Supporting Information

Composite of $LiFePO_4$ with Titanium Phosphate Phases as Lithium-Ion Battery Electrode Material

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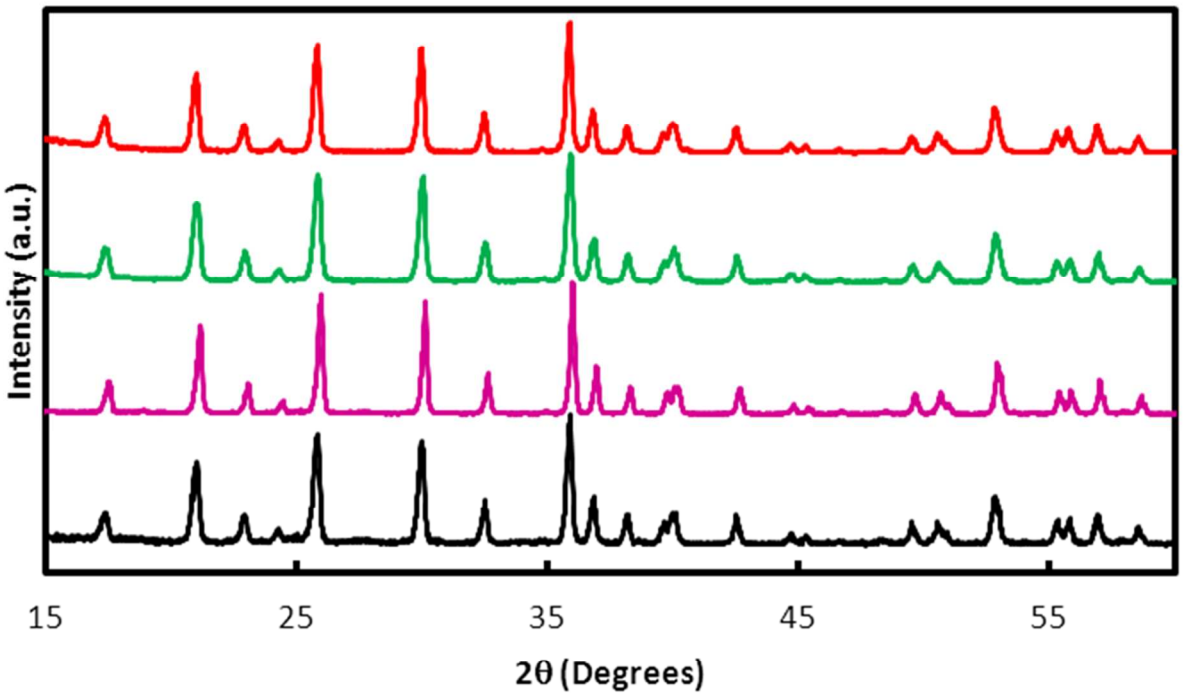

Fig. S1. X-ray diffraction patterns for powders of $LiFePO_4$ (red, top pattern), $0.985LiFePO_4 \cdot Li_{0.015}Ti_{0.015}(PO_4)_\delta$ (green, second from top pattern), $0.95LiFePO_4 \cdot Li_{0.05}Ti_{0.05}(PO_4)_\delta$ (purple, second from bottom pattern), $0.9LiFePO_4 \cdot Li_{0.1}Ti_{0.1}(PO_4)_\delta$ (black, bottom pattern).

Table S1. Crystallographic lattice parameters determined from the X-ray diffraction patterns shown in Figure S1 for $LiFePO_4$ and the composites.

	$LiFePO_4$	$0.985 \cdot LiFePO_4 \cdot Li_{0.015}Ti_{0.015}(PO_4)_\delta$	$0.95 \cdot LiFePO_4 \cdot Li_{0.05}Ti_{0.05}(PO_4)_\delta$	$0.9 \cdot LiFePO_4 \cdot Li_{0.1}Ti_{0.1}(PO_4)_\delta$
a (Å)	10.314 (9)	10.311 (1)	10.324 (6)	10.307 (5)
b (Å)	5.999 (4)	5.996 (2)	6.003 (2)	5.993 (4)
c (Å)	4.689 (1)	4.686 (4)	4.691 (6)	4.681 (9)
V ($Å^3$)	290.18 (1)	289.74 (9)	290.78 (3)	289.23 (4)

