Supporting Information

Enhanced photocatalytic activity of hierarchical three dimensional metal oxide@CuO nanostructures towards the degradation of Congo red dye under solar radiations

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Calibration Curve:

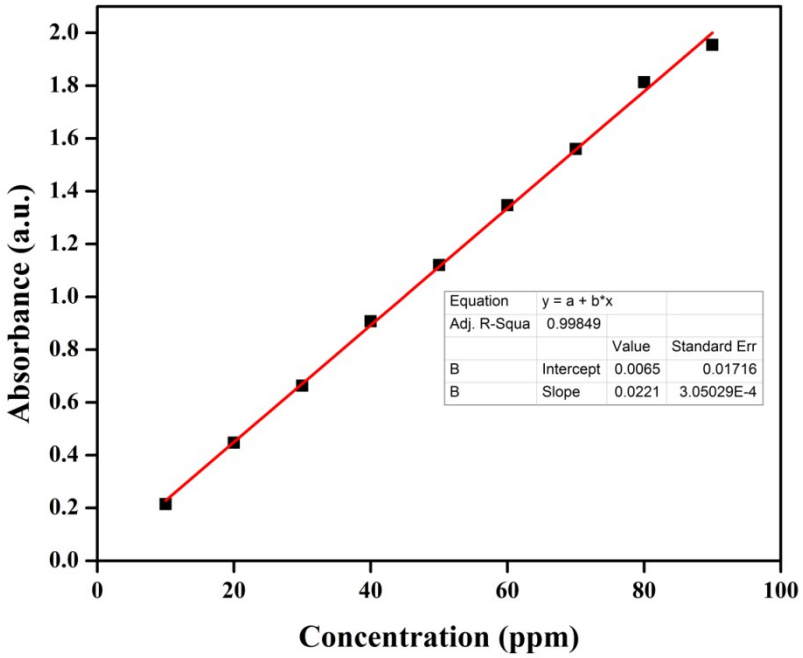


Fig. S1 Calibration curve for congo red dye to calculate the concentration of dye

Thermogravimetric analysis:

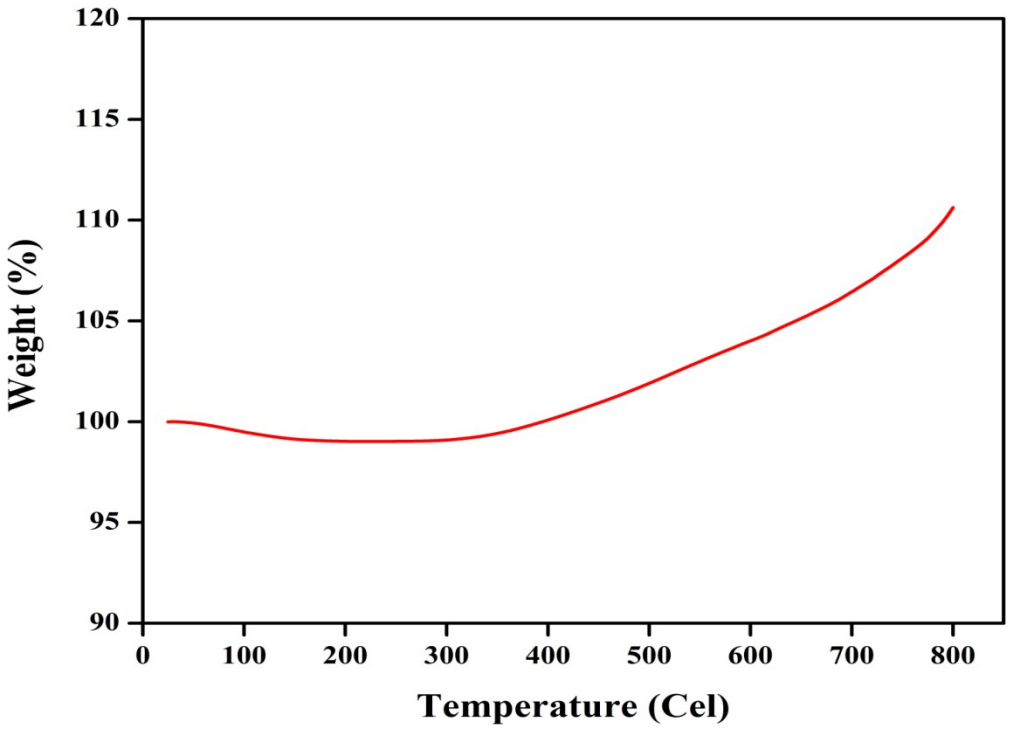
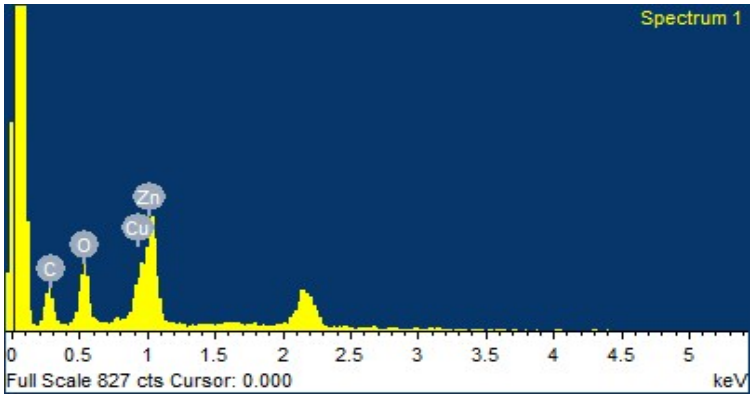


