Supporting Information

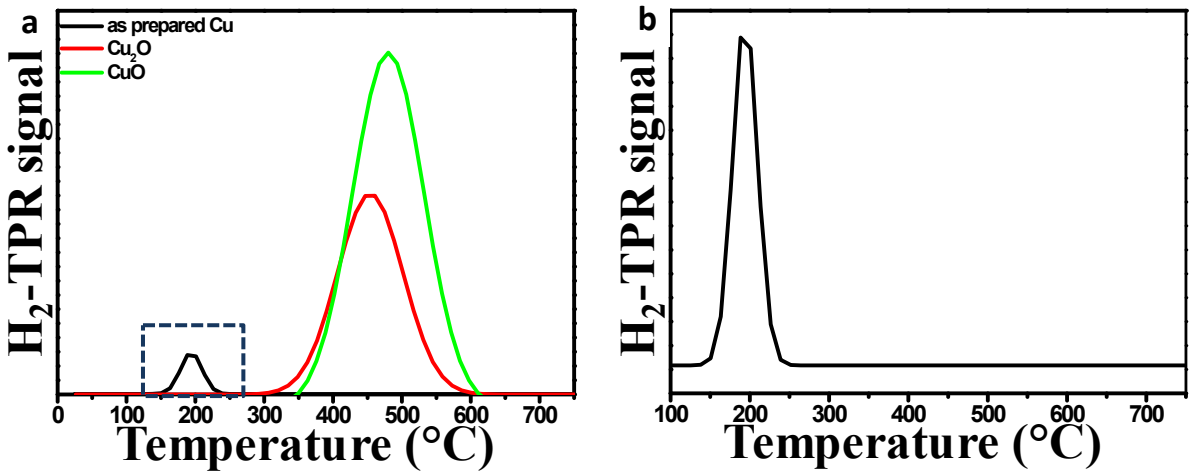

Fig. S1: H_2-TPR profiles of (a) as-prepared Cu and commercial Cu_2O, CuO as reference materials (b) High magnification H_2-TPR profiles for as-prepared Cu.

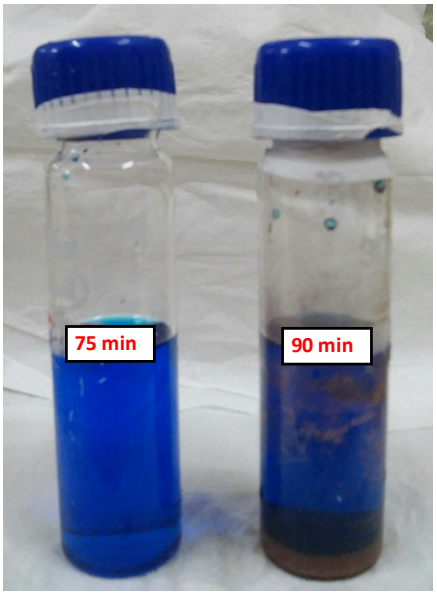

Fig. S2: Optical images of the reactions for 75 and 90 min, indicating no Cu particles are formed (bluish colored solution) at 75 min of reaction.

