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氮掺杂还原氧化石墨烯与吡啶共聚 g-C_3N_4 复合光催化剂及其增强的产氢活性

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Incorporation of N-Doped Reduced Graphene Oxide into Pyridine-Copolymerized g-C_3N_4 for Greatly Enhanced H_2 Photocatalytic Evolution

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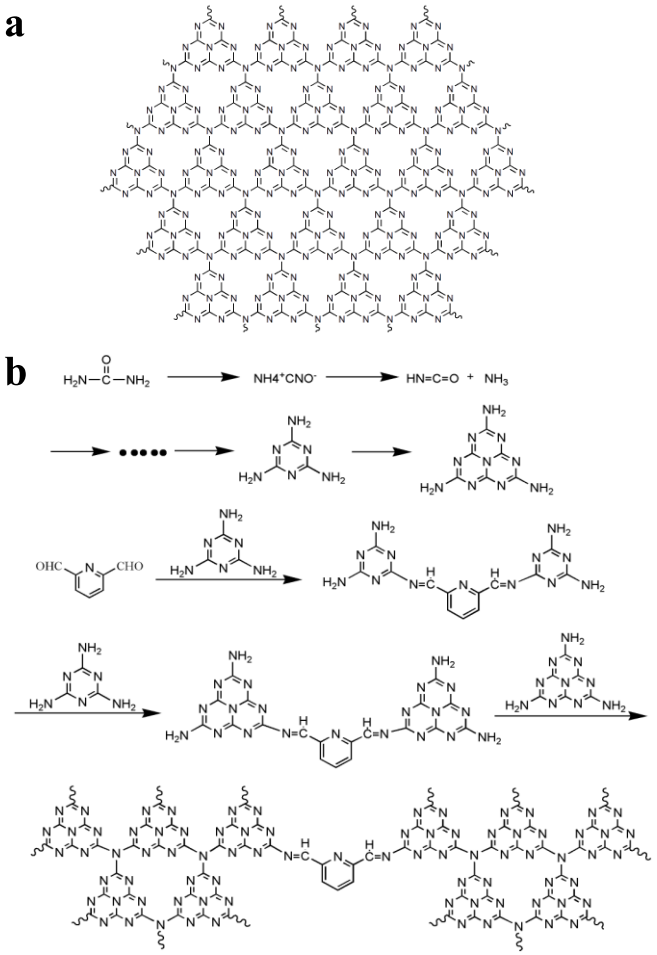

Fig.S1 (a) Possible reaction path of incorporating pyridine into g-C_3N_4 networks[1], (b) the structure of g-C_3N_4.

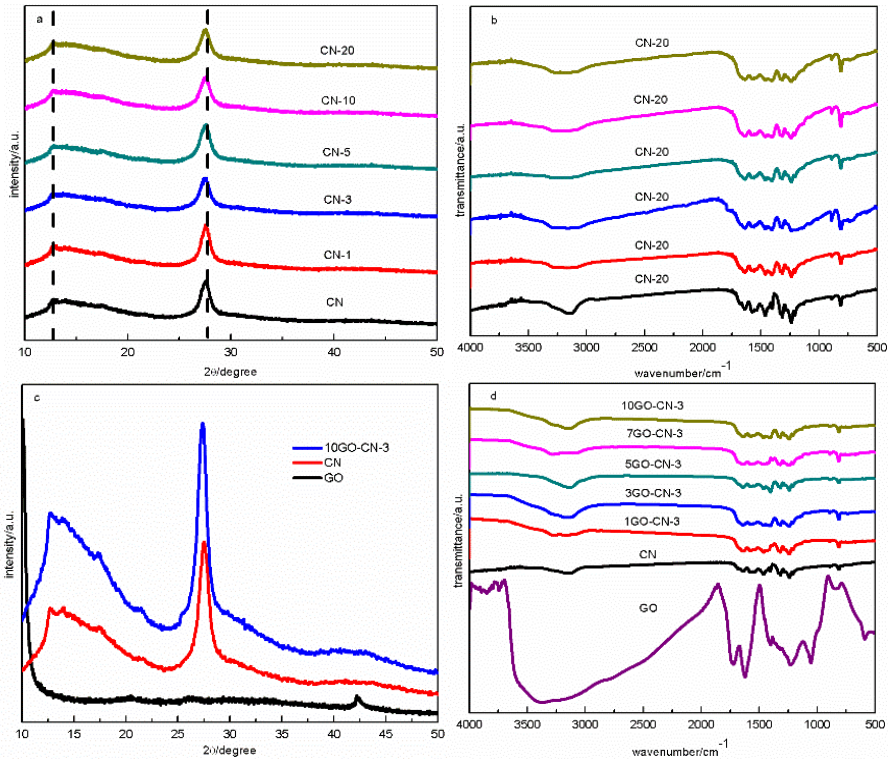

Fig.S2 XRD patterns (a) (c) and FT-IR spectra (b) (d) of CN, GO, CN-*x* and *y*GO-CN-3.

