Determination of As³⁺ Based on Nanoporous Gold by Square Wave Anodic Stripping Voltammetry

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In this paper, the preparation of nanoporous gold (NPG) was established by the dynamic bubble template electrodeposition. Taking advantages of the large specific surface area and good catalytic activity of the NPG, a method of determining trace As³⁺ by the NPG modified electrode was developed. The deposition time, enrichment time, supporting electrolyte and pH was optimized. Under the optimized experimental conditions, a good linearity was obtained in the concentration range of 0.001 to 4 µg/mL and the detection limit is 0.001 µg/mL. The linear equation is $y=14.6753x-0.0132$ ($r=0.9992$). The reproducibility was investigated with a RSD of 3.11% ($n=6$). The repeatability was investigated with a RSD of 2.41% for six measurements. The developed As³⁺ sensor based on NPG has advantages such as simple fabrication, fast response, low detection limit and good reproducibility.

Keywords: nanoporous gold; As³⁺; electrochemical sensor

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