

Silicene as novel substrate nanofiller for thin film nanocomposite forward osmosis membrane

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Thin film composite (TFC) polyamide forward osmosis (FO) membrane was fabricated with silicene as two-dimensional hydrophilic nanofiller in the support layer. The presence of silicene reduced the membrane structural (S) parameter, thereby addressing internal concentration polarization. Characterization of TFCs reveal thinner, more porous, more hydrophilic, and less tortuous support layer in the presence of silicene. Meanwhile, FO evaluation demonstrate an overall improvement in water flux and salt rejection as compared with TFC with unfilled support layer as control. This study was supported by NRF funded by The Ministry of Science and ICT (2017R1A2B2002109 and 2020R1A2C1003560), Ministry of Education (2020R1A6A1A03038817), and by KETEP funded by the Ministry of Trade, Industry & Energy (MOTIE No. 20194010201750).

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