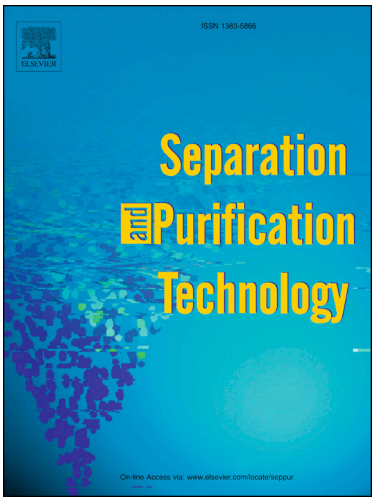

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PII: S1383-5866(17)32751-X
DOI: https://doi.org/10.1016/j.seppur.2018.03.054
Reference: SEPPUR 14474

To appear in: *Separation and Purification Technology*

Received Date: 22 August 2017
Revised Date: 22 December 2017
Accepted Date: 24 March 2018

Please cite this article as: J. Cui, Z. Zhou, A. Xie, M. Meng, Y. Cui, S. Liu, J. Lu, S. Zhou, Y. Yan, H. Dong, Bio-inspired fabrication of superhydrophilic nanocomposite membrane based on surface modification of SiO_2 anchored by polydopamine towards effective oil-water emulsions separation, *Separation and Purification Technology* (2018), doi: https://doi.org/10.1016/j.seppur.2018.03.054

Bio-inspired fabrication of superhydrophilic nanocomposite membrane based on surface modification of SiO_2 anchored by polydopamine towards effective oil-water emulsions separation

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Abstract: A new PVDF@pDA@SiO_2 nanocomposite membrane was fabricated by virtue of the surface modification of polydopamine anchored SiO_2 on PVDF membrane through a facile and eco-friendly preparation process. It possessed the superior superhydrophilicity/underwater superoleophobicity properties and presented the outstanding antifouling oil performance and high-efficiency separation ability for oil-water emulsions, which mainly resulted from its special surface micro-nano structure and pore induced capillarity phenomenon. Furthermore, the PVDF@pDA@SiO_2 nanocomposite membrane also exhibited the splendid separation performance, regeneration ability and universality for various oil-water emulsions separation. In addition, the oil-water emulsion separation mechanism was discussed in depth. This work might provide a significant guidance for large-scale production and application of this nanocomposite membrane in the fields of wastewater recovery and drinking water treatment.

Key words: Bio-inspired; Nanocomposite membrane; Superhydrophilicity; Underwater superoleophobicity; Oil-water emulsions separation