Electronic Supporting Information:

Cu nanocrystals enhancement of C_3N_4/Cu hetero-structure and new application on photo-electronic catalysis: hydrazine oxidation and redox reaction of organic molecule

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Figure S1-S11 and Table S1-S2

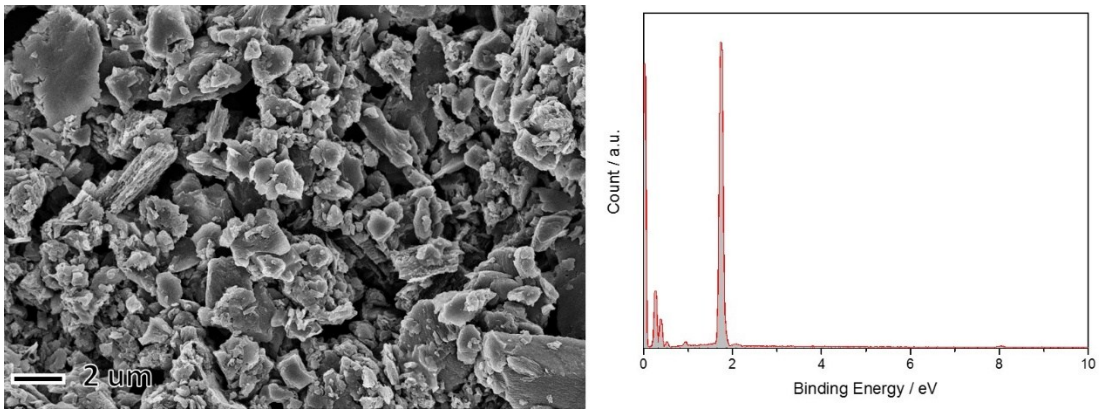

Figure S1. SEM images of as-prepared products after the reaction between C_3N_4/Cu hetero structure; B) the according EDS analysis.

Table S1. Cu concentration of C_3N_4/Cu, characterized by ICP. The test solution was prepared by employing 99.3 mg of as-prepared C_3N_4/Cu to dissolute in HNO_3 then the resulted solution was diluted into 10 mL with water.

