Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supporting Information for

Sm_2O_3 Nanorod modified Graphite Paste Electrode for Trace Level Voltammetric Determination of Acetaminophen and Ciprofloxacin

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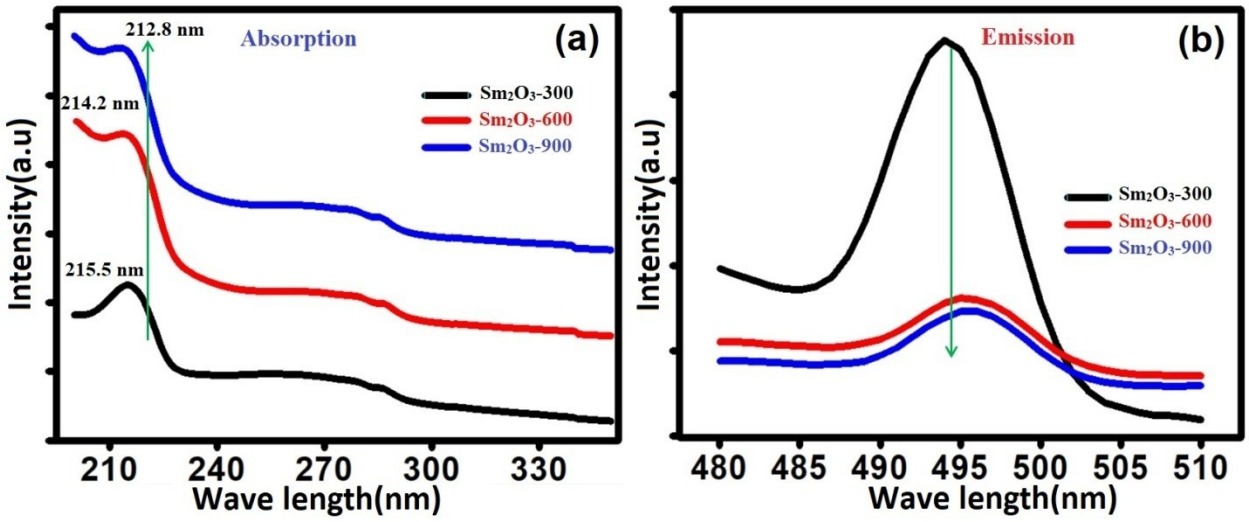


