

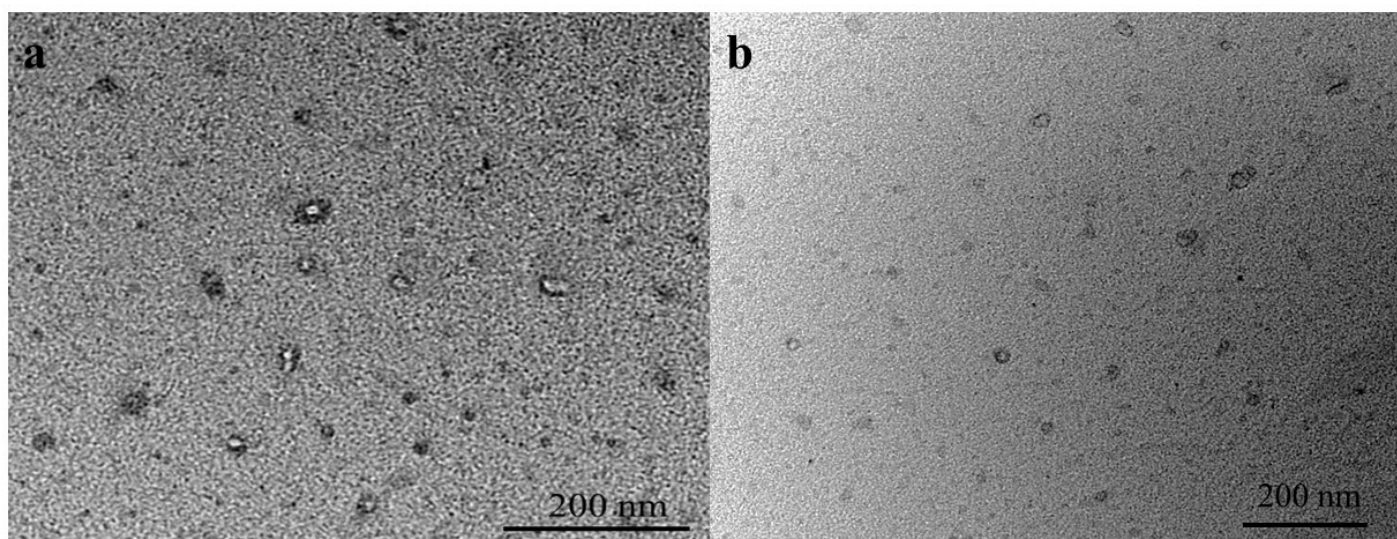
**Supporting Information**

**Coal derived graphene quantum dots with Mn<sup>2+</sup>/Mn<sup>7+</sup> nanosensor for selective detection of glutathione by a fluorescence switch-off-on assay**

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**Fig. S1.** TEM image of (a) A-GQDs and (b) B-GQDs.

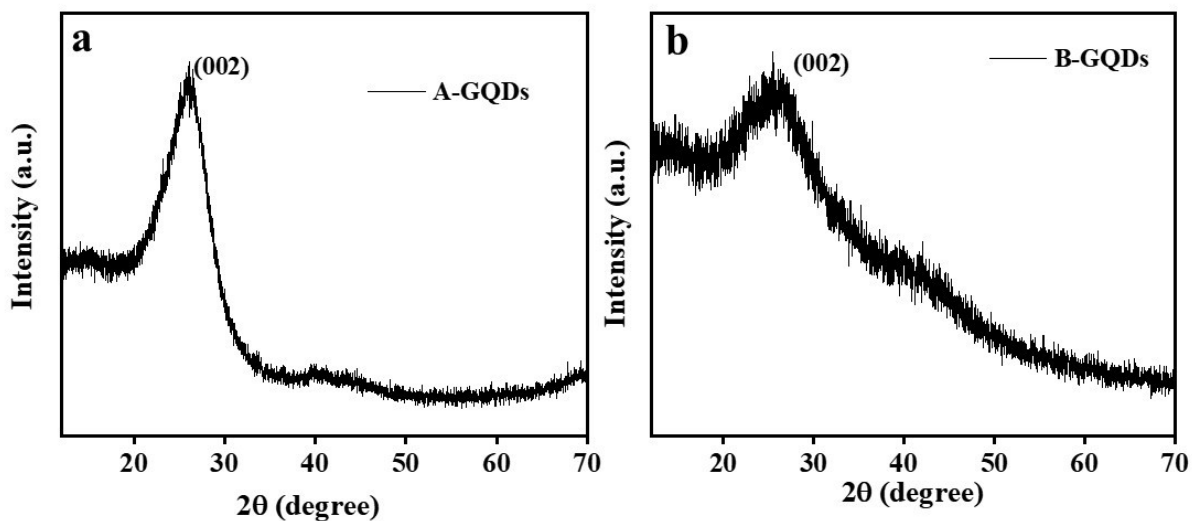


Fig. S2. XRD spectra of (a) A-GQDs and (b) B-GQDs.

