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New Mineral Names*,†

Dmitriy I. Belakovskiy[1], and Yulia Uvarova[2]

[1]Fersman Mineralogical Museum, Russian Academy of Sciences, Leninskiy Prospekt 18 korp. 2, Moscow 119071, Russia
[2]CSIRO Mineral Resources, ARRC, 26 Dick Perry Avenue, Kensington, Western Australia 6151, Australia

In this issue

This New Mineral Names has entries for 11 new species, including 7 minerals of jahnsite group: jahnsite-(NaMnMg), jahnsite-(NaMnMn), jahnsite-(CaMnZn), jahnsite-(MnMnFe), jahnsite-(MnMnMg), jahnsite-(MnMnZn), and whiteite-(MnMnMg); lasnierite, manganflurlite (with a new data for flurlite), tewite, and wumuite.

Lasnierite*

B. Rondeau, B. Devouard, D. Jacob, P. Roussel, N. Stephant, C. Boulet, V. Mollé, M. Corre, E. Fritsch, C. Ferraris, and G.C. Parodi (2019) Lasnierite, (Ca,Sr)(Mg,Fe)$_2$Al(PO$_4$)$_3$, a new phosphate accompanying lazulite from Mt. Ibity, Madagascar: an example of structural characterization from dynamic refinement of precession electron diffraction data on submicrometer sample. European Journal of Mineralogy, 31(2), 379–388.

Lasnierite (2017-084), ideally (Ca,Sr)(Mg,Fe)$_2$Al(PO$_4$)$_3$, was discovered as inclusions in 1.97 carats, 10 × 8 × 6 mm oval-cut faceted lazulite-bearing quartz from Mount Ibity (Bity), Madagascar. The stone was obtained on the market and exact provenance is unknown. Five surface-reaching lasnierite crystals were identified based on similar Raman spectra. The cut stone is originated from the lazulite-bearing metaquartzite horizon of sedimentary origin. The metamorphic sequence belongs to the Itremo Group that reached greenschist- to amphibolite-facies grade, at 450–550 °C and 3.5 kbar. In addition to quartz and lazulite, the mineral association contains chlorapatite, celestite, monazite-(Ce), xenotime-(Y), augelite, trolleite, svanbergite, goyazite, crandallite, berlinite, anhydrite, ilmenite, titanomagnetite, rutile, hematite, muscovite, kyanite, zircon, dumortierite, tourmaline, clinoamphibole, and undetermined Sn-bearing acicular inclusions. The new mineral form transparent slightly pale pinkish brown euhedral crystals 60 to 120 μm in length on the gem surface. Other physical properties were not measured due to the small crystal size; D_{calc} = 3.162 g/cm^3. The crystals are anisotropic with no pleochroism observed. Other optical properties were not measured because crystals are embedded in quartz; n_{calc} = 1.582. The Raman spectrum of lasnierite contains the following bands (cm^{-1}; w = weak, m = medium, s = strong): a doublet at 99s and 122s; a single peak at 418s, and a triplet at 985s, 1028s, and 1040s; modes at 278m, 510m, 569m, 621m, 661m, 808m, 1063m, 1100m, 1126m, and 1148m, and peaks at 209w, 355w, and 465w (associated with quartz matrix). The very weak peak at 808 cm^{-1} may be assigned to P-F bond symmetric stretching. There were no peaks observed between 1200 and 4000 cm^{-1} indicating the absence of CO$_2$, (OH), or (H$_2$O) groups. The averaged 7 point WDS electron probe analysis is [wt%, (range)]: P$_2$O$_5$ 49.41 (48.29–50.57), Al$_2$O$_3$ 10.30 (9.42–11.14), MgO 13.34 (12.89–13.88), FeO 9.08 (8.90–9.20), CaO 7.65 (7.38–7.84), SrO 9.00 (8.00–9.53/0.51), BaO 0.06 (0.02–0.09), SiO$_2$ 0.16 (0.04–0.28), F 2.62 (2.40–2.69), Cl 0.02 (0–0.07), O=(F,Cl)$_2$ 1.11, total 100.52. The presence of light elements such as Li, B, and Be was checked using the LA-ICP-MS analysis, but their concentrations were below detection limits. The empirical formula is $(Ca_{0.59}Sr_{0.37})_{Σ0.96}(Mg_{1.42}Fe_{0.54})_{Σ1.96}Al_{0.87}(P_{2.99}Si_{0.01})_{Σ3.00}(O_{11.41}F_{0.59})_{Σ12}$ based on 12 (O+F) pfu. The strongest lines of the calculated powder X-ray diffraction pattern are [d_{calc} Å (I%$_{calc}$; *hkl*)]: 4.421 (83; 040), 3.802 (63, 131), 3.706 (100; 022), 3.305 (99; 141), 2.890 (90; 211), 2.781 (69; 221), 2.772 (67; 061), 2.601 (97; 023). It was not possible to perform powder nor single-crystal X-ray diffraction study as the individual crystals could not be extracted from the quartz matrix. The crystal structure of lasnierite was solved and refined to R_{all} = 15.01% on the extracted focused ion beam (FIB) lamella (~80 μm thick) using the method of precession electron diffraction tomography (PEDT) associated to dynamical refinement. The lasnierite is orthorhombic, *Pbcn*, a = 6.2771(3), b = 17.684(3), c = 8.1631(4) Å, V = 906.1 Å^3, Z = 4. The crystal structure of lasnierite is built by pairs of edge-connected (Mg,Fe) octahedra linked together through corner-sharing with PO$_4$ tetrahedra and Al octahedra. The P1 tetrahedron and Al octahedron share the O2–O2 edge. The remaining sites are occupied by Ca and Sr, which are hosted in channels oriented along [001] (c axis). Fluorine was ascribed to the phosphate tetrahedra substituting for oxygen. The new mineral is named in honor of Emeritus Professor Bernard Lasnier, who taught geology, mineralogy, and gemology at the University of Nante, France, and conducted the first and detailed studies on lazulite-bearing quartzite from Intremo. The type material is deposited in the Muséum National d'Histoire Naturelle, Paris, France. **Yu.U.**

Manganflurlite* and new data for Flurlite*

A.R. Kampf, I.E. Grey, C.M. Macrae, and E. Keck (2019) Manganflurlite, $ZnMn_3^{2+}Fe^{3+}(PO_4)_3(OH)_2(H_2O)_7·2H_2O$, a new schoonerite-related mineral from the Hagendorf-Süd pegmatite. European Journal of Mineralogy, 31(1), 127–134.

