Electronic Supplementary Information (ESI) for

Interconnected Mesoporous NiO Sheets Deposited onto TiO_2 Nanosheet Arrays as Binder-Free Anode Materials with Enhanced Performance for Lithium Ion Batteries

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Measurement of the Active Material

First, the sample of TiO_2@NiO growth on Ti substrate was weighed by an electronic balance, the result marked as M_1. Then the sample was immersed in dilute hydrochloric acid (1 M) in a beaker for 3 hours at room temperature. After that, ultrasonication for a certain period of time was employed to completely eliminate the active material attached to the substrate. Finally, the substrate was dried, followed by weighing and marking its weigh as M_2. The weight of the active materials was the difference between M_1 and M_2 (ΔM=M_1-M_2). Several samples were treated as above at a batch to obtain an average weight for narrowing down the error. Note that metallic titanium is insoluble in cold dilute hydrochloric acid. Hence, the weight of titanium substrate could be regarded as invariance. The weight of the active material for different electrodes are shown in Table S1.

Table S1. Weight of the active material for different electrodes

Electrodes	**Mass Density (mg/cm^2)**
TiO_2	0.1812
TiO_2+NiO (8 min)	0.2814
TiO_2+NiO (10 min)	0.3527
TiO_2+NiO (12 min)	0.4016

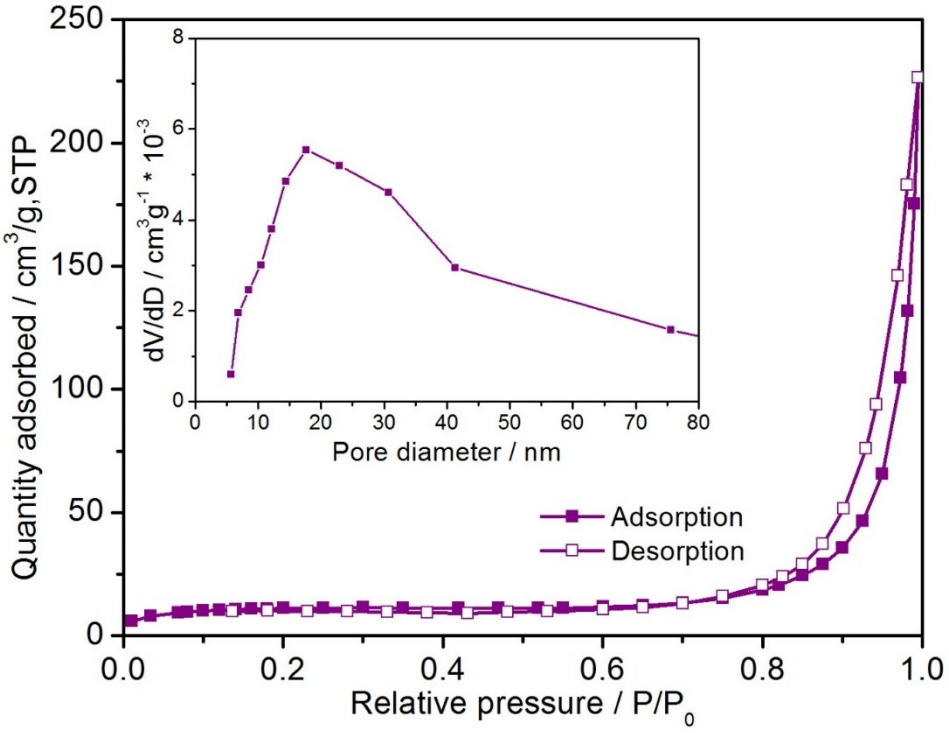

Fig. S1 Nitrogen adsorption-desorption isotherms for bare TiO_2 backbone with the corresponding BJH pore size distribution in the inset. With calculation, the BET specific surface area for TiO_2 was 39.7 m^2/g and the average pore width was 16.3 nm.