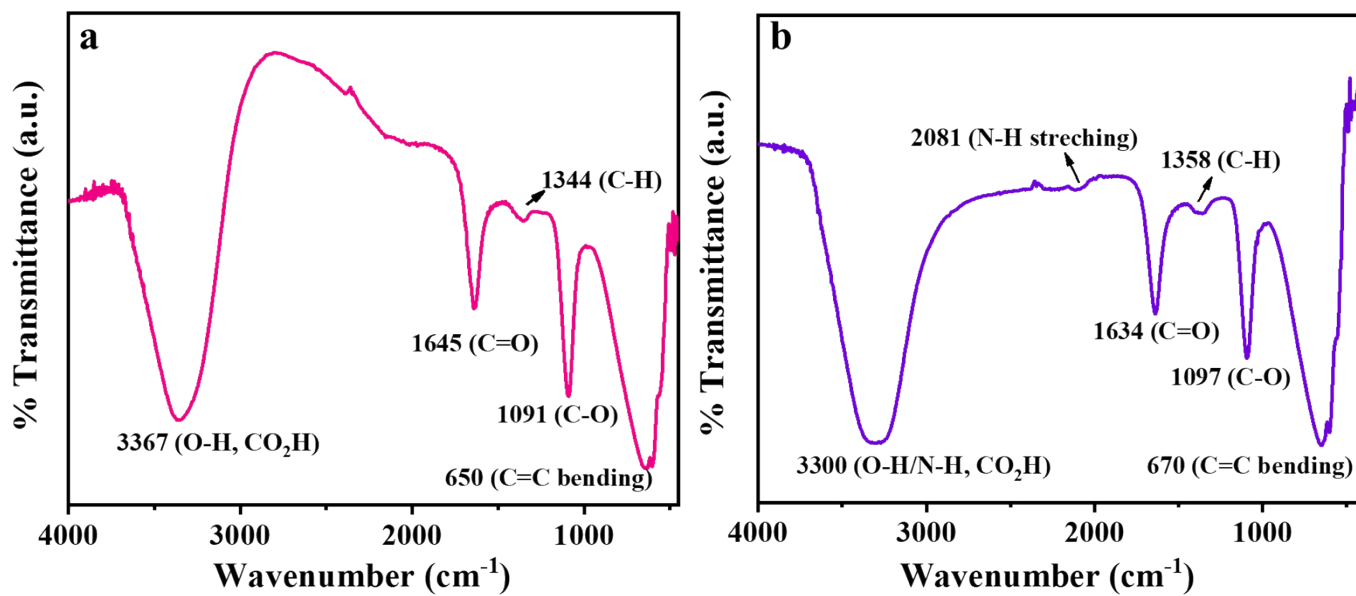
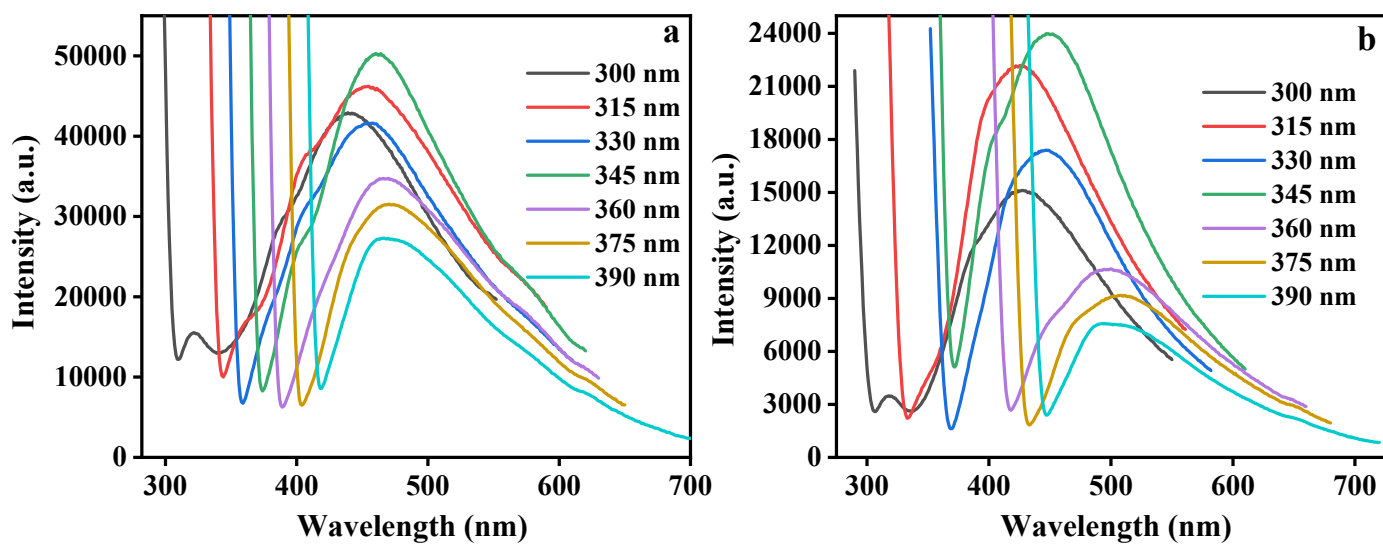
