



CLBO, Lithium Cesium Borate :

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CLBO cesium lithium borate (CsLiB6O10, CLBO) is an emerging crystal material with excellent deep ultraviolet nonlinear properties, mainly used in semiconductor detection, micro lithography technology, biomedicine, ultraviolet radar and other fields. CLBO crystal has the advantages of wide spectral range, large temperature tolerance, large reception angle, small dispersion angle, and high conversion efficiency. Therefore, CLBO is a very outstanding harmonic generator in the ultraviolet band (4HG&5HG of Nd: YAG lasers, Class I SHG wavelengths up to 237nm).

Main features:

Short wave cut-off wavelength up to 180nm

High conversion efficiency of Nd: YAG laser

Large effective nonlinear coefficient (about twice the KDP)

Large reception angle and small discrete angle

A vacuum UV light output of 193nm can be obtained by phase matching

Short growth period and can grow large-size crystals

Materials Properties:

Crystal structure	Tetragonal crystal system, the space group
Crystal lattice parameters	a=b=10.494Å , c=8.939Å
Symmetry	Z=4
Melting point	About 844.5°C
Photo-permeability range	180-2750nm
Effective nonlinear coefficient	1.01dm/V @ 532nm , 1.16dm/V @ 488nm , 0.95dm/V
Damage threshold	26GW/cm ²
walk-off angle	1.78°@1064nm , 1.83°@ 532nm , 0.98°@ 488nm
Angle allowable amplitude (mrad·cm)	1.02 @ 1064nm , 0.49 @ 532nm , 0.84 @ 488nm
Wavelength allowable amplitude (nm·cm)	7.03 @ 1064nm , 0.13 @ 532nm , 0.09 @ 488nm
Temperature allowable amplitude (°C·cm)	9.4
Nonlinear optical coefficient	d _{eff(I)} =d ₃₆ sinθmsin(2 φ) d _{eff(II)} =d ₃₆ sin(2θm)cos(2 φ)
Sellmeier Equation (λ in μm)	CLBO @ 20°C n _{o2} =2.2104+0.01018/(λ ² -0.01424) -0.01258λ ² n _{e2} =2.0588+0.00838/(λ ² -0.01363) -0.00607λ ² (0.1914 < λ < 2.09 μm)

Comparison of Nonlinear Optical Parameters between CLBO and BBO Crystals:

Wavelength	Crystal	Phase	Effective	Angle allowed	walk-	wavelength	Temperature
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(nm)		matching angle (°)	nonlinear optical constants (pm/V)	amplitude (mrad·cm)	off angle (°)	allowed amplitude (nm·cm)	allowed amplitude (°C·cm)
532+532=266	CLBO	61.7	0.84	0.49	1.83	0.13	8.3
	BBO	47.7	1.32	0.17	4.80	0.07	4.5
1064+266=213	CLBO	68.4	0.87	0.42	1.69	0.16	4.6
	BBO	51.1	1.26	0.11	5.34	0.08	3.1

Product Parameter:

Dimensional tolerance	(W±0.1mm)x(H±0.1mm)x(L+0.5mm/-0.1mm) (L ≥ 2.5mm) (W±0.1mm)x(H±0.1mm)x(L+0.1mm/-0.1mm) (L < 2.5mm)
Optical aperture	≧ 90%
Wavefront distortion	≧ λ/8 @ 633nm
Flatness	λ/8 @ 633nm
Finish	10/5
Parallelism	≧ 20"
Verticality	≧ 5'
Angular deviation	△θ ≧ 0.25°, △φ ≧ 0.25°
Coating film	customized