

TiO₂光催化降解水中土霉素的动力学研究

Kinetics study on photocatalytic degradation of oxytetracycline(OTC) in water by nano titanium suspended system

投稿时间: 2010-05-27 最后修改时间: 2010-07-21

DOI:

中文关键词: [土霉素](#) [TiO₂](#) [光催化](#) [光降解速率常数](#)

英文关键词: [oxytetracycline](#) [titanium dioxide](#) [photocatalytic](#) [photodegradation rate constant](#)

基金项目: 上海市科委重点项目(09230500200); 高等学校博士点专项科研基金(20090075120007); 中央高校基本科研业务费专项资金项目(10011308); 国家自然科学基金资助项目(21007010)

作者	单位
黄丽萍	东华大学环境科学与工程学院, 上海 201620
陈东辉	上海应用技术学院, 上海 200235
黄满红	东华大学环境科学与工程学院, 上海 201620
陈亮	东华大学环境科学与工程学院, 上海 201620

摘要点击次数: 351

全文下载次数: 119

中文摘要:

环境中抗生素的出现及其引起的危害正受到越来越多的关注。以高压汞灯为光源, 选用较为广泛的抗生素土霉素(OTC)为处理对象。考察了初始质量浓度、反应过程中光照、催化剂投加量、溶液起始pH、溶液中DOM和NO₃⁻对光催化降解的影响, 研究了其光降解动力学。结果表明, TiO₂光催化氧化法能够有效去除水中半微量的OTC, OTC的光降解过程符合一级反应动力学模型; UV/TiO₂联用工艺对TOC也有很好的去除效果, 反应90 min, TOC去除率可达74%; OTC的初始浓度从30 mg/L增大到90 mg/L, 反应速率从0.0619 min⁻¹降低到0.0130 min⁻¹; 随着光催化剂投加量的增大, 光降解速率常数先增大后减小; 增加溶液的pH值, 速率常数逐渐减小; 溶液中的DOM和NO₃⁻也可以影响光降解效率。

英文摘要:

The occurrences of antibiotics in aquatic environments have attracted much concern from the public. The photocatalytic degradation of OTC in water by UV/TiO₂ was studied in a high pressure mercury lamp. Effects of the initial concentration, different reaction condition, TiO₂ dosage, solution pH, DOM and NO₃⁻ on the degradation rates were investigated. The results showed that the removal of OTC by photocatalytic was effective. The photodegradation rate in aqueous solution followed first-order kinetics. And after 90 minutes, 74% of TOC was removed. The photodegradation rate constant ranged from 0.0619 min⁻¹ to 0.0130 min⁻¹ in the OTC concentration from 30 mg/L to 90 mg/L. Increasing TiO₂ dosage led to the photodegradation rate constant increasing initially, followed by decreasing. Reduction of the rate constant was observed when pH increasing. It can also be affected by DOM and NO₃⁻ in aqueous solution.

[查看全文](#) [查看/发表评论](#) [下载PDF阅读器](#)

关闭