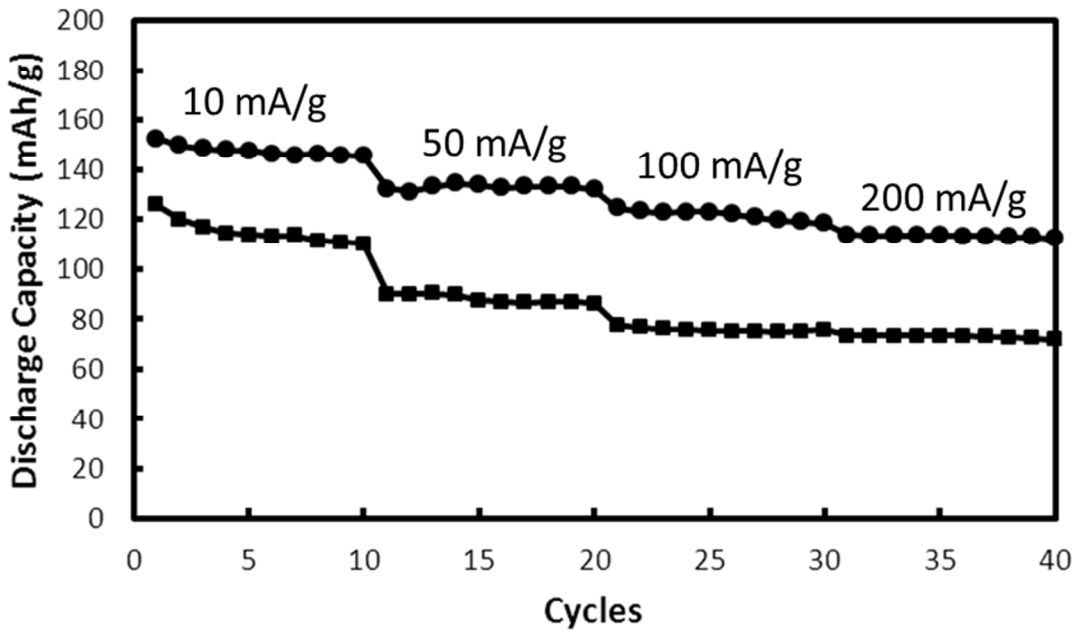

Fig. S2. Discharge capacity of $0.9LiFePO_4 \cdot Li_{0.1}Ti_{0.1}(PO_4)_\delta$ (●) and $LiFePO_4$ (■) at charge/discharge rates of 10 mA/g, 50 mA/g, 100 mA/g, and 200 mA/g (~C/15, C/3, C/1.5, and 1.33 C). Cells were charged and discharged for 10 cycles at each rate.

