Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information of
Dicoumarol assisted synthesis of water dispersible gold nanoparticles for colorimetric sensing of cysteine and lysozyme in biofluids

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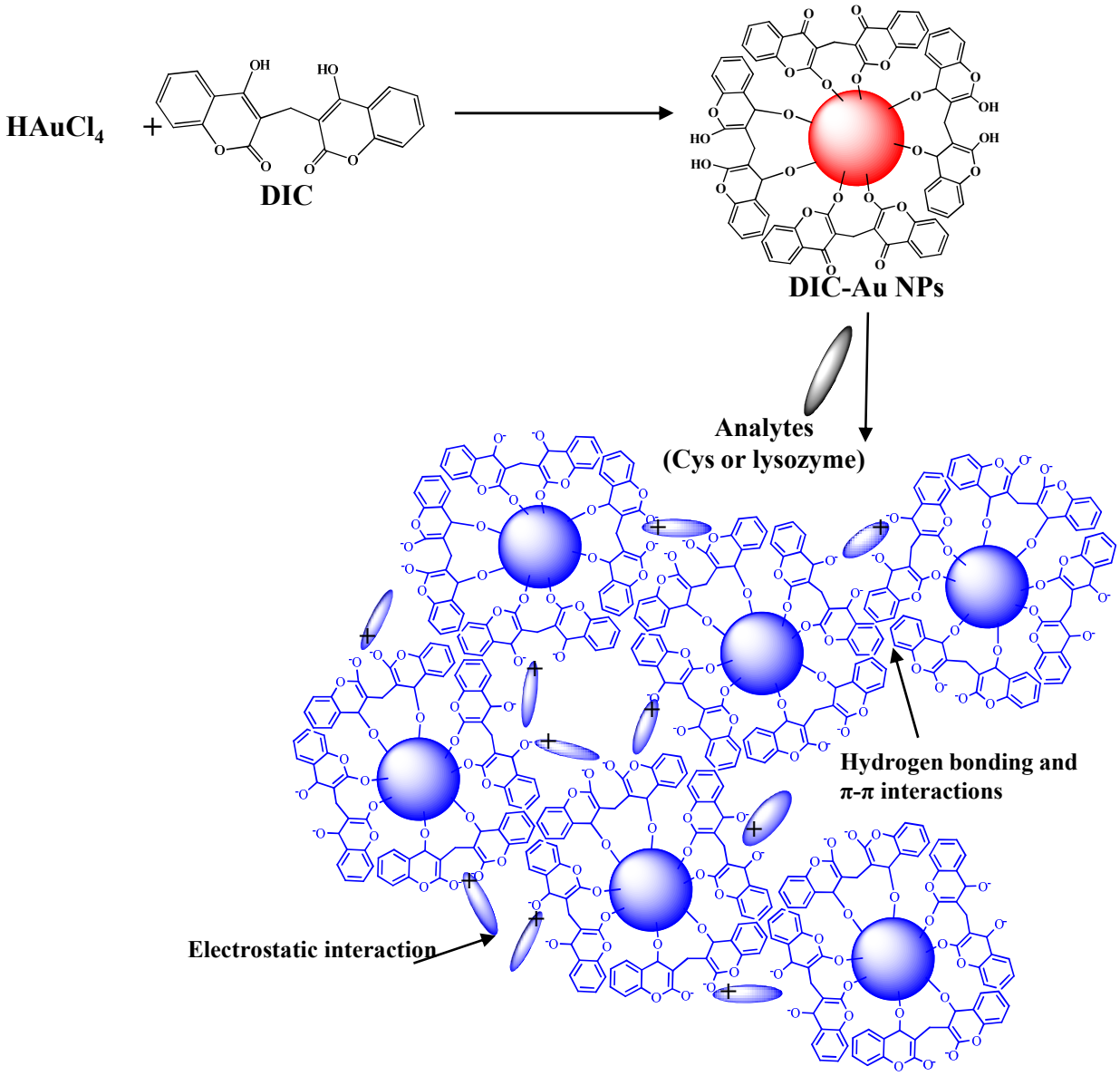

Scheme S1. A schematic representation of the mechanism for the colorimetric sensing Cys and Lys using DIC-Au NPs as a probe.

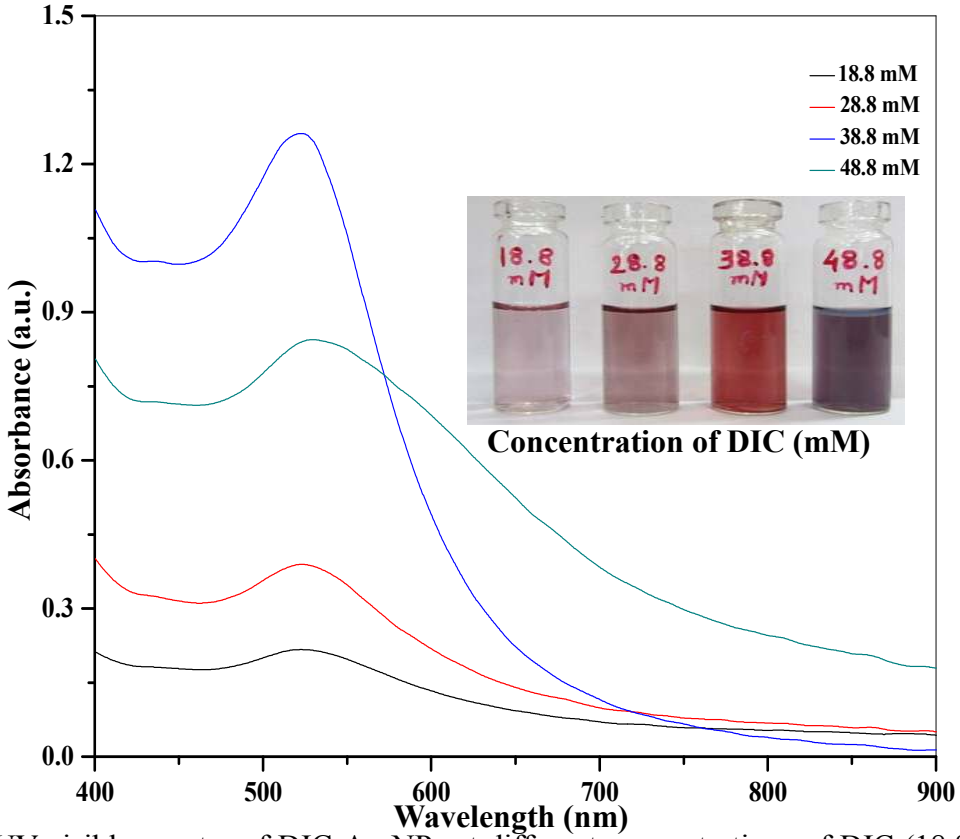

Figure S1. UV-visible spectra of DIC-Au NPs at different concentrations of DIC (18.8 – 48.8 mM). Inset: Photographic image of corresponding solutions.

