Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supplementary Information

Au-Pd bimetallic nanoparticles anchored on α-Fe_2O_3 nonenzymatic hybrid nanoelectrocatalyst for simultaneous electrochemical detection of dopamine and uric acid in the presence of ascorbic acid

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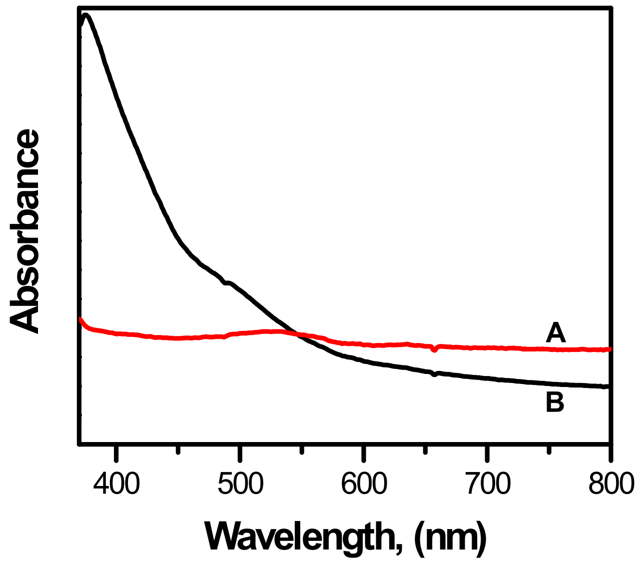

Figure S1. UV visible spectra of (A) α–Fe_2O_3 (B) α–Fe_2O_3 /Au-Pd hybrid nanostructure

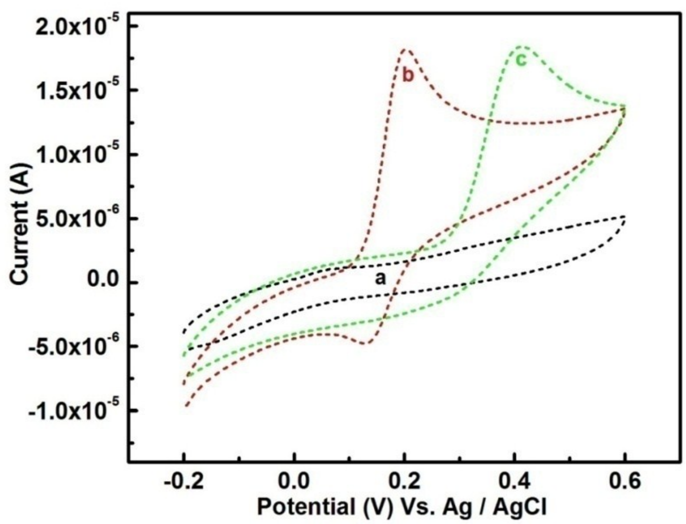

Figure S2. 1mM of (a) Ascorbic acid, (b) Dopamine (c) Uric acid in PBS (pH 7) for the α–Fe_2O_3/ Au-Pd hybrid modified electrode

