

## Supporting Information

### Enhancing photoactivity of defective g-C<sub>3</sub>N<sub>4</sub> via self-polarization effect of tourmaline for CO<sub>2</sub> reduction †

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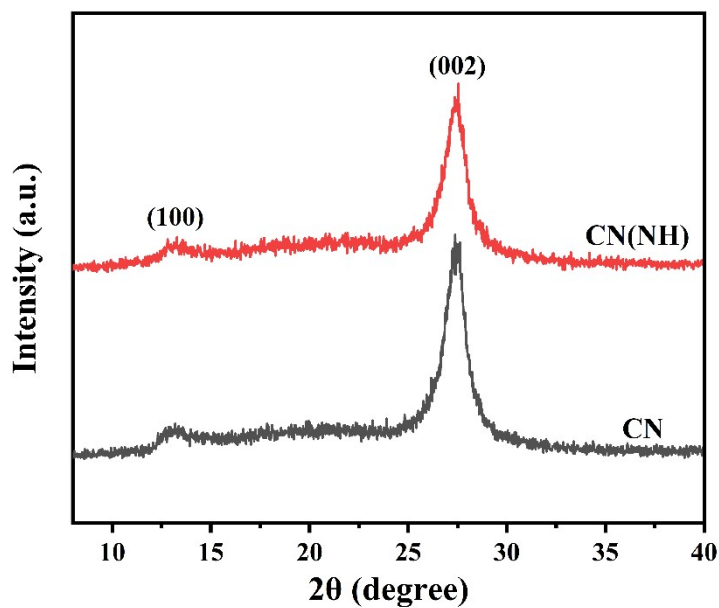


Figure S1. XRD patterns of CN and CN(NH).

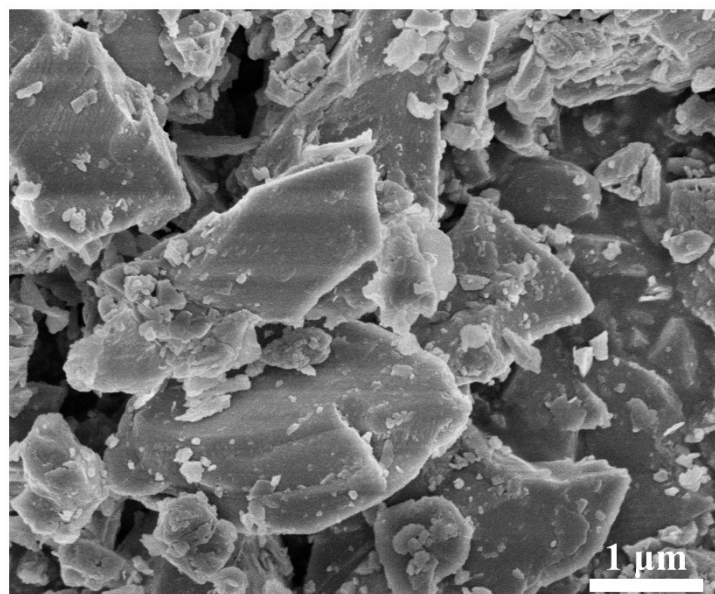
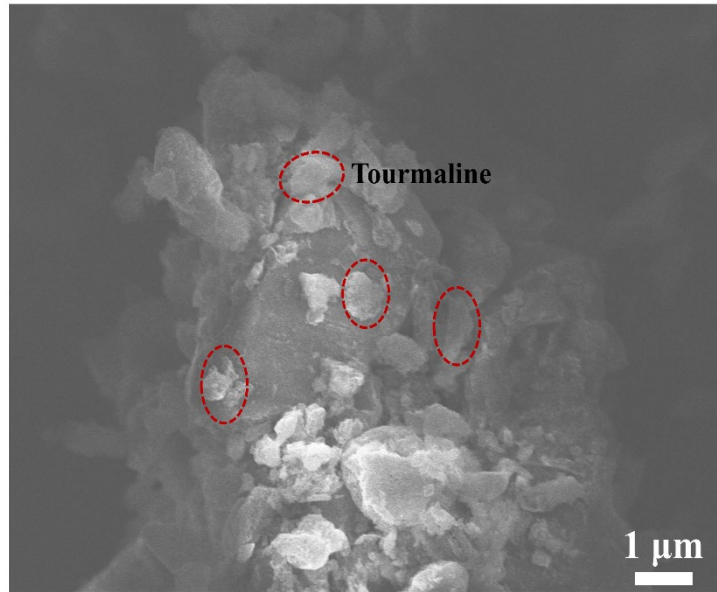
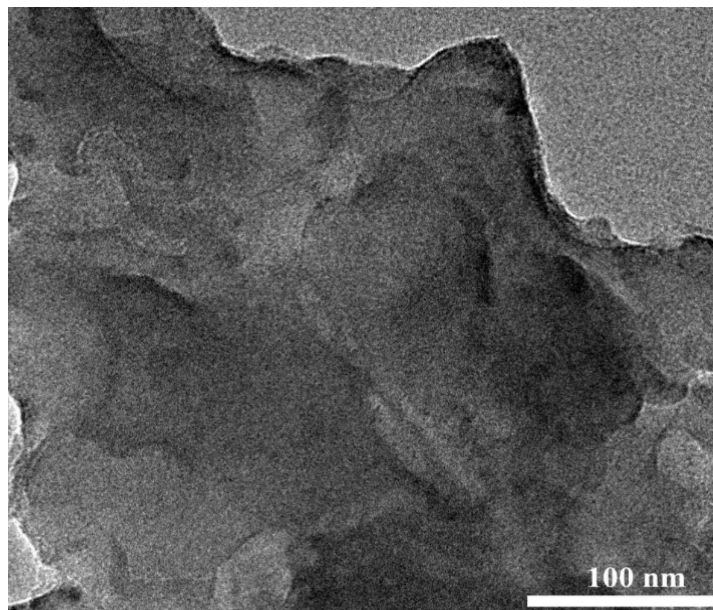


