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CHEMICAL ANALYSES OF JAPANESE MINERALS (III)

By

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INTRODUCTION

This report is a supplement of the report "Chemische Analysen-resultate von japanischen Mineralien" published in 1936*. That report and the second report** included all analyses of Japanese minerals in earlier publication, thus being completed from 1807 to 1935, from 1936 to 1946 respectively.

The object of this report is mainly to put on record the additional new analyses made since 1947, not including a vast number of partial routine determinations and numerous analyses made in connection with technical purposes, as in the former reports.

Many of the analyses that have been published are widely scattered in different scientific journals and publications, which are strongly in evidence post the war. It is therefore impossible to find them without a great expenditure of time. Anyone wishing to make an exhaustive search for analyses of Japanese minerals will therefore have to consult these reports.

Three hundred analyses of Japanese minerals were reported in the period 1947-1952. It induces that considerable research works on mineralogic and geochemical problems in the last 6 years have been done, overcoming the post-bellum difficulty.

Here the mineral analyses, except silicates, are arranged according to the classifications of DANA's System of Mineralogy, 7th Edition, the silicate minerals are classified by the classifications of KLOCKMANN's Lehrbuch der Mineralogie, 13te Auflage, 1948.

* This Journal, Vol. III, Nos. 3-4, 1936.

** This Journal, Vol. VII, Nos. 1-2, 1948.

In general, the following expression for each analysis is adopted:
The name of mineral: Locality: Occurrence: Name of Analyst: Name
of Author, Literature.

When Analyst and Author was the same, only the Analyst is written
in this report. In case of the mode of occurrence was not given or
doubtful, its description is omitted.

To Mr. Y. OKAMOTO of the Geological Institute of the Kyûshû Uni-
versity, I express my thanks for having introduced me to the new
analyses available on this report.

August, 1953.

Z. HARADA.

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List of Abbreviation

Am. Miner	American Mineralogist.
Bull. Geol. Surv. Japan	Bulletin of the Geological Survey of Japan.
Bull. Res. Inst. Miner. Dress. Metall.	Bulletin of the Research Institute of Mineral Dressing and Metallurgy, Tôhoku University.
Jap. J. Geol. Geogr.	Japanese Journal of Geology and Geography.
J. Chem. Soc. Japan.	Journal of the Chemical Society of Japan.
J. Fac. Sci., Hokkaidô Univ.	Journal of the Faculty of Science, Hokkaidô University.
J. Geogr. Tokyo.	Journal of Geography, Tôkyô.
J. Geol. Soc. Japan.	Journal of the Geological Society of Japan.
J. Jap. Ass. M. P. G.	Journal of the Japanese Association of Mineralogists, Petrologists and Economic Geologists.
J. Jap. Ceram. Ass.	Journal of the Japanese Ceramic Association.
J. Chem. Ind. Japan	Journal of the chemical Industry, Japan
J. Mining Inst. Japan.	Journal of the Mining Institute of Japan.
Mem. Fac. Sci., Kyûshû Univ.	Memoirs of the Faculty of Science, Kyûshû University.
Mem. Fac. Sci. Eng., Waseda Univ.	Memoirs of the Faculty of Science and Engineering, Waseda University.
Miner. Japan.	Minerals of Japan I. 3rd Edition, 1947.
Min. Geol.	Mining Geology. (Journal of the Society of Mining Geologists of Japan.)
M. G.	Mineralogy and Geology.
Proc. Japan Acad.	Proceedings of the Japan Academy.
Rep. Res. Inst. Asahi Glass Co.	Report of Research Institute of the Asahi Glass Company.
Sci. Pap. Coll. Gen. Ed., Univ. Tôkyô.	Science Paper of the College of General Education, University of Tôkyô.
Sci. Rep. Fac. Sci., Kyûshû Univ.	Science Report of the Faculty of Science, Kyûshû University.
Sci. Rep. Tôkyô Bunrika Daigaku	Science Report of the Tôkyô Bunrika Daigaku.
Sci. Rep. Yokohama Nat. Univ.	Science Report of the Yokohama National University.

I. Element Minerals.

(1) *Iridosmine*

	1.	2.	3.
Ir	45.81%	——%	38.23%
Os	38.01	——	37.65
Ru	14.70	——	21.03
Pd	tr.	51.10	0.87
Pt	0.51	48.90	1.81
Rh	1.09	——	0.51
Total	100.12	100.00	100.00

1, 2. No. 8 Valley, the 2 Tésio Experimental Plantation of Hokkaidô University, Tesio Prov. Hokkaidô: Placer: Analyst, R. TAKAHASI and T. TANAKA, J. Mining Inst. Japan, 63 (1947), 1.

1. non-magnetic. 2. magnetic.

3. No. 4 Gold placer Valley, Uryû Experimental Plantation of Hokkaidô University, Uryû, Isikari Prov. Hokkaidô: Placer: ditto: loc. cit.

(2) *Allemontite*

As	86.84%
Sb	8.95
Zn	tr.
S	0.42
Al ₂ O ₃ }	2.36
Fe ₂ O ₃ }	
CaO	none
MgO	tr.
Insol.	0.61
Total	99.18

Banzai vein, Yakumo mine, Yakumo town, Iburi Prov. Hokkaidô: Botryoidal crusts in druses in lead-zinc and rhodochrosite vein: Analyst, T. SAITÔ Unpublished.

(3) *Bismuth*

Bi	98.86%
Cu	0.63
Po	0.04
Te	0.09
Fe	0.04
Ag	0.05
SiO ₂	0.21
Al ₂ O ₃	0.20
H ₂ O	0.04
Total	100.16

Ebisu mine, Hirukawa village, Ena county, Gifu Pref. : Pegmatite quartz vein : Analyst, S. ITAKURA : S. ITAKURA and K. YAMASAKI, Syumi-no-Tigaku, 5 (1952), 240.

II. Sulphide Minerals.

(4) *Bornite*

Cu	61.73%
Fe	10.44
S	24.23
Sb	0.02
As	tr.
SiO ₂	0.07
H ₂ O (50°C)	0.43
Other Insol.	2.21
<hr/>	
Total	99.13

Kôtu mine, Mituyama village, Maué county, Tokushima Pref. : Copper bearing iron sulphide deposit : Analyst, S. NAGANO : T. TAKEUTI and M. NAMBU, J. Jap. Ass. M. P. G. 36 (1952), 34.

(5) *Sphalerite*

Zn	66.83%
S	32.52
Fe	0.04
SiO ₂	0.04
Cu	none
HO ₂	0.05
<hr/>	
Total	99.93

Ainonai mine, Kosaka town, Kazuno county, Akita Pref. : Copper deposit : Analyst, S. NAGANO : T. TAKEUTI and M. NAMBU, J. Jap. Ass. M. P. G. 34 (1950), 22.

(6) *Stibnite*

Sb	71.78%
S	27.70
SiO ₂	0.20
<hr/>	
Total	99.68

Itinokawa mine, Ôzyôin village, Nii county, Ehimé Pref. : Vein : Analyst, S. YAMASITA, M. G. 3 (1949), 74.

(7) *Pyrite*

Fe	46.9%
S	52.8
SiO ₂	0.3
<hr/>	
Total	100.0

Kamikita mine, Tenmabayasi village, Kamikita county, Aomori Pref.: Black ore deposit: Analyst, T. ISIHARA and K. SUDÔ, Bull. Res. Inst. Miner. Dress. Metall. 8 (1952), 196.

(8) *Arsenopyrite*

δ	6.008 (^{17}O +C)
Fe	34.09%
As	43.82
S	20.95
Mn	0.004
Total	99.734

Nodatamagawa mine, Noda village, Kunohé county, Iwaté Pref.: Contact deposit: Analyst, J. KITAHARA, J. Geol. Soc. Japan, 58 (1951), 546.

III. Sulphosalt Minerals.

(9) *Pyrargyrite*

	1.	2.
Ag	57.9%	58.1%
Sb	21.9	21.8
As	none	0.2
Fe	1.1	0.5
S	18.7	18.9
Total	99.6	99.5

1. Innai mine, Okatu county, Akita Pref.: Quartz vein: Analyst, K. MURAOKA, J. Geol. Soc. Japan, 56 (1950), 242.
2. Uba mine, Hube village, Nogi county, Simane Pref.: Quartz vein: Analyst, K. MURAOKA, loc. cit.

(10) *Tetrahedrite*

	1.	2.	3.	4.
S	25.41%	30.12%	24.72%	27.54%
As	4.82	8.33	0.49	5.32
Sb	22.17	12.15	8.55	20.15
Cu	41.57	38.69	12.19	38.82
Fe	1.99	5.24	5.14	4.12
Zn	2.55	2.50	35.01	tr.
Ag	0.27	0.70	—	tr.
Bi	0.56	—	—	—
Pb	—	1.30	—	tr.
SiO ₂	—	0.83	13.41	3.51
Total	99.34	99.86	99.21	99.46

1. Teine mine, Sapporo county, Isikari Prov., Hokkaidô: Gold Quartz vein: Analyst, M.

- KITAHAMA: Z. HARADA and M. KITAHAMA, J. Fac. Sci., Hokkaidô Univ. Ser. IV, 8 (1952), 77.
2. Bokoi, Muroran city, Iburi Prov. Hokkaidô: Lead-zinc vein: Analyst, M. KITAHAMA: loc. cit.
 3. Daté mine, Usu county, Iburi Prov. Hokkaidô: Copper pyrite impregnation deposit: Analyst, M. KITAHAMA: loc. cit.
 4. Mutu mine, West-Hiratanai village, East-Tugaru county, Aomori Pref.: In sericite clay around gold quartz vein: Analyst, M. KITAHAMA: loc. cit.

(11) *Tennantite*

S	31.61%
As	14.75
Sb	5.11
Cu	42.51
Fe	5.51
Zn	tr.
Ag	tr.
Bi	tr.
Pb	0.17
<hr/>	
Total	99.66

Zenikamezawa mine, Kameda county, Osima Prov. Hokkaidô: Cu-Pb-Zn vein: Analyst, M. KITAHAMA: Z. HARADA and M. KITAHAMA, J. Fac. Sci., Hokkaidô univ. Ser. IV, 8 (1952), 78.

(12) *Enargite*

	1.	2.
S	29.8%	31.85%
As	18.2	18.46
Sb	2.2	1.10
Cu	39.8	37.55
Fe	4.7	2.63
Pb	—	1.99
Zn	—	6.11
Mn	—	0.82
SiO ₂	5.0	—
<hr/>		
Total	88.7	100.51

1. Kamikita mine, Tenmabayasi village, Kamikita county, Aomori Pref.: Black ore deposit: Analyst, M. KITAHAMA: Z. HARADA, J. Fac. Sci., Hokkaidô Univ. Ser. IV, 7 (1951), 321.
2. Hanaoka mine, North-Akita county, Akita Pref.: Black ore deposit: Analyst, M. KITAHAMA: loc. cit.

(13) *Jordanite*

As	7.8%
S	11.6
P	43.0

Sb	0.5
Cu	0.1
Zn	0.1
Fe	0.1
BaSO ₄	37.7
<hr/>	
Total	100.9

Aomori mine, Okoppé, Ooku village, Simokita county, Aomori Pref.: Copper replacement deposit: Analyst, T. SERIZAWA: K. SAKURAI and T. SERIZAWA, M. G. 2 (1948), 75.

(14) *Klaprotholite*

Cu	20.2%
Bi	43.8
S	16.0
Fe ₂ O ₃	7.8
Insol.	13.2
<hr/>	
Total	101.0

Imooka mine, Okutu village, Tomada county, Okayama Pref.: Copper vein: Analyst, E. SORIDA, M. G. 4 (1951), 43.

(15) *Boulangerite*

Pb	45.83%
Fe	4.65
Sb	29.03
S	18.14
Cu	0.14
Zn	0.42
As	none
Insol.	1.64
<hr/>	
Total	99.84

Yosioka mine, Kokura city, Hukuoka Pref.: Analyst, E. SORIDA: Y. OKAMOTO, M. G. 3 (1949), 170.

(16) *Berthierite*

S	23.3%
Sb	44.6
Fe	9.5
Insol.	22.2
<hr/>	
Total	99.6

Nakase mine, Sekinomiya village, Yôhu county, Hyôgo Pref.: Antimony gold quartz vein: Analyst, E. SORIDA: K. SAKURAI and E. SORIDA, M. G. 2 (1948), 73.

IV. Oxide Minerals.

(17) *Quartz*

SiO ₂	99.53%
Al ₂ O ₃	0.02
Fe ₂ O ₃	0.05
FeO	0.05
H ₂ O (+)	0.20
H ₂ O (—)	0.13
Total	99.93

Miyamori village, Kamihei county, Iwaté Pref.: Pegmatite: K. Yagi, M. G. 3 (1950), 186.

(18) *Ilmenorutile*

SiO ₂	0.27%
TiO ₂	45.15
Al ₂ O ₃	1.09
FeO	13.62
CaO	0.36
SnO ₂	1.64
(Nb, Ta) ₂ O ₅	37.31
H ₂ O	0.27
Total	99.71

Samekawa village, East-Sirakawa county, Hukusima Pref.: Pegmatite: K. MORINAGA:
T. ITÔ and K. SAKURAI, Miner. Japan (1947), 212.

(19) *Pyrolusite*

δ	1.50(4°C)
SiO ₂	0.28%
TiO ₂	0.00
Al ₂ O ₃	0.12
Fe ₂ O ₃	0.77
MnO	5.75
MnO ₂	86.94
MgO	0.05
CaO	1.81
BaO	n d.
H ₂ O (+)	3.63
H ₂ O (—)	0.75
Total	100.10

Hamayokokawa mine, Kawakami village, Kami-Ina county, Nagano Pref.: Manganese deposit: Analyst, J. KITAHARA, J. Geol. Soc. Japan, 54 (1948), 183.

(20) *Diaspore*

	1.	2.	3.	4.	5.	6.
SiO ₂	5.43%	2.34%	9.26%	11.16%	25.43%	11.78%
Al ₂ O ₃	74.93	81.71	66.46	73.92	63.38	74.05
FeO	1.03	0.61	1.00	0.21	0.49	0.49
MgO	0.95	0.43	0.53	0.15	0.30	0.41
CaO	1.37	0.54	7.89	0.16	0.20	0.20
Ig. loss	14.67	14.24	14.24	14.44	10.34	12.88
Total	99.65 (98.37)	99.87	99.89 (99.38)	100.04	100.24	99.87 (99.81)

1, 2, 3. Hirao village, Simotakai county, Nagano Pref.: Network deposit in agglomerate: Analyst, S. NAGAI, J. Jap. Ceram. Ass. 54 (1946), 8.

