

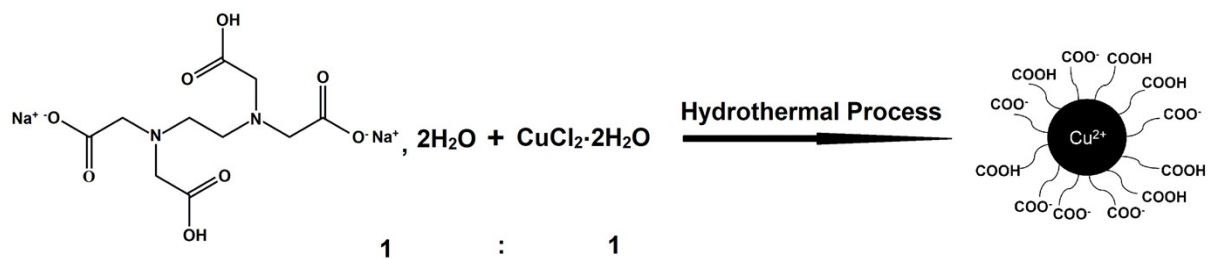
Electronic Supplementary Information

Cu²⁺ integrated carbon dots as efficient bioprobe for selective sensing of guanine nucleobase

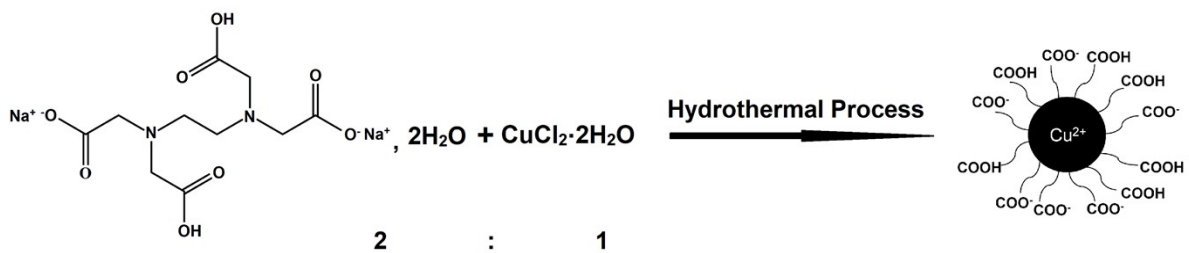
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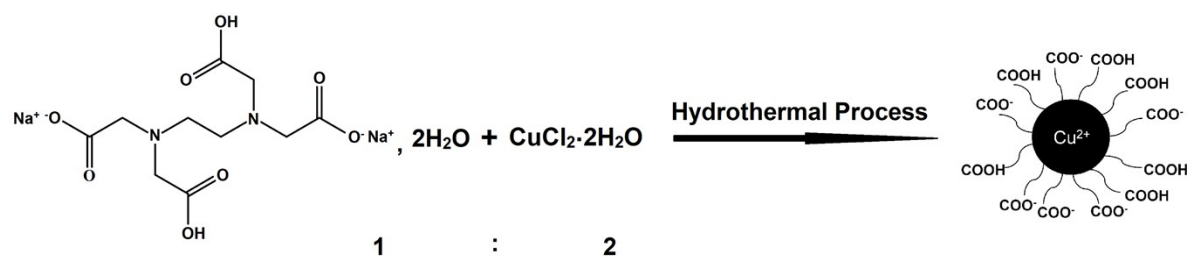
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Scheme S1. Synthetic scheme of **CuCD** (molar ratio between EDTA-2Na, 2H₂O and CuCl₂·2H₂O was 1:1).



Scheme S2. Synthetic scheme of **CuCD** (molar ratio between EDTA-2Na, $2\text{H}_2\text{O}$ and $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$ was 2:1).



Scheme S3. Synthetic scheme of CuCD (molar ratio between EDTA-2Na, 2H₂O and CuCl₂·2H₂O was 1:2).

