

## NEW MINERAL NAMES\*

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### Arhbarite\*

K. Schmetzer, G. Tremmel, and O. Medenbach (1982) Arhbarite,  $\text{Cu}_2[\text{OH}|\text{AsO}_4]\cdot 6\text{H}_2\text{O}$ , a new mineral from Bou-Azzer, Morocco. Neues Jahrb. Mineral., Monatsch., 529-533 (in German).

Arhbarite is found as blue, spherulitic aggregates on massive dolomite, associated with hematite, löllingite, pharmacolite, erythrite, talc and mcguinnessite. Arhbarite is optically biaxial with  $2V \approx 90^\circ$  and indices  $n_x' 1.720(5)$  and  $n_z' 1.740(5)$  (parallel and perpendicular to the fiber axis); extinction is inclined at  $\approx 45^\circ$ ,  $X'$  turquoise blue,  $Z'$  deep turquoise blue. Microprobe analysis gave CuO 41.00, CoO 0.03, ZnO 0.01, FeO 0.04,  $\text{As}_2\text{O}_5$  29.19% ( $\text{H}_2\text{O}$  by difference 29.73%), corresponding closely to the formula  $\text{Cu}_2[\text{OH}|\text{AsO}_4]\cdot 6\text{H}_2\text{O}$ . Among the 23 lines of the powder diffraction pattern tabulated the strongest are: 4.57(100), 4.51(90), 3.72(60), 2.602(50), 2.474Å(50). The name is for the Arhbar mine in the Bou-Azzer district. A.P.

### Berdesinskiite\*

H. J. Bernhardt, K. Schmetzer, and O. Medenbach (1983) Berdesinskiite,  $\text{V}_2\text{TiO}_5$ , a new mineral from Kenya and additional data for schreyerite,  $\text{V}_2\text{Ti}_3\text{O}_9$ . Neues Jahrb. Mineral., Monatsch., 110-118.

Two microprobe analyses (of 5 given) yield  $\text{TiO}_2$  34.34, 33.53;  $\text{Al}_2\text{O}_3$  1.38, 0.64;  $\text{V}_2\text{O}_5$  62.87, 65.25;  $\text{Cr}_2\text{O}_3$  1.43, 1.43; MnO—, 0.01; sums 100.02, 100.86%. These yield the idealized formula  $\text{V}_2\text{TiO}_5$ , with V assumed to be trivalent based on associated graphite and analogy to other vanadium phases.

Single crystals were not found. The X-ray powder pattern was indexed by analogy with  $\text{CrFeTiO}_5$  and yields a monoclinic cell with  $a = 10.11(1)$ ,  $b = 5.084(4)$ ,  $c = 7.03(1)\text{Å}$ ,  $\beta = 111.46(6)^\circ$ ,  $V = 336.37\text{Å}^3$ , and possible space groups  $C2/c$ ,  $C/c$ ,  $P2_1/c$ ,  $P2/c$ , or  $Pc$ ;  $Z = 4$ . The strongest lines in the powder diffraction data are: 3.316(202), 2.895(112), 2.676(310), 2.447(112), 1.730(422), 1.648(402), 1.450(132).

Berdesinskiite forms black 15-30  $\mu\text{m}$  grains which are reddish brown in reflected light and microscopically indistinguishable from schreyerite. It is weakly anisotropic with reflectances (nm, %) 470, 18.1-18.7; 546, 19.6-20.5; 589, 20.1-21.2; 650, 20.6-21.6. Polishing hardness is about the same as that of rutile.

Berdesinskiite is from a kornerupine deposit 6 km SE of Lasamba Hill, Kwale district, south of Voi, Kenya, and is found as rims around schreyerite and as isolated grains. The name is for Dr. W. Berdesinski, Professor of mineralogy and crystallography at the University of Heidelberg. Type material is at the Universities of Bochum, Hamburg, and Heidelberg. P.J.D.

\* Minerals marked with asterisks were approved before publication by the Commission on New Minerals and Mineral Names of the International Mineralogical Association.

### Bonshtedtite\*

A. P. Khomyakov, V. V. Aleksandrov, N. I. Krasnova, V. V. Ermilov and N. N. Smolyaninova (1982) Bonshtedtite,  $\text{Na}_3\text{Fe}(\text{PO}_4)(\text{CO}_3)$ , a new mineral. Zapiski Vses. Mineralog. Obshch., 111, 486-490 (in Russian).