4, 5, 6. Gotô, South-Matura county, Nagasaki Pref.: Agalmatolite deposit: Analyst, S. NAGAI, loc. cit.

	7.	8.
SiO ₂	18.12%	24.63%
Al ₂ O ₃	69.75	58.97
Fe ₂ O ₃	0.85	1.31
MgO	0.13	0.14
CaO	0.17	0.34
Ig. loss	11.03	13.79
Total	100.05	98.68

7, 8. Nitto minè, Hukae town, Gotô, South-Matura County, Nagaki Pref.: Agalmatolite deposit: Analyst, Y. YAMADA, J. Jap. Ceram. Ass. 55 (1947), 120.

(21) *Spinel*

δ	4.03(4C°)
SiO ₂	0.94%
Al ₂ O ₃	31.61
Fe ₂ O ₃	1.09
FeO	8.87
MnO	0.55
MgO	19.53
Cr ₂ O ₃	37.71
Total	100.30

Chrome-spinel: Wakamatu mine, Tari village, Hino county, Tottori Pref.: Chromite deposit: Analyst, J. KITAHARA, M. G. 3 (1949), 27.

(22) *Magnetite*

	1.	2.	3.	4.	5.
Fe ₂ O ₃	63.50%	61.47%	69.00%	40.62%	57.14%
FeO	30.30	30.68	26.09	44.12	34.32
SiO	1.90	4.60	2.10	—	—
TiO ₂	tr.	tr.	tr.	14.03	7.33

Al ₂ O ₃	tr.	tr.	tr.	—	—
MnO	0.02	0.02	0.36	0.74	0.74
MgO	0.43	0.40	0.36	—	—
CaO	2.10	2.40	1.10	—	—
V ₂ O ₃	—	—	—	0.49	0.45
NiO	—	—	—	0.004	—
S	0.63	0.43	0.69	—	—
Total	99.88	99.98	99.80	100.004	99.98

- 1, 2. Kamaisi mine, Kamihei county, Iwaté Pref.: Contact deposit: Analyst, K. HAYASE and T. HARADA, Mem. Fac. Sci. Eng. Waseda Univ., No. 16 (1952) 37.
3. Titibu mine, Ôtaki village, Titibu county, Saitama Pref.: Contact deposit: ditto: loc. cit.
4. Tunodayama, West-Kanbara county, Nîgata Pref.: Basalt: Analyst, K. KATURA: I. IWASAKI and K. KATURA, Kagaku (Science) 21 (1951), 93.
5. Haruna volcano, Gunma Pref.: ditto: loc. cit.

	6.	7.	8.	9.
Fe ₂ O ₃	41.09%	63.01%	53.69%	100.61%
FeO	43.59	31.46	31.61	—
SiO ₂	—	—	9.60	—
TiO ₂	13.55	4.06	0.15	1.73
Al ₂ O ₃	—	—	0.03	—
MnO	0.74	1.22	0.01	0.70
MgO	—	—	0.86	—
CaO	—	—	2.60	—
V ₂ O ₅	1.04	0.25	—	0.37
NiO	0.004	0.007	—	—
S	—	—	1.46	—
Total	100.014	100.007	99.98	103.41

6. Ôsima, Izu Prov. Tôkyô Pref.: Dolerite: Analyst, K. KATURA: loc. cit.
7. Tenzyôsan, Kêzusima, Izu Prov. Tôkyô Pref.: Liparite: Analyst, K. KATURA: loc. cit.
8. Yanahara mine, Katuta county, Okayama Pref.: Iron ore deposit: Analyst, K. HAYASE and T. HARADA, loc. cit.
9. Sanbé volcano, Simané Pref.: Quartz andesite: Analyst, K. KATURA: loc. cit.

(23) *Chromite*

	1.	2.	3.	4.	5.
δ	4.60-4.62	4.41 (4°C)	4.33	4.47	4.41
Cr ₂ O ₃	57.00%	51.21%	55.72%	44.61%	41.01%
Al ₂ O ₃	7.10	15.36	17.63	19.14	20.89
Fe ₂ O ₃	5.85	2.57	2.14	4.39	6.25
FeO	19.88	19.38	9.21	22.21	21.41
MgO	9.49	11.34	15.42	8.63	9.63
CaO	0.07	—	0.07	—	—
SiO ₂	0.64	0.55	0.49	0.98	1.19
Total	100.03	100.41	100.68	99.96	100.38

1. Nittô mine, Biratori village, Hidaka Prov. Hokkaidô: Chromite deposit: Analyst, J. KITAHARA, J. Geol. Soc. Japan, 53 (1947), 55.
2. Picro-chromite: Nukahira mine, Biratori village, Hidaka Prov. Hokkaidô: ditto: loc. cit.
3. Picro-chromite: Kasuga mine, Niwan village, Iburi Prov. Hokkaidô: ditto: loc. cit.
- 4, 5. Dainitô mine, Ôhinata village, South-Saku county, Nagano Pref.: ditto: loc. cit.

	6.	7.	8.	9.	10.	11.
δ	4.27(4°C)	4.22(4°C)	4.52(4°C)	4.42(4°C)	4.63(4°C)	4.36(4°C)
Cr ₂ O ₃	41.63%	41.14%	51.91%	53.80%	60.60%	57.08%
Al ₂ O ₃	26.86	25.92	12.08	11.68	6.19	12.89
Fe ₂ O ₃	1.50	2.37	4.10	1.27	2.04	2.75
FeO	16.36	13.71	22.87	20.05	25.10	13.95
MnO	—	0.58	0.82	1.23	—	0.72
MgO	13.07	16.42	7.70	10.61	5.48	12.45
SiO ₂	0.85	0.59	0.42	1.62	1.02	0.92
Total	100.27	100.73	99.90	100.26	100.43	100.98

6. Picro-chromite: Komori mine, Kamimiyazu village, Yosa county, Kyôto Pref.: ditto: loc. cit.
7. Picro-chromite: Wakamatu mine, Tari village, Hino county, Tottori Pref.: ditto: loc. cit.
- 8, 9. Akaisi mine, Sekigawa village, Uma county, Ehimé Pref.: ditto: loc. cit.
10. Yagiyama, Tinzei village, Kaho county, Hukuoka Pref.: ditto: loc. cit.
11. Kaizoi, Usuki village, Ôita Pref.: ditto: loc. cit.

(24) *Hausmannite*

	1.	2.
δ	4.81	4.86 (^{36°C} / _{+C})
MnO	91.73%	89.95%
O	6.94	7.34
SiO ₂	0.47	tr.
Al ₂ O ₃	none	1.74
Fe ₂ O ₃	0.74	1.13
MgO	0.35	0.38
CaO	tr.	0.15
BaO	—	none
H ₂ O	0.08	—
Ig. loss	—	0.37
Total	100.31	100.96

1. Himegamori, Karumai town, Kunohe county, Iwaté Pref.: Manganese deposit: Analyst, S. HASEGAWA: K. ÔMORI and S. HASEGAWA, J. Jap. Ass. M. P. G. 36 (1952), 68.; Sci. Rep. Tôhoku Univ. III Ser. 4 (1952), 100.
2. Ioi mine, Haruta village, Kurita county, Siga Pref.: Manganense deposit: Analyst, H. SHIRÔZU, J. Geol. Soc. Japan, 55 (1949), 80; Mem. Fac. Sci., Kyûshû Univ. Ser. D, 3 (1949), 72.

(25) *Fergusonite*

δ	5.54
Na_2O_5 }	50.6%
Ta_2O_5 }	
[Ce] Rare Earth }	38.6
[Y] " " }	
ThO_2	0.8
UO_2	4.0
TiO_2	0.4
Al_2O_3	0.2
FeO	0.8
MnO	0.1
MgO	0.2
CaO	2.8
ZnO	0
Total	98.5

Ôkaneda, Sekimoto village, Taga county, Ibaragi Pref.: Pegmatite: Analyst, S. HATA:
T. IRÔ and K. SAKURAI, Miner Japan, (1947), 277.

(26) *Kôbeite** (New Mineral)

	1.	2.
CaO	1.15%	1.23%
MgO	0.53	1.28
MnO	0.35	0.84
FeO	0.61	0.62
Fe_2O_3	9.67	12.93
Al_2O_3	2.69	0.34
Ce_2O_3	0.90	0.58
$[\text{Ce}]_2\text{O}_3$	0.05	1.63
$[\text{Y}]_2\text{O}_3$	23.91	22.21
SiO_2	2.29	3.83
TiO_2	33.03	34.72
$(\text{Nb}_2\text{O}_5 + \text{Ta}_2\text{O}_5)$	5.45	4.84
ThO_2	1.19	0.82
U_3O_8	12.64	9.95
$\text{H}_2\text{O}(+)$	3.19	3.75
$\text{H}_2\text{O}(-)$	0.92	0.44
PbO	—	0.13
Total	98.57	100.14

1, 2. Siroisi, Kôbe village, Naka county, Kyôto Pref.: Pegmatite: 1—Analyst, T. MINATO,
2—Analyst, J. TAKUBO, J. Geol. Soc. Japan, 56 (1950), 511.

* Named after its locality.

This mineral is prismatic in habit and the crystals are grouped in twin like forms. Color black and luster vitreous. The chemical composition is expressed as follows: $\text{R}^{\text{IV}}[\text{R}^{\text{III}}(\text{OH})]_4[(\text{Ti}, \text{Si})\text{O}_3]_4[(\text{Nb}, \text{Ta})\text{O}_3]_2]_5$. The content of TiO_2 is exceedingly high compared with that of polycrase or blomstrandite.

(27) *Samarskite*

δ	5.64 ($\frac{22}{4}C$)
(Nb, Ta) ₂ O ₅	53.2%
Rare Earths + ThO ₂	21.7
UO ₂	7.1
SnO ₂	0.7
SiO ₂	n. d.
TiO ₂	0.1
Al ₂ O ₃	3.4
FeO	4.2
MnO	2.9
MgO	0.2
CaO	2.6
Total	96.1

Yamanoo, Makabé town, Makabé county, Ibaragi Pref.: Pegmatite: Analyst, B. HIGAMI,
M. G. 2 (1948), 53.

V. Carbonate Minerals.

(28) *Calcite and Mangan-calcite*

	1.	2.	3.	4.	5.
CaO	53.20%	56.51%	48.63%	51.92%	55.50%
MnO	—	—	—	0.11	—
MgO	1.01	0.01	4.61	0.99	0.40
FeO	2.02	0.20	2.81	0.81	0.04
CO ₂ }	44.67	43.20	44.81	45.00	44.06
H ₂ O(—) }					
Al ₂ O ₃	—	—	—	0.15	—
Fe ₂ O ₃	0.05	—	0.86	0.34	—
Insol.	—	—	0.19	0.20	—
Total	100.95	99.92	101.90	99.52	100.00

- 1, 2. Calcite: Kōnomai mine, Monbetu town, Monbetu county, Kitami Prov. Hokkaidō: Gold quartz vein: Analyst, S. MATUDA, (1952), Unpublished.
 3. Mn-Calcite: Eitai mine, Utasutu village, Utasutu county, Sirikese Prov. Hokkaidō: Gold vein: Analyst, S. MATUDA, loc. cit.
 4, 5. Calcite: Asio mine, Asio town, Kamitoga county, Totigi Pref.: Copper vein: Analyst, S. MATUDA, (1952), loc. cit.

	6.	7.	8.	9.	10.
CaO	43.25%	53.42%	54.60%	51.20%	53.71%
MnO	1.11	0.20	0.19	—	0.74
MgO	2.41	0.95	1.15	—	1.01
FeO	0.25	1.51	—	—	—
CO ₂ }	50.12	48.82	—	44.10	42.57
H ₂ O(—) }					

SiO ₂	-----	-----	0.81	-----	-----
Al ₂ O ₃	1.00	0.11	0.26	} tr.	} 1.21
Fe ₂ O ₃	0.12	0.92	0.16		
H ₂ O(+)	-----	0.04	-----	-----	-----
Ni	-----	-----	0.0002	-----	-----
Ig. loss	0.25	0.01	43.11	-----	-----
Insol.	-----	-----	-----	tr.	0.95
Total	98.51	99.98	100.22	97.81	97.70

- 6, 7. Calcite: Taio mine, Nakatué village, Hida county, Ôita Pref.: Gold vein: Analyst, S. MATUDA, (1952), loc. cit.
8. Calcite: Egami mine, Kayaki village, West-Sonoki county, Nagasaki Pref.: Calcite veins in serpentine with asbestos: Analyst, K. MUTA, J. Jap. Ass. M. P. G. 35 (1951), 57.
9. Calcite: Hutagoyama, Mitagawa village, Titibu county, Saitama Pref.: Analyst, T. TOMISAKA, (1946), loc. cit.
10. Calcite: Arakawa mine, Yamamoto county, Akita Prov.: Copper vein: Analyst, T. TOMISAKA, (1946), Unpublished.

	11.	12.	13.
δ	-----	-----	2.80 (4°C)
CaO	54.76%	51.89%	39.21%
MnO	0.65	2.47	13.06
MgO	0.28	0.50	2.68
FeO	-----	0.13	2.08
CO ₂	} 43.81	} 45.02	42.43
H ₂ O(-)			
SiO ₂	-----	-----	0.25
Al ₂ O ₃	-----	} 0.02	-----
Fe ₂ O ₃	0.24		-----
H ₂ O	-----	-----	0.08
Total	99.74	100.03	99.79

11. Mn-Calcite: Teiné mine, Sapporo county, Isikari Prov. Hokkaidô: Gold vein: Analyst, S. MATUDA, (1952), loc. cit.
12. Mn-Calcite: Innai mine, Okatu county, Akita Pref.: Silver vein: Analyst, S. MATUDA, (1952), loc. cit.
13. Mn-Calcite: Hamayokogawa mine, Kawakami village, Kami-Ina county, Nagano Pref.: Manganese deposit: Analyst, J. KITAHARA, J. Geol. Soc. Japan, 54 (1948), 183

(29) *Magnesite*

	1.	2.	3.
MgO	26.1%	43.58%	39.52%
FeO	25.3	6.71	-----
MnO	-----	0.61	0.10
CO ₂	47.0	-----	-----
Al ₂ O ₃	-----	-----	0.34
Fe ₂ O ₃	-----	-----	13.61
NiO	-----	0.021	0.058

Ig. loss	—	46.91	43.57
Insol.	1.6	1.08	2.36
Total	100.00	99.00	99.58

1. Magnesite: Bessi mine, Nii county, Ehimé Pref.: Xenocryst in chlorite schist: Analyst, E. SORIDA, M. G. 2 (1948), 38.
2. Iron-Magnesite: Motokosi, Kigaku vilage, Nagasaki Pref.: In talcose serpentine: Analyst, K. MUTA, J. Jap. Ass. M. P. G. 35 (1951), 57.
3. Iron-Magnesite: Onzyaku, Korauti village, Hukuoka Pref.: In talcose schist: Analyst, K. MUTA, loc. cit.

