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New Mineral Names

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ABSTRACT

This issue of New Mineral Names provides a summary of the newly described minerals from 2024 and selected information for recent descriptions from September 2024 to January 2025. New mineral name trends and observations are presented with an objective examination of new species and their broader implications. All minerals presented have been approved by the International Mineralogical Association Commission on New Minerals, Nomenclature and Classification (IMA-CNMNC).

SUMMARY OF MINERAL DISCOVERIES IN 2024

A total of 103 new mineral species were approved in 2024; see Bosi et al. (2024a–f, 2025, and references therein). This is a slight decrease from 2023, which saw 112 new mineral species approved (Olds and Emproto 2024). Of the 103 new species approved in 2024, 72 introduced new root names. Nioboixiolite-(Fe^{3+}), peprossiite-(Y), and clino-ferro-suenoite, among others, belong to existing nomenclature systems. At the time of writing, at least 8 of the new minerals were previously known as synthetic compounds, including králíkite ($BaCl_2·2H_2O$), heimaeyite [$Na_3Al(SO_4)_3$], and vegrandisite ($BaCl_2$). There were at least 21 new structure types reported. This figure is not exact, as the structural details for many recent new minerals are unpublished. Minerals with structures noted as being closely related to known structures were not counted as having novel structure types. Two minerals with an extraterrestrial type specimen were approved in 2024: cafeosite and ohtaniite. At least 10 of the newly approved minerals in 2024 are of post-mining origin, including ferriphoxite, fanguangite, and amurselite.

Type and co-type localities for the 2024 cohort of new minerals are shown in Figure 1. The top four countries for new minerals in 2024 were the same as in 2023. In 2024, the new mineral counts for each country were: U.S.A. (16), China (13), Russia (11), and Germany (10). This is a slight reshuffle from 2023 when the new mineral counts for each country were: U.S.A. (13), Russia (13), Germany (10), and China (10). As was also observed for 2023, new minerals for 2024 were predominantly discovered in central Europe—with a total of 10 from Germany, 5 from Switzerland, 4 from Slovakia, 3 from the Czech Republic, and 2 from Poland. While several of these new minerals were found at world-famous localities that have been prolific producers of new minerals in the past, such as the Hagendorf pegmatites (sperlingite and fluor-rewitzerite), Caspar Quarry (karlleuite), and Clara Mine (slottaite and hyblerite) in Germany and the Lengenbach Quarry (giuşcăite and geuerite) in the Swiss alps, there were also a few new localities represented among the 2024 new species cohort. This includes the Lindner Mine in Bavaria, Germany, where the type specimen of fluormacraeite originated, as well as the Šibeničný vrch deposit in Slovakia that produced the new Au-bearing pearceite-polybasite group minerals auropearceite and auropolybasite. Globally, some prolific areas that added new species this past year included the Tolbachik Volcanic Field in Russia (5 new species; type locality for 152 species), the Långban Mine in Sweden (1 new species; type locality for 80 species), and the Tsumeb Mine in Namibia (3 new species; type locality for 75 species). Also of note are the 5 new species for the Bayan Obo deposit in Inner Mongolia, China, bringing the total new species count at this world-famous deposit to 23.

RECENTLY APPROVED

This section features just a few of the 47 minerals approved by the IMA-CNMNC in the period of September 2024 to January 2025; see Table 1 for the list and cursory details of all 47 minerals (Bosi et al. 2024e–f, 2025).

Slottaite, $SrFe^{3+}_3(PO_4)(SO_4)(OH)_6$

The new mineral slottaite (IMA2024-051, Soi), ideally $SrFe^{3+}_3(PO_4)(SO_4)(OH)_6$, is an alunite supergroup mineral discovered at the Clara Mine in Baden-Württemberg, Germany, by its namesake: mineral dealer and collector Carsten Slotta. Like other members of the alunite supergroup, slottaite is trigonal, $R\bar{3}m$, and has the cell parameters a = 7.2817(3) and c = 16.8198(3) Å. More than 472 unique mineral species have been recorded from the Clara Mine, placing this mine among the most prolific mineral localities on Earth. Interestingly, despite the very large number of mineral species found here and its long history of mining dating back to 1726, relatively few (17) were first discovered at the Clara Mine, compared to other famously diverse mineral localities such as the Poudrette Quarry in Canada (type locality for 73 of its 440 reported species), the Tsumeb Mine in Namibia (75/348), or the Franklin Mine in the U.S.A. (50/247) (www.Mindat.org). There is species-defining Sr in 4 of the 17 minerals first discovered at the Clara Mine. Of these, arseno-goyazite is the most widely distributed with 25 reported localities, while benauite and oberwolfachite are each reported from just three localities, and slottaite remains a one locality mineral at the time of writing. It is worth noting that Sr minerals make up a very small fraction of the Clara mine's mineral complement—with just eight Sr minerals reported here according to www.Mindat.org. Thus, it is significant that half of these eight Sr minerals were first discovered at the Clara Mine and that three of these four are extremely rare minerals. This indicates that Sr is present at the Clara Mine in unusual geochemical environments scarcely replicated elsewhere.

Marsaalamite-(Y), $Y(MoO_4)(OH)$

Marsaalamite-(Y) (IMA2024-050, Maa-Y), ideally $Y(MoO_4)(OH)$, is a new molybdate mineral from Um Safi in eastern Egypt. The name references its type locality, the Marsa Alam district. A formal description of this new mineral was recently made available by Mahdy et al. (2025). Marsaalamite-(Y) is the OH analog of the synthetic materials $Y(MoO_4)F$ and $Y(MoO_4)Cl$. In nature, tancaite-(Ce) is the only other mineral to

* 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/.

