THERMAL CONDUCTIVITY OF CRYSTALLINE DIELECTRICS

This table lists the thermal conductivity of a number of crystalline dielectrics, including some which find use as optical materials. Values are given at temperatures for which data are available.

Reference

Powell, R. L., and Childs, G. E., in *American Institute of Physics Handbook, 3rd Edition*, Gray, D. E., Ed., McGraw-Hill, New York, 1972.

Material	*T*/K	Ther. cond. W/m K
AgCl	223	1.3
	273	1.2
	323	1.1
	373	1.1
Al,B silicate (tourmaline)	398	2.9
|| to *c* axis	540	3.2
	723	3.5
Al,Be silicate (beryl)	315	6.4
Al,F silicate (topaz)	315	17.7
|| to *c* axis	358	15.6
	417	13.3
Al,Fe silicate (garnet)	315	35.8
	358	35.4
	377	35.6
Al_2O_3 (sapphire):		
36° to *c* axis	4.2	110
	20	3500
	35	6000
	77	1100
⊥ to *c* axis	373	2.6
	523	3.9
	773	5.8
Al_2O_3 (sintered)	4.2	0.5
	20	23
	77	150
	194	48
	273	35
	373	26
	973	8
Ar	8	6.0
	10	3.7
	20	1.4
	77	0.31
As_2S_3 (glass)	283	0.16
	323	0.21
	373	0.27
BN	1047	36.2
	1475	22.7
	1928	21.9
	2111	18.5
BaF_2	225	20
	260	13.4
	305	10.9
	370	10.5
$BaTiO_3$	5	4.2
	30	24.0
	40	25.0
	100	12.0
	250	4.8
	300	6.2
BeO	4.2	0.3
	20	16
	77	270
	373	210
	573	120
	1273	29
Bi_2Te_3	80	6.4
	204	2.8
	303	3.6
	370	4.6
C (diamond)	4.2	13
type I	20	800
	77	3550
	194	1450
	273	1000
$CaCO_3$		
|| to *c* axis	83	25
	273	5.5
⊥ to *c* axis	83	17
	194	6.5
	273	4.6
	373	3.6
CaF_2	83	39
	223	18
	273	10
	323	9.2
	373	9
$CaWO_4$ (scheelite)	422	11.3
CdTe	160	7.0
	297	3.6
	422	2.9
CsBr	223	1.2
	273	0.94
	323	0.81
	373	0.77
CsI	223	1.4
	273	1.2
	323	1
	373	0.95
Cu_2O (cuprite)	102	3.74
	163	7.76
	299	5.58
	360	4.86
Fe_3O_4 (magnetite)	4.5	27.4
	20.5	293.0
	126.5	7.4
	304	7.0
Glass:		
phoenix	4.2	0.095
	20	0.13
	77	0.37
plastic perspex	4.2	0.058

Material	*T*/K	Ther. cond. W/m K
	20	0.074
pyrex	77	0.44
	194	0.88
	273	1
H_2 (para + 0.5% ortho)	2.5	100
	3	150
	4	200
	6	30
	10	3
H_2O (ice)	173	3.5
	223	2.8
	273	2.2
He^3 (high pressure)	0.6	25
	1	2
	1.5	0.57
	2	0.21
He^4 (high pressure)	0.5	42
	0.8	120
	1	24
	2	0.18
I_2	300	0.45
	325	0.42
	350	0.4
KBr	2	150
	4.2	360
	100	12
	273	5
	323	4.8
	373	4.8
KCl	4.2	500
	25	140
	80	35
	194	10
	273	7.0
	323	6.5
	373	6.3
KI	4.2	700
	80	13
	194	4.6
	273	3.1
Kr	4.2	0.48
	10	1.7
	20	1.2
	77	0.36
LaF_3	78	7.8
	197	5.0
	274	5.4
LiF	4.2	620
	20	1800
	77	150
$MgO{\cdot}Al_2O_3$ (spinel)	373	13
	773	8.5
MnO	4.2	0.25
	40	55
	120	8
	573	3.5
NaCl	4.2	440
	20	300
	77	30
	273	6.4
	323	5.6
	373	5.4
NaF	5	1100
	50	250
	100	90
Ne	2	3.0
	3	4.6
	4.2	4.2
	10	0.8
	20	0.3
NH_4Cl	77	17
	194	23
	230	38
	273	27
$NH_4H_2PO_4$		
$\parallel$ to optic axis	315	0.71
	339	0.71
$\perp$ to optic axis	313	1.26
	342	1.34
NiO	4.2	5.9
	40	400
	194	82
SiO_2 (quartz)		
$\parallel$ to *c* axis	20	720
	194	20
	273	12
$\perp$ to *c* axis	20	370
	194	10
	273	6.8
SiO_2 (fused silica)	4.2	0.25
	20	0.7
	77	0.8
	194	1.2
	273	1.4
	373	1.6
	673	1.8
$SrTiO_3$	5	2.4
	30	21.0
	40	19.2
	100	18.5
	250	12.5
	300	11.2
TlBr	316	0.59
TlCl	311	0.75
TiO_2 (rutile)		
$\parallel$ to optic axis	4.2	200
	20	1000
	273	13
$\perp$ to optic axis	4.2	160
	20	690
	273	9