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ENVIRONMENTAL APPLICATION OF Ti/TiO₂ ANODES PREPARED BY DC-MAGNETRON SPUTTERING: DEGRADATION OF ACID ORANGE 7

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Abstract

Ti/TiO₂ films were prepared by DC reactive magnetron sputtering followed by annealing in air at 400 °C for 4 h. Structural tests have been performed to characterize the films, showing that the prepared films present 70% of anatase phase. When these results are compared with those from TiO₂ films grown on glass substrates with similar deposition parameters, it can be seen that Ti substrates favour the formation of rutile phase, which is not observed on the films supported on glass, indicating that the film structure is strongly influenced by the substrate's nature. The electrocatalytic oxidation of acid orange 7 aqueous solutions, with concentrations between 5 and 50 mg L⁻¹, was performed using Ti/TiO₂ electrodes, at applied current densities of 0.1 and 0.25 mA cm⁻². COD removal increased with applied current density and acid orange 7 initial concentration. The current efficiency also increased with initial concentration, showing that the process was mainly controlled by diffusion.

Key words: acid orange 7, DC-magnetron sputtering, decolourization, electrodegradation, TiO₂

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