

Advanced electrochemical biosensor integrating single-walled carbon nanotubes and peptides

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Single-walled carbon nanotubes (SWNTs) have been reported as potential electrode materials for the applications of electrochemical biosensor, due to their superb mechanical and electrical properties. However, the poor dispersity and solubility of SWNTs in both aqueous and non-aqueous solution demand the challenge for their functionalizations, which lead to the great potential for electrochemical applications. We here report about the SWNTs debundled with peptide via sonication-assisted noncovalent interactions, showing effectively dispersed in water. The well-dispersed peptide/SWNTs were characterized by UV-Vis spectroscopy, AFM and TEM, displaying in forms of individual exfoliated SWNTs-wrapped peptide. The peptide/SWNTs hybrid films were prepared by the film casting under vacuums for electrochemical biosensors with nano-thickness. The peptide/SWNTs hybrid films were showed high electrochemical properties and stabilities through the verified cyclic voltammetry. [Our work was supported in part by the IT Leading R&D Support Project from the Ministry of Knowledge Economy through IITA and by the KOSEF through the Center for Ultramicrochemical Process Systems].