BOOKS

Principles of Solution and Solubility, Kozo Shinoda (Translated in Collaboration with Paul Becher), Marcel Dekker (1978), 240 pages, $17.50.

This book was originally written in Japanese in 1966 and revised in 1974. The English translation lies closer to the second edition than to the first. The text is a brief but coherent treatment of the theory of solutions which is suitable for both undergraduate chemists and chemical engineers. Several examples are worked out at the end of each chapter followed by only a few exercise problems with answers provided. The number of references cited is rather sparse.

Professor Shinoda was a major collaborator of J. H. Hildebrand in the development of regular solution theory which not surprisingly, is a major focus of the text. The first four chapters provide an introduction to solution theory including ideal solutions, dilute solutions, and regular solutions. Chapter 5 addresses the important topic of the estimation of the solubility of gases, liquids, and solids in liquids. The essential theory is presented and compared with a number of experimental results.

Subsequent chapters treat the enthalpy and entropy of solutions and discuss aqueous solutions, polymer solutions, surfactant solutions, and solubilized solutions. The final chapter is a summary which outlines and discusses the factors which control solubility. The breadth of application of regular solution theory is presented and the factors that determine solubility in such solutions are detailed. In addition some general viewpoints on solubility are presented including the effect of hydrophilic groups in making organic compounds more water soluble and the effect of excess solute in mixtures of isomers. Also solution by particular mechanisms as related to polymeric substances, colloidal surfactants, and water-soluble polymers is briefly discussed.

Because the book is a brief treatment of a relatively narrow area within thermodynamics, it is not suitable as the only required text in an undergraduate course. However, the book will prove valuable as a supplemental text.

WILLIAM E. KING, JR.
Department of Chemical and Nuclear Engineering
University of Maryland

Fundamentals of Chemical Reaction Engineering, by Charles D. Holland and Rayford G. Anthony, 1979, Prentice-Hall International Series, 541 pages, $23.95.

Measures of a good textbook should include: (1) ideas presented in small packages building into larger, generalized theories or concepts, (2) all major ideas within a unit clearly highlighted, (3) many illustrative examples, (4) generous use of graphs and figures, (5) problems that are graded from easy to more difficult allowing the student to progress from recall to analysis, and finally to synthesis: the three learning levels. When I use these measures to assess the book by Holland and Anthony, I find that they did succeed in some chapters, but failed in others. Some of the earlier chapters suitable for an undergraduate course meet most of these requirements. The latter chapters of more advanced material do not. I feel that the text could have been improved by highlighting major concepts and generalities in concluding type formats that would tend to pull together major ideas within each chapter or subunit. Some of the material within the book seems more like a collection of loosely related topics obtained from past theses or student projects.

The notation used is a mixture of engineering and SI units which may cause the purists some difficulty. Some concepts seem to be shorted in the book; namely space time, space velocity, yields, selectivities, extent of reaction, and others. In some cases these are not mentioned at all and others only rather briefly.

The book probably has its greatest utility as an undergraduate, one-semester text with its limitation falling in those chapters that deal with complex reactions and in the energy balance chapter, Chapter VI. I can recommend this text to be used in a one-semester course for Chemical Reaction Engineering. In spite of the shortcomings outlined above I believe that the mix of generalized theory and notation with specific applications throughout the earlier chapters warrants consideration from those professors seeking a different text or from those in industry seeking a reference in the area. I would not recommend the book for use at the advanced level.

The advanced level material is contained in the last three chapters covering polymerization reactions, highly non-ideal solutions, and theory of reaction rates. Most of the material in these three chapters is given to the polymerization topics, however.

Chapter I is the usual introduction to the definitions and language of the subject. Chapter II introduces flow reactors at isothermal operation and is well done from the standpoint of developing the plug flow, perfectly mixed flow, recycle, laminar, and partial axial mixing reactor models.

Chapters III and IV introduce complex reaction systems and these two chapters are probably the weakest in