Simultaneous Determination of Catechol and Hydroquinone using N, P co-doped Carbon Derived from Ionic Liquid

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The N, P co-doped carbon (N-P-C) was prepared with the ionic liquid (IL) of hydrated pyridium dihydrate phosphate ([Hpdy]DHP). As precursors via one-pot pyrolysis. The N-P-C was used to modify the glassy carbon electrode (GCE) for simultaneous determination of hydroquinone (HQ) and catechol (CC). The obtained N-P-C was characterized by scanning electron microscopy (SEM), transmission electron microscopy (TEM), X-ray photoelectron spectroscopy (XPS), Raman spectroscopy and electrochemical techniques. Cyclic voltammetry (CV) and differential pulse voltammetry (DPV) techniques were employed to investigate the catalytic performance of simultaneous determination of HQ and CC. The N-P-C/GCE exhibits wide linear responses (from 5 to 400 μM), low detection limit (0.98 μM for HQ and 0.61 μM for CC, ratio of signal-to-noise 3) and superior sensitivity of 1.1 $\text{AM}^{-1} \text{cm}^{-2}$ for HQ and 1.4 $\text{AM}^{-1} \text{cm}^{-2}$ for CC in the simultaneous detection of HQ and CC, demonstrating superior detection performance even compared with the state-of-art carbon materials, such as N-doped graphene, graphene oxide or carbon nanotubes. Moreover, it displayed the favorable reproducibility and good long-term stability.

Keywords: Ionic liquids, N, P co-doped carbon, Hydroquinone, Catechol, Simultaneous determination

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