

纳米TiO₂修饰 Ni-W-P电极的制备及其光电催化析氢性能

张卫国, 刘洋, 王飙, 李贺, 姚素薇

天津大学化工学院杉山表面技术研究室, 天津 300072

收稿日期 2006-8-7 修回日期 2006-9-29 网络版发布日期 2007-7-5 接受日期

摘要 在Cu基体上电沉积Ni-W-P合金后, 通过溶胶-凝胶法制备了纳米TiO₂修饰Ni-W-P合金电极.

利用扫描电子显微镜(SEM)、X射线衍射(XRD)、阴极极化曲线测试了TiO₂/Ni-W-P电极的表面形貌、

结构及催化析氢性能, 考察了烧结温度、TiO₂膜层厚度对电极结构和性能的影响. 实验结果表明: 550℃下烧结

1h、拉膜15次制备的TiO₂/Ni-W-P电极光电催化析氢性能最佳, 500W碘钨灯照射下析氢过电位减小约140mV;

此时TiO₂为锐钛矿型和金红石型混晶结构, 平均晶粒尺寸约7nm.

关键词 [纳米TiO₂](#) [Ni-W-P](#) [光电催化](#) [析氢](#)

分类号 [0614, 0644](#)

Preparation of Nano-crystalline TiO₂ Film Modified Ni-W-P Electrode and Its Photoelectrocatalytic Activity for Hydrogen Evolution Reaction

ZHANG Wei-Guo, LIU Yang, WANG Biao, LI He, YAO Su-Wei

SUGIYAMA Laboratory of Surface Technology, School of Chemical Engineering and Technology, Tianjin University, Tianjin 300072, China

Abstract After electrodeposition of Ni-W-P alloy on Cu sheet, nano-crystalline TiO₂ film modified Ni-W-P electrode was prepared by a sol-gel method. Scanning electron microscope (SEM), X-ray diffraction (XRD) and cathodic polarization curves were used to characterize the surface morphology, microstructure and catalytic activity for hydrogen evolution reaction (HER) of TiO₂/Ni-W-P electrodes. Effects of the sintering temperature and the thickness of TiO₂ film on the structure and performance of TiO₂/Ni-W-P electrodes were researched. The results clearly demonstrate that the TiO₂/Ni-W-P electrode annealed at 550℃ for 1h has the best photoelectrocatalytic activity for HER, and the overpotential for HER decreases about 140mV under illumination. The TiO₂ film with average grain size of 7nm is mixed crystal structure containing anatase and rutile crystal phases.

Key words [nano-crystalline TiO₂](#) [Ni-W-P](#) [photoelectrocatalytic activity](#) [hydrogen evolution](#)

DOI:

通讯作者 张卫国 weiguozhang@eyou.com

扩展功能

本文信息

▶ [Supporting info](#)

▶ [PDF\(468KB\)](#)

▶ [\[HTML全文\]\(0KB\)](#)

▶ [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](#)

▶ [复制索引](#)

▶ [Email Alert](#)

▶ [文章反馈](#)

▶ [浏览反馈信息](#)

相关信息

▶ [本刊中 包含“纳米TiO₂”的
相关文章](#)

▶ [本文作者相关文章](#)

- [张卫国](#)
- [刘洋](#)
- [王飙](#)
- [李贺](#)
- [姚素薇](#)