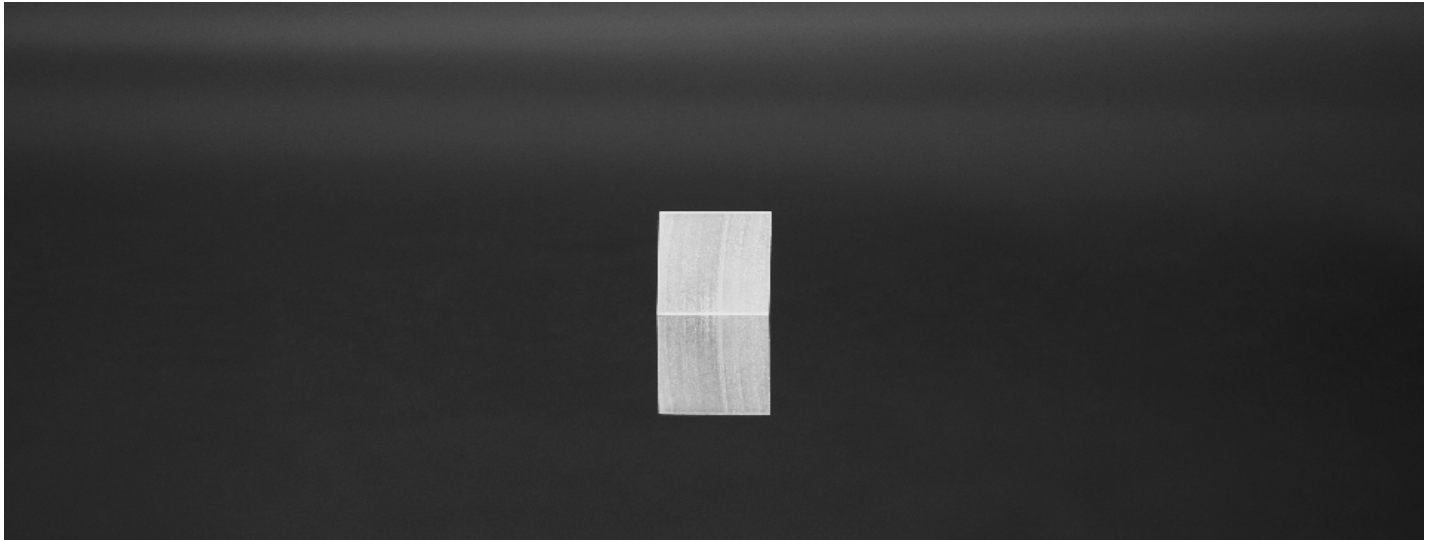


Magnesium Aluminate (Spinel) Crystal Substrate



DESCRIPTION

MgAl₂O₄ is an attractive material for uses in a wide range of optical, electronic and structural applications including windows and lenses. Theoretical transmission is very uniform and approaches 87% between 0.3 to 5 microns. Transmission characteristics rival that of ALON and sapphire in the mid-wave IR, making it especially attractive for the ever-increasing performance requirements of current and next-generation IR imaging systems. MgAl₂O₄ magnesium aluminate (spinel) single crystals are widely used in ultrasonic and microwave material and device related epitaxial growth and as fast IC epitaxial substrates.

It is also found that MgAl₂O₄ is a good substrate for III-V nitrides device. Spinel (MgAl₂O₄) is one candidate for such GaN LDs substrate. The crystallographic structure of MgAl₂O₄ is a spinel type (Fd3m), and its lattice constant is 8.083Å. MgAl₂O₄ is a relatively low-cost substrate material, which has been successfully applied to the growth of high quality GaN films. MgAl₂O₄ is cleaved on the (100) plane. GaN LD cavities have been obtained by simply cleaving MgAl₂O₄ substrates along the (100) direction, which will also work well for ZnO. MgAl₂O₄ crystal is very difficult to grow, due to the difficulty in maintaining a single phase structure.

FEATURE

- Good physical, chemical and thermal properties
- Good high temperature properties
- Stable physical performance

APPLICATION

- MgAl₂O₄ substrate



PARAMETER

Material Properties

Chemical formula	MgAl ₂ O ₄
Crystal structure	cubic: m3m
Lattice parameters	a = 8.083 Å
Melting Point	2130°C
Density	3.61 g/cm ³
Transmission Range	0.21 ~ 5.3 μm
Refractive index	1.8245 @0.8 μm
Mohs hardness	8
Thermal conductivity at 25°C	14.0 W/(m·K)
Thermal expansion coefficient	7.45×10 ⁻⁶ /K
Phase velocity	6500m/s at (100) shear wave
Propagation loss	6.5 dB/ms
Specific heat	0.59 W·s/g/K

Specification

Orientation	[100] or [100] or [111] < ±0.5°
Parallel	10"
Perpendicular	5'
surface Quality	44474
Wavefront Distortion	λ/4 @632nm
Surface Flatness	λ/8 @632nm
Clear Aperture	>95%
Chamfer	<0.1×45°
Thickness/Diameter Tolerance	±0.05 mm
Maximum dimensions	dia 50×100mm
Coatings	AR/AR@940+1030; HR@1030+HT@940+AR1030

