Preparation of 3D Nanoflower-like ZnO/graphene Oxide decorated with Au@AuPt Bimetallic Nanoparticles for Electrochemical Determination of Doxorubicin Hydrochloride

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A novel 3D nanoflower-like ZnO-graphene oxidation (3D ZnO-GO) nanocomposites were proposed for the first time by simple aqueous hydrothermal method and sonochemical approach. Then the Au@AuPt NPs were decorated onto 3D ZnO-GO nanocomposites to obtain a novel Au@AuPt/3D ZnO-GO nanohybrids. The obtained nanohybrids were characterized by scanning electron microscopy, transmission electron microscopy, and X-ray diffraction. The Au@AuPt/3D ZnO-GO nanohybrids were used to fabricate electrochemical sensor for detection of doxorubicin hydrochloride. The proposed sensor showed excellent electrocatalytic activity toward electrochemical oxidation doxorubicin hydrochloride. The electrochemical oxidation reaction of doxorubicin hydrochloride on modified electrode surface was a surface-controlled process, and the charge transfer coefficient (α) and electron transfer number (n) were 0.81 and 2, respectively. The sensor had a wide linear range from 0.65 μM to 369.45 μM , with the limit of detection was 0.013 μM . Furthermore, the proposed electrochemical sensor can be applied successfully to selective determination of doxorubicin hydrochloride in urine sample.

Keywords: Graphene oxidation; Au nanoparticles; Pt nanoparticles; Zinc oxide; doxorubicin hydrochloride; electrochemical sensor

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