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Supporting information

A hybrid photoelectrode with plasmonic Au@TiO_2 nanoparticles for enhanced photoelectrochemical water splitting

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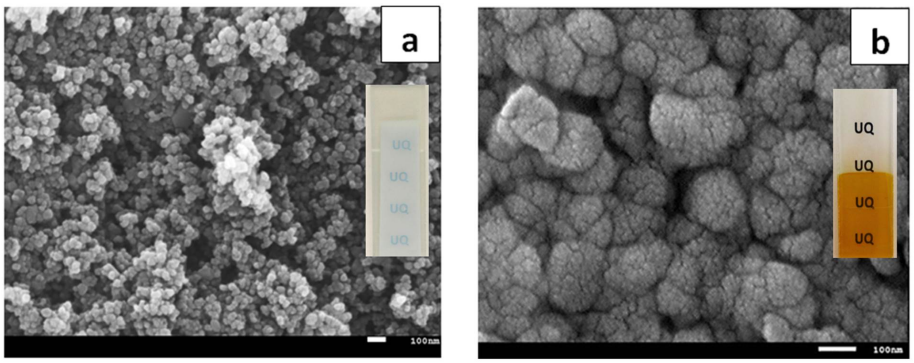

Fig. S1 SEM images and inset digital images of (a) FTO/TiO_2-1 wt% Au@TiO_2 (b) FTO/Cu_2O photoelectrodes. (Scale bars: 100 nm)

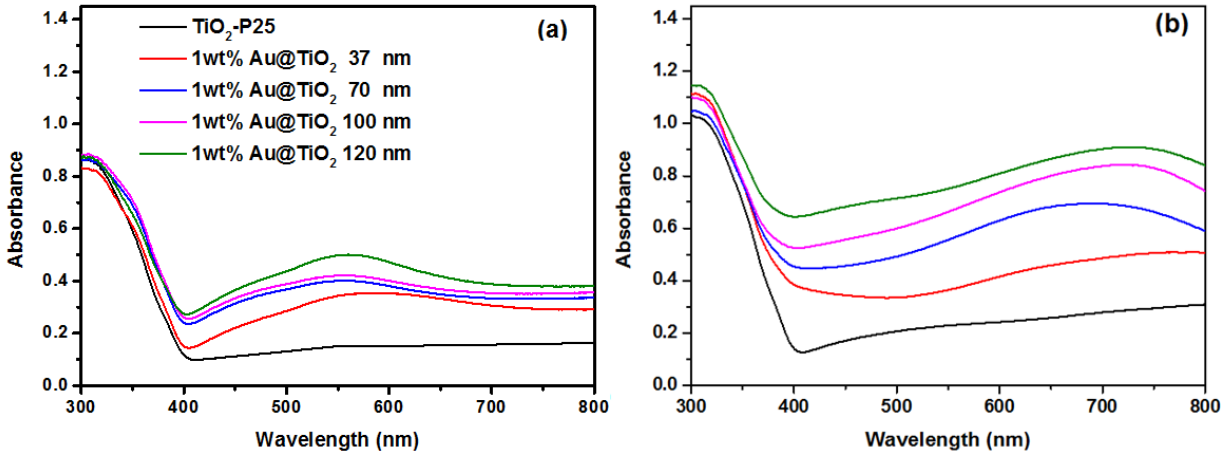

Fig. S2 Light absorption spectra of (a) FTO/TiO_2-1 wt% Au@TiO_2 (b) FTO/ TiO_2-1wt% Au@TiO_2/Al_2O_3/Cu_2O photoelectrodes with different sizes of Au metal cores.

