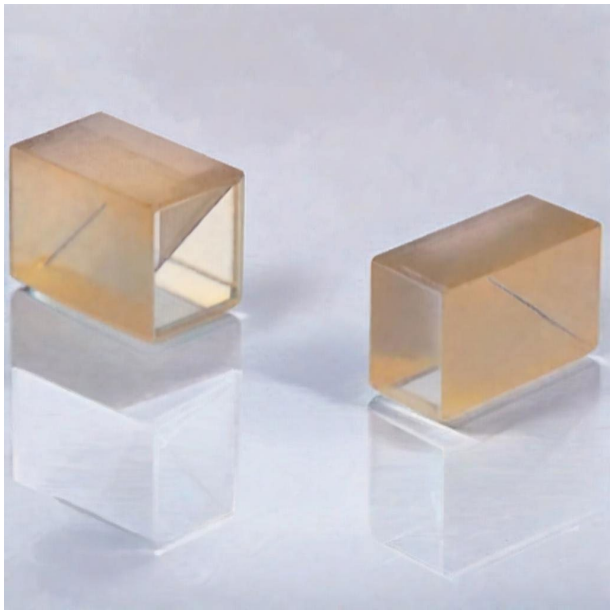
Photonics On Crystals

POC-OC-122511-ZnTe Crystal Datasheet

1 Main Features

- High applicability for THz wave generation, detection, and optical limiters.
- Exceptional purity levels ranging from 99.995% to 99.999%.
- Maximum aperture size of 30 mm × 30 mm and minimum thickness of 0.01 mm.
- High-quality ZnTe crystals with [100] and [111] crystal orientations available.
- Outstanding electro-optic coefficient (y41 = 4.0 pm/V) for advanced applications.



2. Material General Description

Zinc Telluride (ZnTe) is a direct-bandgap II-VI compound semiconductor material with a cubic zinc blende crystal structure. It is an ideal electro-optic crystal widely utilized in terahertz (THz) wave generation and detection due to its exceptional optical and electronic properties. With a wide range of applications, ZnTe crystals boast high transmission efficiency in the mid-infrared (7-12 μm) and visible spectrum.

The crystal's intrinsic qualities include a high electro-optic coefficient, moderate birefringence, and excellent purity levels that contribute to its performance in high-power and ultrafast laser systems. Its compact lattice structure ensures low defect density, making it a reliable choice for industrial-grade THz imaging and spectroscopy applications. Furthermore, ZnTe's ability to support ultra-thin and large-area production makes it a versatile option for demanding optical setups.

3. General Applications and Examples

ZnTe crystals are extensively utilized in a variety of high-performance optical and electronic fields:

- **Terahertz Wave Generation and Detection**: ZnTe serves as a critical nonlinear optical material for efficient THz wave production via optical rectification and its detection using electro-optic sampling.

- **Electro-Optic Devices**: With its high electro-optic coefficient, ZnTe is integrated into modulators and other advanced photonics applications.
- **Optical Limiters and Detectors**: ZnTe demonstrates exceptional transmission properties, making it valuable for optical limiters and mid-infrared detectors.
- **Spectroscopy and Imaging**: Widely employed in THz spectroscopy and imaging systems, ZnTe enables the precise identification of materials and structures due to its excellent bandwidth capabilities.

