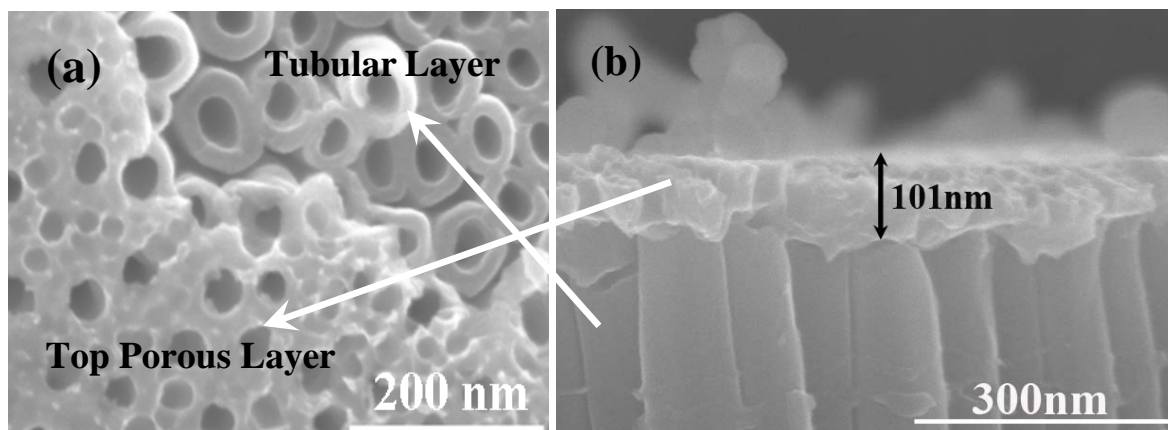
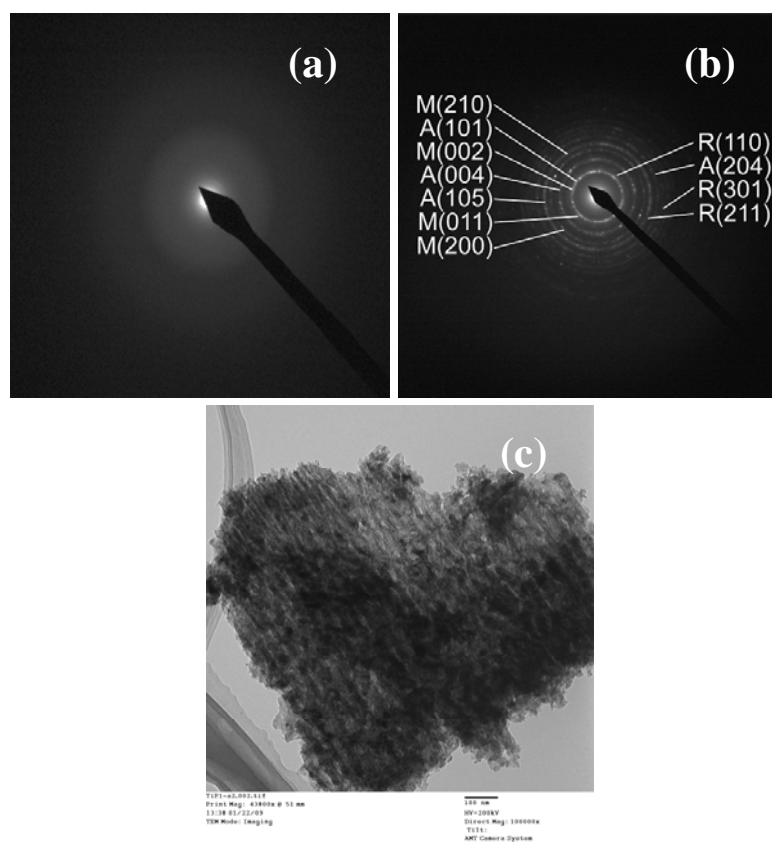


