Supporting Information

Graphitic carbon nitride decorated with C-N compounds broken by s-triazine unit as homojunction for photocatalytic H_2 evolution

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Fig. S1. The digital photos of dialysis process.

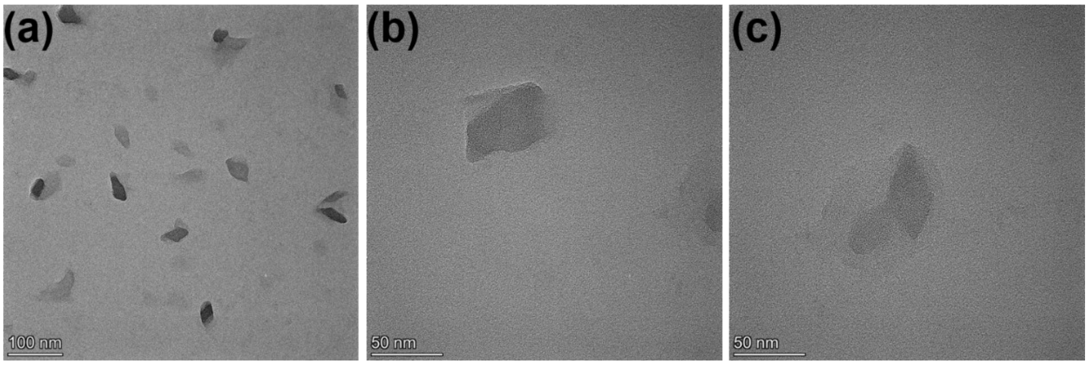

Fig. S2. TEM images of BST-CN

