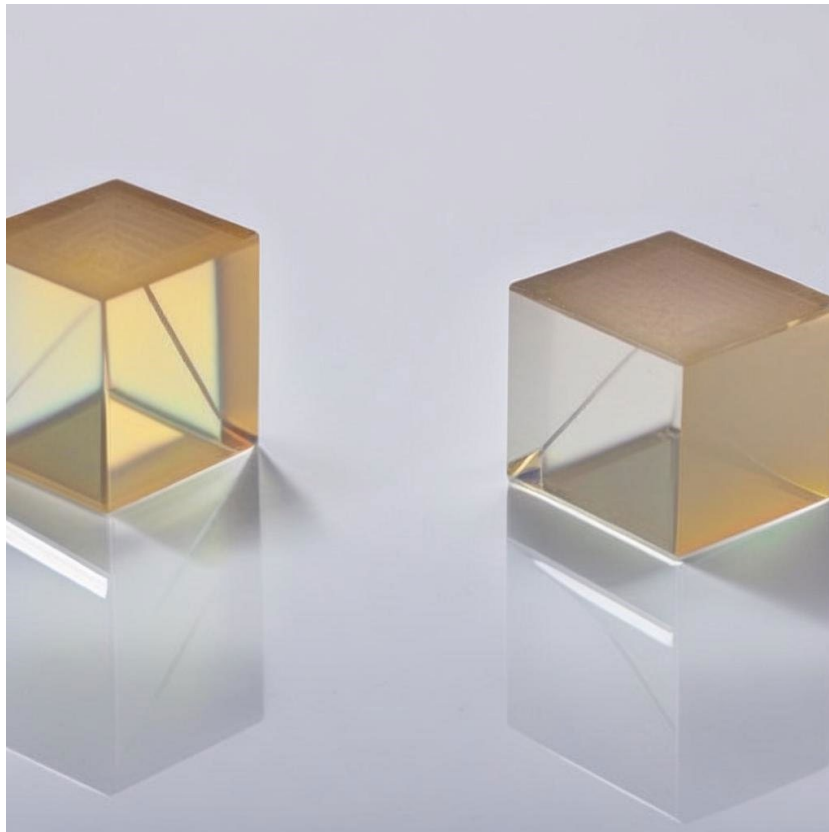


POC-OC-122476-ZnS Crystal Datasheet

1 Main Features

- Excellent optical transmission in the range of 0.37–14 μm .
- High optical uniformity and stable chemical properties.
- Low infrared absorption, ideal for infrared optics and thermal imaging systems.
- Resistant to acid corrosion and suitable for high-performance optical applications.
- Compatible with custom design coatings for enhanced optical performance.



2. Material General Description

Zinc Sulfide (ZnS) crystal is a wide-bandgap semiconductor material that exhibits superior optical transmission across the infrared spectrum (0.37–14 μm). Manufactured using Chemical Vapor Deposition (CVD), ZnS crystals are chemically stable, insoluble in water, and provide moderate density with ease of processing. Their low absorption and high optical uniformity make them the preferred choice for applications requiring advanced IR transparency, such as CO₂ laser optics, thermal imaging systems, and IR windows. The CVD ZnS is further processed with heat treatment to enhance its optical and mechanical properties, ensuring compatibility with high-precision optical systems.

3. General Applications

Zinc Sulfide crystals are widely utilized across numerous industries due to their excellent optical and mechanical properties. Some notable applications include:

- High-Power CO₂ Laser Systems:** ZnS is commonly used for CO₂ laser optics, including lenses, beam splitters, and output windows, owing to its exceptional transmission in the IR range and resistance to thermal stress.
- Thermal Imaging and Infrared Sensors:** ZnS serves as a core material for IR windows and thermal imaging systems, particularly in forward-looking infrared (FLIR) technology. Its broad transmittance range allows the detection of far-infrared wavelengths for high-resolution imaging.
- Military and Aerospace Applications:** Due to its rugged optical performance, ZnS crystals are employed in laser guidance systems, infrared surveillance, and missile guidance technologies.
- Medical Science:** ZnS optics are integrated into infrared diagnostic systems for non-invasive thermal imaging and medical sensors.
- Astronomy and Night Vision Systems:** ZnS contributes to high-performance night vision equipment and infrared telescopes for astronomical observations.

