

# Pharmaceuticals Business

## Review of Operations

The annual sales of our Pharmaceuticals business amounted to 49.335 billion yen, a decrease of 5.092 billion yen (9.4 percent) compared to the previous fiscal year, and the operating income was 12.509 billion yen, a decrease of 2.815 billion yen (18.4 percent) compared to the previous fiscal year. Of pharmaceutical products for the domestic market, sales of FARESTON (anti-cancer drug), RANDA (anti-cancer drug), PINORUBIN (anti-cancer drug), and MILLIS TAPE (vasodilator) increased whereas the sales of ODYNE (anti-cancer drug), MILLISROL (vasodilator), and BESTATIN (anti-cancer drug) decreased, leading to a decrease in total sales compared with the same period sales in the last year. For pharmaceutical products for export, the sales of ETOPOSIDE (anti-cancer drug) increased whereas the sales of BLEOMYCIN (anti-cancer drug) decreased. The sales of the bulk for both domestic and foreign markets decreased compared to the previous fiscal year. For diagnostic products, the sales of LANAZYME ST-439 (breast cancer diagnostic agent) increased whereas the sales of the major product LANA AG (diabetes diagnostic agent) decreased with sales less than the previous fiscal year. As for preservatives, the sales of alcohol decreased compared to the previous fiscal year. Of the healthcare-related products, the sales of bulk increased with sales exceeding the previous fiscal year. Our



Nine anti-cancer drugs, one of the best lineups in the world

pharmaceutical products, mainly the anti-cancer drugs, are exported to more than 80 countries. In addition, joint research is conducted in exploratory research for anti-cancer drugs in affiliation with pharmaceutical companies overseas. In October 1999, application was filed for the manufacture of cevimeline hydrochloride hydrate, a drug for Sjögren syndrome jointly developed by Nippon Kayaku and Snow Brand Milk Products. Sjögren syndrome is an intractable disease of unknown cause with symptoms such as dry mouth and eyes due to disorder in the salivary gland and lacrimal gland. Cevimeline hydrochloride has an action which directly stimulates salivary gland cells and accelerates salivary secretion. It is expected to be useful for improving the quality of life in patients suffering from unpleasant symptoms such as oral and ocular dryness.

## ●Anti-cancer drugs

Nippon Kayaku is engaged in the development of anti-cancer drugs in the fields of prevention, diagnosis, and treatment. The technologies and achievements are among the top level in the world. The launch of BLEO in 1969 was followed by PEPLEO in 1981, RANDA in 1984, BESTATIN and LASTET in 1987, PINORUBIN in 1988, STARASID in 1992, ODYNE in 1994, and FARESTON in 1995, and the company has thus established a stable position as an anti-cancer drug manufacturer. At present, our lineup of anti-cancer drugs covering cancers of all sites is virtually unparalleled. For the total care of cancer, the company is making efforts in the research and development of drugs to relieve severe pain associated with terminal cancer, and supplementary drugs to suppress adverse reactions of anti-cancer drugs and to maximize their characteristics effectively. Of these, early development of a cancer diagnostic agent indispensable for early detection of cancer is awaited. At present, Nippon Kayaku provides the cancer diagnostic drug LANAZYME ST-439, which utilizes monoclonal antibodies, for clinical use.



MILLIS TAPE, a transdermal patch formulation

## ●Cardiovascular drugs

In the research and development of cardiovascular drugs, Nippon Kayaku has also made global achievements. As a producer of explosives that has handled nitroglycerine for years, the company started the manufacture of sublingual nitroglycerine tablets in 1953, noting that nitroglycerin has an action as a specific remedy for angina attacks. Later in 1984, MILLISROL, the first nitroglycerin water solution drug in Japan, was launched. In 1988, NITROPEN, a new type of sublingual nitroglycerine tablet with heat sealing for portability, was launched, followed, in 1989, by MILLISROL TAPE, which demonstrates preventive effects against attacks of angina pectoris or heart failure with only skin application, and MILLIS TAPE, a smaller and improved version of MILLISROL TAPE, in 1998. To prepare for the aging society of the future, the company has a good lineup of nitroglycerine products to combat cardiovascular disease. We also carry out research and development of new compounds effective for cardiovascular disease. ADEHL, one example of such development, is expected as a drug having a special mechanism of action with both inotropic and vasodilating effects.

