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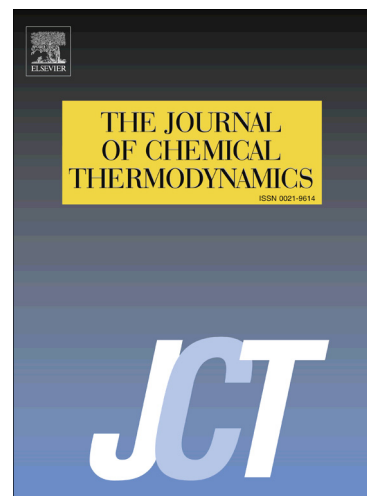
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# Molecular interactions of some amino acids in aqueous 1-butyl-3-methylimidazolium bromide solutions at different temperatures: A volumetric approach

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## ABSTRACT

Apparent molar volumes,  $V_\phi$  of amino acids i.e. glycine, L-alanine, L-serine, L-threonine and DL- $\alpha$ -aminobutyric acid in pure water and in aqueous solutions of imidazolium based ionic liquid, 1-butyl-3-methylimidazolium bromide,  $[BMIm][Br]$  were determined from precise density measurements at temperatures  $T = (288.15-318.15)$  K and at atmospheric pressure. Partial molar volumes  $V_2^o$  and partial molar volumes of transfer,  $\Delta_{tr}V_2^o$  of amino acids in aqueous  $[BMIm][Br]$  solutions have been obtained from the  $V_\phi$  data. The  $V_2^o$  values follow the order: L-threonine > DL- $\alpha$ -aminobutyric acid > L-serine > L-alanine > glycine. Positive  $\Delta_{tr}V_2^o$  values for all the studied amino acids indicate the dominance of hydrophilic-ionic interactions between amino acids and  $[BMIm][Br]$ . The partial molar expansibilities  $(\partial V_2^o/\partial T)_P$  and their second order derivatives  $(\partial^2 V_2^o/\partial T^2)_P$ , volumetric interaction parameters,  $V_{AB}$  and  $V_{ABB}$ , hydration number,  $n_H$  have been calculated. The charged end groups,  $V_2^o(NH_3^+, COO^-)$ , side chain contributions of the amino acids,  $V_2^o(R)$  and apparent specific volume,  $v_\phi$  have also been obtained from  $V_2^o$  and  $V_\phi$  data. The results have been interpreted in terms of possible molecular interactions.

**Keywords:** Amino acids, 1-butyl-3-methylimidazolium bromide, Partial molar volumes, Partial molar expansibilities, Volumetric interaction parameters, Hydration number, Apparent specific volume

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