Abstract

Poly(vinyl chloride) (PVC) hollow-fiber membranes were spun by a dry/wet phase-inversion tech-nique from dopes containing 15 wt % PVC to achieve membranes with different pore sizes for ultrafiltration (UF) applications. The effects of the N,N-dimethylaceta-mide (DMAc) concentration in the internal coagulant on the structural morphology, separation performance, and mechanical properties of the produced PVC hollow fibers were investigated. The PVC membranes were character-ized by scanning electron microscopy, average pore size, pore size distribution, void volume fraction measurements, and solubility parameter difference. Moreover, the UF experiments were conducted with pure water and aqueous solutions of poly(vinyl pyrrolidone) as feeds. The mechani-cal properties of the PVC hollow-fiber membranes were discussed in terms of the tensile strength and Young's modulus. It was found that the PVC membrane morphol-ogy changed from thin, fingerlike macrovoids at the inner edge to fully spongelike structure with DMAcconcentra-tion in the internal coagulant. The effective pores showed a wide distribution, between 0.2 and 1.1lm, for the mem-branes prepared with H2O as the internal coagulant and a narrow distribution, between 0.114 and 0.135lm, with 50 wt % DMAc. The results illustrate that the difference in the membrane performances was dependent on the DMAc concentration