Dispersion of SnO$_2$ Nanocrystals on TiO$_2$(B) Nanowires as Anode Material for Lithium Ion Battery Application

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Supporting Information

Captions

**Fig. S1** Low magnification FE-SEM images show the high uniformity of H$_2$Ti$_3$O$_7$ nanowires and TiO$_2$(B)@SnO$_2$ nanowires, while the high magnification FE-SEM images reveal many aggregations of the nanowires: (a) low magnification FE-SEM image of H$_2$Ti$_3$O$_7$ nanowires; (b) high magnification image of H$_2$Ti$_3$O$_7$ nanowires; (c)
low magnification image of TiO$_2$(B)@SnO$_2$ nanowires; (d) high magnification image of TiO$_2$(B)@SnO$_2$ nanowires. (Gold nanoparticles with grain size of ~5-10 nm were evaporated on the surface of the H$_2$Ti$_3$O$_7$ nanowire samples to reduce electrostatic charging during SEM imaging.)

**Fig. S2** (a) TEM image of single TiO$_2$(B)@SnO$_2$ nanowire, demonstrating that SnO$_2$ nanocrystals surround the TiO$_2$(B) nanowires. (b) High-magnification TEM image of TiO$_2$(B)@SnO$_2$ nanowire. (c) EDX spectrum of TiO$_2$(B)@SnO$_2$ nanowires and corresponding content table for the sample (inset). The carbon and aluminum are respectively attributable to the tape and the Al stage used during SEM characterization.

**Scheme S1** Charge diffusion and conducting mechanism of TiO$_2$(B)@SnO$_2$ nanowires during charge/discharge cycling. The inset shows a high resolution TEM image of a TiO$_2$(B)@SnO$_2$ nanowire.

**Fig. S3** Capacity–cycle number and coulombic efficiency curves from the first cycle to the 50th cycle for TiO$_2$(B)@SnO$_2$ hybrid nanowire electrode between 1.0 and 3.0 V vs. Li$^+$/Li at the current density of 30 mAg$^{-1}$. 
Fig. S1
Fig. S2
Scheme S1
Fig. S3