Electronic Supplementary Material (ESI) for RSC Advances.

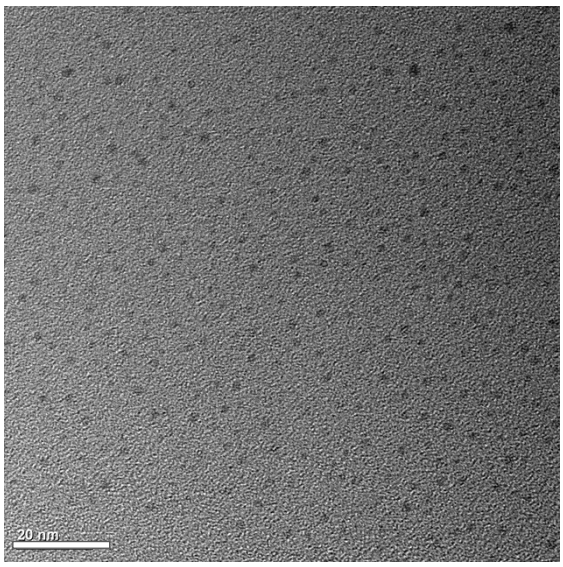

Fig. S1. Typical TEM image of the as-prepared Au NCs

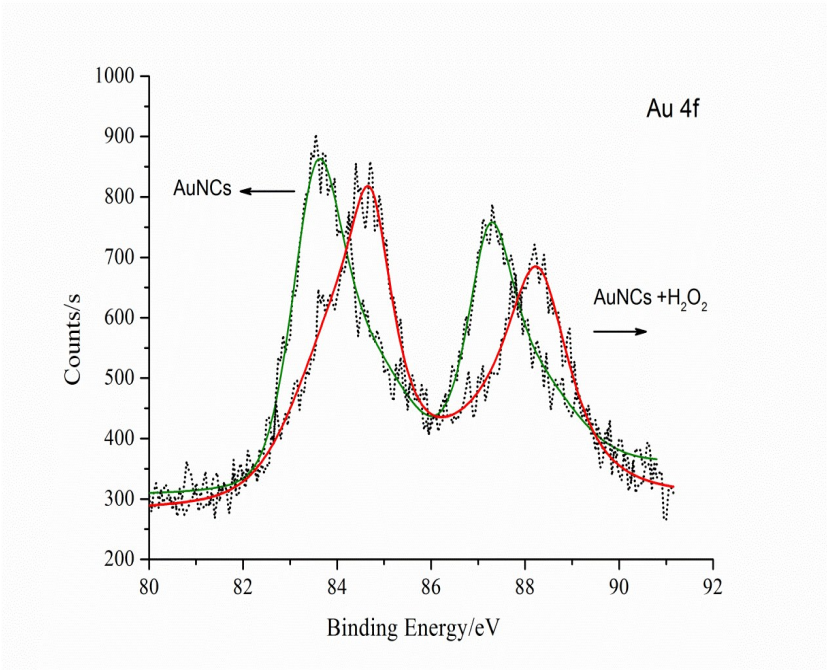

Fig. S2. XPS spectra of Au 4f core-level for the Au NCs in the absence of H_2O_2 (green line) and in the presence (red line) of 0.1 mM H_2O_2.

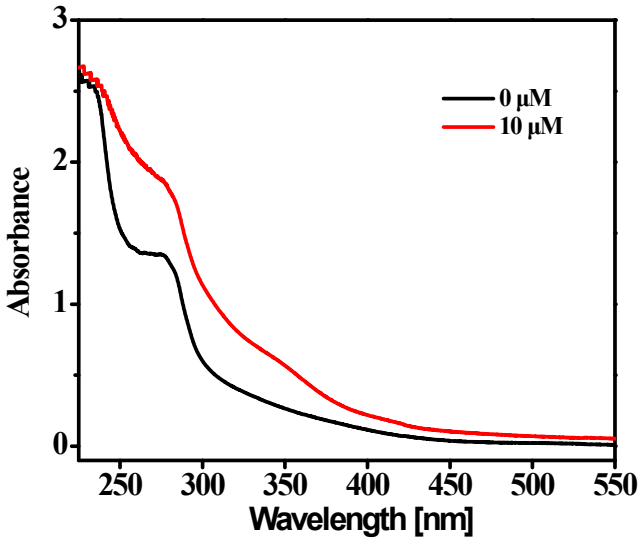

Fig. S3. Absorbtion spectra of Au NCs in the absence and presence of 10 μM H_2O_2

Table S1

Comparison of the present method with other optical method.

Method	System	Detection limit for H_2O_2(M)	Detection limit for glucose (M)	Reaction Time (for H_2O_2)	Reference
Optical (Colorimetry)	Au nanorod	0.1	1	3h	1
Optical (Colorimetry)	Au NPs -Cys-I^-	2×10^{-6}	1×10^{-6}	30 min	2
Optical (Colorimetry)	N-GQDs-TMB	5.3×10^{-6}	1.6×10^{-5}	30 min	3
Optical (Colorimetry)	Cu NCs-TMB	1×10^{-5}	1×10^{-4}	15 min	4
Optical (Fluorescence)	PVP-AuNPs/BSA-AuNCs	8×10^{-7}□□	not given	1h	5
Optical (Fluorescence)	PEI-Cu NCs	4×10^{-7}□□	8×10^{-6}	45 min	6
Optical (Fluorescence)	CdSe/ZnS QDs	0.1□	1	at least 20min	7
Optical (Fluorescence)	Au NCs/Fenton	2×10^{-7}□□	8×10^{-7}□	8 min	This work

Gys: cysteine; TMB: 3,3',5,5'-tetramethylbenzidine N-GOD: nitrogen-doped graphene quantum dots; PVP: polyvinylpyrrolidone; BSA: bovine serum albumin; PEI: polyethylenimine ; NCs: nanaocluster; QDs: quantum dots; AgNP: Ag nanoparticles;

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Table S2. Repeatability of fluorescence response of the Au NCs to10 μM H_2O_2 (F_0 and F are the fluorescence intensity of the H_2O_2 at 650 nm in the absence and presence of H_2O_2, respectively).

