Sputtering Targets for Thin Film Batteries

umicore

Umicore Thin Film Products

Umicore Thin Film Products, a globally active business unit within the Umicore Group, is one of the leading producers of coating materials for physical vapor deposition with more than 50 years experience in this field. Its Semiconductor portfolio covers a wide range of highly effective sputtering targets and evaporation materials.

Thin Film Batteries are all-solid state batteries manufactured as a stack of sputter deposited films. The working principle is similar to Lithium-ion batteries, with the conversion of chemical energy into electrical energy in red-ox reactions as the driving force. The active layers comprise metallic anode and cathode contact layers, an anode layer, a solid state electrolyte layer and a cathode layer. There is a wide variety of battery designs available, but they mostly all share a Li anode, a LiPON electrolyte (reactive deposited from Li_3PO_4 in N2) and a $LiCoO_2$ cathode. Li, Li_3PO_4 and $LiCoO_2$ targets are available at Umicore Thin Film Products in a wide range of shapes and sizes to match customers' requests.

Sputtering Targets for Thin Film Batteries Applications

Production Process

Our $LiCoO_2$ and Li_3PO_4 materials are produced by powder metallurgy. Precise control of raw powder processing as well as advanced densification processes guarantee uniform structure and high density. Our Li material is produced by melting/forging.

Analysis

All materials are tested in our leading edge analytical laboratory or in one of our associate laboratories:

- Mass Spectrometry (GDMS)
- Hot Gas Extraction (LECO)
- Metallographic Investigation
- Density Measurement (Archimedes principle)
- X-ray Diffraction (XRD)

Density

The density of our $LiCoO_2$ is typically min. 4.9 g/cm³ and of our Li_3PO_4 typically min. 2.33 g/cm³.

Purity

Li, Li_3PO_4 and $LiCoO_2$ are available in 3N (99.9%) metallic purity.

Dimensions

Due to our flexible production processes single- and multi-tile targets of a wide range of sizes and shapes can be realized.

Bonding

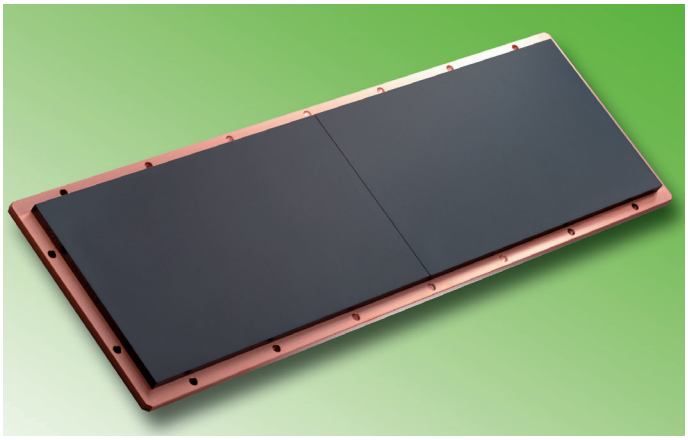
Umicore Thin Film Products uses its own proprietary bonding methods. Depending on the target and backing plate materials solder, elastomer, conductive epoxy and mechanical bonding techniques can be applied. The bonding is compliant to accommodate thermo-mechanical stress and to guarantee electrical contact.

Packaging

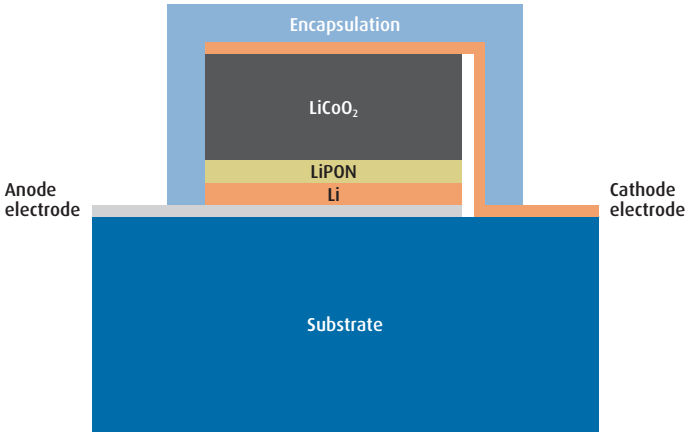
Final cleaning and packaging is completed under clean-room conditions. All targets are vacuum sealed in polyethylene bags, guaranteeing consistent target performance, even when stored for a longer period of time. Li targets are packed and transported according to international transport regulation for dangerous goods. Talk to us to design appropriate transport packaging.

Quality Assurance

The Balzers location is certified according to ISO 9001, ISO 14001 and OHSAS 18001 standards. All other production sites are also ISO 9001 and ISO 14001 certified. Documentation, process specifications, traceability, sophisticated analytical methods, and continuously trained employees guarantee the highest and most consistent product reliability.



$LiCoO_2$ sputtering target



Schematic of a rechargeable thin film batteries (artificial colors)

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Please find your local sales partner at:
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