Gunbai Column No. 06

To mark the 50th anniversary of the company's establishment, head office was relocated into Chiba office and began integrated operations

Denka Consultant & Engineering's 50th Anniversary

Co-creating the Future with Customers

Denka Consultant & Engineering Co., Ltd. (DCE) is located in a corner of Denka's Chiba Plant along the coast of Ichihara City, Chiba Prefecture. In 1971, a period of rapid economic growth in Japan, DCE was established after splitting off from Denka's facility and electrical equipment divisions. This year marks the 50th anniversary of its establishment.

DCE's main business is the design, construction, and maintenance of plant facilities, and the company is currently expanding its businesses overseas. In particular, the pneumatic conveyance of powder and granular materials is one of the main pillars of its business. The High Flow Pneuma, developed in 1973, is a system that conveys powder and granular materials with high-pressure air or inert gas, suppressing dust and saving space and labor in maintenance. This product led to the development of pneumatic conveyance systems for various other powder and granular materials, and the company has built up a track record in fields such as steel, machinery, petrochemicals, cement, food, and paper manufacturing.

Take steel, for example. The PCI (Pulverized Coal Injection) System, jointly developed with a major steel manufacturer, is a system for blowing pulverized coal into blast furnaces. Following the second oil crisis, it contributed to meeting the increased demand for coal through cost reductions and the stabilization of blast furnace operations. Its sister technology of blowing waste plastic into blast furnaces achieves the same benefits, while also making a positive impact on the environment by reducing CO_2 emissions.

Recent projects to reduce environmental impact include the construction of facilities to treat special liquid waste generated by IT companies, storage and handling facilities for fly ash in biomass power plants, and sewage sludge carbonization pellet handling facilities, all of which have been highly evaluated by customers.

Efficiency and eco-friendliness are both essential for the future of the manufacturing industry. As an engineering partner that commits to customers, we are starting to look toward the next 50 years.

VOC FREE

The DenkaWay Winter 2021 Vol.06

Published: January. 1, 2021 Publisher: Corporate Communications Dept., Denka Co., Ltd. / Editor-in-chief: Satoshi Fukuoka / Nihonbashi Mitsui Tower, 2-1-1 Nihonbashi-muromachi, Chuo-ku, Tokyo 103-0022

Denka

The DenkaWay

Winter

2021 | Vol.06

Driving forward to the future of the world with EVs

Contents

Think Next Generation

Driving forward to the future of the world with EVs

The Denka Group aims to realize a clean and safe future for society by supporting technological innovation in the automobile industry, using our chemical capabilities that we have cultivated over the years.
So that the next generation can also lead an enriched life with automobiles,
we are thinking about what we can do to contribute to the global environment and automobiles.

Amazing the World with Innovation

The Future of Automobiles as Predicted by CASE

“A period of change that only comes once a century”
This is what the president of a leading automobile manufacturer said in response to the huge transformations in the industry.
CASE has gained popularity as a keyword for considering the future of automobiles.
The technologies and services encompassed by these words will surely create a new era of automobiles.

Connected

New values created through connection

A connected car is a car that can be used as an ICT terminal. New value is created by collecting a wide variety of data such as on the vehicle's status and surrounding road conditions through sensors, and analyzing it via a network. When 5G service is more widespread and connected services are more fully featured, it is expected that IoT will link cars to drivers and various other devices, other cars, and even public transport. Even after getting out of our cars, we can find and reserve restaurants by linking our location information with our smartphones, avoid traffic jams by using other means of transport. In this way, we will be able to live more convenient and enriched lives through connected cars.

Autonomous

An era where drivers no longer need to drive

These days, cars with driving support features, such as detecting a car ahead and maintaining a certain distance or supporting the steering to stay in the middle of its lane, became much more familiar. Issues including long-standing legislation is preventing completely automatic driving, but it is expected to become the standard in the 2030s. This would mean that steering wheels, brake and accelerator pedals, and even the front windshield would no longer be necessary, and so it is likely that the interior of cars will massively change in the future. Under the "new normal," autonomous dispatch services without drivers are starting to draw attention, and taxis and food delivery services have already taken off in China and the USA.

Shared & Services

Turning owned things into social infrastructure

People's idea of “owning a car” has been changing over recent years. When car sharing service becomes more popular, it is expected that cars will no longer be a thing that one person owns, but will instead be considered a social infrastructure. It is likely that the form of ownership will not be individual-based and decentralized, but more centralized and brought together by companies offering services using automobiles. In that case, the number of automobiles in society will decrease, while each will be used more frequently. This shift will likely increase the value of each automobile and change their shapes, with more functionality and higher comfortability.

