Electronic Supplementary Information

A Facile Method for Scalable Synthesis of Ultrathin g-C_3N_4 Nanosheets for Efficient Hydrogen Production

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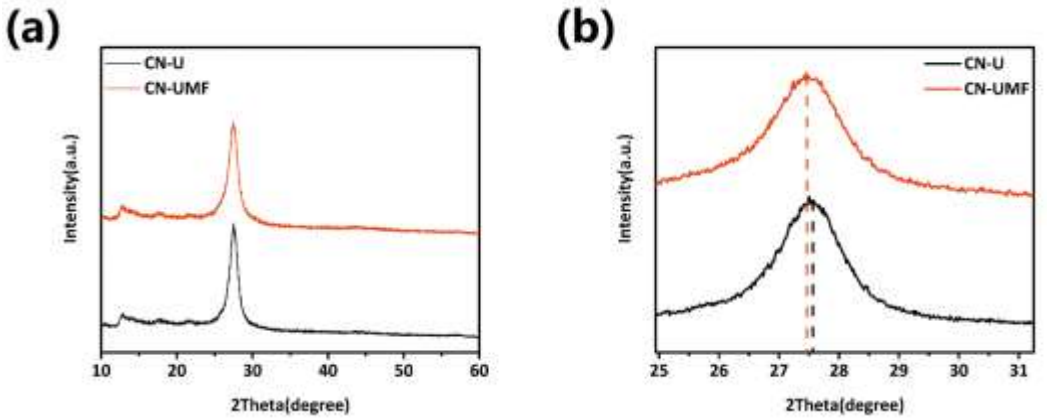

Fig. S1 a) XRD patterns, and b) enlarged view of (002) peak for as-prepared CN-U and CN-UMF samples.

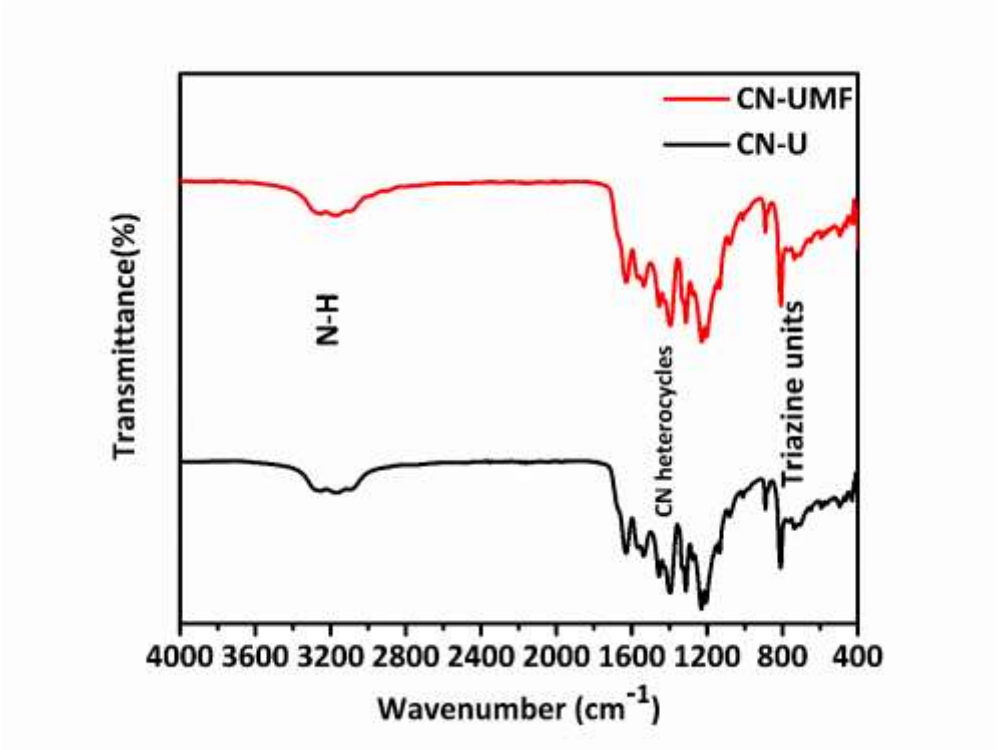

Fig. S2 FT-IR spectra of CN-UMF and CN-U.