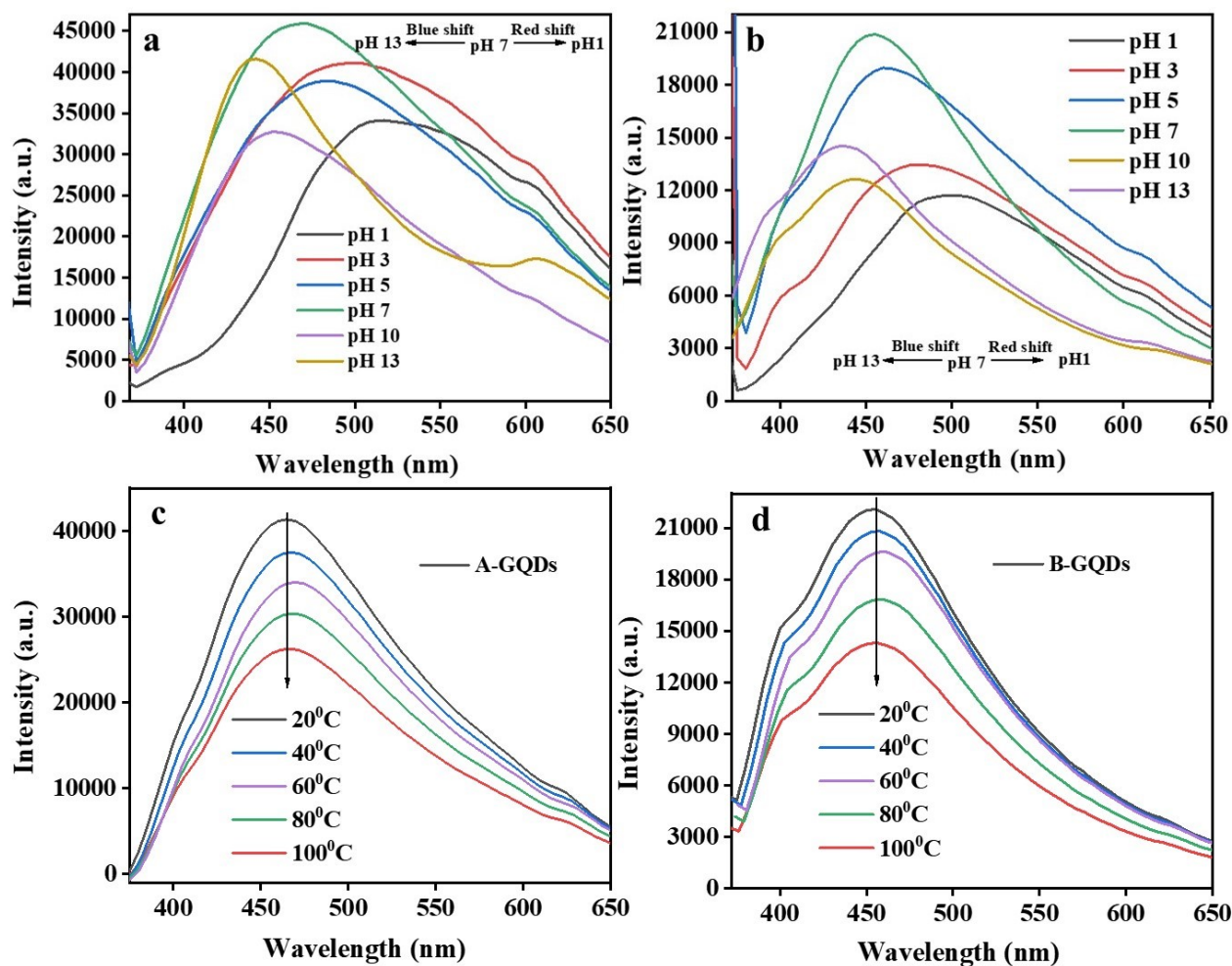


