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New Mineral Names*,†

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This new mineral names has entries for 12 new minerals, including belakovskiite, ekplexite, forêtite, grigorievite, kaskasite, koksharovite, leonardsenite, manganokaskasite, rickturnerite, rumseyite, tondiite, and whiteite-(CaMnMn).

BELAKOVSKIITE*

A.R. Kampf, J. Plášil, A.V. Kasatkin, and J. Marty (2014) Belakovskiite, $Na_7(UO_2)(SO_4)_4(SO_3OH)(H_2O)_3$, a new uranyl sulphate mineral from the Blue Lizard mine, San Juan County, Utah, USA. Mineralogical Magazine, 78(3), 639–649.

Belakovskiite (IMA 2013-075), ideally $Na_7(UO_2)(SO_4)_4(SO_3OH)(H_2O)_3$, is a new uranyl sulphate mineral from the Blue Lizard Mine, Red Canyon, White Canyon district, San Juan Co., Utah, U.S.A. (37°33′26″N 110°17′44″W). This underground U mine is host to a large number of rare Na-bearing secondary uranyl minerals related to the post-mining oxidation of primary uraninite, pyrite, chalcopyrite, bornite, and covellite deposited as replacement of wood and other organic material and as disseminations in the enclosing medium- to coarse-grained sandstone of the Shinarump Member of the Chinle Formation (Upper Triassic age). The genesis of the main ore is related to percolated ore solutions in permeable sandstone between less permeable siltstone and claystone. The new mineral occurs in efflorescence on sandstone in direct association with blödite, ferrinatrite, kröhnkite, meisserite, and metavoltine while the general secondary assemblage includes atacamite, boyleite, pickeringite, brochantite, chalcanthite, cobaltoblödite, manganoblödite, copiapite, coquimbite, cyanotrichite, d'ansite-(Mn), dickite, gerhardtite, gordaite, gypsum, halite, johannite, natrochalcite, natrozippeite, pseudojohannite, rhomboclase, römerite, sideronatrite, tamarugite, and bluelizardite. Belakovskiite forms pale yellowish-green fibrous crystals up to 22 mm in length and a few micrometers in diameter. It is transparent with a vitreous luster, has a white streak, and estimated Mohs hardness ~2. The crystals of belakovskiite are flexible and elastic, with brittle failure and irregular fracture, with no cleavage. The new mineral is soluble in cold H_2O, and its density could not be measured due to high solubility in density liquids; D_{calc} = 2.953 g/cm^3. Belakovskiite is biaxial (+) with α = 1.500, β = 1.511, and γ = 1.523° (white light); $2V_{meas}$ = 87.1° and $2V_{calc}$ = 88°. No pleochroism or dispersion observed; $X \approx \mathbf{a}$. The average of 9 electron probe EDS analyses is: Na_2O 21.67 (20.78–22.60), UO_3 30.48 (27.83–33.54), SO_3 40.86 (36.95–43.50), H_2O (calculated by stoichiometry) 6.45, total 99.46 wt%. The empirical formula calculated on the basis of 25 O apfu is $Na_{6.83}(U_{1.04}O_2)(SO_4)_4(S_{0.99}O_3OH)(H_2O)_3$. The strongest lines of the X-ray powder diffraction pattern are [d_{obs} Å (I_{obs}%; *hkl*)]: 8.96 (35; 002), 8.46 (29; 011), 5.19 (100; $\bar{1}01$, 101, $\bar{1}10$), 4.66 (58; 013, $\bar{1}02$, $\bar{1}\bar{1}0$, 110), 3.568 (37; 120, 023, 005, $0\bar{3}3$), 3.057 (59; $0\bar{1}6$, $1\bar{1}5$, $\bar{1}31$), 2.930 (27; $0\bar{3}5$, $1\bar{2}5$, $0\bar{2}6$, 105, $\bar{1}\bar{3}1$, $\bar{1}\bar{3}2$, $1\bar{3}4$, 123), 1.8320 (29; $1\bar{6}2$, $2\bar{4}6$, $\bar{2}\bar{4}3$, $0\bar{1}10$, $\bar{2}17$, $1\bar{6}4$, $0\bar{5}8$, 054). The crystal structure of belakovskiite was solved by direct methods and refined to R_1 = 5.39%. The mineral is triclinic, $P\bar{1}$, a = 5.4581(3), b = 11.3288(6), c = 18.4163(13) Å, α = 104.786(7), β = 90.092(6), γ = 96.767(7)°, V = 1092.76 Å^3, and Z = 2. The crystal structure of belakovskiite is based on a 3D framework that is unique among known uranyl sulphates structures. The framework consists of uranyl groups linked to four [SO_4] tetrahedral and a H_2O molecule forming $[(UO_2)(SO_4)_4(H_2O)]^{6-}$ clusters linked to each other via an extensive network of Na-O bonds and hydrogen bonds involving eight Na sites, three other (H_2O) sites, and the (SO_3OH) group. The mineral was named in honor of Dmitry Ilych Belakovskiy (b. 1957), a prominent Russian mineralogist and Curator of the Fersman Mineralogical Museum in Moscow, Russia. The cotype specimen is deposited in the collections of the Natural History Museum of Los Angeles County. Another cotype is at the Fersman Mineralogical Museum of the Russian Academy of Sciences, Moscow, Russia. **Yu.U.**

EKPLEXITE*, KASKASITE*, AND MANGANOKASKASITE*

I.V. Pekov, V.O. Yapaskurt, Y.S. Polekhovsky, M.F. Vigasina, and O.I. Siidra (2014) Ekplexite $(Nb,Mo)S_2{\cdot}(Mg_{1-x}Al_x)(OH)_{2+x}$, kaskasite $(Mo,Nb)S_2{\cdot}(Mg_{1-x}Al_x)(OH)_{2+x}$ and manganokaskasite $(Mo,Nb)S_2{\cdot}(Mn_{1-x}Al_x)(OH)_{2+x}$, three new valleriite-group mineral species from the Khibiny alkaline complex, Kola peninsula, Russia. Mineralogical Magazine, 78(3), 663–679.

