Chemicals

Most of the products of this division are comprised of industrial chemicals, such as ammonia and sulfuric acid, and derivative products/ high-purity products that have been developed downstream with added value. These products are supporting people's lives in a wide range of fields. By building an efficient production system, we strive to provide excellent products and technologies while reducing the environmental burden.

OKIKAWA Toshiaki
Executive Officer,
Head of Chemicals Division

Basic Chemicals

We sell industrial chemicals such as sulfuric acid, nitric acid, ammonia, and urea, and their derivative products to a wide variety of industries. The Company is further improving the efficiency of our production system in order to create a stronger business foundation to minimize the impact on our earnings due to external factors, such as changes in economic trends in Japan or oversea and fluctuating fuel prices.

We are also manufacturing and supplying products to support cutting-edge fields, and providing products to the market such as high-purity sulfuric acid, nitric acid, aqueous ammonia and liquid ammonia from which impurities are removed to utmost level.

In addition, we established a manufacturing and supply system for our high-grade urea solution AdBlue®* that decomposes nitrogen oxide contained in exhaust gas from diesel vehicles, which is considered to be the cause of air pollution, into nitrogen and water, thereby reducing environmental impact.

*AdBlue® is a registered trademark of the Verband der Automobilindustrie (VAD).

Fine Chemicals

We offer environmental chemicals such as HI-LITE®, used for sterilization and disinfection of swimming pools and water purification tanks, and Venus® Oilclean, a microorganism formulation that decomposes oils and fats in wastewater from food factories, as well as other chemicals such as FINEOXOCOL®, higher alcohol used in products including cosmetics.

In addition, TEPIC®, a high-performance chemical derived from isocyanuric acid, a derivative of urea, and melamine cyanurate are positioned as key products for earnings growth. In addition to being used as a curative agent for coating powders, TEPIC® is seeing an increase in demand for use in electronic materials such as solder resist ink and sealants for LED. Melamine cyanurate is used as a non-halogen flame retardant or an auxiliary flame retardant for various engineering plastics. In addition to focusing on the expansion of applications for these existing products, we are promoting R&D of our own isocyanuric acid derivatives.

Progress in FY2022

1 Isocyanuric Acid

Isocyanuric acid is a material used in TEPIC®, HI-LITE®, and melamine cyanurate, which is used as a flame retardant. In order to facilitate the stable provision of TEPIC® and HI-LITE®, which are sources of growth of this division, to the market, we expanded our isocyanuric acid production facilities in December 2020, which contributed to an increase in sales.

2 TEPIC®

The high-performance chemical TEPIC®, which has a distinctive triazine ring, is used in a wide range of applications. For electronic material applications, we expect that demand for TEPIC® will continue to grow in various fields, including the information & communication field (5G base stations for solder resist ink applications, substrates for autonomous driving, etc.). In FY2022, we fell short of our plans notably due to the lockdowns in China, but in FY2023, we forecast an increase in sales along with the recovery from COVID-19 pandemic. For general-purpose grades, we revised the sales prices in response to soaring international market prices due to rising raw fuel and materials costs and logistics costs. We will pursue a well-balanced sales strategy by expanding sales of high-quality grades while avoiding low-price competition in general-purpose grades.

3 HI-LITE®

"Clean Water and Sanitation", one of the SDGs, is an important global issue. We have exported some grades of HI-LITE® since they have been certified as materials for disinfectants for drinking water in areas where hygiene management is insufficient, such as in developing countries. We will respond to the global demand for disinfection, as well as the demand for disinfectant applications for drinking water.

4 High-Purity Sulfuric Acid

Demand for high-purity sulfuric acid is expected to grow in the information & communications field, a business field which will continue to grow. In FY2022, we fell short of our plans due to production adjustments at customer's semiconductor facilities, but we are forecasting that production adjustments will be complete and shipments will increase in the second half of FY2023. We will continue to maintain high quality and high availability.

