

Supporting Information

A Bifunctional Cerium-Containing Modification Strategy for High-Performance High-Voltage LiCoO₂ Cathodes

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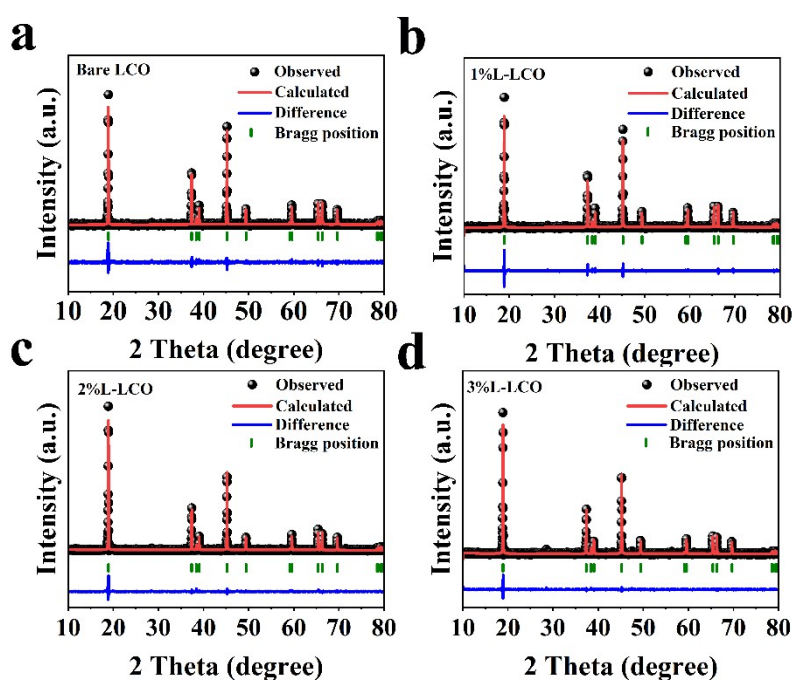


Fig S1. Rietveld refinement of (a) Bare LCO, (b) 1% L-LCO, (c) 2% L-LCO, (d) 3% L-LCO.

Table S1. Refined atomic coordinates and site occupations for Bare LCO and x% L-LCO samples.

Sample	Atom	Wyckoff Site	Fractional Coordinates			Occupancy
			x	y	z	
Bare LCO	Li	3a	0	0	0	1.00
	Co	3b	0	0	0.5	1.00
	O	6c	0	0	0.2405	1.00
1%L-LCO	Li	3a	0	0	0	1.00
	Co	3b	0	0	0.5	0.99
	O	6c	0	0	0.2398	1.00
	Ce	3b	0	0	0.5	0.01
2%L-LCO	Li	3a	0	0	0	1.00
	Co	3b	0	0	0.5	0.98
	O	6c	0	0	0.2395	1.00
	Ce	3b	0	0	0.5	0.02
3%L-LCO	Li	3a	0	0	0	1.00
	Co	3b	0	0	0.5	0.97
	O	6c	0	0	0.2392	1.00
	Ce	3b	0	0	0.5	0.03

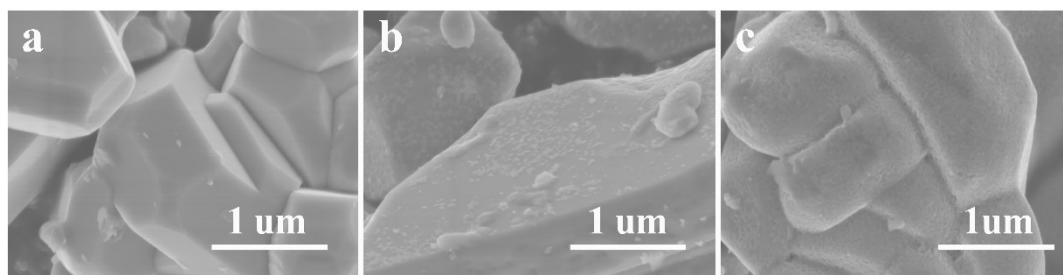


Fig S2. SEM images of (a) Bare LCO, (b) 1% L-LCO, (c) 3% L-LCO.

