

ELLIPSOMETRY CONSTANTS

Material	Symbol	N	K	(6328Å unless specified)	Source
Acrylics (gen. purpose)		1.485 – 1.500		5893	
Aluminum (bulk)	A1	1.62	5.44		
Aluminum (metallic)		1.30	7.48	6199	Shiles
Aluminum (metallic)		1.39	7.65	6358	Shiles
Aluminum (polished)		1.5	5.5		Greef
Aluminum (sputtered)			2.26		
Aluminum (UHV deposited)		1.43	7.28		Nyce
Aluminum Carbide	A14C3	2.7			
Aluminum Fluoride	A1F3	1.38		55u	Mathis
Aluminum Oxide (film)	A12O3	1.7			
Antimony (bulk)	Sb	3.17	4.94		
Antimony Trioxide	Sb2O3	2.05		?	Mathis
Antimony Trisulphide	SB2S3	3.01		0.55u	Mathis
Arsenic Selenide	As2Se3	N/A	N/A	6320	Palik
Arsenic Sulfide (crystalline)	As2S3	3.19 (a)	N/A	6250	Palik
Arsenic Sulfide (crystalline)	As2S3	2.53 (b)	N/A		Palik
Arsenic Sulfide (crystalline)	As2S3	2.84 (c)	6.2×10^{-6} (c)		Palik
Arsenic Sulfide (vitreous)	a-As2S3	2.60	2.6×10^{-6}	6400	Palik
Arsenic Trisulphide	As2S3	2.8		?	Mathis
Asphaltum (bitumen)		1.64 – 1.66		5893	
Barium Fluoride	BaF2	1.29		5u	Mathis
Barium Oxide	BaO	1.98		?	Mathis
Barium Sulphide	BaS	2.16		?	Mathis
Beryllium Oxide	BeO	1.72		?	Mathis
Bismuth Fluoride	BiF3	1.74		1u	Mathis
Bismuth Fluoride	BiF3	1.64		10u	Mathis
Bismuth Oxide	Bi2O3	2.55		?	Mathis
Bismuth Trisulphide	Bi2S3	1.5		?	Mathis
Boron Oxide	B2O3	1.46		?	Mathis
Cadmium (bulk)	Cd	1.31	5.31		
Cadmium Fluoride	CdF2	1.56		?	Mathis
Cadmium Oxide	CdO	2.5			
Cadmium Selenide	CdSe	2.4		0.6u	Mathis
Cadmium Silicide	CdSiO2	1.69		?	Mathis
Cadmium Sulphide	CdS	2.4		?	Mathis
Cadmium Telluride	CdTe	2.99	0.351	6199	Palik
Cadmium Telluride	CdTe	2.873	N/A	6250	Palik
Calcium Fluoride	CaF2	1.2 – 1.4		?	Mathis
Calcium Oxide	CaO	1.84		?	Mathis
Calcium Silicate	CaO – SiO2	1.61		?	Mathis
Calcium Sulphide	CaS	2.14		?	Mathis
Calcium Tungstate	CaWO4	1.92		?	Mathis
Carbon		2.705	0.512 to 0.04		
Cellulose Acetate		1.47 – 1.51		5893	
Cellulose Acetate Butyrate		1.47 – 1.49		5893	
Cellulose Nitride		1.47 – 1.58		5893	
Cellulose Propionate		1.47 – 1.48		5893	
Cerium Fluoride	CeF3	1.63		0.55u	Mathis
Cerium Oxide	Ce2O3	1.95		?	Mathis
Cesium Bromide	CsBr	1.70		?	Mathis

Material	Symbol	N	K	(6328A unless specified)	Source
Cesium Chloride	CsCl	1.64		?	Mathis
Cesium Iodide	CsI	1.79		?	Mathis
Chiolote	Na5A13F14	1.33		?	Mathis
Chromium (bulk)	Cr	3.4	4.4		
Chromium Oxide	Cr3O3	2.25			
Cobalt (bulk)	Co	2.35	4.40		
Cobalt Chromium	CoCr	1.83	3.772		
Cobalt deposited		3.10			
Copolyvinyl Chloride Acetate		1.53		5893	
Copper (bulk)	Cu	0.44	3.26		
