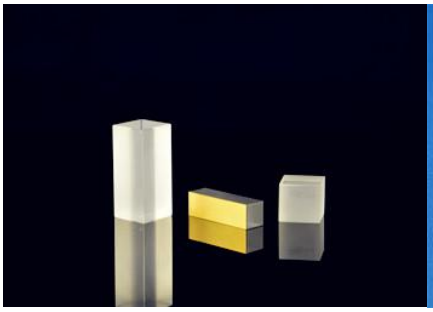
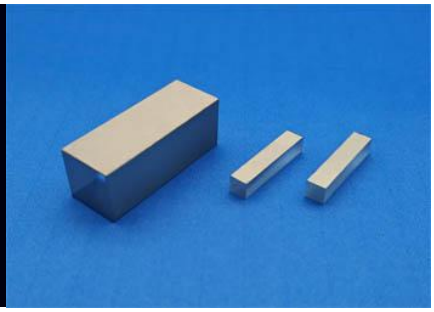
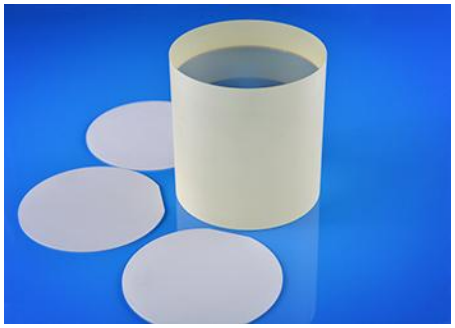
MgO:LiNbO3 crystals

$LiNbO_3$ Crystal is widely used as frequency doublers for wavelength > 1μm and optical parametric oscillators (OPOs) pumped at 1064 nm as well as quasi-phase-matched (QPM) devices. Compared with pure LiNbO3, MgO:LN has higher optical damage threshold.Due to its large Electro-Optic (E-O) and Acousto-Optic (A-O) coefficients, $LiNbO_3$ crystal is the most commonly used material for Pockel Cells, Q-switches and phase modulators, waveguide substrate, and surface acoustic wave (SAW) wafers, etc. Hangzhou Shalom EO provides the MgO(0.6~1.0mol%):LiNbO3 and MgO(5mol%):LiNbO3 crystals, the custom crystals of blanks, polished and coated and electroded is available upon your request.

SPECIFICATIONS

Specification of MgO:LiNbO3 crystals	
Crystal materials	MgO(0.6-1.0mol% or 5mol%):LiNbO3 crystals
Size	Customized
Size tolerance	+/-0.1mm
Length tolerance	+/-0.2mm
Surface quality	20/10 S/D
Parallelism	<20 arc seconds
Flatness	< Lambda/10 @633nm
Perpendicularity	<5 arc minutes
Chamfer	0.2mmx45°
Side surface	Fine ground
Orientation tolerance	< 10 arc minutes
Wavefront distortion	<Lambda/4@633nm

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Note: crystals with other special specificaton is available upon request

Application Notes

One of the most versatile nonlinear crystals, lithium niobate has a wide range of applications, including:

• **Optical modulation and Q-switching.**

Thanks to its large electro-optic coefficients, lithium niobate is well suited to optical modulation and Q-switching of infrared wavelengths. Among its advantages in these applications are:

1.Zero residual birefringence

2.Transverse electric field to direction of light propagation

3.Nonhygroscopic

4.Low half-wave

5.Second harmonic generation,particularly with low power laser diodes in the 1.3 to 1.55 μm range.

6.Optical parametric oscillation. With its high nonlinear coefficients, lithium niobate is an efficient medium for optical parametric oscillation.

• **Phasematching.**

To generate tunable wavelengths over a broad wavelength range, lithium niobate phasematching processes offer:

1.Broad spectral transmission ranging from 0.4 μm to 5.0 μm with an OH- absorption at 2.87 μm

2.Large negative birefringence

3.Large nonlinear coefficients

4.Difference frequency mixing. Lithium niobate generates tunable infrared wavelengths through a difference frequency mixing process.

Typical powers for 10 nanosecond pulses and 5-μm beams are:

1.30 mJ/pulse of 0.640 μm minus 40 mJ/pulse of 1.064 μm to produce 2.5 mJ/pulse at 1.54 μm

2.32 mJ/pulse of 0.532 μm minus 32 mJ/pulse of 0.640 μm to produce 0.25 mJ/pulse at 3.42 μm

Magnesium Oxide Doped Lithium Niobate Crystals (MgO:$LiNbO_3$)

Compared with $LiNbO_3$ crystal, MgO:$LiNbO_3$ crystal exhibits its particular advantages for NCPM frequency doubling (SHG) of Nd:Lasers, mixing (SFG) and optical parametric oscillators (OPOs). The SHG efficiencies

of over 65% for pulsed Nd:YAG lasers and 45% for cw Nd:YAG lasers have been achieved in MgO:$LiNbO_3$ crystals, respectively. MgO:$LiNbO_3$ is also a good crystal for optical parametric oscillators (OPOs) and amplifiers (OPAs), quasi-phase-matched doublers and integrated waveguide.

MgO:$LiNbO_3$ has similar effective nonlinear coefficients to pure $LiNbO_3$. Its Sellmeier equations are:

$n^2o\ (l) = 4.8762+0.11554/(l^2-0.04674)-0.033119 \times l^2$ (l in um)

$n^2o\ (l) = 4.5469+0.094779/(l^2-0.04439)-0.026721 \times l^2$

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