We "Act" to touch the heart and make society better

First Quarter, 2020 Financial Results
- Consolidated -

SHOWA DENKO K.K.

May 15, 2020

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Representative Director & Managing Corporate Officer

Performance forecast and other statements pertaining to the future as contained in this presentation are based on the information available as of today and assumptions as of today regarding risk factors that could affect our future performance. Actual results may differ materially from the forecast due to a variety of risk factors, including, but not limited to, the influence of the coronavirus disease 2019 (COVID-19) on the world economy, the economic conditions, costs of naphtha and other raw materials, demand for our products such as graphite electrodes and other commodities, market conditions, and foreign exchange rates. We undertake no obligation to update the forward-looking statements unless required by law.

Consolidated Companies

- Consolidated subsidiaries: 61
  Newly consolidated or excluded: none
- Equity method applied: 11
  Newly applied or excluded: none

Selected Data

(Average figure)

	Jan.- Mar. 2019	Jan.- Mar. 2020	Increase/ decrease
■Exchange rates:			
¥/US$	110.2	108.9	Yen appreciated by ¥1.3/$
¥/€	125.2	120.1	Yen appreciated by ¥5.0/€
■Domestic naphtha price: ¥/KL	41,200	44,800	3,600
■Aluminum			
LME price: US$/T	1,881	1,713	-168
Domestic market*: K¥/T	258	236	-22

Exchange rate at December 31, 2019 ¥109.6/US$, at March 31, 2020 ¥108.8/US$
⇒Yen appreciated by ¥0.7/US$

*Domestic market: data from Nikkei

Summary

(Unit: Billions of Yen)

	CQ1, 2019	CQ1, 2020	Increase/ decrease
Net Sales	234.7	171.7	-63.0
Operating Income	45.4	2.5	-42.9
Non-operating income and expenses, net	-1.2	0.8	1.9
Interest/Dividends income and expenses	0	0.1	0
Equity in earnings of affiliates	-0.5	0.4	0.9
Foreign exchange gains or losses	0.2	0.6	0.3
Other	-0.9	-0.3	0.6
Ordinary Income	44.2	3.2	-41.0
Extraordinary Profit	0.3	1.7	1.4
Extraordinary Loss	-0.7	-1.5	-0.8
Income before income taxes	43.8	3.5	-40.3
Income taxes	-9.5	0.3	9.8
Net income	34.3	3.8	-30.5
Net income attributable to non-controlling interests	-1.2	-1.1	0.1
Net income attributable to owners of the parent	33.1	2.7	-30.4

Extraordinary Profit/Loss

(Unit: Billions of Yen)

	CQ1, 2019	CQ1, 2020	Increase/ decrease
■Extraordinary Profit	0.3	1.7	1.4
●Gain on sales of investment securities	0	1.5	1.5
●Other	0.3	0.2	-0.1
■Extraordinary Loss	-0.7	-1.5	-0.8
●Loss on sales and retirement of noncurrent assets	-0.5	-0.8	-0.4
●Other	-0.2	-0.7	-0.5
■Extraordinary Profit/Loss, Net	-0.4	0.2	0.6

Consolidated Sales and Operating Income by Segment (1)

(Unit: Billions of Yen)

		CQ1, 2019	CQ1, 2020	Increase/ decrease	Item
Petro-chemicals	Sales	62.7	55.0	-7.7	Olefins: sales decreased (shipment volumes down, market prices down) Organic chemicals: sales decreased (vinyl acetate, ethyl acetate: shipment volumes down due to shutdown maintenance, market prices down) SunAllomer Ltd.: sales decreased (market prices down)
	Operating income	4.0	-0.2	-4.1	Olefins: profit decreased (shipment volumes down, spread squeezed) Organic chemicals: profit decreased (vinyl acetate, ethyl acetate: shipment volumes down due to shutdown maintenance) SunAllomer Ltd.: profit decreased (time lag between market prices and a fall in raw material prices)
Chemicals	Sales	36.0	36.3	0.3	Basic chemicals: sales decreased (chloroprene rubber: sales down (shipment volumes for export down), ammonia, AN: sales maintained at the CQ1, 2019 level) Electronic chemicals: sales increased (shipment volumes up due to production recovery in semiconductor industry) Industrial gases: sales maintained at the CQ1, 2019 level Functional chemicals: sales decreased (shipment volumes for China down) Coating materials: newly consolidated in 2H, 2019
	Operating income	2.4	2.3	-0.1	Basic chemicals: profit decreased (chloroprene rubber: shipment volumes for export down) Electronic chemicals: profit increased (shipment volumes up due to production recovery in semiconductor industry) Industrial gases: profit slightly decreased Functional chemicals: profit decreased (shipment volumes for China down)
Electronics	Sales	20.6	23.6	3.0	HDs: sales increased (shipment volumes up) Compound semiconductors: sales increased (shipment volumes for export up) LIB materials: sales maintained at the CQ1, 2019 level SiC epitaxial wafers: sales slightly decreased (steady in domestic, shipment volumes for export down)
	Operating income	-0.3	1.0	1.3	HDs: profit increased (shipment volumes for data centers up) Compound semiconductors: profit maintained at the CQ1,2019 level LIB materials: profit increased (structural reform of anode materials) SiC epitaxial wafers: profit decreased (shipment volumes down, R&D costs up)

Consolidated Sales and Operating Income by Segment (2)

(Unit: Billions of Yen)

