

Direct observation in surface charge variation during functionalization steps of nanowire field-effect transistor-based biosensors

서지혜, 김진태, Rizwan, Deepti Sharma, 구아영, 송정근,
임연호*
전북대학교
(yeonhoim@jbnu.ac.kr*)

Nanoscale chemical and biological sensors are emerging as one of the most impressive platforms for the specific identification of biomolecules and chemical species in the life sciences. Field effect transistors (FETs) using semiconductor nanowires (NWs) have been demonstrated to be outstanding platforms for the real-time, label-free, highly sensitive and multiplexed detection of biological and chemical species. For these approaches, one of the critical issues is to establish an effective surface functionalization technology to maximize total performance of chemical and biological nanosensors. To address these issues, we present real-time monitoring results of surface charge variation according to various surface functionalization materials using the electrolyte-gated nanowire FETs with an Ag/AgCl electrode as the top-gate. In this work, various surface functionalization materials for surface charge monitoring includes self-assembly monolayer, amorphous carbon with several functional groups and blocking chemical agents. These results give us better insights for effective design of biosensor.