Element	Concentration of Cu (mg/L)	S.D.
Cu	5.99	0.01

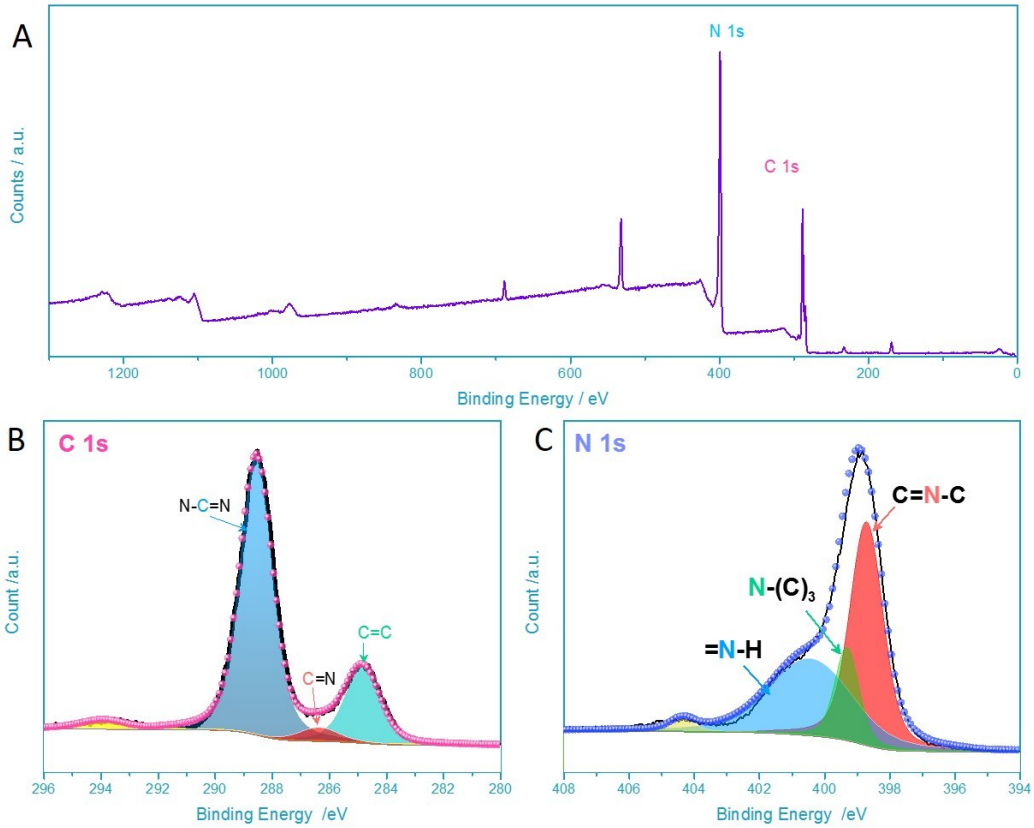

Figure S2. Survey XPS of as-prepared C_3N_4 powder abd the according high solution XPS sprectra of B) C 1s and C) N 1s.

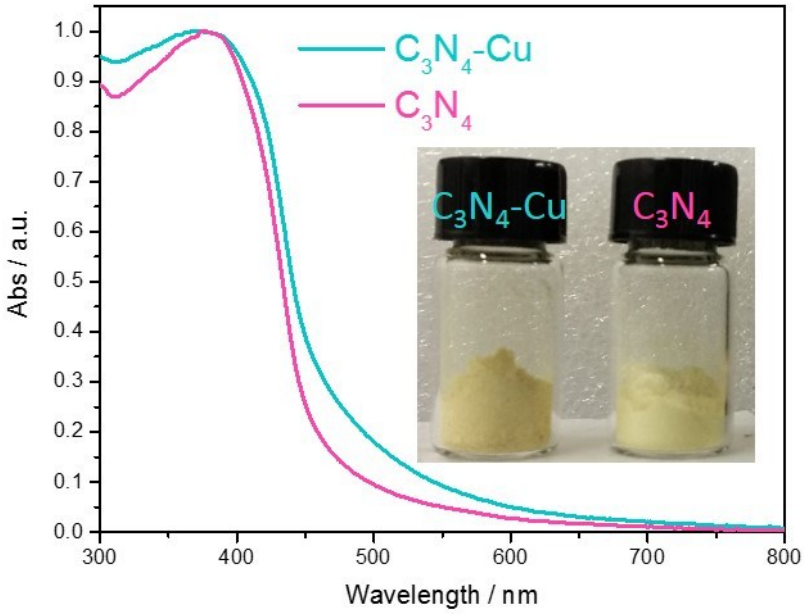

Figure S3. The UV-visual absorption spectra of C_3N_4/Cu hetero structure and graphitic C_3N_4 electrode.

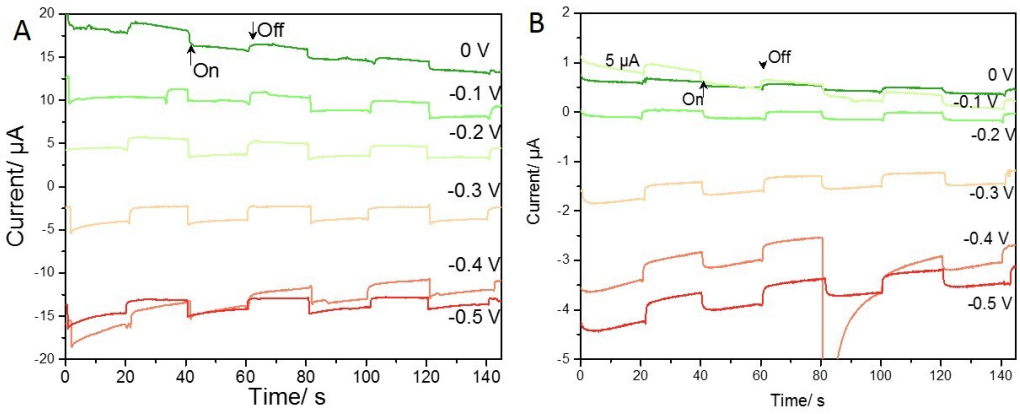

Figure S4. The photocurrent of C_3N_4/Cu hetero structure (A) and graphitic C_3N_4 electrode (B).

