

GEOLOGICAL SURVEY CIRCULAR 194



A GLOSSARY OF URANIUM-
AND THORIUM-BEARING
MINERALS Second Edition

By Judith Weiss Frondel and Michael Fleischer

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GLOSSARY OF URANIUM- AND THORIUM-BEARING MINERALS

Second Edition

INTRODUCTION

The first edition of this work was published as U. S. Geological Survey Circular 74 in April 1950 and is now out of print. This second edition contains additions, revisions, and corrections and brings the glossary up to date as of January 1952.

The compilation of this glossary is part of a continuing systematic survey of data pertaining to uranium and thorium minerals and to those minerals that contain traces or more of uranium and thorium. This survey, part of the work being done by the Geological Survey on behalf of the U. S. Atomic Energy Commission, consists of collecting authoritative chemical, optical, and X-ray diffraction data from the literature and adding to these data, where inadequate, by work in the laboratory. The results will be reported from time to time and the authors welcome information on additional data and names.

The glossary is divided into four groups: A, minerals containing uranium and thorium as major constituents; B, minerals containing minor amounts of uranium and thorium; C, minerals that, if investigated by modern analytical methods, might show uranium or thorium content; and D, minerals that are nonuranium- or nonthorium-bearing but that have been reported to contain impurities or intergrowths of uranium, thorium, or rare-earth minerals. Uranium is more widespread in its natural occurrence than generally has been supposed and it is possible that the third group of minerals (C) will give valuable information when reinvestigated.

It is hoped that this glossary will alleviate the confusion that obscures the nomenclature of these minerals. For many of them the confusion will remain until more thorough research is done. Some species always may be subject to question as their type specimens have been lost and existing specimens bearing the species name have been found to be other substances (for example, in group A, uranochalcite and voglianite). Structural formulas are given for most of the minerals and oxide formulas are given where good data are not available. Identities and group relations are indicated. It might be well to relegate to obscurity the many synonyms existing in the literature.

In the index there are 350 entries. These represent 182 species of which 90 are in group A, 40 are in group B, 37 are in group C, and 15 are in group D. These four categories are shown in the index by reference letters.

The question is often asked, "How many uranium and thorium minerals are there?" If the group A is used as the criterion, there are about 90 such minerals to which have been applied 185 names.

For most of the minerals a reference has been chosen from standard reference books and easily available journals. Dana VI and Dana VII stand for the 6th and 7th editions, respectively, of Dana's System of Mineralogy.

Thanks are due to Professor Clifford Frondel of the Department of Mineralogy and Petrography, Harvard University; to J. S. Vhay of the Geological Survey for pointing out errors in the first edition of this glossary and for making many valuable suggestions; and to others who have made us aware of other needed corrections.

A. URANIUM AND THORIUM MINERALS

ALDANITE

$KThO_2 \cdot 11UO_2 \cdot mUO_3 \cdot 1PbO$
 Mineralog. Mag., vol. 28, p. 722, 1949
 Acad. sci., U.R.S.S., Fersman Memorial
 Volume, p. 79, 1946

AMPANGABEITE

$(Y, Er, U, Ca, Th)_2(Nb, Ta, Fe, Ti)_{7-18}O_{18}?$
 Validity questionable; may be an inhomogeneous alteration product of euxenite
 U = 17.1 percent, Th = 1.8 percent
 Dana VII, vol. 1, pp. 806-807

Hydroeuxenite

Synonym of ampingabeite
 Dana VII, vol. 1, p. 806

ANDERSONITE

$Na_2Ca(UO_2)(CO_3)_3 \cdot 6H_2O$
 U = 39.2 percent
 Dana VII, vol. 2, p. 239

AUTUNITE

$Ca(UO_2)_2(PO_4)_2 \cdot 10-12 H_2O$
 U = 45.4 to 48.2 percent
 Dana VII, vol. 2, pp. 984-987

Calciumphosphouranite

Synonym of autunite
 Mineralog. Mag., vol. 28, p. 732, 1949

Meta-autunite I

$Ca(UO_2)_2(PO_4)_2 \cdot 2\frac{1}{2}-6\frac{1}{2} H_2O$
 Not found in nature, but most museum specimens of autunite have been dehydrated to this phase
 Dana VII, vol. 2, p. 985

Meta-autunite II

$Ca(UO_2)_2(PO_4)_2 \cdot 0-6H_2O$
 Not found in nature. Meta-autunite I passes into this phase on heating to ~80°C

Dana VII, vol. 2, p. 985

BASSETITE

$Fe(UO_2)_2(PO_4)_2 \cdot 8H_2O$
 U = 51.0 percent
 Dana VII, vol. 2, pp. 994-995
 Frondel, C., Harvard University,
 personal communication

BAYLEYITE

$Mg_2(UO_2)(CO_3)_3 \cdot 18H_2O$
 U = 28.9 percent
 Dana VII, vol. 2, pp. 237-238

BECQUERELITE

$2UO_3 \cdot 3H_2O$
 U = 76.0 percent
 Dana VII, vol. 1, pp. 625-627
 Cuttita, F., U. S. Geological Survey,
 unpublished analysis

Billietite

$BaO \cdot 6UO_3 \cdot 10H_2O?$
 Work in progress indicates this may be a barian becquerelite
 U = 69.7 percent
 Mineralog. Abs., vol. 11, p. 109, 1950
 Frondel, J. W., U. S. Geological Survey,
 personal communication

BETAFITE

$(U, Ca)(Nb, Ta, Ti)_3O_9 \cdot nH_2O?$
 U = 16.3 to 24.5 percent
 Th = 1.0 to 1.1 percent
 Dana VII, vol. 1, pp. 803-805

Blomstrandite

Synonym of betafite
 U = 16.3 percent
 Dana VII, vol. 1, pp. 803-804

Mendeleevite

Titanian betafite
 U = 13.7 percent
 Dana VII, vol. 1, pp. 803-804

Samiresite

Has been considered a plumbian variety
of betafite
U = 18.7 percent
Dana VII, vol. 1, pp. 803-805

BETA-URANOPHANE

$\text{Ca}(\text{UO}_2)_2\text{Si}_2\text{O}_7 \cdot 6\text{H}_2\text{O}$
Dimorphous with uranophane
U = 56.6 percent
Am. Mineralogist, vol. 24, pp. 324-338,
1939

Randite

A mixture of beta-uranophane, some
tyuyamunite, and calcite
Am. Mineralogist, vol. 35, pp. 245-250,
1950

BRANNERITE

$(\text{U}, \text{Ca}, \text{Fe}, \text{Y}, \text{Th})_3\text{Ti}_5\text{O}_{16}$?
U = 39.3 percent, Th = 3.6 percent
Dana VII, vol. 1, pp. 774-775
Rowe, J. J., U. S. Geological Survey,
unpublished analysis

CALCIOSAMARSKITE

Probably $(\text{Ca}, \text{X}, \text{U}, \text{Th})_3(\text{Nb}, \text{Ta}, \text{Fe}, \text{Ti}, \text{Sn})_5\text{O}_{15}$
X = yttrium and other rare earths
U = 9.4 to 11.3 percent
Th = 1.9 to 2.9 percent
Dana VII, vol. 1, p. 772

CARNOTITE

$\text{K}_2(\text{UO}_2)_2(\text{VO}_4)_2 \cdot 3\text{H}_2\text{O}$
 H_2O can range from 1 to 3
U = 52.8 to 55.0 percent
Dana VII, vol. 2, pp. 1043-1045

CLARKEITE

UO_3 , with nonessential H_2O
U = 83.2 percent
Dana VII, vol. 1, pp. 624-625
Fron del, C., Harvard University,
personal communication

CUPROSKLODOWSKITE

$\text{Cu}(\text{UO}_2)_2\text{Si}_2\text{O}_7 \cdot 6\text{H}_2\text{O}$
U = 54.1 percent
Am. Mineralogist, vol. 19, p. 235, 1934

Jachymovite

Synonym of cuprosklodowskite
Mineralog. Abs., vol. 6, p. 345, 1936

CURITE

$\text{Pb}_2\text{U}_5\text{O}_{17} \cdot 4\text{H}_2\text{O}$?
U = 61.1 percent
Dana VII, vol. 1, pp. 629-631

