LBO crystals

LBO (Lithium Triborate - LiB3O5) is now the most popularly used material for Second Harmonic Generation (SHG) of 1064nm high power lasers (as a substitute to KTP) and Sum Frequency Generation (SFG) of 1064nm laser source to achieve UV light at 355nm.

Advantages:

- Broad transparency range from 160nm to 2600nm ;
- High optical homogeneity (δn≈10-6/cm) and being free of inclusion;
- Relatively large effective SHG coefficient (about three times that of KDP);
- High damage threshold;
- 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.

Note:

1. LBO has a low susceptibility to moisture.Users are advised to provide dry conditions for both the use and preservation of LBO.
2. Polished surfaces of LBO requires precautions to prevent any damage.
3. Mount available.

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Basic properties	
Crystal Structure	Orthorhombic, Space group Pna21, Point group mm2
Lattice Parameter	a=8.4473Å,b=7.3788Å,c=5.1395Å,Z=2
Melting Point	About 834℃
Mohs Hardness	6
Density	2.47g/cm3
Thermal Expansion Coeficients	αx=10.8x10-5/K, αy=-8.8x10-5/K,αz=3.4x10-5/K
Thermal Conductivity Coefficients	3.5W/m/K
Transparency Range	160-2600nm
SHG Phase Matchable Range	551-2600nm (Type I) 790-2150nm (Type II)
Therm-optic Coefficient (/℃, λ in μm)	dnx/dT=-9.3X10-6dny/dT=-13.6X10-6dnz/dT=(-6.3-2.1λ)X10-6
Absorption Coefficients	<0.1%/cm at 1064nm <0.3%/cm at 532nm
Angle Acceptance	6.54mrad·cm (ϕ, Type I,1064 SHG)15.27mrad·cm (θ, Type II,1064 SHG)
Temperature Acceptance	4.7℃·cm (Type I, 1064 SHG)7.5℃·cm (Type II, 1064 SHG)
Spectral Acceptance	1.0nm·cm (Type I, 1064 SHG)1.3nm·cm (Type II, 1064 SHG)
Walk-off Angle	0.60° (Type I 1064 SHG)0.12° (Type II 1064 SHG)

Technical Parameters	
Dimension tolerance	(W±0.1mm)x(H±0.1mm)x(L+0.5/-0.1mm) (L≥2.5mm)(W±0.1mm)x(H±0.1mm)x(L+0.1/-0.1mm) (L<2.5mm)
Clear aperture	central 90% of the diameterNo visible scattering paths or centers when inspected by a 50mW green laser
Flatness	less than λ/8 @ 633nm
Transmitting wavefront distortion	less than λ/8 @ 633nm
Chamfer	≤0.2mm x 45°
Chip	≤0.1mm
Scratch/Dig	better than 10/ 5 to MIL-PRF-13830B
Parallelism	better than 20 arc seconds
Perpendicularity	≤5 arc minutes
Angle tolerance	△θ≤0.25°, △ϕ≤0.25°
Damage threshold[GW/cm2]	>10 for 1064nm, TEM00, 10ns, 10HZ (polished only)>1 for 1064nm, TEM00, 10ns, 10HZ (AR-coated) >0.5 for 532nm, TEM00, 10ns, 10HZ (AR-coated)