

Supplemental information for Efficient WO₃ photoanode modified by Pt layer and plasmonic Ag for enhanced charge separation and transfer to promote photoelectrochemical performances

Yanting Li¹, Zhifeng Liu^{1,2,3*}, Zhengang Guo^{1,2}, Mengnan Ruan^{1,2}, Xifei Li⁴,
Yilin Liu¹

(1 School of Materials Science and Engineering, Tianjin Chengjian University, 26 Jinjing Road, Xiqing District, Tianjin 300384, China. 2 Tianjin Key Laboratory of Building Green Functional Materials, 26 Jinjing Road, Xiqing District, Tianjin 300384, China. 3 Key Laboratory for Photonic and Electric Bandgap Materials, Ministry of Education, Harbin Normal University, 1 Shida Road, Limin Economic Development Zone, Harbin 150025, P. R. China. 4 Institute of Advanced Electrochemical Energy & School of Materials Science and Engineering, Xi'an University of Technology, 150 meters west of Renhouzhuang South Road, Beilin District, Xi'an, 710048, China)

* corresponding author Tel: +86 22 23085236 Fax: +86 22 23085110

E-mail address: tjulzf@163.com

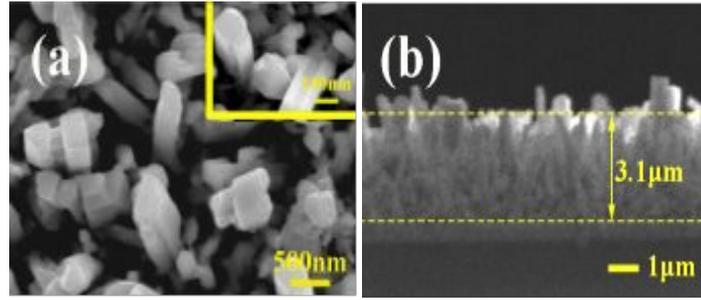


Fig. S1 Typical top-view (a) and side-view (b) SEM images of the pristine WO_3 NRs

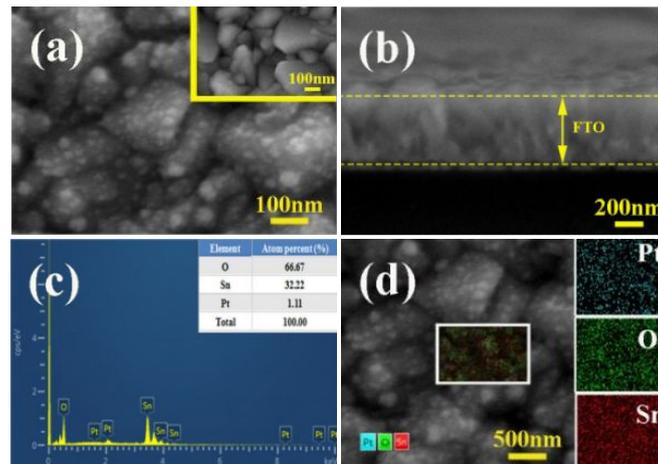


Fig. S2 (a) typical top-view and (b) side-view of Pt layer, inset of (a) is the FTO substrate; (c,d) the EDS elemental analysis spectrum and the corresponding elemental mapping images of Sn, O and Pt, respectively

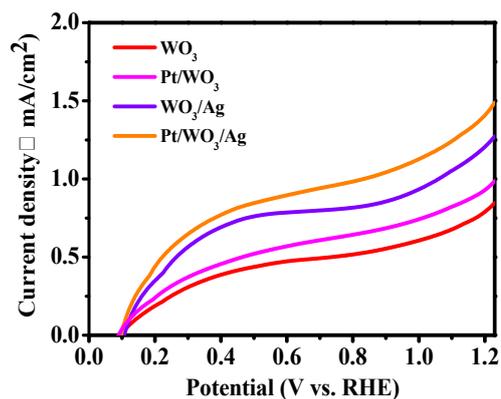


Fig. S3 LSV plots of bare WO₃, Pt/WO₃, WO₃/Ag, and Pt/WO₃/Ag photoanodes measured in 0.2 M Na₂SO₄ electrolyte containing 0.1M Na₂SO₃ as hole scavenger under AM 1.5G illumination

