Battery diaphragm laser cutting technology

What are the ablative and cutting processes of battery packs?
The cutting processes are primarily focused on the dismantling of metal and metal-plastic components of battery packs. Furthermore, in the ablative processes, the ablation of active material of the battery electrode foil using ns-pulsed lasers is investigated.

How does laser cutting a lithium metal foil work?
Separating lithium metal foil into individual anodes is a critical process step in all-solid-state battery production. With the use of nanosecond-pulsed laser cutting,a characteristic quality-decisive cut edge geometryis formed depending on the chosen parameter set.

Can laser technology be used in cutting and ablating processes?
Laser technologies offer the possibility to perform many of the necessary process steps of dismantling and recycling. In this paper,an application overview and analysis of laser technologies in the field of cutting and ablating processeswill be presented.

What is a scatter plot in laser cutting?
Scatter plots of the automatically determined standard deviations of (d) the melt heights,(e) the melt widths,and (f) the kerf widths for individual cuts indicating process stabilityduring laser cutting. In subfigures (d) and (e),"left" and "right" refer to the respective position of the melt superelevation in relation to the cutting kerf.

How fast can a laser cut a lithium metal substrate?
Moreover,it was recently demonstrated that laser pulses in the nanosecond range enable the separation of lithium metal substrates at exceptional cutting speeds of more than 5 m s -1(Kriegler .,2022).

How are laser cuts in lithium metal samples obtained?
Images of the laser cuts in the lithium metal samples were obtained using LSM(VK-X 1000,Keyence,Japan) at a 480-fold magnification,resulting in a captured image region of approximately 702 × 527 u m 2. The cutting kerfs were manually centered in the microscope's image field.

Fundamental technology of electrode slice and disc cutting for lithium ion battery. 2, die cutting. Lithium-ion battery pole cutting process is divided into two kinds :(1) wood knife die punching, sharp blade is installed on the board, a certain pressure will be used to cut the blade pole piece. This process mold is simple, low cost, but the ...

For Lithium-ion batteries to find widespread use in electromobility and stationary energy storage applications, manufacturing costs must be lowered. Pilot-sc...

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The application of laser technology in the process of lithium-ion battery manufacturing also brings drastic changes to the production process of lithium-ion batteries. Laser cutting process is mainly adopted into cutting and forming the battery lug and cutting the pole slice and separator. The laser welding is largely applied onto the moulding ...

In this paper, an application overview and analysis of laser technologies in the field of cutting and ablating processes will be presented. The cutting processes are primarily focused on the ...

For lithium battery series, since the electrolyte is an organic solvent system, a diaphragm material resistant to organic solvents is required, and a high-strength thin-film polyolefin porous membrane is generally used.

Fraunhofer ILT develops energy-efficient, laser-based manufacturing processes for the production and processing of functional layers in battery and fuel cell production. To introduce competitive energy storage systems into the mass ...

Overall, the laser rotary die cutter enables efficient and precise cutting of the diaphragm material, allowing for the mass production of renewable energy lithium battery diaphragms. It enhances productivity, reduces material ...

Fraunhofer ILT develops energy-efficient, laser-based manufacturing processes for the production and processing of functional layers in battery and fuel cell production. To introduce competitive energy storage systems into the mass market, industry needs to reduce the production costs for battery cells significantly.

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