



انواع نانو ذرات صنعتی و آزمایشگاهی

Silicon Oxide Nanoparticle (SiO_2 , 99+%, 11-13 nm)

Details:

Silicon Oxide (SiO_2)

Purity: 99+%

APS: 11-13 nm

SSA: 200 m^2/g

Color: white

Bulk density: $<0.10 \text{ g/cm}^3$

True density: 2.4 g/cm^3

Applications:

Paint, plastic, color rubber, magnetic materials, in addition, nano-silica can be widely used in ceramics (sugar) porcelain, gypsum, batteries, paints, adhesives, cosmetics, glass, steel, fiber, glass, and many other fields of environmental protection products the upgrading.

Certificate of Analysis

SiO_2	Ti	Ca	Na	Fe
$>99\%$	$<120\text{ppm}$	$<70\text{ppm}$	$<50\text{ppm}$	$<20\text{ppm}$



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Silicon Dioxide (SiO₂) Nanopowder (SiO₂, 99+%, 20-30 nm, amorphous)

Silicon Oxide Nanoparticles (SiO₂, **amorphous**)

Purity: 99+%

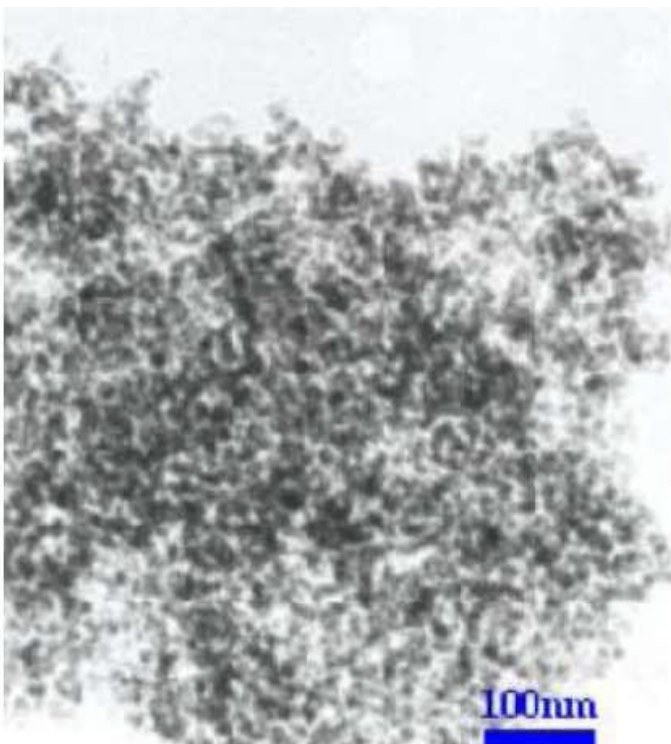
APS: 20-30nm

SSA: 180-600m²/g

Color: white

Bulk Density: <0.10 g/cm³

True Density: 2.4 g/cm³



Silicon Oxide Nanoparticles (SiO₂) Certificate of Analysis

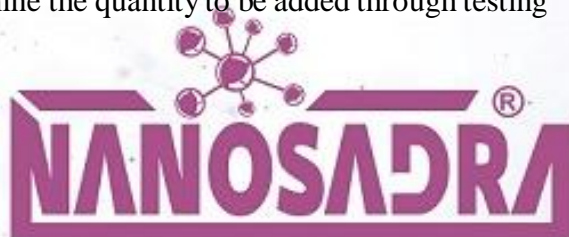
SiO ₂	Ti	Ca	Na	Fe
>99%	<120ppm	<70ppm	<50ppm	<20ppm

Silicon Oxide Nanoparticles Applications:

Paint, plastic, color rubber, magnetic materials, in addition, nano-silica can be widely used in ceramics (sugar) porcelain, gypsum, batteries, paints, adhesives, cosmetics, glass, steel, fiber, glass, and many other fields of environmental protection products the upgrading.

Recommended Dosage:

There is a wide range of product application in different fields with a large different amount of dosage, from 0.5 to 5.5%. The end user shall determine the quantity to be added through testing and make the best dosage choice for the best use.



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Silicon Oxide Nanopowder / SiO₂ Nanoparticles (SiO₂, 99.5+%, 15-20nm, P-type, Porous)

Silicon Oxide Nanoparticle SiO₂ What are the pore sizes of these porous SiO₂: 2-6nm What are the pore volumes of these porous SiO₂: 0.8-1.5 cm³/g

Purity: 99.5+%

APS: 15-20nm--Porous particles

SSA: ~640m²/g

Color: white

Morphology: porous (Size 2-6nm)

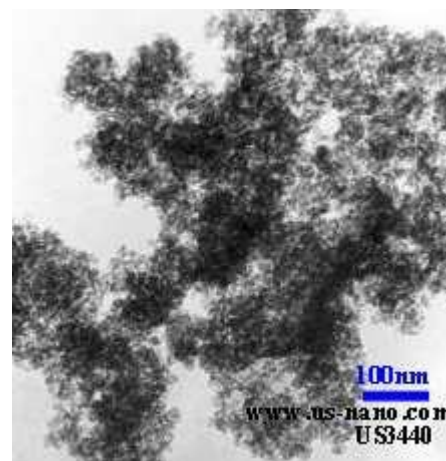
Bulk Density: <0.10 g/cm³

True Density: 2.4 g/cm³

Ultraviolet Reflectivity :> 85%

Hydroxyl Content :> 45%

Making Method: Plasma CVD



Silicon Oxide Nanoparticles Certificate of Analysis - ppm

Al	Fe	Ca	Mg	Cl
<20	<10	<20	<10	<10

Silicon Oxide Nanoparticles Features:

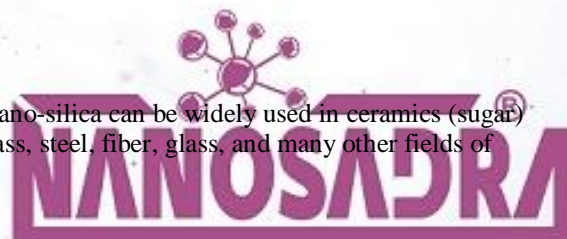
Nano-silica particles according to their structure are divided into two types: P-type (Porous particles) and S-type (Spherical particles). P-type nano-silica surface contains a number of nano-porous with the pore rate of 0.611ml /g; therefore, P-type has much larger SSA comparing to S-type (See US3436). US3440 is P-type and its SSA is ~640m²/g. Furthermore, P-type ultraviolet reflectivity is >85% , S-type >75%.

Silicon Oxide Nanoparticles Test Methods:

1. Transmission electron microscopy (TEM) method, nano-silica particle has small size, narrow particle size distribution.
2. BET method, nano-silica particle has large specific surface area.
3. Infrared spectroscopy method, nano-silica particle exists a large number of hydroxyl groups and unsaturated residual bonds on its surface, and forms the deviation from the steady state of the silicon oxide structure.
4. Cary-5E spectrophotometer testing method, nano-silica particles--high reflectivity to long wave and visible light about UV.
5. Omnisorp100CX surface area and porosity analyzer, P-type nano-silica surface contains a number of nano-porous with the pore rate of 0.611ml /g.

Silicon Oxide Nanoparticles Applications:

Paint, plastic, color rubber, magnetic materials, in addition, nano-silica can be widely used in ceramics (sugar) porcelain, gypsum, batteries, paints, adhesives, cosmetics, glass, steel, fiber, glass, and many other fields of environmental protection products the upgrading.



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Recommended Dosage:

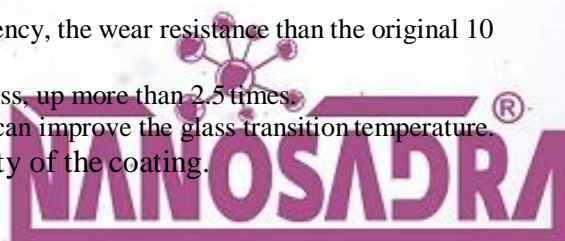
There is a wide range of product application in different fields with a large different amount of dosage, from 0.5 to 5.5%. The end user shall determine the quantity to be added through testing and make the best dosage choice for the best use.

Silicon Oxide Nanoparticle (SiO_2 , 99.6%, 20-35 nm, Hydrophobic)

Properties	Value
$\text{SiO}_2\%$	99.5
Powder brightness	97
Loss on drying (2Hrs, 105 °C) %	2.0
Ignition loss 1000 °C %	7.0
pH value (10% aqueous suspension) PH	6.0-8.0
Tap density g/ml	0.2
BET specific surface area BET m^2/g	170-210
DBP absorption value DBP ml/g	1.5-2.5
Soluble salt (Na_2SO_4) %	1.0

Hydrophobic nano Silica/Silicon Dioxide/ SiO_2 used for coating/dope/painting with high performance. Added to coating, it can improve the scrub resistance, the strength and hardness of the coating. Cans effect is significantly improved. The property of coating non-hierarchical, anti-sagging, good workability and stain resistance is greatly improved, and with excellent self-cleaning and adhesion properties. It also shows significant antibacterial effect.

- (1) Abrasion: abrasion resistance increases by a few thousand up to ten thousand times.
- (2) Weather ability: Weather ability can be improved about three times.
- (3) Stain-resistant and self-cleaning: the use of nano-porous structure of silicon dioxide, in the nanometer scale geometry complementary (such as concave and convex white) interface structure is formed by means of a certain process in the coating surface, so that the adsorption air to form a stable gas barrier layer of film on the surface; the second is surface-treated nano-silica particles to the surface exhibits the parent or dual-thinning, thus effectively improve rainwater run on the surface of the coating architectural coatings dust and wet adhesion, improved film stain resistance and self-cleaning ability.
- (4) Antimicrobial resistance: in coatings, showed significant antimicrobial effect.
- (5) Hydrophobic corrosion resistance: not only has excellent adhesion, corrosion resistance, and has high denseness and anti from Sub-permeability.
- (6) Transparency: nano-modified coatings ensure transparency, the wear resistance than the original 10 times.
- (7) Hardness: UV-curable coatings to improve film hardness, up more than 2.5 times.
- (8) Thermal stability: in UV-curable coatings, the coating can improve the glass transition temperature.
- (9) Viscosity: can significantly increase the viscosity of the coating.



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Nanosilica Technical Data Sheet, A200 grade

Properties and Test Method	Unit	Grade A200
Specific Surface Area(BET)	m ² /gr	250
Main Particle Size(SEM)	nm	20-50
Agglomerate mean Particle size	μm	20-40
pH value 5% in water	-	6-7
Loss on drying	%	4
SiO Content	%	98
Residual Salt	%	1
Product Shape	-	Powder



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Aluminum Oxide Nanoparticle (Al_2O_3 , alpha, 99+%, 50 nm)

Details: Aluminum Oxide
Nanopowder (alpha)

Purity: 99+%

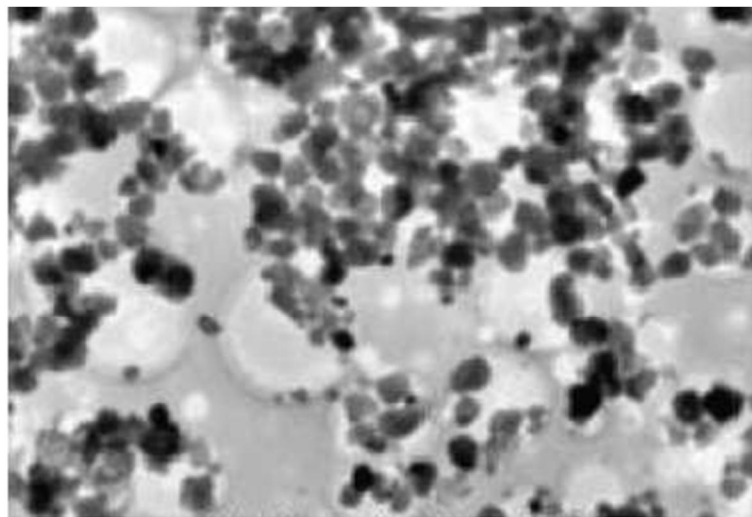
APS: 50 nm

SSA: >19 m²/g

Morphology: nearly spherical

Color: white

Crystallographic Structure:
Rhombohedral



Certificate of Analysis						
Al_2O_3	Ca	V	Cl	Na	Mn	Co
≥99%	≤20ppm	≤5ppm	≤280ppm	≤30ppm	≤5ppm	≤5ppm

Aluminum Oxide Nanoparticle (Al_2O_3 , alpha, 99+%, 50 nm)

Features: α-phase ultrafine Al_2O_3 : phase stability, high hardness, materials with high dimensional stability, it is widely used in a variety of plastics, rubber, ceramics, refractory products for reinforcement toughening, in particular, significantly to improve the ceramic density, finish, thermal fatigue resistance, fracture toughness, creep resistance and wear resistance.

Applications: 1. transparent ceramics: high-pressure sodium lamps, EP-ROM window; 2.cosmetic filler; 3. single crystal, ruby, sapphire, sapphire, yttrium aluminum garnet; 4.highstrength aluminum oxide ceramic, C substrate, packaging materials, cutting tools, high purity crucible, winding axle, bombarding the target, furnace tubes; 5. Polishing materials, glass products, metal products, semiconductor materials, plastic, tape, grinding belt; 6. Paint, rubber, plastic wear-resistant reinforcement, advanced waterproof material; 7. Vapor deposition materials, fluorescent materials, special glass, composite materials and resins; 8. catalyst, catalyst carrier, analytical reagent; 9. Aerospace aircraft wing leading edge.



انواع نانو ذرات صنعتی و آزمایشگاهی

Aluminum Oxide Nanoparticle (Al_2O_3 , alpha, 99+%, 80 nm)

Details:

Details: Aluminum Oxide

Nanopowder (alpha)

Purity: 99+%

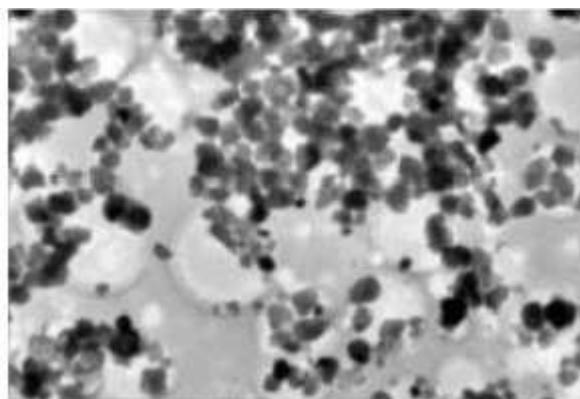
APS: 80 nm

SSA: >15 m^2/g

Morphology: nearly spherical

Color: white

Crystallographic Structure: rhombohedral



Aluminum Oxide Nanoparticles (Al_2O_3) Product Features:

US3023 g-phase nano- Al_2O_3 with small size, high activity and low melting temperature, it can be used for producing synthetic sapphire with the method of thermal melting techniques; the g-phase nano- Al_2O_3 with large surface area and high catalytic activity, it can be made into microporous spherical structure or honeycomb structure of catalytic materials. These kinds of structures can be excellent catalyst carriers. If used as industrial catalysts, they will be the main materials for petroleum refining, petrochemical and automotive exhaust purification. In addition, the g-phase nano- Al_2O_3 can be used as analytical reagent

Aluminum Oxide Nanoparticles (Al_2O_3) Applications:

1. transparent ceramics: high-pressure sodium lamps, EP-ROM window; 2. cosmetic filler; 3. Single crystal, ruby, sapphire, sapphire, yttrium aluminum garnet; 4. high-strength aluminum oxide ceramic, C substrate, packaging materials, cutting tools, high purity crucible, winding axle, bombarding the target, furnace tubes; 5. polishing materials, glass products, metal products, semiconductor materials, plastic, tape, grinding belt; 6. paint, rubber, plastic wear-resistant reinforcement, advanced waterproof material; 7. vapor deposition materials, fluorescent materials, special glass, composite materials and resins; 8. catalyst, catalyst carrier, analytical reagent; 9. aerospace aircraft wing leading edge.

Aluminum Oxide Nanoparticles (Al_2O_3) Dosage:

Recommended dosage is usually 1 to 5%, users should be based on different systems to test, and then determine the best dosage for the best use.



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Aluminum Oxide Nanopowder / Nanoparticles (Al_2O_3 , gamma, 99+%, 20 nm, **Hydrophilic**)

Details:

Aluminum oxide Nanopowder (gamma) —Hydrophilic Nanoparticles (Al_2O_3)

Purity: 99+%

Nanoparticles (Al_2O_3) APS: 20 nm

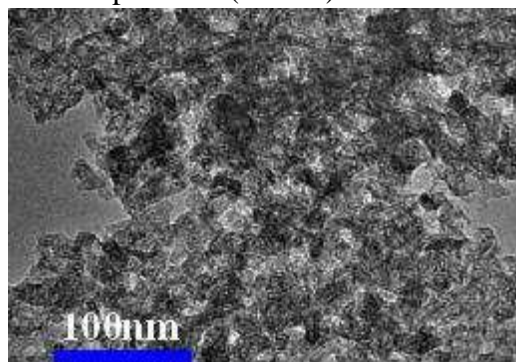
Nanoparticles (Al_2O_3) SSA: >138 m^2/g

Nanoparticles (Al_2O_3) Morphology: nearly spherical

Nanoparticles (Al_2O_3) Color: white

Specific heat capacity: 880 J/(Kg-K)

Density: 3890 Kg/m³



Aluminum Oxide Nanoparticles (Al_2O_3) Product Features:

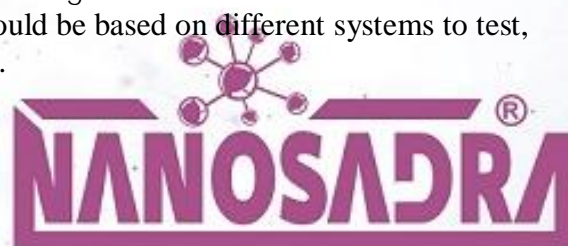
US3023 g-phase nano- Al_2O_3 with small size, high activity and low melting temperature, it can be used for producing synthetic sapphire with the method of thermal melting techniques; the g-phase nano- Al_2O_3 with large surface area and high catalytic activity, it can be made into microporous spherical structure or honeycomb structure of catalytic materials. These kinds of structures can be excellent catalyst carriers. If used as industrial catalysts, they will be the main materials for petroleum refining, petrochemical and automotive exhaust purification. In addition, the g-phase nano- Al_2O_3 can be used as analytical reagent

Aluminum Oxide Nanoparticles (Al_2O_3) Applications:

1. transparent ceramics: high-pressure sodium lamps, EP-ROM window; 2. cosmetic filler; 3. Single crystal, ruby, sapphire, sapphire, yttrium aluminum garnet; 4. high-strength aluminum oxide ceramic, C substrate, packaging materials, cutting tools, high purity crucible, winding axle, bombarding the target, furnace tubes; 5. polishing materials, glass products, metal products, semiconductor materials, plastic, tape, grinding belt; 6. paint, rubber, plastic wear-resistant reinforcement, advanced waterproof material; 7. vapor deposition materials, fluorescent materials, special glass, composite materials and resins; 8. catalyst, catalyst carrier, analytical reagent; 9. aerospace aircraft wing leading edge.

Aluminum Oxide Nanoparticles (Al_2O_3) Dosage:

Recommended dosage is usually 1 to 5%, users should be based on different systems to test, and then determine the best dosage for the best use.



