

Electronic Supplementary Information

Determination of promethazine in forensic samples using multi-walled carbon nanotubes-gold nanoparticles electrochemical sensor

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S1 Characterization of gold nanoparticles (AuNPs)

Gold nanoparticles (AuNPs) were prepared via sodium citrate reduction method following the procedure developed by Pu *et al.*[1]. TEM was employed to confirm the size and morphology of the synthesized AuNPs. The AuNPs are spherical with average size of 13.4 ± 0.3 nm (Fig S1(A) and S1(B)).

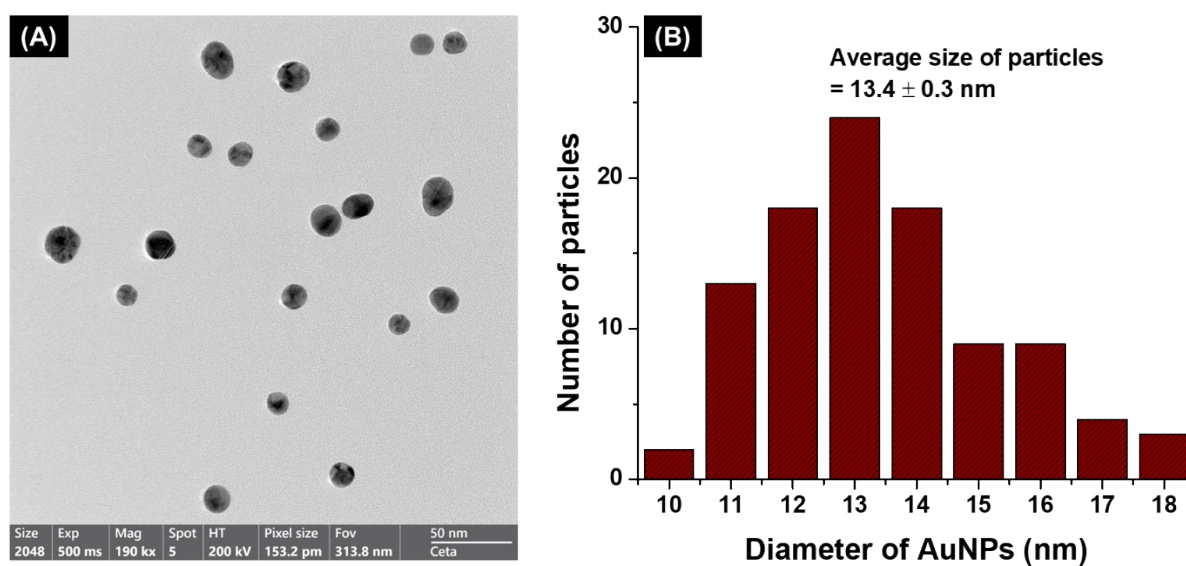


Fig. S1 (A) The TEM image of AuNPs and (B) size distribution of the AuNPs ($n=100$) obtained from the TEM images.

