

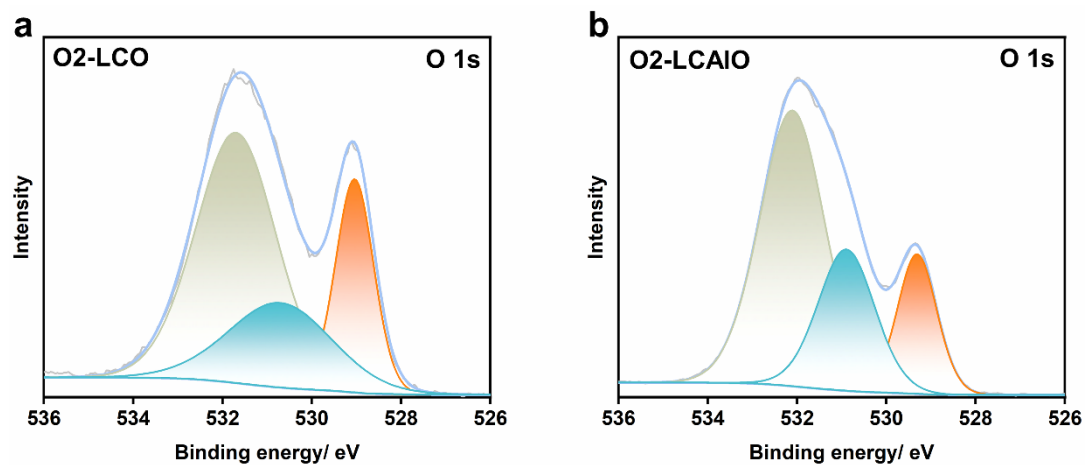


Figure S1. XPS spectra of pristine (a) O2-LCO and (b) O2-LCAIO.

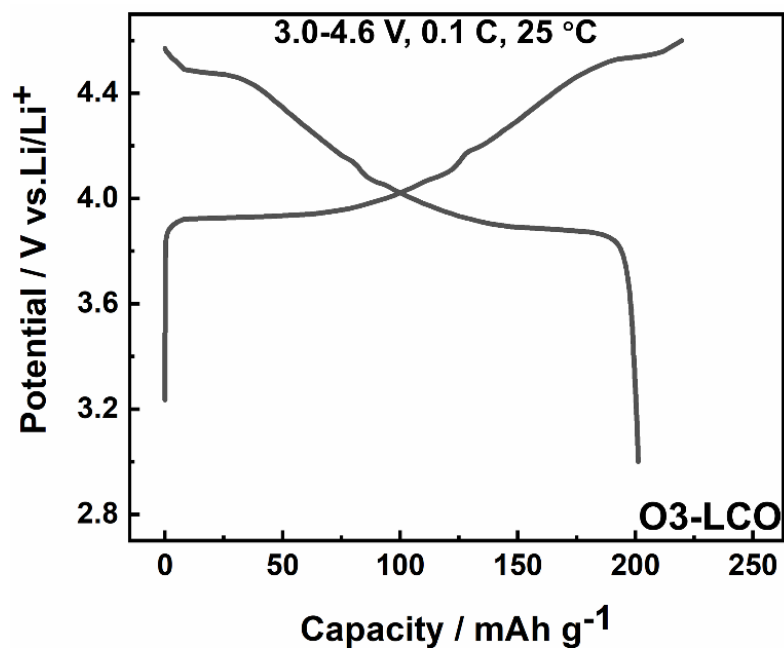


Figure S2. Charge and discharge voltage profiles of O3-LCO cathodes at 0.1 C-rate between 3.0 and 4.6V.

