April 2006: Opening of the Integrated Research Laboratories

Working to Develop New Products Through a Fusion of Technology and Human Resources

In December 2005, Nippon Kayaku established the Research & Development Management Committee and the Research & Development Group, which serves as a comprehensive R&D organization spanning the entire company. In April 2006, in commemoration of the 90th anniversary of our founding, the Integrated Research Laboratories were opened. The purpose of these laboratories is to strengthen our R&D through a comprehensive, company-wide fusion of personnel and technology. Hidetoshi Kitazawa, director of the Research & Development Group, explains the background behind this event and the goals for Nippon Kayaku.

Hidetoshi Kitazawa
Director of the Research & Development Group
Representative Director, Senior Managing Director

Changes in Nippon Kayaku business

In 2006, Nippon Kayaku celebrated the 90th anniversary of the company's founding. During this long history, we have continued to expand our business while keeping pace with the changing times, and in doing so we have effected many changes in the structure of our business. Before the war and during the recovery period after it, our main focus was the explosives business, aimed at meeting the demand for energy. We then started our dyes business, pharmaceuticals business, agrochemicals business, and resins business. As the nation's economy grew, Japan was faced with the pressing need to make changes in order to adapt to the global economic environment, and there became intense technological reforms centered on such fields as IT and biotechnology. Under these conditions, we eventually positioned the functional chemicals business, related to electronic information and display materials such as cellular telephones, flat-screen televisions, DVD players, and ink-jet printers, as our central business. We also expanded our operations to include catalysts for the production of acrylic acid, optical functional films, and other products. Our business producing inflators, micro gas generators, and other automotive safety products began to grow as well. During this time, we continued to accumulate key intellectual assets, which centered primarily on the broad range of technology that supports these businesses.

Now, as globalization accelerates, needs are diversifying and unique and distinctive products are in demand. Moreover, the product cycle is extremely short, and customers are demanding even greater speed in product development. For these reasons, it has become nearly impossible to develop a product on the basis of one single technology, and it is necessary to create a combination of technologies.

The key is to develop products that satisfy customer needs, have creativity, and are highly marketable.

Reform of the R&D system

It was from this perspective that the structural reforms carried out by Nippon Kayaku in August 2004 reorganized the company to form a dynamic business organization able to rapidly meet market needs, aiming to apply a fusion of technologies to achieve growth in niche markets in three fields: information/communications, health care, and safety systems.

In addition, in December 2005 we established the Research & Development Management Committee and Research & Development Group, which serves as a comprehensive R&D organization spanning the entire company, in order to better make use of our company's collective strengths. As a result, we have reviewed our research and development system to strengthen company-wide R&D, working to resolve the following issues.

(1) Strengthen the technology business by constructing a comprehensive R&D strategy and intellectual asset strategy which are in line with the company's business strategy and operation strategy.
(2) Create new businesses and new products by promoting a fusion of technologies inside and beyond the company, including collaboration with industry, government, and universities, and by acquiring and incorporating leading-edge technologies.
(3) Strengthen the next-generation fundamental technologies in order to construct technologies that will set us apart from other companies.

Establishment of the new Research & Development Management Committee

Nippon Kayaku has already carried out research and investment into each of these issues within the range of each business area. Indeed, these efforts were helpful in accelerating business research in each area; however, they were not effective in establishing a company-wide synergy, and there tended to be a lack of concentration in resource investment. As a result, the company eventually began to suffer from the effects of compartmentalization. For these reasons, we established the new Research & Development Management Committee, chaired by the company president, and created a mechanism for formulating company-wide strategy and policy for research and development.

The members of the Research & Development Management Committee include executive directors with official posts and the directors of research facilities, and the committee is tasked with discussing and formulating company-wide strategies and policies for research and development.

Establishment of the new Research & Development Group

In December 2005, we established the new Research & Development Group for the purpose of collecting and integrating business resources and R&D functions. This group combines

Fundamental Technologies and Growth Fields

Original Products

Explosives
Dyes, Chemicals
Pharmaceuticals
Agrochemicals
Resins

Fundamental Technologies

Materials technologies

Molecular & particle design
Functional design
Nanotechnology

Processing technologies

Explosives manufacturing
Dye manufacturing
Resin manufacturing
Dispersion processing
Film processing
Vapor-phase oxidation reactions
Pharmaceutical manufacturing
Agrochemicals formulation

System creation technologies

Control
Assembly

Evaluation technologies

Material & function evaluation
Hazard evaluation
Physiological & pharmacological activity evaluation
Safety & toxicity evaluation
Analysis

the Functional Chemicals R&D Laboratories, Pharmaceuticals Research Laboratories, Safety Systems Development Laboratories, and Agrochemicals Laboratories, together with the R&D Planning Division and Intellectual Property Division. At the same time, it provides a mechanism and operations for cooperation with business and marketing functions. The Functional Chemicals R&D Laboratories are responsible for development of functional materials, electronic materials, colors and inks for inkjet printers, functional films, and vapor-phase oxidation catalysts, as well as development of products in new areas. The Pharmaceutical Research Laboratories carry out development in the medical pharmaceuticals field, centered on anti-cancer drugs, while the Safety Systems Development Laboratories carry out development of airbag inflators and micro gas generators for seatbelt pretentioners, and the Agrochemicals Laboratories develop chemical and biological pesticides. The R&D Planning Division operates company-wide research and development projects, such as R&D strategy planning and corporate themes. The Intellectual Property Division constructs intellectual property strategies for the entire company, and strengthens the company's information functions. Finally, the establishment of a new Pharmaceuticals Development Division in the Pharmaceuticals Group centralizes the organization for clinical development and provides links with the Pharmaceuticals Research Laboratories, and is intended to generate rapid progress in development projects and post-marketing clinical trials.