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انواع نانو ذرات صنعتی و آزمایشگاهی

Titanium Oxide Nanoparticle (TiO_2 , anatase, 99+%, 10-25 nm)

Details:

Titanium Oxide Nanopowder (TiO_2 , anatase)

Purity: >99%

APS: 10-25 nm

SSA: 200-240 m^2/g

Color: white

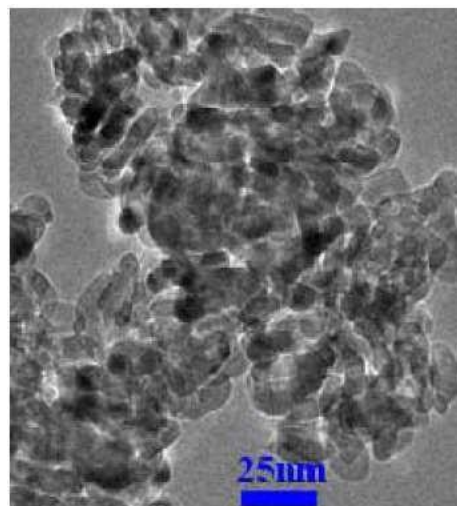
Bulk density: 0.24 g/cm^3

True density: 3.9 g/cm^3

PH: 6-6.5

Loss of weight in drying: 4.17%

Loss of weight on ignition: 8.24%



Application:

1. UV-resistant material, chemical fiber, plastics, printing ink, coating; 2. Photocatalyst, self-cleaning glass, self-cleaning ceramics, antibacterial material, air purification, sewage treatment, chemical industry; 3. Cosmetics, sunscreen cream, natural white moisture protection cream, beauty and whitening cream, morning and night cream, moistening refresher, vanishing cream, skin protecting cream, face washing milk, skin milk, powder make-up; 4. Coating, printing ink, plastics, foods packing material; 5. Coating for paper-making industry: used for improving the impressionability and opacity of the paper and used for producing titanium, ferrotitanium alloy, carbide alloy etc in the metallurgical industry; 6. Astronautics industry.

Certificate of Analysis--ppm

Al	I	Mg	I	Si	I	Ca	I	s	I	Nb
<=19	I	<=67	I	<=116	I	<=75	I	<=128	I	<=82



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انواع نانو ذرات صنعتی و آزمایشگاهی

Titanium Oxide Nanoparticles (TiO₂, Rutile, 99.9+%, 30 nm)

Details:

Titanium Oxide Nanopowder (TiO₂, rutile)

Purity: 99.9+%

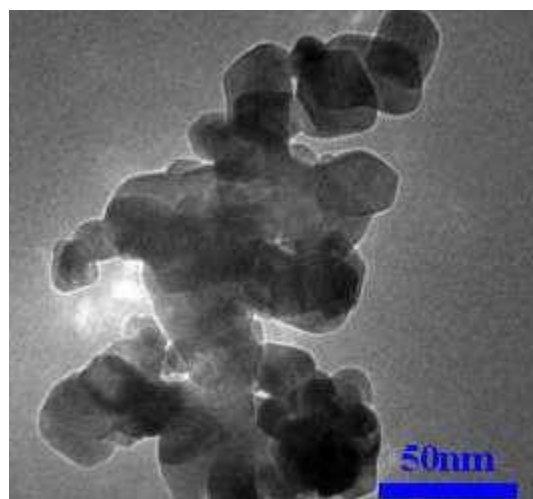
APS: 30 nm

SSA: ~35-60m²/g

Color: white

Morphology: spherical

True density: 4.23 g/cm³



Applications:

1. UV-resistant material, chemical fiber, plastics, printing ink, coating; 2. Photocatalyst, self-cleaning glass, self-cleaning ceramics, antibacterial material, air purification, sewage treatment, chemical industry; 3. Cosmetics, sunscreen cream, natural white moisture protection cream, beauty and whitening cream, morning and night cream, moistening refresher, vanishing cream, skin protecting cream, face washing milk, skin milk, powder make-up; 4. Coating, printing ink, plastics, foods packing material; 5. Coating for paper-making industry: used for improving the impressionability and opacity of the paper and used for producing titanium, ferrotitanium alloy, carbide alloy etc in the metallurgical industry; 6. Astronautics industry.

Certificate of Analysis--%

TiO ₂	Al	Ca	Co	Cr	Fe	K+Na	Mo	Mg	P	S	Si	W
≥99.9	≤0.003	≤0.005	≤0.01	≤0.005	≤0.005	≤0.005	≤0.005	≤0.01	≤0.01	≤0.005	≤0.003	≤0.01



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انواع نانو ذرات صنعتی و آزمایشگاهی

Titanium Oxide Nanoparticles (TiO_2 , anatase/rutile, 99+%, 20 nm)

Details:

Titanium Oxide (TiO_2 , 80 vol% anatase +20 vol% rutile)

Purity: 99+%

APS (D50): 20 nm

SSA: 10 - 45 m^2/g

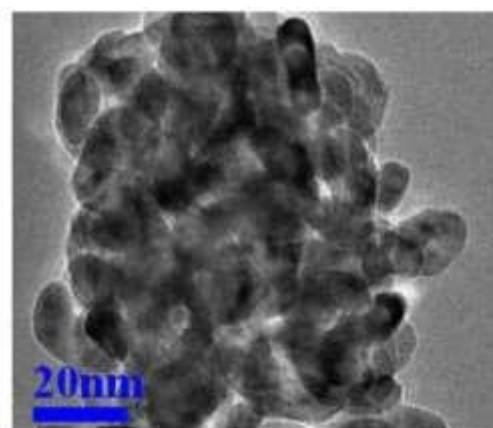
Color: white

Bulk Density: 0.46g/ml

PH: 5.5-6.0

Loss of weight in drying: 0.48%

Loss of weight on ignition: 0.99%



Certificate of Analysis

TiO ₂	Al	Mg	Si	Ca	S	Nb
99 %	<17ppm	<65ppm	<120 ppm	<75ppm	<130ppm	<80ppm

Applications

1. UV-resistant material, chemical fiber, plastics, printing ink, coating; 2. Photocatalyst, self-cleaning glass, self-cleaning ceramics, antibacterial material, air purification, sewage treatment, chemical industry; 3. Cosmetics, sunscreen cream, natural white moisture protection cream, beauty and whitening cream, morning and night cream, moistening refresher, vanishing cream, skin protecting cream, face washing milk, skin milk, powder make-up; 4. Coating, printing ink, plastics, foods packing material; 5. Coating for paper-making industry: used for improving the impressionability and opacity of the paper and used for producing titanium, ferrotitanium alloy, carbide alloy etc in the metallurgical industry; 6. Astronautics industry.



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AEROXIDE® TiO₂ P 25

Hydrophilic Fumed Titanium Dioxide

AEROXIDE® TiO₂ P 25 is a highly dispersed titanium dioxide manufactured according to the AEROSIL® - process.

Applications and Properties

Catalyst carrier
Active component for photocatalytic reactions
Heat stabilizer for silicone rubber

Properties

Process related high purity
Heat stabilizing properties for silicone-elastomers through its effect on redox reactions
Thereby:

- Improvement of ageing properties at high temperature (= 200 °C)
- Positive impact on flammability protection

* ex plant

- The data represents typical values and not production parameters.

Physico-chemical Data		
Properties	Unit	Typical Value
Specific surface area (BET)	m ² /g	50 ± 15
Average primary particle size	nm	21
Tapped density* (approx. value) acc. to DIN EN ISO 787/11, Aug. 1983	g/l	approx. 130
Moisture* 2 hours at 105 °C	wt. %	< 1.5
Ignition loss 2 hours at 1000 °C, based on material dried for 2 hours at 105 °C	wt. %	< 2.0
pH in 4% dispersion		3.5 - 4.5

Titanium dioxide based on ignited material	wt. %	> 99.50
Al ₂ O ₃ - content based on ignited material	wt. %	< 0.300
SiO ₂ - content based on ignited material	wt. %	< 0.200
Fe ₂ O ₃ - content based on ignited material	wt. %	< 0.010
HCl - content based on ignited material	wt. %	< 0.300



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Safety and Handling

With every sample or initial shipment of our products we will send a Material Safety Data Sheet. Of course, you can also request an MSDS or any other information regarding product safety at any time, or download it as a registered user at www.aerosil.com.

Packaging and Storage

AEROXIDE® TiO₂P 25 is supplied in multiple layer 10 kg bags. We recommend to store the product in closed containers under dry conditions and to protect the material from volatile substances. AEROXIDE® TiO₂P 25 should be used within 2 years after production

Registration

AEROXIDE® TiO₂P 25

CAS-No.	EINECS	TSCA (USA), AICS (Australia), DSL (Canada)	ENCS (Japan)	ECL (Korea)	IECS (China)
13463-67-7	236-675-5	Registered	1-558	Registered	Registered



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Iron Oxide (Fe_3O_4) Nanopowder (Fe_3O_4 , 98+%, 20-30 nm)

Iron Oxide Nanopowder (Fe_3O_4)-PVP coated - 1wt% - easier to be dispersed.

Purity: 98+%

APS: 20 - 30 nm

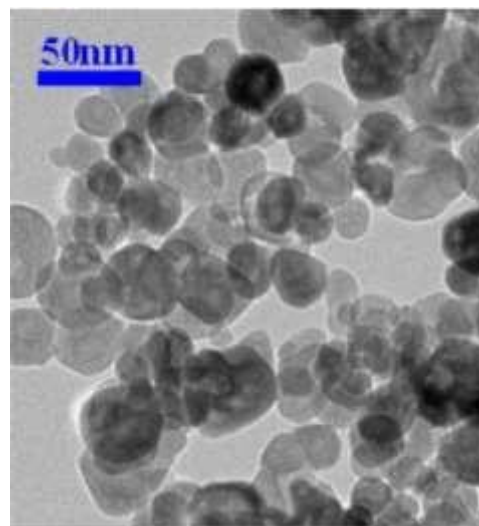
SSA: 40-60 m^2/g

Color: Dark Brown

Morphology: spherical

Bulk Density: 0.84 g/cm^3

True Density: 4.8-5.1 g/cm^3



Iron Oxide Nanoparticles (Fe_3O_4) Certificate of Analysis--%				
Ca	Cr	K	Mn	SiO ₂
<0.0229	<0.0016	<0.0012	<0.0860	<0.1420

Iron Oxide Nanoparticles (Fe_3O_4) Applications:

Color imaging; Detoxification of biological fluids; Electromagnetic-wave absorption; Ferrofluids; Magnetic detectors; Electromagnetorheological fluids; High-density magnetic recording; Magnetic cell separation; Magnetic coatings; Magnetic refrigeration; Magnetic resonance imaging contrast enhancement; Magnetically controlled transport of anti-cancer drugs; Magneto-optical devices; Semiconductors; Toners for copies and laser printers; Microwave devices; Removal of actinides from waste water...



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انواع نانو ذرات صنعتی و آزمایشگاهی

Iron Oxide (Fe_2O_3) Nanopowder (Fe_2O_3 , alpha 98+%, 20-40 nm)

Details:

Iron Oxide nanopowder (Fe_2O_3 , alpha)

Purity: 98+%

APS: 20-40 nm

SSA: 40-60 m^2/g

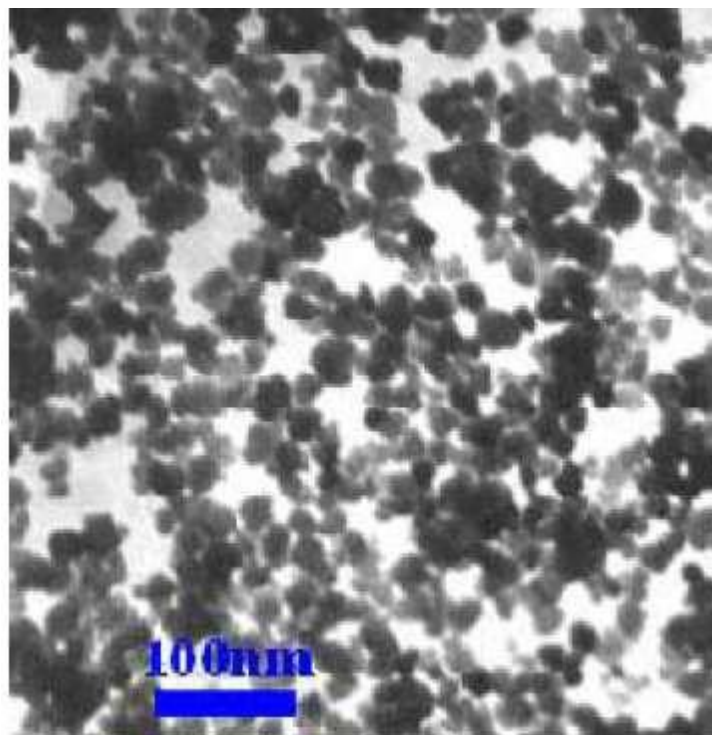
Color: red brown

Morphology: spherical

PH-value: 5-7

Bulk density: 1.20 g/cm^3

True density: 5.24 g/cm^3



Certificate of Analysis (%)							
Ca	Cr	P	SiO_2	S	Al	Na	Mn
0.024	0.037	0.016	0.134	0.12	0.0002	0.0005	0.095

Application:

Coatings, plastics, rubber, silicone, alloy, wear-resistant materials, sealing materials, drugs, lithium iron phosphate batteries, lithium batteries, etc.



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انواع نانو ذرات صنعتی و آزمایشگاهی

Iron Oxide Nanoparticles (Fe_2O_3 , gamma, high purity, 99.5+%, 20 nm)

Details:

Iron Oxide nanopowder (gamma- Fe_2O_3)

Purity: >99.5%

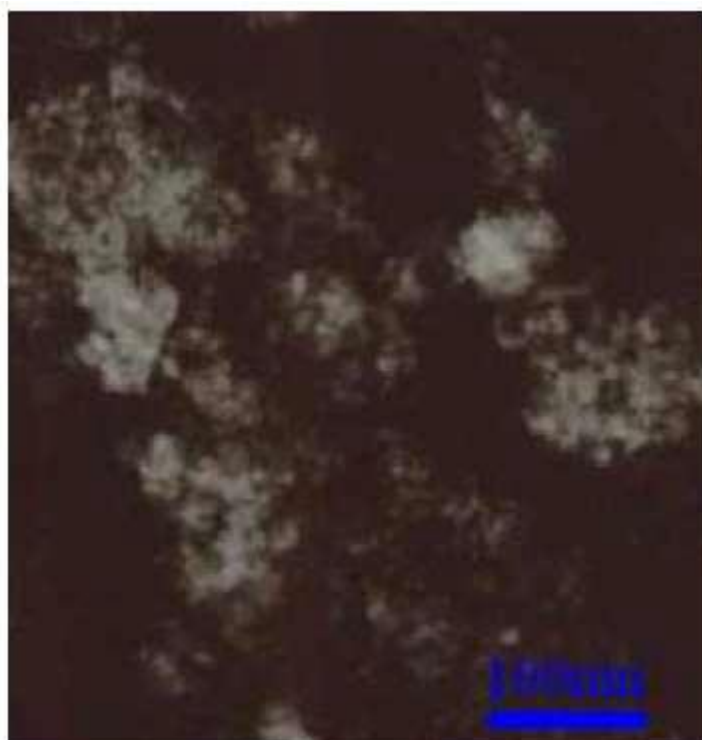
Color: red brown

APS: 20 nm

SSA: 40-80 m^2/g

Morphology: spherical

The High-purity products are prepared by using analytically pure chemical reagent as raw materials, and washed by distilled water. Its purity is higher than 99.5%. All our high-purity products are produced by our well-known research universities and national laboratories, not produced by ordinary manufactories. Ordinary products are prepared by using fine chemical raw materials; purity is up to 98-99%.



Certificate of Analysis

Ca	I	Co	I	K	I	Mn	Ni	I	Sr	I	Zn
70ppm	I	40.2 $\mu\text{g/g}$	I	3500ppm	I	1600 ppm	21.5 $\mu\text{g/g}$	I	3.46 $\mu\text{g/g}$	I	9.70 $\mu\text{g/g}$

Application:

Coatings, special anti-corrosion, silicone, plastic, rubber, alloy, lithium batteries, and lithium iron phosphate batteries, magnetic seal, wear-resistant materials, such as targeted drug.



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انواع نانو ذرات صنعتی و آزمایشگاهی

Iron Nanoparticles (Fe, 99.5+%, 35-45nm, metal basis)

Details: Iron (Fe)

Purity: 99.5+% (metal basis)

Color: black

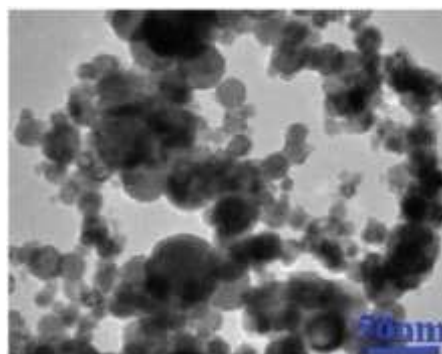
APS: 35-45 nm

SSA: 8-14 m²/g

Morphology: spherical

Bulk density: 0.45 g/cm³

True density: 7.90g/cm³



Certificate of Analysis-%													
Fe	Cu	Si	Ni	Cr	Mg	Al	Ti	Mo	Pb	Mn	Ca	Sn	
≥99.5	≤0.005	≤0.02	≤0.12	≤0.015	≤0.004	≤0.001	≤0.005	≤0.002	≤0.004	≤0.13	≤0.044	≤0.008	

Applications:

Utilized as probes of fundamental magnetic interactions; Media for magnetic data storage; Ferro fluids for rotary vacuum seals; Biomedical applications such as magnetic separation and contrast agents for magnetic resonance imaging; In the environmental field in the degradation of chlorinated hydrocarbons and hard metals in contaminated soils; Single electron transistors.....

Storage Conditions:

Damp reunion will affect its dispersion performance and using effects, therefore, this product should be sealed in vacuum and stored in cool and dry room and it should not be exposure to air. In addition, the product should be avoided under stress.

Cautions:

1. Metal nanopowder should be gently placed and avoided violent vibration and friction.
2. Metal nanopowder should be prevented from moisture, heat, impact and sunlight.
3. User must be a professional (This person must know how to use this product.)



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انواع نانو ذرات صنعتی و آزمایشگاهی

Multi Walled Carbon Nanotubes (MWNTs, >95%, OD: 20-30nm)

Details:

Multi walled nanotubes (MWNTs)

Purity: > 95 wt% (carbon nanotubes) (from TGA & TEM) > 97 wt% (carbon content)

Outside diameter: 20-30 nm (from HRTEM, Raman)

Inside diameter: 5-10 nm

Length: 10-30 um (TEM)

SSA: > 110 m²/g (BET)

Color: Black

Ash: <1.5wt% (TGA)

Electrical conductivity: >100 s/cm

Tap density: 0.28 g/cm³

True density: ~2.1 g/cm³

Multi Walled Carbon Nanotubes (MWNTs, MWCNTs) Manufacturing Method: CVD



Application

Potential applications of carbon nanotubes are: (1) additives in polymers; (2) catalysts; (3) electron field emitters for cathode ray lighting elements; (4) flat panel display; (5) gas-discharge tubes in telecom networks; (6) electromagnetic-wave absorption and shielding; (7) energy conversion; (8) lithium-battery anodes; (9) hydrogen storage; (10) nanotube composites (by filling or coating); (11) nanoprobe for STM, AFM, and EFM tips; (12) nanolithography; (13) nanoelectrodes; (14) drug delivery; (15) sensors; (16) reinforcements in composites; (17) supercapacitor.



