Crystals. Components
& Price-Performance Ratio

Crystrong.
Photonics

Product Catalogue for 2024

CRYSTRONG PHOTONICS

Catalogue 2024

ROADMAP

Evolution **2023**

With a recent investment, we are able to increase our production scale to a whole new level and carry on creating values for our customers, honing skills and inspiring others for a better future.

2020 **Reformation**

We conducted an integration and reorganization of our company's operations. The optimized management structure elevated our production efficiency.

Expansion **2018**

We extended our business field to design and manufacture of optical components & electro-optics in 2018

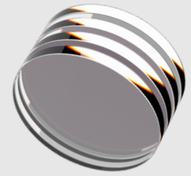
2015 **Innovation**

Our first breakthrough came to life in 2015 when we realized the mass-production of NLO crystals.

Foundation **2012**

Founded in 2012, we are an ambitious and creative team with solid capabilities.

Table of Contents



About Us	01
SESAM	03
Pockels Cells	05
Laser Crystals	15
Pyroelectric Crystals	23
Nonlinear Optical Crystals	25
General Terms&Conditions	53

JINAN CRYSTRONG PHOTOELECTRIC TECHNOLOGY CO.,LTD.

A8-1-2402
HANYU JINGU, LICHENG DISTRICT
JINAN, CHINA

CONTENT

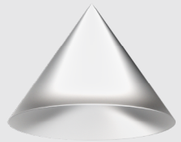
Why you should choose Crystrong.

Capabilities & Specialties

- Design and development of custom laser gain and optical modules
- Development and production of different laser crystal hosts and ion dopant combinations
- Conventional and super-polished laser optics
- Services from refurbishment of your crystals to monolithic crystal assemblies

Qualification & Experience

- Over 10 years of experience in lasers and photonics industry
- Expert in design and production of custom optical components & crystals
- Highly efficient communication and short lead-time, even for custom production
- High-quality assurance with guaranteed superior price-performance ratio



ABOUT US

Jinan Crystrong Photonics Technology Co., Ltd.

is a high-tech enterprise with core technology in mid-infrared ultrafast lasers, possessing full industry chain capabilities for design, development, and production.

Our customers are distributed across various industries globally such as laser technology, optical communications, cosmetic surgeries, scientific research and detection analysis instruments.

After more than a decade of perpetual efforts, Crystrong has become a world-renowned manufacturer of optical crystals and electro-optic devices. We adhere to the principles of focusing on technology and creating values for our customers. We have mastered the growth technology of various special crystals and established multiple advanced and precise optical component production lines, as well as several coating process production lines such as EB+IAD and IBS.

Advanced testing equipments such as Zygo interferometers and PE spectrophotometers makes it possible for us to finish our products with fine quality.

In alliance with multiple outstanding colleges and scientific research facilities, we are able to provide exquisite custom service.

We adhere to our principals and carry on exploring, innovating, dedicating ourselves to the global laser industry.

CEO:

Mr. Yang Shutong

OUR VALUES

Creativity
Reliability
Tenacity

Eminence
Excellence
Elegance

Change the futuer with Lasers.

MIDINFRARED SESAM

FEATURES

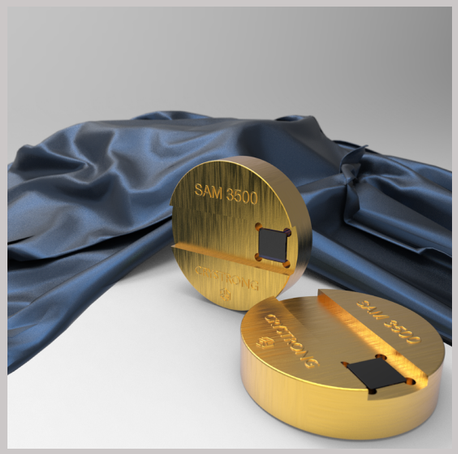
- **World's first 3-5μm range mid-infrared mode-locked laser with high stability**
- **Comprehensive and efficient post-sales service**
- **Reasonable Price**
- **Class-II superlattice design with wide bandwidth**
- **Operating range covers 2-5 μm**
- **No lattice mismatching**
- **10× higher damage threshold than traditional SESAM**
- **Plasma injection brings ultrafast absorption recovery (~1.4ps)**

APPLICATIONS

- **Key mode-locking component for DPSS passive mode-locked laser**

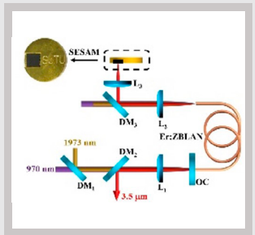
STRUCTURE

- **Key mode-locking component for DPSS passive mode-locked laser**

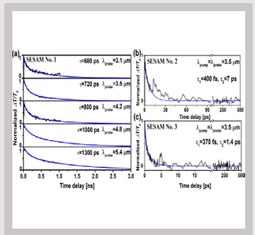


Semiconductor Saturable Absorption Mirror
by
Crystrong

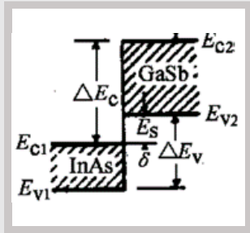
Model SAM-3500



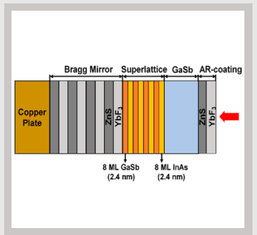
Structure of the
3.5μm
mode-locking laser



Pump Detection Curve
for
Different Wave Bands



Class-II Superlattice



SESAM Structure

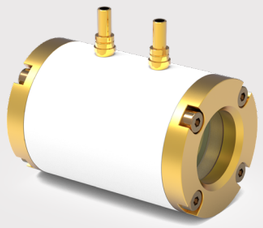
Specifications

Model	SAM-2800-40-680ps-c/e	SAM-3500-38-720ps-c/e	SAm-3500-38-7ps-c/e	SAM-3500-38-1.4ps-c/e
Central Wavelength	2800nm	3500nm	3500nm	3500nm
Absorbance	40%	38%	38%	38%
Modulation Depth	15%	11.5%	11.5%	11.5%
Relaxation Time	680 ps	720 ps	7 ps	1.4 ps
Saturation Fluence	70 μJ/cm²	70 μJ/cm²	70 μJ/cm²	40 μJ/cm²

POCKELS CELLS

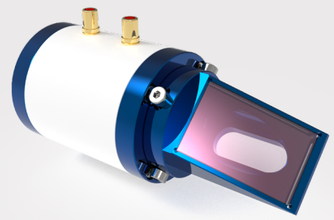
A Pockels cell is a type of electro-optic device used to control the polarization state of light passing through it. When an electric field is applied to a Pockels cell, it induces a change in the refractive index of the material, which in turn affects the polarization of light passing through it.

Here at Crystrong we provide various different kinds of pockels cells along with several indices to be customized for your particular needs.



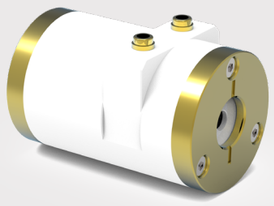
DKDP
Pockels Cell

Pockels // Cells



DKDP(694nm / 755nm)
Pockels Cell

Pockels // Cells



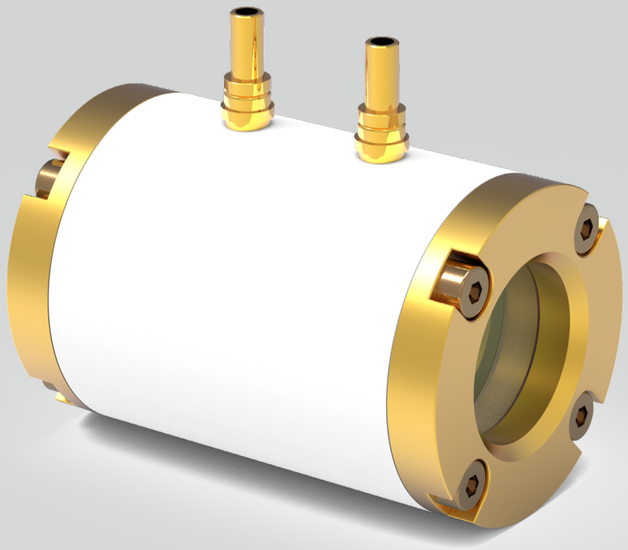
BBO
Pockels Cell

Pockels // Cells

$LiNbO_3$
Pockels Cell

Pockels // Cells

DKDP Pockels Cell



Applications

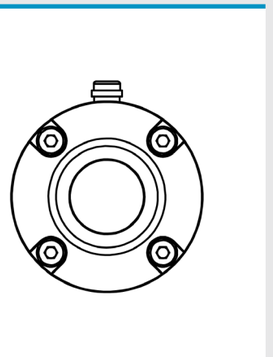
» Q-Switching
» Regenerative Amplifier
» Pulse Picker
» Cavity Dumping

