

Nanoparticle, Nano Colloids Oxide Materials (ZrO₂, CeO₂, TiO₂, Fe₃O₄, WO₃ etc...)

We have developed GS NP Oxide series as Nanoparticle, Nano Colloids Oxide Materials, based on years of our experience in the field of organic pigment, functional material manufacturing technology, industrial powder fine grinding, nano size particle dispersion technique. GS NP Oxide Series are made based on either dispersion or synthetic technology. When metal, semiconductor, oxides becomes in a range of nano size (0.5 – 30 nm), they exhibits different physical and chemical properties compared to bulk materials. They behave in a different way even they are same materials when particle size is extremely small, such as

1. Quantum size effect
2. Electronic devices can be thinner and smaller
3. High activity due to enhanced surface area
4. Enhancement of solubility, diffusion speed in a liquid
5. Enhancement of memory function
6. Melting, sintering temperature can be lowered
7. Enhancement of emission intensity
8. Enhancement of catalysis, new reaction pathway

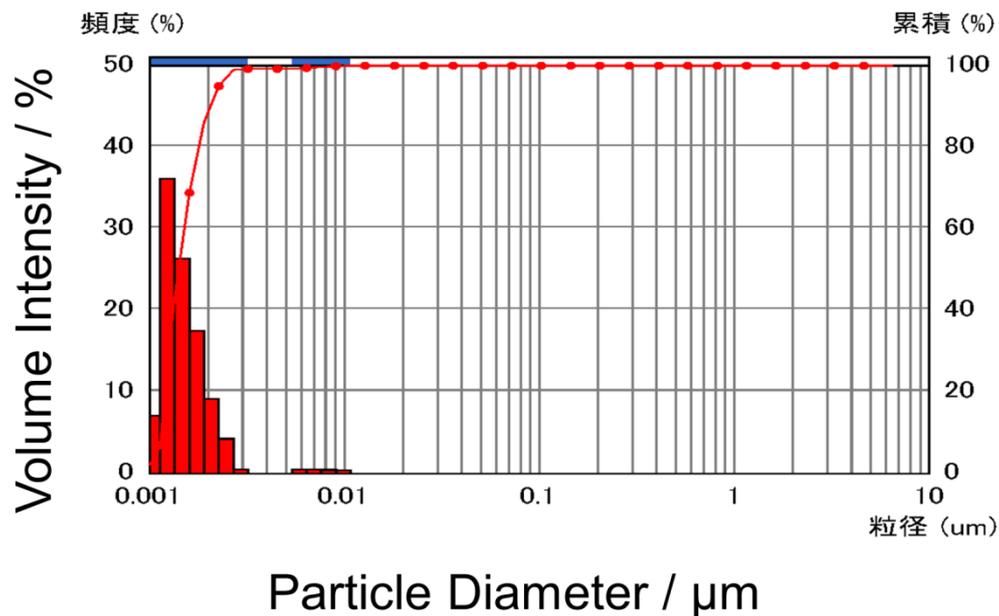
These phenomenon are due to various influence of quantum size effect including high surface area, interface area, enhancement of diffusion speed, solubility of molecules.

For rapidly developing modern scientific technologies, various types of devices have tendency to become smaller, lighter, finer resolution, higher density. Utilizing these properties, nano particle, nano colloids oxide materials can be applied for modifier for nano sized structural ceramic, thin film synthesis, coating, materials for rechargeable battery, fuel cell, solar cell, fluorescent material, encapsulation material, filler for various types of films, paint, catalyst, pigment,

absorbing material, abrasive material, electronic material, magnetic, storage material, sensor, cosmetics, drug delivery, artificial tissue etc... so many applications can be expected.

In our company, to correspond to imminent society demands for these nano particles, nano colloids materials, we have been developing and manufacturing various types of oxide materials.

Main solvent is usually water, although we can replace with other organic solvent if customer requests.



For example, above figure indicates the particle distribution of water based CeO₂ nanoparticle, nano colloids. Based on this, we can also prepare ink, slurry for various type of customer purpose. Below table presents the basic properties of water based CeO₂ nano particles colloids.

GS TECHNICAL INFORMATION

FUJI NP CeO₂ series	0.2 – 5.0 %
Resin and additive	0.1 – 4.0 %
Water or Organic Solvent (Terpineol, NMP, MIBK, Toluene, BCA etc...)	90.0 - 99.0 %
Viscosity	1.0 – 80 mPa·s/ 25 °C (Viscosity can be modified for customer's request for their printing method)
Particle size of GS NP CeO₂ series	0.5 nm – 5.0 nm

It is critical when nano particle, colloids are mixed with various types of additive, resin, solvent etc.. in order to make ink, slurry. Because sometimes they can deteriorates the stabilized nano particle dispersion in a liquid. However, based on our long termed liquid dispersion technologies, we will try to prepare good ink, slurry for customer demands. We are also now developing SiO₂, Al₂O₃, ZnO etc... besides our current items ZrO₂, CeO₂, TiO₂, Fe₃O₄, WO₃ nano particle, colloids.

Please consult with us including any technical detail anytime.

Thank you in advance.

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