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Organic matter adsorption on montmorillonite pillared by an organophile complex for tangential microfiltration through a ZrO_2 - TiO_2 inorganic membrane

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Abstract

Adsorption of organic matter (humic and fulvic acids) at 10 mg/l onto a montmorillonite (Maghnia, Algeria) combined pillared by ABPC and a cationic surface-active CTAB turns out to be comparable and even better than adsorption onto an active carbon under the same conditions. The efficiency reaches levels of 95%. On the other hand, the transformation of the hydrophile character to a hydrophobe organophile character by modification of the montmorillonite matrix increased retained quantities of HA and FA in mg per g of adsorbate of 1.7 fold. Thus, efficiencies jump from 60 to 98%. Tangential microfiltration of the (Mont- Al_3 -CTAB)-HA couple through an inorganic membrane of ZrO_2 - TiO_2 had a total retention with no effect on the deposit. But a decrease of the specific area of the deposit vs. concentration was observed. This can be acceptable if we consider that the limiting process comes mainly from colloidal suspension microfiltration. Indeed, (pillared mont.)-(organic matter) particles are not mono-dispersed, and the interaction between loaded particles has a great effect on stability with regard to the particle aggregation phenomenon.

Keywords: Microfiltration; Membrane; Adsorption; Organic matter; Pillared montmorillonite

1. Introduction

Many new applications are possible for microfiltration membranes. The reinforcement of

microfiltration by other processes has a considerable effect on selectivity and fouling mechanisms. The integration of adsorption onto modified montmorillonite turns out to be very interesting from this point of view. Algeria has great poten-

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