Supporting Information

Facile Structure Design Based on C_3N_4 for Mediator-free Z-Scheme Water Splitting under Visible Light

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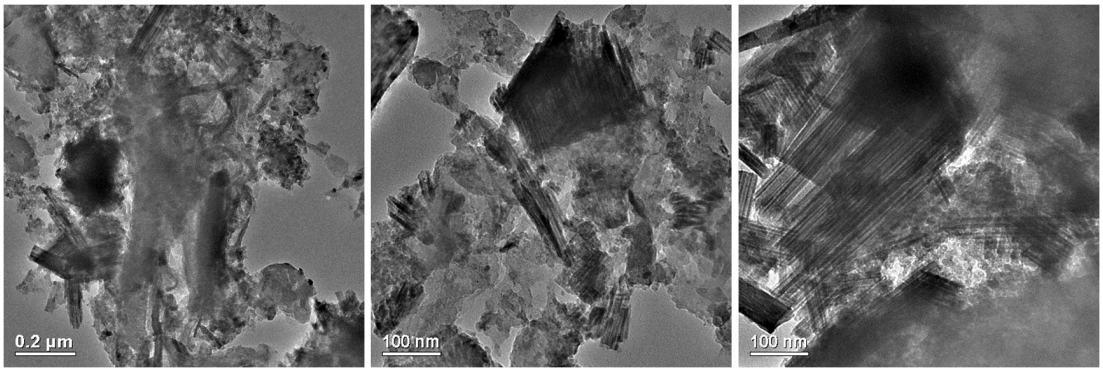

Figure S1. TEM images of C_3N_4-rGO-150-WO_3 400-260 loaded with 1 wt% Pt after photocatalytic test.

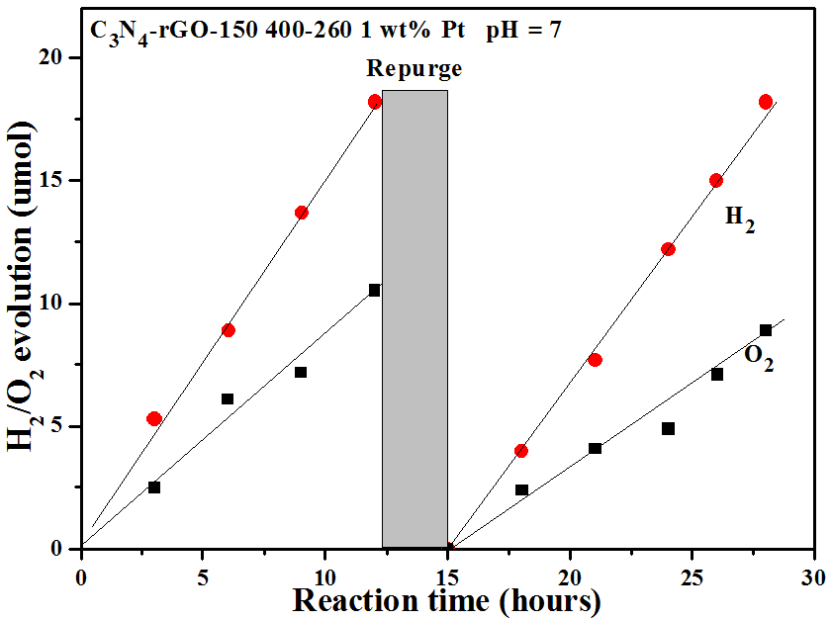

Figure S2. Time course of H_2/O_2 evolution for C_3N_4-rGO-150-WO_3 400-260 loaded with 1 wt% Pt under visible light irradiation ($\lambda > 420$ nm) at pH = 7.

Typical time courses of the H_2 evolution by C_3N_4-rGO composites with TEOA as sacrificial agent under visible light is shown in Fig. S2. It is obviously to note that the C_3N_4-rGO-250 and C_3N_4-rGO-150 showed higher activity than pure C_3N_4 and C_3N_4-rGO-150 held the best among the five samples. The composite with the highest graphene content showed the lowest performance, even worse than that of pure C_3N_4. Their contents of graphene in C_3N_4-rGO composites are shown in Table S1.