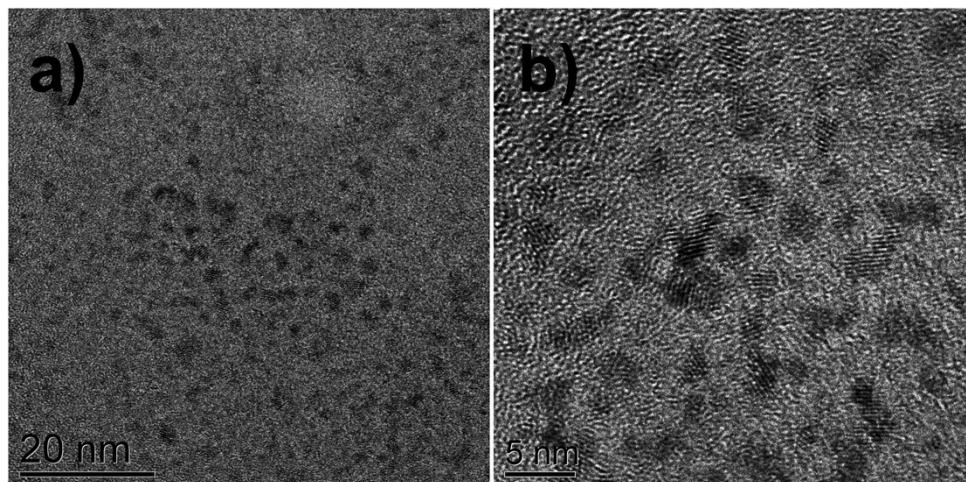


Fig. S1 FEGTEM images of **CuCD**.

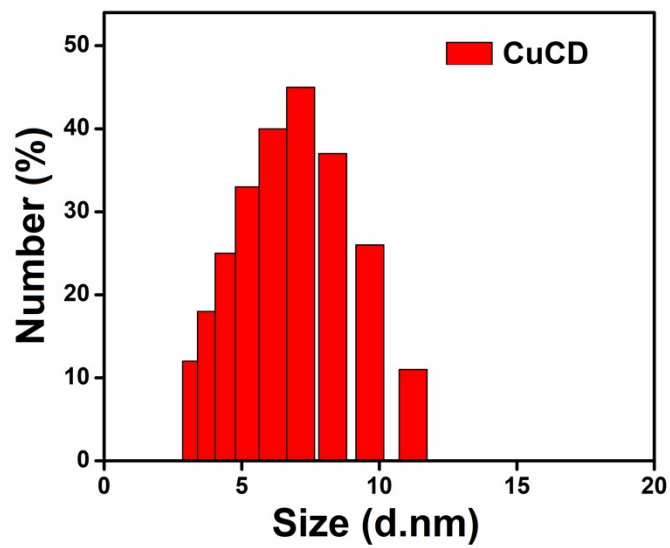


Fig. S2 DLS study of CuCD.

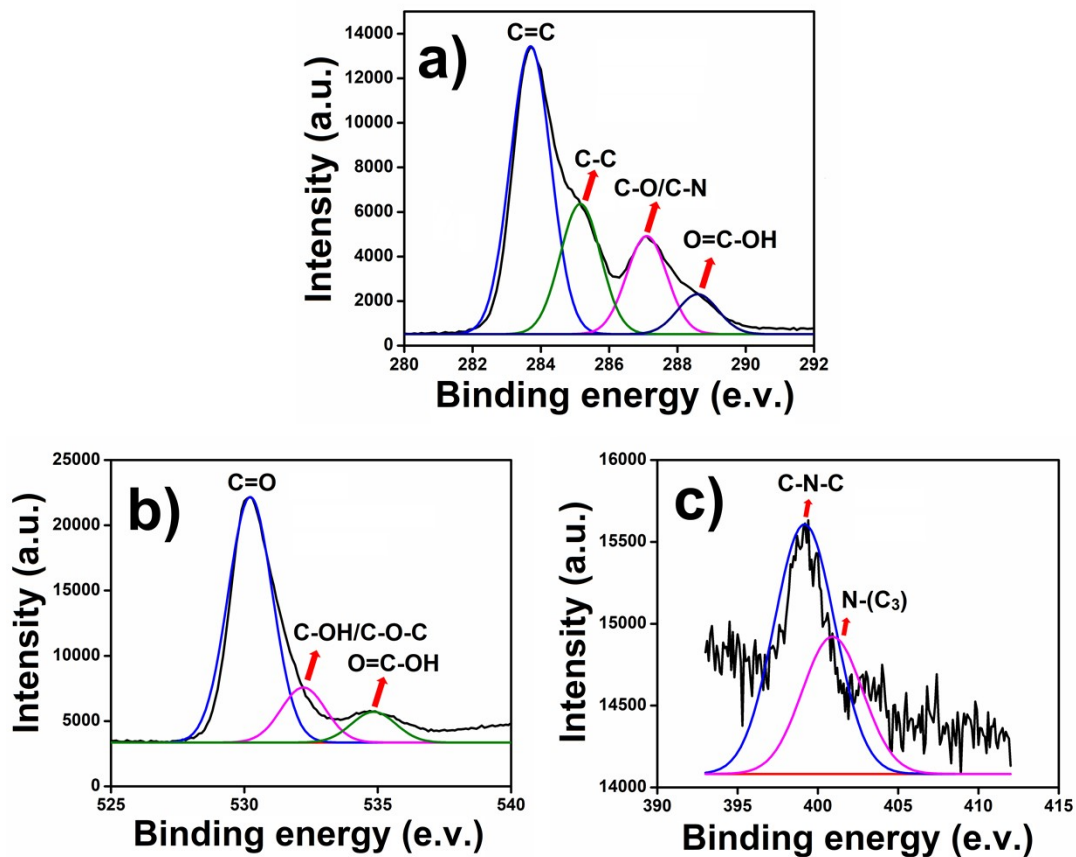


Fig. S3 Deconvolution spectra of (a) C 1s (b) O 1s and (c) N 1s of CuCD.

