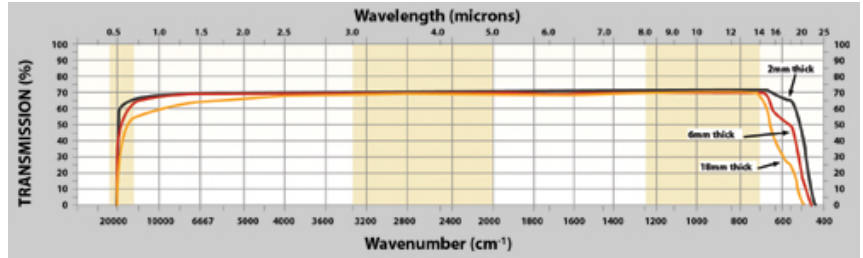


# Zinc Selenide Polycrystalline CVD ZnSe

## OVERVIEW

Phoenix Infrared is one of a select few companies in the world producing laser grade zinc selenide using the Chemical Vapor Deposition (CVD) process. Phoenix Infrared personnel have over 30 years experience producing zinc selenide and are internationally known for producing some of the highest quality ZnSe in the world. With its low bulk absorption at 10.6 microns, zinc selenide is the optical component material of choice for high powered CO<sub>2</sub> lasers and CO<sub>2</sub> marking lasers. Its index of refraction homogeneity and uniformity offers excellent optical performance for use as protective windows or optical elements in high resolution forward looking infrared (FLIR) thermal imaging equipment. This material can also be used for windows and lenses in medical and industrial applications, such as thermometry and spectroscopy.



## PRODUCTS



For optics producers, we offer SMTY blanks in diameters ranging from 5.5mm to 305mm and thicknesses from 1mm to 25mm. Phoenix Infrared can also offer shaped parts –generated, polished, & coated. We can provide lenses, windows, beamsplitters, prisms, wedges, and other optical components according to customer specifications and drawings. We can even offer one off specialty optics. Example: large window 12" diameter x 0.4455" thickness Flatness = 1/2 lambda @.633nm Wedge = < 1 minute SQ = 60/40 BBAR coating 2 - 14um

## SPECIFICATIONS

| Chemical Properties           | ZnSe                   |
|-------------------------------|------------------------|
| Density, (20 °C)              | 5.27 g/cm <sup>3</sup> |
| Hardness (20 °C)              | 105 kg/mm <sup>2</sup> |
| Flexural Strength (20 °C)     | 750 psi                |
| Flexural Strength (260 °C)    | 10,500 psi             |
| Young's Modulus (20 °C)       | 10.2 Mpsi              |
| Young's Modulus (260 °C)      | 8.9 Mpsi               |
| Thermal Conductivity (20 °C)  | 0.16 W/cm-k            |
| Thermal Conductivity (260 °C) | 0.08 W/cm-k            |
| Thermal Expansion (20-170 °C) | 7.57 ppm/K             |
| Specific Heat (20 °C)         | 0.339 J/g-K            |
| Grain size                    | 50-70 microns          |
| Dielectric Constant (20 °C)   | 8.976                  |
| Loss Tangent (20 °C)          | 0.0017                 |
| Poisson's Ratio (20 °C)       | 0.28                   |

| Optical Properties                     | ZnSe                                |
|--|-------------------------------------|
| Max Transmittance 1 μm                 | 69.2%                               |
| Max Transmittance 10 μm                | 70.9%                               |
| Absorption Coefficient                 | x 10 <sup>-3</sup> cm <sup>-1</sup> |
| 0.63 μm                                | 100                                 |
| 2.7 μm                                 | 1.5                                 |
| 3.8 μm                                 | 1.5                                 |
| 5.3 μm                                 | 0.4                                 |
| 10.6 μm                                | 0.5                                 |
| Index of inhomogeneity                 | 3 ppm                               |
| 10.6 μm                                |                                     |
| Thermo-optic Coefficient (dn/dT) @293K | x 10 <sup>-5</sup> K <sup>-1</sup>  |
| 0.63 μm                                | 10.6                                |
| 1.15 μm                                | 7.0                                 |
| 3.39 μm                                | 6.2                                 |
| 10.6 μm                                | 6.1                                 |

| Wavelength μm | Refractive Index |
|---------------|------------------|
| 1             | 2.4892           |
| 2             | 2.4462           |
| 3             | 2.4376           |
| 4             | 2.4331           |
| 5             | 2.4295           |
| 6             | 2.4258           |
| 7             | 2.4218           |
| 8             | 2.4173           |
| 9             | 2.4122           |
| 10            | 2.4065           |
| 11            | 2.4001           |
| 12            | 2.3930           |
| 13            | 2.3850           |
| 14            | 2.3762           |