

**Solus Advanced Materials**  
- Introduction to the Company



**NO.1 MATERIAL  
SOLUTIONS PARTNER**



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Chapter. 1

# Overview

Company Profile

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# Company Profile

**Solus Advanced Materials has a range of growth engines, in the fields of electric vehicles, ICTs, and next-generation displays.**

Solus Advanced Materials (formerly Doosan Solus), which was established on October 1, 2019 through an equity spinoff from Doosan Co. Ltd. to specialize in the battery copper foil, copper foil and electronic materials businesses, is a world-leading material solutions partner that has developed the world's first copper foil for electric vehicle batteries, and is an exclusive supplier of essential materials for OLED displays.


Solus Advanced Materials supplies customized products to customers around the world in the fields of electric vehicles, semiconductors, artificial intelligence (AI) and ICT based on its unique technologies and manufacturing know-how.

Even in the field of OLED displays, it has unique technologies for various display layers, including emitting materials HBL (Hole Blocking Layers), and is growing into a core display materials company through constant R&D and investment.

## Vision

Solus Advanced Materials aims to become a global leader that provides advanced materials and innovative solutions based on its technological capabilities that create future value.



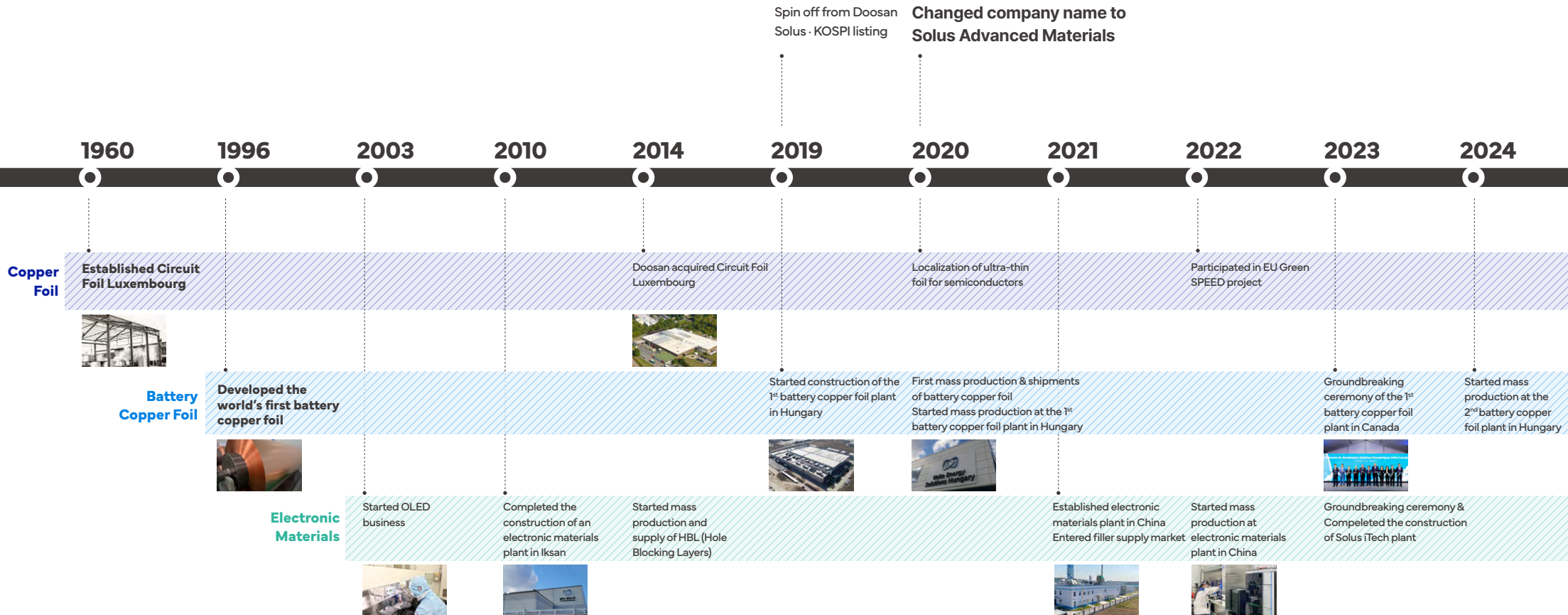
 <b>Solus Advanced Materials</b>	<b>Company Name</b>	Solus Advanced Materials
	<b>Date Established</b>	Oct. 1, 2019
	<b>CEO</b>	Chin Daeje · Keunman Kwak
	<b>Number of Employees</b>	1,225 employees (2023)
	<b>Sales</b>	429.4 billion won (2023)
	<b>Total Assets</b>	1,706.7 billion won (2023)
	<b>Business Areas</b>	Battery copper foil, copper foil, electronic materials



# History

The path that Solus Advanced Materials has taken has involved constant growth and new developments.

The history of Solus Advanced Materials dates back to 1960, with the founding of 'Circuit Foil Luxembourg (CFL)', the first copper foil manufacturer in Europe. Based on the manufacturing skills and original technologies it had strengthened over many years, the company developed battery copper foil, the world's first copper foil for electric vehicles, in 1996, and is currently active in promising industries such as semiconductors, artificial intelligence (AI) and ICT as well as electric vehicles.

