Titanate Nanofibers Modified Electrode for Electrochemistry of Hemoglobin and Its Electrocatalytic Application for Trichloroacetic Acid Determination

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In this paper titanate nanofibers (TiNFs) decorated carbon ionic liquid electrode (CILE) was fabricated for study on direct electrochemistry of hemoglobin (Hb). Electrocatalysis of this electrochemical protein sensor (Nafion/Hb/TiNFs/CILE) to different substrates was investigated in detail. Spectral analysis proved that Hb remained its biostructure after mixed with TiNFs. Electrochemical experiments indicated that direct electron transfer of Hb was accelerated on TiNFs/CILE with a couple of well-defined redox responses. Electrochemical kinetics were checked with electrochemical parameters calculated. Under the optimized experimental conditions, this biosensor displayed superiority electrocatalytic activity to the reductions of hydrogen peroxide, sodium nitrite and trichloroacetic acid. Real sample was detected by this Hb and TiNFs based sensor with the satisfactory results obtained. Therefore TiNFs exhibited the remarkable potential in the application of bioelectrocatalysis.

Keywords: Titanate nanofibers, Hemoglobin, Electrocatalysis, Nitrite, Hydrogen peroxide, Trichloroacetic acid

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