Supporting information

Hydrogen-Treated Hematite Nanostructures with Low Onset Potential for Highly Efficient Solar Water Oxidation

Ming Li, Jiujun Deng, Aiwu Pu, Pingping Zhang, Hui Zhang, Jing Gao, Yuanyuan Hao, Jun Zhong and Xuhui Sun **

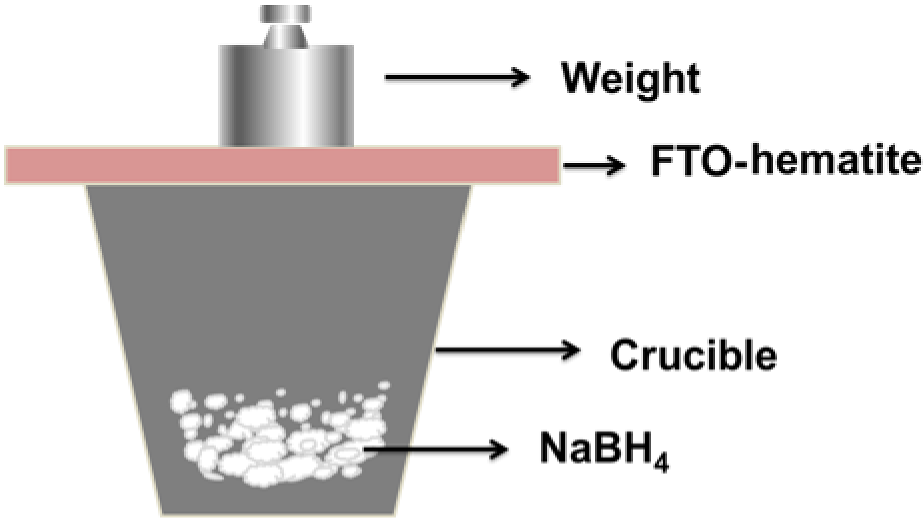

Figure S1: Illustration of the experimental setup for H_2 treatment.

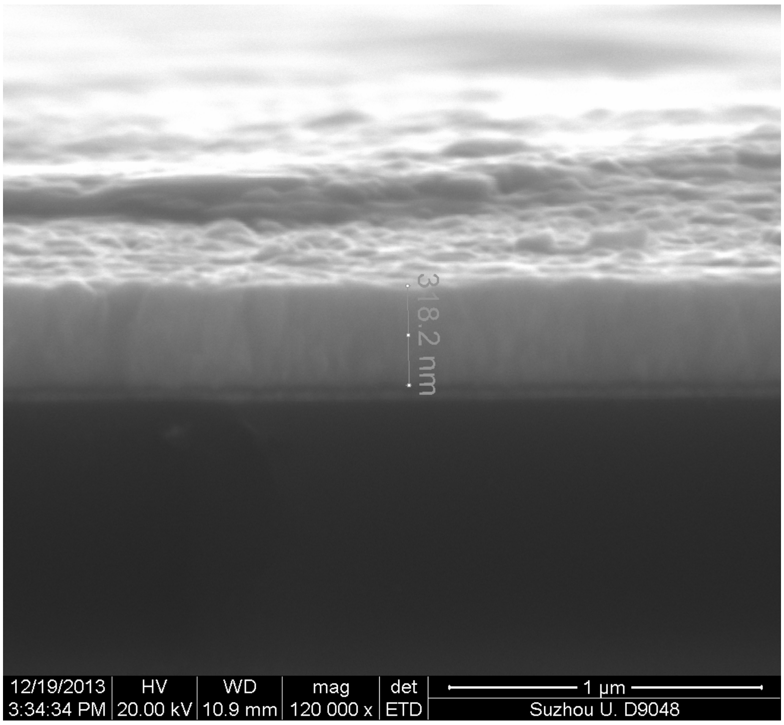

Figure S2: SEM image of the cross section of H_2-treated (8 mmol $NaBH_4$) hematite nanostructures.