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Table 1. New minerals approved by the IMA-CNMNC from September 2024–January 2025[a]

Mineral	Formula	IMA #	Space Group	Type Locality Area	Country	New RN
Anningite-(Ce)	$(Ca_{0.5}Ce^{4+}_{0.5})(VO_4)$	2024-060	$I4_1/amd$	Gara Samai Formation	Algeria	yes
Proxitwelvefoldite[b]	$Pd_3Ni_4Te_8$	2024-034	$P4_2/mnm$	Kalgoorlie	Australia	yes
Cuprosenandorite	$Ag_{16}Cu_8Pb_{24}Sb_{72}S_{144}$	2024-022	$Pna2_1$	San José deposit	Bolivia	no
Huntingdonite	$Pb_{19}Sb_{16}As_6S_{51}Cl_2$	2024-027	$P\bar{1}$	Madoc	Canada	yes
Moiraite	$Pb_{12}Sb_8As_8S_{36}$	2024-028	$P\bar{1}$	Madoc	Canada	yes
Fuyuanite[b]	$Mg_7Nb_6O_{18}(OH)_8$	2024-059	$P\bar{3}$	Bayan Obo	China	yes
Oxyplumbopyrochlore	$Pb_2Nb_2O_6O$	2024-026	$Fd\bar{3}m$	Bayan Obo	China	no
Dulanggouite	Bi_6Te_3	2024-067	$P\bar{3}m1$	Dulanggou gold mine	China	yes
Meizhouite	$Fe^{2+}V^{3+}_2(PO_4)_2(OH)_2$	2024-036	$P2_1/c$	Yushui deposit	China	yes
Králíkite	$BaCl_2{\cdot}2H_2O$	2019-070a	$P2_1/n$	Mining Plant I, ČSA Mine	Czechia	yes
Marsaalamite-(Y)[b]	$Y(MoO_4)(OH)$	2024-050	$P2_1/c$	Um Safi area	Egypt	yes
Hyblerite	$Pb_4Bi_2(SO_4)_2(CO_3)O_4$	2024-052	$Cmcm$	Clara Mine	Germany	yes
Slottaite	$SrFe^{3+}_3(PO_4)(SO_4)(OH)_6$	2024-051	$R\bar{3}m$	Clara Mine	Germany	yes
Nioboixiolite-(Fe^{3+})	$(Nb_{0.5}Fe^{3+}_{0.5})O_2$	2024-057	$Pbcn$	In den Dellen Quarry	Germany	no
Fluormacraeite	$[(H_2O)K]Mn_2(Fe_2Ti)(PO_4)_4(OF)(H_2O)_{10}{\cdot}4H_2O$	2024-054	$P2_1/c$	Lindner Mine	Germany	no
Barronite	$(\square_{1.5}Ba_{0.5})(UO_2)_2Si_5O_{12}(OH){\cdot}2H_2O$	2024-053	$C2/m$	Krunkelbach deposit	Germany	yes
Heimaeyite	$Na_3Al(SO_4)_3$	2023-127a	$R\bar{3}$	Eldfell Volcano	Iceland	yes
Rotemite	$Ca_4Cr_2(OH)_{12}Cl_2{\cdot}4H_2O$	2024-058	$R\bar{3}c$	Hartrurim Complex	Israel	yes
Belmonteite	$CaMn_2(AsO_4)_2{\cdot}7H_2O$	2024-040	$Cmce$	Gambatesa Mine	Italy	yes
Proto-owyheeite	$Ag_9Pb_{40}Sb_{45}S_{112}$	2024-021	$P2_1/n$	Monte Arsiccio Mine	Italy	no
Vanadoakasakaite-(Ce)	$CaCe(V^{3+}AlMn^{2+})(Si_2O_7)(SiO_4)O(OH)$	2024-044	$P2_1/m$	Mogurazawa mine	Japan	no
Amaterasuite	$Sr_4Ti_6Si_4O_{23}(OH)Cl$	2024-056	$Fddd$	Osayama mountain area	Japan	yes
Shenganfuite	$PbTe^{4+}_3O_5(OH)Cl_3(H_2O)$	2024-031	$P\bar{1}$	Moctezuma Mine	Mexico	yes
Stankeithite	$MnMnTe^{4+}_4O_{10}$	2024-049	$P4_2/nbc$	Moctezuma Mine	Mexico	yes
Nancyrossite	$FeGeO_6H_5$	2024-033	$P4_2/n$	Tsumeb Mine	Namibia	yes
Zincostottite[b]	$ZnGe(OH)_6$	2024-024	$P4_2/n$	Tsumeb Mine	Namibia	no
Dubińskaite	$Ca_4Sc_2Al_4[Be_2Si_8O_{30}](OH)_2$	2024-035	$P\bar{1}$	Jordanów Śląski	Poland	yes
Boevskite	$Pb_4(TeO_3)_2(SO_4)(S_2O_3)$	2024-041	$Pnma$	Boevskoe Deposit	Russia	yes
Olgafrankite	Ni_3Ge	2024-048	$Pm\bar{3}m$	Dzhaltul intrusion	Russia	yes
Ferroinnelite[b]	$Ba_4Ti_2Na(NaFe^{2+})Ti(Si_2O_7)_2[(SO_4)(PO_4)]O_2[O(OH)]$	2024-029	$P\bar{1}$	Kovdor Phlogopite Mine	Russia	no
Stibiosegnitite	$Pb(Fe^{3+}_{2.5}Sb^{5+}_{0.5})(AsO_4)_2(OH)_6$	2024-065	$R\bar{3}m$	Murzinskoe deposit	Russia	no
Kantorite	$K_2NaMg(SO_4)_2F$	2024-042	$Pna2_1$	Tolbachik Volcano	Russia	yes
Zircarsite	$Na_{18}Cu_{12}ZrO_8(AsO_4)_8Cl_6$	2024-037	$Pm\bar{3}n$	Tolbachik Volcano	Russia	yes
Auropearceite	$[Ag_9AuS_4][Ag_6As_2S_7]$	2024-025	$P321$	Šibeničný vrch deposit	Slovakia	no
Clino-ferro-suenoite	$\square Mn^{2+}_2Fe^{2+}_5(Si_8O_{22})(OH)_2$	2024-032	$C2/m$	Hilläng mines	Sweden	no
Friisite	$Pb_8Al_3Si_8O_{27}Cl_3$	2024-047	$P\bar{6}2c$	Långban deposit	Sweden	yes
Metaheimite	$PbCu_2(AsO_4)(OH)_3$	2023-020a	$Pnma$	Chalttal deposit	Switzerland	no
Zanelliite	$PbCu_9[AsO_{3.5}(OH)_{0.5}]_2(AsO_4)_2(OH)_9(H_2O)_3$	2024-061	$C2/c$	Grosses Chalttal Deposit	Switzerland	yes
Nacareniobsite-(Nd)	$Ca_2(CaNd)Na_3Nb(Si_2O_7)_2(OF)F_2$	2024-012	$P2_1/c$	Darai-Pioz alkaline massif	Tajikistan	no
Peprossiite-(Y)	$YAl_2(B_{3.67}Si_{0.33})O_{10.67}$	2024-046	$P\bar{3}1m$	Dorozhniy pegmatite	Tajikistan	no
Svornostite-(NH_4)	$(NH_4)_2Mg(UO_2)_2(SO_4)_4(H_2O)_8$	2024-068	$Pmn2_1$	Blue Lizard Mine	U.S.A.	no
Amurselite	$(NH_4)_2(UO_2)_5(SeO_3)_3O_2(OH)_2(H_2O){\cdot}8H_2O$	2024-062	$P\bar{1}$	Burro Mine	U.S.A.	yes
Wangyanite	$PdNi_8S_8$	2024-008a	$Fm\bar{3}m$	Johns-Manville Reef	U.S.A.	yes
Alexearlite	$Hg_3(MoO_4)S_2$	2024-039	$Pnma$	Lucky Boy Mine	U.S.A.	yes
Szilagyiite	$NaCa_3(UO_2)(CO_3)_3(SeO_3)F(H_2O)_6$	2024-063	$R\bar{3}c$	Pickett Corral Mine	U.S.A.	yes
Yellowcatite[b]	$KNaFe^{3+}_2(Se^{4+}O_3)_2(V^{5+}_2O_7){\cdot}7H_2O$	2024-030	$P\bar{6}m2$	School Section #32 Mine	U.S.A.	yes
Stunorthropite	$(NH_4)_4[Mo_2O_6(MoO_4)_2]$	2024-064	$P\bar{1}$	Summit group of claims	U.S.A.	yes

