13-024

Kurt J. Lesker® Company

MATERIAL DEPOSITION TABLE

Key of Symbols

°	Magnetic material (Requires special sputter source)
*	Influenced by composition
**	Cr-plated rod or strip
***	All metals alumina coated
C	Carbon
Gr	Graphite
Q	Quartz
Incl	Inconel®
VC	Vitreous carbon
SS	Stainless steel
Ex	Excellent
G	Good
F	Fair
P	Poor
S	Sublimes
D	Decomposes
RF	RF sputtering
RF-R	Reactive RF sputtering
DC	DC sputtering
DC-R	Reactive DC sputtering
PDC	Pulsed DC sputtering

† **E-Beam Liners:** Contact the KJLC® Sales Department for e-beam crucible liner recommendations.

Caution: Many of these materials are highly reactive, toxic, pyrophoric, or otherwise hazardous. A few are radioactive. Before attempting any deposition, consult the appropriate safety/handling information and experts for the specific material(s).

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ISO 9001:2008 Certified

Material	Symbol	MP (° C)	S/D	g/cm^3	Temp. (° C) for Given Vap. Press. (Torr)			E-Beam†	Evaporation Techniques Thermal Sources				Sputter	Comments
					10^{-8}	10^{-6}	10^{-4}		Boat	Coil	Basket	Crucible		
Aluminum	Al	660	—	2.70	677	821	1,010	Ex	—	—	W	TiB_2-BN, ZrB_2, BN	DC	Alloys W/Ta/Mo. Flash evap or use BN crucible
Aluminum Antimonide	AlSb	1,080	—	4.3	—	—	—	—	—	—	—	—	RF	
Aluminum Arsenide	AlAs	1,600	—	3.7	—	—	~ 1,300	—	—	—	—	—	RF	
Aluminum Bromide	$AlBr_3$	97	—	2.64	—	—	~ 50	—	Mo	—	—	Gr	—	
Aluminum Carbide	Al_4C_3	~1,400	D	2.36	—	—	~ 800	F	—	—	—	—	RF	n 2.7
Aluminum, 2% Copper	Al2%Cu	640	—	2.82	—	—	—	—	—	—	—	—	DC	Wire feed & flash. Co-evap difficult
Aluminum Fluoride	AlF_3	1,291	S	2.88	410	490	700	P	Mo, W, Ta	—	—	Gr	RF	
Aluminum Nitride	AlN	>2,200	S	3.26	—	—	~1,750	F	—	—	—	—	RF-R	Decomposes. R-evap Al in 10^{-3} T N2 with glow discharge.
Aluminum Oxide	Al_2O_3	2,072	—	3.97	—	—	1,550	Ex	W	—	W	—	RF-R	Forms smooth, hard films. n 1.66
Aluminum Phosphide	AlP	2,000	—	2.42	—	—	—	—	—	—	—	—	RF	
Aluminum, 2% Silicon	Al2%Si	640	—	2.69	—	—	1,010	—	—	—	—	TiB_2-BN	RF, DC	Wire feed & flash. Co-evap difficult
Antimony	Sb	630	S	6.68	279	345	425	P	Mo*** Ta***	Mo, Ta	Mo, Ta	BN, C, Al_2O_3	RF, DC	Sublimes rapidly at low temp
Antimony Oxide	Sb_2O_3	656	S	5.2	—	—	~300	G	Pt	—	Pt	BN, Al_2O_3	RF-R	Decomposes on W. n 2.09, 2.18, 2.35
Antimony Selenide	Sb_2Se_3	611	—	—	—	—	—	—	Ta	—	—	C	RF	Composition variable
Antimony Sulfide	Sb_2S_3	550	—	4.64	—	—	~200	G	Mo, Ta	—	Mo, Ta	Al_2O_3	—	No decomposition. n 3.19, 4.06, 4.3
Antimony Telluride	Sb_2Te_3	629	—	6.50	—	—	600	—	—	—	—	C	RF	Decomposes over 750° C
Arsenic	As	817	S	5.73	107	150	210	P	C	—	—	Al_2O_3, BeO, VC	—	Dedicated vacuum system. Sublimes rapidly at low temp.
Arsenic Oxide	As_2O_3	312	—	3.74	—	—	—	—	—	—	—	—	—	
Arsenic Selenide	As_2Se_3	~360	—	4.75	—	—	—	—	—	—	—	Al_2O_3, Q	RF	
Arsenic Sulfide	As_2S_3	300	—	3.43	—	—	~400	F	Mo	—	—	Al_2O_3, Q	RF	n 2.4, 2.81, 3.02
Arsenic Telluride	As_2Te_3	362	—	—	—	—	—	—	—	—	—	—	—	Flash. See JVST. 1973;10:748
Barium	Ba	725	—	3.51	545	627	735	F	W, Ta, Mo	W	W	Metals	RF	Wets without alloying; reacts with ceramics
Barium Chloride	$BaCl_2$	963	—	3.92	—	—	~650	—	Ta, Mo	—	—	—	RF	Preheat gently to outgas. n 1.73
Barium Fluoride	BaF_2	1,355	S	4.89	—	—	~700	G	Mo	—	—	—	RF	n 1.47
Barium Oxide	BaO	1,918	—	5.72	—	—	~1,300	P	Pt	—	Pt	Al_2O_3	RF, RF-R	Decomposes slightly. n 1.98
Barium Sulfide	BaS	1,200	—	4.25	—	—	1,100	—	Mo	—	—	—	RF	n 2.16
Barium Titanate	$BaTiO_3$	—	D	6.02	—	—	—	—	—	—	—	—	RF	Gives Ba. Co-evap OK. Sputter OK. n 2.40
Beryllium	Be	1,278	—	1.85	710	878	1,000	Ex	W, Ta	W	W	BeO, C, VC	DC	Wets W/Ta/Mo. Evaporates easily
Beryllium Carbide	Be_2C	>2,100	D	1.90	—	—	—	—	—	—	—	—	—	
Beryllium Chloride	$BeCl_2$	405	—	1.90	—	—	~150	—	—	—	—	—	RF	
Beryllium Fluoride	BeF_2	800	S	1.99	—	—	~200	G	—	—	—	—	—	n <1.33
Beryllium Oxide	BeO	2,530	—	3.01	—	—	1,900	G	—	—	W	—	RF, RF-R	No decomposition from E-beam. n 1.72
Bismuth	Bi	271	—	9.80	330	410	520	Ex	W, Mo, Ta	W	W	Al_2O_3, VC	DC	Resistivity high.
