Supporting Information for

Facile Synthesis of Ultrathin ZnO Nanotubes with Well-organized Hexagonal Nanowalls and Sealed Layouts: Applications for Lithium Ion Battery Anodes

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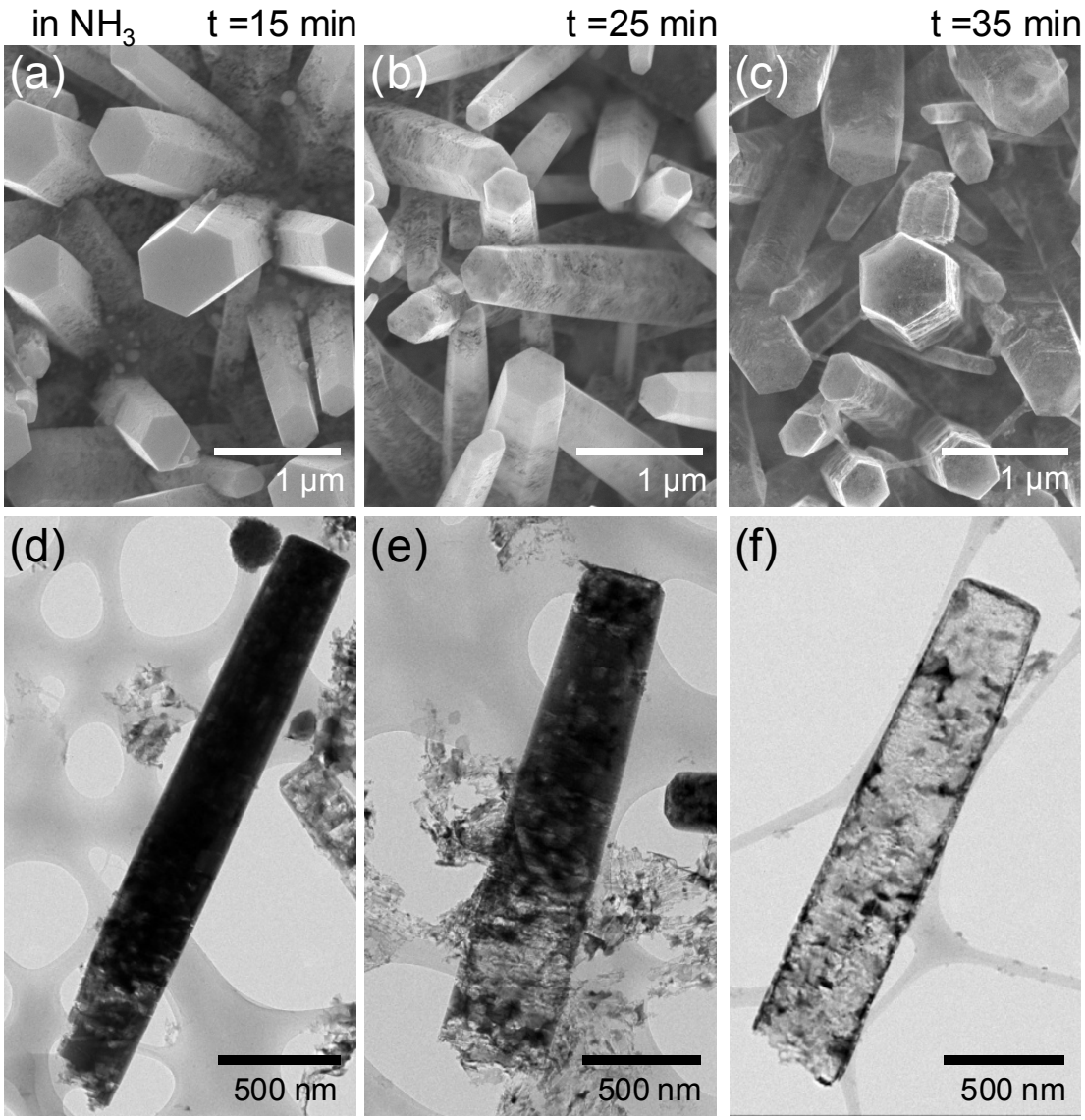

Figure S1. SEM and TEM images showing the morphological evolution from solid nanorods to porous and tubular structures at different annealing times in ambient NH_3; SEM (a-c) and TEM (d-f) images taken at t = 15 min (a, d), t = 25 min (b, e) and t = 35 min (c, f).

