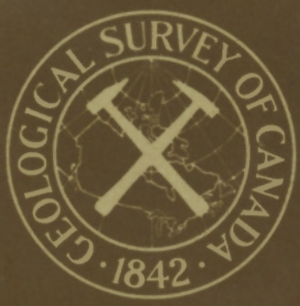


60-4

*A. M. Hallia*



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GEOLOGICAL  
SURVEY  
OF  
CANADA

Paper 60 - 4

DEPARTMENT OF MINES  
AND TECHNICAL SURVEYS

CATALOGUE OF X-RAY DIFFRACTION PATTERNS  
AND SPECIMEN MOUNTS ON FILE AT  
THE GEOLOGICAL SURVEY OF CANADA

Ann P. Sabina and R. J. Trail



CANADA

G E O L O G I C A L S U R V E Y  
O F C A N A D A

PAPER 60-4

CATALOGUE OF X-RAY DIFFRACTION PATTERNS  
AND SPECIMEN MOUNTS ON FILE AT THE  
GEOLOGICAL SURVEY OF CANADA

By

Ann P. Sabina and R. J. Traill

D E P A R T M E N T O F  
M I N E S A N D T E C H N I C A L S U R V E Y S  
C A N A D A

CATALOGUE OF X-RAY DIFFRACTION PATTERNS AND  
SPECIMEN MOUNTS ON FILE AT THE  
GEOLOGICAL SURVEY OF CANADA

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A reference file of approximately 650 X-ray diffraction patterns of minerals has been established in the X-ray laboratory, Geological Survey of Canada. Presented in this paper is a list of the patterns on file as of April 1, 1959, followed by tabulations of the measured spacings and estimated intensities of those patterns for which no published X-ray data were available for cross-checking. The specimen mounts prepared for the photographs are retained on permanent file and are available for loan to similar Canadian X-ray laboratories. Persons wishing to borrow specimen mounts should write to: The Director, Geological Survey of Canada, Department of Mines and Technical Surveys, Ottawa, Canada.

The patterns are listed alphabetically by mineral names. Where several varieties of a mineral are represented, they are listed under the group name. The chemical composition and location or source of the material are indicated. Literature references are given for minerals whose patterns have been checked and found to be in agreement with published X-ray data. Specimen mounts are available for all patterns unless otherwise stated.

Most of the minerals used for this compilation were obtained from a collection, classified according to Dana's system, which has been accumulated by the Geological Survey of Canada. The specimens were acquired from museums, universities, commercial establishments, and field collections by officers of the Geological Survey. Some specimens, mounted and ready for photographing were supplied by the United States Geological Survey, the United Kingdom Geological Survey, Harvard University, Queen's University, and the Mines Branch of this Department.

The mineral fragments used to prepare the X-ray mounts were carefully selected under a microscope to ensure purity, then ground to a fine powder in an agate mortar, and mounted on the tip of a thin vaseline-coated glass rod. In a few cases the mounts were made by rolling the powdered material with collodion into the shape of a thin rod, and allowing the mixture to harden. The specimen-bearing rods were attached with wax to aluminum rods designed to fit a Philips Debye-Scherrer X-ray powder camera. Unless otherwise indicated, all reference films were exposed in a 57.54 -mm -diameter camera using copper radiation and a nickel filter. All d-spacings are given in angstrom units and are not corrected for film shrinkage except where cell-edge determinations have been made.

## ABBREVIATIONS USED IN REFERENCES

- Am. Min. -- The American Mineralogist (Mineralogical Society of America).
- Am. J. Sci. -- The American Journal of Science
- Anal. Chem. -- Analytical Chemistry (American Chemical Society).
- Ann. Acad. Sci. Fennicae -- Annales Academiae Scientiarum Fennicae.
- Arch. Min. Polish Acad. Geol. -- Polska Akademia Nauk Komitet Geologiczny.
- Arkiv Min. Geol. -- Arkiv för Mineralogi och Geologi, Stockholm; also Arkiv för Kemi, Mineralogi och Geologi.
- A. S. T. M. -- Alphabetical and Numerical Indexes of X-ray Diffraction Patterns, American Society for Testing Materials.
- Aust. J. Sci. -- Australian Journal of Science (Australian and New Zealand Association for the Advancement of Science).
- Bull. Comm. Geol. Finlande -- Bulletin de la Commission géologique de Finlande.
- Bull. Inst. Roy. Sci. Nat. Belgique -- Bulletin d'Institut royal des Sciences naturelles de Belgique.
- Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci. -- Bulletin du Musée et Laboratoire Minéralogique et Géologique de la Faculté des Sciences de Lisbonne.
- Bull. Soc. Belge Geol. -- Bulletin de la Société belge de géologie, de paléontologie et d'hydrologie, Bruxelles.
- Bull. Soc. Franc. Min. Crist. -- Bulletin de la Société française de Minéralogie et de Cristallographie.
- Can. Min. -- The Canadian Mineralogist (Journal of the Mineralogical Association of Canada).
- Chemie der Erde -- Chemie der Erde, Jena.
- Doklady Acad. Sci. U.S.S.R. -- Doklady Akademii Nauk SSSR.
- Econ. Geol. -- Economic Geology and the Bulletin of the Society of Economic Geologists.
- Estudios Geol. Madrid -- Estudios geológicos, Instituto de Investigaciones Geológicas "Lucas Mallada", Madrid.
- Heidelberger Beitr. Min. Petrog. -- Beiträge zur Mineralogie und Petrographie, Heidelberg.
- Inst. Min. Geo. Cryst. SSSR. -- Akademiya Nauk SSSR, Institut Mineralogii, Geokhimmii i Kristalloghimmii Redkikh Elementov, Trudy.
- J. Chem. Soc. -- Journal of the Chemical Society, London.
- J. Geol. -- The Journal of Geology, University of Chicago.
- J. Ind. Eng. Chem. -- Journal of Industrial and Engineering Chemistry (American Chemical Society).
- J. Res. Nat. Bur. Stds. -- Journal of Research of the National Bureau of Standards.
- Kyoto Univ. Coll. Sci. Mem. -- Memoirs: Kyoto Imperial University College of Science.
- Min. Sbornik, Lvov. -- Lvovskoe Geologicheskoe Obshestvo Mineralogicheskii Sbornik.
- Min. Mag. -- The Mineralogical Magazine and Journal of the Mineralogical Society, London.
- Neues Jahr. Min. Abhandl. -- Neues Jahrbuch für Mineralogie Abhandlungen.

- Neues Jahr. Min. Monat. -- Neues Jahrbuch für Mineralogie Monatshefte.
- Norsk. Geol. Tidssk. -- Norsk Geologisk Tidsskrift, Oslo.
- Proc. All Sov. Min. Soc. -- Zapiski Vsesoyuznogo Mineralogicheskogo Obshestva.
- Proc. Indian Acad. Sci. -- Proceedings of the Indian Academy of Sciences.
- Rend. Soc. Min. Italiana -- Rendiconti della Societa Mineralogica Italiana.
- Science -- Science (American Association for the Advancement of Science).
- Std. X-ray Diff. Patterns, Nat. Bur. Stds. -- Standard X-ray Diffraction Powder Patterns, National Bureau of Standards Circular 539, United States Department of Commerce, Washington.
- Tokyo Univ. Coll. Ed. -- Scientific Papers of the College of General Education, University of Tokyo.
- Trans. Inst. Geol. Ore Dep. Petr. Min. Geochem. SSSR. -- Akademiya Nauk SSSR, Trudy Instituta Geologii Rudnykh Mestorosdenii, Petrografii, Mineralogii i Geokhimii.
- Trans. Roy. Soc. Canada -- Transactions of the Royal Society of Canada.
- Tscher. Min. Petr. Mitt. -- (Tschermak) Mineralogische und Petrographische Mitteilungen.
- Univ. Tor. Stud., Geol. Ser. -- University of Toronto Studies, Geological Series.
- U.S.A.E.C. RME 3110 -- United States Atomic Energy Commission Annual Report for June 30 to April 1, 1955, Part II, RME 3110.
- U.S.G.S. Bull. 1036-G -- X-ray Powder Data for Uranium and Thorium Minerals; United States Geological Survey Bulletin 1036-G.
- U.S. Bur. Mines, Rept. -- Bureau of Mines Report of Investigations, No. 5150, United States Department of the Interior.
- Verh. K. Vlaamsche Acad. Wetensch. Belgie -- Verhandelingen van de Koninklijke Vlaamsche Academie van wetenschappen, Belgie.
- X-ray Tables for the Determination of Colloidal Minerals of Soils, U.S.S.R. Soil Institute -- Rentgenograficheskie Tablitsy dlya Opredeleniya Kolloidnykh Mineralov Pochv. Akademiya Nauk Soyuza SSR, Pochvenny Institut.
- Zeits. Krist. -- Zeitschrift für Kristallographie, Mineralogie und Petrographie.

#### REFERENCES FOR CHEMICAL FORMULAE

- Fron del, Clifford, Riska, Daphne, and Fron del, Judith Weiss  
1956: X-ray Powder Data for Uranium and Thorium Minerals; Geological Survey Bulletin 1036-G, United States Department of the Interior, Washington.
- Hey, Max H.  
1955: An Index of Mineral Species and Varieties Arranged Chemically; Jarrold and Sons Limited, Norwich.
- Palache, Charles, Berman, Harry, and Fron del, Clifford  
1944: Danas System of Mineralogy, Seventh edition; John Wiley and Sons, vol. 1 (1944), vol. 2 (1951).

## ACANTHITE



Loc.: Freiberg, Saxony.

Ref.: Ramsdell, Lewis S.: Am. Min., 28, 1945, p. 413.

ACMITE -- See Pyroxene Group

ACTINOLITE -- See Amphibole Group

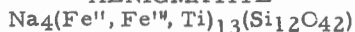
## ADAMITE



Loc.: Tsumeb, South West Africa.

Ref.: Guillemin, C.: Bull. Soc. Franc. Min. Crist., vol. 75, 1952, p. 93.

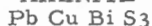
## AENIGMATITE



Loc.: Naujakasuk, Ilimaussag, Southern Greenland.

d	I	d	I	d	I
7.83	3	2.54	10	1.959	1
4.82	2	2.45	1	1.910	1
4.15	4	2.41	4	1.728	1b
3.71	3	2.35	1	1.679	1
3.49	2	2.31	2	1.627	4
3.14	8	2.18	1	1.562	16
2.93	5	2.12	6	1.517	2
2.75	1	2.07	3	1.497	4
2.70	8	2.01	3	1.464	4

## AIKINITE



Loc.: Berezon, Ural Mountains, U.S.S.R.

Ref.: Peacock, M.A.: Univ. Tor. Stud., Geol. Ser., No. 42, 1942, pp. 63-69.

AKERMANITE  
Mg Ca<sub>2</sub> Si<sub>2</sub>O<sub>7</sub>

Loc.: Oka, Quebec, Canada.

Ref.: Ervin, Guy Jr., and Osborn, E.F.: Am. Min., 34, 1949,  
p. 720.

ALABANDITE  
Mn S

Loc.: Nagyac, Transylvania.

Ref.: Zhak, Lyubor: Min. Sbornik, Lvov, No. 10, 1956, p. 223.

ALBITE -- See Plagioclase Feldspar Group

ALGODONITE  
Cu<sub>3</sub> As

Loc.: Ahmeek Mine, Michigan, U.S.A.

Ref.: A.S.T.M., No. 2 - 1266.

ALLACTITE  
Mn<sub>7</sub> (AsO<sub>4</sub>)<sub>2</sub>(OH)<sub>8</sub>

Loc.: Nordmarken, Sweden.

d	I	d	I	d	I
6.07	2	2.91	6	1.890	2
5.08	4	2.67	5	1.791	4
4.62	4	2.50	5	1.762	2
4.14	3	2.40	2	1.670	4
3.71	9	2.31	2	1.646	2
3.43	3	2.26	1	1.573	3
3.24	5	2.15	2	1.535	3
3.05	10	1.995	2	1.452	3

ALLANITE  
(Ca, Fe<sup>II</sup>)<sub>2</sub>(R, Al, Fe<sup>III</sup>)<sub>3</sub> Si<sub>3</sub>O<sub>12</sub>OH

Loc.: (1) Pieds des Monts, Quebec, Canada.

(2) Amherst County, Virginia, U.S.A.

Ref.: Kauffman, A.J. Jr., and Jaffe, W.H.: Am. Min., 31, 1946,  
p. 584.

Remarks: Material was heated 5 minutes in vacuum, at 1,000°C.

ALLEMONTITE  
As Sb

Loc.: Allemont, France.

d	I	d	I	d	I
3.58	4	1.767	1	1.260	1
3.51	2	1.753	2	1.201	3
3.29	3	1.653	4	1.184	3
2.91	10	1.558	2	1.159	3b
2.76	6	1.465	3	1.124	2b
2.13	5	1.413	2	1.106	2b
2.05	3	1.387	1	1.087	1
2.01	4	1.372	1	1.066	1
1.88	3	1.355	1	1.033	3
1.83	3	1.342	3		
1.797	2	1.280	5		

ALMANDITE -- See Garnet Group

ALTAITE  
Pb Te

Loc.: Long Lake, Yale, British Columbia, Canada.  
Ref.: Thompson, R.M.: Am. Min., 34, 1949, p. 361.

ALUNITE  
 $K Al_3 (SO_4)_2(OH)_6$

Loc.: Muszay, Hungary.  
Ref.: Taylor, Duncan, and Bassett, Henry: J. Chem. Soc., 1952,  
p. 4442.

ALUNOGEN  
 $Al_2 (SO_4)_3 \cdot 18H_2O$

Loc.: Springhill, Cumberland County, Nova Scotia, Canada.  
Ref.: Gabinet, M.P.: Min. Sbornik, Lvov., No. 11, 1957, p. 134.

AMBLYGONITE  
(Li, Na) Al PO<sub>4</sub> (F, OH)

Loc.: Keystone, South Dakota, U.S.A.

Ref.: A.S.T.M., No. 8-102.

AMMONIA ALUM (Tschermitite)  
NH<sub>4</sub> Al (SO<sub>4</sub>)<sub>2</sub> · 12H<sub>2</sub>O

Loc.: Wamsutter, Wyoming.

d	I	d	I	d	I
7.0	5	2.61	3	1.801	1
6.13	2	2.50	1	1.707	2
5.47	6	2.40	1	1.634	2
4.98	3	2.35	3	1.613	
4.32	10	2.28	1	1.588	2
4.07	8	2.229	2	1.554	1
3.68	6	2.130	2	1.506	1
3.26	10	2.067	2	1.482	2
3.05	4	2.036	2	1.445	1
2.96	3	2.001	2	1.418	1
2.88	3	1.981	2	1.390	1/2
2.81	5	1.933	5	1.358	2
2.74	3	1.870	2		
2.67	3	1.822	1		

AMMONIOJAROSITE  
(NH<sub>4</sub>) Fe<sub>3</sub> (SO<sub>4</sub>)<sub>2</sub> (OH)<sub>6</sub>

Loc.: Wamsutter, Wyoming.

d	I	d	I	d	I
5.83	3	2.90	1	1.82	4
5.10	6	2.56	2	1.73	1
3.65	1	2.27	2		
3.10	10	1.99	4		

AMPANGABEITE  
(Y, Er, U, Ca, Th)<sub>2</sub> (Cb, Ta, Fe, Ti)<sub>7</sub> O<sub>18</sub>(?)

Loc.: Tritriva, Madagascar.

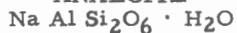
Remarks: Specimen was heated 5 minutes in vacuum at 1,000°C.

d	I	d	I	d	I
3.98	4	2.50	7	1.70	5
3.70	3	2.41	1	1.68	4
3.46	2	2.31	1	1.64	1b
3.28	3	2.20	1	1.605	2
3.20	10	2.06	2	1.578	
3.02	5	1.99	1	1.515	1
2.77	2	1.91	1	1.486	1
2.62	1	1.85	8	1.359	1b

### AMPHIBOLE GROUP

- Varities:
- Actinolite; Dorchester, Quebec, Canada.
  - Anthophyllite; Burlington, Connecticut, U.S.A.
  - Arfvedsonite; Montreal, Quebec, Canada.
  - Crocidolite; Ringwood, New Jersey, U.S.A.
  - Edenite; Grenville, Quebec, Canada.
  - Glaucophanes; Uto, Sweden.
  - Hexagonite; St. Lawrence County, New York, U.S.A.
  - Hornblende; Bilin, Bohemia.
  - Kaersutite; Umanak District, Greenland.
  - Mountain Cork; Buckingham, Ottawa County, Quebec.
  - Nephrite; New Zealand.
  - Richterite; Langban, Sweden.
  - Tremolite; Nordmark, Sweden.
  - Uralite; Ottawa County, Quebec, Canada.
  - Winchite; Jhabua State, India.

### ANALCITE



- Loc.: Crisis Creek, British Columbia, Canada.  
 Ref.: McConnell, Duncan: Am. Min., 37, 1952, p. 614.

ANATASE  
TiO<sub>2</sub>

Loc.: Travetsch, Switzerland.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 100.

ANCYLITE  
(Ce, La)<sub>4</sub>(Sr, Ca)<sub>3</sub>(CO<sub>3</sub>)<sub>7</sub>(OH)<sub>4</sub> · 3H<sub>2</sub>O

Loc.: Narsarsuk, Greenland.

d	I	d	I	d	I
5.57	5	2.02	7	1.495	3
4.34	10	1.953	5	1.459	1
3.71	10	1.908	1	1.430	2
3.36	4	1.855	3	1.390	2
2.96	10	1.829	3	1.321	5
2.78	2	1.743	3	1.287	1
2.66	4	1.718	2	1.265	3
2.53	4	1.683	3	1.247	2
2.44	2	1.658	1	1.230	1
2.35	8	1.623	2	1.214	3
2.18	1	1.598	2	1.183	1
2.15	3	1.558	1		
2.09	7	1.535	4		

ANDALUSITE  
Al<sub>2</sub>SiO<sub>5</sub>

Loc.: Lancaster, Massachusetts, U.S.A.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 163.

ANDESINE -- See Plagioclase Group

ANDORITE  
Pb Ag Sb<sub>3</sub> S<sub>6</sub>

Loc.: Oruro, Bolivia.

Ref.: Nuffield, E.W.: Trans. Roy. Soc. Canada, vol. 39, ser. 3, sec. 4, 1945, pp. 41-50.

ANDRADITE -- See Garnet Group

ANGLESITE



Loc.: Mount Zechan, Tasmania.

Ref.: Swanson, Howard E., and Fuyat, Ruth K.: Std. X-ray Diff. Patterns, Nat. Bur. Stds. Circ. 539, vol. 3, 1954, p. 67.

ANHYDRITE



Loc.: Lambton County, Southwestern Ontario, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 130.

ANNABERGITE



Loc.: Churchill County, Nevada, U.S.A.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 154.

ANORTHITE -- See Plagioclase Feldspar Group

ANTHOPHYLLITE -- See Amphibole Group

ANTIMONY



Loc.: Kern County, California, U.S.A.

Ref.: Swanson, Howard E., and Fuyat, Ruth K.: Std. X-ray Diff. Patterns, Nat. Bur. Stds. Circ. 539, vol. 3, 1954, pp. 14-15.

ANTLERITE



Loc.: Chuquicamata, Chile.

Ref.: Hamilton, P.K.: U.S.A.E.C. RME 3110, pt. II, 1955, p. 10.

APATITE  
 $\text{Ca}_5(\text{PO}_4)_3(\text{F}, \text{Cl}, \text{OH})$

Loc.: Tory Hill, Ontario, Canada.

Ref.: Volborth, A.: Ann. Acad. Sci. Fennicae, ser. A. 111, 39, 1954, p. 48.

APHTHITALITE  
 $(\text{K}, \text{Na})_3 \text{Na}(\text{SO}_4)_2$

Loc.: Mount Vesuvius, Italy.

Ref.: Winchell, Horace, and Benoit, Richard J.: Am. Min., 36, 1951, p. 597.

APOPHYLLITE  
 $\text{K Ca}_4 \text{Si}_8\text{O}_{20} (\text{F}, \text{OH}) \cdot 8\text{H}_2\text{O}$

Loc.: Guanojuato, Mexico.

Ref.: Mason, B., and Greenberg, S.S.: Arkiv. Min. Geol., Bd. 1, Nr. 18, 1954, p. 523.

ARAGONITE  
 $\text{Ca CO}_3$

Loc.: Girgenty, Sicily.

Ref.: Faust, George T.: Am. Min., 38, 1953, p. 13.

ARFVEDSONITE -- See Amphibole Group

ARGYRODITE  
 $\text{Ag}_8 \text{GeS}_6$

Loc.: Oruro, Bolivia.

Ref.: A.S.T.M., No. 2-0610.

ARSENIC  
 $\text{As}$

Loc.: Edward Island, Port Arthur, Ontario, Canada.

Ref.: Swanson, Howard E., and Fuyat, Ruth K.: Std. X-ray Diff. Patterns, Nat. Bur. Stds., Circ. 539, vol. 3, 1954, pp. 6-8.

ARSENIOSIDERITE  
 $\text{Ca}_3 \text{Fe}_4 (\text{As O}_4)_4 (\text{OH})_4 \cdot 4\text{H}_2\text{O} (?)$

Loc.: Mazapil, Mexico.

d	I	d	I	d	I
8.8	10	2.78	9	1.773	2
5.68	6	2.63	4	1.646	6
4.60	3	2.52	4	1.576	1
3.26	6b	2.40	1	1.510	1
3.11	1	2.22	5		
2.96	7	2.14	1		

ARSENOPYRITE  
 $\text{Fe As S}$

Loc.: Guysboro, Nova Scotia, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 62.

ARTINITE  
 $\text{Mg}_2 \text{CO}_3 (\text{OH})_2 \cdot 3\text{H}_2\text{O}$

Loc.: Vallanterna, Lombardy, Italy.

Ref.: Eremeev, V.P.: Trans. Inst. Geol. Ore Dep., Petr. Min. Geochem. SSSR., No. 10, 1957, p. 32.

ASHTONITE (Mordenite)  
 $(\text{Ca}, \text{Na}_2)_2 \text{Al}_2 \text{Si}_9 \text{O}_{23} \cdot 5\text{H}_2\text{O} (?)$

Loc.: Penticton, British Columbia, Canada.

Ref.: Harris, P.G. and Brindley, G.W.: Am. Min., 39, 1954, pp. 822-23.

ASTROPHYLLITE  
 $(\text{K}, \text{Na})_2 (\text{Fe}^{II}, \text{Mn})_4 \text{Ti Si}_4 \text{O}_{14} (\text{OH})_2$

Loc.: El Paso County, California, U.S.A.

Ref.: Semenov, E.I.: Doklady Acad. Sci. U.S.S.R., vol. 108, 1956, p. 933.

ATACAMITE



Loc.: Chuquicamata, Chile.

Ref.: Garavelli, Carlo: Rend. Soc. Min. Italiana, vol. 11, 1955, p. 163.

AUGITE -- See Pyroxene Group

AURICHALCITE



Loc.: Magdalena, New Mexico, U.S.A.

Ref.: A.S.T.M., No. 9-492.

