Short Communication

Enzyme-Free Glucose Sensor Based on Micro-nano Dualporous Gold-Modified Screen-Printed Carbon Electrode

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In this work, an enzyme-free glucose sensor at neutral pH (7.4) has been developed based on a micro-nano dualporous (MNDP) gold-modified screen-printed carbon electrode (SPCE). The combination of MNDP gold and SPCE makes the device a compact, low-cost and reliable enzyme-free glucose sensor. MNDP gold was directly synthesized via an electrochemical deposition method on a carbon surface using a hydrogen bubble as a dynamic template. The obtained MNDP gold has a highly porous structure and is mechanically stable. The MNDP gold-modified SPCE was applied to glucose sensing. This enzyme-free sensor showed a wide linear range, with the logarithm of glucose concentration between 1.5 and 16 mM, a high sensitivity of $48.4 \mu\text{A} \cdot \text{mM}^{-1} \cdot \text{cm}^{-2}$, and a limit of detection of 25 μM . It also exhibited exquisite selectivity with the common interference compounds in real samples. Moreover, this sensor successfully detects glucose levels in human blood serum with satisfactory results and functional recovery.

Keywords: Enzyme-Free, Glucose Sensor, Screen-Printed Carbon Electrode, Micro-Nano Dualporous Gold.

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