

本期目录 | 下期目录 | 过刊浏览 | 高级检索

[打印本页] [关闭]

## 论文

### Span/Tween混合表面活性剂微乳液制备纳米铁及脱硝研究

李铁龙, 金朝晖, 刘海水, 王薇, 李海莹, 韩璐

南开大学环境科学与工程学院, 天津 300071

摘要:

研究了以Span 80和Tween 60为混合表面活性剂的微乳液的形成。以电导率及目测法为表征手段, 利用正交试验, 分析了多因素对W/O型微乳液最大增容水量的影响, 探明了该乳液形成的适宜条件。

关键词: 混合表面活性剂; 微乳液; 纳米铁; 硝酸盐

### Synthesis of Iron Nanoparticles by Microemulsion with Span/Tween as Mixed-surfactants for Denitrification of Nitrate in Water

LI Tie-Long, JIN Zhao-Hui\*, LIU Hai-Shui, WANG Wei, LI Hai-Ying, HAN Lu

College of Environmental Science and Engineering, Nankai University, Tianjin 300071, China

Abstract:

Recent studies have shown that zero-valent iron( $\text{Fe}^0$ ) may potentially be used as a chemical medium in permeable reactive barriers(PRBs) for groundwater nitrate remediation, and due to the extremely high reactivity, denitrification of nitrate in groundwater using nanoparticles has received increasing interest in recent years. In order to fabricate iron nanoparticles with homogeneous spherical shape and narrow size distribution, we developed a simple and green approach for synthesizing iron nanoparticles. We modified the conventional methods by applying the microemulsion with Span 80 and Tween 60 as mixed surfactants. Water was then titrated into the octane surfactant mixture and changes were observed by visual inspection and conductivity measurement and the information was used in developing a phase diagram. The maximum content of water in the W/O microemulsion and its appropriate forming condition of the microemulsion were found. And then the microemulsion system consisting of saturated  $\text{Fe}^{2+}$  solution was used to synthesize  $\alpha$ -Fe ultrafine particles by reduction reaction. The nanoparticles were characterized by using the powder X-ray diffraction(XRD), transmission electron microscopy(TEM). The results show that the average diameter of the particle is about 80 nm. The reductive activity of the obtained iron nanoparticles were studied by the denitrification experiment of nitrate. And the results show that under the experimental conditions iron removed mostly 120 mg/L of nitrate within a period of 30 min. And the mass balance of nitrate reduction with nanoscale Fe indicates that endproducts mainly are ammonia and the probable formation of nitrogen gas species during reaction with the new prepared nanoscale iron without pH control.

Keywords: Mixed-surfactants; Microemulsion; Iron nanoparticles; Nitrate

收稿日期 2005-04-08 修回日期 网络版发布日期 2006-04-10

DOI:

基金项目:

国家自然科学基金(批准号: 20477019)和教育部南开大学/天津大学科技合作基金资助

通讯作者: 金朝晖(1946年出生), 男, 教授, 博士生导师, 从事环境化学研究. E-mail:

jinzh@nankai.edu.cn

作者简介:

参考文献:

扩展功能

本文信息

Supporting info

PDF(578KB)

[HTML全文]

[\({article.html\\_WenJianDaXiao} KB\)](#)

参考文献[PDF]

参考文献

服务与反馈

把本文推荐给朋友

加入我的书架

加入引用管理器

引用本文

Email Alert

文章反馈

浏览反馈信息

本文关键词相关文章

混合表面活性剂; 微乳液; 纳米铁; 硝酸盐

本文作者相关文章

PubMed

反馈人	<input type="text"/>	邮箱地址	<input type="text"/>
反馈标题	<input type="text"/>	验证码	<input type="text" value="5542"/>