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溅射二氧化钛电极对过氧化氢电化学检测的研究

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摘　要：

本文介绍了一种使用微电子技术制造的二氧化钛电极，并且研究了该电极在磷酸缓冲液中的电化学特性。循环伏安法测量的结果显示，过氧化氢和氧气都能在极上还原，而且过氧化氢的还原更为明显。在磷酸盐缓冲液中，以Ag/AgCl 为参考电极，当所施加电压为－300V时，安培法显示二氧化钛电极对过氧化氢有很响应速度，其对于0.1 mM过氧化氢的响应电流是0.4 μA，而由于溶解氧所带来的背景还原电流仅为14 nA。为了研究这种电极在生物传感器中的应用可能性，中把葡萄糖氧化酶固定在钛氧化物电极薄膜上并测试了相应特性，发现存在的主要问题为酶在氧化钛表面的固定较为困难。

关键词：二氧化钛电极，过氧化氢，溅射，还原

Electrochemical Detection of Hydrogen Peroxide at the Sputtered Titanium Oxide Electrode

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Abstract:

In this paper a planar titanium oxide electrode was fabricated by standard microelectronic technology and its electrochemical properties in phosphate buffer solution was investigated. According to the cyclic voltammetric results, both hydrogen peroxide and oxygen can be cathodic reduced at titanium oxide electrode, while the reduction c hydrogen peroxide is preferential. The amperometric measurement of hydrogen peroxide at the planar titanium oxide electrode in air saturated phosphate buffer solution a 300mV shows fast responses. The amperometric response to 0.1mM hydrogen peroxide is 0.4 μA while the residual current due to the reduction of oxygen is only 14 nA Glucose oxidase has been immobilized on the surface of titanium oxide film to explore the possible applications of this electrode in biosensing. The experimental results sl it is difficult to immobilize enzyme on titanium oxide surface. Keywords: titanium oxide, hydrogen peroxide, sputtering, reduction

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