Zwitterionic peptide-capped gold nanoparticles for colorimetric detection of Ni^{2+}

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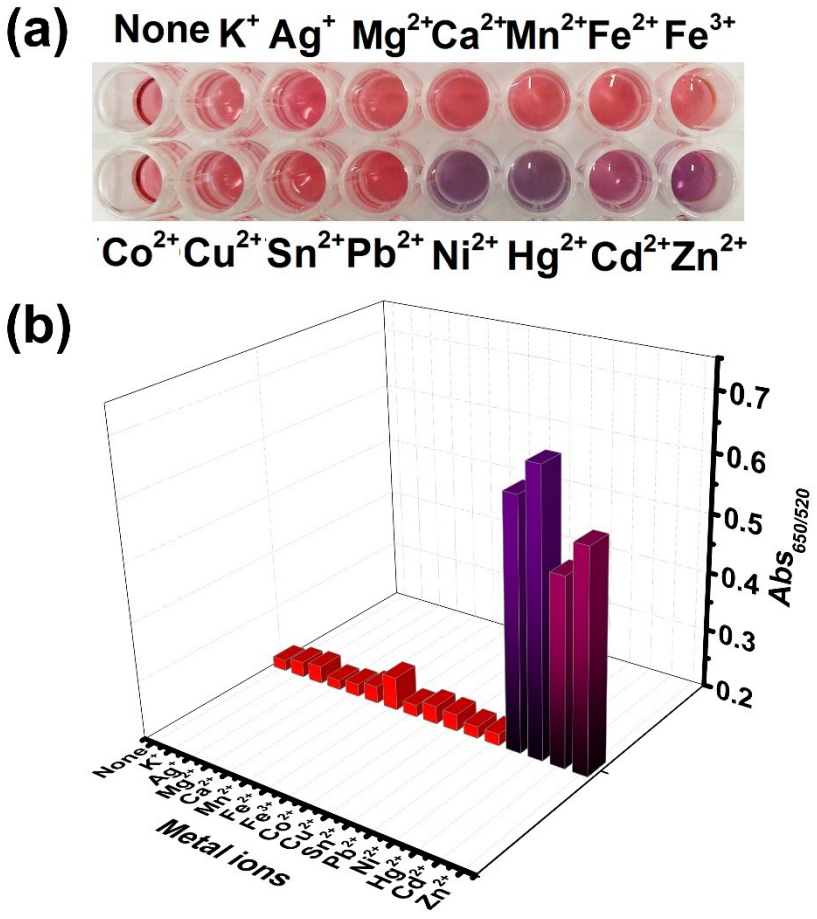

Figure S1. Selectivity of AuNPs-$(EK)_3$ toward different metal ion species at 25 μM, pH 8.0, and 45 min reaction time: (a). Photograph of colored AuNPs-$(EK)_3$ solutions and (b). $Abs_{650/520}$ corresponding to (a).

