Card #2

Pyroxene

289 Pyroxene R940
290 Pyroxene H35 (BH1.23)
291 Hypersthene C-2270
292 Pyroxene 177/54
293 Hypersthene 400
294 Pyroxene 20486
301 Pyroxene Ks137/59
302 Pyroxene Y7
303 Pyroxene Y-18 (EB13)
304 Pyroxene Y-25 (55MV-29)
309 Orthopyroxene A
322 Jadeite 54-RGG-58

Miss. silicates and glasses

#9 Akermanite (melilite)
11 Zircon
23 Akermanite
39 Rare Earth Glass (REE 1)
40 Rare Earth Glass (REE 2)
41 Rare Earth Glass (REE 3)
42 Rare Earth Glass (REE 4)
111 Cordierite glass
115 MAS 22
116 MAS 2
117 MAS 14
130 Scapolite XXX
131 Scapolite XXXI
132 Scapolite XXXII
133 Scapolite XXXIII
134 Scapolite XXXIV
135 Scapolite XXXV
152 Fluoro-phlogopite
153 Taeniolite
162 Lepidolite 60-1252
204 Lepidolite
#205 Serpentine
208 Epidote #E-16
209 Chlorite #G-RS-2
211 Epidote #E-2
240 Haplogranite Glass
297 Boron Fluorophologopite
318 V-glass
319 W-glass
320 X-glass
321 Kyanite
329 Zircon
333 Scandium thortveitite

Simple Oxides

1 Cobalt Oxide
2 Iron Oxide
3 Nickel Oxide
4 Nickel Oxide
5 Vanadium Trioxide
6 Vanadium Trioxide
7 Vanadium Pentoxide
8 Iron Oxide
25 Rutile
26 Chromium Oxide
28 Corundum
29 Quartz
30 Periclase
55 Cobalt Oxide
56 Zinc Oxide
72 Anatase
73 Rutile
74 Corundum
77 Magnetite
298 Baddeleyite
300 Boehmite
330 Vanadium Pentoxide
332 Iron Trioxide

Garnet

#51 Yttrium Aluminum Garnet
110 Pyrope glass
138 Uvarovite
140 Yttrium Aluminum Garnet
164 Andradite K-450
165 Garnet (Gore Mt.).
217 Garnet #3708
218 Garnet #219
219 Garnet S-347
220 Garnet #5

Fluorides

#46 Calcium Fluoride
71 Fluorite
141 Cadmium Fluoride

Olivine

#53 Beryllium Silicate
54 Beryllium Silicate
136 Cobalt-Olivine
137 Nickel-olivine
154 Olivine 174.1
259 Scandium Olivine
271 Mn-Hortonolite
274 Olivine-Susimäki
282 Olivine R2202
307 Olivine YS-5 (EG4146)
308 Olivine 39126
324 Olivine (Turkevich)
325 Olivine (P 140)
327 Olivine T-531
331 Li-Sc-olivine

Amphibole

#112 Anthophyllite-Al #5
113 Anthophyllite-Mg #1
114 Anthophyllite-Al #3
206 Hornblende
210 Amphibole #175a-Gl
212 Amphibole #P1
213 Hornblende
214 Amphibole #SL0561
215 Actinolite
216 Amphibole
221 Mn-Cummingtonite #4
222 Grunerite #1
223 Actinolite #11B
224 Riebeckite-Tremolite #13
245 Grunerite #7
283 Pargasite R1128
284 Tremolite R1597

Pyroxene

#119 Scandium Spodumene
120 Indium aegirine
121 Wollastonite glass
122 Enstatite Glass
123 Diopside Glass
124 Enstatite 5% Al_2O_3 Glass
125 Enstatite 10% Al_2O_3 Glass
126 Enstatite 20% Al_2O_3 Glass
127 Diopside (85%) - Jadeite (15%)
139 Rubidium Aluminum Silicate
144 Ferrosilite
145 Ferrosilite
146 Diopside
#147 Enstatite
155 Enstatite 25.25
159 Jadeite
160 Rhodonite #388
166 Hedenbergite
167 Wollastonite
168 Clinopyroxene
199 Rhodonite #104791
207 Jadeite
242 Clinopyroxene N23
243 Diopside
266 Pyroxene - Eskola 21
269 Jadeite
272 Rhodonite #104738
273 Eulite #9B
285 Clinopyroxene R2395
286 Clinopyroxene R2394
287 Clinopyroxene R1482
288 Clinopyroxene R1133

Complex Oxides

#43 Lithium Tantalum Oxide
44 Lead Molybdenum Oxide
45 Lithium Niobium Oxide
47 Calcium Tungstate
48 Barium Iron Oxide
49 Barium Cobalt Iron Oxide
50 Barium Zinc Iron Oxide
118 Scandium Pseudobrookite
142 Copper Iron Oxide
143 Copper Iron Oxide
148 Calcium tungstate
149 Sodium Lanthanum Tungstate
150 Lithium Niobate
261 Ilmenite A-128
278 Ilmenite K-13-131.8
299 Barium Aluminum Oxide
306 Iron Aluminum Chromium Oxide

Carbonates & Sulpha

#225 Kutnahorite #85670
227 Dolomite #105064
252 Barite M-17328

Phosphates

#10 Calcium Phosphate
15 Apatite-chloro
16 Apatite-chloro
151 Calcium phosphate
163 Herderite
200 Brazilianite #100873
201 Apatite
202 Apatite DM-B
226 Hurlbutite #106243
244 Apatite #101464
262 Apatite A-408
323 Apatite

Feldspars

#12 Orthoclase
20 Anorthoclase
52 Pollucite
59 Plagioclase glass - An_{100}
60 Plagioclase glass-An_{100}
61 Plagioclase glass-An_{90}
62 Plagioclase glass - An_{80}
63 Plagioclase glass - An_{70}
64 Plagioclase glass - An_{60}
65 Plagioclase glass - An_{50}
66 Plagioclase glass - An_{40}
67 Plagioclase glass - An_{30}
68 Plagioclase glass - An_{20}
69 Plagioclase glass-An_{10}
70 Albite glass - An_{0}

Selenides, Arsenides, Tellurides

#169 Dyscrasite Ag-16
170 Dyscrasite Ag-17
171 Allargentum Ag-18
172 Allargentum Ag-19
173 Allargentum Ag-20
174 Antimony Silver Ag-21
175 Iron Arsenide As-18
176 Copper-sulfur selinide 69-155
177 Copper-sulfur selinide 69-159
179 Nickel Antimony #142
180 Nickel Antimony #141
181 Copper Selenide #113
182 Copper Selenide #129
183 Copper Selenide #130
184 Copper Selenide
185 Krennerite-J
186 Calaverite-K
196 Cobalt arsenide
228 Lead Telluride #23
229 Lead Selenide #22
232 Gold antimony #8

CARD #2 — Feldspars

#128 Sr-Anorthite
156 Bytownite
241 Feldspar PRC-2000
246 Feldspar (Mt. Anakie)
247 Sanidine (Kokomo)
248 Albite (Amelia)
249 Adularia (Spencer B)
250 Oligoclase #81822
258 Microcline (Asbestos)
264 Plagioclase Glass An_{90}
265 Labradorite - Clear Lake
314 Ge-Anorthite
315 Ge-Anorthite
316 Sr-Anorthite
317 Ga-Anorthite
326 Paracelsion
328 Orthoclase (Benson)

Spinels

#13 Chromite #2034
14 Chromite #706
129 Spinel
157 Chromite GS-3
158 Chromite GS-4
161 Chromite GS-2
197 Chromite
198 Picrochromite
253 Magnesioferrite
254 Magnesioferrite
257 Magnetite A-35
263 Chromite MB5
270 Spinel 64-3
275 Chromite R2447
276 Chromite R2448
277 Chromite R-2309
279 Chromite 61-1436
280 Chromite R-557
281 Chromite 61-1437
295 Picrochromite CM-1
296 Chromite
305 Aluminous chromite

Sulphides

#17 Pyrite
18 Chalcopyrite
19 Molybdenite
21 Galena
22 Daubreelite
57 Troilite
58 Millerite
178 Cobalt-antimony Sulfide #145
187 Millerite #48
188 Pyrite #20
189 Bornite #14
190 Galena #21
191 Sphalerite #31
192 Chalcopyrite #11
193 Pentlandite #68
194 Troilite
203 Sphalerite #1360
230 FeS+2% Cu #90
231 Silver-Bismuth Sulfide #5
233 CdS+ZnS #43
234 Lead-Copper Antimony-Sulfide #25
235 Alabandite #76
#236 MnS-ZnS #38
237 FeS-ZnS #35
239 FeS-ZnS #37
255 Pyrrhotite-A
256 Pyrrhotite-B
267 Sphalerite
268 Cadmium Sulfide

Metals

#24	Nickel Silicide
27	Chromium
31	Iron metal
32	Copper metal
33	Titanium metal
34	Zinc metal
35	Vanadium metal
36	Nickel metal
37	Manganese metal
38	Niobium metal
75	Titanium-Niobium alloy
76	Cerium metal
78	Zirconium metal
79	Bismuth metal
80	Tellurium metal
81	Iridium metal
82	Palladium metal
83	Vanadium metal
84	Chromium metal
85	Tungsten metal
86	Aluminum metal
87	Magnesium metal
88	Molybdenum metal
89	Arsenic metal
90	Germanium metal
91	Uranium metal
92	Lead metal
93	Gold metal
94	Cobalt metal
95	Silver metal
96	Tin metal
97	Nickel metal
98	Antimony metal
99	Thallium metal
100	Manganese metal
101	Copper metal
102	Zinc metal
103	Gallium metal
104	Tantalum metal
105	Indium metal
106	Iron metal
107	Cadmium metal

Card #2

Metals

#108	Platinum metal
109	Hafnium metal
238	Gold-Silver #82
251	Beryllium metal
260	Silicon metal
310	Nickel metal
311	Iron metal
312	Cobalt metal
313	Tungsten-Rhenium metal

At #-3

Li

#43	$LiTaO_3$	.0294
45	$LiNbO_3$	.0469
119	$LiScSi_2O_6$	.0340
150	$LiNbO_3$	.0469
153	Taeniolite	.0170
162	Lepdolite	.0249
204	Lepidolite	.0249
259	Sc-olivine	.0196
331	$LiScSiO_4$	.0482

At #-3
Li

#43	$LiTaO_3$	.0294
45	$LiNbO_3$	.0469
119	$LiScSi_2O_6$	.0340
150	$LiNbO_3$	.0469
153	Taeniolite	.0170
162	Lepdolite	.0249
204	Lepidolite	.0249
259	Sc-olivine	.0196
331	$LiScSiO_4$	.0482

At #
F

224	Riebeckite-Tremolite	.0160
220	Grunerite #1	.0100
210	Amphibole #175a-Gl	.0059
206	Hornblende	.0178
210	Apatite	.0240
323	Apatite	.0330
297	B-F-Phlogopite	.0938
262	Apatite	.0338
244	Apatite	.0238
204	Lepidolite	.0788
202	Apatite DM-B	.0353
46	CaF_2	.4866
71	CaF_2	.4866
141	CdF_2	.2527
152	Fluoro-phlogopite	.0902
153	Taeniolite	.0938
162	Lepidolite	.0788

At # 4
Be

#53	Be_2SiO_4	.1637
54	Be_2SiO_4	.1637
163	Herderite	.0535
226	Hurlbutite	.0767
251	Be-metal	1.0

Na

#20	Anorthoclase	.0611
52	Pollucite	.0139
61	An_{90}-Glass	.0083
62	An_{80}-Glass	.0167
63	An_{70}-Glass	.0252
64	An_{60}-Glass	.0338
65	An_{50}-Glass	.0425
66	An_{40}-Glass	.0513
67	An_{30}-Glass	.0603
68	An_{20}-Glass	.0693
69	An_{10}-Glass	.0784
70	An_0 -Glass	.0877
120	$NaInSi_2O_6$	.0793
127	Di85-Jd15	.0171
149	$NaLaW_2O_8$	.0350
249	Adularia	.0080

At #11

130	Scapolite XXX	.0181
131	Scapolite XXX1	.0283
132	Scapolite XXX11	.0475
133	Scapolite XXX111	.0509
134	Scapolite XXXIV	.0634
135	Scapolite XXXV	.0779
247	Sanidine	.0167
246	Na-K-feldspar	.0618
156	Bytownite	.0203
159	Jadeite	.0994
166	Hedenbergite	.0033
168	Clinopyroxene	.0070
200	Brazilianite #100873	.0615
206	Hornblende	.0198
207	Jadeite	.1109
210	Amphibole #175a-Gl	.0487
212	Amphibole #P1	.0450
213	Hornblende	.0230
214	Amphibole #SL0561	.0501

At #5
B

#297	B-F-phologopite	.0267
318	V-glass	.0137
319	W-glass	.0135
320	X-glass	.0135

Card 2

At #11
Na

216	Amphibole	.0501
224	Riebeckite-Tremolite	.0214
240	Haplogranite glass	.0237
241	Feldspar PRG-2000	.0532
242	Clinopyroxene N23	.0078
248	Albite (Amelia)	.0856
250	Oligoclase #81822	.0714
264	Plagioclase Glass (An_{90})	.0083
265	Labradorite-Clear Lake	.0313
269	Jadeite	.0994
283	Pargasite R1128	.0169
285	Clinopyroxene R2395	.0090
322	Jadeite 54-RGG-58	?

At #6
C

#225	Kutnahorite #85670	.1141
130	Scapolite XXX	.0078
131	Scapolite XXX1	.0073
132	Scapolite XXX11	.0062
133	Scapolite XXX111	.0058
134	Scapolite XXXIV	.0046
135	Scapolite XXXV	.0030
227	Dolomite	.1293
323	Apatite	.0057

At #15
P

201	Apatite	.1789
200	Brazilianite #100873	.1693
323	Apatite	.1675
262	Apatite A408	.1806
10	Calcium phosphate	.2438
15	Apatite-chloro	.1784
16	Apatite-chloro	.1784
151	$Ca_2P_2O_7$	.2438
163	Herderite	.1895
202	Apatite DMB	.1749
226	Hurlbutite	.2452
244	Apatite #101464	.1802

268	CdS	.2219
267	ZnS	.3291
252	$BaSO_4$	.1374
239	FeS-ZnS	.3525
237	FeS-ZnS	.3323
17	FeS_2	.5345
18	$CuFeS_2$	.3493
19	MoS_2	.4006
21	PbS	.1340
22	$FeCr_2S_4$	-
57	FeS	.374
58	NiS	.3532
130	Scapolite XXX	.0038
131	Scapolite XXXI	.0057
132	Scapolite XXXII	.0029
133	Scapolite XXXIII	.0032
176	$Cu_{.64}Se_{.30}S_{.06}$	.0300
177	$Cu_{.64}Se_{.25}S_{.111}$	.0536
178	CoSbS	.1507
187	NiS	.6467

At #16 S

188	FeS_2	.5345
189	$Cu_{5.4}Fe_{.82}S_4$	.2469
190	PbS	.1340
191	ZnS	.3291
192	$CuFeS_2$	.3494
193	Pentlandite	.3746
230	FeS + Cu	.3587
231	$AgBiS_2$	.1683
233	ZnS + Cd	.3275
234	$Pb_2Cu_2Sb_2S_6$	.1968
235	MnS	.3685
236	MnS-ZnS	.3362
255	Pyrrhotite-A	.387
256	Pyrrhotite-B	.396
203	Sphalerite #1360	.

At # 22 Ti

25	TiO_2	.5995
33	Ti-metal	1.0
72	TiO_2	.5995
73	TiO_2	.5995
75	Ti-Nb metal	.353
119	Sc_2TiO_5	.2196
318	V-glass	.0047
157	chromite GS-3	.0034
158	chromite GS-4	.0046
168	clinopyroxene	.0032
206	hornblende	.0047
261	ilmenite A-128	.2973
263	chromite MB5	.0120
278	ilmenite K-13-131.8	.3140
283	pargasite R1128	.0111

At #17 Cl

15	Apatite-chloro	.0681
16	Apatite-chloro	.0681
132	Scapolite XXXII	.0166
133	Scapolite XXXIII	.0185
134	Scapolite XXXIV	.0219
135	Scapolite XXXV	.0296
202	Apatite DM-B	.0041
201	Apatite	.0091

At # 2 V

5	V_2O_3	.6704
6	V_2O_3	.6704
7	V_2O_5	.5602
35	V-metal	1.0
83	V-metal	1.0
319	W-glass	.0044
330	V_2O_5	.5602

At #19 K

246	Na-K-feldspar	.0266
318	V-glass	.0067
12	orthoclase	.1405
20	anorthoclase	.0290
130	scapolite XXX	.0183
131	scapolite XXXI	.0084
132	scapolite XXXII	.0096
133	scapolite XXXIII	.0072
134	scapolite XXXIV	.0089
135	scapolite XXXV	.0096
152	fluoro-phlogopite	.0928
153	taeniolite	.0958
162	lepidolite	.0820
204	lepidolite	.0820
247	sanidine	.1060
249	adularia	.1251
297	B-F-phlogopite	.0955
205	hornblende	.0142
240	haplogranite glass	.0478
241	feldspar PRC-2000	.0497
258	asbestos microcline	.1376

At #24 Cr

13	chromite #2034	.2271
14	chromite #706	.3635
22	$FeCr_2S_4$	-
26	Cr_2O_3	.6842
27	Cr-metal	1.0
84	Cr-metal	1.0
138	uvarovite	.2078
318	V-glass	.0054
157	chromite GS-3	.2689
158	chromite GS-4	.3045
161	chromite GS-2	.4434
168	clinopyroxene	.0042
197	chromite	.4646
198	picrochromite	.5408
263	chromite MB5	.1723
275	chromite R2447	.3237
276	chromite R2448	.3237
277	chromite R2309	.3374
279	chromite 61-1436	.2830
280	chromite R-557	.3046
281	chromite 61-1437	.2940
295	picrochromite CM-1	.5406
296	chromite	.4646
305	Al-chromite	.2615
306	Fe-Al-Cr-oxide	.3192

At #21 Sc

118	Sc_2TiO_5	.4123
119	$LiScSi_2O_6$	.2203
259	Sc-olivine	.1266
331	$LiScSiO_4$	.3122
333	$Sc_2Si_2O_7$	.3484

At #25 Mn

37	Mn-metal	1.0
100	Mn-metal	1.0
102	Lepidolite	.0170
204	Lepidolite	.0170
235	MnS	.6315
236	MnS-ZnS	.1153
319	W-glass	.0061
160	Rhodonite #388	.2558
165	Garnet (Gore)	.0039
166	Hedenbergite	.0203
167	Wollastonite	.0034
199	Rhodonite #104791	.3497
206	Hornblende	.0056
211	Epidote #E-2	.0690
215	Actinolite	.0269
219	Garnet S-347	.0102
220	Garnet #5	.1357
221	Cummingtonite	.1067
225	Kutnahorite	.2193
245	Grunerite #7	.0077
261	Ilmenite A-128	.0066
271	Mn-Hartonolite	.0397
272	Rhodonite #104738	.3501
273	Eulite #913	.0058
327	Olivine T-531	.0204

At # 27
Co

319	W-glass	.0062
#1	CoO	.7865
49	$Ba_2Co_2Fe_{12}O_{22}$	.0833
55	CoO	.7865
94	Co-metal	1.0
136	Co_2SiO_4	.5614
178	CoSbS	.2770
194		
196	$CoAs_2$	.2821
312	Co-metal	1.0

At # 28
Ni

3	NiO	.7858
4	NiO	.7858
24	Ni_2Si	-
36	Ni-metal	1.0
58	NiS	.6468
97	Ni-metal	1.0
137	Ni_2SiO_4	.5605
179	$NiSb_2$	.1943
180	NiSb	.3253
187	NiS	.6467
193	Pentlandite	.2703
310	Ni-metal	1.0
320	X-glass	.0062
154	olivine 174.1	.0031
324	olivine (Turk)	.0030
325	olivine (P140)	.0030

At# - 29
Cu

#319	W-glass	.0063
234	$Pb_2Cu_2Sb_2S_6$	.1300
230	FeS + Cu	.0165
192	$CuFeS_2$	.3462
189	$Cu_{5.4}Fe_{.82}S_4$	.6649
184	Cu_2Se	.6168
18	$CuFeS_2$	.3463
32	Cu-metal	1.0
101	Cu-metal	1.0
142	$CuFe_2O_4$	.2656
143	$CuFe_2O_4$	.2656
176	$Cu_{.64}Se_{.30}S_{.06}$	.6184
177	$Cu_{.64}Se_{.25}S_{.11}$	.6380
181	CuSe	.4459
182	$Cu_{1.8}Se$	.5017
183	$CuSe_2$	.2861

At#- 30
Zn

#34	Zn-metal	1.0
50	$Ba_2Zn_2Fe_{12}O_{22}$	.0916
56	ZnO	.8034
102	Zn-metal	1.0
191	ZnS	.6709
233	ZnS + Cd	.6612
236	MnS-ZnS	.5485
237	FeS-ZnS	.6098
239	FeS-ZnS	.4189
267	ZnS	.6709
320	X-glass	.0063
203	Sphalerite #1360.	