In Fig.S2a, the distinct peak at 27.48 ° belongs to the characteristic (002) interlayer-stacking reflection of aromatic system, and the other pronounced peak at 12.78 °originates from (100) plane and represents the in-plane structural packing motif [2]. In Fig.S2b, a series of strong bands at 1200−1650 cm^{-1} originate from the typical stretching modes of 3, s-triazine heterocyclic (C_6N_7) rings. The broad bands at about 3000-3500 cm^{-1} correspond to the adsorbed H_2O molecules and the terminal amino groups in g-C_3N_4. The most intense band located at 809 cm^{-1} represents the out-of-plane bending vibration of 3, s-triazine rings. In the composite 10GO-CN-3 (Fig.S2c), only the characteristic peaks of g-C_3N_4 can be observed, indicating the well-crystallized structure of g-C_3N_4 has been well retained. For GO (Fig.S2d), the characteristic band at 854 cm^{-1} is attributed to epoxide groups. The peaks at 1406, 1220 and 1053 cm^{-1} correspond to －OH, C－OH and C－O－C groups, respectively.

Table S1 Elemental composition and C/N molar ratio of CN, CN-*x* and *y*CN-3.

Sample	*w*/%			C/N mass ratio
	C	N	H	
CN	34.600	57.720	1.705	0.6994
CN-1	34.585	57.980	1.709	0.6959
CN-3	34.865	57.970	1.714	0.7017
CN-5	34.840	57.790	1.742	0.7034
CN-10	34.745	57.445	1.758	0.7056
CN-20	34.755	57.140	1.769	0.7096
1GO-CN-3	34.745	58.105	1.675	0.6976
3GO-CN-3	34.835	58.055	1.660	0.7000
5GO-CN-3	34.460	57.335	1.803	0.7012
7GO-CN-3	34.515	57.170	1.786	0.7043
10GO-CN-3	34.855	57.745	1.671	0.7042

Table S2 Summary of surface area and bandgap results of the as-prepared samples

Sample	S_{BET}/(m^2 g^{-1})	Bandgap/eV
CN	80	2.94
CN-1	83	2.93
CN-3	82	2.87
CN-5	78	2.83
CN-10	75	2.83
CN-20	73	2.75
1GO-CN-3	92	2.87
3GO-CN-3	97	2.86
5GO-CN-3	95	2.85
7GO-CN-3	107	2.82
10GO-CN-3	99	2.80

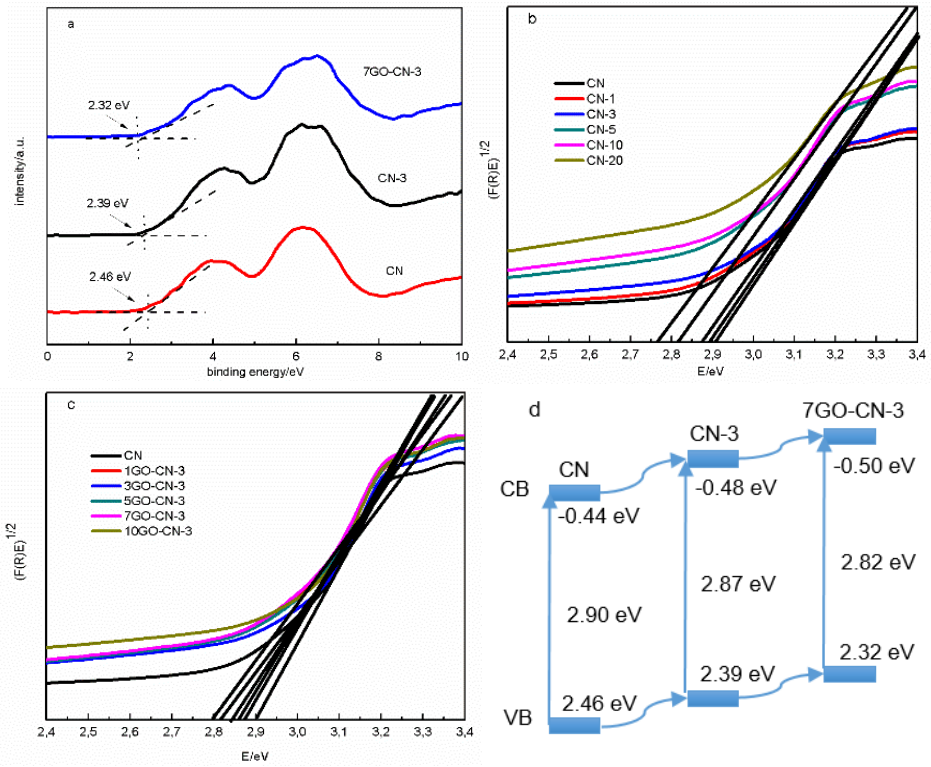

Fig.S3 (a) Valence band XPS spectra of traditional CN, CN-*x* and *y*GO-CN-3; The Tauc plots of (b) CN and CN-*x* samples, (c) CN and *y*GO-CN-3, each band gap is determined by the intersection point of the corresponding dashed tangent line and the horizontal axis; Schematic of the relative positions of HOMO and LUMO energy levels for CN, CN-3 and 7GO-CN-3.

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