

Electronic Supplementary Information (ESI)

Cobalt and lithium recovery from spent LiCoO₂ using a free-standing potassium zinc hexacyanoferrate/carbon cloth composite electrode

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Supplementary Figures

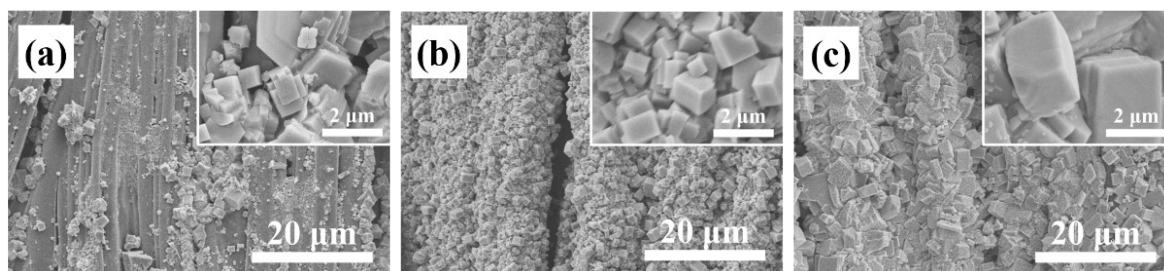


Fig. S1 SEM images of (a) CC/KZHCF-1, (b) CC/KZHCF-3 and (c) CC/KZHCF-4.

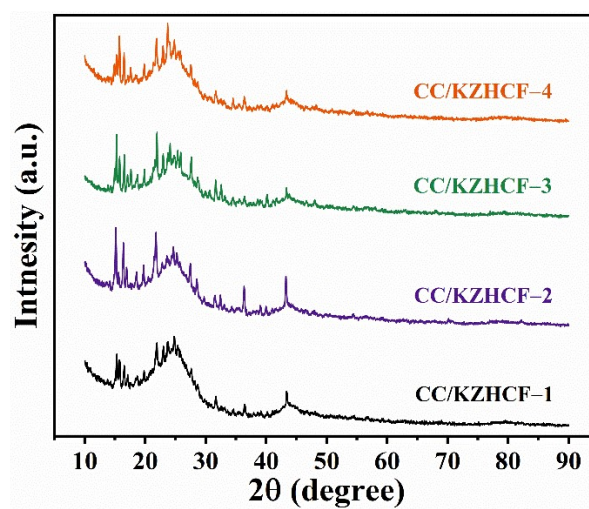


Fig. S2 XRD patterns of the as-synthesized CC/KZHCF-1, CC/KZHCF-2, CC/KZHCF-3 and CC/KZHCF-4.

