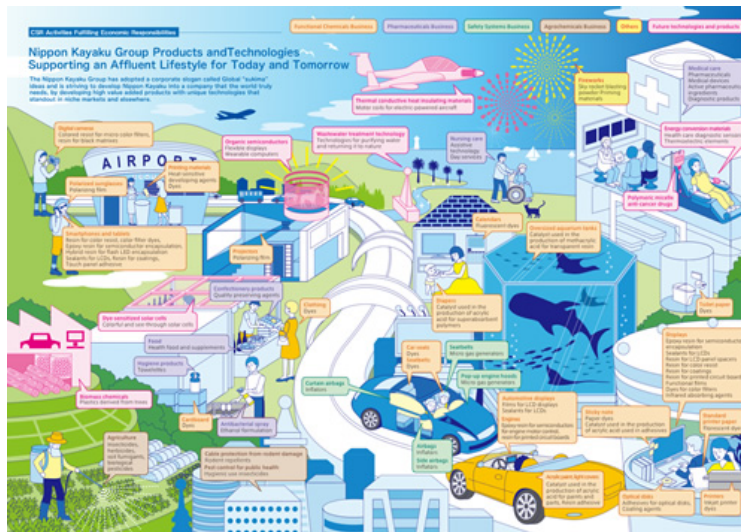




CSR Activities Fulfilling Economic Responsibilities

Current Nippon Kayaku Group Products and Future Technologies and Products Supporting an Affluent Lifestyle

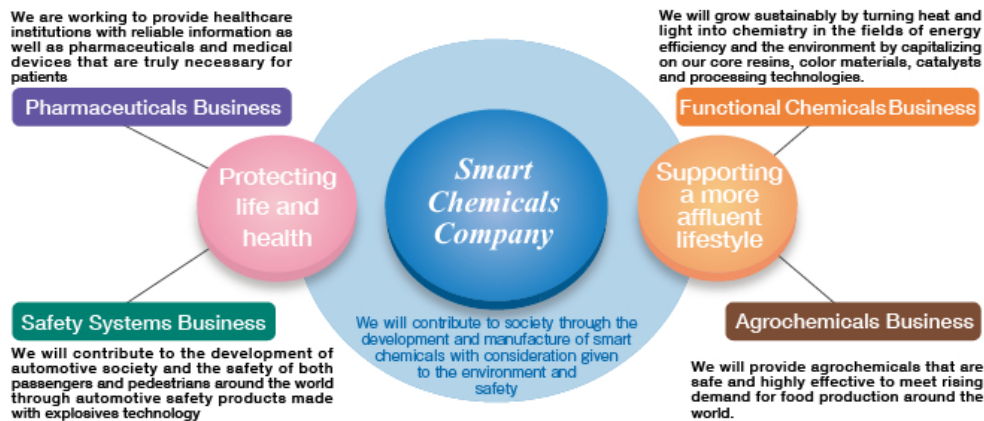
The Nippon Kayaku Group has adopted a corporate slogan called Global "sukima" ideas and is striving to develop Nippon Kayaku into a company that the world truly needs, by developing high value added products with unique technologies that stand out in niche markets and elsewhere.



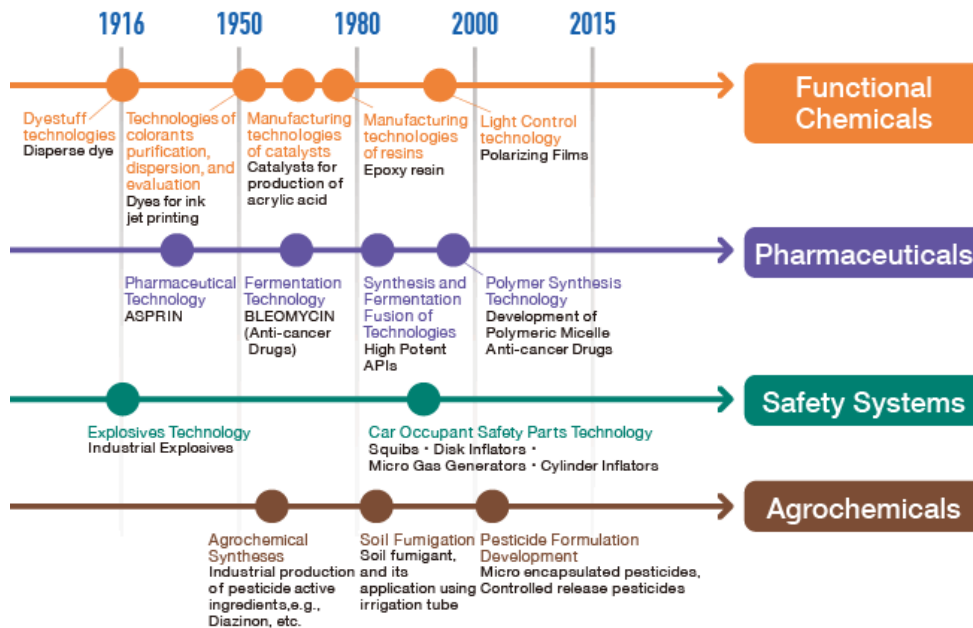
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The Nippon Kayaku Group's Businesses

This section will take a closer look at the 4 core businesses of the Nippon Kayaku Group as well as products that it developed with unique technologies that contribute to the betterment of society.