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انواع نانوذرات صنعتی و آزمایشگاهی

OH Functionalized MWCNTs (>95%, OD: 20-30 nm)

Multi Walled Carbon Nanotubes (MWNTs, MWCNTs), -OH functionalized

Purity: > 95 wt% (carbon nanotubes) (from TGA & TEM) > 97 wt% (carbon content)

Content of -OH: 1.76 wt% (XPS & Titration)

Outside diameter: 20-30 nm (from HRTEM, Raman)

Inside diameter: 5-10 nm

Length: 10-30 μm (TEM)

SSA: > 110 m^2/g (BET)

Color: Black

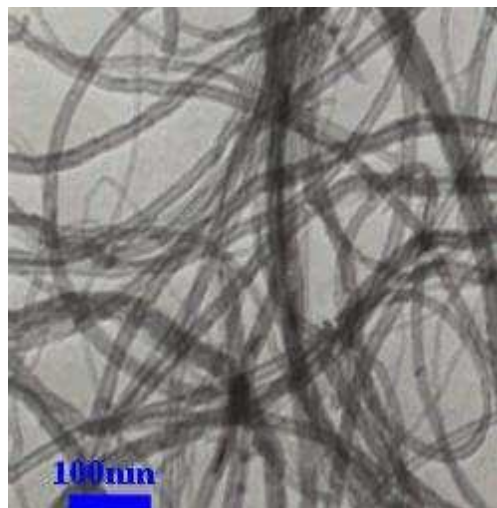
Ash: <1.5 wt% (TGA)

Electrical conductivity: >100 s/cm

Tap density: 0.28 g/cm^3

True density: ~2.1 g/cm^3

Manufacturing method: CVD



Multi Walled Carbon Nanotubes (MWNTs, MWCNTs) Application

Potential applications of carbon nanotubes are: (1) additives in polymers; (2) catalysts; (3) electron field emitters for cathode ray lighting elements; (4) flat panel display; (5) gas discharge tubes in telecom networks; (6) electromagnetic-wave absorption and shielding; (7) energy conversion; (8) lithium-battery anodes; (9) hydrogen storage; (10) nanotube composites (by filling or coating); (11) nanoprobe for STM, AFM, and EFM tips; (12) nanolithography; (13) nanoelectrodes; (14) drug delivery; (15) sensors; (16) reinforcements in composites; (17) supercapacitor.



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انواع نانوذرات صنعتی و آزمایشگاهی

Multi Walled Carbon Nanotubes, -COOH Functionalized (20-30nm, >98%, -COOH)

Details:

Multi -walled nanotubes (MWNTs), -COOH functionalized

Purity: Carbon nanotubes > 99 wt%

Multi -walled nanotubes > 98wt% (from TGA & TEM)

Content of -COOH: 2.73 wt% (XPS & Titration)

OD: 20-30 nm (from HRTEM, Raman)

ID: 5-10nm

Length: 10-30 um (TEM)

SSA: > 110 m²/g (BET)

Color: Black

Ash: <1.5 wt% (TGA)

Electrical conductivity: >100 s/cm

Tap density: 0.28 g/cm³

True density: ~2.1 g/cm³



Application

Potential applications of carbon nanotubes are: (1) additives in polymers; (2) catalysts; (3) electron field emitters for cathode ray lighting elements; (4) flat panel display; (5) gas-discharge tubes in telecom networks; (6) electromagnetic-wave absorption and shielding; (7) energy conversion; (8) lithium-battery anodes; (9) hydrogen storage; (10) nanotube composites (by filling or coating); (11) nanoprobe for STM, AFM, and EFM tips; (12) nanolithography; (13) nanoelectrodes; (14) drug delivery; (15) sensors; (16) reinforcements in composites; (17) supercapacitor.



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انواع نانوذرات صنعتی و آزمایشگاهی

Research Grade NH₂-MWCNTs / Amino-MWNTs (Multi-Walled Carbon Nanotubes Modified by Amino)

Research Grade MWCNTs-NH₂ (Multi-Walled Carbon Nanotubes Modified by Amino)

MWCNTs-NH₂ Purity: >95%

MWCNTs Purity: 99%

Content of - NH₂: 0.45wt%

Outer Diameter: 7-13nm

Inner Diameter: 2-4nm

Length: ~55um

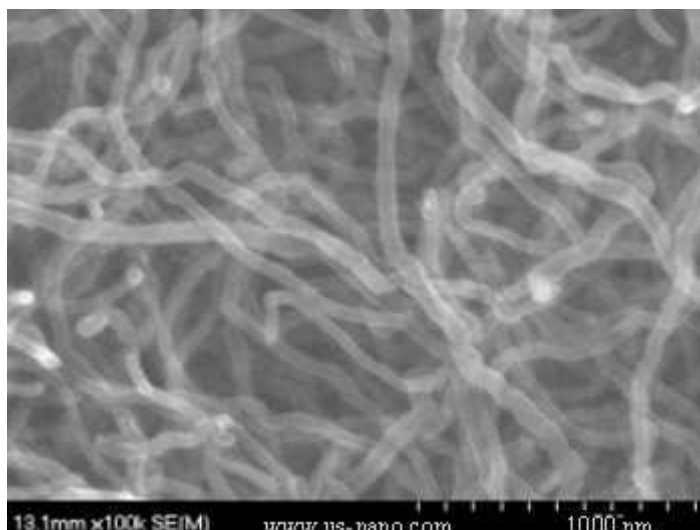
SSA: >233m²/g

Color: Black

Tap density: 0.256g/cm³

Electric Conductivity: >100s/cm

Production Method: CVD



Research Grade MWCNTs-NH₂ (MWCNTs Modified by Amino) Application:
Potential Applications of Carbon Nanotubes; Additives in polymers; Catalysts; Electron field emitters for cathode ray lighting elements; flat panel display; gas-discharge tubes in telecom networks; Electromagnetic-wave absorption and shielding; Energy conversion; Lithium-battery anodes; Hydrogen storage; Nanotube composites (by filling or coating); Nanoprobes for STM, AFM, and EFM tips; nanolithography; nanoelectrodes; drug delivery; sensors; Reinforcements in composites; Supercapacitor...



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انواع نانو ذرات صنعتی و آزمایشگاهی

Single-Walled Carbon Nanotubes (SWNTs, >98%, OD:1-3 nm)

Details:

Single-walled nanotubes (SWNTs)

Purity: Carbon nanotubes > 95wt%

Single-walled nanotubes > 98wt% (from TGA & TEM)

OD: 1-3 nm (from HRTEM, Raman)

ID: 0.9-2 nm

Average diameter: 1.1 nm (from Raman spectra) ,

Length: 5-30 μm (TEM)

SSA: > 380 m^2/g (BET) ,

Ash: < 1.5 wt% (HRTEM,TGA)

Tap density: 0.14 g/cm^3

True density: ~2.1 g/cm^3

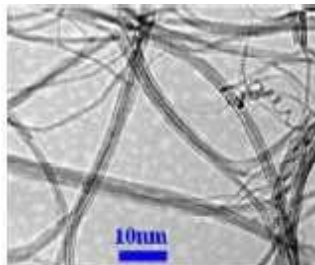
Electric Conductivity: > 100 S/cm

Thermal Conductivity: 50-200 W/m.K

Color: black

Ig/Id > 9 (Raman)

Manufacturing method: CVD



Application

Potential applications of carbon nanotubes are:

- (1) additives in polymers;
- (2) catalysts;
- (3) electron field emitters for cathode ray lighting elements;



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انواع نانوذرات صنعتی و آزمایشگاهی

Single-Walled Carbon Nanotubes, -COOH Functionalized (SWNTs, >90%, -COOH)

Single-walled carbon nanotubes (SWNTs, SWCNTs), -COOH functionalized

Purity: Carbon nanotubes > 95 wt%

Single-walled nanotubes > 90 wt% (from TGA & TEM)

Content of -COOH: 2.73 wt% (XPS & Titration)

OD: 1-2 nm (from HRTEM, Raman)

ID: 0.8-1.6 nm

Average diameter: 1.1 nm (from Raman spectra)

Length: 5-30 μm (TEM)

SSA: > 380 m^2/g (BET)

Ash: < 1.5 wt% (HRTEM, TGA)

Tap density: 0.14 g/cm^3

True density: ~2.1 g/cm^3

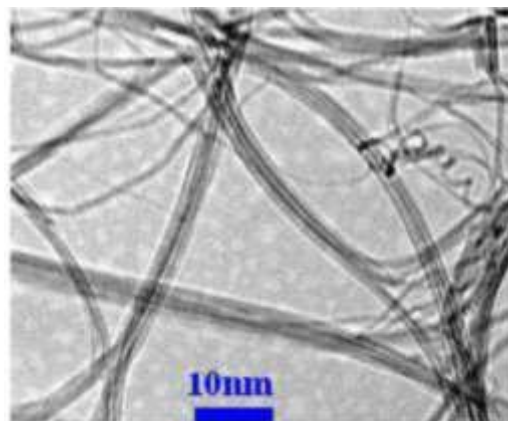
Electric Conductivity: > 100 S/cm

Thermal Conductivity: 50-200 W/m.K

Color: black

$I_g/I_d > 9$ (Raman)

Single-walled Carbon Nanotubes (SWNTs, SWCNTs) Manufacturing Method: CVD



Application

Potential applications of carbon nanotubes are: (1) additives in polymers; (2) catalysts; (3) electron field emitters for cathode ray lighting elements; (4) flat panel display; (5) gas-discharge tubes in telecom networks; (6) electromagnetic-wave absorption and shielding; (7) energy conversion; (8) lithium-battery anodes; (9) hydrogen storage; (10) nanotube composites (by filling or coating); (11) Nano probes for STM, AFM, and EFM tips; (12) nanolithography; (13) Nano electrodes; (14) drug delivery; (15) sensors; (16) reinforcements in composites; (17) super capacitor.



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انواع نانو ذرات صنعتی و آزمایشگاهی

Carbon Black Nanopowder / Nanoparticles (C, 50 nm, Plant as Raw Materials)

Morphology: spherical

Purity: >95%

Color: Black

APS: 50nm

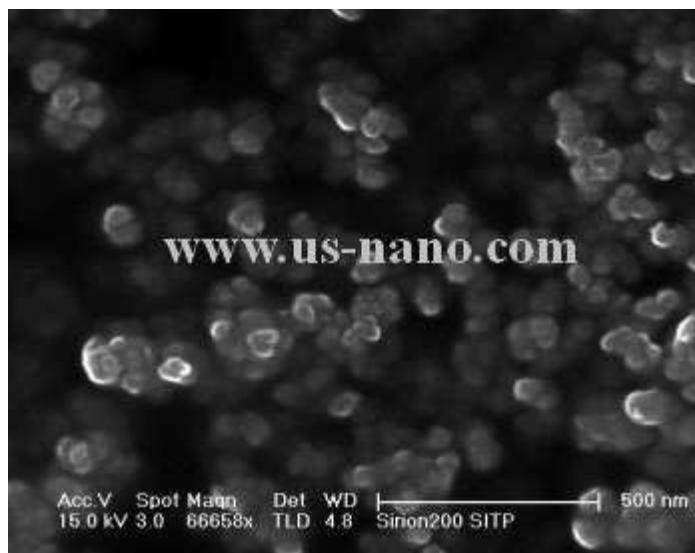
H₂O: <5%

Ash: <3.2%

PH: 9.80

True Density: 0.38g/ml

Electrical Conductivity: **0.30 Ω .cm**



Carbon Black Nanopowder Product Features:

Our company's Conductive Carbon Black Nanopowder is produced by selecting perennial mountain trees as raw materials, through high temperature (1300°C) carbonization, ultra-fine nano-grinding, therefore, the nanopowder possesses the following features: Powerful specific surface Area (SSA>700m²/g); Electrical conductivity (0.30 Ω .cm); Easy to be dispersed...

Carbon Black Nanopowder Applications:

It can be used for plastics, rubber, electronics technology, anti-static materials. It is all-natural, non-polluting material - It is the real green conductive material.

Carbon Black Nanopowder Storage Conditions:

Damp reunion will affect its dispersion performance and using effects, therefore, this product should be sealed in vacuum and stored in cool and dry room and it should not be exposure to air. In addition, the product should be avoided under stress.



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انواع نانو ذرات صنعتی و آزمایشگاهی

Carbon (C) Nanopowder / Nanoparticles (C, 20-40nm, Plant as Raw Materials)

Morphology: spherical

Color: Black

Decoloration Rate: 99%

Purity: >95%

Cobalt-60 Radiation Sterilization

APS: 20-40nm

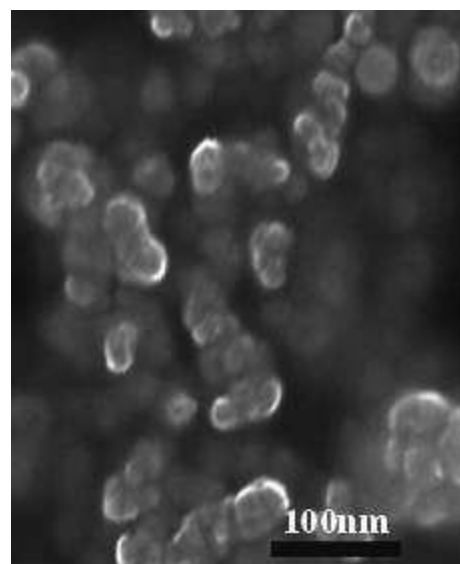
H₂O: <5%

Ash: <2%

PH: 7-10

True density: 0.44g/ml

Bulk density: 0.32g/ml



Carbon Nanoparticles Product Features:

Our company's natural plant porous nano-carbon powder is produced by selecting perennial mountain bamboo and holly trees as raw materials, through high temperature carbonization, ultra-fine nano-grinding, cobalt-60 radiation sterilization, therefore, the nanopowder possesses the following features: Powerful specific surface area (SSA>1400m²/g); Electrical conductivity (0.2 Ω.cm); high activation; Easy to disperse; Powerful iodine adsorption (absorption capability >1350mg/g); Methylene blue number >280mg/g; Negative-ions concentration 7150/cm³; Far Infrared emission rate 91%.

Carbon Nanoparticles Applications:

It can be used for medicine, food, cosmetics, health products and functional materials...

Carbon Nanoparticles Storage Conditions:

Damp reunion will affect its dispersion performance and using effects, therefore, this product should be sealed in vacuum and stored in cool and dry room and it should not be exposure to air. In addition, the product should be avoided under stress.



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انواع نانو ذرات صنعتی و آزمایشگاهی

Super Activated Carbon (C) Nanopowder / Nanoparticles (C, <100nm, Bamboo as Raw Materials)

Super Activated Carbon Nanopowder (C, <100nm, Bamboo as Raw Materials)

Morphology: spherical

Decoloration rate: 99%

Purity: >95%

Color: Black

APS: <100 nm

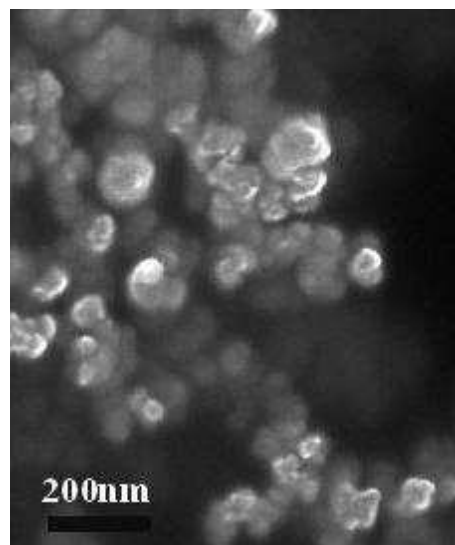
H₂O: <5%

Ash: <2%

PH: 7-10

True density: 0.43g/ml

Bulk density: 0.3g/ml



Activated Carbon Nanoparticles Product Feature:

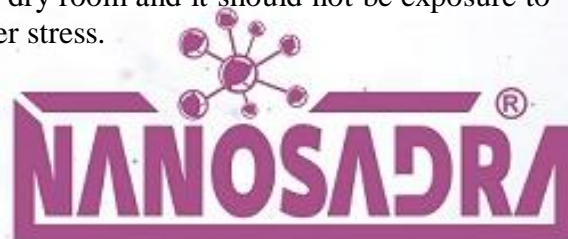
The Super Activated Carbon Nanopowder is made from a selection of high temperature bamboo charcoal through special carbonization, activation, grinding and classification, therefore, the nanopowder possesses the following features: Powerful specific surface Area (SSA>1000m²/g); Electrical conductivity (0.4Ω.cm); high activation; Easy to disperse; Powerful iodine adsorption (absorption capability >1000mg/g); Methylene blue number >240mg/g; Negative-ions concentration 7150/cm³; Far Infrared emission rate 91%.

Activated Carbon Nanoparticles Application:

Mainly used in military industry, aviation and aerospace, textile, rubber, functional materials, chemical industry, food, pharmaceutical, electronics technology, environmental protection, etc.

Activated Carbon Nanoparticles Storage Conditions:

Damp reunion will affect its dispersion performance and using effects, therefore, this product should be sealed in vacuum and stored in cool and dry room and it should not be exposure to air. In addition, the product should be avoided under stress.



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انواع نانو ذرات صنعتی و آزمایشگاهی

Titanium Carbide Nanoparticles (TiC, 99+%, 40-60nm, cubic)

Details:

Titanium Carbide (TiC) Purity: >99%

APS: 40-60 nm,

SSA: >50 m²/g

Color: black

Morphology: nearly spherical

Bulk density: ~0.08 g/cm³

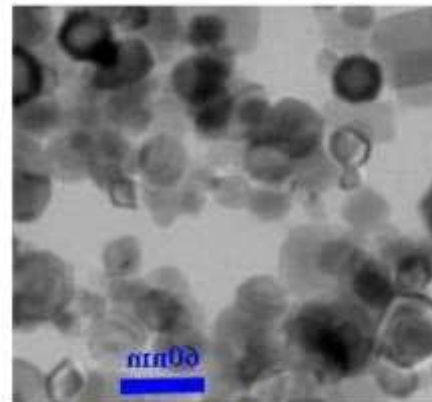
True density: 4.93 g/cm³

Melting point: 3200 °C

Crystal phase: Cubic

Zeta potential: 25mV

Flammable, UN 3178 4.1 III



General features:

1. The product possesses high purity, narrow range particle size distribution, and larger specific surface area. Also, the product has a good conductivity and chemical inert ability to steel and iron. 2. The product's melting point is about 3200 °C. It is an essential component of cemented carbide with high hardness, corrosion resistance, thermal stability, etc. Also, it is often used in manufacture of wear-resistant materials, cutting tools, mold, metal melting crucible and many other fields.

Applications:

1)TiC is used in manufacturing wear-resistant materials, cutting tools etc. TiC coating can improve the alloy, abrasive steel bearings, nozzles, cutting tools wear resistance; 2) Nano-titanium carbide ceramic is a good optical material; 3) plastic enhanced \conductive material \ nucleating agents.....