(30) *Siderite*

	1.	2.
CaO	0.25%	0.37%
MnO	0.35	0.27
MgO	4.20	4.20
FeO	52.42	52.43
CO ₂ }	31.91	40.00
H ₂ O }		
Al ₂ O ₃	2.21	0.20
Fe ₂ O ₃		2.09
Ig. loss	—	0.12
Inso.	6.21	—
Total	97.55	99.68

- 1, 2. Asio mine, Asio town, Kamitoga county, Totigi Pref.: Copper vein: Analyst, I. T. TOMISAKA, (1946), 2. S. MATUDA, (1952), Unpublished.

(31) *Rhodochrosite*

	1.	2.	3.	4.	5.	6.
CaO	6.80%	3.12%	1.29%	2.03%	1.92%	2.41%
MgO	1.17	0.54	0.59	0.11	0.21	0.21
MnO	45.36	56.92	55.74	55.82	54.22	53.78
FeO	0.61	0.51	3.83	2.03	1.92	2.18
SiO ₂	11.15	—	—	—	—	—
Fe ₂ O ₃	—	3.21	—	0.10	0.21	—
Al ₂ O ₃	—	—	—	0.01	—	—
CO ₂ }	34.74	38.87	38.70	37.52	39.22	37.92
H ₂ O(—) }						
H ₂ O(+)	0.04	—	—	—	—	—
Insol.	—	—	0.03	0.02	0.05	0.08
Total	99.87	103.08	99.88	97.99	99.01	96.58

1. Teiné mine, Sapporo county, Isikari Prov. Hokkaidô: Gold vein: Analyst, J. KITAHARA, J. Geol. Soc. Japan, 56 (1950), 473.
- 2, 3. Ooé mine, Ooé village, Yoiti county, Siribesi Prov. Hokkaidô: Lead, zinc and rhodochrosite vein: Analyst, S. MATUDA, (1952), Unpublished.

- 4, 5, 6. Inakuraisi mine, Hurubira town, Hurubira county, Siribesi Prov. Hokkaidô: Rhodochrosite vein: 4. 5...Analyst, S. MATUDA, loc. cit. 6...Analyst, T. TOMISAKA, (1946), Unpublished.

	7.	8.	9.	10.	11.	12.
CaO	1.00%	0.98%	1.20%	3.14%	4.11%	2.28%
MgO	1.76	1.68	1.84	0.01	1.58	2.24
MnO	56.02	54.11	54.82	56.06	53.21	54.43
FeO	2.01	4.07	4.18	3.14	4.11	2.88
Al ₂ O ₃	—	—	—	—	—	—
Fe ₂ O ₃	0.02	0.74	0.92	3.12	0.15	0.49
CO ₂ }	38.36	38.36	37.11	34.58	38.73	38.88
H ₂ O (-) }						
Insol.	0.01	0.01	0.02	—	—	0.13
Total	99.18	99.95	100.09	99.99	101.89	101.33

- 7, 8, 9, 10, 11, 12. Yakumo mine, Yakumo town, Yakumo county, Iburi Prov. Hokkaidô: Lead, zinc and rhodochrosite vein: Analyst, S. MATUDA, (1952), loc. cit.

	13.	14.	15.	16.	17.
δ	—	3.54	3.35	3.59	3.62
CaO	2.61%	8.04%	6.69%	3.41%	2.30%
MgO	0.97	1.01	0.53	0.49	1.25
MnO	52.04	51.06	50.52	57.05	54.53
FeO	4.25	0.20	0.09	0.33	2.75
CO ₂	37.56	39.59	36.83	38.38	39.04
SiO ₂	—	0.12	5.21	0.09	0.03
H ₂ O	—	—	—	0.11	—
Total	96.98	100.20	99.87	99.76	99.90

13. Imai-Isizaki mine, Kaminokuni village, Hiyama county, Osima Prov. Hokkaidô: Rhodochrosite vein: Analyst, K. ADATI, (1952).
 14. Innai mine, Okatu county, Akita Pref.: Gold silver vein: Analyst, J. KITAHARA, J. Geol. Soc. Japan, 56 (1950), 437.
 15. Ôisi mine, Akita Pref.: Silver vein: Analyst, J. KITAHARA, loc. cit.
 16. Mori mine, Nagai village, West-Okutama county, Yamagata Pref.: Silver bearing lead and zinc vein: Analyst, J. KITAHARA, loc. cit.
 17. Ryûsima mine, Azumi village, South-Azumi county, Nagano Pref.: Silver bearing lead and zinc vein: Analyst, J. KITAHARA, loc. cit.

	18.	19.
δ	3.54 (4°C)	3.60
CaO	7.00%	3.34%
MgO	0.42	0.47
MnO	52.37	55.85
FeO	0.12	1.62
CO ₂	34.16	38.50
SiO ₂	5.39	0.23
TiO ₂	n.d.	—

Al ₂ O ₃	tr.	---
H ₂ O	0.02	---
Total	96.66	100.01

18. Hamayokokawa mine, Kawakami village, Kami-Ina county, Nagano Pref.: Manganese deposit: Analyst, J. KITAHARA, J. Geol. Soc. Japan, 54, (1948), 181.
 19. Kuradani mine, Saikawa village, Isikawa county, Isikawa Pref.: Silver bearing lead and zinc vein: Analyst, J. KITAHARA, J. Geol. Soc. Japan, 56 (1950), 472.

(32) *Aragonite*

	1.	2.	3.	4.	5.	6.
CaO	53.25%	51.82%	52.84%	51.75%	54.00%	54.05%
MgO	2.77	5.10	2.92	2.20	1.27	1.07
MnO	---	---	---	tr.	tr.	---
SiO ₂	2.08	---	tr.	1.22	1.56	1.70
Al ₂ O ₃	0.01	tr.	tr.	0.13	0.06	---
Fe ₂ O ₃	0.16	0.24	0.20	0.17	---	0.20
NiO	0.0043	0.0053	0.0013	0.0002	0.0016	0.0020
Ig. loss	42.20	42.80	40.80	40.72	42.32	42.26
Total	99.54	99.80	98.80	99.89	99.21	99.28

1. Nyoidaké, Kosio town, Irima county, Saitama Pref.: Analyst, K. MUTA, J. Jap. Ass. M. P. G. 35 (1951), 57.
 2. Hironaga mine, Ōnaga village, Sita county, Sizuoka Pref.: In fissures of serpentine: Analyst, K. MUTA, loc. cit.
 3. Yosikawa pass, Hunatuki village, Hatina county, Aiti Pref.: In fissures of serpentine: Analyst, K. MUTA, loc. cit.
 4. Kasio, Osika village, Simo-Ina county, Nagano Pref.: In fissures of serpentine: Analyst, K. MUTA, loc. cit.
 5, 6. Kiuragi village, East-Matura county, Saga Pref.: In fissures of serpentine: Analyst, K. MUTA, loc. cit.

(33) *Cerussite*

PbO	81.03%
SiO ₂	0.33
Al ₂ O ₃ }	0.48
Fe ₂ O ₃ }	
CaO	0.14
Ig. loss	17.05
Total	99.03

- Asio mine, Kami-Toga county, Totigi Pref.: Copper vein: Analyst, M. SAITÔ, J. Geol. Soc. Japan, 55 (1949), 58.

(34) *Dolomite*

	1.	2.	3.	4.	5.
CaO	34.16%	34.46%	34.20%	34.40%	33.27%
MgO	19.45	19.48	19.90	18.75	19.02
SiO ₂	0.05	0.92	0.90	0.24	0.75
Al ₂ O ₃	0.08	0.51	0.48	0.12	0.16
Fe ₂ O ₃	0.21	0.58	0.32	0.32	0.18
SO ₃	0.04	—	—	—	—
Ig. loss	47.06	44.20	44.20	46.20	46.94
Org. matter	0.05	—	—	—	—
Total	101.10	100.15	100.00	100.03	100.32

- 1, 2, 3, 4, 5, 6. Kuzuu town, Aso county, Totigi Pref.: Dolomite deposit: 1—Analyst, R. KIYOURA and T. SATA, J. Jap. Ceram. Ass. 58 (1950), 48. 2—3—Analyst, S. NAGAI and R. SAWAMOTO, Ibid. 58 (1950), 379. 4—5—6—Analyst, Y. SANADA and K. MIYAZAWA, Ibid. 60 (1952), 535.

	6.	7.	8.	9.
CaO	52.31%	30.90%	33.57%	37.82%
MgO	2.58	20.39	19.51	5.00
FeO	—	—	1.58	0.31
MnO	—	0.23	0.01	—
CO ₂	—	—	44.72	44.87
SiO ₂	0.45	0.02	—	—
Al ₂ O ₃	0.06	0.68	—	—
Fe ₂ O ₃	0.11	1.24	0.01	—
NiO	—	0.0009	—	—
Ig. loss	43.88	45.84	—	—
Insol.	—	—	0.29	—
Total	99.37	99.07	99.69	100.02

7. Miyazawa, Higuti village, Titibu county, Saitama Pref.: In talc deposit: Analyst, K. MUTA, J. Jap. Ass. M. P. G. 35 (1951), 57.
 8. Tunémi, Mozi city, Hukuoka Pref.: Dolomite deposit: Analyst, S. MATUDA, (1952), Unpublished.
 9. Ōno, Ōno county, Ōita Pref.: Analyst, S. MATUDA, loc. cit.

(35) *Hydrozincite*

δ	3.59 (26°C)
Al ₂ O ₃	1.17%
Fe ₂ O ₃	tr.
CaO	2.69
ZnO	66.70
CO ₂	16.26
H ₂ O(+)	11.75
H ₂ O(−)	1.55

Insol.	0.26
Total	98.2

Nakatatu mine, Simo-Anauma village, Ôno county, Hukui Pref.: Lead and zinc vein :
Analyst, H. MINATO and Y. TAKANO, J. Geol. Soc. Japan, 55 (1950), 25.

(36) *Aurichalcite*

ZnO	53.5%
CuO	17.4
Fe ₂ O ₃	0.2
CO ₂ } H ₂ O (+) }	23.8
H ₂ O (—)	1.2
Insol.	2.1
Total	98.2

Urusiyama deposit, Kamioka mine, Yosiki county, Gifu Pref.: Oxydized zone in contact
deposit: Analyst, E. SORIDA: T. ITÔ and K. SAKURAI, Miner. Japan, (1947), 272.

IV. Borate Minerals.

(37) *Ludwigite*

δ	3.752
SiO ₂	2.65%
Al ₂ O ₃	2.14
Fe ₂ O ₃	35.55
FeO	3.47
MnO	0.50
MgO	37.56
CaO	0.26
NiO	0.20
B ₂ O ₃	14.68
Cr ₂ O ₃	0.68
H ₂ O (+)	1.84
H ₂ O (—)	0.18
Total	99.71

Hayama nickel mine, Tomita village, Daté county, Iwaté Pref.: Acicular crystals in
forsterite aggregates: Analyst, S. HASAGAWA: S. HASEGAWA and A. SUGAKI, J. Jap. Ass.
M. P. G. 36 (1952), 108.

VII. Sulfate Minerals.

(38) *Barite*

	1.	2.	3.	4.	5.	6.
δ	4.43	4.29	4.44	4.41	4.42	4.49
SiO	6.25%	15.43%	0.57%	0.57%	1.84%	1.34%
Al ₂ O ₃ }	0.54	0.85	0.49	0.21	0.34	0.38
Fe ₂ O ₃ }						
MgO	0.63	0.62	0.70	0.33	tr.	tr.
CaO	0.40	0.15	tr.	0.09	0.42	0.21
BaO }	53.23	43.80	55.98	55.81	56.34	55.82
SrO }						
SO ₄	37.52	30.19	41.65	40.60	38.86	40.00
Pb	—	—	—	—	—	1.98
H ₂ O(+)	0.60	1.25	0.15	0.26	0.62	0.57
H ₂ O(−)	0.04	0.05	0.03	0.03	0.15	0.08
Total	99.65	92.33	99.57	98.90	98.57	100.35

1. Pirika, Imagané town, Siribesi Prov. Hokkaidô : Precipitates of Hotspring : Analyst, OGAWA : K. KINOSITA and Y. KUBO, M. G. 1 (1947), 123.
2. Hunauti mine, Sôma village, Naka-Tugaru county, Aomori Pref. : Lead and zinc vein : Analyst, OGAWA : loc. cit.
3. Csarizawa mine, Kazuno county, Akita Pref. : Copper vein : Analyst, OGAWA : loc. cit.
4. Motoyama, Hanaoka mine, Ôdate town, North-Akita county, Akita Pref. : Black ore deposit : Analyst, loc. cit.
5. Kanehata mine, Kosaka town, Kazuno county, Akita Pref. : Copper-vein : Analyst, OGAWA : loc. cit.
6. Sibukuro, Tazawa village, Senpoku county, Akita Pref. : Precipitates of Hotspring : Analyst, OGAWA : loc. cit.

(39) *Anhydrite*

	1.	2.
CaO	41.13%	40.69%
SO ₄	58.37	58.29
SiO ₂	—	0.18
Al ₂ O ₃	0.06	} 0.15
Fe ₂ O ₃	—	
MnO	—	0.03
MgO	—	0.03
CO ₂	0.17	—
FeS ₂	0.02	—
H ₂ O(+)	—	1.07
H ₂ O(−)	—	0.38
Total	99.75	100.82

1. Yonaibata mine, Kanô village, Yama county, Hukusima Pref.: Gypsum deposit: Analyst, K. TOGARI, J. Geol. Soc. Japan, 56 (1950), 162.
2. Hitati mine, Hitati city, Ibaragi Pref.: In sericite schist: Analyst, K. YAGI, M. G. 1 (1947), 58.

