

Nd:YAG Nd-doped YAG



DESCRIPTION

Nd:YAG one of the mature developed laser crystals which is obtained by doping Nd ion into YAG crystal. The absorption bandwidth of Nd:YAG laser crystal are 730-760 nm and 790-820 nm, and usually pumped by flash-tube or laser diode. The typical laser emission peak is 1064 nm, the wavelength of 946 nm, 1120 nm, 1320 nm and 1440 nm lasers can be emitted too through some measures, Q-switch and lock mode are adapted to obtain laser with different wavelength (532 nm, 266 nm, 213 nm etc.) and pulse width (10-25 ns) respectively, which makes the huge application in biophysics, medicine, military, machine, scientific research and architecture etc.. Commonly, the high concentration doped crystal is applied into pulse laser and the low concentration doped one is usually used in continuous wave output.

FEATURES

- · High gain coefficient
- Low lasing threshold
- Excellent optical, mechanical and physical properties
- High slope efficiency
- Wide absorption bandwidth

APPLICATIONS

- Laser rangefinder
- Laser cosmetic instrument
- Laser marker
- Laser medicine
- Optical Communication
- Radar and Ranging
- Holography
- Medical Applications





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PARAMETERS

MATERIAL AND SPECIFICATIONS

Property	Value
Nb Concentration Tolerance (atm%)	0.1-2.5(+/-0.1)atm%
Orientation	[001] or [110] or [111] <±0.5°
Parallelism	10″
Perpendicularity	5 ´
Surface Quality	10-5(MIL-O-13830A)
Wavefront Distortion	λ/4@632 nm
Surface Flatness	/8@632)nm
Clear Aperture	>95 %
Chamfer	<0.2×45°
Length Tolerance	+0.5/-0mm
Thickness/Diameter Tolerance	±0.05 mm
Maximum Dimensions	dia (3~12.7)×(3~150) mm
Damage Threshold	>750 MW/cm2@1064 nm 10 ns 10 Hz
Chips	<0.1 mm
Extinction Ratio	>30 dB(depends on actual sizes)
Barrel Finish	400 grit
Coatings	AR/AR@940+1030; HR@1030+HT@940+AR1030

PHYSICAL AND CHEMICAL PROPERTIES

Property	Value
Crystal Structure	cubic – la3d
Lattice Constants	12.01Å
Density	4.56 g/cm ³
Melting Point	1950°C
Thermal Conductivity/(W·m ⁻¹ ·K ⁻¹ @25°C)	0.14W
Specific Heat/(J·g ⁻¹ ·K ⁻¹)	0.59
	[100] Orientation-8.2
Thermal Expansion /(10 ^{-6.} K ⁻¹ @25°C)	[110] Orientation-7.7
	[111] Orientation-7.8
Hardness (Mohs)	8.5
Young`s Modulus /GPa	317
Shear Modulus /Gpa	54.66
Extinction Ratio/dB	25 dB
Poisson Ratio	0.25

OPTICAL AND SPECTRAL PROPERTIES

Property	Value
Laser Transition	${}^{4}F_{_{3/2}} \rightarrow {}^{4}I_{_{11/2}}$
Photon Energy	1.86×10 ⁻¹⁹ J
Laser Transition Wavelength, XI (nm)	1064
Pump Transition Wavelength, λp (nm)	808
Pump Transition Bandwidth, $\Delta\lambda p$ (nm)	<4
Laser Transition Bandwidth, $\Delta\lambda I$ (nm)	~0.6
Pump Transition Peak Cross Section, σp (E ⁻²⁰ cm ²)	6.7
Laser Transition Peak Cross Section, ol (E-20 cm2)	28
Pump Transition Saturation Intensity, $\phi p (kW/cm^2)$	12
Laser Transition Saturation Intensity, $\phi I \ (kW/cm^2)$	2.6
Laser Transition Saturation Fluence, Fl,sat (J/cm ²)	0.6
Minimum Pump Intensity, Imin (kW/cm ²)	~0
Upper Laser Manifold Lifetime, τ (msec)	0.26
Quantum Defect Fraction	0.24
Fractional Heat Generation	0.37
Refractive Index	1.8197 @1.064 µm
Fluorescence Lifetime	230 µs

SPECTRA