DAVIDITE

Near $\text{Fe}^2(\text{Fe}^3, \text{Ce})_2\text{Ti}_8\text{O}_{17}$, with about 8
percent rare earths and 5 percent UO_2
U = 4.4 percent, Th = 0.12 percent
Hey, M. H., Chemical index of minerals,
British Museum, 1950

Radioactive mineral from Tete district of Mozambique

Possibly $\text{AB}_3(\text{O}, \text{OH})_7$
A = Fe^2 , rare earths, U^6 , Ca, Na, Zr, Th
B = Ti, Fe^3 , V, Cr
Near davidite
U = 2.7 percent, Th = 0.06-0.12 percent
Mineralog. Mag., vol. 29, pp. 101-112,
1950

Guadarramite

Possibly an intergrowth of ilmenite and
davidite
Mineralog. Mag., vol. 16, p. 361, 1913
Bowie, S. H. U., Geological Survey of
Great Britain, personal communication
Studies by George Switzer, U. S. National
Museum, indicate that this mineral may
be a mixture of ilmenite and monazite

DELORENZITE

$(\text{Y}, \text{U}, \text{Fe}^2)(\text{Ti}, \text{Sn})_3\text{O}_8$?
U = 8.7 percent
Dana VII, vol. 1, p. 808

DEWINDTITE

$\text{Pb}_3(\text{UO}_2)_5(\text{PO}_4)_4(\text{OH})_4 \cdot 10\text{H}_2\text{O}$
U = 45.8 percent
Dana VII, vol. 2, p. 875
Am. Mineralogist, vol. 35, pp. 756-763,
1950

Stasite

Synonym of dewindtite
Am. Mineralogist, vol. 7, pp. 196-197,
1922

DIDERICHITE

Contains uranium, water, and carbonate
Species not well-defined, but work in progress indicates it is a valid species
Dana VII, vol. 2, p. 275
Fronzel, J. W., U. S. Geological Survey, personal communication

DJALMAITE

$(U, Ca, Pb, Bi, Fe)(Ta, Nb, Ti)_3O_9 \cdot nH_2O?$
May be microlite
U = 10.4 percent
Dana VII, vol. 1, p. 805
Tavora, E., Anais acad. brazil. cienc., vol. 21, pp. 337-350, 1949

DROOGMANSITE

No chemical analysis has been made
May be related to sklodowskite
Am. Mineralogist, vol. 11, p. 168, 1926

DUMONTITE

$Pb_2(UO_2)_3(PO_4)_2(OH)_4 \cdot 3H_2O$
U = 46.5 percent
Dana VII, vol. 2, pp. 928-929

EPIANTHINITE

$yUO_3 \cdot xH_2O?$
Good chemical analysis has not been made
An alteration product of ianthinite
Am. Mineralogist, vol. 32, pp. 344-350, 1947

ESCHYNITE

Also aeschynite
 $(Ce, Ca, Fe^{2+}, Th)(Ti, Nb)_2O_6$
Th = 9.9 to 15.4 percent
Dana VII, vol. 1, pp. 793-796

EUXENITE

$(Y, Ca, Ce, U, Th)(Nb, Ta, Ti)_2O_6$
U = 3.0 to 9.0 percent, Th = up to 4.3 percent
Dana VII, vol. 1, pp. 787-791

Lyndochite

Variety of euxenite-polycrase, relatively high in Ca and Th and low in U
U = 0.6 percent, Th = 4.3 percent
Dana VII, vol. 1, pp. 787, 789-791

Oliveiraite

Alteration product of euxenite
Dana VII, vol. 1, p. 791

Tanteuxenite

Variety of euxenite with Ta substituting for Nb
U = 3.0 to 3.8 percent, Th = tr
Dana VII, vol. 1, pp. 787, 789-790

Titanoniobite

Allied to euxenite
Mineralog. Abs., vol. 29, p. 232, 1951

FERGHANITE

$U_3(VO_4)_2 \cdot 6H_2O$
Perhaps leached or weathered tyuyamunite
U = 67.9 percent
Dana VII, vol. 2, p. 1048

FERGUSONITE

$(Y, Er, Ce, Fe)(Nb, Ta, Ti)_2O_4$
U = 0.8 to 6.3 percent, Th = 0.7 to 2.5 percent
Dana VII, vol. 1, pp. 757-762

Adelpholite

Synonym of fergusonite?
A poorly defined substance; possibly an altered mossite
Dana VII, vol. 1, pp. 762, 778-779

Arrhenite

An altered fergusonite
Dana VII, vol. 1, p. 762

Bragite

Synonym of fergusonite
U = 7.2 percent
Dana VII, vol. 1, pp. 757, 759, 761

Kochelite

Synonym of fergusonite
Dana VII, vol. 1, pp. 757, 761

Risörite

Synonym of fergusonite
U = 0.09 percent, Th = tr
Dana VII, vol. 1, pp. 757-758, 760-762

Rutherfordite

An altered fergusonite
Dana VII, vol. 1, pp. 757, 759-760, 762

Sipylite

Synonym of fergusonite

U = 0.8 to 6.3 percent

Dana VII, vol. 1, pp. 757, 759-760, 762

Tyrite

Synonym of fergusonite

Dana VII, vol. 1, pp. 757, 760-761

FORMANITE

(Y, U, Th, Ca)(Ta, Nb, Ti)O₄

U = 1.1 percent, Th = 1.1 percent

Dana VII, vol. 1, pp. 758, 760, 762

FOURMARIERITE

PbU₄O₁₃·7H₂O

U = 63.7 percent

Am. Mineralogist, vol. 33, pp. 619-621,
1948

FRITZSCHEITE

Mn(UO₂)₂[(P, V)O₄]₂·8H₂O?

No actual analysis is available. May be
the manganese analogue of torbernite

Dana VII, vol. 2, p. 984

GUMMITE

Generic term for minerals occurring as
alteration products of uraninite and
not otherwise identified

Group includes silicates, phosphates,
and oxides

Dana VII, vol. 1, pp. 622-625

Eliasite

Synonym of gummite

U = 57.2 percent

Dana VII, vol. 1, pp. 622-624

Pittinit

Synonym of gummite

Dana VII, vol. 1, pp. 622-624

Yttrogummite

Yttrian variety of gummite

An alteration product of yttrian
uraninite

Dana VII, vol. 1, pp. 622-624

HUTTONITE

ThSiO₄

Dimorph of thorite

Th = 71.6 percent

Am. Mineralogist, vol. 36, pp. 60-69,
1951

IANTHINITE

2UO₂·7H₂O?

U = 71.5 percent

Dana VII, vol. 1, pp. 633-634

ISHIKAWAITE

(U, Fe, X)(Nb, Ta)O₄

X = rare earths

U = 19.3 percent

Dana VII, vol. 1, p. 766

JOHANNITE

Cu(UO₂)₂(SO₄)₂(OH)₂·6H₂O

U = 50.8 percent

Dana VII, vol. 2, pp. 606-607

Gilpinite

Synonym of johannite

Am. Mineralogist, vol. 11, pp. 1-5, 1926

KASOLITE

Pb(UO₂)SiO₄·H₂O

U = 40.5 percent

Am. Mineralogist, vol. 7, pp. 128-129,
1922

KHLOPINITE

(Y, U⁴, Th)₃(Nb, Ta, Ti, Fe)₇O₂₀?