Fig. S1. (a) UV-Vis and (b) Photoluminescence spectra of Sm_2O_3

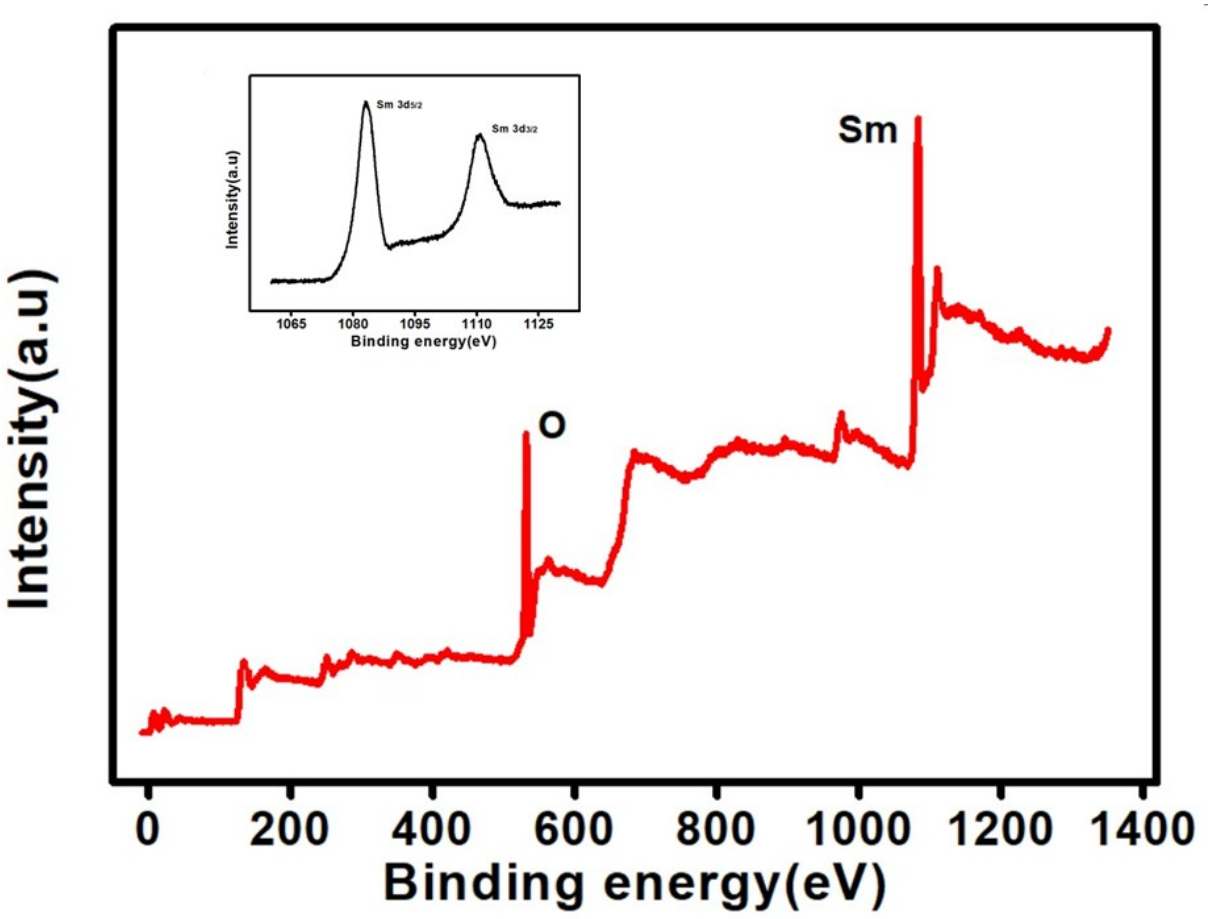


Fig. S2. XPS survey of Sm_2O_3-300; inset HRXPS of Sm 3d

Fig. S3. XPS survey of Sm_2O_3-300; inset HRXPS of Sm 3d

Table S1. Elemental composition by XPS

	Sm (atomic wt. %)	**O (atomic wt. %)**
Sm_2O_3-300	42.7	57.3
Sm_2O_3-600	41.6	58.4
Sm_2O_3-900	41.3	59.7

