



Quick-reference for Shin-Etsu's Key Materials

By providing key materials, Shin-Etsu will continue to contribute to daily life, industry and society.

Safe, comfortable and environmentally friendly –

The Shin-Etsu Group's key materials are playing an active role in a multitude of ways to help create a richer daily life.

This brief booklet introduces in an easy-to-understand way what kinds of products the Shin-Etsu Group's key materials are used in and what kinds of roles they are playing.

We would be pleased if you enjoy reading this booklet at your workplace or at home and if it gives you a better understanding of the wide range of useful product applications of the Shin-Etsu Group's key materials.

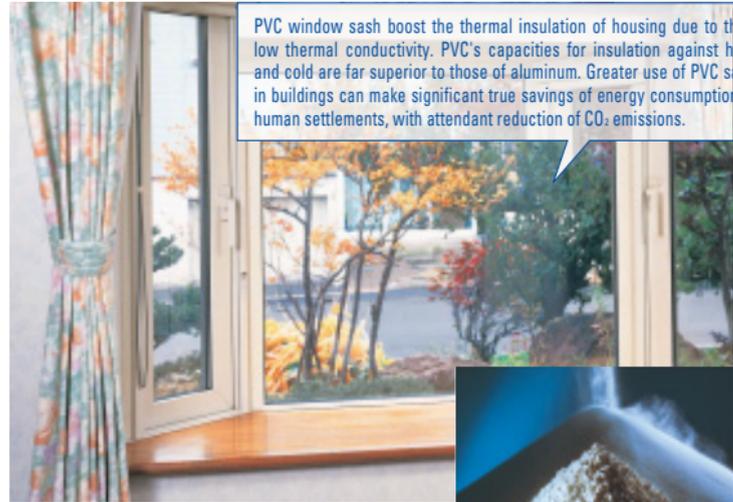
Shin-Etsu Chemical Co., Ltd.
Public Relations Department

C o n t e n t s		09		Rare Earth Magnets		
04		Polyvinyl Chloride (PVC)		10		Synthetic Pheromones
05		Silicon Wafers		11		Rare Earths
06		Silicones		12		Liquid Fluoroelastomers
07		Cellulose Derivatives		13		Silicon Metal
08		Synthetic Quartz Photomask Substrates		14		Shin-Etsu's Technologies and Materials

Polyvinyl Chloride (PVC)

Polyvinyl Chloride (PVC) is a general-purpose plastic widely used in various consumer goods and industrial products. PVC is an ecological material because it helps to save natural resources and energy at every step of the product cycle. PVC products have excellent durability and safety in use, and are easily recyclable. Shin-Etsu Chemical, a leading manufacturer of PVC, has developed its own integrated manufacturing technology and supplies high quality PVC to customers worldwide.

PVC application: Window sash



PVC window sash boost the thermal insulation of housing due to their low thermal conductivity. PVC's capacities for insulation against heat and cold are far superior to those of aluminum. Greater use of PVC sash in buildings can make significant true savings of energy consumption in human settlements, with attendant reduction of CO₂ emissions.

Materials: PVC powder and pellets



Shin-Etsu Group's production bases: Japan, U.S., Portugal and The Netherlands

Silicon Wafers

Silicon wafers are used as a substrate for integrated circuits, which are indispensable for digital products such as PCs, mobile phones and LCD (liquid-crystal display) TVs. The Shin-Etsu Group has developed leading-edge wafer technologies that achieve such characteristics as high-flatness and larger diameters in its wafer products, and it began the mass production of 300mm wafers ahead of other global competitors. As the world's top silicon wafer manufacturer, we stably supply high-quality wafer products and meet the advanced high-level requirements of our customers.

Silicon wafers application: Digital products (IC substrate)



Silicon wafers are used as substrates for ICs that are indispensable for digital products and these wafers help support the highly advanced information society.

Materials: Silicon ingots (left) and sliced silicon wafers (right)



Shin-Etsu Group's production bases: Japan, U.S., U.K., Malaysia and Taiwan

Silicones

Silicones have characteristics of both organic and inorganic materials and have superior properties such as heat, cold and weather resistance as well as possessing good electrical insulation properties. They come in a variety of forms such as oil, resin, rubber, gel and powder. Shin-Etsu Chemical commercialized silicone in 1953. Presently, Shin-Etsu's silicones have more than 4,000 product applications, and the Group's silicone products are meeting needs in various industrial fields such as electronics, electrical, construction, automotive, cosmetics, toiletries, chemicals and foods.

Silicones application: Rinse, conditioner

Silicones are combined in rinses and conditioners and are helping to make products with high functionality and high performance.



Material: Silicone oil



Shin-Etsu Group's production bases: Japan, U.S.,
The Netherlands, Korea, China, Taiwan and Thailand

Cellulose Derivatives

Shin-Etsu Chemical has developed various water-soluble cellulose derivatives with cellulose as the raw material. The applications of cellulose derivatives are diverse and include applications, just to start with, in construction, civil engineering, ceramics and paper processing. They are also used in the pharmaceutical, food and toiletry fields, where safety is a primary concern. Shin-Etsu Chemical began production of cellulose derivatives from 1962. Presently, the Shin-Etsu Group has grown to become the world's top manufacturer of methylcellulose and is meeting the varied needs of its customers for these products.

