

## **Mixed Matrix Membrane Incorporating of MgAl-CO<sub>3</sub> Layered-Double-Hydroxide for Enhanced Carbon Dioxide Separation**

### **ABSTRACT**

In this study, mixed matrix membranes were fabricated by incorporating MgAl-CO<sub>3</sub> layered double hydroxides (LDH) into polysulfone (PSF) coated with low-cost commercial PEBA polymer for enhancing CO<sub>2</sub>/CH<sub>4</sub> separation. LDH was synthesized via a simple co-precipitation method and flat sheet membranes were fabricated by dry/wet inversion phase. The gas separation performance on pure PSF and LDH/PSF membranes were investigated. The physical property, chemical structure and membrane morphology were characterized by XRD, FTIR, and SEM. The sample membranes were tested with CO<sub>2</sub> and CH<sub>4</sub> gas for permeance performance and selectivity of CO<sub>2</sub>/CH<sub>4</sub> was calculated. By incorporation of LDH, the CO<sub>2</sub> permeance increased about 54.6%. LDH mixed matrix membranes displayed the 18.2 GPU of CO<sub>2</sub> permeance and CO<sub>2</sub>/CH<sub>4</sub> selectivity of 18.0. The LDH based membrane produces innovation in membrane technology by improving its morphology and permeance performance with great potential for large-scale CO<sub>2</sub> capture and separation.