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NEW MINERAL NAMES

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CHABAZITE-Sr*

I.V. Pekov, A.G. Turchkova, N.V. Chukanov, A.E. Zadov, V.G. Grishin (2000) Chabazite-Sr, $(Sr,Ca)[Al_2Si_4O_{12}]\cdot6H_2O$, a new zeolite mineral from the Lovozero massif, Kola Peninsula. Zapiski Vseross. Mineral. Obshch., 129(4), 54–58 (in Russian, English abs.).

The mineral occurs as rough, discoid crystals, up to 0.3 mm, that are twinned {113} and form aggregates, to 3 mm, in cavities of corroded analcime crystals. Electron microprobe analysis gave Na_2O 0.85, K_2O 2.97, CaO 4.79, SrO 10.32, BaO 0.36, Al_2O_3 21.74, SiO_2 41.33, H_2O (TGA) 18.40, sum 99.76 wt%, corresponding to $(Sr_{0.54}Ca_{0.46}K_{0.34}Na_{0.15}Ba_{0.01})_{\Sigma1.50}[(Si_{3.64}Al_{2.31})_{\Sigma5.95}O_{12}]\cdot5.53H_2O$, simplified as $(Sr,Ca)[Al_2Si_4O_{12}]\cdot6H_2O$. Colorless to yellowish, transparent, vitreous luster, brittle, white streak, moderate {101} cleavage, rough fracture, $H = 4–4\frac{1}{2}$, $D_{meas} = 2.16(1)$, $D_{calc} = 2.20(1)$ g/cm^3 for $Z = 6$. Optically uniaxial positive, $\omega = 1.503(1)$, $\varepsilon = 1.507(1)$, nonpleochroic. By analogy with other chabazites, trigonal symmetry, space group $R\bar{3}m$; indexing of the X-ray powder pattern (57 mm camera, Fe$K\alpha$ radiation) gave $a = 13.715(6)$, $c = 15.09(1)$ Å. Strongest lines are 9.38(80,101), 5.55(60,021), 4.34(70,211), 2.92(100,401), and 1.697 (70,524,700,530).

The mineral is associated with analcime, gonnardite, låvenite, vinogradovite, phillipsite, seidozerite, apatite, and others in a K-feldspar and aegirine pegmatite veinlet at Suoluaiv Mountain, Lovozero alkaline massif, Kola Peninsula, Russia. Type material is in the Fersman Mineralogical Museum, Moscow, Russia. **J.L.J.**

MENSHIKOVITE*

A.Y. Barkov, K. Laajoki, F. Gervilla, E. Makovicky (2000) Menshikovite, Pd-Ni arsenide and synthetic equivalent. Mineral. Mag., 64, 847–851.

The mineral occurs as anhedral, individual grains, up to 0.15 mm in the longest dimension, within chalcopyrite and along its borders, and rarely as veinlet-like grains among hydrous silicates. Electron microprobe analyses gave Pd 48.66, Ni 17.56, As 33.73, sum 99.95 wt%, corresponding to $Pd_{3.03}Ni_{1.98}As_{2.98}$, ideally $Pd_3Ni_2As_3$. The mineral is associated with numerous PGM at the type locality, which is the Lukkulaisvaara layered intrusion, Karelia, Russia. The mineral is also known to occur in the Stillwater intrusion, the Chiney layered intrusion in Siberia, the Two-Duck Lake and Geordie Lake intrusions, Canada, and has been synthesized at 450 °C.

Discussion. The description of the mineral is reported to be in preparation, but the rationale for introducing the new name at this stage is not given. Corresponds to approved mineral IMA No. 93–057. **J.L.J.**

PAGANOITE*

A.C. Roberts, P.C. Burns, R.A. Gault, A.J. Criddle, M.N. Feinglos, J.A.R. Stirling (2001) Paganoite, $NiBi^{3+}As^{5+}O_5$, a new mineral from Johanngeorgenstadt, Saxony, Germany: description and crystal structure. Eur. J. Mineral., 13, 167–175.

