

Functional Materials business

We will enhance our competitiveness and develop sustainable products with a combination of a wide range of materials and technologies of oleo & speciality chemicals and functional chemicals & polymers.

Business strengths

- Covers diverse industries, centered on fatty acid derivatives
- Top-class lineup of cosmetic materials in Japan
- Highly advanced technology for miniaturization of electronic components
- Developing high-performance products in collaboration with resin manufacturers
- Reliable technological capabilities in refining, synthesis, formulation, and more
- Promoting global business development by increasing the overseas sales ratio

Executive Operating Officer
General Manager,
Functional Materials
Division

**Kenshiro
Shuto**



The Oleo & Speciality Chemicals Division, whose core products were various derivatives made from oils and fats, and the Functional Chemicals & Polymers Division, whose core products were petrochemicals, were merged to form a division with a wide range of materials and technologies, including fatty acids, fatty acid derivatives, surfactants, ethylene oxide and propylene oxide derivatives, organic peroxides, polybutene, functional polymers and electronic materials. This business domain encompasses all of NOF's three prioritized business fields, and aims to expand business in each of these growth fields.

The biggest goal is to develop more sustainable products while increasing competitiveness in the market. We are focusing on proposals that integrate materials of oleo chemicals and functional chemicals & polymers, such as eco-friendly products that utilize biomass and products that improve the performance of polybutene by applying oleo chemical's emulsification technology. Moreover, for our R&D, in addition to our key technologies such as functional polymers, we are working to consolidate and strengthen our technologies, by integrating the additive design technology of oleo & speciality chemicals and the

resin evaluation technology of functional chemicals & polymers, while pursuing technological innovation and the creation of new, higher-performance materials.

We will establish our position in the market through provision of innovative products while flexibly responding to global needs and environment changes. To achieve a sustainable business model, we emphasize the integration of technology in our strategic proposals and R&D. Along with improving our competitiveness in the market, we aim to have consideration for the global environment and contribute to building a sustainable society.

Main products and uses

- **Fatty acids**
(for tires, rubber, and other resin products, etc.)
NAA®
- **Fatty acid derivatives**
(for base material for refrigerating oils, toner for printing machines, lubricants, gear oil, etc.)
UNISTER®, MILLUBE®, ELECTOL®
- **Surfactants**
(for cosmetics, various detergents, etc.)
UNILUBE®, DIAPON®, STAFOAM®, LUMINOVEIL®
- **Ethylene oxide propylene oxide (EO/PO) derivatives**
(for cosmetics, electronic components, coatings, adhesives, etc.)
WILBRIDE®, MALIALIM®, BLEMMER®
- **Organic peroxides**
(for various plastic products, rubber products, golf balls, home appliances, construction materials, automobile interiors and exteriors, etc.)
PERBUTYL®, PERHEXYL®, PERCUMYL®, PEROYL®
- **Petrochemical Products**
(for lubricants, various kinds of tape, adhesive plasters/pastes, coatings, etc.)
Polybutene, EMAWET®, NA Solvent™
- **Functional polymers**
(for lamps, air ducts and other automotive parts, bathtubs, etc.)
MODIPER®, NOFALLOY®
- **Electronic materials**
(for LCD panels of PCs and smartphones, coatings, etc.)
NOFCURE®

Contribute to social issues

Expectations for naturally-derived products in response to tighter environmental regulations



Unlike mineral oils, which do not decompose naturally, the materials used by NOF are biodegradable, naturally-derived oils and fats. Even if lubricants leak from rotating parts of machines, environmental pollution can be prevented, so demand for naturally-derived oils for ships and wind power generation is expected to increase in the future. The usage of oiled products is expected to increase due to growing demand for products such as alternative CFC refrigerants caused by increased need for polymer surfactants for condensers alongside the shift to EVs, as increased need for air conditioners due to global warming.