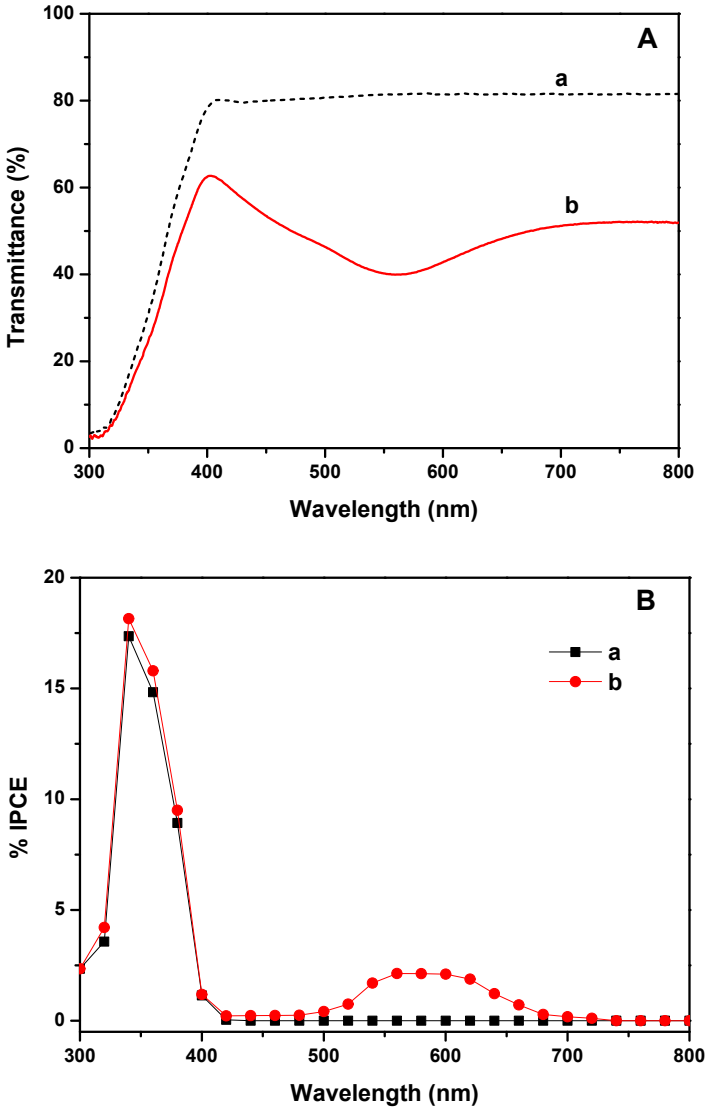

Fig. S3 (A) Optical transmittance spectra and (B) Measured incident-photon-to-current efficiency (IPCE) spectra of (a) FTO/TiO_2-P25 and (b) FTO/TiO_2-1 wt% Au@TiO_2 (120nm) photoelectrodes.

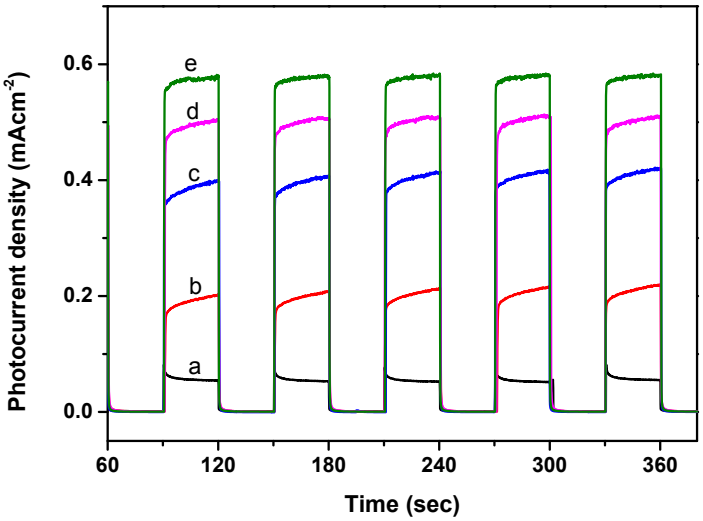

Fig. S4 Amperometic I-t curves collected at -0.2 V vs. Ag/AgCl for (a) FTO/TiO_2-P25 and FTO/TiO_2-1 wt% Au@TiO_2 photoelectrodes with different particle size of Au metal core (b) 37 nm (c) 70 nm (d) 100 nm and (e) 120 nm under AM 1.5G,100 mWcm^{-2}.

