N-doped Ti_3C_2-reinforced porous g-C_3N_4 for photocatalytic contaminants degradation and nitrogen reduction

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Equations:

1. The conversion between reversible hydrogen electrode (RHE) and saturated calomel electrode (SCE)

$$E_{(RHE)} = E_{(SCE)} + 0.242 + 0.0591 \times (pH)$$

$$E_{(NHE)} = E_{(SCE)} + 0.242$$

2. Optical band gap (E_g)

$$\alpha h\nu=(h\nu-E_g)^n$$

α and hν are respectively absorption and photon energy. n=2 and 1/2 are respectively corresponded to indirect and direct gap.

3. Turnover frequency (TOF)

$$TOF = \frac{jAM}{4Fm}$$

Where j is the current density (mA cm^{-2}) at a given overpotential, A is electrode area, n, F m, M are molar concentration of catalyst and Faraday constant (96485 $C \cdot mol^{-1}$), mass loading of the catalyst (mg cm^{-2}), and molecular weight of the catalyst, respectively respectively.

Table S1

Table S1 Photocatalytic performance of TCCN-1 in this paper and other reported g-C_3N_4-based photocatalysts.

Photocatalysts	Amount (mg)	Light source	Concentration and volume of RhB	Efficiency (%)	Ref.
Pt/g-C_3N_4	10 mg	300W (λ> 420 nm)	10 mg·L^{-1}, 50ml	85% (20 min)	1
Cu/C /g-C_3N_4	50 mg	250W (λ> 420 nm)	10 mg·L^{-1}, 50ml	97% (120 min)	2
m-Fe/ g-C_3N_4	20 mg	500W (λ> 420 nm)	5 mg·L^{-1}, 40ml	88% (2 h)	3
Cu^+/g-C_3N_4	0.1 g	300/ (λ＜420 nm)	10 mg·L^{-1}, 200ml	95.7% (30 min)	4
GQDs/mpg-C_3N_4	25 mg	300W (λ> 420 nm)	10 mg·L^{-1}, 50ml	97% (120 min)	5
Ag/g-C_3N_4	10 mg	500W (λ< 420 nm)	10 mg·L^{-1}, 25ml	≈99% (100 min)	6
Ce/ g-C_3N_4	50 mg	250W (λ> 420 nm)	10 mg·L^{-1}, 200ml	≈90% (120 min)	7
CS@g-C_3N_4/MX	0.1 g	250W (λ> 420 nm)	50 mg·L^{-1}, 20ml	≈99% (180 min)	8
N-Ti_3C_2/porous g-C_3N_4	15 mg	300W (λ> 420 nm)	20 mg·L^{-1}, 30ml	97.5% (15 min)	This work

Figure S1

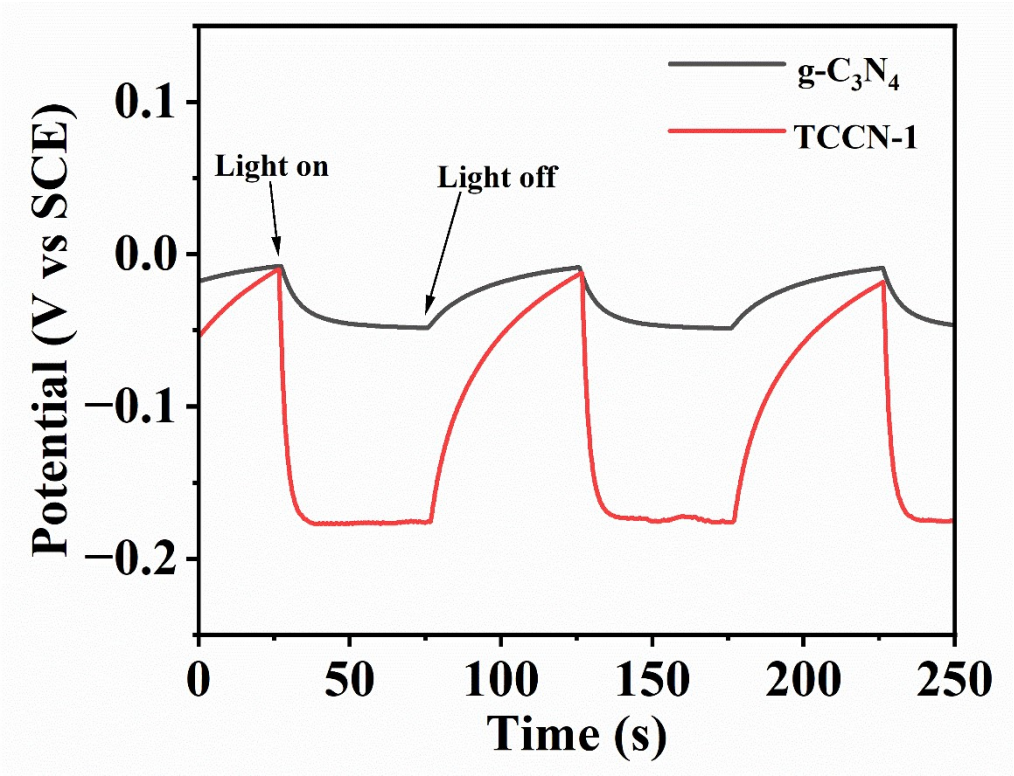

Figure S1 The transient photopotential for g-C_3N_4 and TCCN-1

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