Electronic supplementary information

Plasmonic and photo-electrochemical enhancements of AuAg@Au/RGO-C3N4 nanocomposite for the detection of DA

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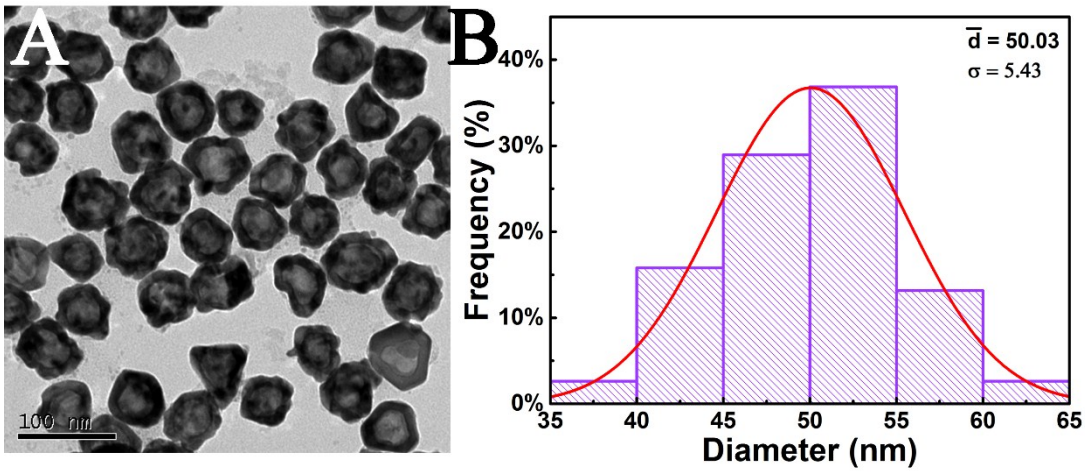

Fig. S1 The TEM image of AuAg@Au (A) and the corresponding nanoparticles size distribution (B).

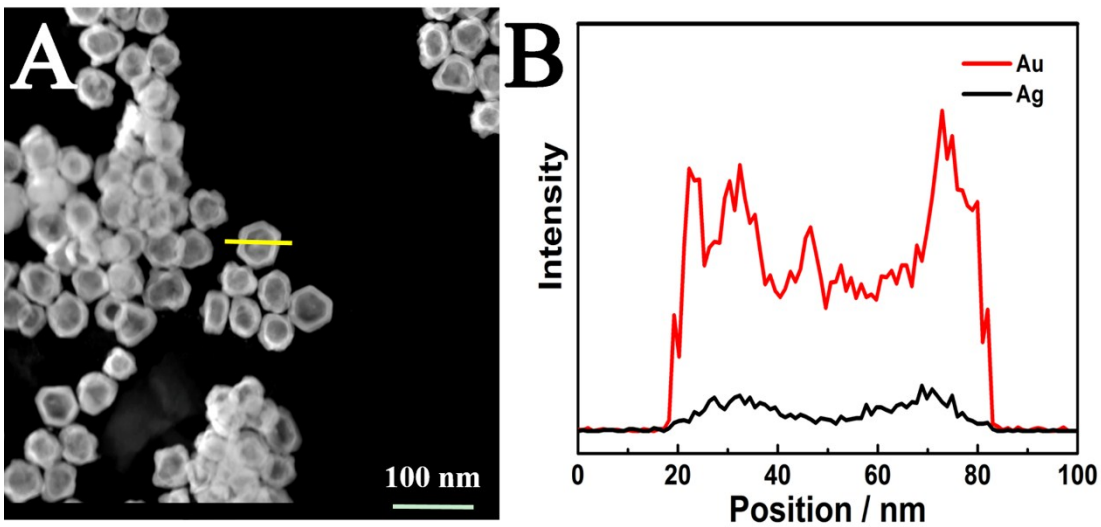

Fig. S2 EDS mapping image of AuAg@Au NPs (A) and distributions of Au (red) and Ag (black) components along the cross-sectional line profiles of a single AuAg@Au NP (B).