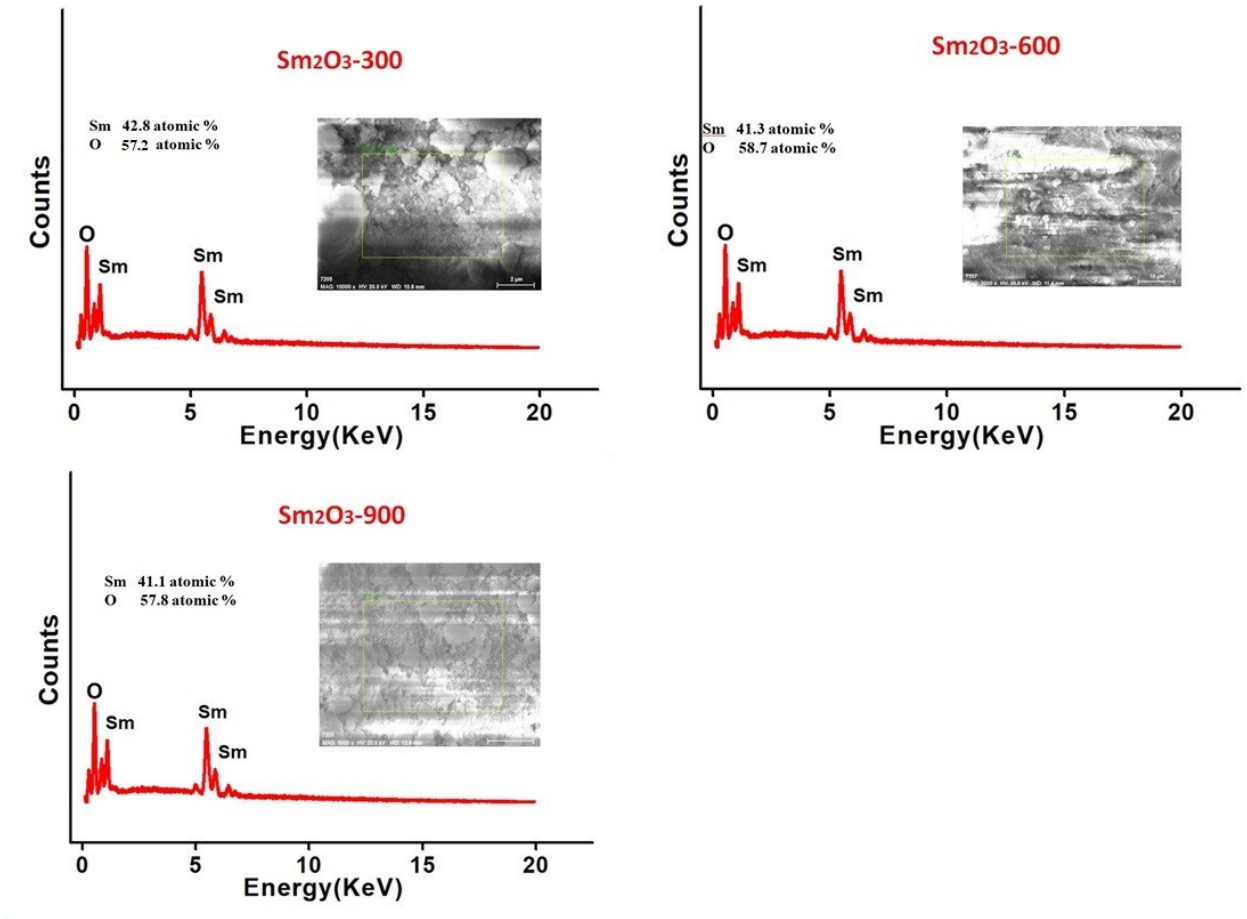


Fig. S4. EDX analyses

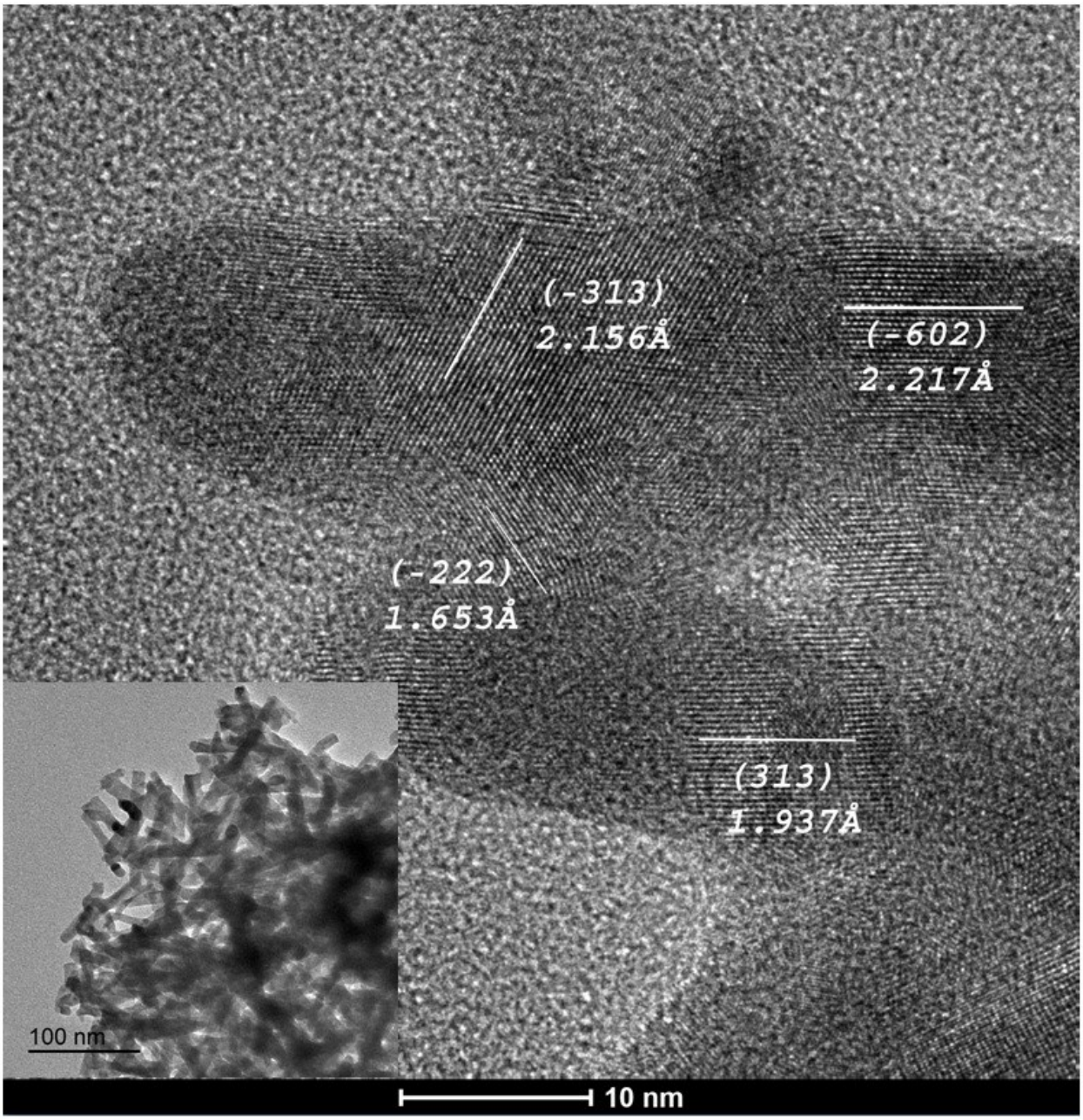


Fig. S5. HRTEM of Sm_2O_3-300

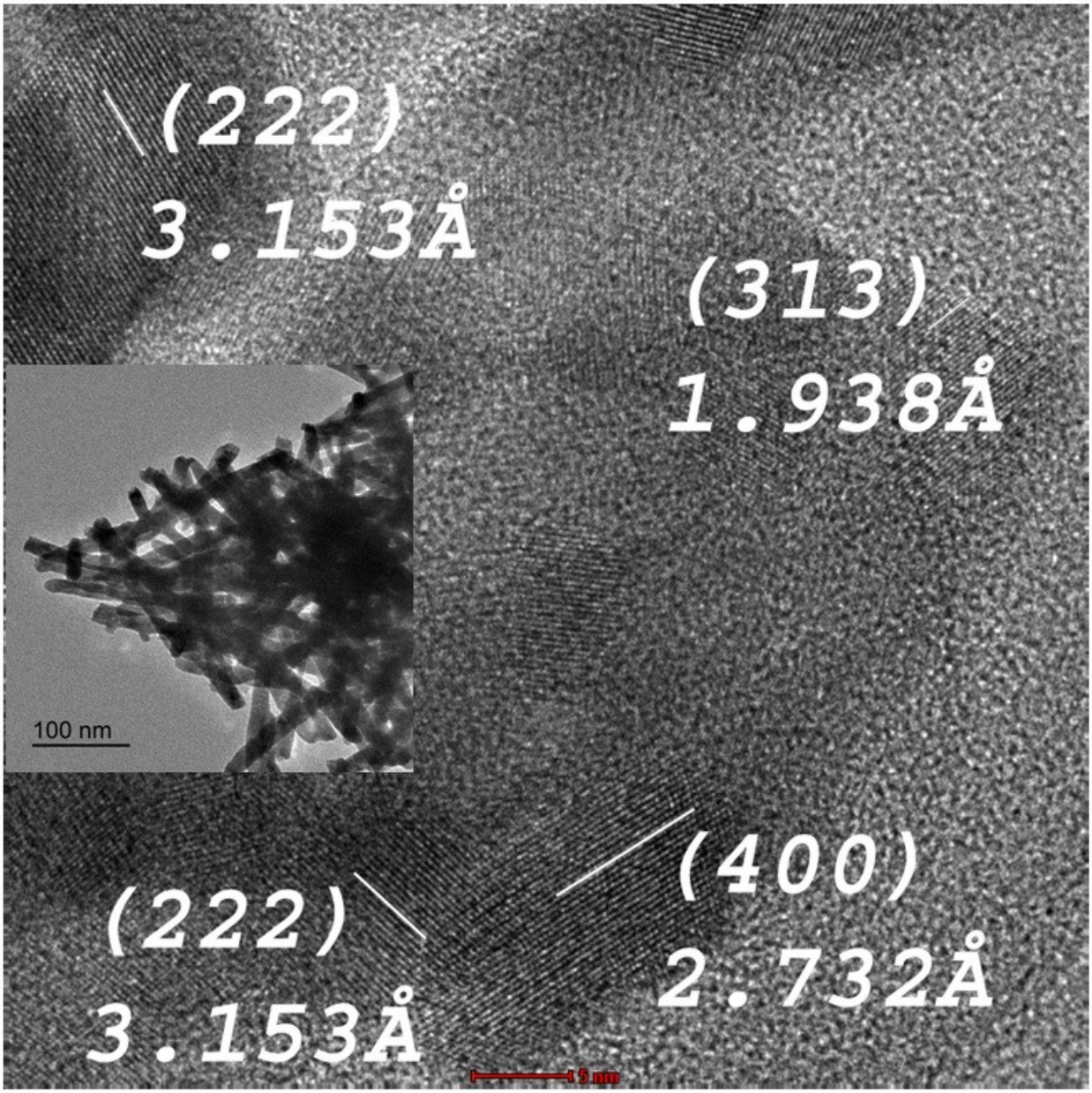


Fig. S6. HRTEM of Sm_2O_3-600

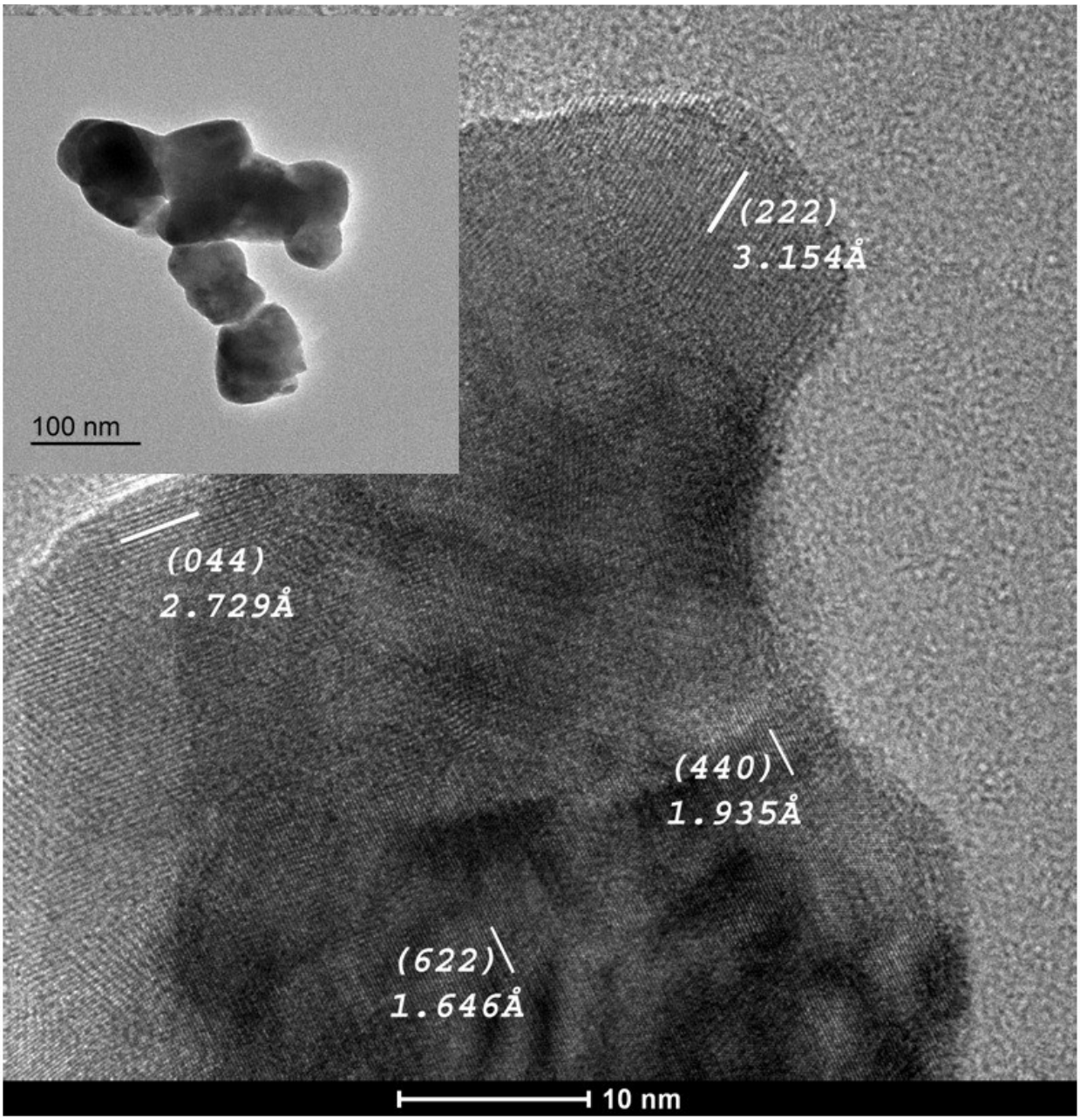


Fig. S7. HRTEM of Sm_2O_3-900

Surface area calculation

According to the Randles–Sevcik equation,

$$Ip = (2.69\times10^5)n^{3/2}D^{1/2}\upsilon^{1/2}AC$$

Here, Ip = anodic peak current

n = no. of electrons transferred (1)

