

**Construction of S-scheme CdS/CuFe<sub>2</sub>O<sub>4</sub> heterojunction with suppressed charge recombination  
for enhanced visible light driven photocatalytic activity**

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## **Text S1.**

### **Characterization of nanoparticles**

XRD analysis (Bruker D8 Advance) was carried out to study the crystalline nature of fabricated CuFe<sub>2</sub>O<sub>4</sub>/CdS NCs in the 2θ range of 10 to 90° using Cu-Kα radiation ( $\lambda = 1.54178 \text{ \AA}$ ). TEM was carried out to examine the morphology of fabricated nanomaterial using Jeol/JEM 2100. EDAX analysis was done to confirm the presence of elements in the NCs. FTIR of the fabricated NCs was acquired from the Thermo Fisher scientific Nicolet IS50 instrument. The specific surface area of the sample was detected by BET analysis (Quantachrome instrument, Autosorb IQ series). In order to detect the chemical composition and oxidation states of the fabricated NCs, XPS analysis was done using Thermo Scientific™ ESCALAB™ Xi+. UV-vis DRS was done using Perkin-Elmer Lambda 750. Raman spectroscopic studies (WiTec alpha 300, Germany) were done in order to determine the vibrational modes of NCs. EIS (Metrohm Autolab Potentiostat) was carried out to confirm the effective separation and migration of e<sup>-</sup>/h<sup>+</sup> pairs. Photoluminescence spectroscopy (FLS 1000, Edinburgh Instruments) was carried out to obtain the PL spectra of the fabricated NCs.



