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Highly stable non-noble metal Ni_2P co-catalyst for increased H_2 generation by g-C_3N_4 under visible light irradiation

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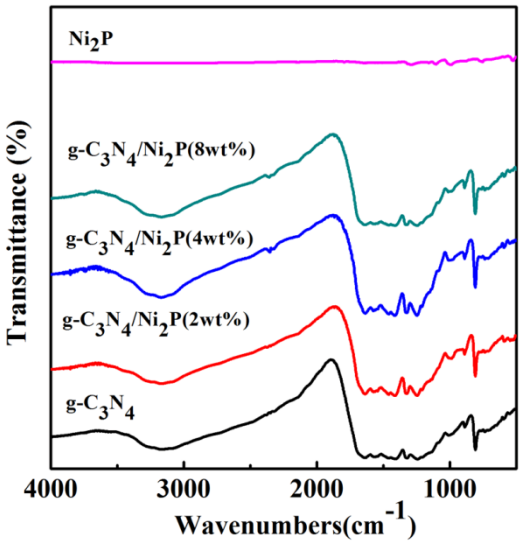

Fig. S1 FT-IR spectra of pure g-C_3N_4 and g-C_3N_4/Ni_2P composites with various amount of Ni_2P (i.e. 2wt%, 4wt%, and 8wt%). FT-IR for Ni_2P is also provided for reference.

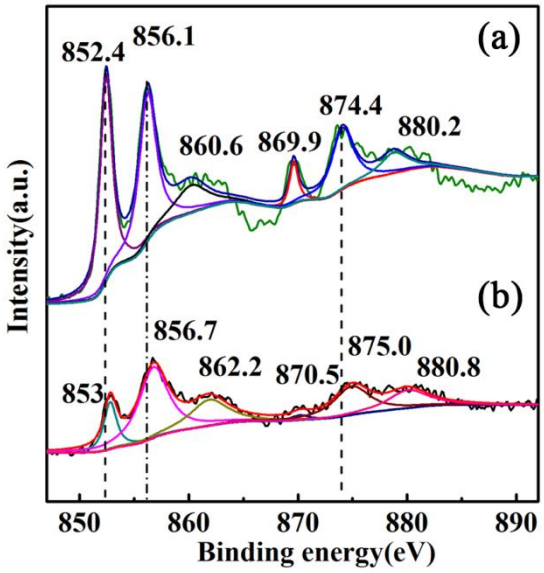

Fig. S2 XPS spectra of Ni 2p binding energy in (a) pure Ni_2P and (b) g-C_3N_4/Ni_2P(8wt%) sample.

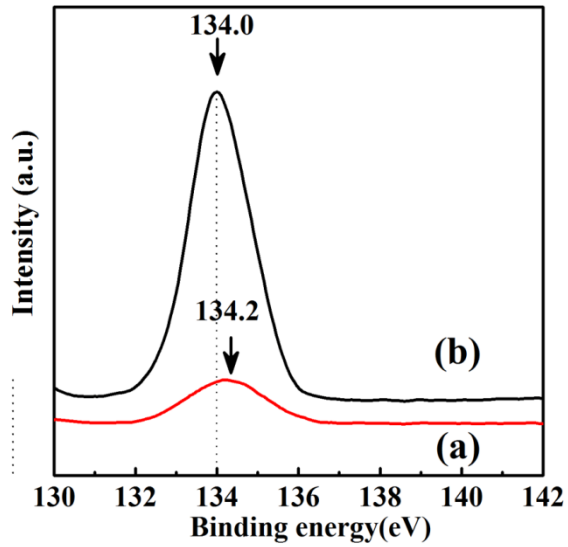

Fig. S3 XPS spectra of P 2p binding energy in (a) pure Ni_2P and (b) g-C_3N_4/Ni_2P(8wt%) samples.

