

Experimental study on densities of binary 1-butyl-3-methylimidazolium halide solutions with water or alcohol

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In order to improve the process utilizing ionic liquid (IL) for easier operation, the reduction of IL viscosity is considered by mixing it with a solvent. In this work, densities of nine binary solutions were measured for each of ionic liquid 1-butyl-3-methylimidazolium halides ([bmim]Cl, [bmim]Br, [bmim]I) with water, methanol, or ethanol at different temperatures. Densities were measured by using a vibrational density meter at atmospheric pressure. With the obtained density data, the apparent molar volume and coefficient of thermal expansion β under constant pressure were calculated in interval of 5 K from 293.15 to 318.15 K. In the case of methanol and ethanol systems, the thermal expansion was decreased as the composition of the ionic liquid increased. However, the thermal expansion of aqueous solution had its own distinct characteristic and therefore showed a different aspect compared to those of binary systems containing methanol and ethanol.