

## Supplementary Information

### Fluoride-free Self-templated Synthesis of Hollow TiO<sub>2</sub> Nanostructures for Hydrogen Evolution

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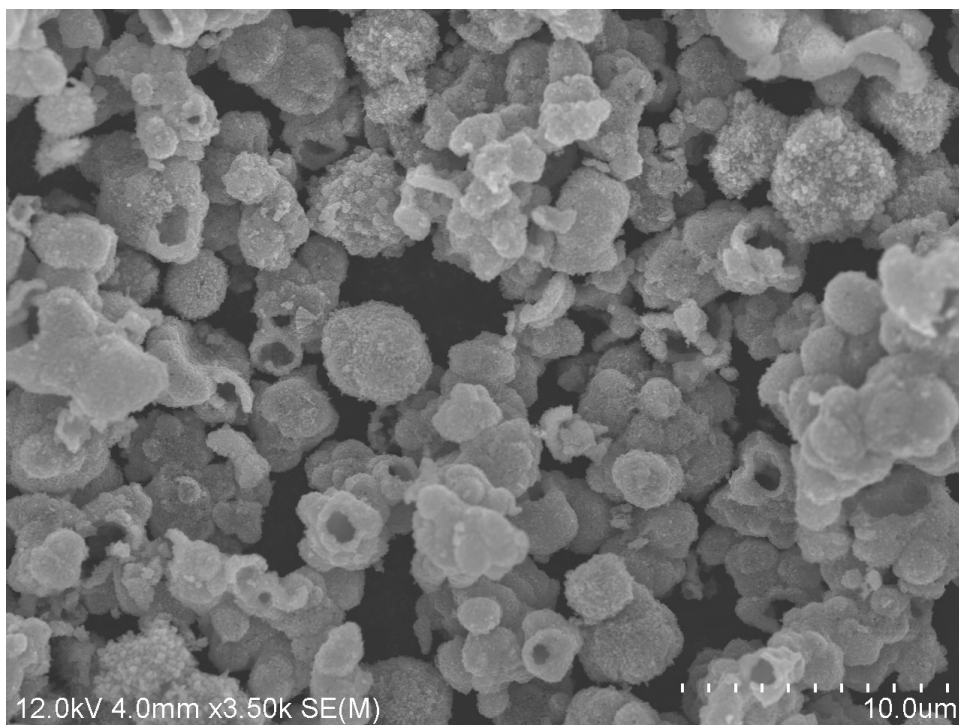
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980-8577, Japan.

