Electronic Supplementary Information

Electrospun Sn-doped $LiTi_2(PO_4)_3$/C nanofibers for ultra-fast charging and discharging

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~~Figure S2 (a) shows the~~ thermogravimetric (TG) curves of the precursor fibersfor

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$LiTi_2(PO_4)_3/C$ and $LiTi_{1.8}Sn_{0.2}(PO_4)_3/C$ nanofibers at atmospheres of N_2. These TG curves show almost same trend. Two distinct regions of weight loss are found in the regions of 50-300 °C and 300-500 °C. The weight loss in first region is mainly attributed to the release of ethanol and the decomposition of lithium acetate and titanium(IV) isopropoxide. The second steep weight loss, which occurs between 300 and 500 °C, mainly arises from the decomposition of PVP to carbon. To estimate the amount of carbon in the as-prepared $LiTi_2(PO_4)_3/C$ and $LiTi_{1.8}Sn_{0.2}(PO_4)_3/C$, TG analysis of these materials was carried out in air. Figure S2 (b) shows the TG curves of $LiTi_2(PO_4)_3/C$ and $LiTi_{1.8}Sn_{0.2}(PO_4)_3/C$. It can be found that both of these samples demonstrate a weight loss of about 8 % in the regions of 50-500 ^{o}C. Hence, the approximate amount of carbon in $LiTi_2(PO_4)_3/C$ and $LiTi_{1.8}Sn_{0.2}(PO_4)_3/C$ is calculated to be about 8 wt%.

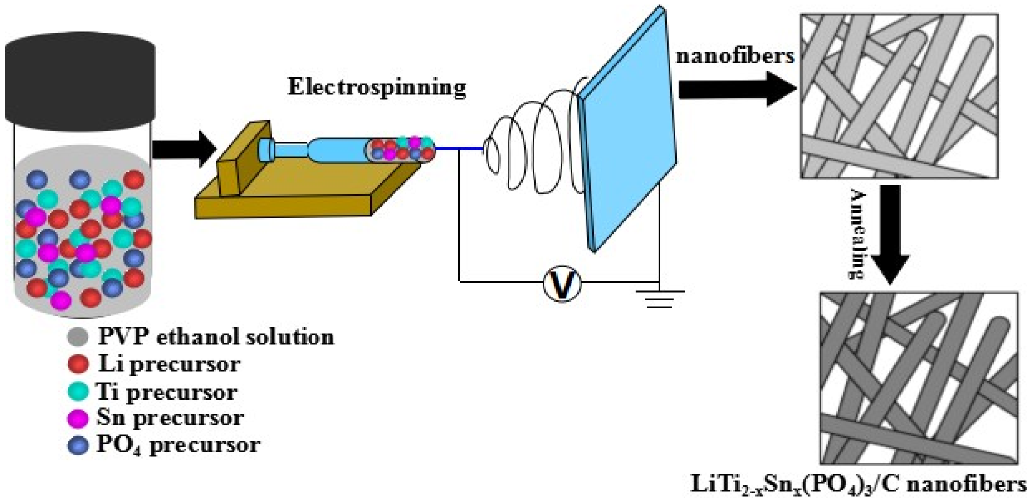

Figure S1. Schematic illustration of the experimental procedures for $LiTi_{2-x}Sn_x(PO_4)_3/C$ (x=0, 0.1, 0.2,0.4) .

