ELASTO-OPTIC, ELECTRO-OPTIC, AND MAGNETO-OPTIC CONSTANTS

When a crystal is subjected to a stress field, an electric field, or a magnetic field, the resulting optical effects are in general dependent on the orientation of these fields with respect to the crystal axes. It is useful, therefore, to express the optical properties in terms of the refractive index ellipsoid (or indicatrix):

$$\frac{x^2}{n_x^2}+\frac{y^2}{n_y^2}+\frac{z^2}{n_z^2}=1$$

or

$$\sum_{ij} B_{ij} x_i y_j = 1\,(i,j=1,2,3)$$

where

$$B_{ij}=\left[\frac{1}{\varepsilon}\right]_{ij}=\left[\frac{1}{n^2}\right]_{ij}$$

ε is the dielectric constant or permeability; the quantity B_{ij} has the name impermeability.

A crystal exposed to a *stress* **S** will show a change of its impermeability. The photo-elastic (or elasto-optic) constants, P_{ijkl}, are defined by

$$\Delta\left[\frac{1}{\varepsilon}\right]_{ij}=\Delta\left[\frac{1}{n^2}\right]_{ij}=\sum_{kl} P_{ijkl} S_{kl}$$

where n is the refractive index and S_{kl} are the strain tensor elements; the P_{ijkl} are the elements of a 4th rank tensor.

When a crystal is subjected to an *electric field* ***E*** two possible changes of the refractive index may occur depending on the symmetry of the crystal.

1. All materials, including isotropic solids and polar liquids, show an electro-optic birefringence (Kerr effect) which is proportional to the square of the electric field, ***E***:

   $$\Delta\left[\frac{1}{n^2}\right]_{ij}=\sum_k K_{ijkl} E_k E_l=\sum_{k,l=1,2,3} g_{ijkl}\, p_k\, p_l$$

   where E_k and E_l are the components of the electric field and P_k and P_l the electric polarizations. The coefficients, K_{ijkl}, are the quadratic electro-optic coefficients, while the constants g_{ijkl} are known as the Kerr constants.
2. The other electro-optic effect only occurs in the 20 piezoelectric crystal classes (no center of symmetry). This effect is known as the Pockels effect. The optical impermeability changes linearly with the static field

   $$\Delta\left[\frac{1}{n^2}\right]_{ij}=\sum_k r_{ij,k} E_k$$

The coefficients $r_{ij,k}$ have the name (linear) electro-optic coefficients.

The values of the electro-optic coefficients depend on the boundary conditions. If the superscripts T and S denote respectively the conditions of zero stress (free) and zero strain (clamped) one finds:

$$r_{ij}^{\mathrm{T}}=r_{ij}^{\mathrm{S}}+q_{ik}^{\mathrm{E}} e_{jk}=r_{ij}^{\mathrm{S}}+P_{ik}^{\mathrm{E}} d_{jk}$$

where $e_{jk} = (\partial T_k/\partial E_j)_S$ and $d_{jk} = (\partial S_k/\partial E_j)_T$ are the appropriate piezoelectric coefficients.

The interaction between a *magnetic field* and a light wave propagating in a solid or in a liquid gives rise to a rotation of the plane of polarization. This effect is known as *Faraday rotation*. It results from a difference in propagation velocity for left and right circular polarized light.

The Faraday rotation, θ_F, is linearly proportional to the magnetic field H:

$$\theta_{\mathrm{F}}=VlH$$

where l is the light path length and V is the *Verdet* constant (minutes/oersted·cm).

For ferromagnetic, ferrimagnetic, and antiferromagnetic materials the magnetic field in the above expression is replaced by the magnetization M and the magneto-optic coefficient in this case is known as the Kund constant K:

Specific Faraday rotation $F=KM$

In the tables below the *Faraday rotation* is listed at the saturation magnetization per unit length, together with the absorption coefficient α, the temperature T, the critical temperature T_C (or T_N), and the wavelength of the measurement.

In the tables that follow, the properties are presented in groups:

- Elasto-optic coefficients (photoelastic constants)
- Linear electro-optic coefficients (Pockels constants)
- Quadratic electro-optic coefficients (Kerr constants)
- Magneto-optic coefficients:
  - Verdet constants
  - Faraday rotation parameters

Within each group, materials are classified by crystal system or physical state. References are given at the end of each group of tables.

ELASTO-OPTIC COEFFICIENTS (PHOTOELASTIC CONSTANTS)

Name Cubic (43m, 432, m3m)	Formula	λ/μm	p_{11}	p_{12}	p_{44}	p_{11}-p_{12}	Ref.
Sodium fluoride	NaF	0.633	0.08	0.20	–0.03	–0.12	1
Sodium chloride	NaCl	0.589	0.115	0.159	–0.011	–0.042	2
Sodium bromide	NaBr	0.589	0.148	0.184	–0.0036	–0.035	1
Sodium iodide	NaI	0.589	–	–	0.0048	–0.0141	3
Potassium fluoride	KF	0.546	0.26	0.20	–0.029	0.06	1
Potassium chloride	KCl	0.633	0.22	0.16	–0.025	0.06	4
Potassium bromide	KBr	0.589	0.212	0.165	–0.022	0.047	5
Potassium iodide	KI	0.590	0.212	0.171	–	0.041	6
Rubidium chloride	RbCl	0.589	0.288	0.172	–0.041	0.116	7,8
Rubidium bromide	RbBr	0.589	0.293	0.185	–0.034	0.108	7,8
Rubidium iodide	RbI	0.589	0.262	0.167	–0.023	0.095	7,8
Lithium fluoride	LiF	0.589	0.02	0.13	–0.045	–0.11	5
Lithium chloride	LiCl	0.589	–	–	–0.0177	–0.0407	3
Ammonium chloride	NH_4Cl	0.589	0.142	0.245	0.042	–0.103	9
Cadmium telluride	CdTe	1.06	–0.152	–0.017	–0.057	–0.135	10
Calcium fluoride	CaF_2	0.55–0.65	0.038	0.226	0.0254	–0.183	11
Copper chloride	CuCl	0.633	0.120	0.250	–0.082	–0.130	12
Copper bromide	CuBr	0.633	0.072	0.195	–0.083	–0.123	12
Copper iodide	CuI	0.633	0.032	0.151	–0.068	–0.119	12
Diamond	C	0.540–0.589	–0.278	0.123	–0.161	–0.385	13
Germanium	Ge	3.39	–0.151	–0.128	–0.072	–0.023	14
Gallium arsenide	GaAs	1.15	–0.165	–0.140	–0.072	–0.025	15
Gallium phosphide	GaP	0.633	–0.151	–0.082	–0.074	–0.069	15
Strontium fluoride	SrF_2	0.633	0.080	0.269	0.0185	–0.189	16
Strontium titanate	$SrTiO_3$	0.633	0.15	0.095	0.072	–	17
KRS-5	Tl(Br,I)	0.633	–0.140	0.149	–0.0725	–0.289	18,20
KRS-6	Tl(Br,Cl)	0.633	–0.451	–0.337	–0.164	–0.114	19,20
Zinc sulfide	Zn	0.633	0.091	–0.01	0.075	0.101	15

