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Electronic Supplementary Information (ESI)

Visible light induced efficient hydrogen production through semiconductor-conductor-semiconductor (S-C-S) interface formed between g-C_3N_4 and rGO/Fe_2O_3 core-shell

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Content

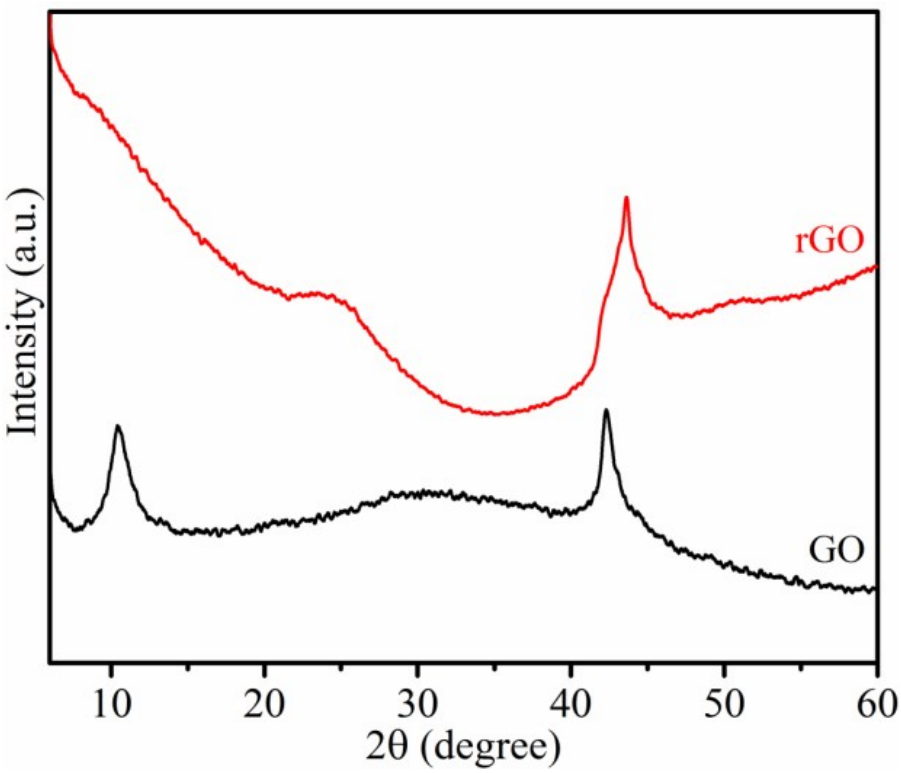

Figure S1. XRD patterns of GO and rGO

