Electronic Supplementary Information

Black mesoporous $Li_4Ti_5O_{12-\delta}$ nanowall arrays with improved rate performance as advanced 3D anodes for microbatteries

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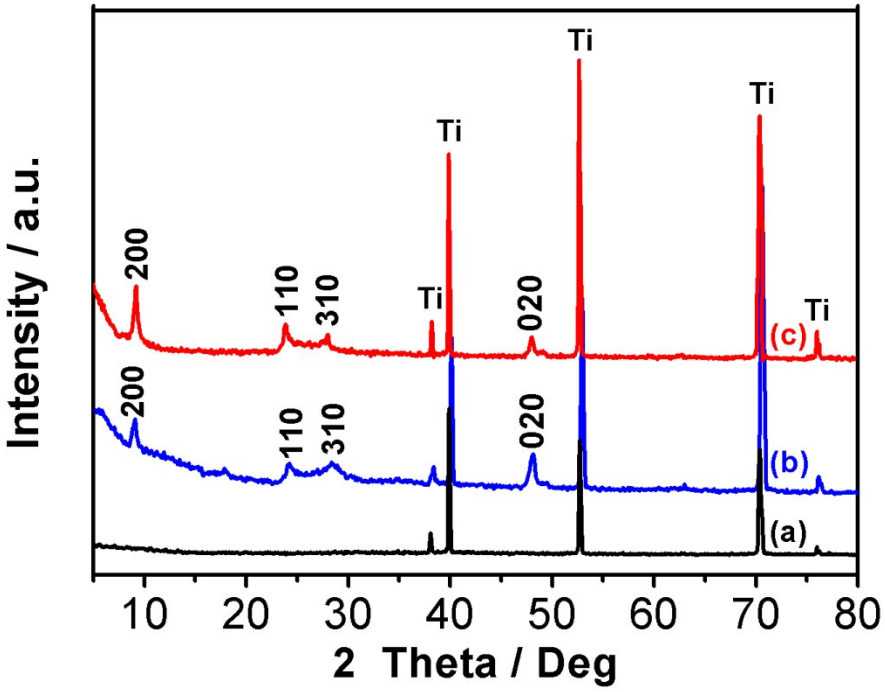

Fig. S1 XRD patterns of (a) Ti foil, (b) NTO nanowall arrays, and (c) HTO nanowall arrays.

