

Composite Modified Electrode

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INTRODUCTION

Two-dimensional graphene nanomaterials are widely used in industry since Andre Geim and Konstantin Novoselov of the University of Manchester in the United Kingdom obtained monolayer graphene from graphite by mechanical stripping in 2004, which opened the prelude to two-dimensional nanomaterials. As a new carbon material, graphene is an ideal electrode modifier [4]. The excellent mechanical properties, thermodynamic stability, high conductivity and large specific surface area of graphene have inspired researchers to study new graphene-like materials. There are abundant surface active sites on the surface of two-dimensional graphene nanomaterials [6], which is beneficial to the increase of electrochemical signals. Tyrosine is one of the essential amino acids in the human body. It is a key precursor for the synthesis of melanin and neurotransmitters in human body. It is an important indicator for the diagnosis of melanoma, neurological diseases [8] and early cancer. Currently, a variety of methods have been reported for the determination of tyrosine, such as colorimetry [10], the Acc Q-Tag method, fluorescence spectroscopy capillary electrophoresis [13], high performance liquid chromatography-tandem mass spectrometry etc. These methods have the disadvantages of expensive instruments, complicated operation and low sensitivity. The subject adopts an electrochemical method, which has the advantages of low cost, simple operation, good selectivity and high sensitivity [16, 17]. In this paper, the preparation and characterization of PSS/Pt/GR composite modified electrode materials were studied. The electrochemical behavior of tyrosine on the surface of PSS/Pt/GR/GCE composite modified electrode was determined. The bare electrode was rotated and polished with 80 nm and 50 nm alumina polishing powder on the wet deer skin in turn. After each polishing of the glassy carbon bare electrode, the surface of the electrode was washed with distilled water, and then ultrasonically washed with 1 : 1 nitric acid solution ($\text{HNO}_3 : \text{H}_2\text{O} = 1 : 1$), absolute ethanol and double distilled water for 2 min, and dried under natural conditions. The 6 mL PSS/Pt/GR dispersions were removed by a pipette gun and dripped evenly onto the surface of the treated glassy carbon electrode. The surface of the electrode was dried under an infrared lamp. The composite modified electrode with a strong, uniform and stable PSS/Pt/GR dispersions was obtained. The PSS/Pt/GR/GCE composite modified electrode can be used again in citric acid-sodium citrate buffer solution with $\text{pH} = 3.60$.

The morphology of synthesized graphene composite modified electrode materials was characterized by TEM. The TEM images of samples. It can be seen from that there are a large number of wrinkles on the surface of GO. It is because of the existence of wrinkles that GO has a relatively large specific surface area and special electrical and chemical properties there are a large number of nanometers. The platinum metal particles are distributed on the surface of the graphene layer. The results show that the PSS/Pt/GR composite modified electrode material has been successfully synthesized. A polymer/mediator composite modified glassy carbon electrode (GCE) is fabricated for electrochemical detection of iodate (IO_3^-). Flavin adenine dinucleotide (FAD) is chosen as mediator for sensing iodate, and 3,4 ethylenedioxythiophene (EDOT) is chosen for entrapping FAD and forming a conducting polymeric matrix, poly(3,4 ethylenedioxythiophene) (PEDOT). The PEDOT/FAD modification layer is electrodeposited on the GCE by cyclic voltammetric (CV) method. It is noted that FAD can enhance the electrodeposition of PEDOT, and possible reasons are proposed to explain this phenomenon. The optimal cycle number for preparing the modified electrode is determined to be 9. The relationship between the formal potential of FAD and the pH value is studied. Two slopes, 60.4 and 29.2 mV per pH unit, are recorded in the ranges of $1.5 \leq \text{pH} \leq 8.5$ and $8.5 \leq \text{pH} \leq 11.5$, respectively. Additionally, it is found that the oxidation current of iodate increases significantly with the decrease of pH value. (C) 2011 Published by Elsevier Ltd. In this study, a glassy carbon electrode (GCE) was modified with multi-walled carbon nanotubes (MWCNTs), 1-butyl-3-methylimidazolium hexafluorophosphate ([bmim]PF₆), N,N'-bis(2-hydroxyacetophenone)ethylenediamine (BZE) and Nafion to form a MWCNT-BZE-[bmim]PF₆-Nafion-GCE. The electrochemical behaviour of the modified electrode with respect to silver (Ag(I)) ion detection was studied by cyclic voltammetry (CV) and differential pulse anodic stripping voltammetry (DPASV). Furthermore, the experimental parameters including the pH value of Britton-Robinson Buffer (BRB), Nafion, MWCNTs, BZE and ([bmim]PF₆) concentrations and the deposition potential and time were optimized. The detection limit of the modified electrode for the Ag(I) ion was found to be 70 ng L^{-1} . Repetitive measurements revealed good reproducibility with a relative standard deviation (RSD) value of 0.4%. The system performance of the modified electrode was highly satisfactory and the recoveries

for river water samples were found to be 96–121%. This study proved that the MWCNT-BZE-[bmim]PF₆-Nafion-GCE is a highly selective and sensitive modified electrode for the detection of the Ag(I) ion in river water samples with good recovery value. Hydro-thermal synthesised MOWS2 nano-composite has been specified and employed to the modify a screen-printed electrode (SPE) in electro-catalytic voltammetric detection of hydroxylamine. Sensor of MOWS2 nano-composite has been followed by acceptable function to detect hydroxylamine with a linear range within 0.7–400.0 μM , and a limit of detection (LOD) of 0.2 μM . Results indicated that MOWS2 nano-composite enjoy high potentials to be used in electrochemical sensing. Moreover, this modified electrode has the benefits of a significant linear association, higher sensitivity and small determination limit, acceptable anti-interference capability and very high stability, resulting in widespread uses in detecting real samples. d posttest, in which case posttest nervousness was higher, 2) there were no huge contrasts in the connection between math familiarity or mathematical question settling execution and nervousness at any time point .