Solus Advanced Materials
– Introduction to the Company

NO.1 MATERIAL SOLUTIONS PARTNER

Solus Advanced Materials

NO.1 MATERIAL
SOLUTIONS PARTNER

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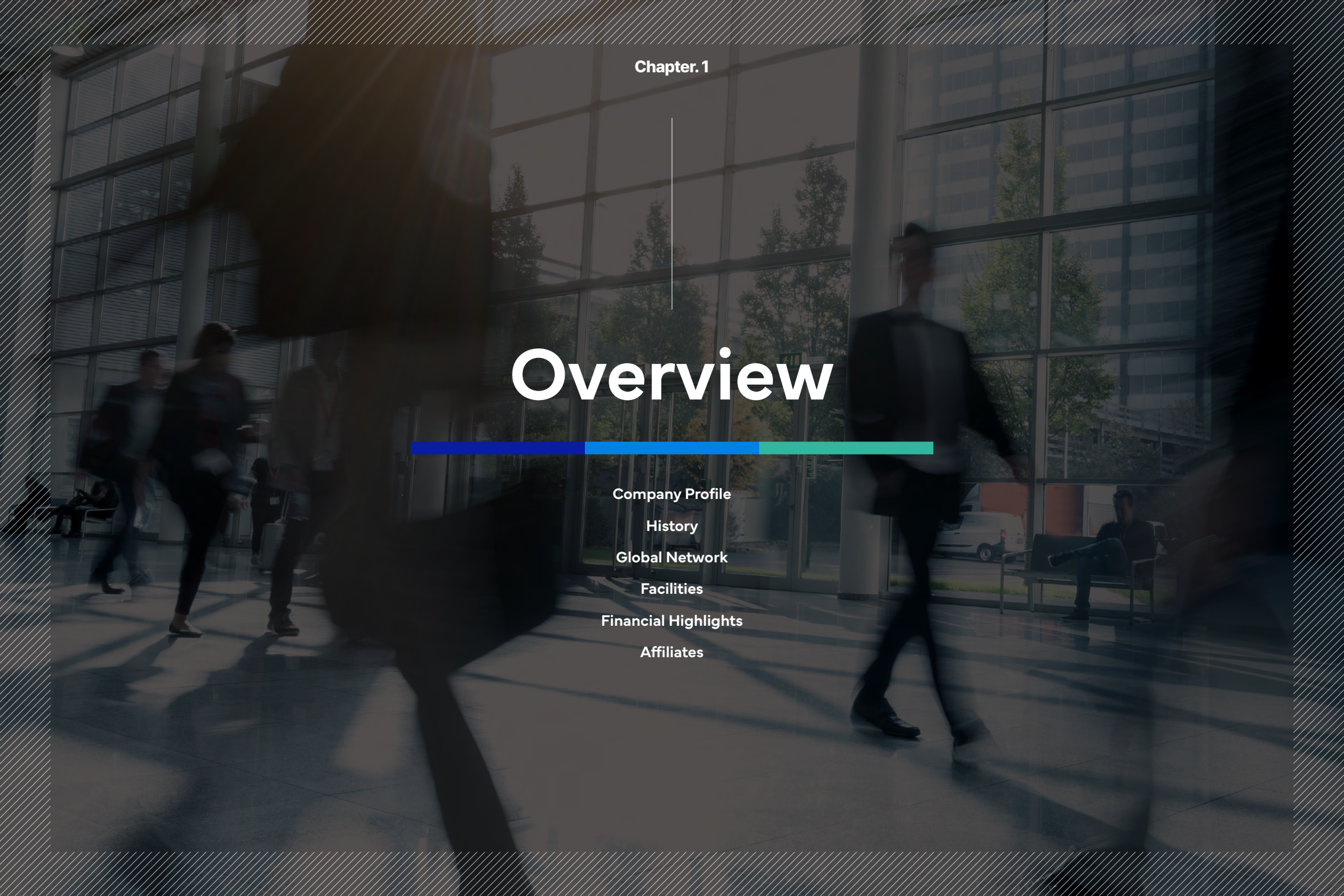

Chapter. 1

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.