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انواع نانو ذرات صنعتی و آزمایشگاهی

Silver Nanoparticles (Ag, 99.99%, 20nm, metal basis)

Details:

Silver Nanopowder (Ag, metal basis)

True density: 10.5g/cm³

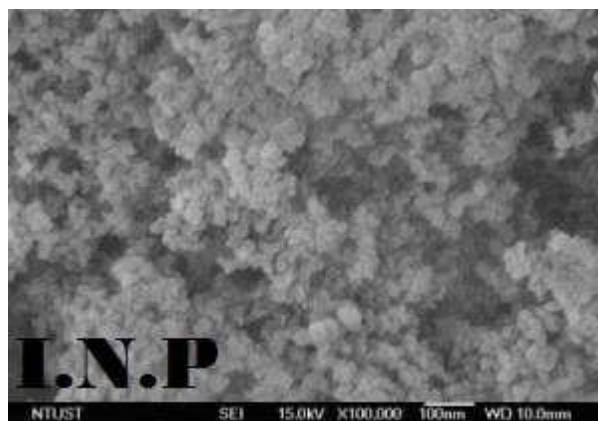
Purity: 99.99%

APS: 20 nm

SSA: ~18-22 m²/g

Color: black

Morphology: spherical



Application:

pharmaceutical antibacterial, disinfectant; some of countries for anti-AIDS drugs, mixed with zinc oxide powder for disinfection; chemical catalyst. Also, antiviral antibacterial material: 0.1% silver nanoparticle, the inorganic antibacterial powder, can play an important role in the suppression and killing of dozens of pathogenic micro-organisms such as Escherichia coli, Staphylococcus aureus, such as. As a new anti-infective product which has broad-spectrum, non-resistance, free from the pH effects, antibacterial, durable, non-oxidized black and many other properties, it can be widely used in medical, household fabrics and health care supplies. Add Nano Ni, Ag powder antibacterial, anti-corrosion coating paint can also be used successfully in the construction and the preservation of relics. Manufacturers produce household items that utilize the antibacterial properties of silver nanoparticles.

These products include nano-silver lined refrigerators, air conditioners and washing machines. Other current applications: Toys, Baby pacifiers, Clothing, Food storage containers, Face masks, HEPA filters, Laundry detergent. Conductive slurry: Widely used for wiring, encapsulation and connection in microelectronic industry, it plays an important role in the minimization of electronic devices and circuits. Efficacious catalyst: Greatly enhance the chemical reaction speed and efficiency, such as Ethylene oxidation.

Biological pharmacy: The silver nanopowder can be used in the cell dyeing and the gene diagnosis.



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انواع نانو ذرات صنعتی و آزمایشگاهی

Silver Nanoparticles (Ag, 99.99%, 5-8 nm, metal basis)

Details

Silver Nanopowder (Ag, metal basis)

True density: 10.9 g/cm³

Purity: 99.99%

APS: 5-8 nm

SSA: ~25-42 m²/g

Color: black

Morphology: spherical

Application

pharmaceutical antibacterial, disinfectant; some of countries for anti-AIDS drugs, mixed with zinc oxide powder for disinfection; chemical catalyst. Also, antiviral antibacterial material: 0.1% silver nanoparticle, the inorganic antibacterial powder, can play an important role in the suppression and killing of dozens of pathogenic micro-organisms such as Escherichia coli, Staphylococcus aureus, such as. As a new anti-infective product which has broad-spectrum, non-resistance, free from the pH effects, antibacterial, durable, non-oxidized black and many other properties, it can be widely used in medical, household fabrics and health care supplies. Add Nano Ni, Ag powder antibacterial, anti-corrosion coating paint can also be used successfully in the construction and the preservation of relics. Manufacturers produce household items that utilize the antibacterial properties of silver nanoparticles.

These products include nano-silver lined refrigerators, air conditioners and washing machines. Other current applications: Toys, Baby pacifiers, Clothing, Food storage containers, Face masks, HEPA filters, Laundry detergent.

Conductive slurry: Widely used for wiring, encapsulation and connection in microelectronic industry, it plays an important role in the minimization of electronic devices and circuits.

Efficacious catalyst: Greatly enhance the chemical reaction speed and efficiency, such as Ethylene oxidation. Biological pharmacy: The silver nanopowder can be used in the cell dyeing and the gene diagnosis.



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Tin Oxide Nanoparticle (SnO_2 , High purity, 99.7%, 35-55nm)

Details:

Tin Oxide (SnO_2)

Purity: 99.7% ***

Color: white

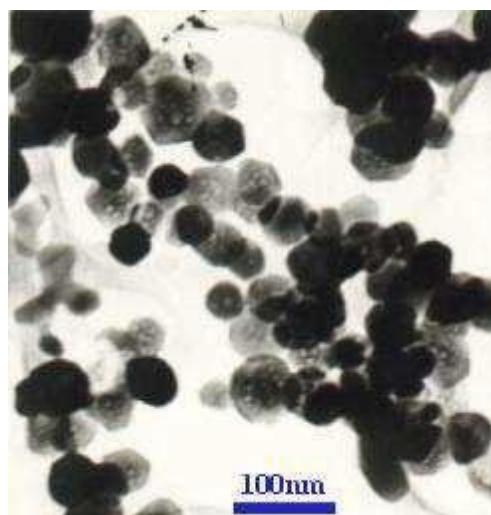
APS: 35-55 nm

SSA: 18.55 m^2/g

Bulk density: 0.55 g/cm^3

True density: 6.95 g/cm^3

Morphology: spherical



*The High-purity products are prepared by using analytically pure chemical reagent as raw materials, and washed by distilled water. Its purity is higher than 99.5%. All our high-purity products are produced by our well-known research universities and national laboratories, not produced by ordinary manufactories. Ordinary products are prepared by using fine chemical raw material, purity is up to 98-99%.

Applications:

Catalysts; Transparent heating elements; Anti-static coatings; Electrodes and antireflection coatings in solar cells; Gas sensors; Energy-conserving coatings; Optoelectronic devices; Resistors; Liquid crystal displays.

Certificate of Analysis											
Al	Ca	Cd	Co	Fe	Mg	Mn	Na	Ni	Pb	Sr	Zn
1.79 $\mu\text{g}/\text{g}$	202 $\mu\text{g}/\text{g}$	0.14 $\mu\text{g}/\text{g}$	0.42 $\mu\text{g}/\text{g}$	11.7 $\mu\text{g}/\text{g}$	89.5 $\mu\text{g}/\text{g}$	0.51 $\mu\text{g}/\text{g}$	0.18%	7.07 $\mu\text{g}/\text{g}$	8.01 $\mu\text{g}/\text{g}$	0.56 $\mu\text{g}/\text{g}$	1.83 $\mu\text{g}/\text{g}$

Zinc Oxide Nanoparticle (ZnO, 99+%, 10-30 nm)

Details:

Zinc Oxide Nanopowder (ZnO)

Purity: 99+%

APS: 10-30 nm

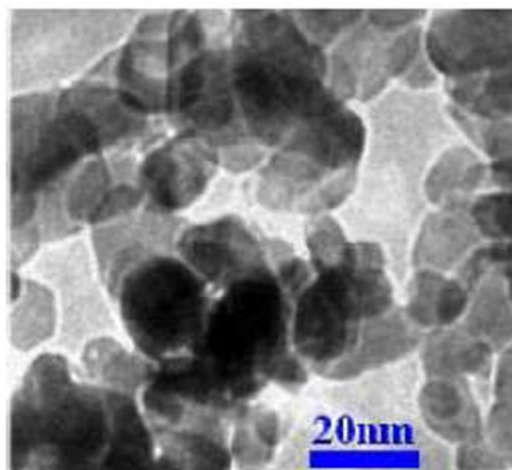
SSA: 20-60m²/g

Color: milky white

Crystal phase: single

Crystal Morphology: nearly spherical

True density: 5.606 g/cm³



Certificate of Analysis				
ZnO	Cu	Mn	Cd	Pb
≥99%	≤3ppm	≤5ppm	≤9ppm	≤9ppm

Applications:

Electronic industry, instrumental industry, manufacture, electrical device, radio, wireless fluorescence lamp, image recorder, rheostat, phosphor; Sunscreening agent used in cosmetics, antibacterial and health protection antiager; UV protection; Piezoelectrics; High-temperature lubricant in gas turbine engines; Flame retardant; Adsorption; Dental cements; Environmental remediation; Gas sensors; Photocatalytic decontamination; Attenuation of ultraviolet light; Demilitarization of chemical and biological warfare agents; Cosmetics and cosmeceuticals; Electrodes for solar cells; Varistors; Pigments for paints.....



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Zirconium Oxide Nanopowder / Nanoparticles (ZrO_2 , high purity 99.95%, 20 nm)

Zirconium Oxide Nanopowder,

Purity: 99.95%

Crystal Phases: monoclinic

APS: 20 nm

SSA: 30-60m²/g

Color: white

Morphology: near spherical

True Density: 5.89 g/cm³

Zirconium Oxide Nanoparticles (ZrO_2) Applications:

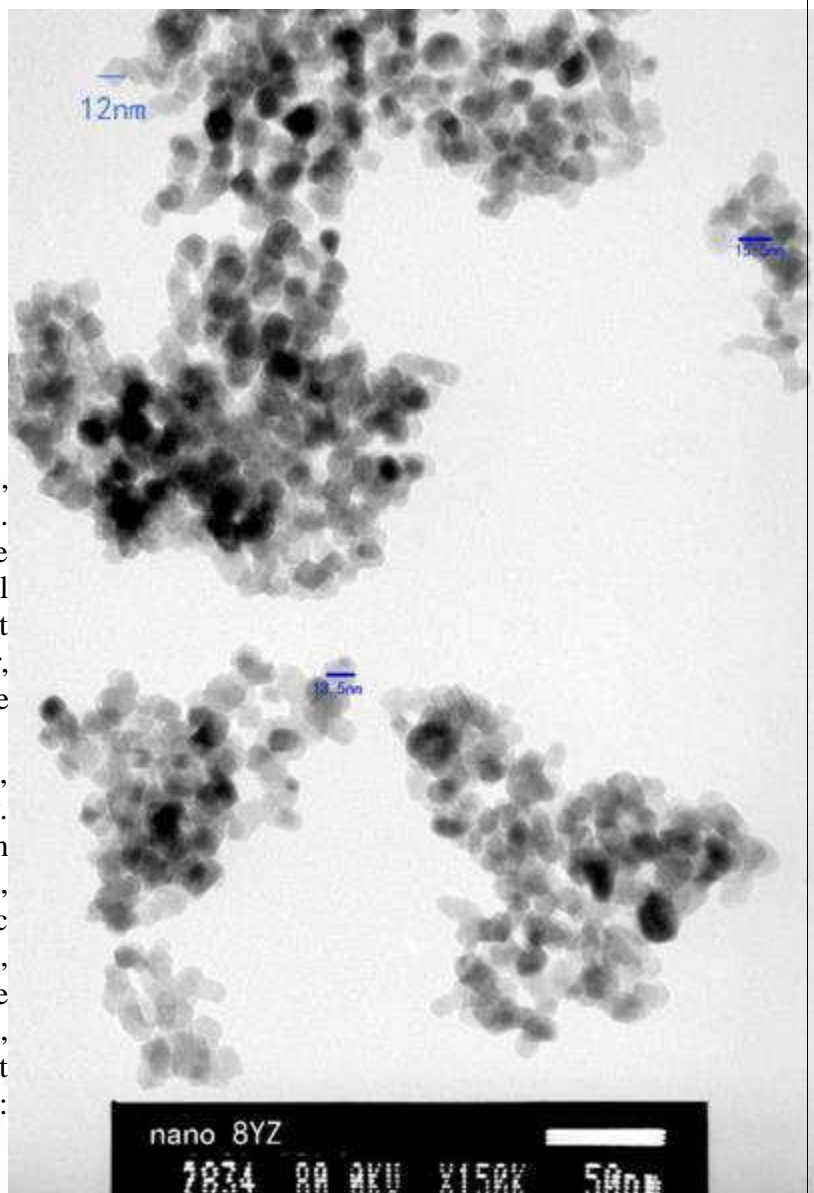
1. Functional ceramics, ceramic pigment, high-purity pigment, porce lain glaze. 2. Pyrooptical element, oxygen-sensitive element, high-capacity capacitor, optical storage, image display element light modulated element, light shutter, stereotelevision glasses, image storage and display element. 3.

Abrasive material, insulating material, fire-retarding material, roentgenography.

4. High- temperature and corrosion resisting components, bearing nozzle, smelting crucible. 5. Piezoelectric element, ion exchanger, solid dielectric, filter, temperature and pressure transmitters and transmitting elements, electrode used for magnetic-current generator, heating element. 6. Jewellery: artificial jewel. 7. Fuel, battery.

Recommended Dosage:

There is a wide range of product application in different fields with a large different amount of dosage, from 0.8 to 9.6%. The end user shall determine the quantity to be added through testing and make the best dosage choice for the best use



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انواع نانو ذرات صنعتی و آزمایشگاهی

Zirconia-Yttria Nanopowder / Nanoparticles (ZrO_2-3Y , 99.9%, 40 nm, metal basis)

Zirconium Oxide Nanopowder (Yttria Stabilized)
($ZrO_2 + 3\% \text{ mol } Y_2O_3$)

ZrO_2 Nanoparticle Purity: 99.9% (metal basis)

ZrO_2 Nanoparticle Crystal phases: mostly tetragonal

ZrO_2 Nanoparticle APS: 40 nm

ZrO_2 Nanoparticle SSA: 10-25m²/g

ZrO_2 Nanoparticle Morphology: Spherical

ZrO_2 Nanoparticle True Density: 5.88 - 5.91 g/cm³

Zirconium Oxide Nanopowder (Yttria Stabilized) Certificate of Analysis--PPM

Al	Mg	Si	Ca	S	Nb
20	65	102	75	165	119

Applications:

1. Functional ceramics, ceramic pigment, high-purity pigment, porce lain glaze. 2. Pyrooptical element, oxygen-sensitive element, high-capacity capacitor, optical storage, image display element, light modulated element, light shutter, stereotelevision glasses, image storage and display element. 3. Abrasive material, insulating material, fire-retarding material, roentgenography. 4. High-temperature and corrosion resisting components, bearing nozzle, smelting crucible. 5. Piezoelectric element, ion exchanger, solid dielectric, filter, temperature and pressure transmitters and transmitting elements, electrode used for magnetic-current generator, heating element. 6. Jewellery: artificial jewel. 7, Fuel, battery.

Recommended Dosage:

There is a wide range of product application in different fields with a large different amount of dosage, from 0.8 to 9.6%. The end user shall determine the quantity to be added through testing and make the best dosage choice for the best use.



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انواع نانو ذرات صنعتی و آزمایشگاهی

Copper (Cu) Nanopowder / Nanoparticles (Cu, 99.9%, 40 nm, metal basis)

Stock #: US1090 --- Made by electrical explosion method

Copper (Cu) Nanoparticles

Purity: 99.9% (metal basis)

Color: Saddle brown

APS: 40 nm

SSA: ~10-14 m²/g

Morphology: spherical

Bulk Density: 0.21 g/cm³

True Density: 8.9 g/cm³

*Flammable, UN 3089

Copper (Cu) Nanoparticles Certificate of Analysis-%

Cu	As	Sb	Pb	Sn	Fe	Ni	Bi	O
** 99.9	0.002	0.002	0.001	0.001	0.006	0.0042	0.001	1.76

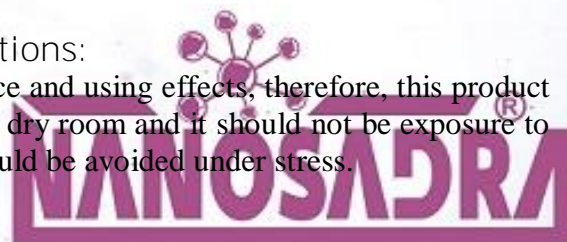
**Copper (Cu) Nanoparticles Metal Basis

Copper (Cu) Nanoparticles Applications:

The superficial conductive coating processing of metal and non-ferrous metal; Medicine append material; Capacitor materials; Raw material for bulk nanomaterial: Adopt the inert gas to make bulk copper nano composite material with powder metallurgy; Cu Nanoparticles widely used as Catalysts; Efficacious catalyst: Copper and copper alloy nanometer, feature high efficacy and selectivity, can be used as catalyst in some reactions, e.g. carbon dioxide compound hydrogen to produce methanol; Cu Nanoparticles used as Conductive coatings; Conductive inks; Conductive slurry: The copper nanopowder can be applied to the production of MLCC internal electrode and other electronic components in electronic slurry for the miniaturization of microelectronic devices; The electronic size with good performance made of copper nanopowder instead of valuable metal particles cuts cost to a large extent; This technology is used to the preference of microelectronic processes; Conductive pastes; Cu Nanoparticles are high thermal conductivity materials; Nanometal Lubricant additives: Adding 0.1~0.6% of copper nanopowder to lubricant oil and lubricant grease. It will form a self-lubricating and self-repairing coating film in the fractioning surface and lower its anti-friction and anti-wear performance; Cu Nanoparticles Lubricant additives; Cu Nanoparticles Sintering additives....

Copper (Cu) Nanoparticles Storage Conditions:

Damp reunion will affect its dispersion performance and using effects, therefore, this product should be sealed in vacuum and stored in cool and dry room and it should not be exposure to air. In addition, the Copper (Cu) Nanoparticles should be avoided under stress.



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Copper oxide Nanoparticles (CuO, 99.9%, 40 nm)

Details: Copper Oxide (CuO)

Purity: 99%

Color: black

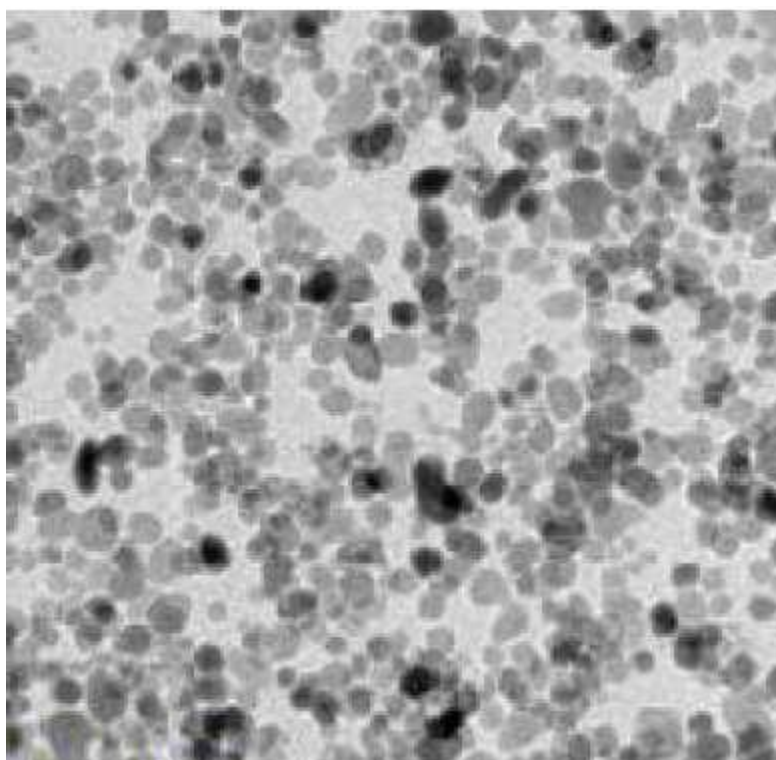
APS: 40 nm

SSA: ~20 m²/g

Morphology: nearly spherical

Bulk density: 0.79g/cm³

True density: 6.4 g/m³



Applications:

Insoluble in water. Dissolve slowly in alcohol or ammonia solution. Soluble in dilute acids, NH₄Cl, (NH₄)₂CO₃, potassium cyanide solution. Under high temperature, copper oxide meet with hydrogen or carbon monoxide, can restore copper metal. Nano-copper oxide is a widely used material. It has been applied to the catalyst, superconducting materials, thermoelectric materials, sensing materials, glass, ceramics and other fields. In addition, the nano-copper oxide can be used as rocket propellant combustion catalyst. It not only can significantly improve the homogeneous propellant burning rate, lower pressure index, but also can better perform as the catalyst for the AP composite propellant. More use such as: Ceramic resistors, Gas sensors, Magnetic storage media, Near-infrared filters, Photoconductive and photothermal applications, Semiconductors, Solar energy transformation, Catalysts, High-tech superconductors...

