One-step Electrochemical Synthesis of Free-Standing Cobalt Oxide Nanoflakes to Fabricate Amperometric Sensor for the Acetaminophen Detection in Human Fluids and Pharmaceutical Formulations

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Free-standing cobalt oxide nanoflakes were synthesized directly on a glassy carbon electrode via an one-step electrodeposition. A stable and sensitive amperometric sensor based on the cobalt oxide nanoflakes was developed for the acetaminophen detection, with a high sensitivity of $5042 \mu\text{A} \cdot \text{mM}^{-1} \cdot \text{cm}^{-2}$, and a detection limit of $0.015 \mu\text{M}$ at the applied potential of 0.47 V . The high sensitivity and stability towards acetaminophen detection are mainly attributed to direct electrochemical growth and self-supported features of the cobalt oxide nanoflakes on a conducting substrate. The sensor was successfully applied for the determination of acetaminophen in serum, urine samples and commercial tablets.

Keywords: cobalt oxide nanoflakes, acetaminophen, sensor, electrochemical synthesis

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