New Data Compilations

High Temperature Properties and Decomposition of Inorganic Salts. Part 1. Sulfates. K. H. STERN AND E. L. WEISE. Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 20402–Price 35 cents.

Part 1 of a series of reports dealing with the thermodynamic properties of inorganic salts. In this report, the literature dealing with the high-temperature behavior of inorganic sulfates has been critically reviewed. Free energy functions of reactants and products of the decomposition reactions were calculated and have been tabulated from 298° K. up to as high a temperature as possible. Free energy functions, equilibrium constants of reactions, and partial pressures of gaseous components were tabulated. Auxiliary data on phase transitions, densities, and kinetics of chemical decomposition have also been included.

Tables of Molecular Vibrational Frequencies. Part 1. T. SHIMANOUCHI. Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 20402–Price 40 cents.

This report, first of a series of annual reports, contains fundamental vibrational frequencies of 59 molecules together with vibrational assignments, sources of data, brief comments, and citations of references. The fundamental frequencies are obtained mainly from the infrared and Raman spectra. When these are not available, other experimental data such as microwave results are taken into account. The selection of vibrational fundamentals from observed spectral data is based upon careful studies of the spectral data and comprehensive mathematical analyses. These tables were designed to provide a concise summary needed for the computation of ideal gas thermodynamic properties. They may also provide a convenient source of information to those who require vibrational energy levels and related properties in molecular spectroscopy, analytical chemistry, and other fields of physics and chemistry. The work is being conducted at the University of Tokyo in cooperation with the National Standard Reference Data Program of the National Bureau of Standards as a part of an international effort to compile and evaluate physical and chemical data.

Tables of Molecular Vibrational Frequencies. Part 2. T. SHIMANOUCHI. Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 20402—Price 30 cents.

A compilation of vibrational frequency data for selected molecules is being conducted at the University of Tokyo in cooperation with the National Standard Reference Data Program of the National Bureau of Standards as a part of an international effort to compile and evaluate physical and chemical data. This report, as a continuation of Part I published as NSRDS–NBS–6, contains fundamental vibrational frequencies of 54 molecules together with vibrational assignments, sources of data, brief comments, and citations of references. The procedures used for the preparation of tables are the same as given in Part I. The fundamental frequencies are obtained mainly from the infrared and Raman spectra. When these are not available, other experimental data such as microwave results are taken into account. The selection of vibrational fundamentals from observed data is based upon careful studies of the spectral data and comprehensive mathematical analyses. These tables were designed to provide a concise summary needed for the computation of ideal gas thermodynamic properties. They may also provide a convenient source of information to those who require vibrational energy levels and related properties in molecular spectroscopy, analytical chemistry, and other fields of physics and chemistry.

The Band Spectrum of Carbon Monoxide. PAUL H. KRUPENIE. Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 20402–Price 70 cents.

This first publication in a series on diatomic molecules, reviews the literature on the spectrum of carbon monoxide (CO, CO^+, and CO^{2+}) in the gas phase. It also contains a compilation of critically evaluated numerical data on band positions, molecular constants, energy levels, potential energy curves, data pertaining to transition probabilities, and other molecular properties derived from the spectrum. Estimates of reliability are given where possible.

Though the text provides no spectrograms nor does it offer discussions of topics like infrared intensities, absorption coefficients, and line-shapes and widths, NSRDS–NBS–5 does review and examine the papers from which the data have been extracted to construct evaluated tables. The references cited constitute a critical bibliography.

Thermal Conductivity of Selected Materials. R. W. POWELL, C. Y. HO, AND P. E. LILEY. Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 20402–Price $1.00.

This paper has been published as part of the National Standard Reference Data Series as NSRDS–NBS–8. This compilation consists of the critical evaluation and analysis of the available thermal conductivity data on 11 metals and 9 nonmetals mainly for the solid state, on 7 fluids for both the liquid and gaseous states, and on 2 for liquid state only. The materials studied were selected primarily for their potential applicability as reference standards or because of their technical importance.

The metals included in this compilation are aluminum (solid and liquid state), copper, gold, iron (Armco and pure), manganin, mercury (liquid state), platinum, platinum alloyed with 40% rhodium, silver, and tungsten.

The nonmetallic solids treated include aluminum oxide, beryllium oxide, Corning code 7740 glass, diamond, magnesium oxide, ceramic code 9606 glass, quartz, thorium dioxide, and titanium dioxide.

Data in the literature for the following substances in both liquid and gaseous state were examined and evaluated in this compilation: argon, carbon tetrachloride, diphenyl, helium, nitrogen, *m*-terphenyl, *p*-terphenyl, toluene, and water.

Thermodynamic and Related Properties of Parahydrogen from the Triple Point to 100° K. at Pressures to 340 Atmospheres. H. M. RODDER, L. A. WEBER, and R. D. GOODWIN. Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 20402–Price 75 cents.

Experimental programs on parahydrogen at this laboratory have provided pressure-density-temperature relations and heat capacities at temperatures from 15 to 100° K. and at pressures from 2 to 350 atm. The two types of data have been correlated to yield a consistent set of functions. The properties tabulated for selected isobars and isochores are temperature, volume of pressure, the isotherm derivative $(\partial P/\partial \rho)_T$, the isochore derivative $(\partial P/\partial T)_\rho$, internal energy, enthalpy, entropy, the specific heats at constant volume and at constant pressure, and the velocity of sound. Also presented are the derived Joule-Thomson inversion curve and some comparisons with normal hydrogen near 100° K.

These documents have been reviewed by the staff of the Editorial Review Board of the National Standard Reference Data System.