●**Immunotherapy drugs**

To prepare for the aging society to come, Nippon Kayaku is expected to make further breakthroughs as a pharmaceutical manufacturer. One such breakthrough is immunotherapy. Of all the therapeutic fields, the drugs most awaited are immunosuppressants to suppress rejections of organ transplants and drugs for treatment of autoimmune diseases such as allergies. For the research and development of these drugs, Nippon Kayaku is conducting joint research with various companies. To elucidate the immune system which is indispensable for living creatures to survive has become a great theme for medicine of the future. In the research and development of anti-cancer drugs, the company has already made achievements not only through the approach of chemotherapy but also through immunotherapy. Organ transplants are a state-of-the-art medical treatment, which is commonly practiced in medically advanced countries in the world and is now becoming accepted in Japan. As immunosuppression is the greatest issue at the time of organ transplantation, Nippon Kayaku launched SPANIDIN in 1994. The immunosuppressant is being employed at many medical institutions even now, and has been highly regarded. SPANIDIN is also drawing considerable attention as a drug for autoimmune diseases such as glomerular nephritis.

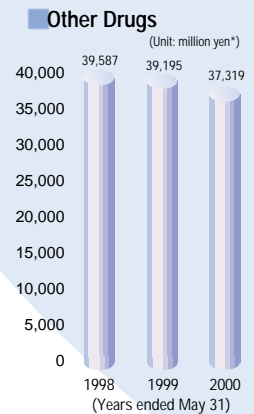
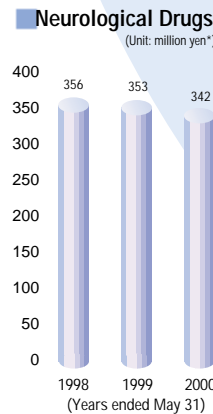
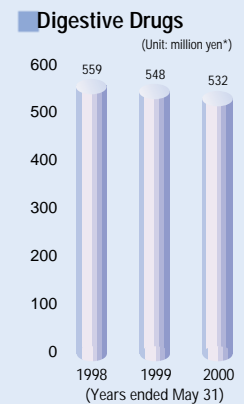
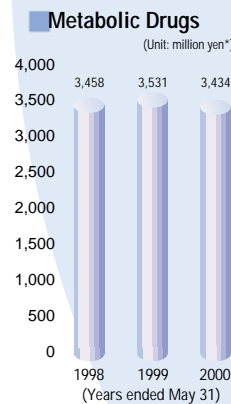
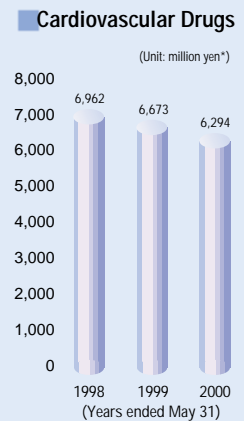
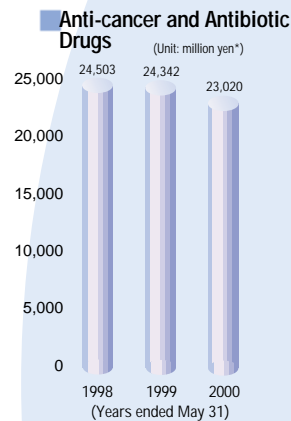
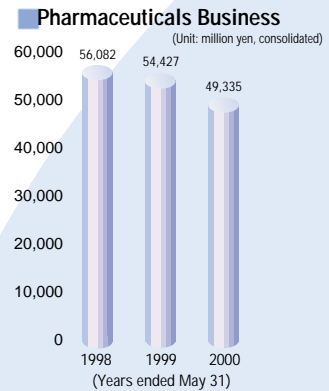


