Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A

Surface modification of Li-rich layered $Li(Li_{0.17}Ni_{0.25}Mn_{0.58})O_2$ oxide with Li-Mn-PO_4 as cathode for lithium-ion battery

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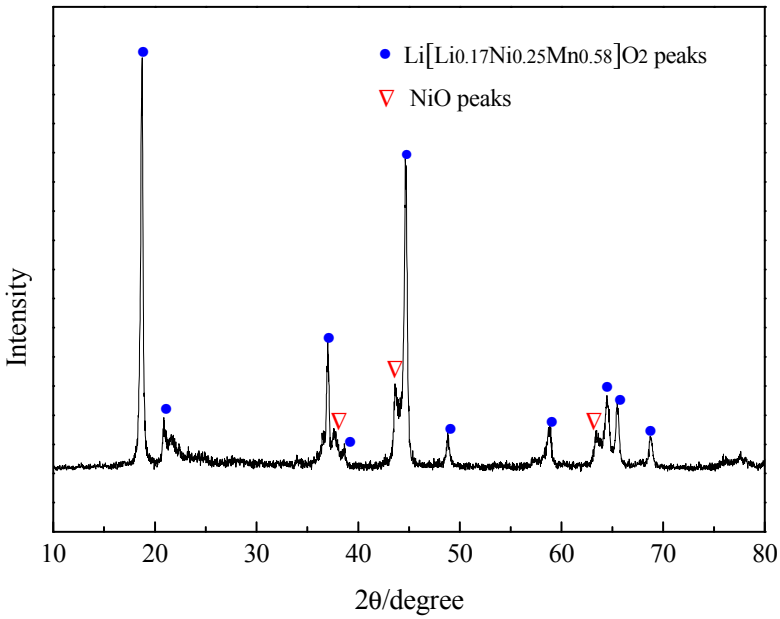

Fig. S1 XRD pattern of the Li-Mn-PO_4-coated samples after calcination at 600 °C.

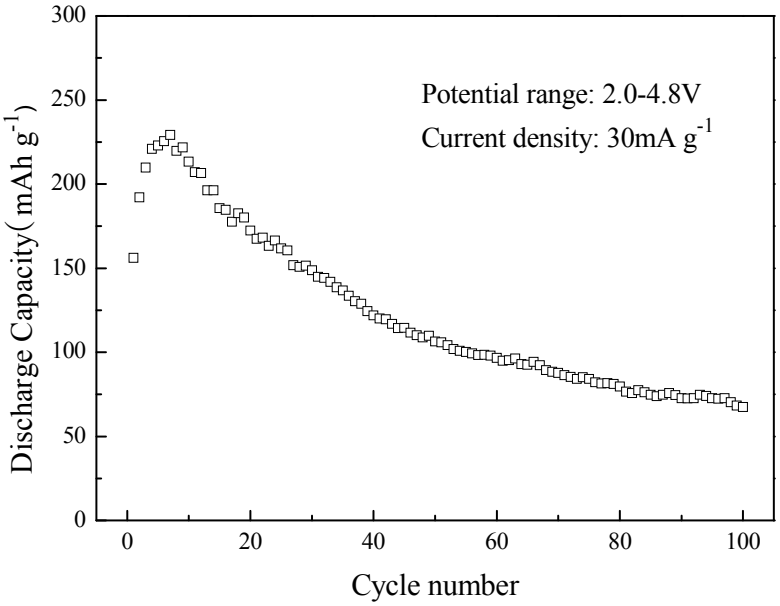

Fig. S2. Cycle performance of the Li-Mn-PO_4-coated samples after calcination at 600 °C.

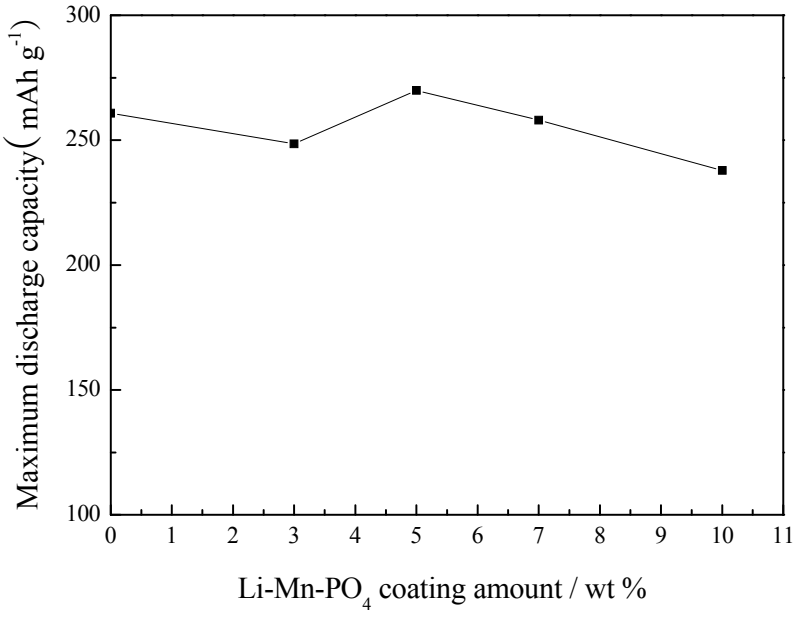

Fig. S3. Maximum discharge capacity of the Li-Mn-PO_4-coated samples at different coating amount (Li-Mn-PO_4).

