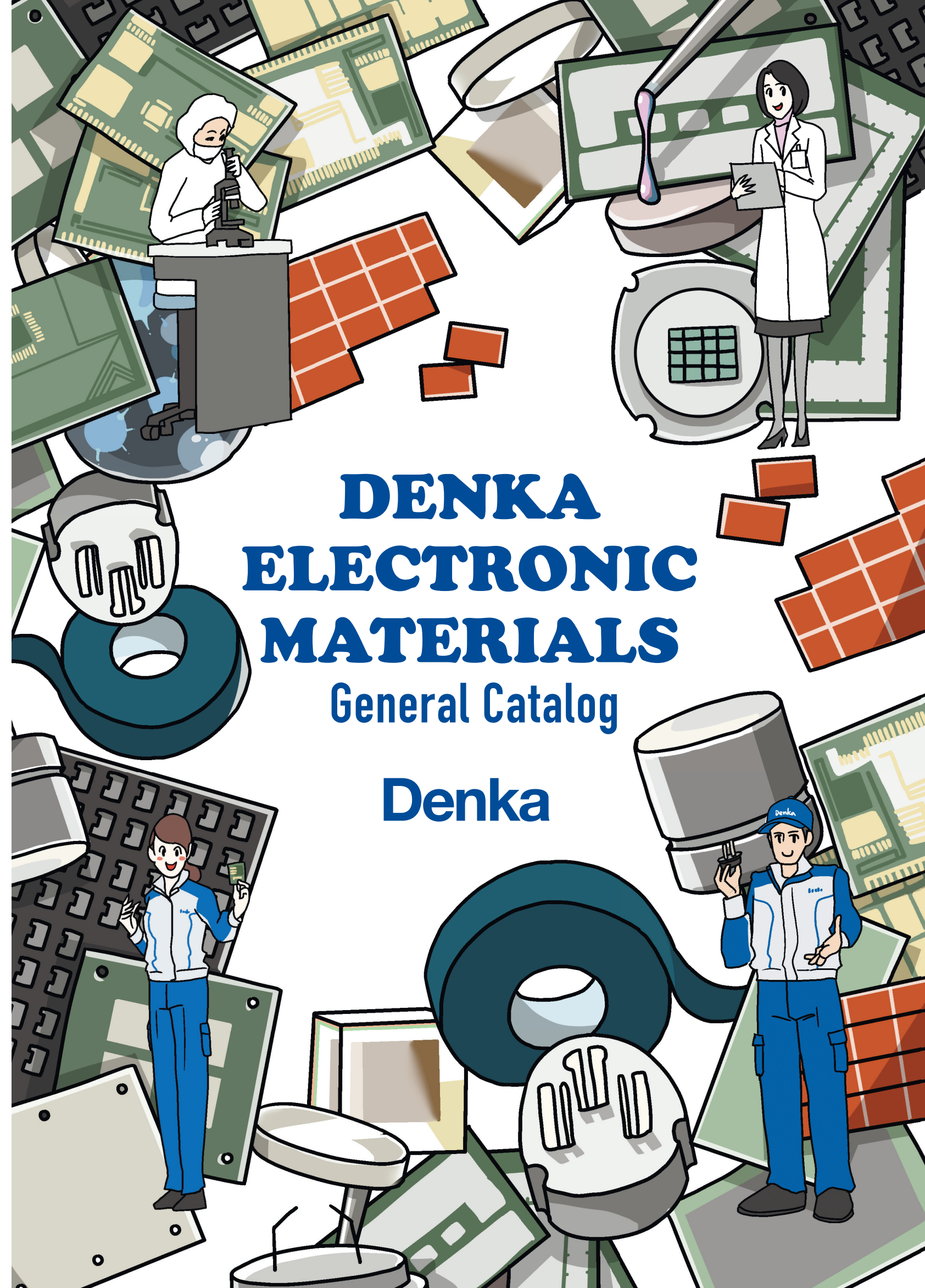
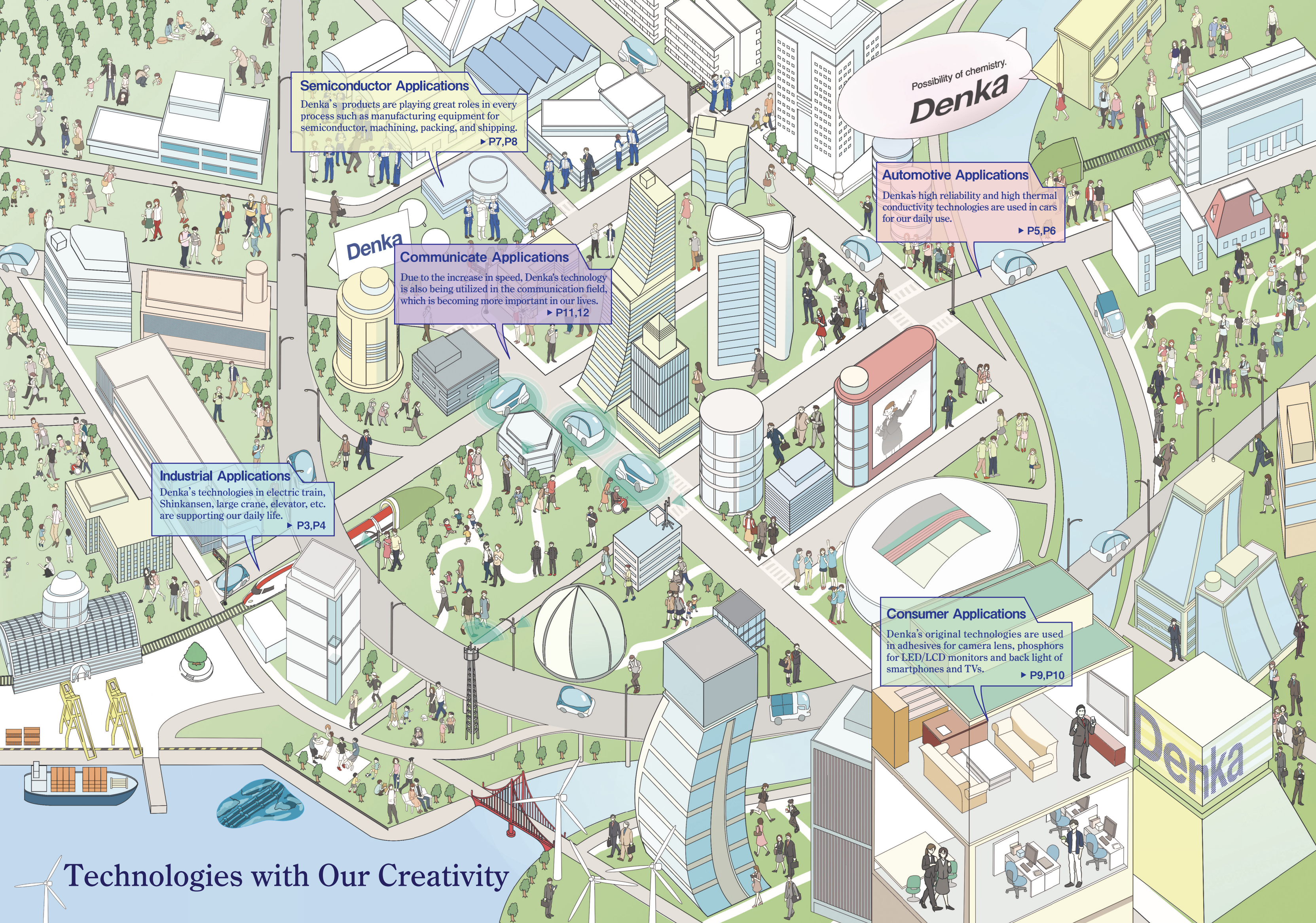


Possibility of chemistry

Denka





Semiconductor Applications

Denka's products are playing great roles in every process such as manufacturing equipment for semiconductor, machining, packing, and shipping.

