Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Improving light absorption and photoelectrochemical performance of thin-film pho-toelectrode with a reflective substrate

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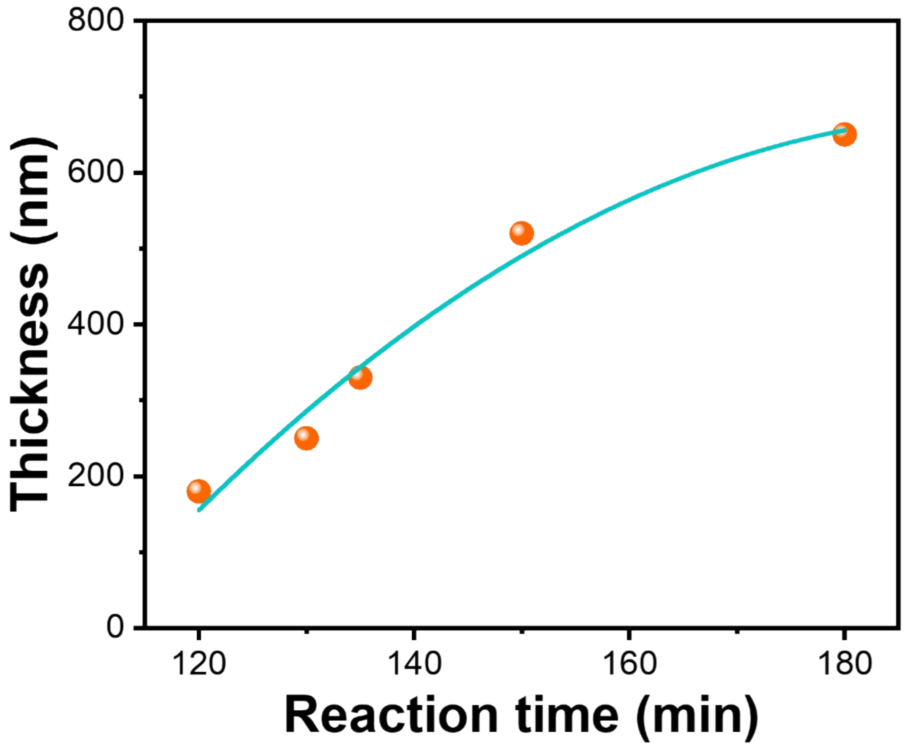

Fig. S1. Film thickness vs. hydrothermal reaction time of the hematite electrodes.

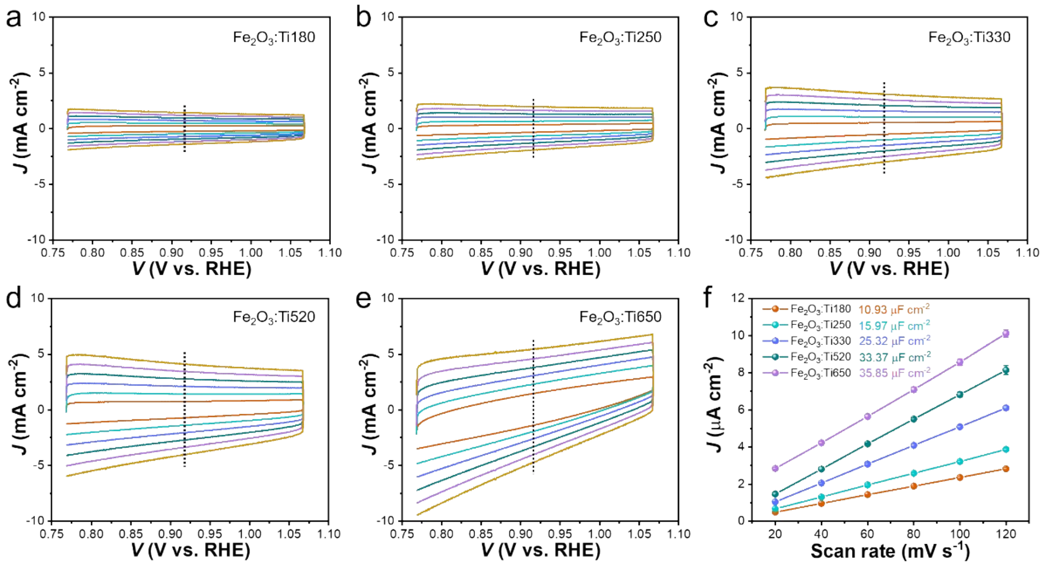

Fig. S2. (a-e) Cyclic voltammetry test of the Fe_2O_3:Ti electrodes, (f) Plots of the capacity current differences and the calculated electrochemical specific surface area ECSA values of the Fe_2O_3:Ti electrodes.