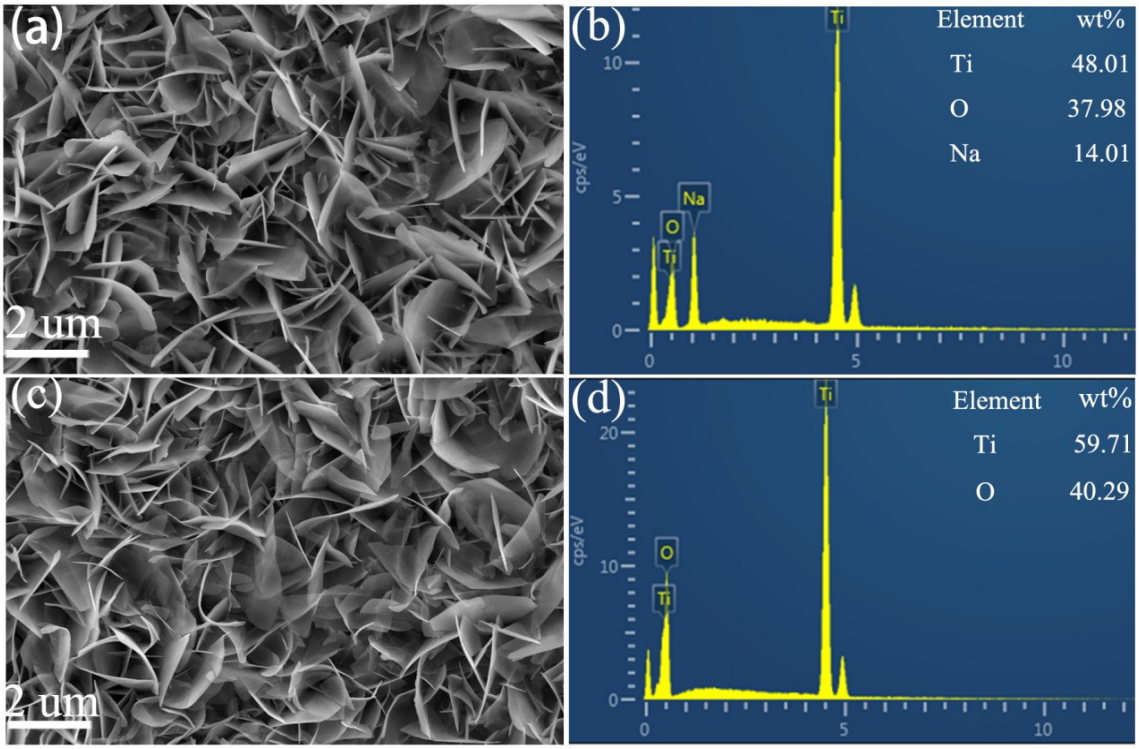

Fig. S2 (a, b) FESEM image and EDS spectrum of the NTO nanowall arrays. (c, d) FESEM image and EDS spectrum of the HTO nanowall arrays.

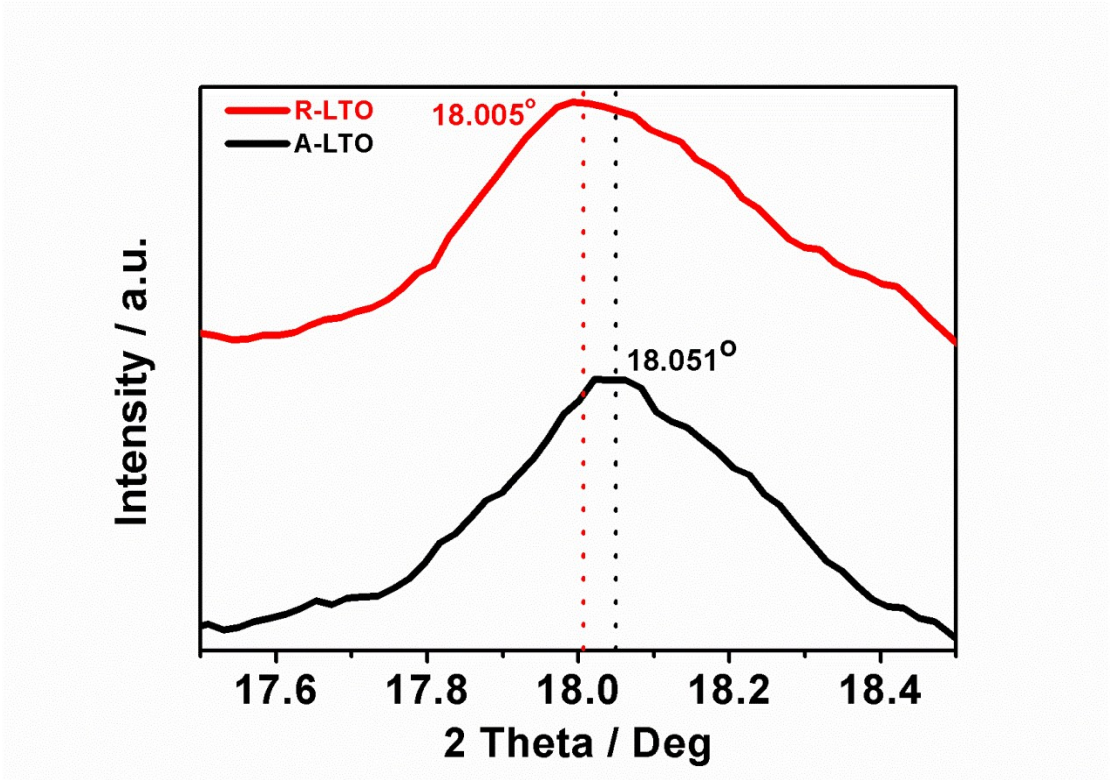

Fig. S3 Enlarged XRD patterns of (111) peaks for A-LTO and R-LTO nanowall arrays.

