

LiNbO₃ 铌酸锂 Lithium Niobate

简介 Introduction:

铌酸锂是一种无机物，化学式为 LiNbO₃，是一种负性晶体、铁电晶体，经过极化处理的铌酸锂晶体具有压电、铁电、光电、非线性光学、热电等多性能的材料，同时具有光折变效应。

铌酸锂晶体是很好的压电换能材料，铁电材料，电光材料，作为电光材料在光通讯中起到光调制作用，广泛应用于参量振荡器、倍频、声光器件、光学调制器。MgO 的掺入可有效提高晶体的抗损伤阈值。

典型应用有：声表面波滤波器、隔离器、窄带滤波器、传感器、光子可调谐滤波器、声光器件、光陀螺仪、光波导、光开关、光调制方向耦合器、光通信调制器、干涉仪回转器、高速长途通信器件和倍频器件等。



Lithium Niobate is an inorganic material, chemical formula LiNbO₃, is a negative crystal, ferro-electric crystal, polarization of lithium niobate crystal with piezoelectric, ferro-electric, photoelectric, nonlinear optical, thermo-electric materials, and have optical refractive effect.

Lithium niobate crystal is a good piezoelectric conversion materials, ferro-electric materials, electric and optical materials. As electro-optical materials in optical communication, it is widely used in parametric oscillator, double frequency, acoustic and optical devices, and optical modulator. The doping of MgO can effectively improve the damage resistance value of the crystal.

Typical applications include: acoustic surface wave filter, isolation device, narrow band filter, sensor, photon tunable filter, acoustic and optical device, optical wave-guide, optical switch, optical modulation direction coupler, optical communication modulator, inter-ferometer converter, high-speed long-distance communication devices and multiple frequency device, etc.

主要优点 Main Advantages:

很小的啁啾效应

高调制带宽

良好消光比

物理化学性能稳定

Very small chirp effect

High modulation bandwidth

High extinction ratio

Stable chemical and physical properties

材料特性 Material Properties:

晶体结构 Crystal Structure	三方晶系 Trigonal
晶格参数 Lattice constant	a=0.515Å, c=13.863Å, Z=6Å
熔点 Melting Point	1250±5° C
居里点 Curie Point	1140±5° C
莫氏硬度 Mohs Hardness	5
密度 Density	4.64 g/cm ³
潮解性 Hygroscopy	不潮解 No
介电常数 Dielectric Constant	ε ₁₁ /ε ₀ =85; ε ₃₃ /ε ₀ =29.5
热膨胀系数 Thermal Expansion Coefficient	a ₁ =a ₂ =2×10 ⁻⁶ /°C, a ₃ =2.2×10 ⁻⁶ /°C at 25°C
电阻系数 Thermal Conductivity	38 W /m /K @ 25°C
透光范围 transmission range	370-5000nm
压电常数 Piezoelectric constant	d ₂₂ =2.04×10 ⁻¹¹ C/N, d ₃₃ =19.22×10 ⁻¹¹ C/N
电光系数 E-O Coefficient	g _{T33} =32pm/V, g _{S33} =31pm/V; g _{T31} =10pm/V, g _{S31} =8.6pm/V g _{T22} =6.8pm/V, g _{S22} =3.4pm/V
折射率 Refractive Indices	n _o =2.2827 ± 0.0003 n _e =2.1928± 0.0003

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尺寸 Size	4" , 6" 晶棒和晶圆 (声表级/光学级) Boule or wafer ,Acoustic or Optical grade
掺杂 Doping	无掺杂或可掺杂 , No Doping or With Mg
晶棒长度 Boule Length	≥50mm
晶圆厚度 Wafer Thickness	0.25, 0.35, 0.50(mm) 可定制
切向 Orientation	Y42°/Y36°/X/Y/Z 可依客户需求定制 or Upon Request
表面处理 Surface Process	单面抛光, 双面抛光 Single/Double Sides Polishing
TTV	< 10μm
BOW	± (25μm ~40um)
Warp	≤35μm
定向边宽度 Flat Width	32.0±2.0 (mm) 可要求定制 or Upon Request
抛光面 Roughness	粗糙度 Ra≤10Å
倒角 Chamfer	≤0.1mm@45°