Copper (evap.)		0.09	3.39		
Copper (evap.)		0.14	3.33		
Copper (evap.)		0.28	2.76		
Copper (evap.)		0.272	3.24	6199	Palik
Copper Chloride	CuCl	1.93		?	Mathis
Copper Oxide	Cu2O	2.705		10u	Mathis
Copper Oxide	CuO	2.63		?	Mathis
Copper Sulfide	CuS	1.45		?	Mathis
Corn Oil		1.4733		5893	
Cryolite	Na3AlF6	2.34		6330A	Mathis
Cubic Carbon (Diamond)	C	2.411	(neg1.)	6439	Palik
Cubic Carbon (Diamond)	C	2.408 (c)			
Diamond	C	2.42			
Ethyl Cellulose		1.47		5893	
Gadolinium Gallium Garnet	GGG	1.965	Small Value	6330	
Gadolinium Oxide	Gd2O3	1.8		0.55u	Mathis
Gadolinium Aluminum Arsenide	GaAlAs 3.0				
Gallium Arsenide	GaAs	3.8 - 4	0.3 - 0.6		
Gallium Arsenide	GaAs	3.746	0.653		
Gallium Arsenide	GaAs	3.888	0.590		
Gallium Arsenide	GaAs	3.878	0.211	6199	Palik
Gallium Arsenide	GaAs	3.867	0.203	6262	Palik
Gallium Arsenide	GaAs	3.856	0.196	6326	Palik
Gallium Arsenide	GaAs	4.981	0.995	4416	
Gallium Phosphide	GaP	3.313	N/A	6300	Palik
Garnet:: Common, black	3CaOFe2O33SiO2	1.857		5893	
Garnet:: Common, black	A12O33FeO3SiO2	1.801		5893	
Garnet:: Common, black	3CaOA12O33SiO2	1.735		5893	
Garnet:: Common, black	3MnOA12O3ASiO2	1.811		5893	
Garnet:: Common, black	3CaOCr2O33SiO2	1.838		5893	
Gelatin		1.516 - 1.534	0		
Germanium (bulk)	Ge	5.45	0.85		
Germanium (evap.)		4.7	1.52		
Germanium (evap.)		5.588	0.933	6199	Palik
Germanium (evap.)		5.5	N/A	6358	Palik
Glass, Borisilicate		1.51 - 1.52			
Glass, Schott 8329		1.47		?	Mathis
Gold (bulk)		0.306	3.12		
Gold (electrol.)		0.31	3.31		
Gold (evap.)		0.155	3.2		
Gold (plated)		0.194	N/A (~ 3)	6199	Palik
Gold (sputtered)	Au	0.25	3.46		

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Hafnium Oxide	HfO2	2.0		0.5u	Mathis
Indium Antimonide	InSb	4.249	1.799	6326	Palik
Indium Arsenide	InAs	3.962	0.606	6326	Palik
Indium Phosphide	InP	3.42			
Indium Phosphide	InP	3.55	0.0813		
Indium Phosphide	InP	3.549	0.317	6199	Palik
Indium Phosphide	InP	3.530	0.299	6391	Palik
Indium Tin Oxide (85% transparent)		1.83			
Iridium	Ir	2.50	4.57	6199	Palik
Iron Oxide (red)	Fe2O3	2.78		5893	
Lanthanum Bromide	LaBr3	1.94		?	Mathis
Lanthanum Fluoride	LaF3	1.59		0.55u	Mathis
Lanthanum Oxide	La2O3	1.09		0.5u	Mathis
Lead Chloride	PbCl2	2.2		?	Mathis
Lead Fluoride	PbF2	1.75		0.3u	Mathis
Lead Iodide	PbI2	2.7		?	Mathis
Lead Oxide	PbO	2.55		?	Mathis
Lead Selenide	PbSe	3.65	2.9	6199	Palik
Lead Sulfide	PbS	4.29	1.48	6199	Palik
Lead Telluride	PbTe	(6.4)	(4.3)	6199	Korn & Braunst
