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New Mineral Names*,†

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This New Mineral Names has entries for 10 new species, including huenite, laverovite, pandoraite-Ba, pandoraite-Ca, and six new species of pyrochlore supergroup: cesiokenomicrolite, hydrokenopyrochlore, hydroxyplumbopyrochlore, kenoplumbomicrolite, oxybismutomicrolite, and oxycalciomicrolite.

HUENITE*

P. Vignola, N. Rotiroti, G.D. Gatta, A. Risplendente, F. Hatert, D. Bersani, and V. Mattioli (2019) Huenite, $Cu_4Mo_3O_{12}(OH)_2$, a new copper-molybdenum oxy-hydroxide mineral from the San Samuel Mine, Carrera Pinto, Cachiyuyo de Llampos district, Copiapó Province, Atacama Region, Chile. Canadian Mineralogist, 57(4), 467–474.

Huenite (IMA 2015-122), ideally $Cu_4Mo_3O_{12}(OH)_2$, trigonal, is a new mineral discovered on lindgrenite specimens from the San Samuel Mine, Carrera Pinto, Cachiyuyo de Llampos district, Copiapó Province, Atacama Region, Chile (27°,40′,40″S and 70°,0′,10″W). Huenite and lindgrenite occur in a body of brecciated quartz porphyry enriched in molybdenite and Cu-sulfides, and both are oxidation products of primary Cu-sulfides formed as a result of late-stage hydrothermal fluids as open-space fillings in tourmalinized collapse breccia pipes. The new mineral forms dark reddish-brown flattened, stout, orthorhombic prisms up to 60–70 μm long elongated by [001] on the surfaces of brittle fractures in the quartz breccia and closely associating with lindgrenite, gypsum, and an unidentified pale purple phase. Huenite has a pale reddish-brown to pinkish streak and a strong vitreous to adamantine luster. No fluorescence under UV light was observed. It is brittle with an irregular fracture and good cleavage on {010}. The Mohs hardness and density were not measured due to small size of the crystals; D_{calc} = 5.1 g/cm^3. The optical properties were not determined; n_{calc} = 2.18. The Raman spectra of huenite were collected from single crystals in three different orientations in the range 100–4000 cm^{-1}. The bands are at (cm^{-1}; vw = very weak, w = weak, m = medium, s = strong, vs = very strong, sh = shoulder): 3424s, 3410s, 949sh, 942s, 923vs, 917sh, 883vs, 870sh, 853sh, 835s, 772m, 734w, 690vw(sh), 601vw, 580w, 541w, 499vw(sh), 488m, 470m, 422m, 391m, 365sh, 340w, 318m, 311m, 290vw, 254w, 242w, 232m, 224w, 195m, 180vw, 168m, 134m, 122sh, 116w, and 105m. The presence of two (OH) groups is confirmed by its stretching modes at ~3424 and 3410 cm^{-1}. The bands at lower wavenumbers are mostly associated with Mo-O stretching modes, strong distortion of Mo-O_6 octahedra, and O-Mo-O bending vibrations. The averaged 5 point WDS electron probe analyses [wt% (range)] is: MoO_3 55.45 (54.70–56.15), SO_3 0.94 (0.87–1.03), SiO_2 0.03 (0.01–0.05), CuO 37.08 (35.59–39.92), FeO 3.84 (1.93–5.22), H_2O 2.39 (by stoichiometry), total 99.73. The empirical formula based on (Mo + S + Si) = 3 is $(Cu_{3.52}Fe^{2+}_{0.40})_{\Sigma 3.92}(Mo_{2.91}S_{0.09}Si_{<0.01})_{\Sigma 3.00}O_{12}(OH)_{2.23}$. The strongest lines of the powder X-ray diffraction pattern are [*d* Å (*I*%; *hkl*)]: 6.786 (25; 100), 5.372 (25, $10\bar{1}$), 3.810 (51; 110), 2.974 (100; 112), 2.702 (41; 202), 2.497 (38; 210), 2.203 (24; 300), 1.712 (60; 312), 1.450 (37; 314). The crystal structure was solved by direct methods and refined to R_1 = 3.4% using the synchrotron light source. Huenite is trigonal, $P3_1/c$, a = 7.653(5), c = 9.411(6) Å, V = 477.4 Å^3, Z = 2. The structure is based on clusters of $Mo_3O_{12}(OH)$ and $Cu_4O_{16}(OH)_2$ units. Three edge-sharing Mo octahedra form the $Mo_3O_{12}(OH)$ unit, and four edge-sharing Cu-octahedra form the $Cu_4O_{16}(OH)_2$ units of a "U" shape, which are in turn share edges to form a sheet of Cu octahedra parallel to (001). The mineral is named in honor of Edgar Huen, a senior mineral collector, and an expert in Alpine fissure minerals. Type material is deposited in the mineralogical collections of the Laboratoire de Mineralogie, University of Liege, Belgium. **Yu.U.**

LAVEROVITE*

E. Sokolova, M.C. Day, F.C. Hawthorne, A.V. Kasatkin, R.T. Downs, L. Horváth, and E. Pfenninger-Horváth (2019) Laverovite, $K_2NaMn_7Zr_2(Si_4O_{12})_2O_2(OH)_4F$, a new astrophyllite-supergroup mineral from Mont Saint-Hilaire, Québec, Canada. Canadian Mineralogist, 57(2), 201–213.

Laverovite (IMA 2017-009b), ideally $K_2NaMn_7Zr_2(Si_4O_{12})_2O_2(OH)_4F$, triclinic, is a new kupletskite-group (astrophyllite supergroup) mineral discovered in the sample R060216, RRUFF Project of the University of Arizona, Tucson, U.S.A. The sample is from the Desourdy quarry, which became part of the Demix and later the Poudrette quarry, Mont Saint-Hilaire, La Vallée-du-Richelieu RCM, Montérégie, Québec, Canada. Laverovite is associated with zircophyllite, kupletskite, astrophyllite, aegirine, analcime, orthoclase, and albite, and formed as a late-stage hydrothermal mineral in a nepheline-syenite pegmatite. In the studied sample, all astrophyllite-supergroup minerals occur as transparent pale brown to dark-brown elongated lath-like crystals. Each grain is an intergrowth of four minerals: laverovite, zircophyllite, astrophyllite, and kupletskite. Laverovite is brown, has a vitreous luster and a light-brown streak. It does not fluoresce under the UV light and is visually indistinguishable from other astrophyllite-supergroup minerals in the intergrowths. The new mineral is brittle, has a hackly fracture and Mohs hardness of 3. The cleavage is perfect on {001}. D_{calc} = 3.367 g/cm^3. It is optically biaxial (–), α = 1.670(2), β = 1.710 (5), γ = 1.740(5) (λ = 589 nm), $2V_{meas}$ = 82(2)°, $2V_{calc}$ = 80°. The dispersion of optical axes is strong, $r > v$. The new mineral is pleochroic: X – yellowish brown > Y – brownish yellow > Z – pale yellow. The FTIR spectrum has the following bands (cm^{-1}; s = strong band, w = weak band, sh = shoulder): ~3612s (O-H stretching); ~3432s (H_2O stretching band); ~1645w (H-O-H bending mode); ~962s and ~1042sh (symmetric and asymmetric stretching

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* 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://cnmnc.main.jp/ (click on "IMA list of minerals").