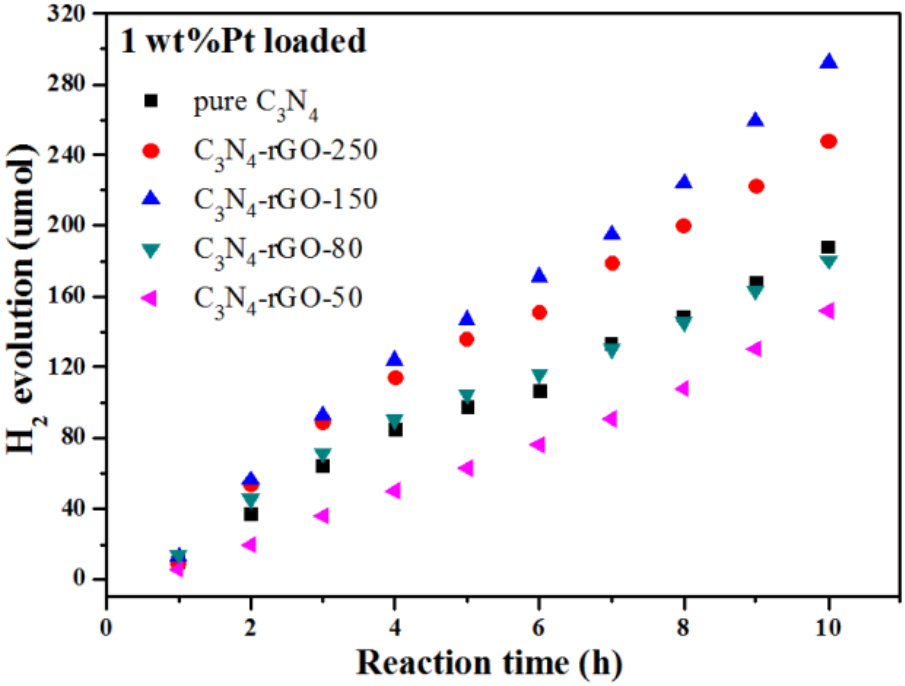

Figure S3. Time course of hydrogen evolution of pure C_3N_4 and C_3N_4-rGO composites loaded with 1 wt% Pt and in the presence of TEOA.

Table S1: rGO contents in different C_3N_4-rGO composites

Samples	Initial Reactant mass		Element component in mass			Calculated weight ratio of rGO to C_3N_4(%)
	Melamine (mg)	rGO (mg)	C(%)	N(%)	H(%)	
Pure C_3N_4	3000	0	34.39	62.76	1.67	**0**
C_3N_4-rGO-250	3000	12	34.78	63.04	1.60	**0.24**
C_3N_4-rGO-150	3000	20	34.42	61.01	1.39	**1.05**
C_3N_4-rGO-80	3000	37.5	35.14	60.73	1.48	**1.98**
C_3N_4-rGO-50	3000	60	34.26	58.54	1.7	**2.41**
C_3N_4-rGO-30	3000	100	35.63	56.38	1.27	**5.43**

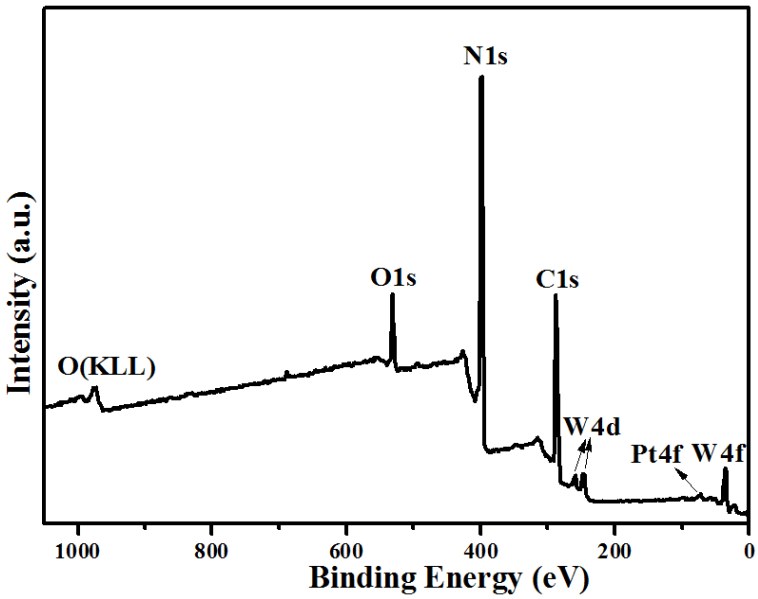

Figure S4. XPS survey spectrum of the fresh wet C_3N_4-rGO-150-WO_3 1000-260 loaded with 1 wt% Pt dried in Ar.

