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Synthesis of Au@Pt nanoflowers supported on graphene oxide for enhanced electrochemical sensing of dopamine

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Abstract

Au@Pt nanoflowers supported on graphene oxide (Au@Pt/GO) nanocomposites were synthesized for enhanced electrochemical sensing of dopamine (DA). Au@Pt/GO nanocomposites were synthesized through a facile wet-chemical co-reduction method and the nanocomposites were characterized by scanning electron microscopy (SEM), transmission electron microscopy (TEM), energy-dispersive X-ray spectrum (EDS), X-ray diffraction spectroscopy (XRD) and electrochemical techniques. SEM and TEM results showed that large numbers of Au@Pt nanoflowers with Au cores and Pt dendritic shells were distributed on the surface of GO sheets, which made Au@Pt/GO modified electrode exhibit an excellent performance toward DA detection with a wide linear range of 0.5 μM to 0.1775 mM, a high sensitivity of 329.0 $\mu\text{A mM}^{-1}\text{cm}^{-2}$ and a low detection limit of 0.11 μM (S/N = 3). Moreover, the sensor also displayed good selectivity, accepted reproducibility and stability. Therefore, these results indicated that Au@Pt/GO nanocomposite was a promising sensing material for DA detection.

Keywords: Au@Pt nanoflowers; Graphene oxide; Dopamine; sensor

1. Introduction

As an important neurotransmitter, dopamine (DA) plays significant roles in central nervous, human metabolism and renal system [1]. Therefore, the sensitive and selective determination of DA is essential. Right now, many methods are developed for the determination of DA, in which electrochemical methods attract much attention for its advantages of rapid response, low cost, easy operation and so on [2]. However,

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