Vanadium pentoxide and tungsten oxide as substrates for enzyme immobilization in an EGFET-biosensor

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doi: 10.20964/2018.10.29

Received: 26 January 2018 / Accepted: 28 July 2018 / Published: 1 September 2018

V₂O₅ and WO₃ were obtained via sol-gel process as candidates to application in biosensors. X-ray diffractograms indicated the presence of lamellar structures, $d = 1.17$ nm and $d = 0.69$ nm, corresponding to V₂O₅.1.8H₂O and WO₃.2H₂O, respectively. SEM images of V₂O₅ in xerogel form (comment 2) revealed a vanadium pentoxide xerogel ribbons with one dimensional stacking. Diffractograms corresponding to WO₃ in xerogel form (comment 2) revealed a delamination process, which resulted in an irregular stack of rounded platelets. Investigation of the electronic and electrochemical properties of the samples was conducted using cyclic voltammetry (CV) and extended gate field effect transistors (EGFET). Glucose oxidase (GOx) was further immobilized to act as the sensing component in a biosensor. CV and EGFET were also used to confirm immobilization of GOx on the oxide surfaces, indicating that the materials are promising candidates for application as disposable biosensors in the future.

Keywords: V₂O₅; WO₃; glucose oxidase; Cyclic Voltammetry; EGFET

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