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Excess volumes, Viscosities and Speeds of Sound for Binary Mixtures of Ethyl methanoate +Alkanes: Application of Viscosity Models

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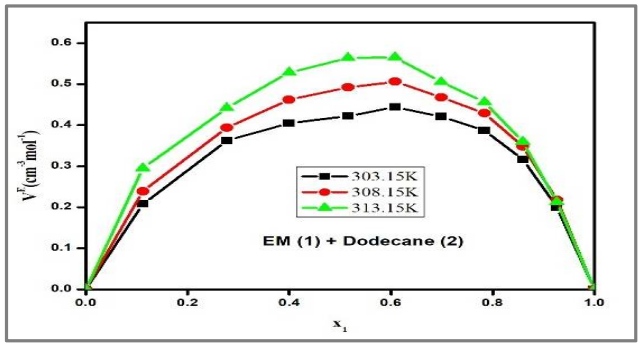
ABSTRACT

Densities (ρ), viscosities (η) and speeds of sound (u) of binary mixtures of ethyl methanoate with alkanes (heptane, decane, dodecane and tridecane) at 303.15, 308.15 and 313.15K temperature were measured over the entire composition range. In this experimental data excess volume V^E, deviation in viscosity Δη, isentropic compressibility Ks and excess isentropic compressibility K^E_s were calculated. These quantities have been fitted to the Redlich-Kisterpolynomial equation and results analyzed in terms of molecular interactions and structural effects. It is shown that the values of V^E are positive and Δη are negative over the entire composition range for each binary system investigated. The viscosity data have been correlated using Katti-Chaudhri, McAllister's three body and Auslander models at the studied temperature.

Graphical Abstract



Excess volume (V^E) Vs mole fraction(x_1) for Ethyl methanoate with dodecane

Keywords: Ethyl methanoate, Alkanes, Excess volumes, Isentropic compressibility, Binary liquid mixture.