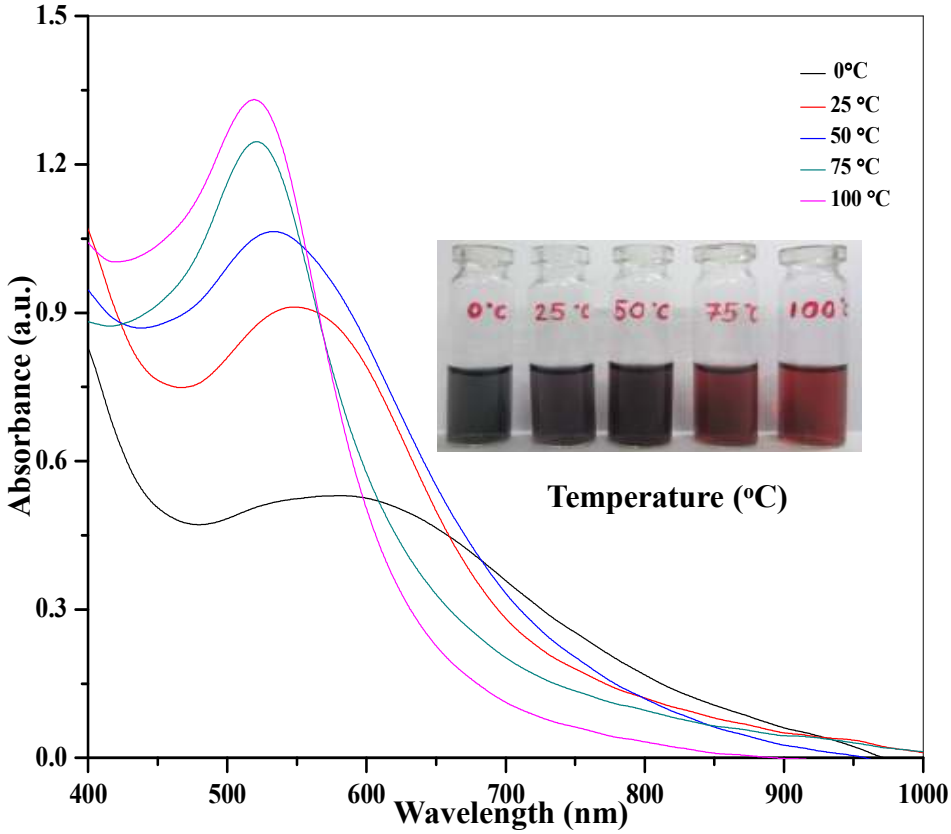

Figure S2. UV-visible spectra of DIC-Au NPs at different temperature (0 – 100°C). Inset: Photographic image of DIC-Au NPs at different temperature.

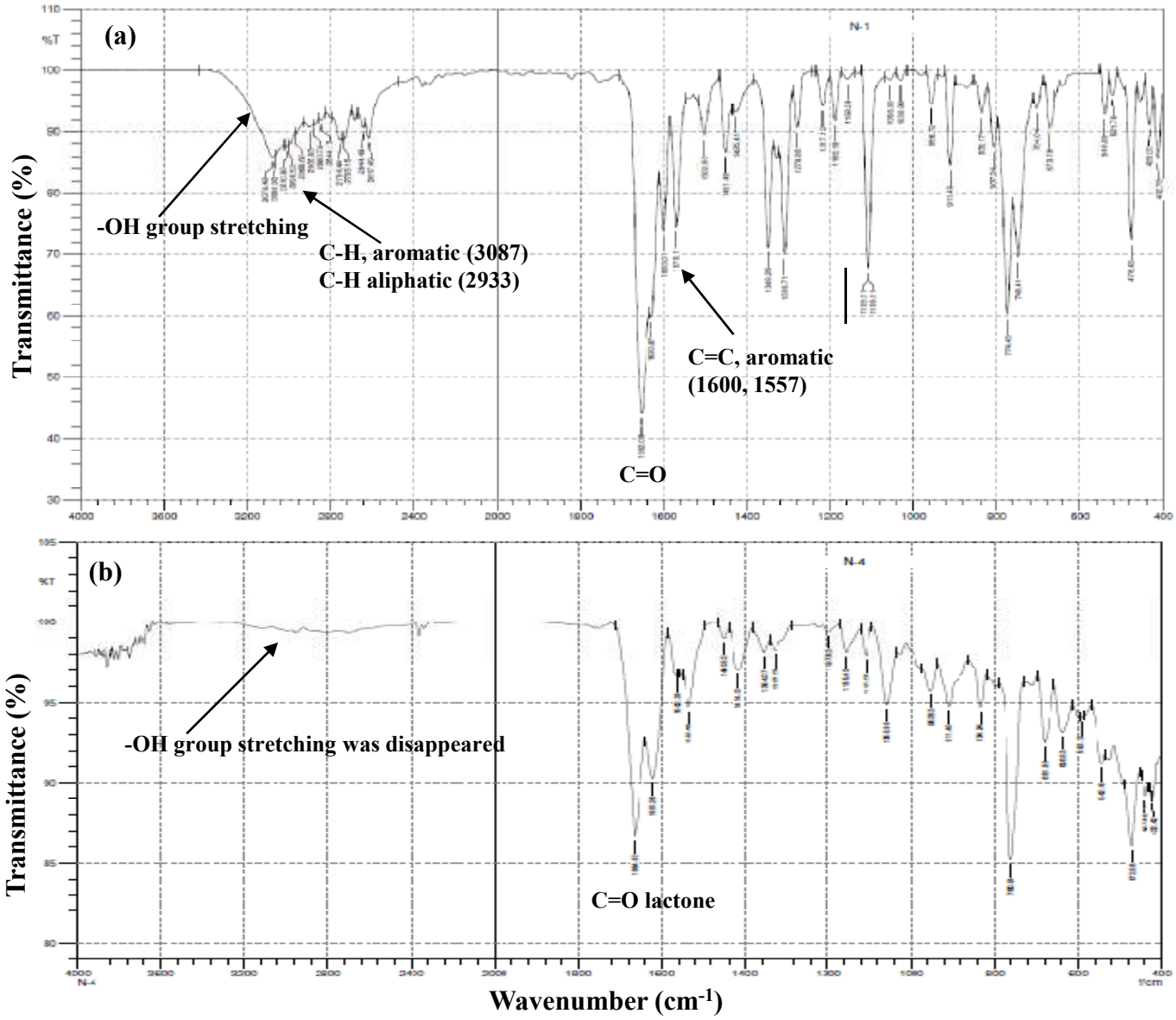

Figure S3. FT-IR spectra of (a) pure DIC and (b) DIC-Au NPs.

