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ABSTRACT:

Pervaporation as a tool to remove the residual water in biological resources, such as fusel oils (by-product of alcohol fermentation), is gaining increasing importance and consist with sustainable development well. In this study, polyelectrolyte complexes/silica (PEC/SiO_2) hybrid hollow fiber membranes were prepared *in situ* via sol-gel process on polysulfone ultrafiltration support membrane. γ-glycidyloxypropyltrimethoxysilane (GPTMS) was introduced as precursor and crosslinker into poly (diallyldimethylammonium chloride)–sodium carboxymethyl cellulose complexes to form SiO_2 particles *in situ* and enhance the interaction between inorganic and organic components. The physicochemical properties and morphology of the membranes were characterized by FT-IR, FESEM, EDS, etc. PEC/SiO_2 membrane (PECM/SiO_2) achieved an enhanced flux compared with the PEC pristine membrane without GPTMS. The membranes possessed a flux of 1332 g/m^2h and water content in permeate of 99.0 wt% for the dehydration of fusel oils at 60 ^oC. The effects of feed temperature and water content in feed on pervaporation performance were also investigated. Furthermore, the performance of PECM/SiO_2 for the batch continuous dehydration application of fusel oils was more efficient than PERVAP-1001 commercial membranes. This approach provided a convenient way to prepare PEC/SiO_2 hybrid hollow fiber membranes, which were potentially applied in fusel oils pervaporation dehydration processes.

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