

Enhanced permeance by incorporation of porous materials for facilitated olefin transport membranes

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The separation performance of olefin/paraffin mixtures, such as ethylene/ethane and propylene/propane, is a very significant industrial process. Previously results reported that when permeable polymer, poly(ethylene oxide) (PEO), was used as polymer matrix for facilitated transport membrane, the separation performance was enhanced. The selectivity and permeance were measured as about 10 and 20 GPU, respectively. However, in cost aspect, silver complex still have been a problem for application of practical process. In this study, although the content of silver salt was diminished, the facilitated olefin transport membranes to show the high separation performance were prepared by utilizing the porous inorganic material, KIT-6 to enhance the capacity of olefin carrier. Because of both porous properties and hydroxy group of KIT-6, even though diminished content of silver salt as olefin carrier was incorporated into the membrane, the PEO/AgBF₄/Al(NO₃)₃/KIT-6 composite membranes still could show excellent separation performance. The coordinative interaction was characterized by using FT-IR, FT-Raman, XPS and TGA analysis.