

Sapphire lenses and balls

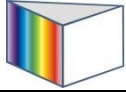
Chemically, **sapphire** is single crystal aluminum oxide (Al_2O_3) and is useful in a transmission range from 0.2 - 5.5 μ m, it is suitable for MWIR 3-5 μ m **thermal imaging** applications. Sapphire lenses are made from single crystal sapphire, they are ideal for demanding applications because of their extreme surface hardness, high thermal conductivity, high dielectric constant and resistance to common chemical acids and alkalis. Sapphire is the second hardest crystal next to diamonds and, because of their structural strength, sapphire windows can be made much thinner than other common dielectric windows with improved transmittance. Hangzhou Shalom EO provide the customized lenses and balls upon customer's request.



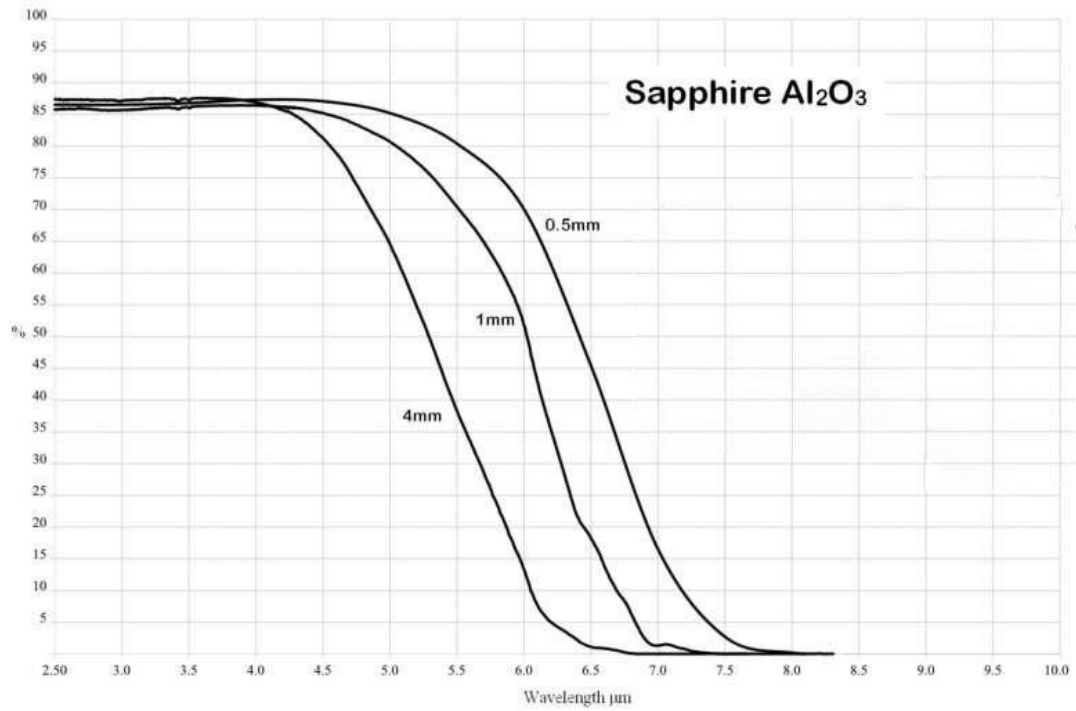
SPECIFICATIONS

Specifications	
Materials	Optical grade sapphire crystals
Diameter range	~300mm
Diameter Tolerance	+0.0/-0.2mm
Thickness Tolerance	+/-0.2mm
Surface Quality	60/40 S/D
Frings (N)	3
Irregularity (delta N)	1
Centration	3'
Chamfer	0.1-0.3mmx45 degree