Certificate of Analysis-ppm											
Ba	Cd	Co	Zn	Sr.	Ca	K	P	Mg	Fe	Pb	Mn
0.75	2.5	6.4	195	2.3	400	300	300	75	87	90	3.5



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Diamond (C) Nanopowder / Nanoparticles (C, >98.3%, 3-10 nm)

Diamond Nanopowder (C)

purity: > 98.3%

color: Grey

APS: 3-10 nm

SSA: 272.6289 m²/g

decompsing Temperature: 616.73°C

ash: 1.042%

Nanopowder functionalized group on surface (**linked directly to the diamond carbon**): --

OH, --CN, --C=O, --COOH-C-O-C etc.

Resistivity: 7.7x10⁷, 0.1-2 (Ω.cm) (Boron doped 2- 4wt %)

MJ/mol.g: -3100 (Hydrophilia degree)

m³/kg: <1.0x10⁻⁸ (Relative magnetic susceptibility)

Initial oxidization temperature: 803 K

A(J/g): 384

(mV): 3.7-75 (change with PH)

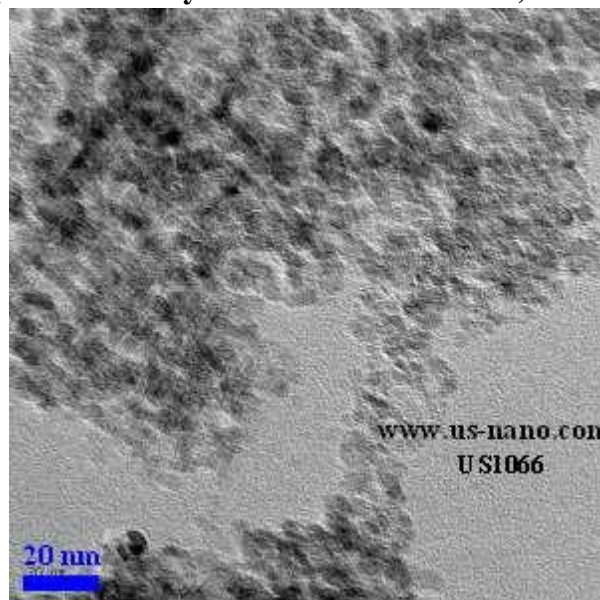
morphology: spherical

bulk density: 0.16-0.18 g/cm³

pore volume: 1.314 cm³/g

true density: 3.05-3.30 g/cm³

Diamond Nanoparticles made by Explosion Synthesized Method



Diamond Nanoparticles Certificate of Analysis --%

Diamond	Cu	Fe	Ca	Mg	Pb	Zn	Cr	Ni	Cu
98.3	0.0003	0.026	0.0049	0.00027	0.0005	0.0099	0.00018	0.0005	0.00071
Na	K	Si	H	N	O	Al	Co	C	
0.0005	0.00379	0.001	0.1476	0.0232	0.82	0.001	0.001	98.5	

Diamond Nanoparticles Application:

High precision polishing-for the computer disk heads, the panels, and chips, optics lenses and jewelry; Additives in Polymer complexes-can be used as a additives in rubber, glass, ceramic, and textile fabric material; Erosion-resistant diamond films/coatings; Biomedical materials (artificial bones and joints); Biosensors; Chemical sensors; Field electron emission materials; Heat-resistant diamond films/coatings; Integrated circuit substrates; Photoelectric sensors;



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Self-lubricating, wear-resistant composite coating; Pressure-limiting sensors; Radiation-resistant diamond films/coatings; Reinforcing agents for rubber, plastics, and resin; Seed crystal for growing larger diamond; High-strength abrasive material.....

Gold (Au) Nanoparticles (Au, 99.97+%, 28 nm)

Details:

Gold (Au) nanoparticles

Purity: >99.97%

APS: 28 nm

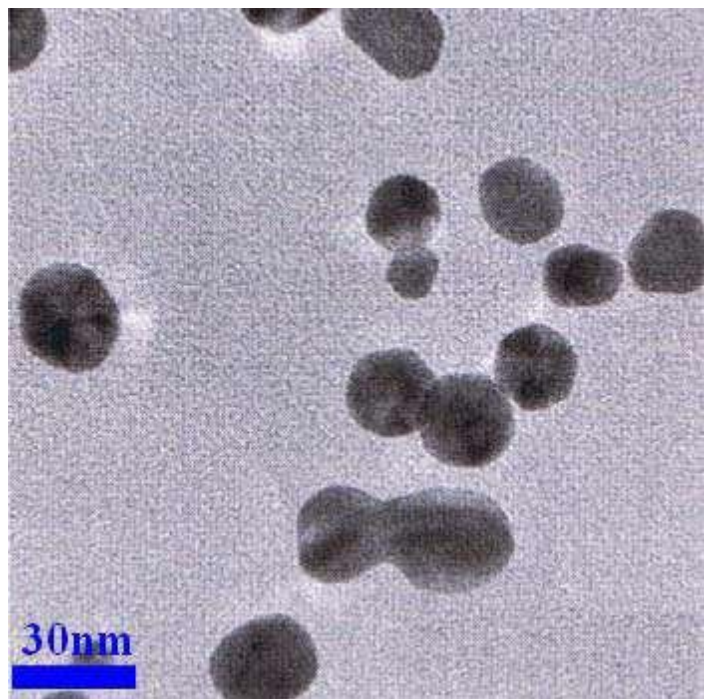
Color: Dark Brown

Bulk density: ~0.85 g/cm³

True density: 19.32 g/cm³

Morphology: spherical

Crystallographic structure: cubic



Gold Nanoparticles Certificate of Analysis -%

Ag	As	Cd	Cu	Fe	Pb	Sb
0.0015	0.001	0.003	0.005	0.0025	0.005	0.001

Applications:

the main purposes: medical, biological and chemical reagents; the electronics industry; cosmetic; some of counties has used for anti-AIDS drugs.....



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Cobalt (III) Oxide (Co_2O_3) or Dicobalt Trioxide Nanopowder
(Co_2O_3 , 99.7%, 50nm)

Cobalt (III) Oxide (Co_2O_3) or Dicobalt Trioxide Nanopowder

Purity: 99.7%

APS: 50nm

SSA: 75.8 m^2/g

Morphology: nearly spherical

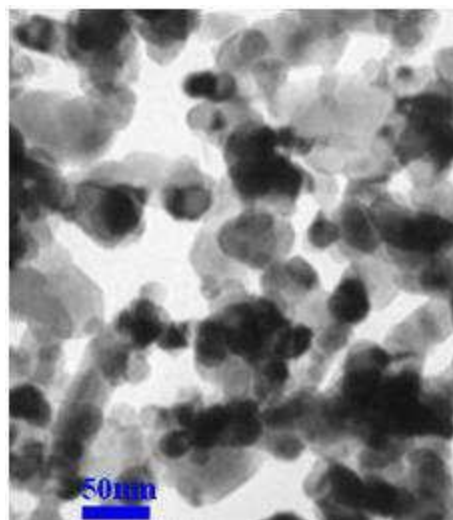
Color: black

Loss of weight in drying: 0.21

Loss of weight on ignition: 0.38

PH: 5.3-6.5

Bulk Density: 0.732 g/cm^3



Purity (Co_2O_3)	Co	Cu	Fe	Ni	Mg	Mn	As
99.7%	73.65%	150ppm	320ppm	580ppm	50ppm	180ppm	39ppm



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انواع نانو ذرات
صنعتی و آزمایشگاهی

Research Grade Graphene Nanoplatelets (99.5+%, Thickness 2-18 nm with Less Than 32 Layers)

Research Grade Graphene Nanoplatelets Powder

Purity: 99.5% - **Graphene**

Thickness: 2-18nm, Less Than 32 Layers

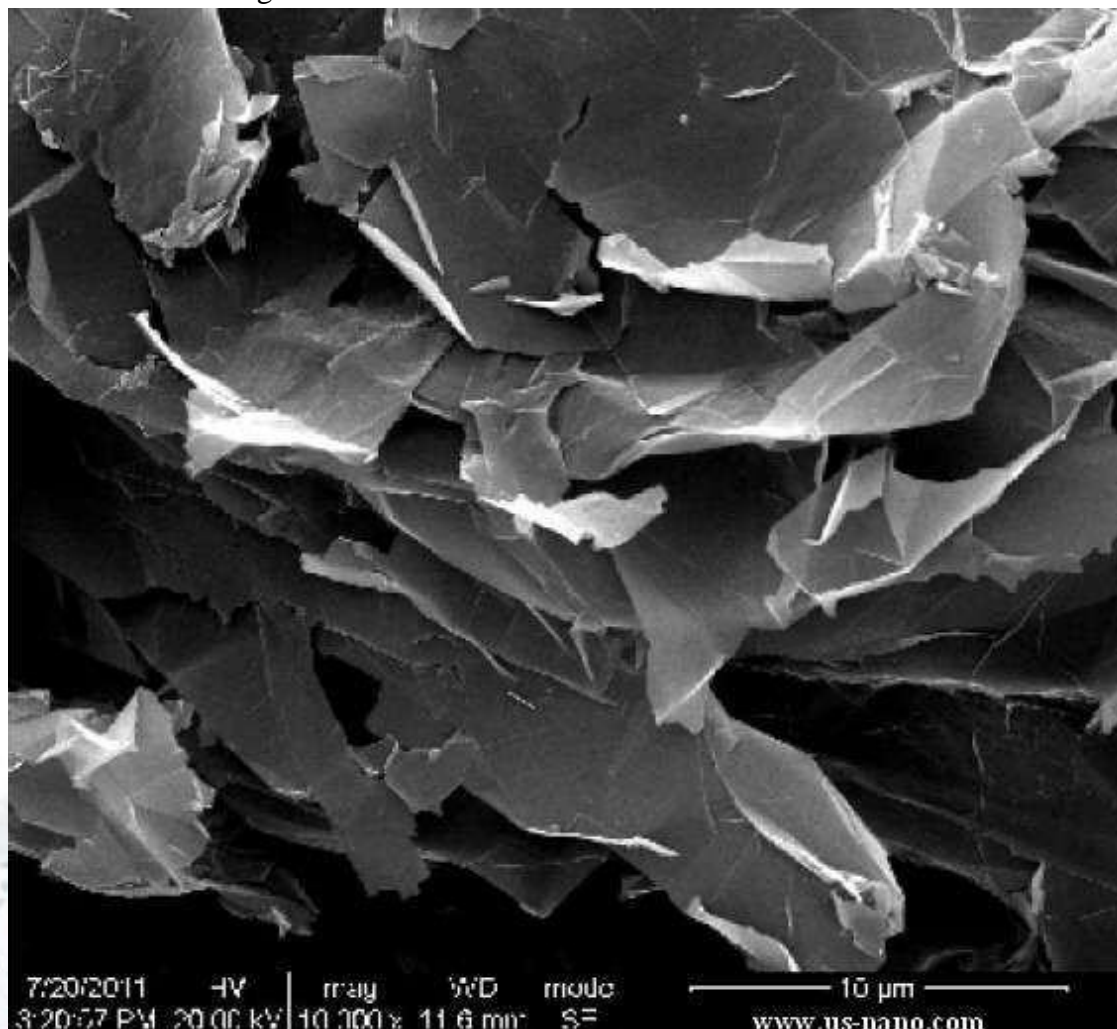
Ph: 7 - 7.7 (30 °C)

Volume Resistivity: 4×10^{-4} ohm.cm

Diameter: 4-12um

The Product COA: C=99.7%, O<0.3%

SSA: 500-1200 m²/gr



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انواع نانو ذرات
صنعتی و آزمایشگاهی

Research Grade Graphene Oxide Nanoplatelets (99%,
Thickness 3.4-7 nm with 6-10 Layers)

Research Grade Graphene Oxide Nanoplatelets Powder

Purity: 99% - Graphene Oxide

Thickness: 3.4-7nm

Layers: 6-10 Layers

Ph: 7 - 7.7 (30 °C)

Volume Resistivity: 4×10^{-4} ohm.cm Diameter: 10-50 um

The Product COA: C=92.7%, O 7.3% Appearance: Brown yellow or Black powder SSA: 100-300 m²/gr

Density: 1 gr/cm³ at 20 ° C



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انواع نانو ذرات صنعتی و آزمایشگاهی

Reduced Graphene Oxide Nanplatelets Powder

Reduced Graphene oxide is manufactured by modified HUMMER'S method using proprietary processing unit.

Advantages of Reduced Nano Graphene Oxide

- High aspect ratio & porosity
- Very high electro-sorption capacity
- Very thin exfoliated sheet
- Ultimately High Purity

TECHNICAL PARAMETERS

Product Name	Element Analysis				
Reduced Graphene Oxide	C	O	S	H	N
	87	8	<1	2	<2

PARAMETERS	VALUES
Length Average X & Y Dimensions	1-10 micron
Thickness Average Z Dimension:	0.8~2 nm
Purity	~98%
Number of Layers	Average number of Layer 3-6
Lateral dimension	~10 μm
Surface Area	>250 m ² /g
Electrical Conductivity	Conductor ~560 S/M
Bulk Density	0.121 g/cc



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انواع نانوذرات صنعتی و آزمایشگاهی

Research Grade Single Layer Graphene Nanopowder with High Purity 99.3%

Graphene Purity: >99.3wt%

Research Grade Single Layer Graphene Thickness: 0.55nm- 1.2nm

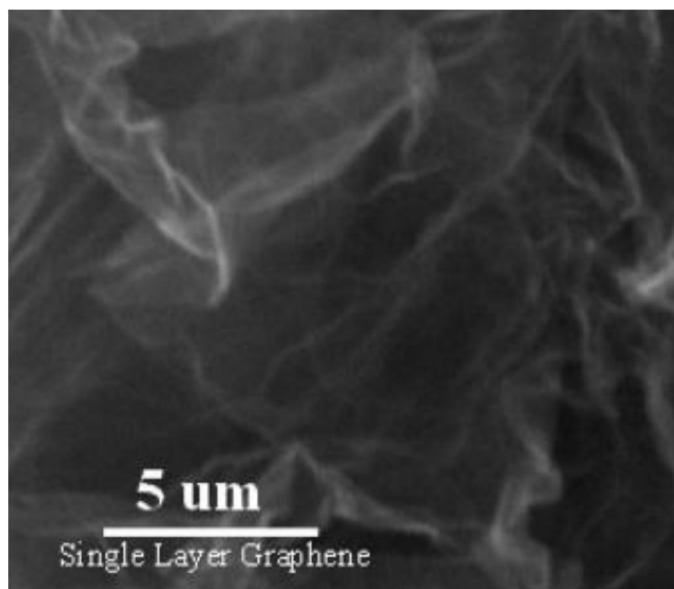
Graphene Diameter: 1 μ m - 12 μ m

Graphene Specific Surface Area: 500 - 1200m²/g

Graphene Color: Black

Conductivity: 1000-1500 S/M

The Product COA: C=99.6%, O<0.4%



Research Grade Single Layer Graphene -COA-%						
C	O	Ø	SSA	Purity	Color	Thickness
99.6	<0.4	1 μ m - 12 μ m	500 - 1200m ² /g	>99.3	Black	0.55nm - 1.2nm



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انواع نانو ذرات صنعتی و آزمایشگاهی

Research Grade Single Layer Graphene Oxide Nanopowder with High Purity 99.3%

Research Grade Single Layer Graphene Oxide Dry Nanopowder

Purity: >99.3% -- Single Layer Graphene Oxide

C: 68.44%, O: 30.92, Free C: 0.4%, S: 0.13%

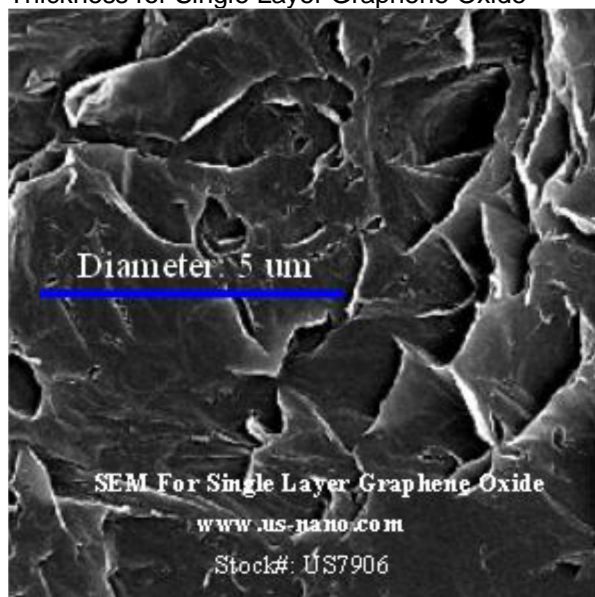
Diameter Ø: 1.5-5.5 µm

Thickness: 0.43-1.23 nm

Color: Amber

Research Grade Single Layer Graphene Oxide Dry Nanopowder--COA--%							
C	Free C	O	S	Ø	Thickness	Color	Purity
68.44	0.4	30.92	0.13	1.5-5.5µm	0.43-1.23nm	Amber	>99.3

