## **Optical Glasses**

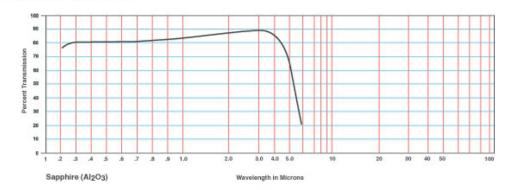


## **Optical material / crystals (Infrared)**

**Material / Specification:** Sapphire for 0.17µm to 5.5µm transmission (UV-C cut) **Range / Description:** OPMI-SAPPHIRE C

Glass-like. Sapphire (Al $_2O_3$ ) is an extremely hard material which is useful for UV, NIR and IR applications through 5 microns.

**Internal Transmittance** 



Internal Transmittance $t_i(\lambda)$ vs. wavelength $\lambda$											
λ,мкм	0.2	0.5	1.0	3.0	5.0	-		_		-	
τ <sub>i</sub> (λ)	0.79	0.97	0.97	0.97	0.45						—

Refractive Index n vs. Wavelength λ no = ordinary ne = extraordinary																
μm	0.22	0.24	0.28	0.33	0.44	0.51	0.63	0.75	0.82	1.32	2.24	3.33	4.34	5.26		
no	1.87	1.84	1.82	1.80	1.78	1.77	1.76	1.76	1.75	1.75	1.73	1.70	1.65	1.60	I	-
ne	1.86	1.83	1.81	1.79	1.77	1.76	1.75	1.75	1.75	1.74	1.72	1.69	1.65	1.59		

<b>Optical Properties</b>	
Transmission Range	0.17 to 5.5 µm
Refractive Index	No 1.75449; Ne 1.74663 at 1.06 μm
Refractive Loss	14% at 1.06 µm
Crystal/Class Structure	Trigonal (hex), R3c
Cleavage Plane	(1011),(1012), imperfect

Thermal Properties					
Thermal Expansion	5.6 (para) & 5.0 (perp) x 10 <sup>-6</sup> /K *				
Thermal Conductivity	27.21 W m <sup>-1</sup> K <sup>-1</sup> at 300K				
Melting Point	2040°C				
Specific Heat Capacity	419 J Kg <sup>-1</sup> K <sup>-1</sup>				

## Mechanical Properties

Density	3.97 g/cc				
Hardness (Knoop)	2000 with 2000g indenter				
Youngs Modulus	335 GPa				
Shear Modulus	148.1 GPa				
Bulk Modulus	240 GPa				
Poisson Ratio	0.25				
Elastic Limit	300 MPa (45,000 psi)				
Molecular Weight	101.96				

<b>Chemical Properties</b>	
Solubility	98 x 10 <sup>-6</sup> g/100g water

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www.knightoptical.com | info@knightoptical.com | usasales@knightoptical.com

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