No.	F_0	F	F/F_0	Average value	Relative standard deviation (%)
1	159.0	39.3	0.2472	0.2414	3.32
2	148.7	35.2	0.2367		
3	148.3	34.33	0.2315		
4	151.7	38.15	0.2515		
5	149.9	36.01	0.2402		

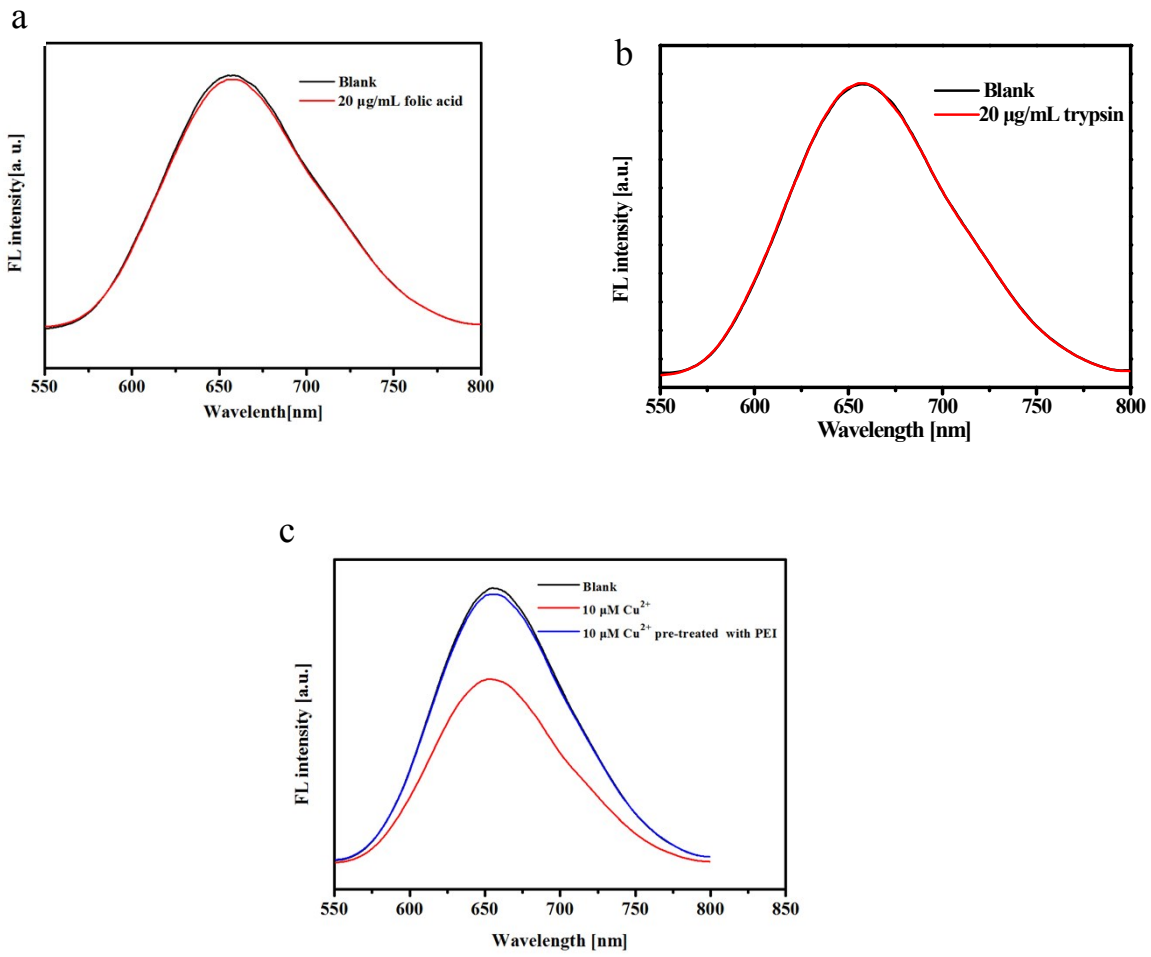

Fig.S4. Fluorescence response of our sensing system toward (a) 20 μg/ml folic acid and (b) 20 μg/ml typsin; (c) Fluorescence response of the our sensing system toward 10 μM Cu^{2+} before and after treated with PEI.

Table S3. Fluorescence response toward 10 μM H_2O_2 by using Au NCs stored at 4 ℃ for 0, 1, 2 week, respectively.

Week no.	F_0	F	F/F_0	Average value	Relative standard deviation (%)
0	159.0	39.30	0.2472	0.2405	2.76
1	143.4	33.54	0.2339		
2	148.3	35.67	0.2405		