Also chlopinite, hlopinite

May be related to euxenite - polycrase

U = 7.2 percent, Th = 1.9 percent

Dana VII, vol. 1, p. 792

LIEBIGITE

Ca₂U(CO₃)₄·10H₂O

U = 32.2 percent

Dana VII, vol. 2, p. 240

Uranothallite

Synonym of liebigite

Dana VII, vol. 2, p. 241

Flutherite

Synonym of uranothallite
Am. Mineralogist, vol. 35, pp. 251-254,
1950
Dana VII, vol. 2, p. 240

MACKINTOSHITE

(Th, U)SiO₄·H₂O?
U = 19.7 percent, Th = up to 39.9 percent
Dana VI, appendix I, p. 44

Hydrothorite

ThSiO₄·4H₂O
Alteration product of mackintoshite
U = 1.9 percent, Th = 50.7 percent
Am. Mineralogist, vol. 13, p. 570, 1928

Pilbarite

PbO·UO₃·ThO₂·2SiO₂·4H₂O
Alteration product of mackintoshite;
close to thorogummite
U = 24.4 percent, Th = 27.4 percent
Am. Mineralogist, vol. 13, pp. 464-465,
1928

Thorogummite

(Th, U)SiO₄·6H₂O?
Alteration product of mackintoshite
U = 20.2 percent, Th = 36.4 percent
Dana VI, p. 893

Chlorothorite

Synonym of thorogummite
Dana VI, p. 893

Nicolayite

Synonym of thorogummite
Am. Mineralogist, vol. 16, p. 409, 1931

MAITLANDITE

(U, Th, Pb)SiO₄·3H₂O?
Close to mackintoshite
U = 31.2 percent, Th = 22.7 percent
Am. Mineralogist, vol. 16, p. 472, 1931

MASUYITE

Hydrated lead uranium oxide
Work in progress indicates it may be a

valid species

Soc. belge géologie Bull., vol. 70,
pp. 212-225, 1947
Fron del, J. W., U. S. Geological Survey,
personal communication

MEDJIDITE

Supposedly a uranium sulfate
Validity of species is questionable
Dana VII, vol. 2, p. 600

METATORBERNITE

Cu(UO₂)₂(PO₄)₂·8H₂O
U = 50.8 percent
Dana VII, vol. 2, p. 991

Metachalcolite

Synonym of metatorbernite
Dana VII, vol. 2, p. 991

META-URANOPILITE

(UO₂)₆(SO₄)(OH)₁₀·5H₂O?
Recent work indicates validity of species
is questionable
Dana VII, vol. 2, pp. 582-583
Fron del, C., Harvard University, personal
communication

Beta-uranopilite

Synonym for meta-uranopilite
Dana VII, vol. 2, p. 582

METAZEUNERITE

Cu(UO₂)₂(AsO₄)₂·8H₂O
U = 46.4 percent
Dana VII, vol. 2, pp. 993-994

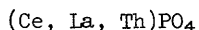
Zeunerite

All natural specimens labeled zeunerite
that have been examined by X-ray means
have proved to be metazeunerite
The fully hydrated, or true zeunerite has
not yet been found in nature
Dana VII, vol. 2, pp. 989-990

Kupferarsenuranit

Synonym of zeunerite
Mineralog. Mag., vol. 28, p. 732, 1949

MONAZITE



Th = normally from a few percent to 10.6 percent, but series probably extends to 26.4 percent

Dana VII, vol. 2, pp. 691-696

Cryptolite

Synonym of monazite

Dana VII, vol. 2, p. 691

Edwardsite

Synonym of monazite

Dana VII, vol. 2, p. 691

Eremite

Synonym of monazite

Dana VII, vol. 2, p. 691

Kararfveite

Impure monazite

Dana VII, vol. 2, p. 691

Mengite

Synonym of monazite

Dana VII, vol. 2, p. 691

Monazitoid

Synonym of monazite

Dana VII, vol. 2, p. 691

Phosphocerite

Synonym of monazite

Dana VII, vol. 2, p. 691

Turnerite

Synonym of monazite

Dana VII, vol. 2, pp. 691, 695

Urdite

Synonym of monazite

Dana VII, vol. 2, p. 691

NOHLITE

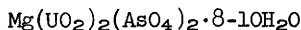
$(Ca, Mg, Fe^2, X, U)_2(Nb, Zr, Fe^3)_{30}O_{10}$
X = yttrium and other rare earths

Validity of species is questionable

U = 13.0 percent

Dana VII, vol. 1, pp. 772-773

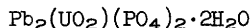
NOVACEKITE



U = 51.6 to 53.7 percent

Am. Mineralogist, vol. 36, pp. 680-686, 1951

PARSONSITE

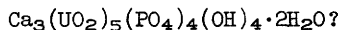


U = 26.1 percent

Dana VII, vol. 2, pp. 913-914

Am. Mineralogist, vol. 35, pp. 245-250, 1950

PHOSPHURANYLITE

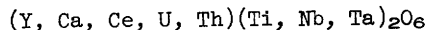


U = 72.0 percent

Dana VII, vol. 2, p. 876

Am. Mineralogist, vol. 35, pp. 756-763, 1950

POLYCRASE



U = 5.5 to 12.4 percent, Th = up to 4.7 percent

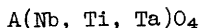
Dana VII, vol. 1, pp. 787-791

Eschwegite

Tantalian variety of polycrase

Am. Mineralogist, vol. 36, p. 927, 1951

POLYMIGNYTE

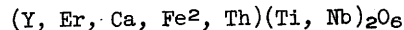


A = Ca, Fe², Y, Zr, Th

Th = 3.4 percent

Dana VII, vol. 1, pp. 764-766

PRIORITE



U = 0.4 to 3.4 percent, Th = 0.5 to 14.9 percent

Dana VII, vol. 1, pp. 793-796

Blomstrandine

Also blomstrandinite

Synonym of priorite

Dana VII, vol. 1, pp. 793-796

RAUVITE

$\text{CaO} \cdot 2\text{UO}_3 \cdot 5\text{V}_2\text{O}_5 \cdot 16\text{H}_2\text{O}$
U = 23.1 percent
Dana VII, vol. 2, p. 1058
Sherwood, A. M., U. S. Geological Survey,
unpublished analysis

RENARDITE

$\text{Pb}(\text{UO}_2)_4(\text{PO}_4)_2(\text{OH})_4 \cdot 7\text{H}_2\text{O}$
U = 57.3 percent
Dana VII, vol. 2, p. 928

RICHTITE

Contains Pb and U
Validity of species is questionable
Soc. belge géologie Bull., vol. 70,
pp. 212-225, 1947

RUTHERFORDINE

$\text{UO}_2\text{CO}_3?$
Composition needs to be checked
U = 72.1 percent
Dana VII, vol. 2, pp. 274-275

SABUGALITE

$\text{HAl}(\text{UO}_2)_4(\text{PO}_4) \cdot 16\text{H}_2\text{O}$
U = 53.6 percent
Am. Mineralogist, vol. 36, pp. 671-679,
1951

SALÉEITE

$\text{Mg}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 8-10\text{H}_2\text{O}$
U = 50.9 to 53.0 percent
Dana VII, vol. 2, pp. 988-989
Am. Mineralogist, vol. 36, pp. 680-686,
1951

Magnesium-phosphouranite

Synonym of saléeite
Mineralog. Mag., vol. 28, p. 732, 1949

SAMARSKITE

$(\text{Y, Ce, U, Ca, Fe, Pb, Th})(\text{Nb, Ta, Ti, Sn})_2\text{O}_6$
U = 8.4 to 16.1 percent,
Th = up to 3.7 percent
Dana VII, vol. 1, pp. 797-800

Annerödite

Samaraskite with parallel overgrowths of
columbite
Dana VII, vol. 1, pp. 797, 799

Eytlandite

Synonym of samarskite
Dana VII, vol. 1, p. 797

Hydrosamaraskite

An altered samarskite
Dana VII, vol. 1, pp. 799-800

Nuevite

Synonym of samarskite
Am. Mineralogist, vol. 36, p. 358, 1951

Plumboniobite

A niobate of Y, U, Pb, Fe and rare earths
May be a plumbian variety of samarskite
Dana VII, vol. 1, p. 800

Rogersite

Probably an altered samarskite
Of doubtful validity
Dana VII, vol. 1, p. 800

Uranotantalite

Synonym of samarskite
Dana VII, vol. 1, p. 797

Vietinghofite

Supposedly a ferroan samarskite
Dana VII, vol. 1, pp. 800-801

Yttro-ilmenite

Synonym of samarskite
Dana VII, vol. 1, p. 797

SCHOEPITE

$\text{UO}_3 \cdot 2\text{H}_2\text{O}$
U = 73.9 percent
Dana VII, vol. 1, pp. 627-628
Cuttita, F., U. S. Geological Survey,
unpublished analysis

