

Supplementary material

Green synthesis of a silver nanoparticles–graphene oxide composite and its application for As (III) detection

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Figures

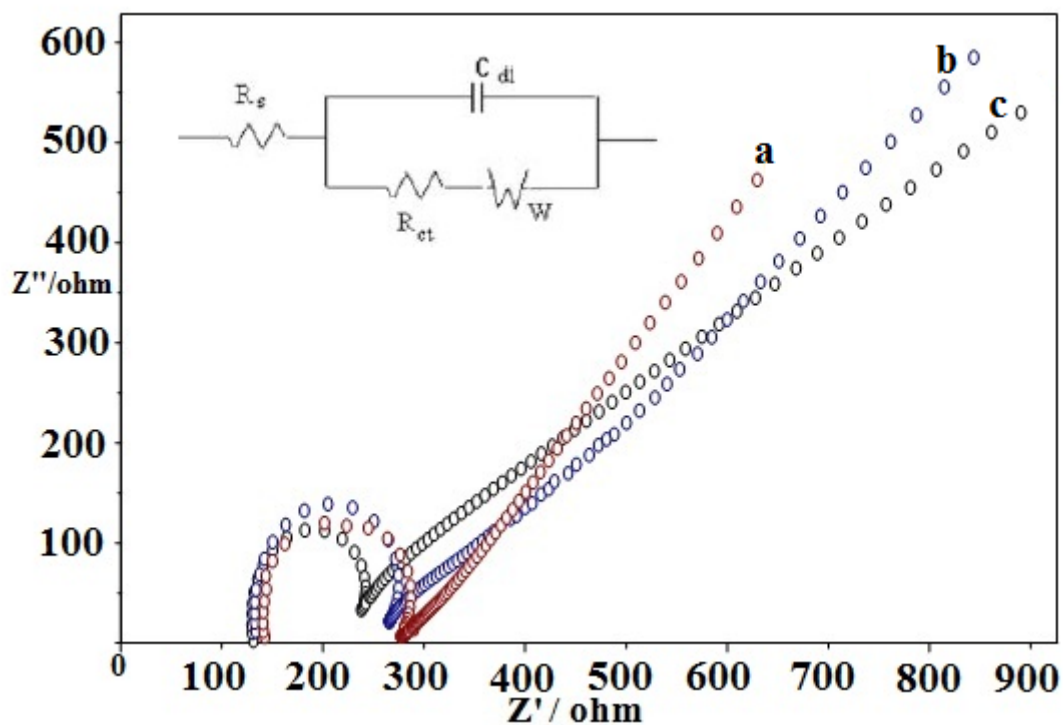


Fig. S1. Nyquist plots for (a) bare GCE, (b) GO/GCE, (c) AgNP/GO/GCE, in 0.1 M KCl solution containing 1.0 mM $K_3[Fe(CN)_6]$. The frequency range of EIS was from 10^{-1} to 10^6 Hz at the formal potential of 0.17 V.

