

Supplementary information for

Integration of Cd:ZnS QDs into ZIF-8 for enhanced selectivity toward Cu²⁺ detection

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Table S1 Contents of Cd element in Cd:ZnS QDs and Cd:ZnS QDs@ZIF-8.

Material	Content of Cd element
Cd:ZnS QDs	32.6wt%
Cd:ZnS QDs@ZIF-8	3.4wt%

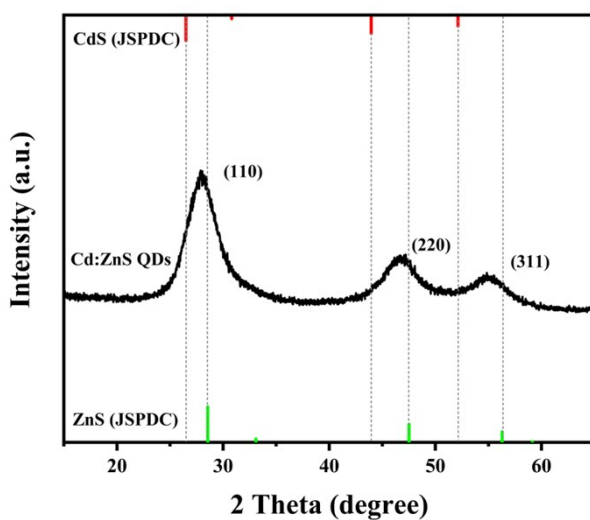


Fig. S1 PXRD pattern of Cd:ZnS QDs, bottom/top bar: cubic ZnS/CdS.

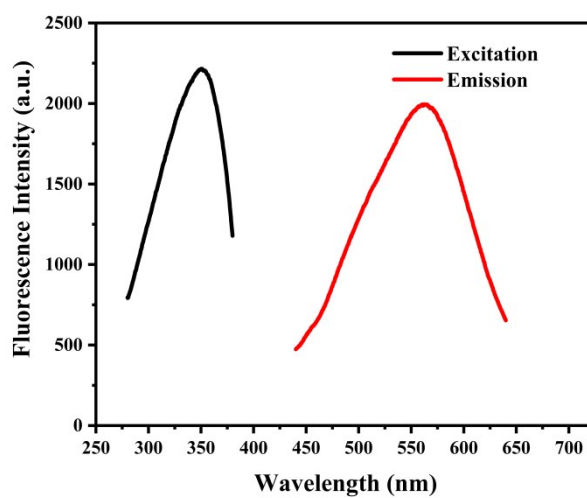


Fig. S2 Excitation and emission spectra of Cd:ZnS QDs.

