

No.1 Material Solutions Partners

Solus Advanced Materials



Solus Advanced
Materials





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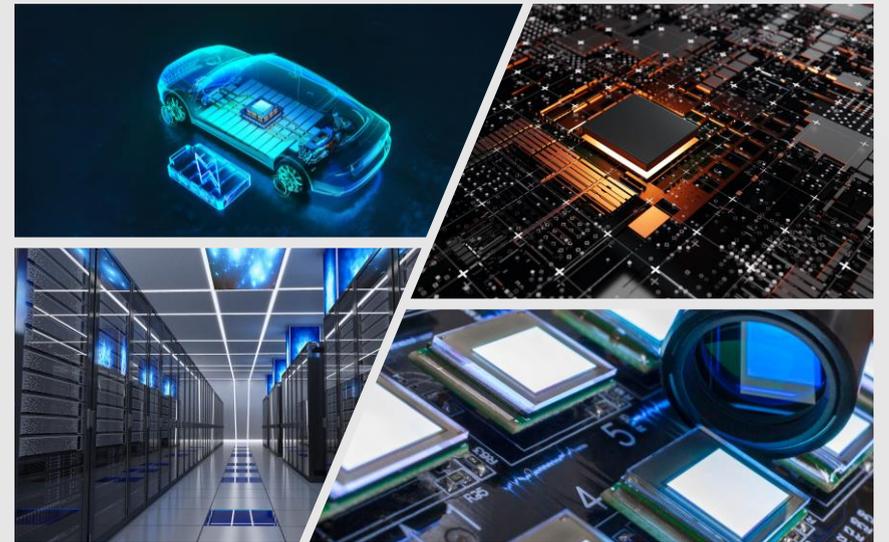
II. Business

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Solus Advanced Materials has a range of growth engines in the field of electric vehicles, next-generation displays and ICT

We research, develop and manufacture a number of advanced materials for each field, and provide them to companies domestically and around the globe



Overview

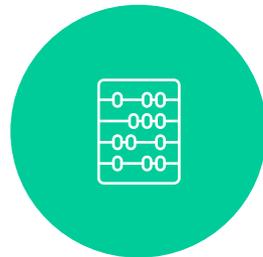
Date Founded

CEO

Employees

Business

Company Profile



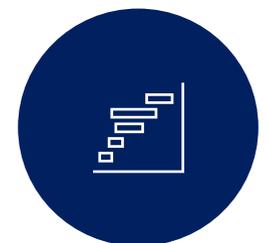
OCT. 1. 2019



Daeje Chin
Kwangpyuk Suh



1,277
(July. 2023)



Battery copper foil
Copper foil
Electro Materials

Overview

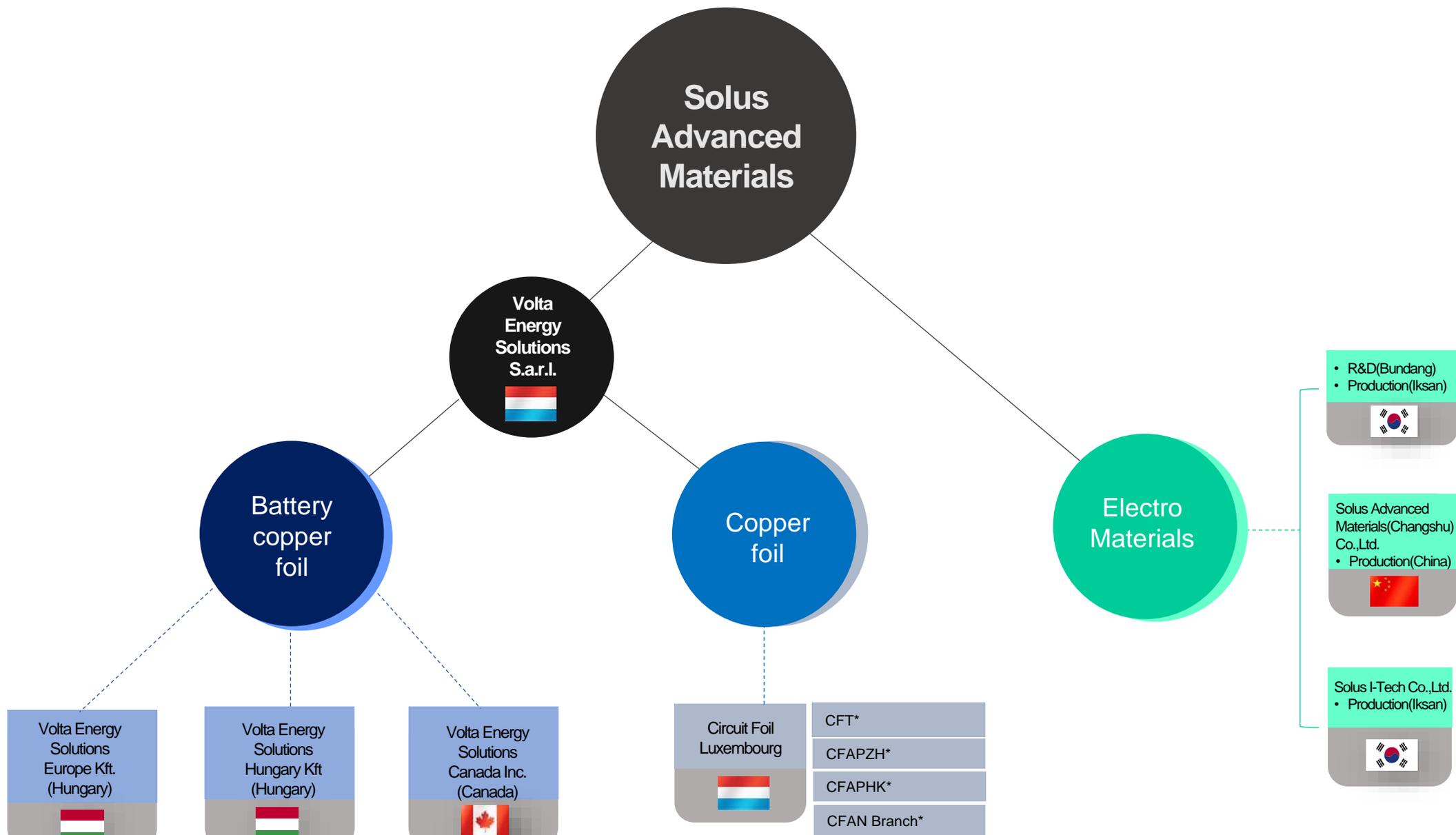
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Vision