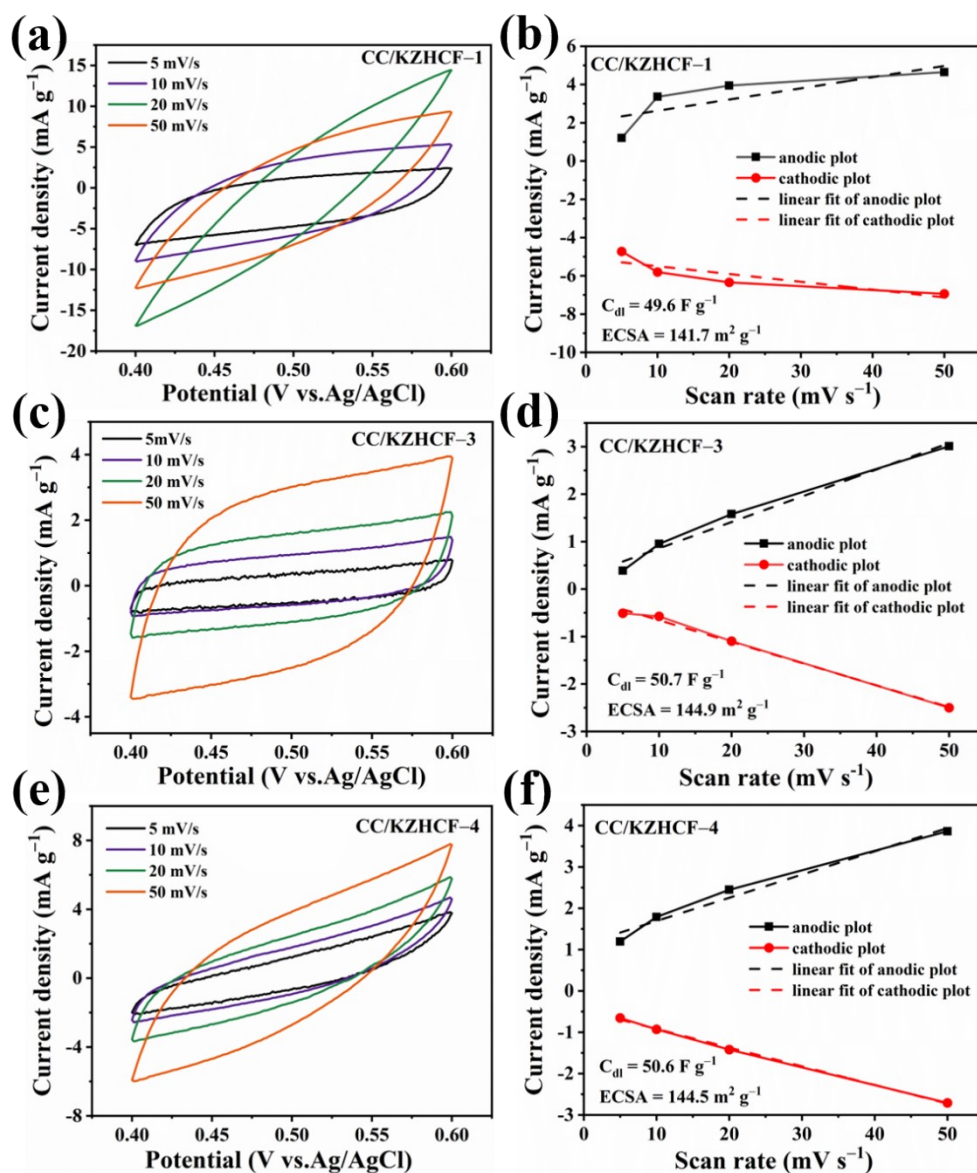


Fig. S3 CV curves at different scan rates between 0.40 and 0.60 V (vs. Ag/AgCl) of (a) CC/KZHCF-1, (c) CC/KZHCF-3 and (e) CC/KZHCF-4. The corresponding cathodic and anodic charging current measured at 0.50 V (vs. Ag/AgCl) plotted as a function of scan rates of (b) CC/KZHCF-1, (d) CC/KZHCF-3 and (f) CC/KZHCF-4.

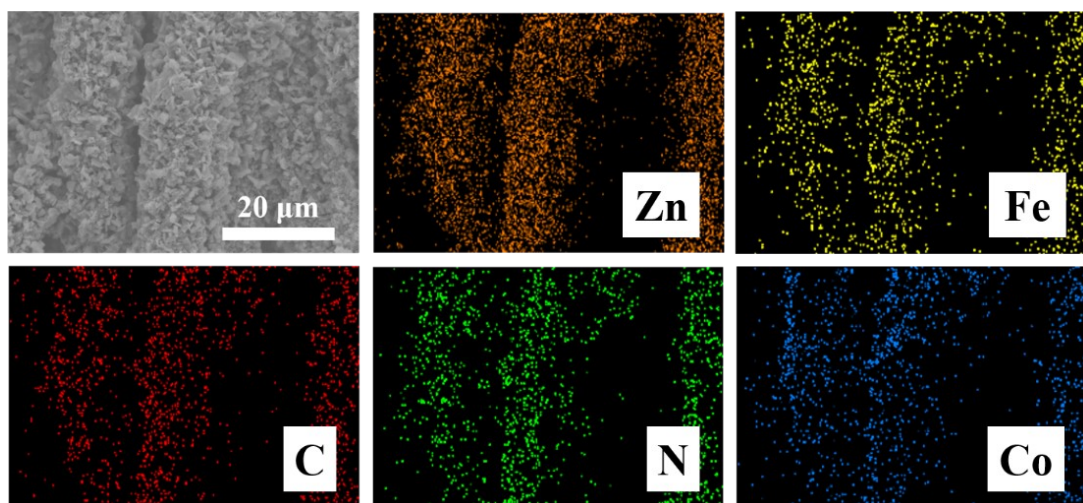


Fig. S4 EDS elemental mappings of CC/KZHCF-2 electrode after Co^{2+} electrosorption.

