

Physical Properties and Solubility Parameters of 1-Ethyl-3-methylimidazolium Based Ionic Liquids/DMSO Mixtures at 298.15 K¹

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Abstract—Densities, refractive indices, conductivities and viscosities of binary mixtures of 1-ethyl-3-methylimidazolium-based ionic liquids (ILs) with dimethyl sulfoxide at 298.15 K are reported. Excess molar volumes have been calculated from experimental data and were fitted with Redlich–Kister equation. The density and refractive index were found to increase with increasing concentration in all cases except [EMIM]COOH. The free mobility of ions has found to enhance conductivity and decrease viscosity to varying extent in all mixtures being studied. It has been observed that solubility parameters, dielectric constants and nature of anions of ILs being used play a vital role in determining the subsequent characteristics. As DMSO has high dielectric constant therefore, it was able to form interactions with most of ILs except with [EMIM]COOH due to anomalous nature of anion.

Keywords: ionic liquid mixtures, density, refractive index, conductivity, viscosity.

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