Lead-acid battery reduction method

How pyrometallurgy is used in recycling lead-acid batteries?
The method has been successfully used in industry production. Recycling lead from waste lead-acid batteries has substantial significance in environmental protection and economic growth. Bearing the merits of easy operation and large capacity,pyrometallurgy methods are mostly used for the regenerationof waste lead-acid battery (LABs).

What is the recovery efficiency of lead from lead paste?
The recovery efficiency of lead from lead paste increased and then reached maximum value of 93.2%,as the reductant dosage was increased from 8% to 12%. Therefore,the reductant dosage of 10% was chosen for the subsequent experiments. Reduction time is another parameter that affect lead paste reduction process.

What is a lead-acid battery?
Lead-acid batteries (LABs) have been undergoing rapid development in the global market due to their superior performance , , . Statistically, LABs account for more than 80% of the total lead consumption and are widely applied in various vehicles .

How effective is the industrial recovery of lead?
Moreover, this method has been successfully applied for the industrial recovery of lead at the scale of 200, 000 tons annually since 2019. Taken together, this method is robust for recovery of lead from the waste LABs and is helpful for building the resource-conserving society. 2 2 1. Introduction

When did lead use decrease?
A general trend of decreasing lead use occurred for most applications since the 1980swith the exception of LABs. The consumption of lead through the production of LABs increased from 0.6 Mt of lead in 1960 to 10 Mt in 2012,when it accounted for greater than 85% of lead used .

How is low temperature alkaline melting of lead concentrate done?
The research on low temperature alkaline melting of lead concentrate started at the earliest and the main reaction of the process are as follows: (1)4MeS +8NaOH = 4Me +Na2SO4 +3Na2S +4H2O(2)4MeS +4Na2CO3 = 4Me +Na2SO4 +3Na2S +4CO2

These interventions include using barium sulfate and carbon additives to reduce sulfation, implementing lead-calcium-tin alloys for grid stability, and incorporating boric and phosphoric acids in electrolytes for ...

Lead-acid batteries ... The oxidation and reduction peaks appear at about - 0.65 V and - 1.35 V for the ... Gao PR, Dai Y (2011) A method for resource utilization of waste lead-acid batteries. CN-patent: 102263309 A. Lei LX, Zhou YQ, Tai J, Ma BB, Liu W (2016) A method for producing electrochemically active lead sulfate using waste lead-acid batteries. CN-Patent: ...

Lead-acid battery reduction method

This paper reports a new method of direct recovery of highly pure lead oxide (PbO) from waste lead pastes and lead grids of spent lead-acid batteries via catalytic conversion, desulfurization, and recrystallization processes in sequence.

During the process of recycling lead from waste lead-acid batteries, how to minimize the wastage of chemical reagents and prevent secondary pollution is a significant research subject. In this study, a method for preparing ?-PbO based on low-temperature thermochemical reduction of PbO 2 was proposed.

There is a growing need to develop novel processes to recover lead from end-of-life lead-acid batteries, due to increasing energy costs of pyrometallurgical lead recovery, the resulting CO 2 emissions and the catastrophic health ...

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Further cost reductions from battery R& D improvements and economies of scale are expected by the authors and a cost ... compare the price performance of LIBs and lead-acid batteries based on cumulative battery production. 93 For lead-acid batteries, the authors apply a decomposition method that separates technological learning into variations in material prices, ...

Herein, dual rotating liquid film reactors (RLFRs) and lime are proposed to construct a recyclable, ultra-fast, and value-added desulfation method. Parameter optimization and kinetic calculations prove that the above ...

Hydrometallurgical processes for the recovery of the lead from SLP are divided into different categories, i.e., acid leaching hydro/electrowinning followed by direct recovery of metallic Pb and acid leaching hydro/chemical conversion followed by direct recovery of new battery assembly material (lead leady oxide PbO/Pb, lead oxide ?-PbO) (Ref ...

In this paper, a new method is introduced based on short discharge of the battery. This method is cheap, fast, reliable and accurate enough for second-life batteries. A second-life battery means that when a battery is done for its life but still it can be used for small load than before. The method can be applied in two different ways and ...

As of today, common rechargeable batteries are lead-acid battery series and lithium-ion battery series. The earliest lead-acid batteries and lithium-ion batteries were proposed in 1859 (Kurzweil, 2010) and 1976 (Whittingham, 1976), respectively the past records, lithium-ion batteries have caused many explosions due to improper use and improper circuit design, ...

The total charge time for lead-acid batteries using the CCCV method is usually 12-16 hours depending on the battery size but may be 36-48 hours for large batteries used in stationary applications. Using multi-stage ...

High pure PbO is recovered by multidentate coordination and dissociation strategy. The proposed histidine + CO2 dual cycles construct a chemical consumption-free method. The new chemical property of 2PbO·PbSO 4 realizes the desulfation-free process.

Herein, dual rotating liquid film reactors (RLFRs) and lime are proposed to construct a recyclable, ultra-fast, and value-added desulfation method. Parameter optimization and kinetic calculations prove that the above reactions are controlled by internal diffusion, revealing that RLFR promotes the mass transfer and reaction rate.

High pure PbO is recovered by multidentate coordination and dissociation strategy. The proposed histidine + CO2 dual cycles construct a chemical consumption-free ...

There is a growing need to develop novel processes to recover lead from end-of-life lead-acid batteries, due to increasing energy costs of pyrometallurgical lead recovery, the resulting CO 2 emissions and the catastrophic health implications of lead exposure from lead-to-air emissions.

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