Supported ILs for CO_2 Capture

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- Acts in line of research of materials and processes to mitigate and control environmental impacts.

Objectives

- Synthesize and characterize ionic liquids (ILs) and ILs supported on zeolites and sol-gel.

- Study the mechanism of interaction between IL systems and support using NMR techniques.

- Compare measurements of CO_2 adsorption on these materials, through the techniques of NMR and thermogravimetric microbalance.

Methodology

The ionic liquid should be synthesized with appropriate structure for immobilization, this can be done in three steps: 1º) the IL is silanized; 2º) incorporation in the silica matrix; 3º) exchange of the anion. Or, in case of sol-gel process, the IL is used directly *in situ* polymerization with the support. Figure 1 shows a comparison between the methods of immobilization via cation.

Characterization: Infrared spectroscopy (FTIR), Nuclear Magnetic Resonance (NMR), Thermogravimetric Analyser (TGA), for monitoring the thermal stability and, Scanning Eletron Microscopy (SEM) for verification the supported ILs. Pressure and Temperature Gravimetric Analyzer (PTGA) for CO_2 adsorption.

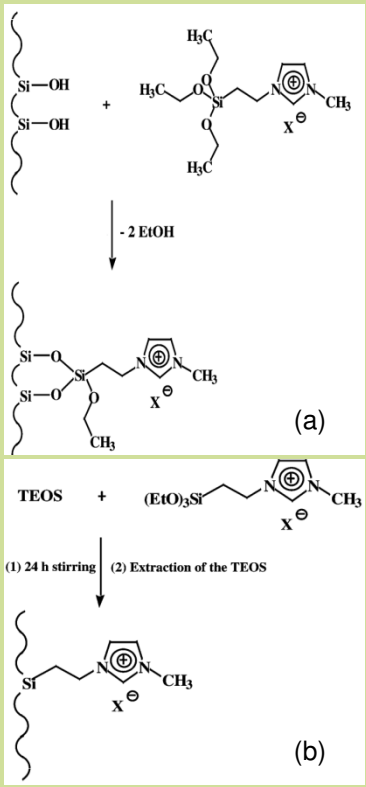

Figure 1. Methodology of immobilization: (a) grafting and (b) sol-gel.

Expected Results

The main result to be achieved is the immobilization of ionic liquids with greater potential for CO_2 capture in order to develop an economic alternative and energetically viable process of carbon sequestration.

Figure 2 presents a graphic that compares CO_2 adsorption in pure IL with a IL supported on zeolite (25 %, MCM-41) and these results follow the same trend.
The FTIR, TGA, SEM and NMR (solid state) analysis confirms that the IL is covalently bonded to the support surface.

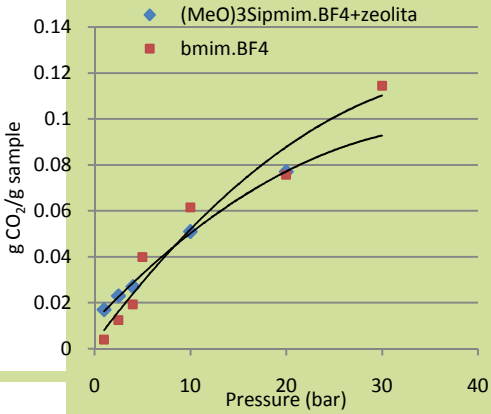

Figure 2. CO_2 adsorption.

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