**Supporting Information**

**Figure S1.** Galvanostatic cycling profiles of TiO$_2$ hollow nanofibers in half-cell configuration between 1-3 V vs. Li at various current densities in ambient temperature conditions. Plot of capacity vs. cycle number.
Figure S2. Galvanostatic cycling profiles of electrospun anatase nanofibers prepared through two different electrospinning techniques such as conventional single needle procedure and co-axial electrospinning technique.
Figure S3. (a) CV traces of Li/electrospun TiO₂ hollow fibers cells recorded at various scan rates between 1-3 V vs. Li in ambient temperature conditions and (b) Relationship between the peak current density and the square root of scan rate in anodic processes.
Figure S4. Cyclic voltamogram of Li/LiFePO₄ cells cycled between 2.5-4 V at scan rate of 0.1 mV s⁻¹.
**Figure S5:** (a) Normalized charge-discharge curves of Li/LiFePO$_4$ cells cycled between 2.5-4 V at current density of 100 mA g$^{-1}$ in room temperature, and (b) cycling performance of charge/discharge capacity vs. cycle number.