

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 SH^- and 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 μm |
| Refractive Index | 2.398 at 1.014 μm |
| Reflection Loss | 29% at 1.014 μm |
| Absorption Coefficient | <0.005 cm^{-1} |
| Reststrahlen Peak | n/a |
| dn/dT | +75 $\times 10^{-6}$ / $^{\circ}\text{C}$ |
| $\text{dn/d}\mu = 0$ | 4 μm |
| Density | 4.04 g/cc |
| Melting Point | 830 $^{\circ}\text{C}$ |
| Thermal Conductivity | 0.43 $\text{W m}^{-1} \text{K}^{-1}$ at 273K |
| Thermal Expansion | 10 $\times 10^{-6}$ K^{-1} at 273K |
| Hardness | Knoop 206 with 200g indenter |
| Specific Heat Capacity | 0.54 $\text{J g}^{-1} \text{K}^{-1}$ |
| 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^{-2} at 1550nm

Acousto-optic Figure of Merit: $M_2 = 6 \times 10^{-15}$

Verdet Constant = 0.205 min/Oe/cm



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| μm | No | μm | No |
|---------------|-------|---------------|-------|
| 0.5461 | 2.522 | 0.5790 | 2.500 |
| 0.6678 | 2.458 | 0.7065 | 2.466 |
| 1.3673 | 2.379 | 1.7101 | 2.371 |

| μm | No |
|---------------|-------|
| 0.6439 | 2.467 |
| 1.0140 | 2.398 |