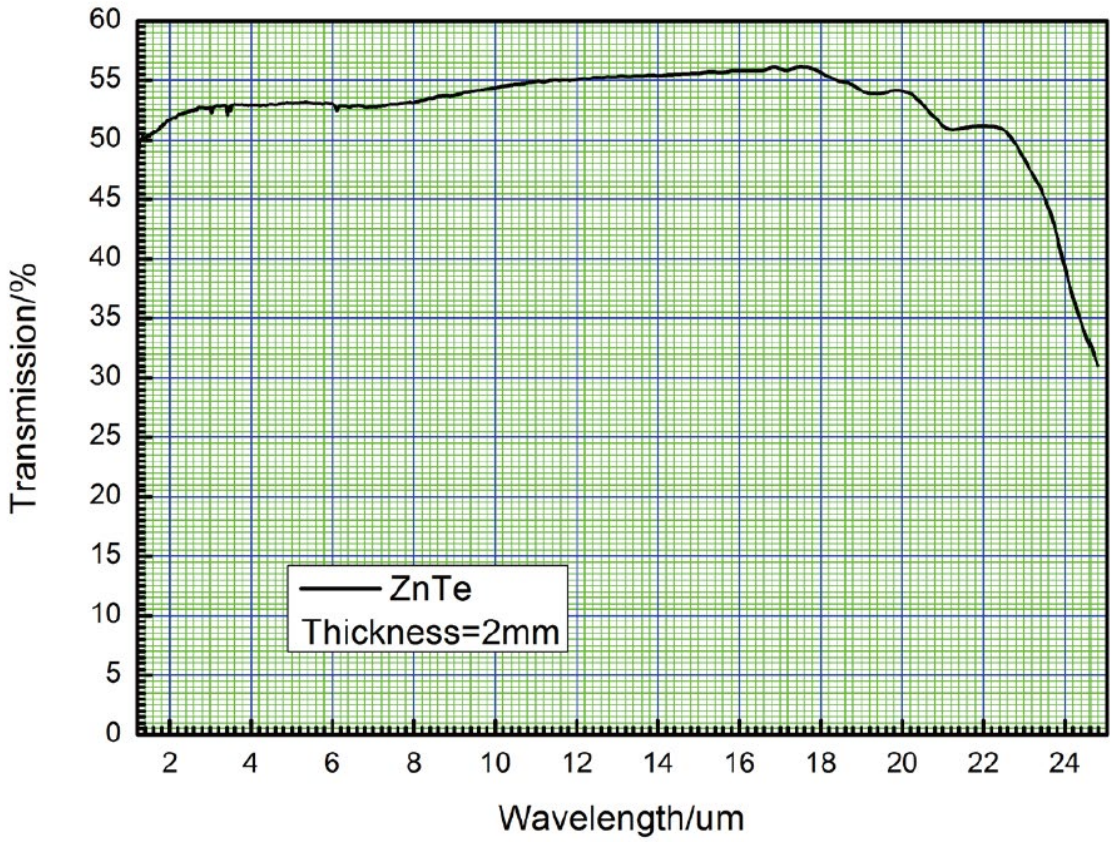
4. Chemical, Physical, and Structural Properties

Property	**ZnTe Crystal**
Crystal Structure	Cubic Zinc Blende
Lattice Constant	a = 6.1034 nm
Density	5.633 g/cm³
Bandgap	2.26 eV
Transparency Range	7-12 µm
Transmission Efficiency	60% (7-12 µm)
Refractive Index	n (λ=10.6 µm) = 2.7
Electro-Optic Coefficient	y41 = 4.0 pm/V
Electrical Resistivity	Low: <10^3 Ω·cm, High: >10^9 Ω·cm

5. Optical, Laser, or Nonlinear Optical Properties

Wavelength (λ)	**Refractive Index (n)**	**Transparency (%)**	**Electro-Optic Efficiency**
7 µm	2.8	60%	High
10.6 µm	2.7	55%	High
12 µm	2.6	50%	Moderate

6. Spectrum Transmission Curve



7. Coating Specification

- ZnTe Crystals are typically delivered uncoated to preserve their surface integrity. Anti-reflective coatings are available upon request depending on application-specific requirements.

8. Standard Fabrication Specifications

Specification	Parameter
Aperture Size	Up to 30 × 30 mm
Minimum Thickness	0.01 mm
Crystal Orientation	[100] or [111]
Surface Flatness	<λ/10
Surface Roughness	Ra < 0.01 nm

9. POC Strength and Capabilities

Photonics On Crystals (POC) excels in delivering high-quality ZnTe crystals tailored for THz applications. With advanced manufacturing processes and precision control, POC provides large-aperture crystals with minimal defect density, ensuring high performance across optical and electronic applications. POC also specializes in custom fabrication and electro-optic crystal bonding for enhanced utility.

10. Standard Products

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Clear Aperture	Thickness	Orientation	Coating	Price (USD)	Customization Available
30 × 30 mm	0.5 mm	[100]	Uncoated	$2,500	Yes
20 × 20 mm	1.0 mm	[111]	Uncoated	$2,000	Yes
15 × 15 mm	2.0 mm	[100]	Uncoated	$1,500	Yes