

Supporting Information:

A highly selective and sensitive single click novel fluorescent off-on sensor for copper and sulfide ions detection directly in aqueous solution using curcumin nanoparticles

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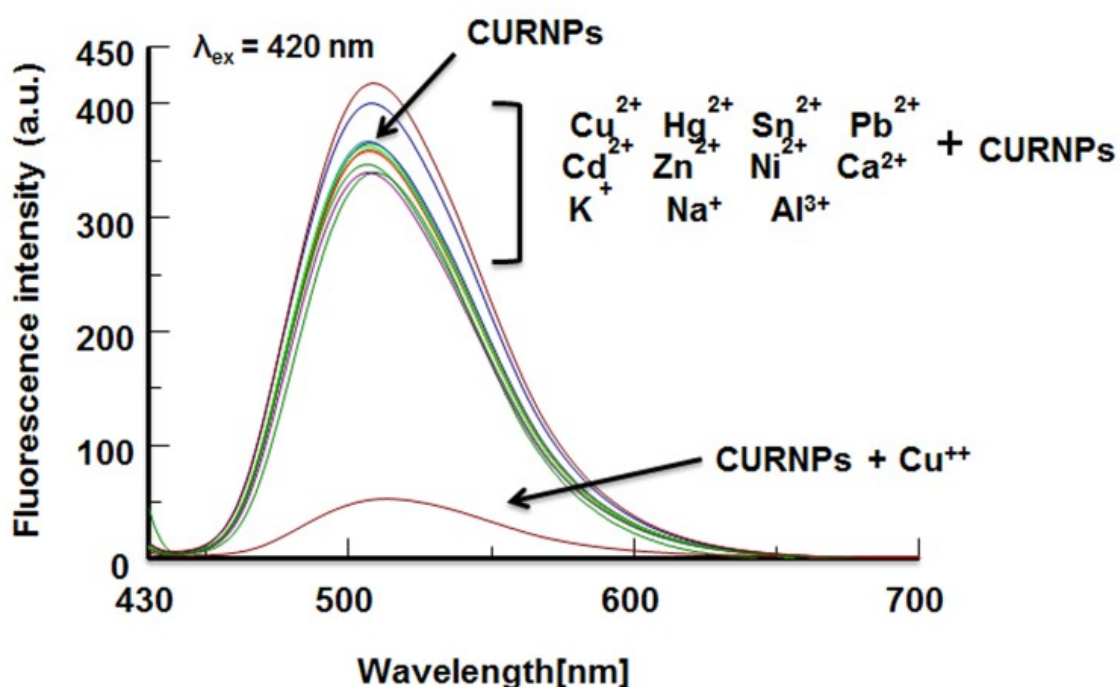


Fig. S1: Fluorescence responses of CURNPs, ($\lambda_{ex} = 420 \text{ nm}$) without and upon the addition of metal ions (concentration 62.5 ng.mL^{-1} of each Hg^{2+} , Sn^{2+} , Pb^{2+} , Cd^{2+} , Zn^{2+} , Ni^{2+} , Ca^{2+} , K^+ , Na^+ , Al^{3+} and Cu^{2+}) in aqueous solution of pH 4 by using acetate buffer.