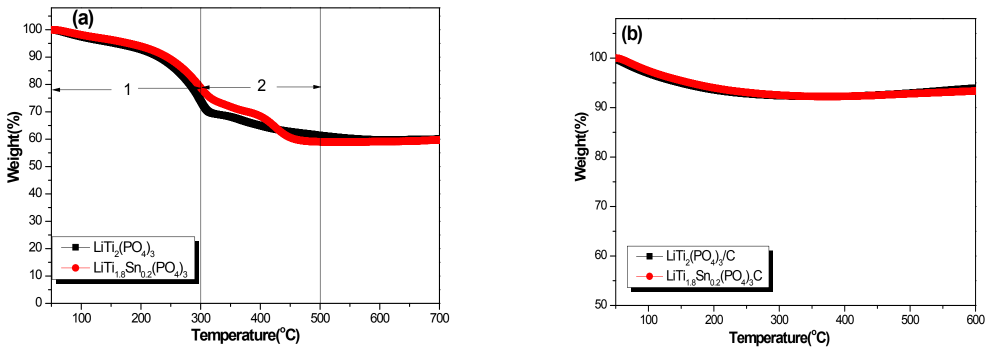

Figure S2. TG curves of precursor fibers (before annealing) in N_2 (a), and as-prepared $LiTi_2(PO_4)_3/C$ and $LiTi_{1.8}Sn_{0.2}(PO_4)_3/C$ nanofibers in air (b).

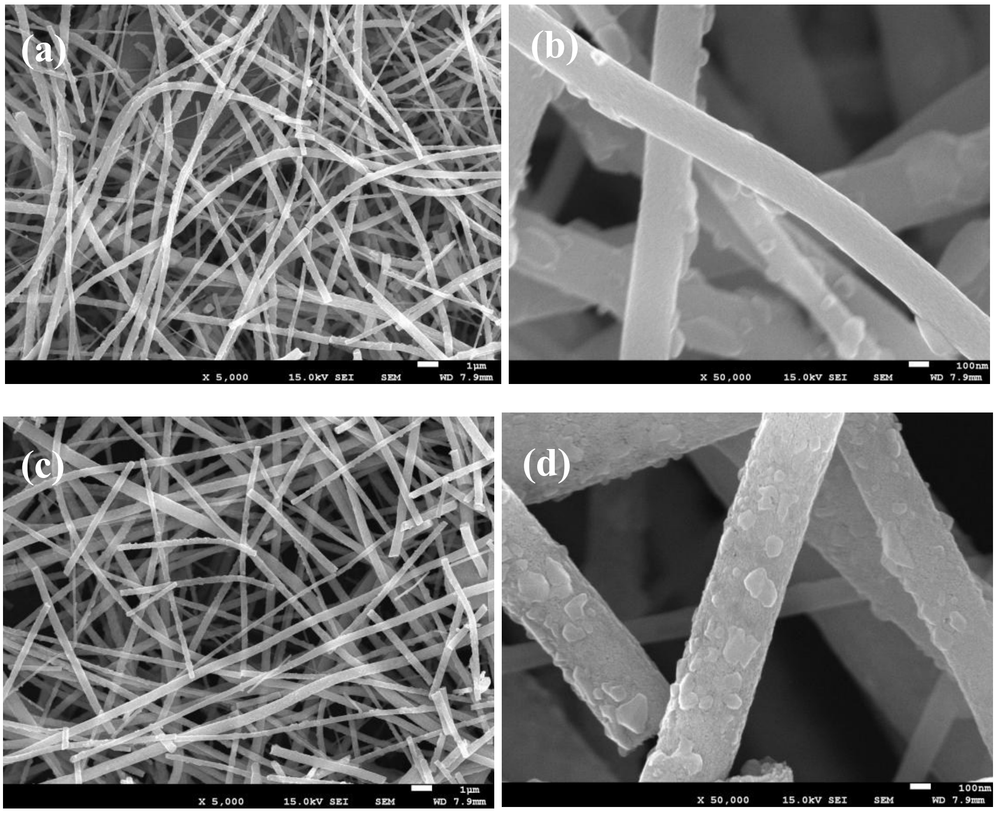

Figure S3. SEM images of $LiTi_{1.9}Sn_{0.1}(PO_4)_3/C$ (a,b) and $LiTi_{1.6}Sn_{0.4}(PO_4)_3/C$(c,d)