**Figure S2.** EDAX of CuFe<sub>2</sub>O<sub>4</sub>/CdS NCs- 40

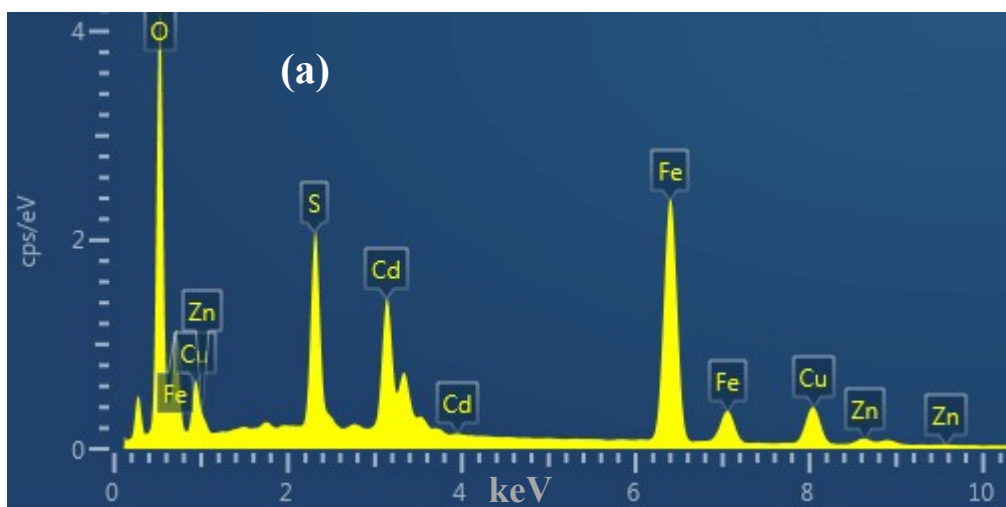
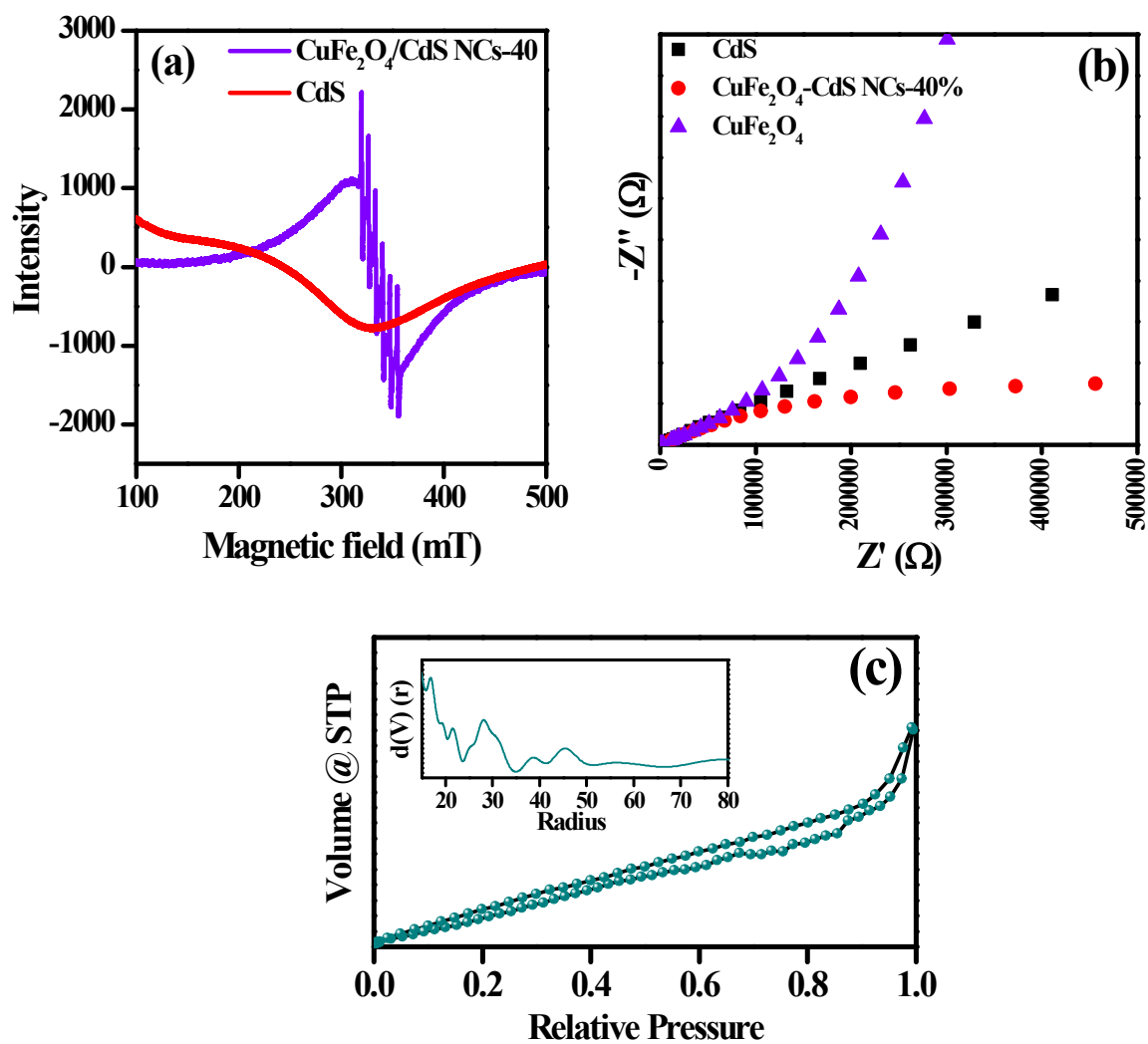
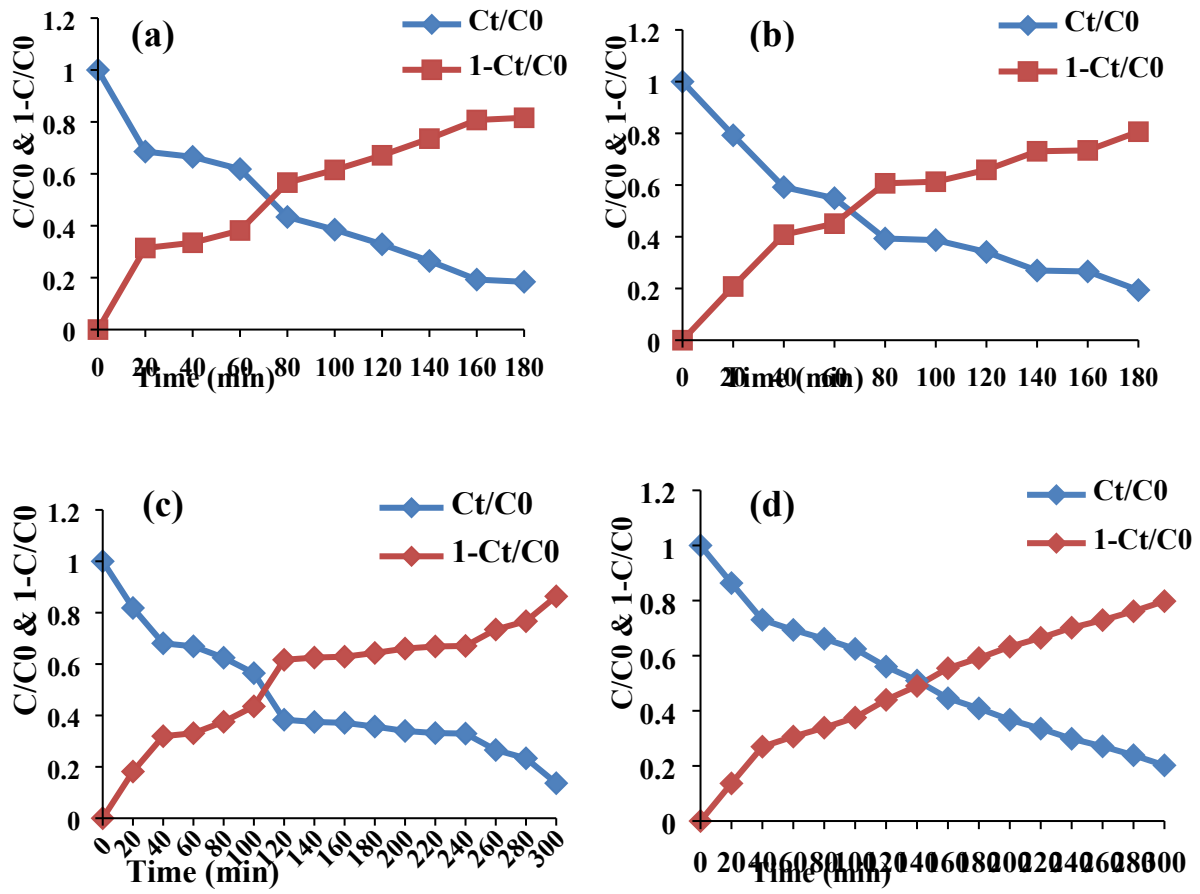