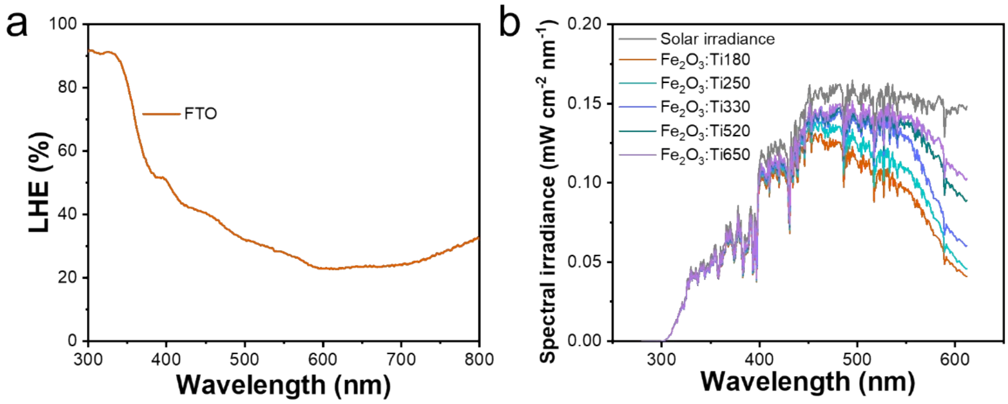

Fig. S3. (a) The LHE of bare FTO, (b) The solar irradiance spectrum of AM 1.5G (ASTM G173-03) and those weighted by the LHE spectra of Fe_2O_3:Ti electrodes.

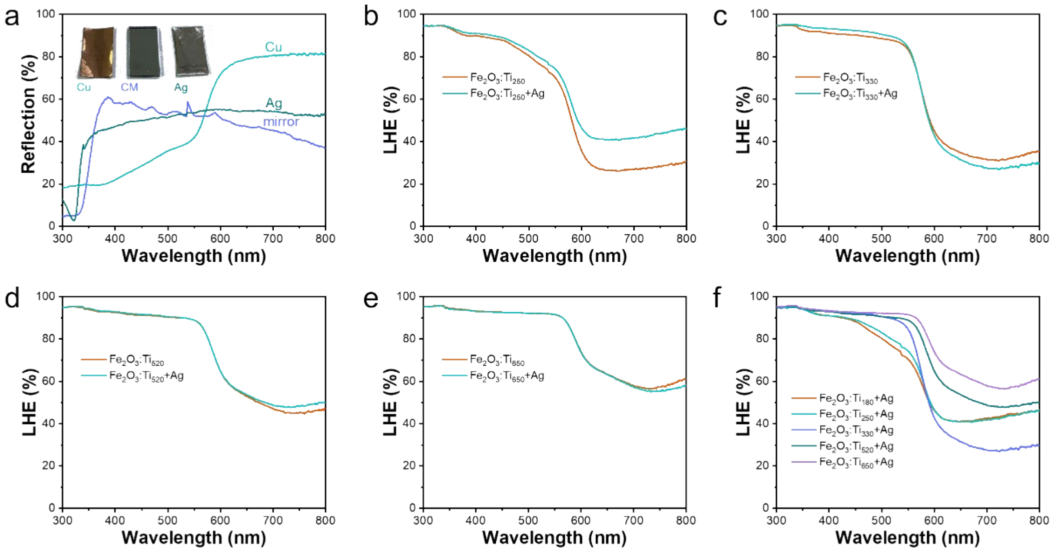

Fig. S4. The reflectance of the Cu foil, CM and Ag foil, insert are the photographs of the three reflective substrates. (b-e) Comparison of the LHE of the Fe_2O_3:Ti electrodes with and without overlay of the Ag reflective substrate. (f) A comparison of the LHE of Fe_2O_3:Ti electrodes supported by Ag reflective substrate.

