**Development of electrochemical sensor based on silica/gold nanoparticles modified electrode for detection of arsenite**


ABSTRACT

Arsenic is an extremely poison element in earth crust and its contamination in environment is a global hazard. In this study, an efficient electrochemical detection of arsenite [As(III)] has been developed using linear sweep anodic stripping voltammetry (LSASV), based on adsorption of arsenic on the surface of screen printed carbon electrode modified silica/gold nanoparticles (SiNPs/AuNPs/SPCE). The surface property of modified electrode was characterized by field emission scanning electron microscopy (FESEM), transmission electron microscopy (TEM), energy dispersive X-ray spectroscopy (EDX) and fourier transform infrared spectroscopy (FTIR). The morphology studies using FESEM showed that the distribution of SiNPs/AuNPs composite is not homogenous therefore resulting in some areas with aggregation on the working electrode surface. Several optimum voltammetric parameters were established such as supporting electrolyte, 1 M HCl; deposition potential, -0.4 V and deposition time, 300 s. Under optimum condition, a linear correlation was obtained in the range of 10 - 100 ppb with limit of detection 5.6 ppb. A variety of common coexistence ions such as Pb 2+ , Ni 2+ , Zn 2+ , Hg 2+ and Cu 2+ in water samples showed no interferences in arsenite detection. The proposed method showed high sensitivity and good reproducibility with a relative standard deviation of 4.52 %, providing potential application of arsenite detection in environment.



**Keyword:** Arsenic; Gold nanoparticles; Screen printed carbon electrode; Silica nanoparticles