Simultaneous Determination of Dopamine and Uric Acid on a MoS₂-CPtNPs Nanocomposite-Modified Electrode

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Clover-like platinum nanoparticle-supported MoS₂ (MoS₂-CPtNPs) nanocomposites were employed to construct an electrochemical sensor for the simultaneous determination of dopamine (DA) and uric acid (UA). The MoS₂-CPtNPs nanocomposite was synthesized by a microwave-assisted hydrothermal method, and it was characterized by TEM and XRD. Two well-defined oxidation peaks of DA and UA located at 0.096 V and 0.304 V (vs. SCE) were obtained with the MoS₂-CPtNPs nanocomposite-modified electrode. A sufficient peak separation (208 mV) and a large peak current allowed the simultaneous determination of DA and UA by differential pulse voltammetry (DPV) with this modified electrode. Under optimal conditions, the MoS₂-CPtNPs-modified electrode could determine DA and UA down to 0.39 μM and 1.8 μM, respectively, with high selectivity. Moreover, an accepted relative standard deviation (RSD) and good recovery in serum were established. The above results suggest that the MoS₂-CPtNPs nanocomposite has potential applications in analytical and diagnostic research.

Keywords: electrochemistry; dopamine; simultaneous determinations

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