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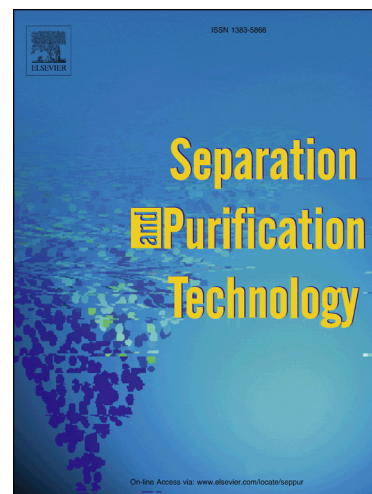
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A diatomite coated mesh with switchable wettability for on-demand oil/water separation and methylene blue adsorption

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Abstract

A diatomite coated mesh showing switchable wettability has been successfully fabricated via a spray-coating process. The switchable mesh allows separating various oil–water mixtures in one single device. The diatomite coated mesh operates in water-removing mode to permeate water in typical light oil–water mixtures. Moreover, the mesh can rapidly switch to oil-removing mode to permeate heavy oil in the heavy oil–water mixtures. Reversible transition between water-removing and oil-removing mode can be realized simply by prewetting the coated mesh with water and corresponding heavy oils alternately. In addition, the switchable mesh showed high separation efficiencies above 99.2 % for a series of light or heavy oil–water mixtures. Furthermore, the as-prepared coated mesh can separate oils from harsh conditions, such as strong acidic, alkaline, hyperhaline solutions and hot water. Besides, we demonstrated the methyl blue adsorption performance with the diatomite at room temperature, showing excellent adsorption capacity for water remediation.

Keywords: Superamphiphilic; Switchable wettability; Oil/water separation; Separation efficiency; Adsorption.

1. Introduction

With expanding industrial oily wastewater and frequent oil spill accidents, oil/water

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