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TGG - Terbium Gallium Garnet ($Tb_3Ga_5O_{12}$)

Introduction

Terbium Gallium Garnet ($Tb_3Ga_5O_{12}$, TGG) is an excellent magneto-optical crystal used in various Faraday devices (Rotators and Isolators) in the range of 400 nm-1100 nm, excluding 475 nm-500 nm.

CASTECH's magneto-optical crystal TGG is featured by

- Large Verdet constant (35 Rad $T^{-1}m^{-1}$)
- High thermal conductivity (7.4 W $m^{-1}K^{-1}$)
- High laser damage threshold (>1 GW/cm^2)

Table 1. Basic Properties

Chemical Formula	$Tb_3Ga_5O_{12}$
Lattice Parameter	a = 12.355 Å
Growth Method	Czochralski
Density	7.13 g/cm^3
Melting Point	1725℃
Mohs Hardness	8 Mohs
Refractive Index	1.954 @1064 nm

Specifications of TGG crystal from CASTECH

Table 2. Specifications

Orientation	[111] within ±15′
Extinction Ratio	＞30 dB
Diameter Tolerance	± 0.1 mm
Length tolerance	± 0.2 mm
Surface Quality (Scratch/Dig)	10/5 to MIL-PRF-13830B
Flatness	＜λ/8 @633 nm
Wavefront Distortion	＜λ/8 @633 nm
Parallelism	20 arc sec
Perpendicularity	≦15 arc min
Chamfer	≦0.2 mm × 45°
AR coating	<0.2% at 1064 nm