Notes: The type locality names have been simplified for readability and are organized by country of origin. The "New RN" column conveys which mineral names introduce a new root name.

[a] 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 81–83 (Bosi et al. 2024e–f, 2025), individual references for each mineral can be found within. [b] Published or in press (as of February 2025).

contain both Mo and a rare earth element as defining constituents. Marsaalamite-(Y) was encountered at Um Safi as inclusions and intergrowths with an F-rich "zinnwaldite" (polylithionite-siderophyllite series) in a greisen alteration assemblage within an F-rich granite. Although its environment is very rich in F, marsaalamite-(Y) is proposed to have formed after available F was depleted by earlier phases including "zinnwaldite," fluorite, and F-bearing rare earth element minerals—explaining why marsaalamite-(Y) formed rather than a phase equivalent to its F analog (Mahdy et al. 2025). Marsaalamite-(Y) type material was unsuitable for a single-crystal X-ray diffraction study, and the unit cell of the new mineral was determined through powder X-ray diffraction. Marsaalamite-(Y) crystallizes in space group $P2_1/c$ with cell parameters a = 5.1863(7), b = 12.3203(11), c = 6.6953(7) Å, β = 114.173(8)°, V = 390.30(8) Å^3, Z = 4.

Stankeithite, $Mn^{2+}Mn^{2+}Te^{4+}_4O_{10}$

The new mineral stankeithite (IMA2024-049, Stnk), $Mn^{2+}Mn^{2+}Te^{4+}_4O_{10}$, is a new MnMn analog of denningite ($CaMn^{2+}Te^{4+}_4O_{10}$) discovered at the Moctezuma Mine in Sonora, Mexico. Denningite was also first discovered at the Moctezuma Mine and published by Mandarino et al. (1963). The Moctezuma Mine hosts epithermal quartz veins that contain gold, baryte, and high Te concentrations (ca. 1942 ppm Te; Deen and Atkinson 1988). The remobilization of Te at the Moctezuma Mine has resulted in the formation of nearly 30 additional secondary Te minerals, 16 of which were first discovered here. Two other minerals, bambollaite and rozhdestvenskayaite-(Zn), were also first discovered at the Moctezuma Mine. Like denningite, stankeithite is tetragonal with space group symmetry $P4_2/nbc$ and has the cell parameters a = 8.7694(4) and c = 12.9687(8) Å. Stankeithite was named for Arizona geologist and mineral collector Stanley Keith.

Zincostottite, $ZnGe^{4+}(OH)_6$

Zincostottite (IMA2024-024, Zsto) is a new non-stoichiometric perovskite supergroup mineral from the Tsumeb Mine, Oshikoto, Namibia. A full description was provided by Kampf et al. (2025a). The new mineral was found as a secondary phase alongside siderite, malachite, and quartz on fracture surfaces in a Ge-rich sulfide ore assemblage con-