Fig. S2 TGA spectra for copper foam showing the weight (%) change as a function of temperature

EDX analysis:

(a)

Element	Weight%	Atomic%
C K	7.02	18.09
O K	23.16	44.82
Fe L	45.85	25.41
Cu L	23.97	11.68
Totals	100.00	



(b)

Element	Weight%	Atomic%
C K	17.57	41.86
O K	16.17	28.91
Cu L	19.37	8.72
Zn L	46.89	20.52
Total	100.00	

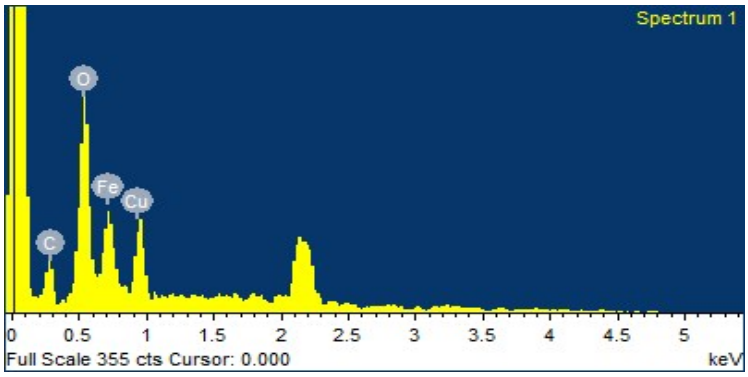


Fig. S3 EDX spectra and elemental composition of (a) Fe_3O_4/CuO and (b) ZnO/CuO nanostructures

Absorption spectra:

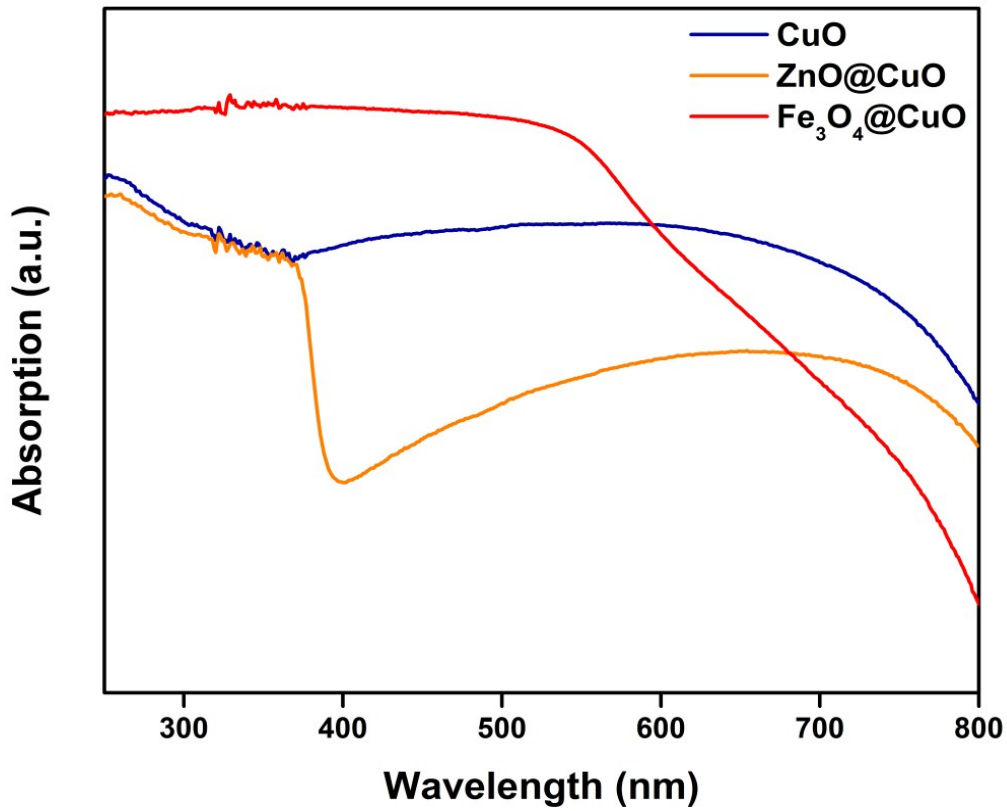


Fig. S4 UV-VIS-NIR diffuse reflectance spectrum depicting the photo-absorption by CuO nanowires, ZnO@CuO and Fe_3O_4@CuO nanostructures.

Photocatalytic experiment under UV radiations:

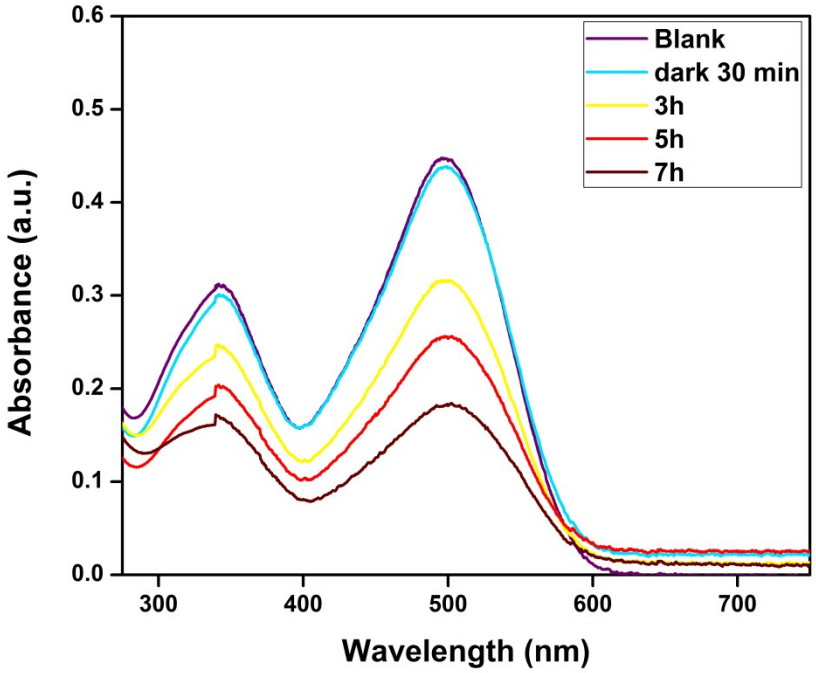


Fig. S5 UV-Vis absorption spectra depicting the congo red degradation using Fe_3O_4@CuO heterostructures under UV radiations