Fig. S3. FTIR spectra of (a) A-GQDs and (b) B-GQDs.



**Fig. S4.** PL spectra of (a) A-GQDs, (b) B-GQDs at different excitation wavelength.



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Fig. S5. Effect of pH on (a) A-GQDs, (b) B-GQDs, effect of temperature on the fluorescence of (c) A-GQDs, and (d) B-GQDs.

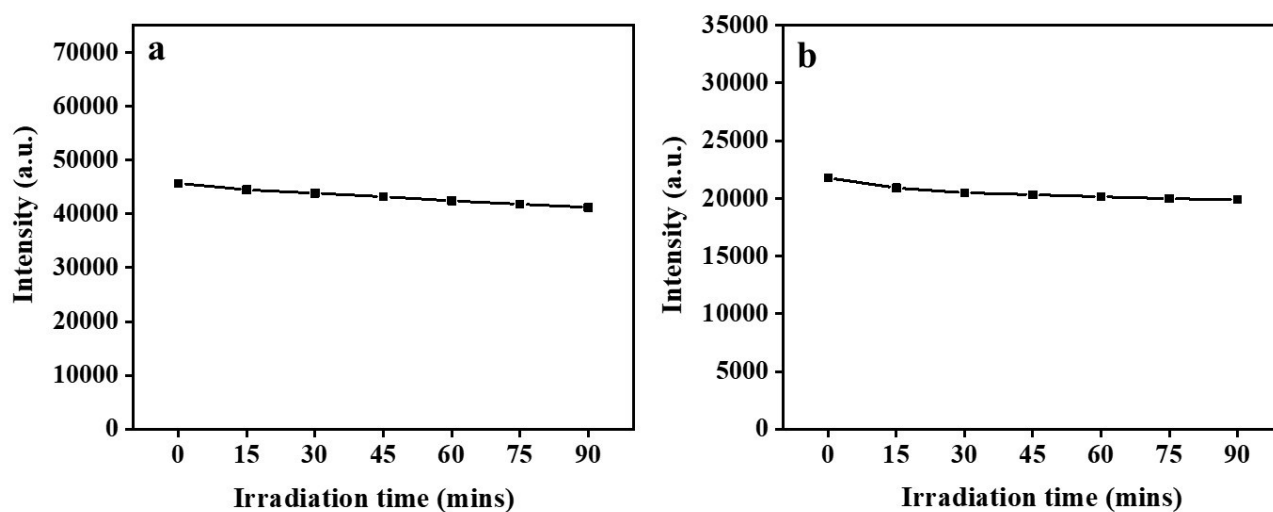
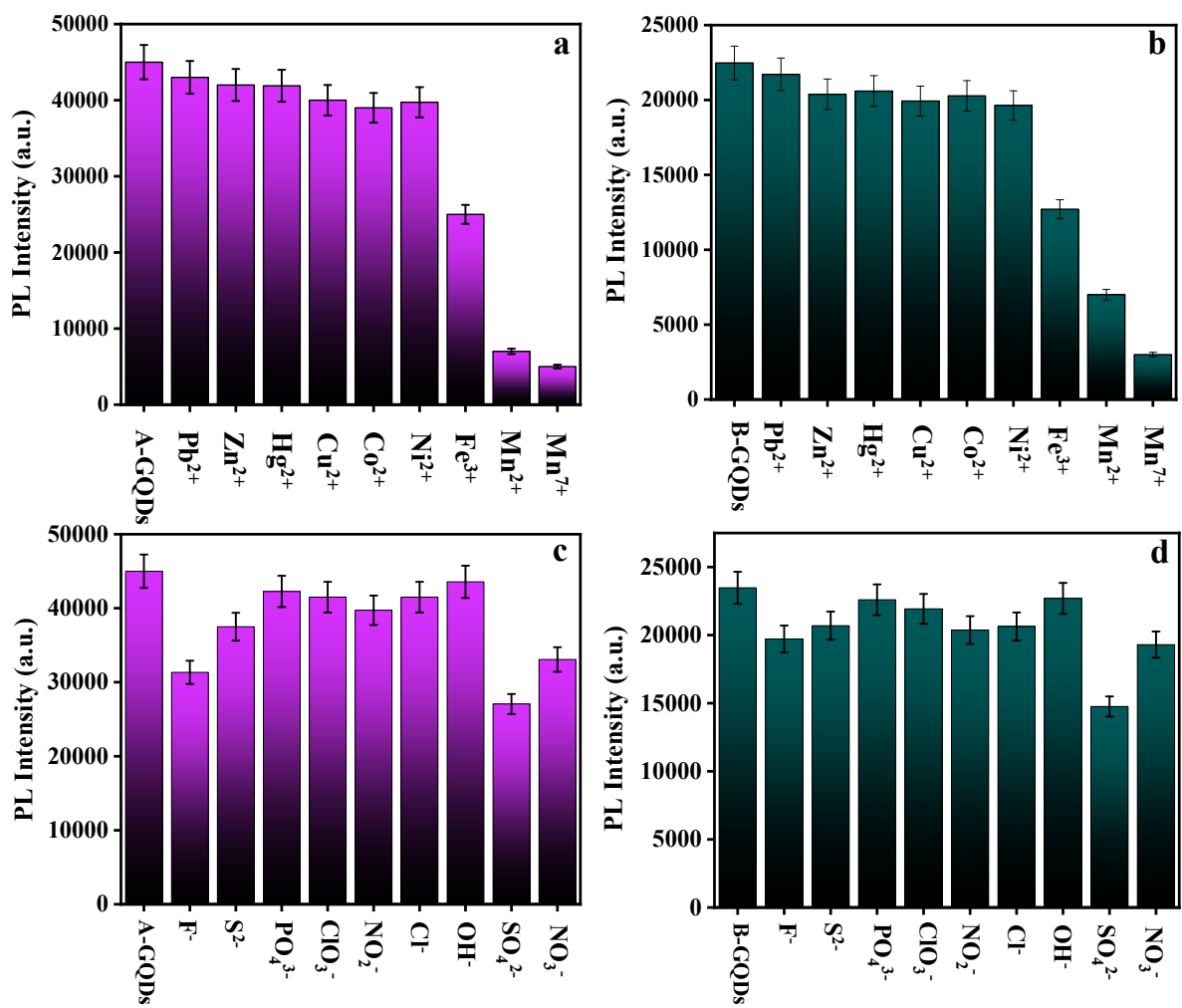
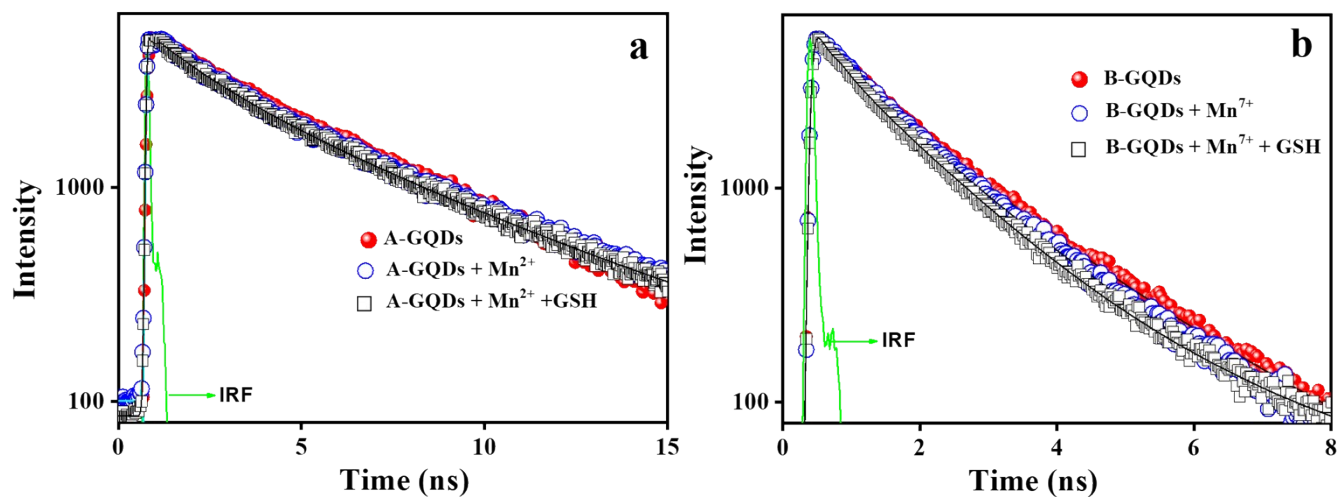


