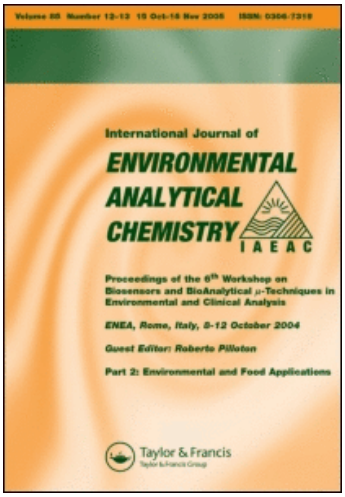

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Book Reviews

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BOOK REVIEWS

SULPHUR CYCLING ON THE CONTINENTS: WETLANDS, TERRESTRIAL ECOSYSTEMS AND ASSOCIATED WATER BODIES (SCOPE 48), edited by R. W. Howarth (Cornell University, Ithaca, NY, USA), J. B. Stewart (University of Saskatchewan, Canada) and M. V. Ivanov (USSR Academy of Sciences, Russia) 350 pp. John Wiley, Chichester, England (1992). ISBN 0–471–93153–5. U.S.$ 169,–.

This book reviews and synthesizes information on the processes that govern the cycling of sulfur in the various ecosystems on the continent. It is the result of a workshop held at Trent University, Petersborough, Canada in May 1989, organized by the Scientific Committee on Problems of the Environment (SCOPE) of the International Council of Scientific Unions (ICSU) and published in cooperation with the United Nations Environment Programme (UNEP). It is the fourth SCOPE publication dedicated specifically to sulfur in the environment.

The Trent workshop has brought together specialists from various disciplines including environmental chemists, ecologists, microbiologists and agronomists and it both treats natural and agricultural ecosystems. The book is a clear fruit of their discussions. Moreover, since sulfur species are not easy to determine analytically, the book includes an extended appendix on the analytical techniques currently used.

Human activity has profoundly altered the global sulfur cycle; in this respect, the quantity of anthropogenic emissions is known in sufficient detail. Knowledge on biogenic emissions is growing; however, estimates for continental ecosystems are still less reliable than oceanic emissions. The last decade has witnessed a growing knowledge on the role of the biogenic volatile organic sulfur compounds and better estimates are becoming available. A large part of the book tries to evaluate the impact of increased sulfur inputs to the ecosystems which concern changes in the acid-base chemistry and the sulfur cycling. In this respect, wet depositions are well quantified, but uncertainties concern dry deposition and direct interception. Bacterial dissimilatory sulfate reduction is becoming progressively more important in continental aquatic ecosystems. The fate of this sulfide is decisive for the wetland sulfur budget. Apart from re-oxidation at the oxic-anoxic interface and sequestering by metal ions, different chapters show a growing awareness on the sulfur incorporation in organic material, although analytical techniques and knowledge on the mechanisms are still scant.

Finally, it is concluded that human activities have greatly altered the sulfur cycles both globally and locally, but the full magnitudes are still unknown. Acid sulfur deposition has damaged forests and lakes. In the temperate regions in the northern hemisphere, anthropogenic emissions are declining. In contrast, high increases are expected for the tropics, but human abilities to control these and limit the deleterious effects are questionable. In science,

an interdisciplinary approach as stimulated by this book is an urgent need. This book is highly recommended for everybody working on sulfur in the natural environment.

Rutger de Wit
Dep. of Environmental Chemistry
CID-CSIC, Barcelona, Spain.

PERSISTENT POLLUTANTS IN MARINE ECOSYSTEMS, edited by C. H. Walker (University of Reading) and D. R. Livingstone (Plymouth Marine Laboratory), 272 pages. Pergamon Press, Oxford (1992). ISBN 0–08–041874–0. US$ 81.00.

This is a volume in the SETAC Special Publications Series, which was established to provide critical reviews and new perspectives on current topics relating to chemicals in the environment, such as environmental chemistry, environmental toxicology and hazard and risk assessment.

