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## A glutathione biosensor based on a glassy carbon electrode modified with CdO nanoparticle-decorated carbon nanotubes in a nafion matrix

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### Abstract

A nanocomposite consisting of cadmium oxide decorated with carbon nanotubes (CdO.CNT NC) was prepared by a wet-chemical technique, and its optical, morphological, and structural properties were characterized by FTIR, UV/Vis, FESEM coupled to XEDS, XPS, and XRD methods. A flat glassy carbon electrode was modified with the nanocomposite to obtain a sensor for L-glutathione (GSH) which displays improved sensitivity, a large dynamic range and good long-term stability. The calibration plot (best acquired at a voltage of 0.5 V) is linear ( $r^2 = 0.99$ ) in the 0.1 nM to 0.01 M GSH concentration range. The detection limit is as low as 30.0 pM, and the sensitivity is similar to 9.49  $\mu\text{A}/\text{cm}^2/\text{M}(-1)$ . To the best of our knowledge, this is the first report on the determination of GSH using such a modified glassy carbon electrode (GCE) in combination with I-V method. The GCE was applied to the selective determination of GSH in spiked rabbit serum samples and gave acceptable results.

### Keywords

**Author Keywords:** Glutathione sensor; Electrochemical oxidation; Nanomaterials; Nafion; Nanocomposite; FTIR; Glassy carbon electrode; FESEM; Sensitivity; XEDS; Carbon nanotubes; XPS; Rabbit serum; XRD; I-V technique

**KeyWords Plus:** NICOTINAMIDE ADENINE-DINUCLEOTIDE; PASTE ELECTRODE; VOLTAMMETRIC SENSOR; ELECTROCHEMICAL DETERMINATION; HEMOLYZED ERYTHROCYTE; SAMPLES; NANOCOMPOSITE; REDUCTION; MEDIATOR; CYSTEINE

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