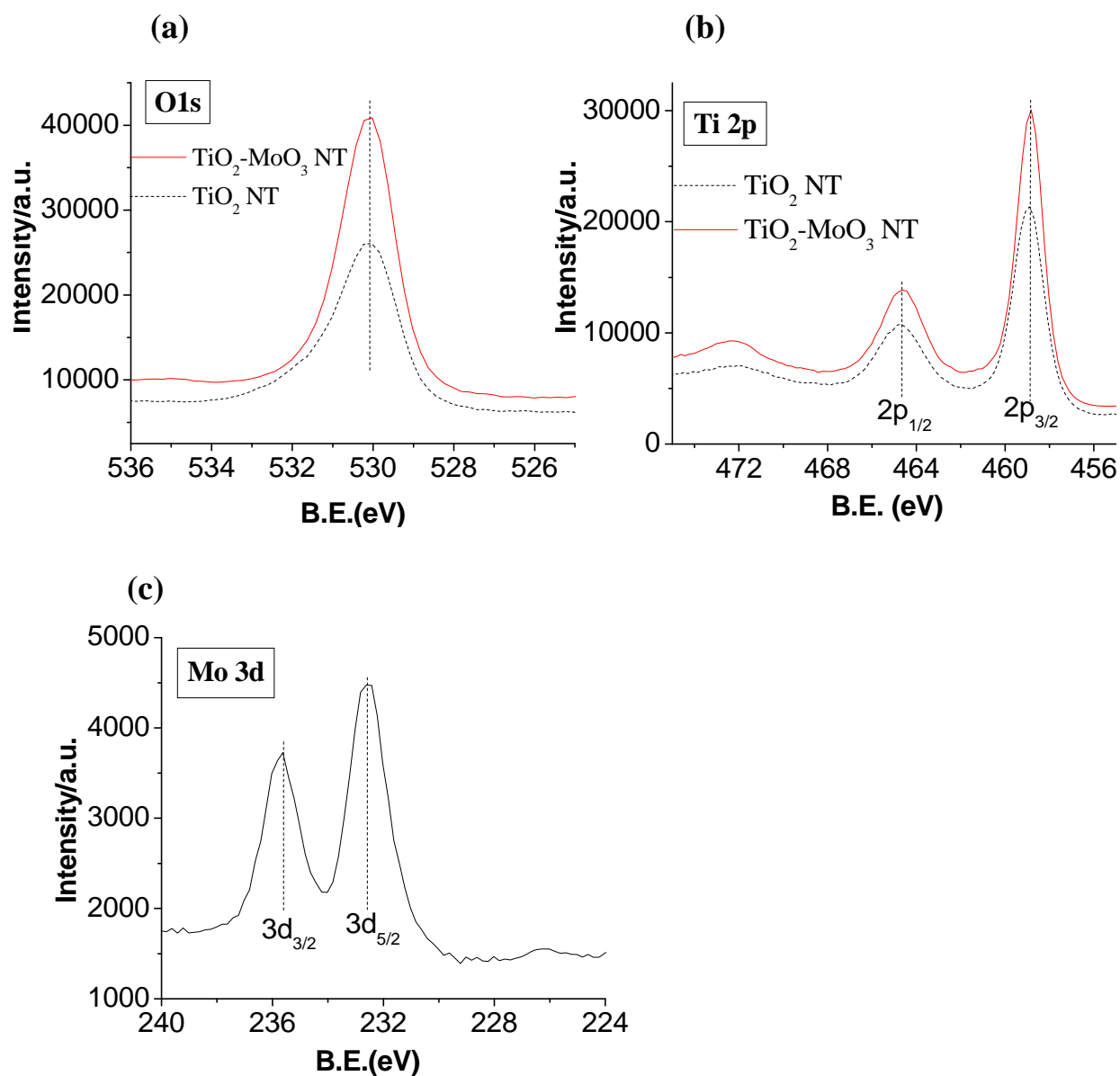
## Electronic supplementary information (ESI) †



