

Effect of antibody-immobilization method in real-time, and label-free nanowire field effect transistor biosensor

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Nanoscale chemical and biological sensors are emerging as one of the most promising platforms for the specific identification of biomolecules and chemical species in the life sciences. In this approach, effective surface immobilization routes still remain great challenges to maximize total performance of chemical and biological detections for practical applications. In general, covalent and non-covalent methods of antibody-immobilization have been used for nanobiosensor. In this work, total performance of nanosensor is investigated systematically according to immobilization method. In case of covalent immobilization, ZnO/amorphous carbon core-shell nanowire is modified by self-assembly monolayer (3-aminopropyltriethoxysilane), and then immobilized with antibody. The other approach is that antibody was directly immobilized on amino-functionalized ZnO/amorphous carbon core-shell nanowire by NH<sub>3</sub> plasma treatment. Finally, effect of antibody-immobilization method in label-free nanobiosensor is discussed in terms of total performance, leading to better insights for effective design of biosensor.