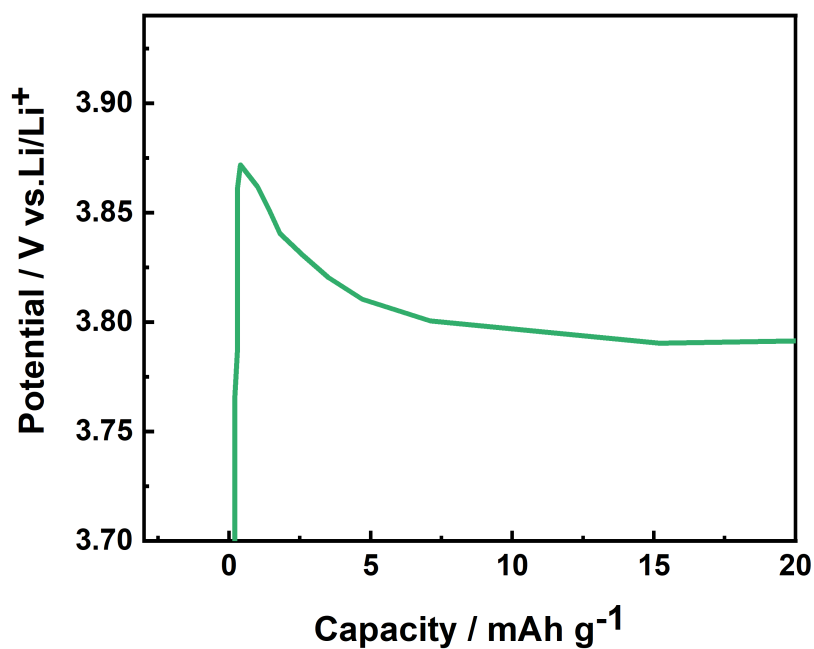


Figure S3. In the early stages of charge, the O2-LCAIO electrode sample exhibited a phenomenon in which the voltage first increased and then decreased.

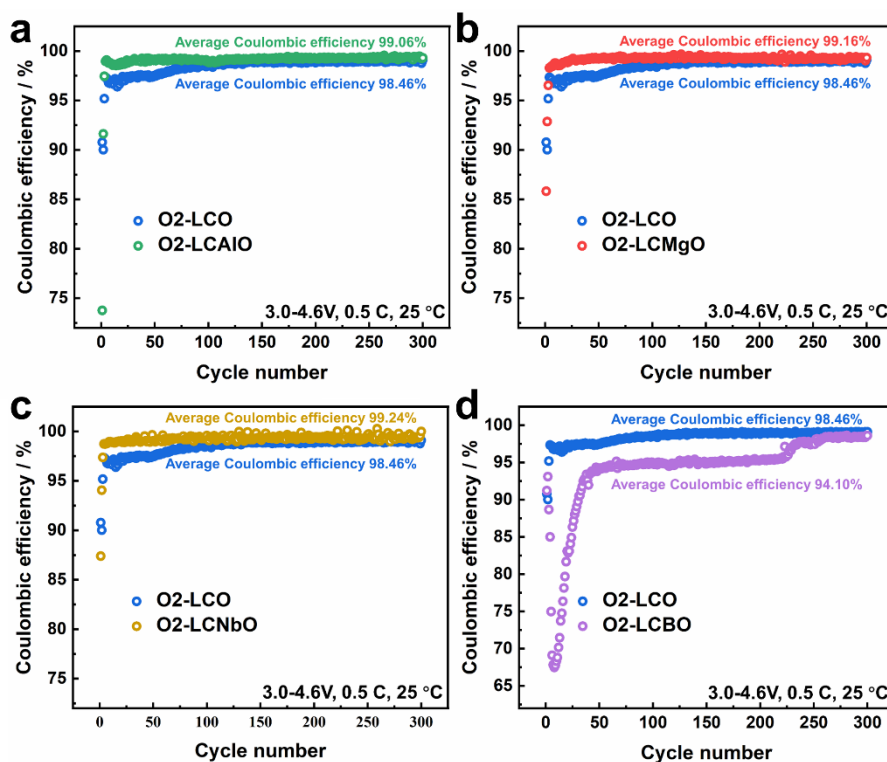


Figure S4. Comparison of Coulombic Efficiency between O2-LCO and (a) O2-LCAIO, (b) O2-LCMgO, (c) O2-LCNbO, (d) O2-LCBO cathodes at 0.5C in the range of 3.0-4.6V.