► P7,P8

Denka

Communicate Applications

Due to the increase in speed, Denka's technology is also being utilized in the communication field, which is becoming more important in our lives.

► P11,12

Industrial Applications

Denka's technologies in electric train, Shinkansen, large crane, elevator, etc. are supporting our daily life.

► P3,P4

Possibility of chemistry.

Denka

Automotive Applications

Denka's high reliability and high thermal conductivity technologies are used in cars for our daily use.

► P5,P6

Consumer Applications

Denka's original technologies are used in adhesives for camera lens, phosphors for LED/LCD monitors and back light of smartphones and TVs.

► P9,P10

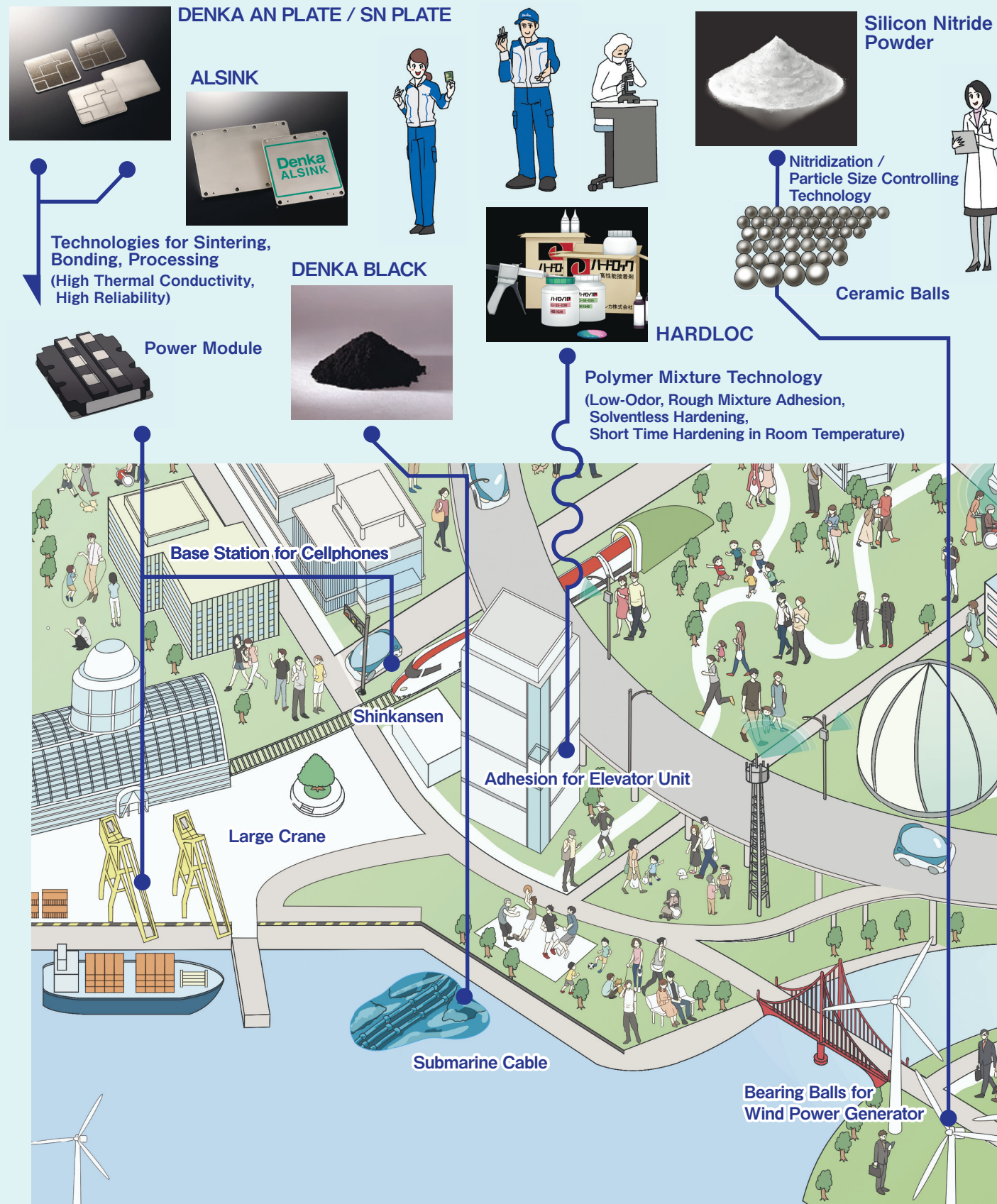
Denka

Technologies with Our Creativity

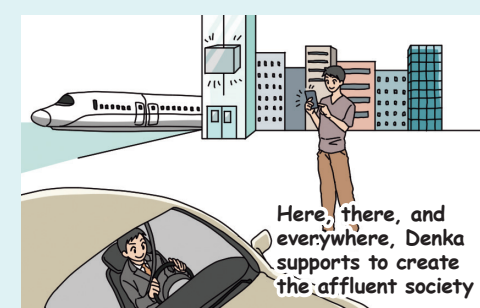
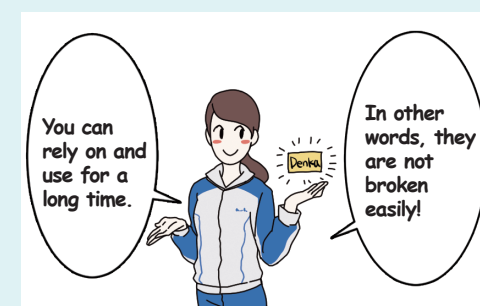
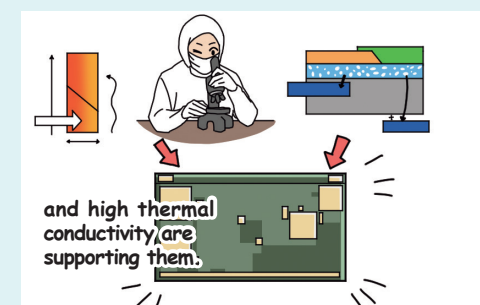
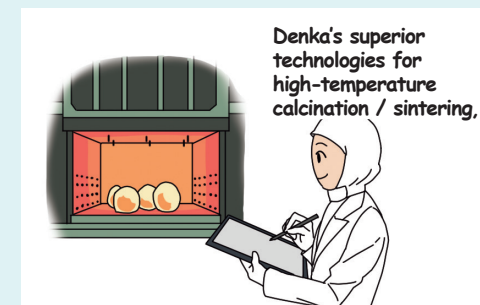
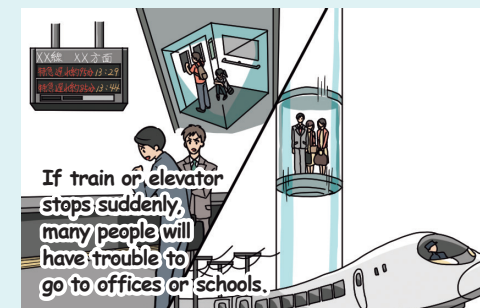
Industrial Applications

Denka's highly trusted technologies are supporting people's living.

By utilizing our technologies for high-temperature calcination/sintering and high thermal conductivity, we make ceramic products and high thermal conductive products with long-term reliability to meet industrial application needs.



Denka Technologies in Electric Trains



DENKA BLACK

Special Conductive Materials



"Denka Black" is a carbon black manufactured via thermal decomposition of acetylene. By virtue of its high purity, as well as outstanding electrical and thermal conductivities, Denka black is used in diverse applications such as electrical cables, silicone products, IC packaging where its electrical conductivity and anti-static functionalities are leveraged upon.

