SUPPLEMENTARY INFORMATI

Fluorine Migration Regulation for Direct Regeneration of High-Nickel Cathode Scraps

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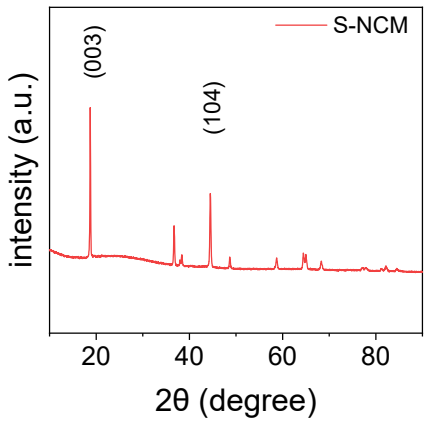

Figure S1. X-ray diffraction pattern of S-NCM

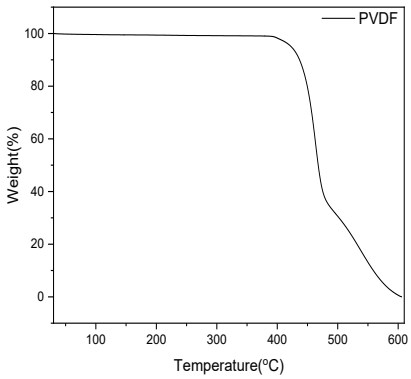

Figure S2. Thermogravimetric (TG) curve of PVDF measured under an air atmosphere.

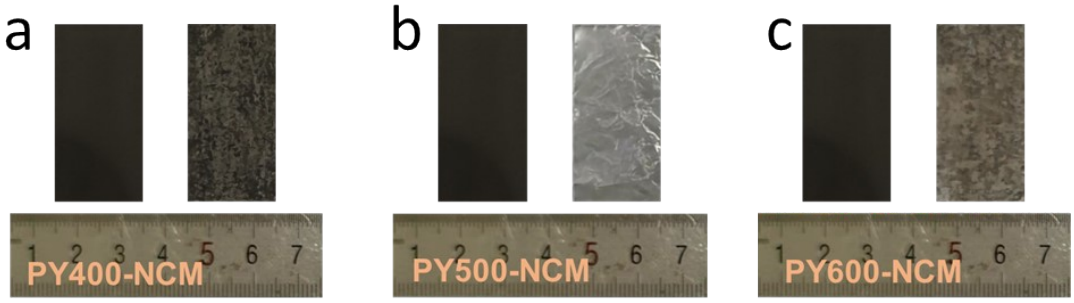

Figure S3. Optical photographs of NCM cathode sheets after thermal decomposition at (a) 400 °C, (b) 500 °C, and (c) 600 °C for 4 h.

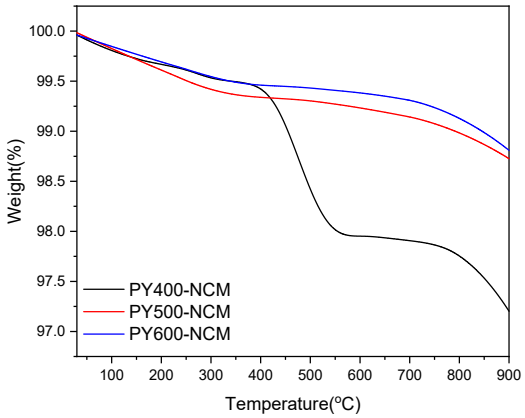

Figure S4. Thermogravimetric (TG) curves of PY400-NCM, PY500-NCM, and PY600-NCM samples.

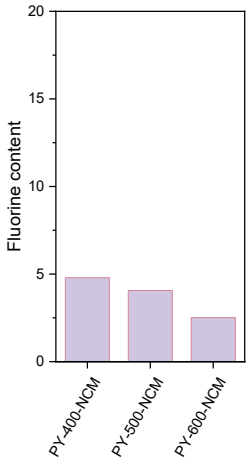

Figure S5. Fluoride contents of PY400-NCM, PY500-NCM, and PY600-NCM measured by ion chromatography.

