

## Cadmium Telluride (CdTe)

## MATERIALS DATA

**CAUTION: Cadmium salts are considered TOXIC and should be handled with care.**

CdTe is rarely used because of its toxicity. The finished optics are not particularly hazardous but should be handled with care. However, difficulties with processing cadmium compounds means that very few optical companies will cut and polish the material. Crystran Ltd does not supply CdTe. This data is provided for reference only. A form of CdTe was originally utilised as the obsolete Kodak designation of IRTRAN-6

**APPLICATIONS:** Cadmium Telluride can be used for spectroscopy and where deep IR transmission is required. It is relatively workable and offers transmission to >20 $\mu\text{m}$ . CdTe has some application for solar cells.

Transmission Range	0.85 to 28 $\mu\text{m}$ (1)(3)
Refractive Index	2.653 @ 10 $\mu\text{m}$ (1)
Reflection Loss	32% @ 10 $\mu\text{m}$
Absorption Coefficient	n/a
Reststrahlen Peak	n/a
dn/dT	50 x 10 <sup>-6</sup> K <sup>-1</sup>
dn/d $\mu$ = 0	n/a
Density	6.2 g cm <sup>-3</sup> (2)
Melting Point	1092°C (4)
Thermal Conductivity	6.2 W m <sup>-1</sup> K <sup>-1</sup> at 293 K
Thermal Expansion	5.9x10 <sup>-6</sup> K <sup>-1</sup> at 293 K
Hardness	Knoop 54 (3)
Specific Heat Capacity	210 J Kg <sup>-1</sup> K <sup>-1</sup> at 293 K
Dielectric Constant	11 @ 1MHz
Youngs Modulus (E)	36.52 GPa
Shear Modulus (G)	n/a
Bulk Modulus (K)	25 GPa
Elastic Coefficients	C <sub>11</sub> =53.51; C <sub>12</sub> =36.81; C <sub>44</sub> =19.94
Apparent Elastic Limit	5.9 MPa (3)
Poisson Ratio	0.41
Solubility	Insoluble in water
Molecular Weight	240.02
Class/Structure	Cubic ZnS (110) cleavage

(1) Handbook Optical Constants, ed. Palik, V1, ISBN 0-12-544420-6

(2) Capper; Properties of Narrow Gap Cadmium-Based Compounds, IET, ISBN 978-0-85296-880-2

(3) Hawkins, Sherwood, Djotni; Mid IR Filters for astronomical and remote sensing instrumentation, invited paper SPIE Conference, Glasgow (2008)

(4) David R Lide; CRC Handbook of Chemistry and Physics, 78th ed (1997)



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$\mu\text{m}$	No	$\mu\text{m}$	No	$\mu\text{m}$	No
0.8	2.876	1.0	2.840	2.0	2.713
2.5	2.702	3.0	2.695	3.5	2.691
4.0	2.6807	5.0	2.684	6.0	2.681
7.0	2.679	8.0	2.677	10.0	2.653
12.5	2.646	15.5	2.6407	20.0	2.614
22.2	2.601	24.8	2.5801	26.32	2.570
27.03	2.564				