Microprobe analyses from Vuonnemiok, Khibina massif, by VVE and from the Kovdor massif by G. N. Utochkina gave, resp.,  $\text{Na}_2\text{O}$  35.34, 33.00;  $\text{K}_2\text{O}$  0.03, 0.35;  $\text{CaO}$  0.03, 0.26,  $\text{MgO}$  2.54, 4.61;  $\text{MnO}$  1.65, 0.30;  $\text{FeO}$  16.66, 16.80;  $\text{P}_2\text{O}_5$  26.17, 25.80,  $\text{CO}_2$  (16.09) (calc.), 14.70;  $\text{SiO}_2$  —, 0.43; loss on ignition —, 4.33, sum 98.51, 100.15%. The Kovdor sample contained forsterite and shortite (each about 1%). These analyses yield the formulas, resp.,  $\text{Na}_{3.00}(\text{Fe}_{0.63}\text{Mg}_{0.17}\text{Mn}_{0.06}\text{Na}_{0.12})(\text{PO}_4)_{1.01}(\text{CO}_3)_{1.00}$ , and  $(\text{Na}_{2.99}\text{K}_{0.02})(\text{Fe}_{0.66}\text{Mg}_{0.28}\text{Mn}_{0.01})(\text{PO}_4)_{1.03}(\text{CO}_3)_{0.91}$ . The mineral is the ferrous iron analogue of bradleyite (Mg) and of sidorenkite (Mn) (64, 1332 (1979)).

X-ray study shows the mineral to be monoclinic, space group probably  $P2_1/m$ ,  $a = 8.921$ ,  $b = 6.631$ ,  $c = 5.151\text{Å}$ ,  $\beta = 90^\circ 25'$ ,  $Z = 2$ . The strongest X-ray lines (45 given) are 8.923(20)(100), 3.318(100)(020), 2.662(30)(121,220,121), 2.578(20)(301,301).

Bonshtedtite is colorless with rose, yellowish, or greenish tint. Luster vitreous, pearly on cleavages.  $H \sim 4$ ,  $G 2.95$  (Khibina), 3.16 (Kovdor). Cleavages {010}, {100} perfect. Brittle. Optically biaxial, negative,  $\alpha = 1.525$ ,  $\beta = 1.570$ ,  $\gamma = 1.597$  (Kovdor),  $\alpha = 1.520$ ,  $\beta = 1.568$ ,  $\gamma = 1.591$ ,  $2V = 68^\circ$  (Khibina),  $X = b$ ,  $Y = c$ ,  $Z = a$ . The mineral occurs as fine-grained aggregates in shortite and as crystals up to  $0.5 \times 2 \times 5$  mm showing eleven forms.

The mineral occurs in drill cores associated with shortite, thermonatrite, etelite, trona, neighborite, and other minerals. The name is for El'ze Bonshtedt-Kupletskaya (1897-1974), Russian mineralogist. Type material is at the Mineralogical Museum, Acad. Sci. USSR (Moscow), the Mining Institute (Leningrad), Leningrad Univ., and the Kola Branch, Acad. Sci. USSR (Apatite). M.F.

### Kamiokite\*

D. Picot and Z. Johan (1977) Kamiokite. Atlas des Minéraux Métalliques. Mémoires du Bureau de recherches géologiques et minières, No. 90-1977, 219 (in French).

No chemical analytical data are given but the formula is stated as  $\text{Fe}_2\text{Mo}_3\text{O}_8$ .

The mineral occurs often as euhedral, hexagonal grains up to 50  $\mu\text{m}$ . It is usually found as inclusions in domeykite or algonite, associated with calcite filling small cavities. It polishes well,  $H = 4.5$ . In reflected light it is gray with distinct pleochroism. Strongly anisotropic with rotation tints of brownish yellow. Reflectance is weak, similar to sphalerite or magnetite. Reflectance measurements in air (% $R_{\text{max}}$ , % $R_{\text{min}}$ , nm) gave 25.0,18.6(420); 24.6,18.2(440); 24.2,17.8(460); 23.8,17.4(480); 23.5,17.1(500); 23.2,16.8(520); 23.0,16.6(540); 22.7,16.4(560); 22.5,16.1(580); 22.3,15.9(600); 22.2,15.8(620); 22.3,15.8(640); 22.4,15.9(660); 22.6,16.0(680); 22.7,16.3(700).