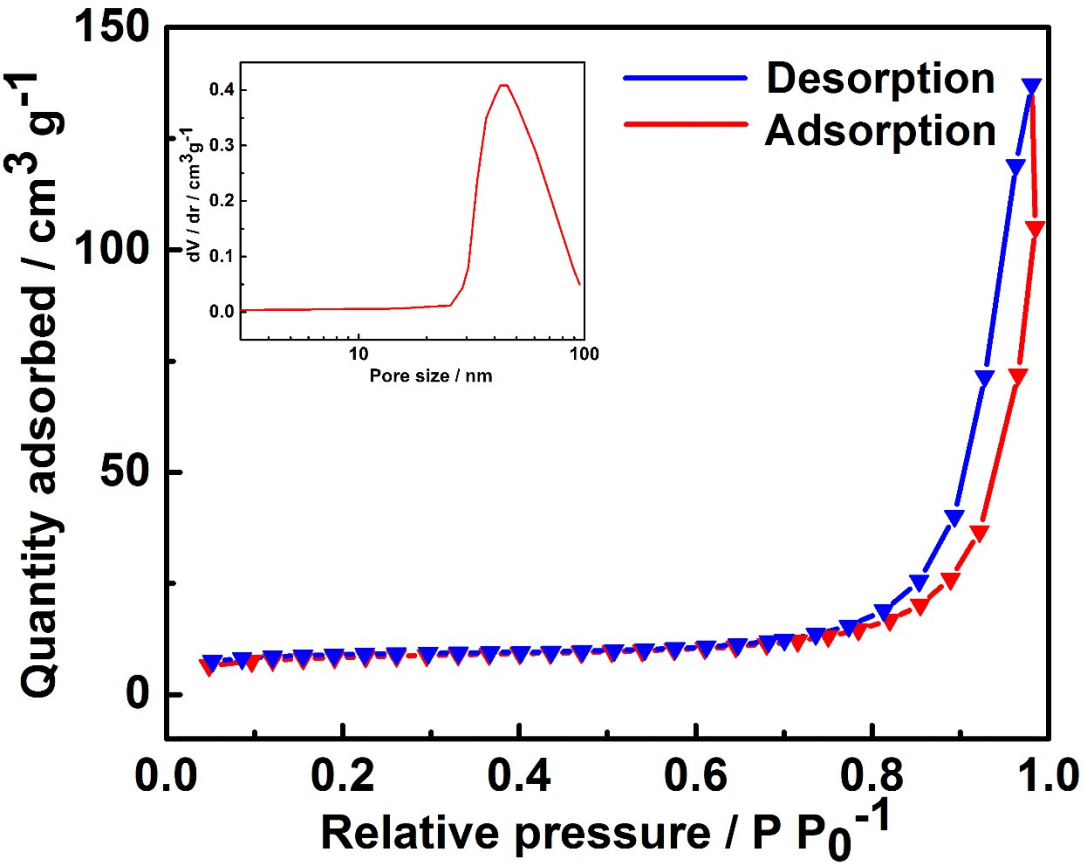

Fig. S3 Nitrogen adsorption desorption isotherms of AuAg@Au sample. The corresponding BJH model pore distribution plot is shown as inset.

