

Book Review: Equations of State for Fluid and Fluid Mixtures, Parts I and II

Equations of State for Fluid and Fluid Mixtures, Parts I and II. J. V. Sengers, R. F. Kayser, and H. J. White, Jr. Elsevier Science B.V., The Netherlands, 2000.

“A theory is the more impressive the greater the simplicity of its premises, the more different kind of things it relates, and the more extended is its area of applicability. Therefore the deep impression which classical thermodynamics made upon me...” So wrote Albert Einstein in his autobiographical notes referring to the subject of the books reviewed here. Of central importance in this theory is the concept of an equation of state. In fact, thermodynamic theory is a framework of universal scope, which provides precise predictions when the equations of state for pure substances or their mixtures are known. This is the basis for attributing great importance to the subject matter covered in these volumes. In general, there is a careful discussion not only of the theoretical background underlying the many topics discussed in these two books, but also of the scope and limitations involved in their application in many fields of science and engineering.

A wide selection of equations of state is covered, the topics ranging from the most basic ideas to their application in practice.

Indeed, the review describes the equations of state of simple systems (Vol. I) as well as more sophisticated equations of state for more physically realistic systems (Vol. II). Specific important details of the theory, exemplified by the broad range of applicability of phase diagrams, intricate problems related to the behavior of systems in the critical region, detailed comparisons between theoretical and experimental results, are dealt with systematically and often quite deeply. A detailed review of each of the eighteen chapters contained in these volumes would require enormous effort and a degree of specialization difficult to meet, even with two reviewers. The authors, editors, and publishers deserve praise for issuing these volumes. In our opinion they satisfy a considerable need for a widely-anticipated and eagerly awaited review of topics in theoretical and applied

thermodynamics that will be welcomed by scientists and engineers. Non-specialists will find a comprehensive review of many research accomplishments of the past few decades.

Reading through the material covered in these volumes inevitably leads to the discovery of minor faults which are almost unavoidable in a work of such wide scope. For example, it is almost impossible to recall the meanings of the abbreviations in each of the articles. A glossary indicating the definition of each would be a welcome addition for many readers. In addition, the subject index is rather brief. A running title in each chapter would have improved accessibility. However these minor defects pale are truly insignificant in comparison to the intrinsic value of the entire body of material.

We highly recommend that these books be acquired by every library supporting research in engineering and physical chemistry. It also belongs on the shelves of any interested in modern developments in pure and applied thermodynamics.

L. S. Garcia-Colin and F. J. Uribe
Department of Physics
Universidad Autonoma Metropolitana-Iztapalapa
09340 Mexico D.F., Mexico
August 2, 2001