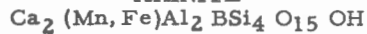
AUROSIBITE



Loc.: Giant Yellowknife Mine, Yellowknife, N.W.T., Canada.

Ref.: Graham, A.R. and Kaiman, S.: Am. Min., 37, 1952, p. 468.

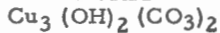
AXINITE



Loc.: Dauphine, France.

Ref.: Milton, C., Hildebrand, F.A., and Sherwood, A.M.: Am. Min., 38, 1953, p. 1150.

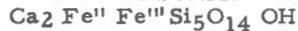
AZURITE



Loc.: Copper Queen Mine, Bisbee, Arizona, U.S.A.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 124.

BABINGTONITE



Loc.: Baverno, Italy.

d	I	d	I	d	I
6.69	4	2.47	5	1.641	3
4.47	3	2.33	1	1.580	2
4.40	3	2.24	1	1.566	1
4.07	4	2.20	1	1.504	1
3.75	4	2.17	6	1.478	1
3.45	4	2.07	3	1.458	1
3.27	2	2.02	1	1.430	3
3.12	7	1.965	1	1.403	2
2.95	6b	1.905	2	1.390	2
2.87	8	1.809	4	1.369	2
2.75	10	1.767	1	1.337	1
2.63	3	1.716	4	1.320	2
2.56	2	1.662	3		

BALDAUFITE  
 $H_2(Fe, Mn, Ca, Mg)_5(PO_4)_4 \cdot 5H_2O (?)$

Loc.: Hagendorf, Bavaria.

d	I	d	I	d	I
6.32	3	3.05	1	2.15	2
6.05	3	2.99	8	2.03	1
4.73	4	2.88	4	1.99	1
4.55	4	2.64	5	1.93	1
4.07	5	2.56	4	1.73	1
3.42	2	2.43	2	1.71	1
3.26	4	2.40	2	1.64	5
3.14	10	2.19	5	1.58	5

BARITE  
 $Ba SO_4$

Loc.: Custer County, South Dakota, U.S.A.

Ref.: Swanson, Howard E., and Fuyat, Ruth K.: Std. X-ray Diff. Patterns Nat. Bur. Stds., Circ. 539, vol. 3, 1954, pp. 65-66.

BARYTOCALCITE  
 $Ca Ba(CO_3)_2$

Loc.: Alston Moor, England

d	I	d	I	d	I
7.6	3	2.51	4	1.784	1
5.74	3	2.38	6	1.682	3
4.34	6	2.25	1	1.643	3
4.00	7	2.16	6	1.595	4
3.83	6	2.11	1	1.545	4
3.13	10	2.02	6	1.490	2
2.69	1	1.953	4	1.466	2
2.61	3	1.899	3	1.411	1

BASSETITE  
 $\text{Fe}''(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O} (?)$

Source: U.S.G.S. (no mount)

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 98.

BASTNAESITE  
 $(\text{Ce, La})(\text{CO}_3)\text{F}$

Loc.: El Paso, Colorado.

Ref.: Smith, William L., and Cisney, Evelyn A.: Am. Min. 41,  
 1956, p. 79.

BAYLDONITE  
 $(\text{Cu, Pb})_2(\text{AsO}_4)(\text{OH}) (?)$

Loc.: Cornwall, England.

Ref.: Claringbull, G.F.: Min. Mag., vol. 29, 1951, p. 613.

BAYLEYITE  
 $\text{Mg}_2\text{UO}_2(\text{CO}_3)_3 \cdot 18\text{H}_2\text{O}$

Remarks: U.S.G.S. mount

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 99.

BECQUERELITE  
 $2\text{UO}_3 \cdot 3\text{H}_2\text{O} (?)$

Remarks: U.S.G.S. mount.

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 100.

BENJAMINITE  
 $\text{Pb (Cu, Ag) Bi}_2\text{S}_4$  (?)

Loc.: Cerro Boneto, Bolivia.  
Ref.: Nuffield, E.W.: Am. Min., 38, 1953, p. 551.

BERAUNITE  
 $\text{Fe}^{\text{II}}\text{Fe}_4^{\text{III}}(\text{PO}_4)_3(\text{OH})_5 \cdot 3\text{H}_2\text{O}$  (?)

Loc.: Waldgrimes, Germany.  
Ref.: Frondel, Clifford: Am. Min., 34, 1949, pp. 536-539.

BERTHIERITE  
 $\text{Fe Sb}_2\text{S}_4$

Loc.: Yellowknife, N.W.T., Canada.  
Ref.: Romanova, E.M.: Proc. All Sov. Min. Soc., vol. 86, 1957,  
p. 486.

BERTRANDITE  
 $\text{Be}_4\text{Si}_2\text{O}_7(\text{OH})_2$

Loc.: Pisek, Bohemia.  
Ref.: Semenov, E.I.: Inst. Min. Geo. Cryst. SSSR., 1957, pp. 64-69.

BERYL  
 $\text{Be}_3\text{Al}_2\text{Si}_6\text{O}_{18}$

Loc.: Ural Mountains, U.S.S.R.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and  
Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 181.

BERYLLONITE  
 $\text{NaBe}(\text{PO}_4)$

Loc.: Stoneham, Maine.  
Ref.: Mrose, Mary E.: Am. Min., 37, 1952, p. 938.

BERZELIANITE  
 $\text{Cu}_2\text{Se}$

Loc.: Martin Lake Mine, Beaverlodge, Saskatchewan, Canada.  
Ref.: Earley, J.W.: Am. Min., 35, 1950, p. 353.

BERZELIITE  
 $(\text{Mg, Mn})_2(\text{Ca, Na})_3(\text{AsO}_4)_3$

Loc.: Langban, Sweden.

Ref.: A.S.T.M., No. 2-0854.

BETAFITE  
 $(\text{U, Ca})(\text{Cb, Ta, Ti})_3\text{O}_9 \cdot n\text{H}_2\text{O}$

Loc.: 1. Tangenbruddet, Krabero, Norway.

2. Canada.

Remarks: Material was heated 5 minutes in vacuum at 1,000°C.

Ref.: (1) Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 101.

(2) Hogarth, D.D.: Unpub. Ph.D. thesis, McGill Univ., 1959.

BETA-URANOPHANE  
 $\text{Ca}(\text{UO}_2)_2(\text{SiO}_3)_2(\text{OH})_2 \cdot 5\text{H}_2\text{O}$

Loc.: Huddersfield Township, Ontario, Canada.

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 102.

BEUDANTITE  
 $\text{Pb Fe}_3 \text{AsO}_4 \text{SO}_4 (\text{OH})_6$

Loc.: Cerro Gorda, California, U.S.A.

Ref.: Guillemin, C.: Bull. Soc. Franc. Min. Crist., vol. 75, 1952,  
p. 104.

BILLIETITE  
 $\text{BaU}_6\text{O}_{13} \cdot 11\text{H}_2\text{O}$

Loc.: Katanga, Belgian Congo.

Remarks: Mount from Harvard University.

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 103.

BINDHEIMITE  
 $\text{Pb}_2\text{Sb}_2\text{O}_6 (\text{O, OH})$

Loc.: Tasna, Bolivia.

Ref.: Mason, B., and Vitaliano, C.J.: Min. Mag., vol. 30, No. 221,  
1953, p. 103.

BIOTITE -- See Mica Group

BISMUTH

Bi

- Loc.: Tough Oaks Mine, Porcupine, Ontario, Canada.  
Ref.: Swanson, Howard E., and Fuyat, Ruth K.: Std. X-ray Diff. Patterns, National Bur. Stds., Circ. 539, vol. 3, 1954, p. 53.

BISMUTHINITE

$\text{Bi}_2\text{S}_3$

- Loc.: Little Shuswap Lake, British Columbia, Canada.  
Ref.: Padera, K.: Chemie der Erde, vol. 18, 1956, pp. 14-18.

BISMUTITE

$(\text{BiO})_2 \text{CO}_3$

- Loc.: Tasna, Bolivia.  
Ref.: Frondel, Clifford: Am. Min., 28, 1943, p. 524.

BIXBYITE

$(\text{Mn, Fe})_2 \text{O}_3$

- Loc.: Sitapur, Chhindwara District, India.  
Ref.: McMurdie, Howard F., and Golovato, Esther: J. Res. Nat. Bur. Stds., vol. 41, 1948, pp. 589-99.

BLOEDITE

$\text{Na}_2\text{Mg}(\text{SO}_4)_2 \cdot 4\text{H}_2\text{O}$

- Loc.: Chuquicamata, Chile.  
Ref.: A.S.T.M., No. 4-0549.

BLOMSTRANDINE

(Eschynite-Priorite Series)

- Loc.: Kabuland, Iveland, Setesdalen, Norway.  
Remarks: U.K.G.S. material.

BOEHMITE  
Al O(OH)

Loc.: Georgia, U.S.A.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. III.

BOLEITE  
 $Pb_9Cu_8Ag_3Cl_{21}(OH)_{16} \cdot 2H_2O (?)$

Loc.: Boleo, Mexico.  
Ref.: A.S.T.M., No. 2-0240.

BORACITE  
 $Mg_3B_7O_{13} Cl$

Loc.: Luneburg, Hanover, Germany.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 126.

BORNITE  
 $Cu_5 Fe S_4$

Loc.: Bruce Mine, Lake Huron, Ontario, Canada.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 25.

BOULANGERITE  
 $Pb_5 Sb_4 S_{11}$

Loc.: Galena Hill, Yukon, Canada.  
Ref.: Robinson, S.C.: Am. Min., 33, 1948, p. 719.

BOURNONITE  
 $Pb Cu Sb S_3$

Loc.: Neudorf, Germany.  
Ref.: Thompson, R.M.: Univ. Tor. Stud., Geol. Ser., No. 51, 1946, p. 81.

BRACKEBUSCHITE  
 $\text{Pb}_4 \text{Mn Fe (VO}_4)_4 \cdot 2\text{H}_2\text{O}$

Loc.: Venus Mine, Cordoba, Argentina.  
Ref.: Berry, L.G., and Graham, A.R.: Am. Min., 33, 1948, p. 491.

BRANNERITE  
 $(\text{U, Ca, Fe, Y, Th})_3 \text{Ti}_5 \text{O}_{16} (?)$

Loc.: Foster Lake, Saskatchewan, Canada.  
Blind River area, Ontario, Canada.  
Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 104.  
Remarks: Material heated 5 minutes in vacuum at 1,000°C.

BRAUNITE  
 $\text{Mn}^{\text{II}} \text{Mn}_6^{\text{III}} \text{SiO}_{12}$

Loc.: Wheatley River, Prince Edward Island, Canada.  
Ref.: Fleischer, Michael, and Richmond, Wallace E.: Econ. Geol.,  
vol. 38, 1943, p. 269.

BREITHAUPTITE  
 $\text{NiSb}$

Loc.: Cobalt, Ontario, Canada.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and  
Geol. Min. Lab., Lisbon Fac. Sci., Nos. 21-22, 1953, p. 37.

BRUCITE  
 $\text{Mg(OH)}_2$

Loc.: Lancaster County, Pennsylvania, U.S.A.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and  
Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 107.

BUETSCHLITE  
 $\text{K}_6 \text{Ca}_2 (\text{CO}_3)_5 \cdot 6\text{H}_2\text{O}$

Loc.: Deseronto, Ontario, Canada.  
Ref.: Milton, Charles, and Axelrod, Joseph: Am. Min., 32, 1949,  
p. 616.

CACOXENITE  
 $\text{Fe}_4(\text{PO}_4)_3(\text{OH})_3 \cdot 12\text{H}_2\text{O}$

Loc.: Oberrosbach, Hesse, Germany.

d	I	d	I	d	I
7.9	3	3.18	9	2.04	3
6.86	6	3.13	4	1.98	1
6.46	1	2.92	5	1.93	3
4.82	8	2.79	10	1.84	1
4.65	2	2.73	1	1.81	3
4.17	5	2.53	1	1.77	2
4.00	2	2.43	3	1.72	1
3.71	2	2.30	3	1.69	2
3.42	2	2.26		1.60	1
3.30	2	2.14	2	1.55	1

CALAFATITE  
 $\text{K}_2\text{Al}_7(\text{SO}_4)_4(\text{OH})_{15} \cdot \text{H}_2\text{O}$

Loc.: Almeria, Spain.

d	I	d	I	d	I
5.72	3	2.21	2	1.322	1
4.94	5	1.903	5	1.289	2
4.46	1	1.748	4	1.206	2
3.49	4	1.685	1	1.165	1
3.34	2	1.654	1	1.152	1
2.98	10	1.571	1	1.141	1
2.87	2	1.498	5	1.106	1/2
2.56	1	1.428	1	1.087	1/2
2.48	1	1.389	2		
2.29	5	1.372	1		

CALAMINE (Hemimorphite)  
 $\text{Zn}_4\text{Si}_2\text{O}_7(\text{OH})_2 \cdot \text{H}_2\text{O}$

Loc.: Ogdensburg, New Jersey, U.S.A.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 177.

CALAVERITE  
 $\text{AuTe}_2$

Loc.: Cripple Creek, Colorado, U.S.A.

Ref.: Thompson, R.M.: Am. Min., 34, 1949, p. 348.

CALCITE  
Ca CO<sub>3</sub>

Loc.: Partridge Island, Cumberland County, Nova Scotia, Canada.  
Ref.: Faust, George T.: Am. Min., 38, 1953, p. 13.

CALOMEL  
Hg Cl

Loc.: Yellowstone National Park, Wyoming, U.S.A.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 71.

CANCRINITE  
Na<sub>3</sub>CaAl<sub>3</sub>Si<sub>3</sub>O<sub>12</sub> CO<sub>3</sub>

Loc.: French River, Ontario, Canada.  
Ref.: A.S.T.M., No. 3-0503.

CARNOTITE  
K<sub>2</sub>(UO<sub>2</sub>)<sub>2</sub> (VO<sub>4</sub>)<sub>2</sub> · 3H<sub>2</sub>O

Loc.: Green Mountains, Utah, U.S.A.  
Ref.: Vaes, J.F. and P.F. Kerr: Am. Min., 34, 1949, p. 115.

CARROLLITE  
Co<sub>2</sub> Cu S<sub>4</sub>

Loc.: Ruwe, Katanga, Belgian Congo.  
Ref.: A.S.T.M., No. 2-0787.

CASSITERITE  
SnO<sub>2</sub>

Loc.: Ekrenfriedessdorf, Saxony.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 98.

CATAPLEHITE  
(Na<sub>2</sub>, Ca)ZrSi<sub>3</sub>O<sub>9</sub> · 2H<sub>2</sub>O

Loc.: Langesundfiord, Norway.

d	I	d	I	d	I
6.35	6	2.17	2	1.346	2
5.37	5	2.08	1	1.312	1b
4.98	1	1.969	6	1.283	1b
3.94	10	1.846	4	1.254	1
3.69	2	1.799	1	1.233	1
3.53	1	1.772	1	1.219	1
3.34	1	1.740	4	1.178	2
3.19	2	1.672	1	1.157	1
3.05	10	1.617	1	1.141	1
2.96	10	1.523	3	1.115	1
2.69	9	1.485	3	1.105	1
2.55	2	1.451	1		
2.42	2	1.409	2		

CELADONITE  
Fe, Mg, K Silicate

Loc.: Victoria Island, Northwest Territories, Canada.

Ref.: Jasmund, K.: Die Silicatischen Tonminerale, Monograph 60, Applied Chem. & Engineering Chem., Germany, 1955, p. 158.

CELESTITE  
Sr SO<sub>4</sub>

Loc.: Bagot Township, Renfrew County, Ontario, Canada.

Ref.: A.S.T.M. No. 5-0593.

CERARGYRITE  
AgCl

Loc.: Charnarcillo, Chile.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac., Sci., Nos. 20-21, 1953, p. 70.

CERIANITE  
(Ce, Th)O<sub>2</sub>

Loc.: Lackner Township, Ontario, Canada.

Ref.: Graham, A.R.: Am. Min., 40, 1955, p. 561-64.

CERITE  
Ce<sub>4</sub>Si<sub>3</sub>O<sub>12</sub> · 3H<sub>2</sub>O (?)

Loc.: Bastnaes, Sweden.

d	I	d	I	d	I
5.4	2	2.87	6	2.01	2
4.87	5	2.79	3b	1.945	4
4.51	3	2.69	4	1.895	3
4.21	3	2.57	3	1.861	3
3.55	8	2.44	1	1.789	1
3.45	7	2.29	1	1.743	5b
3.30	4	2.21	3	1.669	5
3.10	4	2.12	1	1.579	3b
2.94	10	2.06	3		

CERUSSITE



Loc.: Mammoth, Arizona, U.S.A.

Ref.: de Assuncao, Carlos Torre and Julio Garrido; Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 123.

CHABAZITE



Loc.: Aussig, Bohemia.

Ref.: Barrer, R.M., and Baynham, S.W.: J. Chem. Soc. 1956, p. 2889.

CHALCANTHITE



Loc.: Not known.

Ref.: Bloss, F. Donald; Am. Min., 37, 1952, p. 598.

CHALCOCITE



Loc.: Megantic, Quebec, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido; Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, pp. 22-23.

CHALCOPHANITE



Loc.: Proprietary Mine, Broken Hill, New South Wales, Australia.

Ref.: A.S.T.M., No. 7-174.

CHALCOPHYLLITE  
 $\text{Cu}_{18}\text{Al}_2(\text{AsO}_4)_3(\text{SO}_4)_3(\text{OH})_{27} \cdot 33\text{H}_2\text{O}$

Loc.: Cornwall, England.

d	I	d	I	d	I
7.05	10	2.64	5	1.989	1/2
4.12	1	2.57	5	1.877	2
3.72	1	2.37	1	1.535	4
3.53	6	2.26	3	1.331	1
3.34	1	2.10	1/2	1.313	1/2

CHALCOPYRITE  
 $\text{CuFeS}_2$

Loc.: Outlaw Mine, Mariposa Canyon, Colorado, U.S.A.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 28.

CHAMOSITE  
 $15(\text{Fe}, \text{Mg})\text{O} \cdot 5\text{Al}_2\text{O}_3 \cdot 11\text{SiO}_2 \cdot 16\text{H}_2\text{O}$

Loc.: Bicroft Mine, Bancroft, Ontario, Canada.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 227.

CHAPMANITE  
 $\text{Fe}_5\text{Sb}_2\text{Si}_5\text{O}_{20} \cdot 2\text{H}_2\text{O}$

Loc.: Kelly Mine, South Lorraine, Ontario, Canada.  
Ref.: Milton, C., Axelrod, J.M., and Ingram, B.: Am. Min., 43, 1958, p. 668.

CHILDRENITE  
 $(\text{Fe}^{II}, \text{Mn}^{II}) \text{Al PO}_4 (\text{OH})_2 \cdot \text{H}_2\text{O}$

Loc.: Tavistock, Devonshire, England.  
Ref.: Amor, Isidoro Asensio: Estudios Geol. Madrid., vol. 25, 1955, pp. 43-51.

CHIOLITE  
 $\text{Na}_5\text{Al}_3\text{F}_{14}$

Loc.: Ivigtut, Greenland.  
Ref.: A.S.T.M., No. 2-0749.

CHLORITE GROUP

Varieties: Clinochlore; Megantic County, Quebec, Canada.

Penninite; Megantic, Quebec, Canada.

Prochlorite; Michigammi, Michigan, U.S.A.



Loc.: Kassioybrod, Urals, U.S.S.R.

Ref.: Milne, I.H.: Am. Min., 34, 1949, p. 429.



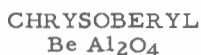
Loc.: Franklin Furnace, New Jersey, U.S.A.

d	I	d	I	d	I
4.86	5	2.67	3	1.80	1
3.95	1	2.61	3	1.74	8
3.69	1	2.51	3	1.69	1
3.57	2	2.42	1	1.61	2
3.47	1	2.32	2	1.58	1
3.37	2	2.25	10	1.54	1
3.01	4	2.15	1	1.50	2
2.92	1/2	2.11	1	1.48	6
2.87	1/2	2.03	1/2	1.40	2
2.80	1	1.94	1/2	1.34	3
2.76	3	1.86	1/2		



Loc.: Mount Albert, Quebec, Canada.

Remarks:  $a_0 = 8.333$ .



Loc.: Ektarinburg, Ural, Siberia.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 85.

CHRYSOCOLLA  
 $\text{Cu SiO}_3 \cdot 2\text{H}_2\text{O}$

Loc.: Chile, South America.

Ref.: Billiet, V.: Verh. K. Vlaamsche Acad. Wetensch. Belgie,  
vol. 4, No. 1, 1942, pp. 1-59.

CHURCHITE (Weinschenkite)  
 $(\text{Ce, Ca}) (\text{PO}_4) \cdot 2\text{H}_2\text{O}$

Loc.: Auerbach, Bavaria.

Ref.: Milton, Charles, Murata, K. J., and Knechtel, M. M.: Am. Min.,  
29, 1944, p. 92.

CINNABAR  
 $\text{Hg S}$

Loc.: Almaden, Santa Clara County, California, U.S.A.

Ref.: Harcourt, G. Alan.: Am. Min., 27, 1942, p. 77.

CLARKEITE  
 $(\text{Na, K, Ca, Pb})_2\text{U}_2\text{O}_7 \cdot n\text{H}_2\text{O}$

Loc.: Not known; mount borrowed from U.S.G.S.

Ref.: Gruner, John W.: Am. Min., 39, 1954, p. 837.

CLAUSTHALITE  
 $\text{Pb Se}$

Loc.: Theano Point, Lake Superior, Ontario, Canada.

Ref.: Earley, J. W.: Am. Min., 35, 1950, p. 357.

CLINOCHLORE -- See Chlorite Group

CLINOCLASITE  
 $\text{Cu}_3\text{AsO}_4(\text{OH})_3$

Loc.: Eureka Hill Mine, Tintic District, Utah, U.S.A.

Ref.: Palache, Charles and L.G. Berry: Am. Min., 31, 1946, p. 256.

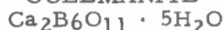
CLINOZOISITE -- See Epidote Group

COBALTITE



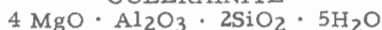
Loc.: Cobalt, Ontario, Canada.  
Ref.: Peacock, M.A., and Henry, W.J.: Univ. Tor. Stud., Geol. Ser., No. 52, 1947, p. 75.

COLEMANITE



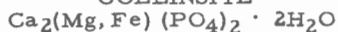
Loc.: Death Valley, California, U.S.A.  
Ref.: Christ, C.L.: Am. Min., 38, 1953, p. 413.

COLERAINITE



Loc.: Delaware County, Pennsylvania, U.S.A.  
Ref.: A.S.T.M., No. 7-325.

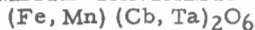
COLLINSITE



Loc.: François Lake, British Columbia, Canada.

d	I	d	I	d	I
6.3	3	2.54	1	1.831	4
5.01	2	2.30	1	1.797	1/2
4.51	1	2.25	3	1.765	4
3.54	1	2.13	1/2	1.695	2
3.26	2	2.10	3	1.669	6
3.14	5	1.982	2	1.629	1
3.04	8	1.91	1/2		
2.69	10	1.87	1/2		

COLUMBITE-TANTALITE SERIES



Loc.: Several localities.  
Ref.: Campbell, William J., and Parker, John G.: U.S. Bur. Mines Rept., No. 5150, 1955, p. 9.

