

Advanced Nanostructured Materials

From Nanoscale Science to Industrial Solutions



***Produced By :
NANO KARA FARAZ CO.***

Who We Are?

Nano Kara Faraz Co. specializes in the development, production and trading of advanced nanostructures and polymer nanocomposites, leveraging cutting-edge scientific knowledge and the expertise of a highly skilled team. Our core mission is to supply high-performance nanoscale materials and polymer compounds, while delivering innovative, practical solutions tailored to the evolving needs of various industries including automotive, packaging, construction and road engineering, home appliances, cosmetics and personal care, medical devices, and industrial equipment.

Through the design and production of innovative nanomaterials and reinforcing polymer nanocomposites, as well as industrial additives, we play a key role in improving product quality, reducing production costs, and enhancing the performance of industrial processes. Backed by advanced research and development infrastructure, we have the capability to develop customized formulations and solutions precisely aligned with the technical requirements of each industry.

Main Activities & Services

- Development and Production of Advanced Nanomaterials and Polymer Nanocomposites
- Optimizing Synthesis Methods, Particle Size Control, and Functional Properties
- Industrial Problem-Solving and Process Optimization
- Key Areas of Specialty Product Trading



We Are Committed To:

- Developing up-to-date formulations to meet the specific needs of various industries
- Expanding the frontiers of technology through international and research collaborations
- Producing and exporting high-quality products to enhance competitiveness in global markets
- Upholding professional ethics and sustainable development principles to responsibly fulfill our commitments



Introduction

Zinc Oxide (ZnO) nanoparticles are multifunctional nanomaterials with remarkable optical, UV-blocking, and antimicrobial properties. Their nanoscale structure provides a high surface area and strong reactivity, enabling superior performance in coatings, plastics, cosmetics, textiles, electronics, and medical formulations. ZnO nanoparticles offer efficient UV protection, antibacterial activity, and thermal stability while maintaining transparency in thin films and polymer matrices. With their unique combination of protective, functional, and reinforcing characteristics, they serve as an essential additive in industries seeking durable, safe, and high-performance materials.

Description

Zinc Oxide nanoparticles are ultra-fine inorganic particles with high purity and controlled nanometer-scale size distribution. They exhibit exceptional UV absorption, antimicrobial properties, high surface reactivity, and photocatalytic activity, making them suitable for applications in coatings, polymers, cosmetics, sensors, catalysts, and biomedical fields.

Properties

Appearance: White to off-white fine powder

Average Particle Size: 20-80 nm

Purity: >99%

Density: 5.6 g/cm³

Morphology: Spherical

Crystal Structure: Hexagonal Wurtzite

Band Gap Energy: ~3.3 eV

Packaging: 1kg / 5kg / 25kg



Applications

- Cosmetics & Personal Care: UV filters in sunscreens, skincare products
- Polymer & Rubber Industry: Reinforcement, UV stabilizer, antibacterial additive
- Paints & Coatings: UV protection, antimicrobial coatings, self-cleaning surfaces
- Electronics & Sensors: Gas sensors, varistors, optoelectronic devices
- Environmental: Photocatalyst for wastewater treatment, air purification
- Biomedical: Antimicrobial agents, wound dressings, drug delivery



Introduction

Silicon Dioxide (SiO₂) nanoparticles are high-performance nanomaterials valued for their large surface area, excellent thermal stability, and chemical inertness. Their nanoscale size enables enhanced mechanical reinforcement, improved barrier properties, and superior dispersion in polymeric, ceramic, and composite systems. SiO₂ nanoparticles with their versatile properties and compatibility across diverse matrices, are widely applied in coatings, adhesives, rubber, plastics, electronics, and biomedical formulations, where they contribute to improved durability, transparency, and functional performance.

Description

Silicon Dioxide nanoparticles are high-purity, amorphous or crystalline nano-sized particles with excellent thermal stability, chemical inertness, and high surface area. Their nanoscale dimensions impart unique optical, rheological, and reinforcing properties, making them suitable for a wide range of industrial and high-tech applications including polymer reinforcement, coatings, adhesives, catalysts, pharmaceuticals, and electronics.

