The coal mine explosion-proof battery system consists of

What is the lithium-ion battery management system for explosion-proof mining electric vehicle?
This paper designs a kind of lithium-ion battery management system for explosion-proof mining electric vehicle according to GB3836-20210 series standard. And the management system takes STM32F103 as the main controller and LTC6811 as the core, using passive equalization strategy to realize battery voltage equalization.

Can lithium battery pack be used in underground coal mining?
In coal mining industry,specifically in underground coal mining,the requirements on lithium battery pack applications are very stringent with various engineering constraints imposed on them,which,in most cases,make the application of lithium technology in such an environment unfeasible or impractical.

Can lithium batteries be used in mining?
The mining industry has encountered difficultiesin deploying large LIB packs (more than 100 kWh) for the underground coal environment,and currently,most battery applications are only in low-power devices with currents drawn in the milli-amperes range .

How much heat does a battery pack generate?
The battery pack thermal runaway simulation had the same total heat generation as the single cell simulation performed in the last section,with a constant heat generation rate of 1.354 × 10 7 W/m 3. From the experimental data,however,the heat generation rate of the battery pack was slower than that of the single battery simulation.

What are explosion-protection techniques?
Explosion-protection techniques (also called type of protection or explosion-protected apparatus) are classed under a generic term,which describes the use of particular techniques for constructing electrical apparatus for use in hazardous areas.

Can Li-ion battery thermal runaway protection be encapsulated?
An encapsulated method is proposedfor largescale Li-ion battery thermal runaway protection. A series of nail penetration experiment are conducted for thermal abuse analysis. Data-intensive modeling is designed for single and 10 cell pack thermal abuse simulation.

When the rated energy of the battery pack is greater than 200Wh, the battery pack should be placed separately in an explosion-proof chamber and able to withstand a 1.5MPa water pressure test. The protective circuit should be placed outside the explosion-proof chamber.

Power batteries for coal mine robots generally have large capacity, and need to be built in a relatively narrow

and closed explosion-proof space when used in underground ...

For its second-generation battery, Komatsu adopted a nickel-magnesium-cobalt (NMC) battery. It's a 240-volt system that generates 220 kWh. It weighs 18,000 lb, charges in two hours, and has wireless communications. This system is intended for underground coal use and the batteries are stored in explosion-proof (XP) enclosures.

Based on the working principle and characteristics of lead-acid batteries used in coal mine transportation vehicles, the inspection system of lead-acid batteries used in coal mine is ...

Complex environment in coal mine tends to cause disasters [1, 2], accompanied by power outages, equipment damage, gas leakage, and other dangerous situations. From the year 2004 to 2021, there were 21753 coal mine disasters in China. In 2021, a coal and gas outburst disaster occurred in Coal Mine in Heilongjiang Province. In coal mine ...

According to the relevant requirements in IEC60079, the explosion-proof protection of LIB can be adapted to the working environment of high dust and explosive gas environments such as in the...

This paper introduces a search-and-rescue robot system used for remote sensing of the underground coal mine environment, which is composed of an operating control unit and two mobile robots with ...

The article focuses on specific challenges of the design of a reconnaissance mobile robotic system aimed for inspection in underground coal mine areas after a catastrophic event. Systems that are ...

power supply"[4], which designs a lithium-ion battery management system for mine electric vehicle. The system can monitor the battery cell voltage, temperature and the current of battery pack, and using the way of passive equilibrium to adjust the inconsistency problem of monomer. At the same time, the

Power batteries for coal mine robots generally have large capacity, and need to be built in a relatively narrow and closed explosion-proof space when used in underground dangerous gas environment. The fire and explosion characteristics of batteries are a gradual dynamic process. However, due to the

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When the output of explosion-proof lithium power supply is used in parallel, there exists the problem of non-uniform current between power sources, so a digital current-sharing strategy and...

This article is written to provide a comprehensive understanding and of the influence of design factors for large-scale explosion-proof LIB pack systems for underground coal-mining applications. In next section, we provide an overview of current international standards for explosion protection techniques for apparatus

employed in hazardous area ...

With the electrification of underground coal mines, electric explosion-proof rubber-tyred vehicles will gradually replace high-polluting explosion-proof diesel rubber-tyred vehicles, but explosion-proof electric rubber-tyred vehicles have problems such as short cruising range and poor power performance. Based on this, this paper proposes a pure electric explosion-proof rubber-tyred ...

Based on the working principle and characteristics of lead-acid batteries used in coal mine transportation vehicles, the inspection system of lead-acid batteries used in coal mine is designed, with emphasis on the voltage detection circuit and current detection circuit for ...

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