# Core-Shell Ti@Si Coaxial Nanorod Arrays Formed Directly on Current Collectors for Lithium-Ion Batteries

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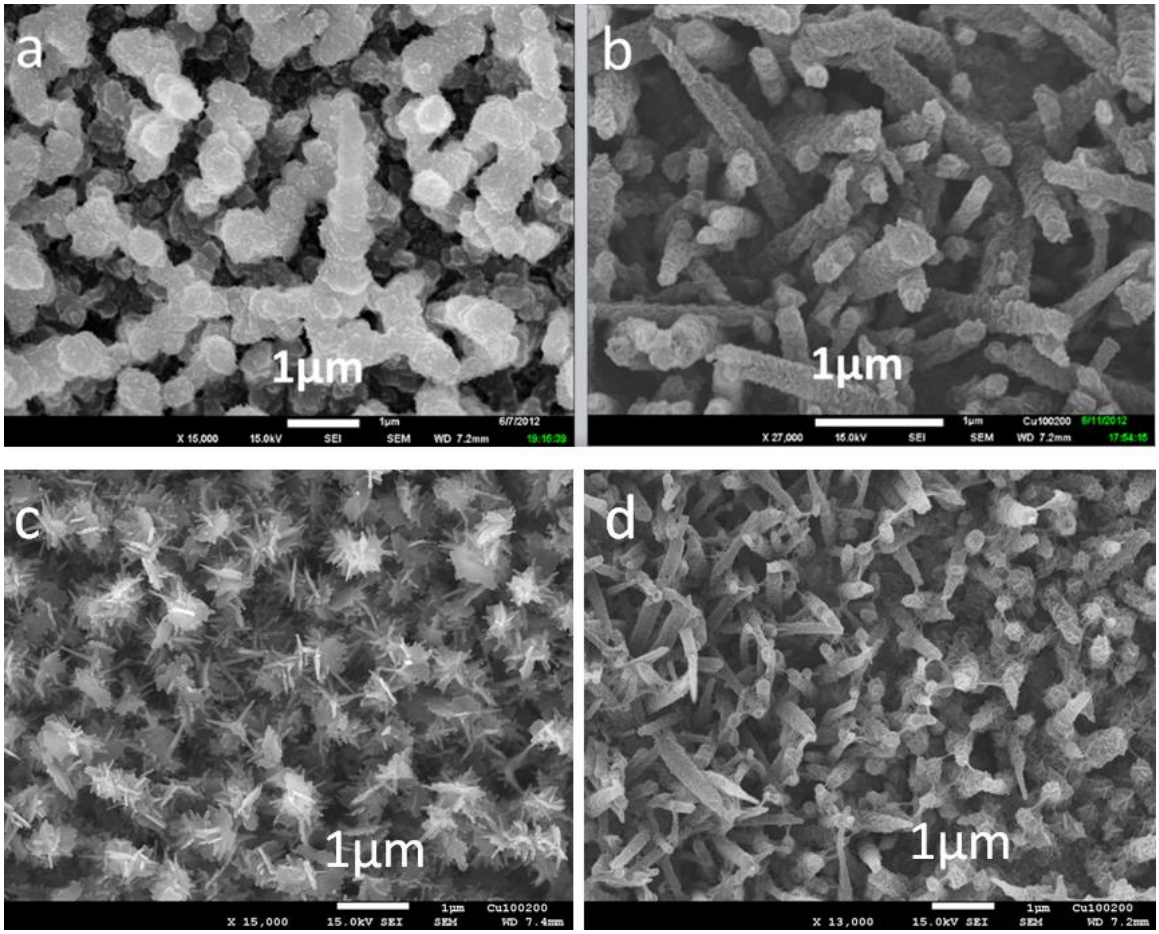


**Figure S1.** Top-view FESEM images of the results from control experiments of magnesiothermically reduced $TiO_2$ nanorod arrays on titanium foil without $SiO_2$ coating: (a) after Mg reduction of the $TiO_2$ nanorod arrays; (b) metallic Ti nanorod arrays obtained after 0.5 M HCl treatment of (a) to remove MgO. (c-d) Minor phases of other morphologies after Mg reduction of the $TiO_2$ nanorod arrays and before HCl etching and it could be attributed to the use of excessive amount of Mg powder.