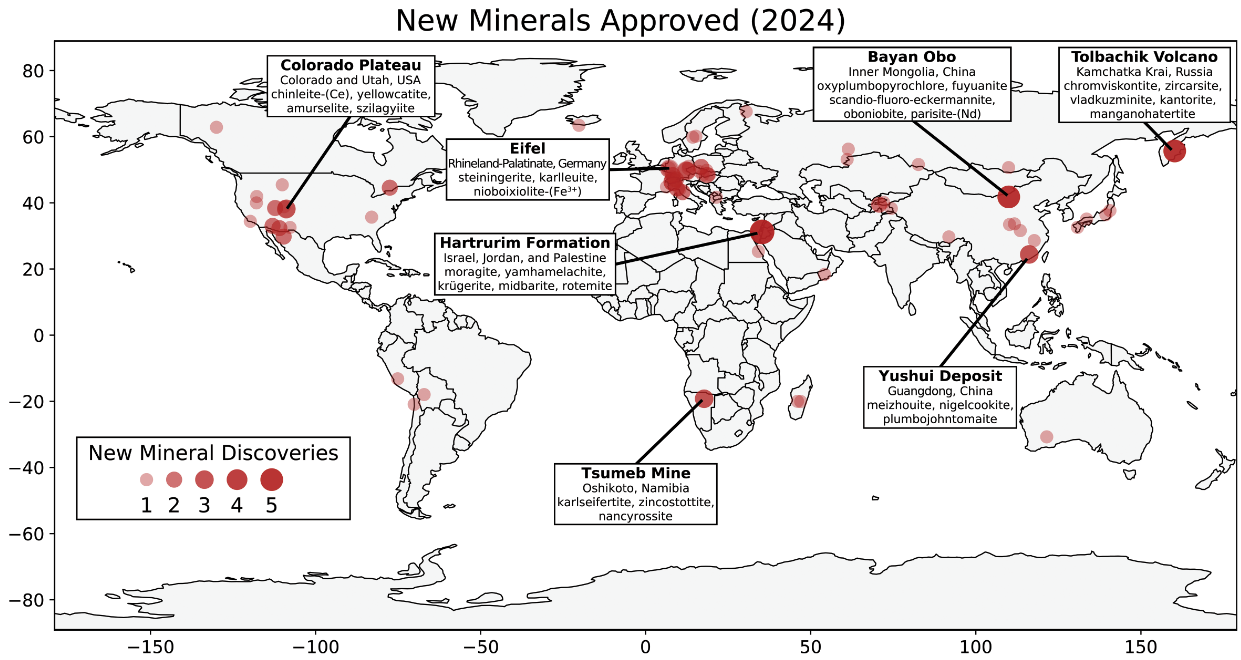

FIGURE 1. World map with localities of new minerals plotted as red circles with transparency. The size of the circle relates to the number of new minerals (approved in 2024) that were found within a 1-decimal degree radius determined using Euclidean distances. This is to emphasize areas that produced multiple minerals that were approved in 2024. Some prolific areas are further enumerated with callouts.

sisting of germanite, bornite, chalcocite, and tennantite-(Zn) (Kampf et al. 2025a). Zincostottite crystals on the type specimens are translucent and yellowish in color and appear to have been strongly etched after formation (Kampf et al. 2025a). Zincostottite has the ideal chemistry $ZnGe^{4+}(OH)_6$ and its structure has $P4_2/n$ symmetry with cell parameters $a = 7.4522(18)$ and $c = 7.4000(8)$ Å, $V = 411.0(2)$ Å^3, $Z = 4$. As the name suggests, the new mineral is the Zn analog of stottite, $Fe^{2+}Ge^{4+}(OH)_6$, also discovered at the Tsumeb Mine. The Tsumeb Mine is a unique hotspot for Ge mineralization. With the addition of zincostottite, nancyrossite ($Fe^{3+}Ge^{4+}O_6H_5$), and karlseifertite [$Pb(Ga_2Ge)(AsO_4)_2(OH)_6$] in 2024, there are now 16 Ge minerals for which the Tsumeb Mine is the type locality out of 41 total minerals with essential Ge. Of the 41 known Ge minerals, 23 are found at Tsumeb and 14 of these remain undocumented elsewhere as of the time of writing (www.Mindat.org). Apart from the Ge perovskite supergroup minerals stottite, zincostottite, and nancyrossite, the Tsumeb Mine is also the type (and, at present, only) locality for söhngeite, a $Ga(OH)_3$ perovskite.

Yellowcatite, $KNaFe^{3+}_2(Se^{4+}O_3)_2(V^{5+}_2O_7)\cdot 7H_2O$

Yellowcatite (IMA2024-30, Yel) is a new post-mining mineral discovered at the School Section #32 Mine in Utah, U.S.A., and described by Kampf et al. (2025b). The mineral is named for the Yellow Cat Mesa where the type locality is and for the Yellow Cat Road located above the underground workings of the School Section #32 Mine. The chemistry of yellowcatite is unusual in that there is a combination of Se and V as essential elements. These components form $Se^{4+}O_3$ trigonal pyramids and $V^{5+}O_4$ tetrahedra, respectively, within a heteropolyhedral sheet that is the major architectural component of the structure. Heteropolyhedral sheets in this novel structure are linked along *c* through hydrogen bonds with cross-linking $Na(H_2O)_6$ octahedra. The layered structure no doubt gives rise to the platy habit of yellowcatite crystals. Yellowcatite has a hexagonal cell with $P\bar{6}m2$ space group symmetry and cell parameters $a = 5.4966(7)$ and $c = 17.2109(16)$ Å ($Z = 1$). It is surprising that a mineral with coexisting Se and V was only recently discovered, given that these elements are present within coexisting secondary minerals elsewhere in the Colorado Plateau, such as at the Burro Mine—where volborthite [$Cu_3(V_2O_7)(OH)_2\cdot 2H_2O$] is found in association with Se minerals such as chalcomenite [$Cu(SeO_3)\cdot 2H_2O$] (Kampf et al. 2022).

Barronite, $(\square_{1.5}Ba_{0.5})(UO_2)_2Si_5O_{12}(OH)\cdot 2H_2O$

Barronite (IMA2024-053, Barr) is a new weeksite-like uranyl silicate mineral from the Krunkelbach Valley Uranium deposit, Baden-Württemberg, Germany. The Menzenschwand region is a relatively prolific locality for uranyl minerals, with more than 40 different species discovered there to date and serving as the type locality for eight, including metauranocircite, joliotite, arsenuranospathite, uranosilite, uranotungsite, arsenovanmeersscheite, nielsbohrite, and heisenbergite. Being structurally related to weeksite, $K_2(UO_2)_2(Si_5O_{13})\cdot 4H_2O$, barronite is its "keno" analog with significant interlayer vacancy and partial protonation of silicate O to account for charge imbalance. In the revised structure of a Ba-bearing weeksite by Fejfarová et al. (2012), K^+ and Ba^{2+} occupy the same two interlayer sites, and these authors report the empirical formula $(K_{1.03}\square_{0.46}Ba_{0.21}Na_{0.18}Ca_{0.12})_2(UO_2)_2(Si_{5.03}O_{13})\cdot 4H_2O$ (re-written to indicate vacancy), supported by thermogravimetric analyses and an untwinned structure. The twinned "orthorhombic" weeksite of Jackson and Burns (2001) gave an empirical formula with significantly less H_2O pfu, $(K_{1.05}\square_{0.56}Ba_{0.25}Na_{0.02}Ca_{0.12})_2(UO_2)_2(Si_{5.07}O_{12.38})\cdot 1.46H_2O$, closer to that of barronite. Unlike most uranyl minerals that bear sheet-like structural units, weeksite and barronite are open frameworks formed by crosslinking uranyl polyhedra and silicate tetrahedra, with cations and H_2O groups located in channels. The new mineral formed from supergene processes, occurring as radial and globular aggregates of acicular, pale yellow crystals within abundant baryte (source of Ba), quartz, and associated with other secondary uranyl silicates, arsenates, and phosphates.

