Repurposing of LiFePO4 materials to value added fertilizers

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Applications

Battery materials recycling, agricultural fertilizer, Phosphate and Lithium re-use

Target Problems

Recycling spent lithium iron phosphate (LFP) cathodes in an economical sustainable way remains a great challenge due to its low-value elemental composition. Thus, a low-cost technology together with a high-value product are critical for the recovery of the LFP materials.

Key Features

- **Low Cost –** the method provides high value elements for agriculture and Li ion batteries
- **Simple –** the process is easy for recovery of spent LFP
- **Mature –** this commercial ion-exchange (IX) method is available and practical
- **Fast -** the kinetics of IX and regeneration reaction are fast, and the equilibrium can be reached in as short as 20 min

Technology

Inventors at University of Wisconsin, Milwaukee (UWM) have developed a simple and economical technology which provides a practical recycling strategy for spent LFP batteries. This mature and low-cost ion-exchange method takes advantage of Li-H and Li-K reactions using strong and weak acid cation exchange resins. More than 90% of lithium can be recovered with strong acid cation resins as well as K-form resins. Along with the phosphorus remaining in the leaching solution, the reaction delivers a potential product of multi-elemental fertilizer. The verification of this method opens a new promising recycling direction that could transform spent LFP cathodes to high-value single or multi-elemental fertilizer.

Intellectual Property

US Provisional Patent Pending

About the Inventor(s)

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