New Mineral Names*†

DMITRIY I. BELAKOVSKYI, DALILA M. ZECONI, ARNOLDO RIVAI, AND FERNANDO CÁMARA

1Fersman Mineralogical Museum, Russian Academy of Sciences, Leninskiy Prospekt 18 kor. 2, Moscow 119071, Russia
2CSIRO Mineral Resources, ARRC, 26 Dick Perry Avenue, Kensington, Western Australia 6151, Australia
3Dipartimento di Scienze della Terra “Ardito Desio”, Università degli Studi di Milano, Via Mangiagalli, 34, 20133 Milano, Italy

IN THIS ISSUE

This New Mineral Names has entries for 13 new species, including falottaithe, meieranite and high-pressure minerals found in meteorites, terrestrial impact rocks, and as inclusions in diamonds: hemleyite, hiroseite, ice-VII, kaititianite, maohokite, prosidecagonite, riestie, rubinite, uakinite, wangdaodeite, and zagamiite.

FALOTTAITHE*


Falottaithe (IMA 2013-044), MnC₃O₂·3H₂O, orthorhombic, is a new mineral discovered in abandoned manganese mines of Falotta and Parsettens and Tinzen in the Oberhalbstein region, Canton Grisons, Switzerland. The mines were exploited in the past centuries up to the World War II. The manganese ores occur as lenses in radiolaritic rocks of the large Oberhalbstein ophiolitic zone. The origin of the synsedimentary ores related to a Jurassic ocean ridge volcanism. The whole complex was deformed by the Alpine metamorphism and influenced by lowest greenschist facies conditions. The primary ores consist mostly of braunite, rhodonite, and spessartite. The remobilization process produced several manganese arsenates: brandtite, sarkinite, manganberzeliite, braunite, rhodonite, and spessartite. Falottaithe presumably resulted from reaction of humus and oxalic acids (from plants) with manganese minerals. Perfectly shaped colorless transparent crystal to 1 × 0.5 mm were found in small fractures (from plants) with manganese minerals. Falottaithe does not fluoresce under UV radiation. Cleavage was not observed. Mohs hardness is estimated as 2½. Density was not measured. D(calc) = 4.7490(2), a = 6.630(100; 010), 4.635 (60; 201), 3.801 (90; 211), 3.520 (35; 012), 2.625 (100; 014), 2.376 (50; 211), 2.222 (70; 312), 1.726 (70; 233). The single-crystal study shows falottaithe is orthorhombic, space group Pca₃. The unit-cell parameters refined from the Gandolfi data are a = 10.527(5), b = 6.626(2), c = 9.783(6) Å, V = 682.4 Å³. Structure refinement was not performed. The mineral was named for its type locality.

HEMLEYITE*


Hemleyite (IMA 2016-085), ideally FeSiO₃, trigonal, is a new mineral—Fe-analogue of akimotoite (ilmenite-structured MgSiO₃), and a predicted high-pressure polymorph of clinoferrosilite, ferrosilite, and pyroxferroite. Hemleyite was discovered in unmetelct portion of the heavily shocked L6 Suizhou chondrite fallen on April 15, 1986, in Dayanpo, ~12.5 km southeast of Suizhou in Hubei, China. Shock-produced melt veins are less than 300 µm thick and contain high-pressure minerals including ringwoodite, majorite-pyrope garnet, akimotoite, magnesiovišsite, lusinite, pyroxferroite. Hemleyite was found as one subhedral crystal ~7 × 6 × 5 mm coexisting with forsterite, clinopyroxene and Fe-bearing pyroxene with a composition nearly identical to that of hemleyite. The physical and optical properties were not determined due to small size; D(calc) = 4.383 g/cm³. Hemleyite was initially identified by the Raman spectrum (similar to that of akimotoite), which displays bands at 795, 673, 611, 476, 403, and 342 cm⁻¹ with the typical strong peak at 795 cm⁻¹, corresponding to the stretching vibrations of the SiO₆ octahedra. It has much sharper bands than those observed for ilmenite-type polymorphs in other chondrites indicating rather high crystallinity.