		CQ1, 2019	CQ1, 2020	Increase/ decrease	Item
Inorganics	Sales	72.4	21.4	-51.0	Ceramics: sales decreased (shipment volumes of abrasives, fine ceramics for electronics down) Graphite electrodes: sales significantly decreased (shipment volumes down due to further reduced production, market prices down)
	Operating income	39.5	0.8	-38.7	Ceramics: profit decreased Graphite electrodes: profit significantly decreased (shipment volumes down due to further reduced production, spread squeezed)
Aluminum	Sales	23.8	19.2	-4.6	High-purity foil for capacitors: sales decreased (shipment volumes down) Aluminum specialty components: sales decreased (shipment volumes for auto application down) Aluminum cans: sales decreased (shipment volumes for Japan and Vietnam down)
	Operating income	0.3	0	-0.2	High-purity foil for capacitors: profit maintained at the CQ1, 2019 level Aluminum specialty components: profit slightly increased (decrease in depreciation and amortization due to posting of impairment loss in FY2019) Aluminum cans: profit decreased (shipment volumes for Japan and Vietnam down)
Others	Sales	32.4	28.6	-3.8	SHOKO Co., Ltd.: sales decreased (market prices of products down)
	Operating income	0.3	0.2	-0.1	
Adjustments	Sales	-13.1	-12.3	0.8	
	Operating income	-0.8	-1.7	-0.9	
Total	Sales	234.7	171.7	-63.0	
	Operating income	45.4	2.5	-42.9	

Consolidated Balance Sheet

(Unit: Billions of Yen)

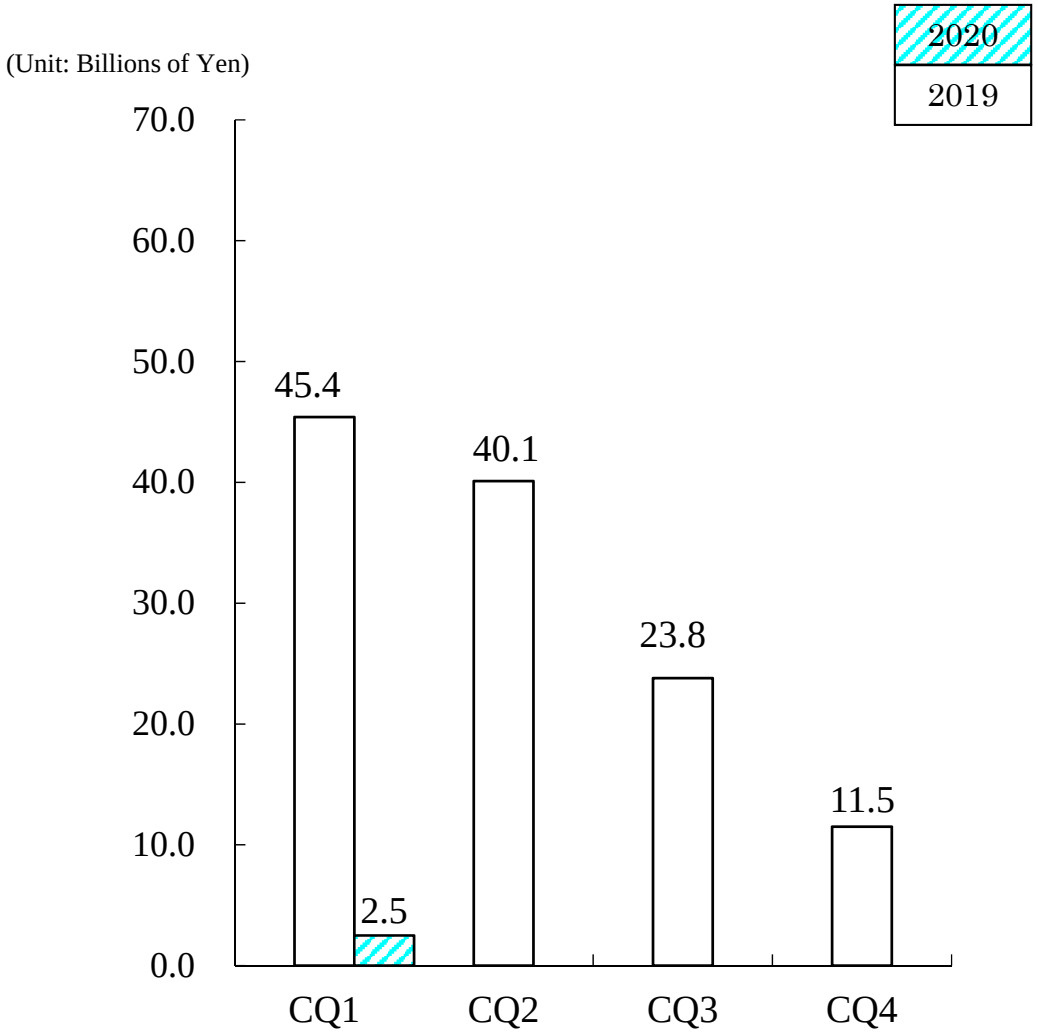
Assets	Dec. 31, 2019	Mar. 31, 2020	Increase/ decrease	**Liabilities and net assets**	Dec. 31, 2019	Mar. 31, 2020	Increase/ decrease
Cash and deposits	122.1	115.5	-6.6	Notes and accounts payable	117.5	103.0	-14.5
Notes and accounts receivable	170.3	152.8	-17.5	Interest-bearing debt	298.5	325.1	26.6
Inventories	173.7	187.4	13.7	Net defined benefit liability	10.0	9.4	-0.5
Other current assets	31.0	29.4	-1.6	Other liabilities	130.9	120.4	-10.6
Total current assets	497.1	485.1	-11.9	Total liabilities	556.9	557.9	1.0
Buildings and structures	79.8	77.3	-2.5	Capital stock	140.6	140.6	0
Machinery and equipment	140.7	136.8	-3.9	Capital surplus	78.9	78.9	-0
Land	226.4	225.3	-1.1	Retained earnings	249.2	240.7	-8.5
Other tangible fixed assets	26.3	32.8	6.5	Treasury stock	-11.7	-11.7	-0
Total tangible fixed assets	473.2	472.2	-1.0	Total shareholders' equity	457.1	448.5	-8.5
Intangible fixed assets	22.6	22.7	0.1	Valuation difference on available-for-sale securities	9.8	0.1	-9.7
Investments and other assets	83.5	71.5	-12.0	Deferred gains or losses on hedges	0.4	-0.9	-1.4
incl. investment securities	71.8	57.3	-14.4	Revaluation reserve for land	33.1	32.8	-0.2
				Foreign currency translation adjustment	4.1	-1.2	-5.3
				Remeasurements of defined benefit plans	-5.1	-5.3	-0.2
				Total accumulated other comprehensive income	42.3	25.5	-16.8
				Non-controlling interests	20.1	19.6	-0.5
Total fixed assets	579.3	566.5	-12.9	Total net assets	519.4	493.6	-25.8
Total assets	**1,076.4**	**1,051.6**	**-24.8**	**Total liabilities and net assets**	**1,076.4**	**1,051.6**	**-24.8**

