Encapsulation of TiO$_2$(B) Nanowire Cores into SnO$_2$/Carbon Nanoparticle Shells and Their High Performance in Lithium Storage

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Supporting Information

Captions

Fig. S1 the TGA results on (a) TSC1, (b) TSC2.

Fig. S2 X-ray diffraction patterns of as-prepared H$_2$Ti$_3$O$_7$ nanowires and TS1 sample.

Fig. S3 Low and high magnification FE-SEM images of the hybrid nanowires: (a)

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low magnification FE-SEM image of **TSC1** and higher magnification (inset); **(b)** low magnification FE-SEM image of **TS1** and higher magnification (inset); **(c)** low magnification FE-SEM image of **TSC2** and higher magnification (inset); **(d)** low magnification FE-SEM image of **TS2** and higher magnification (inset). (The hybrid nanowires of **TSC1** and **TSC2** are much smoother than those of **TS1** and **TS2** because of the many SnO$_2$ nanocrystals growing on the surface of the **TS1** and **TS2** nanowires.)

**Fig. S4 (a)** TEM image of single **TSC2** nanowire, indicating that SnO$_2$ nanocrystals are encapsulated in carbonaceous material surrounding the TiO$_2$(B) nanowire. **(b)** High-magnification TEM image of **TS2** nanowire, indicating that SnO$_2$ nanocrystals surround the TiO$_2$(B) nanowire.

**Fig. S5** Energy dispersive X-ray (EDX) spectra and corresponding content tables for the samples (insets): **(a)** TSC1; **(b)** TS1; **(c)** TSC2; **(d)** TS2. (The signals of Carbon result from the tape used for SEM observations, while those of Aluminum may be due to the Al stage used during SEM.)

**Scheme S1** Charge diffusion and conducting mechanism of composite nanowires during charge/discharge processes: **(a)** TSC1 and TSC2; **(b)** TS1 and TS2.

**Fig. S6 (a)** Cyclic voltammograms of **TS1** electrode from the first cycle to the fifth cycle at a scan rate of 0.1 mV s$^{-1}$ in the voltage range of 0.01–3.0 V. **(b)** Capacity–cycle number curves from the first cycle to the 66$^{th}$ cycle of composite electrodes cycled between 1.0 and 3.0 V vs. Li$^+/\text{Li}$ at the current density of 60 mA g$^{-1}$.
Fig. S1
Fig. S2
Fig. S3
Fig. S4
Fig. S5
Scheme S1
Fig. S6