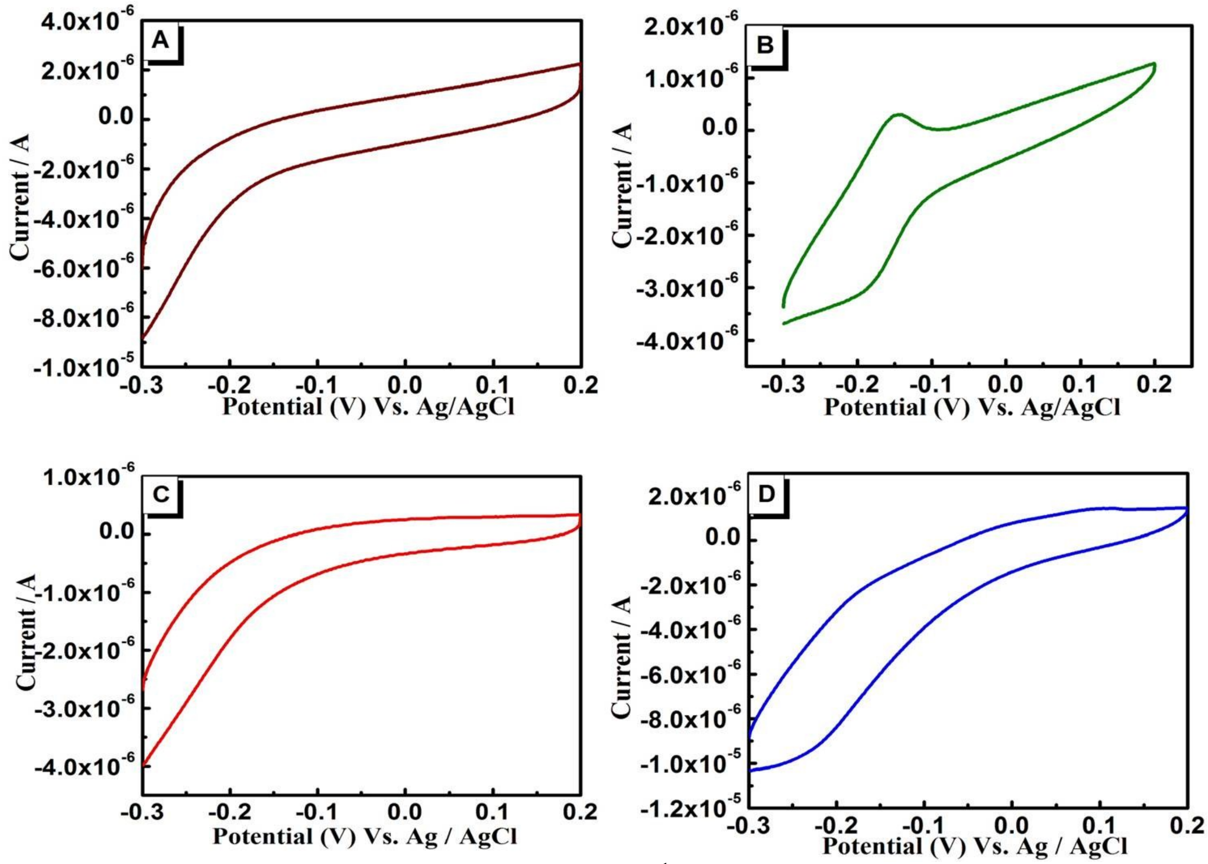

Figure S3. CVs obtained for (1mM) PBS at a 50 mV s^{-1} with addition 25 μM of Methylene blue at a (A) bare (B) α–Fe_2O_3 (C) Au-Pd (D) α–Fe_2O_3 /Au-Pd hybrid at a potential between -0.3 and 0.2 V (pH 7).

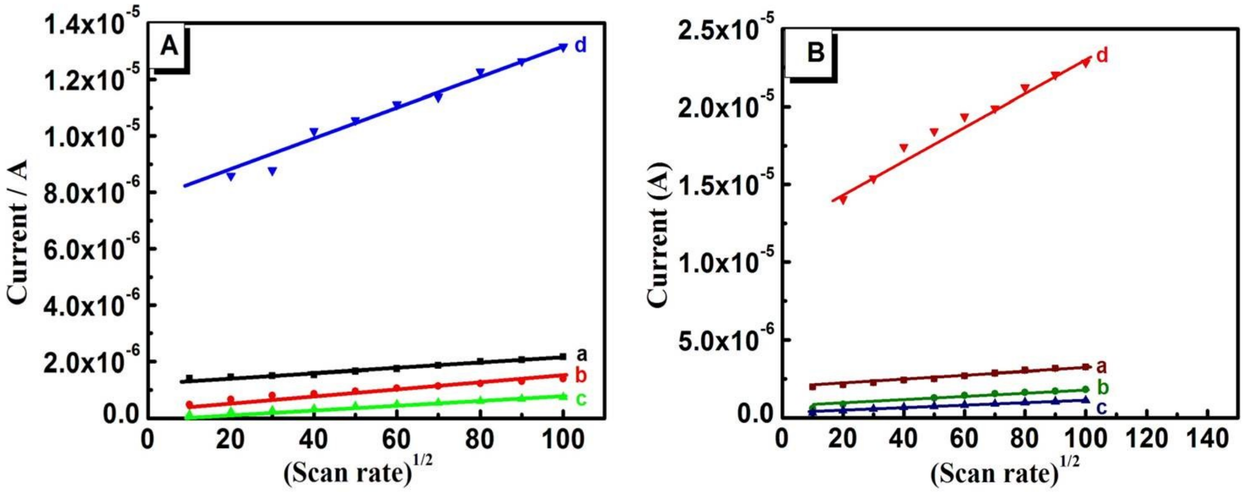

Figure S4. (A) CV studies recorded at different scan rate from (10 – 100 mVs^{-1}) (a) Bare GC (b) α–Fe_2O_3 (c) Au/ Pd (d) α–Fe_2O_3 /Au-Pd hybrid for dopamine. Fig (B) differ scan rate for (10 - 100 mV s^{-1} (a) Bare GC (b) α – Fe_2O_3 (c) Au/Pd (d)) α–Fe_2O_3 /Au-Pd hybrid for uric acid.