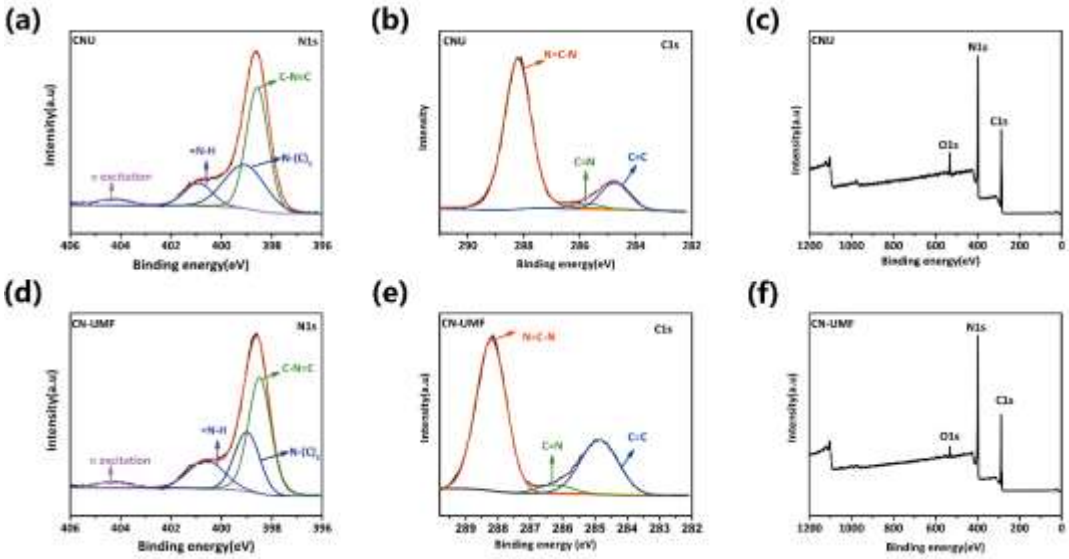

Fig. S3 High-resolution N1s, C1s and survey XPS spectra of CN-U (a, b, c), and CN-UMF (d, e, f).

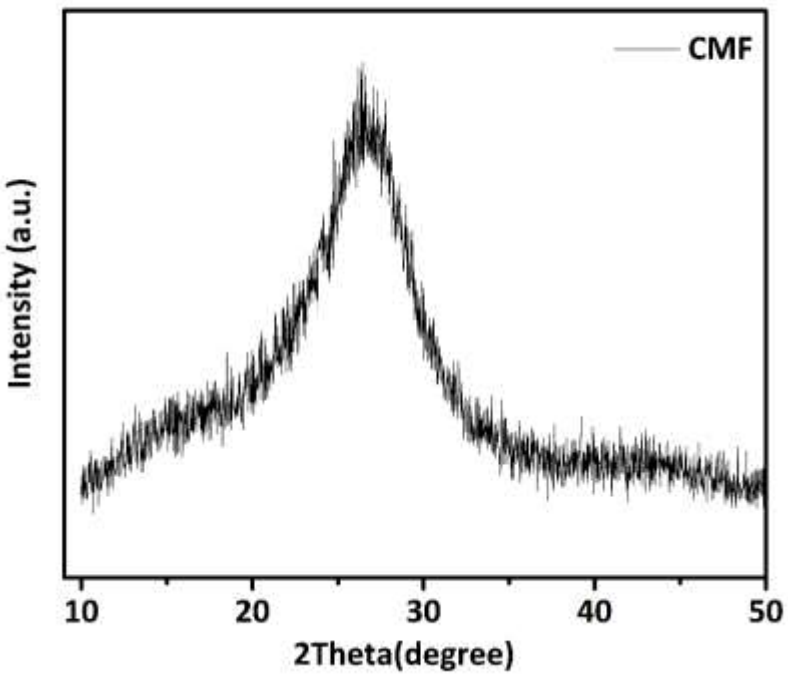

Fig. S4 XRD patterns of the carbonized foam (CMF).

