

## Solubility of Unsaturated and Branched Hydrocarbons in Imidazolium Based Ionic Liquids

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Different families of simple gaseous solutes, alkanes[1] or perfluoroalkanes[2], have been used to probe the local structure and molecular interactions in solutions of ionic liquids based on alkylimidazolium<sup>[1]</sup> or tetraalkylphosphonium<sup>[2]</sup> cations. For example, from the study of the dissolution of alkanes in imidazolium-based ionic liquids, two conclusions could be upheld<sup>i</sup>: larger gaseous alkanes are more soluble as they interact more favourably with the non-polar side chains; the gaseous solutes are more soluble in ionic liquids with longer alkyl-side chains because they are more mobile in the media and the solvation is entropically more favourable. We present a study of the solubility of n-butane and 2-methylpropane (isobutane) and of ethane and ethylene in 1-alkyl-3-methylimidazolium based ionic liquids. The influence of several structural features on the solvation properties could be assessed: the branching<sup>[1]</sup> and unsaturation[3] of the solute gas and the size and nitrile functionalization<sup>[3]</sup> of the ions. For example, it was observed that the solubility of isobutane was lower than that of n-butane in all the ionic liquids and that ethylene was more soluble than ethane in all the studied solvents. The differences encountered are rationalized in terms of the molecular interactions involved in the solubilisation process.

### References

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