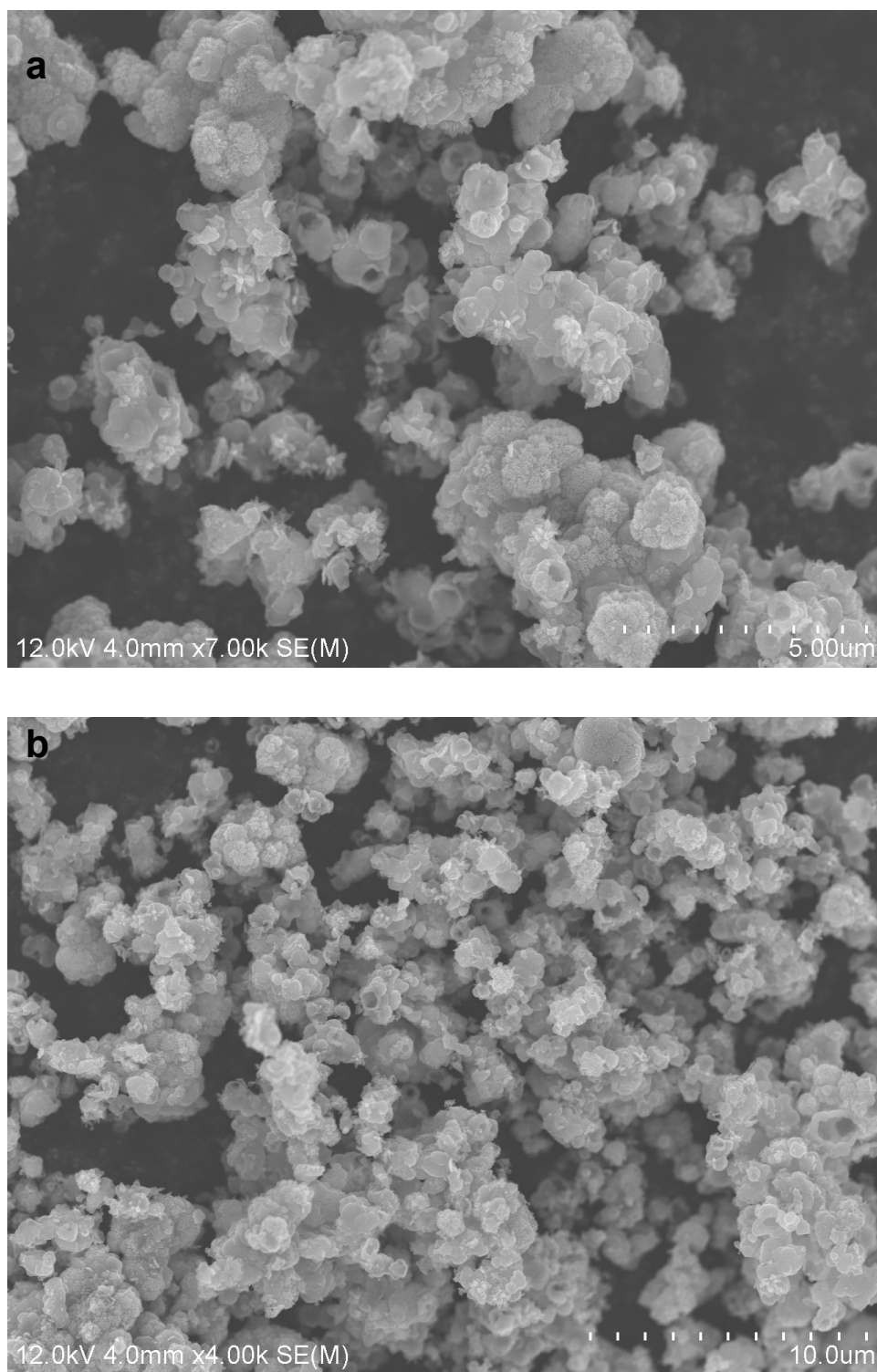
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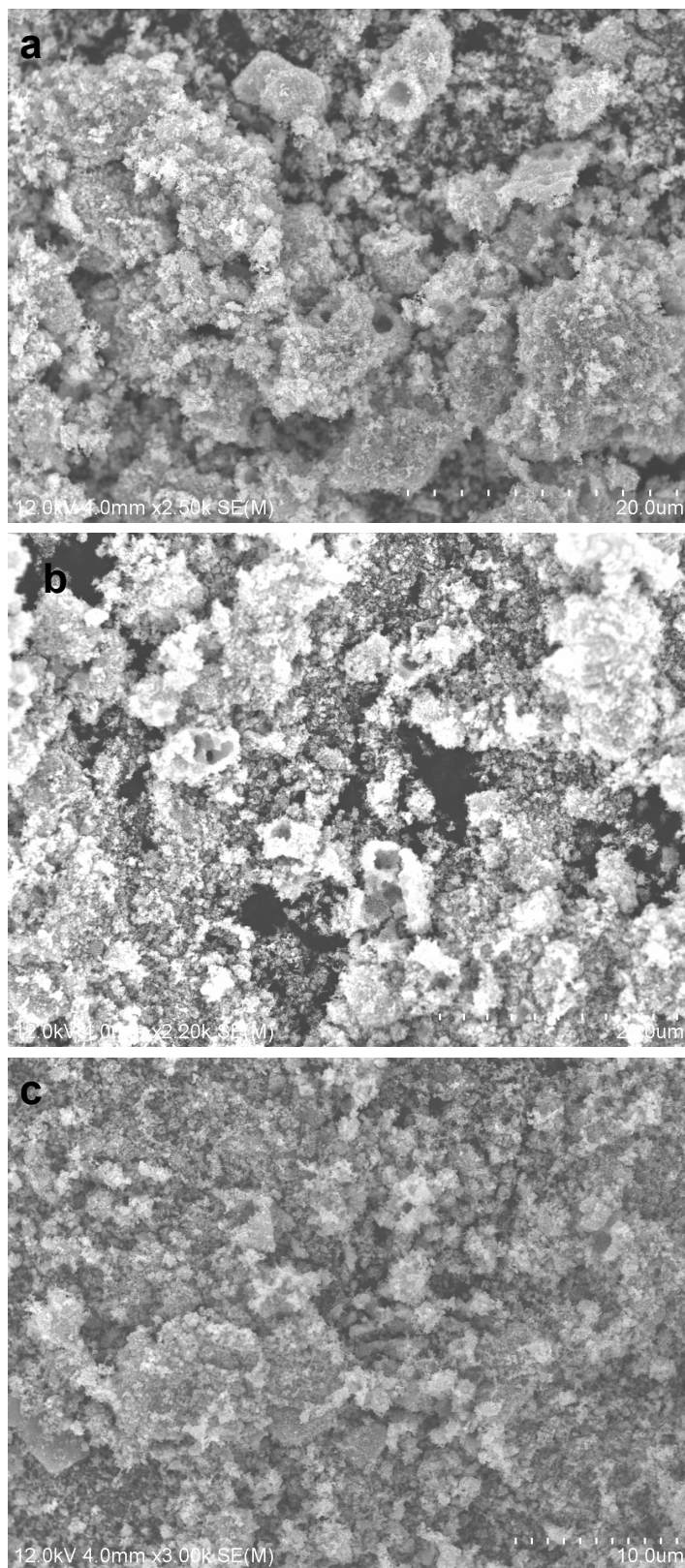
Email: tqduc@mail.tagen.tohoku.ac.jp. Tel./fax: +81-22-217-5651.