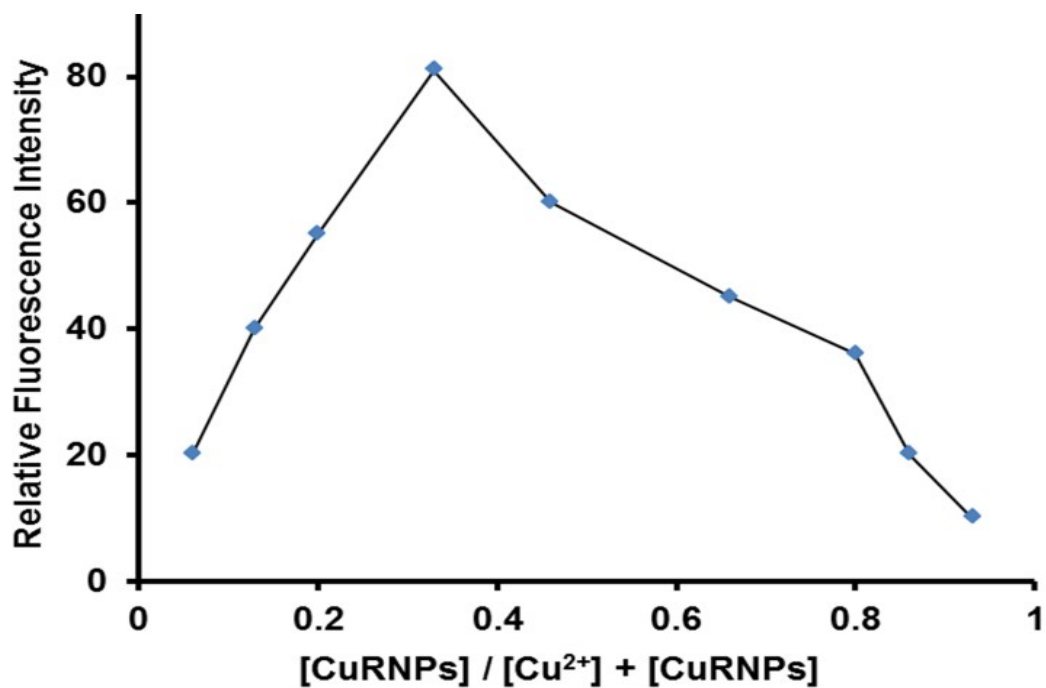


Fig. S2: Job plot for determining the stoichiometry of CURNPs and Cu²⁺ in aqueous solution of pH=4.. The total concentration of CURNPs and Cu²⁺ is 15 μM, $X_{\text{CURNPs}} = [\text{CURNPs}] / ([\text{Cu}^{2+}] + [\text{CURNPs}])$.

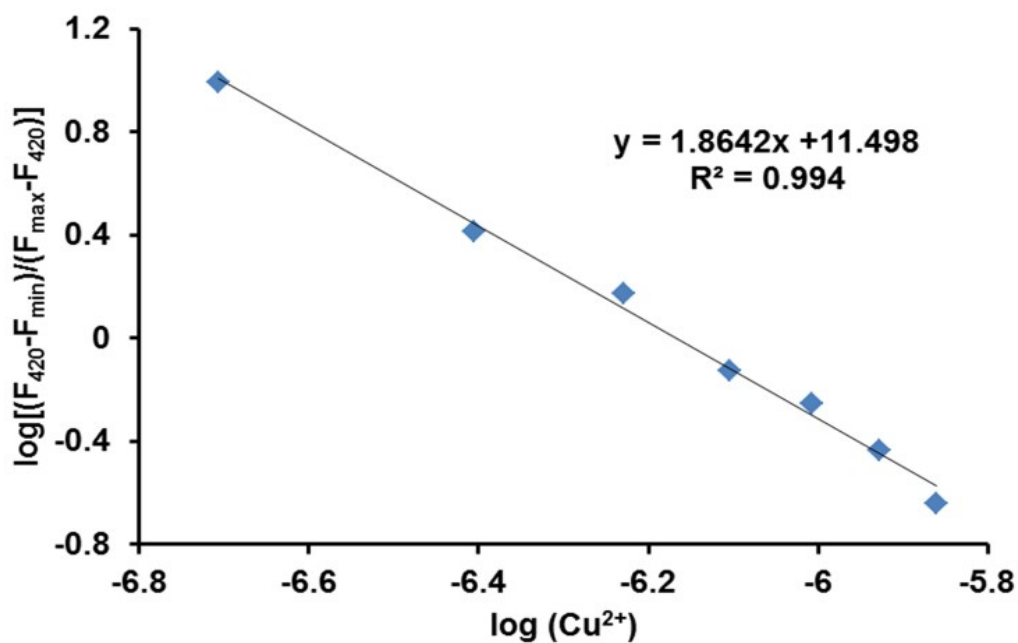


Fig. S3: Hill Plot for bonding mode between CURNPs and Cu²⁺ ions.