Properties

Appearance: White, free-flowing fine powder

Average Particle Size: 20-50 nm

Purity: >99%

Density: 2.2 g/cm³

Morphology: Spherical

Crystal Structure: Amorphous / Crystalline

Thermal Stability: >1000 °C

Packaging: 1kg / 5kg / 25kg



Applications

- Polymers & Plastics: Reinforcement, scratch resistance, barrier properties
- Paints & Coatings: Anti-scratch, anti-corrosion, UV protection, matting agent
- Electronics: Insulating layers, dielectric materials, polishing agents
- Catalysis: Catalyst support, photocatalyst composites
- Pharmaceuticals & Cosmetics: Drug delivery systems, excipients, UV-blockers
- Adhesives & Sealants: Rheology control, mechanical reinforcement
- Ceramics & Glass: Strength enhancement, optical modifiers



Introduction

Titanium Dioxide (TiO₂) nanoparticles are advanced functional materials widely recognized for their exceptional photocatalytic activity, high refractive index, and strong UV-blocking capability. Their nanoscale size enhances surface area and reactivity, making them ideal for applications in coatings, plastics, cosmetics, inks, and environmental purification systems. TiO₂ nanoparticles offer superior whitening, opacity, and stability while providing effective protection against UV degradation. Their versatile performance has positioned them as a key nanomaterial in industries focused on durability, sustainability, and high-performance product innovation.

Description

Titanium Dioxide nanoparticles are high-purity, ultrafine oxide particles with strong UV absorption, high refractive index, excellent photocatalytic activity, and chemical stability. They are commonly produced in the anatase or rutile crystalline phases, each optimized for specific applications such as photocatalysis, coatings, cosmetics, and advanced materials.

Properties

Appearance: White fine powder

Average Particle Size: 10-60 nm

Purity: >99%

Density: 4.2 g/cm³

Morphology: Spherical

Crystal Structure: Anatase / Rutile

Band Gap Energy: 3.0-3.2 eV

Packaging: 1kg / 5kg / 25kg



Applications

- Paints & Coatings: UV protection, whiteness, opacity, durability
- Cosmetics & Sunscreens: UV filter, skin-safe formulations
- Polymers & Plastics: Colorant, UV stabilizer, reinforcement additive
- Photocatalysis: Self-cleaning surfaces, wastewater treatment, air purification
- Electronics & Energy: Solar cells, sensors, dielectric materials
- Biomedical: Antimicrobial agents, drug delivery, bioimaging (research use)



Introduction

Copper (I) Oxide (Cu₂O) nanoparticles are advanced semiconductor materials known for their excellent catalytic, optical, and antimicrobial properties. With a direct band gap and high surface reactivity, these nanoparticles are widely utilized in photovoltaics, gas sensors, batteries, antimicrobial coatings, and environmental remediation systems. Their nanoscale dimensions enhance electron transfer efficiency, stability, and interaction with surrounding media, making them ideal for applications that demand energy efficiency, functional performance, and long-term durability. Cu₂O nanoparticles are an essential component in the development of innovative technologies across electronics, energy, and healthcare industries.

Description

Copper (I) Oxide nanoparticles are reddish-brown nanocrystalline powders with unique optical, electrical, and antimicrobial properties. At the nanoscale, Cu₂O exhibits enhanced catalytic activity, narrow bandgap semiconducting behavior, and strong antimicrobial performance. These features make Cu₂O-NPs highly suitable for use in catalysis, sensors, energy devices, coatings, and biomedical applications.

Properties

Appearance: Reddish-brown fine powder

Average Particle Size: 20-90 nm

Purity: >99%

Density: 6.0 g/cm³

Morphology: Spherical

Crystal Structure: Cubic

Band Gap Energy: 2.0–2.2 eV

Packaging: 1kg / 5kg / 25kg



Applications

- Catalysis: Photocatalytic degradation of pollutants, CO oxidation, hydrogen production
- Electronics & Sensors: Gas sensors, solar cells, lithium-ion battery anodes
- Coatings & Polymers: Antimicrobial additive, UV protection, coloration
- Biomedical: Antibacterial and antifungal agents, wound care (research use)
- Energy & Environmental: Wastewater treatment, photocatalytic water splitting



Introduction

Copper (II) Oxide (CuO) nanoparticles are versatile p-type semiconductor materials with high thermal conductivity, stability, and catalytic activity. Their nanoscale dimensions and large surface area make them highly effective in applications such as gas sensors, lithium-ion batteries, supercapacitors, antimicrobial coatings, and photocatalytic systems for environmental remediation. CuO nanoparticles also exhibit strong optical absorption and electron transport properties, enabling their use in solar cells and electronic devices. With their multifunctional performance and cost-effective availability, CuO nanoparticles are a key material for industries focused on energy storage, environmental sustainability, and advanced functional products.

Description

Copper (II) Oxide nanoparticles are black, monoclinic nanocrystalline powders with strong catalytic, optical, and antimicrobial properties. At the nanoscale, CuO demonstrates enhanced surface reactivity, narrow bandgap semiconducting behavior, and excellent catalytic activity, making it suitable for applications in catalysis, energy storage, sensors, coatings, and biomedical uses.