Cellulose derivatives application: Pharmaceuticals

Application of cellulose derivatives helps make bitter medicine easier-to-swallow and controls the release of the medicine in the stomach or intestines. Cellulose derivatives are used in many very useful applications.



Materials: Cellulose derivatives

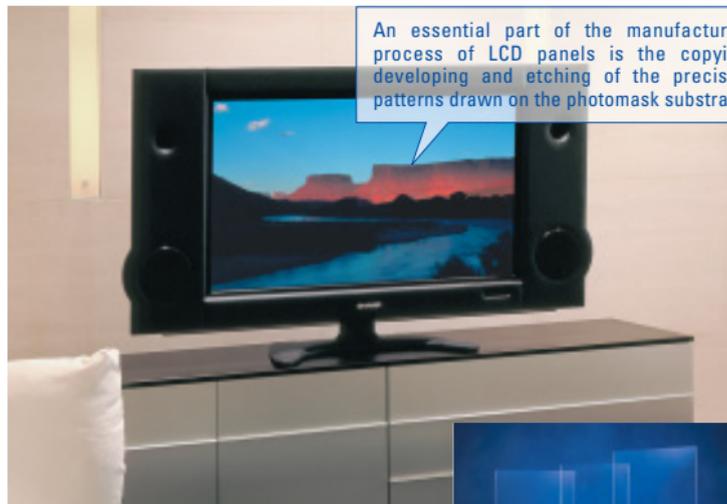


Shin-Etsu Group's production bases: Japan, Germany

Synthetic Quartz Photomask Substrates

With the shift from the cathode-ray tube age to the flat-panel display era, LCD (liquid-crystal display) TVs have become a very popular product. Synthetic quartz photomask substrates play a role in the required lithography for mass-producing LCD panels. Shin-Etsu Chemical's photomask substrates have the highest level of flatness, and Shin-Etsu has achieved the highest yield level in the industry. The need for large-size LCD applications was met at an early stage, and as the world's top maker of photomask substrates, Shin-Etsu is supporting the development of the liquid-crystal display industry.

Synthetic quartz application: Photomask substrates for LCD panels



An essential part of the manufacturing process of LCD panels is the copying, developing and etching of the precision patterns drawn on the photomask substrate.

Materials: Synthetic quartz photomask substrates



Shin-Etsu production base: Japan

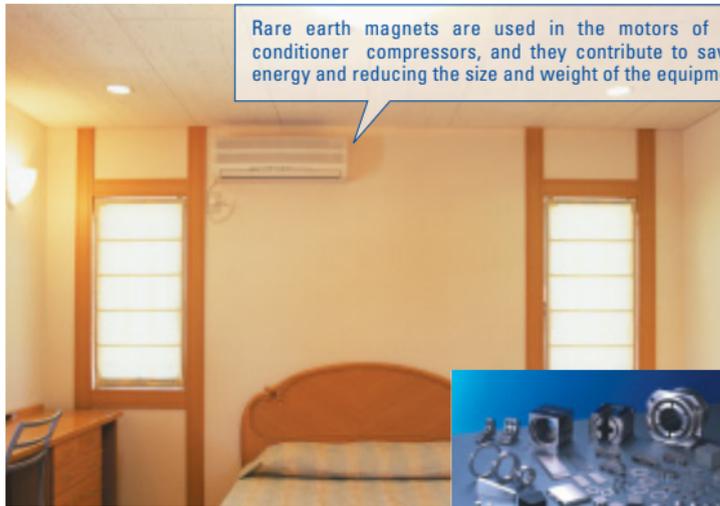


Rare Earth Magnets

Rare earth magnets have a magnetic force about 10 times stronger than ferrite magnets. Its strong magnetic characteristics are applied in such fields as home appliance products and automobiles, and these magnets contribute to energy-saving and the reduction in size and weight of equipment such as machinery tools and other apparatus. Shin-Etsu has integrated its production system from the separation and refining of the rare earth raw material, to the processing and assembly of magnetic circuits. We offer a stable supply of these high-quality products.

Rare earth magnets application: Air-conditioners

Rare earth magnets are used in the motors of air-conditioner compressors, and they contribute to saving energy and reducing the size and weight of the equipment.