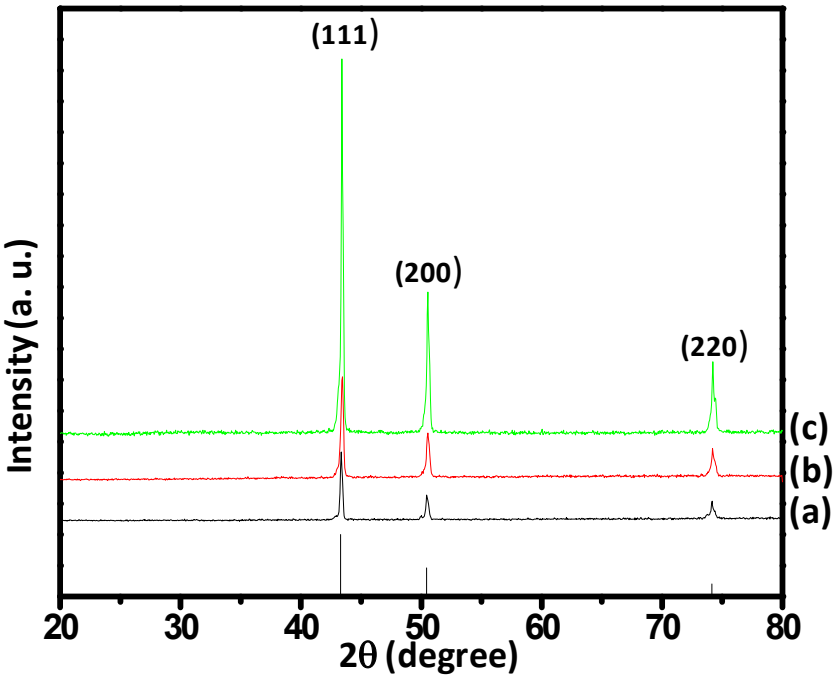

Fig. S3: XRD patterns of the as-prepared samples synthesized at 150°C for (a) 90 min, (b) 100 min and (c) 110 min.

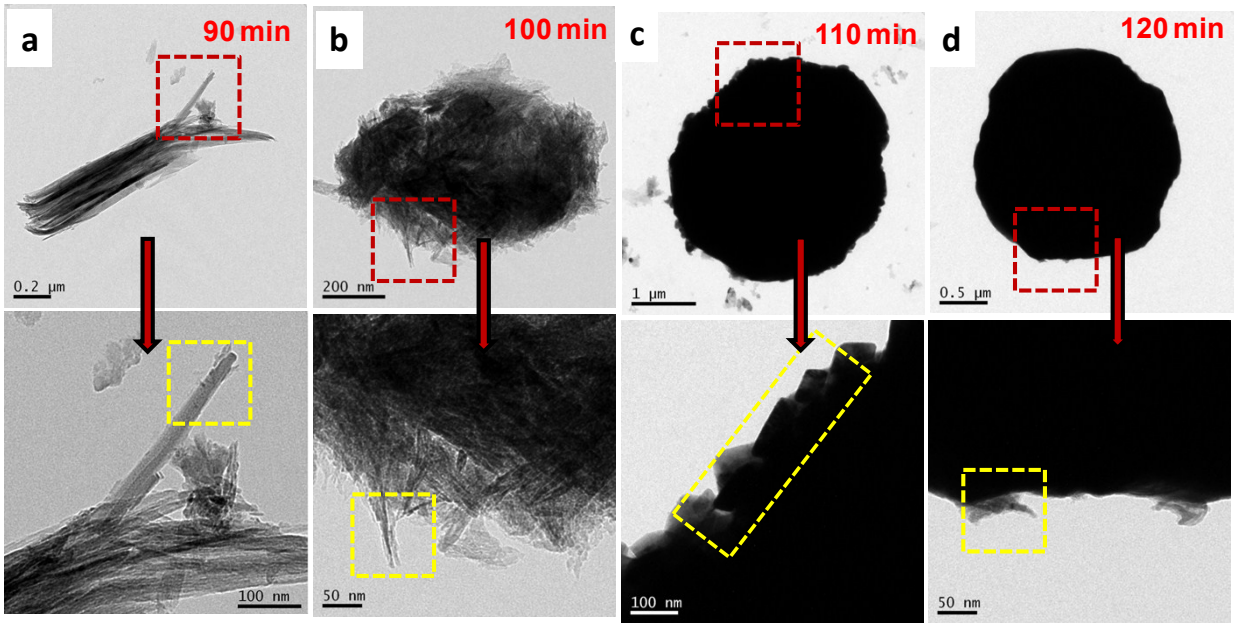

Fig. S4: TEM images showing how the nanorod-like copper particles further self-assembled to each other forming copper microspheroid with increase in reaction time from 90 to 100-120 min.

