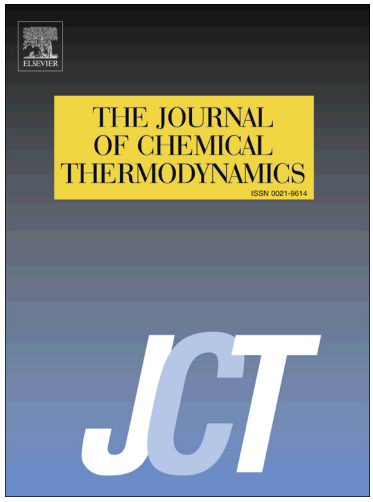

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Abstract

Ionic Liquids (ILs) are task specific materials with tunable properties which may be applied as heat transfer fluids (HTFs) due to their characteristic properties including low vapour pressure, wide liquid range and high thermal stability. This study provides an evaluation of their potential as HTFs from both their physicochemical properties as well as an economic comparison with commonly used materials. The paper presents the thermophysical properties (density, isobaric heat capacity, ionic conductivity, viscosity, thermal stability by TGA, thermal conductivity) and their thermodynamic derivatives (isobaric thermal expansion coefficient, excess molar volume, excess molar heat capacity), as well as the Walden rule of ionicity for a range of hydrophobic ILs based on the trihexyl(tetradecyl)phosphonium, ($[P_{14,6,6,6}]^+$), cation. The ionic liquids studied are trihexyl(tetradecyl)phosphonium acetate ($[AcO]^-$), butanoate ($[ButO]^-$), hexanoate ($[HexO]^-$), octanoate ($[OctO]^-$), and decanoate ($[DecO]^-$), as well as their mixtures with water. It was shown that investigated systems are highly promising materials as HTFs, especially ILs + water mixtures, which may be the solution for many engineering issues.