

Functional Materials of Titanium Dioxide

ISK ISHIHARA SANGYO KAISHA, LTD.

ISK ISHIHARA TECHNO CORP.



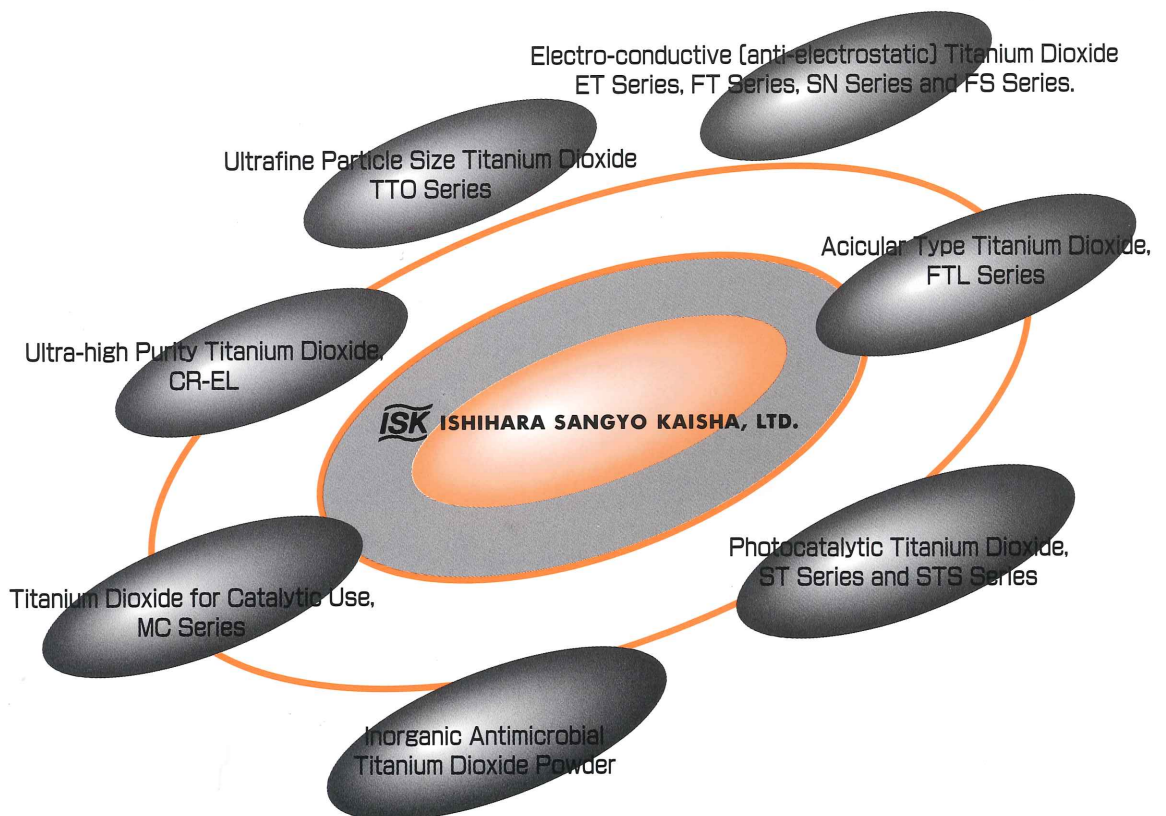
ISHIHARA'S FUNCTIONAL MATERIALS

As a major TiO_2 manufacturer, ISK is dedicated to developing new materials with versatile functions, using titanium dioxide technology.

We have been developing a wide variety of materials such as electro-conductive materials, ultrafine TiO_2 , high purity TiO_2 , TiO_2 catalysts, photocatalytic TiO_2 and inorganic antimicrobial powder. We have marketed these products in many different industries and adapted them to many commercial applications.

Beyond serving the chemical industries, we share the philosophy of people all over the world that environmentally friendly development is a necessity. Our functional materials are aimed at achieving that goal by protecting and purifying the earth, conserving energy, and ultimately, improving our lives.

Through the development of our functional materials, we have become familiar with many different personal and commercial needs and put great effort into applying our technology to meet them. We will continue to work with our customers to make the best use of our technology in creating new products.





Ultrafine Particle Size Titanium Dioxide TTO Series

A lot of industrial materials are known to improve in character or be imparted new functions when micronized.

ISK offers a full range of high quality ultrafine titanium dioxide whose particle size is approximately 1/10 of a pigmentary titanium dioxide.