It has been identified in the ores of the Mohawk and Ahmeek mines, Michigan as well as the Kamioka mine, Japan from whence it takes its name. **J.D.G.**

#### Loudounite\*

P. J. Dunn and D. Newbury (1983) Loudounite, a new zirconium silicate from Virginia. *Can. Mineral.*, 21, 37–40.

Microprobe analyses yielded SiO<sub>2</sub> 45.8, Al<sub>2</sub>O<sub>3</sub> 0.8, FeO 2.0, MnO tr., MgO 0.3, CaO 12.1, ZrO<sub>2</sub> 25.7, Na<sub>2</sub>O 1.3, K<sub>2</sub>O 0.2, with H<sub>2</sub>O by difference 11.8, sum = 100.0%. This yields the formula, calculated on the basis of 26 cations: (Na<sub>0.85</sub>K<sub>0.09</sub>Ca<sub>0.06</sub>)<sub>Σ1.00</sub>(Ca<sub>4.31</sub>Fe<sub>0.56</sub>Mg<sub>0.15</sub>)<sub>Σ5.02</sub>Zr<sub>4.22</sub>(Si<sub>15.44</sub>Al<sub>0.32</sub>)<sub>Σ15.76</sub>O<sub>40</sub>(OH)<sub>10.70</sub>·7.92H<sub>2</sub>O, or ideally, NaCa<sub>5</sub>Zr<sub>4</sub>Si<sub>16</sub>O<sub>40</sub>(OH)<sub>11</sub>·8H<sub>2</sub>O as the tentative formula.

Single crystals were not found. The strongest lines in the X-ray powder diffraction pattern are: 7.37(6), 5.81(5), 4.06(7b), 3.527(4), 2.931(10b), 2.694(4).

Loudounite occurs as spherical light-green to white aggregates composed of fibrous crystals; most spherules are less than 0.1 mm in diameter. The hardness (Mohs) is approximately 5; the streak is colorless; D (meas) = 2.48(3). Loudounite is not fluorescent in ultraviolet radiation. Optically, loudounite is biaxial with wavy extinction; fibrous fragments are length-slow. The indices of refraction are  $\alpha = 1.536(4)$  and  $\gamma = 1.550(4)$ .

Loudounite is found associated with chlorite, stilbite, actinolite, albite, zircon, prehnite, and anyclite. All observed loudounite was coated with anyclite crystals. Loudounite occurs at the Goose Creek Quarry, Loudoun County, Virginia. The name is for the County. Type material is preserved at the Smithsonian Institution. **P.J.D.**

#### Metaköttigite\*

K. Schmetzer, G. Amthauer, V. Stähle, and O. Medenbach (1982) Metaköttigite, (Zn, Fe<sup>3+</sup>)(Zn, Fe<sup>3+</sup>, Fe<sup>2+</sup>)<sub>2</sub>(AsO<sub>4</sub>)<sub>2</sub>·8(H<sub>2</sub>O, OH), a new mineral from Mapimi, Mexico. *Neues Jahrb. Mineral., Monatsch.*, 506–518 (in German).

Metaköttigite, the natural (Zn, Fe)-analogue of symplectite, is found on massive samples of fine-grained goethite and smithsonite from the Ojuela mine, together with köttigite and adamite. Metaköttigite occurs in minute, bluish-gray crystals in oriented intergrowth with köttigite, the name being chosen from the relation of dimorphism. The new mineral is considered an iron-bearing, triclinic, dimorph of the monoclinic köttigite, relations between the two being strictly similar to those of vivianite and metavivianite (50, 896). In the absence of untwinned crystals, cell dimensions were determined from the powder pattern, indexed in analogy with that of symplectite, to be:  $a = 7.96(2)$ ,  $b = 9.44(2)$ ,  $c = 4.72(1)\text{Å}$ ,  $\alpha = 95.6(2)^\circ$ ,  $\beta = 97.0(2)^\circ$ ,  $\gamma = 107.8(2)^\circ$ ; strongest lines of the powder pattern are: 8.898(40)(010), 6.909(100)( $\bar{1}10$ ), 3.926(30)( $\bar{1}11, \bar{2}10$ ), 3.001(30)( $12\bar{1}$ ). In the intergrowth with köttigite the  $c$  axis is in common and the perfect ( $1\bar{1}0$ ) cleavage of metaköttigite is parallel to the perfect (010) cleavage of köttigite. ( $1\bar{1}0$ ) is also the twin plane of metaköttigite. Its optical properties are:  $2V_Z = 93^\circ$ ,  $\alpha = 1.648(3)$ ,  $\beta = 1.680(1)$ ,  $\gamma = 1.716(2)$ , strongly pleochroic:  $X$  dark blue,  $Y$  yellow,  $Z$  pale yellow. Microprobe analyses of the new mineral show an average composition of CoO 0.09, ZnO 22.50, FeO (total Fe as FeO)