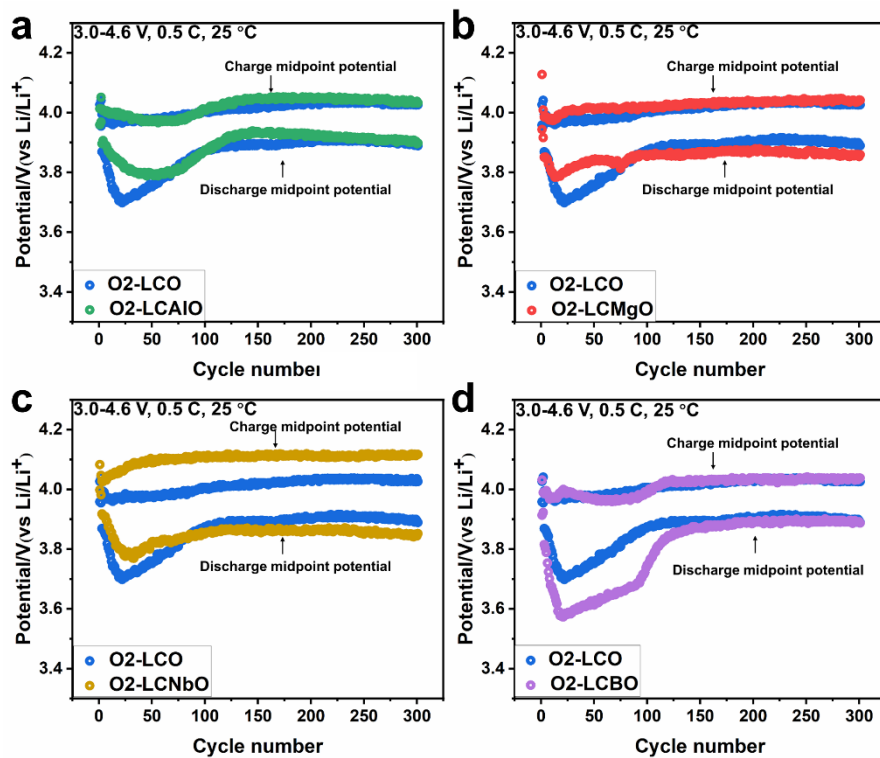


Figure S5. The charge/discharge midpoint potential evolution of O2-LCO and (a) O2-LCAIO, (b) O2-LCMgO, (c) O2-LCNbO, (d) O2-LCBO cathodes at different cycles.

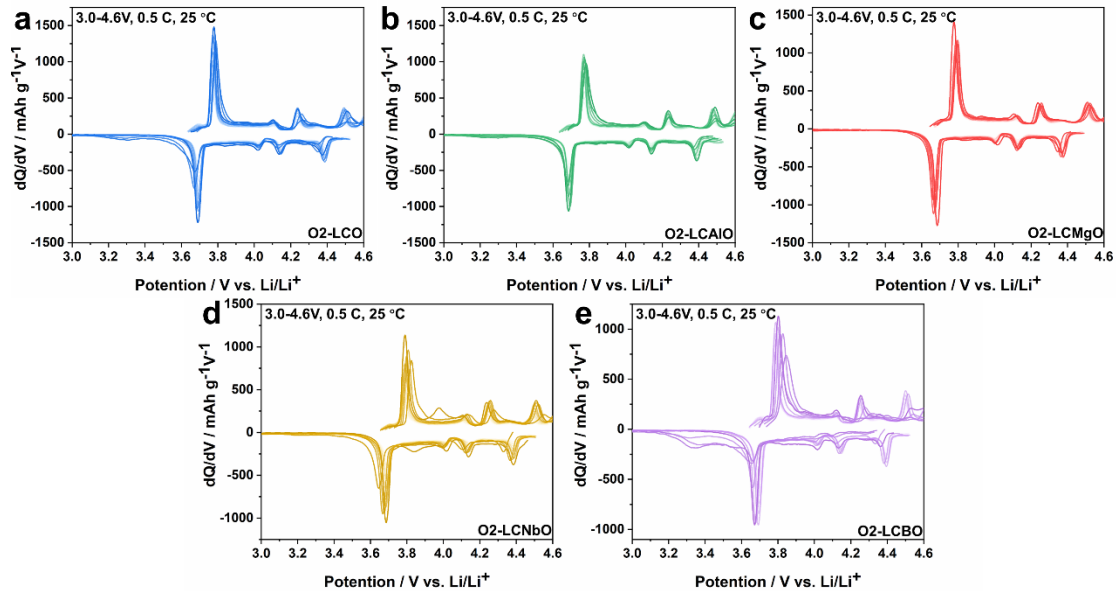


Figure S6. The dQ/dV profiles of (a) O2-LCO, (b) O2-LCAIO, (c) O2-LCMgO, (d) O2-LCNbO, and (e) O2-LCBO cathodes during 300 cycles within 3.0-4.6V.

Table S1. ICP-OES determined elemental composition of the O2-LCAIO, O2-LCMgO, O2-LCNbO, and O2-LCBO cathode.

Sample	Co (wt%)	Dopant (wt%)	Co:Dopant (mol ratio)
O2-LCAIO	56.7293	0.1723	99.34:0.66
O2-LCMgO	59.6330	0.4058	98.38:1.62
O2-LCNbO	60.6562	0.2321	99.76:0.24
O2-LCBO	59.1485	0.0114	99.89:0.11