

## Cr<sup>4+</sup>:YAG Crystals and Components

Cr<sup>4+</sup>:YAG Crystal is an excellent crystal for passively Q-switching diode pumped or lamp-pumped Nd:YAG, Nd:YLF, Nd:YVO<sub>4</sub> or other Nd and Yb doped lasers at wavelength from 0.8 to 1.2 μm. Because of its chemically stable, durable, UV resistant, good thermal conductivity and high damage threshold (> 500 MW/cm<sup>2</sup>) and being easy to be operated, it will replace traditional materials, such as LiF, organic Dye and color centers.

The preliminary experiments of ULTI Crystal 's Cr<sup>4+</sup>:YAG showed that the pulse width of passively Q-switched lasers could be as short as 5ns for diode pumped Nd:YAG lasers and repetition rate as high as 10kHz for diode pumped Nd:YVO<sub>4</sub> lasers. Furthermore, an efficient green output @ 532nm, and UV output @ 355nm and 266nm were generated, after a subsequent intracavity SHG in KTP or LBO, THG and 4HG in LBO and BBO for diode pumped and passive Q-switched Nd:YAG and Nd: YVO<sub>4</sub> lasers.

Cr<sup>4+</sup>:YAG is also a laser crystal with tunable output from 1.35μm to 1.55μm. It can generate ultrashort pulse laser (to fs pulsed) when pumped by Nd: YAG laser at 1.064μm.

### The Physical and Optical Properties of Cr<sup>4+</sup>:YAG Crystals

Properties	Values
Chemical formula	Cr <sup>4+</sup> :Y <sub>3</sub> Al <sub>5</sub> O <sub>12</sub>
Crystal structure	Cubic
Lattice Constants	12.01Å
Melting Point	1970 °C
Density	4.56 g/cm <sup>3</sup>
Mohs hardness	8.5
Specific Heat (0-20)	0.59J/g.cm <sup>3</sup>
Modulus of Elasticity	310GPa
Young's Modulus	3.17×10 <sup>4</sup> Kg/mm <sup>2</sup>
Poisson Ratio	0.3(est.)
Tensile Strength	0.13~0.26GPa
Thermal Expansion Coefficient	[100]:8.2×10 <sup>-6</sup> / °C [110]:7.7×10 <sup>-6</sup> / °C [111]:7.8×10 <sup>-6</sup> / °C
Thermal Conductivity	14W/m/K( @25 °C )
Thermal Optical Coefficient (dn/dT)	7.3×10 <sup>-6</sup> / °C
Thermal Shock Resistance	790W/m

### Standard Processing Specifications of Cr<sup>4+</sup>:YAG Crystals

Specifications	Capability
Doping Level	0.5 mol% - 3 mol%
Orientation	<111> crystalline direction
Surface Flatness	up to λ/10 at 633 nm



Parallelism	< 15 arcsec
Surface quality	20/10 scratch/dig as per MIL-O-13830A
Perpendicularity	< 5 arcmin
Angle tolerance	< 30 arcmin
Aperture tolerance	± 0.1 mm
Clear aperture	90% of full aperture
Chamfers	0.1 mm at 45 deg
Coating	both sides coated AR @ 1064 nm, R < 0.2%, AOI = 0 deg

#### Notes

- »| Our inspection standard is comply with MIL standard and ISO9001 standard
- »| OEM Specifications are available upon requested

#### Standard Product List

Code	Size,mm	Initial Transmission @ 1064nm	Coating	Price
CRYG-101	Ø5	T0=30%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-102	3X3	T0=30%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-103	5X5	T0=30%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-104	Ø5	T0=40%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-105	3X3	T0=40%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-106	5X5	T0=40%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-107	Ø5	T0=50%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-108	3X3	T0=50%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-109	5X5	T0=50%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-110	Ø5	T0=60%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-111	3X3	T0=60%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-112	5X5	T0=60%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-113	Ø5	T0=70%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-114	3X3	T0=70%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-115	5X5	T0=70%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-116	Ø5	T0=80%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-117	3X3	T0=80%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-118	5X5	T0=80%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-119	Ø5	T0=90%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-120	3X3	T0=90%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-121	5X5	T0=90%	AR/AR@1064nm	<a href="#">Contact us</a>
CRYG-122	Ø5	T0=95%	AR/AR@1064nm	<a href="#">Contact us</a>



<b>CRYG-123</b>	3X3	T0=95%	AR/AR@1064nm	<a href="#">Contact us</a>
<b>CRYG-124</b>	5X5	T0=95%	AR/AR@1064nm	<a href="#">Contact us</a>

 **Notes**

- »| When ordering Cr4+:YAG crystal, Please specify the size, initial transmission and coatings.
- »| Custom size is available upon requested.