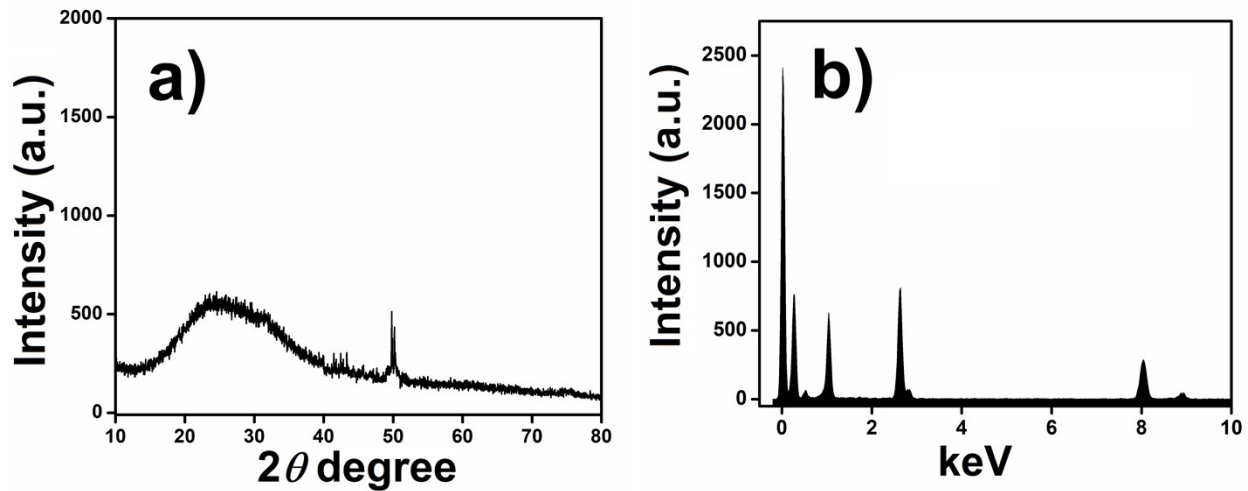


Fig. S4 (a) XRD, and (b) EDX analysis of CuCD. Sample was crusted on glass grid for the EDX experiment.

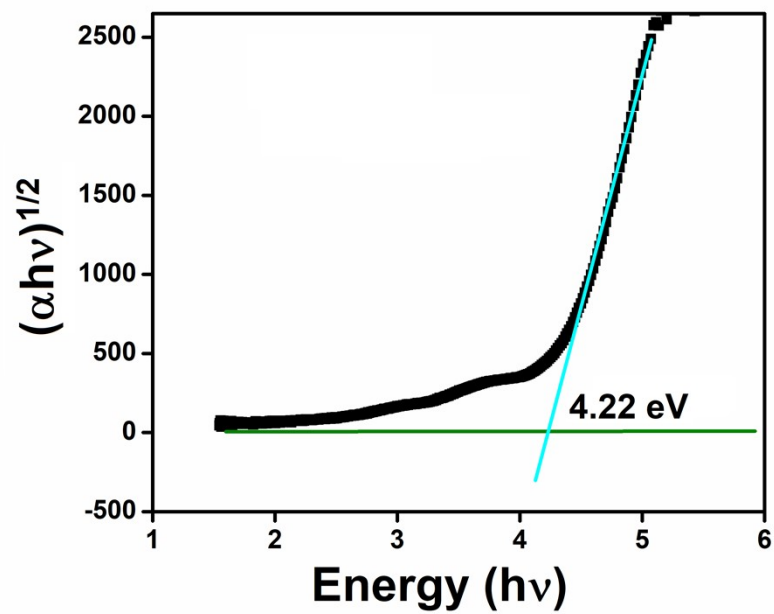


Fig. S5 Tauc's plot of CuCD.

