# IT-related Chemicals

## Deliver New Value that Responds to the Growth in the ICT Industry by Combining Our Material Development Capabilities with Our Optimization Technology


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**Primary Focus SDGs**

### Business Activities

Sumitomo Chemical's IT-related Chemicals Sector supplies highly functional materials to display manufacturers, and high quality semiconductor materials to semiconductor manufacturers, so that it can contribute to improving performance and productivity for displays and semiconductors.

### Core Competence

Locating our production centers near customer manufacturing sites, we strive to foster good relationships with customers, quickly grasp their needs, and build supply chains that reflect those needs in the development and supply of products. Our strength lies in this sort of development and supply system, our ability to develop materials as a diversified chemical manufacturer, as well as our processing technology cultivated in the display-related materials busines

### Basic Strategy

In order to respond to the generational shift in display technology from liquid crystal to organic light-emitting diodes (OLEDs), we are working to expand our OLED display business and transform the cost structure of our LCD components business. In addition, we are focusing on developing semiconductor materials and expanding our production capacity in this area, which will support increasingly sophisticated semiconductor manufacturing technologies.

### Initiatives in Fiscal 2019

We decided to make a full-fledged entry into the field of display materials for automobiles, which has great growth potential, by turning SANRITZ CORPORATION, specialized in producing polarizing film for this application, into our subsidiary. In the field of semiconductor materials, we completed construction of a new plant for photoresists in Japan.

### Issues in the Future

We will continue to develop and offer a wide range of materials with unique features for OLED displays based on our materials and product development capabilities. We will continue to reinforce our competitiveness in LCD materials and promote the optimization of our entire supply chain across multiple countries and regions. In the semiconductor materials business, we will work to cultivate new uses for these materials and expand to new customers. We will also focus on the growth of next-generation businesses that are compatible with 5G communications and smart mobility.

### Long-term Vision

Making the most of the strengths of Sumitomo Chemical, we are continuing to improve our profitability by providing new materials and solutions that anticipate future growth in the ICT industry.

### Corporate Business Plan for FY2019-FY2021

| Action Plan | Major Issues |
|---|---|
| ● Structural reform of polarizing film business<br>● Capture demand by aggressively investing in future market growth in the semiconductor materials business<br>● Expand touchscreen panel product portfolio | ● Develop next-generation businesses |

| (Billions of yen) | FY2019 | In Comparison to FY2018 | Corporate Business Plan for FY2019-FY2021: Sector Goals FY2021 Target |
|---|---|---|---|
| Sales revenue | **404.9** | +8.0 | 520.0 |
| Core operating income | **25.1** | -1.1 | 35.0 |
| Sales revenue of SSS*-designated products | **231.6** | +91.8 | 158.0 |

* Sumika Sustainable Solutions

## SWOT Analyses of the Major Businesses

**Strengths**
- Offering a wide range of display materials
- Established market needs-driven global supply chains
- Material development capabilities as a diversified chemical company
- Nano-level micro surface analysis technology

**Weaknesses**
- Heavy reliance on some specific products
- High sensitivity to exchange rate movements

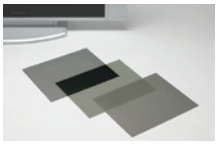
**Opportunities**
- Fast-growing organic LED displays market
- Rising demand for flexible displays
- Expanding Chinese semiconductor market

**Threats**
- Intensifying competition in the maturing LCD market

## Product Introduction

### LCD-related Materials Business [Polarizing Film, Color Resists, etc.]

| | |
|---|---|
| Polarizing Films | Polarizing film is an indispensable component in displays, and contributes to better performance and higher display quality, including higher luminance, higher contrast and wider viewing angles. |
| Color Resists | Color resists are red, green and blue color materials that form the color filter layers in displays. Using proprietary dye technology, Sumitomo Chemical's color resists deliver high luminance and high color reproducibility in color filters. |



Polarizing films

### OLED Display-related Materials Business [Touchscreen Panels, Circular Polarizing Film, Ag Etchant, etc.]

| | |
|---|---|
| Touchscreen Panels | These are locational input components installed in devices such as smartphones. |
| Circular Polarizing Film | This film limits the reflection of light (sunlight, artificial light) from displays to deliver the beautiful color produced by OLEDs. |

### Semiconductor Materials Business

[Photoresists, High-purity Chemicals for Semiconductor Manufacturing (Sulfuric Acid, Hydrogen Peroxide, Ammonia Water, etc), Aluminum Targets, Compound Semiconductor Materials, etc.]

| | |
|---|---|
| Photoresists | Photoresists are photosensitive resins used in the process of creating highly dense/highly integrated circuit patterns on semiconductors and print substrates. |

Photoresists

## Market Environment and Strategy for Major Businesses

### OLED Display-related Materials Business

OLED displays have been increasingly adopted for use in smartphones. Sumitomo Chemical is focusing on expanding sales of touchscreen panels and circular polarizing film, and has a large market share in these products. The company is also developing materials for foldable displays, which are drawing attention as the next-generation display technology. In addition to materials such as flexible touchscreen panels, polarizing film, and window film to replace cover glass, the company is developing products that will eventually integrate the functions of several components into one component, and is working on the further expansion of the OLED display-related materials business. The company is also engaged in commercialization of soluble high polymer OLED materials that can produce large-scale OLED displays at low cost.

### LCD-related Materials Business

The company has built strategic alliances as a prime supplier for promising LCD panel manufacturers, with production sites for LCD components in the East Asian region. Using in-house competitive materials, including acrylic protective film, the company is focused on expanding the sales of high value-added products, such as polarizing film for extra-large TVs. It also works to improve productivity in polarizing film production by consolidating production items between production sites.