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modes of the SiO_4 group), ~646w and ~694sh (Si-O-Si bending mode). Other low-intensity bands in the range 2800–3000, 2060–2420, and a single low-intensity band at ~1260 cm^{-1} are assigned to C-H stretching from grease used during sample preparation, atmospheric CO_2, and due to epoxy attached to the sample after removal from the EMPS slide, respectively. The average of nine electron probe WDS analyses of laverovite [wt%, (range)] is: Nb_2O_5 0.56 (0.29–0.69), ZrO_2 9.78 (9.34–10.67), TiO_2 4.69 (4.03–5.03), SiO_2 33.52 (33.34–33.80), Al_2O_3 0.94 (0.91–0.97), SrO 0.13 (0.09–0.18), ZnO 0.07 (0.05–0.12), FeO 13.94 (13.23–14.44), MnO 20.51 (20.09–21.03), CaO 0.48 (0.46–0.49), MgO 0.76 (0.73–0.79), Cs_2O 0.05 (0.03–0.06), K_2O 6.00 (5.97–6.05), Na_2O 2.28 (2.23–2.35), F 1.80 (1.56–2.26), H_2O (by structure) 2.57, $-O=F_2$ 0.76, total 97.32. The empirical formula is $(K_{1.78}Sr_{0.02}Cs_{0.01}\square_{0.19})_{\Sigma 2}(\square_{1.85}Na_{0.15})_{\Sigma 2}(Na_{0.88}Ca_{0.12})_{\Sigma 1}(Mn_{4.03}Fe^{2+}_{2.71}Mg_{0.25}Zn_{0.01})_{\Sigma 7}(Zr_{1.11}Ti_{0.82}Nb_{0.06}Mg_{0.01})_{\Sigma 2}[(Si_{7.78}Al_{0.26})_{\Sigma 8.04}O_{24}]O_2[(OH)_{3.68}F_{0.32}]_{\Sigma 4}[\square_{1.85}(H_2O)_{0.15}]_{\Sigma 2}$ based on 31.15 (O+F) atoms pfu, in accord with refined site-occupancies. The strongest lines in the powder X-ray diffraction pattern are [*d* Å (*I*%; *hkl*)]: 3.452 (92; 003,111), 2.788 (97; $\bar{1}\bar{3}1$, $1\bar{4}2$), 2.680 (68; $\bar{2}11$), 2.589 (100; 130,143), 2.504 (44; $\bar{2}12$), 1.590 (50; $3\bar{5}1$,$\bar{3}\bar{2}2$). The crystal structure was refined using the atomic coordinates of zircophyllite as a starting model and refined to R_1 = 3.26%. Laverovite is triclinic, $P\bar{1}$, *a* = 5.4329(1), *b* = 11.9232(3), *c* = 11.7491(3) Å, α = 112.905(2), β = 94.696(1), γ = 103.178(1)°, *V* = 670.14 $Å^3$, *Z* = 1. It is a Mn-analogue of zircophyllite. The new mineral is named in honor of Professor Nikolay Pavlovich Laverov, Academician of the Russian Academy of Sciences, a prominent Russian ore geologist. The holotype specimen of laverovite has been deposited in the collections of Royal Ontario Museum, Toronto, Ontario, Canada. **Yu.U.**

Pandoraite-Ba* and Pandoraite-Ca*

A.R. Kampf, J.M. Hughes, B.P. Nash, and J. Marty (2019) Pandoraite-Ba and Pandoraite-Ca, $Ba(V^{4+}_5V^{5+}_2)O_{16}\cdot 3H_2O$ and $Ca(V^{4+}_5V^{5+}_2)O_{16}\cdot 3H_2O$, two new vanadium oxide bronze minerals in solid solution from the Pandora mine, La Sal mining district, San Juan County, Colorado, USA. Canadian Mineralogist, 57(2), 255–265.