DENKA AN PLATE / SN PLATE

Electronic Products



DENKA AN PLATE is made of aluminum nitride which has 7 times higher thermal conductivity than alumina. DENKA SN PLATE is the ceramics circuit board with high thermal conductivity which is made of silicon nitride. We are proud of both products for their high reliability. These substrates are used for high power IGBT modules which are key-parts of electric trains and elevators.

ALSINK

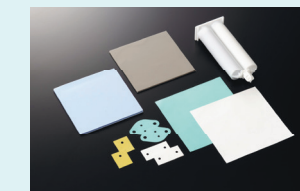
Electronic Products



The composite material which is made of aluminum and ceramics. The feature is low thermal expansion, high thermal conductivity, and light weight. It is used for IGBT power modules for electric train and industrial applications which require high reliability.

DENKA THERMALLY CONDUCTIVE SHEET / SPACER

Electronic Products



The silicon-based insulating materials with high thermal conductivity which are filled with ceramics filler. These are used for various thermal designs with electronic materials such as street lights, power conditioner for photovoltaics and power supply.

HARDLOC (SGA)

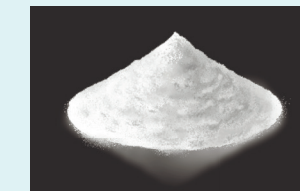
High Functional Adhesive Materials



The HARDLOC series (SGA) are room temperature curing 2 liquid mixture type acrylate-based adhesives that Denka developed first in the world. It is the most suitable for the adhesion of metal and the magnet, and shows excellent durability.

Silicon Nitride

Functional Ceramics



The raw material powder of non-oxide ceramics which is superior for heat resistance, corrosion resistance, and abrasion resistance. It has possibilities for use of automotive engine parts, electronics parts, and industrial machine parts, various composite materials, etc.

VINI-TAPE

High Functional Adhesive Materials



This is the first vinyl tape in Japan that has been successfully industrialized. Using an environmentally friendly low VOC adhesive, it is used in more than 60 countries around the world for a wide range of applications from industrial to household, centering on the binding of electric wires for electrical products.

Automotive Applications

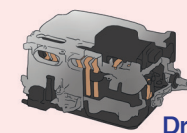
Our technologies for high thermal conductivity and high reliability help to progress the electric equipment of cars.

The electric equipment of cars is in progress to improve operability, amenity, and mileage. Denka makes various products with high reliability and high thermal conductivity to meet demands of the electric equipment of cars.

DENKA AN PLATE / SN PLATE



Technologies for Sintering, Bonding, Processing (High Thermal Conductivity, High Reliability)



Drive Inverter

Wire Harness Vinyl Tape

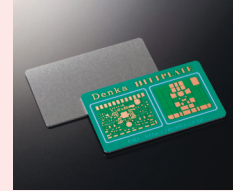


HARDLOC



Polymer Mixture Technology (Low-odor, Rough Mixture Adhesion, Solventless Hardening, Short Time Hardening in Room Temperature)

DENKA HITTPATE



Denka Heat Dissipation Sheet



DENKA BLACK



Resin Mixture Technology for Filler, Processing Technology

Power Steering

DCDC Converter

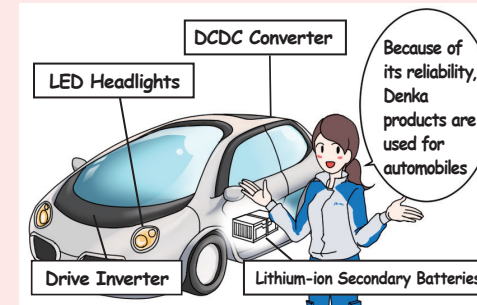
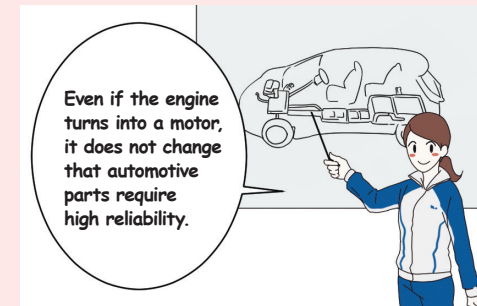
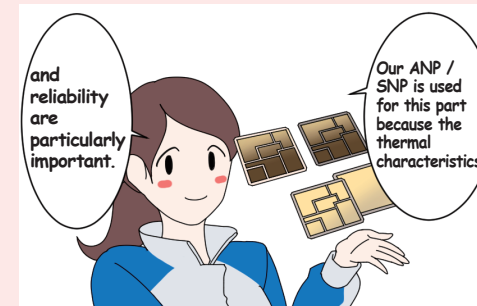
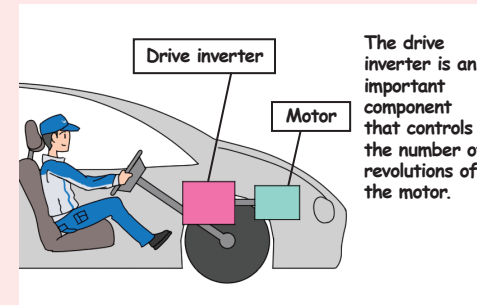
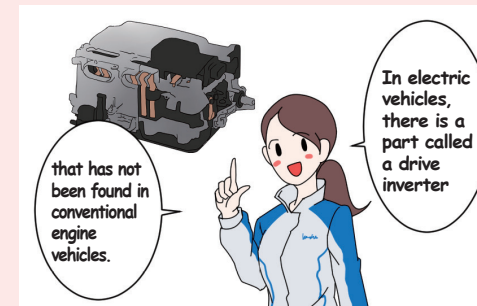
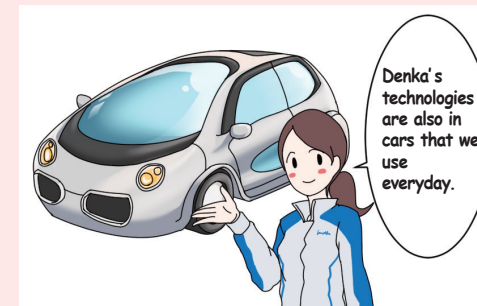
Carbon Black Synthesis Technology, Structural Control Technology, High Purity Technology

Possibility of chemistry.
Denka

Hybrid Vehicle (HV)

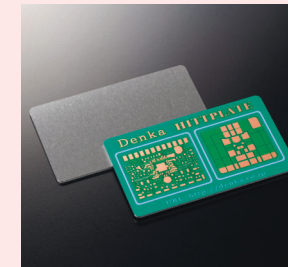
Electric Vehicle (EV)

Denka Technologies in Cars



DENKA HITTPATE

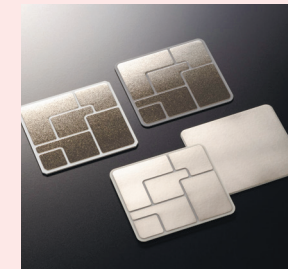
Electronic Products



The aluminum base circuit board - HITTPATE has many products with various types of insulating layers, and they are used for power steering, DCDC converter, LED headlight, etc. in various automotive applications which require high reliability, high thermal conductivity, and high insulation characteristic.

DENKA AN PLATE / SN PLATE

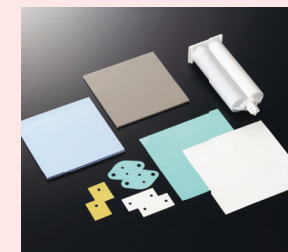
Electronic Products



The power module for Hybrid cars' inverter which controls motor and it requires high reliability. We have variety of products such as DENKA AN PLATE with which we are proud of its' high thermal conductivity, and DENKA AN PLATE with high strength and high reliability. Denka supplies the most suitable products for customer's requirements.

