

제 60회

ORGAN ON A CHIP

기술교류회

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1. Education

박사: Texas A&M Univ., Dept. of Chemical Engineering (2004)
석사: Stanford Univ., Dept. of Chemical Engineering (1998)
학사: 서울대학교, 공업화학과 (1992)

2. Experience

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2006 ~ 2007 삼성 SDI 중앙연구소, 책임연구원
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제목

바이오전자 및 광학 코티솔 센서 및 바이오소재 메모리 소자

Bioelectronic and optical cortisol sensor and biomaterial memory device

초록

Recently, chemiresistive semiconductor, which varies its resistance or conductance status based on chemical phenomena at its surface, has been developed as a sensor device for biomolecule detection. Particularly, graphene and gallium nitride (GaN) has been one of the best example for the chemiresistive semiconductors. In this study, we demonstrated reduced graphene oxide (rGO) and AlGaIn/GaN biosensor structure for a detection of stress hormone, i.e. cortisol, sensing. Cortisol monoclonal antibody (c-Mab) was chemically tethered on semiconductor surface for the cortisol detection by its specific antigen-antibody binding. The current versus voltage (I-V) curve exhibited resistance changes, threshold voltage shift, and resistive switching I-V behaviors as a sensing mechanism, which demonstrated a unique possibility of semiconductor based biosensor. In addition, localized surface plasmon resonance (LSPR) cortisol sensor and biomaterial-based memory device can be introduced.

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