

Global Source for IR Optics and Materials



Zinc Sulfide (ZnS)

Similar to Zinc Selenide, Zinc Sulfide is produced using the Chemical Vapor Deposition (CVD) process. Although used mostly in the 8 to 12 micron range, multispectral (MS) ZnS has low absorption and scatter properties over its broad transmission range. Due to its good transmission in the visible thru infrared wavebands, MS ZnS is the ideal choice for systems utilizing various sensors such as visible, NIR, SWIR, MWIR or LWIR.

ZnS is about one third harder than ZnSe and can be found as an external window in defense sensing and guiding systems. Its high resistance to rain erosion and high-speed dust and particulate abrasion makes it particularly suitable for exterior IR windows in aero environments.

Specification

Physical Properties	ZnS	MS ZnS
Density, (g/cm ³)	4.08	4.09
Knoop Hardness, (kg/mm ²)	210–240	150–165
Young's Modulus, (Gpa)	74.5 GPa (10.8 x 106 psi)	85.5 GPa
Thermal Conductivity, 20°C, (W/cm ² C)	0.167 W/cm ² C	0.27 W/cm ² C
Linear Expansion Coefficient, 20°C	6.8 x10 ⁻⁶ /°C	6.5 x10 ⁻⁶ /°C
Specific Heat Capacity, (J/g/°C)	0.469 J/g/°C	0.527 J/g/°C
Poisson's Ratio	0.27	0.27
Rupture Modulus, (MPa)	103.4 (15,000 psi)	68.9 MPa (10,000 psi)

Optical Properties	ZnS
Max Transmittance 10.6 μm	70%
Bulk Absorption Coefficient 10.6 μm	≤0.24 cm ⁻¹
Temperature Change of Refractive Index 10.6 μm	41 x 10 ⁻⁶ /°C
Refractive Index Inhomogeneity 10.6 μm	< 100 x 10 ⁻⁶

Optical Properties	MS ZnS
Max Transmittance 10.6 μm	71%
Bulk Absorption Coefficient 10.6 μm	≤0.20/cm
Temperature Change of Refractive Index 0.6328 μm	54 x 10 ⁻⁶ /°C
Refractive Index Inhomogeneity 0.6328 μm	< 20 x 10 ⁻⁶

Wavelength, μm	Refractive Index of ZnS
1	2.2921
2	2.2655
3	2.2578
4	2.2521
5	2.2467
6	2.2395
7	2.2321
8	2.2234
9	2.2121
10	2.2005
11	2.1867
12	2.1765
13	2.1523
14	2.1305
15	2.1065
16	2.0789

Wavelength, μm	Refractive Index of MS ZnS
1	2.2926
2	2.2662
3	2.2577
4	2.2523
5	2.2466
6	2.2391
7	2.2328
8	2.2233
9	2.2129
10	2.2008
11	2.1892
12	2.1710
13	2.1525
14	2.1301
15	2.1068
16	2.0782

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