

HOME # CSR # Special Feature - For the Next 100 Years



Special Feature - For the Next 100 Years Passing Down Our Technical Prowess and Developing the Human Resources of Tomorrow



Raising the level of safety-oriented culture and safety awareness (employees from administrative departments also take part in trainings otherwise unrelated to their duties)

One of the important challenges we face today as a multinational corporation looking at the next 100 years is how to pass down the advanced technical prowess developed over our history to the next generation at our global network of subsidiaries. Nippon Kayaku excels at integration and now we must work to combine and integrate not only our technologies, but also our approach to human resources development. We believe this represents the first step in creating the innovations of the future.

Passing down Technologies from Veteran Senior Employees to Junior Employees Initiatives of Nippon Kayaku Fukuyama

Nippon Kayaku Fukuyama is a subsidiary of Nippon Kayaku established in 2000 that engages in the contract manufacturing of functional materials and pigment materials. It plays an important role in ensuring the Nippon Kayaku Group is able to provide a stable supply of products. In recent years, Nippon Kayaku Fukuyama was faced with a shortage of mid-career employees despite the globalization of its business. As of October 2014, some 70% of its workforce was under the age of 40, and when many of its core employees reach retirement age five years from now the company's employees in their 20s and 30s will need to take the reins and drive the company forward. For this reason, Nippon Kayaku Fukuyama faced the urgent task of passing down its technologies and establishing a solid foundation of knowledge among its young employees before its veteran senior employees



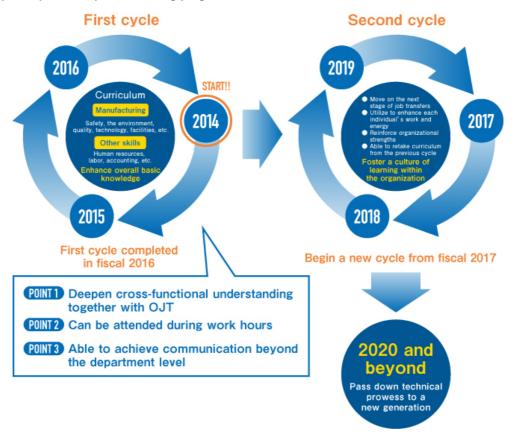
Workshop about the basics of cost

reached retirement. price as well as profit and loss

To overcome this issue, Nippon Kayaku Fukuyama worked on developing a new training program that would allow younger employees to obtain a comprehensive overview of the plant's functions. This in-depth three-year program consists of 49 curriculums and administered to employees based on their career stage. The company set up an effective organizational structure for this program involving the entire plant by establishing a crossfunctional working group to come up with the curriculum and instructors.

The program was launched in 2014. Section heads, team leaders and other mid career employees headed up efforts to create the curriculum so that newly hired employees can learn a broad range of skills over a period of time. Through this training, the plant's vertical threads and horizontal threads are able to mesh, creating a sense of solidarity that transcends age. The program is now being implemented under a new three-year plan established for fiscal 2017 and beyond. The know-how gained from the program will be shared with other business sites as a way to develop the human resources who will underpin the Nippon Kayaku Group in the future.

Overview of Nippon Kayaku Fukuyama's training program



MESSAGE

"What's needed to elevate frontline strengths and make progress toward becoming a stronger company."

The year 2012 is when we realized that we had a real problem on our hands in terms of the unbalanced nature of our workforce that could negatively affect the company. As a result, we set up a team and began planning and preparing a training program while meeting countless times to discuss details carefully. As a result, in 2014, we were able to launch the program, which represents the first of its kind at the Nippon Kayaku Group. One of the challenges we faced was how to implement this in–depth program given that the plant's functions primarily involved production. The secret to our success may have been the fact we were able to reach an agreement with top management and working group members to allow employees to take the course during work hours.

