Electronic Supplementary Material (ESI) for Photochemical & Photobiological Sciences.

Supporting Information

Dual modification of TiO_2 nanorod arrays with $SiW_{11}Co$ and Ag nanoparticles for enhanced photocatalytic activity under simulated sunlight

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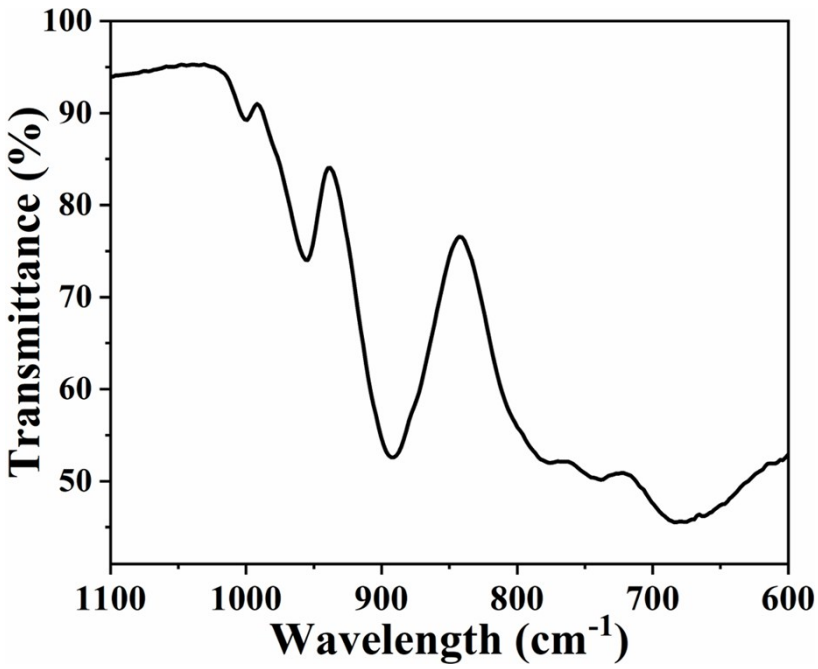

Fig. S1. IR spectrum for $SiW_{11}Co$.

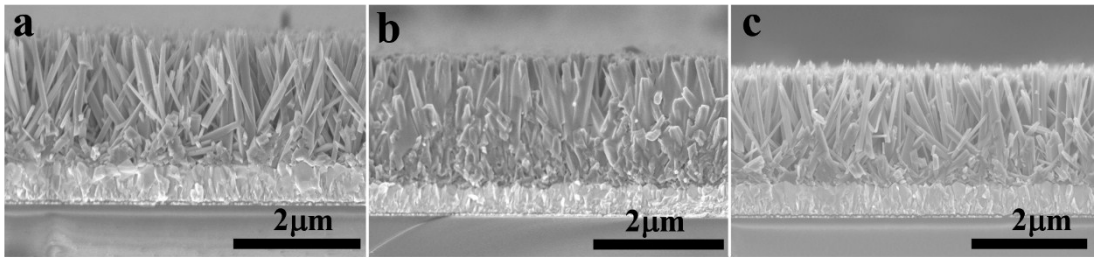

Fig. S2. Cross-sectional SEM images of TNRs (a) TNRs/$SiW_{11}Co$ (b) and TMRs/$SiW_{11}Co$/Ag (c).

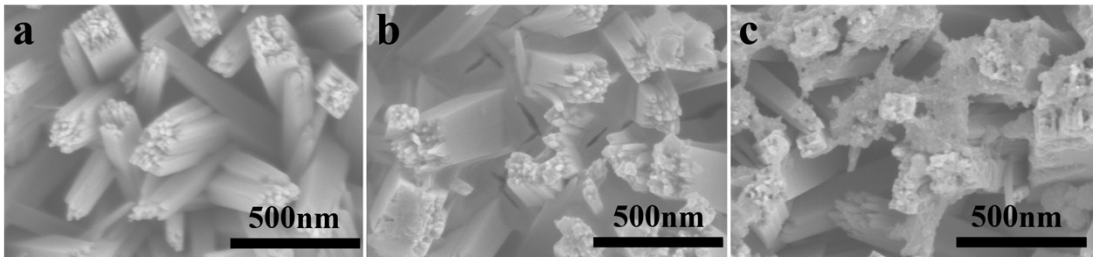

Fig. S3. SEM images of TNRs (a) TNRs/$SiW_{11}Co$ (b) and TMRs/$SiW_{11}Co$/Ag (c) at high magnification.

