Photonics On Crystals

POC-OC-122475-ZnSe Crystal Datasheet

1 Main Features

- Broad transmission range: 0.55 µm to 20 µm.
- Low optical absorption, making it ideal for high-power CO_2 laser systems.
- Uniform refractive index for consistent performance across infrared applications.
- Excellent thermal and optical properties for FLIR and imaging systems.
- Customized dimensions and coatings available upon request.

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2. Material General Description

Zinc Selenide (ZnSe) crystal is a transparent yellow material known for its excellent optical transmission properties and low optical absorption in the infrared region. With a transmittance range from 0.55 µm to 20 µm, ZnSe is widely used in CO_2 laser optics, forward-looking infrared (FLIR) systems, and other thermal imaging applications. Its uniform refractive index and low absorption make it an ideal choice for high-power laser systems, medical equipment, and astronomy.

ZnSe crystals are grown through the chemical vapor deposition (CVD) method, ensuring high purity and uniformity for optical applications. Additionally, ZnSe's mechanical strength and durability make it suitable for demanding applications requiring stable performance under extreme conditions.

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3. General Applications

1. **High-Power CO_2 Laser Systems**:
   ZnSe crystals are extensively used in high-power CO_2 laser systems for industrial cutting, welding, and engraving due to their low optical absorption and high thermal stability.
2. **Imaging Systems (FLIR)**:
   ZnSe is a critical component in forward-looking infrared systems, providing accurate thermal imaging in defense, aerospace, and surveillance applications.
3. **Medical Optics**:
   ZnSe crystals are used in medical laser systems, including CO_2 surgical lasers for precise cutting and tissue ablation.
4. **Astronomy and Night Vision**:
   ZnSe's excellent transmission properties make it suitable for infrared telescope lenses and night vision devices, enabling detailed imaging in low-light environments.
5. **Custom Coating Solutions**:
   ZnSe crystals can be coated with anti-reflection coatings to enhance performance in specialized laser optics and thermal imaging systems.

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4. Chemical, Physical, and Structural Properties

Property	**Value**
Material Grade	CVD ZnSe
Maximum Crystal Size	Ø300 mm
Growing Method	CVD
Density	5.27 g/cm³
Knoop Hardness	105 kg/mm²
Transmittance Range	0.55 µm – 20 µm
Thermal Expansion	7.1 × 10^-6 /°C
Surface Flatness	λ/8 @ 632.8 nm
Surface Quality	40-20
Clear Aperture	>90%
Parallelism	<1'
Bevel Angle	<0.25 × 45°
Customization	Available upon request

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5. Optical, Laser, and Nonlinear Optical Properties

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Optical Property	Value
Transmission Range	0.55 µm – 20 µm
Refractive Index	n = 2.402 @ 10.6 µm
Thermal Conductivity	18 W/m·K
Reflection Loss	<0.2% per surface
Damage Threshold	>10 J/cm² @ 10 ns