Pandoraite-Ba, (IMA 2018-024), ideally $Ba(V^{4+}_5V^{5+}_2)O_{16}\cdot 3H_2O$, and pandoraite-Ca, (IMA 2018-036), ideally $Ca(V^{4+}_5V^{5+}_2)O_{16}\cdot 3H_2O$, are two new monoclinic pseudotetragonal minerals discovered at the underground Pandora mine, La Sal district (Paradox Valley district), San Juan County, Colorado, U.S.A. The uranium and vanadium ore mineralization at the Pandora mine was deposited from solutions rich in U and V where they encountered pockets of strongly reducing solutions developed around accumulations of carbonaceous plant material. During the mining stage, both unoxidized and oxidized U and V phases were found. Pandoraite-Ba and pandoraite-Ca are rare and occur on matrix consisting of recrystallized quartz grains from the original sandstone that are intermixed with an unknown Fe-V-oxide phase. Pandoraite-Ba occurs in intimate association with well-formed carnotite, and tiny plates of a Ba-Fe-V-bearing member of the alunite supergroup. Pandoraite-Ca is intimately associated with large and well-formed crystals of finchite. These associations allow to distinguish between these two minerals really well, as pandoraite-Ba and pandoraite-Ca are indistinguishable in hand specimen. They both occur as thin, dark blue, square plates up to approximately 100 μm across and approximately 2 μm thick, and the plates form subparallel to random intergrowths. Pandoraite-Ba and pandoraite-Ca mostly have the same physical properties. They have light greenish-blue streak, vitreous luster, brittle tenacity, curved fracture, perfect cleavage on {001}, and Mohs hardness of ~2½. Both are nonfluorescent under UV light. D_{meas} = 3.24 g/cm^3 and D_{calc} = 3.256 g/cm^3 for pandoraite-Ba, and D_{meas} = 2.91 g/cm^3 and D_{calc} = 2.920 g/cm^3 for pandoraite-Ca. The optical properties were difficult to measure because of the dark color and thinness of plates for both minerals, but they are expected to be uniaxial. For each mineral, β and γ correspond to ω, and α corresponds to ε. Their optic signs are negative and $X \approx \mathbf{c}$. Refractive indices measured in white light are ω = 1.84(1), ε = 1.81(2) for pandoraite-Ba and ω = 1.83(1), ε = 1.80(2) for pandoraite-Ca. The pleochroism in shades of greenish blue is $O > E$. The average of five electron probe WDS analyses on two crystals of pandoraite-Ba [wt%, (range/standard deviation)] is: Na_2O 0.11 (0.09–0.13/0.02), K_2O 0.09 (0.09–0.11/0.01), CaO 0.36 (0.33–0.44/0.05), SrO 1.10 (0.87–1.32/0.16), BaO 15.54 (15.31–15.67/0.17), Al_2O_3 0.13 (0.10–0.15/0.02), Fe_2O_3 3.41 (3.26–3.53/0.11), VO_2 67.07 (66.60–67.69/0.50) (with VO_2 42.99 and V_2O_5 26.40 allocated for charge balance), H_2O_{calc} 6.60, total 96.73. The amount of H_2O was calculated from the crystal structure with (V + Fe + Al) = 7 and O = 19 atoms pfu. The empirical formula of pandoraite-(Ba) is $(Ba_{0.83}Sr_{0.09}Ca_{0.05}Na_{0.03}K_{0.02})_{\Sigma 1.02}(V^{4+}_{4.25}V^{5+}_{2.38}Fe^{3+}_{0.35}Al_{0.02})_{\Sigma 7.00}O_{16}\cdot 3H_2O$ based on (V + Fe + Al) = 7 and O = 19 atoms pfu. The average of 4 WDS analyses on 3 crystals of pandoraite-Ca [wt% (range/standard deviation)] is: Na_2O 0.06 (0.03–0.10/0.03), K_2O 0.08 (0.06–0.10/0.02), CaO 4.88 (4.75–5.06/0.13), SrO 0.23 (0.20–0.29/0.04), BaO 1.54 (1.02–2.14/0.46), Al_2O_3 0.05 (0.03–0.07/0.01), Fe_2O_3 4.13 (3.94–4.28/0.14), VO_2 77.64 (77.17–78.17/0.41) (with VO_2 43.33 and V_2O_5 37.62 allocated for charge balance), H_2O_{calc} 7.65, total 99.57 wt%. The amount of H_2O was calculated from the crystal structure with (V + Fe + Al) = 7 and O = 19 atoms pfu. The empirical formula of pandoraite-(Ca) is $(Ca_{0.62}Ba_{0.07}Sr_{0.02}Na_{0.01}K_{0.01})_{\Sigma 0.73}(V^{4+}_{3.70}V^{5+}_{2.93}Fe^{3+}_{0.37}Al_{0.01})_{\Sigma 7.01}O_{16}\cdot 3H_2O$ based on (V + Fe + Al) = 7 and O = 19 atoms pfu. Additional electron microprobe analyses not reported in the paper indicate that a complete solid solution exists between pandoraite-Ba and pandoraite-Ca. The strongest lines in the powder X-ray diffraction pattern of pandoraite-Ba and pandoraite-Ca are [pandoraite-Ba *d* Å / pandoraite-Ca *d* Å (pandoraite-Ba *I*% / pandoraite-Ca *I*%; *hkl*)]: 10.9/11.07 (100/100; 002), 3.631/3.629 (18/11; 006), 2.812/2.831 (19/14; 023), 2.739/2.745 (20/22; $\bar{1}16$,116,120,121), 2.559/2.564 (26/23; $\bar{2}13$), 1.9345/1.9401 (20/25; 130,$\bar{3}11$). The crystal structure of pandoraite-Ba was solved by direct methods and refined to R_1 = 5.73%. Pandoraite-Ba is monoclinic (pseudo-tetragonal), *P*2, *a* = 6.1537(16), *b* = 6.1534(18), *c* = 21.356(7) Å, β = 90.058(9)°, *V* = 808.7 $Å^3$, *Z* = 2. Pandoraite-Ca occurs as subparallel intergrowths of plates, and this fact made single-crystal diffraction study impossible, but it was inferred as isostructural with the Ba-dominant phase. Based on the refinement of powder diffraction data, pandoraite-Ca has *a* = 6.119(8), *b* = 6.105(8), *c* = 21.460(9) Å, β = 90.06(14)°, *V* = 801.7 $Å^3$, *Z* = 2. The crystal structures of both new minerals are based on the vanadium oxide bronze layer formed of sheets of V_7O_{16} polyhedra. These sheets form the structural unit and there are $(Ba,Ca)(H_2O)_3$ interlayers within it. The vanadium is of mixed valence (4+, 5+), with the reduction of pentavalent vanadium occurring to balance the charge of the Ba substitution ions in partially occupied sites in the interlayer. There is a known tetragonal synthetic analogue of pandoraite-Ba. The pseudo-tetragonal monoclinic unit cell of pandoraite-Ba compares well with the tetragonal cell of the synthetic $BaV_7O_{16}\cdot nH_2O$. Both minerals are named after the mine where they were discovered while the suffixes indicate the dominant interlayer cation. Two cotype specimens of pandoraite-Ba and one holotype specimen of pandoraite-Ca are deposited in the Natural History Museum of Los Angeles County, Los Angeles, California, U.S.A. **Yu.U.**

Pyrochlore Supergroup Minerals: Cesiokenopyrochlore*, Hydrokenopyrochlore*, Hydroxyplumbopyrochlore* Kenoplumbomicrolite*, Oxybismutomicrolite*, Oxycalciomicrolite*

A.A. Agakhanov, A.V. Kasatkin, S.N. Britvin, O.I. Siidra, L.A. Pautov, I.V. Pekov, and V.Yu. Karpenko (2020) Cesiokenopyrochlore, the first natural niobate with an inverse pyrochlore structure. Canadian Mineralogist, DOI: 10.3749/canmin.2000056.

C. Biagioni, N. Meisser, F. Nestola, M. Pasero, M. Robyra, P. Roth, C. Schnyder, and R. Gieré (2018) Hydrokenopyrochlore,

$(\square,\#)_2Nb_2O_6\cdot H_2O$, a new species of the pyrochlore supergroup from the Sahatany Pegmatite Field, Antananarivo Province, Madagascar. European Journal of Mineralogy, 30(4), 869–876.

T. Li, Z. Li, G. Fan, H. Fan, J. Zhong, N.S. Jahdali, M. Qin, A.M. Jehani, F. Wang, and M.M. Nahdi (2020) Hydroxyplumbopyrochlore, $(Pb_{1.5},\square_{0.5})Nb_2O_6(OH)$, a new member of the pyrochlore group from Jabal Sayid, Saudi Arabia. Mineralogical Magazine, 84(5), 785–790.

D. Atencio, M.B. Andrade, L. Bindi, P. Bonazzi, M. Zoppi, C.J. Stanley, and R. Kristiansen (2018) Kenoplumbomicrolite, $(Pb,\square)_2Ta_2O_6[\square,(OH),O]$, a new mineral from Ploskaya, Kola Peninsula, Russia. Mineralogical Magazine, 82(5), 1049–1055.

A.V. Kasatkin, S.N. Britvin, I.S. Peretyazhko, N.V. Chukanov, R. Škoda, and A.A. Agakhanov (2020) Oxybismutomicrolite, a new pyrochlore-supergroup mineral from the Malkhan pegmatite field, Central Transbaikalia, Russia. Mineralogical Magazine, 84(5), 444–454.

