Supporting Information (SI)

Uniform Graphitic Carbon Nitride Nanorod for Efficient Photocatalytic Hydrogen Evolution and Sustained Photoenzymatic Catalysis

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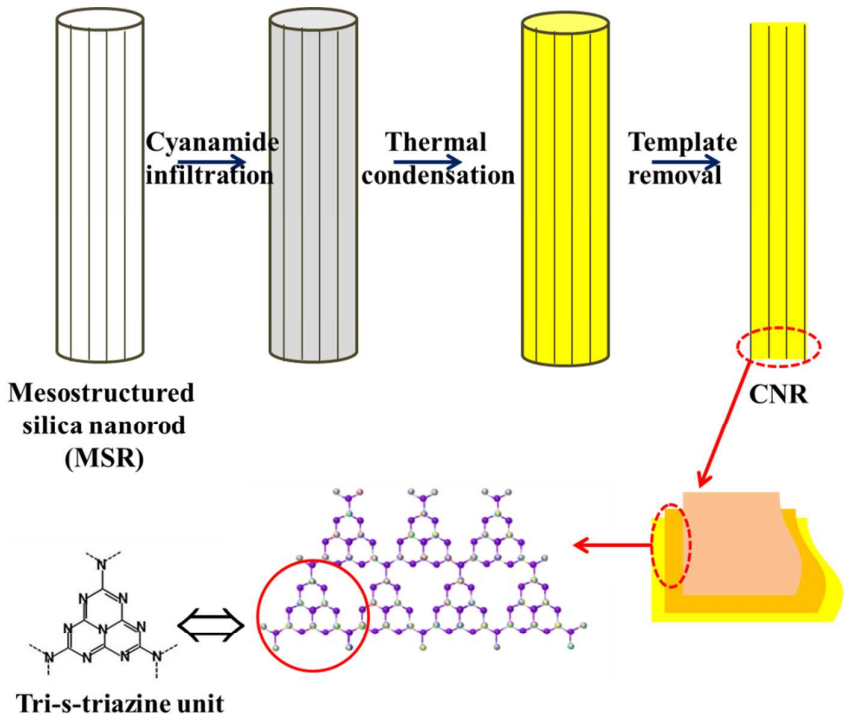


Scheme S1. A schematic diagram of the synthesis of CNR templated from mesostructured silica nanorod (MSR) using cyanamide as precursor. The obtained CNR features layered carbon nitride sheet as building blocks with tris-s-triazine basic unit.

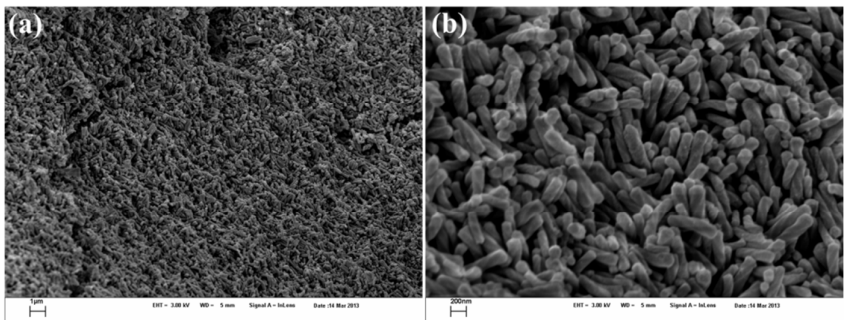


Figure S1. SEM images of MSR.