ADEHL



SPANIDIN

**TOTAL SALES**



\*: non-consolidated

## Outlook for the Future

In the future, Nippon Kayaku will specialize in cancer treatment and cancer-related businesses in the medical field, and will combine and utilize its “Knowledge” to make it a core for growth and development of the company. As expected sales for our fiscal year 2002, the company targets 58 billion yen in consolidated accounts. In the pharmaceutical development in Japan, NK433, a drug for temporomandibular joint disorder and SNI-2011, a drug for Sjögren syndrome, have already been applied for approval, and PMCJ-9, a drug for bladder cancer, and NS75A, a drug for infertility, are scheduled to be applied by the end of 2000, while DDP-H, a drug for hepatocellular carcinoma, and SS750, an antifungal drug for systemic infection, are under development. In addition, a drug delivery system (DDS) to enhance therapeutic efficacy by concentrating and accumulating a high molecular weight compound containing an anti-cancer drug in cancer tissue is under development. In Europe, development of a drug for autoimmune diseases, NKT-01 (SPANIDIN), is being conducted, while joint research with venture companies is being conducted in the United States to search for new drugs on a long-term basis.

### Joint development of antifungal drug with SS Pharmaceutical Co., Ltd.

In September 1999, Nippon Kayaku signed a contract for joint development of the antifungal drug SS750 for systemic infection developed by SS Pharmaceutical Co., Ltd. This is a triazol antifungal drug to be administered for systemic infection from fungi (mold) in persons with extremely compromised immunity such as patients with acquired immunodeficiency syndrome (AIDS), patients with terminal cancer, and patients with severe diabetes mellitus. The drug also has a potent action for aspergillus, against which conventional antifungal drugs have weak effectiveness, and is reported to have a wider antibacterial

spectrum. A clinical study will be started in the United States by the end of the year 2000.

### Drug for Sjögren syndrome

In October 1999, Nippon Kayaku applied for approval of manufacture of a drug for Sjögren syndrome that was jointly developed by Snow Brand Milk Products. Sjögren syndrome is an intractable disease with symptoms such as dry mouth and eyes due to disorders in the salivary gland and lacrimal gland. According to the national survey of patient trends conducted by the Ministry of Health and Welfare in 1997, the number of patients with the disease is estimated to be approximately 42,000. SNI-2011 is a new drug for Sjögren syndrome containing cevimeline hydrochloride hydrate as an active ingredient, which has an action to stimulate salivary gland cells. It has already been approved in the United States and is under review by EMEA (European Medicines Evaluation Agency). It is scheduled to be launched in Japan in 2002.

### Joint development business with U.S. venture companies

Nippon Kayaku has started a plan to supply 30,000 types of microorganism culture broth extracts to venture companies in the United States as a seed for joint development of new drugs.

## Steps in clinical development

### Status of new product development

Status of development	Therapeutic classification	Test drug name Non-proprietary name	Development code	Category	Major domestic developers	Expected indications
			Date of NDA		Origin	
NDA filing	Neurological drug	NK433 Lanperisone hydrochloride [Tablet]	NK433	Central muscle relaxant	Nippon Kayaku	Temporomandibular
			Jul. 31, '95		Nippon Kayaku	
	Narcotic analgesic	Morphine sulfate [Capsule]	TNK951	Morphine sulfate	Joint dev. with Teikoku	Cancer pain
			Mar. 10, '99		Ethypharm	
	Neurological drug	SNI-2011 Cevimeline hydrochloride [Capsule]	SNI-2011	Muscarinic agonist	Joint dev. with Snow Brand	Dry mouth associated with Sjögren syndrome
			Oct. 13 '99		Snow Brand	
Phase II	Anti-tumor drug	BCG vaccine [Intravesical instillation]	PMCJ-9	BCG vaccine	Joint dev. with Aventis Pasteur	Bladder cancer
	Anti-hormonal drug	NS75A Cetorelix [Injection]	NS75A	LHRH antagonist	Joint dev. with Shionogi, ASTA Medica, Kayaku ASTA Medica	Infertility
					ASTA Medica (Germany)	
Anti-hormonal drug	NS75A Cetorelix [Injection]	NS75A	LHRH antagonist	Joint dev. with Shionogi, ASTA Medica, Kayaku ASTA Medica	Uterine myoma	
					ASTA Medica (Germany)	