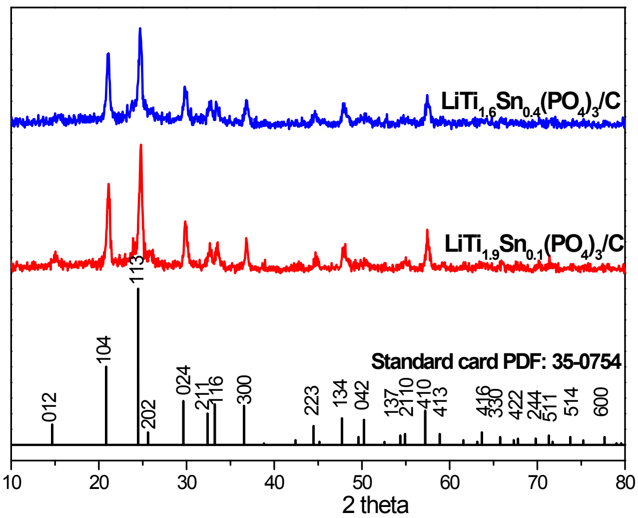

Figure S4. XRD patterns of $LiTi_{1.9}Sn_{0.1}(PO_4)_3/C$ and $LiTi_{1.6}Sn_{0.4}(PO_4)_3/C$

