Electronic Supplementary Information

Total Photocatalysis Conversion from Cyclohexane to Cyclohexanone by C_3N_4/Au Nanocomposites

Juan Liu, Yanmei Yang, Naiyun Liu, Yang Liu, Hui Huang and Zhenhui Kang**

Conduction band (CB) and valence band (VB) energy level calculation

By subtracting the width of the He I UPS spectra (Fig. S5) from the excitation energy (21.22 eV), the ionization potential was calculated to be 6.35 eV. The E_v (at 6.35 eV) and E_c (conduction band energy, at 3.64 eV) of C_3N_4/Au can be converted to the electrochemical energy potential in volts (1.91 V and -0.80 V respectively) based on a reference standard where 0 V (equal to 4.44 eV when compared to the normal hydrogen electrode potential (NHE)) is plotted against Evac (vacuum level).

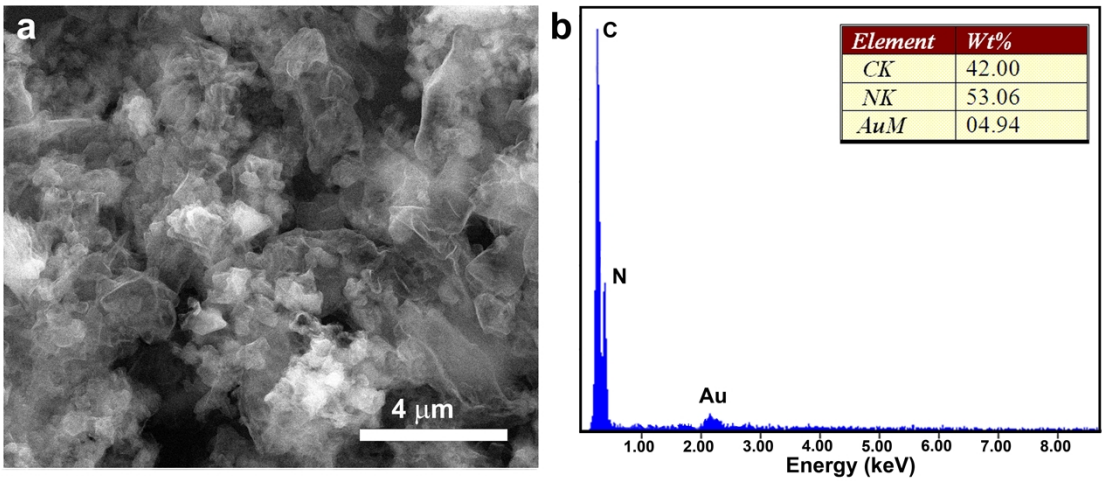

Fig. S1 (a) SEM images of C_3N_4/Au. (b) EDX of C_3N_4/Au.

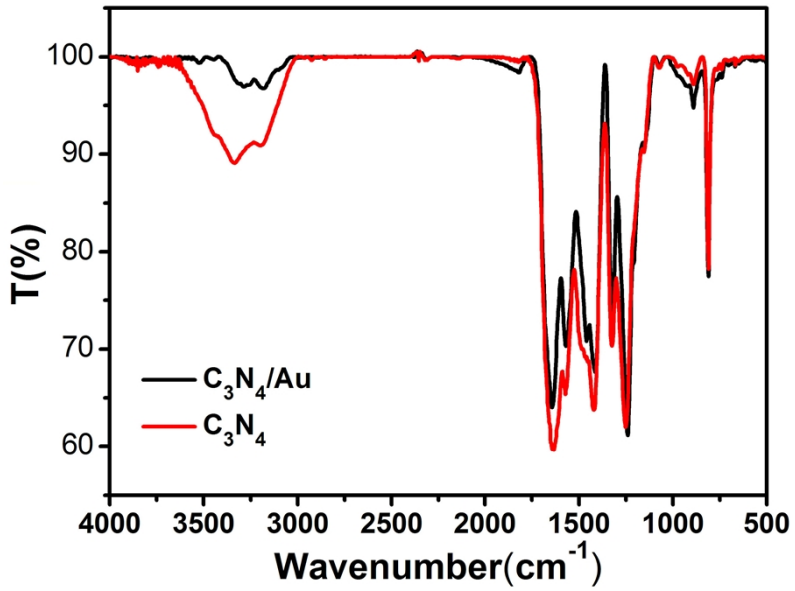

Fig. S2 FT-IR spectra of the obtained graphitic carbon nitride powders (C_3N_4 and CDots-C_3N_4). The spectra present several major bands between 1200 cm^{-1} and 1650 cm^{-1} region, which correspond to the characteristic stretching modes of CN heterocycles. In addition, the breathing mode of triazine units appears at 809 cm^{-1}. The results are well consistent with former reports.

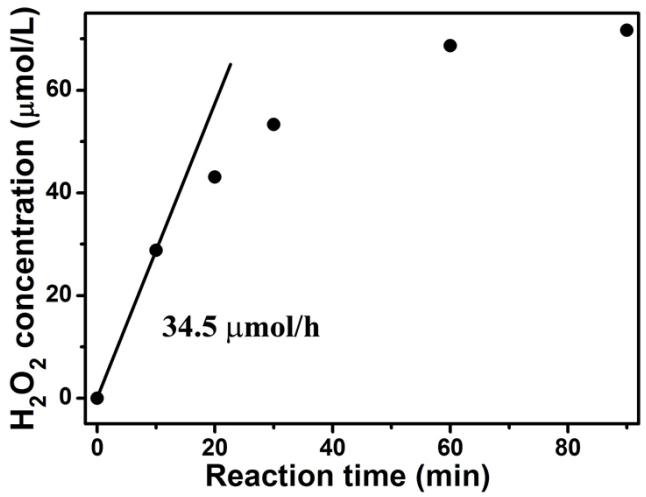

Fig. S3 A time course of H_2O_2 production from water under visible light (of wavelength longer than 420 nm) by pure C_3N_4 for 90 min.

