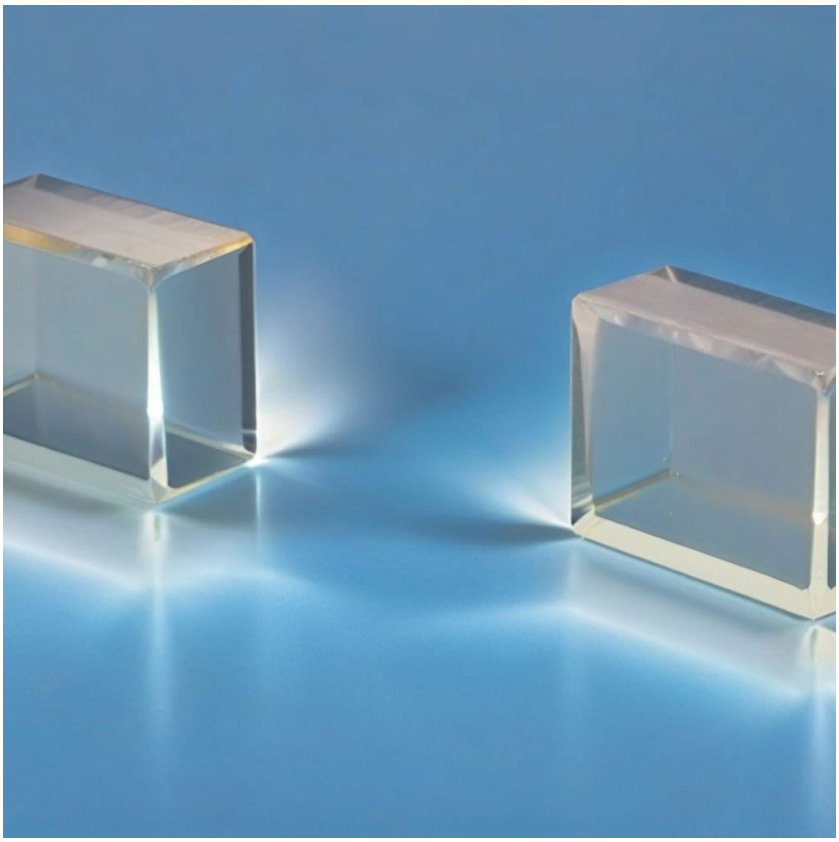
Photonics On Crystals

POC-OC-122513-Fe:LiNbO3 Crystal Datasheet

Main Features

- High electro-optic coefficient (r41 = 5 pm/V) for efficient photorefractive applications.
- Superior phase conjugation efficiency for optical applications.
- Available in large size elements or wafers up to 3 inches.
- Grown using the Czochralsky method, ensuring high quality.
- Customization available for doping levels, coatings, and dimensions.



Material General Description

Fe:$LiNbO_3$ (Iron-doped Lithium Niobate) crystals are renowned for their exceptional photorefractive properties, making them ideal for optical and photonic applications. Doping with Fe enhances their photorefractive sensitivity and diffraction efficiency. Their high electro-optic coefficients, combined with excellent chemo-mechanical properties, enable versatile use in various fields, including telecommunications and holography. Fe:$LiNbO_3$ is easy to handle, cost-effective, and suitable for high-volume production, making it a preferred choice for industrial and research applications.

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These crystals are grown by the Czochralsky method, ensuring high structural uniformity and purity. With the ability to customize doping levels and physical dimensions, Fe:$LiNbO_3$ crystals can meet the specific demands of advanced optical systems.

General Applications

Fe:$LiNbO_3$ crystals are extensively used in:

- **Spatial Light Modulators (SLMs):** Applications in optical displays and adaptive optics systems.
- **Optical Switches:** For high-speed data transmission in telecommunications.
- **Holographic Recording:** Ideal for high-density optical data storage.
- **Optical Waveguides:** Integrated photonics for light manipulation and signal processing.

These applications leverage the crystal's high phase conjugation efficiency and electro-optic coefficients, ensuring minimal signal distortion and energy loss in photonic devices. Additionally, Fe:$LiNbO_3$'s wide range of doping levels and customizable sizes enhance its utility in both research and commercial domains.

Chemical, Physical, and Structural Properties

Property	Specification
Chemical Formula	Fe:$LiNbO_3$
Crystal Structure	Trigonal, 3m
Density	4.64 g/cm³
Mohs Hardness	5
Transmission Range	0.35–5.5 µm
Refractive Index @0.63 µm	ne = 2.29, no = 2.22
Electro-optic Coefficients	r33 = 32 pm/V, r22 = 6 pm/V
Dielectric Constant	ε1 = 85, ε3 = 30

Optical and Nonlinear Optical Properties

Optical Property	Specification
Transparency Range	0.35–5.5 µm
Refractive Index	ne = 2.29, no = 2.22
Electro-optic Coefficient	r41 = 5 pm/V

Phase Matching	Supports wide-angle matching

Coating Specifications

- **Available Coatings:** Antireflective or indium tin oxide coatings upon request.
- **Standard Coatings:** None (crystals are supplied uncoated).

Standard Fabrication Specifications

Specification	**Tolerance**
Clear Aperture	≥ 85%
Thickness Tolerance	±0.2 mm
Surface Flatness	<λ/4 @632.8 nm
Parallelism Error	<3 arcmin
Face Dimensions Tolerance	±0.2 mm

POC Strength and Capabilities

Photonics On Crystals (POC) excels in delivering high-quality Fe:$LiNbO_3$ crystals tailored to meet diverse industrial and research requirements. With advanced growth techniques and stringent quality control, POC ensures superior performance in photonics and electro-optic applications. Customization options, including doping levels and coatings, allow clients to adapt the crystals to specific use cases, maintaining competitive pricing and reliable delivery.

Standard Products

Face Dimensions	**Length**	**Doping (Fe_2O_3)**	**SKU**	**Price (USD)**
10 × 10 mm	1 mm	0.02%	7006	Request
10 × 10 mm	5 mm	0.02%	6457	Request
20 × 20 mm	1 mm	0.02%	7010	Request

Customization Options: Additional sizes, doping levels, and coatings can be requested.