Materials: Rare earth magnets

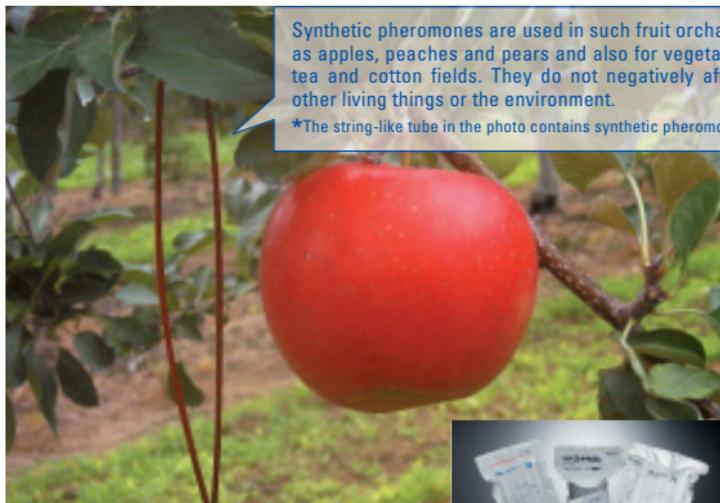


Shin-Etsu Group's production bases: Japan, Malaysia, Indonesia and The Philippines

Synthetic Pheromones

Synthetic pheromones are used for "mating disruption", a new technique to control pests that harm agricultural products. These artificially synthesized pheromones disrupt the mating behavior of such target pests. When the mating is disrupted, the population of the following generation decreases, which could eventually lead to the reduction in the use of broad-spectrum insecticide sprays. Today, synthetic pheromones are drawing attention as an environmentally friendly ecological product, indispensable for controlling harmful pests by reducing the need for insecticides.

Synthetic pheromones application: Mating disruptor for harmful insects



Synthetic pheromones are used in such fruit orchards as apples, peaches and pears and also for vegetable, tea and cotton fields. They do not negatively affect other living things or the environment.

*The string-like tube in the photo contains synthetic pheromones.

Materials: Synthetic pheromones

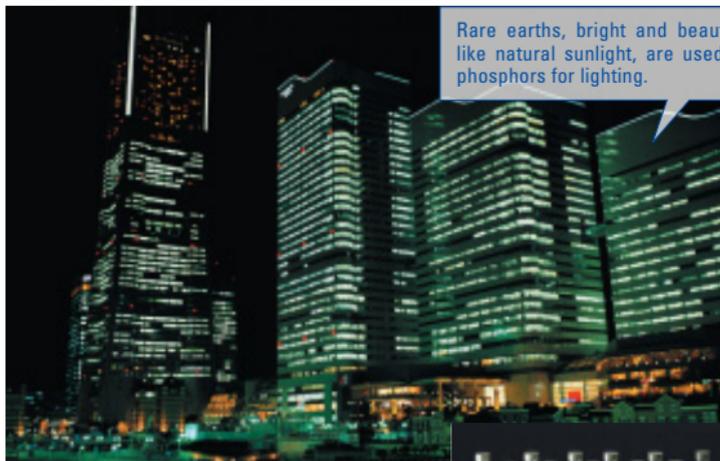


Shin-Etsu's production base: Japan

Rare Earths

Lighting is essential in daily life. Rare earths generate light that is very natural in color, high-intensity light and light with low-power consumption. Accordingly, they are used widely in fluorescent lamps, including lights and phosphors for large-scale lighting applications such as those for sports stadiums. By making the best use of its high-level separation and refining technologies, Shin-Etsu Chemical manufactures various high-purity rare earths.

Rare earths application: Lighting



Rare earths, bright and beautiful like natural sunlight, are used as phosphors for lighting.

Materials: Rare earths is a general term for 17 chemical elements adding yttrium and scandium to the lanthanide series.



Shin-Etsu's production base: Japan

Liquid Fluoroelastomers

Liquid fluoroelastomers are strong in withstanding heat as well as low temperatures and also have superior resistance to oils. It is a material that, upon heating, hardens into a flexible, solid synthetic rubber material. Shin-Etsu Chemical was the first company in the world to commercialize liquid fluoroelastomers. They have the superior property of withstanding temperatures of -50°C and not losing their elasticity, and they are helping to improve the reliability of automobile parts. In addition, they have been attracting considerable attention in various industrial fields, where applications are expanding.

Liquid fluoroelastomers application: Automotive parts

Liquid fluoroelastomers are used in rubber molding for automotive parts such as fuel system O-rings and diaphragms and also for protection and sealing of electric and electronics parts.



Materials: Liquid fluoroelastomers
SHIN-ETSU SIFEL[®]



Shin-Etsu's production base: Japan

Silicon Metal

Shin-Etsu's main products such as silicon wafers and silicones are made using silicon metal as its main raw material. Shin-Etsu produces silicon metal at its Group company in Australia, and thus has assured a stable supply of this crucial raw material. At the same time, Shin-Etsu Chemical has in place an integrated production system starting from raw materials, and is always striving to provide for a stable supply of its products to customers in addition to endeavoring to improve product quality.

Silicon metal application: Silicon wafers, silicones and many other products

Silicon wafers and silicones, which are made from the raw material of silicon metal, are indispensable to daily life in society.



Material: Silicon metal (Si)



Shin-Etsu's production base: Australia

Shin-Etsu's Technologies and Materials

High-quality materials stem from superior technologies.

The Shin-Etsu Group's wide array of technologies and key materials are successfully being used in a vast number of industrial fields.

