

Gadolinium Gallium Garnet (GGG) Single Crystals and

Substrates

- **Fine mechanical, optical and chemical properties**
- **Excellent as optical, microwave isolator and HTS substrates**

Gadolinium Gallium Garnet (GGG) single crystal is material with good optical, mechanical and thermal properties which make it promising for use in fabrication of various optical components as well as substrate material for magneto - optical films and high - temperature superconductors. It can be used for infrared optical isolator (1.3 and 1.5 μm), which is made of YIG or BIG film on the Gadolinium Gallium Garnet (GGG) substrate plus birefringence parts. **GGG crystal** is an important substrate for microwave isolators and can be used as a HTS material, for laser technology, telecommunications, electronic.



SPECIFICATIONS

Standard specifications	
Materials	Gallium Gadolinium Garnet ($\text{Gd}_3\text{Ga}_5\text{O}_{12}$ or GGG) single crystal
Standard Size (mm)	5x5, 10x10, 15x15, 20x20, $\Phi 25.4$, $\Phi 50.8$
Thickness	0.5mm, 1.0mm or customized
Thickness tolerance	$\pm 0.05\text{mm}$
Diameter tolerance	$\pm 0.05\text{mm}$
Orientation	$\langle 111 \rangle$, $\langle 100 \rangle$, $\langle 110 \rangle$
Orientation error	6 arc seconds;
Parallelism	< 10 arc seconds
Perpendicularity	< 6 arc minutes
Internal quality	$< 2\text{A}$

Note: The boules, blanks, polished wafers are available.

Basic Properties

Optical Property		
Transmission range (μm)	0.3 to 7.0	
Refractive Index	At 480nm	1.97
	At 633nm	1.96
	At 1064nm	1.95

Physical Property	
Density, g/cm ³ (20°C)	7.08
Type of materials	Single crystal
Crystal structure	cubic
Lattice parameter, A	12.383
Melting point (°C)	1750
Thermal conductivity, W x cm ⁻¹ x °K ⁻¹	7.05
Thermal expansion, 1/°C	8.2x10 ⁻⁶
Dielectric constant	30
Dielectric loss tangent, at 10GHz	0.15
Mohs Hardness	7.5