Electronic Supplementary Material (ESI) for Dalton Transactions.

Facile synthesis of mesoporous polymeric carbon nitride nanosheets anchored by Pt with ultralow loading for high-efficiency photocatalytic H_2 evolution

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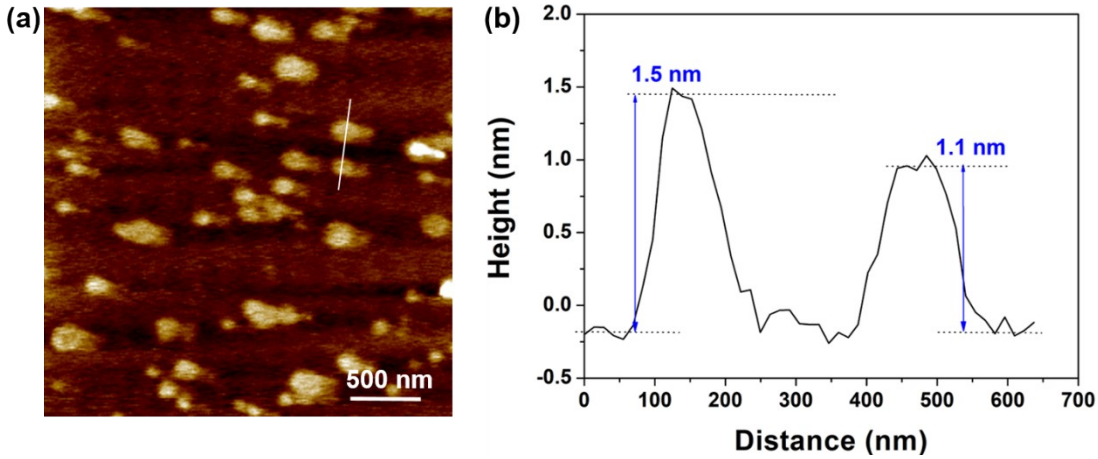

Fig. S1 (a) AFM image and (b) corresponding height profiles along the white line in figure (a) of CNNS.