Electric

Cars that can exist in harmony with the earth

Electrification has become a trend in the world of automobiles. Especially in Europe, many countries have been promoting EVs as a national policy. The majority of automobile manufacturers are expected to expand the development and commercialization of these kinds of vehicles through the 2020s. In comparison to cars with engines that burn fossil fuels, EVs with electric motors do not produce any exhaust fumes. EVs are an integral essence of CASE, as they not only have superior acceleration and are extremely quiet, but also align with Connected, Autonomous, and Shared & Services, as these functions will allow better control of automatic driving. While there are still problems such as charging time and range, there is no doubt that EVs will play a leading role in the future of the automobile industry.

A number of Denka's technologies lie at the heart of electrification, which drives the evolution of automobiles

What is CASE?

CASE stands for Connected, Autonomous, Shared & Services, and Electric. The word was first used at the 2016 Paris Motor Show by Dieter Zetsche, then the Chairman of Daimler AG and the Head of Mercedes-Benz Cars, in a talk on mid- to long-term strategy.

Amazing the World with Innovation

Denka's technologies used in electrification

In our management plan, Denka Value-Up, we have established Environment and Energy, particularly in relation to automobiles, as one of our areas of priority, and are working to expand our business. We are contributing to the evolution of automobiles by creating various products that help drive the electrification.

Electric

Amazing the World with Innovation

P C U

Power Control Unit

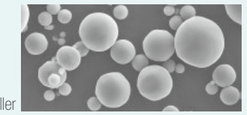
A power control unit (PCU) controls the electric power of motor-driven hybrid and electric vehicles. It consists of an inverter to power the motor and a converter to control the voltage. Aluminum nitride plates and silicon nitride plates have for many years been used as circuit boards for high-voltage, high-current inverters in the electric railway field, in particular for high-speed railways. Electric vehicles will also need inverters for the motor, so the demand is growing. While automobiles use lower voltages than electric railways, silicon nitride substrates are frequently used owing to demand for size reductions and a high level of reliability.

Ceramic PCBs

Lithium-ion batteries

Denka Black® is a type of carbon black, obtained from thermal decomposition of acetylene. Lithium-ion batteries require high-purity cells, as a large amount of metallic impurities can lead to short circuits. Denka Black® contains significantly fewer impurities than competing products, and it is used for parts that must be extremely reliable, such as conductive materials in lithium-ion batteries and semi-conductive layers for ultra-high voltage cables. Spherical alumina filler is a modifier that adds high thermal conductivity to resins, and is used as a key material for dissipating heat generated by equipment.

Spherical alumina filler



Denka Black® acetylene black

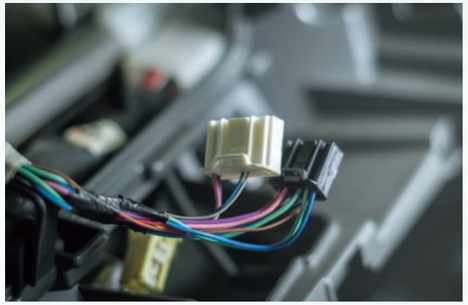
Denka IP® heat resistance modifier

Interior and exterior materials

Our technological innovations in automobile interior and exterior material fields play an important role in meeting the increasing global needs for lightweight materials, which is led by the electrification of automobiles. Denka IP®, which is widely used as heat resistance modifier for ABS and ASA resins, contribute to the safety of manufacturing plants by increasing the heat resistance of resins and preventing heat deformation of parts. In addition, it greatly contributes to reducing environmental burden by reducing the weight of parts, removing the need for coatings, improving the vehicle's internal environment through low-VOC materials, and producing recycled heat-resistant ABS by adding it to recycled ABS materials.

Wire harness binding

Harness tape



A wire harness is an assembly component that consists of electrical wires for power supply and signal transmissions, as well as terminals and connectors. The process of electrification has increased the number of wire harnesses used, which has led to a corresponding growth in vehicle weight. As a result, there is new demand for lighter cables, and a trend towards fewer and more compact parts. Denka not only develops lightweight grades, but also reduces the size and the number of parts used in a wire harness by adding new functionality to the tape. In addition, high voltage cables are used for the wire harness of electric and hybrid vehicles, and we are aiming to capture the needs by developing new products.

Special Talk Session with **Manabu Kawaguchi**

Automotive Innovation Inspiring the Next Generation

**How will automobiles and the environment around us change in the future?
We invited Mr. Manabu Kawaguchi, an automobile journalist,
to join us for a roundtable discussion with employees from Denka's automotive-related divisions.**

The technology of the Denka Group, which spans more than 100 years, has contributed to the development of the automobile business.

First of all, please tell us about your responsibilities within the Denka Group.

