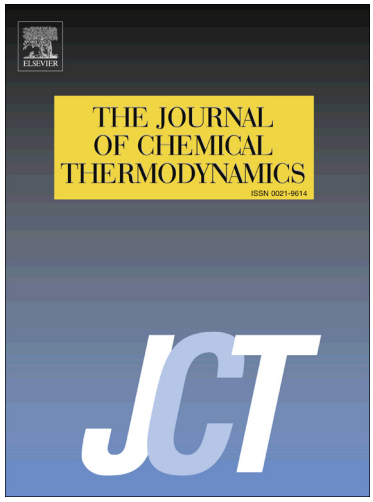

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HIGHLIGHTS

- Density measurements at high pressures of TFE + $[C_1C_4Im][PF_6]$.
- Excess molar volumes have a sigmoid shape.
- Apparent molar volumes of IL indicating hydrogen bonding inexistent or scarce.
- PC-SAFT density correlations of 0.3 % for $[C_1C_4Im][PF_6]$ were obtained.
- An *ARD* of 3.1 % was achieved for PC-SAFT predictions of density for the mixtures.

ABSTRACT

New data of densities at temperatures in the 288.15-333.15 K range and several pressures, up to 40 MPa, have been measured for 2,2,2-trifluoroethanol + 1-butyl-3-methylimidazolium hexafluorophosphate system using a vibrating tube densimeter. The combined expanded uncertainty at the 0.95 confidence level in the density measurements is 2 kg·m^{-3}. Excess molar volumes, V_m^E, and apparent molar volumes, V_φ, were determined from the density values of the pure compounds and mixtures. The influence of the temperature, pressure and composition on V_m^E, V_φ, was studied. In general, the dependence of V_m^E with the mole fraction is sigmoid showing that there is a competition between the breaking and formation of interactions and the packing effect; V_φ was represented using the Redlich-Mayer equation, indicating that hydrogen bonding interactions are inexistent or scarce. Derived properties, κ_T and α_p were calculated from the analytical differentiation of the Tait equation, and it was observed that the variation with pressure and temperature is very small for 1-butyl-3-methylimidazolium hexafluorophosphate. In addition, PC-SAFT parameters of 1-butyl-3-methylimidazolium hexafluorophosphate were optimized using density data at