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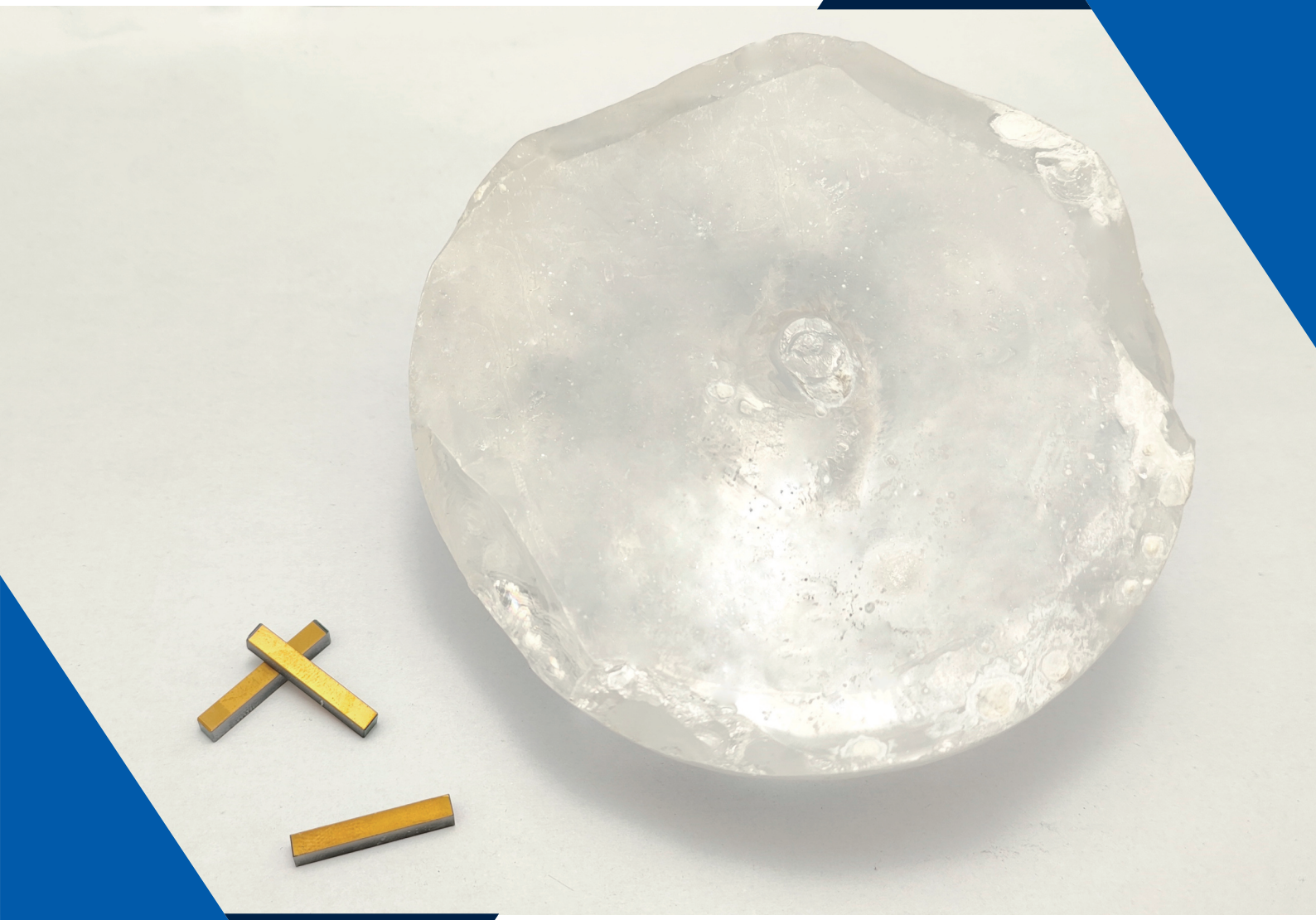

