New Data Compilations

Reviewed by the JC&ED Editorial Board

Tables of Dielectric Constants, Dipole Moments, and Dielectric Relaxation Times. WORTH E. VAUGHAN. Digest of Literature on Dielectrics, Vol. 33, Chap. 2. Order from National Academy of Sciences, Washington, DC 20418, 1969. Price of the Digest is $35.

Tables of static dielectric constants for pure solids and liquids, dielectric relaxation times, both resolved and unresolved, and dipole moments are given. Although dilute solutions are covered, mixtures or poorly characterized substances are omitted.

Viscosity of Gases and Gas Mixtures, A Handbook [Vyazkost' gazov i gazovykh smesei (spravochnoe rukovodstvo)]. I. F. GOLUBEV, trans. by R. Kondor for the Israel Program for Scientific Translations Ltd., Jerusalem. Order from National Technical Information Service, Springfield, VA 22151 as TT 70-50022, 1970. $3.00.

This reference book on the viscosity of gases and gas mixtures gives a survey of contemporary experimental methods for measuring the viscosity of gases under various conditions. Several types of viscosimeters are described, the data are included on the viscosity of numerous gases and gas mixtures over wide ranges of pressure and temperature. The published data and calculation methods for the viscosity coefficients of gases and gas mixtures are analyzed and generalized.

Heavy Water: Thermophysical Properties (Tyazhelaya voda. Teplofizicheskie svoistva). YA. Z. KAZAVCHINSKII, P. M. KESSEL'MAN, V. A. KIRILLIN, S. L. RIVKIN, A. E. SHEINDLIN, E. E. SHPIL'RAIN, V. V. SYCHEV, AND D. L. TIMROT. V. A. KIRILLIN, Ed., published by the State Power Publishing House (Gosudarstvennoe energeticheskoe izdatel'stvo), Moscow-Leningrad, 1963; trans. by the Israel Program for Scientific Translations Ltd., Jerusalem, 1971. Order from National Technical Information Service, Springfield, VA 22151 as TT 70-50094. $3.00.

This book contains a review, a critical analysis, and a synopsis of most of the papers published on the thermophysical properties of heavy water. This material served to derive equations of state for heavy water and its vapor. These equations form the basis of the comprehensive tables given in the book on thermodynamic properties of heavy water for pressures of up to 500 kg/cm^2 and a temperature range between 3.8° and 550°C.

Thermophysical Properties of Air and Air Components (Teplofizicheskie svoistva vozdukha i ego komponentov). A. A. VASSERMAN, YA. Z. KAZAVCHINSKII, AND V. A. RABINOVICH, ed. by A. M. Zhuravlev, published by the Academy of Sciences of the U.S.S.R. (Izdatel'stvo "Nauka"), Moscow 1966, trans. by Ch. Nisenbaum for the Israel Program for Scientific Translations Ltd., Jerusalem, 1971. Order from National Technical Information Service, Springfield, VA 22151 as TT 70-50095. $3.00.

This monograph describes a method for deriving equations of state from elementary functions conforming to experimental thermodynamic data. The equations of state constructed by this method are sufficiently reliable for computing the thermal and thermodynamic values. A critical analysis is given of the available data on the thermal properties of air, nitrogen, oxygen, and argon. The equations of state for these gases are determined, and detailed tables of their thermodynamic properties are compiled for conditions ranging from the saturation curve to temperatures of 1300K and pressures of 1000 bar. T–s and i–s diagrams are given for each gas. The experimental data on the viscosity and thermal conductivity of air and its components are analyzed and generalized, and equations are given for computing these properties over a wide range of parameters.

Thermodynamic and Thermophysical Properties of Helium (Termodinamicheskie i teplofizicheskie svoistva geliya). N. V. TSEDERBERG, V. N. POPOV, AND N. A. MOROZOVA, ed. by A. F. Alyab'ev, published by Atomizdat, Moscow, 1969, trans. by the Israel Program for Scientific Translations Ltd., Jerusalem, 1971. Order from National Technical Information Service, Springfield, VA 22151 as TT 70-50096. $3.00.

This monograph contains thermodynamic and thermophysical properties of helium in the ranges of pressure from 0.2–200 bar and of temperature from 0–300°C. An equation of state for helium is given, and the thermal properties are calculated. By means of the rules of statistical thermodynamics, the authors calculated the specific heat, enthalpy, and entropy of helium in the perfect gas state. The influence of the real state of the gas on the thermodynamic properties was estimated from the equation of state for helium. The i–s diagram was constructed, and equations were formulated for describing the thermal conductivity and the viscosity of helium in given temperature and pressure ranges.

Thermophysical Properties of Freon-22 (Teplofizicheskie svoistva freona-22). A. V. KLETSKII, published by the Committee of Standards, Measures and Measuring Instruments of the U.S.S.R. Council of Ministers—Government Standards Service (Izdatel'stvo Komiteta Standartov, Mer i Izmeriten' nykh Priborov pri Sovete Ministrov SSSR Gosudarstvennaya Sluzhba Standartnykh I Spravochnykh Dannykh), Moscow, 1970, trans. by Ch. Nisenbaum for the Israel Program for Scientific Translations Ltd., Jerusalem, 1971. Order from National Technical Information Service, Springfield, VA 22151 as TT 70-50178. $3.00.

In this book an analysis is made of Soviet and non-Soviet studies on the thermodynamic and physical properties of Freon-22, which is one of the most widely used refrigerants. A table is given of the thermodynamic properties of superheated Freon-22 vapor in the range −100 to +250°C, at pressures of 0.02–65 bar (1 bar = 1×10^5 N/m^2). Tables and thermal diagrams are given of the thermodynamic properties of the gas in a state of saturation (from −105°C to the critical point). Data on the thermal conductivity, viscosity, surface tension, and dielectric properties of Freon-22 are analyzed and tabulated.

Handbook of Electronic Materials, Volume 5, Group IV. Semiconducting Materials. M. NEUBERGER. IFI/Plenum Data Corp., New York, Washington, London, 1971. $10.

Evaluated data are compiled on the physical, mechanical, thermal, electronic, electrical, magnetic, and optical properties of Group IV materials. The compiler has attempted to provide values derived from experiments on high-purity single crystals or epitaxial films. Variations over a range of temperatures, wavelengths, frequencies, pressures, and field strengths (both electrical and magnetic) are reported.