

Photoelectrocatalytic activity of Zn-loaded RGO-TiO₂ composite coatings on mild steel substrate via DC electrochemical co-deposition

Abstract

The photoelectrocatalytic activity of Zn-loaded reduced graphene oxide-titania (RGO-TiO₂) composite coatings on mild steel substrate was investigated in detail. Zn-loaded RGO-TiO₂ composite films were prepared by using DC electrochemical co-deposition technique onto mild steel substrate in an acid-sulphate bath electrolyte. The cyclic voltammetry and photocurrent response studies showed that the Zn-loaded RGO-TiO₂ films have improved photoelectrocatalytic performance. The embedding of metallic Zn into the RGO-TiO₂ promoted an effective charge carriers separation by minimizing the recombination losses. In this manner, metallic Zn will act as efficient photo-induced electron acceptors from the bulk of RGO-TiO₂ film. Thus, the transportation of the electrons from the working electrode to the counter electrode was improved significantly.

Keywords; Composite, Mild steel, Photoelectrocatalytic, Composite coatings