Annotation

Experimental methods of determining thermodynamic properties of pure substances and binary mixtures in wide parameters' ranges including near-critical regions are considered. A brief survey of apparatus designed in various laboratories of the former USSR is given; the main units of the apparatuses, their characteristic features, and the experimental procedures are described. Primary experimental data obtained using these apparatuses are given; the main uncertainties are estimated.

Equations of state are analyzed to show which of them are best to describe the thermodynamic behavior of real gases and liquids and their binary mixtures. Special attention is paid to problems of the critical state and to the verification (using experimental data available) of the results of the modern theory of critical and crossover phenomena in pure substances and binary mixtures. New equations of state are obtained based on the theoretically substantiated model of hard chains (SPHCT) for some mixtures of water and hydrocarbons under supercritical conditions. The computation results are compared, where possible, with experimental data.

This book is addressed to specialists, both theorists and experimentalists, working in the fields of molecular physics, chemical technology, and power engineering, as well as for researchers, lecturers, postgraduates, and students of the appropriate specialities in technical colleges and universities.

The book contains 114 tables, 110 figures, and 517 references.