

Aptamer immobilized nanosensor for label free and real time detection of metal ions and cancer marker

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Nanowire sensors are emerging as one of the most outstanding platforms for specific identification of biomolecules in the life sciences. To date, there have been many reports for chemical and biological nanosensors using one dimensional nanostructure and various functionalization schemes. For the purpose of commercialization, it has been recognized that control of the solution Debye length is critical for highly sensitive detection of biomolecules. To address these issues, we tried to demonstrate that aptamers enable sensitive detection possible because they are smaller in size than the Debye length. For this work, we have fabricated label free nanosensors based on aptamer-modified ZnO/PAC (polymer-like amorphous carbon) nanowire field effect transistors. We investigated the real-time, label free detection of Cu metal ion and AFP antigen in solutions. Finally, the electrical signals of nanosensors according to specific bindings on nanowire field effect transistor were discussed in terms of ion screening effects, as compared to the conventional approach.