

Global Network of Kao's Chemical Products Business

Asia

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Bringing New Value To Chemicals

The World of Kao's Chemical Products



Contributing to industries globally by developing new products through dynamic activities.

Developing a variety of chemical products.

In the century of activities since its founding, Kao has also forged a long history in the field of chemical products for industrial uses. Kao is currently developing many diverse chemical products that revolve around fat and oil derivatives, surfactants, functional polymers and aroma chemicals which are used in many fields such as toiletries, textiles, pulp and paper, plastics, metals, electronics and so on.

Creative new products for industries globally.

Furthermore, more than 50 years have passed since Kao's initial venture overseas. The stage of Kao's worldwide activities has now expanded to include operations in Asia, North and Central America and Europe. Kao will continue to concentrate its comprehensive strength in developing innovative new chemicals, technologies and products and will contribute to the development of a wide range of industries by providing these to industries globally.



Plants employ Kao's own production technology — production of fatty alcohols.



Highly systemized production of superior quality — products-automated perfume compounding equipment.



Research down to the molecular and atomic level.



Forming chemical compounds with new functions.

Research and Development Activities

Production Activities

Creation of New Products

Marketing Activities



An opportunity for communication with the end users-the launch of a new Kao product.



Grasping and responding attentively to the needs of end users on site.

Engaging in the entire production process from the raw materials of natural fats and oils to the final products.

Superior products begin with superior raw materials.

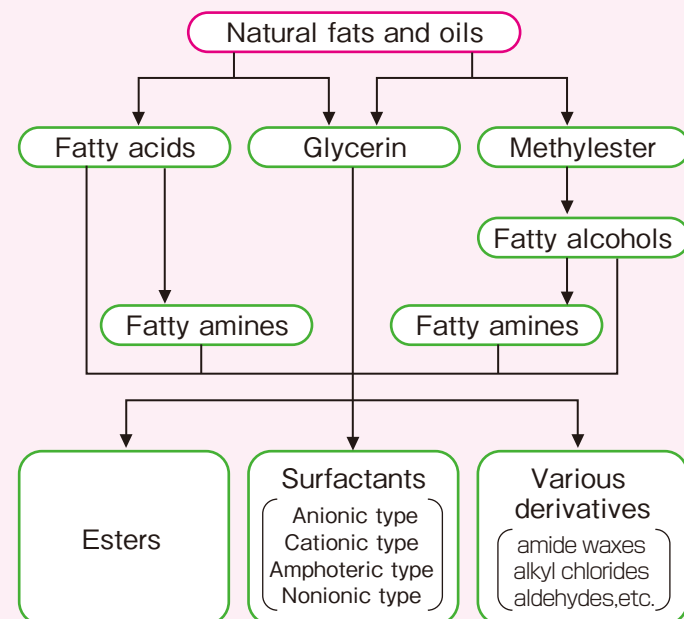
Based on the philosophy that "Superior products begin with superior raw materials," Kao engages in the entire production process from the raw materials of natural fats and oils to the final products.

Kao has created approximately 2,000 types of products through this wide breadth of activities. Each of these products boast superior features and functionality with diverse applications in many areas enabling Kao to broadly contribute to industries globally.

A global leader in the fats and oils business.

Kao also handles high quality fatty acids, fatty alcohols, fatty amines, glycerin and other chemicals derived from natural fats and oils enabling it to command a position as a leading global producer in the fats and oils business.