The average of unspecified number of electron probe WDS analysis [wt% (range)] is: SiO₂: 51.08 (50.68–51.85), Al₂O₃: 1.26 (1.11–2.55), Cr₂O₃: 0.61 (0.29–1.25), Fe₂O₃: 29.33 (26.88–30.52), MgO 12.71 (11.21–13.10), CaO 1.88 (0.95–2.03), MnO 1.76 (1.44–2.05), Na₂O 1.02 (0.88–1.39), total 99.65. The empirical formula based on 3 O pfu is [Fe₃₋ₓMgₓMgₓ₋₃Ca₄₋₄Mnₓ₋₃⁡ₙ₈Al₉₋ₙ₈Si₆₋ₙ₈O₂₃₋₈·₃H₂O. The strongest lines in powder XRD pattern [d (Å, P(hkl)]: 3.520 (35; 012), 2.625 (100; 014), 2.376 (50; 110), 2.105 (50; 030). The single-crystal XRD data shows hemleyite is trigonal, space group R3, a = 4.7483(5), c = 13.665(1) Å, V = 266.82 Å³, Z = 6. The crystal structure was refined to

* All minerals marked with an asterisk have been approved by the IMA-CNMMC.
† For a complete listing of all IMA-validated unnamed minerals and their codes, see http://pubsite.usgs.edu/ima-cnnmc/.
HIROSEITE*  

Hiroseite (IMA 2019-019), ideally FeSiO₃ orthorhombic, is a newly discovered perovskite-supergroup mineral and the Fe analog of bridgmanite (MgSiO₃), which is considered to be the most abundant mineral in the Earth lower mantle. Hiroseite was found in a shock vein of a heavily shocked (S6) L6 chondrite meteorite Suizhou fallen in Dayanpo, 12.5 km SE of the Suizhou city, Hubei province, China. It occurs in a quenched shock melt associated with Fe-rich segregations of Fe₂+ as Fe⁺⁺ ratio charge balanced with Cl⁻ ions reside in ice-VII on the same site as oxygen and no structural correlation occurs between dissolved ionic species. The geological implications of the presence of natural ice-VII are discussed. Ice-VII crystallizes from aqueous fluid trapped during diamond growth upon ascent of the host diamonds providing the evidence for the presence of aqueous fluid in the mantle transition zone and in its boundary with lower mantle. Inclusions of ice-VII remain at high pressure in rigid diamond host crystal allowing to determine minimum pressures of the surrounding diamond formation as ~6 GPa and 9 ± 1.6 GPa for diamonds from Orapa, ~12 ± 2 GPa for a diamond from Shandong, and 24–25 (±3) GPa for a specimen from Namaqualand. Entrapment conditions are estimated for the ice-VII inclusions that are currently at ~8 to 12 GPa as pressure-temperature regime of 400 to 550 km depth and 1400 to 1900 K. For inclusions at 24 to 25 GPa, the source region is estimated as 610 to 800 km depth. Type material (a triangular diamond fragment of ~350 × 420 µm) is deposited in the Royal Ontario Museum, Toronto, Ontario, Canada. D.B.

