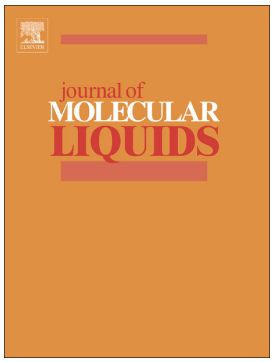

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Thermodynamic properties, excess properties, and molecular interactions of ionic liquids 1-cyanopropyl-3-methyl-imidazolium bis(fluorosulfonyl)imide/trifluoromethanesulfonate and binary systems containing acetonitrile

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ABSTRACT

In this study, two novel binary systems of ionic liquids (ILs) {1-cyanopropyl-3-methyl-imidazolium bis(fluorosulfonyl)imide ([C_3CNmim][FSI]), or 1-cyanopropyl-3-methyl-imidazolium trifluoromethanesulfonate ([C_3CNmim][CF_3SO_3]) + acetonitrile (AN)} are prepared over the whole concentration. Densities (ρ), electrical conductivities (σ), dynamic viscosities (η), and surface tensions (γ) of pure ILs and two binary systems were measured at temperatures from 288.15 to 323.15 K at 101 kPa within the whole composition range. The thermodynamic parameters of pure ILs such as coefficient of thermal expansion (α), standard molar entropy (S^0), and lattice energy (U_{POT}) were estimated. The excess molar volumes (V^E) were obtained from the experimental densities and fitted to Redlich−Kister (R−K) polynomial equation. The dependence of the transport properties (viscosity and conductivity) on temperature can be described by the