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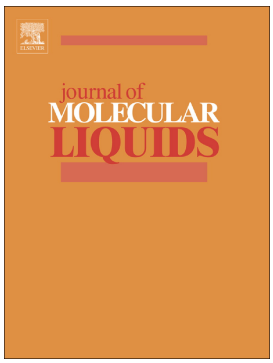

Spectroscopic and temperature dependent physicochemical studies on interactional behavior of phosphate salts in aqueous ionic liquid (1-butyl-3-methyl imidazolium tetrafluoroborate) solutions

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Spectroscopic and temperature dependent physicochemical studies on interactional behaviour of phosphate salts in aqueous ionic liquid (1-butyl-3-methyl imidazolium tetrafluoroborate) solutions

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Abstract

Density ρ, speed of sound c and FT-IR spectral studies for disodium hydrogen phosphate (DSHP) and dipotassium hydrogen phosphate (DPHP) salts in aqueous solution of ionic liquid (1-butyl-3-methyl imidazolium tetrafluoroborate) [C_4mim][BF_4] at intervals 5K, from temperatures T = (288.15, 293.15, 298.15, 303.15 and 308.15) K and experimental pressure of p = 0.1 MPa have been done. Different parameters have been calculated by utilizing the experimental data of density and speed of sound. Also the transfer parameters such as partial molar volumes of transfer (ΔV_ϕ^0), partial molar isentropic compression of transfer ($\Delta K^0_{\phi,S}$) have been determined by utilizing the limiting apparent molar volumes (V_ϕ^0) and limiting apparent molar isentropic compressions ($K^0_{\phi,s)}$, data respectively. Apparent molar and partial molar parameters predict that the solute-solvent interactions are dominating in the ternary system. The pair and triplet interaction coefficients illustrate the dominance of pair wise interactions in the system. The possible molecular interactions like hydrophilic-hydrophilic, hydrophilic- hydrophobic or hydrophobic-hydrophobic are investigated in due course. Further, FTIR spectra have been recorded for the mixture of phosphate salts and ionic liquid (1-butyl-3-methyl imidazolium tetrafluoroborate). Decrease in wave number also suggests structural changes in the mixtures.

Keywords: FT-IR; Density; speed of sound; 1-butyl-3-methyl imidazolium tetrafluoroborate; Phosphate salts.

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