Rare Gases	Formula	λ/μm	p_{11}	p_{12}	p_{44}	p_{11}-p_{12}	Ref.
Neon (T = 24.3 K)	Ne	0.488	0.157	0.168	0.004	–0.011	21
Argon (T = 82.3 K)	Ar	0.488	0.256	0.302	0.015	–0.046	22
Krypton (T = 115.6 K)	Kr	0.488	0.34	0.34	0.037	0	21
Xenon (T = 160.5 K)	Xe	0.488	0.284	0.370	0.029	–0.086	22

Garnets	Formula	λ/μm	p_{11}	p_{12}	p_{44}	p_{11}-p_{12}	Ref.
GGG	$Gd_3Ga_5O_{12}$	0.514	–0.086	–0.027	–0.078	–0.059	23
YIG	$Y_3Fe_5O_{12}$	1.15	0.025	0.073	0.041	–	15
YGG	$Y_3Ga_5O_{12}$	0.633	0.091	0.019	0.079	–	17
YAG	$Y_3Al_5O_{12}$	0.633	–0.029	0.0091	–0.0615	–0.038	15

Cubic (23, m3)	Formula	λ/μm	p_{11}	p_{12}	p_{44}	p_{13}	Ref.
Barium nitrate	$Ba(NO_3)_2$	0.589	–	$p_{11}-p_{22}$ = 0.992	–0.0205	$p_{11}-p_{13}$ = 0.713	13
Lead nitrate	$Pb(NO_3)_2$	0.589	0.162	0.24	–0.0198	0.20	24,25
Sodium bromate	$NaBrO_3$	0.589	0.185	0.218	–0.0139	0.213	26
Sodium chlorate	$NaClO_3$	0.589	0.162	0.24	–0.0198	0.20	26
Strontium nitrate	$Sr(NO_3)_2$	0.41	0.178	0.362	–0.014	0.316	27

Hexagonal (mmc, 6mm)	Formula	λ/μm	p_{11}	p_{12}	p_{13}	p_{31}	p_{33}	p_{44}	Ref.
Beryl	$Be_3Al_2Si_6O_{18}$	0.589	0.0099	0.175	0.191	0.313	0.023	–0.152	28
Cadmium sulfide	CdS	0.633	–0.142	–0.066	–0.057	–0.041	–0.20	–0.099	15,2
Zinc oxide	ZnO	0.633	±0.222	±0.099	–0.111	±0.088	–0.235	0.0585	30
Zinc sulfide	ZnS	0.633	–0.115	0.017	0.025	0.0271	–0.13	–0.0627	31

Trigonal (3m, 32, $\bar{3}$m)	**Formula**	**λ/μm**	p_{11}	p_{12}	p_{13}	p_{14}	p_{31}	p_{33}	p_{41}	p_{44}	**Ref.**
Sapphire	Al_2O_3	0.644	–0.23	–0.03	0.02	0.00	–0.04	–0.20	0.01	–0.10	15,32
Calcite	$CaCO_3$	0.514	0.062	0.147	0.186	–0.011	0.241	0.139	–0.036	–0.058	33
Lithium niobate	$LiNbO_3$	0.633	±0.034	±0.072	±0.139	±0.066	±0.178	±0.060	±0.154	±0.300	15,34
Lithium tantalate	$LiTaO_3$	0.633	–0.081	0.081	0.093	–0.026	0.089	–0.044	–0.085	0.028	15,35
Cinnabar	HgS	0.633			±0.445			±0.115	–	–	36
Quartz	SiO_2	0.589	0.16	0.27	0.27	–0.030	0.29	0.10	–0.047	–0.079	37
Proustite	Ag_3AsS_3	0.633	±0.10	±0.19	±0.22		±0.24	±0.20	–	–	38
Sodium nitrite	$NaNO_2$	0.633		±0.21	±0.215	±0.027	±0.25		0.055	–0.06	39
Tellurium	Te	10.6	0.155	0.130	–	–	–		–	–	15

Tetragonal (4/mmm, $\bar{4}$2m, 422)	**Formula**	**λ/μm**	p_{11}	p_{12}	p_{13}	p_{31}	p_{33}	p_{44}	p_{66}	**Ref.**
Ammonium dihydrogen phosphate	ADP	0.589	0.319	0.277	0.169	0.197	0.167	–0.058	–0.091	40
Barium titanate	$BaTiO_3$	0.633	0.425	–	–	–	–	–	–	41
Cesium dihydrogen arsenate	CDA	0.633	0.267	0.225	0.200	0.195	0.227	–	–	42
Magnesium fluoride	MgF_2	0.546	–	–	–	–	–	±0.0776	±0.0488	43
Calomel	Hg_2Cl_2	0.633	±0.551	±0.440	±0.256	±0.137	±0.010	–	±0.047	44
Potassium dihydrogen phosphate	KDP	0.589	0.287	0.282	0.174	0.241	0.122	–0.019	–0.064	45
Rubidium dihydrogen arsenate	RDA	0.633	0.227	0.239	0.200	0.205	0.182	–	–	41
Rubidium dihydrogen phosphate	RDP	0.633	0.273	0.240	0.218	0.210	0.208	–	–	41
Strontium barium niobate	$Sr_{0.75}Ba_{0.25}Nb_2O_6$	0.633	0.16	0.10	0.08	0.11	0.47	–	–	46
Strontium barium niobate	$Sr_{0.5}Ba_{0.5}Nb_2O_6$	0.633	0.06	0.08	0.17	0.09	0.23	–	–	46
Tellurium oxide	TeO_2	0.633	0.0074	0.187	0.340	0.090	0.240	–0.17	–0.046	47
Rutile	TiO_2	0.633	0.017	0.143	–0.139	–0.080	–0.057	–0.009	–0.060	48

