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Electronic Supplementary Information for:

{116} faceted anatase single-crystalline nanosheets arrays: facile synthesis and enhanced electrochemical performances

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Synthesis process of polycrystalline anatase TiO_2 nanosheet array assembled by TiO_2 nanocrystallites with {116} facets parallel to the nanosheet surface in our former work.

In a typical synthesis, the FTO coated glass was ultrasonically cleaned sequentially in acetone, ethanol, distilled water for 15 min each, subsequently immersed in a 1 M NaOH aqueous solution for 24 h, then rinsed with distilled water, and finally dried in the air. A TiO_2 seed layer was prepared on the as-cleaned FTO coated glass by spin coating method. 1.5 ml of titanium butoxide was added dropwise to 20 ml of toluene, the mixture was stirred at ambient conditions for 5 min before the addition of 0.6 ml of hydrofluoric acid. After stirring for another 5 min, the mixture was transferred to a dried 50 ml Teflon-lined autoclave within a piece of FTO coated glass substrate placed vertically, and kept at 70 ºC for 24 h. After synthesis, the FTO substrate was taken out, washed with ethanol and distilled water, then dried in air to obtain the precursor. TiO_2 nanosheet array was prepared after the precursor annealed at 500 ºC in air for 2 h.

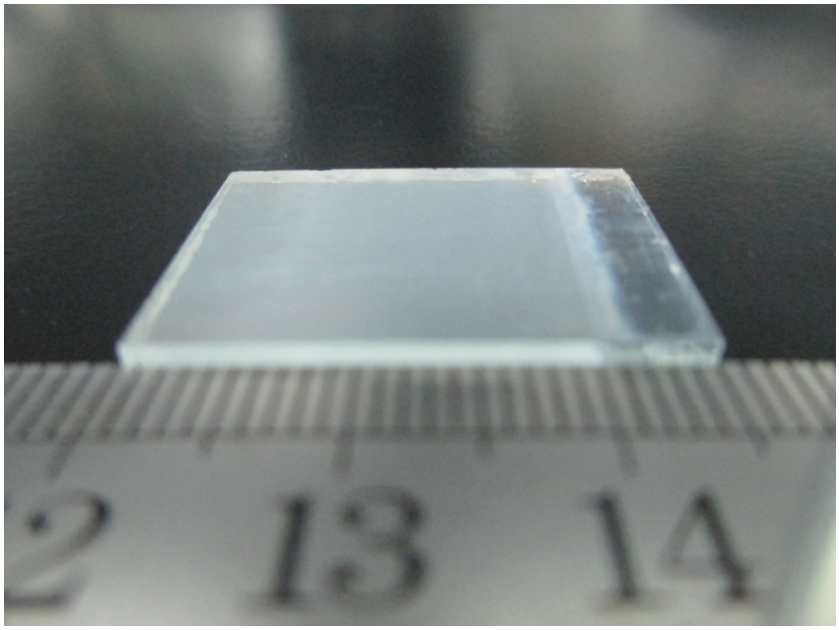

Fig. S1. Photo of LTNF-116 grown on a 2.5 cm x 2.0 cm area FTO substrate uniformly.

