

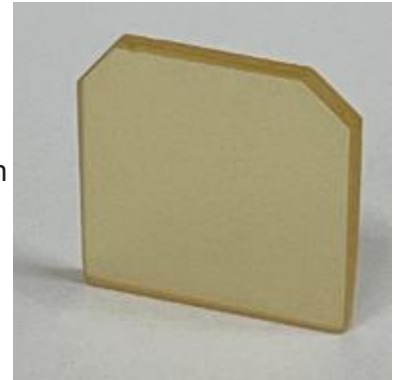
INFRARED MATERIALS

Zinc Sulfide (ZnS)

Zinc Sulfide (ZnS) is a versatile II-VI compound semiconductor with exceptional optical and mechanical properties.

In the optical domain, ZnS's wide transmission range, from the visible to the infrared spectrum, is ideal for high-performance optical components. It offers low absorption, high refractive index, exceptional hardness, abrasion resistance, and chemical inertness.

Good applications for this material are lenses, windows, and prisms, scratch-resistant displays, and corrosion-resistant coatings for demanding applications such as aerospace instrumentation, night vision systems, and laser optics.



ZnS's luminescent properties make it a candidate for next-generation optoelectronic devices. Its wide bandgap and high quantum efficiency are useful for efficient light-emitting diodes (LEDs), flat-panel displays, and scintillation detectors.

Size Availability: Our ZnSe substrates and finished parts are available in the following sizes

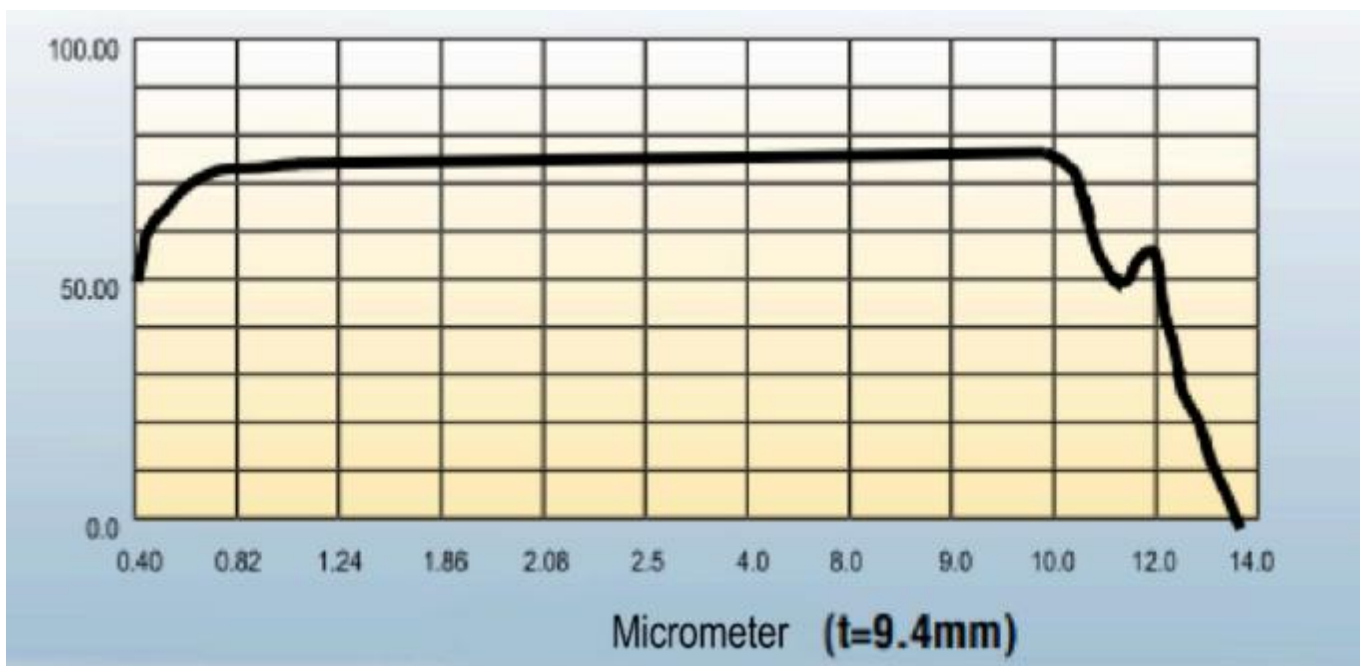
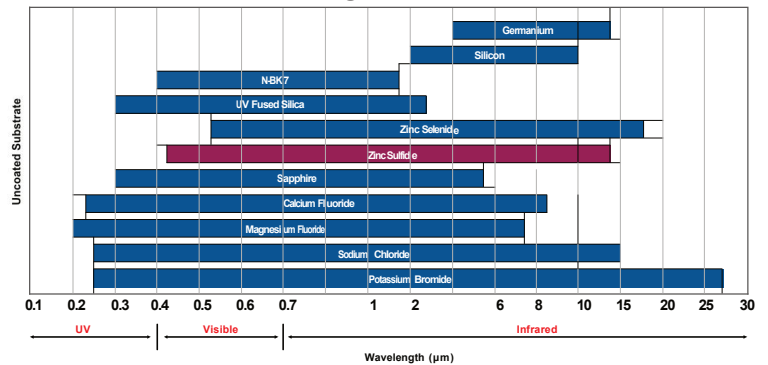
Diameter: Up to 400mm

