Supplementary Material

Study on Impurity Removal from Black Powder of Lithium Iron Phosphate Cathode Materials

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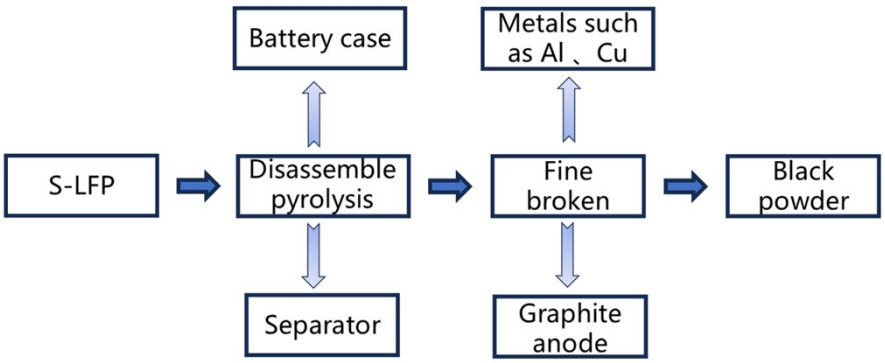

Fig. S1. S-LFP preprocessing flowchart

The preprocessing of spent batteries involves several steps, including discharge, disassembly, electrode sheet drying, and pulverization of the electrode sheets. To ensure safe disassembly, the battery must be discharged to a safe voltage level. A semi-automatic disassembly machine is used to separate the battery casing and the cell. Manual assistance is provided to mechanically separate the separator. The electrode sheets are then dried, and a pulverizer is used to obtain aluminum foil, copper foil, cathode lithium iron phosphate powder, and graphite powder.

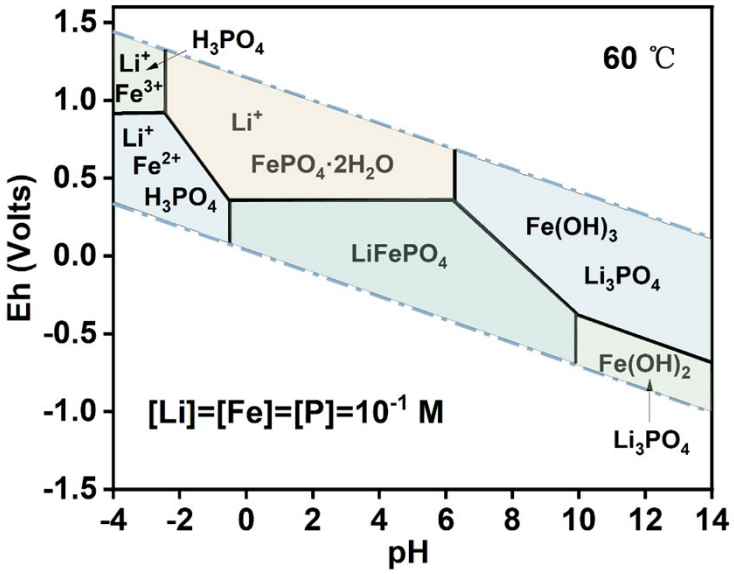

Fig. S2. E-pH plot of the Fe-P-S-H_2O system at 60°C

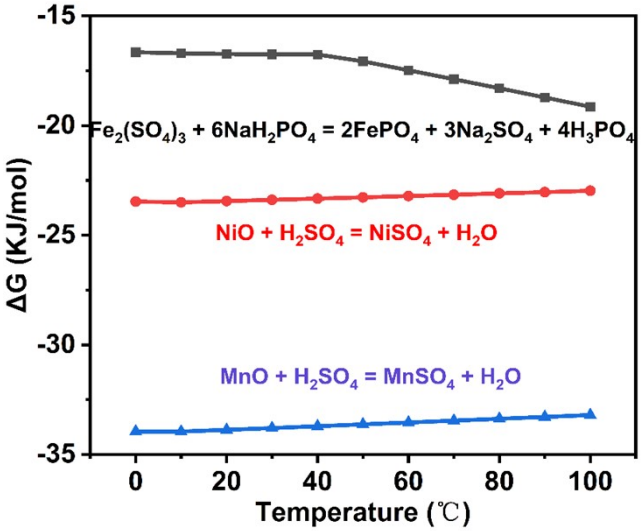

Fig. S3. Reaction (5) (6) (7) Gibbs free energy (ΔG) and temperature relationship