C = concentration of $K_4[Fe(CN)_6]$

υ = scan rate (50 mVs^{-1})

D = diffusion coefficient (6.5×10^{-6} cm^2s^{-1})

Table S2. Calculated surface area and adsorp amount of drug molecules

Electrode	Effective surface area (cm^2)	Adsopr amount (nM) AC	CP
Bare GP	0.027	0.02100	0.0039
Sm_2O_3-3-1/GP	0.039	0.00890	0.0358
Sm_2O_3-3-2/GP	0.050	0.00450	0.0405
Sm_2O_3-3-3/GP	0.047	0.02700	0.0449
Sm_2O_3-6-1/GP	0.047	0.03120	0.0002
Sm_2O_3-6-2/GP	0.044	0.03910	0.0262
Sm_2O_3-6-3/GP	0.051	0.0401	0.0427
Sm_2O_3-9-1/GP	0.049	0.08898	0.0214
Sm_2O_3-9-2/GP	0.051	0.10888	0.0415
Sm_2O_3-9-3/GP	0.052	0.21000	0.0600

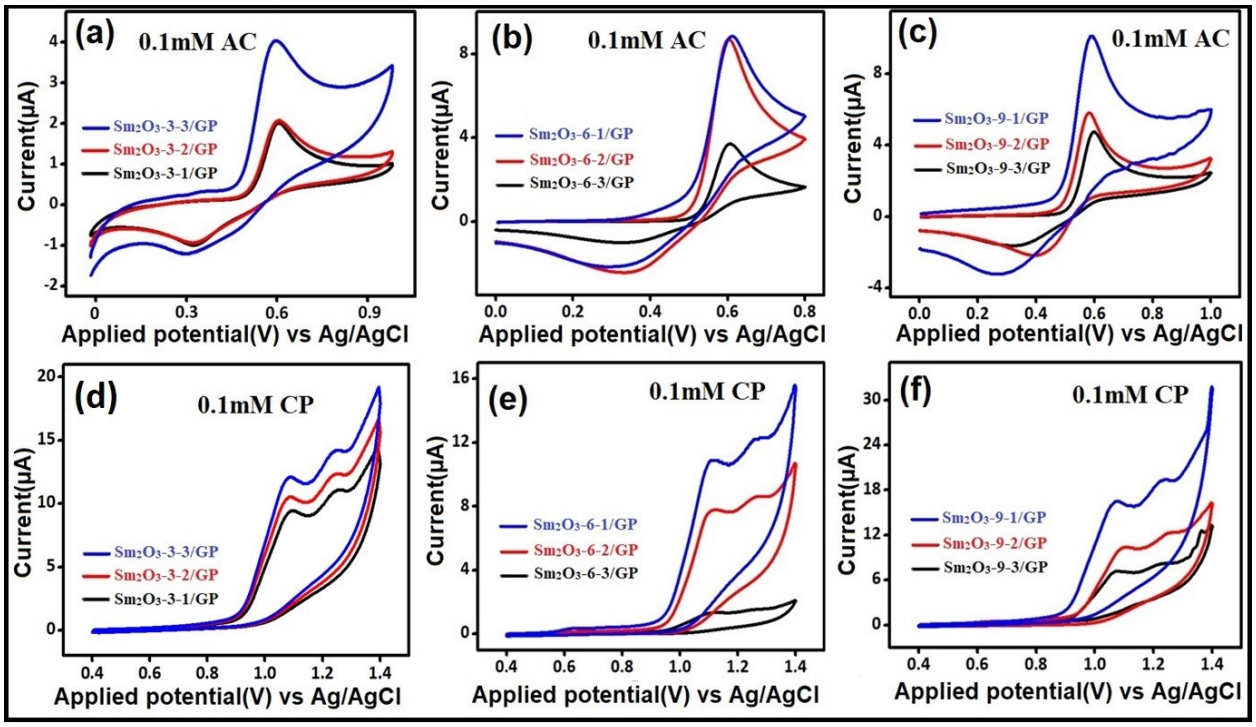
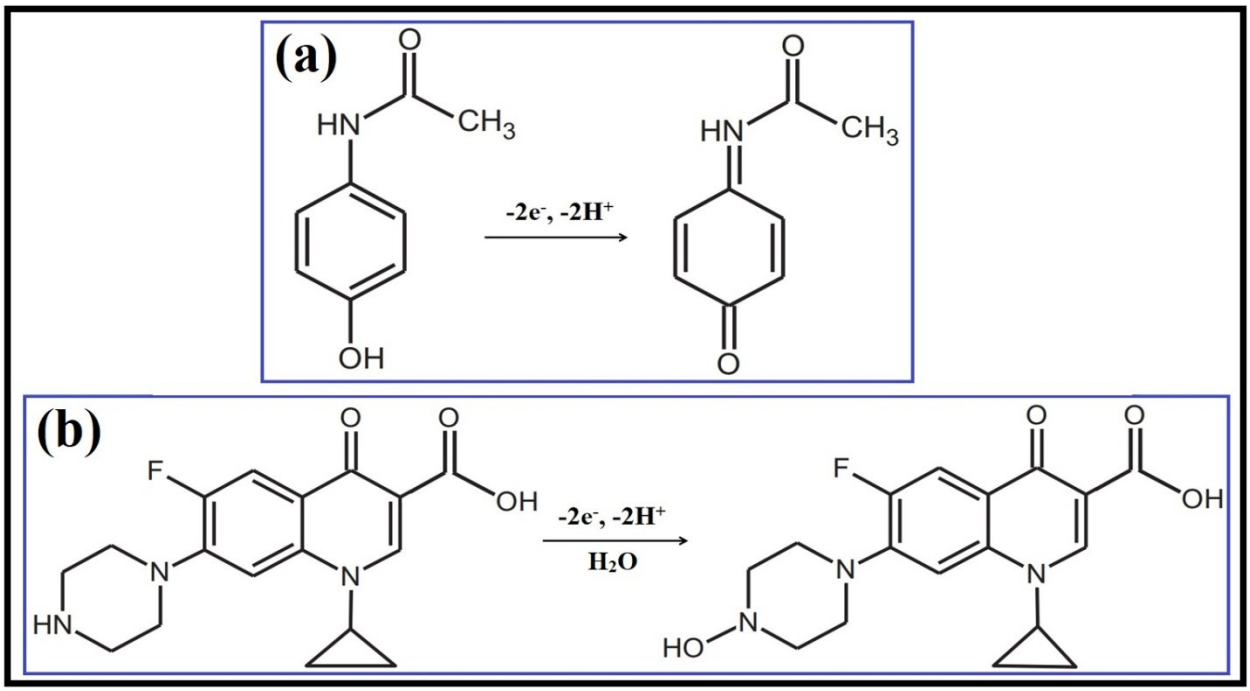