Tetragonal (4, $\bar{4}$, 4/m)	**Formula**	**λ/μm**	p_{11}	p_{12}	p_{13}	p_{16}	p_{31}	p_{33}	p_{44}	p_{45}	p_{61}	p_{66}	**Ref.**
Cadmium molybdate	$CdMoO_4$	0.633	0.12	0.10	0.13	–	0.11	0.18	–	–	–	–	49
Lead molybdate	$PbMoO_4$	0.633	0.24	0.24	0.255	0.017	0.175	0.300	0.067	–0.01	0.013	0.05	52
Sodium bismuth molybdate	$NaBi(MoO_4)_2$	0.633	0.243	0.205	0.25	–	0.21	0.29	–	–	–	–	–

Orthorhombic (222, m22, mmm)	**Formula**	**λ/μm**	p_{11}	p_{12}	p_{13}	p_{21}	p_{22}	p_{23}	p_{31}	p_{32}	p_{33}	p_{44}	p_{55}	p_{66}	**Ref.**
Ammonium chlorate	NH_4ClO_3	0.633	–	0.24	0.18	0.23	–	0.20	0.19	0.18	±0.02	<±0.02	–	±0.04	51
Ammonium sulfate	$(NH_4)_2SO_4$	0.633	0.26	0.19	±0.260	±0.230	±0.27	±0.254	0.20	±0.26	0.26	0.015	±0.0015	0.012	52
Rochelle salt	$NaKC_4H_4O_6$	0.589	0.35	0.41	0.42	0.37	0.28	0.34	0.36	0.35	0.36	–0.030	0.0046	–0.025	53
Iodic acid (α)	HIO_3	0.633	0.302	0.496	0.339	0.263	0.412	0.304	0.251	0.345	0.336	0.084	–0.030	0.098	54
Sulfur (α)	S	0.633	0.324	0.307	0.268	0.272	0.301	0.310	0.203	0.232	0.270	0.143	0.019	0.118	54
Barite	$BaSO_4$	0.589	0.21	0.25	0.16	0.34	0.24	0.19	0.28	0.22	0.31	0.002	–0.012	0.037	55
Topaz	$Al_2SiO_4(OH,F)_2$	–	–0.085	0.069	0.052	0.095	–0.120	0.065	0.095	0.085	–0.083	–0.095	–0.031	0.098	28

Monoclinic (2, m, 2/m)	**Formula**	**λ/μm**			
Taurine	$C_2H_7NO_3S$	0.589	$p_{11} = 0.313$	$p_{25} = -0.0025$	$p_{51} = -0.014$
			$p_{12} = 0.251$	$p_{31} = 0.362$	$p_{52} = 0.006$
			$p_{13} = 0.270$	$p_{32} = 0.275$	$p_{53} = 0.0048$
			$p_{15} = -0.10$	$p_{33} = 0.308$	$p_{55} = 0.047$
			$p_{21} = 0.281$	$p_{35} = -0.003$	$p_{64} = 0.0024$
			$p_{22} = 0.252$	$p_{44} = 0.0025$	$p_{66} = 0.0028$
			$p_{23} = 0.272$	$p_{46} = -0.0056$	

Isotropic	Formula	λ/μm	p_{11}	p_{12}	p_{44}	Ref.
Fused silica	SiO_2	0.633	0.121	0.270	–0.075	15
Water	H_2O	0.633	±0.31	±0.31		15
Polystyrene		0.633	±0.30	±0.31		25
Lucite		0.633	±0.30	0.28		25
Orpiment	As_2S_3-glass	1.15	0.308	0.299	0.0045	15
Tellurium oxide	TeO_2-glass	0.633	0.257	0.241	0.0079	56
Laser glasses	LGS-247-2	0.488	±0.168	±0.230		57
	LGS-250-3		±0.135	±0.198		
	LGS-1		±0.214	±0.250		
	KGSS-1621		±0.205	±0.239		
Dense flint glasses	LaSF	0.633	0.088	0.147	–0.030	58
(examples)	SF_4		0.215	0.243	–0.014	
	U10502		0.172	0.179	–0.004	
	$TaFd_7$		0.099	0.138	–0.020	

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LINEAR ELECTRO-OPTIC COEFFICIENTS

Name Cubic ($\bar{4}3m$)	Formula	λ/μm	r_{41} pm/V
Cuprous bromide	CuBr	0.525	0.85
Cuprous chloride	CuCl	0.633	3.6
Cuprous iodide	CuI	0.55	–5.0
Eulytite (BSO)	$Bi_4Si_3O_{12}$	0.63	0.54
Germanium eulytite (BGO)	$Bi_4Ge_3O_{12}$	0.63	1.0
Gallium arsenide	GaAs	10.6	1.6
Gallium phosphide	GaP	0.56	–1.07
Hexamethylenetetramine	$C_6H_{12}N_4$	0.633	0.78
Sphalerite	ZnS	0.65	2.1
Zinc selenide	ZnSe	0.546	2.0
Zinc telluride	ZnTe	3.41	4.2
Cadmium telluride	CdTe	3.39	6.8

Cubic (23)	Formula	λ/μm	r_{41} pm/V
Ammonium chloride (77 K)	NH_4Cl	–	1.5
Ammonium cadmium langbeinite	$(NH_4)_2Cd_2(SO_4)_3$	0.546	0.70
Ammonium manganese langbeinite	$(NH_4)_2Mn_2(SO_4)_3$	0.546	0.53
Thallium cadmium langbeinite	$Tl_2Cd_2(SO_4)_3$	0.546	0.37
Potassium magnesium langbeinite	$K_2Mg_2(SO_4)_3$	0.546	0.40
Bismuth monogermanate	$Bi_{12}GeO_{20}$	–	3.3
Bismuth monosilicate	$Bi_{12}SiO_{20}$	–	3.3
Sodium chlorate	$NaClO_3$	0.589	0.4
Sodium uranyl acetate	$NaUO_2(CH_3COO)_3$	0.546	0.87
Trenhydrobromide	$N(CH_2CH_2NH_2)_3$ 3HBr	–	1.5
Trenhydrochloride	$N(CH_2CH_2NH_2)_3$ 3HCl	–	1.7