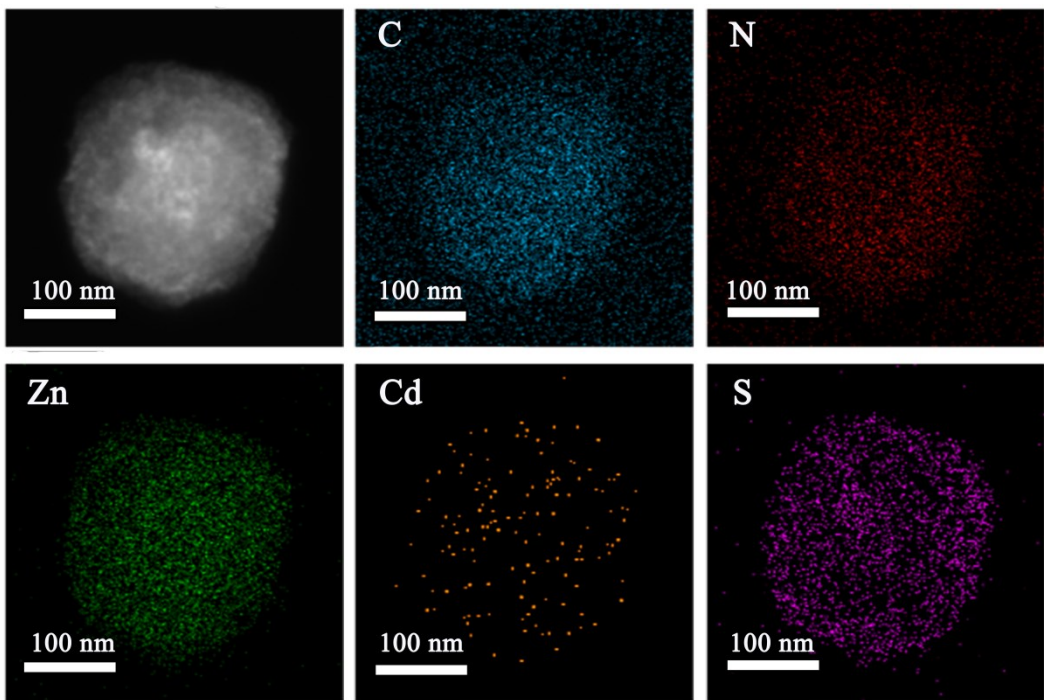


Fig. S3 EDX mapping of Cd:ZnS QDs@ZIF-8 during TEM measurement.

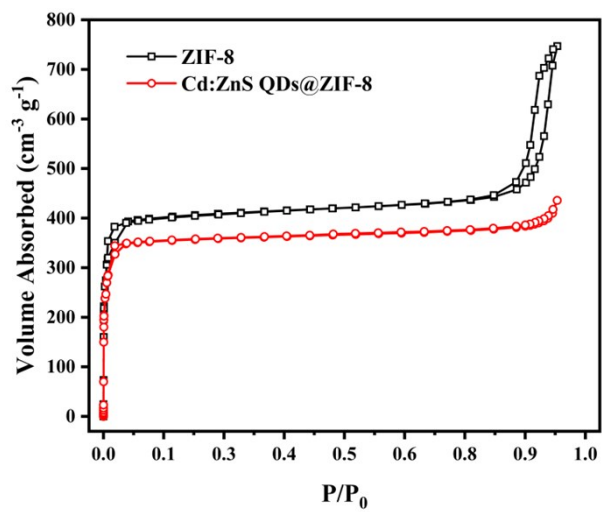


Fig. S4 Nitrogen adsorption isotherms of ZIF-8 and Cd:ZnS QDs@ZIF-8 at 77 K.

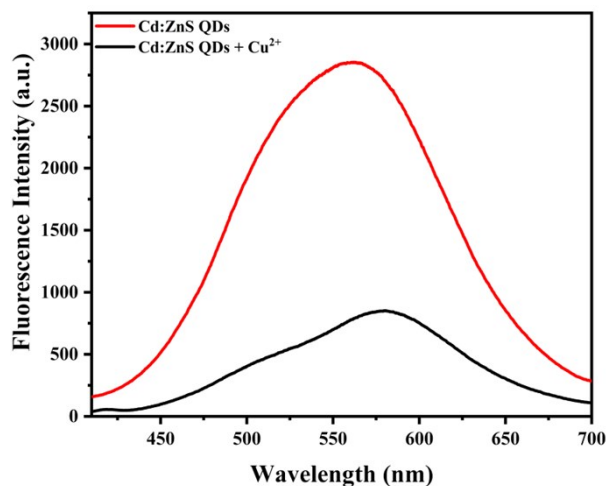


Fig. S5 Fluorescence spectra of Cd:ZnS QDs (0.3 mM) before and after the addition of Cu²⁺ (5 μM).