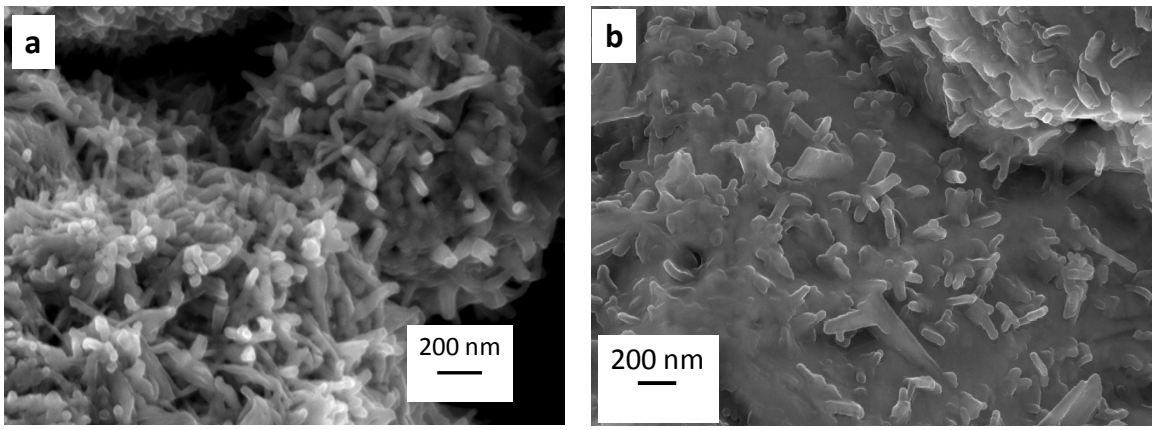

Fig. S5: FESEM images of the as-prepared Cu nanorod assembly synthesized at 150°C for (a) 100 min and (b) 120 min

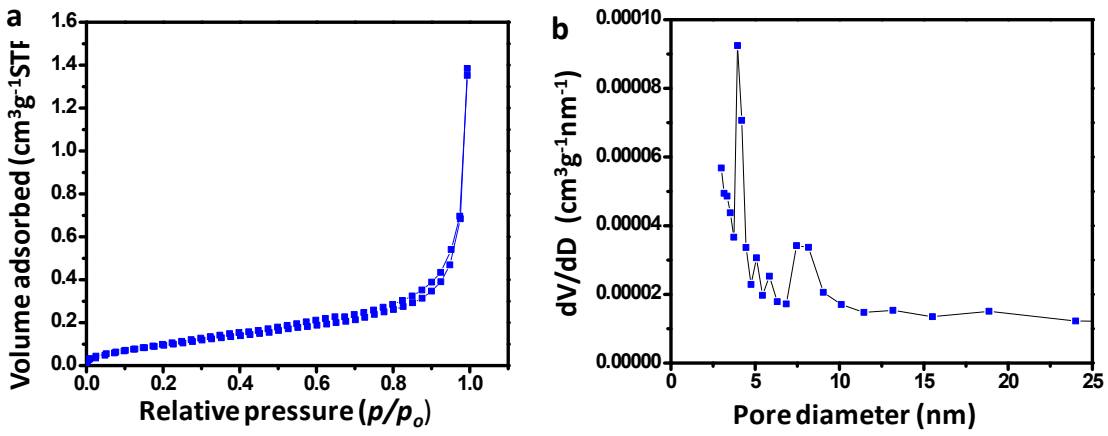

Fig. S6: (a) N_2 adsorption-desorption isotherms and (b) pore size distributions of the as-prepared samples synthesized at 150°C for 120 min

