Titanium Oxide (TiO₂) Nanoparticles Decorated Three-Dimensional Porous Nickel Foam Electrode for Non-Enzymatic Electrochemical Sensing of Glucose

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Three dimensional (3D) interconnected materials paid much attention in various field due to their significant electrical and catalytic properties. Here, 3D Ni-TiO₂ nanocomposite was prepared by wet impregnation method. The structure and morphology of the prepared 3D Ni-TiO₂ were characterized by scanning electron microscopy and electrochemical techniques, namely cyclic voltammetry and amperometry for non-enzymatic detection of glucose. The Ni-TiO₂ nanocomposite electrode showed excellent electrocatalytic activity towards the electro-oxidation of glucose molecule in an alkaline medium. The sensitivity was 844.85 $\mu\text{A mM}^{-1} \text{cm}^{-2}$ with selectivity towards the detection of glucose in the presence of interferences such as uric acid, ascorbic acid, and dopamine. The sensor was also used to determine the glucose in human blood serum samples.

Keywords: Ni-TiO₂ nanocomposite, Amperometry, Glucose sensor, Blood serum.

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