Crylink BBO NLO Crystals

For high performance lasers

Scan the QR code to go to the official website for more information

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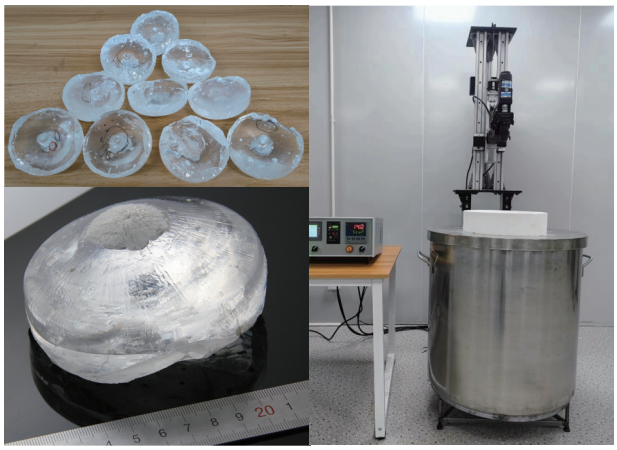
Crylink BBO · Superior Quality

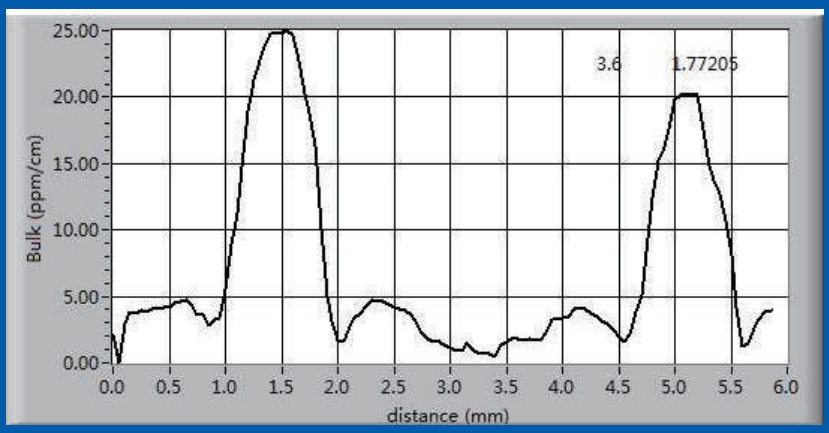
Crylink BBO (β-BaB_2O_4) crystals are widely used nonlinear crystals for frequency conversion in the UV, VIS and NIR.

Crylink uses flux pulling method to grow BBO crystals, and the largest blank size grown so far is dia.100mm.

Known for their large birefringence, low dispersion, high damage threshold, wide phase matching range, good temperature stability, and significant nonlinear optical effects, BBO crystals are ideal for frequency conversion of Nd:YAG and Nd:YLF lasers, including ultrafast laser harmonic generation.



Crylink BBO · Weak Absorption Testing



The test results of Crylink's weak absorption at 1064nm on BBO

Crylink uses a Weak Absorption Tester to measure the absorption properties of BBO crystals at various wavelengths. This highly sensitive tool provides crucial data for product design and optimization, with the self-absorption of BBO crystals being less than 50 ppm @532 nm.

The following table shows the weak absorption test results for Crylink BBO crystals.

	Weak absorption (ppm/cm)		
BBO	1064nm	532nm	355nm
5*5*5mm^3	1.77	16.8	232

Crylink BBO · Coating

Crylink utilizes advanced Ion-Assisted Deposition (IAD) coating technology to ensure high quality and ultra-high durability of BBO crystal surface coatings.

