

Supporting Information

Mechanical force-induced proton transfer promotes the selective extraction of spent lithium iron phosphate

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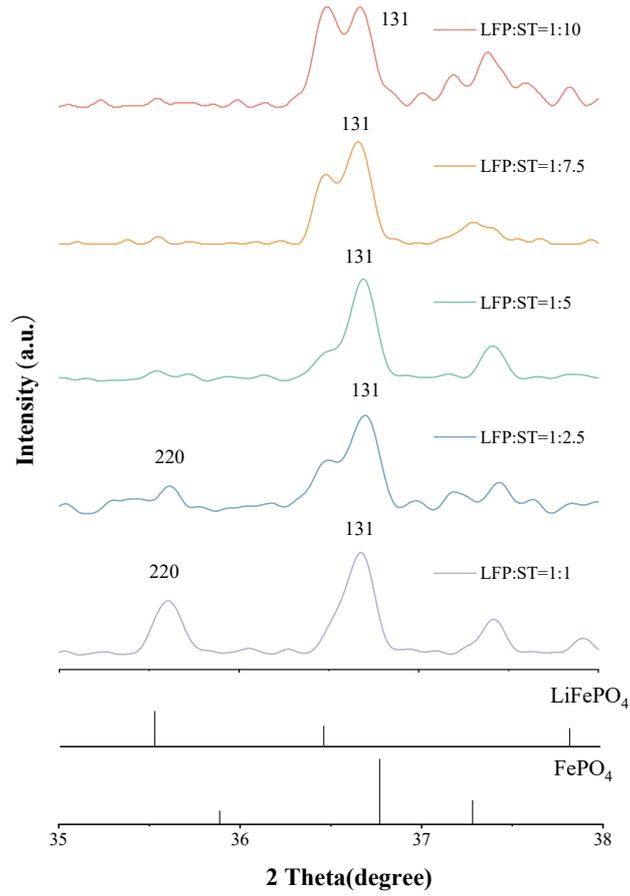


Figure S1. XRD pattern of the leached residue of the spent LFP following the AFMC reaction. (The mass ratio of LFP to ST was the single experimental variable, and other experimental conditions were kept constant: H_2O_2 or H_2O addition=1 ml, rotation speed=5h, and Grinding time =5 h.).

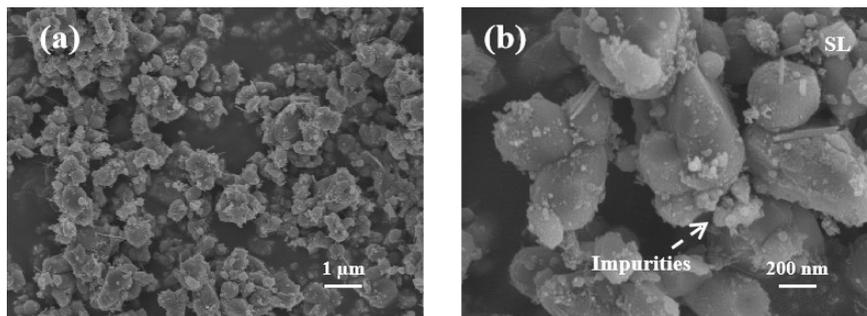


Figure S2. (a) SEM images of spent LFP sample.

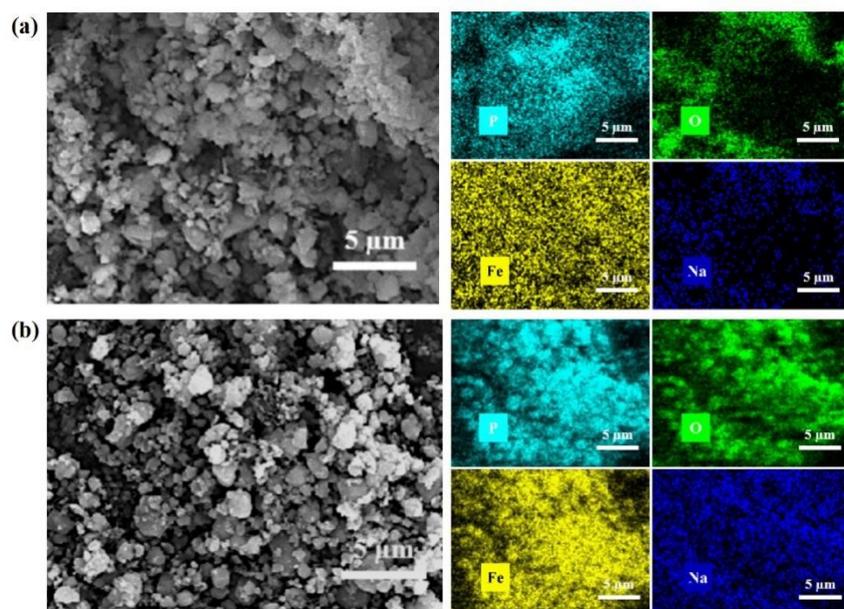


Figure S3. Element mapping of (a) spent LFP sample and (b) ST-LL sample.

