Smart Business Briefing

14 July 2022

This document is an English translation of a statement written originally in Japanese for reference. The Japanese original should be considered as the primary version

DAICEL CORPORATION



Daicel's Business Segment

DAICEL Sustainable Value Together

		FY2022 Net Sales Total	Jap	oan's market World's mar	ket
		467.9 bn-yen	Major Products	share No.1 share No.	1
	Medical / Healthcare		Cosmetics ingredients such as 1,3-butylene glyco	l and polyglycerin	
			Naturally derived ingredients such as equol and k	Konjac ceramide	Mal
		4%	Chiral columns, High-purity chiral reagents,		
			Co-processed excipients such as orally disintegrat	ting tablets	
	Smart		Tri-acetate cellulose(TAC) for optical films, Photoresist materials,		
		7%	Solvents for electronic materials, High-performan	ce optical films,	
			Optical lens, Printed electronics materials, Organi	<u>c semiconductor device</u>	
	Safety	15%	Automobile safety parts such as airbag inflators		
			Automobile safety parts such as an bag initiators,		000
			micro gas generators, mitiators and pyro-ruses		
	Materials	W	Acetic acid, Acetic acid derivatives(acetic anhydri	de ,common solvents)	
		26.	Cellulose acetate for applications other than opti	cal films	15
		20%	Acetate tow. Organic chemicals such as Alicyclic-e	epoxy-resin.	
			Caprolactone derivatives		
	Engineering Plastics		Engineering plastics such as POM , PBT, PPS, LCP ,	COC	
		45%	Resin compound products,		
			Plastics processing products such as Polystyrene	sheet and Coating films,	
			Water-soluble polymer		all the the
	Others		Membrane separation systems		
		2%	Defense related products		
			Defense-related products		

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Our Smart Business





Smart Business



Main business in display field and semiconductor field (Foundation and Next Generation of Portfolio management) and developing a business in the sensing field as a new business

	Display	IC/Semiconductor	Sensing
Our Products	Tri-acetate cellulose(TAC), for optical films, High-performance optical films	Solvents for electronic materials, Photoresist materials	Optical lens. Printed electronics materials , Organic semiconductor device,
Customers Products	TAC Films, Display for TV, in-vehicle, etc. Touch panel	Logic (IC) , Memory Device, CMOS sensor	Camera / sensor module, Capacitor, Power device
Market	TV Image: Smartpliances Smart appliances Sensor	hone Tablet Data center device ((()) Logistics management	PC Communication base station ((())) ent

Business Policy

- Continue to provide solutions with technologies and products necessary for a comfortable smart society
- Establish Growth businesses in portfolio management and aim for a well-balanced profit structure in parallel with strengthening Foundation businesses and expanding next-generation development businesses









Smart Business sales and profit trends From FY2021 / 3 to FY2026 / 3



*1: Operating income before reviewing the method of allocating corporate expenses

*2: The mid-term management strategy will be revised in the future

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Sustainable Value Together

Daicel materials to support the semiconductor manufacturing process



- Higher integration and miniaturization of logic and memory semiconductors are accelerating as electronic devices become more sophisticated, faster, and consume less power.
- Providing resist polymers and solvents for electronic materials that are indispensable for microfabrication such as ArF and EUV.
- Contributes to resource saving by high yield and low power consumption by fine circuit.



Semiconductor resist polymer

[Our strengths]

- Designing resist polymer for immersion ArF and EUV from monomer
- Designed and precision synthesized from chemical structure inhouse
- Production and quality control using metal and foreign body removal technology

[Our business status]

- 20% or more of global market share of resist polymer for immersion ArF
- A main supplier of major resist manufacturers whose customers are major semiconductor manufacturers
- Working on new development such as EUV with major resist manufacturers
- Continuing to increase production capacity, developing innovative production methods

[Our Focus products]

• Resist polymer for Immersion ArF and EUV





*Set to 100 based on 21/3



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Solvents for electronic materials such as semiconductors

[Our strengths]

- Integrated manufacturing of PGME and PGMEA and sales performance in semiconductor applications
- High purity, foreign matter removal, low metal production and quality control
- High boiling point organic solvent, highly soluble and low toxicity

[Our business status]

- Demand for PGMEA for semiconductor processes increased from 60,000 tons in 2022 to over 130,000 tons in 2030
- Providing PGMEA, PGME, etc. to 5 major semiconductor resist companies, with a market share of 50% or more
- Expanding sales channels to semiconductor manufacturers in South Korea, Taiwan, and China.
- Continue to increase production capacity

[Our Focus products]

• High purity and low metal compatible PGMEA, PGME, MBA







Expansion into the semiconductor back-end process and electronics mounting field Sustainable Value



Semiconductor front process Polymer for resist Solvents for electronic materials





Semiconductor back-end E process Accelerating 3D implementation 5G / that integrates CPU and memory

Electronics packaging

5G / 6G shifts from millimeter wave to terahertz band

Under development through NEDO

Developing cleaning agents for semiconductor processes

Bonding material for advancedHigh frequency compatible low losssemiconductors,material,Organic / inorganic composite materialNoise reduction material

Development of semiconductor and electronics packaging for post 5G



New Energy and Industrial Technology Development Organization(NEDO) Post 5G Information and Communication Systems Infrastructure Reinforcement Research and Development Project

Research and development of advanced materials and measurements for millimeter-wave and terahertz bands

High-frequency compatible printed wiring board material, joining, and measurement technology for post 5G or later base stations

- Next-generation ultra-low loss, low-dielectric materials
- Highly reliable bonding between smoothing conductors and lowdielectric materials
- Measurement technology for materials for terahertz band communications.