Paraschoepite

X-ray study indicates mineral is identical with schoepite
Am. Mineralogist, vol. 32, pp. 344-350, 1947; vol. 33, pp. 513-514, 1948
Fron del, J. W., U. S. Geological Survey, personal communication

SCHROECKINGERITE

$\text{NaCa}_3(\text{UO}_2)(\text{CO}_3)_3(\text{SO}_4)\text{F}\cdot 10\text{H}_2\text{O}$
U = 26.8 percent
Dana VII, vol. 2, p. 236

Dakeite

Synonym of schroeckingerite
Dana VII, vol. 2, p. 236

SENGIERITE

$\text{Cu}(\text{UO}_2)(\text{VO}_4)(\text{OH})\cdot 4\text{-}5\text{H}_2\text{O}?$
U = 42.8 to 44.3 percent
Dana VII, vol. 2, p. 1047

SHARPITE

$(\text{UO}_2)_8(\text{CO}_3)_5(\text{OH})_2\cdot 6\text{H}_2\text{O}?$
U = 68.6 percent
Composition needs to be checked
Dana VII, vol. 2, p. 275

SKLODOWSKITE

$\text{Mg}(\text{UO}_2)_2\text{Si}_2\text{O}_7\cdot 7\text{H}_2\text{O}$
U = 58.4 percent
Am. Mineralogist, vol. 10, p. 132, 1925

Chinkolobwite

Synonym of sklodowskite
Mineralog. Abs., vol. 3, p. 115, 1926

SODDYITE

$(\text{UO}_2)_5(\text{SiO}_3)_2(\text{OH})_6\cdot 3\text{H}_2\text{O}$
U = 71.6 percent
Mineralog. Abs., vol. 3, p. 371, 1927

STUDTITE

Hydrated carbonate of U and Pb
Species not well-defined, but work in progress indicates it is a valid species
Dana VII, vol. 2, p. 275
Fron del, J. W., U. S. Geological Survey, personal communication

SWARTZITE

$\text{CaMg}(\text{UO}_2)(\text{CO}_3)_3\cdot 12\text{H}_2\text{O}$
U = 32.6 percent.
Dana VII, vol. 2, pp. 238-239

THORIANITE

$(\text{Th}, \text{U})\text{O}_2$
Forms complete series with uraninite
Division between thorianite and uraninite ideally at Th:U = 1:1
Dana VII, vol. 1, pp. 620-622

THORITE

ThSiO_4
U = up to 9.0 percent, Th = 25.2 to 62.7 percent
Dana VI, pp. 488-490

Auerlite

Phosphatian variety of thorite
Th = 60.7 to 61.5 percent
Dana VI, pp. 488-490

Calciothorite

Variety of thorite
Th = 52.3 percent
Dana VI, p. 489

Enalite

Uranian variety of thorite
U = 9.4 percent, Th = 25.4 percent
Am. Mineralogist, vol. 18, p. 223, 1933.

Eucrasite

Variety of thorite
Th = 31.6 percent
Dana VI, p. 489

Ferrothorite

A ferrian variety of thorite
U = 2.4 percent, Th = 54.0 percent
Am. Mineralogist, vol. 14, p. 78, 1929

Freyalite

Variety of thorite
Th = 25.2 percent
Dana VI, p. 489

Hyblite

(both alpha and beta)
Hydrous basic sulfo-silicate of Th, with
minor U, Fe, and Pb
An alteration product of thorianite
Am. Mineralogist, vol. 12, pp. 368-372,
1927

Orangite

Synonym of thorianite
U = 1.0 percent, Th = 62.7 percent
Dana VI, pp. 488-489

Uranothorite

Uranoan variety of thorianite
U = up to 10.1 percent, Th = 55.0 percent
Am. Mineralogist, vol. 36, pp. 557-562,
1951

TORBERNITE

$\text{Cu}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 8-12\text{H}_2\text{O}$
U = 47.1 to 50.8 percent
Dana VII, vol. 2, pp. 981-984

Chalkolith, chalcophile

Synonyms of torbernite
Dana VII, vol. 2, p. 981

Copper uranite

Synonym of torbernite
Dana VII, vol. 2, p. 981

Cupouranite

Synonym of torbernite
Dana VII, vol. 2, p. 981

Kupferphosphouranite

Synonym of torbernite
Mineralog. Mag., vol. 28, p. 732, 1949

Uranite

Synonym of torbernite-autunite group
Dana VII, vol. 2, pp. 981-984

Uranophyllite

Synonym of torbernite
Dana VII, vol. 2, p. 981

TROEGERITE

Probably $\text{H}_2(\text{UO}_2)_2(\text{AsO}_4)_2 \cdot 8-12 \text{H}_2\text{O}$
U = 52.9 to 55.1 percent
Am. Mineralogist, vol. 36, p. 322, 1951
Dana VII, vol. 2, pp. 966-967

TYUYAMUNITE

$\text{Ca}(\text{UO}_2)_2(\text{VO}_4)_2 \cdot n\text{H}_2\text{O}$
n = 9-10, but may be down to 4
U = 48.1 to 54.0 percent
Dana VII, vol. 2, pp. 1045-1047

Calciocarnotite

Synonym for tyuyamunite
Dana VII, vol. 2, p. 1045

URACONITE

This name has been used for uranium
sulfates, but lacks specific meaning
and should be abandoned
Dana VII, vol. 2, p. 600

Calciouraconite

Near $\text{Ca}(\text{UO}_2)_4(\text{SO}_4)_2(\text{OH}_6) \cdot 20\text{H}_2\text{O}$
Validity questionable
Boldyrev, A. K., Course of descriptive
mineralogy, vol. 3, 1935, Leningrad
and Moscow

URANINITE

Ideally UO_2
U = 88.2 percent
Usually more or less oxidized and ranging
in composition to at least $(\text{U}^4, \text{U}^6)\text{O}_{2.3}$.
Also contains Th, Pb, Y, and other rare
earths, in solid solution. Forms com-
plete series with thorianite. Division
between uraninite and thorianite ideal-
ly at U:Th = 1:1
Dana VII, vol. 1, pp. 611-620

Bröggerite

A thorian variety of uraninite
U = 68.3 percent, Th = 5.3 percent
Dana VII, vol. 1, pp. 611-614

Cleveite

A variety of uraninite containing rare
earths
U = 57.0 percent, Th = 4.0 percent
Dana VII, vol. 1, pp. 611, 613-614

Coracite

Synonym of uraninite

Dana VII, vol. 1, pp. 611, 615, 617

Nasturan

Synonym of pitchblende

Dana VII, vol. 1, pp. 611, 614, 617

Nivenite

A variety of uraninite containing rare earths

U = 57.8 percent, Th = 5.9 percent

Dana VII, vol. 1, pp. 611, 613-615, 617

Pitchblende

A colloform, fine-grained variety of uraninite

U = 56.9 to 82.9 percent

Dana VII, vol. 1, pp. 611-619

Ulrichite

Synonym of uraninite

Dana VII, vol. 1, pp. 611, 613, 617

Uranoniobite

Synonym of uraninite

Dana VII, vol. 1, pp. 611, 613

Uranopissite

Synonym of uraninite

Mineralog. Mag., vol. 16, p. 374, 1913

URANOCHALCITE

An ill-defined uranium sulfate of doubtful validity

Dana VII, vol. 2, p. 600

URANOCHER

A generic term used chiefly for uranium sulfates, and, in part, uranium oxides

Dana VII, vol. 2, pp. 581, 598

URANOCIRCITE

$\text{Ba}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$

U = 47.1 percent

Dana VII, vol. 2, pp. 987-988

Bariumphosphouranite

Synonym of uranocircite

Mineralog. Mag., vol. 28, p. 732, 1949

URANOPHANE

$\text{Ca}(\text{UO}_2)_2\text{Si}_2\text{O}_7 \cdot 6\text{H}_2\text{O}$

U = 56.6 percent

Dana VI, p. 699

Lambertite

Synonym of uranophane

Am. Mineralogist, vol. 11, pp. 155-157, 1926

Uranotil

Synonym of uranophane

Dana VI, p. 699

URANOPILITE

$(\text{UO}_2)_8(\text{SO}_4)(\text{OH})_{10} \cdot 12\text{H}_2\text{O}$

U = 67.9 percent

Dana VII, vol. 2, pp. 581-582

URANOSPATHITE

A hydrated uranyl compound, perhaps an arsenate or phosphate, related to the autunite group, but the full composition is not known