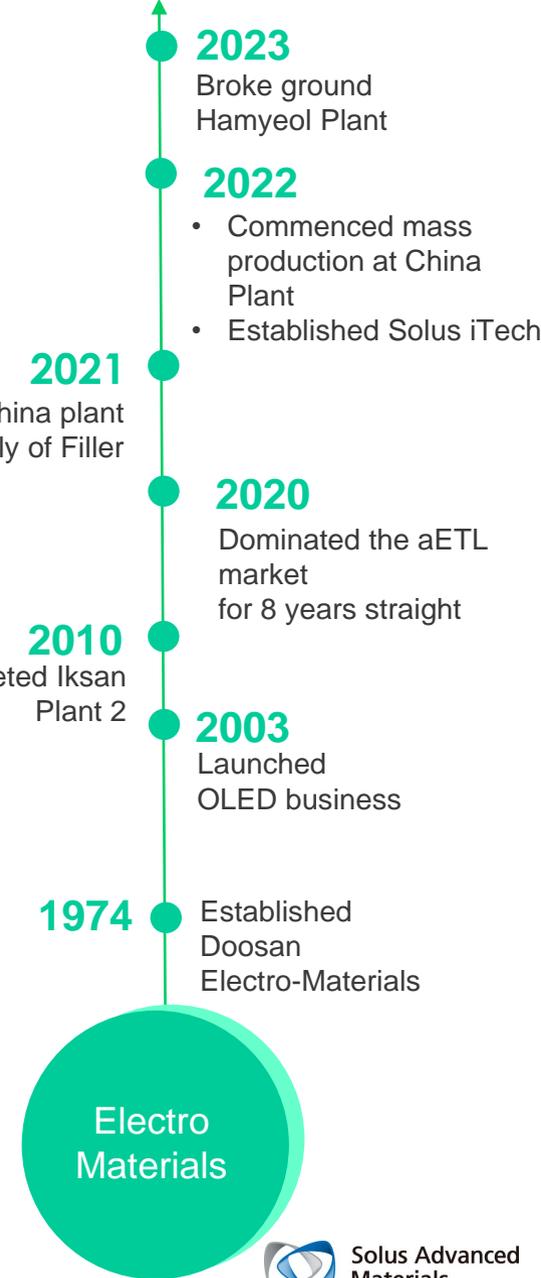
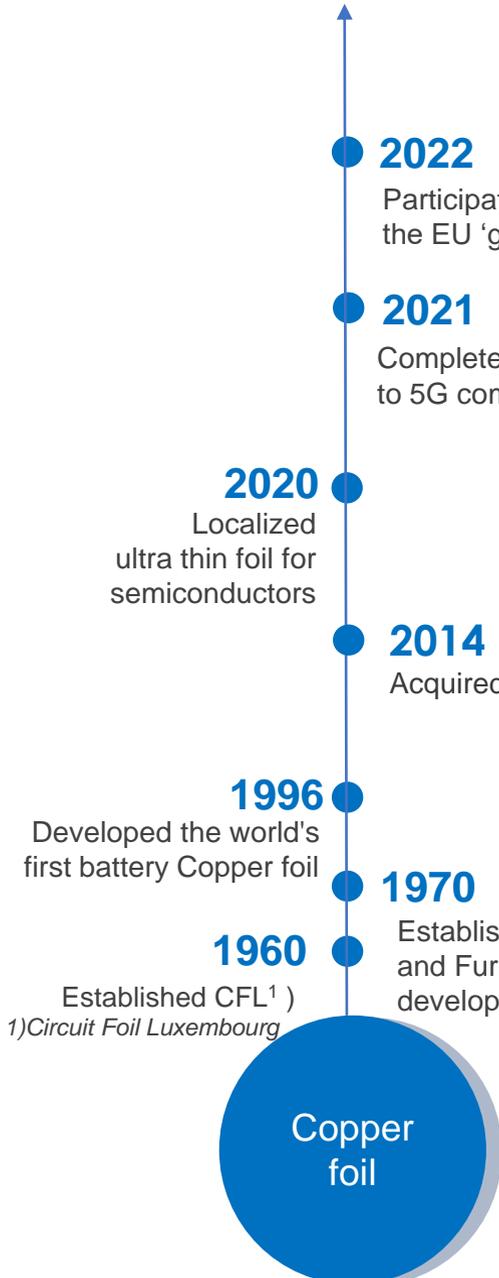
No.1 Material Solutions Partner