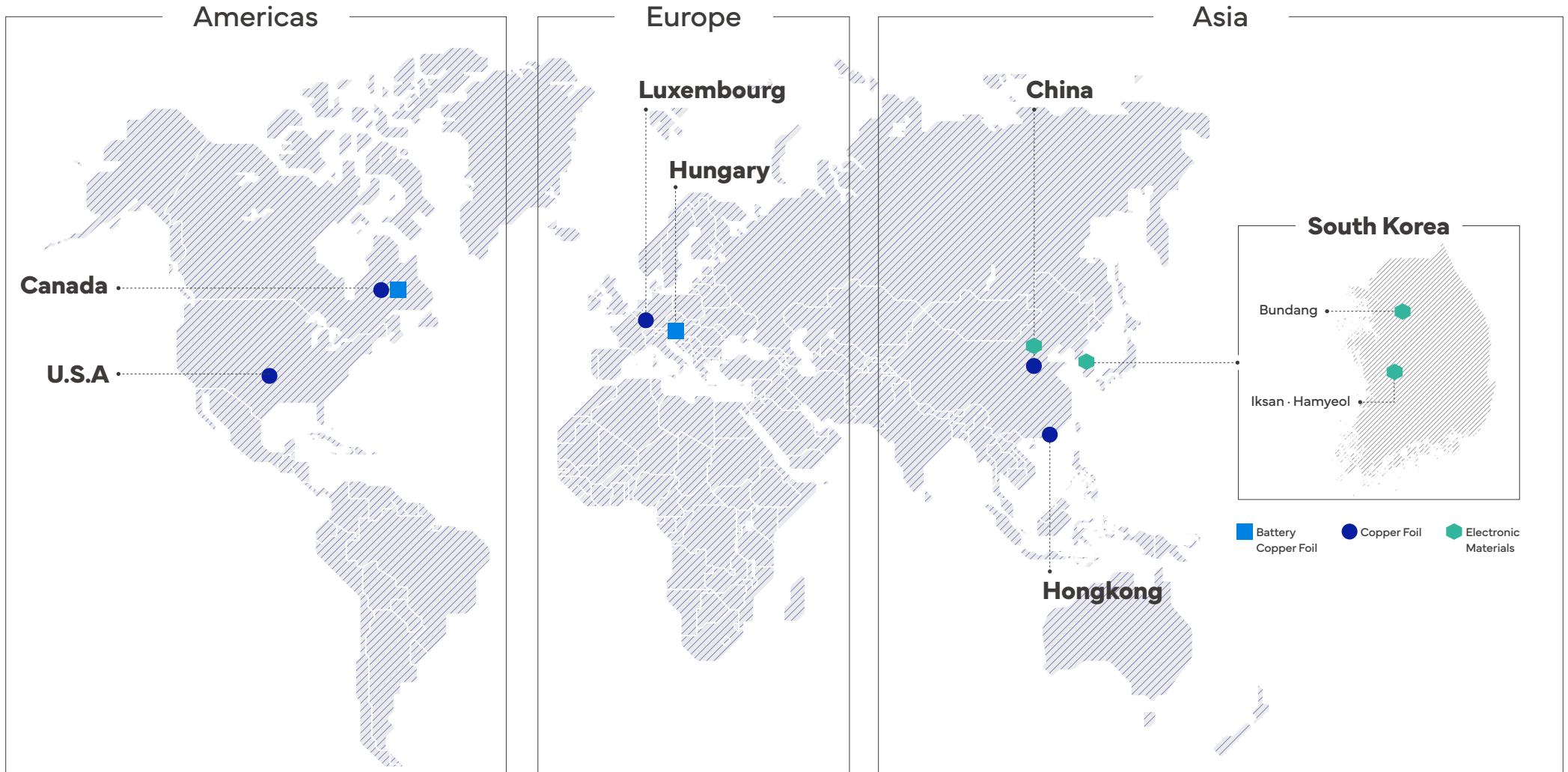


# Global Network

**Solus Advanced Materials is everywhere its customers are.**

Solus Advanced Materials has R&D, production and sales bases in 7 countries around the world, including Hungary, Luxembourg, Canada, the United States, China, Hong Kong and South Korea.

By owning battery copper foil production bases in Europe and North America, the battlegrounds for electric vehicles, the company has a competitive edge when it comes to same-day inland transportation, enabling truly responsive customer support.



# Facilities

Solus Advanced Materials has battery copper foil and copper foil production bases in Hungary, Luxembourg, and Canada.

The company operates production plants for electronic materials in Korea (Iksan and Hamyeol) and China (Changshu Province).

## Battery Copper Foil - Copper Foil

Solus Advanced Materials' battery copper foil production plants are located in Tatabánya, Hungary, and Quebec, Canada, and their combined production capacity of 163,000 tons enables the company to respond to the growing demand for batteries in the upcoming electric vehicle era.

The copper foil production plant in Luxembourg is preparing to expand its supply in response to the increased demand for high-end copper foils for AI semiconductors, cloud computing and data centers.



Copper Foil

**Circuit Foil Luxembourg**  
Luxembourg plant 15,000 tons



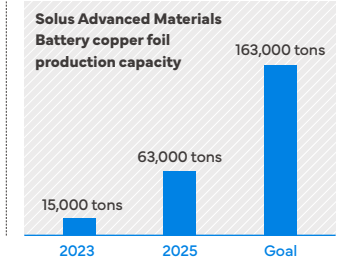
Battery Copper Foil

**Volta Energy Solutions Hungary**  
Hungary 1<sup>st</sup> plant 15,000 tons  
Hungary 2<sup>nd</sup> plant 23,000 tons  
Hungary 3<sup>rd</sup> plant 62,000 tons (planned)



Battery Copper Foil

**Volta Energy Solutions Canada**  
Canada 1<sup>st</sup> plant 25,000 tons  
Canada 2<sup>nd</sup> plant 38,000 tons (planned)



## Electronic Materials

For electronic materials, the company operates two production plants in Iksan, Jeollabuk-do.

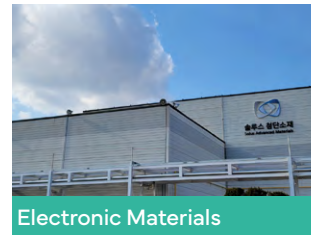
The company also has production facilities in Changshu Province (China) to enable it to more effectively provide customer service in China.

The production facility of Solus iTech, a subsidiary established by Solus Advanced Materials for the OLED non-light-emitting material business, is also located in Hamyeol, Jeollabuk-do.