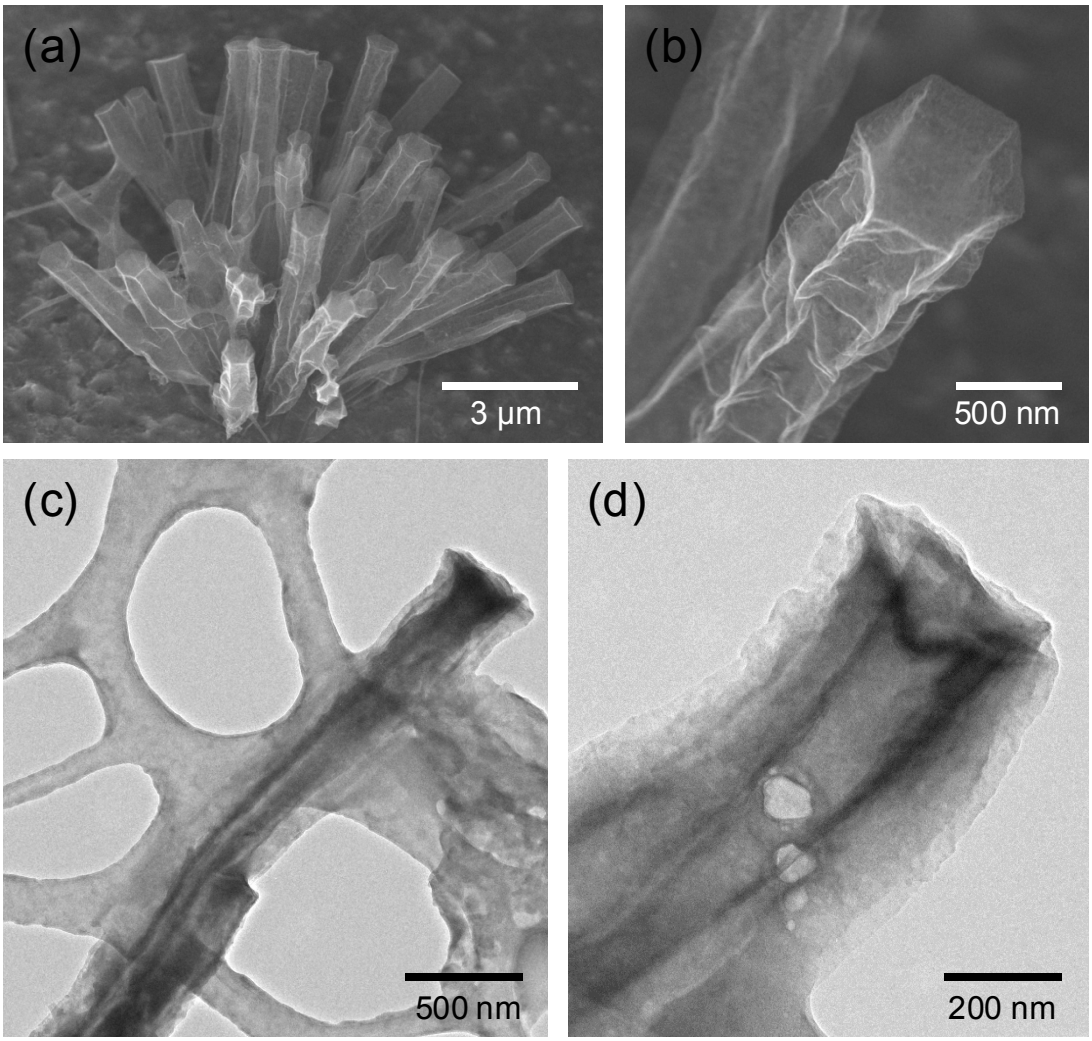

Figure S2. SEM (a, b) and TEM (c, d) images of the dented ZnO nanotubes after the excessive etching in ambient NH_3 ($t \geq 40$ min). During the TEM measurement, circular holes were formed on the nanotube walls due to high-energy electron irradiation (d).

