

能源和环境工程

电化学还原脱氯用GC负载Pd-Ni电极的制备及表征

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收稿日期 2007-9-30 修回日期 2007-12-21 网络版发布日期 2008-5-9 接受日期

摘要

通过电沉积法在玻碳板(GC)电极上负载钯镍双金属颗粒, 并利用正交实验对其进行循环伏安(CV)研究, 得到Pd-Ni/GC电极的最佳制备条件为: $Ni^{2+}=8.5 \text{ mmol} \cdot L^{-1}$, $Pd^{2+}=3 \text{ mmol} \cdot L^{-1}$, $pH=7.0$, $J_k=15 \text{ mA} \cdot \text{cm}^{-2}$, $T=30 \text{ min}$ 。可以在-500 mV (以Hg/Hg₂SO₄为参比电极)左右获得-24.83 mA的氢吸附峰。用聚吡咯(PPy)修饰GC制备Pd-Ni/PPy/GC电极, CV结果表明, Pd-Ni/PPy/GC电极具有比Pd-Ni/GC电极更大的氢吸附峰值, 可以在-500 mV (以Hg/Hg₂SO₄为参比电极)左右获得-32.33 mA的氢吸附峰。扫描电镜(SEM)分析表明, 聚吡咯的修饰明显改变了Pd-Ni颗粒的沉积形态, 使其沉积粒径更小, 分散度更高。

关键词

[Pd-Ni/GC电极](#) [Pd-Ni/PPy/GC电极](#) [循环伏安](#)

分类号

Preparation and characterization of glassy carbon electrode modified by composite palladium-nickel film used in electrochemical reductive dechlorination

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Abstract

The electrochemical deposition behavior of Pd-Ni bimetal on glassy carbon (GC) electrode was studied by means of cyclic voltammetry (CV) based on orthogonal experiments. The optimum preparation conditions of Pd-Ni/GC electrode were $Ni^{2+}=8.5 \text{ mmol} \cdot L^{-1}$, $Pd^{2+}=3 \text{ mmol} \cdot L^{-1}$, $pH=7.0$, $J_k=15 \text{ mA} \cdot \text{cm}^{-2}$, and $T=30 \text{ min}$. The hydrogen adsorption peak on Pd-Ni/GC electrode of -24.83 mA was obtained at about -500 mV (vs Hg/Hg₂SO₄). Pd-Ni/PPy/GC electrode modified by polypyrrole film was prepared. CV results revealed that the hydrogen adsorption peak of -32.33 mA was obtained at about -500 mV (vs Hg/Hg₂SO₄), which was larger than that on Pd-Ni/GC electrode. Scanning electron microscope (SEM) images revealed that PPy film changed the deposition configuration of Pd-Ni particles evidently. The diameters of Pd-Ni microparticles were smaller and the dispersion degree was higher.

Key words

[Pd-Ni/GC electrode](#) [Pd-Ni/PPy/GC electrode](#) [cyclic voltammetry](#)

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