

Supplementary Information

Synthesis of micro-assembled Si/titanium silicide nanotube anodes for high-performance lithium-ion batteries

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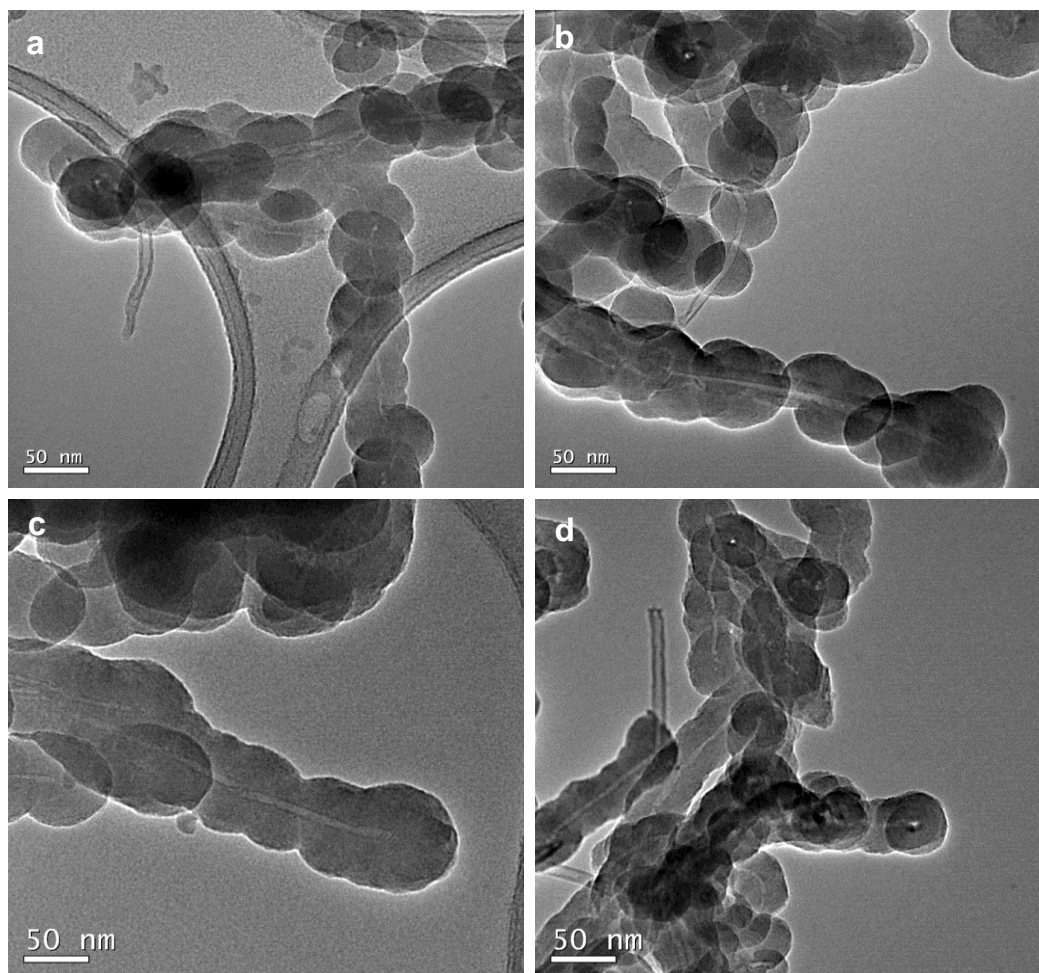


Figure S1. Control of SiO₂ layer thickness by volumetric ratio of NH₄OH and TEOS. (a) NH₄OH /TEOS = 16 mL/9 mL, (b) NH₄OH /TEOS = 8 mL/9 mL, (c) NH₄OH /TEOS = 12 mL/12 mL, and (d) NH₄OH /TEOS = 12 mL/9 mL.