〈Characteristics〉

- Our TTO products have outstanding physical and chemical stability because their crystal structure is rutile.
- Because of the ultrafine particle size, TTO products have excellent transparency and very little light scattering.
- Our TTO products have excellent ultraviolet shielding properties. As we have developed many variations of particle sizes within these products, our TTO products cover a wide range of light, from UV – A to UV – B.
- Our TTO products have superior opalescence and give the top coat of automobiles a flip-flop effect that changes color when seen from different angles.
- Our TTO products are designed to give outstanding surface smoothness as an undercoat.
- ISK can manufacture ultrafine TiO₂ that is particularly superior in either dispersibility and /or durability by controlling the production method. Furthermore, ISK offers different shapes such as spherical, dendrite and spindle.
- TTO grades are mostly white, however, ISK has developed a unique technology to produce a TTO grade with a beige hue, making the powder suitable for cosmetics.

〈Applications〉

- Cosmetics, UV-shielding sunscreens, Foundations
- UV-shielding films, Textiles, Paints, Inks
- Automobile topcoats
- Coating materials for magnetic recording films and disks
- Additives for toners and silicone rubber

〈Grade variety〉

Process Particle Size	Calcination	Wet process	Calcination(beige)
Large		TTO-D-1 TTO-D-2	TTO-F-6
Medium	TTO-55A TTO-55B TTO-55C TTO-55D TTO-55S TTO-55N	TTO-M-1 TTO-M-2	TTO-F-1 TTO-F-2 TTO-F-11
Small	TTO-51A TTO-51C	TTO-S-1 TTO-S-3 TTO-S-2 TTO-S-4	

- Neutral type titanium dioxide sol: TSK-5

An individual catalogue for ultrafine titanium dioxide is available upon request. ISK can provide the TTO grades either dispersed in water or in a silicone compound.



Electro - conductive (anti - electrostatic) Titanium Dioxide ET Series, FT Series, SN Series and FS Series

Anti-electrostatic measures have become very important due to the highly developed electronics in offices, factories and even in our homes.

ISK has succeeded in developing three types electro-conductive materials: ET series, FT series, SN Series and FS Series in order to meet those needs in various fields.

〈Characteristics〉

Our electro-conductive materials are not affected in electroconductivity by humidity because of their electronic conduction and have excellent physical and chemical stability.

- ET products (Spherical) are surface-coated with an electro-conductive layer of tin oxide on rutile titanium dioxide. Their whiteness makes coloring very easy and they offer outstanding smoothness of the surface, especially when used in paint and textile.
- FT products (Acicular) are surface-coated with an electro-conductive layer of tin oxide on the acicular titanium dioxide uniquely developed by ISK. The whiteness of FT makes coloring very easy. FT products maintain their acicular shape even after dispersion and provide excellent electro-conductivity in comparatively small amounts. Because the shape is acicular, they are expected to be very effective as reinforcing materials.
- SN products (Ultrafine) are electro-conductive particles of tin oxide. Their particle size is 0.01 to 0.03 microns and they have excellent electro-conductivity and transparency. ISK offers both a powder type and a water-dispersed type.
- FS products (Fine acicular) are transparent tin oxide with electroconductivity, and uniquely manufactured by ISK. In comparison with spherical materials, FS products show a greater advantage in providing a sufficient anti-electrostatic effect with much smaller contents.

〈Applications〉

- Anti - electrostatic paints
- Anti - electrostatic plastics
- Anti - electrostatic textile
- Anti - electrostatic fillers

〈Grade variety〉

ET-500W, ET-600W, ET-300W
FT-1000, FT-2000, FT-3000
SN-100P, SN-100D (dispersed in water)
FS-10P, FS-10D (dispersed in water)

An individual catalogue for electro-conductive materials is available upon request.



Acicular Type Titanium Dioxide FTL Series

The importance of the whisker as a reinforcing material has been recognized by various industries due to recent progress of material diversification.

ISK has succeeded in developing an acicular type titanium dioxide FTL products with our proprietary technology. The FTL products perform as optimum reinforcing material.

〈Characteristics〉

- Our FTL products are white acicular rutile TiO_2 . They have excellent physical and chemical stability.
- Our FTL products have superior strength to other whiskers.
- Our FTL products have a high aspect ratio even though the particles are relatively shorter than other materials. Therefore, the products are suitable for applications where an extremely small or thin size is necessary. Furthermore, the products are designed to offer excellent surface smoothness in paint applications.
- Detailed health and safety information is available.

〈Applications〉

- Plastics, Ceramics, Metals
- Paints, Papers, Rubber and Catalysts
- Other usages (especially where durability is necessary)

〈Grade variety〉

FTL-100, FTL-110 (treated with Al_2O_3), FTL-200, FTL-300

Besides the above, ISK has grades treated with silicone compound for plastics.

An individual catalogue for our FTL products is available.



Ultra-high Purity Titanium Dioxide CR-EL

The technological advance of electronics and the miniaturization of electronic parts have created a need for materials of high purity and the miniaturization of electronic parts.

