

LBO crystals

Main features

- Broad transparency range from 155 nm to 3200 nm
- Absence of photochromic damage (gray-tracking)
- Highest damage threshold among common nonlinear crystals
- Small walk-off angle at room temperature, no walk-off at NCPM regime
- Wide acceptance angle
- Temperature tunable type I and II non-critical phase-matching
- Custom size, orientation and coatings are available upon

Application examples

- Sum-frequency generation of 532 nm and 1064 nm to produce 355 nm UV radiation
- Widely tunable OPOs in NIR range pumped by second harmonic of Nd-doped lasers
- Efficient second harmonic generation at 1064 nm without walk-off effect (NCPM, $t = 149^\circ\text{C}$)

Lithium Triborate (LiB₃O₅, LBO) crystals feature a broad transparency range, wide acceptance angle, small walk-off angle and the highest damage threshold among common nonlinear crystals. Most common applications include high-power near-infrared wavelength second harmonic generation, sum frequency generation to produce visible, ultraviolet laser light and visible, near-infrared widely tuned optical parametric oscillators.

Standard specifications

LBO CRYSTALS	
Orientation accuracy	<30 arcmin
Clear aperture	>90%
Face dimensions tolerance	+0,0/-0,1 mm
Length tolerance	±0,1 mm
Parallelism error	<20 arcsec
Perpendicularity error	<10 arcmin
Protective chamfers	<0,1 mm at 45°
Surface quality	10-5 S-D
Wavefront distortion	<λ/4@632,8 nm
Coatings	AR coatings on both sides
Laser induced damage threshold	>1 GW/cm ² @1064 nm, 10 ns
Mount	Unmounted

Properties

PHYSICAL AND OPTICAL PROPERTIES	
Chemical formula	LiB ₃ O ₅
Crystal structure	Orthorhombic, mm ²
Lattice parameters	a = 8,46 Å, b = 7,38 Å, c = 12,717 Å
Optical symmetry	Negative biaxial (2V _x = 109,2° @0,5321 μm)
Density	2,474 g/cm ³
Mohs hardness	6-7
Transparency range	155 nm - 3,2 μm @"0" transmittance level
Sellmeier equations @T = 293 K (λ in μm)	$n_x^2 = 2,4542 + 0,01125/(\lambda^2 - 0,01135) - 0,01388 \lambda^2$ $n_y^2 = 2,5390 + 0,01277/(\lambda^2 - 0,01189) - 0,01849 \lambda^2$ $+ 4,3025 \times 10^{-5} \lambda^4 - 2,9131 \times 10^{-5} \lambda^6$ $n_z^2 = 2,5865 + 0,0131/(\lambda^2 - 0,01223) - 0,01862 \lambda^2 + 4,5778 \times 10^{-5} \lambda^4 - 3,2526 \times 10^{-5} \lambda^6$
Refractive indices	$n_x = 1,5656$; $n_y = 1,5905$; $n_z = 1,6055$ @1064 nm

Guidance

Optogama provides guidance and theoretical calculations for particular LBO applications. Contact us and we will help you to configure your crystal.

Standard products

FACE DIMENSIONS	LENGTH	THETA	PHI	COATINGS	APPLICATION	SKU
3 x 3 mm	10 mm	90°	11,6°	AR/AR@532+1064 nm	SHG@1064 nm, type I	7203
	10 mm	42,2°	90°	AR/AR@532+1064/355 nm	THG@1064 nm, type II	7199
	10 mm	90°	0°	AR/AR@532+1064 nm	NCPM SHG@1064 nm, T = 149 °C	7209
	20 mm	90°	11,6°	AR/AR@532+1064 nm	SHG@1064 nm, type I	7202
	20 mm	42,2°	90°	AR/AR@532+1064/355 nm	THG@1064 nm, type II	9457
	20 mm	90°	0°	AR/AR@532+1064 nm	NCPM SHG@1064 nm, T = 149 °C	7210
5 x 5 mm	10 mm	90°	11,6°	AR/AR@532+1064 nm	SHG@1064 nm, type I	7207
	10 mm	42,2°	90°	AR/AR@532+1064/355 nm	THG@1064 nm, type II	7204
	20 mm	90°	11,6°	AR/AR@532+1064 nm	SHG@1064 nm, type I	7208
	20 mm	42,2°	90°	AR/AR@532+1064/355 nm	THG@1064 nm, type II	9459
6 x 6 mm	1 mm	90°	13,8°	AR/AR@515+1030 nm	SHG@1030 nm, type I	9458
	2 mm	90°	13,8°	AR/AR@515+1030 nm	SHG@1030 nm, type I	9460
	3 mm	90°	13,8°	AR/AR@515+1030 nm	SHG@1030 nm, type I	9461
	4 mm	90°	13,8°	AR/AR@515+1030 nm	SHG@1030 nm, type I	9462


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