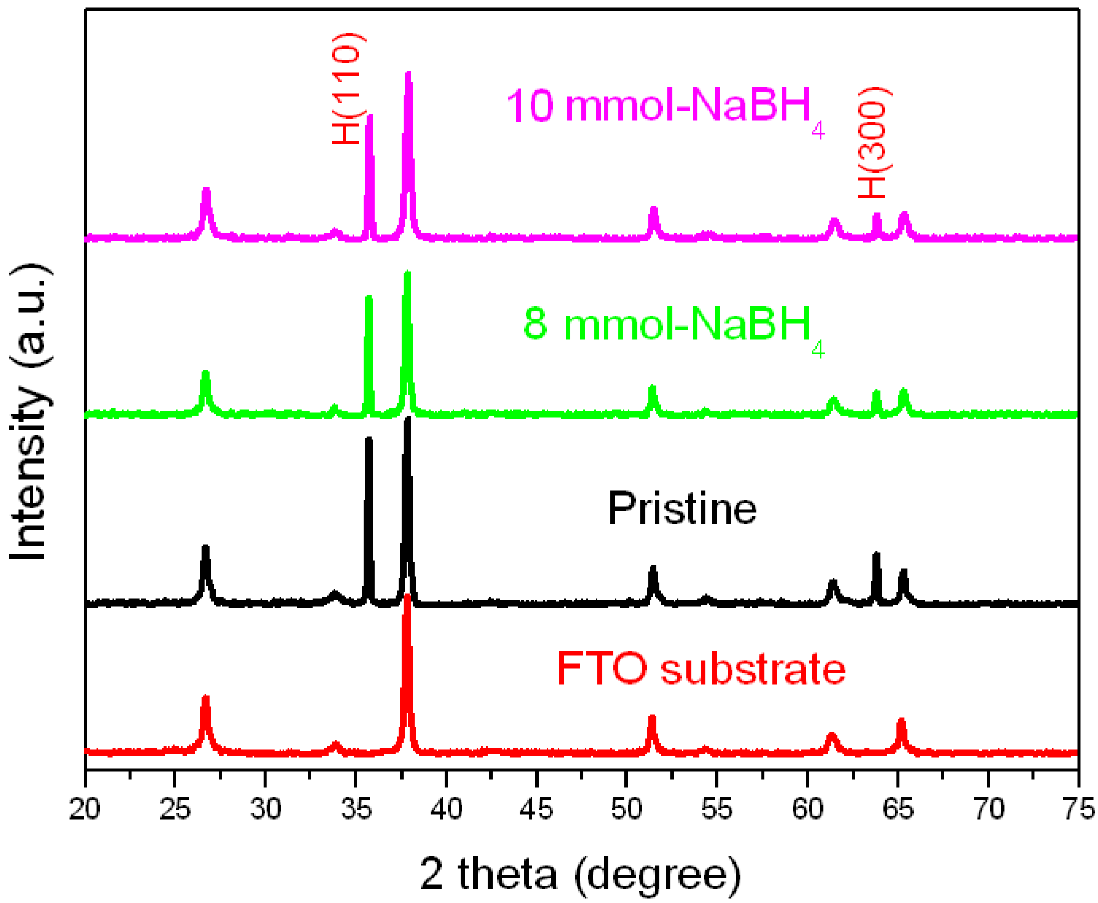

Figure S3: XRD spectra of hematite nanostructures before and after H_2 treatment.

