

The Superparamagnetic Hollow Fiber Membrane Contactor for Dissolved Oxygen Removal from Water

Velianti, Pil Yeon Hwang¹, Pil Woo Heo¹, 박승빈†

Chemical and Biomolecular Engineering, Korea Advanced Institute of Science and Technology; ¹Department of Extreme Thermal Systems, Korea Institute of Machinery and Materials

(sbpark@kaist.ac.kr†)

Removal of dissolved oxygen (DO) in water is an important process for reducing corrosion in the boiler feed water system, preventing the formation of oxide layer on silicon wafer, and developing artificial gills. In this study, hydrophobic magnetic hollow fiber membrane is proposed as a new membrane contactor for DO removal. The separation is based on the magnetic interaction, where the paramagnetic oxygen molecules are expected to be separated through the magnetic membrane. The superparamagnetic membrane was prepared by coating polytetrafluoroethylene (PTFE) hollow fibers with commercial superparamagnetic particles. The coated fibers have magnetic particles concentration of 0.9 mg/cm². To study the relation between membrane operational conditions and the contribution of magnetic field for DO removal, the coated fibers module with total surface area of 208 cm² were prepared. The performance of superparamagnetic PTFE hollow fiber will be determined at different water flow rates and vacuum strengths.