

Cleaning

Removal of Coating Material from Battery Foils



Process of Cleaning Battery Foils

The manufacture of Lithium-ion batteries is a highly technical process in which cathodes and anodes are manufactured from thin metallic foils that are coated with active materials. Cathode materials are typically thin aluminum foil in the 0.012-0.015mm range that are coated with a carbon based lithium containing material that increases the thickness to >0.2mm. For the anodes, copper foils are used in the 0.008-0.012mm range and these are coated with a graphite layer on both sides and again can be >0.2mm thick.

Within the manufacturing process there are often requirements to expose the metal foils which requires the selective removal of the carbon based coatings. Quality is key to this process in that coatings need to be completely removed without damaging the thin foils.



10mm x 20mm areas removed
processing rates $>1\text{cm}^2 / \text{s}$ for Cu
AND $>2\text{cm}^2 / \text{s}$ for Al.

What the TruPulse nano 2020 Can Do

TRUMPF's TruPulse nano pulsed fiber lasers are ideally suited to this task. The ability to tailor the pulse characteristics using Pulsetune technology enables the pulse energy to be controlled such that it removes the coating by ablation but generates insufficient energy density to ablate the metallic foils. This process can require a number of passes where the pulse characteristics can be varied between passes to better control the material removal rate.

Using a TruPulse nano 2020 laser, both anode and cathode foils can be processed, leaving clean metallic surfaces for subsequent processing such as welding. Lower power EP-Z lasers can be used for this application but processing rates will be proportional to average power.

Application Parameters

Type	TP-200P-A-EP-Z-B-Y
Power	200W
M ²	<1.6
Input Beam Dia	10mm
Scanner/Lens	163mm
Energy	WF26 2MHz (Alu) or WF28 4MHz (Cu)