Electron microprobe analysis gave NiO 15.37, CoO 2.05, Bi_2O_3 55.06, As_2O_5 28.00, sum 100.48 wt%, corresponding to $(Ni_{0.86}Co_{0.11})_{\Sigma0.97}Bi_{0.99}As_{1.02}O_5$. Occurs as euhedral orange-brown to golden brown crystals, to 1 mm in length, and as crystal aggregates. Crystals are elongate [010], showing {100} and minor {010} and {001}. Adamantine luster, transparent to translucent, brittle, soft, pale orange-brown streak, uneven fracture, no cleavage, nonfluorescent, $D_{calc} = 6.715$ g/cm^3 for the empirical formula and $Z = 2$. Gray in reflected light, no bireflectance, nonpleochroic; reflectance percentages from 400 to 700 nm in air are 13.8 to 11.95 for R_1, 14.0 to 12.35 for R_2; $n_{calc} = 2.07$, 2.09. Single-crystal X-ray structure study ($R = 0.044$) indicated triclinic symmetry, space group $P\bar{1}$, $a = 6.709(2)$, $b = 6.820(3)$, $c = 5.229(2)$ Å, $\alpha = 107.63(3)$, $\beta = 95.43(3)$, $\gamma = 111.13(3)°$ as refined from a 114 mm Debye–Scherrer powder pattern (Cu$K\alpha$ radiation) with strongest lines of 5.943(100,010), 3.233 (100,011), 3.067(60,$0\bar{2}1$), 3.047(50,200), and 2.116 (50,112,$\bar{1}12$, $0\bar{3}1$, $\bar{3}11$, +).

The mineral is associated with aerugite, xanthiosite, rooseveltite, and two unidentified arsenates on a quartz matrix veined by nickeline and bismuth, the latter intergrown with bunsenite. The new name is for amateur mineralogists Renato (b. 1938) and Adriana (b. 1939) Pagano of Cinisello, Milan, Italy. Part of the type material is in the National Mineral Collection of Canada, Ottawa. **J.L.J.**

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* Before publication, minerals marked with an asterisk were approved by the Commission on New Minerals and Mineral Names, International Mineralogical Association.

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RAPPOLDITE*, ZINCGARTRELLITE*

H. Effenberger, W. Krause, H.-J. Bernhardt, M. Martin (2000) On the symmetry of tsumcorite group minerals based on the new species rappoldite and zincgartrellite. Mineral. Mag., 64, 1109–1126.

RAPPOLDITE

The mineral forms red to red-brown, rosette-like crystal aggregates consisting of prismatic to tabular crystals to 1 mm in length, elongate $[\bar{1}20]$ and showing {210} and {001}. Vitreous luster, transparent, light yellow-brown streak, brittle, $H = 4\frac{1}{2}$, conchoidal fracture, no cleavage, nonfluorescent, twinned on $\{2\bar{3}0\}$, $D_{calc} = 5.28$ g/cm^3 for $Z = 4$, soluble in warm, dilute HCl. Optically biaxial positive, $\alpha = 1.85$ (calc.), $\beta = 1.87(2)$, $\gamma = 1.90(2)$, $2V_{meas} = 85(5)°$, dispersion $r > v$ distinct, nonpleochroic, X and Y approximately parallel to c and $[\bar{1}20]$, respectively. Electron microprobe analysis gave PbO 35.27, CaO 0.12, Bi_2O_3 0.11, Fe_2O_3 0.28, ZnO 4.52, CoO 11.60, NiO 7.31, As_2O_5 35.82, SO_3 0.11, H_2O (calc.) 5.62, sum 100.76 wt%, corresponding to$(Pb_{1.01}Ca_{0.01})_{\Sigma 1.02}(Co_{0.99}Ni_{0.62}Zn_{0.35}Fe_{0.02})_{\Sigma 1.98}[(AsO_4)_{1.99}(SO_4)_{0.01}]_{\Sigma 2.00}[(H_2O)_{1.98}(OH)_{0.02}]_{\Sigma 2.00}$, simplified as $Pb(Co,Ni)_2(AsO_4)_2{\cdot}2H_2O$. Single-crystal X-ray structure study ($R = 0.047$) showed a monoclinic $C2/m$ subcell and a triclinic supercell, space group $P\bar{1}$, $a = 11.190(2)$, $b = 10.548(2)$, $c = 7.593(1)$ Å, $\alpha = 100.38(1)$, $\beta = 109.59(2)$, $\gamma = 98.96(1)°$, isotypic with helmutwinklerite. Strongest lines of the X-ray powder pattern (diffractometer, Cu$K\alpha$ radiation) are 4.670(97,$\bar{2}11$,$0\bar{2}1$), 3.256(100,022,$\bar{2}12$), 3.072(56,211), 2.890(40,$2\bar{3}1$,$\bar{2}31$), 2.760(37,401,231), 2.568(46,022,$\bar{4}02$, $23\bar{2}$, 400,230), and 1.731(38,$0\bar{6}1$,$44\bar{1}$,004,$42\bar{4}$).

