

## NEW MINERAL NAMES\*

MICHAEL FLEISCHER AND J. A. MANDARINO

### Brassite\*

FRANCOIS FONTAN, MARCEL ORLIAC, FRANCOIS PERMINGEAT, ROLAND PIERROT, AND REJANE STAHL (1973) La brassite,  $MgHASO_4 \cdot 4H_2O$ . *Bull. Soc. Franc. Mineral. Cristallogr.* **96**, 365-370.

Analysis by M.O. on 15.4 mg from Jachymov gave  $As_2O_5$  48.1, MgO 15.6, CaO 0.9,  $H_2O$  (by diff.) 35.4 percent, corresponding to the formula above. The mineral can be synthesized from solutions with pH 2-4 and is readily obtained by the spontaneous dehydration of roesslerite. The DTA curve shows a small endothermic break at  $95^\circ$ , a large one at  $135^\circ$ , and an exothermic peak at  $570^\circ$ .

X-ray study shows the mineral to be orthorhombic, space group *Pbca*,  $a$  7.472 $\pm$ 0.001,  $b$  10.891 $\pm$ 0.001,  $c$  16.585 $\pm$ 0.005 $\text{\AA}$ ,  $Z=8$ ,  $G$  calc. 2.326, meas 2.28 $\pm$ 0.04 (data on synthetic crystals, Brasse and Pemy, *Bull. Soc. Chim. Franc.* **7**, 2449-2450, 1970). The strongest X-ray lines (39 given) are 4.97 **10 112**; 4.14 **6 004**; 388 **5 112,023**; 3.45 **5 114**; 3.20 **8 131**; 3.07 **7 220**.

The mineral occurs as white crusts and coating on specimens from Jachymov, Bohemia (type); Bieber, Saxony; Neurode, Silesia; and Wittichen, Baden, on museum samples labelled roesslerite, pharmacolite, haidingerite, and wapplerite. It is associated with arsenic, the minerals mentioned above, weillite, raenthalite, and picropharmacolite. Synthetic crystals show cleavage {001} excellent and are tabular with {001} dominant, also {011}, {021}, {102}. Optically biaxial, positive,  $\alpha$  1.531,  $\beta$  1.546,  $\gamma$  1.562, (all  $\pm$ 0.002),  $X=b$ ,  $2V$  large,  $Y=a$ ,  $Z=c$ .

The name is for Rejane Brasse, who synthesized the compound. Type material is at the Ecole Natl. Supérieure des Mines, Paris. M.F.

### Duranusite\*

ZDENEK JOHAN, CLAUDE LAFORET, PAUL PICOT, AND JEAN PERAUD (1973) La duranusite,  $As_4S$ , un nouveau mineral. *Bull. Soc. Franc. Mineral. Cristallogr.* **96**, 131-134.

Electron microprobe analyses by E. Joseph, using As and  $Sb_2S_3$  as standards, gave As 90.0, 90.8; S 10.3, 10.3; sum 100.3, 101.1 percent, corresponding to  $As_4S$ .

X-ray powder data are indexed on an orthorhombic cell with  $a$  3.576  $\pm$  0.002,  $b$  6.759  $\pm$  0.002,  $c$  10.074  $\pm$  0.005  $\text{\AA}$ ,  $Z=2$ ,  $G$  calc. 4.50. The strongest lines (26 given) are 5.620 **9 011**; 5.037 **9 002**; 3.377 **6 020**; 3.016 **7 111,013**; 2.919 **10 102**; 2.808 **7 022**; 2.682 **8 112**; 1.969 **9 114**; 1.788 **9 200**.

In polished section gray-white, birefractance weak, anisotropy rather strong with color effects like those of arsenic. Internal red reflections are observed rarely. Reflectances ( $R_{max}$ ,  $R_{min}$ ) in percent: 480 nm, 33.4, 32.1; 540 nm, 31.7, 30.4; 580 nm, 31.0, 29.5; 640 nm, 30.0, 28.4. Microhardness (25 g load) 58 kg/sq. mm.