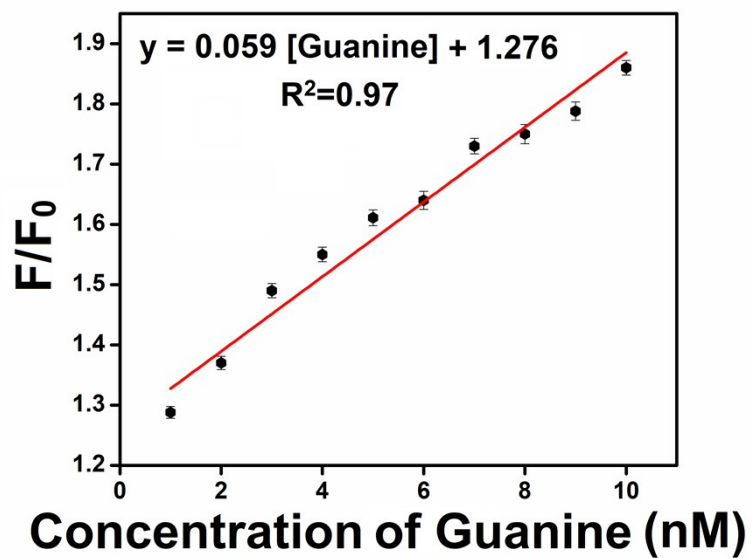


Fig. S6 Stern-Volmer plot of guanine (1-10 nM) in aqueous solution of **CuCD** (250 $\mu\text{g/mL}$).

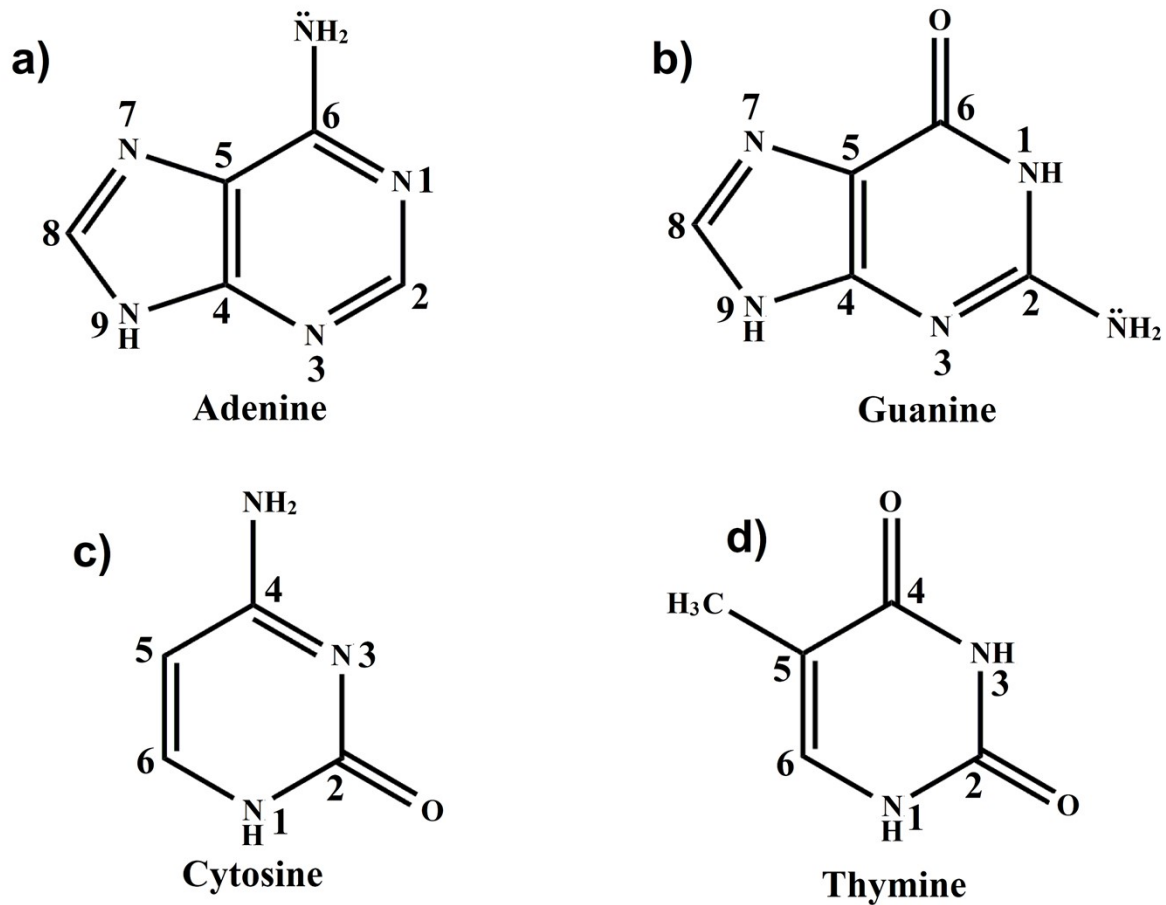


Fig. S7 Structures of (a) adenine, (b) guanine, (c) cytosine and (d) thymine nucleobases.

