Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information (SI)

Tuning the Composition of Gold-Silver Bimetallic Nanoparticles for the Electrochemical Reduction of Hydrogen Peroxide and Nitrobenzene

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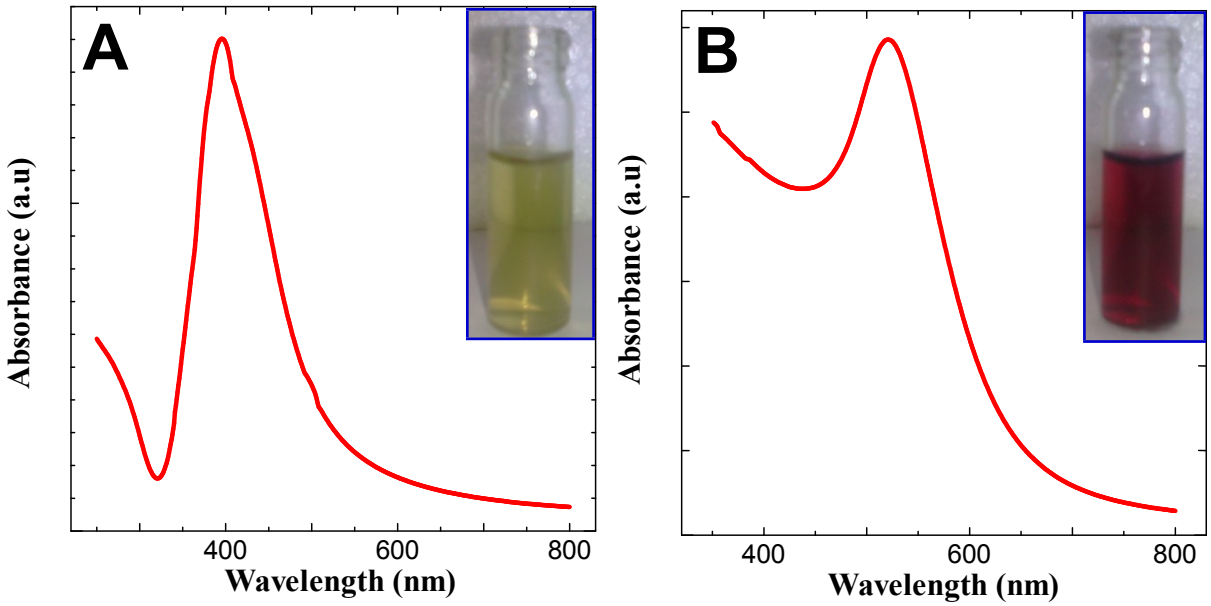

Figure S1. UV-vis spectra obtained for (A) AgNPs and (B) AuNPs. Insets: Photographs of (A) AgNPs and (B) AuNPs.

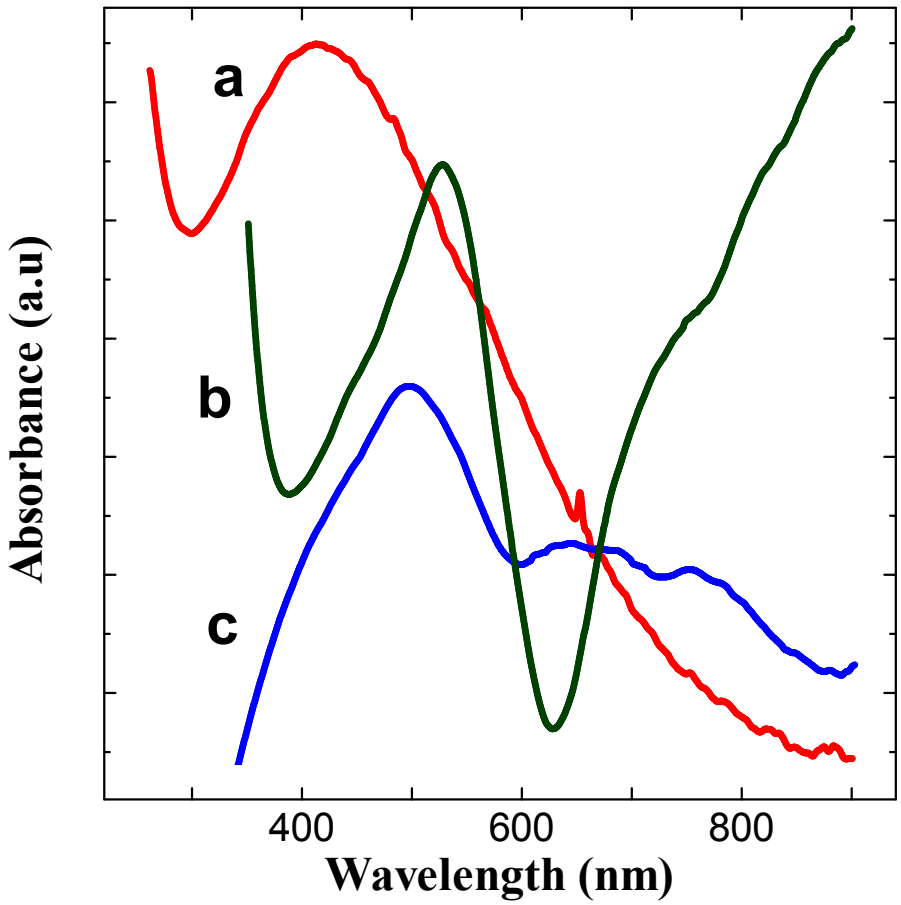

Figure S2. DRS obtained for (a) GC/HDA/AgNPs, (b) GC/HDA/AuNPs and (c) GC/HDA/Au-AgNPs electrodes.

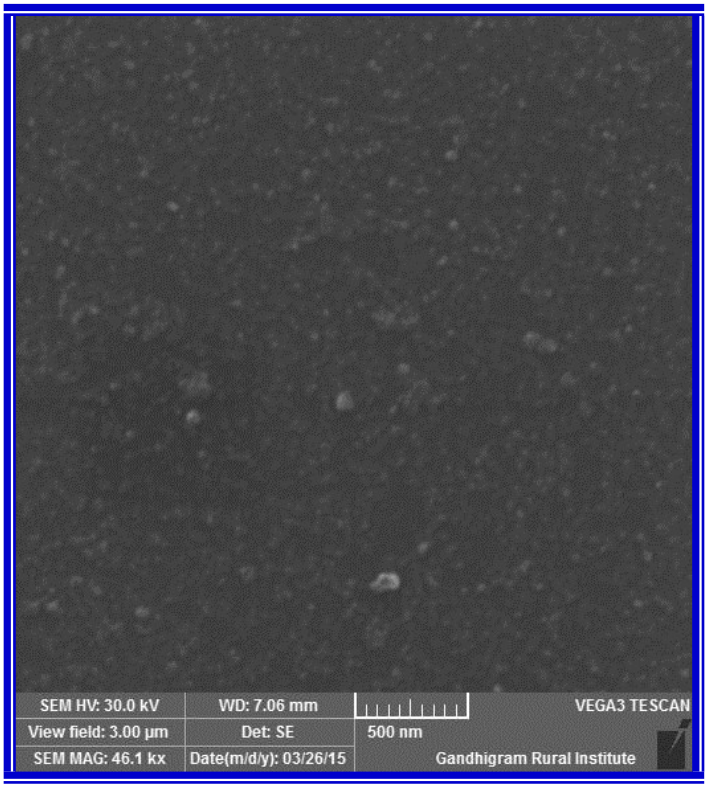

Figure S3. SEM image obtained for Au-AgNPs (Ag:Au=1:0.12) modified substrate.

