

Electronic Supplementary Material

Al-doping enables high stability of single-crystalline

$\text{LiNi}_{0.7}\text{Co}_{0.1}\text{Mn}_{0.2}\text{O}_2$ lithium-ion cathode at high voltage

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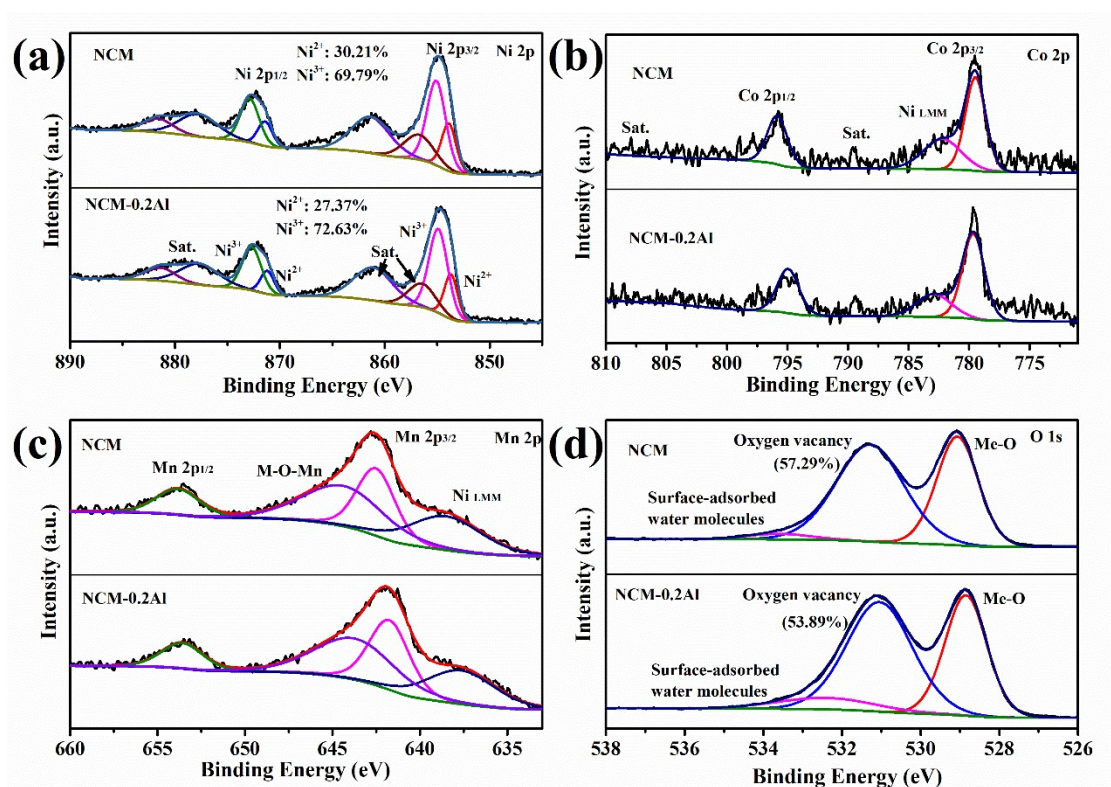


Fig. S1 XPS spectra of NCM and NCM-0.2Al: (a) Ni 2p, (b) Co 2p, (c) Mn 2p, (d) O 1s.

Table S1 Rietveld analysis results of NCM and Al-modified cathode materials.

Sample	<i>a</i> (Å)	<i>c</i> (Å)	<i>c/a</i>	Ni/Li%	<i>R</i> _w %	<i>R</i> _p %	chi
NCM	2.8754	14.2225	4.9463	3.89	12.33	9.15	1.47
NCM-0.1Al	2.8756	14.1937	4.936	2.23	10.54	7.54	1.67
NCM-0.2Al	2.8733	14.2160	4.9475	1.77	12.39	9.38	1.48
NCM-0.3Al	2.8739	14.2160	4.9466	1.78	12.24	9.43	1.47

Sample	Li (wet%)	Ni (wet%)	Co (wet%)	Mn (wet%)	Al (wet%)
NCM	7.18	41.63	5.95	11.09	0.004
NCM-0.1Al	7.14	41.66	5.96	11.07	0.098
NCM-0.2Al	7.16	41.60	5.97	11.09	0.2013
NCM-0.3Al	7.15	41.67	5.98	11.02	0.3095

Table S2 the ICP results of all samples.

Table S3 Diffusion coefficient of NCM and NCM-0.2Al.

Parameter	σ	D_{Li^+} (cm² s⁻¹)
NCM	11.147	4.65423×10^{-11}
NCM-0.2Al	10.399	5.32782×10^{-11}