

Neodymium Doped Gadolinium Orthovanadate (Nd:GdVO₄)

CASTECH's Nd:GdVO₄ is featured by

- Large stimulated emission cross section at laser wavelength;
- High absorption coefficient and wide bandwidth at pump wavelength;
- Low dependency on pump wavelength;
- Good thermal conductivity;
- Low lasing threshold and high slope efficiency;
- High laser induced damage threshold;
- Strongly-polarized laser output.

Specifications

Crystal Structure	Tetragonal
Space Group	I4 ₁ /amd
Lattice Parameter	a=0.721nm, b=0.635nm
Lasing Transition	$^4F_{3/2} \rightarrow ^4I_{11/2}$
Lasing Wavelength	1062.9nm
Emission Cross Section (at 1064nm)	$7.6 \times 10^{-19} \text{ cm}^2$
Absorption Cross Section (at 808nm)	$4.9 \times 10^{-19} \text{ cm}^2$
Absorption Coefficient (at 808nm)	74 cm^{-1}
Index of Refractivity (at 1064nm)	$n_o=1.972, n_e=2.192$
Thermal Conductivity (<110>)	11.7W/m/K
Density	5.47 g/cm^3
Nd Dopant Level(atomic)	0.1%, 0.2%, 0.3%, 0.5%, 0.7%, 1.0%...

Material Properties: Comparing Nd:GdVO₄ and Nd:YVO₄

Crystal	Nd:GdVO ₄		Nd:YVO ₄	
Crystal Structure, Space Group	Tetragonal, I4 ₁ /amd		Tetragonal, I4 ₁ /amd	
Lattice Constants(nm)	a:0.721	b:0.635	a:0.721	b:0.629
Melting Temperature(°C)	1780		1825	
Thermal Expansion @25°C, $\times 10^{-6}/^\circ\text{C}$	a	1.5	a	4.43
	b	7.3	b	11.4
Specific Heat @25°C, cal/mol·K	32.6		24.6	
dn / dT, $\times 10^{-6}/^\circ\text{C}$	4.7		2.7	

Information Regarding Neodymium Laser Host Crystals

Crystal	Nd:YVO ₄	Nd:GdVO ₄	Nd:YAG
Laser Wavelengths	1064.3nm,1342.0 nm	1062.9 nm,1340 nm	1064.2 nm,1338.2 nm
Emission Bandwidth (linewidth at 1064 nm)	0.8nm	No data	0.45nm
Effective Laser Cross Section (emission cross section at 1064 nm)	$15.6 \times 10^{-19} \text{ cm}^2$	$7.6 \times 10^{-19} \text{ cm}^2$	$6.5 \times 10^{-19} \text{ cm}^2$
Polarization	Parallel to c-axis	Parallel to c-axis	unpolarized
Radioactive Lifetime (microseconds) at 1% Nd Doping	~ 100 μs	~ 95 μs	230 μs
Pump Wavelength	808.5 nm	808.4 nm	807.5 nm
Peak Pump Absorption at 1% Doping	~ 41 cm^{-1}	~ 57 cm^{-1}	
Thermal Conductivity, W/m/K	5.1	11.7	14
Doping Concentration Range	0.1 - 3.0%	0.1 - 3.0%	0.1-2.0%

CASTECH Warranty on Nd:GdVO₄ Specifications

- Transmitting wavefront distortion: less than $\lambda/4$ @ 633nm
- Dimension tolerance: $(W \pm 0.1\text{mm}) \times (H \pm 0.1\text{mm}) \times (L + 0.2/-0.1 \text{ mm})$
- Clear aperture: >90% central area
- Flatness: $\lambda/8$ @ 633 nm, and $\lambda/4$ @ 633nm for thickness less than 2mm
- Scratch/Dig code: 10/5 to MIL-PRF-13830B
- Parallelism: better than 20 arc seconds
- Perpendicularity: 5 arc minutes
- Angle tolerance: $< \pm 0.5^\circ$
- AR coating: $R < 0.2\%$ at 1064nm,
- HR coating: $R > 99.8\%$ @ 1064nm, $T > 95\%$ @ 808nm
- Quality Warranty Period: one year under proper use.

公司简介 INTRODUCTION



CASTECH INC.

(CASTECH) was founded by Fujian Institute of Research on the Structure of Matter, Chinese Academy of Science in 1988. Thanks to long term interactive partnership with the leaders in laser system manufacturing industry and ongoing efforts of our employees, we have established the largest mass production lines in the world for LBO, BBO, Nd:YVO₄ and TGG crystals, and implemented a complete quality control system for our products.

CASTECH is now a worldwide leading supplier of nonlinear optical crystals, laser crystals, precision optics, and a variety of laser components. In CASTECH, there are Flux/Czochralski/Water Solution/Bridgman Crystal Growth production lines, Crystal Orientation and Dicing workshop, Optical Polishing workshop and Optical Coating workshop with IBS, IAD, MS and EB coating technique. Our commitments are backed by our huge manufacturing capacity.

CASTECH's quality system is IATF 16949:2016 and ISO 9001:2015 certified. We have established a complete system for outgoing parts inspection. Our optical testing equipments include Zygo Interferometers, Agilent Cary 7000, Perkin-Elmer Lambda 950, Nikon Microscope, Photo-Thermal Common-Path Interferometers, Zygo Newview 8300, Taylor Hobson LupoSan 260, Extinction Ratio Measurement and Ellipsometers. These equipments along with many others, ensure that we comply with all specifications for our products.

Today, over 60% of CASTECH's products are exported to USA, Japan, Europe and other Asia Market. We have established a global sales network. We have set up our agencies and distributors in the main industrial countries and districts.

Our mission is to deliver the best products and solutions to our customers in photonics industry, and help them to realize their full potential in business. Here at CASTECH, we value comity, integrity, honesty, and innovation.