

Predominant orientation growth of $\text{Li}_{1.2}(\text{Mn}_{0.4}\text{Co}_{0.4})\text{O}_2$ cathode materials by NaOH compound molten salt method and their enhanced electrochemical performance

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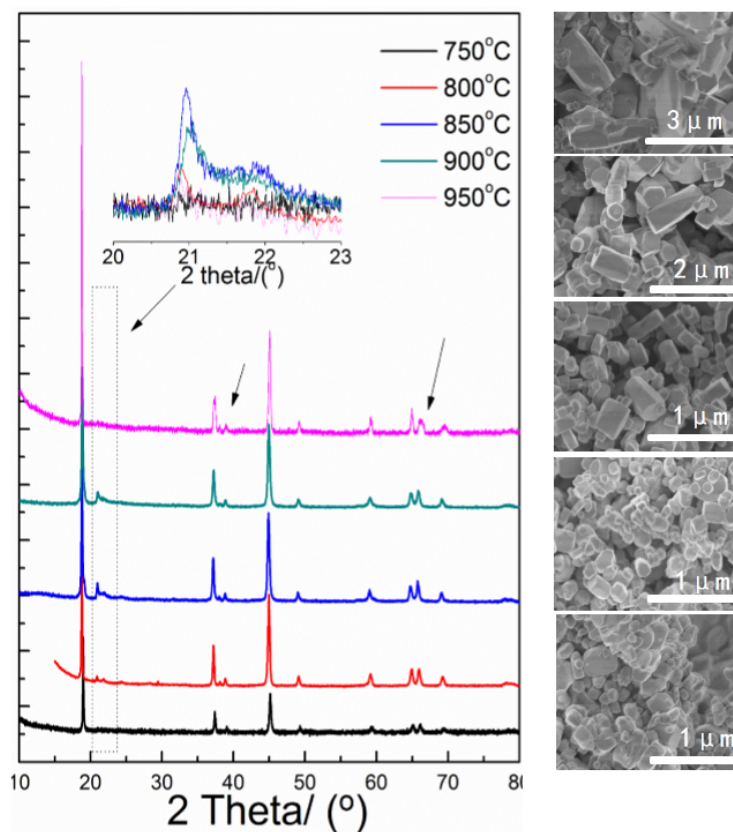


Fig. S1 XRD and SEM images of $\text{Li}_{1.2}(\text{Mn}_{0.4}\text{Co}_{0.4})\text{O}_2$ materials with different treating temperature when R=5.

Table S1. Rietveld refinement of XRD data of as-prepared $\text{Li}_{1.2}(\text{Mn}_{0.4}\text{Co}_{0.4})\text{O}_2$ powders prepared at different heat treat temperature with $R = 5$.

R=5	750°C	800°C	850°C	900°C	950°C
I(003)/I(10)	1.8815	1.8738	1.7451	1.5136	2.5956
a/nm	0.2831	0.2831	0.2830	0.2831	0.2823
c/nm	1.4168	1.4170	1.4167	1.4180	1.4194
c/a	5.0038	5.0046	5.0051	5.0086	5.0280
C2/m%	21.78	22.01	23.75	18.66	10.11
R-3m%	78.22	77.99	76.25	81.34	89.89

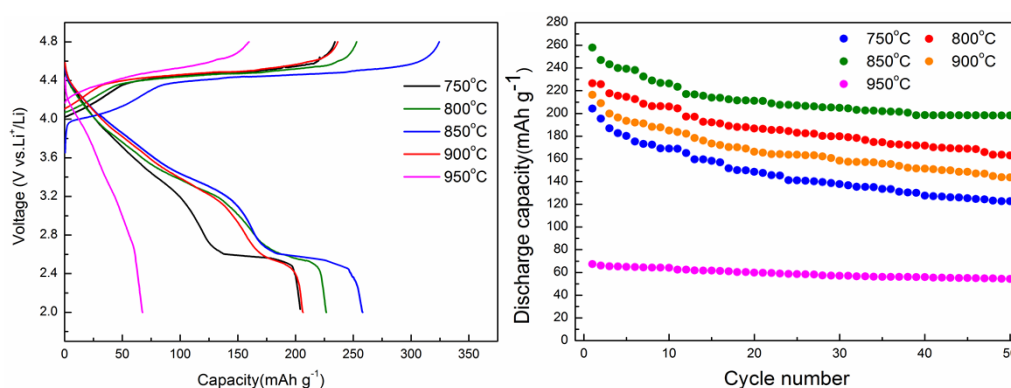


Fig. S2 (a) Initial charge-discharge curves, and (b) Cycling stability of as-prepared $\text{Li}_{1.2}(\text{Mn}_{0.4}\text{Co}_{0.4})\text{O}_2$ powders prepared at different heat treat temperature with different $R = 5$.

