HOW FAR PERCOLATION IN IONIC LIQUIDS IS REFLECTED IN THEIR THERMOPHYSICAL PROPERTIES

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Introduction: The structural segregation in Ionic liquids will depend on the size of the polar and nonpolar regions in each ion may exist as dispersed or continuous microphases. The transition between these two phases is related with the percolation phenomenon, and depends on the relative size of the high-charge and low-charge regions in each ion and the size of the alkyl chain length. The percolation phenomenon in ionic liquids should be reflected somewhere in their thermophysical properties and application.

Experimental: A set of basic thermophysical properties and their temperature dependency (vapour pressures, enthalpies and entropies of vaporization, viscosity, surface tension, refraction index, and heat capacities) were measured and evaluated for imidazolium NTf_2 based ionic liquids.

Results and discussion: The resolution and accuracy of the obtained results allowed the observation of a trend shift along the alkyl chain length and a subtle odd-even effect related with a structural change, in agreement with the percolation model.

Conclusions: The trend of the thermodynamic properties of vaporization together with other selected thermophysical properties will be used to support the percolation model as well to indicate a well-defined alkyl size length limit for the appearance of the nonpolar region, enabling some insights concerning the impact on the properties, functionality and application of the ionic liquids based in the simple model of two distinct regions.