Tetragonal ($\bar{4}2m$)	Formula	T_{tran} K	r_{41} pm/V	r_{63} pm/V
Ammonium dihydrogen phosphate (ADP)	$NH_4H_2PO_4$	148	24.5	–8.5
Ammonium dideuterium phosphate (AD*P)	$NH_4D_2PO_4$	242	–	11.9
Ammonium dihydrogen arsenate (ADA)	$NH_4H_2AsO_4$	–	–	9.2
Cesium dihydrogen arsenate (CsDA)	CsH_2AsO_4	143	–	18.6
Cesium dideuterium arsenate (CsD*A)	CsD_2AsO_4	212	–	36.6
Potassium dihydrogen phosphate (KDP)	KH_2PO_4	123	8.6	–10.5
Potassium dideuterium phosphate (KD*P)	KD_2PO_4	222	8.8	23.8
Potassium dihydrogen arsenate (KDA)	KH_2AsO_4	97	12.5	10.9
Potassium dideuterium arsenate (KD*A)	KD_2AsO_4	162	–	18.2
Rubidium dihydrogen phosphate (RDP)	RbH_2PO_4	147	–	15.5
Rubidium dihydrogen arsenate (RDA)	RbH_2AsO_4	110	–	13.0
Rubidium dideuterium arsenate (RD*A)	RbD_2AsO_4	178	–	21.4

Tetragonal (4mm)	Formula	T_{tran} K	r_{13} pm/V	r_{33} pm/V	r_{51} pm/V
Barium titanate	$BaTiO_3$	406	8	28	–
Potassium lithium niobate	$K_3Li_2Nb_5O_{15}$	693	8.9	5.9	–
Lead titanate	$PbTiO_3$	765	13.8	5.9	–
Strontium barium niobate (SBN75)	$Sr_{0.75}Ba_{0.25}Nb_2O_6$	330	6.7	1340	42
Strontium barium niobate (SBN46)	$Sr_{0.46}Ba_{0.54}Nb_2O_6$	602	~180	35	–

Hexagonal (6mm)	Formula	r_{13} pm/V	r_{33} pm/V	r_{42} pm/V	r_{51} pm/V
Greenockite	CdS	3.1	2.9	2.0	3.7
Greenockite (const. strain)	CdS	1.1	2.4	–	–
Wurzite	ZnS	0.9	1.8	–	–
Zincite	ZnO	−1.4	+2.6	–	–

Hexagonal (6)	Formula	r_{13} pm/V	r_{33} pm/V	r_{42} pm/V	r_{51} pm/V
Lithium iodate	$LiIO_3$	4.1	6.4	1.4	3.3
Lithium potassium sulfate	$LiKSO_4$	$r_{13}-r_{33} = 1.6$	–	–	–

Trigonal (3m)	Formula	T_{tran} K	r_{13} pm/V	r_{22} pm/V	r_{33} pm/V	r_{42} pm/V
Cesium nitrate	$CsNO_3$	425	–	0.43	–	–
Lithium niobate	$LiNbO_3$	1483	8.6	7.0	30.8	28
Lithium tantalate	$LiTaO_3$	890	8.4	–	30.5	–
Lithium sodium sulfate	$LiNaSO_4$	–	–	<0.02	–	–
Tourmaline	–	–	–	0.3	–	–

Trigonal (32)	Formula	T_{tran} K	r_{11} pm/V	r_{41} pm/V
Cesium tartrate	$Cs_2C_4H_4O_6$	–	1.0	–
Cinnabar	HgS	659	3.1	1.5
Potassium dithionate	$K_2S_2O_6$	–	0.26	–
Strontium dithionate	$SrS_2O_6{\cdot}4H_2O$	–	0.1	–
Quartz	SiO_2	1140	−0.47	0.2
Selenium	Se	398	2.5	

Orthorhombic (222)	Formula	T_{tran} K	r_{41} pm/V	r_{52} pm/V	r_{63} pm/V
Ammonium oxalate	$(NH_4)_2C_2O_4{\cdot}4H_2O$	–	230	330	250
Rochelle salt	$KNaC_4H_4O_6{\cdot}4H_2O$	$T_u = 297$ $T_l = 255$	−2.0	−1.7	+0.32

Orthorhombic (mm2)	Formula	*T*trans K	r_{13} pm/V	r_{23} pm/V	r_{33} pm/V	r_{42} pm/V	r_{51} pm/V
Barium sodium niobate (BSN)	Ba_2NaNbO_{15}	833	15	13	48	92	90
Potassium niobate	$KNbO_3$	476	28	1.3	64	380	105

Monoclinic (2)	Formula	T_{trans} K	r_{22} pm/V	r_{32} pm/V
Calcium pyroniobate	$Ca_2Nb_2O_7$	–	0.33	13.7
Triglycine sulfate (TGS)	$(NH_2CH_2COOH)_3{\cdot}H_2SO_4$	322	7.2	13.6

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QUADRATIC ELECTRO–OPTIC COEFFICIENTS

Kerr Constants of Ferroelectric Crystals[1,2]

Name	Formula	T_{tran} K	λ μm	g_{11} 10^{10} esu	g_{12} 10^{10} esu	$g_{11}-g_{12}$ 10^{10} esu	g_{44} 10^{10} esu
Barium titanate	$BaTiO_3$	406	0.633	1.33	–0.11	1.44	
Strontium titanate	$SrTiO_3$	–	0.633	–	–	1.56	–
Potassium tantalate niobate	$KTa_{0.65}Nb_{0.35}O_3$	330	0.633	1.50	–0.42	1.92	1.63
Potassium tantalate	$KTaO_3$	13	0.633	–	–	1.77	1.33
Lithium niobate	$LiNbO_3$	1483	–	0.94	0.25	0.7	0.6
Lithium tantalate	$LiTaO_3$	938	–	1.0	0.17	0.8	0.7
Barium sodium niobate (BSN)	$Ba_{0.8}Na_{0.4}Nb_2O_6$	833	–	1.55	0.44	1.11	

Kerr Constants of Selected Liquids[2]

K is the Kerr constant at a wavelength of 589 nm and at room temperature; ε is the static dielectric constant; t_m is the melting point; and t_b is the normal boiling point

