

# 钆镓石榴石GGG,SGGG, NGG

## 简介 Introduction:

GGG,SGGG和NGG都是应用于衬底液体外延生长。钆镓石榴石 (GGG) 是用于磁光薄膜的专用基片。在光通讯设备中,需大量使用 1.3 $\mu$ 及 1.5 $\mu$ 的光隔离器,其核心部件为置于磁场中的 YIG 或 BIG 膜。不同切向的 GGG 单晶基片可以做到与这类磁光材料晶格的匹配,从而保证 YIG、BIG 薄膜成功的外延生长。GGG 良好的物理、机械性能和化学稳定性也保证薄膜制备过程中对膜的各项要求。GGG 也是制作微波器件的基片材料。

在磁制冷行业,GGG成功应用在20K以下温区,用于市场HeII流以及氦氮液化前级制冷。

GGG,SGGG and NGG Garnets are used as substrates for liquid epitaxy.GGG substrate is dedicated substrates for magneto-optical film. In the optical communication devices, require a lot of using 1.3 $\mu$  and 1.5 $\mu$  optical isolator, its core component is the YIG or BIG film been placed in a magnetic field. GGG single crystal substrates of different tangential, which can achieve the best lattice match with this magneto-optical material, thus ensuring the YIG, BIG film epitaxial growth be successful. It has good physical and mechanical properties and chemical stability. GGG is also substrate material for microwave devices.

GGG has been successfully applied in the magnetic refrigeration industry in the temperature zone below 20 K for market HeII flow and helium-nitrogen liquefaction pre-stage refrigeration.



### 主要优点:

- ◆ 低光学损耗 ( $\pm 0.1\%$ /厘米)
- ◆ 高导热性 (7.4W m-1K-1)
- ◆ 高激光损伤阈值 ( $\pm 1\text{GW}/\text{cm}^2$ )

### Main Advantages:

- ◆ Low optical losses ( $< 0.1\%$ /cm)
- ◆ High thermal conductivity (7.4W m-1K-1)
- ◆ High laser damage threshold ( $> 1\text{GW}/\text{cm}^2$ )

## 材料特性Material Properties:

材料	GGG	SGGG
分子式Chemical Formular	Gd <sup>3+</sup> Ga <sup>3+</sup> O <sub>12</sub>	Substituted GGG
晶格常数Lattice constant	12,383 Å	12,497 Å
生长方法Growth Method	Czochralski	Czochralski
密度Density	7.13g/cm <sup>3</sup>	7.09 g/cm <sup>3</sup>
硬度Mohs Hardness	8.0	7.5
熔点Melting Point	1725°C	1730°C
反射系数Refractive Index	1.954 at 1064nm	1.954 at 1064nm

## 科瑞思创提供 Crystro offers:

尺寸Size	Max 4" inch
厚度Thickness	0.5mm, 1.0mm
抛光Polishing	单面或双面Single or double side
晶向Orientation	$\langle 111 \rangle \pm 0.2^\circ$
边缘定向精度Edge orientation accuracy	2" (特殊要求可达1"以内)
斜切晶片Cutting	可按特定需求,加工边缘侧面的晶面按特定角度切割(切割角 1° - 45°)
Ra:	$\leq 1\text{nm}$
包装Package	100 级洁净袋, 1000 级超净室