

Supporting Information for

Understanding the key role of {100} exposed crystal facets on the electrochemistry of spinel LiMn_2O_4 cathode

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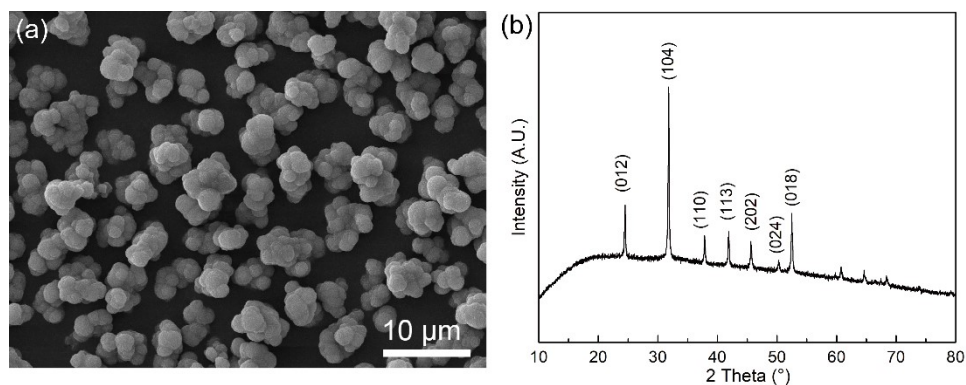


Figure S1 SEM image and XRD pattern of the as-prepared MnCO_3 precursors.

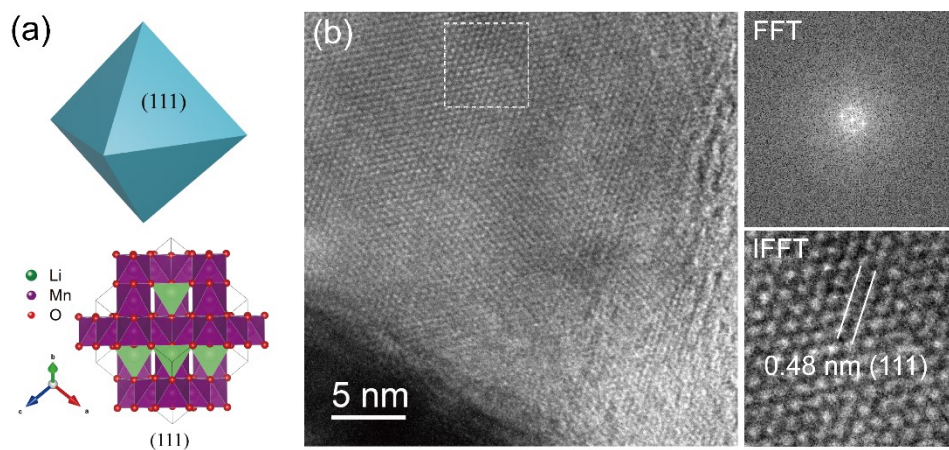


Figure S2 (a) Atomic arrangements toward the surface orientations of (111) facet, (b) the corresponding HRTEM image, the FFT and IFFT images.

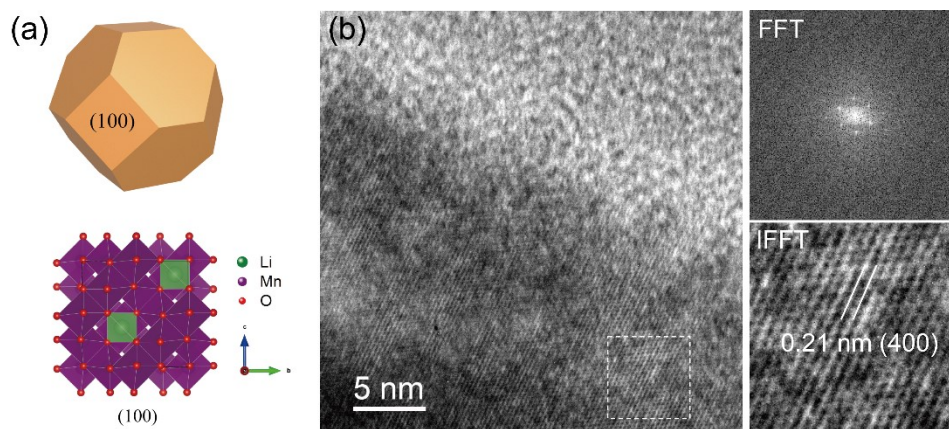


Figure S3 (a) Atomic arrangements toward the surface orientations of (100) facet, (b) the corresponding HRTEM image, the FFT and IFFT images.