The new mineral manganflurlite (IMA2017-076), ideally $ZnMn_3^{2+}Fe^{3+}(PO_4)_3(OH)_2(H_2O)_7·2H_2O$, monoclinic, was discovered on two specimens of phosphophyllite from the famous Hagendorf-Süd pegmatite, Oberpfalz, Bavaria, Germany (49°39′1″N, 12°27′35″E). The ideal formula for its zinc analogue, flurlite, has been revised to $Zn_4Fe^{3+}(PO_4)_3(OH)_2(H_2O)_7·2H_2O$. Manganflurlite forms random (jackstraw) aggregates , or (occasionally) divergent fans of long, very thin, rectangular laths, up to 0.5 mm long and less than 10 μm thick. Laths are elongated by [100], flattened on {001} and exhibit the forms {100}, {010}, and {001}. No twinning was observed. The mineral is orange-brown, transparent with a vitreous iridescent luster and buff streak. Crystals are flexible and elastic having an irregular fracture. The cleavage is perfect on {001} and good on {100} and {010}. The Mohs hardness is ~2½; D_{meas} = 2.73(2), D_{calc} = 2.737 g/cm^3. At room

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* All minerals marked with an asterisk have been approved by the IMA CNMMC.
† For a complete listing of all IMA-validated unnamed minerals and their codes, see http://cnmnc.main.jp/ (click on "IMA list of minerals").

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temperature, the mineral dissolves rapidly in dilute HCl. Optically, manganflurlite is biaxial (–), $\alpha = 1.623$(calc), $\beta = 1.649(2)$, $\gamma = 1.673(2)$ (white light); $2V = 86(1)°$; $X = \mathbf{c}$, $Y = \mathbf{b}$, $Z = \mathbf{a}$. The dispersion of optical axes is weak, $r > v$, slight; the optical orientation is. The pleochroism is X – pale yellow brown > Y – orange brown > Z – light yellow brown. The averaged electron probe WDS analyses for holotype (16-point) / cotype (21-point) specimens [wt% (range)] are: MgO 0.39 (0.27–0.60) / 0.28 (0.14–0.37), CaO 0.02 (0–0.11) / 0.04 (0–0.13), MnO 13.54 (12.76–14.60) / 14.20 (13.31–15.19), ZnO 17.29 (16.01–18.84) / 13.68 (12.68–14.80), Fe_2O_{3total} 16.52 (15.50–17.33) / 20.92 (19.30–22.79) [apportioned in according structural data to FeO 6.26 / 9.78 and Fe_2O_3 9.57 / 10.05], Al_2O_3 0.32 (0.17–0.50) / 0.20 (0.09–0.32), P_2O_5 26.85 (26.08–27.68) / 27.61 (25.13–29.17), H_2O (by structure) 22.79 / 23.48, total 97.03 / 99.32. The empirical formulae based on 3 P and 23 O apfu are $Zn(Mn^{2+}_{1.51}Fe^{2+}_{0.69}Zn_{0.68}Mg_{0.08})_{\Sigma 2.96}(Fe^{3+}_{0.95}Al_{0.05})_{\Sigma 1.00}(PO_4)_3(OH)_{1.92}(H_2O)_{9.08}$ / $Zn(Mn^{2+}_{1.54}Fe^{2+}_{1.05}Zn_{0.30}Mg_{0.05})_{\Sigma 2.95}(Fe^{3+}_{0.97}Al_{0.03})_{\Sigma 1.00}(PO_4)_3(OH)_{1.88}(H_2O)_{9.12}$. The strongest lines of the powder X-ray diffraction pattern are [d Å (I%; hkl)]: 12.89 (100; 001), 8.43 (38; 011), 6.14 (22; $\overline{1}01$), 5.57 (28; 012,110), 4.241 (26; 003,022), 3.206 (29; 130,multiple), 2.776 (95; 040,220,024), 2.713 (27; $\overline{1}24$,104), 1.605 (21; $\overline{2}61$,260). The unit-cell parameters refined from the powder data with whole-pattern fitting are $a = 6.435(4)$, $b = 11.163(5)$, $c = 13.175(5)$ Å, $\beta = 99.96(2)°$, $V = 932.1$ Å^3. Single-crystal data shows manganflurlite is monoclinic, $P2_1/m$, $a = 6.4546(8)$, $b = 11.1502(9)$, $c = 13.1630(10)$ Å, $\beta = 99.829(5)°$, $V = 933.44$ Å^3, $Z = 2$. The crystal structure, refined including all protons to $R_{obs} = 0.034$ for 2219 observed $I > 3\sigma I$ reflections, shows the mineral to be isostructural with flurlite. These minerals have a heteropolyhedral layer structure that is a topological isomer of the schoonerite structure. The layers are parallel to {001} and with H_2O groups between them. The slab-like layers contain along [100] the chains of edge-sharing $M2$- octahedra and the chains in which Fe^{3+}-centered octahedra share their apices with edge-sharing units comprised of one $^{[5]}$Zn-centered trigonal bipyramid and one $P2$-centred PO_4 tetrahedron. These two types of chains are interconnected by corner-sharing along [010]. A second type of PO_4 tetrahedron ($P1$-centred) connects the chains to $M1O_2(H_2O)_4$ octahedra along [010] to complete the {001} slabs. The structure of flurlite/manganflurlite differs from that of schoonerite by different octahedra-tetrahedra linkages: two independent octahedra $M2$ and $M3$ in the structure of schoonerite group minerals with coordinations $M2O_4(OH)_2$ and $M3O_2(OH)_2(H_2O)_2$ are replaced by a single octahedron $M2$ with intermediate coordination $M2O_3(OH)_2(H_2O)$ in flurlite/manganflurlite lowering the symmetry from orthorhombic $Pmab$ to monoclinic $P2_1/m$. Same way as the structure of strunzite differs from that of laueite. In the original description of flurlite (Grey et al. 2015) dominant Mn^{2+} was assigned to $M1$ by analogy with schoonerite and dominant Zn was assigned to $M2$, but a reanalysis of the data showed that Zn was dominant in both $M1$ and $M2$ sites. The revised ideal formula of flurlite is $Zn_4Fe^{3+}(PO_4)_3(OH)_2(H_2O)_7{\cdot}2H_2O$. Holotype and cotype specimens are deposited in the Natural History Museum of Los Angeles County, California, U.S.A. **D.B.**

References cited

Grey, I.E., Keck, E., Mumme, W.G., Pring, A., and MacRae, C.M. (2015) Flurlite, $Zn_3Mn^{2+}Fe^{3+}(PO_4)_3(OH)_2{\cdot}9H_2O$, a new mineral from the Hagendorf Süd pegmatite, Bavaria, with a schoonerite-related structure. Mineralogical Magazine, 79, 1175–1184.