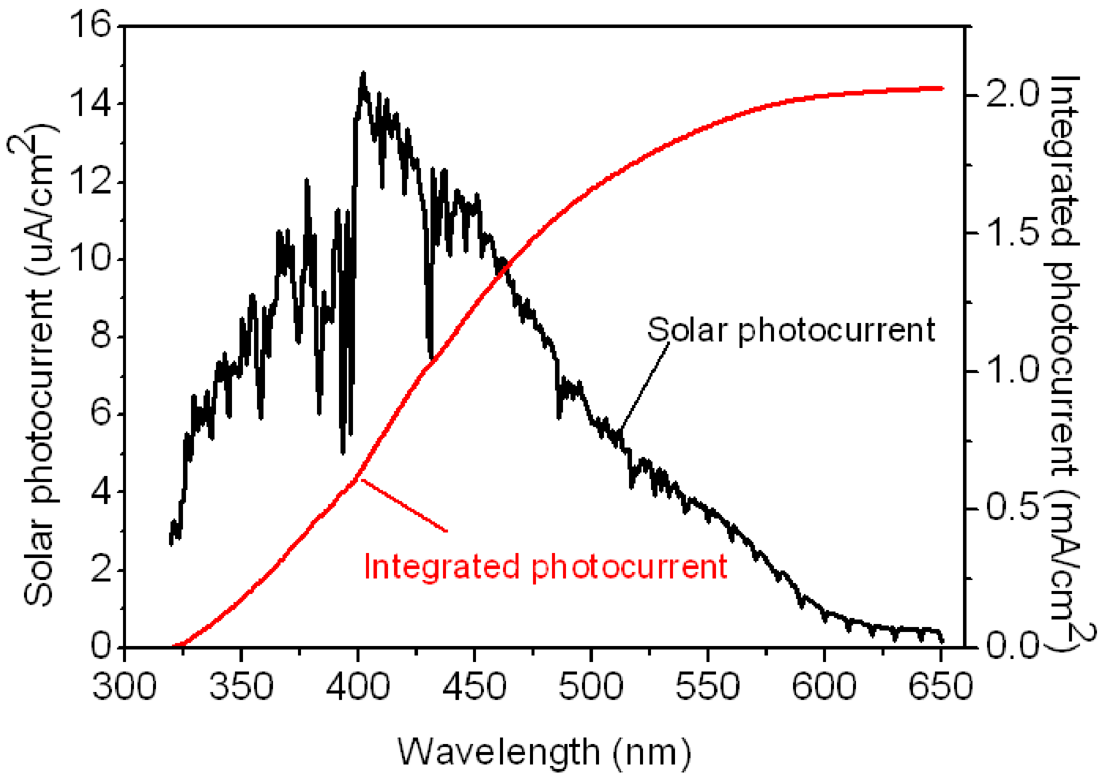

Figure S4: The integrated photocurrent of H_2-treated (8 mmol $NaBH_4$) hematite based on the IPCE data (320 nm to 650nm) at 1.23 V vs. RHE. The photocurrent density was calculated by integrating the IPCE spectra with a standard AM 1.5G solar spectrum (ASTMG-173-03), using the following equation (Ref: Nano Lett., 2011, 11, 3503):

$$I = \int_{320}^{650} \frac{1}{1240} \lambda \mathrm{IPCE}(\lambda) E(\lambda)\, \mathrm{d}(\lambda)$$

where E(λ) is the solar spectral irradiance at a specific wavelength (λ) and IPCE(λ) is the obtained IPCE profile as a function of wavelengths (λ) at 1.23 V vs. RHE. The calculated photocurrents are 2.03 mA cm^{-2} at 1.23 V vs. RHE.

