A Silver Hexacyanoferrate-Graphene Modified Glassy Carbon Electrode in Electrochemical Sensing of Uric Acid and Dopamine

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A silver hexacyanoferrate-graphene hybrid modified glassy carbon electrode is put forward in sensing of uric acid (UA) and dopamine (DA) in this work. The structure and composition of the silver hexacyanoferrate was characterized by X-ray diffraction (XRD) and X-ray photoelectron spectroscopy (XPS). Catalysis of the modified material to the electrochemical reaction of UA and DA were verified by cyclic amperometry method. Experiments show that both UA and DA have excellent linear response on the modified electrode in acetic acid buffer solution by chronoamperometry measurements. The sensitivity is 0.102 $\mu\text{A}/\mu\text{M}$ in linear range of 2-80 μM UA with a detection limit of 0.07 μM and the sensitivity DA is 0.133 $\mu\text{A}/\mu\text{M}$ in the range of 0.4-28 μM DA with a detection limit of 0.03 μM . Furthermore, the developed sensor exhibited a high sensitivity, good reproducibility, stability for the detection of UA and DA.

Keywords: dopamine; uric acid; electrochemical sensor; graphene; silver hexacyanoferrate

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