Yb:CALGO

DESCRIPTION

Yb:CALGO crystal product, also known as ytterbium calcium aluminum gadolinium oxide crystal, with the chemical formula of Yb^{3+}:$CaGdAlO_4$, is a laser gain crystal with good comprehensive performance. The Yb doped crystal used by calgo for high power and ultra short (femtosecond) lasers shows that the Yb doped $CaGdAlO_4$ crystal has shown excellent performance in producing high power and ultra short laser pulses.

This crystal has remarkable thermal, spectroscopic and mechanical properties, and can efficiently and safely generate short duration continuous wave radiation and ultrafast pulses. More specifically, its excellent thermo optical characteristics and high conversion efficiency allow high-power operation. Its high nonlinear coefficient is helpful to optimize the research of mode-locked laser. In addition, its ultra wide and flat top emission band is conducive to the generation of complex structured light with excellent adjustability.

Yb:CALGO has the main characteristics of high absorption coefficient at 979 nm, high excited emission cross section, low laser threshold, extremely low quantum defects, wide emission spectrum of 994 – 1050 nm and high slope efficiency of diode pumping.

Recently, it has been found that Yb^{3+}:$CaGdAlO_4$ is very interesting for the development of diode pumped short pulse mode-locked lasers. Compared with Ti: sapphire crystal (since the early 1990s, the ultrashort laser system developed by using chirped pulse amplification technology can produce very short and powerful pulses), Yb:CALGO can directly pump semiconductor lasers (green laser pumped Ti: sapphire crystal) with very high efficiency and high power.

FEATURES

- High thermal conductivity
- Big gain bandwidth
- Broad and smooth launch of bandwidth
- Low temperature gradient refractive index
- High power InGaAs laser diode cover absorption band

APPLICATIONS

- BAW equipment
- Femtosecond laser technology
- Solid femtosecond oscillators
- Double color double pulse scheme
- Short pulse mode locked laser diode pump

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MATERIAL SPECIFICATIONS

Doping concentration	1-10%
Parallelism	10″
Vertical	10‘
The surface quality	October 20th
The surface roughness	<λ/10@632.8nm
Clear aperture	>90%
Chamfering	0.1mm@45°
The thickness/diameter tolerance	±0.05 mm

PHYSICAL AND CHEMICAL PROPERTIES

Chemical formula	Yb:$CaGdAlO_4$ (Yb:CALGO)
The crystal structure	Tetragonal crystal system K_2NiF_4 type structure
Melting point	1840°C
Coefficient of thermal conductivity/（$W\cdot m^{-1}\cdot K^{-1}$）	11.4(not doping)
	6.3(2% Yb:CALGO)
	5(5% Yb:CALGO)
Thermal shock resistance($W.m^{-1}$ / 2）	>4.5
Thermal expansion rate/（$10^{-6}\cdot K^{-1}$）	35
Thermal expansion rate /（$10^{-6}\cdot K^{-1}$@25°C）	7.8

OPTICAL PROPERYIES

Emission bandwidth * (FWHM) (nm)	80
Emission wavelength (nm)	1018-1052
Minimum duration of theory (fs)	14
The emission peak (nm)	1050
Absorption (usually pump) (nm)	980
Emission cross section (10^{-20} cm^2)	0.8
Fluorescence lifetime （μs）	420
$\sigma_{em}\tau$（μscm^2）	336
The quantum defect	<0.8%

OPTICAL PROPERYIES

Material	Shoot the bandwidth (FWHM)	Theory of minimum duration (fs)	The emission peak	Absorption (usually pump) (nm)
Yb:YAG	9	124	1031	942
Yb:Glass	35	31	1020	975
Yb:GdCOB	44	26	1044	976
Yb:BOYS	60	18	1025	975
Yb:KGW	25	44	1023	981
Yb:KYW	24	46	1025	981
Yb:SYS	73	16	1040	979
Yb:YVO_4	30	36	1008	984
Yb:CaF_2	30	36	1047	980
Yb:CALGO	80	14	1050	980

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SPECTRA