# Supporting Information

## Constructing inverse opal structured hematite photoanodes via electrochemical process and their application to photoelectrochemical water splitting

*Xinjian Shi*[†], *Kan Zhang*[†], *Kahee Shin*[†], *Jun Hyuk Moon*[‡], *Tae-Woo Lee*[§], *Jong Hyeok Park*[†]

[†]School of Chemical Engineering, Sungkyunkwan University, Suwon 440-746, Republic of Korea
lutts@skku.edu

[‡]Department of Chemical and Biomolecular Engineering, Sogang University, 1 Shinsu-dong, Mapo-gu, Seoul 121-742, Korea

[§]Department of Materials Science and Engineering, Pohang University of Science and Technology, San 31, Hyoja-dong, Nam-gu, Pohang, Gyeongbuk 790-784, Korea

Email Address: lutts@skku.edu

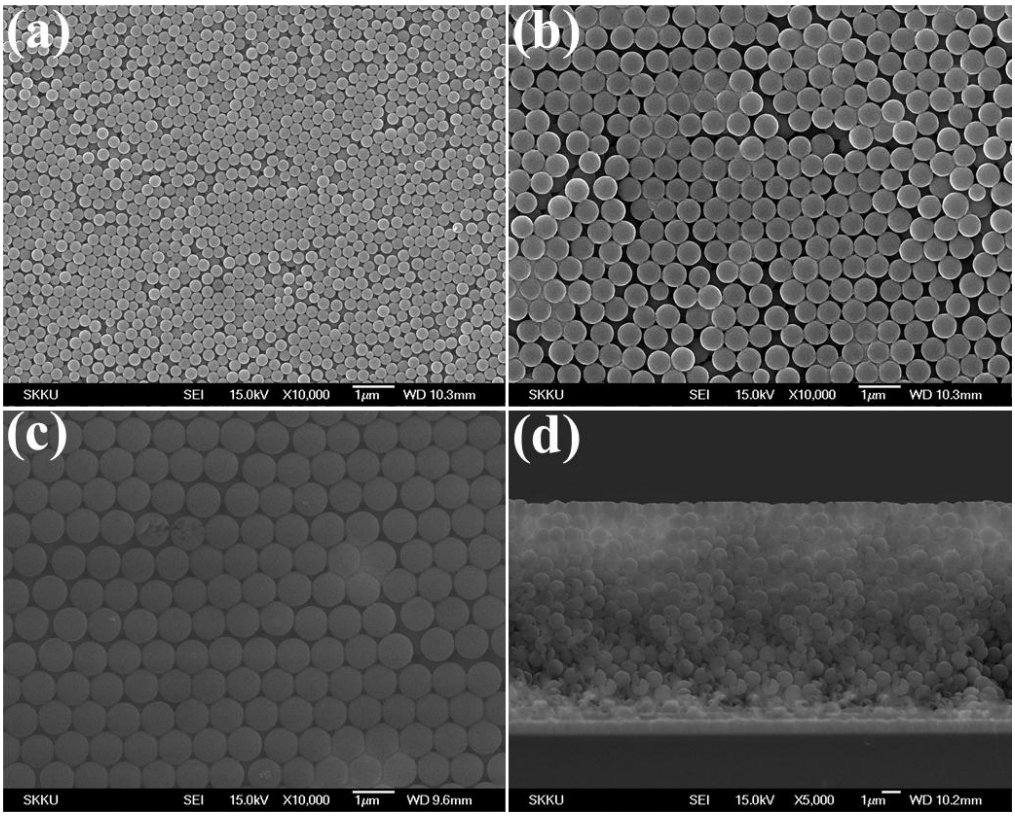


**Figure S1.** FE-SEM image of different sized PS colloid templates: (a) 250 nm, (b) 500 nm and (c) 900 nm; (d) the section image for a general PS template.

