Carbon Nitride Nested-tubes with Graphene as Dual Electron Mediator in Z-Scheme Photocatalytic Deoxynivalenol Degradation

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Experimental Section

Materials Preparation of ZnO/g-C_3N_4 Z-Scheme

Synthesis of GO and RGO: Graphene oxide (GO) was synthesized by the modified Hummmers' method[24], and graphene was prepared according to the literature[25]. The AAO membrane were purchased from Whatman Anodisc™ 47 with pore size = 0.2 μm and diameter = 47mm while the two ends of the porous channel are open. All chemicals were analytical reagent grade and were used without further purification.

Preparation of bulk graphitic carbon nitride (g-C_3N_4): A porcelain crucible was loaded with cyanamide (3 g) wrapped in foil paper tightly leaving no gaps, and then calcined at 600 °C for 4 h in N_2 atmosphere at a heating rate of 2.3 °C min^{-1}. Then product was ground to a homogeneous powder.

Preparation of ZnO blank sample: A porcelain crucible was loaded with zinc oxalate (3 g) wrapped in foil paper tightly leaving no gaps, and then calcined at 550 °C for 4 h in N_2 atmosphere at a heating rate of 2.3 °C min^{-1}. Then product was

ground to a homogeneous powder.

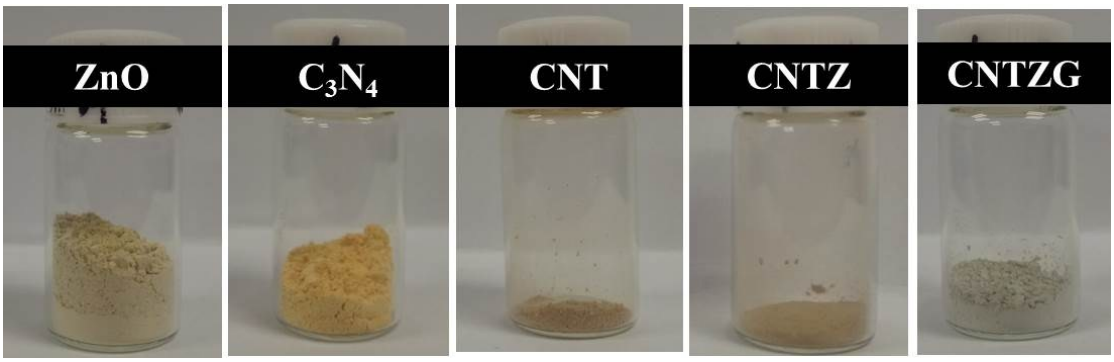

Figure S1. The optical photographs of ZnO samples, g-C_3N_4 and tubular series.

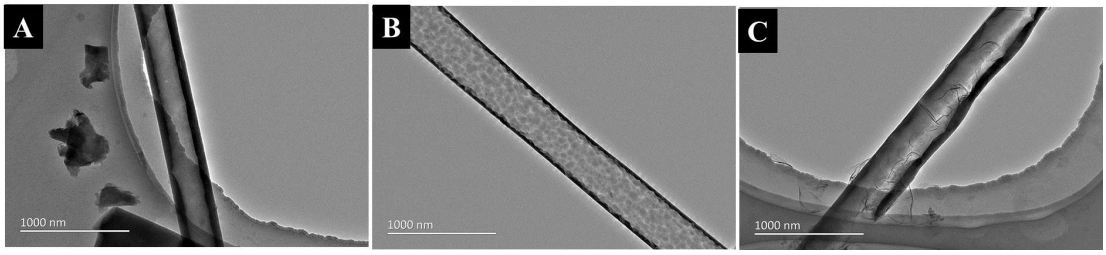

Figure S2. TEM images of tubular samples: (A) CNT (B) CNTZ (C) CNTZG.

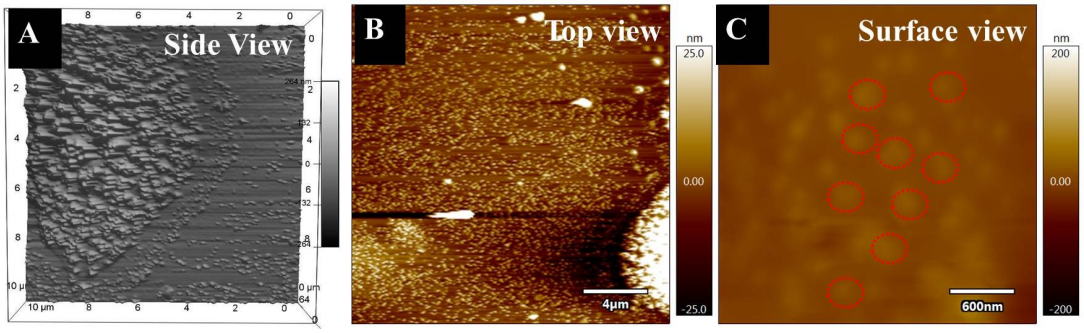

Figure S3. AFM images of CNTZG sample: (A) side view; (B) top view; (C) surface morphology.