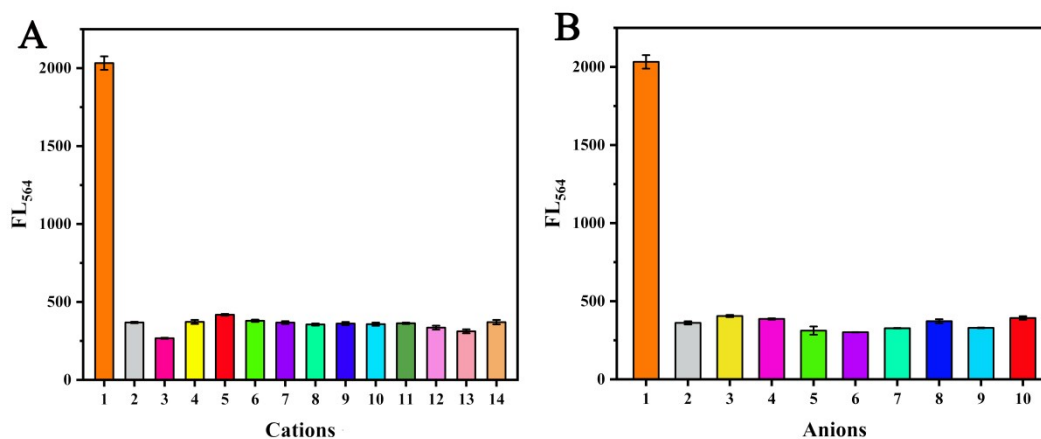


Fig. S6 Fluorescence intensities of Cd:ZnS QDs@ZIF-8 (250 μg mL⁻¹) after the addition of Cu²⁺ (5 μM) in the presence of different cations (5 μM) (A) or anions (5 μM) (B); (A) 1-none, 2-Cu²⁺, 3-Cu²⁺ + Na⁺, 4-Cu²⁺ + K⁺, 5-Cu²⁺ + Mg²⁺, 6-Cu²⁺ + Ca²⁺, 7-Cu²⁺ + Mn²⁺, 8-Cu²⁺ + Co²⁺, 9-Cu²⁺ + Ni²⁺, 10-Cu²⁺ + Zn²⁺, 11-Cu²⁺ + Cd²⁺, 12-Cu²⁺ + Al³⁺, 13-Cu²⁺ + Cr³⁺, 14-Cu²⁺ + Fe³⁺; (B) 1-none, 2-Cu²⁺, 3-Cu²⁺ + F⁻, 4-Cu²⁺ + Cl⁻, 5-Cu²⁺ + Br⁻, 6-Cu²⁺ + I⁻, 7-Cu²⁺ + CO₃²⁻, 8-Cu²⁺ + NO₃⁻, 9-Cu²⁺ + SO₄²⁻, 10-Cu²⁺ + PO₄³⁻.

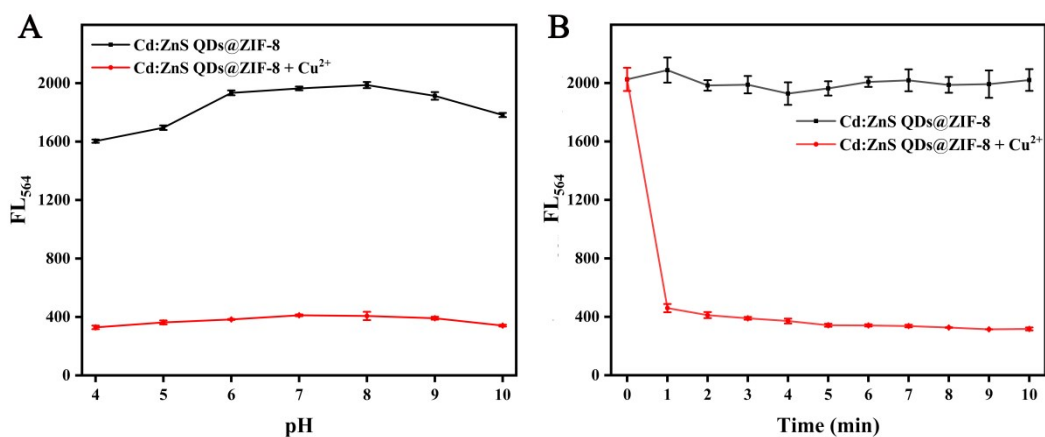


Fig. S7 Effects of pH (A) and time (B) on the fluorescence intensities of Cd:ZnS QDs@ZIF-8 ($250 \mu\text{g mL}^{-1}$) in the absence and presence of Cu^{2+} ($5 \mu\text{M}$).

