

In-situ Fabrication of Silver-PDMS Nanocomposite Membrane with Application in Olefine Separation

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Abstract : In this study, silver nanoparticle-Polydimethylsiloxane membrane (SNP-PDMS) was prepared with an in-situ reduction method using AgNO₃ in poly (dimethylsiloxane) hardener. Optical and mechanical properties as well as functionality of these membranes were determined employing, UV-Vis spectrophotometry, FTIR, strain-stress test and liquid/liquid filtration measurements. Silver nanoparticles are known to selectively absorb Olefins and may be used for separation of Alkanes from olefins. Yellow color of silver nanocomposites and transparency of blank polymer were observed employing optical microscope. λ_{max} in 415-420 nm regions in UV-Vis spectrophotometry are related to silver nanoparticles absorbance. Based on stress-strain test results, tensile strength of silver nanoparticle PDMS (SNP-PDMS) membranes is higher than PDMS films of comparable size and thickness. Moreover, permeability of SNP-PDMS membranes were characterized using similar olefin/paraffin pair using a simple bench scale separation set- up. The silver -PDMS membranes retain their color and UV-vis characteristics for extended periods of time exceeding several months.

Keywords : nanocomposite membrane, gas separation, facilitated transport, silver nanocomposite, PDMS, in-situ reduction

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