Magnesium Oxide/Carbon Nanofiber Nanocomposite Modified Electrode for Electrochemical Hemoglobin Sensor

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MgO decorated carbon nanofiber (MgO@CNFs) nanocomposite was prepared by electrospinning and carbonization method. Then the nanocomposite was casted on carbon ionic liquid electrode (CILE) with the following immobilization of hemoglobin (Hb) by Nafion polymer film. UV-Vis spectroscopic results showed that Hb maintained its original structure without changing after mixing with nanocomposite. The resultant MgO@CNFs modified electrode provided a favorable microenvironment for Hb to realize electrochemistry and the bioelectrochemical properties of Hb were studied in details. The results showed that MgO@CNFs nanocomposite on electrode improved Hb loading amount with its bioactivity maintained and electron transfer rate fasten, which was attributed to big specific interface area, excellent biocompatibility and high conductivity. Nafion/Hb/MgO@CNFs/CILE also displayed high electrocatalytic activity to the electroreduction of trichloroacetic acid. This study provided a novel way for the fabrication of the nanostructured biosurfaces for electrochemical biosensors.

Keywords: MgO decorated carbon nanofiber; Hemoglobin; Biosensor; Direct electrochemistry; Electrocatalysis

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