## Review of Operations

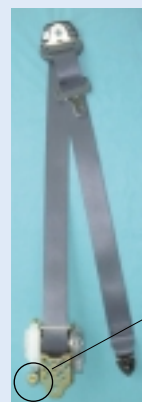
The annual sales for Fine Chemicals business were 68.404 billion yen, an increase of 2.749 billion yen (4.2 percent) compared to the previous fiscal year, and the operating income was 7.844 billion yen, an increase of 4.216 billion yen (116.2 percent) compared to the previous fiscal year. In the inflator business, airbag gas generators (inflator) and micro gas generators for seatbelt pretensioners did well, and a Czech subsidiary company that produces squibs has been turning out steady profits. The catalyst business was sluggish because there was no export of catalysts for manufacture of acrylic acid. In the functional products business which is enjoying good results from booming information technology (IT) related industries, the sales of epoxy resins for semiconductor encapsulation and UV-curing resins for information storage materials are increasing, and optical functional films showed considerable growth owing to this increased demand. In the color chemicals business, special color chemicals for non-textiles showed favorable growth including color chemicals for paper and pulp, resins, and inkjet printing. The sales of fabric dyes were not favorable due to a slump in the market, but the achievements of two Chinese subsidiary companies showed favorable growth. Agrochemicals continuously faced severe conditions in both domestic and overseas markets, and fine chemical intermediates did not perform well due to diminishing demand. In the explosives business, explosives, electric detonators, and fireworks showed steady results. In addition, in the Fine Chemicals business, the color chemical department in the Tokyo plant and all departments in the Fukuyama plant were turned into independent companies. This is an attempt to improve their high-cost nature and strengthen cost competitiveness, aiming to promote introduction and the growth of new business for further expansion of this line of business.

### ◆Inflators

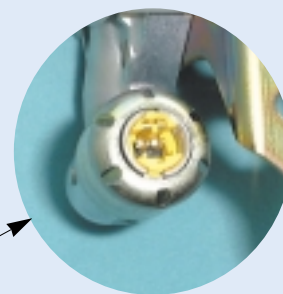
The explosives technology and the explosion control technology established by Nippon Kayaku over long years are utilized in airbag inflators to protect passengers at the moment of collision. The inflator is a core part of the airbag to inflate the bag by generating gas after receiving a signal from a collision sensor. It can take only 0.1 second for the sensor to sense the collision, explode the powder to burn the gas generator, and inflate the airbag if a passenger is to be saved. Our technology for controlling an explosion in unit of 1/1000 second is utilized in that critical moment. Nippon Kayaku also produces micro gas generators (MGG) for seatbelt pretensioners that lock the seatbelt to ensure the safety of a car passenger at the time of collision, and supplies them to automobile manufacturers in Japan. With the increase in the number of automobiles, the safety standard has been upgraded. To meet such requirements in society, the company has been tackling new areas, for example, the development of new gas generators, and adding a function to control the way an airbag inflates depending on the speed at the time of collision, and the technologies are regarded to be at a top level in the world.



Airbag for driver's seat and Inflator



Seatbelt pretensioner



Micro gas generator (MGG)



Airbag inflator for driver's seat

### ◆Catalysts

Two types of catalysts for the production of acrylic acid by propylene direct oxidizing method and two types of catalysts for the production of methacryl acid by isobutylene direct oxidizing method are manufactured and marketed.

Acrylic acid produced using catalysts of our company turn out products useful in various aspects of daily life. For example, super absorbent polymer (SAP) is used for paper diapers and sanitary napkins, and its share in the chemicals market is increasing at an annual rate of 5 percent and more. Acrylic acid polymer is used as a raw material in dental cement for treatment of cavities, and acrylic acid ester synthesized from acrylic acid and alcohol is used as raw material for tags and water paints, etc.

On the other hand, acrylic plates produced from methacrylic acid are highly transparent, and are used for signboards, displays, airplane windshields, large water tanks at public aquariums, and compact disks (CD). The catalysts of Nippon Kayaku are not only for domestic use and are exported to various countries to contribute to development of numerous industries on a global basis.