14.71, and As<sub>2</sub>O<sub>5</sub> 37.36%. The formula given is based on these data and the interpretation of Mössbauer spectra from two mixed samples in one of which köttigite predominated and another in which metaköttigite predominated. It is considered that oxidation of Fe<sup>2+</sup> to Fe<sup>3+</sup> and the simultaneous conversion of H<sub>2</sub>O to OH<sup>-</sup> determines the transition from monoclinic to triclinic as in the change from vivianite to metavivianite. **A.P.**

#### Natrodufrénite\*

F. Fontan, F. Pillard and F. Permingeat (1982) Natrodufrénite, a new mineral of the dufrénite group. *Bull. Minéral.*, 105, 321–326 (in French).

Analysis of the mineral (Na, Al and Ca by atomic absorption, P<sub>2</sub>O<sub>5</sub> and total Fe by colorimetry FeO by potentiometer, and H<sub>2</sub>O by Penfield) gave Na<sub>2</sub>O 2.36, CaO 0.14, FeO 0.42, Fe<sub>2</sub>O<sub>3</sub> 46.21, FeO 0.42, P<sub>2</sub>O<sub>5</sub> 32.67, H<sub>2</sub>O 13.04, sum. 100.35%, corresponding to [Na<sub>0.628</sub>Ca<sub>0.021</sub>(H<sub>2</sub>O)<sub>0.351</sub>]<sub>1</sub>(Fe<sub>0.647</sub><sup>2+</sup>Fe<sub>0.667</sub><sup>3+</sup>□<sub>0.286</sub>)<sub>1</sub>(Fe<sub>4.108</sub>Al<sub>0.892</sub>)<sub>5</sub> [(PO<sub>4</sub>)<sub>3.798</sub>(H<sub>4</sub>O<sub>4</sub>)<sub>0.202</sub>]<sub>4</sub> [(OH)<sub>5.564</sub>(H<sub>2</sub>O)<sub>0.436</sub>]<sub>6</sub>·2H<sub>2</sub>O or (Na, □)(Fe<sup>3+</sup>, Fe<sup>2+</sup>)(Fe<sup>3+</sup>, Al)<sub>5</sub>(PO<sub>4</sub>)<sub>4</sub>(OH)<sub>6</sub>·2H<sub>2</sub>O. The DTA curve shows an endothermic peak at 275°C (dehydration) and exothermic peaks at 565°C, 590°C and 620°C (oxidation of iron). Thermal analysis to 1000°C showed a loss of 13.68%. The products of heating natrodufrénite to 1000°C are hematite, alluaudite and an aluminum oxide.

The X-ray powder pattern is similar to those of dufrénite and burangaite and is indexed on a monoclinic cell with  $a = 25.83$ ,  $b = 5.150$ ,  $c = 13.772\text{Å}$ ,  $\beta = 111^\circ32'$ ,  $Z = 4$ , D calc. 3.20, meas. 3.23. The strongest X-ray lines (45 given) are 12.04(80)(200), 3.040(60)(110), 4.124(50)( $\bar{1}12$ ), 3.400(80)( $\bar{3}13$ ), 3.204(80)(004), 3.152(100)( $\bar{5}13$ ), 2.989(50)(711), 2.862(50)(314, 710).

The mineral occurs as pale, blue-green spheres of compact radiating fibers up to 0.5 cm in diameter. Precise optical measurements were not possible but it has parallel or sub-parallel extinction, positive elongation;  $ns$   $\alpha = 1.756$ ,  $\gamma = 1.775$ ; pleochroic,  $X$  pale yellow,  $Z$  dark green.

The mineral was originally found and described by Lacroix (1910) as dufrénite from Rochefort-en-Terre. It occurs in a limonitic ore bed associated with cyrilovite and goethite. These minerals were formed simultaneously by low temperature, supergene alteration.

The name is for the Na-rich member of the dufrénite group. Type material is at the Muséum National d'Histoire Naturelle, Paris and Ecole Nationale Supérieure des Mines de Paris. **J.D.G.**

#### Reinhardbraunsite\*

H. -M. Hamm and G. Hentschel (1983) Reinhardbraunsite, Ca<sub>5</sub>(SiO<sub>4</sub>)<sub>2</sub>(OH, F)<sub>2</sub>, a new mineral—the natural equivalent of “calcio-chondrodite”. *Neues Jahrb. Mineral., Monatsch.* 119–129.