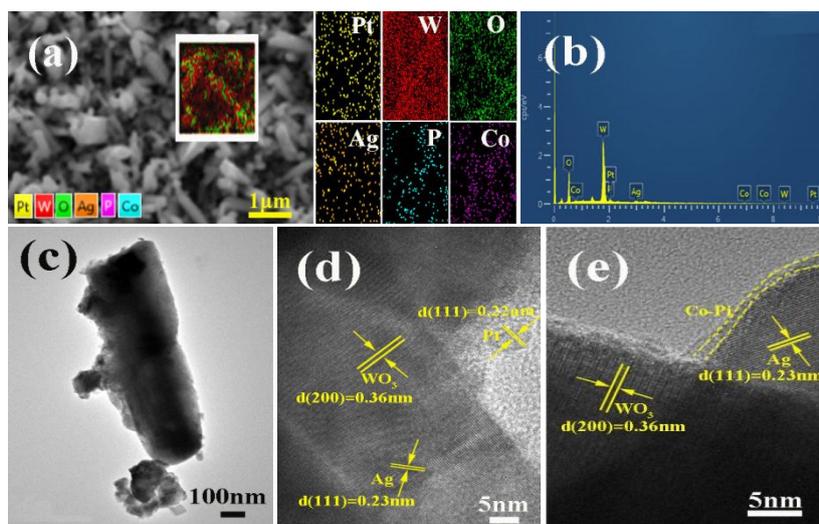


Fig. S4 (a) Top-view SEM image of Pt/WO₃/Ag/Co-Pi composite and the corresponding elemental mapping images of Pt, W, O, Ag, Co and P, respectively; (b) the EDS elemental analysis spectrum and TEM (c) and HRTEM (d,e) images of Pt/WO₃/Ag/Co-Pi composite

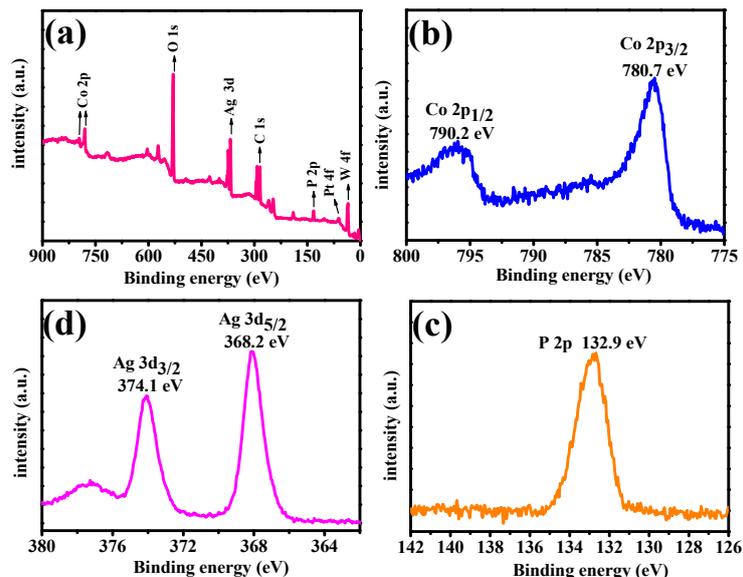


Fig. S5 (a) Survey XPS spectrum; High resolution XPS spectra of (b) Co 2p (c) P 2p and (d) Ag 3d for Pt/WO₃/Ag/Co-Pi composite

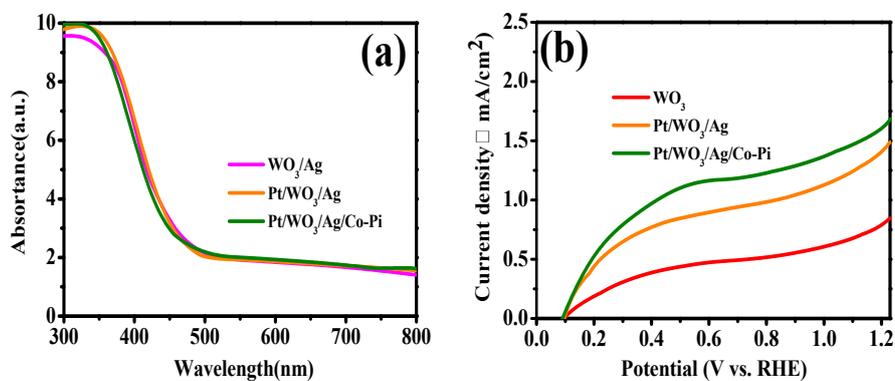


Fig. S6 (a) the UV-vis absorption spectrum of WO₃/Ag, Pt/WO₃/Ag and Pt/WO₃/Ag/Co-Pi composite; (b) LSV plots measured in 0.2 M Na₂SO₄ electrolyte containing 0.1M Na₂SO₃ as hole scavenger under AM 1.5G illumination

Tab. S1 EIS fitted parameters extracted from Nyquist plots of Pt/WO₃/Ag/Co-Pi photoanode

Sample	R _s (Ω cm ²)	R _{ct} (Ω cm ²)	CPE(F/cm ²)
Pt/WO ₃ /Ag/Co-Pi	291	364	3.24×10 ⁻⁵