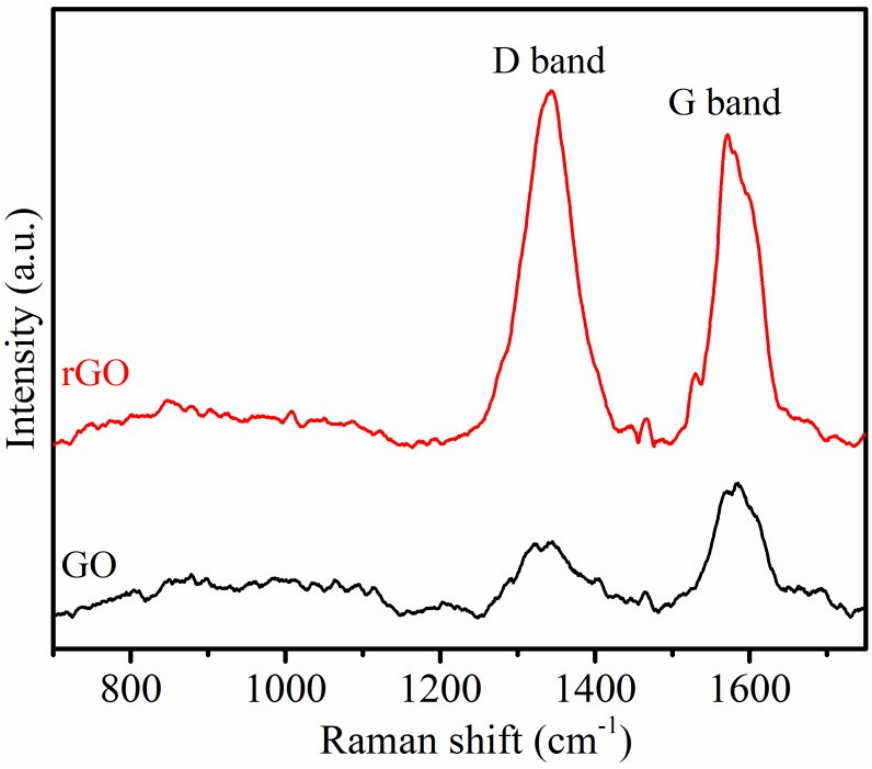

Figure S2. Raman Spectra of GO and rGO

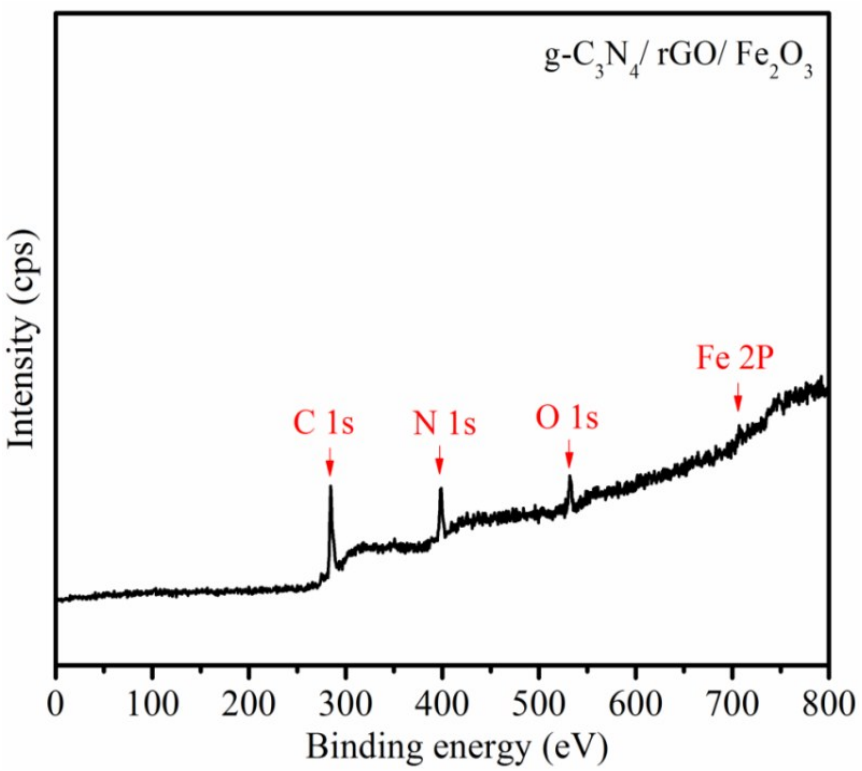

Figure S3. Photoemission survey scan spectra of g-C_3N_4/rGO/Fe_2O_3

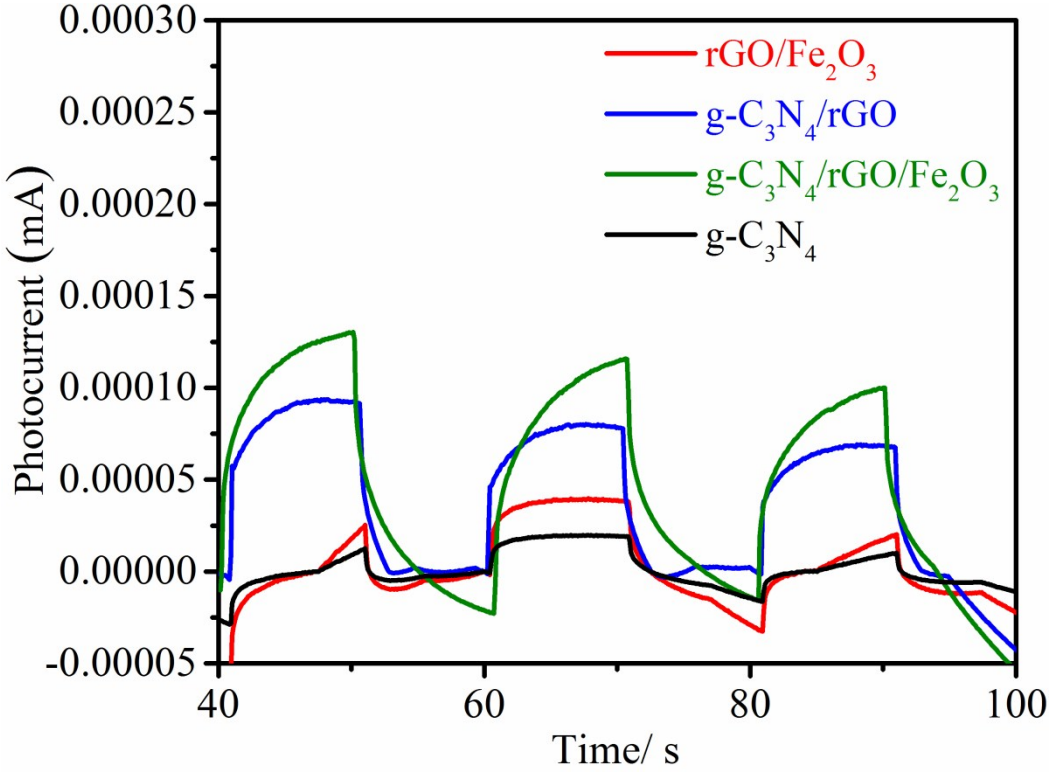

Figure S4. Transient photocurrent measurement of g-C_3N_4, g-C_3N_4/rGO, g-C_3N_4/rGO/Fe_2O_3, rGO/Fe_2O_3

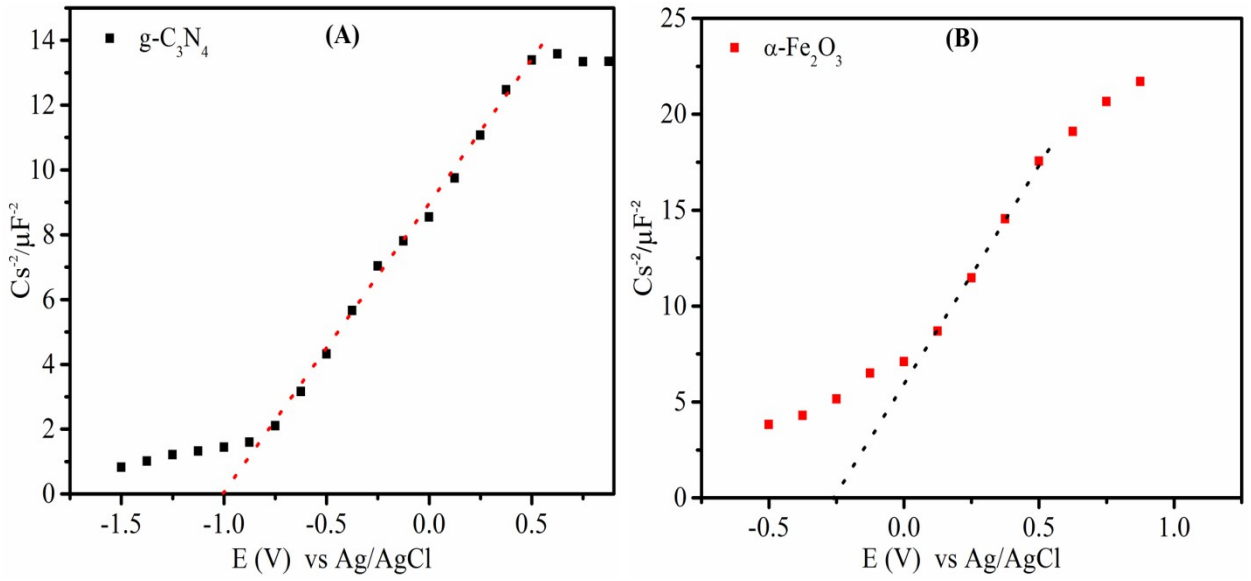

Figure S5. Mott-Schottky plot for (A) g-C_3N_4 (B) Fe_2O_3

The Mott-Schottky analysis was performed to calculate the flat band potential of g-C_3N_4 and Fe_2O_3. As shown in Fig. S5, both g-C_3N_4 and Fe_2O_3 are exhibits n-type characteristics curves. The flat band potential of g-C_3N_4 and Fe_2O_3 was found to be -1.0 V and -0.25 V vs Ag/AgCl at pH 7 (equivalent to -1.19 V and -0.44 vs. NHE at pH 7).