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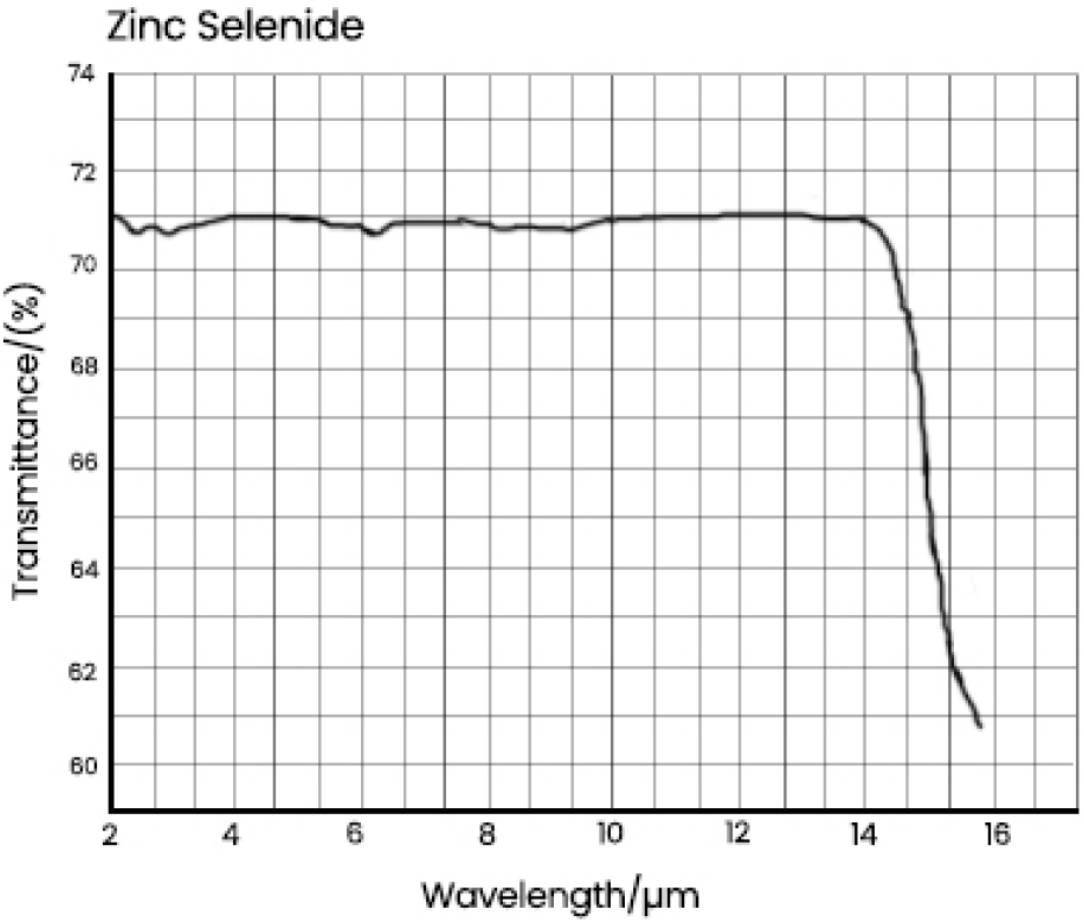
6. Spectrum Transmission Curve

The spectrum transmission curve of ZnSe crystals showcases a broad and efficient transmittance range from 0.55 µm to 20 µm. The curve highlights the material's ability to maintain over 90% transmittance across this range, making it ideal for applications like CO_2 lasers and thermal imaging.



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7. Coating Specification

- **Anti-Reflection Coatings**: Available for wavelengths ranging from 2 µm to 15 µm.
- **Material Options**:

- **Calcium Fluoride**: 1 mm, 2 mm, 3 mm.
- **Barium Fluoride**: 1 mm, 2 mm, 3 mm.
- **Magnesium Fluoride**: 1 mm, 2 mm, 3 mm.
- **Lithium Fluoride**: 1 mm, 2 mm, 3 mm.

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8. Standard Fabrication Specifications

Specification	Value
Dimensional Tolerance	±0.1 mm
Surface Flatness	λ/8 @ 632.8 nm
Parallelism	<1'
Surface Quality	40-20
Bevel Angle	<0.25 × 45°
Clear Aperture	>90%

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9. POC Strength and Capabilities

Photonics On Crystals (POC) is a leading provider of high-performance ZnSe crystals. With advanced manufacturing facilities and extensive expertise in optical materials, POC ensures superior quality, precision fabrication, and customizable solutions for clients across various industries. Our focus on innovation and quality assurance has positioned us as a trusted partner for demanding optical and laser applications.

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10. Standard Products

Size (mm)	Coating	Price (USD)	SKU
10 × 10 × 1	AR Coating (2-15 µm)	300	ZNSE-1010
20 × 20 × 2	AR Coating (2-15 µm)	450	ZNSE-2020
50 × 50 × 2	AR Coating (2-15 µm)	700	ZNSE-5050
Custom Size	Upon Request	TBD	CUSTOM-ZNSE