

## Supplementary Information

### Facile photocatalytic reduction of carcinogenic Cr(VI) on Fe-doped copper sulfide nanostructures

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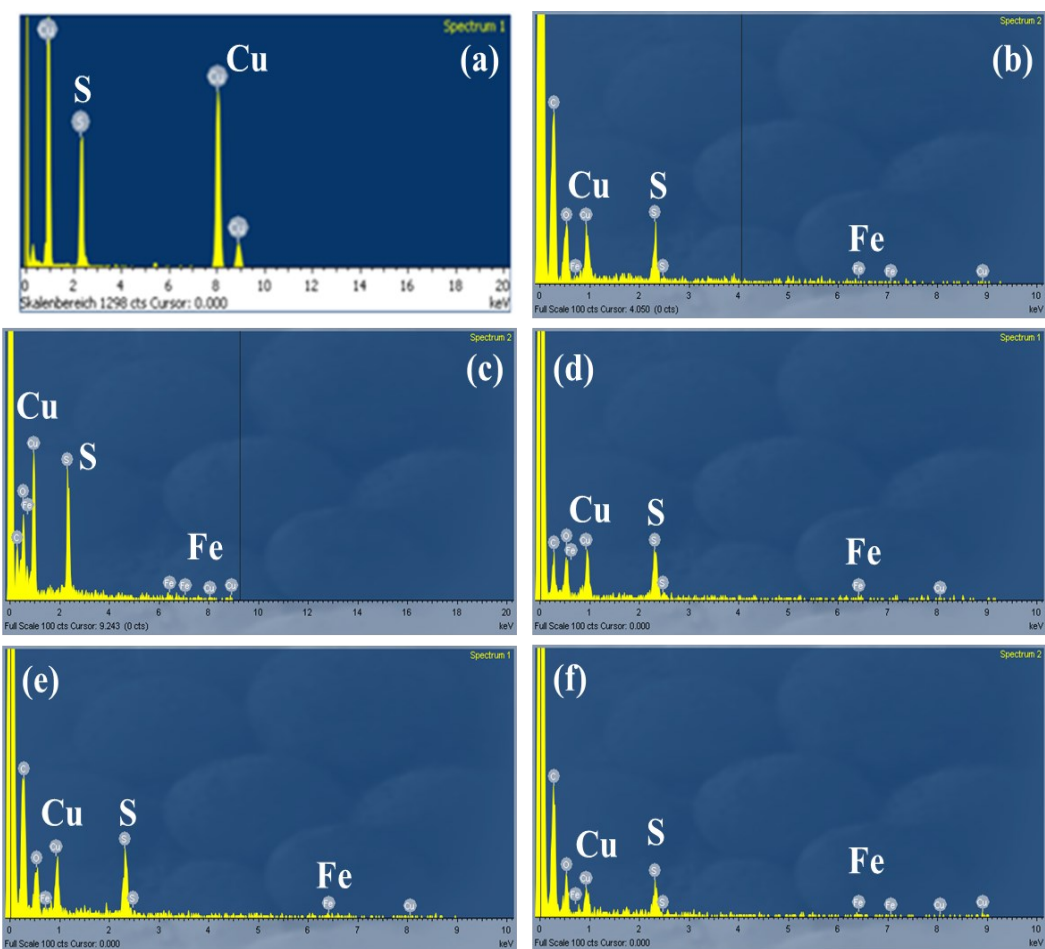


Figure S1: EDX Images of (a) pure CuS/Cu<sub>2</sub>S, (b) Fe (0.01)- CuS/Cu<sub>2</sub>S, (c) Fe (0.03)- CuS/Cu<sub>2</sub>S, (d) Fe (0.05)- CuS/Cu<sub>2</sub>S, (e) Fe (0.07)- CuS/Cu<sub>2</sub>S and (f) are Fe(0.09)- CuS/Cu<sub>2</sub>S,

