Supporting Information

A dual polymer composite of poly(3-hexylthiophene) and Poly(3,4-ethylenedioxythiophene) hybrid surface heterojunction with g-C_3N_4 for enhanced photocatalytic hydrogen evolution

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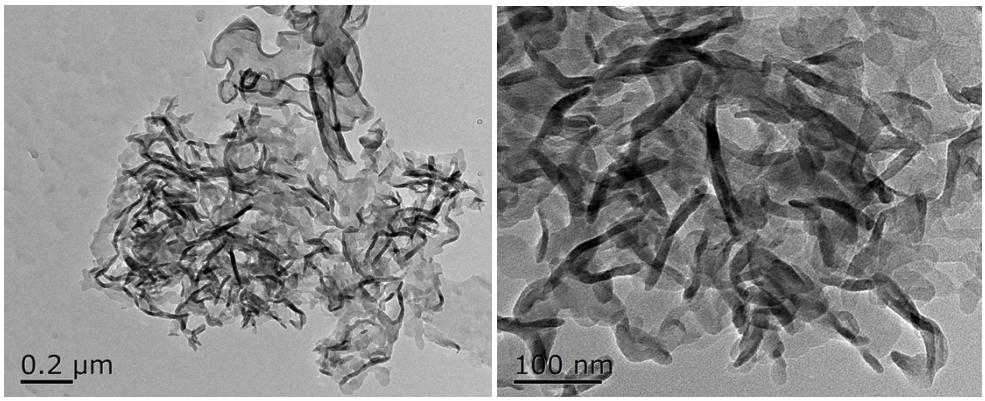

Fig. S1 Typical TEM images of pure g-C_3N_4.

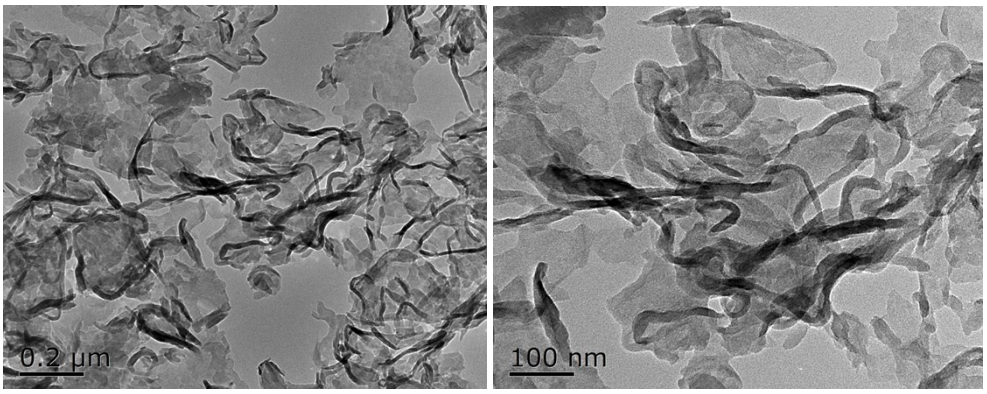

Fig. S2 Typical TEM images of g-C_3N_4-PEDOT/P3HT.

