

## **Sustainability in petrochemical industry: mixed matrix membranes from polyethersulfone/cloisite15a® for the removal of carbon dioxide**

### **Abstract**

Polyethersulfone membranes embedded with surfactant modified montmorillonite clay, cloisite15A® were prepared. In this work, membrane fabrication protocols, microstructural characterization, and gas permeation measurements were combined to demonstrate the improvement in gas separation properties by the mixed matrix membrane. Permeability and selectivity of carbon dioxide and methane were determined for the unfilled and filled membranes with organoclay loadings of 0.25 to 1.0 wt%. Physical properties of the membranes were determined by using scanning electron microscopy (SEM). Unfilled membrane exhibits lower gas permeability and selectivity compared to the coated filled polyethersulfone membrane with 1.0 wt% achieved the highest selectivity (46.89) and CO<sub>2</sub> permeance of 3.71 GPU. Improvement in gas separation properties upon coating and thermal curing shows the potential of clay nanoflakes polymeric membrane as a promising approach in the separation of the gas pairs.