

## SAPPHIRE CRYSTALS

Large size Sapphire crystals up to 4" boule are available from Sanctity Laser. As the hardest of all 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.



### Specification

Transmission Range	0.17 to 5.5μm
Refractive Index	1.75449 [ no ] 1.74663 [ ne ] at 1.06μm
Reflection Loss	14% at 1.06μm [ 2 surfaces ]
Absorption Coefficient	0.3 × 10 <sup>-3</sup> cm <sup>-1</sup> at 2.4μm
Restrahlen Peak	13.5μm
dndT	13.7 × 10 <sup>-6</sup> at 5.4μm
dn/dμ = 0	1.5μm
Density	3.98 g/cm <sup>3</sup>
Melting Point	2040°C
Thermal Conductivity	27.21 W/ [ m · K ] at 300K
Thermal Expansion [ parallel / perpendicular ]	5.6 / 5.0 × 10 <sup>-6</sup> /K
Hardness	Knoop 2000 with 2000g indenter
Specific Heat Capacity	419 J/ [ kg · K ]
Dielectric Constant [ parallel / perpendicular ]	11.5 / 9.4 at 1MHz
Young's Modulus [ E ]	335 GPa
Shear Modulus [ G ]	148.1 GPa
Bulk Modulus [ K ]	240 GPa
Elastic Coefficients	C11=496MPa    C12=164MPa    C13=115MPa    C33=498MPa C44=148MPa
Apparent Elastic Limit	275 MPa [ 40,000 psi ]
Poisson Ratio	0.25