

Supporting Information

Probing Dynamics of Photogenerated Holes in Doped Hematite Photoanodes for Solar Water Splitting with Transient Absorption Spectroscopy

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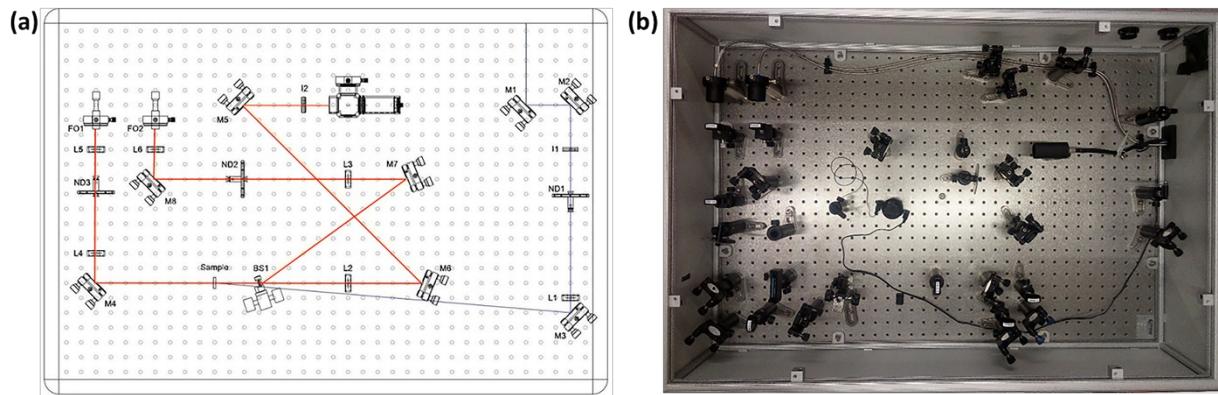


Fig. S1. (a) Schematic layout and (b) photograph of the EOS spectrometer.

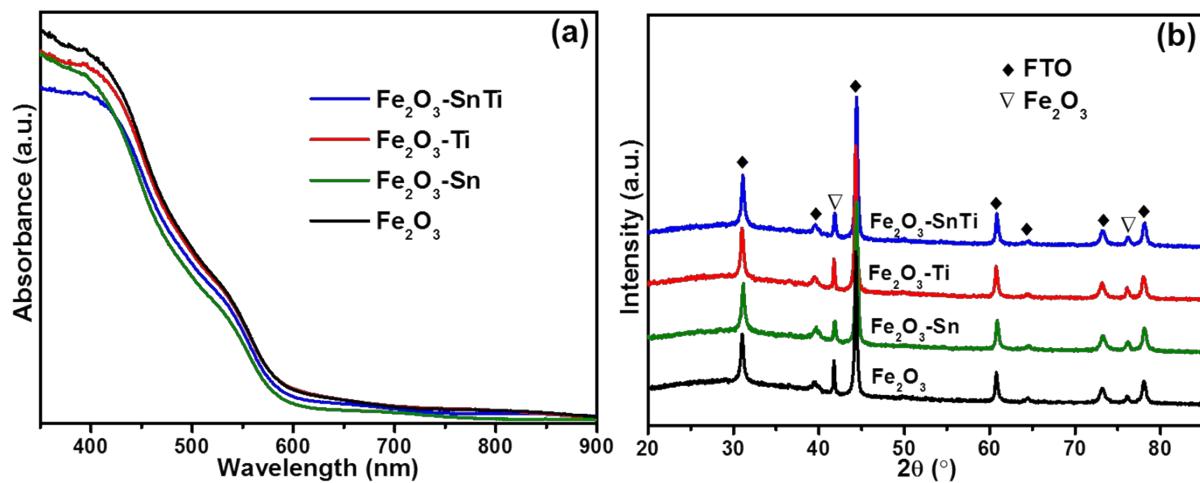


Fig. S2. (a) UV-vis spectra and (b) XRD patterns of pristine Fe_2O_3 , Fe_2O_3 -Sn, Fe_2O_3 -Ti and Fe_2O_3 -SnTi.

