I recommend this book as a "must" to those, at all levels, involved in food technology and related fields.

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The Principles of Chemical Equilibrium

Author Kenneth Denbigh

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Pages 494

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Reviewer Eric Haskin

There were two sources of irritation in my undergraduate thermodynamics work: first, I felt that work done on the system should have the same (positive) sign as heat added to the system, and second, it took me nearly a full semester to lay my hands on a copy of Denbigh's text (then in its first edition). The latter irritant was especially frustrating since my instructor relied more on Denbigh as a source of lecture material and problems than on the assigned text for the course. However, when I was finally able to borrow a copy of Denbigh's text my frustration rapidly subsided and my instructor was slowly forgiven. It is indeed an outstanding book.

I am pleased to find the revisions in this third edition more concerned with the details than with the logic and style of the original presentation. The author has adopted SI units (except for the use of the calorie and the atmosphere in places) and the nomenclature recommended by the International Union of Pure and Applied Chemistry. He has taken work done on the system to be positive—a change which hopefully will not confuse students using older texts simultaneously.

The book is divided into three parts. Part I, "The Principles of Thermodynamics," develops the laws of thermodynamics, the various thermodynamic functions, and criteria for equilibrium. Part II, "Reaction and Phase Equilibria," applies thermodynamics to reaction and phase equilibria and develops the theory of ideal and nonideal solutions. Chemical potentials are employed in accordance with Gibb's methods. Part III, "Thermodynamics in Relation to the Existence of Molecules," is a brief introduction to statistical mechanics treating gases, perfect crystals, the third law, regular solutions, and adsorption. The last chapter, "Chemical Equilibrium in Relation to Chemical Kinetics," includes a short outline of transition state theory.

My chief criticism is not really of the text but of its suitability as a textbook for an undergraduate thermodynamics course. In his preface the author accurately states that the book is concerned with "the second or third round" of study in thermodynamics. While the subject matter in the book is usually presented to undergraudates, it is not usually presented at this level of sophistication. In addition, considering the time limitations imposed on most undergraduate curricula, most instructors would probably desire a thermodynamics text with less emphasis on chemical equilibria. However, the book would be an excellent supplementary reference for any student of thermodynamics. It is also available in paperback.

Eric Haskin (PhD, nuclear engineering, Kansas State University, 1971) is the author of technical papers in the fields of radiation chemistry and activation analysis. He has worked in the Product Exploration Division of the Boeing Company and is currently a visiting assistant professor in the Nuclear Engineering Department at the University of Arizona.