Vista2027 Business Strategies

Opportunities and Risks

- Rising prices of raw materials and fuels
- Expansion of semiconductor market
- Increasing demand for environmental-friendly products
- Introduction of carbon pricing

Strengths

- Manufacturing process for products with high self-extinguishing rates as well as high value-added products by developing derivative products using ammonia as a core raw material
- Accumulation of more than half a century of research and know-how regarding ultra-high purity of industrial chemicals

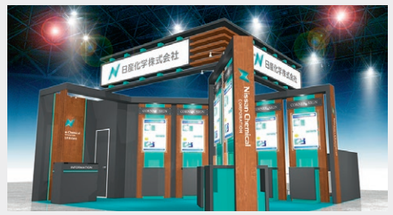
Main Measures

1. Improve profitability of ammonia-related business after the withdrawal from the melamine business
2. Expand sales of high purity sulfuric acid
3. Expand sales and improve profitability of isocyanuric acid and HI-LITE®
4. Develop the business of Venus® Oilclean (a microorganism formulation)

Efforts to achieve Vista2027

In June 2022, the first year of Vista2027, we discontinued the production of melamine, which had been a core product in our ammonia-related products for more than half a century. Meanwhile, for sulfuric acid products, we will make capital investments and upgrade facilities in response to increasing demand. The Chemicals business is susceptible to the effects of fuel prices, supply demand balance, and market environment. Therefore, we will continue to strive to secure stable earnings while flexibly reviewing business strategies in response to environmental changes.

As a source of sustainable growth for the business, we will focus on the development and deployment of new products, mainly isocyanuric acid derivatives, while strengthening sales of products for the electronic materials field. We started the full-fledged commercialization of STARFINE® (zinc cyanurate), from which effects as an additive for paints and adhesives can be expected. Together with the new grades of TEPIC®, it has already been evaluated by many users for various purposes. We will also contribute to waste reduction with Venus® Oilclean, a microorganism formulation.



Exhibited STARFINE® at Converting Technology Exhibition 2023 (STARFINE®)

Performance Materials

In this rapidly evolving business, it is necessary to quickly and accurately grasp the needs and technological trends of the market. For this, sales, research, and production, including overseas bases, are integrated, and we emphasize activities that are closely related to customers. We aim to contribute to the development of society by providing products and services based on the reliable technical capabilities that we have cultivated.

ISHIKAWA Motoaki
Director, Senior Managing Executive Officer,
Head of Performance Materials Division

Display Materials

We are working on alignment materials for aligning liquid crystal molecules in a certain direction. SUNEVER® was made available for sale in 1989, and we have expanded our market share by increasing the functionality of alignment materials, even when the liquid crystal type used is changed from TN to STN or TFT. In addition, in 2014, we started the sale of Rayalign®, a photo-alignment material for IPS liquid crystal, and this has become our main product. This product has been used in many smartphones, tablets and laptops. In the future, it is expected that product demand for Rayalign® will further increase as resolutions in monitor and automotive applications increase.

Semiconductor Materials

We started the manufacture and sale of ARC®*1 in 1998 based on a licensing agreement with US company, Brewer Science, Inc. ARC® is a coating material designed to prevent issues such as irregular reflection and interference of light, and coating failure during micro-fabrication of the photoresist. We launched OptiStack®*2 (multi-layer process material) in 2007 which greatly expanded our business.

With the mass adoption of EUV exposure technology (wavelength: 13.5 nm, semiconductor circuit width: 7 nm and under) in 2018, we are promoting high-quality improvements in the mass production and next-generation development of EUV materials and also focusing on three-dimensional (3D) packaging technology preparing for the limits of optical shrink.

*1,2 ARC® and OptiStack® are registered trademarks of Brewer Science, Inc.

Inorganic Materials

SNOWTEX®, a nano silica water dispersion serving as a fiber processing agent, went on sale in 1951. Now we also offer organosilicasol serving as an organic solvent dispersion, and monomer sol, a product that can be used without solvent. These products are indispensable materials used in coating materials for optical films and in abrasives for electronic substrate materials and for other purposes. In the future, we will work on the development of CCS/CCUS-related materials and expand their applications to new eco-friendly products.