### ◆Functional products

Nippon Kayaku has a 40 percent share of the world market for epoxy resin semiconductor encapsulation. This is proof of our success and testifies to our skill in constantly grasping and meeting the needs of the market. We have succeeded in liquifying epoxy resins for semiconductor encapsulation that had been limited to a solid form. On the other hand, optical films with superior heatproof and weatherproof properties used for liquid crystal displays (LCD) have been employed for electronic and information-related equipment including car navigation systems, lap-top computers, word processors, and liquid crystal televisions, and evaluated highly. Based on resins as a basic material, we are engaged in the development of combined materials with a higher added value by making full use of our own fine chemicals technology. Particularly, thermal ink is used for receipts and prepaid cards taking advantage of instant printability. In addition, dip materials and molding compositions of the KAYATORON series, and application products using high-purity liquid epoxy resins have been developed, and have attracted attention in various fields. By combining our macromolecular technology and paper-related assessment technology, we have also developed recyclable KAYANOVA (coating

material for special paper). Moreover, UV-curing resins and combined materials are used in numerous fields including CD, digital versatile disks (DVD), coating agents for optical disks, adhesives, precision lenses for electronic and information equipment, resist ink for printed boards, and coating of optical fibers. We will continue creating diversified products to contribute to society based on our distinguished ability for research and development.

### ◆Color chemicals

The color chemicals division manufactures approximately 700 types of dyes and coloring agents. In recent years, the diversification and complexity of fabric materials demand the advanced technologies used for dyes. Nippon Kayaku has met the needs of the age by developing a number of new technologies such as KAYACELON REACT, an epoch-making dye that enables dyeing synthetic fabric and natural fabric at the same time. We are also conducting research and development of dyes for paper pulp, fluorescent dyes, and KAYASET, a dye for coloring resins. In addition, we are conducting research into coloring agents for color inkjet printers used for the output of digital cameras and computers, and have come up with coloring products with good lightproof and waterproof properties. Nippon Kayaku, with a broad perspective,



Examples of color inkjet printouts using our coloring agents

continues research and development by comprehensively covering various technologies related to color.

### ◆Agro and fine chemicals

The agrochemicals group exports agrochemicals to more than 50 countries worldwide including Russia and Europe but mainly to Southeast Asia. At the same time, we conduct research and development to make these chemicals safer and more environmentally friendly, and supply agrochemicals to help raise safe farm products. CUCUMERIS, which uses insects as a natural predator to suppress other insects, the first of its kind in Japan and a subject of attention at present, is one example. This is one of the latest insect extermination methods with little effect on the environment, and which can curb excessive use of agrochemicals. It is another theme of the research and development of Nippon Kayaku to supply agrochemical products that are safe, effective, and easy to use. For example, a microcapsule preparation containing an agrochemical in small capsules has sustained efficacy by controlling the agrochemical's release from the capsule. In addition, a bulk preparation packaged in a water-soluble film is a unique compound that can be scattered in a

short time without having to physically touch the agrochemical. Meanwhile, the synthesis technology we have developed is applied for supplying intermediates which serve as raw materials of fine chemical products. In particular, nitrotoluene chemicals, for which we are the only supplier in Japan, are used as raw materials for pharmaceuticals, agrochemicals and dyes.



New ANFO Explosive

### Explosives

Nippon Kayaku has contributed to the Japanese economy as a leading manufacturer of industrial explosives since its foundation. Our products, such as dynamite, slurried explosives, ANFO explosives, and electric detonators, are used for civil projects including the construction of dams and tunnels, and residential land development, quarries and mines. The mainstream of the currently used explosives in place of conventional dynamite is ULTEX, an emulsion-type slurried explosive containing no nitroglycerin. It is highly safe and manageable while having an explosive power equivalent to dynamite. We will conduct further research and development of ANFO explosives and emulsion-type slurried explosives to deliver new products which meet the needs of users. The technology of Nippon Kayaku is also utilized in fireworks that light up the summer night's sky. We are the only company in Japan that manufactures the propellants used for fireworks, and the detonating cords to set them off. As risk assessment tests, the company performs tests recommended by the United Nations concerning the transportation of hazardous materials in terms of fire regulations, chemical substances, and hazardous materials to ensure safety from an objective point of view.