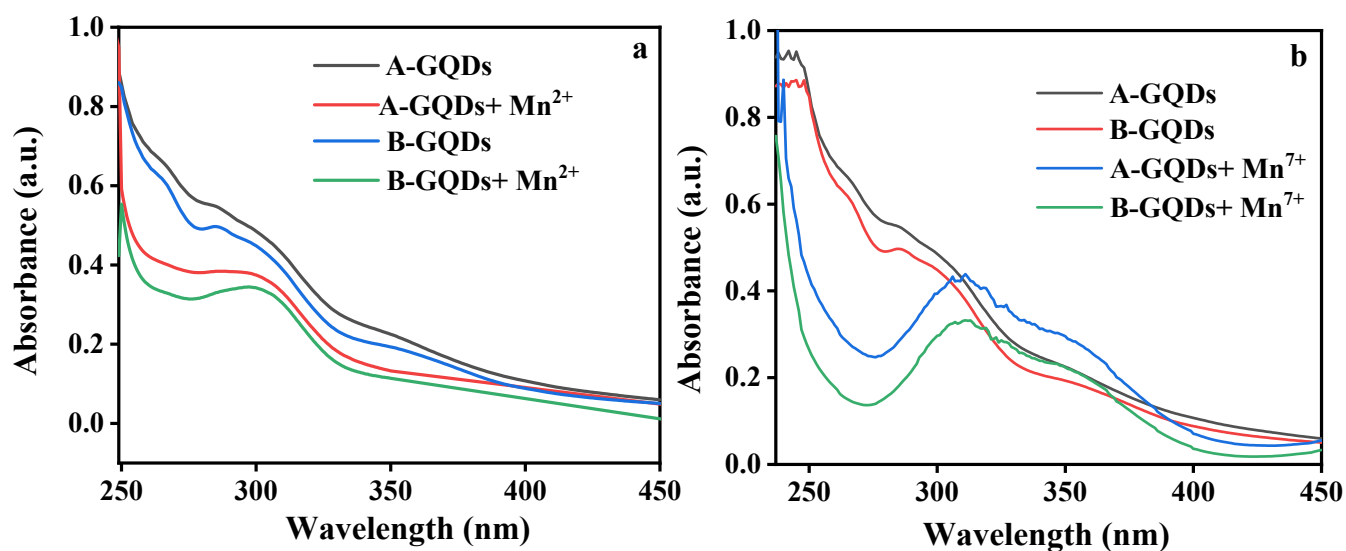
Fig.S6. The effect of irradiation time on the PL intensity of (a) A-GQDs, and (b) B-GQDs.