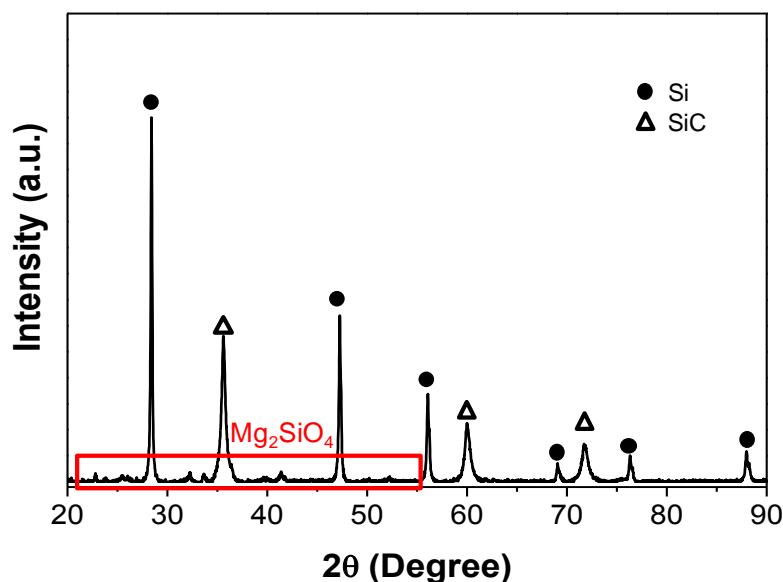


Figure S2. XRD patterns of as-synthesized CNT@SiC@Si prepared by a magnesiothermic reduction of SiO₂-coated CNTs. During the magnesiothermic reaction, SiC was formed at the interface between CNT and Si due to additional reaction of carbon source, CNT, and Si. Solid circle and triangle represent crystalline Si and SiC, respectively. Small peaks represent Mg₂SiO₄ by-products.

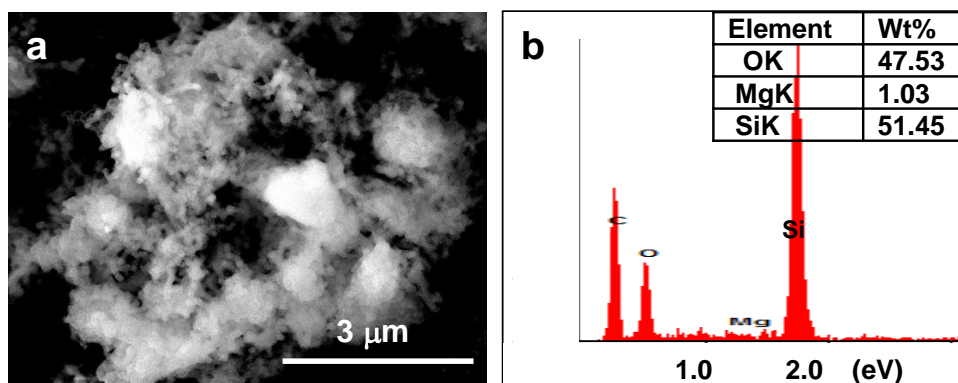


Figure S3. (a) SEM images and (b) EDAX profile of carbon-coated Si nanotubes.