V.H.R. Menezes da Silva, C.A. Ávila, R. Neumann, F.R.L. Faulstich, F.E.A. Alves, F.B. de Almeida, T. Proença Cidade, and S. Siqueira da Cruz Guimarães Sousa (2020) Oxycalciomicrolite, $(Ca,Na)_2(Ta,Nb,Ti)_2O_6(O,F)$, a new member of the microlite group (pyrochlore supergroup) from the Paleoproterozoic São João del Rei Pegmatite Province, Minas Gerais state, Brazil. Mineralogical Magazine, 84(6), 854–858.

Six more pyrochlore-supergroup minerals were recently described. The general formula of the pyrochlore supergroup is $A_{2-m}B_2X_{6-w}Y_{1-n}$ (m = 0–1.7, w = 0–0.7, n = 0–1.0) where A represents large [8]-coordinated cations (Na, Ca, Ag, Mn, Sr, Ba, Fe^{2+}, Pb, Sn^{2+}, Sb^{3+}, Bi^{3+}, Y, REE, Sc, U, Th), a vacancy ($\square$) or H_2O. The *A* atoms occupy cavities in the framework of edge-sharing BX_6 octahedra where *B* is mainly Ta, Nb, Ti, Sb^{5+}, W, less commonly V^{5+}, Sn^{4+}, Zr, Hf, Fe^{3+}, Mg, Al, and Si. The *X* site usually occupied by O, but can also contain OH and F. The *Y* is an anion (OH, F, O), but can also be a vacancy, H_2O, or large monovalent cations (K, Cs, Rb). According to the pyrochlore supergroup nomenclature (Atencio et al. 2010) the dominance of Ta, Nb, Ti, Sb^{5+}, or W in the *B* site defines the group name within the supergroup (microlite, pyrochlore, betafite, roméite, or elsmoreite, respectively) and the root of a mineral species name. All these groups have $X = O^2$. Two groups with $X = F$ have $B = Al^{3+}$ (ralstonite) or Mg^{2+} (coulsellite) (Atencio et al. 2017). The first prefix in the mineral name refers to the dominant anion (or cation) of the dominant valence [or H_2O or $\square$] at the *Y* site. The second prefix reflects the dominant cation of the dominant valence [or H_2O or $\square$] in the *A* site. All names of new pyrochlore-supergroup mineral species below are given according to these rules. That nomenclature scheme bases names upon the preponderant species of preponderant valence group in each site of the structure. However, the variety of possible coupled substitutions is such that a valid species name can be associated with either one, several, or no end-member. Most of currently known pyrochlore-supergroup minerals have a cubic unit cell and space group $Fd\overline{3}m$, however lower symmetry in cubic system is known and several different non-cubic pyrochlore polytypes exist.

Cesiokenopyrochlore (IMA 2016-104), is a member of pyrochlore group with simplified formula $^A\square_2{}^B(Nb,W,Ta)_2{}^XO_6{}^YCs$. It was discovered in a single specimen from rare-element granitic pegmatite obtained in 2010 at the Munich mineral show as a sample of béhierite. Presumably collected at Tetezantsio-Andoabatokely pegmatite field in the Betafo region, 40 km SW of Antsirabe, Vankinankaratra, Madagascar. The mineral forms light-brown, translucent rough equant crystals up to 0.05 mm overgrowing béhierite bipyramidal crystal 7 mm across and dark red rynersonite on its surface. Other associated minerals in a cavity of quartz-orthoclase aggregate include pink elbaite, muscovite, xenotime-(Y), pollucite, zircon, albite, and kaolinite. The mineral was probably formed due to a natural cation exchange with a hydrothermal solution at a late hydrothermal stage of pegmatite evolution. Cesiokenopyrochlore has resinous luster. It is brittle with an uneven fracture and no cleavage or parting. No fluorescence under UV light was observed. The indentation hardness VHN_{100} = 598 (567–625) kg/mm^2 corresponds to ~5 of Mohs scale. The density and refractive index were not measured; D_{calc} = 5.984 g/cm^3; n_{calc} = 2.064. In reflected light cesiokenopyrochlore is light gray, non-pleochroic, isotropic, with strong light-brown internal reflections. The reflectance values vary from 13.7 to 14.5% in the range 400–700 nm with a maximum at ~460–500 nm. The values for **COM** wavelengths (R%, nm) are 14.5, 470; 14.1, 546; 13.9, 589; 13.9, 650. The average of unreported number of electron probe EDS analyses [wt% (range)] for holotype specimen is: Cs_2O 22.66 (21.67–23.11), Na_2O 1.74 (1.58–1.88), CaO 0.64 (0.39–1.05), Nb_2O_5 20.87 (19.37–21.98), Ta_2O_5 21.27 (19.20–23.32), WO_3 30.67 (28.77–33.84), H_2O (by structure) 0.12, total 97.97. The empirical formula calculated on the basis of (Nb + Ta + W) = 2 and (O + OH) = 6 apfu is $Na_{0.29}Ca_{0.06}(Nb_{0.81}W_{0.69}Ta_{0.50})_{\Sigma 2}[O_{5.93}(OH)_{0.07}]_{\Sigma 6}Cs_{0.83}$. The strongest lines of the powder X-ray diffraction pattern [*d* Å, (*I*%; *hkl*)] are: 6.03 (37; 111), 3.70 (9; 220), 3.15 (100; 311), 3.02 (36; 222), 2.012 (17; 511,333), 1.848 (19; 440), 1.576 (11; 622). The mineral is cubic, $Fd\overline{3}m$, a = 10.444(1) Å, V = 1139.5 Å^3, Z = 8. The crystal structure was refined to R_1 = 0.0212. In the structure of cesiokenopyrochlore cationic site A, located in the axial zone of the channels, is nearly empty, while the peripheral Y site is occupied mostly by Cs, not anions. Thus, the new mineral is the first natural niobate with the inverse pyrochlore structure. The synthetic inverse Cs pyrochlores $CsNb_2O_5F$ and $CsNb_2O_5OH$ are known. The end-member formula could be presented as $\square_2Nb_2O_5OHCs$, but high amount of W^{6+}, substituting Nb drastically reduces the number of OH groups required for charge balance. The type specimen is deposited in the Fersman Mineralogical Museum of the Russian Academy of Sciences, Moscow, Russia. **D.B.**

