NEW MINERAL NAMES

MICHAEL FLEISCHER

Gagarinite


Analyses of a cryptocrystalline variety by A. V. Bykova and of a crystalline variety by I. A. Sokolova gave, respectively, RE 54.00, 54.80; ThO₂ 0.50, –; CaO 14.00, 14.18; Na₂O 7.70, 7.50; K₂O none, 0.10; P₂O₅ and S not found; F 36.00, 33.00; Cl none, 3.79; H₂O⁺ 2.38, –; H₂O⁻ none, 0.07; SiO₂ 0.23, 0.15; TiO₂ none, trace; Al₂O₃ trace, 0.60; Fe₂O₃ 0.50, 0.15; sum 115.31, 114.34, – (O=F₂Cl₂) 15.10, 14.73=100.20, 99.61%. These correspond to Na₂Ca₂Y₃F₁₅–H₂O and Na₂Ca₂Y₃ (F,Cl)₁₅. The second sample gave a weak infra-red absorption band at 3.0 μm, indicating the presence of a little hydroxyl. X-ray spectrographic analyses of the rare earths by R. L. Barinskii and L. A. Yuzvak gave, resp., La 1.5, 1.2; Ce 7.7, 5.3; Pr 2.0, 1.0; Nd 6.7, 6.1; Sm 5.7, 4.8; Eu 0.7, –; Gd 7.4, 6.1; Tb 1.7, 2.2; Dy 12.0, 18.2; Ho 2.8, 3.6; Er 8.2, 10.6; T½ 1.2, 1.4; Yb 5.7, 10.1; Lu 1.8, –; Y≈35.0, 29.4%. Av. Atomic weights 133.27, 138.43.

The mineral is decomposed by water, most of the Na going into solution. It is easily decomposed by HNO₃, HCl, and concentrated H₂SO₄. The DTA curve shows a large endothermal break at 720–750° and a small exothermal break at about 900°. When heated the mineral loses water and part of the fluoride above 500°.

Gagarinite has a creamy, in some cases yellowish or rosy color. Luster dull to vitreous, streak white. Brittle, II 4¼. Microhardness 370 kg/mm² (about 4.6). G 4.21 (by hydrostatic suspension). Non-luminescent in UV light. Magnetism close to that of aegirine or riebeckite.

Colorless in thin section, uniaxial positive, with ε 1.492, ω 1.472; sometimes anomalously biaxial, 2V up to 20°. Extinction parallel to the fair prismatic cleavage. Elongation positive.

Indexed x-ray powder data (40 lines) by N. G. Shumyatatskaya and by A. E. Shalamov agree well; the strongest lines are given, resp., as: 1.717 (broad) (10), 2.086 (9), 3.00 (5), 2.92 (5), and 1.709 (10) (1231), 1.726 (9) (3031), 2.085 (9) (2021), 1.129 (10) (doublet, 1450, 2351), 0.9967 (8) (5081), 2.980 (7) (1120), 1.012 (7) (3380). The powder data correspond to a hexagonal cell with a 5.99±0.02, c 3.53±0.02 Å.

The mineral occurs in albitized granites and associated quartz-microcline veins of “one of the granitic massifs of Kazakhstan” and in “analogous rocks of other regions of the U.S.S.R.” These rocks contain riebeckite and as accessories pyrochlore, zircon and bastnaesite. The mineral alters easily and is replaced by aggregates of tengerite, synchisite and yttrofluorite.

The name is for the first cosmonaut, Yuri Alekseevich Gagarin.

Discussion.—The unit cell content is not given, but from the data given, Z=0.39 and 0.38 for the unit cell and formulas given, so that the unit cell contains (Y, Ca, Na)₂,₈Fe₆. The magnetic properties, evidently due to the rare earths, are interesting.

