$Nd:GdVO_4$

DESCRIPTION

$Nd:GdVO_4$ Crystal (Neodymium-doped gadolinium orthovanadate) acts as a good gain medium in lasers. The output wavelength of Nd: $GdVO_4$ Crystal is mainly concentrated in 1060nm and 1340nm. $Nd:VO_4$ Crystal is well known in the solid laser field for its high chemical stability and its excellent laser performance. But it cannot be used in high power laser field because of its thermal conductivity coefficient is not high. Compared with $Nd:VO_4$ Crystal, It not only has many advantages of $Nd:VO_4$ Crystal, but also makes up for the shortage of $Nd:VO_4$ Crys-tal in the field of high-power laser due to its relatively high thermal conductivity. It has a very good development prospect.

The $Nd:GdVO_4$ Crystal is used as the gain medium and the wavelength is 1520nm for human eye safe laser motion in ranging, telemetry and other remote sensing applications.

The field of human eye security is between 1500nm to 1600nm. By the research of Raman scattering, it is found that the self-frequency Raman laser can move to 1174nm-1175nm. Therefore, $Nd:GdVO_4$ Crystal under pull-dif-fuse reflection can realize the development of a human eye safety laser with a wavelength of 1340nm and 1520nm. Such a laser can be widely used in various remote sensing applications and has a good development prospect.

FEATURES

- Large absorption coefficient and absorption band width, with small dependence on pump wavelength
- Good thermal conductivity
- Low laser threshold and high efficiency of laser output slope
- High laser damage threshold
- Good polarization of laser output

APPLICATIONS

- 1520nm laser is used for telemetry
- 1520nm laser is used for ranging
- 1520nm laser is used for remote sensing applica-tions

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PARAMETERS

PHYSICAL AND CHEMICAL PROPERTIES

Crystal Structure	tetragonal
Space Group	I41/amd
Density	5.47g/cm^3
Specific Heat @25oC	32.6 (cal/mol/K)
Mohs Hardness	4.6 – 5
Melting Point	1780 °C
Thermal Conductivity, W/(mxK): <110>	11.7Wm/K
Thermal Expansion Coefficient	α_a=1.5x10E^{-6}/K, α_c=7.3x10E^{-6}/K
Lattice Parameter (A)	a=7.21b=6.35

MATERIAL AND SPECIFICATIONS

Nd: Dopant Level	0.1 – 3.0 atm%
Standard Dimensions	4x4x8mm^3,3x3x5mm^3,3x3x3 mm^3, 3x3x1 mm^3
Wavefront Distortion	< l/8 at 633 nm
Orientation	+/−0.5deg.
Surface quality	10/5 Scratch/Dig per MIL-O-13830B
Flatness	l/10 at 633 nm
Clear Aperture	> Central 90%
Parallelism	< 10 arc sec.
Intrinsic Loss	< 0.1% cm^{-1}

OPTICAL AND SPECTRAL PROPERTIES

Lasing Transition	$^4F_{3/2}$ – $^4I_{1/2}$	
Lasing Wavelength	1062.9 nm, 1340.0 nm	
Emission Cross Section, (E ½ ½ c, at 1064 nm)	7.6×10−19cm²	
Peak Absorption Wavelength	808nm	
Absorption Cross Section, (E ½ ½ c, at 808 nm)	4.9×10−19cm²	
Absorption Linewidth	3 nm	
Relaxation Time of Terminal Lasing Level	100 μs	
Absorption Coefficient (1% Nd)	57 cm^{-1} with E//c @ 808 nm	
Index of Refraction (at 1064 nm):	n_o=1.972	n_e=2.192

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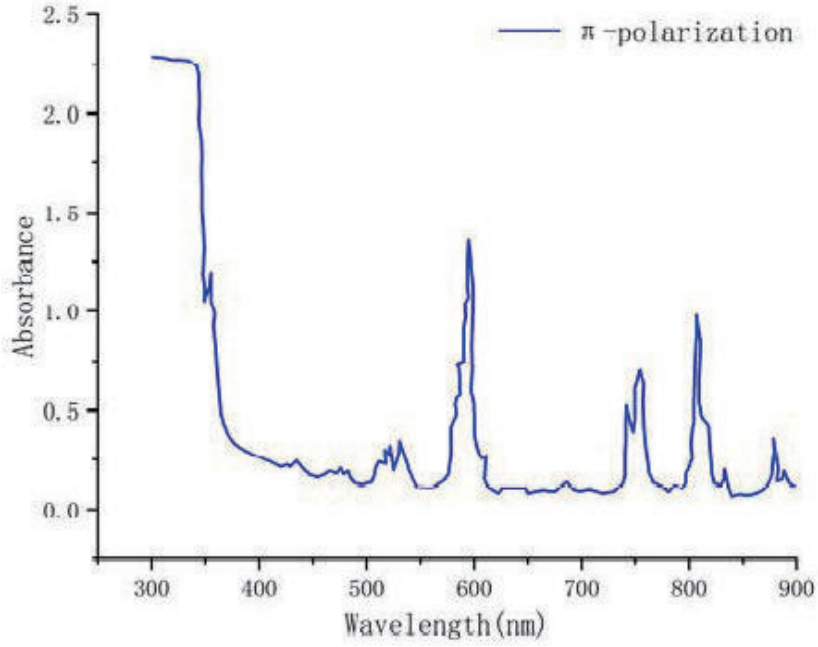
SPECTRA



π polarization absorption spectra of $NdGdVO_4$ crystal