

عنوان مقاله:

OPTIMIZATION ELECTROPHOTOCATALYTIC REMOVAL OF ACID YELLOW 36 BY THE TAGUCHI MODEL

محل انتشار:

چهارمین همایش بین المللی نفت، گاز و پتروشیمی (سال: 1396)

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خلاصه مقاله:

The aim of this applied-analytical research is to investigate acid yellow 36 (AY 36) removal from water by a batch electrophotocatalytic (EPC) reactor using zinc oxide (ZnO) nanoparticles immobilized on a zinc (Zn) sheet-copper electrode and an emitting dynode (LED) ultraviolet-A (UV-A) lamp. Various operating variables are tested; these include current density, initial concentration of AY 36, lamp intensity, concentration of ZnO nanoparticles, pH and radiation time. To prepare the ZnO films on the Zn electrode dry methods were used. The studied variables are pH (3.5-10.5), AY 36 concentration (100-300 mg L⁻¹), lamp intensity (120-360 mW cm⁻²), radiation time (0-30 min), concentration of zinc oxide nanoparticles (1.5-4.5 mg cm⁻²) and current density (3-6 mA cm⁻²). The AY 36 concentration is measured by a spectrophotometer. The optimal removal (0) is obtained at pH 3.5, a radiation time of 20 minutes, 3 mg cm⁻² of ZnO nanoparticles concentration, lamp intensity of 360 mW cm⁻² and a current density of 6 mA cm⁻². The AY 36 degradation follows a first order reaction. The results of AY 36 removal efficiency via the Taguchi model indicated that the concentration is the most important variable. The rate of degradation decreases at higher concentrations. Thus, batch experiments show that the EPC reactor can be considered a promising technology for treating AY 36-polluted water.

کلمات کلیدی:

Acid yellow 36 (AY 36), Electrophotocatalytic, Taguchi model, Zinc oxide nanoparticle

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