

We also fabricate spheres to order made from crystals or glass supplied by customer.

## PRECISION OPTICAL SPHERES FOR ALL FIBER OPTIC SYSTEMS

Except for ruby and sapphire, (see page 3), crystal and glass spheres are made to order, involving an eventual tooling charge and minimum order quantity. Glass type as per glass producer's specifications selected by the customer. (Eg. Schott or Corning).

Crystal	Sapphire	Rutile	Spinel	Quartz	YAG	Cubic Zirconia	Silicon
	Al <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	MgO x Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Y <sub>2.97</sub> Nd <sub>0.03</sub> Al <sub>5</sub> O <sub>2</sub>	ZrO <sub>2</sub> Si	
	hexagonale rhomboedrique	tétragonale	cubique				
Density	3.99 - 3.98	4.25	3.61	2.2	4.55	5.65	2.33
Fusion temperature	2050 °C	1825 °C	2030 - 2060 °C	1900 °C	1950 °C	2700 °C	1412 °C
Thermal expansion	5.4 x 10 <sup>-6</sup> /°C face perp. axe C 6.2 x 10 <sup>-6</sup> /°C face paral. axe C	9.19 x 10 <sup>-6</sup> /°C face perp. axe C 7.14 x 10 <sup>-6</sup> /°C face paral. axe C	5.9 x 10 <sup>-6</sup> /°C	0.51	6.9 x 10 <sup>-6</sup> 0-1		2.33
Hardness Mohs Knoop	9 1800 face perp. axe C 2200 face paral. axe C	7 900/950	8 1175/1380	5.5 - 6.5	8.0 - 8.5	8.5	7
Modulus of elasticity	4.4 x 10 <sup>2</sup> kg/cm <sup>2</sup> ± 1% Young E			4.41 x 10 <sup>6</sup> a20°C			
Refractive index n <sub>d</sub>	1.760 face perp. axe C 1.769 face paral. axe C	2.903 face perp. axe C 2.616 face paral. axe C	1.1727	1.45	1.823	2.177	3.498 at 1.3 microns
Dispersion factor	0.011	0.205 face perp. axe C 0.155 face paral. axe C	0.012			0.065	