

Development of Next-Generation Membrane for Seawater Treatment

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Summary

Membrane fouling caused by adsorption of organic foulants onto membrane surfaces is a difficult problem in various applications. Surface modification of porous membranes with poly (2-methacryloyloxyethyl phosphorylcholine (PMPC) that is a well-known artificial biomaterial has a high potential for preparing anti-fouling surface. In this study, surface of microfiltration (MF) membrane was modified with PMPC brushes in order to develop the next-generation membrane for seawater treatment. The PMPC brush was prepared by using surface-initiated atom transfer radical polymerization (SI-ATRP) method. Structural parameters of the polymer layers on silicon wafer were characterized by ellipsometry and scanning probe microscopy (SPM). The thickness and surface roughness of the PMPC brushes can be controlled with polymerization conditions. The performances of the porous ceramic membranes with nominal pore size of 50 nm and 400 nm modified under various polymerization conditions were also evaluated by filtering tests. As a result, effectiveness of the modification method for development of the next-generation membrane were suggested.