Yb:YAG Yb-doped YAG

DESCRIPTION

Yb: YAG is a laser crystal which is doped with trivalent ytterbium ions in yttrium aluminum garnet crystal and can emits 1030 nm near-infrared laser. Yb: YAG crystal has characters of high quantum efficiency, no excited state absorption and up-conversion, high concentration tolerance, long fluorescence lifetime, wide absorption band and broad emission range and robust optical, mechanical and thermal properties etc., which makes it have great potential application in high efficiency, high power diode-pumped solid-state lasers.

FEATURES

- Good optical quality
- Wide absorption bands
- Low quantum defect
- High slope efficiency
- Low working temperature
- Linearly polarized emission and single-mode
- Simple energy level structure

APPLICATIONS

- 1030nm laser
- Diode pumping
- Human friendly in dental treatment field
- Yb: YAG amplifier module for optical fiber amplifier
- Material micromachining
- Holography, interference, optical storage and other fields
- YAG laser marker
- Laser cutting and welding
- Multiphoton microscopy
- Ultrashort pulse research
- LIDAR and optical refrigeration

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PARAMETERS

MATERIAL AND SPECIFICATIONS

Property	Value
Yb Concentration Tolerance (atm%)	0.5, 1, 2, 3, 5, 7.5 , 10, 15, 20, 25%
Orientation	[001] \ [110] \ [111] <±0.5°
Parallelism	10″
Perpendicularity	5′
Surface Quality	10-5
Wavefront Distortion	λ/4@632nm
Surface Flatness	λ/8@632nm
Clear Aperture	>95%
Chamfer	<0.1×45°
Thickness/Diameter Tolerance	±0.05 mm
Maximum Dimensions	dia 50×100 mm
Coatings	AR/AR@940+1030; HR@940+AR1030

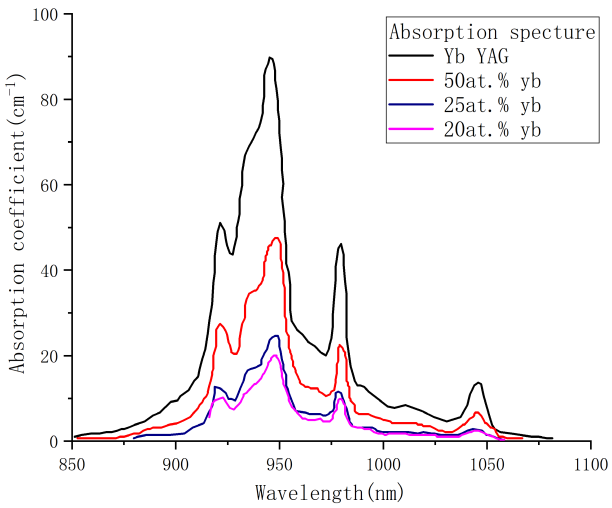
PHYSICAL AND CHEMICAL PROPERTIES

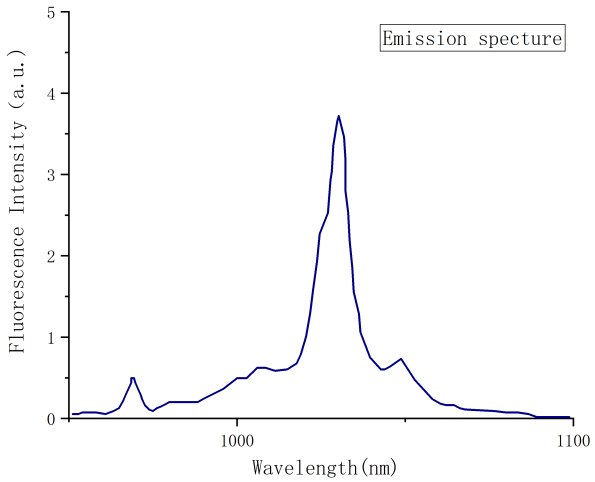
Property	Value
Crystal Structure	cubic – Ia3d
Lattice Constants	12.01 Å
Density	4.56±0.04 g/cm^3
Melting Point	1970 °C
Thermal Conductivity /(W·m^{-1}·K^{-1}@25°C)	λ/4@632nm
Specific Heat/ (J·g^{-1}·K^{-1})	0.59
Thermal Optical Coefficient(d_n/dT)	7.3×10^{-6}/°C
Thermal Expansion / （10^{-6}·K^{-1}@25°C ）	8.2 [100] 7.7 [110] 7.8 [111]
Hardness (Mohs)	8.5
Young`s Modulus /GPa	317
Shear Modulus /Gpa	54.66
Extinction Ratio	25 dB
Tensile Strength/Gpa	0.13-0.26
Solubility	Water: Insoluble; Common Acides: Slightly
Poisson Ratio	0.25

OPTICAL AND SPECTRAL PROPERTIES

Property	Value
Laser Transition	$^2F_{5/2} \rightarrow {}^2F_{7/2}$
Laser Wavelength	1030 nm
Photon Energy	1.93×10^{-19}J(@1030 nm)
Pump Absorption Band Width	8 nm
Loss Coefficient	0.003 cm^{-1}
Diode Pump Band	940 nm or 970 nm
Emission Cross Section	2.0×10^{-20} cm^2
Fluorescence Lifetime	1.2 ms
Emission Linewidth	9 nm
Refractive Index @1.030 μm	1.82
Thermal Optical Coefficient	9× 10^{-6}/°C

SPECTRA





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