DENKA THERMALLY CONDUCTIVE SHEET/SPACER

Electronic Products



The siricon-based insulating materials with high thermal conductivity which are filled with ceramics filler. These are used for various thermal designs with electronic materials such as power steering, inverter of Hybrid cars, car navigation system, automobile camera and LiB battery.

HARDLOC (SGA)

High Functional Adhesive Materials



The room temperture curing 2 liquid mixture type acrylate-based adhesive which is used for bonding magnets of speakers and motors of car. We are aiming to expand automotive applications by developing new grade.

DENKA BLACK

Special Conductive Materials



Specialized for lithium-ion batteries, "Denka Black Li" maintains the standard properties of Denka Black while having minimally low metallic impurity content. In addition to high electrical conductivity and electrolyte liquid retention properties required in lithium-ion secondary batteries, battery failure caused by short circuit as a result of metallic impurities can be mitigated.

Wire Harness Vinyl Tape

High Functional Adhesive Materials

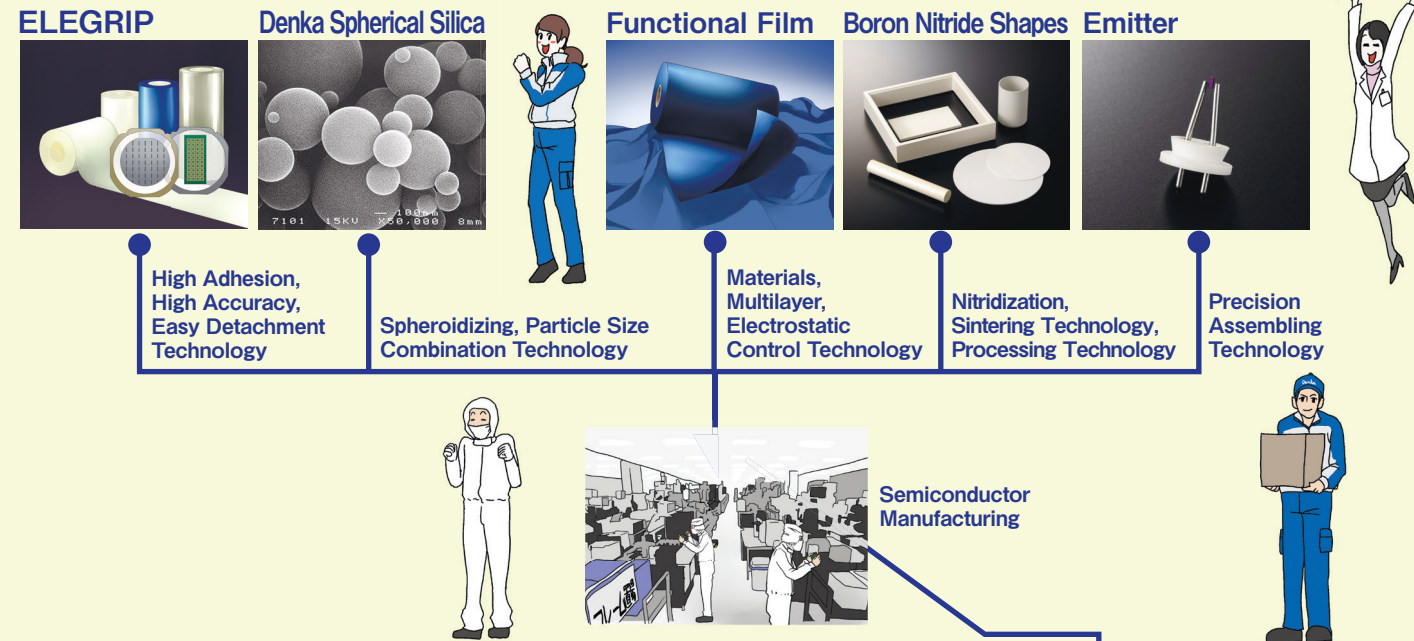


This tape is used for binding wire harnesses. We are contributing to the weight reduction / electrification of automobiles with a lineup that meets needs, such as the industry's thinnest 70 μ m and heat-resistant tape for high-voltage cables.

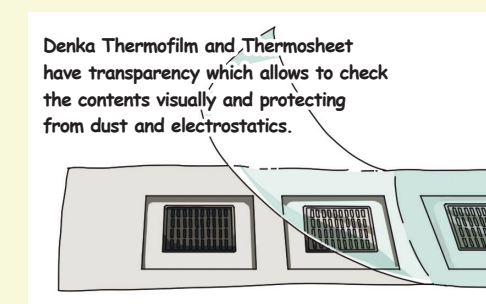
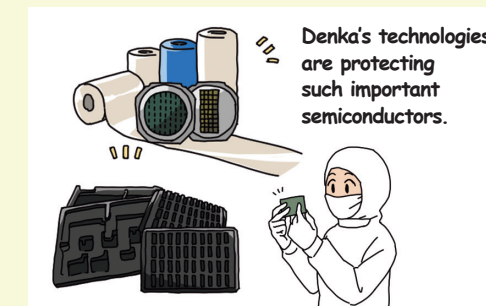
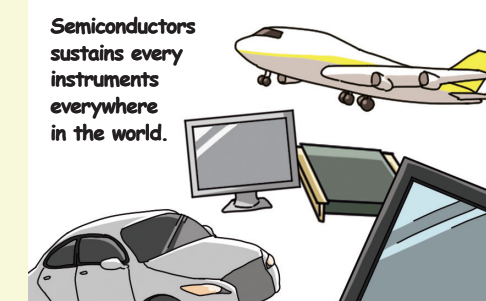
Semiconductor Applications

Denka's products are playing great roles in every process such as manufacturing equipment for semiconductor, machining, packing, and shipping.

Our various technologies such as polymer, multilayer, electrostatic control, pressure sensitive adhesive, spheroidizing(fusion), baking, grain body particle size combination, are used in the process of manufacturing semiconductors.

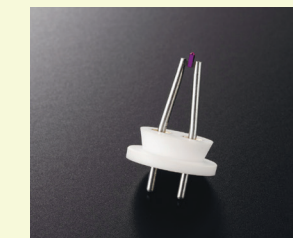


Denka Technologies in Precision Instruments



Emitter (Electron source)

Electronic Products



The emitter is essential for manufacturing and testing of semiconductors and electronic materials. It has superior electronic emission properties and used for electron source of electron microscope, manufacturing semiconductors, and testing devices, etc.

Denka Boron Nitride (Shapes)

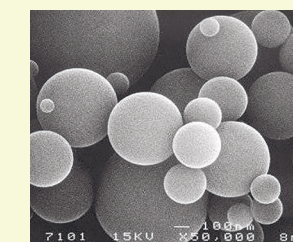
Functional Ceramics



It is sintered hexagonal crystal boron nitride powder (h-BN) which has superior thermal conductivity, heat resistance, lubricity, corrosion resistance, and electric insulation. It can be molded to any shape that customer wants.

Denka Spherical Silica

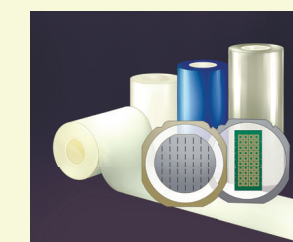
Advanced Specialty Materials



It's coefficient of thermal expansion is the smallest in industrial materials, and accumulation of the technologies for many years has developed a characteristic with high sphericity and variety of particle size distribution to meet the customers' demands. As filler for semiconductor sealing material, it has No.1 share in the global market.

ELEGRIP

High Functional Adhesive Materials



ELEGRIP is the protecting and temporary fixing purpose tape for materials during polishing or cutting process of wafer and electronic materials. Varieties of grades are available for various needs such as high accuracy and diversification of materials.

Denka Thermofilm ALS

High Functional Films



Denka Thermofilm ALS is a heat-seal type cover film for emboss carrier and it shows good detachment characteristic for bottom carrier tape materials such as polystyrene, polycarbonate, polyester.