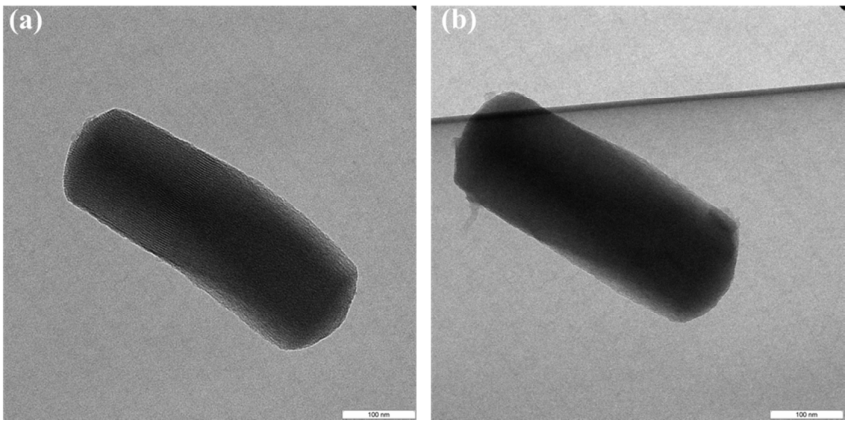


Figure S2. TEM images of a single MSR (a) and carbon nitride/MSR composite (b).

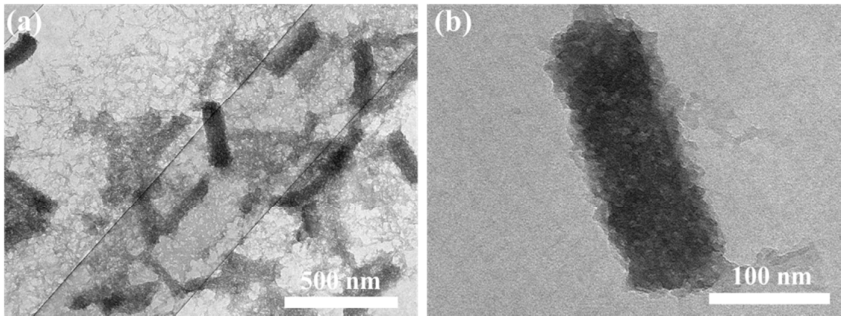


Figure S3. TEM images of the carbon nitride nanorod templated by MSR by aqueous infiltration method. (a), large are view; (b) magnified view.

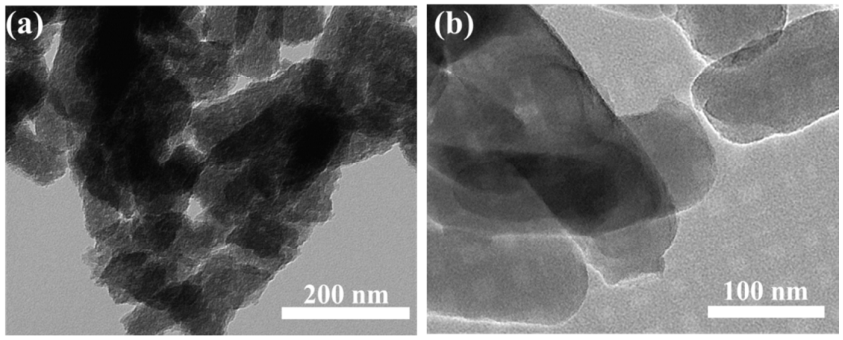


Figure S4. TEM of etched MSR (a) and the templated e-CNR, also featuring the non-porous properties.

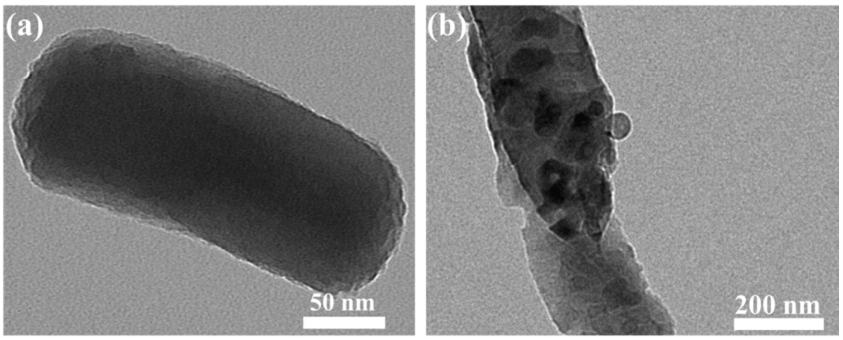


Figure S5. TEM images of original CNR (a) and after air exfoliation (b). Air exfoliation program: 500 ºC, 4h.