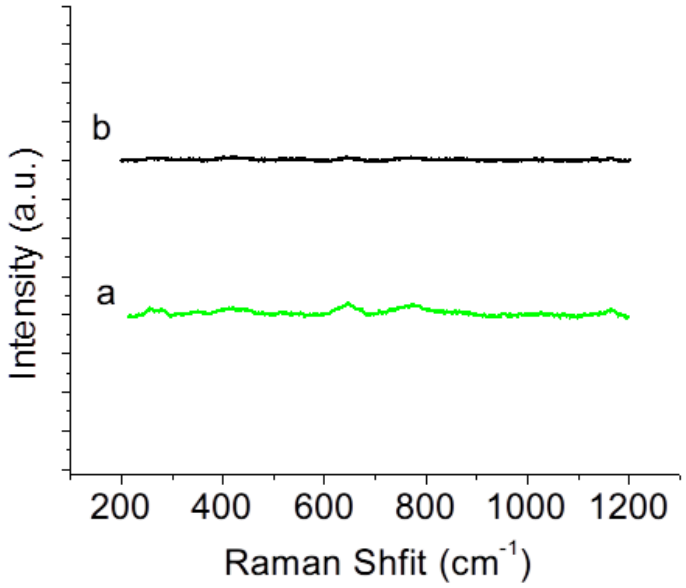


**Figure S2.** Raman spectra of the magnesiothermically reduced $TiO_2$ nanorod arrays on titanium foils without $SiO_2$ coating: (a) after Mg reduction of the $TiO_2$ nanorod arrays; (b) metallic Ti nanorod arrays obtained after 0.5 M HCl treatment of (a) to remove MgO.

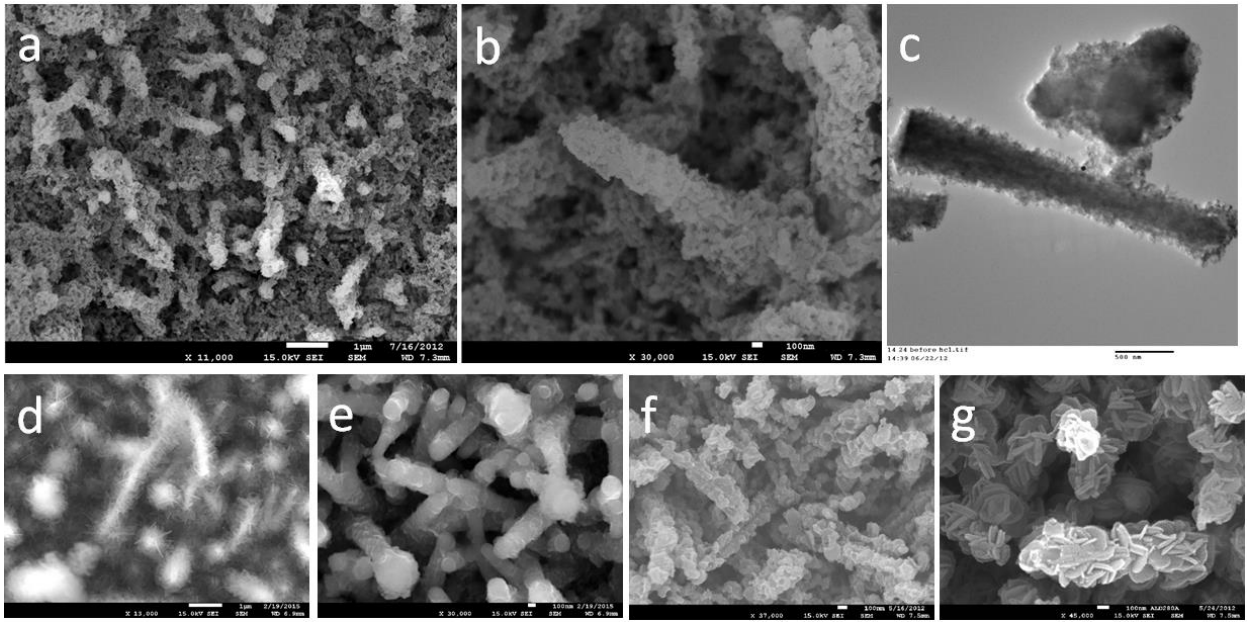


**Figure S3.** Additional characterization of the Ti/MgO@Si/MgO nanorod arrays after magnesiothermic reduction treatment of $TiO_2$@$SiO_2$ nanorod arrays: (a) FESEM image of the typical morphology at low-magnification view; (b) high-magnification view of few typical nanorods showing their rough external surface; (c) TEM image of a typical Ti/MgO@Si/MgO nanorod showing the evenly distributed MgO along the nanorod with rough surface; (d-g) minor phase of other morphologies observed which could be attributed to the excessive amount of Mg used and the formation of structured MgO on the surface of the nanorods.