4. Chemical, Physical, and Structural Properties

Property	Value
Density	4.09 g/cm ³
Hardness (Vickers)	150–160 kg/mm ²
Thermal Expansion	6.5 × 10 ⁻⁶ /°C
Melting Point	Approx. 1830 K
Crystal Structure	Polycrystalline (CVD)
Transparency Range	0.37–14 μm
Acid Resistance	High
Cleavage Plane	Customizable

5. Optical and Laser Properties

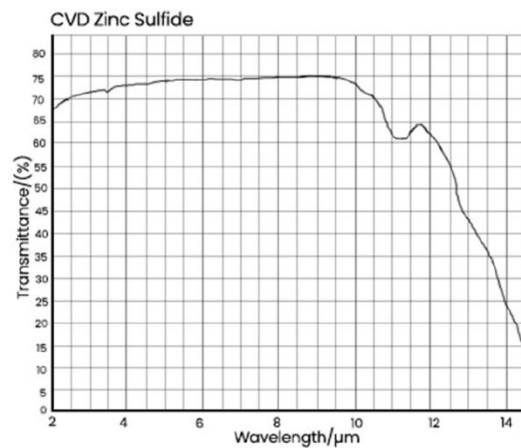
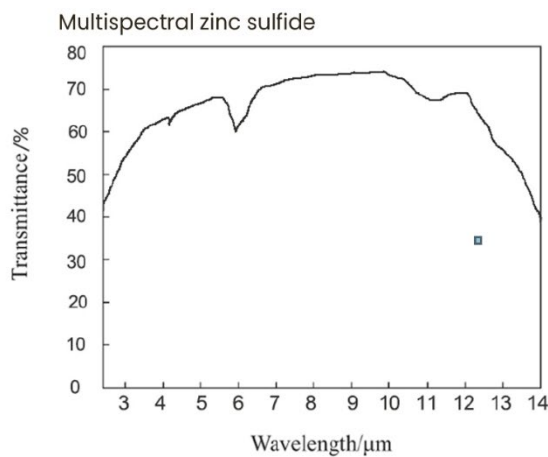
Property	Value
Optical Transmission Range	0.37–14 μm
Refractive Index	2.35 @ 10.6 μm
Reflection Loss (both surfaces)	~10% @ 10.6 μm

Absorption Coefficient	<0.0005/cm @ 10.6 μm
Thermal Conductivity	27 W/mK
Laser Damage Threshold	>3 J/cm ² @ 10 ns pulse (1064 nm)

6. Spectrum Transmission Curves

Two spectrum transmission curves demonstrate ZnS's high transmission properties:

- Curve 1: High transmission up to 75% from 400–1200 nm.
- Curve 2: Near-perfect IR transmission in the range of 8000–12000 nm.



7. Coating Specifications

ZnS crystals can be provided with optional anti-reflective coatings to enhance performance for specific wavelengths. Coatings include:

- **Calcium Fluoride Coating:** Available in 1–5 mm thickness.
- **Magnesium Fluoride Coating:** Thickness ranges from 1–5 mm.
- Custom coatings for extended IR or UV ranges are available upon request.

8. Standard Fabrication Specifications

Specification	Value
Clear Aperture	>90%
Surface Flatness	$\lambda/8$ @ 632.8 nm

Parallelism	<1 arcmin
Surface Quality	40–20 scratch-dig
Dimensional Tolerance	±0.1 mm
Chamfering	<0.25 × 45°
Coating Options	Available upon request

9. POC Strength and Capabilities

Photonics On Crystals (POC) excels in delivering high-quality ZnS crystals tailored to various industries. With advanced manufacturing processes and rigorous quality control standards, POC ensures superior performance and reliability. POC provides custom coating solutions, precision engineering, and bulk manufacturing capabilities for a wide range of optical applications, offering optimal solutions for specialized needs in military, medical, and industrial sectors.

10. Standard Products

Dimensions (mm)	Coating	Price (USD)
10 × 10 × 2	Anti-Reflective (AR)	200
20 × 20 × 3	Broadband IR Coating	350
25 × 25 × 5	UV & IR Coating	400
50 × 50 × 5	Customizable	600
Custom Dimensions Upon Request		Contact for Quote