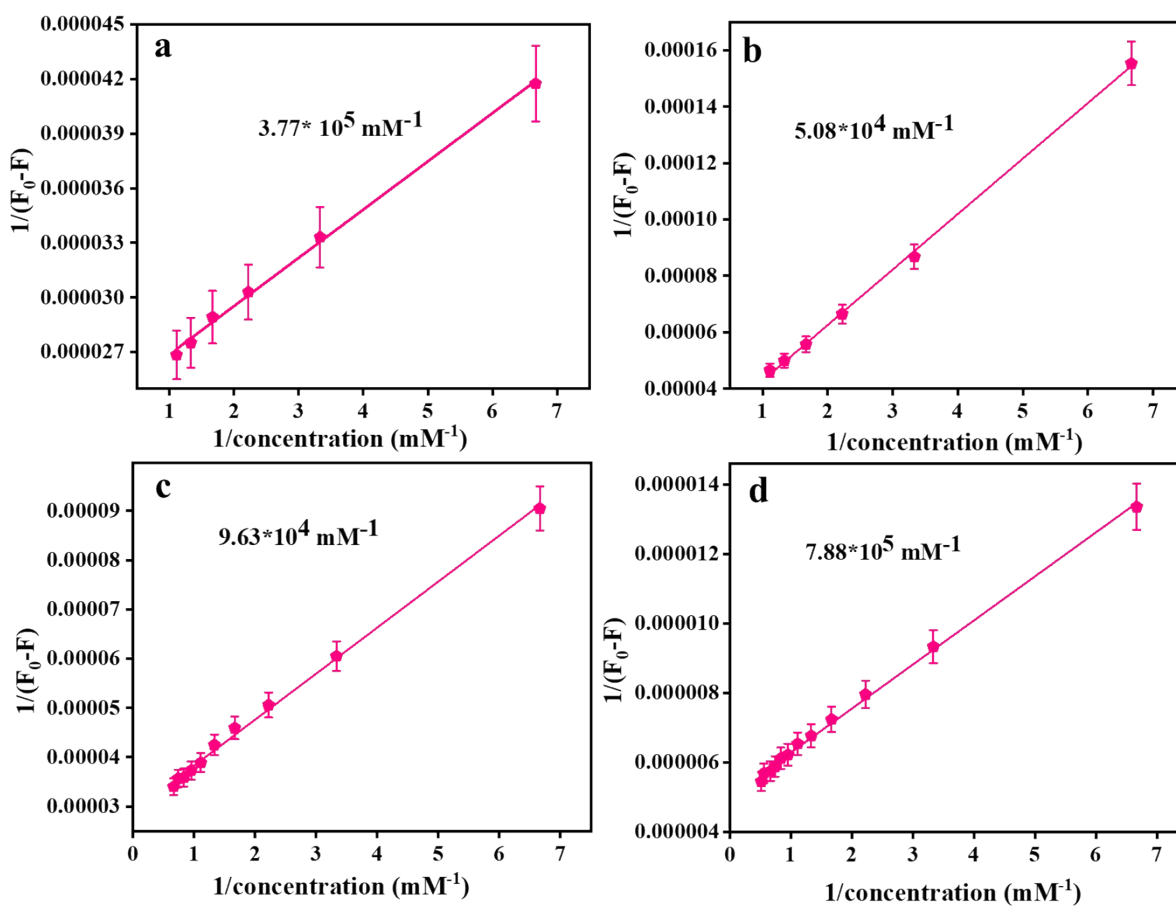
**Fig. S7.** Fluorescence response studies of (a) A-GQDs, (b) B-GQDs with cations, (c) A-GQDs, and (d) B-GQDs with anions.



