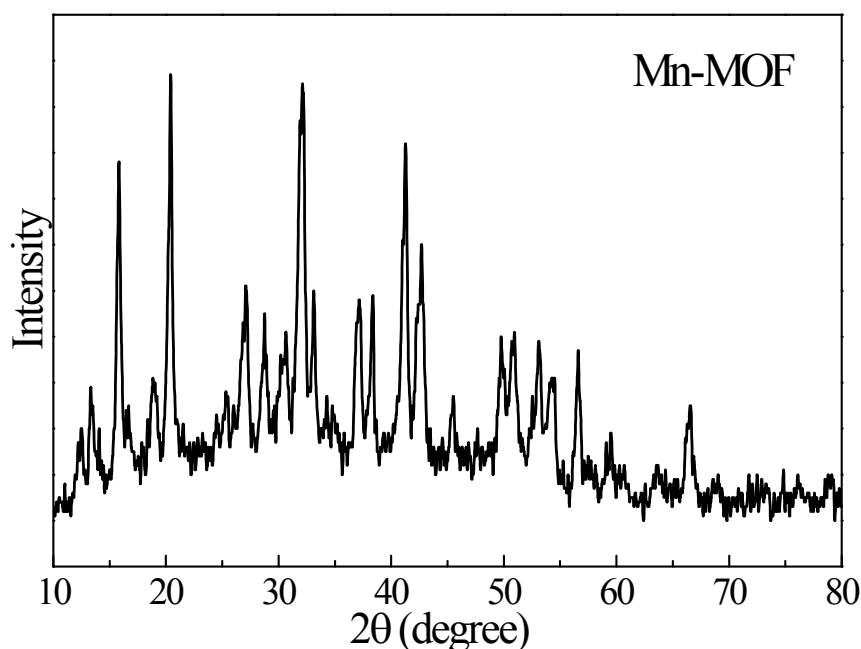
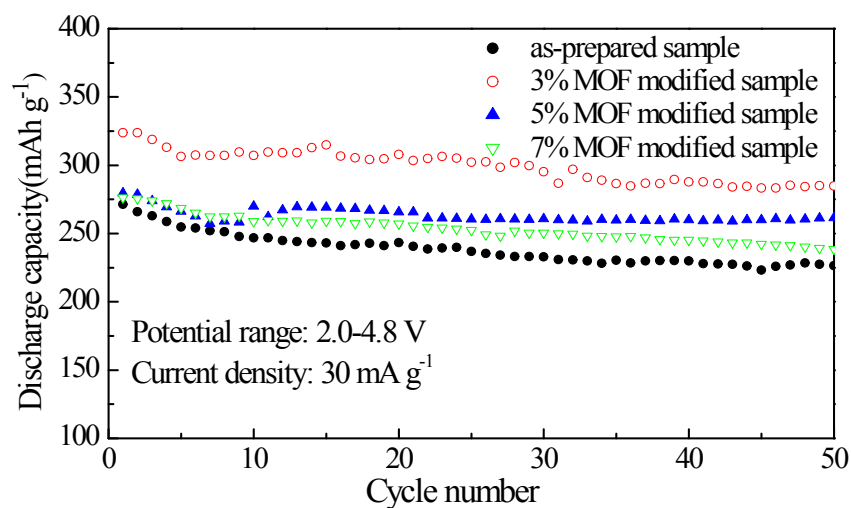


To enhance capacity of Li-rich layered oxides by surface modification  
with metal-organic frameworks (MOFs) as cathode for advanced lithium-  
ion batteries

