American Mineralogist, Volume 109, pages 799–802, 2024

New Mineral Names

Travis A. Olds[1,*] and Christopher Emproto[2]

[1]Section of Minerals and Earth Sciences, Carnegie Museum of Natural History, 4400 Forbes Avenue, Pittsburgh, Pennsylvania 15213, U.S.A.
[2]Department of Earth and Environmental Sciences, University of Michigan, Ann Arbor, Michigan 48109, U.S.A.

Abstract

This issue of New Mineral Names provides a summary of the newly described minerals from 2023 and selected information for recent descriptions from October to December of 2023. New mineral name trends and observations are presented using an objective, data-driven, and curated examination of new mineral species and their broader implications.

Summary of Mineral Discoveries in 2023

A total of 112 new mineral species were approved in 2023; see Bosi et al. 2023a–f, 2024, and references therein. This is a significant increase from 2022, which saw 77 new mineral species approved. Of the new species approved in 2023, 85 introduced new root names. Papikeite, tetrahedrite-(Cd), tennantite-(In), mangani-eckermannite, magnesio-dutrowite, and xenotime-(Gd), among others, belong to existing nomenclature systems. At the time of writing, at least 13 of the new minerals were previously known as synthetic compounds, including downsite, ebnerite, and hokkaidoite. There were at least 17 new structure types reported. This figure is not exact, as the structural details for these most recent new minerals are unpublished and the novelty of the structure was not specified for 13 minerals. Minerals with structures noted as being related to known structures were not counted as having novel structure types. There were four new dimorphs defined for existing minerals, including tartarosite, a new C allotrope discovered at the Ries Impact Crater, Germany. Two new minerals approved in 2023 from the Rowley mine, Arizona, U.S.A., ebnerite and epiebnerite, were reported as dimorphs of $(NH_4)Zn(PO_4)$; this combination of essential elements had not previously been observed in a natural mineral (www.mindat.org, accessed February 2024). Only one mineral with an extraterrestrial type/cotype specimen was approved in 2023: jianmuite ($ZrTi^{4+}Ti^{3+}_5Al_3O_{16}$) was described from a terrestrial locality (the Cr-11 orebody in the Luobusha ophiolite complex, China) with a designated cotype found in a fragment of the Allende meteorite (Bosi et al. 2023e).

Type and co-type localities for the 2023 cohort of new minerals are shown in Figure 1. New mineral discoveries predominantly occurred in central Europe, with a total of 27 originating from Germany (10), Czech Republic (8), Poland (4), Slovakia (2), Switzerland (2), and Hungary (1). Among these contributions are several new minerals from classic localities with numerous type locality species, including pegmatites in the Neustadt an der Waldnaab District in Germany (e.g., Hagendorf South) as well as the Lengenbach quarry in the Binn Valley, Switzerland. Other prolific areas also added new type locality minerals in 2023, such as the Dara-i-Pioz Massif in Tajikistan, the Poudrette quarry in Canada (included in the Monteregian Hills in Fig. 1), and the Tolbachik Volcanic Field in Russia. The three new minerals for the Dara-i-Pioz Massif, two new minerals from Poudrette quarry, and five new minerals for the Tolbachik Volcano bring their respective type locality species counts to 43, 73, and 147, respectively.

Some localities that have emerged as prolific producers of new species within the last few years include the Freedom no. 2 mine in Utah (U.S.A.), the Redmond mine in North Carolina (U.S.A.), Pusch Ridge in Arizona (U.S.A.), and the Rowley mine in Arizona (U.S.A.). Each has produced new species largely within specific chemical classes. The Pusch Ridge and Rowley Mine localities are also notable in producing a host of unusual organic minerals. There has been a rise in descriptions of organic and post-mining minerals in recent years as old mines are revisited to collect mineral samples.

The Freedom no. 2 mine is a defunct clay-hosted U mine that has produced five new secondary Mo species in 2022 and 2023 and is also the type locality for the mineral umohoite, $(UO_2)MoO_4·2H_2O$, first reported in 1953 (Brophy and Kerr 1953). The Redmond mine is an extinct Pb mine in western North Carolina where the primary sulfide ore consists mostly of galena, sphalerite, and chalcopyrite. Although only one new mineral species from the Redmond mine {dinilawiite; $[Pb_4O_2Al(OH)_5]_2(S_2O_3)_2·H_2(S_2O_3)(H_2O)_5$} was approved in 2023, a total of 15 new Pb/Zn/Cu sulfate and thiosulfate species have been described from this mine since 2021. Prior to the approval of redmondite, $[Pb_8O_2Zn(OH)_6](S_2O_3)_4$, no new species had been recognized from this once obscure North Carolina locality (Kampf et al. 2023).

