

## Supporting Information

### High aspect ratio TiO<sub>2</sub> nanowires tailored in concentrated HCl hydrothermal condition for photoelectrochemical water splitting

Jinzhan Su\*, Liejin Guo

International Research Center for Renewable Energy, State Key Laboratory of Multiphase Flow,  
Xi'an Jiaotong University, Xi'an, Shaanxi 710049, P. R. China

E-mail: j.su@mail.xjtu.edu.cn,

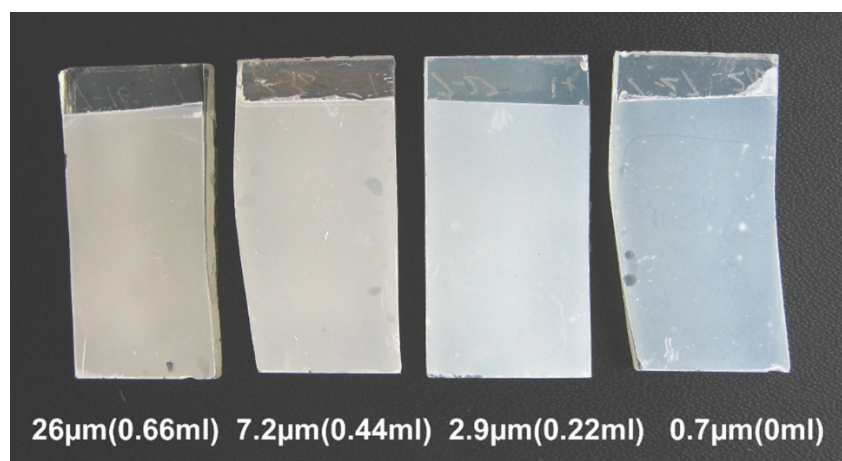


Figure S1. Digital photo of TiO<sub>2</sub> nanowires grown on FTO substrate with different amount of TiCl<sub>4</sub> added in the precursor.

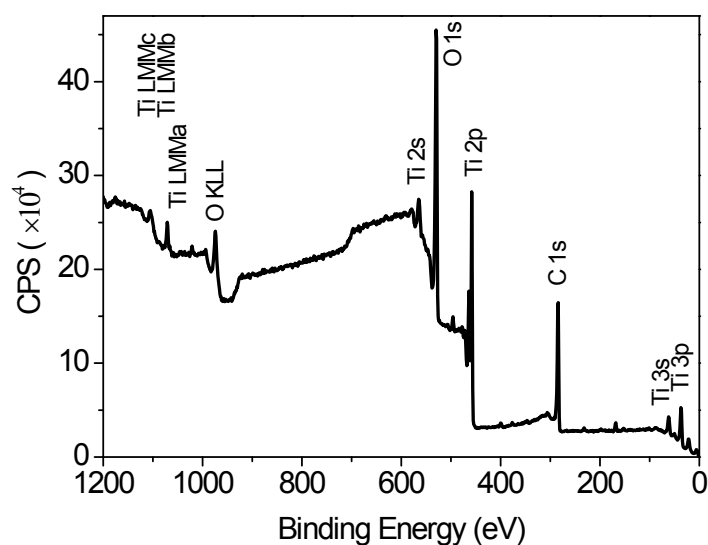


Figure S2. XPS survey spectra for the TiO<sub>2</sub> nanowire grown with 0.22 ml TiCl<sub>4</sub> added.

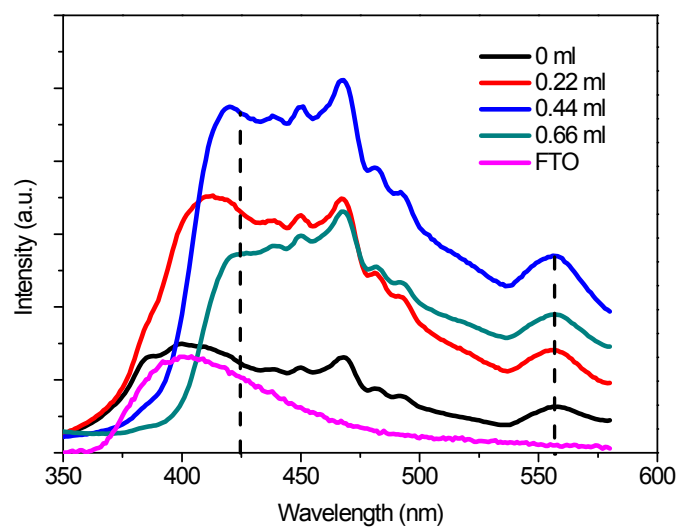


Figure S3. Photoluminescence emission spectra of TiO<sub>2</sub> nanowires grown on FTO substrate with different amount of TiCl<sub>4</sub> added in the precursor and bare FTO substrate.