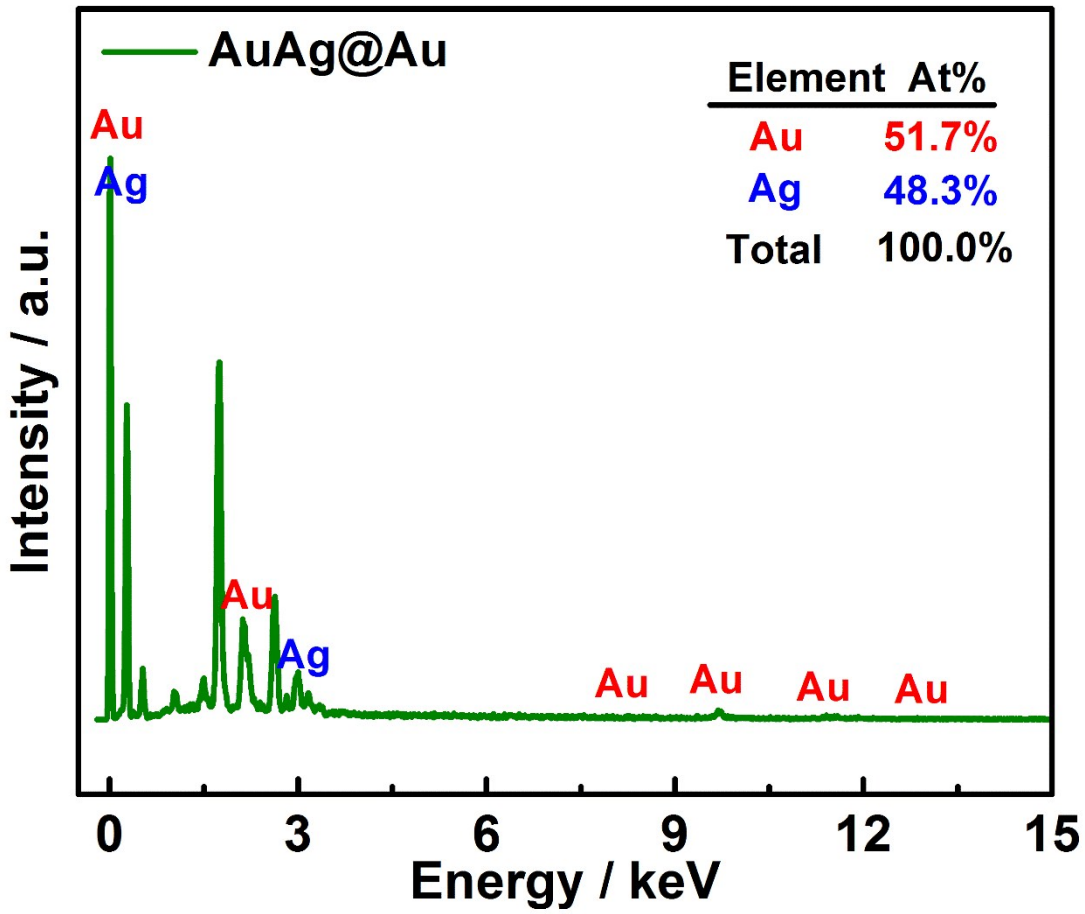

Fig. S4 EDX pattern of AuAg@Au sample.