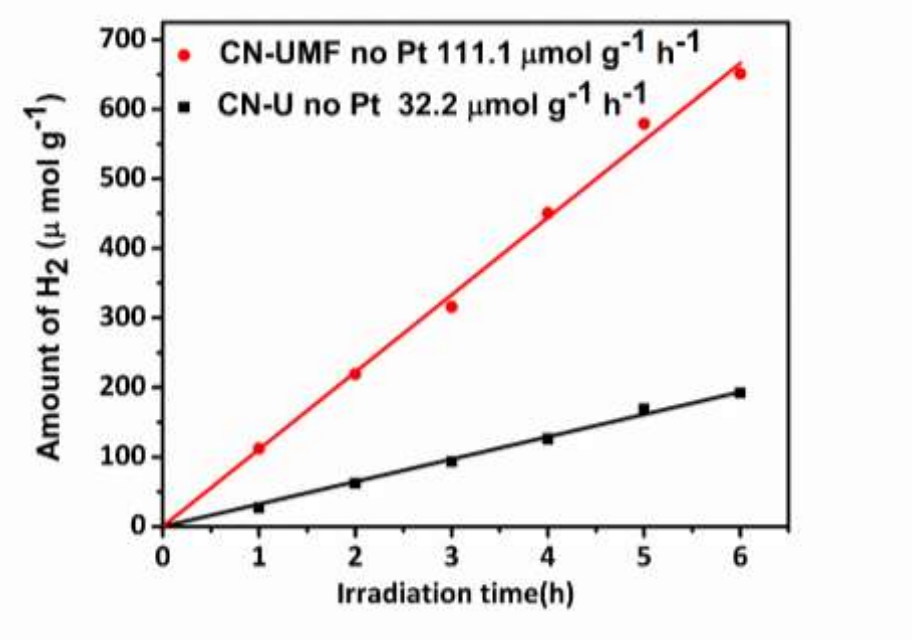

Fig. S5 Photocatalytic H_2 production activity of CN-UMF and CN-U with the absence of Pt.

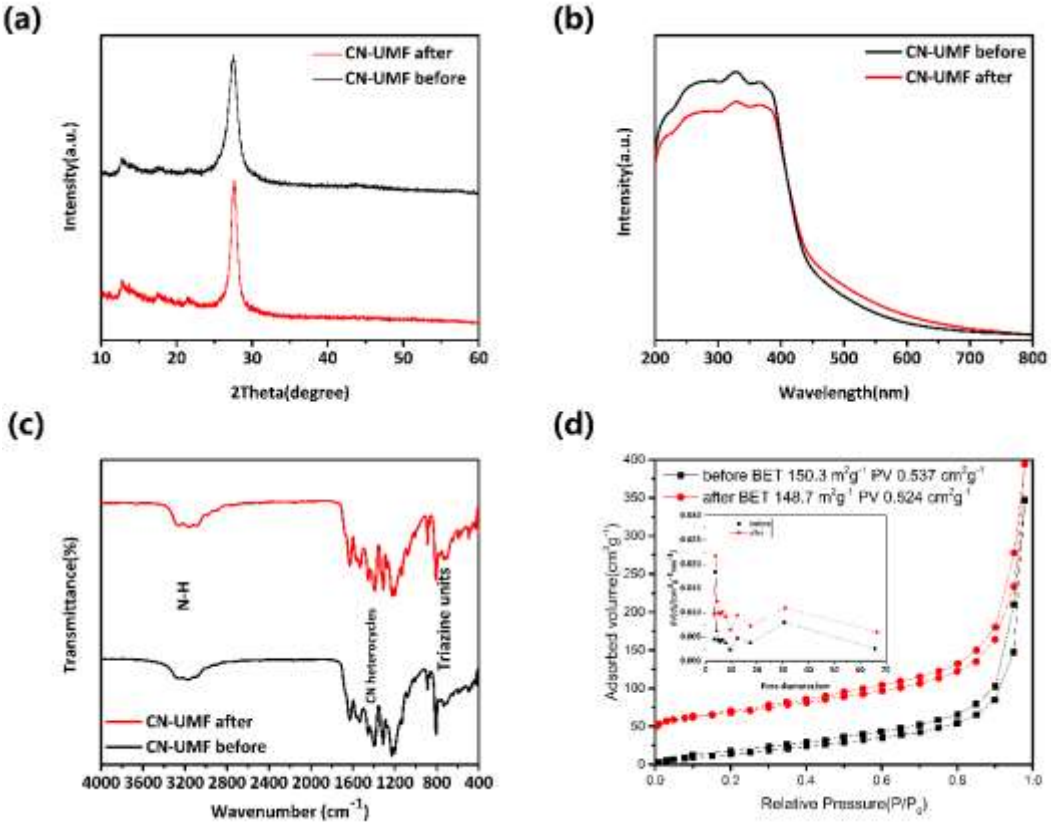

Fig. S6 a) XRD, b) DRS, c) FT-IR spectra, and d) N_2 adsorption of CN-UMF before and after photocatalytic reaction.