Conclusion: Hill coefficient (n) is 1.864 indicating CURNPs binds with Cu²⁺ ion with ratio 2:1.

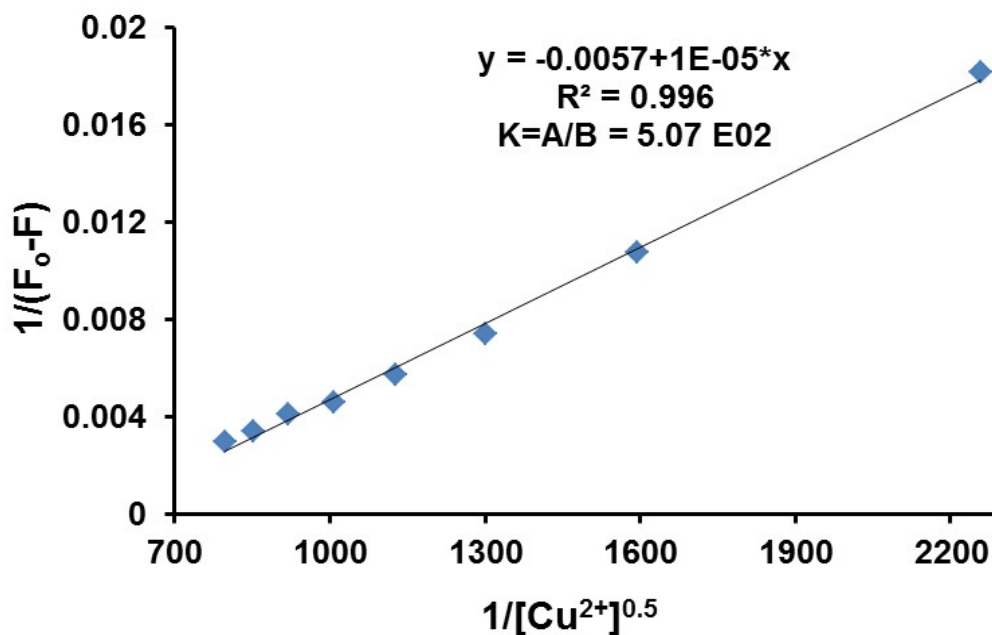


Fig. S4: The binding constants (K) from Benesi–Hildebrand plots of fluorescence intensity response of the CURNPs toward Cu^{2+} anion.

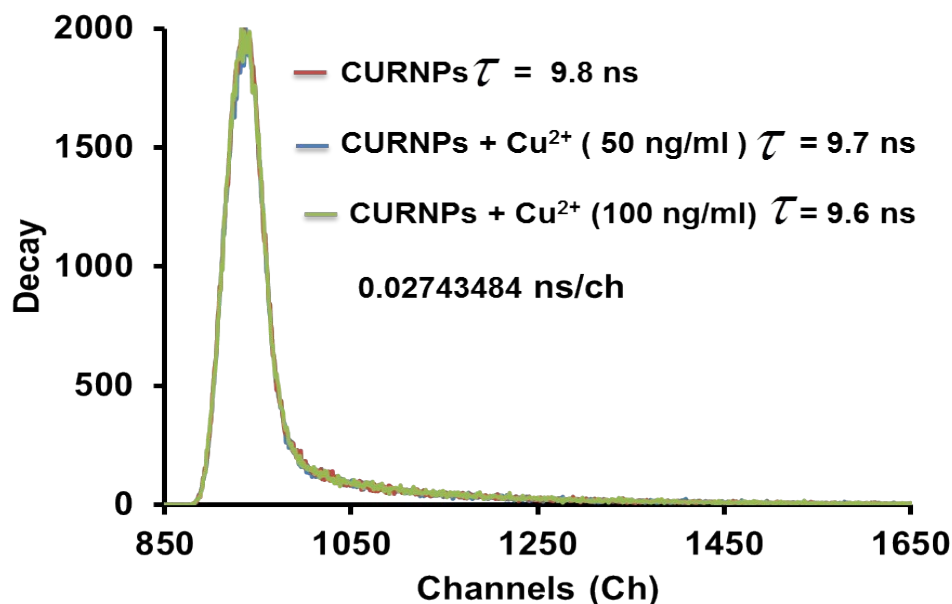


Figure S5: Representation of the lifetime spectra of CURNPs and their variation in response to the addition of Cu^{2+} to CURNPs suspension: (Green) in the absence Cu^{2+} , blue and red in the presence 50 and 100 $ng \cdot mL^{-1}$ Cu^{2+} respectively.