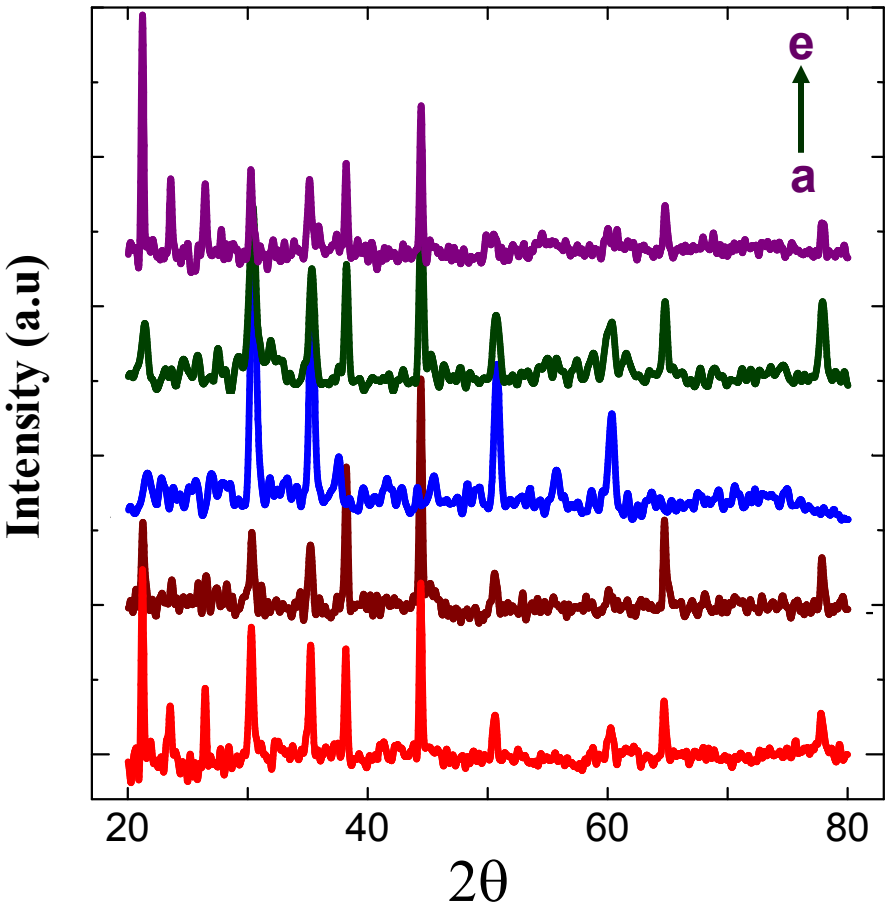

Figure S4. XRD patterns obtained for (a) AgNPs, (b) AuNPs and Au-AgNPs with the Ag:Au mole ratio of (c) 1:0.10, (d) 1:0.12 and (e) 1:0.14 modified ITO substrates.