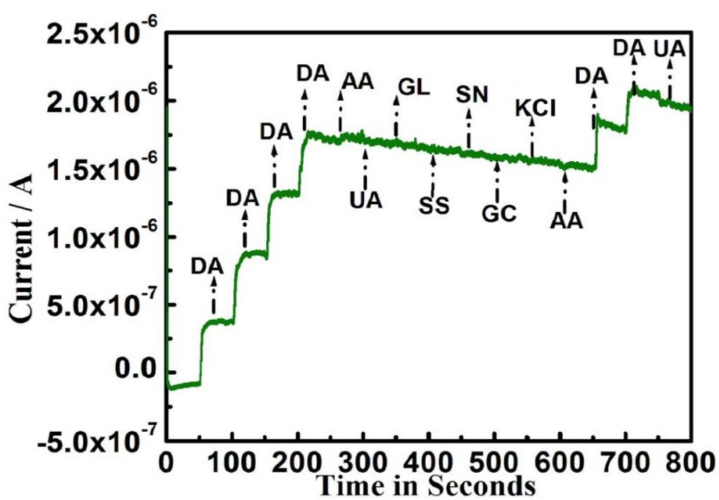

Figure S5. Amperometry (Time Vs Current) for modified α–Fe_2O_3 /Au-Pd hybrid GC for dopamine & uric acid of 50 μM concentration while other interfering analytes of 5 mM concentration

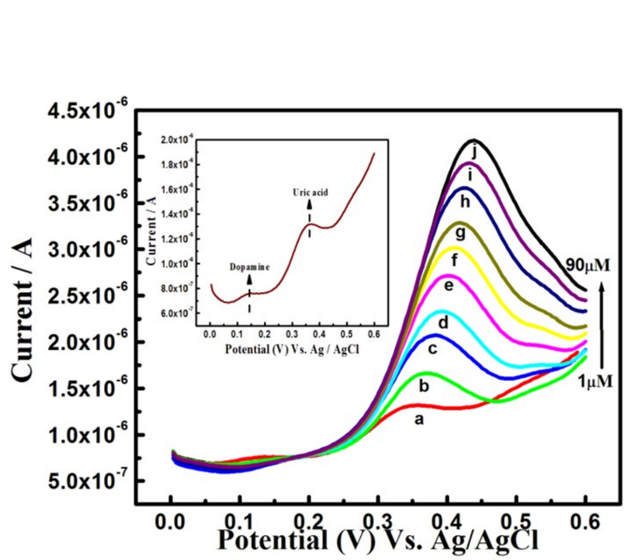

Figure S6. shows the response of α–Fe_2O_3 /Au-Pd hybrid GC at different concentration of urine sample 1 (a) 1 μM (b) 3 μM, (c) 5 μM, (d) 6 μM, (e) 10 μM, (f) 20 μM, (g) 40 μM, (h) 60 μM, (i) 70 μM (j) 90 μM in in 0.1 M PBS containing pH 7.0.

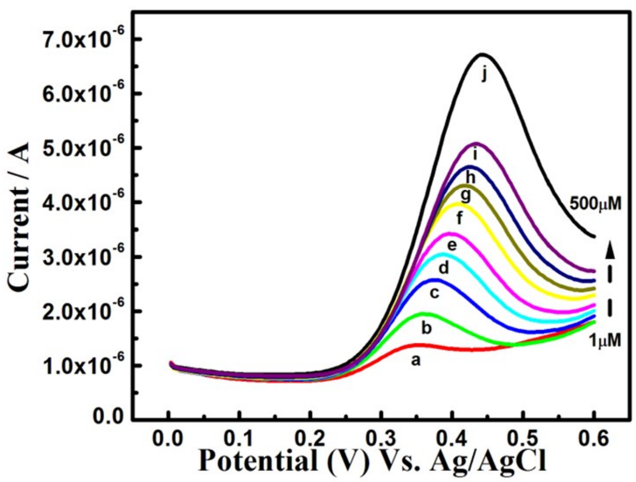

Figure S7. shows the response of α–Fe_2O_3 /Au-Pd hybrid GC at different concentration of urine sample 2(a) 1 μM, (b) 2 μM, (c) 5 μM, (d) 20 μM, (e) 70 μM, (f) 80 μM, (g) 90 μM, (h) 200 μM, (i) 300 μM, (j) 500 μM in 0.1 M PBS containing pH 7.0

