

论文

基于钯纳米颗粒修饰直立碳纳米管电极的电化学葡萄糖生物传感器

徐颖¹, 赵琨², 张小燕¹, 何品刚¹, 方禹之¹

1. 华东师范大学化学系, 上海 200062;
2. 沈阳药科大学药学院, 沈阳 110016

摘要:

将电化学氧化生成的Pd(IV)离子配合到直立碳纳米管(ACNTs)上, 使其还原为纳米颗粒(Pd nps), 从而制得Pd nps-ACNTs纳米复合物电极, 经过葡萄糖氧化酶(GOD)进一步修饰后, 制成GOD/Pd nps/ACNTs酶电极, 通过测量GOD和葡萄糖酶促反应中产生的H₂O₂含量, 进而监测葡萄糖浓度. 实验结果表明, 电极表面大量Pd纳米颗粒的存在显著提高了传感器的检测灵敏度, 使酶电极具有响应时间短(<5 s)及检测电位低(<0.4 V)等优点.

关键词: 葡萄糖传感器; 酶电极; 直立碳纳米管; 钯纳米颗粒

Amperometric Glucose Biosensor Based on Palladium Nanoparticles Combined Aligned Carbon Nanotubes Electrode

XU Ying¹, ZHAO Kun², ZHANG Xiao-Yan¹, HE Pin-Gang^{1*}, FANG Yu-Zhi¹

1. Department of Chemistry, East China Normal University, Shanghai 200062, China;
2. School of Pharmacy, Shengyang Pharmaceutical University, Shengyang 110016, China

Abstract:

Aligned carbon nanotubes(ACNTs) electrode was used as a new support to electrodeposit palladium nanoparticles(Pd nps), the resulting nano-composite showing its outstanding catalytic activity to hydrogen peroxide(H₂O₂). Herein the Pd(IV) ions were firstly covalently linked with ACNTs, and then were electrochemical reduced into Pd nanoparticles. After the glucose oxidase modification, such prepared electrode was employed as the enzyme electrode for glucose detection. The results show that these Pd nps have obviously enhanced the response sensitivity of the glucose biosensor in a short response time(<5 s) and at a low oxidation potential(<0.4 V) when detecting the H₂O₂ liberated in the enzymatic reaction between glucose oxidase and glucose.

Keywords: Glucose biosensor; Enzyme electrode; Aligned carbon nanotube; Pd nanoparticle

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通讯作者: 何品刚, 男, 博士, 教授, 博士生导师, 主要从事生物传感器、纳米材料制备与应用及毛细管电泳电化学检测研究. E-mail: pghe@chem.ecnu.edu.cn

作者简介:

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