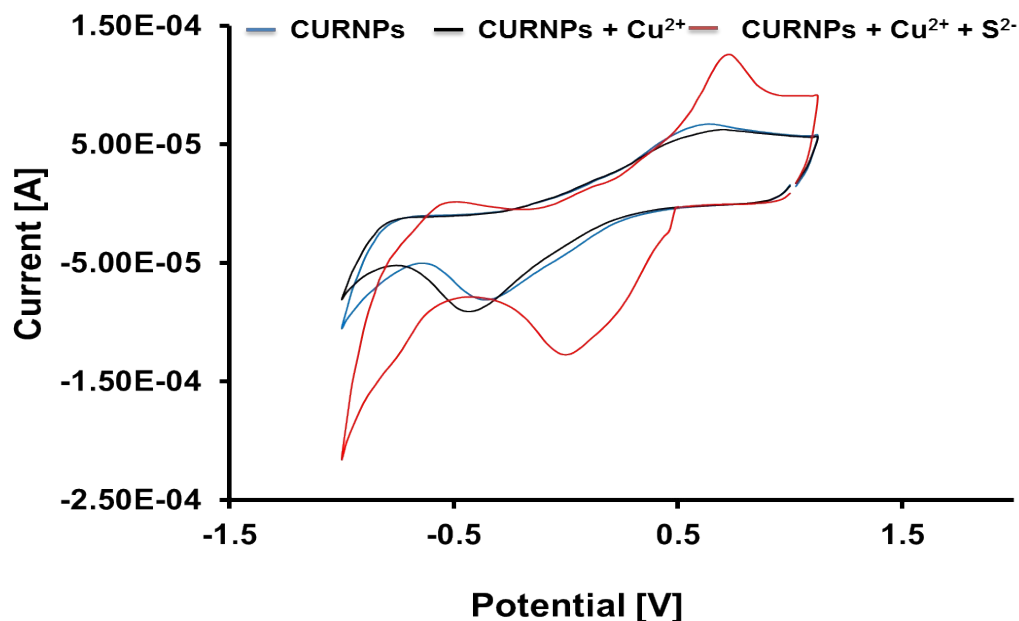


Figure S6: Cyclic voltammogram of CURNPs without ions (Blue line), CURNPs + [Cu²⁺ 50 ng.ml⁻¹] (dark blue), and [CURNPs + [Cu²⁺ 50ng.ml⁻¹] + [S²⁻ 7.5 ng.ml⁻¹]] (red line). The CV measurement was done by applying a voltage potential at 1.4V, scan rate 50 mv/s. using aqueous solvent. The working and counter electrode was Platinum electrode, reference electrode was Ag/Agcl.