Total Assets
Interest-bearing Debt and D/E ratio

(Unit: Billions of Yen)

	Dec. 31, 2019	Mar. 31, 2020	Increase/ decrease
● **Total assets**	1,076.4	1,051.6	-24.8
● **Interest-bearing debt**	298.5	325.1	26.6
● **Debt/Equity ratio**	0.60 times	0.69 times	0.09p
● **Stockholders' Equity ratio**	46.4%	45.1%	-1.3p

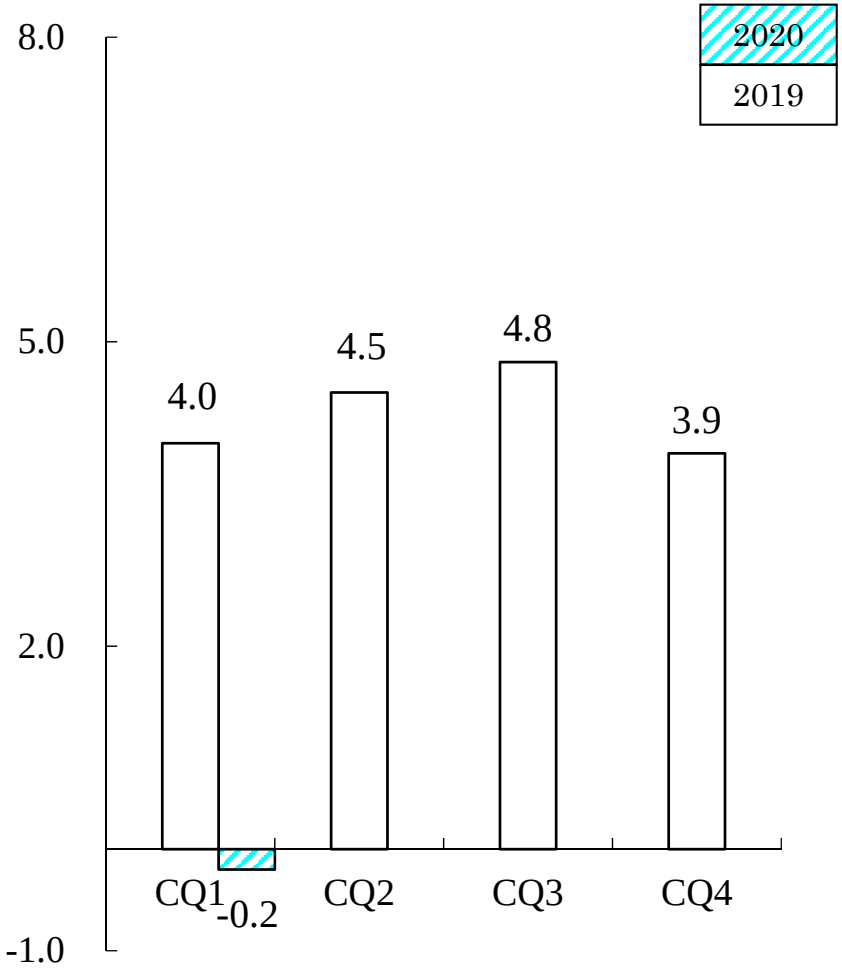
(Reference) Quarterly Operating Income



(Reference) Quarterly Operating Income by Segment

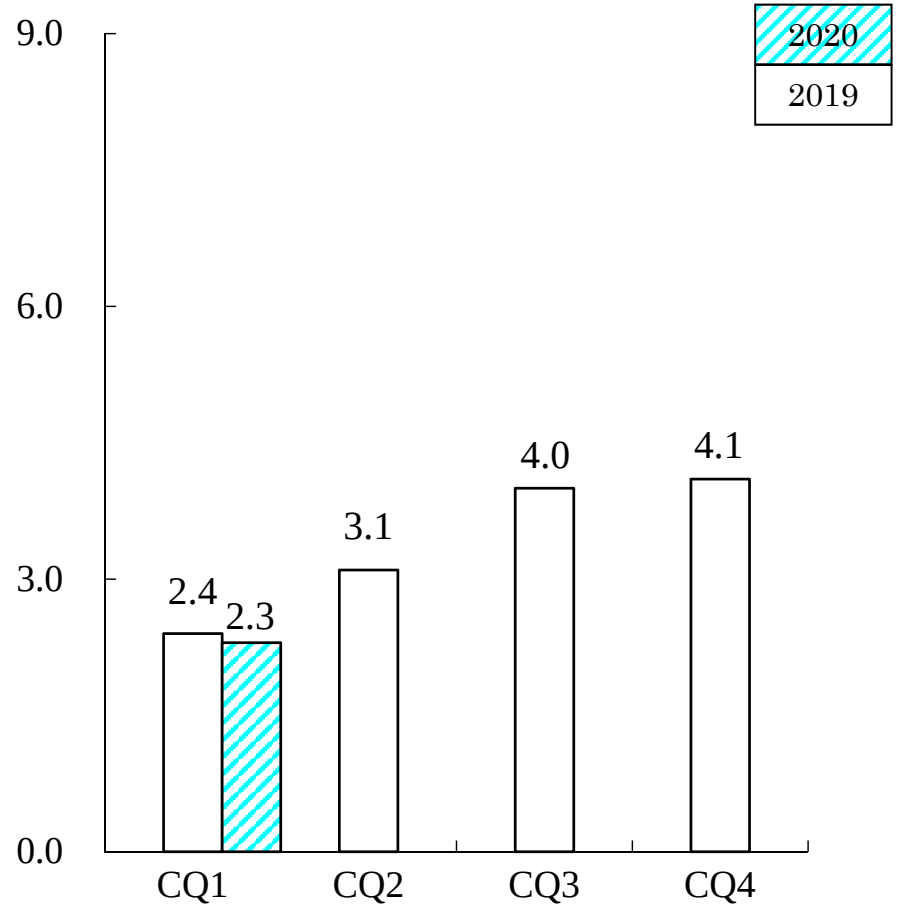
《Petrochemicals》

(Unit: Billions of Yen)



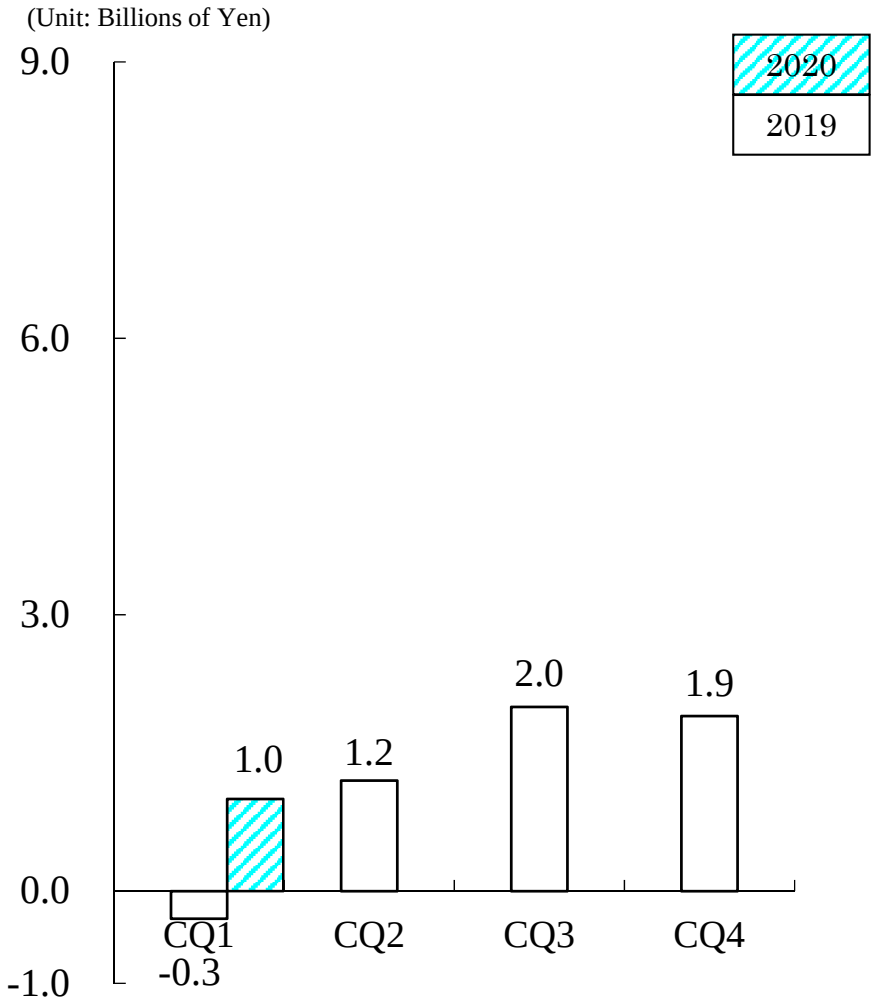
《Chemicals》

(Unit: Billions of Yen)