Miyakawa: I am in charge of new business development for the automotive industry. My duties include marketing, listening to the needs of automakers, and examining ways to utilize the technologies and products of the Denka Group for innovation in automotive technology.

Kamiya: I am in charge of developing new products for the automotive industry through marketing activities. In order to keep up with the expanding market, we need to explore new research topics. We are extracting needs mainly from automakers in the North America area and

What is the Automotive Materials & Solution Dept.?

A department that promotes the expansion of Denka Group's next-gen automotive business by working across various divisions and activities across various divisions and conducting cross-functional marketing and new business development activities.

Amazing the World with Innovation

Special Guest
Manabu Kawaguchi
Automobile Journalist

Taro Kamiya
Automotive Materials & Solutions Dept.

Takeshi Miyakawa
Automotive Materials & Solutions Dept.

Masakazu Minegishi
Special Conductive Materials Dept.
Electronics & Innovative Products Div.

Keisuke Murasaki
Advanced Tape Dept.
Living & Environment Products Div.

Changing the mindset of end users is key to further expanding the xEV market

continuing to provide feedback within the Denka Group.

Murasaki: I am in charge of sales of harness tapes, which bind the wiring harnesses that transmit electricity and electrical signals in automobiles. With electric vehicles and automatic driving necessitating even lighter materials, we are responding to the needs of our customers by manufacturing the thinnest and lightest harness tapes in the industry.

Minegishi: I am in charge of sales of acetylene black, which is used as a conductive material in lithium-ion secondary batteries. The strength of this product is its high purity and its well-developed chain structure, which provides excellent conductivity and moisture absorption. I am proud of the fact that it is widely used as a de facto standard product.

Could you tell us about current market trends and needs in the automotive industry?

Kawaguchi: The xEV (Electromotive Vehicle) market is continuing to expand worldwide, and it has been predicted that production volume will increase more than tenfold between 2030 and 2050. There is currently a slight upward trend in the production of EVs (Electric Vehicles) and PHVs (Plug-in Hybrid Vehicles), but looking at market trends, I honestly wonder if they will really reach that level. Further expansion of the xEV market hinges on a change in the mindset of end users. The first major issue is the pricing. For example, HVs (Hybrid Vehicles) have been around in Japan since 1998. The price has remained low, so they have spread throughout Japan, but the price of EVs remain high. Lower prices are essential for popularizing EVs. Additionally, the range problem needs to be solved. Currently, the cruising range of EVs is about 400 km. This is actually enough, but on a psychological level, I think a lot of users feel uneasy because that number isn't higher. Another issue is the lack of charging ports. At expressway service areas, there are sometimes lines of cars waiting for chargers, and facilities for quick charging are limited. Popularizing xEVs will require a change in the end user mindset with relation to pricing, range, and recharging.

Kamiya: I agree. In California, where ZEV regulations are in place, you can see dozens of EVs waiting in lines to charge at shopping malls. In the meantime, drivers can enjoy a cup of tea, but it might take some time for this custom to spread around the world. It is no exaggeration to say that we are in a phase where we need to transform our very lifestyles.

Miyakawa: Some end users choose xEVs because they want **to reduce greenhouse gas emissions** and contribute to the reduction of environmental impact, but it is also true that many people purchase HVs for economic reasons. One way to meet such needs is to reduce the price of lithium-ion rechargeable batteries. However, the cruising range is shortened by driving with the air condition on and by aging batteries, so we also need to aim for higher performance. The two conflicting issues of lower cost vs. high performance is a common theme in automotive related materials.

Solving the conflicting issues of lower cost vs. high performance

Minegishi: Lithium-ion battery manufacturers have a growing need for conductive materials that can extend the cruising range. Our acetylene black is now the de facto standard, but there are still many "dormant" conductive materials out there. In the future, we will face competition from new materials capable of conducting electricity in smaller amounts to achieve higher capacity batteries. We have to overcome this competition by making proposals that take into account the features of xEVs and all usage scenarios.

Murasaki: The challenge of lowering prices is the same for wire harnesses. As electrification and automated driving technologies evolve, more circuitry is required. In contrast to the trend

Guest

Manabu Kawaguchi
Automobile journalist. Member of the Japan Automobile Journalists Association. Member of the Japan Car of the Year Selection Committee. Has his own YouTube channel called "LOVE CARS!TV!" (280,000 subscribers).

Denka Group

Takeshi Miyakawa
Automotive Materials & Solutions Dept.
Joined the company in 1990. After working on the development of functional resins, sheets, thermal management products, and acetylene black, he assumed his current position in 2016. He is in charge of new business development for the automotive industry.

