Modification of commercial Ultrafiltration and Nanofiltration embranes by UV-photografting Technique for Forward Osmosis Application

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Abstract.
We introduce a novel approach to modify conventional pressure-driven membrane by ultraviolet (UV)-photografting technique for forward osmosis application. Both ultrafiltration polyethersulfone (UFPES) and nanofiltration polyethersulfone (NFPES) membranes were modified using two grafting parameters namely the grafting time and monomer concentration (acrylic acid). Evaluation and comparison were made on the performance in forward osmosis (FO) mode and reverse osmosis (RO) mode. The result shows that the effects of polyacrylic on the polyethersulfone (PES) can be conveniently controlled by controlling the grafting parameters via one factor at a time (OFAT). However, a detailed comparison between these two membranes has identified that only NFPES was suitable in FO application. Even the modified membranes exhibit greater water fluxes, the salt rejection for NFPES membrane is 59 percent while the UF membrane produced less than 1 percent. Therefore, UV-photografting of NFPES membrane can be considered as an alternative technique to improve commercial membrane performance in FO application.

Keyword: commercial Ultrafiltration; Nanofiltration Membranes; Osmosis Application