(40) *Gypsum*

	1.	2.
CaO	32.67%	32.33%
SO ₃	46.48	46.41
H ₂ O(+)	20.93	19.84
H ₂ O(-)		0.11
SiO	0.02	1.00
Al ₂ O ₃	—	0.15
FeO	0.08	0.08
MgO	0.04	0.04
Total	100.22	99.96

1. Matuo mine, Matuo village, Iwaté county, Iwaté Pref.: Sulphur deposit: Analyst, J. KITAHARA: K. ÔMORI, J. KITAHARA and T. SUZUKI, J. Jap. Ass. M. P. G. 35 (1951), 45.
2. Iwasawa mine, Iwasaki village, Waka county, Iwaté Pref.: Sulphur deposit: Analyst, NAGAI and M. SEKIYA, J. Jap. Ceram. Ass. 59 (1951), 526.

(41) *Epsomite*

MgO	16.13%
FeO	0.24
H ₂ O	51.46
SO ₃	32.41
Insol.	0.00
Total	100.24

Hitati mine, Hitati city, Ibaraki Pref.: White stalactitic epsomite on wall of adits.: Analyst, E. SORIDA: K. SASAKURA and E. SORIDA, Syumi-no-Tigaku, 5 (1952), 350.

(42) *Jarosite*

	1.	2.	3.
K ₂ O	8.86%	8.29%	8.43%
Na ₂ O	0.83	0.40	0.53
Fe ₂ O ₃	41.65	47.15	45.90
Al ₂ O ₃	4.18	—	0.36
SO ₃	32.07	31.27	32.00
H ₂ O(+)	11.20	10.87	12.50
H ₂ O(-)	0.07	—	0.25
SiO ₂	0.11	0.42	0.18
TiO ₂	0.00	—	—

MnO	—	—	0.00
CaO	0.09	0.79	0.00
MgO	tr.	0.87	0.00
P ₂ O ₅	0.00	—	0.00
Total	100.26	100.06	100.15

- 1, 2. Suwa mine, Kitayama village, Suwa county, Nagano Pref.: Limonite deposit: 1... Analyst, J. KITAHARA, J. Jap. Ass. M. P. G. 33 (1949), 23. 2... Analyst, S. NAGAI and T. MIYABE, J. Chem. Ind. Japan, 73 (1950), 7.
3. Gunma mine, Kuni village, Azuma county, Gunma Pref.: Limonite deposit: Analyst, T. MINATO, J. TAKUBO and M. SAITÔ, J. Geol. Soc. Japan, 55 (1949), 169.

VIII. Phosphate and Arsenate Minerals.

(43) *Xenotime*

	1.	2.
δ	—	4.43
$\Sigma \text{Ce}_2\text{O}_3$	7.1%	2.7% ... Ce-rare earths
$\Sigma \text{Y}_2\text{O}_3$	60.6	52.9 ... Y-rare earths
P ₂ O ₅	30.1	26.0
ThO ₂	—	2.7
UO ₂	—	1.8
ZrO ₂	—	2.0
SiO ₂	—	7.4
Al ₂ O ₃ +FeO	—	2.8
MnO	—	0.0
MgO	—	0.0
CaO	—	0.7
Total	97.8	99.0

1. Takehinata, Nosen village, West-Yamanasi county, Yamanasi Pref.: Pegmatite: Analyst, K. NAGASHIMA, J. Chem. Soc. Japan, 73 (1952), 602.
2. Hiradan!, Kido village, Siga county, Siga Pref.: Pegmatite: Analyst, B. HIGAMI: T. ITÔ and K. SAKURAI, Miner. Japan, (1947), 164.

(44) *Trichalcite*

CuO	38.5%
As ₂ O ₅	36.7
(Fe, Al) ₂ O ₃	3.6
H ₂ O (+)	16.6
H ₂ O (—)	2.3
Insol.	2.9
Total	100.6

- Kinzyô mine, Inui village, Mugi county, Gihu Pref.: Contact copper deposit: Analyst, E. SORIDA: K. SAKURAI, E. SORIDA and T. SENOO, M. G. 3 (1949), 164.

(45) *Vivianite*

	1.	2.
SiO ₂	0.53%	none%
TiO ₂	0.14	tr.
Al ₂ O ₃	—	2.49
Fe ₂ O ₃	15.43	6.84
FeO	30.05	30.04
MnO	—	0.24
MgO	0.24	0.28
CaO	tr.	0.06
Na ₂ O	—	} tr.
K ₂ O	—	
P ₂ O ₅	27.06	24.43
H ₂ O (+)	13.51	3.05
H ₂ O (—)	13.79	12.65
SO ₃	—	none
Insol.	—	10.36
Total	100.84	100.44

1. Ōnisi, Kawatabi village, Tamutukuri county, Miyagi Pref.: In clay beds: Analyst, K. YAGI, M. G. 1 (1947), 164.
2. Himegahama beach, Himesima, Ōita Pref.: Vivianite gravels in beach and concretionary aggregates in clay: Analyst, H. MINATO, J. Geol. Soc. Japan, 58 (1951), 243.

(46) *Scorodite*

	1.	2.	3.	4.
δ	—	—	—	3.22
As ₂ O ₅	45.66%	31.05%	49.00%	48.97%
SiO ₂	0.56	none	0.03	—
Al ₂ O ₃	tr.	tr.	none	—
Fe ₂ O ₃	31.97	52.38	35.69	33.43
FeO	none	0.57	0.38	0.37
MnO	—	—	tr.	—
MgO	none	none	0.06	none
CaO	tr.	tr.	0.09	tr.
H ₂ O (+)	14.58	16.21	14.81	15.82
H ₂ O (—)	0.71	0.36	0.74	2.18
Insol.	6.41	tr.	0.04	—
Total	99.89	100.57	100.84	100.77

- 1, 2, 3. Kami-Kimobetu mine, Kimobetu village, Abuta county, Iburi Prov. Hokkaidō: Bog iron ore deposit: Analyst, H. MINATO, J. Geol. Soc. Japan, 53 (1947), 54; 55 (1949), 251. 1...white powdery, 2...yellow powdery, 3...massive.
4. Tunozu mine, Tunozu town, Naka county, Simanē Pref.: Contact deposit: Analyst, H. MINATO, J. Geol. Soc. Japan, 55 (1949), 251.

	5.	6.	7.	8.
δ	—	—	3.23 (5°C)	3.167 (10°C)
As ₂ O ₅	41.56%	36.41%	48.53%	48.51%
SiO ₂	15.70	1.73	—	tr.
Al ₂ O ₃	—	none	—	—
Fe ₂ O ₃	29.00	28.16	33.54	33.65
FeO	—	tr.	0.99	0.46
MnO	—	none	—	tr.
MgO	—	0.65	none	0.69
CaO	1.89	0.46	0.34	none
H ₂ O (+)	11.55	12.72	16.36	15.04
H ₂ O (—)	0.60	1.16	0.18	1.04
SnO	—	—	0.30	—
Insol.	—	18.87	—	0.22
Total	100.02	100.16	100.23	99.61

5. Sasagatani mine, Hatasako village, Kanoasi county, Simané Pref.: Contact arsenic deposit: Analyst, H. MINATO, loc. cit.
6. Toroku mine, Iwato village, West-Usuki county, Miyazaki Pref.: Contact deposit: Analyst, H. MINATO, loc. cit.
7. Okumitaté mine, Iwato village, West-Usuki county, Miyazaki Pref.: Stalactitic scorodite in contact deposit: Analyst, H. MINATO, loc. cit.
8. Akesi mine, Tiran town, Kawabé county, Kagosima Pref.: In druse of gold, copper and quartz vein: Analyst, H. MINATO, J. Geol. Soc. Japan, 58 (1951), 243.

(47) *Alumino-scorodite*

δ	3.23 (10°C)
As ₂ O ₅	48.85%
SiO ₂	0.01
Al ₂ O ₃	5.11
Fe ₂ O ₃	27.91
FeO	1.50
MgO	0.15
CaO	0.40
CuO	0.03
H ₂ O (+)	15.14
H ₂ O (—)	1.42
Total	100.52

Kamikimobetu mine, Kimobetu village, Abuta county, Iburi Prov. Hokkaidô: Bog iron ore deposit: Analyst, H. MINATO, J. Geol. Soc. Japan, 53 (1947), 54; 55 (1949), 251.

(48) *Clinoclase*

As ₂ O ₅	27.9%
Fe ₂ O ₃	1.1
CuO	59.3

P ₂ O ₅	0.2
H ₂ O (+)	7.4
H ₂ O (−)	1.2
Insol.	3.2
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Total	100.3

Kitabira mine, Ôda town, Miné county, Yamaguti Pref.: Contact copper deposit:
Analyst, E. SORIDA: K. SAKURAI, E. SORIDA and K. SASAKURA, M. G. 3 (1946), 163.

(49) *Adamite*

As ₂ O ₅	41.5%
CuO	7.3
ZnO	47.1
SnO ₂	?
H ₂ O (+)	2.8
H ₂ O (−)	0.6
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Total	99.3

Ôbuki deposit, Mitaté mine, Iwato village, West-Usuki county, Miyazaki Pref.: Green radial aggregates in oxydized zone of contact deposit: Analyst, H. MINATO, J. Geol. Soc. Japan, 53 (1947), 54.

(50) *Veszelyite*

CuO	30.52%
ZnO	32.44
(Fe, Al) ₂ O ₃	0.31
P ₂ O ₅	17.96
H ₂ O (+)	17.26
H ₂ O (−)	1.62
Insol.	0.72
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Total	100.83

Kamiokaite, A variety of Veszelyite, (named as a new mineral after its locality): Kamioka mine, Yosiki county, Gifu Pref.: Contact lead and zinc deposit: Analyst, E. SORIDA: K. SAKURAI, H. NAGASIMA and E. SORIDA, Syumi-no-Tigaku, 5 (1952), 172.

(51) *Ludlamite*

P ₂ O ₅	32.22%
As ₂ O ₅	0.16
Fe ₂ O ₃	0.66
FeO	50.81
MgO	0.12
CaO	0.10
H ₂ O	15.77
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Total	99.86

Asio mine, Toga county, Totigi Pref.: Copper vein: Analyst, H. MINATO: H. MORI, X-ray, 5 (1949), 110.

(52) *Torbernite*

P ₂ O ₅	8.5%
CuO	5.7
UO ₃	37.5
Al ₂ O ₃	0.0
Fe ₂ O ₃	0.0
CaO	0.0
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Total	51.7

Nagatori, Hukuoka city, Hukuoka Pref.: Pegmatite: Analyst, B. HIGAMI: Y. OKAMOTO, M. G. 2 (1949), 172.

(53) *Autunite*

P ₂ O ₅	15.5%
UO ₃	65.3
CuO	0.0
Al ₂ O ₃	0.0
Fe ₂ O ₃	0.0
CaO	6.5
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Total	87.3

Nagatori, Hukuoka city, Hukuoka Pref.: Pegmatite: Analyst, B. HIGAMI: Y. OKAMOTO, M. G. 2 (1949), 172.

IX. Silicate Minerals.

(54) *Forsterite*

δ	3.122
SiO ₂	40.92%
TiO ₂	0.03
Al ₂ O ₃	0.63
Fe ₂ O ₃	0.55
FeO	0.63
MnO	0.08
MgO	51.53
CaO	0.85
NiO	0.16
Cr ₂ O ₃	none
Ig. loss	3.55
H ₂ O(-)	0.44
<hr/>	
Total	99.37

Hayama nickel mine, Tomita village, Daté county, Hukusima Pref.: Forsterite rock:
Analyst, S. HASEGAWA: S. HASEGAWA and A. SUGAKI, J. Jap. Ass. M. P. G. 36 (1952), 106,

(55) *Tephroite and Knebelite*

	1.	2.
δ	4.03	4.292
SiO ₂	30.27%	29.57%
TiO ₂	0.03	tr.
Al ₂ O ₃	none	0.92
Fe ₂ O ₃	—	1.99
FeO	0.85	51.68
MnO	65.12	14.08
MgO	2.53	0.50
CaO	1.27	0.65
H ₂ O(+)	0.10	0.22
H ₂ O(—)	—	0.26
Total	100.17	99.87

1. Tephroite: Himegamori, Karumai village, Hei county, Iwaté Pref.: Manganese deposit:
Analyst, S. HASEGAWA: K. ÔMORI and S. HASEGAWA, J. Jap. Ass. M. P. G., 36 (1952), 70; Sci. Rep. Tôhoku Univ., III Ser. 4 (1952), 101.
2. Iron-Knebelite: Iizaka village, Daté country, Hukusima Pref.: Pegmatite: Analyst, S. HASEGAWA: K. ÔMORI, S. HASEGAWA and M. ISII, J. Jap. M. P. G.; 34 (1950), 112; J. Geol. Soc. Japan, 56 (1950), 243; Sci. Rep. Tôhoku Univ., III Ser. 4 (1951), 31.

(56) *Chondrodite*

SiO ₂	30.79%
TiO ₂	0.10
Al ₂ O ₃	0.69
Fe ₂ O ₃ }	1.08
FeO }	
MgO	57.04
CaO	tr.
Na ₂ O	n. d.
K ₂ O	n. d.
H ₂ O	3.57
F	4.82
	98.09
O=F	—2.03
Total	96.06

East of Totibora deposit, Kamioka mine, Yosiki county, Gifu Pref.: Contact lead and zinc deposit: Analyst, T. ANDÔ: T. NOZAWA, J. Jap. Ass. M. P. G. 36 (1952), 181.

(57) *Andalusite*

SiO ₂	37.07%
TiO ₂	tr.
Al ₂ O ₃	60.00
Fe ₂ O ₃	0.97
MgO	0.05
CaO	0.37
H ₂ O (+)	0.42
H ₂ O (—)	0.23
Total	99.34

Kabutu, Takano village, Tamura county, Hukusima Pref.: Pegmatite: Analyst, S. HASEGAWA: K. ÔMORI, J. Jap. Ass. M. P. G., 35 (1951), 4.

(58) *Garnet*

	1.	2.	3.	4.	5.
SiO ₂	36.00%	40.23%	37.21%	37.57%	36.59%
TiO ₂	n.d.	n.d.	n.d.	n.d.	0.4
Al ₂ O ₃	8.87	15.96	21.06	18.46	22.15
Fe ₂ O ₃	19.23	6.26	4.43	2.82	1.26
FeO	1.22	3.05	1.78	27.42	30.15
MnO	1.06	0.20	1.12	9.59	1.78
MgO	0.24	1.67	0.72	2.43	3.21
CaO	34.18	32.89	34.77	2.25	5.09
Total	100.80	100.26	101.09	100.54	100.57

1. Garnet: Katusi village, Simo-Hei county, Iwaté Pref.: Contact deposit: Analyst, B. YOSIKI and M. WAKI, Rep. Res. Inst., Asahi Glass Co., 1 (1951), 151.
2. Garnet: Simo-Arisu village, Kesen county, Iwaté Pref.: Contact deposit: loc. cit.
3. Garnet: Toyosato village, East-Sirakawa county, Hukusima Pref.: Pegmatite: loc. cit.
4. Garnet: Atumi peninsula, Atumi county, Aiti Pref.: Beach placer: loc. cit.
5. Garnet: Anamusi, Nizyôsan, North-Katuragi county, Nara Pref.: Placer: loc. cit.

