Supporting Information

Figure S1: The SEM image of the pristine electrode Li_{1.2}Co_{0.1}Mn_{0.55}Ni_{0.15}O_2 electrode at low magnification (a) and high magnification (b). The platelet morphology of the particle can be observed similar to lithium stoichiometric NMC material.

Figure S2: EDS spectrum collected from the pristine electrode. The Mn:Ni:Co ratio is 1:0.26:0.19 which is in agreement with the TM composition of electrode Li_{1.2}Co_{0.1}Mn_{0.55}Ni_{0.15}O_2.
Figure S3: Magnetic susceptibility vs. temperature curves for electrode (a) and powder samples (b) show no difference in the trend.

Figure S4: Heat capacity data of pristine Li$_{1.2}$Co$_{0.1}$Mn$_{0.55}$Ni$_{0.15}$O$_2$ shows λ-like feature indicating the magnetic transition occurs at $T = 50$ K.
Figure S5: Simulated SAED pattern along \( [\bar{1}10\bar{1}] \) (a) and [0001] (b) zone axis of trigonal (O3) \( R\bar{3}m \) unit cell.

Figure S6: Simulated SAED pattern along [11\( \bar{1} \)] (a) and [100] (b) zone axis of spinel \( Fd\bar{3}m \) unit cell.
**Figure S7:** Simulated SAED pattern along [103] zone axis of monoclinic $C2/m$ unit cell.