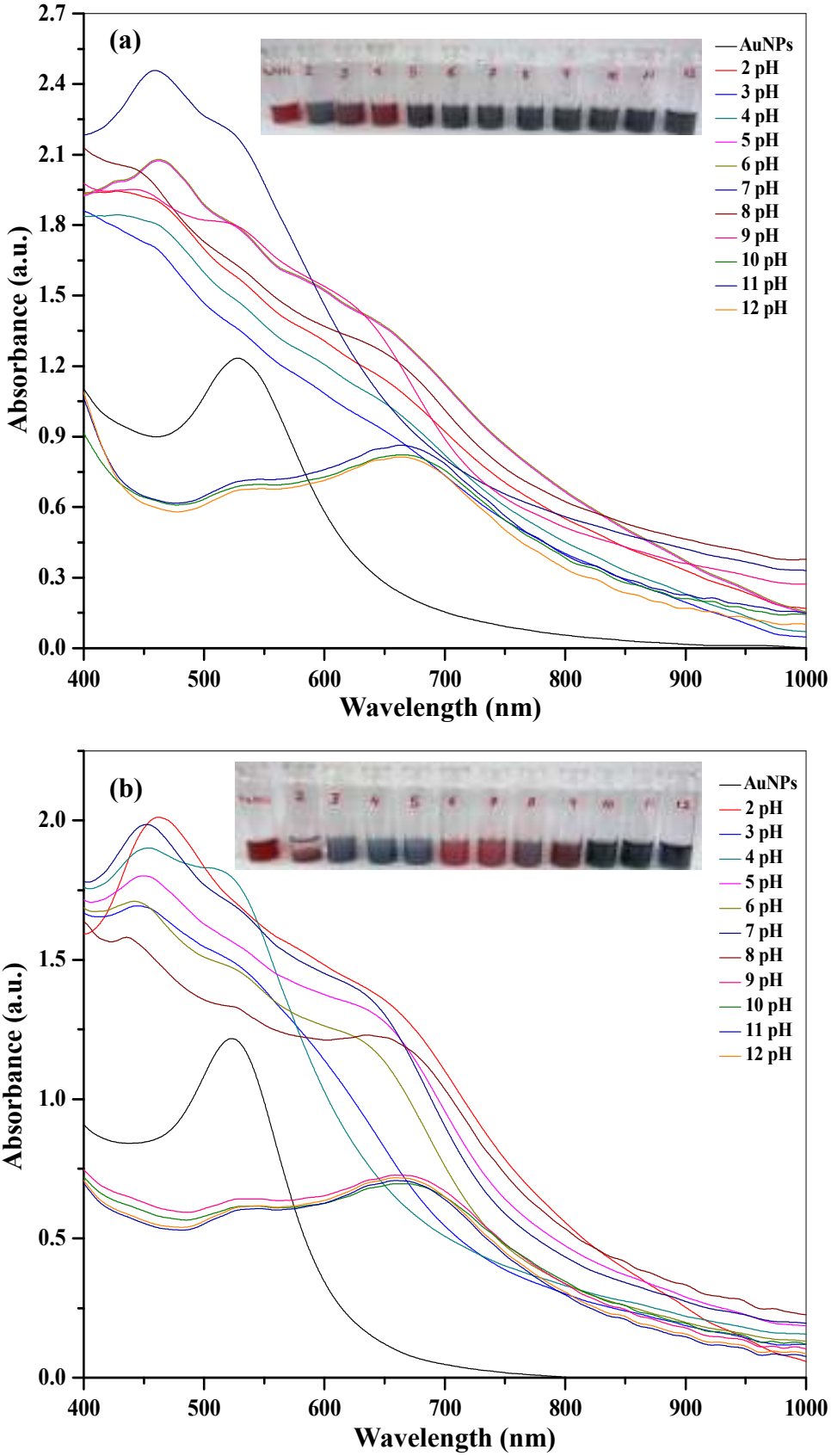

Figure S4. (a) UV-visible spectra of DIC-Au NPs in the presence of Cys (1 mM) at ammonium acetate pHs from 2.0 to 12.0. Inset: Photographic image of corresponding solutions. (b) UV-visible spectra of DIC-Au NPs in the presence of Cys (1 mM) at PBS pHs from 2.0 to 12.0. Inset: Photographic image of corresponding solutions.

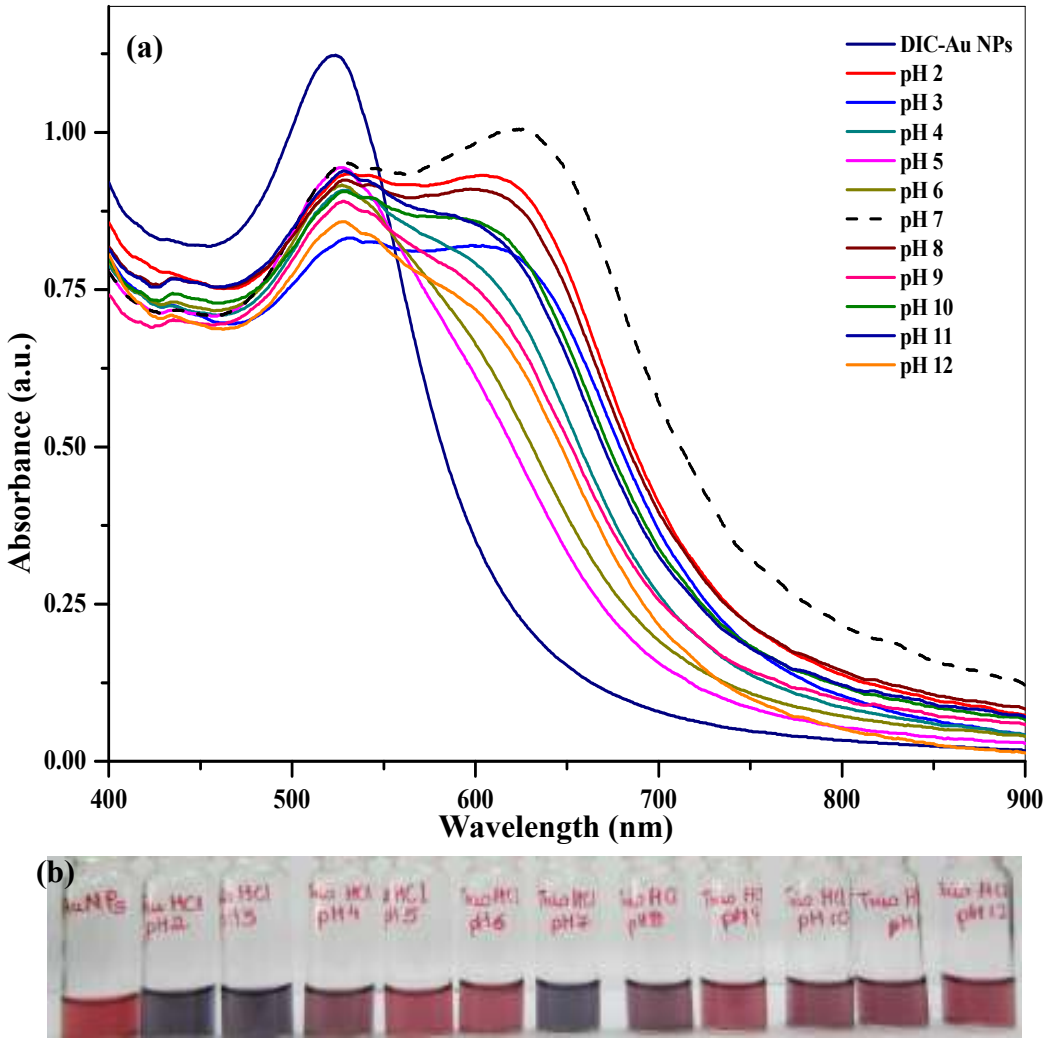

Figure S5. (a) UV-visible spectra of DIC-Au NPs in the presence of Cys (1 mM) at Tris-HCl pHs from 2.0- to 12.0. (b) Photographic image of corresponding solutions.

