

Sapphire Crystal

Large size Sapphire crystals up to 4" boule are available from PZOptics, As the hardest of oxide crystals, sapphire has a combination of optical and physical properties that make it the best choice for a variety of demanding applications. Sapphire maintains its strength even at high temperatures. It has good thermal properties, excellent electrical and dielectric properties and is resistant to chemical attack. These properties encourage the use of sapphire in aggressive environments where reliability, optical transmission and strength are required.

Main applications Include: UV and IR Optics; Windows for High Temperature and Pressure, Corrosion Resistance, Abrasion Resistance; Heat Sinders and Thermocouplers; Semiconductor Wafer Carriers; Electrical Insulators; Thin Film Deposition; Transparent Electronic Substrate; Silicon on Sapphire Wafers; Superconductor Substrate.

Basic Properties:

Crystal structure	Hexagonal System
Lattice	a=4.785Å, c=12.991Å
Density	3.98g/cm ³
Transmission Range	150-5500µm
Melting Point	2040°C
Specific Heat	0.418 W · s/g/K
Thermal Conductivity	25.12 W/m/K(@100°C)
Thermal Shock Resistance	790 W/m
Thermal Expansion Coefficient	5.8x10 ⁻⁶ /K
dn/dt, @633nm	13x10 ⁻⁶ /K
Mohs Hardness	9
Refractive Index	1.83 @0.26 µm, 1.76 @0.63 µm, 1.58 @5.57 µm

Standard Specifications of Sapphire Windows and Mirrors:

Diameter	+/-0.0, -0.1mm
Thickness	+/-0.2mm
Flatness	better than λ per 25 (@633nm)
Parallelism	better than 3'
Perpendicularity	better than 5'
Scratch-Dig	80-50 per MIL-O-13830A
Wavefront Distortion	less than 1/2 per inch(λ @1064nm)

Other high-precision Sapphire windows, AR- and HR-coatings are available upon request. Sapphire boule grown by CZ method and as-cut Sapphire blocks are also available.