Supporting Information

Coaxial TiO$_2$-Carbon Nanotube Sponges as Compressible Anodes for Lithium-Ion Batteries

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Supporting Information

Figure S1

Figure S2

Figure S3

Figure S4

Figure S5

Figure S6

Figure S7
Fig. S1 (a) SEM image of CNT sponge. (b) TEM image of CNT sponge.

Fig. S2 (a) XRD pattern of pure CNT sponges. (b) Raman spectra of anatase TiO$_2$-CNT sponges. (c) Energy-dispersive X-ray spectrometer (EDX) elemental mapping analysis of a TiO$_2$-CNT coaxial structure (left SEM image). The red pattern represents the carbon element from internal CNT, while the green and blue patterns represent the titanium and oxygen element from external TiO$_2$ layer, respectively. The dots in the background come from dispersed solution after sonication dropped on the substrate.
**Fig. S3** (a) Nitrogen sorption isotherms for CNT sponges and TiO$_2$-CNT sponges. (b) The pore size distributions for respective samples.

**Fig. S4** (a) Charge/discharge voltage profiles of the CNT sponge, amorphous TiO$_2$-CNT sponge and anatase TiO$_2$-CNT sponge. (b) Compressive σ-ε curves of anatase TiO$_2$-CNT sponges at 10 %-90 % strain.
Fig. S5 Photos of (a) compressing a composite sponge and (b) anatase TiO$_2$-CNT sponges with different initial thicknesses ($h_i$).

Fig. S6 Specific capacities of anatase TiO$_2$-CNT sponge anodes with different CNT contents.
Fig. S7 (a) Low- and (b) High-magnification SEM images of anatase TiO$_2$-CNT sponges after 1000 cycles compression. The TiO$_2$ layer coating on CNTs was partially broken (white arrows).