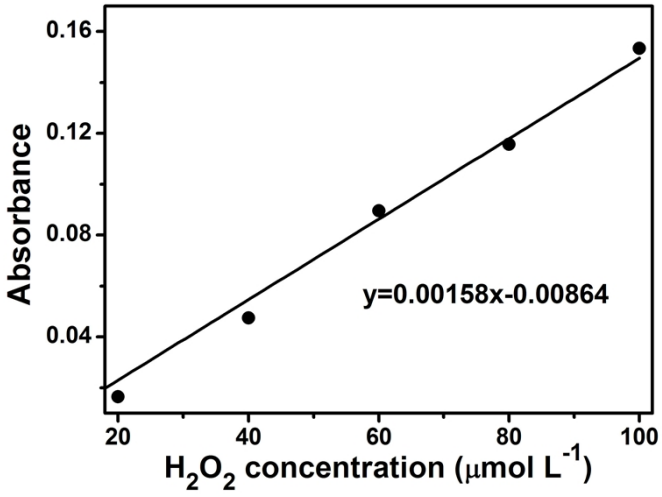

Fig. S4 The calibration curve and the fitting equation of the H_2O_2 concentration and absorbance, which are determined by external standard method using H_2O_2 as standard materials with different concentration.

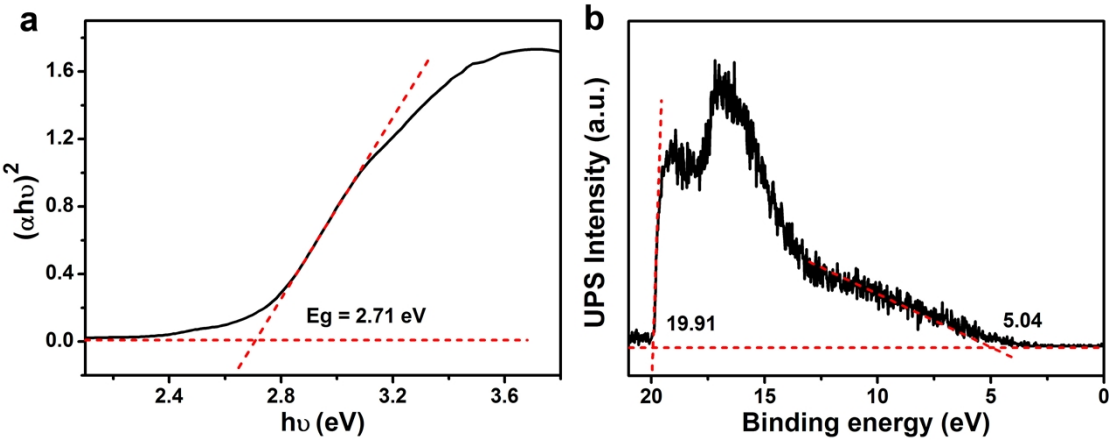

Fig. S5 (a) $(\alpha h\upsilon)^2$ vs. $h\upsilon$ curve of C_3N_4/Au. (b) UPS spectra of C_3N_4/Au.

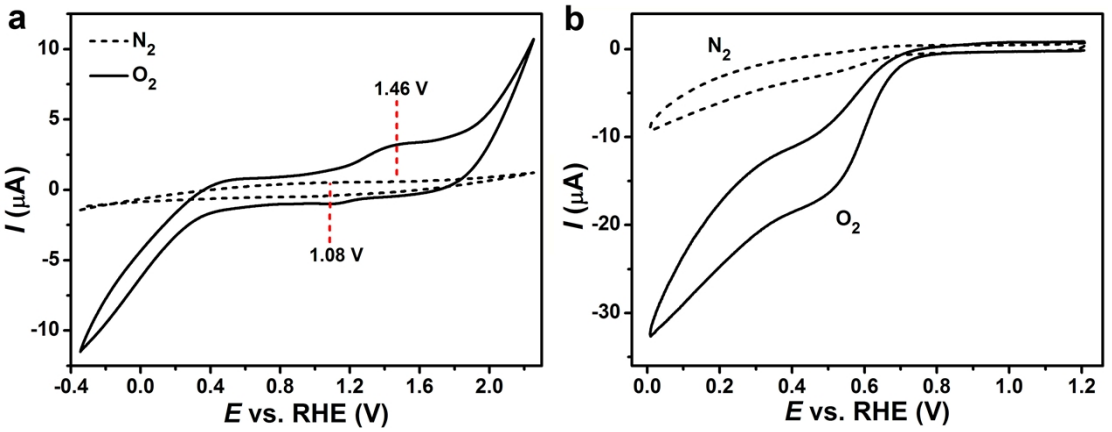

Fig. S6 (a) Cyclic voltammograms (CV) of C_3N_4/Au modified GC electrodes in O_2-saturated (solid lines) and N_2-saturated (dash lines) ultrapure water and in at a scan rate of 50 mV/s. (b) CV curves of C_3N_4/Au modified GC electrodes in O_2-saturated (solid lines) and N_2-saturated (dash lines) 0.1 M KOH at a scan rate of 50 mV/s.