Tewite* and Wumuite*

G. Li, Y. Xue, and M. Xiong (2019) Tewite: a K–Te–W new mineral species with a modified tungsten-bronze type structure, from the Panzhihua-Xichang region, southwest China. European Journal of Mineralogy, 31(1), 145–152.

Y. Xue, G. Li, and Y. Xie (2020) Wumuite ($KAl_{0.33}W_{2.67}O_9$)—a new mineral with an HTB-type structure from the Panzhihua–Xichang region in China. European Journal of Mineralogy, 32(5), 483–494.

Tewite, $(K_{1.5}\square_{0.5})_{\Sigma 2}(Te^{4+}_{1.25}W_{0.25}\square_{0.5})_{\Sigma 2}W_5O_{19}$, orthorhombic, and wumuite $KAl_{0.33}W_{2.67}O_9$, hexagonal, are two new minerals with tungsten bronze (TB)-type-related structure recently discovered in the vicinity of Nanyang village, Huaping County, Panzhihua–Xichang region, on the border between Yunnan and Sichuan Provinces, China (26°46′18.21″N, 101°27′13.86″E). Both found in the same sample from the Neoproterozoic Sinian biotite–quartz monzonite pluton (800 Ma) near the contact zone with Permian gabbro. The boulder of lightly weathered adamellite was crushed, sieved, elutriated, and grains of new species were selected from a heavy mineral concentrate. The associated minerals are alkali feldspar, biotite, clinoamphibole, ilmenite, zircon, zoisite, tourmaline, monazite-(Ce), allanite-(Ce), scheelite, tellurite, and potentially new WO_3 mineral. Tewite and wumuite form intergrows with each other and with sheelite. The former was also found intergrown with tellurite. The formation of tewite and wumuite may be related to the nearby quartz-vein-type Au mineralization being formed by the metasomatic reaction of a high-temperature fluid rich in W and Te with the potassium feldspar of the monzonite. The type specimens of tewite and wumuite have been deposited in the Geological Museum of China, Beijing, China.

Tewite, (IMA 2014-053), $(K_{1.5}\square_{0.5})_{\Sigma 2}(Te^{4+}_{1.25}W_{0.25}\square_{0.5})_{\Sigma 2}W_5O_{19}$, forms greenish yellow translucent to transparent platy-columnar crystals up to 0.1 × 0.2 × 0.5 mm with a light-yellow to white streak and adamantine luster. It is brittle, has three directions of perfect cleavage on {100}, {001}, and {010}. Mohs hardness is 3½–4. The density and refractive indexes were not measured; $D_{calc} = 6.903$ g/cm^3; $n_{calc} = 2.04$. The mineral is optically biaxial (+), $2V = 70$. The IR spectrum shows no feature above 1000 cm^{-1}. The bands (cm^{-1}) are at: 997(w), 923(w), 861(w), 825(m) (W–O octahedra stretching); 766(m), 709(m), and 680(w) (Te–O polyhedra stretching). The average of 16 point electron probe WDS analyses on 2 grains [wt% (range)] are: Na_2O 0.13 (0–0.35), K_2O 5.08 (4.75–5.37), WO_3 83.34 (82.51–84.49), TeO_2 11.32 (10.73–11.64), total 99.86. The empirical formula, based on 19 O is $(K_{1.61}Na_{0.06}\square_{0.33})_{\Sigma 2.00}(Te_{1.06}W_{0.35}\square_{0.59})_{\Sigma 2.00}W_5O_{19}$. The strongest X-ray powder-diffraction lines [d Å (I%; hkl)] are: 6.486 (50; 040), 3.833 (100; 001), 3.621 (30; 200), 3.198 (65; 080), 2.454 (50; 081), 1.844 (30; 390), 1.637 (25; 401), 1.574 (55; 480). Unit-cell parameters refined from the powder data are $a = 7.240(2)$, $b = 25.792(4)$, $c = 3.8142(7)$ Å, $V = 712.2$ Å^3. Single-crystal X-ray data obtained on the 0.1 × 0.07 × 0.05 mm crystal shows tewite is orthorhombic, $Pban$, $a = 7.2585(4)$, $b = 25.8099(15)$, $c = 3.8177(2)$ Å, $Z = 2$. The structure was refined to $R_1 = 0.075$ for 742 unique reflections. It is a new, tungsten-bronze type derivative structure. The layers of corner-sharing WO_6 octahedra parallel to (001) running along **a** connected to hexagonal rings of an ideal hexagonal-tungsten-bronze geometry in tewite are divided by strongly distorted TeO_6 octahedra into ribbons which are displaced by ½ a to each other, lowering the symmetry. Two mutually exclusive sites in hexagonal channels || **c** partly occupied by K ions. The mineral named for its composition.

Wumuite, (IMA2017-067a), $KAl_{0.33}W_{2.67}O_9$, forms light green transparent hexagonal tabular on {001}and modified by minor {100} crystals up to 0.3mm across with a vitreous to adamantine luster and white streak. It is brittle with good cleavage on {001} and {100}. Mohs hardness is ~5–6. Density and refractive indexes were not measured; $D_{calc} = 6.52$ g/cm^3; $n_{calc} = 2.13$. The IR spectrum in the region of 4000–400 cm^{-1} shows bands (cm^{-1}) at: 816 (WO stretching of WO_6 octahedra) and at 523, 475, 446, 424 (W–O bending). The average of 10 point electron probe WDS analyses on one grain [wt% (range)] is: K_2O 5.55 (5.16–5.85), Al_2O_3 2.52 (2.40–2.68), WO_3 91.16 (88.45–92.35), TeO_2 0.59 (0.54–0.75), total 99.82. The empirical formula based on 9 O pfu is $K_{0.80}(W_{2.68}Al_{0.34}Te_{0.03})_{\Sigma 3.05}O_9$. The strongest X-ray powder-diffraction lines [d Å (I%; hkl)] are: 6.261 (36; 010), 3.727 (30; 001), 3.161 (100; 020), 2.610 (10; 111), 2.413 (40; 021), 1.881 (10; 002), 1.820 (15; 220), 1.577 (15; 040). The unit-cell parameters refined from the powder XRD data are: $a = 7.285(5)$, $c = 3.767(1)$ Å, $V = 173.1$ Å^3. Single-crystal X-ray data obtained on the 0.07 × 0.07 × 0.05 mm crystal shows wumuite is hexagonal, *P*6/*mmm*, a = 7.2952(5), c = 3.7711(3) Å, Z = 1. The structure refined to R_1 = 0.025 for 164 unique reflections. Wumuite has a hexagonal tungsten bronze structure. The layers of corner-sharing $(W,Al)O_6$ octahedra || (001), connect to form a hexagonal ring channel (tunnel) occupied by K ions. The name is for the Wumu River near the source area. **D.B.**

New minerals of jahnsite group: Jahnsite-(NaMnMg)*, Jahnsite-(NaMnMn)*, Jahnsite-(CaMnZn)*, Jahnsite-(MnMnFe)*, Jahnsite-(MnMnMg)*, Jahnsite-(MnMnZn)*, Whiteite-(MnMnMg)*

A.R. Kampf, P. Elliott, B.P. Nash, L. Chiappino, and S. Varvello (2018) Jahnsite-(NaMnMg), a new Jahnsite-group mineral from the Sapucaia Mine, Brazil and the White Rock No. 2 quarry, Australia. Canadian Mineralogist, 56(6), 871–882.