Electronic Materials

**Solus Advanced Materials**  
Bundang Head office-R&D



Electronic Materials

**Solus Advanced Materials**  
Iksan 1<sup>st</sup> plant



Electronic Materials

**Solus iTech**  
Hamyeol 1<sup>st</sup> plant



Electronic Materials

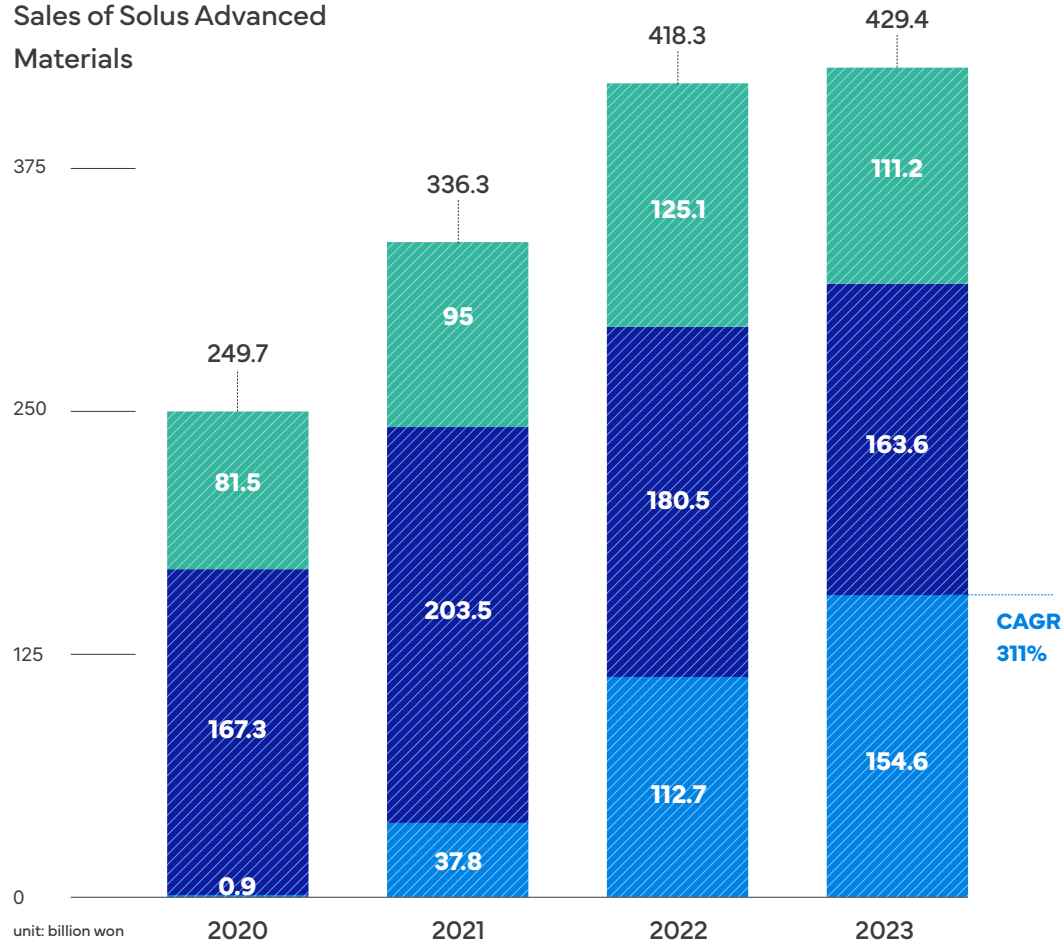
**Solus Advanced Materials Changshu**  
China Changshu Province 1<sup>st</sup> plant

# Financial Highlights

Since its establishment, Solus Advanced Materials has continued to grow in sales.

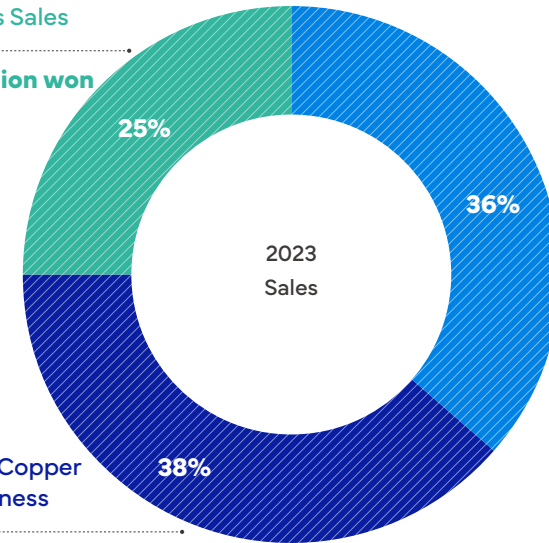
Sales of battery copper foil, which is the company's main business and a growing industry attracting attention, are growing at an annual average rate of 311%.

Sales of Solus Advanced Materials



Electronic Materials Business Sales

111.2 billion won



Sales of Battery Copper Foil Business

154.6 billion won

Sales of Copper Foil Business

163.6 billion won

\*Excluding the sales of discontinued business (bio)



# Business

Business Areas

-

Battery Copper Foil

Copper Foil

Electronic Materials

## Business Areas

Solus Advanced Materials has market-leading technological competitiveness in the areas of electric vehicle batteries, semiconductors, and display materials. Various high-tech materials developed by Solus Advanced Materials are used in a number of future industries, including electric vehicles, artificial intelligence (AI), cloud, data centers, aerospace and IT devices.

### Battery Copper Foil

The battery copper foil of Solus Advanced Materials is the fastest and best quality product for electric vehicle battery customers in Europe and North America.

- Electric vehicle battery

### Copper Foil

From semiconductors to aircraft and spacecraft, Solus Advanced Materials' copper foil is used wherever conductors are required.

- Semiconductor
- Smartphone, Smart card
- Radar equipment, Autonomous vehicle radar sensors, etc.
- Computer, Laptop, Tablet PC, etc.
- Cloud, Data center
- Communication equipment
- Aircraft/Spacecraft

### Electronic Materials

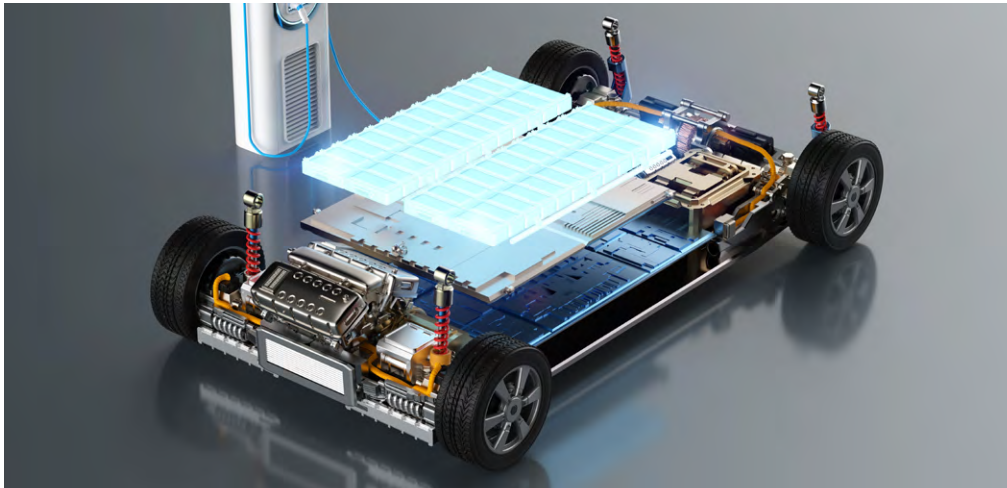
From the world in your hand to moving mobility, Solus Advanced Materials' electronic materials can be found wherever OLED display is applied.

- Smartphone
- TV
- Vehicle display
- Laptop
- Tablet
- XR(AR-VR) devices
- Wearable devices such as smart watches



# Battery Copper Foil

Solus Advanced Materials has battery copper foil manufacturing source technology.



Developed the world's first battery copper foil ———— **1996**

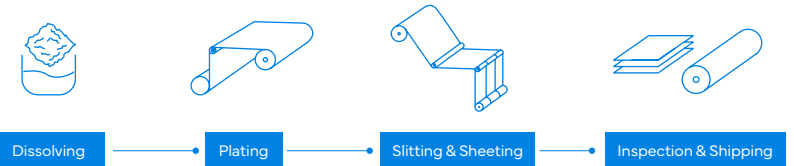
In 1996, Circuit Foil Luxembourg, a subsidiary of Solus Advanced Materials, developed the world's first 'battery copper foil' for electric vehicle batteries.