<An abundant range of chemicals from natural fats and oils>



Creation of new markets and values



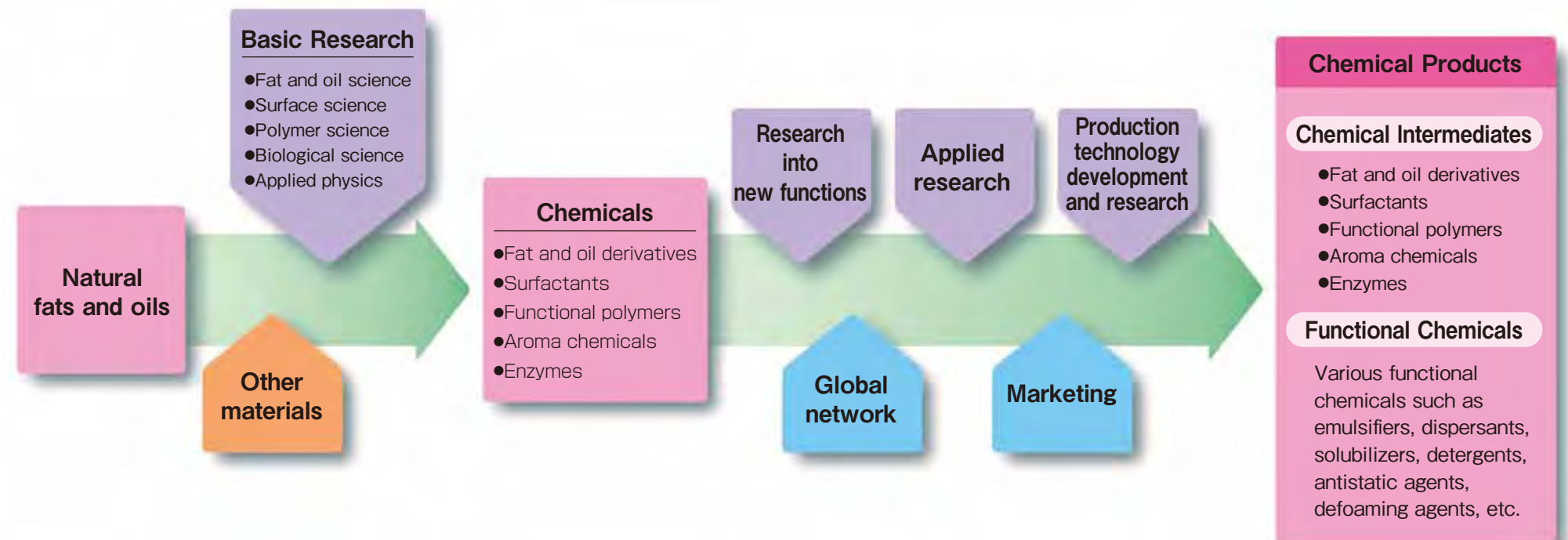
The basis of Kao products, raw material production from natural fats and oils — *Pilipinas Kao*.



Employing various technologies, research and development is conducted jointly throughout Kao's worldwide bases.



Wakayama plant, the largest production base for chemical products within Kao corporation in Japan.



Oil palm, a plant which produces natural fats and oils. The size of each fruit is 4~5 centimeters.



Strategy meetings for new product development also utilize information gathered from the global network.

