Supporting Information

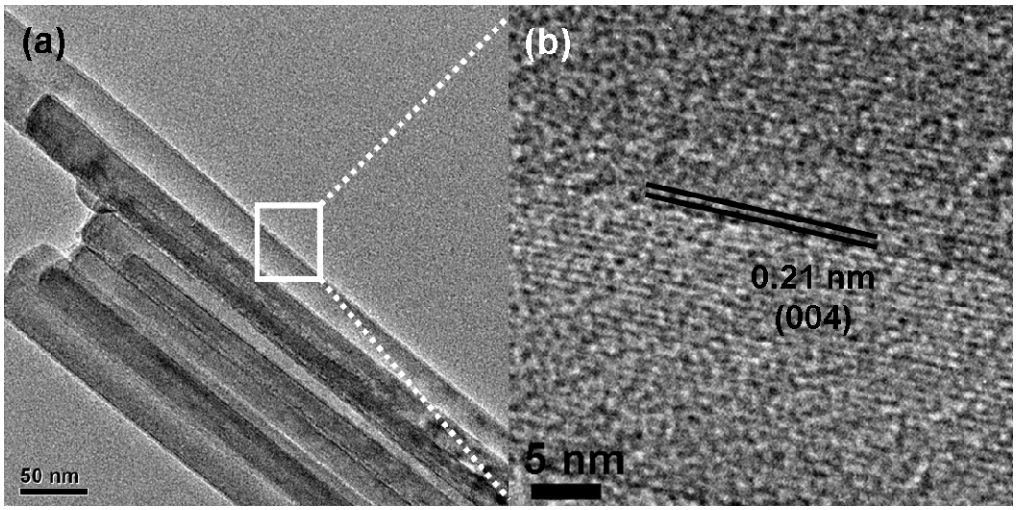

Fig. S.I. 1 S.I. 1a is the TEM image to show the $V_2O_5 \cdot xH_2O$ nanobelts which aggregate together in a parallel manner. Fig. S. I. 1b is the high-resolution TEM image (HRTEM) corresponding to the rectangular zone marked in fig. S. I. 1a to reveal the crystal lattices of $V_2O_5 \cdot xH_2O$ nanobelt. The lattice inter-distance of 0.21 nm matches well with the (004) inter-lattice for the layered $V_2O_5 \cdot xH_2O$.

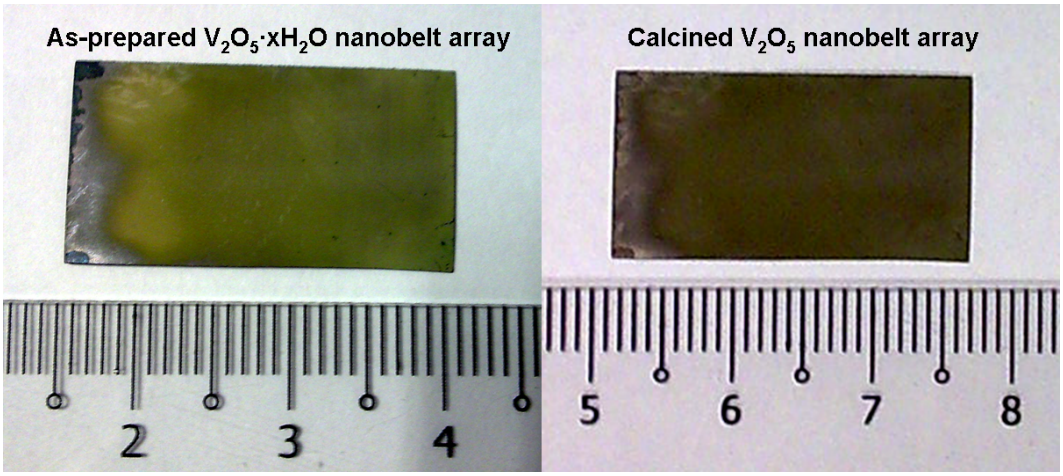

Fig. S. I. 2 optical pictures are shown to disclose the overviews about the original $V_2O_5 \cdot xH_2O$ nanobelt array (fig. S. I. 2a) and calcined V_2O_5 nanobelt array (fig. S. I. 2b) on Ti substrate. After calcinations, the surface color turns from yellow green (fig. S. I. 2a) to dark green or brown (fig. S. I. 2b). Normally the dimension of prepared nanobelt array can reach up to 4 cm^2. The scale bar is cm for both pictures.

