

## Supplementary Material

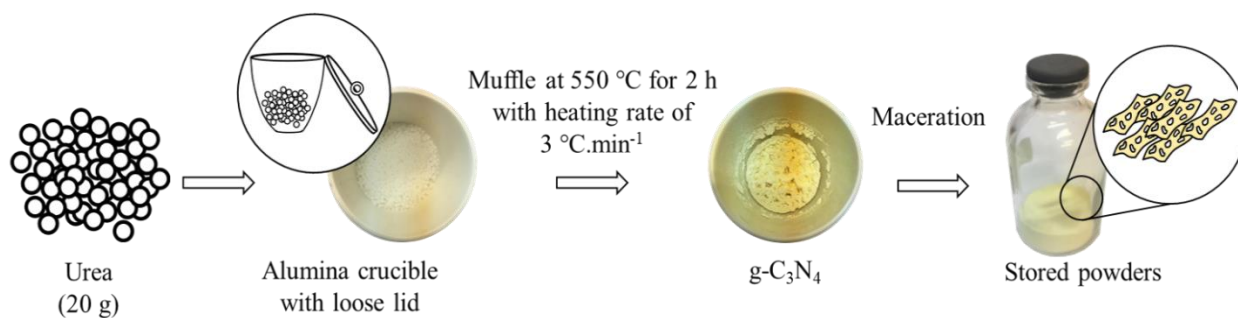


Figure S1. Flowchart of g-C<sub>3</sub>N<sub>4</sub> synthesis method from urea decomposition.

Table S1. Nominal content of DNC (wt%), masses used of both precursors in the synthesis, and the obtained experimental DNC content. \* value obtained by Thermogravimetric analysis.

Sample	DNC		Urea	Synthesis	DNC content
	Nominal Content (wt.%)	Mass (g)	Mass (g)	Yield (%)	Experimental* (wt.%)
<b>g-C<sub>3</sub>N<sub>4</sub></b>	0	0	20.0000	4.4	
<b>g-C<sub>3</sub>N<sub>4</sub>/DNC-2</b>	1.0	0.0086	17.0480	3.0	1.6
<b>g-C<sub>3</sub>N<sub>4</sub>/DNC-11</b>	5.0	0.0432	16.3592	2.3	11.1
<b>g-C<sub>3</sub>N<sub>4</sub>/DNC-28</b>	10.0	0.0865	15.4982	1.9	28.3

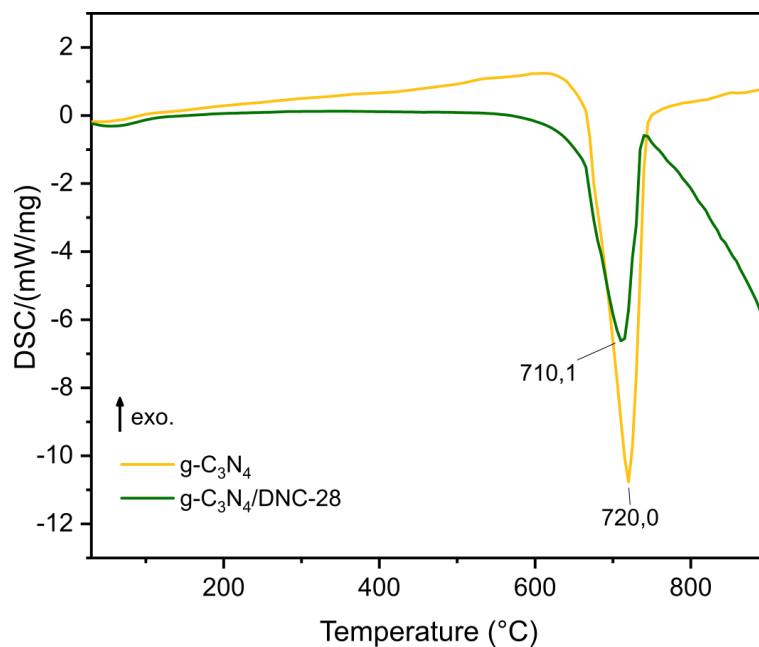


Figure S2. DSC of g-C<sub>3</sub>N<sub>4</sub> and g-C<sub>3</sub>N<sub>4</sub>/DNC-28.