References cited

American Mineralogist, vol. 105, 2020
**KAITIANITE*\**


Kaitianite (IMA 2017-078a), TiO$_2$-Ti$_2$O$_5$, monoclinic, is a new mineral discovered in Allende CV3 carbonaceous chondrite meteorite fallen in Mexico on February 8th, 1969. It was identified in section USNM 3510-5 consisdered as a type specimen and deposited in the National Museum of Natural History, Smithsonian Institution, Washington, D.C., U.S.A. Fine-grained TiO$_2$ was previously observed in a chondrite matrix clast in the Nippena polymictic ureilite (Brearly 1993). Kaitianite occurs in two crystals, 0.3–0.6 × 3.6 μm and 0.2 × 1.1 μm, within one irregular grain in contact with tistartite and rutile, along with Ti$_2^+$-bearing corundum, oxide (TiO$_2$, Al$_2$Zr$_2$Si$_3$Mg$_{1.02}$O$_{10}$) (related to panguite-kangite-type but highly-ordered structure), and Ti-xifengite. These grains are likely from the chondrule where mullite, kramaraveite, and the type tistartite (TiO$_2$) were identified. The average of unspecified number of electron probe WDS analyses (wt%) is TiO$_2$: 56.55, TiO$_2$: 39.29, Al$_2$O$_3$: 1.18, MgO 1.39, FeO 0.59, V$_2$O$_5$: 0.08, total 99.07. The empirical formula based on 5 O pfu is (Ti$_{1.95}$Al$_{0.18}$Ti$_{1.89}$Mg$_{0.10}$Fe$_{0.08}$)O$_{10}$ (Ti$_2^+$/Ti$_{2}^+$) = 0.05 by stoichiometry). The strongest X-ray microdiffraction reflections are [d Å (Pct/ hkl)]: 4.689 (53; 200), 3.377 (75; 202), 2.931 (73; T12), 2.662 (100; 310), 2.307 (59; 112), 1.737 (66; 322,223), 1.671 (67; 314,023), 1.451 (52; 132,24,223). The EBSD data shows kaitianite is monoclinic, space group C2/c, a = 10.115, b = 5.074, c = 7.182 Å, β = 112°, V = 341.77 Å$^3$, Z = 4. The patterns can be indexed only by the V$_2$O$_5$-type structure and give a perfect fit by the synthetic γ-Ti$_2$O$_5$. Kaitianite is a first solar titanium oxide with structurally essential Ti$_2^+$ and Ti$_{2}^+$, probably crystallized from a refractory melt or condensed from a gaseous reservoir under highly reduced conditions. The name is after two Chinese words “Kai Tian,” meaning creating the heaven (sky), from the story of “Pan Gu Kai Tian” in the Chinese mythology. Pan Gu, the giant, created the world by separating the heaven and earth from an egg-shaped chaos. D.B.R.

**References cited**


**MAOHOKITE*\**


Maohokite was formed from subsolidus decomposition of Fe-Mg carbonate via a self-oxidation-reduction reaction at impact pressure and temperature of 25–45 GPa and 800–900°C. The name honors Hokwang Mao (b. 1941) of Geophysical Laboratory, Carnegie Institution of Washington, for his contribution to high pressure research. Type material is deposited in the Geological Museum, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, Tianhe, China. D.B.