Solus Advanced Materials has world-leading competitiveness in high-end battery foil technology, with its manufacturing technology for 4.5µm thin battery copper foil, high-strength battery copper foil up to 70 kgf/µm, and high-elongation battery copper foil up to a 15% stretch ratio. Based on such technologies, Volta Energy Solutions, a European integrated corporation, manufactures high-quality battery copper foils that meet global standards and quickly supplies them to customers in Europe and North America.

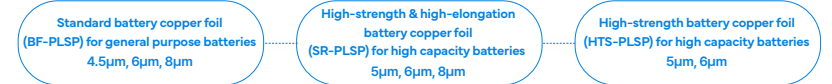
Solus Advanced Materials will lead the electric vehicle era by realizing high density and lightness of batteries to improve the mileage of electric vehicles through its world-leading battery copper foil manufacturing technology.

## Battery Copper Foil

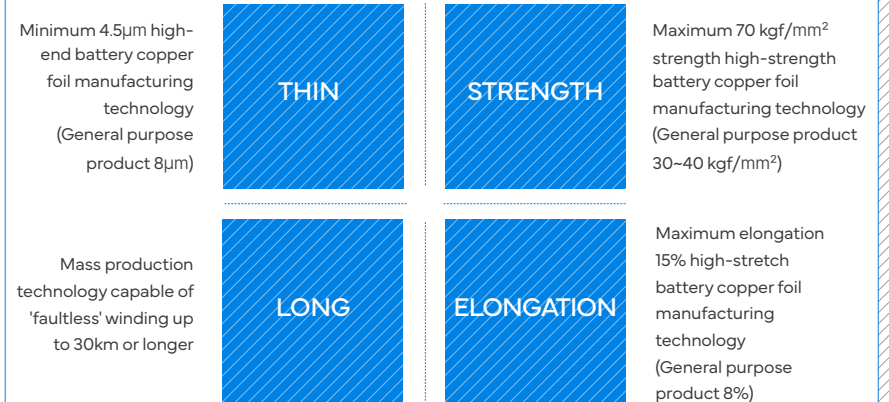
Battery copper foil is a thin copper foil that constitutes anode materials for an electric vehicle battery. It serves as a path of current flow, and releases heat generated from the battery to the outside.



## Product



## Strength



# Copper Foil

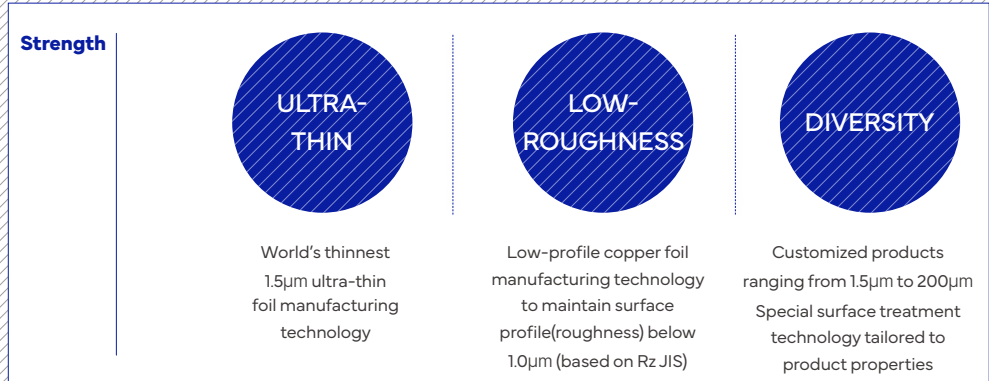
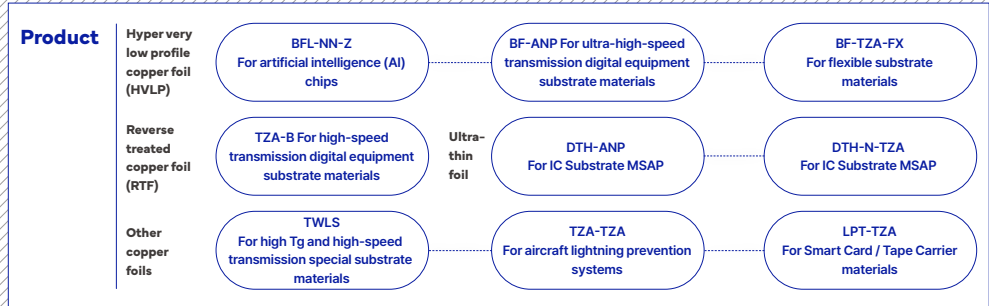
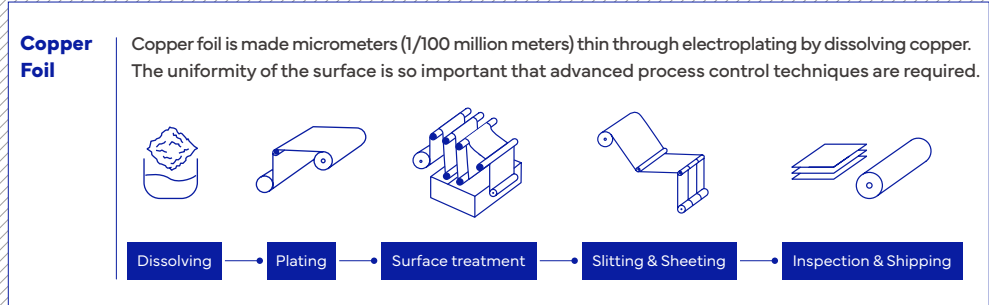
Solus Advanced Materials manufactures the thinnest copper foil in the world based on its 60 years of technical know-how.



Circuit Foil Luxembourg, established in 1960 as the first copper foil company in Europe, has the world's leading high-end copper foil manufacturing technology. The company manufactures customized copper foils optimized for the characteristics of products in a range of industries, from artificial intelligence (AI) semiconductors to smartphones, autonomous vehicles, communications equipment and aircraft and spacecraft.

Solus Advanced Materials has manufacturing technology for the world's thinnest 1.5µm ultra-thin foil. Ultra-thin foil is an essential material for ultra fine-pattern, high integration, and high multilayering of printed circuit board (PCB).

Solus Advanced Materials developed the first ultra-thin foil in Korea in 2020, entering a market that was dominated by Japanese companies, and proving its technological skills globally. Recently, Solus Advanced Materials' copper foil has been used in the field of artificial intelligence (AI), a future growth industry, and the company has been recognized by the big global tech companies for its insurmountable technology gap.