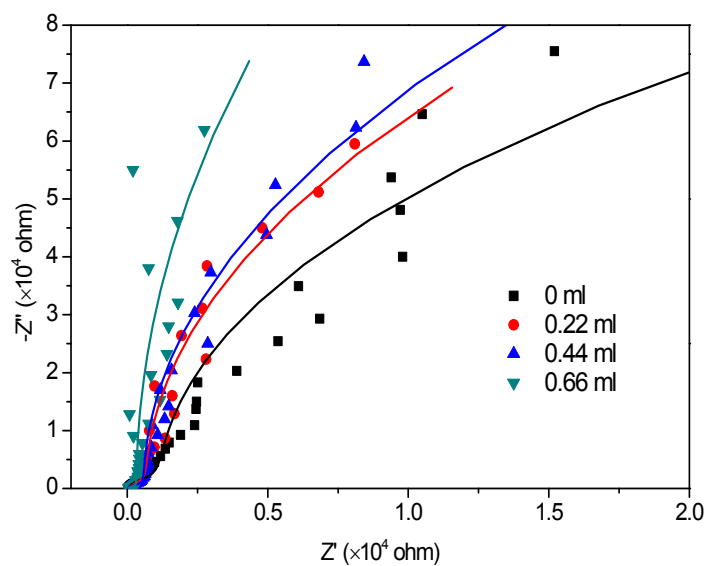


Figure S. Impedance spectra of TiO<sub>2</sub> nanowires grown on FTO substrate with different amount of TiCl<sub>4</sub> added in the precursor.

