

Silica-BPPO Nanocomposite Membranes for CO₂ Separation

X.H. Hu^S, H.C. Cong, Y.S. Shen, and M.R. Radosz^C

*Department of Chemical and Petroleum Engineering, University of Wyoming, Laramie, WY, U.S.A.
radosz@uwyo.edu*

Bromine modified 2,4-dimethyl-1,6-phenylene oxide (BPPO) mixed with 2 nm, 10 nm, and 30 nm of silica is found to form compatible nanocomposite membranes with enhanced CO₂ and O₂ permeability at constant CO₂/N₂, CO₂/CH₄, and O₂/N₂ selectivity. The CO₂ separation performance increases with an increased content of silica in the nanocomposite membrane. 10 nm of silica exhibits the best CO₂ separation properties. The CO₂/N₂ and O₂/N₂ separation is primarily due to the solubility differences, while the CO₂/CH₄ separation is primarily due to the diffusivity difference.