Electronic Supplementary Information

Table S1. Comparison of different fluorescence probes for GSH detection based on MnO_2 nanosheets.

Probes	stokes shift (nm)	LOD (nM)	Assay time (min)	Refs
Scopoletin & Amplex Red	85 and 25	6.7	Not given	10
Boron nitride quantum dots	70	160	6	11
Carbon dots	75	300	3	23
Carbon quantum dots	97	300	5	24
Graphene quantum dot	90	150	6	25
Semiconductor quantum dots	170	10	10	26
BSA-Cu NCs	75	100	5	27
g-C_3N_4 Nanosheet	78	200	6	28
AIE-silica nanospheres	120	200	5	29
Polymer dots	100	100	15	41
AIE-Cys-Cu NCs	235	1.2	3	This work

Table S2. Nanosecond time-resolved luminescence transients of Cu NCs in the absence and presence of MnO_2 nanosheets. The luminescence of Cu NCs (maximum wavelength, λ_{max}=593 nm) was detected with a 375 nm excitation laser. Numbers in parentheses indicate relative weightage.

system	τ_1 (ns)	τ_2 (ns)	τ_{av} (ns)
Cu NCs	6.26 (0.72%)	0.16 (99.28%)	0.2036
Cu NCs + MnO_2	6.36 (0.21%)	0.19 (99.79%)	0.2057

Table S3. Determination result of GSH in human serum samples.

Method	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
This method/μM	2.43	2.41	2.15	2.83	1.97
OPA probe/μM	2.38	2.27	2.09	2.78	2.06

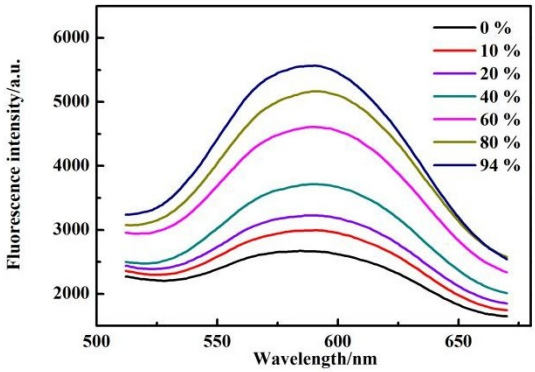

Fig. S1. The fluorescence spectra of the Cu NCs in mixed solvents of ethanol and water with different volumetric fractions of ethanol.

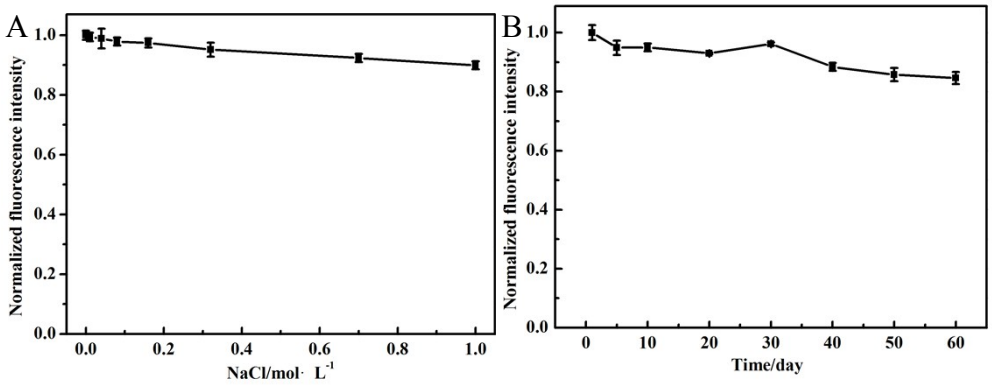

Fig. S2. (A) The effect of NaCl concentration on the FL response of Cu NCs. (B) The effect of storage time on FL response of Cu NCs.

