

# Yb:YAG



## DESCRIPTION

Yb:YAG crystal product, also known as yttrium aluminum garnet crystal, is a laser crystal with good comprehensive performance. Nd:YAG crystal is widely used in holographic, interference, optical storage and other fields. Yb:YAG lasers usually emit at 1030 nm (the strongest line) or 1050 nm.

The product has the characteristics of high quantum efficiency, non excited state absorption and up conversion, high concentration tolerance, long fluorescence lifetime, absorption bandwidth, wide emission range, optical, mechanical and thermal properties, and has a good application prospect.

It is an ideal choice for diode pumping. The wide absorption band enables Yb:YAG to maintain uninterrupted pump efficiency during the typical thermal shift of diode output. High efficiency means that Yb:YAG laser crystal with relatively small size will produce high power output.

Based on YAG main crystal, Yb:YAG can be quickly integrated into the laser design process. This combination of characteristics enables simple and elegant laser design and makes it easier to manufacture high-power lasers. It can be used in high efficiency and high power diode pumped solid-state lasers.

## FEATURES

- Simple level structure
- Good optical quality
- Absorb the bandwidth
- The quantum defect is low
- The slope of high efficiency
- Working temperature is low
- Linear polarization transmission and single mode

## APPLICATIONS

- 1030nm laser
- Diode-pumped
- The laser field of YAG
- Laser cutting and welding
- Micro material processing
- Multiphoton microscope
- Laser cutting and welding



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## PHYSICAL AND CHEMICAL PROPERTIES OF CRYSTALS

The crystal structure	Cubic - Ia3d
The lattice constant	12.01
The density/(g/cm <sup>3</sup> )	4.56±0.04
Melting point / °C	1970
Refractive index@1.030 μm	1.82
Coefficient of thermal conductivity/(w·k <sup>-1</sup> ·m <sup>-1</sup> @25°C)	14
Specific heat (J·g <sup>-1</sup> ·K <sup>-1</sup> )	0.59
Thermal optical coefficient / °C	dn / dT = 7.3×10 <sup>-6</sup>
Thermal expansion rate (10 <sup>-6</sup> ·K <sup>-1</sup> @ 25°C)	8.2 [100]
	7.7 [110]
	7.8 [111]
Hardness (mo)	8.5
Young's modulus/GPa	317
Shear modulus/Gpa	54.66
The extinction ratio/dB	25
The tensile strength/Gpa	0.13-0.26
Solubility	Water: insoluble;Normal acid: slightly soluble
Poisson's ratio	0.25

## MATERIAL SPECIFICATIONS

Material	Yb:YAG
The concentration of Yb tolerance (atm%)	0.5, 1, 2, 3, 5, 7.5, 10, 15, 20, 25%
Orientation	[001] or [110] or [111] <±0.5°
Parallelism	10"
Vertical	5
The surface quality	10/5(MIL-O-13830A)
Wavefront distortion	λ /4@632 nm
The surface roughness	λ/8@632 nm
Clear aperture	>95%
Chamfering	<0.1×45°
The thickness/diameter tolerance	±0.05 mm
The largest size	dia 50×100 mm
Coating	AR/AR@940+1030; R@1030+HT@940+AR1030;

## SCINTILLATOR PROPERTIES

Energy level transition	<sup>2</sup> F <sub>5/2</sub> → <sup>2</sup> F <sub>7/2</sub>
Laser wavelength/nm	1030
The photon energy/J	1.93×10 <sup>-19</sup> (@1030 nm)
Pump absorption bandwidth/nm	8
Loss threshold/cm <sup>-1</sup>	0.003
Diode pump belt/nm	940 or 970
Radiation section/cm <sup>2</sup>	2.0×10 <sup>-20</sup>
Fluorescence lifetime/ms	1.2
The refractive index@ 1.030μm	1.82
Coefficient of thermal light / °C	9× 10 <sup>-6</sup>



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## SPECTRA