Innelite


The name, without description, was noted in a previous abstract (Am. Mineral., 46, 769, 1961). Analysis by M.E.K. gave SiO₂ 18.78, TiO₂ 18.50, Al₂O₃ 0.23, Fe₂O₃ 0.66, FeO 0.57, MgO 0.83, MnO 1.04, CaO 0.72, BaO 44.16, Na₂O 5.63, K₂O 0.72, SO₃ 7.19, F 0.40,
H₂O⁺ 0.88, H₂O⁻ 0.09, sum 100.40 (0=F₂) 0.17=100.23%. Spectrographic analysis showed 0.0% Nb and Sr, 0.0% Zr and V, and 0.00% Cu. Yu. A. Bashalov found 0.77% rare earths, with La predominant (about twice Ce). The analysis gives: (Na₂,32 Ca₀,16 Mg₀,27 Fe₁,27 Fc₁,30 K₀,30 Mn₀,08)₄,₈₆ (Ti₂,96 Al₀,96)₂,₁₂ Si₆O₁₆ (OH₁,25 F₂,75)₁,₈₂ 1.15 S. It is suggested that this might be put in the form (Ba₄, K₄, Ca, Mg, Fe)(Ti₆)Si₆O₁₈ (OH, F)₁,₄ with Na₂SO₄ with n variable (= 1.15 in above analysis, M.F.). The mineral is nearly insoluble in HCl, HNO₃, and H₂SO₄. The DT A curve shows a strong endothermal effect at 915–945°.

Innelite occurs as plates a few mm to some cm in size. Crystal faces are rare; only (001), (010) and some poorly developed faces in the [100] zone were noted. Shows polycrystalline Manebach twinning. Trichlinic, with a 5.38 ± 0.02, b 7.14 ± 0.03, c 14.76 ± 0.10 Å, α~ 99°, β 95°, γ~ 90°. The unit cell contains 1 formula weight. A piezo effect was noted, so the space group is P1. The strongest lines of the x-ray pattern (13 unindexed lines given) by N. D. Pinevich are 3.92 (10), 3.04 (6), 2.95 (6), 1.964 (6), 1.845 (6), 1.735 (6), 6.31 (5), 5.36 (5), 2.69 (5), 1.480 (5), 1.346 (5). Color pale yellow to brown, luster vitreous on cleavages, slightly oily on fracture. Cleavages perfect (010), (110), (101), medium on (001). Brittle. H 4.75 (microhardness 435 kg/sq.mm). G 3.96. Slightly electro-magnetic.

Optically biaxial, positive, with α 1.726, β 1.737, γ 1.766, all ± 0.001, 2V 82°. Dispersion r>v, strong. Pleochroic from light yellow on X and Y to pale brownish-yellow on Z. Sections perpendicular to (001) show anomalous bluish interference colors. The plane of the optic axes is at ~12° to the plane (001). γ is nearly parallel to [100]. P(001):γ= 88°, P(001):γ= 12°, P(001):α= 77°.

Occurs associated with natrolite-albite nests, often in miarolites and with ramsayite and batiste, in aegirine-eckermannite-microcline pegmatites of the Inagli massif, southern Yakutia. It has also been found in pulaskites of Inagli and in shonkinite of the Yakokutsk massif.

The name is from Inneli, the Yakut name for the Inagli River.

Discussion.—The first formula given does not balance. A more reasonable grouping by ionic radii would appear to be

(Ba₄,32 K₀,20 Ca₀,16 Na₀,08;₄,₈₆ (Ti₂,96 Al₀,96)₂,₁₂ Fe²⁺,₂⁺ Fe²⁺,₂⁺ (Mg₀,37 Mn₀,13)₂,₆₈ Si₆O₁₈(OH, F)₁,₄ 1,15Na₂SO₄.

**Laitakarite**


Analysis by Päävo Väännänen gave Bi 78.28, Pb 0.78, Ag 0.71, Cu 0.26, Zn 0.14, Se 15.50, S 3.28, insol. 0.93, sum 99.88%. After deducting a little (total 4%) of galena, sphalerite, and chalcopyrite, this gives for the unit cell content Bi₃₋₂ Se₂₋₂ S₂₋₂ or Bi₄(Se, S)₂. Spectrographic data by Arvo Löfgren showed also Fe, Si, Al, Mg, and traces of Te.