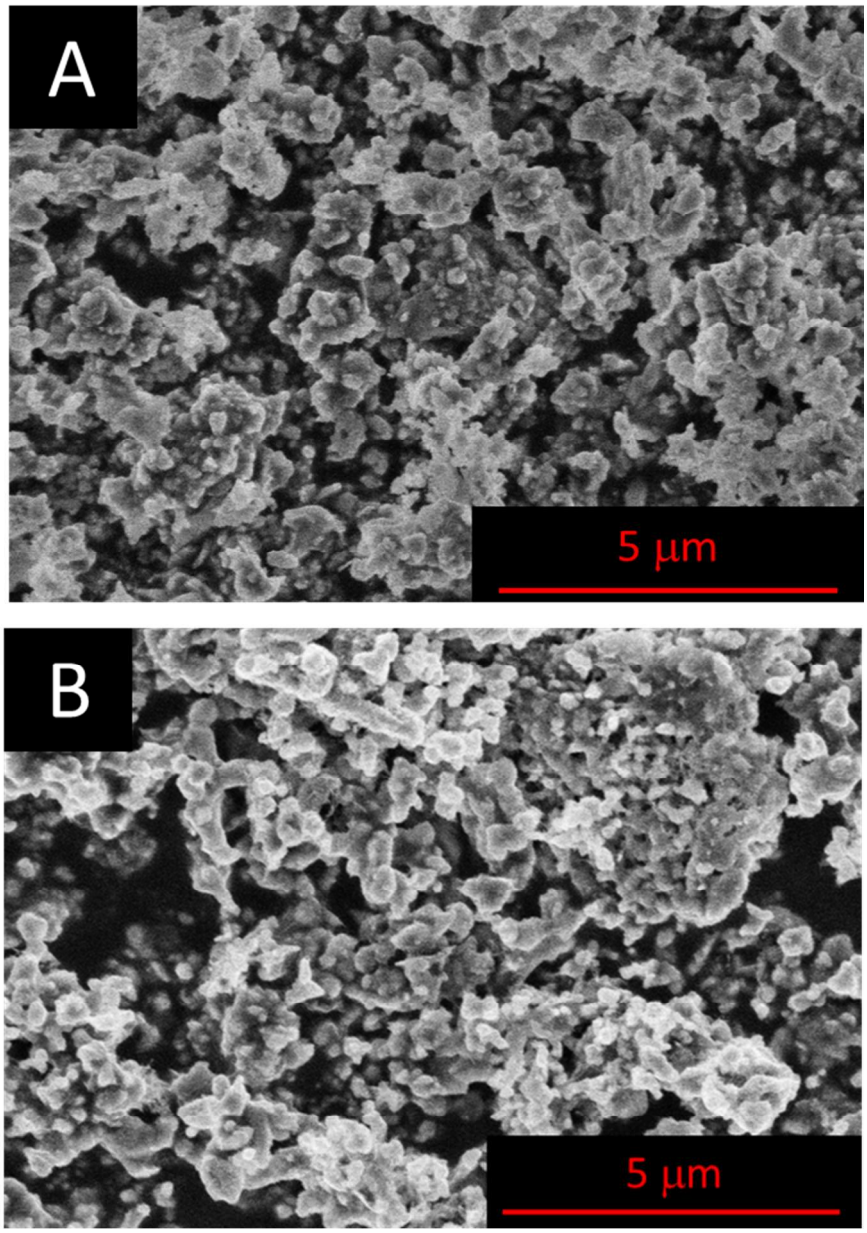

Fig. S3. Scanning electron micrographs of (A) $LiFePO_4$ and (B) $0.9LiFePO_4 \cdot Li_{0.1}Ti_{0.1}(PO_4)_\delta$ powders.

