SEALED OPTICS

Crystal Quartz

Optical

Transmission Range :	180 nm to 3.5 µm
Refractive Index (ordinary) :	n_{ord} 1.54421 at 600 nm
Refractive Index (exraordinary) :	n_e 1.55333 at 600 nm
Reflection Loss :	8.8% at 600 nm (losses from two surfaces)
Absorption Coefficient @190 nm :	0.01 cm^{-1}
Absorption Coefficient @ 2.8 mm :	0.03 cm^{-1}

Physical

Density :	2.649 g/cc
Melting Point :	1710 °C
Thermal Conductivity (parallel) :	10.7 W m^{-1} K^{-1} at 50 °C
Thermal Conductivity (perpendicular) :	6.2 W m^{-1} K^{-1} at 50 °C
Linear CTE (parallel) :	7.1 x 10^{-6} /°C at RT
Linear CTE (perpendicular):	13.2 x 10^{-6} /°C at RT
Specific Heat Capacity :	710 J Kg^{-1} K^{-1}

Mechanical

Youngs Modulus (parallel) :	97.2 GPa
Youngs Modulus (perprendicular) :	76.5 GPa
Shear Modulus (G) :	31.14 GPa
Bulk Modulus (K) :	36.4 GPa
Rupture Modulus :	41 MPa
Hardness :	741 Knoop (500g indenter)
Poisson Ratio :	0.08

Chemical

Formula	SiO_2
Solubility :	Insoluble in H_2O
Molecular Weight :	60.06 g/mole

Notes

Quartz is a mineral that exists in the form of a stable polymorph in nature. The quartz can transform into different polymorphs during heating. At atmospheric pressure, quartz is known as α-quartz at a low temperature. As the temperature increases to around 573 °C, α-quartz will transform into β-quartz, and this transformation process is spontaneous and reversible.

Quartz is crystalline and is positive birefringent.