COLUSITE  
 $\text{Cu}_3(\text{As, Sn, V, Fe, Te})\text{S}_4$

Loc.: Butte, Montana, U.S.A.  
Ref.: Murdoch, Joseph: Am. Min., 38, 1953, p. 796.

CONICALCITE  
 $\text{Ca Cu AsO}_4 \text{OH}$

Loc.: Chile.  
Ref.: Berry, L.G.: Am. Min., 36, 1951, p. 486.

COPIAPITE  
 $(\text{Fe}^{II}, \text{Mg}) \text{Fe}_4^{III}(\text{SO}_4)_6(\text{OH})_2 \cdot 20\text{H}_2\text{O}$

Loc.: Copiapo, Chile  
Ref.: Smith, G.L., Almond, H., and Sawyer, D.L.: Am. Min., 43, 1958, p. 1073.

COPPER  
Cu

Loc.: Martin Lake Mine, Saskatchewan, Canada.  
Ref.: Swanson, Howard E., and Tatge, Eleanor: Std. X-ray Diff. Patterns, Nat. Bur. Stds., Circ. 539, vol. 1, 1953, p. 16.

CORDIERITE  
 $(\text{Mg, Fe}^{II})_2 \text{Al}_4\text{Si}_5\text{O}_{18}$

Loc.: Sandokedal, Norway.  
Ref.: Richardson, H.M. and G.R. Rigby: Min. Mag., vol. 28, No. 204, 1949, p. 549.

CORNETITE  
 $\text{Cu}_3 \text{PO}_4 (\text{OH})_3$

Loc.: Kalabi, Katanga, Belgian Congo.  
Ref.: Guillemin, C.: Bull. Soc. Franc. Min. Crist., vol. 79, 1956, p. 272.

CORNWALLITE (Erinite)



Loc.: Tintic District, Utah, U.S.A.

Ref.: Berry, L.G.: Am. Min., 36, 1951, p. 490.

CORONADITE



Loc.: Bhandara District, Bombay Straight, India.

Ref.: Fleischer, Michael, and Richmond, Wallace, E.: Econ. Geol., vol. 38, 1943, p. 269.

CORUNDUM



Loc.: Hastings County, Ontario, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 89.

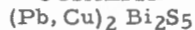
CORYNITE



Loc.: Olsa, Carinthia, Austria.

Ref.: A.S.T.M., No. 2-1029.

COSALITE



Loc.: Temiskaming, Ontario, Canada.

Ref.: Barabanov, V.F.: Doklady Acad. Sci. U.S.S.R., vol. 112, 1957, pp. 938-942.

COVELLITE



Loc.: Miramichi River, New Brunswick, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 42.

CREEDITE  
 $\text{Ca}_3\text{Al}_2\text{F}_4\text{SO}_4(\text{OH}, \text{F})_6 \cdot 2\text{H}_2\text{O}$

Loc.: Wagon Wheel Gap, Colorado, U.S.A.

Ref.: Fleisher, Michael: Am. Min., 37, 1952, p. 788.

$\alpha$ -CRISTOBALITE  
 $\text{SiO}_2$

Loc.: Tucson Springs, Tehama County, California, U.S.A.

Ref.: Swanson, Howard E., and Tatge, Eleanor: Std. X-ray Diff. Patterns, Nat. Bur. Stds., Circ. 539, vol. 1, 1953, pp. 40-41.

CROCIDOLITE -- See Amphibole Group

CROCOITE  
 $\text{Pb CrO}_4$

Loc.: Dundas, Tasmania.

d	I	d	I	d	I
5.42	2	2.25	6	1.618	1
4.97	4	2.09	4	1.605	1
4.37	5	2.05	1	1.551	2
3.75	3	2.00	1	1.482	1
3.48	6	1.975	5	1.471	1
3.28	10	1.903	1	1.449	1
3.15	1	1.850	5	1.426	3
3.02	7	1.820	} 1	1.402	1
2.71	3	1.801		1.368	1/2
2.60	2	1.743	1	1.358	2
2.55	3	1.695	3	1.341	1
2.46	1	1.661	1	1.309	2
2.33	3	1.642	1	1.293	1

CRYOLITE  
 $\text{Na}_3\text{Al F}_6$

Loc.: Ivigtut, Greenland.

Ref.: Ferguson, R.B.: Am. Min., 34, 1949, p. 384.

CUMENGITE  
 $\text{Pb}_4\text{Cu}_4\text{Cl}_8(\text{OH})_8 \cdot \text{H}_2\text{O} (?)$

Loc.: Boleo, Mexico.

d	I	d	I	d	I
7.37	3	2.59	2	1.467	2
7.02	4	2.38	10	1.445	1
5.17	1	2.32	2	1.422	1
4.86	9	2.18	4	1.399	1
3.98	4	2.01	4	1.370	1
3.73	6	1.975	2	1.343	1/2
3.56	2	1.884	3	1.321	3
3.40	2	1.774	1	1.307	1/2
3.22	3	1.762		1.286	2
3.08	4	1.734	3	1.272	1
2.97	3	1.689	2	1.228	1
2.82	3	1.568	1	1.207	1
2.77	2	1.530	3	1.149	2
2.66	4	1.504	1		

CUPRITE  
 $\text{Cu}_2\text{O}$

Loc.: Copper Queen Mine, Bisbee, Arizona, U.S.A.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 76.

CUPROSKLODOWSKITE  
 $\text{Cu}(\text{UO}_2)_2(\text{SiO}_3)_2(\text{OH})_2 \cdot 5\text{H}_2\text{O}$

Loc.: U.S.G.S. mount.

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss: U.S.G.S. Bull. 1036-G, 1956, p. 108.

CURITE  
 $3\text{PbO} \cdot 8\text{UO}_3 \cdot 4\text{H}_2\text{O}$

Loc.: U.S.G.S. mount.

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss: U.S.G.S. Bull. 1036-G, 1956, p. 108.

CYLINDRITE  
 $Pb_3 Sn_4 Sb_2 S_{14}$

Loc.: Poopo, Bolivia.  
Ref.: A.S.T.M., No. 2-0763.

DANALITE  
 $(Fe, Zn, Mn)_8 Be_6 Si_6 O_{24} S_2$

Loc.: Walrus Island, Ungava District, Canada.  
Ref.: Thompson, R.M.: Can. Min., vol. 6, pt. 1, 1957, p. 70.

DANBURITE  
 $Ca B_2 Si_2 O_8$

Loc.: Lewis County, New York, U.S.A.  
Ref.: A.S.T.M., No. 2-0362.

DATOLITE  
 $Ca B Si O_4 OH$

Loc.: Bergin Hill, New Jersey, U.S.A.  
Ref.: Richmond, Wallace E.: Am. Min., 25, 1940, p. 447.

DAVIDITE  
 $(Fe^{II}, U, Ca, Zr, Th, RE) (Ti, Fe^{III}, V, Cr)_3 (O, OH)_7$

Loc.: Mavuzi, Portuguese East Africa.  
Ref.: Bannister, F.A., and Horne, J.E.T.: Min. Mag., vol. 29, 1950, pp. 101-12.

DAWSONITE  
 $Na Al CO_3 (OH)_2$

Loc.: Montreal, Hochelaga County, Quebec, Canada.

d	I	d	I	d	I
5.66	10	2.15	4	1.536	1/2
3.38	4	2.06	1	1.487	1/2
3.09	1	1.989	5	1.420	1/2
2.78	8	1.955	2	1.394	2
2.60	4	1.731	4	1.337	2
2.50	3	1.691	3		
2.23	1	1.658	3		

DESCLOIZITE  
(Zn, Cu) Pb (VO<sub>4</sub>) (OH)

Loc.: Lake Valley, New Mexico, U.S.A.  
Ref.: Guillemin, C.: Bull. Soc. Franc. Min. Crist., vol. 79, 1956,  
p. 275.

DEVILLITE  
Cu<sub>4</sub> Ca(SO<sub>4</sub>)<sub>2</sub> (OH)<sub>6</sub> · 3H<sub>2</sub>O

Loc.: Herregrund, Hungary.

d	I	d	I	d	I
5.08	10	2.38	2	1.682	1
4.68	2	2.26	3	1.609	1
4.40	2	2.22	1	1.579	3
4.12	1	2.10	2	1.557	1
3.75	3	1.99	3	1.529	1
3.53	1	1.949	1	1.516	2
3.39	9	1.914	1/2	1.494	1
3.17	3	1.877	1/2	1.472	1
2.77	2	1.833	1	1.452	1
2.66	5	1.750	3	1.415	1
2.51	6	1.698	1		

DEWINDTITE -- See Phosphuranylite

DIAMOND  
C

Source: Diamond dust.  
Ref.: Swanson, Howard E., and Fuyat, Ruth K.: Std. X-ray Diff. Patterns, Nat. Bur. Stds., Circ. 539, vol. 2, 1953, p. 5.

DIAPHORITE  
Pb<sub>2</sub> Ag<sub>3</sub> Sb<sub>3</sub> S<sub>8</sub>

Loc.: Příbram, Bohemia.  
Ref.: A.S.T.M., No. 2-0478.

DIASPORE  
 $\text{AlO} \cdot \text{OH}$

Loc.: Emery Mine, Chester, Massachusetts, U.S.A.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 108.

DIDERICHITE  
(Hydrated Uranium Carbonate)

Loc.: Katanga, Belgian Congo.  
Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss: U.S.G.S. Bull. 1036-G, 1956, p. 129.

DIGENITE  
 $\text{Cu}_{2-x} \text{S}$

Loc.: Katanga, Belgian Congo.  
Ref.: Buerger, Newton: Am. Min., 27, 1942, p. 714.

DIOPSIDE -- See Pyroxene Group

DIOPTASE  
 $\text{Cu SiO}_2 (\text{OH})_2$

Loc.: Altyn-Tube, Kirghese Steppes, Siberia, U.S.S.R.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 179.

DOLOMITE  
 $\text{Ca Mg} (\text{CO}_3)_2$

Loc.: Niagara Falls, New York, U.S.A.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 119.

DOMEYKITE  
 $\text{Cu}_3 \text{As}$

Loc.: Mohawk Mine, Michigan, U.S.A.  
Ref.: Sedletski, I.D.: X-ray Tables for the Determination of Colloidal Minerals of Soils; U.S.S.R. Soil Institute, 1941.

DOVERITE  
 $Y F CO_3 \cdot Ca CO_3$

Loc.: Scrub Oaks Iron Mine, Dover, New Jersey, U.S.A.  
Ref.: Smith, William Lee, Stone, Jerome, Riska, Daphne D., and  
Levine, Harry: Science, 122, No. 3157, 1955, p. 31.

DUFRENITE  
 $Fe^{II} Fe_4^{III} (PO_4)_3 (OH)_5 \cdot 2H_2O$

Loc.: Ullersreuth, Germany.  
Ref.: Frondel, Clifford: Am. Min., 34, 1949, p. 538.

DUFTITE  
 $Pb Cu AsO_4 OH$

Loc.: Tsumeb, South West Africa.  
Ref.: Guillemin, C.: Bull. Soc. Franc. Min. Crist., vol. 75, 1952,  
p. 118.

DUMORTIERITE  
 $(Al, Fe)_7 B Si_3 O_{18}$

Loc.: Addington County, Ontario.  
Ref.: Claringbull, G.F., and Hey, M.H.: Min. Mag., vol. 31, No.  
242, 1958, p. 905.

DURANGITE  
 $Na Al AsO_4 F$

Loc.: Durango, Mexico.  
Ref.: Richmond, Wallace E.: Am. Min., 25, 1940, p. 447.

EDENITE -- See Amphibole Group

ELLSWORTHITE -- See Pyrochlore-Microlite Series

ELPIDITE  
 $\text{Na}_2 \text{Zr Si}_6 \text{O}_{15} \cdot 3\text{H}_2\text{O}$

Loc.: Narsarsuk, Greenland.

Ref.: Semenov, E.I., and Burova, T.A.: Doklady Acad. Sci. U.S.S.R.,  
vol. 101, 1955, pp. 1113-16.

EMBOLITE  
Ag (Cl, Br)

Loc.: Broken Hill, New South Wales, Australia.

d	I	d	I	d	I
5.50	3	1.99	8	1.26	4
5.20	2	1.70	2	1.15	2
3.25	6	1.63	4	0.995	1
2.82	10	1.41	2	0.939	2
2.37	1	1.29	1		

EMPLECTITE  
 $\text{Cu Bi S}_2$

Loc.: Tannenbaum, Saxony.

Ref.: Harcourt, G. Alan: Am. Min., 27, 1942, p. 67.

ENARGITE  
 $\text{Cu}_3 \text{As S}_4$

Loc.: Butte, Montana, U.S.A.

Ref.: Minato, H., Takano, Y., and Muraoka, H.: Tokyo Univ. Coll. Ed., Scientific Papers, 1954, p. 161.

ENSTATITE -- See Pyroxene Group

EPIDIDYMITE  
 $\text{Na Be Si}_3\text{O}_7 \text{OH}$

Loc.: Narsarsuk, Greenland.

Ref.: Shilin, L.L., and Semenov, E.I.: Doklady Acad. Sci. U.S.S.R.,  
vol. 112, 1957, pp. 325-8.

EPIDOTE GROUP

Varieties: Clinozoisite; Straw Hat Lake, Ontario, Canada.  
Epidote; Tyrol, Austria.

Ref.: A.S.T.M., No. 9-438.

EPISTILBITE --See Heulandite Group

EPISTOLITE

Na Ti silicate and columbate

Loc.: Kangerdluarsuk, Greenland.

d	I	d	I	d	I
7.13	1	3.12	16	2.15	5
6.11	10b	2.97	6	1.79	6
5.30	1	2.87		1.62	4
4.33	10	2.72	8	1.49	2
3.95	1	2.60	4		
3.75	1	2.39	1		

EPSOMITE

MgSO<sub>4</sub> · 7H<sub>2</sub>O

Loc.: Lake Okanagan Valley, British Columbia.

Ref.: A.S.T.M., No. 1-0352.

ERINITE --See Cornwallite

ERYTHRITE

(Co, Ni)<sub>3</sub>(AsO<sub>4</sub>)<sub>2</sub> · 8H<sub>2</sub>O

Loc.: Schneeberg, Saxony.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 154.

ESCHYNITE-PRIORITE SERIES

(Ce, Ca, Fe<sup>II</sup>, Th) (Ti, Nb)<sub>2</sub>O<sub>6</sub> - (Y, Er, Ca, Fe<sup>II</sup>, Th) (Ti, Nb)<sub>2</sub>O<sub>6</sub>

Loc.: Kabuland, Iveland, Setesdalen, Norway.

Ahi-Tomby, Madagascar.

Ref.: Komkov, A.I.: Doklady Acad. Sci. U.S.S.R., vol. 126, 1959, p. 644.

Remarks: Material was heated in a vacuum at 1,000°C for 5 minutes.

EUDIDYMITE  
Na Be Si<sub>3</sub>O<sub>7</sub>OH

Loc.: Langesundfiord, Norway.  
Ref.: Shilin, L.L., and Semenov, E.I.: Doklady Acad. Sci. U.S.S.R.,  
vol. 112, 1957, pp. 325-328.

EULYTITE  
Bi<sub>4</sub> Si<sub>3</sub> O<sub>12</sub>

Loc.: Johanngeorgenstadt, Saxony.  
Ref.: Guitard, G., and Pierrot, R.: Bull. Soc. Franc. Min. Crist.,  
vol. 80, 1957, p. 230.

EUXENITE  
(Y, Er, Ce, La, U) (Cb, Ti, Ta)<sub>2</sub>(O, OH)<sub>6</sub>

Loc.: Nipissing, Ontario, Canada.  
Ref.: Arnott, Ronald J.: Am. Min., 35, 1950, p. 396.

FAIRCHILDITE  
K<sub>2</sub> Ca(CO<sub>3</sub>)<sub>2</sub>

Loc.: Deseronto, Ontario, Canada.  
Ref.: Milton, Charles, and Axelrod, Joseph: Am. Min., 32, 1947, p. 616.

FAMATINITE  
Cu<sub>3</sub> Sb S<sub>4</sub>

Loc.: La Rieja, Argentina.  
Ref.: Gaines, Richard V.: Am. Min., 42, 1957, p. 772.

FERGUSONITE  
(Y, Er, Ce, Fe) (Cb, Ta, Ti)<sub>4</sub>O<sub>4</sub>

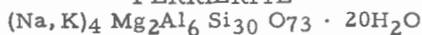
Loc.: Amherst County, Virginia, U.S.A.  
Arendal, Norway.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and  
Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 103.

FERMORITE  
(Ca, Sr)<sub>5</sub>[(P, As)<sub>4</sub>]<sub>3</sub>(F, OH)

Loc.: Sitapur, Chhindwara District, India.

d	I	d	I	d	I
5.34	2	1.971	4	1.451	1
4.80	2	1.916	1	1.37	1/2
4.15	2	1.867	4	1.335	1
3.95	3	1.833	2	1.300	1
3.49	5	1.806	2	1.273	1
3.21	2	1.779	2	1.253	2
3.12	3	1.746	2	1.237	1
2.86	10	1.69	1/2	1.176	1
2.75	6	1.649	1	1.165	1
2.67	3	1.633	1	1.132	2
2.57	1	1.558	1	1.121	2
2.29	3	1.525	1	1.09	1/2
2.18	2	1.494	1	1.047	1
2.06	1/2	1.473	1		

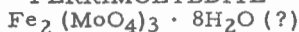
FERRIERITE



Loc.: Kamloops, British Columbia, Canada.

Ref.: Staples, Lloyd W.: Am. Min., 40, 1955, p. 1097.

FERRIMOLYBDITE



Loc.: York County, New Brunswick, Canada.

Ref.: Jones, L.H.P., and Milne, Angela A.: Austr. J. Sci., vol. 17, 1954, p. 100.

FINNEMANITE



Loc.: Langban, Sweden.

d	I	d	I	d	I
5.49	4	2.13	3	1.410	1
5.09	1	2.07	6	1.384	1
4.42	4	2.02	4	1.373	1
4.13	4	1.957	5	1.352	5
3.74	3	1.924	5	1.334	1
3.51	1	1.879	4	1.317	1
3.35	6	1.763	4	1.300	2
3.25	4	1.702	3	1.285	1
3.03	10	1.682	1	1.259	3
2.95	3	1.665	1	1.234	3
2.88	9	1.637	2	1.22	1b
2.73	2	1.59	2b	1.20	1b
2.56	2	1.561	2	1.18	3b
2.46	2	1.540	4	1.16	1b
2.42	2	1.515	3	1.140	3
2.33	3	1.461	1	1.127	1
2.26	2	1.43	2b	1.119	1
2.22	1			1.111	2

FIZELYITE  
 $Pb_5 Ag_2 Sb_8 S_{18}$  (?)

Loc.: Kisbanya, Hungary.

Ref.: Nuffield, E.W.: Trans. Royal Soc. Canada, vol. 39, ser. 3, sec. 4, 1945, pp. 41-50.

FLUOBORITE  
 $Mg_3(BO_3)_2 \cdot 3Mg(OH, F)_2$

Loc.: Nocera, Italy.

Ref.: Brisi, Cesare, and Eitel, Wilhelm; Am. Min., 42, 1957, p. 292.

FLUORITE  
 $Ca F_2$

Loc.: Perry, Labelle County, Quebec, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 72.

FOURMARIERITE  
 $PbO \cdot 4UO_3 \cdot 7H_2O$

Loc.: Mount from Harvard University.

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss: U.S.G.S. Bull. 1036-G, 1956, p. 113.

FRANCKEITE  
 $Pb_5 Sn_3 Sb_2 S_{14}$

Loc.: Poopo, Bolivia.

Ref.: Evans, A.M.: Can. Min., vol. 6, pt. 1, 1957, p. 121.

FRANKLINITE  
 $Zn Fe_2O_4$

Loc.: Franklin Furnace, New Jersey, U.S.A.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 82.

FREIBERGITE  
(Cu, Ag)<sub>3</sub> Sb S<sub>3</sub>

Loc.: Keno Hill, Mayo, Yukon, Canada.

d	I	d	I	d	I
7.34	2	1.861	7	1.300	2
5.24	1	1.806	1	1.260	1
3.72	3	1.757	1	1.228	1
3.36	1	1.710	3	1.210	3
3.03	10	1.667	1	1.167	1
2.81	2	1.629	1	1.139	1
2.63	4	1.591	5	1.113	2
2.48	2	1.558	1	1.088	1
2.35	1	1.525	1	1.079	3
2.24	2	1.491	2	1.068	1
2.20	1	1.436	1	1.046	1
2.06	4	1.342	2	1.016	1
1.923	2	1.320	2	1.007	1

FRITZSHEITE  
Mn, U, Phosphate (?)

Loc.: Synthetic material from Harvard University.

FUCHSITE -- See Mica Group

GADOLINITE  
Be<sub>2</sub> Fe Yt<sub>2</sub> Si<sub>2</sub> O<sub>10</sub>

Loc.: Not known.

Ref.: Ueda, Tateo, and Korekawa, Masaaki: Kyoto Univ. Coll. Sci. Mem., vol. 22, ser. B., 1955, pp. 169-70.

GAHNITE  
Zn Al<sub>2</sub>O<sub>4</sub>

Loc.: Sterling Hill, New Jersey, U.S.A.

Remarks: a<sub>0</sub> = 8.07.

GALENA  
Pb S

Loc.: Silver Islet, Ontario, Canada.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 40.

GALENOBISMUTITE  
Pb Bi<sub>2</sub> S<sub>4</sub>

Loc.: Faleim, Sweden.  
Ref.: Berry, L.G.: Am. Min., 25, 1940, p. 732.

GANOMALITE  
Ca<sub>2</sub> Pb<sub>3</sub> Si<sub>3</sub> O<sub>11</sub>

Loc.: Jakobsberg, Nordmark, Sweden.

d	I	d	I	d	I
4.91	9	1.825	4	1.232	3
4.43	6	1.804	6	1.223	3
4.26	3	1.719	3	1.203	1
3.91	1	1.694	3	1.183	2
3.54	7	1.613	1	1.168	1
3.38	5	1.565	1	1.158	1/2
3.23	4	1.533	2	1.147	2
3.07	10	1.513	2	1.13	1b
2.85	8	1.502	1	1.120	1
2.79	8	1.469	3	1.10	1b
2.71	10	1.454	3	1.081	1
2.46	1	1.410	3	1.067	2
2.36	3	1.398	3	1.052	1
2.33	3	1.379	1	1.026	2
2.25	2	1.354	1	1.018	2
2.18	1	1.326	2	0.997	3
2.13	4	1.314	1	0.989	1
1.993	6	1.297	3	0.989	2
1.94	4b	1.280	1		
1.875	3	1.266	1		

GARNET GROUP

Varieties: Almandite; Albert Harbour, Baffin Island, Canada

Andradite; Texada Isle, British Columbia, Canada.

Grossularite; Mussa Alp, Piedmont, Italy.

Spessartite; Parry Sound District, Ontario, Canada.

Topazolite; Ala Valley, Piedmont, Italy.

Uvarovite; Asia Minor (Nakri).

