Greek Letters

β = constant
ρ = density
Σ = $\rho_L^i + \rho_U^i$
ζ = defined by Eq. 4

Superscripts

f = final
i = initial

Subscripts

C = cell or concentration
D = diffusivity
L = lower compartment of diaphragm cell
U = upper compartment of diaphragm cell

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BOOKS

Classical Thermodynamics of Nonelectrolyte Solutions, H. C. Van Ness and M. M. Abbott, McGraw-Hill 1982, 482 pp. $39.50.

This book gives a detailed account of the classical approach to the thermodynamics of mixtures, and particularly fluid phase equilibria. It is assumed that the reader has had a course in thermodynamics, but the fundamentals are well reviewed in the early chapters, so that readers whose knowledge is rusty will find the book self-contained. After an initial review chapter, there are two chapters giving the thermodynamic equations and introducing the necessary functions (fugacities, activity coefficients, etc.). This is followed by a chapter on behavior of pure fluids and equations of state for pure and mixed fluids. There are particularly useful accounts of the corresponding states correlations, virial expansion and cubic equations of state, with advice on when to use each. The final two chapters cover property changes on mixing and applications to phase equilibria. This last chapter is the longest in the book (138 pages), and is the most useful to chemical engineers. There are also several useful Appendices covering mathematical techniques, conversion factors, residual function calculations, critical constants, Newton's method, G^E equations, and flash calculations. As in other books by these authors, the text is lucid and easy to read, there are many worked examples, and a very good collection of problems at the end of the book.

Although the authors state clearly at the beginning that they will limit themselves to a purely classical approach, the omission of any molecular interpretation seems to me to restrict the book's appeal as a graduate level text. The inclusion of some statistical thermodynamics gives the reader a feeling for the relation between molecular and macroscopic fluid behavior. Without it the reader cannot appreciate the significance of the virial equation of state or local composition concept, for example, and the all-important mixing and combining rules appear as *ad hoc* constructions. Some of the more complex problems that chemical engineers encounter are included and well treated, for instance, Henry's constants for mixed solvents and ternary phase equilibria. However, as in other texts, a number of the more complex areas are omitted or given scant mention. These include detailed discussions of high pressure phase equilibria (particularly highly nonideal mixtures), calculations for mixture critical points, the nonanalytic behavior of thermodynamic properties near critical points (important in supercritical fluid operations), and the use of group contribution methods.

This book will be useful as a reference and as a text for a second thermodynamics course.

Keith E. Gubbins
Department of Chemical Engineering
Cornell University
Ithaca, N.Y. 14853

Industrial Heat Exchangers: A Basic Guide by G. Walker, Hemisphere Publ. Corp. Washington DC, 1982, $41.50, 408 pg.

Recently a number of books started to appear in the, until now, largely neglected area of heat exchanger technology. Practically all such texts are directed to the already experienced reader. The author is correct in stating that this is a "different" book, aimed at the forgotten non-specialist user of heat exchangers as an elementary guide. Within such restrictions it fulfills it's objective very well indeed.

The book starts with a brief summary of heat transfer processes, useful for a novice. The main body of the book contains a concise survey of most industrial heat exchanger types, their principles of operation, areas of application, advantages and limitations and various related comments. Included are standard tubular exchangers, air exchangers, plate and spiral, compact, non-metallic and cryogenic types. Separate sections are devoted to regenerators and boilers, very hard to find elsewhere in such a concise form. Numerous well selected illustrations make the book a good source for self-education or as a supplementary text for heat transfer courses where heat exchangers are usually treated only from academic point of view.

Of special interest even to the more experienced heat exchanger user are the sections on corrosion and erosion, hard to find in general reivew texts. Codes and Standards,