

## New Data Compilations

**AEDC-TR-69-19. Tables of Equilibrium: Thermodynamic Properties of Argon. Volume I. Constant Temperature.** BRAHINSKY, H. S., NEEL, C. A., Arnold Engineering Development Center, ARO, Inc., Arnold Air Force Station, Tenn., March 1969. 122 pp. Available from DDC.

Equilibrium thermodynamic data are presented for argon from a temperature of 300° to 35,000°K and from a  $\log \rho$  of -5.0 to 2.4, where  $\rho$  is density in amagats. These data are tabulated at constant temperature with density incremented. The dependent parameters are  $Z$ ,  $E/RT$ ,  $H/RT$ ,  $S/R$ ,  $\log P$ , and  $Z^*$ . Several sources were used in assembling the data.

**AEDC-TR-69-19. Tables of Equilibrium: Thermodynamic Properties of Argon. Volume II. Constant Pressure.** BRAHINSKY, H. S., NEEL, C. A., Arnold Engineering Development Center, ARO, Inc., Arnold Air Force Station, Tenn., March 1969. 211 pp. Available from DDC.

Equilibrium thermodynamic data are presented for argon from a  $\log P$  of -4.9 to 4.2 and from a temperature of 300° to 35,000°K, where  $P$  is pressure in atmospheres. These data are tabulated at constant pressure with temperature incremented. The dependent parameters are  $\log H/R$ ,  $\log \rho$ ,  $Z$ ,  $S/R$ ,  $H/RT$ , and  $Z^*$ . Several sources were used in assembling the data.

**AEDC-TR-69-19. Tables of Equilibrium: Thermodynamic Properties of Argon. Volume III. Constant Entropy.** BRAHINSKY, H. S., NEEL, C. A., Arnold Engineering Development Center, ARO, Inc., Arnold Air Force Station, Tenn., March 1969. 394 pp. Available from DDC.

Equilibrium thermodynamic data are presented for argon from an  $S/R$  of 12.6 to 101.0 and from a temperature of 300° to 35,000°K, where  $S/R$  is dimensionless entropy. These data are tabulated at constant entropy with temperature incremented. The dependent parameters are  $\log \rho$ ,  $\log P$ ,  $\log H/R$ ,  $\gamma_E$ ,  $A/AA$ ,  $Z$ ,  $H/RT$ , and  $Z^*$ . Several sources were used in assembling the data.

**AEDC-TR-69-19. Tables of Equilibrium: Thermodynamic Properties of Argon. Volume IV. Constant Temperature with Specific Heat and Speed of Sound Data.** BRAHINSKY, H. S., NEEL, C. A., Arnold Engineering Development Center, ARO, Inc., Arnold Air Force Station, Tenn., March 1969. 122 pp. Available from DDC.

Equilibrium thermodynamic data are presented for argon from a temperature of 300° to 35,000°K and from a  $\log \rho$  of -5.0 to 2.4, where  $\rho$  is density in amagats. These data are tabulated at constant temperature with density incremented. The dependent parameters are  $\log P$ ,  $Z$ ,  $C_p/R$ ,  $C_v/R$ ,  $\gamma$ ,  $\gamma_E$ , and  $A/AA$ . Several sources were used in assembling the data.

**AEDC-TR-69-126. Tables of Equilibrium: Thermodynamic Properties of Nitrogen. Volume I. Constant Temperature.** BRAHINSKY, H. S., NEEL, C. A., Arnold Engineering Development Center, ARO, Inc., Arnold Air Force Station, Tenn., August 1969. 153 pp. Available from DDC.

Equilibrium thermodynamic data are presented for nitrogen from a temperature of 100° to 15,000°K and from a  $\log \rho$  of -7.0 to 3.0, where  $\rho$  is density in amagats. These data are tabulated at constant temperature with density incremented. The dependent parameters are  $Z$ ,  $E/RT$ ,  $H/RT$ ,  $S/R$ ,  $\log P$ , and  $Z^*$ . Several sources were used in assembling the data.

**AEDC-TR-69-126. Tables of Equilibrium: Thermodynamic Properties of Nitrogen. Volume II. Constant Pressure.** BRAHINSKY, H. S., NEEL, C. A., Arnold Engineering Development Center, ARO, Inc., Arnold Air Force Station, Tenn., August 1969. 279 pp. Available from DDC.

