Short Communication

A Sensitive Electrochemical Impedance DNA Biosensor Based on ZnO Nanorod Electrodes for BCR/ABL Fusion Gene Detection

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A ZnO based DNA biosensor was developed to detect complementary target single-stranded DNA (ssDNA) of BCR/ABL fusion gene. ZnO nanorods (NRs) have been synthesized onto platinized silicon (Pt/Si) substrate using facile and economical chemical bath deposition method. The ssDNA probe was immobilized by electrostatic attraction on the ZnO/Pt/Si surface. The morphology of the samples were characterized by scanning electron microscopy. Electrochemical impedance spectroscopy and cyclic voltammetry were done to study ZnO NR arrays, and the immobilization and the hybridization of ssDNA at the electrode surface. The fabricated DNA biosensor was evaluated in the complementary target ssDNA of BCR/ABL probe in the dynamic range from 1.0 pM/L to 1.0 nM/L which indicates a good linearity, high sensitivity and low detection limit of 2.75×10^{-13} mol/L. The successful detection of BCR/ABL fusion gene exhibits its potential to be a robust and sensitive label-free electrochemical impedance measurement for sensing applications.

Keywords: Electrochemical impedance DNA biosensor; BCR/ABL fusion gene; Cyclic voltammetry; Electrochemical impedance spectroscopy

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