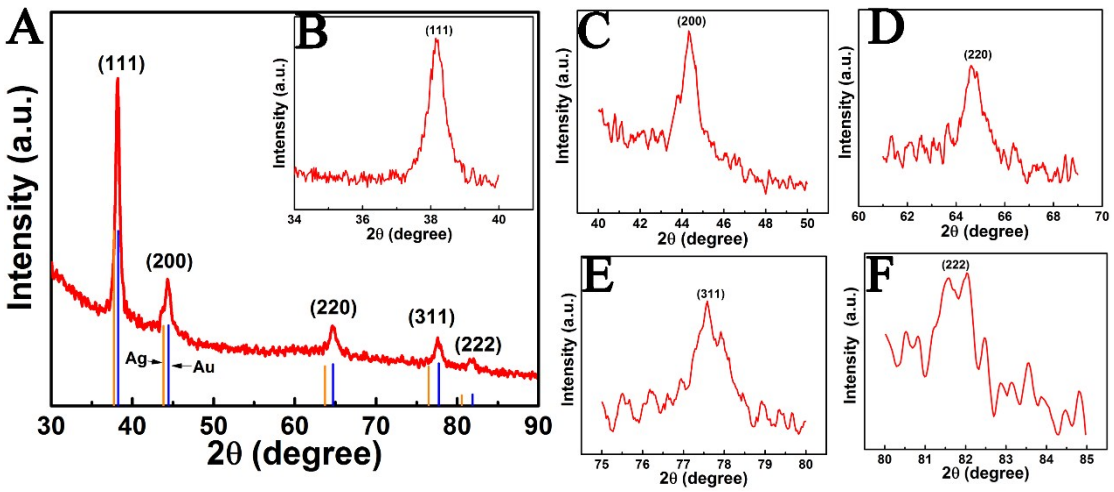

Fig. S5 XRD patterns of AuAg@Au (A), the standard patterns of bulk Ag (orange) and Au (blue) and the magnification of the peaks assigned to the (111)(B), (200)(C), (220)(D), (311)(E) and (222)(F) planes.

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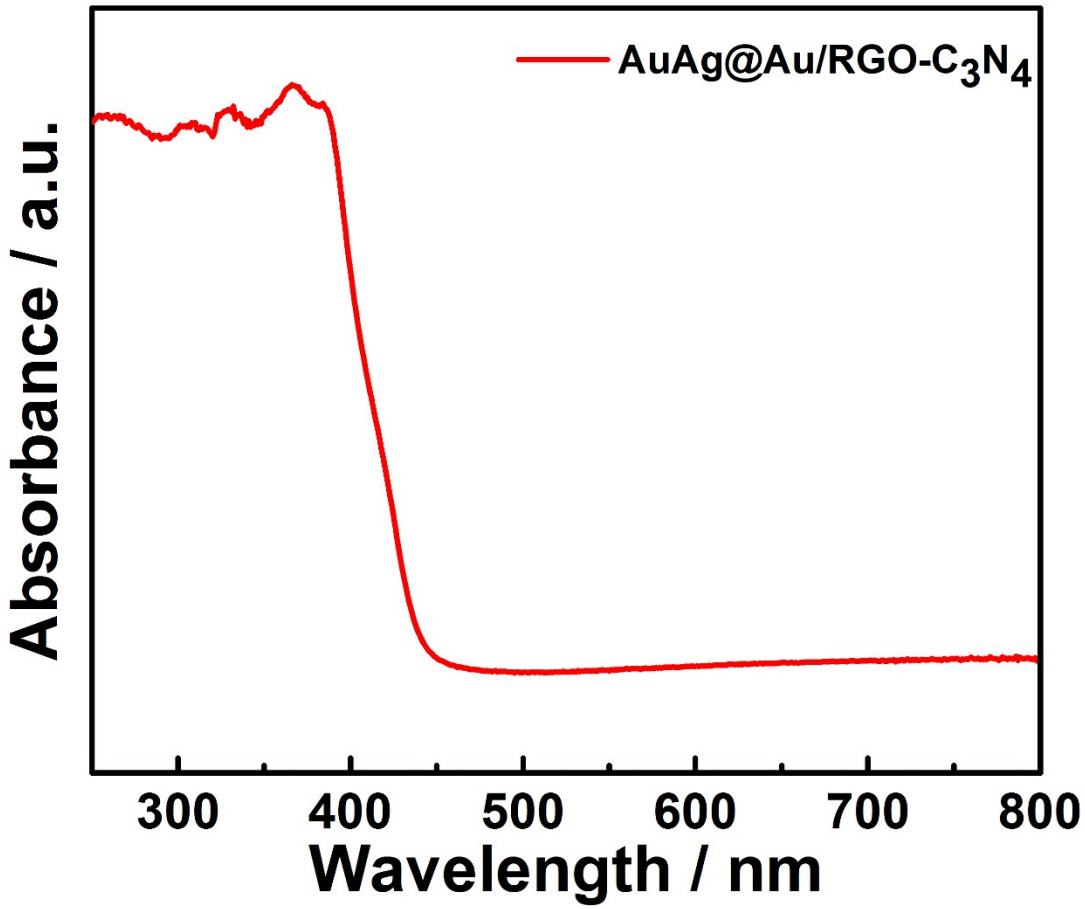

Fig. S6 UV−vis absorption spectra of AuAg@Au/C_3N_4-RGO nanocomposite.