Dana VII, vol. 2, p. 990

URANOSPHAERITE

$\text{Bi}_2\text{U}_2\text{O}_9 \cdot 3\text{H}_2\text{O}?$

U = 43.6 percent

Dana VII, vol. 1, p. 631

URANOSPINITE

$\text{Ca}(\text{UO}_2)_2(\text{AsO}_4)_2 \cdot 8-12\text{H}_2\text{O}$

U = 45.9 to 52.8 percent

Dana VII, vol. 2, pp. 990-991

Calciumarsenuranite

Synonym of uranospinite

Mineralog. Mag., vol. 28, p. 732, 1949

UVANITE

$\text{U}_2\text{V}_6\text{O}_{21} \cdot 15\text{H}_2\text{O}?$

U = 34.3 percent

Dana VII, vol. 2, p. 1056

VANDENBRANDEITE

$\text{CuUO}_4 \cdot 2\text{H}_2\text{O}$
U = 59.3 percent
Dana VII, vol. 1, pp. 632-633

Uranolepidite

Synonym of vandenbrandeite
Am. Mineralogist, vol. 19, pp. 235-236,
1934

VANDENDRIESSCHEITE

Hydrous lead uranium oxide
Work in progress may establish the species
as valid
Soc. belge géologie Bull., vol. 70,
pp. 212-225, 1947
Fronzel, J. W., U. S. Geological Survey,
personal communication

VOGLIANITE

A hydrous calcium and uranium sulfate of
questionable validity
Dana VII, vol. 2, p. 600

VOGLITE

$\text{Ca}_2\text{CuU}(\text{CO}_3)_5 \cdot 6\text{H}_2\text{O}?$
U = 32.6 percent
Dana VII, vol. 2, p. 237

WALFURGITE

Probably $\text{Bi}_4(\text{UO}_2)(\text{AsO}_4)_2\text{O}_4 \cdot 3\text{H}_2\text{O}$
U = 15.9 percent
Dana VII, vol. 2, pp. 796-797

ZIPPEITE

$(\text{UO}_2)(\text{SO}_4)(\text{OH})_2 \cdot n\text{H}_2\text{O}$
 $\text{H}_2\text{O} \sim 4$, but apparently is variable
U = 64.1 percent
Dana VII, vol. 2, p. 598

Cuprozippeite

$\text{Cu}(\text{UO}_2)_3(\text{SO}_4)_3(\text{OH})_2 \cdot 11\text{H}_2\text{O}$
Validity questionable
Boldyrev, A. K., Course of descriptive
mineralogy, vol. 3, p. 83, 1935,
Leningrad and Moscow

B. MINERALS WITH MINOR AMOUNTS OF URANIUM AND THORIUM

ABUKUMALITE

$(\text{Th}, \text{Ca}, \text{Y})_5(\text{SiO}_4, \text{PO}_4, \text{AlO}_4)_3(\text{O}, \text{F})$
Related to apatite
Th = 0.8 percent
Am. Mineralogist, vol. 24, p. 66, 1939
Strunz, H., Mineralogische Tabellen,
p. 167, Leipzig, 1949

ALLANITE

$(\text{Ca}, \text{Ce}, \text{Th})_2(\text{Al}, \text{Fe}, \text{Mg})_3\text{Si}_3\text{O}_{12}(\text{OH})$
U = 0.02 percent, Th = up to 3.2 percent
Dana VI, pp. 522-526

Bagrationite

Variety of allanite
Name also refers to a cerian variety of
epidote
Dana VI, pp. 518-519

Bucklandite

Synonym of allanite
Dana VI, pp. 522-523, 525

Muromontite

Apparently related to allanite but con-
taining much of the Y and Be metals
Dana VI, p. 526

Bodenite

Related to muromontite in composition;
contains more yttrium than cerium
Dana VI, p. 526

Nagatelite

Phosphatian variety of allanite
Th = 0.8 percent
Am. Mineralogist, vol. 16, pp. 343-344,
1931

Orthite

Synonym of allanite
Dana VI, pp. 522-526

Uralorthite

Synonym of allanite
Dana VI, pp. 523-525

Wasite

Altered allanite
Th = 0.83 to 0.86 percent
Dana VI, p. 526

Xanthorite

Altered allanite
Dana VI, pp. 522-523, 525

Yttro-orthite

Also yttrium orthite
Variety of orthite containing 8 percent Y_2O_3
Mineralog. Mag., vol. 23, p. 639, 1934

ANTHRAXOLITE

A nickeliferous and uraniferous hydrocarbon
U = 0.003 percent
Am. Mineralogist, vol. 19, pp. 426-428, 1934

ASPHALTITE

Also asphaltum
U = 0.001 percent
Includes solid bituminous hydrocarbons known as albertite, impsonite, gilsonite, grahamite, nigrite and uintaite
Mineralog. Mag., vol. 15, p. 417, 1910

Broggite

A variety of asphaltite
Mineralog. Mag., vol. 24, p. 604, 1937

BASTNAESITE

$(Ce, La)CO_3F$
U and Th present, but less than 1 percent
U. S. Geological Survey, manuscript report
Dana VII, vol. 2, pp. 289-291

CAPPELENITE

$Ba(Y, Ce, La)_6B_6O_{12}(OH)_2(SiO_4)_3$
Th = 0.42 percent
Strunz, H., Mineralogische Tabellen, p. 193, Leipzig, 1949

CARBONATE-FLUORAPATITE

A carbonatian variety of fluorapatite which is an important constituent of many phosphate rocks. Analyses show U up to 0.02 percent
Dana VII, vol. 2, pp. 879, 883-884
Unpublished analyses, Trace Elements Section, U. S. Geol. Survey

CERITE

A cerium silicate with minor Ca and Fe.
Formula uncertain
U = 0.4 percent, Th = 0.3 percent
Am. Mineralogist, vol. 25, pp. 381-404, 1940

CHINGLUSUITE

A complex silicate of Na, Mn, Ca, and Ti, containing small amounts of Th and rare earths
Mineralog. Abs., vol. 7, p. 222, 1938

CORDYLITE

$(Ce, La)_2Ba(CO_3)_3F_2$
Th = 0.26 percent
Dana VII, vol. 2, pp. 285-287

FERSMITE

$(Ca, Ce, Na)(Nb, Ti, Fe, Al)_2(O, OH, F)_6$
Th = 0.42 percent
Acad. sci., U.R.S.S., C.R., vol. 52, pp. 69-71, 1946

HJELMITE

Also hjelmite
 AB_2O_6 or $A_2B_3O_{10}$
A = Y, Fe^{2+} , U^{4+} , Mn, Ca
B = Nb, Ta, Sn, W
U = 4.0 to 4.3 percent
Dana VII, vol. 1, pp. 779-780

HOKUTOLITE

Plumboan variety of barite. Radioactive mixture of Pb and Ba sulfate. Probably contains Ra, Th, and U
Dana VII, vol. 2, pp. 408, 411

Anglesobarite

Synonym of hokutolite
Dana VII, vol. 2, pp. 408, 411

JOHNSTRUPITE

A complex silicate of Na, Ca, Th, Ce, and Ti
Close to rinkite
Th = 0.7 percent
Dana VI, pp. 720-721

KOLM

Material resembling oil shale
Form in which uranium is present is unknown
U = 0.43 percent
Washington Acad. Sci. Jour., vol. 21, pp. 409-414, 1931

LOVCHORRITE

$Ce_2(TiO_3)_3 \cdot 10CaSiO_3 \cdot 2CeF_3$
U = 0.03 percent, Th = up to 0.7 percent
Mineralog. Mag., vol. 21, p. 569, 1928
Mineralog. Abs., vol. 6, pp. 341-343, 1936