Equilibrium thermodynamic data are presented for nitrogen from a  $\log P$  of -7.4 to 4.8 and from a temperature of 100° to 15,000°K, where  $P$  is pressure in atmospheres. These data are tabulated at constant pressure with temperature incremented. The dependent parameters are  $\log H/R$ ,  $\log \rho$ ,  $Z$ ,  $S/R$ ,  $H/RT$ , and  $Z^*$ . Several sources were used in assembling the data.

**AEDC-TR-69-126. Tables of Equilibrium: Thermodynamic Properties of Nitrogen. Volume III. Constant Entropy.** BRAHINSKY, H. S., NEEL, C. A., Arnold Engineering Development Center, ARO, Inc., Arnold Air Force Station, Tenn., August 1969. 455 pp. Available from DDC.

Equilibrium thermodynamic data are presented for nitrogen from an  $S/R$  of 11.6 to 133.0 and from a temperature of 100° to 15,000°K, where  $S/R$  is dimensionless entropy. These data are tabulated at constant entropy with temperature incremented. The dependent parameters are  $\log \rho$ ,  $\log P$ ,  $\log H/R$ ,  $\gamma_E$ ,  $A/AA$ ,  $Z$ ,  $H/RT$ , and  $Z^*$ . Several sources were used in assembling the data.

**AEDC-TR-69-126. Tables of Equilibrium: Thermodynamic Properties of Nitrogen. Volume IV. Constant Temperature with Specific Heat and Speed of Sound Data.** BRAHINSKY, H. S., NEEL, C. A., Arnold Engineering Development Center, ARO, Inc., Arnold Air Force Station, Tenn., August 1969. 153 pp. Available from DDC.

Equilibrium thermodynamic data are presented for nitrogen from a temperature of 100° to 15,000°K and from a  $\log \rho$  of -7.0 to 3.0, where  $\rho$  is density in amagats. These data are tabulated at constant temperature with density incremented. The dependent parameters are  $\log P$ ,  $Z$ ,  $C_p/R$ ,  $C_v/R$ ,  $\gamma$ ,  $\gamma_E$ , and  $A/AA$ . Several sources were used in assembling the data.

**AEDC-TR-69-89. Tables of Equilibrium: Thermodynamic Properties of Air. Volume I. Constant Temperature.** BRAHINSKY, H. S., NEEL, C. A., Arnold Engineering Development Center, ARO, Inc., Arnold Air Force Station, Tenn., April 1969. 152 pp. Available from DDC.

Equilibrium thermodynamic data are presented for air from a temperature of 100° to 15,000° K and from a log  $\rho$  of -7.0 to 3.0, where  $\rho$  is density in amagats. These data are tabulated at constant temperature with density incremented. The dependent parameters are  $Z$ ,  $E/RT$ ,  $H/RT$ ,  $S/R$ ,  $\log P$ , and  $Z^*$ . Several sources were used in assembling the data.

**AEDC-TR-69-89. Tables of Equilibrium: Thermodynamic Properties of Air. Volume II. Constant Pressure.** BRAHINSKY, H. S., NEEL, C. A., Arnold Engineering Development Center, ARO, Inc., Arnold Air Force Station, Tenn., April 1969. 268 pp. Available from DDC.

Equilibrium thermodynamic data are presented for air from a log  $P$  of -7.4 to 4.8 and from a temperature of 100° to 15,000° K, where  $P$  is pressure in atmospheres. These data are tabulated at constant pressure with temperature incremented. The dependent parameters are log  $H/R$ , log  $\rho$ ,  $Z$ ,  $S/R$ ,  $H/RT$ , and  $Z^*$ . Several sources were used in assembling the data.

**AEDC-TR-69-89. Tables of Equilibrium: Thermodynamic Properties of Air. Volume III. Constant Entropy.** BRAHINSKY, H. S., NEEL, C. A., Arnold Engineering Development Center, ARO, Inc., Arnold Air Force Station, Tenn., April 1969. 434 pp. Available from DDC.

Equilibrium thermodynamic data are presented for air from an  $S/R$  of 13.2 to 133.0 and from a temperature of 100° to 15,000° K, where  $S/R$  is dimensionless entropy. These data are tabulated at constant entropy with temperature incremented. The dependent parameters are log  $\rho$ , log  $P$ , log  $H/R$ ,  $\gamma_E$ ,  $A/AA$ ,  $Z$ ,  $H/RT$ , and  $Z^*$ . Several sources were used in assembling the data.