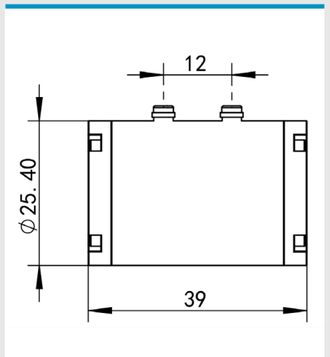
Features

» High Extinction Ratio
» Low Insertion Loss
» High LIDT
» Low Capacitance
» Low Current Leakage

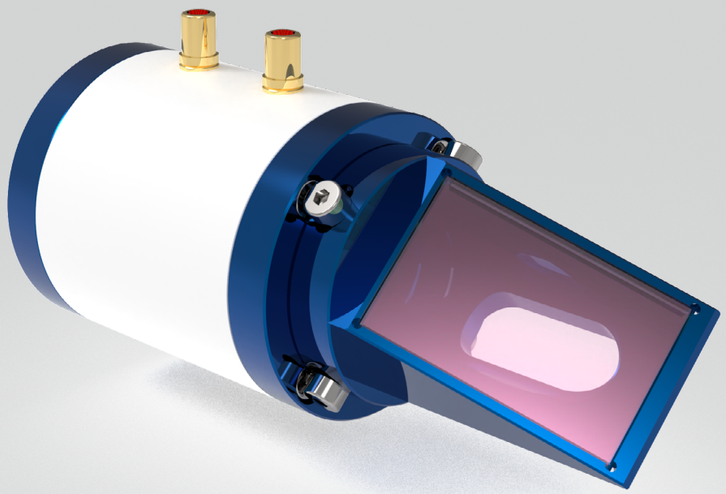
Specifications

CA (mm)	Size (mm)	λ/4 Voltage (v)	Wavelength Range (nm)	Electrode Type	Insertion Loss	Extinction Ratio	Capacitance (pF)	LIDT (@1064nm, 10ns, 10Hz)
ø8	ø19×29	~3400	500~1100	Pin-Type (Gold-Plated)	<2%	>2500:1	<5	>800MW/cm²
ø10	ø25×39(41)	~3400	500~1100	Pin-Type (Gold-Plated)	<2%	>2500:1	<5	>800MW/cm²
ø12	ø28×33	~3400	500~1100	Pin-Type (Gold-Plated)	<2%	>2500:1	<5	>800MW/cm²
ø12	ø32×41	~3400	500~1100	Lead Type	<2%	>2500:1	<5	>800MW/cm²



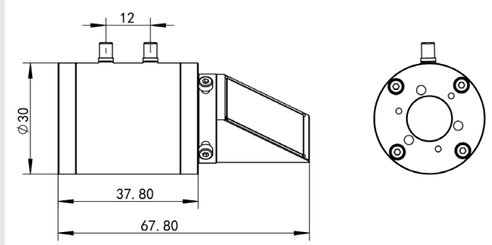


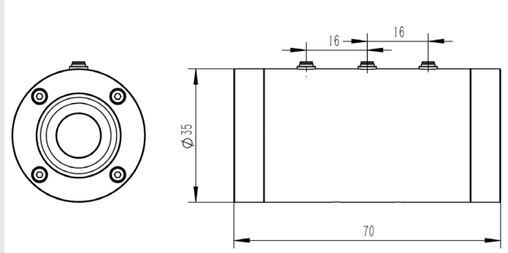
DKDP(694nm/755nm) Pockels Cell

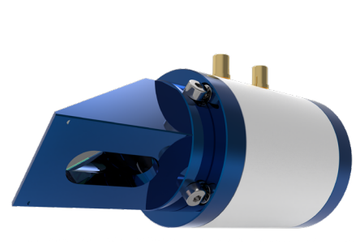


Specifications

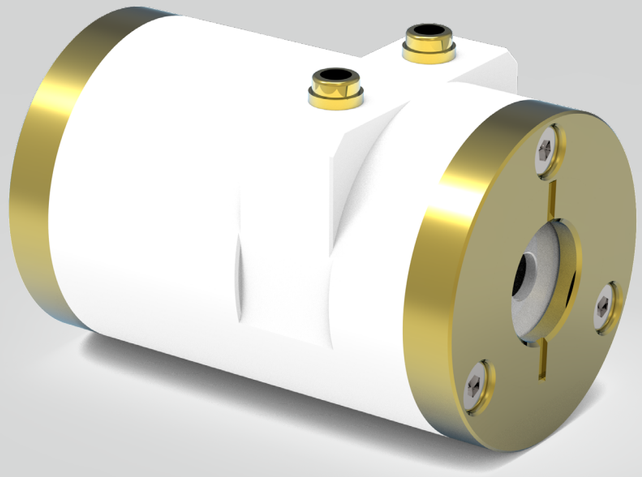
	CA (mm)	Size (mm)	λ/4 Voltage (v)	Wavelength Range (nm)	Electrode Type	Insertion Loss	Extinction Ratio	Capacitance (pF)	LIDT (@1064nm, 10ns, 10Hz)
694 nm	ø12	ø32×38	~2800	694	BNC high voltage interface	<2%	>2500:1	<5	>800MW/cm²
755 nm	ø12	ø20×26	~1200	755	Pin-Type (Gold-Plated)	<2%	>2500:1	-	>800MW/cm²







BBO Pockels Cell



Applications

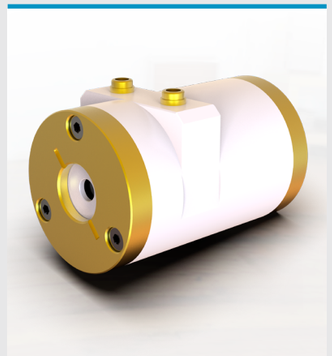
» Q-Switching
» Regenerative Amplifier
» Cavity Dumping
» High Speed Optical Switch

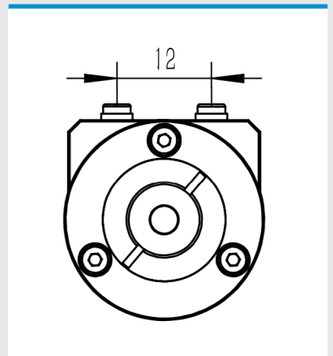
Features

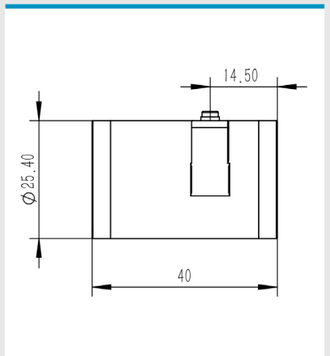
» Compact Size
» Low Absorption
» Low Ringing Effect
» Broad Transmission Range

Specifications

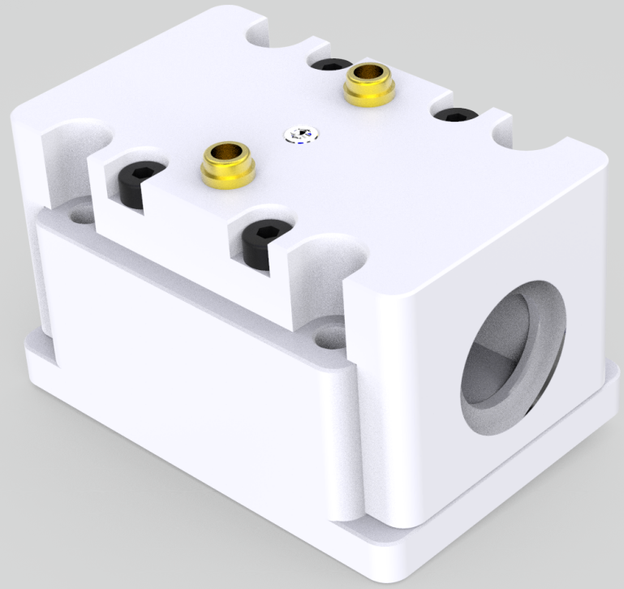
CA (mm)	Size (mm)	λ/4 Voltage (v)	Wavelength Range (nm)	Wavefront Distortion (@633nm)	Insertion Loss	Extinction Ratio	Capacitance (pF)	LIDT (@1064nm, 10ns, 10Hz)
ø1.8	ø20×2×2	~2400	190-3500	<λ/8	<2%	1000:1	<4	600MW/cm²
	ø25×2×2	~1900	190-3500	<λ/8	<2%	1000:1	<5	600MW/cm²
ø2.8	ø20×3×3	~3600	190-3500	<λ/8	<2%	1000:1	<4	600MW/cm²
	ø25×3×3	~2900	190-3500	<λ/8	<2%	1000:1	<5	600MW/cm²
ø3.6	ø20×4×4	~4800	190-3500	<λ/8	<2%	1000:1	<4	600MW/cm²
	ø25×4×4	~3900	190-3500	<λ/8	<2%	1000:1	<5	600MW/cm²