Test conditions:

- Wavelength: 1064nm
- Pulse width: 10ns
- Spot distribution: 231um
- Linear polarized light
- Sample testing angle: 0°

Test result:

32.65 J/cm²

同济大学　精密光学工程技术研究所

激光损伤阈值测试报告

测试时间	2022.11.19	测试地点	同济大学	测试人员	/	样品数量	/	样品来源	/
参数	环境温度/℃	环境湿度/%	光斑直径		重复频率/Hz	脉宽/ns	换算系数	最大输出能量/J	激光波长/nm
	22	45	D(1/e²)=231μm		10	10		2J@1064nm	1064
样品测试	样品编号	镜片尺寸	薄膜种类	偏振态	测试方式	测试角度	损伤阈值 LIDT（J/cm²）		
	2022-158 BBO 基板	10*10*3.5			S-ON-1	0 度	32.65J/cm²		
	2022-158 BBO 镀膜	10*10*3.5	1064AR		S-ON-1	0 度	29.95J/cm²		

测试人员签字：　　部门盖章：精密光学工程技术研究所　　时间：2022-11-19

The BBO Laser Damage Threshold Test Report is provided by the Institute of Precision Optical Engineering at TongJi University

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Crylink BBO · Quality Control Tests

Crylink has adopted a series of strict testing measures to ensure that the quality and performance of BBO crystals meet the standards.

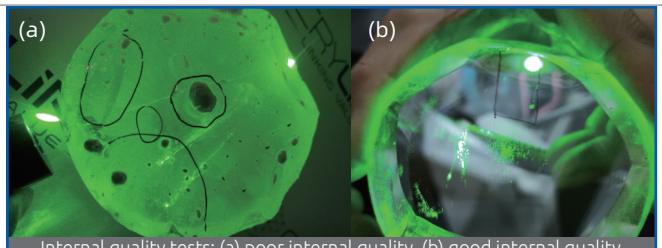
•Internal quality testing of BBO crystals using a 20mw green laser;

•Viewing the surface finish of the crystal through a microscope;

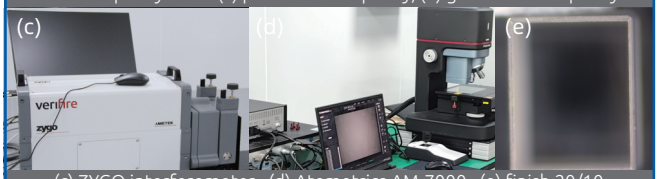
•Using ZYGO laser interferometer to check the flatness;

•Surface roughness inspection with Atometrics AM-7000 white light interferometer;

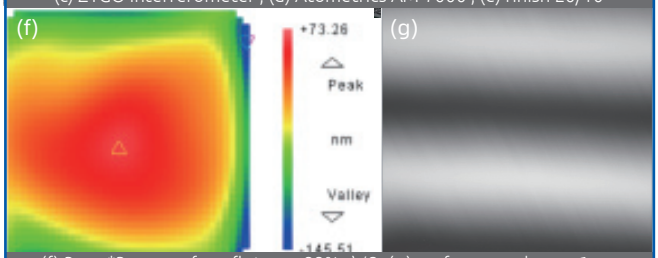
Through these comprehensive and precise inspection methods, the high quality of BBO crystals is effectively guaranteed. The picture on the right shows the results of BBO internal quality, finish, face shape and roughness.



