

**TODA KOGYO CORP.  
CORPORATE PROFILE**











There is infinite potential embedded in a single tiny particle.

Even the smallest particles have enormous potential in their ability to join together, combine with each other, as well as react to and bring about changes that can ultimately contribute to greater growth for our own lifestyles and society.

Similarly, people also have boundless possibilities.

By working hand-in-hand to share knowledge, wisdom, and ingenuity, each person holds tremendous power to help face any type of challenge.

It is our viewpoint that every person is an irreplaceable "particle" making up our larger world. We see our mission as continually trying to connect with each other and combine our abilities as we attempt to create new possibilities that bring hope to the future.

Supporting life and society through nanotechnology.

**Fine particles for a fine future.**

## TOP MESSAGE

# Believing in the possibilities of fine particles and people, we create a new history.

President and CEO

## SHIGERU TAKARAGI

The history of our company, founded in 1823, began with the production of bengala, a fine particle of iron oxide. Our roots lie in a group of engineers who produced bengala, which is said to be the oldest pigment in Japan. Since then, over the past 200 years, we have continued to create products needed by people and society while expanding the possibilities of fine particles with our unique technology and passion. Our predecessors have co-created diverse chemical materials in collaboration with research institutions since the time when the term “industry-academia-government collaboration” did not exist. Because the challenge is to create something that does not yet exist in the world, development takes time. What will be required next? We must catch up with information as quickly as possible, create new technologies that lead to commercialization, and sharpen our skills. We have been working together with our customers to achieve results, and our present and future are based on the accumulation of our enthusiasm for the challenge of creating new value.

Learning from our 200-year history and in order to forge a path to the future, we are now returning to our roots by enhancing the value and expanding the applications of our core businesses in pigments and coloring materials for copiers and printers.

On top of that, we have positioned high-quality magnet materials, dielectric materials, and materials for lithium-ion batteries as our growth business and are providing them to our customers and partners. These chemical materials and components are used in a wide range of products that make our lives richer and more convenient, such as smartphones, automobiles, and home appliances.

Also, we believe that what will be increasingly sought after in the future are environment-related businesses that can help solve the challenges facing the world. In our history, we were the first in the industry to establish an environmentally friendly wet synthesis technology at a time when pollution was a social issue. Our major mission for the future is to contribute to the realization of a decarbonized society by further advancing the fine particle synthesis technology we have cultivated through systems that use iron-based catalysts to produce hydrogen, which is expected to be a sustainable energy source, and CO<sub>2</sub> separation and recovery technology using sodium ferrite.

We believe in the infinite possibilities contained in small particles, which we have always kept our eyes on. And the people who have inherited our technology and passion also have unlimited potential. With strong bonds of trust and gratitude with our stakeholders, we will continue to create new values that will give us hope for the future, as we strive for the next 100 years of continuous growth.





## PURPOSE

# We transform the potential of fine particles into new possibilities for our world.

Throughout Toda Kogyo's 200-year history, we have always believed in the infinite potential contained in small particles.

With the technology we have mastered over many years as well as our passion to persevere under any circumstances, we continue to meet the challenges of the future with the power of nanotechnology and support for our diverse and evolving society.

## PRINCIPLES

### Management Principle

Our group will further improve the fine particle synthesis technology we have developed with iron oxides and will always continue lively growth and development. We will work on a foundation built on sincerity and trust and we will bring together our creativity and manufacturing strength to make a contribution to society in general with attractive new materials and solutions that are full of originality.

### Management Policy

- We will establish a management foundation as a "Manufacturing Company" that can contribute to society and will continue to grow and develop even 100 years after its establishment.
- We will refine our only-one technologies and continue to offer products and solutions that have high added value.
- We will become a company that is essential on a global level and increase the corporate value of the group.
- We will seek the happiness of our employees and their families and will be a company that is constantly trusted by our stakeholders.