GARNIERITE  
 $(\text{Ni, Mg})_3 \text{Si}_2\text{O}_5 (\text{OH})_4$

Loc.: Le Nickel Mines, New Caledonia.

d	I	d	I	d	I
7.34	3	3.33	5	1.81	2
4.54	5	2.60	6	1.52	10
4.11	3	2.44	6	1.30	2

GEARKSUTITE  
 $\text{Ca Al OH F}_4 \cdot \text{H}_2\text{O}$

Loc.: Wagon Wheel Gap, Colorado, U.S.A.

Ref.: Ferguson, R.B.: Am. Min., 34, 1949, p. 383.

GEHLENITE  
 $\text{Ca}_2 \text{Al}_2 \text{Si O}_7$

Loc.: Mount Monzoni, Austria.

Ref.: Ervin, Guy Jr., and Osborn, E.F.: Am. Min., 34, 1949, p. 720.

GEOCRONITE  
 $\text{Pb}_5 (\text{Sb, As})_2 \text{S}_8$

Loc.: Binnenthal, Switzerland.

Ref.: Douglass, R.M., Murphy, M.J., and Pabst, A.: Am. Min., 39, 1954, p. 917.

GERMANITE  
 $\text{Cu}_3(\text{Ge, Ga, Fe, Zn}) (\text{As, S})_4$

Loc.: Isumeh, South West Africa.

Ref.: Murdoch, Joseph: Am. Min., 38, 1953, p. 796.

GERSDORFFITE  
(Ni, Fe, Co) As S

Loc.: Algoma District, Ontario, Canada.  
Ref.: Harcourt, G. Alan: Am. Min., 27, 1942, p. 63.

GLAUBERITE  
Na<sub>2</sub> Ca (SO<sub>4</sub>)<sub>2</sub>

Loc.: St. Bernardine, California, U.S.A.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 129.

GLAUCOCHROITE  
(Ca, Mn)<sub>2</sub> Si O<sub>4</sub>

Loc.: Franklin Furnace, New Jersey, U.S.A.

d	I	d	I	d	I
7.83	3	2.37	4	1.486	1
4.77	3	2.32	1	1.433	2
4.39	3	2.27	1/2	1.412	1/2
4.20	1	2.20	1b	1.388	1
3.99	5	2.11	2	1.361	1
3.62	3	2.07	1	1.344	1/2
3.43	1	1.99	3	1.298	2
3.26	8	1.863	2	1.278	1/2
3.16	2	1.811	1	1.262	1/2
3.09	1	1.784	1	1.244	1/2
2.97	1	1.716	1	1.226	1/2
2.84	1	1.692	1	1.171	1/2
2.78	10	1.650	1/2	1.144	1
2.63	3	1.631	2	1.067	1/2
2.56	1	1.588	2	1.056	1/2
2.51	6	1.553	3		
2.44	1	1.499	2		

GLAUCONITE  
K (Al, Fe)<sub>2</sub> (Si, Al)<sub>4</sub> O<sub>10</sub> (OH)<sub>2</sub>

Loc.: New Jersey, U.S.A.  
Ref.: Maegdefrau, E., and Hofmann, U.: Zeits. Krist., vol. 98, 1938, pp. 38-9.

GLAUCOPHANE -- See Amphibole Group

GMELENITE  
 $(\text{Na}_2, \text{Ca}) \text{Al}_2 \text{Si}_4 \text{O}_{12} \cdot 6\text{H}_2\text{O}$

Loc.: Flinters, Victoria, Australia.  
Ref.: Strunz, H.: Neues Jahr. Min. Monat., 1956, No. 11, p. 254.

GOETHITE  
 $\text{FeO} \cdot \text{OH}$

Loc.: Lanark County, Ontario, Canada.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 109.

GOLD  
Au

Loc.: Tough Oaks Mine, Kirkland Lake, Ontario, Canada.  
Ref.: Swanson, Howard E., and Tatge, Eleanor: Std. X-ray Diff. Patterns, Nat. Bur. Stds., Circ. 539, vol. 1, 1953, p. 33.

GONNARDITE  
 $\text{Na}_2 \text{Ca} \text{Al}_4 \text{Si}_6 \text{O}_{20} \cdot 7\text{H}_2\text{O}$

Loc.: Oka, Quebec, Canada.  
Ref.: Meixner, H., Hey, M.H., and Moss, A.A.: Min. Mag., vol. 31, No. 234, 1956, p. 267.

GRAPHITE  
C

Loc.: High Falls, Bowman, Quebec, Canada.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 17.

GREENALITE  
 $\text{Fe}_9^{\text{II}} \text{Fe}_2^{\text{III}} \text{Si}_8 \text{O}_{28} \cdot 8\text{H}_2\text{O} (?)$

Loc.: Material received from J. W. Gruner, University of Minnesota.

GREENOCKITE  
Cd S

Loc.: Synthetic material from G.S.C.  
Ref.: Ulrich, F., and Zachariassen, W.: Zeits. Krist., vol. 62,  
1925, pp. 260-273.

GRIPHITE  
(Na, Al, Ca, Fe)<sub>24</sub> Mn<sub>16</sub> (PO<sub>4</sub>)<sub>20</sub> (OH)<sub>16</sub>

Loc.: Pennington County, South Dakota, U.S.A.  
Ref.: Jaffe, Howard W.: Am. Min., 31, 1946, p. 405.

GROSSULARITE -- See Garnet Group

GYPSUM  
CaSO<sub>4</sub> · 2H<sub>2</sub>O

Loc.: Ellsworth, Ohio, U.S.A.  
Ref.: Hill, W.L., and Hendricks, S.B.: J. Ind. Eng. Chem., vol.  
28, No. 4, 1936, p. 440.

HALITE  
NaCl

Loc.: Northwick, Cheshire, England.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and  
Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 68.

HALOTRICHITE  
Fe<sup>II</sup> Al<sub>2</sub> (SO<sub>4</sub>)<sub>4</sub> · 24H<sub>2</sub>O

Loc.: Fraser River, British Columbia, Canada.

d	I	d	I	d	I
6.03	2	3.31	1	2.38	1
4.86	10	3.17	1	2.28	2b
4.32	8	3.05	1	1.957	1
4.13	8	2.87	2	1.877	4b
3.96	1	2.67	3	1.77	1/2
3.78	3	2.56	3b	1.667	1
3.50	8	2.47	1		

HAMBERGITE  
Be<sub>2</sub>BO<sub>3</sub>OH

Loc.: Madagascar.

d	I	d	I	d	I
4.52	4	2.12	4	1.567	1
4.15	1	2.09	4	1.523	1
3.80	10	2.04	2	1.425	3
3.58	2	1.99	3	1.362	3
3.35	1	1.955	2	1.333	1
3.13	10	1.906	2	1.302	1
3.04	1	1.817	3	1.282	1
2.89	2	1.768	3	1.269	1
2.56	3	1.725	3	1.257	1
2.51	1	1.674	1	1.238	1
2.39	2	1.642	1	1.222	1
2.20	5	1.607	1	1.197	1
				1.187	2

HARMOTOME  
Ba Al<sub>2</sub>Si<sub>6</sub>O<sub>16</sub> · 6H<sub>2</sub>O

Loc.: Croton Aqueduct, New York, U.S.A.

Ref.: Waterston, C.D.: Min. Mag., vol. 30, No. 221, 1953, p. 138.

HATCHETTOLITE -- See Pyrochlore-Microlite Series

HAUCHECORNITE  
Ni<sub>9</sub>(Bi,Sb)<sub>2</sub>S<sub>8</sub>

Loc.: Vermillion Mine, Sudbury District, Ontario, Canada.

Ref.: Peacock, M.A.: Am. Min., 35, 1950, p. 444.

HAUERITE  
MnS<sub>2</sub>

Loc.: Raddusa, Sicily.

Ref.: A.S.T.M., No. 2-0616.

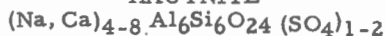
HAUSMANNITE



Loc.: Langban, Sweden.

Ref.: Frondel, Clifford: Am. Min., 38, 1953, p. 763.

HAUYNITE



Loc.: Albano, Italy.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 245.

HAWLEYITE

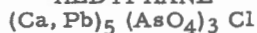


Loc.: Keno Hill, Yukon, Canada.

Ref.: Traill, R.J., and Boyle, R.W.: Am. Min., 40, 1955, p. 555.

HEDENBERGITE--See Pyroxene Group

HEDYPHANE



Loc.: Langban, Sweden.

d	I	d	I	d	I
5.08	2	1.886	4	1.271	2
4.40	1	1.826	3	1.259	1
4.18	4	1.767	1	1.232	1
3.66	4	1.723	1	1.220	2
3.34	3	1.661	1	1.188	3
3.03	10	1.650	2	1.168	1
2.96	6	1.604	1	1.098	3
2.92	5	1.586	2	1.076	1
2.46	3	1.55	4b	1.065	2
2.31	2	1.515	1	1.055	1
2.25	4	1.451	1	1.047	1
2.08	4	1.408	1	1.037	1
2.02	2	1.390	2	1.016	1/2
1.97	5	1.363	1	1.009	1
1.947	3	1.341	3		
1.920	1	1.326	3		

HEMATITE

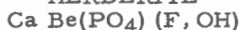


Loc.: New Ross, Lunenburg, Nova Scotia, Canada.

Ref.: A.S.T.M., No. 1-1053.

HEMIMORPHITE -- See Calamine

HERDERITE



Loc.: Stoneham, Maine, U.S.A.

Ref.: Mrose, Mary E.: Am. Min., 37, 1952, p. 938.

HESSITE



Loc.: Long Lake, Yale, British Columbia, Canada.

Ref.: Rowland, J.F., and Berry, L.G.: Am. Min., 36, 1951, p. 478.

HETEROGENITE



Loc.: Katanga, Belgian Congo.

Ref.: Billiet, V. and Vandendriesshe, A.: Bull. Soc. Belge. Geol.,  
vol. 49, 1940, pp. 63-78.

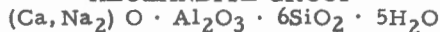
HETEROSITE



Loc.: North Groton, New Hampshire, U.S.A.

Ref.: Quensel, P.: Arkiv. Min. Geol., Bd. 2, No. 2, 1956, p. 43.

HEULANDITE GROUP



Epistilbite: Theigahorn, Iceland

d	I	d	I	d	I
9.1	4	2.98	7	1.774	3
8.3	4	2.80	4	1.725	1
7.0	4	2.75	2	1.695	1
6.3	1	2.54	2	1.645	1
5.1	5	2.45	3	1.597	2
4.65	4	2.37	2	1.526	1
4.37	1	2.27	1	1.486	2
4.13	1	2.19	1	1.457	1
3.96	10	2.11	1	1.441	1
3.74	1	2.08	1	1.363	2
3.56	1	2.01	1	1.310	1
3.44	4	1.961	4	1.281	2
3.34	1	1.906	1	1.240	2
3.18	3	1.863	1		
3.12	3	1.820	1		

Heulandite: Fassathol, Tirol, Austria

Ref.: Mason, B., and Greenberg, S.S.: Arkiv. Min. Geol., Bd. 1, No. 18, 1954, p. 523.

HEWETTITE  
 $\text{Ca V}_6 \text{O}_{16} \cdot 9\text{H}_2\text{O}$

Loc.: Minasragra, Peru.

d	I	d	I	d	I
7.9	4	2.80	3	1.800	5
5.3	1b	2.70	1	1.757	1
3.6	3	2.30	3	1.627	1
3.47	2	2.20	4	1.575	1
3.10	10	2.03	3	1.520	1

HEXAGONITE -- See Amphibole Group

HIBSCHITE  
 $\text{Ca}_3 \text{Al}_2 \text{Si}_2 \text{O}_8 (\text{OH})_4$

Loc.: Bay of Islands, Newfoundland, Canada.

Ref.: Pabst, A.: Am. Min., 27, 1942, p. 788.

HJELMITE (HJELMITE)  
 (?)

Loc.: Shipasen, Norberg, Sweden.

d	I	d	I	d	I
4.65	4	2.63	1	1.246	2
4.12	3	1.916	7	1.216	1
3.43	5	1.640	6	1.108	3
3.14	10	1.570	1	1.090	1
2.72	4	1.355	1	1.047	2

HINSDALITE  
 $(\text{Pb, Sr}) \text{Al}_3 \text{PO}_4 \text{SO}_4 (\text{OH})_6$

Loc.: Lake City, Hinsdale County, Colorado, U.S.A.

d	I	d	I	d	I
6.2	1/2	1.716	1	1.161	1
5.7	8	1.664	1	1.141	1
4.9	1/2	1.640	2	1.118	3
3.49	5	1.612	1	1.100	1
2.96	10	1.499	1	1.086	1
2.84	2	1.480	2	1.074	1
2.78	2	1.463	3	1.029	1
2.45	3	1.416	1	1.018	2
2.25	1	1.365	2b	1.004	1
2.21	7	1.338	1	0.987	2
2.18	1	1.318	2	0.968	1
2.01	2	1.284	3	0.954	3
1.969	1	1.255	1	0.946	2
1.892	5	1.197	2	0.942	3
1.743	4	1.180	2		

HOLLANDITE  
 $\text{Mn Ba Mn}_6 \text{O}_{14}$

Loc.: Sitapur, India.

Ref.: Fleischer, Michael, and Richmond, Wallace E.: Econ. Geol.,  
 vol. 38, 1943, p. 277.

HOPEITE  
 $\text{Zn}_3 (\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$

Loc.: Broken Hill Mine, N. W. Rhodesia.

Ref.: A.S.T.M., No. 1-0975.

HORNBLLENDE -- See Amphibole Group

HOWLITE  
 $\text{Ca}_2 \text{Si B}_5 \text{O}_9 (\text{OH})_5$

Loc.: Windsor, Hants County, Nova Scotia, Canada.  
Ref.: Murdoch, Joseph: Am. Min., 42, 1957, p. 524.

HUHNERKOBELITE  
 $(\text{Na}, \text{Ca}) (\text{Fe}^{II}, \text{Mn}^{II}) (\text{PO}_4)_2$

Loc.: Yellowknife-Beaulieu area, Northwest Territories, Canada.  
Ref.: Lindberg, Marie Louise: Am. Min., 35, 1950, p. 63.

HUMMERITE  
 $\text{K}_2 \text{Mg}_2 \text{V}_{10} \text{O}_{28} \cdot 16 \text{H}_2\text{O}$

Loc.: Hummer Mine, Paradox Valley, Montrose County, Colorado,  
U.S.A.

Remarks: Fe radiation; Mn filter.

d	I	d	I	d	I
9.7	2	3.49	2	2.30	1
9.3	3	3.31	4	2.15	1
8.2	10	3.13	4	2.11	4
7.4	7	3.67	1	2.04	1
7.0	5	2.84	2	1.98	1
5.0	3	2.73	6	1.86	1/2
4.76	1	2.45	1	1.78	1
4.10	3	2.37	1	1.70	1

HURLBUTITE  
 $\text{Ca Be}_2 (\text{PO}_4)_2$

Loc.: Smith Mine, Chandler's Hill, Newport, New Hampshire, U.S.A.  
Ref.: Mrose, Mary E.: Am. Min., 37, 1950, p. 938.

HUTTONITE  
 $\text{Th SiO}_4$

Loc.: Synthetic material from Harvard University.

HYBLITE -- See Thorogummite

HYDROMICA -- See Mica Group

HYDROTALCITE  
 $Mg_6Al_2CO_3(OH)_{16} \cdot 4H_2O$

Loc.: Rossie, St. Lawrence County, New York, U.S.A.  
Ref.: Frondel, Clifford: Am. Min., 26, 1941, pp. 295-315.

HYDROTHORITE -- See Thorogummite

HYDROZINCITE  
 $Zn_5(OH)_6(CO_3)_2$

Loc.: Constantine, Algeria.

d	I	d	I	d	I
6.66	10	2.08	2	1.346	4
5.37	2	2.06		1.296	1
4.45	2	1.910	2b	1.280	1
4.00	4	1.847	1	1.257	1/2
3.82	1	1.812	2	1.232	4
3.65	4	1.772	2	1.196	2b
3.14	5	1.687	5	1.152	2
2.99	1	1.653	1	1.138	2
2.92	3	1.576	4	1.128	2
2.72	7	1.554	3	1.107	2
2.47	4	1.524	2	1.086	1
2.33	2	1.495	1	1.079	2
2.29	2	1.465	5	1.066	1
2.25	1	1.450	1	1.059	2
2.21	2	1.401	1	1.033	2
2.17	1	1.369	3	1.022	3

HYPERSTHENE -- See Pyroxene Group

ILLITE  
 $KAl_2(Si,Al)_4O_{10}(OH)_2$

Loc.: Manhattan, Nevada, U.S.A.  
Ref.: Weaver, Charles Edward: Am. Min., 38, 1953, p. 285.

ILMENITE  
Fe Ti O<sub>3</sub>

Loc.: Yarmouth, Nova Scotia, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 91.

ILSEMANNITE  
Mo<sub>3</sub> O<sub>8</sub> · nH<sub>2</sub>O (?)

Loc.: Marysvale, Utah, U.S.A.

d	I	d	I	d	I
*4.23	5	*2.44	3	*1.550	2
*3.36	10	2.22	3	*1.458	2
3.23	1	*2.12	1	*1.380	2
3.14	2	1.932	3	1.305	1
3.04	1	*1.823	1	*1.257	1
2.72	4	1.641	5	*1.190	1

ILVAITE  
Ca Fe<sup>II</sup><sub>2</sub> Fe<sup>III</sup> Si<sub>2</sub> O<sub>8</sub> OH

Loc.: Siorarssuite, Ilimaussag, Southern Greenland.

d	I	d	I	d	I
7.25	10	2.44	4	1.665	2
6.54	3	2.39	2	1.627	3
3.86	4	2.34	2	1.525	2
3.24	4	2.26	1	1.496	2
2.84	10	2.18	4	1.470	5
2.71	6	2.11	4	1.421	3
2.67	4	1.955	2b	1.398	1
2.57	2	1.891	2	1.369	1

INESITE  
Ca<sub>2</sub> Mn<sub>7</sub> Si<sub>10</sub> O<sub>28</sub> (OH)<sub>2</sub> · 5H<sub>2</sub>O

Loc.: Langban, Sweden.

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\* Lines are due, at least partly, to quartz.

d	I	d	I	d	I
8.92	10	2.39	2	1.623	1
6.52	4	2.33	3	1.612	3
5.87	2	2.26	1/2	1.582	1
5.09	3	2.19	7	1.539	2
4.62	4	2.12	2	1.494	4
4.02	5	2.05	4	1.429	3
3.55	1	1.969	2	1.398	2
3.23	1	1.888	2	1.373	3
2.92	8	1.845	4	1.345	1
2.84	5	1.774	3	1.332	1
2.74	6	1.700	3	1.300	1
2.64	2	1.689	3	1.279	1
2.55	4	1.649	4		

INYOITE  
 $\text{Ca}_2 \text{B}_6 \text{O}_{11} \cdot 13\text{H}_2\text{O}$

Loc.: Hillsborough, New Brunswick, Canada.  
 Ref.: Christ, C.L.: Am. Min., 38, 1953, p. 916.

IODYRITE  
 Ag I

Loc.: Broken Hill, New South Wales, Australia.

d	I	d	I	d	I
3.94	4	1.617	1	1.250	3
3.73	10	1.510	1/2	1.150	2
3.55	1	1.491	2b	1.099	3
2.29	6	1.400	1/2		
1.953	5	1.325	3		

IRIDOSMINE  
 Ir, Os

Loc.: Ural Mountains, U.S.S.R.

d	I	d	I	d	I
2.36	4	1.595	3	1.138	2
2.30	1	1.361	3	1.082	1
2.16	4	1.230	5	1.037	1
2.07	10	1.153	3	0.983	1

IRON  
Fe

Loc.: (1) Benton Meteorite.  
(2) Coahuila Meteorite, Mexico.  
Remarks: (1) Taenite  $a_0 = 3.564$ .  
(2) Kamacite  $a_0 = 2.860$ .

ISOKITE  
Ca Mg PO<sub>4</sub> F

Loc.: Katanga, Belgian Congo.  
Ref.: Deans, T., and McConnell, J.D.C.: Min. Mag., vol. 30,  
No. 230, 1955, p. 688.

IXIOLITE  
Fe Mn Columbate

Loc.: Skogbole, Kimico, Finland.  
Remarks: Specimen heated 5 minutes in vacuum at 1,000°C.

d	I	d	I	d	I
4.60	2	1.820	2	1.377	2
4.21	4	1.768	2	1.310	1
3.65	4	1.750	10	1.290	2b
3.36	8	1.718	4	1.248	2
2.97	10	1.683	4	1.215	4
2.85	1	1.580	1	1.188	3
2.71	1	1.550	3	1.136	2
2.58	10	1.540	1	1.121	1
2.50	4	1.504	3	1.099	1
2.38	5	1.487	1	1.082	2
2.27	1	1.457	5	1.076	
2.20	1	1.431	1	1.064	1
2.10	4	1.411	4	1.040	1b
1.908	2	1.398			

JAMESONITE  
Pb<sub>4</sub> Fe Sb<sub>6</sub> S<sub>14</sub>

Loc.: Unknown.  
Ref.: Harcourt, G. Alan: Am. Min., 27, 1942, p. 67.

JARLITE  
Na Sr<sub>3</sub> Al<sub>3</sub> F<sub>16</sub> (?)

Loc.: Ivigtut, Greenland.  
Ref.: Ferguson, R.B.: Am. Min., 34, 1949, p. 388.

JAROSITE  
 $K Fe_3 (SO_4)_2 (OH)_6$

Loc.: Lawrence County, South Dakota, U.S.A.  
Ref.: Van Tassel, Rene: Bull. Inst. Roy. Sci. Nat. Belgique, vol. 34., No. 44, 1958, p. 4.

JEFFERSONITE -- See Pyroxene Group

JOHANNITE  
 $Cu (UO_2)_2 (SO_4)_2 (OH)_2 \cdot 6H_2O$

Loc.: U.S.G.S. mount.  
Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss: U.S.G.S. Bull. 1036-G, 1956, p. 117.

KAERSUTITE -- See Amphibole Group

KAMACITE -- See Iron

KAOLINITE  
 $Al_2 Si_2 O_5 (OH)_4$

Loc.: Vancouver, British Columbia, Canada.  
Ref.: Murray, Haydn H.: Am. Min., 39, 1954, p. 100.

KASOLITE  
 $Pb UO_2 SiO_3 (OH)_2$

Loc.: Karole, Belgian Congo.  
Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss: U.S.G.S. Bull. 1036-G, 1956, p. 118.

KERMESITE  
 $Sb_2 S_2O$

Loc.: Hants County, Nova Scotia, Canada.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 45.

KIESERITE  
 $Mg SO_4 \cdot H_2O$

Loc.: Hanover, Germany.  
Ref.: A.S.T.M., No. 1-0638.

KLAPROTHITE -- See Wittichenite

KLOCKMANNITE  
Cu Se

Loc.: Beaverlodge, Saskatchewan, Canada.  
Ref.: Earley, J.W.: Am. Min., 34, 1949, p. 440.