Figure S2. SEM image of TM.



**Figure S3.** SEM image of 25TM/CN(NH).



**Figure S4.** TEM image of CN.

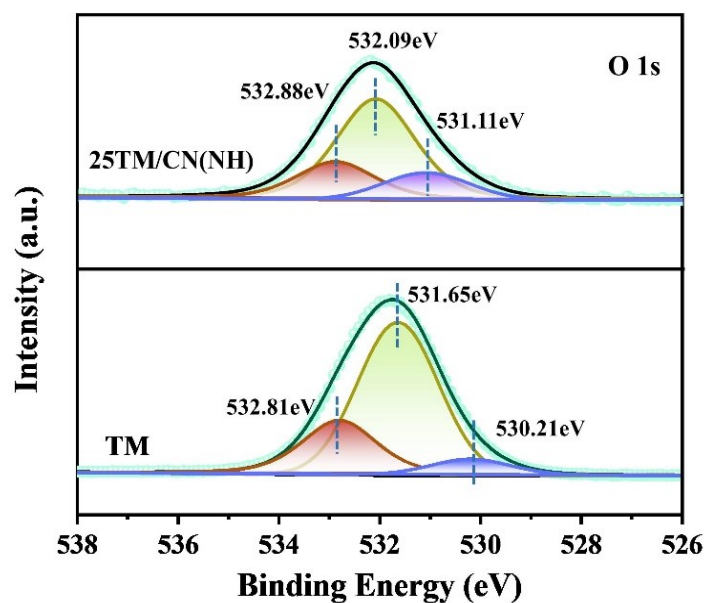


Figure S5. XPS spectra of TM and 25TM/CN(NH): O 1s.

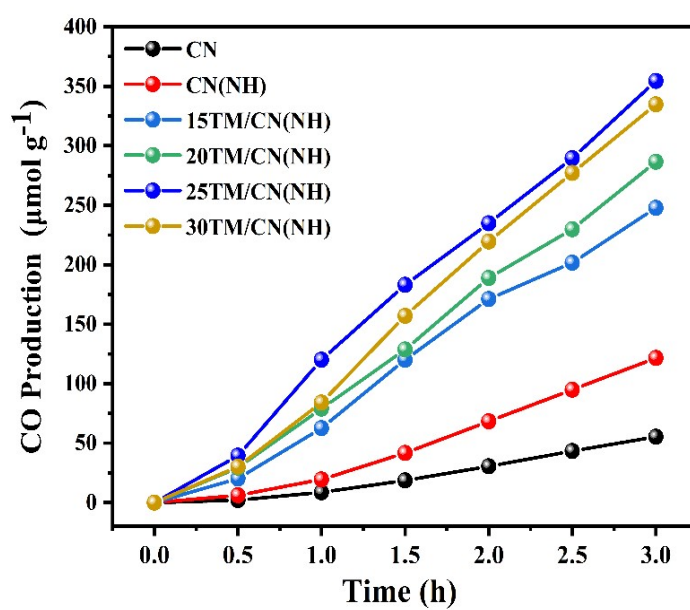


Figure S6. Time-dependent CO yields produced in the presence of different photocatalysts.

