

Database Index #	Atomic # (Z)	Key element 1	common formula	full name	physical state	last treatment	group name	first element	mineral name	survey available	Valence Band Spectrum	Key element 1
1	1	H	H°	hydrogen gas	gas	none	element	hydrogen		yes	yes	H
2	2	He	He°	helium gas	gas	none	element	helium		yes	yes	He
3	3	Li	Li ₂ SO ₄	lithium sulfate	powder	pressed	sulfate	lithium		yes	yes	Li
4	3	Li	Li ₂ CO ₃	lithium carbonate	powder	pressed	carbonate	lithium		yes	yes	Li
5	3	Li	LiF	lithium fluoride	natural crystal	cleaved	fluoride	lithium		yes	yes	Li
6	3	Li	LiCl	lithium chloride	crystallite	crushed	chloride	lithium		yes	yes	Li
7	3	Li	LiNbO ₃	lithium niobate	single crystal	cleaved	niobate	lithium		yes	yes	Li
8	3	Li	Li ₃ N	lithium nitride	powder	pressed	nitride	lithium		yes	yes	Li
9	3	Li	LiI	lithium iodide	crystallite	crushed	iodide	lithium		yes	yes	Li
10	3	Li	LiBr	lithium bromide	crystallite	crushed	bromide	lithium		yes	yes	Li
11	3	Li	LiCoMnNiO _x	m cobalt manganese nickel	powder	pressed	oxide	lithium		yes	yes	Li
12	3	Li	LiB ₃ O ₅	lithium metaborate	single crystal	cleaved	borate	lithium		yes	yes	Li
13	4	Be	Be°	elemental beryllium	solid	ion etched	element	beryllium		yes	yes	Be
14	4	Be	BeO	beryllium oxide	powder	pressed	oxide	beryllium		yes	yes	Be
15	4	Be	Be native oxide	beryllium native oxide	film	as received	native oxide	beryllium		yes	yes	Be
16	4	Be	BeF ₂	beryllium fluoride	powder	pressed	fluoride	beryllium		yes	yes	Be
17	5	B	B°	elemental boron	solid	ion etched	element	boron		yes	yes	B
18	5	B	B ₂ O ₃	boron oxide	crystallite	crushed	oxide	boron		yes	yes	B
19	5	B	BN	boron nitride	solid	cleaved	nitride	boron		yes	yes	B
20	5	B	NaBF ₄	sodium tetrafluoroborate	powder	pressed	borate	sodium		yes	yes	B
21	6	C	C°	oriented pyrolytic graphite	single crystal	peeled	carbon	carbon	Graphite	yes	yes	C
22	6	C	C°	diamond carbon	natural crystal	as received	carbon	carbon	Diamon	yes	yes	C
23	6	C	C°	graphene	natural	peeled	carbon	carbon	Graphite	yes	yes	C
24	6	C	COx	graphene oxide	powder	pressed	oxide	carbon		yes	yes	C
25	6	C	COx	reduced graphene oxide	powder	pressed	oxide	carbon		yes	yes	C
26	6	C	CH	adventitious carbon	film	as received	carbon	carbon		yes	yes	C
27	6	C	K ₂ CO ₃	potassium carbonate	powder	pressed	carbonate	potassium		yes	yes	C
28	6	C	KHCO ₃	potassium bi-carbonate	crystallite	crushed	bi-carbonate	potassium		yes	yes	C
29	6	C	CaCO ₃	calcium carbonate	natural crystal	cleaved	carbonate	calcium	Calcite	yes	yes	C
30	6	C	SiC	silicon carbide	single crystal	cleaved	carbide	silicon		yes	yes	C
31	7	N	Li ₃ N	lithium nitride	powder	pressed	nitride	lithium		yes	yes	N
32	7	N	AlN	aluminum nitride	coating	as received	nitride	aluminum		yes	yes	N
33	7	N	FeN	iron nitride	lump	ion etched	nitride	iron				N
34	7	N	GaN	gallium nitride	single crystal	cleaved	nitride	gallium		yes	yes	N
35	7	N	TaN	tantalum nitride	coating	ion etched	nitride	tantalum		yes	yes	N
36	7	N	TiN	titanium nitride	coating	ion etched	nitride	titanium		yes	yes	N

37	7	N	NH ₄ Cl	ammonium chloride	crystallite	cleaved	ammonium	nitrogen	Salammoniac	yes	yes	N
38	7	N	Cu(NO ₃) ₂	copper nitrate	powder	pressed	nitrate	copper		yes	yes	N
39	7	N	CuCN	copper cyanide	powder	pressed	cyanide	copper		yes	yes	N
40	7	N	Kapton	Kapton	film	hexane wipe	imide	carbon		yes	yes	N
41	7	N	Si ₃ N ₄	silicon nitride	single crystal	cleaved	nitride	silicon		yes	yes	N
42	8	O	AlO(OH)	aluminum oxy hydroxide	natural crystal	cleaved	hydroxide	aluminum	Diaspore	yes	yes	O
43	8	O	Fe ₂ O ₃	iron oxide	natural crystal	cleaved	oxide	iron	Hematite	yes	yes	O
44	8	O	FeO(OH)	iron oxy hydroxide	natural crystal	cleaved	hydroxide	iron	Goethite	yes	yes	O
45	8	O	Cu ₂ O	cuprous oxide	natural crystal	cleaved	oxide	copper	Cuprite	yes	yes	O
46	8	O	CuO	cupric oxide	powder	pressed	oxide	copper	Tenorite	yes	yes	O
47	8	O	PbO	lead oxide	powder	pressed	oxide	lead	Litharge	yes	yes	O
48	8	O	PbCO ₃	lead carbonate	natural crystal	cleaved	carbonate	lead	Cerrusite	yes	yes	O
49	8	O	Al ₂ O ₃	aluminum oxide	amorphous	fractured	oxide	aluminum	Sapphire	yes	yes	O
50	8	O	Al(OH) ₃	aluminum hydroxide	powder	pressed	hydroxide	aluminum		yes	yes	O
51	8	O	MgO	magnesium oxide	single crystal	cleaved	oxide	magnesium	Periclase	yes	yes	O
52	8	O	MgCO ₃	magnesium carbonate	natural crystal	cleaved	carbonate	magnesium	Magnesite	yes	yes	O
53	8	O	MgSO ₄	magnesium sulfate	powder	pressed	sulfate	magnesium	Epsom	yes	yes	O
54	8	O	K ₂ CO ₃	potassium carbonate	powder	pressed	carbonate	potassium		yes	yes	O