In 2019, the Pusch Ridge locality in Arizona was the site of discovery for the first approved glycolate mineral, lazaraskeite, $Cu(C_2H_3O_3)_2$ (Yang et al. 2022). In 2022 and 2023, four additional glycolate minerals from this locality were approved by the IMA-CNMNC, leading to the definition of the glycolate group. The western end of Pusch Ridge, where the new species were found, is directly adjacent to a suburban neighborhood in Tucson, Arizona. Another notable locality for organic minerals (also in south central Arizona) is the Rowley mine. The Rowley mine is a long-inactive mine accessing metalliferous quartz and baryte veins with rich assemblages of secondary mineral species. The mine is most famous among mineral collectors as a source of wulfenite and mimetite specimens. In 2016, the mineral rowleyite ($[Na(NH_4,K)_9Cl_4][V^{5+,4+}_2(P,As)O_8]_6·n[H_2O,Na,NH_4,K,Cl]$) was approved as the first type locality species from the mine. In the following years, an additional 12 new mineral species were described from the mine (mostly from the 125' level). All of the new Rowley mine species variably include organically derived molecules in their structures, such as ammonia (NH_4), oxalate (C_2O_4), and (monohydrogen) phosphate; these are likely post-mining phases formed from the interaction of bat guano with decomposing primary and secondary minerals in the ore veins.

* All minerals have been approved by the IMA CNMMC. For a complete listing of all IMA-validated unnamed minerals and their codes, see http://cnmnc.units.it/ (click on "IMA list of minerals").

0003-004X/24/0004–799$05.00/DOI: https://doi.org/10.2138/am-2024-NMN10949

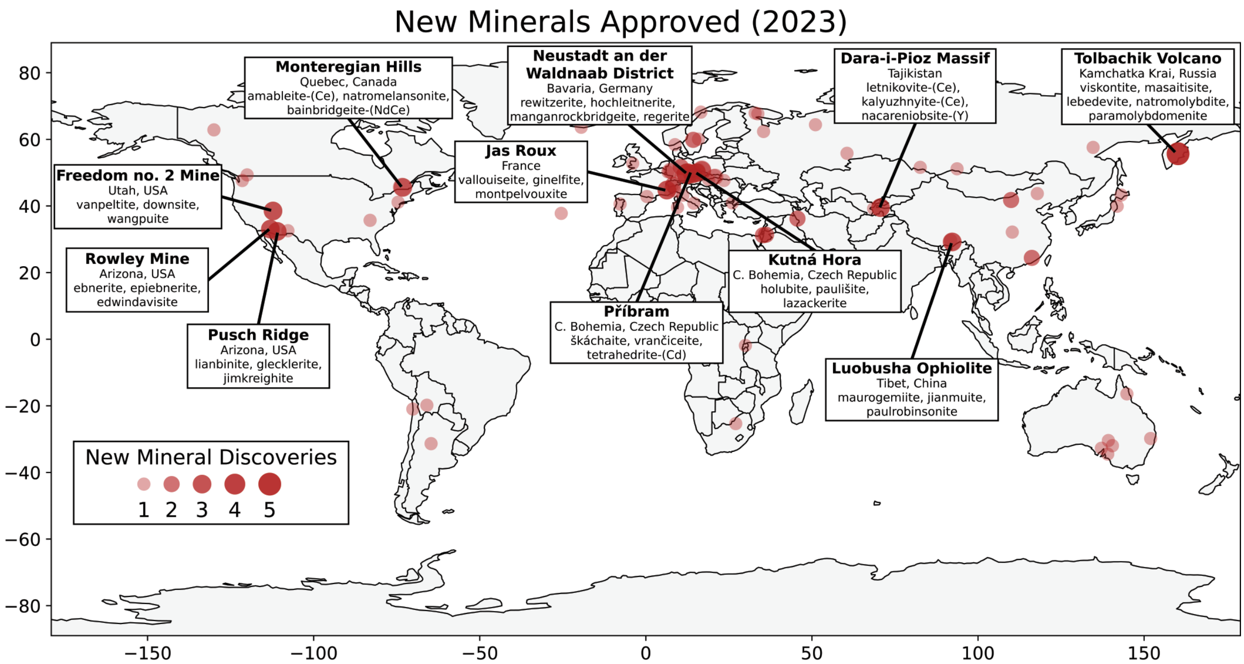


Figure 1. World map with localities of new minerals plotted as red circles with transparency. The size of the circles relates to the number of new minerals (approved in 2023) that were found within a 1 decimal degree radius determined using Euclidean distances. This is to emphasize localities that produced multiple minerals that were approved in 2023. Prolific areas with 3 or more minerals are further enumerated with callouts. (Color online.)

Recently Approved

This section features just a few of the 32 minerals approved by the IMA-CNMNC in the period October–December 2023; see Table 1 for the list and cursory details of all 32 minerals (Bosi et al. 2023f, 2024; Warr 2021).

