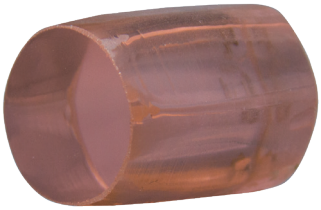


Laser Crystal
Ho:YAG

The radiation wavelength of Ho^{3+} ions is near 2100nm, which is located in the human eye safe band and has high transmittance in the atmosphere and has important application prospect in the fields of remote sensing detection, laser ranging, and laser radar, etc. Meanwhile, 2100nm locates in the absorption peak of the water molecule, which is highly absorbed by human tissues. When Ho laser is used for medical surgery, its penetration depth in the human body is only a few tens of micrometers, and it has little heat damage to the surrounding tissues of the human body. Therefore, it is widely used in medical surgery and treatment. Ho laser can also be used as a pump source, through the non-linear effect of crystal (such as ZGP crystal), an infrared laser with the wavelength of 3 ~ 5 μm can be realized.

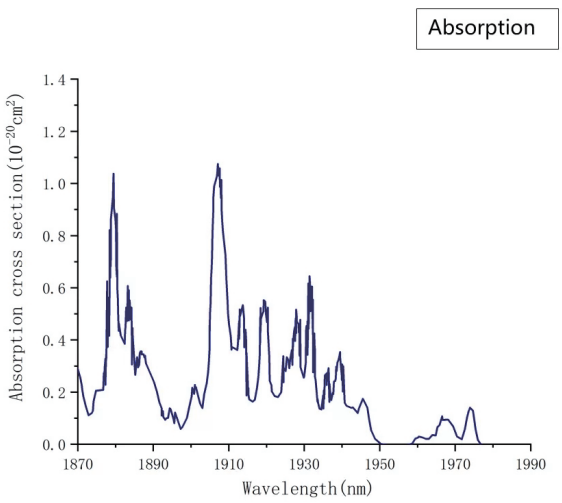
Key Features

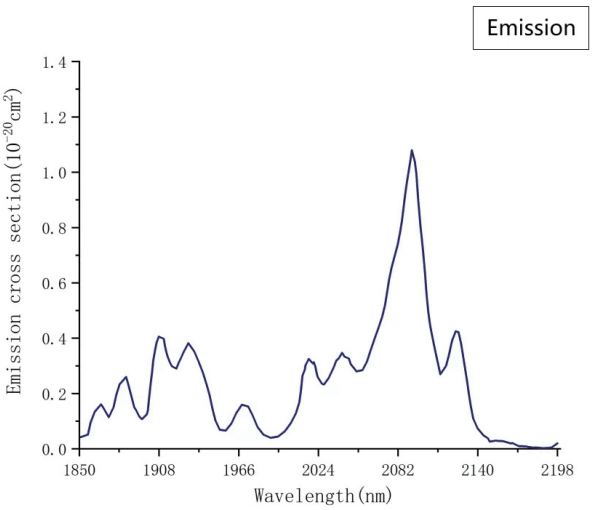
- High laser gain
- Safe for eyes and good atmosphere transmission
- High-energy storage capability
- Low quantum defect
- Long fluorescence life
- Large emission cross section
- High slope efficiency
- Low up-conversion loss and re-absorption loss

Applications

2100nm laser

Spectra





Technical Specifications

Spot Standard Products	
Size (mm^3)	Ø5*20
Doping	1at% Ho
End Surface	BW=60.9°

Material Specifications	
Materials	Ho: YAG
Concentration Tolerance (atm%)	0.2% ~3%(as per customers request)
Orientation	<111> crystalline direction
Parallelism	<10”
Perpendicularity	<5”
Surface Finish	10/5 Scratch/dig per
Wavefront Distortion	λ/8per inch @633nm
Surface Flatness	λ/10@ 633 nm
Clear Aperture	>90
Thickness/Diameter Tolerance	Rods with diameter:(+0、-0.05)mm,(±0.5) mm

Physical and Chemical Properties	
Crystal Structure	Cubic
Lattice Constant	12.01Å
Density	$4.56 g/cm^3$
Melting Point	1970°C
Thermal Conductivity	14W/m/K, 20°C; 10.5W/m/K, 100°C
Thermal Shock Resistance	790W/m
Thermal Optical Coefficient(dn/dT)	7.3×10^{-6}/ K
Thermal Expansion /（10^{-6}•K^{-1} @ 25°C）	[100]:8.2×10^{-6}/K@ 0~250℃; [110]:7.7×10^{-6}/K@0~250℃; [111]: 7.8×10^{-6}/K@0~250℃
Hardness (Mohs)	8.5
Young`s Modulus /GPa	$3.17\times104 Kg/mm^2$
Shear Modulus /Gpa	310GPa
Extinction Ratio	>28dB
Specific Heat	$0.59 J/g.cm^3$@0-20℃
Specific Heat	Insoluble in water, slightly soluble in ordinary acids
Poisson Ratio	0.3

Optical and Spectral Properties	
Laser Transition	$^5I_7 \rightarrow {}^5I_8$
Laser Wavelength	2.05μm
Effective Stimulated Absorption Cross	$1.09\times10^{-20} cm^2$
Effectively Stimulated Emission Cross	$1.14\times10^{-20} cm^2$
Pump Wavelength	1908 nm
Laser Wavelength	2090 nm
Fluorescence Lifetime	7 ms
Quantum Efficiency	1
Refractive Index @1.030 μm	1.82
Upper Conversion Loss Factor	$1.8, 2.6, 5.3\times10^{-18} cm^3/s$