55	8	O	KHCO ₃	potassium bi-carbonate	crystallite	crushed	bi-carbonate	potassium		yes	yes	O
56	8	O	HgO	mercuric oxide	powder	pressed	oxide	mercury		yes	yes	O
57	8	O	Hg ₂ SO ₄	mercurous sulfate	powder	pressed	sulfate	mercury		yes	yes	O
58	8	O	Cu(NO ₃) ₂	copper nitrate	powder	pressed	nitrate	copper		yes	yes	O
59	8	O	KH ₂ PO ₄	potassium hydrogen phospha	single crystal	cleaved	phosphate	potassium		yes	yes	O
60	8	O	SiO ₂	silicon oxide	natural crystal	cleaved	oxide	silicon	Quartz	yes	yes	O
61	8	O	PET, Mylar	PET, Mylar	film	as received	polymer	carbon		yes	yes	O
62	8	O	(CH ₃) ₂ SiO	poly-dimethyl siloxane	oil	smeared	polymer	silicon		yes	yes	O
63	9	F	CaF ₂	calcium fluoride	natural crystal	cleaved	fluoride	calcium	Fluorite	yes	yes	F
64	9	F	MgF ₂	magnesium fluoride	coating	as received	fluoride	magnesium		yes	yes	F
65	9	F	BeF ₂	beryllium fluoride	powder	pressed	fluoride	beryllium		yes	yes	F
66	9	F	CF ₂ CF ₂	Teflon, PTFE	film	razor cut	polymer	carbon		yes	yes	F
67	9	F	CF ₂ CH ₂	Kynar	film	hexane wipe	polymer	carbon		yes	yes	F
68	11	Na	Na°	elemental sodium	lump	ion etched	element	sodium		yes	yes	Na
69	11	Na	NaF	sodium fluoride	natural crystal	cleaved	fluoride	sodium	Villiaumite	yes	yes	Na
70	11	Na	NaCl	sodium chloride	natural crystal	cleaved	chloride	sodium	Halite	yes	yes	Na
71	11	Na	NaBr	sodium bromide	crystallite	crushed	bromide	sodium		yes	yes	Na
72	11	Na	NaI	sodium iodide	crystallite	crushed	iodide	sodium		yes	yes	Na
73	11	Na	NaHCO ₃	sodium bi-carbonate	crystallite	crushed	bi-carbonate	sodium	Nahcolite	yes	yes	Na
74	11	Na	Na ₂ CO ₃	sodium carbonate	powder	pressed	carbonate	sodium		yes	yes	Na

75	11	Na	Na ₂ O	sodium oxide	lump	scraped	oxide	sodium	yes	yes	Na
76	11	Na	Na ₃ AlF ₆	sodium aluminum hexafluoride	natural crystal	cleaved	fluoride	sodium	Cryolite	yes	Na
77	12	Mg	Mg ⁰	elemental magnesium	ribbon	ion etched	element	magnesium		yes	Mg
78	12	Mg	Mg native oxide	magnesium native oxide	film	as received	native oxide	magnesium		yes	Mg
79	12	Mg	MgO	magnesium oxide	single crystal	cleaved	oxide	magnesium	Periclase	yes	Mg
80	12	Mg	MgF ₂	magnesium fluoride	coating	as received	fluoride	magnesium		yes	Mg
81	13	Al	Al ⁰	elemental aluminum	solid	ion etched	element	aluminum		yes	Al
82	13	Al	Al native oxide	aluminum native oxide	film	as received	native oxide	aluminum		yes	Al
83	13	Al	Al ₂ O ₃	aluminum oxide	amorphous solid	fractured	oxide	aluminum		yes	Al
84	13	Al	AlO(OH)	aluminum oxy hydroxide	natural crystal	cleaved	hydroxide	aluminum	Diaspore	yes	Al
85	13	Al	AlF ₃	aluminum fluoride	powder	pressed	fluoride	aluminum		yes	Al
86	14	Si	Si ⁰	elemental silicon	single crystal	cleaved	element	silicon		yes	Si
87	14	Si	Si native oxide	silicon native oxide	film	as received	native oxide	silicon		yes	Si
88	14	Si	SiO ₂	silicon oxide	natural crystal	cleaved	oxide	silicon	Quartz	yes	Si
89	14	Si	SiO ₂	silicon oxide	amorphous solid	fractured	oxide	silicon		yes	Si
90	14	Si	(CH ₃) ₂ SiO	poly-dimethyl siloxane	oil	smeared	polymer	silicon		yes	Si
91	14	Si	Na ₂ SiO ₇	sodium meta-silicate	solution	smeared	silicate	sodium		yes	Si
92	15	P	P ⁰	elemental phosphorus	lump	ion etched	element	phosphorus		yes	P
93	15	P	InP	indium phosphide	single crystal	cleaved	phosphide	indium		yes	P
94	15	P	GaP	gallium phosphide	single crystal	cleaved	phosphide	gallium		yes	P
95	15	P	KH ₂ PO ₄	potassium hydrogen phosphate	single crystal	cleaved	phosphate	potassium		yes	P
96	15	P	NaH ₂ PO ₄	sodium hydrogen phosphate	crystallite	crushed	phosphate	sodium		yes	P
97	15	P	LiFePO ₄	lithium iron phosphate	powder	pressed	phosphate	lithium		yes	P
98	16	S	S ⁰	elemental sulfur	natural crystal	cleaved	element	sulfur		yes	S
99	16	S	Ag ₂ S	silver sulfide	natural crystal	cleaved	sulfide	silver	Acanthite	yes	S
100	16	S	Ag ₂ SO ₄	silver sulfate	powder	pressed	sulfate	silver		yes	S
101	16	S	CdS	cadmium sulfide	single crystal	cleaved	sulfide	cadmium		yes	S
102	16	S	CdSO ₄	cadmium sulfate	powder	pressed	sulfate	cadmium		yes	S
103	16	S	FeS ₂	iron sulfide	natural crystal	cleaved	sulfide	iron	Pyrite	yes	S
104	16	S	FeSO ₄	iron sulfate	powder	pressed	sulfate	iron		yes	S
105	16	S	HgS	mercury sulfide	natural crystal	cleaved	sulfide	mercury	Cinnabar	yes	S
106	16	S	Hg ₂ SO ₄	mercury sulfate	powder	pressed	sulfate	mercury		yes	S
107	16	S	PbS	lead sulfide	natural crystal	cleaved	sulfide	lead	Galena	yes	S
108	16	S	PbSO ₄	lead sulfate	powder	pressed	sulfate	lead		yes	S
109	16	S	ZnS	zinc sulfide	single crystal	cleaved	sulfide	zinc		yes	S