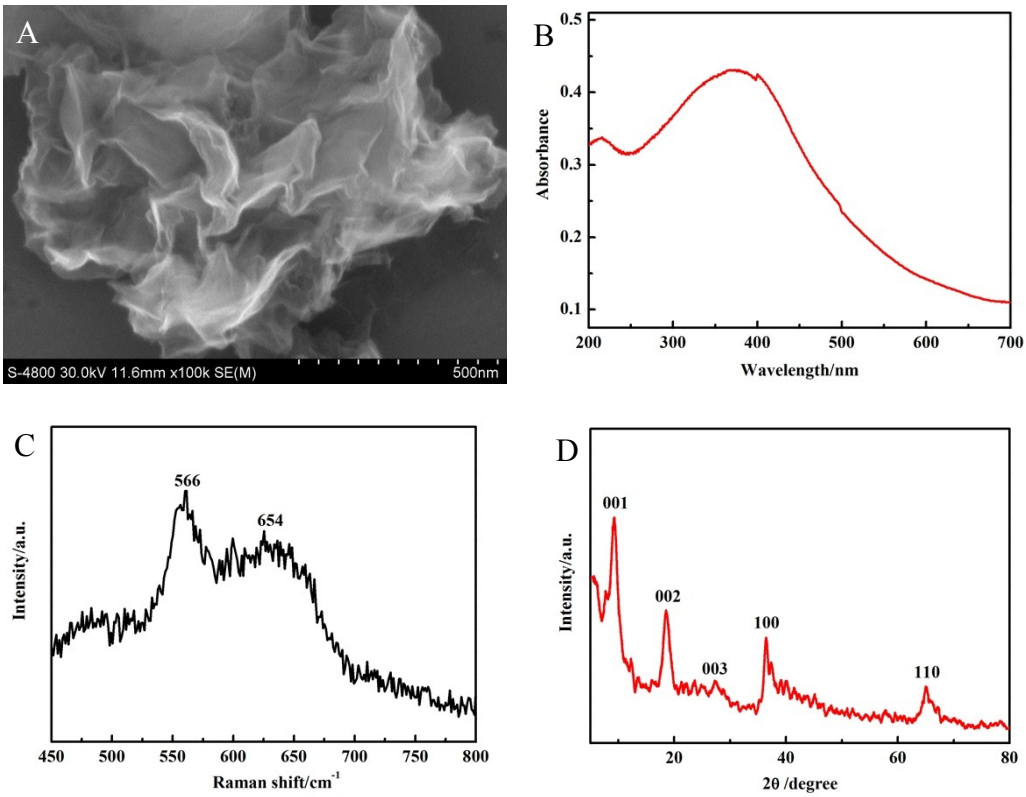

Fig. S3. The SEM image (A), the UV-Vis absorption spectra (B), Raman spectrum (C) and XRD spectra (D) of MnO_2 nanosheets.

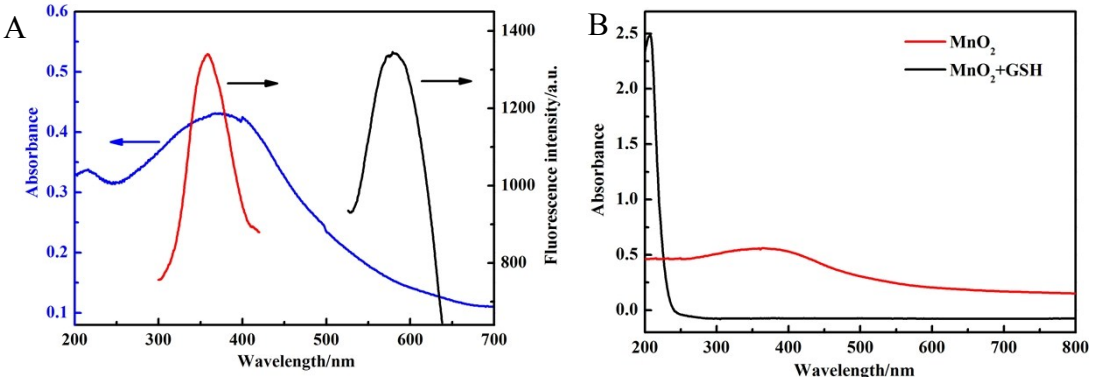

Fig. S4. (A) Fluorescence excitation (red curve) and emission (black curve) spectra of Cu NCs, and UV-vis absorption spectrum of MnO_2 nanosheets (blue curve). (B) UV-vis absorption spectrum of MnO_2 nanosheets in the absence (red line) and presence of GSH (black line).

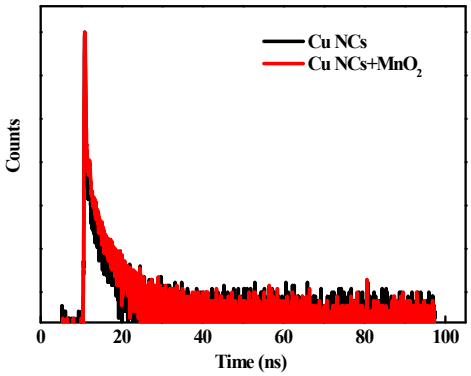

Fig. S5. Decay curves of Cu NCs in the absence and presence of MnO_2 nanosheets. The maximum excitation and emission wavelengths are 375 nm and 593 nm, respectively.