Hydrokenopyrochlore (IMA 2017-005), $^A\square_2{}^BNb_2{}^XO_6\cdot{}^YH_2O$, has been discovered in the obtained at the mineral show specimen presumably collected at Antandrokomby Li-Cs-Ta type pegmatite (boron-enriched danburite subtype) intruded into dolomitic marbles. The pegmatite is located near Mt. Ibity, in the southern part of the Sahatany Pegmatite Field, Manandona Valley, Vakinankaratra region, Antananarivo Province, Madagascar (20°11′45″ S; 47°0′19″ E). Hydrokenopyrochlore occurs as relics, closely associated with quartz, orthoclase, Li-rich mica, hübnerite, heftetjernite-like mineral, stibiotantalite, and red tourmaline. It forms tan to beige subhedral {111} porous crystals up to 1 mm, with a resinous luster and a white streak. Other physical properties were not determined; D_{calc} = 5.08 g/cm^3 and n_{calc} = 2.074. Unpolarized micro-Raman spectra obtained on unpolished sample show a few weak bands (cm^{-1}) between 3000 and 3850 (O–H stretching modes of H_2O groups); two broad and weak bands centered at 1550–1600 (O–H bending modes); not assigned bands at 927 and 853; strong band at 644 with shoulder at 500 (symmetrical stretching of BO_6 octahedra); 365, 267 (BO_6 bending modes); 170 (lattice mode). The average of 12 spot electron probe WDS analysis [wt% (range)] is: WO_3 8.14 (6.89–9.83), Sb_2O_5 [total 14.33 (12.13–16.58); Sb_2O_3 11.37 and Sb_2O_5 1.71 based on structure data], Nb_2O_5 44.09 (39.28–47.02), Ta_2O_5 13.97 (11.01–17.15), SiO_2 0.51 (0.24–0.89), SnO_2 0.21 (0.11–0.30), CaO 0.86 (0.24–1.640), MnO 0.04 (0–0.10), Na_2O 1.79 (1.31–2.21), Cs_2O 14.47 (13.71–15.75), H_2O (by structure) 2.23, total 100.64. Based on 2 *B*-site cations pfu, and Sb_2O_3/Sb_2O_5 ratio, the empirical formula is $^A(\square_{1.32}Sb^{3+}_{0.35}Na_{0.26}Ca_{0.07})_{\Sigma 2.00}{}^B(Nb_{1.47}Ta_{0.28}W_{0.16}Sb^{5+}_{0.05}Si_{0.04})_{\Sigma 2.00}{}^XO_6{}^Y[(H_2O)_{0.55}Cs_{0.45}]_{\Sigma 1.00}$. The ideal end-member formula given as $\square_2Nb_2O_4(OH)_2(H_2O)$, with the O/OH added for electrostatic neutrality (although no OH group was detected). Or, according to Hawthorne (2002), the end-member should be written as $^A(\square_{4/3}Sb^{3+}_{2/3})^BNb_2{}^XO_6{}^Y(H_2O)$, or according to Bosi et al. (2017), the ideal formula of hydrokenopyrochlore could be written as $(\square,\#)_2Nb_2O_6\cdot H_2O$, where "#" indicates a minor substituent needed for charge balance. The main powder diffraction lines are [*d* Å (visually estimated relative intensity s = strong, m = medium); *hkl*]: 3.136 (s; 311), 3.006 (s; 222), 2.010 (ms; 333,511), 1.846 (s; 440), 1.588 (ms; 622). The unit-cell parameters refined from powder XRD data are: 10.466(1) Å, V = 1146.6 Å^3. Single-crystal X-ray data obtained on a crystal 0.090 × 0.070 × 0.050 mm shows space group $Fd\bar{3}m$, a = 10.4887(8) Å, V = 1153.9 Å^3, Z = 8. The crystal structure refined to R_1 = 0.056 for of 105 unique $F_o > 4\sigma(F_o)$ reflections. The empirical formula based on structural constrains is ${}^{A}(\square_{1.27}Na_{0.39}Sb^{3+}_{0.34})_{\Sigma 2.00}{}^{B}(Nb_{1.51}Ta_{0.49})_{\Sigma 2.00}{}^{X}O_6{}^{Y}[(H_2O)_{0.53}Cs_{0.47}]_{\Sigma 1.00}$. Fragmented type material is deposited in the Musée cantonal de géologie, University of Lausanne, Switzerland and in the Museo di Storia Naturale, Università di Pisa, Italy. **D.B.**

Hydroxyplumbopyrochlore (IMA 2018-145), $(Pb_{1.5},\square_{0.5})Nb_2O_6(OH)$, was discovered in pegmatite-aplite rocks of the Jabal Sayid peralkaline granitic complex of the Arabian Shield, Saudi Arabia. (23°49′28.72″N, 40° 56′30.93″E). Several pyrochlore-group minerals with high Pb content were previously described under the name plumbopyrochlore. The lack of data on structure and anionic content do not allow to classify all of them to yield the current pyrochlore-supergroup nomenclature. Plumbopyrochlore of Skorobogatova et al. (1966), Kartashov et al. (1992), Voloshin et al. (1993), Kovalenko et al. (1995), Xie et al. (2006) correspond by composition to "plumbopyrochlore." Plumbopyrochlore of Chakhmouradian and Mitchell (2002), Wang et al. (2003), and Beurlen et al. (2005) correspond to zero-valent-dominant pyrochlore. Several analyses of plumbopyrochlore of Voloshin and Pakhomovskiy (1986) correspond to "plumbopyrochlore" while some of their analysis correspond to oxyplumbopyrochlore and kenoplumbopyrochlore. The newly approved hydroxyplumbopyrochlore is associated with quartz, microcline, "biotite," rutile, zircon, calcite, rhodochrosite, columbite-(Fe), goethite, thorite, bastnäsite-(Ce), xenotime-(Y), samarskite-(Y), euxenite-(Y), "hydropyrochlore," and fluornatropyrochlore. Hydroxyplumbopyrochlore usually forms pale yellow to pale brown, transparent euhedral octahedral crystals (0.01–0.06 mm) slightly modified by rhomododecahedra or cubes. The mineral has white streak and adamantine luster. No fluorescence under UV light was observed. It is brittle with conchoidal fracture and no cleavage or parting. The indentation hardness is 463 (440–490) kg/mm^2 (load not given) corresponding to ~5½ of Mohs scale. The density and refractive index were not measured; D_{calc} = 6.474 g/cm^3; n_{calc} = 2.26(3). The mineral is optically isotropic. No other optical data provided. The Raman spectrum shows bands at (cm^{-1}): 3500 and 3408 (O–H stretching); 727, 560, 511 [(Nb,Ti)-O$_6$ stretching]; 280 [(Nb,Ti)-O$_6$ bending]. No bands responsible for H_2O vibrations were detected. The averaged 6 points electron probe WDS analysis is [wt% (range)]: CaO 0.32 (0.23–0.42), SrO 0.16 (0.08–0.28), FeO 0.17 (0.15–0.20), Ce_2O_3 0.07 (0–0.17), Pr_2O_3 0.02 (0–0.04), PbO 51.69 (50.22–50.40), Nb_2O_5 40.06 (38.71–41.13), SiO_2 0.05 (0–0.11), TiO_2 1.68 (1.56–1.76), Ta_2O_5 4.74 (4.01–5.43), H_2O (by structure) 0.95, F 0.0, total 99.90. The empirical formula is $(Pb_{1.34}Ca_{0.03}Fe_{0.01}Sr_{0.01}\square_{0.61})_{\Sigma 2.00}(Nb_{1.75}Ti_{0.12}Ta_{0.12}Si_{0.01})_{\Sigma 2.00}O_6(OH_{0.53}O_{0.08}\square_{0.39})_{\Sigma 1.00}$. The strongest lines of the powder X-ray diffraction pattern [d Å (I%; hkl)] are: 6.051 (8; 111), 3.043 (100; 222), 2.636 (42; 400), 1.862 (36; 440), 1.591 (43; 622), 1.521 (8; 444), 1.320 (6; 800), 1.183 (12; 840). Unit-cell parameters refined from the powder diffraction data are a = 10.5669(8) Å, V = 1179.8 Å^3. The single-crystal XRD data (crystal 0.08 × 0.10 × 0.11 mm) show a = 10.5456(6) Å, V = 1172.8 Å^3. The crystal structure refined to R_1 = 0.0317 for [$I > 2\sigma(I)$] reflections in space group $Fd\bar{3}m$, Z = 8. The holotype specimen is deposited in the Geological Museum of China, Beijing, China. **D.B.**

