Supporting Information

Plasmonic Nanoparticle-Film-assisted Photoelectrochemical Catalysis across Entire Visible-NIR Region

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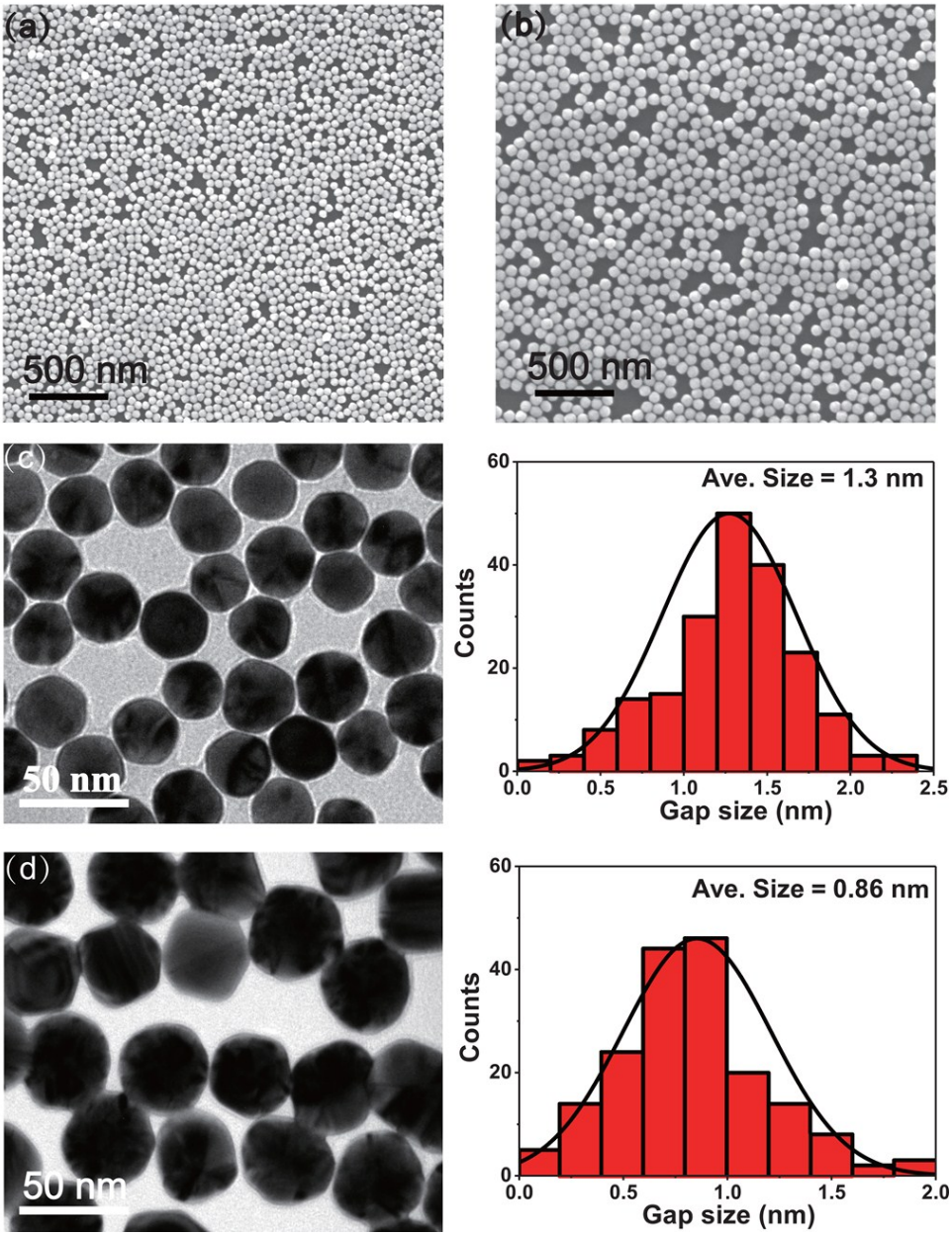

Figure S1. Top-view SEM image of (a) 30 nm and (b) 60 nm Au NP-film on TiO_2 film; TEM images of Au NP-film transferred from the water/heptance interface and a statistical graph of the distribution of the interparticle distance for Au NPs with diameters of (c) 30 nm, (d) 60 nm.