We at Solus Advanced Materials aim to be a global leader that provides customers with advanced materials and innovative solutions based on our excellent technological prowess that creates future value





* CFT(Circuit Foil Trading Inc.)
 * CFAPZH(Circuit Foil Asia Pacific Zhangjiagang)
 * CFAPHK(Circuit Foil Asia Pacific Hong Kong)
 * CFAN (Circuit Foil d' Amérique du Nord)



Business Review

Design the future, Spark the growth

2022 Sales
418.3 billion won
*Excluding Bio business sales

Battery Copper Foil Business Sales

112.7 billion won

Copper Foil Business Sales

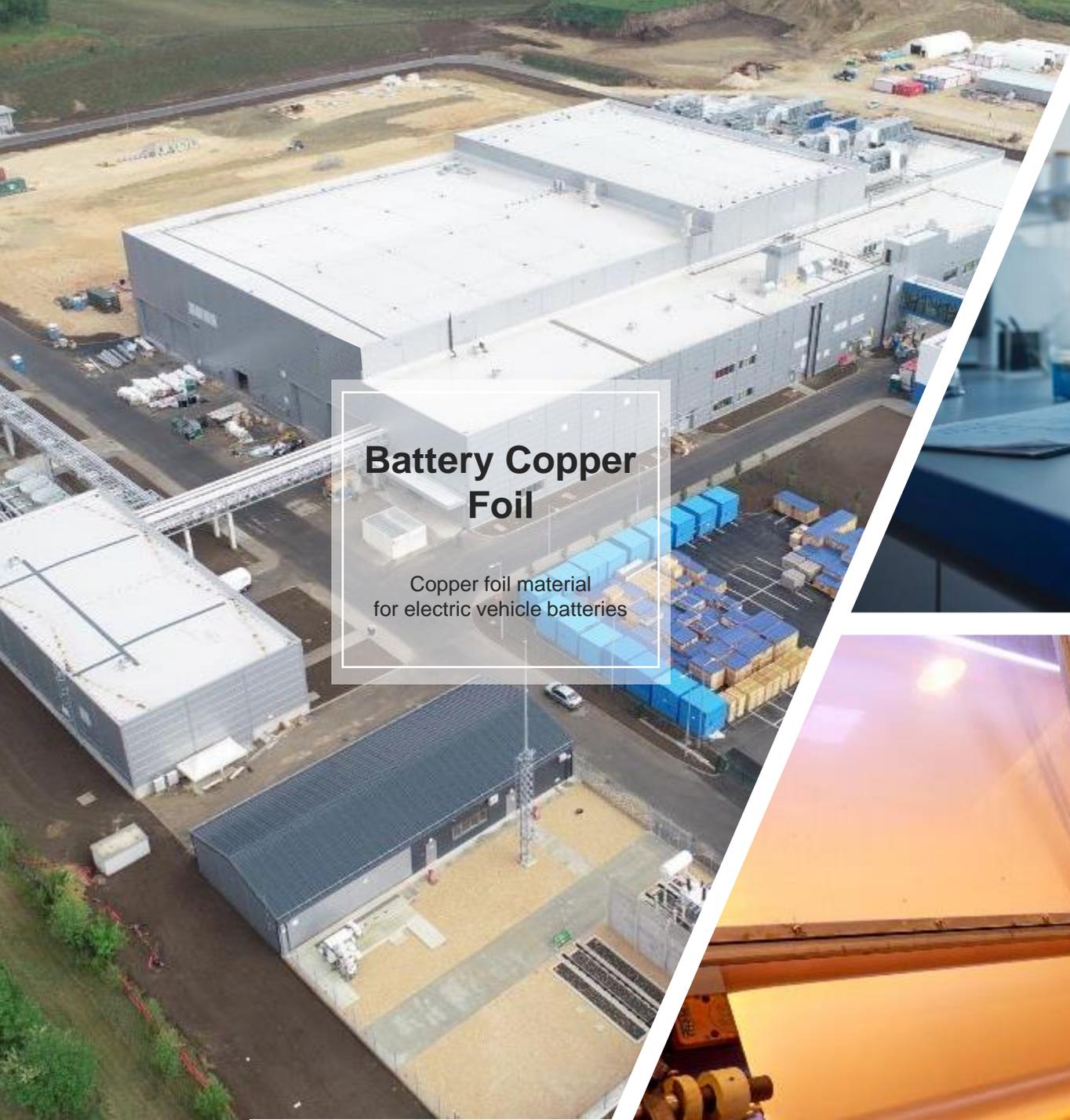
180.5 billion won

Electronic Materials Business Sales

125.1 billion won

Listed on KOSPI in 2019.10

Asset : 1,461 billion won (as of 2022)