Bismuth Fluoride	BiF_3	727	S	5.32	—	—	~300	—	—	—	—	Gr	RF	n 1.74
Bismuth Oxide	Bi_2O_3	860	—	8.55	—	—	~1,400	P	Pt	—	Pt	—	RF, RF-R	n 1.91
Bismuth Selenide	Bi_2Se_3	710	D	6.82	—	—	~650	G	—	—	—	Gr, Q	RF	Co-evap OK. Sputter OK
Bismuth Sulfide	Bi_2S_3	685	D	7.39	—	—	—	—	—	—	—	—	RF	n 1.34, 1.46
Bismuth Telluride	Bi_2Te_3	573	—	7.7	—	—	~600	—	W, Mo	—	—	Gr, Q	RF	Co-evap OK. Sputter OK
Bismuth Titanate	$Bi_2Ti_2O_7$	—	D	—	—	—	—	—	—	—	—	—	RF	Sputter OK. R-co-evap in 10^{-2} T O_2
Boron	B	2,079	—	2.34	1,278	1,548	1,797	Ex	C	—	—	C, VC	RF	Forms carbide with container
Boron Carbide	B_4C	2,350	—	2.52	2,500	2,580	2,650	Ex	—	—	—	—	RF	
Boron Nitride	BN	~3,000	S	2.25	—	—	~1,600	P	—	—	—	—	RF, RF-R	Decomposes. R-sputter preferred
Boron Oxide	B_2O_3	~450	—	1.81	—	—	~1,400	G	Pt, Mo	—	—	—	—	n 1.48
Boron Sulfide	B_2S_3	310	—	1.55	—	—	800	—	—	—	—	Gr	RF	
Cadmium	Cd	321	—	8.64	64	120	180	P	W, Mo, Ta	—	W, Mo, Ta	Al_2O_3, Q	RF, DC	Dedicated vacuum system. High VP. Low sticking coeff
Cadmium Antimonide	Cd_3Sb_2	456	—	6.92	—	—	—	—	—	—	—	—	—	
Cadmium Arsenide	Cd_3As_2	721	—	6.21	—	—	—	—	—	—	—	Q	RF	
Cadmium Bromide	$CdBr_2$	567	—	5.19	—	—	~300	—	—	—	—	—	—	
Cadmium Chloride	$CdCl_2$	568	—	4.05	—	—	~400	—	—	—	—	—	—	
Cadmium Fluoride	CdF_2	1,100	—	6.64	—	—	~500	—	—	—	—	—	RF	n 1.56
Cadmium Iodide	CdI_2	387	—	5.67	—	—	~250	—	—	—	—	—	—	
Cadmium Oxide	CdO	>1,500	D	6.95	—	—	~530	—	—	—	—	—	RF-R	Decomposes. n 2.49
Cadmium Selenide	CdSe	>1,350	S	5.81	—	—	540	G	Mo, Ta	—	—	Al_2O_3, Q	RF	Evaporates easily. n 2.4
Cadmium Sulfide	CdS	1,750	S	4.82	—	—	550	F	W, Mo, Ta	—	W	Al_2O_3, Q	RF	Substrate temp. affects sticking coeff Composition varies. n 2.51, 2.53
Cadmium Telluride	CdTe	1,121	—	5.85	—	—	450	—	W, Mo, Ta	W	W, Ta, Mo	—	RF	Substrate temp. affects composition. n~2.6
Calcium	Ca	839	S	1.54	272	357	459	P	W	W	W	Al_2O_3, Q	—	Film reacts in air.
Calcium Fluoride	CaF_2	1,423	—	3.18	—	—	~1,100	—	W, Mo, Ta	—	W, Mo, Ta	Q	RF	Rate control important. Preheat gently to outgas. n 1.43
Calcium Oxide	CaO	2,614	—	~3.3	—	—	~1,700	—	W, Mo	—	—	ZrO_2	RF-R	Forms volatile oxides with W/Mo. n 1.84
Calcium Silicate	$CaSiO_3$	1,540	—	2.91	—	—	—	G	—	—	—	Q	RF	n 1.61, 1.66
Calcium Sulfide	CaS	—	D	2.5	—	—	1,100	—	Mo	—	—	—	RF	Decomposes. n 2.14
Calcium Titanate	$CaTiO_3$	1,975	—	4.10	1,490	1,600	1,690	P	—	—	—	—	RF	Decomposes in evap. Sputter OK. n 2.34
Calcium Tungstate	$CaWO_4$	—	—	6.06	—	—	—	G	W	—	—	—	RF	n 1.92
Carbon	C	~3,652	S	1.8–2.1	1,657	1,867	2,137	Ex	—	—	—	—	PDC	E-beam or Arc evap. Poor film adhesion.
Cerium	Ce	798	—	~6.70	970	1,150	1,380	G	W, Ta	W	W, Ta	Al_2O_3, BeO, VC	DC, RF	
Cerium Fluoride	CeF_3	1,460	—	6.16	—	—	~900	G	W, Mo, Ta	—	Mo, Ta	—	RF	Preheat gently to outgas. n ~ 1.7
Cerium (III) Oxide	Ce_2O_3	1,692	—	6.86	—	—	—	F	W	—	—	—	—	Alloys. Use thick W boat. n 1.95
Cerium (IV) Oxide	CeO_2	~2,600	—	7.13	1,890	2,000	2,310	G	W	—	—	—	RF, RF-R	Little decomposition.
Cesium	Cs	28	—	1.88	-16	22	80	—	SS	—	—	Q	—	
Cesium Bromide	CsBr	636	—	3.04	—	—	~400	—	W	—	—	—	RF	n 1.70
Cesium Chloride	CsCl	645	—	3.99	—	—	~500	—	W	—	—	—	RF	n 1.64
Cesium Fluoride	CsF	682	—	4.12	—	—	~500	—	W	—	—	—	RF	n 1.48
Cesium Hydroxide	CsOH	272	—	3.68	—	—	550	—	Pt	—	—	—	—	
Cesium Iodide	CsI	626	—	4.51	—	—	~500	—	W	—	—	Pt, Q	RF	n 1.79
Chiolote	$Na_5Al_3F_{14}$	—	—	2.9	—	—	~800	—	Mo, W	—	—	—	RF	n 1.33
Chromium	Cr	1,857	S	7.20	837	977	1,157	G	**	W	W	VC	DC	Films very adherent. High rates possible.
