JOURNAL OF PHYSICAL AND CHEMICAL REFERENCE DATA

Volume 35, No. 2, 2006

IUPAC-NIST Solubility Data Seris 81. Hydrocarbons with Water and Seawater–Revised and Updated. Part 11. C_{13}–C_{36} Hydrocarbons with Water **687**

David G. Shaw and Andrzej Maczynski

The mutual solubility and related liquid–liquid equilibrium of C_{13}–C_{36} hydrocarbons with water are exhaustively and critically reviewed. Reports of experimental determination of solubility in 56 chemcially distinct binary systems are compiled. For 17 systems sufficient data are available to allow critical evaluation. A new method based on the evaluation of the all experimental data for a given homologous series of aliphatic and aromatic hydrocarbons was used.

IUPAC-NIST Solubility Data Series. 81. Hydrocarbons with Water and Seawater–Revised and Updated. Part 12. C_5–C_{26} Hydrocarbons with Seawater **785**

David G. Shaw and Andrzej Maczynski

The mutual solubility of C_5–C_{26} hydrocarbons with seawater is exhaustively and critically reviewed. Reports of experimental determination of solubility in 46 chemically distinct binary systems are compiled. For 15 of these systems sufficient data are available to allow critical evaluation.

A Reference Multiparameter Viscosity Equation for R134a with an Optimized Functional Form **839**

G. Scalabrin, P. Marchi, and R. Span

An optimzation technique was applied to develop a functional form for a multiparameter viscosity equation $\eta = \eta(\rho, T)$ for R134a. The results obtained are very promising, with an average absolute deviation of 0.55% for the currently available 549 primary data points. The technique used to develop the equation, which is heuristic and not theoretically founded, is capable in selecting consistent data sets and thus is a powerful tool for screening the available experimental data.

Chemical Properties of Electronically Excited Halogen Atoms $X(^2P_{1/2})$ (X=F, Cl, Br, I) **869**

A. I. Chichinin

The experimental data on elementary processes (collisional deactivation, chemical reactions, photodissociation) involving spin-orbitally excited $X(2P_{1/2})$ atoms (X=F, Cl, Br, I) published up to the middle of 2004 are summarized in the present compilation. Critical evaluation of the data and limited comparison to theoretical calculations are also presented.

Reference Equations of State for the Thermodynamic Properties of Fluid *n*-Butane and Isobutane **929**

D. Bücker and W. Wagner

New formulations for the thermodynamic properties of fluid phase *n*-butane and *iso*-butane in the form of fundamental equations explicit in the Helmholtz energy are presented. The functional form of the correlation equations for the residual parts was developed simultaneously for both substances considering data for the thermodynamic properties of ethane, propane, *n* butane, and isobutene. This work provides information on the available experimental data for the thermodynamic properties of *n*- and *iso*-butane, and presents all details of the new formulation. Additionally, a preliminary equation of state for propane is presented that was developed in the course of the simultaneous optimization.

A New Equation of State for H_2O Ice Ih **1021**

Rainer Feistel and Wolfgang Wagner

Various thermodynamic equilibrium properties of naturally abundant, hexagonal ice (ice Ih) of water (H_2O) have been used to develop a Gibbs energy function $g(T,P)$ of temperature and pressure, covering the ranges 0 K–273.16 K and 0 Pa–210 MPa, expressed in the temperature scale ITS-90. Additional properties are obtained as partial derivatives by thermodynamic rules. It is based on a significantly enlarged experimental data set compared to its predecessors. In conjunction with the IAPWS-95 formulation for the fluid phases of water, the new chemical potential of ice allows an alternative computation of melting and sublimation curves, being improved especially near the triple point, and valid down to 130 K sublimation.

JPCRD Supplements & Monographs **1048**