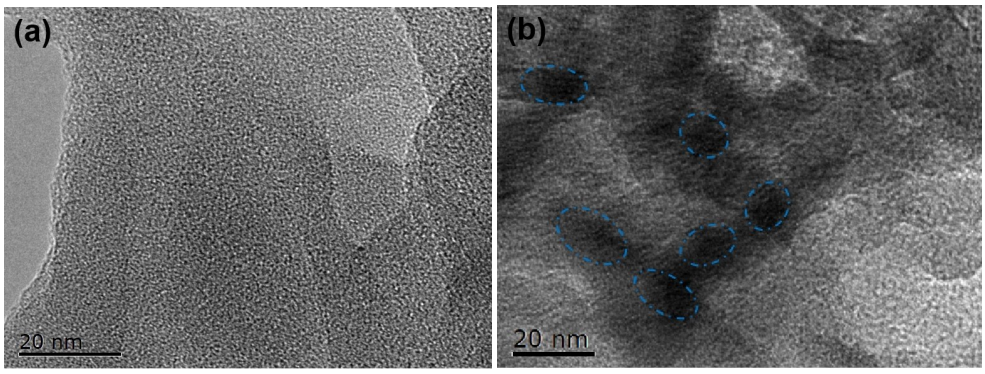

Fig. S3 Typical high resolution TEM (HRTEM) images of the sample, (a) g-C_3N_4, (b) g-C_3N_4-PEDOT/P3HT.

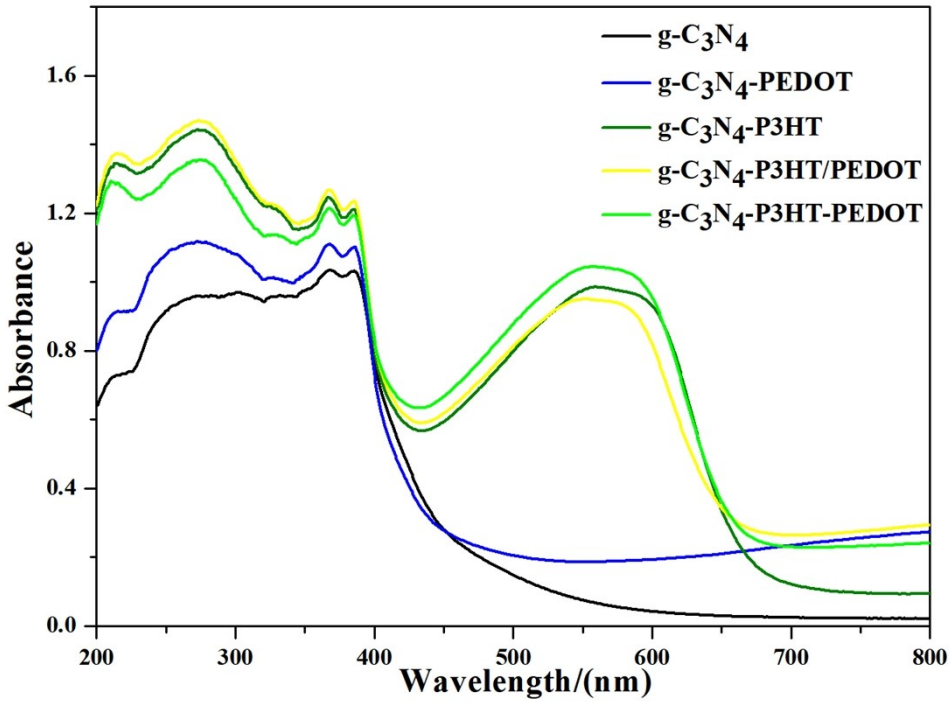

Fig. S4 UV-Vis diffuse reflectance spectra of the as-prepared g-C_3N_4-polymer samples.

