



CRYSTALS



Location: [HOME](#) [PRODUCTS](#) [CRYSTALS](#) [NLO Crystals](#)

[Laser crystals](#)

[NLO Crystals](#)

[Passive Q-switch](#)

[Birefringent Crystals](#)

[Magneto-optical Crystals](#)

[Windows](#)

OPTICS

[Telecom Optics](#)

[Instrumental Optics](#)

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PROCESSING SERVICE

LBO Crystal (Lithium Triborate Crystal)

LBO crystals is an excellent nonlinear crystal. For frequency doubling (SHG), tripling (THG) of Nd:YAG, Nd:YLF, Nd:YVO4 lasers, it is one of the most useful nonlinear optical materials in ultraviolet and visible laser applications.

Advantages:

- broad transparency range from 160nm to 2600nm (see Figure 1);
- high optical homogeneity ($\delta n \approx 10^{-6}/\text{cm}$) and being free of inclusion;
- relatively large effective SHG coefficient (about three times that of KDP);
- wide acceptance angle and small walk-off;
- type I and type II non-critical phase matching (NCPM) in a wide wavelength range;
- spectral NCPM near 1300nm.
- high damage threshold (18.9 GW/cm² for a 1.3ns laser at 1053nm);

LBO has the highest damage threshold in all the commonly-used inorganic NLO crystals. Therefore, it is the best candidate for high average power SHG and other nonlinear optical processes.

Comparison of Bulk Damage Threshold (@1053nm, 1.3ns)			
Crystal	Energy Density (J/cm ²)	Power Density (GW/cm ²)	Ratio
KTP	6.0	4.6	1.00
KDP	10.9	8.4	1.83
BBO	12.9	9.9	2.15
LBO	24.6	18.9	4.10

LBO's main applications

I SHG, THG of Nd lasers

I SHG of Ti:Sapphire, Cr:LiSAF and Alexandrite lasers

I OPA and OPO

HGO offer LBO specification:

Tolerance of cutting angle	$\Delta\theta \leq \pm 0.25^\circ, \Delta\varphi \leq \pm 0.25^\circ$
Tolerance of dimension	Dimension ± 0.1 mm, L: ± 0.1 mm
Flatness	$\lambda/8$ @ 632.8nm
Wavefront distortion	$\lambda/8$ @ 632.8nm
Surface quality	10/5 per MIL-O-13830A
Parallelism	10"
Perpendicularity	5'
Bevel/chamfer	< 0.1 mm @ 45deg.
Chips	< 0.1 mm
CA	$> 95\%$
Coating	AR/P-coating Upon customer's request

Damage Threshold	750MW/CM ² at 1064nm, TEM00, 10ns, 10Hz
Warranty	One year under proper use