

TGG

TGG is an excellent magneto-optical crystal used in various Faraday devices (Rotator and Isolator) in the range of 400nm-1100nm, excluding 475-500nm.

Optical isolator devices make use of the non-reciprocal Faraday effect in TGG. The Faraday effect is the rotation of the plane of polarization of a light beam as it is transmitted through a material in the presence of an external magnetic field coaxial with the light. The polarization rotation is in the same sense regardless of the direction of propagation of the light. An optical isolator is a Faraday rotator combined with suitably aligned polarizers which allows light to pass in one direction only.

Advantages:

- Large Verdet constant (35 Rad T-1m-1).
- Low optical losses (<0.1%/cm)
- High thermal conductivity (7.4W m-1K-1).
- High laser damage threshold (>1GW/cm²).



Basic properties

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|-------------------|---|
| Chemical Formula | TB ₃ Ga ₅ O ₁₂ |
| Lattice Parameter | a=12.355Å |
| Growth Method | Czochralski |
| Density | 7.13g/cm ³ |
| Mohs Hardness | 8.0 |
| Melting Point | 1725°C |
| Refractive Index | 1.954 at 1064nm |

Technical Parameters

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|------------------------------|--------------------------|
| Orientation | [111] within ±15 arc min |
| Wave Front Distortion | <1/8 wave |
| Extinction Ratio | >35dB |
| Diameter Tolerance | +0.00mm/-0.05mm |
| Length Tolerance | +0.2mm/-0.2mm |
| Chamfer | 0.10mm@45° |
| Flatness | <1/10 wave at 633nm |
| Parallelism | < 30 arc Seconds |
| Perpendicularity | < 5 arc min |
| Surface Quality | 10/5 Scratch/Dig |
| AR Coating | <0.2% |
| Large Dimensions of Crystals | 2.8--100 mm in diameter |