The mineral, which is the Co analog of helmutwinklerite, is associated with cobaltlotharmeyerite as overgrowths on quartz in dump material from the Rappold mine near Schneeberg, Saxony, Germany. The new name is for the locality. Type material is in the Bergakademie Freiberg, Germany.

ZINCGARTRELLITE

The mineral forms green-yellow, rosette-like aggregates, to 0.5 mm, that consist of <0.1 mm crystals, tabular on {111}. Vitreous luster, transparent to translucent, brittle, yellow streak, $H = 4\frac{1}{2}$, no cleavage, nonfluorescent, soluble in warm, dilute HCl, $D_{calc} = 5.30$ g/cm^3 for $Z = 1$. Optically biaxial negative, $\alpha = 1.91(2)$, $\beta = 1.94$ (calc.), $\gamma = 1.97(2)$, $2V_{meas} = 87(5)°$, weakly pleochroic, X, Z = pale yellow, Y = yellow. Electron microprobe analysis gave PbO 33.49, CaO 0.35, Fe_2O_3 7.23, Al_2O_3 0.26, CuO 6.26, ZnO 11.40, As_2O_5 34.72, SO_3 0.13, H_2O (calc.) 4.3, sum 98.62 wt%, corresponding to $Pb_{1.03}(Zn_{1.08}Cu_{0.50}Fe_{0.37}Al_{0.03})_{\Sigma 1.98}(AsO_4)_{1.99}[(H_2O)_{1.59}(OH)_{0.45}]_{\Sigma 2.04}$, simplified as $Pb(Zn,Cu,Fe)_2(AsO_4)_2(H_2O,OH)_2$. Single-crystal X-ray structure study ($R = 0.081$) indicated triclinic symmetry, space group $P\bar{1}$, $a = 5.550(1)$, $b = 5.620(1)$, $c = 7.621(1)$ Å, $\alpha = 68.59(1)$, $\beta = 69.17(1)$, $\gamma = 69.51(1)°$. Strongest lines of the powder pattern (Krause et al., *Eur. J. Mineral.*, 10, 179–206, 1998) are 4.731(74,011), 4.669(86,101), 3.283(89,012), 3.252(91,102), 2.999(100,$11\bar{1}$), 2.894(74,$1\bar{1}\bar{1}$), and 2.880(70,$1\bar{1}1$). The structural formula is $Pb(Zn_xFe^{3+}_{1-x})(Zn_xCu_{1-x})(AsO_4)_2(OH)_{1-x}(H_2O)_{1+x}$, where $0 < x < 0.4$ for gartrellite and $0.4 < x < {\sim}0.8$ for zincgartrellite. Where x is close to 1.0, the formula is that of helmutwinklerite, which is not isotypic with zincgartrellite.

The new mineral name refers to the relationship to the isostructural mineral gartrellite. Zincgartrellite is associated with wulfenite and duftite on massive chalcocite from the Tsumeb mine, Namibia. Type material is in the Institut für Mineralogie, University of Bochum, Germany. **J.L.J.**

HOLLANDITE-STRUCTURE $KAlSi_3O_8$

F. Langenhorst, J.-P. Poirier (2000) 'Eclogitic' minerals in a shocked basaltic meteorite. Earth Planet. Sci. Lett., 176, 259–265.