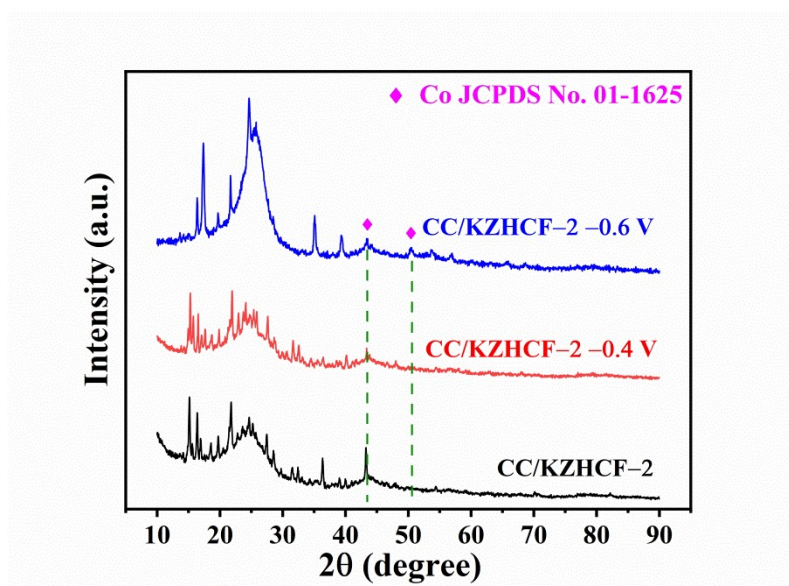


Fig. S5 XRD patterns of CC/KZHCF-2 electrodes before and after Co^{2+} electrosorption under -0.4 V and -0.6 V (vs. Ag/AgCl) potentials.

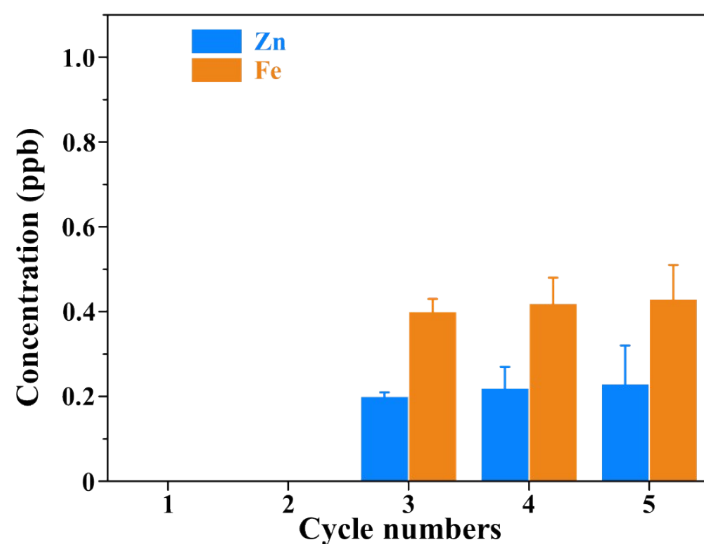


Fig. S6 Concentration of metal ions released from the CC/KZHCF electrode after five cycles.

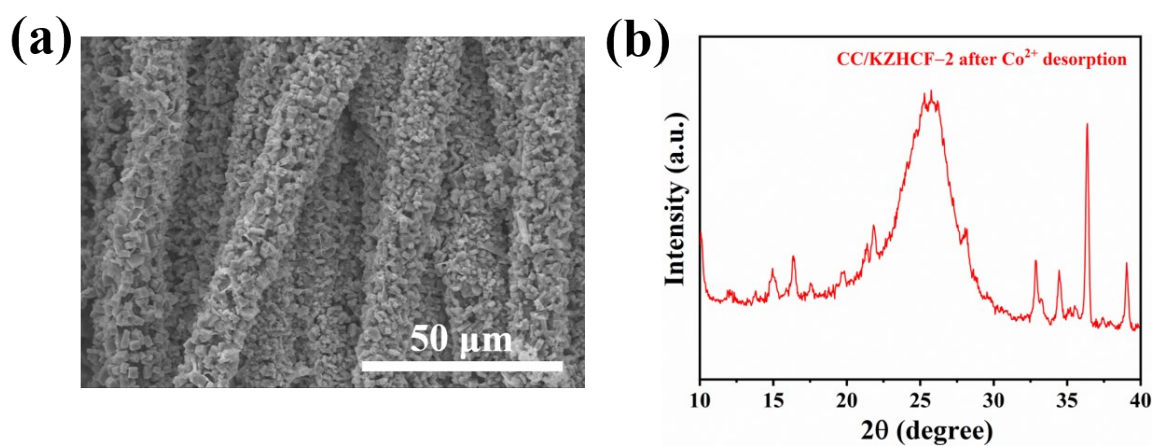


Fig. S7 (a) SEM image and (b) XRD pattern of CC/KZHCF electrode after Co^{2+} desorption.