P. Elliott and A.R. Kampf (2019) Jahnsite-(NaMnMn), IMA 2019-051. CNMNC Newsletter No. 52; Mineralogical Magazine, 83, 891.

I.E. Grey, E. Keck, A.R. Kampf, C.M. MacRae, J.D. Cashion, and A.M. Glenn (2020) Jahnsite-(CaMnZn) from the Hagendorf-Süd pegmatite, Oberpfalz, Bavaria, and structural flexibility of jahnsite-group minerals. Mineralogical Magazine 84(4), 547–553.

P. Vignola, F. Hatert, N. Rotiroti, F. Nestola, A. Risplendente, and F. Vanini (2019) Jahnsite-(MnMnFe), $Mn^{2+}Mn^{2+}Fe^{2+}_2Fe^{3+}_2(PO_4)_4(OH)_2\cdot 8H_2O$, a new phosphate mineral from the Malpensata Pegmatite, Olgiasca, Colico Municipality, Lecco Province, Italy. Canadian Mineralogist, 57(2), 225–233.

P. Vignola, F. Hatert, M. Baijot, N. Rotiroti, A. Risplendente, and S. Varvello (2019) Jahnsite-(MnMnMg), $Mn^{2+}Mn^{2+}Mg^{2+}_2Fe^{3+}_2(PO_4)_4(OH)_2\cdot 8H_2O$, a New phosphate mineral species from Sapucaia Pegmatite, Sapucaia Do Norte, Galiléia, Minas Gerais, Brazil. Canadian Mineralogist, 57(3), 363–370.

A.R. Kampf, P. Alves, A. Kasatkin, and R. Škoda (2019) Jahnsite-(MnMnZn), a new jahnsite-group mineral, and formal approval of the jahnsite group. European Journal of Mineralogy, 31(1), 167–172.

P. Elliott and A.C. Willis (2019) Whiteite-(MnMnMg), a new jahnsite-group mineral from Iron Monarch, South Australia: description and crystal structure. Canadian Mineralogist, 57(2), 215–223.

Seven new minerals species belonging to jahnsite group were recently discovered. Originally jahnsite [now jahnsite-(CaMnMg)] was described by Moore (1974). Its crystal structure was determined by by Moore and Araki (1974). Considering a variety of cation substitutions Moore and Ito (1978) gave the general formula $XM1M2_2M3_2(PO_4)_4(OH)_2\cdot 8H_2O$ for "jahnsite-whiteite complex series" where the X site accommodates the largest cations (Ca, Na, Mn), the *M*1 and *M2* sites occupied by medium- to small octahedrally coordinated cations (Mn^{2+}, Fe^{2+}, Fe^{3+}, Mg, Zn). The *M*3 site accommodates the small octahedrally coordinated cations Fe^{3+} or Al^{3+}. The *M*2 and *M*3 sites each correspond to two similar structural sites, *M*2a/*M*2b and *M*3a/*M*3b). In the proposed naming scheme, the root name jahnsite was applied to minerals with $M3 = Fe^{3+}$ and whiteite to those with $M3 = Al^{3+}$. The root name is followed by a suffix -(*XM*1*M*2). Generally ionic radii increase in the order $M3 < M2 < M1 < X$. This scheme was formally approved by CNMNC IMA and jahnsite group with jahnsite and whiteite subgroups was established. The crystal structure of jahnsite-group minerals is based on the chains of sharing *trans*-OH corners $[M3O_4(OH)_2]$ octahedra extend along **b** and decorated by bridging $P1O_4$ and $P2O_4$ groups. In the **a**-direction the chains are linked by XO_8 square antiprisms, forming dense $[XM1M3_2(OH)_2(PO_4)_4]_4$ slabs parallel to {001}; the *M*1 octahedron shares edges with two $P1O_4$ tetrahedra. Slabs are linked in the **c**-direction via $M2(O,H_2O)_6$ octahedra, which share corners with $P1O_4$ and $P2O_4$ tetrahedra and by hydrogen bonding. Including abstracted below the jahnsite group currently counts 21 species (14 of jahnsite- and 7 of whiteite- subgroup). The exclusion in the naming rule made for keckite [otherwise "jahnsite-($CaMnFe^{3+}$)"] and ritmannite [otherwise "whiteite-(MnMnFe)"].