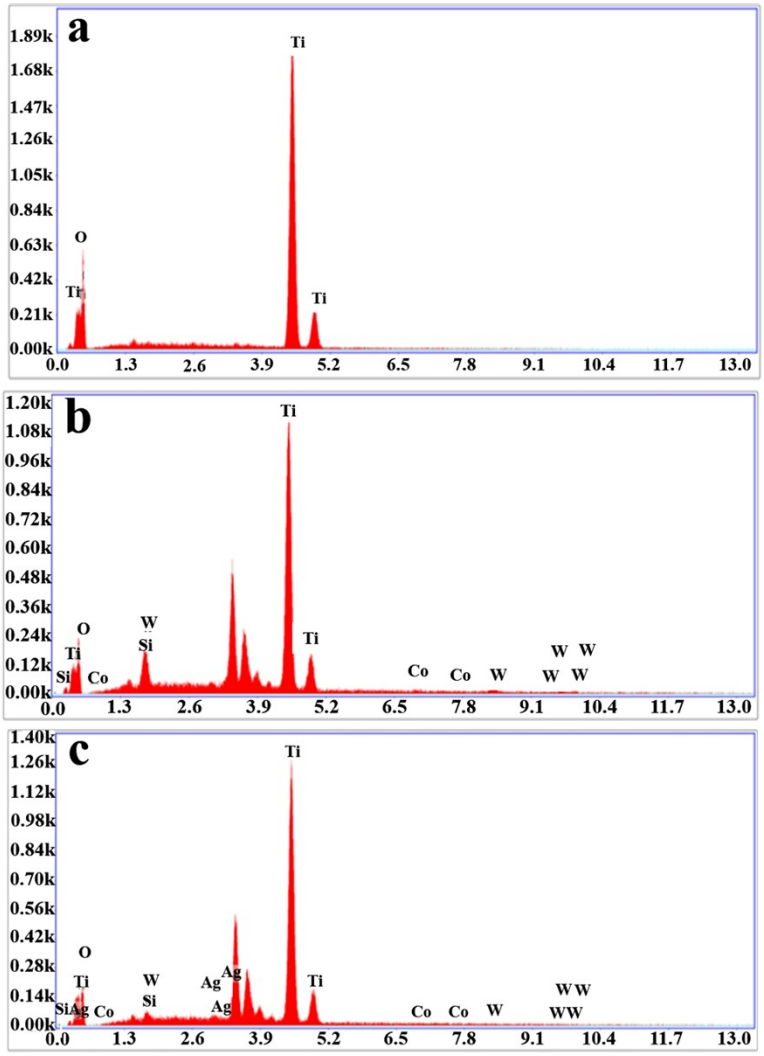

Fig. S4. EDS spectrum of (a) TNRs, (b) TNRs/$SiW_{11}Co$, and (c) TNRs/$SiW_{11}Co$/Ag films.

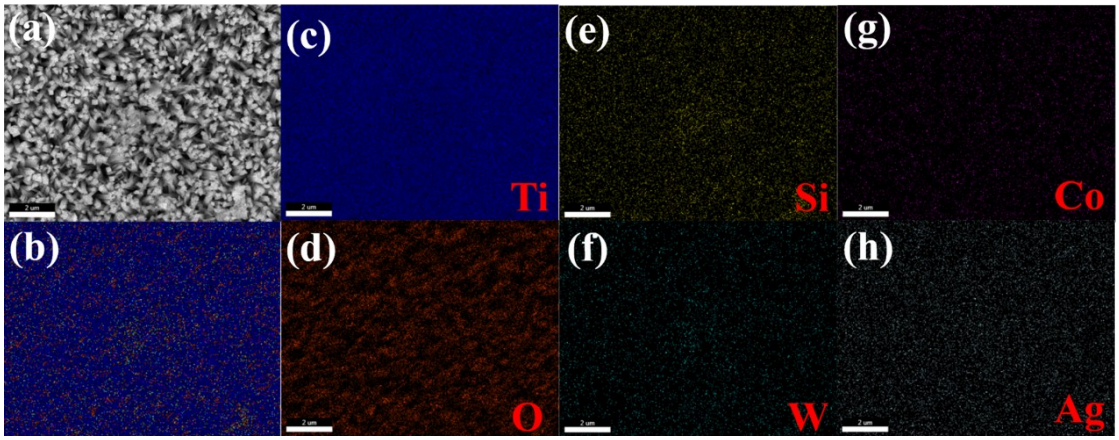

Fig. S5. SEM image (a) and the overlay image (b) of TNRs/$SiW_{11}Co$/Ag; the corresponding EDS mapping images of (c) Ti (d) O (e) Si (f) W (g) Co (h) Ag.