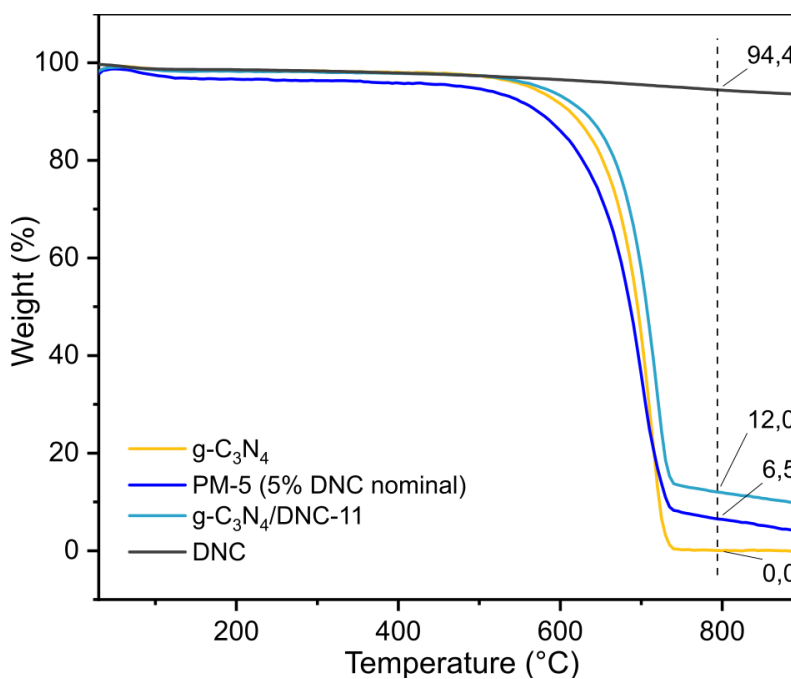


Figure S3. TGA profiles for yield comparisons of both 5 wt.% of DNC nominal mixes: g-C<sub>3</sub>N<sub>4</sub>/DNC-11 and Physically Mixed (PM-5).

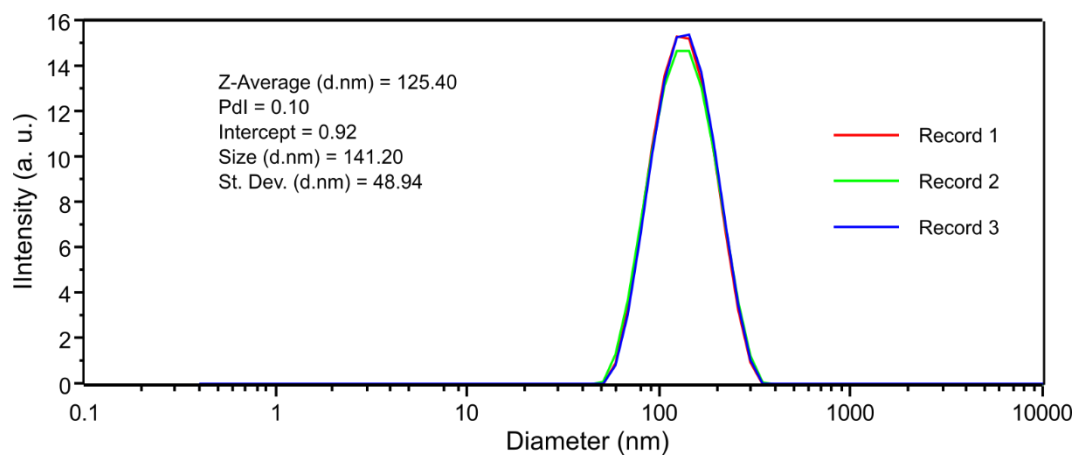


Figure S4. DLS graph of the pristine DNC.