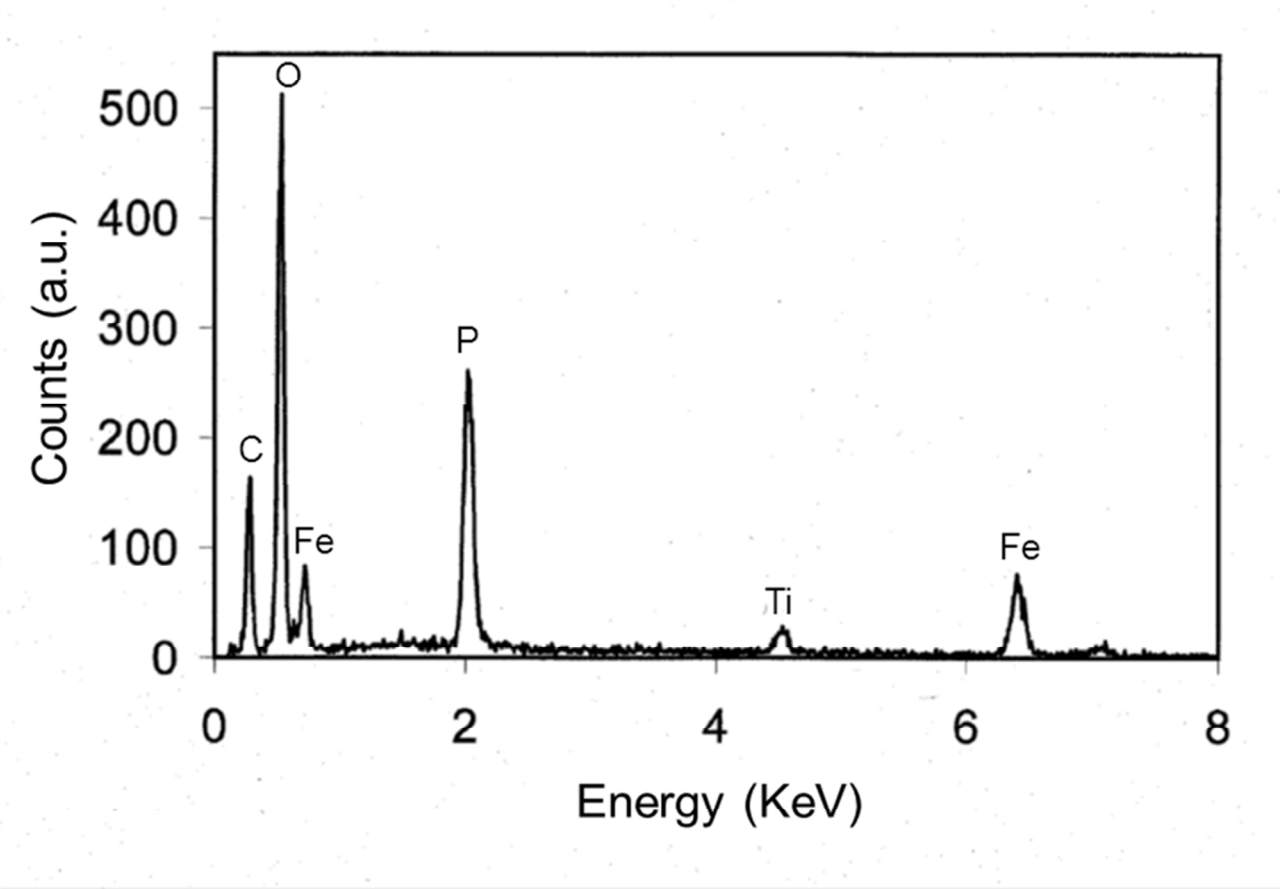

Fig. S4. Scanning electron microscopy energy dispersive x-ray spectroscopy spectrum for $0.9LiFePO_4 \cdot Li_{0.1}Ti_{0.1}(PO_4)_\delta$ powder. Peaks have been labeled corresponding to C, O, Fe, P, and Ti. The powder was mounted on carbon tape.

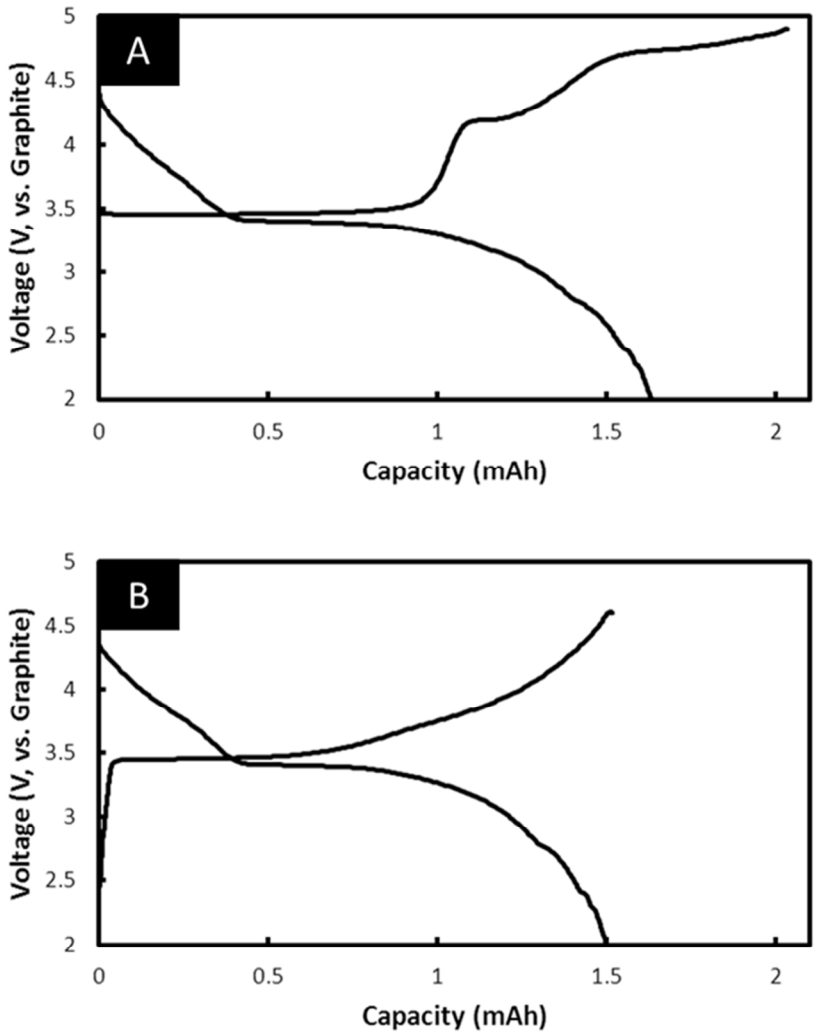

Fig. S5. The first (A) and second (B) charge and discharge cycles of a cell comprised of a graphite anode and a cathode where the active material is a mixture of 50 wt% $0.9LiFePO_4 \cdot Li_{0.1}Ti_{0.1}(PO_4)_\delta$ and 50 wt% $Li_{1.2}(Mn_{0.62}Ni_{0.38})_{0.8}O_2$. The cell was cycled at a rate of 20 mA/g.