Electronic Supplementary Material (ESI) for RSC Advances.

Highly responsive glutathione functionalized green AuNP probe for precise colorimetric detection of Cd^{2+} contamination in the environment

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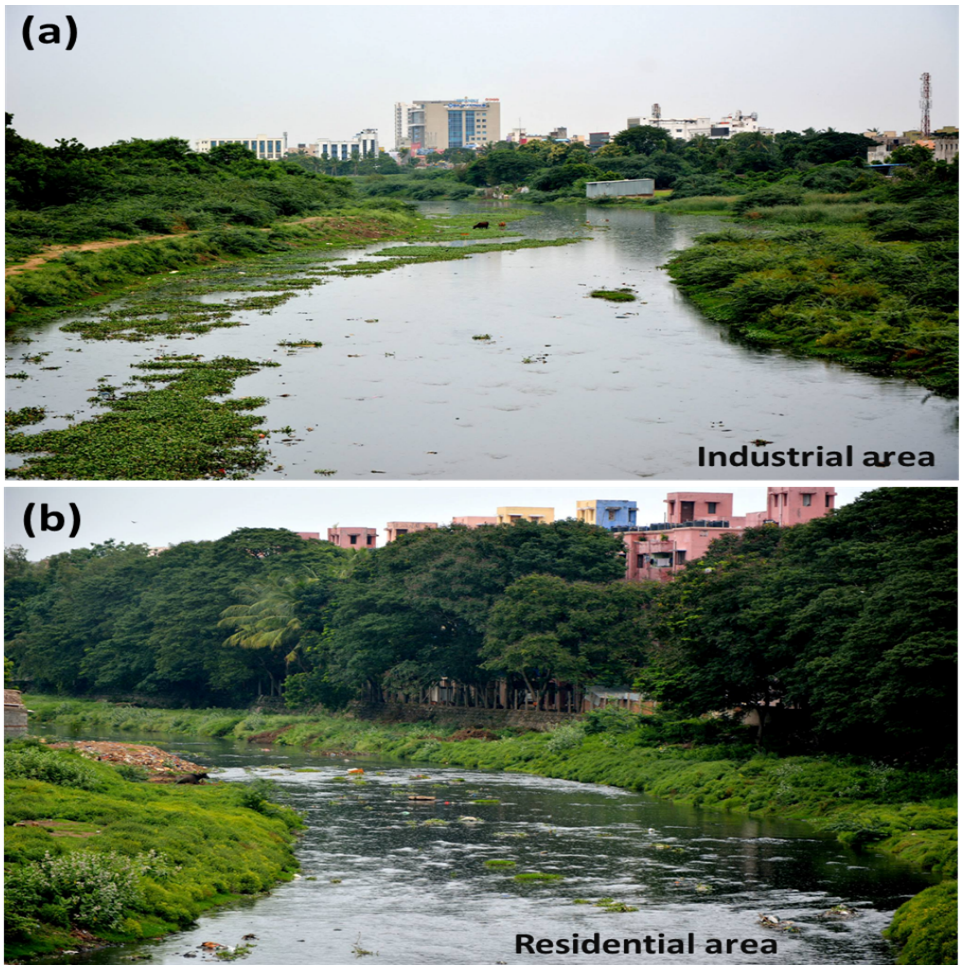

Fig. S1. (a) Photograph of Ranipet industrial area (b) Photograph of residential area in the vicinity.

