

## Highly Sensitive Biosensors Based on High-Performance Carbon Nanotube Field-Effect Transistors

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Electronic detection of biomolecules has been attracting much interest in the fields of clinical diagnosis, pharmacy and biotechnology. In particular, developing highly sensitive, label-free, cost-effective, simple and disposable sensors is strongly required for home medical care. Carbon nanotube field-effect transistors (CNTFETs) with single-wall carbon nanotube (SWNT) conducting channels are a promising candidate for highly sensitive biosensors owing to the excellent electronic and mechanical properties of SWNTs. Therefore, chemical sensors and biosensors based on CNTFETs have been extensively studied and investigated in academia and industry over the years. In this review, we will cover recent advances in the detection of biological species in various manners using CNTFETs. This article highlights the high-performance characteristics of CNTFETs, the detection of deoxyribonucleic acid (DNA) hybridization and proteins using CNTFET sensors and an effective measurement system for the highly sensitive detection of analytes, mainly focusing on works that were carried out in our laboratory.

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