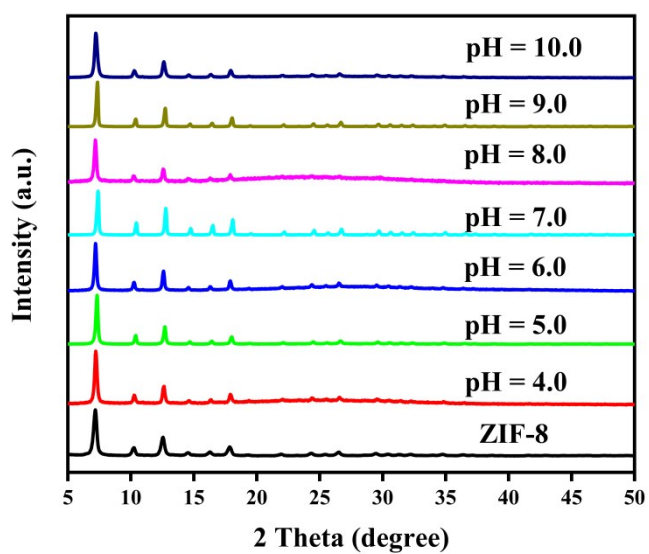


Fig. S8 PXRD patterns of Cd:ZnS QDs@ZIF-8 before and after immersed in aqueous solutions with different pH values (4.0, 5.0, 6.0, 7.0, 8.0, 9.0 and 10.0) for 1 h.

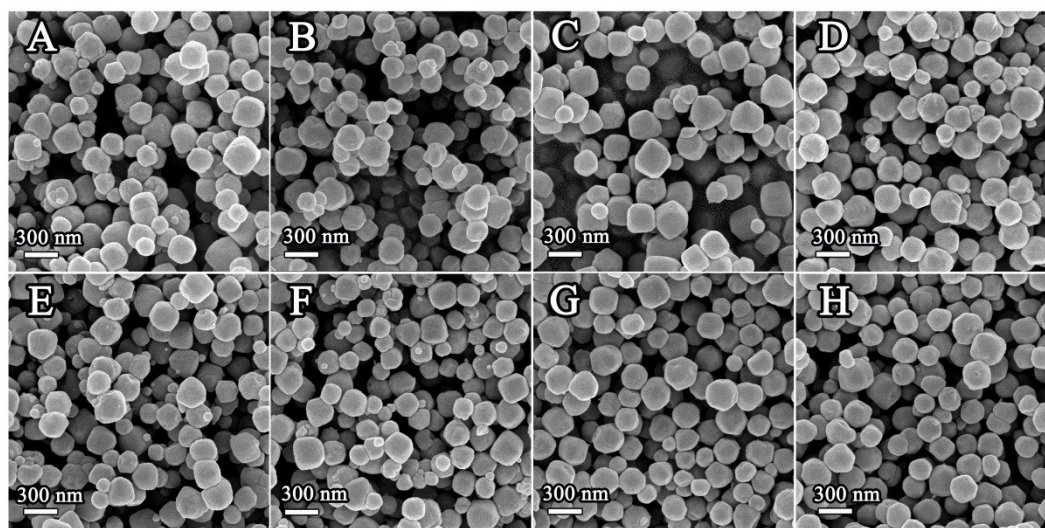


Fig. S9 SEM images of Cd:ZnS QDs@ZIF-8 before (A) and after immersed in aqueous solutions with pH values of 4.0 (B), 5.0 (C), 6.0 (D), 7.0 (E), 8.0 (F), 9.0 (G) and 10.0 (H) for 1 h.