



● SOLUBILIZATION AND RELATED PHENOMENA

M. E. L. McBain and Eric Hutchinson, Department of Chemistry, Stanford University. Academic Press, Inc., New York, 1955. xv + 259 pp. Figs. and tables. 15.5 × 23.5 cm. \$7.

JAMES W. MCBAIN had planned to write a book on the subject of solubilization. After his untimely death, the authors decided that it would not do justice to his memory to leave the monograph unfinished. This book deals with solubilization, wherein particles of a colloidal solution "take up and incorporate within or upon themselves the otherwise insoluble material."

Chapter 1 is a historical background which briefly reviews reported observations of the phenomenon of solubilization. In Chapter 2, model experiments are described as an aid to the understanding of solubilization. Chapter 3 reviews the thermodynamics of two-component systems and then briefly describes experimental methods by which the properties of colloidal electrolytes may be studied.

Chapter 4, called Data and Facts of Solubilization, is 102 pages long, more than two-fifths the size of the entire manuscript. In addition to presenting and critically evaluating a considerable quantity of published data, the authors deduce generalizations which add considerably to the value of the publication. They conclude that solubilization "bears very close resemblance to the uptake of materials by bulk phases, exhibiting supersaturation, variable rates of attainment of equilibrium, etc., just as in bulk phases, and that the treatment of micelles as pseudo-phases is both formally and physically justifiable."

Chapter 5, on the Mechanism of Solubilization, is an excellent analysis of available information concerning the size and shape of micelles. Chapter 6 discusses "co-solvency, blending, and hydrotrophy" and compares these phenomena with solubilization. Chapter 7 is concerned with the "physiological aspects of solubilization," and Chapter 8 contains a very brief discussion of "some practical applications of solubilization." The manuscript concludes with an appendix on "the theory of light scattering," and another on "the behavior of polysoaps." Some 335 references are given; a few are as recent as 1954.

This book is not a complete compendium of published solubilization data, but rather a critical evaluation of such data. As such, it is an important contribution to the literature on surface chemistry. It is valuable not only because of the carefully

chosen generalizations, but also because of the authors' evaluations of conclusions drawn by others writing in this field.

The chapter on practical applications is quite unsatisfactory and not in keeping with the high standards of critical evaluation used throughout the book. Discussions on detergency and dyeing indicate that the authors have given very little thought to these subjects. On page 81, Triton X-100 and Carbowax are incorrectly given as polyethylene oxide-fatty acid compounds. The distribution coefficient given on page 140 as 43.9 should read 4.39. However, errors are relatively few.

This reviewer is of the opinion that any student of surface chemistry or anyone working in the field will profit from a careful reading of this book.

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NEW YORK, N. Y.

● COMPREHENSIVE INORGANIC CHEMISTRY. VOLUME 4: ZINC, CADMIUM AND MERCURY. SCANDIUM, YTTRIUM AND THE LANTHANIDE SERIES.

Edited by **M. Cannon Sneed** and **Robert C. Brasted**, University of Minnesota. D. Van Nostrand Co., Inc., New York, 1955. xii + 193 pp. Figs. and tables. 16 × 23.5 cm. \$5.

FOLLOWING the same pattern as its predecessors, this latest volume presents the descriptive chemistry of groups II-B and III-B. The title remains somewhat deceptive in that the modifier "comprehensive" refers not to the treatment of the subject but to the subject itself, *i. e.*, all of the elements of the periodic table will be covered eventually in this work of 11 volumes. Following an introduction which includes a historical background and a survey of the occurrences in nature, the chemical and physical properties of the element, as well as its more important compounds, are considered.

Both parts (Group II-B by H. M. Cyr and the editors and Group III-B by T. D. O'Brien and the editors) contain diverting digressions into applied chemistry. The role of zinc in corrosion control, the extractive metallurgy of the metals, and the pharmaceutical uses of the rare earths are but a few examples.

The volumes seek their principal audience in the undergraduate

chemists who desire to survey the broad expanses of inorganic chemistry. The treatment in this volume is unsophisticated. Little attention is directed to the relationships of chemical and physical properties to the electronic and size properties of the elements. Nonetheless, within the confines of the size of the book there is a coverage of material, not found elsewhere in such a readable presentation, that will stimulate the knowledge-hungry student.

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● HIGH POLYMERS. VOLUME IX: EMULSION
POLYMERIZATION

F. A. Bovey, Minnesota Mining and Mfg. Co., *I. M. Kolthoff*, University of Minnesota, *A. I. Medalia*, Boston University, and *E. J. Meehan*, University of Minnesota. Interscience Publishers, Inc., New York, 1955. xii + 445 pp. Figs. and tables. 16 × 23.5 cm. \$12.50.