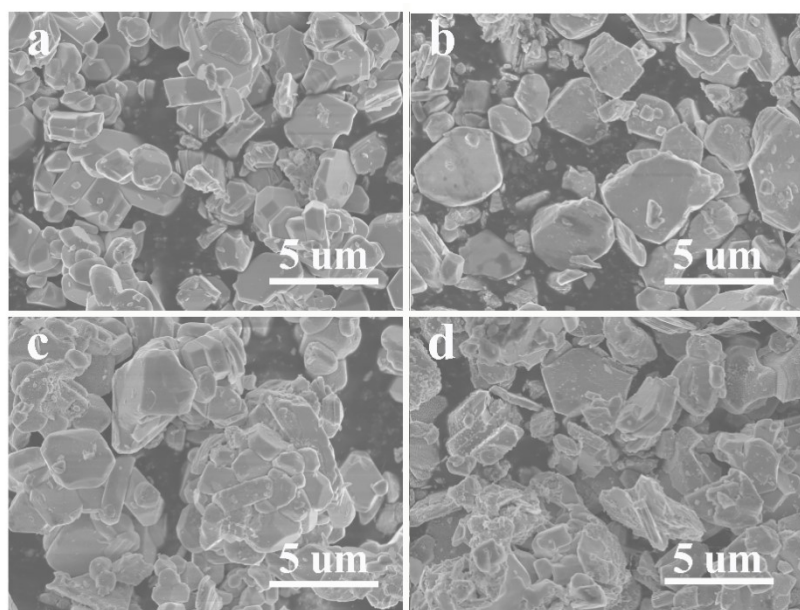


Fig S3. SEM images of (a) Bare LCO, (b) 1% L-LCO, (c) 2% L-LCO and (d) 3% L-LCO.

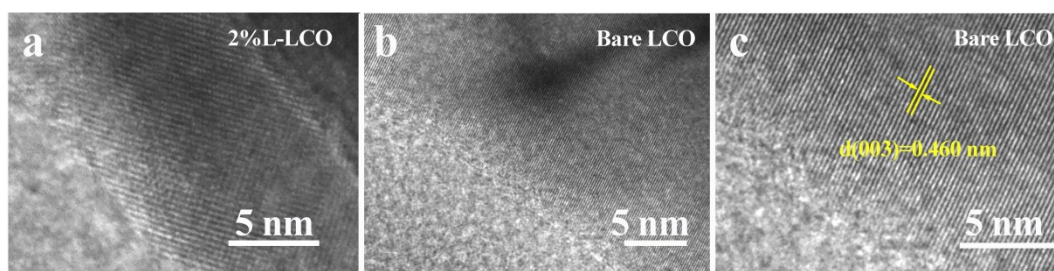


Fig S4. HRTEM images of (a) 2% L-LCO, (b) and (c) Bare LCO.

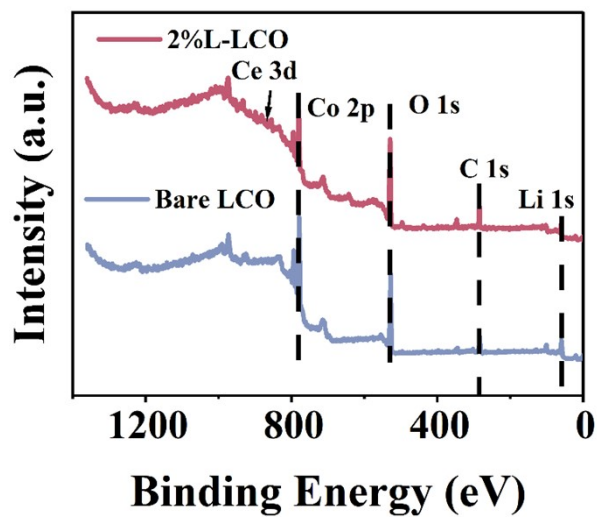


Fig S5. XPS spectra of the whole spectrum for Bare LCO, 2% L-LCO.