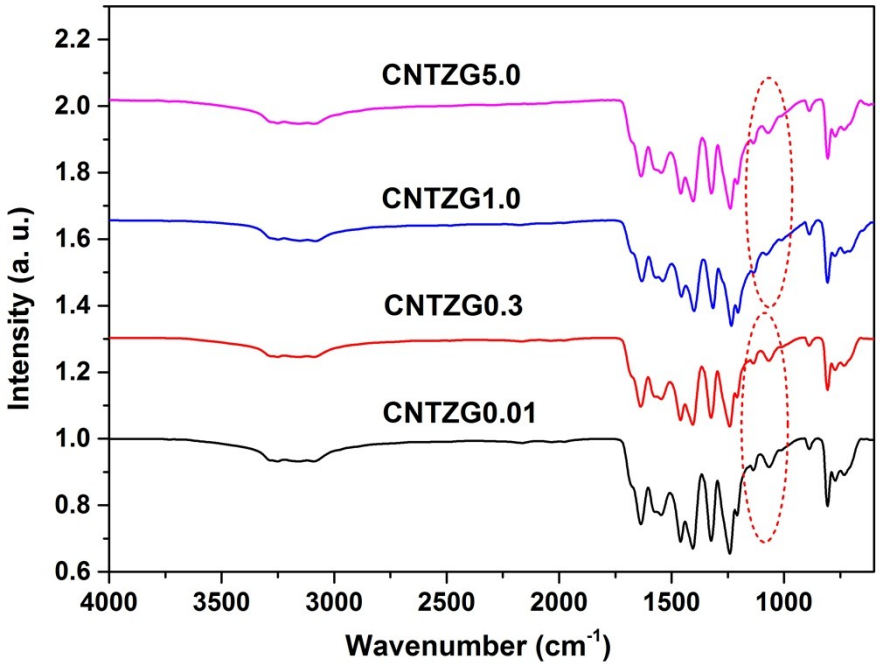

Figure S4. The FTIR spectra of different tubular CNTZG samples.

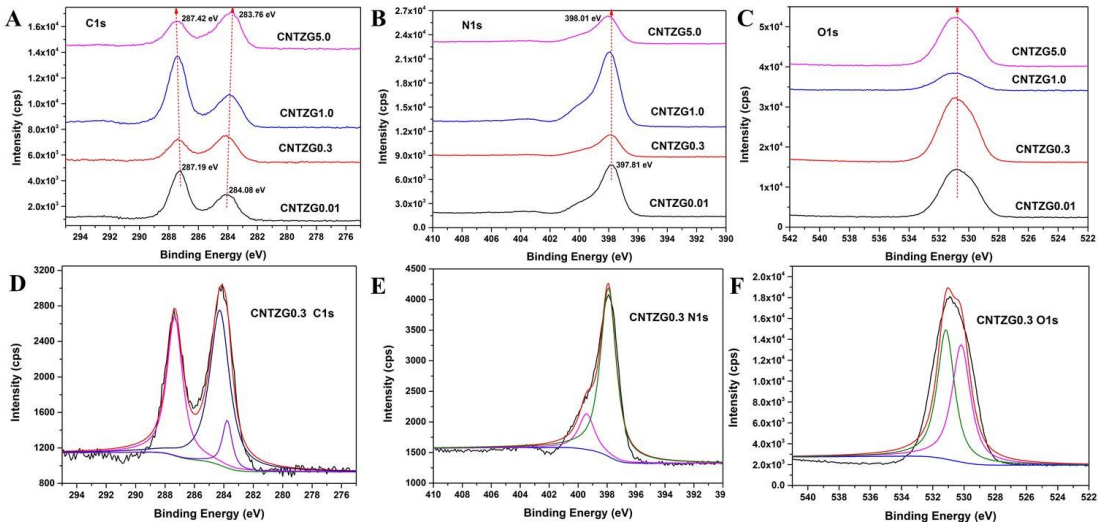

Figure S5. XPS spectra of nested tubular series of CNTZG samples.

