

Optical Material Cadmium Manganese Telluride (CdMnTe) Magneto Optical Crystals

The ternary compound Cadmium Manganese Telluride ("CMT") is a magneto-optical material that is ICL's newest crystal product. This magneto-optical material has a giant Verdetconstant.

Potential applications for this material (as well as CdMnHgTe which is under development) include Faraday rotation devices (optical isolators in the range 630nm to 1100nm), LEDs, spintronics, electro-magnetic interference free devices, field tunable phase shifters, small coupled solar cells for fly-by-light applications, phased array radar with completely fiber-fed antennae, bomb detonators and harsh environment sensors.

At the optimal composition, absorption does not increase with pathlength (thickness) although transmission will vary. Absorption is composition dependent. The spectral data shown is for a 2mm thick sample. ICL's standard processing for CdMnTe is flatness of 1 λ , parallelism of 30 arc seconds, optical surface quality 60-40, reflection loss with broadband AR coating < 0.05% @ 880-1100nm, Max. \varnothing 19mm.



647nm Isolator
Miniature optical isolators based on CdMnTe crystals as Faraday rotators for lasers in the region 630-850nm
Isolator Dimensions: 1mm diameter, 15mm thickness
Crystal Dimensions: 1.7mm x 1.7mm x 1.7mm
Polarizer: Cube type 2.0mm x 2.0mm x 2.0mm
Transmission: 78-79%
Extinction Ratio: 30 dB or higher
Beam Diameter: 1mm



Optimal Composition:

Cd 0.55 Mn 0.45 Te

Optical Properties – Cadmium Manganese Telluride (CdMnTe) Magneto Optical Crystals

Transmission Range: 630nm to 22 μ m

Verdet constant: 0.67min/E*cm @ 904nm, 7min/E*cm @ 630nm

Absorbance: 0.3 cm⁻¹ @ 800nm, ~0.2 cm⁻¹ @ 904nm, 0.12 cm⁻¹ @ 1000nm, <0.1cm⁻¹@1100nm,

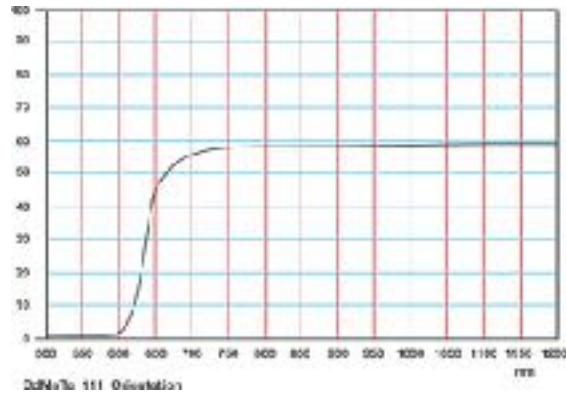
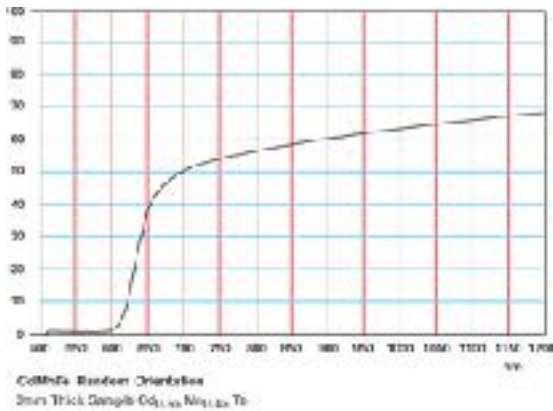
0.02 cm⁻¹ – 0.03 cm⁻¹ @1500nm
Extinction: Emin -28db, Emax -22db
Reflection Loss: 32%@904nm (2 surfaces)

Physical Properties--- Cadmium Manganese Telluride (CdMnTe) MagnetoOptical Crystals

Damage Threshold: 3j/cm²
Structure: cubic, Zink blende
Melting Point: ~ 1070° C

Chemical Properties - Cadmium Manganese Telluride (CdMnTe) Magneto Optical Crystals

Solubility: Insoluble in water.



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