

# Zinc Selenide (ZnSe)

## Specialist Data Sheet

Product Name	Zinc Selenide (ZnSe)
Transmission Range	0.6 ~ 21.0 $\mu\text{m}$
Refractive Index	2.4028 @ 10.6 $\mu\text{m}$
Reflection Loss	29.1% @ 10.6 $\mu\text{m}$ (2 surfaces)
Absorption Coefficient	0.0005 $\text{cm}^{-1}$ @ 10.6 $\mu\text{m}$
Reststrahlen Peak	45.7 $\mu\text{m}$
dN/dT	+61 x 10 <sup>-6</sup> /°C @ 10.6 $\mu\text{m}$ @ 298K
dN/du	5.5 $\mu\text{m}$
Density	5.27 g/cc
Melting Point	1525 °C (see notes below)
Thermal Conductivity	18 W m <sup>-1</sup> K <sup>-1</sup> @ 298K
Thermal Expansion	7.1 x 10 <sup>-6</sup> /°C @273K
Hardness	Knoop 120 with 50g indenter
Specific Heat Capacity	339 J Kg <sup>-1</sup> K <sup>-1</sup>
Dielectric Constant	n/a
Youngs Modulus (E)	67.2 GPa
Shear Modulus (G)	n/a
Bulk Modulus (K)	40 Gpa
Elastic Coefficients	Not Available
Apparent Elastic Limit	55.1 Mpa (8000 psi)
Poisson Ratio	0.28
Solubility	0.001g/ 100g water
Molecular Weight	144.33
Class/Structure	HIP polycrystalline cubic, ZnS, F43m

### Notes:

Zinc Selenide is produced by synthesis from zinc vapour and H<sub>2</sub>Se gas, forming as sheets on graphite susceptors. It is microcrystalline in structure, the grain size being controlled to produce maximum strength. Single crystal ZnSe is available, but is not common but has been reported as having lower absorption and thus more effective for CO<sub>2</sub> optics. Material oxidizes significantly at 300°C, exhibits plastic deformation at about 500°C and dissociates about 700°C. For safety, windows should not be used above 250°C in normal atmosphere.

### Application:

ZnSe is used widely for IR components, windows and lenses, and for spectroscopic ATR prisms. It is one of the materials of choice for CO<sub>2</sub> laser optics operating at 10.6  $\mu\text{m}$



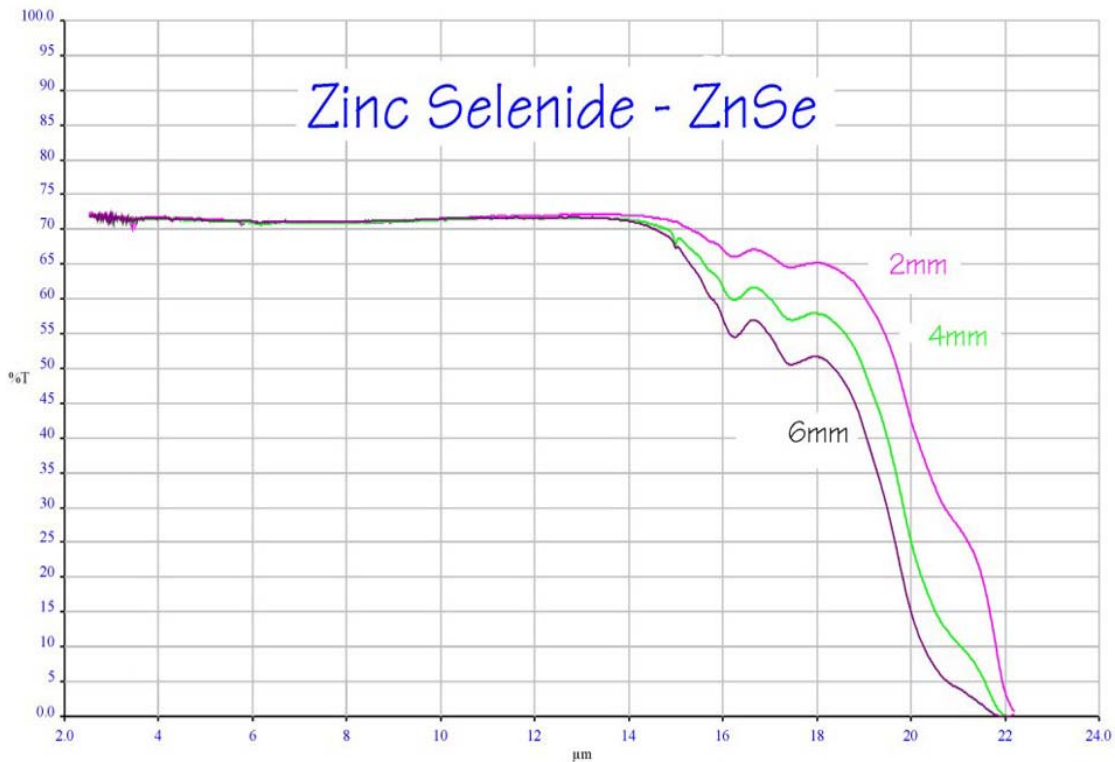
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### Refractive Index:

0.54	2.6754	1.8	2.4496	7.4	2.4201	13.0	2.3850
0.58	2.6312	2.2	2.4437	7.8	2.4183	13.4	2.3816
0.62	2.5994	2.6	2.4401	8.2	2.4163	13.8	2.3781
0.66	2.5755	3.0	2.4376	8.6	2.4143	14.2	2.3744
0.7	2.5568	3.4	2.4356	9.0	2.4122	14.6	2.3705
0.74	2.5418	3.8	2.4339	9.4	2.4100	15.0	2.3665
0.78	2.5295	4.2	2.4324	9.8	2.4077	15.4	2.3623
0.82	2.5193	4.6	2.4309	10.2	2.4053	15.8	2.3579
0.86	2.5107	5.0	2.4295	10.6	2.4028	16.2	2.3534
0.90	2.5034	5.4	2.4281	11.0	2.4001	16.6	2.3487
0.94	2.4971	5.8	2.4266	11.4	2.3974	17.0	2.3438
0.98	2.4916	6.2	2.4251	11.8	2.3945	17.4	2.3387
1.0	2.4892	6.6	2.4235	12.2	2.3915	17.8	2.3333
1.4	2.4609	7.0	2.4218	12.6	2.3883	18.2	2.3278

### Transmission Range Graph:



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Transmission Range Graph:

