Short Communication

Synthesis of Single-Crystalline Iron Oxide Magnetic Nanorings as Electrochemical Biosensor for Dopamine Detection

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In this paper, uniform iron oxide magnetic nanorings (Fe$_3$O$_4$ NRs) were successfully synthesized through hydrothermal method. The electrochemical performance of Fe$_3$O$_4$ NRs/glassy carbon electrode (GCE) based biosensor for dopamine (DA) detection has been investigated by cyclic voltammetry (CV) and differential pulse voltammetry (DPV). These results implied the Fe$_3$O$_4$ NRs/GCE biosensor exhibited superior electrocatalytic activity and significant electron transfer kinetics for the electrooxidation of DA with a quick response time of 4 s and a low detection limit of 10 nM. These excellent electrochemical results indicate the Fe$_3$O$_4$ NRs could be utilized as an extremely promising material for the detection of DA related diseases in biomedical analysis.

Keywords: Fe$_3$O$_4$ nanorings, dopamine, electrooxidation, cyclic voltammetry

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