Vudyavrite

$Ce_2(TiO_3)_3 \cdot 5(Ca, H)SiO_3$
An altered lovchorrite
Th = about 1 percent
Mineralog. Abs., vol. 6, pp. 341-343, 1936

LOVOZERITE

A complex silicate of Ti and Zr, with a minor amount of Th
Th = 0.50 percent
Mineralog. Abs., vol. 7, pp. 468-469, 1940

MELANOCERITE

Chiefly a borosilicate of the Ce and Y metals
Th = 1.5 percent
Dana VI, pp. 414-415

Caryocerite

Near melanocerite, but contains more Th
Th = 12.0 percent
Dana VI, p. 415

MICROLITE

$(Na, Ca)_2(Ta, Nb)_2O_6(O, OH, F)$
U = up to 5.1 percent, Th = 0.2 percent
Dana VII, vol. 1, pp. 748-754

Calciotantalite

Possibly a mixture of microlite and tantalite
Dana VII, vol. 1, p. 787

Haddamite

Synonym of microlite
Dana VII, vol. 1, p. 748

Metasimpsonite

An alteration product of simpsonite, later identified with microlite
Dana VII, vol. 1, p. 755

Neotantalite

An altered microlite with composition close to tantalite
U = tr
Dana VII, vol. 1, pp. 748, 750-751, 753

MOSANDRITE

Complex silicate of Na, Ca, Ce, and Ti
Close to rinkite
Th = 0.3 percent
Dana VI, pp. 721-722
Zentralbl. Mineralogie, 1934, Abt. A, pp. 76-79

PISEKITE

Essentially a niobate-tantalate-titanate of U and rare earths, with Th and Sn. No quantitative analysis available. May be related to ampingabeite
Dana VII, vol. 1, pp. 807-808

PYROCHLORE

$(Na, Ca)_2(Nb, Ta)_2O_6F$
U = up to 1.4 percent usually, but some varieties are high in U
Th = up to 4.4 percent
Dana VII, vol. 1, pp. 748-754

Chalcolamprite

Synonym of pyrochlore
Dana VII, vol. 1, pp. 748, 750, 754

Ellsworthite

An altered uranian variety of pyrochlore related to hatchettolite
U = 17.1 percent
Dana VII, vol. 1, pp. 748, 750-752, 755

Endeiolite

Similar in composition to chalcolamprite
An altered pyrochlore?
Dana VII, vol. 1, pp. 748, 754

Hatchettolite

Uranian variety of pyrochlore
U = 14.0 percent, Th = 0.5 percent
Dana VII, vol. 1, pp. 748, 750-752, 754

Koppite

Synonym of pyrochlore
Dana VII, vol. 1, pp. 748, 754

Marignacite

Synonym of pyrochlore
Th = 0.2 percent
Dana VII, vol. 1, pp. 748, 750-752, 755

Pyrrhite

Synonym of pyrochlore
Dana VII, vol. 1, pp. 748, 752, 754

RINKITE

$Ce_2(TiO_3)_3 \cdot 10CaSiO_3 \cdot 3CaF_2$
Intermediate member of lovchorrite-
calcium-rinkite series
Th = small amounts
Mineralog. Abs., vol. 6, pp. 342-343,
1936

RINKOLITE

Complex silicate of Na, Ca, Ce and Zr in
lovchorrite-calcium-rinkite series
Th = up to 0.41 percent
Mineralog. Mag., vol. 21, p. 575, 1928
Mineralog. Abs., vol. 6, pp. 341-343,
1936

ROWLANDITE

$(Y, La, Ce)_4Fe(F, Si_2O_7)_2?$
U = 0.4 percent
Possibly a metamict thalenite
Dana VI, p. 1047
Strunz, H., Mineralogische Tabellen,
p. 194, Leipzig, 1949

STEENSTRUPINE

Complex silicate of rare earths,
Th, Na, K, Fe, Mn, Mg, P, Be, Al, and

Ta, with (OH) and F
Th = 6.2 percent
Dana VI, p. 415
Strunz, H., Mineralogische Tabellen,
p. 192, Leipzig, 1949

TENGERITE

$CaY_3(CO_3)_4(OH)_3 \cdot 3H_2O?$
The originally described tengerite,
Dana VI, pp. 306-307, is a different
mineral, supposedly beryllium yttrian
carbonate; no published analysis
Th = 0.26 percent
Dana VII, vol. 2, pp. 275-276

THALENITE

$Y_4Si_4O_{13}(OH)_2$
Related to yttrialite
Th = 0.16 percent
Dana VI, appendix I, p. 68

THUCHOLITE

A complex of uraninite with hydrocarbon
U = up to about 45 percent in the ash,
Th = up to about 41 percent in the ash
Great Britain Geol. Survey Bull. 3,
pp. 1-19, 1951

Carburan

A hydrocarbon complex related to
thucholite
U = 4.29 percent
Mineralog. Abs., vol. 6, p. 437, 1936

Titanothucholite

Titanian variety of thucholite
U = 5.35 to 6.40 percent
Mineralog. Abs., vol. 9, p. 37, 1944

TRITOMITE

A borosilicate of Ce, Y, Ca, Th, and F;
exact formula uncertain
Th = 7.5 to 8.3 percent
Dana VI, p. 416

TSCHIEFFKINITE

Also chevkinite
Complex silicate of rare earths, Fe, Mn,
Mg, Ca, Al, Ti, Th, and U
U = 2.3 percent, Th = up to 18.4 percent
Am. Mineralogist, vol. 31, pp. 582-588,
1946

Perrierite

Perhaps identical with tscheffkinitite
Th = 4.0 percent
Am. Mineralogist, vol. 36, p. 926, 1951

TURANITE

Supposedly $\text{Cu}_5(\text{VO}_4)_2(\text{OH})_4$
Seems to be related to mottramite
Reported to contain 3.2 percent U
Dana VII, vol. 2, p. 818

VANOXITE

Perhaps $2\text{V}_2\text{O}_4 \cdot \text{V}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$
Reported to contain up to 0.5 percent U;
work in progress indicates species may
be invalid
Dana VII, vol. 1, pp. 601-602

VOLBORTHITE

Perhaps $\text{Cu}_3(\text{VO}_4)_2 \cdot 3\text{H}_2\text{O}$
Reported to contain 3.1 percent U
Dana VII, vol. 2, pp. 816-819

Calciovolborthite

Probably $\text{CuCa}(\text{VO}_4)(\text{OH})$
Possibly only a calcian variety of
volborthite
Dana VII, vol. 2, pp. 816-818

Tangeite

Also tanguéite
Appears to be identical with calcio-
volborthite
Dana VII, vol. 2, pp. 816-818

Uzbekite

Synonym of volborthite
Dana VII, vol. 2, p. 818

WIIKITE

Ill-defined mixture and alteration
product of minerals high in Nb, Ta, Ti,
Si, and Y
U = up to 13.2 percent, Th = 0.09 to
3.7 percent
Comm. géol. Finlande Bull. 13, no. 82,
1928; idem, no. 149, 1950
Dana VII, vol. 1, p. 801

Nuolaite

A mixture similar to wiikite
Th = 1.8 to 3.5 percent
Dana VII, vol. 1, p. 801

XENOTIME

YPO_4
U = up to 3.6 percent, Th = up to 2.2
percent
Dana VII, vol. 2, pp. 688-691

YTTRIALITE

Silicate of Th and Y metals chiefly
Possibly thalenite with much Th
U = 0.8 percent, Th = 10.5 percent
Dana VI, p. 512
Strunz, H., Mineralogische Tabellen,
p. 194, Leipzig, 1949

YTROCASITE

$(\text{Y}, \text{Th}, \text{U}, \text{Ca})_2\text{Ti}_4\text{O}_{11}?$
U = 2.3 percent, Th = 7.7 percent
Dana VII, vol. 1, p. 793

YTTROTANTALITE

$(\text{Fe}, \text{Y}, \text{U})(\text{Nb}, \text{Ta})\text{O}_4$
U = 3.4 to 3.9 percent, Th = 0.6 to 0.7
percent
Dana VII, vol. 1, pp. 763-764