Employees were able to interact more through this training and learning, which fostered better communication and breathed fresh new air into the company. As a first-time initiative, there were many opinions and issues, but are resolving each based on our discussions. We will continue with our efforts to become a stronger company while making steady progress in human resources development as a manufacturer.

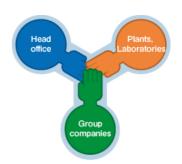


Members of the training system development team at Nippon Kayaku Fukuyama (Pictured from left) Masumi Imai (leader), Shinichi Namba, Hiroki Kishido, Kazufumi Kobayashi

Human Resources Development at the Nippon Kayaku Group

At the Nippon Kayaku head office, the Human Resources Management Division, Technical Administration & Engineering Division, Environment Protection & Safety Division, and Quality Management Division provide various forms of training for human resources development. These include human resources development offered by the Human Resources Management Division, the exchange meeting of "KAYAKU spirit Dream and Drive" ("Kaizen") Activities of the Technical Administration & Engineering Division, why-why analysis provided by the Quality

Management Division, and other small-scale networking sessions. Also, each production site (plants and laboratories) provides systematic training focused around OJT, while working on creating systematic mechanisms for the training system. Each group company carries out human resources development, with best practices also rolled out at overseas subsidiaries. In this manner, we are working to pass down the technical prowess of the Nippon Kayaku Group.



Global Quality Control and Human Resources Development within the Safety Systems Group

The safety systems group supplies automotive safety components to customers around the world. This requires that it provide and guarantee the same standard of quality. The group has production facilities worldwide and so the Himeji mother plant has implemented a robust design *1 resilient in the face of numerous variations given the requirements of differing production sites in terms of culture, language and technologies. This approach has enabled it to provide the same level of quality worldwide.

At its global production sites, locally hired managers and line workers are selected to take part in extended trainings at the mother plant to obtain essential knowledge and skills. After completing their training, they return to their workplaces and serve as instructors to pass on their knowledge and skills to others.



Technical interns from Malaysia and members of the Himeji Plant's Ouality Assurance Department

*1 Robust design: A design in which product performance and quality does not vary and is not affected by interference or measurement errors.

Meeting of the Movement for Tomorrow

The Meeting of the Movement for Tomorrow, which marked its 57th time in 2016, is held annually as a company-wide venue for sharing a broad range of business activities in terms of operational improvements, improving productivity, human resources development, new business creation, and new product development. The presentation has a cosmopolitan flair as it is attended by participants from Nippon Kayaku as well as group companies from inside and outside Japan. Each year the number of participating business sites increases and it has become the largest annual event held by Nippon Kayaku Group.



The presentations indicate the high level of awareness and provide many ideas that can be rolled out at other workplaces or serve as hints for task solving.

Also, exchanges during the presentations and networking session serve as not only a chance to ask questions and share information, but also provide many stimuli from interactions with people from differing sectors, jobs, countries and cultures. This allows for participants to expand their personal network and horizons, while also elevating their motivation toward work.

We will continue holding this meeting so that Nippon Kayaku Group employees can continue to raise their ambitions and take the next step in their careers.

Exchange meeting of "KAYAKU spirit Dream and Drive"("Kaizen") Activities

Nippon Kayaku holds "KAYAKU spirit Dream and Drive" ("Kaizen") Activities *2 as a way to increase operating efficiencies and productivity. These activities involve various plans for promoting active approaches to improvement. One of these activities is the exchange meeting of "KAYAKU spirit Dream and Drive" ("Kaizen") Activities held once every year.



The exchange meeting is a venue for presenting simple improvements a person has made at work. It is a small-scale meeting mainly plant departments. The purpose of the exchange meeting is to share approaches, challenges and issues related to activities on the frontlines and then create a better environment for these activities and implement them actively. In the year 2016, the fifth time exchange meeting was held where participants were separated into small groups to carry on open discussions.

During the open discussion, participants talked freely about approaches to theme creation and team building and innovations for increasing motivation. The small group size made it easier for participants to talk amongst themselves, resulting in active discussions. Participants raved about the format because they were able to find out about the views of other business sites and share challenges.

