Simultaneous Determination of Hydroquinone and Catechol using Carbon Glass Electrode Modified with Graphene Quantum Dots

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In this study, an electrochemical sensor for the simultaneous detection of hydroquinone (HQ) and catechol (CC) was fabricated on glassy carbon electrode (GCE) modified with graphene quantum dots (GQDs). The prepared GQDs were characterized by transmission electron microscope and fourier transform infrared spectroscopy. The GQDs/GCE, which prepared by electrodeposition method, and characterized by electrochemical impedance spectra, exhibited excellent electrochemical catalysis and conductive properties for HQ and CC. Owing to the high electroactive surface area, good electrocatalytic activity and low charge transfer resistance of GQDs, HQ and CC can be easily measured simultaneously for the large separation of oxidation peak potentials (113 mV) and do not interfere with each other. Under the optimal experimental condition, the oxidation peak currents were linear to HQ/CC in the range from 0.5 μM to 100 μM with the same low detection limits of 0.08 μM (S/N=3). Simultaneous determination of HQ and CC with such electrode was conducted in river water samples with reliable recovery between 97.90% and 103.9%.

Keywords: graphene quantum dots; hydroquinone; catechol; simultaneous; modified electrode

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