Thickness for Single Layer Graphene Oxide



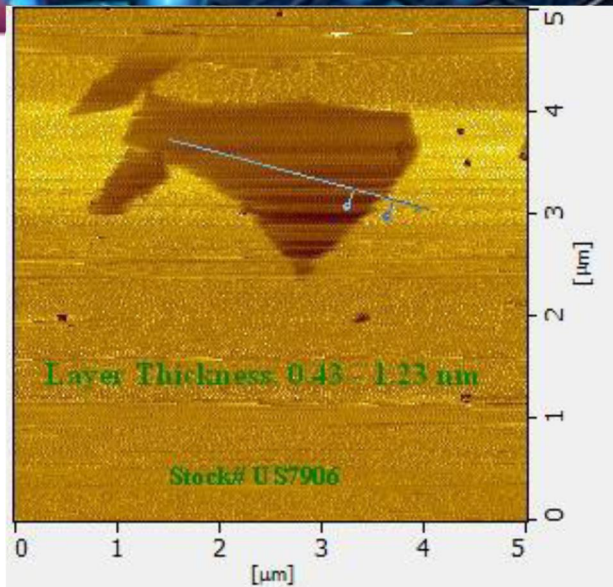
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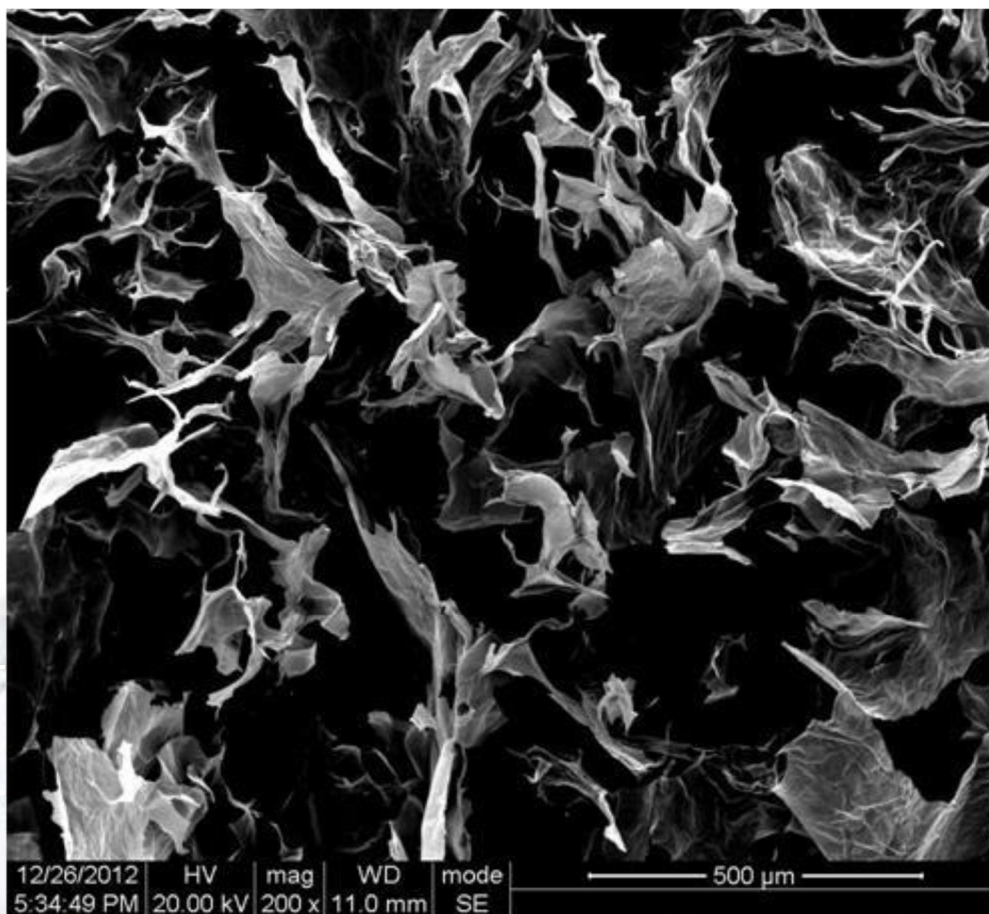
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Diameter of Single Layer Graphene Oxide



TEM-1





انواع نانو ذرات صنعتی و آزمایشگاهی

Graphite Nanoparticles (C/ 10nm - 80 nm, 99.9%, Natural Graphite, Hydrophobic)

Details:

Graphite nanopowder (Natural graphite, hydrophobic)

Purity: 99.9% (metal base)

APS: 10-80 nm

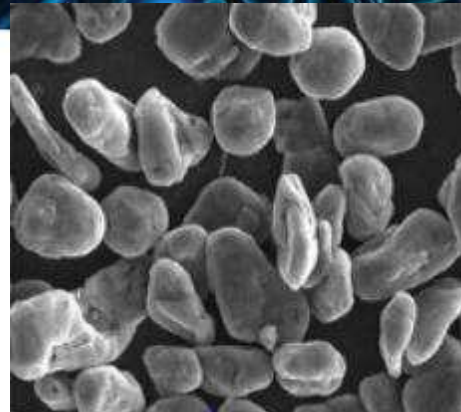
PH = 6-7

Fixed Carbon: 99+%

Ash: <0.5%

Particle morphology: flaky

Color: black



Applications:

Natural graphite is mostly consumed for refractories, steelmaking, expanded graphite, brake linings, foundry facings and lubricants; Natural graphite has found uses as the marking material ("lead") in common pencils, in zinc-carbon batteries, in electric motor brushes, and various specialized applications. Aluminum/graphite composites for bearings, pistons, and liners in engines; Carbon adsorbents for gas chromatography; Copper/graphite and silver/graphite nanocomposites for electrical brushes and contact strips; Inorganic filler (graphite/polymer nanocomposites); Support materials for precision metal powder catalysts Graphite/polymer nanocomposites for enhanced electrical conductivity; Metal matrix composites for reduced friction and wear...



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انواع نانو ذرات صنعتی و آزمایشگاهی

Magnesium Oxide Nanoparticle (MgO, 98+%, 20 nm)

Details:

Magnesium Oxide (MgO)

Purity: 98+%

APS: 20nm

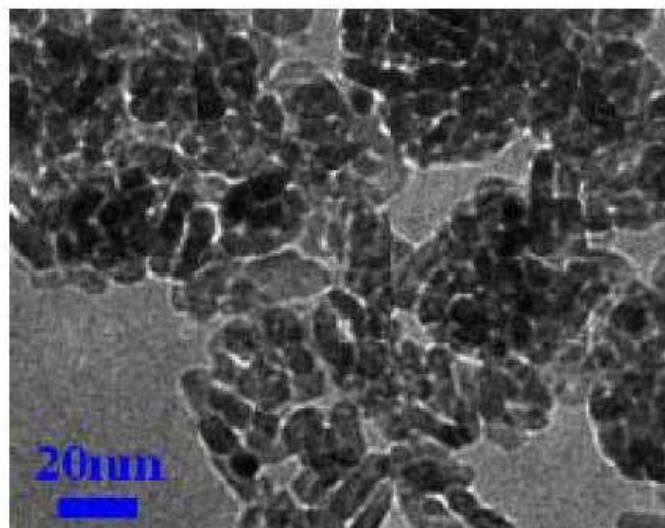
SSA: >60 m²/g

Color: white

Morphology: polyhedral

Bulk density: 0.145 g/cm³

True density: 3.58 g/m³



Certificate of Analysis			
MgO	Na	K	Ca
≥98%	≤2109ppm	≤227ppm	≤1815ppm

Applications:

1. Fire retardant used for chemical fiber and plastics trades; 2. High-temperature dehydrating agent used for the production of silicon steel sheet, high-grade ceramic material, electronic industry material, adhesive and additive in the chemical raw material. 3. High-frequency magnetic-rod antenna, magnetic device filler, insulating material filler and various carriers used in radio industry. 4. Refractory fiber and refractory material, magnesite-chrome brick, filler for refractory coating, refractory and insulating instrument, electricity, cable, optical material, material for steel-smelting furnace and other high- temperature furnaces, heating material and ceramic base plate. 5. Electric insulating material for making crucible, smelter, insulated conduit (tubular component), electrode bar, electrode sheet. 6. Fuel additive, cleaner, antistatic agent and corrosion inhibitor.



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انواع نانو ذرات صنعتی و آزمایشگاهی

Molybdenum Oxide Nanoparticle (MoO_3 , 99.94+%, high purity, 13-80 nm, orthorhombic crystal)

Details:

Molybdenum Trioxide Nanopowder (MoO_3) Orthorhombic crystal

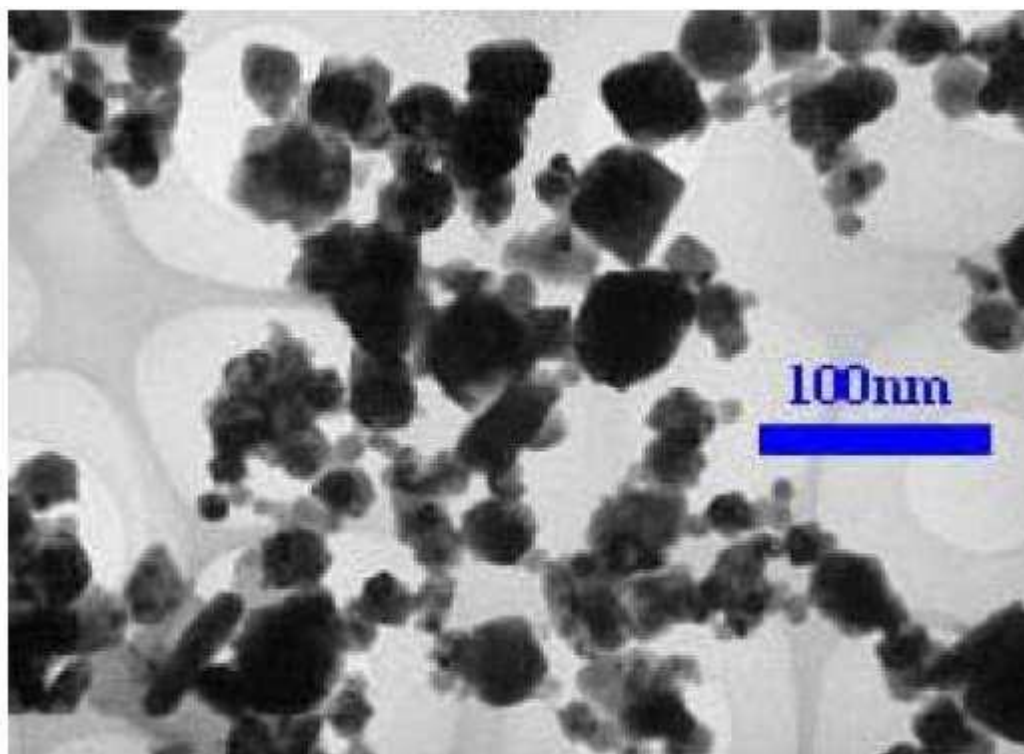
Purity: 99.94%

Molecular weight: 143.94

Color: white - light gray with shaped like talcum powder

APS: 13-80 nm

Production methods: wet chemical purification and roasting



Certificate of Analysis--ppm				
Fe	Ni	Cu	Cr	Co
12	2.3	230	12	0.65

Product Features:

Characters: MoO_3 - white - light gray powder; shaped like talcum powder; specific gravity :4.5-4.7; 795 degree melt into a brown liquid; slightly soluble in water; soluble in alkali and acid; high purity; reaction with phosphoric acid can generate phosphomolybdic acid.

Applications:

Production methods are wet chemical purification and roasting. It applies to restore molybdenum powder and produce molybdenum wire and molybdenum tablets. Pure

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molybdenum trioxide is also widely used as catalysts, cracking catalysts, hydrogenation catalysts, pigments, ceramics and glass production. Molybdenum trioxide nanopowder is chemical compound with the formula MoO_3 . This compound is produced on the largest scale of any molybdenum compound. It occurs as the rare mineral molybdite. Its chief application is as an oxidation catalyst and as a raw material for the production of molybdenum metal. The oxidation state of molybdenum in this compound is +6. Molybdenum trioxide nanopowder is used to manufacture molybdenum metal, which serves as an.



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eurtechserv@sial.com

NANO CLAY bentonite

Product Specification

Product Name: NANOCLAY BENTONITE

Product Number: 256256

CAS Number: - - 6 85 2306

Formula: $H_2Al_2O_6Si$

Formula Weight: 25082g/mol

TEST Specification

Appearance (Color) Conforms to Requirements

Light Tan to Brown

Appearance (Form) Powder

Loss on Drying 18.0%

Bulk Density 200-2200 kg/m³

Average Particle Size 25 micron

Specification: PRD.0.ZQ5.10000012509

SSA: 185 m²/gr

Sigma-Aldrich warrants that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.



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انواع نانو ذرات صنعتی و آزمایشگاهی

Montmorillonite nanoclay properties

nanoclay type	Montmorillonite
particle size	1-2nm
Bulk Density	0.5-0.7 g/cm ³
SSA	220-270 (m ² /g)
electrical con.	25MV
Ion exchange coefficient	48(meg/100g)
Empty gap between particles	60 Å
color	Pale yellow
humidity	1-2 %

Nanoclay chemical analysis

N.	symbol	%
1	Na ₂ O	0.98
2	MgO	3.29
3	Al ₂ O ₃	19.60
4	SiO ₂	50.95
5	K ₂ O	0.86
6	CaO	1.97
7	TiO ₂	0.62
8	Fe ₂ O ₃	5.62
9	LOI	15.45



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انواع نانو ذرات صنعتی و آزمایشگاهی

Selenium Nanoparticles (Se, High Purity, 99.95%, 10-45 nm)

Selenium Nanopowder,

Purity: 99.95%

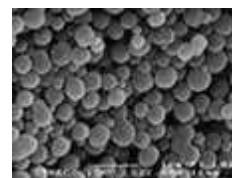
APS: 10 - 45 nm

SSA: 30 - 50 m²/g

Color: Gray

Morphology: near spherical

True Density: 3.89 g/cm³



Specifications

High surface area, antioxidant, spherical particle size Nano selenium has a powerful bearing on your body's ability to resist disease. Because the human body needs selenium in relatively small amounts, it has often been overlooked. Nano selenium may have the ability to reduce the risk of cancer, heart disease, premature aging, and arthritis and protect the body from damage with its antioxidant properties. Selenium is a trace mineral that is essential to human life.

Your body needs this mineral for the production of several important body compounds, including enzymes, or catalysts involved in antioxidant protection and thyroid hormone metabolism. Nano selenium is being researched to help with anti-AIDS virus, anti-hepatitis B virus, anti-hepatitis C virus and the prevention and control of the SARS virus.

Applications:

- _ Electrical rectifiers
- _ Photocells
- _ Photographic exposure meter
- _ Xerography
- _ photoconductor with a relatively low melting point (~217 °C)
- _ Glass-forming tendencies
- _ As a carrier for preparation of practical biosensors (i.e., sensing H₂O₂)
- _ In medical diagnostics
- _ In the glass industry to eliminate bubbles and remove undesirable tints produced by iron
- _ Important role in human health, including antioxidant effects, immune health, cancer prevention, antiviral activities, and protective effect against the oxidation of DNA



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انواع نانو ذرات صنعتی و آزمایشگاهی

Silicon Carbide (SiC) Nanopowder (SiC, beta, 99+%, 45-65nm, cubic)

Silicon Carbide Nanopowder (SiC, Beta)

Purity: 99+%

APS: 45-65nm

Color: Grayish white

Bulk Density: 0.05 g/cm³

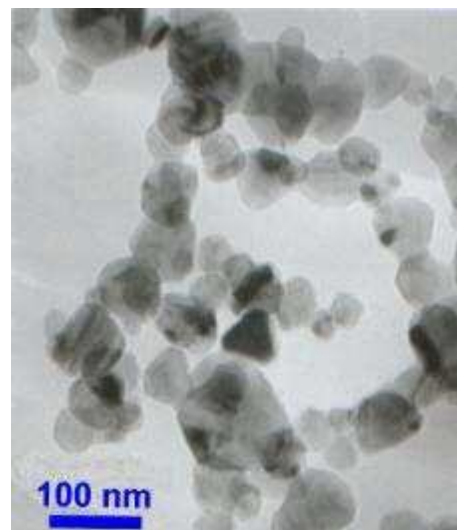
True Density: 3.216 g/cm³

Morphology: cubic

Making Method: Plasma CVD

SSA: 40-80 m²/g

Zeta Potential: -27.8mV



Purity
99+%

Free Si
0.24%

Free C
0.76%

Silicon Carbide Nanopowder (SiC) General Features:

1. The product possesses high purity, narrow range particle size distribution, and larger specific surface area; 2. This product has chemical stability, high thermal conductivity, smaller thermal expansion coefficient and better abrasion resistance; 3. Its microhardness is 2840 ~ 3320kg/mm² and hardness is between corundum and diamond; Its mechanical strength is higher than the corundum; 4. nano-SiC possesses excellent thermal conductivity. It is a semiconductor and resistant to oxidation in high temperature.

Silicon Carbide Nanopowder (SiC) Applications:

High-grade refractory material; Special use material for polishing abrasive; Ceramic bearings; Ceramic engine parts; Grinding wheels; Textile ceramics; High-frequency ceramics; Hard disc and a support for multichip modules; High-temperature and high-power semiconductors; High temperature ceramic bearings; High-temperature fluid transport parts; High hardness grinding materials; High-temperature sealing valves; High-temperature spray nozzles; Integrated circuit substrate; Catalyst support; Mirror or coatings for extreme ultraviolet environment; Nanocomposites (e.g., Si₃N₄/SiC, SiC/polymer); Resistance heating elements; Strengthening materials for Al, Al₂O₃, Mg, and Ni.....

Silicon Carbide Nanopowder (SiC) Storage Conditions:

Damp reunion will affect its dispersion performance and using effects, therefore, this product should be sealed in vacuum and stored in cool and dry room and it should not be exposure to air. In addition, the product should be avoided under stress.



