

Supplementary Information

Enhancing Capacity in Mn-rich Cathode by Kinetics Control for Lithium-ion Batteries

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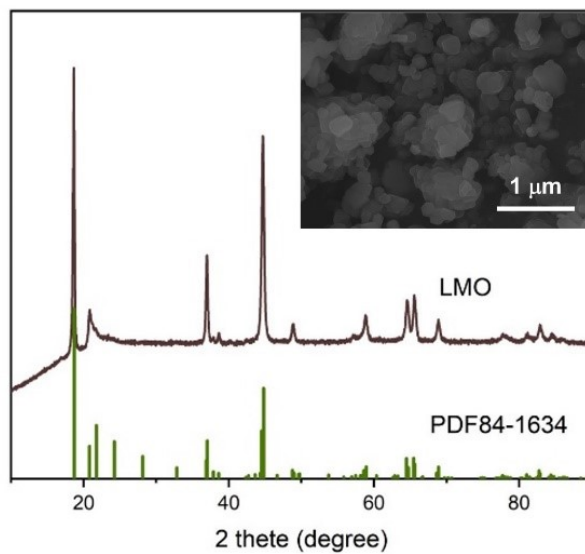


Figure S1 XRD patterns of LMO material. Histogram: PDF patterns for Li_2MnO_3 (PDF84-1634). Insert: SEM image of LMO material.

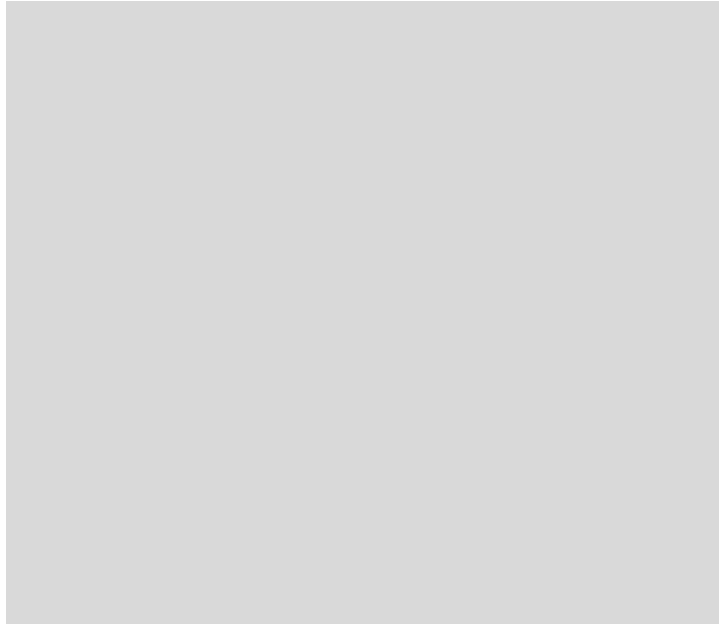


Figure S2 XRD patterns of LMO series materials.

