Thirty-sixth list of new mineral names

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The present list contains 119 entries. Of these 85 are valid species, most of which have been approved by the IMA Commission on New Minerals and Mineral Names, 9 are misspellings or erroneous transliterations, 16 are names published without IMA approval, 2 are trivial or variety names, 1 is a synonym of an approved species, and 6 are names applied to gem materials.

Andouoite. *Bull. Inst. Min. Deposits, Chinese Acad. Geol. Sci.*, no. 18 (1986), p. 108. Error for anduoite.

Angelite. J. I. Koivula and R. C. Kammerling, 1989. *Gems Gemmol.* **25**, no. 1, 45. Trade name for a semi-translucent light blue–grey anhydrite, marketed as a gem material.

Aravaipaite. A. R. Kampf, P. J. Dunn and E. E. Foord, 1989. *Amer. Min.* **74**, 927. Colourless thin plates with a perfect micaceous cleavage in a vug from the Grand Reef mine, Graham County, Arizona, associated with grandreefite, pseudograndreefite and laurelite (all in this list). Formula $Pb_3AlF_9.H_2O$. Triclinic, space group *P* or *P*1, *a* 5.842, *b* 25.20, *c* 5.652Å, α 93.84°, γ 85.28°, Z = 4. $D_{calc.}$ 6.37. Optically biaxial negative, 2V 70°, α 1.678, β 190.40°, γ 1.694. Named for the Aravaipa mining district in which the mine is located.

Arupite. V. F. Buchwald, 1990. *Neues Jahrb. Min., Mh.*, 76. Blue fine-grained earthy aggregates as a weathering product on nickel-rich meteorites exposed to subtropical chloride-rich coastal environments; described from the Santa Catharina meteorite. Formula $Ni_3(PO_4)_2.8H_2O$; the nickel analogue of vivianite. Monoclinic, space group *I*2/*m*, *a* 9.889, *b* 13.225, *c* 4.645Å, β 102.41°, Z = 2. $D_{calc.}$ 2.85. Optically biaxial, α 1.632, γ 1.680. Names for Hans Arup, director of the Danish Corrosion Centre.

Astrocyanite-(Ce). M. Deliens and P. Piret, 1990. *Eur. J. Min.* **2**, 407. Bright blue rosettes on a uraninite matrix in the Cu–Co deposit of East Kamoto, southern Shaba, Zaïre. Ideal formula $Cu_2(Ce,Nd)_2(UO_2)(CO_3)_5(OH)_2.1.5H_2O$. Hexagonal, *a* 14.96, *c* 26.86Å, Z = 12. $D_{meas.}$ 3.80; $D_{calc.}$ 3.95. Optically uniaxial negative, ω 1.688, ε 1.638. Named for the morphology, colour and dominant lanthanide element.

Azulicite. *Tucson Dealers' Directory*, 1988, p.49; 'transparent blue iridescent sanadine [sic]'.

Baiyuneboite-(Ce). Pingqiu Fu and Xlanze Su, 1987. *Acta Min. Sinica*, **7**, 289; Pingqiu Fu, Youhua Kong, Guohong Gong, Meicheng Shao and Jinzi Qian, ibid., p. 298. *Chinese J. Geochem.* 1988, **7**, 348. Yellow irregular grains 0.3 to 3 mm in size, frequently as thin hexagonal tablets, in the REE–Fe–Nb ore deposits at Bayan Obo, Inner Mongolia, China. Hexagonal space group $P6_3/mmc$, *a* 5.0875, *c* 23.1680A, Z = 2. Uniaxial negative, ε 1.5990, ω 1.7450; $D_{meas.}$ 4.30, $D_{calc.}$ 4.45. Named for the locality. Ideal formula $NaBaCe_2(CO_3)_4F$; may be the same as cordylite-(Ce) [see *Amer. Min.* **75**, 240].

Bernardite. J. Pašava, F. Pertlik, E. F. Stumpfl and J. Zemann, 1989. *Min. Mag.* **53**, 531. Black crystals about 1 mm in length with orpiment and realgar on one specimen from Allchar, Macedonia, Yugoslavia. Ideal formula $Tl(As,Sb)_5S_8$. Monoclinic, space group $P2_1/c$, *a* 15.647, *b* 8.038, *c* 10.750Å, β 91.27°, Z = 4; *D* 4.5. Named for Dr J. H. Bernard of Prague.

Boggsite. *Lapidary Journal*, Jan. 1990, p. 5. Premature disclosure of a new zeolite mineral name. See also *Amer. Min.* **75** (1990), p. 501.

Brokenhillite. M. Czank, 1987. *Collected Abstracts, 14th Internat. Congress of Crystallography* (Perth, Australia, C-155); cited in *Amer. Min.* **74**, 1399. Crystals from Broken Hill, New South Wales, Australia, with formula $(Mn,Fe)_{32}[Si_{21}O_{60}](OH)_{29}Cl_{11}$, are said to be members of the pyrosmalite group. Hexagonal, space group $P6_3mc$, *a* 13.481, *c* 14.084Å. An unapproved name.

Burpalite. S. Merlino, N. Perchiazzi, A. P. Khomyakhov, D. T. Pushcharovskii, I. M. Kulikova and V. I. Kuzmin, 1990. *Eur. J. Min.* **2**, 177. Colourless platy crystals in fenitized sandstone in the western contact zone of the Burpa-

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linskii alkaline massif, North Transbaikal, USSR. Ideal formula $Na_2CaZrSi_2O_7F_2$. Monoclinic, space group $P2_1/a$, a 10.1173, b 10.4446, c 7.2555Å, β 90.039°, Z = 4. $D_{meas.}$ 3.33; $D_{calc.}$ 3.27. Optically biaxial negative, α 1.627, β 1.634, γ 1.639, 2V 82°. It is a member of the cuspidine–wöhlerite–låvenite family. Named for locality.

Calcibeborosilite. A. S. Povarennykh and V. D. Dusmatov, 1970. *Konstit. svoist. min.*, no. 4 [калькибеборосилит, Calkibeborosilite]. The unnamed mineral from Tadzhikistan, USSR, of V. D. Dusmatov and N. S. Samsonova (1963) *Kristallografiya*, no. 8, 677, is assigned the ideal formula $CaYBeBSi_2O_8(OH)_2$ and named from its composition.

Calcio-ancylite-(Nd). P. Orlandi, M. Pasero and G. Vezzalini, 1990. *Eur. J. Min.* **2**, 413. Pink pine-cone-like crystals in miarolitic cavities of the Baveno granite, Montecatini quarry, Piedmont, Italy. Formula near $(Nd,Ce)_3Ca(CO_3)_4(OH)_3.H_2O$. Monoclinic, space group $Pm11$, a 4.976, b 8.468, c 7.212Å, β 90.04°, Z = 1. $D_{meas.}$>4.02; $D_{calc.}$ 4.08. Biaxial negative, α 1.660, β 1.725, γ 1.765; $2V_{meas.}$ 70°. Named by analogy with calcio-ancylite-(Ce) and ancylite-(Ce).

Calciohilairite. R. C. Boggs, 1988. *Amer. Min.* **73**, 1191. Pale blue crystals in miarolitic cavities in peralkaline granite from the Eocene Golden Horn batholith, northern Cascades, Washington. Trigonal, $R32$, a 20.870, c 16.002Å. $D_{meas.}$ 2.68, $D_{calc.}$ 2.74; ε 1.619, ω 1.622. Composition $CaZrSi_3O_9.3H_2O$. Named as the Ca analogue of *hilairite*.

Camgasite. K. Walenta and P. J. Dunn, 1989. *Aufschluss*, **40**, 369 (Camgasit). Colourless prismatic crystals forming part of the wall crust in the lower adit of the Johann mine, Wittichen, Germany. Ideal formula $CaMg(AsO_4)OH.5H_2O$. Monoclinic, space group probably $P2_1/m$, a 9.18, b 7.63, c 16.27Å, β 128°, Z = 4. $D_{meas.}$ 2.40; $D_{calc.}$ 2.335. Biaxial, α 1.540, β 1.548, γ 1.563, 2V 74°. Named from its chemical components.

Carbonate-vishnevite. E. I. Semenov, A. P. Khomyakov, G. E. Cherepivskaya and N. G. Ugryumova, 1984. *Min. Zhurn.* **6**, part 2, 50 [карбонат-вишневит]. Veinlets and prismatic crystals in cavities in syenites and associated pegmatites of the Karnasurt and Alluayv Mountains and the River Chinglusuay, Kola Peninsula, USSR. Formula near $Na_8(AlSiO_4)_6CO_3.H_2O$. Hexagonal, a 12.582, c 5.105Å. Optically uniaxial negative; $D_{meas.}$ 2.39–2.46, n 1.490–1.512. Described as the carbonate analogue of vishnevite, but the distinction from other members of the cancrinite group is not clear (*Amer. Min.* **73**, 927).

