

Excess Molar Volumes and Excess Molar Enthalpies for the Binary Mixtures of 1,2-dichloropropane with linear sec-alkanols at T=298.15 K and 101.3 kPa

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The excess molar volumes V_E and excess molar enthalpies H_E at T=298.15 K and atmospheric pressure for the binary systems of 1,2-dichloropropane (1,2-DCP) with linear sec-alkanols (2-pentanol and 3-pentanol) have been determined from density and heat flux measurements by using a digital vibrating-tube densimeter and an isothermal micro-calorimeter, respectively.

Both V_E and H_E values of the binary mixtures are positive over the whole composition range, which could be explained by considering the branched structure of linear sec-alkanols. The maximum values of V_E and H_E are varying from 0.6073 $\text{cm}^3\cdot\text{mol}^{-1}$ (2-pentanol) to 0.7615 $\text{cm}^3\cdot\text{mol}^{-1}$ (3-pentanol) and 1966.7 $\text{J}\cdot\text{mol}^{-1}$ (2-pentanol) to 2312.8 $\text{J}\cdot\text{mol}^{-1}$ (3-pentanol) around $x_1(1,2\text{-DCP}) = 0.50\sim 0.55$, respectively.

The experimental results of both H_E and V_E were fitted to Redlich-Kister equation to correlate the composition dependence of excess properties. In this work, the experimental excess enthalpy data have been also correlated using thermodynamic models (Wilson, NRTL, and UNIQUAC) and have been qualitatively discussed.