# Electronic Materials

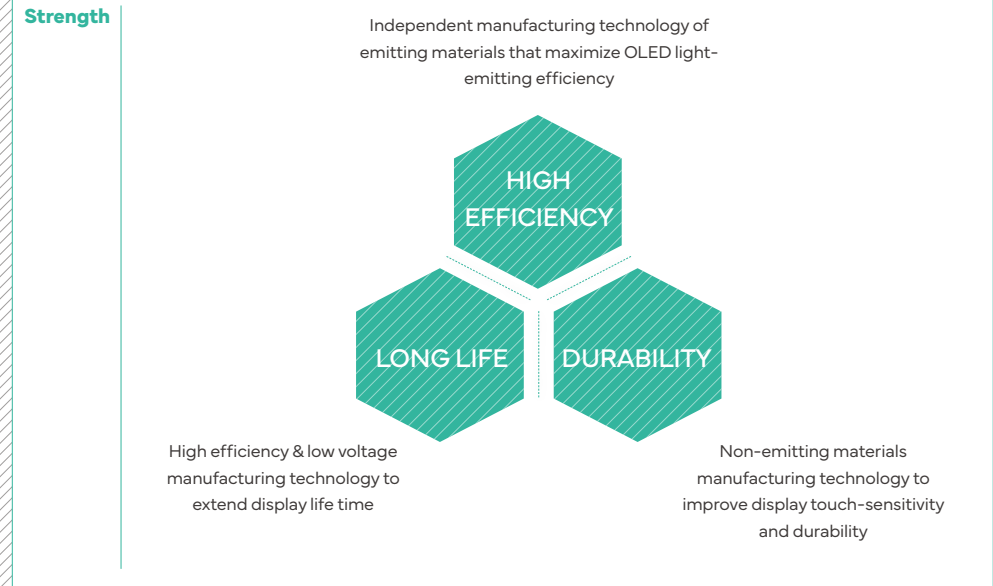
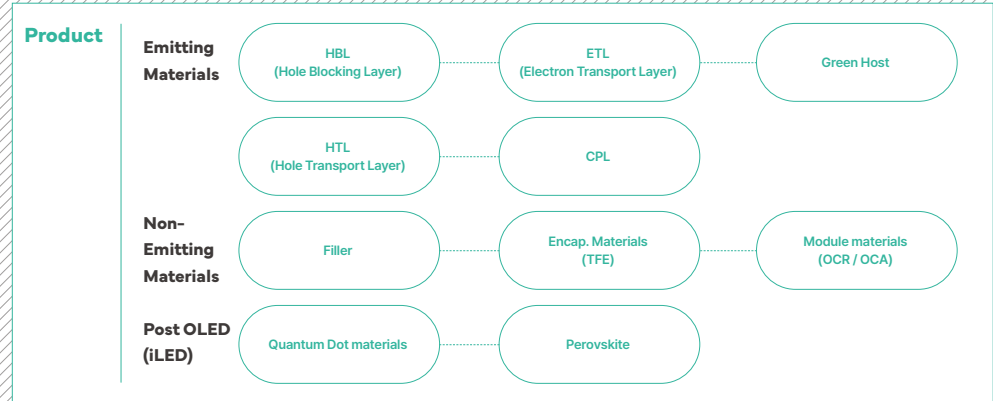
Solus Advanced Materials is the exclusive supplier of HBL, a key display material, thanks to its unrivaled technology.



Solus Advanced Materials supplies the deposited emitting materials used in organic light-emitting diode (OLED) displays, and continues to expand its business with non-emitting materials and next-generation display (iLED) technology.

Notably, Solus Advanced Materials has been exclusively supplying HBL (Hole Blocking Layer), one of the OLED emitting materials, to display manufacturers around the world for 10 years since 2014. With approximately 830 HBL patent applications, the company has the most advanced technology in the world.

In addition, the company is leading the development of display materials by expanding its product portfolio to the areas of non-emitting materials and next-generation display (iLED). The application of OLED has been expanding to a variety of areas, including mobile, TV, tablets, AR/VR devices, and vehicle displays. Solus Advanced Materials is taking the lead in developing a range of products based on market diversification and various customer needs to lead the development of the display industry.





# Strength

**Solus Advanced Materials is conducting research and development (R&D) to contribute to the growth and development of the industry and to enhance customer satisfaction through its technological capabilities. The company has core technologies and intellectual property rights in a range of fields to maintain its unrivaled competitiveness.**

