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Prussian Blue/Chitosan Mixed-Matrix Membranes with Improved Separation Performance of Ethanol/Water Mixtures

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Abstract : Porous Prussian Blue (PB) nanoparticles were successfully incorporated into chitosan (CS) membranes to form PB/CS mixed-matrix membranes (MMMs) and the as-prepared PB/CS MMMs were used to dehydration of ethanol at 25 oC in the pervaporation process. The effect of PB loading in CS matrix on pervaporation performance was investigated. The FESEM, EDS, FTIR and XRD measurements were also used for the characterization of the PB/CS MMMs. The PB/CS membranes with 30 wt% PB loading show the best performance with the permeate flux of 614 g/m2h and the separation factor of 1472. The pervaporation using the PB/CS membranes exhibits outstanding performance as compared with the previously reported CS based membranes and MMMs. The present work demonstrates good pervaporation performance of the PB/CS MMMs for the separation of 90wt% ethanol aqueous solution, moreover, it has an opportunity for dehydration of bioethanol in this system of pervaporation.

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