Nano-cellulose Hydrogel Coated Flexible Titanate-Bismuth Oxide Membrane for Trinity Synergistic Treatment of Super-intricate Anion/Cation/Oily-Water

Ye Xiong, Chao Wang, Hanwei Wang, Chunde Jin, Qingfeng Sun, Xijin Xu

PII: S1385-8947(17)32202-7
DOI: https://doi.org/10.1016/j.cej.2017.12.080
Reference: CEJ 18241

To appear in: *Chemical Engineering Journal*

Received Date: 16 October 2017
Revised Date: 14 December 2017
Accepted Date: 16 December 2017

Please cite this article as: Y. Xiong, C. Wang, H. Wang, C. Jin, Q. Sun, X. Xu, Nano-cellulose Hydrogel Coated Flexible Titanate-Bismuth Oxide Membrane for Trinity Synergistic Treatment of Super-intricate Anion/Cation/Oily-Water, *Chemical Engineering Journal* (2017), doi: https://doi.org/10.1016/j.cej.2017.12.080

Nano-cellulose Hydrogel Coated Flexible Titanate-Bismuth Oxide Membrane for Trinity Synergistic Treatment of Super-intricate Anion/Cation/Oily-Water

Ye Xiong[1], Chao Wang[1], Hanwei Wang[1], Chunde Jin[1], Qingfeng Sun[1*], Xijin Xu[2*]

[1]School of Engineering, Zhejiang A & F University, Hangzhou, Zhejiang Province, 311300, PR China.

[2]School of Physics and Technology, University of Jinan, Shandong Province, 250022, P.R. China

***Corresponding author:** Qingfeng Sun, E-mail: qfsun@zafu.edu.cn; Xijin Xu, E-mail: sps_xuxj@ujn.edu.cn.

Abstract: Taking into account that oil generally hinders the adsorption performance of adsorbents, the purification of super-intricate wastewater containing abundant toxic cations, anions and oils is full of challenge. Based on the synergistic effects of layered titanate nanofibers (TNFs), oxygen vacancy occupied δ-Bi_2O_3 and surface carboxyl/hydroxy groups uniformly arranged cellulose, a layer-by-layer assembled nano-cellulose hydrogel coated flexible titanate-bismuth oxide membrane (CH-TBM) was developed for efficiently handling this sewage. The cellulose hydrogel top-layer with a pore size lower than 100 nm ensures the oil phase is resisted (oil contact angle > 150°), while the water phase can easily and quickly permeate the membrane (water contact angle ≈ 0°). And, the TNFs-Bi_2O_3 sub-layer with a pore size larger than 10 μm guarantees that the toxic anions/cations in the water are capable of efficiently