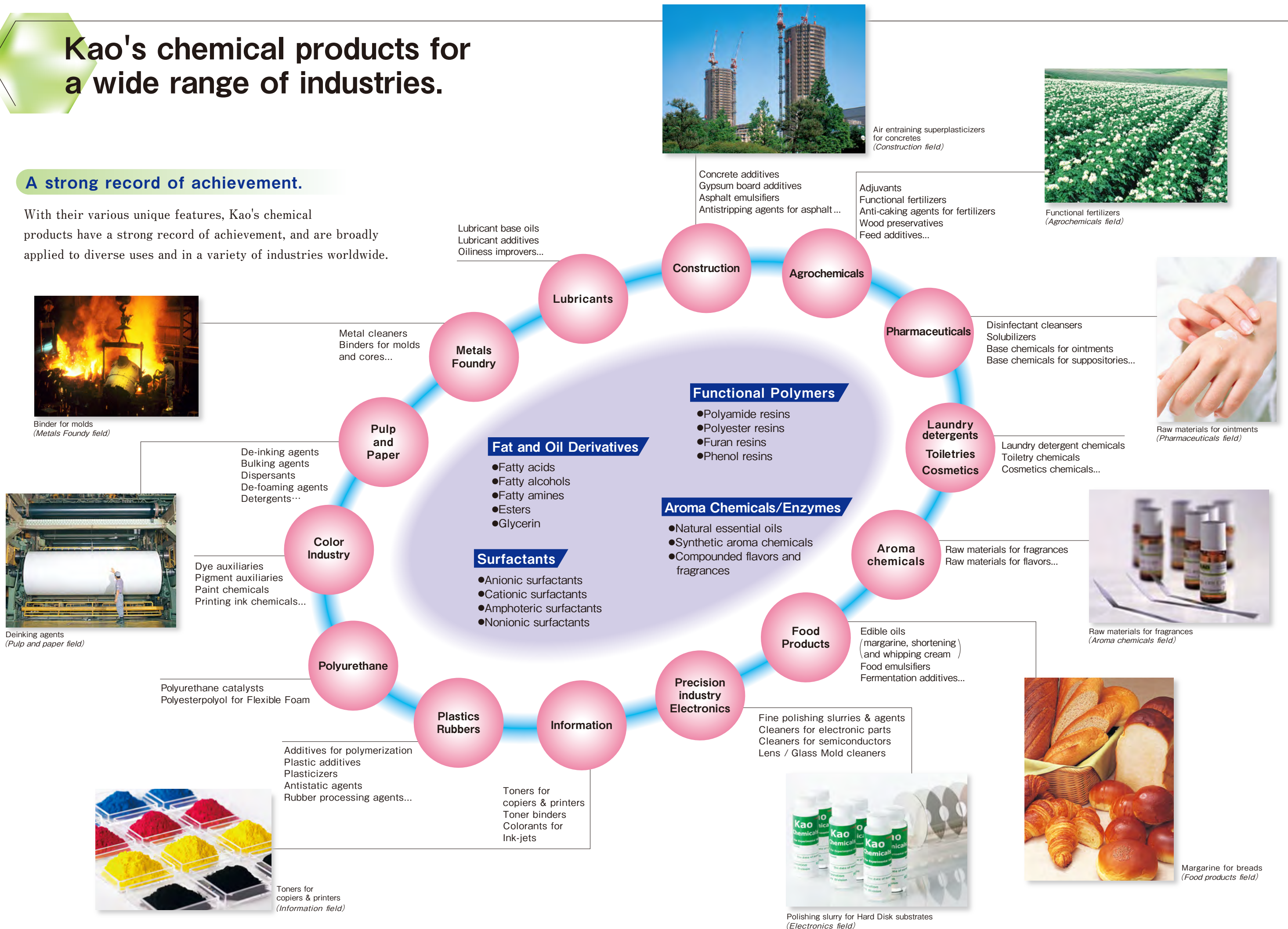


Participation in exhibitions — one part of "Needs & Seeds Communication" in marketing activities.

Kao's chemical products for a wide range of industries.

A strong record of achievement.

With their various unique features, Kao's chemical products have a strong record of achievement, and are broadly applied to diverse uses and in a variety of industries worldwide.



From key chemicals and key technologies —answers to a variety of needs.

Comprehensive research and development activities.

From the basic to the applied fields, Kao has utilized comprehensive research and development activities to create a wide array of chemicals and technologies. Kao has focused on areas—such as fats and oils, surfactants, and polymers—to address the diverse needs of various industries. The following examples illustrate the importance of some of these key chemicals and technologies.

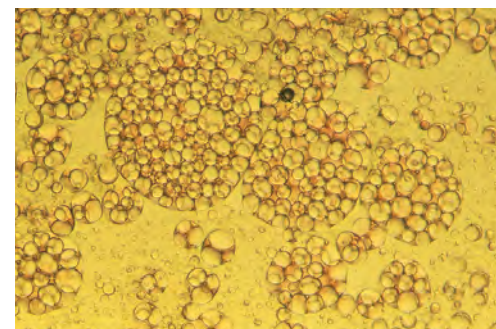


Kao's Wakayama Research Centers in Japan

Emulsification

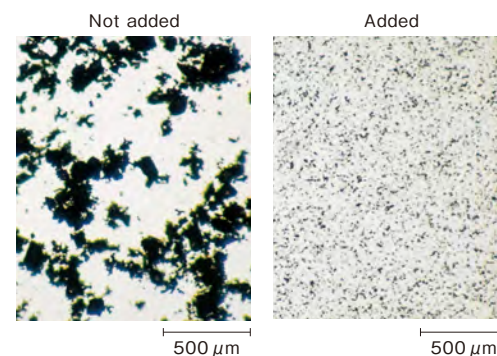
Kao has utilized the multi-phase emulsion technology for fats and oils to develop a butter cream that is as rich and flavorful as fresh cream.

Kao has used emulsion technology for breakthroughs in emulsion liquid crystal research - and association of surfactant molecules - to develop unique margarines and shortenings to use in cakes and other baked goods.