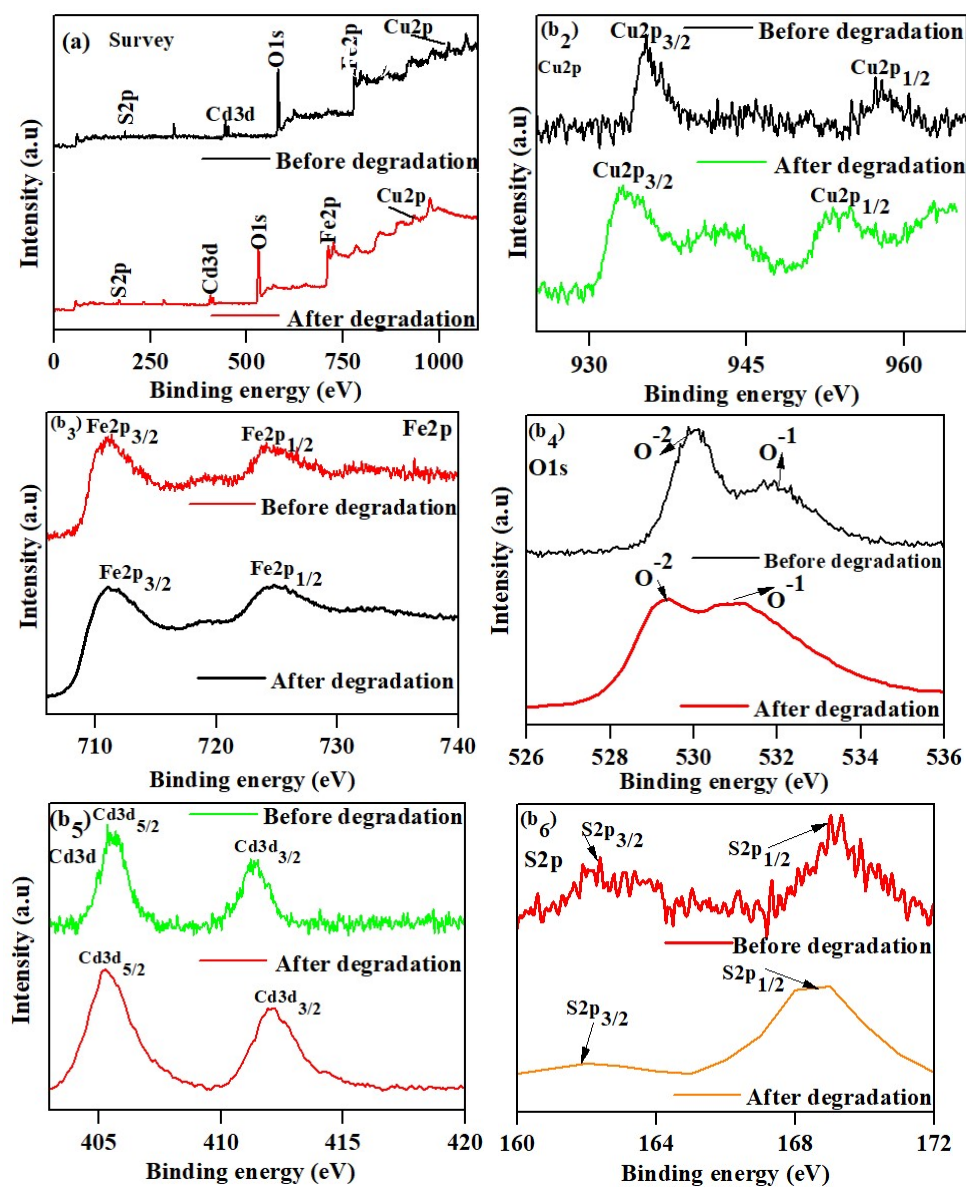
Figure S3. (a) ESR, (b) EIS and (c) BET analysis.