	6.	7.	8.	9.
SiO ₂	37.20%	37.52%	40.71%	37.43%
TiO ₂	n.d.	0.48	—	0.00
Al ₂ O ₃	18.84	21.03	18.15	13.69
Fe ₂ O ₃	2.76	2.68	0.13	9.29
FeO	31.67	25.17	23.22	0.51
MnO	2.54	1.89	2.08	0.00
MgO	2.56	4.66	4.60	3.50
CaO	6.41	6.06	11.00	30.48
Cr ₂ O ₃	—	—	—	4.35
H ₂ O	—	—	—	0.87
Ig. loss	—	—	0.07	—
Total	101.10	99.49	69.49	100.12

6. Garnet: Kawakami village, South-Saku county, Nagano Pref.: Contact deposit: loc. cit.
7. Garnet: Amatakiyama, Tuda town, Ôkawa county, Kagawa Pref.: Placer: loc. cit.
8. Garnet: Nagatu village, Uma county, Ehimé Pref.: Beach placer: Analyst, Chem lab., Res. Inst. Asahi Glass Co.: K. TSUBOYA, Min. Geol. 1 (1951), 24.
9. Chrome bearing Grossularite: Akaisi mine, Uma county, Ehimé Pref.: Chrome deposit: Analyst, J. KITAHARA, M. G. 4 (1951). 79.

(59) *Epidote*

SiO ₂	37.21%
TiO	tr.
Al ₂ O ₃	17.62
Fe ₂ O ₃	14.73
FeO	1.34
MnO	5.18
CaO	21.31
MgO	0.06
Na ₂ O	n.d.
K ₂ O	n.d.
H ₂ O(+)	} 2.06
H ₂ O(-)	
P ₂ O ₅	n.d.
Total	99.51

Mn-epidote: Kakinomata mine, Kagami village, Tosa county, Kôti Pref.: Manganese deposit: Analyst, H. HIROWATARI (1952), communicated by Y. OKAMOTO.

(60) *Allanite*

	1.	2.	3.	4.	5.
δ	3.5 (25°C)	3.95 (15°C)	—	—	—
SiO ₂	31.34%	31.86%	31.33%	19.75%	30.28%
TiO ₂	0.05	0.35	—	—	—
Al ₂ O ₃	17.72	14.31	16.36	11.06	16.03
Fe ₂ O ₃	1.99	8.14	8.41	36.55	12.98
FeO	12.68	10.83	10.10	0.06	6.15
MnO	0.18	1.28	1.11	0.06	2.97
MgO	1.03	1.91	0.03	0.00	0.45
CaO	6.29	10.50	9.70	0.00	7.61
Na ₂ O	0.24	—	—	—	—
K ₂ O	0.81	—	—	—	—
ZrO ₂	0.13	—	—	—	—
ThO ₂	0.16	1.14	1.39	0.82	—
SnO	0.36	—	—	—	—
BeO	0.13	—	—	—	—
Ce ₂ O ₃	4.90	} 18.75 Rare earths	9.41	—	7.90
ΣCe ₂ O ₃	10.45		9.88	10.79	8.01
ΣY ₂ O ₃	10.50	—	0.10	0.00	5.51

U ₃ O ₈	0.04	—	—	—	0.30
H ₂ O(+) Ig. loss ...	1.18	1.60	1.56	10.46	1.58
H ₂ O(−)	0.04	—	0.76	8.53	0.75
CO ₂	—	—	—	2.51	—
Total	100.22	100.65	100.14	100.59	100.52

1. Takehinata, Nosen village, West-Yamanasi county, Yamanasi Pref.: Pegmatite: Analyst, K. NAGASIMA, J. Chem. Soc. Japan, 73 (1952), 602.

2. Hradani, Kido village, Siga county, Siga Pref.: Pegmatite: Analyst, B. HIGAMI, M. G. 1 (1947), 57.

3, 4. Taniuti, Mié village, Naka county, Kyôto Pref.: Pegmatite: Analyst, J. TAKUBO and M. TATEKAWA, J. Geol. Soc. Japan, 57 (1951), 3.
3...Fresh specimen. 4...Decomposed specimen.

5. Simo-Tawara, Tawara village, North-Kawara county, Ôsaka Pref.: Pegmatite: Analyst, J. TAKUBO: M. SHIRAKAMI, M. G. 3 (1950), 255.

(61) *Lievrite*

δ	3.9
SiO ₂	29.32%
TiO ₂	tr.
Al ₂ O ₃	2.04
Fe ₂ O ₃	15.53
FeO	32.82
MnO	3.41
MgO	0.71
CaO	13.57
Alkalis	0.37
P ₂ O ₅	tr.
H ₂ O	2.26
Total	100.03

Kamioka mine, Yosiki county, Gihu Pref.: Contact lead and zinc deposit: Analyst, Y. TAKEUCHI, X-ray, 5 (1948), 8.

(62) *Nogisanwaite** (New Mineral?)

δ	3.42 (°C)
SiO ₂	15.09%
Al ₂ O ₃	10.55
Fe ₂ O ₃	10.08
FeO	3.00
MgO	4.47

* Named from its locality.

Rare earths containing phosphorous silicate mineral. Cubic crystal. A variety of beckelite. ?

CaO	14.01
ZrO ₂	4.55
Rare earths	25.99
P ₂ O ₅	9.78
H ₂ O	2.52
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Total	100.04

Siozawa, Nogisawa village, Isikawa county, Hukusima Pref.: Pegmatite: Analyst T. KAWAI, J. Chem. Soc. Japan, 70 (1949), 268.

(63) *Zircon*

	1.	2.
δ	4.21 ($^{20^\circ\text{C}}$ + C)	4.30 ($^{20^\circ\text{C}}$ + C)
SiO ₂	27.4%	29.5%
Al ₂ O ₃	3.5	2.1
Fe ₂ O ₃	2.5	1.7
MgO	0.2	0.1
CaO	1.2	1.5
P ₂ O ₅	4.0	0.7
Rare Earths	10.7	} 1.8
ThO ₂	0.4	
ZrO ₂	42.8	60.0
UO ₂	1.0	—
Ig. loss	3.7	1.7
<hr/>		
Total	98.4	99.1

1. Suisyōdani, Haguri, Simo-Tanokami village, Kurita county, Siga Pref.: Pegmatite: Analyst, B. HIGAMI, M. G. 2 (1948), 53.
2. Hiradani, Kido village, Siga county, Siga Pref.: Pegmatite: Analyst, B. HIGAMI, loc. cit.

(64) *Keilhaute*

δ	3.93
SiO ₂	27.64%
TiO ₂	32.01
Al ₂ O ₃	3.88
Fe ₂ O ₃	6.30
MgO	0.97
CaO	19.59
Y ₂ O ₃	8.53
H ₂ O	1.45
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Total	100.37

Kaihosaku, Ōta village, Adati county, Hukusima Pref.: Pegmatite: Analyst, K. MORI-NAGA: K. SAKURAI and T. KAWAI, M. G. 4 (1951), 43.

(65) *Thalenite*

δ	4.3 (25°C)
SiO ₂	30.02%
TiO ₂	tr.
Al ₂ O ₃	0.51
Fe ₂ O ₃	1.32
MnO	0.23
MgO	1.19
CaO	1.03
P ₂ O ₅	0.27
ThO ₂	0.78
SnO	tr.
Ce ₂ O ₃	0.00
Σ Ce ₂ O ₃	tr.
Σ Y ₂ O ₃	63.36
Ig. loss	0.53
H ₂ O (—)	0.09
Total	99.33

Takehinata, Nōsen village, West-Yamanasi county, Yamanasi Pref.: Pegmatite:
Analyst, K. NAGASHIMA, J. Chem. Soc. Japan, 73 (1952), 602.

(66) *Rhodonite*

	1.	2.	3.
δ	—	2.38 ($\frac{39^\circ\text{C}}{4^\circ\text{C}}$)	2.38 ($\frac{31^\circ\text{C}}{4^\circ\text{C}}$)
SiO ₂	46.93%	36.62%	35.10%
TiO ₂	0.00	—	—
Al ₂ O ₃	tr.	0.09	0.18
FeO	0.48	0.15	0.27
MnO	44.04	35.92	37.69
MgO	0.78	3.59	0.90
CaO	7.83	2.13	2.97
H ₂ O (+)	0.17	16.34	19.07
H ₂ O (—)	—	3.25	5.26
O	—	0.32	0.18
Total	100.23	99.75	100.28

1. Rhodonite: Hamayokokawa mine, Kawasima village, Kami-Ina county, Nagano Pref.: Manganese deposit: Analyst, J. KITAHARA, J. Geol. Soc. Japan, 54 (1948), 182.
2. Weathered rhodonite (Penwithite): Same locality: Analyst, J. KITAHARA, J. Jap. Ass. M. P. G., 33 (1949) 74.
3. Weathered rhodonite (Penwithite): Kami-Ina mine, Tatuno town, Kami-Ina county, Nagano Pref.: Manganese deposit: Analyst, J. KITAHARA, loc. cit.

(67) *Beryl*

$\bar{n}$	2.755
SiO ₂	64.5 %
Al ₂ O ₃	20.64
Fe ₂ O ₃	—
BeO	11.49
Na ₂ O	2.2
K ₂ O	0.3
Cs ₂ O	0.5
Rb ₂ O	0.01
Li ₂ O	0.3
Insol.	7.81
Total	100.08

Nagatori, Hukuoka city, Hukuoka Pref.: Pegmatite: Analyst, Y. OKAMOTO, M. G. 3 (1950), 171.

(68) *Cordierite*

	1.	2.
SiO ₂	46.08%	50.78%
TiO ₂	0.05	0.01
Al ₂ O ₃	32.85	24.85
Fe ₂ O ₃	0.12	1.95
FeO	4.08	9.97
MnO	0.21	0.40
MgO	9.56	6.68
CaO	1.32	0.61
Na ₂ O	0.62	1.00
K ₂ O	0.49	1.42
H ₂ O	4.88	—
H ₂ O (+)	—	1.73
H ₂ O (—)	—	0.27
Total	100.26	99.67

1. Hitati mine, Hitati city, Ibaragi Pref.: Iron sulphide ore deposit in crystalline schist: Analyst, T. HATA: K. SUGIURA, J. Jap. Ceram. Ass. 59 (1951), 326.
2. Sakkuwabira, Hayasaki, Tarumi town, Kimotuki county, Kagosima Pref.: In druse of biotite bearing pyroxene plagioliparite: Analyst, H. MINATO: R. MORIMOTO and H. MINATO, J. Jap. Ass. M. P. G. 38 (1949), 61

(69) *Zunyite*

	1.	2.	3.	4.
SiO ₂	22.96%	4.44%	37.12%	22.17%
TiO ₂	—	—	—	1.08

Al ₂ O ₃	55.32	59.07	47.00	59.01
Fe ₂ O ₃	—	—	—	0.17
FeO	0.84	15.36	1.33	0.09
MnO	—	—	—	0.65
MgO	0.23	1.28	2.72	0.11
CaO	0.41	0.65	2.00	1.56
H ₂ O(+)	—	—	—	10.17
H ₂ O(−)	—	—	—	0.10
Ig. loss	14.32	13.52	6.59	—
Cl	—	—	—	2.75
F	5.76	5.64	3.56	5.88
Total	99.61	99.74	100.26	102.42
			F = O ₂	−2.47
			Total	99.95

1, 2, 3, 4. Sigayama, Hirao village, Simo-Takai county, Nagano Pref.: In decomposed two pyroxene andesite:

1, 2, 3—Analyst, S. NAGAI, J. Jap. Ceram. Ass. 54 (1946), 8.

4—Analyst, H. TAKESHI and T. HATA, Ibid. 55 (1947), 37.

(70) Augite

	1.	2.	3.	4.	5.
SiO ₂	50.47%	48.73%	49.71%	47.07%	52.02%
TiO ₂	0.37	1.82	0.75	1.24	1.46
Al ₂ O ₃	0.83	4.46	8.05	10.26	7.90
Fe ₂ O ₃	0.26	2.65	2.56	1.90	1.88
FeO	13.71	6.01	6.10	6.83	10.84
MnO	2.02	n. d.	n. d.	0.06	n. d.
MgO	7.56	14.50	14.18	12.99	13.38
CaO	23.85	21.06	17.07	18.26	10.16
Na ₂ O	0.31	0.46	n. d.	0.83	n. d.
K ₂ O	0.16	0.05	n. d.	0.09	n. d.
H ₂ O(+)	0.42	n. d.	n. d.	n. d.	n. d.
H ₂ O(−)	0.08	—	—	—	—
Total	100.04	99.74	98.42	99.53	97.64

1. Common augite: Senmaya town, East-Iwai county, Iwaté Pref.: Contact metamorphic rock: Analyst, H. YAMADA, J. Geol. Soc. Japan, 56 (1950), 255.
2. Red purple colored augite: Takakusayama, East-Masizu village, Sita county, Sizuoka Pref.: Alkali olivine basalt: Analyst, Chem. lab., Geol. Surv. Japan: K. SUGI, Sci. Rep. Fac. Sci., Kyūshū Univ., Geol. 3 (1951), No. 3, 8.
3. Usan peninsula near Hagi city, Yamaguti Pref.: Olivine basalt: Analyst, Geol. Surv. Japan, loc. cit.
4. Takasima near Karatu city, Saga Pref.: Olivine basalt: Analyst, Geol. Surv. Japan, loc. cit.
5. Kutinotu village, South-Takaki county, Nagasaki Pref.: Tholeite: Analyst, Geol. Surv. Japan, loc. cit.

	6.	7.	8.	9.
δ	—	—	3.317 (4°C)	—
SiO ₂	50.67%	47.67%	50.58%	50.58%
TiO ₂	0.56	1.14	0.08	0.68
Al ₂ O ₃	4.11	5.10	4.12	4.01
Fe ₂ O ₃	1.94	3.14	3.22	3.22
FeO	3.17	4.38	7.31	7.31
MnO	n. d.	0.09	0.17	0.17
MgO	17.13	16.35	13.61	13.61
CaO	20.43	19.15	17.28	18.51
Na ₂ O	0.38	0.57	0.71	0.71
K ₂ O	0.25	0.25	0.23	0.23
Cr ₂ O ₃	0.62	0.35	—	—
H ₂ O (+)	n. d.	—	0.69	0.69
H ₂ O (—)	0.06	0.12	1.26	0.41
Total	99.32	100.29	100.26	100.13

6, 7. Nisigataké, East-Yamasiro village, West-Matura county, Saga Pref.: Anorthoclase bearing trachy-basalt: Analyst, T. MIYAKE, M. G. 2 (1948), 78-79. 6...dark green, 7...black.