Chromium Boride	CrB	2,760(?)	—	6.17	—	—	—	—	—	—	—	—	RF	
Chromium Bromide	$CrBr_2$	842	—	4.36	—	—	550	—	Incl	—	—	—	RF	
Chromium Carbide	Cr_3C_2	1,980	—	6.68	—	—	~2,000	F	W	—	—	—	RF	
Chromium Chloride	$CrCl_2$	824	—	2.88	—	—	550	—	Fe, Incl	—	—	—	RF	
Chromium Oxide	Cr_2O_3	2,266	—	5.21	—	—	~2,000	G	W, Mo	—	W	—	RF, RF-R	Loses O_2, reoxidizes at 600° C in air. n 2.55
Chromium Silicide	$CrSi_2$	1,490	—	5.5	—	—	—	—	—	—	—	—	RF	
Chromium-Silicon Monoxide	Cr-SiO	—	S	*	*	*	*	G	W	—	W	—	RF	Flash evap
Cobalt°	Co	1,495	—	8.9	850	990	1,200	Ex	W, Nb	—	W	Al_2O_3, BeO	DC	Alloys with W/Ta/Mo
Cobalt Bromide	$CoBr_2$	678	D	4.91	—	—	400	—	Incl	—	—	—	RF	
Cobalt Chloride	$CoCl_2$	724	D	3.36	—	—	472	—	Incl	—	—	—	RF	
Cobalt Oxide	CoO	1,795	—	6.45	—	—	—	—	—	—	—	—	DC-R, RF-R	Sputter preferred.
Copper	Cu	1,083	—	8.92	727	857	1,017	Ex	Mo	W	W	Al_2O_3, Mo, Ta	DC	Adhesion poor. Use interlayer (Cr). Evap OK.
Copper Chloride	CuCl	430	—	4.14	—	—	~600	—	—	—	—	—	RF	n 1.93
Copper Oxide	Cu_2O	1,235	S	6.0	—	—	~600	G	Ta	—	—	Al_2O_3	DC-R, RF-R	n 2.71
Copper Sulfide	Cu_2S	1,100	—	5.6	—	—	—	—	—	—	—	—	—	
Cryolite	Na_3AlF_6	1,000	—	2.9	1,020	1,260	1,480	Ex	W, Mo, Ta	—	W, Mo, Ta	VC	RF	Large chunks reduce spitting Little decomposition
Dysprosium	Dy	1,412	—	8.55	625	750	900	G	Ta	—	—	—	DC	
Dysprosium Fluoride	DyF_3	1,360	S	—	—	—	~800	G	Ta	—	—	—	RF	
Dysprosium Oxide	Dy_2O_3	2,340	—	7.81	—	—	~1,400	—	Ir	—	—	—	RF, RF-R	Loses O_2.
Erbium	Er	1,529	S	9.07	650	775	930	G	W, Ta	—	—	—	DC	
Erbium Fluoride	ErF_3	1,350	—	—	—	—	~750	—	Mo	—	—	—	RF	See JVST. 1985; A3(6):2320.
Erbium Oxide	Er_2O_3	—	—	8.64	—	—	~1,600	—	Ir	—	—	—	RF, RF-R	Loses O_2.
Europium	Eu	822	S	5.24	280	360	480	F	W, Ta	—	—	Al_2O_3	DC	Low Ta solubility
Europium Fluoride	EuF_2	1,380	—	6.50	—	—	~950	—	Mo	—	—	—	RF	
Europium Oxide	Eu_2O_3	—	—	7.42	—	—	~1,600	G	Ir, Ta, W	—	—	ThO_2	RF, RF-R	Loses O_2. Films clear and hard.
Europium Sulfide	EuS	—	—	5.75	—	—	-	G	—	—	—	—	RF	
Gadolinium°	Gd	1,313	—	7.90	760	900	1,175	Ex	Ta	—	—	Al_2O_3	DC	High Ta solubility
Gadolinium Carbide	GdC_2	—	—	—	—	—	1,500	—	—	—	—	C	RF	Decomposes under sputtering
Gadolinium Oxide	Gd_2O_3	2,330	—	7.41	—	—	—	F	Ir	—	—	—	RF, RF-R	Loses O_2.
Gallium	Ga	30	—	5.90	619	742	907	G	—	—	—	Al_2O_3, BeO, Q	—	Alloys with W/Ta/Mo. E-beam OK.
Gallium Antimonide	GaSb	710	—	5.6	—	—	—	F	W, Ta	—	—	—	RF	Flash evap
Gallium Arsenide	GaAs	1,238	—	5.3	—	—	—	G	W, Ta	—	—	C	RF	Flash evap
Gallium Nitride	GaN	800	S	6.1	—	—	~200	—	—	—	—	Al_2O_3	RF, RF-R	R-evap Ga in 10^{-3} T N_2
Gallium Oxide	Ga_2O_3	1,900	—	6.44	—	—	—	—	Pr, W	—	—	—	RF	Loses O_2. n 1.92
Gallium Phosphide	GaP	1,540	—	4.1	—	770	920	—	W, Ta	—	W	Q	RF	No decomposition. Rate control important.
Germanium	Ge	937	—	5.35	812	957	1,167	Ex	W, C, Ta	—	—	Q, Al_2O_3	DC	E-beam film excellent
Germanium Nitride	Ge_3N_2	450	S	5.2	—	—	~650	—	—	—	—	—	RF-R	Sputter preferred
Germanium (II) Oxide	GeO	710	S	—	—	—	500	—	—	—	—	Q	RF	n 1.61
Germanium (III) Oxide	GeO_2	1,086	—	6.24	—	—	~625	G	Ta, Mo	—	W, Mo	Q, Al_2O_3	RF-R	Loses O_2; Film mostly GeO
Germanium Telluride	GeTe	725	—	6.20	—	—	381	—	W, Mo	—	W	Q, Al_2O_3	RF	
Glass, Schott® 8329	—	—	—	2.20	—	—	—	Ex	—	—	—	—	RF	Melt in air before evaporating.
Gold	Au	1,064	—	19.32	807	947	1,132	Ex	W***Mo***W	—	—	Al_2O_3, BN, VC, W	DC	Films soft; Adhesion poor. Use Cr interlayer
Hafnium	Hf	2,227	—	13.31	2,160	2,250	3,090	G	—	—	—	—	DC	
Hafnium Boride	HfB_2	3,250	—	10.5	—	—	—	—	—	—	—	—	DC, RF	
Hafnium Carbide	HfC	~3,890	S	12.20	—	—	~2,600	—	—	—	—	—	RF	
Hafnium Nitride	HfN	3,305	—	—	—	—	—	—	—	—	—	—	RF, RF-R	
Hafnium Oxide	HfO_2	2,758	—	9.68	—	—	~2,500	F	W	—	—	—	RF, RF-R	Loses O_2. Film HfO
Hafnium Silicide	$HfSi_2$	1,750	—	7.2	—	—	—	—	—	—	—	—	RF	
Holmium	Ho	1,474	—	8.80	650	770	950	G	W, Ta	W	W	—	—	
Holmium Fluoride	HoF_3	1,143	—	—	—	—	~800	—	—	—	—	Q	DC, RF	
Holmium Oxide	Ho_2O_3	2,370	—	8.41	—	—	—	—	Ir	—	—	—	RF, RF-R	Loses O_2
Inconel®	Ni/Cr/Fe	1,425	—	8.5	—	—	—	G	W	W	W	—	DC	Fine wire wrapped on W Low rate for smooth films
Indium	In	157	—	7.30	487	597	742	Ex	W, Mo	—	W	Gr, Al_2O_3	DC	Wets W and Cu. Mo liner OK.
