

Supplementary Information

A novel layered Ni-rich cathode hierarchical architecture of densely integrating hydroxide nanoflakes onto oxide microspheres with superior lithium storage property

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1. Chemical composition of the precursors and the as-prepared cathodes

Table S1 Chemical composition of the precursors and the as-prepared cathodes

Samples	Li	Ni	Co	Mn
$\text{Ni}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}(\text{OH})_2@ \text{Ni}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_x$	/	0.803	0.095	0.102
$\text{LiNi}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_2$	1.000	0.809	0.101	0.106

2. Particle morphology of the spray pyrolyzed $\text{Ni}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_x$ microspheres

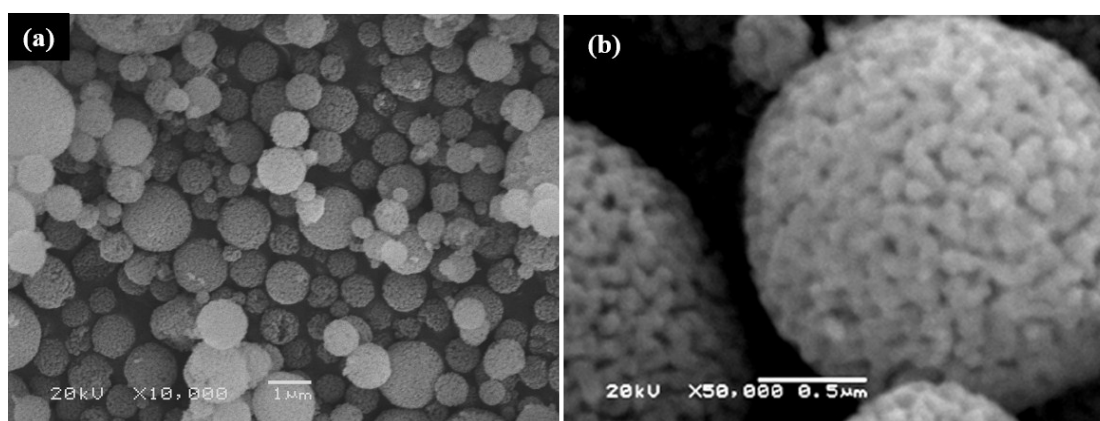


Fig.S1. SEM of the spray pyrolyzed $\text{Ni}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_x$ microspheres

3. Particle size distribution of the precursors and cathodes

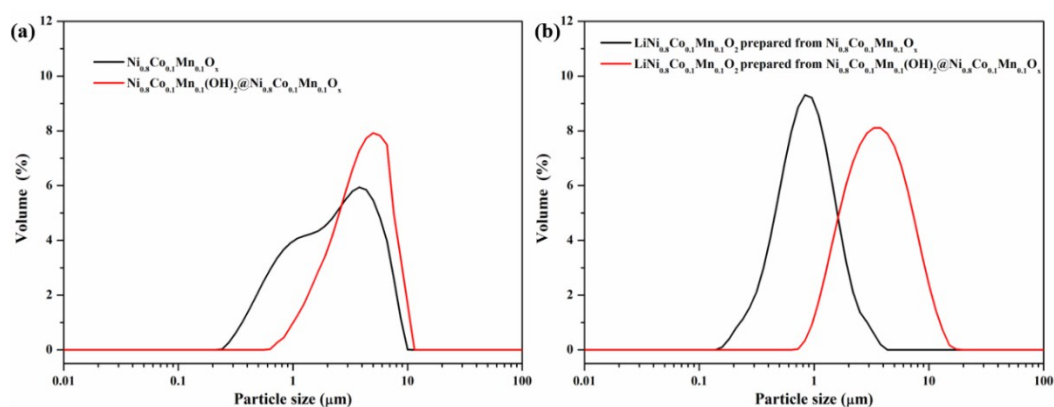


Fig.S2 Particle size distribution of (a) $\text{Ni}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_x$ and $\text{Ni}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}(\text{OH})_2@\text{Ni}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_x$ -precursors and (b) cathodes prepared from the two precursors.

4. SEM images of the $\text{LiNi}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_2$ prepared from the precursors obtained at 1.5 and 2 h co-precipitation reaction.

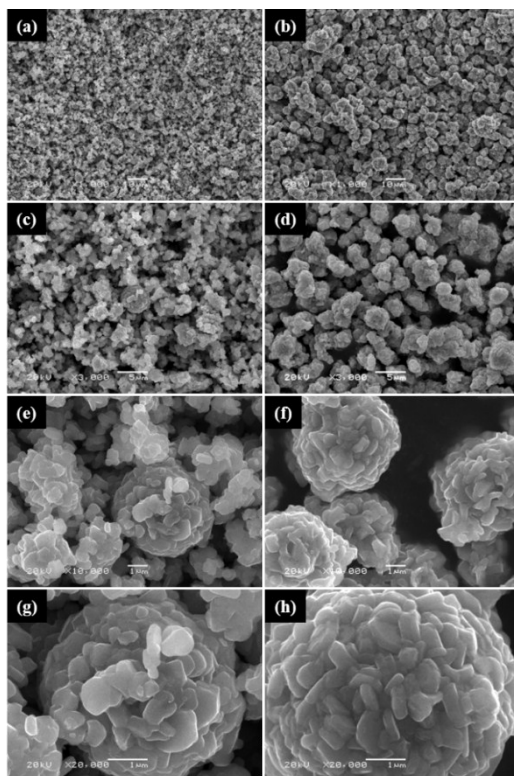


Fig.S3. SEM of the $\text{LiNi}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_2$ prepared from the precursors obtained at different time intervals during the co-precipitation reaction: (a,c,e,g) 1.5 h; (b,d,f,h) 2 h.