Battery Copper Foil

Copper foil material for electric vehicle batteries



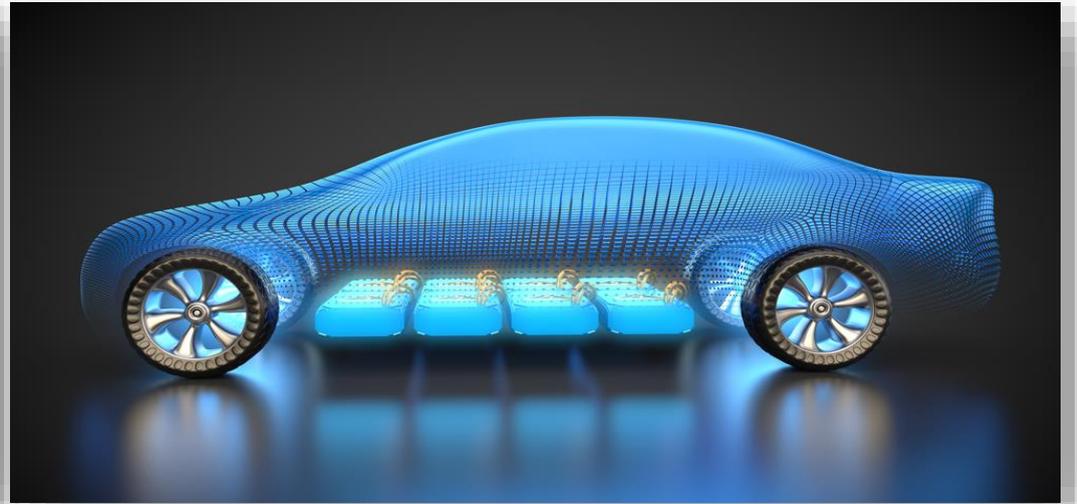
Electronic Materials

Display materials for TVs·Smart phones·XR· Vehicles etc.



Copper Foil

Copper foil materials for semiconductors and electronics products etc.



Battery copper foil for electric vehicle batteries

Battery copper foil is an extremely thin copper foil whose thickness has been reduced to less than one-twentieth the thickness of human hair by electroplating after dissolving copper and is used in electric vehicle batteries

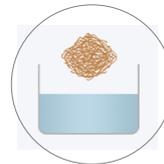
Battery copper foil serves as a negative electrode collector for electric vehicle batteries, is the path of current flow, and releases heat generated from the battery to the outside

Solus Advanced Materials provides high-strength/high-elongation battery copper foil to improve the energy density and mileage of electric vehicle batteries

The competitiveness of Solus advanced materials

- Development and mass production of the world's first battery copper foil
- The world's leading 'thin battery copper foil' manufacturing technology
- Competitive edge in delivery, with battery copper foil production bases in Europe and North America
- Supplying battery copper foil to many domestic-foreign battery manufacturers and EV

Production Process



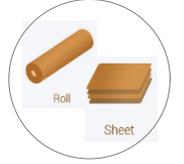
① Dissolving high-purity copper materials



② Electrolytic Plating

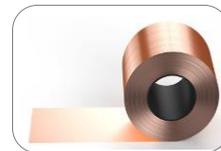


③ Slitting & Sheeting



④ Inspection & Shipping

Battery Construction Process for Electric Vehicles



① Materials (battery copper foil)



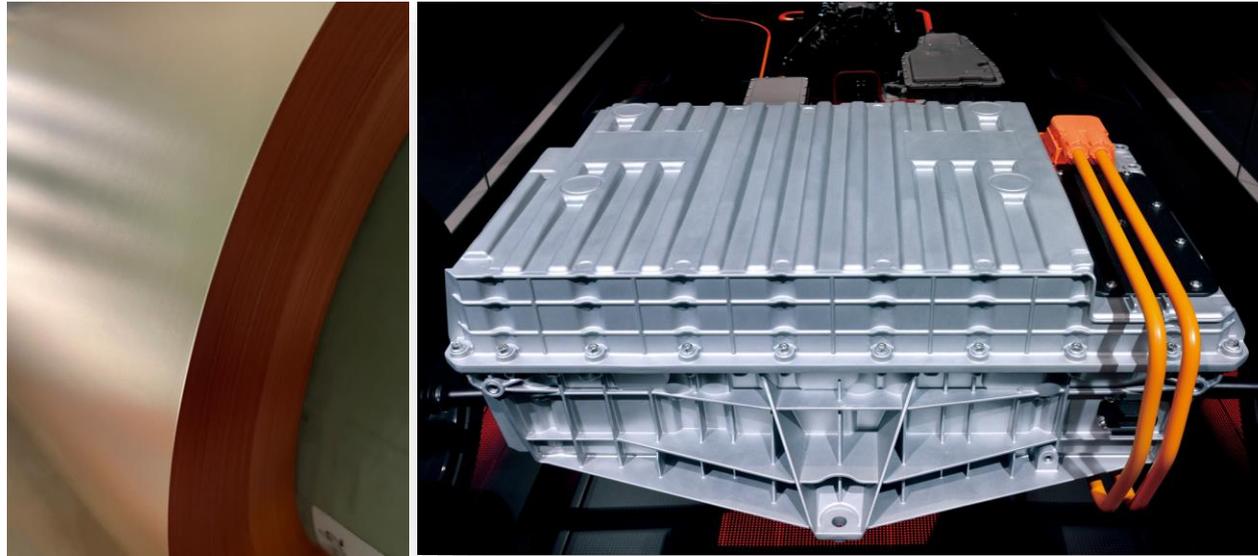
② Battery copper foil + Graphite = Cathode



③ Battery Cell -> Module -> Pack



④ Battery Pack (Mounted on electric vehicles)



