

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.

What is the smallest energy storing component in a battery?

Within any battery storage, the smallest energy storing component is the battery cell or short cell. Whereas for mobile devices, e.g., laptops, only a few cells are combined, in large battery assemblies up to several thousand cells have to be connected.

How does welding energy affect electrical contact resistance and tensile force?

Further increasing the welding energy leads to electrode sticking and significant expulsion of bulk material, , , . Fig. 6. Electrical contact resistance and ultimate tensile force as function of welding energy.

How can battery manufacturing improve energy density?

The new manufacturing technologies such as high-efficiency mixing, solvent-free deposition, and fast formation could be the key to achieve this target. Besides the upgrading of battery materials, the potential of increasing the energy density from the manufacturing end starts to make an impact.

How many battery cells are connected together?

In large battery assemblies, which are integrated, for example, in electric vehicles or stationary storage systems, up to several thousand single battery cells are connected together. Every single cell connection influences the functionality and efficiency of the whole battery system.

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