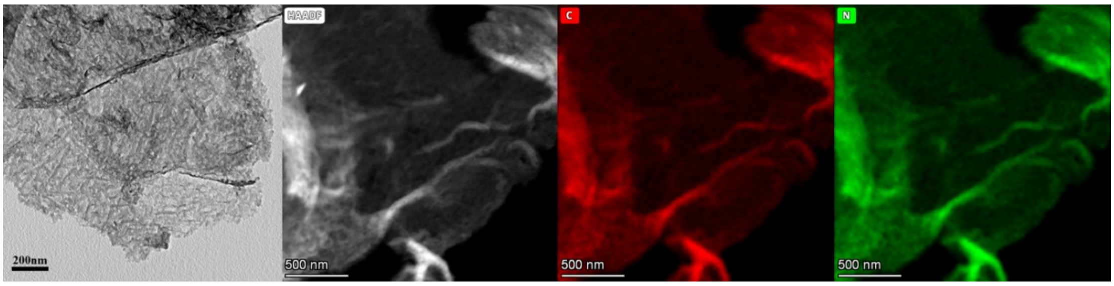

Fig. S3. TEM and EDS mapping images of g-C_3N_4 nanosheets

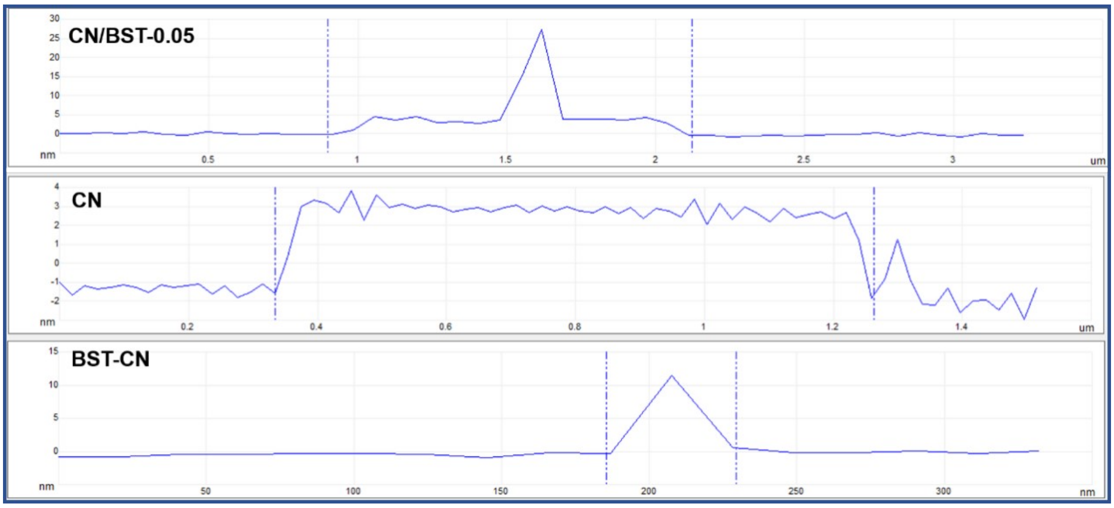

Fig. S4. Corresponding height analysis of CN/BST-0.05, g-C_3N_4 nanosheets (CN) and BST-CN.

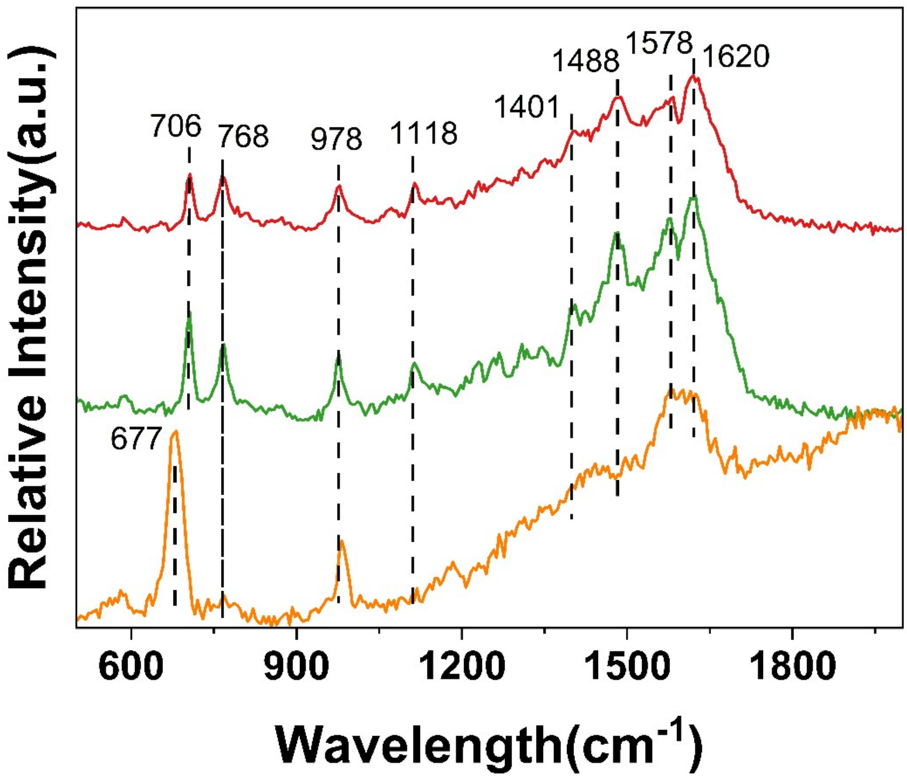

Fig. S5. Raman spectra of CN, BST and CN/BST-0.05.

