Liquid-Liquid Equilibria of 1,5-Pentanediol in Room Temperature Ionic Liquids

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lonic Liquids (ILs) are salts composed of organic cations and inorganic anions with melting points below 100 °C. Due to their unique properties such as negligible vapor pressure, nonflammability, relatively high thermal stability, excellent solvation potential and tunable physical and chemical properties, ILs have promising potential in a wide range of applications such as separations. Diols are important chemical intermediates for producing polymers and cosmetics. Specifically, diols such as 1,4 butanediol and 1,6 hexanediol are used as plastic precursors. Recently, 1,5 pentanediol has been produced from biomass and reported as a potential alternative to 1,4 butanediol and 1,6 hexanediol. In this study, our research has focused on accurately measuring binary liquid-liquid equilibria (LLE) in mixtures of 1,5-pentanediol in a variety of ionic liquids using the volumetric and cloud point methods. The experimental system accuracy has been checked against our previous LLE measurements of 2-butanol and water mixtures at ambient pressure and various temperatures from 286.6 to 303.3 K. The solubilities in binary mixtures of 1,5-pentanediols and a variety of ILs has been measured in a range of temperatures from 283.15 to 313.15 K to understand the phase behavior. Experimental LLE results have been modeled using the nonelectrolyte nonrandom two liquid (NRTL) solution model.