Recently Published

This section includes some of the new minerals approved in recent years that have been published (or entered press) since September 2024.

Ferroinnelite, $Ba_4Ti_2Na(NaFe^{2+})Ti(Si_2O_7)_2[(SO_4)(PO_4)]O_2[O(OH)]$

Ferroinnelite (IMA2024-029, Finn), ideally $Ba_4Ti_2Na(NaFe^{2+})Ti(Si_2O_7)_2[(SO_4)(PO_4)]O_2[O(OH)]$, is a new member of the lamprophyllite group (seidozerite supergroup) from the Kovdor Massif in Murmansk Oblast, Russia. The new mineral occurs as transparent brown crystals to ca. 0.15 mm in agpaitic pegmatite alongside cancrinite, orthoclase, and aegirine-augite, among other minerals (Sokolova et al. 2025). Ferroinnelite is one of a very small number of minerals that bears Ti^{4+} in fivefold coordination. Other minerals with fivefold-coordinated Ti include fresnoite, alfredcasparite, and other members of the lamprophyllite group, such as innelite. Ferroinnelite is related to innelite by the substitution of Fe^{2+} for Mn^{2+} at one of the octahedral metal sites (*M*3), hence its name. The investigation of ferroinnelite carried out by Sokolova et al. (2025) led to the identification of (nonessential) H_2O in addition to OH groups within the structures of both ferroinnelite and innelite. The IMA-CNMNC formulae for other lampyophyllite group minerals, including shkatulkalite $[Na_2Nb_2Na_3Ti(Si_2O_7)_2O_2(FO)(H_2O)_4(H_2O)_3]$ and zvyaginite $[Na_2ZnTiNb_2(Si_2O_7)_2O_2(OH)_2(H_2O)_4]$, contain essential H_2O groups.

Alfredcasparite, $Sr_2TiO(Si_2O_7)$

The new mineral alfredcasparite (IMA2023-024, Afc), ideally $Sr_2TiO(Si_2O_7)$, is a new sorosilicate mineral discovered in an unusual xenolithic assemblage at the Caspar Quarry in western Germany (Juroszek et al. 2024). The scarcity and small grain size of the type material made direct crystal structure solution of alfredcasparite infeasible. The new mineral was identified as the Sr analog of fresnoite, $Ba_2TiO(Si_2O_7)$, through a combination of electron microprobe and electron backscattered diffraction, confirming its similarity in chemistry and structure to fresnoite. Alfredcasparite occurs alongside grains of a potentially new Sr-silicate mineral in intergranular cracks and spaces within a matrix of mostly potassium feldspar, wollastonite, and diopside (Juroszek et al. 2024). The xenolith where alfredcasparite was found is also noteworthy for being the first occurrence of wesselsite, $SrCuSi_4O_{10}$, found outside of its type locality: the Wessels Mine in South Africa. Alfredcasparite is named for the owner and namesake of the type locality: Alfred Caspar (1926–2022).

Nannoniite, $Al_2(OH)_5F$

The unnamed mineral first reported from the Francon Quarry in Canada and formerly known as “UM1990-28:OHF:Al” was recently approved under the name nannoniite (IMA2024-010, Nnn) following the recognition of additional material at the Le Cetine di Cotorniano Mine in Italy and the application of new analytical techniques that permitted the solution of the crystal structure (Biagioni et al. 2024). This mineral was first reported by Sabina et al. (1968) in the type description of weloganite as an unidentified mineral that yielded a powder X-ray diffraction pattern similar to that of gibbsite. Sabina et al. (1968) also mentioned that the mineral had been found on one sample from the nearby Miron Quarry. Interestingly, although nannoniite is only presently known from just four localities, it is relatively common at two of them. Nannoniite is extremely widespread at the Francon Quarry and is present on or associated with most samples of weloganite. Likewise, Biagioni et al. (2024) note that nannoniite is widespread in cavities within silicified limestone at the Italian type locality. The phase was first described in detail by Jambor et al. (1990) with optical properties, major elements (measured by electron microprobe), powder X-ray diffraction with unit-cell determination, and thermogravimetry data, although it was not submitted to the IMA-CNMNC for consideration as a new species. While the powder X-ray diffraction data of Francon nannoniite could be indexed with a gibbsite cell (owing to the homologous relationship between these two species), the structure was noted to be distinct from that of gibbsite even though it could not be solved with direct methods. Due to the ordering of F and OH being important for distinguishing nannoniite from gibbsite, a full structure solution was crucial to defining nannoniite as a unique species. Solving the structure of this mineral still proved difficult for Biagioni et al. (2024), although these authors prevailed through the use of three-dimensional electron diffraction. The structure reported by Biagioni et al. (2024) has $P2_1/b$ symmetry and cell parameters $a = 8.688(3)$, $b = 5.024(2)$, $c = 9.734(4)$ Å, and $\beta = 90.77(2)°$. These cell parameters are very similar to the cell indexed by Jambor et al. (1990) with $a = 8.66$, $b = 4.99$, $c = 9.67$ Å, and $\beta = 92.12°$. Although Biagioni et al. (2024) chose not to study Francon nannoniite while working on material from the Le Cetine di Cotorniano Mine, the similarity in the data reported by Jambor et al. (1990) and Biagoni et al. (2024) unambiguously confirms that UM1990-28-OHF:Al and nannoniite are synonymous. Nannoniite is named for the Italian mineral collector Roberto Nannonii (1943–2022).