Ekplexite (IMA 2011-082), ideally $(Nb,Mo)S_2{\cdot}(Mg_{1-x}Al_x)(OH)_{2+x}$, kaskasite (IMA 2013-025), ideally $(Mo,Nb)S_2{\cdot}(Mg_{1-x}Al_x)(OH)_{2+x}$, and manganokaskasite (IMA 2013-026), ideally $(Mo,Nb)S_2{\cdot}(Mn_{1-x}Al_x)(OH)_{2+x}$, are new minerals from the Mt. Kaskasnyunchorr, Khibiny alkaline complex, Kola Peninsula, Russia. The minerals are of hydrothermal origin, and occur in fenites formed by the influence of a peralkaline fluid acting as a source of Nb on a large xenolith of alumina-rich metamorphic rocks (metapelites) located inside a huge intrusion of agpaitic nepheline syenite. The minerals are associated with orthoclase, anorthoclase, and nepheline with fluorophlogopite, corundum,

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* All minerals and names 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://pubsites.uws.edu.au/ima-cnmnc/.

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pyrrhotite, pyrite, rutile, monazite-(Ce), graphite, edgarite, molybdenite, tungstenite, alabandite, and others. Ekplexite was initially found as isolated, lenticular nests up to 0.2 × 1 × 1 mm in a nepheline-feldspar fenite. It occurs as near-parallel, radiating or chaotic aggregates of mica-like, corrugated flakes no more than 0.1 mm across and 0.01 mm thick. Ekplexite was later found as flakes up to 0.02 × 0.5 × 0.7 mm epitaxially overgrowing Ti-bearing pyrrhotite, as are kaskasite and manganokaskasite. Kaskasite generally occurs as separate lamellar or flaky, mica-like crystals flattened on [001] with their (near-) parallel "stacks" up to 1 × 1.5 mm across and 0.03 mm in thickness. The {001} faces of kaskasite are coplanar to the {001} faces of pyrrhotite. Lamellae of kaskasite are usually irregularly shaped, but fragments of a crude hexagonal shape have been observed. Striations on the {001} faces are typical; three systems of streaks cross at 60°. Manganokaskasite also forms lamellar to flaky crystal up to 0.5 × 1 mm across and 0.02 mm in thickness. It also forms clusters up to 0.05 × 0.15 mm on pyrrhotite. Both kaskasite and manganokaskasite have been observed in small open cracks. All three minerals are opaque, iron-black with a black streak, and have a metallic luster, show perfect (mica-like) cleavage on {001}, a laminated fracture and have a Mohs hardness of ~1. The micro-indentation hardness value for ekplexite (5 g load) is 64 kg/mm^2, and 36 (34–38) kg/mm^2 for kaskasite. The density of the minerals could not be measured due to the significant presence of micro-cracks in the crystal aggregates. D_{calc} = 3.63, 3.83, and 4.09 g/cm^3 for ekplexite, kaskasite, and manganokaskasite, respectively. All three minerals are (light to dark) gray in reflected light, without internal reflections and are strongly anisotropic. Bireflectance values (589 nm) are ΔR = 10.2 (ekplexite), 12.4 (kaskasite), and 14.1% (manganokaskasite). All three are also strongly pleochroic, from light gray to dark gray for ekplexite, from light gray with a yellowish hue to gray for kaskasite, and from light yellowish to blue gray for manganokaskasite. Reflectance values were measured between 400 and 700 nm in 20 nm intervals. The values for (COM) wavelengths [R_{min}, R_{max} % (λ in nm)] in air are: 8.7, 18.9 (470); 8.7, 19.4 (546); 8.8, 19.0 (589); 8.6, 19.2 (650) for ekplexite, 8.6, 21.5 (470); 9.2, 21.6 (546); 9.2, 21.5 (589); 8.9, 21.3 (650) for kaskasite, and 10.4, 25.6 (470); 10.5, 25.0 (546); 10.6, 24.7 (589); 10.6, 24.5 (650) for manganokaskasite. The Raman spectrum of ekplexite shows two distinct absorption bands at 3530 and 3326 cm^{-1} (O-H stretching vibrations), a wide band at 707 cm^{-1} (likely due to the overlap of Mg···O-H and Al···O-H bending vibrations) and narrow bands at 526 and 438 cm^{-1} (Al···O and Mg···O stretching vibrations). The absence of absorption bands in the range 1200–1700 cm^{-1} indicates the absence of H_2O molecules as well as other H-bearing groups in ekplexite. The absence of bands in the range 750–1300 cm^{-1} indicates the absence of S-O, Mo-O, and Nb-O bonds. The average of 5 electron probe WDS analyses on the holotype of ekplexite gave [wt% (range)]: Mg 6.25 (5.91–6.82), Al 4.31 (3.89–4.73), Ca 0.00, V 0.86 (0.57–1.10), Mn 0.00, Fe 0.44 (0.18–0.82), Nb 18.17 (17.04–19.23), Mo 15.89 (15.07–16.28), W 8.13 (7.56–8.64), S 27.68 (26.30–28.91), O 16.33 (15.02–17.37), and H (calc. on the basis that all O are O-H) 1.03, total 99.09 wt%. The average of 5 electron probe WDS analyses on the holotype of kaskasite gave [wt% (range)]: Mg 5.94 (5.76–6.10), Al 3.67 (3.44–4.26), Ca 0.04 (0.00–0.14), V 0.16 (0.05–0.45), Mn 0.23 (0.00–0.46), Fe 1.44 (0.66–2.61), Nb 13.39 (12.14–13.77), Mo 23.18 (21.70–26.49), W 7.59 (0.88–10.05), S 27.09 (26.08–28.14), O 15.66 (14.46–16.93), and H (calc.) 0.99, total 99.08 wt%. The average of 3 electron probe WDS analyses on the holotype of manganokaskasite gave [wt% (range)]: Mg 0.06 (0.00–0.14), Al 3.00 (2.75–3.28), Ca 0.00, V 0.15 (0.09–0.24), Mn 11.44 (10.77–12.08), Fe 2.06 (1.35–2.92), Nb 14.15 (13.16–14.76), Mo 20.08 (19.46–20.65), W 9.12 (8.68–9.55), S 24.84 (24.66–25.00), O 13.36 (12.84–14.13), and H (calc.) 0.89, total 99.15 wt%. On the basis of 2 S pfu, the empirical formulas are: $(Nb_{0.45}Mo_{0.38}W_{0.10}V_{0.04})_{\Sigma 0.97}S_2{\cdot}(Mg_{0.60}Al_{0.37}Fe_{0.02})_{\Sigma 0.99}(OH)_{2.36}$ for ekplexite, $(Mo_{0.57}Nb_{0.34}W_{0.10}V_{0.01})_{\Sigma 1.02}S_2{\cdot}(Mg_{0.58}Al_{0.32}Fe_{0.06}Mn_{0.01})_{\Sigma 0.97}(OH)_{2.32}$ for kaskasite, and $(Mo_{0.54}Nb_{0.39}W_{0.13}V_{0.01})_{\Sigma 1.07}S_2{\cdot}(Mn_{0.54}Al_{0.29}Fe_{0.10}Mg_{0.01})_{\Sigma 0.94}(OH)_{2.28}$ for manganokaskasite. The strongest lines in the X-ray powder-diffraction pattern [d_{obs} (Å) (I_{obs}%; *hkl*)] are: 11.40 (100; 001), 5.65 (56; 002), 2.812 (21; 100) and 1.622 (11; 110,111) for ekplexite, 5.72 (100; 002), 11.46 (97; 001), 2.786 (51; 100), 1.613 (33; 111) and 1.557 (10; 106,112) for kaskasite, and 5.66 (100; 002), 11.39 (85; 001), 2.769 (43; 100,101), 2.663 (25; unassigned), 1.608 (23; 111), 2.455 (18; unassigned), and 1.559 (13; 112). All three minerals are trigonal, space group $P\overline{3}m1$, $P3m1$, or $P321$, one-layer polytypes (Z = 1). The unit-cell parameters refined from powder-diffraction data for the sulfide sub-lattice are: a = 3.262(2), c = 11.44(2) Å, V = 105.4 Å^3 for ekplexite, a = 3.220(2), c = 11.47(2) Å, V = 102.8 Å^3 for kaskasite, and a = 3.243(3), c = 11.61(1) Å, V = 105.8 Å^3 for manganokaskasite. The unit-cell parameters for the hydroxide sub-lattice are: a = 3.066(2), c = 11.52(2) Å, V = 93.8 Å^3 for ekplexite, a = 3.073(2), c = 11.50(2) Å, V = 94.0(4) Å^3 for kaskasite, and a = 3.118(2), c = 11.62(1) Å, V = 97.9(2) Å^3 for manganokaskasite. The curved and flaky nature of the crystals of the three minerals prevented their analysis by single-crystal X-ray diffraction. Partial success was achieved for a crystal of kaskasite, although the crystal was imperfect and the data of poor quality. This data showed kaskasite is trigonal, a = 3.27(3), c = 11.96(12) Å, V = 111.2 Å^3. Ekplexite, kaskasite, and manganokaskasite are members of the valleriite-group minerals and are close to other members in terms of general stoichiometry, symmetry, X-ray diffraction patterns, morphology, physical properties, and optical data. Their structures are non-commensurate and consist of the MeS_2-type (Me = Nb, Mo, W) sulfide modules and the brucite-type hydroxide modules. The combination of Nb and Mo at the same position in the structure in these minerals is noteworthy. Ekplexite is named after the Greek word έκπληξη meaning surprise, for its exotic combination of major chemical constituents. Kaskasite is named after its type locality, Mount Kaskasnyunchorr, in Khibiny, and manganokaskasite is named as a manganese analog of kaskasite. All type specimens are deposited in the systematic collection of the Fersman Mineralogical Museum of the Russian Academy of Sciences, Moscow, Russia. **O.C.G.**

