Supporting information

A scalable colloidal approach to prepare hematite films for efficient solar water splitting

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Table S1. The synthesis conditions of the hematite nanoparticles

Morphology	Iron Chloride (g)	Water (mL)	Ethanol (mL)	Sodium acetate (g)
Spherical	0.55	5	20	0.8
Small plate	0.55	2	20	2
Big plate	0.55	2	20	4

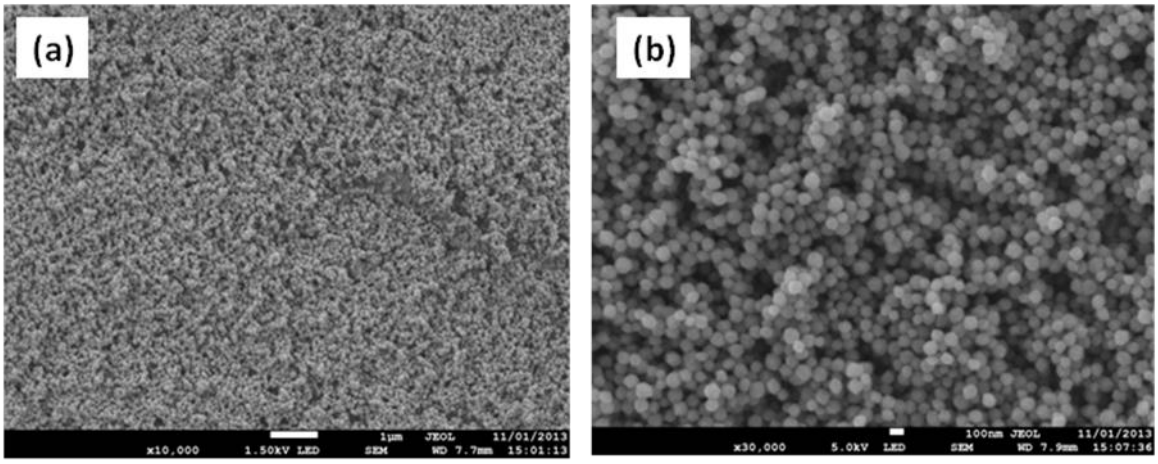

Figure S1. Top view SEM images of the as-deposited hematite films prepared at 10 V for 1 minute. (a) is low magnification image and the scale bar is 1μm. (b) is high magnification image and the scale bar is 100 nm.

