

Title: Optical Material / Crystals (Infrared)

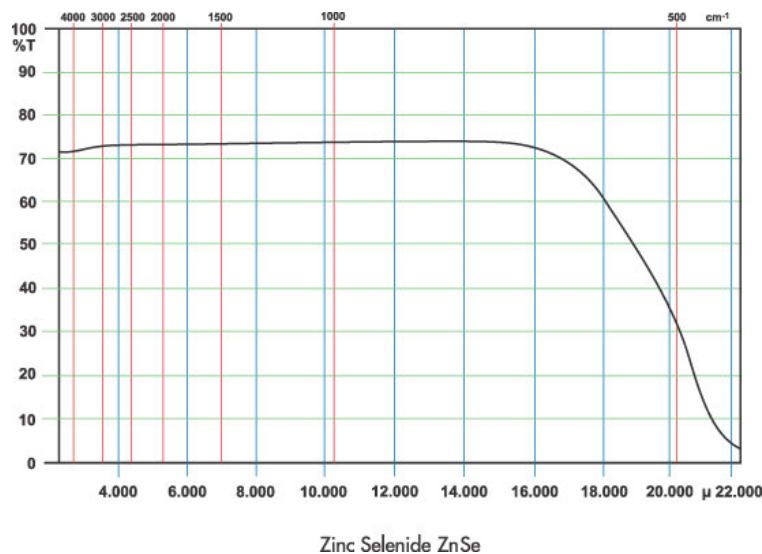
Material / Specification: Zinc Selenide for 0.6 to 21 m Transmission

Range / Description: OPM-Zinc Selenide(ZnSe)

Tel: +44 (0) 1622 859444
 Fax: +44 (0) 1622 859555
 info@knightoptical.co.uk
 http://www.knightoptical.co.uk

It is used as an infrared optical material with a remarkably wide transmission wavelength range (0.6 μm to 20 μm). Zinc selenide can slowly react with atmospheric moisture if poorly polished, but this is not generally a serious problem. Except where optics are used in spectroscopy or at the Brewster angle, antireflection or beamsplitting coatings are generally employed. It is one of the materials of choice for CO₂ laser optics operating at 10.6 μm .

Internal Transmittance



Internal Transmittance $t_i(\lambda)$ vs. wavelength λ											
$\lambda, \mu\text{m}$	0.2	0.5	1.0	3.0	5.0	7.00	9.0	10	12	15	20
$t_i(\lambda)$	—	0.65	0.76	0.94	0.97	0.99	0.99	0.99	0.98	0.90	0.16

Refractive Index n vs. Wavelength λ																
$\lambda, \mu\text{m}$	0.2	0.5	1.0	2.0	3.0	5.0	7.0	8.0	9.0	10	11	12	12.5	15	20	30
$n(\lambda)$	—	2.67	2.48	2.44	2.43	2.43	2.42	2.41	2.41	2.40	2.40	2.39	2.38	2.36	1.38	—

Optical Properties	
Transmission Range	0.6 to 21.0
Refractive Index	2.4028 at 10.6
Refractive Loss	29.1% at 10.6
Crystal/Class Structure	HIP polycrystalline cubic, ZnS, F43m
Cleavage Plane	n/a

Thermal Properties	
Thermal Expansion	$7.1 \times 10^{-6} / ^\circ\text{C}$ at 273K
Thermal Conductivity	$18 \text{ W m}^{-1} \text{ K}^{-1}$ at 298K
Melting Point	1525°C
Specific Heat Capacity	$339 \text{ J Kg}^{-1} \text{ K}^{-1}$

Mechanical Properties	
Density	5.27 g/cc
Hardness (Knoop)	120 with 50g indenter
Youngs Modulus	67.2 GPa
Shear Modulus	n/a
Bulk Modulus	40 GPa
Poisson Ratio	0.28
Elastic Limit	2.4 MPa (350 psi)
Molecular Weight	144.33

Chemical Properties	
Solubility	0.001g/100g water