SCIENTIFIC MATERIALS CORP.
A FLIR Systems Company

Laser Materials Ho:YAG

General Information

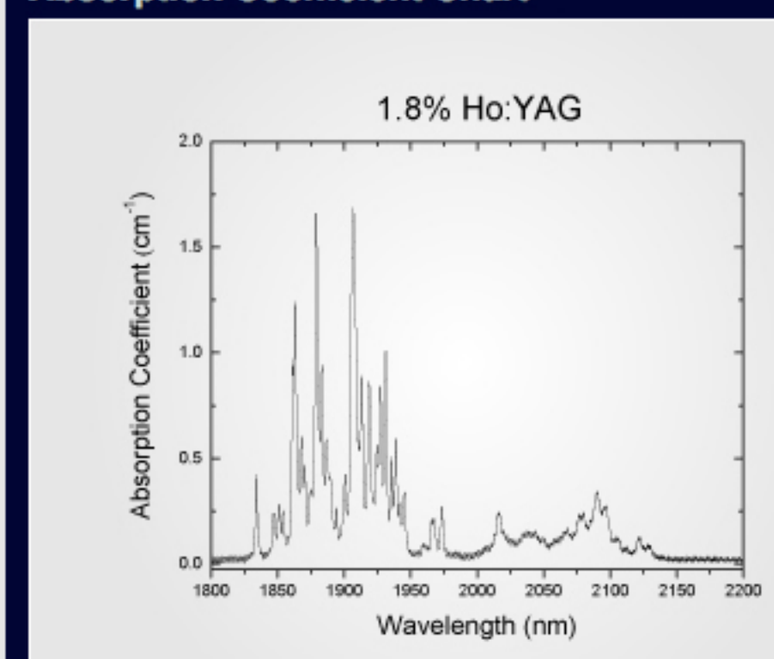
Ho^{3+} ions doped into insulating laser crystals have exhibited 14 inter-manifold laser channels, operating in temporal modes from CW to mode-locked [1]. Ho:YAG is commonly used as an efficient means to generate 2.1-µm laser emission from the $^5I_7$ - $^5I_8$ transition, for applications such as laser remote sensing, medical surgery, and pumping Mid-IR OPO's to achieve 3-5micron emission. Direct diode pumped systems [2], [3] and Tm: Fiber Laser pumped systems[4] have demonstrated hi slope efficiencies, some approaching the theoretical limit.

Contact us with your specific requirements or for availability and pricing.

Dopant Ion

Ho3+ concentration range	0.005 - 100 atomic %
Dopant Ion Density @ 1 atomic %	
Y3+ Site	1.38×10^{20} cm^{-3}
Al3+Site (IV)	1.38×10^{20} cm^{-3}
Al3+Site (VI)	0.92×10^{20} cm^{-3}

Absorption Coefficient Chart



Common Operating Specs

Emission Wavelength	2.01 µm
Laser Transition	$^5I_7 \rightarrow {}^5I_8$
Flouresence Lifetime	8.5 ms
Pump Wavelength	1.9 µm

Physical Properties

Coefficient of Thermal Expansion	6.14×10^{-6} K^{-1}
Thermal Diffusivity	0.041 cm^2 s^{-2}
Thermal Conductivity	11.2 W m^{-1} K^{-1}
Specific Heat (Cp)	0.59 J g^{-1} K^{-1}
Thermal Shock Resistant	800 W m^{-1}
Refractive Index @ 632.8 nm	1.83
dn/dT (Thermal Coefficient of Refractive Index) @ 1064nm	7.8 10^{-6} K^{-1}
Molecular Weight	593.7 g mol^{-1}
Melting Point	1965°C
Density	4.56 g cm^{-3}
MOHS Hardness	8.25
Young's Modulus	335 Gpa
Tensile Strength	2 Gpa
Crystal Structure	Cubic
Standard Orientation	<111>
Y3+ Site Symmetry	D_2
Lattice Constant	a=12.013 Å

References

1)A. A. Kaminskii, "Crystaline Lasers: Physical Processes and Operating Schemes", CRC Press, (1996), Section 1.4.5, ISBN:0-8493-3720-8

2)Early work on diode pumping of Ho:YAG can be found in: T.Y. Fan, et al., Opt. Lett., 12, 678 (1987) along with R. Allen et al., Electron. Lett., 22, 947 (1986).

3) 3 S. Lamrini, et al., "High-Power Ho:YAG Laser in-Band Pumped by Laser Diodes at 1.9 ?m and avelength-Stabilized by a Volume Bragg Grating" ASSP 2010 Technical Digest, ISBN 978-1-55752-883-4.

4) Xiaodong Mu, et al., "High Efficiency, High Power 2.097-µm Ho:YAG Laser", ASSP 2010 Technical Digest, ISBN 978-1-55752-883-4

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