8, 9. Hontanigoé, Kusino village, Aso county, Kumamoto Pref.: Phenocryst in two pyroxene andesite of Aso volcano: Analyst, H. MATUMOTO, S. J. Geol. Soc. Japan, 58 (1951), 25. 9...J. Jap. Ass. M. P. G., 36 (1952), 121.

(71) *Pigeonite*

SiO ₂	52.84%
TiO ₂	0.22
Al ₂ O ₃	0.44
Fe ₂ O ₃	1.06
FeO	16.89
MnO	0.56
MgO	23.51
CaO	4.06
Na ₂ O	0.19
K ₂ O	0.00
P ₂ O ₅	n. d.
H ₂ O (+)	n. d.
H ₂ O (—)	0.22
SrO	0.00
Total	99.99

Usugoyazawa, eastern caldera wall of Hakoné volcano, Kanagawa Pref.: In hypersthene-olivine andesite: Analyst, H. KUNO and K. NAGASHIMA, Am. Miner. 37 (1952), 1004.

(72) *Diallage*

SiO ₂	48.46%
TiO	1.74
Al ₂ O ₃	4.44
Fe ₂ O ₃	2.32
FeO	6.60
MgO	14.60
CaO	21.02
Na ₂ O	0.42
K ₂ O	0.04
Total	99.64

Ida, Toyosato village, Ikaruga county, Kyôto Pref.: Gabbro: Analyst, Chem. lab. Geol. Surv. Japan: K. SUGI, Sci. Rep. Fac. Sci., Kyôshû Univ. Geol. 3 (1951), No. 2, 3.

(73) *Jadeite*

SiO ₂	57.42%
Al ₂ O ₃	25.07
Fe ₂ O ₃	0.67
MgO	1.18
CaO	1.83
Na ₂ O	13.25
K ₂ O	none
Ig. loss	0.44
Total	99.86

Kotaki village, West-Kubiki county, Niigata Pref.: Albite-jadeite rock: Analyst, T. FUKUSHIMA, Rep. Res. Inst. Asahi Glass Co., 2 (1952), 100.

(74) *Bronzite*

	1.	2.
SiO ₂	55.84%	54.11%
TiO ₂	0.19	0.19
Al ₂ O ₃	1.60	1.52
Fe ₂ O ₃	none	none
FeO	9.92	15.73
MnO	0.15	0.34
CaO	1.36	1.16
MgO	30.96	27.03
Na ₂ O	n. d.	n. d.
K ₂ O	n. d.	n. d.
Cr ₂ O ₃	n. d.	n. d.
P ₂ O ₅	n. d.	n. d.

H ₂ O (+)	n. d.	n. d.
H ₂ O (—)	n. d.	n. d.
Total	100.02	100.08

1. Tyôsi city, Tiba Pref.: Phenocryst in bronzite andesite: Analyst, K. TADA and M. HUZIMOTO: H. KUNO, Proc. Japan Acad., 23 (1947), 117.
2. Kokubudani, Hosioka village, Ayauta county, Kagawa Pref.: Phenocryst in bronzite andesite: Analyst, K. TADA and M. HUZIMOTO, loc. cit.

(75) *Hypersthene*

	1.	2.
SiO ₂	53.17%	53.20%
TiO ₂	0.22	0.13
Al ₂ O ₃	0.95	1.15
Fe ₂ O ₃	1.32	none
FeO	17.18	21.64
MnO	0.48	0.78
MgO	23.81	22.50
CaO	2.67	0.82
Na ₂ O	0.47	n. d.
K ₂ O	0.00	n. d.
SrO	0.00	—
P ₂ O ₅	n. d.	n. d.
H ₂ O (+)	n. d.	n. d.
H ₂ O (—)	0.21	n. d.
Total	99.98	100.22

1. Tenguzawa, eastern caldera wall of Hakoné volcano: Hypersthene-olivine andesite: Analyst, H. KUNO and K. NAGASHIMA, Am. Miner. 37 (1952), 1004.
2. Hôkizawa, Miho village, Asigarakami county, Kanagawa Pref.: Amphibolite: Analyst, K. TADA and M. HUZIMOTO: H. KUNO, Proc. Japan Acad. 23 (1947), 115.

(76) *Dannemorite*

	1.	2.
SiO ₂	47.06%	46.09%
TiO ₂	—	tr.
Al ₂ O ₃	1.12	tr.
FeO	20.67	24.82
MnO	14.80	16.43
MgO	9.12	5.61
CaO	1.21	0.58
Ig. loss	3.61	5.93
H ₂ O (—)	0.25	1.10
Total	97.84	100.56

- 1, 2. Rengé mine, Kuga town, Kuga county, Yamaguti Pref.: Manganese deposit: Analyst,

T. YOSHIMURA and H. SHIRÔZU, J. Geol. Soc. Japan, 53 (1947), 59. 2...decomposition product of 1.

(77) *Hornblende*

	1.	2.	3.	4.	5.
δ	—	—	3.02	3.37	—
SiO ₂	40.96%	44.56%	43.47%	44.64%	46.24%
TiO ₂	0.99	1.61	1.81	0.91	1.45
Al ₂ O ₃	11.70	10.33	11.81	6.34	12.79
Fe ₂ O ₃	5.32	4.08	1.38	4.02	3.71
FeO	13.30	—	5.28	16.26	6.35
MnO	0.69	0.10	tr.	—	0.56
MgO	11.06	15.50	19.42	10.95	14.76
CaO	12.72	11.34	10.77	10.33	11.05
Na ₂ O	1.06	2.05	3.61	4.51	1.02
K ₂ O	1.27	0.80	0.25	0.90	0.36
H ₂ O(—)	1.50	1.91	2.12	1.13	0.95
H ₂ O(—)	0.06	0.30	0.22	—	0.14
F ₂	0.13	—	none	F...0.68	—
	100.76			100.67	
O for F ₂	—0.06			—0.29	
Total	100.70	100.64	100.14	100.38	99.38

1. Miyamoto village, East-Sirakawa county, Hukusima Pref.: Hornblende-augite-plagioclase-gneiss: Analyst, T. INOUE: A. MIYASHIRO and T. INOUE, J. Geol. Soc. Japan, 54 (1948), 93.
2. Kamogawa town, Awa county, Tiba Pref.: Pegmatite in diorite: Analyst, K. YAGI, Kagaku (Science) 17 (1947), 116.
3. Koyabê, Yokosuka city, Kanagawa Pref.: Hornblende vein in olivine-enstatite-augite rock: Analyst, T. SAMESHIMA, J. Geol. Soc. Japan, 55 (1949), 138.
4. Kaziya, Yugawara town, Asigarasimo county, Kanagawa Pref.: In druse of dacite: Analyst, T. SAMESHIMA, loc. cit.
5. 786 m. point of west mountain skirt between Beppu city and Yuhuin town, Ôita Pref.: Phenocryst of hypersthene bearing common hornblende andesite: Analyst, T. KUSHIDA: I. SUNAGAWA, J. Geogr. Tôkyô, 61 (1952), 49.

(78) *Inesite*

δ	3.10 ($\frac{18^\circ\text{C}}{4^\circ\text{C}}$)
SiO ₂	45.64%
TiO ₂	0.00
FeO	0.27
MnO	36.77
MgO	0.68
CaO	8.34
H ₂ O(+)	7.74

H ₂ O(-)	0.08
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Total	99.52
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Innai mine, Okatu county, Akita Pref.: Silver vein: Analyst, J. KITAHARA, M. G. 3 (1950), 229.

(79) *Talc*

	1.	2.	3.	4.	5.
SiO ₂	60.10%	55.64%	45.63%	61.22%	59.85%
Al ₂ O ₃	2.68	3.85	9.39	0.22	1.32
Fe ₂ O ₃	2.45	4.23	9.32	5.12	3.10
MgO	29.62	26.06	25.57	29.49	28.85
CaO	0.04	4.61	2.32	0.20	0.86
Na ₂ O	—	—	0.16	0.04	0.17
K ₂ O	—	—	0.01	0.04	0.05
SO ₃	—	—	1.03	0.21	0.30
Ig. loss	4.60	5.26	7.84	4.55	5.21
Total	99.40	99.65	101.31	101.09	99.71

1, 2. East-Iwai county, Iwaté Pref.: Analyst, S. NAGAI, J. Jap. Ceram. Ass. 54 (1946), 4.

3. Surizawa, East-Iwai county, Iwaté Pref.: Analyst, R. KIYOURA and Y. ITÔ, Ibid. 56 (1948), 134.

4. Zyûnanamagari, Tano county, Gunma Pref.: Analyst, R. KIYOURA and Y. ITÔ, loc. cit.

5. Tategatani, Tano county, Gunma Pref.: Analyst, R. KIYOURA and Y. ITO, loc. cit.

	6.	7.	8.	9.	10.
SiO ₂	55.84%	58.04%	57.41%	57.95%	61.40%
Al ₂ O ₃	0.51	3.40	3.42	3.68	1.44
FeO	5.59	5.16	3.88	1.89	0.06
MgO	29.52	27.30	29.52	27.50	29.93
CaO	3.70	0.68	0.64	3.82	1.00
Ig. loss	4.53	4.88	3.71	4.81	4.51
Total	99.69	99.46	99.54	99.65	96.24

	11.	12.	13.	14.	15.
SiO ₂	59.12%	60.00%	59.25%	62.74%	58.64%
Al ₂ O ₃	0.53	0.48	3.31	0.10	3.91
FeO	0.51	0.64	0.64	0.79	0.25
MgO	32.19	31.09	29.95	31.65	31.24
CaO	0.96	1.42	1.27	0.24	tr.
H ₂ O(+)	—	—	—	4.80	—
H ₂ O(-)	—	—	—	0.20	—
Ig. loss	5.81	6.08	5.09	—	4.80
Total	99.12	99.71	99.78	100.52	99.94

6, 7, 8, 9, 10, 11, 12. Tano county, Gunma Pref.: Analyst, S. NAGAI, Ibid. 54 (1946), 4.

13. Iwata county, Sizuoka Pref.: Analyst, S. NAGAI, loc. cit.

14. Akaisi mine, Sekikawa village, Uma county, Ehime Pref.: Chromite deposit: in dunite:
Analyst, J. KITAHARA, M. G. 4 (1951), 80.
15. Mizuki county, Saga Pref.: Analyst, S. NAGAI, loc. cit.

	16.	17.	18.
SiO ₂	56.74%	54.42%	60.06%
Al ₂ O ₃	1.89	1.17	0.41
Fe ₂ O ₃	5.81	7.24	2.61
MgO	28.85	26.94	31.46
CaO	1.12	2.90	0.32
K ₂ O	—	0.00	0.00
Na ₂ O	—	0.03	0.00
Ig. loss	5.66	7.28	5.30
Total	100.05	99.98	100.10

- 16, 17. Miyamori village, Kamihei county, Iwaté Pref.: Serpentine: Analyst, S. SEKINE:
K. TSUBOYA, Bull. Geol. Surv. Japan, 1 (1950), 150.
1—Miyamori deposit. 2—Iwanehasi deposit.
18. Natuyama, Takôzu village, East-Iwai county, Iwaté Pref.: Serpentine: Analyst, S.
SEKINE: K. TSUBOYA, loc. cit.

(80) *Pyrophyllite*

SiO ₂	63.41%
TiO ₂ +Al ₂ O ₃	29.66
Fe ₂ O ₃	0.43
FeO	0.28
MgO	0.27
CaO	0.03
Na ₂ O	0.31
K ₂ O	0.24
H ₂ O(+)	5.29
H ₂ O(—)	0.56
Total	100.48

Kanekura mine, Hirao village, Simotakai county, Nagano Pref.: In decomposed
andesite: Analyst, T. HATA: H. TAKESHI, J. Jap. Ceram. Ass. 56 (1948), 112.

(81) *Muscovite*

	1.	2.	3.	4.	5.
SiO ₂	42.30%	44.10%	43.20%	42.95%	47.22%
TiO ₂	0.05	0.14	0.19	0.15	0.15
Al ₂ O ₃	33.50	33.04	32.06	34.99	31.33
Fe ₂ O ₃	0.97	2.95	3.21	1.38	2.51
FeO	1.20	0.50	0.64	8.82	1.06
MgO	0.16	0.33	0.16	0.70	1.83
MnO	0.01	0.03	0.04	0.01	—

CaO	0.94	0.36	0.32	0.37	0.36
Na ₂ O	0.96	0.78	0.01	0.12	0.11
K ₂ O	9.31	9.73	9.26	9.10	0.13
Li ₂ O	0.40	0.24	0.55	0.25	—
H ₂ O (+)	6.85	5.90	7.08	6.58	55.2
H ₂ O (—)	4.09	1.64	3.36	3.21	0.57
F	0.37	0.56	0.43	0.15	0.66
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—O= $\frac{1}{2}$ F	101.11	100.30	100.38	100.68	Cl···0.00
	0.16	0.24	0.18	0.06	
<hr/>					
Total	100.95	100.06	100.20	100.57	99.85

- 1, 2, 3, 4. Yamanoo town, Makabé county, Ibaragi Pref.: Pegmatite: Analyst, H. SHIBATA, Sci. Rep. Tōkyō Bunrika Daigaku, Sec. C. 2 (1952), 143, 163.
 5. Phengitic mica: Iisi village, Iisi county, Simané Pref.: Phengitic mica vein in granite: Analyst, MAEDA: S. IWAŌ, Bull. Geol. Surv. Japan, 2 (1951), 110.

(82) *Phlogopite*

SiO ₂	39.02%
TiO ₂	0.45
Al ₂ O ₃	14.38
Fe ₂ O ₃	1.11
FeO	4.10
MnO	0.03
CaO	0.04
MgO	25.02
Na ₂ O	1.14
K ₂ O	8.34
Ig. loss	5.24
H ₂ O (+)	0.78
F	0.00
Cl	0.00
Cr ₂ O ₃	0.07
<hr/>	
Total	99.72

Bessi mine, Nii county, Ehimé Pref.: Phlogopite veins in amphibolite: Analyst, Chem. Lab., Meguro Research Inst., Mitsui Chem. Co.: S. IWAŌ, Bull. Geol. Surv. Japan, 2 (1951), 110.

