

## **Effect of La-Doping on Optical Bandgap and Photoelectrochemical Performance of Hematite Nanostructures**

Ning Li<sup>a,b</sup>, Sundaramurthy Jayaraman<sup>b,c</sup>, Si Yin Tee<sup>a,d</sup>, Palaniswamy Suresh Kumar<sup>b,c</sup>, Coryl Jing Jun Lee<sup>a</sup>, Siao Li Liew<sup>a</sup>, Dongzhi Chi<sup>a</sup>, T. S. Andy Hor<sup>a,e</sup>, Seeram Ramakrishna<sup>b\*</sup>, He-Kuan Luo<sup>a\*\*</sup>

<sup>a</sup> Institute of Materials Research and Engineering, Agency for Science, Technology and Research, 3 Research Link, Singapore 117602.

<sup>b</sup> NUSNNI, National University of Singapore, 2 Engineering Drive 3, Singapore 117576.

<sup>c</sup> Environmental & Water Technology, Centre of Innovation, Ngee Ann Polytechnic, Singapore, 599489.

<sup>d</sup> Department of Biomedical Engineering, National University of Singapore, 9 Engineering Drive, Singapore 117576

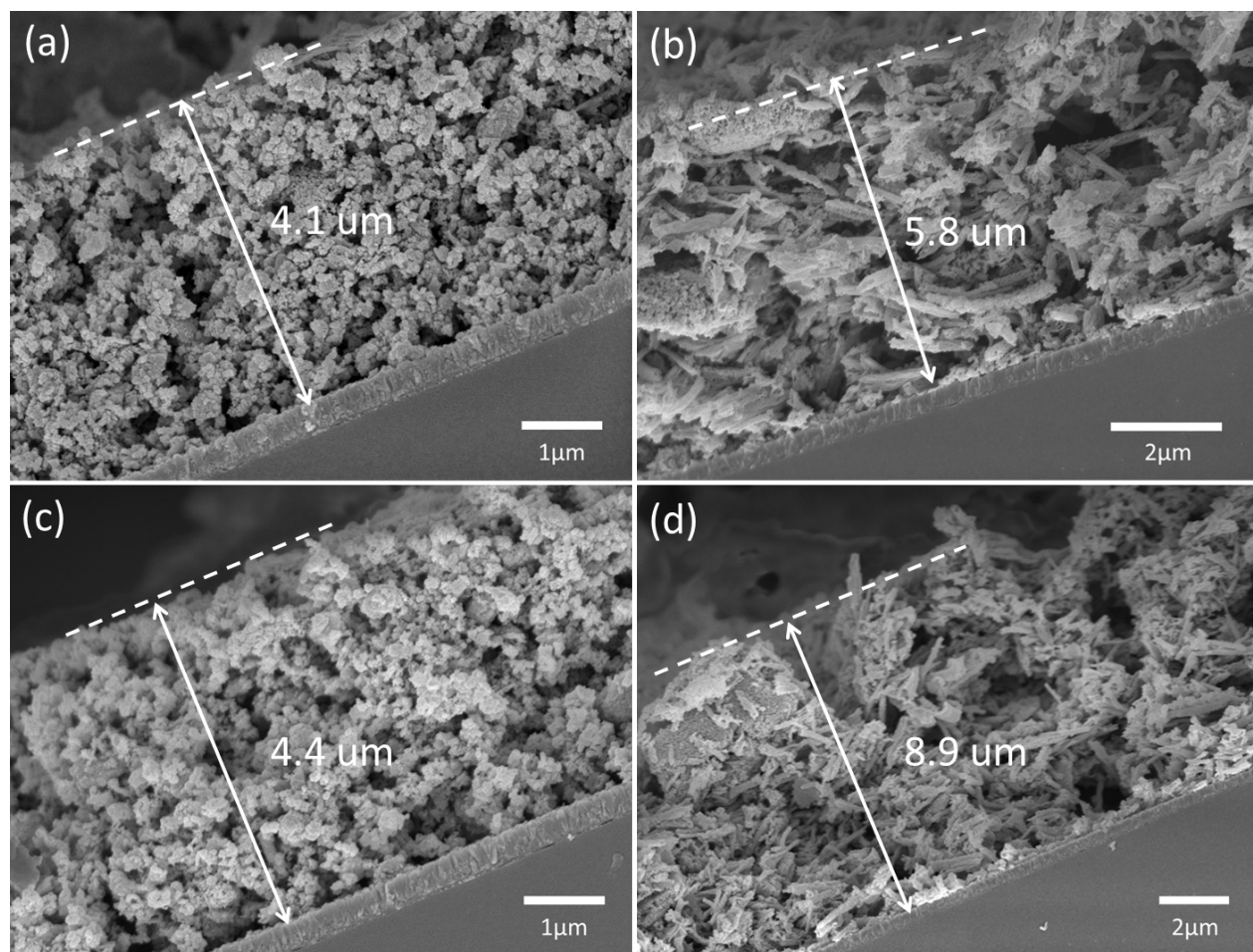
<sup>e</sup> Department of Chemistry, National University of Singapore, 3 Science Drive 3, Singapore 117543.