Indium Antimonide	InSb	535	—	5.8	—	—	—	—	W	—	—	—	RF	Decomposes. Sputter preferred; Co-evap OK.
Indium Arsenide	InAs	943	—	5.7	780	870	970	—	W	—	—	—	RF	
Indium Nitride	InN	1,200	—	7.0	—	—	—	—	—	—	—	—	—	
Indium (I) Oxide	In_2O	~600	S	6.99	—	—	650	—	—	—	—	—	RF	Decomposes under sputtering
Indium (III) Oxide	In_2O_3	850	—	7.18	—	—	~1,200	G	W, Pt	—	—	Al_2O_3	—	
Indium Phosphide	InP	1,070	—	4.8	—	630	730	—	W, Ta	—	W, Ta	Gr	RF	Films are P rich
Indium Selenide	In_2Se_3	890	—	5.67	—	—	—	—	—	—	—	—	RF	Sputter preferred; Co-evap OK. Flash evap
Indium (I) Sulfide	In_2S	653	—	5.87	—	—	650	—	—	—	—	Gr	RF	
Indium (II) Sulfide	InS	692	S	5.18	—	—	650	—	—	—	—	Gr	RF	
Indium (III) Sulfide	In_2S_3	1,050	S	4.90	—	—	850	—	—	—	—	Gr	RF	Decomposes. Film In_2S
Indium (II) Telluride	InTe	696	—	6.29	—	—	—	—	—	—	—	—	—	
Indium (III) Telluride	In_2Te_3	667	—	5.78	—	—	—	—	—	—	—	—	RF, DC-R	Sputter preferred; Co-evap OK. Flash evap
Indium Tin Oxide	In_2O_3–SnO_2	1,800	S	—	—	—	—	—	—	—	—	—	—	
Iridium	Ir	2,410	—	22.42	1,850	2,080	2,380	F	—	—	—	ThO_2	DC	
Iron°	Fe	1,535	—	7.86	858	998	1,180	Ex	W	W	W	Al_2O_3, BeO	DC	Attacks W. Films hard, smooth. Preheat gently to outgas.
Iron Bromide	$FeBr_2$	684	D	4.64	—	—	561	—	—	—	—	Fe	RF	
Iron Chloride	$FeCl_2$	670	S	3.16	—	—	300	—	—	—	—	Fe	RF	n 1.57
Iron Iodide	FeI_2	—	—	5.32	—	—	400	—	—	—	—	Fe	RF	
Iron (II) Oxide	FeO	1,369	—	5.7	—	—	—	P	—	—	—	—	RF, RF-R	Decomposes; sputter preferred. n 2.32
Iron (III) Oxide	Fe_2O_3	1,565	—	5.24	—	—	—	G	W	—	W	—	—	Decomposes to Fe_3O_4 at 1,530° C. n 3.01
Iron Sulfide	FeS	1,193	D	4.74	—	—	—	—	—	—	—	Al_2O_3	RF	Decomposes
Kanthal	FeCrAl	—	—	7.1	—	—	—	—	W	W	W	—	DC	
Lanthanum	La	921	—	6.15	990	1,212	1,388	Ex	W, Ta	—	—	Al_2O_3	RF	Films reacts in air
Lanthanum Boride	LaB_6	2,210	D	2.61	—	—	—	G	—	—	—	—	RF	
Lanthanum Bromide	$LaBr_3$	783	—	5.06	—	—	—	—	—	—	Ta	—	RF	Films hygroscopic. n 1.94
Lanthanum Fluoride	LaF_3	1,490	S	~6.0	—	—	900	G	Ta, Mo	—	Ta	—	RF	No decomposition. n ~1.6
Lanthanum Oxide	La_2O_3	2,307	—	6.51	—	—	1,400	G	W, Ta	—	—	—	RF	Loses O_2. n~1.73
Lead	Pb	328	—	11.34	342	427	497	Ex	W, Mo	W	W, Ta	Al_2O_3, Q	DC	
Lead Bromide	$PbBr_2$	373	—	6.66	—	—	~300	—	—	—	—	—	—	
Lead Chloride	$PbCl_2$	501	—	5.85	—	—	~325	—	Pt	—	—	Al_2O_3	RF	Little decomposition
Lead Fluoride	PbF_2	855	S	8.24	—	—	~400	—	W, Pt, Mo	—	—	BeO	RF	n 1.75
Lead Iodide	PbI_2	402	—	6.16	—	—	~500	—	Pt	—	—	Q	—	
Lead Oxide	PbO	886	—	9.53	—	—	~550	—	Pt	—	—	Q, Al_2O_3	RF-R	No decomposition. n ~2.6
Lead Selenide	PbSe	1,065	S	8.10	—	—	~500	—	W, Mo	—	W	Gr, Al_2O_3	RF	
Lead Stannate	$PbSnO_3$	1,115	—	8.1	670	780	905	P	Pt	—	Pt	Al_2O_3	RF	Decomposes
Lead Sulfide	PbS	1,114	S	7.5	—	—	500	—	W	—	W, Mo	Q, Al_2O_3	RF	Little decomposition. n 3.92
Lead Telluride	PbTe	917	—	8.16	780	910	1,050	—	Mo, Pt, Ta	—	—	Al_2O_3, Gr	RF	Film is Te rich. Sputter preferred; Co-evap OK.