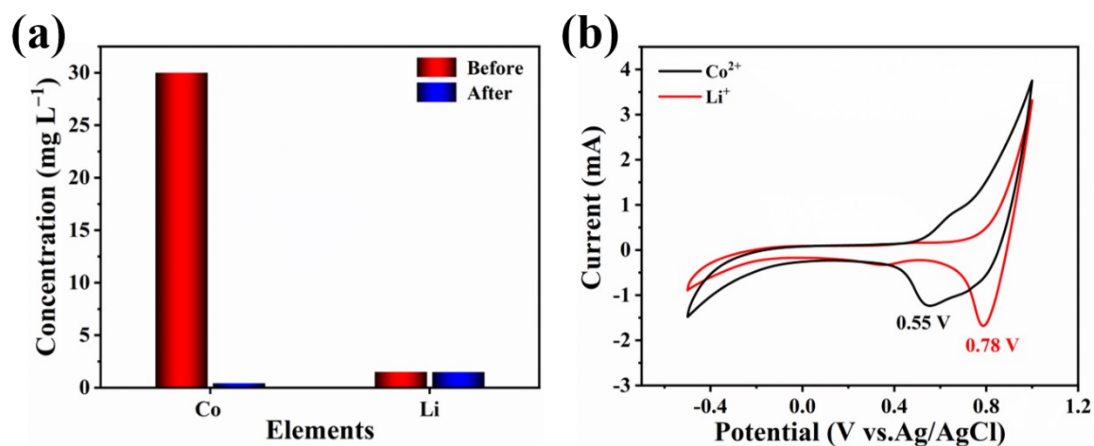


Fig. S8 (a) Concentrations of Co²⁺ and Li⁺ ions in the spent LiCoO₂ leachate before and after electroadsorption; (b) CV curves of CC/KZHCF-2 electrode in 50 mM Co²⁺ or Li⁺ solution at a scan rate of 50 mV/s, respectively.

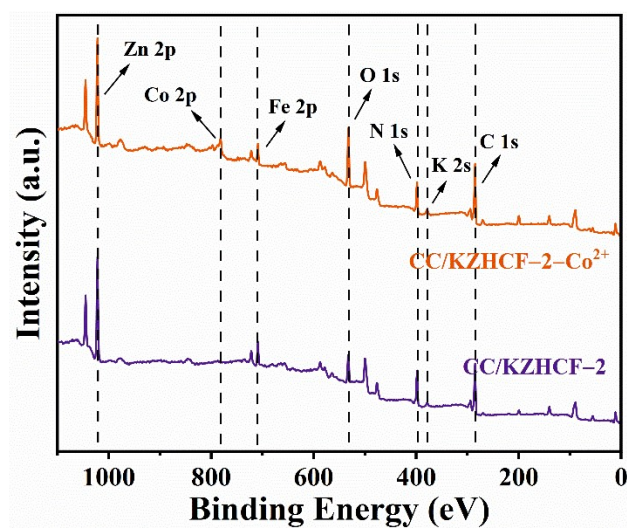


Fig. S9 XPS spectra of CC/KZHCF-2 electrode before and after Co²⁺ electroadsorption.

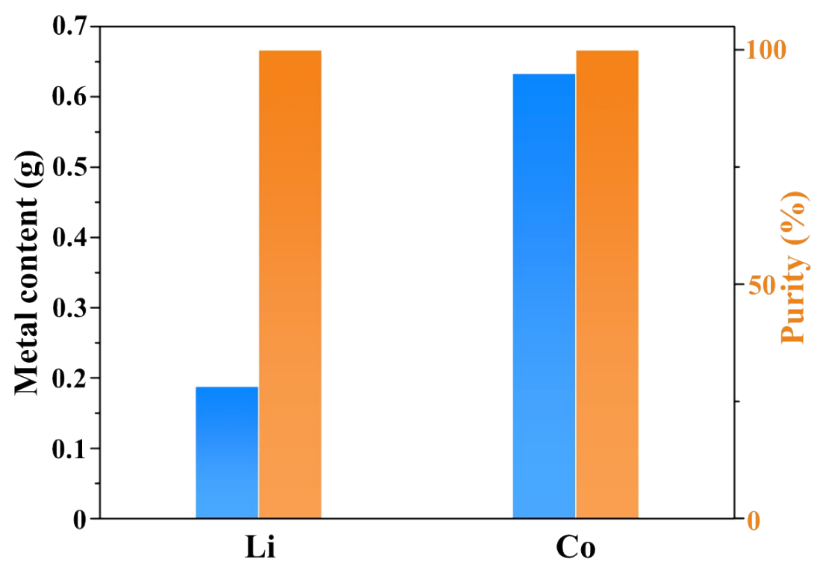


Fig. S10 Metal content and purity of recycled Li_2CO_3 and $\text{Co}(\text{OH})_2$.