

Olefin/Paraffin Separation Using PLA-Silver Containing Ionic Liquids Membranes

Carla Gonçalves^C, João Coutinho and Isabel M. Marrucho^S
CICECO, Chemistry Department, Aveiro University, Aveiro, Portugal

The separation of olefins and paraffins is of pivotal importance in the petrochemical industry. Since the conventional cryogenic distillation process is quite expensive and energy-intensive, the development of new energy saving and cost-effective processes are in demand. Membrane separation technology has been studied as a possible alternative. Kim et al. [1] showed the important role of the use of polar polymers with free oxygen atoms in facilitated olefin transport. Using this approach, Gonçalves et al. [2] studied the use of poly(lactic acid), PLA, membranes in ethane/ethylene separation, but low solubility/selectivity of ethylene over ethane was obtained.

In the present work, 1-(1-methyl-3-imidazolium)propane-3-sulfonate nitrate was tested as a possible carrier in PLA membranes. The interaction between the PLA and the ionic liquid was studied by FT-IR and FT-Raman. The prepared membrane was characterized using conventional techniques. The pure gas sorption has been determined with ethane, ethylene, propane and propylene using the QCM technique and the characterization of gas permeation properties studied by the time-lag method.

1. Kim, J.H., J. Won, and Y.S. Kang, *Olefin-induced dissolution of silver salts physically dispersed in inert polymers and their application to olefin/paraffin separation*. Journal of Membrane Science, 2004. **241**(2): p. 403-407.
2. Goncalves, C.M.B., J.A.P. Coutinho, and I.M. Marrucho, *Light olefins/paraffins sorption in poly(lactic acid) films*. Journal of Polymer Science Part B-Polymer Physics, 2008. **46**(13): p. 1312-1319.