

Density Measurements under Pressure for the Binary System Di-Butyl Ether + 1-Heptanol at Temperatures up to 393.15 K and at Pressures up to 140 MPa.

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The increasing worldwide use of bio-fuels constitutes one of the measures considered to reduce greenhouse gas emissions. Bio-fuels also have an important part to play in promoting the security of energy supply, and promoting technological development and innovation. Di-butyl ether (DBE) is used as blending agent in reformulated gasoline and has been included in recent international regulations on the promotion of the use of energy from renewable sources for transport. The DBE acts as non-polluting, high octane number blending agent. DBE could be also used as cetane enhancer in bio-diesel fuel, and can be obtained as an added valued additive to second generation bio-fuels. Ether + alcohol mixtures are of interest as model mixtures for gasoline in which the ether and the alcohol act as non-polluting, high octane number blending agents. Despite of this interest, density data of binary mixtures containing ether + alcohol at pressures other than the atmospheric pressure are very scarce in the literature. Density of the binary mixture DBE + 1-heptanol have been measured under pressure and reported in this work using a vibrating tube densimeter. Experimental densities for the binary system DBE + 1-heptanol have been measured at 298.15, 313.15, 333.15, 353.15, 373.15 and 393.15 K and at twenty-three isobars up to 140 MPa. For each composition, the experimental values were correlated using a Tait-type equation. Furthermore, the excess molar volume and the isothermal compressibility were calculated from the density data. The authors acknowledge support for this research to the Ministerio de Ciencia e Innovación, Spain, Project and ENE2009-14644-C02-02.