

## Electronic Supplementary Information (ESI)

# Observation of anatase nanograins crystallizing from anodic amorphous TiO<sub>2</sub> nanotubes

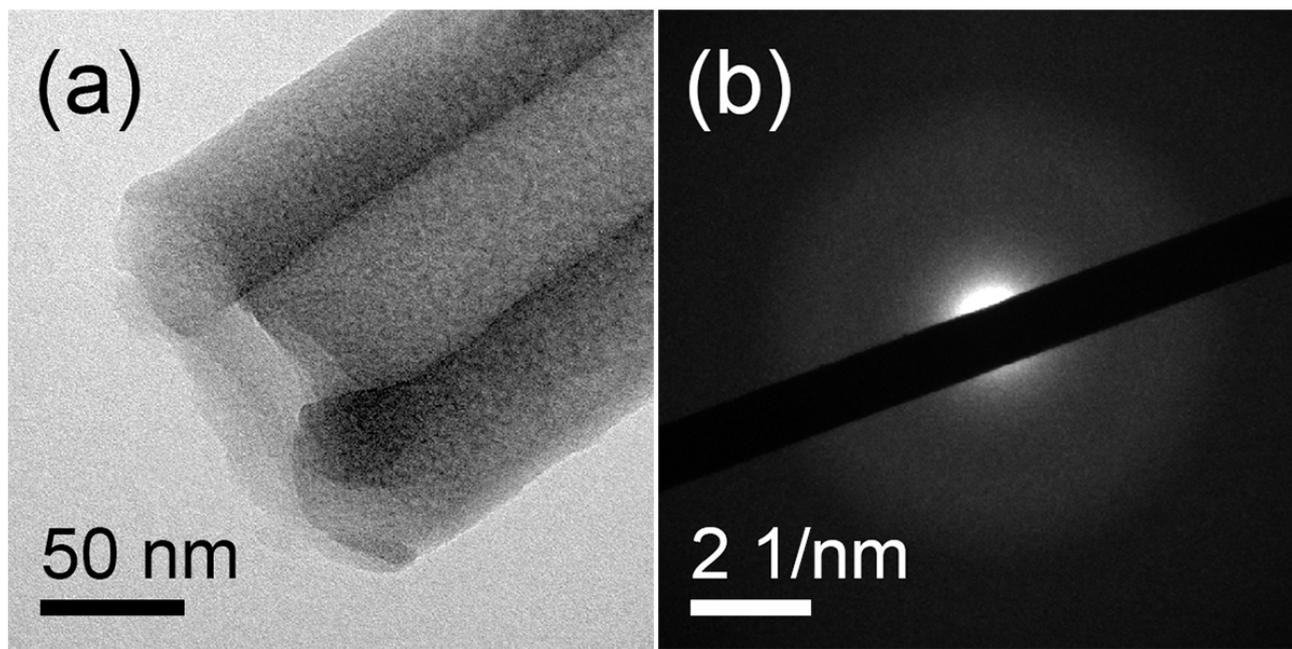
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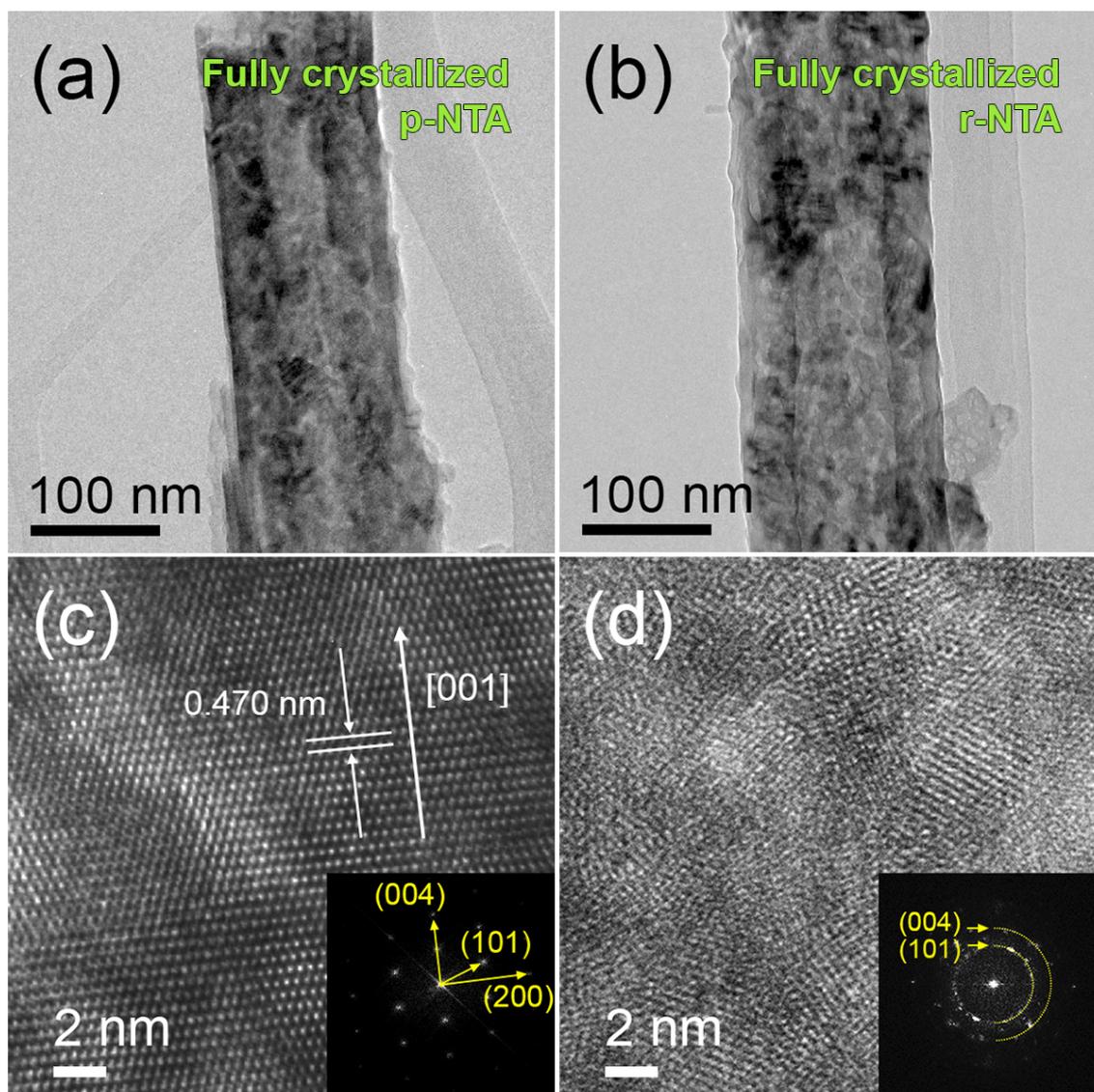
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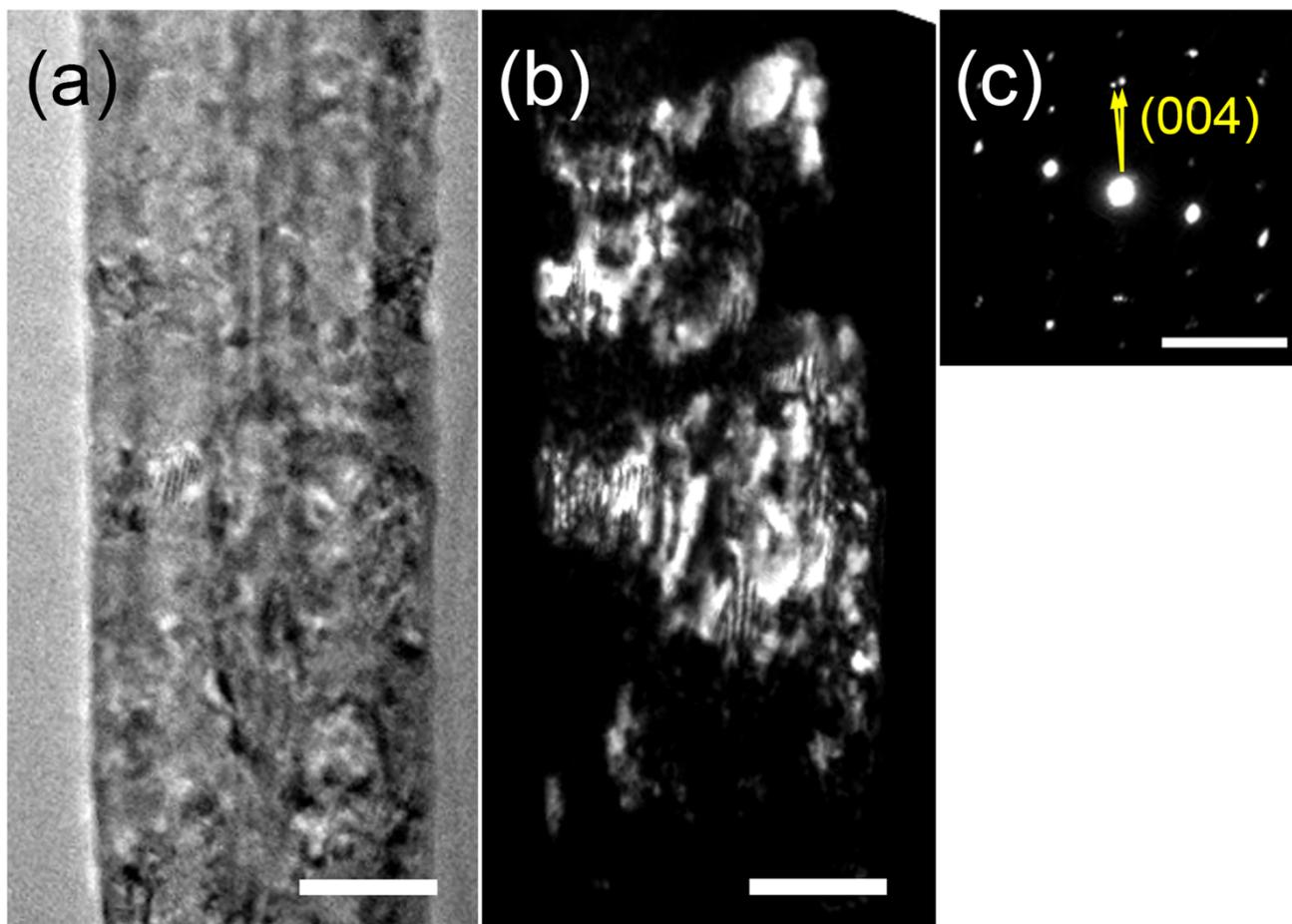
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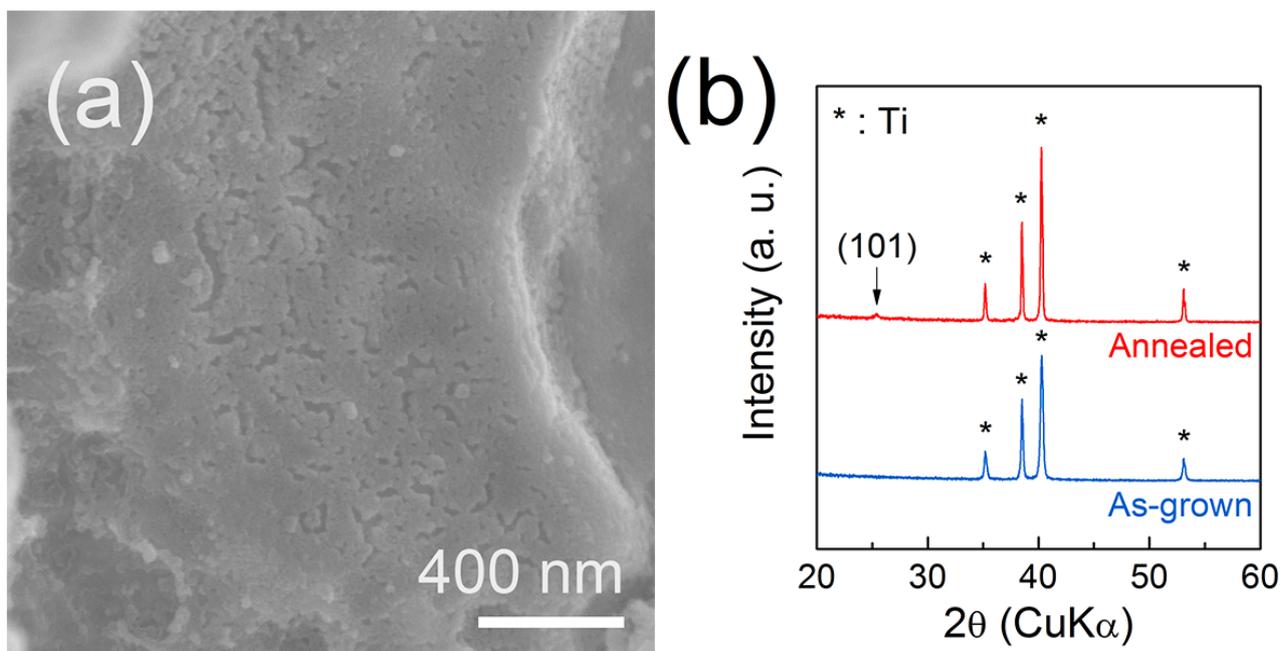
**Fig. S1.** (a) TEM image and (b) SAED pattern of as-grown titanium oxide NTAs. All the as-grown NTAs exhibit non-crystallized nanotube walls.



**Fig. S2.** TEM images of the obtained (a) p-NTA and (b) r-NTA, after annealing at 450 °C for 1 hr. NTAs were grown in 2 wt% and 5 wt% water content, respectively. Diameter of the nanotubes examined are mostly in the range of 140~150 nm. A small difference in wall thickness is attributed to the observing location, as the bottom part of NTAs has thicker wall than the top part of NTA. HRTEM images of (c) p-NTA and (d) r-NTA. The insets of (c) and (d) are FFT patterns obtained from the HRTEM images. Single crystal-like fast Fourier transform (FFT) images from the p-NTAs while ring patterns corresponding to (004) and (101) planes of the anatase phase.



**Fig. S3.** (a) Bright-field TEM image and (b) dark-field TEM image taken from 2W-NTAs. The dark-field image was taken using a diffracted electron beam corresponding to the (101) plane. (c) SAED pattern obtained from (a).



**Fig. S4.** (a) SEM image of an anodized sample in 0 wt% water content electrolyte. (b) X-ray diffraction patterns of the as-grown sample and annealed sample (grown in 0 wt% water content electrolyte).