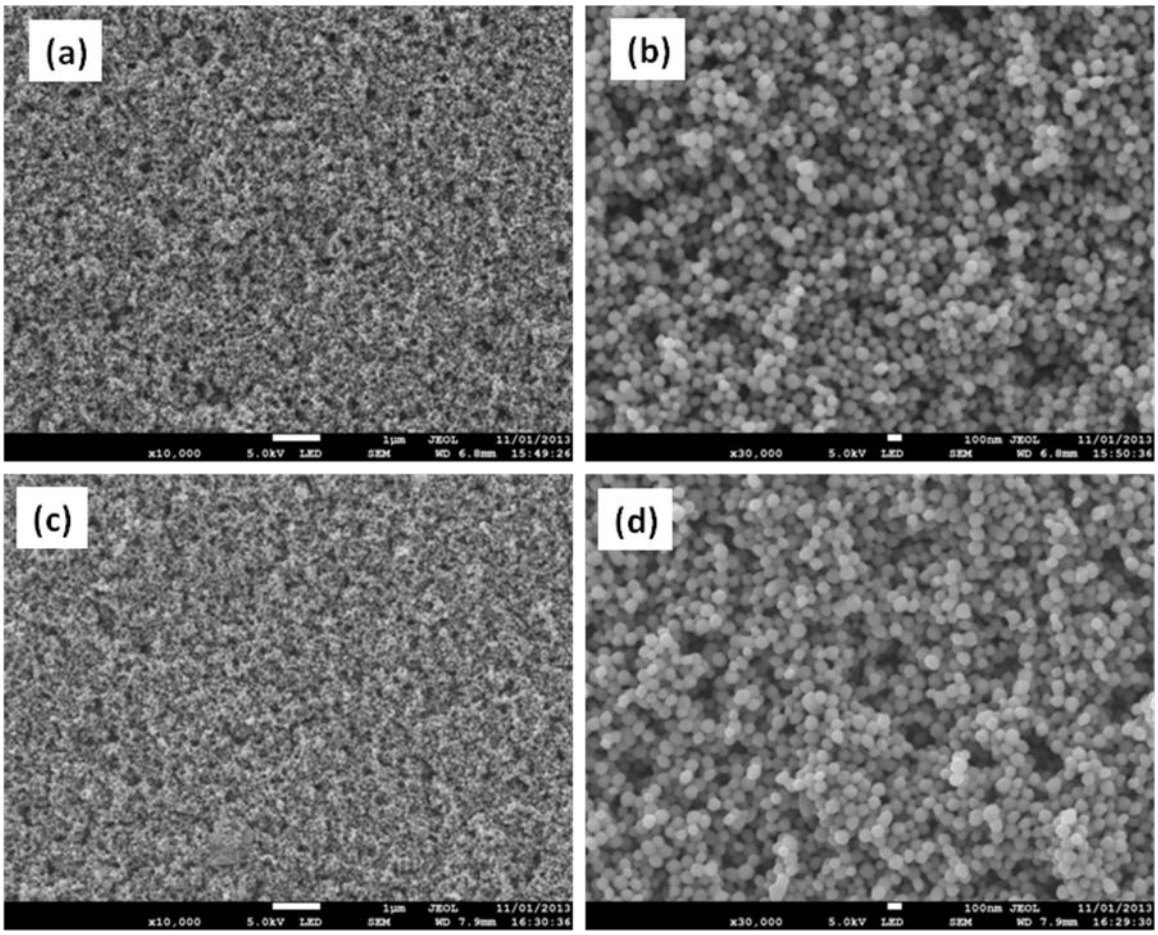

Figure S2. Top view SEM images of the hematite films prepared by annealing the as-deposited film at (a, b) 973K for 30 minutes, (c, d) 1023 K for 20 minutes. (a) and (c) are low magnification images and the scale bar is 1μm. (b) and (d) are high magnification images and the scale bar is 100 nm.

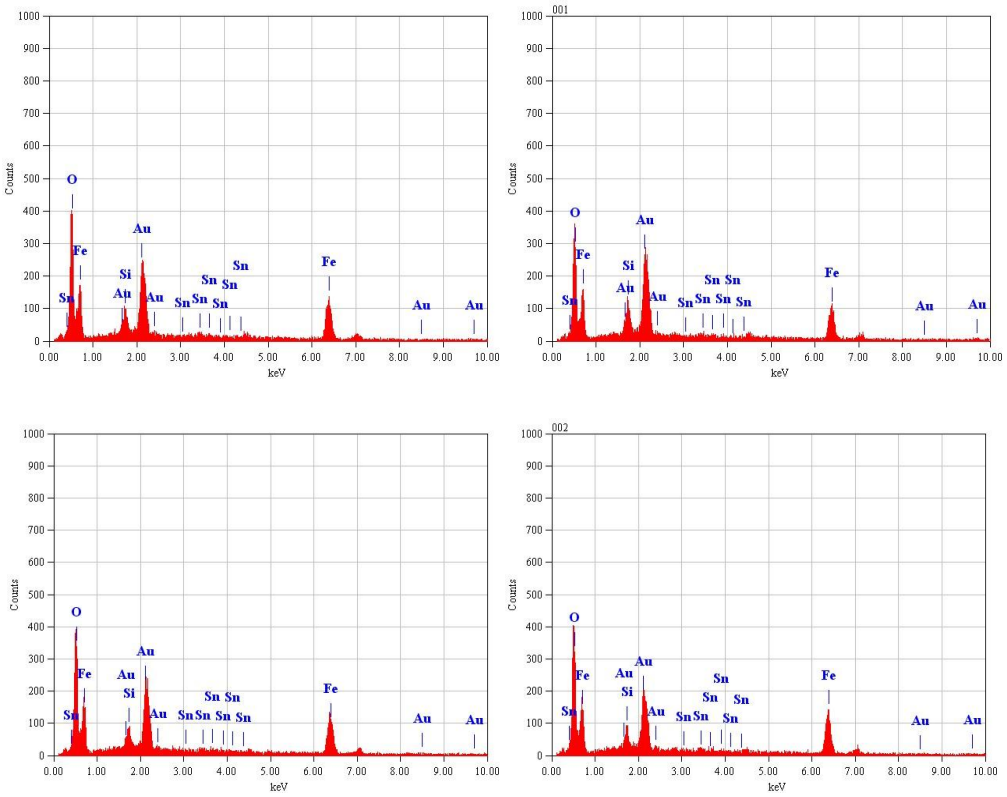

Figure S3. EDX analysis of different areas of the hematite film.

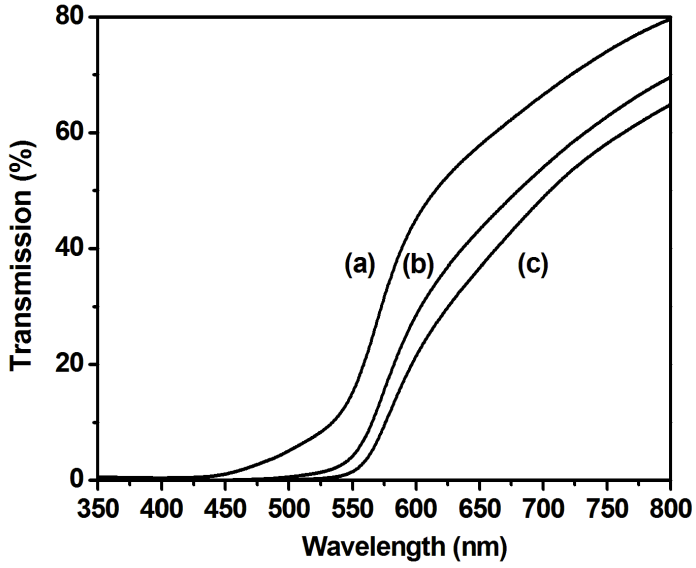

Figure S4. UV-Vis transmission spectrum of the hematite films prepared at an applied voltage of 10 V for deposition time of (a) 1, (b) 2, and (c) 4 minutes.

