

## Supplementary Information

### **Self-assembly synthesis and electrochemical performance of the**

### **$\text{Li}_{1.5}\text{Mn}_{0.75}\text{Ni}_{0.15}\text{Co}_{0.10}\text{O}_{2+\delta}$ microspheres with multilayer shells**

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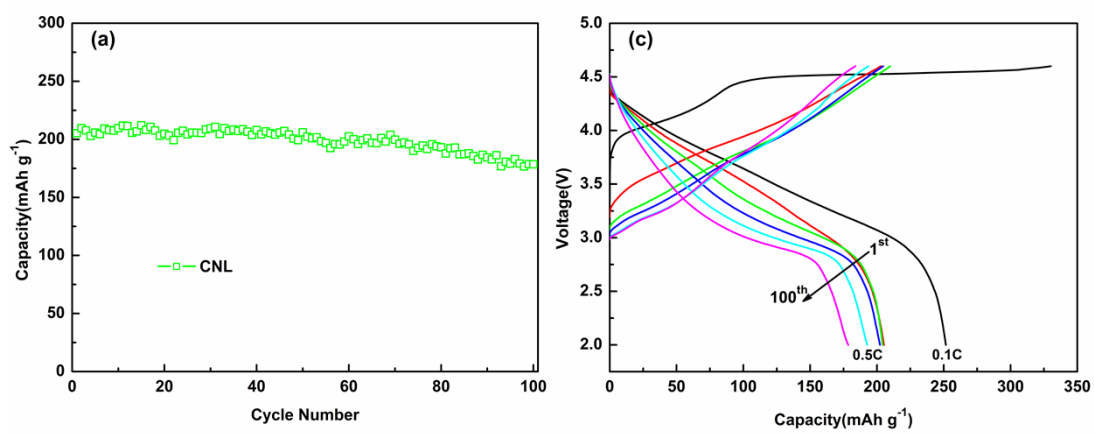
**Keywords:** Lithium-ion batteries; Lithium-rich layered cathode material;

Hierarchically multilayer shells; Co-precipitation method

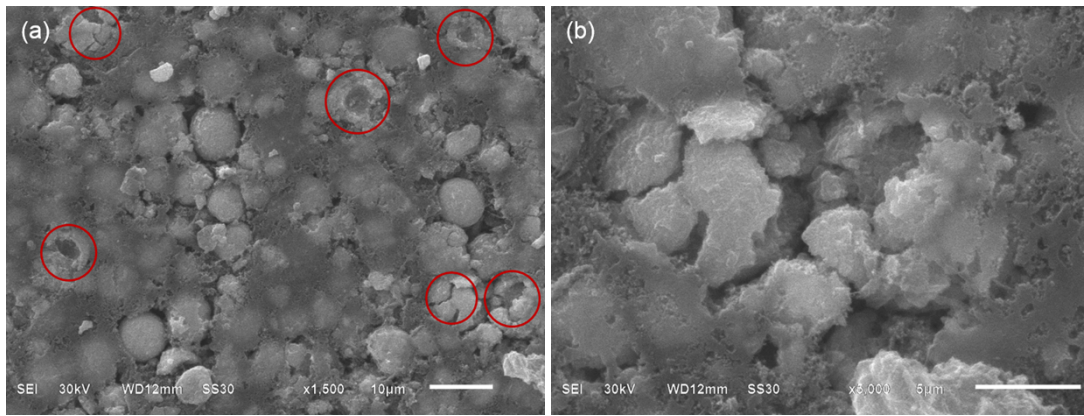
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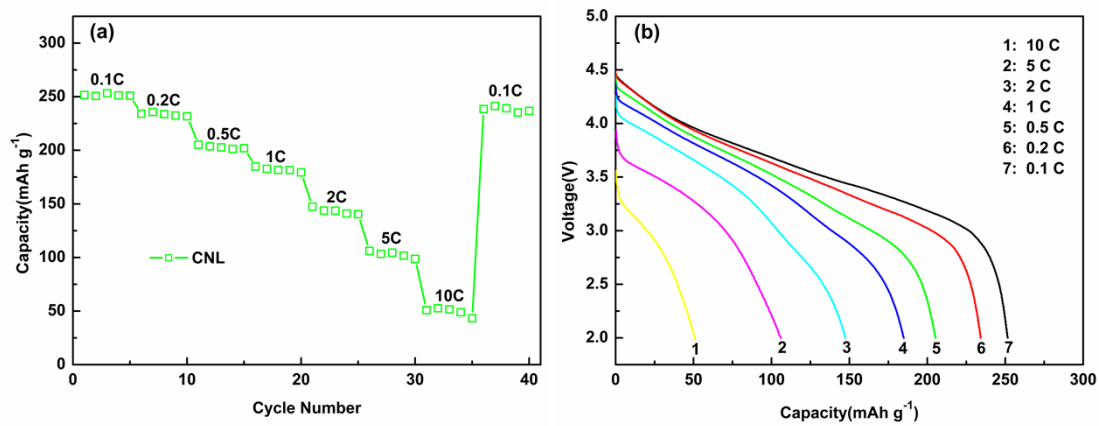
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**Fig. S1** (a) Capacity retention of Li/CNL cell; (b) the continuous charge/discharge curves of the 1<sup>st</sup>, 50<sup>th</sup>, 75<sup>th</sup>, 100<sup>th</sup> cycles for Li/CNL cell at a rate of 0.5 C in the voltage range of 2.0-4.6 V.

