

## SINGLE WALLED CARBON NANOTUBES FOR BIOLOGICAL APPLICATIONS

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Carbon nanotube-field effect transistor (CNT-FET) composed of highly pure single walled carbon nanotubes (SWNT) are successfully demonstrated as a highly selective biosensor. Selective biological events, such as antigen-antibody recognition are monitored from electrical conductance change of the device while constant bias voltage is applied to the Drain electrode. Systematic studies in order to elucidate the mechanism of the conductance changes also have been performed by fabricating CNT-FET devices having metal contact electrodes (Pd/Au) passivated with self-assembled monolayers of mPEG-SH. Metal-nanotube contact area of the CNT-FET is evicted to be highly responsible for the generation of the electrical signals while direct charge injection from biomolecules into carbon nanotube, or modulated electrical double layer field effect are minor effect. Parallel to the electronic sensing approach, microarray-fluorescence technique which is one of the conventional methods for protein chip is also attempted using SWNT film as an efficient protein immobilization surface. Contrast to the typical surfaces for protein chip, SWNT allows minimum contact area to the immobilizing proteins due to high aspect ratio of its structure. This increases the stability of protein structures after immobilization, and highly expected to overcome the hurdle for further improvement of proteomics.