4. Performance comparison of $\text{LiNi}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_2$ cathode in this work and the previous reported works

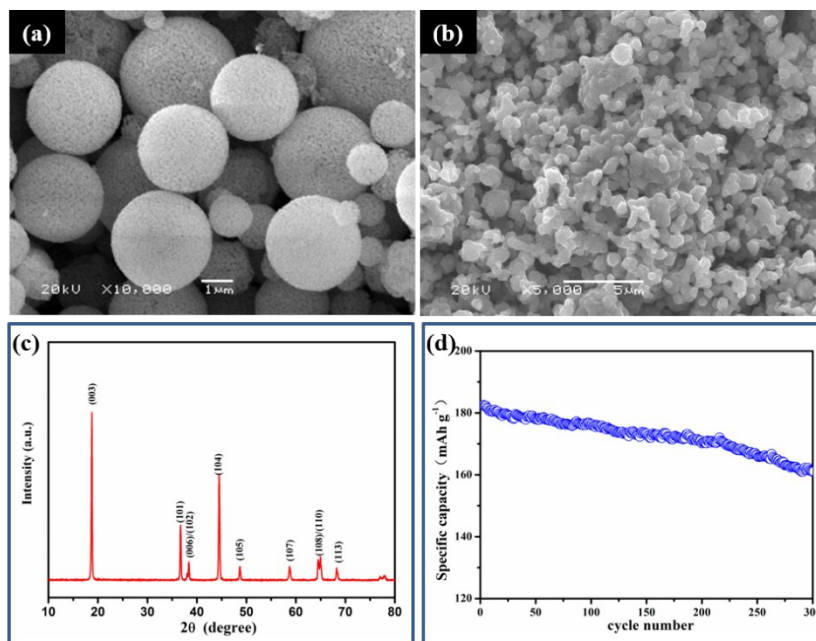


Fig. S4. (a) SEM of the $\text{Ni}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_x$ precursors obtained from spray pyrolysis; (b) SEM of $\text{LiNi}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_2$ cathodes prepared from $\text{Ni}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_x$; (c) XRD patterns of the as-prepared $\text{LiNi}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_2$ cathodes; (d) Cycle performance of the as-prepared $\text{LiNi}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_2$ cathodes.

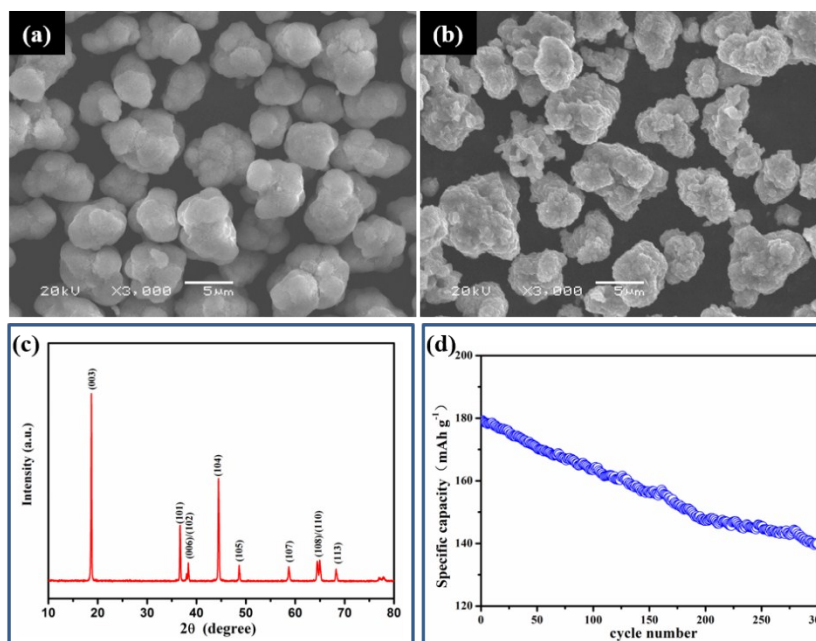


Fig. S5. (a) SEM of the $\text{Ni}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}(\text{OH})_2$ precursors obtained from co-precipitation reaction; (b) SEM of $\text{LiNi}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_2$ cathodes prepared from $\text{Ni}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}(\text{OH})_2$; (c) XRD patterns of the as-prepared $\text{LiNi}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_2$ cathodes; (d) Cycle performance of the as-prepared $\text{LiNi}_{0.8}\text{Co}_{0.1}\text{Mn}_{0.1}\text{O}_2$ cathodes.