Progress in FY2022

1 Liquid Crystal Alignment Materials for TVs

Currently, our major materials for displays are alignment materials for smartphones and tablets, and especially the photo-alignment material for IPS liquid crystal. In the future, we will also use them for TVs. Although demand for LCD TVs is predicted to decrease somewhat, we predict that demand for alignment materials will continue to increase based on screen sizes. Also, since we believe that screen resolutions will continue to improve, we recognize that it is an important theme to accurately respond to technical requests from customers and expand the market share of our products. In FY2022, we were able to expand our share of alignment materials for VA liquid crystal because some customers switched from the competing product.

2 Strengthening Development Capabilities and Establishment of a Structure to Increase Production for Semiconductor Materials

We strengthened the development capabilities in EUV materials for cutting-edge applications. We also focused our efforts on increasing the quality of current EUV materials and developing the next-generation versions. Moreover, in order to increase the speed of development for South Korea market, we established the Semiconductors Division of R&D center at NCK on April 1, 2023. We are also preparing to operate the 3rd NCK BARC plant in Dangjin, South Korea, in order to respond to the future growth in demand (Construction completed on May 15, 2023).

3 Oil and Gas Applications and CCS, CCUS Applications

We expanded sales of inorganic materials for use in improving oil and gas recovery rate. The sharp rise on oil prices led to our acquisition of new customers and sales increased year on year in FY2022. We also engaged in initiatives related to CCS and CCUS applications, as a way to develop applications toward carbon neutrality. In FY2022, we were able to obtain useful data for demonstration test.

Vista2027 Business Strategies

Opportunities and Risks

- Expansion of applications of photo-alignment materials for IPS liquid crystal and growth of the OLED market
- Expansion of the semiconductor market and progress in 3D packaging technology
- Development of a smart society
- Intensification of inter-corporate competitions

Strengths

- A sales and research system closely linked to customers in China, Taiwan, and South Korea
- Optical control technology
- Functional polymer design technology
- Ultrafine particle control technology

Main Measures

1. Improve existing products and expand their applications
2. Reinforce and increase manufacturing facilities and other facilities
3. Develop and launch new products
4. Start the commercial operation of the new NCK plant
5. Improve profitability of the inorganic material (inorganic colloid) business

Strategies of Vista2027

Efforts to achieve Vista2027

Next-Generation Display Materials

OLEDs are thinner and lighter than liquid crystals, offer high-speed response, and provide added value such as foldability. They are being used more often in smartphones, premium TVs and other products. Recently, following OLED, next-generation self-luminous displays incorporating technologies of quantum dot (QD) and LED, which promise higher image quality, have been actively developed. We will aim to commercialize new products by developing proprietary materials, such as materials that enhance light extraction efficiency, release layer materials, and QD-related materials.

Semiconductor Packaging Materials

Technologies related to high-speed, large-capacity information and communication such as IoT, 5G, and sensors, are making rapid progress. For this reason, further miniaturization and higher integration in the formation of electronic circuits are occurring. As we have been working on the development of materials for the process of 3D packaging with thinned semiconductor wafers, we plan to expand sales the materials in the growing market.

Agricultural Chemicals

We contribute to a stable food supply through consistent business activities from the research for new agricultural chemicals to their development, manufacture, and sales, and expansion of a broad product lineup through the acquisition of ingredients from other companies and joint development of products.

SATO Yuji
Managing Executive Officer,
Head of Agricultural Chemicals Division

Agrochemicals

Our agrochemical business started in the 1910s when our predecessors Nippon Seimi Seizo and Kanto Soda began manufacturing and selling insecticides and fungicides. Starting with TARGA® (herbicide for grassy weeds) launched in 1984, we have continued to manufacture and sell products developed in-house such as SIRIUS® (herbicide for paddy rice), SANMITE® (insecticide/acaricide) and PERMIT® (herbicide for paddy rice and corn), which have steadily improved profitability.