FORÊTITE*

S.J. Mills, A.R. Kampf, A.M. McDonald, G. Favreau, and P.-J. Chiappero (2012) Forêtite, a new secondary arsenate mineral from the Cap Garonne mine, France. Mineralogical Magazine, 76(3), 769–775.

Forêtite (IMA2011-100), ideally $Cu_2Al_2(AsO_4)(OH,O,H_2O)_6$, is a new secondary arsenate mineral from the Cap Garonne mine, Var, France (43°6′23″N, 6°1′26″E), a type locality for 13 other species. It has also been identified at the Salsigne gold mine, Languedoc-Roussillon, France (Forner et al. 1997). Known since the 1980s (when it was wrongly identified as wroewolfeite) it was later described as a "Phase X2" (Chiappero 1993). New find in 2011 at the Annex S chamber in the Cap Garonne mine allowed the completion of the study. Forêtite occurs as pale sky blue to aqua aggregates, up to ~0.1 mm made up of minute plates no more than 20 μm in length, possibly flattened on (010). It is found in a horizontal bed of hard conglomerate containing red barite cut by numerous fractures containing olivenite and minor amounts of zeunerite. Forêtite is directly associated with a secondary Al-bearing minerals including bariopharmacoalumite, cyanotrichite, parnauite, and chalcophyllite, presumed to have formed under acidic conditions. It has a very pale blue streak. Individual crystals have a vitreous luster and are transparent, while clusters of forêtite are translucent. The crystals are brittle, with an irregular fracture, poor cleavage parallel to the flattening. Mohs hardness is ~3–4; D_{calc} = 3.286 g/cm^3. The mean refractive index measured on aggregates is 1.620 (white light). Forêtite is not pleochroic. Other optical properties were not determined due to the size of the crystals. Raman spectrum is dominated by two sharp peaks at (848 + 816) and 495 cm^{-1} corresponding to As–O symmetrical stretching and bending modes; a band at 1585 cm^{-1} corresponds to H–O–H bending; a group of bands in the regions near 3000 and 3500 cm^{-1} are corresponding to O–H stretching, suggesting several H_2O and O–H environments. The average of 6 electron probe WDS analyses gave: CuO 37.53 (36.70–38.18), Al_2O_3 24.37 (23.28–25.26), Fe_2O_3 0.72 (0.68–0.92), As_2O_5 23.52 (21.28–24.47), SO_3 1.81 (1.13–2.84), SiO_2 1.79 (1.63–1.99), H_2O 2.27 (by difference), total 100.00 wt%. On the basis of 10 O apfu, the empirical chemical formula is $Cu_{1.94}(Al_{1.96}Fe^{3+}_{0.04})_{\Sigma 2.00}(As_{0.84}S_{0.09}Si_{0.04})_{\Sigma 0.97}O_{10}H_{5.19}$. The strongest lines in the X-ray powder-diffraction pattern [d_{obs} Å (I_{obs}; *hkl*)] are: 7.307 (100; $010,0\bar{1}0$), 3.141 (24; $200,\bar{2}00$), 2.818 (24; $2\bar{2}0,\bar{2}20$), 4.519 (23; 111), 2.343 (22; $1\bar{3}1$). The unit-cell parameters obtained from the powder-diffraction experiment are a = 6.969(9), b = 7.676(9), c = 8.591(11) Å, α = 82.01(9), β = 71.68(8), γ = 102.68(8)°, V = 415 Å^3, triclinic, space group $P\bar{1}$ and Z = 2. The low quality of the powder diffraction pattern did not allow solving the crystal structure. Forêtite is named in honor of Jean-Paul Forêt (b. 1943), a retired engineer of the French Ministry of Equipment, who worked as geologist-in-charge of major risks and the environment. He was a co-founder of the project which turned the Cap Garonne mine into a nationally protected site and museum in 1994 (Musée de la Mine de Cap Garonne), and is since then a museum scientific advisor. Cotype specimens are deposited in the collections of the Natural History Museum of Los Angeles County (catalog numbers 63573, 63574, 63575, 63576, and 63577); Museum Victoria, Melbourne, Australia (registration number M51746); Muséum National d'Histoire Naturelle, Paris, France (catalog number 211.58). **F.C.**

