BOOK REVIEWS

Colloidal Systems and Interfaces

By S. Ross and I. D. Morrison, Wiley-Interscience, New York, 1988, 422 pp., $49.95

As indicated by its authors, this book is closely related to a four-day course on emulsions and dispersions that has been taught by Professors S. Ross and F. M. Fowkes since 1967, joined by Dr. I. D. Morrison in 1985, which, to date, has gathered some 2000 alumni. The topics discussed in the course and reflected in the book, are those considered by the authors to be of central importance to those confronted by research and development problems in the industrial environment. The authors claim that the book, like the course, is intended for the industrial chemist or chemical engineer who may not have had a formal university course in colloid and interface chemistry, but finds that the nature of the problems that must be solved necessitates the rapid acquisition of some knowledge of that subject.

This book displays the broad spectrum of fundamental concepts and experimental techniques that are available in the field of colloid and interface science, with a clear realization that every topic is treated at greater length and depth in existing monographs and reviews. The authors recognize that the main goal of the book is to outline the nature of the topic, define its terms, explain its elementary concepts, and direct the reader to sources of fuller information. The authors state that: "This book constitutes an index of related topics, by means of which the enquirer, with a specific problem in mind, may hope to find the appropriate context to help formulate it. A great body of organized knowledge is at hand, but many who could use it are only vaguely aware of it existence or are intimidated by its bulk and impenetrability. This book is a guide to those so perplexed."

With this view in mind, I believe that this book can become a valuable source of reference for those interested in the area of colloid and interface science. The book is well written and provides a balanced exposition of theory, experiment, and application. The list of references is comprehensive and current.

To give some idea about the breadth of this book, I will briefly describe its contents. The book is divided into four parts. Part I deals with Particulates: Optical Properties-Light Scattering, Kinetic Properties-Rheology, Statistical Properties, Size and Surface Area, Processing Methods for Making Emulsions, References for Part I. Part II deals with Interfaces: Capillarity of Pure Liquids, The Relation of Capillarity to Phase Diagrams, Surface-Active Solutes, Physical Properties of Insoluble Monolayers, Aqueous Solutions of Surface-Active Solutes, Surface Activity in Nonaqueous Media, Thermodynamics of Adsorption from Solution, References for Part II. Part III deals with Stability of Dispersions: Forces of Attraction, Forces of Repulsion, Stability of Systems, Kinetics of Coagulation, References for Part III. Part IV deals with Dispersed-Phase Systems: Emulsions, Foams, Suspensions, References for Part IV. In addition, the book contains a Bibliography and nine Appendices.

In summary, if you are looking for an accurate and updated guide to a broad spectrum of fundamental, experimental, and applied topics in the area of colloid and interface science, this book is a worthwhile investment.

Daniel Blankschtein
Dept. of Chemical Engineering
Massachusetts Institute of Technology
Cambridge, MA 02139

Ion-Exchange Chromatography of Proteins

By S. Yamamoto, K. Nakanishi, R. Matsuno, Marcel Dekker, New York, 1988, 401 pp., $110

This treatise comprehensively covers ion exchange chromatography of proteins and enzymes, a key technique in purification of these biochemicals on both laboratory and production scales. Although in the 15 pages of bibliography there are decidedly few citations of Japanese work before 1980, this substantial monograph is an indication of the importance attached to protein purification in Japan's recent, vigorous development of modern biotechnology. The authors have drawn heavily on their major contributions to chromatographic theory and experimentation over the past ten years.

Chromatographic theory is treated on two levels so that both the chemical engineering scientist and the nonengineer are served. Chemical engineers will appreciate the mixing-cell transport-rate models applied by the authors to attain expressions for temporal moments of concentration responses, leading to equations for separation resolution and number of theoretical plates. How each variable affects the separation, based on theoretical principles and experimental evidence, is discussed. The authors emphasize the value of mathematical theory to guide experimentation and to optimize production.

An outstanding strength of this book is the physical and mathematical insight provided into chromatographic processes. This deep understanding is based on: 1. a thorough study of the extensive chromatographic literature: and 2. their own intensive experimental investigations. Numerous illustrations, tables, and plots of data enhance the discussion of principles.

The work contains chapters on chromatographic theory, ion-exchange equilibria, diffusion in ion-exchange particles, and axial dispersion. Experimental methods and apparatus get proficient coverage. Separation behavior and design calculations for elution techniques, both linear and stepwise gradients, are discussed at length. A chapter on large-scale