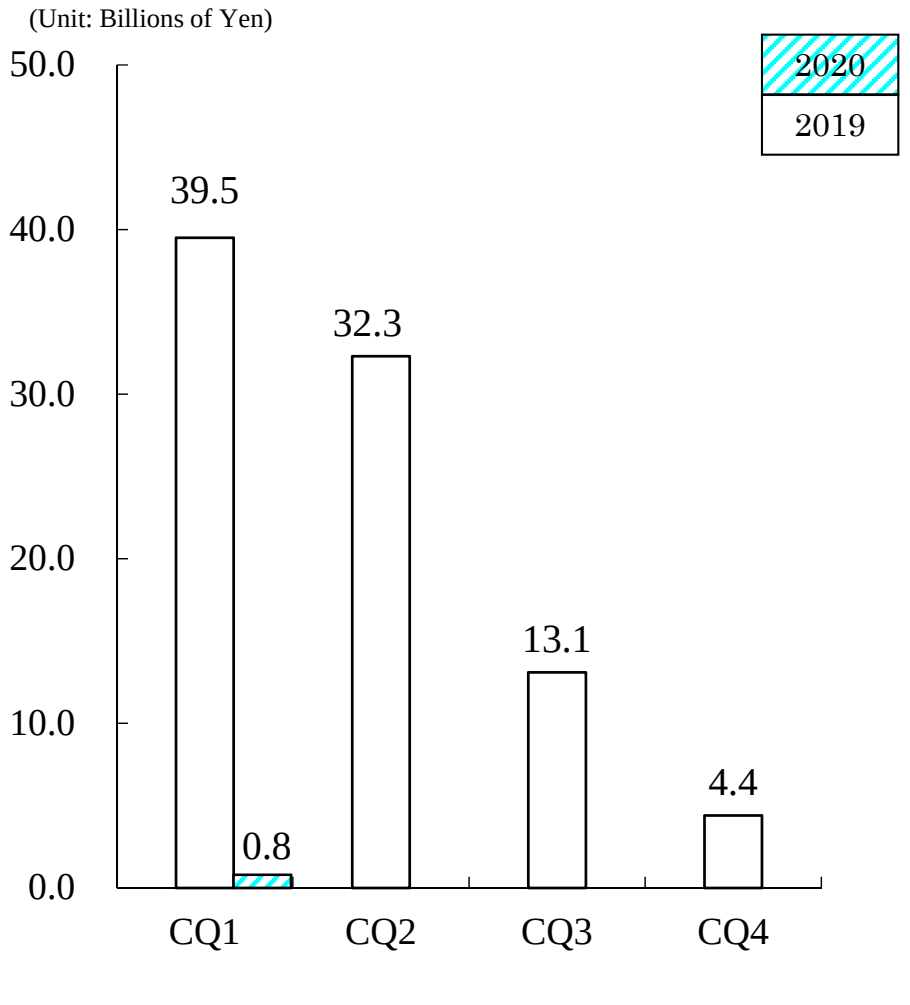


(Reference) Quarterly Operating Income by Segment

《Electronics》

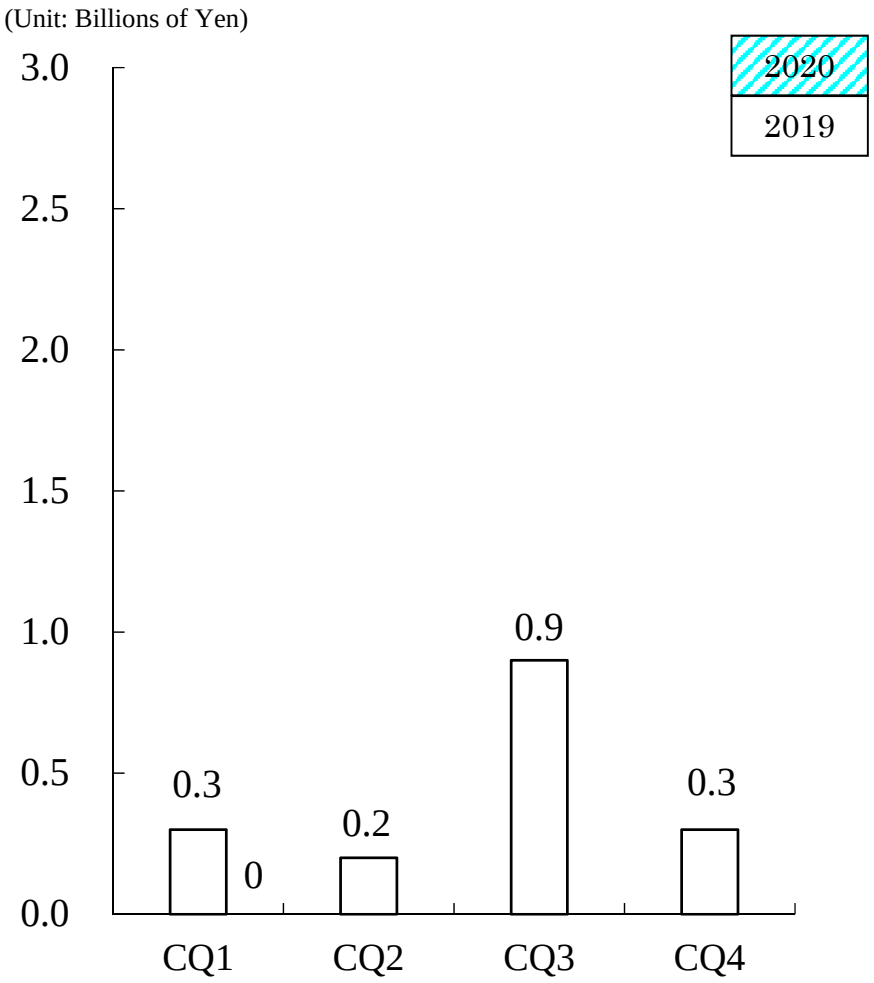


《Inorganics》

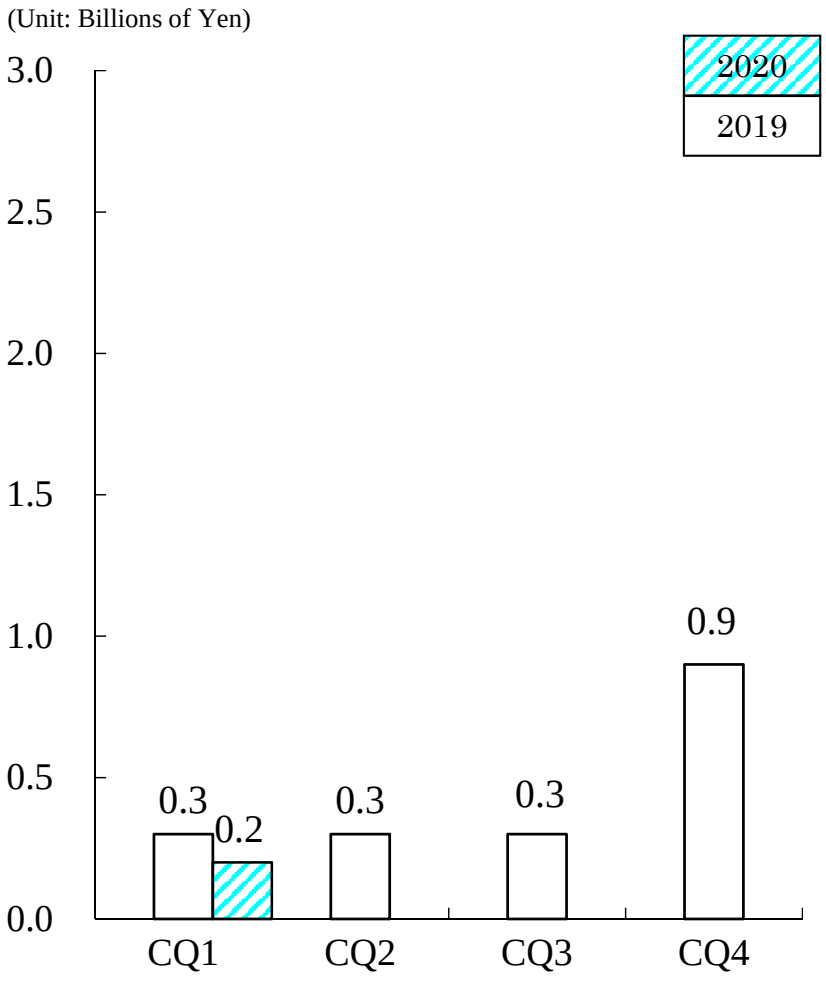


(Reference) Quarterly Operating Income by Segment

《Aluminum》



《Others》



Topics

[General]

- Announcement regarding results of tender offer for shares in Hitachi Chemical Company, Ltd. and change in subsidiary
- Announcement regarding fundraising, capital reduction of the consolidated subsidiary and change in the specified subsidiary company

For details, please refer to our news releases announced on April 21, 2020.

- Received award for used-plastic chemical recycling business

SDK received an award from Chairman of the Japan Business Federation for its used-plastic chemical recycling business. This award is part of Fujisankei Communications Group's 29th Grand Prize for the Global environment Award*. SDK has been conducting the used-plastic chemical recycling business since 2003. At its Kawasaki Plant, used plastic collected from home is gasified by thermal decomposition to generate hydrogen and carbon monoxide. Carbon monoxide from this process is used for production of carbonic acid products. Hydrogen is used as raw material for ammonia production, in fuel-cell vehicles, and for power generation at hotels using fuel cells. Thus this business is contributing toward promotion of a low-carbon society. While reducing CO_2 emissions by avoiding incineration of used plastic, the business promotes resource recycling on land and reduces marine pollution by plastic. In addition to this chemical recycling, the Showa Denko Group is conducting various environment-friendly businesses. They include the global supply of graphite electrodes for recycling of iron, and production of aluminum cans based on used aluminum cans (can-to-can recycling). The group was the first company in Japan to start an aluminum can recycling project.

*This award was established in 1992 by Fujisankei Communications Group with special contribution from World Wide Fund for Nature (WWF) Japan. The award aims at encouraging the development of new technologies and products that will prevent global warming and promote a recycling-oriented society. It also aims at promoting environmental protection measures and enhancing global environment awareness. The award is granted to corporations recognized as having accomplished distinguished achievements in these areas.

