Electronic Supplementary Material (ESI) for RSC Advances

Co-pyrolysis synthesis of Fe_3BO_6 nanorods as high performance anodes for lithium-ion batteries

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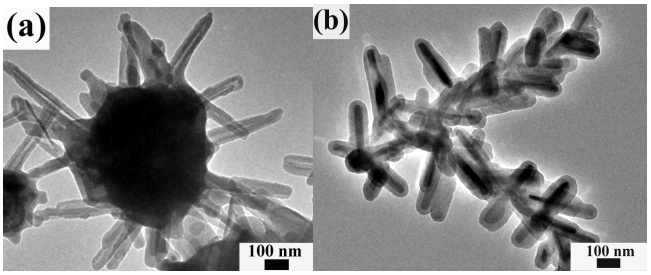

Fig. S1 TEM images of the products obtained at different stages: (a) intermediates; (b) raw product without calcinations; (c) product after calcinations.

Fig.S1a displays the TEM image of the intermediate product, in which the hollow carbon nanotubes (originate from the decomposition of ferrocene and ethanol) co-existed with iron-related microparticles can be clear observed. The composition of the inner microparticle is confirmed by the FESEM EDS spectrum to be composed of Fe, B and O elements. With the prolonged reaction time, the microparticle is believed gradually permeates into the hollow cavities of carbon nanotubes. Fig. S1b shows the TEM image of the raw product with core-shell structure before calcinations. After subsequent calcinations of the as-obtained core-shell like composites, Fe_3BO_6 nanorods were obtained with a high yield.

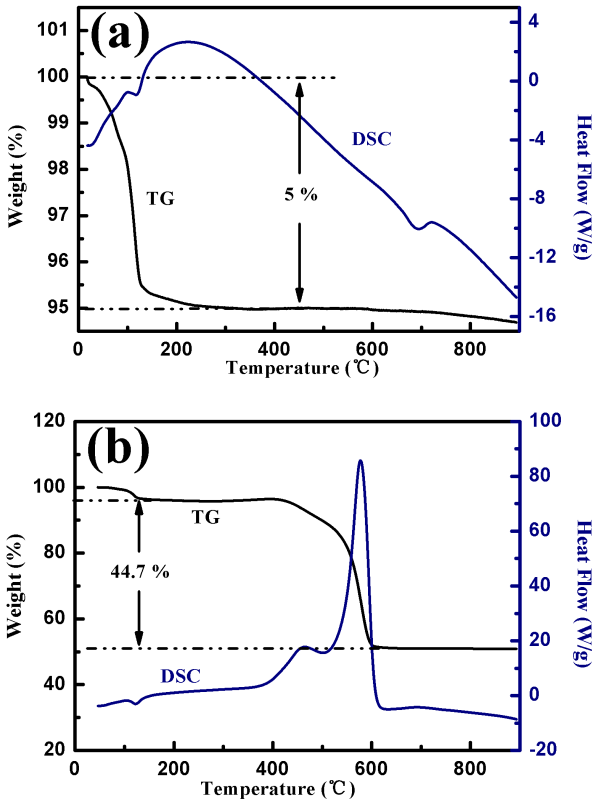

Fig. S2 TG-DSC curves recorded from room temperature to 900 °C at a heating rate of 10 °C min^{-1} under air atmosphere: (a) Fe_3BO_6 nanorods; (b) Fe_3BO_6 @C.

In order to indentify the thermal stability of the products (Fe_3BO_6 and Fe_3BO_6 @C) and the carbon content of

the Fe_3BO_6@C, thermal gravimetric-differential scanning calorimetry (TG-DSC) analysis was carried out. Fig. S2a presents the TG-DSC curve of Fe_3BO_6 nanorods. The little weight loss (about 5%) of the sample mainly occurs before 200 °C, which is probably due to the elimination of the absorbed water on their surfaces，then the product remain almost stable below 900 °C. The TG-DSC curve of Fe_3BO_6@C is shown in Fig. S2b, the weight loss mainly occurs between 400 °C and 600 °C, which can be ascribed to the loss of graphite. The content of graphite in Fe_3BO_6@C is about 44.7 % according to the calculation results, then it remains stable even at 900 °C. The above analyses results indicating the relative high thermal stability of the as-obtained products.