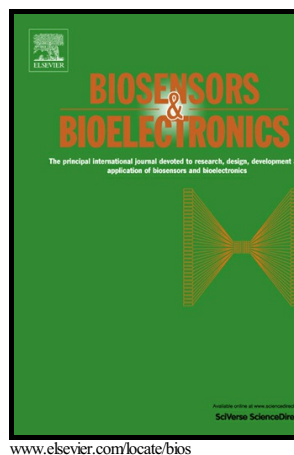


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Fabrication of a facile electrochemical biosensor for hydrogen peroxide using efficient catalysis of hemoglobin on the porous Pd@Fe₃O₄-MWCNT nanocomposite

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Abstract

In this work, a sensitive amperometric biosensor for hydrogen peroxide based on synergetic catalysis of hemoglobin and porous Pd@Fe₃O₄-MWCNT nanocomposite has been constructed. With attention to the utilities of large surface area and outstanding catalytic performance, Pd@Fe₃O₄-MWCNT nanocomposite was employed as the nano-stabilizer for the immobilization of hemoglobin (Hb). The immobilized Hb on the surface of nanocomposite as an electrochemical biosensor efficiently catalyzed the reduction of hydrogen peroxide, amplified the electrochemical signal and enhanced the sensitivity. Results of voltammetry and electrochemical impedance examinations showed that the nanocomposite could enhance the electron conductivity and provide more sites for the immobilization of Hb. A linear response from 0.2-500 μM with detection limit of 0.063 μM for hydrogen peroxide was achieved. The apparent Michaelis–Menten constant K_{app}^M value was 21 μM. Thus, the nanocomposite could be applied for fabrication of a third generation biosensor for hydrogen

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