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A Surfactant Enhanced Graphene Paste Electrode as an Effective Electrochemical Sensor for the Sensitive and Simultaneous Determination of Catechol and Resorcinol

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ABSTRACT

A highly sensitive and selective electrochemical sensor based on surfactant modified graphene paste electrode was designed for the determination of catechol (CC) and resorcinol (RS). The developed electrodes were characterized by cyclic voltammetry (CV), differential pulse voltammetry (DPV), and Field emission scanning electron microscopy (FE-SEM). Under the ideal conditions, CV and DPV studies revealed that, compared with bare graphene paste electrode (BGPE), sodium dodecyl sulfate modified graphene paste electrode (SDSMGPE) demonstrated an increase in the efficiency of the electrocatalytic oxidation of CC. Under the optimized condition the peak current for CC showed a good linear relationship with concentration in the range 2.0×10^{-6} to 1.0×10^{-5} and 1.5×10^{-5} to 1.5×10^{-4} M, and the detection limit was 106 nM (S/N = 3). The CV results show that CC and RS could be detected simultaneously using SDSMGPE with peak-to-peak separation of 0.728 V for CC-RS. The sensor is very promising for CC sensing attributing to its high sensitivity, fast response, excellent stability, and good reproducibility. The SDSMGPE sensor utilized for detection of CC in real sample with a satisfactory result.

Keywords: Catechol; Resorcinol; Cyclic voltammetry; Water sample analysis; Detection limit.

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