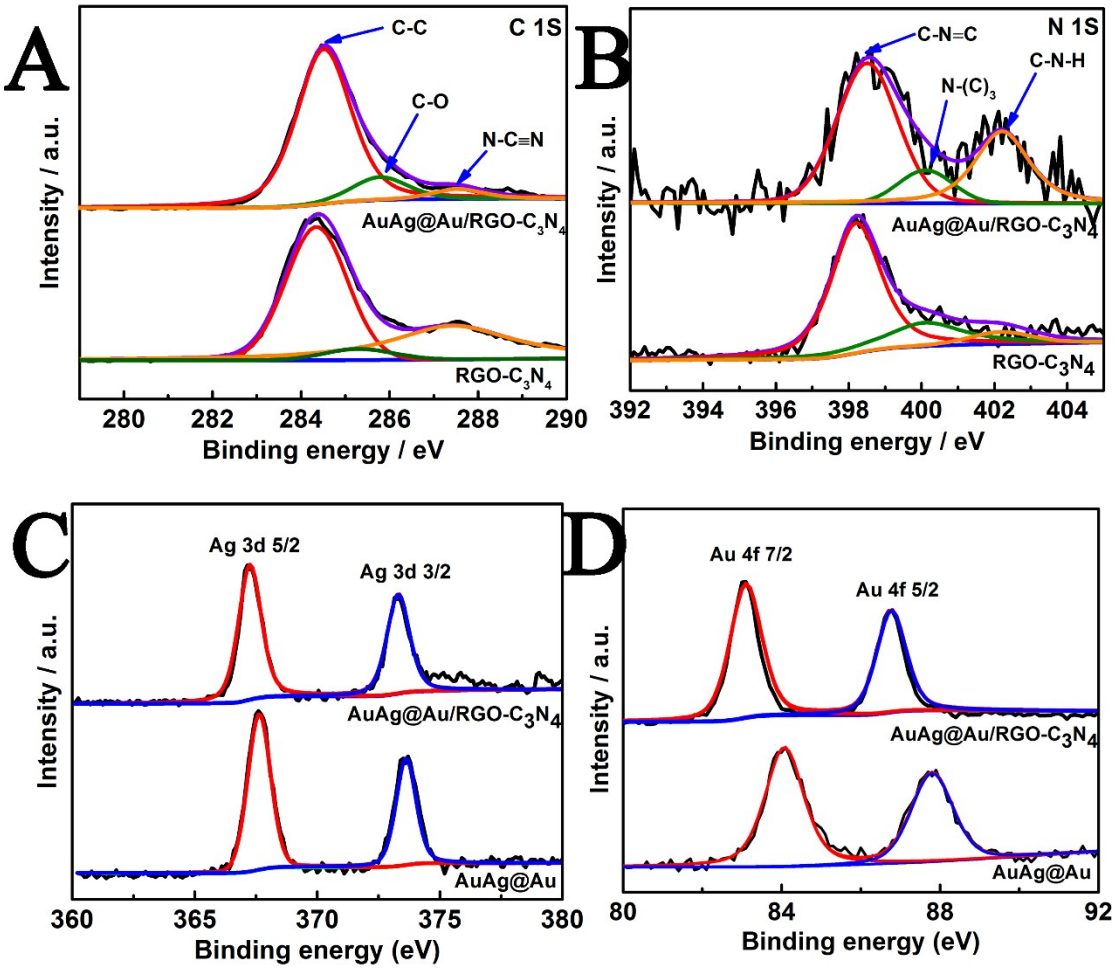

Fig. S7 1s (A) and N 1s (B) XPS spectra of AuAg@Au/RGO-C_3N_4 and RGO-C_3N_4. Ag 3d (C) and Au 4f (D) XPS spectra of AuAg@Au/RGO-C_3N_4 and AuAg@Au.