Table S2. Half peak width of three main peaks calculated by Jade 5 from XRD data of as-prepared $\text{Li}_{1.2}(\text{Mn}_{0.4}\text{Co}_{0.4})\text{O}_2$ powders with different R .

Half peak width	R=	R=2.5	R=5	R=10
(003)	0.2	0.223	0.149	0.138
(104)	0.4	0.387	0.309	0.281
(101)	0.3	0.289	0.252	0.223

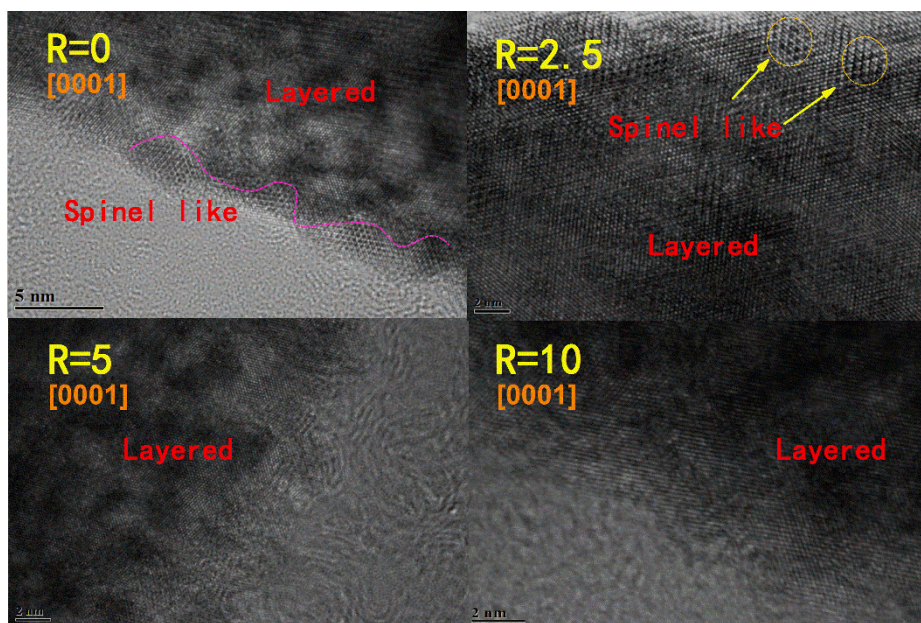


Fig. S3 HRTEM images for $\text{Li}_{1.2}(\text{Mn}_{0.4}\text{Co}_{0.4})\text{O}_2$ with R=0/2.5/5/10 after initial discharge. The formation of spinel-like structure is clearly evidenced in the images of R=0 and R=2.5, however, it's not apparently in images for R=5 and R=10 indicating that the formation of spinel-like structure declined as NaOH added.

