Supporting Information

Template-Free and Scalable Synthesis of Core-Shell and Hollow BaTiO3 Particles: Using Molten Hydrated Salt as a Solvent

Rutile TiO_2 powder: The rutile TiO_2 powder was prepared using a procedure similar to the reported method (Ref. S1). In a typical synthesis, an aqueous solution of $TiCl_3$ (0.13 M) supersaturated with NaCl was loaded into a Teflon-lined autoclave and then heated to 160 □ for 2 hours. After cooling to room temperature, the obtained products were washed with distilled water and ethanol thoroughly, and then dried naturally. Figure S1 shows the TEM images of the products. The size of the TiO_2 particles is in the range of 0.8-2.5 μm. As commercial TiO_2 often consists of rutile and anatase phases, it is not convenient to investigate the phase transformation from TiO_2 to $BaTiO_3$ using XRD. Therefore using the rutiel pure phase as precursor can favor the identification of XRD peaks during the synthesis (see Fig. 1 in the article).

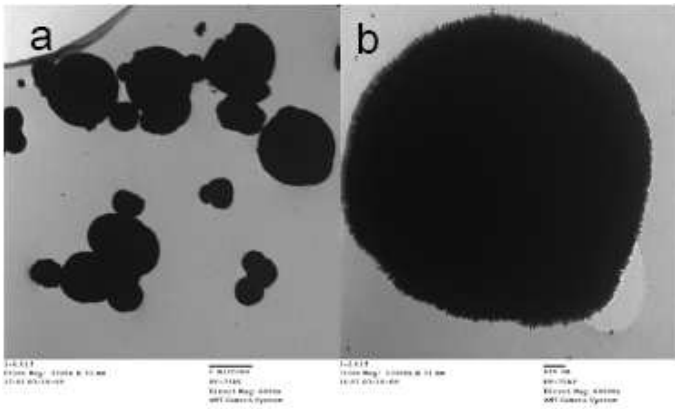

Figure S1. (a) TEM images of rutile powder used in the MHS synthesis. (b) Magnified image of a single TiO_2 particle.

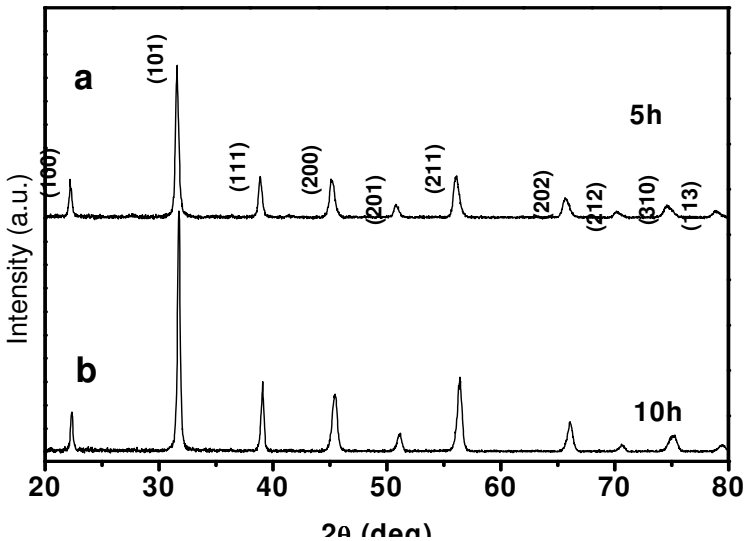

Figure S2. XRD patterns of the products after MHS treatment for (a) 5, (b) 10 hours. All the peaks can be indexed into tetragonal $BaTiO_3$. TiO_2: 0.2 g.

Ref. S1: Feng, X. J.; Zhai, J.; Jiang, L. *Angew. Chem. Int. Ed.* **2005,** *44*, 5115-5118.