110	16	S	ZnSO ₄	zinc sulfate	powder	pressed	sulfate	zinc		yes	S
111	16	S	NaHSO ₄	sodium bi-sulfate	powder	pressed	sulfate	sodium		yes	S
112	16	S	Na ₂ SO ₄	sodium sulfate	powder	pressed	sulfate	sodium		yes	S
113	16	S	PPS	poly-phenylene sulfide	as received	pressed	sulfide	poly		yes	S

114	16	S	MoS2	molybdenum sulfide	natural crystal	peeled	sulfide	molybdenum	Molybdenite	yes	yes	S
115	16	S	WS2	tungsten sulfide	natural crystal	crushed	sulfide	tungsten	Tungstenite	yes	yes	S
116	16	S	TaS2	tantalum sulfide	natural crystal	peeled	sulfide	tantalum	Tantalite	yes	yes	S
117	17	Cl	LiCl	lithium chloride	crystallite	crushed	chloride	lithium		yes	yes	Cl
118	17	Cl	KCl	potassium chloride	crystallite	crushed	chloride	potassium		yes	yes	Cl
119	17	Cl	NaCl	sodium chloride	single crystal	cleaved	chloride	sodium	Halite	yes	yes	Cl
120	17	Cl	NH4Cl	ammonium chloride	crystallite	cleaved	chloride	nitrogen	Salammoniac	yes	yes	Cl
121	17	Cl	CuCl2	cupric chloride	powder	pressed	chloride	copper		yes	yes	Cl
122	17	Cl	PVC	Poly-vinyl chloride	film	as received	chloride	carbon		yes	yes	Cl
123	18	Ar	Ar in Aluminum	Ar in Aluminum	implant	implant	implant	argon		yes	yes	Ar
124	18	Ar	Ar in Boron	Ar in Boron	implant	implant	implant	argon		yes	yes	Ar
125	18	Ar	Ar in Beryllium	Ar in Beryllium	implant	implant	implant	argon		yes	yes	Ar
126	18	Ar	Ar in Carbon	Ar in Carbon	implant	implant	implant	argon		yes	yes	Ar
127	18	Ar	Ar in Chromium	Ar in Chromium	implant	implant	implant	argon		yes	yes	Ar
128	18	Ar	Ar in Manganese	Ar in Manganese	implant	implant	implant	argon		yes	yes	Ar
129	18	Ar	Ar in Scandium	Ar in Scandium	implant	implant	implant	argon		yes	yes	Ar
130	18	Ar	Ar in Silicon	Ar in Silicon	implant	implant	implant	argon		yes	yes	Ar
131	18	Ar	Ar in Titanium	Ar in Titanium	implant	implant	implant	argon		yes	yes	Ar
132	18	Ar	Ar in Vanadium	Ar in Vanadium	implant	implant	implant	argon		yes	yes	Ar
133	18	Ar	Ar in HOPG	Ar in HOPG	implant	implant	implant	argon		yes	yes	Ar
134	19	K	K°	elemental potassium	lump	ion etched	element	potassium		yes	yes	K
135	19	K	KF	potassium fluoride	single crystal	cleaved	fluoride	potassium		yes	yes	K
136	19	K	KCl	potassium chloride	single crystal	cleaved	chloride	potassium		yes	yes	K
137	19	K	KBr	potassium bromide	single crystal	cleaved	bromide	potassium		yes	yes	K
138	19	K	KI	potassium iodide	single crystal	cleaved	iodide	potassium		yes	yes	K
139	19	K	K2CO3	potassium carbonate	crystallite	crushed	carbonate	potassium		yes	yes	K
140	19	K	KHCO3	potassium bi-carbonate	powder	pressed	bi-carbonate	potassium		yes	yes	K
141	19	K	KO ₂	potassium super-oxide	lump	scraped	oxide	potassium		yes	yes	K
142	19	K	KMnO ₄	potassium permanganate	single crystal	crushed	manganate	potassium		yes	yes	K
143	19	K	K ₃ Fe(CN) ₆	potassium ferri-cyanide	single crystal	cleaved	ferri-cyanide	potassium		yes	yes	K
144	20	Ca	Ca°	elemental calcium	lump	ion etched	element	calcium		yes	yes	Ca
145	20	Ca	CaF2	calcium fluoride	single crystal	cleaved	fluoride	calcium	Fluorite	yes	yes	Ca
146	20	Ca	CaCl2	calcium chloride	single crystal	cleaved	chloride	calcium		yes	yes	Ca
147	20	Ca	CaBr2	calcium bromide	single crystal	cleaved	bromide	calcium		yes	yes	Ca
148	20	Ca	CaI2	calcium iodide	single crystal	cleaved	iodide	calcium		yes	yes	Ca
149	20	Ca	CaCO ₃	calcium carbonate	single crystal	cleaved	carbonate	calcium	Calcite	yes	yes	Ca
150	20	Ca	CaMg(CO ₃) ₂	calcium magnesium carbonate	single crystal	cleaved	carbonate	calcium	Dolomite	yes	yes	Ca
151	20	Ca	CaSO ₄	calcium sulfate	natural crystal	cleaved	sulfate	calcium	Gypsum	yes	yes	Ca
152	20	Ca	CaTiO ₃	calcium titanate	single crystal	cleaved	titanate	calcium	Perovskite	yes	yes	Ca
153	21	Sc	Sc°	elemental scandium	flat piece	ion etched	element	scandium		yes	yes	Sc

154	21	Sc	ScC	scandium carbide	film	as received	carbide	scandium	no	no	Sc
155	21	Sc	Sc native oxide	scandium native oxide	film	as received	native oxide	scandium	yes	yes	Sc
156	21	Sc	Sc ₂ O ₃	scandium oxide	powder	pressed	oxide	scandium	yes	yes	Sc
157	22	Ti	Ti ^o	elemental titanium	flat piece	ion etched	element	titanium	yes	yes	Ti
158	22	Ti	Ti native oxide	titanium native oxide	film	as received	native oxide	titanium	yes	yes	Ti
159	22	Ti	TiC	titanium carbide	film	as received	carbide	titanium	no	no	Ti
160	22	Ti	TiO ₂	titanium dioxide	single crystal	cleaved	oxide	titanium	Rutile	yes	Ti
161	22	Ti	TiF ₄	titanium tetrafluoride	powder	pressed	fluoride	titanium	yes	yes	Ti
162	23	V	V ^o	elemental vanadium	flat piece	ion etched	element	vanadium	yes	yes	V