At# - 31
Ga

#103	Ga - metal	1.0
317	Ga-anorthite	.0719

At# - 32
Ge

#90	Ge-metal	1.0
314	Ge-anorthite	.0257
315	Ge-anorthite	.0747

At# - 33
As

#89	As-metal	1.0
175	Iron-Arsenide	.7285
196	$CoAs_2$	.7174

At# - 34
Se

#176	$Cu_{.64}Se_{.30}S_{.06}$	.3559
177	$Cu_{.64}Se_{.25}S_{.11}$	.3084
181	CuSe	.5541
182	$Cu_{1.8}Se$	.4083
183	$CuSe_2$	.7139
184	Cu_2Se	.3832
229	PbSe	.2759

At# - 37
Rb

#52	Pollucite	.0060
139	$RbAlSi_2O_6$	.3230
162	Lepidolite	.0182
204	Lepidolite	.0182
320	X-glass	.0072

At# - 38
Sr

#20	Anorthoclase	.0038
128	$SrAl_2Si_2O_8$	.2690
316	Sr-anorthite	.0310
320	X-glass	.0068
246	Na-K-feldspar	.0085

At# - 39
Y

# 41	REE #3 glass	.0321
51	$Y_3Al_5O_{12}$	.4493
140	$Y_3Al_5O_{12}$	.4493
320	X-glass	.0062

At# - 40
Zr

#11	$ZrSiO_4$	.4974
78	Zr-metal	1.0
298	ZrO_2	.98
320	X-glass	.0058
329	$ZrSiO_4$	.4976

At# - 41
Nb

#38	Nb-metal	1.0
45	$LiNbO_3$	.6284
75	Ti-Nb metal	.655
150	$LiNbO_3$	.6284

At# - 42
Mo

#19	MoS_2	.5994
44	$PbMoO_4$	.2613
88	Mo-metal	1.0

At# - 43
Tc

At# - 44
Ru

At# - 45
Rh

#105	In-metal	1.0
120	$NaInSi_2O_6$	.3959

At# -

At# - 46
Pd

#82	Pd-metal	1.0

At# -

#96	Sn-metal	1.0

At# - 47
Ag

#95	Ag-metal	1.0
169	Dyscrasite	.7401
170	Dyscrasite	.7595
171	Allargentum	.8405
172	Allargentum	.8703
173	Allargentum	.8999
174	Antimony-Silver	.9407
185	$Au_{.28}Ag_{.05}Te_{.67}$	.0402
186	$Au_{.31}Ag_{.02}Te_{.67}$	.0153
231	$AgBiS_2$	.2831
238	AuAg	.5000

At# - 48

#268	CdS	.7781
107	Cd-metal	1.0
141	CdF_2	.7473
233	ZnS + Cd	.0113

At# - 51
Sb

#234	$Pb_2Cu_2Sb_2S_6$	.2492
232	$AuSb_2$	.5528
98	Sb-metal	1.0
169	Dyscrasite	.2599
170	Dyscrasite	.2405
171	Allargentum	.1595
172	Allargentum	.1297
173	Allargentum	.1001
174	Antimony-Silver	.0593
178	CoSbS	.5723
179	$NiSb_2$	.8057
180	NiSb	.6747

At# - 52
Te

#80	Te-metal	1.0
185	$Au_{.28}Ag_{.05}Te_{.67}$	.5829
186	$Au_{.31}Ag_{.02}Te_{.67}$	.5713
228	PbTe	.3811

52	Pollucite	.3056
319	W-glass	.0075

At# - 55
Cs

#41	REE #3 Glass	.0379

At# -

#		
319	W-glass	.0071
299	$BaAl_2O_4$	.5379
252	$BaSO_4$	.5884
48	$BaFe_{12}O_{19}$	.1236
49	$Fa_2Co_2Fe_{12}O_{22}$	.1942
50	$Ba_2Zn_2Fe_{12}O_{22}$	.1924
247	Sanidine	.0180
249	Adularia	.0059
326	Paracelsian	.6451 .3457

At # - 56
Ba

#40	REE #2 Glass	.0365

At# - 6
Nd

#41	REE #3 glass	.0365
149	$NaLaW_2O_8$	.2112
202	Apatite DM-B	.0038
319	W-glass	.0067

At# - 57
La

#40	REE#2 Glass	.0367

At# - 62
Sm

#41	REE #3 Glass	.0342
76	Ce-metal	.985
202	Apatite DM-B	.0046
318	V-glass	.0067
323	Apatite	.0082

At# - 58
Ce

# 39	REE#1 Glass	.0380

At# - 63
Eu

#39 REE #1 Glass .0387

At# - 64
Gd

#42 REE#4 Glass .0381

At# -

#39 REE#1 Glass .0378

At# - 65
Tb

#39 REE #1 Glass .0381

At# -

#42 REE #4 Glass .0380

At# - 66
Dy

#11 $ZrSiO_4$ .0005
40 REE #2 Glass .0374

At# - 7
Yt

#42 REE #4 Glass .0385

At# - 67
Ho

#40 REE #2 Glass .0375

At# - 71
Lu

"109	Hf-metal	1.0
298	ZrO_2	.02
318	V-glass	.0067

At# - 72
Hf

At# - 76
Os

At# - 73
Ta

#43	$LiTaO_3$	.7671
104	Ta-metal	1.0

#81 Ir-metal 1.0

At# - 77
Ir

At# - 74
W

#47	$CaWO_4$	.6385
85	W-metal	1.0
148	$CaWO_4$	.6385
149	$NaLaW_2O_8$	.5592
313	$W_{.74}Re_{.26}$	.74

108 Pt-metal 1.0

At# - 78
Pt

At# - 75
Re

313 $W_{.74}Re_{.26}$ .26

93 Au-metal 1.0

At# - 79
Au

185	$Au_{.28}Ag_{.05}Te_{.67}$	.3769
186	$Au_{.31}Ag_{.02}Te_{.67}$	.4134
232	$AuSb_2$	.4472
235	AuAg	.50

At# - 80

Hg

#319 W-glass .0069

At# - 90

Th

#99 Tl - metal 1.0

At# - 81

Tl

At# - 92

U

#91 U-metal 1.0

320 X-glass .0067

# 320	X-glass	.0073
234	$Pb_2Cu_2Sb_2S_6$	.4240
229	PbSe	.7241
21	PbS	.8660
44	$PbMoO_4$	.5644
92	Pb-metal	1.0
190	PbS	.8660
228	PbTe	.6189

At# - 82

Pb

At# - 83

Bi

79 Bi-metal 1.0

231 $AgBiS_2$ .5486

Cobalt Oxide CoO #1

Source: W. K. Chen, ANL
Type: Synthetic single crystal
Amount: 0.25 cc
Comments: Not checked for purity
Composition: (assumed stoichiometric)

Co - .7865 (1.00)
O - .2135

Co

Iron Oxide Fe_xO #2

Source: W. K. Chen, ANL
Type: Synthetic single crystal
Amount: 0.25 cc
Comments: Not stoichiometric

Fe

Nickel Oxide NiO #3

Source: J. M. Honig, Purdue
Type: Synthetic single crystal
Amount: 0.25 cc
Comments: Not checked for purity
Composition: (assumed stoichiometric)

Ni - .7858 (1.00)
O - .2142

Ni

Nickel Oxide NiO #4

Source: W. K. Chen, ANL
Type: Synthetic single crystal
Amount: 0.25 cc
Comments: Not checked for purity
Composition: (assumed stoichiometric)

Ni - .7858 (1.00)
O - .2142

Ni

Vanadium Trioxide V_2O_3 #5

Source: Thomas B. Reed, MIT
Type: Synthetic single crystal
Amount: 0.1 cc
Comments: Not checked for purity
Composition: (assumed stoichiometric)

V - .6704 (1.00)
O - .3296

V

Vanadium Trioxide V_2O_3 #6

Source: J. M. Honig, Purdue
Type: Synthetic single crystal
Amount: 0.5 cc
Comments: Not checked for purity
Composition: (assumed stoichiometric)

V - .6704 (1.00)
O - .3296

V

Vanadium Pentoxide V_2O_5 #7

Source: J. Ito, U. of C.
Type: Synthetic single crystal
Amount: 0.5 cc
Comments: Small grain size; synthesized by melting commercial V_2O_5 powder: not checked.
Composition: (assumed stoichiometric)

V - .5602 (1.00)
O - .4398

V

Iron Oxide FeO #8

Source: Thomas B. Reed, MIT
Type: Synthetic single crystal
Amount: 0.1 cc
Comments: Not checked for purity
Composition: (assumed stoichiometric)

Fe - .7773 (1.00)
O - .2227

Fe

Akermanite (melilite) $Ca_2MgSi_2O_7$ #9

Source: C. B. Finch, ORNL
Type: Synthetic single crystal
Amount: 0.5 cc
Comments: Single crystal; not checked
Composition: (assumed stoichiometric)

Ca - .2940 (.4113)
Mg - .0892 (.1479)
Si - .2061 (.4408)
O - .4107

Ca,Mg,Si

Calcium Phosphate $Ca_2P_2O_7$ #10

Source: J. Ito, U. of C.
Type: Synthetic
Amount: 0.25 cc
Comments: Purity not checked
Composition: (assumed stoichiometric)

Ca - .3155 (.4414)
P - .2438 (.5586)
O - .4407

Ca,P

Zircon $ZrSiO_4$ #11

Source: C. B. Finch, ORNL
Type: Synthetic single crystals
Amount: 0.2 cc
Comments: Doped with 500 ppm Yb; purity not checked.
Composition: (assumed stoichiometric)

Zr - .4974 (.6719)
Si - .1531 (.3275)
Yb - .0005 (.0006)
O - .3490

Zr,Si,Yb

Orthoclase $K\,Al Si_3O_8$ #12

Source: A. Peckett, Durham, England
Type: Synthetic Orthoclase single crystals
Amount: 0.05 cc
Comments: Obtained by JVS in July 1975; purity not checked.
Composition: (assumed stoichiometric)

K - .1405 (.1692)
Al - .0969 (.1831)
Si - .3027 (.6477)
O - .4599

K,Al,Si

Chromite #2034 $Cr_{5.98}Al_{9.36}Fe^{+3}_{.41}Mg_{5.96}Fe^{+2}_{2.42}O_{32}$ #1

Source: Oxford Univ., England
Type: Natural
Amount: 1.0 cc
Comments: not checked
Composition: wet chemical analysis, Oxford.

Cr - .2271 (.3319)
Al - .1840 (.3476)
Fe - .1147 (.1262 FeO; .0238 Fe_2O_3)
Mg - .1055 (.1749)
O - .3687

Σ 1.0044

Cr,Al,Mg,Fe

Chromite #706 $Cr_{10.64}Al_{3.93}Fe^{+3}_{1.16}Mg_{5.88}Fe^{+2}_{2.53}O_{32}$ #14

Source: Oxford Univ. England
Type: Natural
Amount: 1.0 cc
Comments: not checked
Composition: wet chemical analysis, Oxford.

Cr - .3635 (.5312)
Al - .0695 (.1313)
Fe - .1355 (.1190 FeO; .0614 Fe_2O_3)
Mg - .0938 (.1555)
O - .3377

Σ .9984

Cr,Al,Mg,Fe

Apatite-chloro $Ca_{10}(PO_4)_6\,Cl_2$ #15

Source: E. W. Henderson, GE Research Lab.
Type: Synthetic; $CaCl_2$ flux
Amount: $3mm^3$
Comments: Some $CaCl_2$ inclusions; purity not checked
Composition: (assumed stoichiometric)

Ca - .3848 (.5384)
P - .1784 (.4088)
Cl - .0681 (.0681)
O - .3687

(O ≡ Cl .0154)

Ca,P,Cl

Apatite-chloro $Ca_{10}(PO_4)_6\,Cl_2$ #1

Source: E. W. Henderson, GE Research L
Type: Synthetic; $CaCl_2$ flux
Amount: 1cc
Comments: Many $CaCl_2$ inclusions; purity not checked.
Composition: (assumed stoichiometric)

Ca - .3848 (.5384)
P - .1734 (.4088)
Cl - .0681 (.0681)
O - .3687

(O ≡ Cl .0154)

Ca,P,Cl

Pyrite FeS_2 #17

Source: U. of C. Mineral Collection #2892
Type: Natural; Leadville, Colo.
Amount: 0.25 cc
Comments: SSD shows Fe and S only
Composition: Assumed stoichiometric which is probably good for pyrite.

Fe - .4655
S - .5345

Fe,S

Galena PbS #2

Source: U. of C. Mineral Collection
Type: Natural; location unk; #1n88
Amount: 0.25cc
Comments: not checked
Composition: (assumed stoichiometric)

Pb - .8660
S - .1340

Pb,S

Chalcopyrite $CuFeS_2$ #18

Source: U. of C. mineral collection #3877
Type: Natural; Treece, Cherokee Co., Kansa
Amount: 0.2 cc
Comments: SSD shows only Cu,Fe and S
Composition: (Assumed stoichiometric)

Fe - .3043
Cu - .3463
S - .3493

Fe,Cu,S

Daubreelite $FeCr_2S_4$ #22

Source: American Cyanamid, Dr. G. Haacke
Type: Synthetic-vapor transport
Amount: 0.1cc
Comments: SSD shows only Fe,Cr and S
Composition: Must be checked-initial results showed $Fe_{.3}Cr_{2.7}S_4$

Fe,Cr,S

Molybdenite MoS_2 #19

Source: U. of C. mineral collection #2055
Type: Natural; Refew Co., Can.
Amount: 0.1 cc
Comments: Not checked
Composition: (assumed stoichiometric)

Mo - .5994
S - .4006

Mo,S

Akermanite $Ca_2MgSi_2O_7$ #23

Source: C. B. Finch, ORNL
Type: Synthetic, doped
Amount: .4cc single crystal
Comments: Doped with 100 ppm Ni
Composition: (assumed stoichiometric) + 100ppm Ni

Ca - .2940 (.4113)
Mg - .0892 (.1479)
Si - .2061 (.4408)
Ni - .0001 (.0001)
O - .4107

Ca,Mg,Si,Ni

Anorthoclase $Na_{.71}K_{.199}Ca_{.038}Sr_{.01}Al_{1.07}Si_{2.94}O_8$ #20

Source: D. B. Stewart via Max Carmen
Type: Natural; Nuniuak Isl., Alaska; #64-Ahr-35
Amount: $1mm^3$
Comments: not checked
Composition: wet chemistry, USGS

Si - .3088	(.6606)	Ba - .0013	(.0014)
Al - .1081	(.2042)	Mg - .0001	(.0002)
Fe - .0016	(.0023-Fe_2O_3)	Na - .0611	(.0824)
Ti - .0002	(.0002)	K - .0290	(.0350)
Ca - .0056	(.0079	H - .0001	(.0002)
Sr - .0038	(.0045)		.9989

Si,Al,Ca,Sr,Na,K

Nickel Silicide Ni_2Si #24

Source: I. M. Steele
Type: Synthetic
Amount: .1cc
Comments: not homogeneous - used for calibration of SSD units; made from stoichiometric powder.
Composition: inhomogeneous

Ni,Si

Rutile TiO_2 #25

Source: W. S. Bower, NBS
Type: Synthetic
Amount: 1cc single crystal
Comments: checked against Ti-metal
Composition:
Ti - .5995 (1.00)
O - .4005
Others by e-spec: SiO_2-.022; Fe_2O_3-<.002; Al_2O_3-.002; Sb_2O_3-<.01; SnO_2-.002; Ag-<.0001; Cu-<.0001; Pb-<.0005; Mn-<.00005; Ni-<.0006; V-.00047 Cr-.00011

Ti

Chromium oxide Cr_2O_3 #26

Source: W. S. Bower, NBS
Type: Synthetic
Amount: 0.5cc single-crystal
Comments: checked against Cr-metal by IMS-stoichiometric Cr_2O_3
Composition:
Cr - .6842 (1.00)
O - .3158

Cr

Chromium Cr #27

Source: U. of Ill.
Type: metal
Amount: .2cc
Comments: 99.99% pure
Composition:
Cr 1.0

Cr

Corundum Al_2O_3 #28

Source: U. of Ill., I. M. Steele
Type: synthetic
Amount: 0.5cc
Comments: single crystal rod.
Composition: (assumed stoichiometric)
Al - .5293 (1.00)
O - .4707

Al

Quartz SiO_2 #29

Source: I. M. Steele, U. of Ill.
Type: Natural; locality unknown
Amount: 0.2cc
Comments: low-T quartz is quite pure
Composition: (assumed stoichiometric)
Si - .4674 (1.0)
O - .5326

Si

Periclase MgO #30

Source: I. M. Steele, U. of Ill.
Type: synthetic single crystals
Amount: 0.1cc
Comments: Pure by SSD
Composition: (assumed stoichiometric)
Mg - .6031 (1.0)
O - .3959

Mg

Iron metal Fe #31

Source: I. M. Steele, U. of Ill.
Type: Metal
Amount: 0.1cc
Comments: 99.9 pure
Composition:
Fe - 1.00

Fe

Copper metal Cu #32

Source: I. M. Steele, U. of Ill.
Type: Metal
Amount: 0.1cc
Comments: 99.9 pure
Composition:
Cu - 1.0

Cu

Titanium metal Ti #33

Source: I. M. Steele, U. of Ill.
Type: Metal
Amount: 0.05cc
Comments: 99.9 pure
Composition:

Ti - 1.0

Ti

Manganese metal Mn #3

Source: I. M. Steele, U. of Ill.
Type: Metal
Amount: 0.5cc
Comments: 99.9 pure
Composition:

Mn - 1.0

Mn

Zinc metal Zn #34

Source: I. M. Steele, U. of Ill.
Type: Metal
Amount: 0.5cc
Comments: 99.9 pure
Composition:

Zn - 1.0

Zn

Niobium metal Nb #3

Source: Mid-west Probe Users group
Type: metal
Amount: 0.05cc; plate
Comments: Used as standard in round-robin analysis
Composition:

Nb - 1.0

N

Vanadium metal V #35

Source: I. M. Steele, U. of Ill.
Type: Metal
Amount: 0.1cc
Comments: 99.9 pure
Composition:

V - 1.0

V

Rare Earth Glass (REE 1) #3

Source: M. J. Drake, U. of Oregon
Type: synthetic glass
Amount: 0.05cc
Comment: See Chem. Geol. 10 p.179-181 for details
Composition: Neutron Activation check for Eu and Tb

Al - .1615 (.3052)
Si - .1260 (.2696)
Ca - .1798 (.2516)
Eu - .0380 (.0420) Eu = .0390 ± .0052 (INA
Gd - .0387 (.0446)
Tb - .0378 (.0435) Tb = .0396 ± .0050 (INA
Tm - .0381 (.0435)
O - .3801

Al,Si,Ca,Eu,Gd,Tb,Tm

Nickel metal Ni #36

Source: I. M. Steele, U. of Ill.
Type: Metal
Amount: 1cc
Comments: 99.9 pure
Composition:

Ni - 1.0

Ni

Rare Earth Glass (REE 2) #40

Source: M. J. Drake, U. of Oregon
Type: Synthetic glass
Amount: 0.05 cc
Comment: see Chem. Geol. 10, p.179-181 for details
Composition: Neutron Activation check for Nb, Sm, Yb and Lu

Al - .1621 (.3063)
Si - .1265 (.2707)
Ca - .1805 (.2526)
Nd - .0365 (.0426) Nd = .0360 ± .0076 (INA)
Sm - .0367 (.0426) Sm = .0372 ± .0008 (INA)
Yb - .0374 (.0426) Yb = .0358 ± .0009 (INA)
Lu - .0375 (.0426) Lu = .0375 ± .0009 (INA)
O - .3828

Al,Si,Ca,Nd,Sm,Yb,Lu

#41

Rare Earth Glass (REE 3)

Source: M. J. Drake, U. of Oregon
Type: synthetic glass
Amount: 0.05cc
Comment: see Chem. Geol. 10, p.179-181 for details
Composition: Neutron Activation check for La,Ce and Pr.

Al - .1626 (.3072)
Si - .1269 (.2715)
Ca - .1810 (.2533)
Y - .0321 (.0408)
La - .0365 (.0428) La = .0391 ± .0010 (INA)
Ce - .0342 (.0400) Ce = .0367 ± .0023 (INA)
Pr - .0379 (.0444) Pr = .0393 ± .0016 (INA)
O - .3888

Al,Si,Ca,Y,La,Ce,Pr

#42

Rare Earth Glass (REE 4)

Source: M. J. Drake, U. of Oregon
Type: synthetic glass
Amount: .0.05cc
Comment: see Chem. Geol. 10, p.179-181 for details
Composition: Neutron Activation check for Ho.

