Supporting Information

Ultrathin Quasi-hexagonal Gold Nanostructures for Sensing Arsenic in Tap Water

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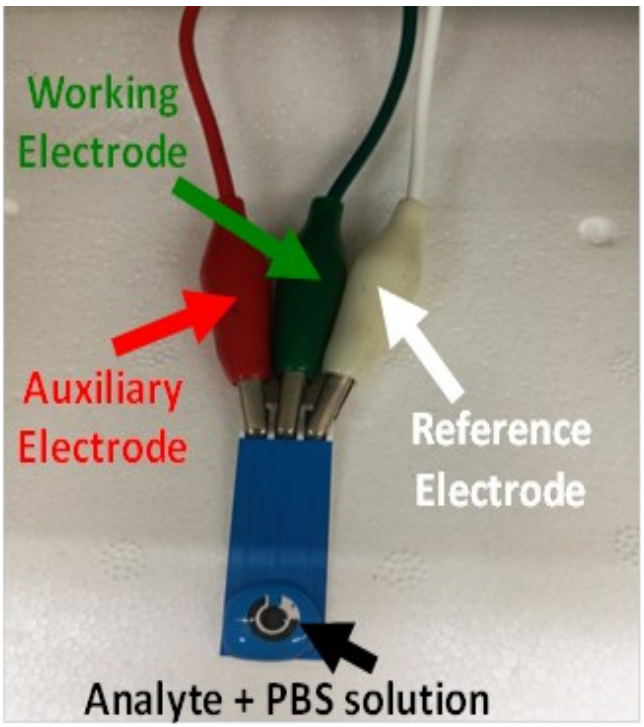
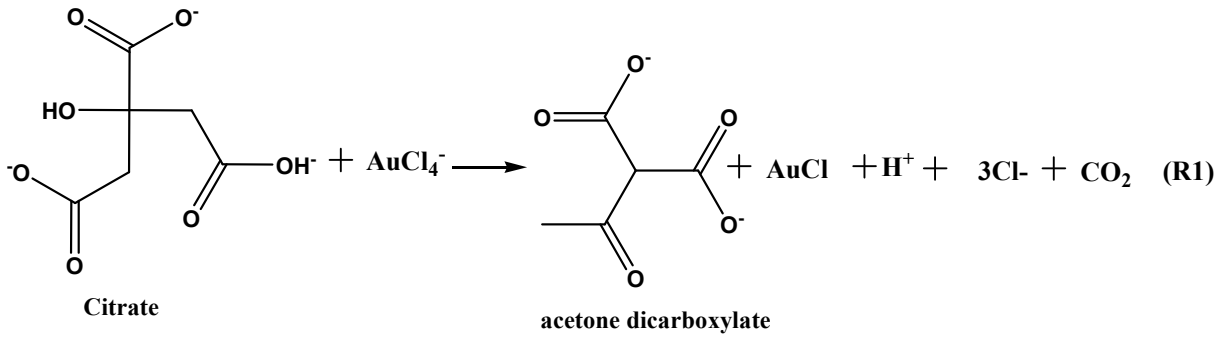


Scheme S1. Photograph of the entire experimental set up.



$$3AuCl + Cl^- \longrightarrow 2Au^0 + AuCl_4^- \quad (R2)$$

Scheme S2. The accepted mechanism for Turkevich method.

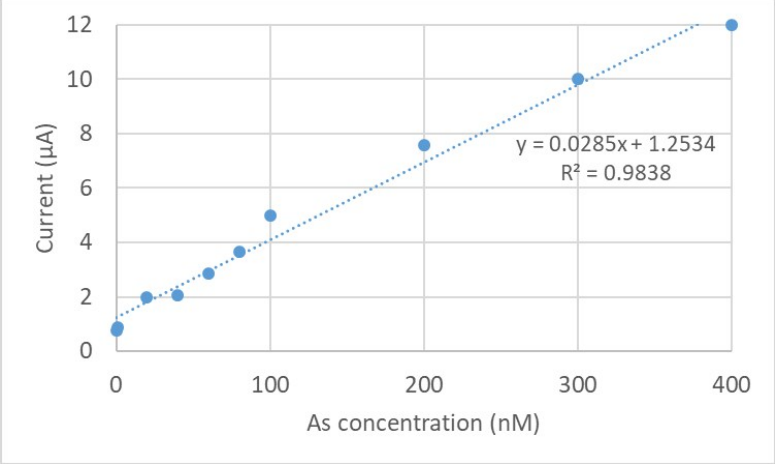
Calculation of limit of detection (LOD) and limit of quantification (LOQ):