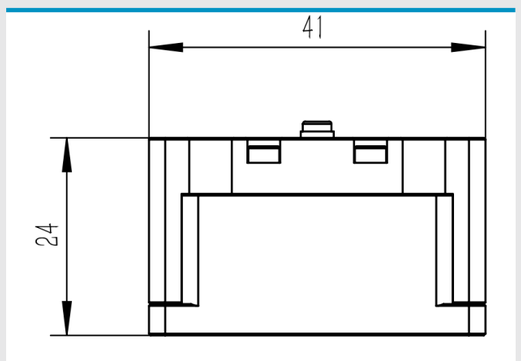


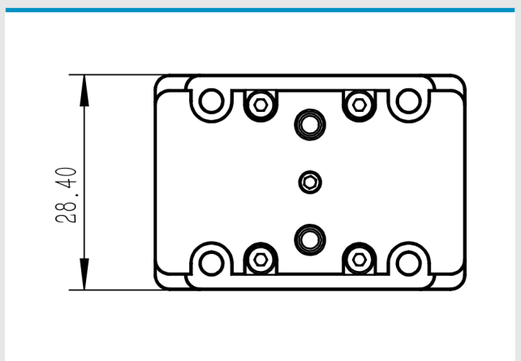




$LiNbO_3$ Pockels Cell







Specifications

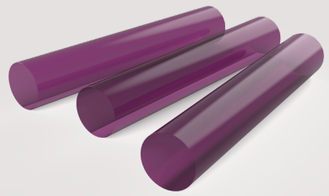
Model	CS032855	CS052855	CS082855	CS092855
Dimensions (mm)	55×28×24	55×28×24	55×28×24	55×28×24
CA (mm)	2.5	5	8	9
Wavelength (nm)	1064	1064	1064	1064
Electrodes	Au/Cr	Au/Cr	Au/Cr	Au/Cr
Half-Wave Voltage (V@632.8nm)	400	800		
Quarter-Wave Voltage (V@1064nm)			1800-1900	2100
Insertion Loss	<3%	<3%	<3%	<3%
Wavefront Distortion (@632.8nm)	<λ/8	<λ/8	<λ/8	<λ/8
Extinction Ratio (Section 5mm)	200:1	200:1	200:1	200:1
Capacitance (pF)	<5	<5	<5	<5
LIDT (@1064nm, 10ns, 10Hz)	100MW/cm²	200MW/cm²	200MW/cm²	200MW/cm²

* Choose LN or MgO:LN. It is also possible to customize cylindrical shells. Structure and function parameters can be customized accordingly. The pictures and the forms are for reference only and do not constitute an offer. The actual parameters are subjects to be contract agreement.

LASER CRYSTALS

Laser crystals, glasses and ceramics are used as optical gain sources in solid-state lasers. These media are typically doped with rare-earth ions (e.g. Neodymium, Ytterbium or Erbium) or transition metal ions (Titanium or Chromium).

Crystrong develops and supplies different laser crystal hosts and ion dopant combinations for fundamental, applied research and industrial applications.



Nd:YAG

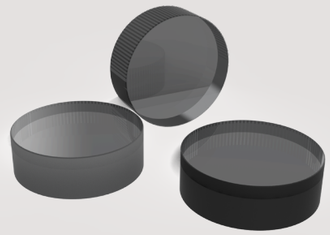
Laser // Crystals

- ▸ High gain/efficiency/mechanical strength
- ▸ Low lasing threshold & absorption of 1064 nm light wave
- ▸ Good thermal conductivity and thermal shock resistance
- ▸ Suitable for various operating modes (CW/ Pulsed/ Q-switched/ Mode-locked)

$Nd:YVO_4$

Laser // Crystals

- ▸ 5× pump bandwidth @ 808nm than Nd:YAG
- ▸ 3× stimulated emission cross-section @ 1064nm than Nd:YAG
- ▸ Low optical damage threshold, high slope efficiency
- ▸ Uniaxial crystal with linearly polarized output



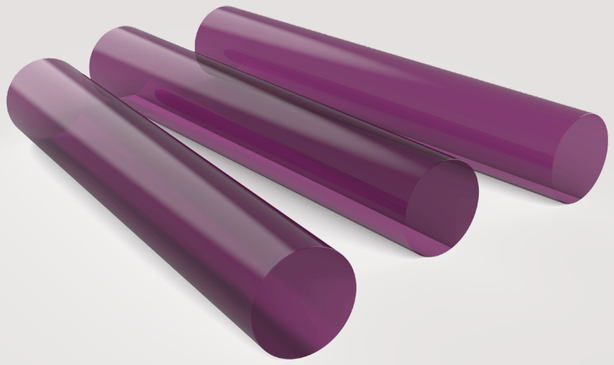
$Cr^{4+}:YAG$

Laser // Crystals

- ▸ Reliable and stable chemical properties
- ▸ Easy to be operated
- ▸ Good thermal conductivity
- ▸ High damage threshold
- ▸ Long lifetime as high-power solid-state passive Q-switch

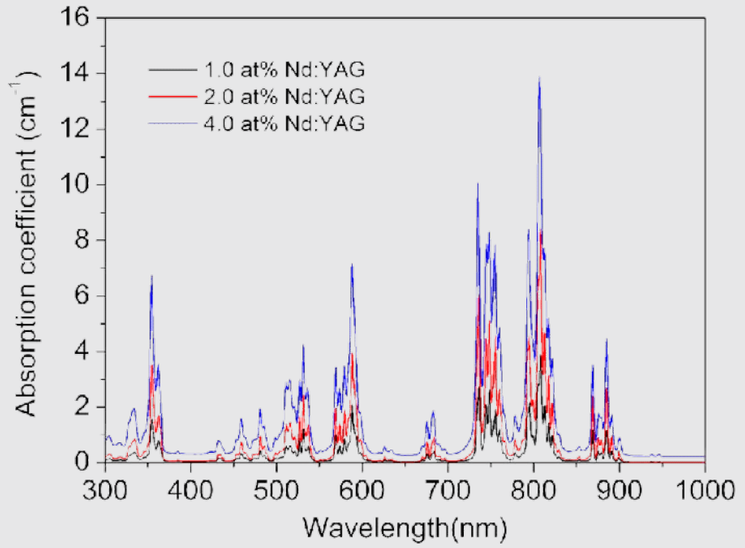
Nd:YAG

- ▸ **High gain/efficiency/mechanical strength**
- ▸ **Low lasing threshold & absorption of 1064 nm light wave**
- ▸ **Good thermal conductivity and thermal shock resistance**
- ▸ **Suitable for various operating modes (CW/ Pulsed/ Q-switched/ Mode-locked)**



Currently, Neodymium-doped Yttrium Aluminum Garnet (Nd:YAG) is the most outstanding laser crystal in terms of comprehensive performance. With a laser wavelength of 1064nm, it finds extensive applications in defense, industrial, and medical fields.

Our main products include Nd:YAG rods or slabs, as well as YAG crystals doped with various ions like Erbium (Er) and Ytterbium (Yb).



