

Supporting Information

Enhancing the Storage Performance and Thermal Stability of Ni-Rich Layered Cathodes by Introducing Li_2MnO_3

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Table S1. ICP results for the chemical composition of the as-prepared cathodes powders.

Samples	Li	Ni	Mn	Co
NCM-811	1.08	0.77	0.09	0.1
LNCMO-1090	1.105	0.671	0.168	0.086

Table S2. Crystal structural parameters of the cathodes powders.

Samples	a (Å)	c (Å)	Volume (Å ³)	c/a	I ₀₀₃ /I ₁₀₄	Ni ²⁺ in Li layer (%)
NCM-811	2.87297	14.20675	101.552	4.94498	1.60	1.72
LNCMO-1090	2.86617	14.19977	101.022	4.95427	1.46	1.76
NCM-811-Air	2.87272	14.22049	101.632	4.95018	1.55	1.73
LNCMO-1090-Air	2.86609	14.21467	101.122	4.95960	1.44	1.83

Table S3. Fitting values of the electrochemical impedance (EIS) curves of the cathodes charged to 4.3 V before and after storage obtained from equivalent circuit in the inset of Figure 5.

Samples		R _f (Ω)	R _{ct} (Ω)	Total (R _f +R _{ct})
NCM-811	Before storage	59	62	121
	After storage	98	163	261
LNCMO-1090	Before storage	64	77	141
	After storage	90	147	237

Table S4. Analysis of the relative content of surface elements from XPS results.

Samples	C (%)	O (%)	Ni (%)	Co (%)	Mn (%)
NCM-811	33.35	59.24	5.45	0.52	1.45
LNCMO-1090	31.28	60.20	5.18	0.71	2.63
NCM-811-Air	36.27	60.89	1.97	0.31	0.56
LNCMO-1090-Air	35.89	61.56	1.97	0.16	0.43

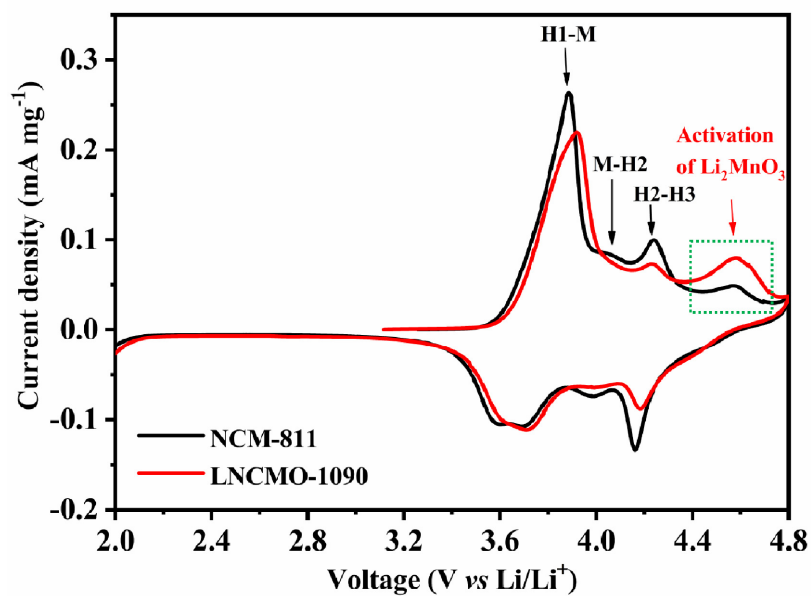


Figure S1. The first cyclic voltammogram curves and phase transitions of the as-prepared cathodes at a scan rate of 0.1 mV s^{-1} between 2.0 and 4.8 V vs Li/Li^+ .