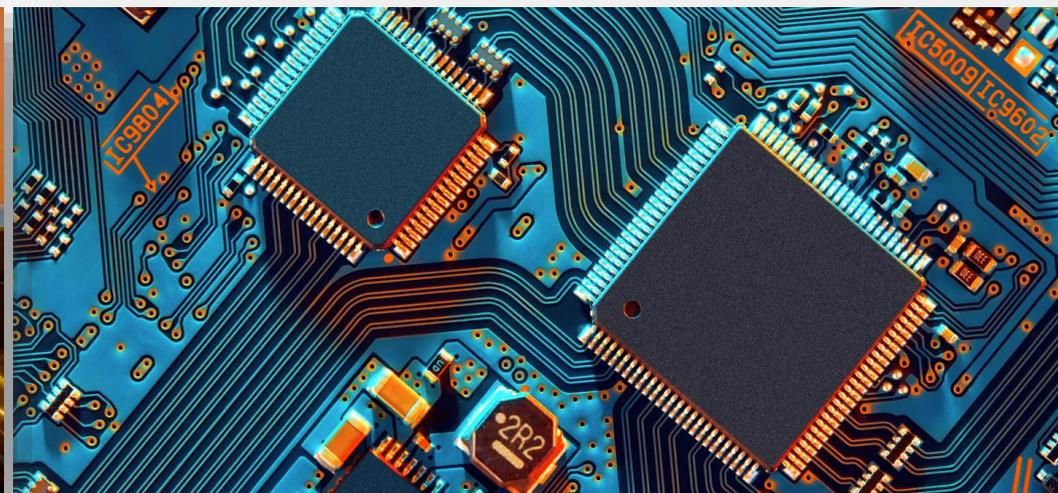
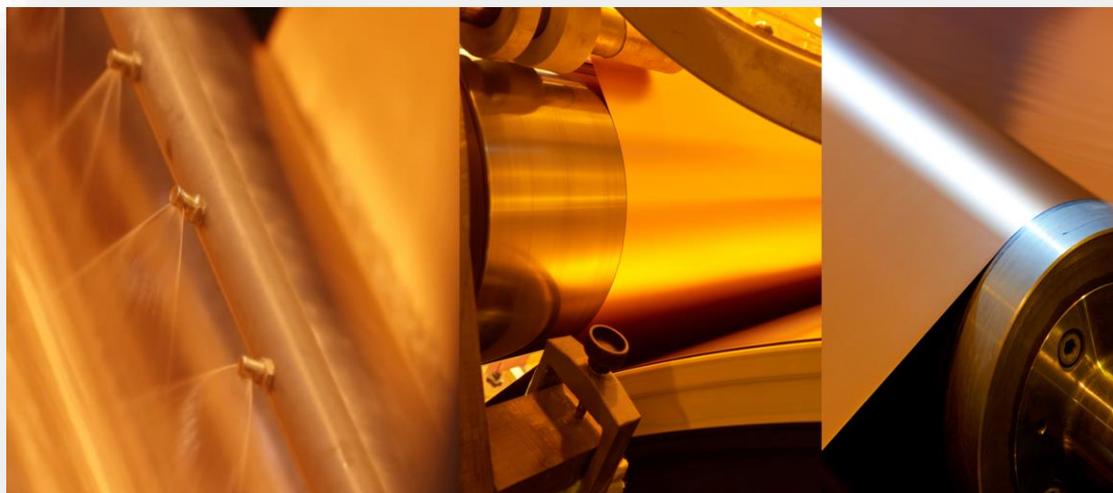
High-end battery copper foil mass production technology that enables improvements in the mileage of electric vehicles and high density and lightness of batteries

Standard battery copper foil
(BF-PLSP)
Cylindrical/Prismatic/Pouch type
6~8 μ m

High-elongation
battery copper foil
(SR-PLSP)
Prismatic/Pouch type
6~8 μ m

High-strength battery foil
(HTS-PLSP)
Pouch type
6~8 μ m

- Securing mass production technology for 6 μ m thin battery copper foil. Can wind more than 30 km.
- Enhancing yield by improving machining in battery manufacturing with high-strength battery copper foil before heat treatment
- Minimizing deformation during the charging/discharging of batteries by maintaining its high-strength properties even after heat treatment
- Improving battery productivity and life/stability with highly elongated battery copper foil



High-end copper foil materialized with advanced original technology

Copper foil is made micrometers thin (1/100 million meters) through electroplating by dissolving copper. As the uniformity of the surface is very important, advanced process control techniques are required.

Solus Advanced Materials has the only copper foil production base in Europe and is recognized for its competitiveness in the global market thanks to its long manufacturing experience and the know-how it has accumulated over 60 years

Copper foils made by Solus Advanced Materials are used in a wide range of fields, including semiconductors, telecommunication equipment, smartphones, smart cards, autonomous vehicles, and aircraft

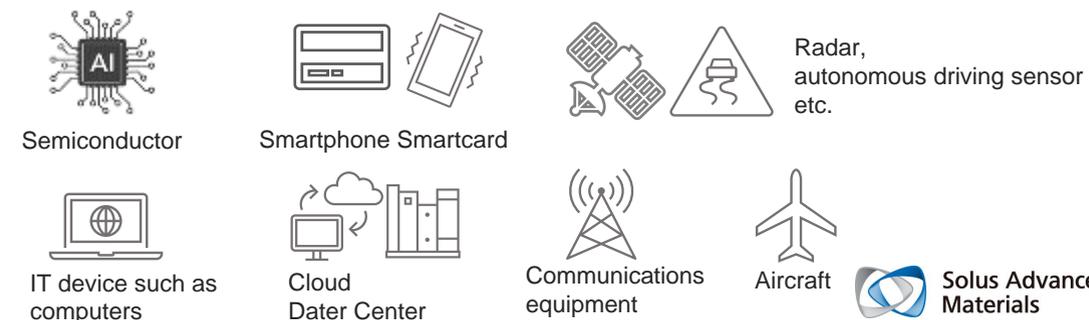
Solus Advanced Materials' Unique Competitive Edge in Copper Foil