Microprobe analysis yielded SiO<sub>2</sub> 26.97, CaO 65.68, P<sub>2</sub>O<sub>5</sub> 0.69, F 4.24, H<sub>2</sub>O (calc.) 2.66, less 0 = F 1.78, sum = 98.64%, which on the basis of Si + P = 2 yields Ca<sub>5.10</sub>Si<sub>1.96</sub>P<sub>0.04</sub>O<sub>8</sub>F<sub>0.97</sub>(OH)<sub>1.24</sub>, or ideally, Ca<sub>5</sub>(SiO<sub>4</sub>)<sub>2</sub>(OH, F)<sub>2</sub>, with  $Z = 2$ .

Single-crystal X-ray study showed it to be monoclinic, space group  $P2_1/a$  with  $a = 11.458(2)$ ,  $b = 5.052(1)$ ,  $c = 8.840(2)\text{Å}$ ,  $\beta = 108.91(1)^\circ$ ,  $V = 484.1\text{Å}^3$ . The strongest lines in the X-ray powder diffraction pattern are 3.806(40)(111), 3.322(50)(112), 3.035(80)( $\bar{3}11$ ), 2.941(50)(310), 2.903(75)(112), 1.902(100)(222,  $\bar{2}23$ ).

Reinhardbraunsite occurs as light pink crystals with vitreous luster; hardness (Mohs) is 5–6; cleavage is distinct (001); twinning on (001) is observed on recrystallized grains; D meas. = 2.84, calc. 2.885. Optically, the mineral is biaxial negative,  $2V = 44\text{--}50^\circ$ , with indices of refraction  $\alpha = 1.606(2)$ ,  $\beta = 1.617(2)$ ,  $\gamma = 1.620(2)$ . Dispersion is distinct  $r > v$ ; orientation is  $Z = b$ ,  $X \perp c = 18(1)^\circ$ .

Reinhardbraunsite occurs in xenoliths in scoria at the Ettringer Bellerberg Volcano, near Mayen, Laacher See volcanic area, West Germany. It is associated with ellestadite, cuspidine, gehlenite, brownmillerite, mayenite, periclase and another new mineral of approximate composition  $4\text{Ca}_2\text{SiO}_4\cdot\text{MgCl}_2$ .

The name honors Dr. Reinhard Brauns, (1861–1937) former professor of mineralogy at the University of Bonn. Type material is preserved at the Mineralogisches-Petrologisches Institut und Museum der Universität Bonn. **P.J.D.**

#### Wadsleyite\*

G. D. Price, A. Putnis, S. O. Agrell, and D. G. W. Smith (1983) Wadsleyite, natural  $\beta$ -(Mg,Fe) $_2$ SiO $_4$  from the Peace River Meteorite. *Can. Mineral.*, 21, 29–35.

The average microprobe analysis (calculated here as oxides) yielded: MgO 38.21, SiO $_2$  38.70, CaO 0.07, Cr $_2$ O $_3$  0.01, MnO 0.43, FeO 22.37, NiO 0.11, ZnO 0.10, sum = 100.00%, corresponding to an idealized composition of (Mg $_{1.5}$ Fe $_{0.5}$ )SiO $_4$ . This has the structure of the  $\beta$ -phase polymorph of (Mg,Fe) $_2$ SiO $_4$ .

X-ray study by the powder method showed wadsleyite to be orthorhombic with probable space group *Imma* and unit cell parameters  $a = 5.70(2)$ ,  $b = 11.51(7)$ , and  $c = 8.24(4)\text{Å}$ ,  $Z = 8$ . The strongest lines in the X-ray powder pattern are: 2.886(50)(040), 2.691(40)(013), 2.452(100)(141), 2.038(80)(240), 1.442(80)(244).

Wadsleyite occurs as 0.5 mm diameter microcrystalline aggregates with actual grain size between 0.5 and 5.0  $\mu\text{m}$ . The wadsleyite aggregates have a felsitic texture, are fractured, transparent, and have a pale fawn color. Detailed optical data could not be obtained due to the small crystal size. However wadsleyite is anisotropic with low first-order birefringence colors and mean index of refraction of  $\bar{n} = 1.76$ . D (calc.) = 3.84.