Cassedanneite. F. Cesbron, R. Giraud, F. Pillard and J.-F. Poullen, 1988. *Compt. Rend. Acad. Sci. Paris*, **306**, 125. Orange-red crystals with hexagonal outline associated with embreyite at Beresovsk, Urals, USSR. Monoclinic, $A2/m$, $A2$ or Am, with a 7.693, b 5.763, c 9.795Å. β 115.93°; D 6.37. Idealized formula $Pb_5(VO_4)(CrO_4)_2.H_2O$, the vanadate analogue of embreyite and probably forming a series with it. Named for J. P. Cassedanne of Rio de Janeiro.

Cebaite-(Nd). Peishan Zhang and Kejie Tao, 1986. *Bayan Obo Mineralogy*. Sci. Publ., Beijing, 208pp. A beige-coloured mineral from the Bayan Obo Fe–Nb–rare-earth deposit, Inner Mongolia, China. Formula $Ba_3(Nd,Ce)_2(CO_3)_5F_2$. As noted by the authors, the Ce:Nd ratio is 1.02:0.98 and the mineral is not Nd dominant. It is therefore not the Nd analogue of cebaite (33rd list) and should not have been named (*Amer. Min.* **73**, 1493).

Cervandonite-(Ce). Th. Armbruster, C. Bühler, S. Graeser, H. A. Stalder and G. Amthauer, 1988. *Schweiz. Min. Petrog. Mitt.* **68**, 125. Black saddle-like aggregates up to 4 mm in diameter; a fissure mineral in the two-mica gneisses of Pizzo Cervandone, Central Alps, Italy–Switzerland border. Formula $(Ce,Nd,La)(Fe^{3+},Fe^{2+},Ti^{4+},Al)_3SiAs(Si,As)O_{13}$. Monoclinic, space group, $C2$, Cm or $C2/m$, a 11.3, b 19.5, c 7.2Å, β 121°, Z = 6. Named for locality and following Levinson's scheme for nomenclature of rare earth minerals.

Cervelleite. A. J. Criddle, J. E. Chisholm and C. J. Stanley, 1989. *Europ. J. Min.* **1**, 371. Thin 30 μm rims surrounding acanthite in hessite and as vermiform inclusions in the latter. On spoil tips of the abandoned Bambolla mine, Moctezuma, Sonora, Mexico. Formula Ag_4TeS. Cubic, a 14.03Å, Z = 24; $D_{calc.}$ 8.53. Isotropic and opaque; reflectance values given. Alters rapidly in light, due to a surface reaction of photochemical origin. Named for Dr B. Cervelle.

Chayesite. D. Velde, O. Medenbach, C. Wagner and W. Schreyer, 1989. *Amer. Min.* **74**, 1368. Very small euhedral to subhedral crystals, a rock-forming silicate of the osumilite group, from a lamproite at Moon Canyon, Utah, USA. Composition $K(Mg,Fe^{2+})_4Fe^{3+}[Si_{12}O_{30}]$; related to roedderite. Hexagonal, probable space group $P6/mcc$, a 10.153, c 14.388Å, Z = 2. $D_{calc.}$ 2.68. Uniaxial positive, ω 1.575, ε 1.578. Named for Dr Felix Chayes of the Geophysical Laboratory, Washington, D.C.

Chekhovichite. E. M. Spiridonov, I. V. Petrova, L. A. Demina, V. I. Dolgikh and G. M. Antonyan, 1987. *Vestn. Mosk. Univ., Geol.* **42**,(6) 71 [чеховичит]; abstr. *Amer. Min.* **74**, 1400. Greyish crystalline aggregates up to 5mm across in fractures in quartz and chalcedony in oxidised ores from former mines at Zod, Armenia, and at Zhana-Tyube and North Aksu, northern Kazakhstan, USSR. Ideal composition $Bi_2Te_4O_{11}$. Monoclinic, space group $P2_1$, a 19.00, b 7.982, c 6.938Å, β 95.67°, Z = 4. $D_{meas.}$ 6.88; $D_{calc.}$ 7.002. Optically biaxial negative, α 2.45, β 2.50, γ 2.65, $2V_z$ 65°. Named for Prof. S. K. Chekhovich. The mineral is known as a synthetic compound.

Chernikovite. D. Atencio, 1988. *Min. Record*, **19**, 249. The name replaces 'hydrogen autunite' which is regarded as misleading, having a different degree of hydration and being originally named for artificial material. The type locality is an undisclosed locality in the USSR; also found at Perus, São Paulo, Brazil, and elsewhere in the USSR. Formula $(H_3O)_2(UO_2)_2(PO_4)_2.6H_2O$. Tetragonal, a 7.030, c 9.034Å. $D_{calc.}$ 3.264. Optically uniaxial negative, ε 1.569, ω 1.583. Named for A. A. Chernikov who originally described the natural material.

Chestermanite. R. C. Erd and E. E. Foord, 1988. *Canad. Min.* **26**, 911. Fibrous greyish-green crystals up to 2mm with a vitreous to silky lustre in a small brucite marble body in the Twin Lakes region, Fresno County, California, USA. Ideal formula $Mg_2(Fe^{3+},Mg,Al,Sb^{5+})BO_3O_2$. Orthorhombic, space group *Pnnm* or *Pnn*2, a 18.535, b 12.273, c 6.043Å, Z = 16. $D_{meas.}$ 3.72, $D_{calc.}$ 3.650. Biaxial positive; α 1.753–1.759, β 1.763–1.767, γ 1.791–1.797; 2V 63°. Named for its discoverer, Charles Chesterman. A member of the ludwigite–pinakiolite group.

Chlarite. *Min. Sbornik (L'vov)*, 1988, no. 42, 2, index page. Error for chlorite.

Clinobehoite. A. V. Voloshin, Ya. A. Pakhomovskii, D. L. Rogachoyv, T. N. Nadezhina, D. Yu. Puscharovskii and A. Yu. Bakhchisaraitsev, 1989. *Min. Zhurn.* **11**, no. 5, 88. Spherulitic aggregates of colourless to white lamellar crystals in pegmatites of the Murzinka region, Ural Mountains, USSR. Formula $Be(OH)_2$; the monoclinic polymorph of behoite. Space group $P2_1$, a 11.020, b 4.746, c 8.646Å, β 98.94°, Z = 12. Biaxial negative, α 1.539, β 1.544, γ 1.548, $2V_{meas.}$ 80°. $D_{meas.}$ 1.93; $D_{calc.}$ 1.91.

Clinobiotite. *Min. Zhurn.*, 1989, **11**, no. 5, contents page (101). Error for clinobehoite, *q.v.*

Damaraite. A. J. Criddle, P. Keller, C. J. Stanley and J. Innes, 1990. *Min. Mag.* **54**, 595. Colourless and transparent crystals in a manganese ore lens in the Asis West section of the Kombat mine, Namibia. Ideal formula $3PbO.PbCl_2$. Orthorhombic, a 15.104, b 6.891, c 5.806Å, Z = 3. $D_{calc.}$ 7.84. Reflectance values given. Named for the Damara sequence which hosts the Kombat deposit.

Diackethyst. A. L. Diack (1979). *Lapidary J.* **32**, 2621. Trivial name for translucent wine and amethystine coloured chalcedony pebbles from Craig, Montrose, Scotland. Named after the Revd Diack, M.A., former minister of Craig parish.

Diaoyudaoite. Shunxi Shen, Lirong Chen, Anchen Li, Tailu Dong, Qiuhuo Huang and Wenqiang Xu, 1986. *Acta Min. Sinica*, **6**, 224. Colourless to light green transparent thin tabular crystals, occurring abundantly in the heavy mineral fraction of sea-floor mud near the island of Diaoyudao, northwest of Taiwan. Ideal composition $NaAl_{11}O_{17}$. Hexagonal, space group $P6_3/mmc$, a 5.602, c 22.626Å, Z = 2; $D_{meas.}$ 3.30, $D_{calc.}$ 3.21. Optically uniaxial negative, ω 1.6876, ε 1.6630. Named for the locality. The data are in good agreement with those for artificial β-$NaAl_{11}O_{17}$.

Dollaseite-(Ce). D. R. Peacor and P. J. Dunn, 1988. *Amer. Min.* **73**, 838. Massive brown material associated with tremolite, norbergite and calcite at the Ostanmossa mine, Norberg district, Sweden. The mineral was called 'magnesium orthite' by P. Geijer (1927) *Sver. Geol. Unders*, **20**, 1, but was renamed as the mineral is not the magnesium analogue of allanite (orthite). Formula $CaCeMg_2AlSi_3O_{11}(OH)F$. Monoclinic, space group $P2_1/m$, a 8.934, b 5.721, c 10.176Å, β 114.31°, Z = 2. $D_{meas.}$ 3.9. Refractive indices α 1.715, β 1.718, γ 1.733. Named for Dr Wayne Dollase.