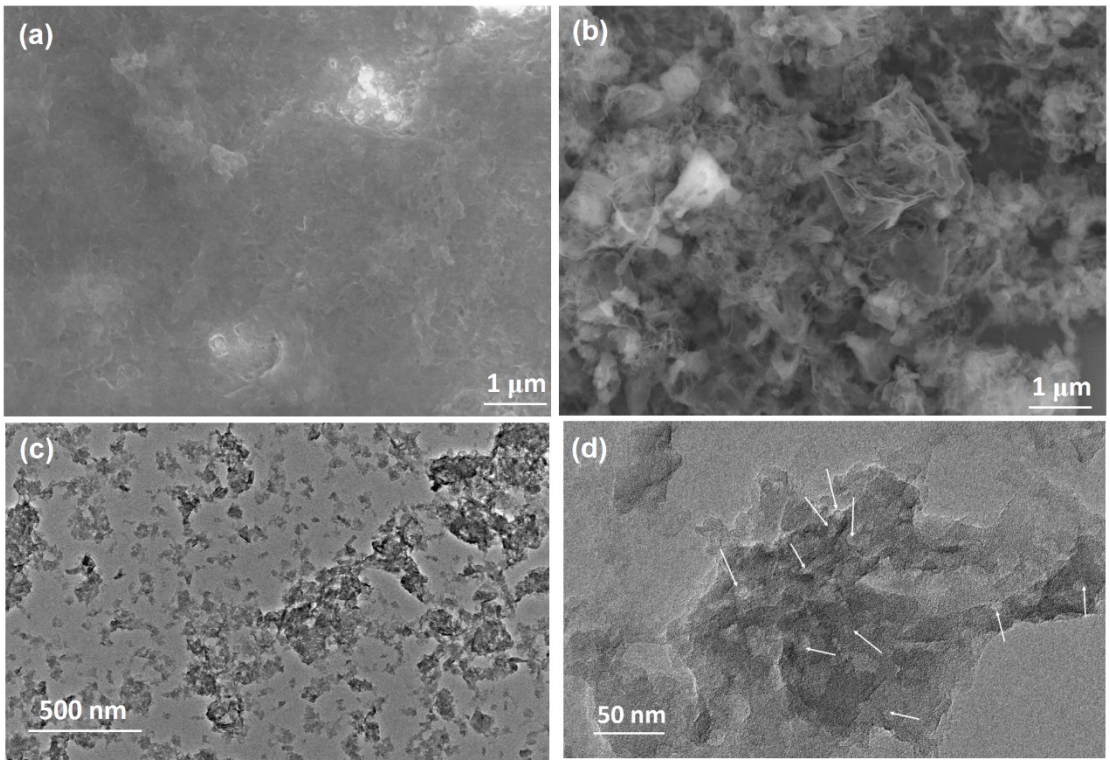

Fig. S2 SEM images of (a) bulk CNu, (b) CNNSu, and TEM images of CNNSu (c, d)

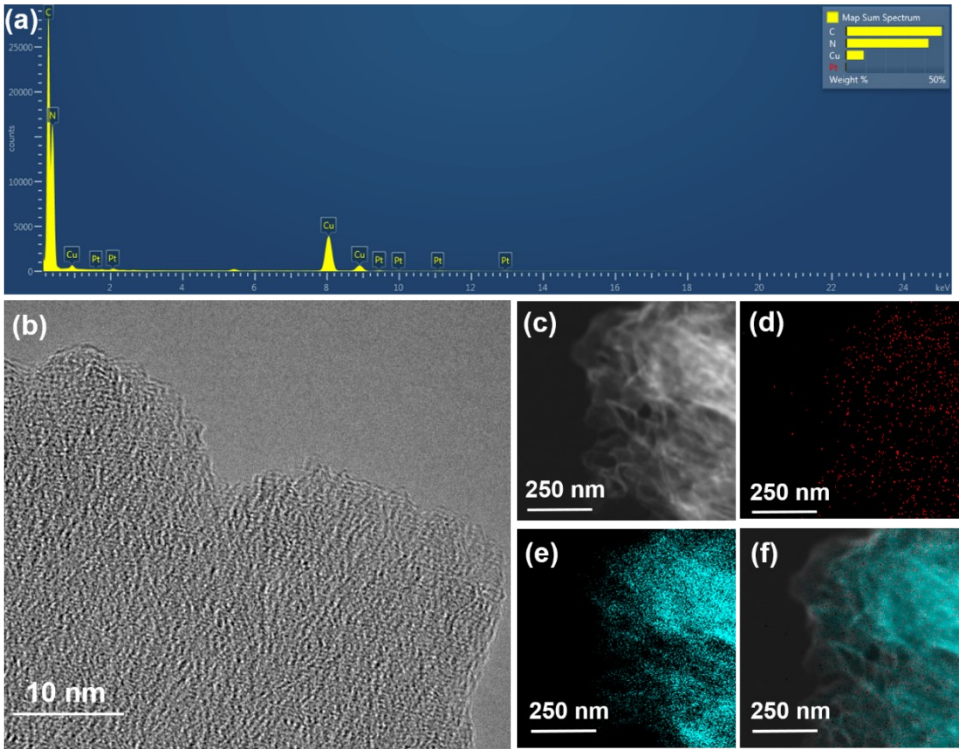

Fig. S3 (a) Energy disperse spectrum, (b) high-resolution TEM and (c) TEM image of Pt/CNNS-5H ($H_2PtCl_6 \cdot 6H_2O$ solution: 1mL) and its (d) Pt, (e) N and (f) Pt, N merged element mappings.

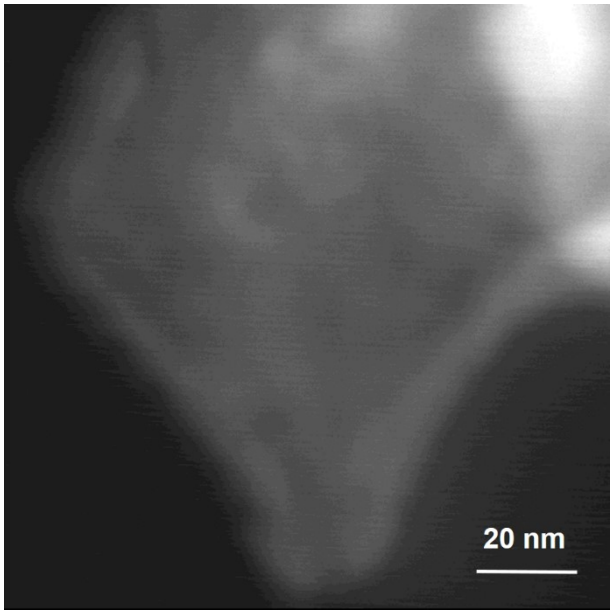

Fig. S4 STEM image of Pt/CNNS-5H ($H_2PtCl_6 \cdot 6H_2O$ solution: 1mL).

