Repairing and upcycling of electrode materials from spent lithium ion batteries

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Electrical energy storage is becoming more and more important due to the widespread use of electrical vehicles and large-scale storage of electricity from wind farms and solar power plants. Lithium ion batteries are taking a dominant role in these fields, and their consumption is exponentially increasing. However, the major elements of lithium, cobalt, nickel, etc, used in lithium ion batteries are either rare or geographically unbalanced. Therefore, it is essential to recycle these substances greenly and efficiently. We have making great efforts to directly recycle and then reuse the electrode materials from spent lithium batteries in a green, cost-effective, and short-processing ways. For example, we have developed upcycling transformation strategy, subtractive transformation strategy, and multi-functional transformation strategy of cathode materials from spent lithium ion batteries, with excellent feasibility based on technical economic analysis.