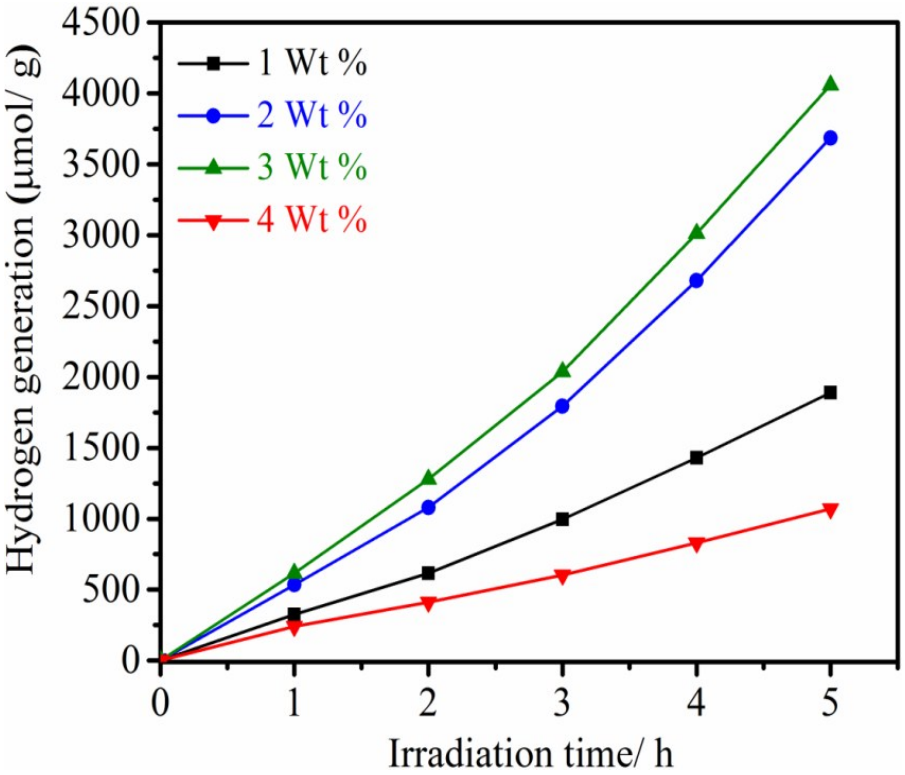

Figure S6. Photocatalytic activity of optimization of rGO on g-C_3N_4

Table S1 Comparison of H_2 production efficiency of reported Pt loaded g-C_3N_4 based composites and without Pt loaded g-C_3N_4 composite catalysts (this work).

Catalysts	Co-catalysts	Light Source	Sacrificial agents	H_2 Evolution Rate ($\mu mol\ g^{-1}\ h^{-1}$)	Quantum Yield (%)	Ref.
α-Fe_2O_3/ 2D-C_3N_4	Pt	300 W Xe, $\lambda > 400$ nm	Triethanolamine (TEOA)	31400	44.35 (420 nm)	21
g-C_3N_4/ zinc phthalocyanine	Pt	350 W Xe, $\lambda \geq 420$ nm	Ascorbic acid	12500	1.85 (700 nm)	55
g-C_3N_4/ PEDOT	Pt	300 W Xe, $\lambda \geq 420$ nm	TEOA	327	NA	56
g-C_3N_4/ WO_3	Pt	300 W Xe, $\lambda \geq 420$ nm	TEOA	110	0.9 (420 nm)	57
g-C_3N_4/ N-GQDs	Pt	300 W Xe, $\lambda \geq 420$ nm	TEOA	2180	5.25 (420 nm)	58
g-C_3N_4 /TiO_2	Pt	300 W Xe, $\lambda \geq 420$ nm	TEOA	1780	NA	12
Nanospherical g-C_3N_4	Pt	300 W Xe, $\lambda \geq 420$ nm	TEOA	13675	9.6 (420 nm)	59
B-doped C_3N_4 Nanosheets	Pt	300 W Xe, $\lambda \geq 420$ nm	TEOA	5560	NA	60
Hollow C_3N_4 Nanospheres	Pt	300 W Xe, $\lambda > 420$ nm	TEOA	4480	7.5 (420 nm)	61
C,N-TiO_2/g-C_3N_4	-	300 W Xe, $\lambda > 420$ nm	TEOA	39	NA	62
g-C_3N_4/ Fe_2O_3/rGO	**-**	**250 W Xe,**	**TEOA**	**6607**	**NA**	**This work**