Donharrisite. W. H. Paar, T. T. Chen, A. C. Roberts, A. J. Criddle and C. J. Stanley, 1989. *Can. Min.* **27**, 257. Brown metallic mica-like flakes on a museum specimen collected before 1834, probably from the former Erasmus mine, Leogang, Salzburg Province, Austria. Ideal formula $Ni_8Hg_3S_9$. Monoclinic, space group $C2$, Cm or $C2/m$, a 11.66, b 6.91, c 10.92Å, β 97.43°, Z = 2. $D_{calc.}$ 5.18. Reflectance values given. Named for Donald C. Harris.

Dorrite. M. A. Cosca, R. C. Rouse and E. J. Essene, 1988. *Amer. Min.* **73**, 1440. Anhedral to prismatic grains associated with esseneite or titanian andradite in a paralava from the Powder River Basin, Wyoming, USA. A new member of the aenigmatite group, with end-

member formula $Ca_2(Mg_2Fe^{3+}{}_4)(Al_4Si_2)O_{20}$. Triclinic, *a* 10.505, *b* 10.897, *c* 9.019 Å, α 106.26°, β 95.16°, γ 124.75°, Z = 2. $D_{calc.}$ 3.959. Refractive indices α 1.82, β 1.84, γ 1.86. Named for Prof. J. A. Dorr of University of Michigan.

Edgarbaileyite. A. C. Roberts, M. Bonardi, R. C. Erd, A. J. Criddle, C. J. Stanley, G. Cressey, R. J. Angel and J. H. Gilles Laflamme, 1990. *Min. Record*, **21**, 215. Thin crusts on fracture surfaces at the Socrates mine, Sonoma County, California, and at the Clear Creek claim, San Benito County, California. Ideal formula $Hg^+{}_6Si_2O_7$; the first known silicate of mercury. Monoclinic, space group *C2/m*, *a* 11.725, *b* 7.698, *c* 5.967Å, β 112.07°, Z = 2. $D_{meas.}$ 9.4; $D_{calc.}$ 9.11. Reflectance values given. Named for Dr Edgar H. Bailey (1914–1983), geologist and mercury commodity specialist.

Eggletonite. D. R. Peacor, P. J. Dunn and W. B. Simmons, 1984. *Min. Mag.* **48**, 93. Dark brown prismatic crystals in miarolitic cavities in nepheline syenite at Big Rock quarry, Little Rock, Arkansas. Formula $(Na,K,Ca)_2(Mn,Fe)_8(Si,Al)_{12}O_{29}(OH)_7.11H_2O$; the Na analogue of ganophyllite. Monoclinic, space group *I2/a*, or *Ia a* 5.554, *b* 13.72, *c* 25.00 Å, β 93.95°, Z = 2. $D_{meas.}$ 2.76, $D_{calc.}$ 2.76. Optically biaxial negative, α 1.566, β 1.606, γ 1.606, 2V 9°. Named for Dr R. A. Eggleton, Australian National University.

Fedotovite. L. P. Vergasova, S. K. Filatov, Ye. K. Serafimova and G. L. Starova, 1988. *Dokl. Akad. Nauk SSSR*, **229**, 961 [федотовит]. Aggregates of poorly developed platy crystals and fine-grained crusts 1 to 2 mm thick as incrustations around fumaroles of the Great Clefted Tolbachik eruption, Kamchatka, USSR. Formula $K_2Cu_3O(SO_4)_3$. Monoclinic, space group $P2_1/c$, *a* 19.06, *b* 9.47, *c* 14.18Å, β 112.36°, Z = 8. $D_{meas.}$ 3.205; $D_{calc.}$ 3.17. Biaxial positive, α 1.577, β 1.594, γ 1.633, $2V_{calc.}$ 68°. Named for S. A. Fedotov. The relationship with euchlorine is unclear; *Amer. Min.* **75**, 241.

Fergusonite-(Ce). Yu. L. Kapustin, 1986. *Novye Dannye Mineral.* **33**, 43. Irregular poikiloblasts and rare prismatic dipyramidal crystals (up to 1 mm) from carbonatites of the Novopoltavsk Massif, USSR. Tetragonal, *a* 5.17, *c* 5.30Å. Formula $(Ce,Nd)NbO_4$. Optically uniaxial, ω 2.30, ε 2.20, *D* 5.48. Apparently the tetragonal polymorph of monoclinic fergusonite-beta-(Ce), but description is incomplete (*Amer. Min.* **74**, 946).

Fergusonite-(Nd). Peishan Zhang and Kejie Tao, 1987. *Zhongguo Xitu Xuebao*, **5**, 1. Dark brown granular or equant grains in aegirine veinlets in the Bayan Obo rare-earth deposit, Inner Mongolia, China. Ideal formula $(Nd,Ce)(Nb,Ti)O_4$. An incomplete description (*Amer. Min.* **74**, 946).

Ferrokesterite. S. A. Kissin and D. R. Owens, 1989. *Can. Min.* **27**, 673. A steel-grey mineral with metallic lustre from the Cligga mine, Perranzabuloe, Cornwall. Formula $Cu_2(Fe,Zn)SnS_4$; a polymorph of stannite and forms a series with kesterite, of which it is the iron analogue. Tetragonal, space group *I*=4, *a* 5.433, *c* 10.884 Å, Z = 2. $D_{calc.}$ 4.490. The mineral isostannite was found to be a member of the kesterite–ferrokesterite series.

Feruvite. J. D. Grice and G. W. Robinson, 1989. *Can. Min.* **27**, 199. Dark brown-black subhedral to anhedral grains up to 2 mm in diameter in a pegmatitic tourmalinized rock at Cuvier Island, New Zealand. Ideal formula $(Ca,Na)(Fe,Mg,Ti)_3(Al,Mg,Fe)_6(BO_3)_3Si_6O_{18}(OH)_4$; a member of the tournmaline group. Trigonal, space group *R3m*, *a* 16.012, *c* 7.245 Å, Z = 3. $D_{meas.}$ 3.207; $D_{calc.}$ 3.21. Optically uniaxial negative, ω 1.687, ε 1.669. The name alludes to the crystal-chemical similarity to uvite.

Fe-shafranovskite. V. V. Korovyshkin, A. P. Khomyakov and O. V. Anikeeva, 1987. *Novye Dannye Mineral.* **34**, 149. A doubtful Fe analogue of shafranovskite with formula given as $H_6(Na,K)_6(Fe,Mn)_3Si_9O_{27}.3H_2O$. From Khibiny, Kola peninsula, USSR. See discussion in *Amer. Min.* **75**, 432.

Florensovite. L. A. Reznitskii, E.V. Sklyarov, L. V. Piskunova and Z. F. Ushchapovskaya, 1989. *Zap. Vses. Min. Obshch.* **118**, 57 [флоренсовит]. Irregular opaque black fine-grained friable aggregates with kalininite enclosed in garnet and pyroxene; an accessory mineral in Cr–V-bearing metamorphic rocks in the Precambrian Sludyanka complex, S. Lake Baikal region, USSR. Ideal formula $(Cu,Zn)Cr_{1.5}Sb_{0.5}S_4$. Cubic, space group *Fd3m*, *a* 10.005 Å, Z = 8; $D_{calc.}$ 4.30. A sulphospinel, named after N. A. Florensov (1909–86).

Foordite. P. Černý, A.-M. Fransolet, T. S. Ercit and R. Chapman, 1988. *Canad. Min.* **26**, 889. Brownish-yellow material with a greenish tint, previously identified as thoreaulite, from Lutsiro, Ebya river, Rwanda, and Punia, Zaïre. Formula $SnNb_2O_6$. Monoclinic, space group *C2/c*, *a* 17.093, *b* 4.877, *c* 5.558 Å, β 90.85°, Z = 4; $D_{meas.}$ 6.73, $D_{calc.}$ 6.66. Biaxial positive. Named for Dr Eugene E. Foord. The work established the existence of a foordite–thoreaulite series.

Françoisite-(Nd). P. Piret, M. Deliens and J. Piret-Meunier, 1988. *Bull. Min.* **111**, 443. Yel-

low tabular crystals from a uraniferous pocket in the Cu–Co deposit of Kamoto-East, Kolwezai, southern Shaba, Zaïre. Formula $(Nd,Ce,Sm)(UO_2)_3O(OH)(PO_4)_2.6H_2O$. Monoclinic, space group $P2_1/c$, a 9.298, b 15.605, c 13.668Å, β 112.77°, Z = 4; space group $P2_1/c$, $D_{calc.}$ 4.63. Named after Dr Armand François, and following Levinson's rule for the nomenclature of rare-earth minerals.

Gananite. Longzai Cheng, Zongshao Hu, Shiwei Pan, Rongsheng Huang and Shuliang Guo, 1984. *Yanshi Kuangwu Ji Ceshi*, **3**, 119. Brown to black and greenish-black aggregates up to 0.15mm in diameter from wolframite-bearing quartz veins, Laikeng mining district, Ganan area, southern Jiangxi Province, China. Formula α-BiF_2; the compound is known artificially. Cubic, space group $P43m$, a 5.825Å, Z = 4; $D_{calc.}$ 8.928. Named from locality.