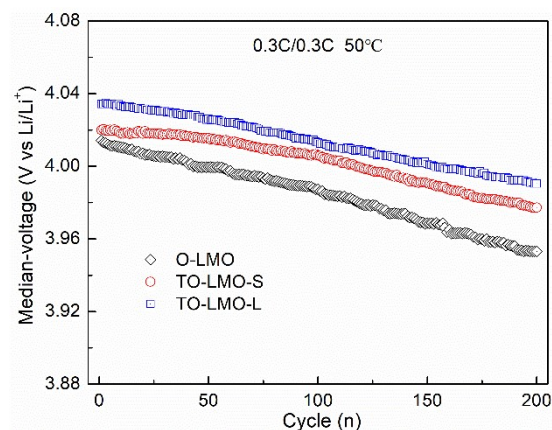


Figure S4 The cycling stability of median voltage of O-LMO, TO-LMO-S and TO-LMO-L at 0.3C.

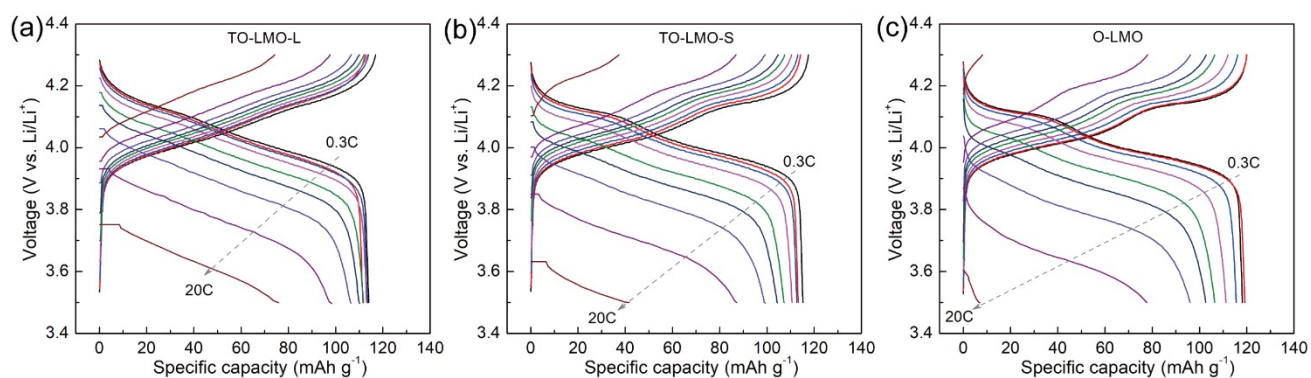


Figure S5 The charge/discharge curves of O-LMO, TO-LMO-S and TO-LMO-L at varied rates from 0.3C to 20C.

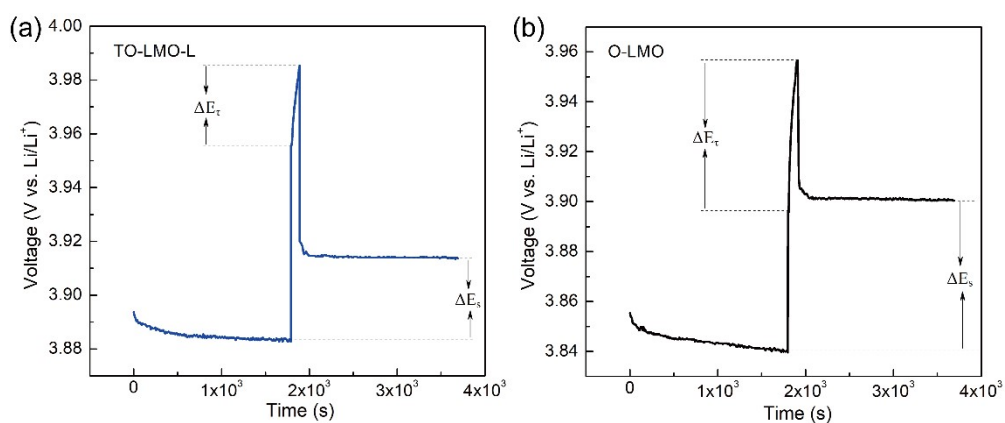


Figure S6 The typical voltage versus time profiles of O-LMO and TO-LMO-L.