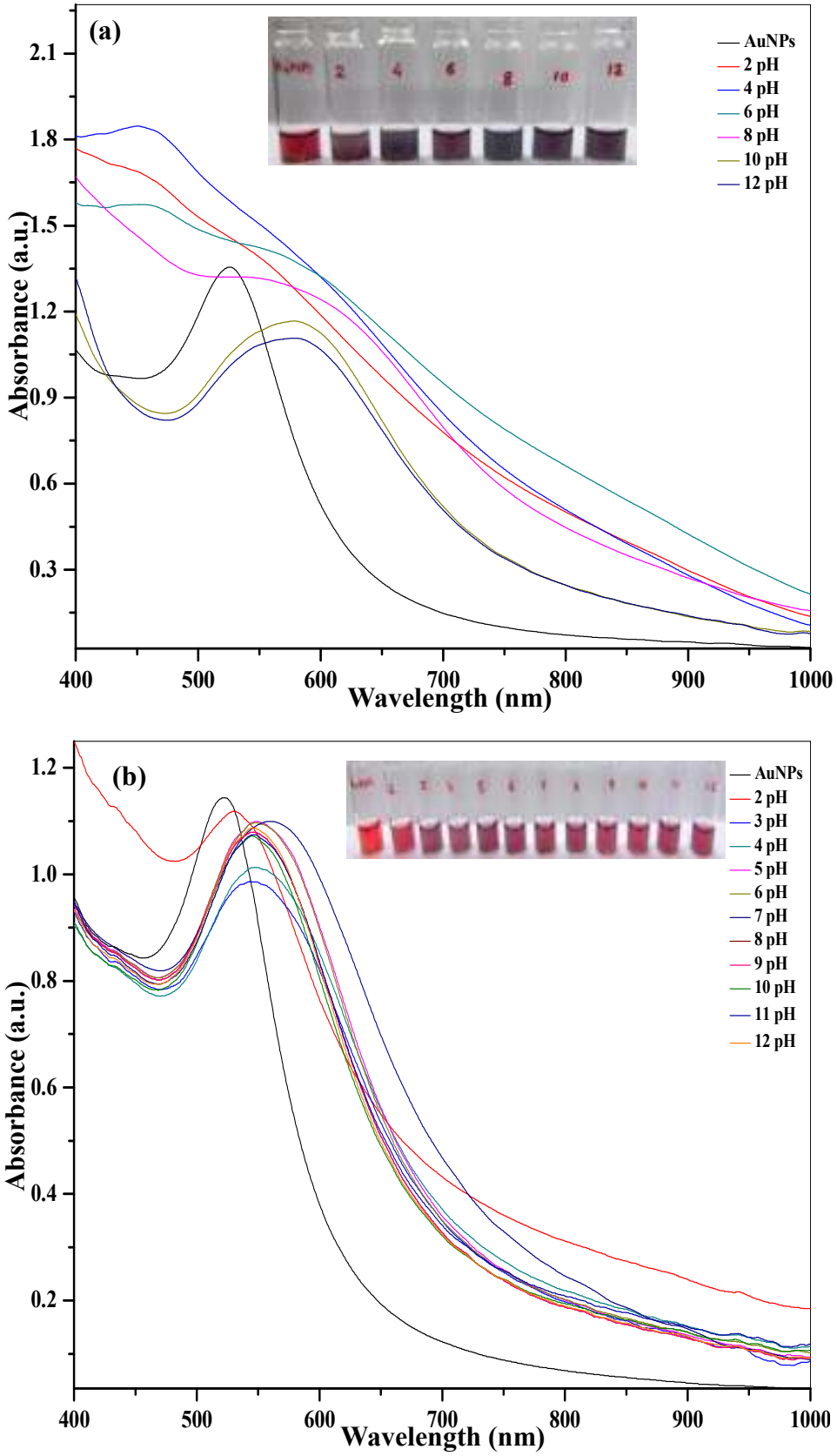

Figure S6. (a) UV-visible spectra of DIC-Au NPs in the presence of Lys (50 µM) at ammonium acetate pHs from 2.0 to 12.0. Inset: Photographic image of corresponding solutions. (b) UV-visible spectra of DIC-Au NPs in the presence of Lys 50 µM) at PBS pHs from 2.0 to 12.0. (c) Photographic image of corresponding solutions.

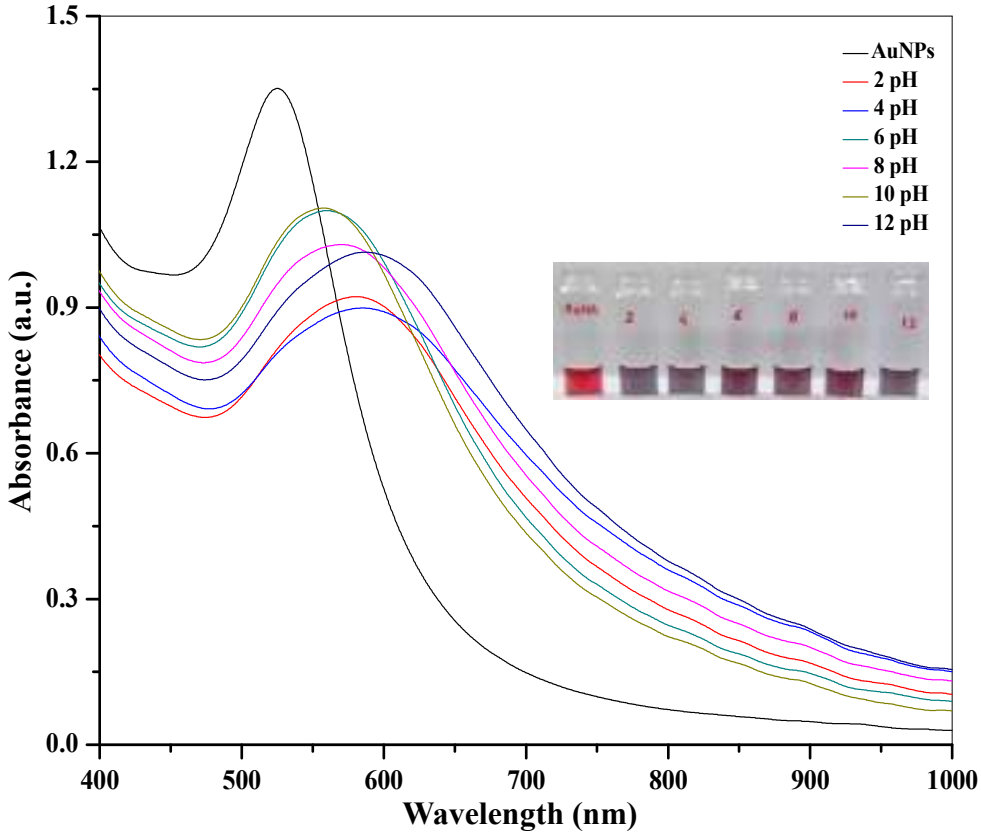

Figure S7. UV-visible spectra of DIC-Au NPs in the presence of Lys (50 μM) at Tris-HCl pH from 2.0 to 12.0. Inset: Photographic image of corresponding solutions.

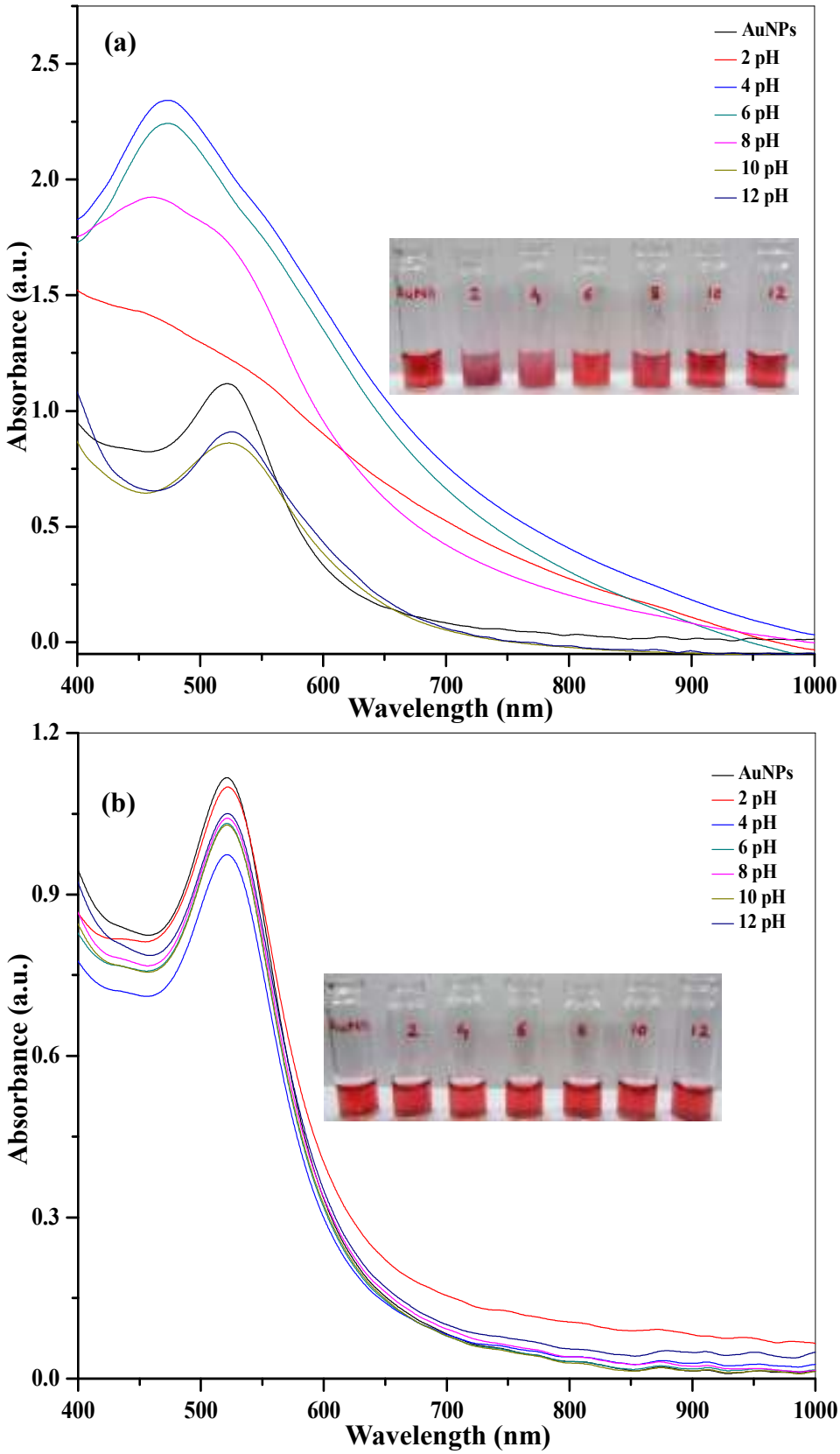

Figure S8. **(a)** UV-visible spectra of DIC-Au NPs in the presence of ammonium acetate buffer in pH range from 2.0 to 12.0 without anlytes. Inset: Photograph of corresponding solutions. (b) UV-visible spectra of DIC-Au NPs in the presence of PBS in pH range from 2.0 to 12.0. Inset: Photograph of corresponding solutions.

