Structural study and photocatalytic performance of ZnO thin films prepared by electrochemical deposition

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Abstract:

In this study, zinc oxide (ZnO) thin films were deposited on Fluorine-doped tin oxide (FTO) substrates by electrochemical deposition (ECD) technique. The ECD was carried out at a constant potential over a range of deposition times. The current-time response was recorded and discussed. The crystal structure and morphologies of the films were studied using X-ray diffraction (XRD) and scanning electron microscopy (SEM), respectively. Furthermore, photocatalytic performance of methylene blue using ZnO was investigated at various quantity of ZnO and irradiation time. The photocatalysis results showed the dependence of photodegradation process on the quantity of catalyst and irradiation time. Moreover, the degradation rate constant and adsorption equilibrium constant were calculated. Our analyses indicate that quantity of catalyst affects the degradation rate constant and the efficiency, while the adsorption equilibrium constant does not.

Keywords:

ZnO; Electrochemical deposition; Structural; Photocatalysis; Thin film

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