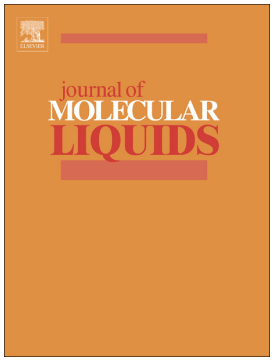

Conductometric and refractometric study of 1-Ethyl-3-methylimidazolium Bromide ionic liquid in water+ethanol/propanol mixtures at T=(298.2, 308.2 and 318.2)K

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Conductometric and refractometric study of 1-Ethyl-3-methylimidazolium Bromide ionic liquid in Water +Ethanol/ Propanol mixtures at T = (298.2, 308.2 and 318.2) K

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Abstract

In this work, thermophysical properties such as conductivity (Λ) and refractive index (n_D) of 1-Ethyl-3-methylimidazolium Bromide, [EMIm]Br, in ternary mixtures of [EMIm]Br + ethanol/ 1- propanol + water have been measured at T =(298.2, 308.2 and 318.2)K and P= 0.1MPa. The conductometric measurements were performed for [EMIm]Br ionic liquid from 0.0001 to 0.2 mol kg^{-1} in different mass fractions of 1-propanol and ethanol in water + ethanol/ 1-propanol mixtures ((w/w)% = $w_{alcohol}/w_{mixture}$ = 10%, 20% and 30%) at T = (298.2, 308.2 and 318.2) K. Ion association constants (K_a) and limiting molar conductivities (Λ_0) of [EMIm]Br were obtained by using Fuoss Onsager equation. The critical aggregation concentration (cac) and the degree of ionization (α) were determined by conductivity measurements. The obtained parameters were used to calculate the standard Gibbs free energy of aggregation (ΔG^0). In addition, refractive indices (n_D) of [EMIm]Br were measured for the binary and ternary water + [EMIm]Br + ethanol/ 1-propanol mixtures at T = (298.2, 308.2 and 318.2) K. The obtained results were compared to the predicted values using the Lorentz-Lorenz equations. Excess refractive index (n_D^E) for binary and ternary mixtures and regression parameters of the Redlich–Kister and Cibulka equations were obtained at different temperatures.

Keywords, Conductivity; Refractive index; 1-Ethyl-3-methylimidazolium Bromide**;**