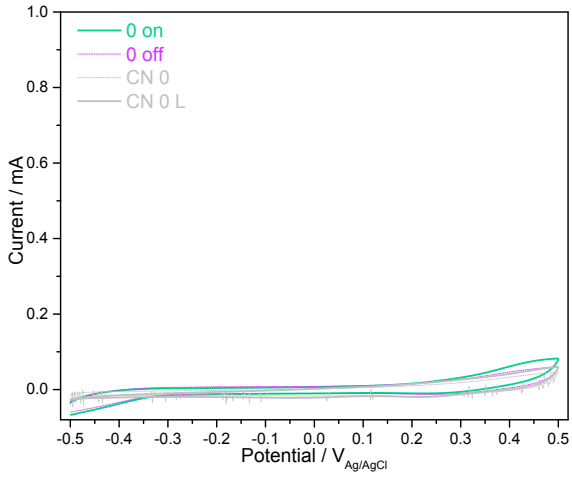

Figure S5. The CV plots of $_3N_4$/Cu hetero structure and graphitic C_3N_4 electrode with hydrazine free.

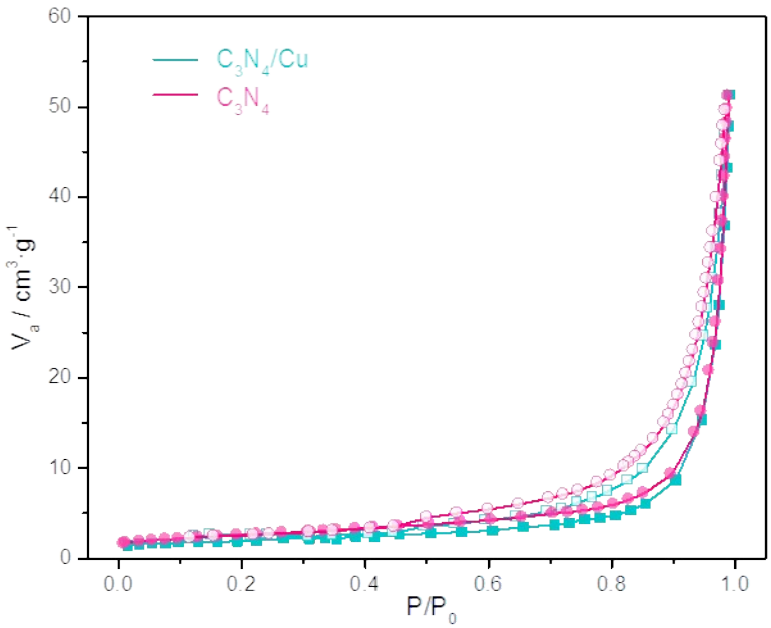

Figure S6. N_2 sorption isotherms of C_3N_4/Cu and graphitic C_3N_4.

Table S2. BET characterization of as-prepared of C_3N_4/Cu and graphitic C_3N_4, which showed the surface of graphitic C_3N_4 was closed to that of C_3N_4/ Cu hetero-structure.

C_3N_4/Cu	
V_m	1.6163 [cm3(STP) g-1]
$a_{s,BET}$	7.035 [m2 g-1]
C	304.16
Total pore volume(p/p_0=0.990)	0.07683 [cm3 g-1]
Mean pore diameter	43.685 nm
C_3N_4	
V_m	2.156 [cm3(STP) g-1]
$a_{s,BET}$	9.384 [m2 g-1]
C	88.625
Total pore volume(p/p_0=0.990)	0.078712 [cm3 g-1]
Mean pore diameter	33.551 nm

