Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

Chloride ions directed synthesis of plate-like Cu_2O mesocrystals for effective nitrogen fixation

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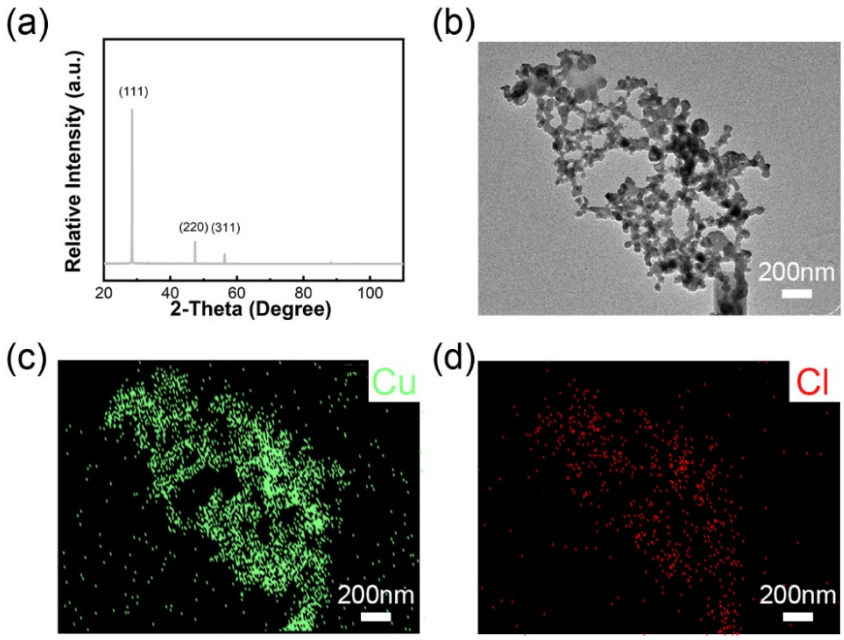

Fig. S1. (a) XRD patterns and (b) TEM image of the prepared CuCl precipitates. (c) Cu element and (d) Cl element mapping images of CuCl precipitates.

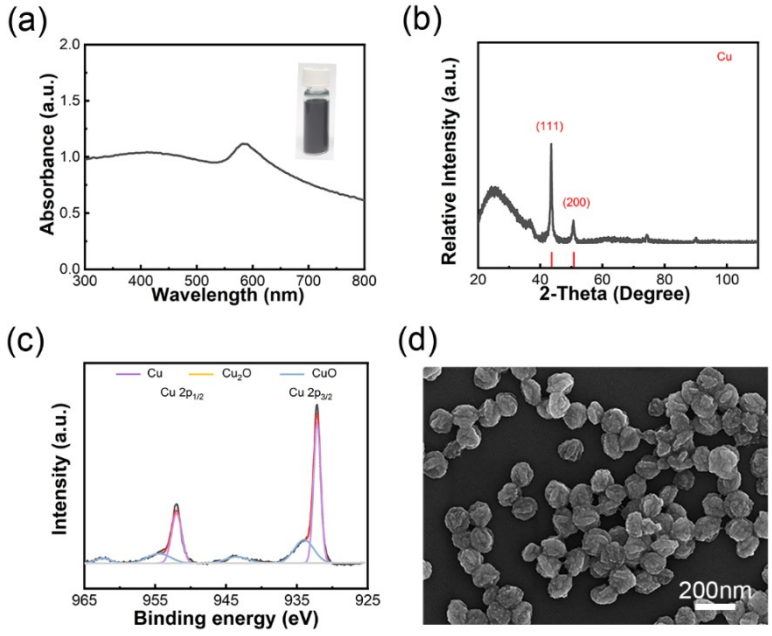

Fig. S2. (a) UV-vis absorption spectra, (b) XRD patterns (c) XPS patterns and (d) SEM images of Cu/CuO when ratio of Cu^{2+}/Cl^{-} was 2:0.