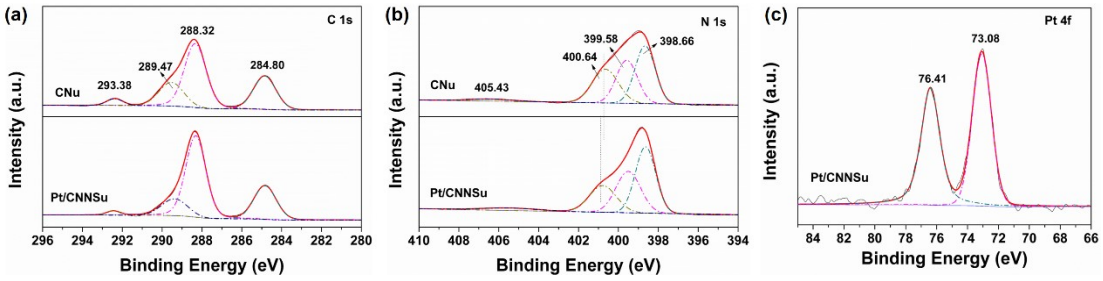

Fig. S5 High-resolution XPS of (a) C 1s, (b) N 1s, and (c) Pt 4f in CNu and CNNSu as-obtained samples.

Table S1 Physicochemical properties and photocatalytic activities of the CN and CNNS samples for H_2 evolution reduction under visible light.

Sample	Specified surface area (m^2/g)	Binding energy (eV)	H_2 resolution (μmol/h)
CN	9.96	2.76	16.1
CNNS-2.5H	61.63	2.77	118.68
CNNS-5H	91.77	2.83	172.79
CNNS-10	80.60	2.86	150.28
CNNS-15	64.02	2.88	97.24

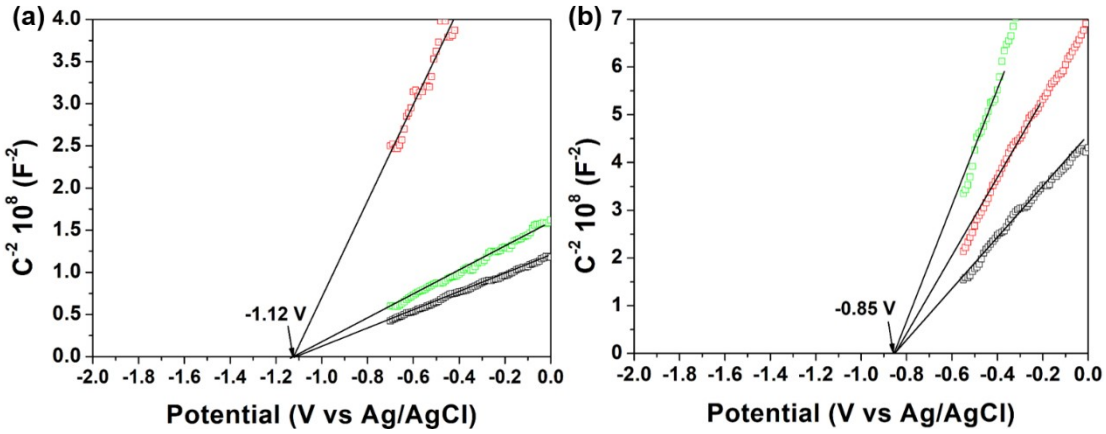

Fig. S6 Mott-Schottky plots of CN (a) and CNNS-5H (b) collected at various frequencies[1] versus saturated Ag/AgCl reference electrode