KOENENITE  
 $Mg_5 Al_2 Cl_4 (OH)_{12} \cdot nH_2O$

Loc.: Wathlingen, Hanover, Germany.

d	I	d	I	d	I
3.87	4	1.528	3	1.033	1
3.50	10	1.493	3	1.000	2
3.12	1	1.430	2	0.990	3
2.85	5	1.401	2	0.972	4
2.48	3	1.324	3	0.961	1
2.34	5	1.302	1	0.953	1
2.20	5	1.281	3	0.929	1
2.09	3	1.239	1	0.920	2
1.993	2	1.220	2	0.904	1
1.939	2	1.203	1	0.897	2
1.870	5	1.169	4	0.888	1
1.753	5	1.152	1	0.876	1
1.650	5	1.109	5	0.869	3
1.597	2	1.083	2		
1.568	3	1.045	3		

KOLOVRATITE  
Ni vanadate

Loc.: Fergana, Russian Turkestan.

d	I	d	I	d	I
5.81	10	2.56	3	1.52	5
3.87	8	2.38	3b	1.46	1b
2.63	3	1.98	2	1.42	1

KORNERUPINE  
 $(\text{Mg}, \text{Fe}^{\text{II}}, \text{Fe}^{\text{III}}, \text{Al})_{40} (\text{Si}, \text{B})_{18} \text{O}_{86}$

Loc.: Waldheim, Saxony.

Ref.: Girault, J.P.: Am. Min., 37, 1952, p. 534.

KYANITE  
 $\text{Al}_2 \text{SiO}_5$

Loc.: Pizzo Forno, Switzerland.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 164.

LABRADORITE -- See Plagioclase Feldspar Group

LANSFORDITE  
 $\text{Mg CO}_3 \cdot 5\text{H}_2\text{O}$

Loc.: Atlin, British Columbia, Canada.

d	I	d	I	d	I
6.42	7	2.69	3	1.720	1
5.80	8	2.61	3	1.617	3
4.46	2	2.50	5	1.572	2
4.16	10	2.30	2	1.533	1
3.85	10	2.20	3	1.502	1
3.56	2	2.15	5	1.456	1
3.32	3	1.993	2	1.422	1
3.20	1	1.928	3	1.401	1
3.04	3	1.850	1	1.332	1
2.90	6	1.802	1	1.315	1
2.78	3	1.742	1	1.257	1

LANTHANITE  
 $(\text{La}, \text{Ce})_2 (\text{CO}_3)_3 \cdot 8\text{H}_2\text{O}$

Loc.: Bastnaes, Sweden.

Remarks: Sample shows preferred orientation.

d	I	d	I	d	I
9.1	9	2.61	6	1.61	7
4.6	7	2.49	7	1.52	5
4.15	5	2.24	5	1.46	1
3.93	4	2.17	3	1.41	5
3.40	3	1.94	4		
3.12	10	1.87	2		

LAUMONTITE  
 $\text{Ca Al}_2\text{Si}_4\text{O}_{12} \cdot 4\text{H}_2\text{O}$

Loc.: Copper Falls, Michigan, U.S.A.

Ref.: Coombs, D.S.: Am. Min., 37, 1952, p. 822.

LAURIONITE  
 $\text{Pb Cl OH}$

Loc.: Laurium, Greece.

d	I	d	I	d	I
5.14	10	1.865	1	1.393	1
4.81	4	1.802	1	1.355	1b
3.68	2	1.791	1	1.333	1
3.49	6	1.742	4	1.288	2b
3.21	10	1.734		1.256	2
2.98	7	1.704	6	1.233	1
2.69	4	1.648	3	1.226	1
2.51	9	1.610	6	1.218	1
2.44	6	1.542	3	1.210	1
2.41	3	1.535	1	1.177	1b
2.24	3	1.492	1/2	1.155	1
2.16	4	1.475	3	1.145	2
2.01	6	1.443	1	1.123	2
1.983	3	1.423	2		
1.888	3	1.404	2		

LAUTITE  
 $\text{Cu As S}$

Loc.: Marienberg, Saxony.

d	I	d	I	d	I
5.66	3	2.39	1	1.693	1
4.90	2	2.20	1	1.640	1
4.80	1/2	2.17	3	1.613	5
3.10	10	2.09	1	1.418	1
2.99	2	2.06	2	1.352	1
2.53	1	1.90	6	1.333	2
2.71	3	1.835	2	1.300	1
2.52	1	1.798	2	1.273	1
2.45	1	1.744	3	1.237	1b

LAZULITE  
 $(\text{Mg, Fe}^{II}) \text{Al}_2 (\text{PO}_4)_2 (\text{OH})_2$

Loc.: Werfen, Austria.

Ref.: Pecora, W. T., and Fahey, J. J.: Am. Min., 35, 1950, p. 11.

LAZURITE  
 $(\text{Na, Ca})_8 (\text{Al, Si})_{12} \text{O}_{24} (\text{SO}_4^{II}, \text{S}_n^{II})$

Loc.: Lake Harbour, Southern Baffin Island, Canada.

d	I	d	I	d	I
6.35	4	2.43	3	1.505	2
4.72	2	2.27	3	1.469	2
4.55	3	2.20	1/2	1.366	4
4.12	4	2.14	4	1.333	1
3.70	10	1.929	1	1.307	3
3.25	1	1.774	3	1.280	1
2.87	4	1.649	1	1.182	3
2.80	1/2	1.600	3		
2.62	7	1.553	2		

LEAD  
Pb

Loc.: Franklin Furnace, New Jersey, U.S.A.

Ref.: Swanson, Howard E., and Tatge, Eleanor: Std. X-ray Diff. Patterns, Nat. Bur. Stds., Circ. 539, vol. 4, 1953, p. 35.

LENGENBACHITE  
 $\text{Pb}_6 (\text{Ag, Cu})_2 \text{As}_4 \text{S}_{13}$

Loc.: Binnenthal, Switzerland.

Ref.: Nuffield, E. W.: Trans. Roy. Soc., Canada, vol. 38, ser. 3, sec. 4, 1944, pp. 59-64.

LEPIDOCROCITE  
 $\text{Fe O} \cdot \text{OH}$

Loc.: East Creek, British Columbia, Canada.

Ref.: Ukai, Yasuo: Kyoto Univ. Coll. Sci. Mem., ser. B, vol. 22, 1955, pp. 188-9.

LEPIDOLITE -- See Mica Group

LESSINGITE  
 $\text{Ca}_2 \text{Ce}_4 \text{Si}_3 \text{O}_{13} (\text{OH})_2 (?)$

Loc.: Kychtym, Urals, U.S.S.R.  
Ref.: Gay, P.: Min. Mag., vol. 31, No. 237, 1957, p. 462.

LEUCITE  
 $\text{K Al Si}_2 \text{O}_6$

Loc.: Vesuvius, Italy.  
Ref.: Barrer, R.M., and Baynham, J.W.: J. Chem. Soc., 1956,  
p. 2886.

LEUCOPHANITE  
 $(\text{Ca, Na})_2 \text{Be Si}_2 (\text{O, F, OH})_7$

Loc.: Langesundfiord, Norway.  
Ref.: Zachariasen, W.H.: Norsk. Geol. Tidssk., vol. 12, 1931,  
pp. 577-81.

LIBETHENITE  
 $\text{Cu}_2 \text{PO}_4 (\text{OH})$

Loc.: Cornwall, England.  
Ref.: Guillemin, C.: Bull. Soc. Franc. Min. Crist., vol. 79, 1956,  
p. 271.

LIEBIGITE  
 $\text{Ca}_2 \text{U} (\text{CO}_3)_4 \cdot 10\text{H}_2\text{O}$

Loc.: Goldfields, Saskatchewan, Canada.  
Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 119.

LINARITE  
 $\text{Pb Cu SO}_4 (\text{OH})_2$

Loc.: Frisco, Utah, U.S.A.  
Ref.: Berry, L.G.: Am. Min., 36, 1951, p. 512.

LIROCONITE  
 $\text{Cu}_2 \text{Al AsO}_4 (\text{OH})_4 \cdot 4\text{H}_2\text{O}$

Loc.: Cornwall, England.

Ref.: Berry, L.G.: Am. Min., 36, 1951, p. 499.

LISKEARDITE  
 $(\text{Al, Fe})_3 \text{AsO}_4 (\text{OH})_6 \cdot 5\text{H}_2\text{O} (?)$

Loc.: Liskeard, Cornwall, England.

Ref.: Guillemin, C.: Bull. Soc. Franc. Min. Crist., vol. 75, 1952, p. 133.

LIVINGSTONITE  
 $\text{Hg Sb}_4 \text{S}_7$

Loc.: Hurtzco, Mexico.

Ref.: Gorman, D.H.: Am. Min., 36, 1951, p. 481.

LOELLINGITE-SAFFLORITE SERIES  
 $(\text{Fe, Co}) \text{As}_2$

Loc.: (a) Eta Mine, Pennington County, North Dakota, U.S.A.

(b) Peterborough County, Ontario, Canada.

Ref.: Newman Henrick, Heier, Knut, and Hartley, Jack: Norsk. Geol. Tidssk., vol. 34, 1955, pp. 157-65.

LOPARITE (Columbian Perovskite)  
 $(\text{Ce, La, Na, Ca, Sr}) (\text{Ti, Nb}) \text{O}_3$

Loc.: Kola Peninsula, U.S.S.R.

Ref.: Murdoch, Joseph: Am. Min., 36, 1951, p. 579.

LORANDITE  
 $\text{Tl As S}_2$

Loc.: Allchar, Macedonia.

Ref.: A.S.T.M., No. 2-0367.

LUDLAMITE  
 $(\text{Fe}^{II}, \text{Mg, Mn})_3 (\text{PO}_4)_2 \cdot 4\text{H}_2\text{O}$

Loc.: Wheal Jane, Cornwall, England.

d	I	d	I	d	I
5.17	2	2.772	6	1.931	1
4.89	8	2.604	1	1.893	1
4.56	3	2.550	6	1.857	3
4.15	2	2.383	3	1.727	1
3.95	10	2.315	1	1.662	2
3.74	4	2.250	3	1.640	5
3.05	1	2.168	2	1.622	2
3.00	3	2.080	1		

LUDWIGITE  
(Mg, Fe<sup>II</sup>)<sub>2</sub> Fe<sup>III</sup> BO<sub>5</sub>

Loc.: Banat, Hungary.

Ref.: Thompson, R.M., and Gower, J.A.: Am. Min., 39, 1954, p. 523.

LYNDOCHITE  
(Variety of Euxenite)

Loc.: Lyndoch Township, Renfrew County, Ontario, Canada.

Remarks: Material heated 5 minutes in vacuum at 1,000°C.

d	I	d	I	d	I
5.5	1	2.24	2	1.652	1
4.44	2	2.21	3	1.577	5b
3.98	1	2.13	2	1.542	2
3.71	4	2.05	1	1.506	5b
3.36	1	1.995	2	1.474	2
3.01	10	1.955	1	1.455	1
2.91	5	1.906	4	1.400	2
2.80	3	1.850	4	1.351	2
2.60	3	1.814	1	1.327	1
2.58		1.779	2	1.226	2b
2.45	3	1.743	1	1.200	2b
2.33	1	1.691	3	1.171	2b

MACKINTOSHITE--See Thorogummite

MAGNESITE  
Mg CO<sub>3</sub>

Loc.: Gillies Glen, Osmond Mine, South Africa.

Ref.: Faust, George T.: Am. Min., 38, 1953, p. 13.

MAGNETITE



Loc.: French Creek, Pennsylvania, U.S.A.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 81.

MALACHITE

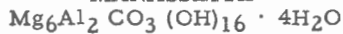


Loc.: Copper Queen Mine, Bisbee, Arizona, U.S.A.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 125.

MALACOLITE -- See Pyroxene Group

MANASSEITE



Loc.: Langban, Sweden.

Ref.: Frondel, Clifford: Am. Min., 26, 1941, p. 295.

MANGANITE



Loc.: Tenny Cape, Nova Scotia, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 110.

MARCASITE



Loc.: Bohemia.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 58.

MARGARITE



Loc.: Chester, Massachusetts, U.S.A.

Ref.: Gruner, John W.: Am. Min., 29, 1944, p. 366.

MARIPOSITE -- See Mica Group

MASUYITE  
 $\text{UO}_3 \cdot 2\text{H}_2\text{O}$

Loc.: Katanga, Belgian Congo.

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 119.

MATLOCKITE  
 $\text{Pb F Cl}$

Loc.: Matlock, Derbyshire, England.

Ref.: Swanson, Howard E., and Tatge, Eleanor: Std. X-ray Diff. Patterns, Nat. Bur. Stds., Circ. 539, vol. I, p. 77.

MEIONITE (Scapolite Group)  
 $\text{Ca}_4 \text{Al}_6 \text{Si}_6 \text{O}_{24} (\text{SO}_4, \text{CO}_3, \text{Cl}_2)$

Loc.: Mount Somma, Italy.

Ref.: A.S.T.M., No. 2-0405.

MELANOCERITE  
Rare-earth Silicate, Borate, etc.

Loc.: Barkevik, Norway.

d	I	d	I	d	I
5.6	2	3.08	2	2.01	3
4.86	4	2.93	6	1.89	3
4.17	2	2.87	10	1.75	1
3.56	5	2.66	1	1.67	2
3.27	2	2.06	3	1.57	2

MELANOPHLOGITE  
(?)

Loc.: Raculmuto, Sicily.

d	I	d	I	d	I
6.7	3	2.93	1	1.829	2
6.0	8	2.49	2	1.720	3
5.5	6	2.30	2	1.656	2b
3.86	5	2.23	1	1.604	1
3.71	3	2.18	2	1.586	1
3.59	10	2.08	1b	1.557	1
3.25	4	1.97	1b	1.448	1/2
3.17	2	1.897	1	1.417	3

MELIPHANITE  
(Ca, Na)<sub>2</sub> Be (Si, Al)<sub>2</sub> (O, F)<sub>7</sub>

Loc.: Langesundfiord, Norway.

Ref.: Zachariassen, W.H.: Norsk. Geol. Tidssk., vol. 12, 1931, pp. 577-81.

MELLITE  
Al<sub>2</sub> C<sub>12</sub> O<sub>12</sub> · 18H<sub>2</sub>O

Loc.: Artern, Thuringia.

d	I	d	I	d	I
7.9	10	2.75	1	1.739	3
5.8	5	2.59	5	1.693	2
5.5	2	2.41	3	1.646	1
5.2	4	2.31	3	1.625	2
4.24	10	2.27	1	1.552	2
3.98	3	2.22	2	1.500	2
3.86	1	2.18	1	1.444	1
3.69	4	2.10	2	1.277	1
3.49	4	2.02	1	1.267	1
3.38	4	1.965	1	1.239	1
3.09	1	1.924	7	1.165	1
2.99	4	1.832	1		
2.90	3	1.792	2		

MENEGHINITE  
Pb<sub>13</sub> Sb<sub>7</sub> S<sub>23</sub>

Loc.: Bottino, Tuscany.

Ref.: Berry, L.G., and Moddle, D.A.: Univ. Tor. Stud., Geol. Ser., No. 46, 1941, p. 10.

MESOLITE  
Na<sub>2</sub> Ca<sub>2</sub> Al<sub>6</sub> Si<sub>9</sub> O<sub>30</sub> · 8H<sub>2</sub>O

Loc.: King's County, Nova Scotia, Canada.

Ref.: Peng, C.J.: Am. Min., 40, 1955, p. 850.

META-AUTUNITE  
Ca (UO<sub>2</sub>)<sub>2</sub> (PO<sub>4</sub>)<sub>2</sub> · 6 - 8 H<sub>2</sub>O

Source: U.S.G.S. material

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss: U.S.G.S. Bull. 1036-G, 1956, p. 120.

METACINNABARITE  
(Hg, Fe, Zn)S

Loc.: Clausthal, Harz, Germany.

Ref.: Baryshnikov, E.K., Merlich, B.V., and Slavskaya, A.I.:  
Min. Sbornik, Lvov, No. 11, 1957, p. 345.

METAHEWETTITE  
Ca V<sub>6</sub> O<sub>16</sub> · 9H<sub>2</sub>O

Loc.: Colorado, U.S.A.

d	I	d	I	d	I
7.6	10	3.10	10	1.796	7
3.72	4	2.90	3	1.673	2
3.43	4	2.57	1	1.555	2
3.26	1	2.26	5	1.411	1

META JARLITE

Loc.: Ivigtut, Greenland.

Ref.: Ferguson, R.B.: Am. Min., 34, 1949, p. 388.

META-ZEUNERITE  
Cu (UO<sub>2</sub>)<sub>2</sub> (AsO<sub>4</sub>)<sub>2</sub> · 6 - 8H<sub>2</sub>O

Loc.: Schneeberg, Saxony.

Ref.: Frondel, Judith Weiss: Am. Min., 36, 1951, p. 252.

MICA GROUP

Varities: Biotite; Franklin Furnace, New Jersey, U.S.A.

Fuchsite; Mattawachewan, Ontario, Canada.

Hydro Mica; Emerald Mine, British Columbia, Canada.

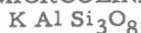
Lepidolite; Mount Mica, Paris, Maine, U.S.A.

Mariposite; Tuttletown, Tutlume County, California, U.S.A.

Muscovite; Peterborough County, Ontario, Canada.

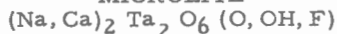
Phlogopite; Synthetic, (U.S.G.S.).  
Wakefield, Quebec, Canada.

MICROCLINE



Loc.: Cameron Township, Ontario, Canada.

MICROLITE



Loc.: Amelia, Virginia, U.S.A.

Ref.: A.S.T.M., No. 3-1139.

MICROSOMMITE



Loc.: Vesuvius, Italy.

d	I	d	I	d	I
6.3	3	2.16	1	1.454	1
4.97	4	2.12	1	1.427	2
4.32	4	2.09	4	1.382	4
4.17	6	2.03	1	1.373	2
3.83	9	1.985	2	1.343	1
3.62	4	1.928	3	1.314	2
3.54	1	1.879	2	1.279	3
3.26	7	1.836	1	1.264	1/2
3.00	10	1.789	2	1.254	1/2
2.87	5	1.724	1	1.234	1
2.80	1	1.691	2	1.219	1
2.73	1	1.633	1	1.202	2
2.57	4	1.615	2	1.184	2
2.49	2	1.596	1	1.168	1/2
2.39	2	1.560	5	1.153	1/2
2.34	6	1.520	2	1.139	2
2.30	4	1.466	2	1.128	2

MILLERITE



Loc.: Orford, Quebec, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 38.

MIMETITE  
 $Pb_5 (AsO_4, PO_4)_3 Cl$

Loc.: Roughton Gill, Cumberland, England.  
Ref.: Guillemin, C.: Bull. Soc. Franc. Min. Crist., vol. 75, 1952,  
p. 138.

MINIUM  
 $Pb_3 O_4$

Loc.: Proprietary Mine, Broken Hill, New South Wales, Australia.  
Ref.: Skinner, B.S., and McBrian, E.M.: Min. Mag., vol. 31,  
1958, p. 949.

MINNESOTAITE  
 $Fe_3 Si_4 O_{10} (OH)_2$

Loc.: Original material from J. W. Gruner, University of Minnesota.  
Ref.: Gruner, John: Am. Min., 29, 1944, p. 373-377.

MIXITE  
 $Cu_{11} Bi (AsO_4)_5 (OH)_{10} \cdot 6H_2O$

Loc.: Tintic District, Utah, U.S.A.  
Ref.: Kokkoros, P.: Tscher. Min. Petr. Mitt., ser. 3, vol. 3,  
1952, p. 59.

MOLYBDENITE  
 $Mo S_2$

Loc.: Aldfield, Quebec, Canada.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and  
Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 63.

MONAZITE  
 $(Ce, La, Y, Th) PO_4$

Loc.: Labelle County, Quebec, Canada.  
Ref.: Karkhanavala, M.D., and Shankar, J.: Proc. Indian Acad.  
Sci., vol. 40, sec. A, 1954, pp. 67-71.

MONETITE  
 $Ca H PO_4$

Loc.: Island of Mona, West Indies.  
Ref.: Hill, W.L., and Hendricks, S.B.: J. Ind. Eng. Chem., vol.  
28, No. 4, 1936, p. 440.

MONTICELLITE  
Mg Ca SiO<sub>4</sub>

Loc.: Crestmore, California, U.S.A.

Ref.: Kouvo, Olavi: Bull. Comm. Geol. Finlande, vol. 26, No. 157, 1952, pp. 7-11.

MONTMORILLONITE  
O · 33(K, Na, Mg, Ca) · (Al, Mg, Fe)<sub>2</sub> (Si, Al)<sub>4</sub>O<sub>10</sub> (OH)<sub>2</sub>

Loc.: Alleghany County, New York, U.S.A.

Ref.: Earley, J.W., Osthau, B.B., and Milne, I.H.: Am. Min., 38, 1953, p. 715.

MONTROSEITE  
(V, Fe) O · OH

Loc.: Paradise Valley, Montrose County, California, U.S.A.

Ref.: Weeks, A.D., Cisney, E.A., and Sherwood, A.M.: Am. Min. 38, 1953, p. 1240.

MORDENITE -- See Ashtonite

MOSANDRITE  
Na Ca<sub>6</sub> Ce<sub>2</sub> (Ti, Zr)<sub>2</sub> Si<sub>7</sub> O<sub>24</sub> (OH, F)<sub>7</sub>

Loc.: Langesundfiord, Norway.

d	I	d	I	d	I
5.45	2	2.56	2b	1.702	1
4.14	3	2.38	1	1.667	5
3.82	1	2.29	1	1.584	2
3.54	4	2.17	2	1.524	3
3.05	10	2.00	5	1.46	1b
2.92	3	1.914	1	1.401	1
2.78	3	1.848	4	1.263	1
2.68	4	1.805	2	1.237	1

MOUNTAIN CORK -- See Amphibole Group

MUSCCVITE -- See Mica Group

NADORITE  
Pb Sb O<sub>2</sub> Cl

Loc.: Djebel-Nador, Constantine, Algeria.  
Ref.: Sillen, Lars Gunnar and Lars Melander: Zeits. Krist., vol. 103, 1941, p. 420.

NAGYAGITE  
Pb<sub>5</sub> Au(Te, Sb)<sub>4</sub> S<sub>5-8</sub>

Loc.: Nagyag, Transylvania.  
Ref.: Thompson, R.M.: Am. Min., 34, 1949, p. 363.

NARSARSUKITE  
Na<sub>2</sub> (Ti, Fe) Si<sub>4</sub> (O, F)<sub>11</sub>

Loc.: Igalike, Greenland.  
Ref.: Stewart, D.B.: Am. Min., 44, 1959, p. 269.