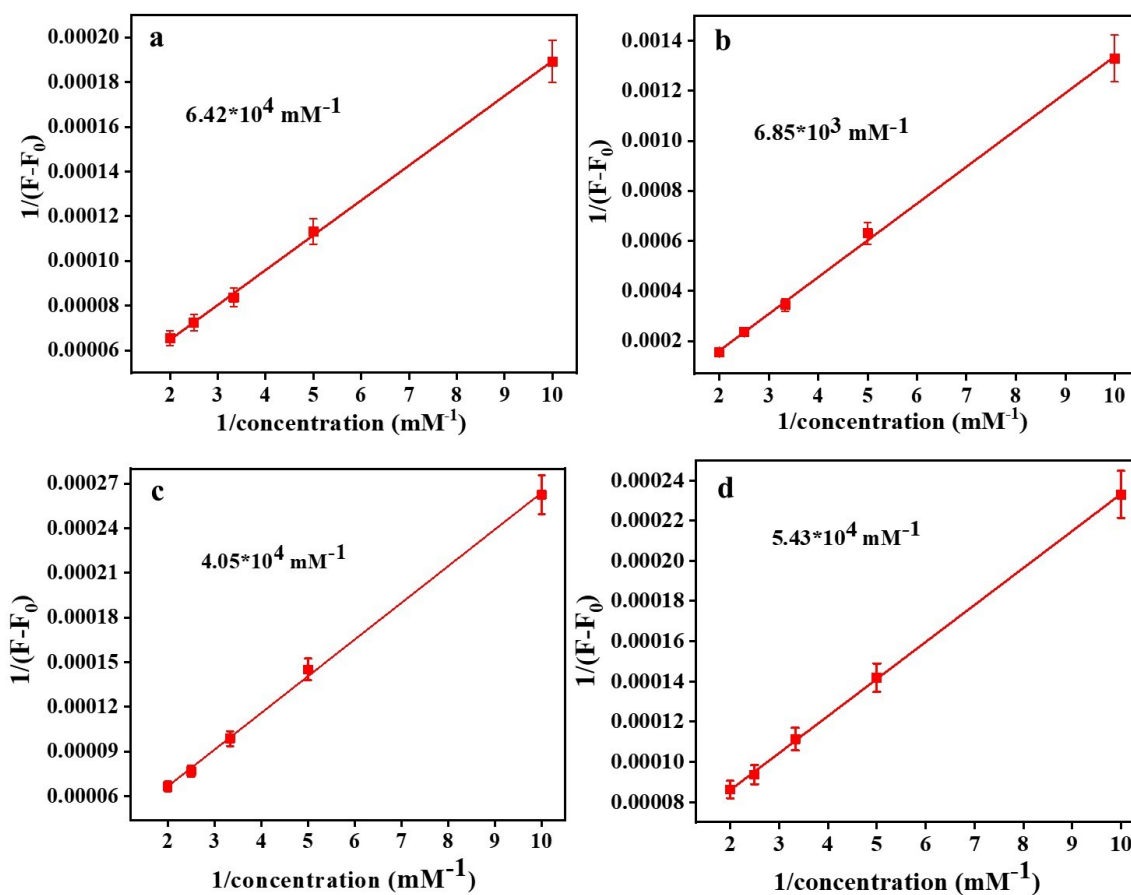
**Fig. S8.** Time-resolved fluorescence emission decays of (a) A-GQDs with Mn<sup>2+</sup> and GSH, (b) B-GQDs with Mn<sup>7+</sup> and GSH.



**Fig. S9.** UV-Visible absorption spectrum of A-GQDs and B-GQDs before and after the addition of (a) Mn<sup>2+</sup>, and (b) Mn<sup>7+</sup>.

