

Ammonium ion detection in solution using vertically grown ZnO nanorods based field-effect transistor

Ahmad Rafiq, 안민상, 한윤봉†

전북대학교

(ybhahn@jbnu.ac.kr†)

Vertically aligned ZnO nanorods were directly grown on a seeded glass substrate between a pre-deposited source-drain to fabricate a field-effect transistor (FET) based ammonium ion sensor. Controlled growth of aligned nanorods provided a well-defined large surface area for the detection of ammonium ions in solution. As a result, fabricated FET sensor showed excellent sensing performance including high sensitivity ($93.16 \mu\text{Acm}^{-2} \text{mM}^{-1}$), wide linear range (0.01 μM to 2.5 mM), low concentration detection ability (0.07 μM), good selectivity and storage stability. Hence, this study provides an efficient strategy for the fabrication of a low-cost, fast, and portable device for environmental monitoring and disease diagnosis.