Fig. S8. Cyclic voltammograms of 0.1 mM AC and 0.1mM CP at individual electrode



Scheme S1. Proposed mechanism of electro-oxidation of (a) AC and (b) CP

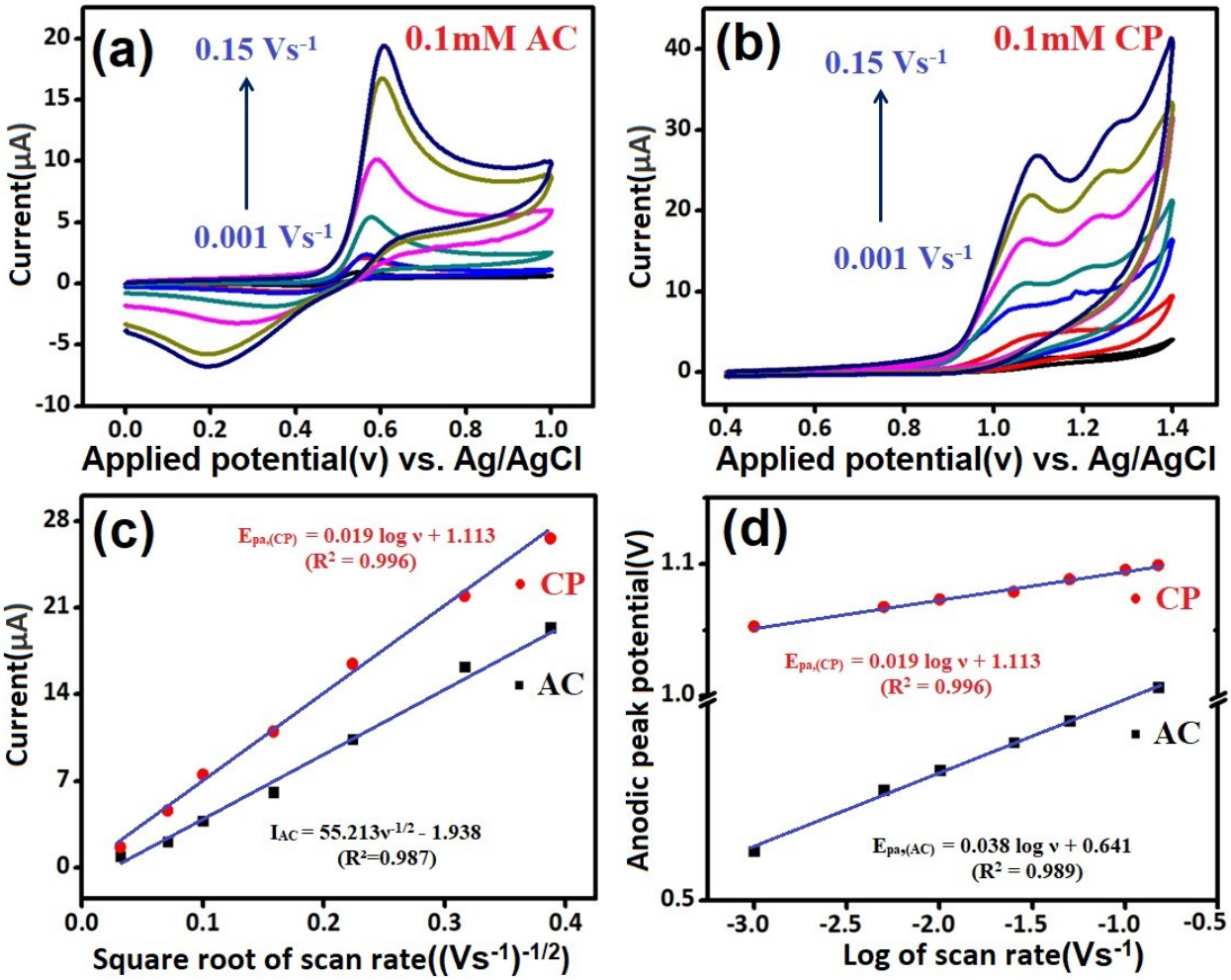


Fig. S9. Scan rate variation at Sm_2O_3-9-3/GP electrodse (a) 0.1mM AC; (b) 0.1 mM CP; Corresponding relation between (c) square root of scan rate vs. current($_{IAC/CP}$); (d) Log(scan rate) vs. Anodic peakpotential (Ep)