Going forward, we will continue to deepen exchanges between participants from differing workplaces in order to spread the effects of these activities to other workplaces and business sites.

*2 "KAYAKU spirit Dream and Drive" ("Kaizen") Activities

A form of improvement activities that focus on the ingenuity and innovations of all employees in order to resolve problems in the workplace independently under the banner of CSR management

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Special Feature A Century of **Challenges**

From Explosives to Chemicals and from Fine Chemicals to a Smart Chemicals Company®

"Continuously providing society with the best products through ceaseless progress and the combined forces of our consciences." By following this corporate slogan, the Nippon Kayaku Group has survived turbulent times, from World War II and post-war reconstruction to Japan's period of rapid economic growth and the collapse of Japan's asset bubble. One of our traits has been our ability to constantly evolve our business activities in a flexible manner under this unwavering slogan to meet the dramatic and repeated changes that have taken place in our business environment. The Nippon Kayaku Group's mainstay products, too, have undergone constant change to meet the needs of the times as well as the needs of Japan's industry and consumers. At the heart of this change and success has been our advanced fine chemical technologies developed since our founding. As a smart chemicals company, we will dedicate management resources to domains where we stand above competition in order to continually contribute to society.











Beginning of Synthetic Dye Production in Japan

Japan relied upon imports for all synthetic dyes from the Meiji period to the Taisho period. These imports were cut off temporarily during World War I causing a nationwide shortage and creating an urgent need to develop synthetic dyes in Japan. For this reason, the government encouraged the domestic production of these dyes. With the start of black sulphur dye, Nippon Kayaku opened the door to production of synthetic dyes in Japan.



