Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

Light-assisted rapid preparation of Ni/g-C_3N_4 magnetic composite for robust photocatalytic H_2 evolution from water

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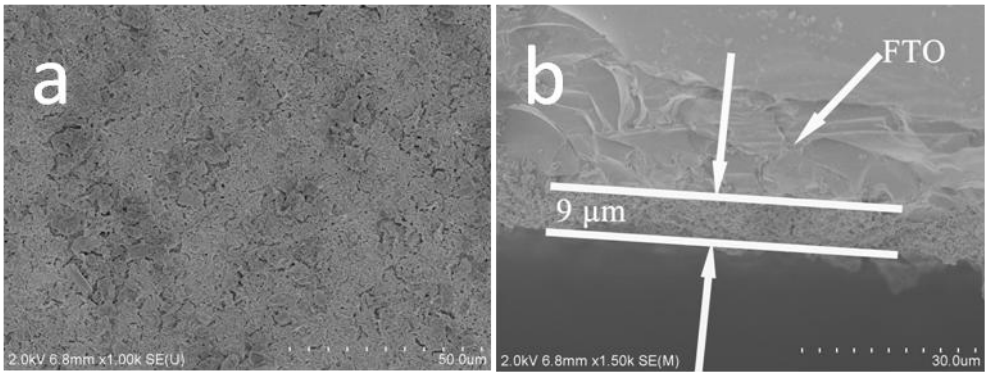

Figure S1. SEM image of Ni/g-C_3N_4 on FTO conductive glass.

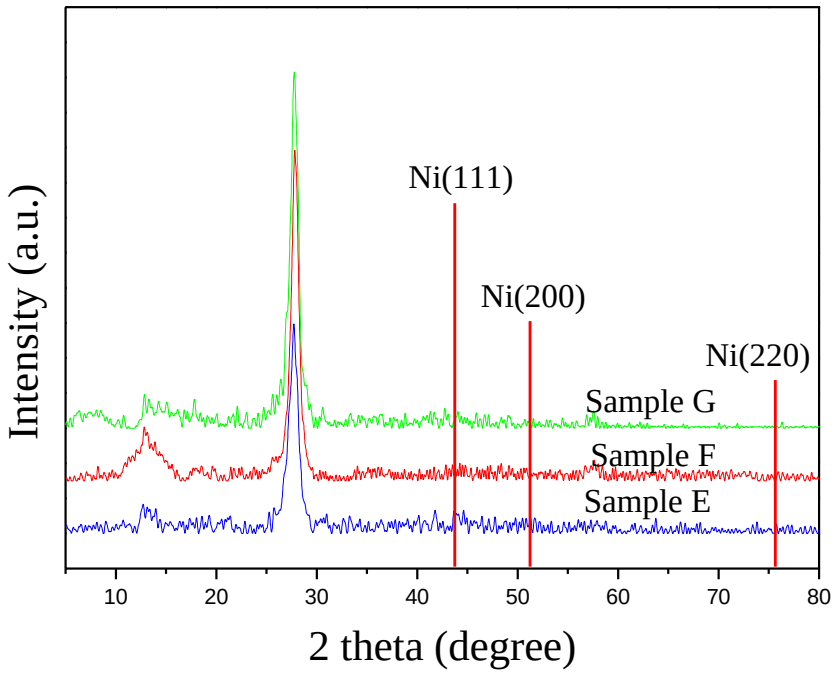

Figure S2. XRD patterns of sample E, F and G obtained by control experiments in Table 1.

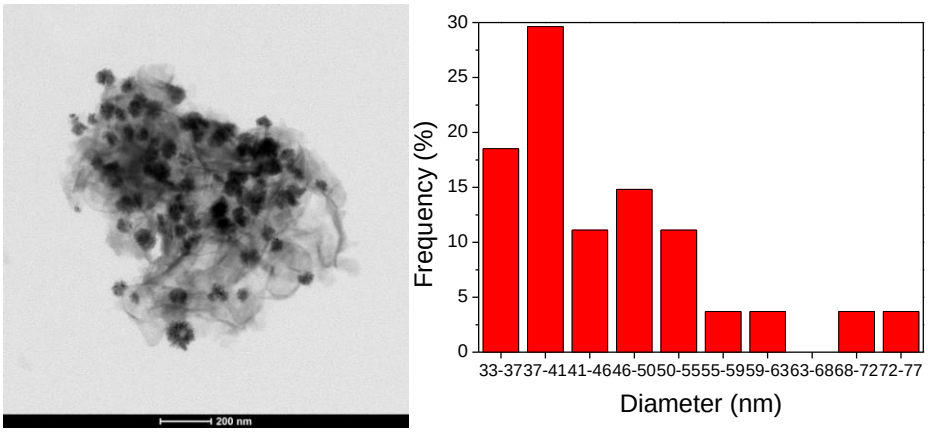

Figure S3. TEM images of Ni/g-C_3N_4 at low magnification (left) showing the distribution of nanoparticle sizes.