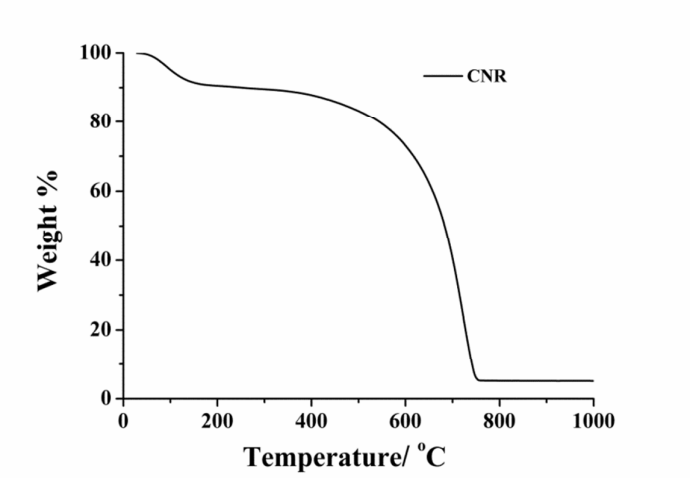


Figure S6. TGA curve of CNR.

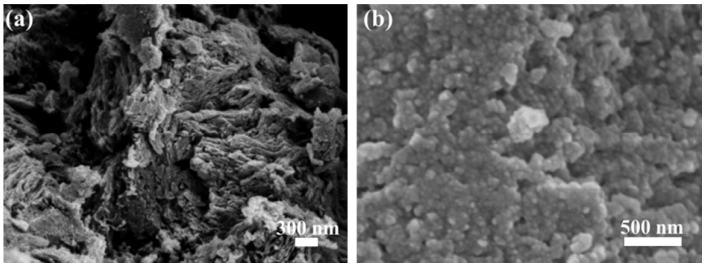


Figure S7. SEM images of the control samples, including Bulk CN **(a)** and Mesoporous CN **(b)**.

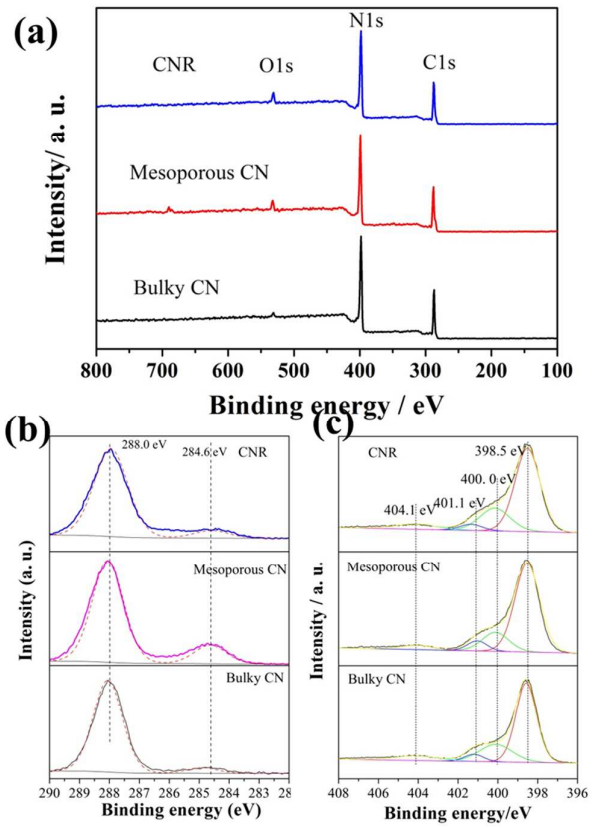
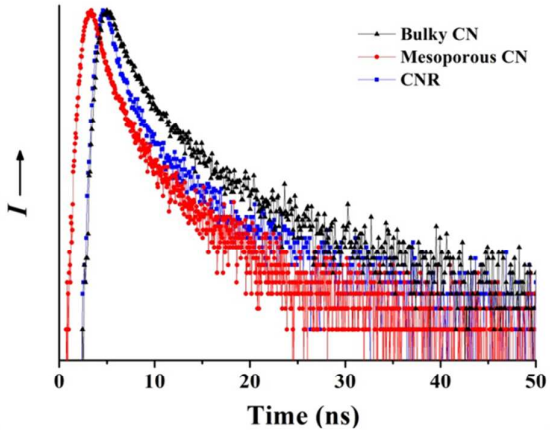