163	23	V	VC	vanadium carbide	film	as received	carbide	vanadium	no	no	V
164	23	V	V native oxide	vanadium native oxide	film	as received	native oxide	vanadium	yes	yes	V
165	23	V	V ₂ O ₃	vanadium oxide	powder	pressed	oxide	vanadium	yes	yes	V
166	24	Cr	Cr ^o	elemental chromium	flat piece	ion etched	element	chromium	yes	yes	Cr
167	24	Cr	CrC	chromium carbide	film	as received	carbide	chromium	no	no	Cr
168	24	Cr	Cr native oxide	chromium native oxide	film	as received	native oxide	chromium	yes	yes	Cr
169	24	Cr	Cr ₂ O ₃	chromium oxide	single crystal	cleaved	oxide	chromium	yes	yes	Cr
170	24	Cr	CrF ₃	chromium fluoride	powder	pressed	fluoride	chromium	yes	yes	Cr
171	25	Mn	Mn ^o	elemental manganese	flat piece	ion etched	element	manganese	yes	yes	Mn
172	25	Mn	Mn native oxide	manganese native oxide	film	as received	native oxide	manganese	yes	yes	Mn
173	25	Mn	MnC	manganese carbide	film	as received	carbide	manganese	no	no	Mn
174	25	Mn	MnO ₂	manganese dioxide	chip	cleaved	oxide	manganese	Ramsdellite	yes	Mn
175	25	Mn	MnF ₂	manganese difluoride	powder	pressed	fluoride	manganese	yes	yes	Mn
176	25	Mn	MnF ₃	manganese trifluoride	powder	pressed	fluoride	manganese	yes	yes	Mn
177	26	Fe	Fe ^o	elemental iron	flat piece	ion etched	element	iron	yes	yes	Fe
178	26	Fe	Fe native oxide	iron native oxide	film	as received	native oxide	iron	yes	yes	Fe
179	26	Fe	Fe ₂ O ₃	iron oxide	single crystal	cleaved	oxide	iron	Hematite	yes	Fe
180	26	Fe	FeF ₃	iron trifluoride	powder	pressed	fluoride	iron	yes	yes	Fe
181	27	Co	Co ^o	elemental cobalt	flat piece	ion etched	element	cobalt	yes	yes	Co
182	27	Co	Co native oxide	cobalt native oxide	film	as received	native oxide	cobalt	yes	yes	Co
183	27	Co	CoO	cobalt monoxide	single crystal	cleaved	oxide	cobalt	yes	yes	Co
184	27	Co	CoF ₂	cobalt difluoride	powder	pressed	fluoride	cobalt	yes	yes	Co
185	28	Ni	Ni ^o	elemental nickel	flat piece	ion etched	element	<td>yes</td> <td>yes</td> <td>Ni</td>	yes	yes	Ni
186	28	Ni	Ni native oxide	nickel native oxide	film	as received	native oxide	<td>yes</td> <td>yes</td> <td>Ni</td>	yes	yes	Ni
187	28	Ni	NiO	nickel oxide	single crystal	cleaved	oxide	<td>Busenite</td> <td>yes</td> <td>Ni</td>	Busenite	yes	Ni
188	28	Ni	NiF ₂	nickel difluoride	powder	pressed	fluoride	<td>yes</td> <td>yes</td> <td>Ni</td>	yes	yes	Ni
189	29	Cu	Cu ^o	elemental copper	flat piece	ion etched	element	copper	yes	yes	Cu
190	29	Cu	Cu native oxide	copper native oxide	film	as received	native oxide	copper	yes	yes	Cu
191	29	Cu	Cu ₂ O	cuprous oxide	single crystal	cleaved	oxide	copper	Cuprite	yes	Cu
192	29	Cu	CuO	cupric oxide	powder	pressed	oxide	copper	Tenorite	yes	Cu
193	29	Cu	CuF ₂	cupric fluoride	powder	pressed	fluoride	copper	yes	yes	Cu

194	30	Zn	Zn ^o	elemental zinc	flat piece	ion etched	element	zinc	yes	yes	Zn
195	30	Zn	Zn native oxide	zinc native oxide	film	as received	native oxide	zinc	yes	yes	Zn
196	30	Zn	ZnO	zinc oxide	single crystal	cleaved	oxide	zinc	yes	yes	Zn
197	30	Zn	ZnF2	zinc fluoride	powder	pressed	fluoride	zinc	yes	yes	Zn
198	31	Ga	Ga ^o	elemental gallium	bead	ion etched	element	gallium	yes	yes	Ga
199	31	Ga	Ga native oxide	gallium native oxde	bead	as received	native oxide	gallium	yes	yes	Ga
200	31	Ga	Ga2O3	gallium oxide	powder	pressed	oxide	gallium	yes	yes	Ga
201	31	Ga	GaF3	gallium fluoride	powder	pressed	fluoride	gallium	yes	yes	Ga
202	32	Ge	Ge ^o	elemental germanium	flat piece	ion etched	element	germanium	yes	yes	Ge
203	32	Ge	Ge native oxide	germanium native oxide	film	as received	native oxide	germanium	yes	yes	Ge
204	32	Ge	GeO2	germanium oxide	powder	pressed	oxide	germanium	yes	yes	Ge
205	32	Ge	Ge3N4	germanium nitride	powder	as received	nitride	germanium	yes	yes	Ge
206	32	Ge	GeSi	germanium silicide	flat piece	cleaved	silicide	germanium	yes	yes	Ge
207	33	As	As ^o	elemental arsenic	lump	ion etched	element	arsenic	yes	yes	As
208	33	As	As native oxide	arsenic native oxide	film	as received	native oxide	arsenic	yes	yes	As
209	33	As	As2O3	arsenic trioxide	powder	pressed	oxide	arsenic	Arsenolite	yes	As
210	33	As	As2O5	arsenic pentoxide	powder	pressed	oxide	arsenic	yes	yes	As
211	33	As	As2S3	arsenic sulfide	lump	fractured	sulfide	arsenic	Realgar	yes	As
212	33	As	GaAs	gallium arsenide	single crystal	cleaved	arsenide	gallium	yes	yes	As
213	34	Se	Se ^o	elemental selenium	bead	ion etched	element	selenium	yes	yes	Se
214	34	Se	Se native oxide	selenium native oxide	bead	as received	native oxide	selenium	yes	yes	Se
