

Figure S1. FIB images the (**a**) uncoated (**b**) Al₂O₃-coated LTO after 500 cycle at 60°C. The electrodes are in a charged state.



Figure S2. Charge and discharge curves of uncoated LTO (**a**) at 25°C and (**b**) at 60°C. (**c**) Cycle-life performances of the uncoated LTO cycled at 25°C and 60°C. The cells are discharged and charged within a voltage range of 2.6 and 0.9 V at 2 C. (2 C = 250 mA/g based upon the theoretical capacity of LTO: 175 mAh/g).



Figure S3. Nyquist plots of the uncoated and Al₂O₃-coated LTO electrodes.



Figure S4. Galvanostatic charge-discharge tests of the uncoated and Al₂O₃-coated LTO electrode at different current densities varied from 0.1 to 20 C.



Figure S5. Comparison of the Al₂O₃-coated LTO electrodes having different thicknesses.