Table 1. New minerals approved by the IMA-CNMNC from October–December 2023*

Mineral	Formula	IMA #	Space Group	Type Locality Area	Country	New RN	New ST
Hydroxylbenyacarite	$(H_2O)_2Mn_2(Ti_2Fe)(PO_4)_4[O(OH)](H_2O)_{10}\cdot4H_2O$	2023-079	*Pbca*	El Criollo mine	Argentina	n	n
Ootannite	$Th^{4+}_2W^{6+}_4O_{16}\cdot5H_2O$	2023-039	$P2_1/c$	Bamford Hill mine	Australia	y	y
Chinnerite	$[Mg(H_2O)_6]Na(H_2O)_2Al_3(PO_4)_2F_6$	2023-083	$P2/m$	Penrice quarry	Australia	y	n
Ehrigite	Bi_8Te_3	2023-074	$R\bar{3}m$	Good Hope gold mine	Canada	y	n
Natromelansonite	$Na_3Zr[Si_7AlO_{19}]\cdot4H_2O$	2023-076	$P2_1/m$	Poudrette quarry	Canada	n	n
Bayanoboite-(Y)	$Ba_2Y(CO_3)_2F_3$	2023-084	*Pbcn*	Bayan Obo deposit	China	y	y
Niobobaotite	$Ba_4(Ti_{2.5}Fe^{2+}_{1.5})Nb_4Si_4O_{28}Cl$	2022-127a	$I4_1/a$	Bayan Obo deposit	China	n	n
Zhonghongite	$Cu_{29}(As,Sb)_{12}S_{33}$	2023-046	*F2mm*	Jiama deposit	China	y	y
Lishiite	$(Ca_2\square)Sr_3(CO_3)_5$	2022-121a	$P6_3mc$	Shaxiongdong complex	China	y	n
Selenodantopaite	$Ag_5Bi_{13}Se_{22}$	2023-092	$C2/m$	Princ Evžen deposit	Czech Republic	n	n
Rotherkopfite	$KNa_2(Fe^{2+}_{2.5}Ti_{1.5})Fe^{2+}(Si_4O_{12})_2$	2023-032a	$C2/c$	Rother Kopf	Germany	y	n
Désorite**	$Pb_2(Fe^{3+}_6Zn)O_2(PO_4)_4(OH)_8$	2023-087	$P\bar{1}$	Schöne Aussicht mine	Germany	y	n
Amoraite	$Ca_{12}Al_6(OH)_{36}(CO_3)_2(SO_3)\cdot15H_2O$	2023-082	$P\bar{1}$	Hatrurim Basin	Israel	y	n
Mampsisite	$Ca_4Al_2(CO_3)(OH)_{12}\cdot5H_2O$	2023-090	$P\bar{1}$	Hatrurim Basin	Israel	y	n
Karwowskiite	$Ca_9Mg(Fe^{2+}_{0.5}\square_{0.5})(PO_4)_7$	2023-080	*R3c*	Daba-Siwaqa complex	Jordan	y	n
Alvesite	$NaKZrSi_6O_{15}\cdot2H_2O$	2023-069	*Cmce*	Lombadas	Portugal	y	n
Macraeite	$K(H_2O)Mn_2(Fe_2Ti)(PO_4)_4[O(OH)](H_2O)_{10}\cdot4H_2O$	2023-065	$P2_1/c$	Mesquitela	Portugal	y	n
Gajardoite-(NH_4)	$(NH_4)As^{3+}_4O_6Cl_2(Ca_{0.5}\square_{0.5})(H_2O)_5$	2023-070	*P6/mmm*	Khovu-Aksy deposit	Russia	n	n
Zilbermintsite-(La)	$(CaLa_5)(Fe^{3+}Al_3Fe^{2+})[Si_2O_7][SiO_4]_5O(OH)_3$	2023-063	$P2_1/m$	Mochalin Log REE deposit	Russia	y	n
Lednevite	$Cu[PO_3(OH)]\cdot H_2O$	2023-094	$P2_1/a$	Murzinskoe Au deposit	Russia	y	y
Lebedevite	$K_4Na_{14}Cu_{14}O_8(AsO_4)_8Cl_6$	2023-089	*I4/mmm*	Tolbachik volcano	Russia	y	n
Dmitryvarlamovite**	$Ti_2(Fe^{3+}Nb)O_8$	2022-125a	$P2_12_12$	Verkhne-Shchugorskoe deposit	Russia	y	n
Yttrotungstite-(Nd)	$NdW_2O_7(OH)\cdot H_2O$	2023-064	$P2_1/m$	Nyakabingo mine	Rwanda	n	n
Xenotime-(Gd)	$Gd(PO_4)$	2023-091	$I4_1/amd$	Slovenské Rudohorie	Slovakia	n	n
Skogbyite	$Zr(Mg_2Mn^{3+}_4)SiO_{12}$	2023-085	$I4_1/acd$	Långban deposit	Sweden	y	n
Sarvodaite	$Al_2(SO_4)_3\cdot5H_2O$	2023-073	$P2_1/n$	Fan-Jagnob coal deposit	Tajikistan	y	y
Clogauite	$PbBi_4Te_4S_3$	2023-062	$P\bar{3}m1$	Clogau mine	U.K.	y	n
Vanpeltite	$(Mo_2O_5)(S^{4+}O_3)\cdot4H_2O$	2023-078	$I2/m$	Freedom No. 2 mine	U.S.A.	y	y
Glecklerite	$Na(C_2H_3O_3)$	2023-071	*Pbcm*	Pusch Ridge	U.S.A.	y	n
Dinilawiite	$[Pb_4O_2Al(OH)_5]_2(S_2O_3)_2\cdot H_2(S_2O_3)(H_2O)_5$	2023-061	$I2/a$	Redmond mine	U.S.A.	y	y
Epiebnerite	$(NH_4)Zn(PO_4)$	2023-066	$P2_1$	Rowley mine	U.S.A.	y	y