Gartrellite. E. H. Nickel, B. W. Robinson, O. FitzGerald and W. D. Birch, 1989. *Austral. Min.* **4**, 83. Translucent yellow crystals as coatings and cavity fillings at the Anticline deposit, Ashburton Downs, Western Australia, and in the Kintore Opencut, Broken Hill, New South Wales. Ideal formula $Pb(Cu,Fe)_2(AsO_4,SO_4)_2(CO_3,H_2O)_{0.7}$. Triclinic, a 5.685, b 7.664, c 5.685Å, α 98.0°, β 110.0°, γ 111.1°, Z = 1. $D_{calc.}$ 5.38. Refractive indices in range 1.94–2.00. Named after Blair J. Gartrell, discoverer of the mineral. It is related to the arsenates tsumcorite, helmutwinklerite and thometzekite.

Geigerite. S. Graeser, H. Schwander, R. Bianchi, T. Pilati and C. M. Gramaccioli, 1989. *Amer. Min.* **74**, 676. Platy, partly triangular crystals of rose-red colour up to 0.5mm in length in the abandoned manganese ore mines near Falotta, Oberhalbstein, Canton Grisons, Switzerland. Formula $Mn_5(H_2O)_8(AsO_3OH)_2(AsO_4)_2.2H_2O$. Triclinic, space group $P\bar{1}$, a 7.944, b 10.69, c 6.770Å, α 80.97°, B 84.20°, γ 81.85°, Z = 1. $D_{meas.}$ 3.05, $D_{calc.}$ 3.00. Optically biaxial negative, α 1.601, β 1.630, γ 1.660, $2V_{calc.}$ 89°. Geigerite is the Mn analogue of chudobaite and was named for Dr Thomas Geiger.

Girvasite. S. N. Britvin, Ya. A. Pakhomovsky, A. N. Bogdanova and E. V. Sokolova, 1990. *Min. Zhurn.* **12**, no.3, 79 [гирвасит]. Spherulites, up to 1.5mm across, consisting of prismatic colourless crystals from dolomitic carbonatites of the Kovdorian massif, Kola peninsula, USSR. Ideal formula $NaCa_2Mg_3(PO_4)_2[PO_2(OH)_2](CO_3)(OH)_2.4H_2O$. Monoclinic, space group $P2_1/c$, a 6.507, b 12.267, c 21.403A, β 90.37°, Z = 4. D 2.46. Optically biaxial negative, α 1.541, β 1.557, γ 1.565, 2V 60°. Named after Lake Girvas, located in the region of the massif.

Gosseixite. *Min. Sbornik (L'vov)*, 1986. no. 39, 2, index page. Error for gorceixite.

Grandreefite. A. R. Kampf, P. J. Dunn and E. E. Foord, 1989. *Amer. Min.* **74**, 927. Colourless prismatic crystals in a vug from the Grand Reef mine, Graham County, Arizona, associated with pseudograndreefite, laurelite and aravaipaite (all in this list). Formula $Pb_2SO_4F_2$, isostructural with $La_2O_2SO_4$. Orthorhombic, space group $I222$, a 4.439, b 13.575, c 4.333Å, Z = 2. $D_{meas.}$ 7.01, $D_{calc.}$ 7.15. Biaxial positive, small 2V, α 1.872, β 1.873, γ 1.897. Named for locality.

Griceite. J. van Velthuizen and G. Y. Ghao, 1989. *Can. Min.* **27**, 125. White translucent to opaque botryoidal aggregates or fine-grained powders in sodalite inclusions at the periphery of massive hornfels from the Poudrette quarry, Mont St-Hilaire, Quebec, Canada. Ideally LiF. Cubic, space group $Fm3m$, a 4.0293Å, Z = 4. $D_{meas.}$ 2.62; $D_{calc.}$ 2.67. Isotropic, n 1.3986. Named for Joel D. Grice.

Hawthorneite. S. E. Haggerty, I. E. Grey, I. C. Madsen, A. J. Criddle, C. J. Stanley and A. J. Erlank, 1989. *Amer. Min.* **74**, 668. An opaque mineral associated with lindsleyite in a veined, metasomatized, harzburgitic xenolith from a diamondiferous kimberlite pipe in Kimberley, South Africa. Formula $Ba[Cr_4Ti_3Fe_4Mg]O_{19}$. Hexagonal, space group $P6_3/mmc$, a 5.871, c 23.06Å, Z = 2. $D_{calc.}$ 5.02. Hawthorneite is the Ba analogue of yimengite and is isostructural with magnetoplumbite and barium ferrite, in the crichtonite group. Named for J. B. Hawthorne.

Hectorfloresite. G. E. Ericksen, H. T. Evans, Jr., M. E. Mrose, J. J. McGee, J. W. Marinenko and J. A. Konnet, 1989. *Amer. Min.* **74**, 1207. Tiny white prismatic crystals in slit-like cavities in nitrate ore at the Alianza mine, Oficina Victore, Province of Tarapacá, Chile. Formula $Na_9(IO_3)(SO_4)_4$, one of two double salts in the system $NaIO_3$–Na_2SO_4–H_2O. Monoclinic (pseudohexagonal space group $P2/a$, a 18.775, b 6.9356, c 14.239Å, β 108.91°, Z = 4. $D_{meas.}$ 2.80, $D_{calc.}$ 2.90. Biaxial negative, α 1.493, β 1.521, γ 1.523, $2V_x = 26°$. Named for Ing. Hector Flores W., Chilean geologist.

Helenite. G. Brown and J. Snow, 1989. *Austral. Gemm.* **17**, no. 3, 88. Trade name for green glass said to originate from Mount St Helens volcanic ash.

Hemloite. D. C. Harris, B. F. Hoskins, I. E. Grey, A. J. Criddle and C. J. Stanley, 1989. *Can. Min.* **27**, 427. Black and opaque subhedral to

anhedral grains in drill core samples from the Hemlo gold deposit, Hemlo, Ontario. Ideal formula $(As,Sb)_2(Ti,V,Fe,Al)_{12}O_{23}OH$. Triclinic, space group $P1$. a 7.158, b 7.552, c 16.014 Å, α 89.06°, β 104.32°, γ 84.97°, $Z=2$. $D_{calc.}$ 4.613. Reflectance values given. There is a close structural relationship between hemloite, derbylite and tomichite. Hemloite is named for the locality.

Hingganite-(Ce). R. Miyawaki, I. Nakai, K. Nagashima, A. Okamoto and T. Isobe, 1987. *Kobutsugaku Zasshi*, **18**, 17; abstr. in *Amer. Min.* **75**, 432. Light red-brown idiomorphic crystals 1 to 5 mm long from a pegmatite at the quarry of the Iwaguro Sekizai Company, Tahara area, Gifu Prefecture, Japan. Monoclinic, a 9.996, b 7.705, c 4.792 Å, β 90.06°. Formula $(Ce,Y)_2(\square,Fe^{2+})Be_2Si_2O_8(OH,O)_2$. Not submitted to the IMA.

Hydroxyl-vishnevite. E.I. Semenov, A. P. Khomyakov, G. E. Cherepivskaya and N. G. Ugryumova, 1984. *Min. Zhurn.* **6**, part 2, 50 [гидроксил-вишневит]. Light blue crystals from the Karnasurt Mountains, Kola Peninsula, USSR (see Carbonate-vishnevite). Formula near $Na_4(AlSiO_4)_3(OH).H_2O$. Hexagonal, space group $P6_32$, a 12.73, c 5.180 Å. D 2.32; refractive indices 1.501 and 1.494. Named as the hydroxyl analogue of vishnevite, but the distinction from other members of the cancrinite group is not clear.

Ilbaite. A. Motiu and L. Suciu, 1987. *Studia Univ. Babes–Bolyai, Geol.-Geogr.* **32**, pt.2, p.95 (Ilbait). White pulverent cryptotocrystalline masses from Ilba, Maramures County, Baia-Mare, Romania, in Pb–Zn–Cu mineralization. Usually considered to be kaolinite, the mineral proved to be allophane containing 0.14% TiO_2 and named as a variety of this mineral for the locality. An unacceptable name.

β-Iridisite. Zuxiang Yu, 1984. *Kexue Tongbao*, **13**, 100. Granular to shell-like grains in a placer deposit from an undisclosed locality in China. Composition range $(Ir,Cu,Rh,Ni,Pt)_{0.77-0.82}S_{2.00}$. Gave a pyrite-type X-ray powder pattern with a near 5.635 Å, $Z=4$. Strongly anisotropic, so the mineral is probably pseudocubic. $D_{calc.}$ 7.88. Reflectance values given. The name is intended to distinguish the mineral from 'normal' iridium sulphide. The data are incomplete [*Amer. Min.* **74**, 1215].