Kenoplumbomicrolite (IMA 2015-007a), $(Pb,\square)_2Ta_2O_6[\square,(OH),O]$, was discovered in amazonite pegmatite from Ploskaya Mountain, Western Keivy Massif, Kola Peninsula, Murmanskaja Oblast, Northern Region, Russia (67°37′60″N, 36°42′0″E). The vein 270 m long with a thickness up to 25 m has been traced downdip for 70 m. It confined to the contact between gneiss and schist of Proterozoic age and genetically related to an alkaline granite pluton. The vein contact zone consists of fine-grained albite and is succeeded nearer the center by an indistinct zone of amazonite blocks up to 2.5 m and partly replaced by albite. Quartz core has galena pockets up to 0.4 m, coarse "biotite" flakes and "cleavelandite" aggregates. Other associated minerals are "zinnwaldite," anglesite, bastnäsite-(Ce), bismite, bismuth, bismuthinite, bismuthite, cassiterite, caysichite-(Y), churchite-(Y), columbite-(Mn), emplectite, fergusonite-(Y), fluorite, gadolinite-(Y), gahnite, galena, hingganite-(Y), hingganite-(Yb), kainosite-(Y), kamphaugite-(Y), kasolite, keiviite-(Y), keiviite-(Yb), kuliokite-(Y), lanarkite, leadhillite, löllingite, monazite-(Ce), pyromorphite, scotlandite, sillénite, sphalerite, tengerite-(Y), thalénite-(Y), thorite, uraninite, vyuntspakhkite-(Y), wulfenite, xenotime-(Y), xenotime-(Yb), and zavaritskite. The mineral "plumbomicrolite" was identified in this vein in 1975 and described by Stepanov et.al (1982) and later under the same name by Voloshin et al (1981) and Bindi et al. (2006) (on the specimens provided by V.I. Stepanov). According to the IMA-approved rules for nomenclature (Atencio et al. 2010), the name "plumbomicrolite" must be preceded by the prefix "keno," which indicates that the Y site is dominantly vacant. Kenoplumbomicrolite forms yellowish brown*, octahedral, cuboctahedral and irregular crystals up to 20 cm and their intergrowths. It has a white streak, greasy luster. No fluorescence under UV light was observed. Mohs hardness is ~6. Density measurements (7.310–7.832 g/cm^3) were affected by the ubiquitous presence of uraninite inclusions; D_{calc} = 7.122 g/cm^3. Kenoplumbomicrolite is optically isotropic. Reflectance values (R% air/oil) are slightly decreasing from 20.35/8.13 for 400 nm to 16.75/5.26 for 700 nm. The values for **COM** wavelengths are (18.62/6.61; 470 nm), (17.62/5.88; 546 nm), (17.26/5.62; 589 nm), (16.90/5.34; 650 nm). Voloshin et al. (1981) for their sample #2 reported D_{meas} = 7.69(7) g/cm^3, indentation hardness VHN_{40} = 610; and R (nm, %) = 486, 21.6; 553, 21.2; 586, 21.7; 656, 20.1.The averages of four electron probe WDS analyses on the crystal used for structure study / seven EDS analyses on fragments used for density and reflectance measurements / WDS analysis of sample #2 of Voloshin et al. (1981) are [wt% (ranges)]: Na_2O 0.37 (0.32–0.46) / – / 0.18; CaO 2.51 (2.18–2.63) / – / 0.28; PbO 45.39 (44.20–46.29) / 46.05 (44.85–46.77) / 47.42; UO_2 1.24 (0.99–1.45) / – / –; Ta_2O_5 28.58 (27.21–28.83) / 29.95 (29.78–30.23) / 30.29; Nb_2O_5 12.90 (12.11–13.39 / 14.85 (14.02–15.24) / 14.21; TiO_2 0.84 (0.74–0.90) / 0.49 (0.22–0.74) / 0.28; SiO_2 2.19 (1.62–2.44)/ – / –; SnO_2 3.47 (3.10–3.58) / 4.27 (4.00–4.76) / 3.32; Fe_2O_3 1.28 (1.23–1.31) / 1.34 (1.27–1.47) / 1.18; Al_2O_3 0.07 (0.01–0.11) / – / –; WO_3 – / 2.88 (2.40–3.69) / –; MnO – / 0.10 (0–0.39) / –; H_2O 0.35 (by structure) / – / –; total 99.19 / 99.93/ 97.16. The corresponding empirical formulae are $(Pb_{1.30}\square_{0.30}Ca_{0.29}Na_{0.08}U_{0.03})_{\Sigma 2.00}(Ta_{0.82}Nb_{0.62}Si_{0.23}Sn^{4+}_{0.15}Ti_{0.07}Fe^{3+}_{0.10}Al_{0.01})_{\Sigma 2.00}O_6[\square_{0.52}(OH)_{0.25}O_{0.23}]_{\Sigma 1.00}$ / $(Pb_{1.33}\square_{0.66}Mn_{0.01})_{\Sigma 2.00}(Ta_{0.87}Nb_{0.72}Sn^{4+}_{0.18}Fe^{3+}_{0.11}W_{0.08}Ti_{0.04})_{\Sigma 2.00}O_6[\square_{0.80}(OH)_{0.10}O_{0.10}]_{\Sigma 1.00}$ / $(Pb_{1.49}\square_{0.43}Ca_{0.04}Na_{0.04})_{\Sigma 2.00}(Ta_{0.97}Nb_{0.75}Sn^{4+}_{0.15}Ti_{0.03}Fe^{3+}_{0.10})_{\Sigma 2.00}O_6[\square_{0.64}O_{0.36}]_{\Sigma 1.00}$. The main lines of the X-ray powder diffraction pattern [d Å (I%; hkl)] are: 3.050 (100; 222), 2.641 (42; 400), 2.425 (9; 331), 2.033 (6; 511), 1.869 (26; 440), 1.595 (23; 622), 1.527 (9; 444). The unit-cell parameters refined from powder X-ray diffraction data are a = 10.575(2) Å, V = 1182.6 Å^3. The single-crystal X-ray data shows the mineral is cubic with a = 10.571(1) Å, V = 1181.3 Å^3, Z = 8. The crystal structure was refined in the space group $Fd\bar{3}m$ to R_{obs} = 4.89% and R_{all} = 5.79%. Type material is deposited in the Museu de Geociências, Universidade de São Paulo, Brazil.

