

CeO₂ Nanostructure based Electrochemical Biosensor for Hydrogen Peroxide Detection

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A facile and sensitive amperometric detection of H₂O₂ was developed based on direct electrochemistry of myoglobin immobilized on a porous CeO₂ nanostructured film which was electrodeposited on an ITO. The ITO/CeO₂ Substrate Surface, characterized by scanning electron microscopy, revealed a large specific surface area with a unique nanostructure of CeO₂ on the ITO. Electrochemical behavior of adsorbed Mb on the fabricated substrate was investigated by cyclic voltammetry and differential pulse voltammetry techniques, showing a considerable electrocatalytic performance without the presence of any electron mediator. The proposed protein-based biosensor showed linear response up to a concentration of 3 mM having a detection limit of 0.6 μM and a response time of approximately 8 s, compared to those of other modified electrodes. Therefore results proved that, well-dispersed and high surface area of the modified electrode as well as direct electron transfer of protein could be a promising method for electrochemical biosensors. Acknowledgments: This work was supported by Samsung Research Funding Center of Samsung Electronics under Project Number SRFC-MA1401-04.