1940 Post-war Reconstruction, Rapid Economic Growth and Environmental Pollution

Approves corporate name change to Nippon Kayaku Co.,



Launches direct dye
"Kayarus", dye for textiles
made from cotton and hemp



1954 Develops fluorescent dye



Launches "Kayalon Polyester", a disperse dye for polyester textiles



1969 Launches "Kayacryl®" dye for acrylic textiles

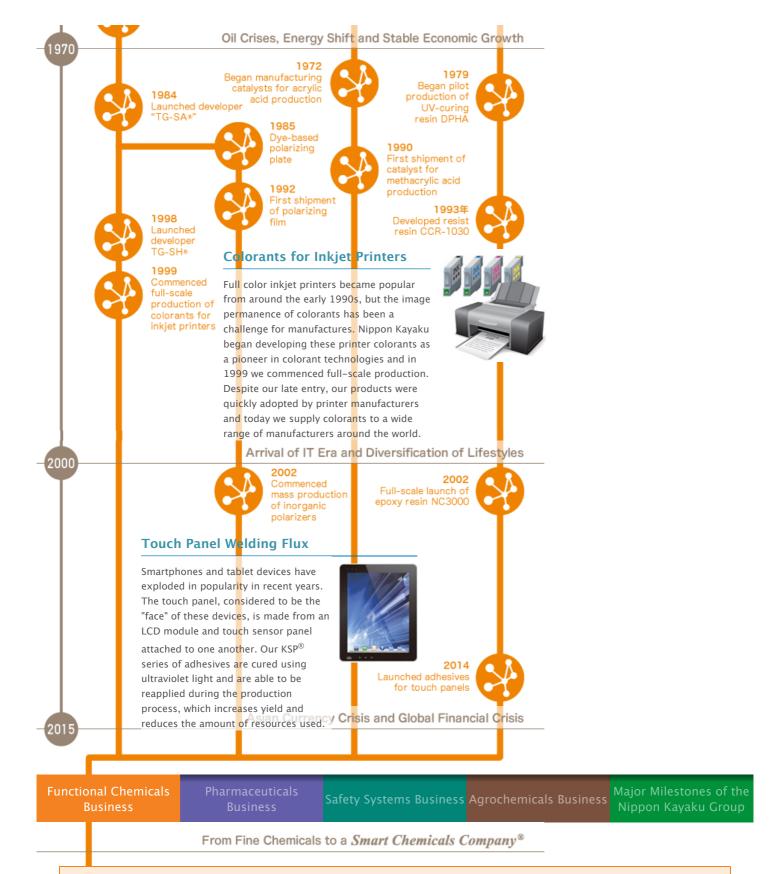


1963 Concludes a licensing agreement with Standard Oil Co., Ohio (US) for acrylic acid technology (catalysts)





1940



Continually delivering functional chemicals with less environmental impacts and that contribute to energy efficiency

The Functional Chemicals Business is developing and supplying functional chemicals with less environmental impacts and that contribute to energy efficiency. For example, our environmentally friendly NC-3000 series of epoxy resin is able to cure with a high degree of flame resistance without adding a flame retardant such as phosphorous or halogen. These adhesives are used for not only semiconductor encapsulation but also printed circuit boards and other fields. The high degree of quality and reduced environmental impact of these products

circuit boards and other fields. The high degree of quality and reduced environmental impact of these products has been proven, earnings them the status of de facto standard in the marketplace today.

In addition, we are contributing to energy and resource savings through the development of high yield catalysts for making acrylic acid and methacrylic acid as well as colorants for industrial inkjet printers that do not produce waste water yet create vivid, solid colors thanks

to our long-standing colorant synthesis technologies. These have earned us a strong reputation among our customers.

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1932 Launches Aspirin, an anti-inflammatory analgesic agent

Meeting demand for aspirin

Aspirin had the largest demand of the important pharmaceuticals that the Government of Japan encourages to be produced domestically, and aspirin was primarily an official drug. At the time, imported pharmaceuticals made up a majority of the domestic market, and amid growing voices for a Japanese pharmaceutical company to initiate private sector production, Nippon Kayaku launched Aspirin Yamakawa, an anti-inflammatory analgesic, in 1932. Aspirin Yamakawa would go on to cover a multitude of domestic drug markets.



1940 Post-war Reconstruction, Rapid Economic Growth and Environmental Pollution

1940

Approves corporate name change to Nippon



1948 Commences production of antibiotic Penicillin



1967 Launches NEOLAMIN™ 3B intravenous multivitamin



Launches BLEO™, an antitumor antibiotic

Beginning of anti-cancer drugs

Nippon Kayaku's Pharmaceuticals Group successfully developed its first anti-cancer drug in February 1969. The drug, Bleomycin, appeared in the April 27, 1969 edition of the Asahi Shimbun newspaper under the headline "High expectations for novel drug used in cancer treatment." This marked the beginning of Nippon Kayaku's long history with anti-cancer drugs.



Oil Crises, Energy Shift and Stable Economic Growth

1970



1973 Launches MUSCALM™ , Antispasmodic agents



1984
Launches RANDA™,
Antineoplastic agents

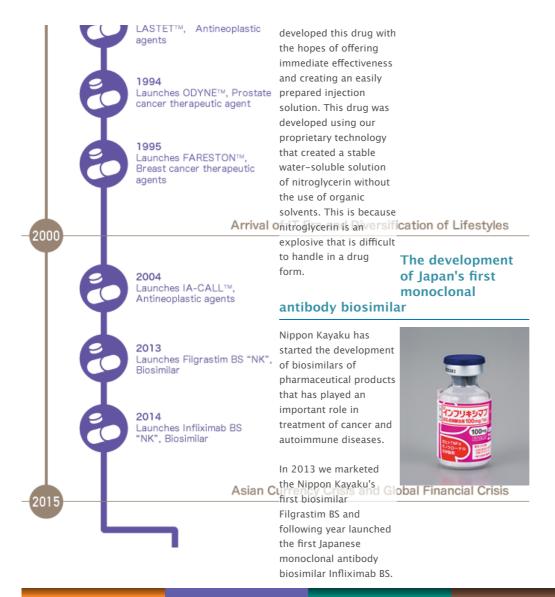


1987 Launches BESTATIN™ and

Development of nitroglycerin injections

In 1984, we launched MILLISROL ™, the world's first water-soluble nitroglycerin injections. In addition to a sublingual tablet used as a treatment for angina already in use, Nippon Kayaku