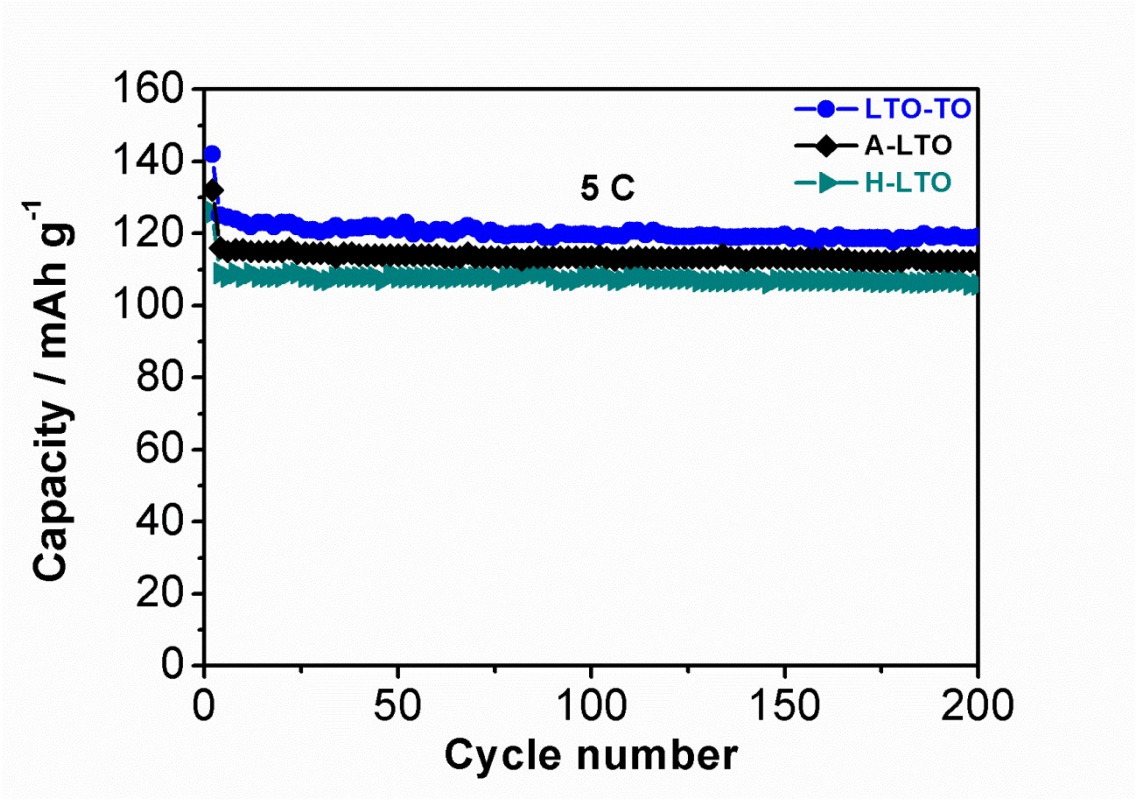

Fig. S4 Cycle performances of the LTO-TO, A-LTO, and H-LTO electrodes at a current rate of 5 C for 200 cycles.