Denka Thermosheet EC

High Functional Films

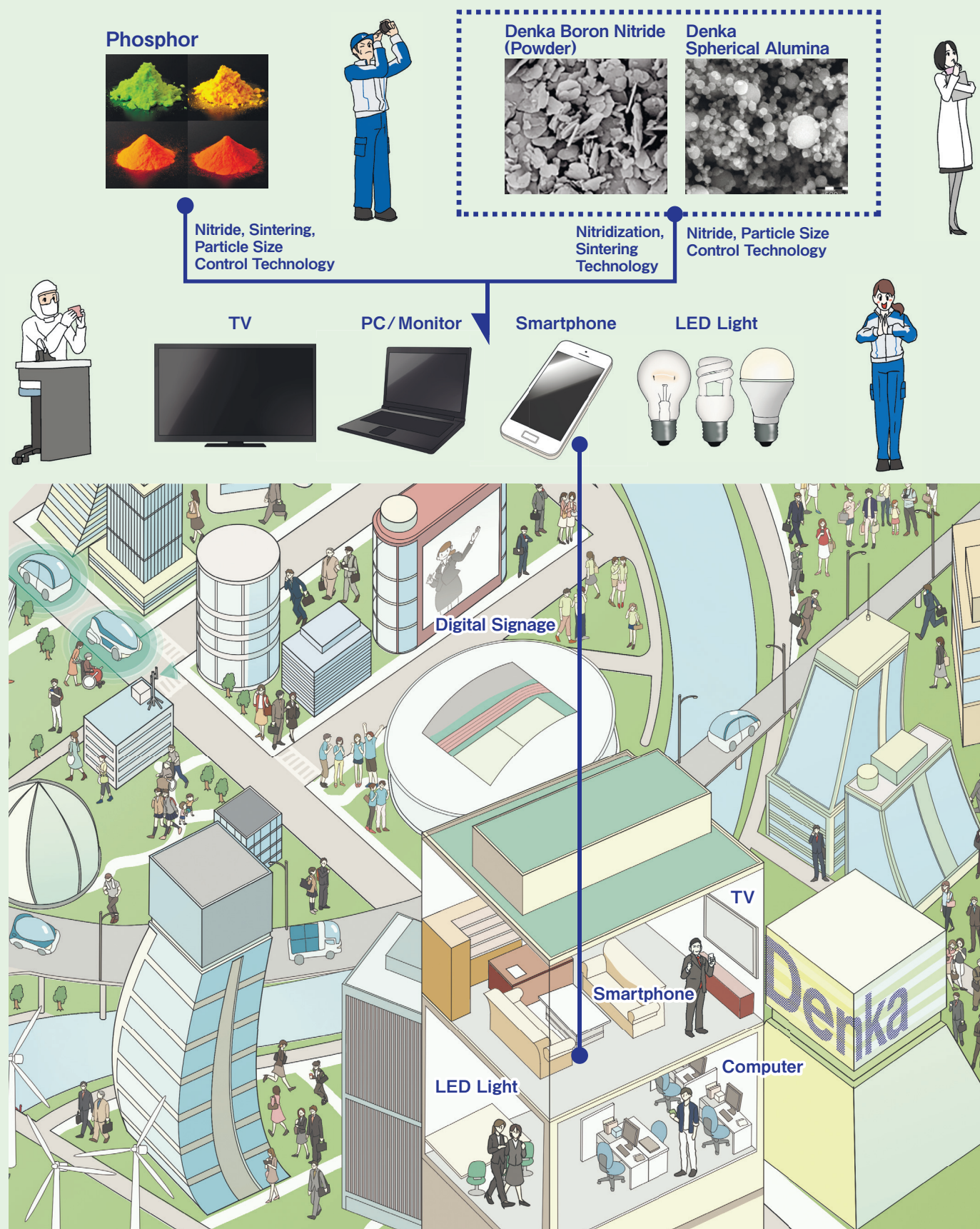


Denka Thermosheet EC is a sheet for emboss carrier tape, and addition to general type; it has varieties of grades for various needs such as electric conductivity, antistatic. It has superior formability and dimensional accuracy, and it can be shaped by various forming methods.

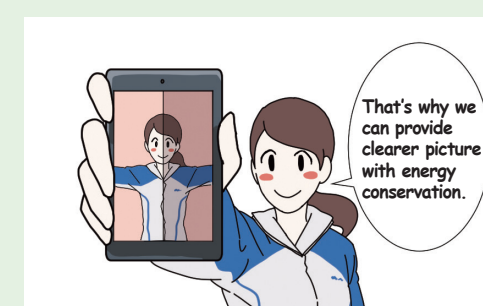
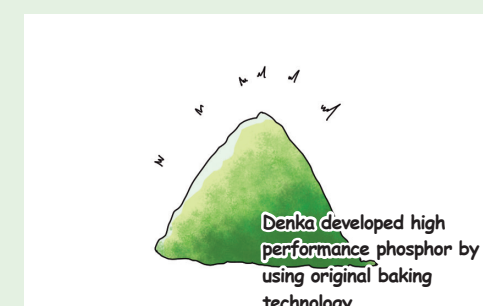
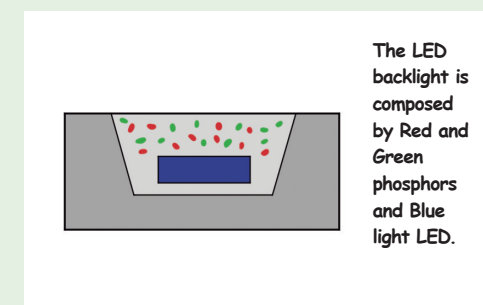
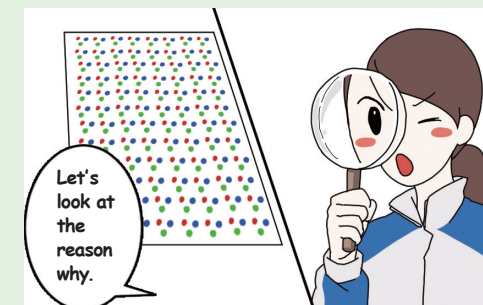
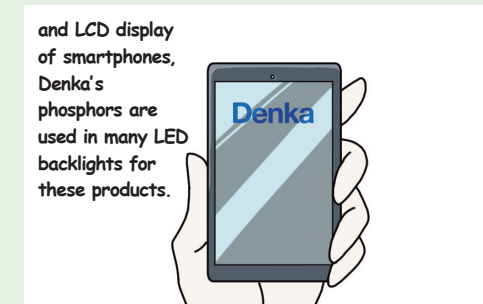
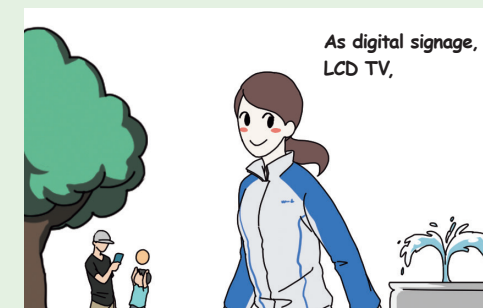
Consumer Applications

Denka technologies such as baking, polymer mixture, and pressure sensitive adhesive are useful for opt electronics related applications.

The baking technology is used for phosphor as light source of LED, and the pressure sensitive adhesive technology is used for adhesive to assemble optical pick-up or camera lens. These technologies are playing active parts.