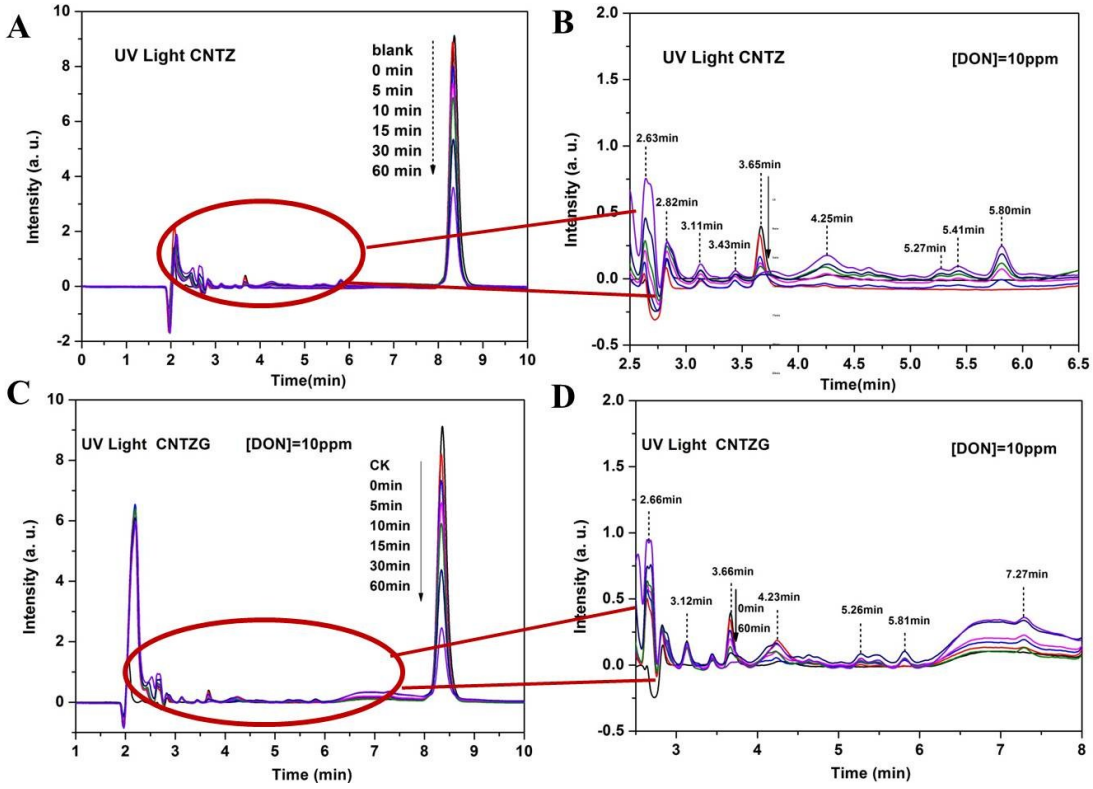

Figure S6. HPLC chromatograms with the photocatalyst of CNTZ and CNTZG systems monitoring the photodegradation process of DON at interval times under UV light irradiation.

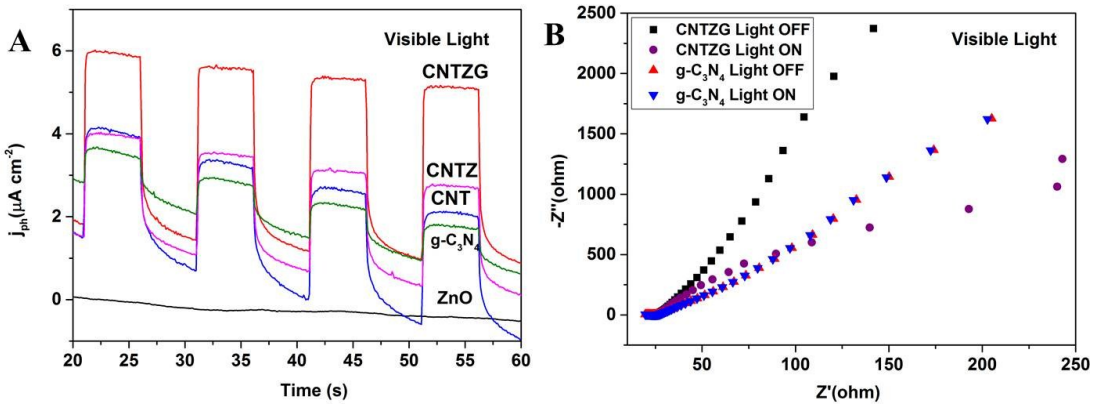

Figure S7. The photoelectrochemical response (Fig.S7A) and electrochemical impedance spectroscopy (Fig.S7B) of bulk g-C_3N_4 and CNTZG systems under visible light irradiation.