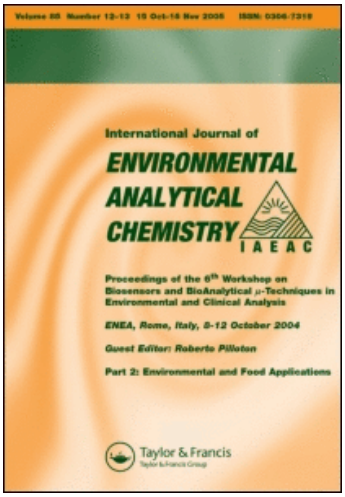

International Journal of Environmental Analytical Chemistry
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713640455

Book Reviews

To cite this Article (1988) 'Book Reviews', International Journal of Environmental Analytical Chemistry, 33: 1, 59 — 61
To link to this Article: DOI: 10.1080/03067318808079930
URL: http://dx.doi.org/10.1080/03067318808079930

Intern. J. Environ. Anal. Chem., Vol. 33, pp. 59–61
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Printed in Great Britain

Book Reviews

HANDBOOK OF AQUEOUS ELECTROLYTE SOLUTIONS. PHYSICAL PROPERTIES, ESTIMATION AND CORRELATION METHODS, by A. L. Horvath, Ellis Horwood Series in Physical Chemistry, John Wiley & Sons, New York, 1985, 631 pages, price £69.50

Scientists working in different fields of (applied) chemistry and looking for information on physical chemical properties of aqueous electrolyte solutions will find this book very useful. After a concise and qualitative chapter on the theory of physical chemical quantities of aqueous electrolytes and a short introduction on methods for estimation and correlation of different data, the book presents an up-to-date and almost comprehensive reference to a large number of theoretical, semi-empirical as well as empirical relations between the different physical chemical properties of aqueous electrolyte solutions.

It covers these properties in 18 chapters on the following topics: phase diagram (freezing point curve); vapour pressure (boiling point curve); critical properties (T_{cr}, p_{cr}, V_{cr}); density and p-V-T-concentration relations; compressibility, bulk modulus and thermal expansivity; velocity of sound (adiabatic properties); osmotic coefficient; activity coefficient; refractive index; transference number; electrical conductivity; diffusion coefficient; surface tension; viscosity; thermal conductivity; heat capacity (specific heat); latent heat of vaporization, integral and differential; and entropy.

Although this is an impressive list, it is a pity that the author has excluded important thermodynamic properties (like different enthalpies and Gibbs energies), and dielectric properties. Also, topics like solutions of weak electrolytes and ionic association have not been treated explicitly. Nevertheless, in the above-mentioned chapters the author gives his readers a valuable review of a large number

of equations used in relation to the above-mentioned quantities and an extensive amount of references to original publications.

In addition, the book gives in five appendices a substantial amount of bibliographies and literature sources (books, compilations, journals) on the various topics. Four appendices contain several tables and a large number of diagrams on electrolyte-water systems.

To help the reader to find his way through the sometimes confusing collection of equations, each chapter concludes with a set of recommendations reflecting the author's experience and preference. There some weakness of the approach exposes itself: rather than presenting a critical evaluation of the different correlating equations, the book gives an exhaustive, but unselected compilation of these equations.

The recommendations of IUPAC on terminology, units and symbols are not generally followed and the book does not make a systematical use of SI units. Partial molar quantities, for example, are called partial molal quantities, suggesting that they are defined in terms of molality, which is not true. Also the calculus of quantities is not systematically applied with the result that quite a number of equations are not generally applicable, but only valid for certain specific units.

Despite this, the book will be useful to graduate students in science and engineering as well as to workers in research and application laboratories in industry. Therefore it should be present in all academic and industrial libraries.

G. SOMSEN

ELECTROANALYTICAL MEASUREMENTS IN FLOWING LIQUIDS, by K. Stulik and V. Pacakova.

This book, which appeared in the Ellis Horwood Series in Analytical Chemistry, deals with electrochemical detection in continuous and segmented flow, in flow injection analysis and liquid chromatography. After a short introduction in chapter 1, the hydrodynamic theory of flowing liquids is treated in the second chapter. In chapter 3 principles and designs of various detectors and types of electrodes

are discussed. Chapter 4 deals with peripheral instrumentation such as pumps, injectors and reactors. In chapter 5 short overviews are presented of some less common measuring techniques, such as titration in flow and spectroelectrochemistry. The use of enzymes is also discussed. A large part of the book (chapter 6) is devoted to practical applications of electrochemical detection, with an emphasis on liquid chromatography.

The completeness of this book is impressive, with 368 literature references in chapter 6 alone. On the other hand, the effort of the authors to treat every aspect of the subject is sometimes also a drawback. The discussion on pumps, injectors etcetera as in chapter 4 is not typical for electroanalytical measurements, and can be found in any general text on chromatography or flow injection analysis. At the same time information that is typical, e.g., about methods to passivate stainless steel parts of the instrumentation to prevent electrode poisoning, is missing.

There is some ambiguity in the framework of the book. For instance, hydrodynamic theory is treated very thoroughly, in my opinion sometimes even too much so. (It comes somewhat as a disappointment, after wrestling through a few pages on turbulent full flow of dimensionless parameters, to read that in practice turbulent flow is not encountered.) The applications in chapter 6 on the other hand are summarized without much critical discussion. So, the book resembles partly an introduction for students who should know the basics of the theory, and partly a review article for practitioners who need a fast literature reference.

Despite these points of criticism, generally I found the book very useful. It is well written and therefore a pleasure to read. Everybody involved in electroanalytical measurements in flowing liquids can learn something from it.

W. TH. KOK