



NANO DISPERSION | FILYXIO®

TRANSLUCENCY - RADIOCAPACITY - LOW VISCOSITY

Characteristics



Typical values	YbF ₃ nano-dispersions
Chemical formula	YbF ₃
Crystal structure	Orthorhombic
Average Particle Size (nm)	20 & 40
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
Radiopacity (mm Al)	2.5	5.4

> **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

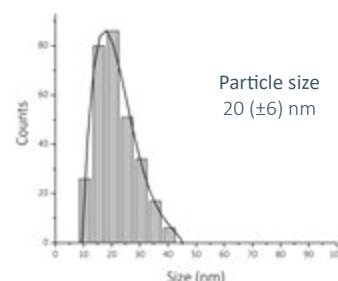
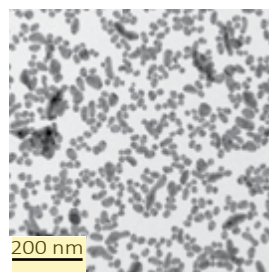
*The **type of functionalization** provided strongly depends on dispersion medium & application requirements.*

YbF₃ 20 nm



50 wt.%
in monomer

> 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**.



PRODUCT DESIGN

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

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

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NANO DISPERSION | ZILIGHT[®]

TRANSPARENCY - REFRACTIVE INDEX - LOW VISCOSITY

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⁾
Average Particle Size (nm)	6 - 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

*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.*

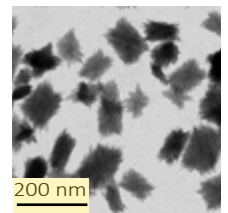
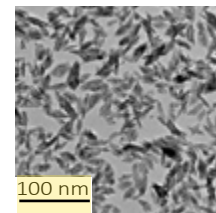
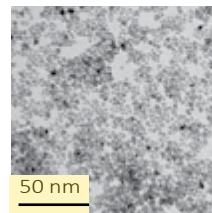
> Final ceramics made with YSZ nanoparticles in suspension **main characteristics:**

- Sintered at low temperature (950- 1200 °C)
- Fine-grained
- Highly translucent

> Example of thin films optical properties

Composition	Solid loading (wt%)	Film thickness (μm)	Haze (%)
8YSZ in HDDA	50	3.2	0.2
8YSZ in HDDA	30	3.4	0.1
Pure HDDA	0	2.5	0.1

> 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 optical materials. It can be used as a **sintering additive** for high-end ceramics or as a **filler** for refractive index enhancement of optical coatings (i.e. ophtalmic or display). It can also be used for mechanical reinforcement or as lubricants additives.



PRODUCT DESIGN

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

- Water, alcohol, polyol, acetone, MEK
- Selected organic solvents
- Methacrylate-based dental resin
- Water based resins



Baikowski[®]