Melt veins of shock origin in the Martian achondrite meteorite Zagami contain omphacite, stishovite, and hollandite-structure $KAlSi_3O_8$ in a matrix of silicate glass. TEM–EDX analysis gave Na 0.4, Ca 0.8, K 10.5, Fe 2.1, Ti 0.2, Al 8.1, Si 31.5, O 46.6 [sum 100] wt%, corresponding to $(K_{0.74}Ca_{0.06}Na_{0.05})_{\Sigma 0.85}Al_{0.82}Fe^{3+}_{0.10}Si_{3.08}O_8$. Electron diffraction patterns (ten d values listed) are indexable with a tetragonal hollandite-type structure, $a = 9.39$, $c = 2.76$ Å. The mineral, which was previously detected in a shocked chondrite, occurs as micrometer-size aggregates of grains, each 10–20 nm in diameter.

Discussion. Data for the corresponding tetragonal $NaAlSi_3O_8$ phase were abstracted in *Am. Mineral.*, 85, p. 1564 (2000) and are also given in *Geophys. Res. Lett.*, 27(24), 3997–4000 (2000) for an occurrence in the Tenham meteorite. **J.L.J.**

K-DOMINANT TOURMALINE, O-DOMINANT DRAVITE

V. Žáček, J. Frýda, A. Petrov, J. Hyršl (2000) Tourmalines of povondraite – (oxy)dravite series from the cap rock of meta-evaporite in Alto Chapare, Cochabamba, Bolivia. J. Czech Geol. Soc., 54, 3–12.

Numerous electron microprobe analyses, assuming the presence of boron, the absence of fluorine, and all Fe as Fe^{3+}, are listed for the tourmaline of Alto Chapare. The results suggest an almost continuous solid-solution series from povondraite to 'oxy-dravite' to dravite. Also present is K-rich tourmaline (formula K = 0.635, Na = 0.427), ideally $KFe^{3+}_3(Mg_2Fe^{3+}{}_4)Si_6O_{18}(BO_3)_3(OH)_3O$, for which grain sizes are several tens of micrometers. **J.L.J.**

Fe- AND Sr-RICH EUDIALYTE

I.A. Ekimenkova, R.K. Rastsvetaeva, A.P. Khomyakov (2000) Refinement of the crystal structure of a Fe,Sr-analogue of kentbrooksite. Crystallogr. Reports, 45, 930–933.

The mineral occurs as optically negative, anhedral, greenish yellow grains, to 1 mm across, in ultraagpaitic pegmatites at Mount Alluaiv, Lovozero alkaline massif, Kola Peninsula, Russia. Electron microprobe analysis (not given) corresponds to $Na_{13.34}K_{0.23}Ca_{4.86}Sr_{1.53}Fe_{2.01}Mn_{1.44}REE_{0.29}Zr_{3.11}Ti_{0.19}Hf_{0.04}Nb_{0.67}Si_{25.39}O_{75.76}Cl_{0.87}$ on the basis of 53 cations. Single-crystal X-ray structure study ($R = 0.033$) indicated trigonal symmetry, space group $R3m$, $a = 14.245(2)$, $c = 29.959(10)$ Å, $Z = 3$. The structural formula is $\{(Ca_{4.85}Mn_{0.85}REE_{0.33})_{\Sigma 6.00}Zr_3[Si_3O_9]_2[Si_9O_{24}(OH,O)_3]_2\}\{Si_{1.0}(Nb_{0.7}Si_{0.3})[Fe_{1.99}Mn_{0.67}Ti_{0.20}Zr_{0.10}Hf_{0.04}]_{\Sigma 3.00}(Sr_{1.80}Na_{0.96}K_{0.24})_{\Sigma 3.00}Na_{12}(OH)_{3.92}Cl_{1.1}\cdot 11H_2O\}$.

