

Photoactive Fe₂O₃/Cu₂O Heterostructured Nanocrystals

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Supporting Information

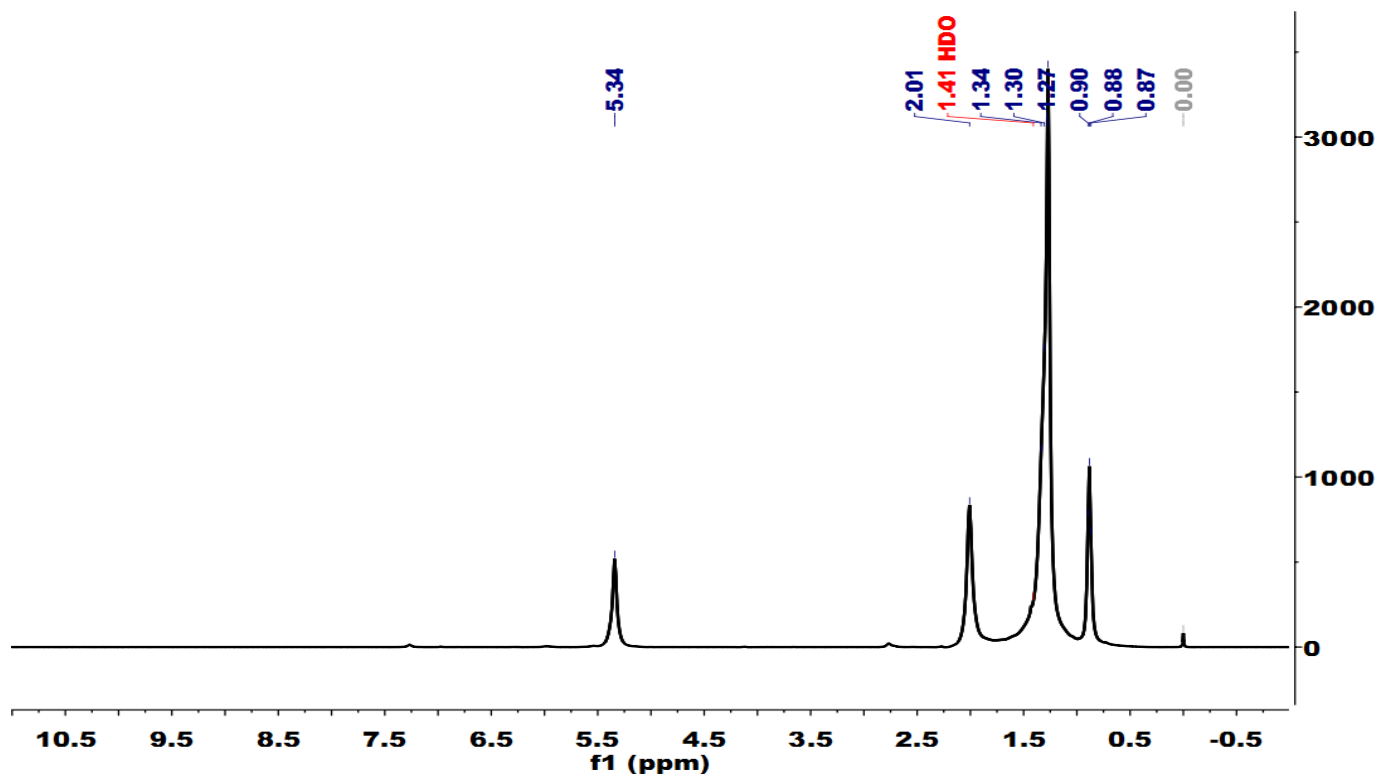


Figure S1. ¹H NMR spectrum of Fe(oleate)₃ precursor acquired in CDCl₃

