

Preparation and application of novel multi-walled carbon nanotubes/ polysulfone nanocomposite membrane for chiral separation

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ABSTRACT

The novel β -cyclodextrin-carboxylated multi walled carbon nanotubes (cMWCNTs)/polysulfone nanocomposite membranes with variable amount of nanoparticle were prepared by wet phase inversion method. Effects of the amount of β -CD-cMWCNTs supramolecular hybrid material on membrane morphology, rejection of bovine serum albumin (BSA), permeation and enantioselectivity were examined. The morphology and chemical compositions of these nanocomposite membranes were characterized by scanning electron microscope (SEM) and attenuated total reflection fourier transform infrared (ATR-FTIR) spectroscopy, respectively. Furthermore, water flux, rejection of BSA and enantioselectivity were used to evaluate the performance of these nanocomposite membranes. As for the enantioseparation of tryptophan enantiomers, filtration experiments were carried out using a dead-end filtration cell holding a flat sheet membrane. In addition, the complete separation of tryptophan racemates can be achieved using a separation system based on multi-stage filtration separation of this novel nanocomposite membrane.

Keywords: Enantiomeric separation; Multi-stage filtration; Nanocomposite membranes; Racemic tryptophan

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