Pharmaceuticals **Business**

Safety Systems Business Agrochemicals Business

From Fine Chemicals to a Smart Chemicals Company®

We are committed to prompting innovations by using our technological expertise. It is our goal to contribute to society by consistently supplying high-quality pharmaceuticals to improve patient outcomes, and to achieve more efficient medical spending.

Nippon Kayaku is now working on the development of polymeric micelle anti-cancer drugs through a joint Multi-national Phase III Clinical Study. In addition, we are also participating in a joint Multi-national Phase III Clinical Study of monoclonal antibody biosimilar treatments for breast cancer as part of our proactive efforts to develop biosimilar treatments following the success of FILGRASTIM BS and INFLIXIMAB BS, which have already been launched.



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

We are committed to prompting innovations by using our technological expertise, including in the development of generic anti-cancer drugs. It is our goal to contribute to society by consistently supplying high-quality pharmaceuticals to improve patient outcomes, and to achieve more efficient medical spending.









Special Feature A Century of **Challenges**

From Explosives to Chemicals and from Fine Chemicals to a Smart Chemicals Company®

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1910

Foundation of Nippon Kayaku Seizo Co., Ltd.



1917 Receives the first private sector license in Japan for manufacturing dynamite

Beginning of Industrial Explosives Production

In 1914, after the start of World War I, Japan's downtrodden economy staged a turnaround to strong economic growth. With an increase mine production, dynamite, which was disposed of by the military and largely relied on imports suffered an extreme shortage. As demands for private sector production sharply increased, Nippon Kayaku Seizo Co., Ltd. became Japan's first company to make dynamite in 1916 in response to the heightened needs of industry.



1940 Post-war Reconstruction, Rapid Economic Growth and Environmental Pollution

1940

Approves corporate name change to Nippon Kayaku Co., Ltd.



1959 Launches C-Type Instantaneous Electric Detonator



1962 Wins the Okochi Memorial Award for the production of Initiating Explosive "DDNP"



1962 Launches ANFO Explosives

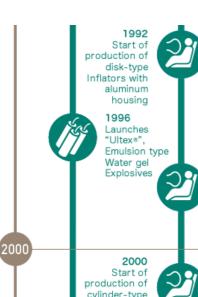
1970

Oil Crises, Energy Shift and Stable Economic Growth

Launch of Ultimate Water Gel Explosives



1989 Start of production of Squibs Sixteen years after we launched emulsion type water gel explosive Kayamite, developed in-house as a water gel explosive that greatly enhances safety during manufacturing and use while maintaining a similar power as dynamite, in 1996 we launched emulsion type water gel explosive Ultex[®], named for the fact that it represents the ultimate explosive.



Users quickly shifted from dynamite to Ultex® and in 2011 we shutdown sales and production of dynamite, which had been a mainstay product for some 94 years since the year after our founding.

Start of production of Micro Gas Generators for Seat Belts

1998

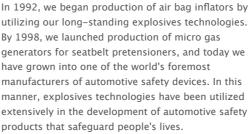
Arrival of IT Era and Diversification of Lifestyles

cylinder-type Inflator with steel housing



Safeguarding people's lives and contributing to automotive society

2001 Start of production of disk-type Inflator with steel housing



2006 Start of production of Micro Gas Generators for Pop-up Hood Lifters



Asian Currency Crisis and Global Financial Crisis

2015

Safety Systems Business Agrochemicals Business

Major Milestones of the

From Fine Chemicals to a Smart Chemicals Company®

With explosives safety technologies as our core competencies, we are providing safety to more people around the world mainly through our automotive safety components.