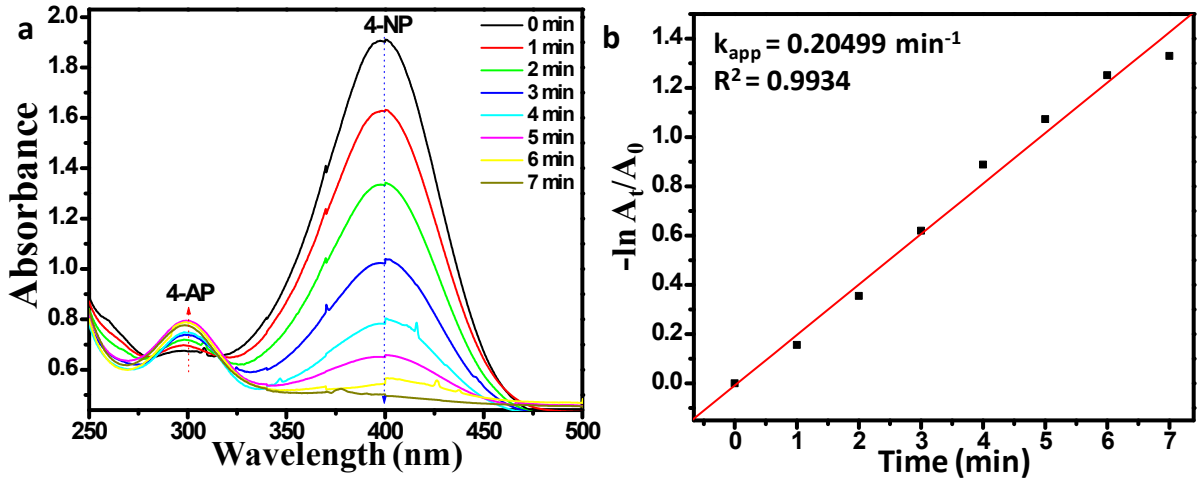

Fig. S7: (a) UV-Vis spectra for the reduction of 4-NP with 2 mg of Cu nanoassembly as catalyst, (b) pseudo-first order plot $-\ln A_t/A_o$ (Abs. intensity at 400 nm) Vs. time with apparent rate constant value 0.20499 min^{-1}

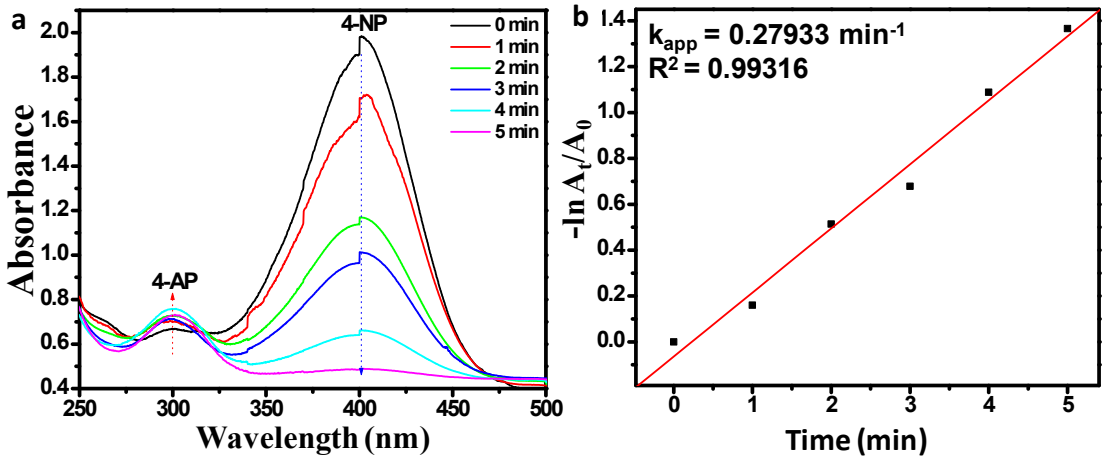

Fig. S8: (a) UV-Vis spectra for the reduction of 4-NP with 3 mg of Cu nanoassembly as catalyst, (b) pseudo-first order plot $-\ln A_t/A_o$ (Abs. intensity at 400 nm) Vs. time with apparent rate constant value 0.27933 min^{-1}.