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انواع نانو ذرات صنعتی و آزمایشگاهی

Calcium Carbonate Nanoparticles

CAS#471-34-1

CaCO₃

Properties

Molecular Weight	100.09
Appearance	White Powder
Melting Point	825 °C
Boiling Point	Decomposes
Density	N/A
True Density	2.93 g/cm ³
Bulk Density	0.68 g/ml
Average Particle Size	10-45 nm
Size Range	N/A
Crystal Phase	N/A
Morphology	cubic or hexagonal



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انواع نانو ذرات صنعتی و آزمایشگاهی

Precipitated Calcium Carbonate Nano particles (PCCN)

Product Specification Sheet

Grade: SHR40

Application: Poly Ethylene Terephthalate (PET) products

Type: Industrial Grade

Chemical Analysis

Purity: min 99%

Coating agent: Alcoholic Groups

Coating agent amount: Max 3%

MgO	0.126
SiO ₂	0.110
Al ₂ O ₃	0.022
Fe ₂ O ₃	0.036

Physical properties

Appearance: White powder

Particle size (d_{99%}) < 90 nm

Residue on 45 µm sieve: 0.0

Crystal structure: Calcite

Moisture: max 0.1%

Bulk density ~ 0.35

PH value: 6.5-7.5

Odor: Odorless

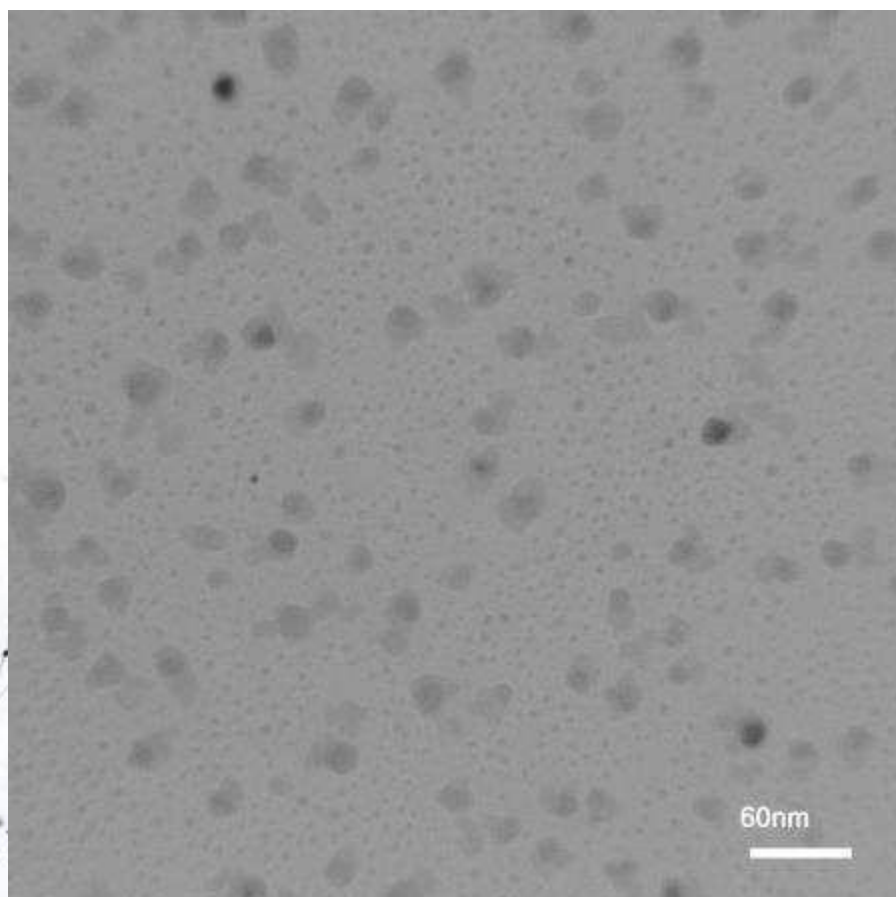
Recommended Usage

Master batch: 10% - 15%

Final product: 0.25% - 2%

Product Pictures

Pic 1) Dispersed



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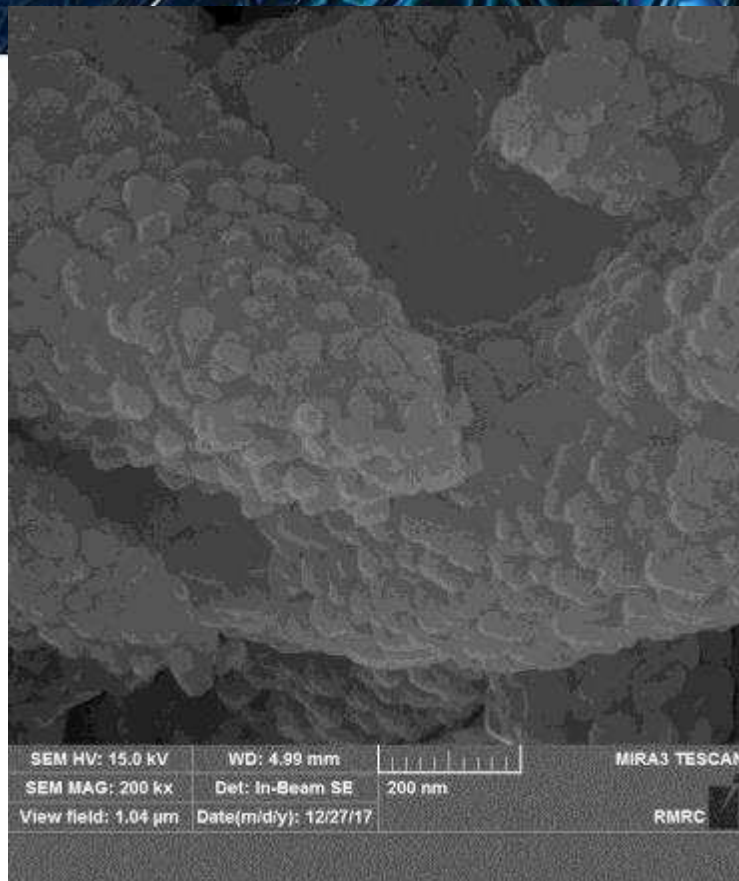
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انواع نانو ذرات صنعتی و آزمایشگاهی

Pic 2) Aggregates and Agglomerates



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Product Specification Sheet

Short description

Product name: Precipitated Calcium Carbonate Nano particles (PCCN)

Grade: SHM80

Application: Polyolefin products, PVC products

Type: Industrial grade

Chemical Analysis

Purity: min 99%

Coating agent: Stearic Acid

Coating agent amount: Max 4%

MgO	0.156
SiO ₂	0.130
Al ₂ O ₃	0.030
Fe ₂ O ₃	0.029

Physical properties Appearance:

White powder

Particle Size (d99%) < 90 nm

Residue on 45 µm sieve: 0.0

Crystal Structure: Calcite

Moisture: max 0.1%

Bulk Density ~ 0.35

PH Value: 6.5-7.5

Odor: Odorless

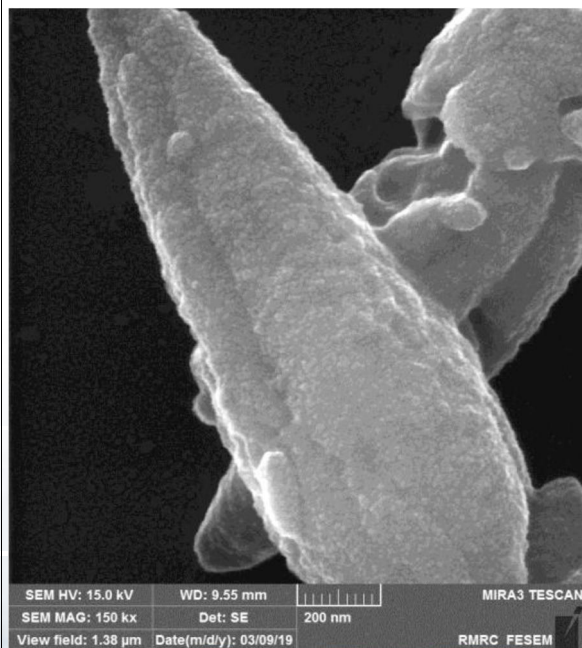
Recommended usage

Master batch: 10% - 15%

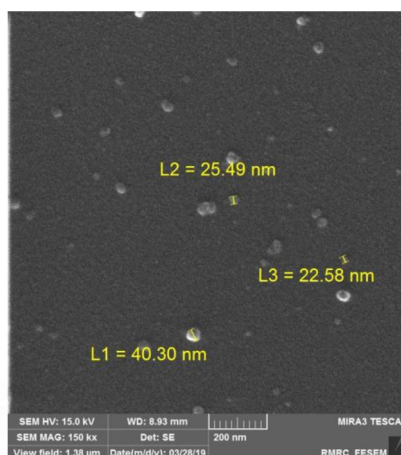
Final product: 0.5% - 5%

Product Pictures

Pic 1) PCCN Aggregates



Pic 2) PCCN Dispersed





انواع نانو ذرات صنعتی و آزمایشگاهی

Cobalt Oxide Nanoparticle (Co₃O₄, 99%, 10-30 nm)

Details:

Cobalt Oxide (Co₃O₄)

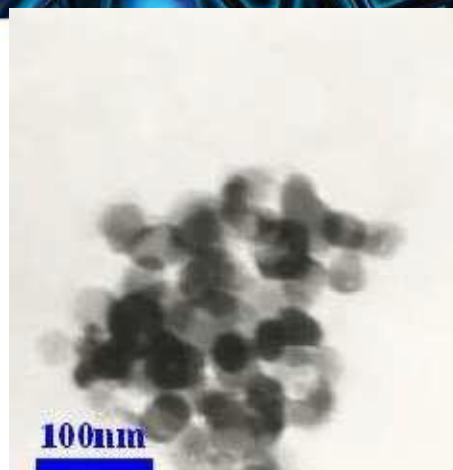
Purity: 99%

APS: 10-30 nm

SSA: 50-150 m²/g

Color: dark brown

True density: 6.11 g/m³



Chemical Properties:

Exposure to air, easy to absorb moisture, but does not generate water compounds. It is soluble in nitric acid. When heated to above 1200 °C, nano-cobalt oxide will be broken down into sub-cobalt oxide. In the hydrogen flame, nano-cobalt oxide is heated to 900 °C, it will be transformed into metal cobalt. Cobalt (II,III) oxide is chemical compound with the formula Co₃O₄. It is a black solid, and a mixed valence compound, containing both Co (II) and Co (III) oxidation states. It can be formulated as CoII CoIII₂O₄ or CoO.Co₂O₃. Cobalt (II) oxide, CoO, converts to Co₃O₄ if heated to around 600-700 °C in air. Above 900 °C, CoO is stable.

Applications:

Catalysis, superconductors, ceramics and other fields as an important inorganic materials; As catalyst and catalyst carrier and the electrode active material; For glass, porcelain colorants and pigments; Chemical industry oxidant and a catalyst for organic synthesis; Senior goggles and other filter materials; Carbide; Temperature and gas sensors; For the semiconductor industry, electronic ceramics, lithium ion battery electrode materials, magnetic materials; Electrochromic devices; Enamels; Grinding wheels; Heterogeneous catalysts; Solar energy absorbers...

Co ₃ O ₄	Ca	Cu	Fe	Ni	Pb
99%	30ppm	20ppm	15ppm	55ppm	5ppm



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انواع نانو ذرات صنعتی و آزمایشگاهی

Chromium Oxide Nanoparticle (Cr_2O_3 , 99+%, 60 nm)

Details:

Chromium Oxide Nanopowder (Cr_2O_3)

Purity: 99+%

APS: 60 nm (from TEM)

Bulk density: $\sim 0.943 \text{ g/cm}^3$

True density: 5.22 g/m^3

Morphology: nearly spherical



Applications:

Chromium (III) oxide is the inorganic compound of the formula Cr_2O_3 . It is one of principal oxides of chromium and is used as a pigment. In nature, it occurs as the rare mineral eskolaite. Because of its considerable stability, chromia is commonly used pigment and was originally called viridian. It is used in paints, inks, and glasses. It is the colourant in "chrome green" and "institutional green." Chromium (III) oxide is the precursor to the magnetic pigment chromium dioxide, according to the following reaction:

$\text{Cr}_2\text{O}_3 + 3 \text{ CrO}_3 \rightarrow 5 \text{ CrO}_2 + \text{O}_2$. It is one of the materials that are used when polishing the edges of knives on a piece of leather (also called stropping).

Certificate of Analysis-ppm												
Al	Ba	Ca	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Sr.	Zn
46	12	190	5	5.3	530	871	150	24	164	62	3.3	30



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Cerium Oxide Nanoparticle (CeO_2 , 99.97%, 10-30nm)

Details: Cerium oxide nanopowder (CeO_2)

Purity: 99.97% (REO)

APS: 10-30nm

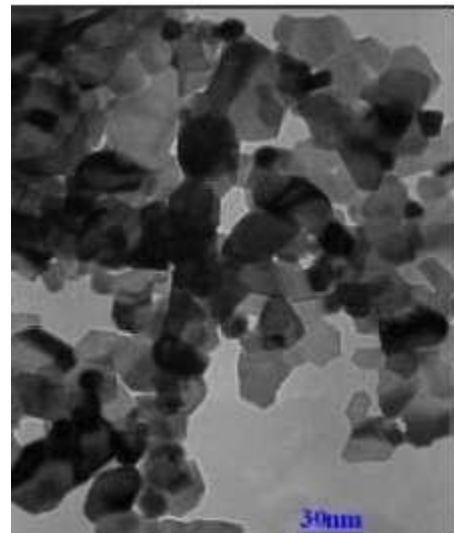
SSA: 30-50 m^2/g

Color: light yellow

Morphology: spherical

Bulk density: $\sim 0.8\text{-}1.1 \text{ g/cm}^3$

True density: 7.132 g/cm^3



Application:

Buffer layer for superconductors; Catalysts and catalyst support; Coatings for infrared filters; Coloring agents for plastics; Electrolyte and/or electrode materials for solid oxide fuel cells; Heat resistant alloy coatings; Infrared absorbents; Oxidation resistant coatings; Oxygen pumps; Oxygen sensors; Polishing media for electronic devices, glasses, and bearing balls; Sintering additives; Ultraviolet absorbent (absorption at $\sim 400 \text{ nm}$ is the strongest for any oxide).

CeO_2	APS	Y_2O_3	Nd_2O_3	Pr_6O_{11}	Sm_2O_3	Ho_2O_3	Lu_2O_3	Dy_2O_3	TiO_2
99.97% (REO)	10-30nm	<10ppm	<22ppm	<36ppm	<10ppm	<10ppm	<10ppm	<10ppm	<13ppm
Er_2O_3	Tm_2O_3	Eu_2O_3	Gd_2O_3	Yb_2O_3	La_2O_3	Co_2O_3	NiO	PbO	CaO
<10ppm	<10ppm	<10ppm	<10ppm	<10ppm	<80ppm	<5ppm	<5ppm	<5ppm	<63ppm
SiO_2	Fe_2O_3	MgO	ZnO	ZrO_2	Cr_2O_3	Al_2O_3	CuO	MnO_2	TiO_2
<56ppm	<243ppm	<12ppm	<5ppm	<5ppm	<5ppm	13ppm	<5ppm	<5ppm	<5ppm



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انواع نانو ذرات صنعتی و آزمایشگاهی

Nickel Oxide (NiO) Nanopowder / Nanoparticles (NiO, 99%, 10-20 nm)

Details:

Nickel Oxide Nanopowder (NiO)

Purity: 99%

APS: 10-20 nm

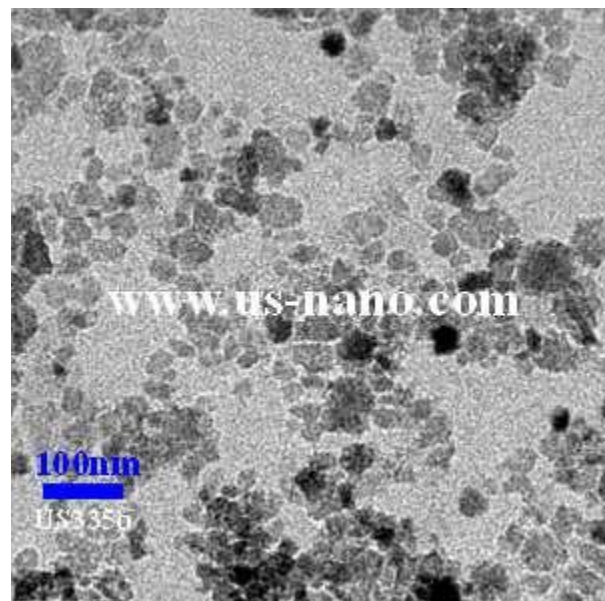
SSA: 50-100 m²/g

Color: Gray-Black

Morphology: nearly spherical

Bulk Density: ~0.8 g/cm³

True Density: 6.67 g/cm³



Nickel Oxide Nanopowder (NiO) Applications:

Adhesive and coloring agents for enamel; Active optical filters; Antiferromagnetic layers; Automotive rear-view mirrors with adjustable reflectance; Catalysts; Cathode materials for alkaline batteries; Electrochromic materials; Energy efficient smart windows (with adjustable absorption and reflectance in the visible and near-IR wavelength range) P-type transparent conductive films; Pigments for ceramics and glasses; Temperature sensors; Counter electrode...



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انواع نانو ذرات صنعتی و آزمایشگاهی

Tungsten Oxide Nanoparticle (WO_3 , high purity, 99.95%, 23-65 nm, orthorhombic crystal)

Details:

Tungsten oxide Nanopowder (WO_3)--

Orthorhombic crystal Purity: 99.95%- high purity product

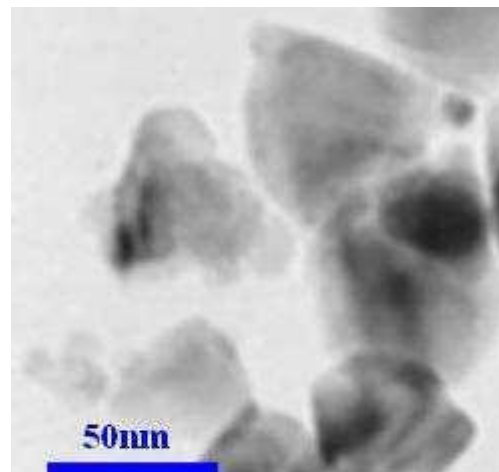
APS: 23-65 nm

Color: Light yellow

Morphology: nearly spherical

Bulk density: 1.3-1.6 g/cm³

True density: 7.16 g/cm³



Certificate of Analysis—ppm				
Fe	Ni	Cu	Cr	Co
2.5	0.50	8.3	100	35

Applications:

Used in colorant and analysis reagent of chinaware; Used in producing metal tungsten material; Gas sensors; Fire-proofing fabrics; Imaging; Large-area displays; Catalysts; Ceramic pigments; Humidity sensors; Infrared switching devices; High-density memory devices; Photocatalysts; Temperature sensors; used in X-ray screen and fireproof textile; Tungstates; Wastewater treatment; Writing-reading-erasing optical devices; Smart windows; Solar energy conversion; producing WC, hardness alloy, cutting tools, super-hard mould and tungsten strips through powder metallurgy.....



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انواع نانو ذرات صنعتی و آزمایشگاهی

Tungsten Carbide (WC) Nanopowder / Nanoparticles (WC, 99.9%, 55 nm, Hexagonal)

Tungsten Carbide Nanopowder (WC)--hexagonal

True Density: 15.63 g/cm³

Color: Grey Black

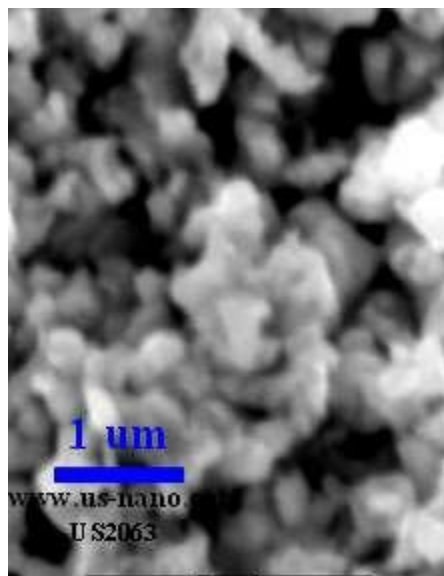
Grain Size: 55nm

APS: 150-200nm

Purity: 99.9%

m.p. 2870 °C

b.p. 6000 °C

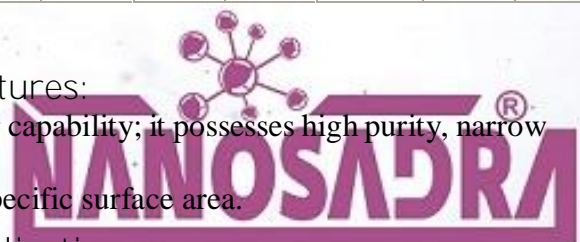


Total Carbon	Free Carbon	Average Crystalline Size	Average Particle Size	Surface Area	Al	Ca	Cr	Fe	Mo	Si	O
6.16 ± 0.1%	<0.08%	40-70 nm (XRD line broadening)	150-200 nm	1.3-2.0 m ² /g	50ppm	50ppm	50ppm	200ppm	50ppm	50ppm	0.3 %

Tungsten Carbide Nanopowder (WC) Features:

It is stable in air; Good inoxidizability; Active sinter capability; it possesses high purity, narrow range particle size distribution, good activity and large specific surface area.

Tungsten Carbide Nanopowder (WC) Application:



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انواع نانو ذرات صنعتی و آزمایشگاهی

Producing high capability nano crystalline or super fine hardness alloy, hard-face abrasion resistant

spraying and petrochemical cracking catalyst; Chipless forming tools; Cutting tools; Mining tools; Nanocomposites (for enhanced hardness, strength, and wear resistance); Erosion-resistant coatings; Wear-resistance coatings; Corrosion-resistant coatings; Wear-resistant parts.....