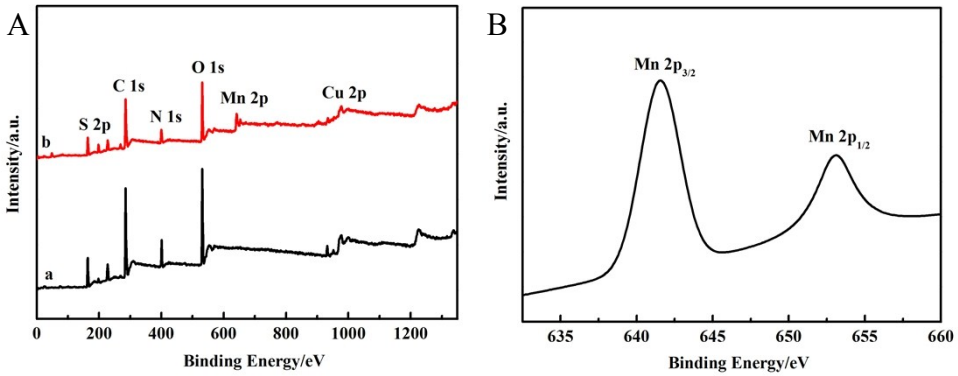

Fig. S6. (A) XPS spectra of Cu NCs in the absence (a) and presence of MnO_2 nanosheets (b). (B) XPS spectrum in the Mn 2p of Cu NCs-MnO_2 system.

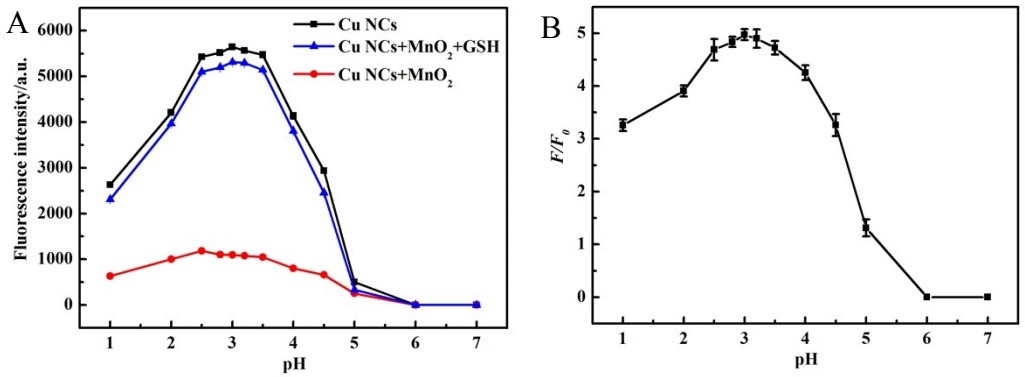

Fig. S7. (A) Effect of pH on the FL response of Cu NCs, Cu NCs-MnO_2 nanosheets and Cu NCs-MnO_2 nanosheets-GSH systems. (B) Effect of solution pH on F/F_0 value. The concentrations of Cu NCs, MnO_2 nanosheets and GSH were 0.5 mM, 100 μg/mL and 90 μM, respectively. Error bars were the standard deviation of three independent experiments.

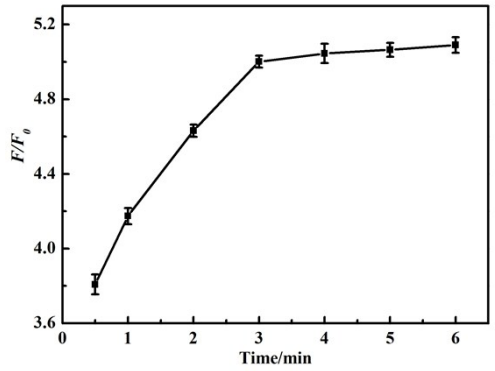

Fig. S8. Effect of reaction time on the fluorescence of Cu NCs-MnO_2 nanosheets system for detecting GSH. The concentrations of Cu NCs, MnO_2 nanosheets and GSH were 0.5 mM, 100 μg/mL and 90 μM, respectively. Error bars were the standard deviation of three independent experiments.