Electronic Supplementary Information

Preparation

Synthesis of mesoporous g-C_3N_4. Cyanamid was dissolved in different amounts of a 40% dispersion of 12-nm SiO_2 particles (Ludox HS40, Aldrich) in water with stirring at 353 K overnight. The resulting transparent mixtures were then heated at a rate of 2.3 K/min over 4 h to reach a temperature of 823 K and then tempered at this temperature for another 4 h. The resulting brown-yellow powder was treated with a 4 M NH_4HF_2 for 24 h to remove the silica template. The powders were then centrifuged and washed three times with distilled water and twice with ethanol. Finally the powders were dried at 323 K under vacuum for overnight.

Synthesis of bulk g-C_3N_4. Cyanamid was directly heated to 823 K and then tempered at this temperature for another 4 h.

Characterizations

X-ray diffraction (XRD) patterns were collected on a Bruker D8 Advance X-ray diffractometer with Cu Kα1 radiation. The accelerating voltage and the applied current were 40 kV and 40 mA, respectively. Data were recorded at a 2θ scan rate of 0.02° s^{-1} in the range of 5° to 60°. The specific surface area and porosity of the samples were measured by N_2 adsorption at 77 K on a Micrometritics ASAP2010 analyzer and calculated by the Brunauer–Emmett–Teller (BET) method. Before measurement, the samples were degassed at a temperature of 150 °C for 20 h in vacuum. Avarian Cary 500 scan UV/vis system equipped with a Labsphere diffuse reflectance accessory was used to obtain the reflectance spectra of the catalysts. FTIR spectra were recorded on a Nicolet Nexus 670 FTIR spectrometer at a resolution of 4 cm^{-1}.

Activity Test

The photocatalytic inactivation of *E. coli K-12* was conducted using a 300 W Xenon lamp (Beijing Perfect Light Co. Ltd., Beijing) with a UV cut off filter (λ< 400 nm) as light source. All glass apparatuses used in the experiments were autoclaved at 121 °C for 20 min to ensure sterility. The bacterial cells were cultured in nutrient broth (Lancashire, UK) at 37 °C and agitated at 200 rpm for 16 h. The cultures were then washed twice with sterilized saline (0.9% NaCl) solution by centrifugation for 5 min and then the cell pellet was re-suspended in sterilized saline solution. The photocatalyst and the saline suspension of washed cell were then added into a flask with an aluminium cover. The final cell density was adjusted to about 2.5×10^6 cfu (colony forming unit)/mL. The reaction temperature was maintained at 25 °C and the reaction mixture was stirred with a magnetic stirrer throughout the experiment. At different time intervals, aliquots of the sample were collected and serially diluted with sterilized saline solution. 0.1 mL of the diluted sample were then immediately spread on nutrient agar (Lancashire, UK) plates and incubated at 37 °C for 24 h to determine the number of viable cells (in cfu). Before irradiation, the suspensions were magnetically stirred in dark for 60 min to ensure the establishment of an adsorption/desorption equilibrium between the photocatalyst and bacterial cells. For comparison, two control experiments were conducted along with treatment experiments. The dark control was carried out with carbon nitride alone in dark and light control was carried in the absence of carbon nitride under visible light irradiation. All the treatment and control experiments were performed in triplicates.

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Figure S1. N_2 adsorption-desorption isothermal of prepared *g*-C_3N_4 samples.

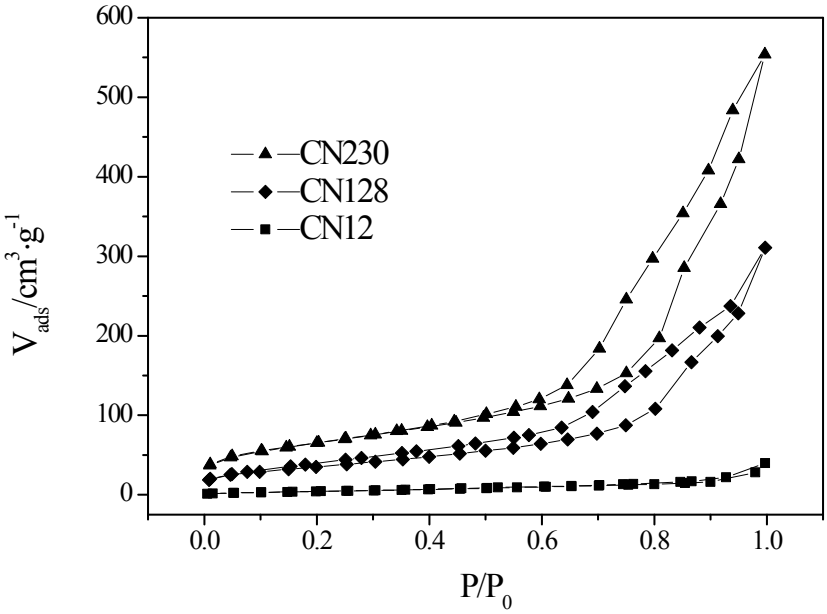

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Figure S2. XRD patterns of *g*-C_3N_4 synthesized at different conditions.

