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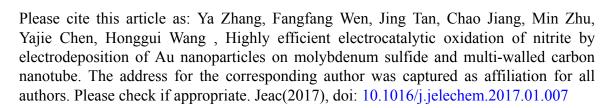
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ACCEPTED MANUSCRIPT

Highly efficient electrocatalytic oxidation of nitrite by electrodeposition of Au nanoparticles on molybdenum sulfide and multi-walled carbon nanotube

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ABSTRACT

molybdenum sulfide/multi-walled carbon nanotubes/gold nanocomposite (MoS₂-MWCNTs-Au) modified glassy carbon electrode (GCE) was developed via a hydrothermal synthesis followed by an electrochemical deposition of gold nanoparticles onto the surface of GCE. Scanning electron microscopy (SEM) and transmission electron microscope (TEM) images indicated the MoS₂ worked as the substrate for MWCNTs and the gold nanoparticles were grown on the MoS₂-MWCNTs. Cyclic voltammetry (CV) results showed the MoS₂-MWCNTs-Au modified GCE exhibited the best electrochemical activity in a 0.1 M phosphate buffered saline (PBS) compared to the MoS2 and MoS₂-MWCNTs modified GCE. Both CV and differential pulse voltammetry (DPV) results indicated the MoS2-MWCNTs-Au had excellent electrocatalytic ability to oxide nitrite in a pH 5.0 PBS. Quantitative analysis of nitrite was carried out using amperometric i-t method. The amperometric response displayed the MoS₂-MWCNTs-Au modified GCE could be used to determine nitrite concentration in a wide linear range of 12 and 6500 µM with a detection limit of 4.0 µM. The proposed sensor also showed good anti-interference and real sample analysis properties.

Keywords: Molybdenum sulfide; Multi-walled carbon nanotubes; Au nanoparticles; nitrite; electrocatalytic oxidation.

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