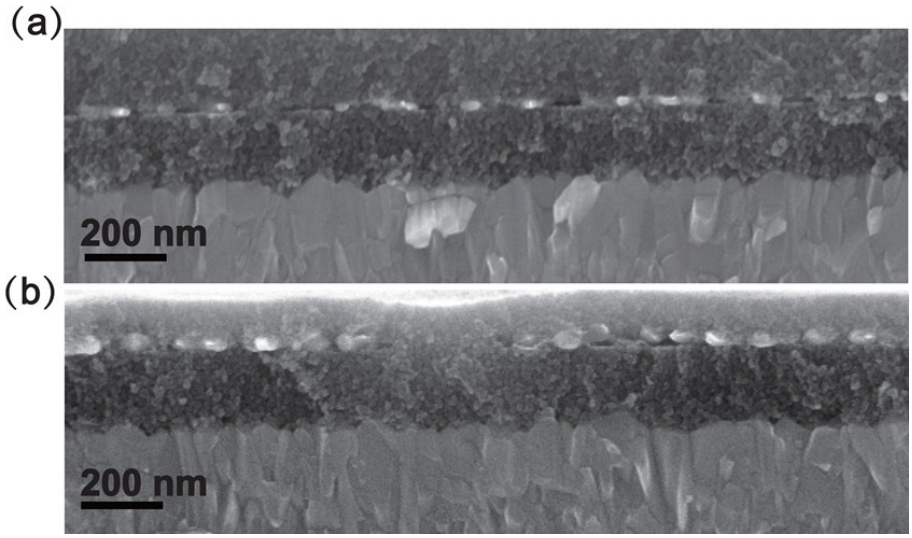

Figure S2. Cross-section SEM image of (a) TiO_2/30Au/TiO_2 and (b) TiO_2/60Au/TiO_2 sandwiched structure on FTO glass.

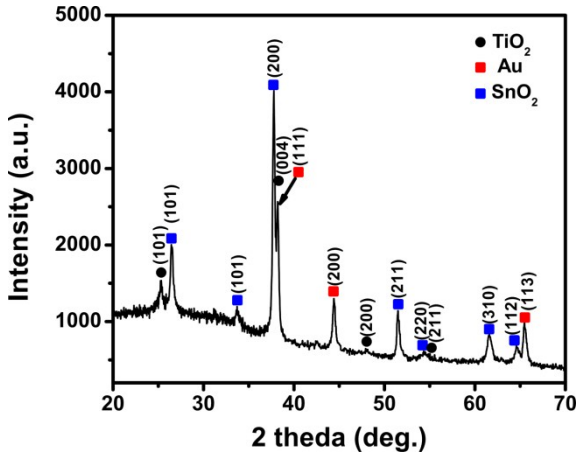

Figure S3. XRD patterns of TiO_2/xAu/TiO_2 (x=30 nm, 60 nm and 90 nm) photoanodes.

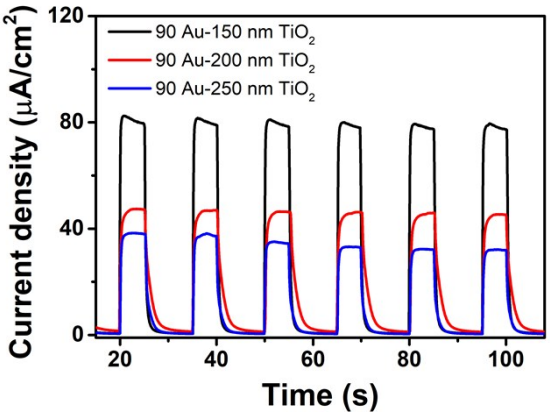

Figure S4. Amperometric *I*−*t* curves at 0.75 V vs RHE under illumination of visible-NIR light for TiO_2/90Au/TiO_2 photoanodes with different top thickness of TiO_2.