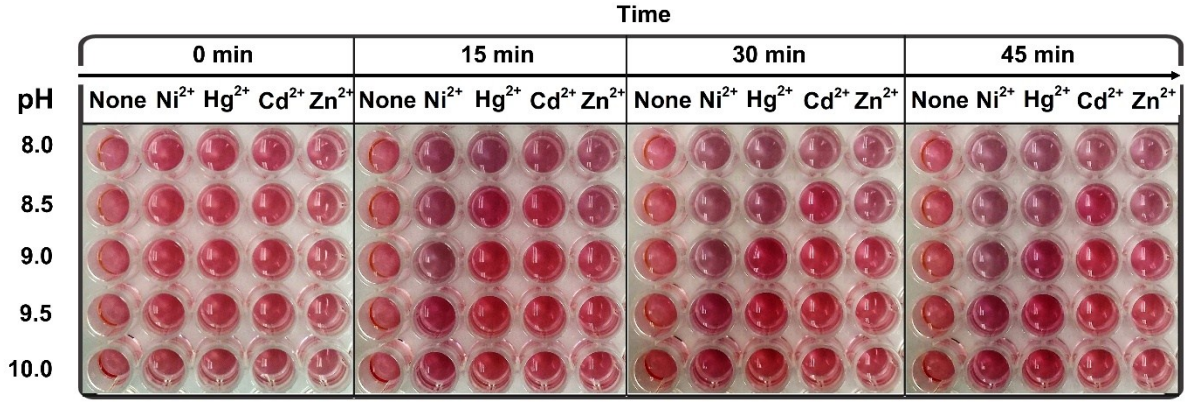

Figure S2. Photographs of color evolution of AuNPs-$(EK)_3$ solution due to the aggregation induced by Ni^{2+}, Hg^{2+}, Zn^{2+}, and Cd^{2+} (25 μM) at different pH.

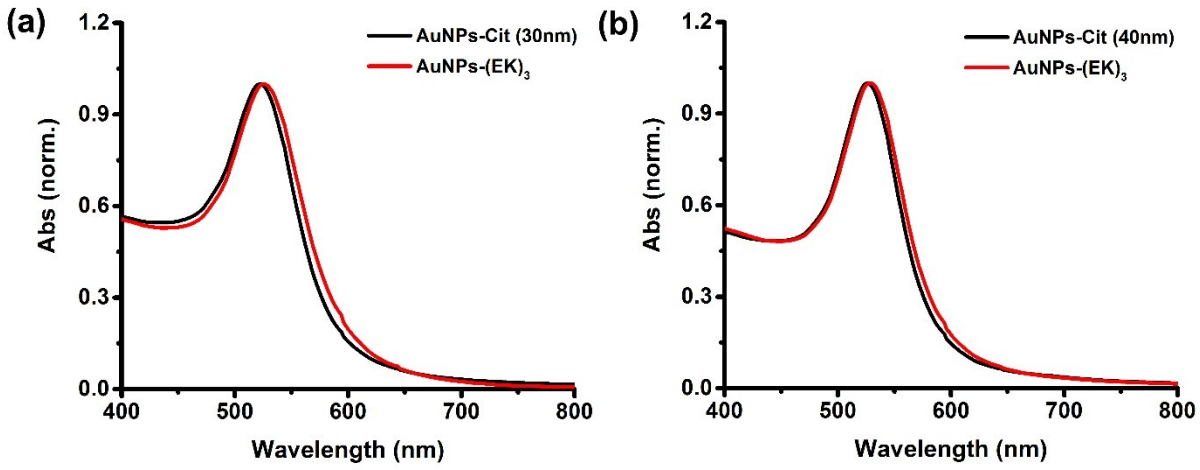

Figure S3. UV-vis spectra of the AuNPs before (black) and after (red) after being functionalized with $(EK)_3$-peptide: (a) 30 nm; and (b) 40 nm.