References cited

Chiappero, P-J. (1993) Les arséniates de cuivre naturels: systématique et approche des conditions de genèse par les synthèses. Application au gisement plumpo-cuprifère de Cap Garonne, Var (France). Unpublished Ph.D. thesis, University of Orléans, Orléans, France.

Forner, H., Favreau, G., Meisser, N., and Descouens, D. (1997) La Mine d'or de Salsigne. Les espèces minèrales remarquables. Le Règne Minéral, 3, 36–54.

KOKSHAROVITE* AND GRIGORIEVITE*

I.V. Pekov, N.V. Zubkova, V.O. Yapaskurt, P.M. Kartashov, Y.S. Polekhovsky, M.N. Murashko, and D.Y. Pushcharovsky (2014) Koksharovite, $CaMg_2Fe^{3+}_4(VO_4)_6$, and grigorievite, $Cu_3Fe^{3+}_2Al_2(VO_4)_6$, two new howardevansite-group minerals from volcanic exhalations. European Journal of Mineralogy, 26(5), 667–677.

Koksharovite (IMA 2012-092), ideally $CaMg_2Fe^{3+}_4(VO_4)_6$, and grigorievite (IMA 2012-047), ideally $Cu_3Fe^{3+}_2Al_2(VO_4)_6$, are two new minerals of the howardevansite group discovered in exhalations of fumaroles of 2 volcanoes at Kamchatka Peninsula, Russia. Koksharovite was found in a single specimen at the Bezymyannyi volcano (55°58′N; 160°36′E), and grigorievite, at the apical part of the Second scoria cone of the Northern Breakthrough of the Great Tolbachik Fissure Eruption, Tolbachik volcano (55°41′N; 160°14′E).

Koksharovite forms equant to prismatic typically hoper crystals, up to 30 × 70 μm (usually 5 × 15 μm) or their groups on the andesite scoria in association with fibrous bannermanite and 2 uncharacterized Fe-Al and Ca vanadates. It also occurs as aggregates up to 80 μm in the products of alteration of porous scoria by fumarolic gas forming along with biotite, quartz, and (Ti,V)-rich magnetite pseudomorphs after an unknown mineral significantly replaced by bannermanite. Koksharovite is yellowish- to reddish-brown, translucent, with an adamantine luster and yellowish-brown streak. The mean micro-indentation hardness VHN_{20} = 368 (272–458) kg/mm^2 corresponding to ~4½ of Mohs scale; D_{calc} = 3.39 g/cm^3. Like grigorievite, koksharovite is brittle, with no cleavage or parting, and uneven fracture. In reflected light koksharovite is light gray with distinct yellow-brown to red internal reflections, and is weakly anisotropic. The reflectance values measured in air with a 20 nm interval are gradually decreasing 17.5–13.2 (R_{max}) and 16.5–12.5 (R_{min}) from 700 to 400 nm. The data for COM wavelengths [R_{min}, R_{max} (λ in nm)] are: 15.3, 16.8 (470), 14.1, 15.9 (546), 13.8, 15.3 (589), 13.4, 14.8 (650). The average of 3 electron probe WDS analyses gave: Na_2O 0.76 (0.70–0.98), K_2O 0.05 (0.03–0.08), MgO 9.43 (8.10–10.83), CaO 3.57 (3.05–4.22), MnO 0.46 (0.43–0.52), NiO 0.11 (0–0.22), Al_2O_3 3.04 (1.66–5.16), Fe_2O_3 23.88 (23.59–24.05), TiO_2 2.42 (2.00–2.99), SiO_2 0.20 (0.13–0.25), P_2O_5 0.98 (0.44–1.29), V_2O_5 53.86 (53.19–54.97), total 98.76 wt%. Contents of other elements heavier than C were below detection limits. On the basis of 24 O apfu the empirical formula is $Na_{0.24}K_{0.01}Ca_{0.63}Mg_{2.30}Mn_{0.06}Ni_{0.01}Al_{0.59}Fe^{3+}_{2.94}Ti_{0.30}Si_{0.03}P_{0.14}V_{5.83}O_{24}$. The strongest lines of the X-ray powder diffraction patterns [d_{obs} Å (I_{obs}%; *hkl*)] are: 7.47 (28; 100), 3.75 (44; $200,\bar{2}01$), 3.26 (27; $0\bar{1}2$), 3.17 (100; $\bar{1}30$), 3.09 (94; $\bar{2}21,210$), 2.039 (28; $\bar{3}\bar{2}1,\bar{3}40$). Koksharovite is triclinic, space group $P\bar{1}$; a = 8.1758(7), b = 9.8292(9), c = 6.6940(6) Å, α = 105.041(8), β = 102.040(8), γ = 106.025(8)°, V = 476.02 Å^3, Z = 1.