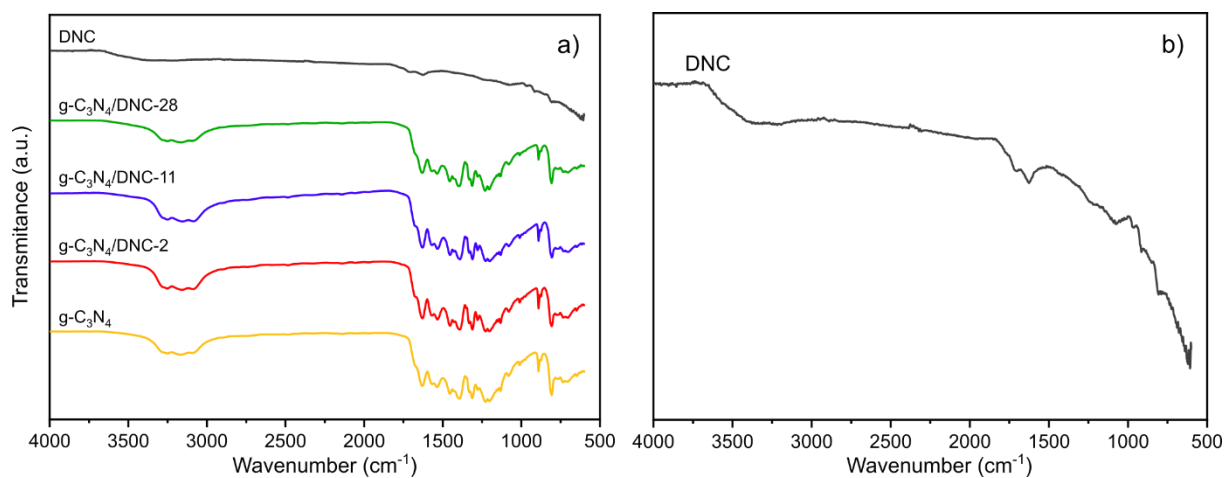


Figure S5. (a) Normalized FTIR spectra of pristine and prepared heterojunctions. (b) DNC spectrum in an enlarged scale.

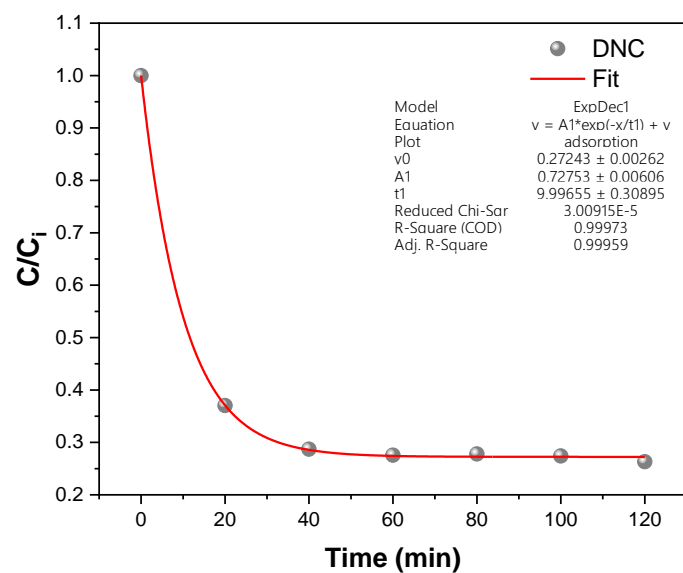


Figure S6. Adsorption of MB under dark using the diamond nanocrystals (DNC) as sorbent material at  $1 \text{ mg mL}^{-1}$  and  $[\text{MB}] = 30 \text{ mg L}^{-1}$ .

Table S2. Kinect constant (k) and R-squared values for first-order MB photodegradation reaction using prepared samples.

Sample	k (min <sup>-1</sup> )	R <sup>2</sup>
<b>g-C<sub>3</sub>N<sub>4</sub></b>	0.0059	0.99857
<b>g-C<sub>3</sub>N<sub>4</sub>/DNC-2</b>	0.0081	0.99763
<b>g-C<sub>3</sub>N<sub>4</sub>/DNC-11</b>	0.0088	0.99989
<b>g-C<sub>3</sub>N<sub>4</sub>/DNC-28</b>	0.0104	0.99795

