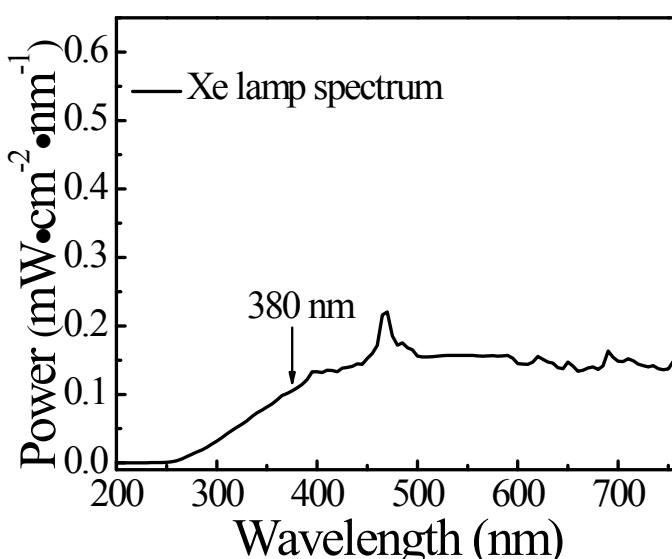


Electronic Supporting Information

A facile approach to synthesize graphitic carbon nitride microwires for enhanced photocatalytic H₂ evolution from water splitting under full solar spectrum

Hailong Dou, Dan Long, Shaohui Zheng, and Yongping Zhang*

Faculty of Materials and Energy, Southwest University, Chongqing 400715, China



Scheme S1 Xe lamp spectrum

The FTIR spectra of the bulk g-C₃N₄ and microwires are depicted in Fig. S1, in which peak at 801 cm⁻¹ is ascribed to the breathing mode of the triazine units. The peaks at 1200-1650 cm⁻¹ represents the stretching vibration of the aromatic rings. The broad peaks at 3000-3400 cm⁻¹ are ascribed to the stretching modes of N-H,

indicating there exist N–H bonds at the edge of the polymerized triazine. The FTIR characteristic peaks remain consistent for all samples, which demonstrates that the original graphitic C–N network in the structure of g-C₃N₄ is kept intact for all samples.

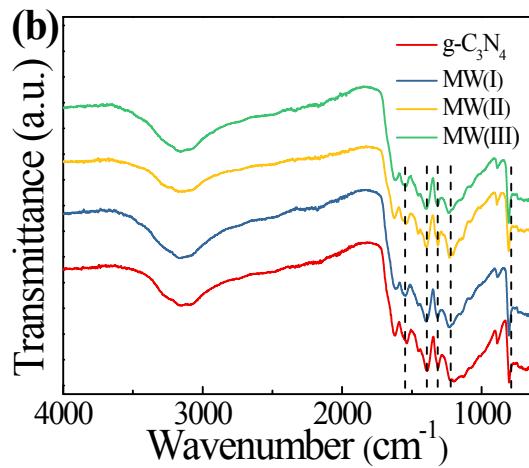


Figure S1 FT-IR spectra of melamine-derived g-C₃N₄ sample (b)

