

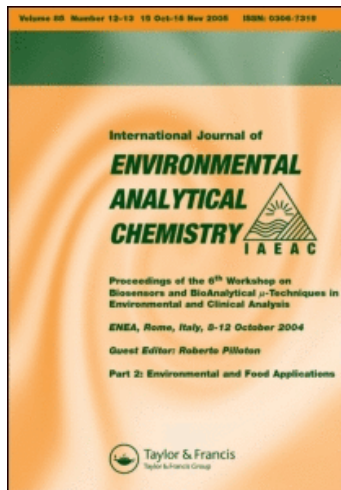
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BOOK REVIEWS

QUALITY ASSURANCE IN ENVIRONMENTAL MONITORING Sampling and sample pretreatment, edited, by Ph. Quevauviller, 306 pages, VCH Weinheim (Germany) (1995). ISBN 3-527-28724-8, DM 178.00

Quality assurance (QA) and quality control (QC) are relevant aspects in environmental monitoring where a large number of samples are usually analyzed, sometimes by different laboratories, and comparisons of data based on spatial or temporal parameters are to be performed.

The data produced are used for evaluating contamination trends, verifying the quality requirements of environmental regulations or for modeling and research activities. Consequently, measures to guarantee the quality of the laboratories performance have increasingly been established. In this respect, it has been recognized that major risk of error in environmental monitoring arises from the sampling and sample handling operations before the analysis itself. Therefore, the book constitutes a very appropriate guide for environmental chemists involved in monitoring activities. The book is organized in ten chapters covering the QA and QC principles, the sampling strategy in monitoring biological specimens, QA and QC of surface water and sediment sampling, the sampling and pretreatment for monitoring organic compounds and trace metals in sea water, sediments and biota. The last chapter proposes a holistic structure for quality managements with particular emphasis on marine environmental monitoring. It appears from this contents that the book serves as a practical reference to environmental chemists. The critical discussions of the methods and the wide and up-dated coverage of the literature are other additional interests of the book.

QUALITY ASSURANCE IN ENVIRONMENTAL MONITORING. Instrumental Methods, edited by G. Subramanian, 334 pages, VCH Weinheim (Germany) (1995). ISBN 3-527-28682-9, DM 178.00

The continuous developments in legislation of environmental pollutants has led to improvements in instrumentation technology and analytical methods to cope with the current and future regulation requirements.

A comprehensive overview of selected instrumental developments and their applications in environmental monitoring is presented in this book. The authors describe in detail both the principles of the techniques and some applications in monitoring specific pollutants. The fact that most of them belong to instrumental companies and, therefore, focus the attention on their own developments, does not prevent the wide interest of the book. Particularly, the description in detail of the different design aspects of the instrumentation aids the reader in improving his methodologies or solving his particular problems in quality assurance. Chapter 1 gives an account of solid phase extraction in sample purification, its importance and application. Superfluid critical extraction in environmental analysis is discussed in Chapter 2. Chapter 3 discusses the validation and environmental analysis by Atomic Absorption Spectrometry as applied to trace metals in environment. The development of Inductively Coupled Plasma Optical

Emmission spectrometry in environmental analysis is discussed in Chapter 4. Volatile Organic Chemical monitoring and the applications of GC-MS are covered in Chapters 5 and 6. CES in environmental monitoring is reviewed in Chapter 7. Development, design, and application of Field Flow analysis is discussed in Chapter 8. Chapter 9 presents the application of software in environmental auditing and quality control.

The coverage has been planned for a wide range of readers, although it will be of special interest to postgraduate students or analytical chemists aiming to work in environmental monitoring.

THE CHEMISTRY OF THE ATMOSPHERE: ITS IMPACT ON GLOBAL CHANGE, edited by J. G. Calvert, 364 pages, Blackwell Science, Oxford (UK) (1994). ISBN 0-632-03779-2, £ 89.50

During the past few years a great deal of progress has been made in understanding the complex chemical interactions which control the composition of the atmosphere and influence the earth and its inhabitants. The book is the outcome of the CHEMRAWN VII Conference, convened with the aim of defining the present scientific understanding of various atmospheric problems and suggesting plans of action for their solution.

