VITRON IG-4

- Discover the Original

Your Material Specialist

Our glass IG-4 features excellent transmittance and low thermal change in refractive index and dispersion.

IG-4 is ideal for applications in combination with other IR material for color corrected designs and infrared optical systems without thermal defocusing in the 1-12 µm spectrum.

Molding, classical polishing or Single-Point-Diamond-Machining permits the production of optical components with flat, spherical and/or aspherical shaped surfaces for the Infrared and Optoelectronics industries.

Antireflection coatings further improve transmission by reducing the reflection at the air-glass interfaces.

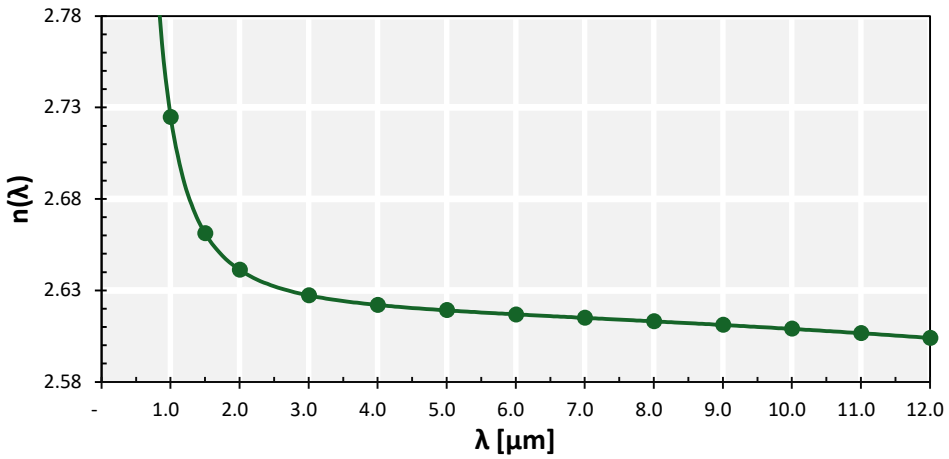
VITRON currently produces 6 different types of Chalcogenide Glasses that are applicable to optics and optoelectronics system design.

Typical delivery in form of blanks:

Ø	*5 – 150 mm*
☐	*5 – 100 mm*
ct	*0.8 – 150 mm*

Index of Refraction (@ 20°C)

λ [µm]	n(λ)
1.00	2.7249
1.50	2.6612
2.00	2.6413
3.00	2.6274
4.00	2.6220
5.00	2.6192
6.00	2.6169
7.00	2.6150
8.00	2.6131
9.00	2.6112
10.00	2.6091
11.00	2.6066
12.00	2.6041



Sellmeier-Formula (@ 20°C)

A	3.7832
B_1	3.0693
C_1	0.3966
B_2	0.8541
C_2	42.3492

$$n^2(\lambda;20) = \boldsymbol{A} + \frac{\boldsymbol{B_1}\lambda^2}{\lambda^2 - \boldsymbol{C_1^2}} + \frac{\boldsymbol{B_2}\lambda^2}{\lambda^2 - \boldsymbol{C_2^2}}$$

Thermo-Optical Coefficient (@ 20°C)

λ_{TK}	$1.45 \cdot 10^{-1}$
D_0	$1.79 \cdot 10^{-5}$
E_0	$2.05 \cdot 10^{-5}$

$$\frac{dn(\lambda)_{abs}}{dT} = \frac{n^2(\lambda;20) - 1}{2n(\lambda;20)} \cdot \left[\boldsymbol{D_0} + \frac{\boldsymbol{E_0}}{\lambda^2 - \boldsymbol{\lambda_{TK}^2}}\right]$$

λ [µm]	dn/dT [K^{-1}]
3.4	$22.1 \cdot 10^{-6}$
7.0	$20.5 \cdot 10^{-6}$
10.6	$20.1 \cdot 10^{-6}$

Dispersion (@ 20°C)

λ [µm]	v_λ
4.00	198
10.00	179

$$v_4 = \frac{n_4 - 1}{n_3 - n_5} \qquad v_{10} = \frac{n_{10} - 1}{n_8 - n_{12}}$$

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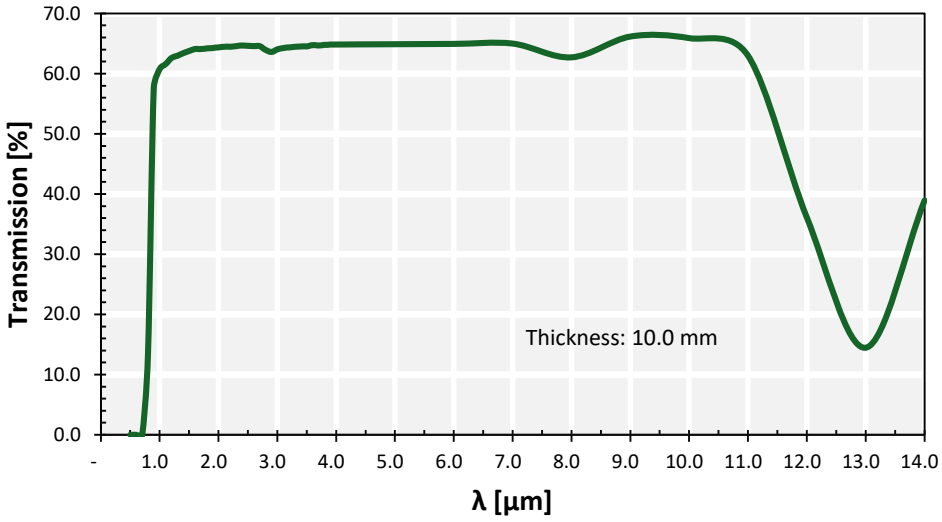
Transmission

λ [µm]	T(λ) [%]
1.00	60.8
1.50	63.8
2.00	64.4
3.00	62.5
4.00	63.6
5.00	64.1
6.00	64.5
7.00	65.0
8.00	62.7
9.00	66.2
10.00	65.9
11.00	63.0
12.00	36.1
13.00	14.5
14.00	38.9



Material Properties

Composition	$Ge_{10}As_{40}Se_{50}$	
Density	4.47	$g \cdot cm^{-3}$
Thermal Expansion (20°C – 100°C)	20.4	$x\ 10^{-6}\ K^{-1}$
Specific Heat Capacity	0.37	$J \cdot g^{-1} \cdot K^{-1}$
Thermal Conductivity	0.18	$W \cdot m^{-1} \cdot K^{-1}$
Transition Temperature	225	°C
Softening Point	310	°C
Young's Modulus	20.5	GPa
Modulus of Rupture	18	MPa
Shear Modulus	8.5	GPa
Hardness (Knoop)	1.12	GPa

Chemical Properties

VITRON chalcogenide glasses are insoluble in water. Under normal circumstances, no reactions are observed between glass and organic solvents.

Typical Forms of Supply

Our chalcogenid glasses are fine-annealed with 3.75 K/h. Variability of the index of refraction: between batches ≤ 10^{-3}
within a batch ≤ 10^{-4}

Semi-finished: Boules, Blanks in disk and rectangular shapes, Rods
Other shapes by customer request

Optical components: Windows, Lenses, Prisms and other optical parts according to customer specification
AR/AR coatings on customer request

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