Dacostaite, $K(Mg_2Al)[Mg(H_2O)_6]_2(AsO_4)_2F_6{\cdot}2H_2O$

Dacostaite (IMA2024-015, Dcs) is another new mineral described from the Le Cetine di Cotorniano Mine in Italy. The new mineral occurs as rosettes of white pseudo-hexagonal plates in association with sulfur, gypsum, quartz, and an unidentified pharmacosiderite-like mineral. It is extremely rare; fewer than 10 specimens were known when the description was published (Biagioni et al. 2025). Dacostaite is monoclinic; *C*2/*m*, $a = 12.474(5)$, $b = 7.198(3)$, $c = 13.724(6)$ Å, and $\beta = 99.518(13)°$. Its crystal structure is novel but incorporates motifs that have been observed in other minerals. The overall architecture of dacostaite consists of heteropolyhedral sheets with a crandallite-like honeycomb configuration of $Al(F,OH)_6$ octahedra decorated at triple junctions by AsO_4 tetrahedra. The AsO_4 tetrahedra link to outer $Mg(H_2O)_6$ octahedra by accepting three hydrogen bonds from H_2O bound to Mg that laterally link the triangular faces of an AsO_4 tetrahedron and a $Mg(H_2O)_6$ octahedron. A disordered K site is located in the honeycomb space. Each heteropolyhedral sheet unit is linked to the next along *c* through hydrogen bonds between interlayer and Mg-bound H_2O molecules. Dacostaite is named for the Italian mineral collector Angelo Da Costa (1940–2022).

Hoperanchite, $(NH_4)_2(S_2O_3)$

Hoperanchite is a new combustion condensate mineral named for its place of discovery at Hope Ranch on the California coast, U.S.A. (IMA2024-017, Hpr). Although new to the mineralogical community, this mineral represents natural ammonium thiosulfate—a highly soluble salt well-known as a consumer product with uses as a photographic fixer salt and an alternative to cyanide-based compounds in gold leaching. Ammonium thiosulfate has further applications in chemistry and biological research. Hoperanchite is, therefore, one of a very small number of new minerals that can be purchased in bulk on the internet at the time of its approval as a new mineral species. Hoperanchite has the same structure as synthetic ammonium thiosulfate with *C*2 symmetry and cell parameters $a = 10.2313(5)$, $b = 6.4998(3)$, $c = 8.8098(6)$ Å, and $\beta = 94.611(7)°$ for a $Z = 4$ cell. Natural ammonium thiosulfate was found in burning landslide talus composed of bituminous and/or kerogenous shales and sandstones of the Miocene-aged Monterey Formation (Kampf et al. 2025c). Material exposed from the landslide is porous, and exposure to oxygen resulted in rapid weathering of minerals such as pyrite that have exothermic oxidation reactions. Thermal insulation resulted in the buildup of heat to the point of sustainable combustion. Hoperanchite formed in close association with sulfur, mascagnite, $(NH_4)_2SO_4$, and koktaite, $(NH_4)_2Ca(SO_4)_2{\cdot}H_2O$, at the vent interface where hot gas mixed with much cooler air. This environment is analogous to the Huron shale fire in Ohio where a landslide of an oil-rich shale unit led to the formation of non-volcanic fumarole environments and the discovery of the new minerals huizingite-(Al), $[(NH_4)_9(SO_4)_2][Al_3(OH)_2(H_2O)_4(SO_4)_6]$, and carlsonite, $(NH_4)_5Fe^{3+}_3O(SO_4)_6 \cdot 7H_2O$ (Kampf et al. 2016).

Vargite, $MnCu_2Mn_2(OH)_4(H_2O)_4(AsO_4)_2$

The new mineral vargite (IMA2020-051, Vg) was described from a historic sample collected at the Långban Mine in Sweden by Swedish miner Erik Gustav Varg (1886–1970) and named in his honor (Langhof et al. 2025). The description of vargite permits the establishment of the akrochordite group comprising vargite, akrochordite, $MnMn_2Mn_2(OH)_4(H_2O)_4(AsO_4)_2$, and guanacoite, $MgCu_2Mg_2(OH)_4(H_2O)_4(AsO_4)_2$. This group of minerals has three independent divalent M cation sites forming slabs of *en echelon* ribbons of MO_6 octahedra that run parallel to [100] and are linked by AsO_4 tetrahedra. The slabs alternate their orientation along [010] and are linked to each other by hydrogen bonds. Vargite occurs in a brecciated and hydrothermally altered manganese ore and carbonate assemblage and is proposed to have formed during the breakdown of hausmannite ($Mn^{2+}Mn^{3+}_2O_4$) and yarrowite (Cu_9S_8) in the presence of As-rich fluids (Langhof et al. 2025).

Shiranuiite, $Cu^+(Rh^{3+}Rh^{4+})S_4$

Shiranuiite, $Cu^+(Rh^{3+}Rh^{4+})S_4$ (IMA2023-072a, Sir), is a new member of the thiospinel group representing an extremely rare example of a mixed-valence rhodium sulfide (Nishio-Hamane et al. 2024a). It was found in Haraigawa, Kyushu, Japan, occurring within a grain of isoferroplatinum containing associated tulameenite, tetraferroplatinum, and cuprorhodisite. The new mineral's name has a fascinating origin—coming from a legendary tale that traces back to the ancient name of Kumamoto Prefecture in Kyushu, Japan. According to the *Nihon Shoki* (*Chronicles of Japan*), Japan's oldest historical record, Emperor Keikō, the 12th emperor, lost his way at sea during a pilgrimage to Kyushu. He was able to reach land safely after spotting a distant fire. When he inquired, "Who lit the fire?" the response was, "It is the fire that no one knows about"—rendered in historical kana orthography as *shiranui* (不知火), an atmospheric optical phenomenon. This legend led to the region being called the "Land of Fire," now modern-day Kumamoto Prefecture. However, the validity of the mineral has been called into question. Cabri and McDonald (2024) argue that shiranuiite and ezochiite, $Cu^+(Rh^{3+}Pt^{4+})S_4$, are not new minerals, but platinum- and rhodium-rich varieties of cuprorhodsite, $(Cu^+_{0.5}Fe^{3+}_{0.5})Rh^{3+}_2S_4$, on the basis of assumed, rather than empirically measured valence and in the absence of refined structures. Nishio-Hamane et al. (2024a) present a clear distinction between Cu/(Cu+Fe) compositions for cuprorhodisite (linnaeite subgroup) and shiranuiite (carrollite subgroup) and consider the two immiscible. They conclude that shiranuiite likely forms at a different stage than cuprorhodisite, where Fe depletion and Cu enrichment cause oxidation to Rh^{4+}.

