

## ZnS Lenses

### Features:

- Good transmission from 0.4 to 14 $\mu$ m for multi-spectrum grade ZnS
- Good choice for aircraft applications

### Descriptions:

ZnS or Zinc Sulphide crystals grown by chemical vapor desposition (or CVD) exhibits exceptional fracture strength and hardness leading to its frequent choice for military applications or other harsh environments. This material is often used in the LWIR 7 to 14 $\mu$ m region of thermal imaging, and the multi-spectrum grade ZnS has a good transmission in 0.4 to 14 $\mu$ m, which covers visible to LWIR wavelength range . Its high resistance to rain erosion and high-speed dust and particulate abrasion makes it particularly suitable for exterior IR windows on aircraft frames.

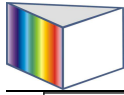
Hangzhou Shalom EO provides the ZnS lenses of IR grade and Cleartran or multi-spectrum grade materials, the AR/AR coating is made to increase the transmission of the lenses.

### Specifications:

Materials	CVD or Cleartran grade ZnS crystals	Diameter Range	~200mm
Diameter Tolerance	+0.0/-0.2mm	Thickness Tolerance	+/-0.2mm
Surface Quality	60/40 S/D	Frings (N)	3
Irregularity (delta N)	1	Centration	3'
Chamfer	0.1-0.3mmx45 degree	Coatings	AR/AR@7-14micro

### Physical and Optical Properties:

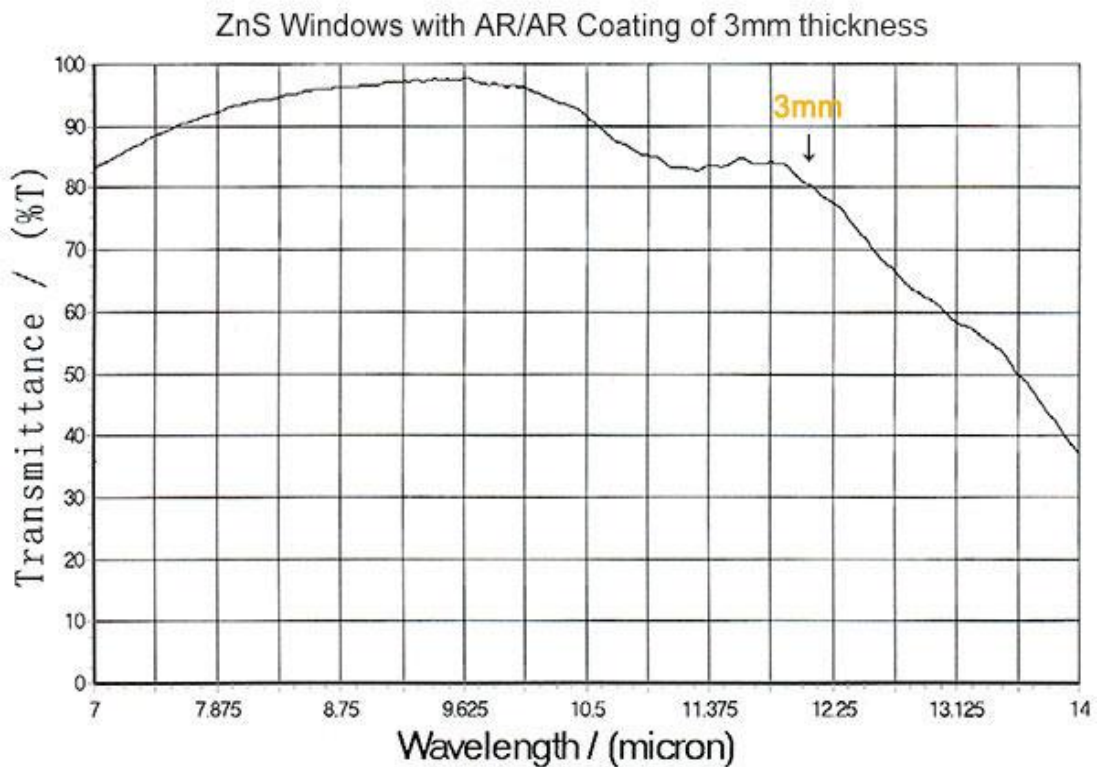
Transmission Range	0.37 to 13.5 $\mu$ m	Refractive Index	2.20084 at 10 $\mu$ m
Reflection Loss	24.7% at 10 $\mu$ m (2 surfaces)	Absorption Coefficient	0.0006 cm <sup>-1</sup> at 3.8 $\mu$ m
Reststrahlen Peak	30.5 $\mu$ m	dn/dT	+38.7 x 10 <sup>-6</sup> /°C at 3.39 $\mu$ m
dn/d $\mu$ = 0	n/a	Density	4.09 g/cc
Melting Point	1827°C (See notes below)	Thermal Conductivity	27.2 W m <sup>-1</sup> K <sup>-1</sup> at 298K
Thermal Expansion	6.5 x 10 <sup>-6</sup> /°C at 273K	Hardness	Knoop 160 with 50g indenter
Specific Heat Capacity	515 J Kg <sup>-1</sup> K <sup>-1</sup>	Dielectric Constant	88

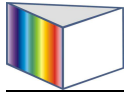


Youngs Modulus (E)	74.5 GPa	Shear Modulus (G)	n/a
Bulk Modulus (K)	n/a	Elastic Coefficients	Not Available
Apparent Elastic Limit	68.9 MPa (10,000 psi)	Poisson Ratio	0.28
Solubility	$65 \times 10^{-6}$ g/100g water	Molecular Weight	97.43
Class/Structure	HIP polycrystalline cubic, ZnS, F42m		

**Technical images:**

1. Transmission of AR coated CVD ZnS substrates at 7-14 micro





2. Transmission at visible wavelength range



**Related products:**

- 1) Infrared lenses -> Ge lenses
- 2) Infrared lenses -> ZnSe lenses
- 3) Infrared windows -> ZnS windows