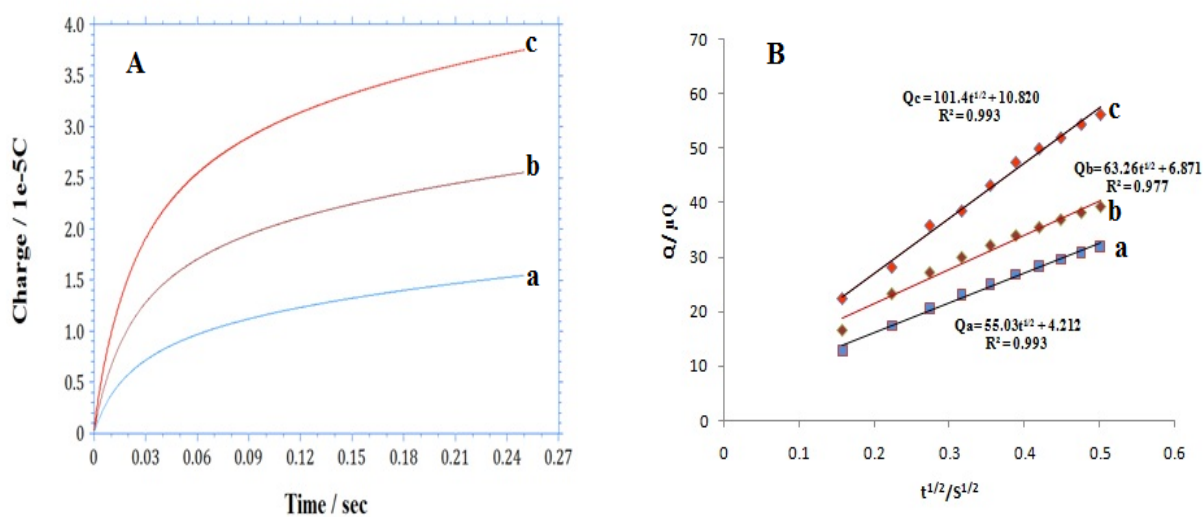


Fig. S2. (A) Plot of $Q-t$ curves for the GCE (a), GO/GCE (b), AgNP/GO/GCE (c) in 0.5 mM $K_3[Fe(CN)_6]$; (B): Plot of $Q-t^{1/2}$ curves for GCE (a), GO/GCE (b), AgNP/GO/GCE (c).

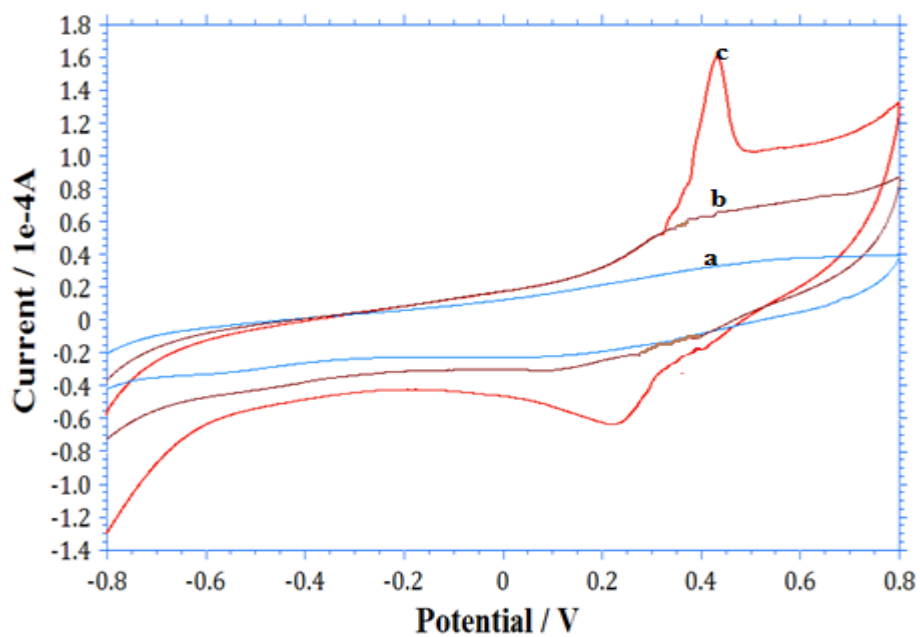


Fig. S3. CVs obtained at (a) bare GCE, (b) GO/GCE and (c) AgNP/GO/GCE in 0.1M H₂SO₄ at 100 mVs⁻¹ in absence of arsenic and in a potential range of -0.8V to 0.8V.