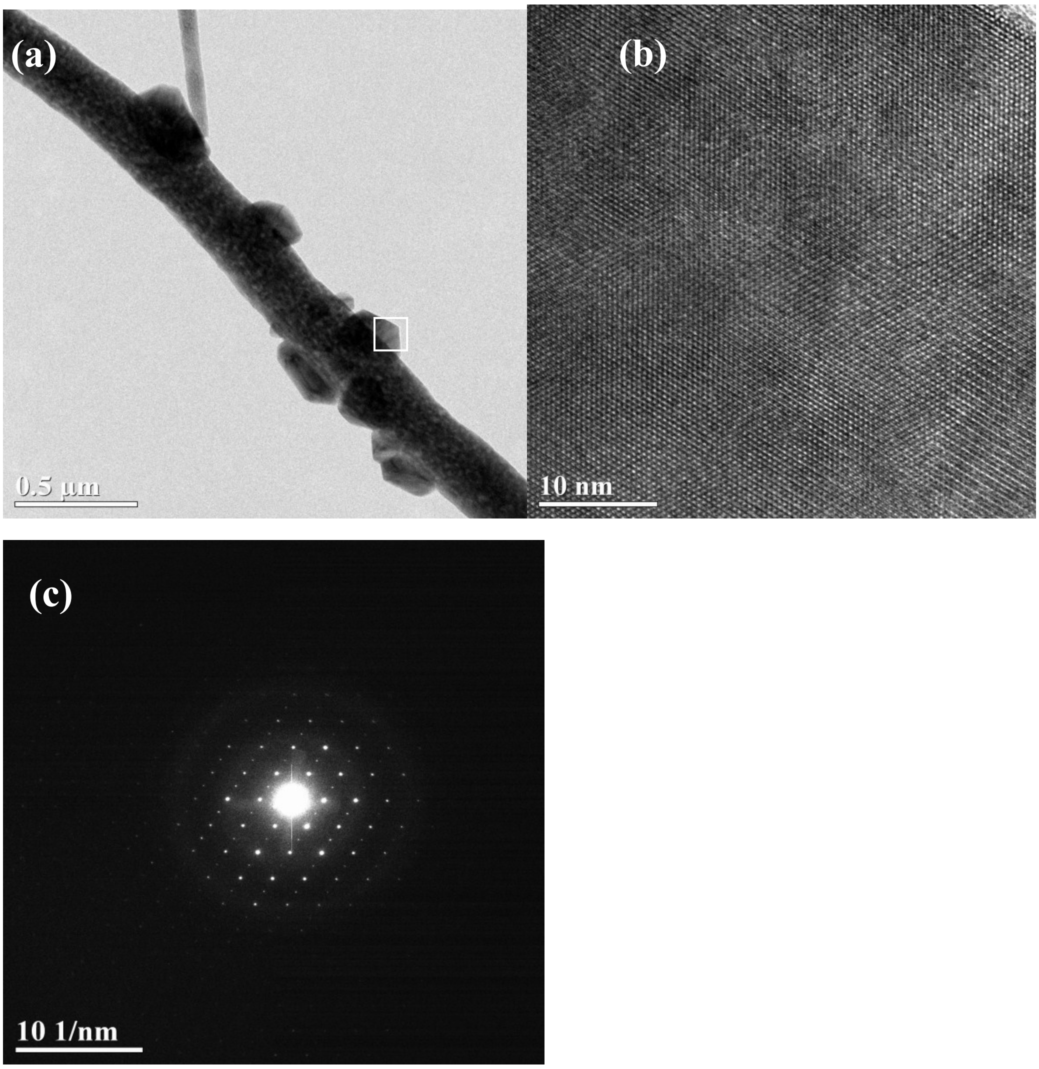

Figure S5. TEM (a) and HRTEM (b) images of $LiTi_{1.8}Sn_{0.2}(PO_4)_3/C$, and corresponding SAED map (c)

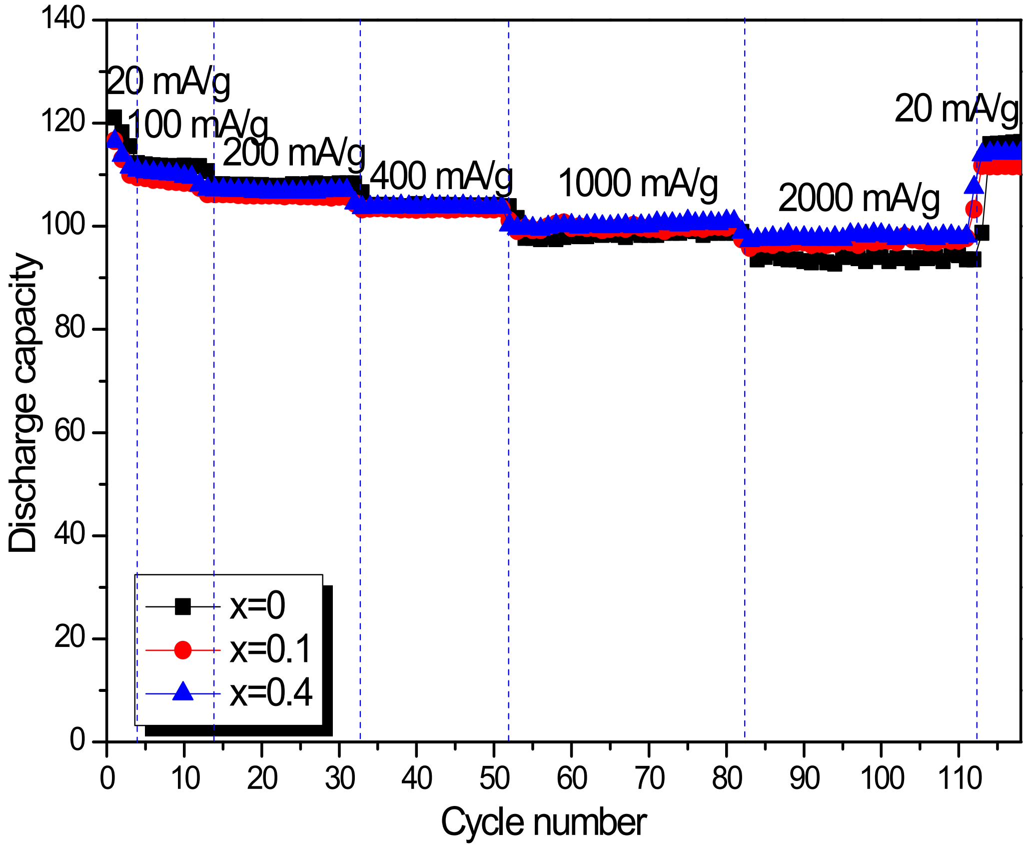

Figure S6. Rate capability of $LiTi_{2-x}Sn_x(PO_4)_3/C$ (x=0, 0.1, 0.4)

