Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

Table S1. A representative summary of the enhanced photocatalytic activity of g-C_3N_4 photocatalysts based on sodium ion treatment for water splitting.

Precursors	Approach	Sacrificial and agentcocatalysts	Light source	Activity (unit)	ref
Melamine and disodium ethylenediaminetetraacetate	Generalthermal condensation	Triethanolamine and Pt	300 W Xe lamp equipped with a UV-cutoff filter ($\lambda > 420$ nm)	H_2；258.4 μmol $h^{-1}g^{-1}$	1
Melamine and sodium tripolyphosphate	Generalthermal condensation	Methanol and Pt	350 W Xe arc lamp	H_2；3820 μmol $h^{-1}g^{-1}$	2
Melamine and sodium hydroxide	Step calcination	Triethanolamine and Pt	350 W Xe lamp with a UV cutoff filter ($\lambda > 400$ nm)	H_2；935 μmol $h^{-1}g^{-1}$	3
Melamine and sodium borohydride	Step calcination	Silver nitrate Cobalt Hydroxide	300 W Xe lamp with a UV cutoff filter ($\lambda > 300$ nm)	O_2；561.2 μmol $h^{-1}g^{-1}$	4
Triazole ring and sodium hydroxide	Condensation reaction	-	50 W halogen tungsten lamp irradiation	Degradation of methylene blue；the maximum monolayer adsorption capacity 35mg/g	5
Dicyandiamide and sodium hydroxide	Hydrothermal treatment	hydrogen peroxide	350 W Xe lamp with a UV cutoff filter ($\lambda > 420$ nm)	The photocatalytic oxidation (PCO) of NO ；Promote three times	6
Melamine and sodium chloride	Ground in planetary ball mill	Pt	300 W xenon lamp with a 420 nm cutoff filter	H_2 and O_2； 31.5 μmol $h^{-1}g^{-1}$, 15.2 μmol $h^{-1}g^{-1}$	7
Melamine and potassium chloride-sodium chloride	Molten salt method	-	250 W high-pressure sodium lamp with main emission from 400 to 800 nm	H_2O_2； 4.6 mmol L^{-1}	8
Melamine and potassium chloride-sodium chloride	Molten salt method	-	250 W high-pressure sodium lamp with main emission in the range of 400-800	Degradation of rhodamine B；RhB degradation rate at 90%	9

			nm		
Urea and sodium hydroxide	High temperature calcination	Methanol and Pt	250 W high-pressure sodium lamp (400 < λ < 800 nm)	H_2 and H_2O_2；900 μmol $h^{-1}g^{-1}$,800 μmol g^{-1}	10
Melamine and sodium hydroxide	Thermal polymerization	-	300 W xenon lamp with a 420 nm cutoff filter	Tetracycline degradation；the photocatalytic degradation efficiency is 80.61%	11

1□Y. Zhang, S. Zong, C. Cheng, J. Shi, X. Guan, Y. Lu and L. Guo, *Int. J. Hydrogen Energy*, 2018, **43**, 13953-13961.

2□S. Cao, Q. Huang, B. Zhu and J. Yu, *J. Power Sources*, 2017, **351**, 151-159.

3□J. Jiang, S. Cao, C. Hu and C. Chen, *Chinese J. Catal.*, 2017, **38**, 1981-1989.

4□D. Zhao, C. L. Dong, B. Wang, C. Chen, Y. C. Huang, Z. Diao, S. Li, L. Guo, S. Shen, *Adv. Mater.,* 2019, **31**, 935-943.

5□H. Wang, M. Li, H. Li, Q. Lu, Y. Zhang and S. Yao, *Mater. Des.*, 2019, **162**, 210-218.

6□H. Nie, M. Ou, Q. Zhong, S. Zhang and L. Yu, *J. Hazard. Mater.*, 2015, **300**, 598-606.

7□F. Guo, J. Chen, M. Zhang, B. Gao, B. Lin and Y. Chen, *J. Mater. Chem. A*, 2016, **4**, 10806-10809.

8□X. Qu, S. Hu, J. Bai, P. Li, G. Lu and X. Kang, *J. Mater. Sci.*, 2018, **34**, 1932-1938.

9□J. Zhao, L. Ma, H. Wang, Y. Zhao, J. Zhang and S. Hu, *Appl. Surf. Sci.*, 2015, **332**, 625-630.

10□F. Liang, X. Sun, S. Hu, H. Ma, F. Wang and G. Wu, *Diam Relat Mater*, 2020, **108**, 107911.

11□W. Wang, P. Xu, M. Chen, G. Zeng, C. Zhang, C. Zhou, Y. Yang, D. Huang, C. Lai, M. Cheng, L. Hu, W. Xiong, H. Guo and M. Zhou, *ACS Sustain. Chem. Eng.*, 2018, **6**, 15503-15516.

The N_2 adsorption and desorption isotherms of the catalyst after solution regulation are shown in the figure S1. All samples show type IV adsorption desorption isotherms with H_3 hysteresis ring, indicating that the existence of mesoporous structure is the result of the accumulation of flake particles.