48 authors from all around the world review the state of our knowledge on the many factors which lead to the degradation and changes of our atmosphere and the earth's climate. The contributions are organized in very timely topics such as the stratospheric ozone depletion, the global warming originated by the greenhouse effect, the tropospheric build-up of oxidants and the acid generation in the troposphere, with particular reference to the acid rain phenomena. A chapter on methods of measurement of atmospheric trace species is also included.

It is the hope of the editor that the readers of this book will gain a new breath of understanding of the various aspects of atmospheric chemistry and its influence on global change. I think the editors expectations are fully satisfied and atmospheric chemists will welcome this publication. Readers will also gain some new insight into the difficult task of designing solutions to the many identified problems.

CLIMATIC CHANGE AND THE MEDITERRANEAN, VOL. 2, edited by L. Jeftic, S. Keckes and J. C. Peruetta, 564 pages, Arnold, London (1996). ISBN 0-340-64565-2.

This is the second volume in a series of books reporting on studies of the impact of climate change on the ecological systems and socio-economic structures of the Mediterranean region. This is a part of a systematic study initiated in 1987 and sponsored by UNEP assessing the changes likely to occur in vulnerable geographic areas included in the Regional Seas Programme. The first volume (edited by L. Jeftic, J. D. Milliman and G. Sestini (1992). ISBN 0-340-55329-4) was focused mainly on the deltaic areas (e.g. Ebro, Rhône, Po and Nile) whereas the present one is on islands and bays (Island of Rhodes, Kastela Bay and the Cres-Losinj archipelago (Croatia), the Syrian coast and the Maltese island).

The case studies are presented by multidisciplinary teams which consider the implications of the climate change on the following aspects: precipitation, sea level, hydrological and water resources, land degradation, socio-economic activities, vegetation and land-use, historical heritage and coastal low lands. Despite the uncertainties of future climatic conditions and rates of change, this is an excellent and comprehensive overview on the topic with many practical considerations. In this respect, general conclusions are drawn about the predictable changes on the Mediterranean region as a whole and predictions and recommendations are proposed to assist the governments in designing

policies and measures that may avoid or mitigate the expected negative effects of these changes or to adapt to them.

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CHEMOMETRICS: EXPERIMENTAL DESIGN, (Analytical Chemistry by Open Learning, ACOL), edited by Ed Morgan, 275 pages, John Wiley, New York USA, (1995). ISBN 0-471-958328, US\$ 19.50.

This monograph on 'Chemometrics: Experimental Design' is really worth to be a member of the ACOL series, comprising easy to read, user friendly texts for people interested in analytical chemistry and instrumental techniques. There are five chapters. The first one deals with basic statistics and considers errors, t-test, F-test and ANOVA. Illustrative for the character of the book is, for instance, the treatment of the F-test and the two-tailed t-test. Not only calculations are presented, but the way the results have to be handled in practice is made very clear; it is outlined step by step and used for illustrative applications. Also the so-called self assessment questions (in combination with the author's response given on a separate page) are highly appropriate and guarantee an active attitude of the reader; presumably, he or she will really become a user. The other chapters consecutively deal with 'Principles of Experimental Design', 'Factorial Design and Analysis', 'Fractional Factorials' and 'Response Surface Methodology'. These chapters are also written in a user friendly style. Chapter 3, for instance, comprises a 2^3 factorial design for HPLC, and considers the influences of the methanol proportion (M) of the mobile phase, the concentration of citric acid (C) and the concentration of acetic acid (A) on the chromatographic response function. The illustrations/diagrams utilized to clarify differences between AM, AC and MC interactions will no doubt be attractive for people who usually do not like chemometrics as such.

To summarize, this book should be recommended to analytical chemists in general, irrespective of their specific expertise, and incorporated in university curricula.

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SELECTIVE DETECTORS—Environmental, Industrial, and Biomedical Applications, edited by R. E. Sievers, 261 pages, J. Wiley, New York, (1995). ISBN 0471013439, £ 49.95.