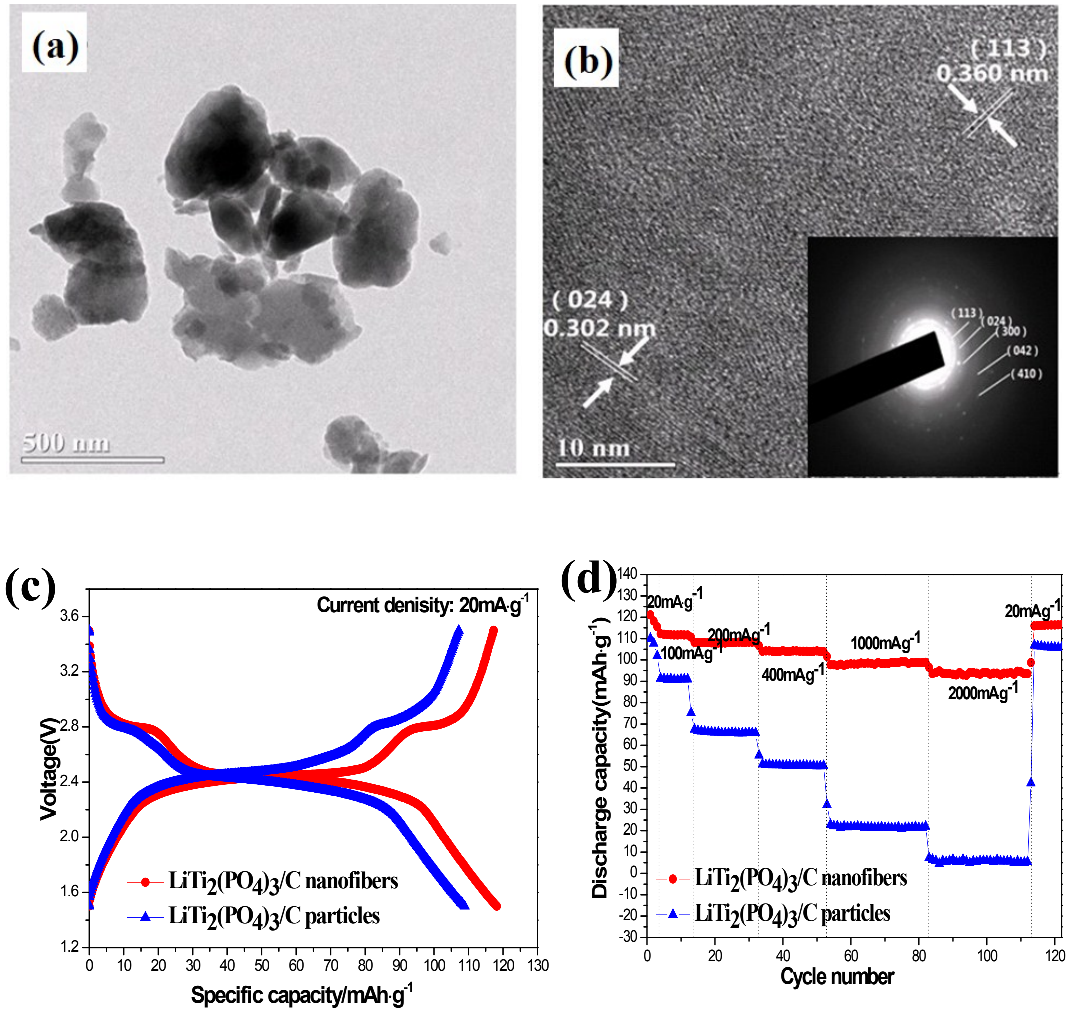

Figure S7. TEM (a) and HRTEM (b) images of $LiTi_2(PO_4)_3/C$ particles(The inset is corresponding SAED pattern); discharge/charge profiles of $LiTi_2(PO_4)_3/C$ particles and $LiTi_2(PO_4)_3/C$ nanofibers at a current density of 20 mA/g (c); discharge capacity retention data of $LiTi_2(PO_4)_3/C$ particles and $LiTi_2(PO_4)_3/C$ nanofibersfor successive cycling at different current densities(d).