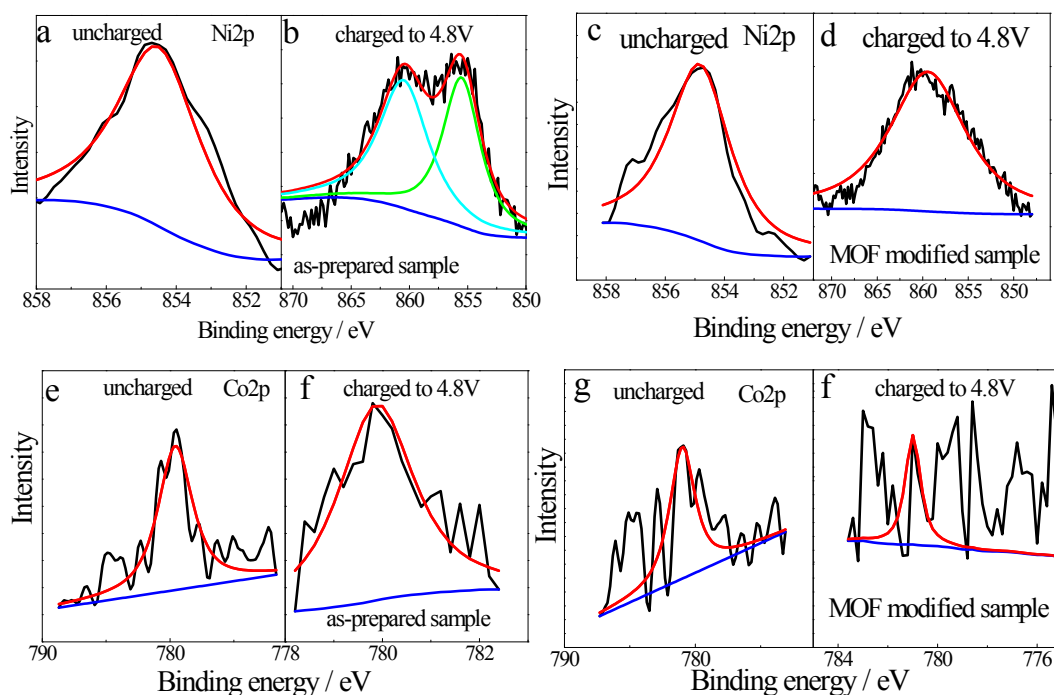
Qi-Qi Qiao, Guo-Ran Li, Yong-Long Wang, and Xue-Ping Gao\*



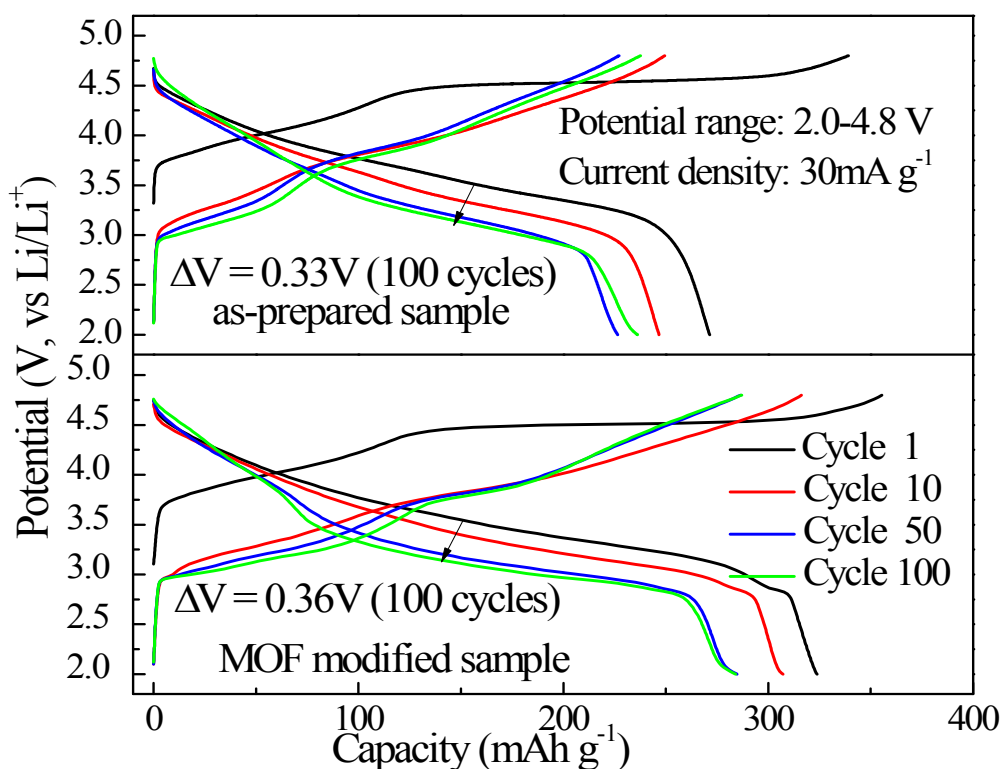
**Fig. S1.** XRD pattern of the as-prepared Mn-MOFs



