

YbF₃



Characteristics

Typical values	YbF ₃ nano-dispersions
Chemical formula	YbF ₃
Crystal structure	Orthorhombic
Average Particle Size (nm)	20, 40 & 60
Density* (g/cm ³)	8.2
Refractive index*	1.53
Dispersion solid content (wt.%) <i>Depending on dispersion medium</i>	Up to 70

*Theoretical

Nano-dispersion Characteristics	Example 1	Example 2
Nanoparticles	YbF ₃	YbF ₃
Monomer	UDMA	TEGDMA
Solid content (wt.%)	30	50
Viscosity (Pa.s)	50	6.9
Shear rate (s ⁻¹)	1	1

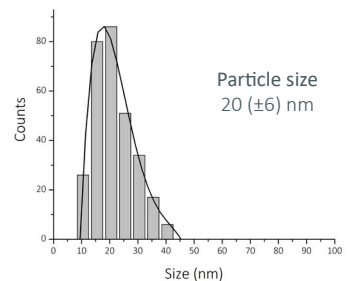
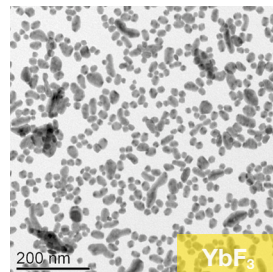
> **filyxio**[®] YbF₃ nanoparticles in suspension **main benefits:**

- High translucency of dental composites
- Higher depth of cure
- Low viscosity at high particle loading
- Improved flexural strength
- Higher filler load

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

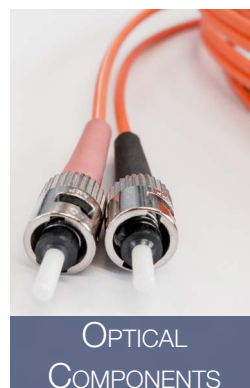


> Example of **particle morphology & size distribution** - YbF₃



Applications

> Our dispersions contain the **smallest YbF₃ nanoparticles** on the market and exhibit the **highest available solid contents**. We advise to use these products as **radiopacifying fillers** in dental composites. They are **compatible with all dental monomers**. YbF₃ nanoparticles can also be used for the manufacturing of **optical components**.



Our nano-dispersions are available dispersed in a variety of solvents & resins:

- Water
- Alcohol
- Polyol
- Acetone
- Methacrylate-based dental resin
- Custom solvent



ZrO₂ / YSZ

Characteristics

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

➤ Doped and undoped Zirconia nanoparticles in suspension
main benefits:

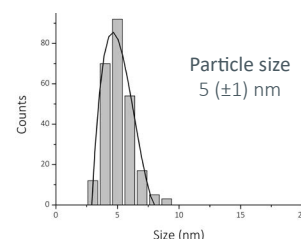
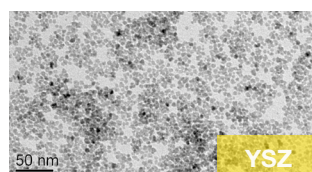
- Smallest nanoparticles on the market
- High transparency nanocomposites
- Low viscosity at high particle loading

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

➤ Final ceramics made with YSZ nanoparticles in suspension
main characteristics:

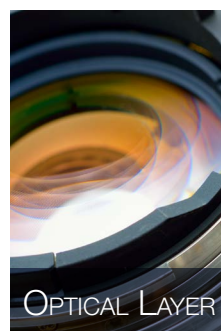
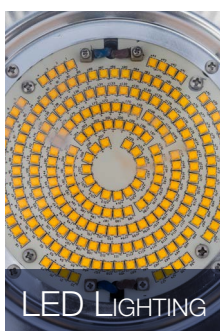
- Sintered at low temperature
- Fine-grained
- Highly translucent

➤ 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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