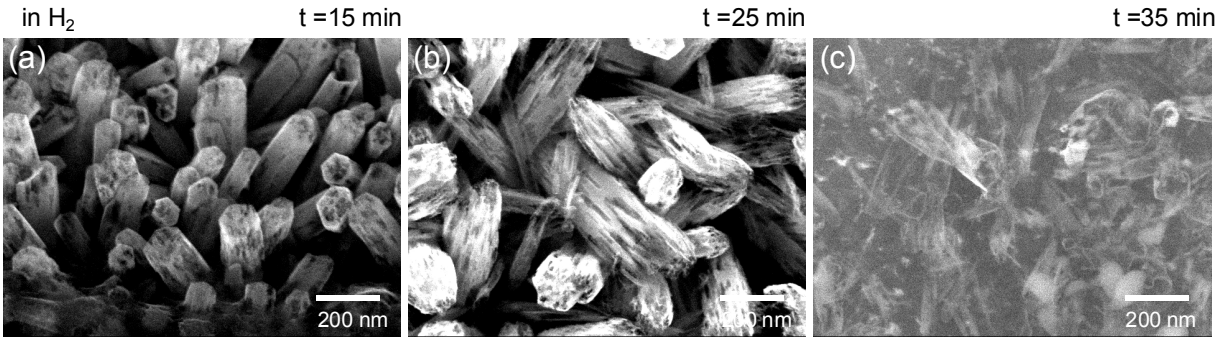

Figure S3. SEM images showing the morphological evolution of the ZnO nanorods after thermal annealing in H_2 ambient at 480 ºC for 15 min (a), 25 min (b) and 35 min (c).

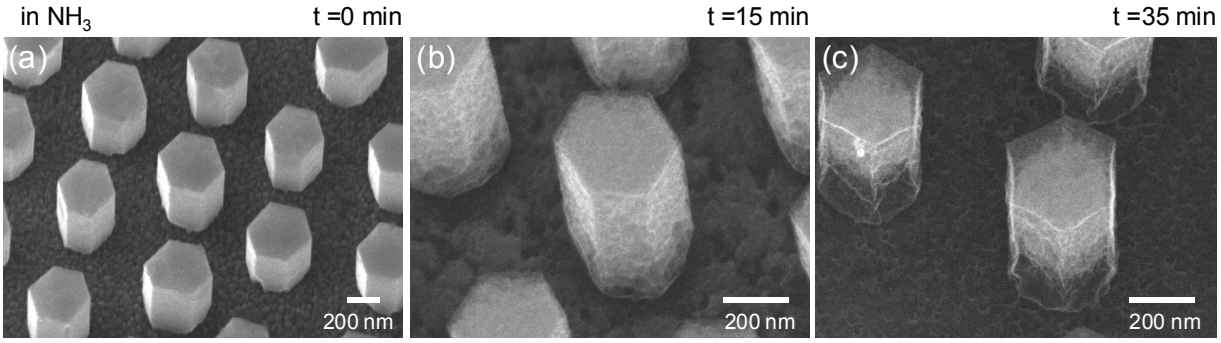

Figure S4. SEM images showing the morphological evolution of ZnO hexagonal rod arrays grown on epitaxial ZnO layer after thermal annealing in ambient NH_3 at 660 ºC for 0 min (a), 15 min (b) and 35 min (c).