Weissenberg photographs showed the mineral to have space group R₃m, R₃₂, or R₃₃, with unit cell a 4.225 ± 0.002, c 39.93 ± 0.02 Å, or a₀₂, 13.53 ± 0.007 Å, α 17° ± 0.04°. This is close to the telluride joseite. Indexed x-ray powder data are given; the strongest lines are 3.072 (vs)(322); 2.246 (vs)(554); 2.112 (vs)(101); 1.741 (s)(331); 4.425 (ms)(333); 3.586 (ms)(110); 1.538 (ms)(644); 1.410 (ms)(876); 1.341 (ms)(421).

Occurs as foliated plates and sheets, with excellent basal cleavage. Color galena white, luster high metallic, old surfaces are lead gray. The folia are soft, flexible, and inelastic. Vickers microhardness 50 kg/sq.mm. G 7.93 ± 0.08; corrected for impurities 8.12. Color on polished surface white, grayish with respect to native Bi. Moderately anisotropic; dark brownish gray under crossed Nicols. Reflectivity in air: green 48%, orange or red 46%.
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Occurs at Orijiirvi, Finland, in veinlets in quartz-anthophyllite-cordierite-biotite rocks, in grains of 0.5-2mm diameter. Associated minerals include chalcopyrite, native Bi, sphalerite, molybdenite, Ag, pyrite and galena.

The name is for Aarne Laitakari, Director, Geological Survey of Finland.


Stishovite

In a recent report (Goskhimiya 1961 (10), 837-839) Stishov and Popova (S. and P.) reported the synthesis of a new form of SiO₂ at 1200-1400° C. and pressures above 160 kilobars. The x-ray data given agree closely with those of natural material isolated from coesite-bearing Coconino sandstone from Meteor Crater. A sample was concentrated by removal of quartz and coesite in HF, which scarcely attacks the stishovite. Spectrographic analysis by Claude Waring showed it to be essentially SiO₂. Indexed x-ray powder data are given; the strongest lines are 2.959 (100)(110), 1.530 (50)(211), 1.981 (35) (111), 1.235 (25)(301), 2.246 (18)(101), 1.478 (18)(220). These are indexed with space group P̅4/mmm (rutile type), a 4.1790, c 2.6649, both ± 0.0004 Å. G (calc.) 4.28, measured on synthetic (S. and P.) 4.35, 46% denser than coesite. The natural material occurs in aggregates of submicron size showing low to moderate birefringence, but ε could not be measured. The synthetic material (S. and P.) had Np 1.799, Ne 1.826, both ± 0.002. Stishovite may also occur in the coesite-bearing material of the Ries Crater, Germany; x-ray patterns show a weak line at 2.96 Å.

The name is for S. M. Stishov, of the Moscow State University, who first synthesized the material.

Discussion.—This is the first mineral reported to contain silicon in octahedral (6-fold) co-ordination.

Eardleyite

Eardleyite occurs with nickel-2smithsonite (Zn:Ni=3:1) in a fracture zone in limestone. It occurs with calcite in small veins traversing limonite; the color of the mixture with calcite ranges from light to dark green. X-ray and infra-red data (not given) indicate it to be an analogues of hydrotalcite; the formula is given as (Ni, Zn)₂Al₂(OH)₆CO₃·₄H₂O with Ni:Zn =11:1. An analogous nickel compound was synthesized hydrothermally at 250° and 16,000 lbs./sq in. Eardleyite is uniaxial, negative, with ε close to 1.60.

Presumably name for A. J. Eardley, Professor of Geology, University of Utah.

Discussion.—Names should not be published without adequate data.

Calciocopiapite, Tusiite
The mineral was found as powdery crusts, grayish- to brownish-yellow, as a supergene product of weathering of magnetite ores containing pyrite and calcite at Dashkesan, Middle Caucasus, Azerbaijan. Associated minerals are hydrous Fe oxides, chalcocite, and malachite. Analysis gave CaO 4.85, Mg 0.32, Fe₂O₃ 26.25, SO₃ 39.00, H₂O 29.30, sum 100.12%, corresponding to CaFe₂⁺(SO₄)₆(OH)₂·19H₂O. The DTA curve by I. A. Vabaev shows a large endothermal break with a double peak at 157° and 205°, moderately large endothermal breaks with peaks at 406° and 676°, a moderate exothermal break with peak at 434°, and a small exothermal break with peak at 521°. X-ray powder data (41 lines) by D. G. Alieva are given; the strongest lines are: 3.108 (10), 3.027 (10), 2.809 (10), 1.860 (10), 3.458 (9), 1.304 (9), 1.267 (9), 1.244 (9), 2.043 (8), 1.986 (8), 1.914 (8), 1.696 (8), 1.156 (8), 1.043 (8).