Manuelarossiite, $CaPbAlF_7$

The new fluoride mineral manuelarossiite (IMA2022-097, Mnrs), ideally $CaPbAlF_7$, was discovered in a fumarole condensate assemblage at Mount Vesuvius in Italy and described by Nestola et al. (2025). The name of the new mineral honors Dr. Manuela Rossi (b. 1977), researcher at the University of Naples and expert on the mineralogy of Mount Vesuvius. Manuelarossiite occurs intimately associated with cerussite and was found at the same vents that have produced specimens of other very rare and unusual halide minerals such as calcioaravaipaite, artroeite, challacolloite, napoliite, and hephaistosite, among others. Manuelarossiite is the third mineral to be discovered here, after sbacchiite (Ca_2AlF_7) and napoliite (Pb_2OFCl). Manuelarossiite has a layered structure comprising a core sheet of CaF_8 polyhedra. The next layers comprise a layer of AlF_6 octahedra on both sides of the CaF_8 polyhedral sheet. The heteropolyhedral sheets are connected to each successive sheet by Pb–F bonds linking Pb atoms adorning the exterior of the AlF_6 octahedral sheet to F atoms in AlF_6 octahedra in the next sheet. Manuelarossiite is a homolog of the closely related mineral calcioaravaipaite, $PbCa_2AlF_9$, which has a core sheet that is two CaF_8 polyhedra thick. Calcioaravaipaite has otherwise identical topology to manuelarossiite.

Bonacinaite, $Sc(AsO_4) \cdot 2H_2O$

Bonacinaite (IMA2018-056, Bci) is the first scandium arsenate mineral to be described and is one of only 24 approved minerals with essential scandium (Ciriotti et al. 2024). Recent years have seen the description of several new scandium minerals, including scandio-winchite (IMA2022-009), heflikite (IMA2022-139), scandio-fluoro-eckermannite (IMA2024-002), and dubińskaite (IMA2024-035). Most scandium minerals are either silicates or oxides, although there are several scandium phosphates such as kolbeckite, pretulite, and juonniite. Bonacinaite belongs to the metavariscite group, as does its phosphate analog kolbeckite. Bonacinaite was found at the Varenche Mine in the Aosta Valley province of Italy, where it occurs as minute purple tabular crystals in an oxidized manganese deposit (Ciriotti et al. 2024). The new mineral's name honors Italian collector Enrico Bonacina (1928–2024), a prolific mineral macrophotography expert and micromineral collector.

Selenolaurite, $RuSe_2$

Selenolaurite is a new ruthenium selenide discovered in heavy mineral separates from the Ingul placer occurrence near the city of Chelyabinsk in Chelyabinsk Oblast, Russia (Belogub et al. 2025). At present, there are fewer than 10 approved mineral species with site-defining Ru and no other minerals with both Ru and Se. The new mineral's name conveys the relationship of selenolaurite as the Se analog of laurite (RuS_2). Laurite was described by Friedrich Wöhler in 1866, who named the mineral for his friend's wife: Laura Louisa Henrietta Rupe Joy (1833–1929). Laurite was one of the first two minerals named after a woman (the other being marialite, named in the same year by Gerhard vom Rath). Selenolaurite type material consists of minute grains to about 20 μm occurring alongside Se-rich moncheite [$Pt(Te,Bi)_2$] within interstices in native osmium crystals (Belogub et al. 2025).

Proxitwelvefoldite, $Pd_3Ni_4Te_8$

Proxitwelvefoldite (IMA2024-034; Ptw) is a new intermetallic mineral from Kalgoorlie-Boulder, Western Australia, Australia, discovered in a historic specimen within the collections of the Natural History Museum of the University of Florence (Bindi et al. 2025). The mineral is very rare and occurs as micrometer-sized crystals associated with Fe-bearing melonite in a silicate matrix composed of major chlorite and lizardite. Its name is derived from the truncated Latin word *proxĭmus*, for "near," and to indicate its pseudo-12-fold symmetry. The new mineral belongs to a series of synthetic materials termed "σ phases"—hard, brittle, and undesirable components of high-Cr and -Mo steel that have structures based on tetrahedra, termed "tetrahedrally close-packed" (Yackel 1983). Proxitwelvefoldite is the first terrestrial pseudo-dodecagonal quasicrystal *approximant*, a periodic crystalline solid with a composition close to that of a quasicrystal, and its existence suggests that a dodecagonal quasicrystal may exist in the Pd-Ni-Te system. The find is significant because natural quasicrystals have so far only been described from extraterrestrial samples. The structure of proxitwelvefoldite is tetragonal, $P4_2/mnm$, and is composed of metal-metal bonded polyhedra with high coordination numbers (Pd1, Ni, Te = 12; Pd2 = 15; Te2 = 14).

Tarutinoite, $Ag_3Pb_7Bi_7S_{19}$

Tarutinoite (IMA2023-122; Trtn) is a new $^{7,8}L$ member of the lillianite homologous series discovered in drill core samples taken in the Tarutinskoe deposit (for which the mineral is named), 9.5 km south of the village of Tarutino, 220 km south of Chelyabinsk, Chelyabinsk Oblast, Russia.

It occurs as anhedral grains in magnetite-calcite matrix associated with andradite, chalcopyrite, and pyrite, and was deposited hydrothermally along with the other ore minerals (Kasatkin et al. 2025). The structure is built from two different galena-like slabs (N = 7 and 8) of complex composition, with mixed (Ag,Bi), (Pb,Ag), (Bi,Pb), and (Pb,Bi) sites. A phase with matching order was previously prepared synthetically by Skowron and Tilley (1990), and tarutinoite now marks the 13th member of the lillianite series.