### Semiconductor Materials Business

As semiconductor manufacturers are promoting greater circuit density, Sumitomo Chemical has the world's highest market share in the area of immersion argon fluoride (ArF) photoresists, which are used in manufacturing high performance semiconductors. The company is accelerating the development of resists for extreme ultraviolet (EUV) lithography, which will be used in the latest cutting-edge process, and they have been well received. Growth is expected in the sales of GaN epiwafers and GaAs epiwafers for high frequency devices used in 5G wireless base stations and 5G devices.

IT-related Chemicals

# Value Creation Model: Circularly Polarizing Film for OLED Displays

## System for Providing Added Value

### Major Management Resources (Input)

| | |
|---|---|
| Intellectual Capital | Sumitomo Chemical conducts research and development based on compound synthesis technology developed through the development of a wide range of products as a diversified chemical manufacturer. |
| Human Capital | Personnel in Japan, South Korea, China, Taiwan and other countries and regions collaborate across the globe to promote business. |
| Social and Relationship Capital | We connect product design with a timely grasp of customer needs, using relationships of trust with customers developed over many years. |

### Value Chain

[OLED Displays Currently on the Market]

Sumitomo Chemical manufactures liquid crystal coated-type retardation film based on proprietary technology, processes it into the final product, circularly polarizing film, and ships it to customers.

Raw material manufacturers

Sumitomo Chemical Group (including subcontractors)

## Sumitomo Chemical's Competitive Advantages

### Competitive Conditions in the Market

Several companies that manufacture polarizing film are competing to improve quality in anticipation of adoption for use in flexible OLED displays.

### Competitive Advantages

Sumitomo Chemical's unique strength is a liquid crystal material that can be used for circularly polarizing film for OLED displays. This liquid-crystal material, developed in-house, offers outstanding functionality, including preventing reflections from light sources such as sunlight or indoor lighting, and displaying real blacks that do not change color no matter what angle they are viewed from. For this reason, they contribute to the creation of OLED displays with extremely high image quality.

### Initiatives to Enhance Competitive Advantages

Sumitomo Chemical is pushing ahead every day on the development of liquid crystal materials that will contribute to even better image quality for OLED displays. In addition, in order to meet demand that is expected to grow in the future, the company is considering economically superior synthesis processes and manufacturing facility, with the goal of also improving cost competitiveness.

## Major Processes Generating Competitive Advantages

**Research:** Sumitomo Chemical is conducting research on liquid crystal materials for use in coating films. In order to develop retardation and polarizing functions using liquid crystal materials, the liquid crystal molecules must be systematically oriented in a specific direction. Sumitomo Chemical is working to develop molecular designs that will achieve this sort of optical performance. Moreover, the company is also manufacturing liquid crystal materials in house, and optimizing optical designs for circular polarizing film suitable for the various OLED displays of TVs and smartphones.

## Earnings Structure and Role in Driving Income

The market for OLED displays (on a revenue basis) is expected to expand even further going forward. It is anticipated that in 2025, the OLED TV market will be five times its current level, while the market for smartphones using OLED displays will be about 2 times its current level. Sumitomo Chemical will increase its earnings capacity by expanding sales and improving productivity.

## Added Value Provided to Society

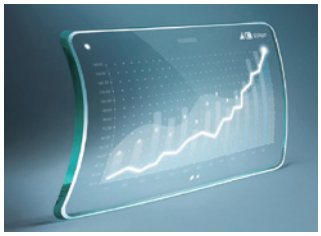
[Next-generation Flexible Displays]
Sumitomo Chemical supplies circular polarizing films that incorporate liquid crystal coating retardation film to panel manufacturers. Panel and device manufacturers develop smartphones, tablets, and laptops that incorporate foldable displays to improve convenience for consumers.


### Customer and Consumer Needs

Our customers are developing foldable smartphones, and unprecedented devices with rollable display panels that can be rolled up like cloth or paper. With existing circular polarizing film, freedom in the design of flexible displays is limited. Thus, panel manufacturers need next-generation circular polarizing film.

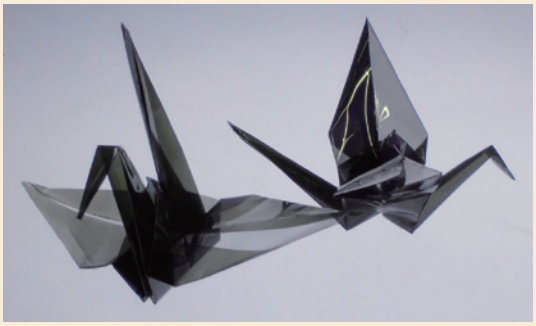
### Providing Customer Value

Customers are designing next-generation displays in order to create entirely new devices. For this reason, Sumitomo Chemical is working with customers to repeatedly conduct trial and error process for circularly polarizing film, which is a component of these new devices, in an effort to provide the performance customers need in terms of thinness and strength when bent.



## Creating More Abundant and Convenient Daily Lives for People

Sumitomo Chemical has raised "contribution to ICT innovation" as one of the material issues to be addressed as management priorities. In order to create a society where people can obtain necessary information wherever and whenever they are, the spread of mobile devices with outstanding portability and visibility is vital. The company is contributing to the creation of new, unprecedented products by developing and manufacturing OLED display related materials, such as circular polarizing film. Going forward, it is committed to making people's daily lives more abundant and convenient by offering new materials and solutions.


Origami cranes made with coating type polarizing film