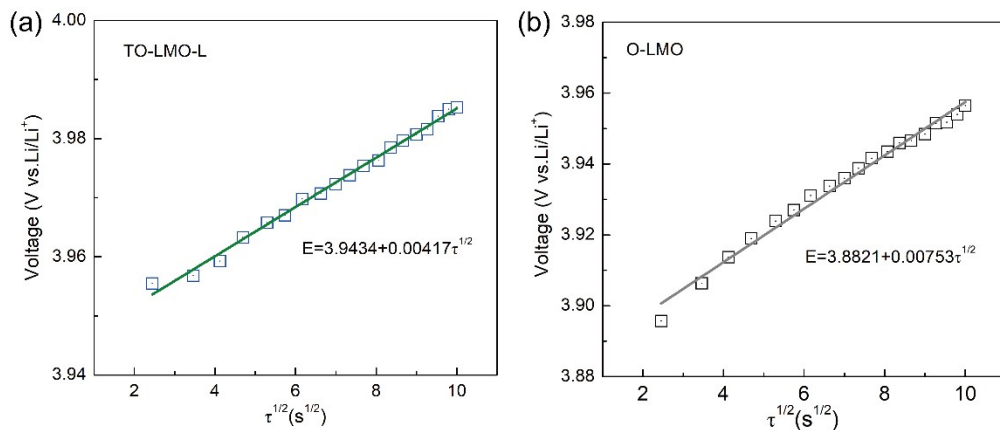


Figure S7 A linear relationship between $\tau^{1/2}$ and voltage of O-LMO and TO-LMO-L.

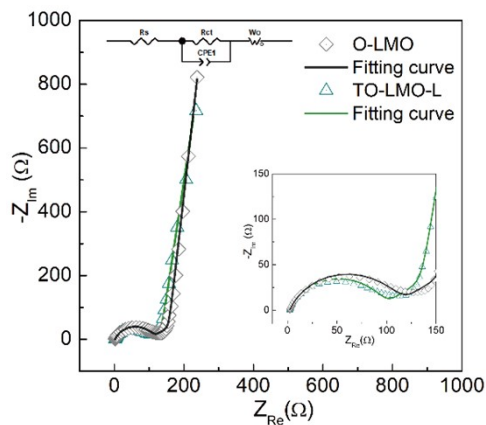


Figure S8 Nyquist plots and fitting curves of EIS before cycling, the insert refers to the used equivalent circuit model.

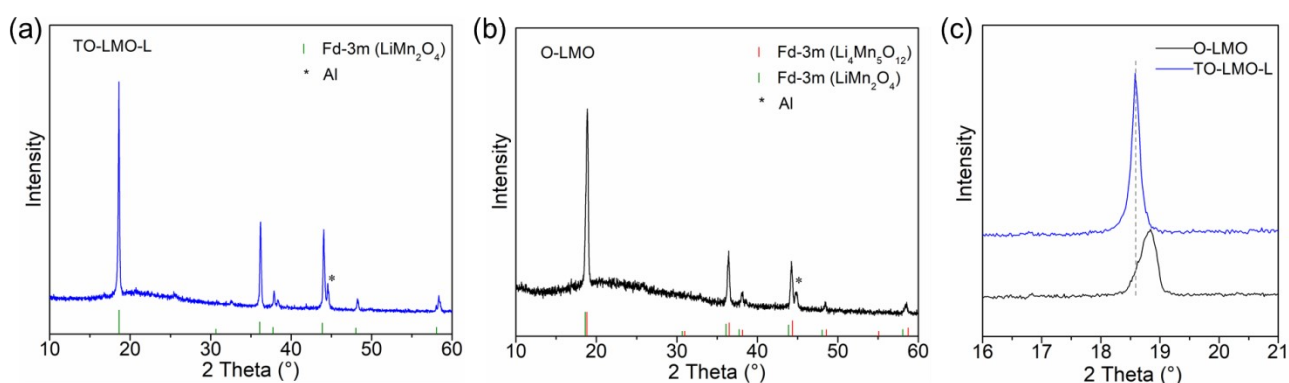


Figure S9 XRD of cycled (a) TO-LMO-L and (b) O-LMO electrodes after 200 cycles at 0.3C under 50 °C, (c) the enlarged diffraction regions of 16-21°. Both electrodes are measured at the fully discharged state.

