Electrochemical Synthesis of NiAu Bimetallic Nanostrips and Their Application for Hydrazine Detection

Lin-Lin Hou, Ye Wan, Jia-Yin Li, Jun-Rui Zhang, Keying Cui, Su-Juan Li*

Henan Province Key Laboratory of New Optoelectronic Functional Materials, College of Chemistry and Chemical Engineering, Anyang Normal University, Anyang, 455000, Henan, China

*E-mail: lemontree88@163.com

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NiAu bimetallic nanostrips with nearly monodispersed structure were synthesized through a one-step electrodeposition method with cetyltrimethylammonium bromide (CTAB) involved as the stabilizer and $\text{Ni}(\text{NO}_3)_2$ and HAuCl_4 with a molar ration of 1:1 as the precursor. The morphology of as-prepared NiAu bimetallic nanomaterials with different Ni/Au molar ratios were characterized with scanning electron microscopy (SEM). The resultant NiAu bimetallic nanostrips showed good electrocatalytic activities toward hydrazine oxidation. Various parameters including Ni/Au molar ratios, CTAB concentration and solution pH affecting the performance of NiAu bimetallic nanomaterials toward hydrazine detection were investigated. Under optimized conditions, NiAu bimetallic nanostrips based electrochemical hydrazine sensor has a linear response in the concentration range of 0.5 to 1665 μM , a lower detection limit of 0.1 μM and high detection sensitivity ($1007 \mu\text{A mM}^{-1} \text{cm}^{-2}$). Most common ions and many environmental organic species do not interfere with the detection of hydrazine.

Keywords: Bimetallic nanostrip; Electrodeposition; Hydrazine; Nickle; Gold

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