Grigorievite forms prismatic to thick tabular crystals up to 40 × 100 μm (usually <50 μm) and their groups associated with hematite on the surface of basalt scoria. It is overgrown by bannermanite, Mg-bearing ziesite, and two uncharacterized Ca-Cu vanadates. Chalcocyanite and euchlorine crystallized later and form a crust covering aggregates of the vanadium minerals. Bonattite and chalcantite replace chalcocyanite exposed to atmospheric air. Grigorievite is black, opaque, with a semi-metallic luster and reddish-brown streak. The mean VHN_{50} = 489 (412–588) kg/mm^2, which corresponding to ~5 of Mohs scale; D_{calc} = 3.67 g/cm^3. In reflected light grigorievite is gray with a weak deep red internal reflections, weakly anisotropic. The reflectance values measured in air with a 20 nm interval are gradually decreasing 17.7–13.9 (R_{max}) and 17.3–13.5 (R_{min}) from 700 to 400 nm. Reflectance values for COM wavelengths [R_{min}, R_{max} (λ in nm)] are: 14.4, 16.4 (470), 13.2, 15.5 (546), 13.0, 14.9 (589), 12.7, 14.1 (650). The average of 5 electron probe WDS analyses is: MgO 2.78 (2.18–3.22), CaO 0.95 (0.90–0.99), MnO 0.04 (0–0.19), CuO 17.70 (16.75–18.86), ZnO 0.14 (0.07–0.24), Al_2O_3 11.76 (10.03–12.26), Fe_2O_3 10.10 (9.26–11.92), TiO_2 1.47 (1.12–1.65), P_2O_5 0.13 (0–0.24), V_2O_5 54.97 (54.34–55.28), total 100.04 wt%. Contents of other elements heavier than C were below detection limits. On the basis of 24 O apfu the empirical formula is $Ca_{0.17}Mg_{0.69}Mn_{0.01}Cu_{2.23}Zn_{0.02}Al_{2.31}Fe^{3+}_{1.27}Ti_{0.18}P_{0.02}V_{6.05}O_{24}$. The strongest lines of the X-ray powder diffraction patterns [d_{obs} Å (I_{obs}%; *hkl*)] are: 7.36 (24; 100), 4.718 (29; $\bar{1}\bar{1}1,\bar{1}11$), 3.671 (26; $200,\bar{2}01$), 3.141(100; $\bar{1}30$), 3.044 (92; 210), 2.811 (26; $\bar{1}\bar{2}2$). Grigorievite is triclinic, space group $P\bar{1}$; a = 8.0217(5), b = 9.6858(10), c = 6.5475(9) Å, α = 103.645(10), β = 102.369(8), γ = 106.281(8)°, V = 452.60 Å^3, Z = 1.

The crystal structures of both new minerals were solved by direct methods and refined to R_1 = 7.88% (koksharovite) and R_1 = 5.48% (grigorievite). Both have crystallographically identical structures based on the pseudo-frameworks built by VO_4 tetrahedra, MIO_6 octahedra [the MI sites are occupied by (Fe^{3+},Al) in grigorievite and (Fe^{3+},Mg,Al,Ti) in koksharovite] and $MIIO_5$ polyhedra [the fivefold MII polyhedra are occupied by (Cu,Mg) in grigorievite and (Mg,Fe) in koksharovite]. Two [MIO_6] octahedra share edges and form dimeric clusters isolated from each other, and these dimers are connected via [VO_4] tetrahedra. The [$MIIO_5$] polyhedra share edges with two crystallographically independent [MIO_6] octahedra. The Ca (in koksharovite) and Cu(2) sites (in grigorievite) are located in tunnels running along [001]. The minerals were named in honor of outstanding Russian mineralogists. Koksharovite, for Nikolay Ivanovich Koksharov (1818–1892), Academician of the Russian Academy of Sciences since 1855 and Director of the Russian Mineralogical Society from 1865, who made the first systematic study of the mineralogy of Russia and who is also well-known as an excellent crystallographer. Grigorievite, for Professor of Saint Petersburg Mining Institute Dmitry Pavlovich Grigoriev (1909–2003) the founder of ontogenical branch of mineralogy. Type specimens of koksharovite and grigorievite are deposited in the Fersman Mineralogical Museum of the Russian Academy of Sciences, Moscow, Russia. **Yu.U.**

LEONARDSENITE*

D. Mitolo, A. Garavelli, T. Balić-Žunić, P. Acquafredda, and S.P. Jakobsson (2013) Leonardsenite, $MgAlF_5(H_2O)_2$, a new mineral species from Eldfell volcano, Heimaey island, Iceland. Canadian Mineralogist, 51(3), 377–386.

Leonardsenite (IMA2011-059), ideally $MgAlF_5(H_2O)_2$, is a new mineral found as a post-eruptional fumarolic encrustation collected at the northeast rim of the main crater of the Eldfell volcano, Heimaey island, Iceland subsequent to the 1973 eruption in association with jakobssonite and anhydrite, ralstonite, jarosite, anhydrous AlF_3, opal-A, and oskarssonite. The subsurface temperature measured at the time of the last sampling in 1995 was less than 100 °C. Leonardsenite has also been found in a fumarole field along the fissure above the eastern main crater of the 1991 eruption of Hekla volcano (Iceland) associated with ralstonite, opal-A, jakobssonite, malladrite, fluorite, and other unidentified minerals. The ground temperature where leonardsenite was collected ranged from 170 to 190 °C. Leonardsenite was first reported as a potentially new mineral under the name "mineral HR" by Jakobsson et al. (2008). It was listed as the valid unnamed mineral UM2008-28-F:AlHMgO (Smith and Nickel 2007). Leonardsenite forms soft and fragile white earthy crusts of granular and columnar crystals up to 20 μm in length, with the most common forms {011} and {101}. Crystals are white with a white streak. Many physical properties could not be determined due to the small size of the crystals. D_{calc} = 2.31 g/cm^3. The calculated refractive index is 1.38. The average of 6 electron probe EDS analyses is [wt% (range)]: Mg 14.66 (13.74–15.14), Al 16.16 (15.10–16.84), F 52.98 (51.37–54.21), O 15.888 (15.13–16.40), and H 1.78 (calculated from the OH required for charge neutrality plus remaining O as H_2O), total 101.46 wt%. The empirical formula based on two cations pfu is $Mg_{1.00}Al_{1.00}[F_{4.64}(OH)_{0.36}]_{\Sigma 5.00}(H_2O)_{1.29}$. The strongest lines in the X-ray powder-diffraction pattern [d_{obs} Å (I_{obs}%; *hkl*)] are: 5.66 (100; 011), 4.92 (29; 101), 3.53 (27; 200), 3.03 (31; 031), 3.00 (38; 211), 2.30 (16; 231), 1.77 (19; 400) and 1.76 (24; 242). Leonardsenite is orthorhombic, space group *Imma*. The unit-cell parameters refined from powder-diffraction data are: a = 7.055(1) Å, b = 10.117(2) Å, c = 6.813(1) Å, V = 486.3 Å^3, and Z = 4. Leonardsenite is identical to the synthetic phase $MgAlF_5(H_2O)_2$ (Weil and Werner, 2001). The structure contains infinite chains of [AlF_6] octahedra along the **c**-axis which are connected via common fluorine atoms to isolated [$MgF_4(H_2O)_2$] octahedra. The mineral is named after Erik Leonardsen (b. 1934), the former leader of the X-ray Diffraction Laboratory of the Geological Institute, University of Copenhagen, for his work on the diffraction characterization of the fumarolic minerals from Icelandic volcanoes as well as his contribution to definition of a number of new minerals. The holotype and cotype specimens are deposited in the mineral collection of the Icelandic Institute of Natural History, Gardabaer, Iceland. Part of holotype is in the "C.L. Garavelli" Museum, Dipartimento di Scienze della Terra e Geoambientali, Università di Bari, Italy. **O.C.G.**