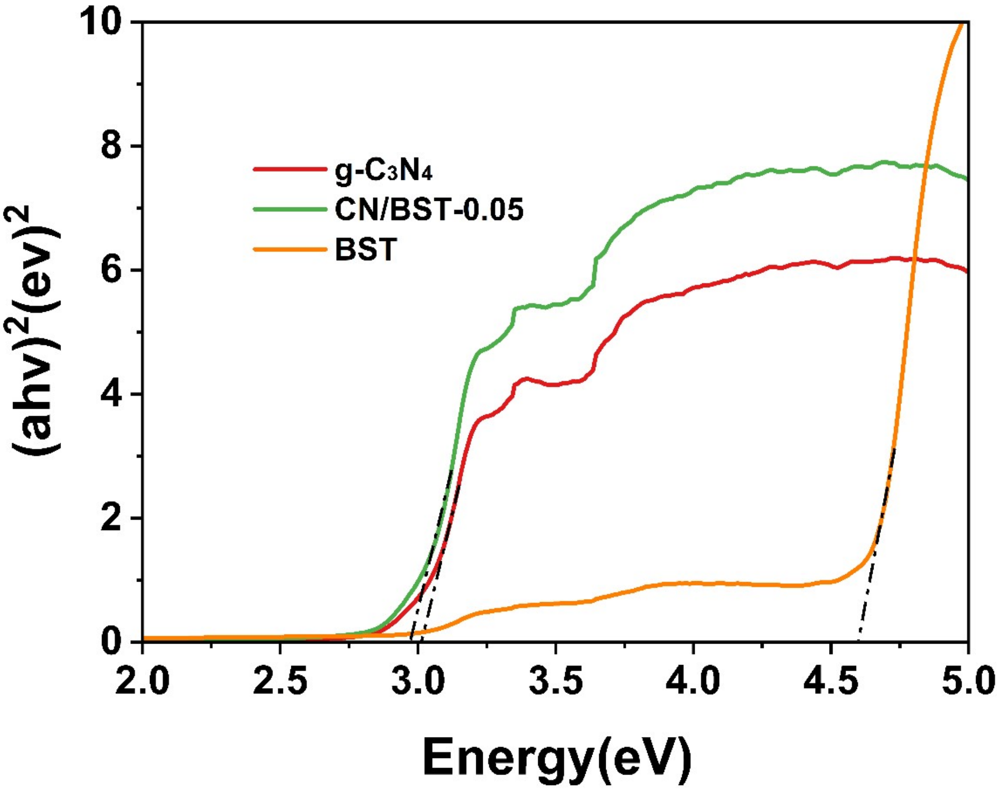

Fig. S6. Corresponding Taus plots of g-C_3N_4, BST-CN and CN/BST-0.05.

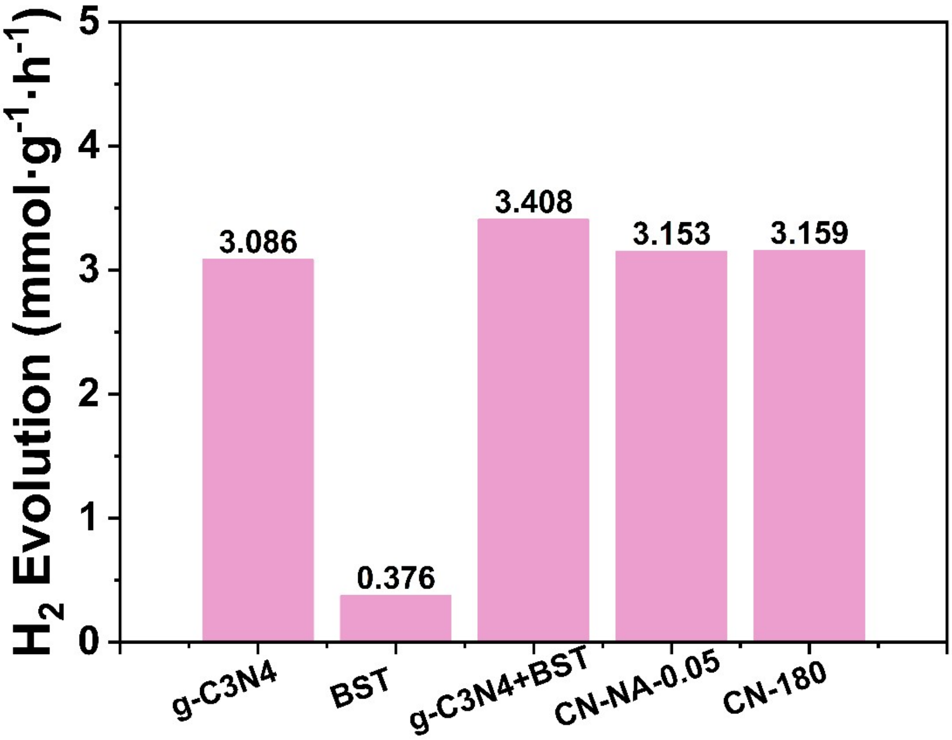

Fig. S7. PHE performance of supplementary reference samples.