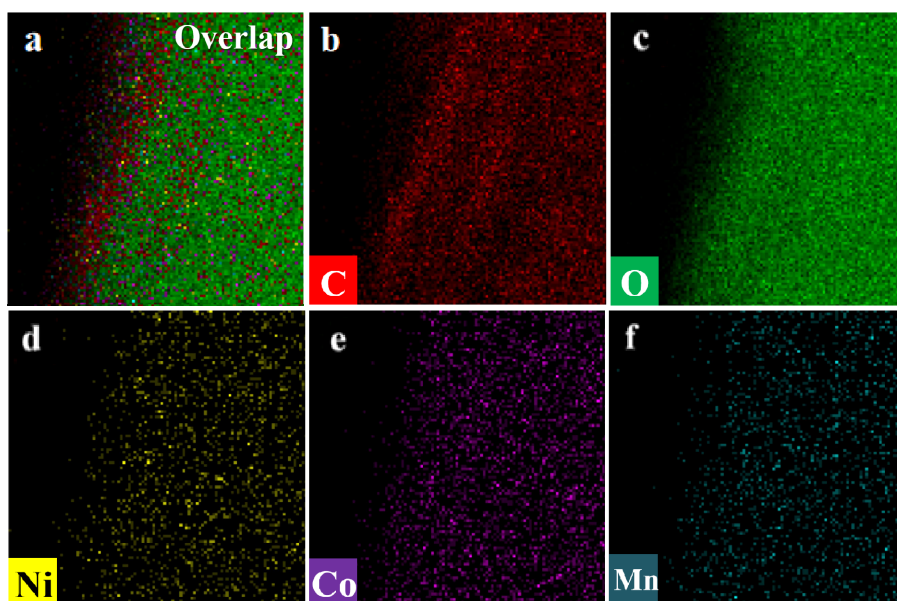


Figure S2. EDS mapping of NCM-811-Air. (a) multiple signal superimposed images, (b-f) C, O, Ni, Co, and Mn signals, respectively.

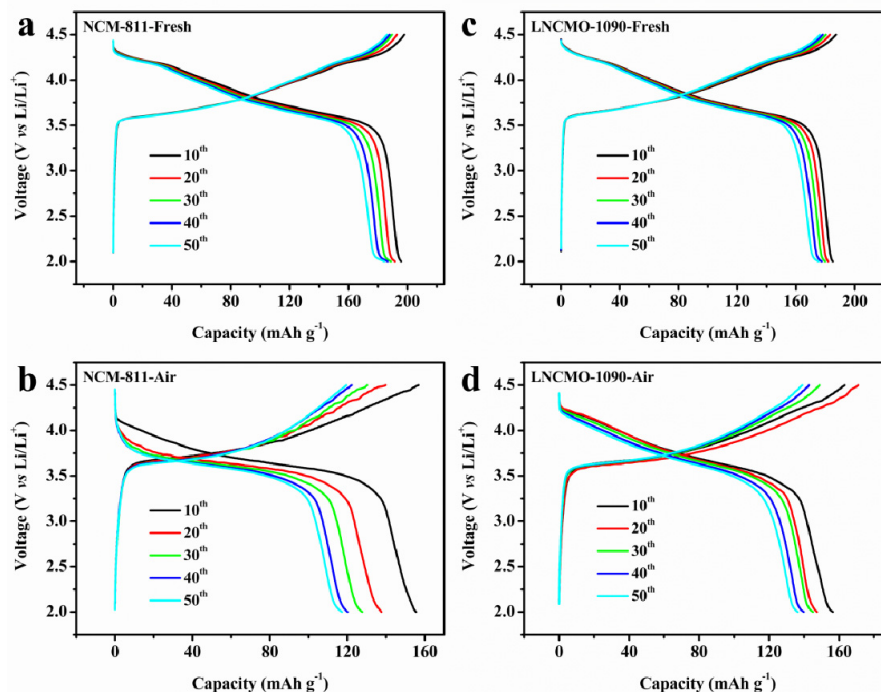


Figure S3. The charge/discharge profiles at different cycles of (a, b) the NCM-811 and (c, d) LNCMO-1090 cathodes before and after storage at a rate of 0.1 C between 2.0 and 4.5 V vs Li/Li⁺: (a, c) before storage, (b, d) after storage.

