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jmr&t
Journal of Materials Research and Technology
journal homepage: www.elsevier.com/locate/jmrt



Review Article

An overview of superhydrophobic ceramic membrane surface modification for oil-water separation



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ARTICLE INFO

Article history:

Received 24 September 2020

Accepted 18 February 2021

Available online 1 March 2021

Keywords:

Ceramic membrane
Surface modifications
Superhydrophobic
Superoleophilic
Oil-water mixture

ABSTRACT

The discharge of oily wastewater and offshore oil spills contaminates the biotic and aquatic environment and ultimately result in the destruction of the ecosystem. Recently, the application of ceramic membranes has gained prodigious attention due to its efficiency in oil-water separation process. Ceramic membranes developed from inorganic materials are considered as the most promising technology for the treatment of industrial wastewater. Besides, different types superhydrophobic-superoleophilic substrates are being developed using various substrate materials to tailor its purpose for higher efficiency. Nonetheless, fouling and clogging phenomena restrict the performance of ceramic membrane in oil-water separation. This review emphasizes the recent innovation on superhydrophobic methods for the modification of ceramic membranes for oil-water recovery. It comprises of an overview of the preparation technique of ceramic membrane using various techniques. Moreover, the different types of hydrophobic ceramic membrane modification using chemical agents and consequent effects on oil-water separation were discussed in detail. Furthermore, the technical challenges and issues associated with the applications of superhydrophobic-superoleophilic ceramic membrane for oil-water separation were discussed. Finally, future direction in the research of cost-efficient approach to produce superhydrophobic ceramic membranes for oil-water filtration process is enumerated.

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<https://doi.org/10.1016/j.jmrt.2021.02.068>

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