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K. C. Chao

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BOOK REVIEW

"Vapor-Liquid Equilibrium Data at High Pressure", by S. Ohe, Elsevier, Amsterdam-Oxford-New York-Tokyo, 1990, 355 pp., ISBN 0-444-988797-5

This book presents a collection of 700 figures showing vapor-liquid equilibrium data points and Peng-Robinson equation of state calculated curves of binary mixtures. Each figure contains a p-x curve and the associated data, and a p-y curve and the associated data, all at one temperature. Several consecutive figures may be devoted to the same binary mixture at ascending temperatures. Tabulated along a figure one finds reference to the data source, and information employed in the Peng-Robinson equation calculations: T_c, p_c, ω for both components and their interaction parameter k_{12}. A value of k_{12} is given at each temperature. Deviations of the calculation from the experimental data are given as: (1) average of the absolute value of y in mole fraction, and (2) average of the absolute value of p; the calculation being at specified T and x.

The figures are well presented to give a good visual appraisal of the Peng-Robinson equation by comparison with experimental data. The accompanying tables provide all the information that is required to implement calculation with the Peng-Robinson equation. The book is a useful guide for applying Peng-Robinson equation in vapor-liquid equilibrium calculations. As such, it might be aptly titled "Vapor-Liquid Equilibrium at High Pressure by Peng-Robinson Equation". The word Data can be well left out from the title, since the data, not being tabulated, do not make a useful data collection.

The 700 figures of the book represent a large collection of mixtures of common interest. But many mixtures of equal or greater interest are left out. For example, water + methanol are in, but water + ethanol are out. The only other water mixtures included are water with ammonia, carbon dioxide, or hydrogen sulfide. The author does not explain why other water mixtures are left out. The criteria of selection of mixtures for inclusion are not stated.

The author does not tell us where high pressure starts for this collection. Surely most mixtures included in the book are commonly recognized as being at high pressure. But we also find SO_2 + benzene at up to about 0.7 atm. Similarly N_2 + Ar, N_2 + CO, O_2 + Kr, benzene + n-heptane, and HF + UF_6 are definitely not at high pressure at some tempertures.

The systems are arranged in order of increasing carbon number for the first component, and then for those with the same first component, in order of increasing carbon number for the second component. Other than this there does not appear to be any systematic ordering of the mixtures in the collection. Fortunately an alphabetical index of the mixtures is provided. A mixture in the collection can be readily located by using the index.

K.C. Chao