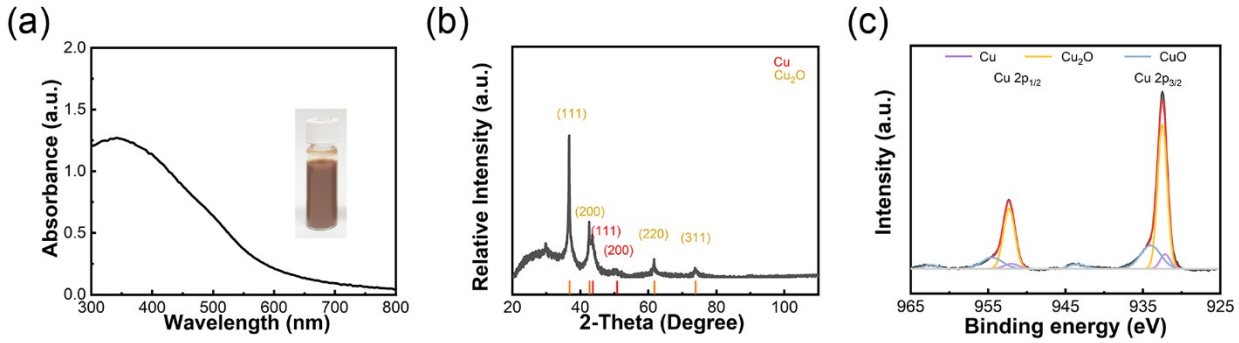

Fig. S3. (a) UV-vis absorption spectrum, (b) XRD patterns and (c) XPS patterns of the sample when ratio of Cu^{2+}/Cl^{-} was 2:1. The inset in (a) was the photograph of the solution of the prepared sample.

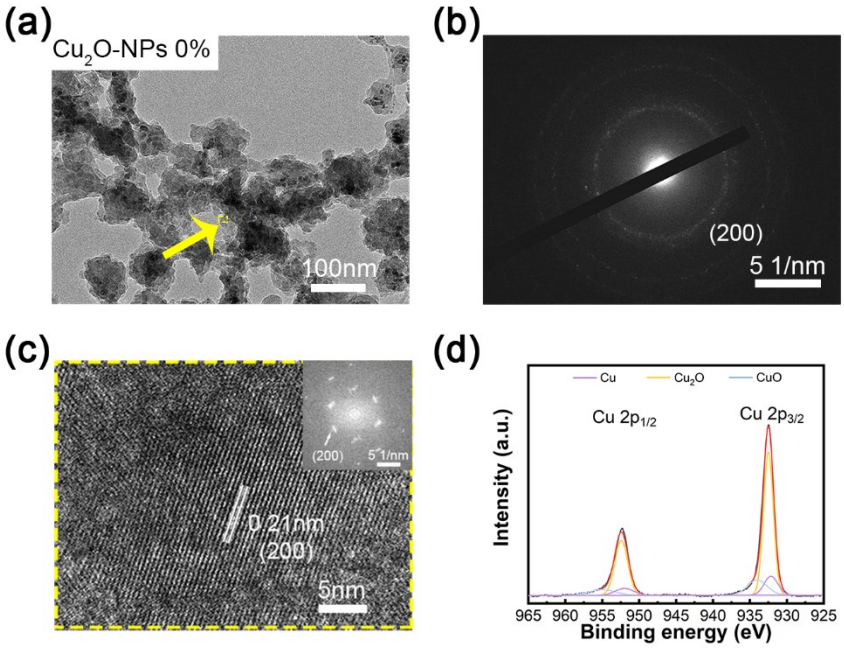

Fig. S4. (a) TEM image and (b) SAED pattern of Cu_2O-NPs prepared without addition of PAM. (c) HR-TEM image and FFT image of the selected area (yellow box) in (a), (d) XPS pattern of Cu_2O-NPs.

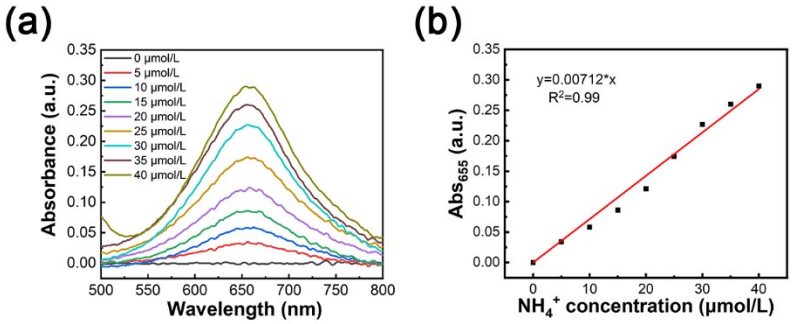

Fig. S5. (a)UV-vis absorption spectra of indophenol assays kept with different concentrations of NH^{4+}. (b) A calibration curve used to estimate the concentrations of NH^{4+} ions.