Notes: The type locality names have been simplified for readability on a chart and are organized by type locality country of origin. The "New RN" column conveys which mineral names introduce a new root name. The "New ST" column displays which minerals are new structure types.
* All minerals have been approved by the IMA-CNMNC. For a complete listing of all IMA-validated unnamed minerals and their codes, see http://cnmnc.units.it/ (click on "IMA list of minerals"). The data contained within this chart were derived from Newsletters 76 and 77 (Bosi et al. 2023f, 2024), individual references for each mineral can be found within. **Published, or in-press (as of Feb 2024).

Vanpeltite, $(Mo_2O_5)(S^{4+}O_3)·4H_2O$

Vanpeltite (IMA2023-078; Vpt) is a new mineral from the Freedom no. 2 mine, Marysvale Mining District, Piute Co., Utah, U.S.A (Gu et al. 2023). Vanpeltite is the first natural molybdate sulfite and is the first natural occurrence of the $(Mo^{VI}_2O_5)^{2+}$ oxycation (www.mindat.org, accessed February 2024). Interestingly, the recently approved mineral downsite (IMA2022-119; awaiting publication), the structure of which is built from chains of regular molybdate octahedra, also occurs in this unique Mo mineral assemblage. Vanpeltite is chemically comparable to the mineral bouškaite, $(MoO_2)_2O(SO_3OH)_2(H_2O)_4$ (Sejkora et al. 2019), which contains two shorter molybdenyl Mo^{VI}=O bonds. However, the structure determined for vanpeltite is reported to be new to the mineral kingdom, although specific details have yet to be published. Crystals of vanpeltite are monoclinic; its structure was solved in the space group *I*2/*m* with *a* = 8.6069(10), *b* = 5.2991(7), *c* = 23.135(3) Å, β = 90.087(5)°. Cotype material is deposited in the collections of the University of Arizona Alfie Norville Gem & Mineral Museum, Tucson, Arizona 85701, U.S.A., catalog number 22733, and the RRUFF Project, deposition number R230006.

Skogbyite, $Zr(Mg_2Mn^{3+}_4)SiO_{12}$

Skogbyite (IMA2023-085; Skb), bearing the ideal formula $Zr(Mg_2Mn^{3+}_4)SiO_{12}$, is a new mineral from the Långban mine, Långban Ore District, Filipstad, Värmland County, Sweden (Jonsson et al. 2023). The Långban mine is one of the most prolific mineral localities on Earth with more than 300 valid minerals occurring there, including 78 minerals for which the Långban mine is the type locality. Skogbyite is the Mg-analog of gatedalite, $ZrMn^{2+}_2Mn^{3+}_4SiO_{12}$ (Bosi and Hålenius 2015), which was also first discovered at the Långban mine. The essential Mg makes the composition of skogbyite a unique combination of elements among minerals and distinguishes skogbyite from 32 other Zr-Mn silicate minerals (www.mindat.org, accessed February 2024). This composition is also unusual for the Långban mine: of the more than 300 mineral species reported from the Långban mine to date, only five bear essential Zr (www.mindat.org, accessed February 2024). Apart from skogbyite and gatedalite, these include the common minerals zircon and baddeleyite, as well as the rare species hiärneite $(Ca_2Zr_4Mn^{3+}SbTiO_{16})$. The structure of the new mineral is tetragonal and was solved in the $I4_1/acd$ space group with *a* = 9.4914(4), *c* = 18.9875(10) Å. Type material is deposited in the collections of the Swedish Museum of Natural History in Stockholm, Sweden (catalog number GEO-NRM20230033).

Xenotime-(Gd), $GdPO_4$

Xenotime-(Gd) (IMA2023-091; Xtm-Gd), ideally $GdPO_4$, is a new mineral found in the Zimná Voda vein, Slovenské Rudohorie (Slovak Ore Mountains), 5.6 km south of the village of Prakovce and 400 m northwest of Trohanka bivouac shelter, Košice Region, Slovakia (Ondrejka et al. 2024). Like other members of the xenotime group, the new mineral is tetragonal, $I4_1/amd$; its cell parameters are: *a* = 6.9589(5), *c* = 6.0518(6) Å. The Gd end-member is the third rare earth element (REE) phosphate member of the xenotime group to be described, after the Y and Yb end-members, respectively. Due to the rarity of preferential enrichments in middle REEs in nature, xenotime-(Gd) is only the third-ever Gd-essential mineral, after lepersonnite-(Gd) and monazite-(Gd)—the latter of which is a dimorph of xenotime-(Gd). Both Gd-dominant monazite and Gd-dominant xenotime were first reported from the Zimná Voda U occurrence, Košice Region, Slovakia (Ondrejka et al. 2023). These authors attribute this rarely observed middle-REE enrichment at the Zimná Voda U occurrence to the low-temperature alteration of uraninite, brannerite, and fluorapatite and mobilization of REEs into the hydrothermal fluid that later deposited REE-U-Au mineralization in quartz veins. Middle-REE enrichment resulting in species-defining Gd concentrations was limited to one sample studied by Ondrejka et al. (2023). Xenotime-(Gd) type material is deposited in the collections of the Slovak National Museum, Natural History Museum, 81006 Bratislava, Slovakia, catalog number M20412.