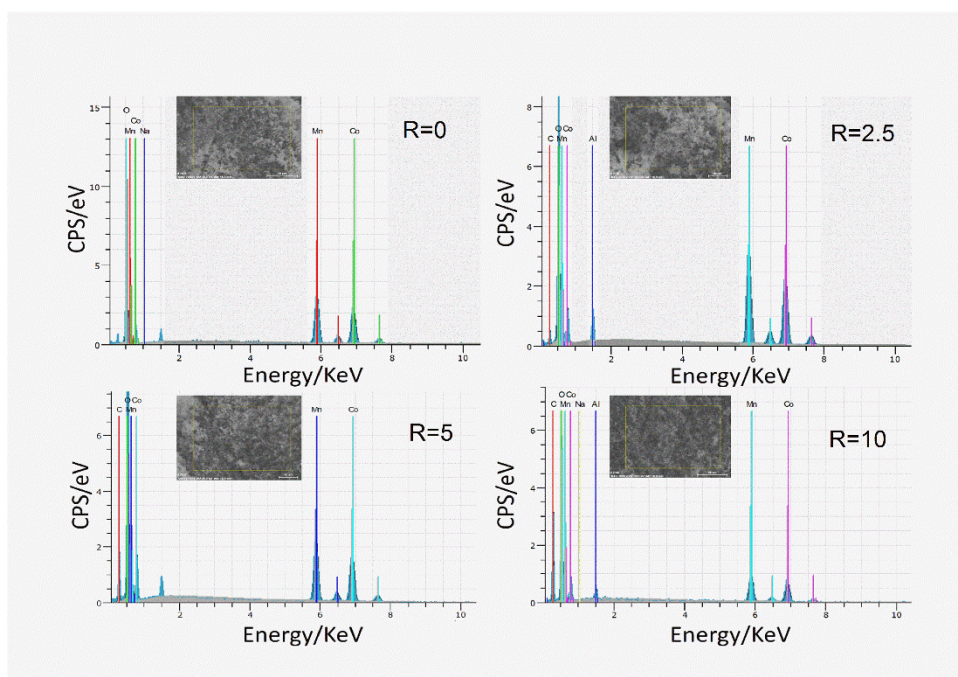


Fig. S4 EDX analysis of materials with different R. No peak is found in the position of Na.

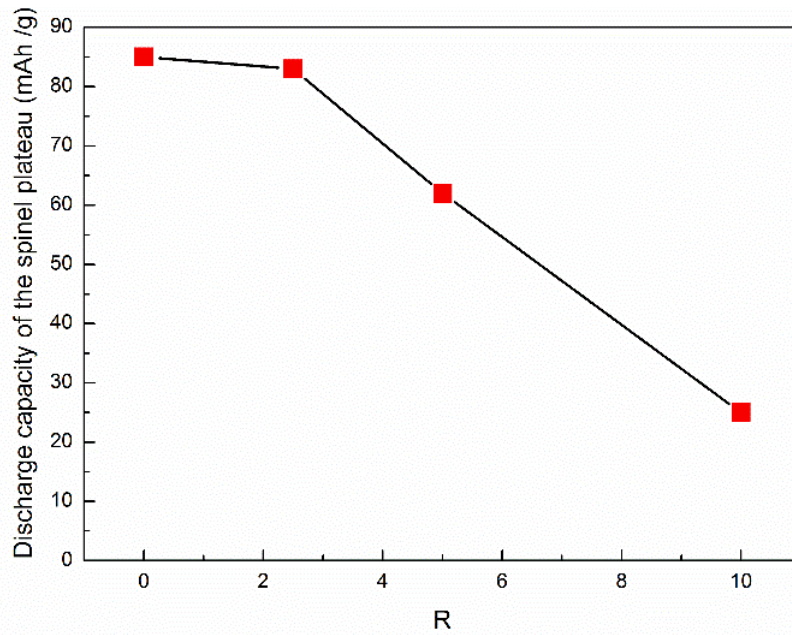


Fig. S5 The relationship of discharge capacity of the spinel plateau with different R