### Outlook for the Future

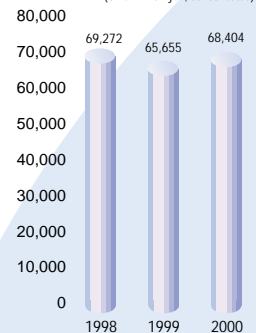
In the Fine Chemicals business, 5 billion yen in single accounts and 7.5 billion yen in consolidated accounts are targeted as operating income in fiscal year 2001. To realize this target, we have developed and successively launched airbag inflators for the passengers seat and seat side, new functional films, information-related functional products, coloring agents for inkjet printers, high-purity epoxy resins for semiconductor encapsulation, various ANFO explosives, and new insecticides. In addition, to improve the current high-cost structure, Nippon Kayaku will aggressively utilize our foreign footholds for production. At present, our Fine Chemicals business has such footholds in two countries, the Czech Republic and China. New bases for production of inflators was set up in the United States.

A policy was made to manufacture functional products using combined materials focusing on electronics-related materials, information-related materials, and optics-related materials, and we plan to establish a new group to handle the combined materials in 2002/2003. Without the inflator business, it would be impossible for us to achieve the goal of our fiscal year 2001. The entire sales of the

## TOTAL SALES

### Fine Chemicals Business

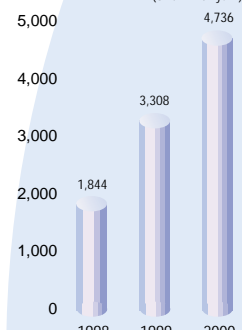
(Unit: million yen, consolidated)



(Years ended May 31)

### Inflators

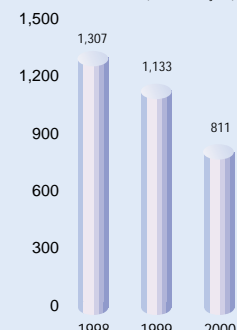
(Unit: million yen\*)



(Years ended May 31)

### Catalysts

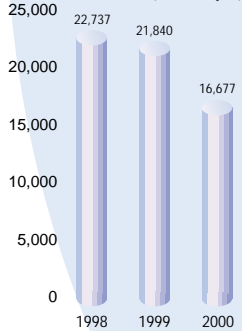
(Unit: million yen\*)



(Years ended May 31)

### Functional Products

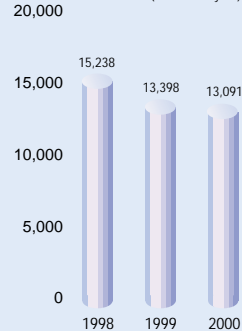
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(Years ended May 31)

### Color Chemicals

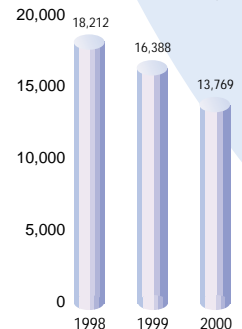
(Unit: million yen\*)



(Years ended May 31)

### Agro and Fine Chemicals

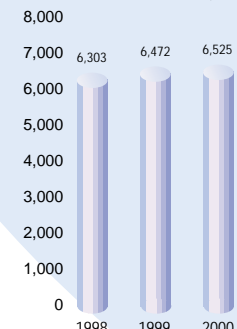
(Unit: million yen\*)



(Years ended May 31)

### Explosives

(Unit: million yen\*)



(Years ended May 31)

\*: non-consolidated

company are steadily increasing, but cost competition in the automobile industry is very stiff, and how to launch new products that are cost-competitive is critical. To win such an international competition, Nippon Kayaku will establish a tripartite production system in Europe, the United States, and Japan to improve the high cost structure. Also, we will invest approximately 4.5 billion yen in facilities and equipment for domestic and foreign inflator business in the next three years to increase the total sales to 12 to 13 billion yen including sales in Europe and the United States.

#### Construction of tripartite production system among Japan, U.S. and Europe for automobile safety-related business

In July, 2000, Nippon Kayaku purchased a company in California that holds a wide range of patents for ignition technology using semiconductors. In cooperation with Nichimen Corporation, Nippon Kayaku established a new company, LifeSparc, as a joint production center for car collision safety-related components such as seatbelts, etc. It will start production of squibs, or igniters, in September, and initiate production of micro gas generators (MGG) for seatbelt pretensioners from the year 2001.



