Development of a ceramic membrane on a flat support for the treatment of an industrial effluent

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A B S T R A C T

The central focus of this research work is upon the development and characterization of a new ceramic microfiltration membrane. The support was prepared in a flat configuration using 100 µm calibrated powder made from mixed natural clay and natural phosphate. The firing temperature of the support amounts to 1,050°C for 3 h. After firing, the produced support was characterized using multiple methods (infrared spectroscopy, permeability, mechanical strength, scanning electronic microscopy, and mercury porosimeter). This support has subsequently become ready to prepare the microfiltration layer based on titanium oxide (TiO₂) through the use of the slip-casting method. The MF layer was firing to 950°C for consolidation. This microfiltration membrane has a permeability of 1,566.9 L/h·m²·bar. Finally, the membrane application to the treatment of textile effluents by photocatalysis revealed a good degradation of dyes with a removal rate of 97.41%.

Keywords: Microfiltration membrane; Flat configuration; Slip-casting method; Treatment of textile effluents; Photocatalysis

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