Facile Synthesis of Au Nanoparticles@Reduced Graphene Oxide Nanocomposition-Modified Electrode for Simultaneous Determination of Copper and Mercury Ions

Youzhi Yao

Wuhu Institute of Technology, Wuhu 241003, China.

E-mail: yaoyz@whit.edu.cn

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A highly efficient electrochemical sensor consisted by gold nanoparticles (Au NPs) loaded on reduced graphene oxide (RGO) nanosheets for Cu^{2+} and Hg^{2+} was developed. The electrochemical performances of as-prepared bare glassy carbon electrode (GCE), RGO/GCE, Au NPs@RGO/GCE were characterized by cyclic voltammetry (CV) and differential pulse voltammetry (DPV), respectively. The Au NPs@RGO/GCE exhibited an excellent sensitivity toward Cu^{2+} and Hg^{2+} . The results revealed that the detection limit of Cu^{2+} was $0.0015 \mu\text{M}$ and Hg^{2+} was $0.02 \mu\text{M}$ ($\text{S/N} = 3$). In addition, the Au NPs@RGO nanocomposite modified electrode was optimized and applied for practical water sample analysis with a satisfactory outcome. The electrochemical sensor based on Au NPs@RGO would be expected to expand the application field of heavy metal detection.

Keywords: Au nanoparticles, reduced graphene oxide, simultaneous determination, electrochemical sensor.

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