Isochalcopyrite. E. Missack, P. Stoffers and A. El Goresy, 1989. *Min. Deposita*, **24**, 82. Exsolution lamellae in isocubanite of an isotropic yellow phase with reflectivity lower than chalcopyrite. From Atlantis II Deep, Red Sea. Composition varies between $Cu_{7.3}Fe_{9.6}S_{16}$ and $Cu_{8.2}Fe_{8.6}S_{16}$. Description inadequate.

Jaffeite. H. Sarp and D. R. Peacor, 1989. *Amer. Min.* **74**, 1203. Colourless euhedral to subhedral elongated crystals with hexagonal cross section associated with defernite, from the Kombat mine, Namibia. Composition ideally $Ca_6Si_2O_7(OH)_6$, the natural analogue of tricalcium silicate hydrate, a component of cement. Hexagonal, space group $P\bar{3}$, a 10.026, c 7.482 Å, $Z=2$. $D_{meas.}$ 2.65, $D_{calc.}$ 2.58. Uniaxial positive, ω 1.596, ε 1.604. Named after Prof. H. Jaffe of the University of Massachusetts.

Jahnsite-(CaMnMn). J. D.Grice, P. J. Dunn and R. A. Ramik, 1990. *Amer. Min.* **75**, 401. Equant brownish-yellow crystals up to 0.5 mm in size from Mangualde, Portugal. Ideal composition $CaMnMn_2Fe^{3+}{}_2(PO_4)_4(OH)_2.8H_2O$; named as a member of the whiteite group using the 'extended Levinson system' nomenclature applied to the group by Moore and Ito (1978). Monoclinic, space group $P2/a$ or Pa, a 14.887, b 7.152, c 9.966 Å, β 109.77°, $Z=2$; $D_{meas.}$ 2.78, $D_{calc.}$ 2.798. Optically biaxial negative, α 1.643, β 1.659, γ 1.671, $2V_{meas.}$ 80°.

Jaspar. *British Museum (Nat. Hist.) Corporate Handbook* [1989], p. 27. Error for jasper.

Kalistroncite. *Min. Sbornik (L'vov)*, 1986, no. 40, 2, index page. Error for kalistrontite.

Kambaldaite. E. H. Nickel and B. W. Robinson, 1985. *Amer. Min.* **70**, 419. Emerald-green needles and prismatic crystals on fracture surfaces in oxidized Ni-Fe sulphide ore from Kambalda, Western Australia. Hexagonal, a 10.340, c 6.097 Å, $Z=1$, $D_{meas.}$ 3.18, $D_{calc.}$ 3.193, space group $P6_3$. Composition $Na_2Ni_8(CO_3)_6.H_2O$. Named from locality. Uniaxial positive, ω 1.65 and ε 1.69.

Kamchatkite. L. P. Vergasova, S.K. Filatov, E. Serafirmova and T. V. Veraksina, 1988. *Zap. Vses. Min. Obshch.* **117**, 459 [камчаткит]. Intergrowths and aggregates of yellow-brown crystals among the products of fumarolic activity at the Tolbachik main fracture eruption, Kamchatka, USSR, 1975–6. Idealized formula $KCu_3OCl(SO_4)_2$. Orthorhombic, a 9.741, b 12.858, c 7.001 Å, space group $Pnam$ or $Pna2_1$, $Z=4$. Named from the Kamchatka volcano.

Klyuchevskite. L. P. Vergasova, S. K. Filatov, M. G. Gorskaya, V.V. Anan'ev and A. S. Sharov, 1989. *Zap. Vses. Min. Obshch.* **118**, 70 [ключевскит]. Aggregates of disoriented, prismatic to acicular dirty-green crystals with a vitreous lustre, from fumarolic activity on the Tolbachik main fracture eruption, Kamchatka, USSR. Formula $K_3Cu_3Fe^{3+}O_2(SO_4)_4$.

Monoclinic, space group *I2/m*, *Im* or *I2*, *a* 18.412, *b* 4.944, *c* 18.640 Å, *β* 101.5°, Z = 2. Refractive indices *α* 1.549, *B* 1.550, *γ* 1.680, $2V_{calc.}$ 11°. The name is for the Klyuchevskaya group of volcanoes.

Komkovite. A. V. Voloshin, Ya. A. Pakhomovsky, Yu. P. Menshikov, E. V. Sokolova and Yu. K. Egorov-Tismenko, 1990. *Min. Zhurn.* **12**, no. 3, 69 [комковит]. 1–5 mm euhedral crystals in carbonatites of Vuorijarvi, Kola peninsula, USSR. Ideal formula $BaZrSi_3O_9.3H_2O$. Trigonal, space group *P*3, *a* 10.526, *c* 15.736 Å, Z = 6. *D* 3.31. Uniaxial negative, *ω* 1.671, *ε* 1.644. Named after A. I. Komkov.

Magnesioaubertite. G. Gebhard, O. Medenbach and W. Gebert, 1988. *Aufschluss*, **39**, 97 (Magnesioaubertit). Polycrystalline aggregates in masses of pickeringite from the Grotta de Faraglione, Vulcano Island, Italy. Triclinic, *a* 6.31, *b* 13.20, *c* 6.29 Å, *α* 91.74°, *β* 94.55°, *γ* 82.62°, Z = 1. Composition $(Mg,Cu)Al(SO_4)_2Cl.14H_2O$. Blue, transparent, *α* 1.466, *β* 1.481, *γ* 1.4875, $D_{meas.}$ 1.80. Named for its relation with aubertite.

Manganotapiolite. S. I. Lahti, B. Johanson and M. Virkkunen, 1983. *Bull. Geol. Soc. Finland*, **55**, 101. Prismatic, dark brown crystals from the granitic pegmatities of the Eräjärvi area, Orivesi, southern Finland, are the Mn-dominant analogue of tapiolite, $(Mn,Fe)(Ta,Nb)_2O_6$. Tetragonal, *a* 4.762, *c* 9.272 Å, Z = 2, $D_{calc.}$ 7.72. Named from its composition.

Maricopaite. D. R. Peacor, P. J. Dunn, W. B. Simmons, F. J. Wicks and M. Randsepp, 1988. *Can. Min.* **26**, 309. Translucent white acicular crystals with mimetite on a quartz matrix from the Moon Anchor mine, Tonopah, Maricopa County, Arizona. Orthorhombic, space group *Cmmm*, *C2mm*, *Cmm*2 or *C*222 with *a* 19.65, *b* 19.40, *c* 7.531 Å, Z = 1. Composition $(Pb_7Ca_2)(Si,Al)_{48}O_{100}.32H_2O$. $D_{meas.}$ 2.94, $D_{calc.}$ 2.96, *α* 1.563, *β* 1.582, *γ* 1.592. Named from locality.

Mawbyite. A. Pring, E. M. McBriar and W. D. Birch, 1989. *Amer. Min.* **74**, 1377. 'Dogstooth' to prismatic crystals of orange–brown to bright reddish-brown colour, forming drusy crusts on fractures at the Kintore Opencut, Broken Hill, New South Wales, Australia. General formula close to $Pb(Fe^{3+}_{1.5},Zn_{0.5})(AsO_4)_2(OH)_{1.5}(H_2O)_{0.5}$, the Fe analogue of tsumcorite. Monoclinic, probable space group *C2/m*, *a* 9.052, *b* 6.277, *c* 7.580 Å, *β* 114.57°, Z = 2. $D_{calc.}$ 5.53. Refractive indices > 1.94. Named for Sir Maurice Mawby.

Mcauslanite. J. M. Richardson, A. C. Roberts, J. D. Grice and R. A. Ramik, 1988. *Can. Min.* **26**, 917. Clusters, up to 4 mm across, of clear, tabular to acicular, yellowish-white fibres and bladed crystals at the East Kemptville tin mine, Yarmouth County, Nova Scotia, Canada. Formula $HFe^{2+}_3Al_2(PO_4)_4F.18H_2O$. Triclinic, space group *P*1 or $P\bar{1}$ with a 10.055, *b* 11.568, *c* 6.888A, *α* 105.84°, *β* 93.66°, *γ* 106.47°, Z = 1. $D_{meas.}$ 2.22, $D_{calc.}$ 2.17, $2V_{meas.}$ 55°, $2V_{calc.}$ 59.7°; biaxial negative with *α* 1.522, *B* 1.531, *γ* 1.534. Named for Dr David McAuslan.

Mereheadite. Quoted in C. Alabaster, 1989. *J. Russell Soc.* **2**, no. 2, p. 29. Premature disclosure of name of an incompletely characterized lead oxychloride mineral from the Mendip Hills, Somerset, now under investigation.

Moschelite. E. R. Krupp, G. Nottes and U. Heidtke, 1989. *Neues Jahrb. Min., Mh.*, 524. Fine crystalline crusts and small irregular plates on cinnabar at the Moschel-Landsberg mines, Obermoschel, Germany. Formula Hg_2I_2; the iodine analogue of calomel. Tetragonal, space group *I*4/*mmm*, *a* 4.920, *c* 11.600 Å, Z = 2. $D_{calc.}$ 7.75. Named for the locality.