Miyawakiite-(Y), $\square Y_4Fe_2(Si_8O_{20})(CO_3)_4(H_2O)_3$

Miyawakiite-(Y) (IMA2024-003; Myw-Y) was described by Nishio-Hamane et al. (2024b) from an abandoned pegmatite mine at Suishoyama in Fukushima Prefecture, Japan. It is found as pale yellow thin plates and columnar crystals in gaps and crevices of allanite-(Y) and britholite-(Y), having formed after their alteration by near-surface waters. The mineral is named in honor of Dr. Ritsuro Miyawaki, a Japanese mineralogist and crystallographer, and director of the Department of Geology and Paleontology at the National Museum of Nature and Science, Japan, for his numerous contributions to descriptive mineralogy and service as CNMNC Chairman from 2018–2022. As Chairman, he reviewed and edited over 500 new mineral proposals and has been involved in the descriptions of 40 new mineral species, including many REE-carbonates. The crystal structure of miyawakiite-(Y) is a novel framework built from Y- and Fe-centered polyhedra connected by triangular CO_3 groups. Their arrangement forms ~square channels that are further lined by SiO_4 tetrahedra in 8-membered rings, creating zeolitic channels that host partially occupied sites for K^+ and H_2O. Though present in non-defining amounts, K^+ content leads to the solid solution series $\square Y_4Fe_2(Si_8O_{20})(CO_3)_4(H_2O)_3$–$KY_4Fe_2(Si_8O_{20})(CO_3)_4[(H_2O)_2(OH)]$, and general formula $K_xY_4Fe_2(Si_8O_{20})(CO_3)_4[(H_2O)_{3-x}(OH)_x]$ where $0 \leq x \leq 0.5$.

Ehrigite, Bi_8Te_3

Ehrigite (IMA2023-074; Ehg) is a new bismuth telluride mineral within the tetradymite group. The new mineral occurs as <100 μm grains within hedenbergite at the Good Hope Mine in British Columbia, Canada (Ciobanu et al. 2024). Ehrigite was the first bismuth telluride mineral described since tsumoite (BiTe) was approved in 1972. However, since 2024 saw the approval of the new mineral dulangguoite (Bi_6Te_3; IMA2024-067), there are now six minerals containing only Bi and Te as essential elements (all are members of the tetradymite group). Ciobanu et al. (2024) utilized the technique of high-angle annular dark-field scanning transmission electron microscopy to visualize the structure of ehrigite. The high-resolution imaging was used to validate the predicted structure modeled using density functional theory with a structure relaxation approach incorporating measured structure parameters. Ehrigite is a member of the tetradymite homologous series, whose structures are formed from the expansion of the tetradymite-type slab. In ehrigite, there is a central five-atom Bi-Te sequence of Te-Bi-Te-Bi-Te with three more Bi atoms on each end to form an 11-atom expanded sequence (Ciobanu et al. 2024).

Zheshengite, $Pb_4ZnZn_2(AsO_4)_2(PO_4)_2(OH)_2$

Zheshengite (IMA2022-011; Zh), a new member of the dongchuanite group, was named in honor of Chinese mineralogist Zhesheng Ma (b. 1937), former professor at the China University of Geosciences in Beijing (Sun et al. 2024). She has conducted a number of mineralogical studies of the Dongchuan Copper ore field and described the tyrolite-like mineral tangdanite, $Ca_2Cu_9(AsO_4)_4(SO_4)_{0.5}(OH)_9 \cdot 9H_2O$, from that locality. The dongchuanite group minerals, which also include dongchuanite, cuprodongchuanite, and cuprozheshengite, have framework structures built from heteropolyhedral chains of corner-sharing tetrahedra interlaced with octahedra. Their general formula is given as $A_4{}^{VI}B^{IV}B_2(X1O_4)_2(X_2O_4)_2(OH)_2$, where A = Pb; ${}^{VI}B$ = Zn,Cu; ${}^{IV}B$ = Zn, Cu; and $X1$ and $X2$ = P or As. Minerals with $X1$ and $X2$ = As have not yet been described.

Minerals belonging to established nomenclature systems

The recently published minerals gysinite-(Ce), hydroxylbastnäsite-(La), nioboixiolite-(□), and parisite-(Nd) belong to established nomenclature systems. Gysinite-(Ce) is the Ce analog of gysinite-(Nd) and gysinite-(La) and belongs to the ancylite supergroup (Kampf et al. 2024). Hydroxylbastnäsite-(La) is a new end-member of the bastnäsite group and is the La analog of hydroxylbastnäsite-(Ce) and hydroxylbastnäsite-(Nd) (Pekov et al. 2025). Nioboixiolite-(□) is a new end-member within the columbite supergroup and is a vacancy (keno) analog of nioboixiolite-(Mn^{2+}) and the recently approved nioboixiolite-(Fe^{3+}) (Li et al. 2025). The new member of the parisite group, parisite-(Nd), is the Nd analog of parisite-(Ce) and parisite-(La) (Fan et al. 2025).

Recent nomenclature changes

Following the approval of the new mineral svornostite-(NH_4), the svornostite group has been established. It includes two subgroups: (1) the svornostite subgroup with general formula $A_2^+M^{2+}(UO_2)_2(SO_4)_4(H_2O)_8$ and (2) the rietveldite subgroup with general formula $M^{2+}(UO_2)(SO_4)_2(H_2O)_5$, [or $M_2^{2+}(UO_2)_2(SO_4)_4(H_2O)_{10}$], where A is the dominant large monovalent cation and M is the dominant octahedrally coordinated divalent cation. The previously described minerals svornostite and oldsite have received Levinson modifiers and were renamed svornostite-(K) and oldsite-(K), respectively. The members of the svornostite subgroup are thus svornostite-(K), svornostite-(NH_4), and oldsite-(K). The members of the rietveldite subgroup are rietveldite and zincorietveldite. No minerals were discredited in the period September 2024–January 2025. Of final note, the IMA-CNMNC has voted to raise the proposal approval threshold from a simple ⅔ majority to a ¾ majority vote.

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