Jahnsite-(NaMnMg), $(Na,Ca)(Mn^{2+},Fe^{3+})(Mg,Fe^{3+},Mn^{3+})_2Fe^{3+}_2(PO_4)_4(OH)_2(H_2O)_8$, was discovered at the Sapucaia pegmatite, 12 km NNE of Galiléia,Conselheiro Pena pegmatite district, Minas Gerais, Brazil (18°54′2″S, 41°29′4″W), and the White Rock No. 2 quarry, Bimbowrie Conservation Park, ~22 km N of Olary, South Australia, Australia (32°4′53″S, 140°19′45″E). At both localities, it is a low temperature, secondary mineral formed as the result of alteration of primary phosphates. At Sapucaia it was found in vugs in frondelite and altered albite in association with meurigite-K, phosphosiderite, and strengite. At White rock jahnsite-(NaMnMg) occurs in seams in late-stage phosphate nodules between the quartz core and intermediate feldspar-rich zone associating with phosphosiderite, ushkovite, strunzite, and bermanite. Jahnsite-(NaMnMg) was previously reported from the Tip Top pegmatite, South Dakota, U.S.A. (Kampf et al. 2008), forming small zones in jahnsite-(NaFeMg) crystals. The size of these zones did not allow its full characterization. Jahnsite-(NaMnMg) forms light orange to orange-yellow transparent to translucent prisms 0.06 to 0.5 mm, elongate on [100], exhibiting the forms {100}, {001}, and {011} and twinned by reflection on {001}. It has very pale yellow streak and vitreous luster. No fluorescence under UV light was observed. The mineral is brittle, with the stepped (splintery) fracture and one perfect cleavage on {001}. The Mohs hardness is ~4; D_{meas} = 2.68(1) / 2.69(3) and D_{calc} = 2.684 / 2.738 g/cm^3 (Sapucaia / White Rock). The mineral is slowly soluble in dilute HCl. Jahnsite-(NaMnMg) is optically biaxial (–), α = 1.642, β = 1.675, γ = 1.677 (white light), $2V$=27(2)°; Z = **b**; X^**c** = 51° in obtuse β. Pleochroism is X – colorless ≈ Y > Z – orange-yellow. Dispersion of optical axes is very strong, $r < v$. The averaged electron probe WDS analyses (14 spots on 5 crystals from Sapucaia / 24 spots on 2 crystals from White Rock) are [wt% (range)]: Na_2O 2.16 (1.74–2.45) / 2.35 (1.19–3.51), CaO 1.73 (1.31–2.21) / 1.53 (0.72–4.89), MgO 7.64 (7.21–7.91) / 6.15 (5.41–6.92), [MnO 8.27 (7.49–10.07) / 10.72 (7.25–15.92), Mn_2O_3 0 / 3.94 (5.41–6.92) apportioned according structural data], Fe_2O_3 23.83 (22.39–25.12) / 20.77 (18.10–23.79), Al_2O_3 1.31 (0.77–1.84) / 0.13 (0.03–0.27), P_2O_5 35.23 (34.71–35.70) / 34.02 (32.44–35.22), H_2O (by structure) 20.31 / 19.45, total 100.48 / 99.06. The empirical formulae based on 26 O apfu are: $(Na_{0.56}Ca_{0.25}Mn^{2+}_{0.09})_{\Sigma 0.90}(Mn^{2+}_{0.85}Fe^{3+}_{0.15})_{\Sigma 1.00}(Mg_{1.53}Fe^{3+}_{0.47})_{\Sigma 2.00}(Fe^{3+}_{1.79}Al_{0.21})_{\Sigma 2.00}(PO_4)_4(OH)_{1.83}(H_2O)_{8.17}$ / $(Na_{0.63}Ca_{0.23}Mn^{2+}_{0.14})_{\Sigma 1.00}(Mn^{2+}_{0.68}Mn^{3+}_{0.26}Fe^{3+}_{0.05}Mg_{0.01})_{\Sigma 1.00}(Mg_{1.26}Mn^{2+}_{0.43}Mn^{3+}_{0.16}Fe^{3+}_{0.15})_{\Sigma 2.00}(Fe^{3+}_{1.97}Al_{0.02})_{\Sigma 1.99}(PO_4)_4(OH)_{1.98}(H_2O)_{8.02}$. The strongest lines of the powder X-ray diffraction pattern [d Å (I%; hkl)] are: 9.29 (100; 001), 5.02 (27; 210), 4.91 (30; 111), 3.935 (20; 310), 3.546 (32; $31\overline{2}$,400,112), 2.975 (26; 401), 2.834 (91; 022), 2.601 (33; $42\overline{1}$), 1.944 (33; 232,$40\overline{5}$,024), 1.887 (22; $80\overline{2}$). (Sapucaia). Unit-cell parameters refined from the powder data with whole pattern fitting are a = 15.096(4), b = 7.153(4), c = 9.888(74) Å , β = 110.575(8)°, V = 999.6 Å^3. The single-crystal X-ray data show the mineral is monoclinic, *P*2/*a*, a = 15.1045(15), b = 7.1629(2), c = 9.8949(7) Å, β = 110.640(7)°, V = 1001.83 Å^3, Z = 2 (Sapucaia). The structure was refined to R_1 = 3.19% for 1941 $I_o > 2\sigma I$ reflections (Sapucaia) and R_1 = 6.94% for 13485 $I_o > 2\sigma I$ reflections (White Rock). The holotype specimen from the Sapucaia mine is housed in the Natural History Museum of Los Angeles County, California, U.S.A. The cotype specimen from the White Rock No.2 quarry is deposited in the South Australian Museum, North Terrace, Adelaide, South Australia, Australia.

Jahnsite-(NaMnMn), (IMA 2019-051), $NaMn^{2+}(Mn^{2+}Fe^{3+})_{\Sigma 2.00}Fe^{3+}_2(PO_4)_4(OH)_2\cdot 8H_2O$ was discovered at Wiperaminga Hill West Quarry, Boolcoomatta Reserve, Olary Province, South Australia, Australia (31°57′42″S, 140°27′34″E).

This species pending full publication. Only already published data are provided below. The main lines in the powder XRD pattern [d Å (I%; hkl)] are 9.310 (58; 001), 5.035 (26), 4.940 (24), 4.664 (25), 3.948

(24), 3.551 (34), 2.851 (100), 2.608 (27).

Monoclinic: *P*2/*a*; *a* = 15.136(1), *b* = 7.2035(3), *c* = 9.9876(6) Å, β = 110.361(5)°. Type material is deposited in the South Australian Museum, North Terrace, Adelaide, South Australia, Australia.