Afterwards, we experienced hard times as a result of in-house development delays and intensifying competition with competitors. However, since the launch of LEIMAY® (fungicide) in 2008, we have returned to introducing products developed in-house, and started sale of STARMITE® (acaricides) in 2009, ALTAIR® (paddy rice herbicide) in 2012, and GRACIA® (general purpose pesticide) in 2018. In addition, we are actively pursuing the acquisition of other companies' agents and have enhanced our agricultural chemical product portfolio by taking over the global product Quintec® (fungicide) in 2019 and Japanese and Korean operations for the versatile DITHANE® (fungicide) in 2020.

Veterinary Pharmaceuticals

Through our development of agricultural pesticides, we have discovered compounds that are not only effective for use on agricultural crop pests, but also on fleas and ticks that are parasitic in dogs and cats, and have continued to examine these compounds as veterinary pharmaceuticals. In 2008, we entered a licensing agreement with Intervet Inc. Development of veterinary pharmaceuticals using Fluralaner, a compound invented by us, as an active ingredient has advanced.

Since launched in Europe and the United States under the brand name BRAVECTO®* in 2014, veterinary pharmaceuticals containing Fluralaner as an active ingredient are now used in more than 100 countries and are leading the growth of Agricultural Chemicals Division. In addition to our products for dogs and cats, "EXZOLT®"* for chickens, cattle, and sheep is also obtaining a marketing authorization in an increasing number of countries.

*BRAVECTO® and EXZOLT® are registered trademarks of Intervet International B.V. and Intervet Inc.

Progress in FY2022

1 GRACIA®

GRACIA®, a pesticide developed in-house, is fast-acting on a wide range of crop pests and has little impact on honeybees which are useful insects. It was released in South Korea in 2018 and went on sale in Japan in May 2019. The product was launched in Indonesia in 2021, in India in 2022, and will be launched progressively in various Asian countries from 2023 onward.

2 ROUNDUP®

ROUND NOZZLE® ULV5, a product that allows for dispersion of ROUNDUP® MAXLOAD in a way that reduces farmer workload, is gaining popularity. We are working to increase sales of ROUNDUP® MAXLOAD by utilizing the boom sprayer nozzle for large-scale farmers released in FY2021. Sales of ROUNDUP® MAXLOAD AL for general consumers are expected to increase due to continued acquisition of new users and expansion of retail distribution.

3 Fluralaner

Veterinary pharmaceuticals for companion animals and livestocks containing Fluralaner as an active ingredient are available in more than 100 countries. In FY2022, sales of animal health products containing Fluralaner as an active pharmaceutical ingredient continued to increase year on year, mainly for companion animals. Along with the low birthrate and aging population, the idea that companion animals are like a family to their owners is growing in popularity. We expect that the demand for veterinary pharmaceuticals will increase in the future as people become more aware about companion animal health.

Vista2027 Business Strategies

Opportunities and Risks

- Labor shortage due to the population decline in Japan
- Growing need for measures to increase food production due to the increase in global population
- Growth of bio-based agrochemicals and materials
- Expansion of market for companion animals

Strengths

- Ability to create distinctive, new agrochemicals from the core technologies of fine organic synthesis and biological evaluation
- Experiences and track records spanning many years from research for new agricultural chemicals to manufacturing and sales
- High level of motivation cultivated through maintaining high profit margins and continuous growth

Main Measures

1. Popularize and expand sales of main products such as GRACIA®, and continue to enhance our respective marketing efforts for large-scale farmers and agricultural corporations, and general consumers
2. Conduct steady development of NC-653 (novel herbicide), NC-656 (novel herbicide) and NC-520 (novel nursery-box insecticide for paddy rice), and create new pipelines
3. Establish a biological research team

Strategies of Vista2027

Efforts to achieve Vista2027

In order to enhance our product portfolio, we will continue to introduce and jointly develop products from other companies, including biological agrochemicals.

In addition, as in-house developed products, following the development of a herbicide for paddy rice flooding treatment (development code NC-653), we also started to develop a herbicide for application on stems and leaves of paddy rice (development code NC-656) and a nursery-box insecticide for paddy rice (development code NC-520). Moreover, we have established a joint venture (Nissan Bharat Rasayan PVT. LTD.) in India for the purpose of manufacturing the active ingredients in agrochemicals. It started commercial operation in March 2023. By having this joint venture's manufacturing plant together with the Onoda Plant, we can respond to growing demand for our agrochemicals. We expect it will contribute to the growth of our agrochemicals business by establishing a robust active production and supply system that is cost-competitive.