Discussion. See the comment in the next abstract. **J.L.J.**

Zr-RICH EUDIALYTE

R.K. Rastsvetaeva, A.P. Khomyakov (2000) Crystal structure of a hyperzirconium analogue of eudialyte. Crystallogr. Reports, 45, 219–221.

Single-crystal X-ray structure study (R = 0.045) of a Zr-rich eudialyte-group mineral from an unstated locality gave trigonal symmetry, space group $R3m$, a = 14.222(3), c = 30.165(5) Å, Z = 3. The crystallochemical formula corresponds to $Zr_3(Ca_{2.7}MnFeNa_{0.85}Ce_{0.33}Sr_{0.12})_{\Sigma 6.00}[Si_3O_9]_2(Si_9O_{27})_2[Si_{0.5}Al_{0.5}][Si_{0.5}(Ti_{0.3}Nb_{0.2})][(Zr_{1.2}Fe_{0.5})Na_{0.87}(OH)_{1.5}](Na_{15.87}K_{0.3}Sr_{0.33})Cl_{0.5}(O,OH)_{1.5}(OH)_{2.5}\cdot H_2O$. The extra Zr substitutes at the Fe-Zr position.

Discussion. The variations among the eudialyte group are seemingly endless — for other unnamed members, see also *Am. Mineral.*, 84, p. 1198, 1999; *Am. Mineral.*, 85, p. 265, 2000; *Am. Mineral.*, 85, p. 1846, 2000 (three abstracts); *Am. Mineral.*, 86, p. 200, 2001; I.A. Ekimenkova. R.K. Rastsvetaeva, N.V. Chukanov (2000) Ordering of calcium and iron in a mineral of the eudialyte group with symmetry $R3$. *Doklady Akad. Nauk*, 374(3), 352–355; also R.K. Rastsvetaeva, A.P. Khomyakov (2000) Crystal structure of a new Mn, Na-ordered analogue of eudialyte with the symmetry $R3$. *Crystallogr. Reports*, 45, 591–594. **J.L.J.**

Pd_2Te AND $(Pt,Pd)_3S_2$

N.D. Tolstykh, E.G. Siderov, K.V.O. Laajoki, A.P. Krivenko, M. Podlipskiy (2000) The association of platinum-group minerals in placers of the Pustaya River, Kamchatka, Russia. Can. Mineral., 38, 1251–1264.

Osmium, cooperite, vysotskite, platarsite, hollingworthite, irarsite, sperrylite, keithconnite, stibiopalladinite, and numerous other PGM, among them the minerals listed below, are present in a placer deposit in the Pustaya River basin, Kamchatka, Russia.

Pd_2Te

Occurs with keithconnite as two-phase inclusions, about 10 μm, in a cavity in a nugget of platinum. Electron microprobe analysis gave Pd 60.05, Pt 5.29, Rh 0.37, Te 35.81, As 0.40, sum 101.92 wt%, corresponding to $(Pd_{1.92}Pt_{0.09}Rh_{0.01})_{\Sigma 2.02}(Te_{0.96}As_{0.02})_{\Sigma 0.98}$.

$(Pt,Pd)_3S_2$

Occurs as grayish cream, weakly anisotropic crystals, to 10 μm. One of two listed electron microprobe analyses gave Pt 55.72, Fe 2.12, Cu 0.46, Pd 26.54, Rh 0.30, S 13.24, sum 98.38 wt%, corresponding to $(Pt_{1.43}Pd_{1.25}Fe_{0.19}Cu_{0.04}Rh_{0.01})_{\Sigma 2.92}S_{2.07}$. The mineral, which has been reported from other localities (e.g., *Am. Mineral.*, 78, 1110–1111, 1993) is intergrown with $(Pd,Cu,Pt)_3S$ and $(Pt,Pd,Fe,Cu)_3S$.

Discussion. The Pd_2Te mineral may be the same as IMA-aproved mineral No. 93-062, for which the formula is given as $(Pd,Ag)_2Te$. **J.L.J.**

Au_3TlTe_2

S.V. Nechaev, N.J. Cook (2000) A natural occurrence of Au_3TlTe_2 from the Maiskoe Au-deposit, Ukraine. Neues Jahrb. Mineral. Mon., 557–562.