S2 EDS spectrum of MWCNTs/AuNPs/GCE

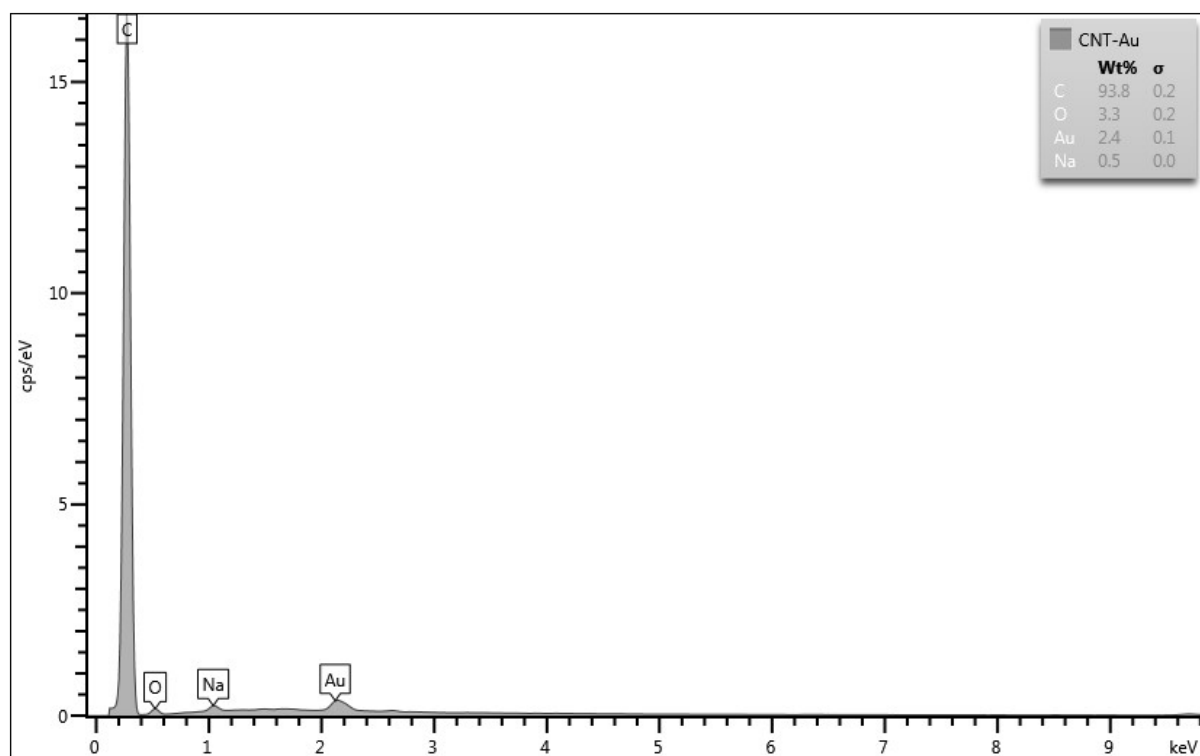


Fig. S2 EDS spectrum of MWCNTs/AuNPs/GCE surface for C, O, and Au.

*Note that the presence of Na in the spectrum may be come from the sodium citrate which was used as the capping agent in gold nanoparticles synthesis.

S3 Effect of volume of modifiers (MWCNTs and AuNPs)

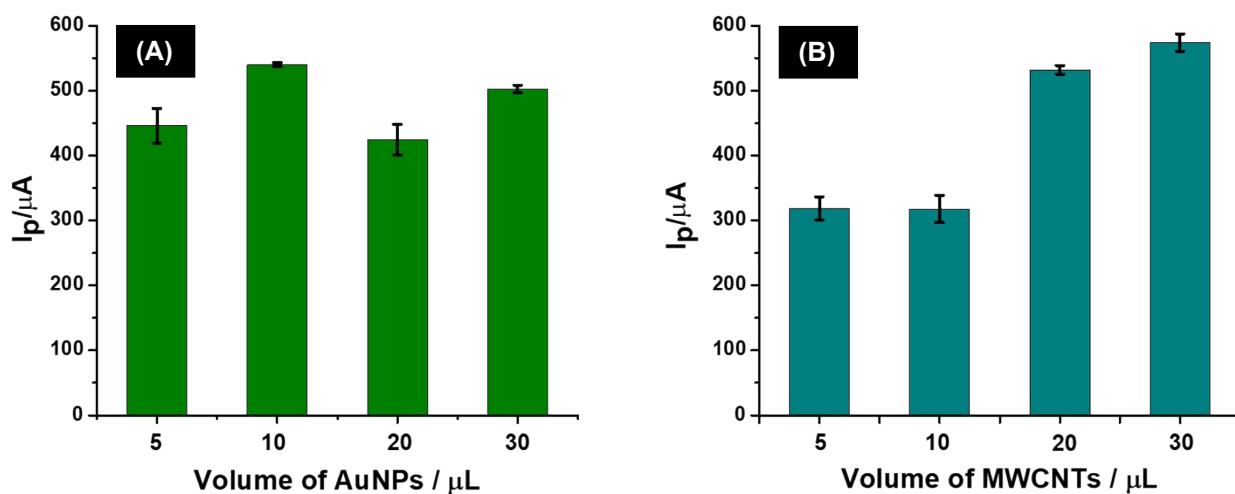


Fig. S3 Effect of (A) the volume of AuNPs on the GCE and (B) the volume of MWCNTs on the GCE.