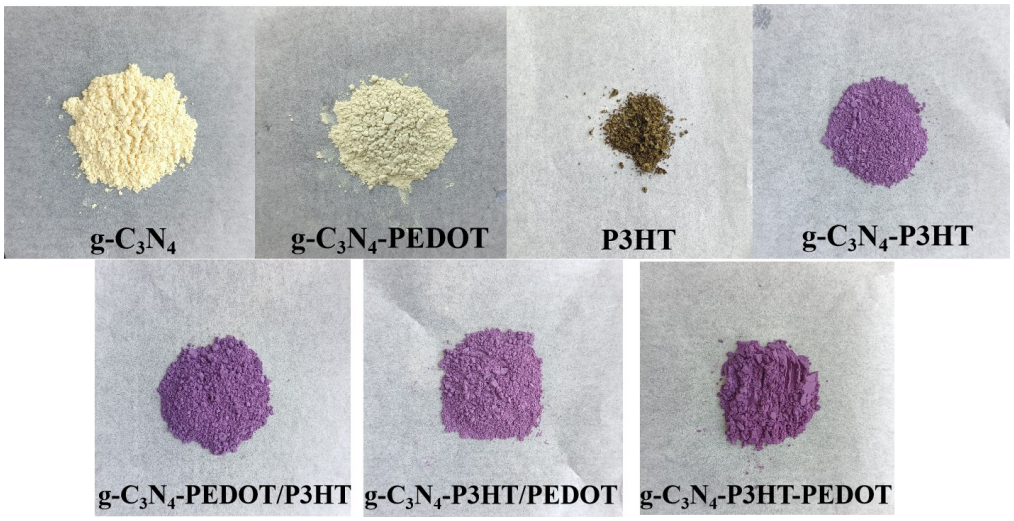

Fig. S5 The ordinary optical photos of the as-prepared g-C_3N_4-polymer samples.

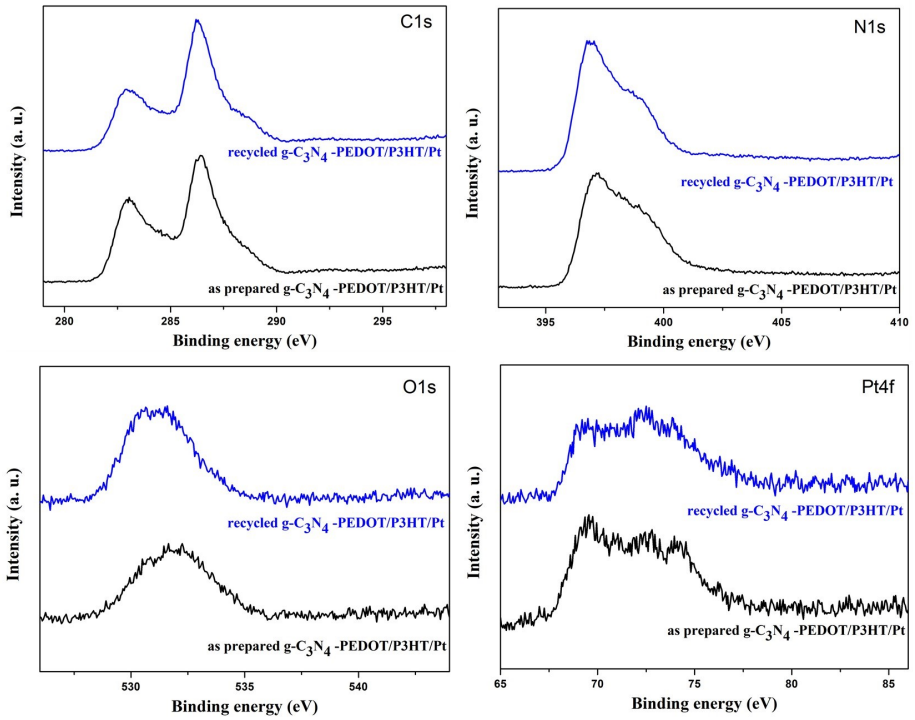

Fig. S6 The XPS spectra of C 1s, N 1s, O 1s and Pt 4f for g-C_3N_4-PEDOT/P3HT/Pt composite before and after stability test in AA solution.