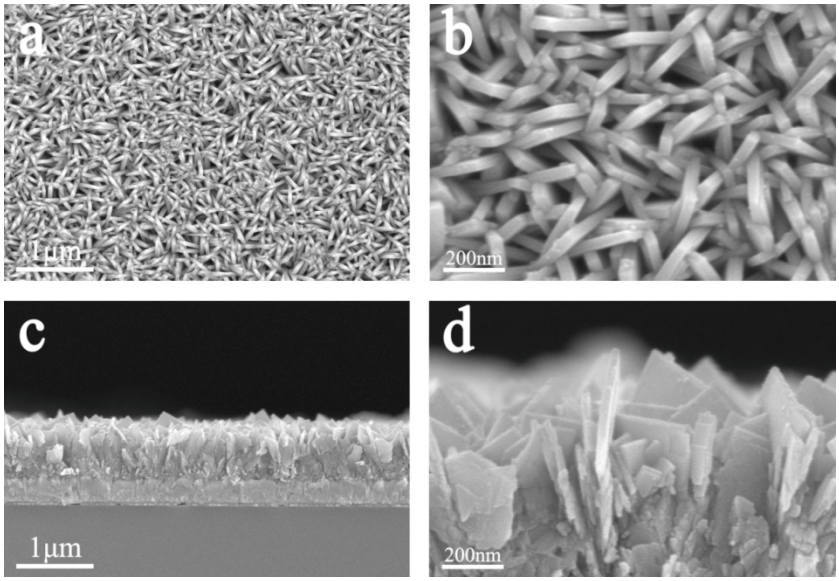

Fig. S2. FESEM images of LTNF-001 grown on FTO substrate in 20 ml toluene, 3.0 ml titanium butoxide, and 1.2 ml hydrofluoric acid at 180 ºC for 24h.

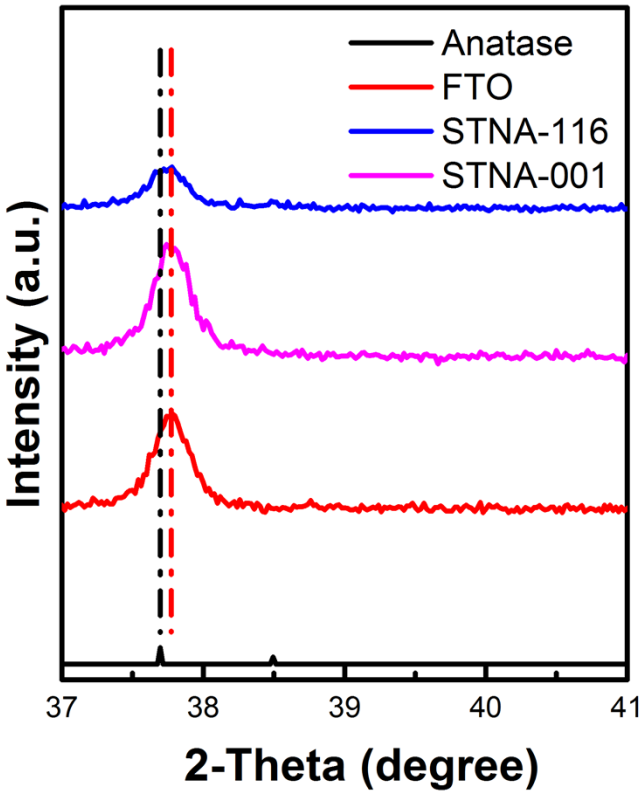

Fig. S3. Enlarged XRD patterns of the samples.