Diagonal: Up to 400mm

Thickness: Up to 20mm



Wavelength Application



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ZnS Transparent Data

Zinc Sulfide (Transparent) Properties			
Optical Properties		Flexural Strength (modulus of rupture)	
10% Transmission (t=6mm)	0.37 - 14 μm	4pt. Loading (psi)	1.09x10 ³
Refr Index Inhomogeneity: ($\Delta n/n$) (ppm @0.6328 μm)	<20	4pt. Loading (Mpa)	75
Thermo-optic coefficient dn/dt (298-358K)		Disk Bursting (Mpa)	50
K ⁻¹ @0.6328 μm	5.43x10 ⁻⁵	Fracture Toughness (critical stress intensity factor, K _{1c} Value)	
K ⁻¹ @1.15 μm	4.21x10 ⁻⁵	(Mpa/m, Vickers, 1g)	1.0
K ⁻¹ @3.39 μm	3.87x10 ⁻⁵	Youngs Modulus (elastic modulus)	
Bulk Absorption Coefficient		psi	10.8x10 ⁶
cm ⁻¹ @1.3 μm	6.0x10 ⁻⁴	GPa	74.5
cm ⁻¹ @2.7 μm	1.0x10 ⁻³	Poisson's Ratio	0.28
cm ⁻¹ @3.8 μm	6.0x10 ⁻⁴	Thermal Properties	
cm ⁻¹ @5.25 μm	6.0x10 ⁻³	Coefficient Thermal Expansion	
cm ⁻¹ @10.6 μm	2.0x10 ⁻¹	K ⁻¹ @273K	6.3x10 ⁻⁶
Physical Properties		K ⁻¹ @373K	7.0x10 ⁻⁶
Crystal Structure:	Cubic	K ⁻¹ @473K	7.5x10 ⁻⁶
Grain Size (diameter):	20-35 μm	Thermal Conductivity	
Density (g/cm ³ @298K):	4.09	(JK ⁻¹ m ⁻¹ s ⁻¹ @298K)	28.4
Resistivity (ρ , cm):	~10 ¹³	Heat Capacity	
Chemical Purity (%):	99.9996	(Jg ⁻¹ K ⁻¹ @273K)	0.474
Hardness Knoop: 50g load (kg/mm ²)	160	(Jg ⁻¹ K ⁻¹ @323K)	0.489
Hardness Vickers: 1kg load (kg/mm ²)	150	(Jg ⁻¹ K ⁻¹ @373K)	0.504
		Thermal Diffusion Coef (m ² s ⁻¹)	1.46x10 ⁻⁵

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ZnS CVD Data

Zinc Sulfide (CVD) Properties			
Optical Properties		Flexural Strength (modulus of rupture)	
10% Transmission (t=6mm)	1.0 - 14 μm	4pt. Loading (psi)	15×10^3
Refr Index Inhomogeneity: ($\Delta n/n$) (ppm @0.6328 μm)	<100	4pt. Loading (Mpa)	74.5
Thermo-optic coefficient dn/dt (298-358K)		Disk Bursting (Mpa)	84
K^{-1} @0.6328 μm	4.6×10^{-5}	Fracture Toughness (critical stress intensity factor, K_{Ic} Value)	
K^{-1} @1.15 μm	4.3×10^{-5}	(Mpa/m, Vickers, 1g)	0.81.0
K^{-1} @3.39 μm	4.1×10^{-5}	Youngs Modulus (elastic modulus)	
Bulk Absorption Coefficient		psi	10.8×10^6
cm^{-1} @10.6 μm	2.0×10^{-1}	GPa	74.5
		Poisson's Ratio	0.29
Physical Properties		Thermal Properties	
Crystal Structure:	Cubic	Coefficient Thermal Expansion	
Grain Size (diameter):	2-8 μm	K^{-1} @273K	6.6×10^{-6}
Density (g/cm^3 @298K):	4.09	K^{-1} @373K	7.3×10^{-6}
Resistivity (\circ cm):	$\sim 10^{12}$	K^{-1} @473K	7.7×10^{-6}
Chemical Purity (%):	99.9996	Thermal Conductivity	
Hardness Knoop: 50g load (kg/mm^2)	200-235	($\text{JK}^{-1}\text{m}^{-1}\text{s}^{-1}$ @296K)	16.7
Hardness Vickers: 1kg load (kg/mm^2)	230	Heat Capacity ($\text{Jg}^{-1}\text{K}^{-1}$ @298K)	0.469