Czech ISS

In February 2000, Nippon Kayaku purchased additional shares of Indet Safety Systems (ISS), a Czech subsidiary company, jointly with Nichimen Corporation to increase the investment ratio to two-thirds. ISS is currently producing 12 million squibs annually, and will start mass production of MGG devices and glass-encapsulated squibs. With the establishment of the U.S. production center, Nippon Kayaku has established the world's first tripartite production system among Japan, the U.S., and Europe.

#### Growing sales of Polatechno's LCD films

Polatechno was established in 1991 as an exclusive manufacturer of optical films for liquid crystal displays (LCD) by joint management of Nippon Kayaku and Arisawa Mfg. Co., Ltd. Its sales exceeded 10 billion yen as of March 2000, and showed a large increase of more than 10 percent compared to the previous year. The company is a leading manufacturer of polarizing plates with a large share of the market for products for liquid crystal projectors and LCD screens used in automobiles by development of high-durability dyestuff-based polarizers and adhesives. With the currently grow-

ing LCD market, demands for polarizing plates for LC projectors, dyestuff-based polarizing plates, and elliptical polarizer (combination of a polarizer and retarder) for cellular phones have increased, and the company was able to achieve sales of 10 billion yen, the sales target since establishment. With the sales of IT-related new products such as products for cellular phones and PDAs (Personal Digital Assistants) expected to grow further in sales during this fiscal year, an increase in sales of 30-50 percent is targeted. Particularly, in the new products for cellular phones, the company will develop business focusing on polarizing plates using a combination of polarizer and retarder such as TWISTER manufactured by our affiliated company, Dejima Optical Films.

#### Business expansion by Kayaku and Sartomer

In November 1999, Nippon Kayaku and Sartomer Inc. in the United States (head office: Pennsylvania), a member of Totalfina Group in France, reached an agreement to expand business activities of Kayaku Sartomer (head office: Tokyo, capital of 20 million yen), a joint venture company with equal shares in Japan. Since its foundation in 1992, Kayaku Sartomer has been engaged in the import and marketing of special acrylate and methacrylate for UV and electron beam (EB)-curing resins, which are in increasing demand in numerous fields including various coatings, printing ink, adhesives, photoresist, PS plates, and rubber crosslinker agents. It has been enjoying steady sales, but a substantial review of the strategy has been attempted in the past three years. As a result, it is now possible to market the products of Cray Valley, a sister company of Sartomer, such as oligomers and related materials in Japan. This also enables the market development and technological support of monomer and oligomer products of Nippon Kayaku in North America through Sartomer. Owing to a renewed contract, Kayaku Sartomer aims to achieve sales of 3 billion yen in five years.

#### Establishment of Dejima Optical Films

Nippon Kayaku regards the LCD-related products represented by display films, manufactured and marketed by its subsidiary company, Polatechno, as promising materials to support the popularization of IT and cellular phones in an ever-growing market. Particularly, in addition to heatproof optical films for projection and dyestuff-based polarizing films for car navigation systems with the largest share in the world market, the company has come up with new products such as Temperature Matching Retarder, Front Scattering Film, Anti-Reflection Film, and Anti-Static Film. To increase productivity by 2.5-fold compared to current production, the company plans to invest approximately 4.5 billion yen in plant and facilities within three years. As part of global development, DEJIMA Optical Films B.V., a subsidiary company of Polatechno in the Netherlands, was newly established and started production of some of the above new products. DEJIMA Optical Films B.V. has an important role as Polatechno's foothold for foreign production in the future.

#### Full-scale entry in the business of liquid crystal sealing materials

In March 2000, Nippon Kayaku decided on full-scale entry into the business of liquid crystal sealing materials. This is an adhesive material of epoxy resins used for joining together the upper and lower glass substrates of LCD. Nippon Kayaku has enjoyed earlier success in the development of a new product with good heatproof and heat-shrink-proof properties based on the technologies accumulated as the largest manufacturer of epoxy resins for semiconductors, and so decided on full-scale entry in the business of liquid crystal sealing material manufacture. A building for production was already secured in the Asa plant (Yamaguchi Prefecture) in 1999, and an exclusive line free from impurities such as heavy metals was previously introduced. In a field mainly dominated by only one company, Nippon Kayaku will make efforts to develop a new market and to achieve a 30 percent share within a few years.

