

Instytut Inżynierii Chemicznej

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Enhanced CO₂/N₂ separation by supported ionic liquid membranes (SILMs) based on PDMS and 1-ethyl-3-methylimidazolium acetate

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The study of CO₂/N₂ separation by supported ionic liquid membranes (SILMs) based on polymeric membrane with ceramic support is presented. The SILMs have been developed by impregnation of the ceramic support of commercial polydimethylsiloxane (PDMS) membrane with ionic liquid: 1-ethyl-3-methylimidazolium acetate ([Emim][Ac]). The objective was to investigate the CO₂/N₂ separation enhancement and stability of the prepared SILMs. The effects of the feed temperature, pressure difference and impregnation method on performance of developed SILMs were analyzed. Two methods of impregnation were used: coating and soaking. The comparison of separation efficiency of the SILMs prepared by the coating method shows good long-term stability and very high CO₂/N₂ selectivities up to 152. The obtained results present an inexpensive alternative in the selective CO₂/N₂ separation by SILMs. The comparison with Robeson upper bound correlation and literature data shows that applying an appropriate ionic liquid and impregnating method to the PDMS membrane results in significant improvement of separation performance.

Metryczka

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