ABSTRACT

The aim of this work was to study the retention and separation of 4BS dye from aqueous solution using N-doped TiO₂ (N-TiO₂) ceramic membrane. An N-TiO₂ sol was synthesized by the sol-gel technique and applied to a ceramic membrane to synthesize a composite membrane. XRD analysis confirmed that the N-TiO₂ had an anatase structure. SEM images revealed that the TiO₂ particles with a diameter of 7–9 nm had been loaded on a ceramic support to form the nanoporous composites. 4BS dye containing aqueous solution was treated by the composite membranes. The operating conditions studied were the dye concentration, solution pH, the pressure and velocity of cross flow. With the coupling of photocatalysis and membrane separation, the retention rate of 99% for dye and the higher permeation flux (over 96%) were obtained. The composite membranes were found to be stable and to perform reproducibly.

Keywords: Ceramic membrane; N-doped TiO₂; Retention; 4BS dye