Al - .1698 (.3208)
Si - .1325 (.2834)
Ca - .1890 (.2545)
Dy - .0380 (.0436)
Ho - .0385 (.0441) Ho = .0381 ± .0002 (INA)
Er - .0381 (.0436)
O - .3941

#43

Lithium Tantalum Oxide $LiTaO_3$

Source: A. Perrotta
Type: synthetic single crystal
Amount: o.1cc
Comments: not checked
Composition: (assumed stoichiometric)

Li - .0294 (.0633)
Ta - .7671 (.9367)
O - .2035

Li,Ta

#44

Lead Molybdenum Oxide $PbMoO_4$

Source: A. Perrotta
Type: synthetic single crystal
Amount: .25cc
Comments: not checked
Composition: (assumed stoichiometric)

Pb - .5644 (.6080)
Mo - .2613 (.3920)
O - .1743

Pb,Mo

#45

Lithium Niobium Oxide $LiNbO_3$

Source: A. Perrotta
Type: synthetic single crystal
Amount: .2cc
Comments: not checked
Composition: (assumed stoichiometric)

Li - .0469 (.1010)
Nb - .6284 (.8990)
O - .3247

#46

Calcium Fluoride CaF_2

Source: A. Perrotta
Type: synthetic single crystal
Amount: .3cc
Comments: not checked
Composition: (assumed stoichiometric)

Ca - ~~.6784~~ .5134
F - ~~.3216~~ .4866

Ca,F

#47

Calcium Tungstate $CaWO_4$

Source: A. Perrotta
Type: synthetic single crystal
Amount: .5cc
Comments: not checked
Composition: (assumed stoichiometric)

Ca - .1392 (.1948)
W - .6385 (.8052)
O - .2222

Ca,W

#48

Barium Iron Oxide $BaFe_{12}O_{19}$

Source: A. Perrotta
Type: synthetic crystals
Amount: 0.2cc
Comments: not checked
Composition: (assumed stoichiometric)

Ba - .1236 (.1380)
Fe - .6029 (.8620)
O - .2735

Ba,Fe

Barium Cobalt Iron Oxide $Ba_2Co_2Fe_{12}O_{22}$ #49

Source: A. Perrotta
Type: synthetic
Amount: 0.3cc
Comments: not checked
Composition: (assumed stoichiometric)
Ba - .1942 (.2168)
Co - .0833 (.1059)
Fe - .4737 (.6773)
O - .2488

Ba,Co,Fe

Barium Zinc Iron Oxide $Ba_2Zn_2Fe_{12}O_{22}$ #50

Source: A. Perrotta
Type: synthetic
Amount: 0.3cc
Comments: not checked
Composition: (assumed stoichiometric)
Ba - .1924 (.2148)
Zn - .0916 (.1140)
Fe - .4694 (.6712)
O - .2466

Ba,Zn,Fe

Yttrium Aluminum Garnet $Y_3Al_5O_{12}$ #51

Source: A. Perrotta
Type: synthetic
Amount: 0.04cc
Comments: not checked. Some Nd^{3+} may be present.
Composition: (assumed stoichiometric)
Y - .4493 (.5706)
Al - .2272 (.4294)
O - .3235

Y,Al

Pollucite $Li_{.05}Rb_{.02}Na_{.17}Cs_{.63}Al_{.85}Si_{2.14}O_6$ #52

Source: Tanco Mine, Manitoba U39-35.8 via P. Cerny via J. Ito
Type: natural; small chips
Amount: $1mm^3$
Comments: analysed by Jun Ito; otherwise not checked.
Composition:

Si - .2188	(.4680)	K - .0014	(.0017)
Al - .0831	(.1570	Rb - .0060	(.0077)
Fe - .0001	(.0001)	Cs - .3056	(.3240)
Ca - .0003	(.0004)	H - .0022	(.0195)
Li - .0013	(.0028)	O - .3673	
Na - .0139	(.0188)	Σ 1.0000	

Si,Al,Na,Rb,Cs

Beryllium Silicate Be_2SiO_4 #53

Source: O. Kleppa; labeled M-12901
Type: synthetic single crystal + powder
Amount: .2cc
Comments: not checked
Composition: (assumed stoichiometric)
Be - .1637 (.4543)
Si - .2551 (.5457)
O - .5812

Be,Si

Beryllium Silicate Be_2SiO_4 #54

Source: O. Kleppa; labeled M-12902
Type: synthetic single crystal & powder
Amount: 0.3cc
Comments: not checked
Composition: (assumed stoichiometric)
Be - .1637 (.4543)
Si - .2551 (.5457)
O - .5812

Be,Si

#55

Cobalt Oxide CoO

Source: T. McGee, Iowa St. U.
Type: synthetic single crystal high purity
Amount: 0.1cc
Comments: <50 ppm impurities
Composition: (assumed stoichiometric)
Co - .7865 (1.0)
O - .2135

Co

Zinc Oxide ZnO #56

Source: P. W. Li, 3M Comp.
Type: synthetic single crystal, high purity
Amount .05cc
Comments: complete analysis; surface coating.
Composition: (assumed stoichiometric)
Zn - .8034 (1.00)
O - .1966
Others (ppm): Sr-30; Sb-10; P-100; Cu-3; Ba-10; B-2; As-3; Zr-3; Ni-1.

Zn

Troilite FeS #57

Source: H.O.A. Meyer, Purdue
Type: synthetic
Amount: $1mm^3$
Comments: made to be FeS but not confirmed; X-ray gives troilite
Composition: I. Steele determined:
Fe - .6212 } $Fe_{.95}S$
S - .374

Fe,S

Millerite NiS #58

Source: H. O. A. Meyer, Purdue
Type: synthetic
Amount: $1mm^3$
Comments: not X-rayed
Composition: determined by I. Steele to be stoichiometric
Ni - .6468
S - .3532

Ni,S

Plagioclase glass - An_{100} $CaAl_2Si_2O_8$ #59

Source: Lindsley, Geophysical Lab.
Type: synthetic glass
Amount: 0.1cc fine crystals
Comments: major elements OK; minor Fe (~0.02)
Composition: (stoichiometric)
Ca - .1441 (.2016)
Al - .1939 (.3664)
Si - .2019 (.4320)
O - .4601

Ca,Al,Si

#60

Plagioclase glass-An_{100} $CaAl_2Si_2O_8$

Source: Lindsley, Geophy. Lab.
Type: synthetic glass
Amount: 0.05cc
Comment: Good for major elements; minor Fe (~0.02) and Sr(~0.01). See J. of Geol. 74, p.217 for details
Composition: (stoichiometric)
Ca - .1441 (.2016)
Al - .1939 (.3664)
Si - .2019 (.4320)
O - .4601

Ca,Al,Si

Plagioclase glass-An_{90} $Ca_{.9}Na_{.1}Al_{1.9}Si_{2.1}O_8$ #61

Source: Lindsley, Geophy. Lab.
Type: synthetic glass
Amount: 0.1cc
Comments: good for major elements; minor Fe (~0.03). See J. of Geol. 74, p.217 for details.
Composition: (stoichiometric)
Ca - .1304 (.1825)
Na - .0083 (.0119)
Al - .1853 (.3501)
Si - .2133 (.4565)
O - .4527

Ca,Na,Al,Si

#62

Plagioclase glass - An_{80} $Ca_{.8}Na_{.2}Al_{1.8}Si_{2.2}O_8$

Source: Lindsley, Geophys. Lab.
Type: synthetic glass
Amount: 0.1cc fine powder
Comments: Good for major elements; minor Fe (~0.03); see J. of Geol. 74, p.217 for details.
Composition: (stoichiometric)
Ca - .1166 (.1631)
Na - .0167 (.0225)
Al - .1766 (.3337)
Si - .2247 (.4807
O - .4654

Ca,Na,Al,Si

Plagioclase glass - An_{70} $Ca_{.7}Na_{.3}Al_{1.7}Si_{2.3}O_8$ #63

Source: D. Lindsley, Geophy. Lab.
Type: synthetic glass
Amount: 0.2cc fine glass
Comments: good for major elements, minor Fe (~ 0.05); see J. of Geol. 74, p.217 for details.
Composition: (stoichiometric)
Ca - .1026 (.1436)
Na - .0252 (.0340)
Al - .1677 (.3169)
Si - .2363 (.5055)
O - .4681

Na,Ca,Al,Si

Plagioclase glass - An_{60} $Ca_{.6}Na_{.4}Al_{1.6}Si_{2.4}O_8$ #64

Source: D. Lindsley, Geophy. Lab.
Type: synthetic glass
Amount: 0.05cc fine glass
Comments: good for major elements; minor Fe(~ 0.05); see J. of Geol. 74, p.217 for details.
Composition: (stoichiometric)
Ca - .0885 (.1238)
Na - .0338 (.0456)
Al - .1588 (.3060)
Si - .2480 (.5306)
O - .4709

Na,Ca,Al,Si

Plagioclase glass - An_{50} $Ca_{.5}Na_{.5}Al_{1.5}Si_{2.5}O_8$ #65

Source: D. Lindsley, Geophys. Lab.
Type: synthetic glass
Amount: 0.05cc
Comments: good for major elements; minor Fe(~0.06) see J. of Geol. 74, p.217 for details; unstable with e^-.
Composition: (stoichiometric)

Ca	.0742	(.1033)
Na	.0425	(.0573)
Al	.1498	(.2830)
Si	.2599	(.5559)
O	.4737	

Na,Ca,Al,Si

Plagioclase glass - An_{40} $Ca_{.4}Na_{.6}Al_{1.4}Si_{2.6}O_8$ #66

Source: D. Lindsley, Geophys. Lab.
Type: sunthetic glass
Amount: 0.1cc fine glass powder
Comments: good for major elements; minor Fe (~0.0); see J. of Geol. 74, p.217, for details; unstable with e^-.
Composition: (stoichiometric)

Ca	.0597	(.0835)
Na	.0513	(.0691)
Al	.1406	(.2656)
Si	.2719	(.5819)
O	.4765	

Na,Ca,Al,Si

Plagioclase glass - An_{30} $Ca_{.3}Na_{.7}Al_{1.3}Si_{2.7}O_8$ #67

Source: D. Lindsley, Geophys. Lab.
Type: synthetic glass
Amount: 0.2cc fine glass
Comments: unstable under e^- bombardment; minor Fe (~ 0.05); see J. of Geol. 74, p.217 for details.
Composition: (stoichiometric)

Ca	.0450	(.0630)
Na	.0603	(.0813)
Al	.1313	(.2481)
Si	.2840	(.6076)
O	.4794	

Na,Ca,Al,Si

#68

Plagioclase glass - An_{20} $Ca_{.2}Na_{.8}Al_{1.2}Si_{2.8}O_8$

Source: D. Lindsley, Geophys. Lab.
Type: synthetic glass
Amount: 0.2cc fine glass
Comments: unstable under e^- bombardment; minor Fe (~ 0.05); see J. of Geol. 74, p.217 for details.
Composition: (stoichiometric)

Ca	.0302	(.0423)
Na	.0693	(.0934)
Al	.1220	(.2305)
Si	.2963	(.6338)
O	.4822	

Na,Ca,Al,Si

Plagioclase glass-An_{10} $Ca_{.1}Na_{.9}Al_{1.1}Si_{2.9}O_8$ #69

Source: D. Lindsley, Geophys. Lab.
Type: synthetic glass
Amount: 0.2cc fine glass
Comments: unstable; minor Fe(~ 0.06); see J. of Geol. 74, p.217 for details.
Composition: (stoichiometric)

Ca	.0152	(.0213)
Na	.0784	(.1057)
Al	.1125	(.2126)
Si	.3088	(.6634)
O	.4851	

Na,Ca,Al,Si

#70

Albite glass - An_0 $Na_{1.0}Al_{1.0}Si_{3.0}O_8$

Source: D. Lindsley, Geophys. Lab.
Type: synthetic glass
Amount: 0.4cc fine glass
Comments: unstable; minor Fe(~0.03); see J. of Geol. 74, p.217 for details.
Composition: (stoichiometric)

Na	.0877	(.1182)
Al	.1029	(.1944)
Si	.3213	(.6874)
O	.4881	

Na,Al,Si

#71

Fluorite CaF_2

Source: NBS, K. Heinrich
Type: synthetic single crystal
Amount: 0.1cc
Comments: not checked
Composition: (assumed stoichiometric)

Ca	~~.6784~~	.5134
F	~~.3216~~	.4866

Ca,F

#72

Anatase TiO_2

Source: Nat'l Lead
Type: synthetic powder
Amount: 1cc
Comments: not checked; too fine-grained for probe.
Composition: (assumed stoichiometric)

Ti	.5995	(1.0)
O	.4005	

Ti

#73

Rutile TiO_2

Source: Nat'l Lead
Type: synthetic powder
Amount: 1cc
Comments: not checked; too fine grained for probe.
Composition: (assumed stoichiometric)
Ti - .5995 (1.0)
O - .4005

Ti

#74

Corundum Al_2O_3

Source: Norton, NBS
Type: synthetic; fine grained
Amount: 1cc
Comments: not checked
Composition: (assumed stoichiometric)
Al - .5293 (1.0)
O - .4707

Al

#75

Titanium-Niobium alloy Ti-Nb

Source: Midwest Probe Users Group
Type: metal alloy - 35 wt.% Ti in Nb
Amount: 0.1cc
Comments: used for round-robin tests
Composition: as manufactured: Ti-0.35; Nb - 0.65
Average of Probes: Ti-0.353; Nb-0.655.

Ti,Nb

#76

Cerium metal Ce

Source: NBS, K. Heinrich
Type: metal
Amount: $1mm^3$
Comment: poor quality-almost powder; not checked; contains Fe and REE.
Composition: Ce - .985
Fe - .0045
REE- .0104

Ce

#77

Magnetite Fe_3O_4

Source: ORNL, W. E. Brundage
Type: large synthetic single crystals
Amount: 2cc
Comment: checked by I. Steele; stoichiometric
Composition: Fe - .7236 (1.0)
O - .2764
(May be some excess FeO) - claims by B. Brundage

Fe

#78

Zirconium metal Zr

Source: K. Heinrich, NBS
Type: metal
Amount: 0.03cc
Comments: very thin sheet; poor for mounting
Composition: Zr = 1.0

Zr

Bismuth metal Bi

#7

Source: K. Heinrich, NBS
Type: metal
Amount: 0.1cc
Comments:
Composition: Bi = 1.0

Bi

#80

Tellurium metal Te

Source: K. Heinrich, NBS
Type: metal
Amount: 0.1cc
Comments:
Composition: Te = 1.0

Te

#81

Iridium metal Ir

Source: K. Heinrich, NBS
Type: metal
Amount: 1mm^3
Comments: very little sample
Composition: Ir = 1.0

Ir

#82

Palladium metal Pd

Source: K. Heinrich, NBS
Type: metal
Amount: 1mm^3
Comments: very thin foil; poor for mounting
Composition: Pd = 1.0

Pd

#83

Vanadium metal V

Source: NBS, K. Heinrich
Type: metal
Amount: 0.1cc
Comments: not good for mounting
Composition: V = 1.0

V

#84

Chromium metal Cr

Source: NBS, K. Heinrich
Type: metal
Amount: 0.1cc
Comments:
Composition: Cr = 1.0

Cr

#85

Tungsten metal W

Source: NBS, K. Heinrich
Type: metal
Amount: 5mm^3
Comments: thin wire
Composition: W-1.0

W

#86

Aluminum metal Al

Source: NBS, K. Heinrich
Type: metal foil
Amount: 3mm^3
Comments: foil too thin for mounting
Composition: Al-1.0

Al

#87

Magnesium metal Mg

Source: NBS, K. Heinrich
Type: metal
Amount: 5mm^3
Comments:
Composition: Mg-1.0

Mg

#88

Molybdenum metal Mo

Source: NBS, K. Heinrich
Type: metal foil
Amount: 0.5mm^3
Comments: too thin for good mount
Composition: Mo-1.0

Mo

Arsenic metal As #89

Source: NBS, K. Heinrich
Type: metal
Amount: .2cc
Comments:
Composition: As - 1.0

As

Germanium metal Ge #90

Source: NBS, K. Heinrich
Type: metal
Amount: 5mm^3
Comments:
Composition: Ge-1.0

Ge

Uranium metal U #91

Source: NBS, K. Heinrich
Type: metal
Amount: 5mm^3
Comments: friable rod
Composition: U-1.0

U

Lead metal Pb #92

Source: NBS, K. Heinrich
Type: metal
Amount: 0.1cc
Comments:
Composition: Pb-1.0

Pb

Gold metal Au #93

Source: NBS, K. Heinrich
Type: metal wire and foil
Amount: 0.1cc
Comments: some Hg contamination
Composition: Au-1.0

Au

Cobalt metal Co #94

Source: NBS, K. Heinrich
Type: metal
Amount: 5mm^3
Comments:
Composition: Co-1.0

Co

Silver metal Ag #95

Source: NBS, K. Heinrich
Type: metal wire
Amount: 5mm^3
Comments:
Composition: Ag-1.0

Hg

Tin metal Sn #96

Source: NBS, K. Heinrich
Type: metal
Amount: 3mm^3
Comments:
Composition: Sn-1.0

Sn

#97

Nickel metal Ni

Source: NBS, K. Heinrich
Type: metal foil
Amount: $1mm^3$
Comments: foil too thin for good mounting
Composition: Ni-1.0

Ni

#98

Antimony metal Sb

Source: NBS, K. Heinrich
Type: metal
Amount: $10\ mm^3$
Comments:
Composition: Sb-1.0

Sb

#99

Thallium metal Tl

Source: NBS, K. Heinrich
Type: metal
Amount: $5mm^3$
Comments: not very good for probe mount
Composition: Tl-1.0

Tl

#100

Manganese metal Mn

Source: NBS, K. Heinrich
Type: metal plate
Amount: $20mm^3$
Comments:
Composition: Mn-1.0

Mn

#101

Copper metal Cu

Source: NBS, K. Heinrich
Type: metal shavings
Amount: $5mm^3$
Comments: too thin for good probe mount
Compositions: Cu-1.0

Cu

#102

Zinc metal Zn

Source: NBS, K. Heinrich
Type: metal
Amount: $10mm^3$
Comments:
Composition: Zn-1.0

Zn

#103

Gallium metal Ga

Source: NBS, K. Heinrich
Type: metal
Amount: .1cc
Comments:
Composition: Ga-1.0

Ga

#104

Tantalum metal Ta

Source: NBS, K. Heinrich
Type: metal foil
Amount: $10mm^3$
Comments: foil too thin for probe mount
Composition: Ta-1.0

#105

Indium metal In

Source: NBS, K. Heinrich
Type: metal
Amount: 5mm^3
Comments:
Composition: In-1.0

In

#106

Iron metal Fe

Source: NBS, K. Heinrich
Type: metal
Amount: 2mm^3
Comments:
Composition: Fe-1.0

Fe

#107

Cadmium metal Cd

Source: NBS, K. Heinrich
Type: metal
Amount: .25cc
Comments:
Composition: Cd-1.0

Cd

#108

Platinum metal Pt

Source: NBS, K. Heinrich
Type: metal wire
Amount: 2mm^3
Comments:
Composition: Pt-1.0

Pt

#1

Hafnium metal Hf

Source: NBS, K. Heinrich
Type: metal foil
Amount: 1mm^3
Comments: too thin for good probe mount.
Composition: Hf-1.0

Hf

#110

Pyrope glass $Mg_3Al_2Si_3O_{12}$

Source: M. J. O'Hara, Geophysical Lal
Type: synthetic glass
Amount: 2mm^3
Comments: not checked
Composition: (assumed stoichiometric)
Mg - .1810 (.3001)
Al - .1339 (.2530)
Si - .2089 (.4469)
O - .4762

Mg,Al,Si

#111

Cordierite glass $Al_4Mg_2Si_5O_{18}$

Source: W. Schreyer, Geophysical Lab.
Type: synthetic glass
Amount: 1mm^3
Comments: not checked
Composition: (assumed stoichiometric)
Mg - .0831 (.1378)
Al - .1845 (.3485)
Si - .2401 (.5137)
O - .4923

Mg,Al,Si

#112

Anthophyllite-Al #5 $Mg_5Al_4Si_6O_{23}$

Source: J. J. Fawcett, Geophysical Lat
Type: synthetic glass
Amount: 2mm^3
Comments: not checked
Composition: (assumed stoichiometric)
Mg - .1587 (.2632)
Al - .1409 (.2662)
Si - .2200 (.4706)
O - .4804

Mg,Al,Si

Anthophyllite-Mg #1 $Mg_7Si_8O_{23}$ #113

Source: J. J. Fawcett, Geophysical Lab.
Type: synthetic glass
Amount: $1mm^3$
Comments: not checked
Composition: (assumed stoichiometric)
Mg - .2230 (.3698)
Si - .2946 (.6302
O - .4824

Mg,Si

Anthophyllite-Al #3 $Mg_6Al_2Si_7O_{23}$ #114

Source: J. J. Fawcett, Geophysical Lab.
Type: synthetic glass
Amount: $2mm^3$
Comments: not checked
Composition: (assumed stoichiometric)
Mg - .1909 (.3165)
Al - .0706 (.1334)
Si - .2571 (.5501)
O - .4814

Mg,Al,Si

MAS 22 $Mg_{4.31}Al_{5.04}Si_{6.83}O_{23}$ #115

Source: W. Schreyer, Geophysical Lab.
Type: synthetic glass
Amount: $2mm^3$
Comments: not checked
Composition: (assumed stoichiometric)
Mg - .1388 (.2302)
Al - .1199 (.2266)
Si - .2539 (.5432)
O - .4874

Mg,Al,Si

MAS 2 $Mg_{2.07}Al_{6.21}Si_{7.36}O_{23}$ #116

Source: W. Schreyer, Geophysical Lab.
Type: synthetic glass
Amount: $2mm^3$
Comments: not checked
Composition: (assumed stoichiometric)
Mg - .0684 (.1134
Al - .1517 (.2866
Si - .2805 (.6000)
O - .4994

Mg,Al,Si

MAS 14 $Mg_{2.37}Al_{2.81}Si_{8.21}O_{23}$ #117

Source: W. Schreyer, Geophysical Lab.
Type: synthetic glass
Amount: $3mm^3$
Comments: not checked
Composition: (assumed stoichiometric)
Mg - .1206 (.2000)
Al - .0953 (.1800)
Si - .2398 (.6200
O - .4943