### Code of Conduct

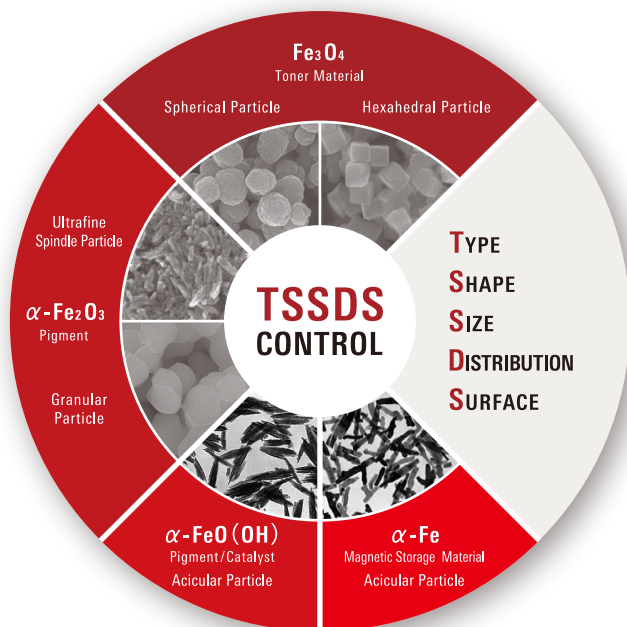
- We will act quickly to offer products and solutions that respond to the requirements of the customers.
- The whole company will come together as one, with manufacturing, engineering, sales and management working enthusiastically together.
- We will be corporate citizens who are faithful and fair and will act with a strong sense of ethics.
- We will improve our dignity as individuals and will continue to have pride, hope and dreams for the future.
- We will work for harmony and symbiosis with the local community and with the global environment.



## CORE COMPETENCE

# The 3Globally-competitive areas of core competence.

articles synthesis with controlling TSSDS, which means Type, Shape, Size, Distribution and Surface.



### Manufacturing technology cultivated since our foundation

Dry synthesis technologies				
Particle design	Composition control	Shape control	Calcination	Atmosphere sintering
Oxidation reduction	Pulverization			

Wet synthesis technologies				
Particle design	Composition control	Shape control	Reaction crystallization	Refinement
Hydrothermal synthesis				

Surface treatment technologies				
Functionality	Dispersibility	Avidity	Weather resistance	Heat resistance
Insulation properties				

Combined technologies/Processing technologies				
Polymerization	Granulation	Dispersion	Paint conversion	Hybrid
Kneading	Injection molding/Extrusion forming	Classification	Multi-layering	Thin film calcination

## 1 A wide range of crystal shapes, configurations, magnetic properties and colors Wet synthesis and other nanotechnology processes

There are a wide variety of types of iron oxide particle powders in which iron and oxygen are linked in different ways, and depending on the chemical and crystal type, shape, size, distribution, and surface of iron oxide particles, these have considerable differences in color, hardness, strength, and magnetic and chemical properties. Toda's wet synthesis technology is unique in that we can control these particles' properties, and use our full command of the material to produce a rich variety of iron oxides and other substances with the desired functions and properties. By changing conditions of synthesis such as temperature and pH, we can alter the crystalline structure, particle size, and other aspects at the molecular level. Toda technology is truly nanotechnology.

In order to create materials with the functions and properties that our customers demand, we make full use of our wealth of knowledge and experience to determine the conditions of synthesis, consider ways in which higher-quality materials can be produced, and decide which compounds to add in order to create new functions. Toda's wet synthesis and other nanotechnology achievements put us way ahead of the competition.

## 2 Meeting complex and diversifying needs A wealth of knowledge and experience with iron oxide and other inorganic compounds

By amassing know-how involving magnets, magnetic materials, pigments and other substances employing iron oxide, Toda has also been able to accumulate a wealth of knowledge and experience with magnesium, barium, rare metals and other inorganic compounds, and to put this to use in the creation of products.

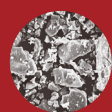
While retaining our focus on iron oxide, we have been able to effectively combine it with other inorganic materials to create new materials with new functions and new properties. Furthermore, the diversifying needs of today's digital "information society" include an everincreasing demand for more highly sensitive magnetic materials, smaller and stronger magnets, and powerful, long-lasting battery materials. Toda Kogyo Group has a wealth of experience not only with iron oxide, but also with advanced inorganic material technologies such as battery materials. We will continue to contribute to social progress by expanding from the materials field to incorporate technological advances in other areas.

## 3 Materials as a tool for providing the support of our customers need to solve problems Total support – starting with materials, ending with solutions

Toda's high level of expertise and unmatched knowledge, techniques, and know-how built around iron oxide help us to illuminate the problems faced by our customers from new angles, and provide solutions from a materials point of view. Customers may wish to increase the strength or magnetism of a material, or give it new additional properties. Toda closely follows these customer needs and identifies the issues that need to be addressed, proposing total solutions including processing methods that take advantage of the materials' properties, suggesting the most appropriate material to use for each situation, and determining which materials to synthesize with which, and in what quantities. Currently, we are meeting a diversifying range of customer needs by making advances in the development and manufacture of electronic components such as electromagnetic shielding material and millimeter-wave absorber use – advances that are made possible through our extensive knowledge of materials. Toda seeks above all to go beyond the role of a mere materials provider to become a valued partner contributing to our client companies' competitiveness, elevating the level of technology, and using the development and delivery of new materials as just the beginning of total, comprehensive solutions.