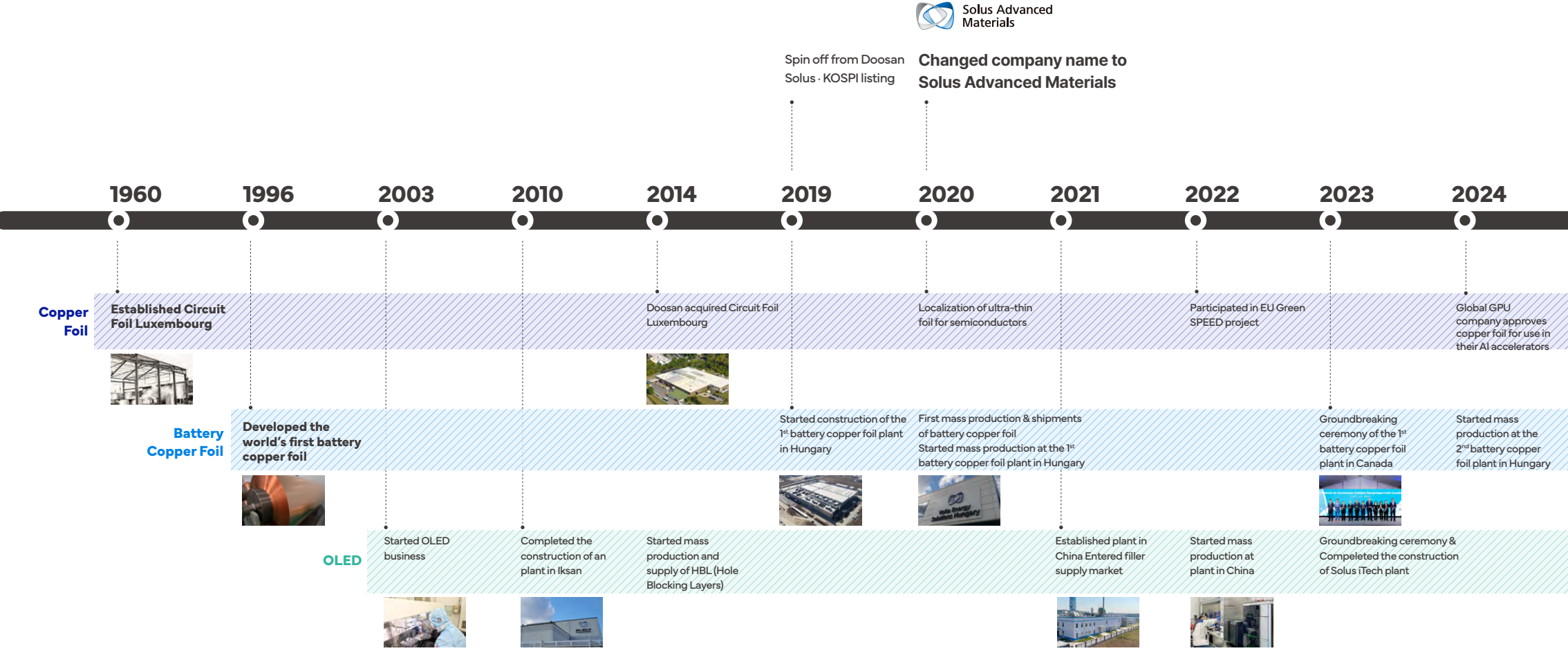
Solus Advanced Materials

Company Name	Solus Advanced Materials
Date Established	Oct. 1, 2019
CEO	Keunman Kwak
Number of Employees	1,128 employees (2024)
Sales	570.9 billion won (2024)
Total Assets	2,064.5 billion won (2024)
Business Areas	Battery copper foil, copper foil, OLED

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.