Multi-phase emulsive margarine (optical micrography) 5 μm

Dispersion



The effects of new air entraining superplasticizers on the dispersion of cement particles (optical micrograph)

Kao recognized the potential of steric repulsion and has successfully developed uniquely structured new air-entraining superplasticizers with long branching chains. These superplasticizers have been added to ready-mixed concrete, contributing to qualities such as: strong dispersant characteristics; steady flowability retention; high early strength. The effects of the superplasticizer's steric repulsion have dramatically improved the performance of concrete.

Cleaning

Kao has applied its surface activities expertise to develop a high-function, water-based cleaner that enables easy wastewater treatment. This multifunctional composition of this cleaner can also be used in the electronics field by replacing chlorofluorocarbon and chloric type solvents. In addition, Kao has developed various high performance chemicals in the area of semi-conductors including a cleaner that has revolutionized manufacturing technology.



Easy wastewater treatment by [OIL-WATER SEPARATING APPARATUS]

Adsorption and coagulation



Deinking simulation using flotation deinking tester.

The pulp fiber, ink, and foam are the three elements that play a major role in the flotation method for wastepaper recycling. In order to remove a greater amount of ink from the paper, Kao has developed a deinking agent that achieves a high level of whiteness by optimally controlling the electrostatic interaction of these substances.

Penetration

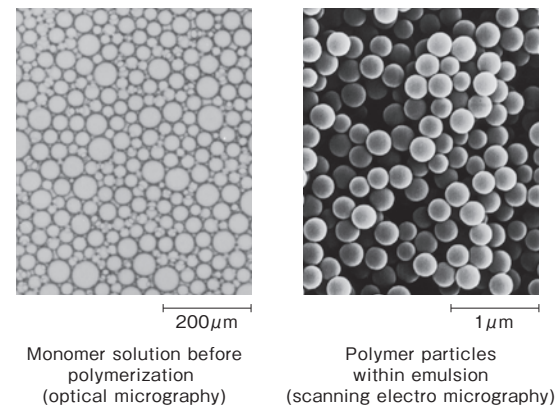
The combination of plant studies and Kao's expertise in surfactants has been used to develop various new crop care products. Some examples of these include: products that reduce the need of pesticides by enhancing the plant's biological effectiveness; and products that improve the plant's resistance to disease by supplementing the leaf's surface with calcium. Kao's new crop care products have not only addressed safety and health issues but have also enhanced the quality and quantity of the harvest.



Effects of functional calcium supplement products on soybeans (example under calcium deficiency disease conditions)

Emulsified polymerization

The emulsifier for emulsified polymerization must also possess the ability to disperse and stabilize polymer particles in the emulsion. Kao is involved in the development of many unique emulsifiers that, in addition to having superior basic functions, also possess a broad range of other important purposes. The new emulsifiers can be used in a diverse range of polymerizing conditions, create a stable emulsion mechanically and chemically, and generate special reactions.



Antistatic finish



The effects of antistatic agents on plastic products (example of dirt chamber test results)

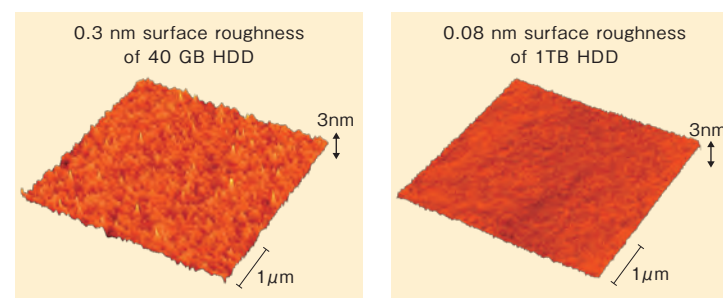
By studying the solubility of antistatic agents in resin, Kao has developed an antistatic agent that efficiently and effectively migrates to the surface in about an hour from molding. The efficiency of the agent has resulted in dramatic cost reductions by eliminating the aging time between molding and delivery. Kao has also developed antistatic agents with prolonged effectiveness.

Polishing

In making of hard disk drive (HDD) used for personal computers and video, a large capacity smoothing high accuracy on the surface of the magnetic disk substrate before a magnetic layer is formed by the deposition becomes a point.

We, Kao developed the grinding medicine for the HD substrate that united smoothness at the highest level in the world to the high throughput based on grinding Totsb of the size of Nano originally designed by a unique technique of combining technologies that chemically processed the surface of the disk.

We advance technological development that will support making to a large memory capacity and making of HDD high-quality in the future, and contribute to the highly-networked information society.



