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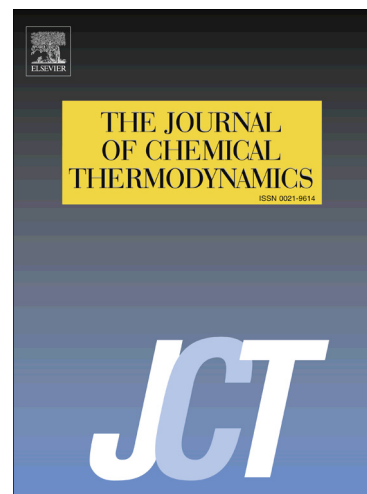
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# Study of solvation consequences of glycine, L-alanine and L-valine in aqueous 1-butyl-4-methyl pyridinium chloride ionic liquid solutions probed by physicochemical approach in the temperature interval (288.15-308.15) K.

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## Abstract

The apparent molar volume ( $V_\phi$ ) and isentropic compression ( $K_{\phi,s}$ ) of glycine, L-alanine and L-valine have been studied in (0.025, 0.05, 0.075 and 0.1) mol·kg<sup>-1</sup> aqueous 1-butyl-4-methyl pyridinium chloride ([C<sub>4</sub>mpy]Cl) solutions over a range of temperatures (288.15, 293.15, 298.15, 303.15 and 308.15) K from the values of densities ( $\rho$ ) and ultrasonic speed ( $c$ ), respectively. The standard partial molar volumes ( $V_\phi^0$ ), standard partial molar isentropic compression ( $K_{\phi,s}^0$ ), and experimental slopes ( $S_V$  and  $S_K$ ) have been determined for these amino acid solutions from the Masson equation and have been interpreted in terms of solute-solvent and solute-solute interactions, respectively. The hydrophilic-hydrophilic, hydrophilic-hydrophobic and hydrophobic-hydrophobic interactions are involved in the studied systems of [C<sub>4</sub>mpy]Cl + amino acids + H<sub>2</sub>O by calculating the corresponding transfer functions ( $\Delta V_\phi^0$  and  $\Delta K_{\phi,s}^0$ ). The contribution of the charged end groups ( $NH_3^+$ ,  $COO^-$ ), ( $-CH_2$ ) group and other alkyl chains of the amino acids were estimated using  $V_\phi^0$  values. Hydration number ( $n_H$ ) for studied amino acids in aqueous [C<sub>4</sub>mpy]Cl solutions are positive, which suggest a strong dehydration effect of [C<sub>4</sub>mpy]Cl. The obtained parameters will be helpful to understand mixing effects and other complex biological processes between head and side chain group of amino acids and ionic liquid [C<sub>4</sub>mpy]Cl in aqueous solution.

**Keywords:** Ionic liquid, Amino acids, Apparent molar volume, Apparent molar adiabatic compressibility, Hydration number

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