Mückeite. G. Schnorrer-Kohler, U. Neumann and Th. Doering, 1989. *Neues Jahrb. Min., Mh.*, p.193. Tabular and elongated crystals with a metallic lustre and light grey colour with orange–yellow tint on old dumps of the former 'Grüne Au' mine, 15 km south of Siegen, Westfalen, Germany. Formula $CuNi(Bi,Sb)S_3$. Orthorhombic, space group $P2_12_12_1$, *a* 7.509, *b* 12.551, *c* 4.877 Å, Z = 4. $D_{calc.}$ 6.07, $D_{obs.}$ 5.88. Named for Prof. Arno Mücke.

Nacareniobsite-(Ce). O. V. Petersen, J. G. Rønsbo and E. S. Leonhardsen, 1989. *Neues Jahrb. Min., Mh.*, p. 84. Aggregate and individual colourless ruler-shaped crystals in lujavrite of the Ilímaussaq complex, Greenland. Ideal formula $NbNa_3Ca_3(Ce,La,Nd)(Si_2O_7)_2OF_3$; related to mosandrite. Monoclinic, space group $P2_1/a$, *a* 18.901, *b* 5.683, *c* 7.462 Å, *β* 101.29°, Z = 2. *D* 3.45. 2V 66°, *α* 1.6618, *B* 1.6706, *γ* 1.6924. Named from its composition and in accordance with Levinson's rule for the nomenclature of rare-earth minerals.

Nanpingite. Yueging Yang, Yunxiang Ni, Liben Wang, Wenying Wang, Yaping Zhang and Chenghu Chen, 1988. *Yanshi Kuangwuxue Zashi*, **7**, 49. Plates and scales up to 10 mm in diameter, white to silver white in colour, in a muscovite-albite-spodumene pegmatite in the Nanping area, Fujian Province, China. Ideal formula $CsAl_2(Si,Al)_4O_{10}(OH,F)_2$; the caesium analogue of muscovite. Monoclinic, space group *C2/c*, mica polytype $2M_1$, *a* 5.362, *b* 8.86, *c* 21.42 Å, *β* 95.77°, Z = 4. $D_{meas.}$ 3.11; $D_{calc.}$

3.19. Optically biaxial negative, α 1.551, B 1.584, γ 1.588, $2V_{meas.}$ 46°. Named from locality.

Norrishite. R. A. Eggleton and P. M. Ashley, 1989. *Amer. Min.* **74**, 1360. Shiny black flakes up to 1.5 mm across as a rock-forming mineral in Mn-schists from the Hoskins mine near Grenfell, New South Wales, Australia. It is a manganese mica with ideal composition $K(Mn^{3+}{}_2Li)Si_4)_{12}$. Monoclinic, space group $C2/m$, $C2$, or Cm, $1M$ polytype, with a 5.293, b 8.936, c 10.077 Å, B 98.0°, $Z=2$. Refractive indices α 1.636, β 1.687, γ 1.785, $2V_{calc.}$ 75°; $D_{meas.}$ 3.264. Named for Dr Keith Norrish of the CSIRO Division of Soils.

Odinite. S. W. Bailey, 1988. *Clay Min.* **23**, 237. An Fe^{3+}-rich green clay, widespread as infillings or replacements of microtests, bioclasts, faecal pellets or mineral debris on shallow marine shelves and reef lagoonal areas in tropical latitudes. Originally identified as chamosite or berthierine. Structural formula $(Fe^{3+},Mg,Al,Fe^{2+},Ti,Mn)_{2.422}(Si,Al)_2O_5(OH)_4$. Both monoclinic and trigonal polytypes are recorded, with $1M$ more abundant than $1T$. Unit cell dimensions: $1M$, a 5.373, b 9.326, c 7.363 Å, β 104.0; $1T$, a 5.366, b 9.334, c 7.161 Å, β 90° (on orthohexagonal axes). Indexed XRD powder data given for odinite from the Islands of Los, off Guinea. The structure is based on a 1:1 serpentine-type layer, intermediate between dioctahedral and trioctahedral. Named for G. S. Odin of Paris.

Opalite. J. I. Koivula and R. C. Kammerling, 1989. *Gems Gemmol.*, **25**, no.1, 30. Plastic imitation opal with 'true' colour-play.

Oulongolite. J. I. Koivula and R. C. Kammerling, 1989. *Gems Gemmol*, **25**, no. 4, 250 (oolongolite); D. Robert, 1989. *Rev. Gemmol.*, no. 101, p. 17 (oulongolite). Trade name for a synthetic material with the garnet structure marketed as a cut stone. Chemical nature not disclosed.

Pararobertsite. A. C. Roberts, B. D. Sturman, P. J. Dunn and W. L. Roberts, 1989. *Can. Min.* **27**, 451. Thin red transparent plates on whitlockite at the Tip Top pegmatite, Custer County, South Dakota, USA. Ideal formula $Ca_2Mn^{3+}{}_3(PO_4)_3O_2.3H_2O$. Monoclinic, space group $P2_1/c$, a 8.825, b 13.258, c 11.087 Å, β 101.19°, $Z=4$. $D_{meas.}$ 3.22; $D_{calc.}$ 3.22. Optically biaxial negative, α 1.79, β 1.81, γ 1.83, $2V_{meas.}$ 84°. Named for its close relationship to robertsite.

Parisite-(Nd). Peishan Zhang and Kejie Tao, 1986. *Bayan Obo Mineralogy*. Sci. Publ., Beijing, 208pp. Large yellowish-brown grains in a quartz matrix from the Bayan Obo Fe-Nb-rare-earth deposit in Inner Mongolia, northern China. Formula $(Nd,Ce)_2Ca(CO_3)_3F_2$. Uniaxial positive ω 1.679, ε 1.754; $D_{meas.}$ 4.2–4.5. Incompletely characterized (*Amer. Min.* **73**, 1497).

Parkinsonite. Quoted in C. Alabaster, 1989. *J. Russell Soc.* **2**, no. 2, p. 29. Premature disclosure of name of an incompletely characterised lead oxychloride mineral from the Mendip Hills, Somerset, now under investigation.

Paulkellerite. P. J. Dunn, J. D. Grice, F. J. Wicks and R. A. Gault, 1988. *Amer. Min.* **73**, 870. Wedge-shaped light greenish yellow lustrous crystals associated with native bismuth, a skutterudite-group mineral, pyrite, erythrite and bismutoferrite at the Neuhilfe mine, Schneeberg, East Germany. Formula $Bi_2Fe^{3+}(PO_4)O_2(OH)_2$. Monoclinic, $C2/c$, a 11.382, b 6.690, c 9.666 Å, β 114.73°, $Z=4$. Optically biaxial α 1.762, β 1.767, γ 1.825. Named for Dr Paul Keller of Stuttgart University.

Petrukite. S. A. Kissin and D. R. Owens, 1989. *Can. Min.* **27**, 673. Minute grains in polymetallic veins associated with granitic plutons at the Herb claim, Cassiar district, British Columbia; the Ikuno mine, Hyogo Prefecture, Japan; and Mount Pleasant mine, Charlotte County, New Brunswick. Formula $(Cu,Fe,Zn,Ag)_3(Sn,In)S_4$. Orthorhombic, space group $Pmn2_1$, a 7.6671, b 6.4399, c 6.2605 Å (Herb claim), $Z=2$. Named for W. Petruk.

Pinalite. P. J. Dunn, J. D. Grice and R. A. Bideaux, 1989. *Amer. Min.* **74**, 934. Very rare, bright yellow acicular bladed crystals associated with leadhillite at the Mammoth mine, Pinal County, Arizona. Formula $Pb_3WO_5Cl_2$. Orthorhombic, a 11.073, b 13.086, c 5,624 Å, space group $A2aa$ or $Amaa$, $Z=4$. Biaxial positive, α 2.490, β 2.495, γ 2.505, $2V_{meas.}=70°$. Named for the locality.

Ponomarevite. L. P. Veergasova, S. K. Filatov, E. K. Serafimova, T. F. Semenova, 1988. *Dokl. Akad. Nauk SSSR*, **300**, 1197 [пономаревит]. Transparent red grains with a gold tint as a cement and crust in the main Tolbachik fissure eruption, Kamchatka, USSR. Formula $K_4Cu_4OCl_{10}$. Monoclinic, space group $C2/c$, a 14.73, b 14.86, c 8.93 Å, β 104.9°, $Z=4$. $D_{calc.}$ 2.72; $D_{meas.}$ 2.78. Optically biaxial negative, α 1.686, β, 1.718; γ 1.720. Named for the volcanologist V. V. Ponomareva (1940–76).