Figure S8. XPS survey (a) and the corresponding high resolution analysis (b) of CNR, mesoporous CN and bulk CN, respectively.



	Components	Lifetime (ns)	Rel%
Bulky CN	τ_1	1.5889	63.86
	τ_2	9.0553	36.14
Mesoporous CN	τ_1	0.8684	68.82
	τ_2	5.1380	31.18
CNR	τ_1	0.7091	66.26
	τ_2	6.8019	33.74

Figure S9. Time-resolved photoluminescence of bulky CN, mesoporous CN and CNR, respectively.

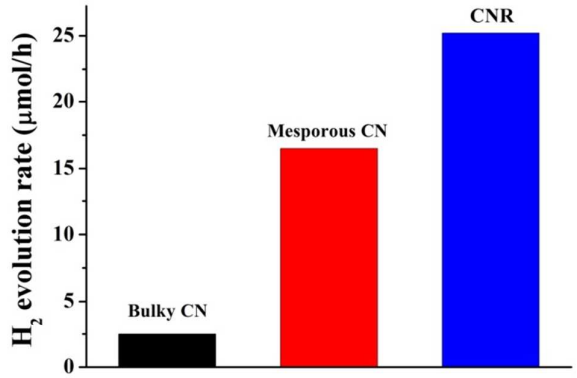


Figure S10. Photocatalytic H_2 evolution for CNR, mesoporous CN and bulk CN under visible light irradiation.

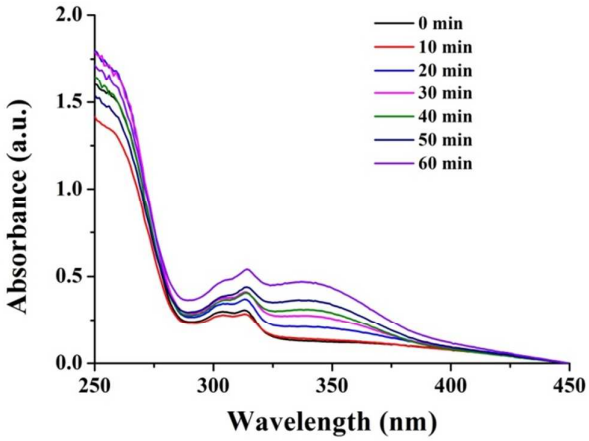


Figure S11. Spectral measurements of NADH concentration in mediator involved reaction solution by CNR photocatalysis. β-NAD^+, 1 mM; **M**, 0.25 mM; TEOA, 15 w/v%; PBS buffer, 0.1 M, pH=8; CNMS, 3 mg.

