

To enhance capacity of Li-rich layered oxides by surface modification with metal-organic frameworks (MOFs) as cathode for advanced lithium-ion batteries

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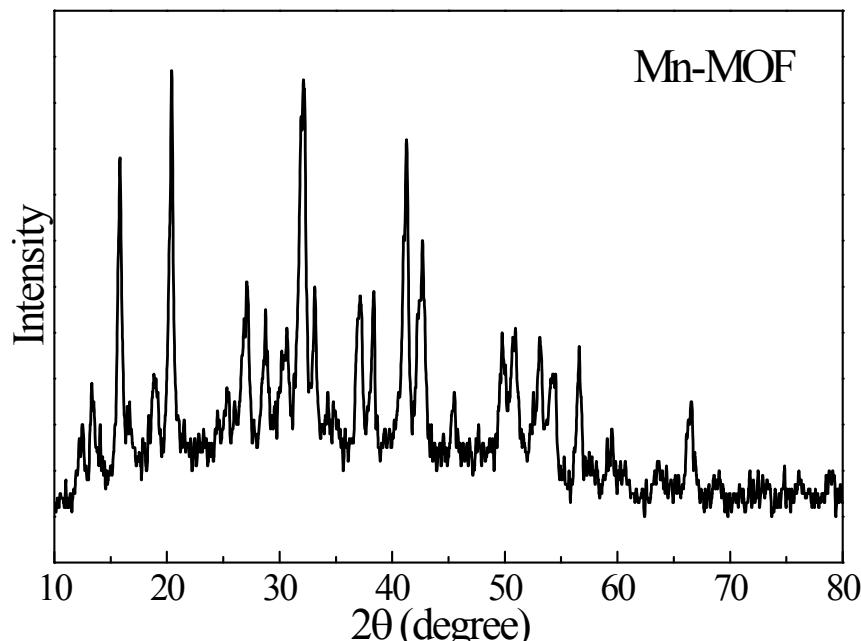


Fig. S1. XRD pattern of the as-prepared Mn-MOFs

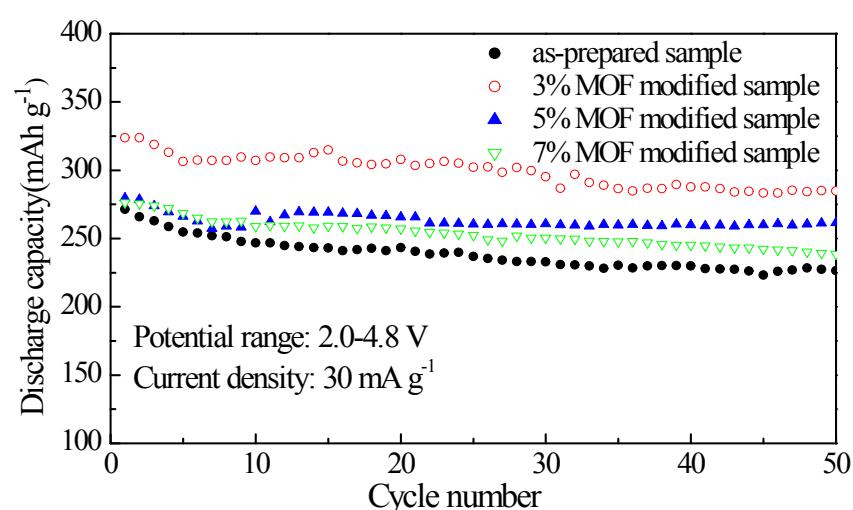


Fig. S2. Cycle performances of the as-prepared and different amount MOF-modified $\text{Li}(\text{Li}_{0.17}\text{Ni}_{0.20}\text{Co}_{0.05}\text{Mn}_{0.58})\text{O}_2$ samples