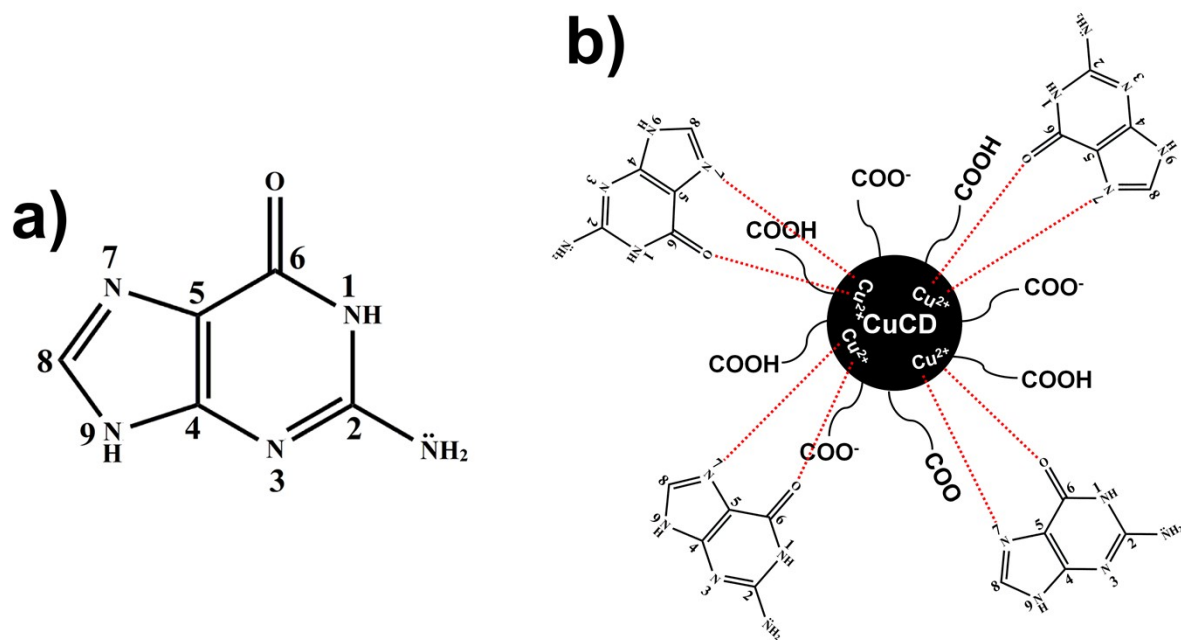


Fig. S8 (a) Structure of guanine and (b) proposed binding model of **CuCDs**-guanine complex.