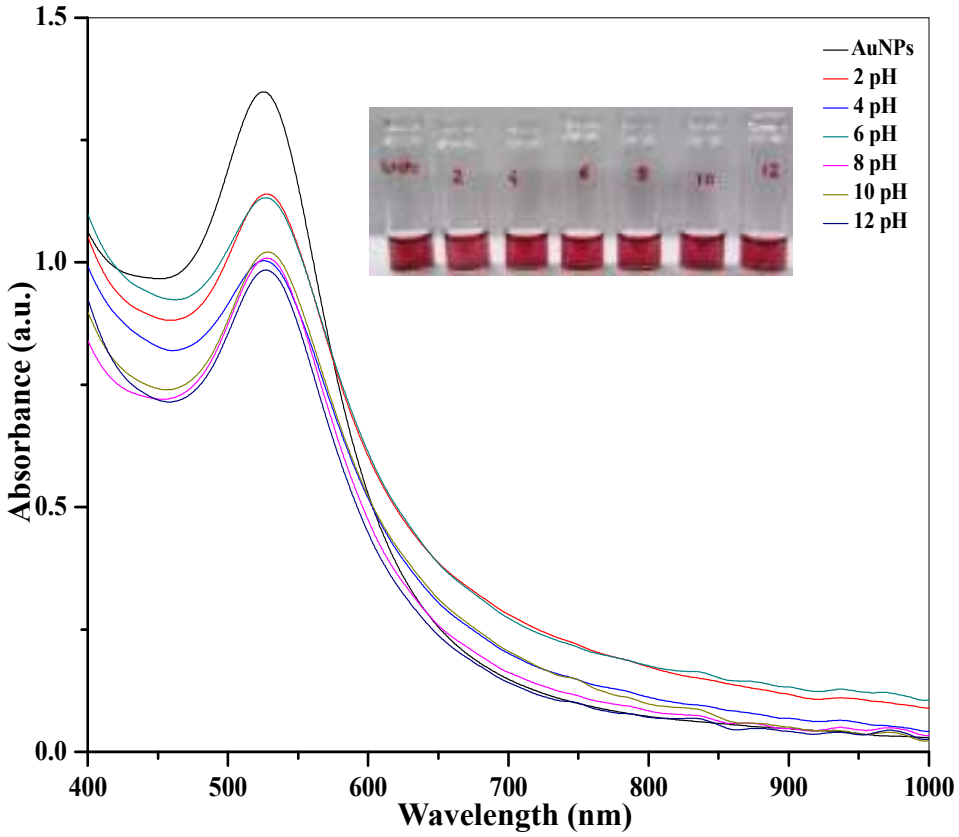

Figure S9. UV-visible spectra of DIC-Au NPs in the presence of Tris-HCl buffer in pH range from 2.0 to 12.0 without anlytes. Inset: Photograph of corresponding solutions.

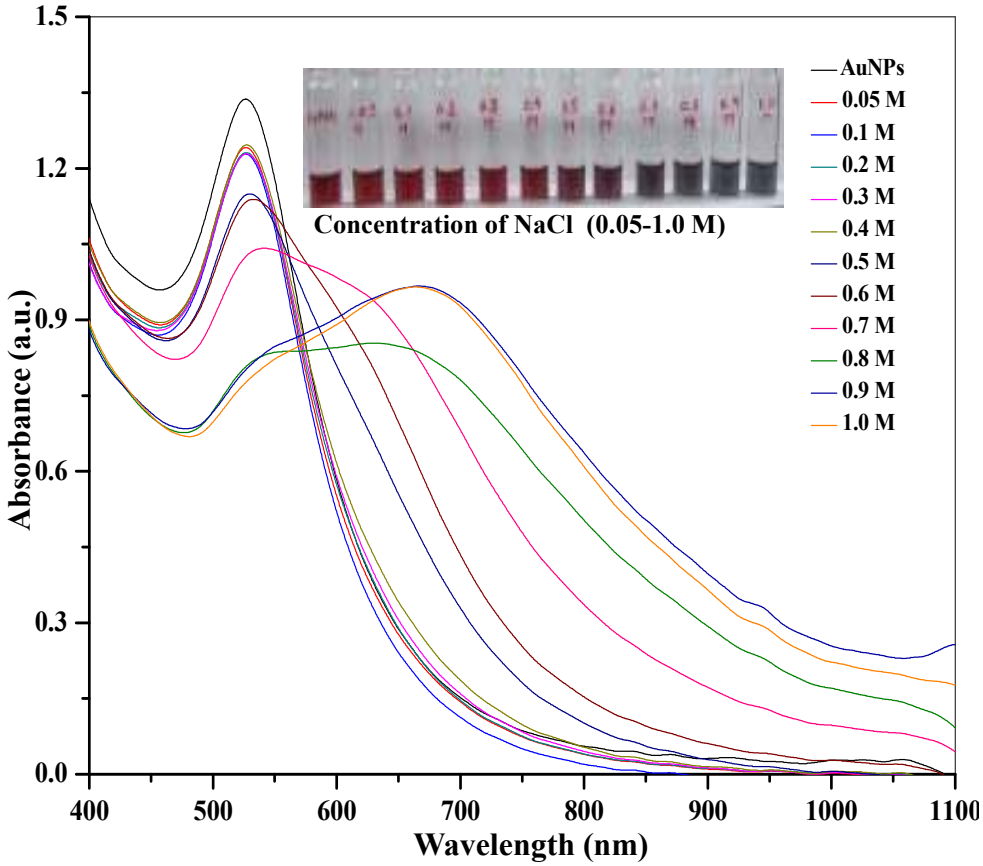

Figure S10. UV-visible spectra of DIC-Au NPs by the addition of NaCl from 0.05 to 1.0 M without target analytes. Inset images are the corresponding photographs of Au NPs color.

