

Electrochemical Biosensor based on Protected Enzyme Nanoparticles

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Covalent modification of redox enzyme-glucose oxidase (GOx)-within porous composite organic/inorganic network and three electrodes fabrication process for electrochemical biosensor was described. The polymerization of organic/inorganic network was synthesized via a three-step process, which consisted of a covalent modification of GOx followed by a polymerization between modified enzyme and methacryloxypropyltrimethoxysilane (MPS) and then hydrosis and crosslinking. The synthesized GOx nanoparticles were less than 20nm in size. They were observed by transmission electron microscope (TEM) and analyzed using Fourier transform infrared spectrophotometer (FT-IR). The three electrodes fabrication process is used photolithography. The nano-biosensor based on protected GOx nanoparticles demonstrated extension of primarily lifetime and detection of extremely limited concentration (pM) in human serum. The hybrid enzyme nanostructures were expected as a method to stabilize enzyme for other biocatalytic application.