Mg,Al,Si

Scandium Pseudobrookite Sc_2TiO_5 #118

Source: J. Ito
Type: synthetic flux grown crystals
Amount: 0.2cc
Comments: small crystals; some Fe_2O_3 (0.17%); possibly Na and W contaminents; X-ray pattern; for details see Am. Min. 56, p.105-108.
Composition: (assumed stoichiometric + 0.17% Fe_2O_3).
Sc - .4123 (.6325)
Ti - .2196 (.3618)
Fe - .0012 (.0017)
O - .3669

Sc,Ti

Scandium Spodumene $LiScSi_2O_6$ #119

Source: J. Ito
Type: synthetic products of hydrothermal gel crystallizati
Amount: .05cc
Comments: some SiO_2 present: maybe some Fe^{3+}. For details see Am.Min. 52, p.1276-1280.
Composition: (assumed stoichiometric)
Li - .0340 (.0722)
Sc - .2203 (.3379)
Si - .2753 (.5889)
O - .4704

Li,Sc,Si

Indium aegirine $NaInSi_2O_6$ #120

Source: J. Ito
Type: synthetic crystals from Na_2WO_4 flux
Amount: 0.05cc
Comments: fine acicular crystals; no compositional data; possibly some Na and W contamination.
Composition: (assumed stoichiometric)
Na - .0793 (.1069)
In - .3959 (.4787)
Si - .1937 (.4144)
O - .3311

Na,In,Si

#121

Wollastonite glass $CaSiO_3$

Source: J. Boyd, Geophys. Lab.
Type: synthetic glass
Amount: $1mm^3$
Comments:
Composition: (assumed stoichiometric)
Ca - .3450 (.4827)
Si - .2418 (.5173)
O - .4132

Ca,Si

#122

Enstatite Glass $MgSiO_3$

Source: J. Boyd, Geophys. Lab.
Type: synthetic glass
Amount: $1mm^3$
Comments: contains some Ca
Composition: (assumed stoichiometric)
Mg - .2421 (.4614)
Si - .2798 (.5986)
O - .4781

Mg,Si

#123

Diopside Glass $MgCaSi_2O_6$

Source: J. Boyd, Geophys. Lab.
Type: synthetic glass
Amount: $1mm^3$
Comments:
Composition: (assumed stoichiometric)
Mg - .1123 (.1862)
Ca - .1851 (25.90)
Si - .2594 (.5549)
O - .4432

Ca,Mg,Si

#124

Enstatite - 5% Al_2O_3 Glass

Source: J. Boyd, Geophysical Lab.
Type: synthetic glass
Amount: $1mm^3$
Comment: some Ca present
Composition: (assumed stoichiometric & 5 wt.% Al_2O_3)
Mg - .2300 (.3813)
Al - .0265 (.0500)
Si - .2658 (.5687)
O - .4777

Mg,Si,Al

#125

Enstatite - 10% Al_2O_3 Glass

Source: J. Boyd, Geophysical Lab.
Type: synthetic glass
Amount: $1mm^3$
Comment: some Ca present
Composition: (assumed stoichiometric + 10wt.% Al_2O_3)
Mg - .2179 (.3613)
Al - .0529 (.1000)
Si - .2518 (.5387)
O - .4774

Mg,Si,Al

#126

Enstatite-20% Al_2O_3 Glass

Source: J. Boyd, Geophysical Lab.
Type: synthetic glass
Amount: $0.5mm^3$
Comment:
Composition: (assumed stoichiometric + 20 wt.% Al_2O_3
Mg - .1937 (.3211)
Al - .1059 (.2000)
Si - .2239 (.4789)
O - .4765

Mg,Si,Al

#127

Diopside (85%) - Jadeite (15%)

Source: J. Boyd, Geophysical Lab.
Type: synthetic glass
Amount: $1mm^3$
Comment:
Composition:
Mg - .0955 (.1583)
Ca - .1574 (.2202)
Na - .0171 (.0230)
Al - .0200 (.0378)
Si - .2622 (.5608)
O - .4478

Na,Al,Mg,Ca,Si

#128

Sr-Anorthite $SrAl_2Si_2O_8$

Source: Hoffman
Type: synthetic crystal
Amount: $2mm^3$
Comment: not checked
Composition: (assumed stoichiometric)
Sr - .2690 (.3181)
Al - .1657 (.3131)
Si - .1724 (.3688)
O - .3929

Sr,Al,Si

Spinel $MgAl_2O_4$ #129

Source: BMS: Bureau of Mines
Type: synthetic crystals
Amount: 0.5cc
Comment: not checked
Composition: (assumed stoichiometric)
Mg - .1709 (.2834)
Al - .3793 (.7165)
O - .4498

Mg,Al

Scapolite XXX #130

Source: D. M. Shaw
Type: natural
Amount: $3mm^3$
Comments: for details see J. Pet. 1, p.241
Composition: as given in paper above.

Si - .2146	(.4591)	K - .0183	(.0221)
Al - .1492	(.2819)	H - .0013	(.0115)
Ti - .0005	(.0007)	C - .0078	(.0286)
Fe - .0008	(.0011)	Cl - .0005	(.0005)
Mg - .0028	(.0046)	S - .0038	(.0094)
Mn - .0001	(.0001)	F - .0001	(.0001)
Ca - .1126	(.1576)	O=F,Cl	(.0002)
Na - .0181	(.0244)	Σ	1.0015

Si,Al,Ca,Mg,Na,K,C,S

Scapolite XXXI #131

Source: D. M. Shaw
Type: natural
Amount: $6mm^3$
Comments: for details see J. Pet. 1, p.241
Composition: as given in above paper

Si - .2205	(.4717)	K - .0084	(.0101)
Al - .1391	(.2629)	H - .0010	(.0195)
Ti - .0002	(.0003)	C - .0073	(.0266)
Fe - .0010	(.0015)	Cl - .0056	(.0056)
Mg - .0060	(.0100)	S - .0057	(.0142)
Mn - .0001	(.0001)	F - .0004	(.0004)
Ca - .1023	(.1431)	O=F,Cl	(.0014)
Na - .0283	(.0382)	Σ	.9976

Si,Al,Ca,Mg,Na,K,C,S

Scapolite XXXII #132

Source: D. M. Shaw
Type: Natural
Amount $4mm^3$
Comments: for details see J. Pet. 1, p.214.
Composition: as given in above paper

Si - .2423	(.5183)	K - .0096	(.0116)
Al - .1286	(.2429)	H - .0003	(.0026)
Ti - .0002	(.0003)	C - .0062	(.0228)
Fe - .0005	(.0007)	Cl - .0166	(.0166)
Mg - .0001	(.0002)	S - .0029	(.0072)
Mn - -	(tr)	F - .0002	(.0002)
Ca - .0833	(.1166)	O = F,Cl	(.0038)
Na - .0475	(.0640)	Σ	1.0002

Si,Al,Ca,Na,K,C,Cl,S

Scapolite XXXIII #133

Source: D. M. Shaw
Type: natural
Amount: $4mm^3$
Comments: for details see J. Pet. 1, p.214.
Composition: as given in above paper

Si - .2435	(.5210)	K - .0072	(.0087)
Al - .1259	(.2379)	H - .0001	(.0017)
Ti - .0001	(.0002)	C - .0058	(.0214)
Fe - .0016	(.0023)	Cl - .0185	(.0185)
Mg - .0011	(.0018)	S - .0032	(.0080)
Mn - (tr)		F - .0011	(.0011)
Ca - .0795	(.1113)	O=F,Cl	(.0046)
Na - .0509	(.0686)	Σ	.9979

Si,Al,Ca,Na,K,C,Cl,S

Scapolite XXXIV #134

Source: D. M. Shaw
Type: natural
Amount: $2mm^3$
Comments: for details see J. Pet. 1, p.214.
Composition: as given in above paper

Si - .2558	(.5473)	K - .0089	(.0108)
Al - .1209	(.2285)	H - .0001	(.0013)
Ti - .0001	(.0001)	C - .0046	(.0169)
Fe - .0006	(.0008)	Cl - .0219	(.0219)
Mg - .0002	(.0003)	S - .0016	(.0039)
Mn - .0	(.0)	F - .0	(.0)
Ca - .0592	(.0829)	O = F,Cl	(.0049)
Na - .0634	(.0855)	Σ	(.9953)

Si,Al,Ca,Na,K,C,Cl,S

Scapolite XXXV #135

Source: D. M. Shaw
Type: natural
Amount: $1mm^3$
Comments: for details see J. Pet. 1, p.214.
Composition: as given in above paper.

Si - .2706	(.5789)	K - .0096	(.0116)
Al - .1144	(.2162)	H - .0005	(.0050)
Ti - .0001	(.0001)	C - .0030	(.0111)
Fe - .0005	(.0007)	Cl - .0296	(.0296)
Mg - .0002	(.0003)	S - .0001	(.0003)
Mn - .0001	(.0001)	F - .0	(.0)
Ca - .0344	(.0481)	O = F,Cl	(.0067)
Na - .0779	(.1050)	Σ	(1.0003)

Si,Al,Ca,Na,K,Cl

Cobalt-olivine Co_2SiO_4 #136

Source: J. Ito
Type: synthetic
Amount: $1mm^3$
Comments: not checked; claimed to be pure; Na, W possible contaminents from flux.
Composition: (assumed stoichiometric)
Co - .5614 (.7138)
Si - .1338 (.2862)
O - .3048

Co,Si

Nickel-olivine Ni_2SiO_4 #137

Source: J. Ito
Type: synthetic
Amount: $2mm^3$
Comments: not checked; Na,W flux - possible inclusions.
Composition: (assumed stoichiometric)
Ni - .5605 (.7131)
Si - .1341 (.2869)
O - .3055

Ni,Si

Uvarovite $Ca_3Cr_2Si_3O_{12}$ #138

Source: J. Ito
Type: synthetic
Amount: $10mm^3$
Comments: not checked; possible flux contamine
Composition: (assumed stoichiometric)
Ca - .2402 (.3361)
Cr - .2078 (.3036)
Si - .1684 (.3603
O - .3836

Ca,Cr,Si

Rubidium Aluminum silicate $RbAlSi_2O_6$ #139

Source: J. Ito
Type: synthetic
Amount: $5mm^3$
Comments: not checked; Ba contamination
Composition: (assumed stoichiometric)
Rb - .3230 (.3533)
Al - .1019 (.1925)
Si - .2123 (.4542)
O - .3628

Kb,Al,Si

Yttrium Aluminum Garnet $Y_3Al_5O_{12}$ #140

Source: Linde Co.
Type: synthetic
Amount: $0.5mm^3$
Comments: melt pulled; not checked
Composition: (assumed stoichiometric)
Y - .4493 (.5706)
Al - .2273 (.4294
O - .3234

Y,Al

Cadmium Fluoride CdF_2 #141

Source: unknown
Type: synthetic
Amount: 1cc
Comments: not checked
Composition: (assumed stoichiometric)
Cd - .7473
F - .2527

Cd,F

Copper Iron Oxide $CuFe_2O_4$ #142

Source: B. J. Evans
Type: synthetic
Amount: $5mm^3$
Comments: tetragonal; not checked
Composition: (assumed stoichiometric)
Cu - .2656 (.3325)
Fe - .4669 (.6675)
O - .2675

Cu,Fe

Copper Iron Oxide $CuFe_2O_4$ #143

Source: B. J. Evans
Type: synthetic
Amount: $1mm^3$
Comments: cubic; not checked
Composition: (assumed stoichiometric)
Cu - .2656 (.3325)
Fe - .4669 (.6675)
O - .2675

Cu,Fe

Ferrosilite $FeSiO_3$ #144

Source: D. Lindsley
Type: synthetic
Amount: $1mm^3$
Comments: not very homogeneous
Composition: (assumed stoichiometric)
Fe - .4233 (.5445)
Si - .2129 (.4555)
O - .3638

Fe,Si

Ferrosilite — $FeSiO_3$ — #145

Source:
Type: synthetic
Amount: $1mm^3$
Comments: not very homogeneous; Fe enriched
Composition: (assumed stoichiometric)
Fe - .4234 (.5445)
Si - .2127 (.4555)
O - .3639

Fe,Si

Diopside — $CaMgSi_2O_6$ — #146

Source: D. Stevenson
Type: synthetic?
Amount: 0.5cc
Comments: not checked
Composition: (assumed stoichiometric)
Ca - .1851 (.2539)
Mg - .1123 (.1852)
Si - .2594 (.5549)
O - .4433

Ca,Mg,Si

Enstatite — $MgSiO_3$ — #147

Source: D. Stevenson
Type: synthetic
Amount: $10mm^3$
Comments: not checked; monoclinic; some contaminents
Composition: assumed stoichiometric
Mg - .2421 (.4014)
Si - .2798 (.5986)
O - .4781

Mg,Si

Calcium tungstate — $CaWO_4$ — #148

Source:
Type: synthetic
Amount: 1cc
Comments: not checked
Composition: (assumed stoichiometric)
Ca - .1392 (.1948)
W - .6385 (.8052)
O - .2223

Ca,W

Sodium Lanthanum Tungstate — $NaLaW_2O_8$ — #149

Source:
Type: synthetic
Amount: $2mm^3$
Comments: not checked
Composition: (assumed stoichiometric)
Na - .0350 (.0472)
La - .2112 (.2477)
W - .5592 (.7051)
O - .1946

Na,La,W

Lithium Niobate — $LiNbO_3$ — #150

Source:
Type: synthetic
Amount: 0.5cc
Comments: not checked
Composition: (assumed stoichiometric)
Li - .0469 (.1008)
Nb - .6284 (.8992)
O - .3247

Li,Nb

Calcium phosphate — $Ca_2P_2O_7$ — #151

Source: Keppler
Type: synthetic
Amount: $0.05mm^3$
Comments: see Naturwiss 19, p.446 for details.
Composition: (assumed stoichiometric)
Ca - .3155 (.4414)
P - .2438 (.5586)
O - .4408

Ca,P

Fluoro-phlogopite — $KMg_3AlSi_3O_{10}F_2$ — #152

Source: H. Yoder
Type: synthetic
Amount: .05cc
Comments: poor for probe mounting; not checked
Composition: (assumed stoichiometric)
K - .0928 (.1118)
Mg- .1731 (.2870)
Al- .0640 (.1209)
Si- .2000 (.4279)
F - .0902
O - .3799

K,Mg,Al,Si,F

Taeniolite $KLiMg_2Si_4O_{10}F_2$ #153

Source: H. Yoder
Type: synthetic
Amount: 0.1cc
Comments: not checked
Composition: (assumed stoichiometric)

K - .0958 (.1154)
Li - .0170 (.0366)
Mg - .1191 (.1975)
Si - .2833 (.6061)
F - .0938
O - .3920

K,Li,Mg,Si,F

Olivine 174.1 $Mg_{.9}Fe_{.1}SiO_4$ #154

Source: Berkeley via B. Evans
Type: Natural
Amount: 1cc
Comments: from Lherzolite inclusion in olivine-nephelinite, Kauai, Hawaii; composition given by B. Evans; analysis by Muysson, McMaster; Ni by Jones at USGS.
Composition:

Si - .1907 (.408)
Mg - .2967 (.492)
Mn - .0010 (.0013)
Ni - .0031 (.0040)
Fe - .0729 (.0913 FeO; .0027 Fe_2O_3)
O - .4356

Σ .9993

Fe,Mg,Si,Ni

Enstetite 25.25 #155

Source: Berkeley via B. Evans
Type: Natural
Amount: 0.1cc
Comments: Anal. by I. Carmichael; nodule in basalt.
Composition: as given by B. Evans.

Si - .2539 (.5431)
Al - .0231 (.0436)
Ti - .0010 (.0017)
Fe - .0494 (.0577 FeO; .0064 Fe_2O_3)
Mg - .2009 (.3332)
Ca - .0060 (.0084)
Na - .0006 (.0008)
Mn - .0012 (.0016)
Cr - .0021 (.0030)
O - .4618

Σ .9995 Si,Al,Fe,Mg,Ca

Bytownite #156

Source: Ward's via B. Evans
Type: natural
Amount: 1cc
Comments: Crystal Bay, Minn. as obtained from Wards.
Composition: as determined by Asari, Japan; composition checks with synthetic glasses; $An_{76}Ab_{24}Or_0$

Si - .2247 (.4808)
Al - .1695 (.3205)
Ti - .0005 (.0009)
Fe - .0089 (.0031 FeO; .0087 Fe_2O_3)
Mg - .0019 (.0031)
Ca - .1108 (.1550)
K - .0004 (.0005)
Na - .0203 (.0273)
H - .0007 (.0058)
O - .4499 Σ 1.0057

Si,Al,Ca,Na

Chromite GC-3 #157

Source: Berkeley via B. Evans
Type: Natural
Amount: 0.2cc
Comments: Not perfectly homogeneous; Stillwater; analyzed by J.I.Dinnin, USGS, Wash.; possible olivine impurity.
Composition:

Si - .0020 (.0065)
Al - .1016 (.1920)
Ti - .0034 (.0057)
Fe - .2078 (.185 FeO; .091 Fe_2O_3)
Mg - .0694 (.1150)
H - .0004 (.0032)
Cr - .2689 (.3930)
O - .3455

Σ 0.9914

Al,Ti,Fe,Mg,Cr

Chromite GS-4 #158

Source: Berkeley via B. Evans
Type: Natural
Amount: 0.1cc
Comments: Stillwater sample; analyzed by J. I. Dinnin, USGS; possible olivine impurit
Composition:

Si - .0008 (.0018)
Al - .0071 (.0135)
Ti - .0046 (.0076)
Fe - .1521 (.185 FeO; .0118 Fe_2O_3)
Mg - .0621 (.103)
Mn - .0015 (.0019)
Ni - .0009 (.0012)
Cr - .3045 (.4450)
V - .0012 (.0021)
H - .0001 (.0006)
O - .4651

Σ (.9912)

Al,Ti,Fe,Mg,Cr

Jadeite $Na_{.87}Fe_{.01}Ti_{.01}Al_{1.02}Si_2O_6$ #159

Source: Berkeley via B. Evans
Type: natural
Amount: 0.5cc
Comments: from Clear Creek, New Idria, Ca.; see J. Pet. 2, p.215 for details; Al and Si maybe suspect Na_2O = 15.1% at Berkeley.
Composition: from above reference; note poor formula based on Na_2O = .1340.

Si - .2776 (.5938)
Al - .1367 (.2582)
Ti - .0002 (.0004)
Mg - .0007 (.0012)
Ca - .0009 (.0013)
Na - .0994 (.1340)
Fe - .0031 (.0045 Fe_2O_3)
K - .0002 (.0002)
H - .0004 (.0032)
Cr - .0001 (.0001)
O - .4773 Σ (.9975)

Na,Al,Si

Rhodonite #388 #160

Source: Berkeley via B. Evans
Type: Natural
Amount: 0.1cc
Comments: from Broken Hill, NSW, Aus; Fe and Mn by I. Carmichael; other elements by probe Mn homogeneous, Fe not.
Composition: as given by Evans:

Si - .2509 (.5367 by diff.)
Fe - .0881 (.1260 Fe_2O_3)
Mg - .0020 (.0033)
Mn - .2558 (.3303)
Zn - .0030 (0.0037)
O - .4002

Mn,Fe,Si

#161

Chromite CC-2

Source: Berkeley via B. Evans
Type: natural
Amount: 5mm^3
Comments: from Iranuan chromite deposit, Palaman, Philippines;
Composition: as given by Evans

Si - .0035 (.0074)
Al - .0318 (.0600)
Fe - .0990 (.095 FeO; .036 Fe_2O_3)
Mg - .0911 (.151)
Cr - .4434 (.648)
O - .3312
Σ (.9974)

Al,Fe,Mg,Cr

#162

Lepidolite 50-1252

Source: Brown Derby Mine, Ohio City, Gunnison Co., Colorado
Type: natural
Amount: 1.5cc
Comments: -100 mesh; analyzed by C. O. Ingamells
Composition:

Si	.2340	(.5005)	Na	.0024	(.0032)
Al	.1300	(.2456)	K	.0820	(.0988)
Ti	.0004	(.0007)	Rb	.0182	(.0199)
Mn	.0170	(.0219	Cs	.0007	(.0008)
Mg	.0002	(.0002)	H	.0009	(.0079)
Ca	.0	(tr)	F	.0788	(.0788)
Sr	.025	(<0.03)	O	.3845	
Ba	.0001	(.0001)	O = F		(.0322)
Li	.0249	(.0537)			
Fe	.0009	(.0003 FeO; .0008 Fe_2O_3)			
			Σ		(1.0000)

Si,Al,Mn,Li,K,Rb,F

#163

Herderite

Source: J. Ito, Harvard
Type: natural, Greenwood Maine
Amount: 20mm^3
Comments: (not checked)
Composition: (J. Ito analyst)

Ca	.2460	(.3442)	Fe	.0010	(.0015 Fe_2O_3)
Sr	.0038	(.0045)	Mn	.0003	(.0004)
Mg	.0018	(.0030)	Na	.0003	(.0004)
Be	.0535	(.1484)	O	.4875	
P	.1895	(.4343)	O = F		(.0035)
F	.0083	(.0083)	Σ		(.9976)
H	.0058	(.0516)			
Si	.0011	(.0024)			
Al	.0011	(.0021)			

Ca,P,Be

#164

Andradite K-450

Source: R. A. Howie
Type: natural
Amount: 10mm^3 fine crystals
Comments: $\underline{a}$ = 12.030
Composition: R. C. Taylor, analyst

Si - .1710 (.3659)
Ti - .0027 (.0045)
Al - .0264 (.0498)
Fe - .1805 (.0019 FeO; .2559 Fe_2O_3)
Mn - .0027 (.0035)
Ca - .2220 (.3106)
Mg - .0052 (.0087)
O - .3895
Σ 1.0008

Si,Al,Fe,Ca,Mg

#165

Garnet (Gore Mt.)