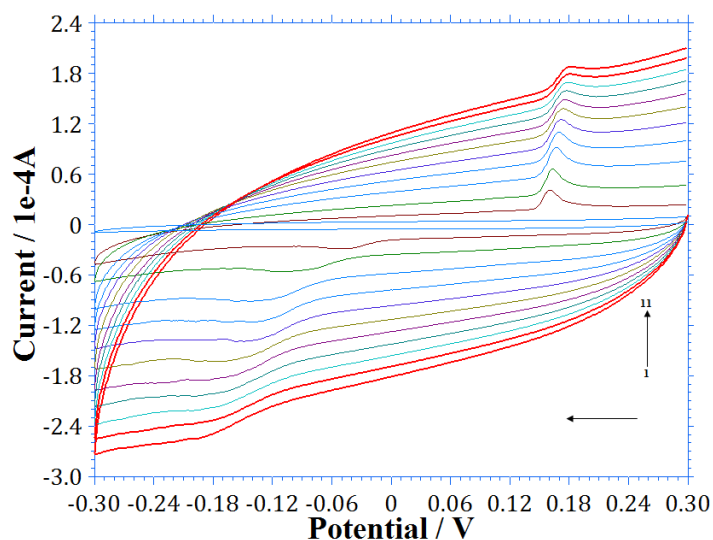


Fig.S4. Typical CVs obtained for the As (III)/As (0) redox couple at a AgNP/GO/GCE in 0.1M H₂SO₄ solution containing 1.33x10⁻⁷ M As(III) at various potential scan rates of 1) 20, 2) 50, 3) 100, 4) 150, 5) 200, 6) 250, 7) 300 ,8) 350, 9) 400, 10) 450, 11) 500 mV s⁻¹.

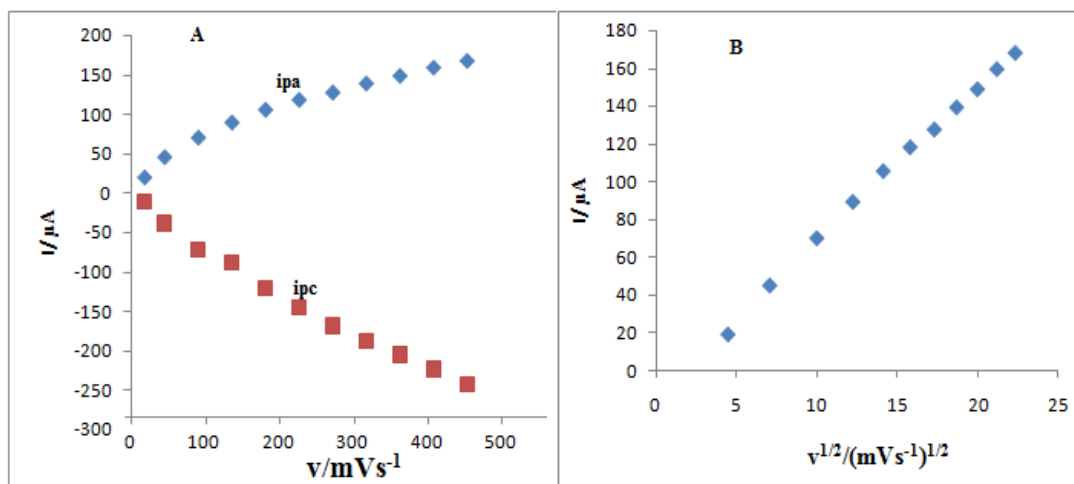


Fig. S5. (A) Plots of peak current (I_{pa} , I_{pc}) vs. potential scan rate (v) and (B) I_{pa} vs. $V^{1/2}$.