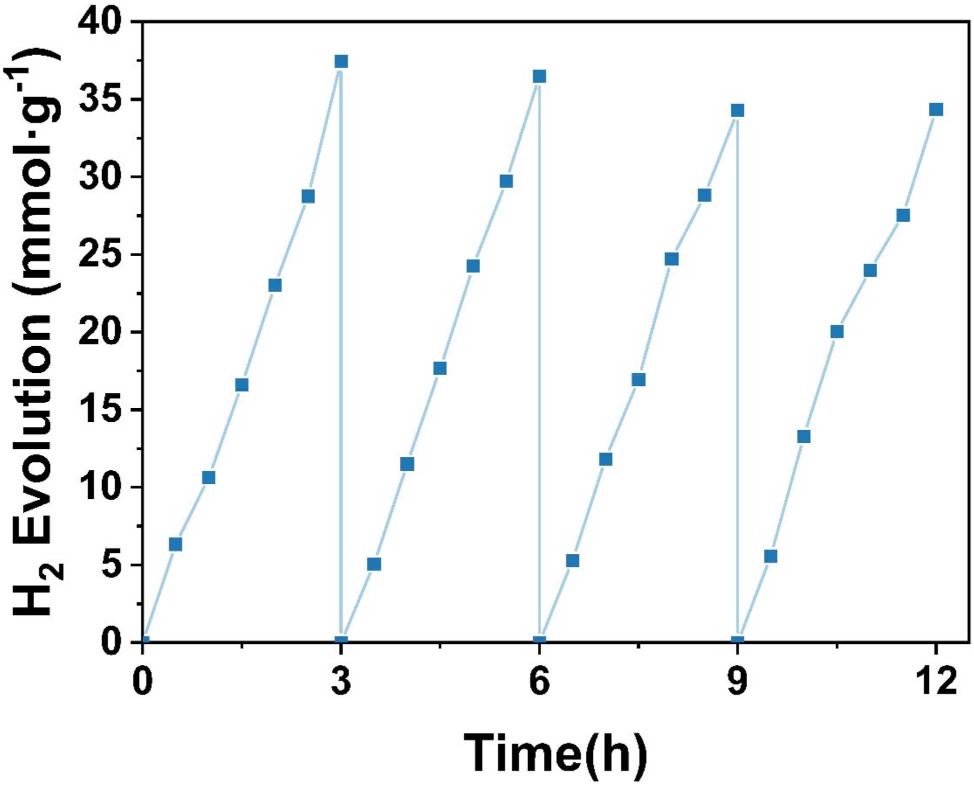

Fig. S8. PHE performance of CN/BST-0.05 catalyst in 4 cycles of tests.