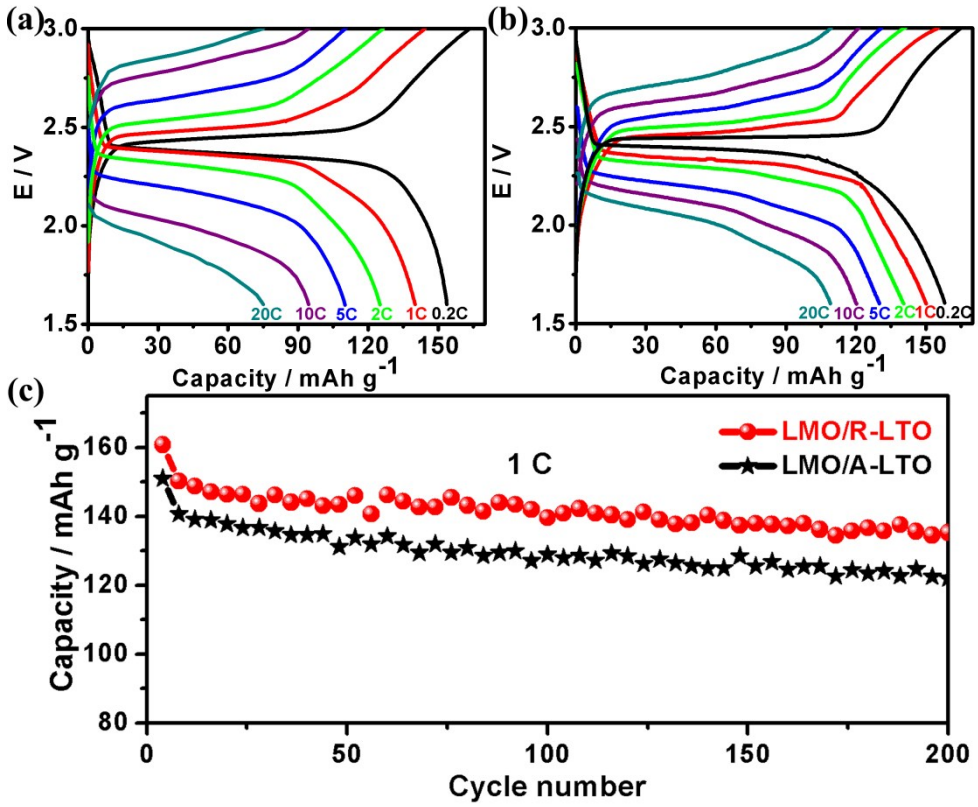

Fig. S5 Charge/discharge curves of (a) the A-LTO/LMO full cell and (b) R-LTO/LMO full cell at different C rates. (c) Cycle performances of the A-LTO/LMO and R-LTO/LMO full cells at a current rate of 1 C for 200 cycles.

Table S1 Comparison of rate performance between the present R-LTO sample and reported LTO/carbon composites.

Materials	Rate performance	Reference
Mesoporous $Li_4Ti_5O_{12}$/graphene composite	165 mAh g^{-1} at 1 C, 124 mAh g^{-1} at 20 C	1
$Li_4Ti_5O_{12}$/graphene composite	179.6 mA h g^{-1} at 0.1 C, 115.6 mA h g^{-1} at 10 C	2
$Li_4Ti_5O_{12}$/Carbon nanotubes composite	171 mA h g^{-1} at 1 C, 112 mAh g^{-1} at 20 C	3
$Li_4Ti_5O_{12}$/ Carbon nanotubes composite	149.2 mA h g^{-1} at 0.2 C, 73.3 mAh g^{-1} at 20 C	4
Carbon modified $Li_4Ti_5O_{12}$	149.2 mAh g^{-1} at 1 C, 77.5 mAh g^{-1} at 20 C	5
$Li_4Ti_5O_{12}$ particles in mesoporous C matrix	161.7 mA h g^{-1} at 0.2 C, 109.7 mA h g^{-1} at 20 C	6
Carbon coated $Li_4Ti_5O_{12}$ spheres	168 mA h g^{-1} at 0.1 C, 107 mA h g^{-1} at 10 C	7
Carbon coated $Li_4Ti_5O_{12}$ nanorods	168.4 mA h g^{-1} at 0.2 C, 115.9 mA h g^{-1} at 20 C	8
Black mesoporous $Li_4Ti_5O_{12-\delta}$ nanowall arrays	163 mAh g^{-1} at 0.2 C, 115 mAh g^{-1} at 20 C	This work

Reference

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