

Thermophysical Properties of Some Nitrogen-Containing Working Fluids

A.J. Grebenkov,^{C,S} V.P. Saplitsa, O.V. Beliaeva, V.P. Trubnikov, and Tsurbelev
Joint Institute for Power and Nuclear Research, Minsk, Belarus
greb@sosny.bas-net.by

Nitrogen-containing working fluids, such as monomethyl-amine, hydrazine, ammonia, and their solutions are quite widespread substances utilized in a number of technical applications, e.g. heat pipes, heat-retaining compositions, refrigeration, chemical industry, high-energy processes, etc. In the present study, several thermodynamic and thermophysical characteristics of the above mentioned fluids and their blends were measured. The investigated properties include phase transition parameters, density, viscosity, thermal conductivity, heat of vaporization and solubilization, and heat capacity. We used a number of experimental installations specially designed for aggressive/toxic substances and operated under relatively high pressures. We involved several techniques: the methods of variable and constant volume piezometers, calorimetry, the steady-state method of co-axial cylinders, and the method of falling cylinder. Mainly, this study covered the temperature range of 280 to 400 K at pressures up to 20 MPa. The results of the experimental studies and the equations describing the investigated properties of the nitrogen-containing fluids and their binary solutions are presented.