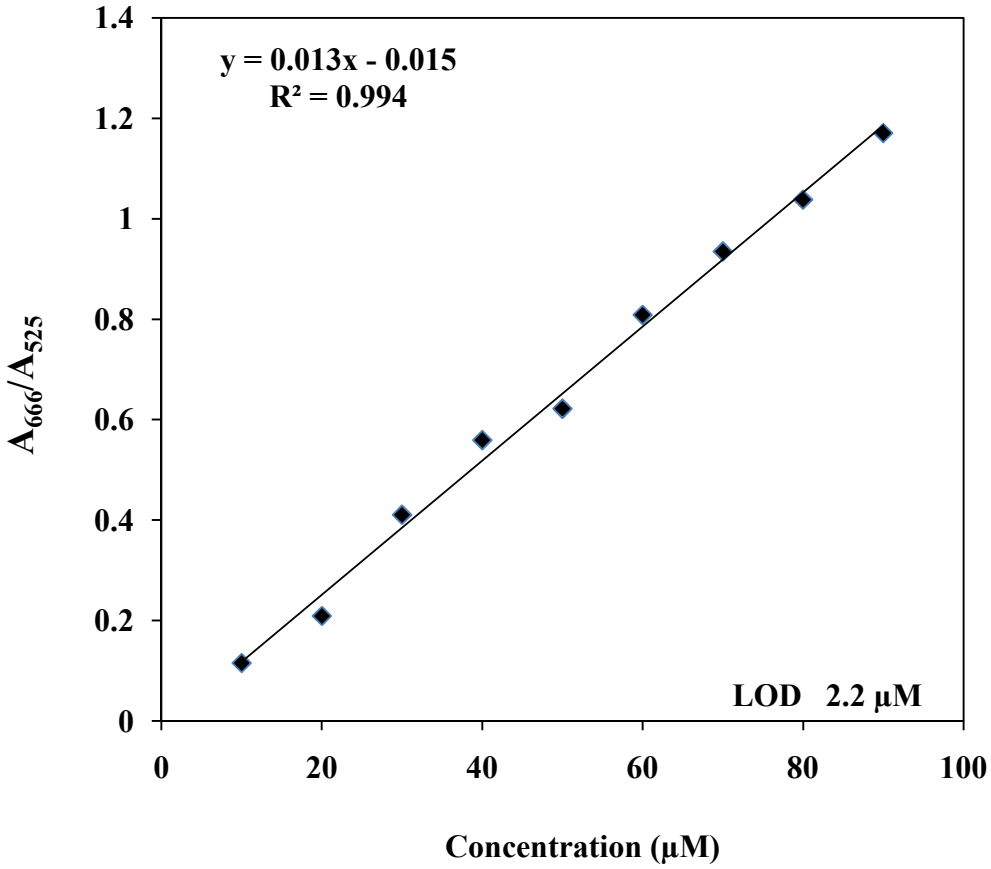

Figure S11. Calibration graph for the detection of Cys in the concentration range of 10-90 µM using DIC-Au NPs as a probe at absorption ratio at A_{666}/A_{525} *versus* Cys concentration.

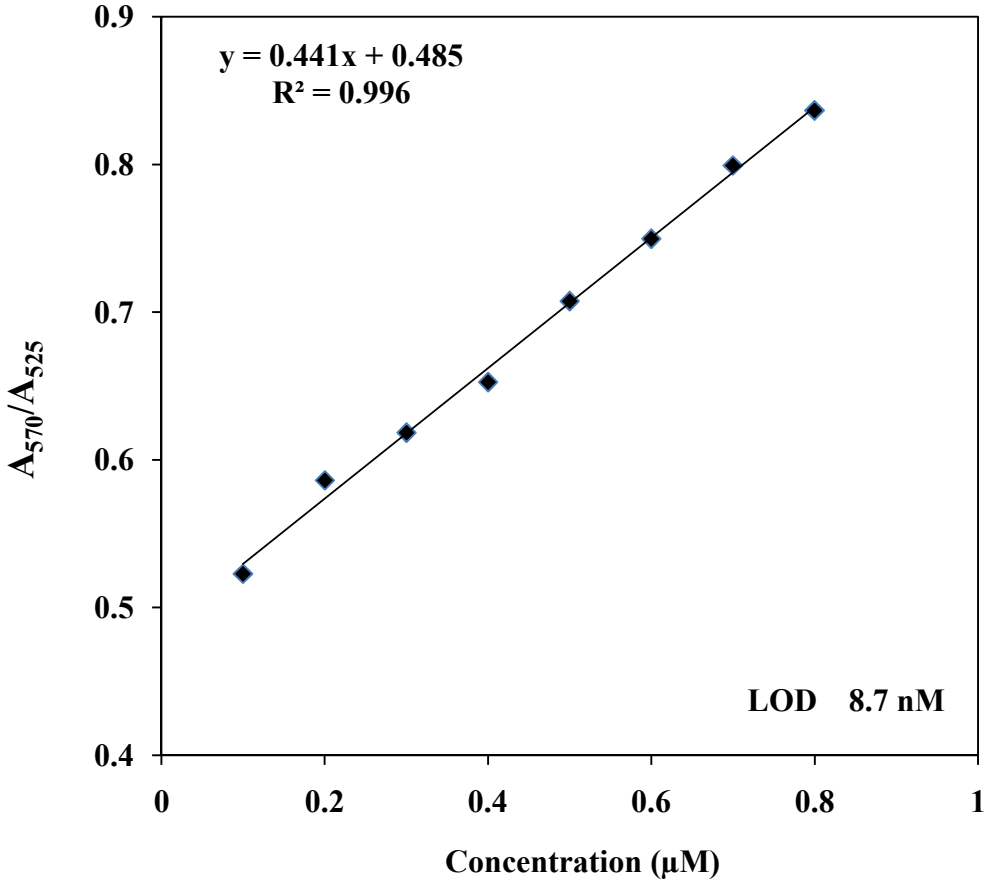

Figure S12. Calibration graph for the detection of Lys in the concentration range of 100-800 nM using DIC-Au NPs as a probe at absorption ratio at A_{570}/A_{525} *versus* Lys concentration.

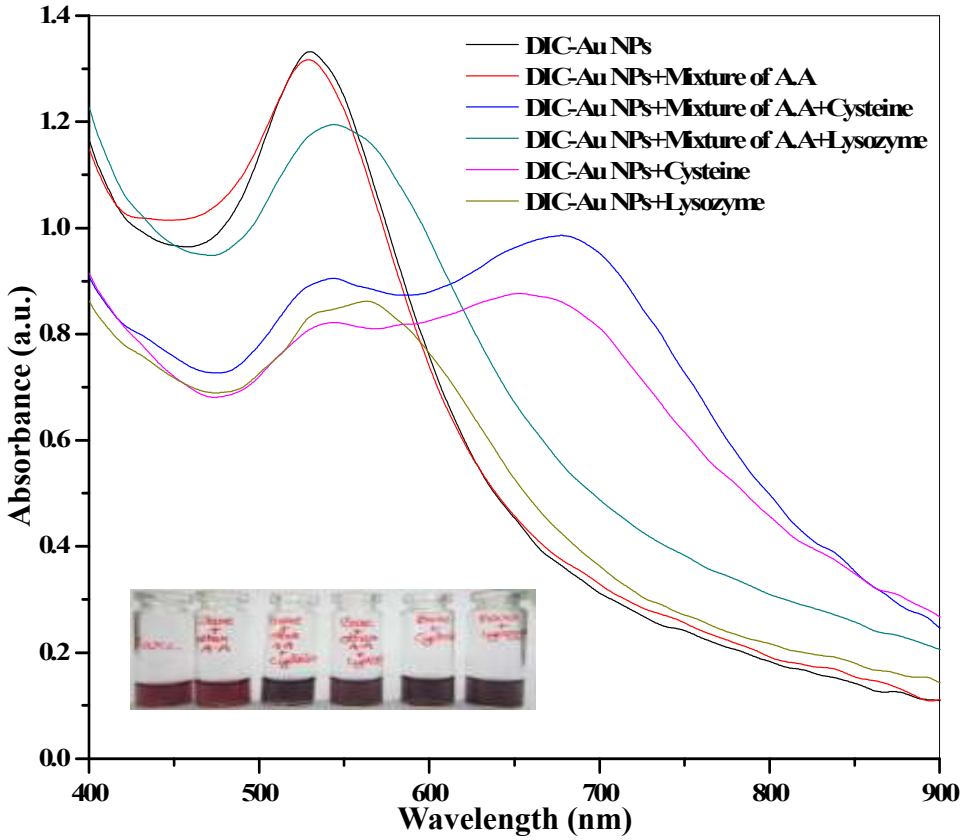

Figure S13. UV-visible absorbance spectra of DIC-Au NPs in the presence of various aminoacids (phenyl alanine, histidine, 4-hydroxyproline, proline, trypophan, tyrosine, alanine, isoleucine, aspargine, aspartic acid, methonine, lysine, serine and leucine, 1 mM) for detection of Cys and Lys. Inset: the corresponding photographic image.