**MEIERANITE*\**


Meieranite (IMA 2015-009), ideally Na$_5$Sr$_3$Mg$_3$Si$_6$O$_{18}$, orthorhombic, was discovered in the Wessels mine, Kalahari Manganese Fields, Northern Cape Province, South Africa (27°6′51.82″S, 22°51′18.31″E). The mineral occurs as isolated aggregates of grains up to 0.5 × 0.5 × 0.4 mm embedded in a matrix consisting mainly of pale green sugilite with a minor aegirine and pectolite. The mineral assemblage is probably a result of a hydrothermal event during metamorphism under conditions of 270–420°C at 0.2–1.0 kbar. Meieranite is light blue to blue, transparent with white streak and vitreous luster. Cleavage is good on [100] with no parting and no twinning observed. The mineral is brittle with a Mohs hardness of 5.5; D$_{meas}$ = 3.411(3), D$_{calc}$ = 3.410 g/cm$^3$. In plane-polarized transmitted light meieranite is strongly pleochroic X = violet, Y = blue, Z = blue. It is optically biaxial (–), with α = 1.610, β = 1.623, γ = 1.630 (white light), 2V$_{meas}$ = 70°(1), 2V$_{calc}$ = 72°; X = a, Y = b, Z = c. Dispersion of optical axes is strong, r > v. The Raman spectrum has common features of nordite-group minerals with bands at the regions (cm$^{-1}$): 1200–900 (Si–O stretching within the SiO$_4$ groups); 800–750 (O–Si–O bending within the SiO$_4$ groups); 700–600 (Si–O–Si bending between SiO$_4$ tetrahedra: below 600 (rotational and translational modes of SiO$_4$ tetrahedra, M–O interactions and lattice modes). The average of nine electron probe work done on WDS analyses (wt% [range]) is: SiO$_2$: 46.16 (45.52–46.74), CaO 0.21 (0.18–0.25), MgO 3.21 (2.74–4.29), MnO 2.53 (1.59–3.52), FeO 0.10 (0–0.26), Na$_2$O 0.27 (75.75–81.11), BaO 0.52 (0.25–0.90), SrO 0.69 (0.41–0.81), PbO 0.56 (0.23–0.83), total 100.12. The empirical formula based on 17 O apfu is Na$_5$Sr$_3$Mg$_3$Co$_{1.02}$Fe$_{0.08}$O$_{17}$, orthorhombic, space group $Pnma$. The strongest reflections in the powder X-ray diffraction pattern are [d Å (Pct/ hkl)]: 3.550 (25; 123), 3.166 (42; 220), 2.990 (100; 222), 2.800 (84; 125), 2.623 (26; 940), 2.425 (17; 303), 2.126 (21; 242), 2.057 (27; 145), 1.778 (25; 343). The unit-cell parameters obtained from the powder XRD data are $a = 7.9343(4), b = 10.4741(4), c = 18.2381(5)$ Å. Single-crystal XRD data collected from a crystal of 0.07 × 0.07 × 0.06 mm shows meieranite is orthorhombic, space group $P2_1/n$, a = 7.9380(2), b = 10.4923(3), c = 18.256(6) Å, V = 1520.50 Å$^3$. The crystal structure was solved and refined to $R_1 = 0.027$ for 4738 independent $I$-2$\theta$(hkl) reflections. In the structure the layers of corner-sharing SiO$_4$ and M$_2$O$_6$ tetrahedra ($M^2+$ = Mg, Mn, Co, Fe) alternate along [100] with layers of Na$_2$O, and SrO$_6$ polyhedra. The tetrahedral layers consist of eight-, seven- six-, five-, and four-coordinate M$_2$O$_6$ polyhedra. The name honors Eugene Stuart Meieran (b. 1937), a member of the U.S. National Academy of Engineering, an avid mineral collector, who donated a number of important specimens to major museums, for his work in mineral preservation and education.

American Mineralogist, vol. 105, 2020
Proxidecagonite*  
L. Bindi, J. Pham, and P.J. Steinhardt (2018) Previously unknown quasi-crystal periodic approximant found in space. Scientific Reports, 8, 16271.

Proxidecagonite (IMA 2018-038), Al$_2$Ni$_2$Fe$_2$, orthorhombic, is a new mineral discovered in a ~2.5 mm fragment of Khatyrka CV3 carbonaceous chondrite found at Listvenitovyi Stream, Koryak Upland, Chukotka, Russia. It has similar chemical composition to a recently discovered at the same meteorite quasi-crystalline mineral decagonite Al$_2$Ni$_2$Fe$_2$ (Bindi et al. 2015), but atomic arrangement is slightly distorted so that the symmetry conforms to the conventional laws of three-dimensional crystallography. That is reflected in the name, first part of which derived from the truncated Latin word prōxinus as periodic approximant to decagonite. Khatyrka meteorite formed 4.5 billion years ago and contains evidence of a heterogeneous distribution of pressures and temperatures during impact shock, in which some portions of the meteorite reached at least 5–10 GPa and 1200–1500 °C. The most recent strong shock supposedly took place in space a few hundred Ma. Proxidecagonite occurs as gray to black metallic anhedral grains up to ~20 μm associating with trevorite, diopside, forsterite, ahrensite, clinonastilite, nepheline, coesite, stishovite, pentlandite, Cu-rich troilite, Al-rich taenite, icosahedrite, decagonite, khatyrkite, steinhardtite, and recently discovered in the same meteorite holllisterite (AlFe), kryachkoite (Al,Cu)$_2$(Fe,Cu), and stolperite (AlCu) (Ma et al. 2017). In reflected light, proxidecagonite is anisotropic, without characteristic rotation tints. The macroscopic physical and optical properties were not determined due to small size; $D_{opt} = 4.37$ g/cm$^3$. The average of 10-point electron probe WDS analyses [wt% (range)] is: TiO$_2$ 99.25 (98.98–99.62), FeO 0.42 (0.33–0.53), CaO 0.03 (0.02–0.04), total 99.70. The strongest reflections of X-ray powder pattern [$d$ Å (P%; hkl)] are: 3.490 (88; 110), 2.852 (100; 011), 2.833 (70; 111), 2.359 (33; 120), 2.094 (22; 210), 1.682 (23; 122), 1.671 (26; 202), 1.647 (27; 221). Riesite is monoclinic, space group P2$_1/c$, $a = 4.519(3)$, $b = 5.503(8)$, $c = 4.888(2)$ Å, $β = 90.59(8)^\circ$, $V = 121.5$ Å$^3$, $Z = 4$. The structure was refined by the Rietveld method to $R_{wp} = 5.1%$ and $γ = 11.2$ for 1534 observations. Riesite is closely related structurally to orthorhombic srilankite (TiO$_2$-II) [$Pnma$, $a = 4.5318(7)$, $b = 5.5019(7)$, $c = 4.9063(6)$ Å], from which it differs by having two distinct cation sites rather than one and through its monoclinic symmetry. The observation of rie in Khatyrka meteorite is consistent with peak pressure 20–25 GPa. Riesite forms only upon release from the shock state upon back transformation from akagoite. Type material is deposited in the collections of the Institut für Geowissenschaften, Ruprecht-Karls Universität Heidelberg, Germany. D.B.

