

## Supplementary information

### **Acidophilic S-doped carbon quantum dots derived from cellulose fibers and their fluorescence sensing performance for metal ions in an extremely strong acid environment**

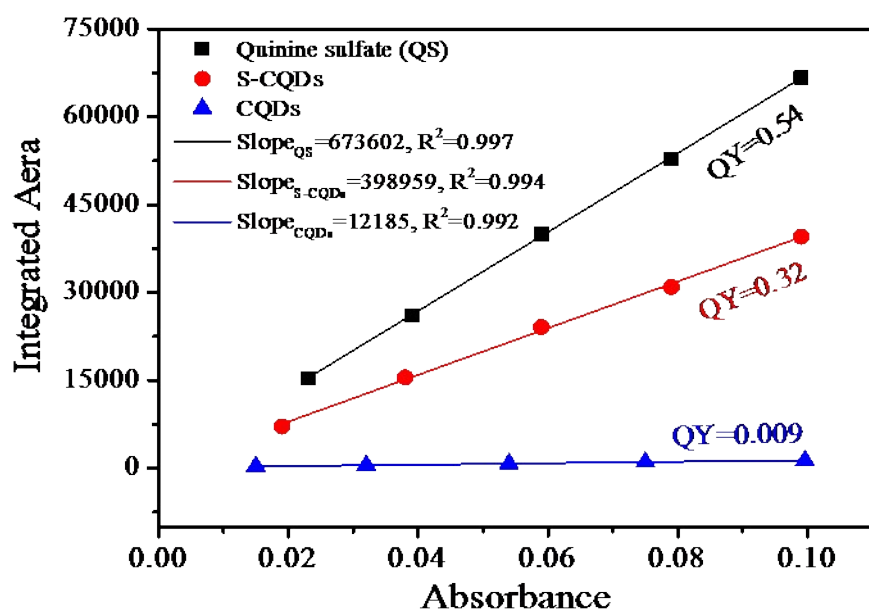
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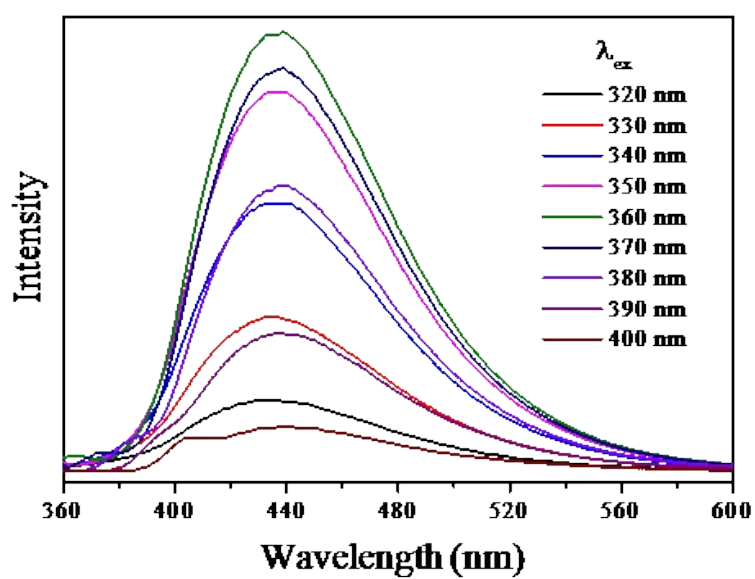
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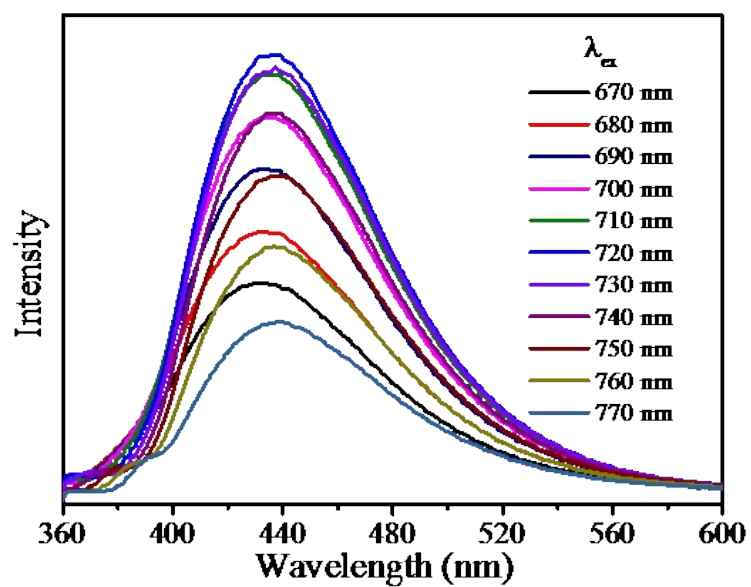
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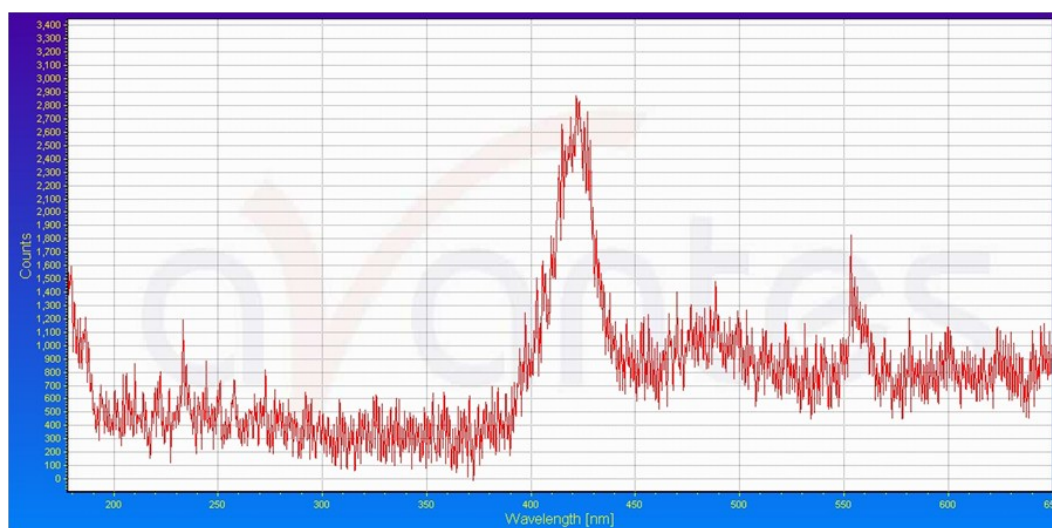
**Fig. S1** Determination of fluorescence quantum yield (QY) for S-CQDs and undoped CQDs.



