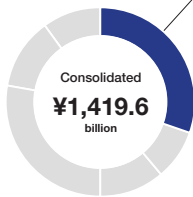




Chemicals

Fiscal 2021 Net Sales



Chemicals segments

Net sales
¥431.0 billion

Operating income
¥37.9 billion

Petrochemicals
¥277.7 billion

Basic chemicals and Industrial gases
¥72.0 billion

Graphite electrodes
¥81.3 billion

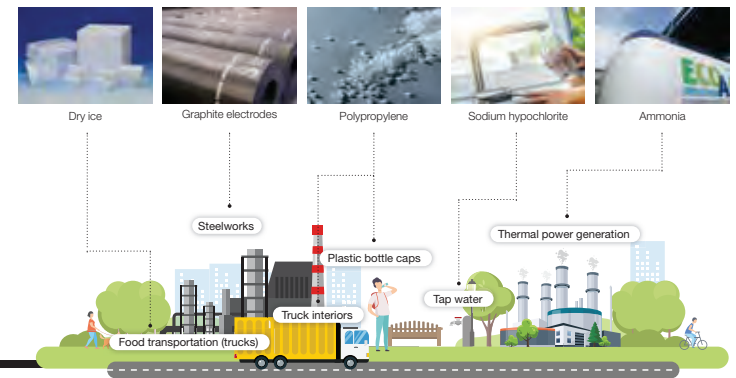
Management Target

EBITDA margin
15% or more
in 2025

Strategy for Realizing the Long-Term Vision

The Chemicals segment has a broad-ranging lineup of highly competitive, high-share products, including olefins, organic chemicals, graphite electrodes and other carbon products, basic chemicals, and industrial gases. With this lineup of products that function as the building blocks of various industries and infrastructure, this segment continues to contribute to society through safe and secure operations. At the same time, improvements to production processes are being pursued with the goal of contributing to the happiness and prosperity of people and to harmony with the global environment.

	Results in 2021	Plan for 2022	Vision for the future (2030)
Petrochemicals	<ul style="list-style-type: none"> Greater-than-expected recovery in demand after the impacts of the COVID-19 pandemic Increases in product market prices due to a more favorable balance of supply and demand Contributions to higher earnings following rises in the price of naphtha (difference between the receipts and disbursements of raw materials and products) Massive year-on-year increase in operating income 	<ul style="list-style-type: none"> Continuation of strong demand Looser balance of supply and demand due to construction of additional facilities in Asia Greater-than-expected market deterioration continuing since the start of 2022 Rising costs due to higher prices for crude oil and naphtha Decrease in production volume as a result of shutdown maintenance of the Oita Petrochemical Complex conducted once every four years 	<ul style="list-style-type: none"> Improvements to profitability and efforts to limit volatility in earnings Reduction of 30% in CO₂ emissions from the Oita Petrochemical Complex in comparison to 2013
Basic chemicals and Industrial gases	<ul style="list-style-type: none"> Greater-than-expected recovery in demand after the impacts of the COVID-19 pandemic Substantial improvement in the earnings structure due to a tighter balance of supply and demand Record-breaking operating income Higher costs due to logistics stagnation and a rise in raw material/fuel prices seen in the second half of 2021 	<ul style="list-style-type: none"> Continuation of strong demand Ongoing logistics stagnation Prolonged rise in costs due to soaring raw material/fuel prices Aggregate volume of used plastic recycled reached one million tons in January 2022 	<ul style="list-style-type: none"> Promotion of the popularization of low-carbon ammonia Creation of a hydrogen use network together with companies near the coastal area of Kawasaki City
Graphite electrodes	<ul style="list-style-type: none"> Alleviation of surplus graphite electrode inventories of customers Achievement of the No. 1 global share of sales and production volume in the three-month period from October to December 2021 Decrease in use of blast furnaces and increase in use of electric furnaces in the global steel production industry from an ESG perspective (resulting in growth in demand for graphite electrodes) Higher sales and income following recovery in demand for steel and electrodes 	<ul style="list-style-type: none"> Increased use of renewable energy 1. Utilization of big data for management of water intake; maximization of hydroelectric power generation volume through sophisticated prediction of water volume fluctuations 2. Global expansion (starting with Europe) Pursuit of synergies with AMI Automation (sale of electric furnace operation optimization software, etc.) Analysis of the relationship between furnace operating conditions and electrode quality (data science) Expansion of strategic supply partnerships with customers Maximization of sales volume at prices ensuring an appropriate spread Improvement in cost-competitiveness 	<ul style="list-style-type: none"> Stable supply of electrodes supporting a global transition toward electric furnaces as the No. 1 global supplier Contributions to the development of zero-emissions electric furnaces Reductions in CO₂ emissions (30% reduction from 2013) and in waste and use of renewable energy at factories Stable operation of water system underpinning the plan of Omachi City, Nagano Prefecture, to evolve into a futuristic city based on the principles of the SDGs and maximization of community water system efficiency through utilization of natural resources and big data