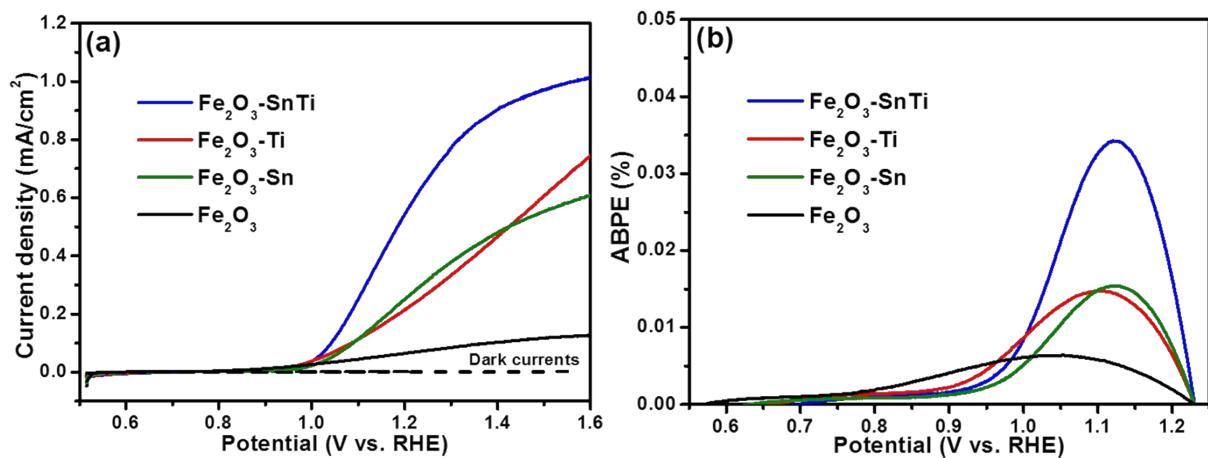


Fig. S3. (a) Photocurrent voltage curves of pristine Fe_2O_3 , Fe_2O_3 -Sn, Fe_2O_3 -Ti and Fe_2O_3 -SnTi measured in 1 M NaOH under AM 1.5 G, (b) the corresponding ABPE results.