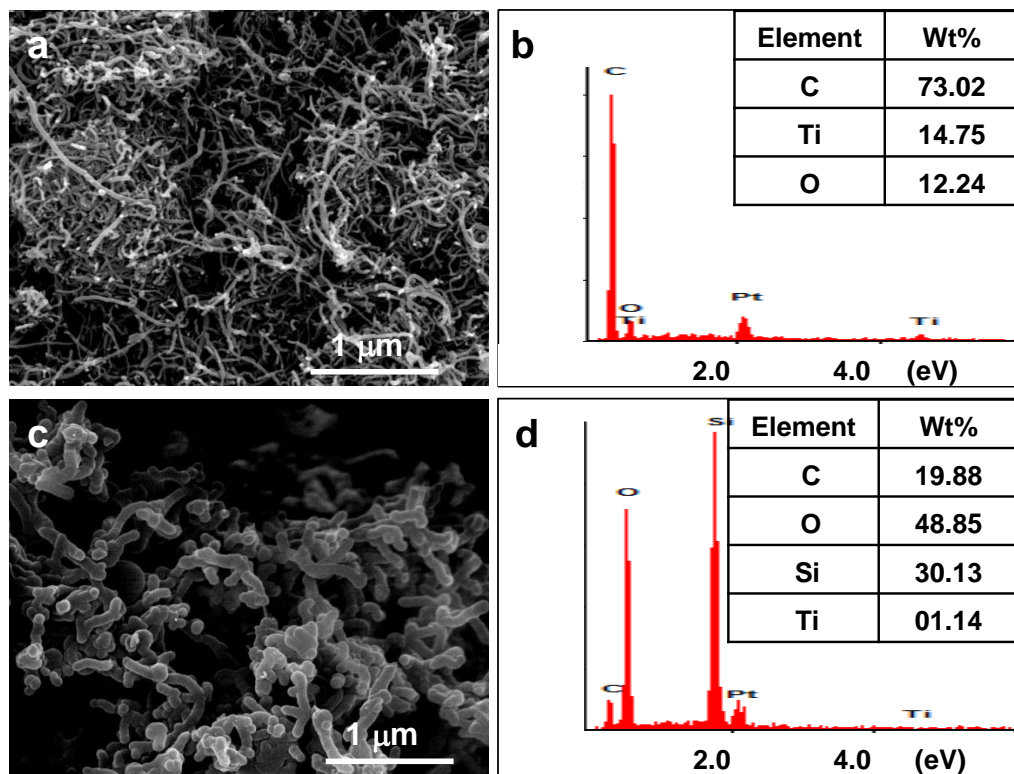


Figure S4. SEM images of (a) TiO₂-coated CNT and (c) micro-assembled CNT@TiO₂@SiO₂ particles. EDAX profiles and elemental contents of (b) TiO₂-coated CNT and (d) micro-assembled CNT@TiO₂@SiO₂ particles.

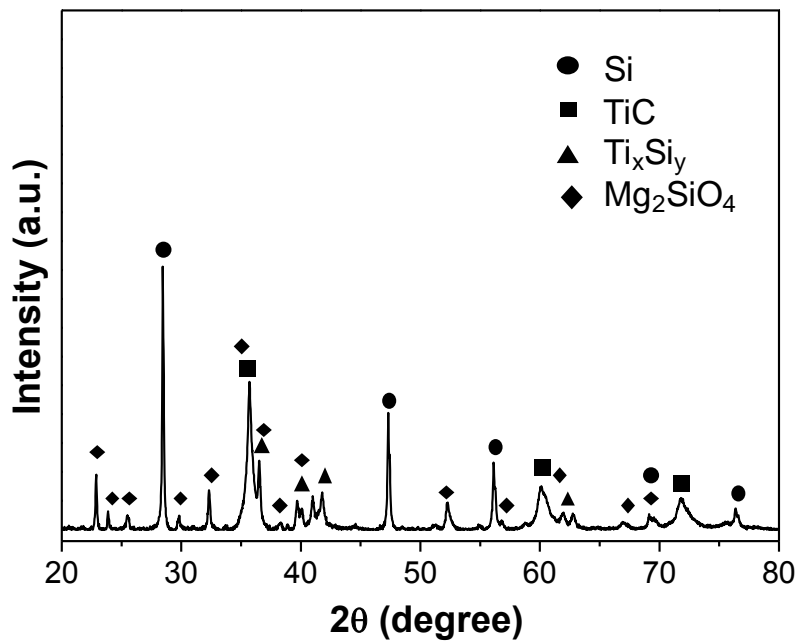


Figure S5. XRD patterns of as-synthesized CNT@TiC/Ti_xSi_y@Si prepared by magnesiothermic reduction of TiO₂/SiO₂ double layer coated CNTs. During magnesiothermic reaction, TiC was formed at the interface between CNT and TiO₂ due to additional reaction of carbon source, CNT, and TiO₂ in addition Ti_xSi_y was formed at the interface between SiO₂ and TiO₂.