Name	Molecular formula	*K* 10^{-7} esu	ε	t_m °C	t_b °C
Carbon disulfide	CS_2	+3.23	2.63	–111.5	+46.3
Acetone	C_3H_6O	+16.3	21.0	–94.8	+56.1
Methyl ethyl ketone	C_4H_8O	+13.6	18.56	–86.67	+79.6
Pyridine	C_5H_5N	+20.4	13.26	–42	+115.23
Ethyl cyanoacetate	$C_5H_7NO_2$	+38.8	31.6	–22.5	205
o-Dichlorobenzene	$C_6H_4Cl_2$	+42.6	10.12	–16.7	180
Benzenesulfonyl chloride	$C_6H_5ClO_2S$	+89.9	28.90	+14.5	247
Nitrobenzene	$C_6H_5NO_2$	+326	35.6	+5.7	210.8
Ethyl 3-aminocrotonate	$C_6H_{11}NO_2$	+31.0	–	+33.9	210
Paraldehyde	$C_6H_{12}O_3$	–23.0	14.7 12.0[a]	+12.6	124
Benzaldehyde	C_7H_6O	+80.8	17.85 14.1[a]	–26	179.05
p-Chlorotoluene	C_7H_7Cl	+23.0	6.25	+7.5	162.4
o-Nitrotoluene	$C_7H_7NO_2$	+174	26.26	–10	222.3
m-Nitrotoluene	$C_7H_7NO_2$	+177	24.95	+15.5	232
p-Nitrotoluene	$C_7H_7NO_2$	+222	22.2	+51.6	238.3
Benzyl alcohol	C_7H_8O	–15.4	11.92 10.8[a]	–15.3	205.8
m-Cresol	C_7H_8O	+21.2	12.44 5.0[a]	+11.8	202.27
m-Chloroacetophenone	C_8H_7ClO	+69.1			
Acetophenone	C_8H_8O	+66.6	17.44 15.8[a]	+19.7	202.3
Quinoline	C_9H_7N	+15.0	9.16	–14.78	237.16
Ethyl salicylate	$C_9H_{10}O_3$	+19.6	8.48	+1.3	231.5
Carvone	$C_{10}H_{14}O$	+23.6	11.2	<0	230
Ethyl benzoylacetate	$C_{11}H_{12}O_3$	+16.0	13.50	<0	270
Water	H_2O	+4.0	80.10	0.00	100.0

[a] Dielectric constant at radio frequencies (108–109 Hz).

References

1. Narasimhamurty, T. S., *Photoelastic and Electro-Optic Properties of Crystals*, Plenum Press, New York, 1981, p. 408.
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MAGNETO–OPTIC CONSTANTS

Verdet Constants of Non-Magnetic Crystals[1]

V is the Verdet constant; *n* is the refractive index; and λ is the wavelength.

Material	*T* K	λ nm	*n*	*V* min/Oe cm
Al_2O_3	300	546.1	1.771	0.0240
	300	589.3	1.768	0.0210
$BaTaO_3$	403	427		0.95
	403	496		0.38
	403	620		0.18
	403	826		0.072
$Bi_4Ge_3O_{12}$	300	442	2.077	0.289
	300	632.8	2.048	0.099
	300	1064	2.031	0.026
C (diamond)	300	589.3	2.417	0.0233
$CaCO_3$	300	589.3	1.658	0.019
CaF_2	300	589.3	1.434	0.0088
$Cd_{0.55}Mn_{0.45}Te$	300	632.8		6.87
CuCl	300	546.1	1.93	0.20
GaSe	298	632.8		0.80
$KAl(SO_4)_2{\cdot}12H_2O$	300	589.3	1.456	0.0124
KBr	300	546.1	1.564	0.0500
	300	589.3	1.560	0.0425
KCl	300	589.3	1.490	0.0275
KI	300	546.1	1.673	0.083
	300	589.3	1.666	0.070
$KTaO_3$	296	352		0.44
	296	413		0.19
	296	496		0.096
	296	620		0.051
	296	826		0.022
LaF_3	300	325	1.639	0.054
(H‖c)	300	442	1.615	0.028
	300	632.8	1.601	0.012
	300	1064	1.592	0.006
$MgAl_2O_4$	300	589.3	1.718	0.021
$NH_4AlSO_4{\cdot}12H_2O$	300	589.3	1.459	0.0128
NH_4Br	300	589.3	1.711	0.0504
NH_4Cl	300	546.1		0.0410
	300	589.3	1.643	0.0362
NaBr	300	546.1		0.0621
NaCl	300	546.1		0.0410
	300	589.3	1.544	0.0345
$NaClO_3$	300	546.1		0.0105
	300	589.3	1.515	0.0081
$NiSO_4{\cdot}6H_2O$	297	546.1		0.0256
	297	589.3	1.511	0.0221
SiO_2	300	546.1	1.546	0.0195
	300	589.3	1.544	0.0166
$SrTiO_3$	298	413	2.627	0.78
	298	496		0.31
	298	620		0.14
	298	826		0.066
ZnS	300	546.1		0.287
	300	589.3	2.368	0.226
ZnSe	300	476	2.826	1.50
	300	496	2.759	1.04
	300	514	2.721	0.839
	300	587	2.627	0.529
	300	632.8	2.592	0.406

Verdet Constants of Rare-Earth Aluminum Garnets at Various Wavelengths[1]

The absorption coefficient α for these materials ranges from 0.2 to 0.6 cm^{-1} at 300 K.

Material	*T*/K	*V* in min/Oe cm							
		λ = 405 nm	450 nm	480 nm	520 nm	546 nm	578 nm	635 nm	670 nm
$Tb_2Al_5O_{12}$	300	–2.266	–1.565	–1.290	–1.039	–0.912	–0.787	–0.620	–0.542
	77		–102.16	–83.45	–3.425	–3.051	–2.603	–2.008	–1.815
	4.2				–64.80	–58.35	–53.77	48.39	–45.15
	1.45		–200.95	–172.52	–139.28	–125.07	–111.27	97.47	–93.42
$Dy_3Al_5O_{12}$	300	–1.241	–0.942	–0.803	–0.667	–0.592	–0.518	–0.411	–0.359
$Ho_3Al_5O_{12}$	300	–0.709	–0.320	–0.260	–0.335	–0.304	–0.299		–0.206
$Er_3Al_5O_{12}$	300	–0.189	–0.240	–0.154	–0.162	–0.157	–0.145	–0.105	–0.089
$Tm_3Al_5O_{12}$	300	+0.151	+0.103	+0.093	0.076	0.069	+0.059	+0.048	
$Yb_3Al_5O_{12}$	298	0.287	0.215	0.186	0.140	0.133	0.116	0.094	
	77	0.718	0.540	0.481	0.393	0.342	0.302	0.239	

Verdet Constants for KDP-Type Crystals[1]

Measurements refer to *T* = 298 K and λ = 632.8 nm, with ***k*** || [001].

Material	*V* min/Oe cm
KH_2PO_4 (KDP)	0.0124
$KH_{0.3}D_{1.7}PO_4$ (KD*P)	0.145
$NH_4H_2PO_4$ (ADP)	0.138
KH_2AsO_4 (KDA)	0.238
$KH_{0.1}D_{1.9}AsO_4$ (KD*A)	0.245
$NH_4H_2AsO_4$ (ADH)	0.244

Verdet Constants of Gases[2]

Values refer to *T* = 0°C and *P* = 101.325 kPa (760 mmHg); n_D is the refractive index at a wavelength of 589 nm.