Healthcare

In order to appropriately respond to changes in the business environment and achieve mid- to long-term growth, we are accelerating the selection and concentration of business areas. In addition, we contribute to the resolution of health issues by developing and launching new pharmaceuticals, generic drugs and medical materials based on our unique technologies.

ISHIWATA Norihisa
Executive Officer,
Head of Healthcare Division

Healthcare

In the 1970s, a number of companies from other industries entered the pharmaceutical business. We focused our research and development on lifestyle-related diseases and launched efonidipine hydrochloride, an antihypertensive drug, in 1994. It is distributed in Japan by Zeria Pharmaceutical and Shionogi as LANDEL®*1, and in South Korea by GC Biopharma as FINTE®tab.

In 2003, Kowa Company launched the anti-cholesterol drug pitavastatin calcium hydrate as LIVALO®*2, which is currently sold in over 30 countries around the world. After domestic substance patent have expired in 2013, the decline in market shares due to generic drugs and the impact of drug price revisions have resulted in a continuing difficult situation in Japan. The creation of new drugs is an urgent issue for us.

With the organizational restructuring in April 2022, the drug discovery research function was transferred to the Planning and Development Division, where it is handled by the Healthcare Business Development Department. The Healthcare Division is taking charge from the out-licensing stage, developing the business from a comprehensive perspective of broader healthcare together with medical materials.

Custom Chemicals

We operate a "solution proposal" contract business and a joint development business that provide total support for the development of active pharmaceutical ingredients (APIs) in response to customer needs. We accept contracts for the development of manufacturing processes at each stage from preclinical to commercial production, as well as for the manufacture of APIs and intermediates under GMP-compliant conditions. Accompanying this, we also handle services such as quality design, stability testing, impurity/metabolite sample synthesis, and preparation of application materials for the drug master file.

Recently, we have expanded our business of supplying APIs for generic drugs, and are not only handling highly active APIs that require containment, but also efficiently manufacturing highly active vitamin D3 APIs in addition to prostaglandin derivatives using our proprietary two-component coupling method based on our diverse fine organic synthesis technologies.
In addition, we have developed our proprietary liquid-phase synthesis technology "SYNCSOL®" for innovative contract peptide production.

*1 LANDEL® is a registered trademark of Zeria Pharmaceutical Co., Ltd.
*2 LIVALO® is a registered trademark of Kowa Company, Ltd.

Progress in FY2022

1 Construction of Basic Technologies to Accelerate Oligonucleotide Drug Discovery and Promotion of Joint Drug Discovery with Pharmaceutical Companies

Oligonucleotide therapeutics are attracting attention in their main roles as next-generation pharmaceuticals. In addition to accelerating our research by strengthening our unique technologies in oligonucleotide drug discovery, we have been jointly working with multiple pharmaceutical companies to create development compounds since 2019 and expanding these partnerships.

2 Advancement of Strategic Alliance with Modulus Discovery, Inc. to Accelerate Small Molecule Drug Discovery

With recent advances in supercomputers, it is becoming possible to design small molecule drug candidates for target molecules with high precision. Since 2021, we have engaged in a strategic drug discovery collaboration agreement with Modulus Discovery, Inc., which leverages its basic technologies such as cutting-edge computational technology. In this agreement, Nissan Chemical share the development of drug candidates and jointly out-license them to pharmaceutical companies with Modulus Discovery, Inc.

3 Establishment of an Efficient Peptide Manufacturing Technology

In 2018, we invested in PeptiStar, which is aiming to establish a stable supply system for APIs of constrained peptides. Meanwhile, we have developed a novel liquid phase peptide synthesis technology (SYNCSOL®) that enables dramatic cost reduction. In the future, we intend to develop this technology for not only APIs but also peripheral medical materials.