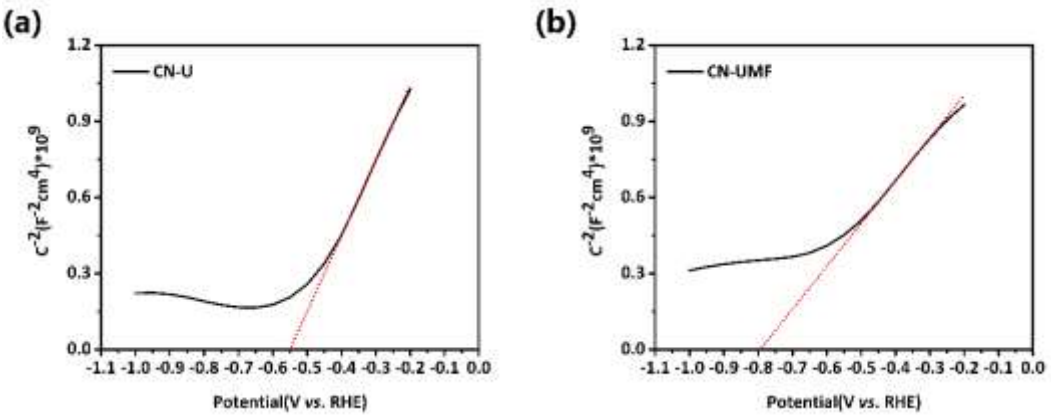

Fig. S7 Mott−Schottky plots of a) CN-U, and b) CN-UMF.

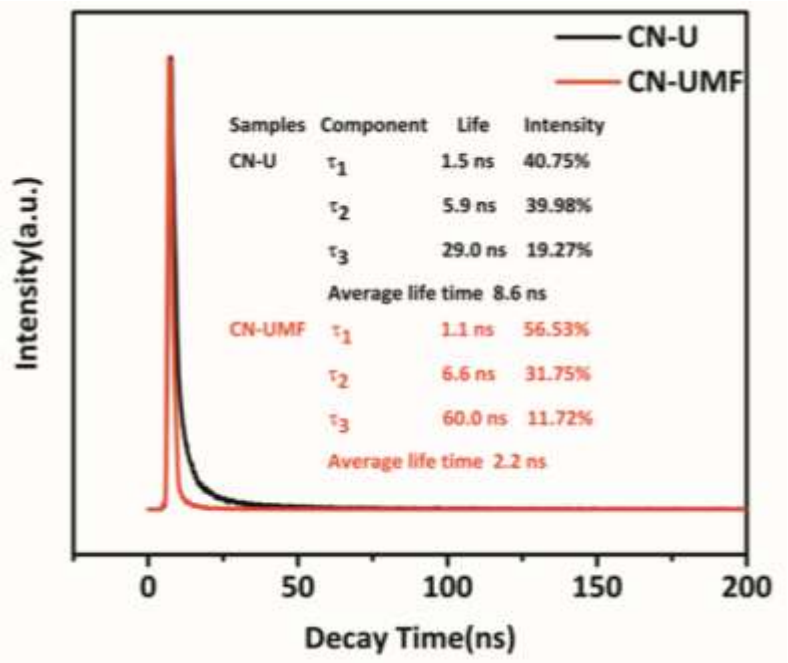

Fig. S8 Detailed decay lifetime analyses of CN-U and CN-UMF.

Table S1 The wavelength-dependent AQEs of CN-UMF.

Wavelength/nm	420	500	550	600	650
AQE	4.8%	1.4%	0.25%	0.17%	0.03%

The "solar-to-hydrogen" conversion efficiency (STH)

We also evaluated the solar energy conversion by using AM 1.5G solar simulator as the light source with CN-UMF as the catalyst. The irradiated light intensity was controlled to be 20 mW cm^{-2} and the irradiation area was controlled to be 19.625 cm^2. After 1 h of illumination, the total incident power over the 19.625 cm^2 irradiation area was 0.3925 W, so that the total input energy in 1 hour was:

$$E_{solar} = 0.3925\ W \times 1 \times 3600\ s = 1413\ J$$

During the photocatalytic reaction, 79 μmol H_2 was detected, which indicated that the energy generated by water splitting is:

$$E_F = 79 \times 10^{-6} \times 6.02 \times 10^{23} \times 2.46 \times 1.609 \times 10^{-19} = 19\ J$$

2.46 eV is the free energy of water splitting.

The "solar-to-hydrogen" conversion efficiency (STH) of CN-UMF was determined to be:

$$STH = \frac{\text{Energy of generation of hydrogen by water splitting}}{\text{Solar energy irradiating the reaction cell}} = \frac{19\ J}{1413\ J} \times 100\% = 1.34\%$$