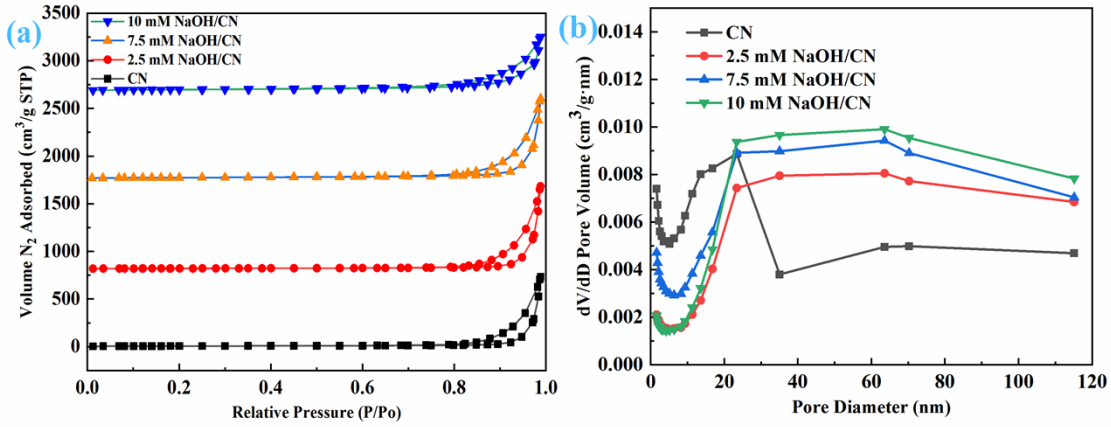
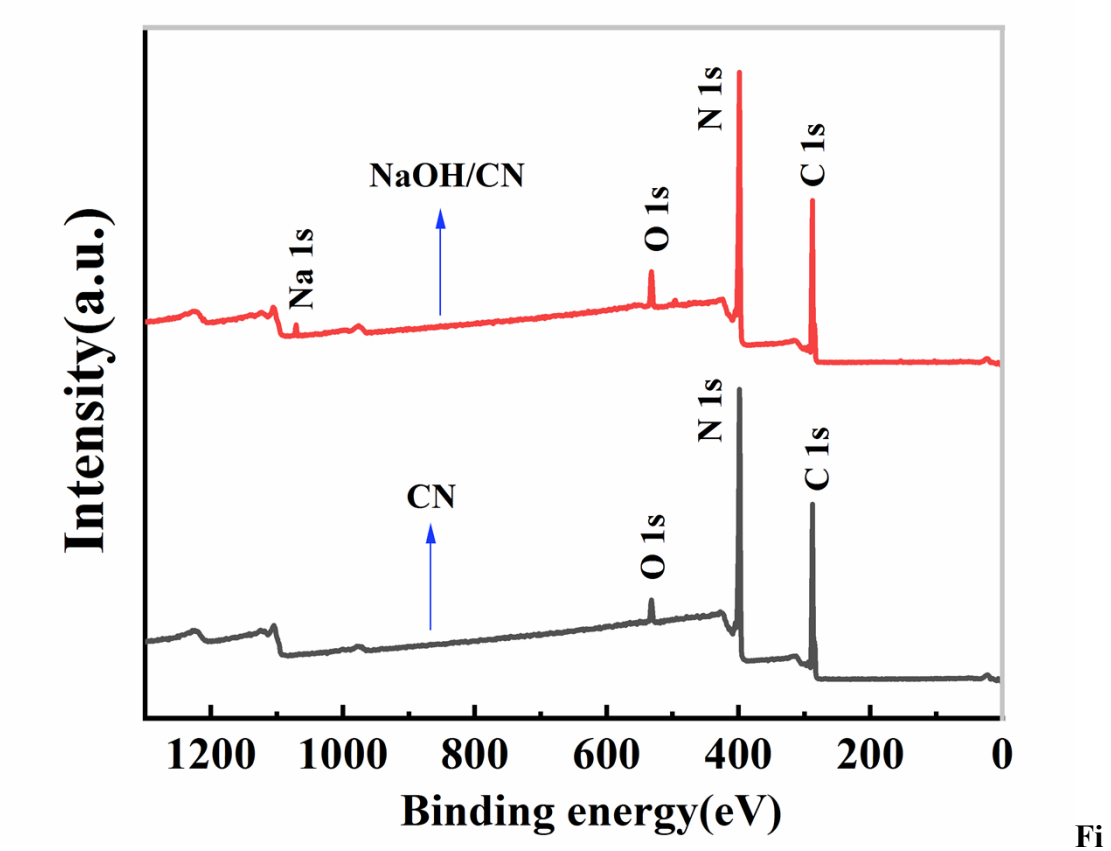


Fig. S1 (a) Nitrogen adsorption-desorption isotherms of CN, 2.5 mM NaOH/CN, 7.5 mM NaOH/CN and 10 mM NaOH/CN; (b) The pore size distribution of CN，2.5 mM NaOH/CN, 7.5 mM NaOH/CN and 10 mM NaOH/CN.