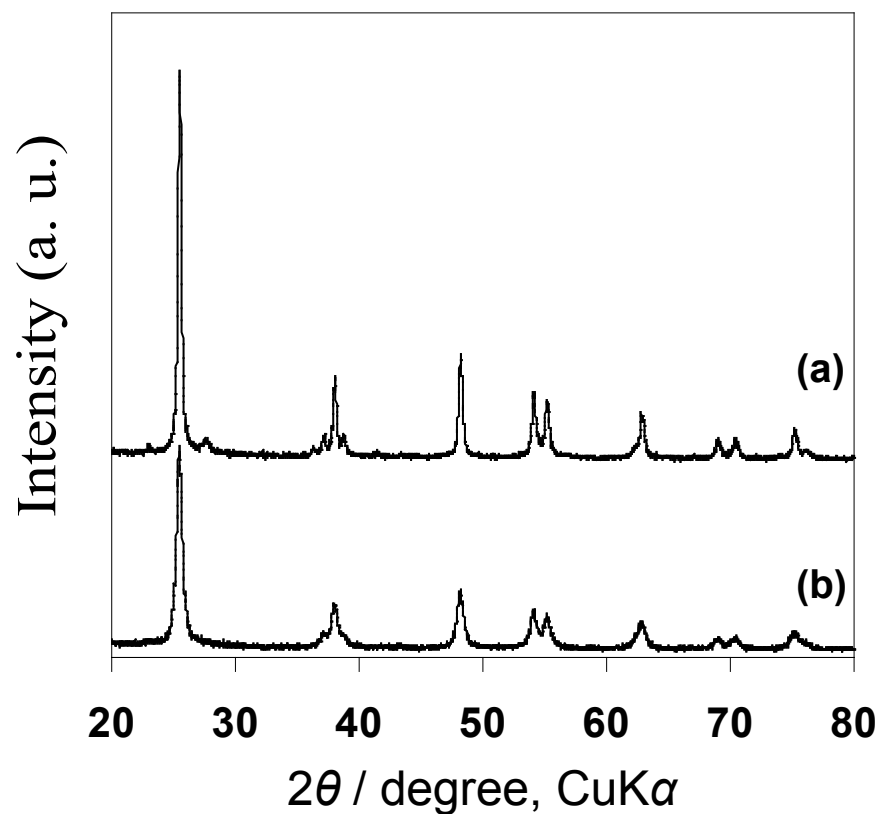
**Fig. S1** SEM image TiO<sub>2</sub> nanostructures synthesized by hydrothermal treatment of Ti(SO<sub>4</sub>)<sub>2</sub> in the presence of H<sub>2</sub>O<sub>2</sub> with pre-treatment at 353 K for 1 day to remove gas bubbles.



**Fig. S2** SEM images of TiO<sub>2</sub> nanostructures synthesized by hydrothermal treatment of Ti(SO<sub>4</sub>)<sub>2</sub> in the presence of small amount of H<sub>2</sub>O<sub>2</sub>: (a) 4 mmol and (b) 6 mmol.



**Fig. S3** SEM images of  $\text{TiO}_2$  nanostructures synthesized by hydrothermal treatment of  $\text{Ti}(\text{SO}_4)_2$  in the presence of larger amount of  $\text{H}_2\text{O}_2$ : (a) 20 mmol, (b) 30 mmol and (c) 50 mmol.



**Fig. S4** XRD pattern of TiO<sub>2</sub> nanostructures synthesized (a) with H<sub>2</sub>O<sub>2</sub> (10 mmol) and (b) without H<sub>2</sub>O<sub>2</sub>.