Internal quality tests: (a) poor internal quality, (b) good internal quality

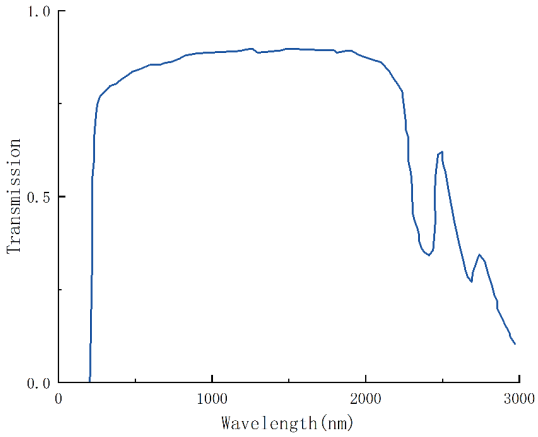


(c) ZYGO interferometer , (d) Atometrics AM-7000 , (e) finish 20/10

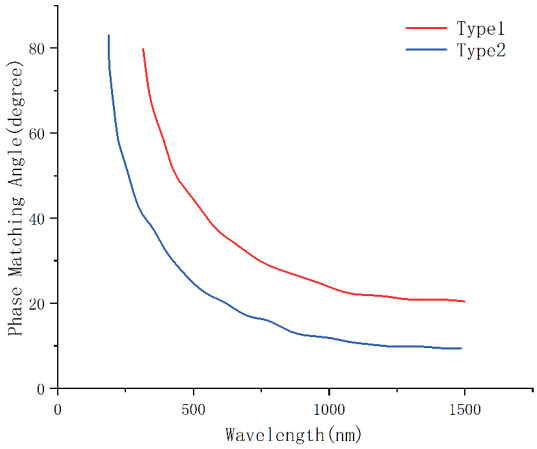


(f) 3mm*3mm surface flatness 90%>λ/8, (g) surface roughness 1nm

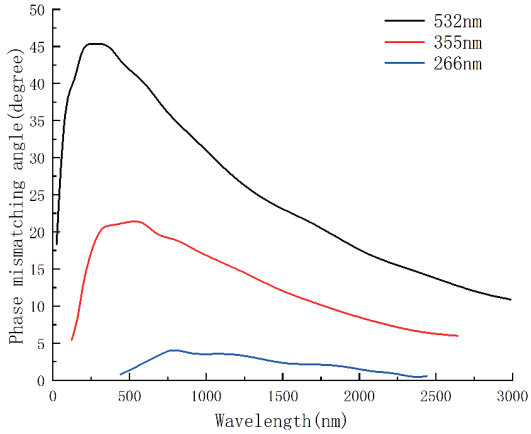
Crylink BBO · Spectra



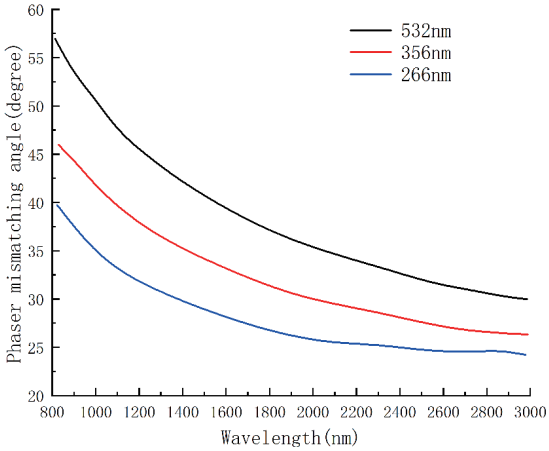
BBO transmission spectrum



The SHG tuning curves of BBO crystal



BBO crystal type I OPO tuning curves



BBO crystal type II OPO tuning curves

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Crylink BBO · Parameters

Physical and Chemical Characteristics		
Attribute	Value	
Chemical Formula	BaB_2O_4	
Crystal Structure	Trigonal system, 3m	
Lattice Parameters	a=b=12.532Å, c=12.717Å, Z=6	
Mass Density	3.85 g/cm^3	
Mohs Hardness	4	
Melting Point	About 1095℃	
Coefficient of Thermal Conductivity	1.2 W/m/K (⊥c); 1.6 W/m/K (//c)	
Coefficient of Thermal Expansion	α, 4×10^{-6}/K; c, 36×10^{-6}/K	
Birefringence	Negative uniaxial	
Experimental Values of Bandwidth Internal Angle at T=293K		
Interaction Wavelength [μm]	θpm [deg]	Δθint [deg]
SHG, o+o ⇒ e		
1.0642⇒0.5321	22.8	0.021
	22.7	0.03
0.5321⇒0.26605	47.3	0.01
0.53⇒0.265	47.6(298K)	0.006
SFG, o+o ⇒ e		
1.0641+0.53205⇒0.3547	31.3	0.011
1.0642+0.5321⇒0.35473	31.1	0.015
2.44702+0.5712⇒0.4631	22.1	0.026
2.68823+0.5712⇒0.4711	21.8	0.028
SHG, e+o ⇒ e		
1.0642⇒0.5321	32.7	0.034
	32.4	0.046
SFG, e+o ⇒ e		
1.0642+0.5321⇒0.35473	38.4	0.02
SFG, o+e ⇒ e		
1.0642+0.5321⇒0.35473	58.4	0.05