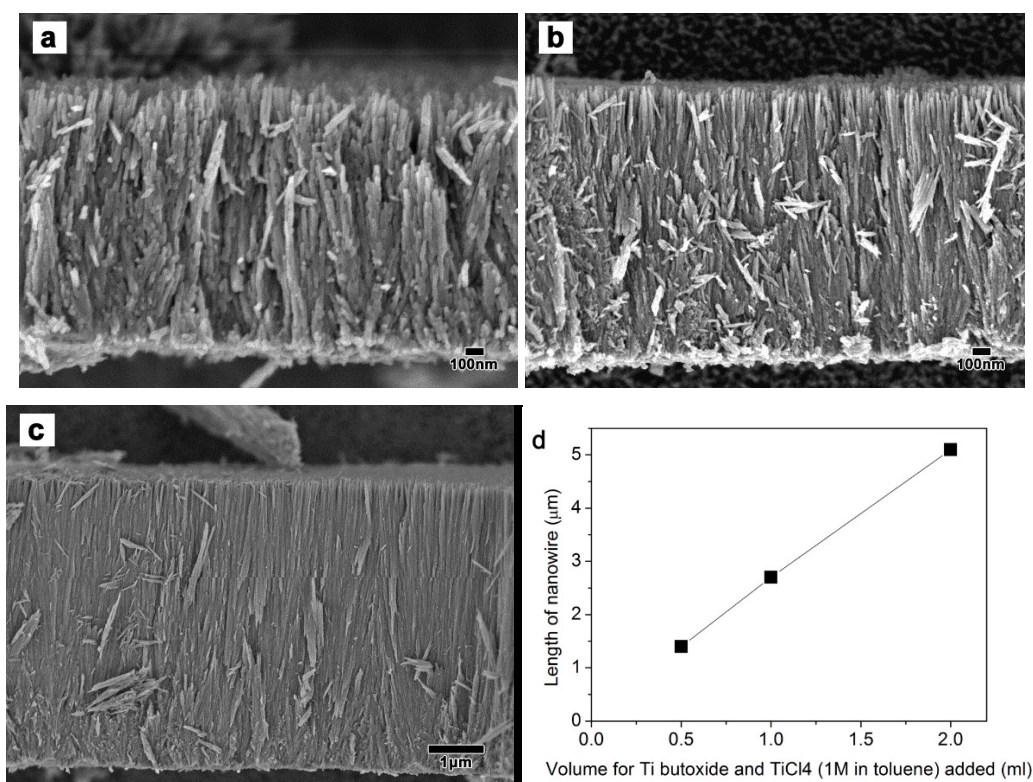


Figure S5. SEM image of TiO<sub>2</sub> nanowire arrays deposited with (a) 0.5 ml (b) 1 ml (c) 2 ml added for each of Ti butoxide and TiCl<sub>4</sub> (1 M in toluene); (d) Plot for lengths of nanowires showing linear with volume of Ti butoxide and TiCl<sub>4</sub> (1 M in toluene) added.

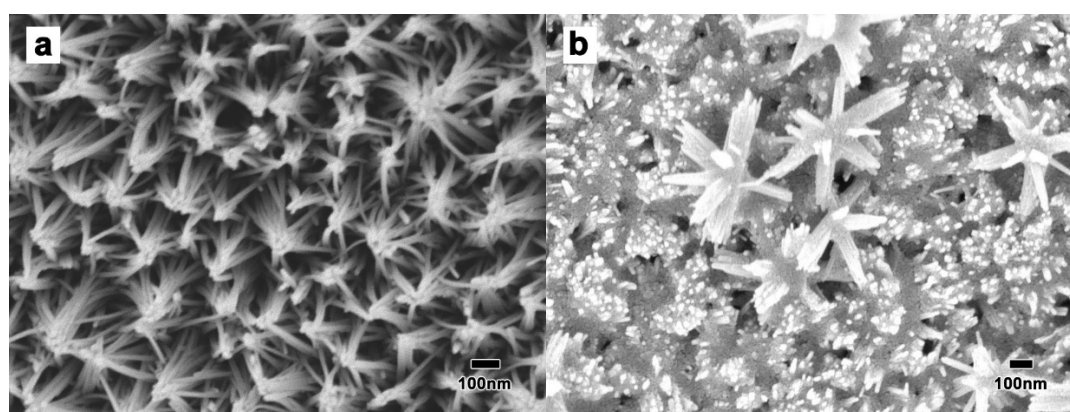


Figure S6. Top view of TiO<sub>2</sub> nanowires synthesized with (a) 1 ml of Ti butoxide and 4 ml of TiCl<sub>4</sub> (1 M in toluene) and (b) 4 ml of Ti butoxide and 1 ml of TiCl<sub>4</sub> (1 M in toluene) as Ti source.

