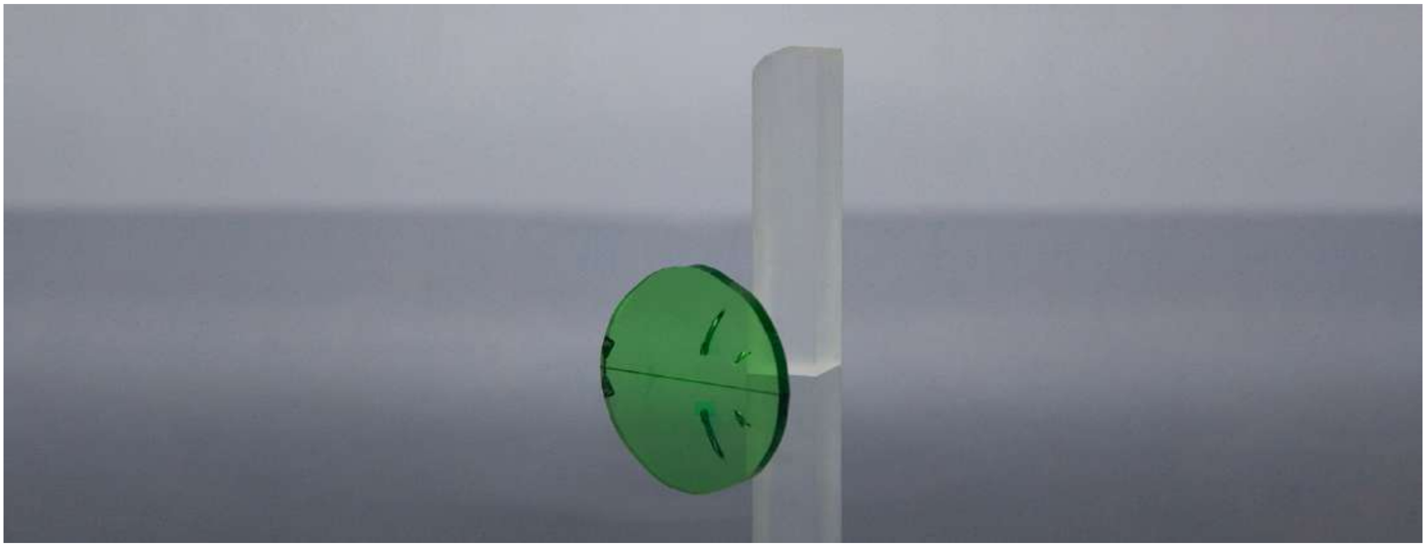
Ce:LiCAF



DESCRIPTION

Ce:LiCAF is perhaps the most extensively studied as a laser and amplifier material because of the absence of color center formation and solarization effects, therefore enabling high-power UV emission. Efficient UV generation through lasing techniques and/or amplification heavily relies on crystal quality and pumping configuration. The gain spectra of Ce:LiCAF is in the range 280–320 nm and is characteristic of the Ce3+ 5d1–4f1 interconfigurational transition. Ce3+-doped colquiriite LiCaA1F6 single crystals (LiCAF:Ce) are not only excellent u.v. fluorescers, but they also exhibit broadband tunable gain in u.v. under pulsed pumping at 266nm. UV solid-state laser materials that are continuously tunable over 4000cm−1, such as and Ce:LiCAF, could service numerous scientific, engineering, and medical applications. This material may also be suited to remote-sensing applications, since molecules such as ozone and aromatic-based compounds have characteristic absorption bands in the UV. For example, the UV tunability provided by Ce:LiCAF could serve as the basis for a UV differential-absorption lidar system that would have the versatility of continuously variable wavelengths. The reliability, compactness, nontoxicity, and high efficiencies offered by solid-state lasers provide many advantages over other tunable coherent ultraviolet sources, such as frequency-doubled dye lasers. Applications in inhospitable environments may also be rendered more practical with an all-solid-state UV source.

APPLICATIONS

- Scintillator
- Tunable ultraviolet lasers
- Remote-sending applications
- Power UV laser amplifiers
- Ultrafast pulse generation and amplification

FEATURES

- The gain spectra in the range 280–320 nm
- Absence of solarization effects
- be directly pumped
- Characteristic of the Ce^{3+} 5d1–4f1 interconfigurational transition
- Transparency, tolerance to laser-induced damage
- Broad UVtunability (from 280 to 325 nm)
- Can be directly pumped at 266 nm by the fourth harmonic generation of Nd:YAG laser

Ce:LiCAF

PARAMETERS

Material and Specifications

Orientation Tolerance	5´
Parallelism	<10″
Perpendicularity	5´
Chamfer	0.1mm@45°
Surface Quality	10/5 or better
Wavefront Distortion	λ/8 @632.8 nm
Surface Flatness	λ/10 @632.8 nm
Clear Aperture	>95%
Diameter Tolerance	+0/-0.05mm
Length Tolerance	±0.1mm
Coatings	As per requirement
Dopant Concentration Tolerance	0.001

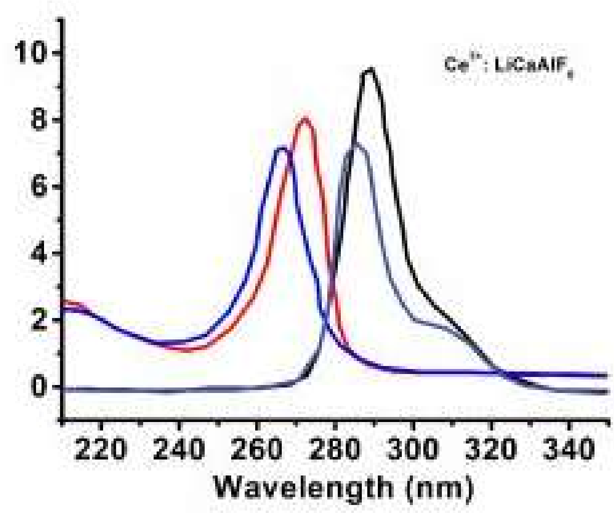
Optical characteristics

Absorption Peak Wavelength(nm)	640
Absorption Cross-section (10-18cm2)@266nm	7.3(π), 5.8(σ)
Absorption Coefficient@266nm	4cm-1
Refractive Index	n=1.41
Laser Wavelength(nm)	266
Fluorescence Lifetime(μs)	25
Spontaneous Emission Constant (10-10cm·s-2)	0.2
Emission Cross-section (10-18cm2)@290nm	9.6(π), 6.2(σ)
Laser Threshold(μJ)	15-25
Estimated Pumping Efficiency	50(π), 33(σ)
ESA Cross-section (10-18cm2)@266nm	5.5π), 6.2(σ)
Gain Cross-section (10-18cm2)@290nm	6.0(π), 4.0(σ)
Saturation Fluence(mJ/cm2)	115

Physical and Chemical Properties

Crystal Structure	Trigonal
Space Group	P31C
Lattice Constants	a=4.9808, c=9.6052Å @1mol%CeF3
Density (g/cm3)	2.94
Melting Point	766°C
Thermal Conductivity(W·m-1·K-1)	3.09-2.9
Thermal Expansion(10-6K-1)	24.3(∥a), 2.7(∥c)

Spectrum



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