Supplementary Materials

Facilitated Coating of Li_3PO_4 on the Rough Surface of $LiNi_{0.85}Co_{0.1}Mn_{0.05}O_2$ Cathode by Synchronous Lithiation

Shaomin Li[a], Jian Wu[a], Jianying Li[a], Guobiao Liu[b], Yanhua Cui[c], Hao Liu[a]*

[a] Chengdu Science and Technology Development Center, China Academy of Engineering Physics, Chengdu, Sichuan, 610207, China

[b]Department of Materials Science, Sichuan Engineering Technical College, Deyang 618000, China

[c]Institute of Electronic Engineering, China Academy of Engineering Physics, Mianyang 621000, PR China

*Corresponding authors: Hao Liu E-mail address: mliuhao@gmail.com

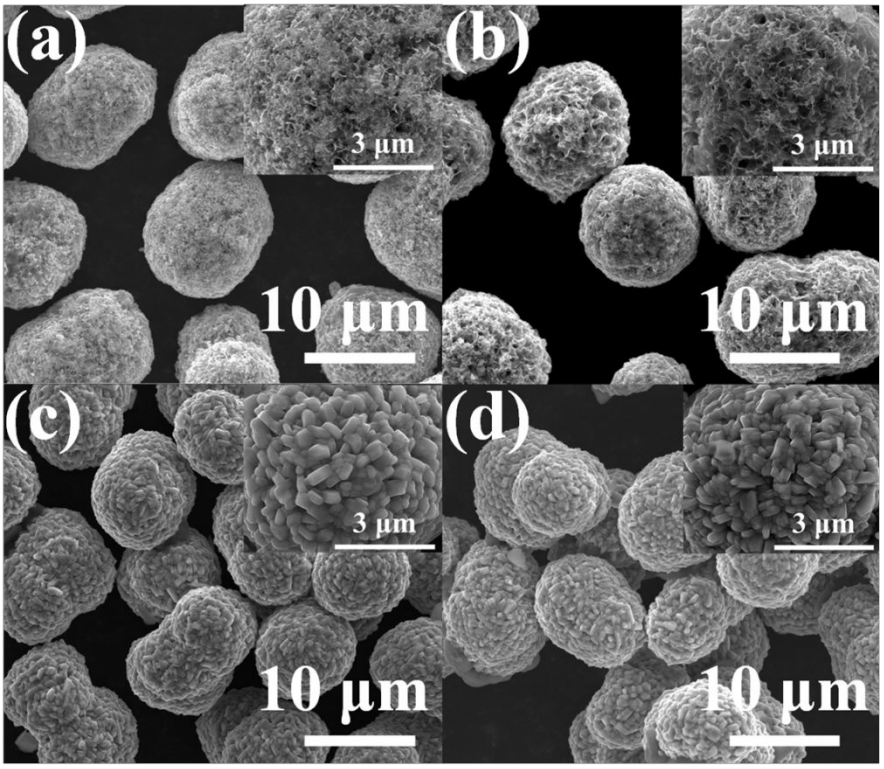

Fig. S1.SEM images of (a) NPO-1, (b) NPO-3, (c) LPO-1 and (d)LPO-3.

