

Speed of sound, density, and related thermodynamic excess properties of binary mixtures of butan-2-one with C1-C4 n-alkanols and chloroform

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Abstract

© 2014 American Chemical Society. Densities and speeds of sound were measured for binary mixtures of butan-2-one with methanol, propan-1-ol, butan-1-ol, and chloroform at temperatures of 293.15-323.15 K and at atmospheric pressure, with the uncertainties of 0.05 kg·m⁻³ and 0.5 m·s⁻¹, respectively. The molar excesses of volume, isentropic compression, and thermal expansion were calculated for those systems from the measured speeds and densities and for the mixture of butan-2-one with ethanol from the data reported in the literature. The negative excess volumes for the mixtures with alcohols decrease with the elongation of the hydrocarbon chain, and they eventually become positive for propan-1-ol and butan-1-ol at higher temperatures. That probably reflects the vanishing difference in size of the molecules in the mixture. The excess volume of butan-2-one + chloroform is close to that of butan-2-one + methanol. The excess expansion of butan-2-one + chloroform is negative, and it is positive for butan-2-one + alcohols, while the excess compression isotherms are approximately mirror images of those of the excess expansion. That results probably from the counteracting effects of temperature and pressure on the aggregation due to hydrogen bonds. (Graph Presented).

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