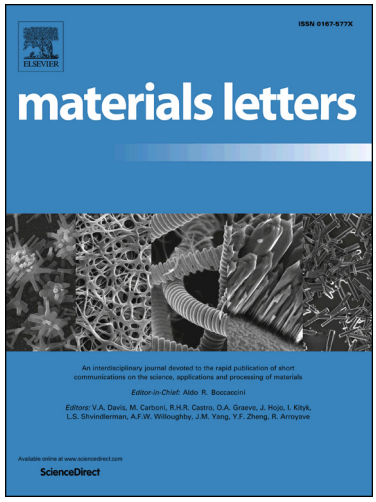

Graphene/gold nanoparticle aerogel electrode for electrochemical sensing of hydrogen peroxide

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Graphene/gold nanoparticle aerogel electrode for electrochemical sensing of hydrogen peroxide

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Abstract

In this letter, we report the preparation of graphene-based aerogel decorated with gold nanoparticles under a mild condition and though a freeze-drying process. The porous composite aerogel is characterized by scanning/transmission electron microscopy, X-ray photoelectron spectroscopy, X-ray diffraction and Raman spectroscopy. The aerogel piece could be used directly as electrochemical sensor, different from the traditional modification of the glassy carbon electrode with the graphene. The aerogel electrode demonstrates satisfying electrocatalytic performances in the detection of H_2O_2 with good repeatability, fast response and low detection limit. This work would propose novel strategy for the applications of graphene in the fields of electroanalysis and sensing.

Keywords: Carbon materials; Graphene; Aerogel; Sensors; Hydrogen peroxide.

1. Introduction

Graphene has attracted tremendous research interests due to its unique structure and special properties, which exhibits intriguing potentials in the fields of energy storage, catalysis and sensing [1-3]. Owing to the excellent electron transport property and high specific surface area, graphene also obtains intense attention in electrochemical analysis [4-6]. For example, the detection of hydrogen peroxide (H_2O_2) is widely studies in biological systems [4]. A variety of effective methods have been proposed to sensing H_2O_2, such as photoluminescence [7], chemiluminescence [8] and colorimetry [9]. Electrochemical technique has been extensively developed in H_2O_2 detection owing to the advantages of