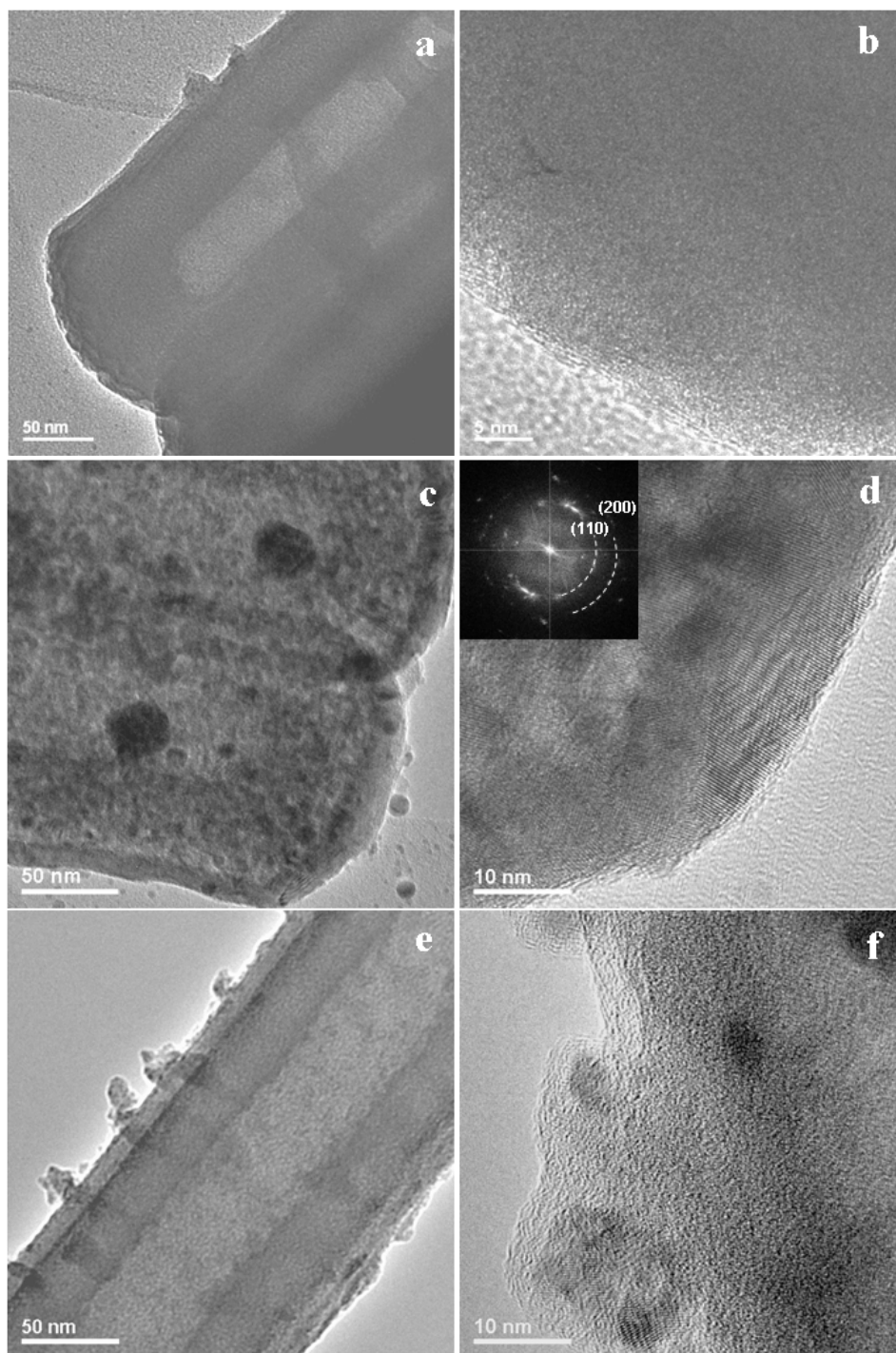


## Supplementary Information



**Fig. S1** TEM images showing different crystalline phases in ATO nanotubes prepared under 60 V in ethylene glycol containing 0.3 wt%  $\text{NH}_4\text{F}$  and 2wt%  $\text{H}_2\text{O}$ . Wherein, a,b show TEM and HRTEM images of ATO nanotubes with amorphous structure; c,d show TEM and HRTEM images of ATO nanotubes mainly of rutile phase; e,f show TEM and HRTEM images of ATO nanotubes with some small nanocrystals which cannot be easily indexed to anatase, rutile or other phases of  $\text{TiO}_2$ . The inset of d is the corresponding FFT pattern of the HRTEM image.