LOD = 3.3*s_b/m and **LOQ = 10*s_b/m**

Where, s_b is the standard deviation of the blank sample measurement and m is the slope of the linear calibration plot of analyte measurement[1].

Calculation of slope m:

As (III) concentration (nM)	Current (µA)
0	0.75
1	0.88
20	2.0
40	2.07
60	2.86
80	3.64
100	5.0
200	7.59
300	10.0
400	12.0

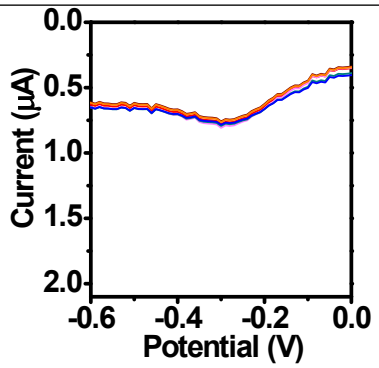


Slope, m = 0.0285

Calculation of standard deviation of blank S_b:

Standard deviation (SD) formula: $$s = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$$

Blank sample	Current value of blank solution (µA)
x_1	0.75
x_2	0.78
x_3	0.76
x_4	0.77
x_5	0.75
Statistics	Mean, $\bar{x}$=0.76
	s_b=0.013038



LOD = 3.3*s_b/m**=** (3.3*0.013038)/0.0285 = 0.0391/0.0285 = **1.51 nM**

LOQ = (10*0.013038)/0.0285 = 0.13038/0.0285 = **4.57 nM**

Table. S1. Comparison of published electrochemical As(III) sensors with that in the present work

Electrode material	Voltammetry	Tested sample	Electrolyte used	LOD (nM)	LOQ (nM)	Interferents	Reference
Au plated carbon paste	Constant current Stripping Analysis	Contaminated freshwater	0.25 M HCl + 1.25 M $HClO_4$	40	-	Cu	[2]
HMDE	SWCSV	Spiked freshwaters	1 M HCl + 45 ppm Cu(II)	0.8	2.7	Cu, Sb	[3]
Au graphite	ASV	-	EDTA-H_3PO_4	-	174	30XCu	[4]
Au coated BDD thin-film	DPASV	Contaminated freshwater	Cation exchange resin/ 1 M HCl	0.067	0.13	Cu	[5]
Au film	Derivative anodic stripping chronopotentiometry	Wine sample	3 M HCl	1	3.4	10X Cu	[6]
AuNP on GCE	LSV	-	1 M HCl + 2 µM Cu(II)	0.08	-	Cu	[7]
Silver	SWASV	-	0.1 M HNO_3	14	-	-	[8]
Au coated BDD thin-film	DPASV	Contaminated freshwater	Cationexchange resin / 1 M HCl	0.067	0.13	Cu	[9]
AuNP/PANI-modified GCE	SWASV	-	1 M HCl	5.4	-	-	[10]
Pt nanotubes arrays on GCE	LSV	Contaminated freshwater	0.1 M H_2SO_4	1.3	13.4	Cl	[11]
AuPd NP on GCE	SWASV	-	0.1 M acetate buffer	0.33	13.4	Cu	[12]
AuNP on carbon polyethylene composite	LSV	Spiked drinking water	0.1 M Na_2SO_3	1.2	-	Cu	[13]
AuNPs/SPE	DPASV	Spiked drinking water	PBS	1.51 nM	4.57	None	**This study**

References

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