Automobile production in Southeast Asia is expected to see strong growth rates, second only to China in the

world, and nearly 60% of the market is occupied by Japanese automakers. In 2011, ASEAN NCAP, safety evaluation standards for new vehicles, was established, with safety testing commencing in 2013. This has dramatically increased the use of automotive safety components in automobiles. Given this, the Safety Systems Group examined market entry in Southeast Asia, with these discussions culminating in the establishment of Kayaku Safety Systems Malaysia Sdn. Bhd. in December 2012. The air bag inflators and micro gas generators for seatbelt pretensioners made here are exported within ASEAN and to India, contributing to automotive safety in these areas.









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Manufacturing Agrochemicals from Picric Acid

In 1931, Nippon Kayaku began making Chloropicrin, a soil fumigant agrochemical that is highly effective against insect pests and soil-borne diseases, using the raw material of dye agents, known as black sulphur. This agrochemical greatly contributed to the control of soil-borne disease and pest insects that had been difficult to keep under control until then. At the same time, it also formed the foundation for the development of our agrochemicals business in the post-war era.



1931 Commences production of Chloropicrin, a soil fumigant to protect plants from insect pests and soil-borne diseases



1940 Post-war Reconstruction, Rapid Economic Growth and Environmental Pollution

1940





1957 Commences production of technical grade Diazinon® for hygienic use



1964 Commences production of Diazinon® Granule for agricultural use

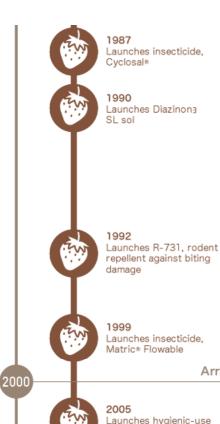
New Agrochemicals Contributing to Increased Food Production

Following World War II, the Government of Japan implemented policies to increase food production, and as a result there were heightened expectations for synthetic agrochemicals that could contribute to plant protection. Nippon Kayaku licensed technologies from Geigy of Switzerland and first commenced production of technical grade
Diazinon® for hygienic use in 1957, and after some quality improvements, we launched the insecticide called Diazinon® Granule for agricultural use in 1964. This product proved to be highly effective against insect pests in paddy rice and agricultural soil, greatly contributing to the development of agriculture in Japan.



Oil Crises, Energy Shift and Stable Economic Growth

1970



Diazinon® SL sol was developed using Nippon Kayaku's micro encapsulation technologies. The active ingredient is enclosed in micro capsules, making it safer and long-lasting . This product is now widely used to control the larva of beetles that eat sweet potatoes. Conventionally. agrochemicals had to be applied several times during a growing season, but this product can control insect pests simply by applying it only once prior to the planting.



Arrival of IT Era and Diversification of Lifestyles



Launches insecticide, Leaf Guard®



2016 Launches insecticide & acaricide, Fuhmon® for mites

Asian Currency Crisis and Global Financial Crisis

2015

Safety Systems Business Agrochemicals Business

Major Milestones of the Nippon Kayaku Group

From Fine Chemicals to a Smart Chemicals Company®

Providing agrochemicals with excellent effects, safety and environmental compatibility together with formulation technologies that make them easy to use and increase performance

On February 15, 2016, the Agrochemicals Division launched spiracle-blocking insecticide Fuhmon®, which is



four unique features: (1) it is made from polyglyceryl fatty acid ester which is used as food additive; (2) there are no limitations on the number of applications and it can be used even the day prior to harvesting vegetables; (3) it can protect plants from damage by spider mites, aphids, and whiteflies simultaneously; and (4) it is effective against insects that have become resistant to $conventional chemical\ pesticides.\ Fuhmon ^{@}\ contributes\ greatly\ to\ protecting\ plants\ from\ various\ pests,\ which\ in\ turn\ contributes\ to\ the$ stable production of agricultural crops. Going forward, we will continue to contribute to agriculture while developing and supplying technologies and materials required by all aspects of this field.