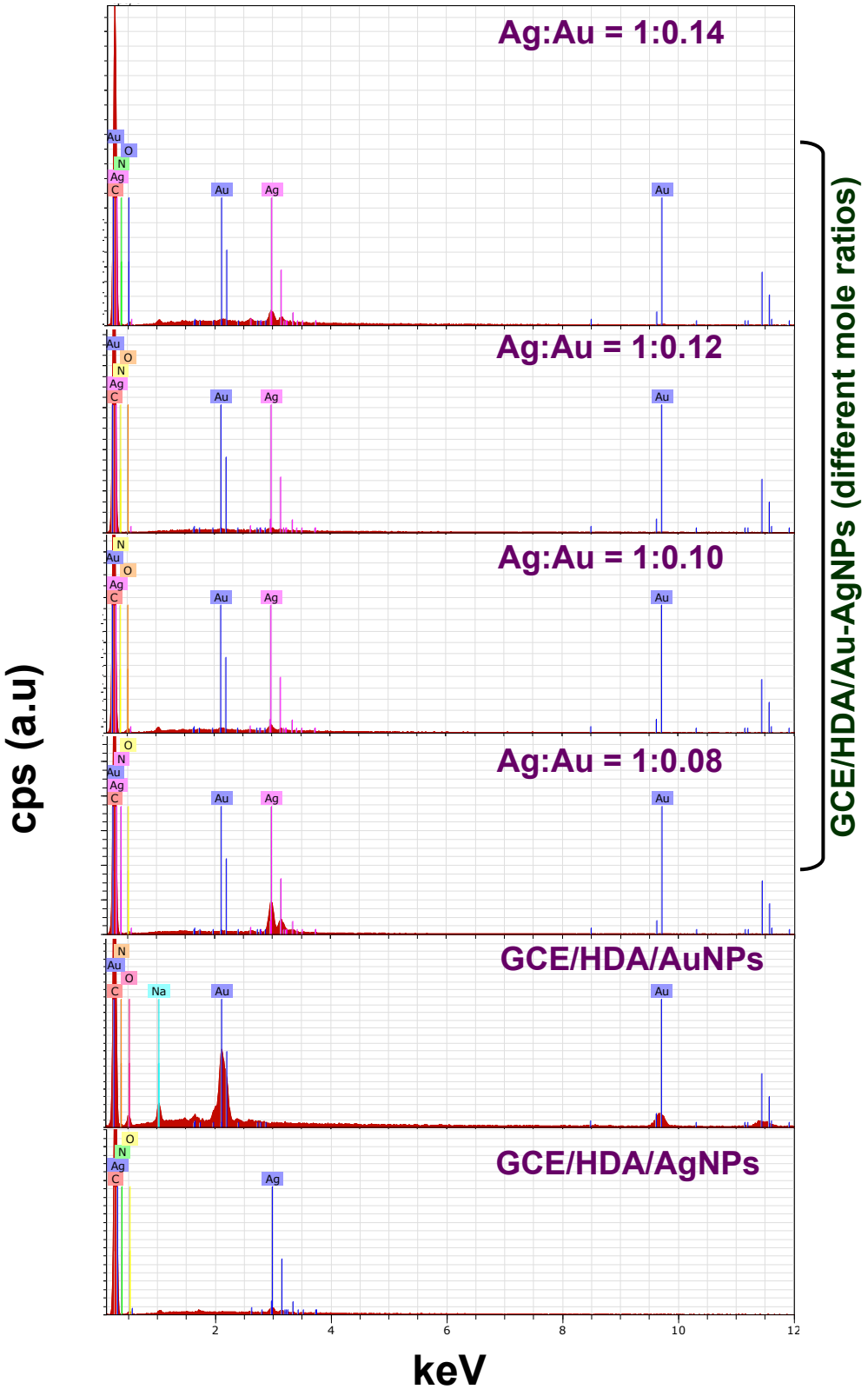

Figure S5. EDAX spectrum obtained for Au-AgNPs modified GC substrates.

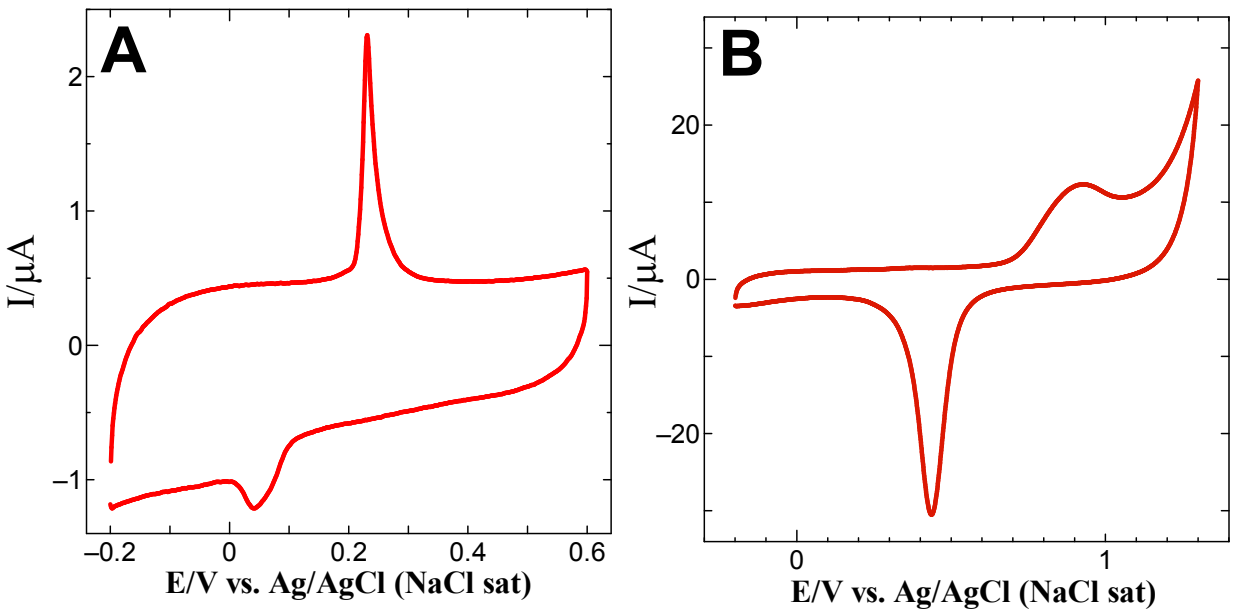

Figure S6. CVs obtained for (A) GC/HDA/AgNPs and (b) GC/HDA/AuNPs electrodes in 0.2 M PB solution (pH 7.2) at a scan rate of 50 mV s^{-1}.