Lithium Bromide	LiBr	1.78		?	Mathis
Lithium Chloride	LiCl	1.66		?	Mathis
Lithium Fluoride	LiF	1.391	(neg1.)	6400	Palik
Lithium Niobate	LiNbO3	2.284 ord (\perp)		6439	Palik
Lithium Niobate	LiNbO3	2.200 ext (\parallel)			Palik
Lithium Oxide	Li2O	1.64		?	Mathis
Magnesium Chloride	MgCl2	1.6		?	Mathis
Magnesium Fluoride	MgF2	1.385	0.0704		
Magnesium Oxide	MgO	1.7		?	Mathis
Manganese Sulphide	MnS	2.7		?	Mathis
Melamine Formaldehyde		1.6			
Mercury	Hg	1.719	4.697		
Mercury Oxide	HgO	2.400			
Molybdenum Trioxide	MoO3	1.9		?	Mathis
Neodymium Fluoride	NdF3	1.61		0.55u	Mathis
Nickel (bulk)	Ni	1.89	3.55		
Nickel (bulk)	Ni	1.99	3.95		
Nickel (electrol.)		1.56	3.40		
Nickel (electrol.)		1.93	3.65	6199	Palik
Nickel Oxide	NiO	2.18		?	Mathis
Niobium (bulk)	Nb	1.8	2.11	5790	
Niobium Pentoxide	Nb2O5	2.3		?	Mathis
Oil Lube		1.36			
Paraffin		1.433			
Phenol Formaldehyde		1.5 - 1.7		5893	
Photoresist		1.64			
Platinum (bulk)	Pt	2.22	4.67		
Platinum (electrol.)		2.48	3.37		
Platinum (electrol.)		2.30	4.07	6199	Palik
Polyamide		1.6			

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Polyethylene		1.51		5893	
Polysilicon		4.06	0.012		Irene
Polysilicon (amorphous)		4.535 - 4.06	0.236 - 0.012		
Polysilicon (large grain P doped)		3.823	0.028		
Polystyrene		1.592 - 1.597		5893	
Polystyrene Butadiene		1.585		5893	
Polyvinyl Acetal		1.46 - 1.50		5893	
Polyvinyl Acetate		1.467		5893	
Polyvinyl Chloride		1.544		5893	
Potassium Bromide	KBr	1.56		?	Mathis
Potassium Chloride	KCl	1.488	(neg1.)	6400	Palik
Potassium Fluoride	KF	1.35		?	Mathis
Potassium Iodide	KI	1.68		?	Mathis
Praseodymium Oxide	Pr2O3	2.0		?	Mathis
Quartz (Fused Silica Silicon Dioxide Glass)		1.457	0		
Rhodium	Rh	2.12	5.51	6199	Palik
Rubber - chlorinated		1.56		5893	
Rubidium Chloride	RbCl	1.49		?	Mathis
Sapphire (crystalline)	Al2O3	1.785		4416	
Sapphire (crystalline)	Al2O3	1.765			
Scandium Oxide	Sc2O3	1.88		0.5u	Mathis
Selenite	CaSO42H2O	1.5205		5893	
Selenite	CaSO42H2O	1.5226			
Selenite	CaSO42H2O	1.5296			
Silicide (similar to poly)		4.245	1.368		
Silicon	Si	4.770	0.17	4416	
Silicon	Si	3.906	0.022	6199	Palik
Silicon	Si	3.893	0.022	6262	Palik
Silicon	Si	3.882	0.019	6326	Palik
Silicon	Si	3.870	0.018	6391	Palik
Silicon (Amorphous)	a-Si	4.1	0.213		
Silicon (Amorphous)	a-Si	4.23	0.461	6199	Palik
Silicon (Amorphous)	a-Si	(4.71)	(0.217)	6199	Palik
Silicon Carbide	SiC	2 - 2.7			
Silicon Carbide	SiC	2.634	N/A	6199	Palik