The name is for the Azerbaijani astronomer and naturalist of the 13th century, Mohammed Nasreddin Tusi.

**Strontium-apatite**


Analysis of the mineral (by Z.V.V.) gave P₂O₅ 30.44, SiO₂ 0.90, SO₃ none, Al₂O₃ 0.40, CaO 10.80, SrO 46.06, BaO 2.70, MnO none, MgO 1.64, TiO₂ none, ThO₂ 0.60, Re₂O₇ 3.73, Fe₂O₃ 0.15, Na₂O 0.64, K₂O 0.10, H₂O 0.61, F 1.67, sum 100.44 − (O = F) 0.70 = 99.74%. This corresponds to (Sr₉₋₈₁Ca₂₋₈₂Ba₆₋₂₃Mg₉₋₂₃Fe₉₋₂₃Na₉₋₂₃Th₂₋₉₂Fe₂₋₉₂O₃₋₂₃Si₂₋₉₂Al₂₋₁₀)O₄(OH₁₋₆F₀₋₁)₂₋₀₆, or nearly (Sr, Ba)₆(Ca, RE, Mg, Na)₆(PO₄)₆(F, OH)₂. The rare earths consist of La 26.15, Ce 53.9, Pr 5, Nd 13.8, Sm 0.63, Eu 0.1, Gd 0.31, Tb – Dy 0.06, Er 0.06, Yb 0.13%. The mineral is easily soluble in acids.

The mineral is pale green to yellowish-green, colorless and transparent in small crystals. Luster vitreous, on the fracture greasy. H 5, G 3.84 (by G. G. Prokho'va by hydrostatic suspension). Optically uniaxial, negative, ω 1.651, ε 1.637.

The x-ray powder diagram (24 lines) shows spacings larger than for apatite. The strongest lines are (in kX) 2.89 (10), 3.167 (7), 2.78 (7), 2.005 (7), 1.909 (7), 1.467 (6), corresponding to α 9.66, ε 7.19 (both ± 0.01) kX, c/a = 0.744.

The mineral occurs in poorly formed oval crystals 0.2×1 cm in longitudinal section and as small crystals with corroded faces. Only the prism (10T0) and dipyramid (10T1) were observed. The mineral occurs in sugary albite filling interstices between crystals of aegirine and eckermannite in veins in alkaline pegmatites that cut the dunite core of the concentrically zoned Inagil massif of ultrabasic-alkaline rocks, southern Yakutia. It is locally intergrown with microline and eckermannite. Other associated minerals include batsite, innelite, ramsayite and rare eudialyte.

**Discussion.**—The authors suggest that the name strontium-apatite (taken from the artificial compound) be used for all members of the group with more than 50% of Sr. The mineral belovite (see *Am. Mineral.*, 40, 367, 1955) has Sr 47%, rare earths 22% of the cations. It would have been simpler perhaps to use belovite for all Sr-dominantapatites.

**Kmaite**


Analysis by V. Ya. Shebtsova and S. Ya. Trebukova gave SiO₂ 43.80, TiO₂ 0.12, Al₂O₃ 3.64, Fe₂O₃ 29.74, FeO 2.75, MnO 0.07, CaO 0.64, MgO 3.79, K₂O 9.55, Na₂O 0.20, H₂O 4.20, loss on ignition 0.98, total 99.38%. Spectrographic analysis by A. S. Dudykin...
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showed also Be 0.004–0.006, Cu 0.004–0.006, Ni 0.001–0.006%. This gives the formula (K_{0.54} Ca_{0.5} Na_{0.5})(Mg_{43}Fe^{2+}_{18}Al^{3+}_{33} Ti_{1}) (Si_{38} Al_{36} Fe^{3+}_{29}) O_{10} (OH)_{2} (Note—the
formula given in the original has two serious misprints). The mineral is optically negative,
2V 5–8°, N_{2} 1.625–1.638, N_{4} 1.657–1.696, birefringence 0.031–0.034, G 3.08–3.09. X-ray
powder data are given: the strongest lines are 3.36 (10), 2.61 (7), 1.66 (7), 2.15 (5), 1.52
(5) (no lines are given with spacings above 4.56 Å.M.F.). From these, a=5.265, b=9.12 kX.

