



α -BBO- Alpha-Barium Borate (α -BaB₂O₄)

Introduction

Alpha-Barium Borate (α -BaB₂O₄, α -BBO) is a negative uniaxial crystal which has large birefringence over a broad transparent range of 190 nm-3500 nm. α -BBO is an excellent crystal especially in UV and high power applications. 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 nonexistent due to the central symmetry of its crystal structure. α -BBO crystal is not recommended for NLO processes.

CASTECH's birefringent crystal α -BBO is featured by

- High UV transmittance
- Large birefringence
- Low bulk absorption suitable for high power applications
- High damage threshold
- Stable physical and mechanical properties.

Table 1. Basic Properties

Crystal Structure	Trigonal
Transparency Range	190-3500 nm
Density	3.85 g/cm ³
Hygroscopic Susceptibility	Low
Hardness	4.5 Mohs
Thermal Expansion Coefficients	-9.3 × 10 ⁻⁶ /°C (C) -9.5 × 10 ⁻⁶ /°C (A)
Damage Threshold	1 GW/cm ² @1064 nm, 10 ns, 10 Hz (AR-coated)
Refractive Indices	n _o = 1.6776, n _e = 1.5534, @532 nm n _o = 1.6579, n _e = 1.5379, @1064 nm
Sellmeier Equation (λ in μ m)	n _o ² = 2.7471 + 0.01878 / (λ^2 - 0.01822) - 0.01354 λ^2 n _e ² = 2.37153 + 0.01224 / (λ^2 - 0.01667) - 0.01516 λ^2

Table 2. Specifications

Size	Aperture up to Φ 50 mm and length up to 40 mm
Surface Quality	10/5 to MIL-PRF-13830B
Flatness	$\lambda/4$ @633 nm
Optical Axis Orientation	6 arc min
Parallelism	20 arc sec
Clear Aperture	>90%
Coating	AR-coating or P-coating
Mount	Upon Customer's Specification

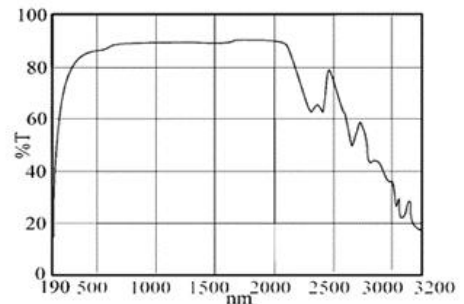


Figure 1. Transparency Curve