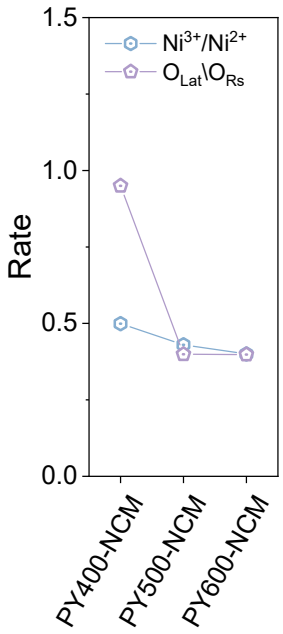

Figure S6. Surface Ni^{3+}/Ni^{2+} and O_lat/O_rs ratios of PY400-NCM, PY500-NCM, and PY600-NCM obtained from XPS fitting.

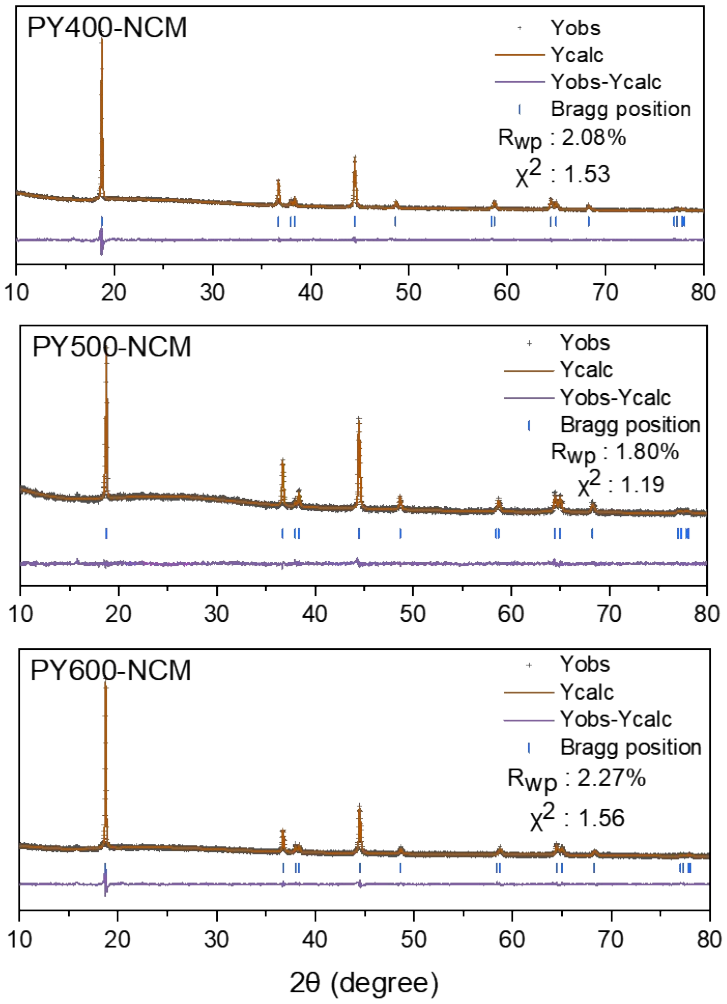

Figure S7. Rietveld-refined XRD patterns of PY400-NCM, PY500-NCM, and PY600-NCM.