The mineral is classified, on the basis of the x-ray data, as trioctahedral with some
dioctahedral (even though the analysis gives 2.05 for the sum of the octahedral positions.
M.D.F.). Similar material from this locality had been classified by Foster in 1959 as be-
longing to the celadonite group; the author considers that the x-ray and DTA charac-
teristics justify a special name.

The name presumably is for the abbreviation of Kursk Magnetic Anomaly.

DISCUSSION.—An unnecessary name for a member of the celadonite group, higher
than usual in FeO and K_{2}O. 

Margaret D. Foster and M. F.

Gelzircon


Gelzircon occurs as white, floury material, resembling clay, in nepheline syenite
pegmatites of the Tatar massif, Venisei Range, in irregular masses up to 3×2 cm and in
platy masses (pseudomorphs after catapleite?) in microcline. Analysis by Z. P. Kataeva
gave SiO_{2} 23.96, ZrO_{2} 47.60, Nb_{2}O_{5} 0.17, Ta_{2}O_{5} 0.03, RE 0.27, Al_{2}O_{3} 5.49, FeO_{2} 3.65,
MgO 0.10, CaO 2.11, H_{2}O 9.60, H_{2}O 9.67, sum 100.65%, corresponding to ZrSiO_{4}·1.7
H_{2}O. Spectrographic analysis by N. V. Lizunov showed traces of Be, P, Sr, Ba, Mn; by
L. I. Sosnovskaya showed HfO_{2} 1.30%. The material is soluble in HCl. The DTA curve
shows a broad endothermal break at 20–300°; most of the water is lost in this interval.

The material can be pulverized by the fingers. G 2.8, 2.9. Optically isotropic, n = 1.655
± 0.003 (calculated additively from zircon+water, 1.66). The x-ray pattern (not given)
is stated to give about ten weak, diffuse lines, all of which correspond to the principal lines
of zircon. When heated 2 hours at 1100°, the material gives a distinct zircon pattern plus
some extra lines.

name, as are other names listed by the author, gelbertrandite, gelthorite, gelgoethite
(limonite), gelcassiterite (arandisite), and gelcrystobalite (opal).

Unnamed

A. D. Genkin and N. V. Korolev, On methods of determining small grains of minerals

The paper is concerned mainly with x-ray and spectrographic methods applied to
small grains, but includes preliminary descriptions of two new minerals from copper-
nickel sulphide ores (Noril’sk?).

Platinum telluride, PtTe_{2}

Occurs as very small, mostly hundreds of a mm, max. 0.2 mm, white grains amidst
chalcopyrite. X-ray powder data agree with those of Grönvold, Haraldsen and Kjekshus,
Acta Chem. Scand. 14 (9) (1960) for synthetic PtTe_{2}. Strongest lines 2.93 (10) (1011), 2.11
(9)(1012), 1.106 (8)(1124), 2.03 (7)(1120), 1.282 (7)(2131), 5.28 (6)(0001), 1.575 (6)(1013),
1.462 (6)(2202), 1.182 (6) (2132), corresponding to hexagonal, a 4.042, c 5.26 Å. Cleavage
Anisotropic. Four microspectrographic analyses of material containing michenerite (PdBi$_2$) gave (in micrograms) Pt 4.0, 4.5, 0.30, 0.20; Te 7.0, 5.5, 0.63, 0.36; Pd 1.25, 1.50, 0.08, 0.03; Bi 5.7, 4.9, 0.15, 0.06.

