Research on new technology of lithium battery welding

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.

Can laser welding be used for electric vehicle battery manufacturing?
There are many parts that need to be connected in the battery system, and welding is often the most effective and reliable connection method. Laser welding has the advantages of non-contact, high energy density, accurate heat input control, and easy automation, which is considered to be the ideal choice for electric vehicle battery manufacturing.

Can laser welding be done between different materials of battery busbar & battery pole?
Because the common material of the battery housing is steel and aluminum and other refractory metals, it will also face various problems. In this paper reviews, the challenges and the latest progress of laser welding between different materials of battery busbar and battery pole and between the same materials of battery housing are reviewed.

Why is laser welding used in power battery manufacturing?
Laser welding is an efficient and precise welding method using high energy density laser beam as heat source. Due to heat concentration, fast welding speed, small thermal effect, small welding deformation, easy to realize efficient automation and integration [15, 16, 17], it is more and more widely used in power battery manufacturing. Figure 1.

Can a real-time controller improve the process robustness of lithium-ion batteries?
Conclusion In this study, a real-time controller and a spherical tool are developed to improve the process robustness in ultrasonic metal welding of lithium-ion batteries. First, the proposed controller uses the initial energy to monitor and identify the presence of oil contamination, which is a common disturbance in battery manufacturing.

Lithium-ion batteries, known for their superior performance attributes such as fast charging rates and long operational lifespans, are widely utilized in the fields of new energy vehicles ...

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This work was designed to study the effects of influencing parameters in series/parallel gap spot welding process and determine the optimized parameters setting for spot welding between 18650...

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Recent advances have achieved high-quality battery welds using refill friction stir spot welding, but this approach can be constrained by access to the weld formation area and lengthy process times due to its complex procedure 11,12).

In this study, we present a novel collection of 3,736 laser welding images which are labeled with eight classes. This dataset contains both normal and defective classes collected from a Dade Laser Chinese production line. Moreover, we introduce a modified loss function that integrates cross entropy and complement objective training.

The need for higher capacity battery cells has increased significantly during the past years. Therefore, the subject of this study is to investigate the behavior of high performance 21700 Lithium ...

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This study reports aluminum tab-to-tab laser welding for connecting components in lithium-ion batteries. In this study, laser welding was conducted using multiple spiral welding paths. The effects of the number (no.) of scan tracks, scan spacing, and laser power on welds were investigated by characterizing the morphology and the mechanical and electrical ...

At the heart of every plug-in, hybrid, or pure electric vehicle (EV) is a power source: a rechargeable battery pack, based on lithium-ion (li-ion) technology. And, whatever the battery technology -- cylindrical, prismatic, pouch, even solid-state -- it is, the evolution of this power source that will determine the future of the EV industry ...

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. The objective is to analyze the temperature change in the lugs, and its influence on ...

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Lithium-ion batteries (LIBs) have attracted significant attention due to their considerable capacity for delivering effective energy storage. As LIBs are the predominant energy storage solution across various fields, such as electric vehicles and renewable energy systems, advancements in production technologies directly impact energy efficiency, sustainability, and ...

This paper analyzed the effect of welding parameters and the welding sequences on the deformation of lithium battery pack, then proposed a method to reduce the welding deformation of lithium battery pack maintaining the welding quality of single weld seam of aluminum alloys.

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