**AEDC-TR-69-89. Tables of Equilibrium: Thermodynamic Properties of Air. Volume IV. Constant Temperature with Specific Heat and Speed of Sound Data.** BRAHINSKY, H. S., NEEL, C. A., Arnold Engineering Development Center, ARO, Inc., Arnold Air Force Station, Tenn., April 1969. 152 pp. Available from DDC.

Equilibrium thermodynamic data are presented for air from a temperature of 100° to 15,000° K and from a log  $\rho$  of -7.0 to 3.0, where  $\rho$  is density in amagats. These data are tabulated at constant temperature with density incremented. The dependent parameters are log  $P$ ,  $Z$ ,  $C_p/R$ ,  $C_v/R$ ,  $\gamma$ ,  $\gamma_E$ , and  $A/AA$ . Several sources were used in assembling the data.

**S-11. II-VI Semiconducting Compounds: Data Tables.** NEUBERGER, M., Hughes Aircraft Co., Electronic Properties Information Center, Culver City, Calif., October 1969. 156 pp. Available from DDC.

These tables include the most reliable information available to date for mechanical, crystallographic, physical, thermal, magnetic, electronic, and optical properties of each of the 2-6 binary semiconducting compounds.

**NSRDS-NBS-21. Kinetic Data on Gas Phase Unimolecular Reactions.** BENSON, S. W., O'NEAL, H. E., Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402—Price \$7.00.

Available rate data on thermally induced, unimolecular, homogeneous gas phase reactions of molecules and free radicals have been reviewed and critically evaluated. Introductory discussion is given of theory and assumptions used in compiling the selected data. Mechanisms of reaction are discussed. The major portion (537 out of 617 pages) of the work presents selected data, with references, in the form of data sheets (one to two pages per molecule). Preferred values are indicated and discussed.

**IPST Cat. No. 5554. Thermophysical Properties of Gases and Liquids, No. 1.** RABINOVICH, V. A. (ED.), MOSCONA, A. (TRANS.), Israel Program for Scientific Translations, Jerusalem, Israel, 1970. 214 pp. Available from CFSTI, TT 69-55091.

This collection is the first of a series of systematic publications initiated by the GSSSD—the Russian equivalent of the U.S. National Standard Reference Data System—designed to supply reliable information on the thermophysical properties of substances and materials and aimed mainly at the practical application of the reference data. This collection includes papers dealing with the theoretical calculation and experimental determination of the thermophysical characteristics of substances and materials. It also contains some papers devoted to methods of calculation and the derivation of equations of state for pure substances and gas mixtures. Unlike existing publications, the collection presents the reference data in a form convenient for use; their accuracy is evaluated, and the limits are prescribed within which the recommended values may vary. The reliability of the data obtained by theoretical calculation methods is checked against well-tested experimental values or confirmed by the accuracy of the calculation method.

**IPST Cat. No. 5555. Thermophysical Properties of Liquid Air and its Components.** VASSERMAN, A. A., RABINOVICH, V. A., BAROUCH, A. (TRANS.), Israel Program for Scientific Translations, Jerusalem, Israel, 1970. 243 pp. Available from CFSTI, TT 69-55092.

The thermophysical properties of liquid nitrogen, oxygen, argon, and air are examined in this monograph. This book supplements previous studies on the thermophysical properties of these substances in the gaseous state. The book surveys and analyzes the best-known equations of state for liquids. An equation of state is derived for liquids on the basis of the principles of statistical physics and is valid for many temperatures and densities. A method is developed for setting up this equation; it is used to describe analytically the thermal properties of the four most important cryogenic liquids. The experimental thermal data for liquid oxygen, argon, and air are extrapolated to pressures of 500 bar. As a result, equations of state valid for pressures of practical importance have been established, and the thermal and calorimetric properties of these substances have been calculated for parameters which have not been studied experimentally. The values obtained for the density were also used in tabulating the viscosity and conductivity of the four liquids with the aid of the limited experimental material on transfer coefficients. It was thus possible to obtain all the data on the thermodynamic and transport properties of liquid air for the pressures most important for practical applications, extending to the saturation and freezing curves.

These documents have been reviewed by the Editorial Board of the National Bureau of Standards.