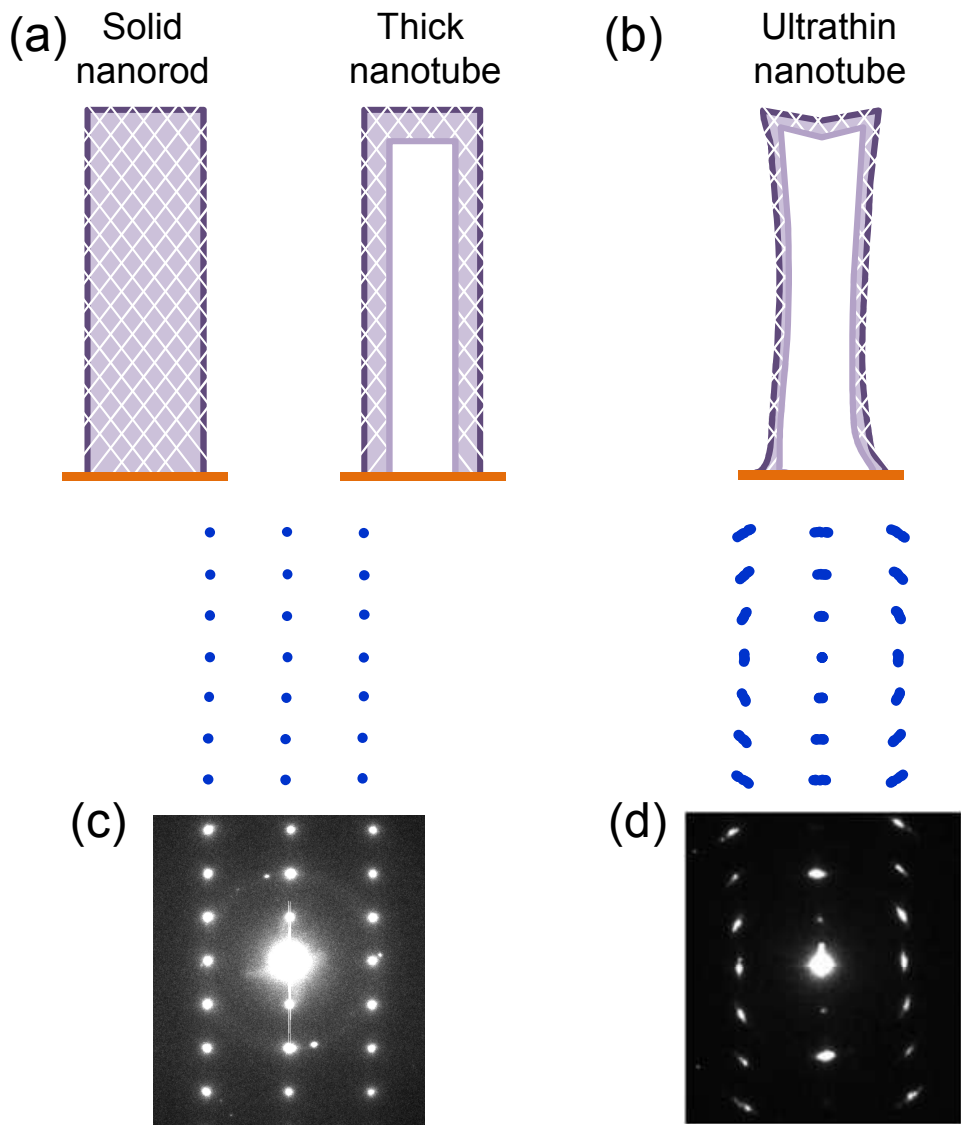

Figure S5. (a,b) Schematics comparing the SAED patterns of different types of nanostructures: solid nanorod and thick nanotube (a) and ultrathin nanotube (b). (c,d) Real SAED patterns of solid ZnO nanorod (c) and ultrathin nanotube (d).