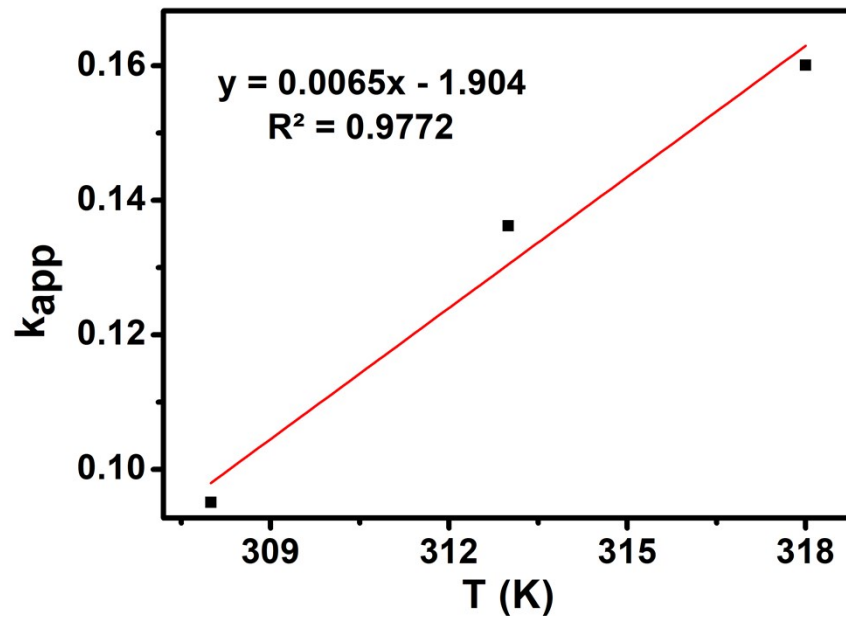


Figure S2: Rate of reaction for photocatalytic Cr (VI) reduction using formic acid increase linearly in the presence of  $Cu_{x-1}Fe_xS$  ( $x = 9\%$ ) nanostructures at different temperatures (35, 40, 45°C).