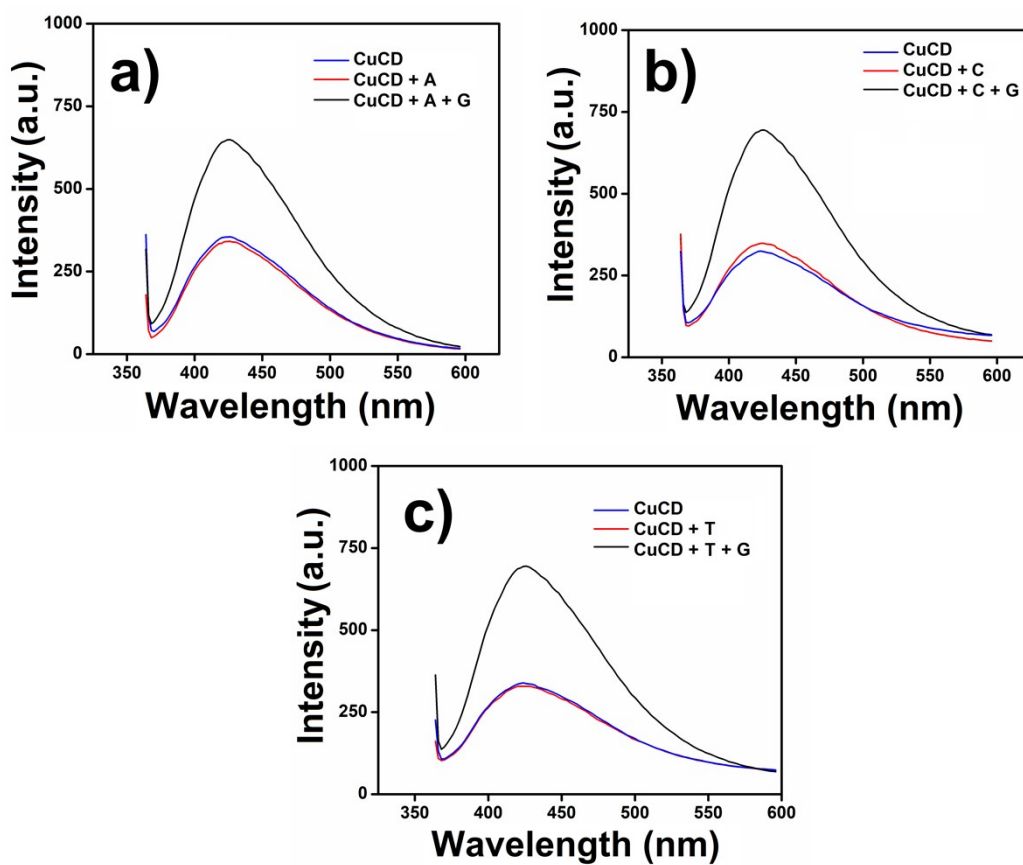


Fig. S9 Interference studies between guanine (20 nM) and samples of (a) **CuCD** (250 $\mu\text{g/mL}$) and adenine (20 nM) mixture, (b) **CuCD** (250 $\mu\text{g/mL}$) and cytosine (20 nM) mixture and (c) **CuCD** (250 $\mu\text{g/mL}$) and thymine (20 nM) mixture.

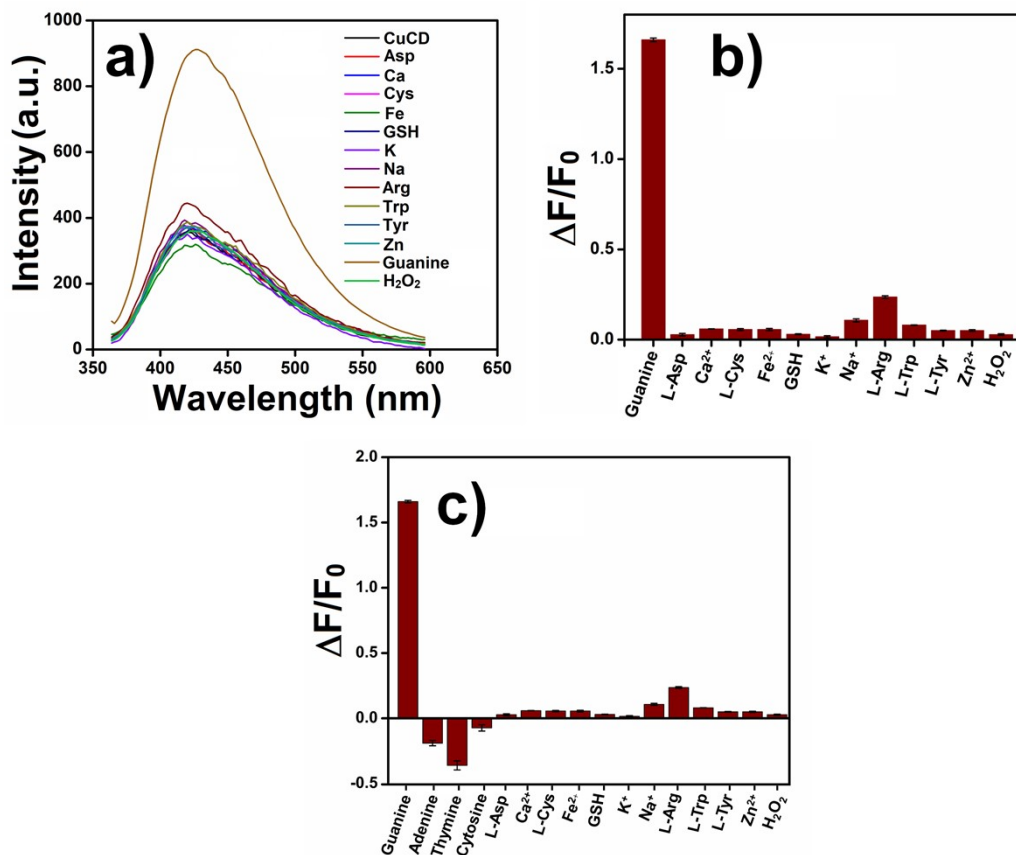


Fig. S10 Selectivity of CuCD (250 μg/mL) to guanine over other metal ions and biomolecules (500 nM). (a) Fluorescence intensity plot (b) relative intensity of CuCD in presence of different metal ions and biomolecules. The error bars represent the standard deviations.

