# Terbium Scandium Aluminum Garnet(TSAG) Crystal

## Introduction

TSAG is a key isolator material for next generation fiber laser. As an ideal magneto-optic crystal in visible and infrared regions，TSAG has the advantages of high Verdet constant，excellent thermal and mechanical properties.

## Main Features of TSAG:

- Large Verdet constant (48 rad $T^{-1}m^{-1}$ at 1064nm)，about 20% higher than that of TGG;
- Low absorption(＜3000ppm/cm at 1064nm)， about 30% less than that of TGG;
- High power compliant;
- Low thermally-induced birefringence;
- Making the isolator small.

## Main Applications:

- Faraday Rotator
- Optical Isolator

Table 1. Properties

| | |
|---|---|
| Transmittance Range(bulk/uncoated) | 400-1600nm |
| Crystal Structure | Cubic，Space group $Ia\bar{3}d$ |
| Chemical Formula | $Tb_3Sc_2Al_3O_{12}$ |
| Lattice Parameter | a=12.3Å |
| Growth Method | Czochralski |
| Density | 5.91g/$cm^3$ |
| Melting Point | 1970℃±10℃ |

## CASTECH offers:

| | |
|---|---|
| Orientation | within ±15 arc min |
| Wavefront Distortion | < 1/8 wave |
| Extinction Ratio | > 30dB |
| Diameter Tolerance | +0.00mm/-0.05mm |
| Length Tolerance | +0.2mm/-0.2mm |
| Chamfer | 0.10mm @ 45° |
| Flatness | < 1/10 wave at 633nm |
| Parallelism | < 3 arc min |
| Perpendicularity | < 5 arc min |
| Surface Quality | 10/5 Scratch/Dig |
| AR coating | <0.3% at 1064nm |