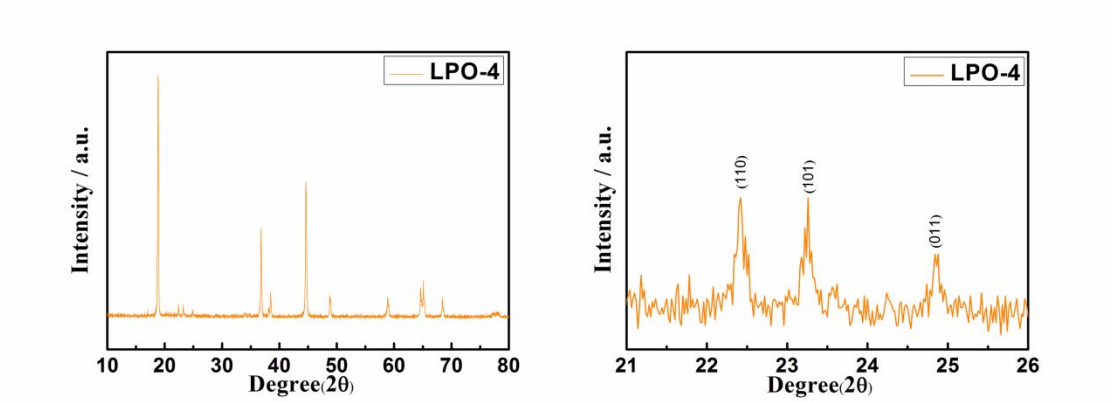

Fig. S2. XRD patterns of the LPO-4 sample.

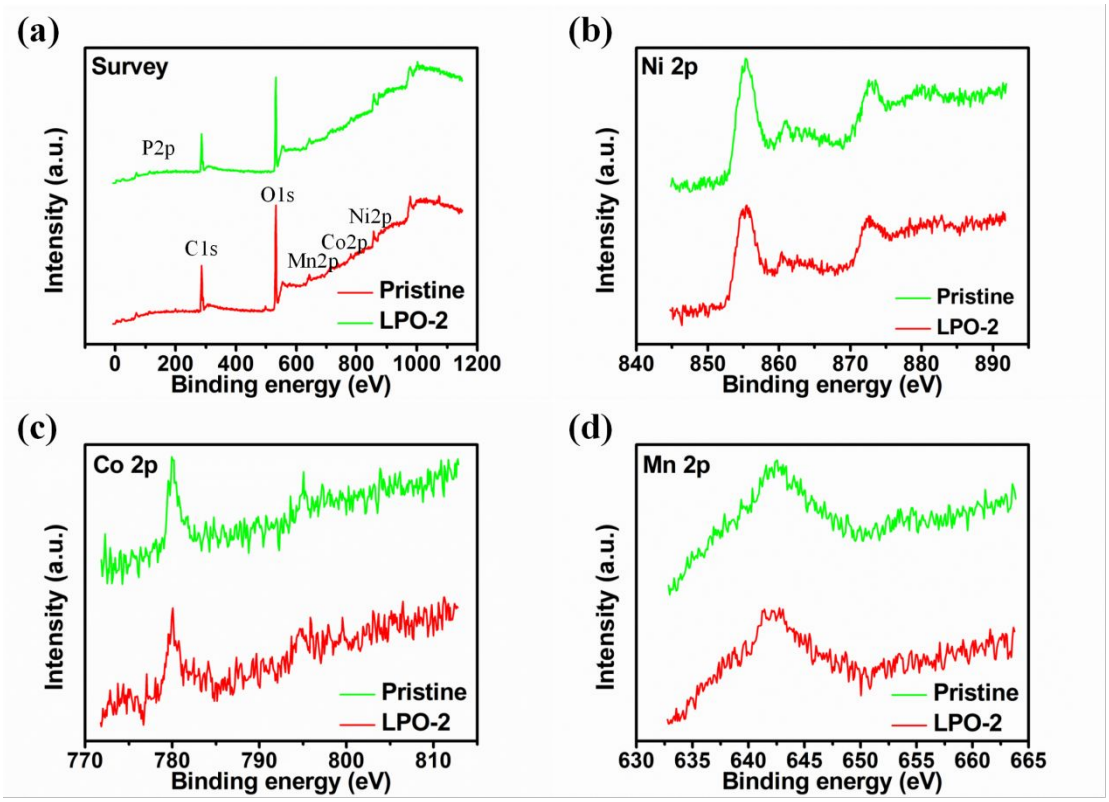

Fig. S3. XPS spectra of survey, Ni, Co and Mn for the pristine and LPO-2 samples.