The shifts to 5G communication and EVs make development of new products an urgent task



We are working on the development of curing agents for low-dielectric materials for substrate material resins in preparation for 5G, which is expected to increase the volume of information. Furthermore, the increase in the number and size of displays accompanying the shift to EVs in automobiles is expected to increase demand for products in the display field, in addition to protective films for LCD color filters. For electronic materials, we will also focus on market development in East Asia, including China, Taiwan, and South Korea.

Metal Coatings business

We will respond to rapidly growing demand centered on the EV and renewable energy markets.

Business strengths

- Contributing to the corrosion protection of automotive parts in Japan and overseas
- Also used in railways, buildings, and wind power generation equipment
- Creating a global standard for corrosion protection through global expansion

Operating Officers
Group Head of the Metal Coatings Group

Kuniaki Tsuruoka



We have been offering materials to prevent rusting mainly on metal parts, centered on automotive parts, as well as joints of buildings, parts fastening railways, and other such parts. In our mainstay automotive market, we will work to expand sales by capturing new demand that is changing amid the ongoing shift to EVs. In the non-automotive market, one of our targets is wind power generation and solar photovoltaic (solar PV) in the growing renewable energy field. In particular, offshore wind power generation, whose development is rapidly expanding in China and elsewhere

in East Asia, is expected to make extensive use of anti-corrosive coatings, including for the use of bolts to fasten rotating blades and anchors that are buried in the seabed. We will respond to the rapidly growing demand by consolidating the technologies where our Group companies have strengths.

The strength of our metal coatings business lies in the global locations of our manufacturing and sales bases, and we are building a strong network. By further strengthening this global supply chain, we aim to improve productivity and

capture market needs.

In addition, as environmental regulations become increasingly strict, we will also contribute to solving sustainability issues to reduce impact on the global environment by leveraging Group synergies in the development of new products that reduce CO₂ emissions and eliminate the use of hazardous substances.

Main products and uses

- Corrosion protection of automotive parts
- Corrosion protection of renewable energy generation facilities (Wind power and Solar power)
- Corrosion protection of railway parts
GEOMET®, GEOMET PLUS®



Contribute to social issues

Differentiation through waterborne anti-corrosion coatings that reduce environmental impact



Unlike "solvent-based anti-corrosion coatings" offered by competitors in Europe and the United States, NOF's products are characterized by the fact that they are "waterborne anti-corrosion coatings." As the need to reduce environmental impact increases, expectations for eco-friendly GEOMET® have been increasing.

Aiming to reduce energy consumption by lowering the temperature in the curing process



Because the use of anti-corrosive coatings requires a manufacturing process that involves curing at temperatures of 300°C or higher, we have been studying the development of low-temperature curing type products to reduce greenhouse gas emissions. By developing anti-corrosive coatings that can be cured at lower temperatures, we can reduce the energy consumption, such as electricity and gas, required for the process.

Life Science business

We will promote the development of biopharmaceuticals and nucleic acid drugs, and aim to become an indispensable presence in the pharmaceutical and medical care industries.

Business strengths

- Widely used in medicine and medical care fields
- World's no. 1 share of activated PEG for DDS
- Contribute to the development of biopharmaceuticals and nucleic acid drugs
- Possess the highly biocompatible material LIPIDURE®
- Expansion of the LIPIDURE® lineup
- Support pharmaceutical and medical equipment manufacturers from research to commercialization

General Manager,
Life Science Division

**Yuji
Yamamoto**



The spread of COVID-19 infections has led to technological innovations in drug delivery systems (DDS: drug delivery systems) in the pharmaceutical market at an astonishing speed. One of these is nucleic acid drugs (mRNA drugs) using lipid nanoparticles (LNPs), a technology that has been established and penetrated the market at a rate that would ordinarily be unfathomable. This new market is said to be growing at an accelerated pace.

