Photonics On Crystals

POC-OC-122512-SBN Crystal Datasheet

1 Main Features

- High optical and photorefractive properties with Ce-doped and pure variants.
- Supports efficient phase-conjugation applications.
- Customizable size, doping levels, and antireflective coatings available.
- Poling and electrode customization options.
- Inclusion-free, homogenous structure for consistent optical performance.

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2. Material General Description

Strontium-Barium Niobate (SBN:61) is a ferroelectric crystal with exceptional optical and photorefractive properties. Its high photorefractive sensitivity makes it a preferred material in electro-optics and nonlinear optics applications. The material features a tetragonal crystal structure with lattice parameters of **a = 12.46 Å** and **c = 3.946 Å**, ensuring uniformity and stability. SBN crystals are grown using the Modified Stepanov method to achieve a high-quality, inclusion-free product with dimensions up to **40 mm**. They can be doped with Cerium (Ce) to enhance photorefractive efficiency, expanding their application potential in advanced optical devices.

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3. General Applications and Examples

- **Optical Information Recording:** SBN crystals are widely used in holographic data storage and photonic memory systems, offering high-resolution capabilities and long-term stability.
- **Pyroelectric Detectors:** Their pyroelectric coefficients make them suitable for thermal imaging and infrared detection.
- **Nonlinear Optics:** Efficient phase-conjugation properties allow SBN crystals to be used in optical correlators and signal processing devices.
- **Acousto-Optic Devices:** The high photorefractive sensitivity supports beam deflection and modulation applications.
- **Custom Applications:** Self-pumped self-conjugation mirrors and electro-optic modulators benefit from SBN's exceptional transparency and refractive index.

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4. Chemical, Physical, and Structural Properties

Property	**SBN:61 Values**
Composition	Sr_xBa_(1-x)Nb_2O_6
Crystal Structure	Tetragonal (4 mm)
Lattice Parameters	a = 12.46 Å, c = 3.946 Å
Density	5.4 g/cm³
Mohs Hardness	5.5
Melting Temperature	1480°C
Curie Temperature	75°C
Transparency Range	0.45–5.5 µm

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5. Optical, Laser, and Nonlinear Optical Properties

Optical Properties	**SBN:61 Values**
Refractive Index (at 633 nm)	n_o = 2.3103, n_e = 2.2817
Birefringence Δn	-0.0286
Half-Wave Voltage (λ/2)	240 V
Electro-Optic Coefficients	r_33 = 250 pm/V
Pyroelectric Coefficient	0.065 µC/cm² K
Dielectric Constant	880

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6. Spectrum Transmission Curves

N.A

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7. Coating Specifications

- Available as uncoated crystals; antireflective coatings available upon request.
- Custom coatings to enhance performance at specific wavelengths can be provided.

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8. Standard Fabrication Specifications

Specification	Details
Orientation	Short edge along tetragonal axis
Poling	Poled or unpoled
Electrodes	Carbon-water or no electrodes
Clear Aperture	85%
Face Dimensions Tolerance	±0.2 mm
Thickness Tolerance	±0.2 mm
Parallelism Error	<30 arcsec
Protective Chamfers	<0.1 mm at 45°
Surface Quality	40-20 S-D over aperture
Surface Flatness	<λ/4 @632.8 nm

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9. POC Strength and Capabilities

Photonics On Crystals (POC) offers state-of-the-art fabrication techniques, ensuring precise control over doping levels, dimensions, and performance parameters. Our SBN crystals feature:

- High customizability in doping concentration (pure or Ce-doped options).
- Reliable growth process using Modified Stepanov techniques.
- Comprehensive design support for various optical and nonlinear optical applications.

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10. Standard Products

Material	Face Dimensions	Length	Doping	SKU	Price (USD)
SBN:61	5 x 5 mm	5 mm	Undoped	73	1850
		10 mm	Undoped	74	2250

		15 mm	Undoped	75	2750
		5 mm	CeO_2 0.002 wt. %	6940	1850
		10 mm	CeO_2 0.002 wt. %	6941	2250
		15 mm	CeO_2 0.002 wt. %	6942	2750
		5 mm	CeO_2 0.01 wt. %	6944	1850
		10 mm	CeO_2 0.01 wt. %	6945	2250
		15 mm	CeO_2 0.01 wt. %	6946	2750
Customization	**Available upon request**				**Contact for pricing**

This datasheet provides an in-depth overview of SBN crystals, consolidating their optical and physical properties for practical applications in photonics and electro-optics. For inquiries or custom specifications, please contact Photonics On Crystals (POC).