*Absorption spectra of Nd:YAG transparent ceramics with different doping concentrations

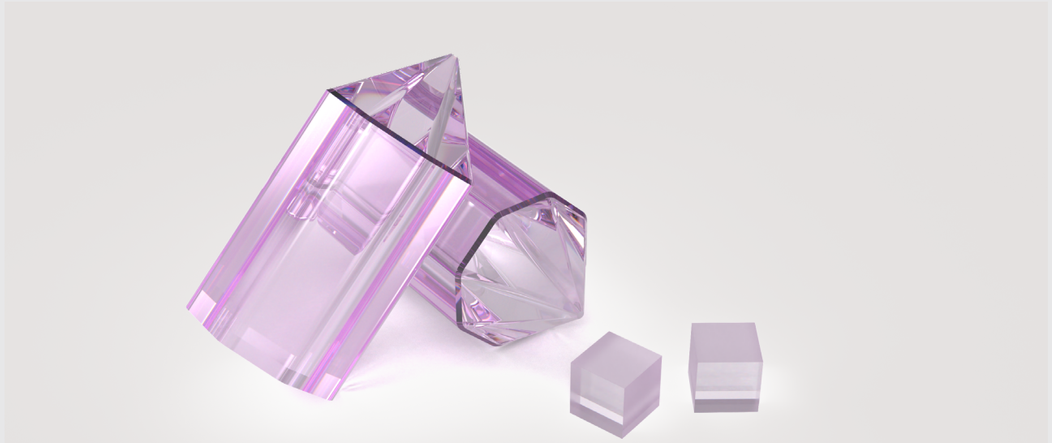
Specifications

Doping concentration	0.3~2.0 (± 0.1) atm%
Moh's hardness	8.5
Refractive index	1.82 @ 1064 nm
Laser induce damage threshold	> 500 MW/cm^2 @1064nm, 10ns
Clear aperture	>90%
Parallelism error	< 20 arcsec
Perpendicularity error	< 10 arcmin
Surface quality	20-10 S-D
Surface flatness	< λ/8@632.8nm
Wavefront distortion	λ/4@632.8nm

*Wenming Yao, Jing Gao, Long Zhang, Jiang Li, Yubing Tian, Yufei Ma, Xiaodong Wu, Gangfei Ma, Jianming Yang, Yubai Pan, and Xianjin Dai, "Continuous-wave yellow–green laser at 0.56 μm based on frequency doubling of a diode-end-pumped ceramic Nd:YAG laser," Appl. Opt. 54, 5817-5821 (2015)

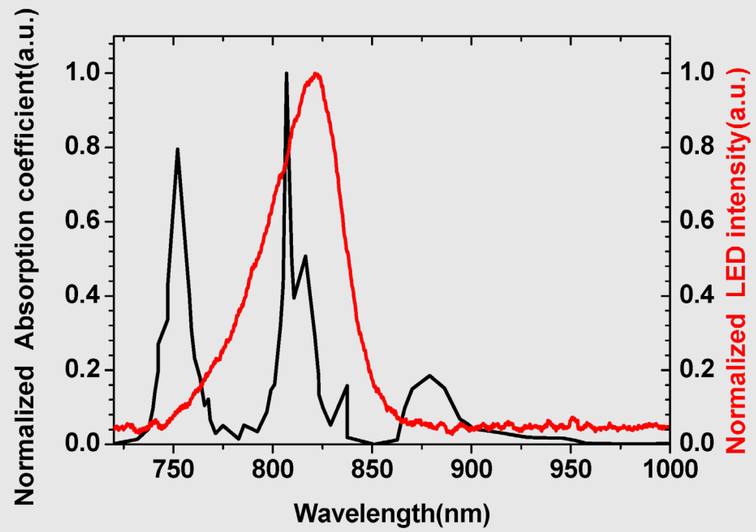
$Nd:YVO_4$

- ▶ 5× pump bandwidth @ 808nm than Nd:YAG
- ▶ 3× stimulated emission cross-section @ 1064nm than Nd:YAG
- ▶ Low optical damage threshold, high slope efficiency
- ▶ Uniaxial crystal with linearly polarized output



Neodymium-doped Yttrium vanadate (Nd:YVO4) crystal is a high-performance laser crystal suitable for manufacturing laser diode-pumped lasers, especially for medium to low power applications.

Nd:YVO4 has a higher absorption coefficient for pump light and a larger stimulated emission cross-section when compared to Nd:YAG.



*The absorption spectra of $Nd:YVO_4$ and the experimental pump spectra of 810-nm LED

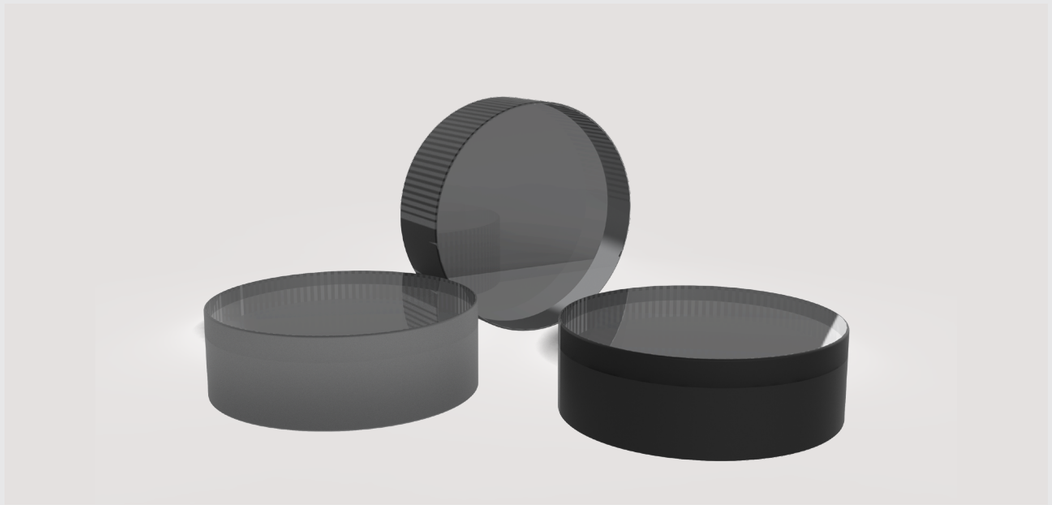
Specifications

Doping concentration	0.5 mol% ~ 3 mol%
Moh's hardness	8.5
Refractive index	1.82 @ 1064 nm
Laser induce damage threshold	> 500 MW/cm² @1064nm, 10ns
Clear aperture	>90%
Parallelism error	< 10 arcsec
Perpendicularity error	< 10 arcmin
Surface quality	20-10 S-D
Surface flatness	< λ/8@632.8nm
Wavefront distortion	< λ/4@632.8nm

*Xiao, H.; Zhao, T.; Ge, W.; Zhong, Q.; Li, M.; Yu, J.; Fan, Z.; Bian, S.; Chen, Y. High Stability LED-Pumped Nd:YVO4 Laser with a Cr:YAG for Passive Q-Switching. Crystals 2019, 9, 201.

Cr^{4+}:YAG

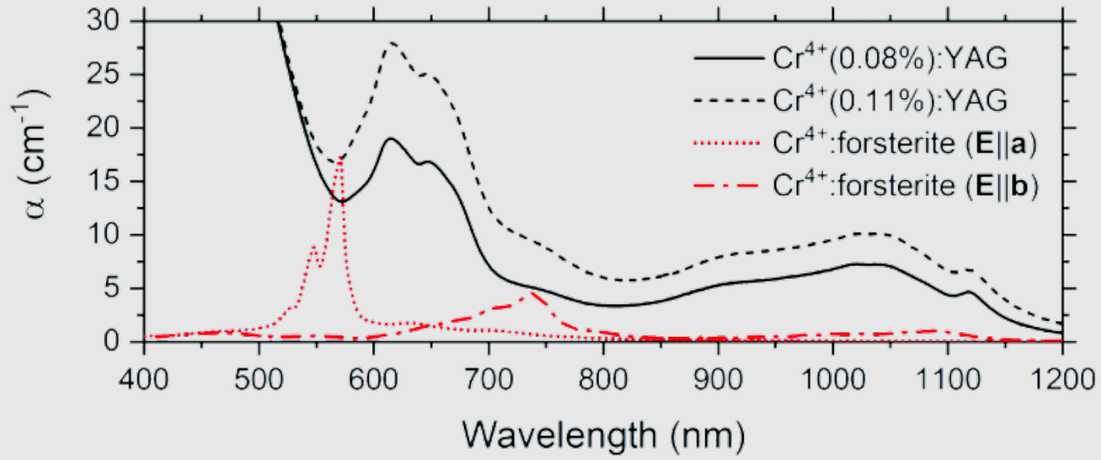
- ▶ Good chemical stability and reliability
- ▶ Easy to be operated
- ▶ Good thermal conductivity
- ▶ High damage threshold
- ▶ Long lifetime as high-power solid-state passive Q-switch



Chromium-doped Yttrium Aluminum Garnet (Cr^{4+}:YAG) is an excellent crystal used as a passive Q-switch for Neodymium-doped Yttrium Aluminum Garnet (Nd:YAG), Neodymium-doped Yttrium Lithium Fluoride (Nd:YLF), Erbium-doped Yttrium Vanadate (Er:YVO_4), and other lasers with wavelengths ranging from 0.8 to 1.2 μm.

