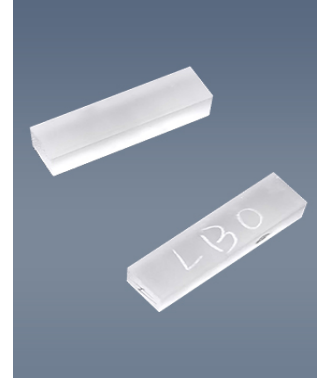


Lithium Triborate LiB_3O_5 (LBO)

Introduction:

Lithium Triborate LiB_3O_5 (LBO) crystal is an excellent frequency crystal, which is a widely used frequency doubling device. The crystal has good optical uniformity, wide penetration band, and high matching efficiency and laser damage threshold. LBO crystals have stable chemical properties, high mechanical hardness, low deliquescence and birefringence less than BBO crystals, so help to limit the phase matching spectral range.



Main advantages:

- ✧ Wide range of light transmittance band (160-2600nm);
- ✧ Good optical uniformity ($n \cdot 10^{-6}/\text{cm}$), less internal inclusion;
- ✧ High multiple frequency conversion efficiency (equivalent to 3 times that of the KDP crystal);
- ✧ High damage threshold value (1053nm laser with 1.3ns pulse width $10\text{GW}/\text{cm}^2$);
- ✧ Wide reception Angle, small discrete Angle;
- ✧ Class I, class II non-critical phase matching (NCPM) band range is wide; Spectral non-critical phase matching (NCPM) is close to 1300nm.


Typical application:

- ✧ 1. Double frequency: Nd: YAG laser; High-power Nd: YAG and Nd: YLF laser for scientific research and military purposes; Nd: YVO₄, Nd: YAG and Nd: Pump of YLF laser; Ruby, Ti: Sapphire and Cr: LiSAF Laser.
- ✧ 2. Triple-frequency: Nd: YAG and Nd: YLF laser; Optical Parametric amplifier (OPA) and optical parametric oscillator (OPO); High power 1340nm Nd: double, triple frequency of YAP laser.

Material Properties:

Crystal Structure	Orthorhombic, Space group Pna21, Point group mm ²
Lattice Constant	a=8.4473Å, b=7.3788Å, c=5.1395Å
Melting Point	About 834°C
Mohs Hardness	6
Density	2.47g·cm ³
Thermal-conductivity Coefficient	3.5W·m ⁻¹ ·K ⁻¹
Thermal Expansivity	$\alpha_x=10.8 \times 10^{-5}/\text{K}$, $\alpha_y=-8.8 \times 10^{-5}/\text{K}$, $\alpha_z=3.4 \times 10^{-5}/\text{K}$
Transmission Band Range	160nm-2600nm
Phase Matching Range	551nm-2600nm (Type I) 790nm-2150nm (Type II)
Thermo-optical Coefficient	$dn_x/dT=-9.3 \times 10^{-6}$
	$dn_y/dT=-13.6 \times 10^{-6}$
	$dn_z/dT=(-6.3-2.1) \times 10^{-6}$
Absorption Coefficient	< 0.1%/cm @ 1064nm < 0.3%/cm @ 532nm
Acceptance Angle	6.54 mrad·cm ⁻¹ (ϕ , Type I, 1064 SHG)

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	15.27 mrad·cm ⁻¹ (q, Type II, 1064 SHG)
Temperature Acceptance Angle Width	4.7°C·cm ⁻¹ (Type I, 1064 SHG)
	7.5°C·cm ⁻¹ (Type II, 1064 SHG)
Spectral Reception	1.0nm·cm ⁻¹ (Type I, 1064 SHG)
	1.3nm·cm ⁻¹ (Type II, 1064 SHG)
Walk Off Angle	0.60° (Type I 1064 SHG)
	0.12° (Type II 1064 SHG)
Non-linear Coefficient	deff(I)=d32cosφ (Type I in XY plane)
	deff(I)=d31cos2θ+d32sin2θ (Type I in XZ plane)
	deff(II)=d31cosθ (Type II in YZ plane)
	deff(II)=d31cos2θ+d32sin2θ (Type II in XZ plane)
Nonlinear Magnetization Coefficient	d31=1.05 ± 0.09 pm/V d32= -0.98 ± 0.09 pm/V
	d33=0.05 ± 0.006 pm/V
Sellmeier Equation [λ in μm]	$n_x^2=2.454140+0.011249/(\lambda^2-0.011350)-0.014591\lambda^2-6.60\times 10^{-5}\lambda^4$
	$n_y^2=2.539070+0.012711/(\lambda^2-0.012523)-0.018540\lambda^2+2.0\times 10^{-4}\lambda^4$
	$n_z^2=2.586179+0.013099/(\lambda^2-0.011893)-0.017968\lambda^2-2.26\times 10^{-4}\lambda^4$

Crystro offers:

Dimensional Tolerance	(W±0.1mm) × (H±0.1mm) × (L+0.5/-0.1mm) (L≥2.5mm)
	(W±0.1mm) × (H±0.1mm) × (L+0.1/-0.1mm) (L<2.5mm)
Angle Tolerance	Δθ ≤ 0.25° Δφ ≤ 0.25°
Clear Aperture	90%
Damage Threshold [GW/cm ²]	>10 @1064nm, TEM00, 10ns, 10Hz (Polish)
	>1 @1064nm, TEM00, 10ns, 10Hz (AR Coated)
	>0.5 @532nm, TEM00, 10ns, 10Hz (AR Coated)
Flatness	< λ/8@633nm
Parallelism	< 20"
Perpendicularity	≤ 5'
Surface Quality[S/D]	< 10/5
Wavefront Distortion	< λ/8@633nm
Internal Quality	50mW green light detection without dispersion
Warranty	One year

Note: Above parameters for reference only, please contact our sales Rep. for your specific requirement.