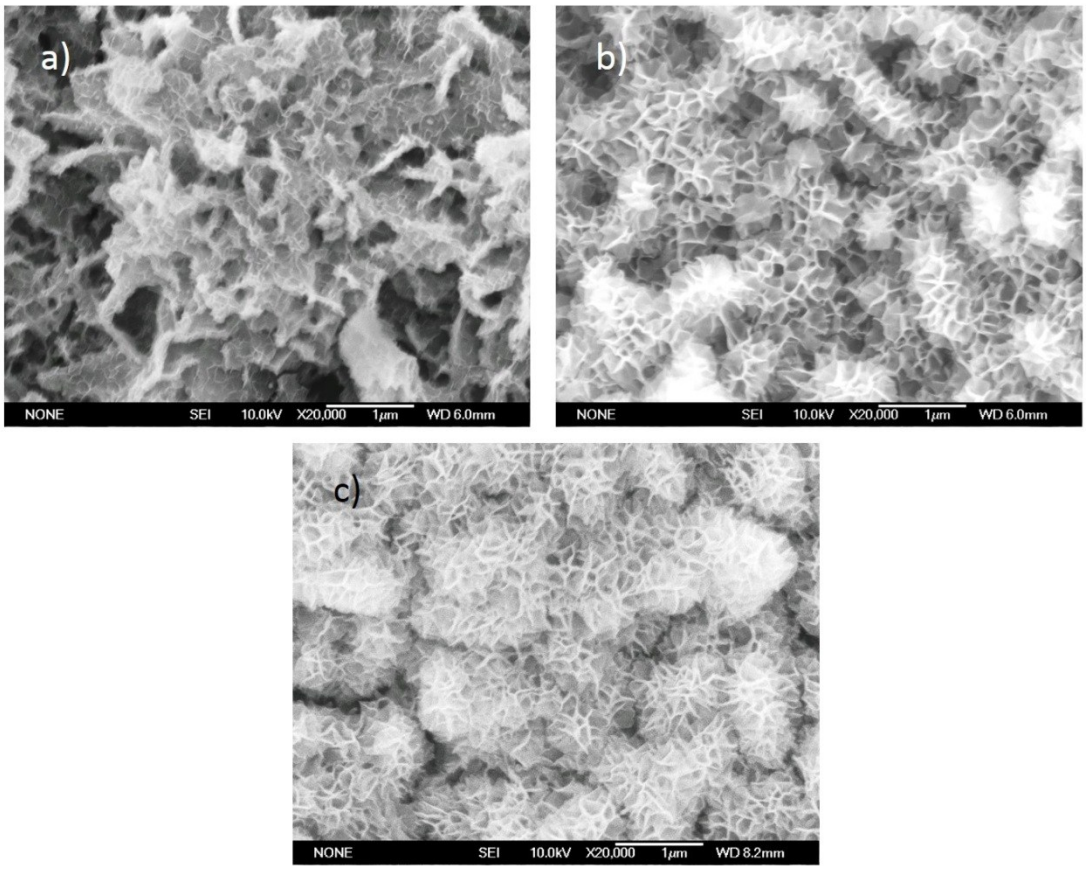

Fig. S2 Chronological SEM images for TiO_2@NiO samples with different NiO deposition time of (a) 8 min, (b) 10 min and (c) 12 min.