### New series of ANFO explosives

Nippon Kayaku has developed a new series of ANFO (ammonium nitrate-fuel oil) explosives, and launched them in April 2000. The industrial ANFO explosives currently account for 75 percent of domestic demand, and are mainly used for civil engineering, quarrying of limestone, and collecting gravel. On the other hand, development of new products with performance required to meet the needs of various usage circumstances was being awaited. The new ANFO series consist of four types of ANFO (H) with high explosive speed, ANFO (L) with low specific gravity, ANFO (W) with simple water-resistance, and ANFO (E) with alkaline-resistance. Type H, a high-power product boasting a detonation speed of 3,000–3,500 m/sec., is the most appropriate for work in corners or in a thread-cutting part where the blasting load is greatest, thus reducing the amount used by approximately 10 percent compared to

conventional ANFO explosives. Type L is a product with low specific gravity which weighs approximately 30 percent less compared to normal ANFO explosives, and its soft blasting is expected to result in a controllable blasting effect and reduction in vibration and noise. Type W, which has a gel barrier on the surface of the explosive, is an epoch-making product in that it inhibits internal penetration of water. Type E, containing a special neutralizing agent, is mainly developed for the construction of tunnels by controlling the generation of ammonia gas. With the line-up of these new core products, Nippon Kayaku intends to increase the share of the ANFO explosive series.

## Other Business

Nippon Kayaku decided to challenge the concrete repair business using FLOWSEALER, a new crack-penetrating sealant. FLOWSEALER, a product developed and marketed solely by Nippon Kayaku beginning in September 1999, is a unique new type of water-based sealant with a concept that stops water leakage using water itself. Since it is a complex product containing a highly safe water-soluble organic macromolecular compound and inorganic silica compound, it has superior characteristics such as securing a safe work environment, and less load on the natural environment. At present, its launch is being prepared by setting up a system to receive orders from government and municipal offices and major construction firms, and establishing an environmentally responsible construction system. In addition to the marketing of current products including spreading and infusion types, the company is actively conducting research to develop new products and construction methods to meet market needs, as well as joint research with government and universities to develop new usages, etc. Nippon Kayaku will fully take advantage of its own special technologies and marketing resources to start a full-scale business with FLOWSEALER.



Before construction with FLOWSEALER



After construction with FLOWSEALER

### Healthcare (in Strategic Corporate Planning Office/ wheelchair)

In September 2000, Nippon Kayaku launched GRANDMA, a wheelchair carrying the company's original brand. In addition to a function for adjusting the armrest height to that of a conventional multi-function wheelchair, our new wheelchair provides the user with the freedom to choose a cushion to suit the user that helps maintain the person's sitting position. Making the sitting position stabilized and comfortable will free the user from a restraint belt, and improved physical and mental well being will be achieved. The seat is given antibacterial processing to further our policy of "a better product for users." The GRANDMA is adjustable in terms of "easiness to get into, driving power, and retaining good position," the main points for choosing a wheelchair for the elderly. It is the first model in the industry that realizes both a reasonable price and adjustable functions. With fashionable design and bright green frame color that were adopted from the German prototype, the wheelchair looks natural in daily life and outdoors alike, and is more than just medical equipment. The GRANDMA became more accessible as it was designated as rental goods to be covered by nursing insurance. It has attracted attention in public showrooms for healthcare and rehabilitation facilities all over Japan.

### Withdrawal from Kayatone

In July 1999, Nippon Kayaku officially decided on substantial withdrawal from Kayatone by the end of November 1999. Kayatone was positioned as a third business and research and development had been carried out to find methods for utilizing it as a construction material at the Takasaki pilot plant. Kayatone is non-sintered ceramic utilizing blast-furnace water-crushed slag with a strength 10 times higher than that of concrete. We have therefore tried to develop it as flooring, and interior and exterior materials for office buildings but no bright prospects for entering a full-scale Kayatone business developed, and we subsequently decided to discontinue its manufacture and marketing except for part of the research and development. Nippon Kayaku reorganized the Fine Chemicals business by conducting a drastic structural reform in June 1998 to classify our businesses into those to be expanded and those for stable profit. The withdrawal from Kayatone was decided as part of measures to strengthen this strategy.