It serves as a passive Q-switch or saturable absorber to obtain sufficient laser pulses without the need for electro-optic switches. This reduces the size and eliminates the requirement for high-voltage energy supply.

It is expected to replace commonly used LiF and dye materials in the field of passive Q-switching and become the ideal choice for 1 μm Nd-doped lasers.



*Absorption spectra of two Cr^{4+}YAG samples and a $Cr^{4+}Mg_2SiO_4$ forsterite

Specifications

Doping concentration	0.5 mol% ~ 3 mol%
Moh's hardness	8.5
Refractive index	1.82 @ 1064 nm
Laser induce damage threshold	> 500 MW/cm² @1064nm, 10ns
Clear aperture	>90%
Parallelism error	< 10 arcsec
Perpendicularity error	< 10 arcmin
Surface quality	20-10 S-D
Surface flatness	< λ/8@632.8nm
Wavefront distortion	< λ/4@632.8nm

*Hiroki Tanaka, Christian Kränkel, and Fumihiko Kannari, "Transition-metal-doped saturable absorbers for passive Q-switching of visible lasers," Opt. Mater. Express 10, 1827-1842 (2020)

PYRO-ELECTRIC CRYSTALS

DlaTGS

DlaTGS crystal is currently the best high-sensitivity infrared detection pyroelectric crystal internationally. It provides a linear response within a wide infrared radiation range, covering from the near-ultraviolet (NUV) light edge at 0.4 μm (~750 THz) to the far-infrared spectrum at 200 μm (~1.5 THz). It has extensive applications in aerospace, defense, medical, and firefighting fields.

Applications&Features

- » Infrared Spectroscopy
- » Thermal Analysis
- » Environmental Monitorin
- » High polarization intensity
- » High thermoelectric coefficient
- » Low relative dielectric constant

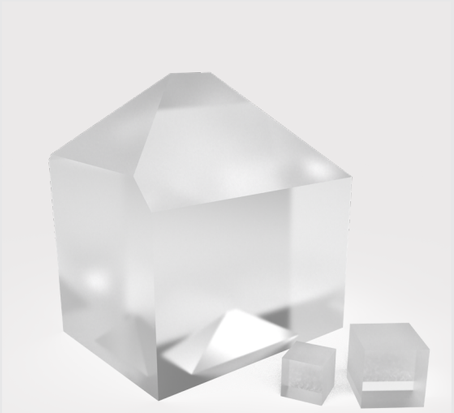
Properties

	TGS	DTGS	DlaTGS
The Curie temperature (°C)	49	57 - 59	56 - 58
Electric permittivity ε_{22}^{v} @25°C	20 - 40	17 - 19	17-19
Dielectric loss δ @25°C (f=1kHz, E_{bias}=5kV / cm)	(3 - 4) x 10^{-3}	(2 - 3) x10^{-3}	(2 - 3) x 10^{-3}
Internal bias E_0 @25°C (V/cm)	< 25	< 25	900
Thermoelectric constant γ2(dPS / dT)(Coul x cm^{-2} x K^{-1})	(3 - 4) x 10^{-8}	(2.7 - 3) x 10^{-8}	3 x 10^{-8}
Performance index M1 @25°C(dPS / dT) x ε_{22}^{-1}	11-12	15-16	15-16

NON-LINEAR OPTICAL CRYSTALS

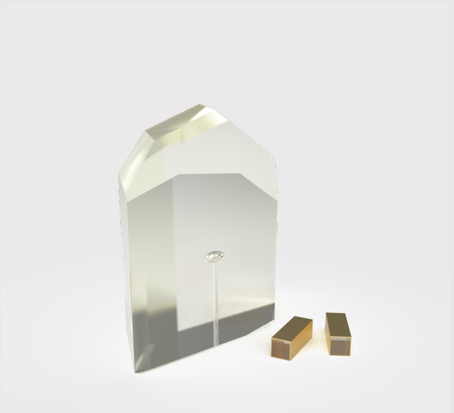
Whether you are setting up your laser experiment or integrating a commercial product, we have superior performance crystals with our own growth techniques for your needs.

Do not hesitate to request a customization if the crystal is not in the standard crystals section.