Taro Kamiya
Automotive Materials & Solutions Dept.
Joined the company in 1999. After working in sales of electronic components, optical fiber materials, and electronics materials for the Chinese market, he assumed his current position in 2019. He is in charge of new business development for the automotive industry.

Masakazu Minegishi
Special Conductive Materials Dept.
Electronics & Innovative Products Div.
Joined the company in 2005. After working in materials procurement, he was put in charge of domestic and overseas sales of acetylene black and has been in his current position since 2014. In addition to sales, he is in charge of training young employees.

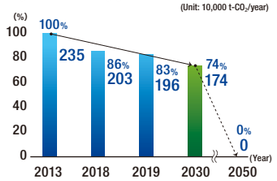
Keisuke Murasaki
Advanced Tape Dept.
Living & Environment Products Div.
Joined the company in 2012. Put in charge of sales of rain gutter products at the Osaka Branch for three years, after which he assumed his current position in 2015. He is currently in charge of harness tapes for automobile wiring harnesses.

01

Realizing carbon neutrality to achieve zero greenhouse gas emissions by 2050

In 2019, our company established a medium- to long-term target for greenhouse gas emissions with the below 2°C target set by the Paris Agreement in mind. We have been aiming for an 85% reduction by 2050. Following the Japanese government's declaration of carbon neutrality in October 2020, we will strengthen our goals and aim to achieve zero greenhouse gas emissions by FY2050.

The Denka Group's medium- to long-term targets for reducing greenhouse gas emissions



Amazing the World with Innovation

of automobiles getting lighter, wire harnesses are getting heavier. We would like to make proposals to integrate functions and optimize excessive specifications for total cost reduction and to reduce size and weight for better performance.

What about the relationship between automobiles and the environment?

Kawaguchi: Automobiles and the environment are inextricably linked. Traditionally, the focus has been on how to reduce greenhouse gas emissions, but this idea is changing. For example, look at FCVs (Fuel Cell Vehicles). These

vehicles take in oxygen and create a chemical reaction with hydrogen to power the motor. This reaction only produces water, so no CO_2 is emitted. Moreover, the latest model purifies the air it takes in and discharges it, so the more you drive, the cleaner the air becomes. Increasing the market share of FCVs is directly related to increasing **clean energy.**

Kamiya: It is truly a "mobile air purifier." I believe that an optimal mix of xEVs is important to reduce environmental impact. Rather than converting all vehicles to FCVs or EVs, FCVs could be used as buses due to their long cruising range, and EVs could be used as small one-seater vehicles for elderly people to go shopping. Operating with each vehicle's features in mind should lead to more efficient energy use.

Expanding the potential of xEVs to reduce environmental impact

Minegishi: Our society is changing rapidly, and we don't know how the automotive industry will look in a few years' time. That is why we need to look beyond the automotive industry. As a materials manufacturer, I think it is important to always think about how we can contribute to the environment.

Murasaki: Performance requirements for harness tapes are different between conventional gasoline cars and xEVs. For example, we need to use high-voltage cables for xEV harness tapes. As Mr. Minegishi says, we believe that continuing to manufacture products that meet the needs of the future will ultimately lead to a reduction in environmental impact.

Miyakawa: We also have to take into account the environmental impact of manufacturing processes. There is data showing that in some cases, the manufacturing processes of new materials used to make vehicles lighter have a higher environmental impact than the processes for conventional materials. We will continue looking for ways to reduce environmental impact, not only during driving but also during manufacturing.

Lastly, what are your expectations for the Denka Group?

Kawaguchi: I hope that you will take pride in the fact that your work is enriching people's lives. Denka's products are contributing to **the realization of a sustainable society** through technological innovations in automobiles and

Bringing joy to people and enrich their daily lives.

the growth of the xEV market. In addition, xEVs can be used as an emergency power source in times of disaster, saving people's lives. When you are working on the development of new products with high added value, please imagine the happy faces of end users.

Miyakawa: Thank you very much. We are currently building a network with automakers and tier 1 suppliers around the world, and we have started to receive inquiries about new materials. I would like to collaborate with the other business units to deepen our relationship of trust and accelerate the development of new products.

Kamiya: "Safety" is an important keyword. We have technologies and products that contribute to automated driving, and we would like to fully realize it without traffic accidents. We want to discover new possibilities while exchanging opinions with our customers. That is the mission of the Automotive Materials & Solutions Department.

Murasaki: I am proud of the fact that when you open a car's hood, you can see our harness tape. This may not be something that end users are aware of, but it is an area where our technical capabilities are put into practice. We will continue developing new products that will become the de facto standard for next-generation automobiles.

