

## 普鲁士蓝/PDDA - 石墨烯复合膜修饰电极的制备及应用于过氧化氢无酶传感器

作者: 张乐华, 张华阳, 李冲, 贾丽萍, 王怀生

单位: 聊城大学化学化工学院

基金项目: 基于DNA

摘要:

本实验制备了一种基于普鲁士蓝/PDDA - 石墨烯复合膜的新型无酶电化学传感器, 可以用于过氧化氢的灵敏检测。以聚二烯丙基二甲基氯化铵(PDDA)作为分散剂和功能化试剂制备了PDDA功能化的石墨烯(PDDA - G), 然后将普鲁士蓝(PB)电沉积到PDDA - G修饰的玻碳电极表面, 制备了PB/PDDA - G/GCE。实验发现, 在工作电位 - 0.3 V时, PB/PDDA - G/GCE作为传感器对H<sub>2</sub>O<sub>2</sub>的电化学还原有很好的催化能力, 响应时间小于5 s, 这主要是源于PDDA - G和PB的协同作用。在3.0 ~ 2061 μmol/L的范围内, H<sub>2</sub>O<sub>2</sub>的还原电流与其浓度呈现良好的线性关系, 检测限为1.0 μmol/L (S/N=3)。该修饰电极有望用于实际样品中H<sub>2</sub>O<sub>2</sub>的快速检测。

关键词: 石墨烯; 聚二烯丙基二甲基氯化铵; 普鲁士蓝; 无酶传感器; 过氧化氢

## Preparation and Application of Sensitive Enzymeless Sensor for Hydrogen Peroxide Based on Prussian Blue/PDDA - Graphene Modified Electrode

**Author's Name:**

**Institution:**

**Abstract:**

A novel, sensitive and enzymeless electrochemical sensor based on Prussian blue/poly (diallyldimethylammonium chloride) functionalized graphene composite film was fabricated for the detection of hydrogen peroxide. Graphite oxide was synthesized chemically by Hummers method and then was reduced by hydrazine hydrate in the presence of PDDA. Prussian blue (PB) was deposited on PDDA - G matrix by electrochemical method. With the synergistic effect of PDDA - G and PB, the PDDA - G/PB composite film (PB/PDDA - G/GCE) modified electrode shows good electrocatalytic ability toward H<sub>2</sub>O<sub>2</sub> reduction, at an applied potential of - 0.3 V, which can be used as an H<sub>2</sub>O<sub>2</sub> enzymeless sensor. The response time of the sensor was less than 5 s. The sensor showed good response to H<sub>2</sub>O<sub>2</sub> reduction in a wide linear range of 3.0 - 2061 μmol/L, and the detection limit was 1.0 μmol/L (S/N=3). This sensor will be promising for the fast detection of H<sub>2</sub>O<sub>2</sub> in real sample.

**Keywords:** Graphene; Poly (diallyldimethylammonium chloride); Prussian blue; Enzymeless sensors; Hydrogen peroxide

投稿时间: 2014-03-10

[查看pdf文件](#)