Supplementary Information

Inhibit oxygen release and stabilize bulk structure of lithium-rich layered oxides by strong Mo-O covalent binding

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1. Supplementary tables

Table S1. Rietveld Refinement Results of LRP and LR-Mo1.0.

Sample	a=b (Å)	c (Å)	c/a	V (Å)^3	Rwp	Rp	χ^2
LRP	2.85627	14.26103	4.9929	100.758	2.03%	1.40%	2.037
LR-Mo1.0	2.85323	14.23955	4.9907	100.392	1.77%	1.25%	2.396

Table S2. Fitting Result of Equivalent Circuit from Nyquist Curves for LRP and LR-Mo1.0.

Samples	R_s/Ω	R_{ct}/Ω	σ/Ω cm^2 s$^{-1/2}$	D_{Li+}/cm^2 s^{-1}
LRP	4.026	100.8	165.9	8.96×10^{-16}
LR-Mo1.0	2.777	65.1	78.7	3.98×10^{-15}

2. Supplementary figures

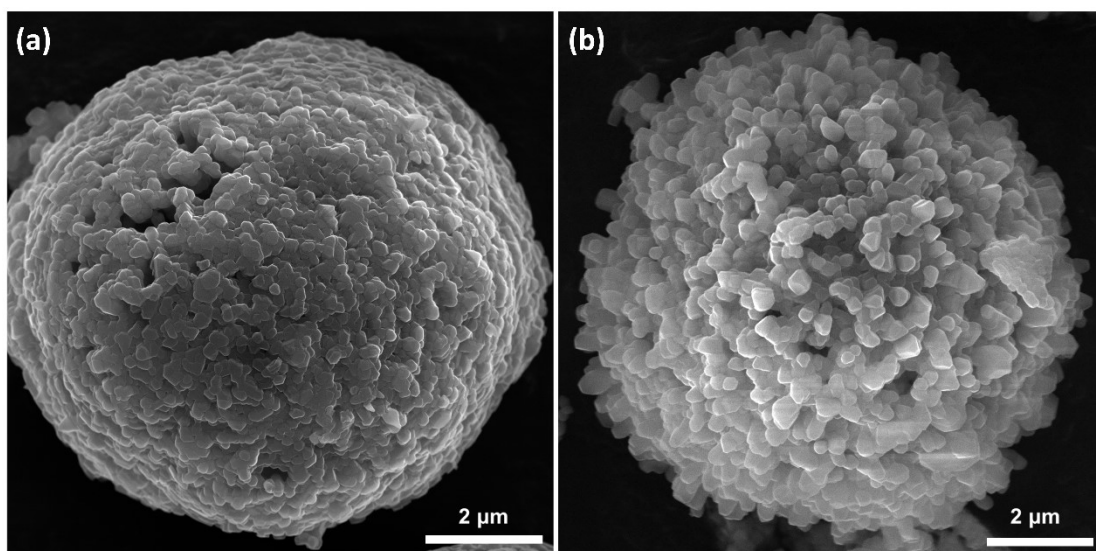**Fig. S1.** Schematic diagram of material synthesis

Fig. S2. SEM images of (a)LR-Mo0.5 and (b)LR-Mo1.5
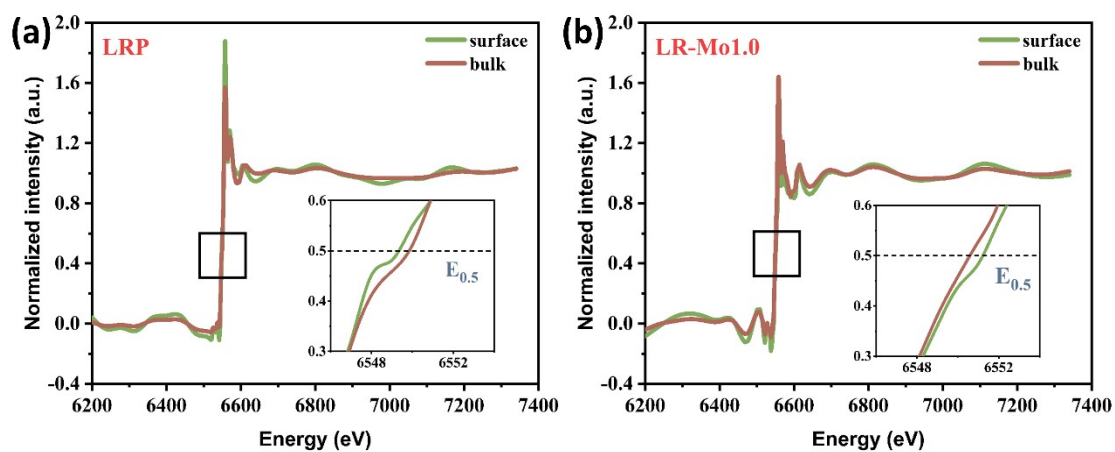