Yttrocolumbite

Similar to yttrotantalite
Am. Mineralogist, vol. 25, p. 155, 1940

ZIRCON

ZrSiO_4
U and Th low in most specimens, but up to
2.7 percent U and up to 13.1 percent
Th reported
Dana VI, pp. 482-486

Alvite

Variety of zircon, near cyrtolite
Th = 13.1 percent
Dana VI, pp. 487-488

Azorite

Variety of zircon
Dana VI, pp. 482, 484

Calyptolite

Probably altered zircon
Dana VI, pp. 482, 486

Cyrtolite

Altered zircon, containing U, Th, Y and
other rare earths
U = up to 1.4 percent
Dana VI, p. 487

Hagatalite

Synonym of zircon
U = trace, Th = 1.3 percent
Am. Mineralogist, vol. 11, p. 137, 1926

Hoegtveitite

May be alvite
Am. Mineralogist, vol. 12, p. 97, 1927

Malacon

Hydrated or altered zircon containing
the common elements, but no U, Th, or
rare earths except in trace amounts
Dana VI, p. 486

Naegite

Variety of zircon

C. MINERALS THAT SHOULD BE TESTED FOR URANIUM AND THORIUM

AMBATOARINITE

Carbonate of Sr and rare earths
May be related to ancylite
Dana VII, vol. 2, p. 293

ANCYLITE

$(\text{Ce, La})_4(\text{Sr, Ca})_3(\text{CO}_3)_7(\text{OH})_4 \cdot 3\text{H}_2\text{O}$
Dana VII, vol. 2, pp. 291-293

Weibyte

A fluocarbonate of Ce and La, with minor
Ca and Sr
May be related to ancylite
Dana VII, vol. 2, p. 293

BAZZITE

Silicate of scandium, with Fe, Na, and
rare earths
Mineralog. Abs., vol. 8, p. 105, 1941

U = 2.4 to 2.7 percent, Th = 2.5 to 4.4
percent
Mineralog. Abs., vol. 2, p. 36, 1923

Oerstedite

Altered zircon
Dana VI, p. 486

Oyamalite

Variety of zircon
Th = 0.5 percent
Am. Mineralogist, vol. 11, pp. 137-138,
1926

Tachyaphaltite

Probably altered zircon
Dana VI, p. 486

Yamagutilite

Also yamaguchilite.
Variety of zircon
Contains P_2O_5 and rare earths
Mineralog. Mag., vol. 24, p. 626, 1937

ZIRKELITE

$(\text{Ca, Fe, Th, U})_2(\text{Ti, Zr})_2\text{O}_5?$
U = 1.4 percent, Th = 6.4 percent
Dana VII, vol. 1, p. 740

BECKELITE

$\text{Ca}_3(\text{Ce, La, Pr, Nd})_4\text{Si}_3\text{O}_{14}$
Dana VI, appendix II, p. 14

BEIYINITE

Undetermined mineral containing La, Ce,
Y, and Er
Mineralog. Abs., vol. 6, p. 151, 1935

BRITHOLITE

$(\text{Na, Ce, Ca})_5\text{F}(\text{SiO}_4, \text{PO}_4)_3$
Strunz, H., Mineralogische Tabellen,
p. 167, Leipzig, 1949

BUSZITE

Silicate of rare earths
Am. Mineralogist, vol. 14, pp. 438-439,
1929

CALCIO-ANCYLITE

$(\text{Ce}, \text{La})_4(\text{Ca}, \text{Sr})_3(\text{CO}_3)_7(\text{OH})_4 \cdot 3\text{H}_2\text{O}$
Dana VII, vol. 2, pp. 291-293

CARBOCER

A hydrocarbon high in Ce
Great Britain Geol. Survey Bull. 3,
p. 3, 1951

CENOSITE

Also kainosite
 $\text{Ca}_2(\text{Ce}, \text{Y})_2(\text{CO}_3)\text{Si}_4\text{O}_{12} \cdot 1-2 \text{H}_2\text{O}$
Strunz, H., Mineralogische Tabellen,
p. 198, Leipzig, 1949

CHURCHITE

$(\text{Ce}, \text{Ca})\text{PO}_4 \cdot 2\text{H}_2\text{O}$
Dana VII, vol. 2, pp. 703, 773

ERDMANNITE

Hydrous silicate of Ce, Y, Fe, Mn, Al,
and Ca
A mixture of homilite with a mineral in
the melanocerite group
Dana VI, pp. 416, 507

ERIKITE

Phosphate-silicate of rare earths, Al,
Ca, and Na
Mineralog. Mag., vol. 14, p. 348, 1907

EUDIALYTE

$\text{X}_5\text{Y}_2\text{Si}_6\text{O}_{18}(\text{OH}, \text{Cl})$
X = Ca, Na, Ce, and other rare earths
Y = Zr, Fe, Nb
Dana VI, pp. 409-412

Eucolite

Same as eudialyte, but with different
optical sign
Dana VI, pp. 409-412

FLORENCITE

$\text{CeAl}_3(\text{PO}_4)_2(\text{OH})_6$
Dana VII, vol. 2, pp. 831, 838-839

FLUOCERITE

$(\text{Ce}, \text{La}, \text{Nd})\text{F}_3$
Dana VII, vol. 2, pp. 48-50

Tysonite

A synonym of fluocerite
Dana VII, vol. 2, pp. 48-50

GADOLINITE

$\text{Be}_2\text{FeY}_4\text{Si}_2\text{O}_{13}$
Dana VI, pp. 509-512

HELLANDITE

$(\text{Ca}, \text{Y}, \text{Er}, \text{Mn})_3(\text{Al}, \text{Fe})\text{H}_2\text{O}(\text{SiO}_4)_2$
Strunz, H., Mineralogische Tabellen,
p. 190, Leipzig, 1949

KONDRIKITE

Also kondrikovite
 $m\text{Na}_2\text{Al}_2\text{Si}_3\text{O}_{10} \cdot n[\text{Ce}_4(\text{Ti}_2\text{O}_6)_3 \cdot 10\text{Ca}_2\text{Si}_2\text{O}_6]$
Natrolite with microscopic inclusions of
rinkite-like mineral
Mineralog. Abs., vol. 6, pp. 341-343,
1936

KNOPIITE

In perovskite series
Dana VII, vol. 1, pp. 730-733

LANTHANITE

$(\text{La}, \text{Ce})_2(\text{CO}_3)_2 \cdot 8\text{H}_2\text{O}$
Dana VII, vol. 2, pp. 241-243

LESSINGITE

Silicate of rare earths
Mineralog. Abs., vol. 10, p. 245, 1940

LOPARITE

Perhaps $(\text{Na}, \text{Ce}, \text{Ca})_2(\text{Ti}, \text{Nb})_2\text{O}_6$
End member in perovskite-knopite-
loparite series
Dana VII, vol. 1, pp. 730, 732-734

LORANSKITE

$(\text{Y}, \text{Ce}, \text{Ca})(\text{Ta}, \text{Zr})\text{O}_4?$
Dana VII, vol. 1, p. 767

METALOPARITE

Hydrous titano-niobate of rare earths,
pseudomorphous after loparite
Mineralog. Mag., vol. 26, p. 339, 1943

OBORITE

Undetermined mineral containing La, Ce,
Y, and Er

• Mineralog. Abs., vol. 6, p. 151, 1935

PARISITE

$(\text{Ce, La})_2\text{Ca}(\text{CO}_3)_3\text{F}$

Dana VII, vol. 2, pp. 282-285, 287

Yttroparisite

Composition near parisite, but contains
much yttria

Dana VII, vol. 2, p. 285

PEROVSKITE

CaTiO_3

Some analyses show rare earths

Dana VII, vol. 1, pp. 730-734

Dysanallyte

Synonym of perovskite

Dana VII, vol. 1, pp. 730-732

RETZIAN

Basic arsenate of Mn, Ca, and rare earths

Dana VII, vol. 2, pp. 794-795

RHABDOPHANE

Also rhabdophanite

$(\text{Ce, La, Nd})\text{PO}_4 \cdot \text{H}_2\text{O}$

Dana VII, vol. 2, p. 774

Scovillite

Synonym of rhabdophane

Dana VII, vol. 2, p. 774

SCHETELIGITE

$(\text{Ca, Y, Sb, Mn})_2(\text{Ti, Ta, Nb})_2(\text{O, OH})_7$

Dana VII, vol. 1, p. 757

SPHENE

Essentially CaTiSiO_5 , but commonly
contains rare earths, Nb, and other
elements