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

The mineral, associated with realgar, native As, and a little orpiment, occurs as grains up to 0.2 mm in calcite veinlets in marls and siliceous limestones at Duranus, Alpes-Maritimes, France.

The name is for the locality. Type material is at the Ecole Natl. Supérieure des Mines, Paris. M.F.

### Jagowerite\*

E. P. MEAGHER, M. E. COATES, AND A. E. AHO (1973) Jagowerite: A new barium phosphate mineral from the Yukon Territory. *Can. Mineral.* **12**, 135-136.

A gravimetric analysis (H. Sharples, analyst) gave: BaO 38.41,  $P_2O_5$  31.41,  $Al_2O_3$  25.87,  $Fe_2O_3$  0.26, S 0.15,  $H_2O+4.09$ , total 100.19 percent. Emission and solid source mass spectrographic analyses indicated the following elements present in amounts less than 1000 ppm: Ca, Cr, Ti, V, Ta, Mn, Cu, Be, Sr, and Si. The analytical data indicate a formula of  $BaAl_2P_2O_8 \cdot H_2O$  or  $BaAl_2P_2O_8(OH)_2$ . Infrared spectroscopy indicated no molecular water in the mineral. In addition, a crystal structure determination confirmed the latter formula. (The theoretical composition of  $BaAl_2P_2O_8(OH)_2$  is BaO 36.93,  $Al_2O_3$  24.55,  $P_2O_5$  34.18,  $H_2O$  4.34, total 100.00%; JAM). The formula derived from the analysis is  $Ba_{1.07}Al_{2.18}Fe_{0.01}P_{1.89}S_{0.02}O_8(OH)_2$ .

Jagowerite is triclinic,  $P\bar{1}$ ,  $a = 6.049$ ,  $b = 6.964$ ,  $c = 4.971 \text{ \AA}$ ,  $\alpha = 116.51^\circ$ ,  $\beta = 86.06^\circ$ ,  $\gamma = 112.59^\circ$ ,  $Z = 1$ . The strongest spacings in the diffractometer scan ( $CuK\alpha$  radiation) are: 5.55 **40 100**, 3.26 **60 101**, 3.00 **100 210**, 2.94 **55 710**, 2.21 **35 211**, and 1.90 **35 030**. A total of 25 indexed spacings are given.

Jagowerite is light green and has a vitreous luster. It fluoresces greenish-white under long-wave ultraviolet light. The hardness is  $4\frac{1}{2}$  and the density is 4.01g/cm<sup>3</sup> (meas) and 4.05g/cm<sup>3</sup> (calc). The mineral is insoluble in hydrochloric acid. The following pinacoidal cleavages are present: {100} good, {011} good, and {021} fair. The mineral occurs as crystalline masses up to one inch across in quartz veins in a carbonaceous argillite of Palaeozoic age. Jagowerite is associated with pyrite and hinsdalite. The mineral was found about 16 miles north of the Hess River in the western central part of the Yukon Territory (at approximately 132°48' 30" W and 63°35' N), Canada.

The mineral is optically biaxial positive with  $\alpha = 1.672$ ,  $\beta = 1.693$ ,  $\gamma = 1.710$ ,  $2V$  (estimated) =  $80^\circ \pm 5^\circ$ . (These indices, however, indicate a biaxial negative nature with a calculated  $2V$  of  $83^\circ$ ; JAM).

The name is for the late Professor J. A. Gower of the University of British Columbia. Type material is in the Department of Geological Sciences, University of British Columbia, Vancouver, B. C., Canada. J.A.M.

### Laffittite\*

ZDENEK JOHAN, JOSEPH MANTIENNE, AND PAUL PICOT (1974) La routhierite,  $TlHgAsS_3$ , et la laffittite,  $AgHgAsS_3$ , deux nouvelles especes minerales. *Bull. Soc. Franc. Mineral. Cristallogr.* **97**, 48-53.