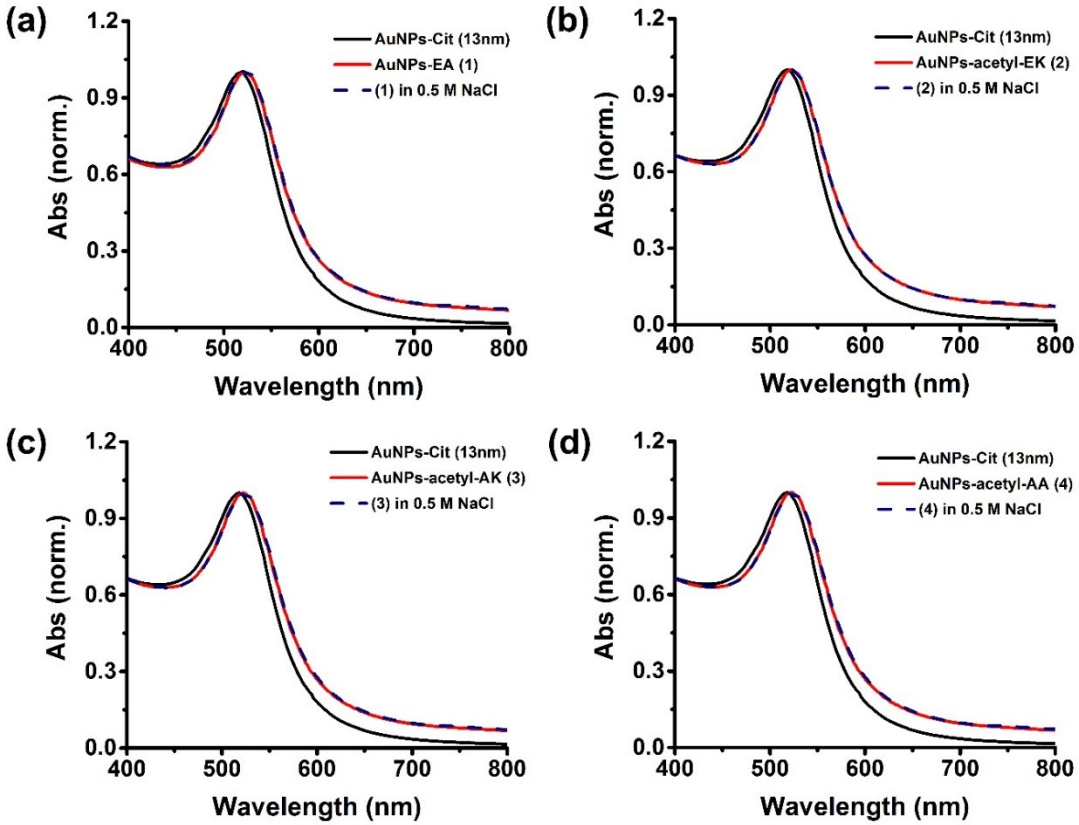

Figure S4. UV-vis spectra of 13-nm AuNPs before (black), and after (red) being functionalized with modified $(EK)_3$-peptides, and the functionalized AuNPs (blue dash) after exposure to 0.5 M NaCl solution for 1h: Sequences of the modified $(EK)_3$-peptide are (a) **1** – **EA**EKEKPPPPC, (b) **2** – **acetyl-EK**EKEKPPPPC, (c) **3** – **acetyl-AK**EKEKPPPPC, and (d) **4** – **acetyl-AA**EKEKPPPPC.

Table S1. Comparison of NPs-based colorimetric methods for Ni^{2+} detection using metal nanoparticles

NPs	Size (nm)	Shape	Sensing ligand	Linear range (nM)	LOD (nM)	Real Samples	Ref
Au	40	S[a]	Peptide – $(EK)_3$PPPPC-amide	60 – 160	34	Soil, Urine, Sea water, Tap water, Drink water	This work
Au	12.5	S	Malonic acid	170 – 8,500	51	River water, pond water, tap water	1 (2017)
Ag	Mixed 10 – 60	Pr[b]	GSH[d]	5 – 300	5	Tap water and Lake water	2 (2016)
Ag	~30	Pl[c]	GSH + L-Cysteine	150 – 20,000	120	Waste water	3 (2014)
Au	45	S	NTA + L-Carnosine	17,000 – 240,000	8,500	ND[e]	4 (2012)
Ag	12	S	N-Acetyl-L-Cysteine	2,000 – 48,000	230	Tap water	5 (2012)
Au	20	S	Peptide – $CALNN(H)_6$	1,000 – 5,000	300	River water	6 (2012)
Au	~15	S	GSH	10,000 – 80,000	ND	ND	7 (2012)
Ag	8	S	GSH	100,000 – 1,000,000	75,000	ND	8 (2009)

[a]S = sphere, [b]Pr = prism, [c]Pl = circle plate, [d]GSH = glutathione and [e]ND = not determined

References

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