NASONITE  
Ca<sub>4</sub> Pb<sub>6</sub> Si<sub>6</sub> O<sub>21</sub> Cl<sub>2</sub>

Loc.: Franklin Furnace, New Jersey, U.S.A.

d	I	d	I	d	I
7.9	4	1.870	3	1.302	2
4.8	3	1.838	1	1.282	1
4.4	3	1.822	2	1.265	1
4.0	5	1.784	2	1.246	1
3.64	3	1.718	2	1.234	1
3.26	7	1.698	1	1.210	1/2
3.18	3	1.658	1/2	1.175	1
2.78	10	1.635	4	1.167	1
2.64	3	1.591	3	1.149	2
2.56	1	1.561	5	1.141	1
2.52	6	1.505	3	1.129	1
2.38	5	1.490	1	1.117	1/2
2.33	1/2	1.436	3	1.100	1
2.19	1b	1.395	2	1.088	1/2
2.11	3	1.368	2	1.069	2
2.07	3	1.352	1	1.058	2
2.00	5	1.334	1/2		

NATROCHALCITE  
Na Cu<sub>2</sub> (SO<sub>4</sub>)<sub>2</sub> OH · H<sub>2</sub>O

Loc.: Chuquicamata, Chile.

d	I	d	I	d	I
6.5	5	2.16	1	1.339	1/2
4.8	4	2.06	3	1.320	3
4.6	1	1.931	3	1.273	2
4.4	3	1.842	1	1.261	1
4.1	1/2	1.79	2b	1.237	1
3.85	3	1.768	2	1.224	2
3.44	8	1.723	2	1.211	2
3.29	1/2	1.683	4	1.179	1
3.20	4	1.641	3	1.152	3
3.10	1/2	1.602	2	1.140	1
2.79	10	1.547	3	1.128	2
2.64	3	1.507	1	1.113	1
2.52	9	1.482	1	1.098	2
2.40	2	1.457	4	1.088	1
2.30	4	1.426	2	1.080	1
2.25	2	1.395	2	1.069	1
2.19	2	1.355	3	1.06	2b

NATROJAROSITE  
 $\text{Na Fe}_3 (\text{SO}_4)_2 (\text{OH})_6$

Loc.: Luning Mineral County, Nevada, U.S.A.

Ref.: Mitchell, Richard S., and Giannini, William F.: Am. Min.,  
 43, 1958, p. 1208.

NATROLITE  
 $\text{Na}_2 \text{Al}_2 \text{Si}_3 \text{O}_{10} \cdot 2\text{H}_2\text{O}$

Loc.: Aussig, Bohemia.

Ref.: Peng, C.F.: Am. Min., 40, 1955, p. 845.

NATRON  
 $\text{Na}_2 \text{CO}_3 \cdot 10\text{H}_2\text{O}$

Loc.: Not known.

d	I	d	I	d	I
5.8	6	2.36	1	1.539	1
5.1	5	2.28	3	1.501	1
4.9	10	2.17	3	1.450	1/2
4.3	4	2.06	1	1.429	1/2
3.91	4	2.04	1	1.419	1/2
3.64	6	1.993	5	1.398	4
3.45	3	1.961	1	1.382	1
3.25	5	1.885	6	1.343	2
3.15	3	1.830	2	1.331	2
3.02	5	1.767	2	1.307	2
2.94	5	1.727	3	1.282	3
2.79	5	1.694	1	1.269	1
2.68	6	1.677	3	1.253	2
2.53	3	1.615	3	1.231	2
2.48	3	1.597	1	1.214	1
2.40	3	1.572	3		

NEPHELINE

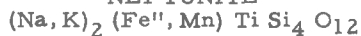


Loc.: York River, Hastings County, Ontario, Canada.

Ref.: Peng, C.J.: Am. Min., 40, 1955, p. 847.

NEPHRITE -- See Amphibole Group

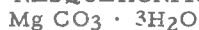
NEPTUNITE



Loc.: San Benito County, California, U.S.A.

d	I	d	I	d	I
7.6	3	2.84	4	1.760	2
6.2	1	2.72	4	1.690	1
5.8	2	2.55	2	1.653	1
4.7	1	2.47	7	1.586	2
4.5	5	2.40	1	1.566	1
4.2	3	2.31	1b	1.507	5
3.83	3	2.16	7	1.482	3
3.51	8	2.08	4	1.422	2
3.30	2	2.04	4	1.381	3
3.18	10	1.978	1	1.356	3
3.08	1	1.914	3		
2.92	8	1.870	1		

NESQUEHONITE



Loc.: Nesquehoning, Carbon County, Pennsylvania, U.S.A.

Ref.: A.S.T.M., No. 1-0130.

NEWBERYITE



Loc.: Skipton Caves, Victoria, Australia.

Ref.: A.S.T.M., No. 1-0597.

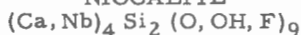
NICCOLITE



Loc.: Temiskaming, Ontario, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 36.

NIOCALITE



Loc.: Oka, Quebec, Canada.

Ref.: Nickel, E. H., Rowland, J. F., and Maxwell, J. A.: Can. Min., vol. 6, pt. 2, 1958, p. 269.

NITRE



Loc.: Fraser River, British Columbia, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 113.

NOCERITE -- See Fluoborite

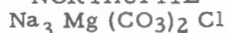
NOLANITE



Loc.: Goldfields, Saskatchewan, Canada.

Ref.: Robinson, S. C., Evans, H. T., Jr., Schaller, W. T., and Fahey, J. J.: Am. Min., 42, 1958, p. 627.

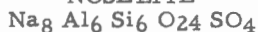
NORTHUPITE



Loc.: Borax Lake, San Bernardino County, California, U.S.A.

Ref.: A.S.T.M., No. 2-0916.

NOSELITE



Loc.: Schildkorpfi, Brenk, Eifel, Rhine Province, Germany.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 244.

OKENITE  
 $\text{Ca Si}_2 \text{O}_4 (\text{OH})_2 \cdot \text{H}_2\text{O}$

Loc.: Disco Island, Greenland.  
Ref.: Gard, J.A., and Taylor, H.F.W.: Min. Mag., vol. 31, No. 232, 1956, p. 8.

OLDHAMITE  
Ca S

Loc.: Synthetic material from G.S.C.  
Ref.: A.S.T.M., No. 1-0980.

OLIGOCLASE - See Plagioclase Feldspar Group

OLIVENITE  
 $\text{Cu}_2 \text{AsO}_4 \text{OH}$

Loc.: Cornwall, England.  
Ref.: Berry, L.G.: Am. Min., 36, 1951, p. 502.

OLIVINE  
 $(\text{Mg, Fe})_2 \text{Si O}_4$

Loc.: Labelle County, Quebec, Canada.  
Ref.: Claringbull, G.F., and Hey, M.H.: Min. Mag., vol. 29, No. 217, 1952, p. 845.

OMPHACITE -- See Pyroxene Group

ONOFRITE  
Hg S

Loc.: Marysvale, Utah, U.S.A.

d	I	d	I	d	I
3.40	10	1.482	3	0.973	1
3.05	4	1.360	4	0.937	2
2.09	8	1.325	2		
1.786	7	1.097	5		
1.709	2	1.045	3		

ORPIMENT  
 $\text{As}_2\text{S}_3$

Loc.: Mercur, Utah, U.S.A.  
Ref.: Harcourt, G. Alan: Am. Min., 27, 1942, p. 92.

ORTHOCLASE  
 $\text{K Al Si}_3\text{O}_8$

Loc.: Baveno, Italy.  
Gap Map-area, Southwestern Alberta, Canada.

OTAVITE  
 $\text{Cd CO}_3$

Loc.: Tsumeb, Otavi District, South West Africa.  
Ref.: A.S.T.M., No. 8-456.

OWYHEEITE  
 $\text{Pb}_5\text{Ag}_2\text{Sb}_6\text{S}_{15}$

Loc.: Unknown.  
Ref.: Robinson, S.C.: Am. Min., 34, 1949, p. 401.

PACHNOLITE  
 $\text{Na Ca Al F}_6 \cdot \text{H}_2\text{O}$

Loc.: St. Peter's Dome, Colorado, U.S.A.  
Ref.: Ferguson, R.B.: Trans. Roy. Soc. Canada, ser. 3, vol. 40,  
sec. 4, 1946, 50-11 (1946) pp. 11-25.

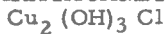
PAIGEITE (Vonsenite)  
 $(\text{Fe, Mg})_2\text{Fe}^{\text{III}}(\text{BO}_5)$

Loc.: Riverside, California, U.S.A.  
Ref.: Thompson, R.M., and Gower, J.A.: Am. Min., 39, 1954,  
p. 523.

PARARAMMELSBERGITE  
 $\text{Ni As}_2$

Loc.: Beaverlodge area, Saskatchewan, Canada.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and  
Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 61.

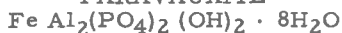
PARATACAMITE



Loc.: Governor's Island, Prince Edward Island, Canada.

Ref.: Garavelli, Carlo: Rend. Soc. Min. Italiana, vol. 11, 1955, p. 63.

PARAUAUXITE



Loc.: Llallagua, Bolivia.

d	I	d	I	d	I
6.3	8	2.70	2	1.947	2
5.9	2	2.58	5	1.810	2b
4.9	2	2.47	3	1.752	1
4.77	10	2.38	3	1.733	1
4.14	2	2.35	3	1.66	2b
3.90	4	2.27	3	1.634	2
3.63	2	2.17	1	1.623	
3.18	9	2.11	3	1.595	1
3.09	3	2.09	1	1.568	2
2.95	1	2.01	3	1.541	1
2.84	5	1.975	2		

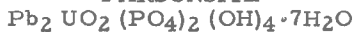
PARISITE



Loc.: Not known.

Ref.: A.S.T.M., No. 2-1257.

PARSONSITE



Loc.: U.S.G.S. mount.

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss: U.S.G.S. Bull. 1036-G, 1956, p. 126.

PASCOITE



Loc.: Minasragra, Peru.

d	I	d	I	d	I
8.8	6	3.34	5	2.23	2
7.3	7	3.26	5	2.18	3
5.9	2	3.01	7	2.12	5
5.5	10	2.83	5	2.03	3b
5.1	8	2.74	5	1.965	5
4.67	10	2.66	5	1.911	4
4.45	6	2.61	1	1.80	3b
4.27	1	2.41	4	1.637	4
3.60	4	2.34	2	1.58	1b
3.54		2.27	1	1.540	1

PATRONITE  
V S<sub>4</sub> (?)

Loc.: Minasragra, Peru.

d	I	d	I	d	I
6.1	3	3.35	2	2.37	2
5.47	6	3.13	3	2.30	1
5.15	10	3.02	5	2.27	1
4.37	3	2.90	2	2.22	1
3.92	5	2.83	3	1.98	4b
3.82	4	2.72	4	1.860	2
3.67	2	2.65	2	1.821	2
3.54	3	2.53	3		
3.44	2	2.46	2		

PECTOLITE  
Na Ca<sub>2</sub> Si<sub>3</sub> O<sub>8</sub> OH

Loc.: Lake Superior, Ontario, Canada.

Ref.: Hildebrand, Fred A.: Am. Min., 38, 1953, p. 1053.

PENNINITE -- See Chlorite Group

PENTLANDITE  
(Fe, Ni)<sub>9</sub> S<sub>8</sub>

Loc.: Algoma District, Ontario, Canada.

Ref.: Robinson, S.C., and Brooker, E.J.: Am. Min., 37, 1952, p. 543.

PERCYLITE  
Pb Cu Cl<sub>2</sub> (OH)<sub>2</sub> (?)

Loc.: Sierra Gorda, Chile.

d	I	d	I	d	I
7.6	3	2.30	4	1.394	1
5.45	5	2.26	4	1.383	3
5.08	4	2.16	1	1.368	1
4.83	1	2.13	1	1.353	2
4.40	10	2.08	3	1.33	2b
4.25	1	2.04	1	1.323	1
4.08	2	2.03	1	1.29	3b
3.82	6	1.99	5	1.27	1b
3.70	3	1.95	1/2	1.24	1b
3.50	2	1.911	2	1.22	1/2
3.33	1	1.853	2	1.208	1
3.12	4	1.801	5	1.201	1
3.06	4	1.753	5	1.174	2
2.94	1	1.713	2	1.158	1
2.83	2	1.678	2	1.146	3
2.77	4	1.616	1b	1.12	1/2
2.70	7	1.561	1	1.098	3
2.58	4	1.54	2	1.07	1/2
2.54	4	1.500	2	1.043	1
2.48	2	1.480	2	1.035	2
2.39	5	1.426	2	1.020	1
2.33	4	1.414		1.013	1

PEROVSKITE  
Ca TiO<sub>3</sub>

Loc.: Zermatt, Switzerland.

Ref.: Murdoch, Joseph: Am. Min., 36, 1951, p. 579.

PETZITE  
Ag<sub>3</sub> Au Te<sub>2</sub>

Loc.: Kalgoorlie, West Australia.

Ref.: Thompson, R.M.: Am. Min., 34, 1949, p. 351.

PHARMACOLITE  
Ca H AsO<sub>4</sub> · 2H<sub>2</sub>O

Loc.: Riechelsdorf, Hesse, Germany.

d	I	d	I	d	I
6.0	2	3.07	10	1.895	4
5.3	4	2.89	5	1.829	2
4.87	2	2.78	3	1.785	2
4.44	3	2.72	3	1.738	2
4.14	3	2.60	2	1.670	3
3.95	1	2.52	3	1.596	1
3.77	6	2.44	2	1.540	2
3.49	2	2.17	3	1.531	2
3.40	2	2.11	2		
3.19	8	1.99	4		

PHARMACOSIDERITE  
 $\text{Fe}_3 (\text{AsO}_4)_2 (\text{OH})_3 \cdot 5\text{H}_2\text{O}$

Loc.: Konigsburg, Hungary.

d	I	d	I	d	I
7.9	10	2.13	1	1.537	3
4.6	4	1.995	1	1.458	2
3.98	4	1.933	3	1.411	4
3.57	1	1.883	4	1.389	2
3.25	6	1.831	1	1.371	1
2.82	5	1.786	5	1.352	2
2.66	3	1.742	1	1.330	2
2.52	4	1.630	3	1.292	1
2.40	4	1.595	4	1.263	1
2.31	2	1.566	1	1.247	1

PHENACITE  
 $\text{Be}_2 \text{SiO}_4$

Loc.: Tokovaja, Siberia.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 160.

PHILLIPSITE  
 $(\text{K}_2, \text{Na}_2, \text{Ca}) \text{Al}_2 \text{Si}_4 \text{O}_{12} \cdot 4 \frac{1}{2} \text{H}_2\text{O}$

Loc.: Capo di Bove, Italy.

Ref.: Bannister, F.A., and Hey, M.H.: Min. Mag., vol. 26, No. 177, 1942, p. 224.

PHLOGOPITE -- See Mica Group

PHOSGENITE  
 $\text{Pb}_2 \text{CO}_3 \text{Cl}_2$

Loc.: Dundas, Tasmania.

Ref.: Midgley, H.G.: Min. Mag., vol. 31, No. 241, 1958, p. 883.

PHOSPHOFERRITE  
 $(\text{Fe, Mn})_3 (\text{PO}_4)_2 \cdot 3\text{H}_2\text{O}$

Loc.: Hagendorf, Bavaria.

Ref.: Tennyson, Christel: Neues Jahr. Min. Abhandl., vol. 87, 1954, p. 208.

PHOSPHURANYLITE (Dewindtite)  
 $\text{Ca} (\text{UO}_2)_4 (\text{PO}_4)_2 (\text{OH})_4 \cdot 7\text{H}_2\text{O}$

Loc.: Stony Rapids, Saskatchewan, Canada.

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss: U.S.G.S. Bull. 1036-G, 1956, p. 127.

PICROMERITE  
 $\text{K}_2 \text{Mg}(\text{SO}_4)_2 \cdot 6\text{H}_2\text{O}$

Loc.: Stassfurt, Prussia.

d	I	d	I	d	I
5.8	4	2.47	1	1.701	4
5.2	2	2.37	6	1.647	2
4.8	3	2.28	1	1.610	1
4.16	3	2.16	3	1.582	2
3.94	2	2.12	1	1.541	1
3.68	2	2.06	2	1.505	2
3.42	10	1.993	1	1.443	1
3.29	3	1.945	4	1.396	2
3.02	4	1.912	1	1.375	2
2.87	3	1.877	1	1.325	1
2.74	3	1.835	2	1.311	1/2
2.61	2	1.791	2		

PILBARITE  
 $\text{Pb Th UO}_2 \text{Si}_2\text{O}_8 \cdot 4\text{H}_2\text{O} (?)$

Loc.: Pilbara, Western Australia.

Remarks: Harvard University material.

PINAKIOLITE  
 $Mg_3 Mn^{II} Mn_2^{III} B_2O_{10}$

Loc.: Langban, Sweden.  
Ref.: Thompson, R.M., and Gower, J.A.: Am. Min., 39, 1954,  
p. 523.

PITCHBLENDE  
 $U O_2$

Loc.: Hottah Lake, Northwest Territories, Canada.  
Goldfields Area, Saskatchewan, Canada.  
Great Bear Lake, Northwest Territories, Canada.  
Agawa River, Lake Superior, Canada.

PLAGIOCLASE FELDSPAR  
 $NaAlSi_3O_8 - CaAl_2Si_2O_8$

Varieties: Albite; Amelia, Virginia, U.S.A.  
Andesine; Montmorency County, Quebec, Canada.  
Anorthite; Yamaska County, Quebec, Canada.  
Labradorite; Labrador, Canada.  
Oligoclase; Hull, Quebec, Canada.

PLANCHEITE  
 $Cu_{15} Si_{12} O_{36} (OH)_8 (?)$

Loc.: Bisbee, Arizona, U.S.A.  
Ref.: Billiet, V.: Verh. K. Vlaamsche Acad. Wetensch. Belgie,  
vol. 4, No. 1, 1942, pp. 1-59.

PLATINUM  
Pt

Loc.: North Saskatchewan River, Alberta, Canada.  
Ref.: Swanson, Howard E., and Tatge, Eleanor: Std. X-Ray Diff.  
Patterns, Nat. Bur. Stds., Circ. 539, vol. 1, 1953, p. 32.

PLATTNERITE  
 $PbO_2$

Loc.: Youlike Lode, Mullan, Idaho, U.S.A.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and  
Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 99.

POLLUCITE  
(Cs, Na) AlSi<sub>2</sub>O<sub>6</sub> · nH<sub>2</sub>O

Loc.: Norway, Maine, U.S.A.  
Ref.: Fleischer, Michael, and Ksanda, C.J.: Am. Min., 25, 1940,  
p. 670.

POLYBASITE  
(Ag, Cu)<sub>16</sub> Sb<sub>2</sub> S<sub>11</sub>

Loc.: Hoelntsch, Hungary.  
Ref.: Peacock, M.A., and Berry, L.G.: Min. Mag., vol. 28, No.  
196, 1947, p. 8.

POLYCRASE  
(Y, Ca, Ce, U, Th) (Ti, Nb, Ta)<sub>2</sub> O<sub>6</sub>

Loc.: Nipissing, Ontario, Canada, and other localities.  
Ref.: U.S.G.S. standard pattern (Sp. 477).

POLYDYMITE  
Ni<sub>3</sub> S<sub>4</sub>

Loc.: Sudbury, Ontario, Canada.

d	I	d	I	d	I
5.46	2	1.746	1	1.225	3
5.33	4	1.673	10	1.175	3
4.17	10	1.583	1	1.110	1
2.37	6	1.537	1	1.089	2
1.936	3	1.482	1	1.053	3
1.897	1	1.433	2	0.989	1
1.865	2	1.355	3	0.962	4
1.823	5	1.255	1		

POLYHALITE  
K<sub>2</sub> Ca<sub>2</sub> Mg(SO<sub>4</sub>)<sub>4</sub> · 2H<sub>2</sub>O

Loc.: Stassfurt, Germany.  
Ref.: Armstrong, G., Dunham, K.C., Harvey, C.O., Sabine, P.A.  
and Waters, W.F.: Min. Mag., vol. 29, No. 214, 1951, p.  
688.

POLYLITHIONITE  
 $K_2 Li_4 Al_2 Si_8 O_{20} (OH, F)_4$

Loc.: Kangerdluarsuk, Greenland.

d	I	d	I	d	I
4.9	8	2.57	10	1.497	6
4.5	10	2.44	1	1.445	1
4.2	1	2.38	4	1.340	1
3.88	1	2.24	3	1.295	3
3.59	4	2.12	2	1.281	1
3.29	8	1.979	7	1.239	1
3.07	5	1.65	1b	1.195	1
2.86	3	1.57	1/2		
2.65	1	1.54	1/2		

POWELLITE  
 $Ca (Mo, W)O_4$

Loc.: Lacorne Township, Quebec, Canada.

Ref.: Vermaas, F.H.S.: Am. Min., 37, 1952, p. 732.

PREHNITE  
 $Ca_2 Al_2 Si_3 O_{10} (OH)_2$

Loc.: West Palerron, New Jersey, U.S.A.

Ref.: Nuffield, E.W.: Univ. Tor. Stud., Geol. Ser., No. 48, 1943, pp. 49-64.

PRIORITE -- See Eschynite-Priorite Series

PROCHLORITE -- See Chlorite Group

PROSOPITE  
 $Ca Al_2 (F, OH)_8$

Loc.: St. Peter's Dome, Colorado, U.S.A.

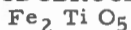
Ref.: Ferguson, R.B.: Am. Min., 34, 1949, p. 372.

PROUSTITE  
 $Ag_3 As S_3$

Loc.: O'Brien Mine, Cobalt, Ontario, Canada.

Ref.: Wernick, J.H., Geller, S., and Benson, K.E.: Anal. Chem., vol. 30, 1958, p. 303.

PSEUDOBROOKITE



Loc.: Aranyer - Berg, Transylvania.

d	I	d	I	d	I
4.8	4	2.19	1b	1.628	1
3.49	10	1.965	1	1.555	2
3.25	1	1.861	2	1.534	2
2.75	5	1.692	1		
2.43	3b	1.658	1		

PSEUDOMALACHITE



Loc.: Ruwe, Katanga, Belgian Congo.

Ref.: Berry, L.G.: Am. Min., 35, 1950, p. 377.

PSILOMELANE



Loc.: Virginia, U.S.A.

Ref.: McMurdie, Howard F., and Golovato, Esther: J. Res. Nat. Bur. Stds., vol. 41, 1948, pp. 589-99.

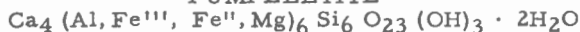
PUCHERITE



Loc.: Pucher Mine, Schneeberg, Saxony.

d	I	d	I	d	I
6.0	3	2.17	2	1.594	2
4.7	5	2.13	4	1.563	4
3.99	5	2.03	1	1.553	6
3.51	10	1.993	4	1.503	1
3.14	1	1.935	4	1.490	2
3.00	4	1.877	2	1.411	2
2.71	10	1.833	4	1.381	1
2.66	2	1.706	1	1.359	1
2.53	3	1.683	1		
2.31	3	1.663	1		

PUMPELLYITE



Loc.: Calumet and Hecla Mine, Michigan, U.S.A.

Ref.: Coombs, D.S.: Min. Mag., vol. 30, No. 221, 1953, p. 121.

PYRARGYRITE



Loc.: Pribram, Hungary.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 54.

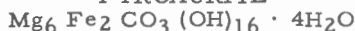
PYRITE



Loc.: Elba.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 55.