Electron microprobe analysis by E. Joseph gave Ag 21.9, Hg 41.0, As 15.6, S 20.3, sum 98.8 percent, giving Ag:Hg:As:S = 0.97:0.98:1.01:3.04, or AgHgAsS<sub>3</sub>. Sb and Tl were not detected. The mineral was synthesized (method not stated).

Weissenberg and rotation photographs showed the mineral to be monoclinic, space group  $P2_1/c$ ,  $a$  6.567±0.003,  $b$  14.020±0.005,  $c$  6.388±0.002Å,  $\beta$  119°0',  $Z=8$ . The strongest X-ray lines (24 given) are 3.505 7 040, 3.198 8 002, 3.005 8 240, 2.682 10 331, 2.133 6 402,351.

Laffittite occurs in grains up to 0.2 mm. In reflected light bluish white, bluer in immersion. Strongly pleochroic, more so in oil, with color effects from bluish-white to bluish-gray. Strongly anisotropic. Numerous purple-red internal reflections. Reflectances are given at 15 wavelengths ( $R_{max}$ ,  $R_{min}$ , %): 480nm, 35.2, 33.8; 540nm, 32.6, 30.7; 580nm, 30.8, 28.5; 640nm, 29.5, 27.1. Microhardness (25g load) 92–138, av. 115 kg/sq mm. Imperfect cleavage in one direction.

The name is for Pierre Laffitte, director of Ecole Nationale Supérieure des Mines, Paris.

Both minerals occur in the Jas Roux mine, Hautes Alpes, France, in dolomitic rocks, associated with smithite, stibnite, pierrotite, realgar, sphalerite, pyrite, and two thallium antimony minerals. Type material is at the Ecole Natl. Supérieure des Mines, Paris, M.F.

#### Melonjosephite\*

ANDRE-MATHIEU FRANSOLET (1973) La melonjosephite,  $\text{CaFe}^{+2}\text{Fe}^{+3}(\text{PO}_4)_2(\text{OH})$ , une nouvelle espèce minérale. *Bull. Soc. Franc. Mineral. Cristallogr.* 96, 135–142.

Analysis by J. M. Speetjens and A-M.F. gave P<sub>2</sub>O<sub>5</sub> 39.96, Fe<sub>2</sub>O<sub>3</sub> 21.81, Al<sub>2</sub>O<sub>3</sub> 0.17, FeO 17.39, MnO 0.44, MgO 1.18, CaO 14.99, Na<sub>2</sub>O 0.48, Li<sub>2</sub>O 0.07, H<sub>2</sub>O 2.50, insol. (quartz) 0.97, sum 99.96 percent, corresponding to the formula above with Fe<sup>2+</sup>:Mg:Mn=3.47:0.43:0.09. Spectrographic analysis showed traces of Pb, Mo, Ni. The mineral is readily dissolved by HCl. The infrared absorption spectrum is given.

Weissenberg study indicated orthorhombic symmetry; the powder data are indexed on a cell with  $a$  9.548,  $b$  10.847,  $c$  6.380 Å,  $Z=4$ ,  $G$  calc. 3.61,  $G$  meas 3.65. The strongest lines (55 given) are 5.42 90 020, 3.049 100 310, 2.912 40 112, 2.710 90 040, 2.624 60 231, 2.187 35 420,411.

The mineral occurs as dark green, nearly black, fibrous masses, luster brilliant to slightly resinous. Brittle, breaking into splinters along a longitudinal cleavage; there is a transverse imperfect cleavage (?).  $H < 5$ . Optically biaxial, negative,  $ns$ ,  $\alpha$  1.720 ± 0.005,  $\beta$  1.770 ± 0.01,  $\gamma$  1.800 ± 0.01,  $2V$  80–85°, dispersion strong, pleochroic X deep brown, nearly opaque, Y greenish-brown, Z yellow to greenish-yellow,  $X=c$ ,  $Z=b$ .

The mineral occurs in the Angarf-South pegmatite, Morocco, in the zone surrounding triphylite. The name is for Joseph Melon, Professor Emeritus of Mineralogy, University of Liege, Belgium, where the type material is preserved (no. 18.587). M.F.

