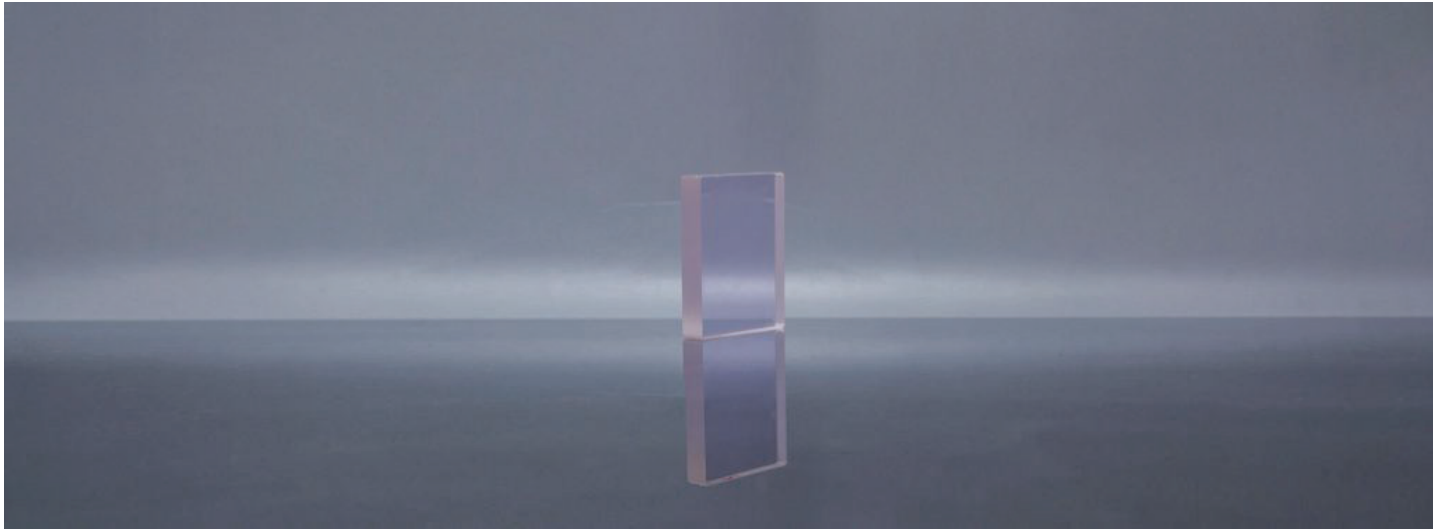


# Nd:YAP



## DESCRIPTION

Nd:YAP ( $\text{Nd}^{3+}:\text{YAIO}_3$ ), the structure is distorted perovskite, belonging to oblique hexagonal crystal system, and spatial group is Pbnm, whose axes a, b and c are perpendicular to each other, belongs to negative uniaxial crystals and is anisotropic. Among the numerous neodymium-doped laser crystals, Nd: YAP crystal not only has high thermal conductivity, but also has a larger excited emission cross section at  ${}^4\text{F}_{3/2} - {}^4\text{I}_{13/2}$  transition. They are one of the most effective laser crystals known at present for the high-power operation at the 1300nm, the crystal is mainly pumped by LD. 1300nm lasers are widely used in the field of medicine, optical fiber communication and military. What's more, water molecule has good absorption at this laser band. Which makes it have a very good hemostatic ability, and widely used in laser therapy, such as hemostasis, neurosurgery, resection of pathological tissues and wrinkle removal. In addition, Nd: YAP crystal has natural birefringence characteristics, which is very beneficial to overcome the thermal depolarization and nonlinear frequency transformation of laser.

## FEATURES

- High thermal conductivity
- Large excited emission cross section
- High laser gain
- Low laser threshold
- Anisotropy

## APPLICATIONS

- Optical Communication  
1600nm laser
- Medical Applications  
2.94 $\mu\text{m}$  laser

## PARAMETERS

### EMISSION CROSS SECTION

Wavelength (nm)	Emission Cross Section $10^{-19}\text{cm}^2$		
	a-cut	b-cut	c-cut
1079	2.05	1.76	1.38
1340	1.13	0.97	0.78
1432		0.34	



# Nd:YAP

## MATERIAL SPECIFICATIONS

Material	Nd: YAP
Orientation	<5°
Parallelism	≤10"
Perpendicularity	≤5'
Surface Finish	10-5 (MIL-O-13830A)
Wavefront Distortion	λ/8 @ 633nm
Surface Roughness	≤ λ/10 @632.8nm
Clear Aperture	>95 %
Length Tolerance	+0.5/-0mm
Thickness/Diameter Tolerance	±0.05 mm
Damage Threshold	≥500MW/cm <sup>2</sup>

## PHYSICAL AND CHEMICAL PROPERTIES

Crystal Structure	Orthorhombic- Pbnm
Lattice Constant	a=5,176, b=5,307, c=7,355
Density	5,35 g/cm <sup>3</sup>
Melting Point	1870°C
Thermal Conductivity	0,11 W/(cm K)
Thermo-optic Coefficient (dn / dT)	na:9.7×10 <sup>-6</sup> K <sup>-1</sup> nc:14.5×10 <sup>-6</sup> K <sup>-1</sup>
Thermal Expansion/ (10 <sup>-6</sup> •K <sup>-1</sup> @ 25°C)	9.5 (a axis), 4.3(b axis), 10.8(c axis)
Mohs Hardness	8.5
Shear Modulus/ Gpa	2.2×10 <sup>12</sup> dyn/cm <sup>2</sup>
Specific Heat	400 J/(kg K)
Linear Dispersion δn/δT[10 <sup>-6</sup> K <sup>-1</sup> ]	9.7 (na)

## OPTICAL AND SPECTRAL PROPERTIES

Laser Transition	<sup>4</sup> F <sub>3/2</sub> → <sup>4</sup> I <sub>9/2</sub> 930 nm <sup>4</sup> F <sub>3/2</sub> → <sup>4</sup> I <sub>11/2</sub> 1079 nm <sup>4</sup> F <sub>3/2</sub> → <sup>4</sup> I <sub>13/2</sub> < 1340 nm <sup>4</sup> F <sub>3/2</sub> → <sup>4</sup> I <sub>13/2</sub> 1432 nm
Laser Wavelength	930nm 1079nm 1340nm
Fluorescence Lifetime	170ms
Refractive Index@ 1064 nm	n <sub>a</sub> =1,929, n <sub>b</sub> =1,943, n <sub>c</sub> =1,952



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## SPECTRA

