Supporting Information

Novel MOF Shell-Derived Surface Modification of Li-Rich Layered Oxide Cathode for Enhanced Lithium Storage

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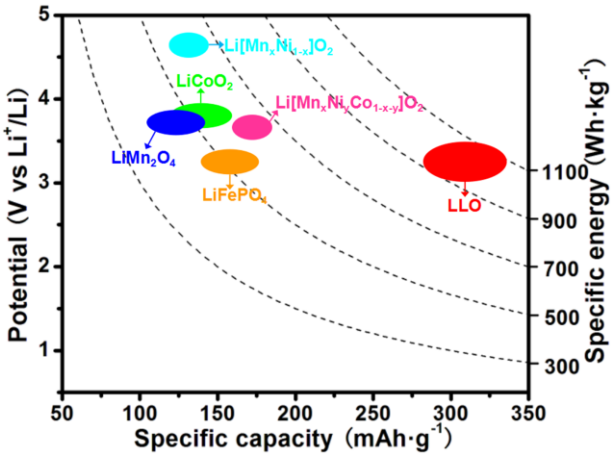

Fig. S1 A comparison of reversible capacity and operating voltage ranges of the typical lithium-containing cathode materials. The energy density is calculated on the basis of the voltage versus metallic lithium for simplicity.

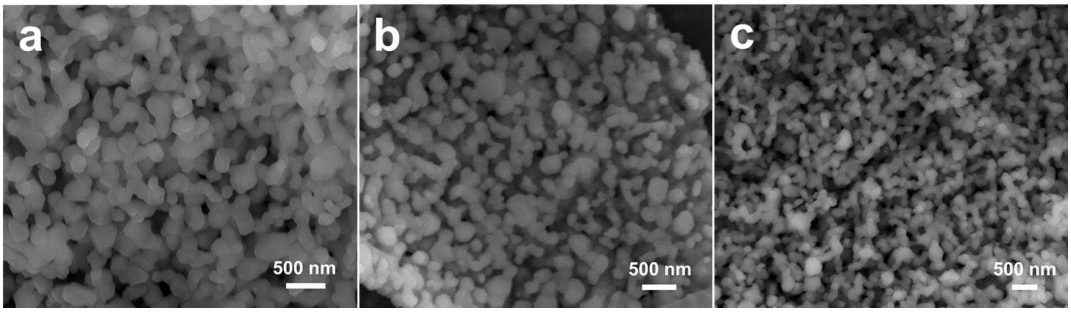

Fig. S2 (a-c) SEM images of LLO, LLO@MOF and LLO@C&NiCo, respectively.

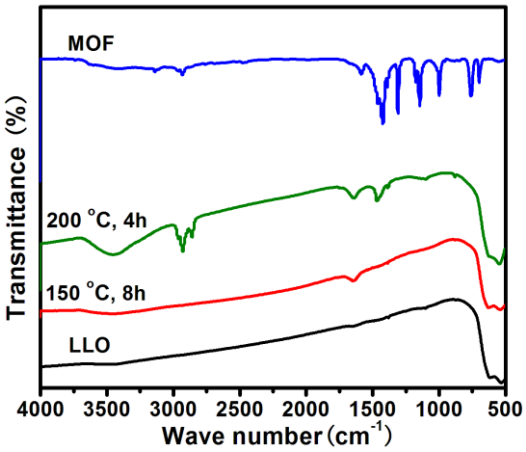

Fig. S3 FT-IR spectra of LLO, LLO processed by low-pressure vapor superassembly at 150 ℃ for 8 h, and at 200 ℃ 4 h, together with a control sample MOF samples.

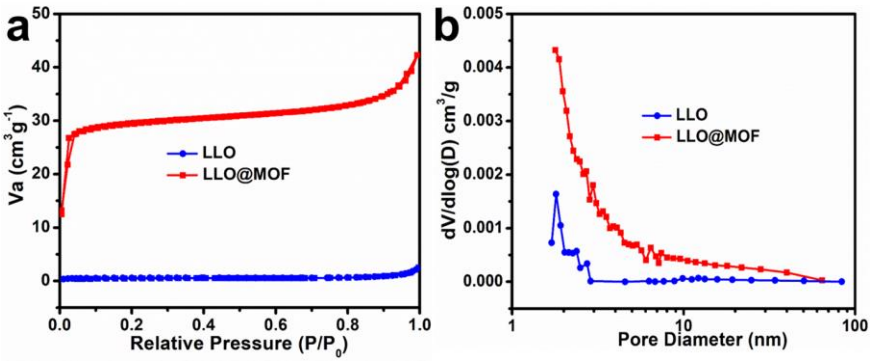

Fig. S4 (a) N_2 adsorption/desorption isotherm and (b) the corresponding pore size distribution of LLO and LLO@MOF.