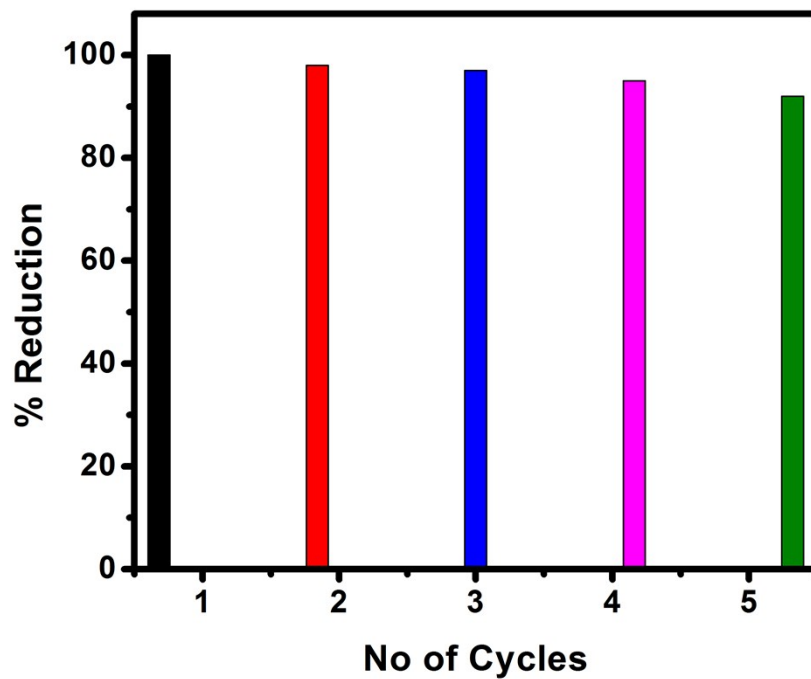


Figure S3: Stability test of 9% CuFeS NPs for 5 Cycles

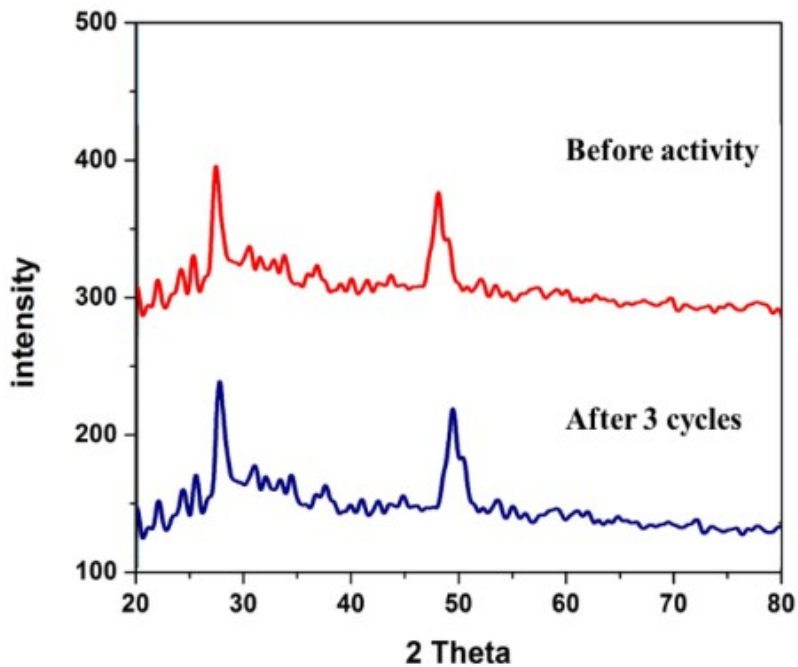


Figure S4: XRD pattern for  $\text{Cu}_{1-x}\text{Fe}_x\text{S}$  ( $x = 9\%$ ), before the activity and after recycling three times for Cr(VI) reduction.

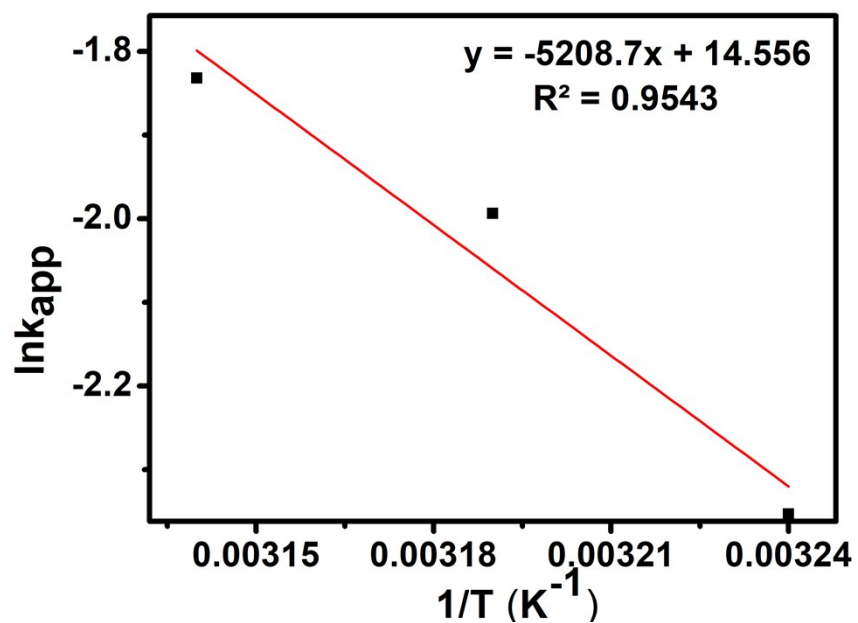


Figure S5: Arrhenius plot of the apparent rate constant

$k_{\text{app}}$  9%  $\text{Cu}_{1-x}\text{Fe}_x\text{S}$  nanostructure.

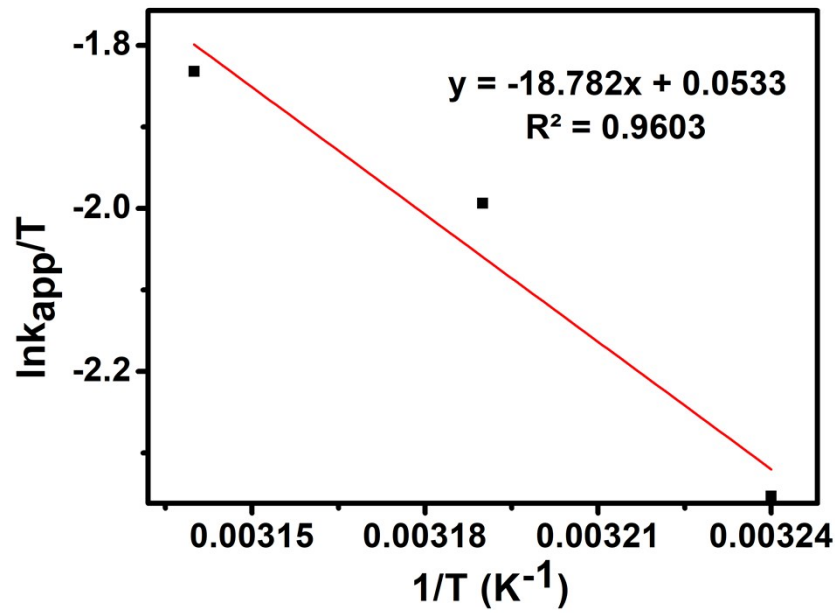


Figure S6: Eyring plot for 9%  $\text{Cu}_{1-x}\text{Fe}_x\text{S}$  nanostructures.