

A Novel Enzyme-Free Hydrogen Peroxide Sensor Based on Electrode Modified with Gold Nanoparticles-Overoxidized Polydopamine Composites

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A new electrode was fabricated by electrodeposition of gold nanoparticles (Au NPs) on overoxidized polydopamine (OPDA) modified gold electrode. The integration of Au NPs and the OPDA film endowed the Au NPs/OPDA modified electrode with high sensitivity and selectivity and good electrocatalytic activities to reduction of hydrogen peroxide (H₂O₂). Compared to electrodes modified with individual Au NPs or OPDA films, the Au NPs/OPDA modified electrode presents the largest current response to reduction of H₂O₂, due to a possible synergism between the OPDA film and the Au NPs. The proposed H₂O₂ sensor has a response sensitivity of 52.94 μA mM⁻¹ cm⁻² and a wide linear range from 10 μM to 8 mM. The detection limit is estimated to be 0.5 μM.

Keywords: Gold nanoparticles; Polydopamine; Electrodeposition; Hydrogen peroxide

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