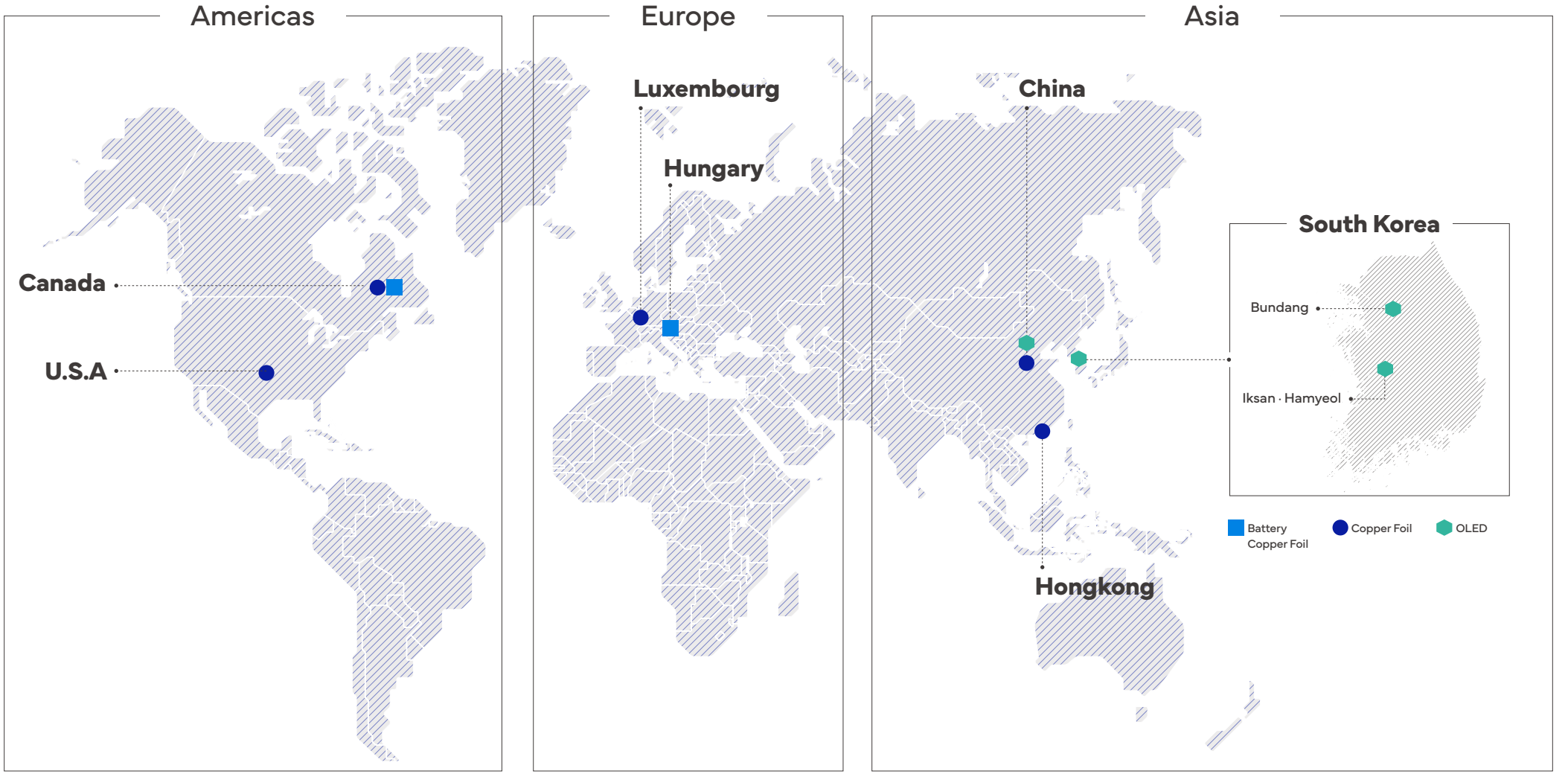


Global Network

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 OLED 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

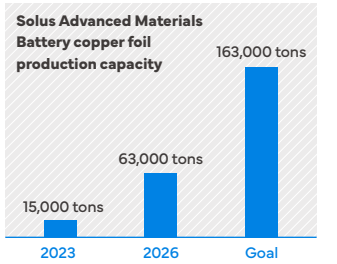
Circuit Foil Luxembourg
Luxembourg plant 15,000 tons

Battery Copper Foil

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

Battery Copper Foil

Volta Energy Solutions Canada
Canada 1st plant 25,000 tons (planned)
Canada 2nd plant 38,000 tons (planned)



OLED

For OLED 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.