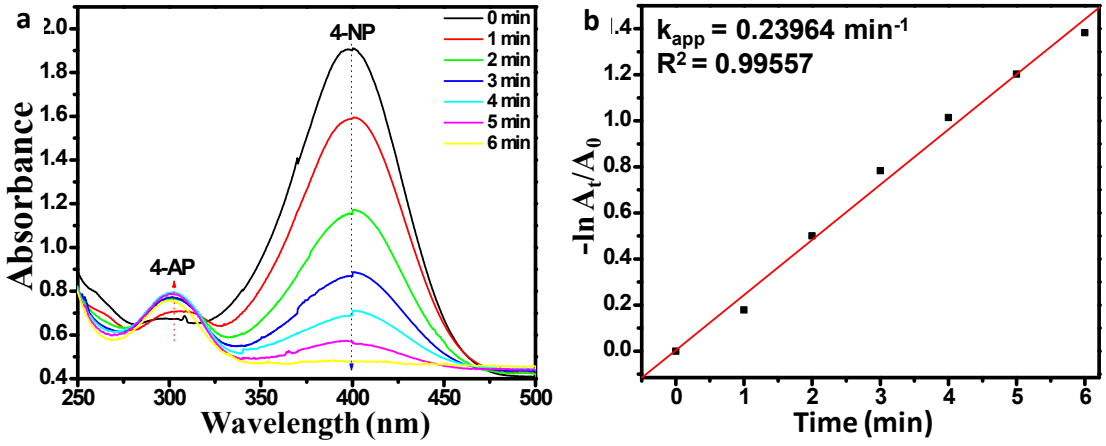

Fig. S9: (a) UV-Vis spectra for the reduction of 4-NP with 4 mg of Cu nanoassembly as catalyst, (b) pseudo-first order plot $-\ln A_t/A_o$ (Abs. intensity at 400 nm) Vs. time with apparent rate constant value 0.23964 min^{-1}.

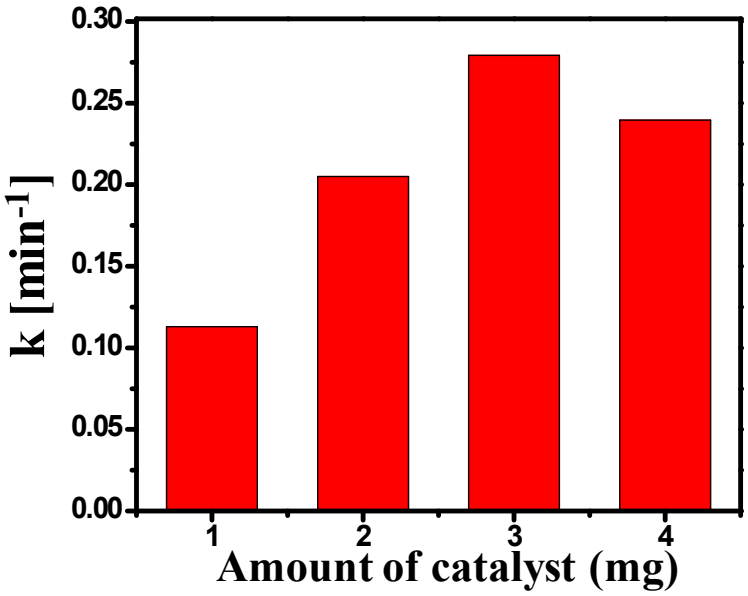

Fig. S10: Change in apparent rate constant with different amount of Cu- catalysts