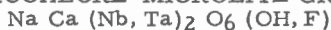
PYROAURITE



Loc.:

d	I	d	I	d	I
7.6	10	1.670	1	1.223	1
4.8	1	1.556	2	1.08	1/2
3.89	7	1.526	3	1.01	1/2
2.62	4	1.497	1	0.993	1
2.33	4	1.448	1		
1.981	5	1.335	1		
1.763	1	1.292	2		

PYROCHLORE-MICROLITE GROUP



Localities: Blue River British Columbia, Canada.

Bancroft, Ontario, Canada.

Hybla, Ontario, Canada.

Other localities.

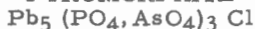
Ref.: Hogarth, D.D.: Unpub. Ph.D. thesis, McGill Univ., 1959.

PYROLUSITE



- Loc.: New Ross, Lunenburg County, Nova Scotia, Canada.  
Ref.: McMurdie, Howard F., and Golovato, Esther: J. Res. Nat. Bur. Stds., vol. 41, 1948, p. 589-99.

PYROMORPHITE



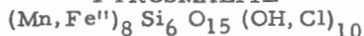
- Loc.: Roughton Gill, England.  
Ref.: A.S.T.M., No. 2-0742.

PYROPHYLLITE



- Loc.: Cape Breton, Nova Scotia, Canada.  
Ref.: Roy, Rustum, and Osborn, E.F.: Am. Min., 39, 1954, p. 862.

PYROSMALITE



- Loc.: Nordmark, Sweden.  
Ref.: Stillwell, F.L., and McAndrew, J.: Min. Mag., vol. 31, No. 236, 1957, p. 374.

PYROXENE GROUP

Varieties: Acmite; Narsarsuk, Greenland.

Augite; Belim, Austria.

Diopside; Mussa Alp, Piedmont, Italy.

Enstatite; Mine Field, Maryland, U.S.A.

Hedenbergite; Rockport, Massachusetts, U.S.A.

Hypersthene; Labrador, Canada.

Jeffersonite; Franklin, New Jersey, U.S.A.

Malacolite; Sing Sing, New York, U.S.A.

Omphacite; Huntington, Indiana, U.S.A.

PYRRHOTITE



Loc.: St. Stephen County, New Brunswick, Canada.

Ref.: Erd, R.C., Evans, H.T. Jr., and Richter, D.H.: Am. Min., 42, 1957, p. 318.

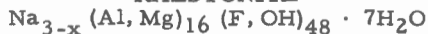
QUARTZ



Loc.: Several localities.

Ref.: Swanson, Howard E., and Tatge, Eleanor: Std. X-ray Diff. Patterns, Nat. Bur. Stds., Circ. 539, vol. 3, 1954, pp. 24-26.

RALSTONITE



Loc.: Ivigtut, Greenland.

Ref.: Ferguson, R.B.: Am. Min., 34, 1949, p. 395.

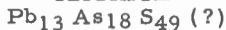
RAMMELSBERGITE



Loc.: Beaverlodge, Saskatchewan, Canada.

Ref.: Temple, A.K.: Min. Mag., vol. 30, No. 227, 1954, p. 542.

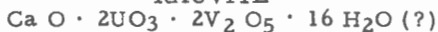
RATHITE



Loc.: Binnenthal, Switzerland.

Ref.: A.S.T.M., No. 2-0695.

RAUVITE



Source: U.S.G.S. mount.

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss: U.S.G.S. Bull. 1036-G, 1956, p. 128.

REALGAR



Loc.: Felsobanya, Hungary.

Ref.: Harcourt, G. Alan: Am. Min., 27, 1942, p. 95.

RENARDITE  
 $\text{Pb}(\text{UO}_2)_4 (\text{PO}_4)_2 (\text{OH})_4 \cdot 7\text{H}_2\text{O}$

Loc.: Shinkolobwe, Katanga, Belgian Congo.  
 Ref.: Frondel, Clifford, and Cuttitta, Frank: Am. Min., 39, 1954,  
 p. 449.

RHODOCROSITE  
 $\text{Mn CO}_3$

Loc.: Butte, Montana, U.S.A.  
 Ref.: Galloni, Ernesto, E.: Am. Min., 35, 1950, p. 565.

RHODONITE  
 $\text{Mn Si O}_3$

Loc.: Franklin Furnace, New Jersey, U.S.A.  
 Ref.: A.S.T.M., No. 5-0614.

RICHTERITE -- See Amphibole Group

RINKITE  
 $(\text{Na, Ca})_{12} (\text{Ce, Ti})_5 \text{Sig}' (\text{O, F})_{36}$

Loc.: Kangerdluarsuk, Greenland.

d	I	d	I	d	I
4.2	2b	2.58	2	1.759	1
3.85	1b	2.40	1b	1.716	1
3.58	2b	2.30	1	1.682	5
3.43	1	2.19	2	1.593	2
3.07	10	2.02	5	1.551	1
2.94	4	1.93	1	1.533	4
2.80	3	1.859	6	1.48	2b
2.70	4	1.820	3	1.431	1

ROCKBRIDGEITE  
 $(\text{Fe}^{\text{II}}, \text{Mn}^{\text{II}}) \text{Fe}_4^{\text{III}} (\text{PO}_4)_3 (\text{OH})_5$

Loc.: Rockbridge County, Virginia, U.S.A.  
 Ref.: Frondel, Clifford: Am. Min., 34, 1949, p. 538.

ROEMERITE  
 $\text{Fe}^{\text{II}} \text{Fe}_2^{\text{III}} (\text{SO}_4)_4 \cdot 14\text{H}_2\text{O}$

Loc.: Klausen, Tyrol, Austria.  
 Ref.: A.S.T.M., No. 4-0167.

ROMEITE  
 $(\text{Ca}, \text{Fe}, \text{Mn}, \text{Na})_2 (\text{Sb}, \text{Ti})_2 \text{O}_6 (\text{O}, \text{OH}, \text{F})$

Loc.: St. Marcel Mine, Piedmont, Italy.  
 Ref.: Natta, G., and Baccaredda, M.: Zeits. Krist., vol. 85, 1933,  
 p. 284.

ROSELITE  
 $(\text{Ca}, \text{Co})_2 (\text{Co}, \text{Mg}) (\text{AsO}_4)_2 \cdot 2\text{H}_2\text{O}$

Loc.: Schneeberg, Saxony.

d	I	d	I	d	I
6.9	4	2.25	3	1.530	2
5.04	5	2.18	1	1.524	
4.18	3	2.09	5	1.497	4
3.75	4	2.06	1	1.414	3
3.36	6	2.01	1	1.390	3
3.22	4	1.863	1	1.372	2
3.13	4	1.814	5	1.320	2
2.98	10	1.726	6	1.280	3
2.76	7	1.702	3	1.244	2
2.69	1	1.608	2	1.222	1
2.59	3	1.569	3	1.206	4
2.33	2				

ROWLANDITE  
 $\text{Y}_4 \text{Si}_3 \text{O}_{12}$

Loc.: Llano, Texas, U.S.A.

d	I	d	I	d	I
7.2	1	2.40	4	1.765	1
6.4	3	2.28	2	1.669	3
4.86	5	2.14	3	1.630	1
4.21	3	2.11	5	1.584	1
3.43	10b	1.991	8	1.52	2b
3.22	10	1.929	2	1.43	3b
2.80	8	1.843	2		
2.56	1	1.797	4		

RUTILE  
Ti O<sub>2</sub>

Loc.: Ottawa County, Quebec, Canada.

Ref.: A.S.T.M., No. 4-0551.

Variety: Struverite:

Loc.: Tongafeno, Madagascar

Ref.: Gasperin, M.: Bull. Soc. Franc. Min. Crist.,  
vol. 80, 1957, p. 234.

Remarks: Material was heated for 5 minutes in vacuum at  
1,000° C.

SAL AMMONIAC  
NH<sub>4</sub> Cl

Loc.: Vesuvius, Italy.

d	I	d	I	d	I
3.86	4	1.372	3	0.972	1/2
3.04	1	1.293	2	0.943	1
2.73	10	1.228	4	0.916	3
2.24	3	1.171	1	0.868	2
1.937	4	1.121	1	0.847	1
1.734	3	1.080	1	0.827	1
1.583	5	1.039	4	0.792	2

SALÉEITE  
Mg (UO<sub>2</sub>)<sub>2</sub> (PO<sub>4</sub>)<sub>2</sub> · 8-10 H<sub>2</sub>O

Loc.: Schneeberg, Saxony (Harvard University mount)

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 130.

SAMARSKITE  
(Y, Er, Ce, U, Ca, Fe, Pb, Th) (Nb, Ta, Ti, Sn)<sub>2</sub> O<sub>6</sub>

Loc.: Mitchell County, North Carolina, U.S.A.

Ref.: U.S.G.S. pattern (Standard Spindle No. 169).

SAPONITE  
9MgO · Al<sub>2</sub>O<sub>3</sub> · 10SiO<sub>2</sub> · 15-16H<sub>2</sub>O

Loc.: Hogg Island (St. George Island), Prince Edward Island, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and  
Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 231.

SAPPHIRINE  
Mg<sub>2</sub> Al<sub>4</sub> Si O<sub>10</sub>

Loc.: Bay St. Paul, Quebec, Canada.

Ref.: Foster, Wilfred R.: J. Geol., vol. 58, 1950, p. 143.

SARCOLITE  
Na Ca<sub>4</sub> Al<sub>3</sub> Si<sub>5</sub> O<sub>19</sub>

Loc.: Mte. Somma, Vesuvius, Italy.

d	I	d	I	d	I
6.2	3	2.26	4	1.621	1
5.8	1	2.24	5	1.593	2
5.2	1b	2.15	3b	1.578	1
4.8	4	2.10	3b	1.566	1
4.4	1	2.01	1/2	1.540	1/2
3.95	4	1.949	4	1.519	4
3.17	4	1.933	4	1.497	4
3.12	6	1.852	2	1.478	3
3.06	4	1.841	2	1.47	1/2
3.02	4	1.807	1	1.438	4
2.75	10	1.788	1	1.418	2
2.69	3	1.743	1	1.395	1
2.67	3b	1.731	1	1.37	1b
2.47	1	1.668	2	1.33	1b
2.42	1	1.640	1b	1.30	2b

SARCOPSIDE  
(Fe, Mn, Ca)<sub>7</sub> (PO<sub>4</sub>)<sub>4</sub> F<sub>2</sub>

Loc.: Deering, New Hampshire, U.S.A.

Ref.: McConnell, Duncan: Am. J. Sci., vol. 240, 1942, p. 652.

SARKINITE  
Mn<sub>2</sub> AsO<sub>4</sub> OH

Loc.: Langban, Sweden.

d	I	d	I	d	I
6.0	6	2.25	2	1.592	2
5.54	2	2.19	4	1.572	1
3.48	6	2.12	4	1.516	5
3.29	7	2.03	5	1.469	5
3.17	10	1.977	2	1.449	2
3.04	10	1.925	2	1.418	2
2.89	6	1.85	2b	1.395	2
2.65	5	1.774	2	1.376	1
2.54	3	1.731	2	1.355	1
2.37	4	1.68	3b		
2.30	2	1.639	4		

SARTORITE  
 $\text{Pb As}_2 \text{S}_4$

Loc.: Binnenthal, Canton, Wallis, Switzerland.  
Ref.: A.S.T.M., No. 2-0400.

SCAPOLITE -- See Meionite

SCHEELITE  
 $\text{Ca WO}_4$

Loc.: Keefers, British Columbia, Canada.  
Ref.: Vermaas, F.H.S.: Am. Min., 37, 1952, p. 719-735.

SCHIZOLITE  
 $\text{Na (Ca, Mn)}_2 \text{Si}_3 \text{O}_8 (\text{OH})$

Loc.: Ilimaussag, South Greenland.  
Ref.: Schaller, Waldemar T.: Am. Min., 40, 1955, p. 1024.

SCHOEPITE  
 $2 \text{UC}_2 \cdot 5\text{H}_2\text{O}$

Remarks: U.S.G.S. mount.  
Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 131.

SCHREIBERSITE  
 $(\text{Fe, Ni})_3 \text{P}$

Loc.: Edmonton, Kentucky, U.S.A. (meteorite).

d	I	d	I	d	I
2.49	4	1.965	8	1.230	1
2.45	1	1.824	3	1.203	1
2.18	10	1.774	4	1.153	1
2.13	4	1.759	4	1.111	1
2.11	5	1.672	3	1.093	2
2.02	4	1.274	3		

SCHROECKINGERITE  
 $\text{Na Ca}_3 \text{UO}_2 \text{SO}_4 (\text{CO}_3)_3 \text{F} \cdot 10\text{H}_2\text{O}$

Remarks: U.S.G.S. mount.

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 132.

SCOLECITE  
 $\text{Ca Al}_2 \text{Si}_3 \text{O}_{10} \cdot 3\text{H}_2\text{O}$

Loc.: Megantic County, Quebec, Canada.

Ref.: Peng, C.J.: Am. Min., 40, 1955, p. 849.

SCORODITE  
 $\text{Fe AsO}_4 \cdot 2\text{H}_2\text{O}$

Loc.: Ouro Preto, Minas Geraes, Brazil.

Ref.: Guillemin, C.: Bull. Soc. Franc. Min. Crist., vol. 75, 1952,  
p. 133.

SELENSULPHUR  
S, Se

Loc.: Cinciana, Sicily.

d	I	d	I	d	I
7.7	1	2.43	3	1.655	2
5.8	4	2.38	2	1.629	2
4.1	2	2.29	2	1.605	2
3.85	10	2.16	1	1.563	1
3.58	1	2.12	4	1.540	1
3.46	4	1.997	1	1.51	1/2
3.35	2	1.965	1	1.48	1/2
3.22	6	1.900	3	1.447	3
3.10	4	1.831	2	1.426	3
2.85	4	1.787	3	1.399	1
2.69	1	1.765	2	1.373	1
2.62	3	1.731	2	1.36	2b
2.57	1	1.698	2		
2.50	2	1.669	1		

SEMSEYITE  
 $Pb_9 Sb_8 S_{21}$

Loc.: Kisbanya, Hungary.

Ref.: Peacock, M.A.: Univ. Tor. Stud., Geol. Ser., No. 49, 1945.

SENARMONTITE  
 $Sb_2 O_3$

Loc.: Algeria.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 88.

SENGIERITE  
 $Cu (UO_2)_2 (VO_4)_2 \cdot 8-10H_2O$

Loc.: Katanga, Belgian Congo.

Remarks: Mount from Harvard University.

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss: U.S.G.S. Bull. 1036-G, 1956, p. 132.

SERPENTINE  
 $H_4 Mg_3 Si_2 O_9$

Loc.: Filly Foster Mine, Brewster, New York.

Ref.: Hess, H.H., Smith, R.J., and Dengo, G.: Am. Min., 37, 1952, p. 70.

SERPIERITE  
 $(Cu, Zn, Ca)_5 (SO_4)_2 (OH)_6 \cdot 3H_2O$

Loc: Laurium, Greece.

d	I	d	I	d	I
10.0	10	2.64	4	1.901	3
5.5	1	2.56	3	1.811	1
5.0	9	2.44	4	1.769	1
4.8	2	2.30	3b	1.699	2
4.3	1	2.23	1	1.667	3
3.54	2	2.16	4	1.566	5
3.38	9	2.11	1	1.538	3
3.15	3	2.06	2	1.476	3
3.01	1	2.02	2	1.461	1
2.71	4	1.955	1		

SIDERITE  
 $\text{Fe CO}_3$

Loc.: Allevard, Isera, France.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 116.

SIEGENITE  
 $(\text{Co, Ni})_3 \text{S}_4$

Loc.: Werner Lake, Manitoba, Canada  
Ref.: A.S.T.M., No. 20788.

SILLIMANITE  
 $\text{Al}_2 \text{Si O}_5$

Loc.: Georgian Bay, Ontario, Canada.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 186.

SILVER  
Ag

Loc.: Galena Hill, Yukon, Canada.  
Ref.: Swanson, Howard E., and Tatge, Eleanor: Std. X-ray Diff. Patterns, Nat. Bur. Stds., Circ. 539, vol. 1, 1953, p. 23.

SKLODOWSKITE  
 $\text{Mg (UO}_2)_2 (\text{SiO}_3)_2 (\text{OH})_2 \cdot 5\text{H}_2\text{O}$

Loc.: Katanga, Belgian Congo.  
Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss: U.S.G.S. Bull. No. 1036-G, 1956, p. 133.

SMALTITE-SKUTTERUDITE SERIES  
 $(\text{Co, Ni}) \text{As}_3$

Loc.: Connigas Mine, Cobalt, Ontario, Canada.  
Haileybury, Ontario, Canada.  
O'Brien Mine, Coleman, Ontario, Canada.

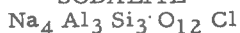
SMITHSONITE



Loc.: Broken Hill, New South Wales, Australia.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 115.

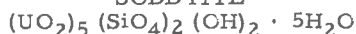
SODALITE



Loc.: Ice River, British Columbia, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 243.

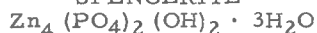
SODDYITE



Loc.: Kasolo, Belgian Congo.

Ref.: Gorman, D.H.: Am. Min., 37, 1952, p. 388.

SPENCERITE



Loc.: Salmo, British Columbia, Canada.

d	I	d	I	d	I
9.0	8	2.34	6	1.557	1
5.0	2	2.26	4	1.529	8
4.6	8	2.18	2	1.489	2
4.2	1	2.11	2	1.464	2
3.85	4	2.02	3	1.440	3
3.71	3	1.922	5	1.398	4
3.49	10	1.866	3	1.372	2
3.05	4	1.827	1	1.341	2
2.95	1	1.772	2	1.319	2
2.84	3	1.729	3	1.281	2
2.67	1	1.687	2	1.267	1
2.61	3	1.648	2	1.247	1
2.54	5	1.622	1	1.228	1
2.46	3	1.586	4	1.207	1

SPERRYLITE



Loc.: Vermillion Mine, Sudbury, Ontario, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 56.

SPESSARTITE -- See Garnet Group

SPHAEROCOBALTITE (Cobaltocalcite)  
 $\text{Co CO}_3$

Loc.: Boleo, Mexico.  
Ref.: A.S.T.M., No. 1-1020.

SPHALERITE  
 $\text{Zn S}$

Loc.: Cumberland, England.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 27.

SPINEL  
 $\text{Mg Al}_2 \text{O}_4$

Loc.: Island of Ceylon.  
Remarks:  $a_0 = 8.09$ .

SPODUMENE  
 $\text{Li Al Si}_2 \text{O}_6$

Loc.: Ungava District, Quebec, Canada.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 188.

STANNITE  
 $\text{Cu}_2 \text{Fe Sn S}_4$

Loc.: Redruth, Cornwall, England.  
Ref.: Levy, C.: Bull. Soc. Franc. Min. Crist., vol. 79, 1956, p. 386.

STAUROLITE  
 $(\text{Fe, Mg})_4 \text{Al}_{18} \text{Si}_8 \text{O}_{46} (\text{OH})_2$

Loc.: Pizzo Forno, Italy.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 166.

STEENSTRUPINE  
 $(La, Ca, Na)_3 (Al, Fe, Mn)_3 (Si, P)_3 (O, OH, F)_{12}$

Loc.: Kangerdluarsuk, Greenland.

d	I	d	I	d	I
5.2	3	2.44	4	1.695	2
4.7	5	2.34	1	1.647	1
4.2	7	2.19	5	1.578	1
3.51	3	2.14		1.538	3
3.29	5	2.08	1	1.47	1b
3.09	10	1.965	4	1.373	1
2.98	1	1.875	5	1.34	3b
2.87	10	1.799	1	1.283	2
2.66	1	1.763	1	1.237	3
2.61	3	1.739	4		

STEPHANITE  
 $Ag_5 Sb S_4$

Loc.: Drummond Mine, Ontario, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 47.

STIBIOTANTALITE  
 $Sb Ta O_4$

Loc.: Greenbushes, Western Australia.

Ref.: Frenzel, Gerhard: Neues Jahr. Min. Monat., 1955, p. 247.

STIBNITE  
 $Sb_2 S_3$

Loc.: Lake George, New Brunswick, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 43.

STICHTITE  
 $Mg_6 Cr_2 CO_3 (OH)_{16} \cdot 4H_2O$

Loc.: Megantic Mine, Megantic, Quebec, Canada.

Ref.: Frondel, Clifford: Am. Min., 26, 1941, p. 295.

STILBITE  
 $\text{Na Ca}_2 \text{Al}_5 \text{Si}_{13} \text{O}_{36} \cdot 14\text{H}_2\text{O}$

Loc.: King's County, Nova Scotia, Canada.  
Ref.: Mason, B., and Greenberg, S.S.: Arkiv. Min. Geol.,  
Bd. 1, Nr. 18, 1954, p. 523.

STILPNOMELANE  
 $\text{K (Fe}^{\text{II}}, \text{Fe}^{\text{III}}, \text{Al})_{10} \text{Si}_{12} \text{O}_{30} (\text{O}, \text{OH})_{12}$

Loc.: Genoa Pit, Mesabi Range, Minnesota, U.S.A.  
Ref.: Gruner, John W.: Am. Min., 22, 1937, p. 912.

STOLZITE  
 $\text{Pb WO}_4$

Loc.: Broken Hill, New South Wales, Australia.  
Ref.: A.S.T.M., No. 2-0527.

STRENGITE  
 $\text{Fe PO}_4 \cdot 2\text{H}_2\text{O}$

Loc.: Pleystein, Oberpfalz, Bavaria.  
Ref.: McConnell, Duncan: Am. Min., 25, 1940, p. 722.

STRONTIANITE  
 $\text{Sr CO}_3$

Loc.: Hamm, Westphalia, Germany.  
Ref.: Swanson, Howard E., and Fuyat, Ruth K.: Std. X-ray Diff. Patterns, Nat. Bur. Stds., Circ. 539, vol. 3, 1954, p. 57.

STRUVERITE -- See Rutile

STRUVITE  
 $\text{Mg NH}_4 \text{PO}_4 \cdot 6\text{H}_2\text{O}$

Loc.: Hamburg, Germany.  
Ref.: Prien, Edwin L., and Frondel, Clifford: J. Urology, Balti-  
more, vol. 57, 1947, p. 949.

STUDTITE  
Pb, U, Hydrated Carbonate

Loc.: Katanga, Belgian Congo.

Remarks: Material received from Harvard University.

SULPHUR  
S

Loc.: Klausen, Tyrol, Austria.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 13.

SUSSEXITE  
(Mn, Mg)<sub>2</sub> B<sub>2</sub> O<sub>5</sub> · H<sub>2</sub>O

Loc.: Franklin, New Jersey, U.S.A.

Ref.: Gruner, John W.: Am. Min., 17, 1932, p. 511.

SYLVITE  
K Cl

Loc.: Stassfurt, Prussia.

Ref.: Armstrong, G., Dunham, K.C., Harvey, C.O., Sabine, P.A., and Waters, W.F.: Min. Mag., vol. 29, No. 214, 1951, p. 688.

SYNCHISITE  
(Ce, La) Ca (CO<sub>3</sub>)<sub>2</sub> F

Loc.: Narsarsuk, Greenland.

Ref.: Goni, J. and Guillemin, C.: Bull. Soc. Franc. Min. Crist., vol. 76, 1953, p. 128.