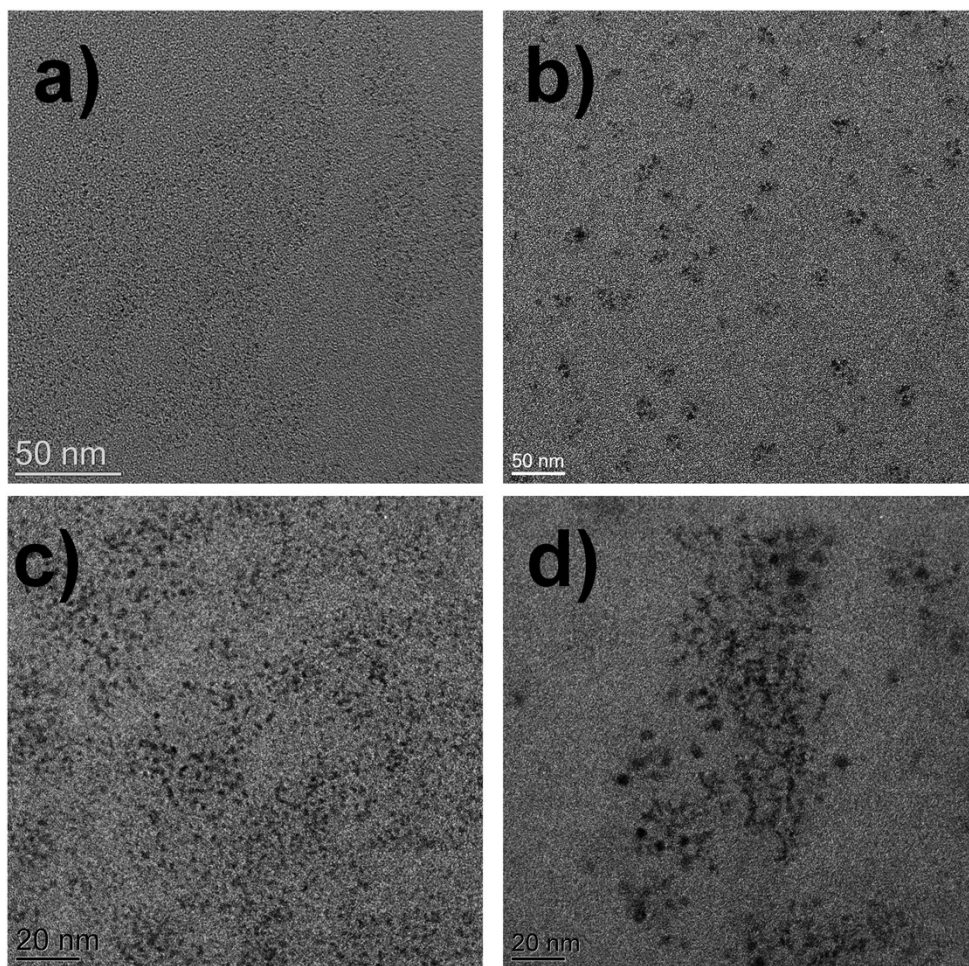


Fig. S11 FEGTEM images of (a) **CuCD**, (b) **CuCD-guanine complex** and (c) **CuCD**, (d) **CuCD-guanine complex** at higher resolution.