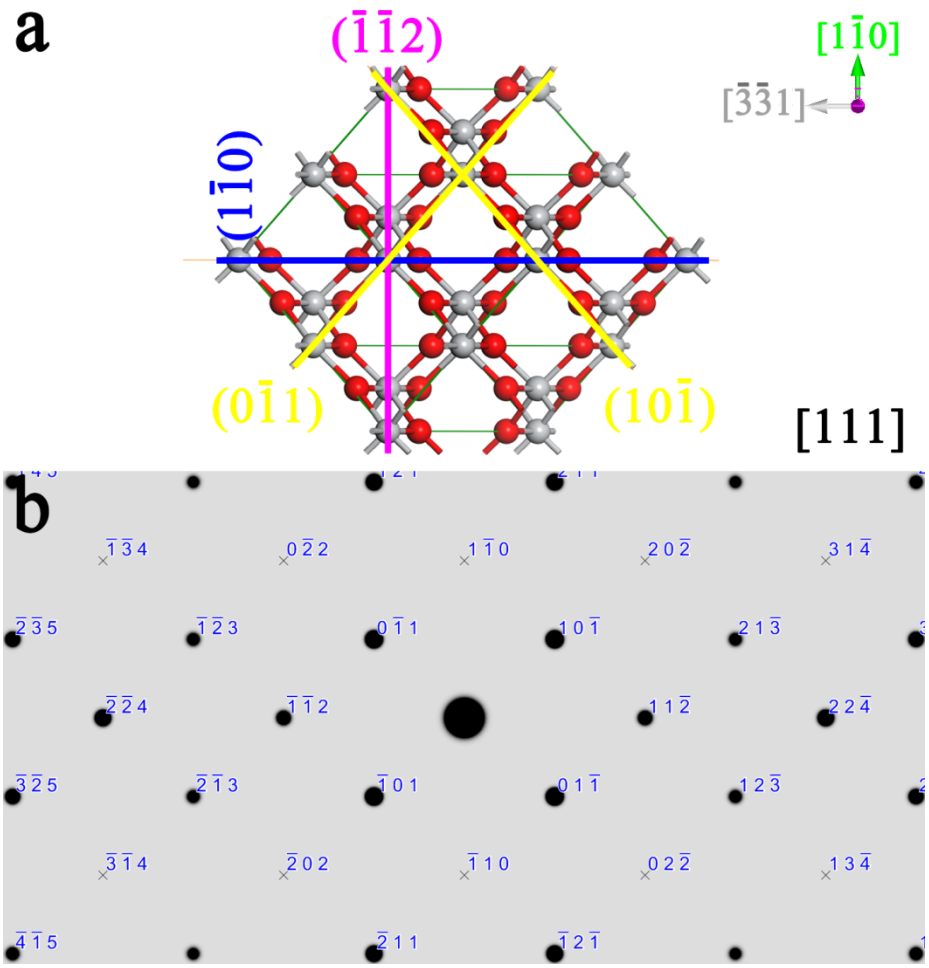

Fig. S4. (a) Crystal structure model along anatase TiO_2 {116} facets, viewed from [111] zone. (b) Corresponding simulated SAED pattern (<111> zone diffraction).

