



Crystal Material Data Sheet

Optical grade LT&LN Wafer



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Optical Grade LiNbO₃ Crystal is widely used as frequency doublers for wavelength > 1 μm and optical parametric oscillators (OPOs) pumped at 1064 nm as well as quasi-phase-matched (QPM) devices. Due to its large Electro-Optic (E-O) and Acousto-Optic (A-O) coefficients, LiNbO₃ crystal is the most commonly used material for Pockel Cells, Q-switches and phase modulators, waveguide substrate, and surface acoustic wave (SAW) wafers, etc.

Basic Properties

Crystal Structure	Trigonal, point group 3m
Lattice Parameters	a=5.148Å, c=13.863Å
Density	4.64 g/cm ³
Melting Point	1250 °C
Curie Point	1142±2°C
Mohs Hardness	5
Dielectric Constant	ε ₁₁ /ε ₀ = 85; ε ₃₃ /ε ₀ = 29.5
Thermal Conductivity	38 W/m/°C at 25°C
Thermal Expansion Coefficient	a ₁ =a ₂ = 2x10 ⁻⁶ /°C, a ₃ =2.2x10 ⁻⁶ / °C at 25°C
Piezoelectric Strain Constant	d ₂₂ = 2.04 x 10 ⁻¹¹ C/N, d ₃₃ = 19.22 x 10 ⁻¹¹ C/N
Elastic Stiffness Constant	CE ₁₁ = 2.04 x 10 ¹¹ N/m ² , CE ₃₃ = 2.46 x 10 ¹¹ N/m ²

Optical and NLO Properties

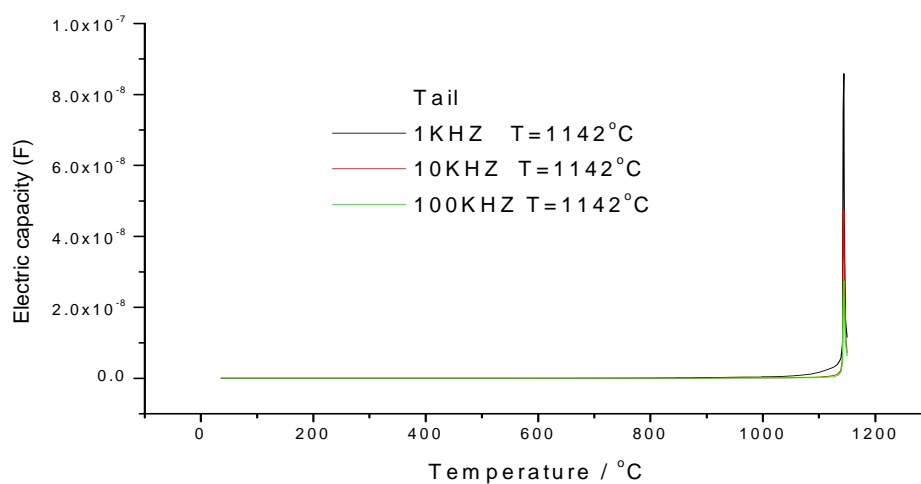
Transparency Region	370 ~ 5000 nm
Sellmeier Equations (λ in μm)	no ₂ = 4.9048+0.11768/(λ ² -0.0475)-0.027169λ ² ne ₂ = 4.5820+0.099169/(λ ² -0.04443)-0.02195λ ²

Optical Homogeneity	$\Delta n \sim 5 \times 10^{-5} / \text{cm}^2$	
Nonlinear Coefficients	$d_{\text{eff}} = 13.6 \text{ d}_{36}(\text{KDP})$ for OPO at 1064 nm $d_{\text{eff}} = 14.6 \text{ d}_{36}(\text{KDP})$ for SHG at 1300 nm $d_{\text{eff}} = 45.0 \text{ d}_{36}(\text{KDP})$ for QPM	
Refractive Indexes	no	ne
	2.220	2.146 @ 1300 nm
	2.232	2.156 @ 1064 nm
	2.286	2.203 @ 632.8 nm
Electro-optic Coefficients (pm/V)	Low frequency	High frequency
	γ_{33}	31
	γ_{31}	8.6
	γ_{22}	3.4
Damage Threshold	> 250 KW/cm ² at 1064 nm (10 ns)	

Optical Grade Lithium Niobate Crystal

Crystal categories	2 inch Optical Grade LiNbO ₃ Crystal	3 inch Optical Grade LiNbO ₃ Crystal	4INCH Optical Grade LiNbO ₃ Crystal
Crystal Orientation	X, Y, Z,	X, Y, Z,	X, Y, Z,
Orientation Fluctuation	±0.10	±0.10	±0.10
Diameter	50.8±0.2 mm	76.2±0.3 mm	100.±0.5 mm
length	≤ 100mm	≤ 85mm	≤ 80mm
Curie temperature	1142°C±1°C	1142	1142
Appearance	Free of crack pore inclusion	Free of crack pore inclusion	Free of crack pore inclusion

Transmittance drawing:



Optical Grade Lithium Tantalate Crystal

Crystal Structure	Oblique hexahedron space group 3M
Lattice Parameters	(hexagon) a = 5.154 Å c = 13.783 Å
Melting Point	1650 C
Density	7.45 g/cm ³
Curie Point	605 C
Mohs Hardness	5.5 - 6 Moh
Thermal Expansion Coefficient	a a= 1.61 x 10 ⁻⁶ / k a c= 4.1 x 10 ⁻⁶ / k
Thermal Conductivity	1015 W.m
Dielectric Constant	es11 / e0: 39 ~43 es33 / e0: 42 ~43 et11 / e0: 51 ~54 et11 / e0:43 ~46
Colour	Colourless
Main properties include: Transparent Range	0.4~5.0 mm
Refractive Indices	no=2.176, ne=2.180 @ 633 nm.
E-O Coefficient:	r33=30.4;

Spec Data for OLT Crystal

Crystal categories	2 inch Optical Grade LiTaO ₃ Crystal	3 inch Optical Grade LiTaO ₃ Crystal	LN (4INCH Optical Grade LiNbO ₃ Crystal)
Crystal Orientation	X, , Z,	X, Z,	X, Z,
Orientation Fluctuation	±0.10	±0.10	±0.10
Diameter	50.8±0.2 mm	76.2±0.3 mm	100.±0.5 mm
length	≤ 80mm	≤65mm	≤ 50mm
Curie temperature	605°C±2°C	605 ±2°C	605±2°C
Appearance	Free of crack pore inclusion	Free of crack pore inclusion	Free of crack pore inclusion

Spec Data for OLT Wafer

Diameter	76.2±0.3	100.0±0.5
Crystal Orientation	X, Y, Z	
Wafers Thickness (mm)	0.25-1.0	
Primary Flat Orientation	X, Y、 Z	
Flat length (mm)	22±1	32±1
S/D	10/5	
TTV(μm)	≤10	

BOW(μm)	≤ 20	≤ 35
Curie temperature($^{\circ}\text{C}$)	605.0 \pm 2.	