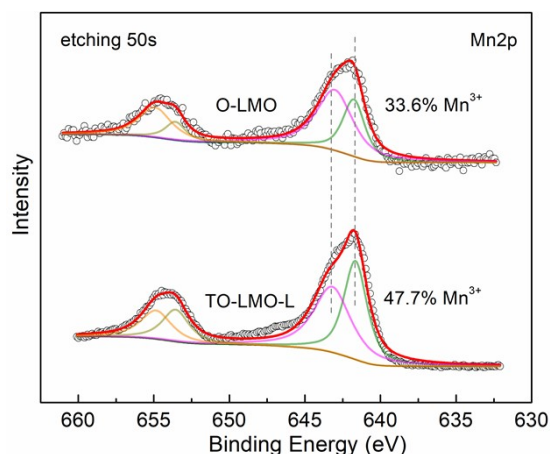


Figure S10 XPS of Mn 2p for cycled O-LMO and TO-LMO-L electrodes after 200 cycles at 0.3C under 50 °C. Both electrodes are measured at the fully discharged state.

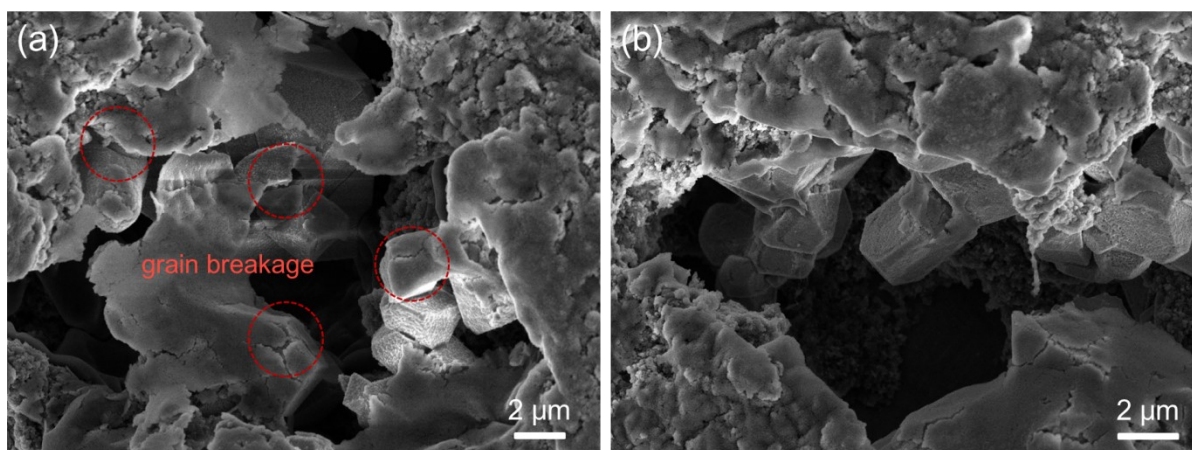


Figure S11 SEM of cycled (a) O-LMO and (b) TO-LMO-L electrodes after 200 cycles at 0.3C under 50 °C. Both electrodes are measured at the fully discharged state.

Table S1 Refined crystallographic parameters by Rietveld analysis for cubic phase in the TO-LMO-L.

S. G., *Fd-3m*

$a=b=c=8.1986$

Atom	Wyck.	x	y	z	Occ.
Li1	8a	0.1250	0.1250	0.1250	0.250
Mn1	16d	0.5000	0.5000	0.5000	0.500
O1	32e	0.2612	0.2612	0.2612	1.000

Table S2 Refined crystallographic parameters by Rietveld analysis for cubic phase in the TO-LMO-S.

S. G., *Fd-3m*

$a=b=c=8.2029$

Atom	Wyck.	x	y	z	Occ.
Li1	8a	0.1250	0.1250	0.1250	0.250
Mn1	16d	0.5000	0.5000	0.5000	0.500
O1	32e	0.2615	0.2615	0.2615	1.000

Table S3 Refined crystallographic parameters by Rietveld analysis for cubic phase in the O-LMO.

S. G., *Fd-3m*

$a=b=c=8.2067$

Atom	Wyck.	x	y	z	Occ.
Li1	8a	0.1250	0.1250	0.1250	0.250
Mn1	16d	0.5000	0.500	0.5000	0.500
O1	32e	0.2618	0.2618	0.2618	1.000

Table S4 The simulated results from EIS measurement of the O-LMO and TO-LMO-L before cycling.

Samples	Simulated electrochemical parameters		
	R_s (Ω)	R_{ct} (Ω)	W_o (Ω)
O-LMO	2.21	108.5	128.2
TO-LMO-L	2.02	93.5	111.6