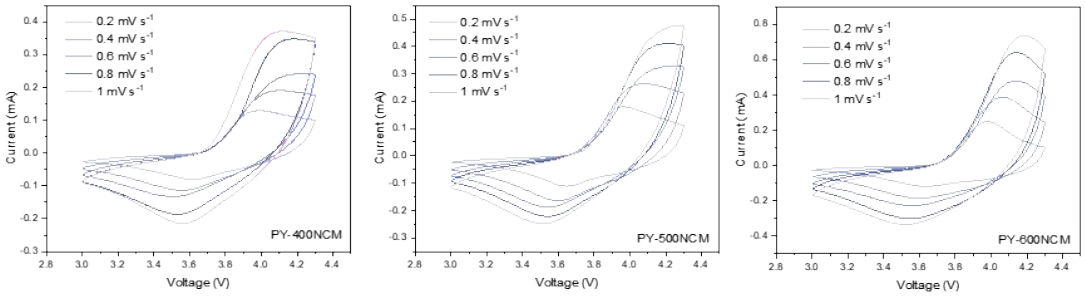

Figure S8. Cyclic voltammetry (CV) curves of PY400-NCM, PY500-NCM, and PY600-NCM.

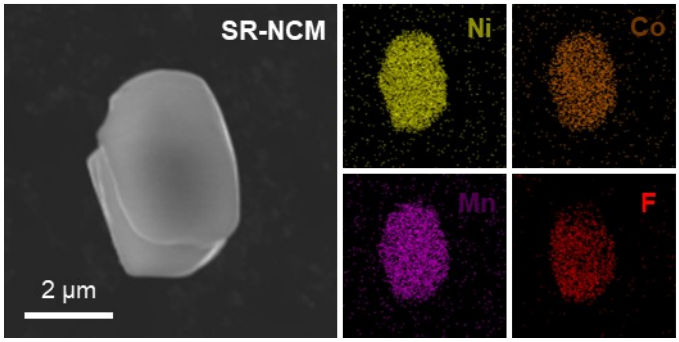

Figure S9. SEM image and corresponding EDS elemental mappings of SR-NCM.

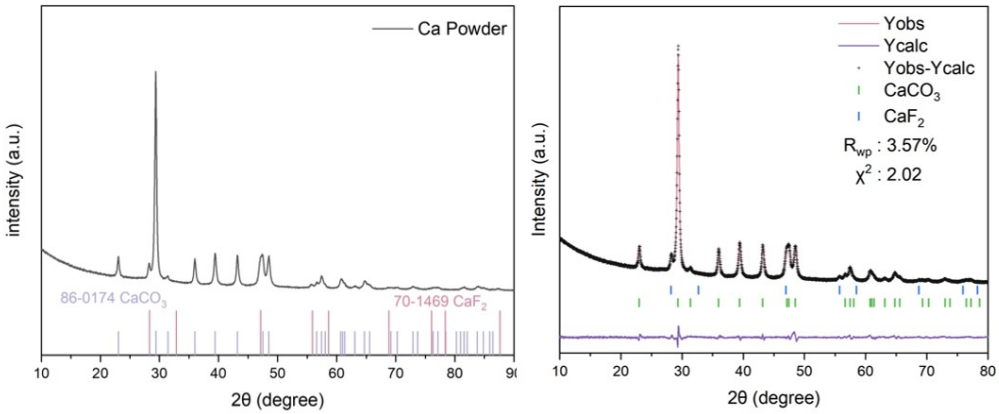

Figure S10. XRD pattern and Rietveld refinement of the reacted Ca powder after fluorine capture.

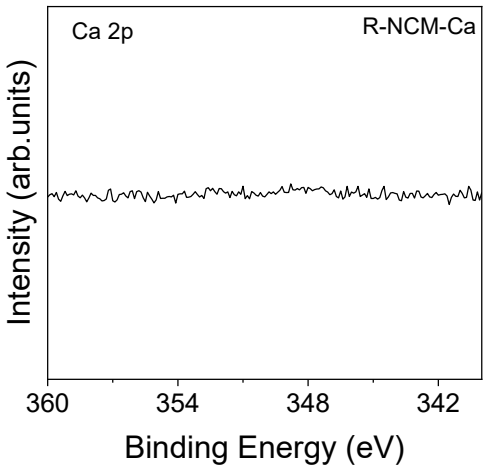

Figure S11. XPS Ca 2p spectrum of R-NCM-Ca.

Sample Id	Ca 317.933 (mg/L)
C-NCM	0.078
R-NCM-Ca	0.067

Figure S12. ICP analysis of the elemental composition of the regenerated material and the commercial cathode material.