(83) *Biotite*

	1.	2.	3.	4.	5.	6.
SiO ₂	32.32%	32.40%	29.43%	32.14%	31.33%	29.68%
TiO ₂	0.81	0.53	0.12	1.38	2.16	2.42
Al ₂ O ₃	15.88	15.66	13.64	12.74	14.65	14.13
Fe ₂ O ₃	12.89	11.72	20.98	18.96	20.95	24.38
FeO	20.06	23.73	21.61	14.50	7.91	4.89
MgO	1.21	0.14	0.44	0.88	4.99	4.67

MnO	1.07	1.13	0.33	0.99	0.50	0.48
CaO	1.06	0.87	0.71	1.22	0.26	0.55
Na ₂ O	0.04	0.33	0.12	0.50	0.12	0.69
K ₂ O	7.53	6.57	6.74	6.12	7.39	6.75
Li ₂ O	0.50	0.08	0.28	0.17	—	—
H ₂ O (+)	3.32	4.02	3.12	3.68	7.58	9.37
H ₂ O (—)	2.34	2.71	3.02	3.60	2.13	2.45
F	0.89	0.43	0.14	1.60	—	—
<hr/>						
	99.92	100.84	100.64	100.17		
—O = 1/2 F	0.37	0.18	0.06	0.67		
<hr/>						
Total	99.55	100.66	100.58	99.55	99.96	100.46
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	7.	8.	9.	10.	11.	12.
SiO ₂	31.30%	33.22%	32.32%	32.50%	35.25%	36.52%
TiO ₂	1.98	1.36	0.29	0.28	1.51	0.76
Al ₂ O ₃	12.64	20.25	28.11	25.32	17.24	14.77
Fe ₂ O ₃	25.41	20.86	9.65	11.83	8.12	7.73
FeO	2.29	6.52	8.82	12.05	20.61	28.41
MgO	3.69	2.08	1.86	2.03	0.28	0.62
MnO	0.35	0.89	0.52	0.54	0.89	0.74
CaO	0.96	0.82	1.06	0.94	1.10	0.35
Na ₂ O	1.69	1.32	0.05	1.01	0.27	0.44
K ₂ O	4.53	7.74	7.56	7.51	7.21	7.68
Li ₂ O	—	0.18	0.16	0.28	0.48	0.50
H ₂ O (+)	10.34	2.34	5.70	3.48	2.99	3.62
H ₂ O (—)	5.05	1.24	3.76	2.15	2.78	2.20
F	—	1.50	0.37	0.48	1.67	1.97
<hr/>						
		100.32	100.23	100.43	101.40	100.53
—O = 1/2 F		0.72	0.16	0.24	0.70	0.83
<hr/>						
Total	100.23	99.60	100.07	100.19	100.70	99.70

1, 2, 3, 4. Iisaka village, Daté county, Hukusima Pref.: Pegmatite: Analyst, H. SHIBATA, Sci. Rep. Tōkyō Bunrika Daigaku, Sec. C, 2 (1952), 121, 162.

1—brown. 2, 3, 4—green.

5, 6, 7. Hydrated biotite: Motomiya town, Adati county, Hukusima Pref.: In clay: Analyst, H. YAMADA and K. SUGIURA, J. Jap. Ass. M. P. G. 34 (1950), 124.

8. Itaga village, Kamitoga county, Totigi Pref.: Pegmatite: Analyst, H. SHIBATA, loc. cit.

9, 10. Yamanoo town, Makabé county, Ibaragi Pref.: Pegmatite: Analyst, H. SHIBATA, loc. cit.

10, 12. Hatiman, Naegi town, Ena county, Gihu Pref.: Analyst, H. SHIBATA, loc. cit.

11—in granite. 12—in pegmatite.

(84) *Zinnwaldite*

	1.	2.
SiO ₂	36.51%	38.83%
TiO ₂	0.14	0.12

Al ₂ O ₃	18.37	22.27
Fe ₂ O ₃	10.06	4.40
FeO	12.21	9.07
MgO	0.63	0.38
MnO	1.97	1.66
CaO	0.99	1.14
Na ₂ O	0.18	0.48
K ₂ O	8.99	9.53
Li ₂ O	2.70	2.62
H ₂ O (+)	2.93	2.93
H ₂ O (-)	3.74	3.74
F	4.79	3.82
		103.45
		100.80
-O = $\frac{1}{2}$ F	2.01	1.39
		101.45
		99.41
Total	101.45	99.41

1, 2. Naegi town, Ena county, Gifu Pref.: Pegmatite: Analyst, H. SHIBATA, Sci. Rep. Tōkyō Bunrika Daigaku, Sec. C, 2 (1952), 114, 161.

(85) *Lepidolite*

SiO ₂	55.93%
Al ₂ O ₃	22.34
Fe ₂ O ₃	0.56
MnO	0.48
MgO	0.46
CaO	1.07
Na ₂ O	1.28
K ₂ O	6.02
Li ₂ O	5.19
Rb ₂ O	2.65
Cs ₂ O	tr.
F	3.11
H ₂ O (+)	0.93
H ₂ O (-)	0.69
<hr/>	
	100.71
-O=F ₂	1.31
<hr/>	
Total	99.40

Takasawa mine, Toyama village, Kibi county, Okayama Pref.: Pegmatite: Analyst, Y. UKAI and K. KONDŌ, M. G. 3 (1949), No. 3, 22.

(86) *Protolithionite*

	1.	2.	3.
SiO ₂	31.96%	32.52%	33.60%
TiO ₂	0.08	0.21	0.06

Al ₂ O ₃	17.06	19.07	22.36
Fe ₂ O ₃	7.44	10.08	1.44
FeO	24.12	17.83	28.54
MgO	0.29	0.70	0.10
MnO	0.71	0.21	0.33
CaO	0.48	0.73	0.14
Na ₂ O	0.51	0.21	0.46
K ₂ O	7.41	8.53	8.90
Li ₂ O	0.59	0.39	0.32
P ₂ O ₅	—	—	0.03
H ₂ O (+)	5.66	3.17	1.66
H ₂ O (—)	2.94	3.21	0.08
F	1.59	2.36	0.89
<hr/>			
	100.84	100.91	99.92
—O= $\frac{1}{2}$ F	0.67	0.99	0.37
<hr/>			
Total	100.17	99.92	99.55

1. Hatiman, Naegi town, Ena county, Gihu Pref.: Pegmatite: Analyst, U. SHIBATA, Sci. Rep. Tōkyō Bunrika Daigaku, Sec. C, 2 (1952), 114, 161.
2. Ebisu mine, same locality: Pegmatite: Analyst, ditto: loc. cit.
3. Yagenyama, same locality: Pegmatite: Analyst, ditto: loc. cit.

(87) *Kaolin*

SiO ₂	49.88%
Al ₂ O ₃	34.90
Fe ₂ O ₃	2.42
MgO	0.63
CaO	1.36
Ig. loss	10.01
<hr/>	
Total	100.20

Naegi town, Ena county, Gihu Pref.: Clay bed: Analyst, K. TUKIOKA, G. YAMAGUCHI and S. NAGAI, J. Jap. Ceram. Ass. 56 (1948), 34.

(88) *Nacrite*

SiO ₂	41.52%
TiO ₂	tr.
Al ₂ O ₃	37.51
Fe ₂ O ₃	1.59
FeO	0.92
MgO	0.92
CaO	0.64
H ₂ O (+)	14.54
H ₂ O (—)	0.93
<hr/>	
Total	98.55

Yonago mine, Niré village, Kamitakai county, Nagao Pref.: In druse of diaspore ore:
Analyst, T. HATA: S. IWATU, H. TAKESI and J. KOSAKA, J. Jap. Ass. M. P. G. **33** (1946), 169,

(89) *Hisingerite*

	1.	2.	3.	4.
SiO ₂	34.33%	34.36%	35.61%	27.99%
Fe ₂ O ₃	37.87	45.95	45.47	34.25
FeO	6.52	2.14	1.08	0.58
MgO	1.54	0.77	0.78	none
CaO	1.88	0.99	1.82	2.33
S	1.36	0.38	0.23	—
H ₂ O(+)	8.93	6.86	6.48	>110°C 7.11
H ₂ O(−)	7.54	8.35	8.25	<110°C 27.89
Total	99.97	99.42	99.49	100.11

1. Brown hisingerite: Akagané miné, Ide village, Esasi county, Iwaté Pref.: Contact deposit: Analyst, S. NAGANO: T. TAKEUCHI and M. NAMBU. Bull. Res. Inst. Miner. Dress. and Matall., Tôhoku Univ., **8** (1952), 13.
- 2, 3, 4. Kawayama mine, Kawayama village, Kugo county, Yamaguti Pref.: Pyrrhotite deposit: 2, 3—Analyst, S. NAGANO: loc. cit. 2—brown color. 3—black color. 4—Analyst, T. SUDÔ and T. NAKAMURA, Am. Miner. **37** (1952), 619.

(90) *Sericite*

	1.	2.	3.	4.	5.
SiO ₂	47.67%	48.50%	65.64%	46.03%	51.62%
TiO ₂	—	—	—	0.38	0.17
Al ₂ O ₃	37.95	37.87	21.62	36.19	33.71
Fe ₂ O ₃	0.69	0.20	0.91	0.59	0.06
FeO	—	0.45	—	—	0.22
MnO	—	—	—	tr.	—
MgO	0.15	0.27	0.40	tr.	—
CaO	0.06	tr.	0.72	0.43	tr.
NaO	0.81	0.25	0.78	0.72	0.70
K ₂ O	6.56	5.66	7.77	9.66	4.43
H ₂ O(+)	} 5.95	5.03	Ig. loss 2.44	Ig. loss 5.65	5.64
H ₂ O(−)		0.81	0.54	—	2.52
Total	99.84	99.04	100.82	99.65	99.23

1. Kabuto, Omata village, Ônuma county, Hukusima Pref.: Analyst, T. KONDÔ and T. SHIMOHIRA, J. Jap. Ceram. Ass. **60** (1952), 134.
2. Asio mine, Kami-Toga county, Totigi Pref.: "Kazika" deposit: Analyst, SUDÔ, J. Geol. Soc. Japan, **53** (1947), 8.
3. Hitati mine, Hitati city, Ibaragi Pref.: Sericite schist: Analyst, S. HONDA.
4. Hurikusa village, North-Sidara county, Aiti Pref.: Sericitized liparite: Analyst, K. MATU-MOTO, Rep. Res. Inst. Asahi Glass Co., **1** (1951), 292.
5. Battariyama, Kokuhu village, Nomi county, Isikawa Pref.: Micaceous mineral in clay:

Analyst, T. HATA: H. TAKESHI, J. Ceram. Jap. Ass. 57 (1949), 103.

	6.	7.	8.	9.	10.
SiO ₂	47.85%	46.88%	45.76%	46.32%	45.27%
TiO ₂	0.67	0.38	0.32	0.03	0.47
Al ₂ O ₃	34.81	36.06	36.82	28.79	33.20
Fe ₂ O ₃	0.71	0.62	1.23	5.74	3.44
FeO	—	—	0.16	1.50	1.57
MnO	—	—	—	tr.	none
MgO	0.42	0.46	0.21	tr.	tr.
CaO	0.68	0.16	0.96	1.09	0.68
Na ₂ O	0.61	0.12	1.92	none	0.46
K ₂ O	8.99	9.02	6.55	9.31	7.36
SO ₃	—	—	—	0.89	none
H ₂ O(+)	5.11	5.92	5.51	5.81	6.26
H O(—)	—	—	0.68	0.35	0.71
Total	99.85	99.63	100.12	99.83	100.14

6, 7, 8. Ohara, Kawakudari village, Yuti county, Simané Pref.: Sericite vein in pottery stone, which is derived from quartz-diorite-porphyrityte: 6, 7...Analyst, K. MATUMOTO, Rep. Res. Inst. Asahi Glass Co., 1 (1951), 292. 6...white. 7...yellow. 8...Analyst, H. TAKESHI, J. Ceram. Ass. Japan, 57 (1949), 103; S. YAMANOUCHI, T. KONDO and T. SHIMOHARA, Ibid. 60 (1952), 134.

9, 10, 11. Unnan mine, Moritani village, Iisi village, Iisi county, Simané Pref.: Clay mica deposit in altered granitic rock: Analyst, G. MINATO, Sci. Pap. Coll. Gen. Edu. Univ. Tōkyō, 2 (1952), 195-196. 9...11...Iron-Sericite. 11...Magnesian-Sericite.

	11.	12.	13
SiO ₂	45.34%	45.53%	51.49%
TiO ₂	0.19	0.72	0.05
Al ₂ O ₃	31.36	26.01	31.75
Fe ₂ O ₃	0.46	5.59	0.39
FeO	1.57	1.45	1.04
MnO	0.09	tr.	tr.
MgO	2.74	2.96	0.11
CaO	0.36	tr.	0.29
NiO	—	tr.	—
Na ₂ O	1.06	—	1.42
K ₂ O	9.12	—	7.34
Cr ₂ O ₃	—	2.25	—
SO ₃	none	—	—
H ₂ O(+)	6.12	7.84	6.17
H ₂ O(—)	1.13	0.91	0.85
F	—	—	0.22
Total	99.63	100.26	100.90

12. Chrome-sericite: Toné, Muramatu village, West-Sonoki county, Nagasaki Pref.: In crystalline schist: Analyst, H. MINATO, Sericite Resources and its Applications. (1951) Table 7.

13. Amakusa, Amakusa county, Kumamoto Pref.: Micaceous mineral in pottery stone:
Analyst, T. HARA: H. TAKESHI, J. Jap. Ceram. Ass. 55 (1947), 117; 57 (1949), 103.

(91) *Ripidolite (Ferromagnesian Prochlorite)*

SiO ₂	25.2%
Al ₂ O ₃	22.4
Fe ₂ O ₃	2.4
FeO	22.1
MgO	15.7
H ₂ O(+)	11.7
H ₂ O(-)	0.4
<hr/>	
Total	99.6

Budô mine, Siono village, Iwahuné county, Niigata Pref.: In propylite: Analyst, T. SUDÔ, J. Jap. Ass. M. P. G., 35 (1951), 125.

(92) *Kämmererite*

SiO ₂	33.85%
Al ₂ O ₃	14.15
Fe ₂ O ₃	0.58
FeO	2.18
MgO	33.27
Cr ₂ O ₃	3.90
H ₂ O(+)	12.24
<hr/>	
Total	100.17

Dainiti mine, South-Saku county, Nagano Pref.: Chromite deposit: Analyst, J. KITA-HARA, M. G. 1 (1947), 100, 260.

