环境工程学报
Chinese Journal of Environmental Engineering

PBTCA稳定零价纳米铁的制备及其去除水中Cr(VI)

Removal of chromium (VI) from aqueous solution by PBTCA-stabilized nanoscale zero valent iron

投稿时间： 2011-06-20 最后修改时间： 2011-09-26

DOI：

中文关键词： 零价纳米铁 六价铬 2-膦酸丁烷-1 2 4三羧酸(PBTCA) 水处理

英文关键词:NZVI;chromium (VI);2-phosphonobutane-1 2 4-tricarboxylic acid(PBTCA);water treatment

基金项目:辽宁省教育厅项目(2006-87)

作者	单位
冯婧微	沈阳化工大学环境与安全工程学院 沈阳110142
纪爽	沈阳化工大学环境与安全工程学院 沈阳110142
梁彦秋	沈阳化工大学环境与安全工程学院 沈阳110142

中文摘要:

以2-膦酸丁烷-1,2,4三羧酸(PBTCA)为稳定剂,通过$FeCl_3 \cdot 6H_2O$与$NaBH_4$反应,利用液相还原法制备稳定纳米级零价铁颗粒(P-NZVI),并用透射电子显微镜(TEM)、扫描电子显微镜(SEM)及X射线衍射(XRD)进行表征,颗粒平均粒径为73 nm。考察了Cr(VI)溶液初始浓度、pH、NZVI投加量、温度等条件对Cr(VI)去除效果的影响,并与同等条件下不加稳定剂制备的纳米铁(N-NZVI)进行对比。结果表明:Cr(VI)的去除率随温度和纳米铁投加量增加而升高,随pH和Cr(VI)溶液初始浓度升高而降低。在相同实验条件下,P-NZVI对Cr(VI)的去除效果明显优于N-NZVI,表明改性后纳米铁在地表水原位修复领域具有较好的应用前景。

英文摘要:

PBTCA (2-phosphonobutane-1,2,4-tricarboxylic acid)-stabilized nanoscale zero-valent iron (P-NZVI) and nanoscale zero-valent iron (N-NZVI) were synthesized by borohydride reduction method.They were characterized by the transmission electron microscope (TEM),scanning electron microscope (SEM) and X-ray diffraction (XRD).The average size of P-NZVI particles was about 73 nm in diameter.The P-NZVI and N-NZVI particles were tested for reduction of Cr(VI) in water.The experiments investigated the effects of initial Cr(VI) concentration,pH,NZVI dosage and reaction temperature on the removal efficiency of Cr(VI).The results show that the removal efficiency of Cr(VI) increases with the increase in temperature and NZVI dosage but decreases with the increase in pH and initial Cr(VI) concentration.The better Cr(VI) removal rate demonstrates that P-NZVI has the potential to become an effective agent for in situ subsurface environment remediation.

查看全文 查看/发表评论 下载PDF阅读器

关闭