Wadsleyite occurs in the Peace River meteorite (an L6 hypersthene-olivine chondrite), associated with majorite and ringwoodite, and is believed to have formed during an extraterrestrial shock event. The name honors the late Dr. A. D. Wadsley. Type material is preserved at the University of Alberta, Canada. **P.J.D.**

#### Zakharovite\*

A. P. Khomyakov, M. E. Kazakova, Z. V. Vrublevskaia, B. B. Zvyagin, and G. O. Piloyan (1982) Zakharovite, Na $_4$ Mn $_5^{+2}$ Si $_{10}$ O $_{24}$ (OH) $_6$ ·6H $_2$ O, a new hydrous silicate of sodium and manganese. *Zapiski Vses. Mineralog. Obshch.*, 111, 491–495 (in Russian).

Analysis by M.E.K. gave SiO $_2$  48.74, Fe $_2$ O $_3$  2.70, MnO 25.63, MgO 0.05, CaO 2.11, SrO 0.09, Na $_2$ O 7.95, K $_2$ O 0.41, H $_2$ O 12.25, sum 99.93%, corresponding to the formula (Na $_3$ .16Ca $_{0.46}$ K $_{0.11}$ Sr $_{0.01}$ ) $_{3.74}$ (Mn $_{4.45}^{+2}$ Fe $_{0.42}^{+2}$ Mg $_{0.02}$ ) $_{4.89}$ Si $_{10}$ O $_{24}$ (OH) $_{5.60}$ O $_{0.40}$ )·5.59H $_2$ O, or ideally, Na $_4$ Mn $_5^{+2}$ Si $_{10}$ O $_{24}$ (OH) $_6$ ·6H $_2$ O, or possibly Na $_3$ Mn $_5^{+2}$ Si $_{10}$ O $_{24}$ (OH) $_5$ ·6H $_2$ O. Thermal analysis (by

G.O.P.) showed loss of water 2.0% at 12°, 9.0% at 120–300°, and 3.0% at 300–500°. The IR spectrum confirms the presence of bound water. Readily decomposed by cold 10% HCl.

X-ray and electron diffraction study (Z.V.V. and B.B.Z.) showed the mineral to be trigonal, space group *P31m* or *P3m1*,  $a = 14.58$ ,  $c = 34.7\text{Å}$ . (refined from the powder data to  $a = 14.58$ ,  $c = 37.71\text{Å}$ ,  $Z = 9$ . The discrepancy in  $c$  is explained as being due to contraction of the  $c$  axis under the high vacuum of the electron microscope. The water is therefore probably interlayer. The strongest X-ray lines (29 given) are 12.57(100)(01 $\bar{1}$ 0,0003), 3.427(15)(000·11), 3.160(40) (0440,2246), 3.064(15)(04 $\bar{4}$ 3), 2.820(15)(23 $\bar{5}$ 3,04 $\bar{4}$ 6).

The mineral occurs at Mt. Karnasurt, Lovozero massif, and at Yukspor and Koashva Mts., Khibina massif, Kola Peninsula, as platy aggregates. Color yellowish to bright yellow, luster pearly to dull waxy, fracture conchoidal, cleavage perfect {0001}. H. about 2. Strongly electromagnetic. D. 2.58, 2.64. Optically uniaxial, negative,  $\omega = 1.565$ ,  $\epsilon = 1.535$  (both  $\pm 0.002$ ).

The name is for E. E. Zakharov (1902–1980), director of the Moscow Geological-Exploration Institute. Type material is at the Mineralogical Museum, Acad. Sci. USSR, Moscow, and at its Kola Branch, Apatite. **M.F.**

#### Unnamed Ca–(Mg)–Fe–Al–(Ti) silicates

A. Havette, R. Clocchiatti, P. Nativel, and L. Montaggioni (1982) An unusual fassaite–melilite–rhönite paragenesis from a contaminated alkali basalt in contact with coral limestones from Reunion Island, Indian Ocean. *Bull. Minéral.*, 105, 364–375 (in French).

The average of five electron microprobe analyses for each of two distinct minerals gave SiO $_2$  13.35, TiO $_2$  3.02, Al $_2$ O $_3$  14.34, Fe $_2$ O $_3$  47.36, Cr $_2$ O $_3$  0.06, MgO 8.01, CaO 12.71, MnO 0.42, Na $_2$ O 0.34, sum 99.62% and SiO $_2$  23.56, TiO $_2$  20.28, Al $_2$ O $_3$  7.83, Fe $_2$ O $_3$  17.84, Cr $_2$ O $_3$  0.06, MgO 0.07, CaO 27.96, MnO 0.16, Na $_2$ O 0.08, sum 97.85%.