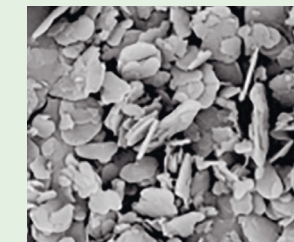


Denka Technologies in Smartphones



Denka Boron Nitride (Powder)

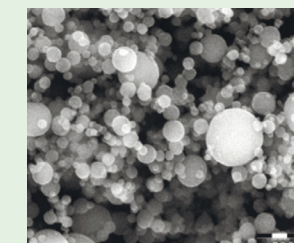
Functional Ceramics



It is the hexagonal crystal boron nitride powder (h-BN) which has superior thermal conductivity, heat resistance, lubricity, corrosion resistance, and electric insulation. It is widely used for mold releasing agent, lubricant, and high thermal conductive insulating filler.

Denka Spherical Alumina

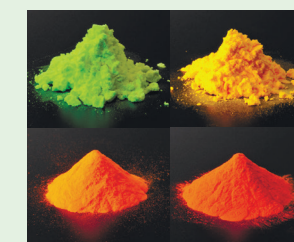
Advanced Specialty Materials



High sphericity high thermal conductive filler which is developed by Denka's original high temperature fusing technology. It makes high filling easier than grinding form filler and it can control abrasion of mixer and mold. Same as spherical silica, it has various particle size distribution, and we can adjust depending on a purpose (particle size : 100 μ m ~ submicron size).

Phosphor

Functional Ceramics



The ALONBRIGHT Phosphor is produced upon our ceramics technologies which have been cultivated for many years. It has varieties of selectable colors from green to red, and by using it for backlight of LCD display or LED for lighting; it can implement vivid light as well as higher brightness characteristic and higher reliability compare to conventional products.

HARDLOC (OP/UV)

High Functional Adhesive Materials



HARDLOC (OP/UV) series are ultraviolet-curing type adhesives. The visibility can be improved by adjusting refractive index by full-filling airspace in front cover glass, touch panel, and LCD module. It is also used for organic light-emitting diode(OLED) of the next generation display panels.

Caralyan OPP Tape

High Functional Adhesive Materials

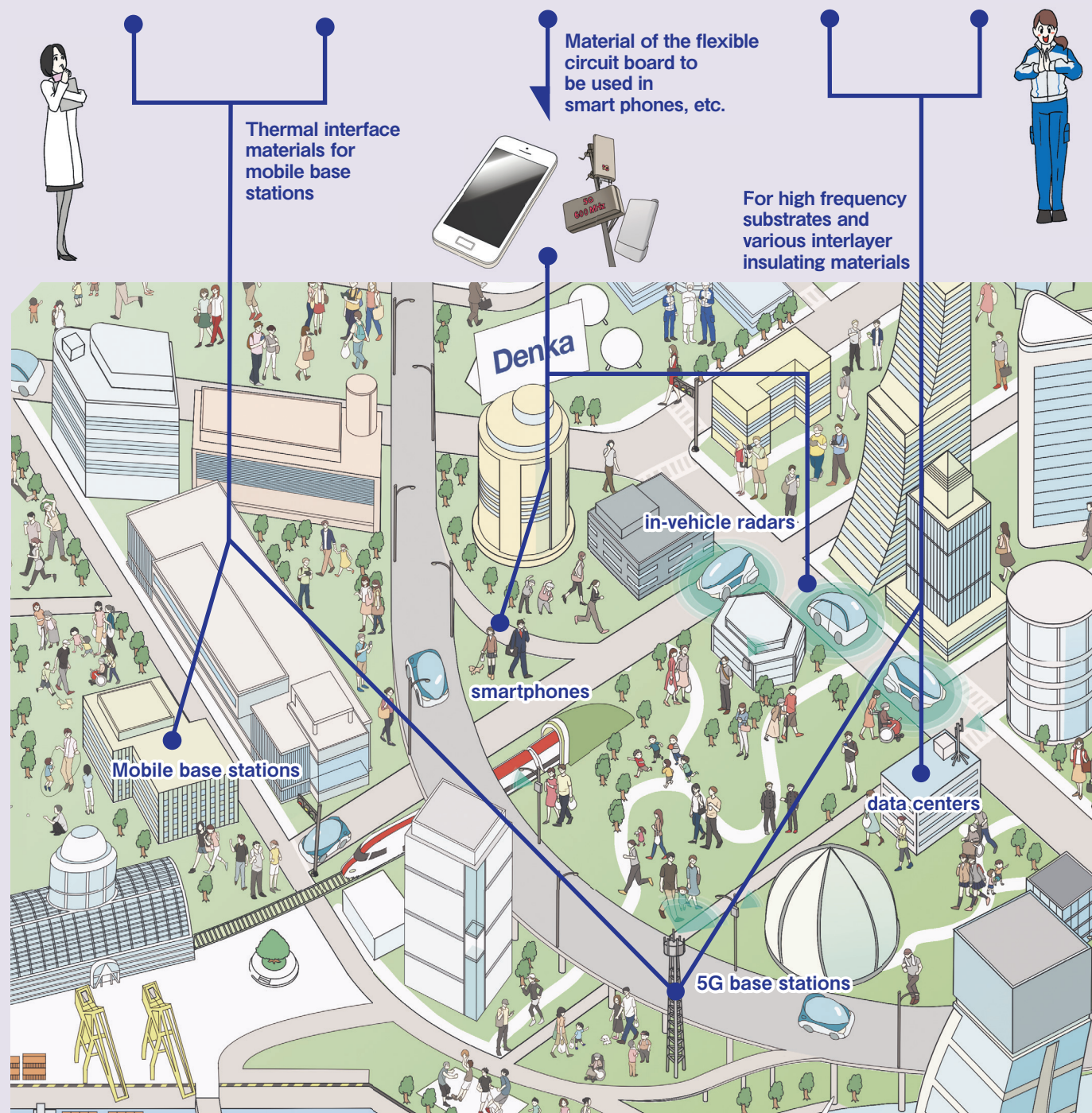
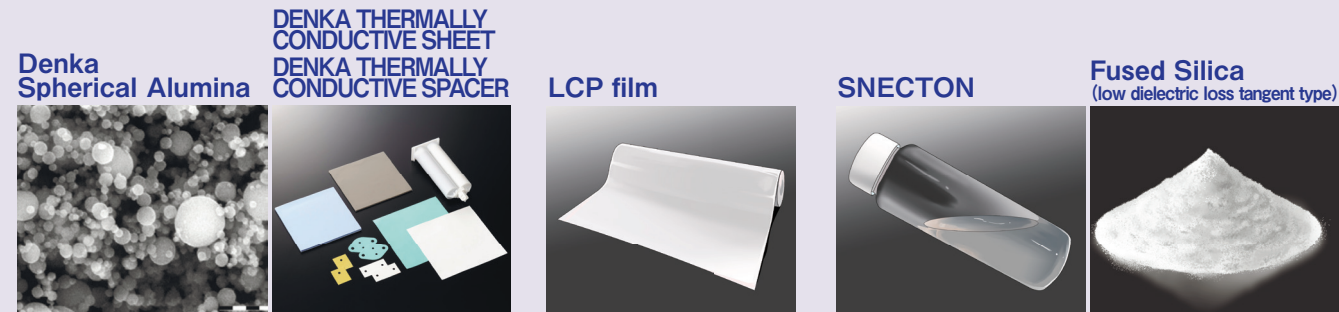


Packing tape using a polypropylene film base material with excellent tensile strength, oil resistance, and water resistance. Not only for corrugated cardboard sealing, but also for printing with original name and tape that can be cut straight and cleanly by hand, it contributes to image enhancement and work efficiency.