**Pd-Bi Mineral (Pd$_5$Bi ?)**

Occurs as small grains in chalcopyrite, mostly intergrown with PtTe$_2$ and michenerite. Characterized in reflected light by its cream color; higher reflectivity and rather strong anisotropy with color effects from brown to grayish-white. The x-ray pattern differs from those of michenerite, froodite, and other compounds found in the system Pb-Bi. The strongest lines are 3.05 (10), 2.24 (9), 2.09 (9), 1.236 (8), 1.175 (8), 3.36 (7), 1.528 (7), 1.336 (7), 1.210 (7). Microspectrographic analysis gave in micrograms: Pt 0.55, Bi 0.44, Te 0.78.

**Vulcanite**


**Neighborite**


**Norsethite**


**Kimzeyite**


**Nobleite**


**Novakite**

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NEW DATA

Lillianite


Lillianite, supposedly Pb₃Bi₂S₆, was shown to be a mixture containing galenobismutite by Berry (1940) (see Dana’s System, 7th Ed., v. I, 404–405). The authors describe a mineral that contains Pb 49.37, Bi 34.88% (microchemical analysis on 20 mg) in good agreement with the formula above. G 7.10. X-ray powder data are given; the strongest lines, in kX, are 2.94 (100), 2.07 (90), 2.84 (70), 1.779 (70), 3.51 (60), 3.39 (60), 3.24 (60), 0.9584 (60). From these the unit cell is calculated to be a 15.84, b 19.02, c 4.10 kX, Z = 4, space group Pbnm (?), G (calc.) 6.58.

Discussion.—The poor agreement of calc. and measured G indicates something wrong with either the chemical composition or the unit cell. Further study is needed.

DISCREDITED MINERALS

Wathlingenite (=Kieserite)


The name wathlingenite or wathlingite was given in 1923 by C. Prager to a supposed sulfate of Ca and Mg (perhaps CaSO₄·MgSO₄·H₂O), but no account of it appears to have been published. It is listed in Hey, 2nd Ed., 1955, p. 278.

Study of material from Wathlingen, including chemical analysis, optical data, and x-ray study, show it to be kieserite with complex polysynthetic twinning.

Shattuckite (=Plancheite (?))


Thirteen samples, including several from the type localities, were examined. X-ray powder data are given for 3; the remainder are stated to give the same diagram or that of bisbeeite. Two new analyses lead to the formula 6CuO·5SiO₂·1.5–2H₂O. A new determination of density (locality not given) gave 3.95±0.02. Optical study from Tantara, Katanga, gave biaxial, positive, 2V 80+5°, α 1.743±0.005, γ 1.795±0.005. It is concluded that the minerals are identical. Plancheite (Lacroix, 1908) has priority over shattuckite (Schaller, 1915).

Discussion.—The new data are in much better agreement with the data previously given for shattuckite than those given for plancheite. There remain to be explained the optical data given by Larsen (U. S. Geol. Survey Bull. 679, 121, 1921) for plancheite: (1) minute, interwoven blue fibers, α 1.640, γ 1.697, both ±0.005 (2) coarser needles, optically pos., 2V medium, α 1.645, β 1.660, γ 1.715, all ±0.005. G. and P. dismiss these as “not concerning the mineral described by Lacroix.” But Larsen states that his material was type material from the Congo procured by W. T. Schaller from Prof. Lacroix. Further study is needed.

Deweylite (=mixture of clinochrysotile or lizardite with stevensite)


Chemical, x-ray and DTA show that samples marked deweylite are mixtures of a
serpentine-group mineral (usually clinochrysotile, but in some samples lizardite) with stevensite.

**Vernadskite (=Antlerite)**

Mary E. Morse, Vernadskite discredited; pseudomorphs of antlerite after dolerophanite.  

**Wiikite, Nuolaite**

A. A. Beus and A. P. Kalita, New data on the so-called wiikite.  

Analyses, x-ray data and DTA study of material from the type locality (Nuolainniemi and Lokansaari) show that material corresponding to wiikite (*See Dana’s System, 7th Ed.*, v. I, p. 801) was in part euxenite, in part obruchevite (the Y member of the pyrochlore group). Some of the older analyses do not correspond with these and may refer to titanian fergusonite or betaite. The obruchevite was found commonly replacing columbite; it is suggested that the analysis of nuolaite may have been made on a mixture of columbite-tantalite and obruchevite. Loraaskite (see *Dana*, p. 767) from the same locality is very dubious.