

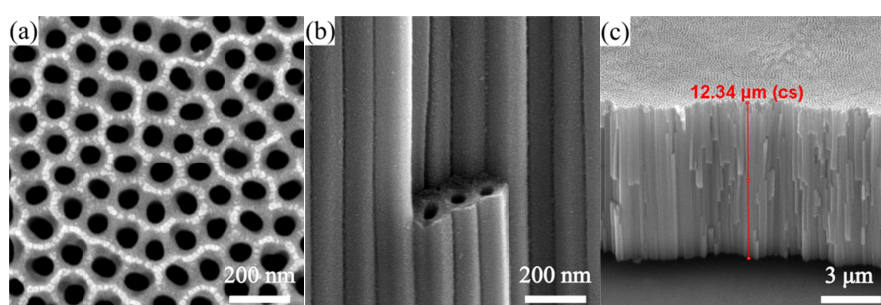
## Supplementary Information

# Improved performance of flexible dye-sensitized solar cells by hierarchical TiO<sub>2</sub> nanostructures with high surface area

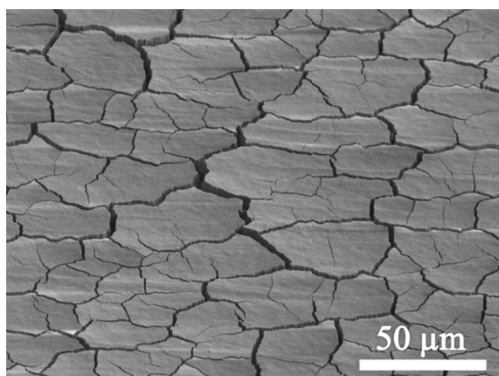
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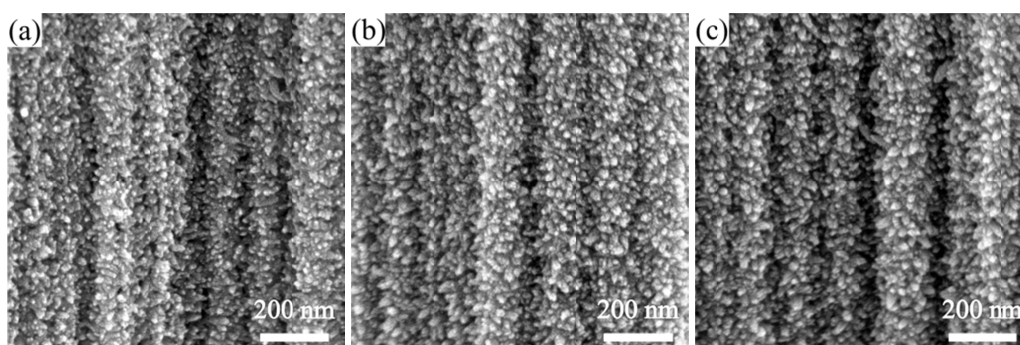
b, Materials Science and Engineering, Virginia Tech, Blacksburg, VA 24061



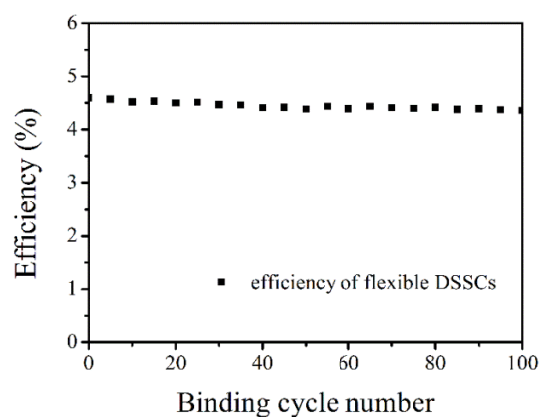
**Fig. S1:** (a) Surface image of as-grown TiO<sub>2</sub> nanotubes with the top porous layer; (b) and (c) profile section image of as-grown TiO<sub>2</sub> nanotubes. The thickness of TiO<sub>2</sub> nanotubular film is ~12 μm, and “cs” represents the cross sectional length after regulating with 52° tilt angle.



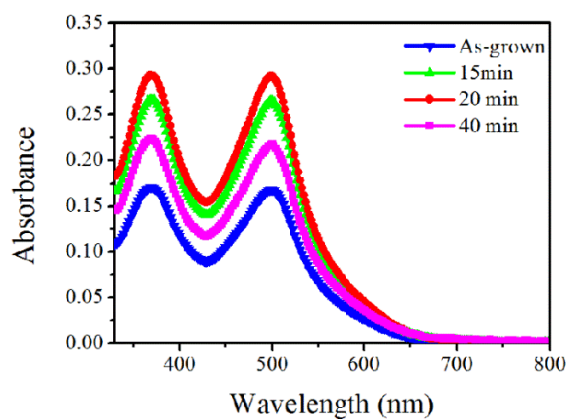
**Fig. S2:** Formation of numerous cracks after 40 min hydrothermal treatment for anodic TiO<sub>2</sub> nanotubes.



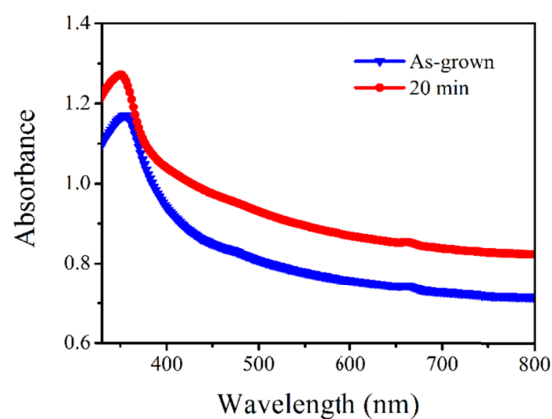
**Fig. S3:** SEM image of the tube outer shell after various hydrothermal treatment times: (a) 15 min, (b) 20 min, and (c) 40 min.



**Fig. S4:** Binding test for the efficiency of flexible DSSCs based on Ti metallic substrate with 20 min hydrothermal treated TiO<sub>2</sub> nanostructures.



**Fig. S5:** UV-Vis absorption spectra of solutions containing N719 dyes desorbed from photoelectrodes with different hydrothermal treatment times.



**Fig. S6:** UV-Vis absorbance spectra of as-grown TiO<sub>2</sub> nanotubes and 20 min hydrothermal treated TiO<sub>2</sub> nanostructures. The absorbance spectra were measured on Ti metallic substrate with TiO<sub>2</sub> nanostructures.