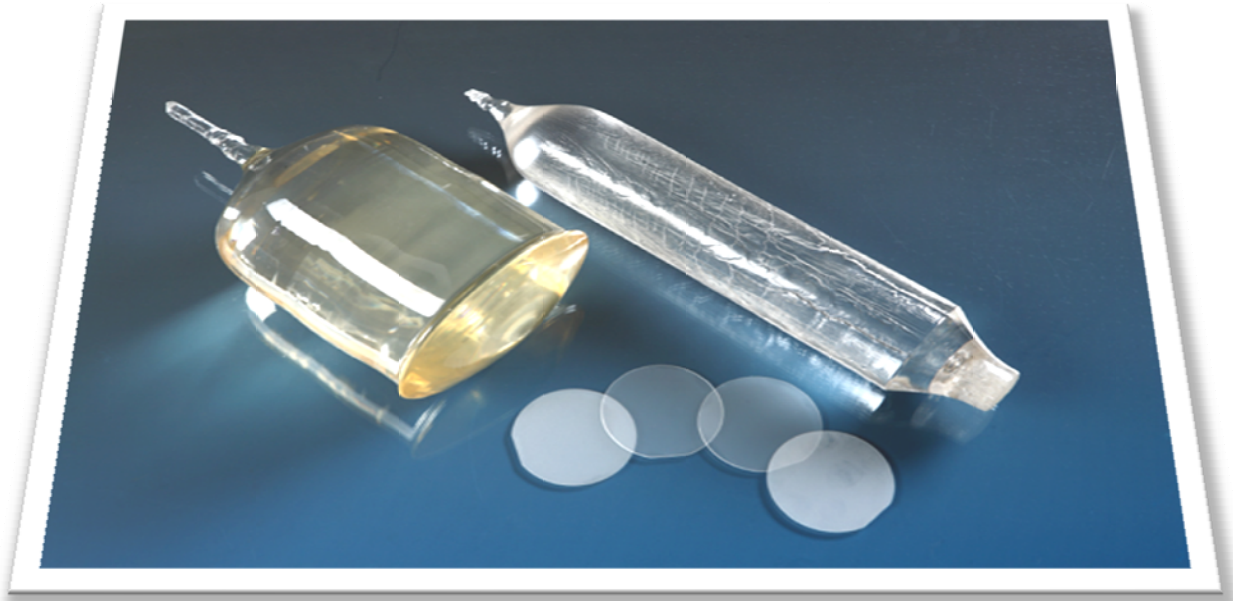




# Sapphire Crystal

2 Inch Ingot



## Sapphire Crystal

Clear Synthetic Sapphire, a Single Crystal Aluminum Oxide, is an excellent material finding increasing uses in various fields. The hardest of all oxide crystals, it shows a unique combination of optical, mechanical, chemical and physical properties. Its optical transmission quality strength and hardness, heat resistance, dielectric properties, insulating characteristics, chemical inertness and insolubility make this Crystal a material of choice for aggressive environments and new high-tech scientific and commercial applications. In addition, because Sapphire has a hexagonal crystal structure, its optical characteristics change with the optic C-axis and it demonstrates birefringence, an additional appealing property for new high-tech uses.

## Sapphire's Multitude Of Uses

### Commercial quality

Sapphire manufactured in bulk quantities and at commercially acceptable purity levels, is a material of choice for the luxury watches industry where it is used to produce high strength and hardness watch windows. It also has several other industrial uses in the form of rods, cubes, cones, vee jewels, orifice nozzles etc.

### Optical quality

Sapphire of good optical quality finds wide applications in UV to mid-IR Optics where it is the substrate of choice. Its optical uses are limited only from its birefringence and high cost of good polishing. Optical elements produced from standard optical quality Sapphire include Windows for High Temperature, Pressure, Corrosion, Abrasion and other demanding uses, Optical flats. Spacers, Thermo-couplers etc When manufactured with excellent crystalline structure at c-plane, a-plane and r-plane surface orientations and with crystalline ensuring the absence of fractures, slips, lineage and other defects, it can be used for the booming field of fine substrates in the following technologies: for the growth of III-V & II-VI compounds to produce Green LED and GaN blue Laser Diodes, for hybrid microelectronic applications, for IC microelectronic epitaxial deposition and especially for microwave IC's, for transducer applications and for the growth of super conducting materials.

### Capabilities

SIPAT, also name Sichuan Institute of Piezoelectric and Acoustooptic Technology, was founded in 1970 and is based in Chongqing, Mainland China.

A high-new technology enterprise specially engaged in scientific research, manufacturing, processing, sales and service of various of functional crystal materials. Develop main products including crystal wafers, rectangular slices, blocks and boules with all kinds of specifications.

The categories of products involve piezoelectric, acoustooptic and optical crystal. Advanced crystal manufacturing, processing, quality inspecting equipments and excellent manufacturing and processing technology.

## Specifications

Chemical formula	Al <sub>2</sub> O <sub>3</sub>
Standard cleared Ingot dimensions	L=120mm, W=100mm, T=20mm
Crystal structure data	Hexagonal Classed Rhombohedral
	negative uniaxial crystal
Lattice Constant	a=4,785 Ang, c= 12,991 Ang
Density (Specific gravity)	3,98 g/cm <sup>3</sup>
Molecular weight	101.94
Hardness	Mohs scale 9
Melting Point	2040 ° C
Water absorption	nil
Solubility	Insoluble in water and common acids + alkalis up to 1000 ° C and not attacked by HF below 300 ° C
Maximum operating temp.	2000 ° C
Thermal Shock Resistance	790 W/m
Thermal Conductivity (at 100 C)	25.12 W/m/K
Specific Heat	0,418 Ws/g/K
Thermal Expansion Coefficient (TEC)	5,3 x 10 <sup>-6</sup> K at c-axis at 300K
Dn/dt	13 x 10 <sup>-6</sup> K <sup>-1</sup>
Young's Modulus	4.4 x 10 <sup>5</sup> Mpa at 300K
Poisson Ratio	0.30
Refractive index of Sapphire	1,760 at 0,63 μ m wavelength

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