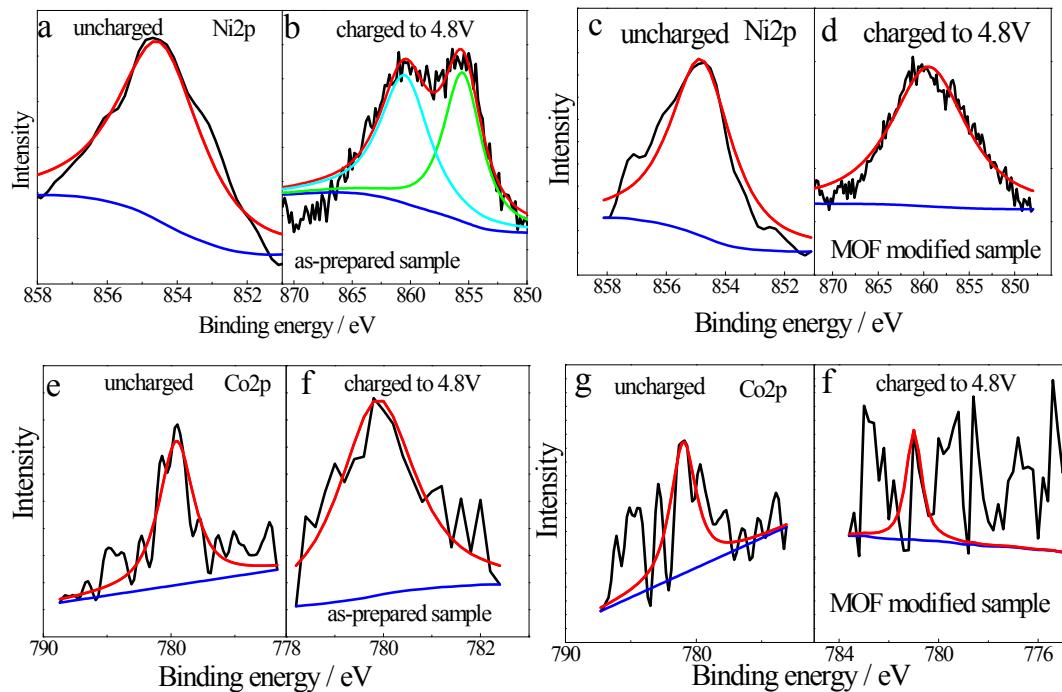


Fig. S3. XPS spectra and fitted curves of the as-prepared and MOF-modified $\text{Li}(\text{Li}_{0.17}\text{Ni}_{0.20}\text{Co}_{0.05}\text{Mn}_{0.58})\text{O}_2$ samples: O 1s: (a, c: uncharged) and (b,d: charged to 4.8 V); Mn2p: (e, g: uncharged) and (f, h: charged to 4.8 V). (black line: original data; red line: calculated pattern; blue line: background; other lines: fitted peaks)