-  
Business Competitiveness

R&D

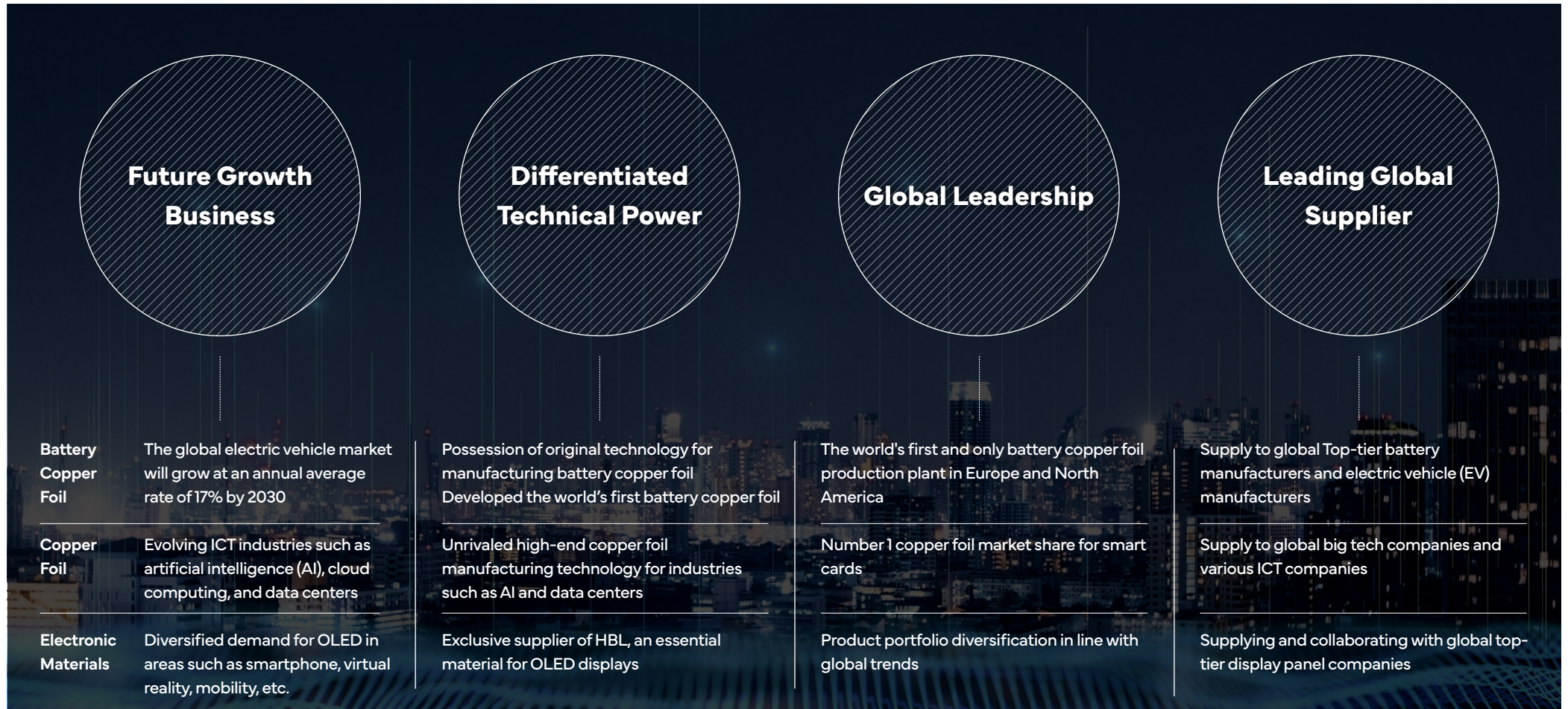


# Business Competitiveness

**Solus Advanced Materials, with the development of promising future industries, has a bright future ahead of it.**

The business area of Solus Advanced Materials covers all future growth businesses: electric vehicles, semiconductors, and displays.

The company has secured global leadership through differentiated technology, and has leading global top-tier companies as its customers.



# R&D Battery Copper Foil Copper Foil

Electric vehicle battery technology is moving toward the improvement of the mileage and battery capacity of electric vehicles and the development of silicon anode materials and all-solid-state batteries. The technology trend at the leading edge of copper foil is evolving toward AI semiconductors, data centers, cloud, and autonomous driving.

Solus Advanced Materials is engaged in the research and development of products that meet front-line technology trends at the R&D centers under Volta Energy Solutions and Circuit Foil Luxembourg.



### Classification

### Field of research

**Battery Copper Foil** Copper foil for lithium-ion batteries



- Reducing the total weight (thickness) of copper foil
- Special treatment to prevent oxidation during storage
- Double treatment of copper foil for silicon anode materials
- Coating and highly conductive materials for all-solid-state batteries

**Copper Foil** Hyper very low profile copper foil (HVLP)



- Reduction of profile (roughness) and improvement of conductivity to reduce signal loss
- Improving chemical/physical bonding strength and possessing various chemical additive technologies
- Best functional performance with zero-defects of Cu foil surface quality

**Reverse treated copper foil (Advanced RTF)**



- Optimization of special treatment to reduce profile and uniformity
- Maintaining optimal chemical bonding performance
- Additives controlling technology for better elongation property

**Copper foil for semiconductor package (PKG)**

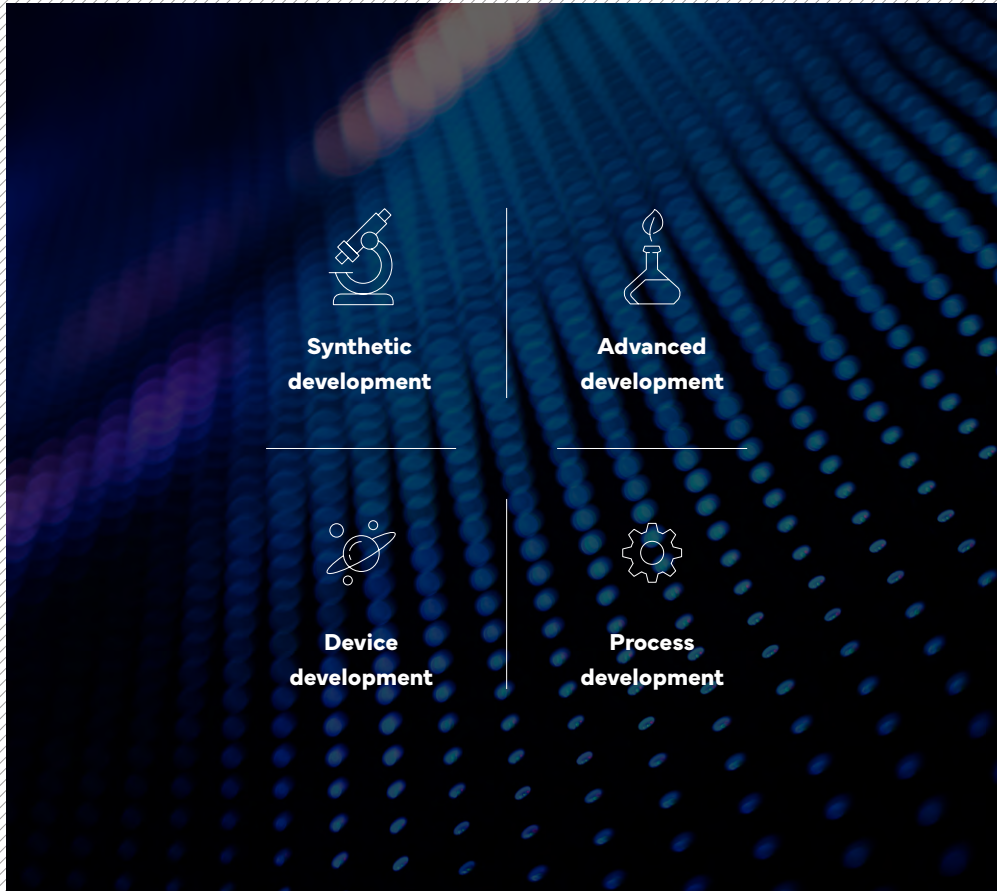


- Optimization of etchability
- Reducing thickness while maintaining low level of porosity
- Reducing the copper profile and developing the chemical treatment technology (passivation, Silane)













# R&D Electronic Materials

Solus Advanced Materials is researching a range of display materials, including HBL. As the OLED industry is expanding its scope of application from mobile phones to tablets and TVs, high-efficiency, longevity, and low-voltage materials are required. The R&D organization of the electronic materials division in Solus Advanced Materials consists of the Research Center and the Manufacturing Technology Center, and is developing customized materials suitable for changing OLED products. 'The Research Center' is developing main products such as emitting materials synthesis, devices, and processes, while 'the Manufacturing Technology Center' is developing advanced technologies such as post-OLED materials, instead of existing business areas.