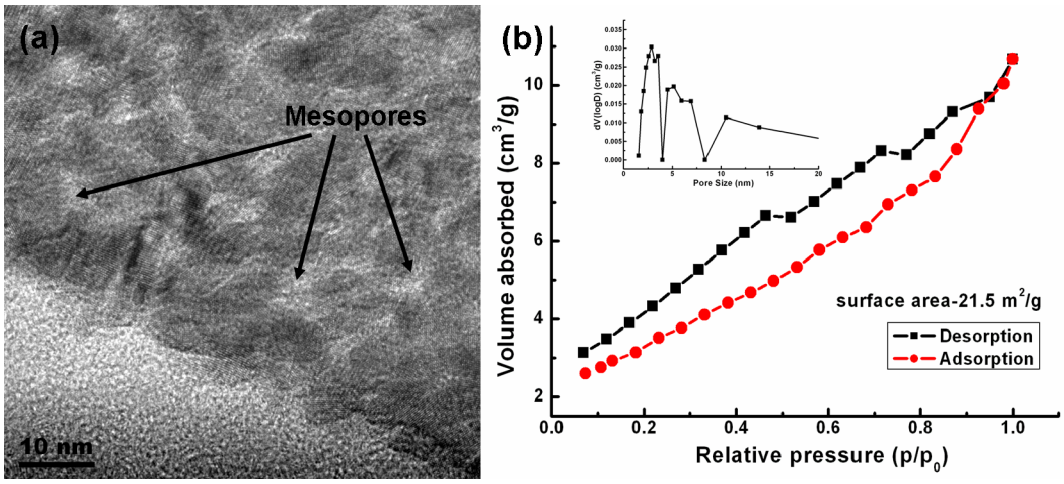

Fig. S. I. 3 fig. S. I. 3a is the TEM image to show the mesoporous structure in V_2O_5 nanobelt achieved from the calcinations of $V_2O_5 \cdot xH_2O$ nanobelt at 400℃. The corresponding BET curves tell us the specific surface area of V_2O_5 nanobelts is around 21.5 m^2/g and the calculated pore size distribution curve is shown in the inset of fig. S. I. 3b, ranging from 2.5 to 7.5 nm.

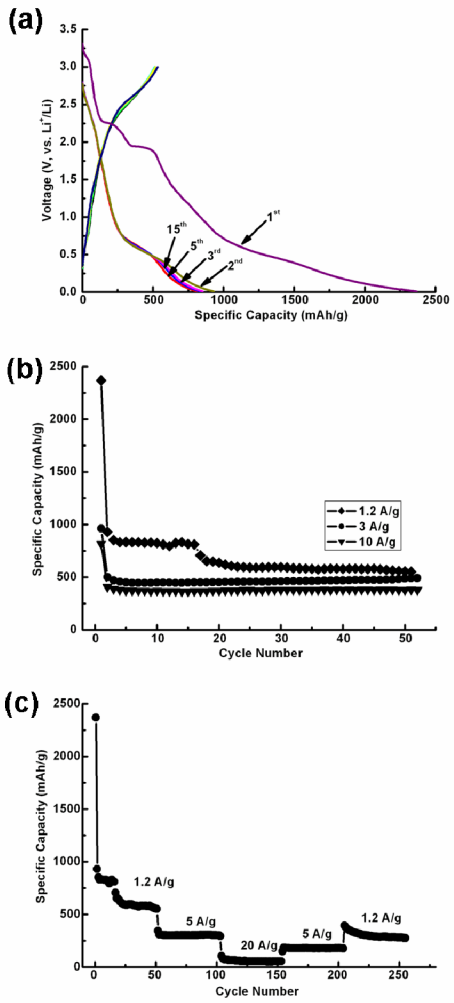

Fig. S. I. 4 the electrochemical tests on V_2O_5 nanobelt array on Ti substrate as anode in LIBs are presented. Fig. S. I. 4a is the galvanostatic cycling at 1.2 A/g to show the reversible capacity of 850 mAh/g for 15 cycles in the voltage window of 0.01 to 3V (vs. Li^+/Li). The vast capacity loss from the first cycle (the specific capacity is changed from 2300 mAh/g to 850 mAh/g) is often introduced in the previous reports, due to the formation of surface-electrolyte interphase (SEI) in the first cycle. When cycled at different current densities of 1.2 A/g, 3 A/g and 10 A/g oven 50 cycles, the V_2O_5 nanobelt array can reversibly deliver 650, 520 and 430 mAh/g, respectively (fig. S. I. 4b), implying the greatly enhanced rate capability and stability in LIBs. At the periodically changed current densities, from 1.2 A/g, 5 A/g, up to 20 A/g, then back to 5 A/g, 1.2 A/g, at least 60% capacity can be recovered from the ultrahigh current densities, revealing the perfect cyclablity of V_2O_5 nanobelt array.