

Solubility of mixed gases in ionic liquids; measurements and predictions at temperature from 303.15K to 443.15K and pressure up to 10MP

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The ionic liquids (IL's) receive keen attention recently as a green solvent for reaction, separation and nano-particle production. In this research, solubilities of CO₂, ethanol and MEAmine in 1-butyl-1-methylpyrrolidinium trifluoro-methanesulfonate([BMIm][CF₃SO₃]) and trihexyltetradecyl-phosphonium bis(trifluoromethylsulfonyl)imide ([P14,6,6,6][Tf₂N]) – a room temperature ionic liquid – have been experimentally studied for development of a CO₂ purification process. The ranges of temperature for experimental measurements are 303.15 K to 443.15 K and pressure up to 10MP, respectively. The results of the experiment are reported as a function of temperature and from the variation of solubility, expressed as Henry's law constants, with temperature, the partial molar thermodynamic functions of solvation such as the standard Gibbs energy, the enthalpy, and the entropy are calculated.