Gas	$(n_D - 1) \times 10^3$	$10^6 \times V$ min/Oe cm
He	0.036	+0.40
Ar	2.81	+9.36
H_2		+6.29
N_2	0.297	+6.46
O_2	0.272	+5.69
Air	0.293	+6.27
Cl_2	0.773	+31.9
HCl	0.447	+21.5
H_2S	0.63	+41.5
NH_3	0.376	+19.0
CO	0.34	+11.0
CO_2	0.45	+9.39
NO	0.297	–58
CH4	0.444	+17.4
n-C_4H_{10}		+44.0

Verdet Constants of Liquids[2]

n_D is the refractive index at a wavelength of 589 nm and a temperature of 20°C, unless otherwise indicated. *V* is the Verdet constant.

Liquid	λ/nm	*t*/°C	$10^2 \times V$ min/Oe cm	n_D
P	589	33	+13.3	
S	589	114	+8.1	1.929 (110°C)
H_2O	589	20	+1.309	1.3328
D_2O	589	19.7	+1.257	1.3384
H_3PO_4	578	97.4	+1.35	
CS_2	589	20	+4.255	1.6255
CCl_4	578–589	25.1	+1.60	1.463 (15°C)
$SbCl_5$	578	18	+7.45	1.601 (14°C)
$TiCl_4$	578	17	–1.65	1.61
$TiBr_4$	578	46	–5.3	
Methanol	589	18.7	+0.958	1.3289
Acetone	578–589	20.0	+1.116	1.3585
Toluene	578–589	15.0	+2.71	1.4950
Benzene	578–589	15.0	+3.00	1.5005
Chlorobenzene	589	15	+2.92	1.5246
Nitrobenzene	589	15	+2.17	1.5523
Bromoform	589	17.9	+3.13	1.5960

Verdet Constants of Rare Earth Paramagnetic Crystals[1]

n is the refractive index, and *V* is the Verdet constant at the wavelength and temperature indicated.

Rare Earth	Host	*T*/K	λ/nm	*n*	*V* min/Oe cm
Ce^{3+}(30%)	CaF_2	300	325	1.516	–0.956
		300	442	1.502	–0.297
		300	633	1.494	–0.111
		300	1064	1.489	–0.035
Ce^{3+}	CeF_3	300	442	1.613	–1.05
		300	633	1.598	–0.406
		77	633		–1.418
		300	1064	1.589	–0.113
Pr^{3+}(5%)	CaF_2	300	266	1.471	–0.172
		300	325	1.461	–0.0818
		300	442	1.451	–0.0089
		300	633	1.445	–0.0168
		300	1064	1.441	–0.0045
Nd^{3+}(2.9%)	CaF_2	4.2	426		–0.19
Nd^{3+}	NdF_3	300	442	1.60	–0.553
		290	633	1.59	–0.209
		77	633		–0.755
		300	1064	1.58	–0.097
Eu^{3+}(3%)	CaF_2	4.2	430		29
		4.2	440		22
Eu^{2+}	EuF_2	300	450		–4.5
		300	500		–2.6
		300	550		–1.6
		300	600		–1.1
		300	650		–0.8
		300	1064		–0.19
Tb^{3+}	KTb_3F_{10}	300	325	1.531	–2.174
		300	442	1.518	–0.933
		300	633	1.510	–0.386
		77	633		–1.94
		300	1064	1.505	–0.114
Tb^{3+}	$LiTbF_4$	300	325	1.493	–1.9
		300	442	1.481	–0.98
		300	633	1.473	–0.44
		300	1064	1.469	–0.13
Tb^{3+}	$Tb_3Ga_5O_{12}$	300	500	1.989	–0.749
		300	570	1.981	–0.581
		300	633	1.976	–0.461
		300	830	1.967	–0.21
		300	1060	1.954	–0.12

Verdet Constants of Paramagnetic Glasses[1]

The Verdet constant V is given at room temperature for the wavelengths indicated.

Rare earth phosphate glasses of composition $R_2O_3 \cdot xP_2O_5$, where x is given in the second column

		Verdet constant V in min/Oe cm									
R	***x***	**λ = 405 nm**	**λ = 436 nm**	**λ = 480 nm**	**λ = 500 nm**	**λ = 520 nm**	**λ= 546 nm**	**λ= 578 nm**	**λ= 600 nm**	**λ= 635 nm**	**λ= 670 nm**
La		0.037	0.030	0.024	0.022	0.020	0.018	0.015	–0.014	0.013	–
Ce	2.67	–0.672	0.510	–0.366	–0.326	–0.287	–0.253	–0.217	–0.197	–0.173	–0.150
Pr	3.09	–0.447	–0.332	–0.283	–0.261	–0.236	–0.208	–0.182	–0.170	–0.150	–0.132
Nd	2.92	–0.250	–0.209	–0.167	–0.155	–0.136	–0.134	–0.094	–0.080	–0.080	–0.071
Sm	2.87	0.026	0.024	0.020	0.020	0.017	0.015	0.014	0.012	0.011	0.010
Eu	2.93	–0.025	–0.017	–0.010	–0.006	–0.006	–0.005	–0.004	–0.003	–0.002	–0.002
Gd	3.01	0.018	0.015	0.014	0.012	0.012	0.011	0.011	0.010	0.009	0.009
Tb	2.94	–0.560	–0.458	–0.357	–0.323	–0.295	–0.261	–0.226	–0.206	–0.190	–0.164
Dy	2.51	–0.540	–0.453	–0.359	–0.331	–0.301	0.268	–0.237	–0.217	–0.197	–0.173
Ho	2.94	–0.299	–0.313	–0.156	–0.153	–0.138	–0.138	–0.119	–0.110	–0.098	–0.084
Er	3.01	–0.139	–0.121	–0.100	–0.111	–0.095	–0.062	–0.060	–0.057	–0.051	–0.044
Tm	2.79	0.019	0.013	0.012	0.009	0.008	0.006	0.005	0.004	0.004	0.007
Yb	3.01	0.087	0.072	0.056	0.050	0.045	0.041	0.036	0.032	0.029	0.024

The following are rare earth borate glasses with composition:

for La and Pr: $R_2O_3 \cdot xP_2O_5$; for Tb–Pr and Dy–Pr: $R_2O_3 \cdot xB_2O_3$; and for other elements: $R_2O_3 \cdot 0.85La_3O_3 \cdot xB_2O_3$.