Topics

[General]

- **Introduced AI system to examine capital investment**

SDK introduced an artificial-intelligence-based search system to look efficiently for information useful for capital investment evaluation from the company's knowledge databases. This new search engine uses an AI system named "KIBIT*" and searches the company's document database for knowledge useful for its internal examination and screening of investment plans. SDK started operation of the new system at the end of January 2020. KIBIT is an AI which simulates "tacit knowledge" held by experts and skilled workers. In order to search databases for cases appropriate to refer, this AI looks up not only key words but also structure of writing and the line of thought in documents on databases, including those in documents contained in attached files. This system enables us to extract cases of investment similar to newly suggested investment plans under screening not reliant on examiners' experiences. In a trial run of the new system conducted in SDK, we confirmed that the KIBIT-based system searched our document databases for similar cases of investment and judged degree of similarity within almost one tenth of the time needed by conventional search systems. In addition, the KIBIT-based system enables us to pick up many similar cases simultaneously, and make the most of our knowledge and know-how about facility-safety measures. SDK will put this new search system into regular use in its process to judge appropriateness of capital investment plans, and consider to extend the use of the news search system to cover search for similar cases of accidents and abnormalities in production fields.

*KIBIT: An artificial intelligence originally developed by FRONTEO, Inc. This AI is equipped with FRONTEO's original mechanical learning algorithm and powerful natural-language processing technology. It can learn deeply from small amount of teaching data, and conduct high precision analysis of database in a short time.