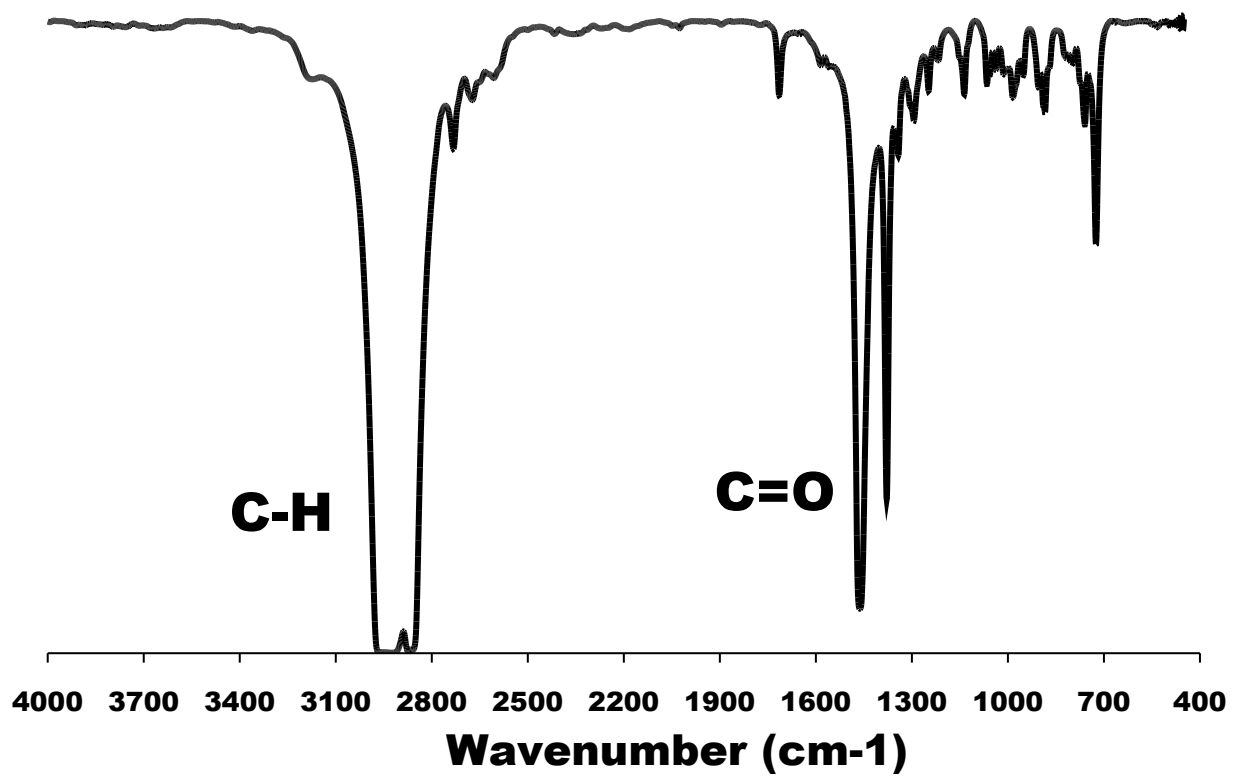


Figure S2. IR Spectrum of Fe(oleate)₃ precursor

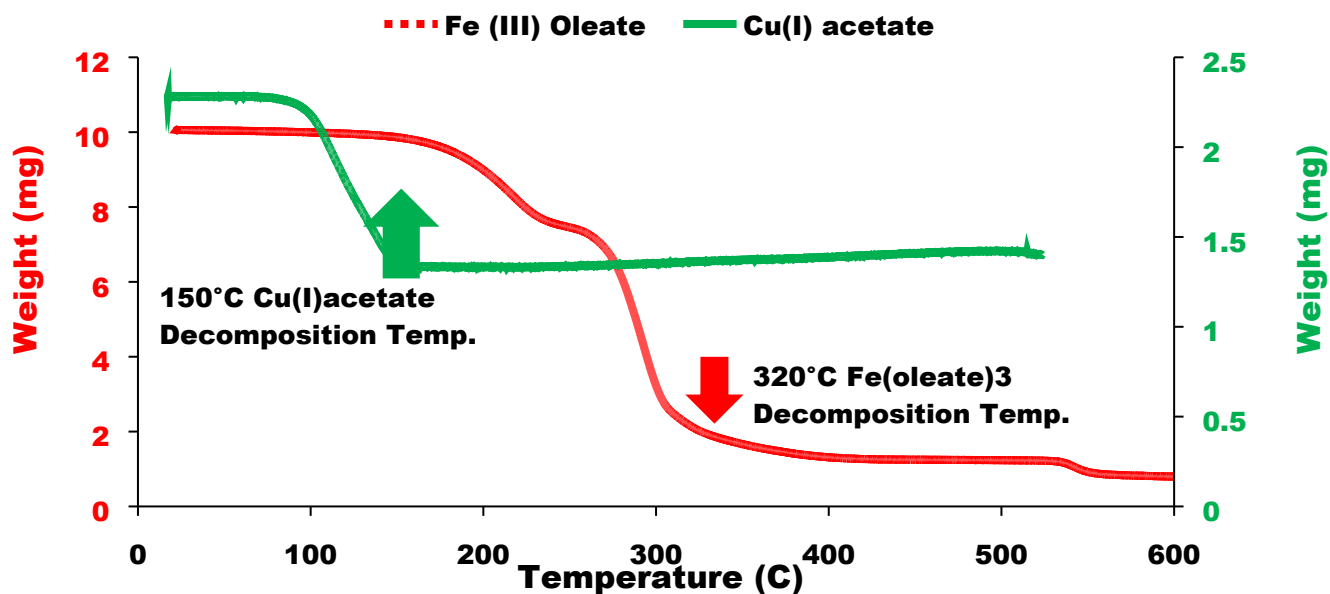


Figure S3. TGA scans of Fe(oleate)₃ and Cu(I) acetate under N₂ showing decomposition temperatures of the organometallic precursors

