

Supplementary Information

Nitridated TiO₂ hollow nanofibers as an anode material for high power lithium ion batteries

Hyungkyu Han¹, Taeseup Song¹, Jae-Young Bae², Linda F. Nazar³, Hansu Kim^{2} and Ungyu Paik^{1,2*}*

¹ Department of Materials Science & Engineering, Hanyang University, Seoul 133-791, South Korea

² WCU Program Department of Energy Engineering, Hanyang University, Seoul 133-791, South Korea

³ Department of Chemistry, University of Waterloo, ON N2L 3G1, Canada

Corresponding Author*

Hansu Kim (khansu@hanyang.ac.kr)

Ungyu Paik (upaik@hanyang.ac.kr)

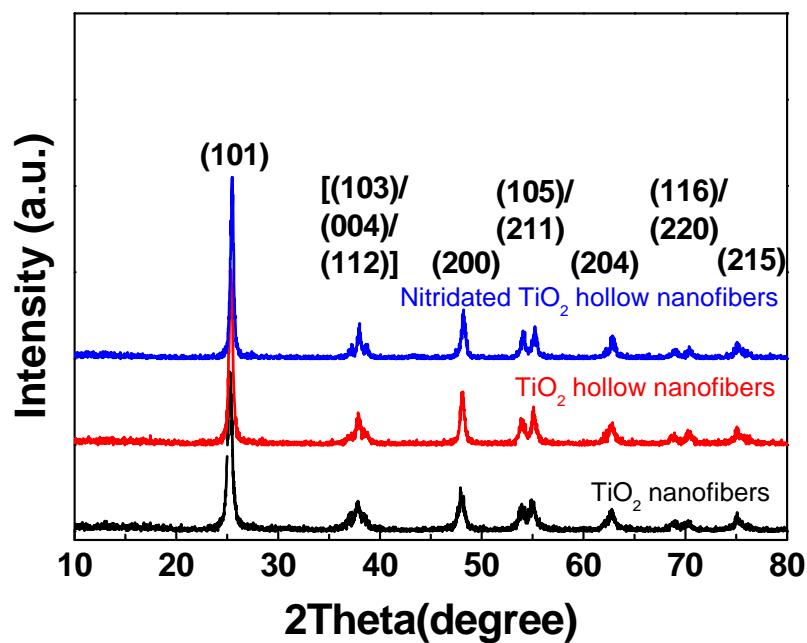


Figure SI1. XRD patterns of TiO_2 nanofibers, TiO_2 hollow nanofibers, and nitridated TiO_2 hollow nanofibers. (black line : TiO_2 nanofibers, red line : TiO_2 hollow nanofibers, blue line : nitridated TiO_2 hollow nanofibers)