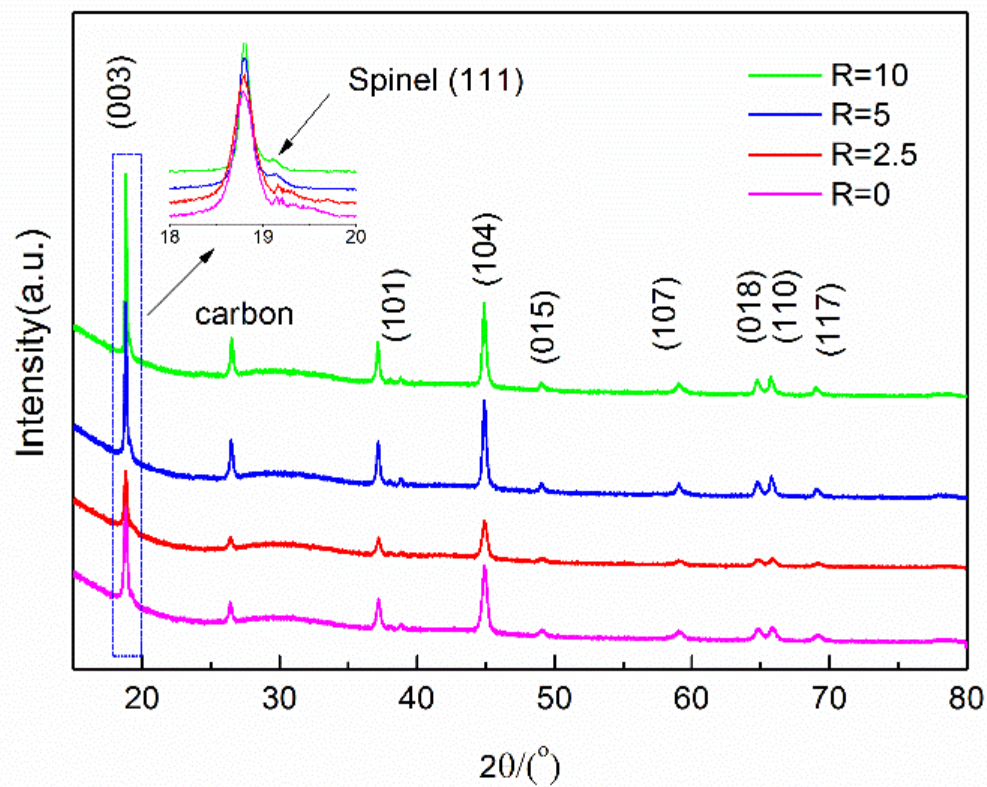


Fig. S6 XRD tests of materials with different R after one cycle

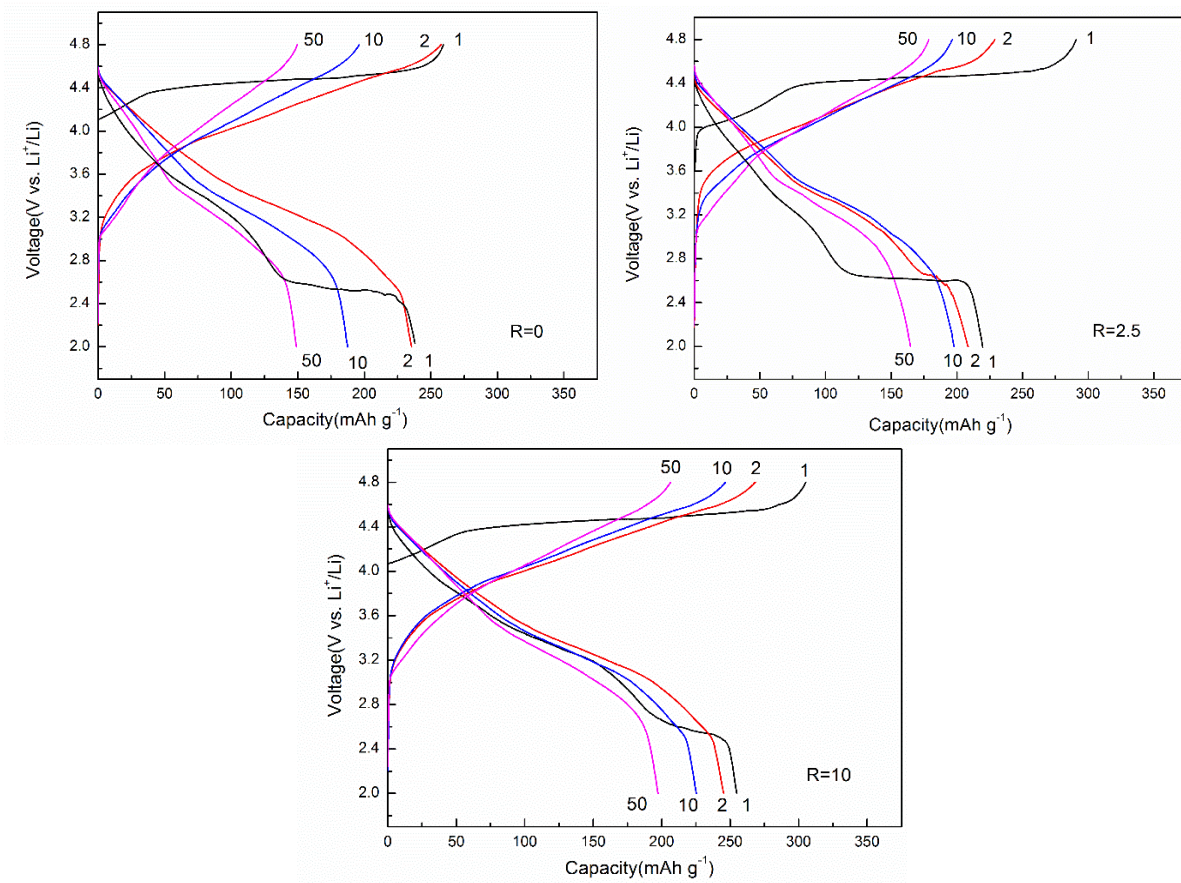


Fig. S7 Charge-discharge curves of different cycle numbers for the $\text{Li}_{1.2}(\text{Mn}_{0.4}\text{Co}_{0.4})\text{O}_2$ prepared at 850°C for 12 h with $R=0$, $R=2.5$ and $R=10$.