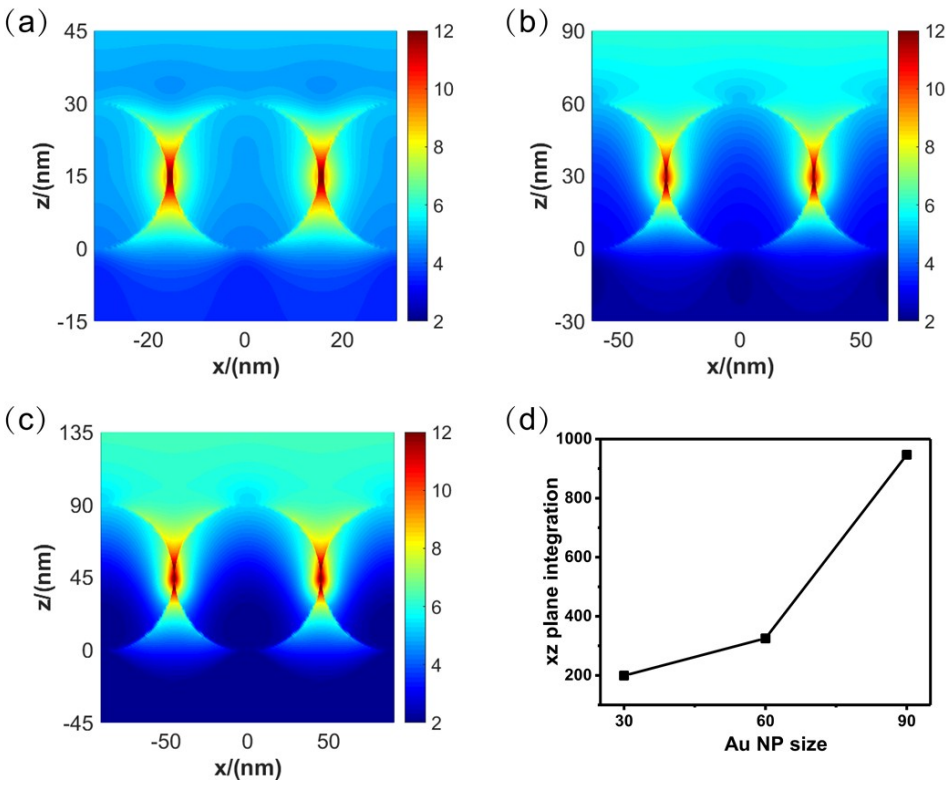

Figure S5. The weighted superposition of the normalized electric field intensities of (a) 30 nm, (b) 60 nm, (c) 90 nm Au NP-film in logarithmic scale. The weighted superpositions were calculated by weighting the normalized electric field intensity according to their relative intensities of solar irradiance. ($\log_{10}(E^2/E_0^2)$). (d) The

integration of the weighted superpositions of the normalized electric field intensity in the middle section.