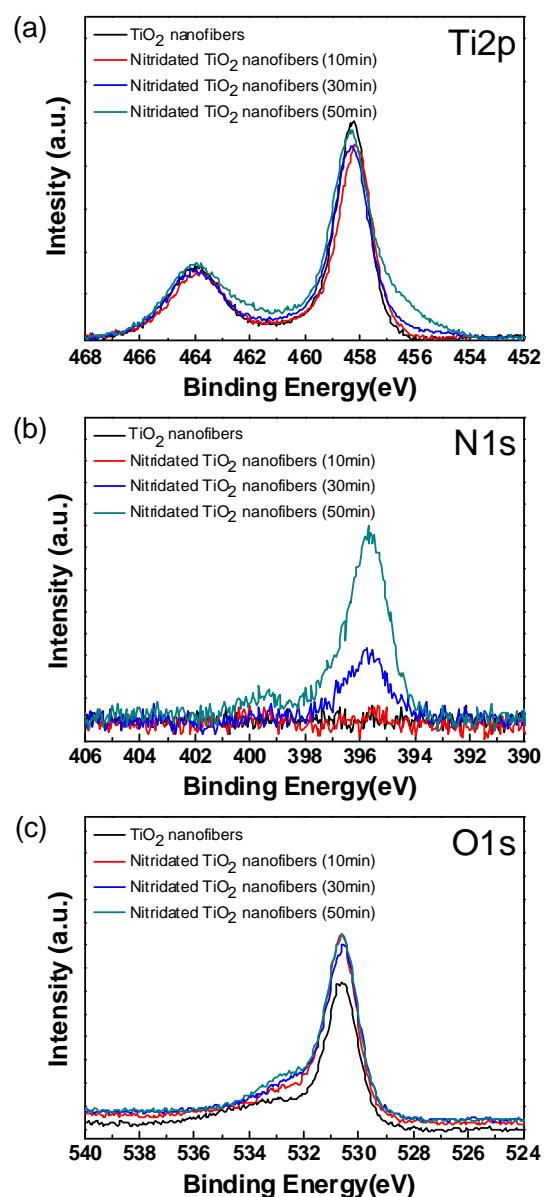


Figure SI2. High resolution XPS spectra of Ti 2p (a), N 1s (b) and O 1s (c) of TiO₂ nanofibers and nitridated TiO₂ nanofibers, which were treated with NH₃ gas for 10 min, 30 min, and 50 min.

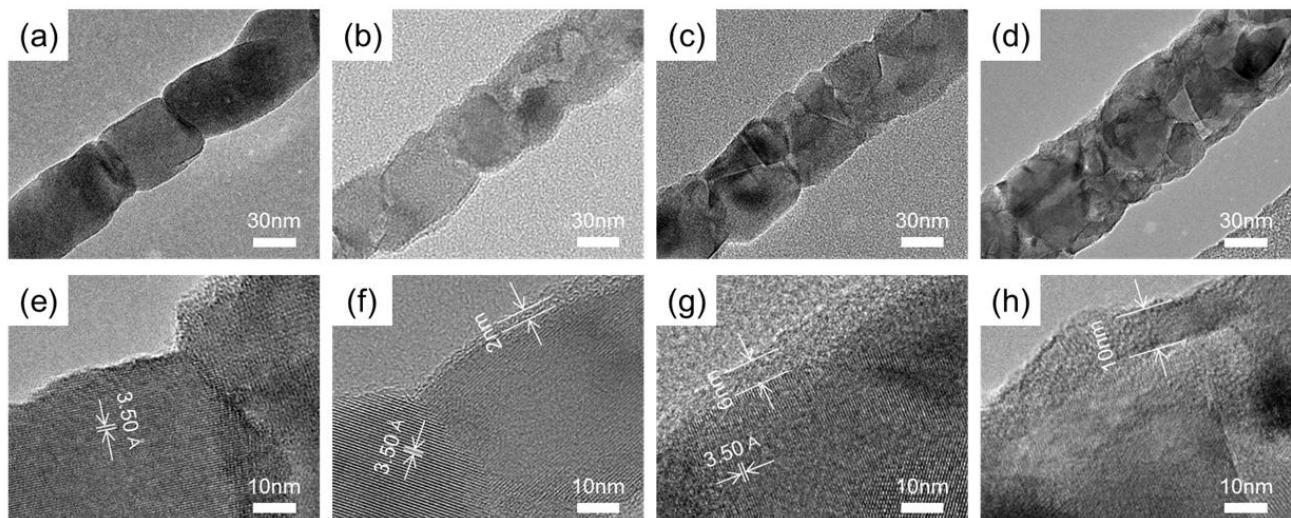


Figure SI3. TEM images and HR-TEM of ((a),(e)) TiO₂ nanofibers and TiO₂ nanofibers nitridated for ((b),(f)) 10 min, ((c),(g)) 30 min and ((d),(h)) 50 min, respectively.

Table 1. The areal and volumetric capacities of three different types of nanofibers at various C-rates.

Rate	Capacity	<i>TiO₂ nanofiber</i>	<i>TiO₂ hollow nanofiber</i>	<i>Nitridated TiO₂ hollow nanofiber</i>
0.2C	Areal capacity (mAh/cm ²)	0.172	0.179	0.200
	Volumetric capacity (mAh/cc)	81.85	68.86	76.91
2C	Areal capacity (mAh/cm ²)	0.053	0.069	0.107
	Volumetric capacity (mAh/cc)	25.36	26.39	41.2
5C	Areal capacity (mAh/cm ²)	0.021	0.032	0.059
	Volumetric capacity (mAh/cc)	10.04	12.17	22.53