EMULSION polymerization is a technique developed during the last war for the production of synthetic rubber. This technique was the largest single factor responsible for the success of the Government Rubber Reserve Company, as it was called, in producing a very good butadiene-styrene rubber. Emulsion polymerization is currently used on an enormous scale in the plastics industry. The method consists of emulsifying with the aid of a soap, vinyl, or diene monomers in water and adding free radical-producing catalysts to the mixture to initiate polymerization. Unlike most other methods of polymerization, the reaction proceeds rapidly and gives a very high molecular weight polymer.

Drs. Bovey, Kolthoff, Medalia, and Meehan have attempted to present a complete picture of all the published results and the current ideas on emulsion polymerization. In order to give a well-rounded treatment they have also included chapters on the fundamentals of free-radical initiation, inhibition, and copolymerization, as well as a particularly excellent chapter on the role of detergents in emulsification.

Altogether, the authors have made a useful contribution to the field of vinyl polymerization. Workers in the field will welcome such a comprehensive work in which all ramifications of the problem are contained in a single volume.

GERALD OSTER

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● THERMODYNAMICS: FROM THE CLASSIC AND
GENERALIZED STANDPOINTS

Joseph Louis Finck, The J. L. Finck Laboratories. Bookman Associates, New York, 1955. xv + 224 pp. 34 figs. 13 tables. 16 × 24 cm. \$7.50.

FOLLOWING the indication in the title, this book is divided into two parts. Part one, through page 103, is a review of "classic thermodynamics" with observations on what the author considers its defects. Part two, pages 104-218, is his presentation of his "generalized thermodynamics," first developed in a series of papers published from 1934 to 1949 in the *Journal of the Franklin Institute* and the *Proceedings of the American Physical Society*.

The first part seems to indicate that some physicists are even more careless in their use of the terminology of thermodynamics than are some chemists. For me, reading this part was a very exasperating experience. The author uses ΔQ and ΔW instead of q and w . In addition to the absurdity of calling the heat absorbed by the system ΔQ , as if Q were a property of the system, in some places ΔQ means something entirely different. On page 59, ΔQ is used to indicate the difference between the heat absorbed by a system and the heat evolved by the system operating in a Carnot cycle. Also on page 59, W is used to mean the same thing that ΔW stands for in the same equation on page 49.

The statements of the second law are the oldest possible, with none of the better understanding developed since 1900. In the discussion, the author states that, "The Kelvin-Planck principle is entirely empirical, yet so fundamental in our analysis of all processes carried out in nature that we have accepted it as a basic law." Actually, like any law, the second law is of necessity empirical. What else can any law be but a summary of experience?

With such an approach, it is not surprising that the discussion of entropy is confusing. To add to the confusion, the symbols G and F are used for what most American authors have now agreed to call F and A respectively.

Despite the author's poor presentation of classic thermodynamics, apparently he is thoroughly familiar with the subject. Therefore, one may feel that perhaps his claims in the second part of his book may be partly justified.

To quote from the preface: "In this consideration the heat term q' is developed, and it is shown how this term is related to phenomena such as friction, viscosity, electric resistance and other energy dissipative properties of systems. This leads to a rational explanation of many of the perplexing problems of low temperature phenomena. A theory of catalysis develops from these considerations without injecting *ad hoc* assumptions."

"I have attempted to express the heat quantity q' in quantum form and to apply it to microscopic systems. In doing so, light is thrown on the meaning of a system exhibiting at times the properties of a particle, and at other times the properties of a photon—the riddle of our modern physics. An additional chapter is devoted to a critique of statistical mechanics, incorporating ideas which I have been entertaining for some time."

Although the jacket states that the book is intended "as a text for advanced students and for those engaged in research and allied fields," it has no problems for students to work. Probably, therefore, its appeal will be limited to the few people who want to compare the author's new proposals with those of Prigogine and DeGroot.

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● ANNUAL REVIEW OF PHYSICAL CHEMISTRY.
VOLUME 6

Edited by *G. K. Rollefson* and *R. E. Powell*, University of California. Annual Reviews, Inc., Stanford, California, 1955. ix + 515 pp. 8 figs. 13 tables. 16 × 22 cm. \$7.

THE third, fourth, and fifth volumes of this excellent review have already been reviewed in THIS JOURNAL. The present volume maintains the high standard set by its predecessors.

The Prospectus for these Reviews states that "Substantially the same subjects are reviewed annually or biennially." Subjects reviewed in this volume which were not covered in Volume 5 are Quantum Theory and Valence, and Metal Chelate Compounds. Subjects reviewed in Volume 5 but omitted from the present volume are: Radioactivity and Nuclear Structure, Microwave Spectra of Gases, Experimental Molecular Structure, and Ion Exchange; the last two are scheduled to be reviewed again in Volume 7.

The authors of the various chapters are recognized authorities in their fields; different authors each year often treat their subjects from different points of view. For some chapters, these differences are reflected in different wording for the chapter title on essentially the same field.

As has been the case in previous volumes, the material is presented as a review of recent work for experts. Although the beginner must look elsewhere for enlightenment, the research worker or other specialist will find this volume, like the others in this series, a valuable addition to his library.

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