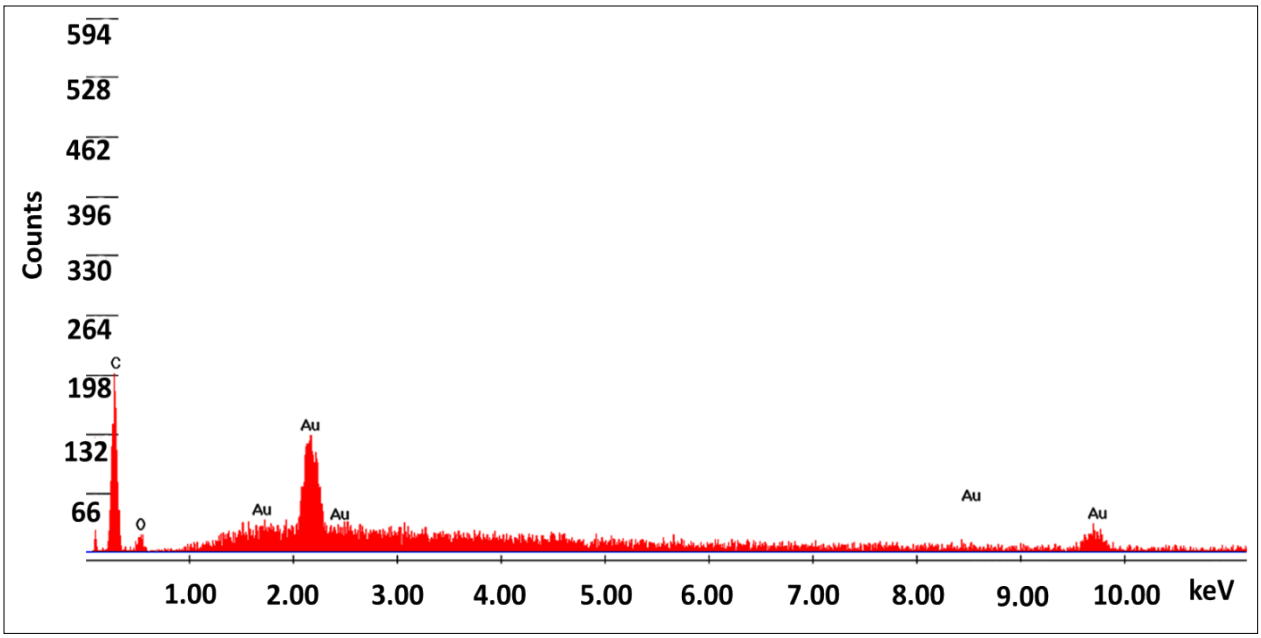

Fig. S2. EDAX spectrum of AuNPs.

