

DESCRIPTION

Calcium fluoride(CaF₂) is a very important optical functional crystal, which has good optical properties, mechanical properties and chemical stability. It can be used as optical crystal, laser crystal and inorganic scintillation crystal. It has a wide transmittance range (0.125-10 μm), and is widely used as optical medium from vacuum ultraviolet to mid infrared. CaF₂ crystal is an ideal optical material for achromatic lenses because of its special refractive index and relative dispersion. At present, deep UV excimer laser lithography is developing from 193 nm to 121 nm. CaF₂ single crystal has the advantages of good ultraviolet transmittance, high laser damage resistance threshold, low stress birefringence and high refractive index, which makes it the best choice for the research of deep UV excimer laser lithography. In terms of laser applications, laser diode pumped CaF₂ crystals activated by Er³⁺, Tm³⁺, Yb³⁺ and other 3-valent rare earth ions were obtained at room temperature.

APPLICATIONS

- Optical crystal, laser crystal(IR, UV, VUV)
- Optical media and optical material
- Best material for the study of deep UV excimer laser lithography
- Substrate, optical waveguide
- IR analytic, astronomical-und camera lenses and optics for Excimer laser

FEATURES

- Excellent transmission from 125nm to 10um
- Good optical properties, mechanical behavior and chemical stability
- Anisotropy, soft and brittle, high coefficient of thermal expansion and easy cleavage
- Special refractive index and relative dispersion value
- Soluble in acids
- Practicality of a certain wavelength bandwidth
- Good ultraviolet transmittance, high laser damage resistance threshold, low stress birefringence and high refractive index



CaF₂

PARAMETERS

Material and Specifications

Orientation	[100] or [001] < ±0.5°
Orientation Tolerance	< 0.5°
Parallelism	<20"
Perpendicularity	5'
Surface Quality	10-5 (MIL-O-13830A)
Wavefront Distortion	<λ/4@633 nm
Surface Flatness	<λ/8 @633 nm
Clear Aperture	>90%
Thickness/Diameter Tolerance	±0.05 mm

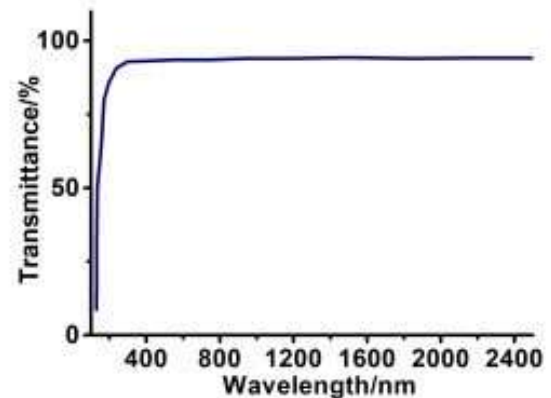
Physical and Chemical Properties

Crystal System	Isometric
Habit	Cubic, massive
Space Group	Fm3m
Class (H-M)	m3m (4/m 3 2/m) – Hexoctahedral
Lattice Constants	5.4626
Z	4
Streak	White
Density	3.175...3.56g/cm ³
Melting Point	1418°C
Thermal Conductivity (W·m ⁻¹ ·K ⁻¹ @25°C)	9.71@[111]
Heat Capacity (J·(kg·K) ⁻¹)	854
Thermal Expansion (10 ⁻⁶ ·K ⁻¹ @25°C)	18.9
Young's Modulus /GPa	75.8
Tenacity	Brittle
Cleavage Quality	Perfect, perfect and easy
Hardness (Mohs)	4
Fracture	Conchoidal

Optical characteristics

Transmission Range	0.125 – 10 μm
Refractive Index	1.432-1.436
Reflective Loss	2.89@4μm
Optical Character	Isotropic
Surface Relief	Moderate
Birefringence	None
Pleochroism	Absent
Dispersion	0.007
Poisson Ratio	0.29
Dielectric Constant	6.76

Spectrum



Index of Refraction

λ(μm)	n	λ(μm)	n	λ(μm)	n
0.18	1.51	0.32	1.45	5.82	1.39
0.19	1.5	0.43	1.44	6.2	1.38
0.21	1.49	0.88	1.43	6.71	1.37
0.22	1.48	2.67	1.42	7	1.36
0.24	1.47	3.94	1.41	7.53	1.35
0.27	1.46	5.01	1.4	8.22	1.34