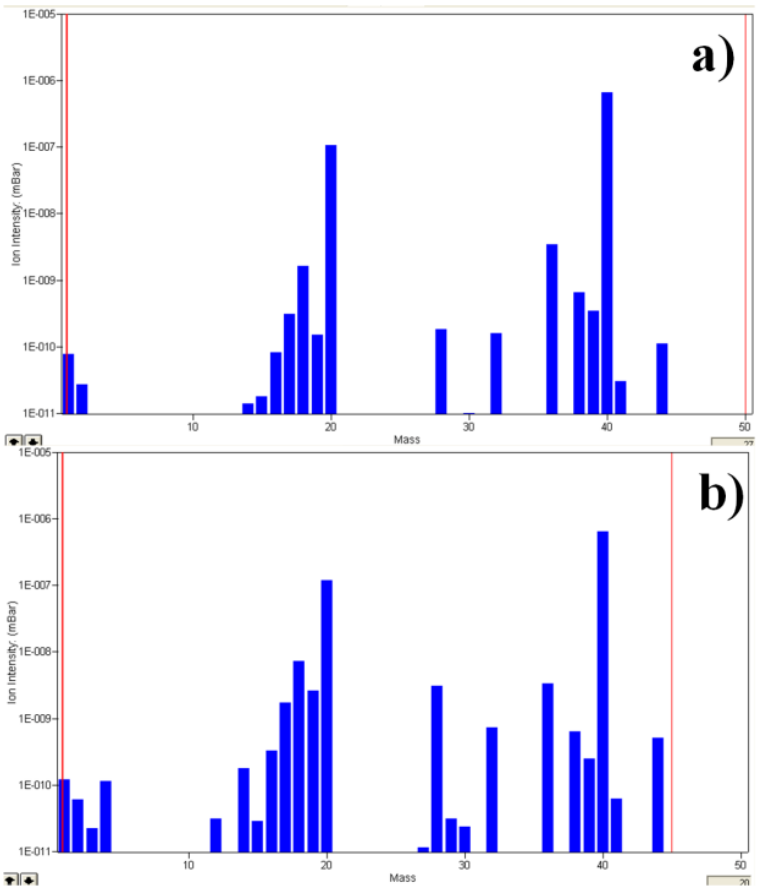

Figure S5. a) The mass spectra results of background test without adding photocatalyst; b) mass spectra of gas mixture from the visible-light irradiated reactor with D_2O and C_3N_4-rGO-150-WO_3 1000-260 (loaded with 1 wt% Pt) as reactants.

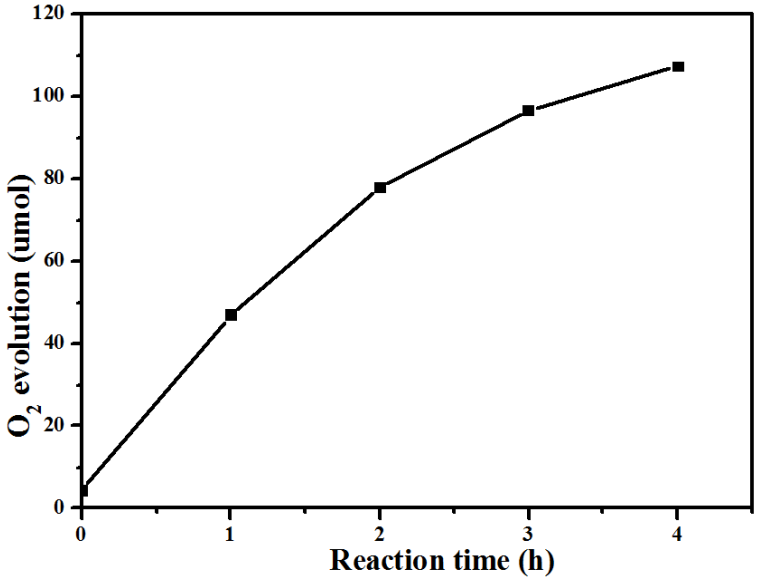

Figure S6. Time course of oxygen evolution of 100 mg of $WO_3 \cdot 1/3H_2O$ powder dispersed into 100 mL of water with 10 mmol/L of $AgNO_3$ as an electron acceptor. It is obvious to note that the $WO_3 \cdot 1/3H_2O$ shows oxygen evolution photocatalytic activity under visible light with $AgNO_3$ as an electron acceptor. The slight decrease of oxygen evolution rate can be attributed to the consumption of Ag^+ and the deposition of Ag nanoparticles onto the surface of WO_3.