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# SELECTING MODEL FOR TREATMENT OF OILY WASTEWATER BY MF-PAC HYBRID PROCESS USING MULLITE-ALUMINA CERAMIC MEMBRANES

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Hermia's models for cross flow filtration were used to investigate the fouling mechanisms of mullite-alumina ceramic membranes in treatment of oily wastewaters in a hybrid microfiltration-powdered activated carbon process (MF-PAC). Results show that cake filtration model can be applied for prediction of permeation flux decline for MF and MF-PAC process up to 400 ppm PAC. The complete pore blocking model and the intermediate pore blocking model can predict permeation flux decline with time for MF-PAC with 800 and 1200 ppm PAC respectively. Average error for prediction of permeation flux with cake filtration model is 2.19% for MF process and 2.16; 2.06 and 1.31% for MF-PAC process with 100; 200 and 400 ppm PAC respectively. Also for MF-PAC process with 800 and 1200 ppm PAC, average error for prediction of permeation flux with complete pore blocking model and intermediate pore blocking model was 6.11 and 6% respectively.

Keywords: oily wastewater treatment, microfiltration, powdered activated carbon, mullite-alumina membranes, membrane Fouling.

## 1. Introduction

Oily wastewaters are one of the major pollutants of the aquatic environment and removing oil from these oil-in-water emulsions is an important aspect of pollution control. This is due to the emission of a variety of industrial oily wastewaters from sources such as refineries, petrochemical plants and transportation [1 – 3].

Low pressure driven membrane separation techniques such as microfiltration (MF) have been considered as indispensable treatment methods in water

concentration respectively. Results of modeling show that pore blocking behavior of membrane during filtration is changed. Finally it can be concluded that modeling results for total time is practical and result of short time intervals is useful for knowledge of fouling mechanisms.

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Received 11.03.2013