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Floating Electrode Sensor based on CNT-FET for the Detection of DNAs MINJU LEE, BYEONGJU KIM, JOOHYUNG LEE, SEON NAMGUNG, JEONGSU KIM, Seoul Natl Univ, JAE YEOL PARK, Doowon Technical University College, MOON-SOOK LEE, Samsung Advanced Institute of Technology, SEUNGHUN HONG, Seoul Natl Univ — DNA sensors based on carbon nanotube (CNT) networks have been drawing much attention due to their high sensitivities. In the CNT network-based DNA sensors, the modulation of the Schottky barrier by the DNA hybridization has been known to play an important role in detecting target DNA. For such applications, many researchers have tried to enhance the sensitivity of the Schottky barrier-based sensors through various methods such as the formation of a nonsymmetrical Schottky contact or the increase of the Schottky contact area. However, these methods suffered from some limitations such as the difficulty of controlling the sensor response for applications. Here in, we developed a floating electrode-based DNA sensor with controllable responses. In this strategy, metallic floating electrodes were fabricated to form Schottky barriers between CNTs and floating electrodes. We showed that the increased number of floating electrodes could enhance the sensitivity of our sensor. We also analyzed our results based on the Langmuir isotherm theory. This efficient approach could be an important strategy to improve the sensitivity and to control the response of CNT network-based sensors. Our work should provide an important insight regarding Schottky barrier-based sensors.

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