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Surface nitridation of Li-rich layered $Li(Li_{0.17}Ni_{0.25}Mn_{0.58})O_2$ oxide as cathode material for lithium-ion battery

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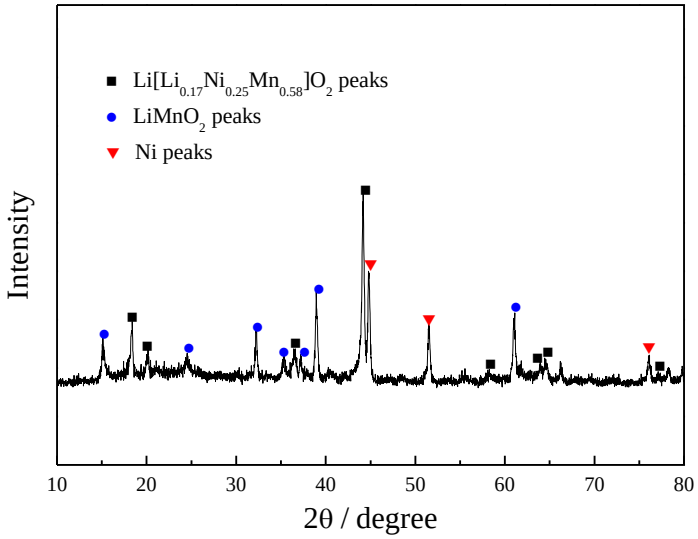

Fig. S1 XRD pattern of $Li[Li_{0.17}Ni_{0.25}Mn_{0.58}]O_2$ after the nitridation at 500 °C for 3 h.

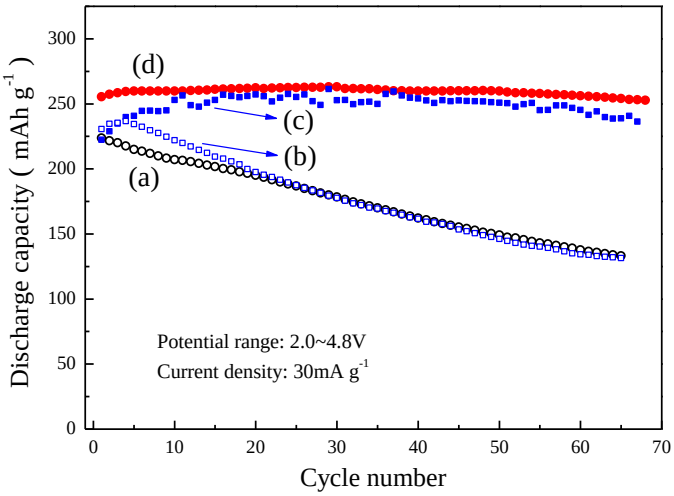

Fig. S2. Cycle performance of the as-prepared (a) and nitrided samples at different nitridation temperature of 200 (b), 300 (c), and 400 ℃ (d).

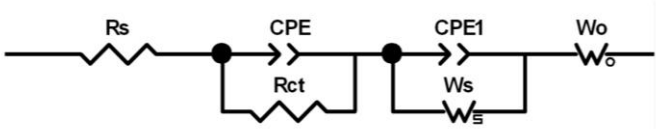

Fig. S3. Equivalent circuits used to fit the experimental data. R_s is solution resistance, R_{ct} is charge-transfer resistance, CPE and CPE1 are constant phase element, W_s and W_o are assigned to the finite Nernst diffusion impedance in the thin film and semi-infinite Warburg diffusion impedance in the bulk, respectively.

Table S1. The simulated results from electrochemical impedance spectra of the as-prepared and nitrided electrodes.

Sample	Cycle	R_{ct} (Ω)	W_s (Ω)	W_o (Ω)
$Li(Li_{0.17}Ni_{0.25}Mn_{0.58})O_2$	Before charging	134.3	—	8765
	1st	115.7	—	6254
	10th	48.9	2236	99
	20th	40.0	2189	97
	30th	47.3	2280	109
	50th	110	2451	20
Nitrided $Li(Li_{0.17}Ni_{0.25}Mn_{0.58})O_2$	Before charging	146.4	—	8847
	1st	92.8	1617	39
	10th	25.8	1487	26
	20th	24.9	667	54
	30th	27.0	680	68
	50th	30.4	1057	15