Yb:CALGO Yb-doped $CaGdAlO_4$

DESCRIPTION

Yb:$CaGdAlO_4$ (Yb:CALGO)- Yb doped crystals for high power and ultrashort(femtosecond) lasers.
Yb-doped $CaGdAlO_4$ crystal (Yb:CALGO) is now recognized to exhibit outstanding properties for the production of high-power and ultra-short laser pulses. It has the broad and smooth emission bandwidth to generate very short pulses (<100 fs). Additionally its' high thermal conductivity make it is able to hold high power pumping(2 at. % Yb:CALGO thermal conductivity to be 6.9 and 6.3 WK^{-1} m^{-1} along the a and c axis); The generation of both very short pulse and high average power femtosecond oscillators has been demonstrated.
Yb^{3+}:$CaGdAlO_4$ has been recently demonstrated to be very interesting for the development of diode–pumped short-pulsed modelocked lasers. Compared with Ti: Sapphire crystal（the choice for the development of ultrashort laser system producing very short and powerful pulses using the Chirped Pulse Amplification technique ，Since the beginning of the 90's）,Yb:CALGO can be directly pumped by very efficient and high power semiconductor laser.(Titanium Sapphire crystal pumped by green laser)

FEATURES

- High thermal conductivity
- Large gain bandwidth
- Broad and smooth emission bandwidth
- Low refractiveindex-temperature gradient
- Absorption band is covered by high-power InGaAs laser diodes

APPLICATIONS

- Solid state femtosecond oscillators
- Ultrafast solid-state laser——time-resolved spectroscopy, multiphoton imaging, micromachining,
- refractive surgery, acceleration of particles, X-rays generation, fusion, etc.
- BAW device
- Diode–pumped short-pulsed modelocked lasers
- Femtosecond lasers technology
- Bicolor double-pulse regime

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PARAMETERS

MATERIAL AND SPECIFICATIONS

Property	Value
Doping Concentration	1-10%
Parallelism	10
Perpendicularity	10 ′
Surface Quality	20/10
Surface Flatness	<λ/10@632.8nm
Clear Aperture	>90%
Chamfer	0.1mm@45°
Clear Aperture	>90%
Chamfer	0.1mm@45°
Thickness/Diameter Tolerance	±0.05 mm

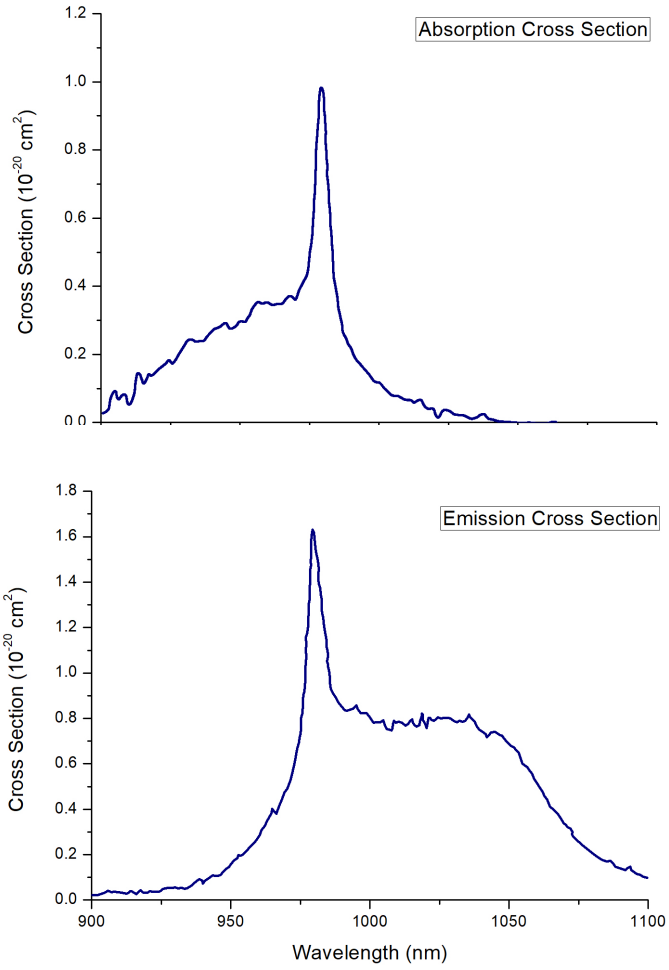
PHYSICAL AND CHEMICAL PROPERTIES

Property	Value
Formula	Yb:$CaGdAlO_4$ (Yb:CALGO)
Crystal Structure	Tetragonal K_2NiF_4 type structure
Melting Point	1840°C
Thermal Conductivity/($W \cdot m^{-1} \cdot K^{-1}$)	11.4(undoped) 6.3(2% Yb:CALGO) 5(5% Yb:CALGO)
Thermal Shock Resistance($W.m^{-1/2}$)	>4.5
Thermal Expansion /($10^{-6} \cdot K^{-1}$ @25°C)	7.8
Thermal Expansion /($10^{-6} \cdot K^{-1}$)	35

OPTICAL AND SPECTRAL PROPERTIES

Property	Value
Emission band width* (FWHM) (nm)	80
Emission Wavelength(nm)	1018-1052
Minimum theoretical duration (fs)	14
Central emission peak (nm)	1050
Absorption (usual pumping) (nm)	980
Emission cross section(10^{-20} cm^2)	0.8
Fluorescence lifetime (μs)	420
σ_{em} τ(μscm^2)	336
Quantum Defect	<0.8%

SPECTRA



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Main properties of laser materials involved in the development of femtosecond lasers

Quantum Defect	Emission band width (FWHM) (nm)	Minimum theoretical duration (fs)	Central emi ssion peak (nm)	Absorption (usual pumping) (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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