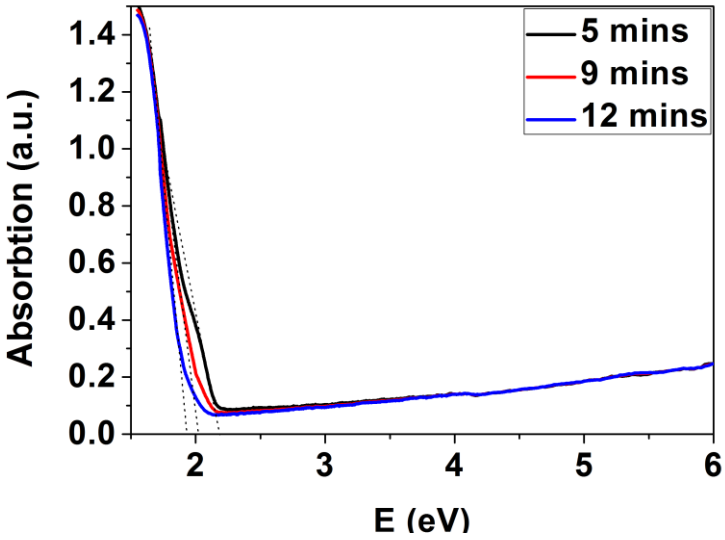


**Figure S2.** The optical band gap (Eg) of the IOS α-$Fe_2O_3$ electrodes made by 250nm beads under 400 ℃ annealing with different electrodeposition time.

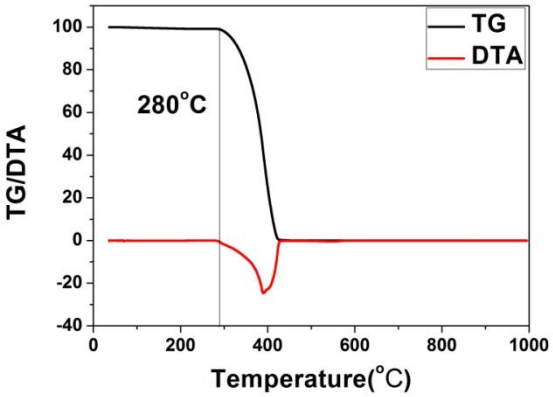


**Figure S3.** TGA data of PS beads as template.

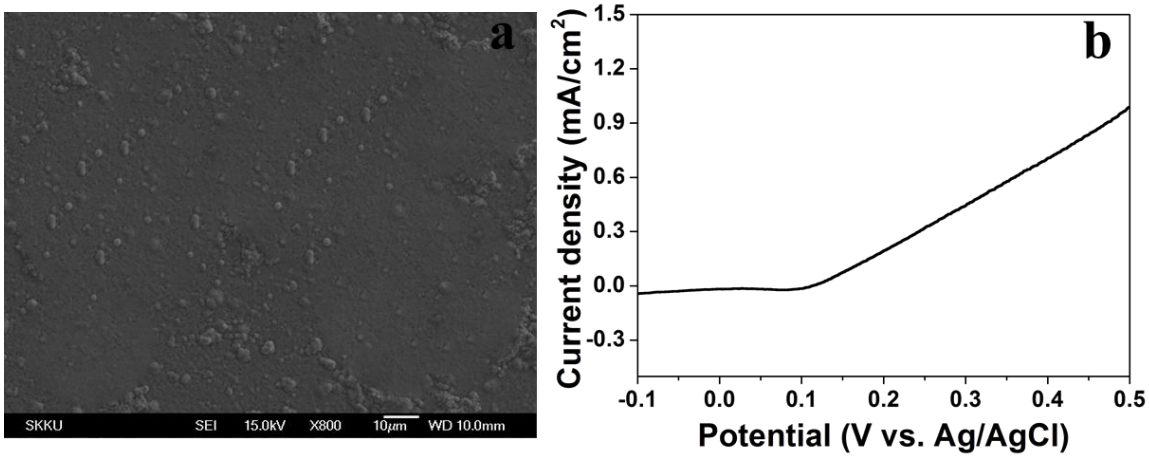


**Figure S4** (a) the morphology of a general planar α-$Fe_2O_3$, (b) the I-V curve of the planar α-$Fe_2O_3$ vs. potential in 1M NaOH electrolyte under AM 1.5G light.