Grand opening of the Integrated Research Laboratories, and the promotion of fusion and collaboration

As part of the activities commemorating the 90th anniversary since our founding, we completed construction of the Integrated Research Laboratories located in the Tokyo Business District, and the grand opening of this facility was held on April 12, 2006. For a long time, the Tokyo Business District has been home to our expanding pharmaceuticals research facilities, and with the completion of the Integrated Research Laboratories, researchers from a variety of fields will be gathered together under one roof. This opportunity for exchange promises to result in a productive fusion of technologies from the chemical, electrical, electronic, materials engineering, pharmaceutical, and other fields, leading to the development of new technologies that will eventually create new businesses. At the same time, these facilities are expected to function as a base for constructing a corporate culture of collaboration and fusion. In order to achieve an effective fusion of R&D management, the new Integrated Research Laboratories gathers the directors of the Functional Chemicals R&D Laboratories and Pharmaceuticals Research Laboratories, and their offices, in a single large room together with the R&D Planning Division and Intellectual Property Division.

Fundamental technologies and core product areas

The Nippon Kayaku fundamental technologies have their origins in the fine chemical technologies of explosives, dyes, and pharmaceuticals, which themselves are based upon this company's first lines of products. We then expanded the range of our technology, first adding agrochemicals to our business,

Core Product Clusters

Semiconductor encapsulation materials
Printed-circuit board materials
Adhesive, cohesive, and sealant materials

Functional colors
Recording materials
Functional films
Optical materials
Coating materials
MEMS materials
Vapor-phase oxidation catalysts

Pharmaceuticals (anti-cancer drugs)
Diagnostic agents
Automotive safety components
Agrochemicals
Dyes
Explosives

Growth Fields

Information/ communications

Health care

Safety systems

(New energy)

and then advancing into the field of epoxy resins used for the encapsulation of semiconductors. Based on the technology for synthesis of low molecular weight compounds, which was developed through our fine chemicals technology, we expanded our technology to cover the design and production of high molecular weight compounds by polymerization. In this way, we constructed the foundation of our fine chemicals business, which is the driving force behind our company. The technology for production of acrylic acid and methacrylic acid monomers, which are the raw materials for high molecular weight compounds, also led to the development of vapor-phase oxidation catalysts. In other areas, the application of explosive ignition technology led to the launch of our inflator business for automotive safety components, and our dye synthesis technology expanded to include the functional dye business, such as colors for inkjet printers, dyes for color filters used on digital cameras, and dyes for polarizing films used on LCD projectors. The current Nippon Kayaku fundamental technologies and core product clusters are as shown in the accompanying chart above.

In the future, we will work to strengthen and expand these technologies, while also working to create new fundamental technologies by fusing and combining all these technologies in our possession.

Operation of company-wide R&D themes and projects

In addition to the existing business-oriented R&D projects, we will also carry out R&D projects that involve the participation of all divisions throughout the company. Specifically, eight such projects are currently in progress (as the corporate themes: four projects related to functional chemicals, three projects related to pharmaceuticals, and one project related to explosives). The soonest among these are expected to generate business within the next 2 to 3 years. In addition, the Nanotech Project – intended for the exchange of technologies and information related to nanotechnology throughout the company – has been in effect for the past several years. We will reinforce our support for this project, and apply it to the development of resin composites, ultra-fine particles, pharmaceuticals and formulation of agrochemicals, analysis technology, inorganic and organic hybrid materials, inflator gas generators, new catalysts, and other products.

Main R&D themes for developing the business that will support our company in the next generation

In the information/communications field, we are focusing on colors for commercial inkjet printers, micro electro-mechanical systems (MEMS)-related devices, high-performance resins such as polyimide and polyamide, high-performance optical films, and high-durability catalysts. In the health care field, we are focusing on the production of macromolecular micelle drug delivery systems (DDS), and in the safety systems field the focus is on the development of next-generation gas generators for automobile airbags and next-generation semiconductor bridge (SCB) squibs. Another growth field is the new energy area, where growth is expected and a number of Nippon Kayaku technologies can be applied to good use. We are proceeding with development, including collaboration with related companies and universities, aimed at commercialization of dye-sensitized solar cells, fuel cells, and other products that require a combination of multiple technologies, such as dyes, electrolytes, sealing materials, and adhesives.

In the future, we will work for a fusion of technology and human resources, targeting global niche markets where the size of Nippon Kayaku is an advantage, in order to increase the percentage of sales generated from new products, and to achieve continual growth for our business.