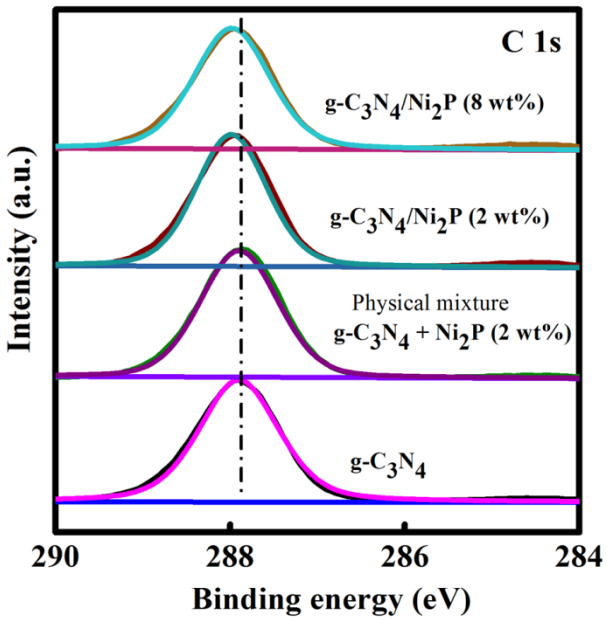

Fig. S4 XPS spectra of C 1s binding energy in pure g-C_3N_4, a physical mixture of g-C_3N_4 and Ni_2P (2 wt%), g-C_3N_4/Ni_2P (2 wt%), and g-C_3N_4/Ni_2P (8 wt%) samples.

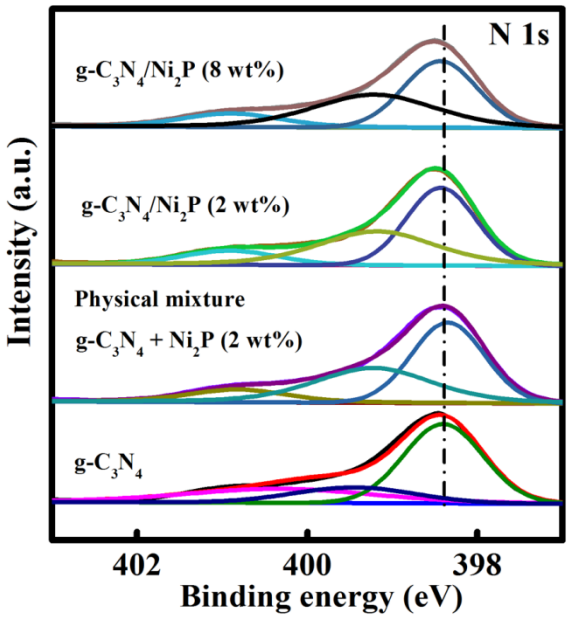

Fig. S5 XPS spectra of N 1s binding energy in pure g-C_3N_4, a physical mixture of g-C_3N_4 and Ni_2P (2 wt%), g-C_3N_4/Ni_2P (2 wt%), and g-C_3N_4/Ni_2P (8 wt%) samples.

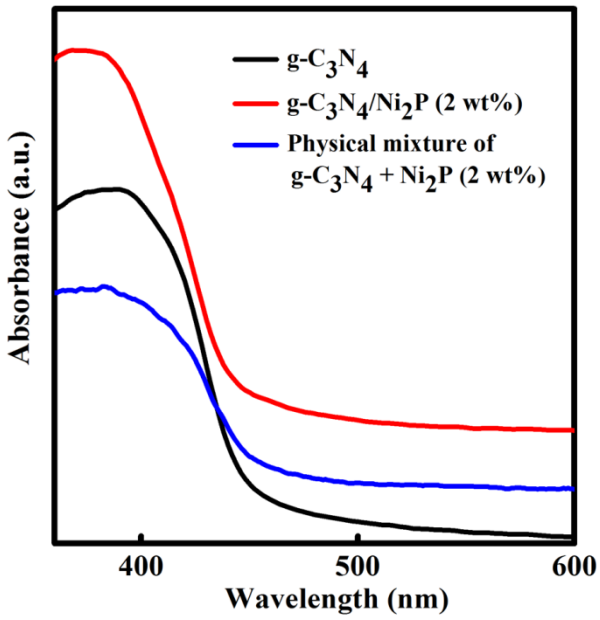

Fig. S6 UV-vis absorption spectra of pure g-C_3N_4, g-C_3N_4/Ni_2P (2 wt%), and a physical mixture of g-C_3N_4 and Ni_2P (2 wt%).