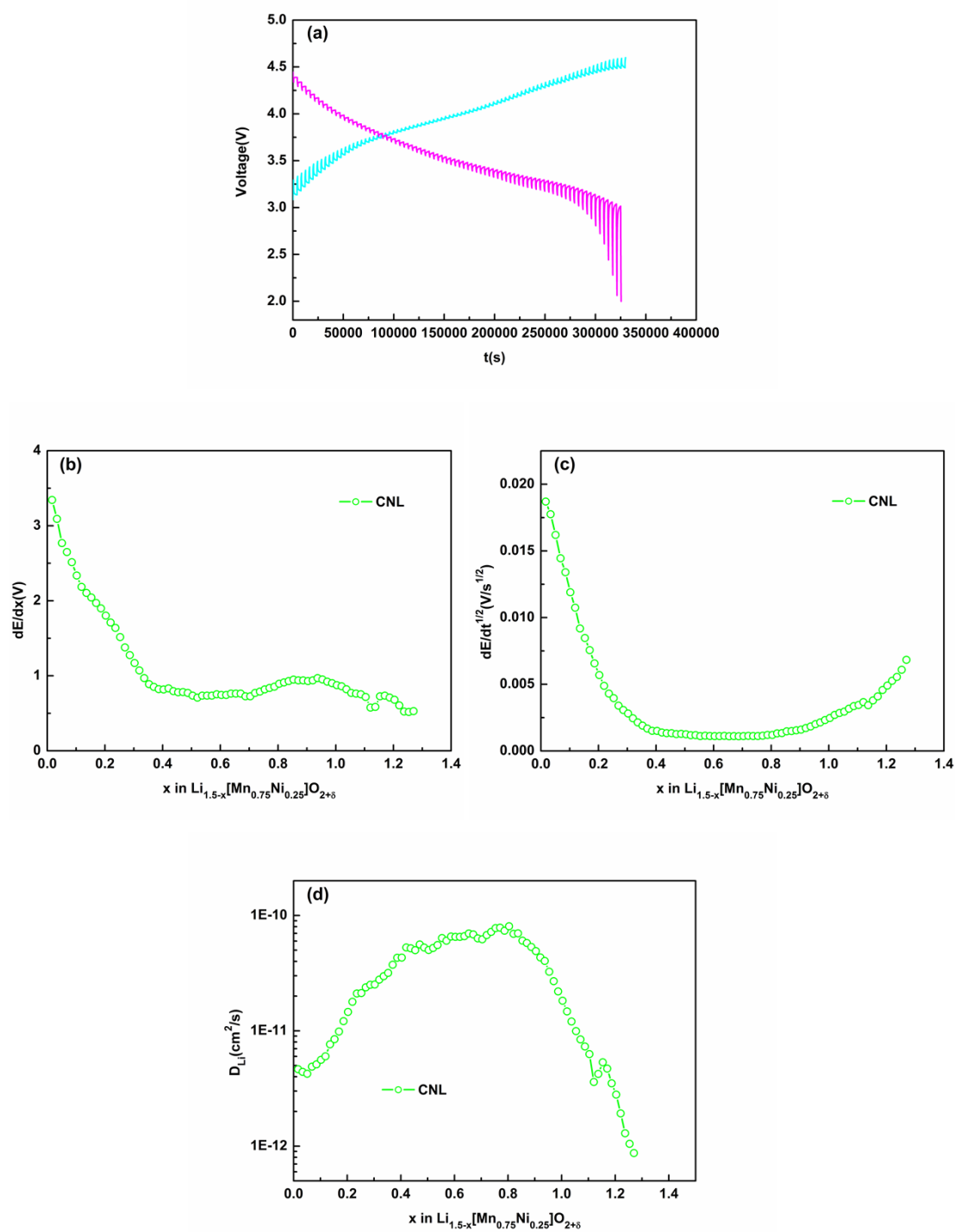


**Fig. S2** SEM images of CNL electrodes after 100 cycles.



**Fig. S3** (a) Discharge capacity versus cycle number of Li/CNL cell; (b) discharge curves of

Li/CNL cell at various rates in the voltage range of 2.0-4.6 V.



**Fig. S4** (a) The GITT curves of CNL cathode materials as a function of time in the voltage range of 2.0-4.6 V; (b)  $dE/dx$  and (c)  $dE/dt^{1/2}$  as a function of the stoichiometry  $x$ ; and (d) the calculated  $D_{\text{Li}^+}$  values of the CNL cathode materials as a function of the stoichiometry  $x$ .