

Thin film composite membrane with electrospun polysulfone-graphene oxide nanofiber support layer for forward osmosis application

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Forward osmosis (FO) is a promising alternative technology for desalination, wastewater treatment, and power generation due to its energy efficiency and lower membrane fouling propensity compared to existing technologies e.g. reverse osmosis. However, membrane development hampers its commercialization. Herein, hydrophilic graphene oxide (GO) was incorporated to the electrospun polysulfone (PSf) nanofiber and subsequently used as support layer for thin-film composite (TFC) membrane. Results showed that PSf-GO support has improved porosity, hydrophilicity, mechanical strength, and reduced tortuosity. Furthermore, the prepared TFC membrane exhibited noteworthy FO performance as compared to the pristine PSf TFC membrane which demonstrates that electrospun nanofiber incorporated with hydrophilic nanoparticles is a promising support layer for high performance TFC FO membrane. This work was supported by NRF funded by the Korea government funded by the Ministry of Science and ICT (2016R1A2B1009221 and 2017R1A2B2002109) and Ministry of Education (2009-0093816 and 22A20130012051(BK21Plus)).