\*Corresponding Author: seeram@nus.edu.sg

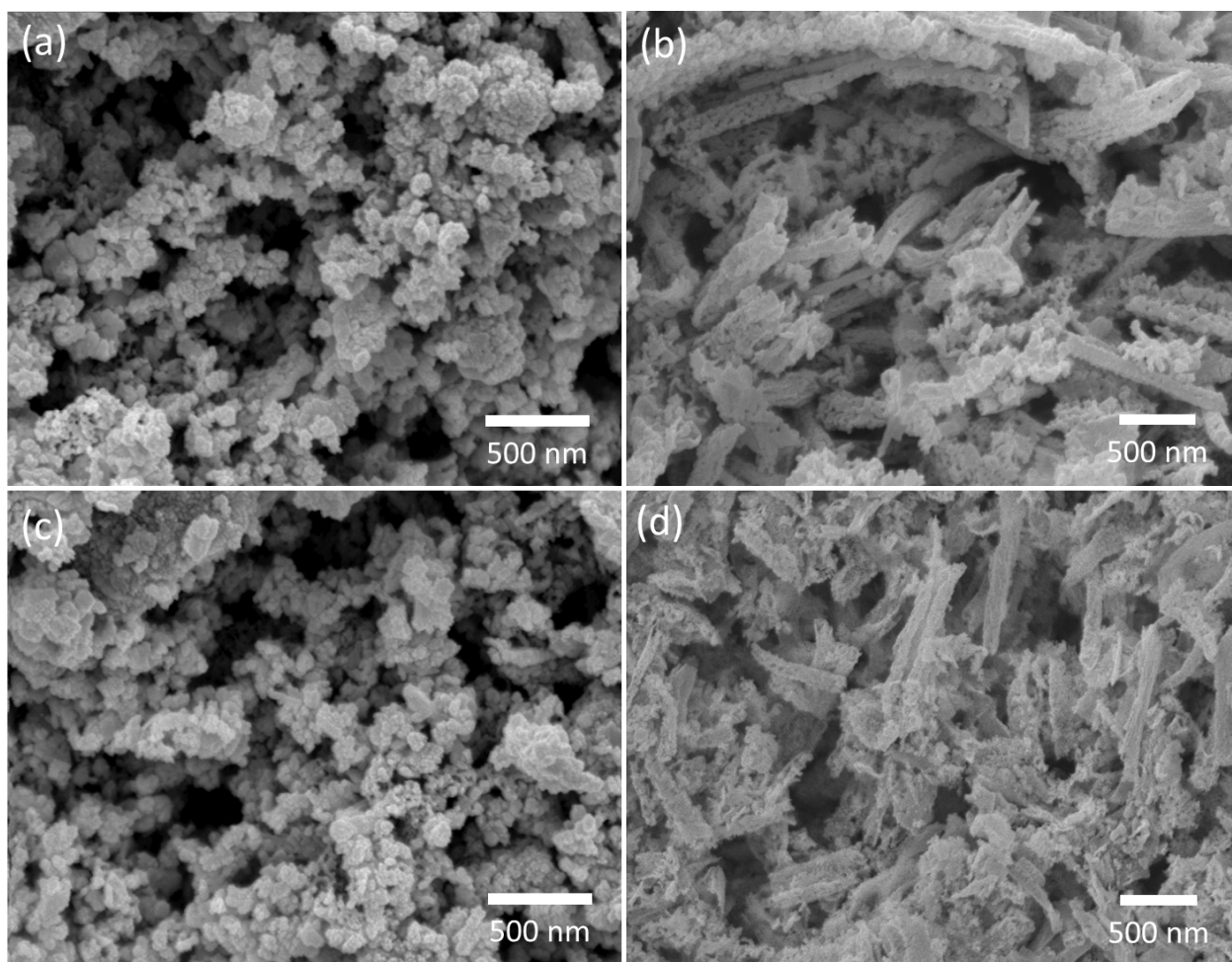
\*\*Corresponding Author: luoh@imre.a-star.edu.sg

