Zinc Sulphide FLIR (ZnS)

Specialist Data Sheet

Product Name	Zinc Sulphide FLIR (ZnS)
Transmission Range	1.0 ~ 13 µm
Refractive Index	2.192 @ 10.6 µm
Reflection Loss	24.6% @ 10.6 µm (2 surfaces)
Absorption Coefficient	0.02 cm^{-1} @ 3.8 µm
Reststrahlen Peak	30.5 µ m
dN/dT	+43 x 10^{-6} /℃ @ 3.39 µm
dN/du	n/a
Density	4.08 g/cc
Melting Point	1827 ℃ (see notes below)
Thermal Conductivity	16.7 W m^{-1} K^{-1} @ 296K
Thermal Expansion	6.6 x 10^{-6} /℃ @273K
Hardness	Knoop 160 with 50g indenter
Specific Heat Capacity	469 J Kg^{-1} K^{-1}
Dialectric Constant	n/a
Youngs Modulus (E)	74.5 GPa
Shear Modulus (G)	n/a
Bulk Modulus (K)	n/a
Elastic Coefficients	Not Available
Apparent Elastic Limit	103.4 Mpa (15000 psi)
Poisson Ratio	0.29
Solubility	65 x 10^{-6} g/ 100g water
Molecular Weight	97.43
Class/Structure	HIP polycrystalline cubic, ZnS, F43m

Notes:

Zinc Sulphide is produced by synthesis from zinc vapour and H2S gas, forming as sheets on graphite susceptors. It is microcrystalline in structure, the grain size being controlled to produce maximum strength. Forward Looking Infra-Red (FLIR) grade, which is pale yellow and translucent in the visible, is used as deposited without further treatment. It is stronger than multispectral grade. Single crystal ZnS is available, but is not common.
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:

ZnS FLIR is used for IR windows and lenses in the thermal band (8 to 14 µm) as a tough front optic in thermal imaging systems, particularly those subjected to harsh environments.

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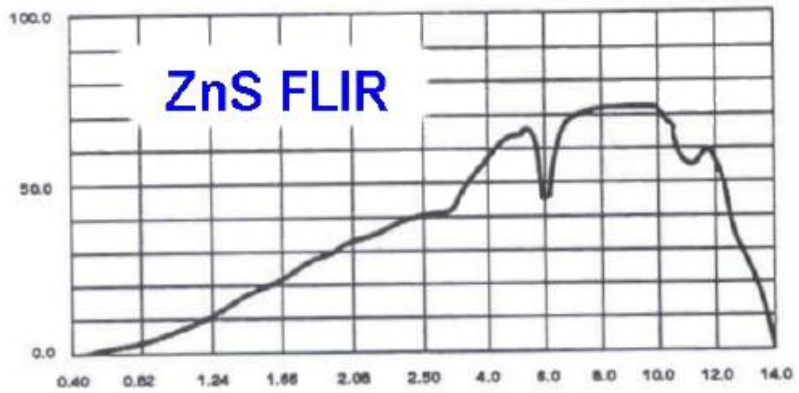
µm	No	µm	No	µm	No	µm	No
0.42	2.516	1.00	2.292	7.00	2.232	13.0	2.152
0.46	2.458	1.40	2.275	7.40	2.228	13.4	2.143
0.50	2.419	1.80	2.267	7.80	2.225	13.8	2.135
0.54	2.391	2.20	2.263	8.20	2221	14.2	2.126
0.58	2.371	2.60	2.26	8.60	2.217	14.6	2.116
0.62	2.355	3.00	2.257	9.00	2.212	15.0	2.106
0.66	2.342	3.40	2.255	9.40	2.208	15.4	2.095
0.70	2.332	3.80	2.253	9.80	2.203	15.8	2.084
0.74	2.323	4.20	2.251	10.2	2.198	16.2	2.072
0.78	2.316	4.60	2.248	10.6	2.192	16.6	2.059
0.82	2.31	5.00	2.246	11.0	2.186	17.0	2.045
0.86	2.305	5.40	2.244	11.4	2.118	17.4	2.03
0.90	2.301	5.80	2.241	11.8	2.173	17.8	2.015
0.94	2.297	6.20	2.238	12.2	2.167	18.2	1.998
0.98	2.294	6.60	2.235	12.6	2.159		

Transmission Range Graph:



원우시스템즈 WONWOO SYSTEMS
Tel (02) 3289-1290 Fax (02) 3289-1293
서울시 동작구 신대방1가길 38 (신대방 719 동작상떼빌) 106동 209호
www.wonwoosystem.co.kr