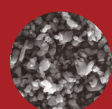
## CORE COMPETENCE



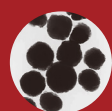
1953 Fe



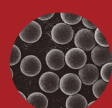
1963 Ba,Fe



1987 Ba,Fe



1989 Fe



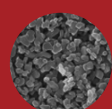
1992 Fe



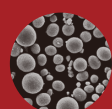
1996 Fe



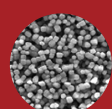
1997 Fe



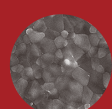
1999 Mg,Al



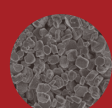
2002 Li,Ni,Co,Mn,Fe



2004 Ti,Ba

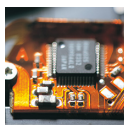


2012 Fe,Ni,Zn,Cu



2022 Na,Fe

## A rich variety of materials created with wet synthesis and other unique technologies



### Compound iron oxide powder for soft ferrite

Developed for use with soft ferrite, used as an ingredient in magnetic cores such as coils and transformers, magnetic yokes, and magnetic shields.



### Hard ferrite powder

Hard ferrite began to be used in rubber magnet products such as refrigerator door gaskets and symbols to be attached to cars by inexperienced drivers. Because it can be used in a wide variety of configurations and is extremely cost-effective, it has found numerous applications such as magnets for home appliance motors, copy machines, and printers.



### Barium ferrite powder for magnetic cards

Magnetic cards such as train tickets, train passes, and all types of prepaid cards have become an essential part of our daily life.

Toda has made a major contribution to the popularization of magnetic cards with the synthesis of barium ferrite.



### Globular magnetite powder for laser printers

Toda succeeded in massproducing the world's first globular black magnetic iron oxide powder for use as a pigment in the black ink (toner) employed by laser beam printers.

This pigment allows the creation of higher quality printed documents.



### Carrier powder for high-resolution color copying machines

Carriers fulfill the function of distributing toner inside color copying machines and printers. Toda has led the world in the development and marketing of longlasting, high-resolution globular resin carriers. These allow the creation of bright, attractive color documents.



### Metal for data storage devices

This is the magnetic material used in magnetic tape for computer data backup. In response to the needs of a digital age, we are continuing to develop metallic magnetic powder for multi-layered high-density magnetic recording media, along with non-magnetic underlying material.



### Highly activated iron oxide powder for use in reducing the generation of dioxin

The naturally occurring oxidative catalytic properties of iron oxide came to attention as a means of reducing the generation of dioxin from incinerators. By simply spraying this material directly on the inside of incinerators, the generation of dioxin was successfully suppressed thanks to the combustion catalysis of highly activated iron oxide.



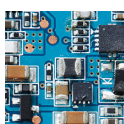
### Hydrotalcite-like hydroxides

As an application of wet synthesis technology, work has been carried out on the generation of hydrotalcite-like hydroxides with anionic exchange capacity, which are used in lead-free vinyl chloride stabilizers and insulation for greenhouses, etc.



### Positive terminal materials for rechargeable lithium ion batteries

Toda employs unique nanotechnology to synthesize high-quality materials with a variety of different compositional distributions, particulate sizes, shapes, and surface characteristics. These materials meet contemporary demands for higher capacity and longer life.



### Barium titanite for multilayered ceramic condensers

This material is used in small, high-performance chip capacitors. The fineness of the particulates makes it suitable for the slimming of devices and increasing the number of layers. Because it is highly crystalline, it retains its high electrical conductivity even in thin layers. Because particles are narrowly distributed, slim and multi-layered components are made more reliable.



### Ferrite sheets for short-range wireless communication antennas for smartphones

Magnetic sheets used for short-range wireless communications in small communications devices such as smartphones. Through our unique soft ferrite manufacturing and sheeting technologies, we have developed ferrite sintered magnetic sheets with high magnetic permeability and low loss to improve communication characteristics.



### Sodium Ferrite for CO<sub>2</sub> Solid Sorbent

Based on our unique iron oxide synthesis technology, we have successfully developed a material that can selectively recover CO<sub>2</sub> from the exhaust gas of boilers, etc. The CO<sub>2</sub> can be adsorbed at room temperature and released when heated to around 100°C, contributing to the construction of an efficient CO<sub>2</sub> recovery system.

## OUR BUSINESS

Innovation to support  
your daily life.



### Device

Magnet materials

Supporting advanced electronic  
devices with the parts and materials

- Automobile motor and sensor parts (various pumps, steering angle sensors, etc.)
- Motor and sensor parts for home appliances (fan motors for air conditioners, detection sensors, etc.)
- Copier parts (magnet rolls, etc.)