Jahnsite-(CaMnZn), $CaMn^{2+}Zn_2Fe^{3+}_2(PO_4)_4(OH)_2 \cdot 8H_2O$, was discovered at the 67 m level of the Hagendorf-Süd pegmatite mine, Oberpfalz, Bavaria, Germany (49°39′1″N, 12°27′35″E). The mineral occurs as thin yellow crusts and brown epitactic growths on altered phosphophyllite in an oxidized 30 ×40 ×50 cm nodule of former triphylite that had been replaced by phosphophyllite and minor apatite with chalcophanite, hopeite, jahnsite-(CaMnMn), Zn-bearing laueite, scholzite/parascholzite, parahopeite, schmidite, stewartite, vivianite, whitmoreite/earlshannonite, and zincostrunzite. The new mineral is often covered with a thin orange-yellow film of Zn-bearing santabarbaraite or green mitridatite. The crystals of jahnsite-(CaMnZn) contain intergrowths of jahnsite-(CaMnMn) on a scale of ~50 μm. The mineral forms blocky crystals lath-like crystals elongated on [100] and flattened on {001} up to 100 μm in size in two almost orthogonal orientations with a good cleavage on {001}. Other macroscopical properties and density are not given; D_{calc} = 2.87 g/cm^3. Optically jahnsite-(CaMnZn) is biaxial (–), α = 1.675(2), β = 1.686(2), γ = 1.691(2) (white light); 2V_{calc} = 68°; *Z* = **b**. Pleochroism is imperceptible. Dispersion was not observed. The IR spectrum has bands at (cm^{-1}): 3270 (H_2O groups and strongly hydrogen-bonded hydroxyl ions), 1640 (H-O-H bending of H_2O), 1015 (PO_4^{3-} stretching). The averages of 6 electron probe WDS analyses (with defocused to 5 μm beam) for each of crystal zones with high / low Zn content [wt% (standard deviation)] are: CaO 3.72 (0.2) / 6.21 (0.2), MnO 13.7 (1.7) / 14.6 (1.5), MgO 0.82 (0.2) / 0.82 (0.1), ZnO 6.76 (1.1) / 3.89 (1.0), Fe_2O_3(total) 23.3 (3.1) / 22.3 (3.2) [apportioned to FeO 1.04 / 1.00 and Fe_2O_3 22.1 / 21.2 based on Mössbauer data], P_2O_5 31.7 (0.3) / 31.7 (0.5), H_2O (by structure) 18.2 / 18.3, total 98.04 / 97.72. The empirical formulae based on 26 O apfu, considering Mössbauer data and applying the IMA-approved site assignment procedure are respectively: $(Ca_{0.59}Mn_{0.24})_{\Sigma0.83}Mn(Zn_{0.74}Mn^{2+}_{0.48}Mg_{0.18}Fe^{2+}_{0.13}Fe^{3+}_{0.47})_{\Sigma2.00}Fe^{3+}_2(P_{1.00}O_4)_4(OH)_{2.03}(H_2O)_{7.97}$ and $(Ca_{0.98})Mn_{0.90}(Zn_{0.42}Mn^{2+}_{0.92}Mg_{0.18}Fe^{2+}_{0.12}Fe^{3+}_{0.36})_{\Sigma2.00}Fe^{3+}_2(P_{0.99}O_4)_4(OH)_{1.97}(H_2O)_{8.03}$. The last one according to the group nomenclature corresponds to jahnsite-(CaMnMn). The main lines of the powder XRD pattern [*d* Å (*I*%; *hkl*)] are: 9.356 (40; 001), 5.018 (43; 210), 4.677 (32; 002), 3.509 (30; 400), 3.473 (24; $\bar{4}02$), 2.853 (100; 022), 2.600 (16; $42\bar{1}$), 1.961 (22; 024), 1.882 (18; $80\bar{2}$). No crystals suitable for single-crystal studies were found. The Rietveld refinement converged at R_p = 6.7%, R_{wp} = 9.4%. The quantitative phase analysis gave the phase composition 46.5(7)% jahnsite-1 + 46.8(7)% jahnsite-2 + 6.7(3)% phosphophyllite. The refined cell parameters for the two jahnsite phases are: *a* = 15.059(1) / 15.059(1), *b* = 7.1885(6) / 7.1885(6), *c* = 10.031(2) / 9.960 Å, β = 111.239(8) / 111.239(8)°, *V* = 1012.1 / 1005.0 Å^3. The phase with a higher *c* parameter is assigned to jahnsite-(CaMnZn). The mineral is monoclinic, *P*2/*a*, *Z* = 2. The structural flexibility of jahnsite-group minerals to accommodate cations of quite different sizes in the *X* and *M*1 sites is discussed in terms of rotations about the 7 Å axis of two independent octahedra centered at the *M*3 sites. The holotype sample is preserved in the Museum Victoria, Melbourne, Victoria, Australia. Crystals from the holotype are deposited as cotype in the Natural History Museum of Los Angeles County, Los Angeles, California, U.S.A.

Jahnsite-(MnMnFe) (IMA 2018-096), $Mn^{2+}Mn^{2+}Fe^{2+}_2Fe^{3+}_2(PO_4)_4(OH)_2 \cdot 8H_2O$, was discovered in the dumps of the Malpensata pegmatite mine close to the village of Olgiasca, Colico municipality, Lecco province, Italy (46°07′20″N, 9°19′33″E). The primary phosphate association is dominated by graftonite-group minerals with sarcopside and triphylite. Arrojadite-(KNa), arrojadite-(BaNa), wyllieite, ferrowyllieite, and karenwebberite are rare primary phosphates in this association. Alteration of primary phosphates in the Malpensata dike results in the formation of ~15 secondary phosphates including jahnsite-(CaMnFe) and jahnsite-(CaMnMn). Jahnsite-(MnMnFe) was found on the surface of 1 cm diameter cavity in the albite matrix in close association with rockbridgeite and mitridatite. It forms dark orange-brown translucent, prismatic crystals up to 0.2 mm elongated along **a**, slightly flattened on (010), and are twinned by reflection on (001). The mineral has a vitreous luster and pale greenish-brown streak. No fluorescence in UV light was observed. It is brittle with an irregular fracture and a perfect {001} cleavage. Mohs hardness is estimated as ~4; D_{calc} = 2.654 g/cm^3. The mineral is optically biaxial (–), α = 1.673(3), β = 1.685, γ = 1.689 (λ = 589 nm), 2V_{calc} = 60°; *X* = **b**, *Y* ~ **c**, *Z* = **a**. The dispersion of optical axes is moderate *r* < *v*. It is pleochroic *X* – dark brown, *Y* – brownish orange, *Z* – yellow. The average of 6-point electron probe WDS analyses [wt% (range)] is: Na_2O 0.17 (0.09–0.27), CaO 1.69 (1.24–2.37), MgO 0.68 (0.50–0.94), MnO 15.40 (14.63–16.25), ZnO 0.33 (0.11–0.48), FeO_{total} 28.30–29.13 [apportioned to Fe_2O_3 18.88 and FeO 11.88 to have 2(Fe^{3+} + Al) in *M*3 site], Al_2O_3 0.04 (0–0.07), P_2O_5 33.68 (33.23–34.15), H_2O (by stoichiometry and charge balance) 18.54, total 101.30. The empirical formula based on 4 P apfu is: $(Mn_{0.40}Ca_{0.25}Na_{0.05})_{\Sigma0.70}Mn(Fe^{2+}_{1.39}Mn_{0.43}Mg_{0.14}Zn_{0.03})_{\Sigma2.00}(Fe^{3+}_{1.99}Al_{0.01})_{\Sigma2.00}(PO_4)_4(OH)_{1.35} \cdot 8H_2O$. The main lines in the powder XRD pattern are [*d* Å, (*I*%; *hkl*)]: 9.221 (89; 001), 5.749 (43; $11\bar{1}$), 4.932 (78; $\bar{2}11$), 4.651 (78; 002), 3.971 (71; 211), 3.504 (64; $\bar{4}00$), 3.295 (46; $\bar{2}03$), 2.840 (82; 320), 2.590 (100; $\bar{4}21$). The unit-cell parameters refined from the powder data are *a* = 14.941(52), *b* = 7.143(3), *c* = 9.925(38) Å, β = 110.2(4)°. Single-crystal XRD data obtained on a twinned 150 × 80 × 70 μm crystal shows jahnsite-(MnMnFe) is monoclinic, *P*2/*a*, *a* = 15.1559(6), *b* = 7.1478(2), *c* = 10.0209(4) Å, β = 112.059(4)°, *V* = 1006.11 Å^3, *Z* = 2. The crystal structure refined to *R* = 7.05% for 2779 F_o>4(F_o) reflections. The holotype sample is deposited in the Mineralogical Collection of the Laboratoire de Minéralogie, University of Liége, Belgium.