4 Continuous Launch of Highly Bioactive Generic Drugs

The demand for eldecalcitol, a drug for treatment of osteoporosis, is growing because the number of patients with osteoporosis is expected to increase due to population aging. Based on the production results of maxacalcitol, a highly active vitamin D3 API, in FY2020 we started the sale of eldecalcitol, which requires high-quality control because of the susceptibility to decomposition and impurities caused by oxygen, moisture, and heat in the air. In the future, with an eye to expanding into overseas markets in addition to new development, we will establish a stable supply system and nurture it as a source of growth.

Vista2027 Business Strategies

Opportunities and Risks

- Increasing demand for generic drugs
- Expanded efforts in middle molecule drug development
- Aging population and diversification of healthcare
- Intensification of inter-corporate competitions

Strengths

- Fine organic synthesis technology
- GMP compliant high-level containment technology
- Chemistry, Manufacturing, and Controls (CMC) support for APIs
- Cutting-edge evaluation functions

Main Measures

1. Healthcare: Concentrate investment in the oligonucleotide drug discovery and commercialize and expand sales of medical materials (biointerface control materials, cosmetic materials, etc.)
2. Custom Chemicals: Strengthen highly profitable business models, expand into overseas markets, and aim for joint development (peptides, etc.)

Strategies of Vista2027

Efforts to achieve Vista2027

We will focus on oligonucleotide therapeutics utilizing our proprietary basic technology for oligonucleotide drug discovery and steadily promote joint drug discovery platform with pharmaceutical companies. In the area of small molecule drugs, we will work on the use of AI as a shift from existing drug discovery method. The API of LIVALO® will be developed by taking advantage of economies of scale. As for medical materials, we will promote commercialization and sales expansion of new products, including biointerface control materials and cosmetic materials. In addition to the generic drug maxacalcitol, which was launched in FY2015, eldecalcitol, which was launched in FY2020, has achieved significant growth as a pillar of our business. In the future, we will accelerate the development of new generic drug APIs which leverage our strength, and be fully engaged in business not only in Japan but also in overseas markets. Furthermore, leveraging the overwhelming technological superiority of our proprietary liquid-phase synthesis technology "SYNCSOL®", we will develop the peptide contracted business and the joint-development business. Through these measures, we will further develop Custom Chemicals into a highly profitable business.

It will take time to obtain results for new pharmaceuticals and medical materials. Until then, we will continue to boldly take on the challenge of developing new pharmaceuticals and medical materials while supporting the backbone with our highly profitable Custom Chemicals business.

Planning and Development Division

By combining our core technologies with new materials and technologies, we are striving to create new products and businesses with high added value that meet the needs of society. To further accelerate development, the Planning and Development Division was established in FY2020. In FY2022, we established the Healthcare Business Development Department by integrating functions of drug discovery and medical materials, and in FY2023 we newly established the Animal Care Planning Group.

ENDO Hideyuki
Managing Executive Officer, CTO,
Head of Planning and Development Division

Healthcare

We carry out drug discovery, mainly oligonucleotide therapeutics, and development for commercialization of materials for regenerative medicine and raw materials for cosmetics.

In the drug discovery, we are focusing on oligonucleotide therapeutics. In order to contribute to improving patients' quality of life through the creation of innovative new drugs, we are strengthening our platform through collaboration with academia and our partner companies and building our robust R&D portfolio through alliances with pharmaceutical companies.

In the field of regenerative medicine, as well as starting investigator-initiated clinical research using Cellhesion®, a scaffold that enables 3D mass culture of undifferentiated mesenchymal stem cells said to be highly safe, we started paid shipments of Advance-CR, a material for non-frozen transportation and storage of cell clumps (spheroids). In addition, prevelex®, an agent to prevent adhesion of proteins and cells, etc. to containers has contributed significantly to the start of clinical trials at partner companies. We will continue to aim for applications in the containers for test and research, fields of gene medicines and antibody pharmaceuticals.

In the cosmetics field, in addition to the increased use of NFG® (NANOFIBERGEL®) in skin care products provided by cosmetics manufacturers, it gained adoption in hair care products. We are working to further expand its use.

Information & Communication

We are working on the development of new materials that support cutting-edge devices required to realize Society 5.0.