KDP/DKDP

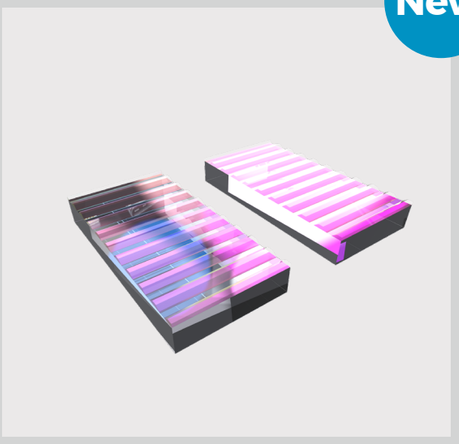
Nonlinear // Crystals



RTP

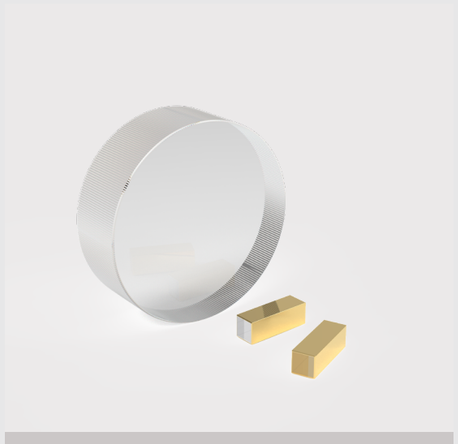
Nonlinear // Crystals

New



PPLN

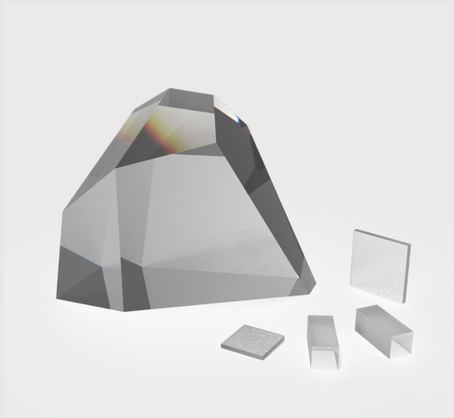
Nonlinear // Crystals



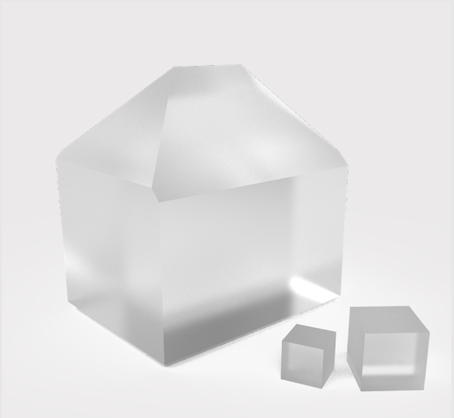
$LiNbO_3$

Nonlinear // Crystals

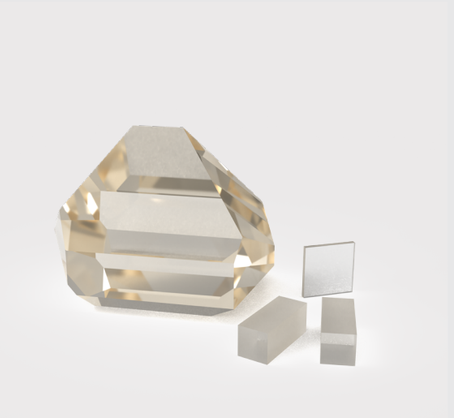
$LiIO_3$
Nonlinear // Crystals



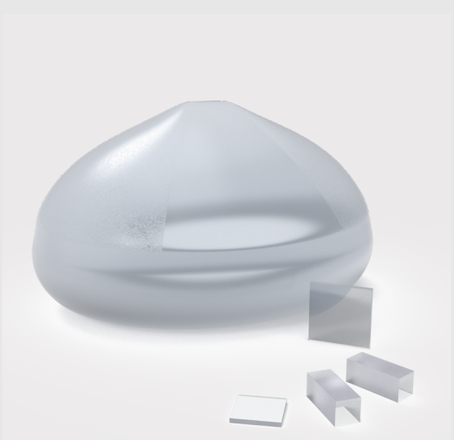
LBO
Nonlinear // Crystals



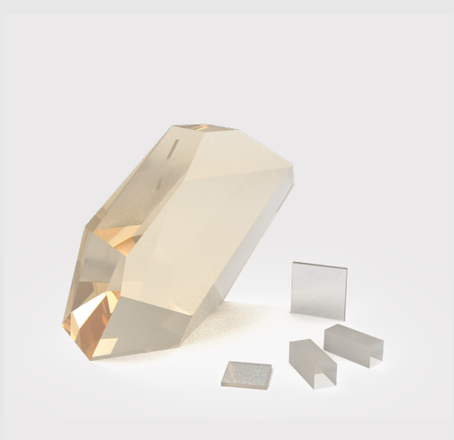
ADP
Nonlinear // Crystals



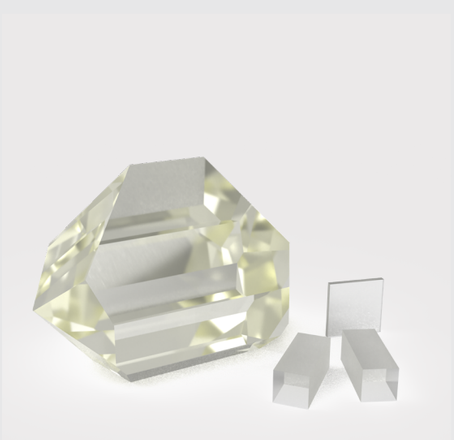
KTP
Nonlinear // Crystals



BBO
Nonlinear // Crystals



BIBO
Nonlinear // Crystals



KTA
Nonlinear // Crystals

ZGP
Nonlinear // Crystals

Applications & Features

» SHG/THG

» Photoelectric Modulation

» Q-Switch

» Exceptional UV Transmission

» Excellent Optical Damage Threshold

» Outstanding Birefringence & Non-linear Coefficient

KDP/ DKDP Crystals

KDP crystals are a type of nonlinear optical material with excellent comprehensive performance. They are widely used in high-tech fields such as laser frequency conversion, electro-optic modulation, and optical fast switching. They are the preferred material for high-power laser systems and are extensively utilized in devices like Pockels cells and electro-optic Q-switches.

Specifications

Orientation Accuracy	< 30 arcmin
Clear Aperture	> 90%
Parallelism Error	< 20 arcsec
Perpendicularity Error	< 5 arcmin
Surface Quality	20/10, S/D
Surface Flatness	< λ/4 @ 632.8nm
Laser Induced Damage Threshold	> 5 GW/cm^2, @ 1064nm 10ns for KDP crystals > 3 GW/cm^2, @ 1064nm 10ns for KDP crystals
Extinction Ratio	30dB
Electrooptical Coefficient	r_{41} = 8.8 pm/V; r_{63} = 10.3 pm/V for KDP crystals r_{41} = 8.8 pm/V; r_{63} = 10.3 pm/V for DKDP crystals
Nonlinear Coefficient	d_{36}=0.44pm/V, for KDP crystals d_{36}=0.40pm/V, for DKDP crystals

Properties

Chemical Formula	KH_2PO_4	KD_2PO_4
Crystal Structure	Tetragonal, 42m	Tetragonal, 42m
Lattice Parameters	a = 7.448 Å, c = 6.977 Å	a = 7.4697 Å, c = 6.966 Å
Optical symmetry	Negative uniaxial (n_o>n_e)	Negative uniaxial (n_o>n_e)
Density	2.332 g/cm^3	2.355 g/cm^3
Mohs Hardness	2.5	2.5
Transparency Range	180nm ~ 1550nm	200nm ~ 2150nm
Refractive Indces	n_o = 1.4938; n_e = 1.4599 @1064nm	n_o = 1.4948; n_e = 1.4554 @1064nm

Applications & Features

» Electro-Optic Modulation

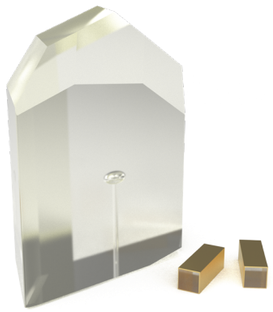
» Optical Parametric Oscillators (OPOs)

» Frequency Conversion

» Ultra-high damage threshold

» High extinction ratio

» Non-deliquescent



RTP Crystals

Rubidium Titanyl Phosphate ($RbTiOPO_4$ or RTP) crystals are isomorphic crystals with KTP crystals, which are widely used in nonlinear and electro-optical applications. RTP crystal has a high damage threshold (1.8 times that of KTP crystal); high resistivity, high repetition frequency and not easy to moisture; no induced piezo effect when the electrical signal reaches 60kHz; its transmission band range is 350nm-4500nm.

Specifications

Clear Aperture	> 90%
Parallelism Error	< 20 arcsec
Perpendicularity Error	< 5 arcmin
Surface Quality	10/5, S/D
Surface Flatness	< λ/8 @ 632.8nm
Laser Induced Damage Threshold	> 15 J/cm^2 @10Hz,10ns, 1064nm
Extinction Ratio	>20dB @633nm
Electrooptical Coefficient	r_{33}=35pm/V; r_{23}=12.5pm/V; r_{13}=10.6pm/V
Nonlinear Coefficient	d_{31}=2.0 pm/V, d_{32}=3.6 pm/V, d_{33}=8.3 pm/V, d_{24}=3.6 pm/V, d_{15}=2.0 pm/V

Properties

Chemical Formula	$RbTiOPO_4$
Crystal Structure	Oblique Square
Lattice Parameters	a=12.96Å,b=10.56Å,c=6.49Å
Density	3.6g/cm^3
Mohs Hardness	~5
Transparency Range	350-4500nm
Refractive Indces	n_x= 1.7673 ; n_y=1.7760; n_z=1.8574

Applications & Features

» Frequency Conversion

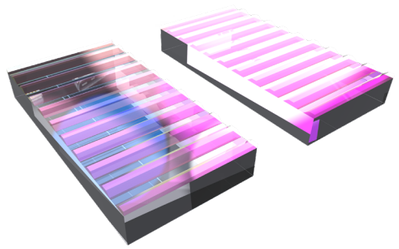
» Quantum Photonics

» OPO and OPA Systems

» High damage threshold

» High conversion efficiency

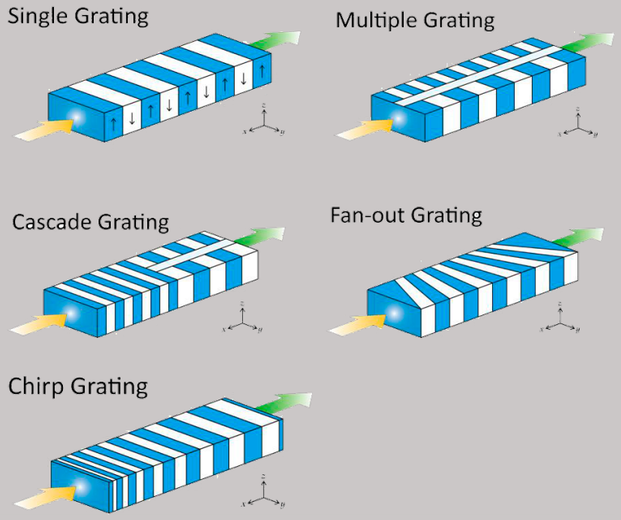
» Long operational lifespan



PPLN Crystals

Based on the quasi-phase matching theory (QPM), Periodic polarized lithium niobate can compensate for the phase mismatch caused by dispersion, thus maximizing the effective nonlinear coefficient of the nonlinear optical crystals, and greatly improving the frequency conversion characteristics of the nonlinear crystals.

Periodic Structure



Specifications

Clear Aperture	> 90%
Parallelism Error	< 20 arcsec
Perpendicularity Error	< 5 arcsec
Surface Quality	10/5, S/D
Surface Flatness	λ/8 @ 633nm
Laser Induced Damage Threshold	100MW/cm² @10ns 1064nm 10Hz (PPLN switch)
Extinction Ratio	300:1 – 500:1
Refractive Indces	$n_e^2=a_1+b_1f+(a_2+b_2f)/\{\lambda^2-(a_3+b_3f)^2\}+(a_4+b_4f)/(\lambda^2-a_5^2)-a_6\lambda^2$ $f=(T-24.5)(T+570.82)$

Applications & Features

» Electro-Optic Modulation

» Surface Acoustic Wave Devices

» Optical Waveguides and Modulators

» Mechanically stable

» Heat & Corrosion resistant

» Numerous photoelectric effects

» Outstanding Birefringence & Non-linear Coefficient

$LiNbO_3$ Crystals

Lithium Niobate crystals are extensively utilized for frequency doubling above 1000nm wavelengths and optical parametric amplification of 1064nm pump light. They can also be used for quasi-phase matching. Moreover, Lithium Niobate crystals find widespread applications in optoelectronic modulators and waveguide materials, serving as Q-switches for Nd:YAG, Nd:YLF, and Ti:sapphire lasers.