OLED

Solus Advanced Materials
Bundang Head office·R&D

OLED

Solus Advanced Materials
Iksan 1st plant

OLED

Solus iTech
Hamyeol 1st plant

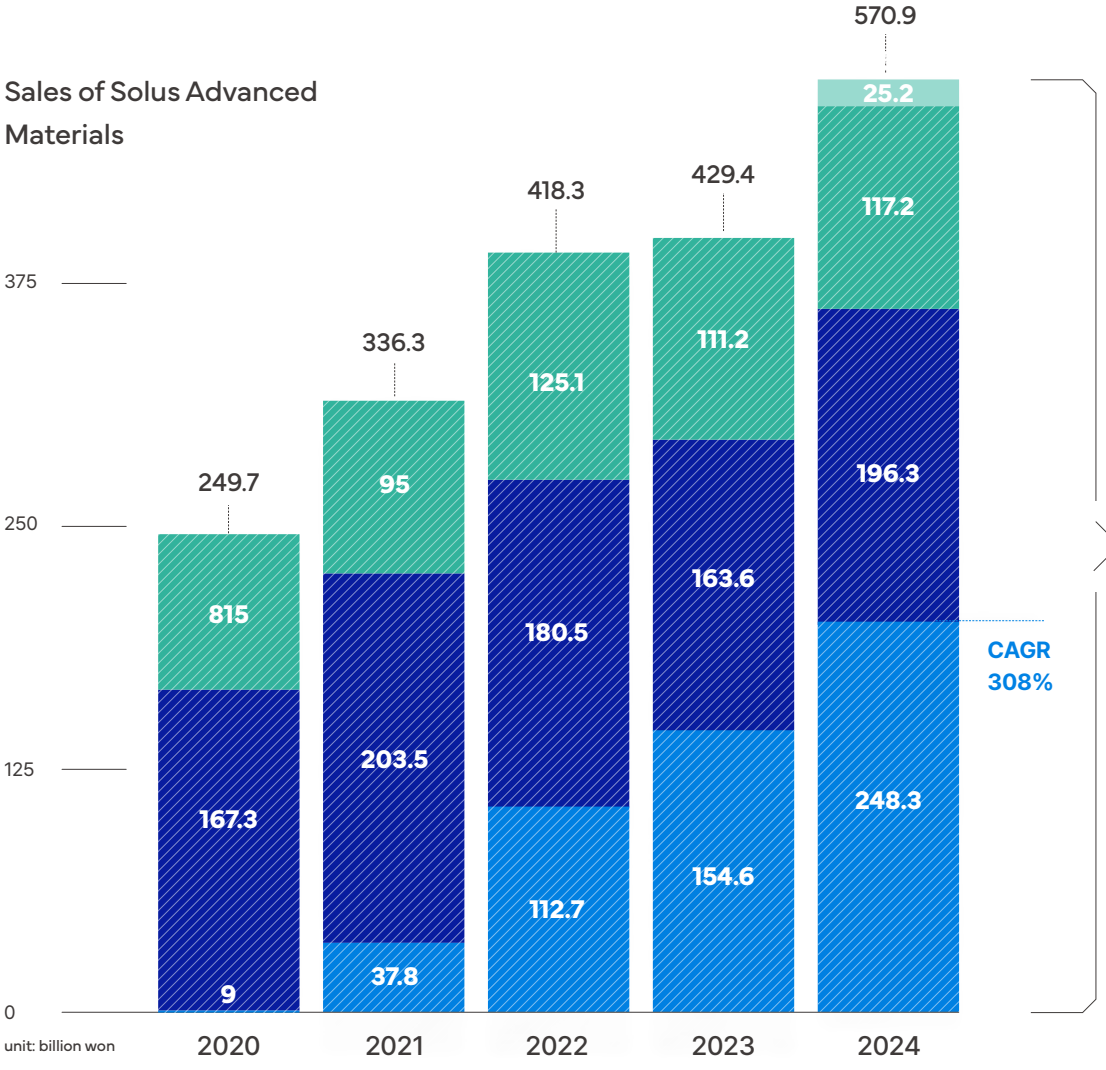
OLED

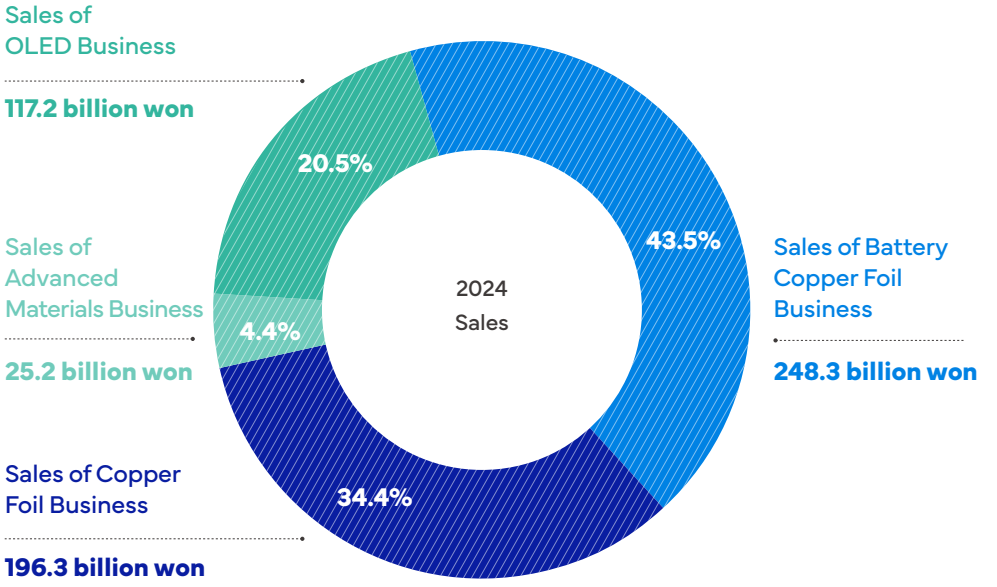
Solus Advanced Materials Changshu
China Changshu Province 1st plant

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 308%.