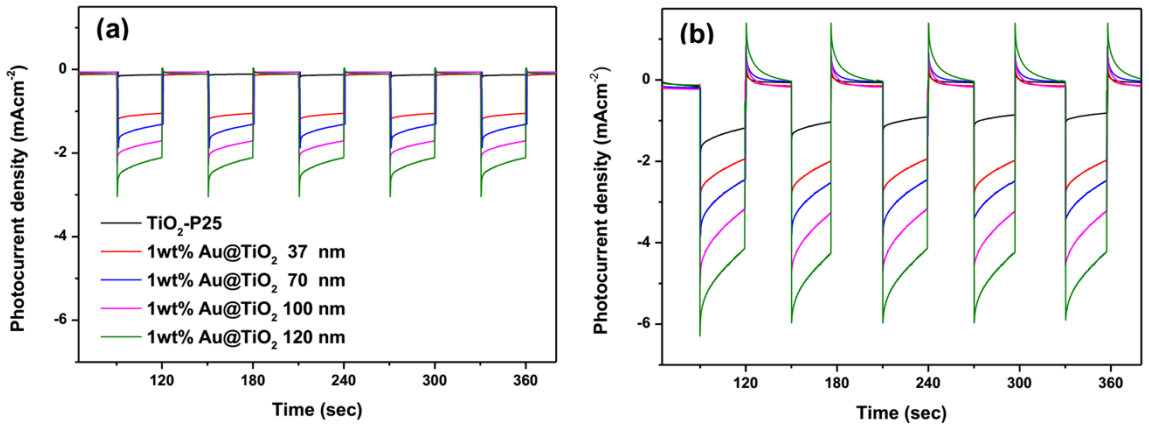

Fig. S5 Amperometic I-t curves collected at -0.2 V vs. Ag/AgCl for electrodes (a) FTO/TiO_2-1 wt% Au@TiO_2/Cu_2O and (b) FTO/ TiO_2-1 wt% Au@TiO_2/Al_2O_3/Cu_2O with different particle sizes of 1 wt% Au@TiO_2 metal core under AM 1.5G,100 mWcm^{-2}.

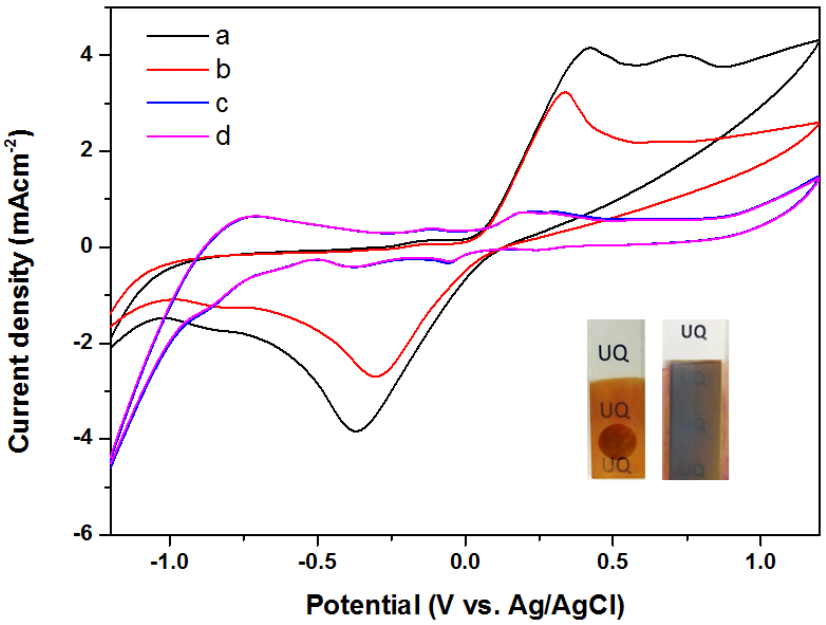

Fig. S6 Dark cyclic voltammograms of the FTO/Cu_2O and FTO/TiO_2-1 wt % Au@TiO_2 (120 nm)/Al_2O_3/Cu_2O photoelectrodes before (a), (c) and after 1 h PEC stability measurement (b), (d) under AM 1.5 light irradiation in presence of 0.1 M Na_2SO_4 (Inset photos indicate FTO/Cu_2O (left) and FTO/TiO_2-1 wt% Au@TiO_2 (120 nm)/Al_2O_3/Cu_2O (right)).