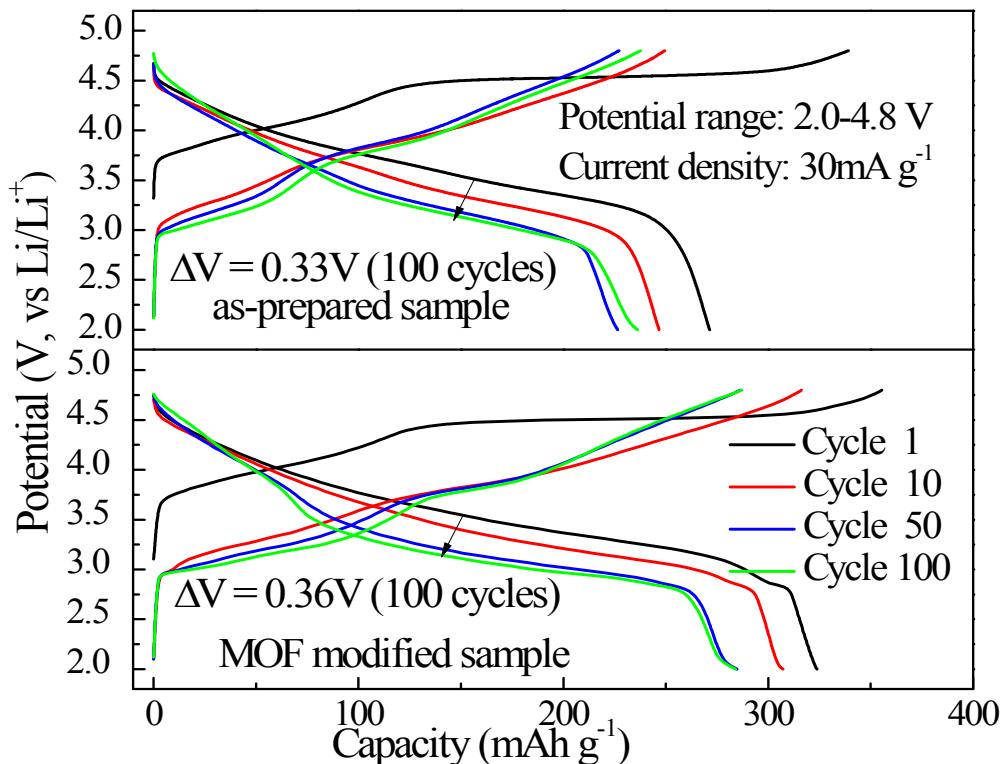


Fig. S4. The charge-discharge curves of the as-prepared and MOF-modified $\text{Li}(\text{Li}_{0.17}\text{Ni}_{0.20}\text{Co}_{0.05}\text{Mn}_{0.58})\text{O}_2$ samples in different cycles at 0.1 C rate (30 mA g^{-1}) between 2.0 and 4.8 V (vs Li/Li^+)

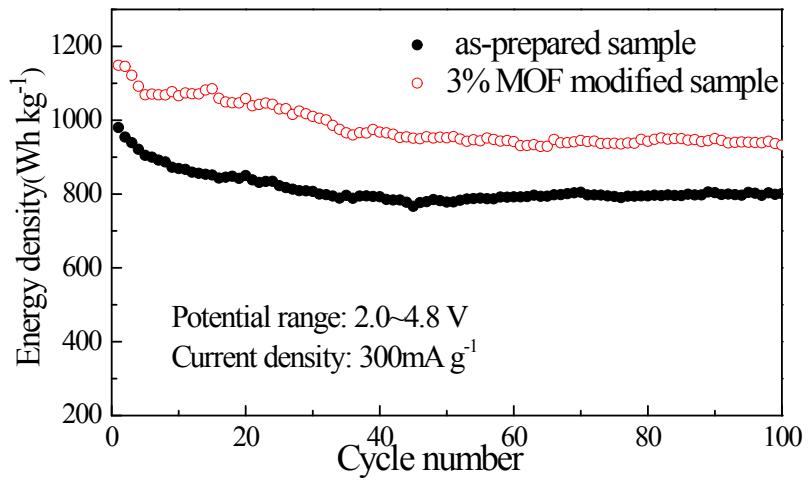


Fig. S5. Energy density of the as-prepared and MOF-modified $\text{Li}(\text{Li}_{0.17}\text{Ni}_{0.20}\text{Co}_{0.05}\text{Mn}_{0.58})\text{O}_2$ samples

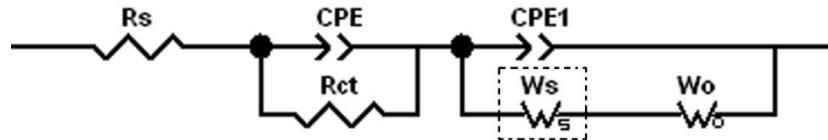


Fig. S6. Equivalent circuits used to fit the experimental data. R_s is solution resistance, R_{ct} is charge-transfer resistance, CPE and CPE1 are constant phase element, W_s and W_o are assigned to the finite Nernst diffusion impedance in the thin film and semi-infinite Warburg diffusion impedance in the bulk, respectively.

Table S1. The simulated results from electrochemical impedance spectra of the $\text{Li}(\text{Li}_{0.17}\text{Ni}_{0.20}\text{Co}_{0.05}\text{Mn}_{0.58})\text{O}_2$ and MOF-modified samples.

Sample	Cycle	R_{ct} (Ω)	W_s (Ω)	W_o (Ω)
$\text{Li}(\text{Li}_{0.17}\text{Ni}_{0.20}\text{Co}_{0.05}\text{Mn}_{0.58})\text{O}_2$	1st	114.3	-	4574
	10th	67.9	1948	2161
	20th	59.3	2073	1491
	50th	55.2	1480	2771
	100th	52.9	1050	9093
MOF-coated $\text{Li}(\text{Li}_{0.17}\text{Ni}_{0.20}\text{Co}_{0.05}\text{Mn}_{0.58})\text{O}_2$	1st	171.0	-	219.3
	10th	70.4	-	168.6
	20th	37.5	-	1670
	50th	43.6	1035	2620
	100th	47.4	1279	6736