Silicon Dioxide (crystalline)	SiO2	1.543 ord		(6278)	Palik
Silicon Dioxide (crystalline)	SiO2	1.522 ext			Palik
Silicon Dioxide (deposited)	SiO2	1.43 - 1.45	0		
Silicon Dioxide (Glass)	SiO2- glass	1.457		6438	Palik
or quartz					
Silicon Dioxide (grown)	SiO2	1.455 - 1.46	0		
Silicon Dioxide (grown)	SiO2	1.466		4416	
Silicon Monoxide	SiO	1.969	0.012	6199	Palik
(noncrystalline)					
Silicon Nitride	Si3N4	2.060		4416	
(noncrystalline)					
Silicon Nitride	Si3N4	2.022	(negl.)	6199	Palik
Silicon Oxide	Si2O3	1.55			

Material	Symbol	N	K	(6328Å unless specified)	Source
Silox (mixture of saline & oxygen)		1.44 - 1.45			
Index varies with phosphorous doping					
Silver (bulk)	Ag	0.240 - 3	2.8 - 4.14		
Silver (evap.)	Ag	0.066	4.02		
Silver (evap.)	Ag	0.131	3.88	6199	Palik
Silver Bromide	AgBr	2.25		?	Mathis
Silver Chloride	AgCl	2.07		?	Mathis
Silver Iodide	AgI	2.21		?	Mathis
Sodium Bromide	NaBr	1.64		?	Mathis
Sodium Chloride	NaCl	1.541		6400	Palik
Sodium Cyanide	NaCN	1.45		?	Mathis
Sodium Fluoride	NaF	1.30		0.55u	Mathis
Sodium Hydroxide	NaOH	1.36		?	Mathis
Spinel	MgO35A12O3	1.72		?	Mathis
Strontium Fluoride	SrF2	1.44		?	Mathis
Strontium Oxide	SrO	1.87		?	Mathis
Strontium Sulphide	SrS	2.11		?	Mathis
Tantalum (bulk)	Ta	2.1	2.33		
Tantalum Pentoxide	Ta2O5	2.1			
Thallium Bromide	TlBr	2.3		?	Mathis
Thallium Chloride	TlCl	2.78		?	Mathis
Thallium Iodide (B)	TlI	2.78			
Thorium Bromide	ThBr4	2.47		5u	Mathis
Thorium Dioxide	ThO2	1.86		2.2u	Mathis
Thorium Fluoride	ThF4	1.52		?	Mathis
Thorium Oxyfluoride	ThOF2	1.52		?	Mathis
Tin Oxide	SnO2	2.0	0.03		
Titanium (evap.)	Ti	3.00	3.62		
Titanium Dioxide (Rutile)	TiO2	2.87=n , 2.58=n⊥		6400	Palik
Titanium Nitride	TiN	1.5	2.0		
Titanium Oxide	TiO	2.2			
Tungsten (bulk)	W	3.27	3.5		
Tungsten (bulk)	W	3.60	2.89	6199	Palik
Tungsten Trioxide	WO3	1.68		?	Mathis
Vanadium (bulk)	Va	3.06	3.21		
X-Ray (substrate)		1.74			
X-Ray Film		1.55	0		
Ytterbium Fluoride	YbF3	1.57		3.8u	Mathis
Yttrium Oxide	Y2O3	1.86	Small Value	6330	
Zinc (bulk)	Zn	2.40	5.53		
Zinc (evap.)	Zn	2.30	4.90		
Zinc Selenide	ZnSe	2.6		?	Mathis
Zinc Sulfide (cubic)	ZnS	2.358	N/A (~ 3.6 x 10 - 6)	6199	Palik
Zinc Sulfide (hexagonal)	ZnS-hex	2.38 ord	6 x 10 - 2 ord	6199	Palik
Zinc Sulfide (hexagonal)	ZnS-hex	2.36 ext	N/A		Palik
Zinc Sulfide (hexagonal)	ZnS-hex	2.354 ord	N/A	6250	Palik
Zinc Sulfide (hexagonal)	ZnS-hex	2.358 ext	N/A		Palik
Zinc Telluride	ZnTe	2.85		0.5u	Mathis
Zirconium Oxide	ZrO2	1.97			Mathis