The 2025 Mid-term Management Plan states that NOF is collaborating with universities and

research institutions to develop and propose more functional materials for biopharmaceuticals such as protein drugs and peptide drugs, as well as for nucleic acid drugs (mRNA drugs) applications, which are attracting attention. In addition, we will provide courteous customer support utilizing our overseas sales bases, strengthen our quality management system by introducing the latest information management system, and expand our production system at the new Aichi Works. Furthermore, in the fields of eye care, medical devices, and diagnostic pharmaceuticals, where

the biocompatible material LIPIDURE® (MPC polymer) has grown as a key material, we will leverage our business integration for further business development, aiming to become an indispensable presence in the global pharmaceutical and medical care industries.

Leveraging the synergies from the business integration, NOF's life science business will continue to contribute to technological innovation in the global pharmaceutical and medical care industries with highly functional life science-related materials.

Main products and uses

- **Activated PEG**
(for various pharmaceuticals)
SUNBRIGHT® Series, PUREBRIGHT® Series
- **Functional lipid**
COATSOME® series
- **Surfactant for drugs**
(for injection and vaccine preparations)
Polysorbate 80 (HX2)™
- **Biocompatible materials**
(for contact lenses, drugs and diagnostic pharmaceuticals, medical devices, etc.)
LIPIDURE®



Contribute to social issues

Contributing to improvement of patients' quality of life



DDS is a technology that enhances the effects of drugs by adjusting their physiological activity, targeting lesions, yielding chemical stability, adjusting metabolic activity, and other means, so that they act at the required place in the body in the required amount for the required time. This technology makes it possible to reduce the side effects of drugs and the frequency of daily injections, thereby contributing to improving the QOL of patients who need these drugs.

Focusing on the development of diagnostic pharmaceutical agent technologies in the wake of the outbreak of infectious disease



COVID-19 is raging around the world. PCR test kits and antigen test kits have been widely used as diagnostic pharmaceuticals. Going forward, as global warming progresses and new infectious diseases emerge, the demand for diagnostic pharmaceuticals is expected to increase. Therefore, in order to contribute to people's health and hygiene, NOF is promoting the development of technologies that contribute to improving the quality and performance of diagnostic pharmaceuticals.

Functional Foods business

We will shift our focus from quantity to quality, promote R&D, and balance both sustainable development of the food industry and people's health.

Business strengths

- Functional food materials with a wide variety of functions
- Strong sales network for bread-making and confectionery production
- Develop new markets with healthcare foods products

Executive Operating Officer
General Manager, Functional Foods Division

Hirofumi Kato



We will reform our profit structure through a strategic shift beyond the conventional food business, shift our focus from quantity to quality, and shift to the functional foods business.

In the processed edible oils business, we will focus on the development of functional food materials, promote R&D related to underutilized food resources, and contribute to sustainable food production and consumption. Furthermore, we will pursue functions to improve the physical properties of foods and address social issues such as greenhouse gas reduction and food loss to contribute to both the global environment and human health.

In the healthcare foods business, we will expand the domains of our proprietary health food materials and fats-coating technologies. With a mission to contribute to people's health, we will provide innovative products by making full use of the latest scientific knowledge and cutting-edge technologies. Furthermore, through public bidding invitations for industry-academia sponsored research, we aim to develop new processing technologies, create proprietary materials, and provide functions involved in biological regulation.

To achieve sustainable innovation, we will collaborate with external experts to respond to market changes and

customer needs. The development of new processing technologies and the creation of innovative materials require a wide range of expertise and experience. Therefore, we actively promote the use of external human resources and collaborate with top-class experts to provide the highest level of quality and value.

We will support development of high-quality products that consumers can use with peace of mind, contribute to the health of people around the world, and establish a sustainable business model by supporting the development of the food industry in consideration of the global environment.

Main products and uses

- **Processed edible oils, functional food materials**
(for bread, confections, etc.)
CRUMB SOFT® SK, BREADY® SA, SUNSHORT®, COOKRICH®
(for alternative foods made with plant materials, etc.)
Delinular™
- **Healthcare foods products**
(for supplement, nutritional products, etc.)
Komecosanol®, NICHYU®PS50, NICHYU®GPC85R



Delinular™ soy protein fat substitute



Contribute to social issues

Supporting the development of food ingredients that can replace meat, which has a high environmental impact



Plant-derived meat alternatives are attracting attention as plant-based foods with both environmental and health-related value. Based on this trend in Japan as well, food manufacturers are actively working to improve the quality of their products as they commercialize them. In response, NOF has begun to develop ingredients with functions to improve taste and texture. Meanwhile, we are also providing function-related support for new materials created by university research laboratories and food ventures.

