

## Supporting information

### **LaF<sub>3</sub>-coated Li[Li<sub>0.2</sub>Mn<sub>0.56</sub>Ni<sub>0.16</sub>Co<sub>0.08</sub>]O<sub>2</sub> as cathode material with improved electrochemical performance for lithium ion batteries**

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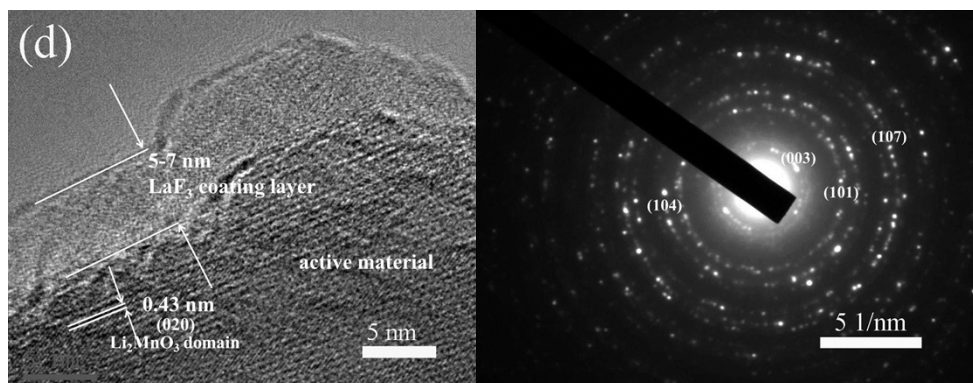


Fig.S1 Corrected HR-TEM image and added SAED (selected area electron diffraction) of 1wt%  $\text{LaF}_3$ -coated  $\text{Li}[\text{Li}_{0.2}\text{Mn}_{0.56}\text{Ni}_{0.16}\text{Co}_{0.08}]\text{O}_2$ .

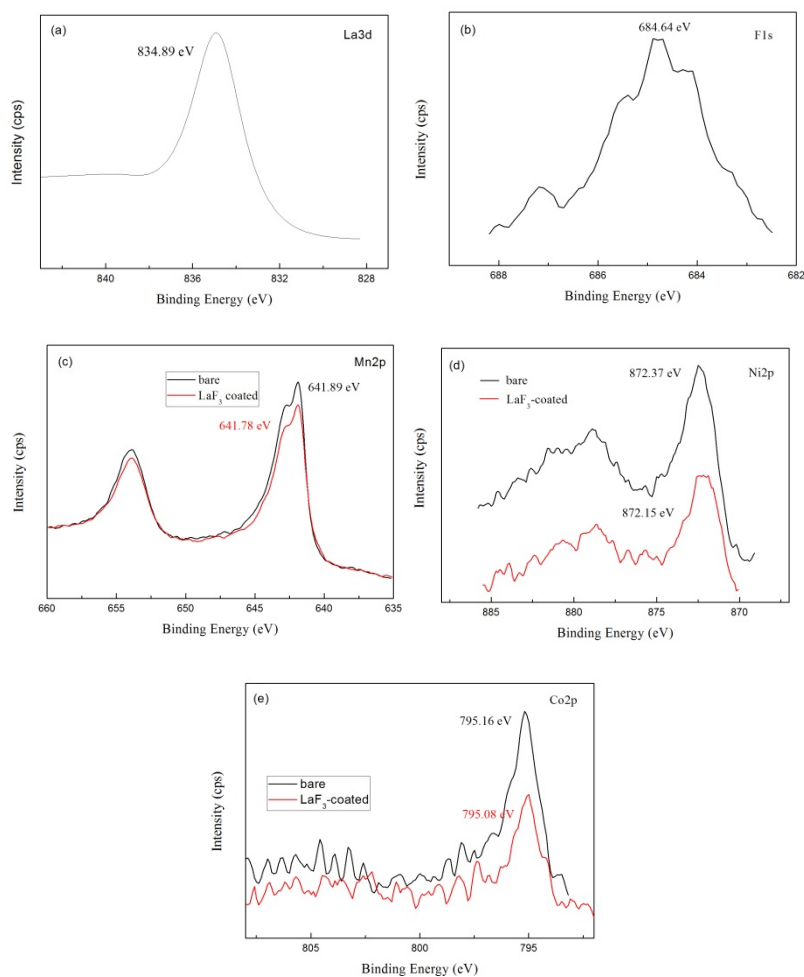


Fig.S2 XPS spectra of bare and 1wt%  $\text{LaF}_3$ -coated  $\text{Li}[\text{Li}_{0.2}\text{Mn}_{0.56}\text{Ni}_{0.16}\text{Co}_{0.08}]\text{O}_2$  (a)La3d, (b) F1s, (c) Mn2p, (d) Ni2p and (e) Co2p.

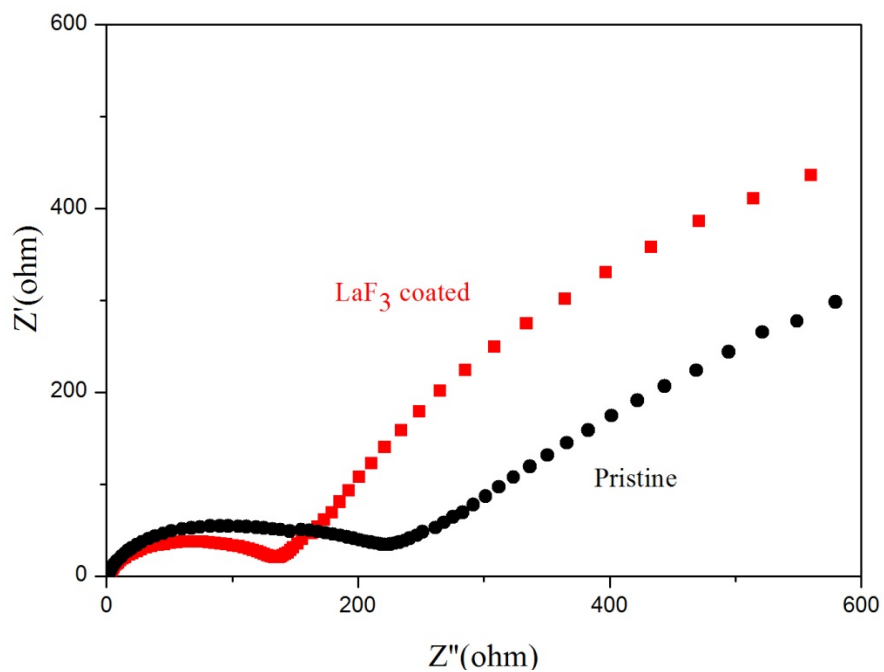


Fig.S3 The original Nyquist plots electrochemical impedance spectroscopy (EIS) of pristine and LaF<sub>3</sub>-coated Li[Li<sub>0.2</sub>Mn<sub>0.56</sub>Ni<sub>0.16</sub>Co<sub>0.08</sub>]O<sub>2</sub> after 3 cycles before charge.