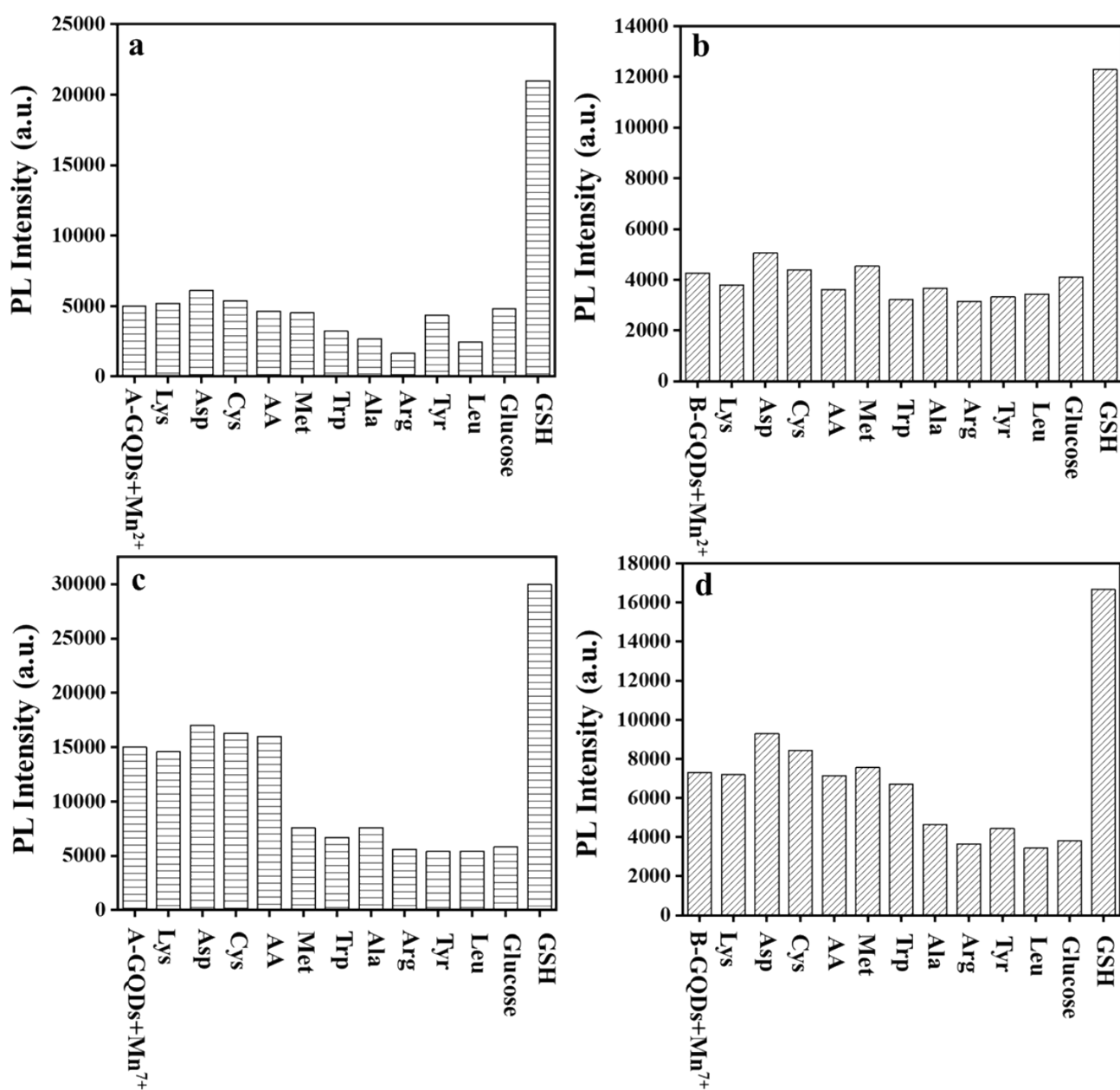


**Fig. S10.** B-H binding plot of (a) A-GQDs with  $\text{Mn}^{2+}$ , (b) B-GQDs with  $\text{Mn}^{2+}$ , (c) A-GQDs with  $\text{Mn}^{7+}$ , and (d) B-GQDs with  $\text{Mn}^{7+}$ .

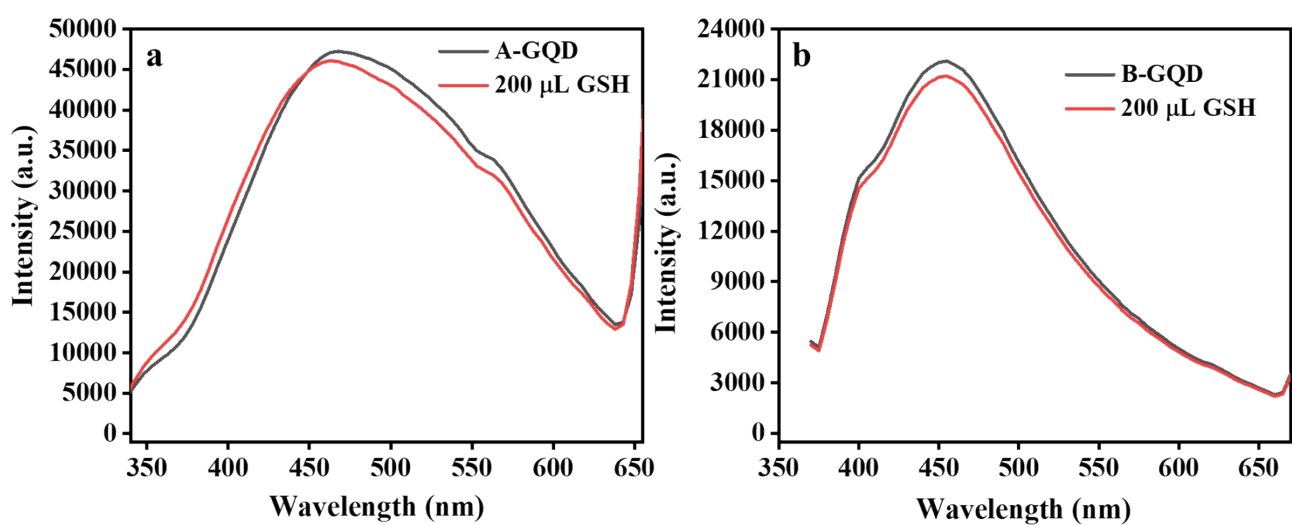


**Fig. S11.** B-H binding plot of (a) A-GQDs with  $\text{Mn}^{2+}$ , (b) B-GQDs with  $\text{Mn}^{2+}$ , (c) A-GQDs with  $\text{Mn}^{7+}$ , and (d) B-GQDs with  $\text{Mn}^{7+}$  in presence of GSH.





**Fig. S12.** Fluorescence response of (a) A-GQDs with Mn<sup>2+</sup>, (b) B-GQDs with Mn<sup>2+</sup>, (c) A-GQDs with Mn<sup>7+</sup>, and (d) B-GQDs with Mn<sup>7+</sup> as a sensing system towards various analytes.



**Fig. S13.** Fluorescence response of (a) A-GQDs, (b) B-GQDs in presence of GSH.

**Table S1.**

Final turn on percentage of different systems after the GSH addition.

	A-GQDs+Mn <sup>2+</sup>	B-GQDs+Mn <sup>7+</sup>	A-GQDs+Mn <sup>2+</sup>	B-GQDs+Mn <sup>7+</sup>
<b>GSH</b>	69.6%	65.5%	45.1%	54.1%