RUBINITE*  

Rubinite (IMA 2016-110), Ca$_3$Ti$_3$Si$_2$O$_{12}$, cubic, is a new mineral of garnet group, Ti$^3^+$-analog of eringaite Ca$_5$Sc$_2$Si$_2$O$_{12}$, goldmanite Ca$_3$V$_2$Si$_2$O$_{12}$, uvarovite Ca$_3$Cr$_2$Si$_2$O$_{12}$, and andradite CaFe$_2$Si$_2$O$_{12}$. It was identified in five Ca-Al-rich inclusions (CAIs) in carbonaceous chondrites. In the shock state upon back transformation from akagoite. Type material is deposited in the Museo di Storia Naturale, Sezione di Mineralogia e Litologia, Università di Firenze, Italy. D.B.

References cited  

Ma, C., Lin, C., Bindi, L., and Steinhardt, P.J. (2017) Hollisterite (AlFe), kryachkoite (AlCu)$_2$(Fe,Cu), and stolperite (AlCu); Three new minerals from the Khatyrka CV3 carbonaceous chondrite. American Mineralogist, 102, 690–693.

American Mineralogist, vol. 105, 2020
NEW MINERAL NAMES

Uakitite*


Uakitite (IMA 2018-003), ideally V3N, cubic, was discovered in (and named for) Uakit iron meteorite (hexahedrite IIAB) found in 2016 on the stream Mukhtunningi terrace, left feeder of the Uakit River, near the Uakit settlement, Baun Event district, Republic of Burятия, Russia. Uakitite occurs in small troilite–daubrèelite (±schreibersite) inclusions up to 1 cm in kamacite—the main mineral of the meteorite (93–98 vol%). Other minor minerals in meteorite are nickelphosphide, taenite, cohenite, tetrataenite, kalinite, gakhovskiyite, carlsbergite, heazzlewoodite, pentlandite, phalerite, copper, unidentified Mn-dominant phase (<0.5 µm), and magnetite. Carlsbergite (Cr analogue of uakitite CrN is a more abundant nitride in the Uakit meteorite, but it was not found in same inclusions with uakitite. Phase relations indicate uakitite as an early mineral in these association. It supposed to be formed due to high-temperature (~1000 °C) separation of Fe-Cr-rich sulfide liquid from Fe-metal melt. Uakitite forms euheudal (cubic) crystals (in daubrèelite) or rounded grains (in schreibersite) up to 5 µm. The physical properties were not obtained due to grains' small size. Dv = 6.126 g/cm³. The synthetic VN is yellow, transparent with a strong luster and white streak. It is non-fluorescent, brittle with no cleavage or parting. Mohs hardness is 9–9.5. It is not soluble in water and weakly concentrated HCl, HNO₃, and H₂SO₄. In reflected light uakitite is light gray with a pinkish tint and no internal reflections. Reflective index for synthetic VN is n = 2.303 and reflectance R = 43.82% for λ = 587.6 nm. The average of 54 electron probe WDS analysis of uakitite (wt% [range]) is: V 73.33 (70.91–71.90), Cr 5.57 (5.02–6.18), Fe 1.56 (1.16–2.08), Mg 0.40 (0.30–0.50), Mn 0.04 (0.00–0.10), Al₂O₃ 0.19 (0.00–0.29), Cr₂O₃ 0.04 (0.00–0.09), TiO₂ 53.69 (52.13–53.92), total 99.54. The empirical formula based on 3O pfu is: Fe₀.₆₁Mg₀.₄₀Mn₀.₀₁Al₂O₃₁.