A Century of Challenges

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1916

Foundation of Nippon Kayaku Seizo Co., Ltd.

Acquires Teikoku Senryo Seizo Co., Ltd.

Establishes Yamakawa Seiyaku Co., Ltd.

1940 Post-war Reconstruction, Rapid Economic Growth and Environmental Pollution

1940

Merges and absorbs Teikoku Senryo Seizo Co., Ltd. and Yamakawa Seiyaku Co., Ltd..

1945

Approves corporate name change to Nippon Kayaku Co., Ltd.

1962

Establishes corporate motto and corporate spirit

Recipient of the Deming Prize

The Deming Prize

In 1961, Mr. Yasusaburo Hara, then President of Nippon Kayaku, decided to establish a candidacy for the Deming Prize based on the implementation of a consistent company-wide fundamental policy and the recognition that a company's mission to society is to supply high quality products at affordable prices. Over the next two years, all 4,150 employees took part in a quality control campaign for promoting quality assurance. These efforts paid off in 1963 when the company was presented with the Deming Prize. Since then, quality activities have become a source of pride and an ongoing tradition for Nippon Kayaku.



Oil Crises, Energy Shift and Stable Economic Growth

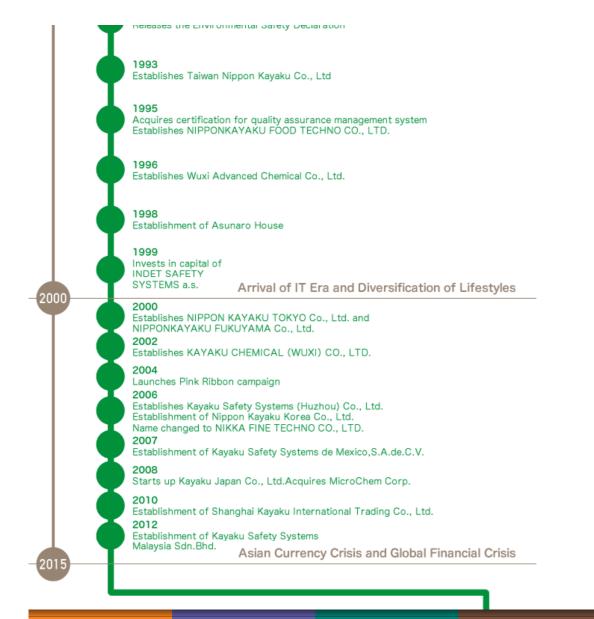
1970

Establishes new corporate symbol

Establishes POLATECHNO CO., LTD.

1992

the Environmental Cafety Declaration



Functional Chemicals

Pharmaceuticals
Rusiness

Safety Systems Business Agroch

Major Milestones of the Nippon Kayaku Group

From Fine Chemicals to a Smart Chemicals Company®

Quality Improvement Promotion Activities

Nippon Kayaku's initiatives for improving quality began with the voluntary introduction of statistical approaches to QC* activities by plant engineers in 1948.

After receiving the Deming Prize in 1963, Nippon Kayaku organized its very first In-house QC Circle Conference in 1966 as a venue to present the results of its QC activities. Since then, we have expanded the scope of these activities into "Small Group Activity Meetings" mandatory for all employees, with this name later changed to the "Meeting of the Movement for Tomorrow." The scope of these activities has been expanded from quality improvement to energy savings, improving occupational health and safety, and environmental conservation. The "Meeting of the Movement for Tomorrow" serves as venue for giving presentations and networking among employees, and now involves Nippon Kayaku Group companies from outside Japan. Additionally, starting in 2014, we re-launched and revamped our proprietary small group activities to include not only improvements, but also human resource development and CSR.

*QC : Quality Control