215	34	Se	PbSe	lead selenide	natural crystal	cleaved	selenide	lead	yes	yes	Se
216	34	Se	PbSe native oxide	selenium native oxide	natural crystal	as received	native oxide	selenium	yes	yes	Se
217	34	Se	PbSeO4	lead selenate	powder	as received	selenate	lead	yes	yes	Se
218	34	Se	ZnSe	zinc selenide	single crystal	cleaved	selenide	zinc	yes	yes	Se
219	35	Br	LiBr	lithium bromide	crystallite	crushed	bromide	lithium	yes	yes	Br
220	35	Br	KBr	potassium bromide	single crystal	cleaved	bromide	potassium	yes	yes	Br
221	35	Br	NaBr	sodium bromide	crystallite	crushed	bromide	sodium	yes	yes	Br
222	35	Br	CsBr	cesium bromide	crystallite	crushed	bromide	cesium	yes	yes	Br
223	35	Br	Tribromo-styrene	tribromo-styrene	film	none	polymer	bromine	yes	yes	Br
224	35	Br	p-Bromo-styrene	p-bromo-styrene	film	none	polymer	bromine	yes	yes	Br
225	35	Br	NH4Br	ammonium bromide	crystallite	crushed	bromide	ammonium	yes	yes	Br
226	37	Rb	Rb ^o	elemental rubidium	lump	ion etched	element	rubidium	yes	yes	Rb
227	37	Rb	RbF	rubidium fluoride	bead	crushed	fluoride	rubidium	yes	yes	Rb
228	37	Rb	RbI	rubidium iodide	powder	pressed	iodide	rubidium	yes	yes	Rb
229	37	Rb	Rb2SO4	rubidium sulfate	powder	pressed	sulfate	rubidium	yes	yes	Rb
230	38	Sr	Sr ^o	elemental strontium	lump	ion etched	element	strontium	yes	yes	Sr
231	38	Sr	SrSO4	strontium sulfate	natural crystal	cleaved	sulfate	strontium	Celestine	yes	Sr
232	38	Sr	SrF2	strontium fluoride	powder	pressed	fluoride	strontium	yes	yes	Sr
233	38	Sr	SrCO3	strontium carbonate	powder	pressed	carbonate	strontium	yes	yes	Sr
234	38	Sr	SrBO3	strontium borate	single crystal	cleaved	borate	strontium	yes	yes	Sr

235	38	Sr	SrTiO3	strontium titanate	single crystal	cleaved	titanate	strontium	yes	yes	Sr
236	39	Y	Y ^o	elemental yttrium	flat piece	ion etched	element	yttrium	yes	yes	Y
237	39	Y	Y native oxide	yttrium native oxide	film	as received	native oxide	yttrium	yes	yes	Y
238	39	Y	YC	yttrium carbide	film	as received	carbide	yttrium	no	no	Y
239	39	Y	Y2O3	yttrium oxide	powder	pressed	oxide	yttrium	yes	yes	Y
240	39	Y	YF3	yttrium fluoride	powder	pressed	fluoride	yttrium	yes	yes	Y
241	39	Y	Y2(SO4)3	yttrium sulfate	powder	pressed	sulfate	yttrium	yes	yes	Y
242	40	Zr	Zr ^o	elemental zirconium	flat piece	ion etched	element	zirconium	yes	yes	Zr
243	40	Zr	Zr native oxide	zirconium native oxide	film	as received	native oxide	zirconium	yes	yes	Zr
244	40	Zr	ZrC	zirconium carbide	film	as received	carbide	zirconium	no	no	Zr
245	40	Zr	ZrO2	zirconium oxide	powder	pressed	oxide	zirconium	yes	yes	Zr
246	40	Zr	ZrF4	zirconium fluoride	powder	pressed	fluoride	zirconium	yes	yes	Zr
247	41	Nb	Nb ^o	elemental niobium	flat piece	ion etched	element	niobium	yes	yes	Nb
248	41	Nb	Nb native oxide	niobium native oxide	film	as received	native oxide	niobium	yes	yes	Nb
249	41	Nb	NbC	niobium carbide	film	as received	carbide	niobium	no	no	Nb
250	41	Nb	Nb2O5	niobium pentoxide	powder	pressed	oxide	niobium	yes	yes	Nb
251	41	Nb	LiNbO3	lithium niobate	single crystal	cleaved	niobate	lithium	yes	yes	Nb
252	42	Mo	Mo ^o	elemental molybdenum	flat piece	ion etched	element	molybdenum	yes	yes	Mo
253	42	Mo	Mo native oxide	molybdenum native oxide	film	as received	native oxide	molybdenum	yes	yes	Mo
254	42	Mo	MoC	molybdenum carbide	film	as received	carbide	molybdenum	no	no	Mo
255	42	Mo	MoO3	molybdenum oxide	powder	pressed	oxide	molybdenum	yes	yes	Mo
256	42	Mo	MoS2	molybdenum sulfide	single crystal	peeled	sulfide	molybdenum	Molybdenite	yes	Mo
257	44	Ru	Ru ^o	elemental ruthenium	flat piece	ion etched	element	ruthenium	yes	yes	Ru
258	44	Ru	Ru native oxide	ruthenium native oxide	film	as received	native oxide	ruthenium	yes	yes	Ru
259	44	Ru	RuO2	ruthenium oxide	powder	pressed	oxide	ruthenium	yes	yes	Ru
260	45	Rh	Rh ^o	elemental rhodium	flat piece	ion etched	element	rhodium	yes	yes	Rh
261	45	Rh	Rh native oxide	rhodium native oxide	film	as received	native oxide	rhodium	yes	yes	Rh
262	45	Rh	RhC	rhodium carbide	film	as received	carbide	rhodium	no	no	Rh
263	45	Rh	Rh2O3	rhodium oxide	powder	pressed	oxide	rhodium	yes	yes	Rh
264	46	Pd	Pd ^o	elemental palladium	flat piece	ion etched	element	palladium	yes	yes	Pd
265	46	Pd	Pd native oxide	palladium native oxide	film	as received	native oxide	palladium	yes	yes	Pd
266	46	Pd	PdO	palladium oxide	powder	pressed	oxide	palladium	yes	yes	Pd
267	47	Ag	Ag ^o	elemental silver	flat piece	ion etched	element	silver	yes	yes	Ag
268	47	Ag	Ag native oxide	silver native oxide	film	as received	native oxide	silver	yes	yes	Ag