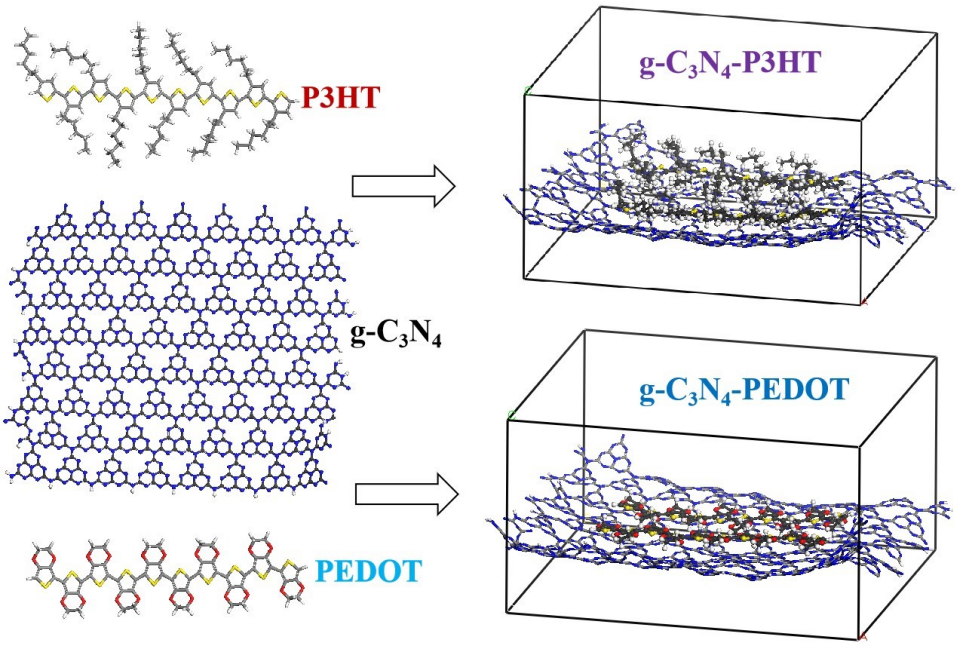

Fig. S7 The molecular structure of monolayer g-C_3N_4, the repeat unit chain of PEDOT, P3HT and the composites.

Table S1. The comparison of other polymer dye-sensitized g-C_3N_4 for photocatalytic H_2 production.

Photocatalyst	Reaction conditions	Wavelength of incident light(λ)	H_2 production activity	AQY/%	Ref.
P3HT-g-C_3N_4 (melamine)	0.25M Na_2S-Na_2SO_3	λ≥400 nm	560 μmol h^{-1}	2.9% (λ= 420 nm)	S1
g-C_3N_4/Au/P3HT/Pt	10% TEOA	λ≥420 nm	320 μmol h^{-1}	none	S2
P3HT-g-C_3N_4 (urea)	0.25M Na_2S-Na_2SO_3	λ≥420 nm	57 μmol h^{-1}	4.2% (λ= 420 nm)	S3
g-C_3N_4-P3HT (RCNTP-5)	10% TEOA	λ>420 nm	609.9 μmol h^{-1} g^{-1}	none	S4
g-C_3N_4-PEDOT	10% TEOA	λ≥400 nm	32.7 μmol h^{-1}	none	S5
g-C_3N_4-PEDOT/P3HT	saturated AA solution	λ≥400 nm	427703.3μmol·h^{-1}·g^{-1}	4.4%(λ=420 nm), 10.6%(λ=520 nm), 14.9%(λ=600 nm)	This work

References

S1. H. J. Yan and Y. Huang, Chem. Commun., 2011, 47, 4168–4170.

S2. Y. Zhang, F. Mao, H. Yan, K. Liu, H. Cao, J. Wu, D. A. Xiao, J. Mater. Chem. A, 2015, 3, 109−115.

S3. X. Zhang, B. Peng, S. Zhang, & T. Peng, ACS Sustainable Chem. Eng., 2015, 3, 7, 1501–1509.

S4. M. Luo, H. Gong, W. Yang, F. He, Y. Cao, & Y. Zhang, et al., Int. J. Hydrogen Energ., 2019, 44, 7108-7117.

S5. X. Zheng, Z. Chen, Z. Xu, L. Wang, Chem. Commun., 2014, 50, 6762-6764.