₈₄Tiₒ₋₈₀O₃. The strongest reflections of the electron diffraction patterns of polycrystalline grains [d Å (hkl)] are: 3.75 (72; 102), 2.72 (100; 104), 2.56 (89; 210), 2.23 (57; 213), 1.86 (59; 240), 1.62 (41; 108), 1.51 (44; 374), 1.48 (44; 300). Electron diffraction data is consistent with the lithium niobate structure and shows wangaodeite is trigonal, space group R3c, a = 5.13 Å, c = 13.78 Å, V = 314.6 Å³, Z = 6. The corner-linked TiO₂ octahedra of adjacent octahedral layers in the structure of LiNbO₃-type FeTiO₃ are rotated relative to one another compare to ilmenite structure where TiO₂ octahedra share edges. Based on paragenesis and high-pressure and high-temperature experiments the P-T conditions for formation of wangaodeite were estimated as 20–24 GPa and >1200 °C. The name honors Alan E. Rubin (b.1953), a cosmochemist at University of California, Los Angeles (UCLA), U.S.A., for his contributions to cosmochemistry and meteorite research. Type material is deposited in the Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, California, U.S.A. (Vigaran), and in the Division of Earth and Planetary Materials Science, Tohoku University, Japan (Allende).

WANGDAODEITE*


Wangaodeite (IMA 2016-007), ideally FeTiO₃, is a new mineral, high-pressure polymorph of ilmenite from the Suizhou L6 chondrite meteorite that fell in the suburb of Suizhou City, Hubei Province, China. The occurrence of tiny grains of LiNbO₃-type FeTiO₃ was first reported (Dubrovinsky et al. 2009) in the Ries crater, Germany. In the Suizhou L6 chondrite wangdaodeite forms small irregular grains 2–20 µm (consisting of random-oriented domains 20–50 nm) inside or adjacent to the shock melt veins 0.02–0.20 mm thick in chondritic area of this meteorite consists of olivine, pyroxene, plagioclase, FeNi-metal and troilite, merrillite, chlorapatite, chrome, ilmenite. Melt veins contain maskelynite and shock-induced high-pressure minerals: ringwoodite, majorite, akimotoite, vitrified perovskite, lingunite, tuite, xite, CaFe₂O₄-structured FeCr₂O₄, majorite–pyrope, magnesiowüstite, and hemlyelite. No cleavage or parting were observed. Mohs hardness estimated by similar relation to associated ilmenite is 5.5–5.5. Macroscopic properties were not determined due to the small size of grains; Dv = 4.72 g/cm³. The reflectance values obtained for COM wavelengths [R/R₅₅% % nm] are: 210/0.87470, 19.9/17.9546, 20.1/18.5089, 20.4/18.3560. Other optical properties are not reported. The Raman spectra of wangdaodeite show the bands at 174–179, 273–277, 560–567, and 738–743 cm⁻¹, being apparently different of those for ilmenite and similar to those of synthetic FeTiO₃, MnTiO₂, ZnTiO₂, with LiNbO₃ structure and to LiNbO₃ itself. Three additional peaks at 221–226, 406, and 686–690 cm⁻¹ are interpreted as caused by the relics of precursor ilmenite. The average of 11 spot electron probe WDA analyses on 7 grains [wt% (range)] is: FeO 41.05 (39.59–41.50), MgO 2.79 (2.44–3.03), MnO 2.74 (2.13–4.38), Al₂O₃ 0.04 (0.00–0.10), V₂O₅ 0.19 (0.00–0.29), Cr₂O₃ 0.04 (0.00–0.09), TiO₂ 52.69 (52.13–53.92), total 99.64. The empirical formula based on 3O pfu is: Fe₀.₆₄Mg₀.₃₁Mn₀.₀₁Al₂O₃₁.₈₄Tiₒ₋₈₀O₃. The strongest reflections of the electron diffraction patterns of polycrystalline grains [d Å (hkl)] are: 3.75 (72; 102), 2.72 (100; 104), 2.56 (89; 210), 2.23 (57; 213), 1.86 (59; 240), 1.62 (41; 108), 1.51 (44; 374), 1.48 (44; 300).
References cited