269	47	Ag	AgO	Silver (II) Oxide	powder	pressed	oxide	Silver	yes	yes	Ag
270	47	Ag	AgF2	Silver Difluoride	powder	pressed	fluoride	Silver	yes	yes	Ag
271	48	Cd	Cd ^o	elemental cadmium	flat piece	ion etched	element	cadmium	yes	yes	Cd
272	48	Cd	Cd native oxide	cadmium native oxide	film	as received	native oxide	cadmium	yes	yes	Cd
273	48	Cd	CdO	cadmium oxide	powder	pressed	oxide	cadmium	yes	yes	Cd
274	48	Cd	CdS	cadmium sulfide	single crystal	cleaved	sulfide	cadmium	yes	yes	Cd

275	49	In	In°	elemental indium	flat piece	ion etched	element	indium	yes	yes	In
276	49	In	In native oxide	indium native oxide	film	as received	native oxide	indium	yes	yes	In
277	49	In	In2O3	indium oxide	powder	pressed	oxide	indium	yes	yes	In
278	49	In	InF3	indium fluoride	powder	pressed	fluoride	indium	yes	yes	In
279	49	In	InP	indium phosphide	single crystal	cleaved	phosphide	indium	yes	yes	In
280	50	Sn	Sn°	elemental tin	flat piece	ion etched	element	tin	yes	yes	Sn
281	50	Sn	Sn native oxide	tin native oxide	film	as received	native oxide	tin	yes	yes	Sn
282	50	Sn	SnO2	tin oxide	natural crystal	cleaved	oxide	tin	Cassiterite	yes	Sn
283	50	Sn	SnF4	tin tetra-fluoride	powder	pressed	fluoride	tin	yes	yes	Sn
284	51	Sb	Sb°	elemental antimony	flat piece	ion etched	element	antimony	yes	yes	Sb
285	51	Sb	Sb native oxide	antimony native oxide	film	as received	native oxide	antimony	yes	yes	Sb
286	51	Sb	Sb2O5	antimony pentoxide	powder	pressed	oxide	antimony	yes	yes	Sb
287	51	Sb	SbF3	antimony fluoride	powder	pressed	fluoride	antimony	yes	yes	Sb
288	52	Te	Te°	elemental tellurium	flat piece	ion etched	element	tellurium	yes	yes	Te
289	52	Te	Te native oxide	tellurium native oxide	film	as received	native oxide	tellurium	yes	yes	Te
290	52	Te	TeO2	tellurium oxide	powder	pressed	oxide	tellurium	Tellurite	yes	Te
291	52	Te	CdTe	cadmium telluride	single crystal	cleaved	telluride	cadmium	yes	yes	Te
292	52	Te	PbTe	lead telluride	single crystal	cleaved	telluride	lead	yes	yes	Te
293	52	Te	AgTe	silver telluride	single crystal	cleaved	telluride	silver	yes	yes	Te
294	53	I	Lil	lithium iodide	bead	crushed	iodide	lithium	yes	yes	I
295	53	I	KI	potassium iodide	single crystal	cleaved	iodide	potassium	yes	yes	I
296	53	I	Nal	sodium iodide	crystallite	crushed	iodide	sodium	yes	yes	I
297	53	I	Rbl	rubidium iodide	powder	pressed	iodide	rubidium	yes	yes	I
298	53	I	CsI	cesium iodide	single crystal	scraped	iodide	cesium	yes	yes	I
299	53	I	p-Iodo-styrene	p-iodo-styrene	film	vaporated solutic	polymer	iodine	yes	yes	I
300	55	Cs	Cs°	elemental cesium	film	ion etched	element	cesium	yes	yes	Cs
301	55	Cs	CsF	cesium fluoride	powder	pressed	fluoride	cesium	yes	yes	Cs
302	55	Cs	CsI	cesium iodide	single crystal	scraped	iodide	cesium	yes	yes	Cs
303	55	Cs	CsCl	cesium chloride	crystallite	crushed	chloride	cesium	yes	yes	Cs
304	55	Cs	CsBr	cesium bromide	crystallite	crushed	bromide	cesium	yes	yes	Cs
305	55	Cs	CsHCO3	cesium bi-carbonate	powder	pressed	bi-carbonate	cesium	yes	yes	Cs
306	55	Cs	Cs2CO3	cesium carbonate	powder	pressed	carbonate	cesium	yes	yes	Cs
307	55	Cs	Cs2SO4	cesium sulfate	crystallite	crushed	sulfate	cesium	yes	yes	Cs
308	56	Ba	Ba°	elemental barium	lump	ion etched	element	barium	yes	yes	Ba
309	56	Ba	BaO	barium oxide	powder	pressed	oxide	barium	yes	yes	Ba
310	56	Ba	BaCO3	barium carbonate	powder	pressed	carbonate	barium	Witherite	yes	Ba
311	56	Ba	BaSO4	barium sulfate	natural crystal	cleaved	sulfate	barium	Baryte	yes	Ba
312	56	Ba	BaF2	barium fluoride	powder	pressed	fluoride	barium	yes	yes	Ba
313	57	La	La°	elemental lanthanum	flat piece	ion etched	element	lanthanum	yes	yes	La
314	57	La	La2O3	lanthanum oxide	powder	pressed	oxide	lanthanum	yes	yes	La
315	57	La	La2(CO3)3 - 6H2O	lanthanum carbonate	powder	pressed	carbonate	lanthanum	yes	yes	La

316	57	La	LaF3	lanthanum fluoride	powder	pressed	fluoride	lanthanum	yes	yes	La
317	57	La	La2(SO4)3	lanthanum sulfate	powder	pressed	sulfate	lanthanum	yes	yes	La
318	57	La	LaB6	lanthanum hexa-boride	single crystal	ion etched	boride	lanthanum	yes	yes	La
319	58	Ce	Ce ^o	elemental cerium	flat piece	ion etched	element	cerium	yes	yes	Ce
320	58	Ce	CeO2	cerium dioxide	powder	pressed	oxide	cerium	yes	yes	Ce
321	58	Ce	Ce2CO3 - nH2O	cerium carbonate	powder	pressed	carbonate	cerium	yes	yes	Ce
322	58	Ce	CeF4	cerium tetra-fluoride	powder	pressed	fluoride	cerium	yes	yes	Ce
323	58	Ce	CeF3	cerium tri-fluoride	crystallite	cleaved	fluoride	cerium	yes	yes	Ce