Two electron microprobe analyses gave Au 56.32, 56.54, Ag 0.03, 0.20, Te 21.65, 22.72, Tl 19.83, 18.19, Sb 0.32, 0.30, sum 98.15, 97.95 wt%, corresponding to $Au_{1.03}Tl_{0.35}Te_{0.61}$. The mineral occurs as a rim, 10–40 μm wide, on calaverite. In reflected light, pale blue against calaverite and native gold, polysynthetically twinned, pleochroic, strong anisotropy with brown-reddish and bluish polarization tints. The mineral is associated with quartz, gold, calaverite, tellurobismuthite, and tellurium at the Maiskoe gold deposit in the Dniester – Bug craton in the southwestern part of the Ukrainian Shield.

Discussion. For Te = 2, the analyses correspond to $Au_{3.38}Tl_{1.14}Te_2Sb_{0.03}$ and $Au_{3.22}Ag_{0.02}Tl_{1.00}Te_2Sb_{0.03}$. **J.L.J.**

$Pb_9Ag(Sb,As)_{13}S_{29}$, $Tl(Sb,As)_7S_{11}$, $Tl(As,Sb)_{10}S_{16}$, Ag_2AsSbS_4

Z. Johan, J. Mantienne (2000) Thallium-rich mineralization at Jas Roux, Hautes-Alpes, France: a complex epithermal, sediment-hosted, ore-forming system. J. Czech Geol. Soc., 45, 63–77.

$Pb_9Ag(Sb,As)_{13}S_{29}$

The mineral occurs as acicular crystals that form aggregates with zinkenite. White in reflected light, bireflectance in gray tints readily observable, strong anisotropy with polarization colors from brown to deep blue; white-gray in oil, rare purple-red internal reflection, some crystals twinned parallel to the elongation. Reflectance percentages are given in 20 nm steps from 420 to 700 nm; representative values (SiC standard, air) for R_{max} and R_{min} are 42.5, 37.1 (460 nm), 40.4, 35.9 (540), 39.3, 33.9 (580), and 36.2, 31.4 (660). VHN_{25} = 165 (157–170). One of two listed electron microprobe analyses has Pb 43.6, Tl 3.1, Ag 2.6, Sb 22.4, As 8.5, S 20.8, sum 101.0 wt%, corresponding to $(Pb_{9.15}Tl_{0.66})_{\Sigma 9.81}Ag_{1.05}(Sb_{8.00}As_{4.93})_{\Sigma 12.93}S_{28.21}$, simplified as $(Pb,Tl)_9Ag(Sb,As)_{13}S_{29}$. Indexing of the X-ray powder pattern (240 mm camera, Cu radiation) gave a monoclinic cell with a = 17.640(8), b = 18.464(8), c = 3.967(3) Å, β = 90.8º, D_{calc} = 5.51 g/cm^3 for the simplified formula with $(Sb_{8.8}As_{4.2})$ and Z = 1. Strongest lines of the pattern, which is similar to that of jamesonite, are 3.406(100,250), 2.960(80,141), 2.821(70,421), 2.730(70,360), 2.089(80,641), and 1.866(60,930,661,312).

$Tl(Sb,As)_7S_{11}$

Electron microprobe analysis gave Tl 14.9, Sb 51.4, As 8.4, S 26.5, sum 101.2 wt%, corresponding to $Tl_{0.97}(Sb_{5.60}As_{1.48})_{\Sigma 7.08}S_{10.95}$. Weakly anisotropic, bluish polarization colors, pervasive red internal reflections; representative average reflectance percentages are 32.1 (460 nm), 31.7 (480), 29.5 (540), 28.7 (560), 27.3 (600), and 26.6 (660). The mineral occurs as veinlets, <30 μm wide, that cut realgar.

$Tl(As,Sb)_{10}S_{16}$

Electron microprobe analysis gave Tl 12.8, Sb 25.4, As 29.7, S 31.5, sum 99.4 wt%, corresponding to $Tl_{1.02}(As_{6.49}Sb_{3.41})_{\Sigma 9.90}S_{16.08.}$ The mineral is amorphous and occurs in type specimens of pierrotite.