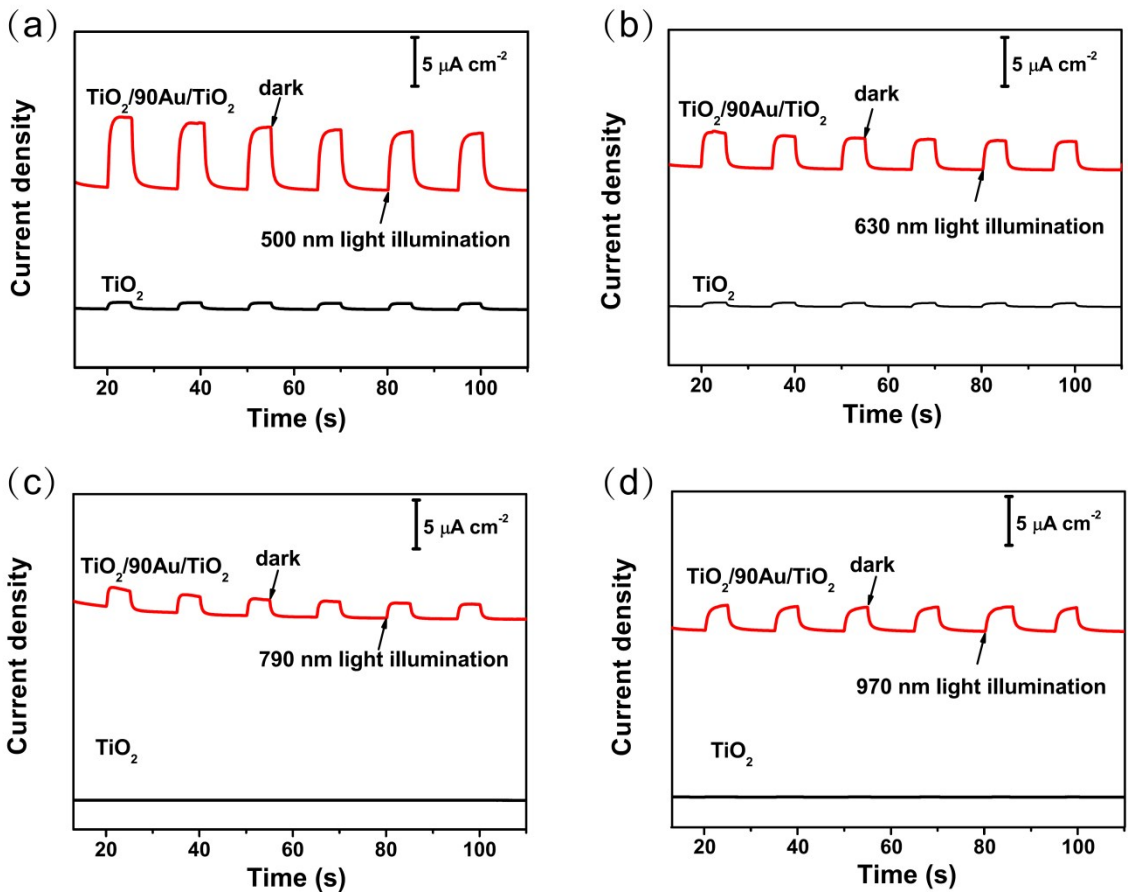

Figure S6. Photocurrents vs time (I-t) curves of TiO_2 (black line) and TiO_2/90Au/TiO_2 (red line) photoanodes under (a) 500 nm, (b) 630 nm, (c) 790 nm and (d) 970 nm light illumination.

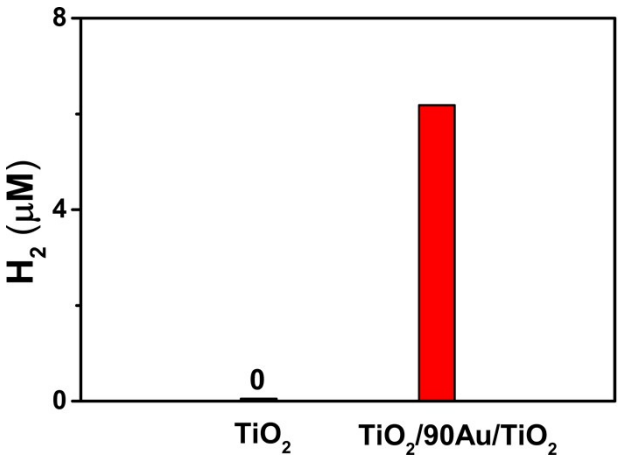

Figure S7. H_2 generation by TiO_2 and TiO_2/90Au/TiO_2 under illumination of visible-NIR light for 24 h (AM 1.5G, 500 mW/cm^2).