

# **Application of polymerized multiporous nanofiber of SnO<sub>2</sub> for designing a bienzyme glucose biosensor based on HRP/GOx**

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## **ABSTRACT**

This work reports on a novel glucose biosensor based on co-immobilization of glucose oxidase (GOx) and horseradish peroxidase with polymerized multiporous nanofiber (MPNFs) of SnO<sub>2</sub> onto glassy carbon electrode with chitosan. Multiporous nanofibers of SnO<sub>2</sub> were synthesized by electrospinning method from the tin precursor which possesses high surface area good electrical conductivity, and the nanofibers were polymerized with polyaniline (PANI). GOx and HRP were then co-immobilized with the nanofibers on the surface of the glassy carbon electrode by using chitosan. The polymerized nanofibers play a significant role in facilitating the direct electron transfer between the electroactive center of the immobilized enzyme and the electrode surface. The morphology of the nanofiber and polymerized nanofiber has been evaluated by field emission scanning electron microscopy (FESEM). Cyclic Voltammetry and amperometry were employed to study and optimize the performance of the fabricated biosensor. The PANI/SnO<sub>2</sub>-NF/GOx-HRP/Ch/GC biosensor displayed a linear amperometric response towards the glucose concentration range from 5 to 100  $\mu$ M with a detection limit of 1.8  $\mu$ M (S/N = 3). Also, the anti-interference study and real sample analysis was investigated. Furthermore, the biosensor reported in this work exhibited excellent stability, reproducibility, and repeatability.

**Keywords:** Polymerized multiporous nanofiber; SnO<sub>2</sub> for designing bienzyme; glucose biosensor; based HRP/GOx.