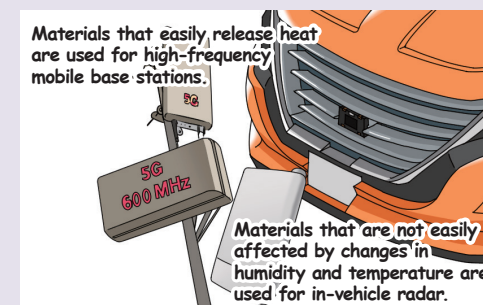
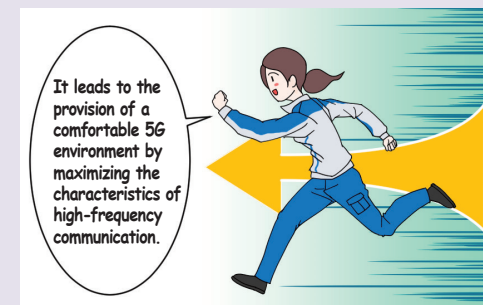
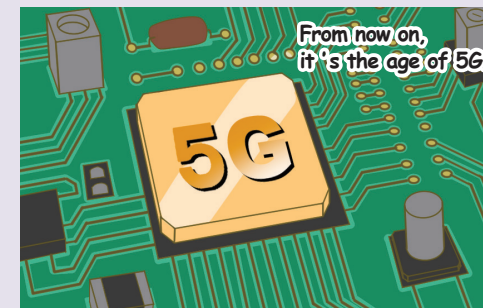
Applications

Denka's technology supports the evolution of high-speed communication.

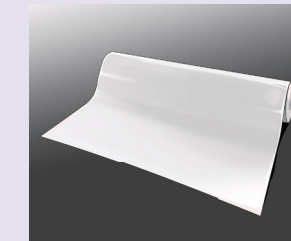
Various technologies such as firing technology and spheroidizing technology for silica and alumina, film forming technology for LCP, and polymerization technology for LDM are utilized in Denka's products.



Denka's technology is also available for 5G

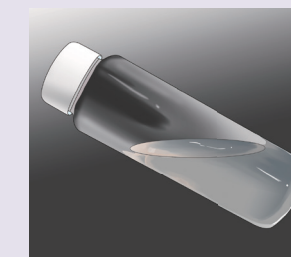


LCP film



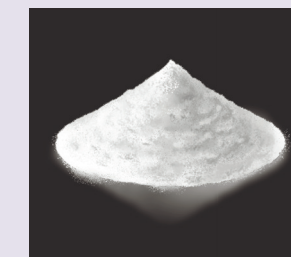
A thermoplastic film with excellent electrical characteristics (low dielectric constant, low dielectric loss tangent), low hygroscopicity, and high heat resistance. It is flexible and has excellent copper foil adhesion, so it can be used for flexible circuit board applications for 5G.

SNECTON (LDM:Low dielectric organic insulating material)



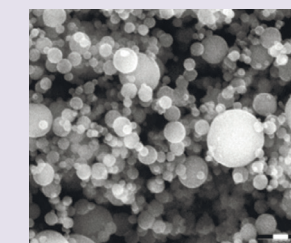
A new resin material with excellent electrical characteristics (low dielectric constant, low dielectric loss tangent), low hygroscopicity, and high heat resistance. Although it is soft, it has crosslinkability, hardness can be easily adjusted by blending with other thermosetting resins, and it has excellent adhesion to copper foil. For these reasons, it is used for high-frequency circuit boards and various interlayer insulating materials.

Fused silica (low dielectric loss tangent type)



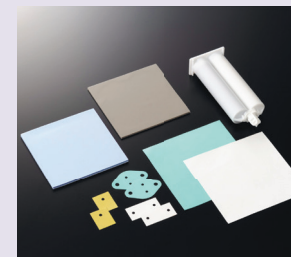
A ceramic powder with excellent electrical characteristics. It is expected to be applied to rigid boards used in 5G communication equipment. It can be used with the same workability as conventional fused silica, and is expected to have a low dielectric loss tangent. In addition, we have a lineup of particle sizes from submicron to 5 micron.

Denka Spherical Alumina



A heat dissipation filler that is mixed with materials such as thermal paste in 5G communication mobile base stations. Since it is highly spherical, it can be filled more than amorphous fillers, and because it can be designed with a wide range of particle sizes, it is possible to cover all directions in the medium and high heat dissipation zones. Spherical alumina will contribute to a wide heat dissipation band in order to suppress performance deterioration due to heat generated by increasing the frequency of communication.

DENKA THERMALLY CONDUCTIVE SHEET
DENKA THERMALLY CONDUCTIVE SPACER



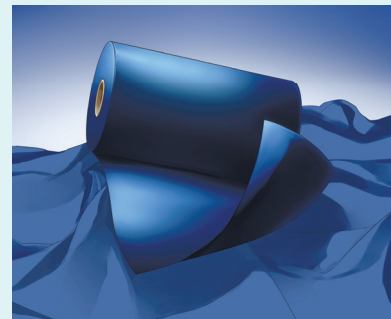
A silicone-based insulating material that is highly filled with a ceramic filler with high thermal conductivity.

The amount of heat generated increases with the higher performance of the elements of the electronic control unit for 5G base stations. Denka thermal interface materials is used to solve the heat control problem.

List of Electronic Materials

Denka Thermosheet EC

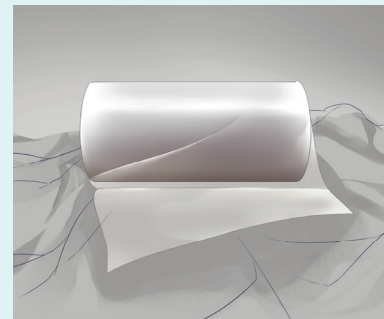
The bottom part emboss carrier tape material for carrying electronic parts and semiconductors.



▶ P8

Denka Thermofilm ALS

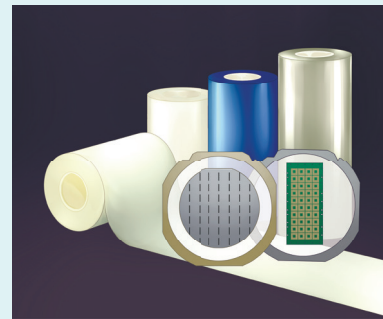
The covering tape for carrying electronic parts and semiconductors.



▶ P8

ELEGRIP

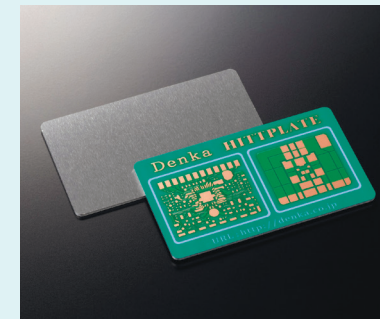
Semiconductor wafer grinding / dicing / surface protection / temporary fixing tape



▶ P8

DENKA HITPLATE

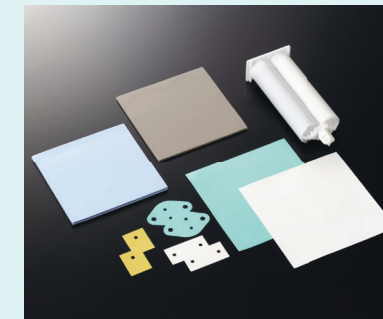
The metal base circuit board with high thermal conductivity.



▶ P6

DENKA THERMALLY CONDUCTIVE SHEET/SPACER

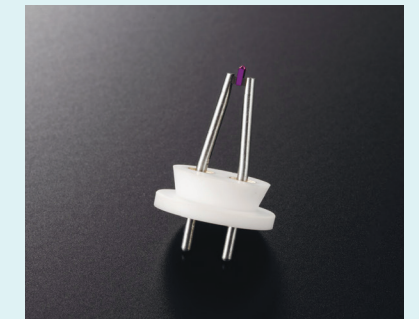
The high heat dissipation electric insulation material.