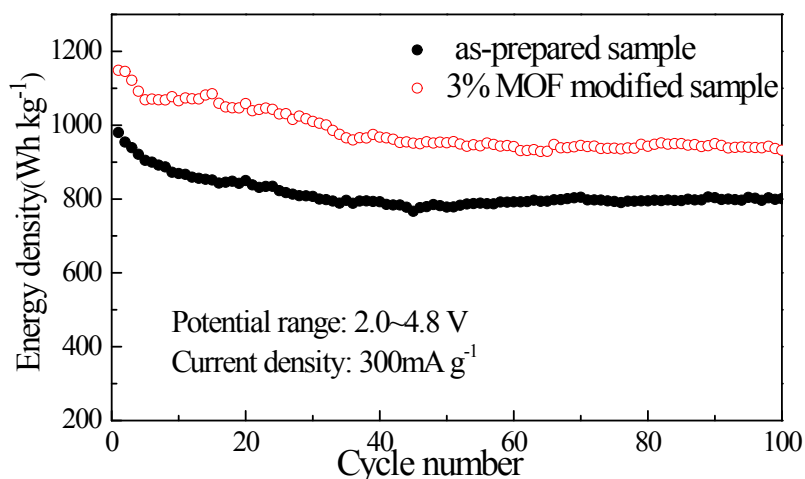
**Fig. S2.** Cycle performances of the as-prepared and different amount MOF-modified  $\text{Li}(\text{Li}_{0.17}\text{Ni}_{0.20}\text{Co}_{0.05}\text{Mn}_{0.58})\text{O}_2$  samples



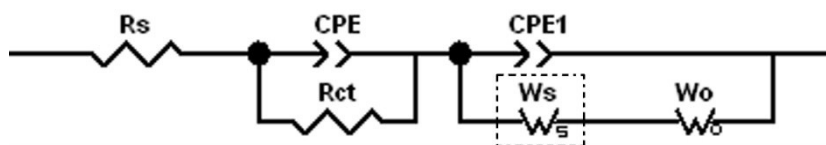
**Fig. S3.** XPS spectra and fitted curves of the as-prepared and MOF-modified  $\text{Li}(\text{Li}_{0.17}\text{Ni}_{0.20}\text{Co}_{0.05}\text{Mn}_{0.58})\text{O}_2$  samples: O 1s: (a, c: uncharged) and (b, d: charged to 4.8 V); Mn2p: (e, g: uncharged) and (f, h: charged to 4.8 V). (black line: original 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 ( $30 \text{ mA g}^{-1}$ ) between 2.0 and 4.8 V (vs  $\text{Li}/\text{Li}^+$ )



**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	$R_{ct}$ ( $\Omega$ )	$W_s$ ( $\Omega$ )	$W_o$ ( $\Omega$ )
$\text{Li}(\text{Li}_{0.17}\text{Ni}_{0.20}\text{Co}_{0.05}\text{Mn}_{0.58})\text{O}_2$	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