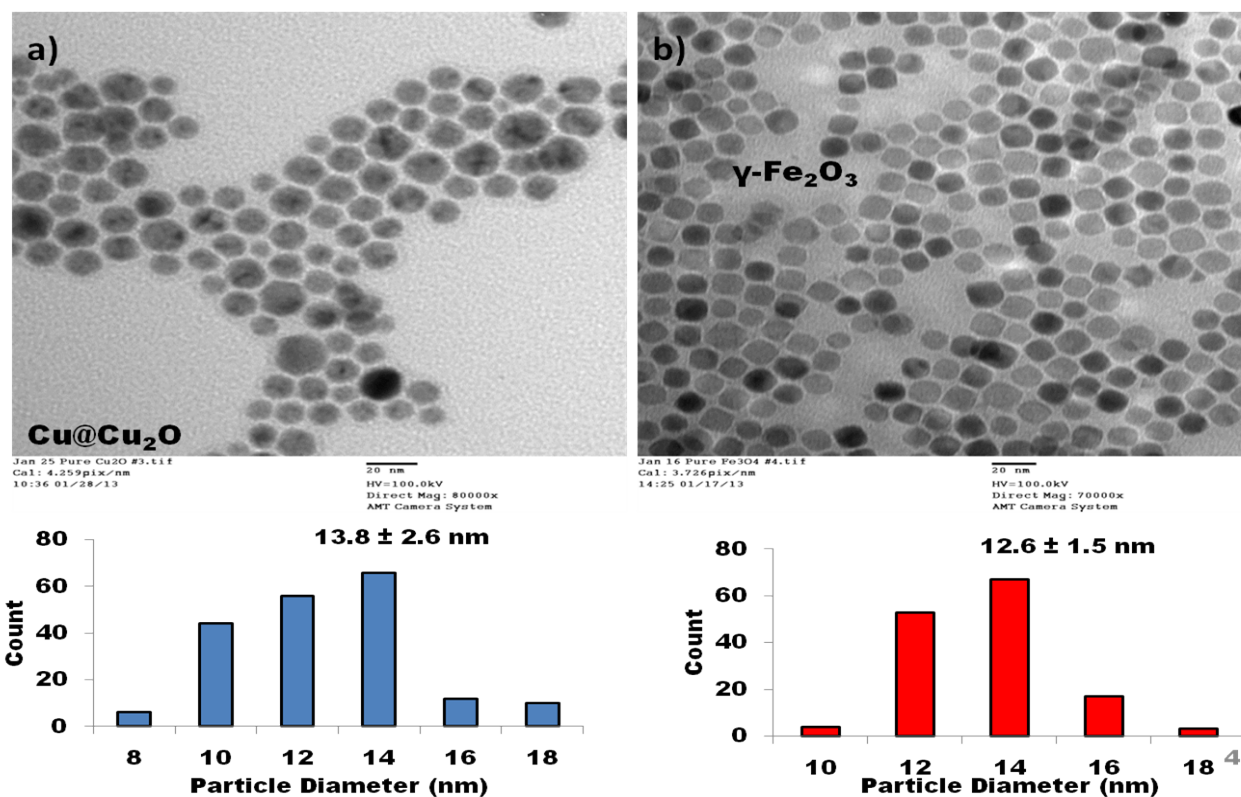


Figure S4. a) Representative TEM image and particle size distribution of isolated Cu₂O nanocrystals b) Representative TEM image and particle size distribution of isolated γ -Fe₂O₃ nanocrystals