PL emission spectra for ZnO@CuO:

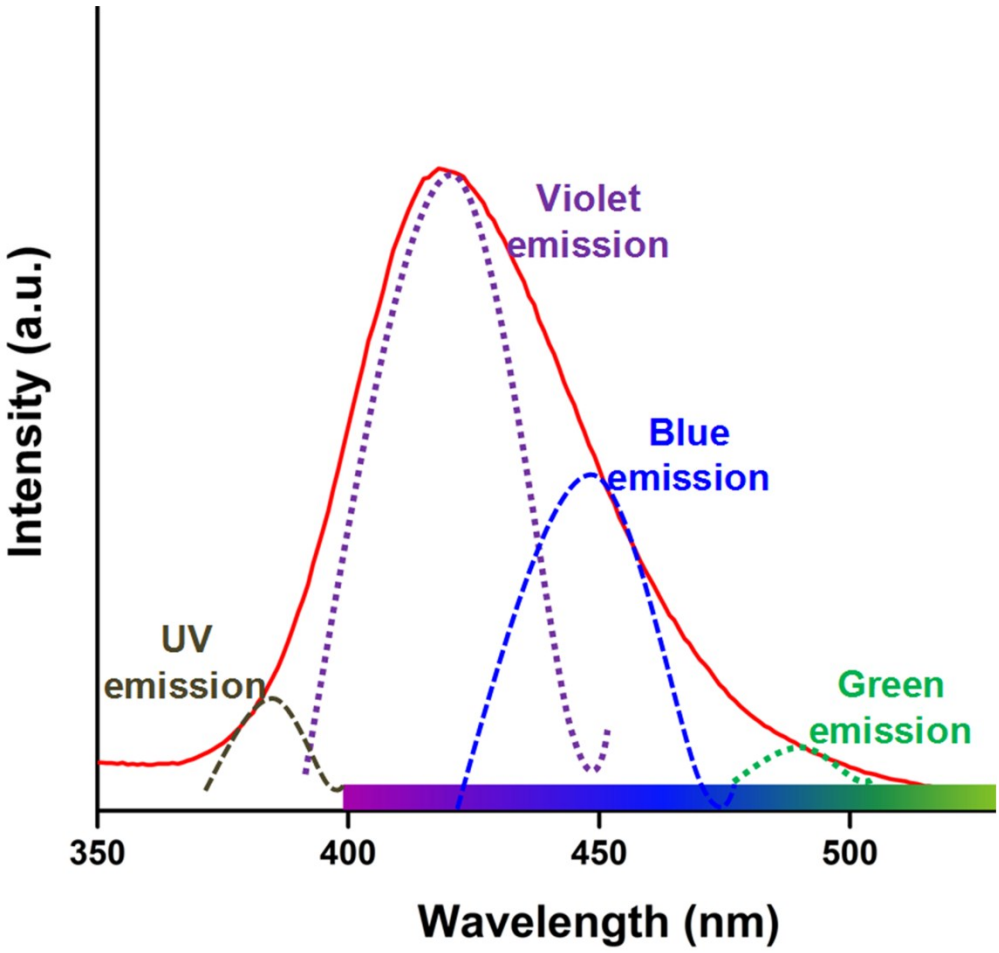


Fig. S6 Photoluminescence spectrum for ZnO@CuO heterostructures fitted with peaks corresponding to UV emission, Violet, Blue and Green emissions