

Preparation of facilitated transport membranes using Ag⁺ - chitosan complex and their propylene/propane separation properties

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The separation of light olefin/paraffin is an important process in petrochemical refining industries. Traditionally, cryogenic distillation process has been used for a long time. But due to their similar size and condensability (or volatility), this process has been carried out under the energy-consuming conditions - low temperature, high pressure and large distillation column in separation trains. Many researchers have investigated the alternative processes [1,2]. Among them, the most attractive technology is a facilitated or carrier-mediated transport membrane using the reversible -complex formation between transition metal ions and double bond of olefin compounds. In this paper, Ag⁺ -containing chitosan chelate membrane was prepared as a new water-swollen membrane material with facilitated transport property. AgNO₃ is chosen as a facilitation agent because Ag⁺ is known to be the most non-toxic among transition metal ions. Chitosan is also chosen because it can form easily water-swollen chitosan chelate membranes containing high Ag⁺ content due to its abundant amino groups to make the coordinated sites toward the transition metal ions.