Lead Titanate	$PbTiO_3$	—	—	7.52	—	—	—	—	Ta	—	—	—	RF	
Lithium	Li	181	—	0.53	227	307	407	G	Ta, SS	—	—	Al_2O_3, BeO	—	Film reacts in air
Lithium Bromide	LiBr	550	—	3.46	—	—	~500	—	Ni	—	—	—	RF	n 1.78
Lithium Chloride	LiCl	605	—	2.07	—	—	400	—	Ni	—	—	—	RF	Preheat gently to outgas. n 1.66
Lithium Fluoride	LiF	845	—	2.64	470	530	650	G	Ni, Ta, Mo, W	—	—	Al_2O_3	RF	Optical films require rate control. Preheat gently to outgas. n 1.39
Lithium Iodide	LiI	449	—	4.08	—	—	400	—	Mo, W	—	—	—	RF	n 1.96
Lithium Oxide	Li_2O	>1,700	—	2.01	—	—	850	—	Pt, Ir	—	—	—	RF	n 1.64
Lutetium	Lu	1,663	—	9.84	—	—	1,300	Ex	Ta	—	—	Al_2O_3	RF, DC	
Lutetium Oxide	Lu_2O_3	—	—	9.42	—	—	1,400	—	Ir	—	—	—	RF	Decomposes
Magnesium	Mg	649	S	1.74	185	247	327	G	W, Mo, Ta, Cb	W	W	Al_2O_3, VC	DC	Extremely high rates possible
Magnesium Aluminate	$MgAl_2O_4$	2,135	—	3.6	—	—	—	G	—	—	—	—	RF	(Natural spinel) n 1.72
Magnesium Bromide	$MgBr_2$	700	—	3.72	—	—	~450	—	Ni	—	—	—	RF	Decomposes
Magnesium Chloride	$MgCl_2$	714	—	2.32	—	—	400	—	Ni	—	—	—	RF	Decomposes. n 1.67
Magnesium Fluoride	MgF_2	1,261	—	2.9–3.2	—	—	1,000	Ex	Mo, Ta	—	—	Al_2O_3	RF	Substrate temp and rate control important. Reacts with W. Mo OK. n 1.38
Magnesium Iodide	MgI_2	<637	D	4.43	—	—	200	—	Ir	—	—	—	RF	
Magnesium Oxide	MgO	2,852	—	3.58	—	—	1,300	G	—	—	—	C, Al_2O_3	RF, RF-R	R-Evap in 10^{-3} T O_2. W gives volatile oxides. n~1.7
Manganese	Mn	1,244	S	7.20	507	572	647	G	W, Ta, Mo	W	W	Al_2O_3, BeO	DC	
Manganese Bromide	$MnBr_2$	—	D	4.39	—	—	500	—	Incl	—	—	—	RF	
Manganese Chloride	$MnCl_2$	650	—	2.98	—	—	450	—	Incl	—	—	—	RF	
Manganese (III) Oxide	Mn_2O_3	1,080	—	4.50	—	—	—	—	—	—	—	—	—	
Manganese (IV) Oxide	MnO_2	535	—	5.03	—	—	—	P	W	—	W	—	RF-R	Loses O_2 at 535° C
Manganese Sulfide	MnS	—	D	3.99	—	—	1,300	—	Mo	—	—	—	RF	Decomposes. n 2.70
Mercury	Hg	-39		13.55	-68	-42	-6	—	—	—	—	—	—	
Mercury Sulfide	HgS	584	S	8.10	—	—	250	—	—	—	—	Al_2O_3	RF	Decomposes. n 2.85, 3.20
Molybdenum	Mo	2,617	—	10.2	1,592	1,822	2,117	Ex	—	—	—	—	DC	Films smooth, hard. Preheat gently to outgas.
Molybdenum Boride	MoB_2	2,100	—	7.12	—	—	—	P	—	—	—	—	RF	
Molybdenum Carbide	Mo_2C	2,687	—	8.9	—	—	—	F	—	—	—	—	RF	Evaporation of $Mo(CO)_6$ yields Mo_2C.
Molybdenum Disulfide	MoS_2	1,185	—	4.80	—	—	~50	—	—	—	—	—	RF	
Molybdenum Oxide	MoO_3	795	S	4.69	—	—	~900	—	Mo, Pt	—	Mo	Al_2O_3, BN	RF	Slight O_2 loss. n 1.9
Molybdenum Silicide	$MoSi_2$	2,050	—	6.31	—	—	—	—	W	—	—	—	RF	Decomposes
Neodymium	Nd	1,021	—	7.01	731	871	1,062	Ex	Ta	—	—	Al_2O_3	DC	Low W solubility
Neodymium Fluoride	NdF_3	1,410	—	6.5	—	—	~900	G	Mo, W	—	Mo, Ta	Al_2O_3	RF	Little decomposition. n 1.6
Neodymium Oxide	Nd_2O_3	~1,900	—	7.24	—	—	~1,400	G	Ta, W	—	—	ThO_2	RF, RF-R	Loses O_2; films clear. E-beam OK. n 1.79
Nichrome IV	Ni/Cr	1,395	—	8.50	847	987	1,217	Ex	***	W	W, Ta	Al_2O_3, VC, BeO	DC	Alloys with W/Ta/Mo
Nickel°	Ni	1,453	—	8.90	927	1,072	1,262	Ex	W	W	W	Al_2O_3, BeO, VC	DC	Alloys with W/Ta/Mo. Smooth adherent films
Nickel Bromide	$NiBr_2$	963	S	5.10	—	—	362	—	Incl	—	—	—	RF	
Nickel Chloride	$NiCl_2$	1,001	S	3.55	—	—	444	—	Incl	—	—	—	RF	
Nickel Oxide	NiO	1,984	—	6.67	—	—	~1,470	—	—	—	—	Al_2O_3	RF-R	Decomposes on heating. n 2.18
Nimendium°	Ni3%Mn	1,425	—	8.8	—	—	—	—	—	—	—	—	DC	
Niobium	Nb	2,468	—	8.57	1,728	1,977	2,287	Ex	W	—	—	—	DC	Attacks W. n 1.80
Niobium Boride	NbB_2	2,900	—	6.97	—	—	—	—	—	—	—	—	RF	
Niobium Carbide	NbC	3,500	—	7.6	—	—	—	F	—	—	—	—	RF	
Niobium Nitride	NbN	2,573	—	8.4	—	—	—	—	—	—	—	—	RF, RF-R	R-evap Nb in 10^{-3} T N_2
Niobium (II) Oxide	NbO	—	—	7.30	—	—	1,100	—	Pt	—	—	—	RF	
Niobium (III) Oxide	Nb_2O_3	1,780	—	7.5	—	—	—	—	W	—	W	—	RF, RF-R	
Niobium (V) Oxide	Nb_2O_5	1,485	—	4.47	—	—	—	—	W	—	W	—	RF, RF-R	n 1.95
Niobium Telluride	NbTeX	—	—	7.6	—	—	—	—	—	—	—	—	RF	Composition variable
Niobium-Tin	Nb_3Sn	—	—	—	—	—	—	Ex	—	—	—	—	DC	Co-evap OK
Osmium	Os	3,045	—	22.48	2,170	2,430	2,760	F	—	—	—	—	DC	
Osmium Oxide	OsO_2	—	D	—	—	—	—	—	—	—	—	—	—	
Palladium	Pd	1,554	S	12.02	842	992	1,192	Ex	W***	W***	W***	Al_2O_3, BeO	DC	
Palladium Oxide	PdO	870	—	9.70	—	—	575	—	—	—	—	Al_2O_3	RF-R	Decomposes
Parylene	C_8H_8	300–400	—	1.1	—	—	—	—	—	—	—	—	—	(Vapor-depositable plastic)
Permalloy®°	Ni/Fe	1,395	—	8.7	947	1,047	1,307	G	W	—	—	Al_2O_3, VC	DC	Film low in Ni
Phosphorus	P	44.1	—	1.82	327	361	402	—	—	—	—	Al_2O_3	—	Film ignites in air. n 2.14
Phosphorus Nitride	P_3N_5	—	—	2.51	—	—	—	—	—	—	—	—	RF, RF-R	
Platinum	Pt	1,772	—	21.45	1,292	1,492	1,747	Ex	W	W	W	C, ThO_2	DC	Alloys W/Ta/Mo. Films soft, poor adhesion.