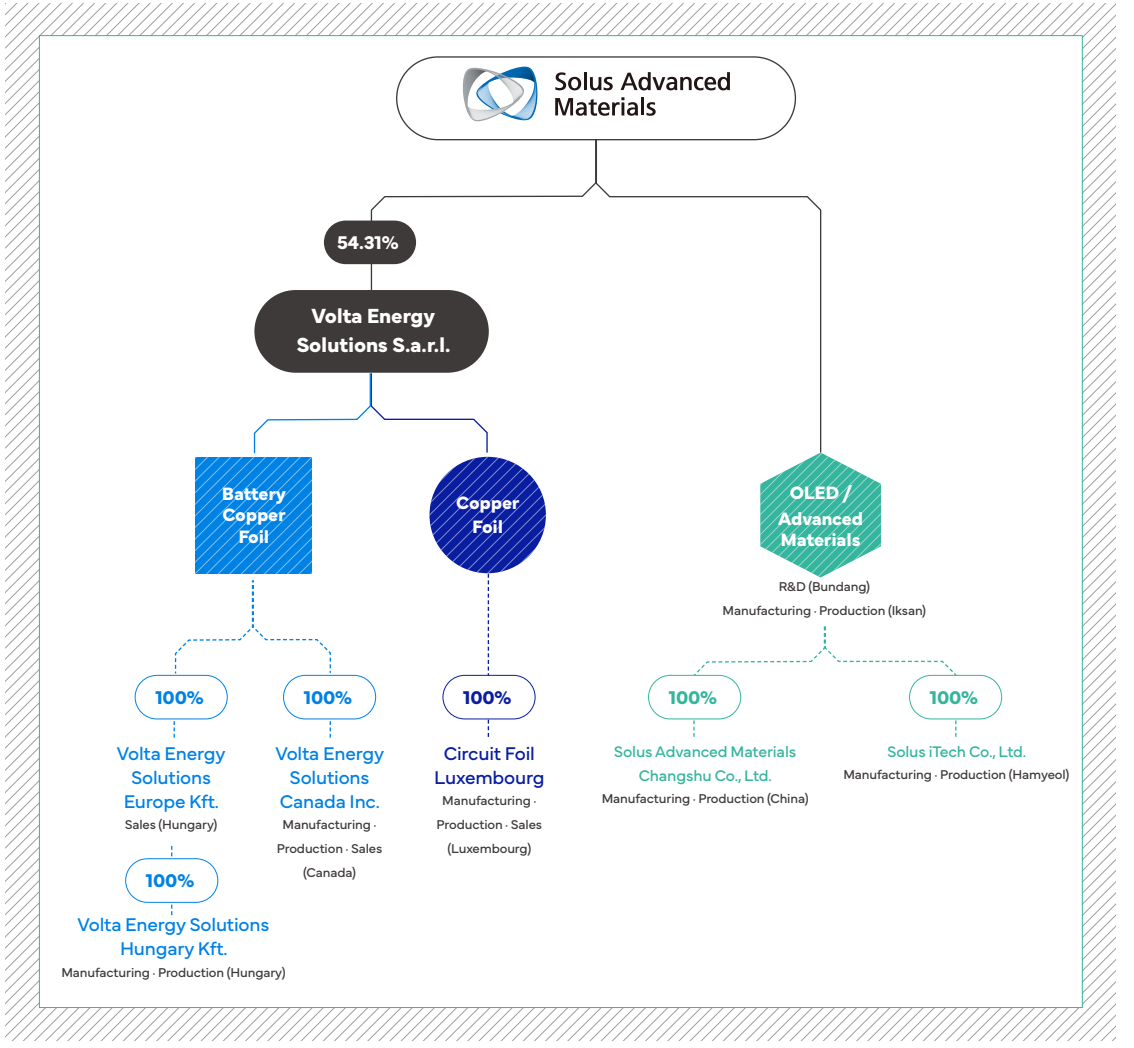




*2024 consolidated adjustments -160.8 billion won

Affiliates

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.



