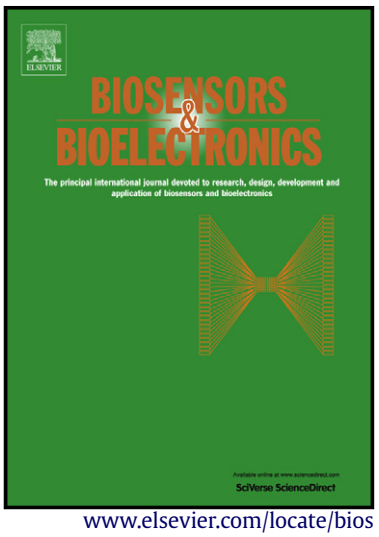

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High loading Pt nanoparticles on functionalization of carbon nanotubes for fabricating nonenzyme hydrogen peroxide sensor

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Abstract

A very efficient, simple approach was developed to fabricate a high Pt nanoparticles-loading multiwall carbon nanotube (MWCNTs) amperometric sensor for hydrogen peroxide (H_2O_2) determination. In this strategy, MWCNTs was first functionalized with an anionic surfactant, sodium dodecyl sulfate (SDS); then the Pt nanoparticles (NPs) were loaded on MWCNTs-SDS by electrodepositing. The large amounts of Pt nanoparticles could be well deposited on the surface of the MWCNTs-SDS modified electrode, as revealed by scanning electron microscopy (SEM). In addition, the PtNPs/MWCNTs-SDS composite was also characterized by electrochemical methods including cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS). The experimental results demonstrated that the constructed electrode exhibited good catalytic activity toward the hydrogen peroxide, and obtained a wide linear range from 5.8×10^{-9} to 1.1×10^{-3} M with a limit of detection (LOD) of 1.9×10^{-9} M, which was superior to that obtained with other H_2O_2 electrochemical sensors reported previously. Moreover, it can also be applied to real samples analysis. The excellent performance of hydrogen peroxide sensor was ascribed to the MWCNTs-SDS composites being used as effective load matrix for the

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