Platinum Oxide	PtO_2	450	—	10.2	—	—	—	—	—	—	—	—	RF-R	
Plutonium	Pu	641	—	19.84	—	—	—	—	W	—	—	—	—	
Polonium	Po	254	—	9.4	117	170	244	—	—	—	—	Q	—	
Potassium	K	63	—	0.86	23	60	125	—	Mo	—	—	Q	—	Film reacts in air. Preheat gently to outgas.
Potassium Bromide	KBr	734	—	2.75	—	—	~450	—	Ta, Mo	—	—	Q	RF	Preheat gently to outgas. n 1.559
Potassium Chloride	KCl	770	S	1.98	—	—	510	G	Ta, Ni	—	—	—	RF	Preheat gently to outgas. n 1.49
Potassium Fluoride	KF	858	—	2.48	—	—	~500	—	—	—	—	Q	RF	Preheat gently to outgas. n 1.363
Potassium Hydroxide	KOH	360	—	2.04	—	—	~400	—	Pt	—	—	—	—	Preheat gently to outgas
Potassium Iodide	KI	681	—	3.13	—	—	~500	—	Ta	—	—	—	RF	Preheat gently to outgas. n 1.677
Praseodymium	Pr	931	—	6.77	800	950	1,150	G	Ta	—	—	—	DC	
Praseodymium Oxide	Pr_2O_3	—	D	7.07	—	—	1,400	G	Ir	—	—	ThO_2	RF, RF-R	Loses O_2
Radium	Ra	700	—	5 (?)	246	320	416	—	—	—	—	—	—	
Rhenium	Re	3,180	—	20.53	1,928	2,207	2,571	P	—	—	—	—	DC	
Rhenium Oxide	ReO_3	—	D	~7	—	—	—	—	—	—	—	—	RF	R-evap in 10^{-3} T O_2
Rhodium	Rh	1,966	—	12.4	1,277	1,472	1,707	G	W	W	W	ThO_2, VC	DC	E-beam OK
Rubidium	Rb	39	—	1.48	-3	37	111	—	—	—	—	Q	—	
Rubidium Chloride	RbCl	718	—	2.09	—	—	~550	—	—	—	—	Q	RF	n 1.493
Rubidium Iodide	RbI	647	—	3.55	—	—	~400	—	—	—	—	Q	RF	n 1.647
Ruthenium	Ru	2,310	—	12.3	1,780	1,990	2,260	P	W	—	—	—	DC	
Samarium	Sm	1,074	—	7.52	373	460	573	G	Ta	—	—	Al_2O_3	DC	
Samarium Oxide	Sm_2O_3	2,350	—	8.35	—	—	—	G	Ir	—	—	ThO_2	RF, RF-R	Loses O_2. Films smooth, clear.
Samarium Sulfide	Sm_2S_3	1,900	—	5.73	—	—	—	G	—	—	—	—	—	
Scandium	Sc	1,541	—	2.99	714	837	1,002	Ex	W	—	—	Al_2O_3, BeO	RF	Alloys with Ta.
Scandium Oxide	Sc_2O_3	2,300	—	3.86	—	—	~400	F	—	—	—	—	RF, RF-R	
Selenium	Se	217	—	4.81	89	125	170	G	W, Mo	W, Mo	W, Mo	Al_2O_3, VC	—	Dedicated vacuum system. High V.P.
Silicon	Si	1,410	—	2.32	992	1,147	1,337	F	W, Ta	—	—	BeO, Ta, VC	DC, RF	Alloys with W; use thick boat. E-beam OK
Silicon Boride	SiB_6	—	—	—	—	—	—	P	—	—	—	—	RF	
Silicon Carbide	SiC	~2,700	S, D	3.22	—	—	1,000	—	—	—	—	—	RF	Sputter preferred. n 2.654, 2.697
Silicon Nitride	Si_3N_4	1,900	—	3.44	—	—	~800	—	—	—	—	—	RF, RF-R	
Silicon (II) Oxide	SiO	>1,702	S	2.13	—	—	850	F	Ta	W	W	Ta	RF, RF-R	Use baffle box and low evap rate. n 1.6
Silicon (IV) Oxide	SiO_2	1,610	—	~2.65	*	*	1,025*	Ex	—	—	—	Al_2O_3	RF	Quartz excellent in E-beam. n 1.544, 1.553
Silicon Selenide	SiSe	—	—	—	—	—	550	—	—	—	—	Q	RF	
Silicon Sulfide	SiS	940	S	1.85	—	—	450	—	—	—	—	Q	RF	n 1.853
Silicon Telluride	$SiTe_2$	—	—	4.39	—	—	550	—	—	—	—	Q	RF	
Silver	Ag	962	—	10.5	570	690	820	Ex	W	Mo	Ta, Mo	Al_2O_3, W	DC	Adhesion poor. Use Cr interlayer
Silver Bromide	AgBr	432	D	6.47	—	—	~380	—	Ta	—	—	Q	RF	n 2.253
Silver Chloride	AgCl	455	—	5.56	—	—	~520	—	Mo, Pt	—	Mo	Q	RF	n 2.07
Silver Iodide	AgI	558	—	6.01	—	—	~500	—	Ta	—	—	—	RF	n 2.21
Sodium	Na	98	—	0.97	74	124	192	—	Ta, SS	—	—	Q	—	Preheat gently to outgas. Film reacts in air. n 4.22
Sodium Bromide	NaBr	747	—	3.20	—	—	~400	—	—	—	—	Q	RF	Preheat gently to outgas. n 1.641
Sodium Chloride	NaCl	801	—	2.17	—	—	530	G	Ta, W, Mo	—	—	Q	RF	Copper oven; little decomposition Preheat gently to outgas. n 1.544
Sodium Cyanide	NaCN	564	—	—	—	—	~550	—	Ag	—	—	—	RF	Preheat gently to outgas. n 1.452
Sodium Fluoride	NaF	993	—	2.56	—	—	~1,000	G	Mo, Ta, W	—	—	BeO	RF	Preheat gently to outgas. No decomposition. n 1.336
Sodium Hydroxide	NaOH	318	—	2.13	—	—	~470	—	Pt	—	—	—	—	Preheat gently to outgas. n 1.358
Spinel	$MgAl_2O_4$	—	—	8.0	—	—	—	G	—	—	—	—	RF	n 1.72
Strontium	Sr	769	—	2.6	239	309	403	P	W, Ta, Mo	W	W	VC	RF	Wets but no alloy with W/Ta/Mo. Film reacts in air.