The book is mainly focused on chlorinated compounds, particularly PCBs, which undergo strong bioaccumulation along the food web. Thus, invertebrates of the lower trophic levels are considered in Chapters 1 and 2, paying particular attention to the direct uptake of pollutants from water and sediments. Chapters 3 and 4 deal mainly with invertebrates higher in the food chain which receive pollutants largely from their prey, the latter chapter being concerned with the modelling of processes of accumulation. Chapter 5 focuses on fish, with some consideration of marine mammals, whereas essentially the reverse is the case in Chapters 6 and 7 which deal with marine mammals and their food sources. Chapters 8–10 cover fish-eating birds. Thus, Chapters 6–10 deal largely with vertebrates at the top of the food chain.

The book, however, does not only pay attention to the bioaccumulation of these compounds in organisms, but to the assessment of their metabolism and ecotoxicological effects.

In this respect, the book is closed with an excellent overview on the:

— transfer processes and routes of uptake,
— comparative enzymology and other factors affecting persistence of chemicals in species,
— toxic effects of pollutants,

stressing the findings of all previous chapters.

Recent literature is extensively covered which is not the usual case in Conference Proceedings which are published with some delay, and the editorial presentation is very accurate.

Throughout the book many questions that require further research or understanding are revised which will be of interest to researchers in the field. This is certainly a reference book for environmental chemists and toxicologists.

J. Albaigés
Dep. of Environmental Chemistry
CID-CSIC, Barcelona, Spain.

FUNDAMENTAL TOXICOLOGY AND RISK ASSESSMENT, A. C. Anderson. (National Environmental Health Association, Denver, USA). 5 computer disks (5.52 in) + 1 manual. Lewis Publishers, Inc., Chelsea, MI, USA (1990). US$ 450.00.

This is an introductory level computer-based training course whose purpose is to provide the user with fundamental knowledge of toxicology and risk assessment, and geared for individuals with little or no background in the subject matter.

The course, organized in 9 lessons, includes a review of basic human organ system structure and function, basic toxicology and risk assessment. Lessons 1 and 2 are introductory and deal with *Fundamentals of Toxicology and Risk Assessment*, giving to the user basic nomenclature and main concepts in Toxicology. Lessons 3 to 5 give the student general information on *Biological Fate of Toxicants*—the major routes of entry of xenobiotics are described and the body's principle clearance mechanisms including detoxification and excretion outlined—, *Pathological Responses*—basically, at the organ and organ system levels—and *Genetic and Developmental Effects of Toxic Substances*. Lessons 6 to 8 incorporate the basics of *Dose-Response Evaluation* and describe the steps involved in *Exposure Assessment and Risk Characterization*. Finally, the last lesson is a practical application of the information presented above to the assessment of a hazardous waste of tetrachloroethylene, through the use of a simulated *Case Study*. Quizzes and exams at the end of most topic paths and lessons will help the student to recognize his/her understanding of the material. If the answers are not correct the student has the opportunity to be taken back to the appropriate material in the topic path.

The computer requirements are a compatible PC with at least a 80286 microprocessor, an EGA or VGA graphics card and monitor, and 4.5 megabytes on the hard disk. The first selection of the program is a tutorial that provides complete information on all the functions and features of the course and allows the user to gain rapid understanding of how to move around within the program and different lessons easily.

In summary, this training course offers an introductory level to Toxicology and Risk Assessment and those users willing basic information on the topic and interested on "electronic books" will find it useful.

Cinta Porte
Dep. of Environmental Chemistry
CID-CSIC, Barcelona, Spain.

ILLUSTRATED HANDBOOK OF PHYSICAL-CHEMICAL PROPERTIES AND ENVIRONMENTAL FATE FOR ORGANIC CHEMICALS, Vol. II. by D. MacKay, W. Ying Shiu and K. Ching Ma., 597 pp., Lewis Publishers, Chelsea, USA. ISBN 0–87371–583–7.