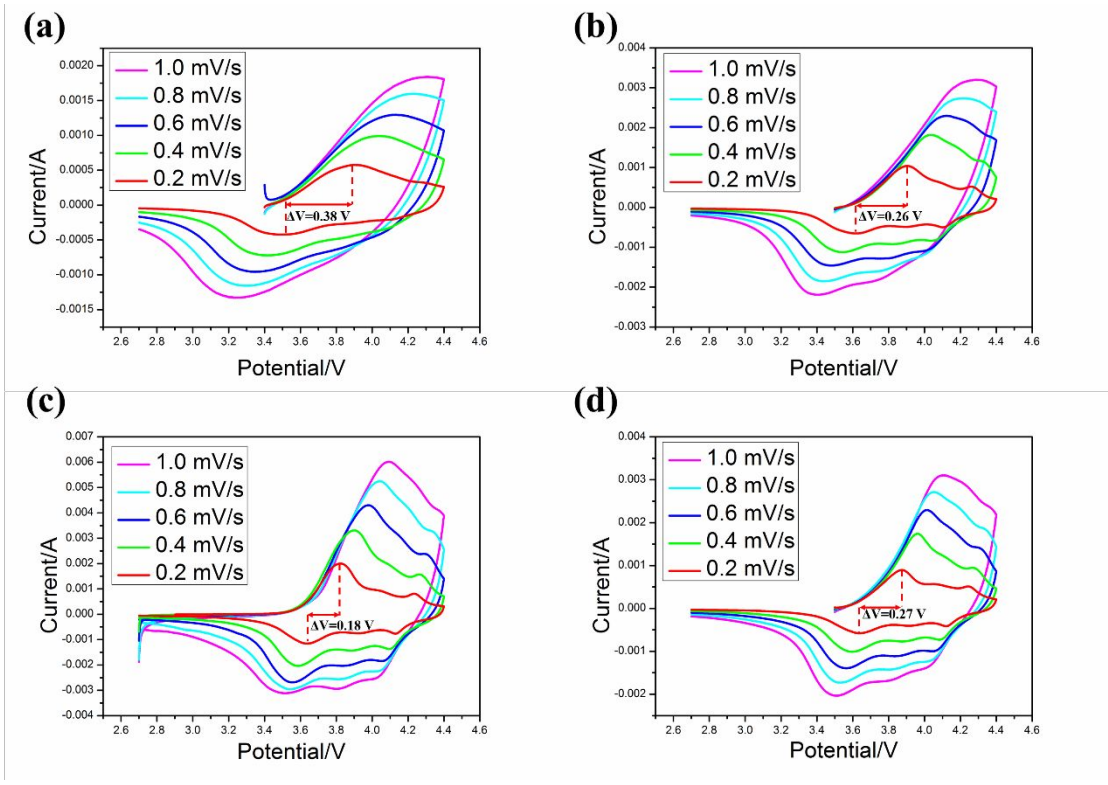

Fig. S4. CV curves of the (a) pristine, (b) LPO-1, (c) LPO-2 and (d) LPO-3.

Table S1. The initial charge-discharge capacity of pristine, LPO-1, LPO-2 and LPO-3.

Samples	Charge capacity (mA h·g^{-1})	Discharge capacity (mA h·g^{-1})	Coulombic efficiency	100th discharge capacity (mA h·g^{-1})	capacity retention
Pristine	230.7	202.8	87.9%	177.9	89.2%
LPO-1	231.5	205.1	88.6%	184.0	91.3%
LPO-2	233.6	208.2	89.1%	192.5	94.3%
LPO-3	230.1	195.5	85.0%	171.4	90.1%

Table S2. the rate performance of the pristine, LPO-1, LPO-2 and LPO-3.

Samples	0.2C (mA h·g^{-1})	0.5C (mA h·g^{-1})	1C (mA h·g^{-1})	2C (mA h·g^{-1})	5C (mA h·g^{-1})	10C (mA h·g^{-1})
Pristine	199.3	192.1	181.4	164.2	136.3	48.4
LPO-1	201.4	193.9	182.8	168.4	144.1	69.4
LPO-2	204.1	195.8	185.1	171.1	148.5	80.0
LPO-3	190.2	185.5	177.1	165.2	139.4	53.2