



Structure and properties of membrane at different ages in drinking water treatment

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ABSTRACT

Effects of membrane aging and chemical cleaning on hollow fiber (HF) membrane properties (morphology, permeability, porosity, hydrophilicity, and physical strength) were systematically investigated by using membrane samples at different ages from a full-scale drinking water membrane filtration plant. Scanning electron microscopic images showed that the extent of fouling on membrane surfaces increased and the diameter of HF membrane decreased with membrane age extended. Membrane permeability, porosity, and break strength were also decreased with an increase in membrane age. Dextran rejection results and scanning electron microscope images showed the same trend in a decrease in membrane pore size with the membrane operational time extended. Chemical cleaning studies showed that organic fouling was important fouling mechanism. The membrane permeability, porosity, and hydrophilicity improved after chemical cleaning. The deterioration of membrane performance with an increase in membrane age correlated well with the changes in membrane properties and fouling.

Keywords: Membrane properties; Membrane aging, Membrane structure, Chemical cleaning; Permeability; Surface morphology

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