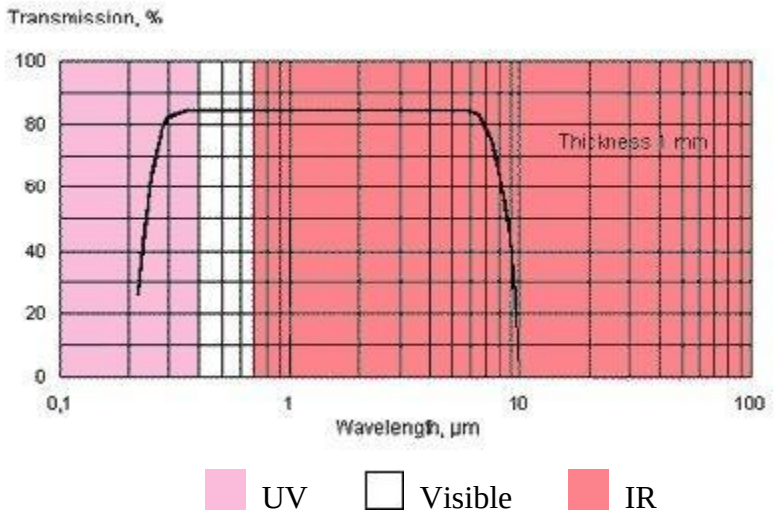
TECHNICAL INFORMATION

SPI Supplies
206 Garfield Avenue,
West Chester, PA 19380, USA

SPI Supplies MgO Magnesium Oxide Single Crystal Substrates

Available in Single Crystal Substrates, Blocks, and Optical Components

The SPI Supplies MgO Single Crystal Substrate products are used widely for HTSC (high temperature superconductor) thin film coatings applications worldwide. There is also a growing amount of interest in using these substrates, because of their economical cost, for other applications that previously would not have justified the higher cost of MgO, such as for use as substrates for the III to V elements. The standard orientation is along the (100) planes. Other orientations at the present time are not available.



MgO single crystal transmission spectrum demonstrating the high transmittance over both the UV and the IR ranges. The light purple color to the left is UV and the light red color to the right is considered IR. The "white" region is the visible point of the spectrum.

Physical Analysis:

Crystal Type:	**Cubic**
Lattice Constant:	4.212 Å
Density	3.585 g/cm^3
Melting Point:	2800° C/5072° F
Dielectric Constant:	9.8
Loss Tangent:	9x10^{-3} @ 10 GHz
Coefficient of Thermal Expansion:	8.0 x 10^{-6}/° C (at 100° C)
Hardness (Mohs scale):	5.8
Thermal conductivity (C.G.S.):	0.09RT
Specific heat constant:	0.24
Vicker Hardness (100):	910
Refractive Index (60 nm):	1.74

Wafer Specifications:

Dimensions:	2" x 0.5 mm thick
Orientation:	(100) ± 1° C
Diameter:	50.8 +0/-0.05mm
Thickness:	0.5 +0/0.02mm
Flatness:	Radial flatness is better than 0.0025mm
Surface Roughness:	R_a < 0.5nm (typical 0.2 nm)
	R_{max} < 3.5 nm (typical 2.0 nm)
Polished Side:	Double sides epi-ready quality
Package:	Paper bag with vacuum

Impurity elements: As MgO single crystal substrates are for thin film deposition, not only must the purity be better than 99.9%, the solid matrix must be free of all inclusions. The elemental composition of the 0.1%. (in maximum ppm): Ca: 40, Al: 15, Si: 10, Fe: 50, Cr: 10, B: 5, C: 10.

Moisture sensitivity:
MgO is almost insoluble in water, however it should not be kept in a moist, high humidity environment for prolonged periods of time. For storage, it should always be kept in a desiccator cabinet. For polishing or repolishing MgO, non-aqueous media should be used at all times.

Revised: EER

Date: 2/16