This Handbook brings together relevant physical-chemical data of polycyclic aromatic hydrocarbons (50 compounds), polychlorinated dioxins (15) and dibenzofurans (8) for the estimation of fate in multimedia systems (air, water, soil, sediments and biota). The book overviews reported physical-chemical data of these compounds and introduces the quantitative Structure-Property Relationships (Q SPRs) for calculations of those

properties, environmental partitioning and reaction tendencies from the information on chemical structures. Furthermore, the fate models at levels I, II and III are presented and applied to selected polycyclic aromatic hydrocarbons and polychlorodibenzodioxins and dibenzofurans. Results are displayed in graphical format, which is very useful to visualize.

Finally, it is worth to point out the excellent literature coverage concerning the fate of the different classes of compounds.

J. M. Bayona
Dep. of Environmental Chemistry
CID-CSIC, Barcelona, Spain.

HANDBOOK OF MASS SPECTRA OF ENVIRONMENTAL CONTAMINANTS, edited by Ronald A. Hites (School of Public and Environmental Affairs and Department of Chemistry, Indiana University, Bloomington, Indiana), Second edition, 581 pages, Lewis Publishers (1992), ISBN 0–87371–534–9. US$ 84.00.

This book contains a compilation of 533 EI mass spectra of commonly encountered organic and organometallic pollutants. The compounds are selected from several U.S. Environmental Protection Agency and World Health Organization data bases, being reviewed by a panel of experienced mass spectrometrists. Characteristics of the mass analyzers and the introduction technique is omitted.

The major fragment ions and rearrangements are indicated in the compound structure being of interest for the identification of structurally related compounds (metabolites, degradation products).

In order to help the identification of unknown compounds, all spectra have been indexed according to: a) alphabetic order, b) CAS registry number, c) exact molecular weight and d) peak intensity.

This book updates the former version including novel pesticides and other contaminants of environmental relevance, consequently, of interest to environmental chemists.

J. M. Bayona
Dep. of Environmental Chemistry
CID-CSIC, Barcelona, Spain.

ORGANIC CONTAMINANTS IN THE ENVIRONMENT: ENVIRONMENTAL PATHWAYS AND EFFECTS, edited by K. C. Jones (University of Lancaster, England). 338 pages. Elsevier Applied Science, London and New York (1991). ISBN 1–85166–621–4. £65.00

This is a volume published in the Environmental Management Series, edited by J. Cairns and R. M. Harrison, intended for covering different aspects of environmental science and engineering, pertinent to monitoring and management of the natural and man-modified environments.

In this context, the environmental fate and effects of organic contaminants, a subject in continuous development, is reviewed in the book. The behaviour of organic chemicals in air, lakes, soils and groundwaters are exemplified in chapters 1 to 3. The fate of organics during sewage treatment and their transfer to the environment following disposal, a topic usually forgotten in this type of books, is dealt with in chapter 4. The physico-chemical processes which determine their environmental partitioning are broadly covered with a view to prediction and modeling and their transfer to biota (chapter 5), plants (chapter 6), terrestrial food chains (chapter 7) and marine mammals (chapter 9). The role played by microorganisms in determining the chemical fate and persistence of organic pollutants is discussed in chapter 8. The final chapter (chapter 10) deals with the role of ecotoxicology in determining the environmental effects of organic chemicals.

The book presents examples of processes which may be important for a wide range of trace organics, although the persistent organochlorine pollutants are those which receive more attention.

The limited extension of the book do not permit a thorough coverage of the different topics. Moreover, some chapters have reproduced almost exactly material published elsewhere. Despite of these limitations the book contains new and interesting approaches and will be of interest to graduate students and people interested in an introduction to the field.

J. Albaigés
Dep. of Environmental Chemistry
CID-CSIC, Barcelona, Spain.