

### **Characteristics**

Typical values	YbF₃ nano-dispersions	
Chemical formula	YbF₃	
Crystal structure	Orthorhombic	
Average Particle Size (nm)	20, 40 & 60	
Density* (g/cm <sup>3</sup> )	8.2	
Refractive index*	1.53	
Dispersion solid content (wt.%) Depending on dispersion medium	Up to 70	

\*Theoretical

Nano-dispersion Characteristics	Example 1	Example 2
Nanoparticles	YbF₃	YbF₃
Monomer	UDMA	TEGDMA
Solid content (wt.%)	30	50
Viscosity (Pa.s)	50	6.9
Shear rate (s <sup>-1</sup> )	1	1

#### YbF<sub>3</sub> 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 - YbF<sub>3</sub>





# Applications

> Our dispersions contain the smallest YbF<sub>3</sub> 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. YbF<sub>3</sub> nanoparticles can also be used for the manufacturing of optical components.





Optical Components





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

- Water
- Alcohol
- Polyol
- Acetone
- Methacrylatebased dental resin
- Custom solvent



main benefits:

main characteristics: Sintered at low temperature

 Fine-grained Highly translucent

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

## **Characteristics**

Nano-dispersions (Typical values)	ZrO₂	YSZ
Chemical formula	ZrO₂	ZrO₂ - 1 to 10 mol% Y₂O₃
Crystal structure	Monoclinic or tetragonal	Tetragonal <sup>(1)</sup>
Morphology	Nearly spherical, needle-like, square bundles	Nearly spherical <sup>(2)</sup>
Average Particle Size (nm)	3 - 90	5 - 20
Density* (g/cm³)	5.7 (Monoclinic ZrO₂)	6.1 (3YSZ)
Refractive index	≥ 2.14	≥ 2.10
Dispersion solid content (wt.%) Depending on dispersion medium	Up to 70	Up to 70
Sintering temperature (°C)	-	950 - 1200

\*Theoretical

<sup>(1) (2)</sup> Some grades contain a small fraction of: <sup>(1)</sup> monoclinic particles <sup>(2)</sup> anisotropic particles

### Applications

Our dispersions are designed enhance optical, thermal and to 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.









Sales Representative in China

China | Shanghai | &+86 21.6289.2883

#### PRODUCT DESIGN

Size (nm)

Particle size

5 (±1) nm

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

- Water, alcohol, polyol, acetone, MEK .
- Selected organic solvents

> Doped and undoped Zirconia nanoparticles in suspension

The type of functionalization provided strongly depends on

> Final ceramics made with YSZ nanoparticles in suspension

> Example of particle morphology & size distribution - YSZ

dispersion medium & application requirements.

- Methacrylate-based dental resin
- Silicone oils, customer specific monomer mixture, e.g.: epoxy & fluorene (under development)

#### sales@baikowski.com

Baikowski<sup>®</sup> SA France | Poisy | &+33 4 50 22 69 02

> Baikowski® Malakoff Inc. USA | Malakoff (TX) | &+1 903-489-1910

Mathym<sup>®</sup> SAS France | Lyon | &+33 4 78 83 72 93

> Baikowski<sup>®</sup> International Corp. USA | Charlotte (NC) | &+1 704-587-7100

Baikowski

www.baikowski.com

Baikowski<sup>®</sup> Korea Co, Ltd. Korea | Seoul | &+82 255.281.97

Baikowski<sup>®</sup> Japan Co, Ltd. Japan | Chiba | &+81 474.73.8150

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