A Century of History and Technological Innovation



Functional Chemicals Business

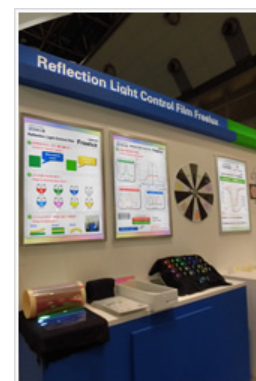
We are working to develop products that can contribute to society by turning heat and light into chemistry in the fields of energy efficiency and the environment

The Functional Chemicals Business is working to develop and supply products that can contribute to society and are people-friendly by turning heat and light into chemistry in the fields of energy efficiency and the environment by capitalizing on our core resins, color materials, catalysts and processing technologies.

In fiscal 2014, we developed Freelix, a specialty long wavelength refractive film. Freelix is able to freely reflect long wavelength light, providing a vivid metallic sheen similar to metallic vapor deposition membrane, despite the fact it is organic. Since it can sharply reflect especially long wavelengths, Freelix is able to cover a wide area from ultraviolet to near-infrared, all while maintaining a high degree of transparency (unpigmented).

Freelix is expected to be used in lens applications to selectively cut ultraviolet, blue light, near-infrared, and other types of light that could potentially be harmful to the eyes. It is also likely that Freelix will be used in automotive and construction material applications as a heat shield.

Functional Chemicals Business



Freelix on display at tiOFT2014

Pharmaceuticals Business

We will contribute to the improvement of patient QOL through our role as a partner to medical professionals

Nippon Kayaku is proactively developing biosimilars that have played an important role in the treatment of cancer and autoimmune diseases.

In 2013, we brought to market Filgrastim BS, Nippon Kayaku's first ever biosimilar. In 2014, we launched Infliximab BS, the first monoclonal antibody biosimilar to be approved in Japan. By offering a wide range of biosimilars, we hope to create a society where people have access to even better and higher quality medicine, anytime, anywhere and for everyone. Nippon Kayaku will continue to contribute to the improvement of patient QOL in its role as a partner to medical professionals.

[Pharmaceuticals Business](#)



MINK Web – an informative site targeting medical professionals developed by Nippon Kayaku

Safety Systems Business

We will provide a stable supply of products made locally as part of our globalization efforts

Automobiles have become an indispensable mode of transportation for people around the world, and this is why worldwide demand for automobiles is expected to continue increasing in the future.

As automobile society grows, there is the growing risk that the number of automobile collisions may become more prevalent than ever before. The active and passive safety technologies used on automobiles continues to make dramatic progress with each passing year and recently consumers have begun selecting their automobiles based not only on the environment, but also safety features.

Nippon Kayaku harnesses its long-standing explosives technologies to manufacture inflators for airbags, which is one element of collision safety protecting passengers, micro gas generators for seat-belt pretensioners, and pop up engine hood devices to protect pedestrians from head injuries at five sites around the world. We are contributing to the safety of automobile passengers around the world by supplying the necessary quantity of products to the areas that require them.

[Safety Systems Business](#)



Air bags inflated using explosives technology

Agrochemicals Business

We will contribute to improving the worldwide food supply through the provision of agrochemicals

The environment surrounding agriculture is becoming more severe with each passing year, marked by food supply issues caused by the rising world population, issues with Japan's food self-sufficiency rate, and increasing crop damage from disease, weeds, and pests due to global warming. Such an environment requires that safe and secure agricultural crops be grown consistently and brought to market in a stable manner.

The Agrochemicals Division offers a variety of agrochemical products created with its innovations and proprietary technologies from unique perspectives. For example, Leaf Guard Water-dispersible Granule, which adopts a granule shape to improve user convenience, or Sukumi Hunter, which is a controlled-release formulation that stops damage to nursery rice plants right after transplantation or during growth after direct seeding from the channeled applesnail for extended periods of time.

In this manner, the Agrochemicals Division is contributing to the stable production and supply of agricultural crops to market by developing and launching new agrochemicals by leveraging its various technologies to develop products closely in tune with the frontlines of agriculture.

[Agrochemicals Business](#)



Left: Sukumi Hunter
Right: Leaf Guard

Research and Development

Researching the Needs of Tomorrow: R&D for Organic Semiconductor Materials

Electronics have drastically improved living standards since the 20th century. Today, electronics occupy an indispensable presence in many of the products we use every day, including computers, smartphones and medical equipment. One of the core components of these electronics are inorganic semiconductors.