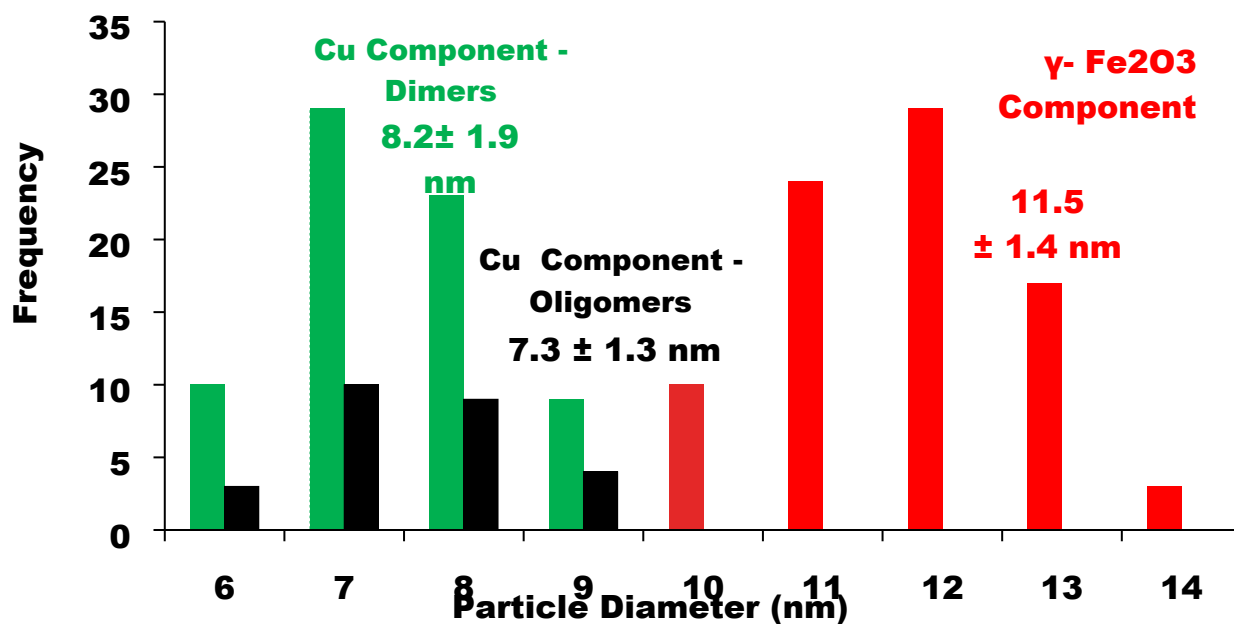


Figure S5. Particle size distribution of the γ -Fe₂O₃ and Cu₂O domains in as-synthesized hetero-nanocrystals in dimer and oligomer morphologies.