Properties

Appearance: Black fine powder

Average Particle Size: 20-80 nm

Purity: >99%

Density: 6.3 g/cm³

Morphology: Spherical

Crystal Structure: Monoclinic

Band Gap Energy: 1.2–1.9 eV

Packaging: 1kg / 5kg / 25kg



Applications

- Catalysis: Photocatalysis, heterogeneous catalysis, CO oxidation, hydrogen production
- Energy & Electronics: Lithium-ion battery anodes, supercapacitors, gas sensors, solar cells
- Coatings & Polymers: Antimicrobial additive, UV absorber, black pigment
- Biomedical: Antibacterial, antifungal, and antiviral agents (research use)
- Environmental: Wastewater treatment, pollutant degradation



Introduction

Iron (III) Oxide (Fe₂O₃) nanoparticles are advanced magnetic nanomaterials with excellent stability, biocompatibility, and catalytic activity. Their high surface area and tunable magnetic properties make them ideal for diverse applications in biomedical fields such as drug delivery, imaging, and biosensing, as well as in catalysis, pigments, wastewater treatment, and energy storage systems. Fe₂O₃ nanoparticles also provide strong optical absorption and chemical durability, supporting their use in coatings, electronics, and environmental remediation technologies. With their multifunctional characteristics, they play a vital role in the development of innovative and sustainable industrial and scientific solutions.

Description

Iron (III) Oxide nanoparticles are red-brown nanocrystalline powders with polymorphic phases, commonly hematite (α -Fe₂O₃) and maghemite (γ -Fe₂O₃). At the nanoscale, Fe₂O₃ exhibits unique magnetic, catalytic, and optical properties, making it highly suitable for catalysis, pigments, energy storage, biomedical applications, and environmental remediation.

Properties

Appearance: Red-brown fine powder

Average Particle Size: 20-80 nm

Purity: >99%

Density: 5.2 g/cm³

Morphology: Spherical

Crystal Structure: Hematite / Maghemite

Band Gap Energy: 2.0–2.2 eV

Packaging: 1kg / 5kg / 25kg



Applications

- Pigments & Coatings: Red pigment in paints, ceramics, plastics
- Catalysis: Photocatalysis, heterogeneous catalysis, pollutant degradation
- Energy & Electronics: Lithium-ion battery electrodes, gas sensors, supercapacitors
- Biomedical: Drug delivery, MRI contrast agents, magnetic hyperthermia (research use)
- Environmental: Wastewater treatment, magnetic separation, arsenic/metal adsorption



Introduction

Magnetite (Fe₃O₄) nanoparticles are superparamagnetic nanomaterials with excellent biocompatibility, chemical stability, and high surface-to-volume ratio. Their unique magnetic properties make them essential in biomedical applications such as targeted drug delivery, magnetic resonance imaging (MRI) contrast agents, hyperthermia therapy, and biosensing. Beyond healthcare, they are widely used in catalysis, magnetic data storage, wastewater treatment, and environmental remediation due to their strong adsorption capacity and reactivity. Combining multifunctionality with efficiency, Fe₃O₄ nanoparticles are a critical material for industries seeking advanced magnetic, catalytic, and environmental solutions.

Description

Magnetite nanoparticles are black, magnetic nanocrystalline powders with unique superparamagnetic and conductive properties. At the nanoscale, Fe₃O₄ exhibits high surface activity, strong magnetism, and biocompatibility, making it suitable for catalysis, energy storage, sensors, environmental remediation, and biomedical applications such as targeted drug delivery and magnetic resonance imaging (MRI).

Properties

Appearance: Black fine powder

Average Particle Size: 10-70 nm

Purity: >99%

Density: 5.2 g/cm³

Morphology: Spherical

Crystal Structure: Inverse Spinel (Cubic)

Band Gap Energy: 0.1 eV

Packaging: 1kg / 5kg / 25kg



Applications

- Biomedical: MRI contrast agents, targeted drug delivery, hyperthermia therapy (research use)
- Environmental: Magnetic separation of pollutants, wastewater treatment
- Catalysis: Photocatalysis, Fenton-like reactions, pollutant degradation
- Energy & Electronics: Lithium-ion battery anodes, supercapacitors, magnetic sensors
- Coatings & Polymers: Functional filler for conductivity and magnetic properties



Introduction

Copper (Cu) nanoparticles are highly conductive and reactive nanomaterials known for their excellent electrical, thermal, and antimicrobial properties. Their nanoscale size provides a large surface area, enhancing catalytic efficiency and stability in diverse applications such as conductive inks, coatings, sensors, catalysts, antimicrobial formulations, and energy storage systems. With their superior cost-effectiveness compared to noble metal nanoparticles, copper nanoparticles offer an attractive solution for industries requiring high performance in electronics, renewable energy, environmental remediation, and healthcare products.