These two minerals are found within the septa of reef coral replacing rhönite and associated with fassaite. **J.D.G.**

#### Unnamed TiHgAs $_3$ S $_6$

P. Engel and W. Nowacki (1982) The crystal structure of a new sulfosalt, TiHgAs $_3$ S $_6$ , from Allchar, Yugoslavia. *Fortschr. Min.*, 60, 68. (abstr. in German).

Microprobe analysis of a red sulfosalt, in 0.1–0.2 mm crystals, associated with rebullite (*Am. Min.* 68, 644) indicated it is TiHgAs $_3$ S $_6$  (no analysis given). X-ray study showed it to be monoclinic, space group *P2 $_1$ /n*, with  $a = 5.948(2)$ ,  $b = 11.404(6)$ ,  $c = 15.979(5)\text{Å}$ ,  $\beta = 90.15(1)^\circ$ ,  $Z = 4$ . It was found at the Allchar deposit in Yugoslavia. **P.J.D.**

#### Unnamed uranium silicates

F. G. Simova (1981) Uranium silicates from two deposits in Permian sediments, Central Europe. *Bulgarska Akademia Nauk, Sofia, Doklady*, 34, #12, 1693–1696.

Microprobe analyses of polished sections of ores from two localities, Zirovsky Vrh, Slovenia, Yugoslavia, and Forstau,

Salzburg, Austria, indicated the presence of a number of previously unknown uranium silicate minerals. They occur as irregular grains, sometimes equant, and vary in color from black to gray to lighter gray. Their hardness is approximately 5. Microprobe analyses are given of samples from the Zirovsky deposit and are clustered in 5 groups (#3, omitted here, is coffinite). No X-ray or optical data are given.

	UO <sub>2</sub>	CaO	SiO <sub>2</sub>	TiO <sub>2</sub>	MgO	BaO	Na <sub>2</sub> O	K <sub>2</sub> O	Total
Group 1.	91.5	2.34	5.9	--	0.11	0.22	0.02	0.4	100.78*
Group 2.	85.7	1.16	11.0	0.3	0.73	0.54	0.08	0.39	100.73**
Group 4.	65.8	2.42	31.3	0.04	0.05	0.27	0.05	0.29	100.33***
Group 5.	51.5	2.46	41.8	0.11	0.23	0.1	0.03	0.37	96.60
	53.31	2.55	43.28	0.11	0.24	0.1	0.03	0.38	100.00

\*----includes 0.31% CuO.

\*\*----includes 0.83% PbO.

\*\*\*----includes 0.11% CuO

P.J.D.

#### Unnamed sulfosalt

B. L. Flerov, E. R. Stepanov, B. Ya. Bichus, and Yu. Ya. Zhadanov (1981) Parageneses of minerals of Polar deposits. Inst. Geol. Yakut Filial, Akad. Nauk SSSR, 5–23 (in Russian).

Analyses by electron microprobe on two samples gave: S 19.51, 16.31; Bi. 43.36, 44.48; Sb 1.32, 1.71; As none; Pb 36.47, 37.03; Ag none; Zn 0.04, none; Cu none; Fe 0.08, none; sum 100.78, 99.52%. These correspond to Pb<sub>4.00</sub>(Bi<sub>4.70</sub>Sb<sub>0.25</sub>)S<sub>13.8</sub> and Pb<sub>4</sub>(Bi<sub>4.72</sub>Sb<sub>0.31</sub>)S<sub>11.3</sub>.

X-ray data on the sample of the first analysis gave strongest lines (21 given) 4.12(10), 3.56(7), 3.13(8), 2.98(5), 2.83(6), 2.27(5).

M.F.

#### Unnamed uranium–titanium silicates

F. G. Simova (1982) Uranium–titanium silicates from the Ambrosia Lake (New Mexico, USA) and Mitterberg (Salzburg, Austria) deposits. Bulgarska Akademia Nauk, Sofia, Doklady, 35, #2, 203–206.