Source: I. M. Steele
Type: natural, Gore Mt. N. Y.
Amount: 5mm^3
Comments: small chips used to check SSD accuracy from day to day.
Composition: I. Steele, probe analysis

Si - .1845 (.3946)
Ti - .0005 (.0009)
Al - .1205 (.2278)
Fe - .1690 (.2176)
Mn - .0039 (.0050)
Mg - .0524 (.0868)
Ca - .0526 (.0739)
O - .4164
Σ 1.0066

Si,Al,Fe,Mg,Ca,Mn

#166

Hedenbergite

Source: N. Ware, ANU
Type: natural, Elba Isl.,
Amount: .01mm^3
Comments: not checked
Composition: E. Kiss, analyst

Si - .2203 (.4712)
Al - .0084 (.0158)
Fe - .1898 (.2269 FeO; .0191 Fe_2O_3)
Mn - .0203 (.0262)
Mg - .0089 (.0147)
Ca - .1570 (.2197)
Na - .0033 (.0044)
K - .0003 (.0004)
O - .3917
Σ .9988

Si,Al,Fe,Mn,Mg,Ca,Na

#167

Wollastonite

Source: N. Ware, ANU
Type: natural, location unknown
Amount: 0.1mm^3
Comments: not checked
Composition: analysed by E. Kiss

Si - .2398 (.5129)
Ti - .0002 (.0003)
Al - .0004 (.0007)
Fe - .0005 (.0007 Fe_2O_3)
Mn - .0034 (.0044)
Mg - .0002 (.0004)
Ca - .3442 (.4816)
Na - .0013 (.0017)
K - .0002 (.0003)
O - .4098
Σ 1.0029

Si,Mn,Ca

#168

Clinopyroxene

Source: N. Ware, ANU
Type: natural, Delegate Pipe, Aus.
Amount: two tiny grains
Comment: very little material; Cr may be in error.
Composition: Anal. E. Kiss

Si - .2403 (.5140)
Ti - .0032 (.0053)
Al - .0292 (.0551)
Fe - .0295 (.0290 FeO; .0100 Fe_2O_3)
Mn - .0006 (.0008)
Mg - .0969 (.1607)
Ca - .1505 (.2106)
Na - .0070 (.0095)
K - .0004 (.0005)
Cr - .0042 (.0061)
Ni - .0005 (.0005)
O - .4377
Σ (1.0022)

Si,Al,Ti,Fe,Mg,Ca,Na,Cr

Dyscrasite Ag-16 $Ag_{.76}Sb_{.24}$ #169

Source: L. J. Cabri, Mines Branch, Ottawa
Type: synthetic
Amount: $2mm^3$
Comments: not checked; very little material
Composition: as given by Cabri:

Ag - .7401
Sb - .2599

Ag,Sb

Dyscrasite Ag-17 $Ag_{.78}Sb_{.22}$ #170

Source: L. J. Cabri, Mines Branch, Ottawa
Type: synthetic
Amount: $.2mm^3$
Comments: not checked; very little material
Composition: as given by Cabri

Ag - .7595
Sb - .2405

Ag,Sb

Allargentum Ag-18 $Ag_{.86}Sb_{.14}$ #171

Source: L. J. Cabri, Mines Branch, Ottawa
Type: synthetic
Amount: $1mm^3$
Comments: not checked; very little material
Composition: as given by Cabri

Ag - .8405
Sb - .1595

Ag,Sb

Allargentum Ag-19 $Ag_{.88}Sb_{.12}$ #172

Source: L. J. Cabri, Mines Branch, Ottawa
Type: synthetic
Amount: $1mm^3$
Comments: not checked
Composition: given by Cabri

Ag - .8703
Sb - .1297

Ag,Sb

Allargentum Ag-20 $Ag_{.91}Sb_{.09}$ #173

Source: L. J. Cabri, Mines Branch, Ottawa
Type: synthetic
Amount: $1mm^3$
Comments: not checked
Composition: given by Cabri

Ag - .8999
Sb - .1001

Ag,Sb

Antimony Silver Ag-21 $Ag_{.95}Sb_{.05}$ #174

Source: L. J. Cabri, Mines Branch, Ottawa
Type: synthetic
Amount: $2mm^3$
Comments: not checked
Composition: given by Cabri

Ag - .9407
Sb - .0593

Ag,Sb

Iron Arsenide As-18 $FeAs_2$ #175

Source: L. G. Cabri, Mines Branch, Ottawa
Type: synthetic
Amount: $.5mm^2$
Comments: not checked; some FeAs present
Composition: (assumed stoichiometric)

Fe - .2715
As - .7285

Fe,As

Copper-sulfur selinide 69-155 $Cu_{.64}Se_{.30}S_{.06}$ #176

Source: L. G. Cabri, Mines Branch, Ottawa
Type: synthetic
Amount: $1mm^3$
Comments: not checked
Composition: as given by Cabri, note sum does not equal 1.00

Cu - .6184
Se - .3559
S - .0300

Cu,Se,S

Copper-sulfur selinide (Q-1-3) $Cu_{.64}Se_{.25}S_{.11}$ #177

Source: L. G. Cabri, Mines Branch, Ottawa
Type: synthetic
Amount: $1mm^3$
Comments: not checked
Composition: as given by Cabri;
Cu - .6380
Se - .3084
S - .0536

Cu,Se,S

Cobalt-antimony Sulfide #1-5 CoSbS #178

Source: L. G. Cabri, Mines Branch, Ottawa
Type: synthetic
Amount: $2mm^3$
Comment: not checked; may have minor second phase.
Composition: assumed above formula
Co - .2770
Sb - .5723
S - .1507

Co,Sb,S

Nickel Antimony #142 $NiSb_2$ #179

Source: L. G. Cabri, Mines Branch, Ottawa
Type: synthetic
Amount: $3mm^3$
Comment: not checked; may have minor second phase.
Composition: as per above formula
Ni - .1943
Sb - .8057

Ni,Sb

Nickel Antimony #141 NiSb #180

Source: L. G. Cabri, Mines Branch, Ottawa
Type: synthetic
Amount: $3mm^3$
Comment: not checked
Composition: as per above formula
Ni - .3253
Sb - .6747

Ni,Sb

Copper Selenide #113 CuSe #181

Source: L. J. Cabri, Mines Branch, Ottawa
Type: synthetic
Amount: $3mm^3$
Comment: not checked
Composition: as per above formula
Cu - .4459
Se - .5541

Cu,Se

Copper Selenide #129 $Cu_{1.80}Se$ #182

Source: L. J. Cabri, Mines Branch, Ottawa
Type: synthetic
Amount: $2mm^3$
Comment: not checked
Composition: as per above formula
Cu - .5917
Se - .4083

Cu,Se

Copper Selenide #130 $CuSe_2$ #183

Source: L. J. Cabri, Mines Branch, Ottawa
Type: synthetic
Amount: $2mm^3$
Comment: not checked; 0.15 wt.% excess Se
Composition: as per above formula + 0.15 wt.% excess Se
Cu - .2861
Se - .7139

Cu,Se

Copper Selenide Cu_2Se+Cu #184

Source: L. G. Cabri, Mines Branch, Ottawa
Type: synthetic
Amount: $2mm^3$
Comments: not checked; probably free copper
Composition: per Cu_2Se
Cu - .6168
Se - .3832

Cu,Se

Krennerite-J $Au_{.28}Ag_{.05}Te_{.67}$ #185

Source: L. G. Cabri, Mines Branch, Ottawa
Type: synthetic ?
Amount: $2mm^3$
Comments: not checked
Composition: as given by Cabri
Au - .3769
Ag - .0402
Te - .5829

Au,Ag,Te

Calaverite-K $Au_{.31}Ag_{.02}Te_{.67}$ #186

Source: L. G. Cabri, Mines Branch, Ottawa
Type: synthetic?
Amount: $2mm^3$
Comments: not checked
Composion: as given by Cabri
Au - .4134
Ag - .0153
Te - .5713

Au,Ag,Te

Millerite #48 NiS #187

Source: Czamanske
Type: synthetic
Amount: $0.5mm^3$ fine powder
Comments: I. Steele analysis shows NiS
Composition: as per above formula
Ni - .6467
S - .3533

Ni,S

Pyrite #20 FeS_2 #188

Source: Czamanske
Type: synthetic
Amount: $0.25mm^3$; fine grained
Comments: not checked
Composition: as per above formula
Fe - .4655
S - .5345

Fe,S

Bornite #14 $Cu_{5.44}Fe_{.82}S_4$ #189

Source: Czamanske
Type: synthetic
Amount: $2mm^3$
Comments: not checked
Composition: as per above formula
Cu - .6649
Fe - .0882
S - .2469

Cu,Fe,S

Galena #21 PbS #190

Source: Czamanske
Type: synthetic?
Amount: $1mm^3$
Comments: not checked
Composition: stoichiometry assumed
Pb - .8660
S - .1340

Sphalerite #31 ZnS #191

Source: Czamanske
Type: synthetic
Amount: $2mm^3$
Comments: not checked
Composition: (assumed stoichiometric)
Zn - .6709
S - .3291

Zn,S

Chalcopyrite #11 $CuFeS_2$ #192

Source: Czamanske
Type: natural from O'okiep
Amount: $0.1mm^3$
Comments: not checked
Composition:
Cu - .3462
Fe - .3043
S - .3494

Cu,Fe,S

Pentlandite #68 $(Fe_{.58}Ni_{.42})_3S_{3.198}$ #193

Source: Czamanske
Type: synthetic
Amount: 0.01mm^3 very fine grained
Comments: material too fine for probe mount
Composition: as per above formula
Fe - .3551
Ni - .2703
S - .3746

Fe,Ni,S

Troilite FeS + 0.5 wt.% Co #194

Source: Czamanske
Type: synthetic
Amount: 0.25mm^3
Comments: very little materiel
Composition: stoichiometric + 0.5 wt.% Co
Fe - .6303
S - .3647
Co - .0050

Fe,Co,S

Cobalt arsenide $CoAs_{2.005}$ #196

Source: D. Radcliffe, Queens.
Type: synthetic powder
Amount: 1mm^3
Comments: not checked; X-ray
Composition: per Radcliffe letter
Co - .2821
As - .7174

Co,As

Chromite $FeCr_2O_4$ #197

Source: Allen
Type: synthetic
Amount: 1mm^3
Comments: not checked
Composition: (assumed stoichiometric)
Fe - .2495 (.3210)
Cr - .4546 (.5790)
O - .2859

Fe,Cr

Picrochromite $MgCr_2O_4$ #198

Source: Allen
Type: synthetic
Amount: 2mm^3
Comments: not checked
Composition: (assumed stoichiometric)
Mg - .1264 (.2096)
Cr - .5408 (.7904)
O - .3328

Mg,Cr

Rhodonite #104791 #199

Source: C. Klein
Type: natural; Merid Mine, Minas Geraes, Brazil
Amount: 0.1cc
Comments: not checked
Composition: wet chemistry, E. K. Oslund analyst
Si - .2167 (.4636)
Al - .0013 (.0024)
Fe - .0198 (.0253 FeO; .0003 Fe_2O_3)
Mg - .0065 (.0107)
Ca - .0296 (.0413)
H - .0002 (.0014)
Ti - .0 (.0)
Mn - .3497 (.4515)
O - .3762
Σ (.9965)

Si,Fe,Mg,Ca,Mn

Brazilianite #100873 #200

Source: C. Klein
Type: natural
Amount: 5mm^3
Comments: for details see AM 33, p.135-141.
Composition: as given in reference
Na - .0515 (.0829)
K - .0017 (.0020)
Al - .2268 (.4285)
Fe - .0002 (.0003 Fe_2O_3)
Ti - .0003 (.0005)
P - .1693 (.3879)
H - .0110 (.0985)
O - .5292
Σ 1.0006

Na,Al,P

Apatite $Ca_{9.81}(PO_4)_{5.9}F_{1.3}Cl_{.26}O_{32}$ #201

Source: E. J. Young via L. Fuchs
Type: natural; Eagle Co. Co
Amount: 4mm^3
Comments: some limonite on surface
Composition: as given by Young

Ca - .3851	(.5389)	C - .0001	(.0003)
P - .1789	(.4100)	H - .0001	(.0012)
Al - .0002	(.0004)	F - .0240	(.0240)
Mn - .0009	(.0011)	Cl - .0091	(.0091)
Na - .0013	(.0017)	S - .0004	(.0011)
K - .0	(.0001)	O - .3830	
Sr - .0003	(.0004)	O = Cl,F	(.0122)
REE- .0156	(.0179)	Σ	(.9992)
Fe - .0010	(.0004	acid insol.	.0038
FeO; .0010 Fe_2O_3)			

Ca,P,F,Cl

#202

Apatite DM-3

Source: E. J. Young
Type: Natural; Durango, Mexico
Amount: 1cc
Comments: analysis is for DM-A (also P-536)
Composition: DMA

Si - .0016	(.0034)	As - .0007	(.0009)
Al - .0004	(.0007)	U - .0001	(.0001)
Fe - .0004	(.0006 Fe_2O_3)	S - .0015	(.0037)
Mn - .0001	(.0001)	REE- .0125	(.0145)
Mg - .0001	(.0001)	Th - .0002	(.0002)
Ca - .3561	(.5402	O - .3795	
Na - .0017	(.0023)	O = F,Cl	(.0138)
K - .0	(.0001)	Σ	1.0003
H - .0	(.0001)		
P - .1749	(.4008)	La - .0038	(.0045)
F - .0353	(.0353)	Ce - .0046	(.0054)
Cl - .0041	(.0041)	Nd - .0022	(.0026)
C - .0001	(.0003)	Ca,P,F,Cl,La,Ce	
Sr - .0005	(.0006)		

#203

Sphalerite #1360

Source: B. Evans
Type: natural; Broken Hill, N.S.W. Aus.
Amount: 0.2cc
Comments: I. Carmichael determined Fe and Mn
Composition: Zn and S by difference assuming stoichiometry.

Fe - .1140	
Mn - .0010	
Zn - .5490	
S - .3360	
1.0000	Fe,Zn,S

#204

Lepidolite

Source: E. E. Olsen via Suhr
Type: natural, see #162
Amount: .05cc
Comments: not checked
Composition: given on J. V. Smith's cards.

Si - .2340	(.5005)	F - .0788	(.0788)
Al - .1300	(.2455)	O - .4095	
Ti - .0004	(.0007)	O=F .0332	
Fe - .0009	(.0003 FeO; .0008 Fe_2O_3)		
Mn - .0170	(.0219)		
Mg - .0002	(.0002)	Σ 1.000	
Ba - .0001	(.0001)		
Na - .0024	(.0032)		
K - .0820	(.0988)		
Li - .0249	(.0537)		
Rb - .0182	(.0199)		
Ca - .0006	(.0008)	Si,Al,Mn,K,Li,Rb,F	
H - .0009	(.0079)		

#205

Serpentine

Source: E. E. Olsen
Type: natural, locality unknown
Amount: 0.2cc
Comments: not checked
Composition: as given on J. V. Smith's cards; Na =

Si - .1800	(.3850)	H - .0165	(.1473)
Ti - .0004	(.0007)	Cr - .0034	(.0050)
Al - .0216	(.0409)	Na - .0013	(.0017)
Mn - .0004	(.0005)	O - .5141	
Mg - .2277	(.3775)	Σ	1.0067
Fe - .0346	(.0129 FeO; .0352 Fe_2O_3)		

Si,Al,Mg,Fe

#206

Hornblende

Source: E. E. Olsen
Type: natural, locality unknown
Amount: 0.2cc
Comments: not checked
Composition: as given on J. V. Smith's cards.

Si - .1916	(.4098)	Na - .0198	(.0257)
Ti - .0047	(.0078)	K - .0142	(.0171)
Al - .0511	(.0965)	H - .0012	(.0104)
Mn - .0056	(.0072)	V - .0003	.0004
Mg - .0502	(.0833)	F - .0178	.0178
Ca - .0721	(.1009)	Cl - .0017	.0017
Fe - .1638	(.1485 FeO; .0713 Fe_2O_3)	O - .4059	
		Σ	.9974 (99.03)

(.2107 ωFeO)

Si,Ti,Al,Mn,Mg,Ca, Fe,Na,K,F

#207

Jadeite

Source: G. Ernst
Type: natural, location unknown
Amount: $4mm^3$
Comments: not checked
Composition: as given on J. V. Smith's cards.

Si - .2761	(.5906)	
Al - .1303	(.2462)	
Ti - .0005	(.0008)	
Fe - .0043	(.0018 FeO; .0041 Fe_2O_3)	
Mn - .0002	(.0003)	
Mg - .0010	(.0017)	
Ca - .0025	(.0035)	
Na - .1109	(.1495)	
K - .0	(.0001)	
H - .0001	(.0010)	Si,Al,Na
O - .4741		
Σ .9996		

#208

Epidote #E-17

Source: G. Ernst
Type: Natural, location unknown
Amount: $6mm^3$
Comments: not checked
Composition: as given on J. V. Smith's cards

Si - .1799	(.3848)	Na - .0004	(.0006)
Al - .1217	(.2299)	K - .0002	(.0003)
Ti - .0015	(.0024)	P - .0007	(.0017)
Mn - .0028	(.0036)	H - .0023	(.0210)
Mg - .0003	(.0005)	O - .4468	
Ca - .1480	(.2071)	Σ	.9853
Fe - .0954	(.0223 FeO; .1116 Fe_2O_3)		

Si,Al,Ca,Fe

#209

Chlorite #G-RS-2

Source: G. ERNST
Type: Natural; location unknown
Amount: $2mm^3$
Comments: Not checked
Composition: as given on J. V. Smith's cards.

Si - .1433	(.3065)	Ca - .0039	(.0054)
Al - .0912	(.1723)	Na - .0015	(.0020)
Ti - .0005	(.0009)	H - .0135	(.1206)
Mn - .0030	(.0039)	O - .4799	
Mg - .1415	(.2347)	Σ	1.0046
Fe - .1217	(.1411 FeO; .0172 Fe_2O_3)		

Si,Al,Mg,Fe

Amphibole #1[illegible]a-01 #210

Source: W. G. Ernst
Type: natural; location unknown; USNM #C-4950
Amount: 1mm^3
Comments: not checked.
Composition: as given on J. V. Smith's cards.

Si - .2580	(.5519)	Na - .0487	(.0657)
Ti - .0007	(.0011)	K - .0016	(.0016)
Al - .0526	(.0994)	P - .0001	(.0003)
Mn - .0012	(.0015)	H - .0028	(.0251)
Mg - .0588	(.0975)	F - .0059	(.0059)
Ca - .0121	(.0169)	O - .4535	
Fe - .1040	(.0921 FeO; .0463 Fe_2O_3)		

Σ 1.0057
Si,Al,Mg,Ca,Fe,Na,F

Epidote #E-2 #211

Source: W. G. Ernst
Type: natural; location unknown
Amount: 10mm^3
Comment: not checked
Composition: as given on J. V. Smith's cards

Si - .1796	(.3842)	Na - .0005	(.0007)
Al - .1087	(.2053)	K - .0002	(.0002)
Ti - .0006	(.0010)	H - .0020	(.0180)
Mn - .0590	(.0891)	P - .0003	(.0005)
Mg - .0022	(.0036)	O - .4262	
Ca - .1487	(.2081)	Σ .9994	
Fe - .0620	(.0 FeO; .0886 Fe_2O_3)		

Si,Al,Mn,Ca,Fe

Amphibole #P1 #212

Source: W. G. Ernst
Type: natural, location unknown
Amount: 0.3cc
Comment: not checked
Composition: as given on J. V. Smith's cards

Si - .2428	(.5194)	Na - .0450	(.0607)
Al - .0011	(.0020)	K - .0003	(.0004)
Mg - .0083	(.0137)	H - .0032	(.0289)
Ca - .0014	(.0019)	O - .4168	
Fe - .2811	(.1939 FeO; .1864 Fe_2O_3)		

Σ 1.0073
Si,Mg,Fe,Na

Hornblende #213

Source: W. G. Ernst
Type: 0.05cc
Comment: not checked
Composition: as given on J. V. Smith's cards

Si - .2243	(.4799)	Na - .0230	(.0310)
Al - .0565	(.1067)	K - .0023	(.0028)
Ti - .0016	(.0027)	H - .0027	(.0238)
Mn - .0019	(.0025)	O - .4464	
Mg - .0541	(.1003)	Σ .9947	
Ca - .0563	(.0788)		
Fe - .1209	(.1135 FeO; .0477 Fe_2O_3)		

Si,Al,Mg,Ca,Fe,[illegible]

Amphibole #SL0361 #214

Source: W. G. Ernst
Type: natural; location unknown
Amount: 0.1cc
Comment: not checked
Composition: as given on J. V. Smith's cards.

Si - .2588	(.5536)	Na - .0501	(.0675)
Ti - .0027	(.0045)	K - .0012	(.0015)
Al - .0644	(.1216)	H - .0029	(.0263)
Mn - .0012	(.0016)	P - .0014	(.0031)
Mg - .0436	(.0723)	F - .0005	(.0005)
Ca - .0073	(.0102)	O - .4609	
Fe - .1050	(.1211 FeO; .0156 Fe_2O_3)		

Σ .9994
Si,Al,Mg,Ca,F
Na

Actinolite #215

Source: W. G. Ernst
Type: natural; location unknown; USNM #939
Amount: .05cc
Comment: not checked
Composition: as given on J. V. Smith's cards.