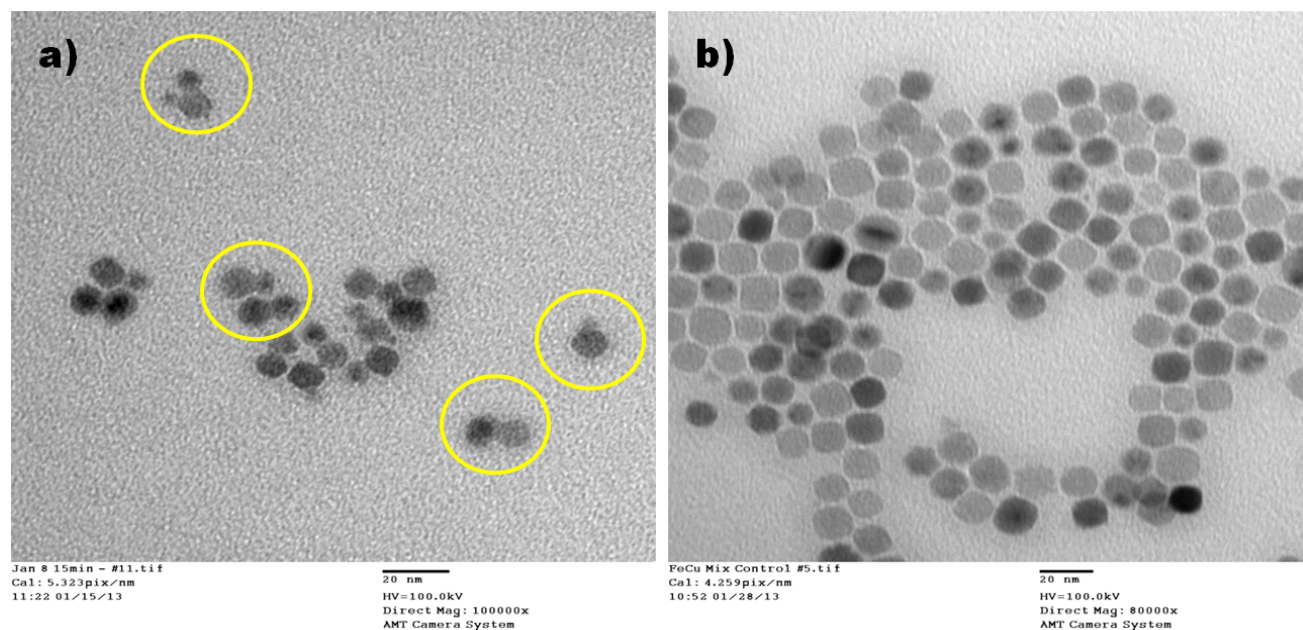


Figure S6. a) Representative TEM image of HNCs showing dimer and trimer morphologies. **b)** TEM image of a physical mixture of γ -Fe₂O₃ and Cu₂O showing the absence of any ordering into hetero-architectures

