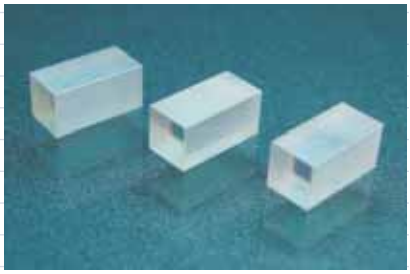
Nd:$GdVO_4$

Nd:$GdVO_4$(Neodymium doped Gadolinium Vanadate) Crystals is an excellent ideal laser host material for the DPSS (Diode pumped Solid State) micro/mini lasers due to its good physical, optical and mechanical properties. It offers higher slope efficiency than Nd:YAG crystal and better thermal conductivity, higher power output than Nd:YVO_4 crystal.

Specification:

Nd Dopant Level:	0.2-3atm%
Standard Dimension:	3x3mm x 3-12m^3
Orientation:	α-cut crystalline direction(+/-0.50)
Dimensional Tolerance:	+/-0.1mm(typical)
Wavefront Distortion:	<λ/8@632.8nm
Surface quality:	better than 20/10 Scratch/Dig
Parallelism:	< 10 arc seconds
Perpendicularity:	< 5 arc minutes
Surface Flatness:	<λ/10 at 632.8nm
Clear Aperture:	>Central 95%
Chamfer:	<0.15mmx45deg
Damage Threshold:	>15J/cm^2 (rods without coating) over 700 MW/cm^2 (coating)
Coating:	1.AR@1064nm R<0.1%
	2.AR@1064nm R< 0.1% & HT@808nm T>95%
	3.HR@1064nm R>99.8% & HR@532nm R>99% & HT@808nm T>95%



Properties:

Crystal Structure	Zircon Tetragonal, space group D_{4h}, a=b=7.21, c=6.35
Melting Point	1780°C
Density	5.47g/cm^3
Mohs Hardness	Glass-like, ~ 5
Thermal Expansion Coefficient	α_a=1.5x10^{-6}/K, ac=7.3x10^{-6}/K
Thermal Conductivity Coefficient	11.7 W/m/K <110>
Peak Absorption Wavelength	808.5 nm
Lasing Wavelength	912.6 nm, 1063.1 nm, 1341.3 nm
Crystal Class	Positive uniaxial, $n_o=n_a=n_b$ $n_e=n_c$ n_o=1.9854, n_e=2.1981, @ 1064nm n_o=2.038184, n_e=2.292962, @ 532nm n_o=1.9977322, n_e=2.219864, @ 808nm
Thermal Optical Coefficient	dn/dT=4.7x10^{-6}/K
Stimulated Emission Cross-Section	7.60x$10^{-19}$$cm^2$, @1064 nm^2
Fluorescent Lifetime Nd=1.2 atm%	95 μs (1 atm% Nd doped) @ 808 nm
Loss Coefficient	0.003 cm^{-1}@ 1064 nm
Absorption Coefficient Nd=1.2 atm%	74 cm^{-1} @ 808 nm (1.2%)
Absorption Length Nd=1.2 atm%	0.18 mm @ 808 nm
Intrinsic Loss Nd=1.2 atm%	Less 0.1% cm^{-1} , @1064 nm
Line width	0.6 nm
Polarized Laser Emission	π parallel to optic axis (c-axis)
Diode Pumped Optical to Optical Efficiency	> 60%
Sellmeier Equation (for pure $GdVO_4$ crystals)	n_o^2=4.734369+0.1216149/(λ^2-0.0523664)-0.013927λ^2 n_o^2=3.8987165+0.05990622/(λ^2-0.0514395)-0.011319λ^2

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