References cited

Jakobsson, S.P., Leonardsen, E.S., Balić-Žunić, T., and Jonsson, S.S. (2008) Encrustations from three recent volcanic eruptions in Iceland: The 1963-1967 Surtsey, the 1973 Eldfell and the 1991 Hekla eruptions. Fjölrit Náttúrufraedistofnunar 52, 165.

Smith, D.G.W., and Nickel, E.H. (2007) A system for codification for unnamed minerals: report of the Subcommittee for Unnamed Minerals of the IMA Commission on New Minerals, Nomenclature and Classification. Canadian Mineralogist, 45, 983–1055, http://pubsites.uws.edu.au/ima-cnmnc/Valid2010.pdf.

Weil, M., and Werner, F. (2001) The thermal dehydration of magnesium aluminum pentafluoride dihydrate: crystal structures of $MgAlF_5(H_2O)_2$ and $MgAlF_5$. Monatshefte für Chemie, 132, 769–777.

RICKTURNERITE*

M.S. Rumsey, S.V. Krivovichev, O.I. Siidra, C.A. Kirk, C.J. Stanley, and J. Spratt (2012) Rickturnerite, $Pb_7O_4[Mg(OH)_4](OH)Cl_3$, a complex new lead oxychloride mineral. Mineralogical Magazine, 76(1), 59–73.

Rickturnerite (IMA 2010-034), ideally $Pb_7O_4[Mg(OH)_4](OH)Cl_3$, is a new mineral from the Torr Works (Merehead) quarry, near the village of Cranmore in Somerset, U.K. Rickturnerite occurs in cavities inside a manganite and pyrolusite pod, as pale emerald green to grey porous aggregates of disordered interwoven minute fibrous crystals (typically less than 5 μm wide and 200 μm long; occasionally 40 × 100 μm in cross section and over 1 mm in length). It is associated with mereheadite, cerussite, calcite, aragonite, mimetite, hydrocerussite, "plumbonacrite," and an uncharacterized lead oxychloride. Rickturnerite is pale emerald green and translucent, with white streak and vitreous luster. Mosh hardness is ~3. Needles are brittle with an indistinct cleavage, breaking with a splintery fracture. D_{calc} = 6.886 g/cm^3. The average of electron probe WDS analyses gave: PbO 87.70 (86.80–88.40), MgO 1.79 (1.63–1.99), CuO 0.14 (0.10–0.16), Cl 6.62 (6.43–6,88), H_2O 2.27 (from structure data), $–O=Cl_2$ 1.50; total 97.02 wt%. On the basis of 12 anions pfu, the empirical chemical formula is $Pb_{7.16}Mg_{0.81}Cu_{0.03}Cl_{3.40}H_{4.60}O_{8.60}\cdot 1.15\ H_2O$. The strongest lines in the X-ray powder-diffraction pattern [d_{obs} Å (I_{obs}; *hkl*)] are: 6.474 (100; 400), 3.233 (73; 107), 2.867 (57; 705), 5.636 (44; 011), 3.112 (31; 802). The unit-cell parameters obtained from the powder-diffraction experiment are a = 5.82(1), b = 22.80(3), c = 25.88(2) Å. Single crystal X-ray diffraction analysis revealed orthorhombic symmetry with space group *Pnma*, a = 5.8024(6), b = 22.717(2), c = 25.879(3) Å , V = 3411.2 Å^3, and Z = 8. The diffraction pattern contains strong reflections that define a subcell with a = 5.8034(5), b = 11.3574(9), c = 12.939(2) Å, and V = 852.9 Å^3 (space group *Pmm*2 which is related to the real unit cell by the transformation matrix [100/020/002]) and weak reflections that correspond to doubled **b** and **c** parameters. The crystal structure was solved by direct methods and refined using 1318 unique reflections to R_1 = 0.063. The structure is composed of a fully ordered part consisting of double $[O_2Pb_3]^{2+}$ chains of oxocentred $[OPb_4]$ tetrahedra extended along the **b**-axis, which together with $Cl^–$ ions form two-dimensional blocks parallel to (001). In between these blocks, there is a disordered region containing ordered $[Mg(OH)_6]^{4–}$ octahedra and low-occupancy Pb and OH sites with a slight degree of ordering; these produce the weak supercell reflections. Rickturnerite is named in honor of its discoverer, geologist and mineral collector Rick Turner. The holotype specimen of is deposited at the Natural History Museum in London, U.K., under the registered number BM 2008,100, where a probe block (P15150) and several cotype specimens are also registered. **F.C.**

RUMSEYITE*

M.S. Turner, O.I. Siidra, S.V. Krivovichev, C.J. Stanley, and J. Spratt (2012) Rumseyite, $[Pb_2OF]Cl$, the first naturally occurring fluoroxychloride mineral with the parent crystal structure for layered lead oxychlorides. Mineralogical Magazine, 76(5), 1247–1255.

