Preparation and Removal Properties of Hollow Fiber Membranes for Drinking Water

Authors : Seung Moon Woo, Youn Suk Chung, Sang Yong Nam

Abstract : In the present time, we need advanced water treatment technology for separation of virus and bacteria in effluent which occur epidemic and waterborne diseases. Water purification system is mainly divided into two categorizations like reverse osmosis (RO) and ultrafiltration (UF). Membrane used in these systems requires higher durability because of operating in harsh condition. Of these, the membrane using in UF system has many advantages like higher efficiency and lower energy consume for water treatment compared with RO system. In many kinds of membrane, hollow fiber type membrane is possible to make easily and to get optimized property by control of various spinning conditions such as temperature of coagulation bath, concentration of polymer, addition of additive, air gap and internal coagulation. In this study, polysulfone hollow fiber membrane was successfully prepared by phase inversion method for separation of virus and bacteria. When we prepare the hollow fiber membrane, we controlled various factors such as the polymer concentration, air gap and internal coagulation to investigate effect to membrane property. Morphology of surface and cross section of membrane were measured by field emission scanning electron microscope (FE-SEM). Water flux of membrane was measured using test modules. Mean pore diameter of membrane was calculated using rejection of polystyrene (PS) latex beads for separation of virus and bacteria. Flux and mean flow pore diameter of prepared membrane show 1.5 LPM, 0.03 µm at 1.0 kgf/cm2. The bacteria and virus removal performance of prepared UF membranes were over 6 logs.

Keywords : hollow fiber membrane, drinking water, ultrafiltration, bacteria
Conference Title : ICCE 2016 : International Conference on Chemical Engineering
Conference Location : Bali, Indonesia
Conference Dates : October 13-14, 2016