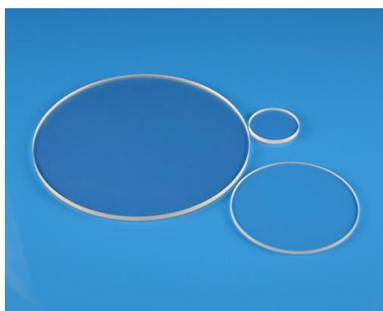


Sapphire (Al₂O₃) Crystals Windows



Features:

- Extreme Surface Hardness Chemical Resistance
- Transmits Wavelengths Ranging From UV to Mid-Infrared (0.2μm to 5.5μm)
- Thinner and Stronger than Standard Glass Windows

Descriptions:

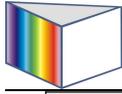
Sapphire or aluminum oxide (Al₂O₃) is single crystal and is useful in a transmission range from 0.2 - 5.5μm, sapphire is suitable for MWIR 3-5μm thermal imaging applications. Sapphire Windows are made from single crystal sapphire, they are ideal for demanding applications for their extreme surface hardness, 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.

Specifications:

Materials	Sapphire crystals	Diameter Range	~ 250mm
Aperture	>90%	Dimension Tolerance	+0.0/-0.2mm
Thickness Tolerance	+/-0.1mm	Surface Quality	60/40 S/D
Parallelism	1 arc minute	Chamfer	0.3-0.5mmx45degree
Coating	No coating or single layer MgF ₂		

Basic Properties:

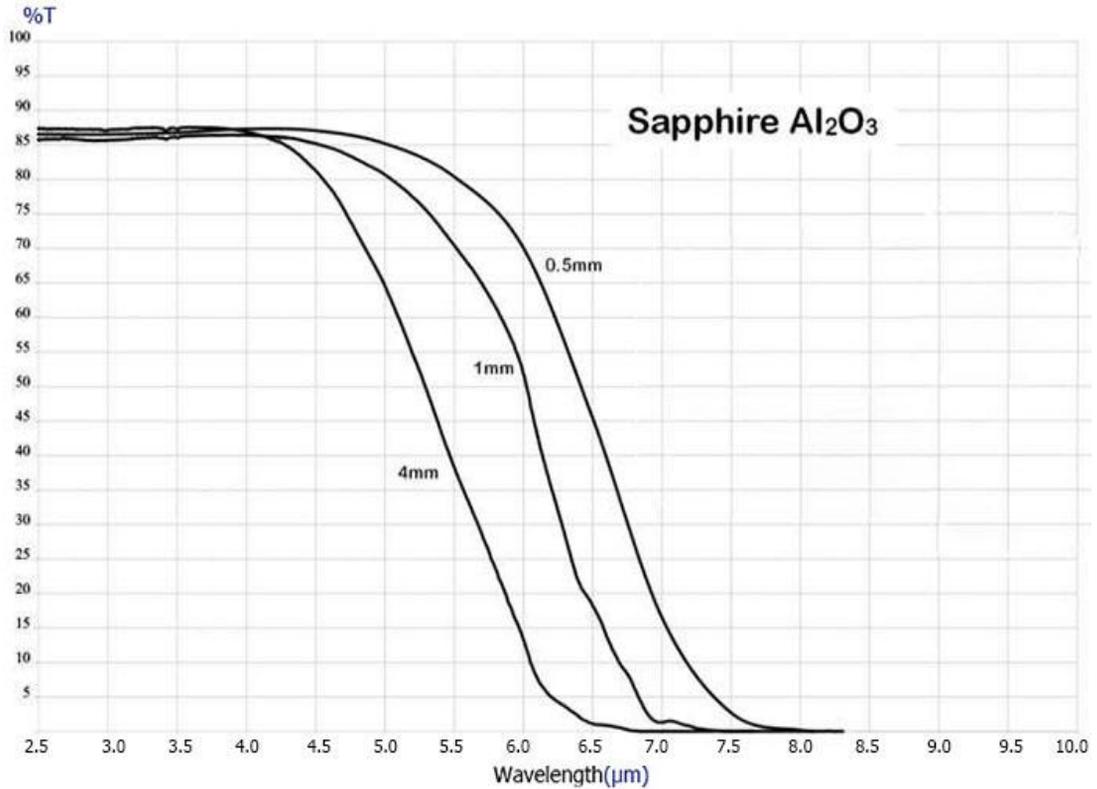
Transmission Range	0.17 to 5.5 μm	Refractive Index	No 1.75449; Ne 1.74663 at 1.06 μm (1)
Reflection Loss	14% at 1.06 μm	Absorption Coefficient	0.3 x 10 ⁻³ cm ⁻¹ at 2.4 μm (2)
Reststrahlen Peak	13.5 μm	dn/dT	13.1 x 10 ⁻⁶ at 0.546 μm (3)
dn/dμ = 0	1.5 μm	Density	3.97 g/cc
Melting Point	2040°C	Thermal Conductivity	27.21 W m ⁻¹ K ⁻¹ at 300K
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 x 10 ⁻⁶ g/100g water
Molecular Weight	101.96	Class/Structure	Trigonal (hex), R3c

Technical images:

Transmission curve of the Sapphire windows (no coating)



Related products:

- 1) Infrared windows -> Ge windows
- 2) Infrared lenses -> Sapphire lenses
- 3) Infrared domes -> Sapphire domes