Energy storage box laser welding method

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 weldingfor connecting battery cells is evaluated.

How can a laser beam be used to connect a battery cell?
To position the laser beam onto the work piece, the scanner optics Remote Welding Elephant by Arges was used. This optics This Section quantitatively compares the three presented welding techniques for connecting battery cells in terms of electrical contact resistance, ultimate tensile force and heat input into the cell.

What is laser micro welding?
Laser micro welding with fibre lasers (1070 nm) meets the requirements placed on joining technology. Due to the high beam quality, very small spot diameters and thus very high intensities can be achieved. Copper materials of high purity are used to achieve the high conductivity of the electrical connection.

What is laser beam welding?
Laser beam welding uses the absorption of electromagnetic waves to heat up the joint partners. The laser beam can be provided by various laser sources . In this study,the laser source YLR-3000-SM by IPG Photonics was used.

Why is laser beam welding of copper a challenge?
Laser beam welding of copper materials represents a challenge due to the material-specific properties. Copper shows a high thermal conductivity (394 W/(mK)) and low absorption rate at room temperature for wavelength ranges that include common beam sources such as CO 2 lasers or Nd:YAG lasers (Fig. 3).

Why is reflected power measured during laser beam micro welding?
The measurement of the reflected power during laser beam micro welding is intended to show whether laser structuring of the copper samples is suitableboth for reducing the initially reflected power at the start of the process and also for increasing efficiency during the entire welding process.

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Advantages of Laser Welding. Laser welding has been documented to be up to 10 times faster than conventional electron welding. It produces a small spot of concentrated light with a power ...

During plasma arc welding, due to its straight arc and high energy density, the arc penetration is strong. The keyhole effect produced during plasma arc welding allows for butt welding of most metals within a certain ...

Laser welding is considered a desirable choice for EV battery manufacturing due to its non-contact nature, high energy density, precise control over the heat input, and ease of ...

Fig. 23g shows a comparison of different cell connection methods by laser welding [249]. Among these methods, laser wire bonding and laser spot welded busbars are used for cylindrical ...

Additive Manufacturing (AM) is a revolutionary manufacturing method that emerged in the 1980s 1 AM is the manufacturing process that can be recognized as a 3D printer or rapid prototyping, where the components are ...

Deep learning technology has advanced rapidly and has started to be applied for the detection of welding defects. In the manufacturing process of power batteries for new ...

Accordingly, the energy coupling during laser welding is closely related to the metallic plume and the molten pool. However, the wavelength of disk laser is shorter(1.03 um) ...

2. Flexibility: Laser welding systems can be easily integrated into automated production lines, providing versatility and adaptability to various manufacturing requirements. 3. Efficient Energy ...

New fiber laser technology allows for the output of longer laser wavelengths, with the best results typically around 2,000 nm, significantly longer than the average 808 nm to 1064 nm diode ...

On the other hand, keyhole mode involves high-intensity laser energy that creates a deep and narrow weld by vaporizing the material, forming a keyhole-shaped cavity. ... In comparing laser welding to traditional welding methods, it is ...

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