

Nd:YAG Crystals and Components

Nd:YAG is the most important laser crystal. It is widely used in industrial, medical, military and scientific fields. Although Nd:YAG was invented in the Sixties last century, it has been and is still the most commonly used solid-state crystal material. Nd:YAG crystals are widely used in all types of solid-state lasers systems-frequency-doubled continuous wave, high-energy Q-switched, and so forth.

Its good fluorescent lifetime thermal conductivity and physical strengths makes it suitable for high power lamp pumped laser.

ULTI Crystal supplies large diameter neodymium doped yttrium aluminum garnet (Nd:YAG) crystals. The use of high quality starting materials for crystal growth, whole boule interferometry, and precise measurement of Nd concentration using transmission spectroscopy and fluorescence lifetime measurements, assures that each crystal will perform to customer specifications.

The Physical and Optical Properties of Nd:YAG Crystals

Properties	Values
Chemical formula	<i>Nd:Y3A15O12</i>
Crystal structure	<i>Cubic</i>
Lattice Constants	<i>12.01Å</i>
Concentration	<i>~ 1.2 x 10²⁰ cm⁻³</i>
Melting Point	<i>1970 °C</i>
Density	<i>4.56 g/cm³</i>
Mohs hardness	<i>8.5</i>
Refractive Index	<i>1.82</i>
Thermal Expansion Coefficient	<i>7.8 x 10⁻⁶ /K [111], 0 - 250 °C</i>
Thermal Conductivity	<i>14 W/m /K @20 °C, 10.5 W /m /K @100 °C.</i>
Lasing Wavelength	<i>1064 nm</i>
Stimulated Emission Cross Section	<i>2.8x10⁻¹⁹ cm⁻²</i>
Relaxation Time of Terminal Lasing Level	<i>30 ns</i>
Radiative Lifetime	<i>550 ms</i>
Spontaneous Fluorescence	<i>230 ms</i>
Loss Coefficient	<i>0.003 cm⁻¹ @ 1064 nm</i>
Effective Emission Cross Section	<i>2.8 x 10⁻¹⁹ cm²</i>
Pump Wavelength	<i>807.5 nm</i>
Absorption band at pump wavelength	<i>1 nm</i>
Linewidth	<i>0.6 nm</i>
Polarized Emission	<i>Unpolarized</i>
Thermal Birefringence	<i>High</i>

Standard Processing Specifications of Nd:YAG Crystals



Specifications	Capability
Nd Doping Level	0.8% or 1.1%
Orientation	<111> crystalline direction
Surface Flatness	up to $\lambda/10$ at 633 nm
Parallelism	< 10 arcsec
Surface quality	10/5 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	Dopeing,%	Coating	Price
NDYG-101	Ø3x60	0.8	AR/AR@1064nm	Contact us
NDYG-102	Ø4x80	0.8	AR/AR@1064nm	Contact us
NDYG-103	Ø5x90	0.8	AR/AR@1064nm	Contact us
NDYG-104	Ø6x110	0.8	AR/AR@1064nm	Contact us
NDYG-105	Ø7x125	0.8	AR/AR@1064nm	Contact us
NDYG-106	Ø8x130	0.8	AR/AR@1064nm	Contact us
NDYG-107	Ø9x150	0.8	AR/AR@1064nm	Contact us
NDYG-108	Ø10x160	0.8	AR/AR@1064nm	Contact us
NDYG-109	3x3x2	1.1	HR@1064+HT@808/AR@1064nm	Contact us
NDYG-110	3x3x3	1.1	HR@1064+HT@808/AR@1064nm	Contact us
NDYG-111	3x3x4	1.1	HR@1064+HT@808/AR@1064nm	Contact us
NDYG-112	3x3x5	1.1	HR@1064+HT@808/AR@1064nm	Contact us
NDYG-113	3x3x2	1.1	AR/AR@1064+808nm	Contact us
NDYG-114	3x3x3	1.1	AR/AR@1064+808nm	Contact us
NDYG-115	3x3x4	1.1	AR/AR@1064+808nm	Contact us
NDYG-116	3x3x5	1.1	AR/AR@1064+808nm	Contact us
NDYG-117	Ø3x60	1.1	AR/AR@1064nm	Contact us
NDYG-118	Ø4x80	1.1	AR/AR@1064nm	Contact us
NDYG-119	Ø5x90	1.1	AR/AR@1064nm	Contact us
NDYG-120	Ø6x110	1.1	AR/AR@1064nm	Contact us

NDYG-121	Ø7x125	1.1	AR/AR@1064nm	Contact us
NDYG-122	Ø8x130	1.1	AR/AR@1064nm	Contact us
NDYG-123	Ø9x150	1.1	AR/AR@1064nm	Contact us
NDYG-124	Ø10x160	1.1	AR/AR@1064nm	Contact us

Notes

»| To inquiry or order a finished Nd:YAG laser rod, please specify the specification listed above, for common application, we only need to know the main specification: Nd-dopant concentration, sizes, and coating. For special request, please specify specification in details for evaluation and fabrication.

»| Custom size is available upon requested.