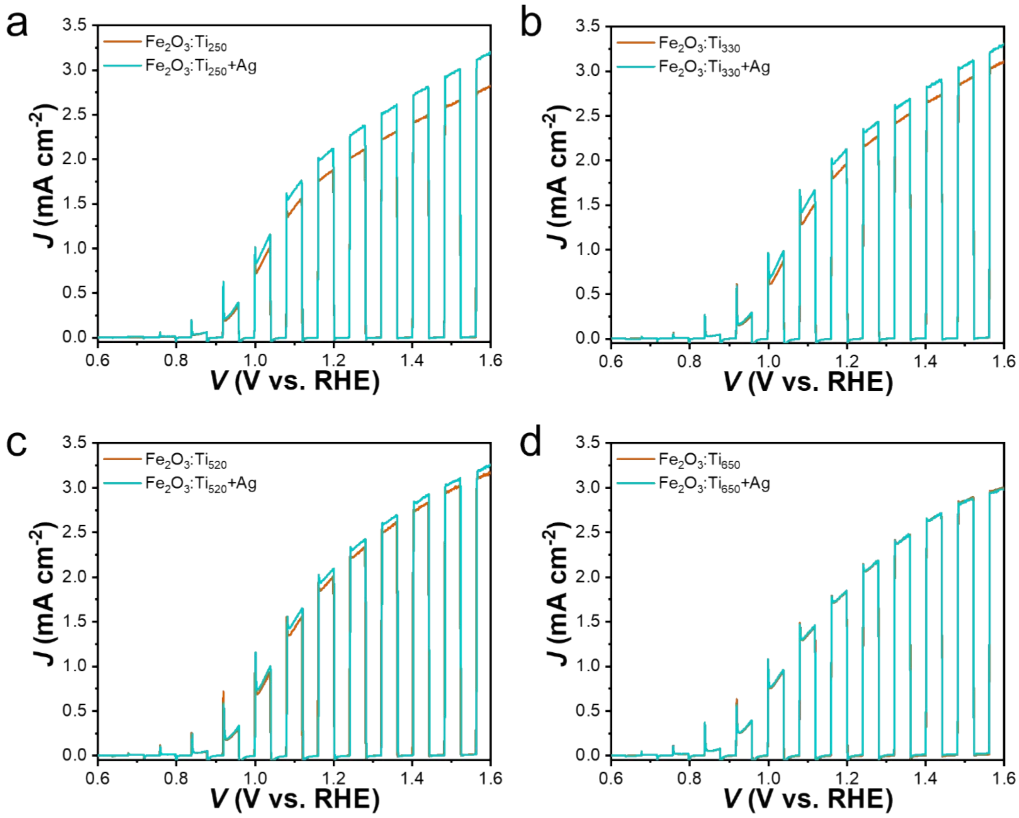

Fig. S5. Comparison of the polarization curves of the Fe_2O_3:Ti electrodes with and without overlay of the Ag reflective substrate.

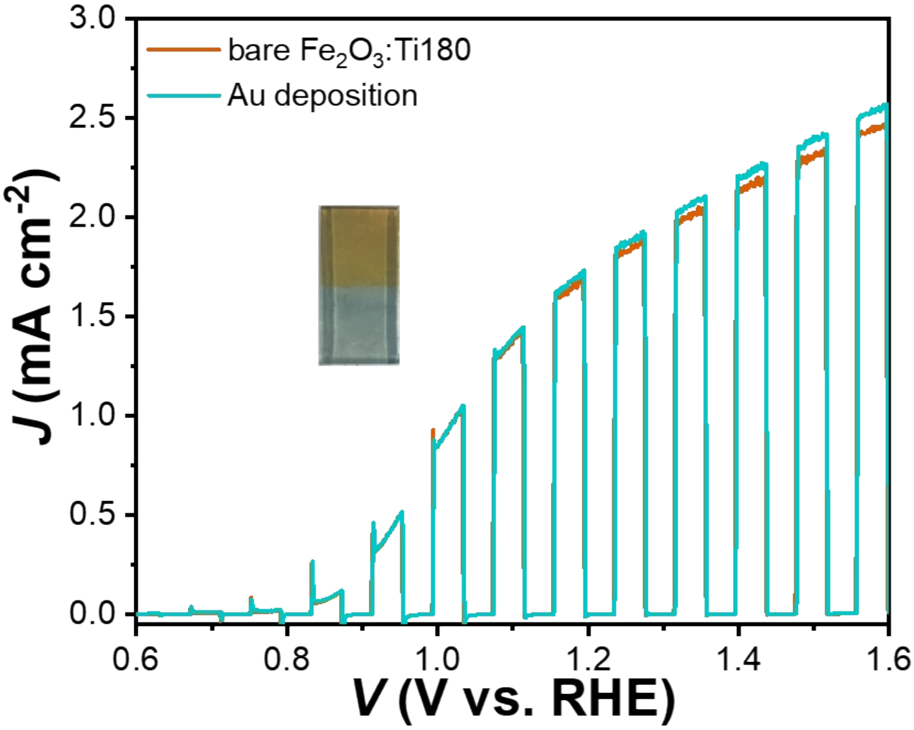

Fig. S6. Comparison of the polarization curves of the Fe_2O_3:Ti180 electrode with and without Au back-layer deposition. Inset is the photograph of Au deposited Fe_2O_3:Ti180.