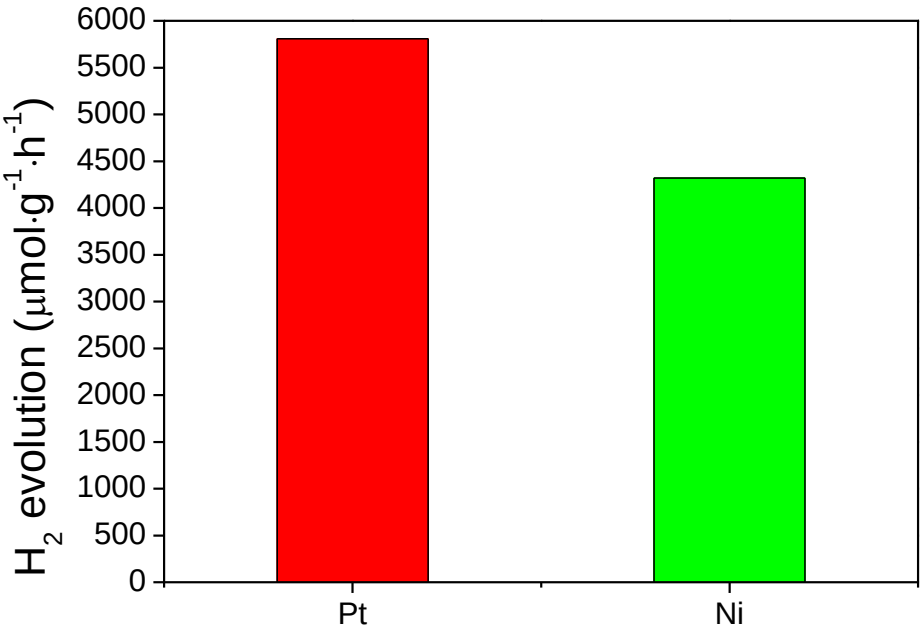

Figure S4. Comparison of photocatalytic activity of Ni-7.4 wt%/g-C_3N_4 and Pt-7.4 wt%/g-C_3N_4. The system contains 10 mg photocatalyst, 10 mL 30 vol% TEOA aqueous solution. The data were obtained by photocatalytic process of 3 h using 300 W Xe lamp with an AM 1.5G filter as light source. Preparation of Pt/g-C_3N_4: 7.4 wt% Pt was loaded on g-C_3N_4 in-situ by photoreduction method using H_2PtCl_6.

Figure S5. The photograph of outdoor equipment of sunlight-driven water splitting by Ni-7.4wt%/ g-C_3N_4 system in Wuxi city on June. 12, 2015. Outdoor temperature: 24~33℃, time: 09:30-17:00.

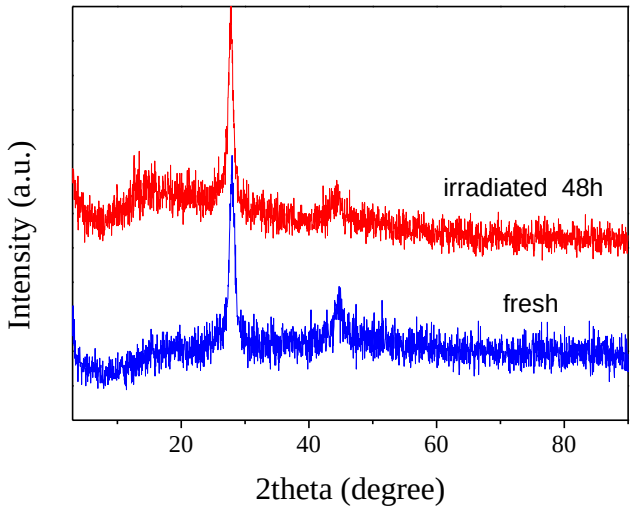

Figure S6. XRD of Ni-7.4%/g-C_3N_4 before and after photocatalysis.