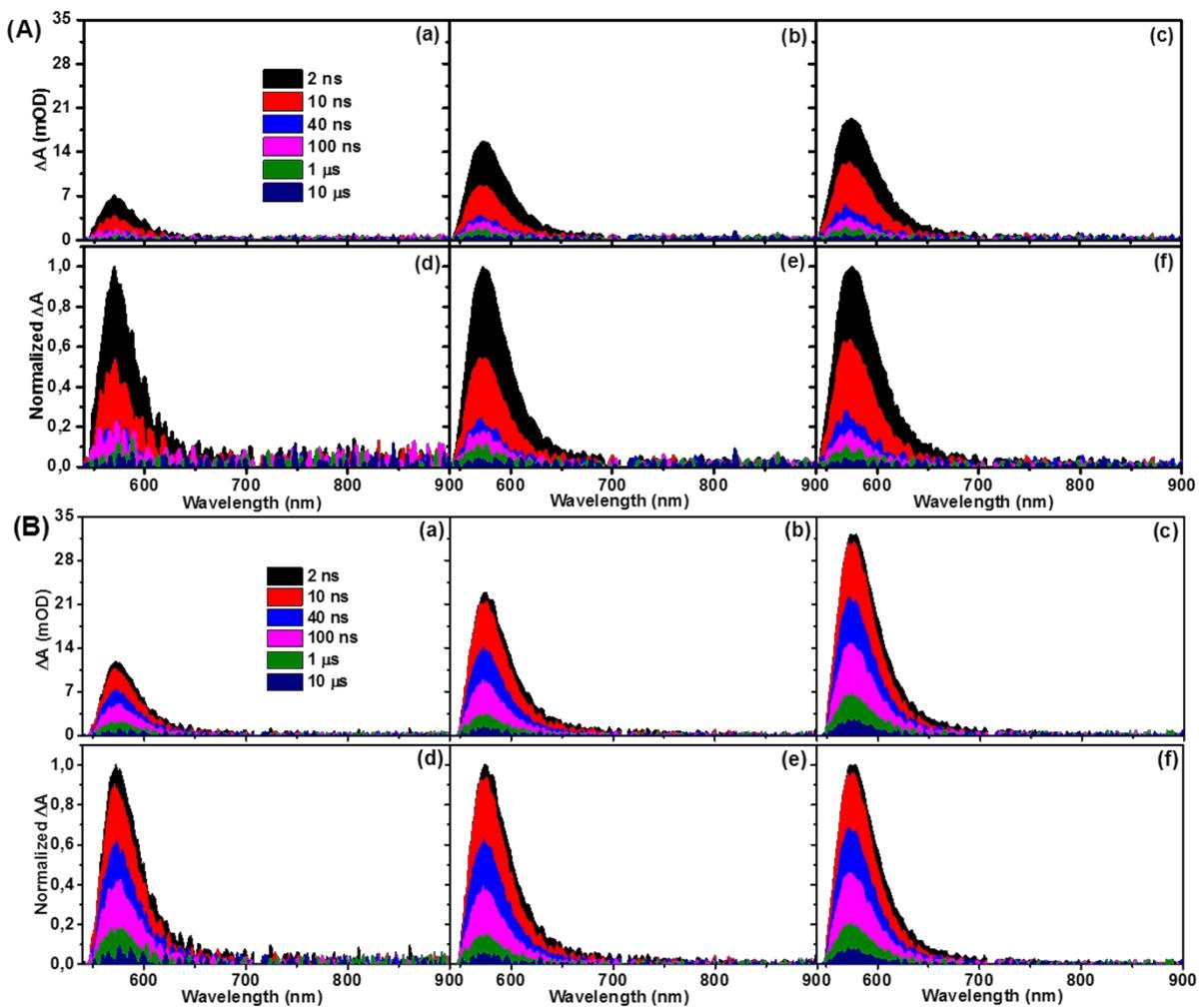


Fig. S4. Time evolution of the transient absorption spectra of (A) pristine Fe_2O_3 and (B) Fe_2O_3 -SnTi following excitation at 355 nm with different excitation intensities: (a) 0.5 $\mu\text{J}/\text{pulse}$, (b) 1.0 $\mu\text{J}/\text{pulse}$ and (c) 1.5 $\mu\text{J}/\text{pulse}$. (d), (e) and (f) are the corresponding spectra normalized at 2 ns.

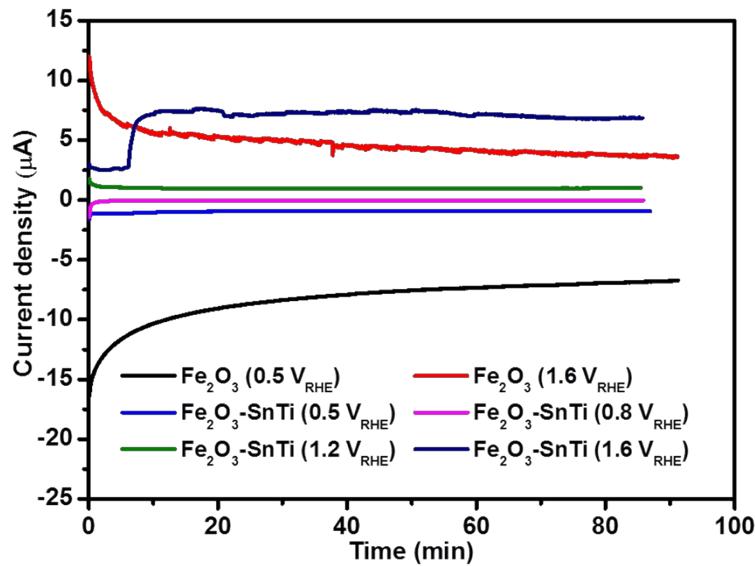


Fig. S5. Current-time profiles of pristine Fe_2O_3 and Fe_2O_3 -SnTi under the illumination of both the 355 nm laser and the white-light-continuum probe beams at different biases.

Table S1. The decayed percent of holes at 10 μs of pristine Fe_2O_3 and Fe_2O_3 -SnTi monitored at 575 nm, following different excitation intensities.

Excitation intensity ($\mu\text{J}/\text{pulse}$)	0.5	1.0	1.5
$\Delta k (\text{Fe}_2\text{O}_3, \%)$	92.8	97.1	97.9
$\Delta k (\text{Fe}_2\text{O}_3\text{-SnTi}, \%)$	92.6	94.9	93.1