#### Mroseite\*

J. A. MANDARINO, R. S. MITCHELL, AND R. G. V. HANCOCK (1975) Mroseite, a calcium tellurite-carbonate from Moctezuma, Sonora, Mexico (abstr.). *Geol. Soc. Am. Abstr.* 7, no. 6, 814–815.

Analysis by neutron activation gave TeO<sub>2</sub> 61.2, CaO 22.3, by thermogravimetry on 18.8 mg gave CO<sub>2</sub> 17.0, total 100.5 percent, yielding CaO:TeO<sub>2</sub>:CO<sub>2</sub> = 1.04:1.00:1.01 or CaTe(CO<sub>3</sub>)O<sub>2</sub>. The

mineral effervesces in cold dilute HCl. Orthorhombic, space group  $Pbca$ ,  $a$  6.93,  $b$  11.16,  $c$  10.54 Å,  $Z=8$ . The strongest lines are 514 10 111; 4.20 9 102; 3.35 8 122; 3.02 8 113; 2.39 8 133,024; 1.97 9 025,152.

The mineral is colorless to white, luster adamantine.  $H$  about 4,  $G$  4.35 (Berman balance), 4.23 calc. Optically biaxial, negative,  $\alpha$  1.79,  $\beta$  1.85,  $\gamma$  1.89,  $2V$  80°.

The mineral occurs in masses, often with a crude radiating structure, at Mina la Moctezuma, associated with quartz and spiroffite. The name is for Mary E. Mrose, mineralogist, U.S. Geological Survey. M.F.

#### Os-Ir-Ru-Alloys\*

DONALD C. HARRIS AND LOUIS J. CABRI (1973) The nomenclature of the natural alloys of osmium, iridium, and ruthenium based on new compositional data of alloys from world-wide occurrences. *Can. Mineral.* 12, 104–112.

The authors propose a new system of nomenclature for minerals whose compositions fall in the Os-Ir-Ru system. The proposed names are quoted from the paper:

(a) the name osmium is for hexagonal alloys with  $\geq 80$  atomic % Os;

(b) the name iridium is for cubic alloys with  $\geq 80$  atomic % Ir;

(c) the name ruthenium is for hexagonal alloys with  $\geq 80$  atomic % Ru;

(d) the name ruthenosmiridium of Aoyama (1936) be applied to cubic (Ir,Os,Ru) alloys, where Ir  $< 80$  atomic % of (Ir + Ru + Os) and Ru  $> 10$  atomic % of (Ir + Ru + Os); also with no single other element  $> 10$  atomic % of total;

(e) iridosmine of Hey (1963) be redefined as hexagonal (Os,Ir) alloys with no single other element  $> 10$  atomic % of total, and where Os  $< 80$  atomic % of (Os + Ir); the presence of the miscibility gap defines the other boundary at approximately 55 atomic % Os;

(f) osmiridium of Hey (1963) be redefined as cubic (Ir,Os) alloys with no single other element  $> 10$  atomic % of total, and where Ir  $< 80$  atomic % of (Ir + Os); again the miscibility gap limits the field to approximately 62 atomic % Ir;

(g) rutheniridosmine or ruthen-iridosmium of Strunz (1966) be re-defined as hexagonal (Os,Ir,Ru) alloys where Os  $< 80$  atomic % of (Os + Ir + Ru) and Ru is 10 to 80 atomic % of (Os + Ir + Ru), also where no single other element  $> 10$  atomic % of total; and

(h) to be consistent with our proposal on the binary join Os-Ir, similar lines must be drawn parallel to the Ru-Os and Ru-Ir edges; these alloys would not require new names, but using Schaller's (1930) adjectival modifiers these compositions may be simply known as ruthenian osmium, osmian ruthenium, iridian ruthenium, and ruthenian iridium; these fields would have similar boundaries (where no single other element  $> 10$  atomic % of total) as proposed for iridosmine and osmiridium; for the former two minerals, the boundary between them is arbitrarily taken at 50 atomic % Os whereas the boundary between the latter two minerals is as defined by the miscibility gap, i.e., to a minimum 57 atomic % Ir for ruthenian iridium and to a minimum of 55 atomic % Ru for iridian ruthenium.