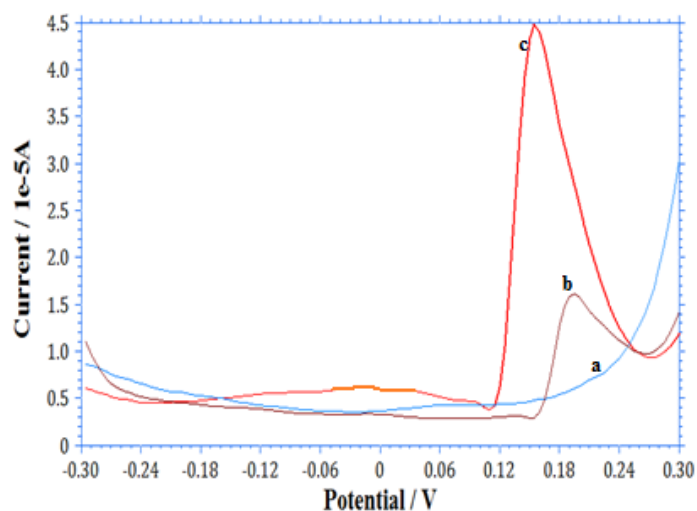


Fig. S6. SW-ASV at: (a) bare GCE, (b) GO/GCE, and (c) AgNP/GO/GCE containing 3.99×10^{-7} M As (III). Deposition potential: -0.60 V for 120 s, rest period: 10 s. Frequency: 40Hz, pulse amplitude: 25 mV.

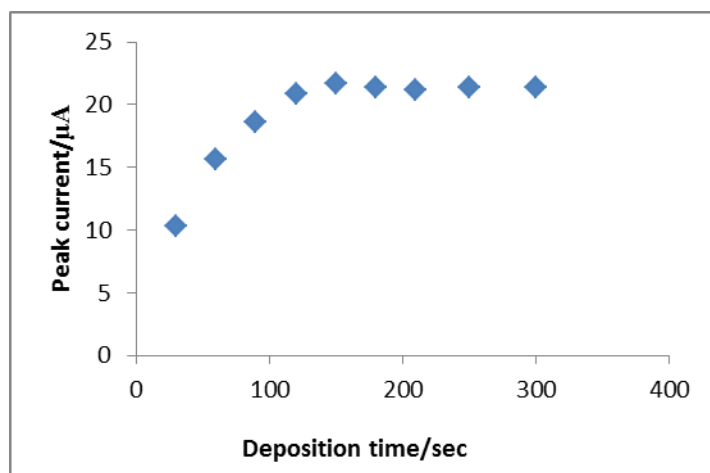


Fig. S7. Effect of deposition time on the stripping peak current at AgNPs/GO/GC electrode in 0.1M H_2SO_4 containing 3.99×10^{-8} M As (III) using SW-ASV at Frequency: 40Hz, pulse amplitude: 25 mV. Deposition potential:-0.60 V for rest period: 10 s. Stirring speed 300 rpm.

Tables

Table S1 Interferences of other species on the anodic stripping peak current of $2.65 \times 10^{-7} \text{ M As (III)}$.

Interferents	Concentrations(M)	Signal change (%)
NaCl	3.33×10^{-3}	+1.4
CaCl ₂	3.33×10^{-3}	3.8
MgCl ₂	3.33×10^{-3}	+2.4
Na ₂ SO ₄	1.33×10^{-4}	3.6
CaSO ₄)	1.33×10^{-4}	+4.2
MgSO ₄	1.33×10^{-4}	+3.4
KH ₂ PO ₄ , K ₂ HPO ₄	1.63×10^{-3}	+1.2
EDTA	6.67×10^{-3}	3.4
SDS	1.33×10^{-3}	2.8
TX-100	1.33×10^{-3}	3.2

Table S2 Precision and accuracy for assay of arsenic in pre analyzed samples by the proposed procedure (SW-AS- Voltammetry).

Added (10 ⁻⁸ M)	Found ^a (10 ⁻⁸ M)	(%R)	Precision (% R.S.D, n=5)	Accuracy (% Bias)
Intraday				
2.0	1.98	99.0	1.02	-1.0
5.0	4.97	99.4	0.78	-0.60
8.0	8.04	100.5	1.30	0.50
Interday				
7.90	8.143	101.88	1.89	1.88
8.00	8.12	101.5	1.97	1.5
10.00	9.72	97.2	1.33	-2.8

Average of five measurements