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g. S2 XPS fully scanned spectrum of CN and 7.5 mM NaOH/CN.

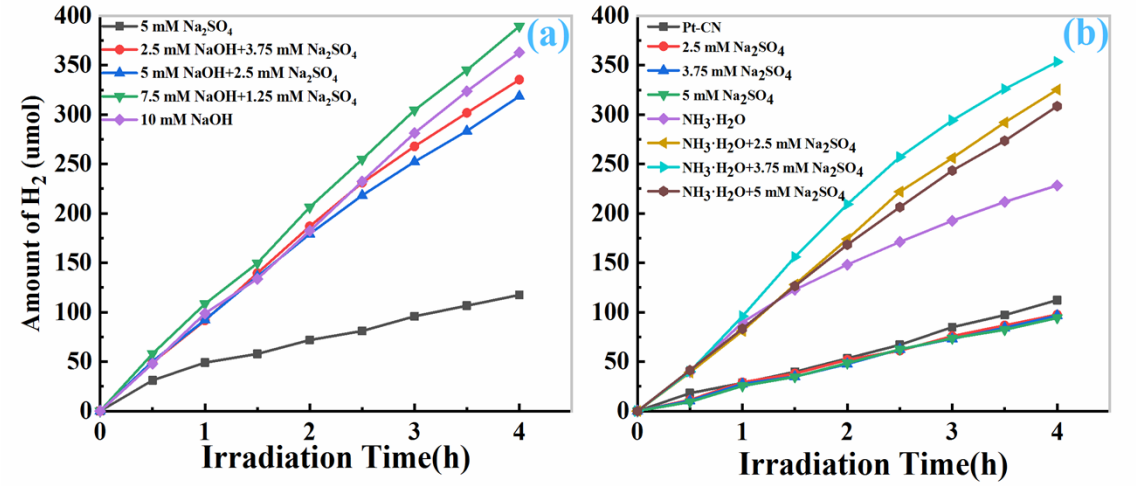

Fig. S3 (a) The time courses of H_2 evolution at different pH and (b) the H_2 production of different Na^+ concentration.

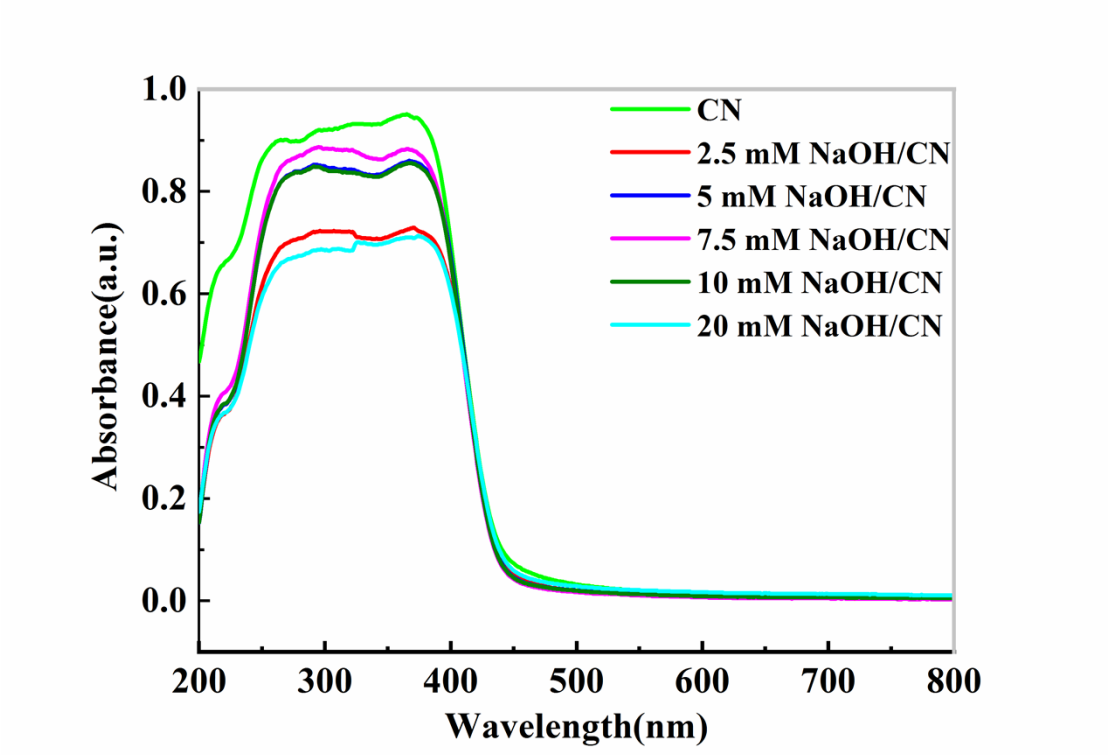

Fig. S4 UV-vis DRS patterns of CN and $(NaOH)_X$/CN (n = 2.5, 5, 7.5, 10, 20 mM)