Minegishi: The growth of xEVs means that our products can contribute to a wider range of fields, but on the other hand, it also means that they will become increasingly commodified. To make our presence felt, we will need to specialize in all areas. We must improve the quality of our products, research system, and customer support, so that customers will come to trust the Denka brand. It is true that our products may only be a tiny part of the automobile. However, our customers choose us, and we can contribute to the lives of people around the world. There is nothing that makes me happier than that. We will continue to take on the challenge of further specialization and contribute to enhancing the value of the Denka Group.

02

Reducing CO_2 emissions by about 35,000 tons per year through clean energy initiatives with hydroelectric power plants

The Denka Group has been actively engaged in the construction of hydroelectric power plants since its establishment. Ten of our own power plants and five jointly owned power plants in Niigata and Nagano prefectures cover about 30% of Denka's total electricity consumption. With the addition of two new power plants, this is expected to contribute to a reduction in CO_2 emissions of about 35,000 tons per year in the future.

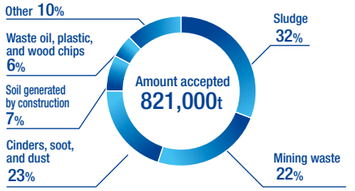
Oami Power Station (Nagano Prefecture)

03

Toward the realization of a sustainable society. Resource recycling at cement plants.

In order to realize a sustainable society, the Denka Aomi Plant utilizes Automobile Shredder Dust (ASR) and other materials from in-house industrial waste as fuel. Efforts are being made to recycle cement to minimize the discharge to final disposal sites as much as possible.

FY2019 Recyclable Resource Acceptance Breakdown by Type



Amazing the World with Innovation

Denka—Hand in Hand with Automobile Developments

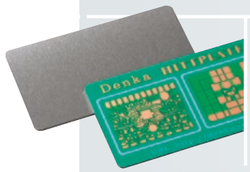
Denka's development has gone hand in hand with the development of automobile-related technologies. In addition to the products introduced here, we will continue to create new technologies and products for the next generation of mobility.

Amazing the World with Innovation

Heat Dissipation

Heat dissipation technology is key for electric vehicles, which are made up of many electronic components that generate heat.

Appli-cations **Electric control units and drive inverters for electric power steering units, LED headlights, etc.**



Metal substrates
Hitt Plate®
A heat-resistant epoxy resin loaded with a high inorganic content filler using our proprietary technology. Achieves high thermal conductivity.

Ceramic substrates
Silicon Nitride Plates
Aluminum Nitride Plates
High-voltage/high-current compatible circuit board, made of high thermal conductivity ceramics.

Heat dissipation materials
Heat Dissipation Sheets, Heat Dissipation Spacers, Heat Dissipation Grease
An insulating material loaded with a highly conductive ceramic filler.

BN resin complex
(In development)
Thermally conductive insulating sheets with adhesive properties Allows for new structures in high-voltage electrical components such as inverters and DC-DC converters.

Towards the Era of Self-Driving Cars

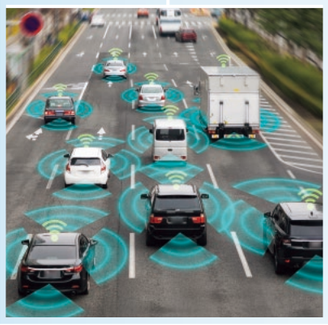
The era of fully automated driving may not be that far away. In preparation for this era, we are working on expanding existing technologies.

Appli-cations **Millimeter wave radar, V2X communication**

LCP film
(In development)
A low dielectric constant and low dielectric tangent film. Reduces transmission loss when used as a flexible insulating layer for high frequency devices.

LDM (In development)
A new thermosetting resin with heat resistance and electrical properties (low dielectric constant). Reduces transmission loss when used as hard substrates and interlayer dielectric materials.

Low dielectric tangent filler
(In development)
By combining various materials, it is possible to reduce the transmission loss of high-frequency devices.



Long-lasting, Beautiful, Shining

Long lasting with clear visibility. LEDs are now the mainstay of lighting technology. They are also often used in automotive components.

Appli-cations **LED lights, indicators**

SiAlON phosphor
Alonbright®
Used for LED lighting and white LED backlights for LCDs. High resistance to temperature changes contributes to longer life and higher brightness of LEDs.

Important Parts in familiar products

Automobiles are equipped with many parts such as power windows and speakers that play a major role even though they do not directly affect driving. Denka's technology is also utilized in these parts.

Appli-cations **Speakers, Small motors**

Adhesive Hardloc®
A denatured acrylate-based structural adhesive of the 2-component type. It is highly durable and excellent for bonding metal and magnets.

For a More Comforta ble Space

Denka's materials are used to create comfortable spaces with pleasant textures and luxurious finishings.