La	3.04	0.043	0.036	0.029	0.026	0.023	0.022	0.019	0.018	0.016	0.014
Pr-La	5.44	–0.380	–0.307	–0.230	–0.220	–0.201	–0.178	–0.153	–0.146	–0.128	–0.110
Nd-La	5.41	–0.180	–0.147	–0.120	–0.111	–0.096	–0.094	–0.100	–0.059	–0.056	–0.046
Sm-La	4.97	0.032	0.030	0.025	0.024	0.022	0.019	0.017	0.016	0.014	0.012
Eu-La	4.69	–0.081	–0.060	–0.038	–0.033	–0.029	–0.024	0.019	–0.016	0.014	–0.012
Gd-La	4.71	0.032	0.026	0.024	0.022	0.021	0.020	0.018	0.017	0.015	0.013
Tb-La	4.73	–0.512	–0.419	–0.319	–0.288	–0.262	–0.234	–0.205	–0.186	–0.167	–0.142
Dy-La	4.88	–0.436	–0.361	–0.299	–0.273	–0.246	–0.220	–0.193	–0.177	–0.159	–0.138
Ho-La	4.36	–0.269	–0.252	–0.123	–0.131	–0.112	–0.128	–0.104	–0.096	–	–0.074
Er-La	4.50	–0.093	–0.078	–0.068	–0.082	–	–0.045	–0.042	–0.040	–0.035	–0.034
Tm-La	4.75	0.060	0.046	0.039	0.034	0.031	0.026	0.023	0.021	0.018	0.016
Yb-La	8.58	0.115	0.094	0.073	0.066	0.060	0.054	0.046	0.043	0.037	0.033
Tb-Pr	4.99	–0.940	–0.786	–0.560	–0.536	–0.489	–0.436	–0.380	–0.348	–0.306	–0.265
Dy-Pr	4.63	–0.850	–	–	–0.497	–0.465	–0.413	–0.358	–0.332	–0.290	–0.252
Pr	2.56	–0.843	–0.646	–0.471	–0.480	–0.432	–0.390	–0.334	–0.317	–0.271	–0.243

Verdet Constants of Diamagnetic Glasses[1]

The Verdet constant V is given at room temperature for the wavelengths indicated.

Glass		**Verdet constant V in min/Oe cm**			
type	**Composition (wt. %)**	**λ = 325 nm**	**λ = 442 nm**	**λ = 633 nm**	**λ = 1064 nm**
SiO_2	100% SiO_2			0.013	
B_2O_3	100% B_2O_3			0.010	
CdO	47.5% CdO, 52.5% P_2O_5	0.079	0.033	0.022	
ZnO	36.4% ZnO, 63.6% P_2O_5	0.072	0.044	0.020	
TeO_2	88.9% TeO_2, 11.1% P_2O_5		0.196	0.076	0.022
ZrF_4	63.1% ZrF_4, 14.9% BaF_2, 7.2% LaF_3, 1.9% AlF_3, 9.1% PbF_2, 3.8% LiF			0.011	

		λ = 700 nm	λ = 853 nm	λ = 1060 nm
Bi_2O_3	95% Bi2O3, 5% B2O3	0.086	0.051	0.033
PbO	95% PbO, 5% B2O3	0.093	0.061	0.031
	82% PbO, 18% SiO2	0.077	0.045	0.027
	50% PbO, 15% K2O, 35% SiO2	0.032	0.020	0.011
Tl_2O	95% Tl2O, 5% B2O3	0.092	0.061	0.032
	82% Tl2O, 18% SiO2	0.100	0.067	0.043
	50% Tl2O, 15% K2O, 35% SiO2	0.036	0.022	0.012
SnO	76% SnO, 13% B2O3, 11% SiO2	0.071	0.046	0.026
TeO_3	75% TeO2, 25% Sb2O3	0.076	0.052	0.032
	80% TeO2, 20% ZnCl2	0.073	0.046	0.025
	84% TeO2, 16% BaO	0.056	0.041	0.029
	70% TeO2, 30% WO3	0.052	0.035	0.022
	20% TeO2, 80% PbO	0.128	0.075	0.048
Sb_2O_3	25% Sb2O3, 75% TeO2	0.076	0.050	0.032
	75% Sb2O3, 75% Cs2O, 5% Al2O3	0.074	0.044	0.025
	75% Sb2O3, 10% Cs2O, 10% Rb2O, 5% Al2O3	0.078	0.052	0.030

Verdet Constants of Commercial Glasses[1]

This table gives the density, ρ, refractive index at 589 nm, n_D, and Verdet constant, *V*, for the wavelengths indicated; the data refer to room temperature.

Glass	ρ		*V* in min/Oe cm				
type	g/cm³	n_D	λ = 365.0 nm	λ = 404.7 nm	λ = 435.8 nm	λ = 546.1 nm	λ = 578.0 nm
BSC	2.49	1.5096	0.0499	0.0392	0.0333	0.02034	0.01798
HC	2.53	1.5189	0.0561	0.0440	0.0372	0.0225	0.01995
LBC	2.87	1.5406	0.0609	0.0477	0.0403	0.0245	0.0216
LF	3.23	1.5785	0.1143	0.0850	0.0693	0.0394	0.0344
BLF	3.48	1.6047	0.1112	0.0832	0.0685	0.0393	0.0344
DBC	3.56	1.6122	0.0662	0.0517	0.0435	0.0261	0.0231
DF	3.63	1.6203	0.1473	0.1076	0.0872	0.0485	0.0423
EDF	3.9	1.6533	0.1725	0.1248	0.1007	0.0556	0.0483

The composition of the glasses in weight percent is:

Glass type	SiO_2	B_2O_3	K_2O	CaO	Al_2O_3	As_2O_3	Na_2O	BaO	ZnO	PbO
BSC	69.6	6.7	20.5	2.9	0.3	0.1	–	–	–	–
HC	72.0	–	10.1	11.4	0.3	0.2	6.1	–	–	–
LBC	57.1	1.8	13.7	0.3	0.2	0.1	–	26.9	–	–
LF	52.5	–	9.5	0.3	0.2	0.1	–	–	–	37.6
BLF	45.2	–	7.8	–	–	0.4	–	16.0	8.3	22.2
DBC	36.2	7.7	0.2	0.2	3.5	0.7	–	44.6	6.7	–
DF	46.3	–	1.1	0.3	0.2	0.1	5.0	–	–	47.0
EDF	40.6	–	7.5	0.2	0.2	0.2	0.1	–	–	51.5

References

1. Weber, M. J., *CRC Handbook of Laser Science and Technology*, Vol. IV, Part 2, CRC Press, Boca Raton, FL, 1988, pp. 299–310.
2. Gray, D. E., Ed., *American Institute of Physics Handbook*, Third edition, McGraw Hill, New York, 1972, p. 6–230.

