Supporting Information

Dual modification of TiO$_2$ nanorod arrays with SiW$_{11}$Co and Ag nanoparticles for enhanced photocatalytic activity under simulated sunlight

Dandan Yan, Wencheng Fang, Fengyan Li,* Zhanbin Jin, Lin Xu*

Key Laboratory of Polyoxometalate Science of Ministry of Education, Department of Chemistry, Northeast Normal University, Changchun, Jilin 130024, P. R. China. E-mail: lify525@nenu.eud.cn; linxu@nenu.edu.cn; Fax: +86-0431-85099765; Tel: +86-0431-85099765

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/SiW₁₁Co and TNRs/SiW₁₁Co/Ag; (b) Si 2p XPS spectra for TNRs/SiW₁₁Co/Ag.
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.