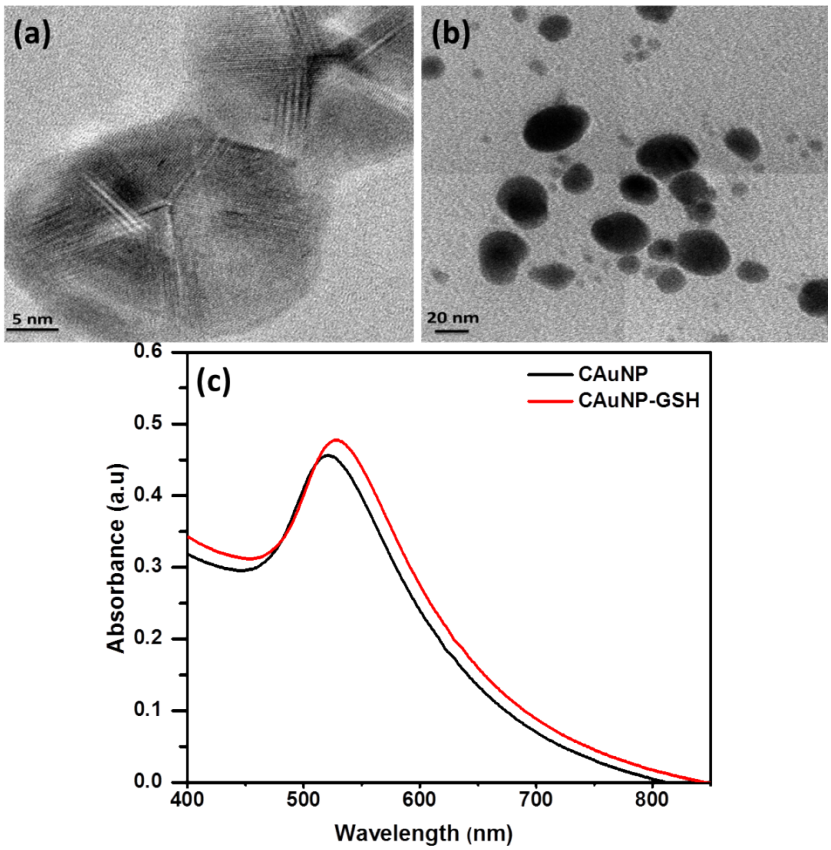

Fig. S3. (a) (b) HRTEM micrographs of the chemically synthesized AuNPs (c) UV-Vis absorption spectra of chemically synthesized AuNps (control) before and after functionalization with GSH

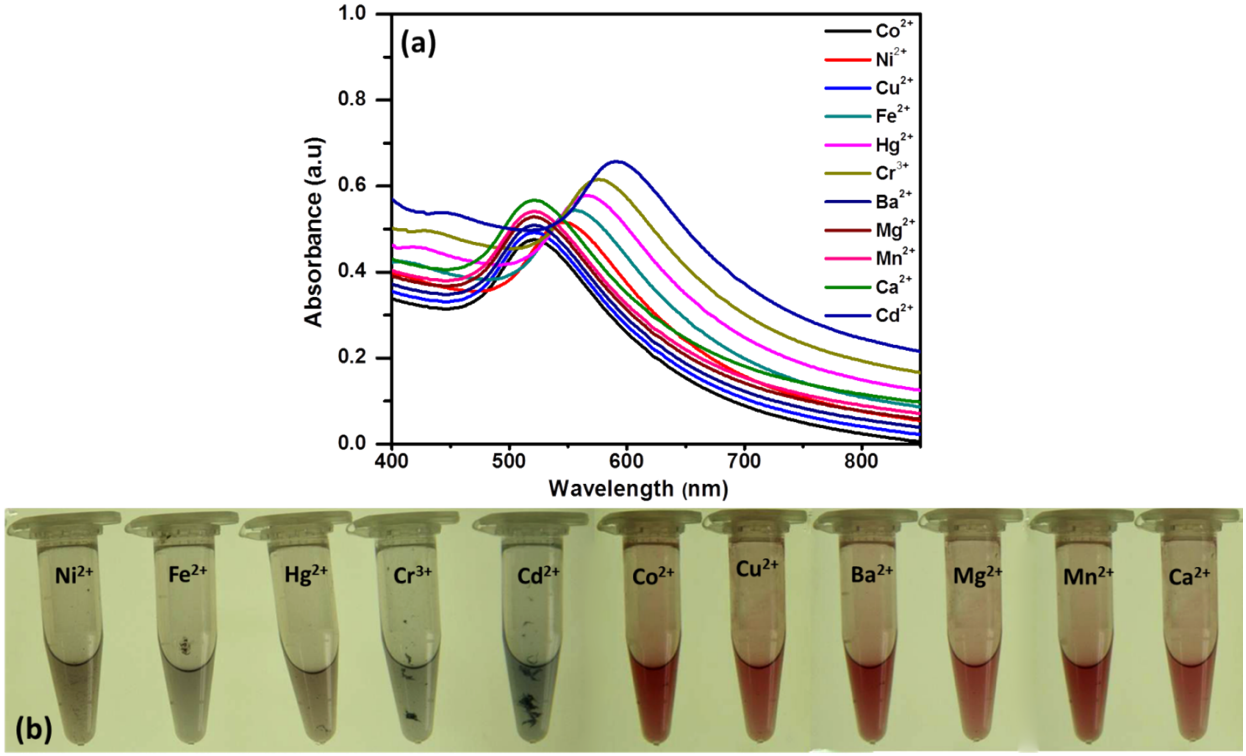

Fig. S4. (a) UV- Vis absorption spectra of chemically synthesized AuNPs- GSH (control) and (b) the corresponding color change photo images of chemically synthesized AuNPs- GSH added with different metal ions showing selectivity/interference

