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PROCEEDINGS

Photocatalytic performance of Ag-TiO₂ films under visible light

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Water pollution caused by the disposal of organic substances such as dyes, pesticides and antibiotics seriously affects the quality of water resources and, consequently, human health. Advanced oxidative processes present themselves as an effective alternative for removing these contaminants from water. In this work, the photocatalysis performance of Ag-TiO₂ films under visible light in the removal of methyl orange dye was studied. The films were obtained from a solution containing titanium isopropoxide (IV) and ethyl alcohol in a ratio of 1:10 (v:v). The solution was kept under constant stirring at 70 °C for 60 min. Subsequently, the sol was deposited on borosilicate glass using an airbrush. The films were heat treated for 30 minutes at 500 °C in a muffle furnace and then immersed for 30 minutes in an aqueous solution of 0.1 mol.L⁻¹ of AgNO₃, followed by rinsing in deionized water and drying. After that, these films were subjected to UVC radiation for periods of 60, 90, 120 and 150 minutes to allow the reduction of Ag⁺ to Ag⁰. X-ray diffraction and scanning electron microscopy techniques were used to characterize the films. In the photocatalysis tests, it was observed that the longer the irradiation time of the catalyst in UVC light, the better its photocatalytic performance, quantified by spectrophotometry, considering the discoloration of the methyl orange dye (5 mg.L⁻¹). The best performance was attributed to the film subjected to 120 minutes of exposure to UVC light, reaching 80% of degradation after 300 minutes of exposure to visible light.

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