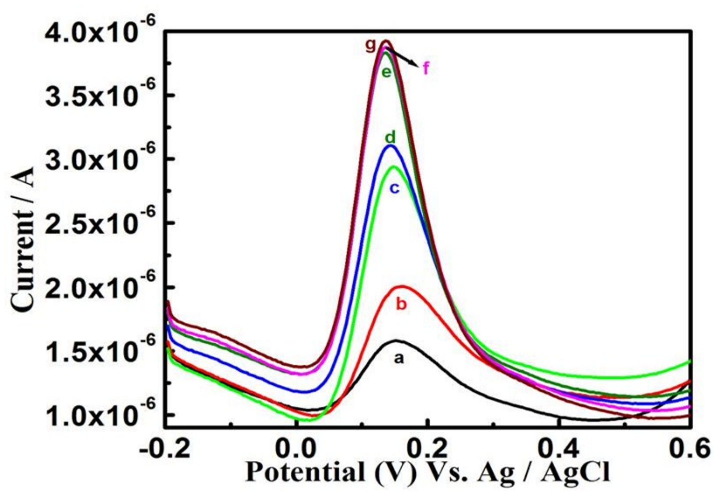

Figure S8. shows the response of α–Fe_2O_3 /Au-Pd hybrid GC at different concentration of fresh human blood serum (a) 300 nM (b) 1μM (c) 4 μM (d) 5 μM (e) 10 μM (f) 25 μM (g) 50 μM containing 0.1M of PBS (pH 7.0).

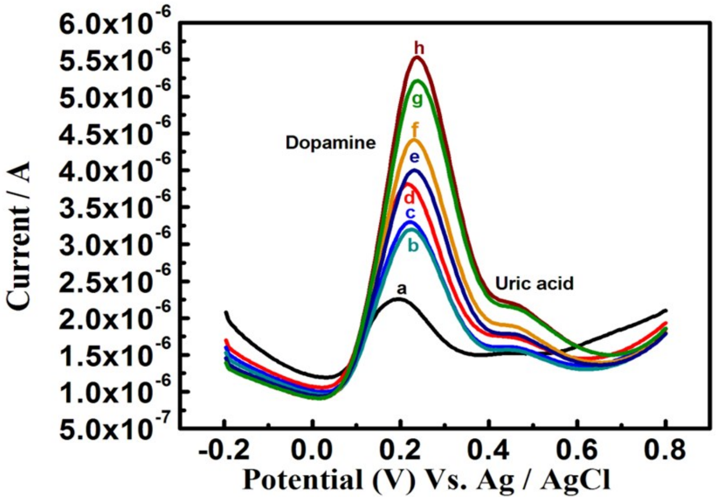

Figure S9. shows the response of α–Fe_2O_3 /Au-Pd hybrid GC at different concentration of dopamine hydrochloride injection (a) 450 nM, (b) 4 μM, (c) 6μM, (d)10 μM, (e) 15 μM, (f) 25 μM, (g) 50 μM, (h) 60 μM containing 0.1M of PBS (pH 7.0)

