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Oily wastewater treatment using mullite ceramic membrane

Mohsen Abbasi[a], Abdolhamid Salahi[b], Mojtaba Mirfendereski[b], Toraj Mohammadi[c,*], Fatemeh Rekabdar[d], Mahmoud Hemmati[d]

[a]*Department of Applied Chemistry, East Tehran Branch, Islamic Azad University, Tehran, Iran*
[b]*Faculty of Chemical Engineering, Iran University of Science and Technology, Research Centre for Membrane Separation Processes, Narmak, Tehran, Iran*
[c]*Department of Chemical Engineering, South Tehran Branch, Islamic Azad University, P.O. Box 11365-4435, Tehran, Iran*
Tel. +98-21-77240496; Fax: +98-21-77240495; email: torajmohammadi@iust.ac.ir
[d]*Polymer Science and Technology Division, Research Institute of Petroleum Industry (RIPI) Tehran, Iran*

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ABSTRACT

This paper presents performance of a microfiltration (MF) ceramic membrane for treatment of oily wastewaters. Mullite MF membranes were synthesized from kaolin clay. The effects of different operating parameters such as pressure (0.5–4 bar), volumetric flow rate (0–2 m/s), temperature (15–55°C), oil concentration (250–3000 ppm) and salt concentration(0–200 g/l) on permeate flux (PF), fouling resistance (FR), fouling and rejection (*R*) were investigated. In order to determine the best operating conditions, 250–3000 ppm condensate gas in water emulsions were employed as synthetic feed. The rejection of total organic carbon (TOC) for the synthetic feeds was found to be more than 94%. The results show that by increasing temperature and pressure, the PF increases. Also, by increasing oil content and salt concentration, the membrane is fouled rapidly and the PF decreases. At low salt concentration (0–25 g/l), PF increases with increasing salt concentration, but at high salt concentration (25–200 g/l), it decreases with increasing salt concentration. Increasing volumetric flow rate causes PF to increase and FR reduce.

Keywords: Ceramic membrane; Oil in water emulsions; Fouling; Rejection; Wastewater treatment; Microfiltration

*Corresponding author.