Si - .2304	(.4930)	Na - .0008	(.0011)
Al - .0007	(.0013	H - .0025	(.0231)
Ti - .0009	(.0015)	O - .4055	
Mn - .0209	(.0270)	Σ .9963	
Mg - .0094	(.0155)		
Ca - .0767	(.1073)		
Fe - .2521	(.3050 FeO; .0215 Fe_2O_3		

Si,Mn,Mg,Ca,Fe

Amphibole #216

Source: W. G. Ernst
Type: natural; location unknown; USNM C-49
Amount: 4mm^3
Comment: not checked
Composition: as given on J. V. Smith's cards

Si - .2592	(.5544)	K - .0012	(.0015)
Ti - .0002	(.0004)	F - .0018	(.0018)
Al - .0012	(.0022)	Cl - .0008	(.0008)
Mn - .0007	(.0009)	H - .0007	(.0060)
Mg - .0742	(.1230)	O - .4364	
Ca - .0155	(.0217)	Σ 1.0002	
Na - .0501	(.0675)		
Fe - .1580	(.0523 FeO; .1677 Fe_2O_3)		

Si,Mg,Ca,Na,Fe

Garnet #3708 #217

Source: R. A. Howie
Type: Natural; Madras, India
Amount: 0.1cc
Comments: see Min. Mag. 31, p.574 for details
Composition:

Si - .1739	(.3720)	
Ti - .0004	(.0007)	
Al - .1151	(.2175)	
Mn - .0057	(.0074)	
Mg - .0291	(.0482)	
Ca - .0113	(.0158)	
Fe - .2639	(.3330 FeO; .0071 Fe_2O_3	
O - .4006		

Σ 1.0017
Si,Al,Mg,Ca,Fe

Garnet #218

Source: R. A. Howie
Type: natural; Madras, India
Amount: .05cc
Comment: see Min. Mag. 31, p.574 for details.
Composition: as given in above:

Si - .1793	(.3835)
Ti - .0005	(.0008)
Al - .1117	(.2110)
Mn - .0055	(.0071)
Mg - .0478	(.0793)
Ca - .0146	(.0204)
Na - .0	(.0001)
K - .0003	(.0004)
Fe - .2319	(.2848 FeO; .0150 Fe_2O_3)
O - .4084	
Σ 1.0024	

Si,Al,Mg,Ca,Fe

Garnet S-347

#219

Source: R. A. Howie
Type: natural; Uganda
Amount: 5mm
Comments: for details see Min. Mag. 31, p.575.
Composition: as given in above:

Si - .1781	(.3810)
Ti - .0011	(.0019)
Al - .1099	(.2076)
Mn - .0102	(.0132)
Mg - .0188	(.0312)
Ca - .0479	(.0670)
Fe - .2328	(.2854 FeO; .0156 Fe_2O_3)
O - .4012	
Σ 1.0079	

Si,Al,Mn,Mg,Ca,Fe

Garnet #5

#220

Source: R. A. Howie
Type: natural; from Meldon, Devonshire, Eng.
Amount: $10mm^3$
Comments: see Min. Mag. 34, p.253 for details.
Composition: as given in above

Si - .1694	(.3624)
Ti - .0001	(.0002)
Al - .1126	(.2128)
Mn - .1357	(.1752)
Mg - .0161	(.0267)
Ca - .1145	(.1502)
Fe - .0469	(.0358 FeO; .0273 Fe_2O_3)
Na - .0	(.0001)
O - .4047	
Σ 1.0007	Si,Al,Mn,Mg,Ca,Fe

Mn-Cummingtonite #4

#221

Source: C. Klein, Harvard
Type: Natural; Wabush Iron Formation Canada
Amount: .2cc
Comment: for details see AM 49, p.963 and Can. J. Earth Sci. 8, p.1177.
Composition: as given in above reference; Ca,Mo, Ag also detected; Second analysis in Rucklidge Probe

Si - .2576, .2541	(.5510, .5437)	O - .4364, .4386	
Al - .0005, .0007	(.0010, .0013)	F = O (.0010)	
Mn - .1020, .1067	(.1317, .1378)	Σ (1.0043, .9969)	
Mg - .1025, .1040	(.1700, .1724)		
Ca - .0087, .0071	(.0122, .0099)		
Na - .0010, .0	(.0013, .0)		
Fe - .0861, .0854	(.1108 FeO; .1112)		
K - .0001, .0001	(.0002, .0001)		
H - .0025, .0023	(.0249, .0204)		
F - .0023, nd	(.0023, nd)		

Si,Mn,Mg,Ca,Fe

Grunerite #1

#222

Source: C. Klein, Harvard
Type: natural; Wabush Iron Formation, Labrador, Canada
Amount: 0.7cc
Comment: For details see AM 49, p.963; Can. J. Earth Sci. 8, p.1177. detected
Composition: as given in above; Cu,Ag,Sr,Yb also/ Second analysis in Rucklidge Probe.

Si - .2291, .2316	(.4901, .4955)	O - .3842, .3889	
Al - .0 , .0016	(.0 , .0030)	F = O (.0042)	
Ti - .0003, .0003	(.0005, .0004)	Σ (1.0021, 1.0072)	
Mn - .0029, .0058	(.0037, .0075)		
Mg - .0191, .0173	(.0317, .0287)		
Ca - .0022, .0022	(.0031, .0031)		
Na - .0003, .0	(.0004, .0)		
Fe - .3497, .3497	(.4499 FeO, .4498)		
K - .0, .0005	(.0 , .0006)		
H - .0008, .0021	(.0159, .0186)		
F - .0100, nd	(.0100, nd)	Si,Mg,Fe,F	
P - .0004, nd	(.0010, nd)		

Actinolite #11B

#223

Source: C. Klein
Type: Natural; Wabush Iron Formation, Labrador, Canada
Amount: .1cc
Comments: contains rare magnetite; details in Klein Thesis; also see Can. J. E.Sci. 8, p.1177.
Composition: as given in thesis; Cu,Ag,Pb,Be,Sr,Y detected; second analysis in Rucklidge Probe.

Si - .2444, .2474	(.5228, .5293)	O - .4282, .4288	
Ti - .0003, .0001	(.0005, .0002)	Σ (1.0020, .9966)	
Al - .0010, .0010	(.0018, .0019)		
Mn - .0019, .0022	(.0024, .0028)		
Mg - .0635, .0647	(.1053, .1072)		
Ca - .0805, .0795	(.1125, .1113)		
Fe - .1755, .1737	(.2257 FeO, .2235)		
Na - .0012, .0002	(.0016, .0002)		
K - .0006, .0002	(.0007, .0003)		
H - .0029, .0022	(.0256, .0199)	Si,Mg,Ca,Fe	

Riebeckite-Tremolite #13

#224

Source: C. Klein
Type: natural; Wabush Iron Formation, Labrador, Canada
Amount: .1cc
Comments: details in Klein Ph.D. Thesis; also Can. J. Earth Sci. 8, p.1177.
Composition: as given in above; Be,Sr,Ag,Cu detected. Second analysis is Rucklidge Probe.

Si - .2594, .2616	(.5550, .5596)	O - .4437, .4564	
Al - .0085, .0075	(.0151, .0141)	F = O (.0067)	
Mn - .0037, .0042	(.0048, .0054)	Σ (1.0007, .9960)	
Mg - .1296, .1239	(.2149, .2054)		
Ca - .0427, .0475	(.0597, .0665)		
Na - .0214, .0262	(.0288, .0278)		
Fe - .0715, .0686	(.0490 FeO; .0478 Fe_2O_3) (.0471 FeO; .0457 Fe_2O_3)		
K - .0017, .0017	(.0021, .0022)		
H - .0014, .0024	(.0122, .0212)		
F - .0150, nd	(.0150, nd)	Si,Al,Mg,Ca,Na,Fe,F	
P - .0004, nd	(.0010, nd)		

#225

Kutnahorite #85670

Source: C. Klein, Harvard
Type: Natural; Franklin, N. J.
Amount: 0.1cc
Comments: Details in AJS 258 p.402 and AM 40, p.749.
Composition: as given in AJS above.

Ca - .1961	(.2744)
Mg - .0133	(.0221)
Mn - .2193	(.2831)
Fe - .0039	(.0050)
C - .1141	(.4180)
O - .4533	
Σ (1.0026)	

Ca,Mg,Mn,C

Hurlbutite #105243 #226

Source: C. Klein, Harvard
Type: natural, Chandler's Mill, N. H.
Amount: .05cc
Comments: details in AM 37 p.931-940.
Composition: as given in above

Ca -	.1561	(.2184)
Be -	.0767	(.2130)
P -	.2452	(.5619)
O -	.5220	
insol -		(.0076)
Σ	1.0009	

Ca,Be,P

Dolomite #105064 $CaMg(CO_3)_2$ #227

Source: C. Klein
Type: natural; Oberdorf, Austria
Amount: 0.1cc
Comments: details in AJS 258 p.402.
Composition: as given in above.

Ca -	.2175	(.3043)
Mg -	.1313	(.2178)
Mn -	.0001	(.0002)
Fe -	.0006	(.0008)
C -	.1293	(.4737)
O -	.5212	
insol -		(.0044)
Σ		(1.0012)

Ca,Mg,C

Lead Telluride #23 PbTe #228

Source: Czamanski
Type: synthetic
Amount: .1mm^3
Comment: not checked
Composition: as above formula

Pb - .6189
Te - .3811

Pb,Te

Lead Selenide #22 PbSe #229

Source: Czamanski
Type: synthetic
Amount: extremely little
Comment: not checked
Composition: as per above formula

Pb - .7241
Se - .2759

Pb,Se

FeS+2% Cu #90 #230

Source: Czamanske
Type: synthetic
Amount: 1mm^3; fine grained
Comment: I. Steele determined Cu to be 1.65 instead of 2.00
Composition: per I. Steele

Cu - .0165
Fe - .6248
S - .3587

Cu,Fe,S

Silver-Bismuth Sulfide #5 $AgBiS_2$ #231

Source: Czamanske
Type: synthetic
Amount: 0.5mm^3
Comment: not checked
Composition: as per above formula

Ag - .2831
Bi - .5486
S - .1683

Ag,Bi,S

Gold antimony #8 $AuSb_2$ #232

Source: Czamanske
Type: synthetic
Amount: .5mm^3
Comment: not checked
Composition: as per above formula

Au - .4472
Sb - .5528

Au,Sb

CdS + ZnS #43 $CdS_{.01}ZnS_{.99}$ #233

Source: Czamanske
Type: synthetic
Amount: 0.5mm^3
Comment: not checked
Composition: as per above formula

Cd - .0113
Zn - .6612
S - .3275

Cd,Zn,S

Lead-Copper Antimony-Sulfide #25 $Pb_2Cu_2Sb_2S_5$ #234

Source: Czamanske
Type: synthetic
Amount: 0.5mm^3
Comment: not checked
Composition: as per above formula
Pb - .4240
Cu - .1300
Sb - .2492
S - .1968

Pb,Cu,Sb,S

Gold-Silver #82 $Au_{50}Ag_{50}$ #238

Source: Czamanske
Type: synthetic
Amount: .25mm^3
Comment: not checked
Composition: as per above formula; wt.% assumed
Au - .50
Ag - .50

Au,Ag

Alabandite #76 MnS 235

Source: Czzmanske
Type: synthetic
Amount: 0.25mm^3
Comment: not checked
Composition: as per above formula
Mn - .6315
S - .3685

Mn,S

FeS-ZnS #37 $FeS_{.4}ZnS_{.6}$ #239

Source: Czamanske
Type: synthetic
Amount: 0.5mm^3
Comment: not checked
Composition: as per above formula
Fe - .2386
Zn - .4189
S - .3525

Fe,Zn,S

MnS-ZnS #38 $MnS_{.2}ZnS_{.8}$ #236

Source: Czamanske
Type: synthetic
Amount: 0.1mm^3
Comment: not checked
Composition: as per above formula
Mn - .1153
Zn - .5485
S - .3362

Mn,Zn,S

Haplogranite Glass #24

Source: C. L. Davis
Type: synthetic glass
Amount: 5mm^3
Comments: not checked; see AM 1952 p.744 fo details.
Composition: as given in above reference; Fe_2O_3 impurity = .0015
Si - .3396 (.7264
Al - .0835 (.1578)
Ca - .0130 (.0182)
Mg - .0048 (.0080)
K - .0478 (.0576)
Na - .0237 (.0319)
O - .4876
Σ (.9999)

Si,Al,Ca,K,Na

FeS-ZnS #35 $FeS_{.1}ZnS_{.9}$ #237

Source: Czamanske
Type: synthetic
Amount: almost nil
Comment: not checked
Composition: as per above formula
Fe - .0579
Zn - .6098
S - .3323

Fe,Zn,S

Feldspar PRC-2000 #241

Source: F. Chayes
Type: Natural, location unknown
Amount: 5mm^3
Comment: see Geop. Lab. Rep. 1961-62, Chayes Zies for details; not checked.
Composition: as given in above reference.
Si - .3170 (.6782)
Al - .0956 (.1806)
Ba - .0006 (.0007)
Na - .0532 (.0717)
K - .0497 (.0599)
Ti - .0001 (.0002)
Fe - .0078 (.0111 Fe_2O_3)
O - .4760
Σ 1.0024

Si,Al,Na,K

Clinopyroxene #23 #242

Source: unknown - but probably Geophy. Lab.
Type: natural
Amount: 3mm^3
Comment: not checked
Composition: as given on J. V. Smith's cards.

Si - .2510	(.5369)	Mg - .0984	(.1632)
Ti - .0010	(.0010)	Ca - .1599	(.2237)
Al - .0129	(.0243)	Na - .0078	(.0105)
Cr - .0014	(.0020)	K - .0001	(.0001)
Ni - .0005	(.0006)	P - .0001	(.0001)
Mn - .0005	(.0006)	O - .4399	
Fe - .0265	(.0086 FeO; .0283 Fe_2O_3)	Σ	(1.0005)

Si,Al,Fe,Mg,Ca,Na

Diopside #243

Source: C. W. Chesterman
Type: natural; Twin Lakes California
Amount: 5mm^3
Comment: also known as Yoder 6; see JG 74 p.464 for details; first analysis is wet chemical - second Smith probe.

Si - .2588, .2599	(.5536, .5560)
Ti - .0001, .0	(.0001, .0)
Mn - .0, .0	(.0 , .0)
Mg - .1133, .1128	(.1880, .1870)
Ca - .1837, .1851	(.2570, .2590)
Na - .0002, .0003	(.0002, .0003)
P - .0003, nd	(.0006, nd)
Fe - .0007, .0007	(.0009, .0010 FeO)
O - .4429, .4412	
Σ	(1.0004, 1.0023)

Si,Mg,Ca

Apatite #101464 #244

Source: C. Klein
Type: natural; Minot, Maine
Amount: 0.2cc
Comment: see ZK 36 p.444 for details; not checked; old analysis.
Composition: as given in above

P - .1802	(.4130)	F = O	(.0100)
Mn - .0066	(.0085)	Σ	(.9933)
Ca - .3819	(.5343)		
Mg - .0042	(.0070)		
K - .0022	(.0027)		
Na - .0027	(.0035)		
H - .0003	(.0029)		
F - .0235	(.0238)		
Fe,Al - .0044	(.0071)		
O - .3937			

P,Ca,F

Grunerite #7 #245

Source: C. Klein
Type: natural; Wabush Iron Formation, Labrador, Canada
Amount: 0.2cc
Comment: Details in AM 49 p.963, and Can. J. Earth Sci. 8, p.1177.
Composition: First analysis is wet chemical; second is Rucklidge Probe.

Si - .2428, .2436	(.5195, .5211)	O - .4149, .4108	
Al - .0008, .0008	(.0015, .0015)	Σ	(1.0002, 1.0056)
Ti - .0001, .0001	(.0002, .0002)		
Mn - .0077, .0081	(.0099, .0105)		
Mg - .0630, .0698	(.1044, .0902)		
Ca - .0050, .0027	(.0070, .0038)		
Na - .0000, .0	(.0008, .0)		
Fe - .2320, .2347	(.3370, .3395 FeO)		
K - .0004, .0002	(.0005, .0003)		
H - .0027, .0028	(.0240, .0196)		

Si,Mn,Mg,Fe

Feldspar (Mt. Anakie) #246

Source: MacKenzie?
Type: natural, Mt. Anakie
Amount: almost nil
Comment: for details see MM 33, p.949 and J.G. 74, p.197
Composition: Smith Probe Analysis

Si - .3048	(.6521)
Al - .1148	(.2169)
Fe - .0014	(.0018)
Sr - .0085	(.0100)
Ca - .0125	(.0175)
K - .0266	(.0320)
Na - .0618	(.0833)
Ba - .0024	(.0027)
O - .4672	
Σ	(1.0163)

Si,Al,Sr,Ca,K,Na

Sanidine (Kokomo) #247

Source: Kracek?
Type: natural, Kokomo, Colorado
Amount: 1cc
Comment: original sample exhausted; present sample may not be identical some Ba zoning; see AJS, 1952, p.293 and J.G. 74 p.197.
Composition: Smith probe analysis of old Kokomo.

Si - .3000	(.6418)	Na - .0167	(.0225)
Ti - .0001	(.0002)	K - .1060	(.1277)
Al - .1004	(.1897)	O - .4553	
Fe - .0008	(.0010)	Σ	(1.0063)
Ca - .0010	(.0013)		
Sr - .0017	(.0020)		
Ba - .0180	(.0201)		

Si,Al,Ba,Na,K

Albite (Amelia) #248

Source: Kracek
Type: natural; Amelia Virginia
Amount: 1cc; + 100 mesh
Comment: see AJS, 1952, p.293; JG 74 p.197.
Composition: average of two probe analyses by Smith

Si - .3212	(.6871)
Al - .1028	(.1942)
Ca - .0001	(.0002)
Na - .0866	(.1167)
K - .0012	(.0014)
O - .4881	
Σ	(.9996)

Si,Al,Na

Adularia (Spencer B) #249

Source: Spencer
Type: natural
Amount: 2mm^3
Comment: See MM 22, p.291 and JG 74 p.197 for details
Composition: Smith probe analysis

Si - .2982	(.638)
Al - .0978	(.185)
Ca - .0001	(.0001)
Sr - .0004	(.0005)
Ba - .0059	(.007)
Na - .0080	(.011)
K - .1251	(.151)
O - .4645	
Σ	(.902)

Si,Al,Na,K,Ba

Oligoclase #31802 #250

Source: H. Yoder
Type: natural; location unk
Amount: .3cc
Comment: see AJS 1952, p.293 and JG 74 p.217.
Composition: Smith probe analysis

Si	.3045	(.651)
Al	.1106	(.222)
Fe	.0003	(.0005)
Sr	.0006	(.0010)
Ca	.0244	(.0340)
R	.0028	(.0030)
Na	.0714	(.0950)
P	.0001	(.0001)
O	.4793	
Σ		(1.0070)

Si,Al,Ca,Na

Beryllium metal Be #251

Source: NBS, K. Heinrich
Type: metal
Amount: .2cc
Comments: not checked
Composition: assumed pure
Be - 1.0

Be

Barite M-17328 $BaSO_4$ #252

Source: U.C. Mineral Collection
Type: natural; Appleton Cal.
Amount: 1cc
Comments: pure by SSD
Composition: stoichiometry assumed
Ba - .5884 (.6569)
S - .1374 (.3431)
O - .2742

Ba,S

Magnesioferrite $MgFe_2O_4$ #253

Source: W. C. Allen
Type: Synthetic
Amount: 0.2cc
Comments: not checked
Composition: assumed stoichiometric
Mg - .1215 (.2015)
Fe - .5585 (.7985)
O - .3200

Mg,Fe

Magnesioferrite $MgFe_2O_4$ #254

Source: W. C. Allen
Type: synthetic powder
Amount: $50mm^3$
Comments: 66-3 but annealed at 450°C
Composition: assumed stoichiometric
Mg - .1215 (.2015)
Fe - .5585 (.7985)
O - .3200

Mg,Fe

Pyrrhotite-A $Fe_{.91}S$ #255

Source: Arnold
Type: Synthetic
Amount: 0.2cc
Comments: I. Steele checked looks OK
Composition: as given by Arnold
Fe - .613
S - .387

Fe,S

Pyrrhotite - B Fe_7S_8 #256

Source: Arnold
Type: synthetic
Amount: 0.3cc
Comments: I. Steele checked - looks OK
Composition: as given by Arnold
Fe - .604
S - .396

Fe,S

Magnetite A-35 Fe_3O_4 #257

Source: Tem-Pres
Type: synthetic; standard phase
Amount: 0.3cc
Comment: not checked; tem-pres usually not reliable.
Composition: assumed stoichiometric
Fe - .7236 (1.0)
O - .2764

Fe

Microcline (Asbestos) #258

Source: F. J. Olsen
Type: natural, Asbestos, Que., Can.
Amount: 2cc
Comment: checked by J. V. Smith; Ca variable; see J.G. 74, p.209.
Composition: Smith preferred analysis

Si	.3024	(.6469)
Al	.0973	(.1838)
K	.1376	(.1697)
Ca	.0002	(.0003)
Na	.0014	(.0019)
O	.4511	
Σ	(.9986)	

Si,Al,K

Apatite A-408 #262

Source: A. T. Anderson
Type: natural
Amount: 0.2cc
Comment: not thoroughly checked; see AM 51, p.1671 for details
Composition: as given in above.