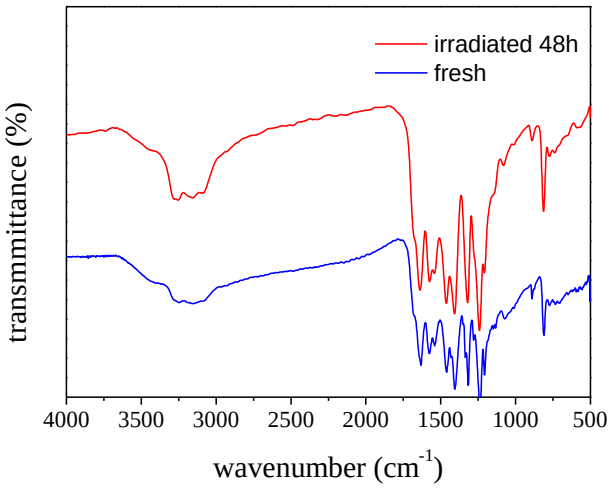

Figure S7. IR of Ni-7.4%/g-C_3N_4 before and after photocatalysis.

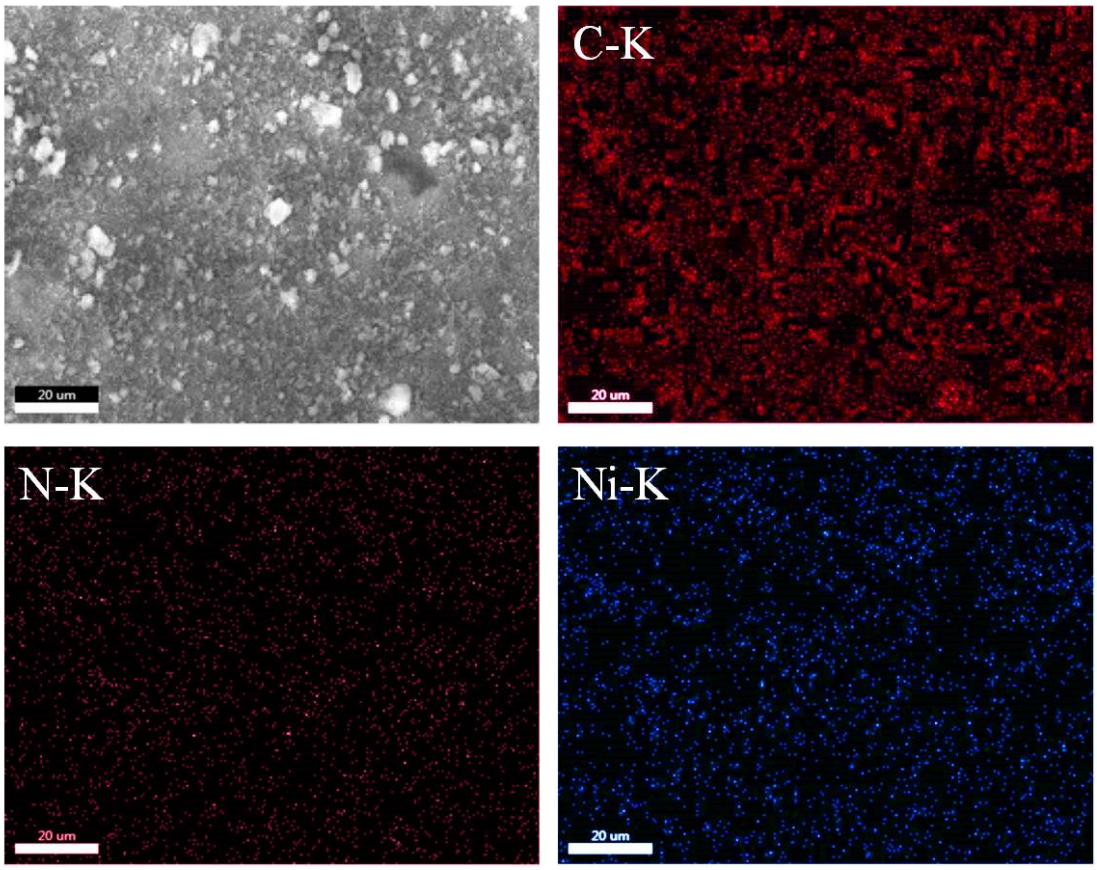

Figure S8. EDX-Mapping of Ni-7.4%/g-C_3N_4 after 48 h photocatalysis.

