Highly Selective Differential Pulse Voltammetric Determination of Uric Acid using Modified Glassy Carbon Electrode

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A nanocomposite was prepared by incorporating Fe3O4 onto graphene sheets, and then a layer of SiO2 were deposited on the surface of the Fe3O4/graphene composites. This modified electrode was used for electrochemical determination of uric acid (UA). Cyclic voltammetry, differential pulse voltammetry and chronoamperometry were used to investigate the electrochemical behavior of uric acid at the chemically modified electrode. According to the results, Fe3O4@SiO2/GO/GCE showed high electrocatalytic activity for uric acid oxidation, producing a sharp oxidation peak current at 330 mV vs. Ag/AgCl reference electrode at pH 7.0. The peak current was linearly dependent on uric acid concentration over the range of 0.5 to 250.0 μM with the detection limit (3σ) of 0.07 µM. The proposed method was successfully applied as a rapid, highly selective, simple, and precise one to determine uric acid in urine.

Keywords: Uric acid; Fe3O4@SiO2/GO nanocomposite; Graphene; Glassy Carbon Electrode; Differential pulse voltammetry

FULL TEXT

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