Synthesis of ZnO nanotube on Si/Ag Substrate as Biosensors for Cholesterol

Ahmad Rafiq, Nirmalya Tripathy[1], 한윤봉[2,*]
전북대학교;
[1]CBNU Department of BIN Fusion Technology;
[2]전북대학교 BIN 융합공학과
(ybhahn@jbnu.ac.kr*)

ZnO nanotube (ZNT) arrays were synthesized by a one-step chemical process on Si/Ag substrate in an aqueous solution. Morphology and structure of ZnO nanotubes are characterized by FESEM, HRTEM and XRD. The prepared ZNT arrays were further used as a working electrode to fabricate an enzyme-based cholesterol biosensor through immobilizing cholesterol oxidase (ChOx). The fabricated biosensor exhibits high and reproducible sensitivity of 79.40 μA cm^{-2} mM^{-1}, wide linear range from 1.0 μM to 13.0 mM, response time ~ 2 s, and a low detection limit of 0.5 nM (S/N = 3), for sensing of cholesterol. The anti-interference ability and long-term stability of the biosensor are also assessed. Compared with the biosensors based on the nanorods and flat structure, the proposed biosensor shows expanded linear range and sensitivity. All these results demonstrate that ZnO nanotube can provide a promising material for the biosensor designs.