The present monograph on Selective Detectors is Volume 131 in the *Chemical Analysis* series of monographs on analytical chemistry and its applications, edited by J. D. Winefordner. In this monograph several selective detectors which were developed in the past 15 years, are discussed with respect to principles, design, performance, applications and future developments. Four of the eight chapters deal with the use of (selective) chemiluminescence (CL) detection techniques. This (over) emphasis probably reflects the research interest of the editor of the present volume. A final chapter entitled 'Tales of a Reluctant Instrument Maker', written by James Lovelock, the inventor of the electron-capture detector (ECD), gives an historical overview on his own career and why and how he invented the ECD.

Chapter 1 deals with gas phase sulphur-selective CL detection. The rather complex mechanism of sulphur CL is explained and fluorine- and ozone-induced CL are discussed.

Attention is devoted to CL efficiency, detector design and several applications such as the determination of blood thiols using aqueous phase oxidation and CL detection. Detection limits (in pg S/sec) range from 1,000 for direct ozone oxidation to 0.05 for flameless sulphur CL detection. The S versus C selectivity generally is very good.

Chapter 2 discusses the potential of flameless sulphur CL detection. The principles of CL detection are briefly reviewed again, as are the principles of flameless sulphur CL and the differences between flame and flameless techniques. The main attention is on analytical aspects (sensitivity, selectivity, linearity, precision) and applications in GC, LC and supercritical chromatography (SFC). The flameless S-selective detectors yield the best sensitivity (< 0.5 pg S/sec), highest selectivity ($S/C > 10!$) and a large linear response.

Chapter 3 discusses detection techniques based on nitric oxide/ozone CL. The determination of aqueous NO, nitrite, nitrate and N-containing organic compounds is discussed, and much information on set-ups and reaction schemes is provided. The section on the FIA determination of nitrite in aqueous samples is especially interesting. The use of redox CL, for GC, LC, and SFC is briefly discussed.

Chapter 8 is the fourth chapter that is devoted to the use of CL, viz. to peroxyoxalate CL (PO-CL). It is somewhat disappointing that only one chapter is devoted to PO-CL which has a selectivity similar to that of fluorescence detection; besides, no comparison is made with luminol CL. Information is provided on CL intensity as a function of time, the mechanism of background emission and photochemical initiation, and PO-CL for on-line detection in LC. A few applications representative for each group of compounds that can be detected with PO-CL (fluorophores, peroxides, oxalates) are given.

In Chapter 4 the principles, design (cracker, methanizer), performance and applications of oxygen-sensitive detection (O-FID) are discussed in some detail. The cracking reactor of the O-FID disintegrates analyte molecules into CO and the methanizer converts it into methane which is detected by the FID. The O/C selectivity of the O-FID which is often used for the analysis of petroleum products, is 10^4 .

Chapter 5 also deals with the FID, but as a metal selective device using ion mobility discrimination. Organometallic compounds containing Al, Fe, Sn, Pb and Mn can be detected at low-pg levels. The practicality of this technique is still very limited.

Chapter 6 mainly discusses GC with atomic emission detection (AED). In principle, all elements except helium can be detected; detection limits often are on the order of 1–10 pg/sec. Quite a number of examples for non-metals as well as metals are given. It is obvious that this detection technique which can simultaneously record traces for several elements, has a rather bright future, especially in environmental analysis.

Chapter 7 discusses the potential of selective detection by plasma mass spectrometry (MS) for metal speciation. The high selectivity and sensitivity of plasma source MS combined with chromatographic separation are well-known. Inductively coupled plasmas (ICP) and microwave-induced plasmas (MIP) are the most frequently used ion sources. ICP-MS can be combined with reversed-phase, ion-pair, micellar, ion-exchange and size-exclusion LC. With GC, MIP sources are generally used, and detection limits are in the low-pg range. GC-plasma MS may well become important for the screening of environmental samples suspected to contain pesticides.

The present monograph provides quite interesting and sufficiently detailed information on several selective detection techniques. Unfortunately, however, the range of such techniques covered in the book is somewhat limited. Besides, there is not too much emphasis on practical aspects/experimental experience, and real-life studies.

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