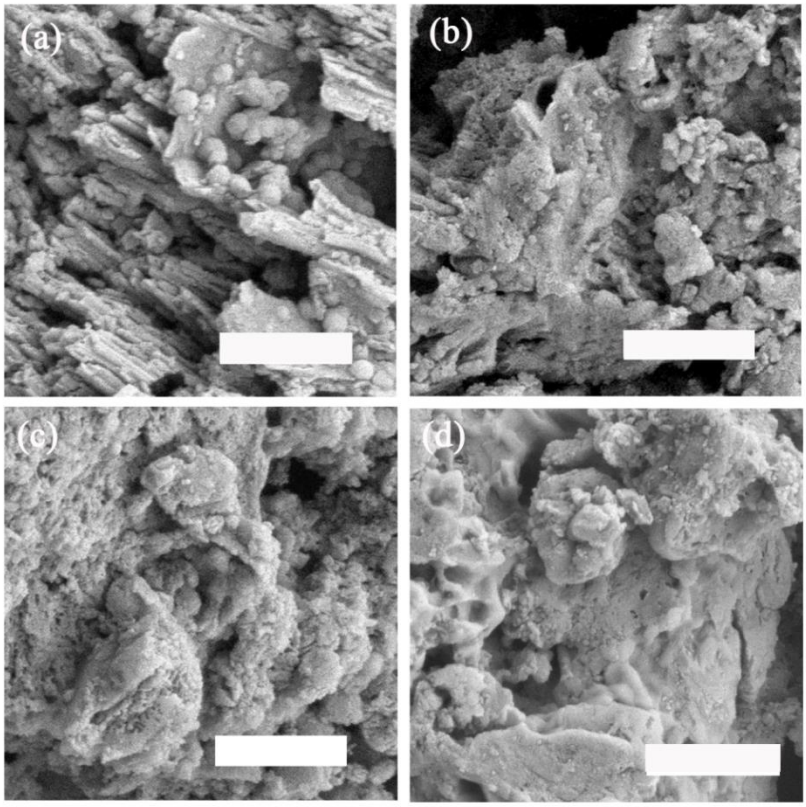

Fig. S7 SEM images of (a) pure g-C_3N_4, (b) g-C_3N_4/Ni_2P(2wt%), (c) g-C_3N_4/Ni_2P(4wt%), and (d) g-C_3N_4/Ni_2P(8wt%) sample. The scale bar is 1 μm.

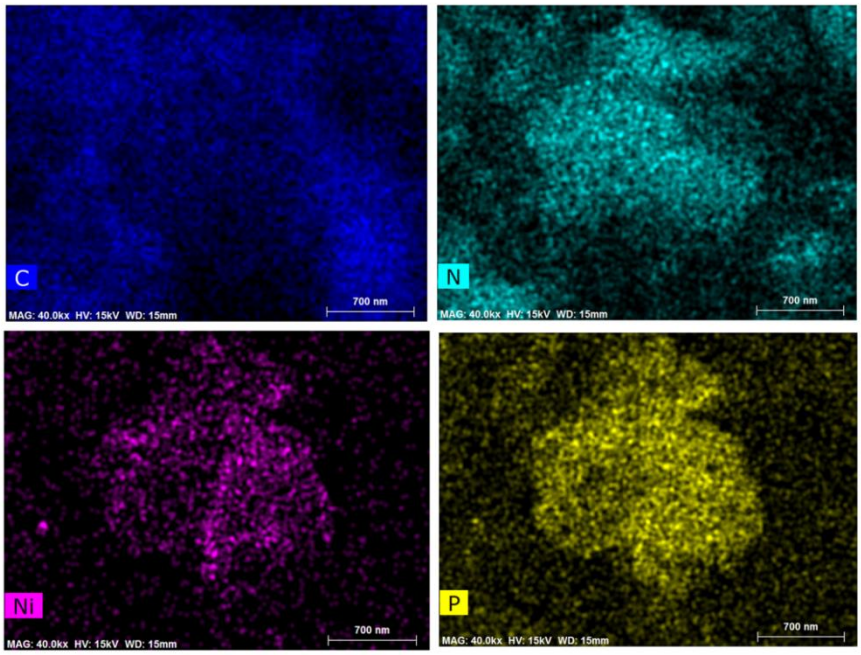

Fig. S8 Elemental mapping for C, N, Ni, and P in g-C_3N_4/Ni_2P(2wt%) sample.

