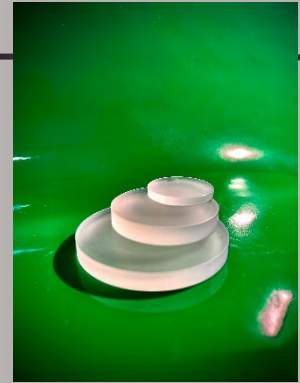


# MATERIAL PROPERTIES & SPECIFICATIONS

## Sapphire Crystal

Sapphire crystal is a transparent form of aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) with excellent mechanical, thermal, and optical properties. It is one of the hardest materials, second to diamond, ranking 9 on the Mohs scale. Sapphire has high optical transmission band from UV to Mid IR regions of electromagnetic spectrum. The crystal has a high refractive index, which makes it useful for lenses, optical windows, and laser components. Due to its excellent thermal stability Sapphire is suitable for applications in harsh environments. It is chemically inert and highly resistant to most acids and alkalis. It is also a great electrical insulator.



	Sapphire	
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Optical Properties	
Transmission Range	0.15 to 5.5 $\mu$ m
Bubbles & Inclusions	none
Refractive Index	1.71-1.79 @ 550nm
Absorption Coefficient @ 800	0.003 cm-1@3 $\mu$ m
Crystal Structure	hexagonal
Birefringence	0.008

Physical/ Thermal Properties	
Density	3.985g/cc
Specific Heat	0.75 J/g x K
Thermal Stability	2.050 deg C
Knopp Hardness	2200 kg/mm <sup>2</sup>
Linear Expansion Coefficient @20 C	5.5 x10-6K-1
Band gap	10 eV@10K
Chemical Resistance	Good

Substance	Form	Diameter Range	Thickness Range	Transmission Range ( $\mu$ m)	Transmittance (0.3-4.0 $\mu$ m)
Sapphire	Single Crystal	10 to mm *	1 to mm*	0.15-5.5	>5%

\* Special orders available \*\*  
Standard finish – other finish available upon request