Nippon Kayaku is researching and developing organic semiconductors as an alternative to inorganic semiconductors. Organic semiconductors can be used in a host of different products (products that bring our live new and greater convenience) because they make it possible to make electronics softer. In addition, organic semiconductors can be

printed, making the semiconductor manufacturing process more environmentally friendly and use less energy. Organic semiconductor materials are garnering much attention from academia and industry alike as a material that represents the key to the future of electronics.

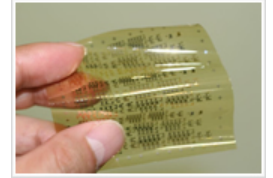
Nippon Kayaku's organic semiconductor materials boast among the best performance in the world. We are also working closely with other leading research institutions in Japan and abroad to accelerate the commercialization of these technologies through our involvement in NEDO's consigned research project, the Japan Advanced Printed Electronics Technology Research Association (JAPERA).

Going forward, Nippon Kayaku will seek to research new themes that capture the needs of tomorrow and to systematically develop businesses in the segment in order to make sustainable contributions to society.

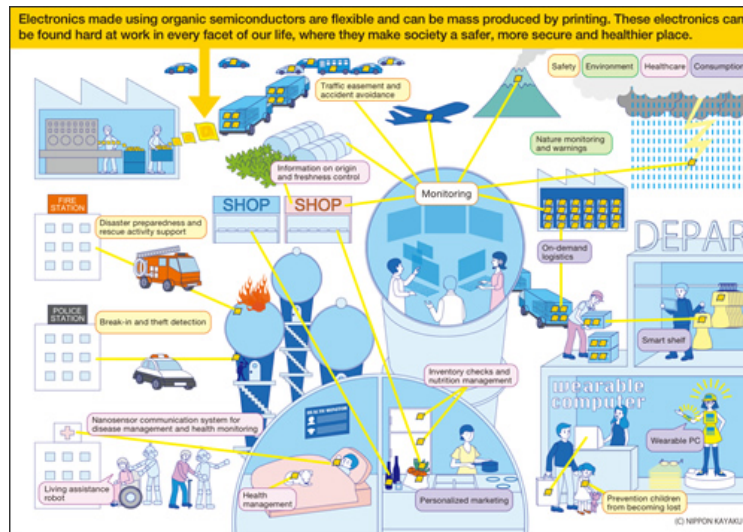
[Learn more about our research laboratories](#)



The world which uses an inorganic semiconductor



The world which uses an organic semiconductor



[View larger image](#)

Involvement in the NEDO Biomass Project

A majority of the chemicals produced in Japan are made from raw materials derived from crude oil and today some 23% of the country's total oil consumption is used as a raw material for chemicals. This means the chemical industry uses a large amount of Japan's oil resources. With worldwide consumption of oil continuing to increase, to overcome the challenges of rising oil prices, depletion risk, and global warming caused by CO2 emissions, society will need to shift to various non-oil-derived raw materials in the future. Non-edible biomass is one such material.

The New Energy and Industrial Technology Development Organization (NEDO) launched the Development of Manufacturing Processes for Chemical Products Derived from Non-edible Plants with the goal of building an integrated, high cost competitive manufacturing process spanning from non-edible biomass to final chemical product and shifting consumption toward non-edible biomass raw materials.

Nippon Kayaku's joint proposal with other companies and research institutions was adopted for the project and research began in September 2013.

Nippon Kayaku's role in this project will be to leverage its core resin synthesis and assessment technologies to develop a process for manufacturing thermally-cured epoxy resin from lignin, a type of unused non-edible biomass.

Globalization of research activities

Following the policy of Nippon Kayaku's global management, the Research and Development Group is in the process of building a global R&D structure inclusive of overseas Group companies. While promoting greater interaction among researchers working for overseas subsidiaries, the Research and Development Group is carrying out the following activities from the perspective of CSR.

Hosting international internship students

Nippon Kayaku participates in the Vulcanus in Japan Program, which provides internship opportunities to international students. This program, which is run by the EU-Japan Centre for Industrial Cooperation, invites trainees from European universities to Nippon Kayaku's laboratories, where they take part in R&D and in-house events. By joining young international researchers, the hope is that the research laboratories of Nippon Kayaku



will be invigorated in the process . Through this program, Nippon Kayaku also hopes to contribute to international exchange and the education of international students.

Joint collaboration with overseas research institutes

Nippon Kayaku actively engages in joint research with research institutes located outside of Japan. For example, we are pursuing joint research through a partnership agreement concluded with the Graphene Center at Cambridge University in the UK. This research focuses on graphene-related material that is garnering attention for its potential use in various fields, including energy and sensing. Nippon Kayaku is also conducting joint research with Guilin University of Technology in China on the decolorization of colored effluent discharged during the dye production process using microorganisms. In addition to these examples, Nippon Kayaku is pursuing joint research activities with research institutes outside of Japan and hopes to realize a sustainable society in a broad range of fields such as the development of innovative materials and the establishment of environmental protection technologies.