## Classification

## Field of research

<b>Emitting materials</b>	HBL (Hole Blocking Layer)		<ul style="list-style-type: none"> <li>·HBL low voltage/high efficiency for single stack</li> <li>·HBL high efficiency/longevity for tandem stack</li> <li>·Implementation of customized performance by adjusting electronic injection performance</li> </ul>
	ETL (Electron Transport Layer)		<ul style="list-style-type: none"> <li>·Development of doping (adding a small amount of impurities to change physical properties) and non-doping ETL</li> <li>·Development of /single/mix bidirectional ETL</li> </ul>
	HTL (Hole Transport Layer)		<ul style="list-style-type: none"> <li>·Development of low-refractive HTL to improve optical efficiency</li> </ul>
	Green Host		<ul style="list-style-type: none"> <li>·Low voltage operation, high efficiency, longevity</li> </ul>
	CPL		<ul style="list-style-type: none"> <li>·Developing the mixed concept of high refraction and low refraction</li> </ul>
<b>Non-emitting materials</b>	Filler		<ul style="list-style-type: none"> <li>·Maximization of high refraction (light efficiency)</li> </ul>
	Encap. Materials		<ul style="list-style-type: none"> <li>·Improvement of touch precision</li> </ul>
	Module materials (OCR/OCA)		<ul style="list-style-type: none"> <li>·Tack Free, Low Modulus OCR</li> <li>·Improvement of durability (high elasticity OCR / OCA)</li> </ul>
<b>Post OLED materials</b>	Quantum Dot materials		<ul style="list-style-type: none"> <li>·Optimization of light-emitting characteristics and dispersion</li> <li>·Improving the reliability at high temperature and high humidity</li> </ul>
	Perovskite (Perovskite Quantum Dot)		<ul style="list-style-type: none"> <li>·Pb reduced high-efficient light-emitting materials</li> </ul>



# Sustainability

**Solus Advanced Materials pursues sustainable management for a better future. Since the company was established, Solus Advanced Materials has been practicing principled ESG management. The company will continue to reflect on the value of ESG, and strive to pay the trust and love of its customers and investors forward in the communities in which we operate, in the name of achieving a win-win business.**

Environment

Society

Governance



# Environment

Solus Advanced Materials considers the impact of all of our business activities on the environment.

The company is establishing an EHS management system, minimizing pollutant emissions, and promoting disaster prevention activities.

To achieve carbon neutrality, Circuit Foil Luxembourg participated in the European Union's Green SPEED project in 2022.



## Establishment of EHS management policy

### 1 Operation of EHS management system

Establish and effectively implement the EHS management system to minimize the EHS impact of all activities, products and services in the workplace

### 2 Promotion of continuous EHS improvement

Continue EHS improvement to prevent environmental pollution and reduce risk through considering our activities from an environmental perspective, as well as performing risk assessment, EHS technology development, etc.

### 3 Minimization of pollutant emissions and promotion of disaster prevention activities

Minimize the use of energy and resources, minimize pollutant emissions through process improvement, and develop activities to prevent disasters

### 4 Compliance with laws and regulations

Comply with relevant domestic and international EHS laws and company EHS guidelines

### 5 Open EHS management

Provide regular education and training to all employees in order to comply with the EHS management system, and disclose EHS outcomes to stakeholders to ensure transparent activities and corporate social responsibilities

## Participation in international carbon neutrality project

Official participation of Circuit Foil Luxembourg in 2022 Green SPEED\*



\* Green SPEED

EU-supported eco-friendly battery production process project that reduces carbon dioxide and VOC (Volatile Organic Compounds) emissions across the entire process ranging from material manufacturing to battery pack installation to realize carbon neutrality by presenting production innovation in the electric vehicle battery process to reduce energy consumption and carbon footprint

# Society

Solus Advanced Materials strives to fulfill its corporate social responsibilities.

The company is carrying out social contribution projects where help is needed.

Solus Advanced Materials operates its businesses in compliance with the code of ethics based on honesty, transparency, an open mind, respect, and responsibility, and all laws and regulations.



## Social Contribution



### Improvement of residential environment for vulnerable classes in 2023

- Support for residential and facility environment improvement projects to help the vulnerable at home and abroad through the donation of Korea Habitat.

### Installation of drinking water purification system in Vietnamese elementary and secondary schools in 2022

- In cooperation with Good Neighbors, installation of water tanks, drinking water tanks, pre-filtering systems, reverse osmosis pressure devices and drinking fountains in Yen Mong School (517 students) and Thong Nhat Elementary and Secondary School (533 students) in Hoya Binh Province, Vietnam.

### Donation of cosmetics to medical staff to Chung-Ang University Medical Team in 2020

- Support for functional cosmetics to medical staff who were wearing masks and protective clothing for a long time due to COVID-19

## Ethical management principles

### Honesty and transparency

Honesty and transparency are values that we must uphold in every aspect of our organization and business, and are the foundation of Solus Advanced Materials. Solus Advanced Materials shows honesty and high ethics in all business transactions.

### Open mind and respect

Individuals who have an open mind and respect others understand that the way they perform their tasks is just as important as their work. Solus Advanced Materials recognizes and respects the various cultures, customs, and business practices encountered in the global community.

### Responsibility

Responsibility is keeping one's promises and taking responsibility for the results. Solus Advanced Materials runs its business responsibly to maintain the faith, respect, and trust it receives from customers, partners, shareholders and others.

## Eliminating conflict minerals from the supply chain

As a responsible company, Solus Advanced Materials has established a conflict mineral management policy to ensure that conflict minerals\* associated with armed conflict zones are not included within the supply chain for its products.

### What are conflict minerals?

Minerals such as tin, tantalum, tungsten, and gold that are produced or mined in conflict zones such as the Democratic Republic of Congo (DRC) and its neighboring countries. Funds generated from conflict minerals flow into the armed forces in the region, directly supporting human rights violations such as child labor, forced labor, and the abuse of women.

# Governance

Solus Advanced Materials pursues transparent management with its shareholders.

The company enhances shareholder value by holding regular shareholders' meetings, and guarantees the independence and diversity of the board of directors and audit organizations.

