Investigation of Layered Double Hydroxide as Inorganic Filler for Mixed Matrix Membrane

Velianti, 박승빈*
KAIST
(sbpark7@kaist.ac.kr*)

Mixed matrix membrane (MMM) made from layered double hydroxide (LDH) and polydimetylsiloxane (PDMS) has been prepared to separate carbon dioxide from methane. LDH is clay-type layered compound stabilized by anion between layers which is able to exchange its anion. For intercalation, both interlayer spacing and surface chemistry are necessary to be modified. In this study, LDH was modified with two different surfactants: 1-butane sulfonate and 1-octane sulfonate, to make it compatible with hydrophobic PDMS and fabricate defect-free flat MMMs. Also, casting conditions of flat MMMs, such as concentration, additives, etc. will be varied. The resulted modified LDHs have been characterized with Scanning Electron Microscopy, X-Ray Diffraction, nitrogen sorption and desorption, and Fourier Transform Infrared Spectroscopy. The results show that LDH has been modified successfully using both surfactants even though the ion exchange mechanism and microstructure of modified-LDH are different. Nitrogen sorption/desorption data show that surfactants can introduce mesoporous characters to LDH even though the pore size does not vary dramatically.