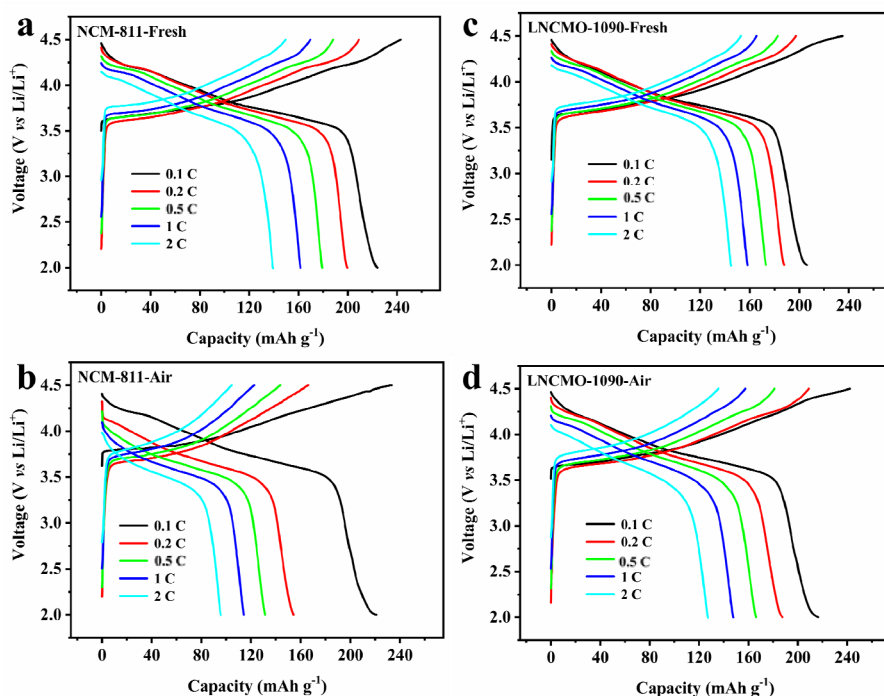


Figure S4. The charge/discharge profiles at different rates of (a, b) the NCM-811 and (c, d) LNCMO-1090 cathodes before and after storage between 2.0 and 4.5 V vs Li/Li⁺: (a, c) before storage, (b, d) after storage.

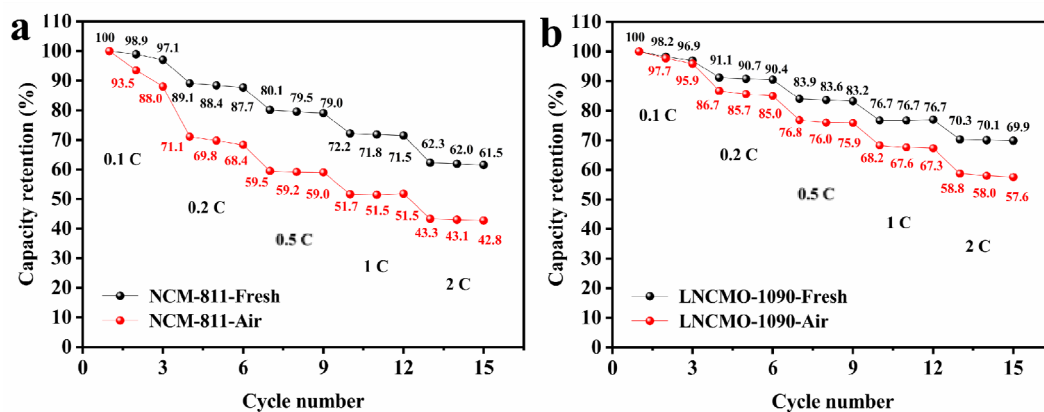


Figure S5. The capacity retention at different rates of (a) the NCM-811 and (b) LNCMO-1090 cathodes before and after storage between 2.0 and 4.5 V vs Li/Li⁺.

