

Transport Phenomena in Aqueous Solutions, Tibor Erdey-Gruz, Halsted Press (Division of John Wiley & Sons). 512 pages, \$37.50, Published December 31, 1974.

This book is concerned primarily with viscosity, diffusion, and electrical conductivity of aqueous solutions together with a basic understanding of how and why such solutions behave as they do.

The presentation is mostly in the nature of a review with a large number of literature citations but with a limited amount of evaluation of the material presented. The survey appears quite exhaustive (much of it Russian) through 1972 with a few 1973 references. It is unfortunate that the more recent contributions of K. Pitzer and J. Newman, J. Prausnitz, C. Tobias and this reviewer and their co-workers and others are not mentioned. Background material is presented extensively although much of the discussion is in generalities and with a characteristic lack of conciseness.

The proof reading and printing in general appear to have been well done although on page 25 about three quarters the way down the page the last words on several lines are nonsense, i.e. (aqueom, partnt, sitsro, pres, co-, sysptt-i, investigaeuse and trannaut). The author uses the usual European "Free Enthalpy" for Gibbs Free Energy and for ease in understanding a reader should have a knowledge of basic thermodynamics and some familiarity with electrolyte theory.

The book should be useful to those interested in electrolyte theory, electrochemistry or transport processes in aqueous solutions.

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Particle Size Measurement: Second Edition, T. Allen, Chapman and Hall, London (1975). 454 pages. \$25.95.

Crucial to the understanding of all processes involving finely divided particulate matter is a knowledge of the real size and shape of the participating particles. The techniques available for such measurements, and their interpretation, are thoroughly surveyed in this work, which by this revision certainly becomes a definitive reference. Its value to the American reader is lessened only very slightly by the British orientation of the author's experience, for example by frequent references to British Standard methods.

Obtaining a truly representative sample of the particles is the first step and

is covered in the first three chapters, now extended to include sampling from "dusty gas streams" and from the atmosphere. There is a good fundamental treatment of isokinetic sampling for air pollution control, although no mention is made of the recent work by Stenhouse and Lloyd (AIChE Sym. Series-137) on corrections for anisokinetic conditions.

Representation of particle size distribution by graphical and mathematical means is treated in the next chapter, with special reference to the log-normal probability and to the Rosin-Rammler distributions. No mention is made of the Weibull function, nor of the upper-size-limit function due to Mugele and Evans. A reasonable degree of mathematical sophistication is assumed; there is a special appendix on manipulation of the log-probability equation.

There follow two series of chapters, one series dealing with techniques of size measurement, the other with determination of surface area. In the first series are included sieving, microscopy, sedimentation (several chapters), centrifugal methods, (Bahco not mentioned) the Coulter principle, and radiation scattering. In the second series permeametry, gas adsorption, adsorption from solutions, and calorimetry of adsorption are discussed. A closing chapter deals with determination of pore size distributions in porous solids.

The book is well-written and an excellent blend of theory and practice. Following a concise exposition of the principles and theory of each method, is a description of the practical operation of representative kinds of commercially available equipment. These are excellent schematic drawings. In each case the nature of errors inherent in the method and/or the equipment is also explained. There is a very useful Appendix listing equipment and suppliers together with addresses of suppliers and manufacturers world-wide.

This is not a text book. There are no problems to solve, but there are numerical illustrations of calculations. The basic education of any chemical engineer is more than adequate for him to follow the material easily. It should be a basic reference on the shelf of anyone working in such fields as air pollution control, particle reduction and conveying, filtration, sedimentation, fluidization, spray drying, atomization, and related operations. To the reviewer's knowledge there is nothing currently available of comparable scope and quality.

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Aqueous Environmental Chemistry of Metals, Allen J. Rubin, Ann Arbor Science Publishers, Inc. (1974). 390 pages. \$20.00.

This book is a timely presentation of a subject which is attracting increasing attention as the extent of metal contamination in the aqueous environment becomes apparent. At first glance, the book appears to be a textbook, but closer examination reveals it as a series of contributions in chapter form by different authors. As a result, the scope of individual chapters and the depth of treatment varies appreciably. There is inevitably some duplication and lack of continuity which makes it more difficult to digest the information presented.

The first two chapters, occupying about one-third of the book, are useful generalized treatments of the problem. Chapter 1 discusses the complex equilibria between metals and the aqueous environment and Chapter 2, the observed sources and distribution of metals, both natural and manmade contributions from air and water pollution. Chapter 4 contains a concise review of analytical methods for trace metals in water supplies. Chapter 6, which discusses crystal growth kinetics of minerals encountered in water treatment processes, contains interesting work, but is only marginally related to the main topic.

The remaining chapters detail research studies of individual metals: lead, mercury, cadmium, iron, and aluminum. These chapters present detailed experimental data which is a valuable addition to the literature, but the implications for water treatment or water quality are only lightly drawn. The reviewer would have appreciated more information relating the topics of each chapter to a specific water treatment processes or to a perspective on ecological consequences and feels that the absence of this type of information diminishes the attractiveness of this book to chemical engineers.

However, in spite of any shortcomings, the book represents a useful addition to the literature in this area of pollution chemistry, where adequate information is widely scattered. It will be most appreciated by chemists or chemical engineers who are actively engaged in research on water quality and treatment processes for metal removal.

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