Tel +65 68745424; Fax +65 68727744

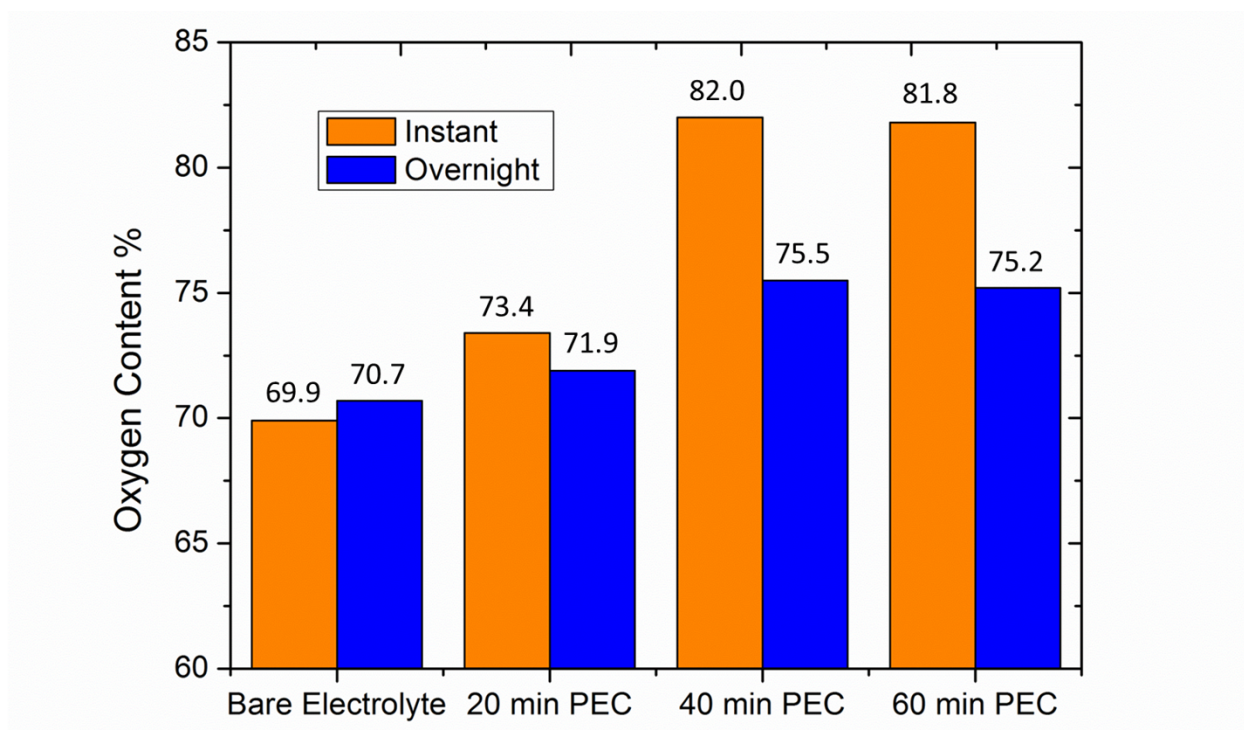
### **Supplementary Information**



**Fig. S1.** Cross section FESEM images of electrode films for (a) La-doped hematite nanoparticles, (b) La-doped hematite nanotubes, (c) Pristine hematite nanoparticles, (d) Pristine hematite nanofibers. Local film thickness is displayed.



**Fig. S2.** Top FESEM images of electrode films for (a) La-doped hematite nanoparticles, (b) La-doped hematite nanotubes, (c) Pristine hematite nanoparticles, (d) Pristine hematite nanofibers.



**Fig. S3.** Oxygen content in the electrolyte near hematite photoanode region after different PEC reaction running time. Orange columns are results measured instantly after PEC reaction. Blue columns are measured after leaving the electrolyte open to air for overnight.