Jahnsite-(MnMnMg) (IMA 2017-118), $Mn^{2+}Mn^{2+}Mg^{2+}_2Fe^{3+}_2(PO_4)_4(OH)_2 \cdot 8H_2O$, was discovered in the dumps of the Sapucaia pegmatite, Sapucaia do Norte, Galiléia, Minas Gerais, Brazil (18°54′3″S, 41°29′4″W). The pegmatite dike has five zones with phosphates occurring in the inner wall zone and inner zone forming two different phosphate mineral associations. The phosphates in association with stronger oxidation conditions are dominated by lipscombite with ferrisicklerite, heterosite, variscite, rockbridgeite, barbosalite, phosphosiderite, hureaulite, and jahnsite subgroup minerals. Jahnsite-(MnMnMg) was previously mentioned here by Baijot et al. (2012) as rim or intergrowths with ferrisicklerite, or as acicular yellow crystals. The specimen with jahnsite-(MnMnMg) described in this work was found as single crystals or groups of crystals perched on cleavelandite in the cavities hosted by a metasomatic unit of the pegmatite. It is a late-stage alteration product of triphylite and is closely associated with frondelite, leucophosphite, and mangangordonite. The mineral forms yellow to honey-colored or greenish-yellow translucent, vitreous prismatic crystals up to 250 μm weakly elongated along **a**, flattened on [010], and twinned by reflection on (001). It has very pale yellow streak, is brittle with irregular fracture, and good cleavage on {001}. The Mohs hardness is estimated as ~4; D_{calc} = 2.625 g/cm^3. No fluorescence under UV light was observed. The mineral is optically biaxial (–), α = 1.616, β = 1.619(3), γ = 1.656(2) (λ = 589 nm), 2V_{calc} = 74°; dispersion of optical axes is strong *r* < *v*; *X* ≈ **c**. The pleochroism is: *X* – greenish gray; *Y* – yellow; *Z* – greenish yellow. The average of 5-point electron probe WDS analyses [wt% (range)] is: Na_2O 0.77 (0.45–0.95), CaO 1.72 (1.49–1.96), MgO 6.16 (5.53–6.64), MnO 17.41 (15.67–19.79), ZnO 0.12 (0.03–0.26), P_2O_5 34.45 (33.44–35.17), FeO_{total} 15.96 (14.85–16.74) [apportioned to Fe_2O_3 15.75 and FeO 1.79 to have 2(Fe^{3+}+Al) in *M*3 site], Al_2O_3 2.31 (0.54–3.13), H_2O (by stoichiometry and charge balance) 19.35, total 99.83. The empirical formula based on 4 P apfu is: $(Mn_{0.50}Ca_{0.25}Na_{0.20})_{\Sigma0.95}Mn(Mg_{1.26}Mn_{0.52}Fe^{2+}_{0.21}Zn_{0.01})_{\Sigma2.00}(Fe^{3+}_{1.63}Al_{0.37})_{\Sigma2.00}(PO_4)_4(OH)_{1.70} \cdot 8H_2O$. The main lines in the powder XRD pattern are [*d* Å, (*I*%; *hkl*)]: 9.282 (100; 001), 4.945 (39; 111), 4.627 (20; 002), 3.984 (18; 211), 3.521 (43; 112), 2.988 (52; $21\bar{3}$), 2.842 (81; 022), 2.601 (18; 510), 1.958 (27; 024). The unit-cell parameters refined from the powder data are a = 14.919(48), b = 7.145(5), c = 9.927(38) Å, β = 110.2(4)°, V = 993 Å^3. Single-crystal XRD data obtained on a 170 × 120 × 100 μm crystal shows jahnsite-(MnMnMg) is monoclinic, $P2/a$, a = 15.177(2), b = 7.176(1), c = 10.006(3) Å, β = 111.01(2)°, V = 1017.3 Å^3, Z = 2. The crystal structure refined to R_1 = 4.04% for 1703 $I>3\sigma(I)$ unique reflections. The holotype sample is deposited in the Mineralogical Collection of the Laboratoire de Minéralogie, University of Liége, Belgium.

