Electronic Supplementary Information

$Ag_2S/g\text{-}C_3N_4$ Composite Photocatalysts for Efficient Pt-free Hydrogen Production. The Co-catalyst Function of Ag/Ag_2S Formed by Simultaneous Photodeposition

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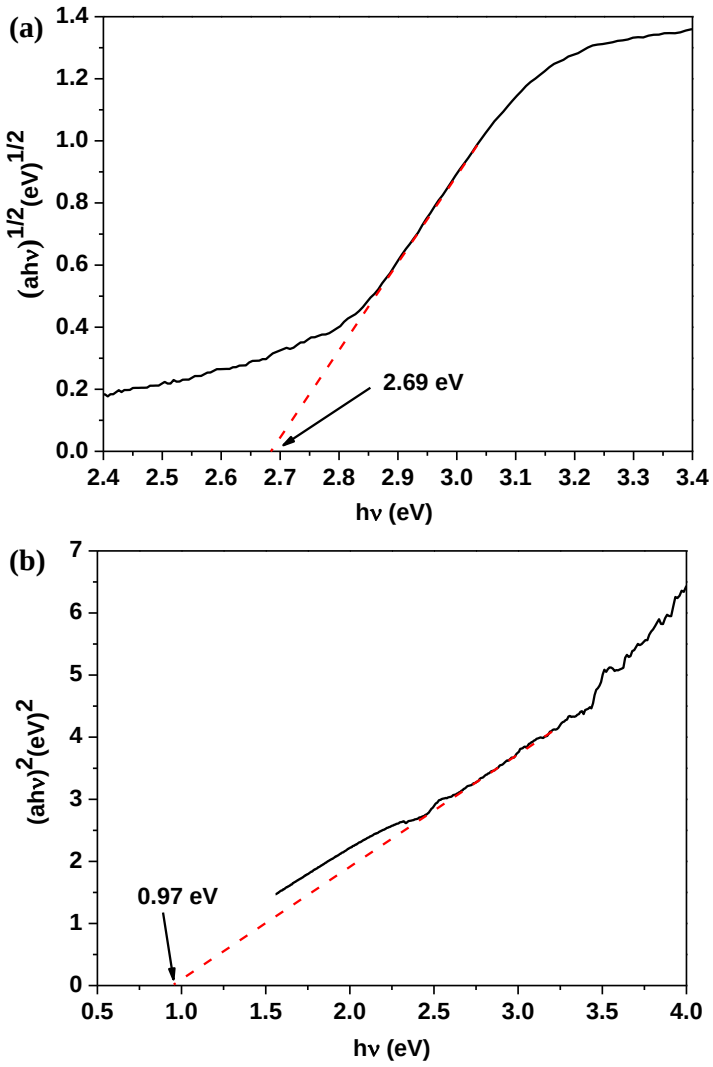

Fig. S1. (a) Plot of $(\alpha h\nu)^{1/2}$ versus energy ($h\nu$) for the band gap energy of g-C_3N_4 and (b) the plot of $(\alpha h\nu)^2$ versus energy ($h\nu$) for the band gap energy of Ag_2S.

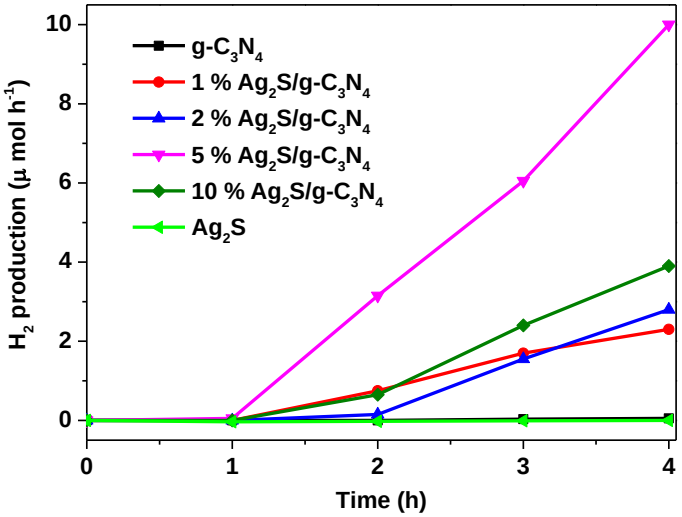

Fig. S2. Time course of H_2 evolution from 25% methanol aqueous solution (20 mL methanol + 60 mL distilled water) over $Ag_2S/g\text{-}C_3N_4$ composites as well as pure $g\text{-}C_3N_4$ and Ag_2S samples.

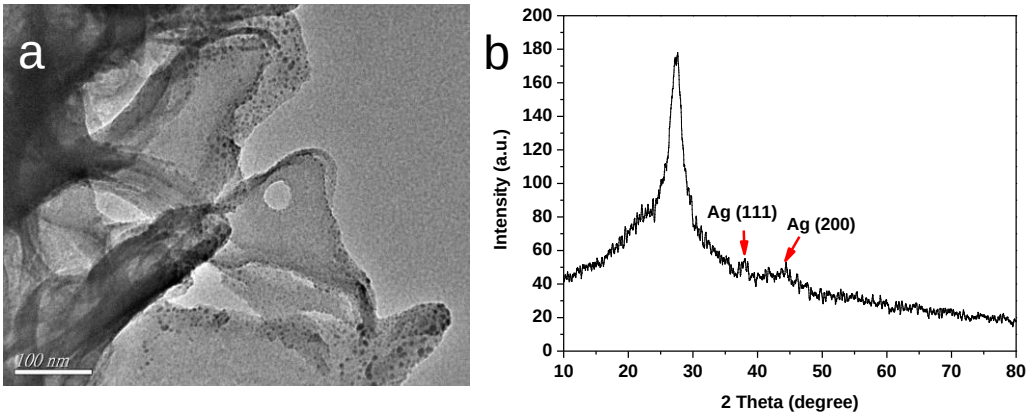

Fig. S3. (a) TEM image and (b) XRD pattern of $Ag/g\text{-}C_3N_4$ composite.

Synthesis of $Ag/g\text{-}C_3N_4$ composite: $Ag/g\text{-}C_3N_4$ composite photocatalysts were prepared by photoreduction method. Typically, 0.05 g of $g\text{-}C_3N_4$ powders and 0.05 g of $AgNO_3$ were dispersed in 50 mL water. The solution was then irradiated under

Xenon lamp (300 W) for 5 h. The product was collected by centrifugation, washed with distilled water and absolute ethanol, and dried in an oven at 60 °C for 12h.

Table S1. Measured N_2 sorption parameters for the different samples

Sample	Surface area ($m^2 \cdot g^{-1}$)	Pore volume ($cm^3 \cdot g^{-1}$)
g-C_3N_4	17.2296	0.01456
1 % Ag_2S/g-C_3N_4	13.2470	0.01500
2 % Ag_2S/g-C_3N_4	17.2487	0.01209
5 % Ag_2S/g-C_3N_4	13.0188	0.01577
10 % Ag_2S/g-C_3N_4	12.7641	0.01512