Full Papers

基于辣根过氧化物酶/纳米金/**L-**半胱氨酸/聚邻氨基苯甲酸膜修饰的过氧化氢生物传感器

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摘要　描述了测定过氧化氢的第三代电流型生物传感器。为了制备生物传感器，邻氨基苯甲酸（oABA）被电聚合到铂电极的表面形成具有抗干扰能力的静电排斥层。辣根过氧化物酶（HRP）通过纳米金（Nano-Au）的吸附固定到修饰了聚邻氨基苯甲酸及L-半胱氨酸的电极上。过氧化氢的测量是在相对于饱和甘汞电极的＋20 mV处进行的。修饰好的电极具有快速的响应，优秀的再现性和灵敏度，宽的线性范围和低的干扰水平等特点。我们研究了温度和pH对电极响应的影响及传感器的稳定性。在优化的条件下，传感器对过氧化氢的线性范围是2.99×10^{-6}到3.55×10^{-3} mol/L，灵敏度和检测下限分别为0.0177 $A\cdot L^{-1}\cdot mol^{-1}$和$4.3\times10^{-7}$ mol/L（$S/N=3$）。传感器不到10 s就可以达到响应的95％。

关键词　 电流型生物传感器　 过氧化氢　 聚邻氨基苯甲酸　 纳米金　 辣根过氧化物酶
分类号

A New Amperometric Biosensor Based on HRP/Nano-Au/ *L*-Cysteine/Poly(*o*-Aminobenzoic acid)-Membrane-Modified Platinum Electrode for the Determination of Hydrogen Peroxide

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Abstract The third generation amperometric biosensor for the determination of hydrogen peroxide (H_2O_2) has been described. For the fabrication of biosensor, *o*-aminobenzoic acid (*o*ABA) was first electropolymerized on the surface of platinum (Pt) electrode as an electrostatic repulsion layer to reject interferences. Horseradish peroxidase (HRP) absorbed by nano-scaled particulate gold (nano-Au) was immobilized on the electrode modified with polymerized *o*-aminobenzoic acid (p*o*ABA) with *L*-cysteine as a linker to prepare a biosensor for the detection of H_2O_2. Amperometric detection of H_2O_2 was realized at a potential of $+20$ mV versus SCE. The resulting biosensor exhibited fast response, excellent reproducibility and sensibility, expanded linear range and low interferences. Temperature and pH dependence and stability of the sensor were investigated. The optimal sensor gave a linear response in the range of 2.99×10^{-6} to 3.55×10^{-3} $mol\cdot L^{-1}$ to H_2O_2 with a sensibility of 0.0177 $A\cdot L^{-1}\cdot mol^{-1}$ and a detection limit ($S/N=3$) of 4.3×10^{-7} $mol\cdot L^{-1}$. The biosensor demonstrated a 95% response within less than 10 s.

Key words   amperometric biosensor   hydrogen peroxide   poly(*o*-aminobenzoic acid)   nano-Au   horseradish peroxidase

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