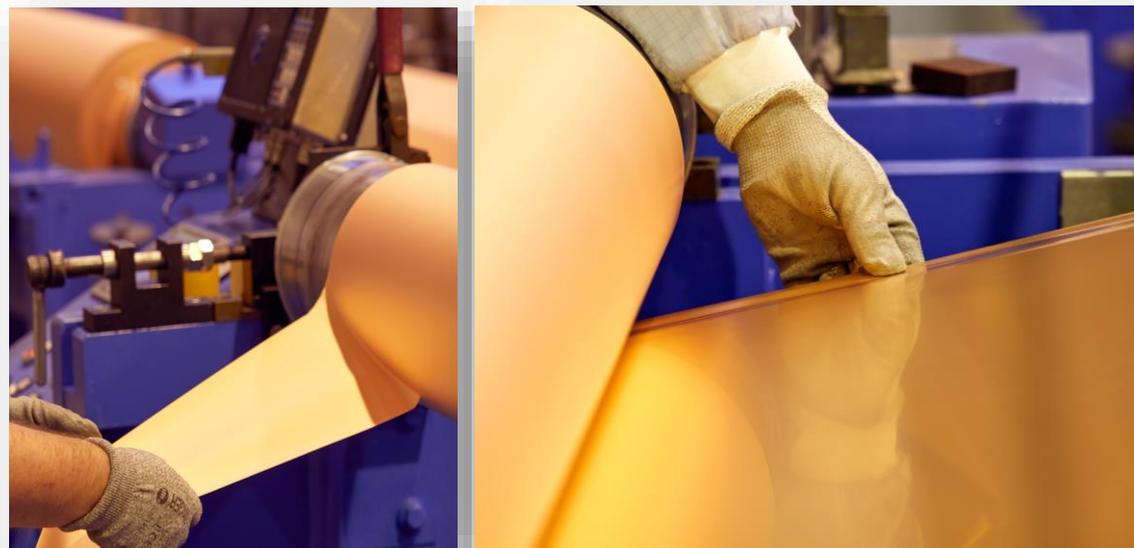
- Securing technological competitiveness with more than 60 years of manufacturing experience and know-how
- A wide range of products, from 1.5 μm ultra-thin to 200 μm copper foil
- Copper foil manufacturing for the semiconductors used in high-performance AI
- No. 1 market share in special copper foil materials for telecommunications

Production Process



Purpose of use





Providing customized solutions with various copper foils ranging from 1.5 μm to 200 μm

1.5 μm ultra-thin copper foil mass production technology

Copper foil suitable for microcirculation, high density, high integration, and high multi-layering of PCB

Uniform illuminance (roughness) manufacturing technology

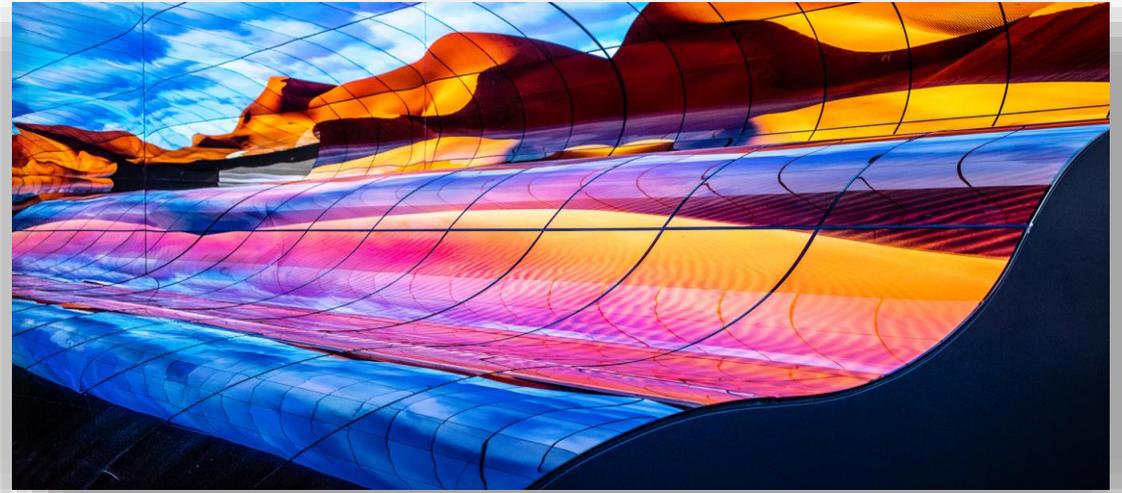
Quality competitiveness required to maintain a constant surface uniformity

Copper foil technology for communication with minimal signal loss

Minimizing signal loss through less than 1.0 μm (based on Rz JIS) 'illuminance formation technology'

Special surface treatment technology for high strength/high elongation copper foil manufacturing

High strength and high elongation rate copper foil manufacturing technology and special surface treatment technology to prevent damage from the external environment



Leading the OLED Display Revolution through Material Technology Innovation

Organic Light Emitting Diode(OLED) is a self-luminous display composed of organic compounds that emits light on its own by electrical stimulation