Zagamiite (IMA 2015-022a), CaAl$_2$Si$_3$O$_{11}$, hexagonal, a new high-pressure calcium aluminosilicate was discovered in shock melt pockets in the basaltic shergottites Zagami and NWA 856. Later it was identified in other shergottites, like Tissint. The mineral was named for locality Zagami, Nigeria, where the Zagami meteorite fell. The meteorites in which zagamiite occurs consist mainly of zoned augite or pigeonite and the shock-generated plagioclase glass maskelynite with accessory ilmenite, titanomagnetite, baddeleyite, merrillite, apatite, and Fe sulfide. Other high pressure minerals liebermannite, lingunite, stishovite, and tissinite-II (Ca,Mg,Na,Fe,Mg)Si$_2$O$_6$, were found along with zagamiite in shock melt veins and pockets in Zagami (stishovite in NWA 856). Zagamiite suggested to be formed by crystallization from a melt derived from a plagioclase-rich mixture of plagioclase and clinopyroxene, rather than through solid state transformation of a precursor mineral. Zagamiite forms prismatic crystals, less than 50 nm × 100 nm to 400 nm × 1 μm. Data on physical properties were not obtained due to a small size. The averages of electron probe (mode is not specified) analysis of zagamiite from Zagami meteorite (6 points)/NWA 856 (8 points) are (wt%): SiO$_2$ 56.95/56.22, Al$_2$O$_3$ 28.27/27.26, CaO 9.96/10.71, Na$_2$O 2.67/2.49, FeO 1.01/1.64, K$_2$O 0.44/0.39, MgO 0.06/0.24, TiO$_2$ 0.05/0.08, MnO 0.03/0.08, total 99.45/99.10. The empirical formulae based on 11 O pfu are (Ca$_{0.66}$Na$_{0.32}$K$_{0.03}$)$_{1.01}$(Al$_{1.94}$Fe$_{0.05}$Mg$_{0.01}$)$_{2.00}$(Si$_{3.51}$Al$_{0.11}$)$_{3.62}$O$_{11}$ and (Ca$_{0.71}$Na$_{0.30}$K$_{0.03}$)$_{1.04}$(Al$_{1.89}$Fe$_{0.09}$Mg$_{0.02}$)$_{2.00}$(Si$_{3.50}$Al$_{0.11}$)$_{3.61}$O$_{11}$. The main lines in the powder-like synchrotron diffraction pattern \(d_\text{Å}(I\%hkl)\) are: 2.701 (29; 110), 2.638 (49; 014), 2.488 (20; 112), 2.197 (15; 022), 2.050 (100; 023), 1.575 (67; 026), 1.547 (22; 031,124), 1.351 (44; 220). Zagamiite is hexagonal \(P6_3/mmc\), \(a = 5.403(2)\ Å, c = 12.77(3)\ Å, V = 322.84\ Å$^3$, \(Z=2\). The structure and cell parameters are very similar to those of synthetic phase CAS (CaAl$_4$Si$_2$O$_{11}$) which is distinctly different in chemistry mostly by differing site occupancies of the 12-coordinated 2$c$ (Ca$_4$/5Na$_{1/5}$ in zagamiite vs. Ca$_1$ in CAS), octahedral 6$g$ (~Si$_{2/3}$O$_{1/3}$ vs. Si$_{2/3}$Al$_{1/3}$), and tetrahedral 4$f$ (~Si$_{1/3}$O$_{2/3}$ vs. Al$_{1/2}$O$_{1/2}$) sites. CAS phase may be important in the Earth’s mantle. Incompletely described natural CAS reported in Zagami and NWA 856 shergottites (Beck et al. 2004). Attempts to confirm the presence of CAS in the areas with zagamiite texturally equivalent to CAS-dominated regions described Beck et al. (2004) at the same meteorites were unsuccessful. Zagamiite type materials are deposited in the Smithsonian Institution, National Museum of Natural History, Washington, D.C., U.S.A. (Zagami), and in the E. Stolper’s Martian Meteorite Collection of the Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, California, U.S.A. (NWA 856). D.B.