Appli-cations **Interior materials**

Noble Tact (In development)
Special sheet with a brushed surface that has a pleasant texture, with optical transparency and high formability. It can be used to make the inside of the vehicle feel more luxurious.

Weig ht Redu ction

For EVs that use motors, which are less powerful than engines, weight reduction is essential. Lighter weig ht means lower fuel consumption.

Appli-cations **Wire harness es, interior and exterior materials**

Harness tape
The first vinyl chloride insulating adhesive tape to be successfully produced in Japan. It is highly flexible and has a strong adhesive strength.

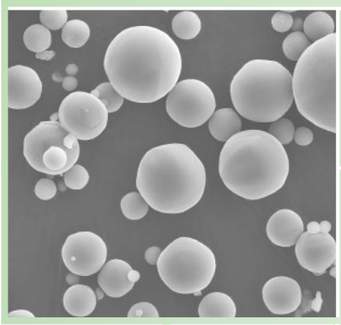
Heat resistance modifier
Denka IP®
A "Styrene-N-Phenylmaleim-ide-Maleic anhydride Copolymer" developed with Denka's proprietary technology. Adds heat resistance to ABS resin.

Heat-resistant ABS resin
Marekka®
An easy-to-use resin with greatly improved moldability, thermal stability, and impact strength, which are shortcomings of conventional heat-resistant ABS resins.

The Source of EV Energy

Lithium-ion batteries are strongly associated with the development of EVs. Denka's products for lithium-ion batteries have been playing a role in the evolution of EVs.

Appli-cations **Lithium-ion batteries**



Spherical alumina fillers
A high sphericity alumina developed with Denka's proprietary technologies. Can provide high thermal conductivity and improve the surface hardness of various resins or rubbers by filling them.

Spherical magnesia filler
A filler that has a higher thermal conductivity than alumina. Its heat conductivity can be further enhanced when combined with spherical alumina.

Acetylene black
Denka Black®
An electric/thermal conductive carbon black made from acetylene. Denka boasts the largest production capacity in the world.

Thermal insulation and fire spread prevention materials
(In development)
Suppresses fires in the event of thermal runaway of LiBs. Enhances the safety of xEVs.

Resistant to Heat

Basic components are also evolving day by day. In particular, Denka is constantly working on improving heat resistance, which continues to be an issue for automobiles.

Appli-cations **Hoses, wipers, sealing materials, air springs**

Denka ER®
Excellent resistance to combined degradation by heat and oil. Used for improving performance in automotive and mechanical parts.

Evolmer®
(In development)
Synthetic rubber with many properties such as mechanical strength, oil resistance, abrasion resistance, and fatigue resistance in dynamic environments.

Special synthetic rubber
Denka Chloroprene®
Commercialized first in Japan using our proprietary technology. Has excellent balance of physical properties, such as heat, ozone, and oil resistance.

Clean Exhaust Gases

Purifying harmful substances contained in exhaust gases. We contribute to global environmental conservation by supplying raw mat materials used as gripping materials that protect ceramic catalyst carriers from heat and vibration.

Appli-cations **Exhaust gas purifier**

Alumina short fiber
Denka Alcen®
With high heat resistance, insulation, and reinforcement properties, it is used for fireproof insulation and as a material for secondary batteries.

Think INNOVATION

Introducing articles that provide hints for innovation

No.06

To Be on the Runway My Whole Life

Model  **Ai Tominaga**

Ai Tominaga came into the spotlight after her debut in the NY Collection when she was 17. Since then, she has continued to be a top model in the global fashion industry. In addition to modeling, she is active in various other fields such as TV, radio, and events. As a Japanese model with an unparalleled career, she also participates in charity and social contribution activities and promotes Japanese culture overseas. In Autumn 2019, she was cast for one of the leading roles in the TV drama "Grand Maison Tokyo," which pushed her acting career to new heights.

When you can reach 50% of a certain goal, that goal is definitely achievable

In February 2020, I applied to model at Paris Fashion Week for the first time in about 10 years. A Japanese TV crew accompanied me to France for an interview, but at that point, it wasn't yet certain if I would be able to model in the show. I would say the odds were about 50-50. Fashion shows are highly competitive. I had to stand out among other younger models in their teens and 20s and make myself look appealing. The key to being selected is to fully concentrate on the moment and give it your all. Fortunately, I was able to walk the runway that time.