P	.1806	(.4139	K	.0001	(.0001)	F	.0338 (.033
Ca	.3908	(.5498)	Al	.0003	(.0003)	N	.0007 (.000
Mg	.0007	(.0011)	Sr	.0007	(.0008)	H	.0002 (.001
Mn	.0001	(.0002)	Ce	.0014	(.0015)	O	.3887
Na	.0004	(.0005)	Y	.0008	(.0010)		
Fe	.0005	(.0006 FeO)	C	.0002	(.0006)		
						Σ	(1.0039)

Ca,P,F

Scandium Olivine $Li_{0.4}Sc_{0.4}Mg_{1.2}SiO_4$ #259

Source: J. Ito
Type: synthetic, Li, V flux
Amount: $4mm^3$
Comment: possibly flux contaminents;
Composition: as per above formula

Li	.0195	(.0422)
Sc	.1266	(.1942)
Mg	.2054	(.3406)
Si	.1978	(.4232)
O	.4506	
Σ	(1.0002)	

Li,Sc,Mg,Si

Chromite MB5 #263

Source: T. N. Irving
Type: Natural
Amount: 0.1cc
Comments: Al inhomogeneous; see Can. J. E. Sci. for details
Composition: original wet chemical and Smith preferred.

Cr	.1724,	.1723 (.252, .2518)
Al	.0508,	.0508 (.095, .095)
Mg	.0428,	.0428 (.071, .0709)
Mn	.0025,	.0025 (.0032,.0032)
Ca	.0002,	.0003 (.0005,.0004)
Ti	.0120,	.0120 (.0200,.0200)
Si	.0005,	.0007 (.0010,.0015)
V	.0008,	.0010 (.0015,.0018)
Ni	.0012,	.0012 (.0015,.0015)
Fe	.4062,	.4060 (.231 FeO; .324 Fe_2O_3; .5222 FeO)
O	.3106,	.3104
Σ	(1.0017,	.9693) Cr,Al,Mg,Fe,Ti

Silicon metal Si #260

Source: NBS, K. Heinrich
Type: metal
Amount: $3mm^3$
Comment: not checked
Composition: assumed pure

Si	1.0

Si

Plagioclase Glass An_{90} $Ca_{.9}Na_{.1}Al_{1.9}Si_{2.1}O_8$ #264

Source: D. Lindsley?
Type: synthetic glass
Amount: 0.1cc
Comment: labeled C-81 but checks with An 90 glass
Composition: as per above formula.

Ca	.1304	(.1825)
Na	.0083	(.0119)
Al	.1853	(.3501)
Si	.2133	(.4565)
O	.4627	
Σ	(1.0010)	

Ca,Na,Al,Si

Ilmenite A-128 #261

Source: A. T. Anderson
Type: Natural; 40-80 mesh
Amount: 2cc
Comment: used routinely
Composition: Anderson original and Smith preferred.

Ti	.2980,	.2973 (.4971, .4959)
Mn	.0066,	.0066 (.0085, .0085)
V	.0,	.0 (.0001, .0)
Si	.0	.0 (.0008, .0002)
Mg	.0060,	.0066 (.0100, .0109)
Al	.0020,	.0062 (.0037, .0003)
Fe	.3674,	.3667 (.3836 FeO, 0.0989 Fe_2O_3, .4743 FeO)
O	.3200,	.3187
Σ	(1.0027,	.9991) Ti,Fe,Mg,Mn

Labradorite - Clear Lake #265

Source: unknown
Type: natural
Amount: 0.5cc
Comment: see JG 74, p.220.
Composition: J. V. Smith Probe analysis

Si	.2475	(.529)
Ti	.0003	(.001)
Al	.1554	(.295)
Fe	.0035	(.0050 Fe_2O_3)
Sr	.0005	(.001)
Ca	.0907	(.127)
K	.0010	(.001)
Na	.0313	(.042)
O	.4698	
Σ	1.0010	

Si,Al,Ca,Na

Pyroxene - Eskola 21

#265

Source: T. G. Sahama
Type: natural; Finland
Amount: almost nil
Comment: see CG 14, p.445
Composition: Smith preferred analysis

Si - .2575	(.5509)	
Al - .0089	(.0168)	
Mg - .1761	(.2990)	
Ca - .0237	(.0352)	
Ti - .0008	(.0013)	
Cr - .0015	(.0022)	
Mn - .0019	(.0026)	
Fe - .0997	(.1283)	
O - .4503		
Σ .9992		

Si,Al,Mg,Ca,Fe

Spinel 64-3 $MgAl_2O_4$

#270

Source: W. C. Allen
Type: synthetic
Amount: 1cc
Comment: porous block annealed at 970°
Composition: assumed stoichiometric

Mg - .1709	(.2834)
Al - .3793	(.7166)
O - .4498	
Σ (1.0000)	

Mg,Al

Sphalerite ZnS

#267

Source: L. C. Greene, WPAFB, Ohio
Type: synthetic
Amount: .5cc
Comment: O.K. by SSD.; some impurities
Composition: assumed stoichiometric

Zn - .6709
S - .3291

Zn,S

Mn-Hortonolite

#271

Source: C. Frondel
Type: Natural
Amount: $10mm^3$
Comment: Some confusion over Mn value
Composition: first is wet chemical second Smith preferred probe.

Si - .1555, .1564	(.3328, .3346)	
Mg - .1004, .1026	(.1666, .1701)	
Mn - .0441, .0397	(.0570, .0512)	
Fe - .3432, .3439	(.4415 FeO, .4424)	
Ca - nd, .0014	(nd , .0020)	
O - .3568, .3561		
Σ (.9979, 1.0030)		

Mn,Mg,Fe,Si

Cadmium Sulfide CdS

#268

Source: L. C. Greene, WPAFB, Ohio
Type: synthetic
Amount: .5cc
Comment: pure by SSD.
Composition: assumed stoichiometric

Cd - .7781
S - .2219

Cd,S

Rhodonite #104738

#272

Source: C. Frondel
Type: natural
Amount: $4mm^3$
Comment: not checked
Composition: from J. V. Smith's cards

Si - .2198	(.4702)
Fe - .0180	(.0232 FeO)
Mn - .3501	(.4520)
Mg - .0236	(.0391)
Ca - .0106	(0.48)
O - .3779	
Σ .9993	

Si,Mg,Fe,Mn

Jadeite

#269

Source: Coleman
Type: natural, Clear Creek, Cal.
Amount: 1cc
Comment: see J. Pet.
Composition: from above reference; see #159

Si - .2776	(.5938)	K - .0002	(.0002)
Al - .1367	(.2582)	H - .0004	(.0038)
Ti - .0002	(.0004)	Cr - .0001	(.0001)
Mg - .0007	(.0012)	O - .4773	
Ca - .0009	(.0013)	Σ	(.9975)
Na - .0094	(.1346)		
Fe - .0031	(.0045 Fe_2O_3)		

Si,Al,Na

Eulite #9B

#273

Source: C. Klein
Type: natural; Wabush Iron Formation, Labrador, Canada
Amount: $1mm^3$
Comments: details in Klein thesis
Composition: as given on J. V. Smith's cards

Si - .2242	(.4797)	
Ti - .0002	(.0003)	
Al - .0007	(.0013)	
Fe - .3411	(.4388, FeO)	
Mn - .0058	(.0075)	
Mg - .0378	(.0626)	
Ca - .0019	(.0026)	
Na - .0001	(.0001)	
K - .0002	(.0003)	
O - .3880		
Σ	(.9932)	

Si,Fe,Mg,Mn

Olivine-Susimäki #274

Source: Sahama + Yoder
Type: natural, Susimäki, Finland
Amount: 2cc
Comment: details in AM 42 p.475; somewhat inhomogeneous; also known as YS-11.
Composition: Smith preferred analysis

Si	.1662	(.3534)
Mg	.1543	(.2558)
Mn	.0041	(.0053)
Fe	.2992	(.3849)
Ca	.0002	(.0003)
O	.3767	
Σ		(.9997)

Si,Mg,Fe

Chromite R2447 #275

Source: E. N. Cameron via Minn. Rock Anal. Lab.
Type: Natural, location unknown
Amount: 0.1cc
Comment: not checked; may be zoned; original No. = 11.241
Composition: as given by MRAL

Cr	.3237	(.4731)
Al	.0767	(.1449)
Ti	.0035	(.0058)
Fe	.1909	(.0744 FeO; .1903 Fe_2O_3)
Mn	.0034	(.0044)
Mg	.0607	(.1007)
Ca	.0	(tr)
H	.0	(.0008)
Si	.0006	(.0013)
V	.0016	(.0028)
O	.3389	
Σ		(.9985)

Cr,Al,Fe,Mg

Chromite R2448 #276

Source: E. N. Cameron via Minn. Rock Anal. Lab.
Type: natural, location unknown
Amount: 0.1cc
Comment: not checked; maybe zoned; original no. = 11.253A
Composition: as given by MRAL

Cr	.3237	(.4731)	V	.0016 (.0028)
Al	.0735	(.1388)	O	.3343
Ti	.0035	(.0058)	Σ	.9986
Fe	.2040	(.0784 FeO; .2044 Fe_2O_3)		
Mn	.0036	(.0046)		
Mg	.0555	(.0921)		
Ca	.0	(tr)		
H	.0	(.0001)		
Si	.0003	(.0007)		

Cr,Al,Mg,Fe

Chromite R-2309 #277

Source: Minn. Rock Anal. Lab.
Type: natural; location unknown
Amount: 0.1cc
Comments: not checked
Composition: as given by MRAL

Si	.0006	(.0013)
Al	.0502	(.0949)
Fe	.2513	(.2435 FeO; .0887 Fe_2O_3)
Mg	.0354	(.0590)
Ca	.0	(.0)
Ti	.0040	(.0066)
Mn	.0059	(.0079)
Cr	.3374	(.4931)
H	.0	(.0008)
V	.0018	(.0033)
O	.3134	
Σ		.9688

Cr,Al,Mg,Fe

Ilmenite K-13-131.8 #278

Source: A. T. Anderson
Type: natural; Quebec
Amount: .5mm^3
Comment: see AJS 266 p.704-727 for details.
Composition: as given in above

Ti	.314	(.5238)
Fe	.3256	(.3833 FeO; .4075 Fe_2O_3)
Mg	.0242	(.0401)
Cr	.0002	(.0002)
V	.0002	(.0002)
Mn	.0043	(.0055)
Ni	.0001	(.0001)
Ca	.0004	(.0006)
Si	.0008	(.0017)
O	.3293	
Σ		1.0032

Ti,Fe,Mg

Chromite 61-1436 #279

Source: E. N. Cameron
Type: Natural; location unknown
Amount: 0.1cc
Comment: See AJS 266 p.704-727 for details
Composition: as given in above;

Ti	.0035	(.0058)
Fe	.212	(.2159 FeO; .0785 Fe_2O_3)
Al	.097	(.183)
Mg	.0602	(.0998)
Cr	.283	(.4136)
V	.0021	(.0038)
Mn	.0062	(.0080)
Ni	.0021	(.0027)
Ca	.0006	(.0008)
Si	.0012	(.0026)
O	.3321	
Σ		1.0029

Cr,Fe,Al,Mg

Chromite R-557 #280

Source: Minn. Rock Anal. Lab.
Type: Natural; location unknown
Amount: 0.2cc
Comments: not checked
Composition: from J. V. Smith's cards; note high Si, H

Si	.0112	(.0239)
Al	.0918	(.1735)
Ti	.0035	(.0058)
Mn	.0022	(.0028)
Mg	.0603	(.1000)
Ca	.0005	(.0007)
H	.0008	(.0071)
Cr	.3046	(.4467)
Ni	.0	(.0001)
Fe	.1848	(.2142 FeO; .0259 Fe_2O_3)
O	.3403	
Σ		1.0007

Cr,Al,Mg,Fe

Chromite 61-1437 #281

Source: E. N. Cameron
Type: natural; location unknown
Amount: 0.2cc
Comment: J. V. Smith noted inhomogeniety
Composition: as given on J. V. Smith's cards; wet chemical.

Si	.0008	(.0018)
Cr	.2940	(.4297)
Al	.0847	(.1601)
Ti	.0042	(.0070)
Fe	.2316	(.2178 FeO; .0891 Fe_2O_3)
Mg	.0524	(.0869)
Ca	.0003	(.0004)
Mn	.0019	(.0024)
V	.0018	(.0032)
Ni	.0011	(.0014)
O	.3272	
Σ		.9998

Cr,Al,Fe,Mg

Olivine R2307 — $Fo_{0.5}$ — #282

Source: Minn. Rock Anal. Lab.
Type: natural; location unknown
Amount: 0.[illegible] mm³
Comment: see JG 74 p.1-16 for details
Composition: Smith probe analysis from above. (average values)

Si - .1425	(.305)	
Ti - .0007	(.0010)	
Cr - .0	(.0)	
Fe - .5045	(.649)	
Mn - .0086	(.011)	
Ni - .0002	(.0)	
Mg - .0225	(.037)	
Zn - .0003	(.0)	
Cu - .0002	(.0)	
Ca - .0020	(.0030)	
O - .3185		
Σ 1.006		Si,Fe,Mg

Pargasite R1128 — #283

Source: Minn. Rock Anal. Lab.
Type: natural; location unknown
Amount: 0.1cc; fine grained
Comments: see Can. J. Earth Sci. 8, p.1171 for details; wet chemical analysis first, Chicago probe second.
Composition: as in above reference.

Si - .1924, .1897	(.4116, .4068)	O - .4299, .4362
Al - .0845, .0756	(.1597, .1429)	Σ (.9981, .9919)
Ti - .0111, .0128	(.0185, .0213)	
Mn - .0014, .0020	(.0018, .0025)	
Mg - .0654, .0540	(.1085, .1061)	
Ca - .0715, .0593	(.1000, .0969)	
Na - .0169, .0169	(.0227, .0225)	
Fe - .1199, .1215	(.1320 FeO, .0247 Fe_2O_3)	
	(.1328 FeO, .0262 Fe_2O_3)	
K - .0051, .0049	(.0061, .0059)	
H - .0019, .0022	(.0175, .0198)	
F - .0 , .0	(nd , nd)	
Cl - .0 .0049	(nd .0049)	Si,Al,Ti,Mg,Ca,Na, Fe

Tremolite R1597 — #284

Source: Minn. Rock Anal. Lab.
Type: Natural, location unknown
Amount: 0.2cc; very fine grained
Comments: See Can. J. Earth Sci. 8, p.1171 for details; wet chemical analysis first, Chicago probe second.
Composition: as in above reference.

Si - .2700, .2707	(.5776, .5791)	
Al - .0034, .0013	(.0064, .0025)	
Ti - .0003, .0	(.0005, .0)	
Mn - .0005, .0007	(.0006, .0009)	
Mg - .1491, .1502	(.2473, .2490)	
Ca - .0948, .0951	(.1327, .1330)	
Na - .0022, .0015	(.0029, .0022)	
Fe - .0011, .0008	(.0014, .0011 FeO	
K - .0008, .0007	(.0009, .0008)	
H - .0027, .0025	(.0238, .0219)	
F - .0026, nd	(.0026, nd)	
Cl - .0 , .0	(.0002, .0002)	
O - .4725, .4764		
Σ	(.9958, .9907)	Si,Mg,Ca

Clinopyroxene R2395 — $En_{21}Fs_{32}Wo_{47}$ — #285

Source: Minn. Rock Anal. Lab.; D. M. Shaw
Type: natural; Quebec
Amount: 0.1cc
Comment: see: Can. Min. 7 p.578 and JG 74 p.463 for details
Composition: wet chemical first, Smith probe second.

Si - .237,	.238	(.507, .509)
Ti - .0005,	.0	(.001, .0)
Al - .008 ,	.005	(.015, .009)
Cr - .0,	.0	(nd, .0)
Mn - .005,	.005	(.006, .006)
Mg - .041,	.040	(.068, .066)
Ca - .1479,	.1508	(.207, .211)
Na - .009,	.009	(.012, .011)
Fe - .1377,	.1410	(.145 FeO, .036 Fe_2O_3; .148, .037)
O - .4132,	.4112	
Σ	(.997, .997)	Si,Al,Mg,Ca,Na,Fe

Clinopyroxene R2304 — $En_{47}Fs_3Wo_{50}$ — #286

Source: Minn. Rock Anal. Lab; D. M. Shaw
Type: natural; Quebec
Amount: 0.1cc
Comment: see Can. Min. 7, p.217 and J.G. 74 p.463 for details
Composition: wet chemical first, Smith probe secon

Si - .255, .255	(.545, .545)	
Ti - .0 , .0002	(.0001, .0003)	
Al - .005, .004	(.0090, .0080)	
Cr - .0 , .0	(nd , .0)	
Mn - .001, .0008	(.001, .001)	
Mg - .103, .102	(.172, .169)	
Ca - .177, .180	(.248, .252)	
Na - .0022, .0022	(.003, .003)	
Fe - .0120, .0124	(.015 FeO, .004 Fe_2O_3; .016, .004)	
K - .0 , .0002	(nd , .0)	
O - .4448, .4432		
Σ	(.9971, .998)	Si,Mg,Ca,Fe

Clinopyroxene R1482 — $En_{46}Fs_5Wo_{49}$ — #287

Source: Minn. Rock Anal. Lab; J. W. Gruner
Type: natural; Libbey, Mont.
Amount: 0.2cc
Comment: see JG 74, p.463 for details
Composition: wet chemical first, Smith probe second

Si - .2510, .2484	(.537, .531)	
Ti - .0018, .0016	(.003, .003)	
Al - .005 , .0030	(.009, .006)	
Cr - .0 , .0006	(nd , .001)	
Fe - .0246, .0265	(.019 FeO, .014 Fe_2O_3; .021, .015)	
Mn - .001 , .0006	(.001, .001)	
Mg - .1001, .1004	(.166, .166)	
Ca - .1765, .1773	(.247, .247)	
Na - .001 , .0020	(.002, .003)	
K - .0 , .003	(nd , .0005)	
O - .4390, .4393		
Σ	.998, .994	Si,Mg,Fe,Ca

Clinopyroxene R1133 — $En_{30}Fs_{26}Wo_{44}$ — #288

Source: Minn. Rock Anal. Lab.; A. F. Buddington
Type: natural; Elizabethtown, N. Y.
Amount: 0.2cc
Comment: see JG 74, p.263 for details.
Composition: wet chemical first, Smith probe second

Si - .2361, .241	(.505, .516)	
Ti - .0012, .0012	(.002, .002)	
Al - .014, .0085	(.027, .016)	
Cr - .0 , .0	(nd , .0)	
Fe - .1163, .1135	(.128 FeO, .024 Fe_2O_3; .130, .025)	
Mn - .001, .0013	(.001, .002)	
Mg - .0579, .0585	(.095, .097)	
Ca - .144, .1453	(.202, .203)	
Na - .005, .0054	(.007, .007)	
K - .0 , .0003	(nd .005)	
O - .4245, .4250		
Σ	(.992, .999)	Si,Mg,Fe,Ca

Pyroxene R940 — $En_{27}Fs_{25}Wo_{48}$ — #289

Source: Minn. Rock Anal. Lab., A. F. Buddington
Type: Natural; Lake Pacid, New York
Amount: 0.05cc
Comment: see AM 35, p.659 and JG 74 p.463 for details
Composition: wet chemical analysis first, Smith probe second.

Si - .228,	.230	(.488, .492)
Ti - .004,	.0017-.0040	(.007, .005)
Al - .023,	.0150	(.044, .028)
Cr - .0	.0	(nd .0)
Fe - .1133,	.1145	(.127 FeO, .021 Fe_2O_3; .128, .021)
Mn - .0015,	.0021	(.002, .003)
Mg - .0531,	.0521	(.088, .086)
Ca - .155 ,	.1527	(.217, .213)
Na - .004 ,	.0041	(.005, .006)
K - .0 ,	.0002	(nd , .0005)
O - .4181,	.4268	
Σ	(.9990, .983)	Si,Al,Fe,Mg,Ca

Pyroxene H35 (5H1.C3) $En_{95}Fs_4Wo_{90}$ #290

Source: H. H. Hess
Type: natural; St. Lawrence Co., N. Y.
Amount: 20mm³
Comment: see AM 34 p.621 and JG 74 p.433 for details.
Composition: wet chemical first, Smith probe second.

Si - .2548,	.2500	(.545,	.558)
Ti - .0 ,	.0002	(.0 ,	.0)
Al - .002,	.0011	(.004,	.002)
Cr - .0 ,	.0	(.0 ,	.0)
Fe - .0208,	.0270	(.023 FeO, .004 Fe_2O_3;	.025, .004)
Mn - .0015,	.0014	(.002,	.002)
Mg - .1037,	.1011	(.172,	.168)
Ca - .1782,	.1794	(.249,	.250)
Na - .0008,	.0008	(.001,	.001)
K - .0	.0003	(nd,	.005)
O - .4382,	.4328		

Σ (1.000, 1.01) Si,Fe,Mg,Ca

Hypersthene Z-2270 $En_{59}Fs_{40}Wo_1$ #291

Source: Howie
Type: natural; Madras, India
Amount: 5mm³
Comment: see Min. Soc. Am. Sp. Paper 1, p.213 and JG 74, p.443 for details.
Composition: wet chemical first, Smith probe second.