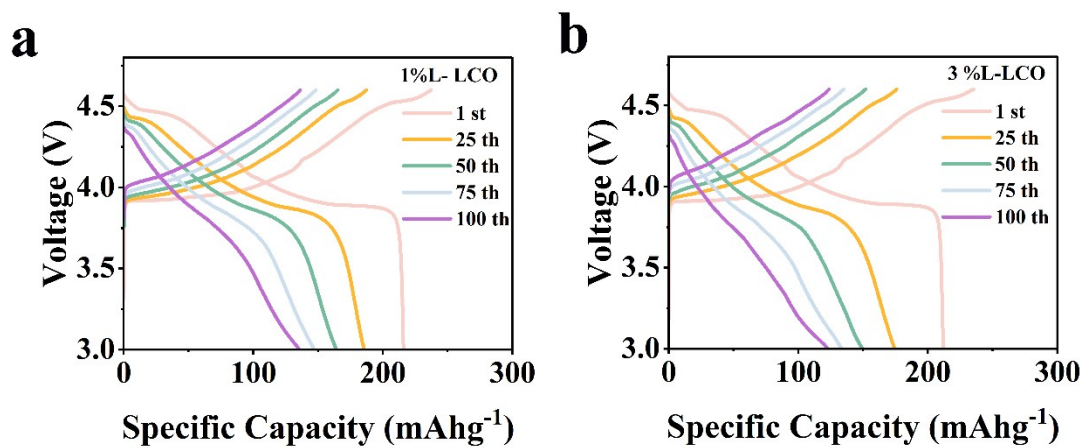


Fig S6. Charge/Discharge curves of (a) 1% L-LCO, (b) 3% L-LCO at 1 C.

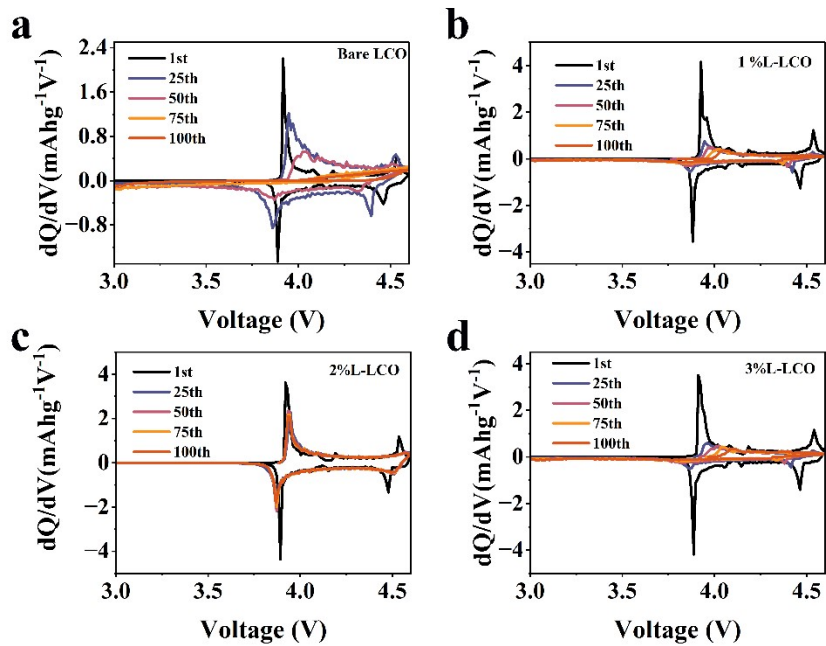


Fig S7. The dQ/dV curves of (a) Bare LCO, (b) 1% L-LCO, (c) 2% L-LCO (d) 3% L-LCO.

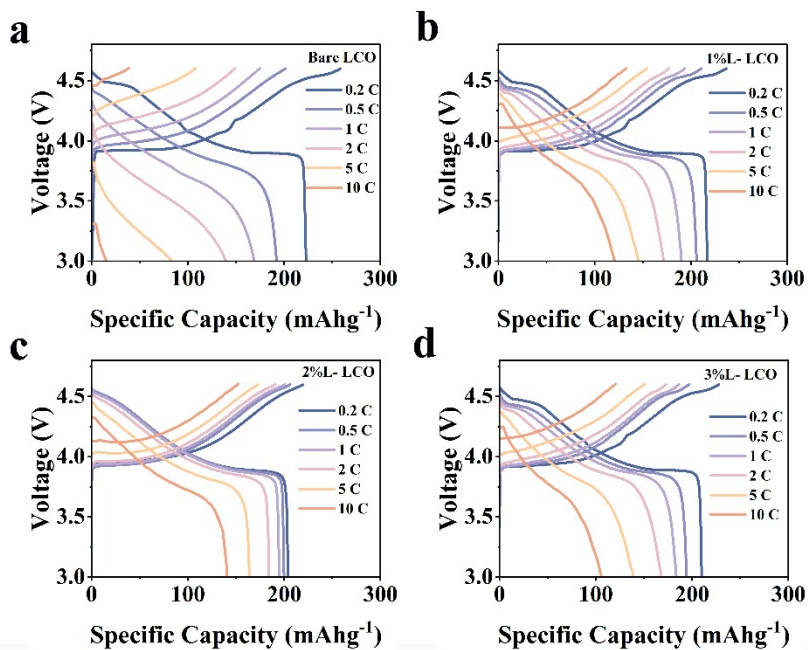


Fig S8. Charge/Discharge curves of (a) Bare LCO, (b) 1% L-LCO, (c) 2% L-LCO (d) 3% L-LCO.

