World Academy of Science, Engineering and Technology
International Journal of Chemical and Molecular Engineering
Vol:15, No:02, 2021

Thermophysical Properties of Glycine/L-Alanine in 1-Butyl-3-Methylimidazolium Bromide and in 1-Butyl-3-Methylimidazolium Chloride

Authors : Tarnveer Kaur

Abstract : Amino acids, as fundamental structural units of peptides and proteins, have an important role in biological systems by affecting solubility, denaturation, and activity of biomolecules. A study of these effects on thermophysical properties of model compounds in the presence of electrolytes solutions provides information about solute-solvent and solute-solute interactions on biomolecules. Ionic liquids (ILs) as organic electrolytes and green solvents are composed of an organic cation and an inorganic anion, which are liquid at ambient conditions. In the past decade, extensive investigations showed that the use of ILs as reaction media for processes involving biologically relevant compounds is promising in view of their successful application in kinetic resolution, biocatalysis, biosynthesis, separation, and purification processes. The scope of this information is valuable to explore the interactions of amino acids in ILs. To reach this purpose, apparent molar volumes of glycine/L-alanine in aqueous solutions of 1-butyl-3-methylimidazolium bromide/chloride were determined from precise density measurements at temperatures T = (288.15-318.15) K and at atmospheric pressure. Positive values for all the studied amino acids indicate the dominance of hydrophilic-ionic interactions between amino acids and Ionic liquids. The effect of temperature on volumetric properties of glycine/L-alanine in solutions has been determined from the partial molar expansibility and second-order partial molar expansibility. Further, volumetric interaction parameters and hydration number have been calculated, which have been interpreted in terms of possible solute-solvent interactions.

Keywords : ILs, amino acids, volumetric properties, hydration numbers
Conference Title : ICAIL 2021 : International Conference on Advanced Ionic Liquids
Conference Location : Istanbul, Türkiye
Conference Dates : February 15-16, 2021