* Voloshin et al. (1981) reported five color varieties of "plumbomicrolite" from Ploskaya Mt (green, yellow-green, yellow, orange-brown, dark brown to black) differ by physical properties and occurrence and provided chemical compositions for these varieties.

Oxybismutomicrolite (IMA 2019-047), $(Bi^{3+},\#)_2Ta_2O_6O$ (#: subordinate substituents: Na, Ca, vacancy, etc.), was discovered at the Solnechnaya ("Sunny") miarolitic pegmatite vein, Malkhan pegmatite field, Central Transbaikalia, Russia. (50°38′50″ N, 109°55′07″ E). The name "bismutomicrolite" was first introduced by Zalashkova and Kukharchik (1957) for the mineral from pegmatites of Altay Mts, Russia. The compositions of pyrochlore supergroup minerals with high Bi content were reported by Knorring and Mrose (1963) (from lithium pegmatite at Wampewo Hill, Uganda) and by Erichsen de Oliveira et al. 1970 (from Tromba pegmatite, Estado de Goiás, Brazil) under the name "westgrenite," which was renamed by Hogarth (1977) according his classification of pyrochlore group to "bismutomicrolite" and later discredited by Atencio et al. (2010) because its published compositions probably refers to a mixture. "Bismutomicrolite" was also described by Tindle and Breaks (1998) from pegmatites of Ontario, Canada, by Zagorsky and Peretyazhko (1992) from Solnechnaya pegmatite vein, Malkhan, Russia, by Pekov and Memetova (2008) from Lipovka pegmatites, Urals, Russia. However, above referred compositions should be considered according to the current nomenclature of Atencio et al. (2010) as fluornatromicrolite or zero-valent-dominant microlite or cannot be classified due to incomplete data. This study of microlites from Solnechnaya vein allows to reinstate the status of "bismutomicrolite" as a valid mineral species under the new name oxybismutomicrolite. This vein in quartz metadiorites has a cigar-shaped body having 55 m in length, up to 5–6 m in width. The central part of the vein is composed of the K-feldspar graphic pegmatite with blocky aggregates of potassic feldspar and quartz up to 0.5–1 m across while medium-grained oligoclase is dominating in the lying side and potassic feldspar dominates over plagioclase in the hanging wall. Miarolitic cavity (3 × 2.5 × 1.5 m) was uncovered in 1985. Walls of the cavity were overgrown by excellent druses of smoky quartz up to 50 × 25 cm, gemmy crystals of watermelon tourmaline up to 18 × 15 cm, perfect crystals of cleavelandite and lepidolite. Oxybismutomicrolite was found in this cavity as black octahedral crystals up to 1 mm and equant grains up to 2 mm embedded in albite–lepidolite–elbaite matrix in association with native bismuth, bismutite, bismutotantalite, fluorapatite, fluorite, fluornatromicrolite, pollucite, stibiotantalite, topaz, xenotime-(Y), Hf-rich zircon. The mineral has resinous luster and grayish white streak. It does not fluoresce under UV light. It is brittle, with uneven fracture. No cleavage or parting was observed. The indentation hardness VHN_{100} = 609 (551–689) kg/mm^2 corresponding to ~5 of Mohs scale. D_{meas} = 6.98(2); D_{calc} = 7.056 g/cm^3. In reflected light oxybismutomicrolite is light gray, isotropic with no internal reflections or pleochroism; n_{calc} = 2.184. The reflectance values were measured in air and slightly decreasing from 14.82% for 400 nm to 13.13 for 700 nm. The values for **COM** wavelengths are (R%, nm): 13.90, 470; 13.41, 546; 13.30, 589; 13.26, 650. The IR spectrum shows strong bands at (cm^{-1}): 570 (shoulders at 650 and 705) and 375 (stretching and bending vibrations of the octahedral framework, respectively). The shoulder at 880 (combination of stretching vibrations of the octahedral framework and lattice vibrations). No bands are observed in the range 1000–3800 indicating the absence of H_2O, OH^-, CO^{3-}, and B-bearing groups. The average of 7 spot electron probe WDS analyses [wt% (range)] is: Na_2O 3.45 (3.38–3.59), CaO 2.88 (2.18–3.73), MnO 0.31 (0.14–0.49), PbO 0.76 (0.67–0.85), Bi_2O_3 29.81 (27.24–32.34), ThO_2 0.18 (0.15–0.22), TiO_2 3.89 (3.34–4.39), SnO_2 1.77 (1.07–3.05), Nb_2O_5 4.50 (4.09–4.95), Ta_2O_5 51.08 (49.51–53.25), F 1.17 (0.96–1.65), $–O=F_2$ 0.49, total 99.31. The empirical formula, based on 2 cations at the B site, is $(Bi_{0.79}Na_{0.68}Ca_{0.32}Mn_{0.03}Pb_{0.02}\square_{0.16})_{\Sigma 2.00}(Ta_{1.42}Ti_{0.30}Nb_{0.21}Sn_{0.07})_{\Sigma 2.00}O_{6.00}(O_{0.52}F_{0.38}\square_{0.10})_{\Sigma 1.00}$. Most of "microlite" grains are zonal with different zones representing solid-solution series between fluornatromicrolite and oxybismutomicrolite. No "calciomicrolite" compositions were found but two exotic compositions: $(Na_{0.73}Bi_{0.71}Ca_{0.36}Sb^{3+}_{0.11}Mn_{0.04}\square_{0.05})_{\Sigma 2.00}(Ta_{1.28}Ti_{0.37}Nb_{0.24}Sn_{0.11})_{\Sigma 2.00}(O_{6.63}F_{0.25}\square_{0.12})_{\Sigma 7.00}$ and $(Bi_{0.74}Na_{0.69}Ca_{0.36}Mn_{0.05}Pb_{0.03}Sb^{3+}_{0.02}Th_{0.02}\square_{0.09})_{\Sigma 2.00}(Ta_{1.20}Ti_{0.48}Nb_{0.19}Sn_{0.13})_{\Sigma 2.00}(O_{6.36}F_{0.60}\square_{0.04})_{\Sigma 7.00}$ might be attributed as oxynatromicrolite and potential new species "fluorbismutomicrolite," respectively. The strongest lines of the powder X-ray diffraction pattern [d Å (I %; hkl)] are: 6.051 (12; 111), 3.160 (10; 311), 3.026 (100; 222), 2.621 (32; 400), 1.854 (33; 440), 1.581 (27; 622), 1.514 (7; 444), 1.203 (7; 662). The unit-cell parameters refined from the powder data are a = 10.4872(6) Å, V = 1153.40(12) Å^3. The single-crystal data shows the mineral is cubic, $Fd\bar{3}m$, a = 10.4746(11) Å, V = 1149.2 Å^3, Z = 8. The crystal structure refined to R = 0.019 for 104 independent $I \geq 2\sigma(I)$ reflections. Type specimen of oxybismutomicrolite is deposited in the Fersman Mineralogical Museum of the Russian Academy of Sciences, Moscow, Russia. A mineral corresponding by chemical composition to oxybismutomicrolite is also reported from Scherlovyi pegmatite near Taiginka Village, Kyshtym District, South Urals, Russia (Kasatkin 2019). Dark-brown resinous grains up to 2 mm embedded in granitic pegmatite are associated with beryl, bismuth, bismutocolumbite, cheralite, fluorapatite, fluor-schorl, gahnite, hercynite, magnetite, manganocolumbite, monazite-(Ce), rutile, spessartine, xenotime-(Y), and zircon. The average of 7 electron probe analyses is (wt%): Na_2O 0.04, K_2O 0.04, CaO 0.80, MnO 2.61, BaO 0.16, PbO 1.20, Sb_2O_3 0.37, Bi_2O_3 32.35, ThO_2 0.85, UO_2 2.83, TiO_2 8.22, SnO_2 2.34, Nb_2O_5 4.38, Ta_2O_5 31.75, WO_3 0.59, F 0.65, –O=F –0.27, total 88.91. The empirical formula based on 2 cations at the B site is $(Bi_{0.94}Mn_{0.25}Ca_{0.10}U^{4+}_{0.07}Pb_{0.04}Sb^{3+}_{0.02}Th_{0.02}Na_{0.01}K_{0.01}Ba_{0.01})_{\Sigma 1.47}(Ta_{0.97}Ti_{0.69}Nb_{0.22}Sn_{0.10}W_{0.02})_{\Sigma 2.00}O_{6.53}F_{0.23}$. Despite the low total and lack of information on measured H_2O, the electroneutrality of this empirical formula can be achieved only if O^{2-} dominates at the Y site. Therefore, this mineral could be assigned to oxybismutomicrolite. **D.B.**