Collaborative research with

- Osaka University
- Waseda University
- Sulfur Chemical Laboratory Inc.

Research and development of high-speed communication and high-density 3D packaging technology for post 5G semiconductors

Technology of high-performance and cost-effective 3D highdensity packaging of advanced semiconductors required for post-5G technology

- Cu sintered bonding material
- Insulating adhesive material for bump-forming



Daicel material to support the display



Providing Tri-acetate cellulose(TAC) for optical films with excellent optical properties, transparency, and smoothness, and High-performance optical films with excellent visibility and surface strength.

Tri-acetate cellulose(TAC) for optical films



Prediction of Cellulose Acetate (TAC) for Optical Films

- Protective film is decreasing, but retardation film is increasing slightly
- The retardation film is evaluated for its compatibility with other materials and the balance between function and cost.

Protective film area prediction



Synthetic system (COP, etc.) TAC 2013 2015 2017 2019 2021 2023 2025

Retardation film area prediction





Tri-acetate cellulose(TAC) for optical films

[Our strengths]

- No. 1 market share for display applications, supplying to 4 major companies
- We can handle wood pulp and linter as raw materials

(other companies handle linter)

• Leading manufacturers of displays and display films are in Asia

[Our business status]

- Increased business inquiries to our company due to lack of linters
- Expanding market share by improving the quality of linter products
- Review of value due to natural materials and biodegradability

Sales trend 150 100 Mid-term management 50 strategy 0 '24/3 '21/3 '22/3 '23/3 '25/3 '26/3 result result forecast

*Set to 100 based on 21/3

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DAICEL ustainable Value Together

[Our strengths]

- Providing high-value-added functional films with excellent visibility and surface strength
- Realizing the functions requested by customers from material development and prescription design
- The world's only commercialized functional film with phase separation

[Our business status]

- Approximately 20% of the world market share for in-vehicle displays (major US, Germany, Companies etc.)
- Adopted for high-performance displays such as for Lifestyle TV and e-sports etc.
- Entering promising markets such as a total heat exchange -type element using a permeable membrane sheet developed with DAIKIN Industories,Ltd.
- 90% or more of the world market share of next-generation automobile battery films







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Business Expansion by Transfer of the Film Segment of the Electronic Components Division of Gunze Limited



We will acquire the film segment of the Electronic Components Division of Gunze Limited (Kameoka Factory) to expand the functional film business. And we will devise solutions by exploiting the synergies it expects to derive by combining our proprietary materials and wide-ranging product lines with newly acquired technologies and know-how.

Functional Film Business Expand the technical field from development of coatings materials to the coating process, improve the efficiency of commercial distribution and expand capacity of existing products (mainly hardcoat products).

New product development in new coating technology (adhesive coating, sputtering)



New Business The Kameoka Factory will be a manufacturing base capable of precision processing in a clean environment. * In addition to functional films, we will also be responsible for the development and manufacture of functional materials such as wafer level lenses, organic semiconductor devices and other electronic component fields, and in the future, life science fields.



Daicel's optical lens that supports 3D sensing

Rapid increase in devices using 3D sensing *

*Receives the emitted reflected light and measures the distance to the object and the three-dimensional shape without contact.

• Demand for compact, thin, and complex-shaped lenses for both light reception and light emission.



Vehicle

Driver monitoring Passenger monitoring Infant / infant left behind Distance measurement Gesture recognition



VR/AR

Resolution adjustment Peripheral recognition Distance measurement Location identification



Mobiles

Face recognition Fingerprint authentication Distance measurement Power saving



Public certification

Location information Risk management Various certifications Obstacle detection

Factory automation

Location information Cargo identification Obstacle detection Cargo Quantity count

Optical lens

[Our strengths]

- Wafer level molding enables mass production of small, thin and complex lenses
- Heat-resistant resin enables reflow mounting of sensor module
- Consistent development, design and production from resin to lens

[Our business status]

- Adopted for VR in North America, sensors in Taiwan and Germany, the largest smartphone in South Korea, etc.
- Continued to increase production capacity in response to rapid expansion of demand
- Aiming for a 10% share in 2025 for sensing applications

[Our focus applications]

- VR / AR device, smartphone 3D sensing
- Combination with CMOS image sensor









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Printed electronics materials



Application example to multilayer ceramic capacitors (MLCC)



Improve print quality and improve device performance

Issues when printing internal electrodes

The solvent of the Ni conductor ink dissolves the ceramic sheet, causing cracks and wrinkles, which reduces reliability.

Daicel's solutions

A high-performance solvent that achieves both selective solubility and printability to become a major capacitor





Organic Semiconductor device by PI-CRYSTAL, INC.



Providing "high performance popular organic semiconductor film sensor devices" for Smart city project provided by University of Tokyo and Mitsui Fudosan Co., Ltd. etc. and contribute to the realization of a smart society in which the efficiency society and the happiness created by individuals are in harmony.



Product example

- Organic semiconductor sensor
- •Organic TFT
- Vibration sensor
- •Transportation temperature sensor
- Livestock management sensor

Under Developing with University of Tokyo,Hitachi Transport System, Ltd. and Mitsui Fudosan Co., Ltd. etc.

Demonstration of long-distance wireless temperature / vibration sensor for low-temperature logistics and normal logistics of fresh fish

https://www.daicel.com/smart/pi-crystal/files/news/attach00000038-01.pdf



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