**Figure S4.** Plot of  $C/C_0$  and  $1-C/C_0$  vs time. (a)  $\text{CuFe}_2\text{O}_4/\text{CdS}$  NCs -20, (b)  $\text{CuFe}_2\text{O}_4/\text{CdS}$  NCs -60, (c)  $\text{CuFe}_2\text{O}_4$  and (d) CdS.



**Figure S5.** XPS spectra of reused CuFe<sub>2</sub>O<sub>4</sub>/CdS NCs-40.



**Table S1.** Comparative data on photocatalysis of present work with available literature.

<b>Particle</b>	<b>Photocatalytic activity (%)</b>	<b>Photocatalyst dosage (mg/L)</b>	<b>Pollutant concentration</b>	<b>References</b>
CeO <sub>2</sub> /CdS	88.07	1000	12 mg/L	[47]
FeSe	88.00	500	6 μM	[48]
CuFe <sub>2</sub> O <sub>4</sub> (UV light)	94.20	240	20 mg/L	[49]
CuFe <sub>2</sub> O <sub>4</sub> /Bi <sub>2</sub> O <sub>3</sub> (with H <sub>2</sub> O <sub>2</sub> )	91.00	2400	7 mg/L	[50]
CuFe <sub>2</sub> O <sub>4</sub> /C <sub>3</sub> N <sub>4</sub> hybrid (with H <sub>2</sub> O <sub>2</sub> )	98.00	1000	0.028 mM	[51]
CuFe <sub>2</sub> O <sub>4</sub> /CdS NCs-40	90.06	150	25 mg/L	Present work