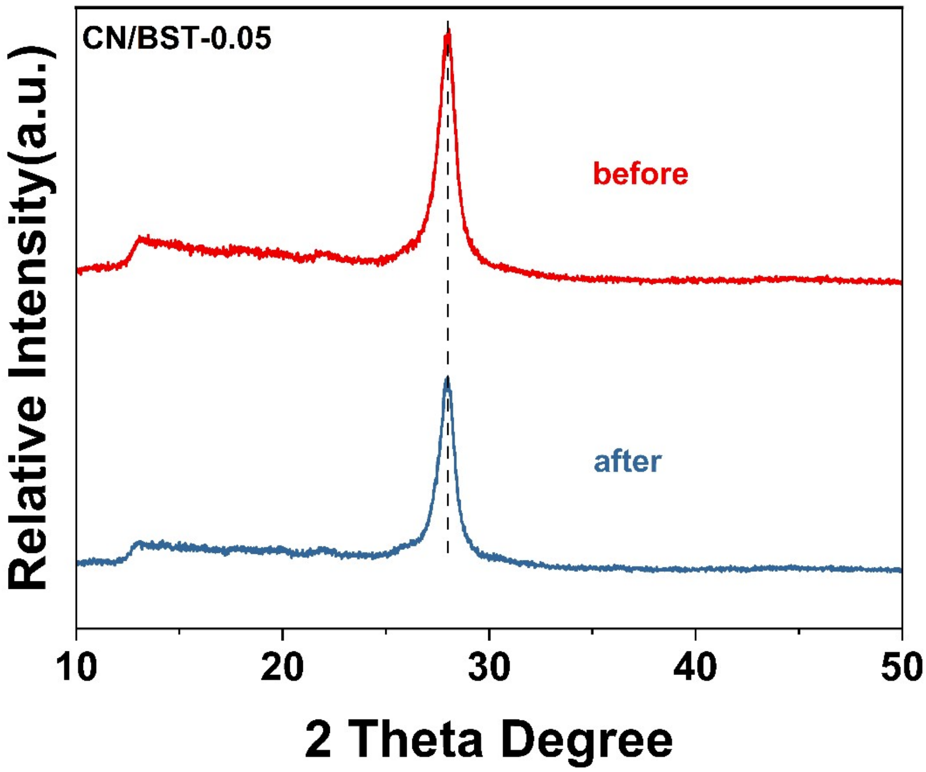

Fig. S9. XRD pattern of CN/BST-0.05 catalyst before and after 4 cycles of tests.