Bayanoboite-(Y), $Ba_2Y(CO_3)_2F_3$

Bayanoboite-(Y) (IMA 2023-084; Byb-Y), ideally $Ba_2Y(CO_3)_2F_3$, is a new fluorcarbonate species from the main pit at the Bayan Obo Deposit, Inner Mongolia, China (Xue et al., 2024). Bayanoboite-(Y) is named for the world-class Bayan Obo deposit. The Bayan Obo deposit is the world's largest rare earth element resource, and mineralization is hosted in Paleoproterozoic carbonate rocks of the Bayan Obo group whose exact origins are contentious at present (Smith et al. 2015). A total of 17 new mineral species were first described from Bayan Obo—all of which contain either Ba, Nb, F, or rare earth elements as essential elements. Bayanoboite-(Y) is the most chemically simple Ba-Y carbonate mineral described to date. Bayanoboite-(Y) has a new structure type and crystallizes in the orthorhombic space group *Pbcn* with *a* = 9.4528(4), *b* = 6.9499(2), *c* = 11.7638(5) Å. The holotype specimen was deposited in the Geological Museum of China, Beijing (catalog number GMCTM2023008). A designated cotype specimen is stored in the Crystal Structure Laboratory at the China University of Geosciences, Beijing (catalog number BYEB-2).

Dinilawiite, $[Pb_4O_2Al(OH)_5]_2(S_2O_3)_2·H_2(S_2O_3)(H_2O)_5$

Dinilawiite (IMA 2023-061; Dlw), ideally $[Pb_4O_2Al(OH)_5]_2(S_2O_3)_2·H_2(S_2O_3)(H_2O)_5$, is a new thiosulfate species discovered in a secondary assemblage derived from the weathering of a quartz vein containing disseminated galena, sphalerite, and chalcopyrite at the Redmond mine in North Carolina, U.S.A. (Kampf et al. 2023). With the addition of dinilawiite, a total of eight new thiosulfate species have been discovered at the Redmond mine. Dinilawiite has a novel structure type and crystallizes in space group *I*2/*a* with *a* = 17.4100(5), *b* = 9.2191(2), *c* = 21.698(1) Å, β = 107.276(8)°. The name "dinilawiite" is taken from the Cherokee word for "twin" (*dinilawi*), in allusion to the ubiquitous twinning observed in the cotype samples. Cotype specimens are stored in the collection of the Natural History Museum of Los Angeles with catalog numbers 76289, 76290, 76291, and 76292.

Recently Published

This section includes some of the minerals approved in 2023 that have been recently published (or entered press).

Virgilluethite, $MoO_3·H_2O$

Virgilluethite (IMA2023-006; Vlh), ideally $MoO_3·H_2O$, was discovered at the Summit group of claims near Cookes Peak, Luna County, New Mexico, U.S.A. (Yang et al. 2023). Virgilluethite crystals exist as pseudomorphs after sidwillite, and are associated with sidwillite, raydemarkite, tianhuixinite, ilsemannite, jordisite, powellite, fluorite, baryte, pyrite, and quartz. It is monoclinic, space group $P2_1/c$, with unit-cell parameters *a* = 7.2834(3), *b* = 10.6949(6), *c* = 7.4861(3) Å, β = 112.779(2)°, *V* = 583.03(5) Å^3, and *Z* = 4. The crystal structure of virgilluethite, which is topologically identical to that of tungstite $(WO_3·H_2O)$, is characterized by highly distorted and elongated $MoO_5(H_2O)$ octahedra. Virgilluethite and raydemarkite are dimorphs of $MoO_3·H_2O$. Unlike virgilluethite, the MoO_6 octahedra in raydemarkite share edges to form isolated double chains, resembling those found in zhenruite, $(MoO_3)_2·H_2O$. Virgilluethite is named for Virgil Lueth, senior mineralogist/economic geologist and director of the New Mexico Bureau of Geology Mineral Museum at New Mexico Tech. Holotype material is deposited at the University of Arizona Alfie Norville Gem & Mineral Museum (catalog number 22723); a cotype specimen was deposited with the RRUFF Project (designated R220017).

