

## Screening Task-Specific Ionic Liquids for Capture/Sequestration of Sour Gases

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A class of *neoteric* organic solvents have gained an unprecedented burst of interest, both by academia and industry, in recent years. Ionic liquids (ILs) large organic cations and asymmetrical organic or inorganic anions compel these molecules to remain liquid at or near room temperature, while presenting, among others properties, negligible vapor pressures, high thermal stability, large liquidus range, nonflammability and high solvation capacity. The tunable properties of ILs, through an endless combination of cations and anions, allow the design of solvents for the development of more efficient and sustainable processes and products. These compounds aptness for fine tuning their properties, cataloged them as *designer solvents*. Nonetheless, the design of a task specific compound postulates the knowledge of what is being designed, which parameters are fixed and which are flexible. Among the several applications foreseeable for task specific ionic liquids such as solvents for reactions involving gaseous reactants and products [1], catalysts for acid-catalyzed organic reactions [2] and chemical absorption [3]. Their use in processes with supercritical gases for capture/sequestration of sour gases like CO<sub>2</sub>, H<sub>2</sub>S and SO<sub>2</sub> in refinery, coal combustion and synthesis of gas streams, is one of the most thrilling. Acidic or basic ILs represent new classes of acids or bases. The study of the acidity/basicity of the ILs is of great importance, since the efficiency of many processes depends on the basicity of the media or can be controlled by it. The present work explores the screening performed on the enhancement of carbon dioxide absorption by ionic liquids. A comparison and evaluation of basic and fluorinated imidazolium based ILs (with the propanoic acid, hexanoic acid, bis(trifluoromethylsulfonyl)imide, acetate and trifluoroacetate anions), in a wide range of pressures and temperatures aiming at a better understanding of the mechanisms of solvation of CO<sub>2</sub>, was performed. This comparison allow not only a better understanding of the anion acid - base interactions with the CO<sub>2</sub> but also the influence of the fluoroalkyl groups in the molecule behavior and consequently, in the CO<sub>2</sub> solubility.

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[2] W. Li, Z. Zhang, B. Han, S. Hu, J. Song, Y. Xie, X. Zhou, Green Chem. 10 (2008) 1142-1145.

[3] G. Yu, S. Zhang, X. Yao, J. Zhang, K. Dong, W. Dai, R. Mori, Ind. Eng. Chem. Res. 45 (2006) 2875-2880.