

Polyvinylidene Fluoride (PVDF)/Poly (Ether Sulfones) (PES) Blend Membrane for CO₂/CH₄ for Gas Separation

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Abstract

In this study, a combination of Polyvinylidene fluoride (PVDF) and Poly (ether sulfones) (PES) blend membrane and DMF as solvent component was developed to evaluate the CO₂ and CH₄ separation performance. The gas permeation test was thereafter conducted on the membrane produced. The separation through a membrane works on the theory of permeation based on permeability and selectivity. These two important values were estimated using a set of analytical functions. The membranes produced was then characterized using scanning electron microscopy (SEM) and the Fourier Transform Infrared Spectroscopy (FTIR). The result obtained revealed a higher permeability for the CO₂ and CH₄ gases when the blending ratio of PVDF: PES: DMF/ 5:15:80 were applied. Moreover, the selectivity results showed that the use of the blending ratio of PVDF: PES: DMF/20:0:80 produce the highest selectivity (1.3086 GPU) while blending ratio of PVDF: PES: DMF/10:10:80 exhibited the least selectivity. Moreover, the morphological elucidation revealed the presence of pores for every cross-section composite membrane and this aids the permeability properties of the membrane aggregates at different blending ratio. Also, the FTIR results showed nearly similar functional group characteristics

Keywords: Permeability; Selectivity; Membrane, Gas separation blending.