Tuned Metal-Organic Framework Membranes with Graphene Oxide Nanoribbons for CO_2/CH_4 Separation

최은지, 김대우†
연세대학교
(audw1105@yonsei.ac.kr†)

Metal-Organic Frameworks (MOFs) based membrane are promising for various gas separation due to its molecular sieving property. Especially, the pore size of Zeolitic Imidazolate Framework-8 (ZIF-8)-based membrane is 4.0 Å, which is effective to separate hydrogen. To improve the gas separation performance, the study of tuning pore size of MOFs has been developed. The pore size of ZIF-8 has been tailored by post-treatment such as vapor ligand or thermal treatment. However, these methods are required to well synthesized ZIF-8 membrane and extra steps. Herein, we introduced graphene oxide nanoribbons (GONR) on the polymeric support. Oxygen functional groups and sp^2 carbon domain of GONR enhanced the direct growth of ZIF-8 crystal on the polymeric support and the rigidity of ZIF-8 by anchoring ZIF-8 layer due to metal-carbon chemisorption. Therefore, the tailored pore size of ZIF-8 was 3.6 Å, showing good gas separation for carbon dioxide/methane and CO_2 permeance of 4×10^{-9} mol/m^2·pa·s.