FARADAY ROTATION

Ferro-, Ferri-, and Antiferromagnetic Solids

Material	T_c K	$4\pi M_s$ gauss	F deg/cm	α cm^{-1}	$2F/\alpha$ deg	T K	λ nm
Fe	1043	21,800	4.4×10^5	6.5×10^5	1.4	300	500
			6.5×10^5	5.0×10^5	2.6	300	1000
			7×10^5	4.2×10^5	3.3	300	1500
			7×10^5	3.5×10^5	4.0	300	2000
Co	1390	18,200	2.9×10^5	–	–	300	500
			5.5×10^5	6.1×10^5	1.8	300	1000
			5.5×10^5	4.5×10^5	2.4	300	1500
			5.5×10^5	3.6×10^5	2.7	300	2000
Ni	633	6,400	0.8×10^5	–	–	300	500
			2.6×10^5	5.8×10^5	0.9	300	1000
			1.5×10^5	4.8×10^5	0.6	300	1500
			1×10^5	4.1×10^5	0.25	300	2000
Permalloy (Ni/Fe = 82/18)	803	10,700	1.2×10^5	6×10^5	0.4	300	500
Ni/Fe = 100/0		6,000	1.2×10^5	7.05×10^5	0.34	300	632.8
Ni/Fe = 80/20		10,800	2.2×10^5	7.10×10^5	0.62	300	632.8
Ni/Fe = 60/40		14,900	2.9×10^5	7.54×10^5	0.77	300	632.8
Ni/Fe = 40/60		14,400	2.2×10^5	8.17×10^5	0.54	300	632.8
Ni/Fe = 20/80		19,400	3.3×10^5	8.10×10^5	0.81	300	632.8
Ni/Fe = 0/100	639	21,600	3.5×10^5	8.13×10^5	0.86	300	632.8
MnBi		7,700	4.2×10^5	6.1×10^5	1.4	300	450
			7.5×10^5	4.2×10^5	3.6	300	900
MnAs	313	–	0.44×10^5	5.0×10^5	0.174	300	500
			0.62×10^5	4.4×10^5	0.28	300	900
CrTe	334	1015	0.5×10^5	2.0×10^5	0.5	300	550
			0.4×10^5	1.2×10^5	0.7	300	900
FeRh	333	–	0.9×10^5	3.3×10^5	0.56	348	700
$Y_3Fe_5O_{12}$ (YIG)	560	2500	2400	1500	3.2	300	555
			1250	1400	1.8	300	625
			750	450	3.3	300	770
			175	<0.06	$>3 \times 10^3$	300	5000 to 1500
$Gd_3Fe_5O_{12}$ (GdIG)	T_n = 564	7300	−2000	6000	0.6	300	500
	T = 286		−1050	900	2.3	300	600
			−300	100	6.0	300	800
			−80	70	2.3	300	1000
$NiFe_2O_4$	858	3350	2.0×10^4	5.9×10^4	0.7	300	286
			-1.0×10^4	10×10^4	0.2	300	500
			−120	38	6	300	1500
			+75	15	10	300	3000
			+110	32	7	300	5000
$CoFe_2O_4$	793	4930	2.75×10^4	12×10^4	0.5	300	286
			3.6×10^4	17×10^4	0.4	300	400
			-2.5×10^4	6×10^4	0.8	300	660
$MgFe_2O_4$	593-713[e]	1450[e]	−60	100	1	300	2500
			0	12	0	300	4000
			+35	6	11	300	6000
$Li_{0.5}Fe_{2.5}O_4$	863–953[e]	3240[e] to 3900	−440	150	6	300	1500
			+10	85	0.2	300	3000
			+110	44	5	300	5000
			+135	80	3	300	7000
$BaFe_{12}O_{19}$	723	–	−50	−38	3	300	2000
			+75	20	7.5	300	3000
			+150	20	15	300	5000
			+165	22	15	300	7000
$Ba_2Zn_2Fe_{12}O_{19}$	–	–	90	120	1.5	300	5000

Material	T_c K	$4\pi M_s$ gauss	F deg/cm	α cm^{-1}	$2F/\alpha$ deg	T K	λ nm
			75	65	2.0	300	7000
$RbNiF_3$	220	1250	360	35	20	77	450[a]
			70	10	14	77	600[a]
			310	70	9	77	800[a]
			75	25	6	77	1000[a]
$RbNi_{0.75}Co_{0.25}F_3$	109	–	180	9	40	77	600[b]
$RbFeF_3$	102	–	3400	7	900	82	300[c]
			1600	3	1100	82	400[c]
			620	1.5	830	82	600[c]
			300	2.5	240	82	800[c]
FeF_3	365	40	670	14	95	300	349[d]
		at 300 K	180	4.4	82	300	522.5[d]
$CrCl_3$	16.8	3880	2000	200	20	1.5	410
			−500	300	3	1.5	450
			−1000	70	30	1.5	590
$CrBr_3$	32.5	3390	3×10^5	3×10^3	200	1.5	478
			1.6×10^5	1.4×10^4	23	1.5	500
CrI_3	68	2690	1.1×10^5	6.3×10^3	35	1.5	970
			0.8×10^5	3×10^3	53	1.5	1000
$FeBO_3$	348	115	3200	140	45	300	500
		at 300 K	450	38	24	300	700
EuO	69	23700	-1.0×10^5	0.5×10^4	40	5	1100
			5×10^5	9.7×10^4	10	5	700
			0.5×10^5	7.8×10^4	1.3	5	500
			3×10^4	>0.5	~105	20	2500
			660	>1.0	1300	20	10600
EuS	16.3	–	-1.6×10^5	0	–	6	825
			-9.6×10^5	3.3×10^4	58	6	690
			$+5.5 \times 10^5$	1.2×10^5	9.2	6	563
EuSe	7.0	13,200	1.45×10^5	80	3600	4.2	750
			0.95×10^5	60	3170	4.2	800

[a] Measured along the C-axis (magnetic hard axis).

[b] Measured along the C-axis (magnetic easy axis).

[c] Measured along the C-axis ([100]-direction at room temperature).

[d] Strong natural birefringence interferes with the Faraday effect.

[e] Depends on heat treatment.

Reference

1. Weber, M. J., Ed., *CRC Handbook of Laser Science and Technology,* Vol. IV, Part 2, CRC Press, Boca Raton, FL, 1988, pp. 288–296.