Tungsten Carbide Nanopowder (WC) Storage Conditions:

Damp reunion will affect its dispersion performance and using effects, therefore, this product should

be sealed in vacuum and stored in cool and dry room and it should not be exposure to air. In addition,

the product should be avoided under stress.



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انواع نانو ذرات صنعتی و آزمایشگاهی

Boron Carbide B4C Nanopowder / B4C Nanoparticles (99+%, 45-55 nm, hexagonal)

Boron Carbide Nanoparticles B4C

Crystal phase: Hexagonal

APS: 45-55nm

SSA: 40-60m²/g

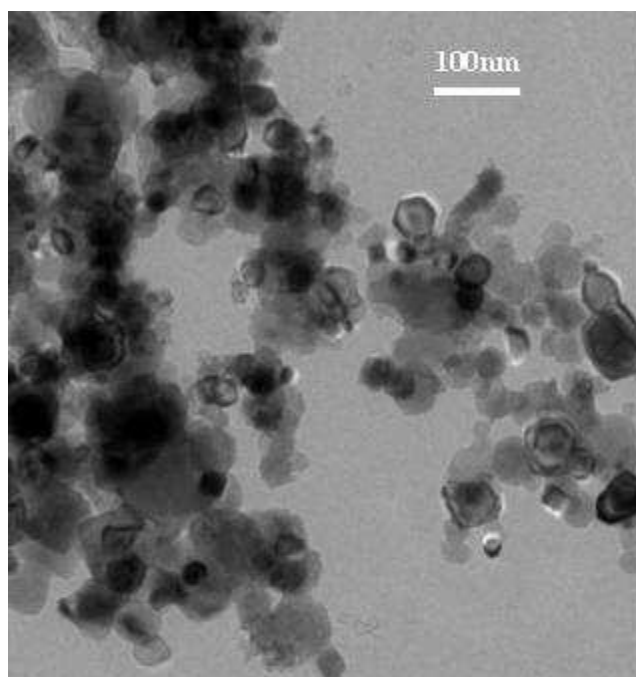
Zeta Potential: -26mV

Bulk density: 0.10g/cm³

Purity: >99%

Color: Black

Manufacturing Method: Plasma vapor phase
synthesis method



B	C	O	N	Si	Fe	Ni
77.48%	21.52%	<0.1%	<0.08%	<0.1%	<0.1%	<0.01%

Boron Carbide Nanoparticles B4C Product Features:

1. The nano-boron carbide powder possesses high purity, narrow range particle size distribution, larger specific surface area and so on; 2. nano-boron carbide melting point up to 2350°C, boiling point higher than 3500°C, hardness up to 9.3, flexural strength 400Mpa; 3. the product does not react with acid and alkali solution. It has high chemical potential and is one of the most stable materials to acid. Also, it has anti-oxidation, high temperature resistant, high strength, high grinding efficiency, high hardness, high elastic modulus, high wear-resistant, and good self-lubrication characteristics; 4. nano-boron carbide has a larger thermal neutron capture cross section, with excellent neutrons absorption property and good anti-radiation performance.

Boron Carbide Nanoparticles B4C Storage Conditions:

Damp reunion will affect its dispersion performance and using effects, therefore, this product should be sealed in vacuum and stored in cool and dry room and it should not be exposure to air. In addition, the product should be avoided under stress.



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انواع نانو ذرات صنعتی و آزمایشگاهی

Manganese Oxide Nanoparticles (Mn_2O_3)

Purity: 99.2%

APS: 30nm

SSA: $150m^2/g$

Bulk Density: $\sim 0.35 g/cm^3$

Morphology: spherical

Color: Dark Brown



Manganese Oxide Nanoparticles (Mn_2O_3) Applications:

Electronic components, bleaching agent, catalyst, voltage sensitive material...

Manganese Oxide (Mn_2O_3) Nanopowder Certificate of Analysis

K	Si	Ca	Co	Cu	Fe	Mg	Na	P	Sr	Zn
17.3 $\mu g/g$	21.5 $\mu g/g$	88.6 $\mu g/g$	0.02%	28.9 $\mu g/g$	0.02%	108 $\mu g/g$	0.16%	0.03%	1.53 $\mu g/g$	33.4 $\mu g/g$



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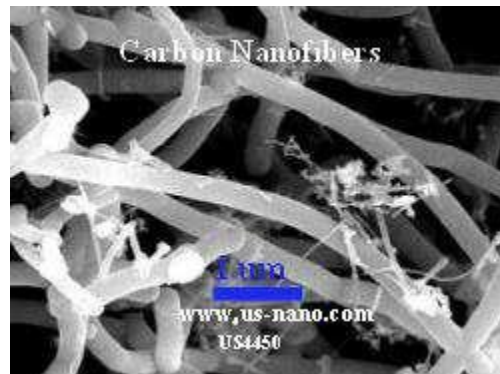
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انواع نانو ذرات صنعتی و آزمایشگاهی

Carbon Nano Fibers:

Purity: > 95 wt% carbon nano fibers (from TGA & TEM)
 Outside Diameter: 200-600 nm
 Carbon NanoFibers Length: 5-50 μm (TEM)
 SSA: > 18 m^2/g (BET) Ash: < 5 wt% (TGA)
 Color: Black
 Electrical Conductivity: >100 s/cm Tap Density: 0.043 g/cm^3
 True Density: 2.1 g/cm^3
 Manufacturing Method: CVD



Carbon NanoFibers Application

Potential applications of carbon nanofibers

are: (1) additives in polymers; (2) catalysts; (3) electron field emitters for cathode ray lighting elements; (4) flat panel display; (5) gas-discharge tubes in telecom networks; (6) electromagnetic-wave absorption and shielding; (7) energy conversion; (8) lithium-battery anodes; (9) hydrogen storage; (10) nanotube composites (by filling or coating); (11) nanoprobe for STM, AFM, and EFM tips; (12) nanolithography; (13) nanoelectrodes; (14) drug delivery; (15) sensors; (16) reinforcements in composites; (17) supercapacitor.



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انواع نانو ذرات صنعتی و آزمایشگاهی

Nano_Zeolite Y Type

Quick Details

Classification:

Chemical Auxiliary Agent

CAS No.:

1318-02-1

Other Names:

Y molecular sieve

MF:

$\text{SiO}_2/\text{Al}_2\text{O}_3$

EINECS No.:

215-691-6

Purity:

99%

Place of Origin:

Hungary

Type:

Adsorbent

Adsorbent Variety:

Molecular Sieve

Usage:

Coating Auxiliary Agents, Electronics Chemicals, Leather Auxiliary Agents, Paper Chemicals, Petroleum Additives, Plastic Auxiliary Agents, Rubber Auxiliary Agents, Surfactants, Textile Auxiliary Agents, Water Treatment Chemicals, Catalyst and catalyst auxiliaries

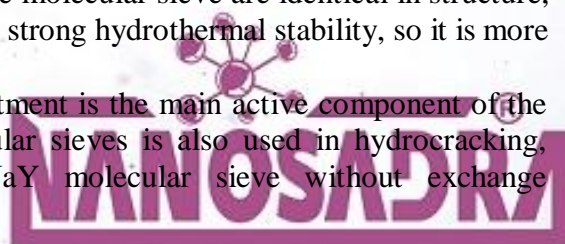
Model Number:

QYY

Product Description

Y-type molecular sieve is similar to diamond dense-pile Hexagonal crystal family structure. If the Beta cage is used as the structural unit to replace the carbon atom node of diamond, and the adjacent two Beta cages are connected by the hexagonal cage, that is, the five Beta cages are connected together by the four hexagonal cages, with one Beta cage at the center and the other four Beta cages at the apex of the regular tetrahedron, an octahedral zeolite crystal structure is formed. The Y-type molecular sieve structure can be obtained by continuing to connect with this structure. In this structure, the large cage formed by the Beta cage and the hexagonal cage is the Faujasite cage, and the window hole they communicate with is a twelve-membered ring with an average effective pore diameter of 0.74 nm, which is the pore diameter of the Y-type molecular sieve. X-type molecular sieve and Y-type molecular sieve are identical in structure, but Y-type molecular sieve has high Si/Al ratio and strong hydrothermal stability, so it is more widely used.

The Y-type molecular sieve modified by post-treatment is the main active component of the sulfurized catalytic cracking catalyst-type molecular sieves is also used in hydrocracking, isomerization and alkylation catalysts. The NaY molecular sieve without exchange modification is an efficient desiccant.



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The Y Type Molecular

Item	Unit	Index
Relative Crystallinity	%	89—93
Total BET	m ² /g	690—7200
Pore Volume	ml/g	0.35
Silica-Alumina Ratio	/	4.8—5.1
Na ₂ O	Wt%	11—12
LOI	Wt%	18—22
D50	nm	50



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ZSM-5 NANO_Zeolite , ZSM 5 Molecular Sieve With High Silica To Alumina Ratio

Detailed Product Description (NANO_Zeolite)

Product Name:	NANO_Zeolite, ZSM-5	Mole Ratio:	15-1000
Application :	Catalyst Carrier	Cl-:	Max90ppm
BET:	330-360	D30:	25nm
D50:	50 nm		

Specifications

Mole Ratio: 15-1000 Nominal Cation Form:

Ammonium/Hydrogen Na₂O Weight %: 0.05 Surface

Area, m²/g: 340

Description:

ZSM-5 zeolite properties

Thermal stability

High thermal stability of ZSM-5 zeolite. This is caused by a skeleton in a stable five-membered ring structure and a high silica to alumina ratio. For example, the sample calcined at 850 After 2 hours, the crystal structure unchanged. Even can withstand high temperature of 1100

. So far, ZSM-5 zeolites are known to one of the highest qualitative hot temperature. Therefore, it is used in high-temperature process is particularly suitable. For example, use it as a hydrocarbon cracking catalyst, regeneration of the catalyst can withstand passage of time.

Acid resistance

ZSM-5 zeolite has good acid resistance; it is resistant to various acids except hydrofluoric acid.

Steam stability

Wang, IKai other studies have shown that when other zeolites by steam and hot water, and their general structure is destroyed, leading to irreversible deactivation. The Mobil company with ZSM-5 as the conversion of methanol (water is one of the major product) catalyst. This suggests that ZSM-5 to water vapor with good stability. 540 lower partial pressure of 22mmHg steaming column and HY zeolite HZSM-5 after 24 hours, a crystallinity of HZSM-5 and about 70 percent of fresh catalyst, but under the same conditions, HY zeolite skeleton almost completely damage.

Hydrophobic

ZSM-5 having a high silica to alumina ratio, the smaller the surface charge density. The water molecule is polar, so you will not ZSM-5 is adsorbed. Although water molecules smaller than the diameter of n-hexane, but the amount of adsorption of n-hexane ZSM-5 is generally greater than water.

Easy to coke

ZSM-5 V-shaped aperture effective, pore size and bending, preventing a large condensate formation and accumulation. Meanwhile, ZSM-5 framework is no greater than the bore of the cavity (cage) exist, so limiting the formation of large molecules from the secondary condensation reactions. So that the possibility of ZSM-5 catalyst coke is reduced. ZSM-5 for an alkyl aromatics into the tunnel barrier is formed, and thus the reaction process it cannot continue to react in smaller pores, the final condensation formed coke. ZSM-5 so much slower than the rate of coke deposition and Y-type mordenite, difference of almost two orders of magnitude. Capacity of ZSM-5 zeolite carbon content is higher.

Excellent shape-selective selectivity

Zeolite molecular sieve as catalyst, only smaller than the hole crystal molecules can catalyze the reaction out of control pore size crystalline zeolite suffering zeolite catalyst size and shape of reactant and product molecules showed great selectivity. Pore system of ZSM-5 zeolite having a 10-MR constituted medium size orifice diameter, it has a good shape-selective selectivity.



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مرکز نانو صدرا



انواع نانو ذرات
صنعتی و آزمایشگاهی

Hydroxyapatite Nano Powder

Chemical Composition: $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$

Average Particle Size: 25 nm

Purity: 97%

Color: White

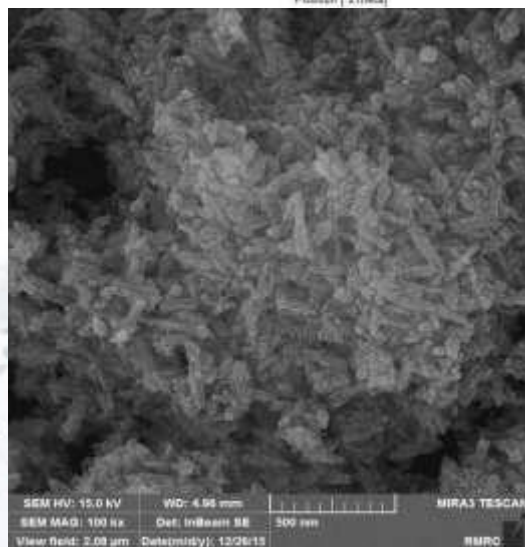
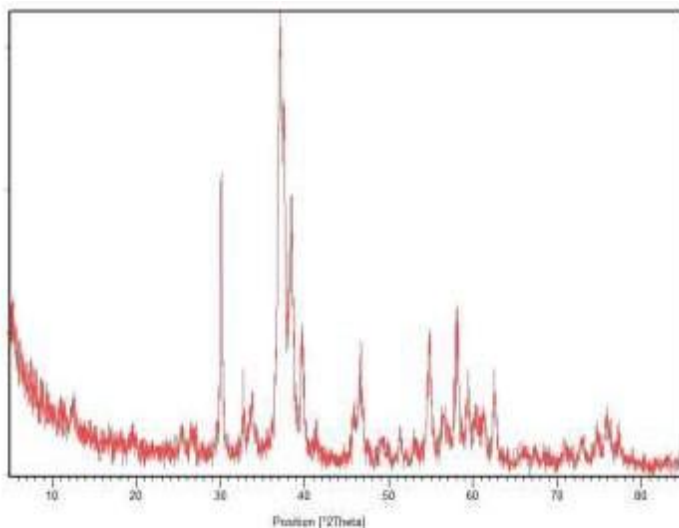
Morphology: Needle-like

Density: 3.1 g/cm³

Heavy metals<1

MgO+Al₂O₃+ Fe₂O₃<1

L.O.I : 1.88%



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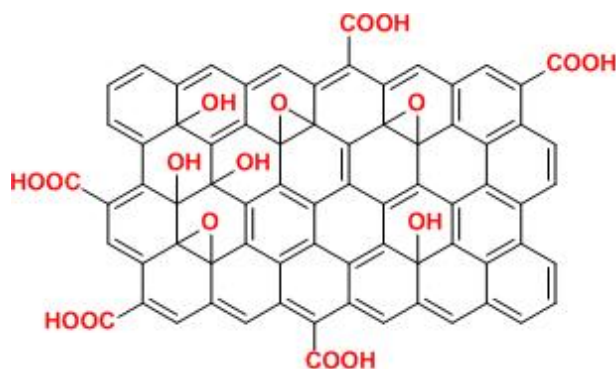
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Graphene oxide



Product Name: Graphene oxide - sheets

Product Number: 001010110

Formula: $C_xO_yH_z$

Test Specification

Appearance (Color): Black

Appearance (Form): Powder or Flakes

X-Ray: Diffraction Conforms to Structure

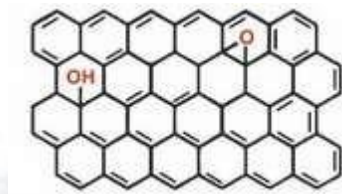
Raman: Conforms to Structure

Infrared spectrum: Conforms to Structure

TEM: Conforms to Structure

SEM: Conforms to Structure

Reduced graphene oxide



Product Name: Reduced graphene oxide

Product Number: 001010111

Formula: $C_xO_yH_z$

Test Specification

Appearance (Color) Black

Appearance (Form) Powder

X-Ray Diffraction Conforms to Structure



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انواع نانو ذرات صنعتی و آزمایشگاهی

Infrared Spectrum Conforms to Structure

Fe₃O₄ NPs

Product Name: Magnetic nanoparticles (MNP), 100 nm diameter

Product Number: 00101011

CAS Number: 1317-61-9

Formula: Fe₃O₄

Weight Formula: 231.53 g/mol

Test Specification

Appearance (Color): Black

Appearance (Form): Nanopowder (Spherical)

X-Ray: Diffraction Conforms to Structure

Infrared spectrum: Conforms to Structure

Particle Size (SEM) 100 nm

Ag NPs

Product Specification

Product Name: Silver nanopowder, 100 nm diameter

Product Number: 00101012

CAS Number: 7440-22-4

Formula: Ag

Formula Weight: 107.87 g/mol

Test Specification

Appearance (Color): Grey

Appearance (Form): Powder

Particle size 100 nm

X-Ray: Diffraction Conforms to Structure

SEM: Conforms to Structure

Au NPs

Product Name: Gold – nanopowder, 100 nm diameter

Product Number: 00101013

CAS Number: 7440-57-5

Formula: Au

Formula Weight: 196.97 g/mol

Test Specification

Appearance (Color): Gold-Brown to Brown

Appearance (Form): Powder

Particle size 100 nm

SEM: Conforms to Structure



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X-Ray: Diffraction Conforms to Structure

Au NPs

Product Name: Gold-nanopowder - 40 nm diameter, stabilized suspension in sodium citrate solution

Product Number: 00101014

Formula: Au

Formula Weight: 196.97 g/mol

Test Specification

Appearance (Color): Depending on the size

Appearance (Form): Suspension

Particles size: 40 nm

Absorption Max: 529 – 533 nm

SEM: Conforms to Structure

Fe₃O₄@SiO₂

Product Name: Silica - coated Magnetic nanoparticles, 100 nm diameter

Product Number: 00101016

Formula: Fe₃O₄@SiO₂

Test Specification

Appearance (Color) Brown

Appearance (Form) Powder

Composition Confirmed

Surface Group: SiO₂

Particle size 100 nm

Infrared spectrum Conforms to Structure

X-Ray Diffraction Conforms to Structure

Fe₃O₄@Arg

Product Name: Arginine - coated Magnetic nanoparticles, 100 nm diameter

Product Number: 00101017

Formula: Fe₃O₄@Arg

Test Specification

Appearance (Color) Darck brown

Appearance (Form) Powder

Composition Confirmed

Functional Group: Arg

Particle size (TEM) 100 nm

Infrared spectrum Conforms to Structure

X-Ray Diffraction Conforms to Structure



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انواع نانو ذرات صنعتی و آزمایشگاهی

Fe₃O₄@PEG

Product Name: Polyethylene glycol-coated Magnetic nanoparticles, 100 nm diameter

Product Number: 00101018

Formula: Fe₃O₄@PEG

Test Specification

Appearance (Color) Brown

Appearance (Form) Powder

Composition Confirmed

Functional Group: PEG

Particle size 100 nm

SEM Conforms to Structure

Infrared spectrum Conforms to Structure

X-Ray Diffraction Conforms to Structure

Fe₃O₄@DEX

Product Name: Dextran-coated Magnetic nanoparticles, 100 nm diameter

Product Number: 00101019

Formula: Fe₃O₄@DEX

Test Specification

Appearance (Color) Brown

Appearance (Form) Powder

Composition Confirmed

Functional group: Dextran

Particle size 100 nm

SEM Conforms to Structure

Infrared spectrum Conforms to Structure

X-Ray Diffraction Conforms to Structure



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