

عنوان مقاله:

Pt–Os–TiO₂ photoelectrocatalyst for methanol oxidation

محل انتشار:

بیستمین کنگره شیمی ایران (سال: 1397)

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خلاصه مقاله:

In recent decades, due to high energy demands, fossil fuel depletion, and environmental pollution throughout the world [1], there has been an increasing interest in the development of fuel cells, because they can directly convert chemical energy to electrical energy with higher efficiency than other sources of electrical power [2]. Among fuel cells, the direct methanol fuel cells (DMFCs) have attracted considerable interest because of a variety of merits such as low operating temperatures, ease of handling a liquid fuel, high energy density of methanol, and applications to micro-sized fuel cells [3–7]. Novel photoelectrocatalyst composed of Pt–Os–TiO₂/FTO was prepared electrochemically using a three-electrode system and directly electrodeposited on the surface of FTO (as working electrode). The photoelectrocatalyst with a composition of 18% TiO₂, 4% Pt and 3% Os showed the best performance for methanol oxidation. Scanning electron microscopy images showed that this composite film was even and porous. The photoelectrocatalytic oxidation behavior of methanol over the modified electrode has been studied by means of electrochemical techniques including, cyclic voltammetry and chronoamperometry methods, with or without UV illumination. Comparative experiments evince that the anodic current for methanol oxidation is increased up to 20% under UV illumination. Moreover, under UV illumination, the poisoning resistance of Pt–Os–TiO₂/FTO for methanol electrooxidation is significantly improved.

کلمات کلیدی:

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