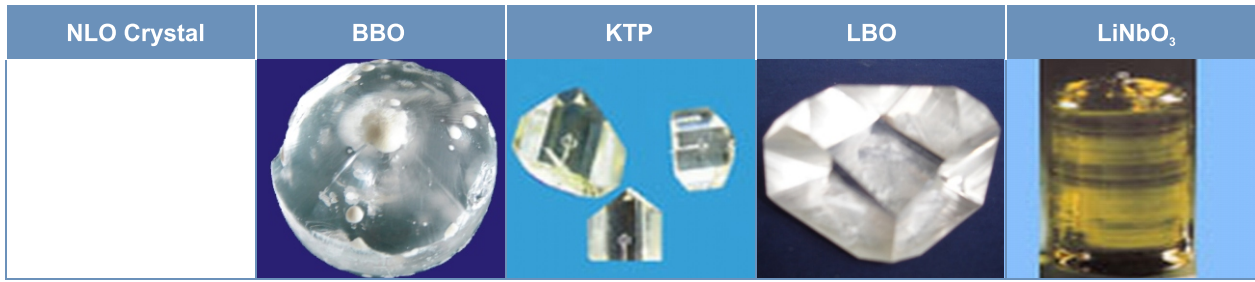


NLO CRYSTAL



Physical and Optical Properties

NLO Crystal	BBO	KTP	LBO	LiNbO ₃
Crystal Structure	Tigonal, Space Group R3c	Orthorhombic, Point Group mm ²	Orthorhombic, Point Group mm ²	Trigonal, Space Group R3c
Transparency Range	189~3500 nm	350nm~4500nm	160~2600 nm	420~5200 nm
Cell Parameters	A=b=12.532Å C=12.717Å	A=6.404Å B=10.616Å C=12.814Å	A=8.44731Å B=7.3788Å C=5.1395Å	a = 0.515Å c = 13.863Å
Melting Point	1095 +/-5° C	1172° C Incongruent	834° C	1255 +/-5° C
Curie point	925 +/-5° C	936° C		1140 +/-5° C
Optical Homogeneity	$\Delta n \approx 10^{-6} / \text{cm}$	$\Delta n \approx 10^{-6} / \text{cm}$	$\Delta n \approx 10^{-6} / \text{cm}$	$\Delta n \approx 5 \times 10^{-5} / \text{cm}$
Mohs Hardness	4.5	5	6	5
Density	3.85 g/cm ³	3.01 g/cm ³	2.47g/cm ³	4.64 g/cm ³
Thermal Conductivity	$\wedge c, 0.012 \text{ W/cm/K}$ $ c, 0.016 \text{ W/m/K}$	0.03 W/cm/K	0.035 W/cm/K	0.046 W/cm/K
Phase-matchable SHG Range	205nm~1750nm	1000~2000nm	800~2000nm	1100~3000nm
Absorption Coefficient	< 0.1%/cm @ 1064nm	<1%/cm @1064nm and 532 nm	<=1%/cm @ 1064nm	<0.1%/cm @ 1064 nm
NLO coefficients	$d_{21} = 2.2\text{pm/V}$ $d_{31} = 0.08\text{pm/V}$ $d_{22} = 2.2\text{pm/V}$	$d_{31} = 1.95\text{pm/V}$ $d_{32} = 3.90\text{pm/V}$ $d_{33} = 15.3\text{pm/V}$ $d_{24} = 3.90\text{pm/V}$ $d_{15} = 1.95\text{pm/V}$	$d_{21} = 0.67\text{pm/V}$ $d_{22} = 0.04\text{pm/V}$ $d_{23} = 0.85\text{pm/V}$ $d_{34} = 0.85\text{pm/V}$ $d_{16} = 0.67\text{pm/V}$	$d_{21} = d_{22} = d_{16} = 2.6\text{pm/V}$ $d_{31} = d_{32} = d_{24} = 4.6\text{pm/V}$ $d_{33} = 25.6\text{pm/V}$
Damage Threshold @ 1064 nm	12.9J/cm ² 9.9GW/cm ²	6.0J/cm ² ; 4.6GW/cm ²	24.6J/cm ² ; 18.9GW/cm ²	200 MW/cm ²
Refractive Indices@ 1064nm@532nm	$n_e = 1.5425$ $n_o = 1.6551$ $n_e = 1.5555$ $n_o = 1.6749$	$n_x = 1.73991$ $n_y = 1.74802$ $n_z = 1.82956$ $n_x = 1.77903$ $n_y = 1.79002$ $n_z = 1.88628$	$n_x = 1.56447$ $n_y = 1.59050$ $n_z = 1.60538$ $n_x = 1.57842$ $n_y = 1.60650$ $n_z = 1.62154$	$n_o = 2.23216$ $n_e = 2.15600$ $n_o = 2.32309$ $n_e = 2.23415$

NLO CRYSTAL

Typical Specification and Capabilities

NLO Crystal	BBO	KTP	LBO	LiNbO ₃
Angle Tolerance	$\Delta \theta < \pm 0.5^\circ$; $\Delta \phi < \pm 0.5^\circ$			
Dimension Tolerance	(W \pm 0.1mm) x (H \pm 0.1mm) x (L + 0.2mm/-0.1mm)	(W \pm 0.1mm) x (H \pm 0.1mm) x (L + 0.2mm/-0.1mm)	(W \pm 0.1mm) x (H \pm 0.2mm) x (L + 0.2mm/-0.2mm)	(W \pm 0.1mm) x (H \pm 0.2mm) x (L + 0.2mm/-0.2mm)
Flatness	< λ /8 @ 633nm	< λ /8 @ 633nm	< λ /4 @ 632.8nm	< λ /8 @ 633nm
Scratch/Dig Code	Better than 10/5 Scratch/Dig per MIL-O-13830A			
Parallelism	< 20 arc seconds			
Perpendicularity	<5 arc minutes	< 5 arc minutes	< 30 arc minutes	< 5 arc minutes
Wavefront Distortion	< λ /8 @ 633nm	< λ /8 @ 633nm	< λ /4 @ 632nm	< λ /8 @ 632nm
Clear Aperture	> 90% Central Area	> 90% Central Area	> 80% Central Area	> 90% Central Area
Aperture	1x1~12x12mm	1x1~10x10mm	2~10mm	1~50mm
Length	0.02~25mm	0.05~20mm	0.3~20mm	0.3~20mm
Phase Matching Type	Type I or Type II	Type II	Type I or Type II	Type I or Type II
End Configuration	Flat or Brewster or Specified	Flat or Brewster or Specified	Flat, Spherical, Parallel and Wedged	Flat, Spherical, Parallel and Wedged
Typical Coating	Antireflective coating	Antireflective coating Highreflective Coating	Antireflective coating	Antireflective coating