An Electrochemical Hydroquinone Sensor with Nitrogen-Doped Graphene Modified Electrode

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In this paper a solvothermal synthesized nitrogen-doped graphene (NG) was used as modifier on carbon ionic liquid electrode (CILE) to get a novel modified electrode, which was denoted as NG/CILE. An electrochemical hydroquinone (HQ) sensor was constructed with NG/CILE as working electrode. Electrochemical behaviors of HQ on NG/CILE were investigated by cyclic voltammetry with a pair of redox peaks observed. Compared with that of CILE, electrochemical responses of HQ were enhanced greatly with the peak-to-peak separation reduced. The result indicated good electrocatalytic ability of NG/CILE to the redox reaction of HQ. Under the optimal conditions a wider linear response between the peak current and HQ concentration was established in the concentration range from 0.2 to 800.0 $\mu\text{mol L}^{-1}$ accompanied by a detection limit of 0.625 nmol L^{-1} (3σ). Furthermore, the as-proposed HQ sensor exhibited high sensitivity and good selectivity toward HQ detection, which was successful applied to the synthetic water samples analysis.

Keywords: Nitrogen-doped graphene; Carbon Ionic Liquid Electrode; Hydroquinone; Electrochemistry; Electrochemical sensor

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