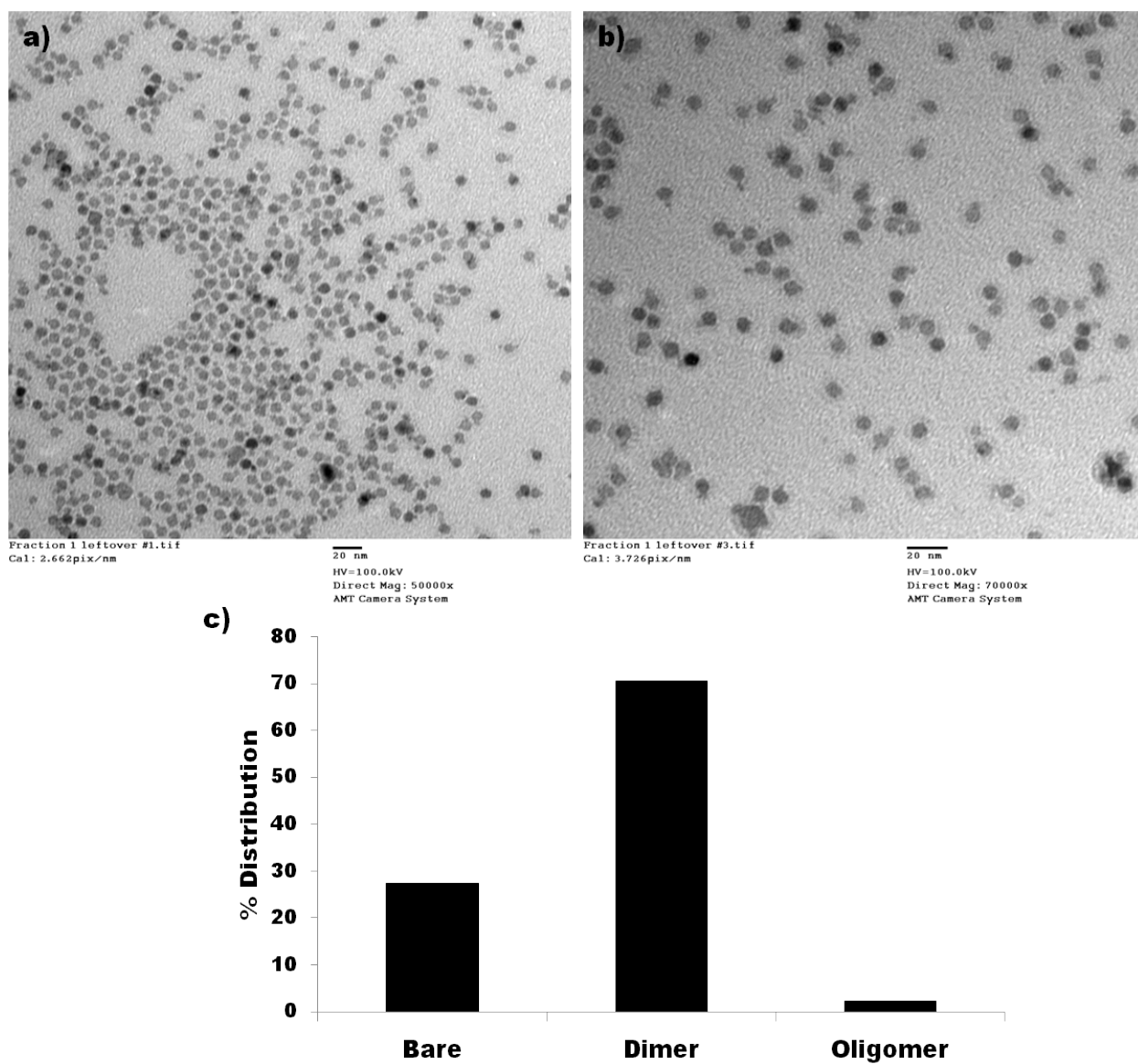


Figure S7. a) & b) Low resolution TEM images of $\text{Fe}_2\text{O}_3/\text{Cu}_2\text{O}$ HNCs after size selective precipitation removing the majority of trimers and higher oligomers. **c)** Particle size distribution following size-selective precipitation treatment of the $\text{Fe}_2\text{O}_3/\text{Cu}_2\text{O}$ nanocrystals.

