

A Hydrogen Peroxide Biosensor based on Nanoparticle PANI/HRP Electrode

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Abstract. Recently, conducting polymers have attracted much interest in the development of biosensor. It contain π - electron backbone responsible for its unusual electronic properties such as electrical conductivity, low energy optical transitions, low ionization potential and high electron affinity. When the Horseradish peroxidase (HRP) was immobilized to the conducting polymers, these polymers possesses the ability to bind oppositely charged complex entities in their neutral insulating state. Determination of Hydrogen peroxide (H_2O_2) and other organic peroxides is of practical importance in clinical, environmental and many other fields. This study intends to see the role and properties of PANI/HRP layer towards H_2O_2 by measuring its current. Langmuir- Blodgett technique was used to form the PANI monolayer and the HRP was deposited in PANI monolayer by using electrodeposition method. Results from U.V.- visible spectrum of PANI with and without HRP shows two sharp absorption peaks at 320 nm and 720 nm. PANI forms as nanoparticles was revealed by VPSEM. AFM shows the image in roughness before and after the HRP was deposited on PANI monolayer. The current and response of H_2O_2 towards PANI/HRP electrode increases demonstrating effective electrocatalytic reduction of H_2O_2 . PANI/HRP electrode not only act as excellent materials for rapid electron transfer but also for the fabrication of efficient biosensors.