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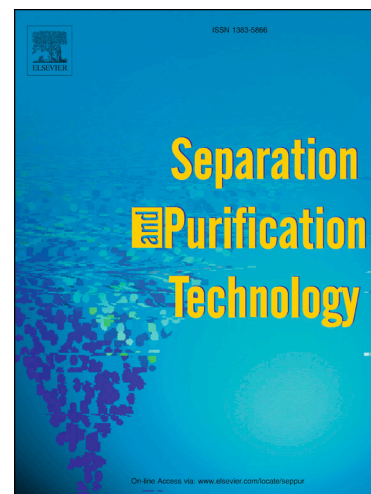
Comparisons of NOM Fouling and Cleaning of Ceramic and Polymeric Membranes during Water Treatment

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Separation and Purification Technology

Title Page

Title: Comparisons of NOM Fouling and Cleaning of Ceramic and Polymeric Membranes during Water Treatment

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Abstract

This research examines the effect of various NOM fractions on ceramic and polymeric UF membranes performance in terms of fouling and cleaning. Fouling experiments were performed using five model solutions, humic acid, protein as bovine serum albumin (BSA), alginate with and without calcium, and a combined NOM mixture. Two chemical agents were selected: an oxidant (NaOCl) and caustic (NaOH). Fouling and cleaning behavior were assessed using the resistance in series (RIS) model, membrane permeability, carbon mass balance, and fluorescence excitation and emission matrix (FEEM) analysis. The results demonstrated that NOM fouling order of the ceramic UF was similar to polymeric UF with the following trend: NOM mixture \approx BSA > alginate \pm Ca⁺² > humic acid. However, the backwash efficiency was 1.5x-2x higher for the ceramic UF in comparison to the polymeric UF, indicating a much higher hydraulic reversibility for the ceramic UF. A carbon mass balance in compliment with FEEM plots determined that NOM removal by the ceramic UF was \approx 10% higher than the polymeric UF. Chemical cleaning was found to be effective for both membrane types. Thus, it was not

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