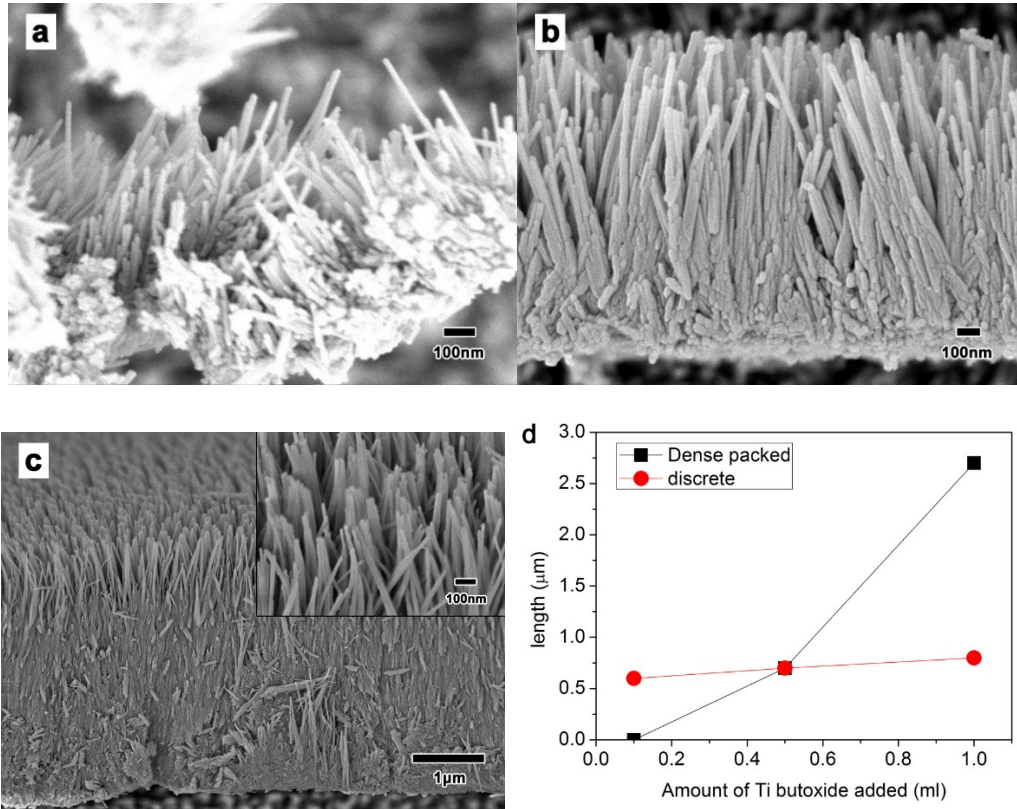


Figure S7. SEM images of TiO<sub>2</sub> nanowires synthesized using precursor composed of 1 ml HCl(6M), 4 ml TiCl<sub>4</sub> solution (1 M in toluene) and (a) 0.1 ml, (b) 0.5 ml and (c) 1 ml Ti butoxide, the inset shows the enlarged view of the discrete wire tips. (d) Lengths of dense packed region and discrete region by changing Titanium butoxide added in the precursor

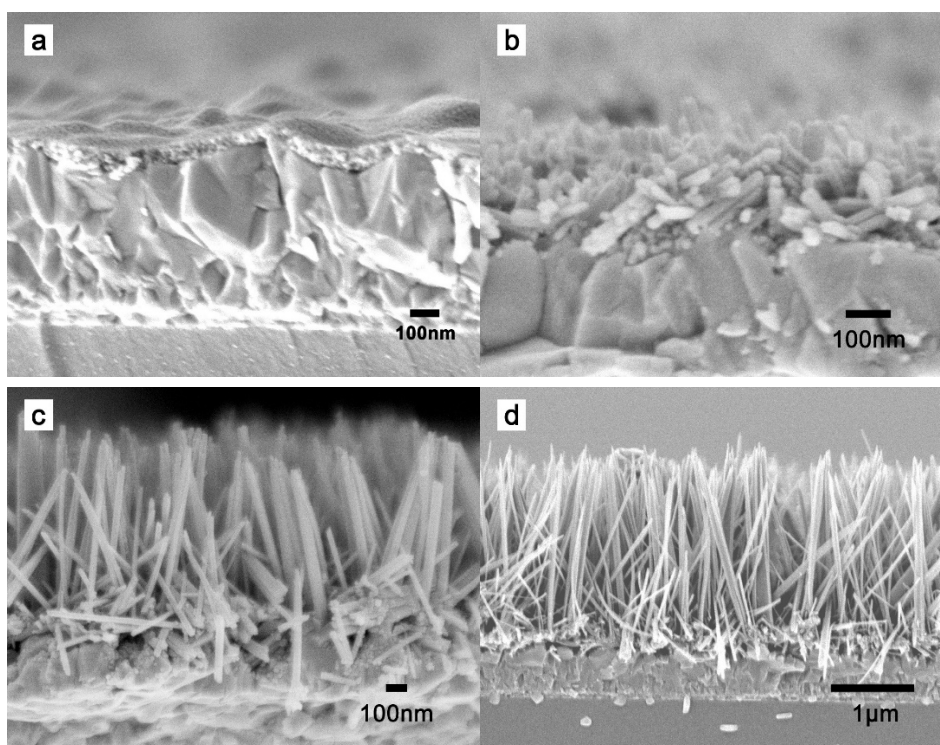


Figure S8. Cross section view of (a) spin-coated TiO<sub>2</sub> seed layer and TiO<sub>2</sub> grown for (b) 24 h (c) 48 h and (d) 66 h. The precursor is 2 ml TiCl<sub>4</sub>(1 M in toluene) and 8 ml 37 wt% HCl (12 M) aqueous solution and temperature is 170 °C.