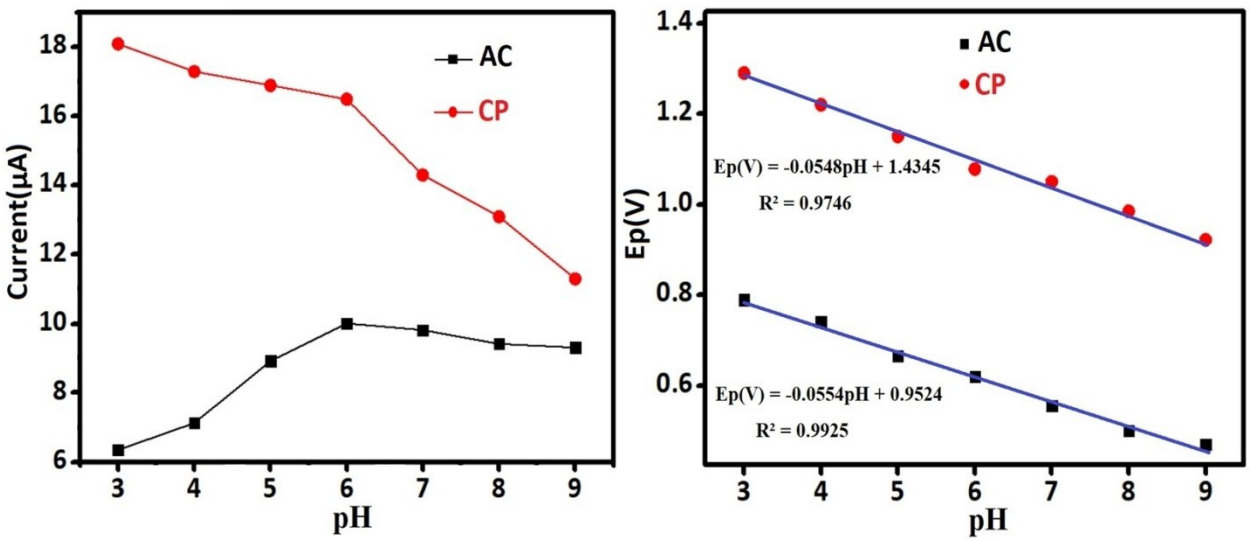


Figure S10. (a) Variation of current with pH; and (b) Change in anodic peak potential

Table S3. The results of kinetics investigations

Molecule	n	Γ_c(nM)	α	$k_s(s^{-1})$
AC	2.12	0.21	0.82	6.44×10^{-2}
CP	2.25	0.06	0.39	7.80×10^{-5}