Strontium Chloride	$SrCl_2$	875	—	3.05	—	—	—	—	—	—	—	—	—	n 1.650
Strontium Fluoride	SrF_2	1,473	—	4.24	—	—	~1,000	—	—	—	—	Al_2O_3	RF	n 1.442
Strontium Oxide	SrO	2,430	S	4.7	—	—	1,500	—	Mo	—	—	Al_2O_3	RF	Reacts with W/Mo. n 1.810
Strontium Sulfide	SrS	>2,000	—	3.70	—	—	—	—	Mo	—	—	—	RF	Decomposes. n 2.107
Sulfur	S	113	—	2.07	13	19	57	P	W	—	W	Q	—	Dedicated vacuum system. High VP. n 1.957
Supermalloy°	Ni/Fe/Mo	1,410	—	8.9	—	—	—	G	—	—	—	—	DC	Sputter preferred; Co-evap Ni/Fe and Mo
Tantalum	Ta	2,996	—	16.6	1,960	2,240	2,590	Ex	—	—	—	—	DC	Forms good films
Tantalum Boride	TaB_2	3,000(?)	—	11.15	—	—	—	—	—	—	—	—	RF	
Tantalum Carbide	TaC	3,880	—	13.9	—	—	~2,500	—	—	—	—	—	RF	
Tantalum Nitride	TaN	3,360	—	16.30	—	—	—	—	—	—	—	—	RF, RF-R	Evap Ta in 10^{-3} T N_2
Tantalum Pentoxide	Ta_2O_5	1,872	—	8.2	1,550	1,780	1,920	G	Ta	W	W	VC	RF, RF-R	Slight decomposition. Evap Ta in 10^{-3} T O_2. n 2.6
Tantalum Sulfide	TaS_2	>1,300	—	—	—	—	—	—	—	—	—	—	RF	
Technetium	Tc	2,200	—	11.5	1,570	1,800	2,090	—	—	—	—	—	—	
Tellurium	Te	449	—	6.25	157	207	277	P	W, Ta	W	W, Ta	Al_2O_3, Q	RF	Wets W/Ta without alloying. n1.002
Terbium	Tb	1,356	—	8.23	800	950	1,150	Ex	Ta	—	—	Al_2O_3	RF	
Terbium Fluoride	TbF_3	1,172	—	—	—	—	~800	—	—	—	—	—	RF	
Terbium Oxide	Tb_2O_3	2,387	—	7.87	—	—	1,300	—	Ir	—	—	—	RF	Partially decomposes
Terbium Peroxide	Tb_4O_7	—	D	—	—	—	—	—	Ta	—	—	—	RF	Loses O_2. Films are mostly TbO
Thallium	Tl	304	—	11.85	280	360	470	P	W, Ta	—	W	Al_2O_3, Q	DC	Wets freely
Thallium Bromide	TlBr	480	S	7.56	—	—	~250	—	Ta	—	—	Q	RF	n 2.4 - 2.8
Thallium Chloride	TlCl	430	S	7.00	—	—	~150	—	Ta	—	—	Q	RF	n 2.247
Thallium Iodide	TlI	440	S	7.1	—	—	~250	—	—	—	—	Q	RF	n 2.78
Thallium Oxide	Tl_2O_2	717	—	10.19	—	—	350	—	—	—	—	—	RF	Decomposes at 850° C to Tl_2O
Thorium	Th	1,750	—	11.7	1,430	1,660	1,925	Ex	W, Ta, Mo	W	W	—	—	
Thorium Bromide	$ThBr_4$	610	S	5.67	—	—	—	—	Mo	—	—	—	—	n 2.47
Thorium Carbide	ThC_2	2,655	—	8.96	—	—	~2,300	—	—	—	—	C	RF	
Thorium Fluoride	ThF_4	>900	—	6.32	—	—	~750	F	Mo	—	W	VC	RF	
Thorium Oxide	ThO_2	3,220	—	9.86	—	—	~2,100	G	W	—	—	—	RF, RF-R	
Thorium Oxyfluoride	$ThOF_2$	900	—	9.1	—	—	—	—	Mo, Ta	—	—	—	—	n 1.52
Thorium Sulfide	ThS_2	1,925	—	7.30	—	—	—	—	—	—	—	—	RF	Sputter preferred; Co-evap OK
Thulium	Tm	1,545	S	9.32	461	554	680	G	Ta	—	—	Al_2O_3	DC	
Thulium Oxide	Tm_2O_3	—	—	8.90	—	—	1,500	—	Ir	—	—	—	RF	Decomposes
Tin	Sn	232	—	7.28	682	807	997	Ex	Mo	W	W	Al_2O_3	DC	Wets Mo. Low sputter power. Ta liner for E-beam.
Tin Oxide	SnO_2	1,630	S	6.95	—	—	~1,000	Ex	W	W	W	Q, Al_2O_3	RF, RF-R	Using W, films low in O; Oxidize in air. n 2.0
Tin Selenide	SnSe	861	—	6.18	—	—	~400	G	—	—	—	Q	RF	
Tin Sulfide	SnS	882	—	5.22	—	—	~450	—	—	—	—	Q	RF	
Tin Telluride	SnTe	780	D	6.48	—	—	~450	—	—	—	—	Q	RF	
Titanium	Ti	1,660	—	4.5	1,067	1,235	1,453	Ex	W	—	—	TiC	DC	Alloys with W/Ta/Mo; Outgas is high on first heating
Titanium Boride	TiB_2	2,900	—	4.50	—	—	—	P	—	—	—	—	RF	
Titanium Carbide	TiC	3,140	—	4.93	—	—	~2,300	—	—	—	—	—	RF	
Titanium Nitride	TiN	2,930	—	5.22	—	—	—	G	Mo	—	—	—	RF, RF-R	Sputter preferred. Decomposes with thermal evap.
Titanium (II) Oxide	TiO	1,750	—	4.93	—	—	~1,500	G	W, Mo	—	—	VC	RF	Preheat gently to outgas. n 2.2
Titanium (III) Oxide	Ti_2O_3	2,130	D	4.6	—	—	—	G	W	—	—	—	RF	Decomposes
Titanium (IV) Oxide	TiO_2	1,830	—	4.26	—	—	~1,300	F	W, Mo	—	W	—	RF, RF-R	Loses O_2. Oxides in air. Ta gives films TiO/Ti. n 2.616, 2.903
Tungsten	W	3,410	—	19.35	2,117	2,407	2,757	G	—	—	—	—	DC	Films hard and adherent.