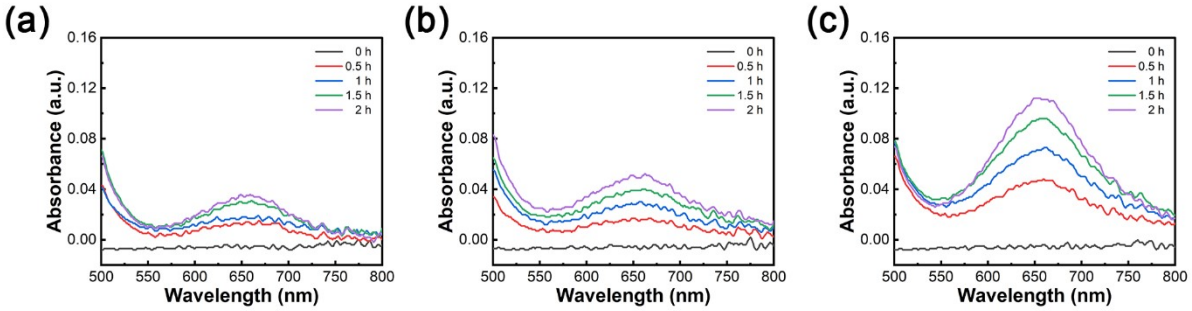

Fig. S6. UV-vis absorption spectra of indophenol assays kept with different times during photocatalytic nitrogen reduction for 2 h under visible light irradiation (λ > 420 nm) at room temperature. (a) Cu_2O-NPs, (b) Cu_2O-MC-S and (c) Cu_2O-MC-P.

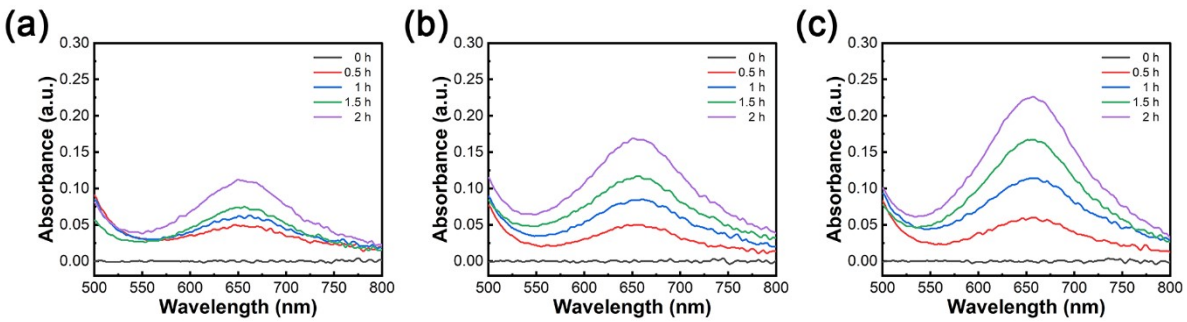

Fig. S7. UV-vis absorption spectra of indophenol assays kept with different times during photocatalytic nitrogen reduction for 2 h under 395 nm irradiation at room temperature. (a) Cu_2O-NPs, (b) Cu_2O-MC-S and (c) Cu_2O-MC-P.

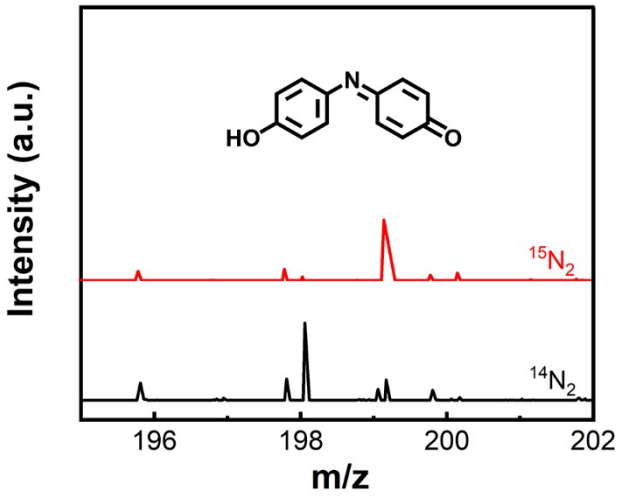

Fig. S8. Mass spectra of the indophenol products obtained by reaction of phenol with ammonia generated from photocatalytic $^{14}N_2$ or $^{15}N_2$ reduction. The inset showed the chemical structure of the indophenol product, with m/z = 198 (^{14}N) and m/z = 199 (^{15}N).