MATERIAL PROPERTIES & SPECIFICATIONS

Zinc Selenide (ZnSe)

Zinc Selenide crystals have a cubic zinc blende structure, similar to another compound semiconductor like gallium arsenide (GaAs). The crystal lattice consists of alternating layers of zinc and selenium atoms. This structure gives ZnSe its unique optical and electronic properties that make the crystal suitable for various applications in optoelectronics and photonics. One of the notable characteristics of ZnSe is its' wide and direct bandgap of approximately 2.7eV, that corresponds to the near IR region of the electromagnetic spectrum. ZnSe is commonly used in collimators for biomedical and military applications. Moreover, ZnSe lenses are particularly well suited for use with high power CO2 lasers.

	Zink Selenide	ZnSe

Thermal properties	
Coefficient of Thermal expansion @10 deg C	**6.8×10^{-6}**
[K^{-1}] @273K	**7.1×10^{-6}**
[K^{-1}] @373K	**7.8×10^{-6}**
[K^{-1}] @473K	**8.3×10^{-6}**
Thermal conductivity [$JK^{-1}m^{-1}s^{-1}$] @298K	**18.0**
Heat capacity [$Jg^{-1}K^{-1}$] @298K	**0.339**

Optical properties	
10% transmittance limits (t=2mm),	**0.5µm – 20µm**
Index of refraction	**2.612 @632.8nm**
Thermo-optic coefficient dn/dT (298-358K)	
K^{-1} @ 0.6328µm	**1.07×10^{-4}**
K^{-1} @ 1.15µm	**7.0×10^{-5}**
K^{-1} @ 3.39µm	**6.2×10^{-5}**
K^{-1} @ 10.6µm	**6.1×10^{-5}**
cm^{-1} @ 1.3µm	**5.0×10^{-3}**
cm^{-1} @ 2.7µm	**7.0×10^{-4}**
cm^{-1} @ 3.8µm	**4.0×10^{-4}**

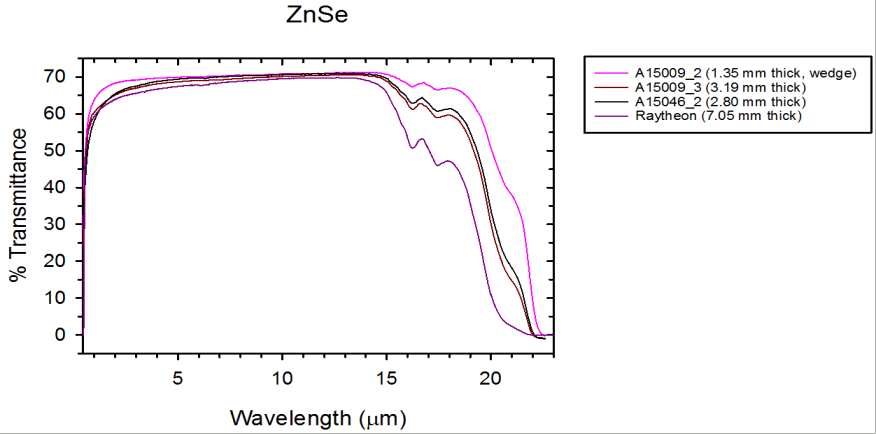
Our ZnSe crystals are grown in a proprietary process based on PVT principles. We are able to generate high quality single crystals up to 30 mm in diameter and 20mm thick. Our longtime experience in the PVT crystal growth allows us to supply our customers with good quality product that has number of advantages properties in comparison to material received in high-pressure melt and sublimation methods that are traditionally being used for the growth of ZnSe.

8 SOUTH END PLAZA ● NEW MILFORD, CT ● 06776-4200
PHONE: (860)354-2111 ● FAX: (860)354-3
www.fairfieldcrystal.com

Mechanical properties	
Knoop, 50g load [kg mm^{-2}]	110
Vickers, 1kg load [kg mm^{-2}]	112
4pt. loading [psi]	8 x 10^3
4pt. loading [MPa]	55
Fracture toughness (critical stress intensity factor, K_{IC} values) [MPa m, Vickers,100g]	0.5
[psi]	9.75 x 10^6
[GPa]	67.2
Poisson's ratio	0.28

Physical properties	
Crystal structure	cubic
SC Grain size	5-30 mm diameter
Density [g cm^{-3}] @298K	5.27
Resistivity [cm]	~10^{12}
Chemical purity [%]	99.9996

Transmittance Spectra ZnSe



Substance	Form	Diameter Range	Thickness Range	Transmittance Range (2-15μm)	Finish
Zinc Selenide	Multi- Crystal*	5 to 76mm**	1 to 25mm	70%	Fine Ground**
Zinc Selenide	Single Crystal	5-25 mm*	1 to 20 mm*	70%	Fine Ground*

** **Multi- Crystal**

Surface Figure: 1/20 λ @10.6 um
Surface Quality: 20/10 S/D, <1 nm RMS
Parallelism: <10arc sec
Custom specs available upon request

***Single- Crystal**

As specified by the customer

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