Chapter. 2

Business

Business Areas

-

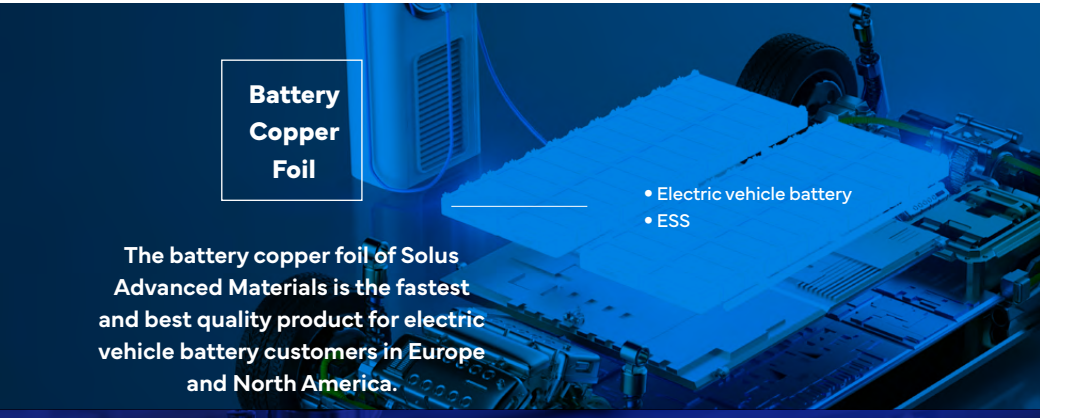
Battery Copper Foil

Copper Foil

OLED

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

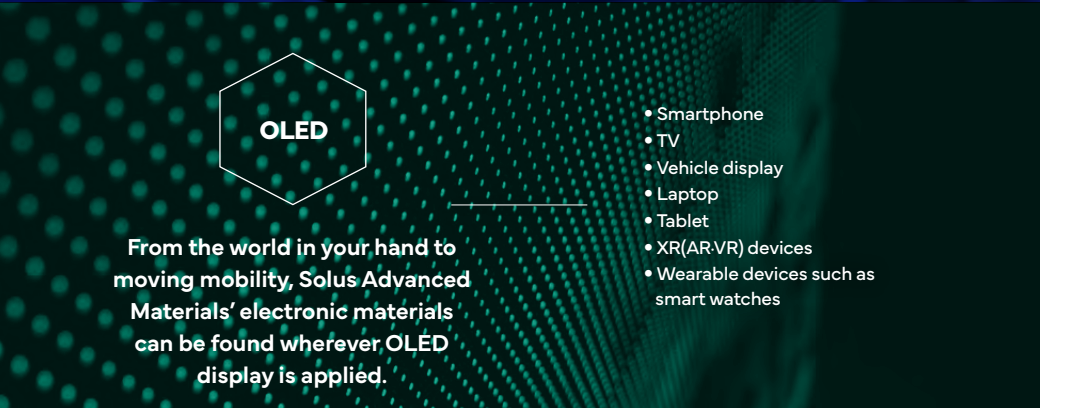
The battery copper foil of Solus Advanced Materials is the fastest and best quality product for electric vehicle battery customers in Europe and North America.

- Electric vehicle battery
- ESS

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



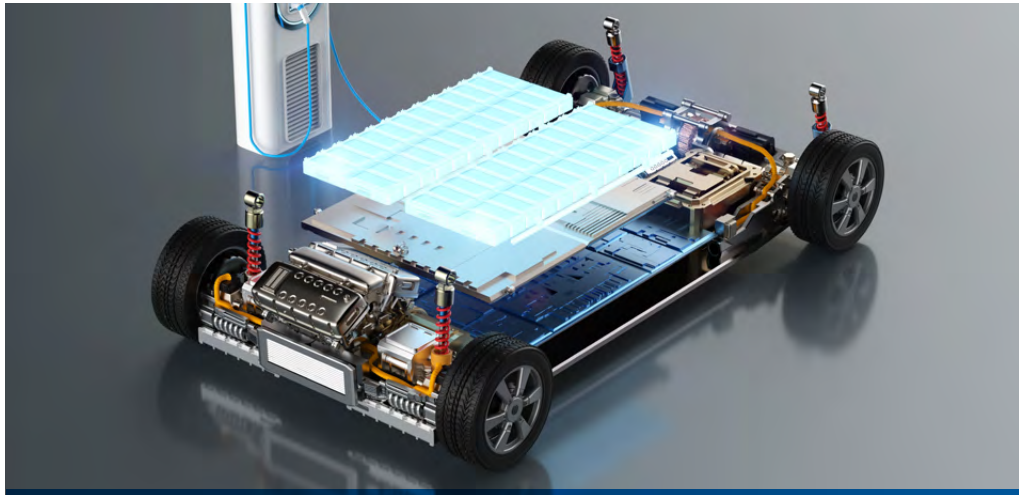
OLED

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

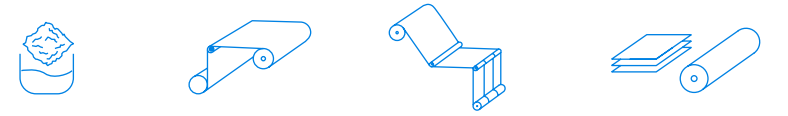
In 1996, Circuit Foil Luxembourg, a subsidiary of Solus Advanced Materials, developed the world's first 'battery copper foil' for electric vehicle batteries.

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.



Dissolving → Plating → Slitting & Sheeting → Inspection & Shipping

Product

- Standard battery copper foil (BF-PLSP) for general purpose batteries 4.5~8μm
- High-strength & high-elongation battery copper foil (SR-PLSP) for high capacity batteries 5~8μm
- High-strength battery copper foil (HTS-PLSP) for high capacity batteries 5~6μm
- Mid-strength battery copper foil (MTS-PLSP) for high capacity batteries 5~6um
- High-elongation battery copper foil (HE-PLSP) for cylindrical batteries 6~8um

Strength

Minimum 4.5μm high-end battery copper foil manufacturing technology (General purpose product 8μm)

THIN

STRENGTH

Maximum 70 kgf/mm² strength high-strength battery copper foil manufacturing technology (General purpose product 30~40 kgf/mm²)

Mass production technology capable of 'faultless' winding up to 30km or longer

LONG

ELONGATION

Maximum elongation 15% high-stretch battery copper foil manufacturing technology (General purpose product 8%)

Copper Foil

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

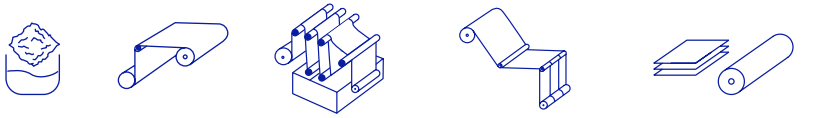
Circuit Foil Luxembourg, established in 1960 as the first copper foil company in Europe, has the world's leading high-end copper foil manufacturing technology. The company manufactures customized copper foils optimized for the characteristics of products in a range of industries, from artificial intelligence (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.

Copper Foil

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



Dissolving → Plating → Surface treatment → Slitting & Sheeting → Inspection & Shipping

Product

Hyper very low profile copper foil (HVLP)	BFL-NN-Z For artificial intelligence (AI) chips	BF-ANP For ultra-high-speed transmission digital equipment substrate materials	BF-TZA-FX For flexible substrate materials
Reverse treated copper foil (RTF)	TZA-B For high-speed transmission digital equipment substrate materials	DTH-ANP For IC Substrate MSAP	DTH-N-TZA For IC Substrate MSAP
Other copper foils	TWLS For high Tg and high-speed transmission special substrate materials	TZA-TZA For aircraft lightning prevention systems	LPT-TZA For Smart Card / Tape Carrier materials

Ultra-thin foil

Strength

ULTRA-THIN

World's thinnest 1.5μm ultra-thin foil manufacturing technology

LOW-ROUGHNESS

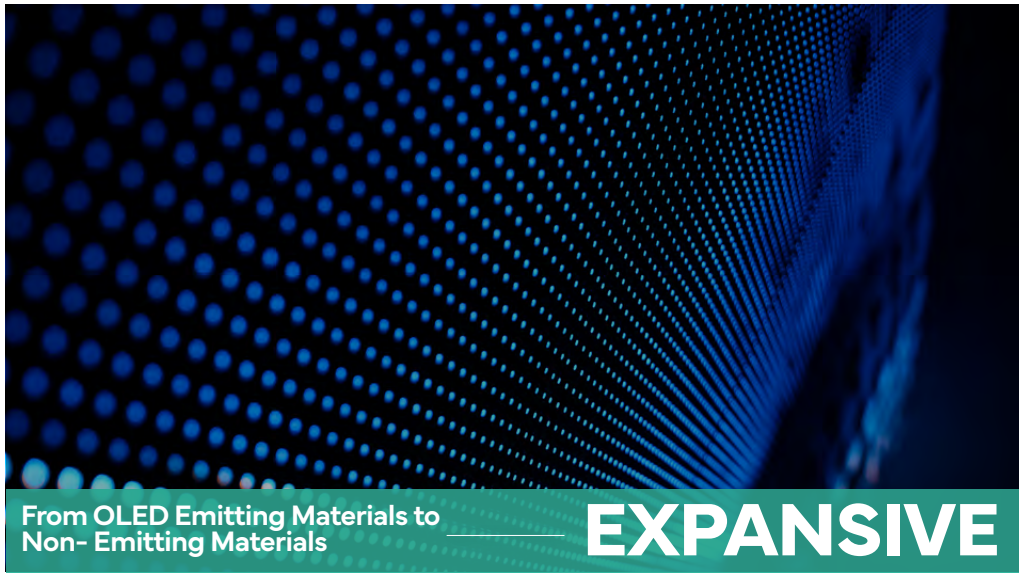
Low-profile copper foil manufacturing technology to maintain surface profile(roughness) below 1.0μm (based on Rz JIS)

DIVERSITY

Customized products ranging from 1.5μm to 200μm Special surface treatment technology tailored to product properties

OLED

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



From OLED Emitting Materials to Non- Emitting Materials EXPANSIVE

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 maintained a dominant market position in HBL (Hole Blocking Layer), one of the OLED light-emitting materials, from 2014 to the present. With approximately 740 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.

Product

Emitting Materials	HBL (Hole Blocking Layer)	ETL (Electron Transport Layer)	Green Host
	HTL (Hole Transport Layer)	CPL	
Non-Emitting Materials	Filler	Encap. Materials (TFE)	Module materials (OCR / OCA)
Post OLED (iLED)	Quantum Dot materials		

Strength

Independent manufacturing technology of emitting materials that maximize OLED light-emitting efficiency

- HIGH EFFICIENCY
- LONG LIFE
- DURABILITY

High efficiency & low voltage manufacturing technology to extend display life time

Non-emitting materials manufacturing technology to improve display touch-sensitivity and durability

Chapter. 3

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.

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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.

	Future Growth Business	Differentiated Technical Power	Global Leadership	Leading Global Supplier
Battery Copper Foil	The global electric vehicle market will grow at an annual average rate of 17% by 2030	Possession of original technology for manufacturing battery copper foil Developed the world's first battery copper foil	The world's first and only battery copper foil production plant in Europe and North America	Supply to global Top-tier battery manufacturers and electric vehicle (EV) manufacturers
Copper Foil	Evolving ICT industries such as artificial intelligence (AI), cloud computing, and data centers	Unrivaled high-end copper foil manufacturing technology for industries such as AI and data centers	Number 1 copper foil market share for smart cards	Supply to global big tech companies and various ICT companies
OLED	Diversified demand for OLED in areas such as smartphone, virtual reality, mobility, etc.	Supplier of HBL, an essential material for OLED displays	Product portfolio diversification in line with global trends	Supplying and collaborating with global top-tier display panel companies