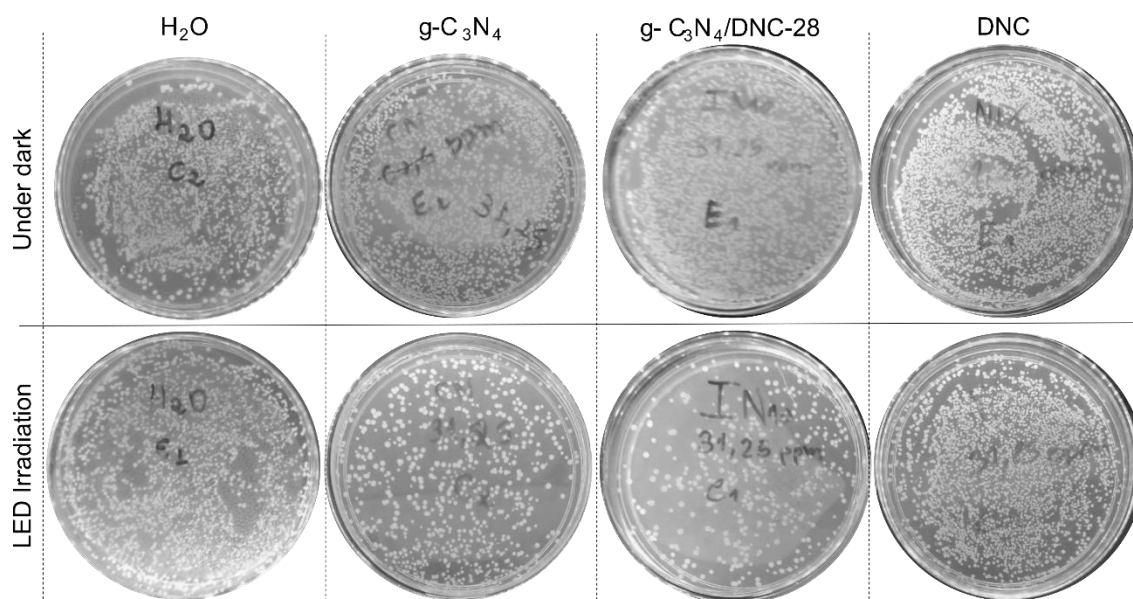


Figure S7. Growth of *Staphylococcus aureus* colonies in Petri dishes after exposure to H<sub>2</sub>O (negative control) and catalysts (g-C<sub>3</sub>N<sub>4</sub>, g-C<sub>3</sub>N<sub>4</sub>/DNC-28, and DNC) at 31 mg L<sup>-1</sup>. The illuminated samples were irradiated by visible light at 18 mW cm<sup>-2</sup> for 1 h provided by RGB light-emitting diodes (LEDs).

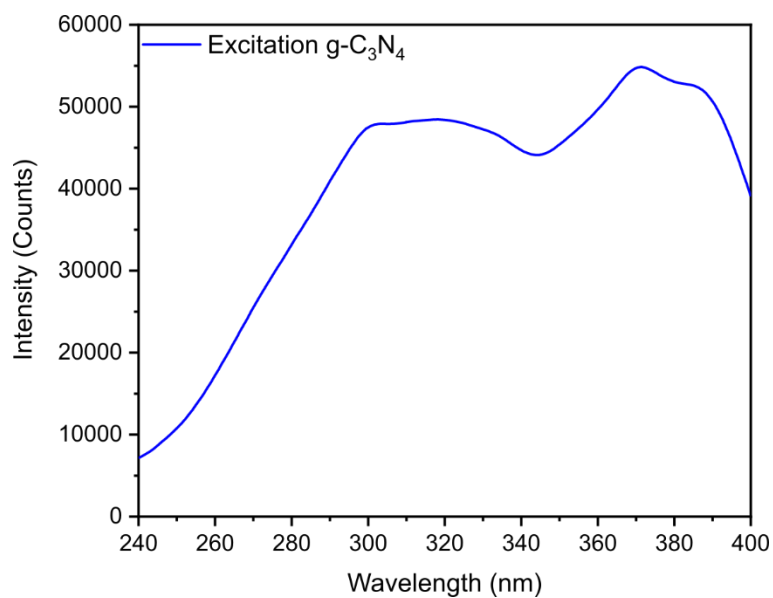


Figure S8. Excitation PL spectrum of pristine g-C<sub>3</sub>N<sub>4</sub> for emission fixed at 443 nm.