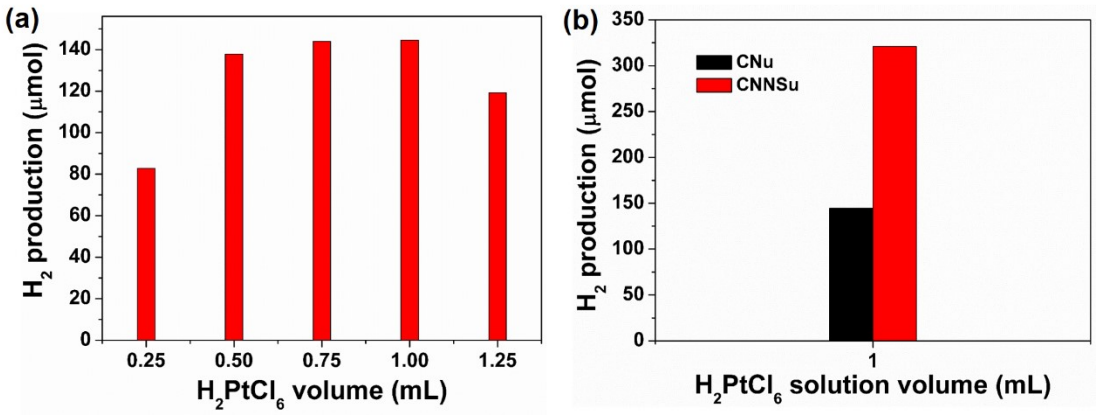

Fig. S7 (a) H_2 evolution rate under visible light irradiation over CNu with varied $H_2PtCl_6 \cdot 6H_2O$ solution (2 mg/mL in H_2O) addition, (b) H_2 yield rate under visible light irradiation over CNu and CNNSu with Pt as cocatalyst (Pt content, 0.28 wt%).

Table S2 Comparation of hydrogen evolution rate on the basis of co-catalyst Pt under visible light irradiation.

Catalyst	Light Source	Cocatalyst (wt%)	H_2 evolution rate (μmol/g/h）	H_2 evolution rate (mmol/g/h, *per* Pt)	References
CNNS	300 W Xe lamp	Pt, 0.23	3455.8 (λ>400 nm) 1888.4 (λ>420 nm)	1502.5 (λ>400 nm) 821.0 (λ>420 nm)	This work
CNNSu	300 W Xe lamp	Pt, 0.28	6412 (λ>400 nm) 3379 (λ>420 nm)	2290 (λ>400 nm) 1206.8 (λ>420 nm)	This work
Atomically thin CNNS	300 W Xe lamp (λ>420 nm)	Pt, 3	3809.6	126.99	[2]
g-C_3N_4	AM 1.5	Pt (II), 0.24	138	57.5	[3]
g-C_3N_4	300 W Xe lamp	Pt single atom, 0.91	11472	1260.6	[4]
N-vacancy g-C_3N_4	300 W Xe lamp (λ>420 nm)	Pt single atom, 1.72	3020	175.58	[5]
MOF	300 W Xe lamp (λ>420 nm)	Pt single atom, 12	11320	94.3	[6]
Defective ultra-thin g-C_3N_4	300 W Xe lamp	Pt, 1	4300	430	[7]
Onion-ring g-C_3N_4	300 W Xe lamp (λ>420 nm)	Pt, 3	1900	63.3	[8]

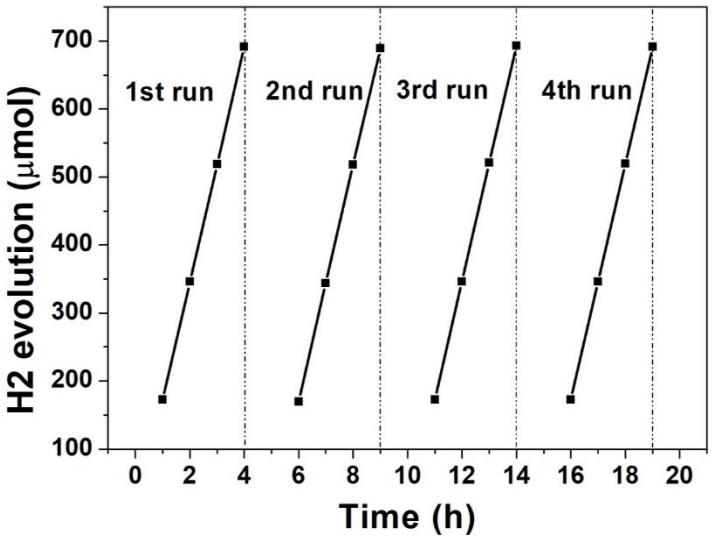

Fig. S8 Cycling runs for photostability test of photocatalytic H_2 evolution on CNNS-5H.

References

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