Table S1 Synoptic table of Au-based colorimetric sensor for heavy metal and other analyte detection

Colorimetric Nanosensor Employed	Route of Synthesis	Surface Functionalization	Analytical Detection	References
AuNPs	Citrate reduction of $HAuCl_4$	GSH	Cd^{2+}	43
AuNPs	citrate reduction of $HAuCl_4$	6-mercaptonicotinic acid (MNA) and L-Cysteine (LCys)	Cd^{2+}	44
Fluorescent gold nanodots	Chemical synthesis using tetrakis(hydroxymethyl) phosphonium chloride (THPC) and $HAuCl_4$	GSH	Pb^{2+}	45
Fluorescent AuNPs	Encapsulation in bio-compatible poly-(amidoamine)	GSH	Cu^{2+}	46
AuNPs	Citrate reduction of $HAuCl_4$	-	melamine	47
AuNPs	Citrate reduction of $HAuCl_4$	-	organophosphorus pesticides - mathamidophos	48
AuNPs	Citrate reduction of $HAuCl_4$	azide-terminal alkyne functionalization	Organophosphate pesticide-Paraoxon	49
AuNPs	Citrate reduction of $HAuCl_4$	Papain	Hg^{2+}, Pb^{2+} and Cu^{2+}	50
AuNPs	Citrate reduction of $HAuCl_4$	2-mercapto-5-(3-nitrophenyl)-1,3,4-thiadiazole]	Cd^{2+}	51

AuNPs	Citrate reduction of $HAuCl_4$	Alkane Thiol-Tween 20, 16-mercaptohexadecanoic acid	Glucose oxidase	52
AuNPs	Citrate reduction of $HAuCl_4$	11-mercaptoundecanoic acid	Pb^{2+}, Cd^{2+}, Hg^{2+}	53
AuNPs	Citrate reduction of $HAuCl_4$	mercaptopropionic acid (MPA) and homocystine	Hg^{2+}	54
AuNPs	Citrate reduction of $HAuCl_4$	Chitosan	Zn^{2+} and Cu^{2+}	55
AuNPs	Citrate reduction of $HAuCl_4$	DNA-oligonucleotides	Hg^{2+}	56
AuNPs	Citrate reduction of $HAuCl_4$	Dithiocarbamate derivative of calixarene	Hg^{2+}	57
AuNPs	Gallic acid mediated reduction of $HAuCl_4$	-	Pb^{2+}	58
Gold nanorods	N-cetyl trimethylammonium bromide mediated reduction of $HAuCl_4$	GSH	Pb^{2+}	59
Fluorescent gold nanoclusters incorporated into electrospun polyvinyl alcohol nanofibers	Bovine serum albumin mediated reduction of $HAuCl_4$	-	Hg^{2+}	60
AuNPs	Citrate reduction of $HAuCl_4$	GSH	Pb^{2+}	61

Table S2 Quantification of metal ions in sample 1 and 2 by atomic absorption spectroscopy

S.No	Transitions metals	Sample 1 (µg/L)	Sample 2 (µg/L)
1	Cr^{3+}	32.5±0.25	24.0±0.22
2	Ni^{2+}	23.8±0.95	11.2±0.30
3	Mn^{2+}	23.0±0.20	11.9±0.41
4	Cu^{2+}	32.0±0.42	31.1±0.60
5	Hg^{2+}	43.0±0.95	30.9±0.87
6	Co^{2+}	37.5±0.40	31.2±0.25
7	Cd^{2+}	33.6±0.48	25.1±0.50
8	Fe^{2+}	25.0±0.98	21.5±0.45
	Alkaline earth metals		
9	Mg^{2+}	21.0±0.25	18.5±0.57
10	Ca^{2+}	39.8±0.47	31.0±0.63
11	Ba^{2+}	20.1±0.85	19.5±0.49