Pseudograndreefite. A. R. Kampf, P. J. Dunn and E. E. Foord, 1989. *Amer. Min.* **74**, 927. Colourless square tabular crystals in a vug from the Grand Reef mine, Graham County, Arizona, associated with grandreefite, laurelite and ara-

vaipaite (all in this list). Formula $Pb_6SO_4F_{10}$, with a structure similar to grandreefite. Orthorhombic, space group $F222$, a 8.5182, b 19.5736, c 8.4926 Å, $Z=4$. $D_{meas.}$ 7.01, $D_{calc.}$ 7.08. Refractive indices, α 1.864, β 1.865, γ 1.873, 2V 30°.

Qinghelite. *Bull. Inst. Min. Deposits, Chinese Acad. Geol. Sci.*, no. 18 (1986), p. 109. Error for gingheiite.

Remondite-(Ce). F. Cesbron, C. Gilles, P. Pelisson and J. -C. Saugues, 1988. *Compt. Rend. Acad. Sci. Paris*, **307**, 915. Massive red material filling veinlets in a nepheline syenite at Eboundja, Kribi, Cameroon. Crystals are biaxial positive, α 1.632, β 1.633, γ 1.638; D 3.43. Monoclinic, pseudo-hexagonal, $P2_1$, a 10.444, b 6.313, c 10.445 Å, β 119.86°, $Z=2$. Formula $Na_3(Ce,La,Ca,Na,Sr)_3(CO_3)_5$; a *REE*–Na–Ca carbonate of the burbankite group. Named for G. Remond and in accordance with Levinson's rule for the nomenclature of rare-earth minerals.

Rittmannite. Y. M. F. Di Cossato, P. Orlandi and G. Vezzalini, 1989. *Can. Min.* **27**, 447. Pale yellow tabular pseudohexagonal crystals in altered phosphatic nodules from the Mangualde pegmatite, Portugal. Ideal formula $(Mn,Ca)Mn(Fe^{2+},Mn,Mg)_2(Al,Fe^{3+})_2(OH)_2(PO_4)_4.8H_2O$; it is the (MnMnFe) analogue of whiteite. Monoclinic, space group $P2/a$, a 15.01, b 6.89, c 10.16 Å, β 112.89°, $Z=2$. $D_{calc.}$ 2.83. Optically biaxial positive, α 1.622, β 1.626, γ 1.654, $2V_{meas.}$ 43°. Named after Prof. Alfred Rittmann (1893–1980).

Salanite. *Bull. Inst. Min. Deposits, Chinese Acad. Geol. Sci.*, no. 18 (1986), p. 108. Formula given as $CaSiO_3.H_2O$. Said to have been described in 1961, but no other data given. Probably a spelling error for solanite (=suolunite).

Sclarite. J. D. Grice and P. J. Dunn, 1989. *Amer. Min.* **74**, 1355. 1.5 mm clusters of clear colourless crystals from the Franklin mine, New Jersey, USA. Composition ideally $(Zn,Mg,Mn)_4Zn_3(CO_3)_2(OH)_{10}$. Monoclinic, space group $A2/a$, a 16.110, b 5.432, c 15.041 Å, β 95.490°, $Z=4$. Biaxial positive, α 1.648, β 1.664, γ1 1.702, $2V_{meas.}$ 63.4°, $2V_{calc.}$ 67°. $D_{meas.}$ 3.51, $D_{calc.}$ 3.547. Isostructural with loseyite, with Zn atoms occupying both the octahedral and tetrahedral sites. Named for Prof. C. B. Sclar of Lehigh University.

Scrutinyite. J. E. Taggart, Jr., E. E. Foord, A. Rosenzweig and T. Hanson, 1988. *Can. Min.* **26**, 905. Red-brown to clove-brown crystals associated with plattnerite in the Hansonburg mining district, Bingham, Socorro County, New Mexico (holotype locality) and from Mapimi, Mexico. Natural occurrences of α-PbO_2. Orthorhombic, a 4.91, b 5.956, c 5.438 Å, $Z=4$. $D_{calc.}$ 9.867. The name is for the close scrutiny needed to describe the species.

Shabaite-(Nd). M. Deliens and P. Piret, 1989. *Europ. J. Min.* **1**, 85. Pale yellow micaceous flakes and rosettes on a uraninite matrix, associated with other uranium and *REE* minerals from the Cu–Co deposit of E. Kamoto, Shaba, Zaïre. Formula $Ca(REE)_2(UO_2)(CO_3)_4(OH)_2.6H_2O$. Monoclinic, a 9.208, b 32.09, c 8.335 Å, β 90.3°, $Z=5$. 2V 44°; refractive indices α 1.534, β 1.590, γ 1.600; D 3.13. Named from the locality and in accordance with Levinson's rule for the nomenclature of rare earth minerals.

Sophiite. L. P. Vergasova, S.K. Filatov, T. F. Semyonova and T. M. Filosophova, 1989. *Zap. Vses. Min. Obshch.* **118**, 65 [софиит]. Druses of white transparent crystals (0.1–1.0 mm) with a pseudohexagonal habit, as a product of fumarolic activity in the Tolbachik main fracture eruption, Kamchatka, USSR. Idealized formula $Zn_2(SeO_3)Cl_2$. Orthorhombic, space group $Pccn$, a 10.151, b 15.224, c 7.719 Å, $Z=8$. $D_{calc.}$ 3.82. Refractive indices α 1.709, β 1.726, γ 1.750, 2V 81°. Named for Dr Sophii Naboko, authority on volcanic mineralogy in the USSR.

Strontiopiemontite. P. Bonazzi, S. Menchetti and A. Palenzona, 1990. *Eur. J. Min.* **2**, 519. Small deep red prismatic crystals in the manganese ore deposit of Val Graveglia, Liguria, Italy. Formula $CaSr(Al,Mn,Fe)_3Si_3O_{11}O(OH)$, a new member of the epidote group. Monoclinic, space group $P2_1/m$, a 8.862, b 5.682, c 10.191 Å, β 114.70°. $D_{meas.}$ 3.65–3.73; $D_{calc.}$ 3.73. Optically biaxial positive, $\bar{n}$ 1.763. Named as the strontium analogue of piemontite.

Strontiopyrochlore. A. V. Lapin, A. A. Malyshev, V. V. Ploshko and G. Ye. Cherepivskaya, 1986. *Dokl. Akad. Nauk SSSR*, **290**, 1212 [стронциопирохлор]. Pale yellow octahedral crystals up to 0.5 mm in diameter from dolomitic carbonatites of the Yenisei Ridge, USSR. Formula $(Sr,Ce,Ca)_{0.66}(Nb,Fe)_2(O,OH)_7$. Cubic, a 10.53 Å, isostructural with pyrochlore and named as the strontium analogue. D 3.80; n 2.08.

Sulrhodite. Kegiao Chen, Nicheng Shi and Zhizhong Peng, 1982. *Ko Hsueh Tung Pao*, **27**(8), 492; abstr. in *Amer. Min.* **74**, 1215. A single subhedral grain embedded in an irregular Pt–Fe grain from placer concentrates at an unstated locality in China. The ideal formula, Rh_2S_3, X-

ray and other data identify the mineral as bowieite (34th List).

Svyatoslavite. B. V. Chesnokov, E. V. Lotova, V. S. Pavlyutchenko, L. V. Usova, A. F. Bushmakin and T. P. Nishanbaev, 1989. *Zap. Vses. Min.Obshch.* **118**, 111 [святославит]. Prismatic crystals up to 0.8mm with a topaz-like habit in old burning mine dumps in the Chelyabinsk coal basin, south Ural Mts., USSR. Formula $CaAl_2Si_2O_8$. Orthorhombic, space group $P2_12_12_1$, a 8.232, b 8.606, c 4.852 Å, $Z=2$. $D_{calc.}$ 2.69. Refractive indices α 1.552, β 1.578, γ 1.581, 2V37°. Named for Dr Svyatoslav N. Ivanov (1911–), Soviet geologist.

Tschernichite. *Lapidary Journal*, Jan. 1990, p. 5. Premature disclosure of a new zeolite mineral name.

Tuliokite. V. N. Yakovenchuk, Ya. A. Pakhomovsky, A. V. Volashin, A. N. Bogdanova, N. A. Yamnova and D. Yu. Pushcharovsky, 1990. *Min Zhurn.* **12**, no.3, 74 [тулиокит]. A light grey mineral found in nepheline syenites of the Khibiny alkaline massif, Kola peninsula, USSR. Ideal formula $Na_6BaTh(CO_3)_6.6H_2O$. Trigonal, space group $R\bar{3}$, a 14.175, c 8.605 Å, $Z=3$. D 3.15. Uniaxial positive, ω 1.574, ε 1.587. Named for the River Tuliok, where the mineral was found.