Ag_2SbAsS_4

Electron microprobe analysis gave Ag 44.5, Sb 20.7, As 11.0, S 23.3, sum 99.5 wt%, corresponding to $Ag_{1.13}(Sb_{0.47}As_{0.40})_{\Sigma 0.87}S_{2.00}$, but thought to have the ideal formula Ag_2SbAsS_2. Strong anisotropy, polarization colors bluish white to deep gray, strongly bireflectant from white to gray in air. No internal reflection; reflectance values are close to those of stibnite. The mineral forms a myrmekitic intergrowth with routhierite at the contact with smithite. **J.L.J.**

New Data

GEORGIADESITE

M. Pasero, D. Vacchiano (2000) Crystal structure and revision of the chemical formula of georgiadesite, $Pb_4(AsO_3)Cl_4(OH)$. Mineral. Mag., 64, 879–884.

Single-crystal X-ray structure study (R = 0.071) of georgiadesite from Laurion, Greece, gave monoclinic symmetry, space group $P2_1/c$, a = 13.765(3), b = 7.896(3), c = 10.804(3) Å, β = 102.57(1)°, Z = 4. Recognition that As is trivalent rather than pentavalent leads to a recalculated empirical formula (*Am. Mineral.*, 69, p. 815, 1984) corresponding to $Pb_{3.92}As_{1.05}O_{3.00}Cl_{3.43}(OH)_{1.57}$, for which D_{calc} = 6.31, D_{meas} = 6.3 g/cm³. **J.L.J.**

ROUTHIERITE

Z. Johan, J. Mantienne (2000) Thallium-rich mineralization at Jas Roux, Hautes-Alpes, France: a complex epithermal, sediment-hosted, ore-forming system. J. Czech Geol. Soc., 45, 63–77.

The ideal formula of routhierite was originally given as $(Tl,Cu,Ag)(Hg,Zn)(As,Sb)S_3$, but routhierite and its Sb analog from the Hemlo deposit, Ontario (*Am. Mineral.*, 75, p. 935, 1990) indicated the formula to be of the type $TlCu(Hg,Zn)_2(As,Sb)_2S_6$. It is concluded that the latter form is correct, and that stalderite, $TlCu(Zn,Fe,Hg)_2As_2S_6$, is the Zn analog of routhierite. **J.L.J.**

NATIVE W

S.F. Glavatskikh, N.V. Trubkin (2000) First find of native tungsten and silver in exhalation products of the Great Tolbachik Fissure Eruption (Kamchatka). Doklady Akad. Nauk 373, 523–526 (in Russian).

Electron microprobe analysis gave 99.96 wt% W, with traces of Ca, Al, Fe, Mn, Mg, Ti, and up to 0.11 wt% Mo. The X-ray powder pattern (seven lines listed) is in good agreement with data for the synthetic analog. Particle size is up to 0.5 mm. The mineral is associated with numerous other high-temperature fumarolic products.

Discussion. See *Am. Mineral.*, 81, 1284–1285 (1996) for a reported occurrence of native tungsten in alluvium. **J.L.J.**

UMOHOITE

R.K. Rastsvetaeva, A.V. Barinova, G.A. Sidorenko, D.Yu. Pushcharovskii (2000) Crystal structure of triclinic umohoite $[UMoO_6H_2O]\cdot H_2O$. Doklady Akad. Nauk, 373, 202–205.

Single-crystal X-ray structure study (R = 0.055) of umohoite from the Kyzylsai ore deposit, Kazakhstan, gave triclinic symmetry, space group $P1$, a = 6.372(3), b = 7.535(4), c = 14.69(3) Å, α = 97.1, β = 85.9, γ = 90.07º; D_{meas} = 4.53, D_{calc} = 4.523 g/cm³ for Z = 4.

Discussion. See *Am. Mineral.*, 86, p. 379 (2001) for another report of triclinic umohoite with a slightly different unit cell and with space group $P\bar{1}$. **J.L.J.**