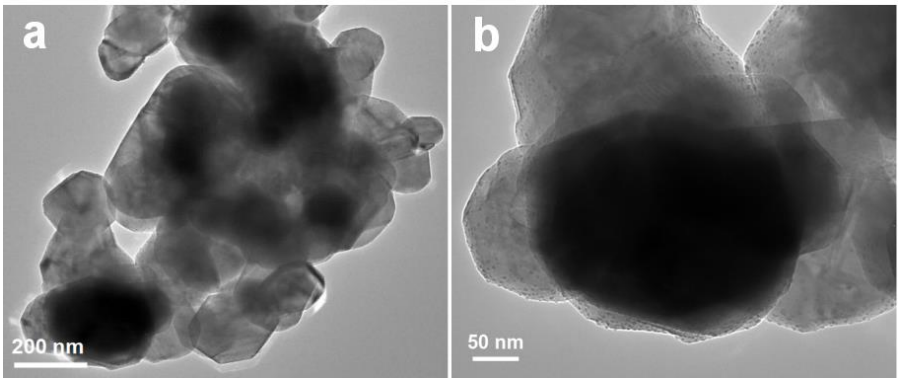

Fig. S5 TEM images of LLO@C&NiCo.

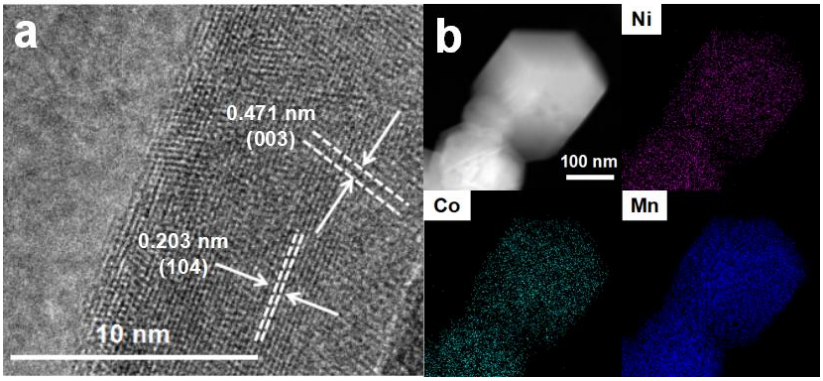

Fig. S6 (a) HRTEM image and (b) TEM mapping images of LLO.

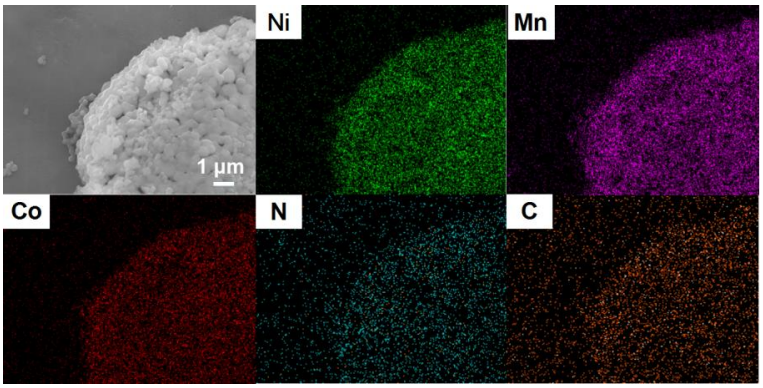

Fig. S7 SEM elemental mapping images of LLO@C&NiCo.

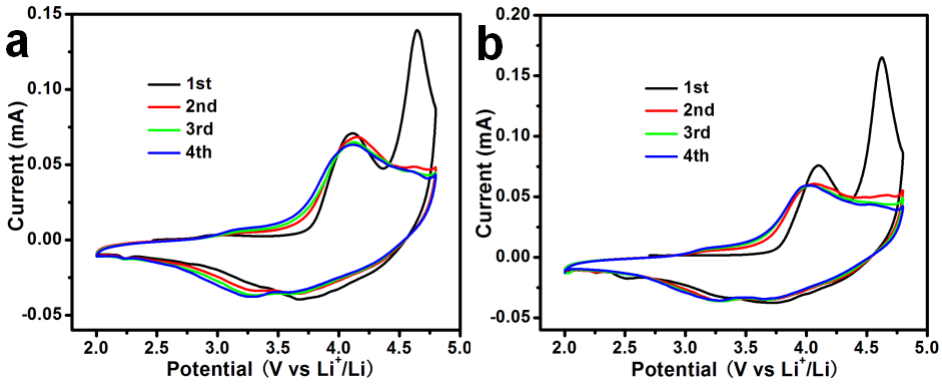

Fig. S8 CV curves of the first four cycles at the scan rate of 0.2 mV s^{-1} of LLO (a) and LLO@C&NiCo (b) in the 2.0-4.8 V range.