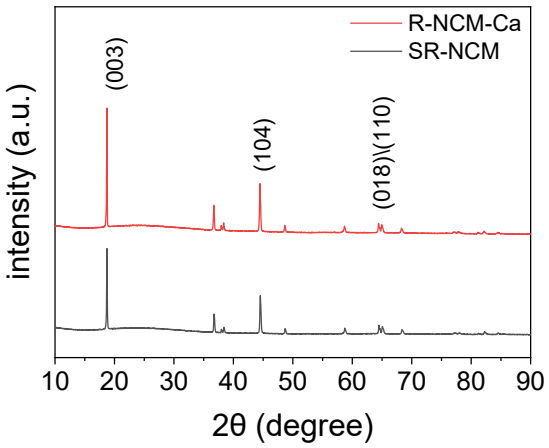

Figure S13. XRD patterns of SR-NCM and R-NCM-Ca.

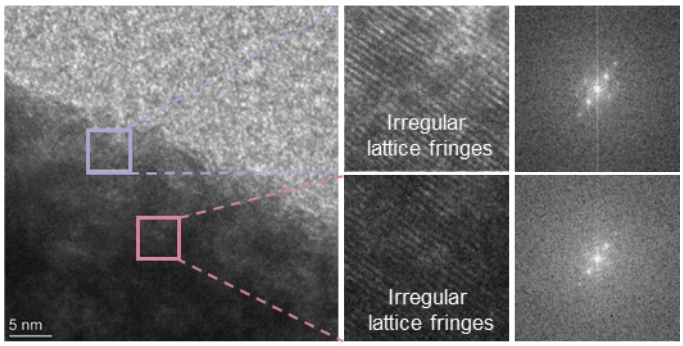

Figure S14. HRTEM image of SR-NCM.

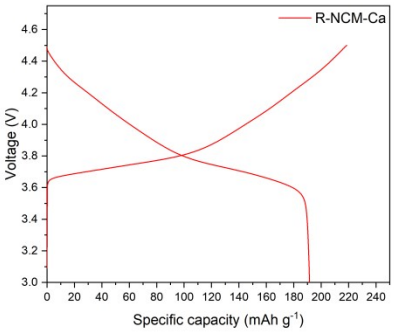

Figure S15. Charge–discharge curves of R-NCM-Ca measured in the voltage range of 3.0–4.5 V.

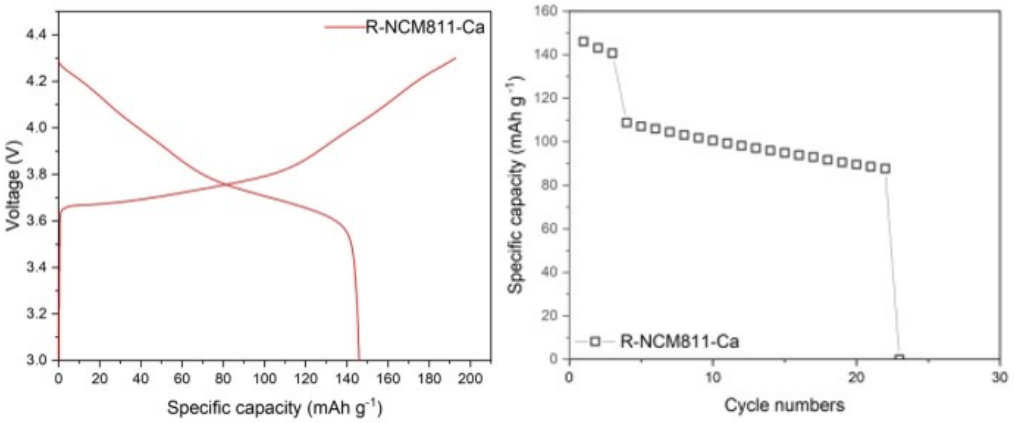

Figure S16. Electrochemical performance of the regenerated NCM811 cathode under the same regeneration conditions.