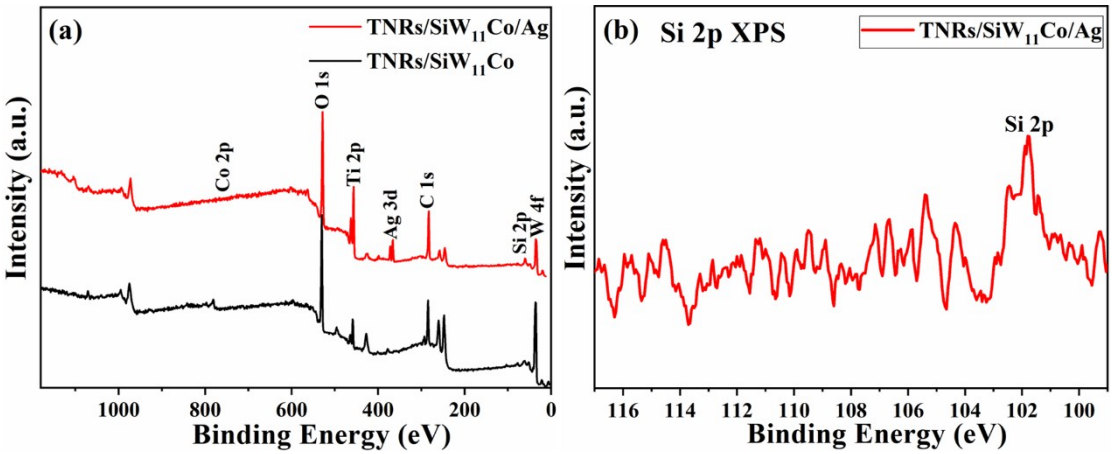

Fig. S6. XPS spectra of (a) full survey spectra for TNRs/SiW_{11}Co and TNRs/SiW_{11}Co/Ag; (b) Si 2p XPS spectra for TNRs/SiW_{11}Co/Ag.

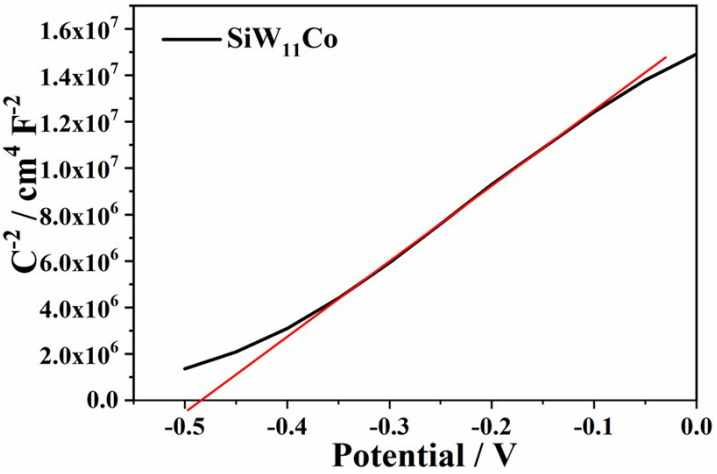

Fig. S7. Mott-Schottky plot of $SiW_{11}Co$.

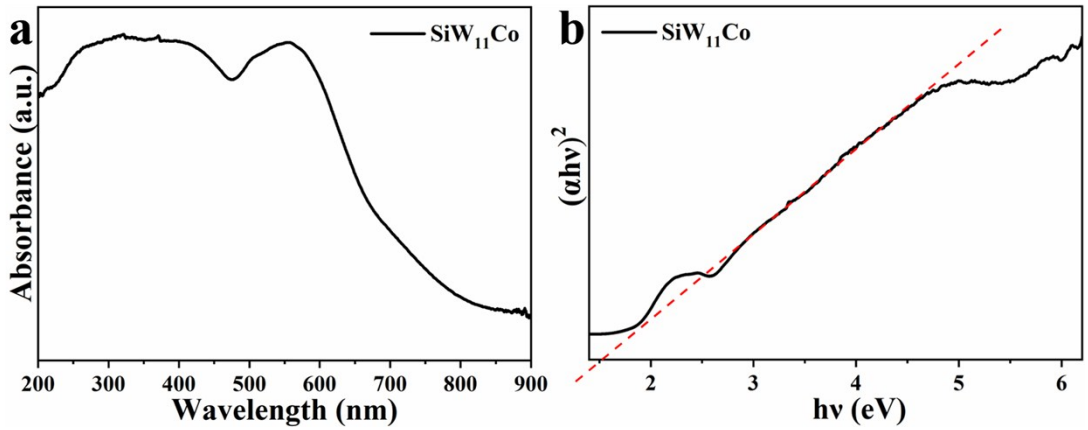

Fig. S8. UV-Vis diffuse reflectance spectra (a) and the band gap determination (b) of $SiW_{11}Co$.

The calculation method of CB or VB potentials of $SiW_{11}Co$:

As shown in Fig. S7, it can be proved that $SiW_{11}Co$ is a N-type semiconductor due to the slope of Mott-Schottky plot for $SiW_{11}Co$ is greater than 0. And the E_{CB} is calculated by doing the intercept on the horizontal axis. Therefore, E_{CB} = -0.481 V vs. SCE, and E_{CB} = 0.24 V vs. RHE according to $E_{RHE} = E_{SCE} + 0.241$ (ref. Applied Catalysis A: General 2017, 536, 67.).

From Fig. S8b, the calculated E_g of $SiW_{11}Co$ is 1.52 eV which is calculated by doing the slopes of the tangents on horizontal axis. According to $E_g = E_{CB} – E_{VB}$, it can be concluded that E_{VB} = +1.28 V.