Density of Rocket Fuels and its Temperature and Pressure Dependence

Zaripova Mohira Abdusalomovna [C, S], Tilloeva Tahmina Rustamovna, Zoirov Hikmatullo Abduholiqovich and Safarov Mahmadali Mahmadievich
Tajik Technical University after named Academician M.S.Osimi, Dushanbe, Tajikistan

The (P,ρ,T,x) properties of binary hydrazine+water mixtures (x_i=0.1052; 0.2006; 0.3005; 0.4016; 0.5093; 0.6087; 0.7084; 0.8072; 0.9004) were studied using high pressure – high temperature Safarov Mahmadali densimeter methods. Measurements were performed at temperatures from 295.4 to 314.3K and at pressure up to 50 MPa. The volumetric properties (excess and partial molar volumes) were calculated using the measured densities as a function of temperature, pressure, and concentration. The precision of the density measurement with the instrument is about 0.01 kg×m^{-3}. An empirical correlation for the density of the investigated solutions with pressure and temperature has been derived.

Microemulsions are formed at mixing of insoluble in other water methyl-ethylhydrazine in the presence of surface-active substances. They are transparent and thermodynamic disperse systems steady under normal conditions. They have found a wide application in chemical, petrochemical and nanotechnologies. Microemulsion are investigated by means of various methods. Thermal properties of microemulsions are insufficiently studied while they give the information on an internal pressure and on a force of intermolecular interaction. In the present work the results of P,ρ,T properties research of tructure for the methylethylhydrazine + water system are given. The thermal properties (isothermal compressibility's and thermal expansibilities) were calculated from the (P,ρ,T) properties at the above mentioned state parameter intervals. The experimental (P,ρ,T) properties were extrapolated to P=0.1MPa, compared with the available literature results at atmospheric pressure conditions and good agreement was found. The high temperature and pressure results of these solutions are not in the literature and comparison was not available.