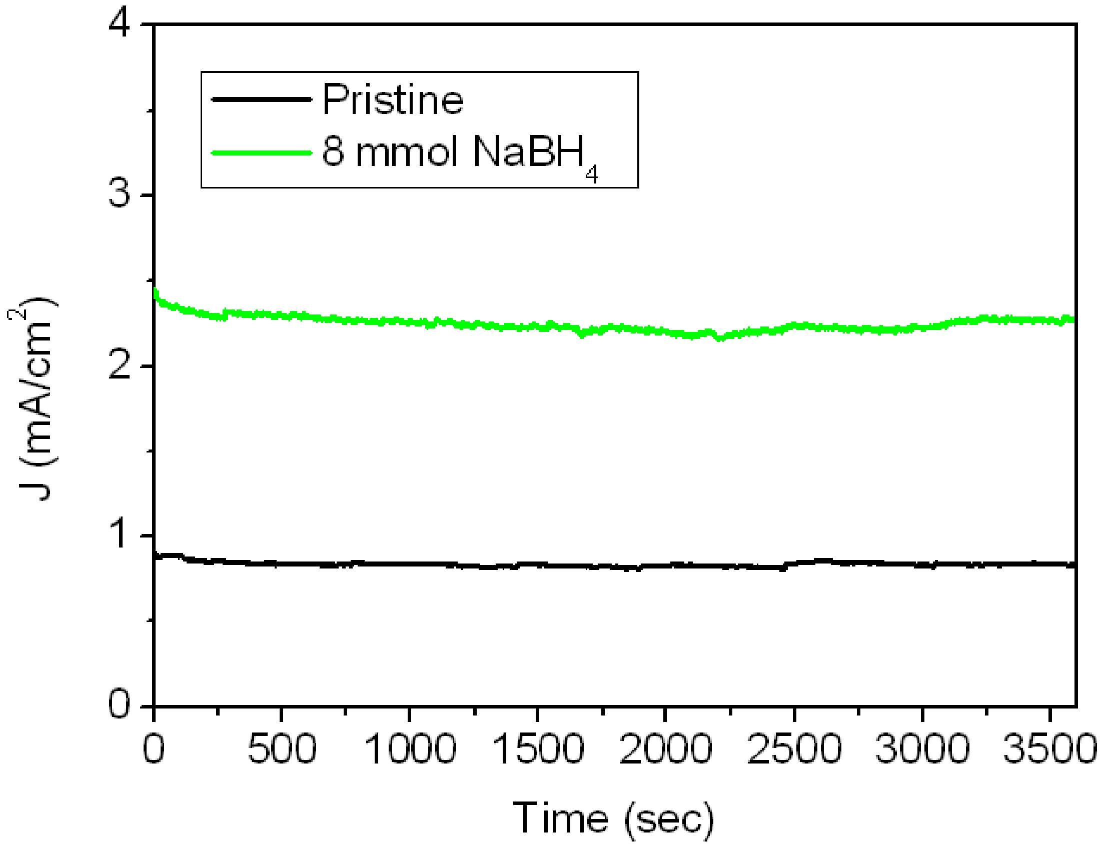

Figure S5: Photochemical stability curves for pristine and H_2-treated (8 mmol $NaBH_4$) hematite electrodes collected at 1.23 V vs. RHE.

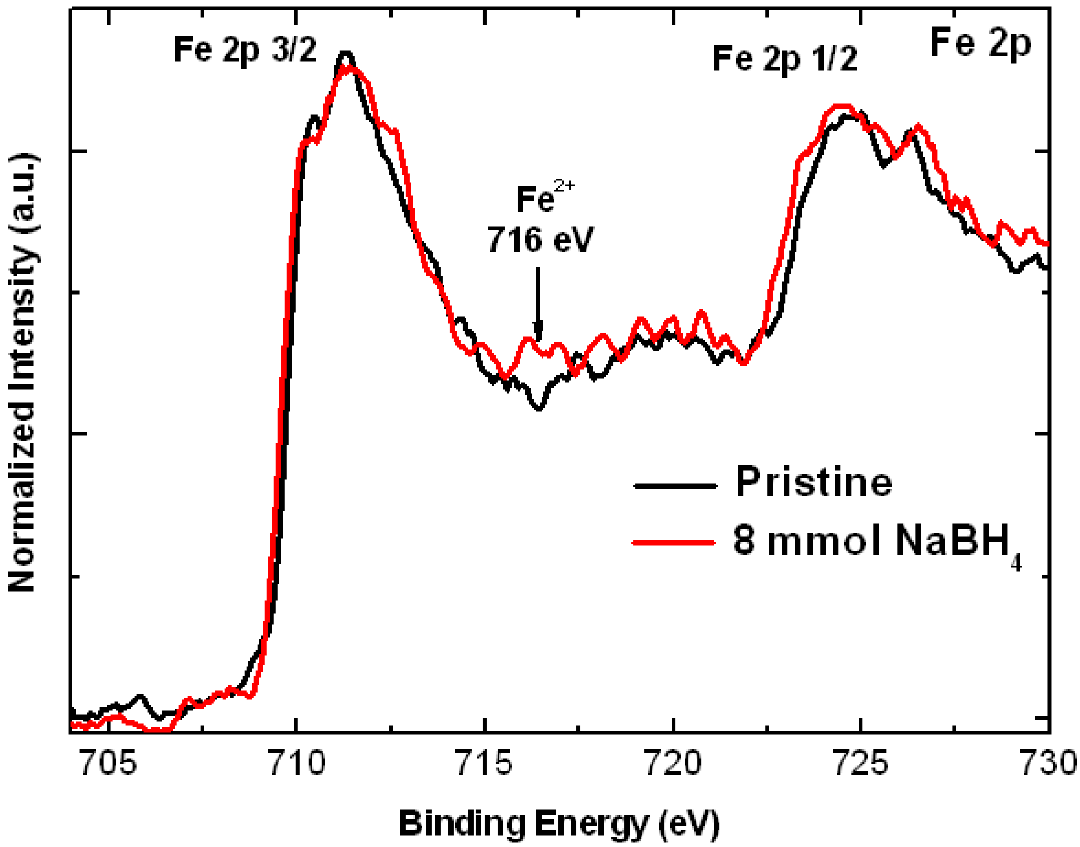

Figure S6: Fe 2p XPS spectra of pristine and H_2-treated (8 mmol $NaBH_4$) hematite nanostructures.