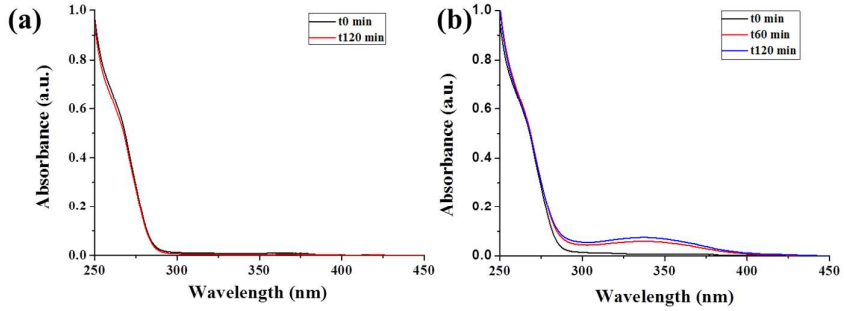


Figure S12. The control experiments without carbon nitride involved (a) and without $[Cp^*Rh(bpy)(H)]^+$ (b), respectively.

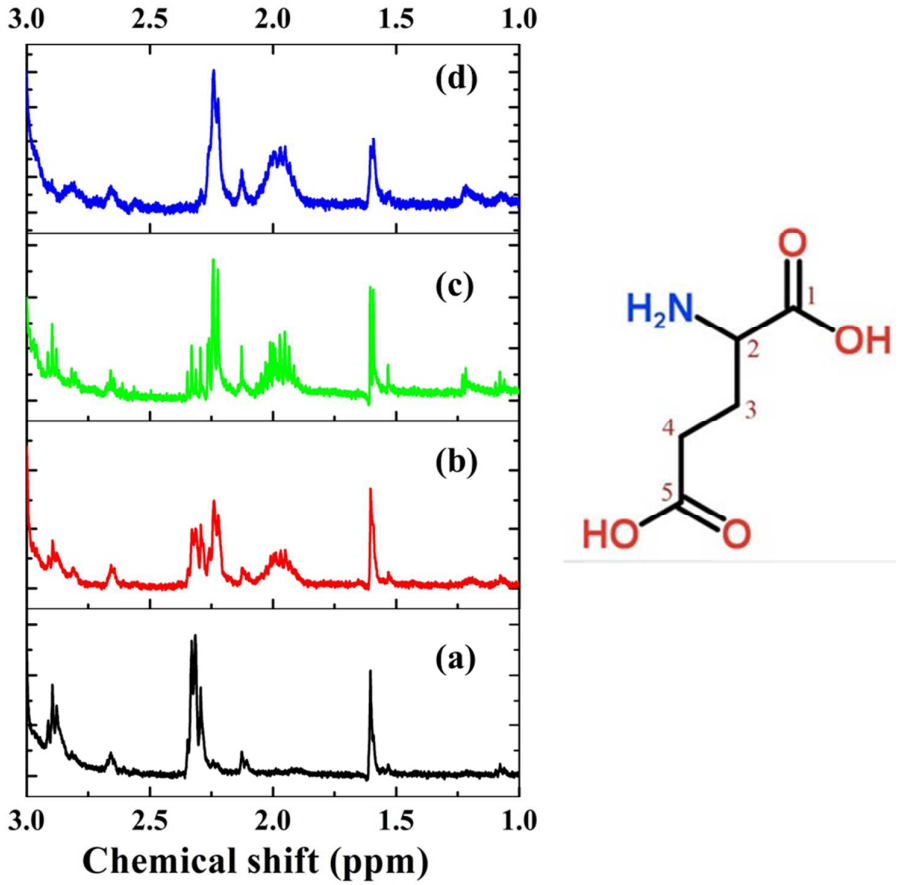


Figure S13. Partial HNMR spectra for the reaction between in-situ regenerated NADH and α-ketoglutarate in the presence of L-glutamate dehydrogenase: (a) before the reaction; (b) after 3h enzymatic reaction; (c) after 6 h enzymatic reaction; (d) after 8 h enzymatic reaction. The conversion ratio was calculated based on the signal of the 3rd carbon in L-glutamate with the multiplet is observed between 1.9 and 2.18 ppm.