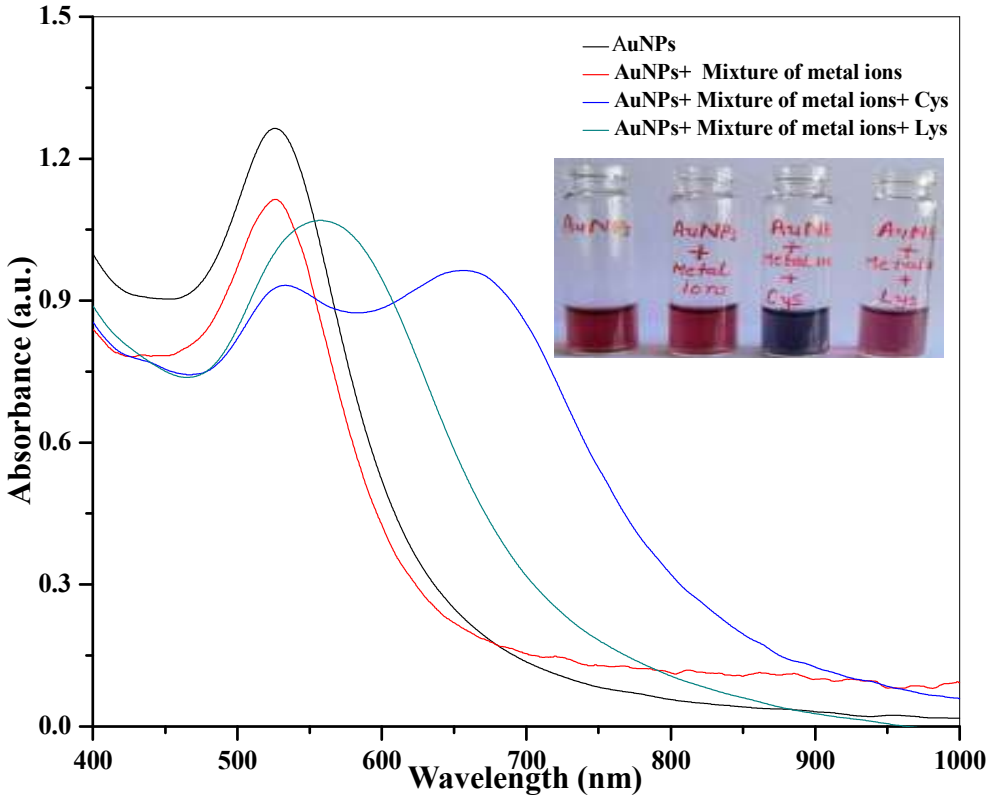

Figure S14. UV-visible absorbance spectra of DIC-Au NPs in the presence of Cys and Lys upon addition of various metal ions (Na^{+}, K^{+}, Br^{2+}, Ca^{2+},Cu^{2+}, Zn^{2+}, Ni^{2+}, Fe^{2+}, Fe^{3+} and Al^{3+}, 1.0 mM). Inset: the corresponding photographic image.

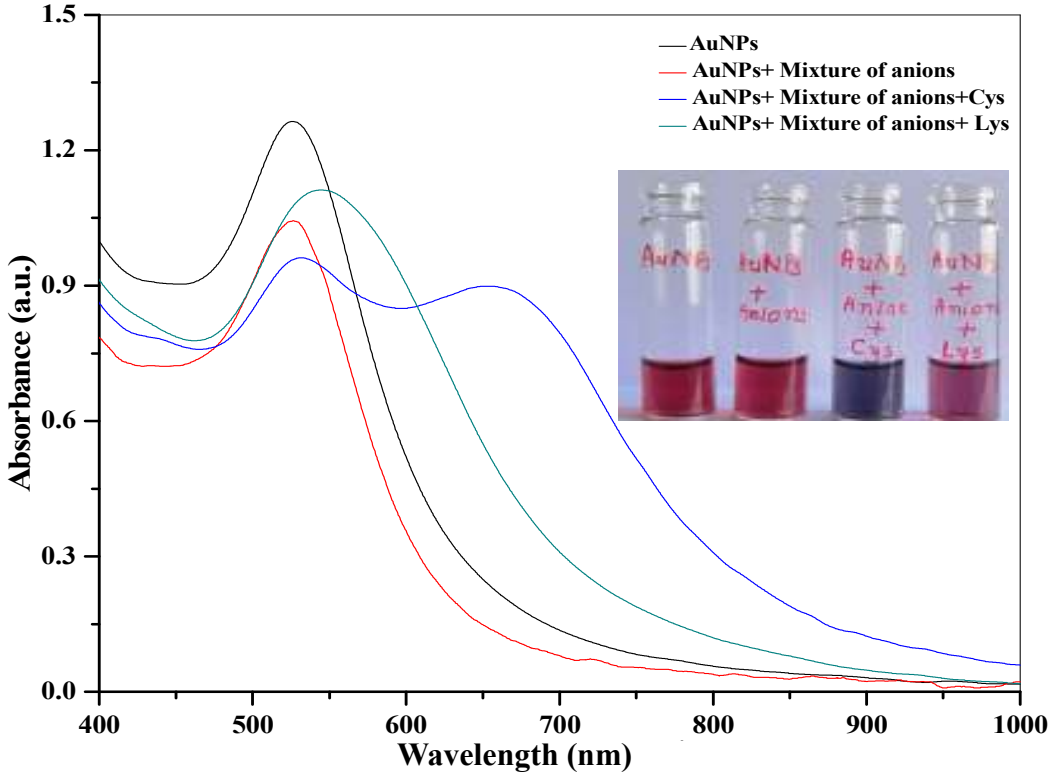

Figure S15. UV-visible absorbance spectra of DIC-Au NPs in the presence of Cys and Lys upon addition of various anions (Cl^{-}, Br^{-}, I^{-} , F^{-} , SO_4^{2-} ,S^{2-} , PO_4^{3-} and $Cr_2O_7^{2-}$, 1.0 mM). Inset: the corresponding photographic image.