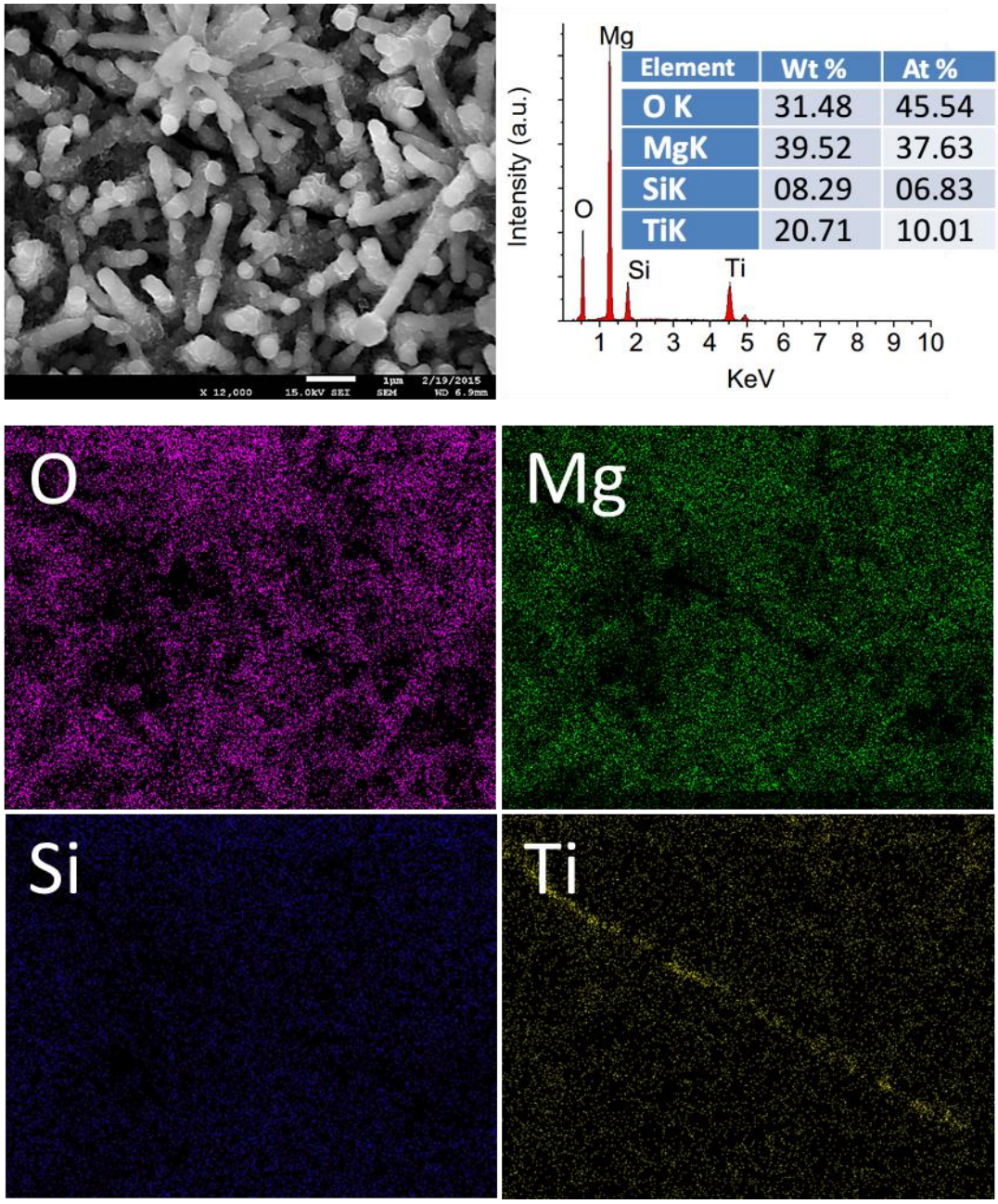


**Figure S4.** EDS analysis and elemental mapping of the intermediate component of Ti/MgO@Si/MgO nanorod arrays on metallic titanium substrate after magnesiothermic reduction of the $TiO_2$@$SiO_2$ nanorod arrays and before etching by dilute HCl to remove MgO.

