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Nanomechanics and Electronic Detection in Biosensing[1]

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Integration of microscale and nanoscale systems together offer ways to increase detection sensitivity and specificity as well as enhancing the processing speed and analysis of chemical and/or biological agents. Implementation of a multifunctional detection system for both chemical and biological agents will require leveraging the integration of nanoscale components (e.g., carbon nanotubes). Transduction of a specific chemical/biological reaction into a 'real world' (*i.e.*, electrical, mechanical or optical) signal is needed before it can be relayed via microelectronics to the 'outside world.' Single walled carbon nanotubes (SWNTs) are nearly ideal, one-dimensional nanostructures and exhibit other unique properties that may be useful in novel nanoelectronics and nanomechanics applications. Here, the fabrication and electrical properties of SWNT devices as a field effect transistor (FETs) will be presented. We have used these SWNT-FET devices as highly sensitive nano-biosensors for the *in-situ* detection of the protein molecules. Results of these experiments will be used in elucidating the role of charge transfer and adsorption on the transport properties. Finally, the future prospects of nanotube devices combining electronics and mechanical detection will be discussed.

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