Obtaining of TiO_2:Ag films on porous substrates for Rhodamine B photocatalysis

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The improper disposal of industrial wastes could endanger the environment and the quality of potable water available for consumption[1]. In this context, the heterogeneous catalysis has emerged as methodology capable to transform organic structures present in the water into harmless products such as CO_2 and H_2O. However, there are two main limitations of this process using pure TiO_2, such as activation only by ultraviolet light and removal of the catalyst from the applied medium[2]. Therefore, in this study was synthesized powders of Ag-doped TiO_2 with 1% by polymeric precursor method[3], thermally treated at 400, 500, 600 and 700°C for 2h and characterized by XRD, infrared region spectroscopy (FTIR), FT -Raman, Scanning Electron Microscopy (SEM-FEG), and also measures surface area by N_2 adsorption/desorption (BET). The photocatalytic experiments were conducted in a reactor containing UV lamps (λ = 254nm), at 20°C. The powders treated at 500°C showed the highest surface area and anatase homogeneous phase. This temperature treatment was used to obtain thin films, which were deposited by dip-coating on porous ceramic substrates for photocatalysis purposes. Rhodamine B photodegradation in the presence of films presented about 30% of the color lost, under UV light after 180 minutes. After the photocatalysis essays, the films showed to be very adherent to the porous surface of the substrate and thus were easily removed from the solution.

References:

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