Comparison of surface roughness by atomic force microscope

Molding

Plant origin resins and biodegradability resins by respect of the environmental harmony are paid attention. The polylactide (PLA) of the transparency and the hard resin had the problem in the processing as it took time for heatproof, an impact, and molding.

We, Kao developed the Nano crystal control technology and the technology of making to softness that generated the crystal of PLA of the size of Nano for the expansion of the PLA use to the split second of molding.

We have improved reforming PLA resin by these technologies. This PLA resin has a transparency, an impact, and heatproof with the processing equal with a PP and an petroleum resins such as ABS resins at the stage of extrusion and injection molding.



Shoe sole molding test using a machine for developing better products

Designing polymer functions



Toner is used for making excellent copies (scanning electron micrograph)

Copier toner is powdered ink, consisting of a pigment dispersed in a toner binder resin; thus, the performance of the binder resin directly affects the toner. In order to create a better toner, Kao has developed a binder resin with pigment dispersion ability, tribo-electric chargeability, and other heightened functions. The resulting toner has excellent copy quality, color reproduction, fusing ability, and durability.

Fragrances

Using results from the latest natural perfume research and synthetic technology, Kao develops a variety of specialty products that are critical in creating new fragrances. These products, along with joint research from Kao's laboratory in Spain, have enabled Kao to supply its fragrances to global markets. Kao's principle focus is to develop a unique fragrance that is both versatile and functional.



Developing fragrances by incorporating personal computer technology and the latest fragrance development systems.

Working around the globe, closely with the people of each country.

Active development of worldwide activities.

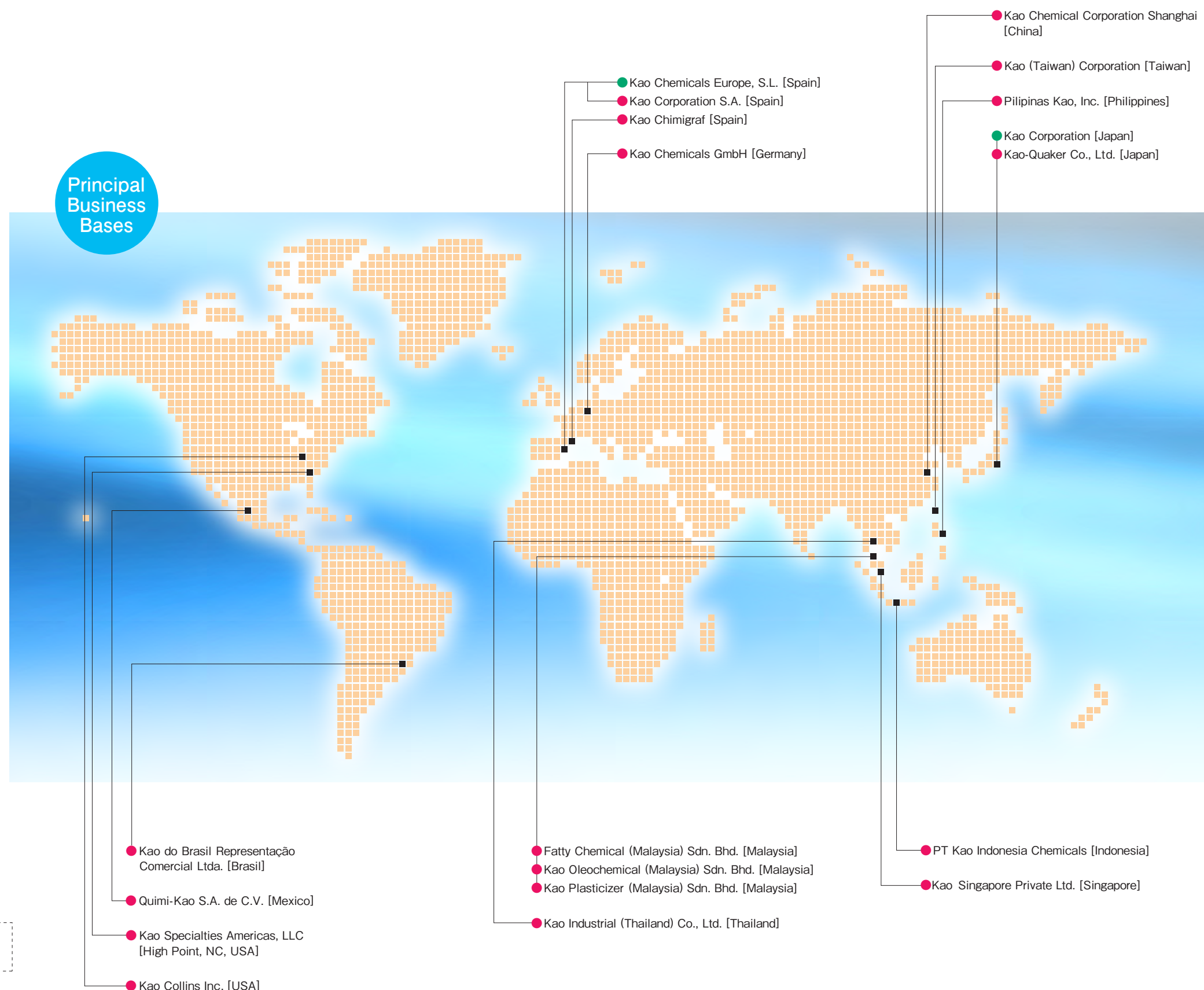
The active development of Kao's worldwide activities is based on its desire to apply the knowledge and technology it has gained through its various activities for the benefit of not only the people of Japan but the people of the world.

