JOURNAL of ELECTROCHEMICAL SCIENCE and TECHNOLOGY

SUPPORTING INFORMATION

Electrode Optimization using Bimodal Sized Particles in Ni-Rich NCM Cathodes for Enhanced Volumetric Energy Density and Cycle Life

So-yeon Kim[1,†] | Junyeob Lim[1,†] | Dong Chul Kang[1] | Sangwon Nam[1] | Jaegyun Heo[1] Tae-jun Koh[1] | Hyun Chul Kang[2] | Sung-Gyu Pyo[1,*] | Songhun Yoon[1,*]

[1]School of Integrative Engineering, Chung-Ang University, 84, Heukseok-ro, Dongjak-gu, Seoul 06974, Republic of Korea

[2]SE2MATERIAL, 701ho, 13, Gyoyuk-gil, Naju-si, Jeollanam-do, Republic of Korea

[†]These authors contributed equally.

CORRESPONDENCE
T: +82-2-820-5769
E: sgpyo@cau.ac.kr
yoonshun@cau.ac.kr

https://doi.org/10.33961/jecst.2025.00843

VOLUME 17 ISSUE 2 MAY 2026

Table S1. Rietveld refinement results of NCM-sp and NCM-LP active material.

Samples	FWHM	a (Å)	c (Å)	c/a	I(003)/I(104)
NCM-sp	0.22876	2.8782	14.19343	4.93114	1.0620
NCM-LP	0.15591	2.87693	14.19383	4.93367	1.0632

Table S2. Results of initial discharge capacity of NCM-sp and NCM-LP at 0.1C, 25°C.

Discharge Capacity (mAh/g)	NCM-sp	NCM-LP
1st	208.69	190.28
2nd	209.17	193.53

Table S3. Results of cycle performance and retention of NCM-sp and NCM-LP at 1st, 100th cycle at 1C, 25°C.

Discharge Capcaity (mAh/g)	1st	100th	Retention (%)
NCM-sp	184.98	142.05	75.69
NCM-LP	173.30	138.30	78.27

Table S4. Result of NCM-sp and NCM-LPs' voltage profile at 1st, 10th, 20th, 50th, 80th at 1C, 25°C.

Discharge Capacity (mAh/g)	NCM-sp	NCM-LP
1st	183.38	172.64
10th	173.94	168.31
20th	168.83	162.47
50th	156.13	145.40
80th	143.89	135.83

OPEN ACCESS This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (http://creativecommons.org/licenses/by-nc/4.0) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.