FCT FACULDADE DE CIÊNCIAS E TECNOLOGIA UNIVERSIDADE NOVA DE LISBOA

Chemical Department

Development of Supported Magnetic Ionic Liquid Membranes

Biochemical and Process Engineering Group

requimte rede de química e tecnologia

bpeg

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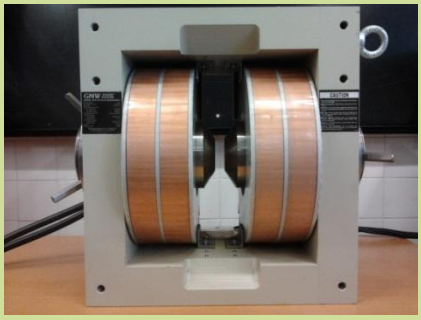
Scientific Articles: 1

Objectives

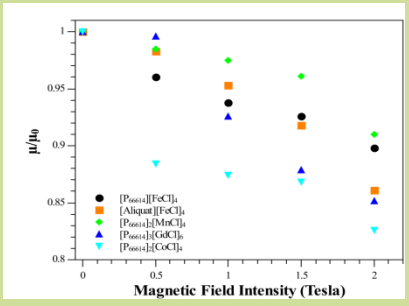
The aim of this work is the development of stimuli-responsive membranes by incorporating magnetic ionic liquids (MILs).
The magnetic behaviour of MILs will be evaluated by the impact of the magnetic field on the intrinsic physico-chemical properties allowing the design of supported magnetic ionic liquid membranes, (SMILMs), which are able to respond to distinct magnetic fields through a dynamic and controlled switch of their properties.



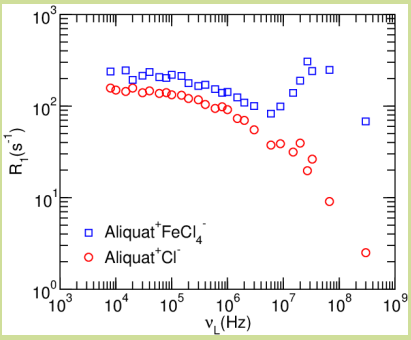
Methodology

The characterization studies of MILs were performed in order to understand the effect of magnetic field intensity (0.5 – 2 T) on the physico-chemical properties of MILs (e.g. solubility, viscosity, diffusion). The solubility and viscosity were measured using an electromagnet with intensities up to 2 T. 1H-NMR, Proton nuclear magnetic resonance relaxometry analysis provides direct information about the molecular dynamics and self-diffusion properties of the system. The results of the magnetically induced molecular rearrangements of MILs and their physicochemical macroscopic behaviour will be used to design and optimise transport studies of different chemical species under magnetic field conditions.

Viscosity



^{1}H - NMR



Expected Results

The development of MILs with optimal designs is drive by an in-depth comprehension of the influence of the magnetic field on their physico-chemical properties. The knowledge obtained from the magnetic characterisation of MILs is expected to get SMILMs with improved chemical and structural stability, capable of changing reversibly their intrinsic properties when exposed to distinct magnetic field conditions, leading to membranes with tunable and improved permeability and selective separation of solutes.

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