Nonlinear Optical Properties	
Attribute	Value
SHG Phase Matching Range	409.6–3500nm (Type I); 525–3500nm (TypeII)
NLO Coefficient	d_{11}=5.8*d_{36}(KDP); d_{31}=0.05*d_{11}; d_{22}< 0.05*d_{11}
	$d_{eff}(I)=d_{31}\sin\theta+(d_{11}\cos3\varphi-d_{22}\sin3\varphi)\cos\theta$
	$d_{eff}(II)=(d_{11}\sin3\varphi+d_{22}\cos3\theta)\cos2\theta$
Thermo-optic Coefficient	$dn_o/dT=-9.3*10^{-6}$/℃
	$dn_e/dT=-16.6*10^{-6}$/℃
Electro-optic Coefficient	g_{11}=2.7pm/V, g_{22}, g_{31}< 0.1g_{11}
Half-wave Voltage	48KV@1064 nm
Damage Threshold	@1064nm, 5GW/cm^2 (10 ns);10GW/cm^2 (1.3ns)
	@532nm, 1GW/cm^2 (10 ns);7GW/cm^2 (250ps)
Linear Optical Properties	
Attribute	Value
Transmission Range	189–3500nm
Absorption Coefficient	α<0.1%/cm @1064nm
Refractive Index	@1.064μm, n_e=1.5425, n_o=1.6551
	@0.532μm, n_e=1.5555, n_o=1.6749
	@0.266μm, n_e=1.6146, n_o=1.7571
Sellmeier Equation (λ in μm)	$n_o^2(\lambda)=2.7359+0.01878/(\lambda^2-0.01822)-0.01354\lambda^2$
	$n_e^2(\lambda)=2.3753+0.01224/(\lambda^2-0.01667)-0.01516\lambda^2$

Scan the QR code and go to the website to learn more about BBO parameters

Crylink BBO · Standard Products

Modle	W (mm)	H (mm)	L (mm)	Type	θ (°)	φ (°)	Coating	Application
BBO-0605-S-800A	6	6	0.5	Type I	29.2	90	AR/AR@400-800nm	SHG@800nm
BBO-0610-S-800A	6	6	1	Type I	29.2	90	AR/AR@400-800nm	SHG@800nm
BBO-0615-S-800A	6	6	1.5	Type I	29.2	90	AR/AR@400-800nm	SHG@800nm
BBO-0620-S-800A	6	6	2	Type I	29.2	90	AR/AR@400-800nm	SHG@800nm
BBO-0605-S-1030A	6	6	0.5	Type I	23.4	90	AR/AR@515+1030 nm	SHG@1030nm
BBO-0610-S-1030A	6	6	1	Type I	23.4	90	AR/AR@515+1030 nm	SHG@1030nm
BBO-0615-S-1030A	6	6	1.5	Type I	23.4	90	AR/AR@515+1030 nm	SHG@1030nm
BBO-0620-S-1030A	6	6	2	Type I	23.4	90	AR/AR@515+1030 nm	SHG@1030nm

Note: Partially standard products, contact sales for more information sales@crylink.com

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