

탄소 나노튜브 트랜지스터를 이용한 대장암 종양표지자의 검출

Detection of CEA tumor markers using single walled carbon nanotube transistors

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We have developed a biosensor that can detect CEA (carcinoembryonic antigen) markers using single walled carbon nanotube field effect transistors (SWNT-FET). The SWNT-FETs were fabricated using nanotubes grown by patterned catalyst growth technique, and the top contact electrodes were generated using conventional photolithography method. For biosensor applications, SU-8 negative photoresist patterns were used as an insulation layer. For our experiment, CEA antibody was used as a recognition element, and we successfully immobilized CEA antibodies on the side wall of the single walled carbon nanotubes using CDI-tween 20 linking molecules. To monitor the binding of CEA to CEA antibodies that were immobilized on the SWNT-FETs, we continuously measured the conductance of the CEA antibody-functionalized SWNT-FET with adding CEA solutions. Upon adding CEA to the CEA antibody-functionalized SWNT-FET, sharp decrease of conductance has observed, thereby demonstrating the possibility of realizing label-free, fast reacting SWNT-FET based tumor marker sensors.