Unknown U–Ti-silicates from the Dog Mine, Ambrosia Lake, New Mexico, occur as formless aggregates associated with unidentified uranium silicates and pyrite. In the Mitterberg, Austria, deposit, they occur in varied shapes and are almost always associated with brannerite and rutile. X-ray, physical and optical data are not given. Two phases are analyzed from the Lake Ambrosia deposit, yielding for one phase: UO<sub>2</sub> 65.3, 69.86; CaO 1.42, 1.51; TiO<sub>2</sub> 10.7, 11.44; SiO<sub>2</sub> 15.6, 16.68; totals 93.48, 100.02%, and for the other phase: UO<sub>2</sub> 50.9, 53.71; ThO<sub>2</sub> 0.09, 0.1; CaO 0.72, 0.75; TiO<sub>2</sub> 34.1, 35.98; SiO<sub>2</sub> 8.1, 8.54; total 94.76, 100.03%. The unknown phase from the Mitterberg deposit yielded: UO<sub>2</sub> 50.3, 53.26; ThO<sub>2</sub> 2.52, 2.67; CaO 0.66, 0.70; TiO<sub>2</sub> 29.6, 31.34; SiO<sub>2</sub> 11.1, 11.75; totals 94.45, 100.00%. P.J.D.

## NEW DATA

### Creedite

G. Giuseppetti and C. Tadini (1983) Structural analysis and refinement of Bolivian creedite, Ca<sub>3</sub>Al<sub>2</sub>F<sub>8</sub>(OH)<sub>2</sub>(SO<sub>4</sub>)·2H<sub>2</sub>O. Neues. Jahrb. Mineral., Monatsch. 69–78.

Based on a crystal structure study with refinement to  $R = 0.015$ , Bolivian creedite is found to have the new formula Ca<sub>3</sub>Al<sub>2</sub>F<sub>8</sub>(OH)<sub>2</sub>(SO<sub>4</sub>)·2H<sub>2</sub>O. Crystal data are: monoclinic, space group  $C2/c$ ,  $a = 13.936(1)$ ,  $b = 8.606(1)$ ,  $c = 9.985(1)\text{Å}$ ,  $\beta = 94.39^\circ$ ,  $Z = 4$ , P.J.D.

### Dervillite

H. Bari (1982) Dervillite Ag<sub>2</sub>AsS<sub>2</sub>, monoclinic, new definition of the species described by Weil, 1941. Pierres et Terre, No. 23–24, 62–67 (in French).

New single crystal X-ray data shows the mineral is monoclinic, space group  $P2/a$ , unit cell  $a = 6.833$ ,  $b = 12.932$ ,  $c = 9.638\text{Å}$ ,  $\beta = 99^\circ 33'$ .

In reflected light it is white, resembling lautite. It is moderately anisotropic with rotation tints of red. VHN 50 g & 100 g = 19.5 kg/mm.

Electron microprobe analysis gave Ag 61.39, As 19.03, S 18.06, sum 98.48% corresponding to Ag<sub>2.02</sub>As<sub>0.91</sub>S<sub>2</sub>. J.D.G.

### Shakhovite

E. Tillmanns, R. Krupp, and K. Abraham (1982) New data on the mercury antimony mineral shakhovite: chemical composition, unit cell and crystal structure. Tschermarks Min. Petr. Mitt., 30, 227–235.

Microprobe analysis of several single crystals from a new occurrence of shakhovite from Moschellandsberg yield an average of 77.3% Hg, and 12.1% Sb, in good agreement with the chemical composition of the original material (66, 1101). New single-crystal X-ray study shows shakhovite to be monoclinic, space group  $Im$ , with  $a = 4.871(1)$ ,  $b = 15.098(3)$ ,  $c = 5.433(1)\text{Å}$ ,  $\beta = 98.86(2)^\circ$ . This cell can be transformed into a triclinic primitive cell with  $a = 5.43$ ,  $b = 4.87$ ,  $c = 8.25\text{Å}$ ,  $\alpha = 104$ ,  $\beta = 74$ , and  $\gamma = 81^\circ$ , in close agreement with the triclinic cell proposed in the original description. Crystal structure analysis, combined with infrared analysis, indicates the formula is Hg<sub>4</sub>Sb(OH)<sub>3</sub>O<sub>3</sub>,  $Z = 2$ . The new spelling of the name, changed from shahovite, is adopted from the thirty-second list of new mineral names (Mineral. Mag., 46, 515–528). P.J.D.

### Wehrlite

E. N. Zav'yalov (1981) The constitution of bismuth tellurides. Novye Dannye Mineralakh, 29, 59–70 (in Russian).

Microprobe analyses are given of 8 samples. The analyses yield the formula (Bi,Ag,Pb)<sub>4-x</sub>Te<sub>3+x</sub>, with  $x$  ranging from 0.11 to 0.28, Ag 0.42 max., Pb 0.07 max. Unit cell contents varied only from  $a = 4.432\text{--}4.437$ ,  $c = 41.98\text{--}42.00\text{Å}$ . M.F.