#### Discussion

I feel very strongly that a system consisting of three end-members should have only *three* names (not *seven* as proposed here). The name should be based on the dominant constituent, not on arbitrary divisions of 60 or 80 or, worse, 55 to 57 atomic per-

cent. Basing certain names on the limits of miscibility gaps presupposes that these gaps will remain so forever. It seems more logical to assign the three names *osmium* (Os > 33½ atomic % of Os + Ir + Ru), *iridium* (Ir > 33½ atomic % of Os + Ir + Ru), and *ruthenium* (Ru > 33½ atomic % of Os + Ir + Ru). True, there is the problem of two structure types. This could be overcome by the use of prefixes such as *iso-* or *hexa-* for the cubic and hexagonal phases, respectively. J.A.M.

#### Routhierite\*

ZDENEK JOHAN, JOSEPH MANTIENNE, AND PAUL PICOT (1974) La routhierite,  $\text{TiHgAsS}_3$ , et la laffittite,  $\text{AgHgAsS}_3$ , deux nouvelles especes minerales. *Bull. Soc. Franc. Mineral. Cristallogr.* 97, 48–53.

Analyses by electron microprobe by C. Gilles and E. Joseph gave Ti 20.4, 19.7; Ag 3.8, 4.2; Cu 3.9, 3.8; Hg 34.7, 34.4; Zn 2.0, 2.1; As 13.2, 13.2; Sb 2.6, 2.9; S 19.6, 19.6, sum 100.2, 99.9 percent, corresponding to  $(\text{Ti}_{0.50}\text{Cu}_{0.30}\text{Ag}_{0.19})(\text{Hg}_{0.88}\text{Zn}_{0.12})(\text{As}_{0.88}\text{Sb}_{0.11})\text{S}_{3.08}$ , and  $(\text{Ti}_{0.48}\text{Cu}_{0.30}\text{Ag}_{0.19})(\text{Hg}_{0.88}\text{Zn}_{0.16})(\text{As}_{0.87}\text{Sb}_{0.12})\text{S}_{3.08}$ , or  $(\text{Ti,Cu,Ag})(\text{Hg,Zn})(\text{As,Sb})\text{S}_3$ .

Weissenberg and rotation photographs showed the mineral to be tetragonal, possible space groups  $I4mm$ ,  $I4m2$ ,  $I42m$ ,  $I4/mmm$ , or  $I422$ ,  $a$  9.977±0.002,  $c$  11.290±0.003 Å,  $Z=8$ ,  $G$  5.83 calc, could not be measured. The strongest X-ray lines (34 given) are 4.146 10 211; 3.525 8 220,103; 2.989 10 222; 2.495 9 400,303; 1.870 7 404,305; 1.827 6 521; 1.763 7 440; 1.520 6 622.

Routhierite occurs as violet-red xenomorphic grains and veinlets. Color in reflected light white with bluish tint, in oil gray-blue. Shows fine polysynthetic turn lamellae, red internal reflections, 2 perpendicular cleavages. Anisotropy weak. Reflectances are given at 15 wave lengths (R max., R min., %): 480nm 30.5, 29.8; 540nm, 29.4, 28.2; 580nm, 27.5, 26.3; 640nm, 25.9, 25.0. Microhardness at 25g load, 133–157, av. 148 kg/sq mm; at 50g load, 148–177, av. 163 kg.

The name is for Pierre Routhier, professor of economic geology, University of Paris. M.F.

#### Samuelsonite\*

P. B. MOORE AND TAKAHARU ARAKI (1975) Samuelsonite,  $(\text{Ba,Hole})(\text{Ca,Hole})_2(\text{Fe}^{2+},\text{Nn}^{2+},\text{Na})_4\text{Ca}_8\text{Al}_2(\text{OH})_2(\text{PO}_4)_{10}$ , a fragmented apatite structure, and some novel insights in the apatite structure type (abstr.). *Geol. Soc. Am. Abstr. Programs*, 7, 825–826.