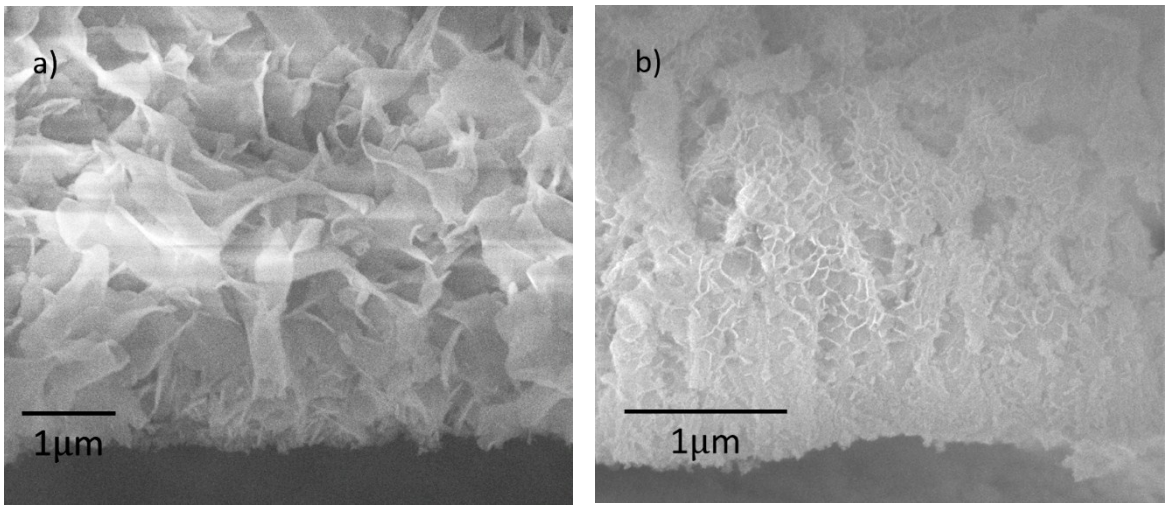

Fig. S3 Cross sectional SEM images of (a) TiO_2 arrays and (b) TiO_2@NiO arrays.

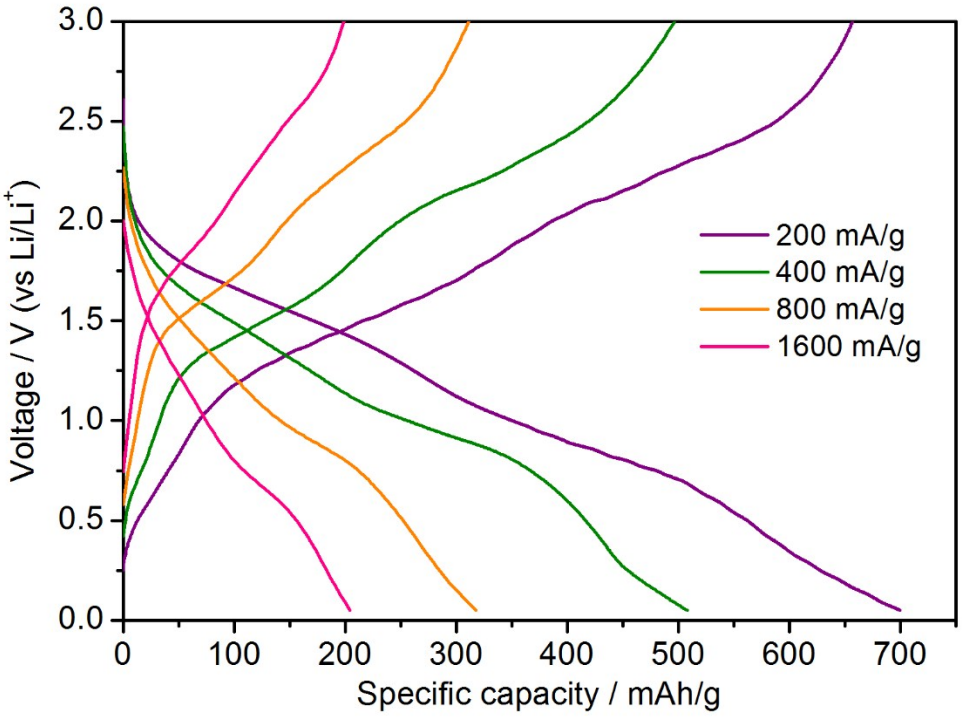

Fig. S4 Charge/discharge curves for hybrid TiO_2@NiO electrode under different current densities.