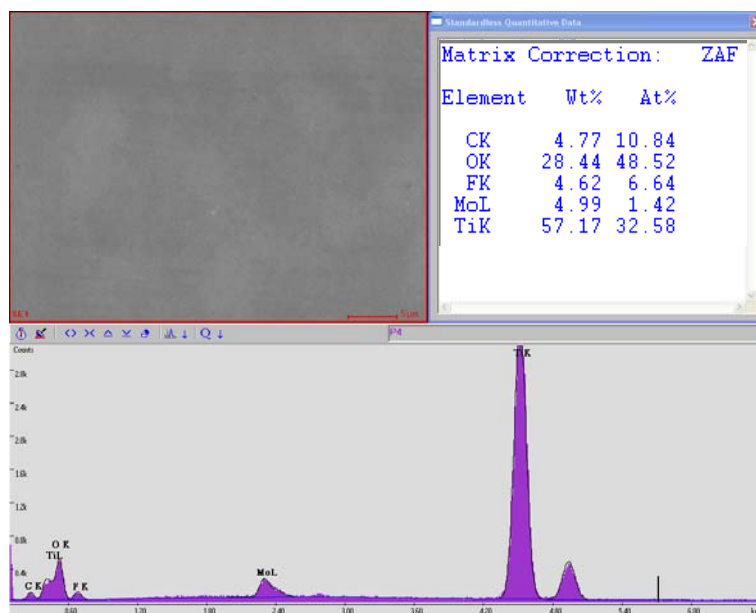
**Fig. S1.** SEM (a) top and (b) cross-sectional view of self organized  $\text{TiO}_2\text{-MoO}_3$  composite oxide nano-structure.



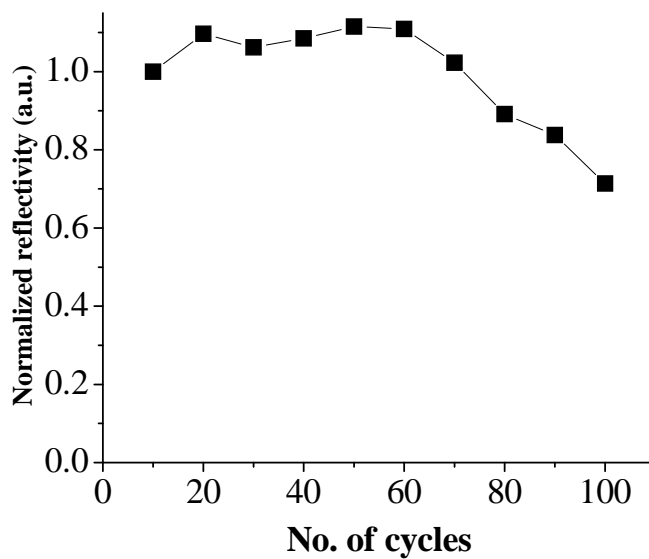
**Fig. S2.** TEM-SAD patterns of  $\text{TiO}_2\text{-MoO}_3$  composite oxide nano-tubes (a) before and (b) after annealing at 550 °C in air showing the crystallization of the as prepared amorphous nano-tubes into polycrystalline structure after annealing. In (b) A: anatase  $\text{TiO}_2$ , R: rutile  $\text{TiO}_2$  and M:  $\alpha\text{-MoO}_3$ . (c) TEM image of the selected area of the annealed nano-tube sample.



**Fig. S3.** XPS spectra of (a) O1s, (b)Ti2p and (c) Mo3d in  $\text{TiO}_2$ - $\text{MoO}_3$  composite oxide nano-tubes. Spectra of O1s and Ti2p in  $\text{TiO}_2$  nano-tubes have also been shown in (a) and (b) for comparison.



**Fig. S4** EDX spectrum of  $\text{TiO}_2\text{-MoO}_3$  composite oxide nano-tubes.



**Fig. S5.** Normalized reflectivity ( $\Delta R$ ) from the surface of amorphous  $\text{TiO}_2\text{-MoO}_3$  composite oxide nano-tube with respect to the number of anodic and cathodic cycle between +1.0V to -0.7V in 0.1M  $\text{HClO}_4$  aqueous solution.