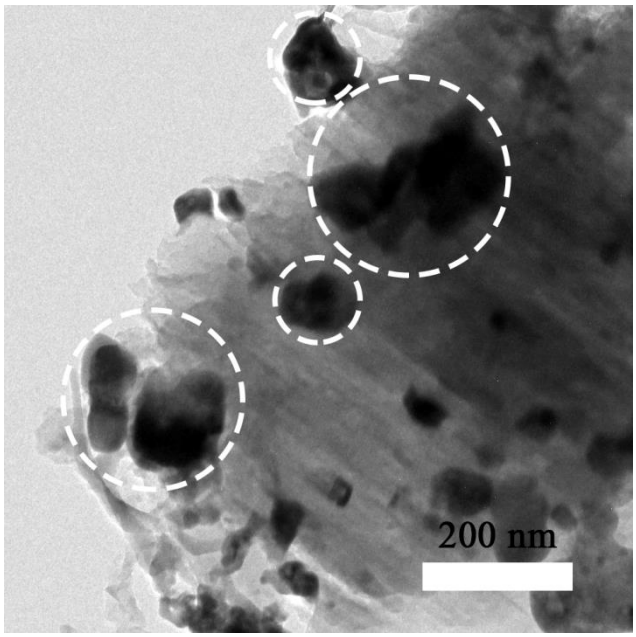

Fig. S9 TEM image of a g-C_3N_4/Ni_2P(8wt%) sample. The growth and aggregation of Ni_2P particle is highlighted by the dashed circles.

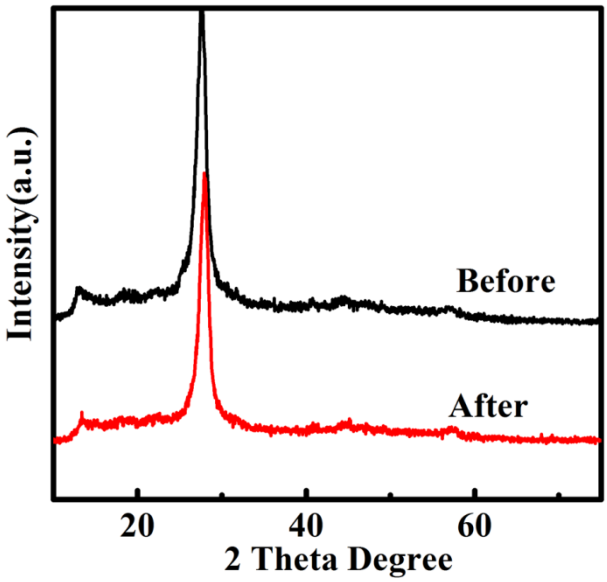

Fig. S10 XRD patterns of a g-C_3N_4/Ni_2P(2wt%) sample before and after 24 h long-term H_2 evolution testing.

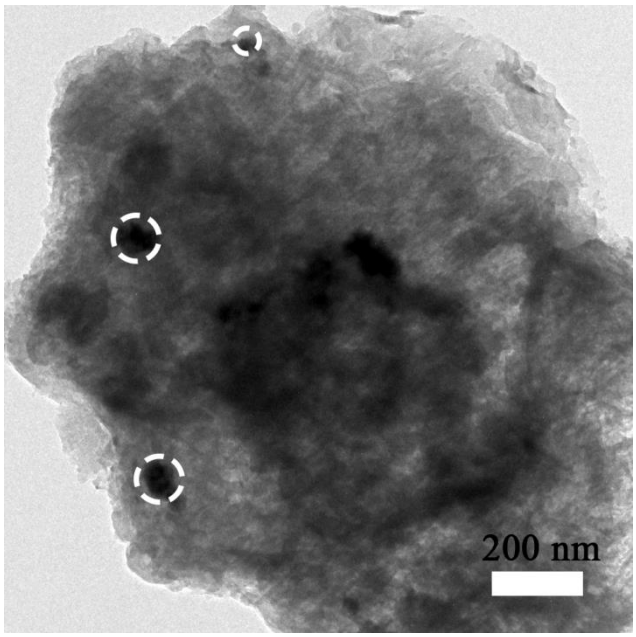

Fig. S11 TEM image of a g-C_3N_4/Ni_2P(2wt%) sample after 24 h long-term H_2 evolution testing. Ni_2P particles are shown by dashed circles.

