

20th World Summit on Nanotechnology and Expo

October 05-06, 2018 | Los Angeles, USA

Incorporation of layered double hydroxide nanomaterials in thin film nanocomposite nanofiltration membrane for desalination application

Norhaniza Yusof¹, Muhammad Hanis Bin Tajuddin¹, Wan Norharyati Wan Salleh, Ahmad Fauzi Ismail, Nur Hanis Hayati Hairom² and Nurasyikin Misdan

¹Universiti Teknologi Malaysia, Malaysia

²Universiti Tun Hussein Onn Malaysia, Malaysia

Thin film nanocomposite (TFN) membrane with copper-aluminium layered double hydroxides (LDH) incorporated into polyamide (PA) selective layer has been developed for desalination application. 0, 0.05, 0.1, 0.15, 0.2 wt% of LDH were dispersed in the trimesoyl chloride (TMC) in n-hexane as an organic solution and embedded into PA layer during interfacial polymerization with piperazine. The fabricated membranes were further characterized to evaluate its morphological structure and membrane surface hydrophilicity. The TFN membranes performance were evaluated with monovalent (NaCl) and divalent salts (MgSO₄; MgCl₂ and Na₂SO₄) removal and compared with thin film composite (TFC). The morphological structures of TFN membranes were altered and the surface hydrophilicity was enhanced by the addition of LDH. The nanofiltration separation performances showed that TFN membrane with the LDH-NO₃ nanofillers loading of 0.1 has the highest rejection towards all salts Na₂SO₄ (97.6%), MgSO₄ (95.4%), MgCl₂ (95.6%) and NaCl (75.2%). Based on the results, it could be postulated that the rejection of each membrane was influenced by their surface charged after the addition of LDH-NO₃. Most importantly, the modification by LDH-NO₃ nanofillers without disturbing the existing procedure can serve as a promising solution to produce high-performance for TFN membrane in nanofiltration process.

norhaniza@petroleum.utm.my

Notes: