High-performance cholesterol sensor using solution-grown ZnO nanorods based FET

Ahmad Rafiq, Nirmalya Tripathy, 한윤봉*
전북대학교
(ybhahn@chonbuk.ac.kr*)

A high-performance cholesterol sensor using solution-grown ZnO nanorods (ZnO NRs) based field-effect-transistor (FET) was demonstrated. The structural, optical and compositional properties of the ZnO NRs were characterized using UV/visible, Fourier transform infrared spectroscopy, Raman spectroscopy, X-ray diffraction, and field-emission scanning electron microscopy etc. In order to immobilize the cholesterol oxidase (ChOx) enzyme the synthesized ZnO NRs were rinsed with PBS to generate hydrophilic surfaces. The fabricated sensor exhibited the wide linear range, good stability and repeatability. The calibration plot is linear over the large dynamic range of 0.001-45 mM, where the sensitivity (10 μA cm^{-2} mM^{-1}) and detection limit (~0.05 μM) were calculated based on signal/noise ratio (~3N/S) in short response time. All these results demonstrate that the FET-based sensors hold great potential for cholesterol determination in human serum.