It is thin and light, and has a very wide range of applications that include transparent displays, vehicle display IT, and many different devices due to its free form of implementation

Through continuous research and development, Solus Advanced Materials is leading the global display material market by developing its own OLED materials, Quantum Dot(QD) materials, and new functional materials

Solus Advanced Materials' Competitive Edge in Electronic Materials

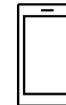
- Various technologies and portfolios spanning all areas of light emitting · non-emitting
- Numerous 'organic material patents' with high efficiency·low voltage·longevity features
- Numerous 'future technology patents' such as new functional polymer materials, quantum dot(QD), etc.
- Development and supply of customized specific materials through joint development and collaboration

OLED Panel Application Device

The OLED materials made by Solus Advanced Materials are installed in TVs, smartphones including foldables, IT devices such as tablets and laptops, AR/VR wearable devices for the growing XR market and automotive display panels, and the scope of application is gradually expanding.



TV



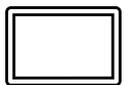
Smartphones such as foldables



Vehicle display



Laptop



Tablet

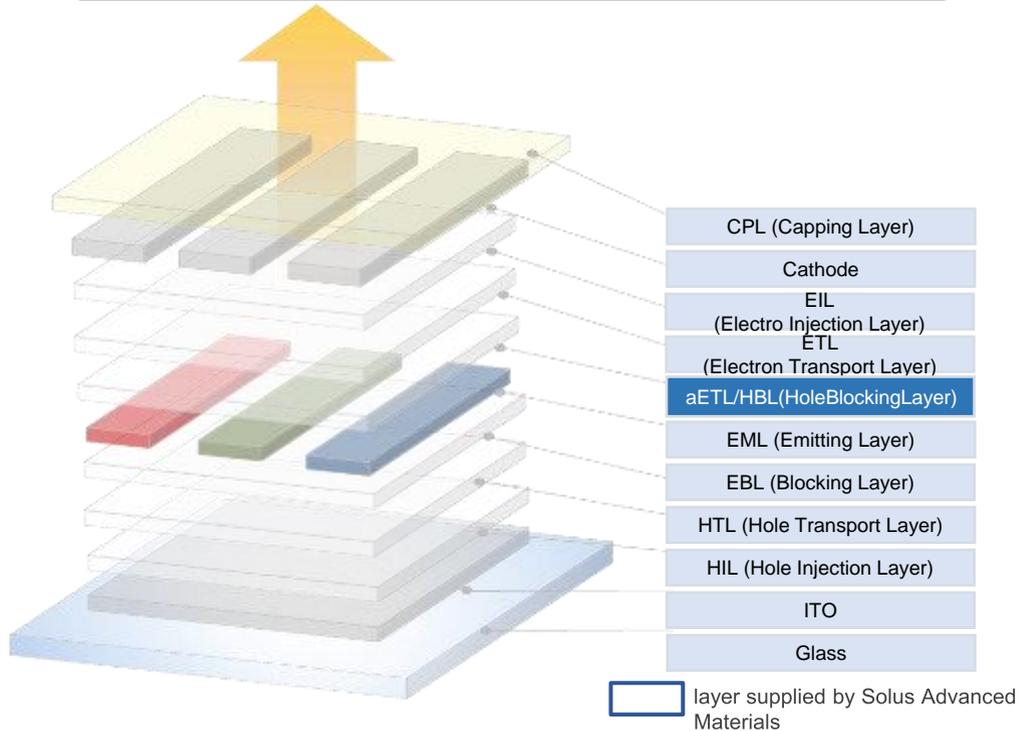


XR (AR·VR) device



Wearable devices such as watches

Business Field seen through OLED Layer Structure



Core Development Field: EML

- High efficiency, long-lived green phosphorescence P/N host
- Long lifetime deuterated fluorescence blue host
- High T1 blue phosphorescence host

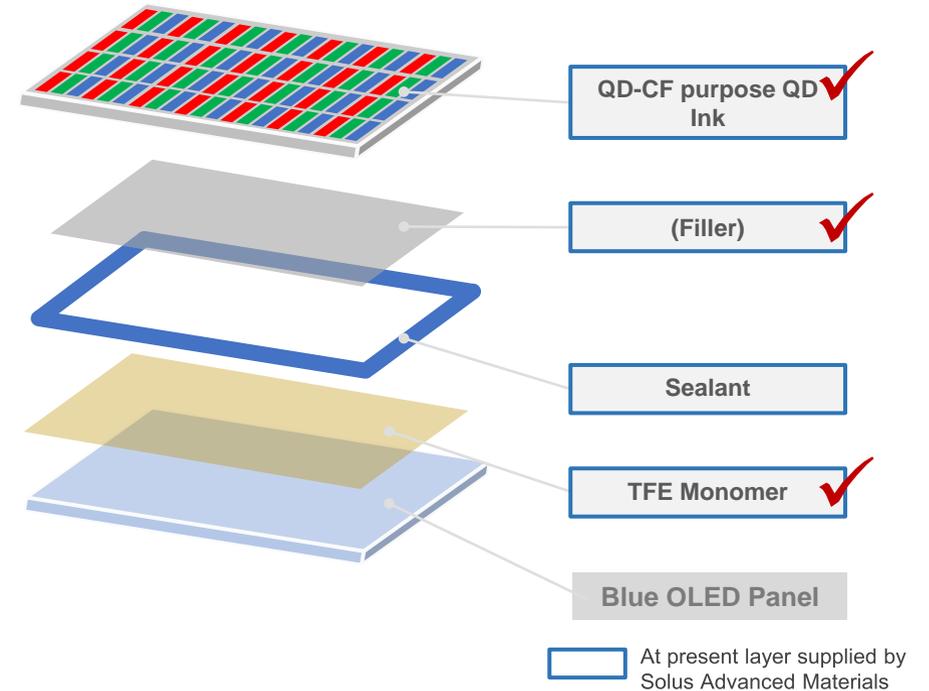
Core Business Field: aETL/HBL

- Core technical element to maximize OLED luminescence efficiency
- 30% increase in blue brightness and vivid color realization
- Increase lifespan of OLED panel