Table S2. Resistance of Bare LCO, x% L-LCO.

Samples	pristine		after cycles		
	$R_s (\Omega)$	$R_{ct} (\Omega)$	$R_s (\Omega)$	$R_{sf} (\Omega)$	$R_{ct} (\Omega)$
Bare LCO	2.935	105.8	14.8	19.65	436.7
1% L-LCO	3.974	49.81	4.828	20.51	104
2% L-LCO	4.694	31.55	6.15	13.1	77.97
3% L-LCO	6.83	59.59	3.829	37.26	279.1

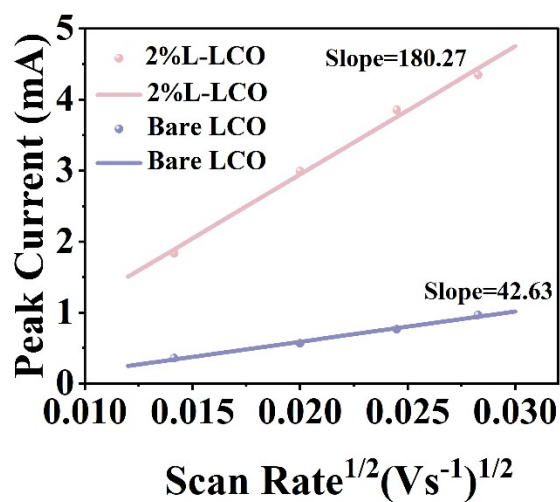


Fig S9. Linear fitting of $I_p-v^{1/2}$ at charging state.

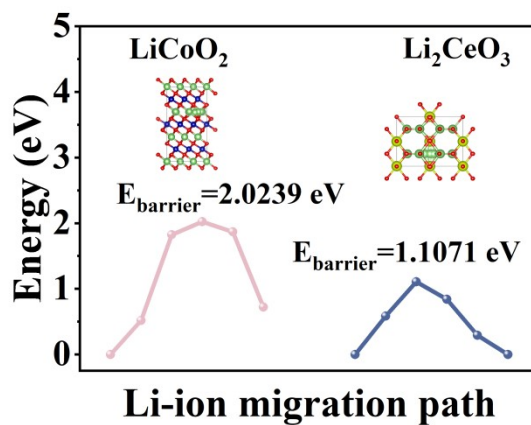


Fig S10. DFT calculation results comparing the Li^+ migration energy barriers in $LiCoO_2$ and

Li_2CeO_3 .

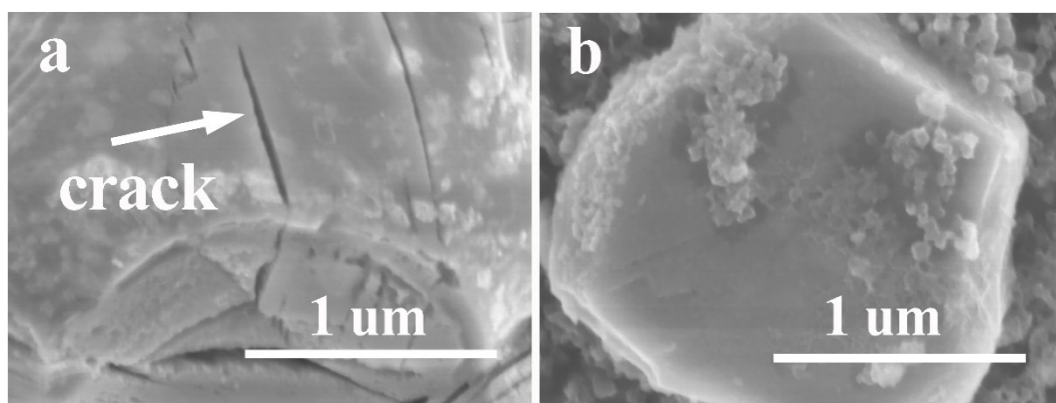


Fig S11. SEM images of (a) Bare LCO and (b) 2% L-LCO after cycling.