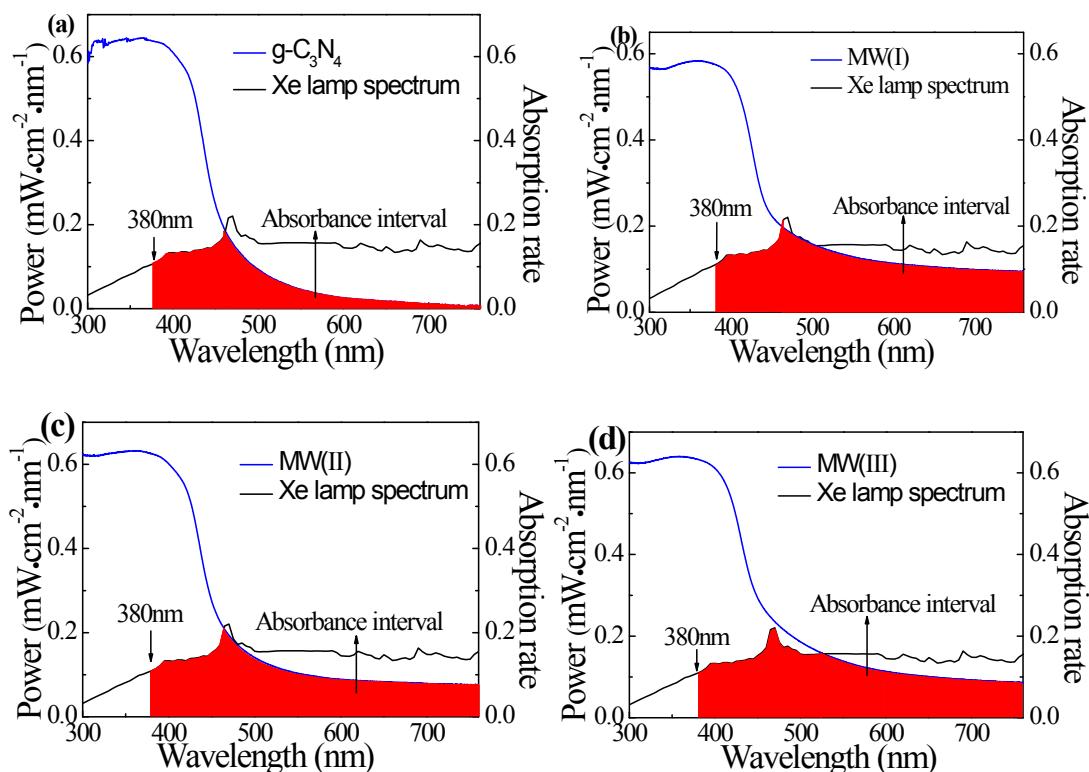


Figure S2 Absorbance interval of all sample.

Figure S2 showed the absorbance interval of the bulk g-C₃N₄, and microwires. The light absorbance increased for the g-C₃N₄ microwires. The Xe lamp spectrum is close to the standard solar spectrum. Therefore, the 500W Xe lamp (Zolix, model Gloria-X500A) simulated the solar light well.

The melemine-derived MW(III) photocatalyst is stable and has high apparent quantum yield with 1 wt% Pt cocatalyst compared with some g-C₃N₄ photocatalysts (Table S1), even closing to the photocatalytic efficiency of some urea-derived g-C₃N₄ photocatalysts [5-9, 39].

Table S1 Comparison of typical g-C₃N₄ photocatalysts reported for hydrogen evolution and the corresponding apparent quantum yields (AQY).

Sample	HER rate [$\mu\text{mol}/(\text{h}\cdot\text{g})$]	Reaction conditions	AQY(%)	Reference
Bulk g-C ₃ N ₄	461 ($\lambda > 380 \text{ nm}$)	1 wt% Pt/17 v% TEOA	2.42 (380-760 nm)	this work
MW(I)	902 ($\lambda > 380 \text{ nm}$)	1 wt% Pt/17 v% TEOA	4.72 (380-760 nm)	this work
MW(II)	1224 ($\lambda > 380 \text{ nm}$)	1 wt% Pt/17 v% TEOA	6.41 (380-760 nm)	this work
MW(III)	1688 ($\lambda > 380 \text{ nm}$)	1 wt% Pt/17 v% TEOA	8.83 (380-760 nm)	this work
Hollow Pt/g-C ₃ N ₄ nanospheres	4480 ($\lambda > 420 \text{ nm}$)	3 wt% Pt/10 v% TEOA	7.5 ($\lambda > 420 \text{ nm}$)	[5]
g-C ₃ N ₄ nanosheets	1860 ($\lambda > 420 \text{ nm}$)	3 wt% Pt/10 v% TEOA	3.75 (400 nm)	[6]
g-C ₃ N ₄ (cyanamide)	106.9 ($\lambda > 420 \text{ nm}$)	3 wt% Pt/10 v% TEOA	ca. 0.1 % (420–460 nm)	[7]
g-C ₃ N ₄ (urea and thiourea)	2230 ($\lambda > 400 \text{ nm}$)	1 wt% Pt/20 v% methanol; pH=13.3(KOH)	6.67 (400 nm)	[8]
g-C ₃ N ₄ (urea)	3327.5 ($\lambda > 395 \text{ nm}$)	3 wt% Pt/13 v% TEOA	26.5% (400 nm, internal quantum yield, IQY)	[9]
Carbon nitride	33($\lambda > 420 \text{ nm}$)	3 wt% Pt/10 v% MeOH	6.8% @420 nm	[39]

