

ZrO₂ / YSZ

Characteristics

zilight
MATHYM

Nano-dispersions (Typical values)	ZrO ₂	YSZ
Chemical formula	ZrO ₂	ZrO ₂ - 1 to 10 mol% Y ₂ O ₃
Crystal structure	Monoclinic or tetragonal	Tetragonal ⁽¹⁾
Morphology	Nearly spherical, needle-like, square bundles	Nearly spherical ⁽²⁾
Average Particle Size (nm)	3 - 90	5 - 20
Density* (g/cm ³)	5.7 (Monoclinic ZrO ₂)	6.1 (3YSZ)
Refractive index	≥ 2.14	≥ 2.10
Dispersion solid content (wt.%) <i>Depending on dispersion medium</i>	Up to 70	Up to 70
Sintering temperature (°C)	-	950 - 1200

*Theoretical

⁽¹⁾ ⁽²⁾ Some grades contain a small fraction of:⁽¹⁾ monoclinic particles⁽²⁾ anisotropic particles

> zilight® doped and undoped Zirconia nanoparticles in suspension **main benefits:**

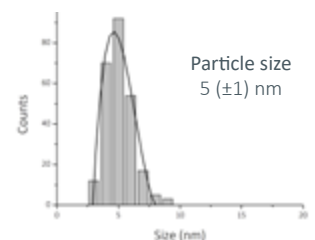
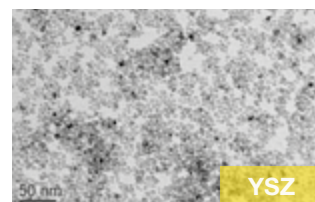
- Smallest nanoparticles on the market
- High transparency nanocomposites
- Low viscosity at high particle loading

The **type of functionalization** provided strongly depends on dispersion medium & application requirements.

> Final ceramics made with YSZ nanoparticles in suspension **main characteristics:**

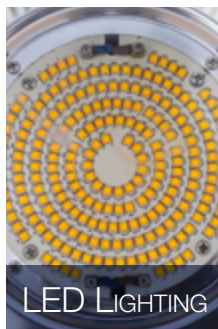
- Sintered at low temperature
- Fine-grained
- Highly translucent

> Example of **particle morphology & size distribution** - YSZ



Applications

> Our dispersions are designed to **enhance optical, thermal and mechanical performances** of your material. Our nanozirconia shows a **very high refractive index**, which is your best ally in the design of high-end optical materials. It will be your favorite nanofiller for encapsulation materials, **improving visible LED devices**. It can also be used as a **sintering additive** for high-end ceramics, or as an **optical coating** for display materials.



PRODUCT DESIGN

Our nano-dispersions are available dispersed in various solvents & resins:

- Water, alcohol, polyol, acetone, MEK
- Selected organic solvents
- Methacrylate-based dental resin
- Silicone oils, customer specific monomer mixture, e.g.: epoxy & fluorene (under development)



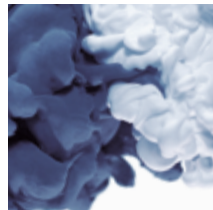
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