Si - .2393,	.2399	(.512,	.513)
Ti - .0012,	.0008	(.002,	.001)
Al - .0106,	.0034	(.020,	.006)
Fe - .183,	.1925	(.235,	.248)
Mn - .007,	.0077	(.009,	.010)
Mg - .1248,	.1225	(.207,	.203)
Ca - .006,	.0044	(.009,	.006)
O - .4281,	.4290		

Σ (.994, .987)

Si,Mg,Fe

Pyroxene 177/54 $En_{59}Fs_{40}Wo_1$ #292

Source: R. A. Howie
Type: natural; British Guiana
Amount: .05cc
Comment: see Min. Soc. Sp. Pap #1, p.213 and JG 74, p.443.
Composition: wet chemical first, Smith probe second.

Si - .2202,	.2237	(.471,	.478)
Ti - .0012,	.0009	(.002,	.002)
Al - .0502,	.0425	(.095,	.080)
Cr - .0 ,	.0004	(nd ,	.001)
V - .0 ,	.0002	(nd ,	.0002)
Fe - .183,	.1800	(.235,	.231)
Mn - .002,	.0040	(.003,	.005)
Mg - .1146,	.1155	(.190,	.191)
Ca - .0007,	.0009	(.001,	.001)
O - .4218,	.4319		

Σ (.997, .989)

Si,Mg,Fe,Al

Hypersthene 400 $En_{39}Fs_{59}Ca_2$ #293

Source: R. A. Howie
Type: natural; Baffin Island
Amount: 5mm³
Comment: see Min. Soc. Sp. Pap. 1, p.213 and JG 74, p.443 for details.
Composition: wet chemical first, Smith probe second.

Si - .2314,	.2329	(.495,	.498)
Ti - .0005,	.0006	(.003,	.001)
Al - .0101,	.0037	(.019,	.006)
Fe - .262,	.2700	(.337,	.347)
Mn - .0057,	.0074	(.007,	.009)
Mg - .0764,	.0775	(.127,	.128)
Ca - .006,	.0058	(.009,	.007)
O - .4080,	.4026		

Σ (.997, .936)

Si,Mg,Fe

Pyroxene 20486 $En_{80}Fe_{19}Wo_1$ #294

Source: R. A. Howie
Type: natural; W. Australia
Amount: 5mm³
Comment: see Min. Soc. Am. Sp. Pap. 1, p.213 and JG 74 p.443 for details.
Composition: wet chemical first, Smith probe second.

Si - .2491,	.2517	(.533,	.538)
Ti - .0012,	.0003	(.002,	.001)
Al - .0212,	.0158	(.040,	.029)
Cr - .001 ,	.0016	(.001,	.002)
Fe - .097,	.097	(.125,	.125)
Mn - .0018,	.0023	(.001,	.003)
Mg - .1737,	.1765	(.288,	.291)
Ca - .005,	.0037	(.009,	.005)
O - .4490,	.4511		

Σ (.999, .994)

Si,Mg,Fe,Al

Picrochromite CM-1 $MgCr_2O_4$ #295

Source: Allen
Type: synthetic
Amount: 0.1cc fine powder
Comment: not checked
Composition: as per above formula

Mg - .1264	(.2096)
Cr - .5408	(.7904)
O - .3328	

Mg,Cr

Chromite $FeCr_2O_4$ #296

Source: Allen, CRL
Type: synthetic
Amount: 1cc fine powder
Comment: not checked
Composition: as per above formula

Fe - .2495	(.3210)
Cr - .4646	(.6790)
O - .2859	

Fe,Cr

Boron Fluorophologopite $KMg_3BSi_3O_{10}F_2$ #297

Source: H. Yoder, geophysical lab.
Type: synthetic
Amount: 1cc
Comment: not checked
Composition: as per above formula

K - .0965	(.1162)
Mg - .1800	(.2985)
B - .0267	(.0850)
Si - .2080	(.4450)
O - .3950	
F - .0938	
O = F .0395	
Σ 1.0000	

B,Mg,Si,F,K

Baddeleyite ~ ZrO_2 #298

Source: A. T. Anderson
Type: natural; location unknown
Amount: 0.05cc
Comment: not checked
Composition: from ATA
Zr - .7255 (.980)
Hf - .0170 (.020)
O - .2575

Hf,Zr

Barium Aluminum Oxide $BaAl_2O_4$ #299

Source: A. Perrotta
Type: synthetic; fused
Amount: $5mm^3$
Comment: not checked
Composition: as per above formula
Ba - .5379 (.6005)
Al - .2114 (.3995)
O - .2507

Ba,Al

Böehmite AlO_2H #300

Source: unknown
Type: ?
Amount: 0.3cc
Comment: not checked, fine grained
Composition: as per above formula
Al - .4498 (.8498)
H - .0167 (.1492)
O - .5335

Al

Pyroxene KS137/59 $En_{52}Fs_{47}Wo_1$ #301

Source: R. A. Howie
Type: natural; Quebec, Canada
Amount: $10mm^3$
Comment: see Min. Soc. Am. Sp. Pap. 1, p.213 and JG 74, p.443 for details.
Composition: wet chemical analysis first, Smith probe record.

Si -	.2275, .2250	(.487, .481)
Ti -	.0006, .0007	(.001, .001)
Al -	.0238, .0208	(.045, .039)
Cr -	.0 , .0003	(nd , .0004)
V -	.0 , .0002	(nd , .0003)
Fe -	.220 , .219	(.383, .382)
Mn -	.002 , .0044	(.003, .006)
Mg -	.1025, .102	(.170, .169)
Ca -	.005, .0011	(.007, .001)
O -	.4185, .4205	
Σ	(.9960, .9797)	

Si,Al,Fe,Mg

Pyroxene Y7 $En_{83}Fs_{14}Wo_3$ #302

Source: H. Yoder, Geophysical lab.
Type: natural; Harzburg
Amount: $0.5mm^3$
Comment: see MM 26 p.179 and JG 74 p.443 for details.
Composition: no wet chemical analysis.

Si -	.2578 (.551)
Ti -	.0008 (.001)
Al -	.0123 (.023)
Cr -	.0046 (.007)
V -	.0002 (.0003)
Fe -	.0755 (.097)
Mn -	.0019 (.002)
Mg -	.1905 (.315)
Ca -	.0100 (.014)
O -	.4464
Σ	1.0113

Si,Al,Fe,Mg

#303

Pyroxene Y-18 (EB13) $En_{82}Fs_{16}Wo_2$

Source: H. Yoder
Type: natural, Stillwater, Mont.
Amount: 0.5mm
Comment: see GSA Mem. #80 and JG 74 p.443 for details.
Composition: wet chemical first, Smith probe second.

Si -	.2590, .2616	(.554, .559)
Ti -	.0012, .0009	(.002, .002)
Al -	.009 , .0062	(.017, .018)
Cr -	.003, .0035	(.005, .005)
Fe -	.0808, .0815	(.104, .105)
Mn -	.0015, .0021	(.002, .003)
Mg -	.1797, .1835	(.298, .304)
Ca -	.011, .0073	(.016, .010)
O -	.4548, .4534	
Σ	(.998, 1.0060)	

Si,Fe,Mg

#304

Pyroxene Y-25 (55MV-29) $En_{82}Fs_{15}Wo_3$

Source: H. Yoder
Type: natural; Stillwater, Mont.
Amount: $3mm^3$
Comment: See JG 74 p.443 for details.
Composition: wet chemical first, Smith probe second.

Si -	.2585, .2590	(.553, .554)
Ti -	.0012, .0006	(.002, .001)
Al -	.013, .0087	(.025, .016)
Cr -	.003, .0037	(.005, .005)
Fe -	.068, .0775	(.088, .100)
Mn -	.002, .0018	(.003, .002)
Mg -	.1827, .1880	(.303, .313)
Ca -	.017, .0100	(.024, .014)
O -	.4546, .4507	
Σ	(1.003, 1.0040)	

Si,Al,Fe,Mg

Aluminous chromite $FeAlCrO_4$ #305

Source: Allen, CRL
Type: synthetic
Amount: 0.5cc
Comment: not checked; very fine grained
Composition: as per above formula
Fe - .2809 (.3613)
Al - .1357 (.2564)
Cr - .2615 (.3823)
O - .3219

Fe,Al,Cr

Iron Aluminum Chromium Oxide $FeAl_2Cr_2O_7$ #306

Source: Allen, CRL
Type: synthetic
Amount: 0.5cc
Comment: not checked; very fine grained
Composition: as per above formula
Fe - .1714 (.2205)
Al - .1656 (.3129)
Cr - .3192 (.4656)
O - .3438

Fe,Al,Cr

Olivine YS-5 (EG4146) $Fo_{10}Fe_{88}Te_2$ #307

Source: H. Yoder
Type: natural
Amount: $10mm^3$
Comment: see JG 74 p.1
Composition: as given by Smith (probe)

Si - .1416 (.303)
Ti - .0007 (.001)
Fe - .4820 (.620)
Mn - .0082 (.011)
Mg - .0330 (.055)
Zn - .0003 (.0004)
Cu - .0002 (.0003)
Ca - .0009 (.0010
O - .3331

Σ (.991)

Si,Mg,Fe

Olivine 39126 $Fo_{34}Fe_{64}Te_1$ #308

Source: Muir
Type: natural
Amount: $10mm^3$
Comment: see JG 74 p.1; not homogeneous.
Composition: probe analysis from above. (only average)

Si - .1584 (.339)
Ti - .0004 (.001)
Fe - .3510 (.452)
Mn - .0058 (.007)
Ni - .0002 (.0)
Mg - .1170 (.194)
Zn - .0003 (.0)
Ca - .0029 (.004)
O - .3540

Σ (.997)

Si,Mg,Fe

Orthopyroxene A #309

Source: R. A. Howie
Type: natural; British Guiana
Amount: $5mm^3$
Comment: see JG 74 p.443 and Min. Soc. Am. Spec. Pap. #1, p.213 for details
Composition: wet chemical analysis first, probe second.

Si - .2403, .2407 (.514, .515)
Ti - .0005, .0008 (.001, .001)
Al - .013, .0109 (.025, .020)
Cr - .0 , .0008 (nd, .001)
Fe - .1803, .1815 (.232, .233)
Mn - .0039, .0039 (.005, .005)
Mg - .1279, .1260 (.212, .209)
Ca - .0042, .0029 (.006, .004)
Ni - 0. , .0001 (nd , .0001)
Zn - 0. , .0003 (nd , .0004)
O - .4200, .4291 Σ (.995, .9886)

Si,Mg,Fe

Nickel metal Ni #310

Source: Johnson Matthey Chemicals Lmt. via J. Goldstein
Type: metal rod
Amount: 0.2cc
Comments: high purity Batch #W.10375; Grade 1
Composition: nickel with following impurities
Fe - 15ppm
Cu - 2ppm
Al,Ca,Mg,Si,Ag - all less than 1ppm

Ni

Iron metal Fe #311

Source: Johnson Matthey Chemicals Lmt. via J. Goldstein
Type: metal rod
Amount: 0.3cc
Comments: high purity Batch #W6648; Grade 1
Composition: iron with following impurities
Mn - 5ppm
Si - 5ppm
Ca - 2ppm
Mg - 2ppm
Ag - less than 1ppm

Fe

Cobalt metal Co #312

Source: Johnson Matthey Chemicals Lmt. via J. Goldstein
Type: metal rod
Amount: 0.3cc
Comments: high purity batch #W10331-F267/3; grade 1
Composition: Cobalt with following impurities
Ni - 3ppm
Si - 2ppm
Al,Ca,Cr,Cu,Fe,Mg,Ag - all less than 1ppm

Co

Tungsten-Rhenium metal $W_{.74}Re_{26}$ #313

Source: unknown
Type: metal wire (themocouple?)
Amount: 10cm thin wire
Comments: not checked
Composition: as per above formula
W - .74
Re - .26

W,Rh

Ge-Anorthite $CaAl_{2.0}Si_{1.9}Ge_{.1}O_8$ #314

Source: Hoffman, Zurich
Type: synthetic
Amount: $4mm^3$
Comment: not checked
Composition: 1/10 mol Ge anorthite; as per above formula.

Ca - .1418 (.1984)
Al - .1909 (.3607)
Si - .1688 (.4039)
Ge - .0257 (.0370)
O - .4528

Ca,Al,Si,Ge

Ge-Anorthite $CaAl_{2.0}Si_{1.70}Ge_{.3}O_8$ #315

Source: Hoffman, Zurich
Type: synthetic glass
Amount: $3mm^3$
Comment: not checked
Composition: 3/10 mol Ge anorthite; as per above formula

Ca - .1375 (.1924)
Al - .1851 (.3497)
Si - .1638 (.3504)
Ge - .0747 (.1076)
O - .4390

Ca,Al,Si,Ge

Sr-Anorthite $Sr_{.1}Ca_{.9}Al_2Si_2O_8$ #316

Source: Hoffman, Zurich
Type: synthetic
Amount: 0.1cc
Comment: not checked
Composition: 1/10 mol Sr anorthite; as per above formula.

Sr - .0310 (.0367)
Ca - .1275 (.1784)
Al - .1907 (.3603)
Si - .1985 (.4247)
O - .4523

Sr,Ca,Al,Si

Ga-anorthite $CaAl_{1.7}Ga_{.3}Si_2O_8$ #317

Source: Hoffman, Zurich
Type: synthetic
Amount: $2mm^3$
Comment: not checked
Composition: 3/10 mol Ga-anorthite; as per above formula.

Ga - .0719 (.0966)
Ca - .1377 (.1927)
Al - .1576 (.2078)
Si - .1930 (.4129)
O - .4398

Ga,Ca,Al,Si

V-glass #318

Source: A. A. Chodos, Cal Tech
Type: synthetic glass
Amount: $10mm^3$
Comment: made by corning glass
Composition: as made by Corning first; as determined by wet chemistry second INNA gives CaO=.0869, K_2O=.0075, TiO_2=.0069, FeO=.0076, Ce_2O_3=0.74, HfO_2=.0074)

Si - .2697, .2697 (.5770, .5770) Fe-.0055, .0058(.0071,.007
Al - .0942, .0990 (.1779, .1870) O-.4885, -
Mg - .0531, .0527 (.0881, .0873)
Ca - .0452, .0465 (.0632, .0650)
B - .0137, nd (.0440, nd)
K - .0057, .0061 (.0079, .0074)
Ti - .0047, .0047 (.0079, .0079)
Cr - .0054, .0052 (.0079, .0077)
Ce - .0057, nd (.0079, nd) Si,Al,Ca,B,Mg,K,Ti,Cr,
Hf - .0057, nd (.0079, nd) Ce,Hf,Fe

X-glass #319

Source: A. A. Chodos, Cal Tech
Type: synthetic glass
Amount: $5mm^3$
Comment: made by Corning glass
Composition: first is corning mixture; second in INNA at Oregon state; wet chemistry at corning gave B_2O_3=.0439 and Cs_2O=.0072; other wet chemical values are MnO=.0066 and CaO=0.0071.

Si-.2650 nd (.5690, nd) Th-.0069,.0058 (.0079, .0066)
Al-.0928, nd (.1754, nd) O-.4796, -
Mg-.0524, nd (.0869, nd)
Ca-.0445, nd (.0623, nd)
B -.0135, nd (.0434, nd)
Cs-.0075,.0057(.0080,.0060)
V-.0044,.0037(.0065,.0054)
Mn-.0061,.0047(.0079,.0061)
Cu-.0053, nd (.0079, nd)
Co-.0052,.0051(.0079,.0065)
Ba-.0071,.0057(.0079,.0064) Si,Al,Mg,Ca,B,Cs,V,Mn,Cu,Co,
La-.0057,.0052(.0079,.0061) Ba,La,Th

X-glass #320

Source: A. A. Chodos, Cal Tech
Type: synthetic glass
Amount: $5mm^3$
Comment: made by Corning glass
Composition: as per Corning mixture; also by wet chemistry ZnO=.0075, NiO=.0070, Rb_2O=.0050, ZrO_2=.0076; By INNA Rb_2O=.0082, UO_2=.0063, ZnO=.0085

Si - .2660 (.5690)
Ca - .0446 (.0624)
Al - .0929 (.1755)
B - .0135 (.0435)
Mg - .0525 (.0870)
Rb - .0072 (.0079) (.0049)*
Zr - .0058 (.0079)
Sr - .0068 (.0080) (.0080)*
Y - .0062 (.0079)
Pb - .0073 (.0079) (.0080)*
Zn - .0063 (.0079) (.0081)*
U - .0067 (.0076)
Ni - .0062 (.0079) (.0081)*
O - .4780
Si,Mg,Ca,Al,B,Rb,Zr,Sr,Y,Pb,Zn, U,Ni

*Jun Ito analysis (AA)

Kyanite Al_2SiO_5 #321

Source: O. Kleppa
Type: natural; Menas Gerais, Brazil
Amount: 0.1cc
Comment: not checked
Composition: ideal formula

Al - .3330 (.6293)
Si - .1733 (.3707)
O - .4937

Al,Si

Jadeite 64-R66-68 $NaAl_2Si_2O_6$ #322

Source: O. Kleppa
Type: natural; location unknown
Amount: 0.05cc
Comment: not checked
Composition: not known

Na,Al,Si

Apatite #323

Source: D. M. Shaw
Type: natural; Yates Uranium Mine, Quebec
Amount: 1cc
Comment: see GCA 29 p.581 for details.
Composition: analysis E from above

Ca - .3858	(.5398)	Cl - .0002	(.0002)
Sr - .0023	(.0027)	U - .0009	(.0010)
Mn - .0001	(.0001)	O - .3824	
Mg - .0001	(.0002)	O = F,Cl .0139	
Fe - .0003	(.0004 Fe_2O_3)	Σ .9995	
Ce - .0082	(.0096)		
La - .0030	(.0035)		
Y - .0013	(.0018)		
Nd - .0038	(.0044)		
C - .0057	(.0210		
P - .1675	(.3837)		
Si - .0050	(.0107)		
Al - .0002	(.0003)		
H - .0002	(.0014)		
F - .0330	(.0330)		

Ca,P,Ce,C,Si,F

Olivine (Turkevich) #324

Source: A. Turkevich, U. of C.
Type: natural
Amount: 1mm³
Comment: probably same as P 140 - #325
Composition: Smith preferred.

Mg - .3068	(.5087)
Si - .1926	(.4120)
Mn - .0009	(.0012)
Fe - .0576	(.0741)
Ni - .0030	(.0038)
O - .4390	

Mg,Si,Fe,Ni

Olivine (P 140) $Fo_{92}Fa_8$ #325

Source: J. Boyd
Type: natural; North Carolina
Amount: .05cc
Comment: probably some of Turkevich olivine #324
Composition: Smith preferred

Mg - .3068	(.5087)
Si - .1926	(.4120)
Mn - .0009	(.0012)
Fe - .0576	(.0741)
Ni - .0030	(.0038)
O - .4390	

Si,Mg,Fe,Ni

Paracelsian #326

Source: L. J. Spencer
Type: natural; Benallt Mine
Amount: .5mm³
Comment: see MM 26 p.231 for details
Composition: from above reference

Si - .1543	(.3301)	
Al - .1437	(.2716)	
Fe - .0020	(.0028 Fe_2O_3)	
Ba - .3451	(.3853)	
Ca - .0004	(.0006)	
Mg - .0008	(.0014)	
Na - .0011	(.0015)	
K - .0045	(.0054)	
H - .0	(.0005)	
O - .3481		
Σ .9992		

Si,Al,Ba

Olivine T-531 Fa_{95} #327

Source: H. Emeleus
Type: natural
Amount: 3mm³
Comment: checked by I. Steele - homogeneous.
Composition: probe analysis by I. Steele

Mg - .0013	(.0021)
Si - .1370	(.2930)
Ca - .0011	(.0015)
Ti - .0002	(.0004)
Mn - .0204	(.0263)
Fe - .5162	(.6640)
O - .3238	
Σ .9873	

Fe,Si,Mn

Orthoclase (Benson) Or_{95} #328

Source: A. T. Anderson
Type: natural; Benson, N. Y.
Amount: 0.1cc
Comment: contains phosphorous
Composition: not found.

329

Zircon $ZrSiO_4$

Source: C. B. Finch, ORNL
Type: synthetic
Amount: 2mm³
Comments: OK by SSD
Composition: (assumed stoichiometric)

Zr - .4976	(.6723)
Si - .1532	(.3277)
O - .3492	

Zr,Si

Vanadium Pentoxide V_2O_5

Source: J. Ito, U.C.
Type: synthetic
Amount: 1cc
Comment: not checked; grown from reagents
Composition: (assumed stoichiometric)

V - .5602 (100.0)
O - .4398

V

331

Li-Sc-olivine $LiScSiO_4$

Source: J. Ito, U.C.
Type: synthetic, flux grown
Amount: $1mm^3$
Comments: not checked
Composition: (assumed stoichiometric)

Li - .0482 (.1038)
Sc - .3122 (.4789)
Si - .1951 (.4173)
O - .4445

Li,Sc,Si

332

Iron Trioxide Fe_2O_3

Source: J. Ito, U.C.
Type: synthetic
Amount: $3mm^3$
Comment: not checked
Composition: (assumed stoichiometric)

Fe - .6994 (100.0)
O - .3006

Fe

333

Scandium Thortveitite $Sc_2Si_2O_7$

Source: J. Ito, U. C.
Type: synthetic, flux grown
Amount: $1mm^3$
Comments: not checked
Composition: (assumed stoichiometric)

Sc - .3484 (.5344)
Si - .2177 (.4656)
O - .4339

Sc,Si