I decided to take on this challenge because I wanted to remain a "true model." To me, that means being in demand for photos or walking the runway. Of course I was nervous, but I needed to make the attempt to measure my capabilities. If you know what you are capable of, you'll know what you need to do next, whether it's to try again or to work harder. So, I had my worries, but I was never afraid. If innovating means achieving results by challenging the uncertain, then the most important thing is to believe in yourself. My believe is that when I can reach 50% of a certain goal, that goal is definitely achievable. I have encouraged myself that way since the moment I took my first flight to New York when I was 17.

I need to work hard to remain a "true model." That is unquestionable. However, I also make sure not to push myself too hard and maintain a good balance between modeling and my private life. Knowing how to refresh yourself is key to continuously working hard.

Exploring new fields to broaden my horizons

I was an extremely curious child, climbing every tree I could find. That personality of mine led me to try many other fields, but I have always considered modeling to be my true calling. I have chosen work that I thought could be applied to my modeling work. For example, being radio personality is a completely different from modeling, but it helped me improve my ability to express myself. Trying different fields allows you to broaden your horizons and enrich your life. All of these experiences have been meaningful to remaining a true model.

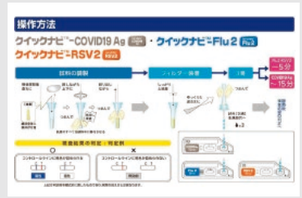
Having said that, I consider myself to be still incomplete. Through all my modeling experiences, I have never truly felt that I have grown. Perhaps I am always looking for someone who will criticize me, otherwise I will never be able to improve. However, working with young and promising designers in Paris made me feel that my career was truly worth it. The fashion industry is always fast-paced and volatile. It is said that 30 years' worth of changes happen in 10 years in the fashion industry. I was proud to be able to walk the runway in such a difficult field.

Recently, consideration for the environment has become an important theme in the fashion industry. Going forward, in addition to my modeling work, I would like to be an Ethical Lifestyle SDGs Ambassador and make innovations in the fashion industry. I know this is possible, because anything is possible if you believe in yourself.

DENKA TOPICS

Introducing Denka Group news topics from October to December 2020

Oct. Expansion of intended use and specimen types for COVID-19 rapid antigen test kits



We have received approval from the Ministry of Health, Labour and Welfare to partially change the market authorization of COVID-19 rapid antigen test kits to expand specimen types. In addition to the conventional nasopharyngeal swab specimen (a specimen collected from deep in the nasal cavity), it is now possible to test with a nasal swab specimen (a specimen collected by inserting a swab about 2 cm into the nasal cavity). In addition, simultaneous testing with the influenza diagnostic kit is now possible with specimens taken from a single swab. This will contribute to improving the testing system in medical institutions.

Oct. Launch of advanced specialty ceramics, Denka Spherical Magnesia, for 5G/xEV markets

In October, we launched Denka Spherical Magnesia, an advanced specialty ceramic that provides a new thermal solution for 5G and xEVs. Furthermore, as part of our efforts to strengthen our business providing heat dissipation materials for xEVs, we increased the capacity of silicon nitride by approximately 30%. We will continue contributing to making our society cleaner and safer as stated in the SDGs by further strengthening our operations in the environment and energy sectors.

Nov. Completion of a new building for manufacturing influenza vaccine materials

As a major domestic manufacturer of influenza vaccines, we decided to increase our manufacturing capacity for influenza vaccines in July 2018 in order to meet the increasing social needs for vaccination. A new building for the manufacturing of influenza vaccine materials has been completed at the Gosen Plant in Gosen City, Niigata Prefecture. In preparation for the start of operations in 2022, verification and test runs of each facility will be conducted.

Nov. Denka Athletics Challenge Cup 2020

On November 3, the Denka Athletics Challenge Cup 2020, the Japanese Grand Prix series for track and field events sponsored by Denka, was held at the Denka Big Swan Stadium in Niigata. In order to prevent COVID-19 infections, the number of sporting events was limited this year, but we decided to provide opportunities for college and high school students, who had fewer opportunities to compete this season. Many student athletes across the country participated in the event alongside top athletes, resulting in a number of good records.

Nov. Environmental management to achieve a carbon neutral society by 2050

Construction of a high-efficiency gas turbine generator to reduce greenhouse gas emissions was completed at the Omi Plant in October.

In October 2020, the Japanese government declared that Japan will strive to become a carbon neutral society by 2050, so we will take this opportunity to strengthen our environmental management to fulfill our social responsibility of addressing the challenges the world is facing. In the Eco-Pro Online 2020 exhibition held from November 25, we introduced the Denka Group's environmental management initiatives along with our unique environmental products and technologies.

Dec. Denka Report (Integrated Report) 2020 published

On December 21, we published the Denka Report (Integrated Report) 2020. In this report, we provide our shareholders, investors, and other stakeholders with comprehensive corporate information from the perspective of ESG management, focusing on medium- to long-term value creation. This year's report highlights the changes in social structure and lifestyles due to COVID-19, our contribution, and the role we should play going forward.

