

第217回講演会
【開催:2022年8月31日(木)】

主催 中国地区化学工学懇話会, 化学工学会分離プロセス部会膜工学分科会

下記の要領で講演会を開催します。多数の方のご参加を頂きますようお願い致します。

記

日時: 2022年8月31日(水) 10:30~11:30

場所: 広島大学工学部A4棟大学院生講義室 A4-112

交通: 山陽本線西条駅下車、バス15分、大学会館前下車

山陽新幹線東広島駅下車、タクシー10分

広島バスセンターから直行バス約1時間、大学会館前下車

講演: Molecular separation by robust polycrystalline metal-organic framework membrane

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講演内容:

Membrane process for organic solvent nanofiltration (OSN) is an urgent technology for products purification in chemical, biochemical, and pharmaceutical industries. Currently, the efficient separation of large molecules in the biochemical industry requires the membranes to be robust in organic solvents and have regular pore sizes. However, the stability and flexible requirements are not met by conventional polymer, ceramic, and zeolite membranes due to the issues of swelling, leaching, and small and irregular pores. Metal-organic frameworks (MOFs), consisting of metal ions coordinated to organic linkers, have great potential for separation because of their uniform and controllable pore sizes. However, the permeance of existing MOF membranes is still too low for industrial OSN applications. Herein, we report the fabrication of high-permeance iron(III)-based PCN-250 polycrystalline MOF membranes for organic solvent nanofiltration. A continuous and dense membrane with a small thickness of 3.7 μm was obtained under a synthesis time of 4 h. This membrane exhibits pure solvent permeance as high as 337.9 $\text{L m}^{-2} \text{h}^{-1} \text{bar}^{-1}$ (LMH/bar) for methanol, and 17.2 LMH/bar for N-methyl-2-pyrrolidone (NMP) at room temperature. In addition, the PCN-250 membrane exhibits excellent molecular separation performance (methyl blue rejection of 93.7%) alongside high NMP permeance of 2.6 LMH/bar. Moreover, XRD and morphology studies, and continuous permeation test of membrane confirm that the PCN-250 membrane has good resistance toward water, acid, and organic solvents. This remarkable separation performance, combined with the outstanding solvent stability, make the PCN-250 membrane a promising candidate for organic solvent nanofiltration.

参加費: 無料

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中国地区化学工学懇話会

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