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Electrochemical sensor based on palladium-reduced graphene oxide modified with gold nanoparticles for simultaneous determination of acetaminophen and 4-aminophenol

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Abstract: Herein, a newly developed electrochemical sensor base on the nanohybrid of palladium-reduced graphene oxide modified with gold nanoparticles (Au/Pd/rGO) was established, which was prepared by electrodeposing Au nanoparticles on Pd/rGO modified on a glass carbon electrode. The morphologies and microstructures of the as-prepared nanohybrid were characterized by X-ray photoelectron spectroscopy, Scanning electron microscopy and Infrared spectroscopy. And, experiment results showed that the prepared Au/Pd/rGO nanohybrid exhibited excellent electrocatalytic-activity toward the redox of acetaminophen (PA) and 4-aminophenol (4-AP) simultaneously. The linear detection ranges were 1.00-250.00 μM for PA and 1.00-300.00 μM for 4-AP, with the detection limits of 0.30 μM for AP and 0.12 μM for 4-AP, respectively. Because of the excellent performance of lower detection, wider linear range and better selectivity, the prepared Au/Pd/rGO nanohybrid with more potential applications was a promising candidate for advanced electrode material in electrochemical sensing field.

Keywords: Graphene; Pd cubes; Acetaminophen; 4-aminophenol; ·Electrochemical Sensor

1. Introduction

As an analgesic and antipyretic drug, paracetamol (PA) (N-acetyl-p-aminophenol or acetaminophen) is mainly used for the reduction of fever and relief the moderate pain

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