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Multistage filtration process for efficient treatment of oil-field produced water using ceramic membranes

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ABSTRACT

Oil and gas industries generate large amounts of wastewater as a byproduct in both onshore and offshore production operations. This wastewater is commonly referred to as "produced water" (PW). PW is very difficult to treat and its characteristics changes by well to well. Treatment of this PW could improve the economic viability of these oil and gas fields and lead to a new source of water for beneficial use. This work describes a research project that evaluated the multistage treatment process of oilfield produced water generated from tank dewatering with different ceramic membranes. The investigations focus on the characterization of permeate flux using various ceramic microfiltration (MF), ultrafiltration (UF) and nanofiltration (NF) membranes as potential techniques for efficient treatment of tank dewatering produced water (TDPW). Results for average flux rates, flux degradation, removal of organic substances (measured as TOC) and inorganic substances (measured as the electrical conductivity (EC)) and oil removal efficiency are shown.

Keywords: Ceramic membrane; Oilfield; Produced water treatment; Membrane fouling; Flux degradation; Oil removal

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