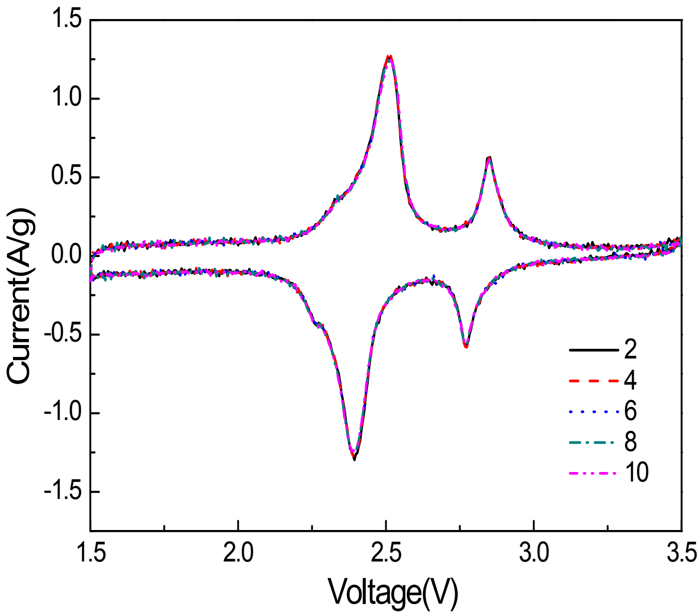

Figure S8. CV curves of $LiTi_{1.8}Sn_{0.2}(PO_4)_3/C$ at different cycles at a scan rate of 1 mV/s

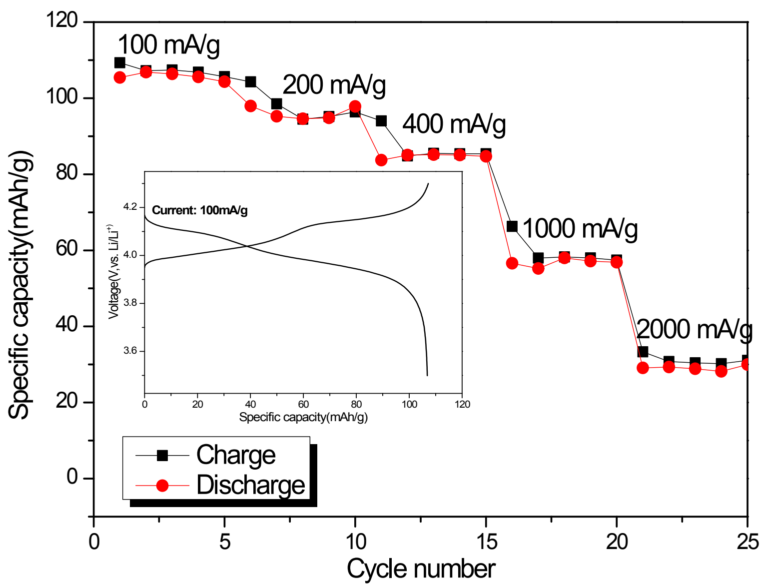

Figure S9. Rate capability of $LiMn_2O_4$ (vs. Li^+/ Li) (inset is the charge/discharge profiles of $LiMn_2O_4$ at the current of 100 mA g^{-1}).