

## Gallium Lanthanum Sulphide (GLS)

## MATERIALS DATA

Gallium Lanthanum Sulphide (GLS) glass is produced by proprietary processes under conditions of the highest purity. Particular effort is made in removing transition metal impurities to a level of better than 1 ppm total metallic impurities with  $\text{SH}^-$  and  $\text{OH}^-$  less than 1 ppm. GLS is routinely processed from ingots of 500 grams. Other glass compositions are available including rare earth doped (Ce, Pr, Nd, Tb, Dy, Ho, Er, Tm, Yb), halide (F, Cl), and Ag doped samples.

**APPLICATIONS:** Gallium Lanthanum Sulphide is a chalcogenide glass, an alternative to toxic arsenic-based glasses. Developed at Southampton University, GLS has found use in a wide range of optoelectronic applications and is available as polished optical components, thin and thick films and in optical fibre form.

Transmission Range	0.5 to 10 $\mu\text{m}$
Refractive Index	2.398 at 1.014 $\mu\text{m}$
Reflection Loss	29% at 1.014 $\mu\text{m}$
Absorption Coefficient	<0.005 $\text{cm}^{-1}$
Reststrahlen Peak	n/a
dn/dT	+75 x 10 <sup>-6</sup> /°C
dn/d $\mu$ = 0	4 $\mu\text{m}$
Density	4.04 g/cc
Melting Point	830°C
Thermal Conductivity	0.43 W m <sup>-1</sup> K <sup>-1</sup> at 273K
Thermal Expansion	10 x 10 <sup>-6</sup> K <sup>-1</sup> at 273K
Hardness	Knoop 206 with 200g indenter
Specific Heat Capacity	0.54 J g <sup>-1</sup> K <sup>-1</sup>
Dielectric Constant	8.1 at 1KHz
Youngs Modulus (E)	59 GPa
Shear Modulus (G)	23 GPa
Bulk Modulus (K)	24.5 GPa
Elastic Coefficients	n/a
Apparent Elastic Limit	n/a
Poisson Ratio	0.24
Solubility	Negligible in water
Molecular Weight	276.9
Class/Structure	Amorphous glass

*Damage Threshold >200MW cm<sup>-2</sup> at 1550nm*

*Acousto-optic Figure of Merit: M<sub>2</sub> = 6 x 10<sup>-15</sup>*

*Verdet Constant = 0.205 min/Oe/cm*



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$\mu\text{m}$	No	$\mu\text{m}$	No	$\mu\text{m}$	No
0.5461	2.522	0.6678	2.458	1.3673	2.379
0.5790	2.500	0.7065	2.466	1.7101	2.371
0.6439	2.467	1.0140	2.398		

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$\mu\text{m}$	No

