

Effect of Impurities on the Capture of CO₂ using Superbase Ionic Liquids

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Recently Ionic Liquids (ILs) composed of a tetra alkyl phosphonium cation paired with a superbasic anion have been reported to exhibit equimolar CO₂ absorption with efficient CO₂ capture and release. In particular these ILs show only small changes in viscosity after reaction with CO₂ unlike the amino acid based ILs which exhibit large increases in viscosity. In this work the effect of water on the CO₂ capture of [P₆₆₆₁₄][124Triz], [P₆₆₆₁₄][PhO], [P₆₆₆₁₄][Bentriz], [P₆₆₆₁₄][123Triz] and [P₆₆₆₁₄][Benzim] has been evaluated showing that depending on the anion, water can have a positive or negative influence on the CO₂ uptake.¹ The effects of the presence or the absence of water on CO₂-IL interactions have been studied using ¹H and ¹³C NMR spectroscopy. CO₂ absorption/desorption cycles have also been carried out to evaluate the recyclability of the IL as well as studies on the viscosity of the IL before and after CO₂ absorption under dry and wet conditions. Various methods for CO₂ absorption have been used and compared as well as studying the effect of changing the cation. In addition to the effect of water, studies have also been carried out looking at the effect of other impurities commonly present in industrial gas streams eg. CH₄, H₂S, NO_x and SO_x.

References

[1] Taylor et al. J. Solution Chem. 2014, *in press*.