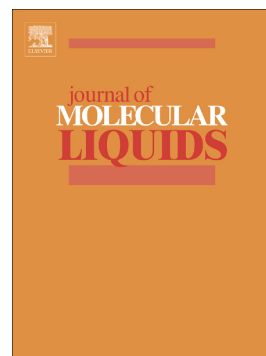


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Volumetric and Compressibility Studies of Aqueous Triethylammonium Based Protic Ionic Liquids at $T = 298.15$ K

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Abstract: The significant considerations have centred on the utilization of the bio-ionic liquids as green solvents to replace or minimize conventional environment-harming organic solvents. Ionic liquids have many remarkable environment-accepting properties such as ease of reuse, low vapour pressure, and thermal stability etc. The present work focuses on thermodynamic understanding of aqueous solutions of protic ionic liquids (PILs) namely triethylammonium formate [TEAF], triethylammonium propionate [TEAP], triethylammonium butanoate [TEAB], triethylammonium glycolate [TEAG], and triethylammonium pyruvate [TEAPy]. The density and speed of sound measurements for aqueous solutions of these PILs are reported at $T = 298.15$ K and the data were used to obtain the apparent and partial molar volumes, isentropic and apparent molar isentropic compressibilities for aqueous PILs solution. From the data of density and sound speed, we estimated electrostriction, hydration numbers of PILs, limiting volumetric and compressibility properties and finally discussed the results obtained in terms of ion-ion, ion-solvent interaction through hydration behaviour of PILs, kosmotropic effect, hydrophobic interactions, etc.

Keywords: Protic ionic liquids, Partial molar volume, Isentropic compressibility, Hydration number, Electrostriction, Kosmotropic effect.

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