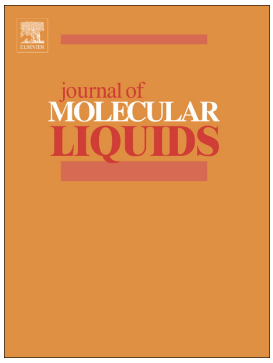

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Synthesis and study of interactions of ionic liquid 1-methyl-3-pentylimidazolium bromide with amino acids at different temperatures

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Abstract

Ionic liquid 1-methyl-3-pentylimidazolium bromide have been synthesised and its extent of purity has been confirmed by characterisation techniques H^1 NMR, C^{13} NMR, MASS and IR spectroscopy. By use of volumetric and acoustic methods the interaction of amino acids (L-leucine and N-acetyl-L-leucine) and synthesised Ionic liquid 1-methyl-3-pentylimidazolium bromide have been studied as a function of temperature and concentration. Density and speed of sound of aqueous amino acids (L-leucine and N-acetyl-L-leucine) in aqueous ionic liquid (0.005, 0.01, 0.03, 0.05) mol·kg^{-1} as solvent have been determined at four different temperatures T = (288.15, 298.15, 308.15, 318.15) K. Using these experimental data apparent molar volumes (V_ϕ), limiting apparent molar volume (V_ϕ°), experimental slope (S_v), standard partial molar volumes of transfer (ΔV_ϕ^0), limiting apparent molar expansibilities (E_ϕ°),apparent molar isentropic compression ($K_{\phi,s}$), limiting apparent molar isentropic compression ($\kappa_{\phi,s}^0$)and standard partial molar isentropic compression of transfer ($\Delta \kappa_{\phi,s}^0$)have been evaluated. The pair and triplet interaction coefficient have also been calculated. The values of these parameters are used for interpretation in terms of solute-solute and solute-solvent interactions, ion hydrophilic, hydrophilic–hydrophilic and hydrophilic– hydrophobic interactions in the amino acid and ionic liquid solutions. The structure making or structure-breaking tendency of amino acids has been studied using these thermodynamic parameters.

KEYWORDS: 1-Pentyl-3-Methylimidazolium bromide; Apparent molar volume; Apparent molar isentropic compression; L-leucine; N-acetyl-L-leucine

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