Tungsten Boride	WB_2	~2,900	—	10.77	—	—	—	P	—	—	—	—	RF	
Tungsten Carbide	W_2C	2,860	—	17.15	1,480	1,720	2,120	Ex	C	—	—	—	RF	
Tungsten Disulfide	WS_2	1,250	D	7.5	—	—	—	—	—	—	—	—	RF	
Tungsten Oxide	WO_3	1,473	S	7.16	—	—	980	G	W, Pt	—	—	—	RF-R	Preheat gently to outgas. W gives O_2 loss. n 1.68
Tungsten Selenide	WSe_2	—	—	9.0	—	—	—	—	—	—	—	—	RF	
Tungsten Silicide	WSi_2	>900	—	9.4	—	—	—	—	—	—	—	—	RF	
Tungsten Telluride	WTe_2	—	—	9.49	—	—	—	—	—	—	—	Q	RF	
Uranium	U	1,132	—	19.05	1,132	1,327	1,582	G	Mo, W	W	W	—	—	Films reacts in air
Uranium Carbide	UC_2	2,350	—	11.28	—	—	2,100	—	—	—	—	C	RF	Decomposes
Uranium Fluoride	UF_4	960	—	6.70	—	—	300	—	Ni	—	—	—	RF	
Uranium (III) Oxide	U_2O_3	1,300	D	8.30	—	—	—	—	W	—	W	—	RF-R	Decomposes at 1,300° C to UO_2
Uranium (IV) Oxide	UO_2	2,878	—	10.96	—	—	—	—	W	—	W	—	RF	Ta causes decomposition
Uranium Phosphide	UP_2	—	—	8.57	—	—	1,200	—	Ta	—	—	—	RF	Decomposes
Uranium (II) Sulfide	US	>2,000	—	10.87	—	—	—	—	—	—	—	—	—	
Uranium (IV) Sulfide	US_2	>1,100	—	7.96	—	—	—	—	W	—	—	—	RF	Slight decomposition
Vanadium	V	1,890	—	5.96	1,162	1,332	1,547	Ex	W, Mo	—	—	—	DC	Wets Mo. E-beam preferred. n 3.03
Vanadium Boride	VB_2	2,400	—	5.10	—	—	—	—	—	—	—	—	RF	
Vanadium Carbide	VC	2,810	—	5.77	—	—	~1,800	—	—	—	—	—	RF	
Vanadium Nitride	VN	2,320	—	6.13	—	—	—	—	—	—	—	—	RF, RF-R	
Vanadium (IV) Oxide	VO_2	1,967	S	4.34	—	—	~575	—	—	—	—	—	RF, RF-R	Sputter preferred.
Vanadium (V) Oxide	V_2O_5	690	D	3.36	—	—	~500	—	—	—	—	Q	RF	n 1.46, 1.52, 1.76
Vanadium Silicide	VSi_2	1,700	—	4.42	—	—	—	—	—	—	—	—	RF	
Ytterbium	Yb	819	S	6.96	520	590	690	G	Ta	—	—	—	—	
Ytterbium Fluoride	YbF_3	1,157	—	—	—	—	~800	—	Mo	—	—	—	RF	
Ytterbium Oxide	Yb_2O_3	2,346	S	9.17	—	—	~1,500	—	Ir	—	—	—	RF, RF-R	Loses O_2
Yttrium	Y	1,522	—	4.47	830	973	1,157	Ex	W, Ta	W	W	Al_2O_3	RF, DC	High Ta solubility
Yttrium Alum Oxide	$Y_3Al_5O_{12}$	1,990	—	—	—	—	—	G	—	W	W	—	RF	Films not ferroelectric
Yttrium Fluoride	YF_3	1,387	—	4.01	—	—	—	—	—	—	—	—	RF	
Yttrium Oxide	Y_2O_3	2,410	—	5.01	—	—	~2,000	G	W	—	—	C	RF, RF-R	Loses O_2; films smooth and clear. n 1.79
Zinc	Zn	420	—	7.14	127	177	250	Ex	Mo, W, Ta	W	W	Al_2O_3, Q	DC	Evaporates well, over wide range of conditions
Zinc Antimonide	Zn_3Sb_2	570	—	6.33	—	—	—	—	—	—	—	—	RF	
Zinc Bromide	$ZnBr_2$	394	—	4.20	—	—	~300	—	W	—	—	C	RF	Decomposes. n 1.545
Zinc Fluoride	ZnF_2	872	—	4.95	—	—	~800	—	Pt, Ta	—	—	Q	RF	
Zinc Nitride	Zn_3N_2	—	—	6.22	—	—	—	—	Mo	—	—	—	RF	Decomposes
Zinc Oxide	ZnO	1,975	—	5.61	—	—	~1,800	F	—	—	—	—	RF-R	n 2.008, 2.029
Zinc Selenide	ZnSe	>1,100	—	5.42	—	—	660	—	Ta, W, Mo	W, Mo	W, Mo	Q	RF	Dedicated vacuum system. Preheat gently to outgas. Evaporates well. n 2.89
Zinc Sulfide	ZnS	1,700	S	3.98	—	—	~800	G	Ta, Mo	—	—	—	RF	Dedicated vacuum system. Preheat gently to outgas. Films partially decompose. Substrate temp affects sticking coeff. n 2.356
Zinc Telluride	ZnTe	1,239	—	6.34	—	—	~600	—	Mo, Ta	—	—	—	RF	Preheat gently to outgas. n 3.56
Zirconium	Zr	1,852	—	6.49	1,477	1,702	1,987	Ex	W	—	—	—	DC	Alloys W. Films react in air.
Zirconium Boride	ZrB_2	~3,200	—	6.09	—	—	—	G	—	—	—	—	RF	
Zirconium Carbide	ZrC	3,540	—	6.73	—	—	~2,500	—	—	—	—	—	RF	
Zirconium Nitride	ZrN	2,980	—	7.09	—	—	—	—	—	—	—	—	RF, RF-R	R-evap in 10^{-3} T N_2.
Zirconium Oxide	ZrO_2	~2,700	—	5.89	—	—	~2,200	G	W	—	—	—	RF, RF-R	Loses O_2. Films clear and hard. n 2.13, 2.19, 2.20
Zirconium Silicate	$ZrSiO_4$	2,550	—	4.56	—	—	—	—	—	—	—	—	RF	n 1.92–1.96; 1.97–2.02
Zirconium Silicide	$ZrSi_2$	1,700	—	4.88	—	—	—	—	—	—	—	—	RF	