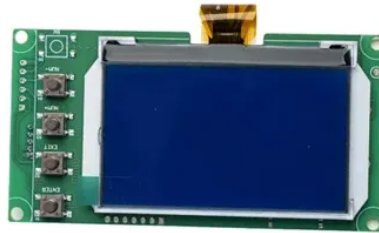




# Reuse of energy storage devices



## Overview

This chapter gives an insight into the processes of heat treatment, chemical treatments, metallurgy methods, etc. for the recycling of the materials of storage devices along with the extraction and recovery of metals and other carbon-based materials from cathode, anode, and electrolyte. Scientists have created a sustainable, cost-effective, and highly efficient solution that promotes a circular economy while supporting the transition to greener energy storage. Big bunch of old mobile phone lithium batteries for recycling disposal. Getty Images A new sustainable method turns old mobile phone lithium batteries into energy storage. NREL researcher Ying Shi works on NREL's Centrica hybrid battery energy storage system, which includes second-life batteries. However, their lifecycle's environmental and resource challenges necessitate innovative strategies to enhance sustainability. This paper explores the role of circular economy principles in advancing battery recycling, reuse, and the development of sustainable energy storage. Abstract The limited reserve of non-renewable energy sources and increased demand for energy due to technological development and higher quality lifestyle has shifted the research directions towards the use of alternative renewable energy sources.



## Article Content

Biodegradable biopolymers for electrochemical energy storage ...

By incorporating biodegradable materials, energy storage devices can be designed to minimise environmental impact, facilitate easier recycling, and reduce the reliance on non-renewable resources.

Circular Economy for Energy Storage

As batteries proliferate in electric vehicles, stationary storage, and other applications, NREL is exploring ways to reduce the amount of critical materials they require and increase the lifetime value of the ...

Recycling Procedures for Energy Storage Devices in the Scope of the ...

This chapter describes the current state-of-the-art of recycling applied to battery electrodes and separators/electrolytes with a focus on environmental and sustainability issues, also in relation to the ...

Methods and Technologies for Recycling Energy Storage ...

This has led to the development of various technologies for recycling energy storage materials and devices to reduce environmental hazards.

New method converts old phones and paper industry waste into green ...

A new sustainable method turns discarded mobile phone batteries and industrial lignin into a powerhouse material for sodium-ion batteries.

Emerging and Recycling of Li-Ion Batteries to Aid in ...

When LIBs reach the end of their useful lives, they can affect the environment or human health because they are utilized in so many products, ...

Innovative Circular Economy Strategies for Energy Storage: ...

recycling processes are energy-intensive and fail to recover valuable materials effectively, leading to resource losses and environmental harm (Fan et al., 2020). The reuse of batteries, while promising, ...

Redox-Active Polymers Designed for the Circular ...

Thus, next-generation energy storage devices should also address the integration of recyclability into the device design. Here, we demonstrate ...

Recyclability of novel energy harvesting and storage technologies for ...

This article outlines a circular approach for energy harvesting and storage devices developed within the project by assessing their recyclability and identifying valuable materials that ...

(PDF) Innovative Circular Economy Strategies for ...

This paper explores the role of circular economy principles in advancing battery recycling, reuse, and the development of sustainable ...

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