

研究论文

氢钼青铜对铂催化氧还原反应的促进作用

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收稿日期 2006-7-20 修回日期 网络版发布日期 2007-4-20 接受日期

摘要 采用循环伏安法在玻碳电极上和硫酸溶液中电沉积制备出铂催化剂(Pt)及铂-氢钼青铜复合催化剂(Pt-H_xMoO₃), 用旋转圆盘电极研究并比较了它们对硫酸溶液中氧还原反应的催化活性. 研究表明, H_xMoO₃能明显地提高Pt对氧还原反应的电催化活性. 通过对静态电极上氧还原的峰电流与扫描速度的关系以及旋转圆盘电极上氧还原电流与旋转速度的关系的分析发现, H_xMoO₃提高了铂电极氧还原反应电荷传递步骤的传递系数, 因此加快了氧还原的动力学过程.

关键词 [氧还原反应](#) [催化](#) [铂](#) [氢钼青铜](#)

分类号 [0646](#)

Catalytic Activity Improvement of Platinum Toward Oxygen Reduction Reaction Promoted by Hydrogen Molybdenum Bronze

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Abstract Platinum catalyst(Pt) and its composite catalyst with hydrogen molybdenum bronze(Pt-H_xMoO₃) were prepared on a glass carbon electrode with cyclic voltammetry, in 0.5 mol/L H₂SO₄ solution containing 5 mmol/L H₂PtCl₆ and 5 mmol/L H₂PtCl₆+5 mmol/L Na₂MoO₄, respectively. Their catalytic activity toward the oxygen reduction reaction(ORR) in 0.5 mol/L H₂SO₄ solution saturated with oxygen was studied with rotating disk electrode. The result shows that the catalytic activity of platinum toward ORR can be improved by H_xMoO₃. The catalytic mechanism was understood, based on the analysis on the relationship between the peak current of ORR and scan rate on the quiescent electrodes and the relationship between the current of ORR and rotating speed on the rotating electrodes. The transfer coefficient of charge transfer step for ORR on Pt is improved by H_xMoO₃, thus the kinetics of ORR is enhanced significantly. The transfer coefficient on Pt-H_xMoO₃ for ORR is 1.2 times that on Pt, and the kinetic current on Pt-H_xMoO₃ at 0.3 V(vs. SCE) is 5 times that on Pt.

Key words [Oxygen reduction reaction](#) [Catalysis](#) [Platinum](#) [Hydrogen molybdenum bronze](#)

DOI:

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