Oxycalciomicrolite (IMA 2019-110), $(Ca,\square,Na)_2(Ta,Nb,Ti)_2O_6(O,F)$, a new member of microlite-group was discovered in the saprolite of the weathered Fumal pegmatite, 18 km north of the city of Nazareno, Minas Gerais state, Brazil (21°04′08.23″S, 44°33′59.63″W). The minerals with similar compositions were previously described by Černý at al. (2004) under the name "stibiomicrolite" in the Varuträsk pegmatite, northeastern Sweden, and by Guastoni et al. (2008) as "microlite" in the pegmatites of Vigezzo Valley (western Alps, Italy). Considering the available chemical data for these occurrences and following the classification scheme of Atencio et al. (2010), these minerals could be attributed as oxycalciomicrolite. The Fumal pegmatite belongs to the Sn–Ta–Nb–Li-rich São João del Rei Pegmatite Province and associated with the Paleoproterozoic granitoids. The pegmatite body of at least 4 m thick is deeply weathered and contains quartz, kaolinized feldspars, muscovite, columbite subgroup minerals, cassiterite, hematite, ilmenite, monazite-(Ce), epidote-group minerals, xenotime-(Y), zircon, beryl, spinel, and garnet-group minerals. Oxycalciomicrolite was obtained from the concentrate of heavy minerals from the pegmatite saprolite. It forms brownish yellow to brownish-red translucent to transparent octahedral (occasionally modified by {110}) crystals 0.2 to 0.5 mm, has a white streak and vitreous to resinous luster. No fluorescence under UV light was observed. The mineral is brittle with conchoidal fracture and no cleavage or parting. Mohs hardness is 5–5½. The density was not measured; D_{calc} = 6.333 g/cm^3. At room temperature the mineral does not dissolves in water, nitric acid (70%), hydrochloric acid (37%), aqua regia, and sulfuric acid (98%) but dissolves and turning white in hydrofluoric acid (48%). Oxycalciomicrolite is optically isotropic, n_{calc} = 2.037. The IR spectrum shows bands at 1000 and 917 cm^{-1} (Ta–O octahedron vibrations) and in the range 700–400 cm^{-1} (vibrations of the microlite type framework). No significant absorption at 3700–2900 and 1700–1600 cm^{-1} were observed indicating the absence of structural H_2O. The Raman spectrum shows three bands between 1100 and 100 cm^{-1} at 295 and 652 (B–X octahedral stretching and X–B–X bending, respectively) and at 791 (assigned to the combination or overtone of 295 and 652 cm^{-1} bands). The average of 14-spot electron probe WDS analyses [wt% (range)] is: Nb_2O_5 4.12 (1.95–7.42), Ta_2O_5 75.77 (72.32–78.63), TiO_2 0.38 (0.23–0.70), UO_2 0.83 (0–5.67), ZrO_2 0.03 (0–0.15), La_2O_3 0.05 (0–0.24), Ce_2O_3 0.18 (0.15–0.29), Yb_2O_3 0.11 (0.03–0.19), Sm_2O_3 0.02 (0–0.11), SnO 0.94 (0.44–2.03), FeO 0.09 (0–0.29), CaO 15.89 (14.44–16.44), MnO 0.17 (0–0.33), SrO 0.51 (0.36–0.74), BaO 0.02 (0–0.09), Na_2O 0.36 (0.28–0.50), F 0.75 (0–1.71), $–O=F_2$ 0.31, total 99.91. The empirical formula based on 2 cations at the B site is $(Ca_{1.57}\square_{0.26}Na_{0.06}Sn_{0.03}Sr_{0.03}U_{0.02}Mn_{0.02}Fe_{0.01}Ce_{0.01})_{\Sigma 2.00}(Ta_{1.79}Nb_{0.18}Ti_{0.03})_{\Sigma 2.00}O_{6.00}[O_{0.64}F_{0.19}\square_{0.17}]_{\Sigma 1.00}$. The main lines of the powder X-ray diffraction pattern [d Å (I %; hkl)] are: 6.023 (89; 111), 3.145 (44; 311), 3.011 (100; 222), 2.608 (25; 400), 2.008 (14; 333), 1.844 (48; 440), 1.573 (33; 622), 1.506 (8; 444). The mineral is cubic, space group $Fd\bar{3}m$. The unit-cell parameters refined from powder X-ray diffraction data are a = 10.4325(4) Å, V = 1135.46 Å^3, Z = 8. The single-crystal X-ray data is not presented. Type material is deposited at the Museu Nacional, Universidade Federal do Rio de Janeiro, Brazil. **D.B.**

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