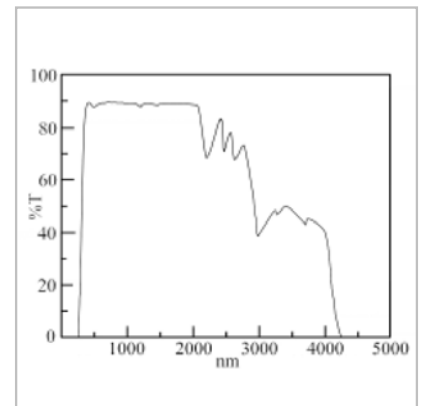


Barium Borate (α -BBO) Crystal

High Temperature form BBO (α -BaB₂O₄) is a negative uniaxial crystal. It has large birefringence over the broad transparent range from 189 nm to 3500 nm. LASER COMPONENTS has succeeded in growing this crystal into large size. The physical, chemical, thermal and optical properties of α -BBO crystal are similar to those of β -BBO. However, the nonlinear optical properties of α -BBO crystal are non-existent due to the centric symmetry with its crystal structure. It is not recommended to use for NLO processes.

α -BBO is an excellent crystal to replace Calcite, TiO₂, and LiNbO₃, etc. in Glan-Taylor and Glan-Thompson polarizers as well as walk-off beam splitters, especially for high power and UV polarizer, due to its unique UV transparency, good mechanical properties and high damage threshold. We manufacture and supply Glan-Laser, Glan-Taylor, Glan-Thompson Polarizers and other beam displacers from high quality α -BBO crystals to replace Calcite in many applications, especially in UV and high power operations.



Transparency Curve of α -BBO

Basic Properties of α -BBO

Transparency range	189 – 3500 nm, see transparency curve	
Density	3.85 g/cm ³	
Therm-optic coefficients	$d n_o / d T = -9.3 \times 10^{-6} / ^\circ C$ $d n_e / d T = -16.6 \times 10^{-6} / ^\circ C$	
Damage threshold	at 1064 nm	1 GW/cm ²
	at 355 nm	500 MW/cm ²
Optical homogeneity	$\Delta n \approx 10^{-6} / cm$	
Mohs hardness	4.5	
Hygroscopic susceptibility	low	
Thermal expansion coefficients (in the range of 25 °C – 900 °C)	$\alpha_o = 4 \times 10^{-6} / K$ $\alpha_e = 36 \times 10^{-6} / K$	
Linear absorption coefficients	$\alpha < 0.005 \text{ cm}^{-1}$ from 300 nm to 2300 nm	

Refractive indices, birefringence ($\Delta n = n_e - n_o$) and walk-off angle at 45° (ρ):

at 1.0642 μm	$n_e = 1.5379$	$n_o = 1.6579$	$\Delta n = -0.1199$	$\rho = -4.287^\circ$
at 0.5321 μm	$n_e = 1.5534$	$n_o = 1.6776$	$\Delta n = -0.1241$	$\rho = -4.387^\circ$
at 0.2660 μm	$n_e = 1.6114$	$n_o = 1.7617$	$\Delta n = -0.1503$	$\rho = -5.082^\circ$

Specifications of α -BBO

Surface quality	20/10 scratch and dig
Beam deviation	<3 arc min.
Optical axis orientation	+/-0.5°
Flatness	$\lambda/4$ @ 632.8 nm
Transmission wavefront distortion	< $\lambda/2$ @632.8 nm
AR-coating	R<0.5%