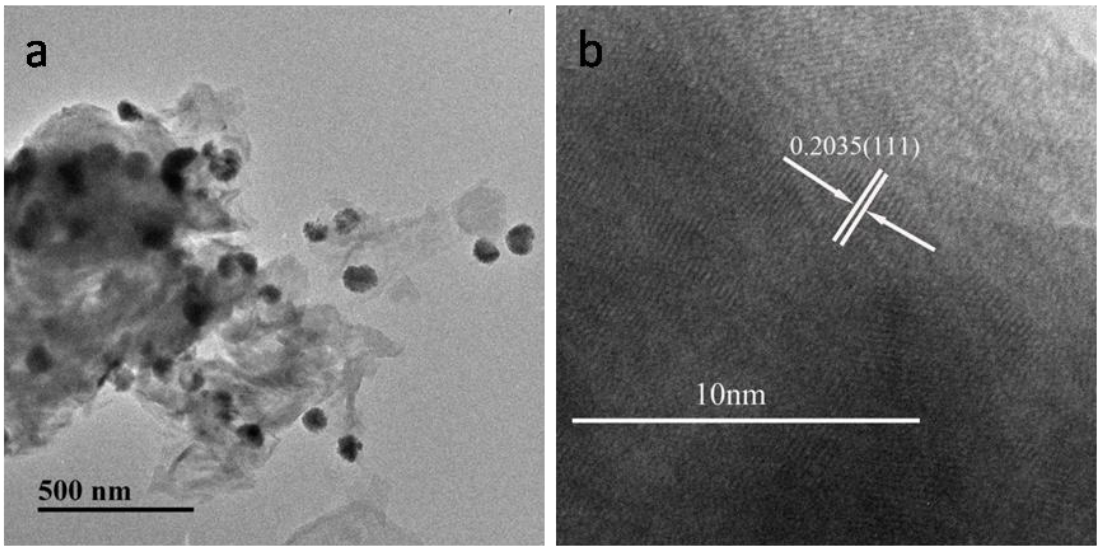

Figure S9. TEM (a) and HRTEM (b) image of Ni-7.4wt%,/g-C_3N_4 after 48 h photocatalysis.

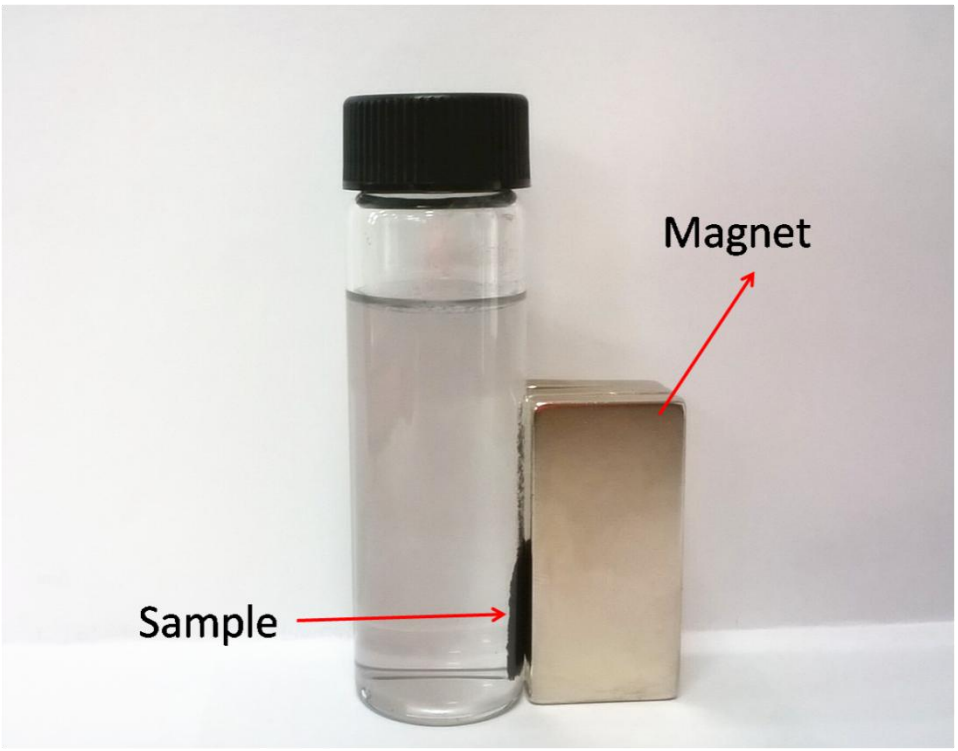

Figure S10. The photograph of using magnets to attract samples.