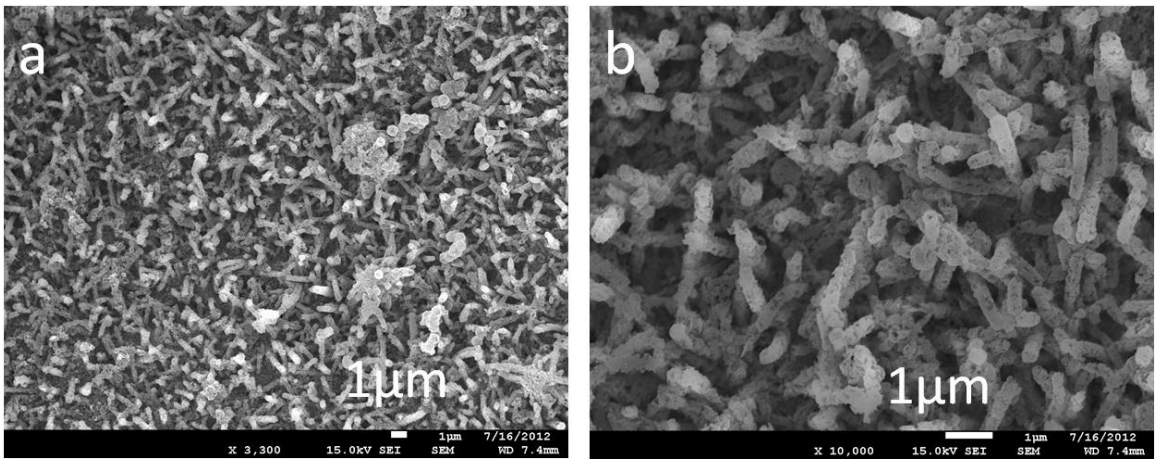


**Figure S5**. Additional characterization of the Ti@Si coaxial nanorod arrays on Ti foil after etching off MgO by HCl: (a) low-magnification overall view showing the general morphology and distribution of Ti@Si nanorod arrays, (b) zoom-in high-magnification view.

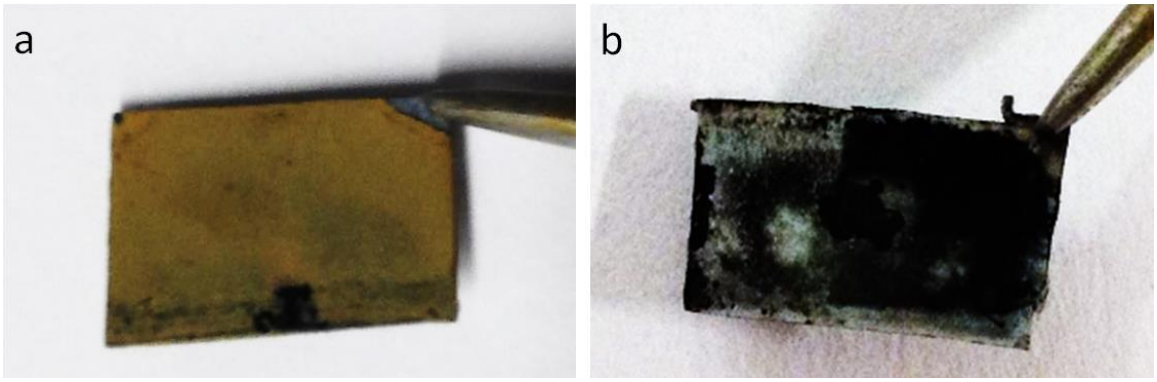


**Figure S6**. Optical images of (a) the as-prepared Ti@Si nanorod arrays; the yellow to brown color is typical for Si nanomaterials; and (b) metallic Ti nanorod arrays obtained by magnesiothermic reduction of $TiO_2$ nanorod arrays without $SiO_2$ coating, followed by etching off MgO by dilute HCl treatment; the black color is typical for metallic nanomaterials.