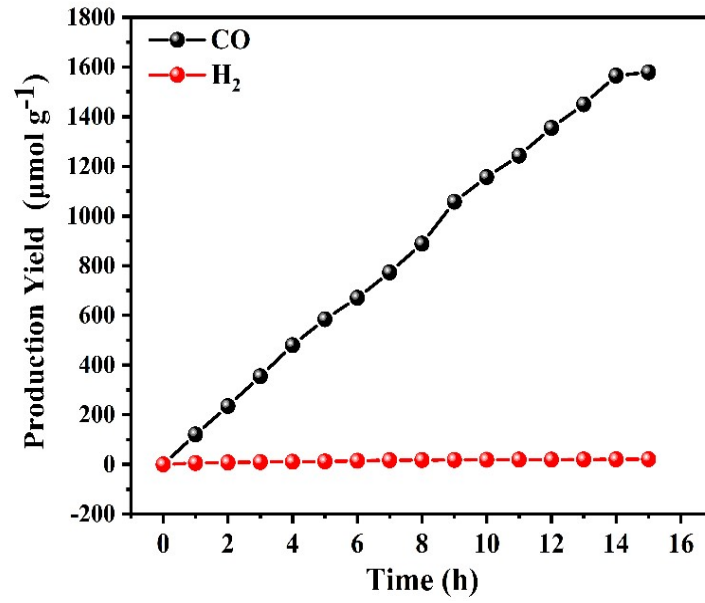


Figure S7. The plot of CO and H<sub>2</sub> yields of 25TM/CN(NH) over a continuous 15 h period.

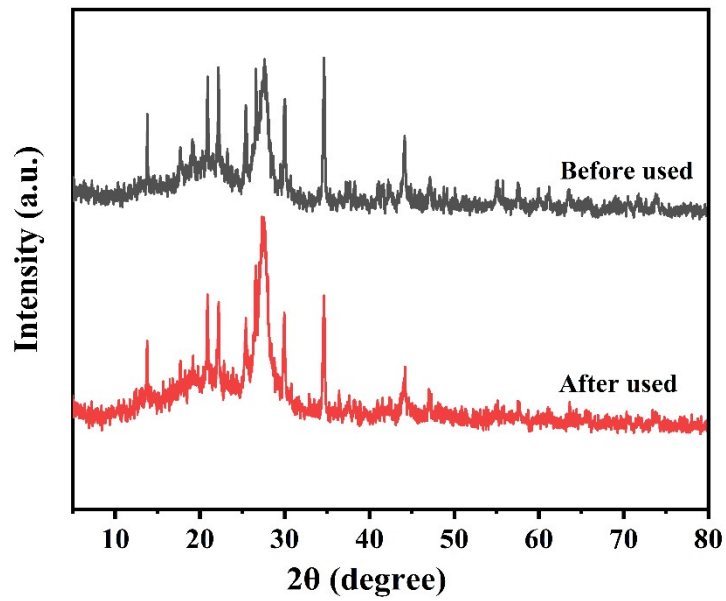


Figure S8. XRD patterns of 25TM/CN(NH) before and after the cyclic experiment.

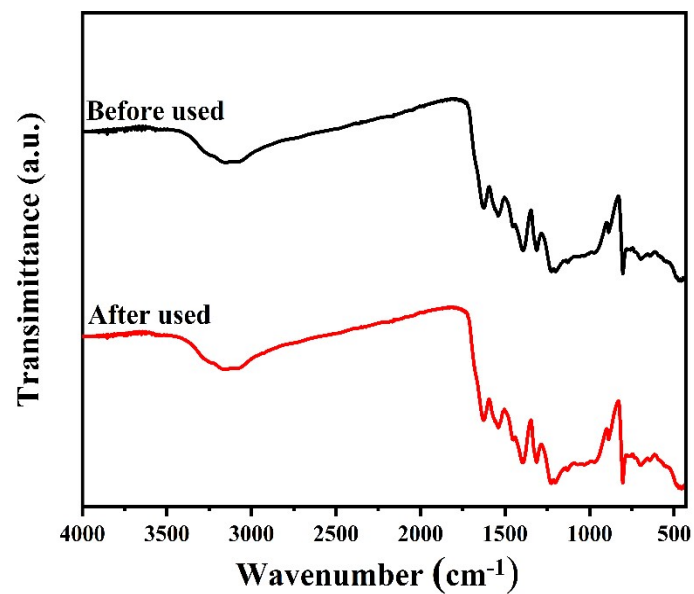


Figure S9. FTIR spectra of 25TM/CN(NH) before and after the cyclic experiment.