324	58	Ce	Ce2(SO4)3	cerium sulfate	powder	pressed	sulfate	cerium	yes	yes	Ce
325	58	Ce	NH4Ce(SO4)2	ammonium cerium sulfate	powder	pressed	sulfate	ammonium	yes	yes	Ce
326	59	Pr	Pr ^o	elemental praseodymium	flat piece	ion etched	element	praseodymium	yes	yes	Pr
327	59	Pr	Pr2O5	praseodymium pentoxide	powder	pressed	oxide	praseodymium	yes	yes	Pr
328	59	Pr	PrF3	praseodymium fluoride	powder	pressed	fluoride	praseodymium	yes	yes	Pr
329	60	Nd	Nd ^o	elemental neodymium	flat piece	ion etched	element	neodymium	yes	yes	Nd
330	60	Nd	Nd native oxide	neodymium native oxide	film	as received	native oxide	neodymium	yes	yes	Nd
331	60	Nd	Nd2O3	neodymium oxide	powder	pressed	oxide	neodymium	yes	yes	Nd
332	60	Nd	NdF3	neodymium fluoride	powder	pressed	fluoride	neodymium	yes	yes	Nd
333	62	Sm	Sm ^o	elemental samarium	flat piece	ion etched	element	samarium	yes	yes	Sm
334	62	Sm	Sm2O3	samarium oxide	powder	pressed	oxide	samarium	yes	yes	Sm
335	62	Sm	SmF3	samarium fluoride	powder	pressed	fluoride	samarium	yes	yes	Sm
336	63	Eu	Eu ^o	elemental europium	flat piece	ion etched	element	europlum	yes	yes	Eu
337	63	Eu	Eu native oxide	europium native oxide	film	as received	native oxide	europlum	yes	yes	Eu
338	63	Eu	Eu2O3	europium oxide	powder	pressed	oxide	europlum	yes	yes	Eu
339	63	Eu	EuF3	europium fluoride	powder	pressed	fluoride	europlum	yes	yes	Eu
340	63	Eu	Eu2(SO4)3	europium sulfate	powder	pressed	sulfate	europlum	yes	yes	Eu
341	64	Gd	Gd ^o	elemental gadolinium	flat piece	ion etched	element	gadolinium	yes	yes	Gd
342	64	Gd	Gd native oxide	gadolinium native oxide	film	as received	native oxide	gadolinium	yes	yes	Gd
343	64	Gd	Gd2O3	gadolinium oxide	powder	pressed	oxide	gadolinium	yes	yes	Gd
344	64	Gd	GdF3	gadolinium fluoride	powder	pressed	fluoride	gadolinium	yes	yes	Gd
345	64	Gd	Gd2(SO4)3	gadolinium sulfate	powder	pressed	sulfate	gadolinium	yes	yes	Gd
346	65	Tb	Tb ^o	elemental terbium	flat piece	ion etched	element	terbium	yes	yes	Tb
347	65	Tb	Tb native oxide	terbium native oxide	film	as received	native oxide	terbium	yes	yes	Tb
348	65	Tb	Tb2O3	terbium oxide	powder	pressed	oxide	terbium	yes	yes	Tb
349	65	Tb	Tb4O7	terbium hepta-oxide	powder	pressed	oxide	terbium	yes	yes	Tb
350	66	Dy	Dy ^o	elemental dysprosium	flat piece	ion etched	element	dysprosium	yes	yes	Dy
351	66	Dy	Dy native oxide	dysprosium native oxide	film	as received	native oxide	dysprosium	yes	yes	Dy
352	66	Dy	Dy2O3	dysprosium oxide	powder	pressed	oxide	dysprosium	yes	yes	Dy
353	66	Dy	Dy2(SO4)3	dysprosium sulfate	powder	pressed	sulfate	dysprosium	yes	yes	Dy
354	67	Ho	Ho ^o	elemental holmium	flat piece	ion etched	element	holmium	yes	yes	Ho
355	67	Ho	Ho native oxide	holmium native oxide	film	as received	native oxide	holmium	yes	yes	Ho
356	67	Ho	Ho2O3	holmium oxide	powder	pressed	oxide	holmium	yes	yes	Ho

357	67	Ho	Ho2(SO4)3	holmium sulfate	powder	pressed	sulfate	holmium	yes	yes	Ho
358	68	Er	Er ^o	elemental erbium	flat piece	ion etched	element	erbium	yes	yes	Er
359	68	Er	Er native oxide	erbium native oxide	film	as received	native oxide	erbium	yes	yes	Er
360	68	Er	Er2O3	erbium oxide	powder	pressed	oxide	erbium	yes	yes	Er
361	68	Er	ErF3	erbium fluoride	powder	pressed	fluoride	erbium	yes	yes	Er
362	69	Tm	Tm ^o	elemental thulium	flat piece	ion etched	element	thulium	yes	yes	Tm
363	69	Tm	Tm native oxide	thulium native oxide	film	as received	native oxide	thulium	yes	yes	Tm
364	69	Tm	Tm2O3	thulium oxide	powder	pressed	oxide	thulium	yes	yes	Tm
365	69	Tm	TmF3	thulium fluoride	powder	pressed	fluoride	thulium	yes	yes	Tm
366	69	Tm	Tm2(SO4)3	thulium sulfate	powder	pressed	sulfate	thulium	yes	yes	Tm
367	70	Yb	Yb ^o	elemental ytterbium	flat piece	ion etched	element	ytterbium	yes	yes	Yb
368	70	Yb	Yb native oxide	ytterbium native oxide	film	as received	native oxide	ytterbium	yes	yes	Yb
369	70	Yb	Yb2O3	ytterbium oxide	powder	pressed	oxide	ytterbium	yes	yes	Yb
370	70	Yb	YbF3	ytterbium fluoride	powder	pressed	fluoride	ytterbium	yes	yes	Yb
371	70	Yb	Yb2(CO3)3 - H2O	ytterbium carbonate	powder	pressed	carbonate	ytterbium	yes	yes	Yb
372	71	Lu	Lu ^o	elemental lutetium	flat piece	ion etched	element	lutetium	yes	yes	Lu
373	71	Lu	Lu native oxide	lutetium native oxide	film	as received	native oxide	lutetium	yes	yes	Lu
374	71	Lu	Lu2O3	lutetium oxide	powder	pressed	oxide	lutetium	yes	yes	Lu
375	71	Lu	Lu2(SO4)3 - 8H2O	lutetium sulfate	powder	pressed	sulfate	lutetium	yes	yes	Lu
376	72	Hf	Hf ^o	elemental hafnium	flat piece	ion etched	element	hafnium	yes	yes	Hf
