

**Laser Crystals**

NLO Crystals

Birefringent Crystals

AO and EO Crystals

**Nd:YAG Crystal**
**Introductions**


**Neodymium Doped Yttrium Aluminum Garnet (Nd:YAG) Crystal.**

Nd:YAG crystal is the most widely used solid-state laser material today. Now, we are able to stably supply quantity of Nd:YAG rods with high optical homogeneity, consistent performance, high processing accuracy and on time delivery.

**Basic Properties**

Chemical Formula:	$Y_3Al_5O_{12}$
Crystal structure:	Cubic
Lattice constant:	12.01Å
Melting point:	1970°C
Density:	4.5g/cm <sup>3</sup>
Reflective Index:	1.82
Thermal Expansion Coefficient:	$7.8 \times 10^{-6} / K <111>$
Thermal Conductivity (W/m/K):	14, 20°C
	10.5, 100°C
Mohs hardness:	8.5
Stimulated Emission Cross Section:	$2.8 \times 10^{-19} \text{ cm}^2$
Relaxation Time of Terminal Lasing Level:	30 ns
Radiative Lifetime:	550 us
Spontaneous Fluorescence:	230 us
Linewidth:	0.6 nm
Loss Coefficient:	$0.003 \text{ cm}^{-1} @ 1064\text{nm}$

**Standard Specifications**
**Specifications of Nd:YAG crystal from Banner Union**

- Dimension: size up to dia.15x160mm and maximum diameter of dia.40mmx2mm
- Nd Dopant Level: 0.3~2.0(±0.1)atm%
- Diameter tolerance: ±0.05mm
- Length tolerance: ±0.5mm
- Perpendicularity: < 5 arc minutes
- Parallelism: <10 arc seconds
- Wavefront distortion:  $\lambda/8$
- Flatness:  $\lambda/10$
- Sccratch/Dig: 10/5 @MIL-PRF-13830B
- Chamfer: 0.1mmx45°
- HR-Coating: R>99.8%@1064nm and R<5%@808nm
- AR-Coating (Single layer MgF2): R<0.25% per surface (@1064nm)
- Other HR coatings, such as HR @ 1064/532 nm, HR @ 946nm, HR 1319 nm and other wavelengths are also available.
- Damage Threshold: >500MW/cm<sup>2</sup>

Optical Parameter of Nd:YAG crystal

Diameter (mm)	Standard grade	Excellence grade	Superexcellence grade
φ3-6.35	≤0.5 fringes/ inch	≤0.25 fringes/ inch	≤0.1 fringes/ inch
	≥25dB	≥28dB	≥30dB
φ7-10	≤0.7 fringes/ inch	≤0.4 fringes/ inch	≤0.16 fringes/ inch
	≥22dB	≥25dB	≥28dB
φ11-13	≤1 fringes/ inch	≤0.6 fringes/ inch	≤0.2 fringes/ inch
	≥20dB	≥23dB	≥26dB
φ14-16	≤1.2 fringes/inch	≤0.8 fringes/inch	≤0.25 fringes/inch
	≥18dB	≥20dB	≥23dB

**Nd:YAG**
**Crystal**
**YAG 01**