Electrochemical Sensor for Detection of Ascorbic Acid based on MoS₂-AuNPs Modified Glassy Carbon Electrode

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In this paper, molybdenum disulfide (MoS₂)-gold nanoparticles (AuNPs) composite nanomaterials were prepared by a one-step synthesis method and characterized by scanning electron microscopy (SEM). The electrochemical sensor based on MoS₂-AuNPs/GCE and the electrochemical behavior of ascorbic acid (AA) on the modified electrode was tested by cyclic voltammetry (CV) and Differential Pulse Voltammetry (DPV). The experimental results showed that in phosphate buffer solution, the final modified electrode had the good electrochemical catalytic ability for the oxidation of AA. The reaction of AA on the electrode surface was a surface adsorption control process. The DPV method showed a good linear relationship between the peak current and the concentration in the range of $7.1 \times 10^{-4} \sim 2.77 \times 10^{-3}$ mol/L. The linear equation was $i_p = 0.6628 + 4.2151c$, the linear regression coefficient $R = 0.9925$, and the detection limit was 2.1×10^{-6} mol/L ($S/N = 3$).

Keywords: molybdenum disulfide, gold nanoparticles, AA, CV, DPV

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