Natromelansonite, $Na_3Zr[Si_7AlO_{19}]\cdot 4H_2O$

Natromelansonite (IMA2023-076; Nmso), ideally $Na_3Zr[Si_7AlO_{19}]\cdot 4H_2O$, is a new rhodesite group mineral discovered at the Poudrette quarry, Quebec, Canada (Lykova et al. 2024). In the type material, natromelansonite is associated with steacyite, polylithionite, rhodochrosite, and an admixture of nearly X-ray amorphous clay minerals (Lykova et al. in press). Natromelansonite is the latest of 73 mineral species whose type (or cotype) specimens come from the Poudrette quarry. Natromelansonite is monoclinic and crystallizes in space group $P2_1/m$ with a = 6.5130(1), b = 24.0944(4), c = 6.9755(1) Å, β = 90.747(1)°. The name was chosen to convey the close chemical and structural relationship of natromelansonite to melansonite ($KNa_2Zr(Si_7Al)O_{19}\cdot 4–5H_2O$; IMA 2018-168). From their studies of natromelansonite, Lykova et al. (in press) suggested a redefinition of the structural formula for melansonite; the simplified version is given above. As the redefinition of the melansonite formula is not presently in use, natromelansonite currently represents a unique combination of elements among valid mineral species. While numerous (K-)Na-Zr silicates (e.g., laverovite, catapleiite) are known, only natromelansonite—and potentially melansonite—contain essential Al. Holotype material is stored at the Canadian Museum of Nature with catalog number CMNMC 90813.

Désorite, $Pb_2(Fe^{3+}_6Zn)O_2(PO_4)_4(OH)_8$

Désorite, ideally $Pb_2(Fe^{3+}_6Zn)O_2(PO_4)_4(OH)_8$, is a secondary mineral discovered from the dumps of the Schöne Aussicht mine, Dernbach, Westerwaldkreis, Rhineland-Palatinate, Germany (Kampf et al. 2024). Désorite is triclinic, space group $P\bar{1}$; the unit-cell parameters are a = 5.4389(7), b = 9.3242(13), c = 10.0927(12) Å, α = 109.024(8), β = 90.521(6), γ = 97.588(7)°, V = 478.90(11) Å^3, and Z = 1. Désorite crystallized with a framework structure assembled from $Fe^{3+}O_6$ octahedra and PO_4 tetrahedra, with Pb occupying cavities in the framework. The $Fe^{3+}O_6$ octahedra in the framework occur in edge-sharing chains, edge-sharing trimers, and individual octahedra, all sharing corners with each other and with PO_4 tetrahedra. The IMA newsletter wherein the acceptance of désorite was first published (Bosi et al. 2024) states that désorite has a novel structure, but this has since been revised; désorite is isostructural with jamesite and lulzacite (Kampf et al. 2024). Désorite is named for the analytical mineralogist and mineral collector Joy Désor (who first analyzed the type specimen), as well as his ancestor, the Swiss geologist Pierre Jean Édouard Désor (1811–1882).

References cited

Brophy, G.P. and Kerr, P.F. (1953) Hydrous uranium molybdate in Marysvale ore [Utah]. In Annual Report for June 30, 1952 to April 1, 1953. U.S. Atomic Energy Commission. RME-3046, 45–51.

Bosi, F. and Hålenius, U. (2015) Gatedalite, $Zr(Mn^{2+}_2Mn^{3+}_4)SiO_{12}$, a new mineral species of the braunite group from Långban, Sweden. Mineralogical Magazine, 79(3), 625–634, https://doi.org/10.1180/minmag.2015.079.3.08.

Bosi, F., Miyawaki, R., Hatert, F., Pasero, M., and Mills, S.J. (2023a) IMA Commission on New Minerals, Nomenclature and Classification (CNMNC) – Newsletter 71. European Journal of Mineralogy, 35, 75–79, https://doi.org/10.5194/ejm-35-75-2023.

Bosi, F., Hatert, F., Pasero, M., and Mills, S.J. (2023b) IMA Commission on New Minerals, Nomenclature and Classification (CNMNC) – Newsletter 72. European Journal of Mineralogy, 35, 285–293, https://doi.org/10.5194/ejm-35-285-2023.

——— (2023c) IMA Commission on New Minerals, Nomenclature and Classification (CNMNC) – Newsletter 73. European Journal of Mineralogy, 35, 397–402, https://doi.org/10.5194/ejm-35-397-2023.

——— (2023d) IMA Commission on New Minerals, Nomenclature and Classification (CNMNC) – Newsletter 74. European Journal of Mineralogy, 35, 659–664, https://doi.org/10.5194/ejm-35-659-2023.

——— (2023e) IMA Commission on New Minerals, Nomenclature and Classification (CNMNC) – Newsletter 75. European Journal of Mineralogy, 35, 891–895, https://doi.org/10.5194/ejm-35-891-2023.

——— (2023f) IMA Commission on New Minerals, Nomenclature and Classification (CNMNC) – Newsletter 76. European Journal of Mineralogy, 35, 1073–1078, https://doi.org/10.5194/ejm-35-1073-2023.

——— (2024) IMA Commission on New Minerals, Nomenclature and Classification (CNMNC) – Newsletter 77. European Journal of Mineralogy, 36, 165–172, https://doi.org/10.5194/ejm-36-165-2024.

Gu, X., Yang, H., Kampf, A.R., Thorne, B., Gibbs, R.G., Scott, M.M., and Downs, R.T. (2023) Vanpeltite, IMA 2023-078, in: CNMNC Newsletter 76, European Journal of Mineralogy, 35, https://doi.org/10.5194/ejm-35-1073-2023.