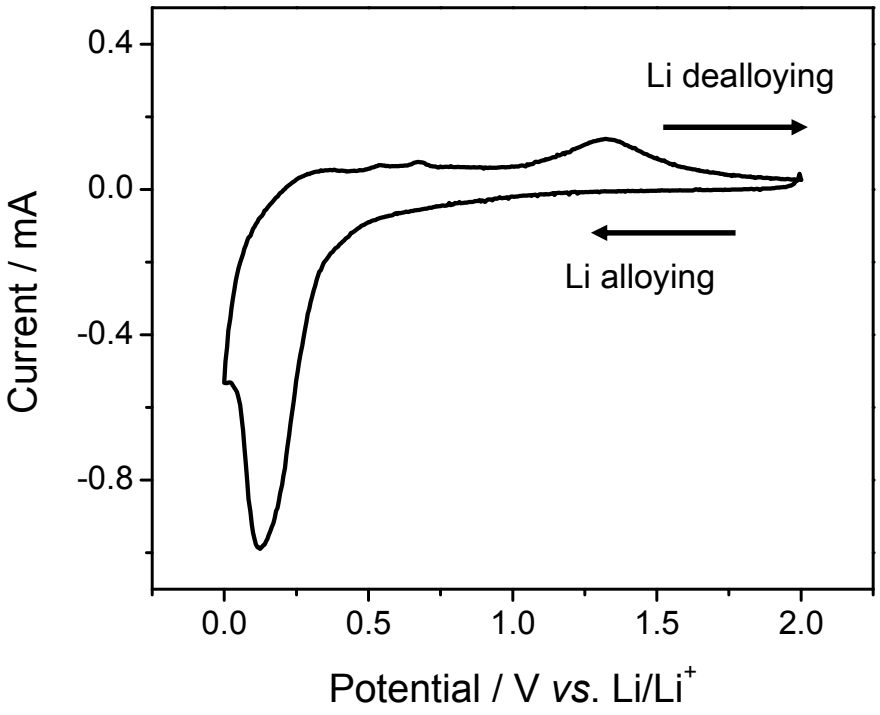

Figure S6. Cyclic voltammogram of the first cycle of ZnO nanotube electrode at a scan rate of 1 mV s-1. A strong cathodic peak (corresponding to Li alloying process) extending from 0.5 to 0.15 V can be attributed to the reduction of ZnO into Zn and formation of lithium-zinc alloy. Several weak anodic peaks (corresponding to Li dealloying process) in the range of 0-0.8 V corresponds to the dealloying of lithium-Zinc alloy, and the peak near 1.3 V might be related to the decomposition of Li_2O.

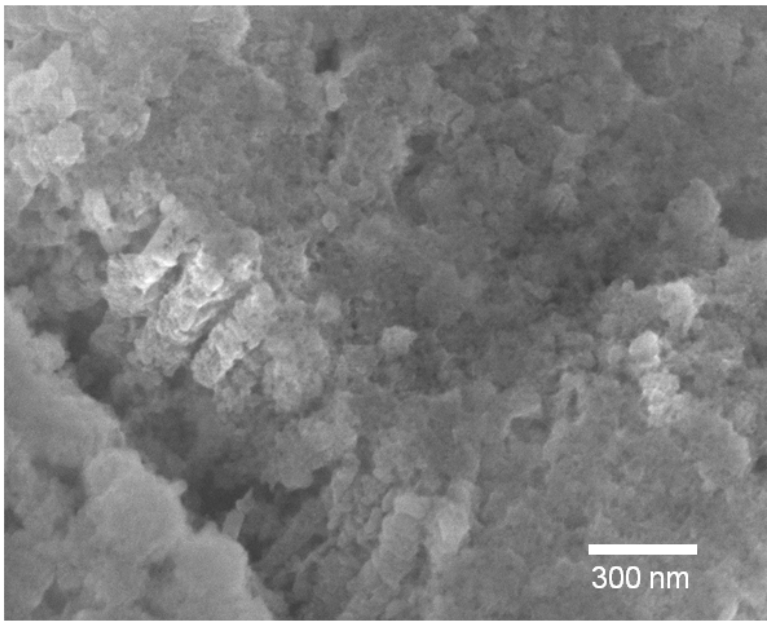

Figure S7. SEM image of the ZnO nanotube electrode after 50 cycles. After taking the sample out from the encapsulated cell, the residual organic electrolyte on the sample was removed by ethanol treatment.