1 Dispersion of SnO₂ Nanocrystals on TiO₂(B) Nanowires as Anode

2 Material for Lithium Ion Battery Application

- 3
- 4 Zunxian Yang,^{1*} Guodong Du,² Qing Meng^{2,3}, Zaiping Guo,^{2,3*} Xuebin Yu,^{4*}
- 5 Zhixin Chen,³ Tailiang Guo,¹ Rong Zeng²
- 6
- ⁷ ¹Engineering Research Center for Field Emission Display Technology of the Ministry
- 8 of Education, Fuzhou University, Fuzhou 350002, P. R. China
- 9 ²Institute for Superconducting & Electronic Materials, University of Wollongong,
- 10 NSW 2522, Australia
- ³School of Mechanical, Materials & Mechatronics Engineering, University of
 Wollongong, NSW 2522, Australia
- ⁴Department of Materials Science, Fudan University, Shanghai 200433, P. R. China
- 14
- 15 Supporting Information
- 16
- 17

```
18 Captions
```

- 19 Fig. S1 Low magnification FE-SEM images show the high uniformity of $H_2Ti_3O_7$
- 20 nanowires and TiO₂(B)@SnO₂ nanowires, while the high magnification FE-SEM
- 21 images reveal many aggregations of the nanowires: (a) low magnification FE-SEM
- image of $H_2Ti_3O_7$ nanowires; (b) high magnification image of $H_2Ti_3O_7$ nanowires; (c)

^{*} Corresponding author should be addressed. Tel.: +61 2 4221 5225; Fax: +61 2 4221 5731

E-mail: <u>zguo@uow.edu.au</u> (Z. Guo) <u>yangzunxian@hotmail.com</u> (Z. Yang)

yuxuebin@fudan.edu.cn (X. Yu)

23 low magnification image of TiO₂(B)@SnO₂ nanowires; (d) high magnification image 24 of $TiO_2(B)@SnO_2$ nanowires. (Gold nanoparticles with grain size of ~5-10 nm were evaporated on the surface of the H₂Ti₃O₇ nanowire samples to reduce electrostatic 25 26 charging during SEM imaging.) Fig. S2 (a) TEM image of single $TiO_2(B)@SnO_2$ nanowire, demonstrating that SnO_2 27 28 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 29 30 corresponding content table for the sample (inset). The carbon and aluminum are 31 respectively attributable to the tape and the Al stage used during SEM characterization. 32 Scheme S1 Charge diffusion and conducting mechanism of TiO₂(B)@SnO₂ 33 34 nanowires during charge/discharge cycling. The inset shows a high resolution TEM 35 image of a $TiO_2(B)@SnO_2$ nanowire. Fig. S3 Capacity–cycle number and coulombic efficiency curves from the first cycle 36 to the 50th cycle for TiO₂(B)@SnO₂ hybrid nanowire electrode between 1.0 and 3.0 V 37 vs. Li^+/Li at the current density of 30 mAg⁻¹. 38

- 39
- 40





Fig. S1





Fig. S2

50

51



Scheme S1

SnO₂ nanocrystals



- 58



Ò

Cycle number

Fig. S3