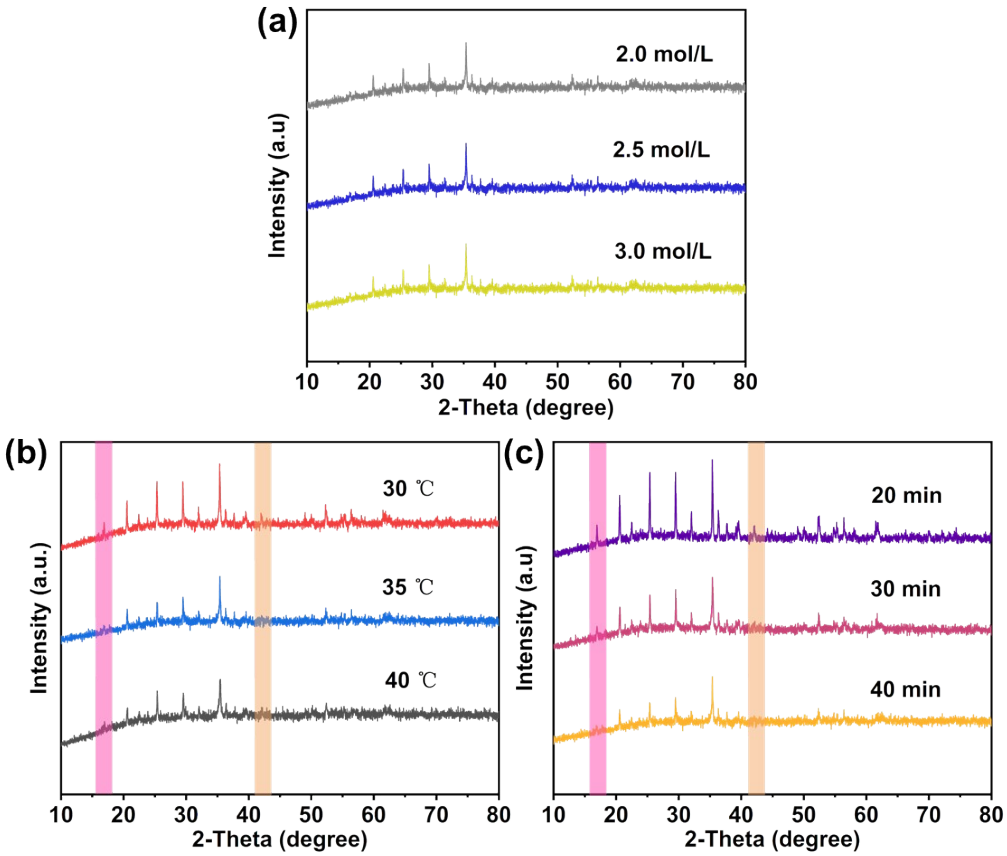

Fig. S4. XRD plots of S-LFP leaching under different conditions: (a) NaOH concentration, (b), leaching temperature, (c), leaching time