## Composition of board of directors

The board of directors is comprised of all directors (Chairman: Daeje Chin / Total number of directors: 7 directors)

<b>Daeje Chin</b> Internal director - Date of appointment 2023-03-30 Position Chairman/Respective CEO (part-time) Term of office 3 years	<b>Keunman Kwak</b> Internal director - Date of appointment 2024-03-28 Position Chairman/Respective CEO (full-time) Term of office 3 years	
<b>Namhyuk Lee</b> Other non-executive director - Date of appointment 2023-03-30 Position Director (part-time) Term of office 3 years	<b>Sangil Lee</b> Other non-executive director - Date of appointment 2023-03-30 (reappointed) Position Director (part-time) Term of office 3 years	<b>Iny Hwang</b> Outside director - Date of appointment 2023-03-30 (reappointed) Position Director (part-time) Term of office 3 years
<b>Taehyeon Choi</b> Outside director - Date of appointment 2023-03-30 Position Director (part-time) Term of office 3 years	<b>Haechoon Park</b> Outside director - Date of appointment 2023-03-30 Position Director (part-time) Term of office 3 years	

## Committees within the board of directors

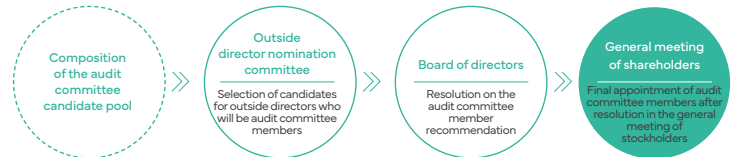
<b>Audit committee</b>	Composition   Iny Hwang   Taehyeon Choi   Haechoon Park Role   Inspection of the accounting, business audit, internal accounting management system, and operation status of the company
<b>Outside director nomination committee</b>	Composition   Taehyeon Choi   Iny Hwang   Haechoon Park Role   Nominating outside directors

## Composition of audit committee

<b>Audit committee</b>		
<b>Iny Hwang</b> Outside director - Date of appointment 2023-03-30 (reappointed) Position Director (part-time) Term of office 3 years	<b>Taehyeon Choi</b> Outside director - Date of appointment 2023-03-30 Position Director (part-time) Term of office 3 years	<b>Haechoon Park</b> Outside director - Date of appointment 2023-03-30 Position Director (part-time) Term of office 3 years

## Procedure for appointing an audit committee

### Procedure for appointing an audit committee



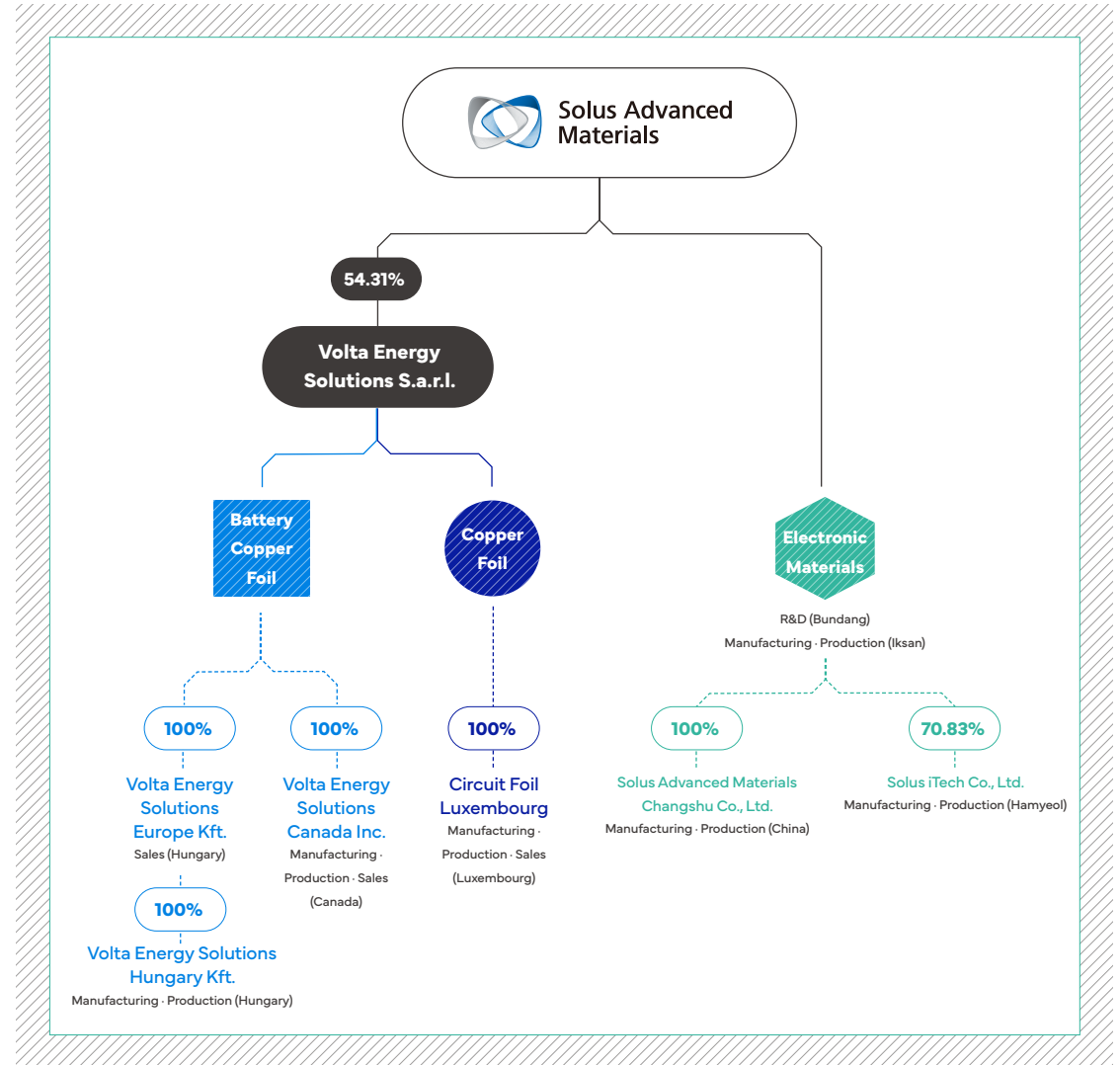
## Status of holding the general meeting of shareholders

The 5 <sup>th</sup> general meeting of shareholders in 2024 (2024.03.28)	<ul style="list-style-type: none"> <li>Approval of the 5<sup>th</sup> financial statements</li> <li>Appointment of Keunman Kwak, internal director</li> <li>Approval of director remuneration limit</li> </ul>
The 4 <sup>th</sup> general meeting of shareholders in 2023 (2023.03.30)	<ul style="list-style-type: none"> <li>Approval of the 4<sup>th</sup> financial statements</li> <li>Appointment of a director</li> <li>Appointment of audit committee members</li> <li>Approval of director remuneration limit</li> <li>Granting of stock options, etc.</li> </ul>
The 3 <sup>rd</sup> general meeting of shareholders in 2022 (2022.03.30)	<ul style="list-style-type: none"> <li>Approval of the 3<sup>rd</sup> financial statements</li> <li>Appointment of a director</li> <li>Appointment of audit committee members, etc.</li> </ul>

# Governance

Overseas subsidiaries of Solus Advanced Materials include Volta Energy Solutions, which oversees the battery copper foil and copper foil business; Circuit Foil Luxembourg, a copper foil manufacturer with 60 years of experience; and Solus Advanced Materials Changshu Co., Ltd., a Chinese electronic materials subsidiary.

As a domestic subsidiary, the company has Solus iTech, which directly produces non-light-emitting materials for displays.





**Solus Advanced  
Materials**