Fig. S3. Mn K-edge XANES of selected surface and bulk regions of (a)LRP and (b)LR-Mo1.0
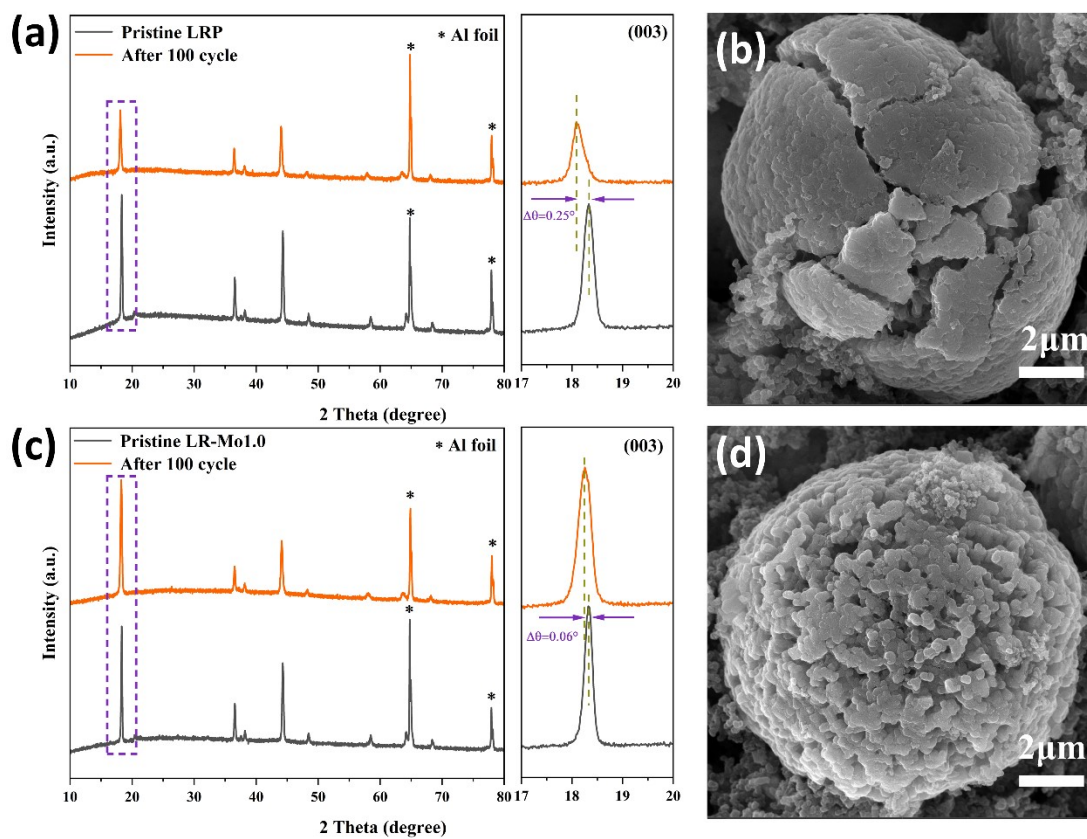
Fig.S4. XRD patterns and SEM images of (a, b) LRP and (c, d) LR-Mo1.0 after 100 cycles at 1C