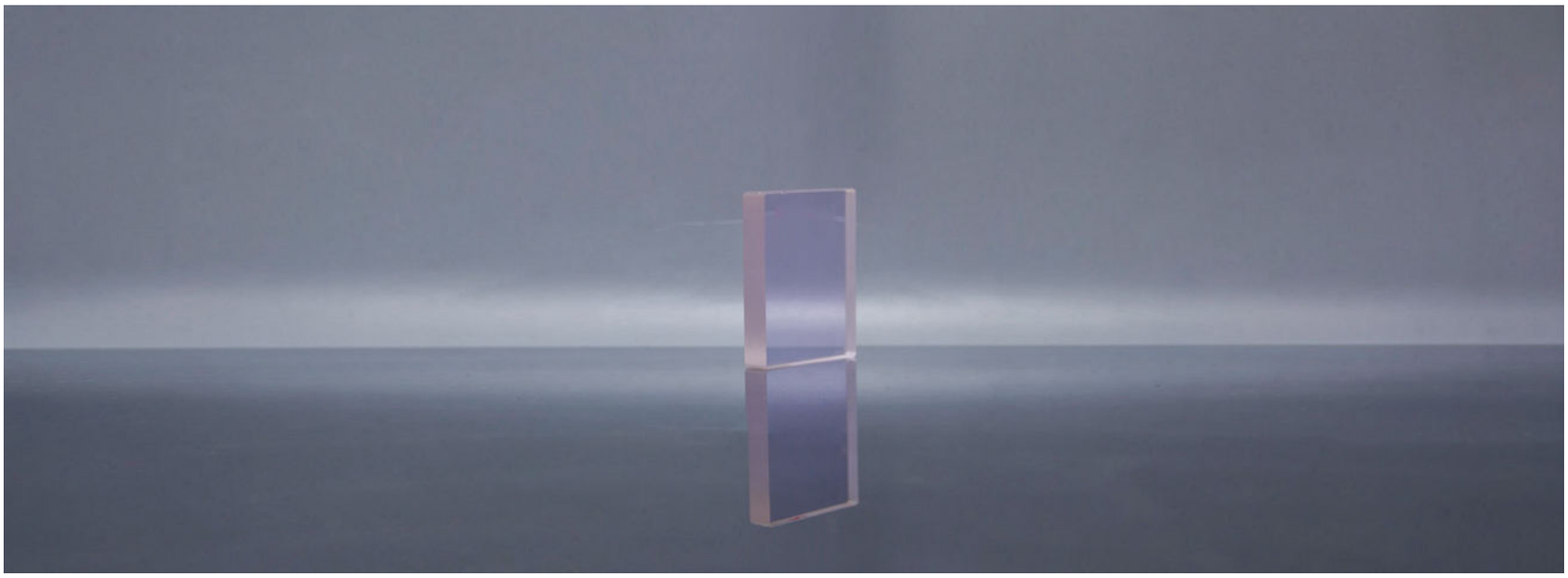
Nd:YAP



DESCRIPTION

The chemical formula of Nd: YAP is Nd3+: YAlO3, and 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 4F3/2–4 I13/2 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.

PARAMETER

Material and Specifications

Materials	Nd: YAP
Orientation	<5°
Parallelism	≤10″
Perpendicularity	≤5′
Surface Quality	10-5 (MIL-O-13830A)
Wavefront Distortion	λ/8 @ 633nm
Surface Flatness	≤ λ/10 @632.8nm
Clear Aperture	>95 %
Length tolerance	+0.5/-0mm
Thickness/Diameter Tolerance	±0.05 mm
Damage Threshold	≥500MW/cm2

FEATURES

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

APPLICATIONS

- 1600nm laser
- 2940μm laser

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Physical and Chemical Properties

Crystal Structure	orthorhombic – Pbnm
Lattice Constants	a=5,176, b=5,307, c=7,355
Density	5,35 g/cm3
Melting Point	1870°C
Thermal Conductivity	0,11 W/(cm K)
Thermal Optical Coefficient(dn/dT)	na:9.7×10-6 K-1 nc:14.5×10-6 K-1
Thermal Expansion/(10-6·K-1@25°C)	9.5 (a axis), 4.3(b axis), 10.8(c axis)
Hardness (Mohs)	8.5
Shear Modulus /Gpa	2.2×1012 dyn/cm2
Specific Heat	400 J/(kg K)
Linear dispersion δn/δT [10-6K-1]	9.7 (na)

Optical and Spectral Properties

Laser Transition	4F3/2→4I9/2 930 nm 4F3/2→4I11/2 1079 nm
	4F3/2→4I13/2 1340 nm 4F3/2→4I13/2 1432 nm
Laser Wavelength	930nm 1079nm 1340nm
Fluorescence Lifetime	170ms
Refractive index @1064 nm	na=1,929, nb=1,943, nc=1,952

Emission Cross Section

Wavelength (nm)	Emission Cross Section 10-19cm2		
	a-cut	b-cut	c-cut
1079	2.05	1.76	1.38
1340	1.13	0.97	0.78
1432		0.34	

SPECTRA