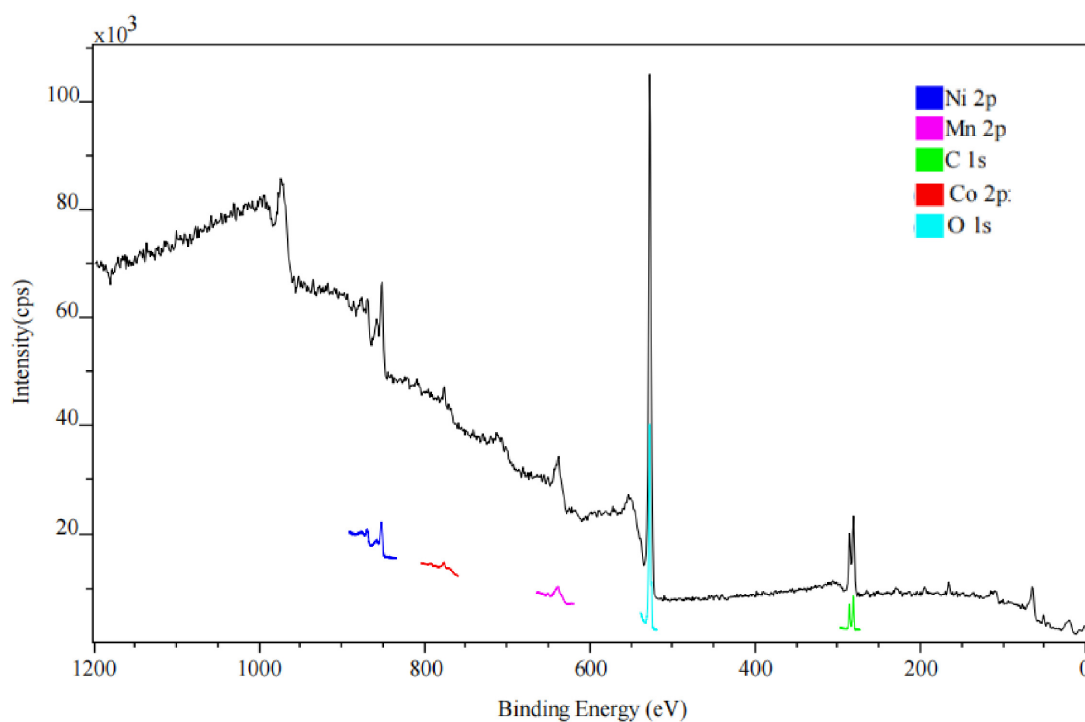


Figure S6. The broad spectrum of XPS for NCM-811 cathodes.

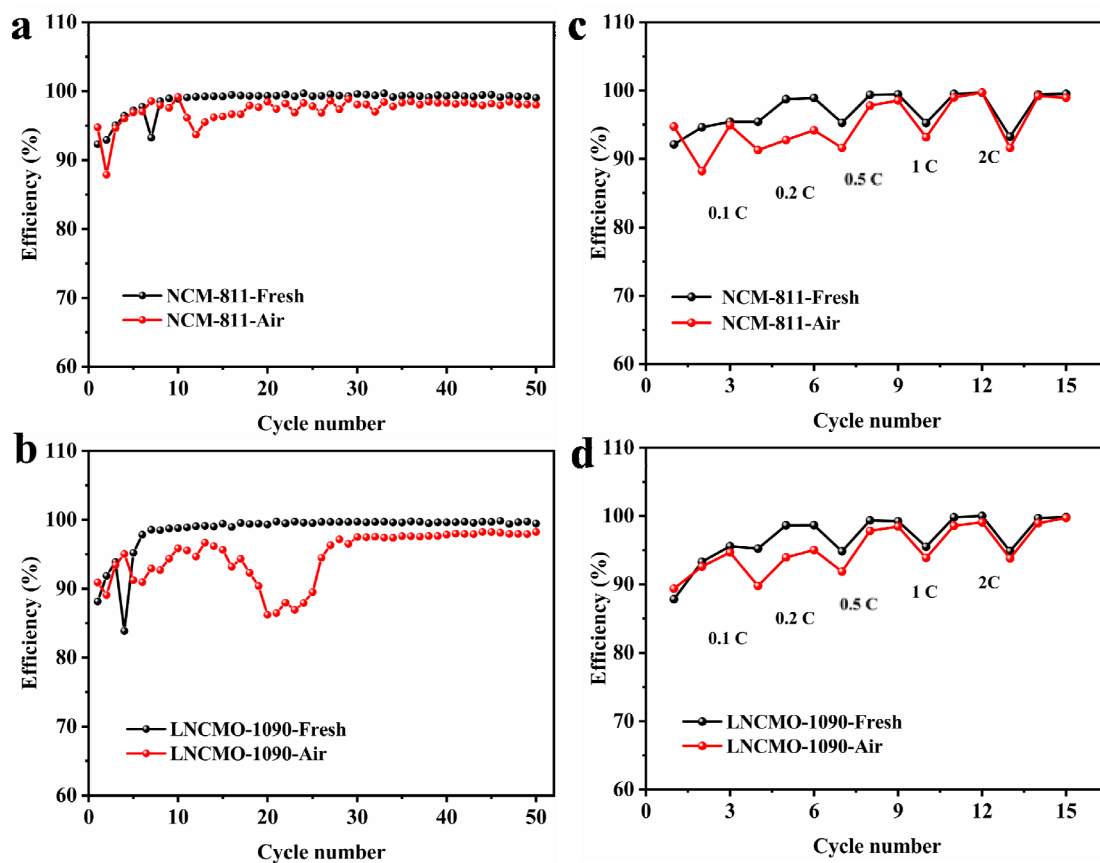


Figure S7. Comparison of electrochemical performance of cathode materials before and after storage: (a, b) Coulombic efficiency of cycling performance; (c, d) Coulombic efficiency of rate performance.