Supplement

Role of Carbon Coating in Improving Electrochemical Performance of Li-rich Li(Li_{0.2}Mn_{0.54}Ni_{0.13}Co_{0.13})O_2 Cathode

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**Fig. S1** TGA plots of the C-3 and C-15 samples.
Fig. S2 Bright field TEM images of the pristine, C-3-H and C-15-H samples.
Fig. S3 HRTEM image of C-15-H sample, indicating further reduced carbon layers on particle surface with about 2 nm thickness.
Fig. S4 Charge/discharge curves with corresponding dQ/dV plots at different stages of cycling, i.e. 2\textsuperscript{nd}, 5\textsuperscript{th}, 10\textsuperscript{th}, 30\textsuperscript{th}, 50\textsuperscript{th}, 70\textsuperscript{th} and 100\textsuperscript{th}. All samples were tested at 0.2 C in a voltage window of 2.0 - 4.8 V at room temperature. The peaks related to the initially-formed spinels, at 2.9 V (charge) and 2.75 V (discharge) tend to vanish and merge into main contribution peaks in C-3-H and C-15-H, as labeled by ♦. The main contribution peaks after 100 cycles in all the samples, as labeled by *, are unequal in shapes or
covered areas, which may suggest slightly different mechanisms in response to electrochemical insertion/extraction of Li.