Description

Copper nanoparticles are reddish-brown metallic nanocrystalline powders with high electrical and thermal conductivity, catalytic activity, and antimicrobial properties. At the nanoscale, copper exhibits enhanced reactivity, surface plasmon resonance, and excellent performance as a conductive additive, catalyst, and antimicrobial agent. These nanoparticles are widely used in electronics, energy storage, catalysis, coatings, and biomedical applications.

Properties

Appearance: Reddish-brown metallic powder

Average Particle Size: 20-80 nm

Purity: >99%

Density: 8.9 g/cm³

Morphology: Spherical

Crystal Structure: Face-Centered Cubic (FCC)

Electrical Conductivity: High

Packaging: 1kg / 5kg / 25kg



Applications

- Electronics & Conductive Materials: Printed electronics, conductive inks, pastes, coatings
- Catalysis: Hydrogenation, CO₂ reduction, pollutant degradation
- Energy Storage: Lithium-ion battery anodes, supercapacitors, fuel cells
- Biomedical: Antibacterial and antifungal coatings, drug delivery (research use)
- Polymers & Coatings: Antimicrobial additive, conductive filler, UV absorber
- Optical & Sensor Devices: Plasmonic sensors, imaging, photothermal agents



Introduction

Silver (Ag) nanoparticles are advanced functional materials widely recognized for their outstanding antimicrobial, electrical, and optical properties. Their nanoscale dimensions provide a large surface area and high reactivity, enabling superior performance in medical devices, textiles, coatings, water purification systems, electronics, and sensing technologies. Ag nanoparticles with their unique combination of protective and functional capabilities, exhibit broad-spectrum antibacterial and antiviral activity while also offering excellent electrical conductivity and plasmonic behavior, making them valuable in both healthcare and high-tech industries.

Description

Silver nanoparticles are black to gray metallic nanocrystalline powders or colloidal suspensions with exceptional antimicrobial, electrical, and optical properties. At the nanoscale, silver exhibits strong surface plasmon resonance (SPR), high electrical conductivity, and superior antibacterial activity, making it valuable in healthcare, electronics, catalysis, and advanced material applications.

Properties

Appearance: Black to gray metallic powder

Average Particle Size: 20-80 nm

Purity: >99%

Density: 10.5 g/cm³

Morphology: Spherical

Crystal Structure: Face-Centered Cubic (FCC)

Electrical Conductivity: Very high

Packaging: 1kg / 5kg / 25kg



Applications

- Biomedical & Healthcare: Antibacterial coatings, wound dressings, drug delivery, medical devices
- Electronics: Conductive inks, flexible electronics, printed circuits
- Catalysis: Oxidation/reduction reactions, pollutant degradation
- Textiles & Polymers: Antimicrobial fabrics, protective clothing, antimicrobial plastics
- Sensors & Optics: Plasmonic sensors, biosensors, optical imaging, photothermal therapy
- Water Treatment: Antibacterial and antiviral filtration systems



Introduction

Carbon Black is a fine particulate form of nearly pure carbon, engineered to deliver excellent reinforcing, conductive, and UV-protective properties. With its high surface area and strong coloring ability, it is widely used as a performance additive in plastics, rubber, inks, coatings, and batteries. In polymer systems, Carbon Black enhances mechanical strength, durability, and weather resistance, while in electronic and energy applications, it provides reliable electrical conductivity and stability. Its multifunctional characteristics make Carbon Black an indispensable material for industries seeking improved performance, cost efficiency, and long-term product reliability.

Description

Carbon Black nanoparticles are ultra-fine, high-surface-area carbon particles produced via controlled thermal or chemical processes. These nanoparticles offer excellent conductivity, UV absorption, and reinforcing properties. CB NPs are widely used in polymer composites, inks, coatings, batteries, and conductive applications.

Properties

Appearance: Black powder

Average Particle Size: 10-50 nm

Purity: >99%

Density: ~0.5 g/cm³

Morphology: Spherical

Crystal Structure: Amorphous

Specific Surface Area (BET): 100–300 m²/g

Packaging: 1kg / 5kg / 25kg



Applications

- Polymer Composites: Reinforcement and electrical conductivity
- Conductive Inks & Coatings: EMI shielding and antistatic applications
- Batteries & Supercapacitors: Electrode material for high-performance energy storage
- Rubber & Elastomers: Tire reinforcement and wear resistance
- UV Protection: Additive in paints, plastics, and coatings





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