S4 Effect of deposition potential and deposition time

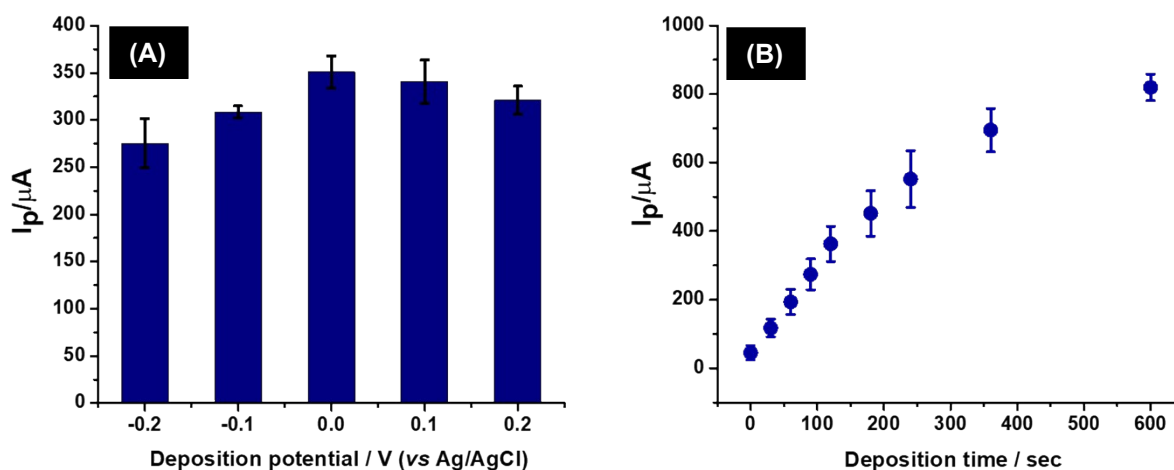


Fig. S4 Effect of (A) deposition potential (-0.2 to +0.2 V vs Ag/AgCl) and (B) deposition time (0 to 600 sec) on the peak current of promethazine using MWCNTs/AuNPs/GCE in 0.30 mol L^{-1} phosphate buffer (pH = 7.0).

S4 Declared composition by the manufacturers for the samples and simulated samples.

Table S1 Chemical compositions declared by the manufacturers of the analyzed samples.

Sample	Type	Physical form	Declared ingredients
PD-1	<i>'Purple drank'</i>	Syrup	<ol style="list-style-type: none"> 1. Grape syrup 2. Sugar 3. Sucralose 4. Citric acid 5. Vitamin B6 6. Vitamine B12 7. L-Theanine 8. Collagen 9. Promethazine
PD-2	<i>'Purple drank'</i>	Syrup	<ol style="list-style-type: none"> 1. Grape syrup 2. Sugar 3. Sucralose 4. Citric acid 5. Vitamin B6 6. Vitamine B12 7. L-Theanine 8. Collagen 9. Promethazine
SPD-1	Simulated <i>'Purple drank'</i>	Liquid	<ol style="list-style-type: none"> 1. Promethazine syrup 2. Soft drink 3. Lemon soda
SPD-2	Simulated <i>'Purple drank'</i>	Liquid	<ol style="list-style-type: none"> 1. Promethazine syrup 2. Tramadol 3. Lemon soda
PF-1	Promethazine syrup	Syrup	<ol style="list-style-type: none"> 1. Promethazine hydrochloride
PF-2	Promethazine syrup	Syrup	<ol style="list-style-type: none"> 1. Promethazine hydrochloride

PF-3	Promethazine tablet	Tablet	<ol style="list-style-type: none"> 1. Promethazine hydrochloride 2. Lactose monohydrate 3. Maize starch 4. Povidone 5. Magnesium stearate 6. Hypromellose 7. Macrogol 200 8. Opaspray Blue M-1-4210A
PF-4	Promethazine tablet	Tablet	<ol style="list-style-type: none"> 1. Promethazine hydrochloride 2. Lactose monohydrate 3. Maize starch 4. Povidone 5. Magnesium stearate 6. Hypromellose 7. Macrogol 200 8. Opaspray Blue M-1-4210A
AS-1	Artificial saliva for pharmaceutical research	Liquid	No components need to be disclosed according to the applicable regulations.
AS-2	Artificial saliva for pharmaceutical research	Liquid	No components need to be disclosed according to the applicable regulations.

References

1. W. Pu, H. Zhao, L. Wu, and X. Zhao, *A colorimetric method for the determination of xanthine based on the aggregation of gold nanoparticles*. *Microchimica Acta*, 2015. **182**(1): p. 395-400.