

能源和环境工程

负载型二氧化钛光电催化降解苯酚废水的反应动力学

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摘要 采用浸渍提拉法制备发泡镍载二氧化钛薄膜电极, 并以其为工作电极, 建立三电极光电催化体系, 对该体系降解苯酚的动力学进行了研究. 考察了反应液初始pH值、反应物初始浓度、催化剂用量、光辐照强度、外加直流偏压值对光电催化反应速率的影响, 采用幂指数方程描述反应动力学, 得到方程 $C=C_0 \exp(-0.5430 C^{-0.4241} E^{0.2968} Q^{0.5418} I^{0.5877} t)$. 方程计算值与实验值吻合较好, 误差基本在15%以内.

关键词

[苯酚](#) [光电催化](#) [降解](#) [动力学](#)

分类号

KINETIC STUDY ON PHOTOELECTROCATALYTIC DEGRADATION OF PHENOL BY USING SUPPORTED TiO₂ AS CATALYST

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Abstract

TiO₂ thin film electrodes were prepared by dip-coating technique. Using the porous nickel based TiO₂ thin film electrode as working electrode, the photoelectrocatalytic system with three kinds of electrodes (working electrode, counter electrode and reference electrode) was built. The effects of pH, initial phenol concentration, quantity of catalyst, intensity of incident light, voltage of electrical bias applied on the photoelectrocatalytic reaction rate of phenol were investigated. The global kinetics was described by an exponential equation derived as $C=C_0 \exp(-0.5430 C^{-0.4241} E^{0.2968} Q^{0.5418} I^{0.5877} t)$. The deviation between calculated and experimental results was approximately within 15%.

Key words [phenol](#) [photoelectrocatalytic](#) [degradation](#) [kinetic](#)

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