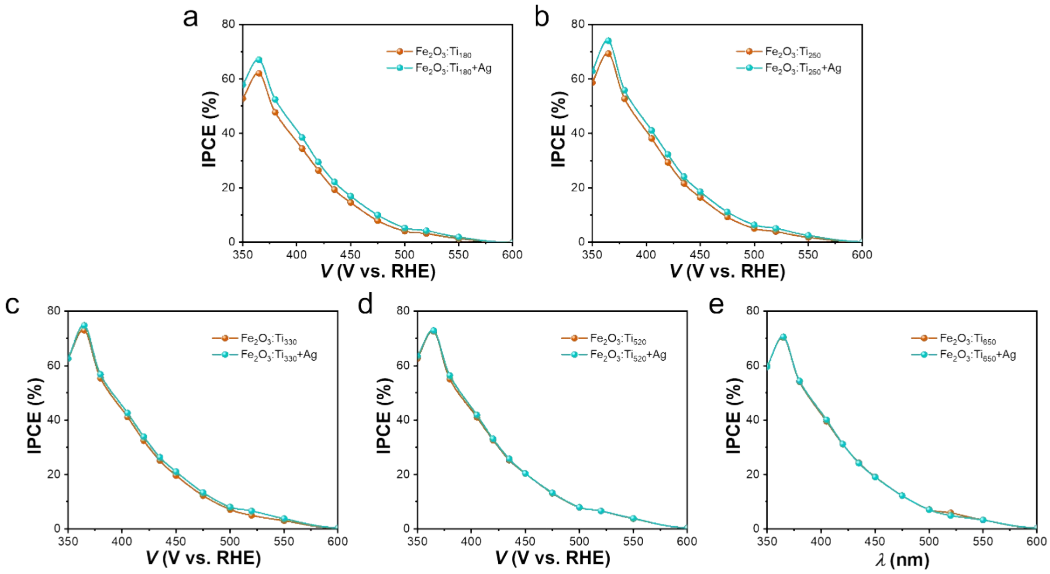

Fig. S7. Comparison of the incident photon-to-electron conversion efficiency (IPCE) of the Fe_2O_3:Ti electrodes with and without overlay of the Ag reflective substrate.

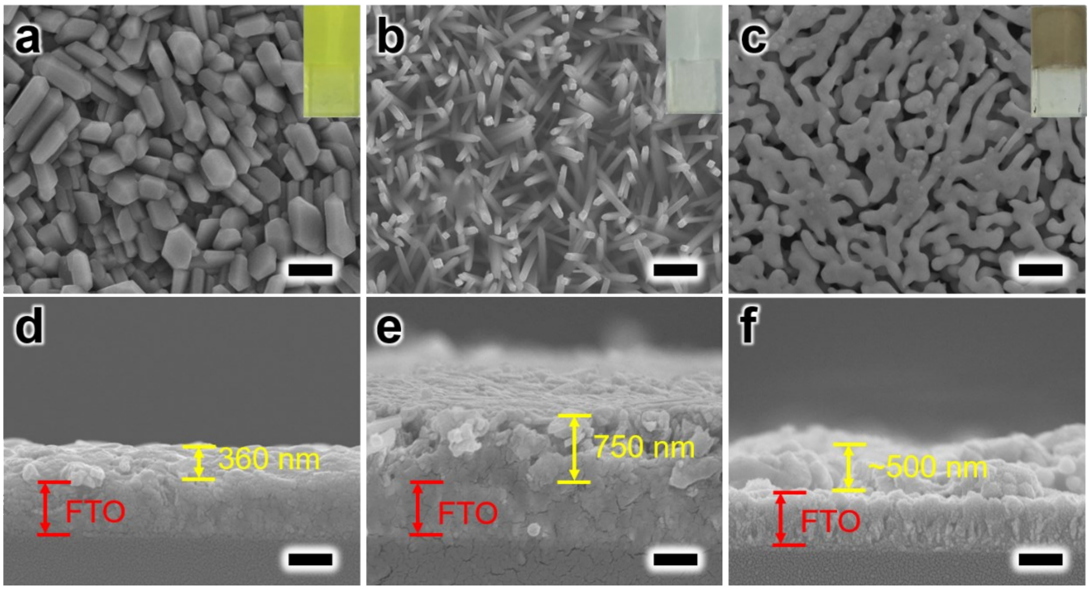

Fig. S8. SEM vertical and cross-section view of the (a,d) $BiVO_4$, (b,e) TiO_2, (c,f) $CuBi_2O_4$ electrodes. Scale bars are 500 nm. Insets in (a-c) are corresponding photographs of the as-prepared electrode.