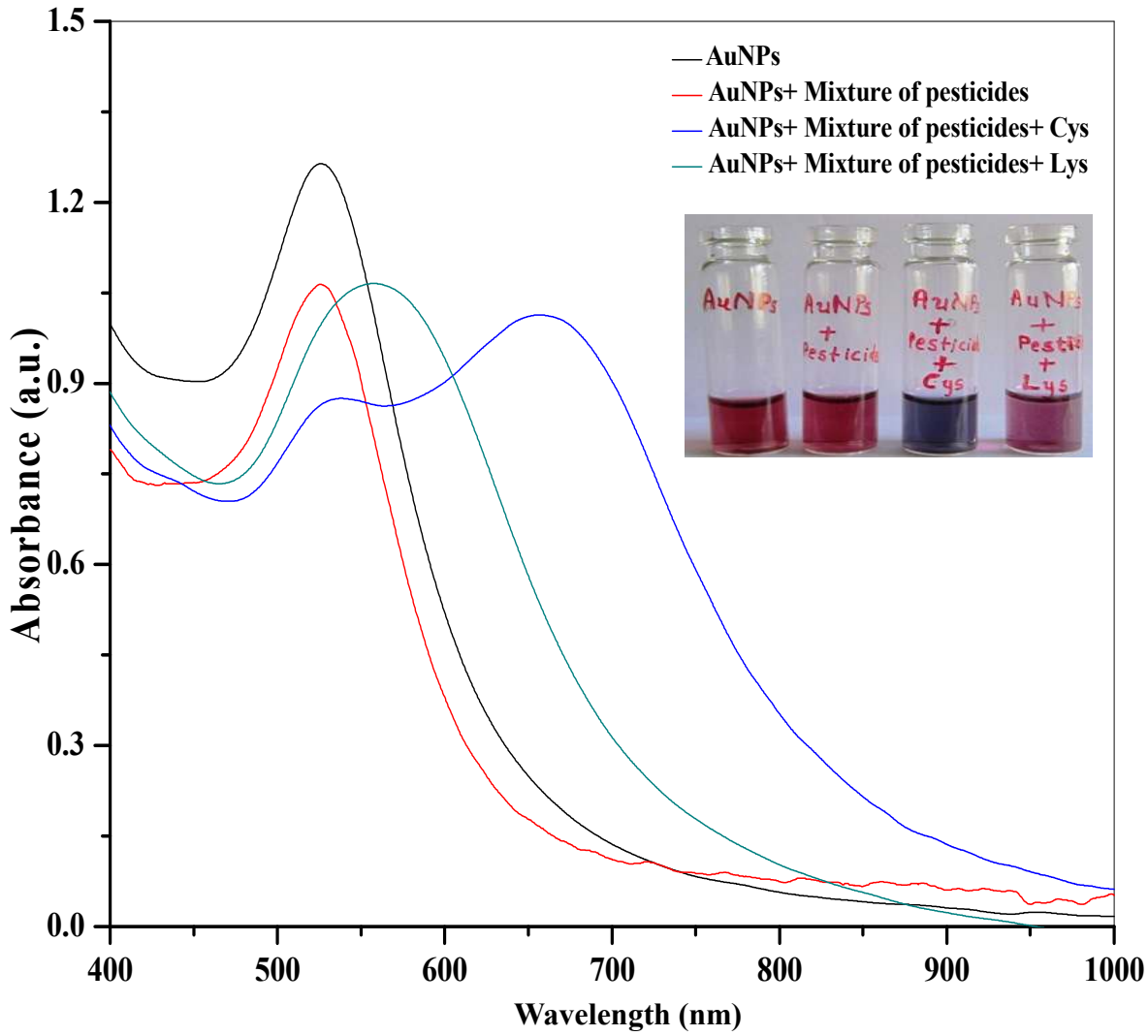

Figure S16. UV-visible absorbance spectra of DIC-Au NPs in the presence of Cys and Lys upon addition of various pesticides (chlorpyrifos, quinalphos, hexaconazole, tricyclazole, acephate, metsulfuron, isoproturon, and chlopropham, 1.0 mM). Inset: the corresponding photographic image.

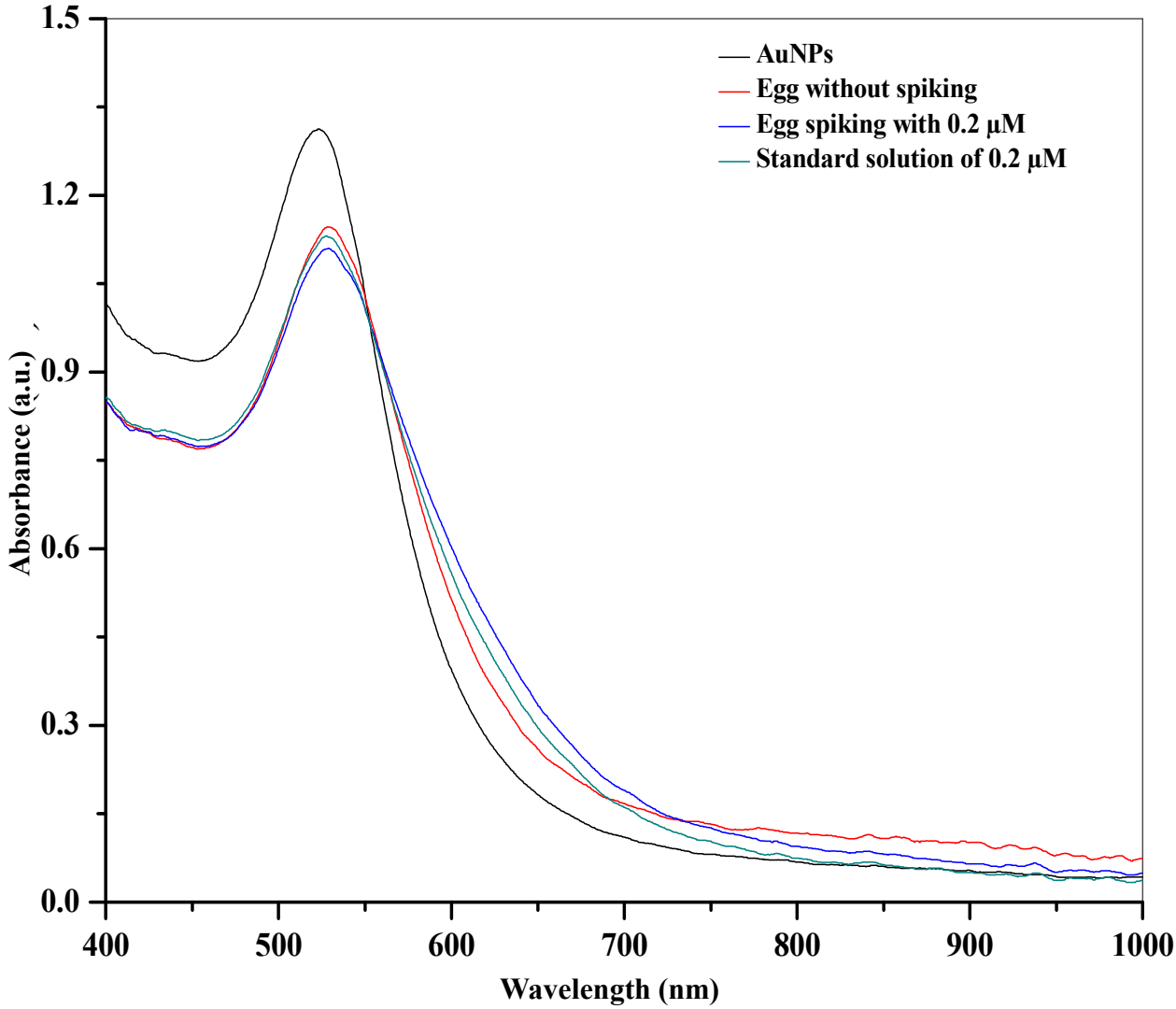

Figure S17. UV-visible spectral variations of DIC-Au NPs in egg white (without spiking of Lys), and with spiking 0.2 µM of Lys and the spectrum of DIC-Au NPs in the presence of standard Lys at PBS pH 7.

Table S1. Analysis of Cys and Lys in biological samples using DIC-Au NPs as a probe.

Sample	Cys				Lys			
	Added[a]	Found[a]	Recovery (%)[b]	RSD	Added[a]	Found[a]	Recovery (%)[b]	RSD
Urine 1	40	39.8	99.5	0.28	0.2	0.21	104.8	2.2
	60	59.9	99.8	0.18	0.5	0.52	104.0	2.9
	80	78.0	97.5	1.82	0.8	0.81	102.2	2.2
Urine 2	40	39.1	97.8	0.12	0.2	0.19	98.6	2.7
	60	57.6	96.0	0.38	0.5	0.51	101.0	2.1
	80	77.8	97.3	0.98	0.8	0.81	100.8	1.6
Urine 3	40	41.2	103.2	0.23	0.2	0.20	101.3	0.7
	60	63.7	106.2	0.18	0.5	0.49	99.4	1.1
	80	85.2	106.5	0.42	0.8	0.81	101.3	1.3
Plasma 1	40	42.2	105.7	0.45	0.2	0.19	97.2	0.3
	60	65.0	108.3	0.14	0.5	0.47	95.1	1.8
	80	85.8	107.2	1.79	0.8	0.75	94.3	1.8
Plasma 2	40	39.1	97.8	0.10	0.2	0.19	95.3	2.6
	60	58.9	98.3	0.11	0.5	0.49	98.9	1.3
	80	78.1	97.6	1.80	0.8	0.77	96.0	1.8
Plasma 3	40	39.1	97.7	0.44	0.2	0.21	102.0	0.9
	60	57.5	95.9	0.14	0.5	0.50	100.2	1.5
	80	77.3	96.6	0.93	0.8	0.79	99.15	2.3
Egg white	-	-	-	-	0.2	0.22	108.4	2.5
	-	-	-	-	0.5	0.55	110.6	2.0
	-	-	-	-	0.8	0.86	108.5	2.6

[a]μM, [b]n=3