Synthesis and Properties of Novel Hydrophobic Perfluoro-*tert*-butoxide-based Ionic Liquids

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Ionic liquids (ILs) have been considered a dreamlike chemical due their unique properties, allowing a large variety of applications in all areas of the chemical industries. Diverse combinations of cation and anion lead to different physical properties of ILs. It is estimated that there are about one million possible of pure ILs. It should, however, be highlighted that the hydrophobic ILs are far outnumbered by the hydrophilic ILs, even if that class of ILs have been shown to be promising media for the extraction of compounds from aqueous solution. In this work, we report for first time the synthesis and key physical properties – density, viscosity, surface tension, refractive index, and water solubility – of novel hydrophobic ILs containing the perfluoro-*tert*-butoxide anion, ([Pftb]) as function of temperature and at 0.1 MPa, and compared them with those of other ILs with fluorinated anions. Systematic variation in the cation counterpart demonstrates how the physical properties of these ILs can be readily controlled. The Gardas and Coutinho group contribution methods were applied to the description of the pure component properties allowing the estimation of new group contribution parameters, to extend the applicability of these methods to new ILs. From temperature dependence of the measured properties, additional properties, such as isobaric thermal expansion, the surface entropy and enthalpy, and the critical temperature, were further estimated.