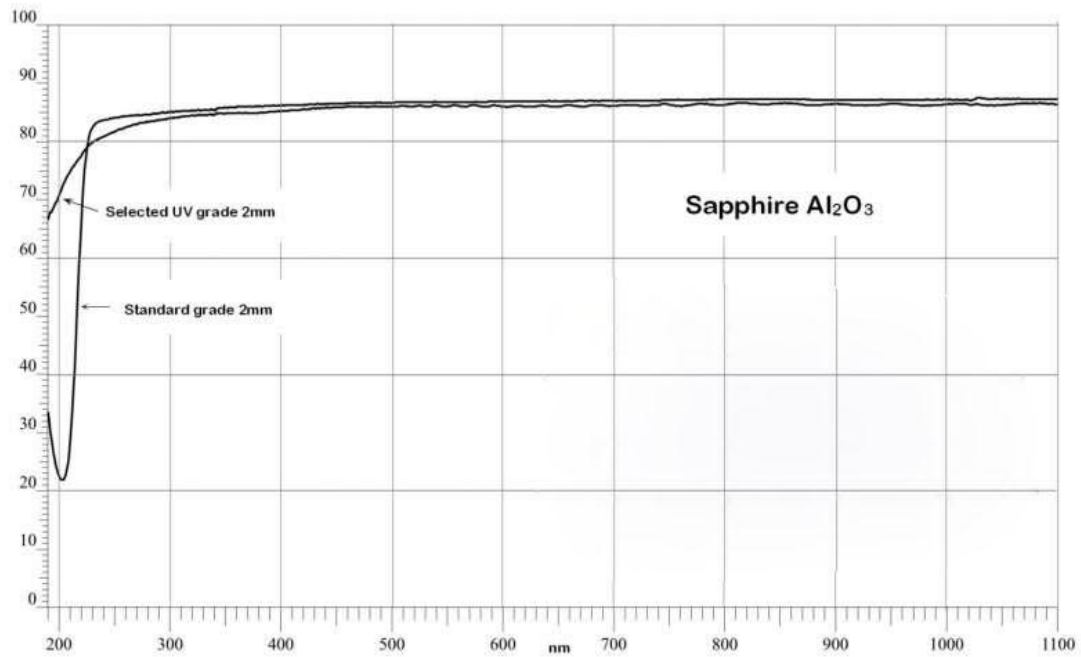
Note: the domes of other specifications is available upon customer's request.



1. Transmission of Sapphire at Infrared wavelength range (no coating)



2. Transmission of Sapphire at UV wavelength range (no coating)



Features

- **Extreme surface hardness and chemical resistance**
- **Transmits wavelength ranging from 0.2 to 5.5 μ m**
- **Suitable for application from UV to MWIR;**
- **Lenes and balls are available upon customer's request**

Basic Properties

Physical and optical properties	
Transmission Range	0.17 to 5.5 μ m
Refractive Index	No 1.75449; Ne 1.74663 at 1.06 μ m (1)
Reflection Loss	14% at 1.06 μ m
Absorption Coefficient	$0.3 \times 10^{-3} \text{ cm}^{-1}$ at 2.4 μ m (2)
Reststrahlen Peak	13.5 μ m
dn/dT	13.1×10^{-6} at 0.546 μ m (3)
dn/d μ = 0	1.5 μ m
Density	3.97 g/cc
Melting Point	2040 $^{\circ}$ C
Thermal Conductivity	27.21 W m ⁻¹ K ⁻¹ at 300K
Thermal Expansion	5.6 (para) & 5.0 (perp) $\times 10^{-6}$ /K *
Hardness	Knoop 2000 with 2000g indenter
Specific Heat Capacity	763 J Kg ⁻¹ K ⁻¹ at 293K (4)
Dielectric Constant	11.5 (para) 9.4 (perp) at 1MHz
Youngs Modulus (E)	335 GPa
Shear Modulus (G)	148.1 GPa
Bulk Modulus (K)	240 GPa
Elastic Coefficients	C11=496 C12=164 C13=115 C33=498 C44=148
Apparent Elastic Limit	300 MPa (45,000 psi)
Poisson Ratio	0.25
Solubility	98×10^{-6} g/100g water
Molecular Weight	101.96
Class/Structure	Trigonal (hex), R3c