

Effect of the Presence of MEA on the CO₂ Capture of Superbase Ionic Liquids

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Recently efficient CO₂ capture and release has been demonstrated by a set of phosphonium superbase ionic liquids.¹ Further investigation of these promising results has been carried out; including the effect of modifying the cation as well as the study of other superbase anions.² In our studies both gravimetric and volumetric methods have been used to quantify and investigate the CO₂ capture of selected ionic liquid-based solutions. To date, literature studies have focused on CO₂ capture under dry conditions, however for the application of CO₂ capture from flue gas it is important to understand the effect of water on the CO₂ uptake. In this work, the effect of water on the CO₂ capture of [P_{666,14}][124Triz], [P_{666,14}][PhO], [P_{666,14}][Bentriz], [P_{666,14}][123Triz] and [P_{666,14}][Benzim] has been evaluated showing that depending on the anion, water can have a positive or negative effect on the CO₂ uptake.² As well as studying the effect of water, the effect of the addition of monoethanolamine (MEA) as a solvent has been investigated extensively. Currently in the literature the effect of MEA as an added solvent on CO₂ absorption has only been investigated using ILs that physically absorb the CO₂. These studies show that the MEA has no prominent effect on the CO₂ uptake however, it does have an effect on the rate of uptake.[3,4] This is due to the decrease in viscosity on the addition of a solvent. In this work, we investigated this effect when the MEA is added to ILs that chemically absorb the CO₂. Initial results have shown that generally the presence of MEA has the ability to enhance the CO₂ capture in these media suggesting that both the IL and MEA are working synergistically.

References

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