Title: Pore Wetting Behavior of Ionic Liquids in Polymeric Membranes

Authors: Bharath Tata, James A. Nabity

Abstract

Supported ionic liquid membranes (SILMs), comprised of an ionic liquid (IL) suspended in the pores of a thin physical membrane support, have potential for use in gas separations. SILMs can continuously and selectively transport target gases from feed side of the membrane to the permeate side without the need for liquid sorbent flows or temperature-pressure cycling to regenerate solid or liquid sorbents. These complexity-reducing and power-saving advantages, combined with the stability of ILs in low-pressure environments, makes SILM-facilitated gas separations attractive for use in space applications.

SILM construction requires the imbibition of an IL into the pores of a membrane, a process governed by complex surface chemistry. In this poster we describe wetting phenomena on rough and porous surfaces and extend the lessons learned to pore imbibition in SILMs focusing on implications for initial wetting, mass transfer performance, and long-term stability. We report results of pore wetting behavior of the ionic liquid 1-butyl-3-methylimidazolium acetate on different membrane supports and the effect of surface and environment modifications on wettability.