

Excess Molar Volume and Viscosity Study of Ternary Mixtures: 1-Propanol (1) + Triethylamine (2) + Cyclohexane (3) and 1-Propanol (1) + Tributylamine (2) + Cyclohexane (3) at 303.15 K

R. L. Gardas^{C,S}

*CICECO, Chemistry Department, University of Aveiro, Aveiro, Portugal
gardasr@yahoo.com*

S. L. Oswal

Department of Chemistry, Veer Narmad South Gujarat University, Gujarat, India

Densities and viscosities for two ternary mixtures 1-propanol (1) + triethylamine (2) + cyclohexane (3) and 1-propanol (1) + tributylamine (2) + cyclohexane (3) and five binary mixtures 1-propanol + triethylamine, 1-propanol + tributylamine, triethylamine + cyclohexane, tributylamine + cyclohexane, and 1-propanol + cyclohexane have been measured at temperature 303.15 K and atmospheric pressure over the entire range of composition. From these results excess molar volumes $V^{(E)}$, viscosity deviations $\Delta\eta$ and excess Gibbs energy of activation $\Delta G^{(E)}$ of viscous flow have been calculated for presently investigated mixtures. The empirical equations due to Redlich-Kister, Kohler, Rastogi et al., Jacob-Fitzner, Tsao-Smith, Lark et al., Heric-Brewer, and Singh et al., have been employed to correlate the excess molar volumes $V^{(E)}$, viscosity deviations $\Delta\eta$, and excess Gibbs energy of activation $\Delta G^{(E)}$ of viscous flow of ternary mixtures with their corresponding binary parameters. The results are discussed in terms of the molecular interaction between the components of the mixture. Further, the Extended Real Associated Solution (ERAS) model has been applied to excess molar volumes for the present ternary mixtures and the results are compared with the experimental data.

Key Words: Excess molar volume; Viscosity; Ternary mixtures; ERAS model