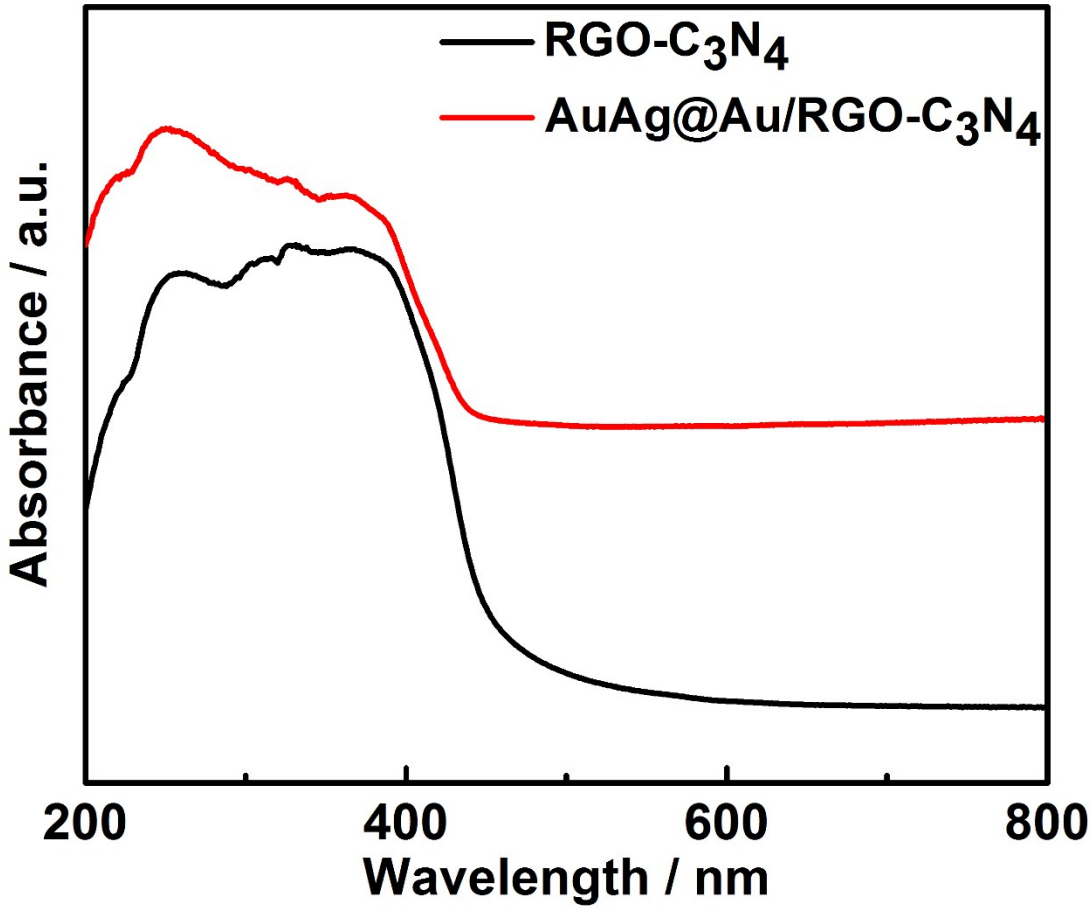

Fig. S8 UV–vis DRS of RGO-C_3N_4 and AuAg@Au/RGO-C_3N_4 samples.