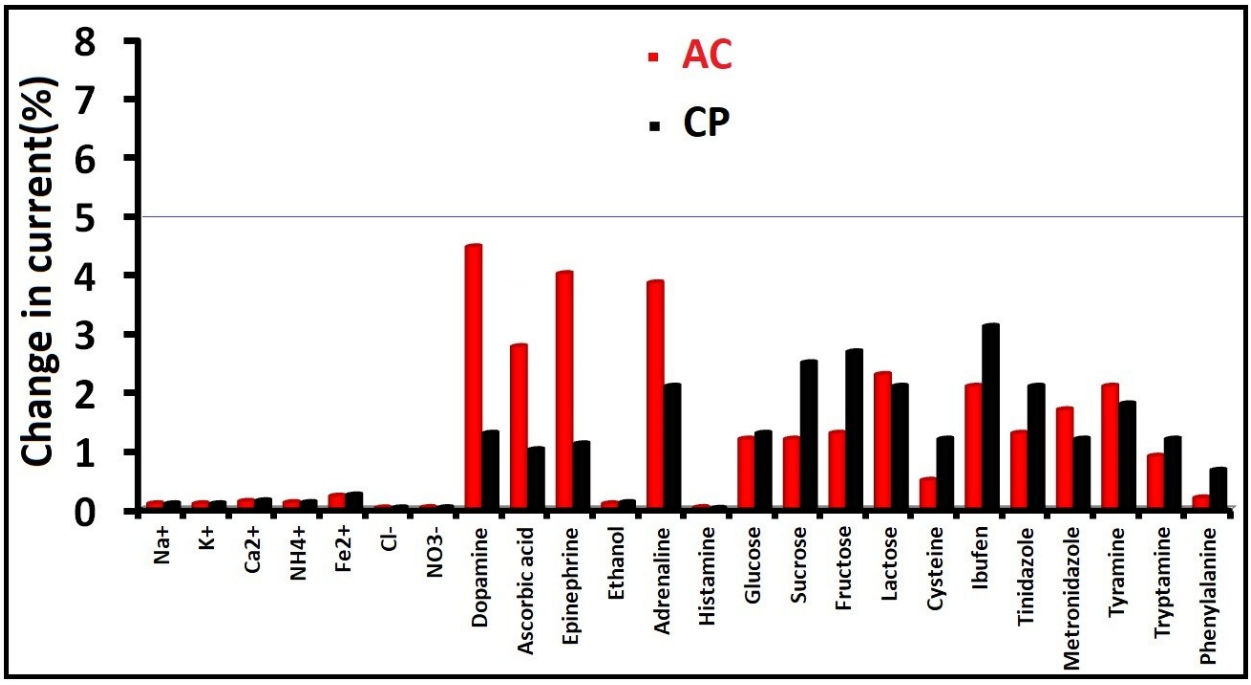


Fig. S11. Interference investigation

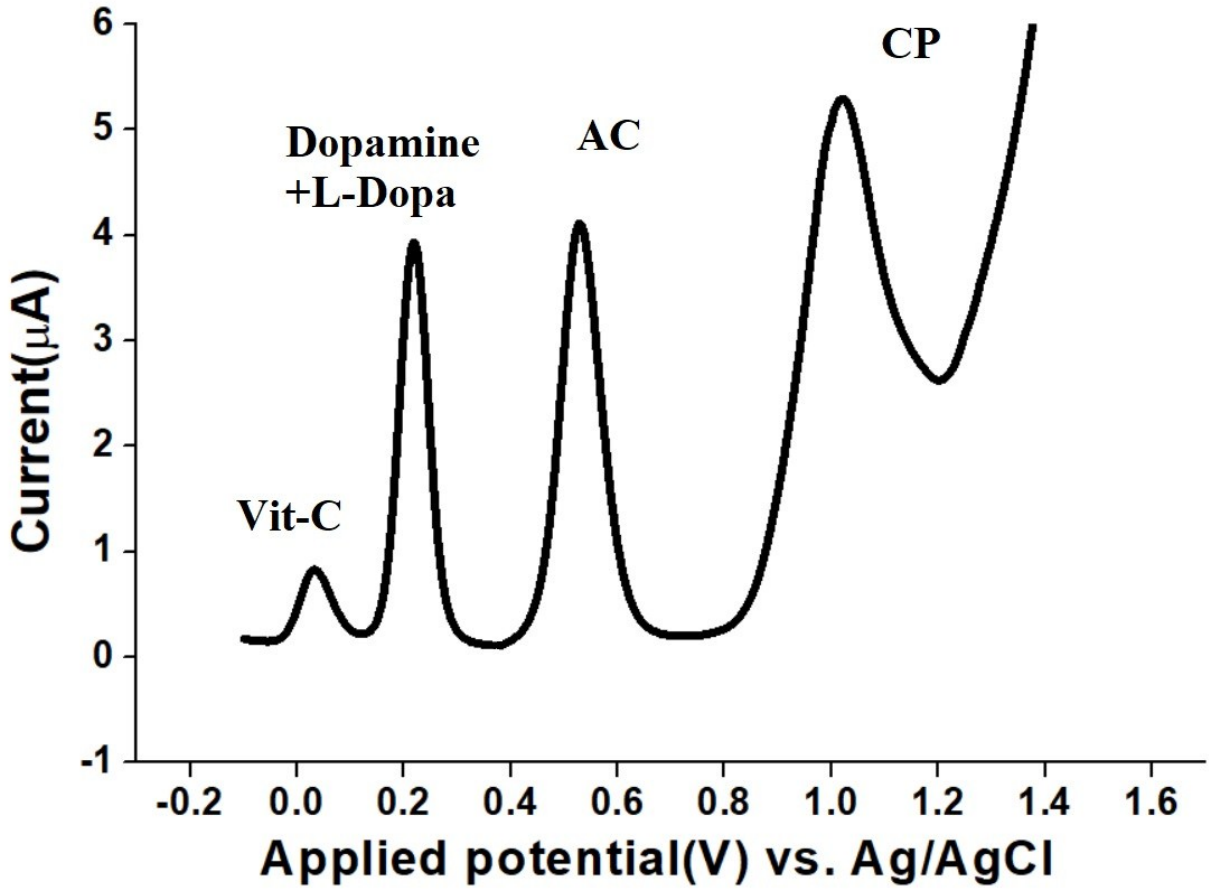


Fig. S12. DPV of 0.1mM AC and CP in presence of various electro-active molecules

Table S4. Determination of AC and CP in the urine sample using Sm_2O_3-9-3/GP (n=3)

	Diluted urine sample(μM)	Spiking(μM) AC	CP	Found(μM)	HPCL(μM)	R.S.D(%)	Recovery(%)
AC	0.65[c]	0.1	0.2	0.751	0.752	2.4	101
CP	0.94[c]	0.2	0.1	1.042	1.042	2.7	102

Table S5. Finding the amount of AC and CP in pharmaceutical formulations

	Content (μM)	Spiking(μM) AC	CP	Found(μM)	HPLC(μM)	R.D.S(%)	Recovery(%)
AC in Injection	1.62[c]	1	2	2.64	2.63	1.8	102
AC in Tablet	10.45[c]	1	2	11.44	11.45	2.1	99

CP in Injection	1.54[c]	2	1	2.55	2.56	2.7	101
CP in Tablet	10.16[c]	2	1	11.14	11.17	2.3	98

Table S6. Determination of AC and CP in hospital usage water (n=3)

Sample	Diluted sample(μM)	Spiking(μM)	Found(μM)	HPLC(μM)	R.S.D[a] (%)	Recovery[b] (%)
AC	0	0.2	0.205	0.203	2.3	105
CP	0	0.2	0.202	0.205	2.5	102

[a] relative standard deviation

[b]Recovery = $\frac{Found(\mu M) - Diluted\ biological\ fluids/pharmaceutical\ sample(\mu M)}{Spiking(\mu M)} \times 100\%$

[c]Average of five consecutive measurements (R.D.S. = 2.6 and 2.9% for AC and CP, respectively in the urine sample. 1.3% and 1.5% in the injection samples for AC and CP, respectively. 1.9 and 2.1% in the diluted tablet samples for AC and CP, respectively and)