Topics

[General]

- **Developed AI-based image analysis system to improve spherical alumina production**

  SDK developed an artificial-intelligence-based image analysis system for spherical alumina production in cooperation with BLUE TAG. SDK will start using the system at its production line in the first half of 2020. SDK's spherical alumina product has the advantage of uniformity in sphericity and stability in product quality. Due to high fluidity and compatibility, it is used as filler for heatsinks for electronic components and as abrasive. The AI-based image analysis system we developed this time utilizes BLUE TAG's high technology of micro-level-image processing in the process to learn examples of skilled operator's judgement as training data. Thus the new system is aimed at visualizing experience-based knowledge of skilled operators and ensuring quick feedback of digitalized data to the production process to stabilize product quality. This was not possible under the conventional image-analysis software. As a result of initial tests, we confirmed the system's ability to make a judgement at the same level as that of skilled operators in about 20 seconds. In addition, this system also enables accumulation of data for relearning process, and inspection accuracy under the system can be improved based on operation results at the production line. Fully utilizing the new AI-based image analysis system, we will work to further improve product quality and productivity.

Topics

[General]

- **Cooperatively proved that AI speeds up development of flexible transparent film**

SDK, National Institute of Advanced Industrial Science and Technology (AIST), New Energy and Industrial Technology Development Organization (NEDO) and Research Association of High-Throughput Design and Development for Advanced Functional Materials (ADMAT) have cooperatively proved that introduction of artificial intelligence (AI) into the process to develop flexible transparent film[1] can reduce the numbers of times of experiment to produce film that satisfies required properties to one-twenty-fifth (1/25) or less of those conventional development methods require. This development work has been subcontracted by NEDO's "Ultra High-Throughput Design and Prototyping Technology for Ultra Advanced Materials Development Project" (Ultra-Ultra PJ) to the consortium. By fully utilizing AI and multiscale simulation[2], Ultra-Ultra PJ aims to reduce substantially the numbers of times of experiment and development period required for the development of flexible transparent film from those conventional ways of material development require. As a result of the experiment we conducted this time, physical properties of all of the three types of films made from combinations of raw materials recommended by the AI showed superiority over those of the 25 types of films made by the skilled researchers. We obtained films with physical properties superior to those developed by skilled researchers through one-twenty-fifth times of experiments or less compared to the development process conducted by the skilled researchers. Thus, we proved that we can substantially shorten the period of development of flexible transparent films by utilizing AI, and that it is possible for us to develop films with physical properties superior to those of films made by researchers based on their knowledge and experience. Hereafter, we will improve this technology further, and develop a system in which the AI can suggest ratios of combinations of raw materials that can produce target products with even better physical properties while satisfying required characteristics.

1) Flexible transparent film: This is a bendable transparent film. Flexible transparent film is applicable to wide-ranging use such as electroconductive transparent base for touch panel, base for flexible electronic circuit and base for flexible display panel.
2) Multiscale simulation: This simulation connects material density, flux density and energy density in an interactive way and as common languages. It simulates behavior of various matters ranging from atoms and molecules in micro fields to fluids and continuums in macro fields.

Topics

[Chemicals segment]

- **Decided to establish second factory in Shanghai to produce electronic high-purity gases**

  In January 2020, SDK decided to establish its subsidiary's second factory in Shanghai to produce high-purity gases for electronics. Shanghai Showa Electronics Materials Co., Ltd. (SSE), which is SDK's wholly owned subsidiary producing high-purity gases for electronics, acquired a right to use a site for its second factory adjacent to the First Factory for 50 years, and will establish facilities to produce high-purity nitrous oxide (N_2O) and high-purity octafluorocyclobutane (C_4F_8) gases and a dangerous goods warehouse to stock high-pressure gases. The second factory will start its operations in the second half of 2021. High-purity N_2O is a specialty gas used to form oxidized films on surfaces of integrated circuits which will compose semiconductor chips or display panels. High-purity C_4F_8 is a specialty gas used for etching of those oxidized films and other micromachining processes. The Showa Denko Group is now producing high-purity N_2O at Kawasaki Plant and a site of a group company in the Republic of Korea, and high-purity C_4F_8 at Kawasaki Plant and SSE's First Factory in Shanghai. Due to progress in information communication technologies including 5G mobile communication technology and Chinese government's policy to nurture high-technology industry, the market in China for semiconductor chips and display panels. In order to strengthen its adaptability to changes in needs of the market, including the need for stable supply of high-purity gases, the Group now aims to promote "local consumption of locally produced high-purity gases" further. Moreover, in the present situation where the Chinese government is strengthening regulations on chemicals, establishment and expansion of the Showa Denko Group's dangerous goods warehouse in China to stock high-pressure gases will enable the Group to strengthen its supply chain and competitiveness. By combining its production and quality-control technologies and getting best supply system ready for customers, the Showa Denko Group will further strengthen its high-purity gas business. In addition, since the market for semiconductor chips in Taiwan is also expected to expand, SDK's subsidiary "Taiwan Showa Chemicals Manufacturing Co., Ltd." will establish a new facility to produce high-purity C_4F_8 with annual production capacity of 150t. The start-up of operations of the new facility in Taiwan is scheduled to be in the spring of 2020.

