Smelting of lead for lead-acid batteries

What is lead smelting?

Overall,lead smelting is a critical process in the lead battery recycling plant,allowing for the extraction of lead from used batteries and the recycling of this lead for use in new batteries or other industrial applications.

How do you smelt lead?

The lead plates and lead oxide paste are then smelted in a furnace to extract the lead. The smelting process involves heating the lead plates and paste to a high temperature, typically around 1,200 degrees Celsius, in a furnace. This melts the lead and separates it from other impurities, which are removed from the furnace.

How long does a lead smelting process take?

During the smelting process,impurities in the lead material are separated from the lead and removed from the furnace. This process can take several hours or even days,depending on the quantity and quality of the materials being smelted. The resulting lead is then refined and purified,typically through a process called electrolysis.

How is lead used to make batteries?

The resulting lead is then refined and purified,typically through a process called electrolysis. This involves passing an electric current through the lead to remove any remaining impurities. Once the lead has been extracted from the batteries and refined,it can be used to manufacture new batteries or other lead-based products.

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 .

What is a lead smelting furnace?

The lead smelting furnace is a crucial piece of equipment in the lead smelting process, used to heat the lead ore or recycled material to high temperatures to extract the lead. Let's take a closer look at what a furnace is and how it works.

Lead extraction from spent lead-acid battery paste in a molten Na2CO3 salt containing ZnO as a sulfur-fixing agent was studied. Some influencing factors, including smelting temperature, reaction time, ZnO and salt dosages, were investigated in detail using single-factor experiments. The optimum conditions were determined as follows: T = 880°C; t = 60 min; ...

A new innovative process for one-step and cleaner extraction of lead from spent lead-acid battery by reductive sulfur-fixing smelting was presented. This paper summarized and discussed ...

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To shorten the energy consumption, a novel pyrometallurgy process which consisted of low temperature alkaline and bath smelting was proposed in this work. The ...

The innovative cleaner metallurgical process for one-step extraction of lead from spent lead-acid battery paste via reductive sulfur-fixing smelting is technically feasible. This new technique is characterized by high comprehensive recovery of valuable metals, elimination of SO 2 emission, energy conservation and environment-friendly.

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Based on the results presented in thermodynamic analysis and low-temperature smelting process, an integrated flowsheet was proposed for the recovery of lead from waste ...

The battery paste consisting of a mixture of lead oxides and sulfates is carbothermically reduced, generally in accordance with the following reactions in either a single batch rotary furnace or a continuous smelting furnace of ...

Environmental concerns, particularly SO 2 handling and slag leaching characteristics and disposal, have led to a significant amount of paste from lead-acid batteries being recycled in primary lead smelters. The extra oxygen available from PbSO 4 can be beneficial in sulfur elimination on the sinter machine and can improve the productivity of ...

A new innovative process for one-step and cleaner extraction of lead from spent lead-acid battery by reductive sulfur-fixing smelting was presented. This paper summarized and discussed several potential sulfur-fixing agents and molten salts which can be used in this new technique.

Yujie et al., Reductive smelting of spent lead-acid battery colloid sludge in molten salt of sodium at low temperature. China Nonferrous Metall. 43(1), 75-79 (2014) Google Scholar Huang. Chao et al., Sulfur-fixing reduction smelting of spent lead-acid battery colloid sludge in fused salt at low temperature. Min. Metall. Eng. 32(2), 84-87 (2012) Google Scholar Li. Yun et ...

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At the smelting step (900 - 1200 °C), the lead compounds from the break are reduced to provide metallic lead, by smelting the battery paste with coke or other reducing agent rich in carbon and sodium hydroxide and sodium nitrate for the removal of other metals in the oxide form.

The reaction mechanism regarding the lead extraction from the spent lead-acid battery paste in the

oxygen-enriched smelting process provides a theoretical guidance for the ...

smelting from lead recycling entirely could enable a process wher e the emission of particulates was. greatly reduced, and follows the modern principles of pollution prevention which prioritize ...

Based on the results presented in thermodynamic analysis and low-temperature smelting process, an integrated flowsheet was proposed for the recovery of lead from waste lead-acid batteries at the scale of 200, 000 tons annually since 2019 (Fig. 7). The whole production line mainly included raw materials process, smelting process and gas ...

A sustainable method, with minimal pollution and low energy cost in comparison with the conventional smelting method, is proposed for treating components of spent lead acid batteries with oxalate and sodium ...

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