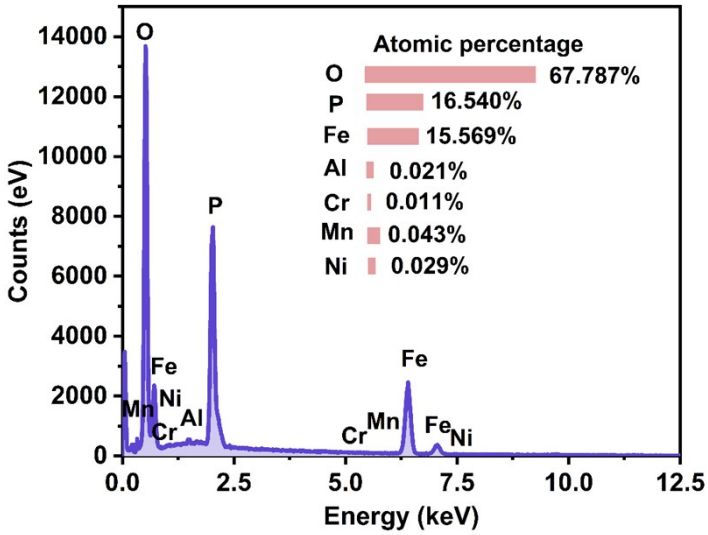

Fig. S5. EDS energy spectra after alkali immersion

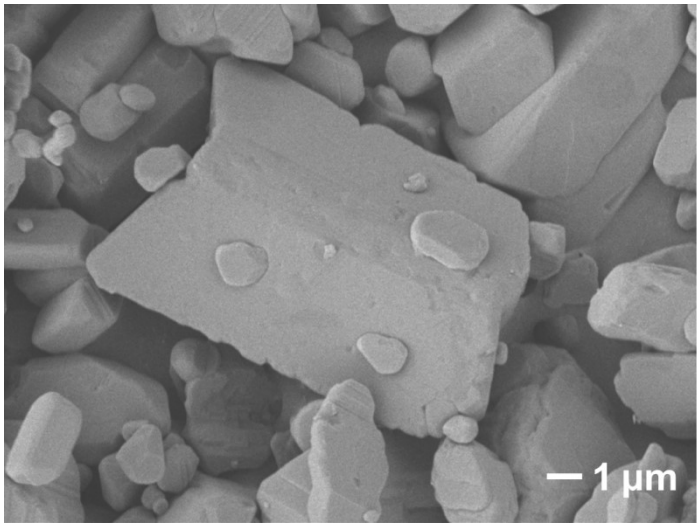

Fig. S6. SEM image of Li_2CO_3 recycling

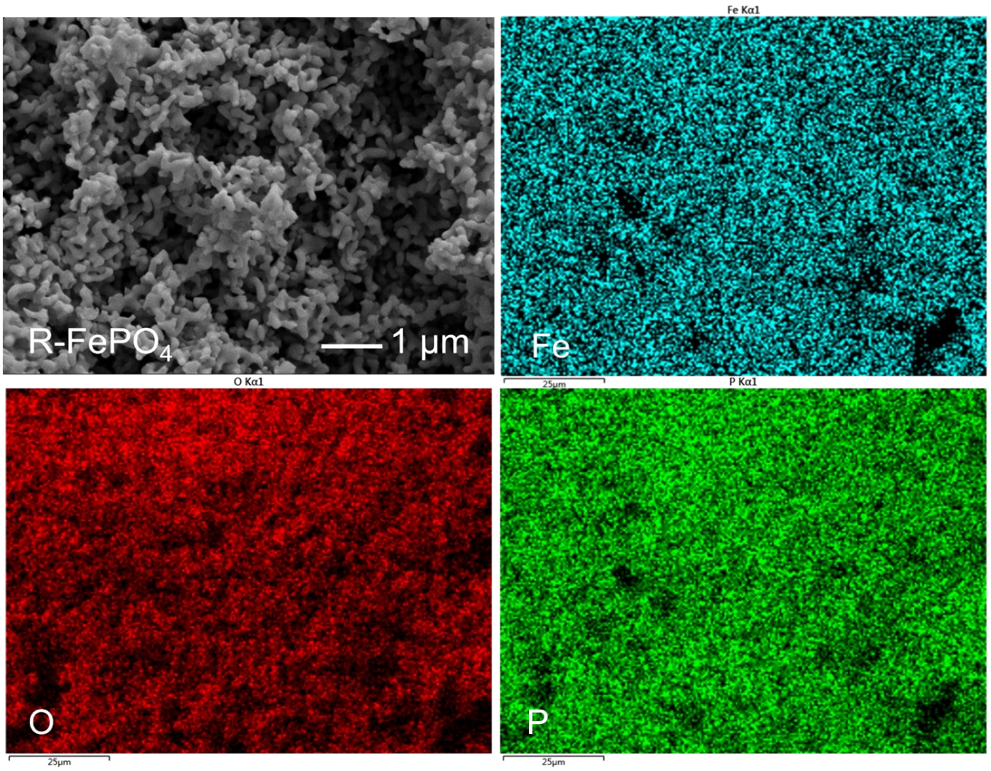

Fig. S7. SEM image and corresponding mapping image of $FePO_4$ recycling