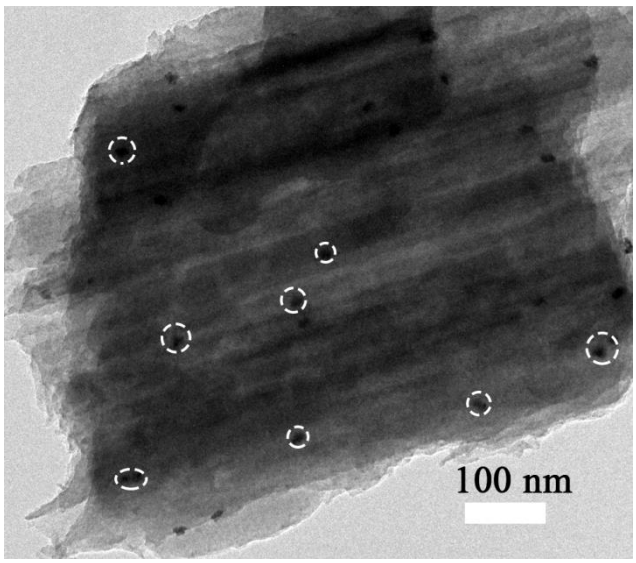

Fig. S12 TEM image of a g-C_3N_4/Pt (0.5 wt%) sample after 24 h long term H_2 evolution testing.

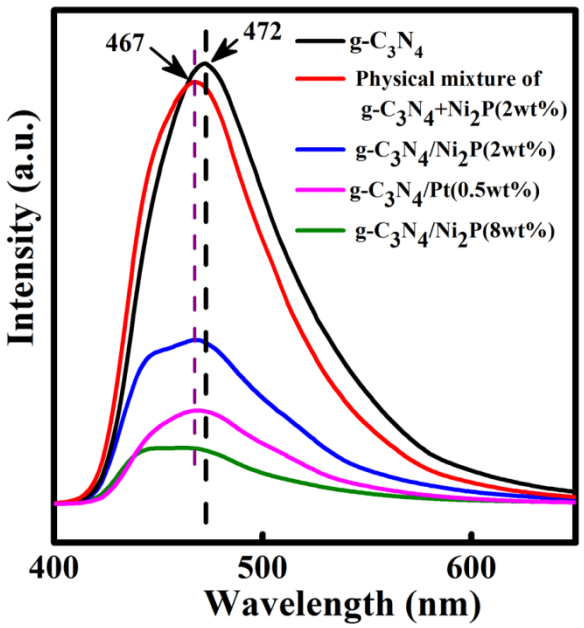

Fig. S13 Stable photoluminescence spectra of pure g-C_3N_4, g-C_3N_4/Ni_2P(2wt%), g-C_3N_4/Ni_2P(8wt%), g-C_3N_4/Pt(0.5wt%), and a physical mixture of g-C_3N_4 and Ni_2P(2wt%) measured in the solid state.

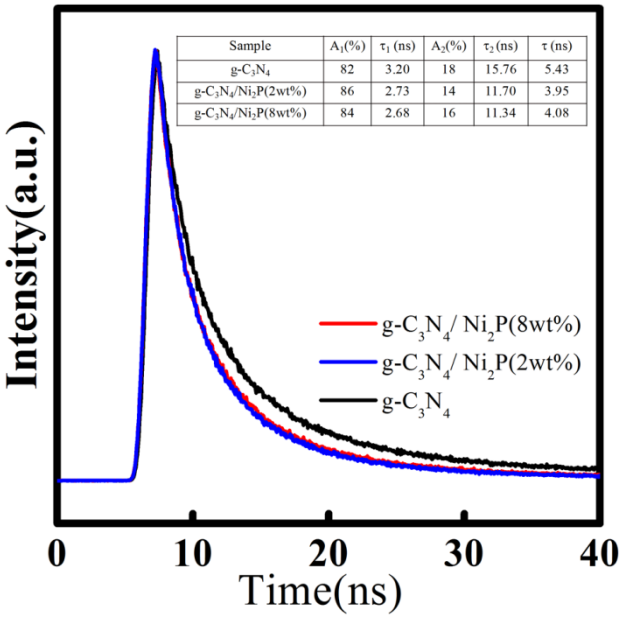

Fig. 14 Time-resolved photoluminescence decay spectra of pure g-C_3N_4, g-C_3N_4/Ni_2P(2wt%), and g-C_3N_4/Ni_2P(8wt%) measured in the solid state. The fitted lifetime from the fluorescence decays are illustrated in the table (inset).