Am. Mineralogist, vol. 32, pp. 637-642,
1947

Keilhauite

Yttrian variety of sphene

Dana VI, p. 717

Yttrötitanite

Synonym of keilhauite

Strunz, H., Mineralogische Tabellen,
p. 192, Leipzig, 1949

Titanite

Synonym of sphene

Dana VI, p. 712

SYNCHISITE

$(\text{Ce, La})\text{Ca}(\text{CO}_3)_2\text{F}$

May be related to parisite

Dana VII, vol. 2, pp. 287-289

THORTVEITITE

$(\text{Sc, Y})_2\text{Si}_2\text{O}_7$

Am. Mineralogist, vol. 7, pp. 195-196,
1922

Befanomite

Synonym of thortveitite

Am. Mineralogist, vol. 11, p. 137, 1926

TOERNEBOHMITTE

Chiefly $\text{R}_3(\text{F, OH})(\text{SiO}_4)_2$

R = Ce(La, Nd), Al, Fe, Mn, Mg, Ca

Am. Mineralogist, vol. 6, pp. 118-119,
1921

WEINSCHENKITE

$(\text{Y, Er})\text{PO}_4 \cdot 2\text{H}_2\text{O}$

Am. Mineralogist, vol. 29, pp. 97-107,
1944

Dana VII, vol. 2, pp. 703, 771-773

YTTROTUNGSTITE

Formerly thortungstite

Contains Y and Ce, but no Th or Zr

Mineralog. Abs., vol. 11, p. 189, 1951

D. MINERALS THAT ARE NONURANIUM- OR NONTHORIUM-BEARING,
BUT THAT HAVE BEEN REPORTED TO CONTAIN IMPURITIES OR
INTERGROWTHS OF URANIUM, THORIUM, OR RARE-EARTH MINERALS

ADAMITE

$\text{Zn}_2(\text{OH})\text{AsO}_4$
Reported to contain small amounts of U
Mineralog. Abs., vol. 10, p. 375, 1948
Strunz, H., Mineralogische Tabellen,
p. 161, Leipzig, 1949

BADDELEYITE

ZrO_2
Analyses show traces of rare earths
Dana VII, vol. 1, pp. 607-610

Brazilite

Mixture of fibrous baddeleyite, zircon,
altered zircon, and other minerals
Dana VII, vol. 1, p. 610

Caldasite

Mixture of baddeleyite, zircon, altered
zircon, and other minerals
Dana VII, vol. 1, p. 610

Zirkite

Mixture of baddeleyite, zircon, altered
zircon, and other minerals
Mineralog. Mag., vol. 18, p. 390, 1919

BODENBENDERITE

Mixture of fluorite and spessartite
U = 0.11 percent
Am. Mineralogist, vol. 34, pp. 608-611,
1949

COLUMBITE

$(\text{Fe}, \text{Mn})(\text{Nb}, \text{Ta})_2\text{O}_6$
U = up to 1.7 percent
Dana VII, vol. 1, pp. 780-785

Baierite

Also baierine
Synonym of columbite
Dana VII, vol. 1, p. 780

Dianite

Synonym of columbite
Dana VII, vol. 1, p. 780

Ferrocolumbite

Synonym of columbite
Dana VII, vol. 1, pp. 780, 783

Ferro-ilmenite

Synonym of columbite
Dana VII, vol. 1, pp. 780, 785

Greenlandite

Synonym of columbite
Dana VII, vol. 1, pp. 780, 784

Hermannolite

Synonym of columbite
Dana VII, vol. 1, pp. 780, 785

Manganocolumbite

Variety of columbite
Dana VII, vol. 1, pp. 780, 783-784

Toddite

Probably a uranian variety of columbite
U = 9.8 percent
Dana VII, vol. 1, pp. 785-786
Ellsworth, H. V., Geological Survey of
Canada, personal communication

CORVUSITE

$\text{V}_2\text{O}_4 \cdot 6\text{U}_2\text{O}_5 \cdot x\text{H}_2\text{O}$
U = 1.45 percent
Work in progress indicates species may be
valid
Reexamination of type material shows
presence of rauvite which might account
for reported uranium content
Weeks, A. D., personal communication,
March 1952
Am. Mineralogist, vol. 18, pp. 195-205,
1933

EVANSITE

$\text{Al}_3(\text{OH})_6\text{PO}_4 \cdot 6\text{H}_2\text{O}$
Reported to contain small amounts of U
Mineralog. Abs., vol. 10, p. 375, 1948
Strunz, H., Mineralogische Tabellen,
p. 176, Leipzig, 1949

FISCHERITE



Reported to contain small amounts of U
Mineralog. Abs., vol. 10, p. 375, 1948
Strunz, H., Mineralogische Tabellen,
p. 175, Leipzig, 1949

FLUORITE



Some specimens, especially those of deep-purple color, show radioactivity. This can generally be shown to be due to inclusions of uranium minerals, but the fluorite itself may possibly have U in substitution for Ca
Dana VII, vol. 2, pp. 28-37

Strong alpha bombardment produces the semiopaque to opaque black variety antozonite as in the inner bands of halos surrounding uraninite and thorite inclusions. Centered thorium halos in fluorite have a maximum radius of about 41 microns. Uranium halos are smaller with a maximum radius of about 31 microns.

Phair, George, and Onoda, Kiyoko,
unpublished manuscript, 1951

Yttrocerite

Variety of fluorite containing rare earths
Dana VII, vol. 2, pp. 29, 33-34

Yttrofluorite

Yttrian variety of fluorite
Dana VII, vol. 2, pp. 29, 32-34

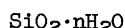
KALKOWSKITE

$\text{Fe}_2\text{Ti}_3\text{O}_9?$
Analysis shows rare earths
Dana VII, vol. 1, pp. 773-774

KATANGITE

Synonym of chrysocolla
May contain U in admixture
Mineralog. Abs., vol. 9, p. 231, 1946

OPAL



Some varieties, particularly hyalite, show a green fluorescence due to uranium content
 $\text{U (in hyalite)} = 4.8 \times 10^{-7} \text{ to } 6.4 \times 10^{-4} \text{ g/g}$
Mineralog. Abs., vol. 10, pp. 374-375, 1948

PYROMORPHITE



Some specimens are uraniferous
Zeitschr. Kristallographie, vol. 62,
pp. 177-178, 1925

SCAPOLITE

$(\text{Na}, \text{Ca})_4\text{Al}_3(\text{Al}, \text{Si})_3\text{Si}_6\text{O}_{24}(\text{Cl}, \text{CO}_3, \text{SO}_4)$
A fluorescent variety contains 0.023 percent U
Chemie der Erde, vol. 9, pp. 139-144, 1934

SEFSTRÖMITE

A mixture of ilmenite with minor amounts of radioactive minerals
Dana VII, vol. 1, p. 542

TANTALITE

$(\text{Fe}, \text{Mn})(\text{Ta}, \text{Nb})_2\text{O}_6$
Dana VII, vol. 1, pp. 780-787

Ferrotantalite

Synonym of tantalite
Dana VII, vol. 1, pp. 780, 783

Ildefonsite

Synonym of tantalite
Dana VII, vol. 1, p. 780

Manganotantalite

Variety of tantalite
Dana VII, vol. 1, pp. 780, 783-784

Siderotantalite

Synonym of tantalite
Dana VII, vol. 1, p. 780

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- (B) indicates minerals containing minor amounts of uranium or thorium.
- (C) indicates minerals that should be tested for uranium and thorium content.
- (D) indicates minerals that are nonuranium- or nonthorium-bearing, but that have been reported to contain impurities or intergrowths of uranium, thorium, or rare-earth minerals.

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