SYNGENITE  
K<sub>2</sub> Ca (SO<sub>4</sub>)<sub>2</sub> · H<sub>2</sub>O

Loc.: Kalusz, East Galicia, Poland.

Ref.: Aruma, E.: Min. Mag., vol. 31, No. 242, 1958, p. 945.

SZAIBELYITE (Camsellite)  
(Mg, Mn) (BO<sub>2</sub>) OH

Loc.: Not known.

Ref.: Serduchenko, D.P.: Proc. All Sov. Min. Soc., vol. 85,  
No. 3, 1956, p. 295.

SZOMOLNOKITE  
Fe SO<sub>4</sub> · H<sub>2</sub>O

Loc.: Tyrol, Austria.

Ref.: A.S.T.M., No. 1-0612.

TAENITE -- See Iron

TALC  
Mg<sub>3</sub> Si<sub>4</sub> O<sub>10</sub> (OH)<sub>2</sub>

Loc.: Hastings County, Ontario, Canada.

Ref.: Phemister, James, Harvey, C.O., and Sabine, P.A.: Min.  
Mag., vol. 29, No. 211, 1950, p. 366.

TANTEUXENITE  
Tantalian Polycrase

Loc.: Eleys, West Australia.

d	I	d	I	d	I
2.93	10	1.533	6	1.17	3b
2.54	5	1.503	1	1.141	2
1.801	6	1.472	2	1.041	2
1.683	1	1.276	2	0.982	3
1.574	2	1.196	1		

TAPIOLITE  
Fe Ta<sub>2</sub> O<sub>6</sub>

Loc.: Not known.

Ref.: Switzer, George, and Foshag, W.H.: Am. Min., 40, 1955,  
p. 66.

TARBUTTITE  
 $Zn_2 PO_4 OH$

Loc.: Broken Hill Mine, Rhodesia.  
Ref.: Switzer, George: Science, vol. 23, No. 3206, 1956, p. 1039.

TEALLITE  
 $Pb Sn S_2$

Loc.: Montserrat, Bolivia.

d	I	d	I	d	I
4.02	4	1.711	3	1.236	1
3.42	4	1.650	4	1.220	3
3.29	6	1.561	1	1.212	3
2.94	4	1.459	4	1.160	2
2.84	10	1.420	5	1.14	1b
2.32	5	1.386	1	1.12	1b
2.10	2	1.373	2	1.094	3
2.04	4	1.349	1	1.051	2
2.01	3	1.340	1	1.039	2
1.872	4	1.316	2	1.022	2b
1.797	4	1.293	1		
1.741	3	1.278	3		

TELLURIUM  
Te

Loc.: Emperor Mine, Fiji.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 15.

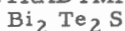
TENNANTITE  
 $(Cu, Fe)_{12} As_4 S_{13}$

Loc.: Cornwall, England.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 30.

TENORITE  
Cu O

Loc.: Vesuvius, Italy.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 79.

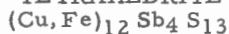
TETRADYMITÉ



Loc.: Boundary District, British Columbia, Canada.

Ref.: Thompson, R.M.: Am. Min., 34, 1949, p. 371.

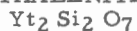
TETRAHEDRITE



Loc.: Felsobanya, Italy.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 31.

THALENITE



Loc.: Aanerod Vaaler, Norway.

d	I	d	I	d	I
5.34	3	2.39	1	1.640	2
4.86	1	2.27	4	1.627	
4.60	4	2.18	2	1.579	4
4.14	2	2.12	2	1.542	1
3.80	2	2.05	2	1.513	1
3.45	2	1.995	1	1.484	1
3.21	10	1.959	2	1.440	1
3.06	7	1.908	1	1.407	3
3.00	7	1.882	1	1.387	2
2.89	2	1.839	1	1.254	1
2.79	2	1.795	2	1.223	3
2.68	5	1.738	2		
2.46	2b	1.690	4		

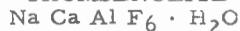
THENARDITE



Loc.: Borax Lake, California, U.S.A.

Ref.: Winchell, Horace, and Benoit, Richard J.: Am. Min. 36, 1951, p. 598.

THOMSENOLITE



Loc.: Ivigtut, Greenland.

Ref.: Ferguson, R.B.: Trans. Royal Soc. Canada, vol. 40, ser. 111, sec. IV, 1946, pp. 11-26.

THOMSONITE  
 $\text{Na Ca}_2 \text{Al}_5 \text{Si}_5 \text{O}_{20} \cdot 6\text{H}_2\text{O}$

Loc.: Thetford Mines, Quebec, Canada.

Ref.: Goldsmith, Julian R.: Min. Mag., vol. 29, No. 218, 1952, p. 953.

THORIANITE  
 $\text{Th O}_2$

Loc.: Several localities.

Ref.: Robinson, S.C., and Sabina, A.P.: Am. Min., 40, 1955, pp. 624-633.

THORITE  
 $\text{Th Si O}_4$

Loc.: Several localities.

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss: U.S.G.S. Bull. 1036-G, 1956, p. 136.

THOROGUMMITE  
 $\text{Th}(\text{SiO}_4)_{1-x}(\text{OH})_{4x}$

Varieties: Thorogummite; Baringer Hill, Texas, U.S.A.

Mackintoshite; Baringer Hill, Texas, U.S.A.

Hydrothorite; Wodgina, Australia.

Hyblite; Hybla, Ontario, Canada.

Ref.: Frondel, Clifford: Am. Min., 38, 1953, pp. 1007-1017.

THORTVEITITE  
 $(\text{Sc, Yt})_2 \text{Si}_2 \text{O}_7$

Loc.: Befanamo, Madagascar.

d	I	d	I	d	I
5.07	4	2.08	3	1.515	3
4.57	3	2.04	3	1.490	2
4.16	1	1.928	1	1.467	1
3.11	10	1.872	4	1.443	1
2.92	5	1.791	1	1.420	3
2.59	3	1.716	1	1.390	2
2.54	3	1.692	4	1.368	3
2.38	1	1.640	5	1.335	1
2.17	4	1.590	2	1.323	2
2.12	1	1.576	2	1.271	1

TIEMANNITE  
Hg Se

Loc.: Clausthal, Hartz Mountains, Germany.  
Ref.: Earley, J.W.: Am. Min., 35, 1950, p. 359.

TIN  
Sn

Loc.: Dawson Lake, Yukon, Canada.  
Ref.: Swanson, Howard E., and Tatge, Eleanor: Std. X-ray Diff. Patterns, Nat. Bur. Stds., Circ. 539, vol. I, 1953, p. 25.

TITANITE (Sphene)  
Ca Ti Si O<sub>5</sub>

Loc.: Sebastopol Township, Ontario, Canada.  
Ref.: Kauffman, A. J. Jr., and Jaffe, H.W.: Am. Min., 31, 1946, p. 584.

TOERNEBOHMITE  
Ce<sub>3</sub> Si<sub>2</sub> O<sub>8</sub> OH

Loc.: Bastnas, Vastmanland, Sweden.

d	I	d	I	d	I
4.57	4	2.18	5	1.574	1
4.22	1	2.05	3	1.547	1
3.53)	4	2.01	6	1.509	1
3.45)		1.981	2	1.480	1
3.30	1b	1.943	3	1.438	1
3.08	10	1.894	4	1.418	2
2.92	2	1.854	3b	1.401	1
2.86	3	1.783	5	1.377	1
2.82	9	1.739	3b	1.345	1
2.66	1	1.675	3	1.332	1
2.62	4	1.641	3	1.296	2

TOPAZ  
Al<sub>2</sub> Si O<sub>4</sub> (OH, F)<sub>2</sub>

Loc.: Minas, Geraes, Brazil.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 165.

TOPAZOLITE -- See Garnet Group

TORBERNITE  
 $\text{Ca}(\text{UO}_2)_2 (\text{PO}_4)_2 \cdot 8-12 \text{H}_2\text{O}$

Source: U.S.G.S. mount.

Ref.: Keller, W.D.: Am. Min., 37, 1952, p. 127.

TOURMALINE  
 $(\text{Na}, \text{Ca}) (\text{Li}, \text{Mg}, \text{Fe}^{\text{II}}, \text{Al})_3 (\text{Al}, \text{Fe}^{\text{III}})_6 \text{B}_3 \text{Si}_6 \text{O}_{27} (\text{O}, \text{OH}, \text{F})_4$

Loc.: Mt. Mica, Paris, Maine, U.S.A.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 183.

TREMOLITE -- See Amphibole Group

TRIDYMITE (Alpha)  
 $\text{Si O}_2$

Loc.: San Christobal, Pachuca, Mexico.

Ref.: Gajda, Eugenia: Arch. Min. Polish Acad. Geol., vol. 20, 1956, p. 89.

TRIPHYLLITE  
 $\text{Li} (\text{Fe}^{\text{II}}, \text{Mn}^{\text{II}}) \text{PO}_4$

Loc.: Branchville, Connecticut, U.S.A.

Hebron, Maine, U.S.A.

Ref.: Quesnel, P.: Arkiv. Min. Geol., vol. 2, No. 2, 1956, p. 43.

TRIPLITE  
 $(\text{Mn}^{\text{II}}, \text{Fe}^{\text{II}}, \text{Mg}, \text{Ca})_2 \text{PO}_4 (\text{F}, \text{OH})$

Loc.: India.

Ref.: Lindberg, Marie Louise: Am. Min., 35, 1950, p. 72.

TRITOMITE

Loc.: Island of Lano, Brevig, Norway.

d	I	d	I	d	I
4.11	4	1.914	4	1.336	2
3.90	3	1.901	1	1.315	1
3.49	4	1.866	6	1.301	2
3.21	5	1.831	3	1.278	3
3.10	5	1.802	3	1.257	4
2.84	10	1.779	4	1.239	4
2.75	4	1.746	3	1.195	1
2.66	1	1.611	1	1.167	2
2.29	3	1.56	3b	1.152	2
2.09	3	1.524	3	1.134	3
2.06	1	1.497	3	1.120	3
2.02	1/2	1.474	4b		
1.969	6	1.449	3		

TROILITE

Fe S

Loc.: Mercuritas Meteor, Atacama, Chile.

Ref.: Harcourt, G. Alan: Am. Min., 27, 1942, p. 103.

TRONA

$\text{Na}_3 \text{H} (\text{CO}_3)_2 \cdot 2\text{H}_2\text{O}$

Loc.: Mogaritz Lake, East Africa.

Ref.: A.S.T.M., No. 1-1077.

TSCHERMIGITE -- See Ammonia Alum

TUNGSTITE

$\text{WO}_3 \cdot \text{H}_2\text{O} (?)$

Loc.: Halifax County, Nova Scotia, Canada.

Ref.: Kerr, Paul F., and Young, Ford: Am. Min., 29, 1944, p. 205.

TURQUOIS

$\text{Cu Al}_6 (\text{PO}_4)_4 (\text{OH})_8 \cdot 4\text{H}_2\text{O}$

Loc.: Los Cerillos Mountains, New Mexico, U.S.A.

Ref.: Graham, A.R.: Univ. Tor. Stud., Geol. Series, No. 52, 1947, p. 51.

TYROLITE  
 $\text{Cu}_5 \text{Ca}(\text{AsO}_4)_2 (\text{CO}_3) (\text{OH})_4 \cdot 6\text{H}_2\text{O} (?)$

Loc.: Tintic District, Utah, U.S.A.  
Ref.: Guillemin, C.: Bull. Soc. Franc. Min. Crist., vol. 1, 79,  
1956, p. 93.

"TYRRELLITE"  
Co, Ni, Cu Selenide

Loc.: Goldfields, Saskatchewan, Canada.  
Ref.: Robinson, S.C., and Brooker, E.J.: Am. Min., 37, 1952,  
p. 543.

TYUYAMUNITE  
 $\text{Ca} (\text{UO}_2)_2 (\text{VO}_4)_2 \cdot 5-8.5\text{H}_2\text{O}$

Loc.: U.S.G.S. material.  
Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 140.

ULEXITE  
 $\text{Na Ca B}_5 \text{O}_9 \cdot 8\text{H}_2\text{O}$

Loc.: Newport, Nova Scotia, Canada.  
Ref.: Hey, M.H., and Bannister, F.A.: Min. Mag., vol. 29, No.  
218, 1952, p. 959.

ULLMANNITE  
(Ni, Co, Fe) (Sb, As, Bi) S

Loc.: Olsa, Austria.  
Ref.: A.S.T.M., No. 2-0954.

UMANGITE  
 $\text{Cu}_3 \text{Se}_2$

Loc.: Sierra Umango, Argentina.  
Ref.: Earley, J.W.: Am. Min., 35, 1950, p. 355.

URACONITE

Source: U.S.G.S. mount.

URALITE -- See Amphibole Group

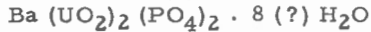
URANINITE



Loc.: Several localities.

Ref.: Robinson, S.C., and Sabina, A.P.: Am. Min., 40, 1955, pp. 624-33.

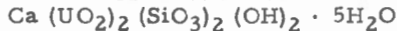
URANOCIRCITE



Loc.: Bergen, Voigtland, Saxony.

Ref.: Harvard University standard pattern.

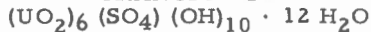
URANOPHANE



Loc.: Avery County, North Carolina, U.S.A.

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss: U.S.G.S. Bull. 1036-G, 1956, p. 142.

URANOPIILITE



Loc.: Beaverlodge, Saskatchewan, Canada.

Ref.: Bignand, Claude: Bull. Soc. Franc. Min. Crist., vol. 78, 1955, p. 20.

URANOSPETHITE

(?)

Source: Harvard University mount.

URANOSPINITE  
 $\text{Ca}(\text{UO}_2)_2(\text{AsO}_4)_2 \cdot 8-10\text{H}_2\text{O}$

Source: U.S.G.S. mount.

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 145.

UVANITE  
 $\text{U}_2\text{V}_6\text{O}_{21} \cdot 15\text{H}_2\text{O} (?)$

Source: U.S.G.S. mount.

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 146.

UVAROVITE -- See Garnet Group

VALENTINITE  
 $\text{Sb}_2\text{O}_3$

Loc.: Wolfe County, Quebec, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 86.

VANADINITE  
 $\text{Pb}_5(\text{VO}_4)_3\text{Cl}$

Loc.: Tiger Mine, Arizona, U.S.A.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 152.

VANDENDRIESSCHEITE  
 $\text{PbO} \cdot 7\text{UO}_3 \cdot 12\text{H}_2\text{O}$

Loc.: Katanga, Belgian Congo (type material from Harvard University).

Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 148.

VARISCITE  
 $\text{AlPO}_4 \cdot 2\text{H}_2\text{O}$

Loc.: Manhattan, Nevada, U.S.A.

Ref.: A.S.T.M., No. 8-157.

VAUXITE  
 $\text{Fe}^{\text{II}} \text{Al}_2 (\text{PO}_4)_2 (\text{OH})_2 \cdot 7\text{H}_2\text{O}$

Loc.: Llallagua, Bolivia.

d	I	d	I	d	I
8.06	4	2.87	6	1.803	5
5.97	8	2.72	5	1.773	1
5.45	10	2.54	3	1.736	3
4.94	6	2.46	1	1.685	1
4.57	4	2.38	3	1.657	3
4.31	6	2.29	3	1.534	3
4.10	2	2.25	3	1.516	
3.64	5	2.16	1	1.48	1b
3.35	5	2.09	5	1.446	2
3.19	1	2.04	1	1.434	
3.04	5	1.972	4		
2.95	3	1.897	3		

VESUVIANITE  
 $\text{Ca}_{10} (\text{Mg}, \text{Fe}^{\text{II}}, \text{Fe}^{\text{III}})_2 \text{Al}_4 \text{Si}_9 \text{O}_{34} (\text{OH})_4$

Loc.: Elker, Norway.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 184.

VILLIAUMITE  
 $\text{Na F}$

Loc.: Ile de Los, French Guinea.

Ref.: A.S.T.M., No. 4-0794.

VIVIANITE  
 $\text{Fe}_3^{\text{II}} (\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$

Loc.: Porcupine River, Yukon, Canada.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 153.

VOGLITE  
Ca, Cu, Uranyl Carbonate

Source: U.S.G.S. mount.

VOLBORTHITE  
 $\text{Cu}_3 (\text{VO}_4)_2 \cdot 3\text{H}_2\text{O}$

Loc.: Richardson, Grand County, Utah, U.S.A.  
Ref.: Guillemin, C.: Bull. Soc. Franc. Min. Crist., vol. 79, 1956,  
p. 273.

VONSENITE -- See Paigeite

WAGNERITE  
 $\text{Mg}_2 \text{PO}_4 \text{F}$

Loc.: Kjorrestad, Bamle, Norway.  
Ref.: Henriques, A.: Arkiv. Min. Geol., Bd. 2, Nr. 6, 1957, p. 153.

WALPURGITE  
 $(\text{BiO})_4 \text{UO}_2 (\text{AsO}_4)_2 \cdot 3\text{H}_2\text{O}$

Loc.: Schneeberg, Saxony.  
Ref.: Frondel, Clifford, Riska, Daphne, and Frondel, Judith Weiss:  
U.S.G.S. Bull. 1036-G, 1956, p. 149.

WARWICKITE  
 $(\text{Mg, Fe})_3 \text{Ti} (\text{BO}_4)_2$

Loc.: Edenville, New Jersey, U.S.A.  
Ref.: Thompson, R.M., and Gower, J.A.: Am. Min., 39, 1954,  
p. 523.

WAVELLITE  
 $\text{Al}_3 (\text{OH})_3 (\text{PO}_4)_2 \cdot 5\text{H}_2\text{O}$

Loc.: Montgomery County, Arkansas, U.S.A.  
Ref.: Fischer, E.: Heidelberger Beitr. Min. Petrog., vol. 4, 1955,  
p. 5225.

WEBERITE  
 $\text{Na}_2 \text{Mg Al F}_7$

Loc.: Ivigtut, Greenland.

Ref.: Ferguson, R.W.: Am. Min., 34, 1949, p. 396.

WEINSCHENKITE -- See Churchite

WHEWELLITE  
 $\text{Ca C}_2 \text{O}_4 \cdot \text{H}_2\text{O}$

Loc.: Burgk, Dresden, Saxony.

Ref.: Prine, Edwin L., and Frondel, Clifford: J. Urology, Baltimore, vol. 57, 1947, p. 949.

WILKEITE  
 $\text{Ca}_5 (\text{P, S, Si, CO}_4)_3 \text{OH}$

Loc.: Crestmore, California, U.S.A.

Ref.: A.S.T.M., No. 6-0453.

WILLEMITE  
 $\text{Zn}_2 \text{Si O}_4$

Loc.: Franklin, Sussex County, New Jersey, U.S.A.

Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 161.

WILSONITE  
Mg, K, Al Silicate

Loc.: Lanark County, Ontario, Canada.

d	I	d	I	d	I
6.98	2	2.40	2	1.911	1
4.96	4	2.37	3	1.870	2
4.45	8	2.28	1	1.657	4
4.13	4	2.23	1	1.629	3
3.63	4b	2.13	3	1.496	7
3.30	8	2.09	1	1.339	3
3.03	8	1.989	5	1.294	4
2.56	10	1.953	1	1.248	2

WINCHITE -- See Amphibole Group

WITHERITE  
 $Ba CO_3$

- Loc.: Porcupine, Ontario, Canada.  
Ref.: de Assuncao, Carlos Torre and Julio Garrido: Bull. Mus. and Geol. Min. Lab., Lisbon Fac. Sci., Nos. 20-21, 1953, p. 122.

WITTICHENITE  
 $Cu_6 Bi_4 S_9$

- Loc.: Schwartzwald, Germany.  
Ref.: Nuffield, E.W.: Econ. Geol., vol. 42, 1947, p. 147-160.

WOLFRAMITE-HUEBNERITE SERIES  
 $(Mn, Fe) WO_4$

- Loc.: Cornwall, England.  
Gladstone, Colorado, U.S.A.  
Shimatsu, Ichikawa, Japan.

WOLLASTONITE  
 $Ca Si O_3$

- Loc.: North Amherst, Quebec.  
Ref.: Schaller, Waldemar T.: Am. Min., 35, 1950, p. 920.

WULFENITE  
 $Pb Mo O_4$

- Loc.: Beregov, Siberia.  
Ref.: Mokievski, V.A., Stulov, N.N., and Tsigelman, I.S.: Proc. All Sov. Min. Soc., vol. 85, 1956, p. 47.

XANTHOCONITE  
 $Ag_3 As S_3$

- Loc.: Not known.  
Ref.: Peacock, M.A.: Min. Mag., vol. 29, No. 211, 1950, p. 352.

XENOTIME  
Y PO<sub>4</sub>

Loc.: Calvin Township, Ontario, Canada.

Ref.: Shaw, Denis M.: Can. Min., vol. 6, pt. 1, 1957, p. 64.

XONOTLITE  
Ca SiO<sub>3</sub> · 2H<sub>2</sub>O

Loc.: Table Mountain, Newfoundland, Canada.

Ref.: Schaller, Waldemar T.: Am. Min., 35, 1950, p. 920.

YTTROFLUORITE  
(Ca, Y) F<sub>2</sub>

Loc.: Not known.

d	I	d	I	d	I
3.49	1	1.369	3	0.914	1
3.13	10	1.256	4	0.867	4
2.73	1	1.224	1	0.837	2
2.14	1	1.120	4	0.827	1
1.931	10	1.056	3	0.792	3
1.648	6	0.969	2		
1.578	1	0.927	3		

ZINC  
Zn

Loc.: Elsa Mine, Keno Hill, Yukon, Canada.

Ref.: Swanson, Howard E., and Tatge, Eleanor: Std. X-ray Diff. Patterns, Nat. Bur. Stds., Circ. 539, vol. 1, 1953, p. 18.

ZINCITE  
Zn O

Loc.: Franklin, New Jersey, U.S.A.

Ref.: A.S.T.M., No. 5-0664.

ZINKENITE  
Pb<sub>6</sub> Sb<sub>14</sub> S<sub>27</sub>

Loc.: Mosey, Nevada, U.S.A.

Ref.: Nuffield, E.W.: Univ. Tor. Stud., Geol. Series, No. 50, 1945, p. 59.

ZIPPEITE  
 $(\text{UO}_2)_3(\text{SO}_4)_2(\text{OH})_2 \cdot 8\text{H}_2\text{O}$

Loc.: Material loaned by Harvard University.

Ref.: Traill, R.J.: Am. Min., 37, 1952, p. 403.

ZIRCON  
 $\text{Zr Si O}_4$

Loc.: Several localities.

Ref.: Berman, Joseph: Am. Min., 40, 1955, p. 813.

ZOISITE  
 $\text{Ca}_2 \text{Al}_3 \text{Si}_3 \text{O}_{12} \text{OH}$

Loc.: Ducktown, Tennessee, U.S.A.

Ref.: Lapham, Davis M.: Am. Min., 42, 1957, p. 71.

ZUNYITE  
 $\text{Al}_{13} \text{Si}_5 \text{O}_{20} (\text{OH}, \text{F})_{18} \text{Cl}$

Loc.: Zuni Mine, Silverton, Colorado, U.S.A.

Ref.: Vermaas, F.H.S.: Am. Min., 37, 1952, p. 963.