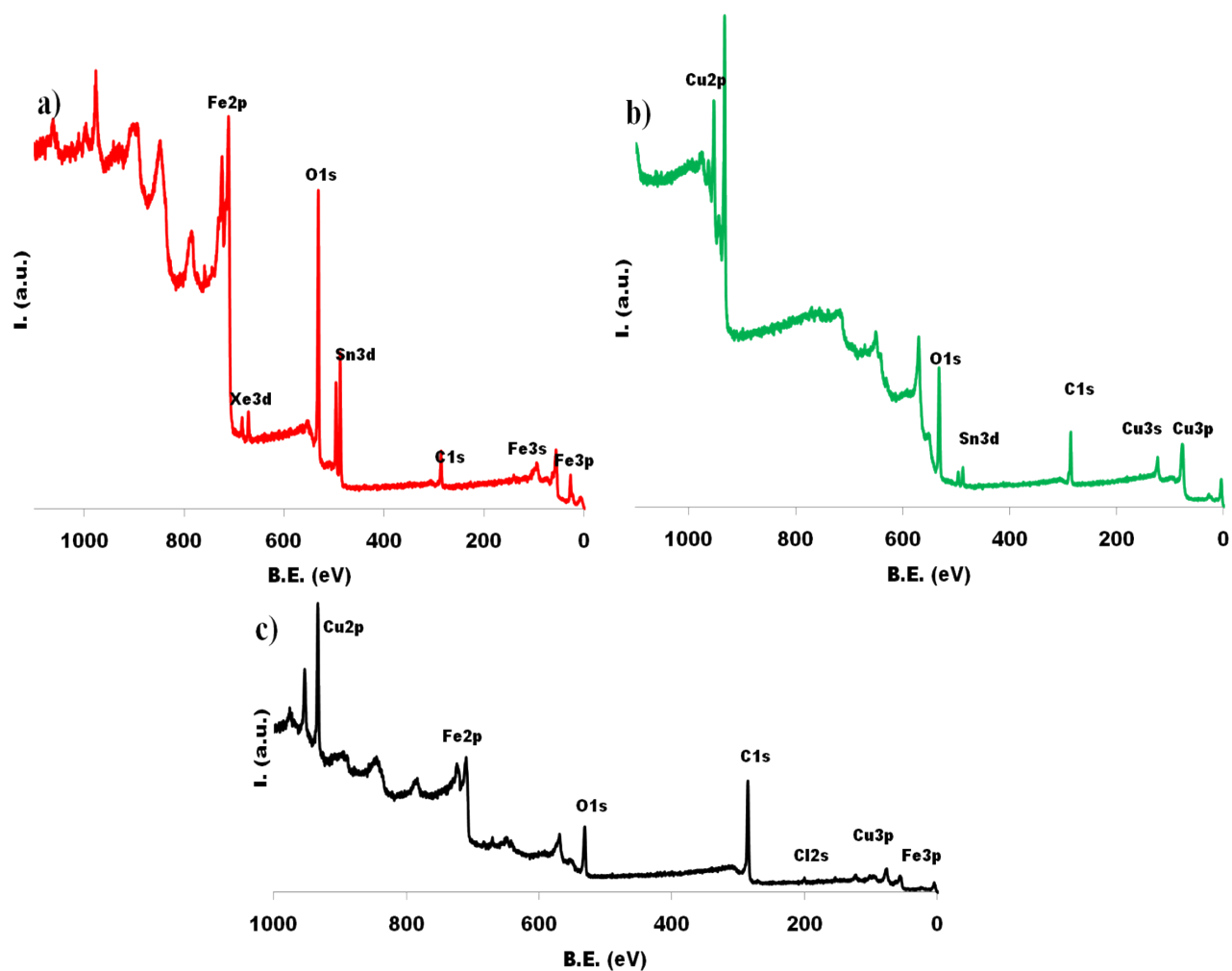


Figure S8. XPS survey spectra of **a)** γ -Fe₂O₃ nanocrystals **b)** Cu₂O particles and **c)** γ -Fe₂O₃/Cu₂O HNCs

