

# MgO:LiNbO<sub>3</sub>



## DESCRIPTION

MgO-doped LiNbO<sub>3</sub> crystals have high optical damage threshold and high nonlinear conversion efficiency than undoped LiNbO<sub>3</sub> crystals, and the doping can lead to increased Raman scattering cross section and reduced phonon mode loss. MgO:LiNbO<sub>3</sub> crystals have unique advantages over LiNbO<sub>3</sub> crystals for NCPM multiplication, mixing and optical parametric oscillation in Nd-doped lasers. crystals are widely used in optical parametric oscillation (OPO), optical parametric amplification (OPA), quasi-phase matching, and integrated optical waveguides.

## FEATURES

- High homogeneity
- Wide range of transparency
- High damage threshold
- Good optoelectronic properties
- Good optoelectronic elasticity
- Reduced photorefractive effects of intrinsic materials

## APPLICATIONS

- Electro-Optical Modulators
- OPA (Optical Parametric Amplification)
- OPO (Optical Parametric Oscillator)
- SHG (second harmonic generation)
- THG (third harmonic generation)
- OPCPA (optical parametric chirped pulse amplification)

## PHASE MATCHING ANGLE EXPERIMENTAL VALUE (T=293K)

Interaction wavelength [ $\mu\text{m}$ ]	$\Phi_{\text{exp}}$ [deg]	Note
SHG, o+o $\Rightarrow$ e		
1.0642 $\Rightarrow$ 0.5321	74.5	5 mol% MgO, full LN
	76	5mol% MgO
	76.5	5mol% MgO, Li/Nb=0.97
	82.3	7mol% MgO
1.0795 $\Rightarrow$ 0.53975	75.1	5 mol% MgO, full LN
1.0796 $\Rightarrow$ 0.5398	74	5mol% MgO, Li/Nb=0.97
1.3414 $\Rightarrow$ 0.6707	54	5 mol% MgO, full LN



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## EXPERIMENTAL VALUES OF NCPM TEMPERATURE

Interaction wavelength [ $\mu\text{m}$ ]	T [ $^{\circ}\text{C}$ ]	Attention
SHG, o+o $\Rightarrow$ e		
1.047 $\Rightarrow$ 0.5235	75.3	5mol% MgO, Li/Nb=0.97
1.0642 $\Rightarrow$ 0.5321	25.4	0.6 mol% MgO, full LN
	78.5	7 mol% MgO, along X
	85-109	>5mol% MgO
	107	5mol% MgO
	110	5mol% MgO
	110.6	5mol% MgO
	110.8	7mol% MgO
1.0795 $\Rightarrow$ 0.53975	115	5 mol% MgO, full LN

## EXPERIMENTAL VALUES OF ANGLE AND TEMPERATURE BANDWIDTH

Interaction wavelength [ $\mu\text{m}$ ]	T [ $^{\circ}\text{C}$ ]	$\theta_{\text{pm}}$ [deg]	$\Delta\theta^{\text{int}}$ [deg]	$\Delta\text{T}$ [ $^{\circ}\text{C}$ ]	Note
SHG, o+o $\Rightarrow$ e					
1.0642 $\Rightarrow$ 0.5321	20	76	0.063		5mol% MgO
	25.4	90		0.68	0.6mol% MgO
	107	90	2.16	0.73	5mol% MgO
	110.6	90		0.73	5mol% MgO

## EXPERIMENTAL VALUES OF ANGLE AND TEMPERATURE BANDWIDTH

		355nm	406nm	532nm	633nm	1064nm
LiNbO <sub>3</sub>	25 $^{\circ}\text{C}$	2.40179	2.32631	2.23622	2.20351	2.15714
	50 $^{\circ}\text{C}$	2.40343	2.32807	2.23765	2.20458	2.15757
	75 $^{\circ}\text{C}$	2.40722	2.3308	2.2394	2.20607	2.15884
MgO:LiNbO <sub>3</sub>	25 $^{\circ}\text{C}$	2.38482	2.31248	2.2253	2.19323	2.14757
	50 $^{\circ}\text{C}$	2.38778	2.31441	2.22644	2.19424	2.14861
	75 $^{\circ}\text{C}$	2.39152	2.31718	2.22819	2.19567	2.14966

## TEMPERATURE DERIVATIVE OF REFRACTIVE INDEX OF MGO ISOTOPES DOPED WITH 5 MOL% LINBO<sub>3</sub>

$\lambda$ [ $\mu\text{m}$ ]	$dn_o/dT \times 10^6$ [ $\text{K}^{-1}$ ]	$dn_e/dT \times 10^6$ [ $\text{K}^{-1}$ ]
0.53975	16.663	72.763
0.6328	12.121	64.866
1.0795	4.356	54.19
1.3414	5.895	52.665

## THE ABSOLUTE VALUE OF THE SECOND-ORDER NONLINEAR COEFFICIENT OF 5 MOL% MGO:LINBO<sub>3</sub>

$ d_{31}(0.852\mu\text{m})  = 4.9\text{pm/V}$	$ d_{33}(1.064\mu\text{m})  = 25.0\text{pm/V}$
$ d_{33}(0.852\mu\text{m})  = 28.4\text{pm/V}$	$ d_{31}(1.313\mu\text{m})  = 3.4\text{pm/V}$
$ d_{31}(1.064\mu\text{m})  = 4.4\text{pm/V}$	$ d_{33}(1.313\mu\text{m})  = 20.3\text{pm/V}$



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## SPECTRA