Topics

[Chemicals segment]

- **Decided to streamline domestic production of unsaturated polyester resin and vinyl ester resin**

  SDK decided to terminate operation of its production lines to synthesize unsaturated polyester resin (UP) and vinyl ester resin (VE) at Isesaki Plant by the end of June 2021, and concentrate domestic production of UP and VE at Tatsuno Plant in order to improve profitability of its UP and VE businesses. SDK's functional polymer business has production lines at two bases in Japan, two bases in China and one base in Thailand. UP is marketed mainly as molding material for automotive parts, housing and construction materials. VE is marketed mainly as corrosion resistant material and electronic material. The demand for UP and VE is increasing in overseas markets, especially in China and ASEAN countries, due to increases in house building and infrastructure construction, and the growth of automotive industry. However, in the domestic market, the demand for UP and VE is decreasing due to a decrease in new house building, because the use as housing material is the main use for UP and VE in Japan. Therefore, SDK decided this time to concentrate its operation to produce UP and VE at Tatsuno Plant, aiming to streamline production of UP and VE in Japan. In addition, SDK decided to concentrate its marketing effort for UP and VE on market segments which are expected to be highly profitable and grow, aiming to strengthen earning power of the UP and VE businesses. In Japan, SDK will focus its marketing effort on infrastructural use. Outside Japan, SDK will focus its sales effort on promising markets including China and ASEAN. Furthermore, Isesaki Plant will commit itself to development and production of highly functional resins for electronics, whose market continues growing.

Topics

[Electronics segment]

- **Developed HAMR-technology-based HD media**

SDK developed the technology of manufacturing media for next-generation hard disk drives (HDDs) based on the Heat Assisted Magnetic Recording (HAMR*) technology. Due to the rapid expansion of cloud service, video content, and image-sharing website, the world's data generation volume is growing rapidly. Thus, data centers need HDDs with larger storage capacity. While HD media record information through the polarity of magnetic particles, the speed of improving recording density has slowed down under conventional magnetic recording methods. As a result, there is a need for new recording methods, including HAMR. Also, there is a need for next-generation HD media corresponding to such new recording methods. To contribute toward commercialization of HAMR-based HDDs, SDK has successfully manufactured a new type of HD media. The new product has magnetic coercivity several times as high as the existing most-advanced HD media, while achieving low noise due to very small crystal grain size and optimized grain size distribution control. The new product embodies the highest levels in the industry in terms of read-write characteristics and durability. HD media are key parts for HDDs to determine their storage capacities. As the largest independent HD media supplier, SDK aims to quickly launch top-quality media based on innovative technologies. In accordance with its motto of "Best in Class," SDK will continue contributing to the increases in storage capacities of HDDs.

*HAMR represents a recording method in which magnetic film is locally heated at the time of recording. This technology has been developed to solve the "magnetic recording trilemma": difficulty in simultaneously meeting the three requirements of fine-particle structure, resistance to thermal fluctuation, and ease of magnetization. Compared with the recording density of approx. 1.14 Tb/in2 for HD media based on conventional magnetic recording methods, it is said that HAMR-based HD media will achieve recording density of 5-6 Tb/in2 in the future. Provided that the same number of disks are used, it is estimated that a 3.5-inch HDD will achieve storage capacity of approx. 70-80 TB per unit.

Topics

[Electronics segment]

- **Decided to install equipment to mass-produce *SPALF*™ packaging material for large onboard LIBs**

  Showa Denko Packaging Co., Ltd. (SPA), a consolidated subsidiary of SDK, has developed a new product to be added to the lineup of *SPALF*™ aluminum laminate film which is used as packaging material for pouch-type lithium-ion batteries (LIBs), and decided to install equipment to mass-produce the new product. This new product is specialized for large-sized LIBs, which are mainly used for cars. Operation of the new production equipment is scheduled to be started in March, 2021. *SPALF*™ is laminated composite film consisting of resin films and aluminum foil, and is mainly used as packaging material for pouch-type LIBs. Pouch-type LIBs have outstanding flexibility in shaping. In recent years, pouch-type LIBs have begun to be widely used in large-sized equipment including EVs because pouch-type LIBs' high quality has been widely recognized and there has been considerable progress in verification of pouch-type LIBs' safety. Since development of EVs is in progress not only in China but also in Europe, the demand for pouch-type LIBs has been increasing. The global demand for LIBs (in electrical capacitance) is expected to increase 30% a year until 2025*. The Showa Denko Group produces and sells various LIB materials with distinguishing advantages, such as *SPALF*™, *VGCF*™ additives for anode/cathode materials, and *POLYSOL*™ aqueous binding resin. By increasing sales of these LIB materials, the Group will aim to contribute to the growth of LIB market and improvement in functions of LIBs, and make the Group's LIB materials business grow to be established as a KOSEIHA Business in the field of advanced battery materials.

  *SDK's estimate

Topics

[Inorganics segment]

- **Started labor-management consultations about realignment of graphite electrode production sites in Europe**

  Labor-management consultations have started concerning planned closure of a production site in Meitingen, Germany, under the jurisdiction of consolidated subsidiaries SHOWA DENKO CARBON Products Germany GmbH & Co. KG and SHOWA DENKO CARBON Germany GmbH. The Meitingen site is currently producing connecting pins* for graphite electrodes. When the site is closed, the Showa Denko Group's connecting pin production will be concentrated at Omachi Plant in Japan. When production at Meitingen is stopped, the Showa Denko Group's global graphite electrode production capacity will decrease by 40,000 t/y, to 210,000 t/y. The Group has the leading share in the global ultrahigh power (UHP) graphite electrode market. However, electric steelmakers are continuing to adjust their inventory of graphite electrodes since the second half of 2019. Thus, our operating rates have fallen in the European market, where economic slowdown is noticeable. In addition, labor-management consultations have started at SHOWA DENKO CARBON Austria GmbH's Steeg site concerning temporary idling for a limited period of time. These two actions will result in a rebalancing of capacity in Europe in line with projected graphite electrode demand. SDK will continue taking various measures to achieve "Value in Use No. 1" for customers and to further increase competitiveness and profitability.

  *A connecting pin is used for connecting rods of graphite electrodes.