

## عنوان مقاله:

NOVEL ELECTROCHEMICAL DETECTION OF ARSENIC (III) AT GLASSY CARBON ELECTRODE MODIFIED WITH NiO-SINGLE WALL CARBON NANOTUBES

## محل انتشار:

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## نویسندگان:

Hosna Ehzari - Department of Analytical Chemistry, Razi University, Kermanshah, Iran

Hossein Kiaii - Department of Analytical Chemistry, Razi University, Kermanshah, Iran

## خلاصه مقاله:

A novel and simple procedure to prepare a glassy carbon (GC) electrode (GCE) modified with NiO-single-wall carbon nanotubes (NiO-SWCNTs) for the detection of trace amount of As (III) in aqueous solution has been developed. The NiO-SWCNTs were immersed into buffer solution (pH=7) (direct deposition) for a short period of time (60 s). The surface coverage ( $\Gamma$ ) and charge transfer rate constant ( $k_s$ ) of the immobilized As(III) on SWCNTs were  $4.56 \times 10^{-4} (\pm 0.2) \text{ s}^{-1}$ ,  $2.94 \times 10^{-9} \text{ mol cm}^{-2}$ ,  $7.3 (\pm 0.3) \text{ s}^{-1}$  indicate high loading ability of SWCNTs for As(III) and great facilitation of the electron transfer between electroactive redox center and carbon nanotubes immobilized on the electrode surface. The resulting electrode surfaces and its morphology were examined with cyclic voltammetry (CV), XRD and scanning electron microscope (SEM) techniques. The catalytic rate constant for redox of As(III) was  $1.75 (\pm 0.2) \times 10^3 \text{ M}^{-1} \text{ s}^{-1}$ . The detection limit (S/N = 3) was 11 nM with the linearity up to 4 orders of magnitude and sensitivity of 111.3 nA/ $\mu\text{M}$ . The response time of the electrode to achieve 95% of the steady-state current is lower than 2 s. This modified electrode recedes many advantageous such as remarkable catalytic activity, good reproducibility, simple preparation procedure and long-term stability of signal response during arsenic oxidation. Cyclic voltammograms of the NiO-SWCNTs indicate a pair of well defined and nearly reversible redox couple with (surface confined characteristic at wide pH range (3–12).

## کلمات کلیدی:

NiO-SWCNTs, Glassy carbon-modified electrode, Cyclic voltammetry, Arsenic detection

## لینک ثابت مقاله در پایگاه سیویلیکا:

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