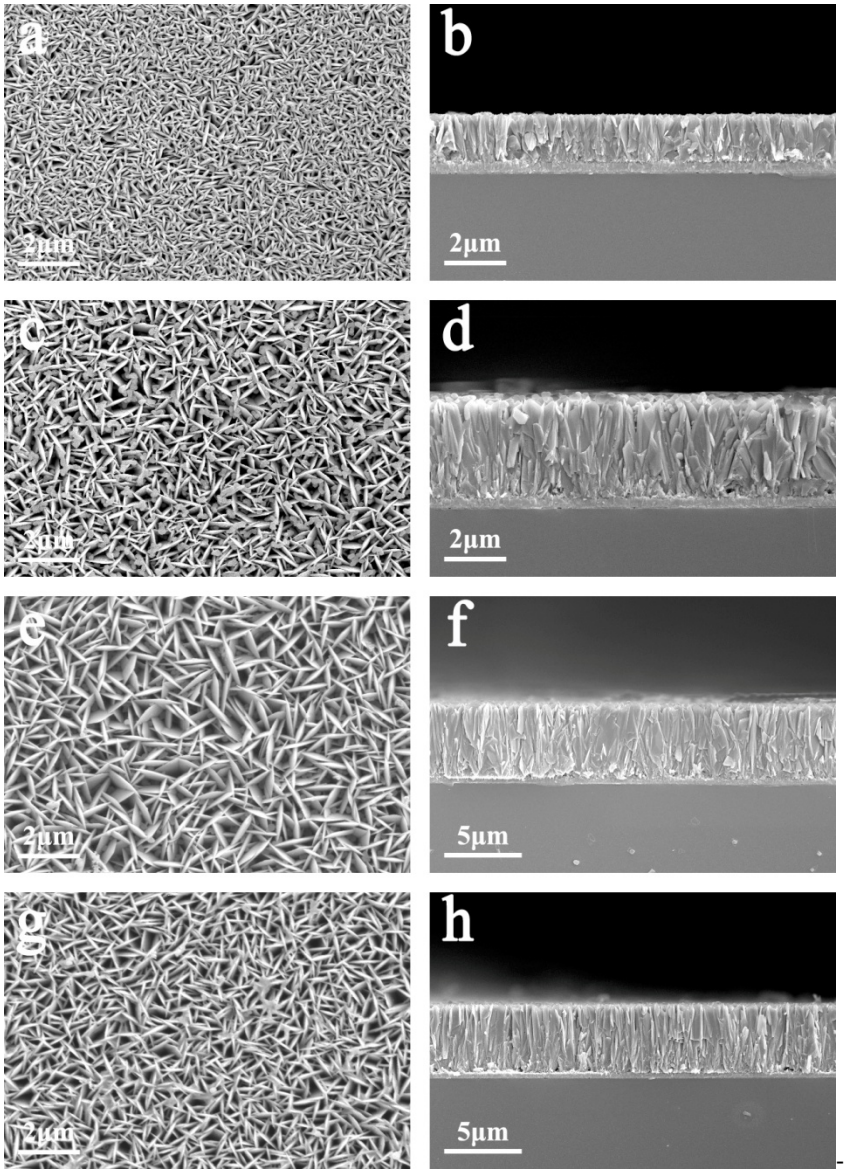

Fig. S5. FESEM images of LTNF-116 grown on FTO substrate in 15 ml ethanol, 1.0 ml titanium butoxide, and 1.0 ml hydrofluoric acid at 200 ºC for (a, b) 4 h, (c, d) 8 h, (e,f) 12 h, (g,h) 16 h.

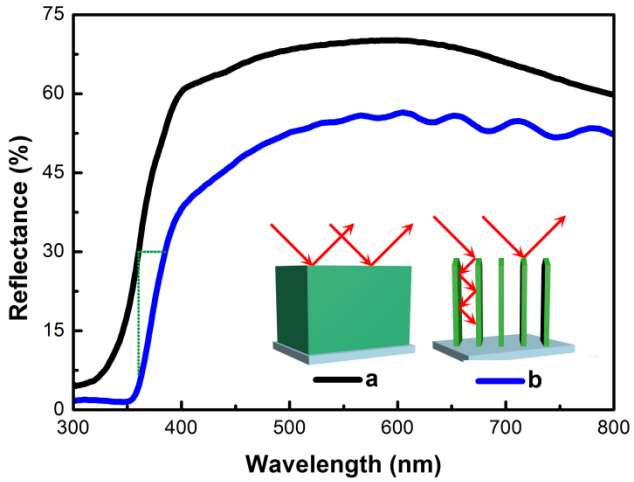

Fig. S6. Reflectance spectra of (a) P25 film and (b) STNA-116 with the same film thickness. The insets are corresponding light path diagram.

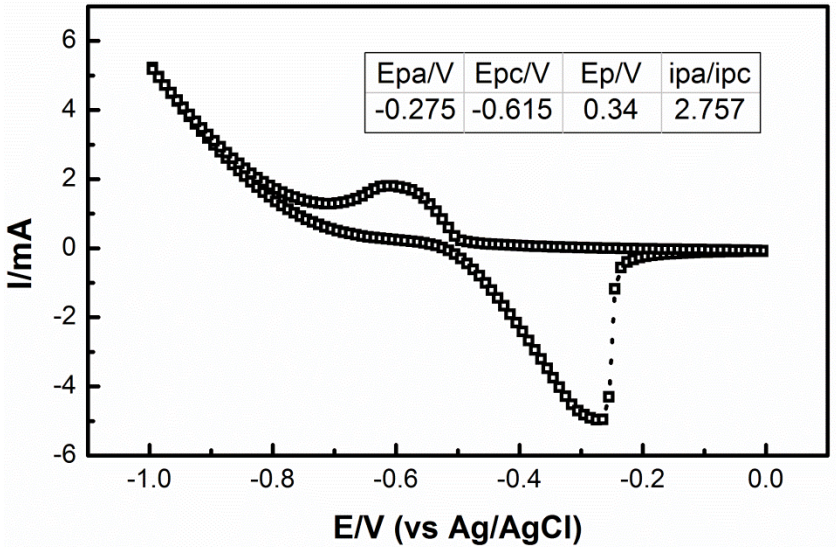

Fig. S7. Cyclic voltammograms of P25 electrode in 0.5 M H_2SO_4. Scan rate: 50 mVs^{-1}. Insets are corresponding electrochemical characteristics.