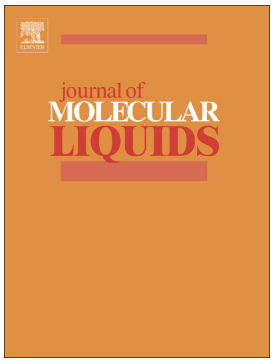

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Triethanolamine-based protic ionic liquids with various sulfonic acids: synthesis and properties

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Abstract

Ten tris(2-hydroxyethyl)ammonium (triethanolammonium)-based protic ionic liquids (ILs) and one molten salt were synthesized by proton transfer reaction from sulfonic acid to triethanolamine (TEOA). The produced PILs were dried under high vacuum at 50 °C for 8 h before use. The PILs were characterized by ^{1}H NMR, ^{13}C NMR, ^{1}H/^{15}N NMR and FT-IR spectroscopic methods. The parameters of IR and NMR spectra of the studied PILs were determined by the nature of the substituent on the sulfonic acid benzene ring. The phase behavior of the PILs was studied using differential scanning calorimetry (DSC) and thermogravimetric analyses (TGA). The temperature dependence of the conductivity and the electrochemical window of each PIL was investigated. The substitution effect on the PILs anionic component was discussed for the studied properties.

Keywords:
Triethanolammonium salts, Protatranes, Ionic liquid, Synthesis, Phase behavior