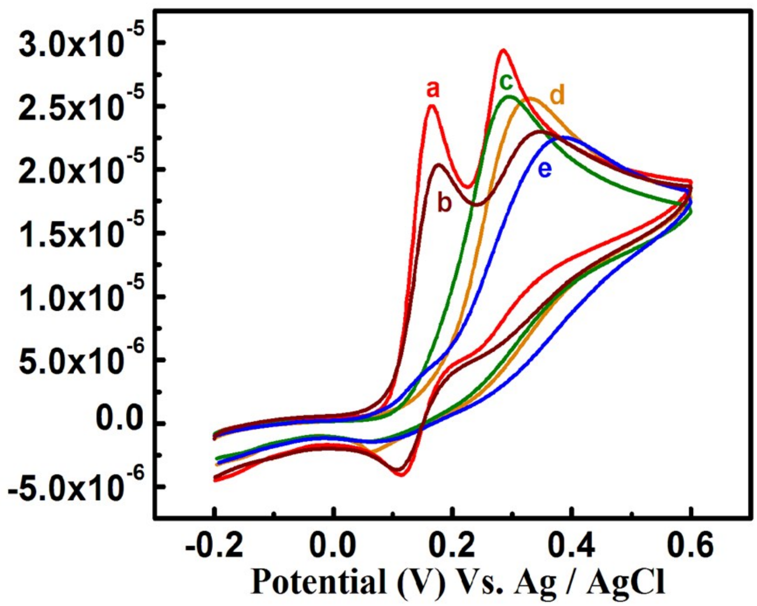

Figure S 10. shows different ratio for Au/Pd bimetal (a)1:1 (b) 1:0.5 (c) 0.5:1 (d) 1:0.25 (e) 0.25:1 ratio containing 600 μM of dopamine & uric acid in 0.1 M of PBS(pH 7.0)

Table S1 - Voltammetric DA,UA in presence of AA recovery tests performed in Human Urine, Serum and Dopamine hydrochloride injection with α – Fe_2O_3 / Au@Pd , pH = 7.0

Sample	Added [DA, UA] μM	Obtained [DA, UA] μM	Recovery (%) [DA, UA]
Urine 1	--- , 5.00	--- , 5.06	--- , 101.2
Urine 2	--- , 5.00	--- , 5.30	--- ,106.0
Serum	4.50, ---	4.29, ---	95.3 , ---
Dopamine hydrochloride injection	4.00,1.00	3.70,1.03	92.5,103.0

Table S2 Summary of various nanomaterial-based electrochemical sensors for DA and UA in presence of Ascorbic acid

		DA	UA	DA	UA	
1	Pretreated pencil graphite	0.15-15µM	0.3-150µM	0.033µM	0.12µM	1
2	Poly(acrylic acid)-multiwalled carbon-nanotube composite-covered glassy-carbon	40nM-3µM	0.3µM-10µM	20nM	110nM	2
3	Multi-walled carbon nanotube-chitosan/poly(amidoamine)/DNA nanocomposite modified gold electrode	0.2-10µM & 10-100µM	0.5-100µM	0.03µM	0.07µM	3
4	Pt/reduced graphene oxide(Pt/RGO) modified glassy carbon electrode	10-170µM	10-130µM	0.25µM	0.45µM	4
5	Gold nanoparticle/choline (GNP/Ch) coated glassy carbon electrode	-	-	-	-	5
6	2,2'-azino-bis(3-ethylbenzthiazoline-6-sulfonic acid)(ABTS)-immobilized carbon nanotube (CNT) electrode	0.90-10µM & 1.87-20µM	2.16-240µM & 3.07-400µM	-	-	6
7	Electrochemically preanodized clay-modified electrodes	0-6µM	0.5-10 & 10-100µM	2.7nM	0.2µM	7
8	DNA/Poly(*p*-aminobenzensulfonic acid) composite bi-layer modified glassy	0.19–13 µM	0.4–23 µM	88 nM	0.19 µM	8

	carbon electrode					
9	RNA modified electrode	0.37 to 36 μM	0.74 to 73 μM	0.2 μM	0.36 μM	9
10	poly(orthanilic acid)–multiwalled carbon nanotubes composite film-modified glassy carbon electrode	9–48 μM	6–55 μM	0.21 μM	0.44 μM	10
11	multi-walled carbon nanotubes with methylene blue composite film-modified electrode	0.4–10.0 μM	2.0–20.0 and 20.0–200.0 μM	0.2 μM	1.0 μM	11
12	Glassy carbon electrode modified with poly(dibromofluorescein)	0.2 to 200 μM L^{-1}	1.0 to 250 μM L^{-1}	0.03 μM L^{-1}	0.2 μM L^{-1}	12
13	functionalized ordered mesoporous carbon/ionic liquid gel modified electrode	0.1 to 500 μM	0.1 to 100 μM	4.1nM	2.5 nM	13
14	Ionic Liquid Functionalized Graphene-Based electrode	1–400 μM	1–600 μM	0.679 μM	0.323 μM	14
15	Indole-3-Carboxaldehyde Modified Glassy Carbon Electrode	10 μM -100 μM	10 μM - 100 μM	1.70 μM	4.99 μM	15
16	DNA/Pt Nanocluster Modified Electrode	1.1×10^{-7} to 3.8×10^{-5} M L^{-1}	3.0×10^{-7} to 5.7×10^{-5} M L^{-1}	3.6×10^{-8} M L^{-1}	1.0×10^{-7} M L^{-1}	16

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