▶ P4,P6

Emitter (Electron source)

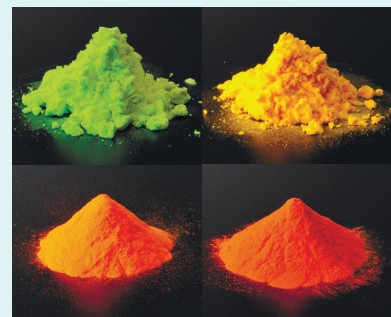
The electron/ion source for microscope, testing device, and manufacturing semiconductors.



▶ P8

ALONBRIGHT

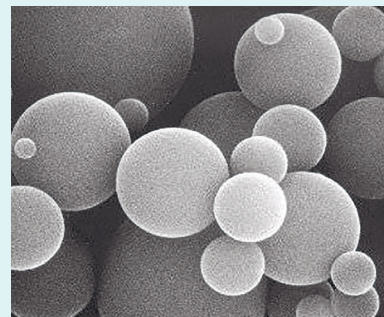
The high performance phosphor for LED.



▶ P10

Denka Spherical Silica

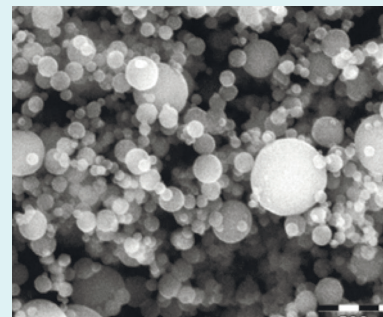
The spherical silica with electric insulation and low thermal expansion characteristics.



▶ P8

Denka Spherical Alumina

The spherical alumina with high thermal conductivity.



▶ P10,P12

ALSINK

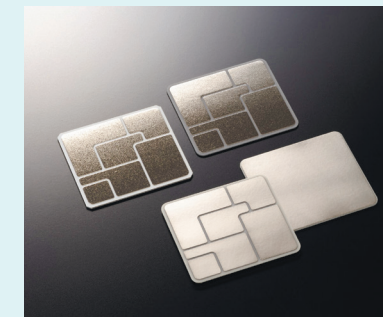
The composite material with low thermal expansion and high thermal conductivity.



▶ P4

DENKA AN PLATE DENKA SN PLATE

The ceramic circuit board with high thermal conductivity.



▶ P4,P6

HARDLOC (SGA)

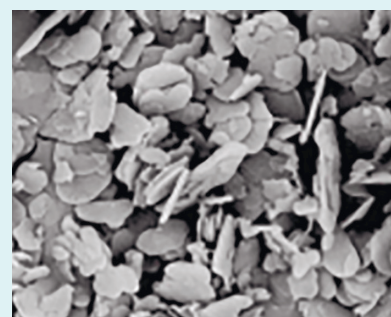
The 2 liquid mixture type acrylate-based adhesive (room temperature curing).



▶ P4,P6

Denka Boron Nitride (Boron Nitride) : Powder

The boron nitride powder used as lubricant, releasing agents and high thermally conductive filler.



▶ P10

Denka Boron Nitride (Nitrogen Boron) : Shapes

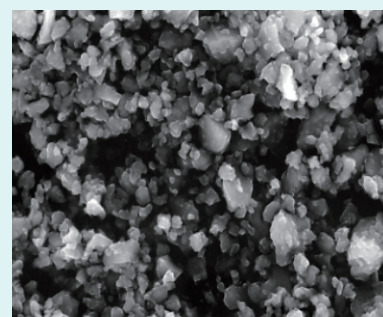
The boron nitride shapes can easily be machined into custom shapes.



▶ P8

Silicon Nitride Powder

The ceramic raw material powder with high heat resistance, corrosion resistance, and abrasion resistance.



▶ P4

HARDLOC (OP/UV)

The ultraviolet-curing type adhesive.



▶ P10

DENKA BLACK

Outstanding electrical conductivity, thermal conductivity, ultra-high purity carbon black



▶ P4,P6



List of Electronic Materials

VINI-TAPE

Polyvinyl chloride adhesive tape for electrical insulation.



▶ P4

Wire Harness Vinyl Tape

Polyvinyl chloride adhesive tape for automobile wirin.



▶ P6

Caralyan OPP Tape

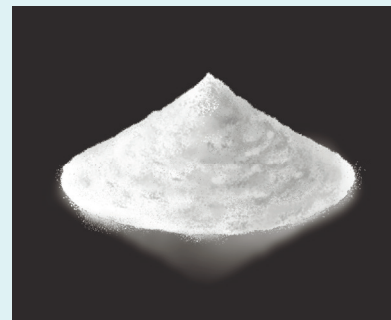
Polypropylene packing tape



▶ P10

Fused Silica (low dielectric loss tangent type)

Low dielectric loss tangent spherical silica filler for high frequency boards.

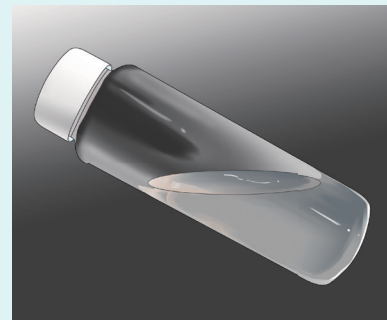


▶ P12

SNECTON

(LDM:Low dielectric organic insulating material)

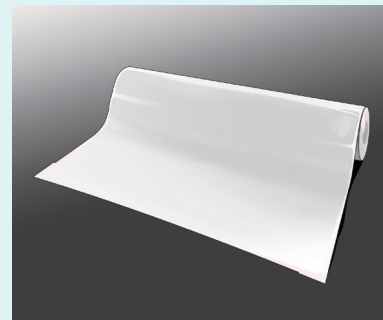
Soft insulation material for high frequency.



▶ P12

LCP film

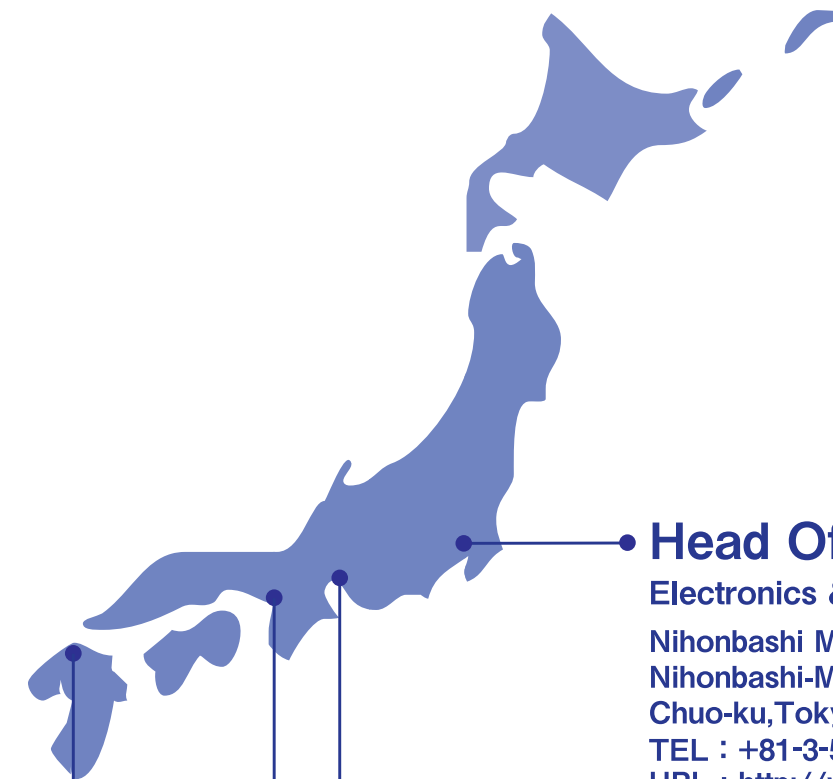
Liquid crystal resin film for high frequency boards



▶ P12



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