Business Portfolio Expansion

- Enter OLED organic material and encapsulation market for business portfolio expansion
- Develop Quantum Dot(QD) ink to secure future growth engine

Non-light emission material business Field seen through QD-OLED Layer Structure



Direction of key project: Filler

- Superb refraction rate for maximum light emission efficiency

Direction of key development: : QD Ink

- Top level optical conversion efficiency and low viscosity ink manufacturing technologies
- High heat resistivity quantum dot thin layer manufacturing technology
- 30nm or less FWHM implementation and process stability improvement
- 25cps or less low viscosity QD ink manufacturing technology

Direction of key development: Low dielectric TFE

- Low dielectric characteristics assigned to improve the touch sensitivity.
- Provide highly functional materials responding to changes in panel structures

Global electric vehicle market to grow to 3,500 trillion won by 2030, the era of electric vehicles

Evolving ICT industries such as AI·6G· Data centers

Increasing demand for IT devices such as TVs, smartphones, AR·VR

1.

Future Growth Business



Development of the world's first battery copper foil; only battery copper foil production plant in Europe; first Korea battery foil production plant in North America

No. 1 market share in high-end copper foil materials with applications such as semiconductors

communications equipment, and data centers
Monopoly in the aETL market with patented core materials of OLED display

2.

Unique position in the market with Differentiated Technology



Investment in expanding overseas production bases according to demand for global electric vehicles

Securing a high-tech edge, highly competitive products and high value-added products

Tailored expansion of global trends with the diversification of display material portfolio

3.

Securing Global Leadership



Domestic-foreign top-tier battery manufacturer

Actively responding to local demand in North America by implementing USMCA

Supplying and collaborating with the world's Top display panel companies

4.

Securing Leading Suppliers for Companies





Solus Advanced Materials, Expanding To The World

R&D, production, and sales in 7 countries around the world
Solus Advanced Materials is where the customers are

- Holding global battery production bases in the U.S. and Europe, the battlegrounds for electric vehicles
- Resolving quality risks involved in long-distance transportation with same-day delivery, competitive edge in delivery
- Real-time support for major customers

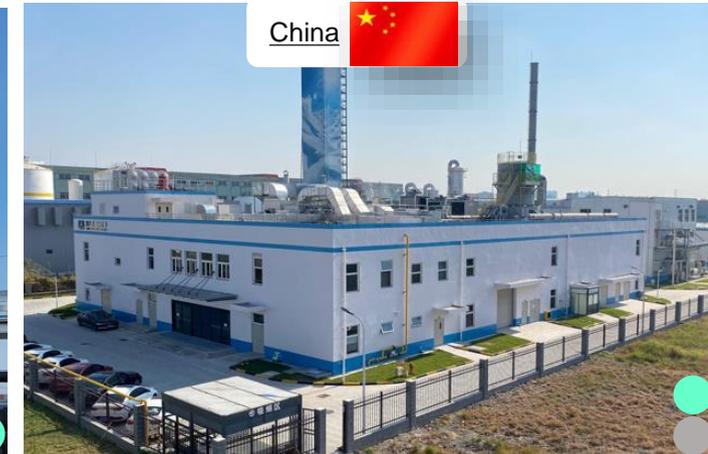
● R&D ● Production ● Sales

Europe

North America



Asia



Solus Advanced Materials pursues sustainable management for a better future

**Sustainable Environment**

- Realizing carbon neutrality
- Participating in the CFL-'greenSPEED'

**Safe and Healthy working environment**

- Establishing EHS management system
- Minimizing pollutant emissions
- Promoting disaster preventive activities
- Regular safety education & training for executives and employees

**Supply Chain Management**

- Join international efforts to ban the use of conflict minerals
- Checking all matters of concern in accordance with international standards, and preparing and complying with conflict minerals management plans of the company, customers, and partners

**Ethical Management**

- Ethical management principles: Honesty and transparency; open mind and respect; and responsibility
- Awareness of responsibility to executives and employees, shareholders, investors, customers, and society

**Transparent and Fair Management Practice**

- Organizing the board of directors and audit committees

**CSR**

- 'Attention to and help for the socially marginalized'
- Supporting drinking water facilities and hygiene kits for schools in Vietnam
- Providing MySkin Solus products to Chung-Ang University Hospital

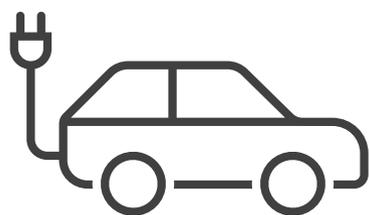
***greenSPEED**

An eco-friendly battery production process project supported by the European Union (EU) to reduce energy consumption and carbon footprint





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Thank You

www.solusadvancedmaterials.com