Rumseyite (IMA 2011-091), ideally $[Pb_2OF]Cl$, is a new mineral from Merehead quarry, Somerset, England. Rumseyite occurs in a single cavity (~1.5 × 1 × 1 mm) in one of manganese oxide pods irregularly distributed in Carboniferous Limestone at the Merehead (also known as Torr Works) quarry. Rumseyite is found enclosed in a platy mass of hydrocerussite with characteristic foliated appearance, off-white color with a distinct greenish tinge, and pearly luster. Rumseyite forms an irregular crystalline mass, which SEM examination shows to be composed of aggregates of minute tabular to prismatic crystallites with pyramidal terminations. No twinning has been observed. The small size of the micro-crystals precludes direct measurement but they show forms that appear to be {100} prisms, with {111} pyramid and rarely, small {001} pinacoid terminations. Associated minerals (not in direct contact) are calcite, cerussite, diaboleite, and undifferentiated Mn oxides, typically a mixture of manganite and pyrolusite. Rumseyite is translucent pale orange-brown with a white streak and vitreous luster. It is brittle with perfect {100} cleavage. Hardness and density could not be determined. D_{calc} = 7.72 g/cm^3. In reflected light rumseyite is gray with abundant pale-yellow internal reflections; it is not pleochroic and has no bireflectance. Any anisotropy is masked by the internal reflections. The calculated mean refractive index for 589 nm is 2.15. The average of 25 electron probe WDS analyses gave: PbO 90.63 (90.73–92.44), F 3.53 (3.05–3.75), Cl 7.15 (6.89–7.33), $–O=(F+Cl)_2$ 3.23; total 99.08 wt%. On the basis of 3 anions pfu, the empirical chemical formula is $Pb_{2.039}O_1F_{0.992}Cl_{1.001}$. A single, well-formed 250 × 80 × 80 μm in size was used for single-crystal and powder-diffraction analysis. Single-crystal analysis revealed tetragonal symmetry, *I*4/*mmm*, a = 4.065(1), c = 12.631(7) Å, V = 208.7 Å^3, Z = 2. The crystal structure was solved by direct methods and refined using 64 unique reflections to R_1 = 0.072. The crystal structure of rumseyite is based on alternating $[OFPb_2]$ and Cl layers. Rumseyite is related to other layered Pb oxyhalides. Fluorine and oxygen are statistically disordered over one crystallographic site. After crushing the crystal fragment used for single crystal work, an X-ray powder-diffraction pattern was collected showing the following strongest lines [d_{obs} Å (I_{obs}; *hkl*)]: 2.923 (100; 013), 2.875 (68; 110), 3.848 (41; 011), 6.306 (17; 002), 1.680 (14; 123), 2.110 (12; 006). Refinement in the tetragonal space group *I*4/*mmm* produced a = 4.07(1), c = 12.61(1) Å, V = 208.4 Å^3, with Z = 2. Rumseyite is named in honor of its discoverer, Michael Scott (Mike) Rumsey (b. 1980), Curator and Collections Manager at the Natural History Museum in London, U.K., where the holotype specimen of rumseyite is deposited. Mike is noted for his work on the mineralogy of the Mendip Hills and Kombat mine (Namibia), and in particular for studies of Pb oxychlorides and related Pb secondary minerals, which have already led to the description of several new minerals. **F.C.**

TONDIITE*

T. Malcherek, L. Bindi, M. Dini, M.R. Ghiara, A. Molina Donoso, F. Nestola, M. Rossi, and J. Schlüter (2014) Tondiite, $Cu_3Mg(OH)_6Cl_2$, the Mg-analog of herbertsmithite. Mineralogical Magazine, 78(3), 583–590.

Tondiite (IMA 2013-077), ideally $Cu_3Mg(OH)_6Cl_2$, is a new supergene mineral found in phonolitic tephrite of Vesuvius volcano, Italy, and (associated with haydeeite) in the Santo Domingo Cu Mine, Caleta Vitor district, Arica Province, Chile (18°45′51″S; 70°18′16″W). The specimen considered to be a holotype was found in the Collezione Vesuviana of the Real Museo Mineralogico, Universitá di Napoli, Italy (catalog no. 1178R), labeled as "1906 lava." In this phonolitic-tephrite-vesicular lava erupted from Vesuvius, tondiite occurs in millimeter-sized vesicles in association with leucite, sodalite, nepheline, sanidine, and Fe oxides and hydroxides. Tondiite from Santo Domingo mine occurs with haydeeite, anhydrite, and atacamite as an alteration product of chalcocite, bornite, and chalcopyrite from veins embedded in andesitic porphyric lavas and lava tuff, banded by calcareous limestone. This cotype specimen is deposited in the Mineralogical Museum, University of Hamburg, Germany. The tondiite crystals reach (by estimation from the photo) at least up to 200 μm. The main habit forms are {101) and {012}. The mineral is emerald-green, transparent, vitreous. Mohs hardness is 3–3.5; D_{calc} = 3.503 g/cm^3. It is optically uniaxial (+), ω = 1.749(6), and ε = 1.766(7) (589 nm). Tondiite is slightly pleochroic from green to faintly green (absorption scheme not given). The average of 15 electron probe WDS analysis on the holotype and 20 on the cotype gave: CuO 65.90 (62.74–67.98), MnO 0.94 (0.58–1.92), MgO 6.61 (5.34–9.20), Cl 16.79 (15.88–17.63), H_2O 13.84, –O=Cl 3.79, total 100.29 wt% (holotype), and CuO 66.78 (65.11–68.57), MgO 6.12 (4.54–6.79), Cl 17.05 (16.76–17.34), H_2O 13.52, –O=Cl 3.85, total 99.62 wt% (cotype) (H_2O is calculated from stoichiometry assuming Cl^- and OH^- as the only anions). On the basis of 8 anions pfu the empirical formulas are respectively: $Cu_{3.29}Mg_{0.65}Mn_{0.05}(OH)_{6.11}Cl_{1.89}$ and $Cu_{3.38}Mg_{0.62}(OH)_{6.06}Cl_{1.94}$. Raman spectra of the tondiite holotype identified due to very weak signal only 5 well-distinguished peaks between 300 and 1200 cm^{-1}: 942 and 695 cm^{-1} (in-plane and out-of-plane CuO-H and MgO-H deformations); 363, 395, and 503 cm^{-1} (metal-oxygen stretching vibrations). The strongest lines of the calculated powder X-ray diffraction pattern [d_{calc} Å (I_{calc}; *hkl*)] are: 5.459 (88; $10\bar{1}1$), 3.419 (22; $11\bar{2}0$), 2.898 (15; $02\bar{2}1$), 2.764 (100; $11\bar{2}3$), 2.266 (54; $02\bar{2}4$), 1.820 (19; $03\bar{3}3$), 1.709 (26; $22\bar{4}0$), 1.382 (13; $22\bar{4}6$). The crystal structure was refined to R_1 = 6.4% based on 491 unique reflections with $F > 4\sigma(F)$. Tondiite is trigonal, space group $R\bar{3}m$, with a = 6.8377(7), c = 14.088(2) Å, V = 570.4 Å^3, for the holotype specimen and with a = 6.8345(2)/6.8384(2), c = 14.0022(7)/14.0103(5) Å, V = 566.42/567.4 Å^3 for 2 crystals of the cotype specimen (the second crystal was later used for microprobe analysis). The crystal structure is similar to that of the herbertsmithite. In tondiite, Cu atoms are [6]-coordinated by O and Cl atoms, and Cu octahedra form layers of 6-memebred rings (the intralayer). Copper kagome layers are connected through Mg atoms occupying the interlayer space. The new mineral is named in honor of Matteo Tondi (1762–1835), an eminent Italian mineralogist co-author with R.J. Haüy of the classic Traité de Minéralogie. **Yu.U.**