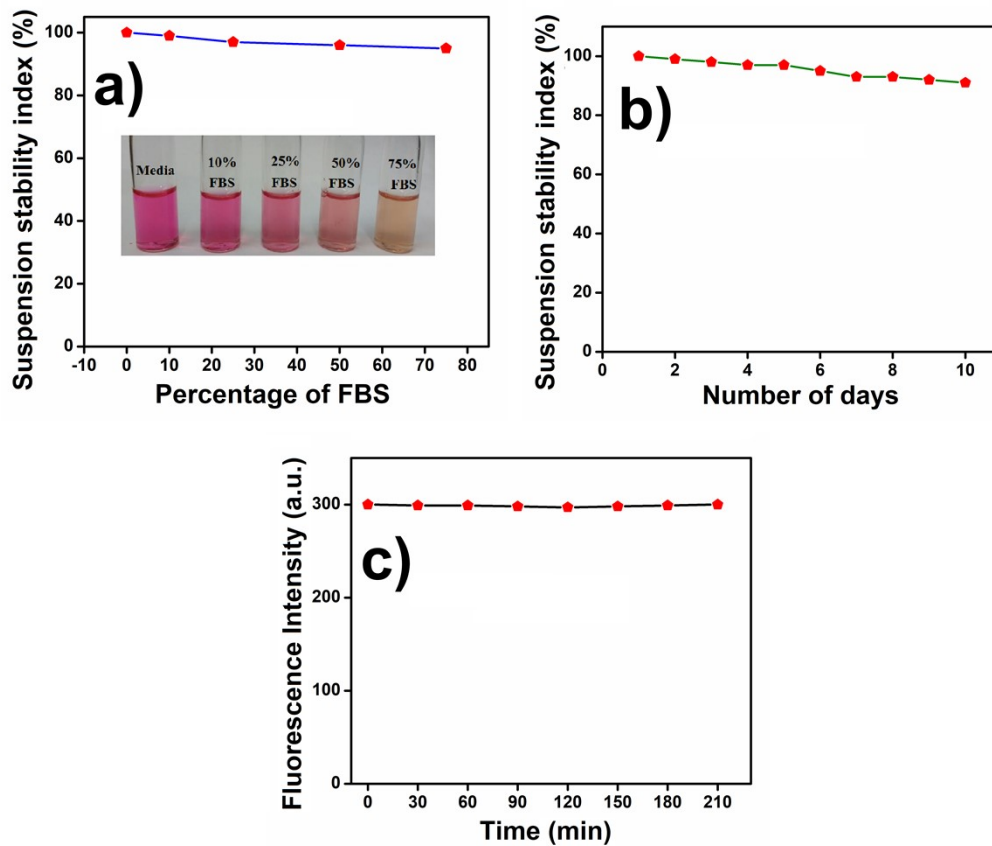


Fig. S12 Suspension stability index of **CuCD** solution where $[\text{CuCD}] = 500 \mu\text{g/mL}$ (a) **CuCD** with respect to FBS concentration (0-75%) in DMEM media, (b) **CuCD** with respect to number of days in 10% FBS in DMEM media and (c) photostability of **CuCD** solution under UV (wavelength 365 nm, power 12 W) light irradiation up to 200 min.

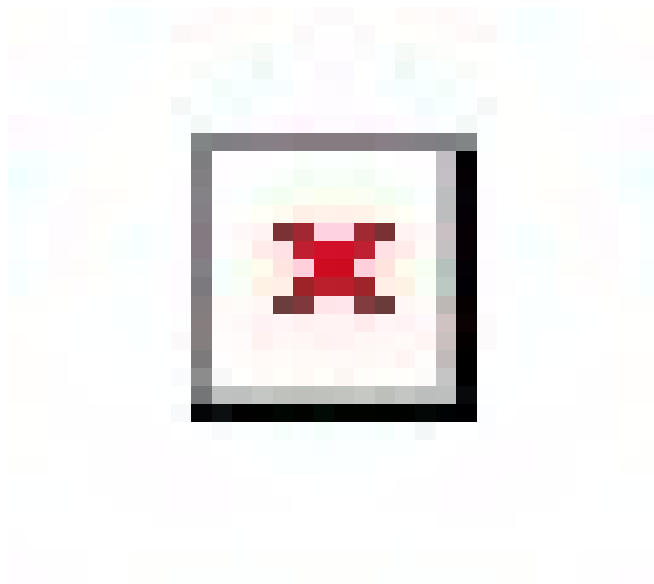


Fig. S13 Cell viability experiment of **CuCD** where $[\text{CuCD}] = 25\text{-}200 \mu\text{g/mL}$ in NIH3T3, B16F10 and MCF-7 cells after 12 h of incubation. The standard deviation was in the range of 1-3% in triplicate experiments.

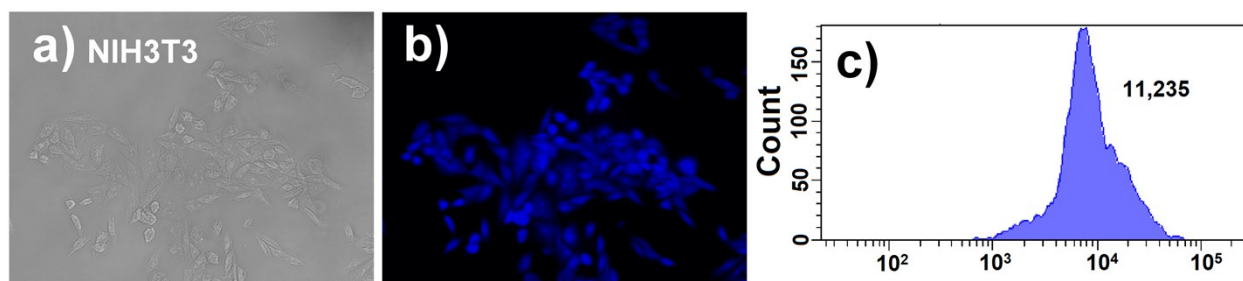


Fig. S14 Bright field and fluorescence microscopic images of cells after 12 h incubation with **CuCD** where $[\text{CuCD}] = 200 \mu\text{g/mL}$ in case of (a,b) treated NIH3T3 cells with guanine (500 nM) and (c) corresponding mean fluorescence intensity for NIH3T3.