377	72	Hf	Hf native oxide	hafnium native oxide	film	as received	native oxide	hafnium	yes	yes	Hf
378	72	Hf	HfC	hafnium carbide	lump	ion etched	carbide	hafnium	yes	yes	Hf
379	72	Hf	HfO2	hafnium oxide	powder	pressed	oxide	hafnium	yes	yes	Hf
380	72	Hf	HfF4	hafnium fluoride	powder	pressed	fluoride	hafnium	yes	yes	Hf
381	73	Ta	Ta ^o	elemental tantalum	flat piece	ion etched	element	tantalum	yes	yes	Ta
382	73	Ta	Ta native oxide	tantalum native oxide	film	as received	native oxide	tantalum	yes	yes	Ta
383	73	Ta	TaC	tantalum carbide	film	as received	carbide	tantalum	yes	yes	Ta
384	73	Ta	Ta2O5	tantalum pentoxide	film	as received	oxidwe	tantalum	yes	yes	Ta
385	73	Ta	TaF5	tantalum penta-fluoride	powder	pressed	fluoride	tantalum	yes	yes	Ta
386	74	W	W ^o	elemental tungsten	flat piece	ion etched	element	tungsten	yes	yes	W
387	74	W	W native oxide	tungsten native oxide	film	as received	native oxide	tungsten	yes	yes	W
388	74	W	WC	tungsten carbide	powder	ion etched	carbide	tungsten	no	no	W
389	74	W	WO3	tungsten oxide	powder	pressed	oxide	tungsten	yes	yes	W
390	74	W	Li2WO4	lithium tungstate	crystallite	crushed	tungstate	lithium	yes	yes	W
391	75	Re	Re ^o	elemental rhenium	flat piece	ion etched	element	rhenium	yes	yes	Re
392	75	Re	Re native oxide	rhenium native oxide	film	as received	native oxide	rhenium	yes	yes	Re
393	75	Re	Re2O7	rhenium hepta-oxide	crystallite	crushed	oxide	rhenium	yes	yes	Re
394	76	Os	Os ^o	elemental osmium	flat piece	ion etched	element	osmium	yes	yes	Os
395	76	Os	Os native oxide	osmium native oxide	film	as received	native oxide	osmium	yes	yes	Os
396	76	Os	OsO2	osmium di-oxide	powder	pressed	oxide	osmium	yes	yes	Os

397	77	Ir	Ir ^o	elemental iridium	flat piece	ion etched	element	iridium	yes	yes	Ir
398	77	Ir	Ir native oxide	iridium native oxide	film	as received	native oxide	iridium	yes	yes	Ir
399	77	Ir	IrO2	iridium oxide	powder	pressed	oxide	iridium	yes	yes	Ir
400	78	Pt	Pt ^o	elemental platinum	flat piece	ion etched	element	platinum	yes	yes	Pt
401	78	Pt	Pt native oxide	platinum native oxide	film	as received	native oxide	platinum	yes	yes	Pt
402	78	Pt	PtO2	platinum di-oxide	powder	pressed	oxide	platinum	yes	yes	Pt
403	78	Pt	PtCl4	platinum tetra-chloride	crystallite	crushed	chloride	platinum	yes	yes	Pt
404	78	Pt	PtS2	platinum di-sulfide	powder	pressed	sulfide	platinum	yes	yes	Pt
405	79	Au	Au ^o	elemental gold	flat piece	ion etched	element	gold	yes	yes	Au
406	79	Au	Au native oxide	gold native oxide	film	as received	native oxide	gold	yes	yes	Au
407	79	Au	Au2O3	gold oxide	powder	pressed	oxide	gold	yes	yes	Au
408	79	Au	Au2O	gold (I) oxide	powder	pressed	oxide	gold	yes	yes	Au
409	80	Hg	Hg ^o	elemental mercury	bead	ion etched	element	mercury	yes	yes	Hg
410	80	Hg	HgO	mercury oxide	powder	pressed	oxide	mercury	yes	yes	Hg
411	80	Hg	HgS	mercury sulfide	natural crystal	cleaved	sulfide	mercury	Cinnabar	yes	Hg
412	80	Hg	HgF2	mercury fluoride	powder	pressed	fluoride	mercury	yes	yes	Hg
413	81	Tl	Tl ^o	elemental thallium	flat piece	ion etched	element	thallium	yes	yes	Tl
414	81	Tl	Tl native oxide	thallium native oxide	film	as received	native oxide	thallium	yes	yes	Tl
415	81	Tl	Tl2O3	thallium oxide	powder	pressed	oxide	thallium	yes	yes	Tl
416	81	Tl	TINO3	thallium nitrate	powder	pressed	nitrate	thallium	yes	yes	Tl
417	82	Pb	Pb ^o	elemental lead	flat piece	ion etched	element	lead	yes	yes	Pb
418	82	Pb	Pb native oxide	lead native oxide	film	as received	native oxide	lead	yes	yes	Pb
419	82	Pb	PbO	lead monoxide	powder	pressed	oxide	lead	Litharge	yes	Pb
420	82	Pb	PbF2	lead difluoride	powder	pressed	fluoride	lead	yes	yes	Pb
421	83	Bi	Bi ^o	elemental bismuth	flat piece	ion etched	element	bismuth	yes	yes	Bi
422	83	Bi	Bi native oxide	bismuth native oxide	film	as received	native oxide	bismuth	yes	yes	Bi
423	83	Bi	Bi2O3	bismuth oxide	powder	pressed	oxide	bismuth	yes	yes	Bi
424	83	Bi	BiF3	bismuth fluoride	powder	pressed	fluoride	bismuth	yes	yes	Bi
425	90	Th	Th ^o	elemental thorium	flat piece	ion etched	element	thorium	yes	yes	Th
426	90	Th	Th native oxide	thorium native oxide	film	as received	native oxide	thorium	yes	yes	Th
427	90	Th	ThO2	thorium oxide	powder	pressed	oxide	thorium	Thorite	yes	Th
428	90	Th	ThF4	thorium fluoride	powder	pressed	fluoride	thorium	yes	yes	Th
429	92	U	U ^o	elemental uranium	flat piece	ion etched	element	uranium	yes	yes	U
430	92	U	U native oxide	uranium native oxide	film	as received	native oxide	uranium	yes	yes	U
431	92	U	UO2	uranium di-oxide	grains	crushed	oxide	uranium	Uraninite	yes	U