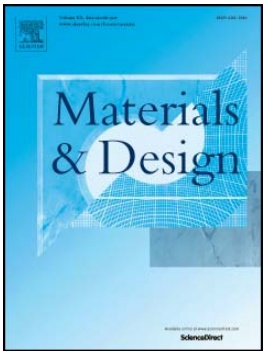

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An improved process for polyvinylidene fluoride membrane preparation by using water soluble diluent via thermally induced phase separation technique

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Abstract

Polyvinylidene fluoride (PVDF) membranes without surface pores were prepared by using water soluble diluents, diethylene glycol monoethyl ether acetate (DCAC), via thermally induced phase separation (TIPS) technique. The effects of PVDF concentration, temperature of coagulant and DCAC concentration in coagulation bath on membrane structures and properties were studied. The antifouling property of membrane with or without surface pores was compared by humic acid (HA) solution and the recovery of DCAC in aqueous solution was investigated. Membranes were characterized by porosity, pure water flux and retention to bovine serum albumin (BSA). Membrane structures were inspected by SEM. The crystal forms of membranes were analyzed by FTIR and XRD. The results show that a compact skin layer and a support layer with spherulitic structure form when DCAC is diluent. Higher polymer concentration and higher coagulation temperature promote the formation of α phase crystal, while higher DCAC concentration in coagulation bath promotes the formation of β phase crystal. Membrane without surface pores has better antifouling property than the membrane with surface pores. Dichloromethane is the best extractant to recover DCAC in DCAC aqueous solution.

Key words: polyvinylidene fluoride; diethylene glycol monoethyl ether acetate; surface pore; antifouling; recovery