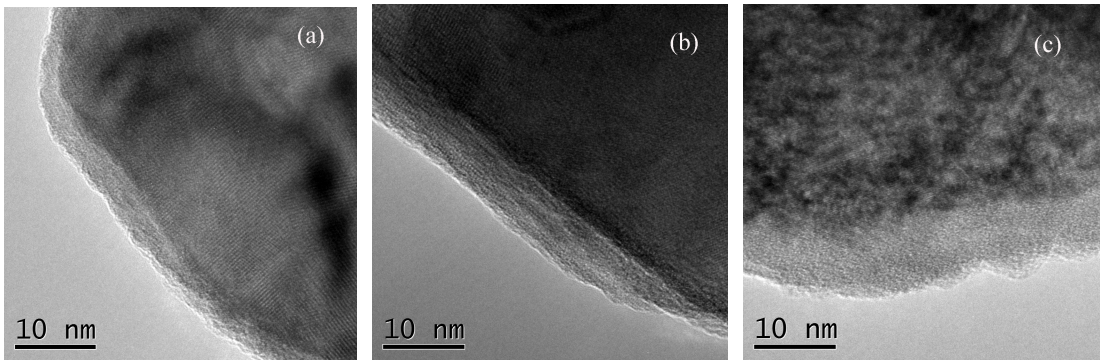

Fig. S4. TEM image of the Li-Mn-PO_4-coated sample after calcination at 400 °C with different coating amount. 3 wt % (a), 7 wt % (b) and 10 wt % (c).

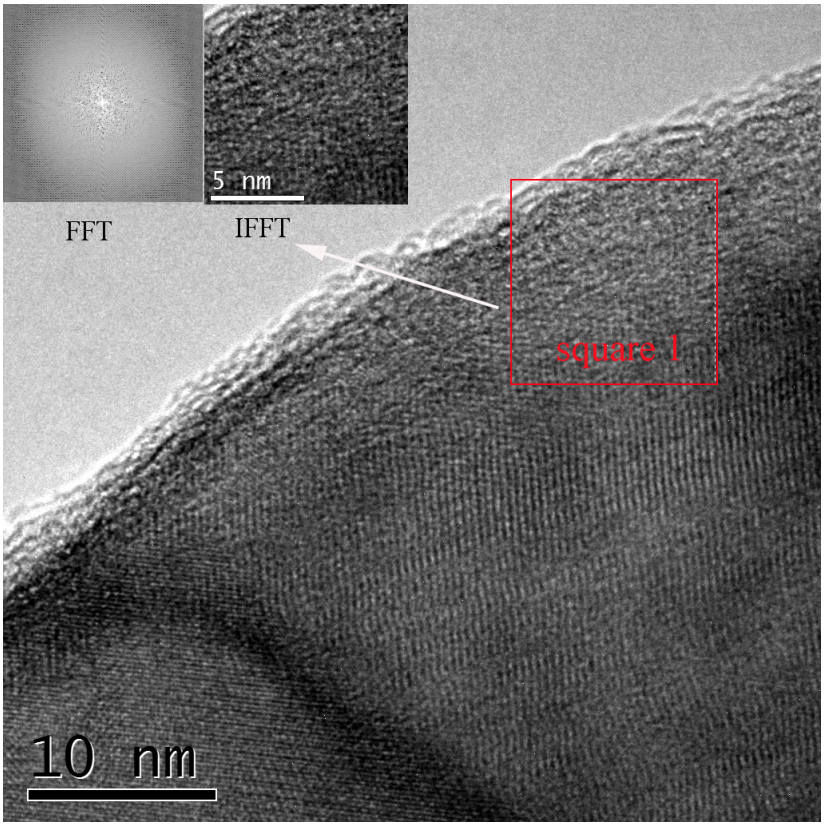

Fig. S5. TEM image of the Li-Mn-PO_4 coated sample after calcination at 500 °C. FFT and IFFT with selected area are presented.

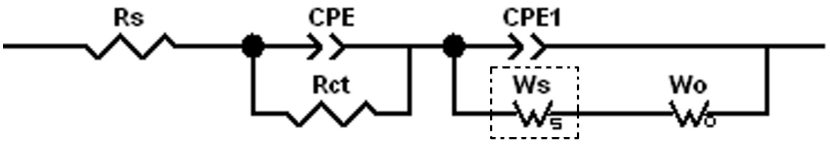

Fig. S6. Equivalent circuits used to fit the experimental data. R_s is solution resistance, R_{ct} is charge-transfer resistance, CPE and CPE1 are constant phase element, W_s and W_o are assigned to the finite Nernst diffusion impedance in the thin film and semi-infinite Warburg diffusion impedance in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

Table S1. The simulated results from electrochemical impedance spectra of the as-prepared and Li-Mn-PO_4-coated samples.

Sample	Cycle	R_{ct} (Ω)	W_s (Ω)	W_o (Ω)
$Li(Li_{0.17}Ni_{0.25}Mn_{0.58})O_2$	1st	217.5	598.3	35302
	10th	38.7	-	33770
	20th	39.3	-	31815
	30th	43.9	-	29507
	50th	47.6	-	28625
Li-Mn-PO_4-coated $Li(Li_{0.17}Ni_{0.25}Mn_{0.58})O_2$ after calcination at 400°C	1st	119.7	66.6	21750
	10th	21.1	-	18913
	20th	17.8	-	17247
	30th	16.6	-	15039
	50th	16.9	-	14229
Li-Mn-PO_4-coated $Li(Li_{0.17}Ni_{0.25}Mn_{0.58})O_2$ after calcination at 500°C	1st	145.2	165.2	30442
	10th	34.0	-	10019
	20th	33.6	-	18621
	30th	33.5	-	22379
	50th	44.2	-	16296