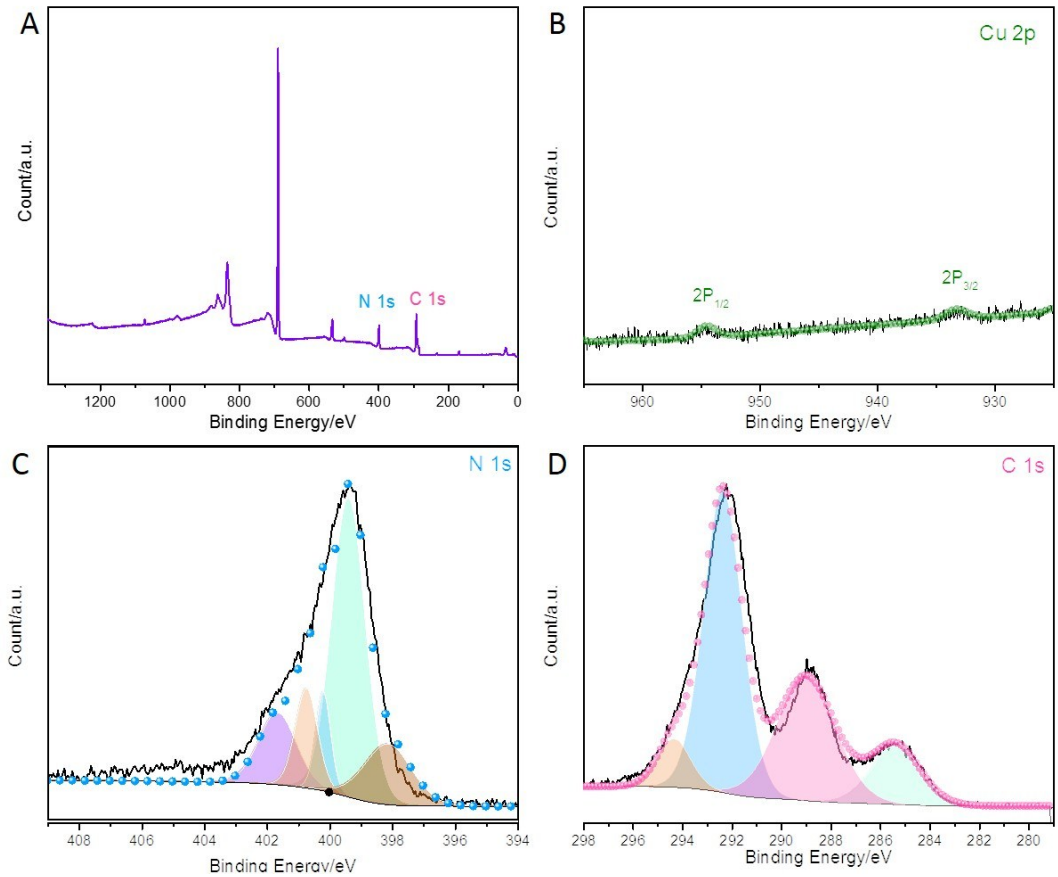

Figure S7. The XPS spectrum of as-prepared C_3N_4/Cu hetero-structure after photo-electronic reaction: (A) survey spectra and high solution XPS, (B) Cu 2p, (C) N 1s, and (D) C 1s.

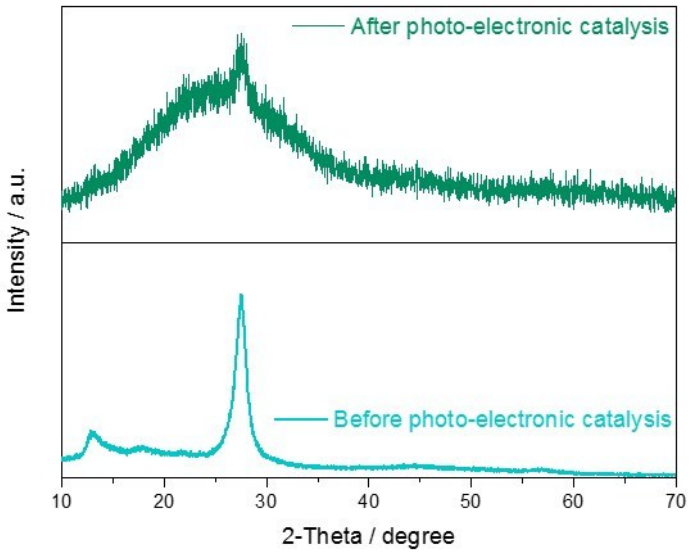

Figure S8. XRD pattern comparing of C_3N_4/Cu hetero-structure before and after photo-electronic catalysis.