(93) *Aphrosiderite*

SiO ₂	28.00%
Al ₂ O ₃	23.84
Fe ₂ O ₃	2.38
FeO	14.56
MgO	18.55
CaO	1.28
Ig. loss	11.26
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Total	99.87

Wagasennin mine, Waga county, Iwate Pref.: Hematite deposit: Analyst, A. TAKAHATAKE, J. Geol. Soc. Japan, 54 (1948), 179.

(94) *Serpentine*

SiO ₂	41.45%
Al ₂ O ₃	0.17
Fe ₂ O ₃	0.36
FeO	16.90
MgO	37.93
H ₂ O (+)	13.54
<hr/>	
Total	100.35

Ôhinata mine, Ôhinata village, South-Saku county, Nagano Pref.: Chromite deposit:
Analyst, J. KITAHARA, M. G. 1 (1947), 260.

(95) *Chrysotile and Picrolite*

	1.	2.
SiO ₂	40.52%	40.99%
Al ₂ O ₃	0.32	1.33
Fe ₂ O ₃	1.73	1.49
FeO	0.99	2.74
MgO	41.95	39.77
CaO	0.11	0.18
H ₂ O (+)	13.25	12.89
H ₂ O (-)	1.47	0.95
<hr/>		
Total	100.34	100.34

1. Chrysotile: Yamabé, Sorati county, Isikari Prov. Hokkaidô: Asbestos deposit: Analyst, T. INOUE: J. SUZUKI and T. INOUE, J. Geol. Soc. Japan, 54 (1948), 195.
2. Picrolite: same locality of 1.: Asbestos deposit: Analyst, T. INOUE: loc. cit.

(96) *Sepiolite*

	1.	2.
SiO ₂	49.42%	48.57%
TiO ₂	none	—
Al ₂ O ₃	tr.	—
Fe ₂ O ₃	0.03	} 0.38
FeO	0.42	
MnO	none	none
MgO	22.03	21.81
CaO	tr.	0.18
Na ₂ O }	0.12	—
K ₂ O }		
NiO	0.06	—
H ₂ O (+)	9.99	9.65
H ₂ O (-)	18.49	19.18
<hr/>		
Total	100.59	100.77

- 1, 2. Dondon, Wakita village, Kuraté county, Hukuoka Pref.: Serpentine: Analyst, K. MURAOKA: Y. OKAMOTO communicated.

(97) *Deweylite*

	1.	2.
δ	1.94 (5°C)	—
SiO ₂	41.1%	41.49%
Al ₂ O ₃	2.9	2.87
Fe ₂ O ₃	tr.	tr.
FeO	3.2	3.21
MgO	30.6	30.63
CaO	1.2	1.20
Ig. loss	15.7	15.68
H ₂ O(—)	7.1	7.11
Total	101.8	101.79

1. Yagiyama, Tinzei village, Kaho county, Hukuoka Pref.: Small fissures in serpentine: Analyst, H. MINATO: Y. OKAMOTO and H. MINATO, M. G., 1 (1946) 6; T. SUDÔ and H. MINATO, Jap. J. Geol. Geogr. 21 (1949), 12.
 2. Same locality: Analyst, H. MINATO: Y. OKAMOTO, M. G. 2 (1949), 172.

(98) *Montmorillonite*

SiO ₂	46.30%
Al ₂ O ₃	18.47
Fe ₂ O ₃	6.03
FeO	0.45
MgO	3.06
CaO	2.16
Na ₂ O	1.03
K ₂ O	0.35
H ₂ O(+)	6.83
H ₃ O(—)	14.50
Total	99.18

Iron-Montmorillonite: Hanaoka mine, North-Akita county, Akita Pref.: Black ore deposit: Analyst, T. SUDÔ, Proc. Japan Acad. 26 (1950), 92.

(99) *Halloysite*

SiO ₂	44.18%
Al ₂ O ₃	39.08
Fe ₂ O ₃	0.89
MgO	0.05
CaO	0.10
H ₂ O(+)	14.09

H ₂ O(—)	2.40
Total	100.00

Zaô mine, Nakagawa village, South-Murayama county, Yamagata Pref. : Sulphur deposit :
Analyst, T. SUDÔ, C. KAWASHIMA and H. TASAKI, J. Jap. Ceram. Ass. 58 (1950), 6.

(100) *Hydromica*

SiO ₂	44.45%
TiO ₂	tr.
Al ₂ O ₃	36.00
Fe ₂ O ₃	0.07
FeO	1.24
MnO	tr.
MgO	0.82
CaO	0.25
Na ₂ O	0.87
K ₂ O	5.77
H ₂ O(+)	9.56
H ₂ O(—)	2.00
Total	101.03

Motomiya town, Adati county, Hukusima Pref. : In clay : Analyst, T. HATA : K. SUGI-
URA, J. Jap. Ceram. Ass. 57 (1949), 117.

(101) *Petalite*

SiO ₂	74.36%
TiO ₂	0.03
Al ₂ O ₃	19.04
Fe ₂ O ₃	tr.
FeO	tr.
MnO	0.01
MgO	0.33
CaO	0.09
Na ₂ O	0.71
K O	0.22
Li ₂ O	3.46
HO ₂ (+)	1.46
H ₂ O(—)	0.50
Total	100.62

Altered Petalite : Nagatori, Hukuoka city, Hukuoka Pref. : Pegmatite : Analyst, N.
SAITÔ and N. KOKUBU : Y. OKAMOTO, M. G. 2 (1949), 176. ; N. SAITÔ N. KOKUBU and H.
KAKIHARA, J. Chem. Soc. Japan, 71 (1950), 131.

(102) *Adularia*

δ	2.585 ($^{11^{\circ}\text{C}}$ $^{4^{\circ}\text{C}}$)
SiO ₂	61.15%
Al ₂ O ₃	20.58
Fe ₂ O ₃	0.29
CaO	0.16
BaO	3.36
Na ₂ O	0.41
K ₂ O	13.87
Ig. loss	0.30
Total	100.12

Barium-Adularia: Sunakozawa mine, Tukigawa village, Iwaté county, Iwaté Pref.:
Hematite deposit: Analyst, H. SHIRÔZU: T. YOSHIMURA and H. SHIRÔZU, J. Geol. Soc.
Japan, 54 (1948), 122.

(103) *Perthite*

	1.	2.
SiO ₂	63.80%	65.12%
TiO ₂	0.01	—
Al ₂ O ₃	19.33	18.62
Fe ₂ O ₃	0.13	0.70
FeO	0.08	—
MnO	0.00	—
MgO	0.07	0.33
CaO	0.56	0.03
Na ₂ O	2.55	5.23
K ₂ O	12.08	9.83
H ₂ O (+)	0.40	Ig. loss 0.54
H ₂ O (—)	0.35	—
Total	99.36	100.40

1. Miyamori village, Kami-Hei county, Iwaté Pref.: Pegmatite: Analyst, K. YAGI, M. G.
3 (1950), 186.
2. Kurahasi, Kamitakara village, Yosiki county, Gifu Pref.: Pegmatite: Analyst, S. SEKINE
and S. YAMADA: T. ANSAI, Bull. Geol. Surv. Japan, 1 (1950), 16.

(104) *Albite*

	1.	2.
SiO ₂	65.66%	63.83%
Al ₂ O ₃	20.90	21.94
Fe ₂ O ₃	0.70	0.34
MgO	0.39	tr.
CaO	0.03	3.63

Na ₂ O	12.34	10.21
K ₂ O	0.06	0.09
Ig. loss	0.50	0.69
Total	100.58	100.73

1. Kurahasi, Kamitakara village, Yosiki county, Gifu Prof.: Pegmatite: Analyst, S. SEKINE and S. YAMADA: T. ANSAI, Bull. Geol. Surv. Japan, **1** (1950), 16.
2. Kotaki village, West-Kubiki county, Niigata Pref.: Albite-jadeite rock: Analyst, K. MATUMOTO, Rep. Res. Inst. Asahi Glass Co., **2** (1952), 100.

(105) *Bytownite*

	1.	2.
SiO ₂	46.04%	48.92%
TiO ₂	0.06	0.33
Al ₂ O ₃	34.36	31.48
Fe ₂ O ₃	0.88	0.52
FeO	0.00	0.65
MnO	0.00	0.01
MgO	0.05	0.43
CaO	17.92	15.08
Na ₂ O	1.18	1.73
K ₂ O	0.09	0.32
P ₂ O ₅	—	0.08
H ₂ O(+)	—	1.07
H ₂ O(−)	0.20	0.24
Total	100.78	100.86

1. Syōwa-sinzan, Usu volcano, Abuta town, Abuta county, Iburi Prov. Hokkaidō: Analyst, K. YAGI, J. Jap. Ass. M. P. G. **33** (1949), 13.
2. Tukuba mountain, Niihari county, Ibaragi Pref.: Constituent of plagioclase: Analyst, K. YAGI, Kagaku (Science), **17** (1947), 116.

(106) *Danburite*

	1.	2.	3.	4.	5.
SiO ₂	48.2%	48.5%	48.41%	48.67%	48.51%
Al ₂ O ₃	} 0.7	} 12.1	0.14	2.01	4.12
Fe ₂ O ₃			0.32	1.13	2.15
MnO	—	0	—	—	—
MgO	0.1	4.1	0.10	0.30	0.25
CaO	22.3	32.2	22.34	21.47	21.01
B ₂ O ₃	28.6	tr.	28.62	25.23	23.14
H ₂ O(+)	—	—	0.42	1.57	1.55
Total	99.9	96.9	100.35	100.38	100.73

- 1, 2, 3, 4. Toroku mine, Iwato village, West-Usuki county, Miyazaki Pref.: Contact deposit: Analyst, T. TOMISAKA, J. Geol. Soc. Japan, **54** (1948), 114; J. Fac. Sci., Hok-

kaidô Univ. Ser. IV, 7 (1951), 391. 1...transparent part of the crystal. 2...white layered part of the crystal...in the former report. 3...transparent part of the crystal. 4...white clouded part of the crystal. 5...ashengray part of the crystal...in the latter report.

(107) *Datolite*

δ	2.996 $\pm$ 0.002
SiO ₂	37.52%
Al ₂ O ₃	0.38
FeO	0.31
MgO	0.65
CaO	32.44
B ₂ O ₃	21.53
Na ₂ O	0.13
K ₂ O	0.12
H ₂ O(+)	5.70
H ₂ O(-)	0.20
Total	99.89

Iwato copper mine, Iwato village, West-Usuki county, Miyazaki Pref.: Contact deposit :
Analyst, K. ISONO: Z. HARADA, J. Fac. Sci., Hokkaido Univ. Ser. IV, 7 (1950), 222.

(108) *Gadolinite*

δ	4.5 (25°C)	4.341 ($\frac{20}{4}^{\circ}\text{C}$)
SiO ₂	23.09%	23.69%
TiO ₂	0.07	—
Al ₂ O ₃	0.62	1.66
Fe ₂ O ₃	1.83	5.20
FeO	12.21	8.18
MnO	0.32	4.04
MgO	0.31	2.15
CaO	1.16	0.40
ZrO ₂	0.03	—
ThO ₂	0.25	0.26
SnO	0.31	—
BeO	9.21	9.45
Ce ₂ O ₃	0.41	—
$\Sigma\text{Ce}_2\text{O}_3$	2.21	Rare Earths 44.20
$\Sigma\text{Y}_2\text{O}_3$	48.05	—
Na ₂ O	} 0.02	—
K ₂ O		—
Ig. loss	0.45	H ₂ O 1.27
H ₂ O(-)	0.13	—
Total	100.68	100.50

1. Takehinata, Nôsen village, West-Yamanashi county, Yamanashi Pref.: Pegmatite: Analyst,

K. NAGASHIMA, J. Chem. Soc. Japan, 73 (1952), 602.

2. Hiradani, Kido village, Siga county, Siga Pref.: Pegmatite: Analyst, B. HIGAMI, M. G. 1 (1947), 57.

(109) *Stilbite*

	1.	2.
SiO ₂	60.78%	59.49%
Al ₂ O ₃	16.04	15.91
Fe ₂ O ₃	1.57	0.38
FeO	0.21	0.20
MgO	0.68	none
CaO	4.90	9.19
Na ₂ O	0.00	none
K ₂ O	0.15	none
H ₂ O(+)	12.15	13.49
H ₂ O(-)	3.65	2.76
Total	100.72	100.77

1. Watari, Tuyazaki town, Munakata county, Hukuoka Pref.: In conglomerate: Analyst, H. MINATO: Y. OKAMOTO, M. G. 3 (1949), 171.
2. Sôtan, Saidôsyô village, Tagawa county, Hukuoka Pref.: Analyst, H. MINATO: loc. cit.

(110) *Yugawaralite** (New mineral)

	1.	2.
SiO ₂	57.94%	58.44%
Al ₂ O ₃	17.65	17.31
Fe ₂ O ₃	0.35	0.36
CaO	9.79	9.75
MgO	0.86	0.42
MnO	—	—
Na ₂ O	0.38	0.36
K ₂ O	0.41	0.12
H ₂ O(+)	10.70	10.55
H ₂ O(-)	1.80	2.03
Total	99.88	99.34

- 1, 2. Yugawaralite (New mineral): „Hudô-no-taki” Fall, Okuyugawara Hot spring, Asigara-simo county, Kanagawa Pref.: Network vein in andesite and andesite tuff: 1... Analyst, A. HAYASHI. 2... Analyst, N. SHIMODA: K. SAKURAI and A. HAYASHI, Sci. Rep. Yokohama Nat. Univ., Ser. II, No. 1 (1952), 72.

* Named after its locality.

Monoclinic, $a : b : c = 0.9748 : 1 : 1.0792$, $\beta = 68^\circ 28'$. Transparent, colourless or semitransparent white, strong vitreous luster. Cleavage imperfect on (010). $H = 4.5$ sp. gr. = 2.20, Opt. (-), Opt. pl. // (010). $2V = 56^\circ - 89^\circ$, $\alpha = 1.495$, $\beta = 1.497$, $\gamma = 1.504$. $\text{Ca}_1\text{Al}_7\text{Si}_{20}\text{O}_{54} \cdot 14\text{H}_2\text{O}$. Not attacked by HCl. $a_0 = 13.26 \text{ \AA}$, $b_0 = 13.69 \text{ \AA}$, $c_0 = 9.37 \text{ \AA}$, $\beta = 68^\circ 28'$.

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