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 · Eco-friendly anti-oxidation surface treatment · Double treatment of copper foil for silicon anode materials · Coating and highly conductive materials for all-solid-state batteries · Electrolytic copper foil physical properties (strength and elongation) control technology
Copper Foil	Hyper Very Low Profile (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
	Double Thin (DTH) 	· Optimization of etchability for the implementation of microcircuit · Minimizing the risk of microhole and implementation of ultra-thin thickness · Reducing the copper profile and developing the chemical treatment technology (passivation, Silane)
	Reverse Treated Foil (RTF) 	· Optimization of special treatment to reduce profile and uniformity · Maintaining optimal chemical bonding performance · Additives controlling technology for better elongation property

R&D OLED

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
Emitting materials	HBL (Hole Blocking Layer)	·HBL low voltage/high efficiency for single stack ·HBL high efficiency/longevity for tandem stack ·Implementation of customized performance by adjusting electronic injection performance
	ETL (Electron Transport Layer)	·Development of doping (adding a small amount of impurities to change physical properties) and non-doping ETL ·Development of /single/mix bidirectional ETL
	HTL (Hole Transport Layer)	·Development of low-refractive HTL to improve optical efficiency
	Green Host	·Low voltage operation, high efficiency, longevity
	CPL	·Developing the mixed concept of high refraction and low refraction
	Phosphorescent Sensitized Fluorescent	Development of high efficiency/long life phosphorescent blue host material
Non-emitting materials	Filler	·Maximization of high refraction (light efficiency)
	Encap. Materials	·Improvement of touch precision
	Module materials (OCR/OCA)	·Tack Free, Low Modulus OCR ·Improvement of durability (high elasticity OCR / OCA)
Post OLED materials	Quantum Dot materials	·Optimization of light-emitting characteristics and dispersion ·Improving the reliability at high temperature and high humidity

Chapter. 4

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.

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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

❶ **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

❷ **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.

❸ **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

❹ **Compliance with laws and regulations**
Comply with relevant domestic and international EHS laws and company EHS guidelines

❺ **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

* 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

Red Cross Humanitarian Activities Sponsor in 2024

· Support disaster relief and welfare projects, blood and medical projects through donations from the Korean Red Cross

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: Keunman Kwak / Total number of directors: 7 directors)

Keunman Kwak
Internal director
-
Date of appointment 2024-03-28
Position Chairman/Respective CEO (full-time)
Term of office 3 years

Namhyuk Lee
Other non-executive director
-
Date of appointment 2023-03-30
Position Director (part-time)
Term of office 3 years

Sangil Lee
Other non-executive director
-
Date of appointment 2023-03-30 (reappointed)
Position Director (part-time)
Term of office 3 years

Youngwook Ahn
Other non-executive director
-
Date of appointment 2025-03-27
Position Director (part-time)
Term of office 3 years

Taehyeon Choi
Outside director
-
Date of appointment 2023-03-30
Position Director (part-time)
Term of office 3 years

Haechoon Park
Outside director
-
Date of appointment 2023-03-30
Position Director (part-time)
Term of office 3 years

Sehyeong Kim
Outside director
-
Date of appointment 2025-03-27
Position Director (part-time)
Term of office 3 years

Committees within the board of directors

Audit committee	**Composition**	Taehyeon Choi	Haechoon Park	Sehyeong Kim
	Role	Inspection of the accounting, business audit, internal accounting management system, and operation status of the company		
Outside director nomination committee	**Composition**	Taehyeon Choi	Haechoon Park	Sehyeong Kim
	Role	Nominating outside directors		

Composition of audit committee

Audit committee

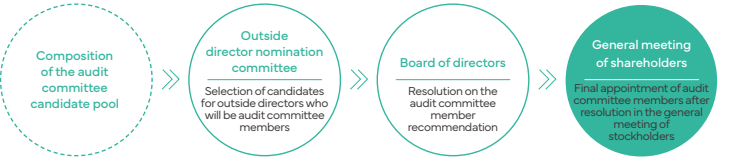
Taehyeon Choi
Outside director
-
Date of appointment 2023-03-30
Position Director (part-time)
Term of office 3 years

Haechoon Park
Outside director
-
Date of appointment 2023-03-30
Position Director (part-time)
Term of office 3 years

Sehyeong Kim
Outside director
-
Date of appointment 2025-03-27
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 6th general meeting of shareholders in 2025 (2025.03.27)	· Approval of the 6th financial statements · Appointment of a director · Appointment of audit committee members, etc
The 5th general meeting of shareholders in 2024 (2024.03.28)	· Approval of the 5th financial statements · Appointment of Keunman Kwak, internal director · Approval of director remuneration limit
The 4th general meeting of shareholders in 2023 (2023.03.30)	· Approval of the 4th financial statements · Appointment of a director · Appointment of audit committee members, etc


Solus Advanced
Materials