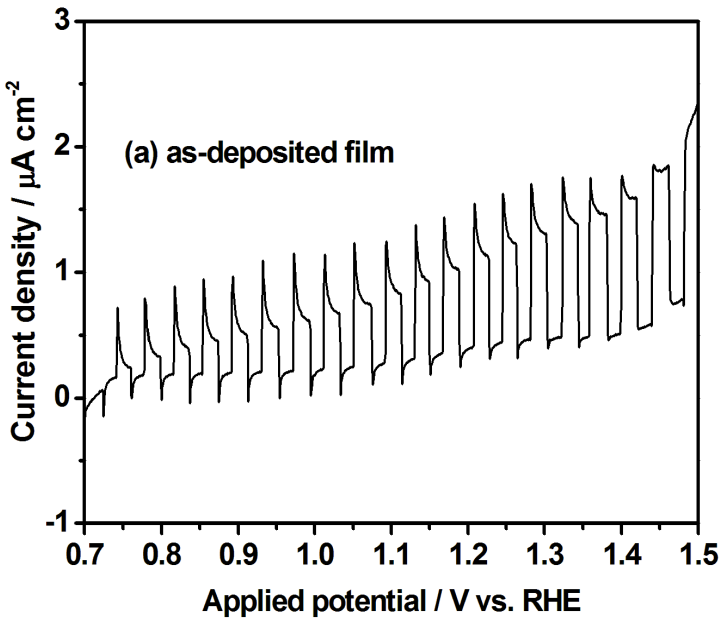

Figure S5. Current-potential curves of the as-deposited film. . Electrolyte, 1 M NaOH (pH 13.6). Light source, 300 W Xe lamp with a cut-off filter ($\lambda > 420$ nm).

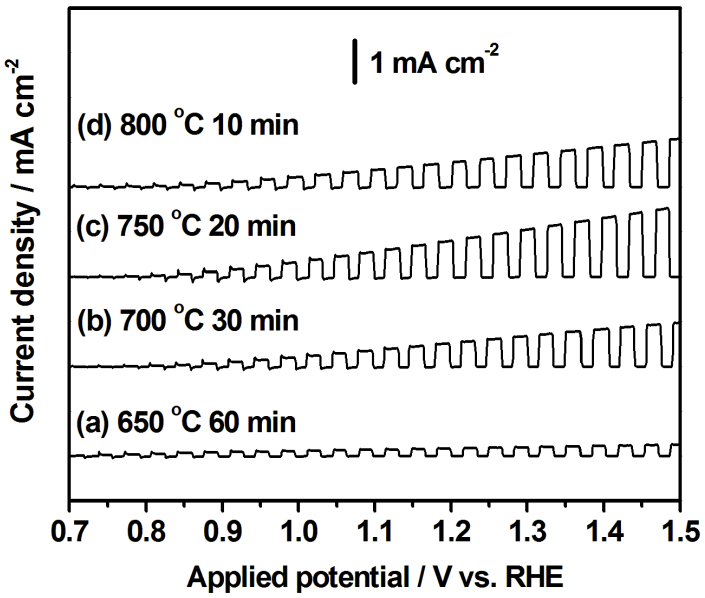

Figure S6. Current-potential curves of the Sn-doped hematite films prepared at different conditions under front-side illumination. Electrolyte, 1 M NaOH (pH 13.6). Light source, 300 W Xe lamp with a cut-off filter ($\lambda > 420$ nm).

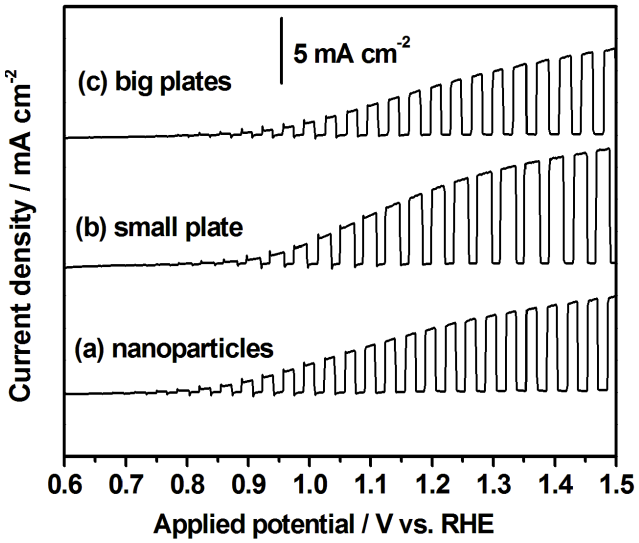

Figure S7. Current-potential curves of the hematite films prepared from different hematite colloidal precursors. Electrolyte, 1 M NaOH (pH 13.6). Light source, 300 W Xe lamp with a cut-off filter ($\lambda > 420$ nm).