Table S1. EDAX-Elemental analysis

S.No	Electrode	Weight % of the element present				
		C	**N**	**O**	**Ag**	**Au**
1	GCE/HDA/AgNPs	83.74	3.81	6.13	**6.33**	**-**
2	GCE/HDA/AuNPs	79.70	4.09	16.23	**-**	**8.99**
3	GCE/HDA/Au-AgNPs (Ag:Au = 1:0.08)	84.61	3.98	4.78	**5.32**	**1.31**
4	GCE/HDA/Au-AgNPs (Ag:Au = 1:0.10)	84.73	2.41	6.15	**3.63**	**1.19**
5	GCE/HDA/Au-AgNPs (Ag:Au = 1:0.12)	85.40	3.40	3.97	**5.76**	**1.48**
6	GCE/HDA/Au-AgNPs (Ag:Au = 1:0.14)	84.81	5.07	4.31	**4.37**	**1.43**

Table S2. Impedance spectral data

Parameter	GCE/HDA/ AgNPs	GCE/HDA/ AuNPs	GCE/HDA/Au-AgNPs (Ag:Au mole ratio)			
			1:0.10	**1:0.12**	**1:0.14**	**1:0.16**
R_s (kΩ)	0.138	0.129	0.136	0.151	0.131	0.150
CPE (μF)	4.77×10^{-6}	1.49×10^{-5}	2.82×10^{-6}	6.11×10^{-6}	1.47×10^{-6}	5.96×10^{-6}
R_{CT} (kΩ)	49.94	27.70	18.23	17.16	19.73	23.64
k_{et} (cm s^{-1})	5.39×10^{-8}	4.86×10^{-7}	3.29×10^{-7}	2.77×10^{-7}	3.40×10^{-7}	3.75×10^{-7}

Table S3. Comparison of onset reduction potential and limit of detection of HP obtained from the present modified electrode with the reported modified electrodes.

S.No	Electrodes	Onset potential (*vs*. AgCl)	pH	Linear range	Detection limit (μM)	Reference
1	Au@Ag nanorods/GCE	-0.30 V	6.5	0.02-7.02 mM	0.67	[20]
2	Au@Ag nanoparticles/GCE	-0.10 V*	7.2	0.005-15 mM	1.3	[34]
3	Au–Ag/BMT[a]-NF/GCE	-0.40 V	7.0	1-250 μM	-	[35]
4	Ag@Cu nanowires/GCE	-0.40 V	7.2	1-10 mM	3	[36]
5	Au@AgNPs/GCE	-0.40 V	7.2	10-110 μM	0.12	This work

[a]*BMT-NF*: 1-Butyl-3-methylimidazolium tetrafluoroborate/Nafion , *(*vs*. SCE)

Table S4. Comparison of onset reduction potential and limit of detection of NB obtained from the present modified electrode with the reported modified electrodes.

S.No.	Electrodes	Onset potential (*vs.* AgCl)	pH	Linear range	Detection limit (μM)	Reference
1	Au/Ag–TPDT NRs/GCE	-0.50 V	7.0	-	-	[37]
2	TPDT-Ag NPs/GCE	-0.55 V	7.2	1-7 μM	1.0	[38]
3	AuNPs/GCE	-0.60 V	7.0	0.1-600 μM	0.016	[39]
4	PAA-AgNPs/GCE	-0.50 V	7.0	10-600 μM	1.68	[40]
5	RGO-AgNPs/GCE	-0.30 V	7.0	0.5-900 μM	0.26	[41]
6	Au@AgNPs/GCE	-0.30 V	7.2	10-120 μM	0.23	This work

TPDT: N^1-[3-(trimethoxysilyl)propyl]diethylene triamine, *NRs*: Nanorods, *PAA-AgNPs*: AgNPs embedded in poly(amic) acid, *RGO*: reduced graphene oxide