Density Measurements under Pressure for the Binary System Di-Butyl Ether + 1-Propanol at Temperatures Up to 343.15 K and at Pressures Up to 70 MPa

Fatima Alaoui and Fernando Aguilar
_Universidad de Burgos, Electromechanical Engineering Department, Burgos, Spain_

José Juan Segovia and Miguel Ángel Villamañán
_Universidad de Valladolid, Grupo de Termodinámica y Calibración TERMOCAL, Valladolid, Spain_

Eduardo Montero
_Universidad de Burgos, Electromechanical Engineering Department, Burgos, Spain_
emontero@ubu.es

The increasing worldwide use of biofuels constitutes one of the measures considered to reduce greenhouse gas emissions. Biofuels 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 [1] The DBE acts as non-polluting, high octane number blending agent. DBE could be also used as cetane enhancer in biodiesel fuel, and can be obtained as an added valued additive to second generation bio-fuels [2]. 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 atmospheric pressure are very scarce in the literature. Density of the binary mixture DBE + 1-propanol have been measured under pressure and reported in this work using a vibrating tube densimeter. Experimental densities for the binary system DBE + 1-propanol have been measured at 283.15, 298.15, 313.15, 328.15 and 343.15 K and at eleven isobars up to 70 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.

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