In the area of magnets, our magnetic materials are widely used as the magnets for automotive and home appliances. In addition to Japan, we have manufacturing bases in China and Thailand for ferrite and rare earth magnetic powders, magnetic compounds, injection molded magnets, and more, and have established a supply system from our Asian bases. We are currently working on magnets for small motors in electric vehicles, which are expected to grow significantly.



### Color

Pigments

Creating a vivid, beautiful  
community and environment

- Concrete coloring pigment
- Pigment for colored pavement
- High-quality pigments for coatings and resin

Pigments are the field in which Toda was first founded. From our origin as a producer of a coloring material known as Bengala, we have evolved into a supplier of a broad range of products such as high-quality pigments for coatings and resins used for automotive, pigments for construction and road pavement, environmentally friendly particle coatings, and more.



### Imaging

Electronic printing materials

Meeting demands for higher-quality  
color documents

- Toner materials for printers and copying machines
- Carriers for color printers and copying machines
- Magnetic materials for printers and copying machines

As a leading supplier of carriers and materials for use in toners, Toda stands at the forefront of "color communication." Toda provides materials for use in printer and copying machines toners, and is also working to develop a new generation of carriers for use in color printers and copying machines. Carriers are high-performance substances that preserve and distribute toners. Our unique technology has made possible the production of carriers with spherical particulates, meeting the growing demand for higher-quality color documents. Toda is also developing and manufacturing materials for use in high-performance magnets in printers and copying machines, and even supplies high-chroma, a high-grade pigment for use in lipstick.





## ICT

Dielectric materials

**Contributing to the growing sophistication of electronics**

- Materials for MLCC (For dielectric layer, Co-material of electrode layer)
- High performance resin filler (High dielectric constant, Refractive index and transmittance )
- Materials for piezoelectric devices.

TODA KOGYO's barium titanate, characterized by fine and sharp particle size distribution, is a ferroelectric material produced by our wet synthesis technology. It is suitable as a raw material for multilayer ceramic capacitor, etc., for its high dielectric constant characteristics.



## EMC

Soft magnetic materials

**Materials and devices to eliminate electromagnetic interference safely and effectively in the information technology society.**

- Inductor
- Noise suppression parts
- filter parts

With numerous highly sophisticated IT devices, wireless devices, automotive electronic devices, and other electronics surrounding us, the electromagnetic environment is creating an ever-increasing number of issues. In order to transmit and receive high-quality communications and images, for even to operate properly, electronic devices are required to coexist in a variety of electromagnetic environments. Meanwhile, the ever-growing sophistication of multifunctional compact electric devices is leading to an increasing density of circuits, creating electromagnetic interference problems inside the devices. Ingenious countermeasures are needed to ensure the proper functioning of devices in such an environment, and some of these countermeasures are found in the wide range of magnetic materials. We provide solutions in the form of electromagnetic components and sheets built around magnetic materials.



## Ecology

Environmental Related Materials

**Maintaining clean air, water and soil**

- Raw material for lead-free vinyl chloride stabilizers(Anion catcher for various resins)
- Combustion additive for waste incinerators
- Purification of deep polluted places

Toda's environmental related materials activities cover a wide range of aspects, ranging from measures to treat air, water and ground pollution, to the development of energy production systems that reduce global warming. In the area of materials with environmental applications, we are working on purification systems for remediation of VOC and heavy metals in the ground and ground-water, catalysts to promote total incineration, and others. We have also developed crow-repellent garbage bag additives and raw material for lead-free vinyl chloride stabilizers that are both safe for humans and environmentally friendly. In recent years, we have been conducting research and development on CO<sub>2</sub> separation and recovery.



## Battery

Battery materials

**Materials that enable the production of high capacity and longer-lasting high performance rechargeable lithium ion batteries.**

- Battery materials for electric cars

In our battery materials business, we carry out research, development and manufacture of cathode materials for rechargeable lithium ion batteries, which consist of lithium metal oxide. Various materials developed from our group's unique advanced synthesis technologies are being used to solve issues such as the higher capacity required as batteries become smaller and more multifunctional, and the demand for higher output and safety from environmentally friendly electric vehicles. Numerous customers use these materials and hold them in high regard. The market for rechargeable lithium ion batteries continues to grow in a widening variety of fields, from the challenges of continual miniaturization and use of wireless communications in electronic devices, to the need for more efficient energy conservation in cars and other vehicles, to the development of home power storage technology. Our materials support the global "energy-oriented society" – this is the goal and mission we have in mind as we continue to pursue research and development of new battery materials to enable the creation of a better social infrastructure.