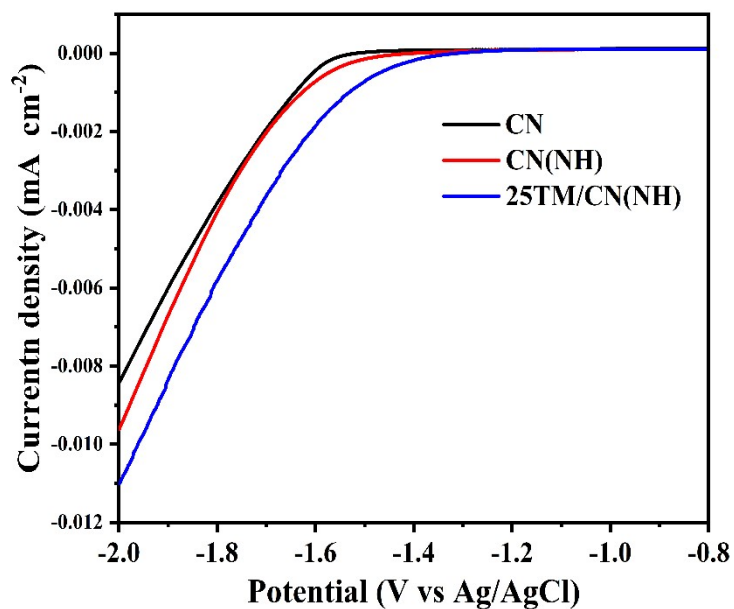
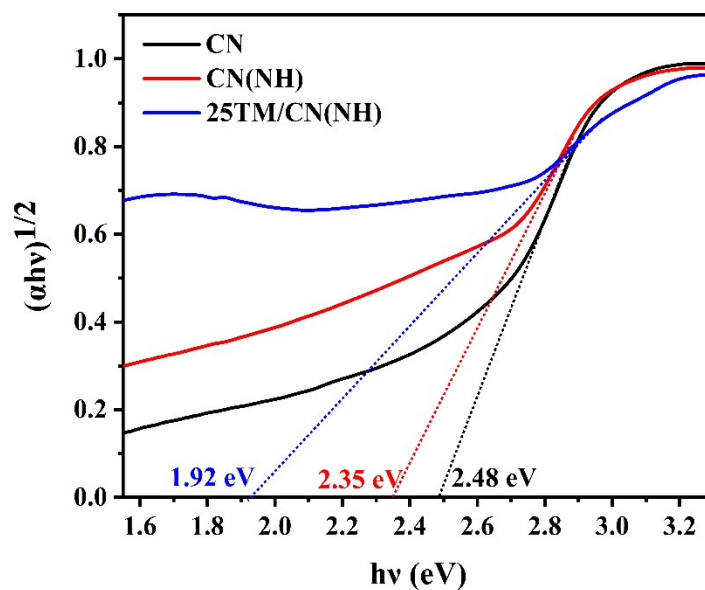


Figure S10. Polarization curve of CN, CN (NH), and 25TM/CN (NH).



**Figure S11.** Tauc spectra of CN, CN(NH), and 25TM/CN(NH).

**Table S1:** Photocatalytic CO<sub>2</sub> reduction properties of previously reported g-C<sub>3</sub>N<sub>4</sub> based photocatalysts

Catalysts	Reaction condition	Sacrificial agent	Light source	CO production rate (μmol g <sup>-1</sup> h <sup>-1</sup> )	CO Selectivity	Ref.
Cu <sub>2</sub> ZnSnS <sub>4</sub> /Pt/g-C <sub>3</sub> N <sub>4</sub>	gas-solid, water	/	400W Xe lamp	34.7	68.55%	1
NiO/g-C <sub>3</sub> N <sub>4</sub>	Liquid-solid	TEOA	a 300 W Xe lamp	3.78	68.4%	2
g-C <sub>3</sub> N <sub>4</sub> /In <sub>2</sub> O <sub>3</sub>	Liquid-solid	TEOA	300 W Xe lamp	274	100%	3
Co <sub>4</sub> @g-C <sub>3</sub> N <sub>4</sub>	Liquid-solid	TEOA	300 W Xe lamp	107	94%	4
CN/CTF	Liquid-solid	TEOA	300 W Xe lamp	151	/	5
BCN-30	Liquid-solid	TEOA	300 W Xe lamp	93	/	6
Bi-BCN-0.2	Liquid-solid	/	300 W Xe lamp	16.31	88.67%	7
<b>25TM/CN(NH)</b>	<b>Liquid-solid</b>	<b>TEOA</b>	<b>300W Xe lamp</b>	<b>118.17</b>	<b>95.56%</b>	<b>This work</b>

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