Table S1. Photocatalytic H_2 evolution on g-C_3N_4 with non-noble-metal cocatalysts.

Cocatalysts	Mass fraction	sacrificial agent	Light source	Activity ($\mu molg^{-1}h^{-1}$)	Quantum yield	Ref.
$[Ni(TEOA)]_2Cl_2$	2.0 wt% of Ni^{2+}	triethanolamine	500 W Xe lamp	2435	1.51 % (400 nm)	S1
$Ni(OH)_2$	0.5 mol%	triethanolamine	350 W Xe lamp	152	1.1% (420 nm)	S2
NiS	1.1 wt%	triethanolamine	300 W Xe lamp	482	1.9 % (440 nm)	S3
$Co^{III}(dmgH)_2pyCl$	/	triethanolamine	300 W Xe lamp	216.7	0.62% (365 nm)	S4
NiS_2	2.0 wt%	triethanolamine	300 W Xe lamp	406	/	S5
Ni–Tu–TETN	/	triethanolamine	300 W Xe lamp	510	0.2% (420 nm)	S6
NiS	1.5 mol%	triethanolamine	300 W Xe lamp	447.7	/	S7
$Ni(dmgH)_2$	3.5 wt%	triethanolamine	300 W Xe lamp	236	/	S8
MoS_2	2.89 wt%	triethanolamine	300 W Xe lamp	252	/	S9
Ni	10wt%	triethanolamine	500W Xe lamp	168.2	/	S10
NiS	0.97wt%	triethanolamine	150 W Xe lamp	84	1.4%	S11

					(420 nm)	
Ni/NiO	2 wt%	triethanolamine	300 W Xe lamp	200	/	S12
$C_3N_3S_2Ni$	0.1 wt%	triethanolamine	300 W Xe lamp	110	2.6 % (420 nm)	S13
Ni	0.73 wt%	triethanolamine	300 W Xe lamp	103	/	S14
Ni	7.4wt%	triethanolamine	300 W Xe lamp	4318	2.01% (400 nm)	This work

References

S1 J. Dong, M. Wang, X. Li, L. Chen, Y. He, L. Sun, *ChemSusChem.*, 2012, 5, 2133.

S2 J. Yu, S. Wang, B. Cheng, Z. Lin, F. Huang, *Catal. Sci. Technol.*, 2013, 3, 1782.

S3 J. Hong, Y. Wang, W. Zhang, R. Xu, *ChemSusChem*, 2013, 6, 2263.

S4 S. W. Cao, X. F. Liu, Y. P. Yuan, Z. Y. Zhang, J. Fang, S. C. Loo, J. Barber, T. C. Sum, C. Xue, *Phys. Chem. Chem. Phys.*, 2013, 15, 18363.

S5 L. Yin, Y. P. Yuan, S.W. Cao, Z. Zhang, C. Xue, *RSC Adv.*, 2014, 4, 6127.

S6 D. Wang, Y. Zhang, W. Chen, *Chem. Commun*., 2014, 50, 1754.

S7 Z. Chen, P. Sun, B. Fan, Z. Zhang, X. Fang, *J. Phys. Chem. C*, 2014, 118, 7801.

S8 S. W. Cao, Y. P. Yuan, J. Barber, S. C. J. Loo, C. Xue, *Appl. Surf. Sci.*, 2014, 319, 344.

S9 H. Zhao, Y. Dong, P. Jiang, G. Wang, H. Miao, R. Wu, L. Kong, J. Zhang, C. Zhang, *J. Mater. Chem. A*, 2015, 3, 7375.

S10 L. Bi, D. Xu, L. Zhang, Y. Lin, D. Wang, and T. Xie, *Phys. Chem. Chem. Phys.*, 2015, 17, 29899.

S11 Y. Lu, D. Chu, M. Zhu, Y. Du and P. Yang, *Phys. Chem. Chem. Phys.*, 2015, 17, 17355.

S12 G. Zhang, G. Li, X. Wang, *ChemCatChem*, 2015, 7, 2864.

S13 Y. Chen, B. Lin, W. Yu, Y. Yang, S. M. Bashir, H. Wang, K. Takanabe, H. Idriss J. M. Basset, *Chem. Eur. J.*, 2015, 21, 10290.

S14 A. Indra, P. W. Menezes, K. Kailasam, D. Hollmann, M. Schröder, A. Thomas, A. Brückner, M. Driess, *Chem. Commun.*, 2016, 52, 104.