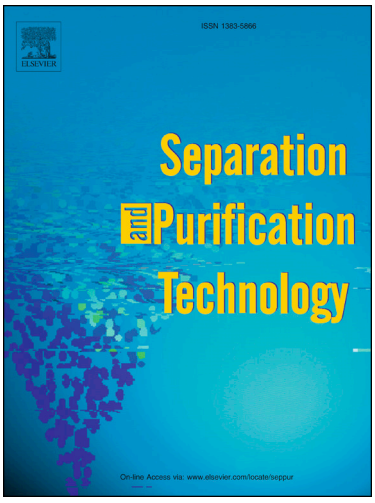

Underwater superoleophobic/underoil superhydrophobic corn cob coated meshes for on-demand oil/water separation

Jian Li, Xiangge Bai, Xiaohua Tang, Fei Zha, Hua Feng, Wei Qi

PII: S1383-5866(17)33512-8
DOI: https://doi.org/10.1016/j.seppur.2017.12.023
Reference: SEPPUR 14256

To appear in: *Separation and Purification Technology*

Received Date: 2 November 2017
Revised Date: 9 December 2017
Accepted Date: 10 December 2017

Please cite this article as: J. Li, X. Bai, X. Tang, F. Zha, H. Feng, W. Qi, Underwater superoleophobic/underoil superhydrophobic corn cob coated meshes for on-demand oil/water separation, *Separation and Purification Technology* (2017), doi: https://doi.org/10.1016/j.seppur.2017.12.023

Underwater superoleophobic/underoil superhydrophobic corn cob coated meshes for on-demand oil/water separation

Jian Li*[,a], Xiangge Bai[a], Xiaohua Tang[a], Fei Zha[a], Hua Feng[a], Wei Qi*[,b]

[a] College of Chemistry and Chemical Engineering, Northwest Normal University, Lanzhou 730070, China

[b] Guangdong Provincial Key Laboratory of New and Renewable Energy Research and Development, Guangzhou Institute of Energy Conversion, Chinese Academy of Sciences, Guangzhou 510640, China.

Abstract

The separation of water/oil mixtures is extensively required due to the expanding industrial oily wastewater and frequent oil spill accidents, exciting the development of facile and efficient oil/water separation technologies. In this study, corn cob powders (CCPs) coated meshes with underwater superoleophobicity and underoil superhydrophobicity were successfully fabricated by a facile spraying-coating method, which can be used for on-demand immiscible oil/water mixtures separation without any additional chemical treatment. Thus, both separation modes (oil-blocking or water-blocking) in one single device were achieved for selective oil/water separation regardless of the heavy oil or light oil involved in the mixtures. The oil-blocking mode with underwater superoleophobicity allows water in light oil/water mixtures to permeate, while the water-blocking mode with underoil superhydrophobicity letting heavy oil to permeate. In addition, the high separation efficiencies larger than 99.9 % for a series of oil/water mixtures were achieved in the single device with the driving-force only its gravity. Moreover, the coated meshes showed robust

* Corresponding author. Tel.: +86 931 7971533; fax: +86 931 7971989.
E-mail address:jianli83@126.com (J. Li); qiwei@ms.giec.ac.cn