Whiteite-(CaMnMn)*

V.N. Yakovenchuk, E. Keck, S.V. Krivovichev, Y.A. Pakhomovsky, E.A. Selivanova, J.A. Mikhailova, A.P. Chernyatieva, and G.Yu. Ivanyuk (2012) Whiteite-(CaMnMn), $CaMnMn_2Al_2[PO_4]_4(OH)_2 \cdot 8H_4O$, a new mineral from the Hagendorf-Süd granitic pegmatite, Germany. Mineralogical Magazine, 76(7), 2761–2771.

Whiteite-(CaMnMn) (IMA 2011-002), ideally $CaMnMn_2Al_2[PO_4]_4(OH)_2 \cdot 8H_4O$, is a new hydrous phosphate from the Hagendorf Süd granitic pegmatite no. 25 (49°39′1″N, 12°27′35″E) (Germany), the type locality for 10 other secondary phosphate species. Primary phosphates in this pegmatite include triphylite, minerals of the zwieselite-triplite series, wolfeite, hagendorfite, sarcopside, scorzalite, graftonite, arrojadite-(NaFe), and fluorapatite; these have been altered and leached by low-temperature oxidizing hydrothermal solutions to produce numerous secondary phosphates including bassetite, barbosalite, benyacarite, beraunite, childrenite, ferrisicklerite, fluellite, hureaulite, jahnsite-(CaMnMn), koninckite, kryzhanovskite, lipscombite, mitridatite, morinite, paravauxite, phosphophyllite, phosphoferrite, reddingite, rockbridgeite, stewartite, vivianite, whitmoreite, jungite, keckite, laueite, lehnerite, nordgauite, parascholzite, pseudolaueite, scholzite, strunzite, and wilhelmvierlingite. Associated minerals which are characteristic of this deposit include arsenopyrite, bismuth, bismuthinite, chalcopyrite, columbite-(Fe), covellite, greenockite, hematite, molybdenite, muscovite, pyrite, pyrrhotite, sphalerite, uraninite, and zircon. Whiteite-(CaMnMn) is colorless to pale yellow, depending on its Fe^{3+} content, and has a vitreous luster. It forms bar-shaped crystals elongated along [100] and tabular on {010}. The crystals are either simply or polysynthetically twinned on {001}, with dominant pinacoidal {100}, {010}, {001}, and {$\bar{1}01$} faces. The mineral is transparent, with a white streak, perfect cleavage on {001} and a stepped fracture. It is brittle with Mohs hardness ~3½. D_{meas} = 2.70(3) g/cm^3 and D_{calc} = 2.768 g/cm^3. In transmitted light, the mineral is colorless and nonpleochroic. It is optically biaxial positive, with α = 1.589(2), β = 1.592(2), γ = 1.601(2) (589 nm); $2V_{meas}$ =60(10)°, $2V_{calc}$ = 60.3°. No dispersion was observed. The optical orientation is X = **b**, Z^**a** = 5°. The average of electron probe WDS analyses on 13 crystals (5–6 analyses per crystal) gave: Na_2O 0.53 (0.00–1.03), MgO 0.88 (0.56–1.41), Al_2O_3 11.66 (7.78–13.32), P_2O_5 34.58 (33.84–35.14), CaO 4.29 (3.68–4.90), MnO 17.32 (15.21–18.93), FeO 8.32 (5.87–13.71), ZnO 2.60 (1.74–4.14), H_2O 2.27 (by the Penfield method), total 99.68 wt%. On the basis of 4 P apfu (Fe^{3+} calculated to maintain charge balance) the empirical chemical formula is $(Ca_{0.63}Zn_{0.26}Na_{0.14})_{\Sigma 1.03}(Mn_{0.60}Fe^{2+}_{0.40})_{\Sigma 1.00}(Mn_{1.40}Fe^{2+}_{0.37}Mg_{0.18}Fe^{3+}_{0.06})_{\Sigma 2.01}(Al_{1.88}Fe^{3+}_{0.12})_{\Sigma 2.00}[PO_4]_4(OH)_2 \cdot 7.89\ H_2O$. The mineral is easily soluble in 10% HCl at room temperature. The strongest lines in the X-ray powder-diffraction pattern [d_{obs} Å (I_{obs}; *hkl*)] are: 9.443 (65; 001), 5.596 (25; 011), 4.929 (80; 210), 4.719 (47; 002), 3.494 (46; 400), 2.7958 (100; 022). The unit-cell parameters obtained from the powder-diffraction experiment are a = 15.02(2), b = 6.95(1), c = 10.13(3) Å, β = 111.6(1)°, V = 983.3 Å^3, and Z = 2. Single-crystal analysis revealed monoclinic symmetry with space group $P2_1/a$, a = 15.020(5), b = 6.959(2), c = 10.137(3) Å, β = 111.47(4)°, V = 983.3 Å^3. The crystal structure was refined to R_1 = 0.063. The structure is similar to that of other whiteite group members. The mineral is named for the chemical composition, in accordance with whiteite group nomenclature. Type material is deposited in the collections of the Mineralogical Museum of St. Petersburg State University, Russia; catalog number 1/19470. **F.C.**