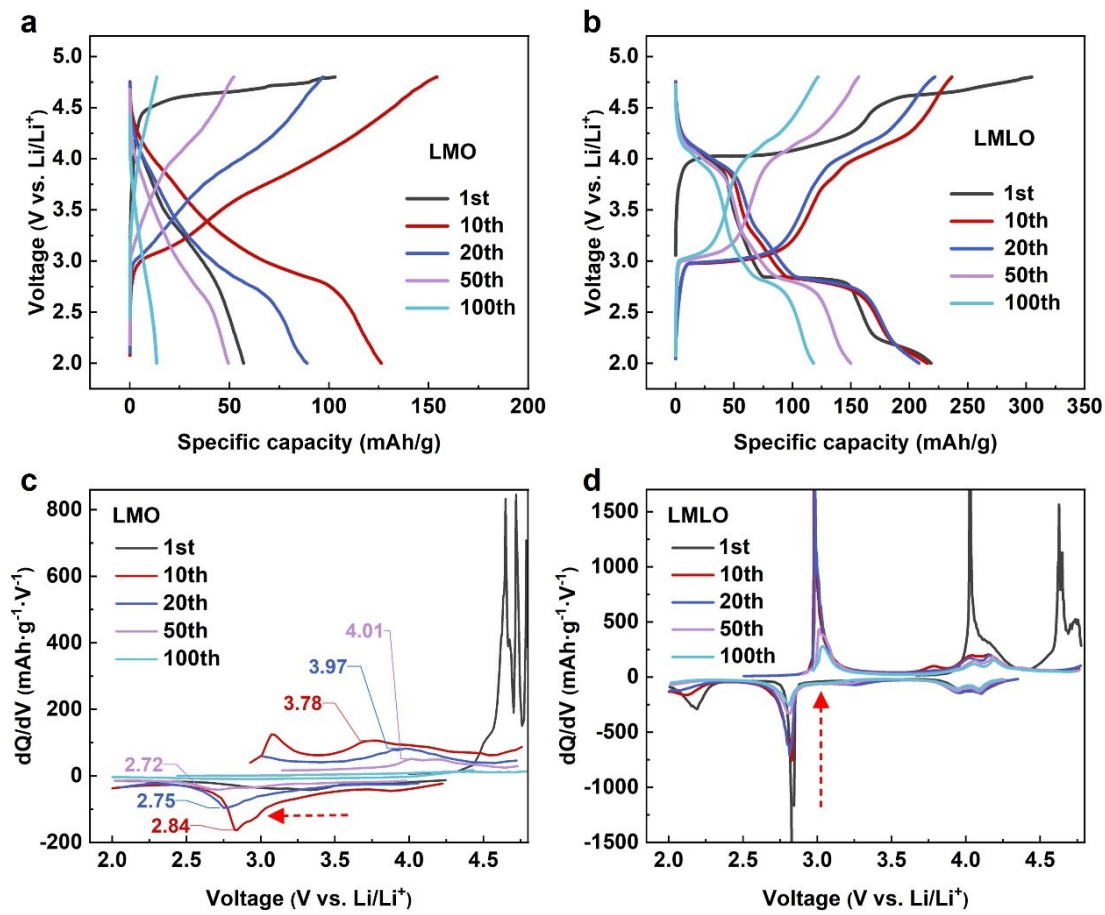


Figure S3 (a, b) The charge-discharge curves, and **(c, d)** corresponding dQ/dV curves for LMO and LMLO electrodes at the 1st, 10th, 20th, 50th, and 100th cycle.

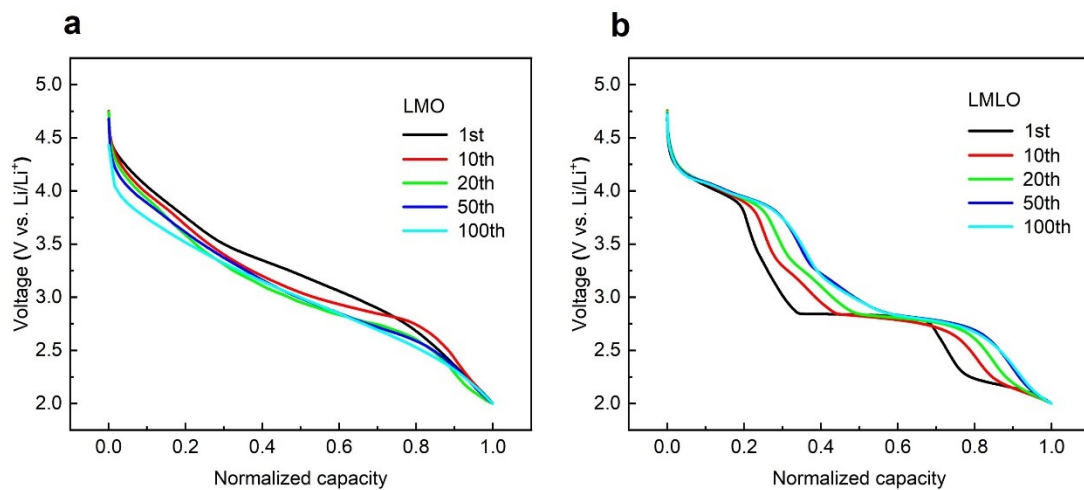


Figure S4 The normalized charge-discharge profiles for (a) LMO, and (b) LMLO materials.