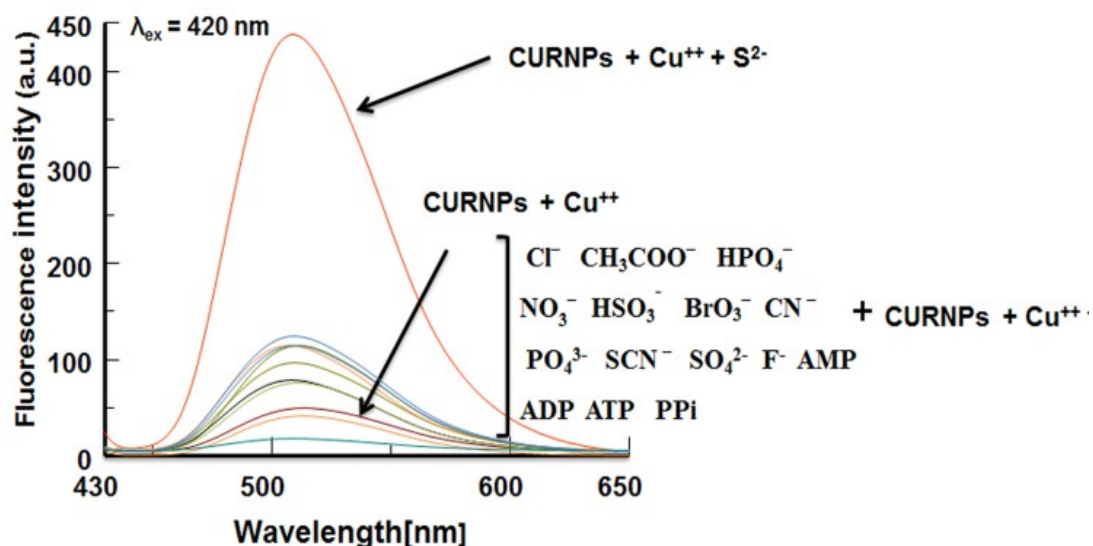


Fig. S7: Fluorescence responses of CURNPs-Cu²⁺ ensemble suspension ($\lambda_{ex} = 420 \text{ nm}$) and upon the addition of anions (7.5 ng.mL⁻¹ each of Cl⁻, CH₃COO⁻, HPO₄⁻, NO₃⁻, HSO₃⁻, BrO₃⁻, PO₄³⁻, SCN⁻, SO₄²⁻, F⁻ and S²⁻ in aqueous solution of pH 4 by using acetate buffer.

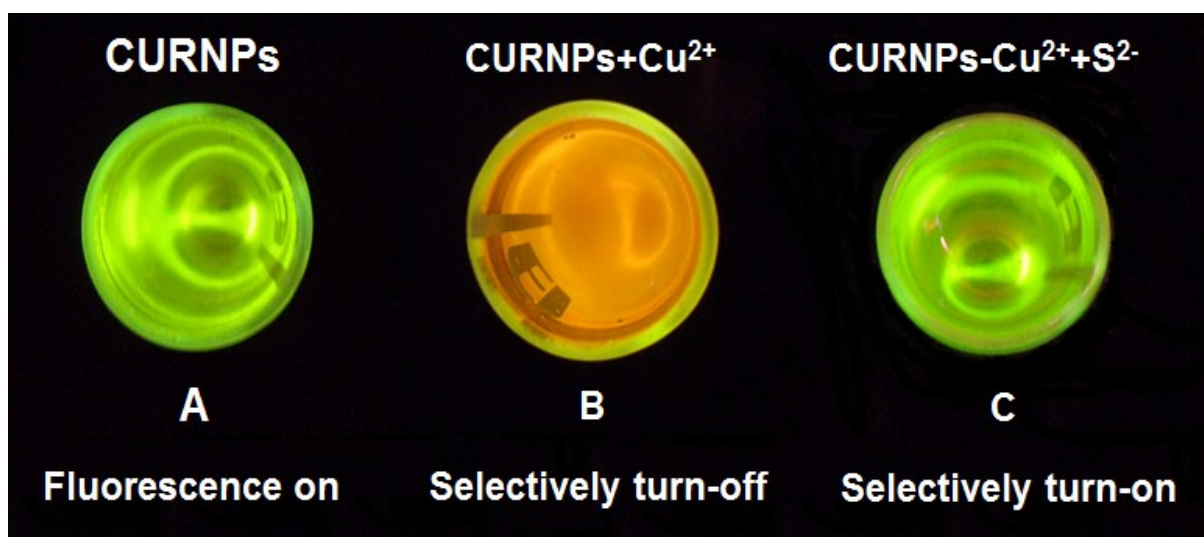


Figure S8: Fluorescence images of curcumin nanoparticles (A), fluorescence off image (B) of curcumin nanoparticles by copper ion i.e. (CURNPs+ Cu²⁺) under excitation and fluorescence on images (C) of CURNPs+ Cu²⁺ by Sulfide ion under excitation.