Kampf, A.R., Smith, J.B., Hughes, J.M., Ma, C., and Emproto, C. (2023) New minerals from the Redmond Mine, North Carolina, USA: I. Redmondite, hydroredmondite, and sulfatoredmondite, three minerals containing the novel $[Pb_8O_2Zn(OH)_6]^{8+}$ structural unit. The Canadian Journal of Mineralogy and Petrology, 61(1), 189–202, https://doi.org/10.3749/2200059.

Kampf, A.R., Möhn, G., and Ma, C. (2024) Désorite, $Pb_2(Fe^{3+}_6Zn)O_2(PO_4)_4(OH)_8$, a new phosphate mineral isotypic with jamesite. Minerals, 14(2), 175, https://doi.org/10.3390/min14020175.

Jonsson, E., Hålenius, U., Majka, J., and Bosi, F. (2024) Skogbyite, IMA 2023-085, in: CNMNC Newsletter 77, European Journal of Mineralogy, 36, https://doi.org/10.5194/ejm-36-165-2024.

Lykova, I., Rowe, R., Poirier, G., Friis, H., and Barnes, S. (2024) Natromelansonite, $Na_3Zr[Si_7AlO_{19}]\cdot 4–5H_2O$, a new member of the rhodesite mero-plesiotype series from Mont Saint-Hilaire, Quebec, Canada. Mineralogical Magazine. Published online January 2024, 1–17, https://doi.org/10.1180/mgm.2024.1.

Ondrejka, M., Uher, P., Ferenc, Š., Milovská, S., Mikuš, T., Molnárová, A., Škoda, R., Kopáčik, R., and Bačík, P. (2023) Gadolinium-dominant monazite and xenotime: Selective hydrothermal enrichment of middle REE during low-temperature alteration of uraninite, brannerite, and fluorapatite (the Zimná Voda REE-U-Au quartz vein, Western Carpathians, Slovakia). American Mineralogist, 108, 754–768, https://doi.org/10.2138/am-2022-8418.

Ondrejka, M., Bačík, P., Majzlan, J., Uher, P., Ferenc, Š., Števko, M., Čaplovičová, M., Milovská, S., Mikuš, T., Rößler, C., Matthes, C., and Molnárová, A. (2024) Xenotime-(Gd), IMA 2023-091, in: CNMNC Newsletter 77, European Journal of Mineralogy, 36, https://doi.org/10.5194/ejm-36-165-2024.

Sejkora, J., Grey, I.E., Kampf, A.R., Plášil, J., and Škácha, P. (2019) Bouškaite, a new molybdenyl-hydrogensulfate mineral, $(MoO_2)_2O(SO_3OH)_2(H_2O)_2\cdot 2H_2O$, from the Lill mine, Příbram ore area, Czech Republic. Journal of Geosciences, 197–205, https://doi.org/10.3190/jgeosci.287.

Udoratina, O.V., Panikorovskii, T.L., Chukanov, N.V., Voronin, M.V., Lutoev, V.P., Agakhanov, A.A., and Isaenko, S.I. (2024) Dmitryvarlamovite, $Ti_2(Fe^{3+}Nb)O_8$, a new columbite-supergroup mineral related to the wolframite group. Mineralogical Magazine, Published online February 2024, 1–8, https://doi.org/10.1180/mgm.2023.95.

Warr, L.N. (2021) IMA-CNMNC approved mineral symbols. Mineralogical Magazine, 85(3), 291–320, https://doi.org/10.1180/mgm.2021.43.

Xue, Y., Sun, N., Li, G., Hao, J., Liu, P., Song, W., Li, X., Shen, J., Yang, L., Wang, Z., Meng, W., Yan, G., Zhao, Y., and Liu, Y. (2024) Bayanoboite-(Y), IMA 2023-084, in CNMNC Newsletter 77; Mineralogical Magazine, 88, https://doi.org/10.1180/mgm.2024.5.

Yang, H., Gu, X., Gibbs, R., Evans, S., Downs, R.T., and Jibrin, Z. (2022) Lazaraskeite, $Cu(C_2H_2O_3)_2$, the first organic mineral containing glycolate, from the Santa Catalina Mountains, Tucson, Arizona, U.S.A. American Mineralogist, 107(3), 509–516, https://doi.org/10.2138/am-2021-7895.