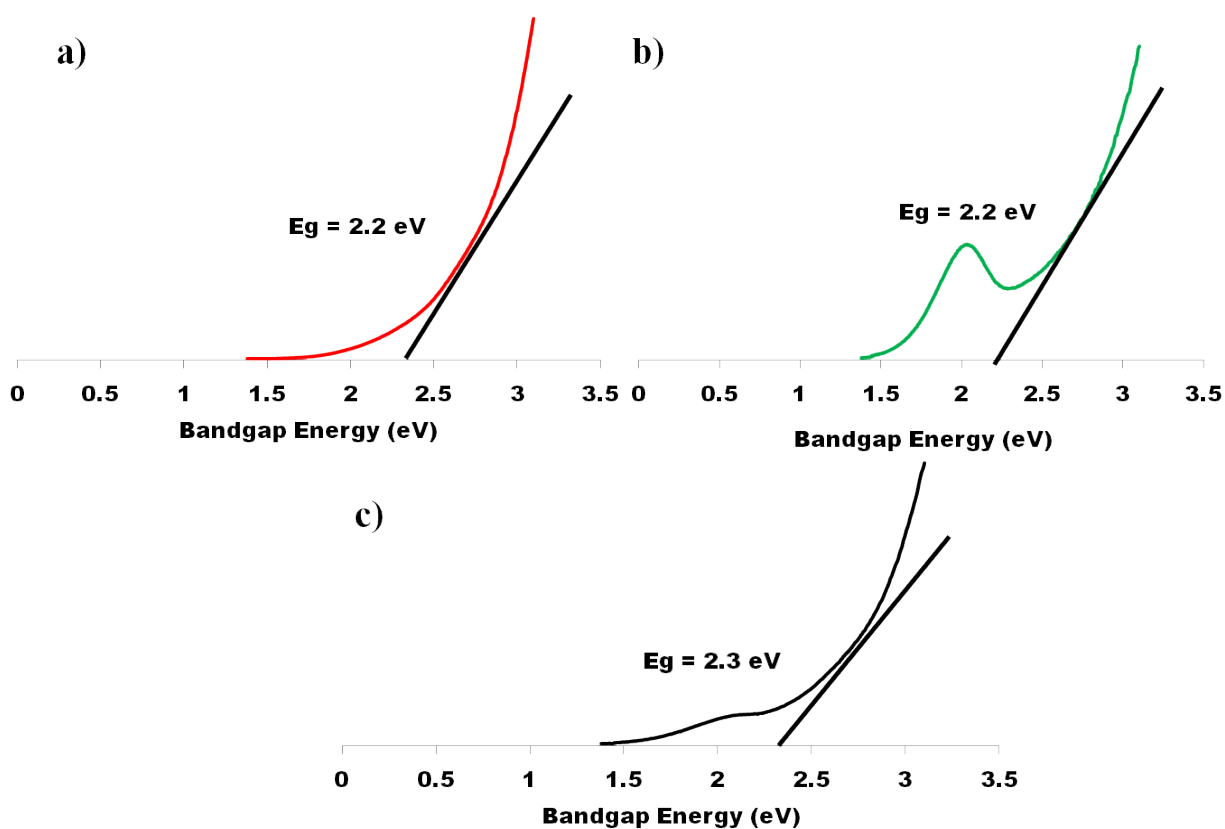


Figure S9. Optical absorption spectra of a) pure $\gamma\text{-Fe}_2\text{O}_3$ b) pure Cu_2O and c) $\gamma\text{-Fe}_2\text{O}_3/\text{Cu}_2\text{O}$ HNCs manipulated using the Tauc relation (see reference 58 in the manuscript) to determine their optical bandgaps

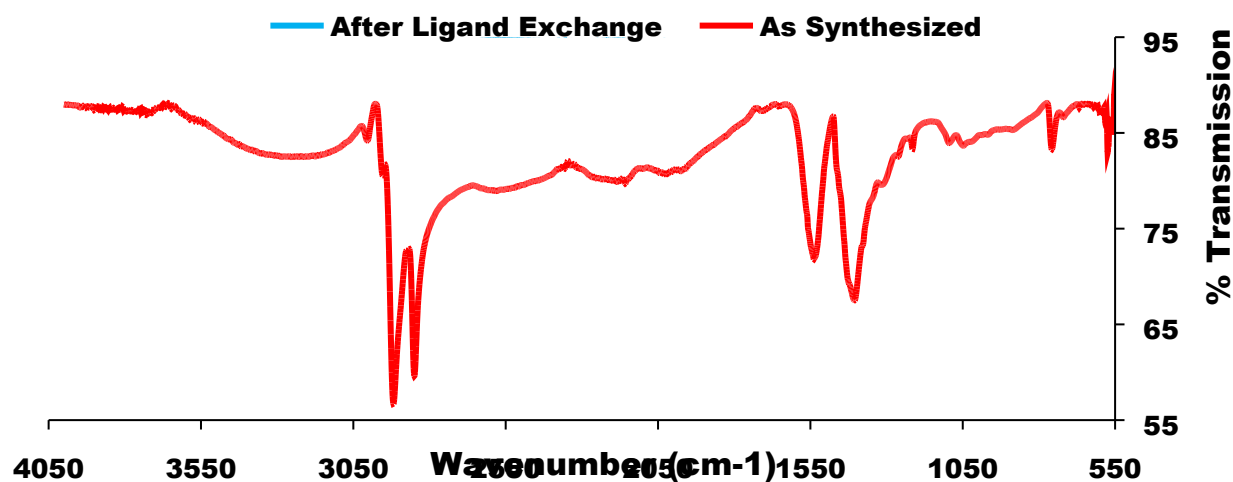


Figure S10. Infrared transmission spectra of as $\gamma\text{-Fe}_2\text{O}_3/\text{Cu}_2\text{O}$ HNCs before and after ligand exchange with NOBF_4 showing removal of the oleate capping ligands

