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Effect of diluents on the characteristics of cellulose diacetate membranes prepared via thermally induced phase separation method

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ABSTRACT

Cellulose diacetate hollow fiber membranes were fabricated via thermally induced phase separation (TIPS) method to investigate the effect of diluent on membrane characteristics. Ethylene glycol (EG), diethylene glycol, triethylene glycol and tetraethylene glycol were used as diluent. Asymmetric membrane structures with dense layers on the outer surfaces and porous structures on the inner surfaces were obtained. When EG was used as diluent, the phase separation temperature of the cellulose diacetate solution was high, resulting in the large pore on the inner surface of the fabricated membrane. This is because solution with higher phase separation temperature has the longer coarsening time for the structure. The rejection experiment elucidated that the membrane fabricated from diluent of lower phase separation temperatures showed the higher rejection. The membranes with ultrafiltration property were successfully prepared by TIPS method.

Keywords: Thermally induced phase separation; Cellulose diacetate; Phase separation temperature; Rejection; Diluent

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