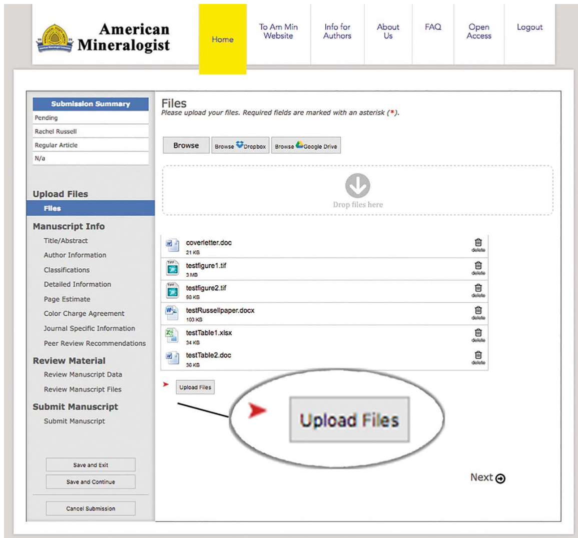
Yang, H., Gu, X., Gibbs, R.B., and Downs, R.T. (2023) Virgilluethite: A new mineral and the natural analogue of synthetic β-$MoO_3\cdot H_2O$, from Cookes Peak, Luna County, New Mexico, USA. The Canadian Journal of Mineralogy and Petrology, 61(6), 1151–1162, https://doi.org/10.3749/2300041.

Submit to American Mineralogist

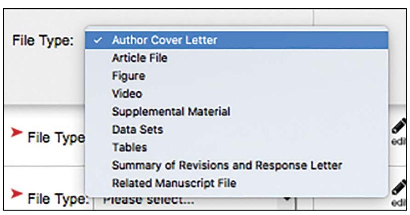
Easy-to-Use Interface

Read our full information for authors:
http://www.minsocam.org/MSA/AmMin/instructions.html

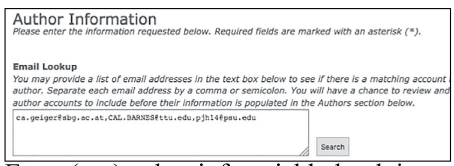
1. Prepare your materials and know your co-authors' affiliation info/emails.
2. Log in to submit your manuscript: **http://aminsubmissions.msubmit.net** Click & Drag your files when prompted.
3. Click "Upload Files", then you can amend the order for the merged file, you can edit the file details, you can delete or replace the file.
4. After files are shipshape, work through the required information step by step, using the next button or selecting via the vertical menu.



TIPS & TRICKS

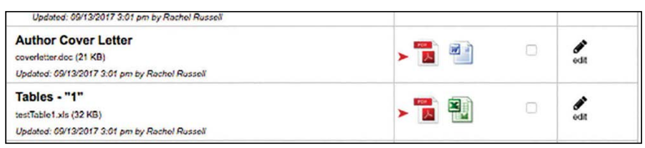


The system displays helpful pop-ups and pulldowns as needed. Each uploaded file needs to be given a type and a name.



Enter (co-)author info quickly by doing a search by email address.

When all the uploaded files have been named and approved, press the Auto Order button.



LAST STEP -- "Review Material" tab: Open each PDF by clicking to review and check box on right to **approve** files.

Mineralogical Society of America

Reviews in Mineralogy & Geochemistry

Reviews in Mineralogy & Geochemistry: RiMG

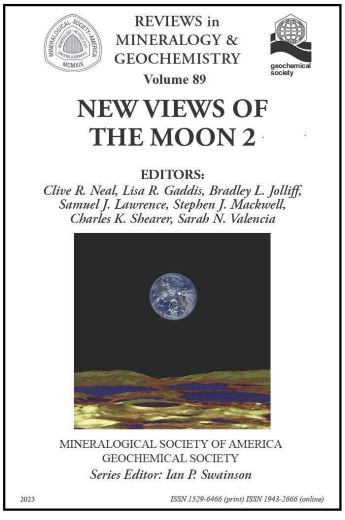
89 volumes published, and **more** on the way!

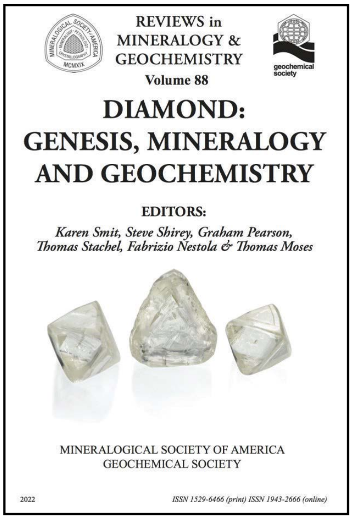
MSA is pleased to announce the publication of the latest *RiMG* volume*:*

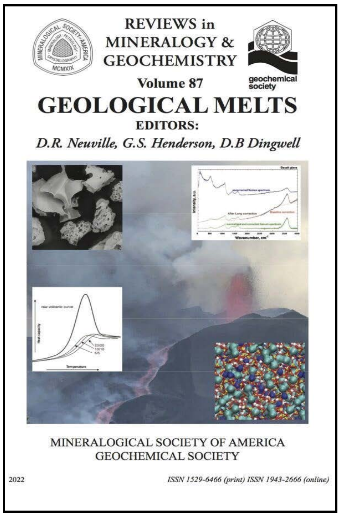
New Views of the Moon II *(89).*

RiMG is a series of multi-authored, soft-bound volumes containing concise reviews of the literature and advances in theoretical and/or applied mineralogy, crystallography, petrology, and geochemistry.

Volumes are available in hard copy and electronically as pdfs.







For the complete list of volumes, and to order, visit MSA's website at:

www.msaweb.org