Showa Denko Products in Everyday Life

Competitive Edge

Petrochemicals

Policies

We will seek to boost competitiveness and help achieve carbon neutrality in 2050 based on our vision of developing a sustainable business that consistently generates high profits.

Major Products

Olefins, organic chemicals



Business Strengths

- The Oita Petrochemical Complex is located in close proximity to the Asian market, giving this export base one of the greatest geographical advantages in Japan in terms of logistics. We anticipate that we will have access to an increased range of business opportunities as demand for petrochemical products grows overseas.
- The capacities of our equipment and our operating track record enable us to accommodate a diverse range of ethylene feedstock, giving us the ability to respond flexibly to changes in the volatile raw material market.
- We boast a lineup of unique, high-market-share acetyl derivatives (ethyl acetate, n-Propyl acetate, and allyl alcohol) that take advantage of proprietary catalysts and processes, and we hold the top share in the Japanese market for these products.
- Our lineup of reliable olefin derivatives (polyethylene, polypropylene, etc.), assembled through alliances in Japan, make us competitive in high-value-added fields.
- Development is underway for a low-concentration CO₂ separation system employing an innovative separation agent to further our quest toward carbon neutrality in 2050 (P.52).

Basic chemicals and Industrial gases

Policies

Foundations are being developed so that we can become Asia's foremost chemical supplier.

Major Products

Industrial gases, basic chemicals

Business Strengths

- Capitalizing on the advantageous urban location of the Kawasaki Plant, we are catering to needs for a diverse range of functional chemicals including industrial gases, fiber materials, high-purity gas for semiconductor production, and medical and agricultural materials.
- Chemical recycling technologies are being utilized to produce ammonia using hydrogen extracted from used plastic. As a result of these efforts, the amount of used plastic recycled reached one million tons in January 2022. Moreover, the CO₂ emitted during manufacturing processes is used to produce dry ice and liquid CO₂, meaning that our operations produce effectively zero emissions (P.52).

Graphite electrodes

Policies

By supplying the world's best electrodes coupled with unparalleled services, we will promote efficient and eco-friendly steel recycling and thereby contribute to the sustainable development of society.

Major Products

Graphite electrodes

Business Strengths

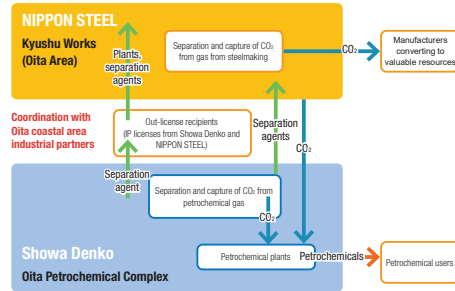
- With the No. 1 position in the global market and the ability to ship electrodes from production bases in six countries, we are promoting local production and consumption in the United States, Europe, and Asia.
- Our base of more than 200 customers around the world is being utilized to engage in strategic supply partnerships with customers who share our values, in order to stabilize operations. Such partnerships are also leading to increased operational stability in terms of procurement.
- Through our partnership with AMI Automation, we are working together with customers to enhance operations at production sites via digital technologies for optimizing electric furnace operating conditions. Electric furnaces are an effective means of conserving energy and cutting CO₂ emissions (reduced equipment damage, increased electricity efficiency in production processes, higher electrode output) (P.52).
- We are promoting renewable energy use on a global scale. In Japan, for example, we are using hydroelectric power as the primary power source at the Omachi Plant. We have also commenced long-term procurement of renewable energy in Europe (P.64).