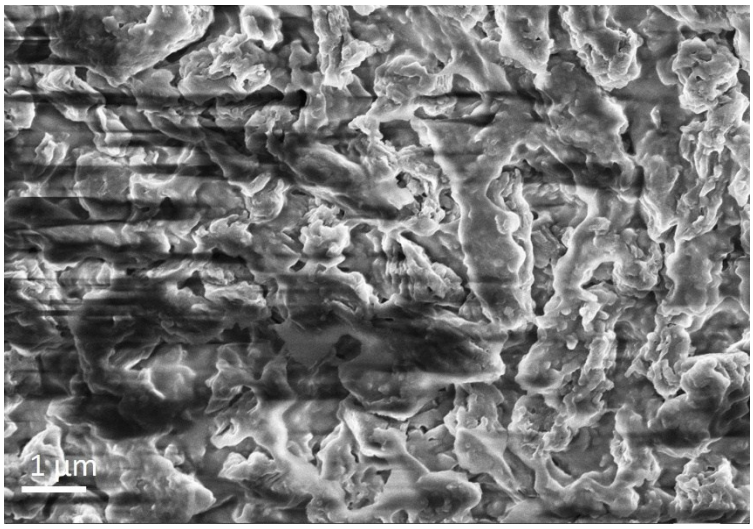

Figure S9. The TEM images of as-prepared C_3N_4/Cu hetero-structure after photo-electronic catalysis.

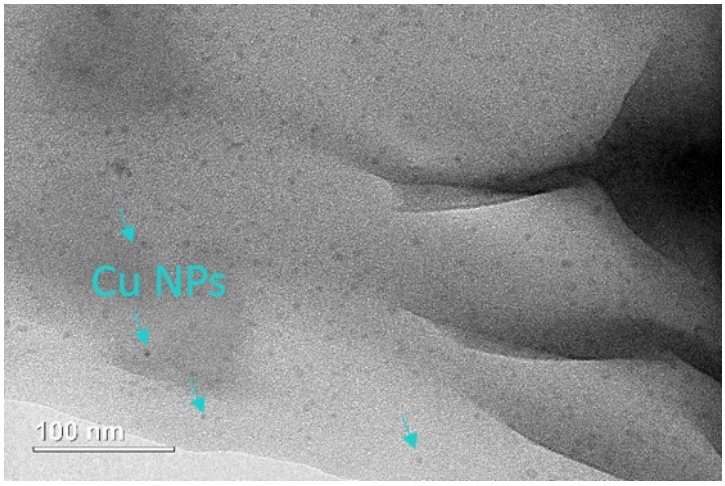

Figure S10. The TEM images of as-prepared C_3N_4/Cu hetero-structure after photo-electronic catalysis.

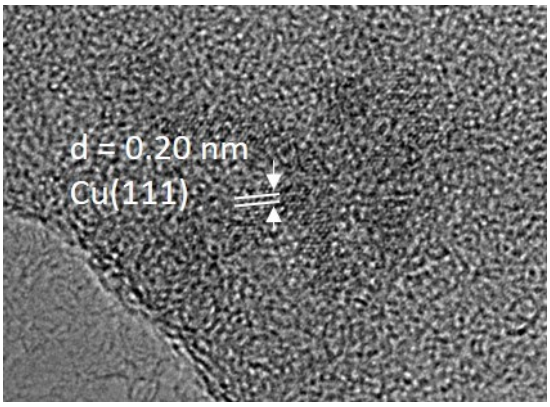

Figure S11. The HRTEM images of as-prepared C_3N_4/Cu hetero-structure before and after photo-electronic catalysis.