Titanium Dioxide TiO_2

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Nanocrystalline Colloidal Titanium Dioxide Paste

TiO_2

Titanium dioxide (TiO_2) can be used in the creation of photoelectrodes for the production of Dye Sensitized, Perovskite and other solid state solar cells.

Improved solar efficiency

G24 Power offers a range of transparent and opaque colloid TiO_2 pastes with a narrow particle size distribution for improved solar conversion efficiency. These performance improvements have been verified by École polytechnique fédérale de Lausanne.

Characteristics

Characteristics of our TiO_2 include high anatase purity, variable light trapping characteristics with transparent or opaque coating options. Our range includes colloidal TiO_2 pastes that are aqueous based for safer handling and improved environmentally friendliness. In addition our TiO_2 pastes do not require any post $TiCl_4$ treatment.

Particle & pore sizes

Tunable particle sizes from 18 – 30 nm are available upon request. Formulations can also be targeted to achieve the tunable pore volume needed for emerging solid state solar cells based on Perovskite and other light absorbers.

Deposition methods

Our pastes can be used in laboratory and mass-production nanoporous deposition techniques including screen printing, doctor-blading and spin coating.

Benefits

- Improved solar conversion efficiency*
- High purity < 10ppm of Fe, K and Na
- Crystal purity 96-98% anatase
- A range of aqueous based for safer handling
- Near zero volatile organic compounds
- Does not require any post $TiCl_4$ treatment
- Achieve high performance using a single coating step with opaque TiO_2 colloids
- Removes the need for making mechanically weak secondary light scattering layer.

*Verified by independent tests by École polytechnique fédérale de Lausanne.

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TiO_2 product selector

Produce code	Particle size	Pore size	Scatter particle size	Transparency	Deposition Method
18TA	18nm	12nm	-	Transparent	Doctor blading, spin coating
22TB	22nm	22nm	-	Transparent	Doctor blading, spin coating
18OB	18nm	30nm	>150nm	Opaque	Doctor blading, spin coating
22OB	22nm	35nm	>150nm	Opaque	Doctor blading, spin coating
18TS	18nm	20nm	-	Transparent	Screen printing
22TS	22nm	27nm	-	Transparent	Screen printing
18OS	18nm	28nm	>150nm	Opaque	Screen printing
22OS	22nm	35nm	>150nm	Opaque	Screen printing

Transparent TiO_2 – Deposition by doctor blading or spin coating

18TA	
Anatase particle size	18-20nm
Concentration	~16% wt.
Medium	Aqueous, polymeric binders
Acidity	pH <1
Specific surface area	75-85m^2/g

Paste containing 16% wt. of 18-20 nm titanium dioxide (TiO_2) anatase particles. The resulting layer after sintering is transparent.

Transparent TiO_2 paste for applications that require a transparent sintered titania film with a large surface volume ratio.

22TB	
Anatase particle size	22-25nm
Concentration	~16% wt.
Medium	Aqueous, polymeric binders
Acidity	pH <1
Specific surface area	65-75m^2/g

Paste containing 16% wt. of 22-25 nm titanium dioxide (TiO_2) anatase particles. The resulting layer after sintering is transparent.

Transparent TiO_2 paste for applications that require a transparent sintered titania film with a large surface volume ratio.

Transparent TiO_2 – Deposition by doctor blading or spin coating

18OB	
Anatase particle size	18-20nm
Scatter particle size	>150nm
Concentration	~16% wt.
Medium	Aqueous, polymeric binders
Acidity	pH <1
Specific surface area	60-70m^2/g

Paste containing 16% wt. of 18-20 nm titanium dioxide (TiO_2) anatase particles mixed with larger scattering titania particles.

Opaque TiO_2 paste for applications that do not require transparency.

22OB	
Anatase particle size	22-25nm
Scatter particle size	>150nm
Concentration	~16% wt.
Medium	Aqueous, polymeric binders
Acidity	pH <1
Specific surface area	50-60m^2/g

Paste containing 16% wt. of 22-25 nm titanium dioxide (TiO_2) anatase particles mixed with larger scattering titania particles.

Opaque TiO_2 paste for applications that do not require transparency.

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Transparent TiO_2 – Deposition by screen printing

18TS	
Anatase particle size	18-20nm
Concentration	~18% wt.
Medium	Solvent a-Terpineol
Acidity	pH <4
Specific surface area	75-85m^2/g

Paste containing 18% wt. of 18-20 nm titanium dioxide (TiO_2) anatase particles. The resulting layer after sintering is transparent.

Transparent TiO_2 paste for applications that require a transparent sintered titania film with a large surface volume ratio.

22TS	
Anatase particle size	22-25nm
Concentration	~18% wt.
Medium	Solvent a-Terpineol
Acidity	pH <4
Specific surface area	65-75m^2/g

Paste containing 18% wt. of 22-25 nm titanium dioxide (TiO_2) anatase particles. The resulting layer after sintering is transparent.

Transparent TiO_2 paste for applications that require a transparent sintered titania film with a large surface volume ratio.

Opaque TiO_2 – Deposition by screen printing

18OS	
Anatase particle size	18-20nm
Scatter particle size	>150nm
Concentration	~18% wt.
Medium	Solvent a-Terpineol
Acidity	pH <4
Specific surface area	60-70m^2/g

Paste containing 18% wt. of 18-20 nm titanium dioxide (TiO_2) anatase particles mixed with larger scattering titania particles.

Opaque TiO_2 paste for applications that do not require transparency.

22OS	
Anatase particle size	22-25nm
Scatter particle size	>150nm
Concentration	~18% wt.
Medium	Solvent a-Terpineol
Acidity	pH <4
Specific surface area	50-60m^2/g

Paste containing 18% wt. of 22-25 nm titanium dioxide (TiO_2) anatase particles mixed with larger scattering titania particles.

Opaque TiO_2 paste for applications that do not require transparency.

Available sizes

Titanium dioxide (TiO_2) pastes are available in 10g, 20g, 50g, 100g, 200g, 500g and 1kg batches available as standard. Bulk sizes also available upon request.

Customized particle sizes

G24 Power can also accommodate requests for the manufacture of Titanium Dioxide (TiO_2) with customized particle sizes from 18-30nm.

Other metal oxides

Available on request - other metal oxides and nanomaterials manufactured by hydrothermal process to customer specification, including Aluminium oxide (Al_2O_3) and Zirconium oxide (ZrO_2).

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