The new species was found with whitlockite and hydroxylapatite at the Palermo no. 1 pegmatite, N. Groton, New Hampshire. It is monoclinic, space group  $C2/m$ ,  $a$  18.495,  $b$  6.805,  $c$  14.000 Å,  $\beta$  112.75°,  $Z=2$ . The structure is discussed. M.F.

#### Temagamite\*

LOUIS J. CABRI, J. H. GILLES LA FLAMME, AND JOHN M. STEWART

(1973) Temagamite, a new palladium-mercury telluride from the Temagami copper deposit, Ontario, Canada. *Can. Mineral.* 12, 193–198.

Grains ranging from a few microns wide to  $30 \times 115$  microns in massive chalcopyrite have been identified as a new species. In polished section (in air) temagamite is white with a gray tinge, shows no birefractance, and is weakly anisotropic. In oil, the anisotropism is enhanced with colors pale gray to dark gray. Reflectance in air is 52.8 and 51.8 (at 470 nm), 53.9 and 52.9 (at 546 nm), 55.0 and 54.2 (at 589 nm), and 57.7 and 57.1 (at 650 nm). One micro-indentation hardness measurement gave  $\text{VHN}_{25} = 92$ . Temagamite is usually closely associated with merenskyite, hessite, and stuetzite. An unknown Pd-Hg-Ag telluride was also found.

Electron microprobe analyses gave: Pd 34.9, 34.6, 35.1, 34.8; Hg 22.1, 21.5, 22.6, 22.1; Te 42.1, 41.6, 42.3, 41.6; Ag n.d. (all four analyses); Sb n.d., 0.3, n.d., n.d.; Bi n.d., 0.5, n.d., n.d.; totals 99.1, 98.5, 100.0, 98.5. The Sb and Bi noted in the second analysis may not be real, due to background correction problems. These give a formula of  $\text{Pd}_3\text{HgTe}_3$ . (The theoretical composition of  $\text{Pd}_3\text{HgTe}_3$  is Pd 35.4, Hg 22.2, Te 42.4, total 100.0. JAM)

Single crystal X-ray studies could not be made. The X-ray powder diffraction data were indexed on an orthorhombic pseudo-hexagonal cell with  $a = 11.57$ ,  $b = 12.16$ ,  $c = 6.76$  Å. The density of the synthetic material is 9.5g/cc(meas) and 9.36g/cc(calc) for  $Z = 6$ . For the natural material, the calculated density is 9.45g/cc. The strongest lines in the X-ray powder pattern of synthetic  $\text{Pd}_3\text{HgTe}_3$  are 2.912 10, 2.187 9, 1.959 7, 1.661 5, 1.624 5, 1.462 5, and 1.155 5 Å.

Temagamite is found in massive chalcopyrite ore from the Temagami Mine, Temagami Island, near Temagami, Ontario, Canada. The mineral is probably the same as a mineral noted from Rustenburg (Kingston, 1966) and from Monchegorsk (Genkin, 1968). Temagamite is named for the locality. Type material (one polished section) is preserved at the Royal Ontario Museum. J.A.M.

#### Unnamed Pd-Hg-Ag Telluride

L. J. CABRI, J. H. G. LA FLAMME, AND J. M. STEWART (1973) Temagamite, a new palladium-mercury telluride from the Temagami copper deposit, Ontario, Canada. *Can. Mineral.* 12, 193–198.

A mineral associated with temagamite (see previous abstract) is darker gray than temagamite, is slightly birefractant in air and distinctly so in oil. The colors in oil are brownish gray and bluish gray. It is distinctly to strongly anisotropic in air and in oil with colors yellow-orange to a dull grayish brown. The latter color changes to greenish blue a few degrees from extinction. Electron microprobe analysis gave: Pd 19.4, Hg 38.2, Te 23.1, Ag 18.2, total 98.9 wt percent. Because of the small size of the single grain found, no further data could be obtained. J.A.M.