

Densities of Ethylbenzene + n-Heptane Mixtures at High Temperatures and Pressures

I.M. Abdulagatov^{C,S}

*Institute for Geothermal Problems of the Dagestan Scientific Center of the Russian Academy of Sciences,
Makhachkala, Dagestan, Russia
ilmutdin@boulder.nist.gov*

N.D. Azizov

Azerbaijan State Oil Academy, Baku, Azerbaijan, Azerbaijan

New experimental data on the densities of three (25, 50, and 75) mass % binary ethylbenzene + n-heptane mixtures have been measured with a constant-volume piezometer immersed in a precision liquid thermostat. These new experimental data cover a temperature range of 306 to 527 K and a pressure range of 0.1 to 11 MPa. The experimental data reported here have uncertainties of less than 0.06 % for density, 0.05 % for pressure, 15 mK for temperature, and 0.012 % for concentration. Excess molar volumes were derived using the measured values of density for the mixtures, were calculated using a reference equation of state for the pure component n-heptane (Span and Wagner, 2003), and present results for pure ethylbenzene were used. The derived values of excess molar volumes at atmospheric pressure were compared to the values reported by other authors in the literature. The effect of pressure on the excess molar volumes was studied. The experimental results for excess molar volumes derived from precise density measurements were fitted by means of the Redlich-Kister type equation. The derived values of the excess molar volumes were analyzed in term of the Prigogine-Flory-Patterson model for solutions. The values of the different contributions to the excess molar volumes were estimated.