Electronic Supplementary Information

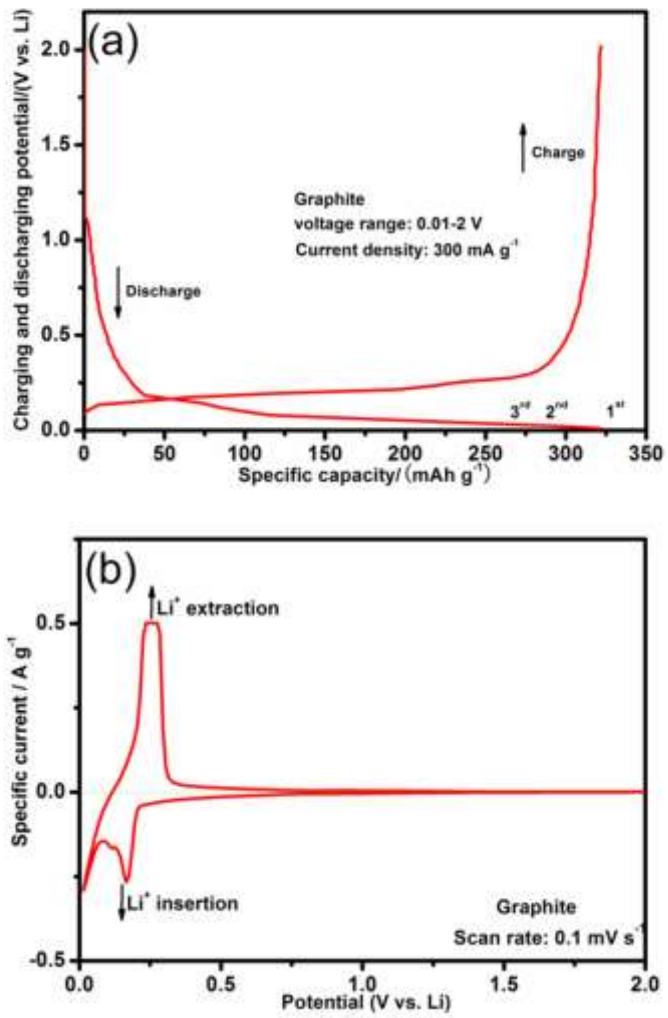

Fig. S1 The typical charge-discharge profiles (a) of graphite as anode at the current density of 300 mA g^{-1} in the voltage window of 0.01~2 V (V vs. Li) and the corresponding cyclic voltammogram (b) at the scan rate of 0.1 mV s^{-1} under the same voltage range.

Graphite is the commonly used anode material in LIBs industry due to its cheap price and low working voltage (V vs. Li). As illustrated in Fig. S1, we present its typical charge-discharge profiles at the current density of 300 mA g^{-1} in the voltage window of 0.01~2 V and the corresponding cyclic voltammogram at the scan rate of 0.1 mV s^{-1} under the same voltage range using Li as counter electrode. Generally, graphite as anode material possesses a theoretical capacity of ~370 mAh g^{-1}. In our experiment, it delivers a capacity of 320~330 mAh g^{-1}. For the assembly of full-cell, V_2O_5 nanobelt is used as cathode and lithiated graphite (discharge to 0.01 V vs. Li) as anode.

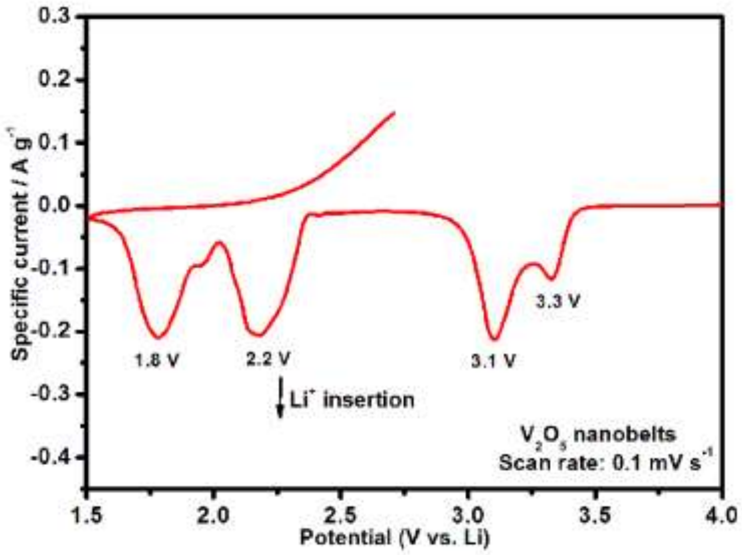

Fig. S2 Cyclic voltammogram of V_2O_5 nanobelts as cathode at the scan rate of 0.1 mV s^{-1} between 1.5~4 V (V vs. Li).

As mentioned in the manuscript, four voltage plateaus at about 3.3, 3.1, 2.2 and 2 V would appear during the initial discharge process, which correspond to the phase transitions of α-$Li_xV_2O_5$ (x<0.01) to ε-$Li_xV_2O_5$ (0.35<x<0.7), ε-$Li_xV_2O_5$ to δ-$Li_xV_2O_5$ (x<1), δ-$Li_xV_2O_5$ to γ-$Li_xV_2O_5$ (x>1) and γ-$Li_xV_2O_5$ to ω-$Li_xV_2O_5$ (x>2), respectively, upon Li^+ intercalation. To better illustrate this reduction behavior, we performed cyclic voltammogram at the scan rate of 0.1 mV s^{-1} between 1.5~4 V as shown in Fig. S2. It can be seen that there are four obvious cathodic peaks located at 3.3, 3.1, 2.2 and 1.8 V, respectively, in which the first three peaks match very well with the corresponding voltage plateaus. The peak at 1.8 V, which corresponds to the plateau at 2 V, has a slight shift to low-voltage region. This phenomenon is primarily caused by the polarization of electrode material near the cut-off voltage.