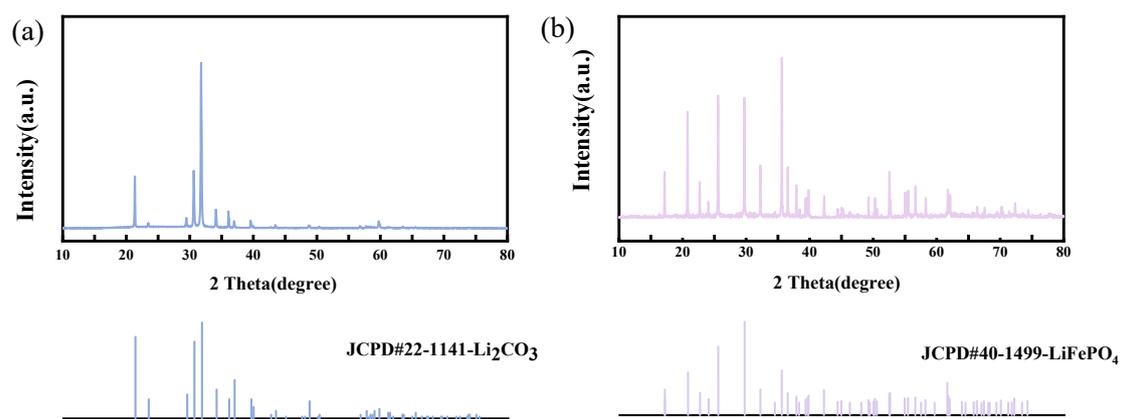


Figure S4. XRD pattern of the (a) Li_2CO_3 and (b) R-LFP samples.

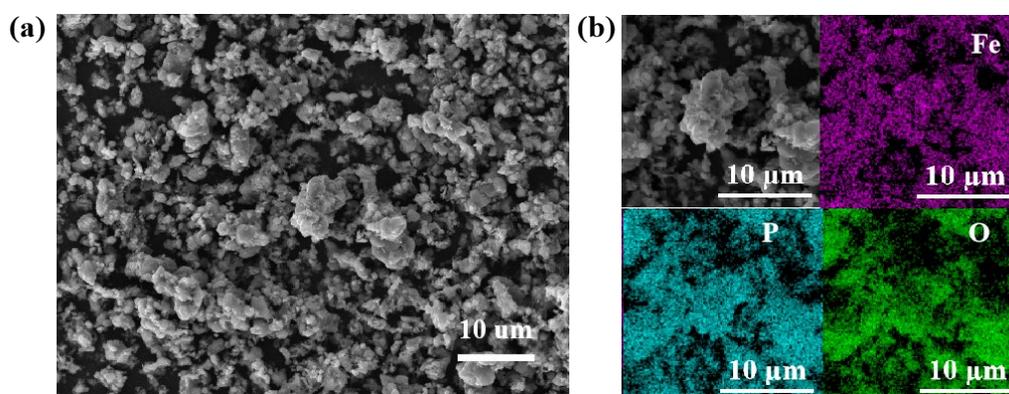


Figure S5. (a) SEM images and (b) Element mapping of R-LFP sample.

Table S1. Comparison of rate performance and long-term cycling stability of regenerated cathode materials prepared via different recycling processes.

Sample	Rate Performance	Long-term Cycling Stability	Ref.
This work	156.7, 143.9, 129.2, 115, 96.1 mAh·g ⁻¹ at 0.2, 0.5, 1.0, 2.0, 5.0 C	Capacity retention: 97.3% after 100 cycles at 1.0 C	/
Commercial LFP	155 mAh·g ⁻¹ at 0.1 C	Capacity retention: 55.8% after 450 cycles at 1.0 C	1;2
Advanced oxidative metallurgy	142.4, 133.4, 123.2, 113.3, 101.9 mAh·g ⁻¹ at 0.1 C, 0.2 C, 0.5 C, 1.0 C, 2.0 C	Capacity retention: 93.6% after 50 cycles at 0.5 C	3
Phosphate-based leaching	158.72 mAh·g ⁻¹ at 0.2 C	Capacity retention: 91.33% after 400 cycles at 0.5 C	4
Cold-stimulus separation	/	Capacity retention: 92.7% after 300 cycles at 0.5 C	5
Selective leaching recovery	158 mAh·g ⁻¹ at 0.1 C	Capacity retention: 99% after 300 cycles at 2.0 C	6
Thermal-activated regeneration	114.2 mAh·g ⁻¹ at 10.0 C	Capacity retention: 79.2% after 1500 cycles at 10.0 C	7
Targeted surface reconstruction	156.4 mAh·g ⁻¹ at 0.1 C	Capacity retention: 92.1% after 400 cycles at 2.0 C	8

Notes and references

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