Experimental Properties of Sulfonated Polyimide at Room Temperature

# 1. Permeability of Carbon Dioxide (CO₂)

Sulfonated Polyimide (SPI) membranes show CO₂ permeability values typically ranging from 50 to 400 Barrer, depending on the specific membrane composition and conditions.

Reference: Sulfonated polyimide/ionic liquid composite membranes for carbon dioxide separation. \*Polymer Journal\*. Available at: https://www.nature.com/articles/s41427-019-0155-5.pdf.

# 2. Permeability of Oxygen (O₂)

The permeability of O₂ through SPI membranes is generally lower than that of CO₂, typically in the range of 10 to 30 Barrer.

Reference: Chaidou, C.I., Pantoleontos, G., Koutsonikolas, D.E., Kaldis, S.P., Sakellaropoulos, G.P. (2012). Gas separation properties of polyimide-zeolite mixed matrix membranes. \*Separation Science & Technology\*, 47, 950–962. DOI: 10.1080/01496395.2011.645263.

# 3. Activation Energy

The activation energy for gas diffusion in SPI can vary based on the gas type and membrane configuration. For CO₂, the activation energy is typically found to be in the range of 10 to 25 kJ/mol.

Reference: Dinari, M., Ahmadizadegan, H., Asadi, P. (2015). Thermal, mechanical, and optical transport properties of nanocomposite materials based on triethoxysilane-terminated polyimide and TiO₂ nanoparticles. \*RSC Advances\*, 5, 60745–60753. DOI: 10.1039/C5RA12562F.