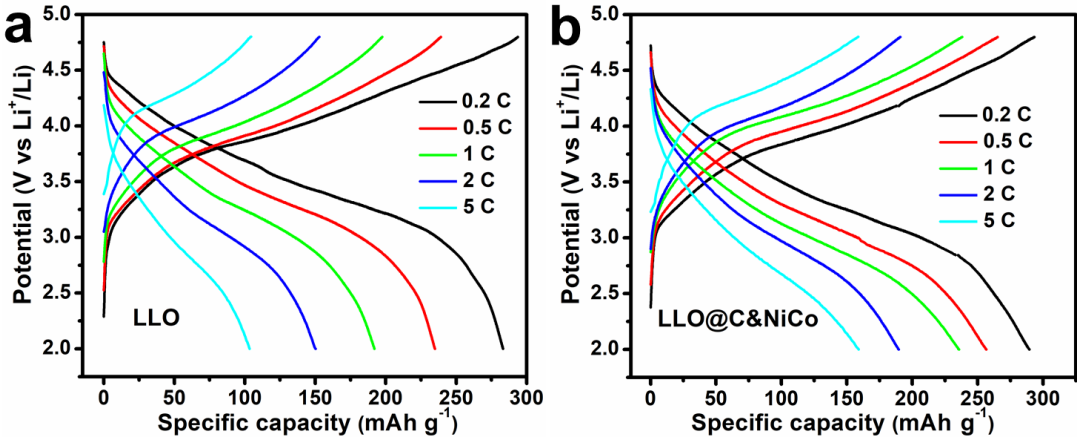

Fig. S9 The charge-discharge voltage profiles of the LLO (a) and LLO@C&NiCo (b) at different current densities.

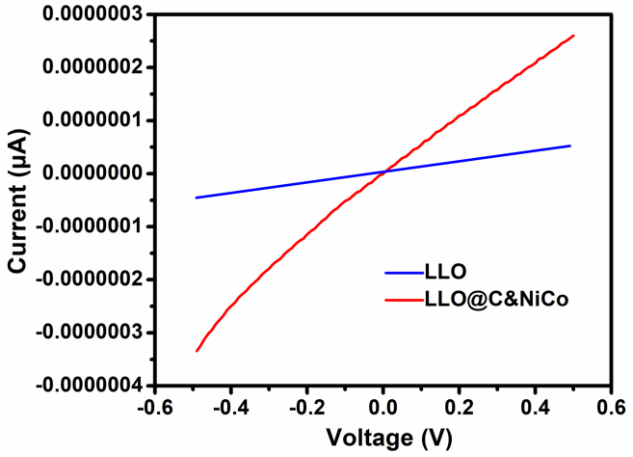

Fig. S10 I-V curves of LLO and LLO@C&NiCo.

Table S1. Electrochemical performance comparison of various modified Li-rich layered oxide cathodes.

Li-rich layered oxide cathode	Voltage range (V)	Current density (mA g^{-1})	Cycle number	Residual capacity (mAh g^{-1})	Capacity retention	Reference
LLO@C&NiCo	**2-4.8**	**100** **500**	**100** **300**	**270** **178**	**95%** **90%**	**Our work**
$Li_{1.2}Ni_{0.13}Co_{0.13}Mn_{0.54}O_2$ used CMC	2-4.8	200	500	178	79%	S1

binder						
Concentration-gradient PO_4^{3-} polyanion doped LLO	2-4.8	100	400	228.5	88.2%	S2
3D hollow hierarchical structure LLO	2-4.8	125	200	225	89.5%	S3
Fusiform porous micro-nano structure LLO	2-4.6	125	200	256.78	87.1%	S4
Full microwave synthesized LLO	2.5-4.8	200	100	197.2	83.3%	S5
Spherical core-shell structure $Li_{1.2}Ni_{0.2}Mn_{0.6}O_2$@$Li_{1.2}Ni_{0.4}Mn_{0.4}O_2$	2-4.8	200	100	175	93.1%	S6
Spinel-structure skin and ferric oxide islands coated LLO	2-4.8	250	150	200	80%	S7
0.5 Li_2MnO_3·0.5 $LiNi_{0.8}Co_{0.1}Mn_{0.1}O_2$ (LL-811) cathode	2-4.7	50	100	195	92%	S8
PEDOT:PSS conducting polymer coated LLO	2-4.8	250	100	146.9	80%	S9
Li_2ZrO_3 coated LLO	2.5-4.8	250	100	162	83.5%	S10

References

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