# HISTORY

## Toda Kogyo's history begins with Bengala.

### Our story began in 1823 with the production of Bengala, mankind's oldest pigment.

What we call Bengala is red iron oxide, a compound of iron and oxygen. Bengala is one of the oldest color pigments, having been used by human beings for painting since ancient times. It was used, for example, in the famous cave paintings in Altamira, Spain, and the beautiful woman painted on the Takamatsu-Zuka Kofun (Takamatsuzuka Tumulus Mound) in Japan. It has also been used for a wide range of other purposes since ancient times, including painting of Kakiemon I (a famous ceramic artist) and succeeding in creating bright red colors on white porcelain pottery, and as a lipstick color. The predecessor to Toda Kogyo, Seikinsha, was established in Nishiebara, Shitsuki District, Okayama Prefecture (present day Ibara City), and our company started by manufacturing Bengala as a family business.

### TODA KOGYO CORP. was established in 1933.

Throughout the Meiji and Taisho eras, the cottage industry gradually became a modern industry, and in 1933, TODA KOGYO CORP. was established in Hiroshima City for the purpose of manufacturing and selling Bengala. In 1941, we developed a method that uses iron sulfate instead of the conventional production methods, and succeeded in further enhancing our productivity.

### In 1965, the wet synthesis process for iron oxide was developed and became one of Toda's core competences.

At the time, iron oxide was produced by burning iron sulfate, and the sulfur dioxide gas generated became a major problem after the war. In order to solve this problem from the ground up, our company, together with the late Professor Toshio Takada of Kyoto University, tried to develop a "wet synthesis method" by which iron oxide was synthesized from an aqueous solution through a chemical reaction, and we succeeded in 1965. These efforts were finally successful in 1965. Using this method means that sulfur dioxide is no longer produced as a by-product since it does not involve the burning of ferrous sulfate. In addition, by controlling production conditions of the wet synthesis process, high quality products with a wide variety of shapes and properties could be produced reliably and stably.

### In the 1970s, magnetic iron oxide for audio and videotapes began to flourish.

The development of the wet synthesis method enabled the production of particles with a high level of purity and uniform shape control. Based on this technological foundation, magnetic recording materials for audiotapes and videotapes were developed. Furthermore, during this period our magnetic iron oxide for audio and videotapes had an unwavering position in the global market.

### Taking on the challenge of the digital information society in the 1990s.

The 1990s saw a major transition from analog to digital. Audio and videotapes, which had a dominating market share and served as the foundation of our business, continued to decline amidst the wave of digitalization, and so our company began to take on new frontiers with nanotechnology as our core competence, starting with wet synthesis. While focusing on iron oxide, we also accumulated experience and knowledge in various other inorganic materials and continued to take on new social and industrial challenges associated with IT and environmental issues. In our efforts to tackle environmental issues, when harmful dioxins were detected in the exhaust gas of garbage incinerators at the time, we believed that the cause was incomplete combustion of the garbage. As such, we focused on iron oxide's ability to promote the combustion of combustible materials, and developed the activated Ferroxide TIC, an iron oxide used as a combustion catalyst.

### In the 2010s, we expanded our business by collaborating with business partners.

We began developing materials for lithium-ion battery in the 2000s, as we saw great potential in it becoming a next-generation business. Demand was initially sluggish, but has continued to grow as demand for electric and hybrid vehicles has expanded. In order to establish a system that would allow us to quickly respond to global market demand in anticipation of further expansion of the lithium-ion battery market in the future, we sought to work together with strong partner companies. In 2015, we partnered with BASF, a leading German chemical manufacturer, and shifted to growing business as a group company through joint ventures. In 2019, we considered deepening our existing businesses in Japan and overseas and further developing new businesses. We began an extensive partnership with TDK Corporation, which we had previous experience working with, with the aim of collaborating on the development of new products centered on the electronic materials business, procurement of raw materials in Japan and overseas, marketing utilizing global networks, logistics, and more.

### We celebrated our 200th anniversary in 2023, and moving forward, the Toda Kogyo Group will continue to take on new challenges.

On November 30, 2023, we celebrated the 200th anniversary since our founding and the 90th anniversary since we were established as a company by declaring our purpose to be "transforming the potential of fine particles into new possibilities for our world." Through this we express our belief in the potential of both fine particles and people, and our intention to continue to create new value that provides hope for the future. Beyond our 200th anniversary, our group will continue to pursue the potential of iron oxide, provide new materials and solutions, and work to support a diverse and evolving society.







**TODA KOGYO CORP.**