

Thermodynamics of Gas Dissolution in Ionic Liquids

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During the last decade, Ionic Liquids (ILs) have been the subject of intense studies, spurred by an increasing demand for replacing volatile, toxic liquids in industrial processes by more benign solvents. Besides, these liquids have attracted the attention of the scientific community since they provide an excellent opportunity to broaden our knowledge of the liquid state. For both purposes, the properties of solutions in ILs are of paramount importance. First, because in most potential industrial applications ILs are the media where the process takes place, i.e. the solvent, and properties of the dissolved substances, like reactivity or selectivity, are strongly affected by the medium. In addition, the properties of solutions, especially those containing simple solutes, can help understanding structural aspects and interaction characteristics of the solvent. As a matter of fact, dissolution properties of simple gases in molecular solvents have played a significant role in the development of the present ideas about solvation. In this work, we present experimental results of the partial molar volumes of CO₂ dissolved in alkyl-methyl imidazolium ILs with BF₄⁻, NTf₂⁻ anions. We compare these data with those obtained from gas solubility information. Our conclusion is that both sources of information give similar results provided the ionic nature of the solvent is properly taken into account.