In the area of chemical products also, Kao has established bases in countries around the world such as in Asia, North and Central America and Europe from many years ago.

In addition to exporting, these bases have also been used to develop business in the form of local production. Through their organic links and shared possession of up-to-the-minute information, utilizing personal computer communications, these bases continue to conduct efficient and lively business activities over a wide scope based on the awareness that "The global market is one."

Contributions that enrich cultures and lifestyles in each country.

In addition, research and development activities are conducted closely with local communities, and unique products which match the needs of the market are developed. This relationship is contributing widely to the growth of industries, and as a result to the enrichment of cultures and lifestyles in countries around the world.





Abundance of diverse product lines.

Chemical intermediates

Chemical intermediates			North and Central America		Europe	
			Kao Specialties Americas, LLC [USA]	Quimi-Kao S.A.de C.V. [Mexico]	Kao Chemicals GmbH [Germany]	Kao Corporation S.A. [Spain]
Surfactants	Anionic type	Fatty acid salts	●	●	●	●
		Sulfates	●	●	●	●
		Sulfonates	●	●	●	●
		Phosphates	●	●	●	●
		Ether carboxylates	●	●	●	●
		Naphthalene sulfonate formaldehyde condensates	●	●	●	●
		Special carboxylates	●	●	●	●
		Special reactive type	●	●	●	●
	Cationic type	Alkyl amine salts	●	●	●	●
		Quaternary ammonium salts	●	●	●	●
	Amphoteric type	Alkyl betaines	●	●	●	●
		Amine oxides	●	●	●	●
	Nonionic type	Polyoxyethylene type	●	●	●	●
		Sorbitan esters	●	●	●	●
		Glycerin esters	●	●	●	●
		Alkanol amides	●	●	●	●

Note :Summary of items only (●:Items produced ●:Items handled)

Production of high quality products.

Kao's bases throughout the world produce various high quality products that match the characteristics of each region based on their organic links and promptly provide these products to the markets of countries around the world.

Asia										
Kao Corporation [Japan]	Kao-Quaker Company Limited [Japan]	Kao Chemical Corporation Shanghai [China]	Kao(Taiwan) Corporation [Taiwan]	Pilipinas Kao Incorporated [Philippines]	Kao Commercial(Thailand)Co.Ltd. Kao Industrial(Thailand)Co.Ltd Co.Ltd. [Thailand]	Fatty Chemical(Malaysia) Sdn.Bhd. [Malaysia]	Kao Oleochemical(Malaysia) Sdn.Bhd. [Malaysia]	Kao Plasticizer(Malaysia) Sdn.Bhd. [Malaysia]	Kao (Singapore) Private Ltd.	PT Kao Indonesia Chemicals [Indonesia]
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Note : Kao has established Kao Chemicals Europe S.L. in Spain to administer the industrial chemical products business in Europe.