Chemicals

Initiatives for Resolving Social Issues as a “Co-creative Chemical Company”

Petrochemicals: CO₂ Capture and Use Initiatives to Achieve Carbon Neutrality

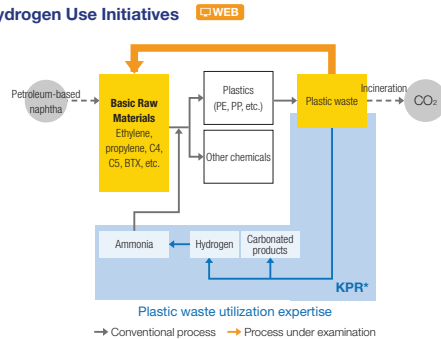
Showa Denko has teamed up with NIPPON STEEL CORPORATION in a co-creative venture to develop a low-concentration CO₂ separation system that employs an innovative separation agent. In May 2022, this initiative was adopted for the CO₂ separation and capture technology development project of NEDO under its Green Innovation Fund. Together with NIPPON STEEL CORPORATION, we are developing technologies for the low-cost separation and capture of low-pressure, low-concentration CO₂ from sources such as factory exhaust gas, while verifying the feasibility of technologies for producing chemical products from captured CO₂. We anticipate that these technologies will allow us to develop and grow CO₂ separation and capture plant operations and separation agent operations. The technology is also expected to give rise to chemical business models that use CO₂ and are thus not dependent on fossil resources, and thereby contribute to carbon neutrality.



Basic chemicals and Industrial gases:

Co-creative Plastic Chemical Recycling and Large-Scale Hydrogen Use Initiatives

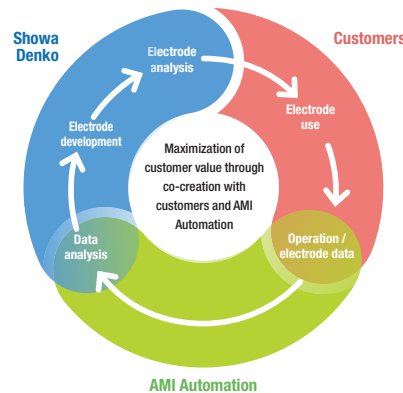
Showa Denko's Kawasaki Plant is developing its Kawasaki Plastic Chemical Recycling* operations through which it decomposes used plastics to extract hydrogen. The hydrogen collected in this manner is utilized for a variety of initiatives, including verification tests of supply for fuel cells for hotels. Showa Denko is a world leader in synthesizing ammonia by utilizing low-carbon hydrogen extracted from gas produced through the process of used plastic chemical recycling. We have been producing ammonia in this manner for many years, and as a result the total volume of used plastic recycled reached one million tons in January 2022. Moreover, the Company began examining the possibility of establishing a base in the coastal area of Kawasaki City to create a cycle for expanding supply and demand to use hydrogen in this manner. Under the envisioned scheme, we would coordinate with seven partners from various industries to form a carbon use network to track medium- to long-term hydrogen demand and supply network feasibility within the area.



* Kawasaki Plastic Chemical Recycling, plastic recycling business operated at the Kawasaki Plant

Graphite electrodes: Maximization of Customer Value in the Steel Recycling Process through Digital Transformation

Showa Denko is the No. 1 global manufacturer of the graphite electrodes that are indispensable to the electric furnaces used to melt iron scraps as part of the steelmaking process. To further build upon these operations, in 2021 we acquired a stake in Mexico-based AMI Automation, a global provider of sophisticated electrode elevation control systems and other services for optimizing the operation of electric furnaces. By strengthening our relationship with this company, we aim to contribute to the maximization of value for customers through a service lineup that expands beyond the sale of graphite electrodes to include operational support and the development of optimal electrodes. Moreover, in 2022 we began collecting operating data from customers' electric furnaces to perform big data analyses for use in proposing optimal electric furnace operating conditions, constructing optimized electrode development systems, and enhancing data science initiatives. In this manner, we will pursue ongoing improvements in the value that we provide to customers through co-creation with these customers and with AMI Automation.



Contribution to Healthy and Fulfilling Lifestyles

MINARIS
REGENERATIVE MEDICINE

Minaris Regenerative Medicine, LLC, is a global provider of services specializing in regenerative medicines including clinical trials and contract manufacturing.