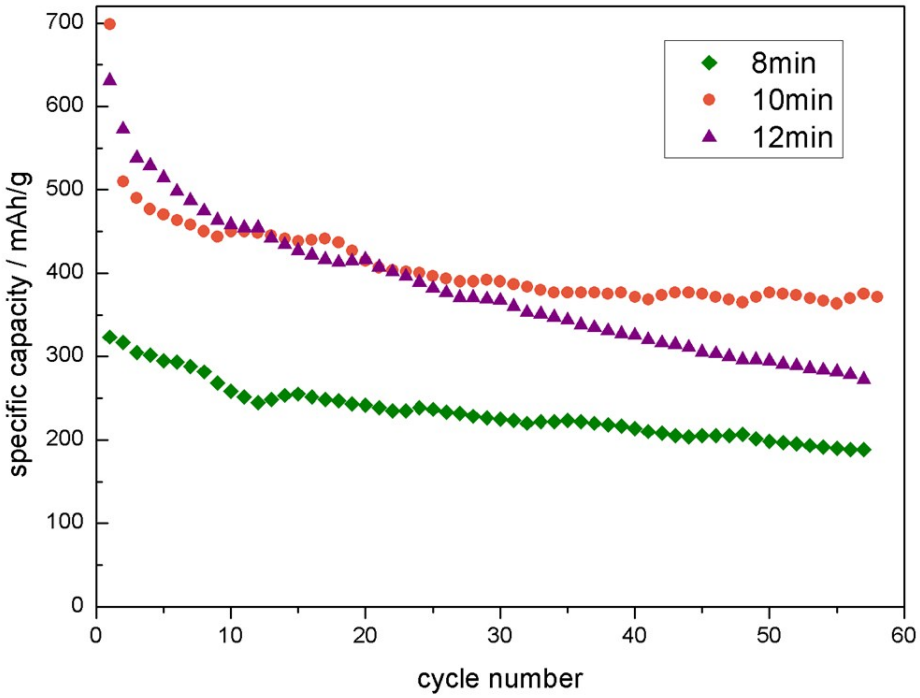

Fig. S5 Galvanostatic charge/discharge measurement for TiO_2@NiO electrodes with NiO deposited for 8, 10 and 12 min at 200 mA/g. The capacity mentioned here refers to the discharge capacity.

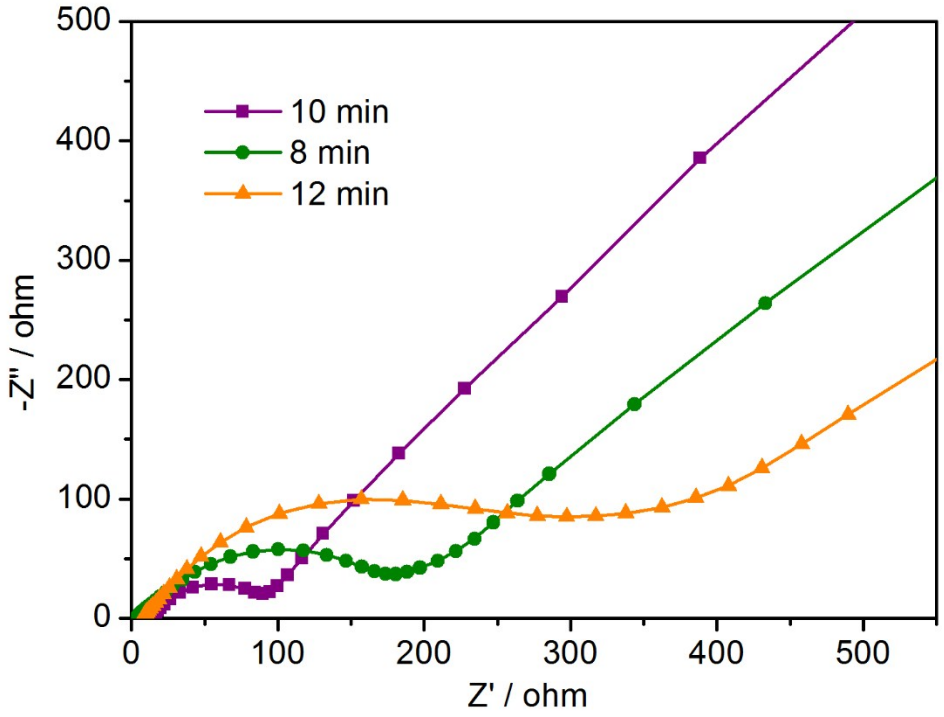

Fig. S6 Nyquist plots of TiO_2@NiO electrodes with NiO deposited for 8, 10 and 12 min, scanning range from 100 kHz to 10 mHz.