We are promoting market development for materials including μLED-related materials attracting attention as next-generation displays with high brightness and high reliability, wafer-level package-related materials that enable miniaturization and thinness, SUNCONNECT®, an optical interconnect material that support high-speed, large-capacity data communications, and liquid metal-based thermal interface material developed by Arieca Inc.

Environment & Energy

We are committed to product development that contributes to the realization of a sustainable society through Green Transformation (GX).

As for lithium-ion batteries (LIB), we are developing slurry additives with the aim of improving input/output characteristics, extending service life, and reducing process costs, for their early commercialization. We are developing materials for catalyst layers in polymer electrolyte fuel cells and ammonia electrolyte synthesis catalysts for utilizing hydrogen energy, as well as charge transport materials that contribute to improve the efficiency of lightweight flexible solar cells.

With the aim of realizing a recycling-oriented society, we are promoting the development of a gas separation membrane technology expected to reduce costs for CO_2 separation and recovery, and the early commercialization of ECOPROMOTE®, a resin additive, that contributes to cost reduction in the molding process and improving a heat-resisting property of polylactic acid which is rapidly spreading as a biodegradable bioplastic.

Animal Care

We are working on planning and development for commercialization in the field of veterinary pharmaceuticals. We are planning and developing new veterinary drugs using the R&D technology of small molecule drugs cultivated by Nissan Chemical over many years, and formulating strategies for establishing a sales and distribution system for veterinary drugs in Japan.

New Material Planning and Research Management

Through venture capital based investment and other means, we are working to discover high-quality start-up companies and new development themes. We are working at the revitalization of development themes by introducing new materials and technologies in each field and accelerate commercialization by strategically investing in startup companies.

Also, through the training of researchers and the support of R&D themes, we are working for enhancement of R&D capabilities by creating a mechanism that leads to the evolution of existing technologies and the creation of new technologies.

Progress in FY2022

1 Cellhesion®-MS

As a result of our joint research with Incorporated Medical Institute Saiseikai SOBAJIMA Clinic, we commenced the clinical research on knee osteoarthritis (OA) using adipose-derived mesenchymal stem cells cultured with Cellhesion®-MS. Compared with plane-cultured mesenchymal stem cells in conventional culture vessels, they show improvements in the potency of accumulation in involved and injured sites, the anti-inflammatory effect, and the angiogenesis potency and other aspects. Therefore, it is expected to exert a higher efficacy on the OA treatment.

2 prevelex®

prevelex® series developed by Nissan Chemical are anti-adhesion coatings for biological substances that are applicable from test and research to clinical applications. Heartseed announced that they had successfully dosed the first patient in a phase I/II clinical trial, an investigational cell therapy for heart failure. prevelex® CC1 was used for the production of iPSC-derived cardiomyocyte spheroids for the clinical trial.

3 SUNCONNECT®

SUNCONNECT®, an optical interconnect material with high heat resistance and low optical loss, has been evaluated by customer companies as a material for polymer optical waveguides, and its paid sales have already started. For opto-electronic hybrid technology, which is expected to see further development in the future, we will widely deploy this material, mainly to semiconductor package substrate manufacturers in Japan and overseas.

4 Charge Transport Materials for Solar Cells

Regarding organic photovoltaics (OPV), lightweight and flexible solar cells that practical application preceded, efficiency improvement by adopting next-generation active layers, has become one of the most important issues, and our charge transport materials are being evaluated by customers. Currently, we are utilizing this knowledge to develop materials for perovskite solar cells.

Vista2027 Business Strategies

Strategies of Vista2027

Opportunities and Risks

- Expansion of regenerative medicine market, growth of beauty and health market
- Development of digital society and expansion of ICT market
- Increasing demand for technological development aimed at the realization of a low-carbon society
- Development delays and late arrival of expected new fields

Strengths

- Fusion of fine organic synthesis, functional material design and biological evaluation
- Thin film coating based interface control technology
- Extensive network with external research institutes

Main Measures

1. Accelerate development by allocating resources to important themes
2. Incorporate new technologies and materials from inside and outside the Company into in-house technology
3. Improve contact with customers and strengthen solution proposals capability