrument is dissected and described in

Chapter 2 in a systematic manner from the ion source through ion guides to the m/z analyzer to the detection system. Chapter 3 describes the concept of MS/MS with emphasis on collisionally activated dissociation. Tandem-in-space is distinguished from tandem-in-time, and several qualitative and quantitative applications of both types of technology are presented in the context of environmental and biomedical fields. In addition, information on analyte identification from MS/MS is provided along with explanations and sources of spectral databases and how to use them. Various means of transporting the sample into the low-pressure environment of the mass spectrometer are described in Chapter 4. Descriptions of non chromatographic continuous inlets include DART, DESI, DAPCI, SIFT, MIMS, CRIMS, pyrolysis, electrophoresis, laser ablation, continuous-flow FAB, and ICP.

A general strategy for interpretation of a mass spectrum, regardless of the type of ionization involved, is presented in Chapter 5, with appropriate examples resulting from a variety of ionization types, including El, CI and electrospray. Chapter 6 is one of the highlights of the book, providing a solid introduction to the formation, appearance and interpretation of El mass spectra. Fragmentation pathways of a molecular ion are introduced in a clear manner and supported with nearly 100 fragmentation schemes to facilitate interpretation of dozens of representative mass spectra of various types of compounds. This chapter also includes detailed information on El mass spectral databases and library search programmes along with descriptions of their use. The basis for chemical ionization is described in Chapter 7. Atmospheric pressure CI (APCI) and the specialized technique of desorption CI (DCI) are also described and supported with illustrative examples of application to environmental and biomedical problems. The operating principles of electrospray ionization (ESI) are described in Chapter 8 together with some current LC/MS applications. The operating principles of matrix-assisted laser desorption/ionization (MALDI) and atmospheric pressure MALDI are described in Chapter 9. Attention is given to sample preparation, including descriptions of specialized sample probes to facilitate sample cleanup. Chapter 10 describes the basis for trade-offs in individual operation of GC and MS that are necessary for successful operation of the combined technique. Strategies and procedures for data processing with mass chromatograms are described and some current applications are reviewed along with explanations of software used for component deconvolution through processing complex data. Chapter 11 deals with LC/MS particularly emphasizing the different interfaces, which lend themselves to particular applications. Methodology for proteomics is covered in Chapter 12, which also describes some basic approaches to the characterization of carbohydrates and nucleotides. The strategy and procedure for sequencing a peptide from CAD MS/MS data are also described in detail. Methodology for identifying/characterizing a variety of post-translational modifications to proteins is described in the context of several step-by-step examples. Hundreds of current applications are reviewed within the chapters that include bibliographies containing several hundred references, mostly published since 2000.

As this excellent book is designed for use as a textbook for courses on mass spectrometry, PowerPoint presentations developed by the authors are available for downloading to site-registered instructors. The authors indicate that these materials will be updated on a regular basis. In addition to being an introductory text for students, it is also relevant to anyone working with mass spectrometry in all application areas. This book should certainly be on the bookshelf of every mass spectrometrist.

Fundamentals of Contemporary Mass Spectrometry, by Chhabil Dass, Hoboken, NJ, USA: John Wiley & Sons Inc., 2007, 585 pp., £57.95, ISBN 978-0-471-99815-0

This book provides a well-balanced and in-depth discussion of the basic concepts and latest developments over a range of important topics in modern mass spectrometry. The book is organized in three parts and 15 chapters. Part I provides a detailed description of the instrumentation aspects of mass spectrometry. Topics in this section include all modes of ionization, mass analysis and ion detection, tandem mass spectrometry, and hyphenated separation techniques. Two important topics, namely the identification of organic compounds (< 1000 daltons), including the interpretation of the mass spectra of organic compounds and the rules of their fragmentation, and the characterization of inorganic materials, are discussed in Part II. A large portion of the book (Part III) is devoted to the field of biological mass spectrometry that has expanded in recent times. This section contains eight chapters, dealing with the analysis of proteins and peptides, oligosaccharides, lipids and oligonucleotides. The field of quantitative analysis is reviewed separately, and the last chapter covers a range of miscellaneous topics, including enzyme kinetics, imaging mass spectrometry, analysis of microorganisms, clinical mass spectrometry, metabolomics, forensic analysis, and combinatorial chemistry.

As an aid to understanding the concepts more thoroughly and to improve problem solving skills, several worked examples are included in most chapters. Another feature of the book is an overview of each chapter, which provides a concise survey of the concepts discussed. Also, the practice exercises included at the end of the chapters will help develop readers understanding. Solutions to the exercises are given in an Appendix.

The book will be a good teaching tool of the principles of mass spectrometry to undergraduates and graduates as well as to those with no background in mass spectrometry. The practitioner of mass spectrometry at all levels should also enjoy reading the book.

Analytical Instrumentation: A Guide to Laboratory, Portable and Miniaturized Instruments, by Gillian McMahon, 296 pages. Chichester, UK: John Wiley & Sons Ltd, 2007, 296 pp., £50.00, ISBN 978-0-470-02975-0

This book arose from a series of lectures developed by the author in a postgraduate course on ''Instrumentation''. It is a comprehensive, clearly written and structured text that reveals the basis of the key instrumental methods, and the importance they play in many aspects of modern life (e.g. environment, food, health). The text takes the reader systematically from large, laboratory based instruments through to on-line and in-line instruments for industry, to portable and hand held equipment, and finally to micro-scale devices. It is a pity that some coloured schemes are not properly produced.