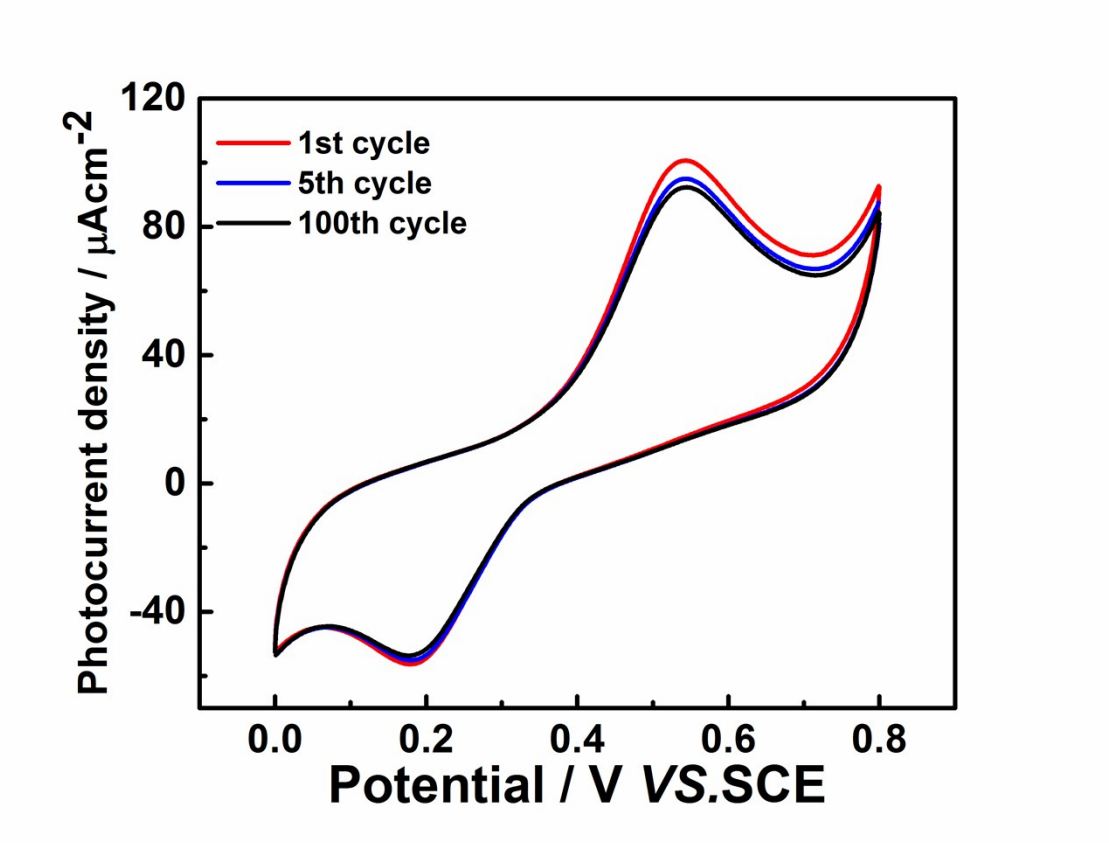

Fig. S9 The 1st 5th and 100th CV curves of the AuAg@Au/C_3N_4-RGO/GCE in 0.1 M PBS (pH = 4.0) solution containing 0.1 mM DA, scan rate: 0.05 V s^{-1}.