Specifications

Clear Aperture	> 90%
Parallelism Error	< 20 arcsec
Perpendicularity Error	<5 arcmin
Surface Quality	20/10, S/D
Surface Flatness	< λ/8 @ 632.8nm
Laser Induced Damage Threshold	> 100 MW/cm^2 @10ns, 1064nm, 10Hz
Extinction Ratio	> 20dB
Electrooptical Coefficient	gT_{33} = 32 pm/V, gS_{33} =31 pm/V, gT_{31} =10 pm/V, gS_{31}=8.6 pm/V, gT_{22} = 6.8 pm/V, gS_{22}= 3.4 pm/V
Nonlinear Coefficient	d_{33} = 34.4 pm/V d_{31} = d_{15} = 5.95 pm/V d_{22} = 3.07 pm/V

Properties

Chemical Formula	$LiNbO_3$
Crystal Structure	Trigonal
Density	4.64 g/cm^3
Mohs Hardness	5
Transparency Range	420 – 5200 nm
Refractive Indces	ne = 2.156, no = 2.232

Applications & Features

» Nonlinear Optical Devices

» Electro-Optic Modulation

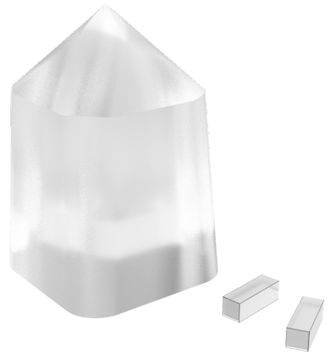
» Frequency Doubling and Mixing

» Broad Transparency Range

» High Thermal Stability

» Phase Matching Properties

» Tunability



$LiIO_3$ Crystals

Lithium Iodate crystal is an earlier-used nonlinear crystal in industrial applications. This crystal possesses a high nonlinear coefficient and can be used for second, third-harmonic generation, and mixing in mid to low-power lasers. Crystal Technology provides large-sized LiIO3 crystals with good optical uniformity and offers services such as polishing, coating, and sealed mounting for LiIO3 crystals.

Specifications

Clear Aperture	> 90%
Parallelism Error	< 20 arcsec
Perpendicularity Error	< 5 arcmin
Surface Quality	20/10, S/D
Surface Flatness	< λ/4 @ 632.8nm
Laser Induced Damage Threshold	> 100 MW/cm² @10ns, 1064nm, 10Hz
Nonlinear Coefficient	d_{31}=4.4 pm/V

Properties

Chemical Formula	LiO_3
Crystal Structure	Hexagonal
Density	4.487 g/cm³
Mohs Hardness	3.5-4.0
Transparency Range	280–4000nm
Refractive Indces	n_o = 1.8571, n_e = 1.7165

Applications & Features

» High-power Nd:YAG/Nd:YLF lasers for civilian&defense purposes

» SHG/THG of high-power 1340nm Nd:YAG lasers

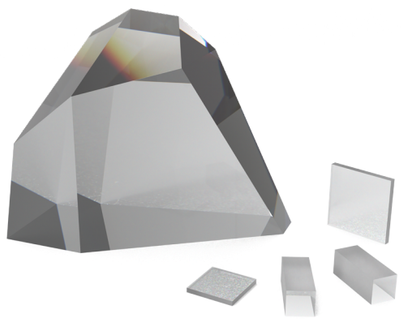
» OPA & OPO

» Broad Transparency Range

» High Nonlinear Coefficient & Frequency Conversion Efficiency

» Phase-Matching Capabilities

» Thermal and Chemical Stability



LBO Crystals

Lithium Triborate is a crystal known for its high damage threshold, wide acceptance angle, good thermal stability, and broad transparency range.
For Type I Non-Critical Phase Matching, the wavelength range is 1000-1300 nm (under temperature control).
For Type II Non-Critical Phase Matching, the wavelength range is 800-1100 nm (at room temperature).

Specifications

Clear Aperture	> 90%
Parallelism Error	< 20 arcsec
Perpendicularity Error	< 5 arcmin
Surface Quality	20/10, S/D
Surface Flatness	< λ/8 @ 632.8nm
Laser Induced Damage Threshold	9 GW/cm^2 @1064nm, 9ns 19 GW/cm^2 @1064nm, 1.3ns
Nonlinear Coefficient	d_{31}=1.05 ± 0.09 pm/V d_{32}= -0.98 ± 0.09 pm/V d_{33}=0.05 ± 0.006 pm/V

Properties

Chemical Formula	LiB_3O_5
Crystal Structure	Rhombic, Space GroupPna21, Point Group mm^2
Lattice Parameters	a=8.4473Å ,b=7.3788Å, c=5.1395Å, Z=2
Density	2.47 g/cm^3
Mohs Hardness	6
Transparency Range	169 - 2600 nm
Refractive Indces	n_x= 1.5656 n_y= 1.5905 n_z= 1.6055

Applications & Features

» SHG/THG/FHG of Nd doped & dye lasers

» SHG/THG/FHG of Ti:Sapphire & Alexandrite lasers

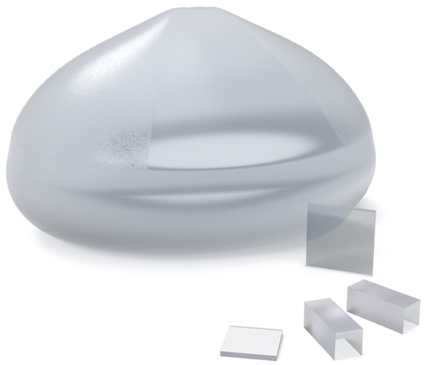
» OPA & OPO

» Broad Transparency Range

» Excellent Optical Homogeneity

» Adjustable Phase Matching

» High Damage Threshold & Thermal Stability



BBO Crystals

BBO possesses an extremely wide transparency range, large phase-matching angle, high resistance to optical damage, broad temperature matching, and excellent optical homogeneity. It finds extensive application, especially in the third-harmonic generation of Nd:YAG lasers, due to its outstanding properties among nonlinear optical crystals.

Specifications

Clear Aperture	> 90%
Parallelism Error	< 20 arcsec
Perpendicularity Error	< 5 arcmin
Surface Quality	20/10, S/D
Surface Flatness	< λ/8 @ 632.8nm
Laser Induced Damage Threshold	5 GW/cm^2 @1060nm, 10 ns
Electrooptical Coefficient	g_{11} = 2.7 pm/V, g_{22} = g_{31} < 0.1g_{11}
Nonlinear Coefficient	d_{11} = 5.8 x d_{36}(KDP) d_{31} = 0.05 x d_{11} d_{22} < 0.05 x d_{11}

Properties

Chemical Formula	β-BaB_2O_4
Crystal Structure	Trigonal System, 3m
Lattice Parameters	a=b=12.532Å,c=12.717Å, Z=6
Density	3.85 g/cm^3
Mohs Hardness	4
Transparency Range	409.6 - 3500nm
Refractive Indces	n_e = 1.5425, n_o = 1.6551

Applications & Features

» SHG/THG of high-power lasers at multiple wavelengths

» Optical parametric amplifiers (OPA)

» Optical parametric oscillators (OPO)

» Wide Transparency Range

» Walk-off Compensation

» Type I & II Phase Matching

» Broad Temperature and Spectral Acceptance

BIBO Crystals

Bismuth Triborate possesses a significantly larger effective nonlinear optical coefficient. Its nonlinear optical coefficient is approximately 3.5-4 times that of LBO and 1.5-2 times that of BBO. It is an excellent frequency doubling crystal used for generating blue light.