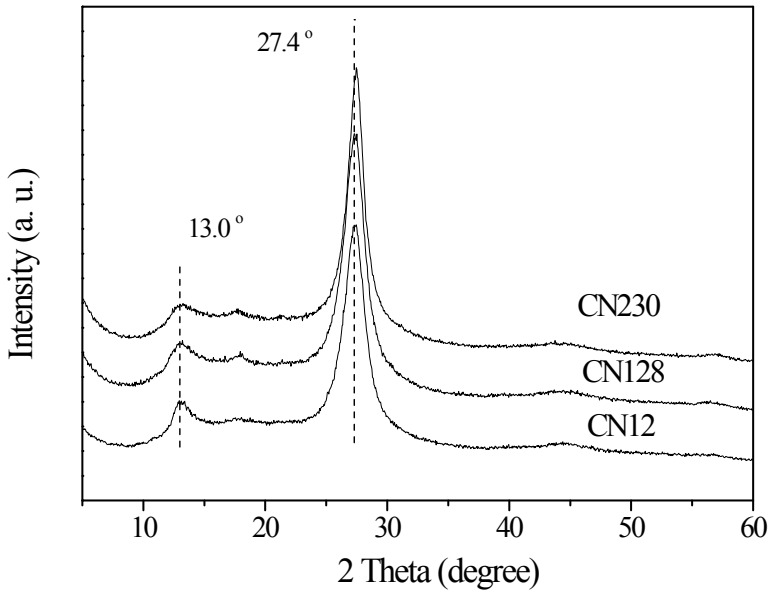
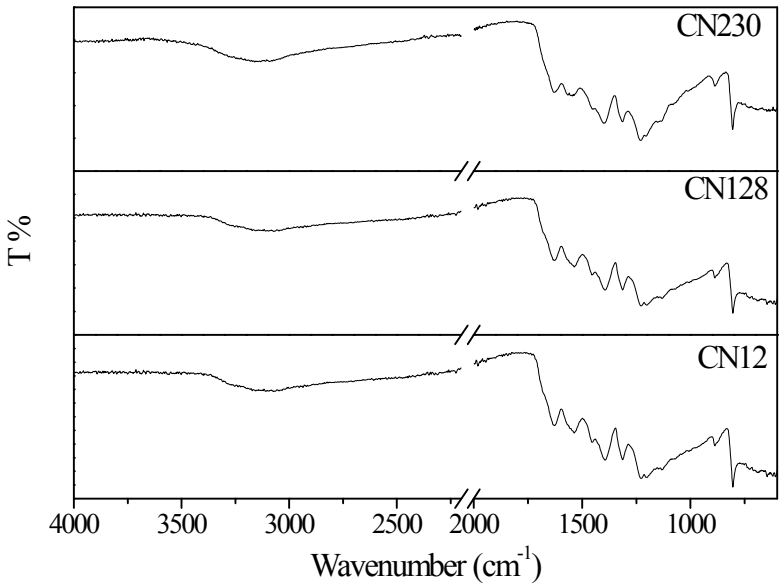


Figure S3. FTIR spectra of g-C_3N_4 synthesized at different conditions.



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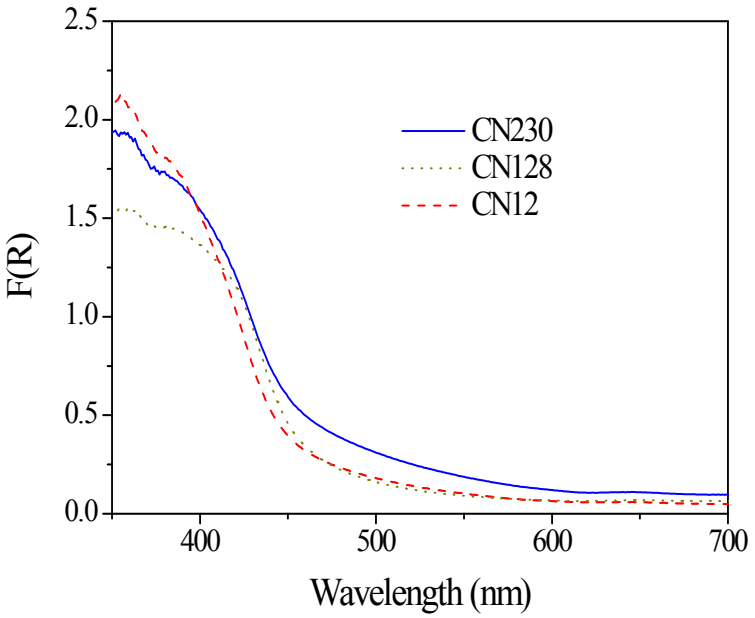
Figure S4. Diffuse reflectance UV/Vis spectra of *g*-C_3N_4 synthesized at different conditions.