Our editorial team regrets that the following error was made in "The Denka Way" Vol. 5. We sincerely apologize.
Page 16: First paragraph
(Error) LCP is a material with a unique molecular structure that is insoluble in solvents.
(Correct) LCPs, which have excellent dielectric properties and exhibit a thermotropic liquid crystalline phase, have a unique molecular structure and are difficult to dissolve in solvents.

LINK GLOBALLY, LINK FUTURE

Group members around the world, working toward the future of Denka

The Denka Group has 6,000 employees around the world.
We posed the following question to members from different countries.

Theme Aspirations for 2021

健康志向 Health-conscious

Kotaro Honda
Construction Dept.
Denka Renotec

I can't stand hot weather, but am also sensitive to cold.

Joined the company in October 2014. As a construction site agent, he is involved in construction management related to repairing PC bridges that have been damaged by salt.

In 2021, I will attempt to make the worksite healthier. In 2020, the COVID-19 pandemic made it much more difficult to go outside, and all year, I felt like I wasn't getting enough exercise. For people like us who work on sites, we can't turn a blind eye to the physical fitness required. By always aiming for a well-balanced diet, enough exercise, and a regular lifestyle, I would like to lead by example and realize a healthy and lively working environment with everyone.

How are things in Japan, Kotaro?

How are things in China, Dong?

Cui Dong
Production Dept.
Denka Inorganic Materials (Tianjin) Co., Ltd.

事故"0" Zero accident

I like playing the game of Go!

Joined the company at the end of 2013. As Production Dept. Manager, he focuses on work related to safety and the environment.

We produce special cement additive extracts at our plant, and have been meeting customers' needs for seven years. Currently, daily production is running smoothly, and we have been able to ensure zero accident. In addition, we are considering the introduction of air transport facilities for environmentally friendly, safer, and more efficient production, for which expectations are growing.

How are things in the USA, Yuki?

Yuki Wang
Back Office Operations
Denka Corporation USA

More Productive, Brilliant & Professional !!

I like visiting new places with my family.

Joined the company in January 2008. As an assistant manager for accounting, logistics, and general affairs, she oversees work related to accounting and supports logistics and office tasks.

I will make 2021 a bright year, be more positive, and carve out a highly specialized career for myself. In light of the new working conditions resulting from the COVID-19 pandemic, I will consider how to improve productivity, how to make working from home easier, and how to improve work processes. I will also stay on the lookout for new ideas, both at work and in my private life, and would like to gain new skills.

How are things in Singapore, Ho?

For a better tomorrow

Ho Rui Rong
Financial Dept.
Denka Chemicals Holdings Asia Pacific Pte. Ltd. (DCHA)

I'm a big fan of Marvel movies!

Joined the company in October 2019. As a team leader in the Financial Dept., he oversees the management and processing of annual financial information, and endeavors to improve the team's efficiency.

There are three things I want to try in 2021. First, I will start studying big data analysis and the automation of financial tasks. Secondly, I will create a new slogan and work hard with everyone to achieve it with the goal of further increasing the team's efficiency.
Thirdly, I will aim to incorporate the team's new ideas to improve our work-life balance.
I'll do my best!

How are things in Vietnam, Tran?

Tran Van Anh
Planning Dept.
Denka Advanced Materials Vietnam Asia Pacific Pte. Ltd. (DCHA)

Break through the power of your potential

I love manga!

Joined the company in September 2019. In cooperation with related departments, she works towards the introduction of ERP and the establishment of various rules and regulations with the goal of strengthening internal control systems and rationalizing business management.

With my work, I plan to study the flow of each type of management task so that I can more deeply understand the internal control systems of the company. I am also aiming to pass the highest-level Japanese-Language Proficiency Test with the goal of improving my Japanese overall. If I succeed, I would like to try another language too. Travelling is more fun when you can speak a lot of languages!

How are things in Hong Kong, Anna?

Anna Tam
Accounting
Denka Chemicals Hong Kong Co., Ltd.

Want to be Fluent in English

I always put my all into my work and childcare.

Joined the company in April 2013. She is involved in monthly accounting tasks and annual settlement processing. Last year, the company began consolidating financial statements with the head office, and she is learning about it every day.

With the aim of improving my skills, I will start studying new things like business English. For the most part, people born and raised in Hong Kong can speak English and Chinese, but since I started working, I haven't had many opportunities to use my English and I have forgotten a large amount. When I see news of major manufacturing companies relocating their production bases from China to Southeast Asia, I feel how important business English is going to become. I am going to start preparing for the future!