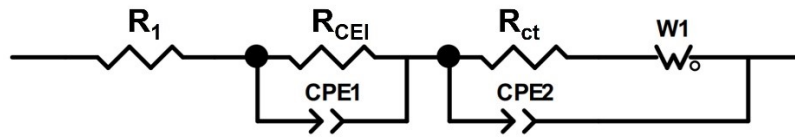


Figure S5 The equivalent circuit for EIS data.

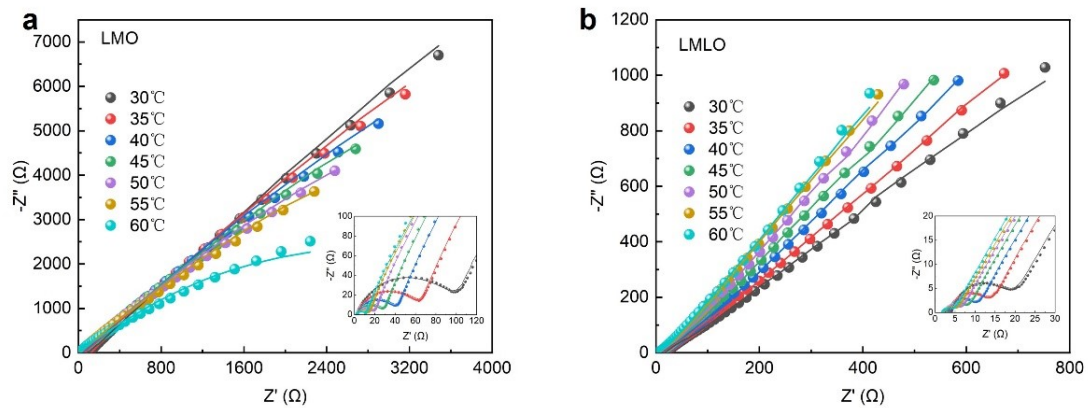


Figure S6 The variable temperature EIS data for **(a)** LMO, and **(b)** LMLO.

Table S1 SEM-EDS quantity analysis table weight fraction of La0.01, La0.03, La0.05 and LMLO.

Material	Atomic ratio of Mn : La
La0.01	99.02 : 1.01
La0.03	97.01 : 3.02
La0.05	95.02 : 5.02
LMLO	196.95 : 3.03

Table S2 Rietveld refined crystallographic parameters of LMO material by the XRD patterns.

Material	phase	a (Å)	b (Å)	c (Å)	α (°)	β (°)	γ (°)	V (Å ³)
LMO	Li ₂ MnO ₃	4.9276	8.5132	5.0132	90.000	108.812	90.000	199.069

Table S3 Atoms occupancy of LMO material from Rietveld refinement by the XRD patterns.

Material	Phase	Atom	Site	x	y	z	Occ.
LMO	Li ₂ MnO ₃	Mn1	4g	0.00000	0.17346	0.00000	1.000
		Li1	2b	0.00000	0.50000	0.00000	1.000
		Li2	2c	0.00000	0.00000	0.50000	1.000
		Li3	4h	0.00000	0.72850	0.50000	1.000
		O1	4i	0.23990	0.00000	0.21169	1.000
		O2	8j	0.25960	0.33724	0.23159	1.000

Table S4 Fitting results of EIS at varied temperatures for LMO and LMLO electrodes.

Sample	Temperature (°C)	R_{ct} (Ω)
LMO	30.0	2.842×10^5
	35.0	9.624×10^4
	40.0	5.317×10^4
	45.0	3.583×10^4
	50.0	2.524×10^4
	55.0	1.888×10^4
	60.0	7.232×10^3
LMLO	30.0	138.2
	35.0	120.0
	40.0	84.31
	45.0	68.45
	50.0	39.26
	55.0	32.11
	60.0	26.50

Note S1 The calculation formula for E_a value from varied temperature EIS data.

$$\log \frac{1}{R_{ct}} = -\frac{E_a}{2.303RT} + z$$