ISK has developed and commercialized ultra-high purity titanium dioxide for use as an electronic material.

〈Characteristics〉

- CR-EL has extremely high purity of titanium dioxide and small particle size. It also has very high reactivity and dispersibility, making it suitable for a wide variety of applications.

〈Applications〉

- Capacitor, PZT, PTC, Sensor
- Ceramics

〈Grade variety〉

CR-EL

ISK has provisional grades with even higher purity and provisional grades with ultrafine particle size. An individual catalogue is available.



Titanium Dioxide for Catalytic Use MC Series

Protecting and purifying the global environment are currently among the biggest challenges facing us all.

ISK developed the MC series in the 1970s for catalytic applications. These materials have a high specific surface area and a narrow particle size distribution. ISK has been supplying these products to customers in Japan and in other parts of the world, primarily for applications to eliminate nitrogen oxide (NOx). The MC series has excellent catalytic activity and adsorptivity.

〈Applications〉

- Catalysts, Adsorbents

〈Grade variety〉

MC-50, MC-90, MC-150



Inorganic Antimicrobial Titanium Dioxide Powder

Sanitation and antimicrobial measures are growing concerns of domestic households as well as public spaces.

ISK has developed new inorganic powdery materials for antimicrobial applications by compounding silver on titanium dioxide coated with silica-alumina.

〈Characteristics〉

- These new powdery materials are designed to show an excellent antimicrobial activity because of the superior dispersibility for plastics.
- These materials are white, making them easy to color.
- These materials are physically and chemically stable and very safe, because the base of the powder is titanium dioxide.

〈Applications〉

- Plastics, Textiles, Paints
An individual catalogue is available.

〈Grade variety〉

ABT-20



Photocatalytic Titanium Dioxide ST Series, STS Series

Titanium Dioxide acts as a photocatalyst which has strong oxidizing effect when activated by ultraviolet light such as sunlight.

ISK has developed the technology to commercially produce photocatalytic titanium dioxide and to optimize this photoactive characteristics of titanium dioxide.

ST and STS products are capable of decomposing various organic contaminants and offensive odors into carbon dioxide and water by light irradiation. In addition, the photoactivity itself lasts semi-permanently. These products has outstanding stain-preventing effect when especially used in a finishing material for buildings and houses, soundproof walls and guardrails. ST and STS products are also effective in adsorbing and decomposing five major malodorous gasses such as ammonia, hydrogen sulphide and acetaldehyde, which are considered hazardous in a living space, and volatile organic compounds (VOC). Furthermore, ISK is studying the practical application of the photocatalytic titanium dioxide for decomposing nitrogen oxide (NOx) in the air.

<Characteristics>

- To effectively activate titanium dioxide, sunlight, mercury lamps with short wave length and black lights are recommended.
- ISK offers a wide range of grades that makes ST and STS adaptable to many different use. The ST is in powder form, while STS is dispersed in water. Grades with extremely large specific surface area, high photoactivity, excellent adsorptivity and high dispersibility are available.
- ISK has developed many processed products, such as honeycomb type filters suitable for deodorization, coating materials for anti-bacterial and stainproof measures and spherically granulated catalysts for water treatment.

<Applications>

- Stainproof usage
- Anti-fogging usage (hydrophilic usage)
- Water purification
- Deodorization
- Air treatment
- Anti-bacterial usage

<Grade variety>

Powder: ST-01, ST-21, ST-31, ST-41

Sol: STS-01, STS-02, STS-21

Processed products:

Honeycomb filters: P-ST series

Coating materials: ST-K01, ST-K03

Spherical granules: ST-B01, ST-B11

Adsorbent: ST-A31

An individual catalogue for photocatalytic titanium dioxide is available.

FOR YOUR PROTECTION

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(THE MANUFACTURER)  **ISHIHARA SANGYO KAISHA, LTD.**

(THE PRIMARY DISTRIBUTOR)  **ISHIHARA TECHNO CORP.**

<http://www.ijjnet.or.jp/itc-fmp/>

10-30, FUJIMI 2-CHOME CHIYODA-KU, TOKYO, 102-0071 JAPAN

TEL : 81 (3) 3230-8753

FAX : 81 (3) 3230-8701

ISHIHARA CORPORATION (U.S.A)

Transamerica Pyramid 38 th Floor 600 Montgomery Street,
San Francisco, CA94111, U.S.A

TEL : (415) 421-8207

FAX : (415) 397-5403

ISK EUROPE HEADQUARTERS

ITT Tower 480 Avenue Louise Bte 12

B-1050 Brussels Belgium

TEL : 32 (2) 627-8652

FAX : 32 (2) 648-3472

