supplementary

2D g-C_3N_4 as Bifunctional Photocatalyst for Co-catalyst and Sacrificial Agent-Free Photocatalytic N_2 Fixation and Dye Photodegradation

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Table S1: Comparison of NH_3 production rate on 2D g-C_3N_4 with reported relevant catalysts.

Catalysts	**Cocatalyst**	**Light source**	**Sacrificial**	**The rate of the NH_3 production**	**Ref**
g-C_3N_4	Sulfur-doped	Xenon lamp (500-W)	Methanol	5.99 mM h^{-1} $gcat^{-1}$	[S1]
g-C_3N_4	HCl	Sodium lamp (250 W, 400–800 nm)	Ethanol	6.32 mg L^{-1} h^{-1} $gcat^{-1}$	[S2]
g-C_3N_4	rGO	Sodium lamp (250 W, 400–800 nm)	EDTA-2Na	9.276 mg L^{-1} h^{-1} $gcat^{-1}$	[S3]
g-C_3N_4	KOH	Xe lamp (300 W)	Methanol	3.632 mmol h^{-1} g^{-1}	[S4]
g-C_3N_4/ Fe_2O_3	**Non**	Xenon lamp (300 W)	Ethanol	47.9 mg/L/h	[S5]
g-C_3N_4/ ZnMo/CdS	**Non**	Sodium lamp (250 W, 400–800 nm)	Ethanol	1.47 mg L^{-1} h^{-1} $gcat^{-1}$	[S6]
V-g-C_3N_4/ Ag_2CO_3	**Non**	Sodium lamp (250 W, 400–800 nm) with $NaNO_2$ solution filter	Ethanol or Methanol	4.5 mg·L^{-1} h^{-1} $gcat^{-1}$	[S7]
g-C_3N_4	**Non**	Sodium lamp(200W,400-800nm)	Ethanol	3.01 mg L^{-1} h^{-1} $gcat^{-1}$	[S8]
V-g-C_3N_4	**Non**	Xe lamp with UV cutoff filter (300 W, $\lambda > 420$ nm)	Methanol	1.24 mmol/h per 1g of V-g-C_3N_4	[S9]
r-GO @$PMo_{10}V_2$	**Non**	Xenon lamp (300 W)	**Non**	130.3 μmol L^{-1} h^{-1}	[S10]
2D g-C_3N_4	**Non**	**Sunlight**	**Non**	**3.9 mg/L/h**	**Current work**

* Nitrogen vacancies (V)

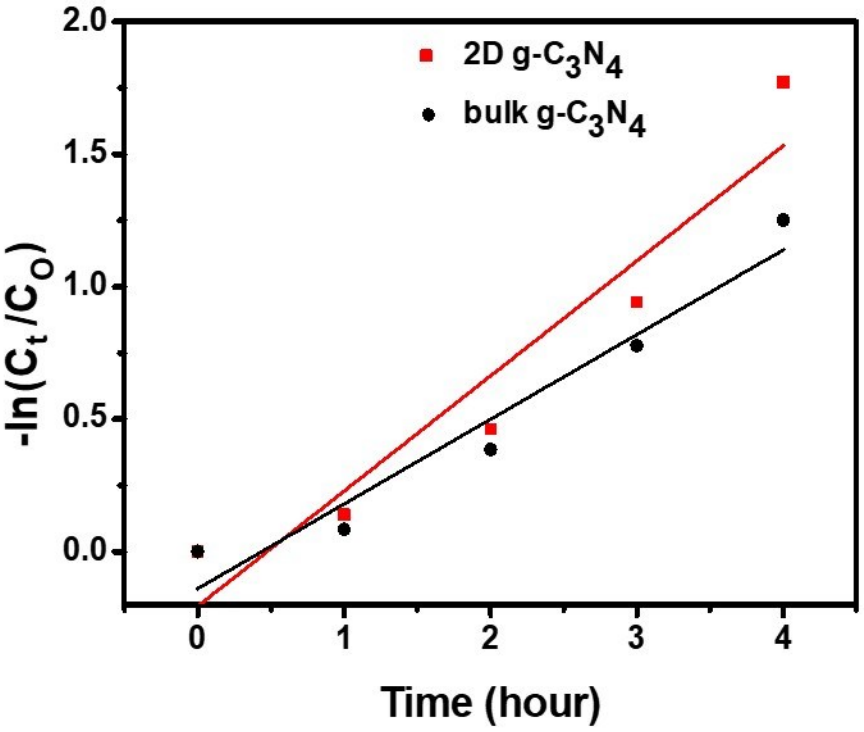

Fig. S1. Second order kinetic rate of bulk g-C_3N_4 and 2D g-C_3N_4 of MB.

Table S2. Kinetic k constant and R^2 for first order reaction for MB and MG, and second order reaction for MB.

Sample	**First-order kinetic rate (k1) constant (min^{-1})**	**R^2**	**Second order kinetic rate (k2) constant L/mg/min**	**R^2**
MB 2D g-C_3N_4 bulk g-C_3N_4	 0.43463 0.31967	 0.88833 0.93027	 0.11179 0.0623	 0.68702 0.81244
MG 2D g-C_3N_4 bulk g-C_3N_4	 0.5133 0.38103	 0.8808 0.92414		

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