MINARIS
MEDICAL

Minaris Medical Co., Ltd., has cultivated a solid operating foundation over its more than 40 years of operation and is able to supply in vitro diagnostic products for various fields including clinical chemistry and immunology.

Minaris is Showa Denko's life science brand.



Others

Life Science

Strategy for Realizing the Long-Term Vision

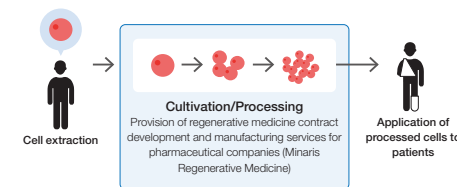
The life science business has been positioned as a pillar of Next-Generation businesses. In this business, we are engaged in manufacturing process development and contract manufacturing of regenerative medicines and the production and sale of in vitro diagnostic products. In 2020, the names of certain life science business Group companies and products were changed to unite them under the Minaris brand, to enable the development of global operations under a stronger brand.

	Results in 2021	Plan for 2022	Vision for the future (2030)
Regenerative medicine	<ul style="list-style-type: none"> Establishment of a manufacturing base network encompassing three regions (North America, Europe, and Japan) Development of a manufacturing base network (start of the expansion of bases on the east coast of North America and construction of a second factory in Germany) 	<ul style="list-style-type: none"> Augmentation of production facilities to improve quality and efficiency (completion of the expansion of bases on the east coast of North America, advancement of construction of a second factory in Germany that is scheduled to commence operations in 2024, and the full-fledged start of regenerative medicine production in Japan) Construction a high-quality, high-efficiency manufacturing network through introduction of IT systems at bases 	<ul style="list-style-type: none"> Provision of high-quality regenerative medicine contract manufacturing services out of bases in North America, Europe, and Japan as a partner to pharmaceutical companies, to contribute to the development and popularization of regenerative medicine and subsequently healthy and fulfilling lifestyles for people around the world
Medical products	<ul style="list-style-type: none"> Acquisition of approval for a new allergy diagnostic reagent panel from the U.S. Food and Drug Administration (FDA) Commencement of joint development with the National Cancer Center of a fast COVID-19 test using cellular immunity methodology 	<ul style="list-style-type: none"> Expansions of the share for cholesterol lipid and diabetes HbA1c reagents Start of shipments of creatinine kidney disease reagents for overseas markets Acceleration of new product development combining FDA approval processes and point of care testing technologies through coordination with the U.S. reagent subsidiary and a U.S. research institution 	<ul style="list-style-type: none"> Establishment of a position as a global company by bolstering operations in distinctive areas of strength and creation of diagnosis technologies and products to support prevention, diagnosis, and treatment, to realize personalized medicine

Initiatives for Resolving Social Issues as a “Co-creative Chemical Company”

Regenerative Medicine

With bases in North America, Europe, and Japan, Minaris Regenerative Medicine supplies contract manufacturing services, through which it produces reliable, high-quality regenerative medicine products on a global basis. These services can be used to produce regenerative medicines with the same level of quality as conventional pharmaceuticals, regardless of whether these medicines are derived from T-cells, mesenchymal stem cells, IPS cells, or some other type of cell, autologous or allogeneic. Contributions are made to Minaris Regenerative Medicine's pharmaceutical company customers through the supply of these medicines. Moreover, the provision of safe and effective regenerative medicines to patients through customers helps society to combat intractable and recurrent diseases that are difficult to treat with conventional methods, such as cancer and hereditary disorders.



Medical Products

It is expected that the role of clinical examinations will grow increasingly important in the years ahead, as examinations are used to treat diseases based on evidence and prevent pre-symptomatic lifestyle diseases, and thereby extend people's lifespans. Minaris Medical has a long history of providing diagnostic products, dating back to its commercialization of the enzyme-method reagent for measuring total cholesterol in 1975. In the years that followed, this company went on to provide a biochemical test for diseases such as hyperlipidemia and diabetes as well as in vitro diagnostic products such as allergy immunological tests and medical devices. Looking ahead, we will strive to create technologies, products, and services to support prevention, diagnosis, and treatment in order to realize personalized medicine. In this way, Minaris Medical will seek to become the company patients choose by contributing to healthy and fulfilling lifestyles through the supply of new value in clinical examinations.

