

What is battery recycling?

Battery recycling is a downstream process that deals with end-of-life batteries of different types and health conditions. Many established battery-recycling plants require a standardized presorting process to distinguish spent LIBs, as direct recycling reduces the efficiency of recovering valuable metals.

How can a recycling process improve the sustainability of the battery industry?

The innovation of this study is evident in its optimization of the recycling process, effectively separating and recovering cathode materials while reducing environmental pollution. This approach supports environmentally friendly waste treatment and contributes to the sustainable development of the battery industry. 1. Introduction

Are there systematic reviews on electrochemical recycling methods for batteries?

There are several comprehensive reviews on electrochemical recycling methods for batteries; however, there are systematic reviews that focus on comparing and developing different methods for the specific recycling of spent LIBs are lacking.

Is there a universal recycling process for all types of batteries?

Currently, the literature highlights a significant gap in the development of a universal recycling process for various battery types, including cylindrical, prismatic, and pouch batteries, and there is no global process to recycle all types of batteries. (15)

Why do we need a wet recycling method for lithium batteries?

In recent years, various technologies and optimization algorithms have emerged to address challenges such as significant metal loss, complexities in waste liquid management, and environmental pollution associated with traditional wet recycling methods for lithium batteries.

Does lithium-ion battery recycling reduce environmental and economic impact?

Life cycle analysis confirmed recycling reduces environmental and economic impact. Strengthen regulatory approaches and government support to enhance recycling. An integrated approach is required for effective Lithium-ion battery recycling.

Recycling serves the main perspectives, from a cost-effective source of raw materials to the aim of cheaper battery production, to the environmental standpoint and minimizing the adverse ...

In summary, we have reported an environmentally friendly, non-glove box, closed-system and continuous process for mass production of the critical battery material Li₂S. The ...

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automobile. Process of recharging of e-vehicle battery. Environmentally friendly zero ...

The utilization of ethylene glycol (EG) as an environmentally friendly solvent for electrode delamination has been proposed [61]. The delamination process using EG enables ...

This study provides a green, economical, and effective approach for selective recovery of lithium from spent LFP battery by inducing electron transfer through ...

The refining process shown in Fig. 11 involves a few general steps such as treating ... these processes have some eco-friendly concerns which need to be addressed, ...

Amid lithium producers announcing new lithium supply a record pace to try to meet this demand, there is a substantial need for technologies that enable less expensive, environmentally-friendly, and highly-standardized lithium, which is ...

In this Article, we report a new electrochemical lithium recycling system coupled with nitrogen dioxide (NO₂) capture to realize a stable and energy input-free lithium recycling ...

This study seeks to thoroughly elucidate the many facets of lithium-ion battery recycling (Fig. 4), emphasizing the importance of prospective recycling solutions for mitigating environmental ...

In summary, repurposing Si from waste PV in LIB anodes is a more efficient, cost-effective, and environment-friendly upcycling process compared to the conventional ...

In the current research, an economical and environmentally friendly method for selectively recovery of lithium from spent LFP battery has been developed. Lithium can be ...

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