Ulrichite. W. D. Birch, W. G. Mumme and E. R. Segnit, 1988. *Austral. Min.* **3**, 125. Sprays of pale apple green to lime green prismatic crystals up to 1mm long and 0.2mm thick in miarolitic cavities in pegmatoidal granite from a quarry 10 km SSW of Lake Boga, Victoria, Australia. Ideal formula $CaCu(UO_2)(PO_4)_2.4H_2O$. Monoclinic, space group $C2/m$, a 12.79, b 6.85, c 13.02 Å, B 91.03°, $Z=4$. Named for G. H. F. Ulrich (1830–1900).

Vaughanite. D. C. Harris, A. C. Roberts and A. J. Criddle, 1989. *Min. Mag.* **53**, 79. A rare primary constituent of the Golden Giant orebody of the Hemlo gold deposit, Ontario, Canada. Found as a 450×300 μm aggregate with pääkkönenite, stibnite, realgar and native arsenic, and as a 40 μm anhedral grain associated with stibarsen and chalcostibite. Ideal formula $TlHgSb_4S_7$. Triclinic, a 9.012, b 13.223, c 5.906A, α 93.27°, β 95.05°, γ 109.16°, $Z=2$. Named for Prof. D. J. Vaughan.

Vochtenite. P. C. Zwaan, C. E. S. Arps and E. de Grave, 1989. *Min. Mag.* **53**, 473. Brown crystal aggregates with a bronze lustre, associated with bassetite in Cu–Sn mineralization at the contact of the Carnmenellis granite with Devonian sandstones at Wheal Basset, Redruth, Cornwall. Formula $(Fe^{2+},Mg)Fe^{3+}[UO_2/PO_4]_4OH.12–13H_2O$. Monoclinic, a 12.606, b 19.990, c 9.990 Å, β 102.31°, $Z=3$. $D_{calc.}$ 3.663. Refractive indices α 1.575, β 1.589, γ 1.603; 2V 89°. Named for R. F. C. Vochten of the State University, Antwerp.

Voggite. A. C. Roberts, A. P. Sabina, T. S. Ercit, J. D. Grice, J. T. Szymański and R. A. Ramik, 1990. *Can. Min.* **28**, 155. Colourless to white transparent acicular crystals in cavities at the margin of an altered amygdaloidal basalt dyke at the Francon quarry, Montreal, Quebec, Canada. Ideal formula $Na_2Zr(PO_4)(CO_3)(OH).2H_2O$. Monoclinic, space group $I2/m$, a 12.251, b 6.557, c 11.755 Å, β 116.12°, $Z=4$. $D_{meas.}$ 2.70; $D_{calc.}$ 2.704. Optically biaxial positive, α 1.569, β 1.594, γ 1.622, $2V_{meas.}$ 81°. Named for Adolph Vogg, who first discovered the mineral.

Wawayandaite. P. J. Dunn, D. R. Peacor, J. D. Grice, F. J. Wicks and P. H. Chi, 1990. *Amer. Min.* **75**, 405. Colourless platy crystals with pearly lustre, some strongly curved, from Franklin, New Jersey. Ideal formula $Ca_6Mn_2BBe_9Si_6O_{23}(OH,Cl)_{15}$. Monoclinic, space group $P2/c$ or Pc, a 15.59, b 4.87, c 18.69 Å, B 101.84°, $Z=2$; $D_{meas.}$ 3.0; $D_{calc.}$ 2.98. Optically biaxial negative, α 1.619, β 1.631, γ 1.641, 2V 85°. Named in allusion to the grossly curved and winding habit of the preponderance of the crystals.

Werdingite. J. M. Moore, D. J. Waters and M. L. Niven, 1990. *Amer. Min.* **75**, 415. Brownish-yellow translucent crystals in a sillimanite-hercynite-rich band in a supracrustal gneissic sequence at Bok se Puts, Namaqualand, South Africa. Ideal formula $(Mg,Fe)_2Al_{14}Si_4B_4O_{37}$. Triclinic, space group $P\bar{1}$, a 7.995, b 8.152, c 11.406 Å, α 110.45°, β 110.85°, γ 84.66°, $Z=1$; $D_{meas.}$ 3.04, $D_{calc.}$ 3.07. Biaxial negative, α 1.614, B 1.646, γ 1.651, $2V_{meas.}$ 33°, $2V_{calc.}$ 42°. Named for Dr Günter Werding of Ruhr-Universität, Bochum, Germany.

Whiteite-(CaMnMg). J. D. Grice, P. J. Dunn and R. A. Ramik, 1989. *Can. Min.* **27**, 699. Yellowish bipyramidal crystals on massive beryl at the Tip Top mine, near Custer, South Dakota, USA. Ideal formula $CaMnMg_2Al_2(PO_4)_4(OH)_2.8H_2O$. Monoclinic, space group $P2/a$ or Pa, a 14.842, b 6.976, c 10.109 Å, β 112.59°, $Z=2$. $D_{meas.}$ 2.63; $D_{calc.}$ 2.64. Optically biaxial positive, α 1.580, β 1.584, γ 1.591, $2V_{meas.}$ 81°. Named in keeping with the Moore and Ito (1978) nomenclature proposal for the whiteite group (*Min. Mag.* **42**, 309).

Wilkinsonite. M. B. Duggan, 1990. *Amer. Min.* **75**, 694. Black anhedral groundmass grains in a fine-grained silica-undersaturated trachyte

from the Warrumbungle Volcano, central New South Wales, Australia. Ideal composition, $Na_2Fe^{2+}{}_4Fe^{3+}{}_2Si_6O_{20}$, a member of the aenigmatite group. Triclinic, a 10.355, b 10.812, c 8.906 Å, α 105.05°, B 96.63°, γ 125.20°, Z = 2. Optically biaxial positive with low 2V (c.10°), α 1.79, β 1.79, γ 1.90. $D_{calc.}$ 3.89. Named for J. F. G. Wilkinson.

Yoshiokaite. D. T. Vaniman and D. L. Bish, 1990. *Amer. Min.* **75**, 676. Occurs as shocked crystal fragments and in devitrified glasses from a rare lunar Apollo 14 regolith breccia. Composition $Ca_{8-x/2}\square_{x/2}Al_{16-x}SiO_{32}$, a metastable phase in the system CaO–Al_2O_3–SiO_2. Hexagonal, space group $P\bar{3}$, a 9.939, c 8245 Å, with a nepheline-like structure. Anomalous optical properties, due to lattice strain. Named for T. Yoshioka (1935–1983), who made synthetic studies of this system.

Zabuyelite. Mianping Zheng and Wengao Liu (1987). *Acta. Min. Sinica*, **7**, 221. Crystals 1.5 to 20 μm long embedded in halite in rock-salt layers at the Zabuye Salt Lake, Nagri, Tibet. After subtracting impurities of gaylussite and northupite, the ideal formula is Li_2CO_3. Monoclinic, space group $C2/c$, a 8.356, b 4.964, c 6.185 Å, β 114.6°, Z = 4. $D_{meas.}$ 2.09; $D_{calc.}$ 2.096. Optically biaxial negative, α 1.4285, B 1.5672, γ 1.5743, 2V 25°. Named for locality.

Zhanghengite. Kuiren Wang, 1986. *Acta Min. Sinica*, **6**, 220. Irregular-shaped grains in the matrix of a meteorite that fell on Boxian County, Anhui Province, China, on October 20, 1977. Composition near CuZn with a little Fe, Al and Cr. A cubic alloy, space group $Im3m$ with a 2.952 Å, Z = 1. $D_{calc.}$ 8.32. A phase of equivalent composition is known in the system Cu–Zn. Named for Zhang Heng, Chinese astronomer.

Zincovoltaite. Wanmao Li, Guoying Chen and Shurong Sun, 1987. *Acta Min. Sinica*, **7**, 307. Green-black to oil-green grains 1 to 2mm in size in the oxidation zone of sphalerite–galena–pyrite deposit at Xitieshan, Qinghai Province, China. Ideal formula $K_2Zn_5Fe^{3+}{}_3Al(SO_4)_{12}.18H_2O$; the zinc analogue of voltaite. Cubic, space group $F3c$, a 27.1180 Å, Z = 16. $D_{meas.}$ 2.756, $D_{calc.}$ 2.767. Optically anomalously uniaxial, n 1.605.

Zodacite. P. J. Dunn, J. D. Grice and W. C. Metropolis, 1988. *Amer. Min.* **73**, 1179. Individual yellow crystals and aggregates of radiating crystals associated with a Mn-rich jahnsite-group mineral, phosphosiderite and hureaulite on a specimen from the Mangualde pegmatite, Portugal. Ideal formula $Ca_4MnFe^{3+}{}_4(PO_4)_6(OH)_4.12H_2O$. Monoclinic, space group $C2/c$ or Cc, a 10.152, b 24.14, c 6.308 Å, β 91.14°, Z = 2. $D_{meas.}$ 2.68; $D_{calc.}$ 2.65. 2V 83°, with α 1.598, β 1.601, γ 1.602. Zodacite is a Mn-dominant member of the montgomeryite group. Named after Peter Zodac.

[*Manuscript received 24 September 1990*]