

Accepted Manuscript

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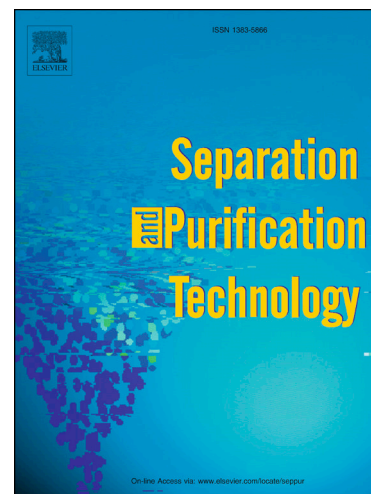
PII: S1383-5866(17)32987-8
DOI: <https://doi.org/10.1016/j.seppur.2017.11.070>
Reference: SEPPUR 14226

To appear in: *Separation and Purification Technology*

Received Date: 13 September 2017
Revised Date: 27 November 2017
Accepted Date: 27 November 2017

Please cite this article as: M. Peydayesh, T. Mohammadi, O. Bakhtiari, Effective Treatment of Dye Wastewater via Positively Charged TETA-MWCNT/PES Hybrid Nanofiltration Membranes, *Separation and Purification Technology* (2017), doi: <https://doi.org/10.1016/j.seppur.2017.11.070>

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Effective Treatment of Dye Wastewater via Positively Charged TETA-MWCNT/PES Hybrid Nanofiltration Membranes

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Abstract

Positively charged hybrid nanofiltration membrane were prepared by the incorporation of Triethylenetetramine (TETA) functionalized multiwall carbon nanotube (MWCNT) into Polyethersulfone (PES) matrix. In the best nanoparticles loading ratio of 0.4 wt.%, the fabricated membrane exhibits a pore diameter of 0.73 nm, a molecular weight cut off (MWCO) of 570 Da and a pure water flux (PWF) of 84.35 L/m² h which shows 130% improvement compared to the neat PES. Regarding salts rejection, it follows the order R (MgCl₂) > R (MgSO₄) > R (Na₂SO₄) > R (NaCl) which confirms positively charge nature of the membranes. Furthermore, the prepared membrane demonstrates effective rejection for two cationic dyes i.e. Rhodamine B (99.23%) and Crystal violet (98.43%) and acceptable rejection for two anionic dyes i.e. Indigo carmine (87.12%) and Orange G (82.13%). In addition of improvements in their mechanical and thermal stabilities, antifouling nature of the hybrid membranes enhances as well due to lower surface roughness and higher hydrophilicity.

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