Specifications

Clear Aperture	> 90%
Parallelism Error	< 30 arcsec
Perpendicularity Error	< 5 arcmin
Surface Quality	20/10, S/D
Surface Flatness	< λ/6 @ 632.8nm
Laser Induced Damage Threshold	> 500 MW/cm^2 @ 1064nm, 10ns
Nonlinear Coefficient	d_{11}=2.53 pm/V, d_{12}=2.93 pm/V, d_{13}=-1.93 pm/V, d_{14}=1.63 pm/V d_{25}=1.67 pm/V, d_{26}=3.48 pm/V d_{35}=-1.58 pm/V, d_{36}=1.67 pm/V

Properties

Chemical Formula	BiB_3O_6
Crystal Structure	Monoclinic, point group C_y-2
Lattice Parameters	a=7.116 Å, b=4.993 Å, c=6.508 Å, β=105.6°, Z =2
Density	5.033 g/cm^3
Mohs Hardness	5.5
Transparency Range	286- 2500 nm
Refractive Indces	n_x = 1.7569, n_y = 1.7835, n_z = 1.9166

Applications & Features

» SHG/THG

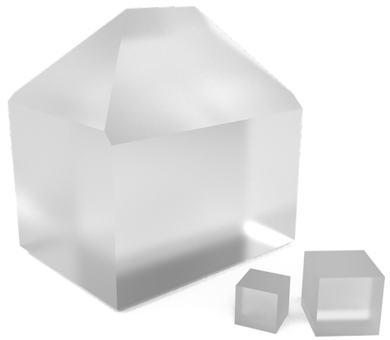
» Photoelectric Modulation

» Q-Switch

» Efficient laser harmonic generation effect

» X-ray spectroscopic effect

» Easy growing large-sized high-quality crystals



ADP Crystals

Ammonium Dihydrogen Phosphate is a member of the KDP-type crystal family and has been used in practical production for a long time as a large-sized crystal. Due to its various special functionalities like laser frequency doubling, electro-optic effect, and piezoelectric effect, the research and application of ADP crystals have been of significant interest to people.

Specifications

Clear Aperture	> 90%
Parallelism Error	< 20 arcsec
Perpendicularity Error	< 5 arcmin
Surface Quality	20/10, S/D
Surface Flatness	< λ/8 @ 632.8nm
Laser Induced Damage Threshold	6 GW/cm^2 @1060nm, 10 ns
Density	1.799 g/cm^3
Transparency Range	180~1500nm
Refractive Indces	n_o=1.5071, n_e=1.4685

Applications & Features

» Frequency Conversion Lasers

» Second Harmonic Generation (SHG)

» Optical Parametric Oscillators (OPOs)

» High resistance ratio & thermal conductivity

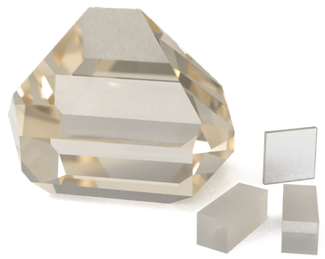
» Stable chemical and mechanical properties

» Large acceptance angle, small walk-off angle

» Wide temperature and spectral bandwidth

» High photoelectric coefficient and low dielectric constant

Potassium Titanyl Phosphate is widely used in both commercial and defense lasers, including laboratory and medical systems, range finders, laser radars, optical communication, and industrial laser systems. KTP is most commonly used for frequency doubling Nd:YAG lasers and other Nd-doped crystals, particularly in lasers with mid to low power densities. In many industrial applications, these lasers are extensively used as green light sources.



KTP Crystals

Specifications

Clear Aperture	> 90%
Parallelism Error	< 20 arcsec
Perpendicularity Error	< 5 arcmin
Surface Quality	10/5, S/D
Surface Flatness	< λ/8 @ 632.8nm
Laser Induced Damage Threshold	> 500 MW/cm^2 @1064 nm,TEM00, 10ns,10Hz(AR-coated)
Nonlinear Coefficient	d_{31}=1.95 pm/v, d_{32}=3.9 pm/v d_{33}=15.3 pm/v,d_{24}=3.9 pm/v d_{15}=1.95 pm/v

Properties

Chemical Formula	$KTiOPO_4$
Crystal Structure	Rhombic System, Space GroupPna21,Point Group mm^2
Lattice Parameters	a=6.404Å, b=10.616Å, c=12.814Å, Z=8
Density	3.01 g/cm^3
Mohs Hardness	5
Transparency Range	350~4500nm
Refractive Indces	n_x=1.7377, n_y=1.7453, n_z=1.8297

Applications & Features

» Nonlinear Optical Frequency Conversion

» Solid-State Laser Gain Medium

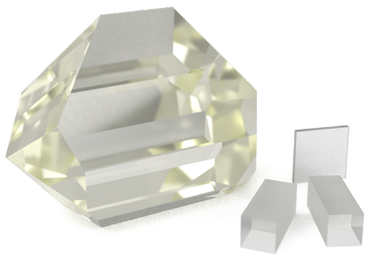
» Optical Parametric Oscillators (OPOs)

» Broad Transparency Range

» Tunable Phase Matching

» Low Dispersion

» Fine thermal and chemical stability



KTA Crystals

Potassium Titanyl Arsenate crystal is an excellent nonlinear optical crystal used for optical parametric oscillation (OPO). KTA possesses outstanding nonlinear optical and electro-optic coefficients, wide angular and temperature bandwidth, low dielectric constant, and sharp absorption drop in the wavelength range of 2.0-5.0 μm. Due to its lower ionic conductivity, it has a higher damage threshold compared to KTP crystals.

Specifications

Clear Aperture	> 90%
Parallelism Error	< 20 arcsec
Perpendicularity Error	< 5 arcmin
Surface Quality	20/10, S/D
Surface Flatness	< λ/8 @ 632.8nm
Electrooptical Coefficient	γ_{13}= 11.5 pm/V, γ_{23}= 15.4 pm/V, γ_{33}= 37.5 pm/V
Nonlinear Coefficient	d_{31}= 2.76, d_{32} = 4.74, d_{33} = 18.5 d_{15} = 2.3, d_{24} = 3.2

Properties

Chemical Formula	$KTiOAsO_4$
Crystal Structure	Orthorhombic System, Point Groupmm^2
Lattice Parameters	a=13.125Å, b=6.5716Å, c=10.786Å
Density	3.454 g/cm^3
Mohs Hardness	~ 5
Transparency Range	350 - 5300 nm
Refractive Indces	n_x=1.90713 n_y=2.15912 n_z=2.14768

Applications & Features

» Generating mid-wave and long-wave infrared continuously tunable radiation with OPO and DFG techniques

» Harmonic generation based on CO2 and CO lasers

» Generation of terahertz frequency

» Transmittance range from 2μm to 12μm

» Relatively high damage threshold

» High thermal conductivity

» Broad phase matching spectral range

ZGP Crystals

Zinc Germanium Phosphide crystal is an efficient mid-infrared nonlinear optical crystal material. Its transparency range is from 0.76 to 12.0 μm, making it suitable for applications in the mid-infrared spectral region such as optical parametric amplifiers (OPA), optical parametric oscillators (OPO), second-harmonic generation (SHG), and fourth-harmonic generation (FHG).

Specifications

Clear Aperture	> 90%
Parallelism Error	< 20 arcsec
Perpendicularity Error	< 5 arcmin
Surface Quality	20/10, S/D
Surface Flatness	< λ/8 @ 632.8nm
Laser Induced Damage Threshold	30 GW/cm^2 @2790nm,150 ps
Nonlinear Coefficient	d_{36}=75 ± 8 pm/V

Properties

Chemical Formula	$ZnGeP_2$
Crystal Structure	Tetragonal Crystal System,42m
Lattice Parameters	a=b=5.467Å, c=12.736Å
Density	4.16 g/cm^3
Mohs Hardness	5.5
Transparency Range	740 – 1200 nm
Refractive Indces	n_o= 3.0729, n_e= 3.1143

Crystrong
Photonics

General Terms&Conditions

Price & Payment

All price quotations are subject to confirmation and are non-binding. Unless otherwise agreed to by Crystrong in writing, and all prices for the sale of Product are stated in and to be paid in $ (USD). For orders below 200 $ additional documentation and handling fee may be applied. All payments are due and payable in thirty (30) days from date of invoice.
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Payment can be made only by wire transfer.

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Bank Name:
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SWIFT Code: PCBCCNBJSDG
Beneficiary:
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Address:
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Return& Repair Policies

Buyer will notify Crystrong about the occurrence of defective or nonoperational Product and request a Return Authorization Number (RMA) from Crystrong for the items Buyer would like to return for repair or replacement by email. This RMA number is to be used for all correspondence and shipping documents that relate to the Product.
Buyer will ship the defective or non-operational Product to Crystrong. Buyer is responsible for shipping cost. Upon receipt of the returned Product, Crystrong will test the Product to verify the defective status of the component within the terms of the Limited Warranty and communicate such results to Buyer.
Crystrong will either send a repaired or replacement Product after verifying that the Product returned under the RMA number is in fact defective within the terms of the Limited Warranty. Crystrong is responsible for shipping costs of replacement Product to the Buyer.

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