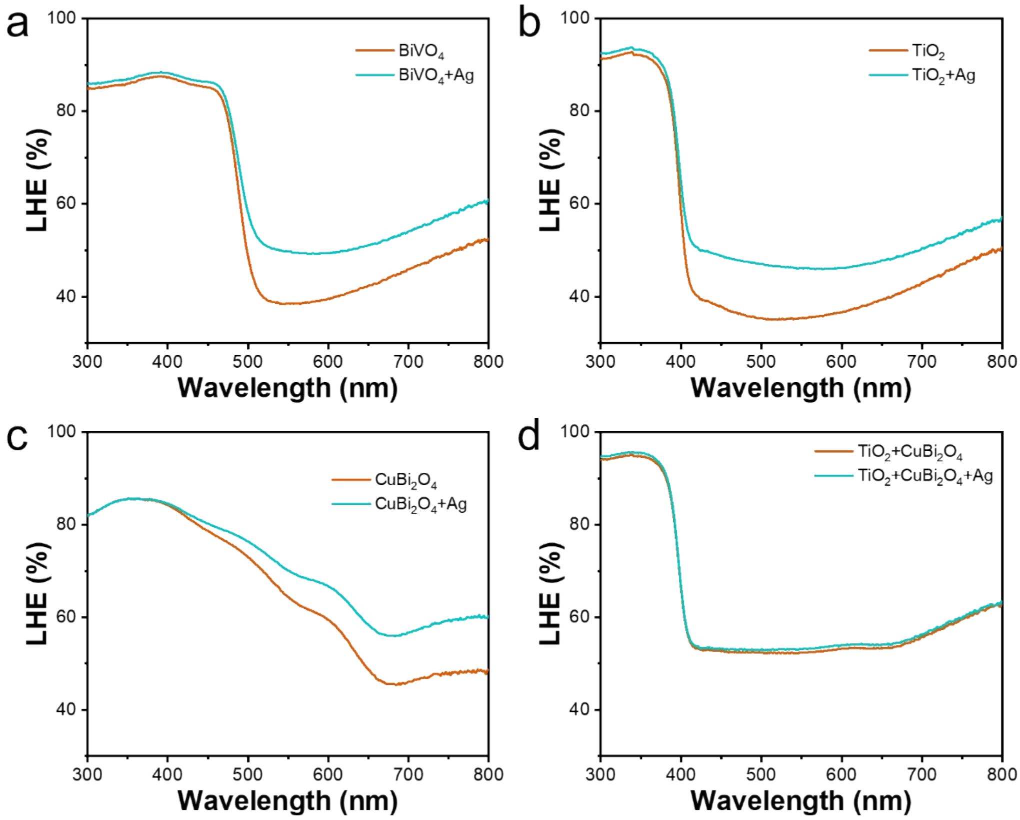

Fig. S9. Comparison of the LHE of (a) $BiVO_4$, (b) TiO_2, (c) $CuBi_2O_4$ and (d) TiO_2+ $CuBi_2O_4$ photoelectrodes with and without overlay of the Ag reflective substrate.

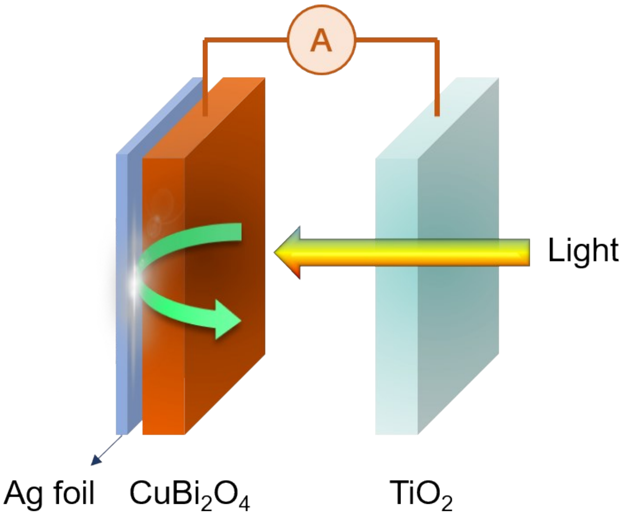

Fig. S10. Schematic of the tandem cell constructed by TiO_2 photoanode and the rear $CuBi_2O_4$ photocathode with the integration of Ag reflective substrate.