References cited
American Mineralogist is now available online three ways


►2 Via Geoscienceworld – Since 2004, a comprehensive internet resource for research across the geosciences, built on a database of peer-reviewed journals and integrated with GeoRef. This gives global researchers a single point of access to 45 full-text scholarly journals and links to millions of relevant resources hosted elsewhere on the Web. [http://ammin.geoscienceworld.org/](http://ammin.geoscienceworld.org/).

Many features including html and PDF views. To subscribe: [http://www.geoscienceworld.org/site/subscriptions/](http://www.geoscienceworld.org/site/subscriptions/)

◄3 Via De Gruyter – our newest offering, another way for libraries include in their collection our great articles and variety. The features you expect in today’s web, such as eTOC alerts and new article alerts and cite/export. To subscribe: [http://www.degruyter.com/view/j/ammin](http://www.degruyter.com/view/j/ammin)

Our Aims and Scope

American Mineralogist: Journal of Earth and Planetary Materials, is the flagship journal of the Mineralogical Society of America (MSA), continuously published since 1916. Our mission is to provide readers with reports on original scientific research, both fundamental and applied, with far reaching implications and far ranging appeal. Topics of interest cover all aspects of planetary evolution, and biological and atmospheric processes mediated by solid-state phenomena. These include, but are not limited to, mineralogy and crystallography, high- and low-temperature geochemistry, petrology, geofluids, biogeochemistry, bio-mineralogy, synthetic materials of relevance to the Earth and planetary sciences, and breakthroughs in analytical methods of any of the aforementioned.

Have your librarian pick the one that suits your institution’s needs and budget today!
We invite you to submit for publication the results of original scientific research in the general fields of mineralogy, crystallography, geochemistry, and petrology. Specific areas of coverage include, but are not restricted to, igneous and metamorphic petrology, experimental mineralogy and petrology, crystal chemistry and crystal-structure determinations, mineral spectroscopy, mineral physics, isotope mineralogy, planetary materials, clay minerals, mineral surfaces, environmental mineralogy, biomineralization, descriptive mineralogy and new mineral descriptions, mineral occurrences and deposits, petrography and petrogenesis, and novel applications of mineralogical apparatus and technique. Am Min also cultivates a number of special collections that are frequently updated.

Submit your paper: https://aminsubmissions.msubmit.net

Information on manuscript preparation:
http://www.minsocam.org/MSA/AmMin/Instructions.html

Am Min website
http://www.minsocam.org/msa/AmMin/AmMineral.html

Quick Facts

- Average submission-to-acceptance time averages ~4 months
- MSA member authors qualify for free online color
- Read research articles, reviews, special collections, and more
- Paper Highlights are noted each issue via the MSA talk list, Facebook, and Am Min web page
- Publish with us for high-quality, fast publication, with availability and visibility worldwide
- Full array of the latest publishing options: e.g., Open access options (both Green and Gold), early publication, reprints, and e-links are all available
- Letters papers submission to acceptance time averages less than 2 months
- Impact Factor 2018: 2.63