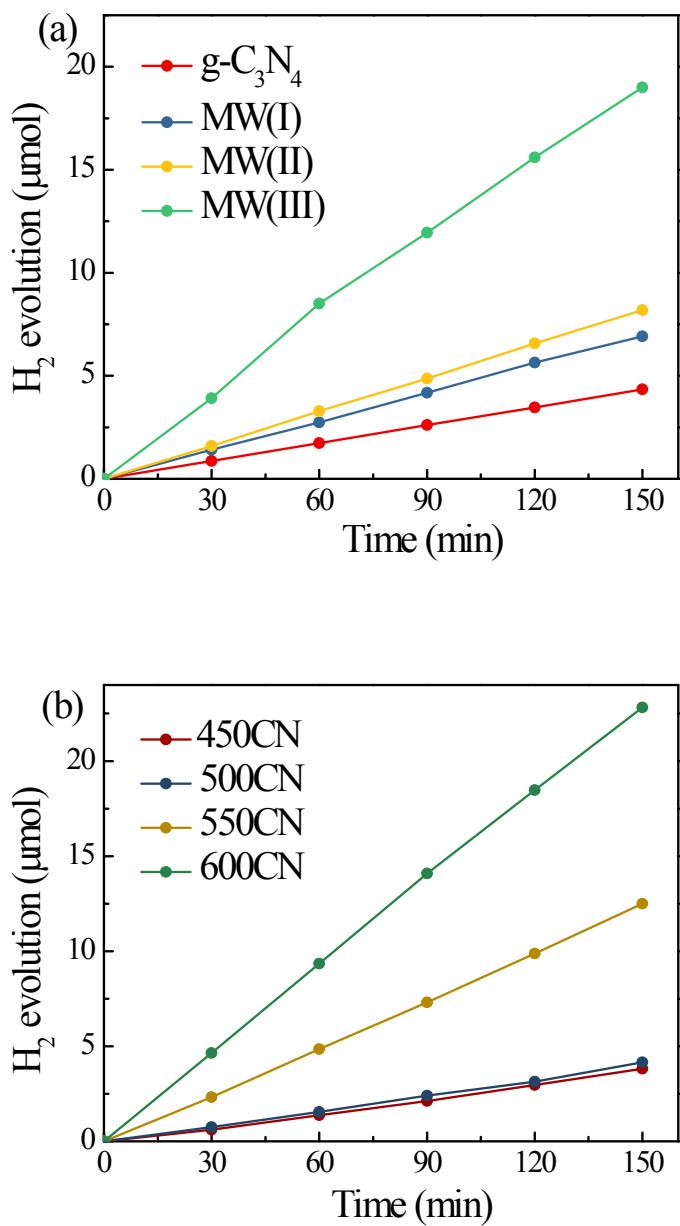


Figure S3 H_2 production of melamine-derived microwires (a) and urea-derived $\text{g-C}_3\text{N}_4$ photocatalysts under visible light with wavelength of 400-760 nm.

Table S2 The of H₂ evolution rate and the AQY of all samples under visible light with λ=400-780nm.

Sample	HER rate (μmol/h)]	AQY(%) [400-760nm]
g-C ₃ N ₄	1.74	0.94
MW(I)	2.77	1.49
MW(II)	3.28	1.77
MW(III)	7.60	4.1
450CN	1.53	0.82
500CN	1.66	0.9
550CN	5.00	2.7
600CN	9.13	4.92