Jahnsite-(MnMnZn), (IMA 2017-113), $Mn^{2+}_2Zn_2Fe^{3+}_2(PO_4)_4(OH)_2$ $8H_2O$, was discovered at the Herdade dos Pendões manganese and iron mine, 5 km north of the village Odemira, Beja district, Portugal (37°38′33″N, 8°37′52″W). It occurs in a highly altered (leached and silicified) gossan in association with Zn-bearing libethenite, quartz, rhodochrosite, and santabarbaraite. The mineral forms sub-parallel bundles of light golden brown prisms or thick blades up to 0.3 mm elongated on [001] with shallow pyramidal terminations. Crystals are twinned presumably by reflection on {001}; they are transparent with vitreous to silky luster and white streak. No fluorescence under UV light was observed. The mineral is brittle with irregular, splintery fracture, and at least one good cleavage on {001} and Mohs hardness ~4; D_{meas} = 2.89(2), D_{calc} = 2.898 g/cm^3. At room temperature, the mineral is rapidly soluble in dilute HCl. Jahnsite-(MnMnZn) is optically biaxial (+), a = 1.655(2), b = 1.662(2), c = 1.673(2) (white light); 2V = 78(1)°; pleochroism: X – nearly colorless < Y ≈ Z (beige). Dispersion was not observed; optical orientation was not determined. The features of the Raman spectrum (cm^{-1}) are: broad band consisting of three components at 3440, 3278, and 3248 (O-H stretching vibrations); broad weak band at 1614 (H-O-H bending); strong bands at 1069 and 970 (ν_3 antisymmetric and ν_1 symmetric stretching of PO_4^{3-}, respectively); 621, 582, and 556 (ν_4 out-of-plane bending modes of PO_4^{3-}); 487 and 428 cm^{-1} (ν_2 bending modes of PO_4^{3-}); 337, 246, 180 (metal-oxygen stretching and lattice modes). The average of 5-point electron probe WDS analyses [wt% (range)] is: Na_2O 0.54 (0.48–0.61), CaO 0.63 (0.59–0.71), MgO 0.47 (0.45–0.50), MnO 19.15 (18.64–19.57), ZnO 9.25 (8.90–9.50), FeO_{total} 18.33 (18.16–18.55) (apportioned to Fe_2O_3 18.39 and FeO 1.70 for the charge balance), Al_2O_3 0.03 (0–0.05), P_2O_5 32.72 (32.07–33.47), H_2O (calculated based on 26 O pfu) 18.49, total 101.37. The empirical formula based on 26 O pfu, total of 10 cations pfu (with P), Fe^{3+}/Fe^{2+} for the charge balance and cations are assigned to sites in accord with ionic radii $M3 < M2 < M1 < X$ is: $(Mn^{2+}_{0.71}Na_{0.15}Ca_{0.10})_{\Sigma0.96}Mn^{2+}_{1.00}(Zn_{1.00}Mn^{2+}_{0.66}Fe^{2+}_{0.21}Mg_{0.10}Fe^{3+}_{0.03})_{\Sigma2.00}(Fe^{3+}_{1.99}Al_{0.01})_{\Sigma2.00}(P_{1.01}O_4)_4(OH)_2\cdot8H_2O$. The main lines in the powder XRD pattern are [d Å (I%; hkl)]: 9.25 (63; 001), 5.00 (40; 210,111,$21\bar{1}$), 4.648 (33; 002), 3.562 (26; 020,400), 3.509 (41; $40\bar{2}$), 2.949 (25; 401,$40\bar{3}$), 2.842 (100; 022), 1.9984 (37; 422,$42\bar{4}$), 1.9506 (30; 024), 1.5853 (33; 820,$82\bar{4}$). Unit-cell parameters a = 15.222(6), b = 7.187(6), c = 10.028(5) Å, b = 111.746(16)°, V = 1019.0 Å^3, Z = 2. Jahnsite-(MnMnZn) is monoclinic, $P2/a$. No crystals suitable for single-crystal X-ray study were found due to its occurrence in tightly intergrown subparallel aggregates. Site's assignment made using ionic radii rule $M3 < M2 < M1 < X$ in accord with approved nomenclature recommendations. The holotype specimen is deposited in the Natural History Museum of Los Angeles County, California, U.S.A.

Whiteite-(MnMnMg), (IMA 2015-092), $Mn^{2+}_2Mg_2Al_2(PO_4)_4(OH)_2\cdot8H_2O$ was discovered in the single specimen collected at the Iron Monarch Quarry, Iron Knob, South Australia, Australia. The mineral was previously reported from the Jocão pegmatite, Minas Gerais, Brazil (Baijot et al. 2014) and from the Sapucaia mine Minas Gerais, Brazil (Baijot et al. 2012). Iron Monarch is the largest of several Precambrian sedimentary iron ore deposits in the Middleback Ranges of South Australia. The orebody contains pods of high-grade manganese ore with iron, and small amounts of Cu, Zn, Bi, Ag, P, As, and other elements. An unusually diverse mineralogy formed as a result of deep Tertiary and post-Tertiary weathering. Whiteite-(MnMnMg) occurs in Mn-rich and carbonate-rich zone, comprising hematite, hausmannite, baryte, Mn-calcite, rhodochrosite with a number of secondary phosphates, arsenates, vanadates, and sulfates formed at late low-temperature hydrothermal stage. The association includes triploidite, gatehouseite, waterhouseite, collinsite, fairfieldite, arsenoclasite, and an unidentified Ca,Mn phosphate carbonate mineral. The new mineral found as a single unterminated, reddish orange, translucent prismatic along [100] crystal 1.2 × 0.3 mm with pale orange streak and vitreous luster. The habit forms are {001} and {011}. It is brittle with a splintery fracture and a good cleavage on {001}, Mohs hardness of ~4; D_{meas} = 2.61(4) and D_{calc} = 2.632g/cm^3. The mineral is optically biaxial (–), α = 1.582(2), β = 1.586(2), γ = 1.613(2) Å (white light); 2V_{calc} = 74.5°. Pleochroism is distinct X – pale gray< Z – beige < Y – orange-pink. The average of 12 electron probe WDS analyses [wt% (range)] is Na_2O 0.11 (0.04–0.20), K_2O 0.04 (0.03–0.06), CaO 3.03 (2.87–3.17), MgO 10.97 (10.64–11.46), [MnO 14.11 (13.62–14.53), Mn_2O_3 1.81 (1.38–2.44) apportioned assuming that the $M1$ sites are occupied by Mn, the $M2$ site—by Mg and Mn, and the $M3$ sites—by Al and Mn^{3+}], Al_2O_3 12.10 (11.76–12.47), P_2O_5 37.13 (35.69–38.76), H_2O (by structure) 21.15, total 100.45. The empirical formula based on 26 O apfu, is $(Mn^{2+}_{0.60}Ca_{0.41}Na_{0.03}K_{0.01})_{\Sigma1.05}(Mn^{2+}_{0.92}Mg_{0.08})_{\Sigma1.00}Mg_{2.00}(Al_{1.82}Mn^{3+}_{0.18})_{\Sigma2.00}(PO_4)_{4.00}(OH)_{2.06}\cdot7.95H_2O$. The strongest lines in the X-ray powder diffraction pattern are [d Å (I%; hkl)]: 9.244 (100; 001), 5.619 (32; $1\bar{1}\bar{1}$), 4.839 (20; 111,$20\bar{2}$), 4.111 (16; $1\bar{1}\bar{2}$), 3.501 (22; $3\bar{1}\bar{2}$,400,020,$40\bar{2}$), 2.936 (16; 401), 2.759 (30; 022,510), 2.566 (17; $42\bar{1}$). The unit-cell parameters, refined from a powder XRD data are a = 15.010(3), b = 6.949(2), c = 9.986(1) Å, β = 111.09(2)°, V = 971.9 Å^3. Single-crystal data obtained from the 0.11 × 0.07 × 0.02 mm crystal shows whiteite-(MnMnMg) is monoclinic, space group $P2/a$; a = 15.0357(18), b = 6.9408(5), c = 9.9431(9) Å, β = 110.827(8)°, V = 969.86 Å^3, Z = 2. The crystal structure has been refined to R = 0.0396 for 23 703 unique observed $F_o>4\sigma F_o$ reflections. Holotype material is preserved in the South Australian Museum, Adelaide, South Australia, Australia. **D.B.**

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