Chemical intermediates

Chemical intermediates		North and Central America		Europe	
		Kao Specialties Americas, LLC [USA]	Quimi-Kao S.A.de C.V. [Mexico]	Kao Chemicals GmbH [Germany]	Kao Corporation S.A. [Spain]
Fat and oil derivatives	Fatty acids	●		●	●
	Fatty alcohols	●	●	●	●
	Primary and secondary fatty amines	●	●	●	●
	Tertiary fatty amines	●	●	●	●
	Esters	●	●	●	●
	Amide waxes	●	●	●	●
	Glycerin	●		●	●
Functional polymers	Polyamide resins (for ink vehicles)				
	Polyester resins(for toners)	●		●	●
	Furan resins (for mold and core-binders)				
	Phenol resins (for mold and core-binders)				
Aroma chemicals	Natural essential oils	●		●	●
	Synthetic aroma chemicals	●	●	●	●
	Compounded flavors and fragrances	●		●	●

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Functional chemicals

Field	Functional chemicals	North and Central America		Europe	
		Kao Specialties Americas, LLC [USA]	Quimi-Kao S.A.de C.V. [Mexico]	Kao Chemicals GmbH [Germany]	Kao Corporation S.A. [Spain]
Laundry detergents and fabric softeners	Base chemicals for laundry detergents	●	●	●	●
	Base chemicals for fabric softeners	●	●	●	●
Toiletries	Raw materials	●	●	●	●
	Pre-mixtures	●	●	●	●
Cosmetics	Pearling agents	●	●	●	●
	Raw materials	●	●	●	●
Aroma chemicals	Raw materials for fragrances	●		●	●
Pharmaceuticals	Disinfectant cleansers	●	●	●	●
	Base chemicals for ointments and suppositories	●	●	●	●
	Bulking agents, solubilizers, etc.	●	●	●	●
Agrochemicals	Adjuvants	●	●	●	●
	Anti-caking agents for fertilizers	●	●	●	●
	Additives for agrochemicals, etc.	●	●	●	●
Food products	Edible oils				
	Food emulsifiers, etc.			●	●
	Fermentation additives	●		●	●
Textiles	Agents for dyeing and finishing	●	●	●	●
Pulp and paper	Deinking agents	●	●	●	●
	Defoaming agents, felt cleaners, etc.	●	●	●	●
Color industry	Dispersants for dyes, pigments and paints, etc.	●	●	●	●

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Functional chemicals

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		Kao Specialties Americas, LLC [USA]	Quimi-Kao S.A.de C.V. [Mexico]	Kao Chemicals GmbH [Germany]	Kao Corporation S.A. [Spain]
Plastics	Additives for polymerization	●	●	●	●
	Plastic additives	●		●	●
	Plasticizers	●	●	●	●
Rubbers	Additives for polymerization	●		●	●
	Rubber processing agents	●		●	●
Polyurethane	Polyurethane catalysts	●			
Construction	Asphalt emulsifiers	●	●	●	●
	Concrete additives	●		●	●
Metals	Cold rolling oils for steels			●	●
	Metal cleaners, etc.	●		●	●
Foundry	Binders for molds and cores, etc.				
Lubricants	Lubricant base oils	●	●	●	●
	Lubricant additives	●	●	●	●
Mining	Flotation agents, etc.		●	●	●
Electronics	Cleaners for electronic parts, etc.	●		●	●
Precision industry	Plastic lens cleaners, etc.	●		●	●
Information	Toner binders	●		●	●
	Toners for copiers	●		●	●

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Kao's dedicated corporate activities

-Providing wholehearted satisfaction and pleasure to customers throughout the world.

Evolving into a comprehensive chemicals company.

Kao has continued its activities in the century since its founding based on the principles of "Cleanliness, Beauty and Health."

During this time, Kao has vigorously pursued research and development activities based on the philosophy that "The source of business lies in research and development." This has led to an expansion of Kao's products from its original toiletry products such as soaps, laundry detergents, shampoos and rinses; to cosmetics; functional health beverages and other food products; and various other chemical products. This expansion has resulted in the development of Kao into a comprehensive chemicals company.

Joining the ranks of global companies.

In addition, Kao established its first local corporation in Thailand in 1964, more than 50 years ago. From Asia, Kao's worldwide activities have since expanded to Europe, and then to North and Central America and other parts of the world, leading it to become a truly global company. Drawing upon its creative and innovative strengths, Kao aims to continue its corporate activities to provide customers throughout the world with products of unique values that bring them true satisfaction and pleasure.

History of Kao's Corporate Activities