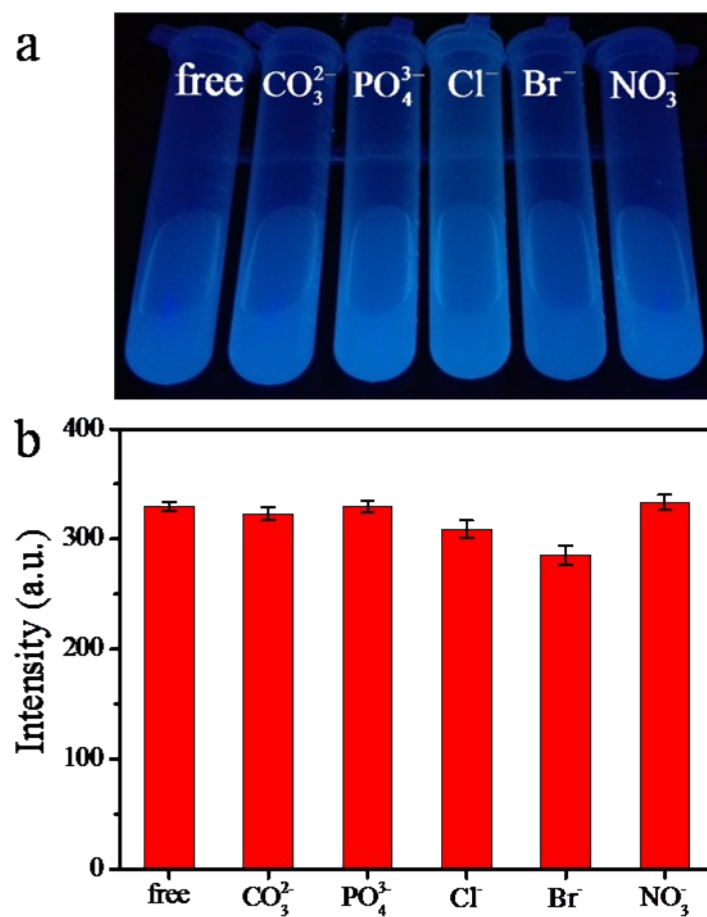
**Fig. S2** Excitation-wavelength dependent PL spectrum of S-CQDs dispersed in a pH 0 aqueous solution.



**Fig. S3** Up-conversion PL emission spectra of S-CQDs dispersed in pH 0 aqueous solution.



**Fig. S4** Up-conversion PL spectrum obtained from S-CQDs under excitation of a femtosecond pulsed laser at 800 nm (the laser power is 1.4 W).



**Fig. S5** (a) Digital photographs and (b) the corresponding PL intensities of S-CQDs dispersed in pH 0 aqueous solutions with 2 mM of various acid ions.