After a short introduction to analytical instrumentation and the analytical process in general (chapter 1), the book is divided into four sections:

Section I covers the more conventional equipment, with chapters on each of the following spectroscopic methods (visible and ultraviolet spectrophotometry, near infrared, mid-infrared and Raman spectrometry, fluorescence and phosphorescence, nuclear magnetic resonance, mass spectrometry and atomic spectrometric techniques), separation and hyphenated techniques (gas and liquid chromatographies, capillary electrophoresis

and supercritical fluid chromatography), imaging instrumentation, electrochemical methods (potentiometry, voltammetry and conductivity) and thermoanalytical and diffraction techniques.

Section II is devoted to the smaller instruments with a discussion of the drive to make devices more portable and their use in laboratory, medical and environmental applications. Special emphasis is placed on point-of-care meters for blood glucose testing and coagulation monitoring and portable instruments in environmental monitoring.

Section III examines process analytical instrumentation, which is a growing area, especially in the petrochemical, food and beverage and pharmaceutical industries. After discussing in-process sampling and analysis, a number of examples are given of instruments that are being used in process analytics applications.

Section IV tackles the most recent trend in analytical instrumentation, which is miniaturization and the drive to create laboratory and field chip-based devices.

In conclusion, this is an exciting new resource for analytical science education that offers an interesting approach for teaching modern instrumentation. It will certainly appeal to both undergraduate and postgraduate students in a practical way, enhancing their interest for this discipline as they move through their career.

Chemical Analysis: Modern Instrumentation Methods and Techniques, 2nd edition, by Francis Rouessac and Annick Rouessac, 574 pages. Chichester, UK: John Wiley & Sons Ltd, 2007, 574 pp., £34.95, ISBN 978-0-470-85903-2.

Chemical Analysis is an essential introduction to a wide range of analytical and instrumentation techniques that have been developed and improved in recent years. Prepared for teaching purposes, the chapters contain detailed descriptions of instruments and basic principles of the techniques with a few applied examples that are useful to appreciate their strengths and limitations in their application.

The book is carefully structured in three parts devoted to separation techniques, spectroscopic techniques and other methods. Among the separation techniques the following are considered: general aspects of chromatography, gas chromatography, high-performance liquid chromatography, ion chromatography, thin layer chromatography, supercritical fluid chromatography, size exclusion chromatography, capillary electrophoresis and electro chromatography. Ultraviolet and visible absorption spectroscopy, infrared spectroscopy, fluorimetry and chemiluminescense, X-ray fluorescence spectrometry, atomic absorption and flame emission spectroscopy, atomic emission spectroscopy and nuclear magnetic resonance are discussed in Part 2. Mass spectrometry, labelling methods (e.g. RIA), elemental analysis, potentiometric methods, voltammetric and coulometric methods, sample preparation and basic statistical methods are included in the last part.

The text contains only a minimum of theory in order not to lose the attention of the broader readership whose interest is preferential for the technical content. Additional problems and solutions have been introduced throughout the book. Each chapter is illustrated by photographs, numerous diagrams and schemes of chemical reactions or technical principles.

Although it was written for undergraduate students of chemistry it may be of interest for students in other disciplines (physics, biology, etc.) where chemical methods of analysis and instrumental techniques are used. Moreover, it will also be an invaluable reference for

a broad readership, looking for an overview of the wide range of techniques and instruments that can be applied to analytical problems in many areas where the structure determination and quantitation of chemical species is needed.

Chemistry for Environmental and Earth Sciences, by Catherine V.A. Duke and Craig D. Williams, Boca Raton, FL, USA: CRC Press, Taylor & Francis Group, 2008, 230 pp., £24.99, ISBN 0-8493-3934-0

It is well known that chemistry is behind all current environmental issues such as global warming, ozone depletion, acid rain, smog, water and soil pollution. Therefore, in order to be able to understand and tackle these issues, it is necessary to have a general understanding of chemistry and of the basic physico-chemical principles. *Chemistry for Environmental and Earth Sciences* is an original chemistry text book in the sense that it provides a friendly introduction to the basic chemistry concepts from the perspective of those environmental problems.

The book is divided into four intuitive chapters: fire, earth, water and air. The first chapter explains classical concepts such as atomic and molecular structures, chemical bonding and reactions, states of matter, phase transitions and radioactivity. Subsequent chapters focus on the chemistry relating to the geosphere, hydrosphere and atmosphere, including the chemical aspects of pollution of these compartments and the basic chemistry used for mitigation, remediation or elimination of pollutants. Phase diagrams, acid-base properties, solvation of ions, redox chemistry are some of the concepts developed in these chapters.

Starting from the most fundamental concept of atoms and atomic structure, the different chapters show how simple molecules, like CO_2 or trace elements, join together to form molecules as complex as humic acids or zeolites, and how those molecules in turn react with each other and determine the biogeochemical cycles.

Throughout the book and at the end of most chapters there are self-assessment questions, designed to help the reader to grasp the concepts involved and gain confidence in applying them towards understanding current real-world problems. Additional material is given in boxes throughout the text, intended to develop a few selected topics in more detail. The book is easy to read and fills a gap specifically for undergraduate students of environmental and earth sciences, physical geography and geology.

J. Albaigés
CID-CSIC, Barcelona, Spain