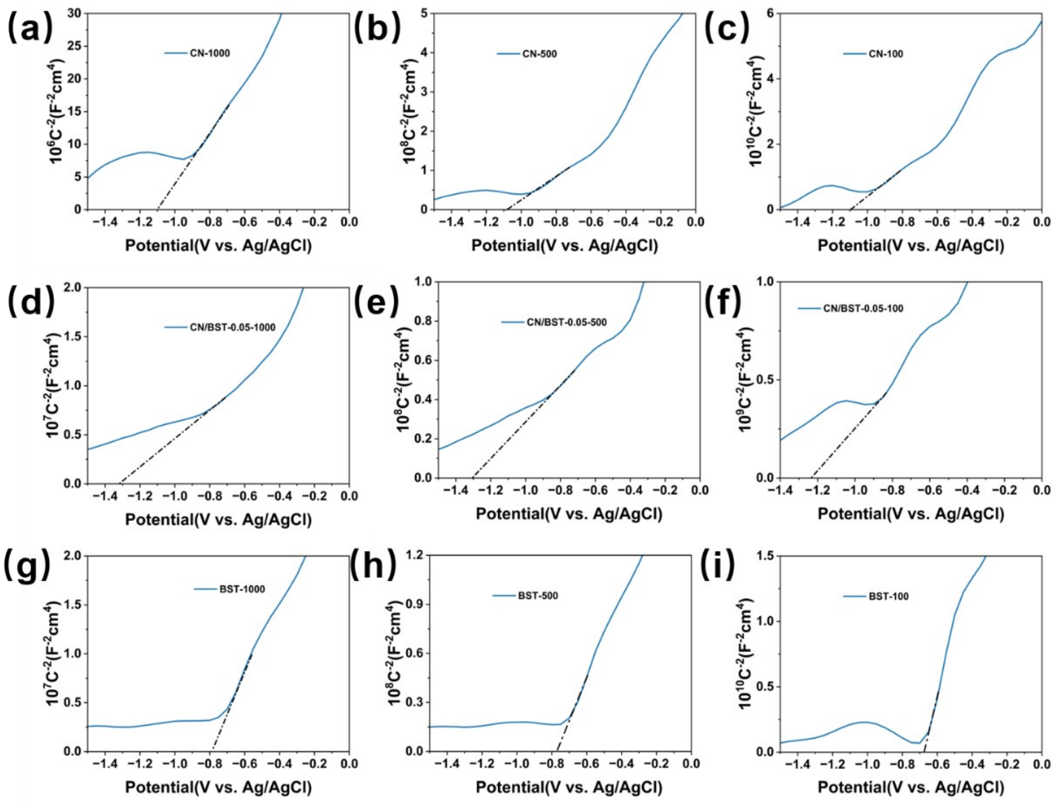

Fig. S10. Mott-Schottky plots under different frequency of (a-c) g-C_3N_4 nanosheets (CN), (d-f) CN/BST-0.05 and (g-i) BST-CN.

Table S1. Summary of BET obtained parameters of g-C_3N_4, CN/BST-0.05 and BST series samples.

Sample	Pore Volume ($cm^3\ g^{-1}$)	Surface Area ($cm^2\ g^{-1}$)	Pore Width (nm)
CN	0.569	231.771	27.043
CN/BST-0.05	0.342	136.162	10.321
BST	1.8291	50.9	7.4410

Table S2. The comparison of our results with those reported photocatalyst performance.

Sample	Reaction condition	HER (μmol g^{-1} h^{-1})	Ref.
CN/BST-0.05	Pt (λ ≥ 320 nm)	12470	This work
CN/BST-0.05	Pt (λ ≥420 nm)	5601	This work
IR/CN	Pt (λ ≥ 420 nm)	3882	[S1]
30ZIS-S/CN	Pt (λ ≥ 420 nm)	3215	[S2]
g-C3N4/Ni-P-3%	No Pt	1051	[S3]
$CN_{700-210}$	Pt(λ ≥ 420 nm)	830	[S4]
A–CGCN	Pt (λ ≥ 420 nm)	1179	[S5]
tri-/tri-s-tri-C_3N_4-90	Pt (λ ≥ 420 nm)	1600	[S6]
g- C_3N_4-Co2P	(λ≥ 420 nm)	11120	[S7]
DCN-200	Pt (λ ≥ 420 nm)	3980	[S8]
CN-$TH_{3/3}$	Pt (λ ≥ 420 nm)	3806.5	[S9]

Reference

[S1] W. Yu, X. Shan and Z. Zhao, *Appl. Catal. B: Environ.*, 2020, **269**, 118778.

[S2] Y. Qin, Hong Li, J. Lu, Y. Feng, F. Meng, C. Ma, Y. Yan and M. Meng, *Appl. Catal. B: Environ.*, 2020, **277**, 119254.

[S3] K. Qi, Y. Xie, R. Wang, S. Liu and Z. Zhao. *Appl. Surf. Sci.*, 2019, **466**, 847-853.

[S4] L. Cui, X. Hou, H. Du and Y. Yuan, *ACS Appl. Mater. Inter.*, 2013, 23, **5**, 12533-12540.

[S5] Z. Liu, G. Wang, H.-S. Chen and P. Yang, *Chem. Commun.*, 2018, **54**, 4720-4723.

[S6] Z. X. Zeng, H. T. Yu, X. Quan, S. Chen and S. S. Zhang, *Appl. Catal. B-Environ.*, 2018, **227**, 153-160.

[S7] R. C. Shen, J. Xie, H. D. Zhang, A. P. Zhang, X. B. Chen and X. Li, *ACS Sustain. Chem. Eng.*, 2018, **6**, 816-826.

[S8] G. Liu, G. Zhao, W. Zhou, Y. Liu, H. Pang, H. Zhang, D. Hao, X. Meng, P. Li, T. Kako and J. Ye, *Adv. Funct. Mater.*, 2016, **26**, 6822-6829.

[S9] Z. Fang, Y. Bai, L. Li, D. Li, Y. Huang, R. Chen, W. Fan and W. Shi, *Nano Energ.*, 2020, **75**, 104865.