

Can laser welding be used in the production of lithium battery modules?

To investigate the application of laser welding in the production of lithium battery modules for electric vehicles, this study employs the finite element method to simulate the welding process of lugs and busbars in lithium batteries under different parameters.

How does laser welding affect the temperature of lithium battery lugs?

1. The heat during the laser welding of lithium battery lugs is distributed centrally within the weld region, resulting in a significant temperature gradient in front of the molten pool and a smaller gradient at the rear. During the cooling process after welding, the temperature decreases rapidly within 5 s.

Which welding techniques can be used for connecting battery cells?

Brass (CuZn37) test samples are used for the quantitative comparison of the welding techniques, as this metal can be processed by all three welding techniques. At the end of the presented work, the suitability of resistance spot, ultrasonic and laser beam welding for connecting battery cells is evaluated.

Can a battery cell casing be welded?

The findings are applicable to all kinds of battery cell casings. Additionally, the three welding techniques are compared quantitatively in terms of ultimate tensile strength, heat input into a battery cell caused by the welding process, and electrical contact resistance.

How is a 26650 lithium-ion battery welded?

As external conductor a CuZn37 sheet of 0.2 mm thickness was welded at the negative pole of the cell. The negative tab of the battery cells is made of nickel-plated steel. Welding results for the 26650 lithium-ion cells and the chosen geometries of the weld areas are shown in Fig. 16.

What is laser beam welding?

For battery assemblies, joining of two different metals can be required, e.g., an aluminum cell terminal with a copper external conductor. When laser beam welding is used, the two molten materials are mixed and a metallurgical system is generated, which influences the mechanical properties.

Battery packs manufactured for electromobility application consist of battery cells/modules connected with joints. While their quality has been significantly improved with ...

Fig. 1 (a) shows the components of a commercial 21,700 format lithium-ion battery cap. The battery cap comprises a CID and a sealing ring, and the CID of the battery ...

The production of lithium battery modules, also known as Battery Packs, involves a meticulous and multi-step manufacturing process. This article outlines the key ...

Resistance spot welding is used as a battery welding method, and it faces many challenges. There are three main points: (1) High conductivity materials commonly used in lithium batteries are not suitable for resistance spot ...

The proposed technique offers the following advantages: (1) the development of a fully noncontact and nondestructive laser ultrasonic inspection system for inspecting the ...

The technology- and process setup, in which ultrasonic welding is employed in tab pre-welding and laser welding in tab final welding, indicates a high technological and economic suitability. ...

The variable of greatest influence when welding battery packs is the contact resistance between the cell and the connection tab. It is crucial to minimize this ... 48 lithium-ion batteries. The ...

Using the example of two battery cells connected in parallel, Fig. 1 illustrates the influence of the quality of cell connections on a battery assembly. The higher electrical contact ...

Abstract. Ultrasonic metal welding is one of the key technologies in manufacturing lithium batteries, and the welding quality directly determines the battery ...

Advantages of Lithium Battery Welding: Laser welding offers high energy density, minimal welding deformation, a small heat-affected zone, effective improvement of part precision, smooth and ...

The welding process of lithium batteries is a crucial part of the battery production process. Especially when it comes to the connection of battery tabs, it directly affects the performance and safety of the battery.

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