

## Comparative studies of thin-film, CO<sub>2</sub>-selective mixed-matrix membranes with 2 MOFs

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In this study, thin-film, CO<sub>2</sub>-selective mixed-matrix membranes comprising two different zirconium-based metal-organic frameworks (MOFs), MIL-140 and UiO-67, were prepared. MOFs were dispersed into polymer matrix, poly(glycidyl methacrylate-co-poly(oxyethylene methacrylate)) (PGO). With highly adhesive property of PGO, prepared MMMs showed high compatibility with both MOF fillers without any interfacial defects. Two MOFs have different structures such as pore sizes, morphologies although both are synthesized using same materials. MIL-140C shows rod-shaped morphology with 1D channel pores whereas UiO-67 has polyhedral morphology with tetrahedral/octahedral pores with larger pore sizes. These properties of MOFs made differences to degree of polymer infiltration into the MOF pores resulting different CO<sub>2</sub> separation performances. MMMs with MIL-140C showed higher CO<sub>2</sub>/N<sub>2</sub> and CO<sub>2</sub>/CH<sub>4</sub> separation performances than those with UiO-67 due to less infiltration and structural benefits. Among fabricated MMMs, PGO/MIL-140C MMM at 20 wt% loading showed the best performance with CO<sub>2</sub> permeance of 1768 GPU and CO<sub>2</sub>/N<sub>2</sub> and CO<sub>2</sub>/CH<sub>4</sub> selectivities of 38 and 16, respectively.

### Reference

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