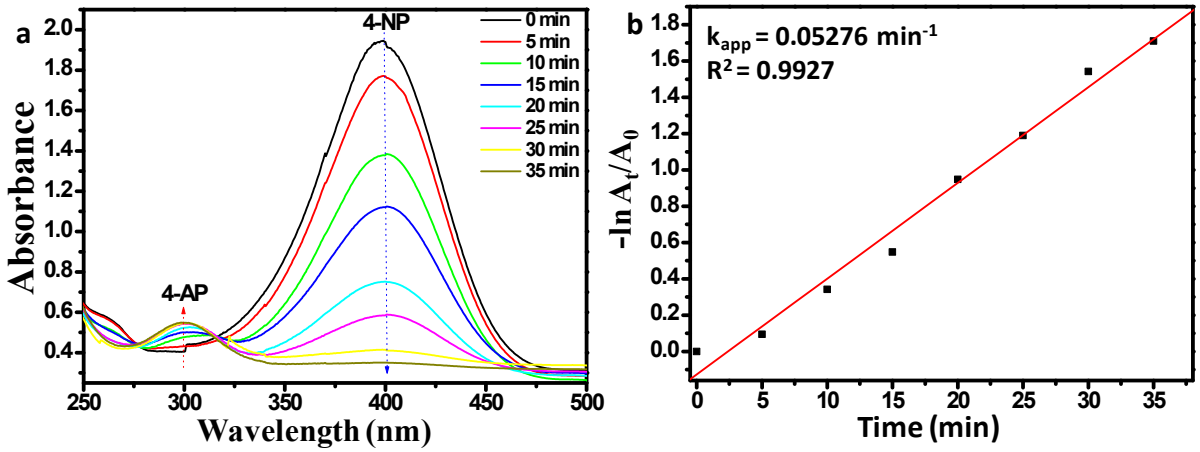

Fig. 11: (a) UV-Vis spectra for the reduction of 4-NP with 1 mg of reference Cu_2O as catalyst, (b) pseudo-first order plot $-\ln A_t/A_o$ (Abs. intensity at 400 nm) Vs. time.

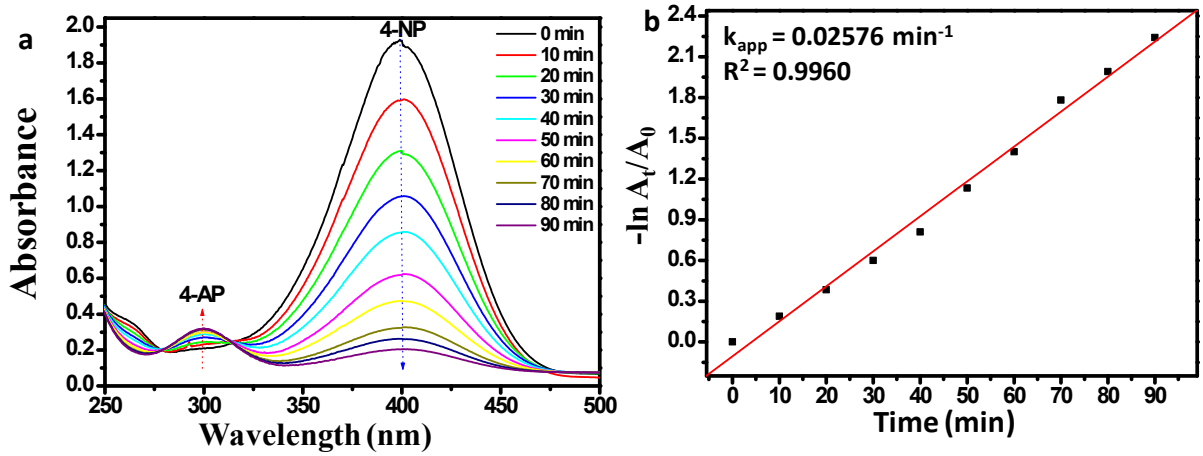

Fig. 12: (a) UV-Vis spectra for the reduction of 4-NP with 1 mg of reference CuO as catalyst, (b) pseudo-first order plot $-\ln A_t/A_o$ (Abs. intensity at 400 nm) Vs. time.

Table S1. Comparison of rate constant (k) and activity parameter (κ) of as-prepared Cu with other catalysts for 4-NP reduction.

Catalysts	k (min^{-1})	κ ($min^{-1}g^{-1}$)*	References
CuNP aggregates	0.0952	7.62	23
Spherical Cu_2O	0.1023	102.3	48
CuO	0.0876	87.6	48
Conventional CuO	1.14	11.4	49
Coral like Ag-dendrite	0.3114	77.85	50
Spherical Ag	0.0218	5.46	50
Ag-NP/C composite	0.1014	101.4	51
Spherical Ni	0.162	54	52
RANEY® Ni	0.0192	6.4	52
[Au@Ag] MOF	0.2982	86.18	53
Cu spheroid	0.11300	113.0	This work

*Rate constant per unit mass of Catalyst.

Table S2. Comparison of rate constant (k) and activity parameter (κ) of as-prepared Cu with reference Cu_2O and CuO for 4-NP reduction.

Catalysts	k (min^{-1})	κ ($min^{-1}g^{-1}$)*	Time (min)
As-prepared Cu	0.11300	113.0	22
Cu_2O (Reference oxide)	0.05276	52.76	35
CuO (Reference oxide)	0.02576	25.76	90

*Rate constant per unit mass of Catalyst.