Contributing to the reduction of food loss, which has now become a major social issue



“Food loss,” which refers to the disposal of food that could have been eaten, such as unsold, uneaten, or expired food, has become a major social problem. We have developed functional food materials that maintain the softness of bread and improve its texture and volume, which prolongs its deliciousness and prevents its early disposal, thereby contributing to the reduction of food loss.

Explosives & Propulsion business

We will develop businesses based on national policies, such as on defense and space, and focus on the introduction of eco-friendly equipment and product manufacturing.

Business strengths

- There are continuous needs for space and defense-related products
- Solid propellants for rockets are the best technology in Japan
- Development of energy control technologies for a wide variety of consumer products

Executive Operating Officer
General Manager, Explosives & Propulsion Division

Kazuhiro Narumi



The NOF Group's Explosives and Propulsion business provides explosives in three major areas: the industrial explosives field, the defense field, and the space field. We are developing business for much of this based on national policies. Our industrial explosives are used in public works mainly for purposes such as quarrying and tunnel excavation. Our defense business responds to Japanese demand for defense equipment, such as firearms and guided missiles for the Self-Defense Forces to face geopolitical risks. In the space business, we have a mission as a top manufactur-

er in Japan to meet needs for solid propellants for space rockets required for launching satellites, which have become indispensable to people's lives. In each of these businesses, we have established efficient production systems to ensure a stable supply of products and to meet increasing demand, and we are working to further improve productivity.

In addition, we have been introducing eco-friendly facilities, such as those that reduce CO₂ emissions. Aiming to improve sustainability going forward, we are promoting research on

gunpowder compositions that reduce CO₂ emissions, substituting eco-friendly gunpowder that does not use lead, and accelerating development of solid propellants for small rockets that have less environmental impact.

The production plant of our Explosives & Propulsion business has a large area for security reasons, and a wide variety of wild plants grow within the grounds. By properly managing these living things, we will contribute to climate change and biodiversity.

Main products and uses

- Industrial explosives**
 (for quarries, tunnels, etc.)
 Emulsion explosives, ANFO explosives, electric detonators
- Space rocket products**
 Solid propellants, pyrotechnic devices for space rockets
- Defense products**
 Gun propellants / rocket propellants, pyrotechnic devices for missiles, defense equipment
- Functional products (consumer products business)**
 Temperature Label® (temperature indicator), UV Label®, sterilization materials, anti-freezing agents, NET LAUNCHER® (crime prevention devices), vapor pressure crushing agent (GANSIZER®)



Contribute to social issues

Focusing efforts on space and defense-related businesses from a medium- to long-term perspective



The NOF Group has long supported the space business, starting with the Japan Aerospace Exploration Agency (JAXA). It can be predicted that information from satellites will become increasingly necessary for industries in Japan and abroad going forward, such as in the evolution of communications and the commercialization of automated driving. On the other hand, launching a rocket with high accuracy is not easy, and constant technological innovation is required. Space and defense-related business is an essential part of national policy. We will continue to focus our efforts on contributing to society while earning stable profits.

Preventing road surfaces from freezing and contributing to traffic safety
Automatic liquid antifreezing agent spraying devices



When automobiles drive on roads with snow and ice in winter, there is a danger of traffic accidents caused by tires slipping. Our competitors' antifreezing agents are mostly chloride-based. However, the chlorine-free antifreezing agent KAMAGU® sold by HOKKAIDO NOF CORPORATION does not cause salt damage to structures such as metal or concrete, nor to the natural environment. In addition, the AUTOKAMAGU® automatic antifreezing agent spraying device is equipped with a solar panel and can be operated without electricity, which contributes to energy conservation.