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Thermodynamic and physical study of [hmim]Cl + (1-pentanol or ethylene glycol) mixtures at various temperatures

Fakhri Kermanpour
Bu-Ali Sina University, Iran

Densities, viscosities, and refractive indices for pure compounds of 1-hexyl-3-methyl imidazolium chloride ([hmim]Cl) (IL), 1-pentanol, and ethylene glycol (EG), along with their binary mixtures of $\{x1[hmim]Cl + x21$-pentanol$\}$ and $\{x1[hmim]Cl + x2EG\}$ were measured over the entire composition range at temperatures (293.15 to 333.15) K and ambient pressure. The excess molar volumes and viscosity deviations for the binary mixtures were calculated from the experimental data. The excess molar volume values of $\{x1[hmim]Cl + x21$-pentanol$\}$ mixture are negative in the entire composition range at all temperatures, and increase with increasing temperature in the alcohol rich region and decrease with increasing temperature in the IL rich range. The excess molar volumevalues of $\{x1[hmim]Cl + x2EG\}$ mixture are positive in the alcohol rich range and negative in the IL rich range at all temperatures, and decrease with increasing temperature. Viscosity deviations of both mixtures are negative over the entire composition range in all temperatures and decrease with increasing temperature. The obtained excess molar properties were correlated by Redlich– Kister equation, and the excess molar volumes were correlated using Prigogin- Flory- Patterson (PFP) model. The fitting parameters and standard deviations were determined.

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