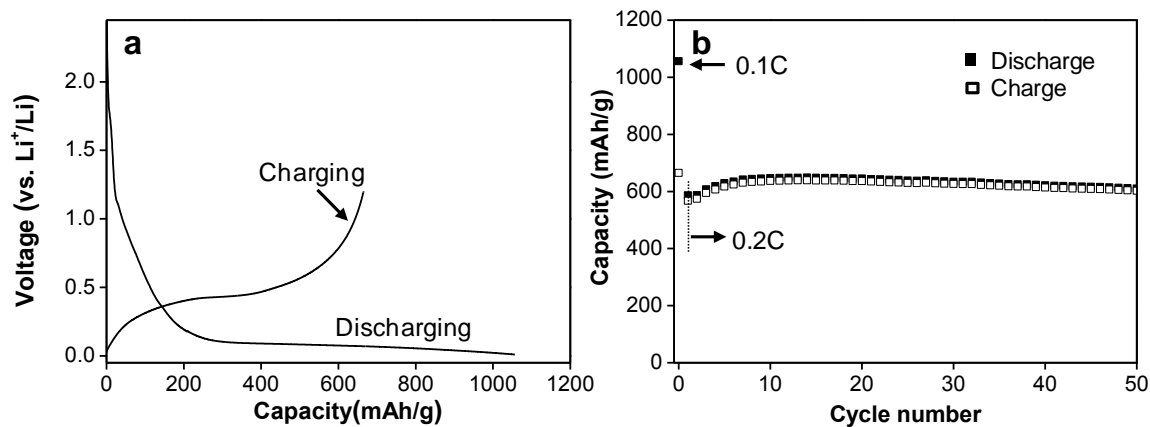


Figure S6. Electrochemical properties of carbon-coated CNT@TiC/Ti_xSi_y@Si electrodes.

(a) The first cycle voltage profile and (b) cycling performance of the carbon-coated CNT@TiC/Ti_xSi_y@Si electrodes was obtained in the range of 0.01-1.2 V.

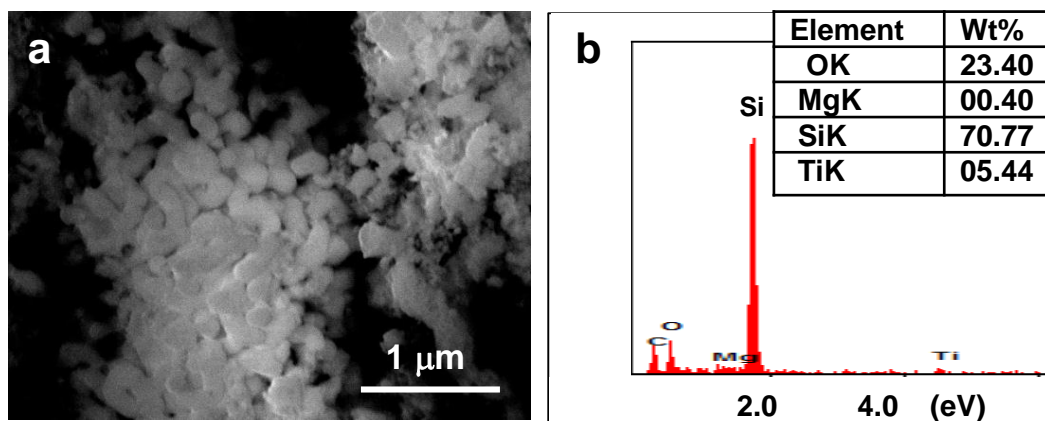


Figure S7. (a) SEM image and (b) EDAX profile of carbon-coated $Ti_xSi_y@Si$ nanotubes.