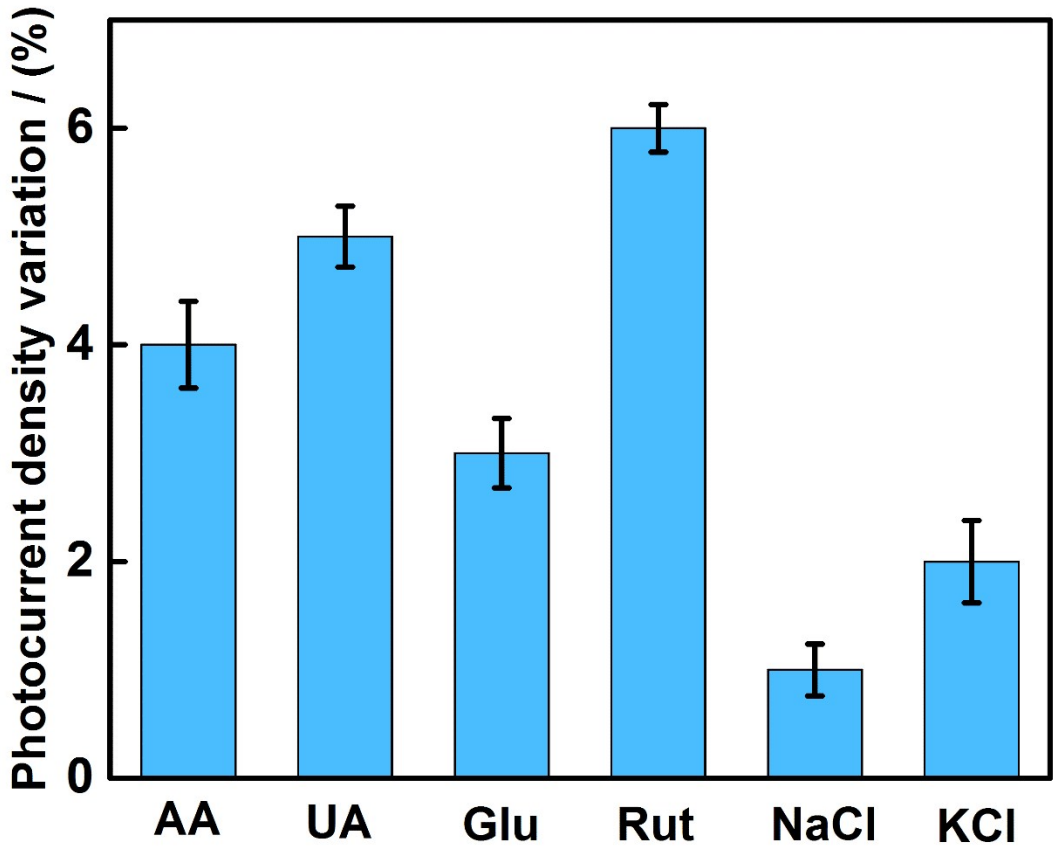

Fig. S10 Peak current intensity variations of foreign species on the photo-electrochemical response of AuAg@Au/C_3N_4-RGO/GCE to DA.

Table S1. C1s, N1s, Au 4d and Ag 3d XPS fitting results for the AuAg@Au/RGO-C_3N_4 AuAg@Au and RGO-C_3N_4 samples.

Sample	Au/eV		Ag/eV		C1S/eV			N1S/eV		
	$4f_{5/2}$	$4f_{7/2}$	$3d_{3/2}$	$3d_{5/2}$	N-C=N	C-O	C-C	C=N-C	$N-(C)_3$	C-N-H
RGO- C_3N_4	-	-	-	-	287.6	285.3	284.3	402.2	400.1	398.2
AuAg@Au	87.9	84.1	373.7	367.5	-	-	-	-	-	-
AuAg@Au/RGO-C_3N_4	86.8	83.2	373.3	367.2	288.1	285.8	284.5	402.2	400.1	398.5

Table S2 Comparisons of analytical performance of different electrodes for determination of DA.

Electrodes	Technique	Linear range (μM)	Detection limit (μM)	Reference
GEF/CFE	Electrochemical method	0.7-45.21	0.5	1
Pt/RGO/MnO_2/GCE	Electrochemical method	1.5-215.56	0.1	52
$(P_2W_{16}V_2$-AuPd/PEI$)_8$	Electrochemical method	1-200	0.83	53
Pd/CNF-CPE	Electrochemical method	0.5-160	0.2	54
Pd-NP/CPE	Electrochemical method	0.1-151	0.03	55
AuAg@Au/C_3N_4-RGO/GCE	Photo-electrochemical method	0.064-780.90	0.022	This work

Table S3 Determination of DA levels in real samples using the AuAg@Au/C_3N_4-RGO/GCE in 0.1 M PBS (pH = 4.0)

Serum samples	1	2	3	4	5
Original (μM)	20	40	60	80	100
Added (μM)	5	5	5	5	5
Found (μM)	25.24	44.81	64.79	85.34	105.41
Recovery (%)	104.8	96.2	95.8	106.8	108.2
RSD (%)	2.4	1.9	2.1	2.2	1.7