Mineralogical Magazine (2021), 1–5
doi:10.1180/mgm.2021.30

CAMBRIDGE UNIVERSITY PRESS

IMA Commission on New Minerals, Nomenclature and Classification (CNMNC)

Newsletter 60

Ritsuro Miyawaki (Chairman, CNMNC)[1], Frédéric Hatert (Vice-Chairman, CNMNC)[2], Marco Pasero (Vice-Chairman, CNMNC)[3]* and Stuart J. Mills (Secretary, CNMNC)[4]

[1]Department of Geology and Paleontology, National Museum of Nature and Science, 4-1-1 Amakubo, Tsukuba 305-0005, Japan – miyawaki@kahaku.go.jp; [2]Laboratoire de Minéralogie, Université de Liège, B-4000 Liège, Belgium – fhatert@uliege.be; [3]Dipartimento di Scienze della Terra, Università di Pisa, Via Santa Maria 53, I-56126 Pisa, Italy – marco.pasero@unipi.it; and [4]Geosciences, Museums Victoria, PO Box 666, Melbourne, Victoria 3001, Australia – smills@museum.vic.gov.au

The information given here is provided by the IMA Commission on New Minerals, Nomenclature and Classification for comparative purposes and as a service to mineralogists working on new species.
Each mineral is described in the following format:

Mineral name, if the authors agree on its release prior to the full description appearing in press
Chemical formula
Type locality
Full authorship of proposal
E-mail address of corresponding author
Relationship to other minerals
Crystal system, Space group; Structure determined, yes or no
Unit-cell parameters
Strongest lines in the powder X-ray diffraction pattern
Type specimen repository and specimen number
Citation details for the mineral prior to publication of full description

Citation details concern the fact that this information will be published in the *Mineralogical Magazine* on a routine basis, as well as being added month by month to the Commission's web site.

It is still a requirement for the authors to publish a full description of the new mineral.

NO OTHER INFORMATION WILL BE RELEASED BY THE COMMISSION

NEW MINERAL PROPOSALS APPROVED IN FEBRUARY 2021

IMA No. **2019-033a**
Haitaite-(La)
$LaU^{4+}Fe_2^{3+}(Ti_{13}Fe_4^{2+}Fe^{3+})_{\Sigma 18}O_{38}$
Haita town, Miyi County, Sichuan province, China (26° 54'13"N, 102°01'27"E)
Fenggang Wang*, Guang Fan, Ting Li, Xiangkun Ge, Yu Wu, Huan Wang and Jian Yao
*E-mail: wfg9818@163.com
Crichtonite group
Trigonal: $R\bar{3}$; structure determined
$a = 10.3678(5)$, $c = 20.839(1)$ Å
3.391(79), 3.241(65), 3.039(49), 2.994(46), 2.871(100), 2.475(62), 1.694(58), 1.436(55)
Type material is deposited in the mineralogical collections of the Geological Museum of China, No. 16 Yangrou Hutong, Xisi, Beijing 100031, People's Republic of China, catalogue number M13859
How to cite: Wang, F., Fan, G., Li, T., Ge, X., Wu, Y., Wang, H. and Yao, J. (2021) Haitaite-(La), IMA 2019-033a. CNMNC Newsletter 60; *Mineralogical Magazine*, 85, https://doi.org/10.1180/mgm.2021.30

IMA No. **2020-081**
Dobšináite
$Ca_2Ca(AsO_4)_2{\cdot}2H_2O$
Dionýz mining field, Zemberg-Terézia vein system, 2.2 km NE of the Dobšiná town, Spišsko-gemerské rudohorie Mts., Rožňava Co., Košice Region, Slovakia (48°50'17"N, 20°23'01"E)
Jiří Sejkora*, Martin Števko, Radek Škoda, Eva Višňová, Jiří Toman, Sebastián Hreus, Jakub Plášil and Zdeněk Dolníček
*E-mail: jiri.sejkora@nm.cz
Roselite group
Monoclinic: $P2_1/c$
$a = 5.990(2)$, $b = 13.013(4)$, $c = 5.726(2)$ Å, $\beta = 108.47(3)°$
5.197(37), 5.002(33), 3.443(38), 3.385(66), 3.249(77), 3.201(42), 3.026(100), 2.822(60)

***Author for correspondence**: Marco Pasero, Email: marco.pasero@unipi.it
Cite this article: Miyawaki R., Hatert F., Pasero M. and Mills S.J. (2021) Newsletter 60. *Mineralogical Magazine* 1–5. https://doi.org/10.1180/mgm.2021.30

Type material is deposited in the mineralogical collections of the Moravian Museum, Department of Mineralogy and Petrology, Zelný trh 6, Brno, Czech Republic, catalogue number B12257
How to cite: Sejkora, J., Števko, M., Škoda, R., Víšková, E., Toman, J., Hreus, S., Plášil, J. and Dolníček, Z. (2021) Dobšináite, IMA 2020-081. CNMNC Newsletter 60; *Mineralogical Magazine*, 85, https://doi.org/10.1180/mgm.2021.30

IMA No. **2020-082**
Bobfinchite
$Na[(UO_2)_8O_3(OH)_{11}]\cdot 10H_2O$
Burro mine, Slick Rock district, San Miguel Co., Colorado, USA (38°02'42"N, 108°53'23"W)
Travis A. Olds*, Jakub Plášil, Anthony R. Kampf, Peter Burns, Joe Marty and John S. McCloy
*E-mail: oldst@carnegiemnh.org
Schoepite family
Orthorhombic: *Pbcn*; structure determined
$a = 14.6249(9)$, $b = 14.0389(10)$, $c = 16.6923(10)$ Å
7.337(100), 3.658(21), 3.590(50), 3.516(22), 3.229(63), 3.176(36), 2.568(20), 2.013(23)
Type material is deposited in the mineralogical collections of the Natural History Museum of Los Angeles County, 900 Exposition Boulevard, Los Angeles, CA 90007, USA, catalogue number 75146
How to cite: Olds, T.A., Plášil, J., Kampf, A.R., Burns, P., Marty, J. and McCloy, J.S. (2021) Bobfinchite, IMA 2020-082. CNMNC Newsletter 60; *Mineralogical Magazine*, 85, https://doi.org/10.1180/mgm.2021.30

IMA No. **2020-084**
Yuzuxiangite
$Sr_3Fe^{3+}(Si_2O_6)_2(OH)\cdot 3H_2O$
Wessels mine, Kalahari Manganese Fields, Northern Cape Province, South Africa (27°06'51.82"S, 22°51'18.31"E)
Xiangping Gu*, Hexiong Yang and Xiande Xie
*E-mail: guxp2004@163.com
The Fe^{3+}-analogue of ohmilite
Monoclinic: $P2_1/m$; structure determined
$a = 11.1035(10)$, $b = 7.8463(7)$, $c = 7.8222(7)$ Å, $\beta = 101.406(8)°$
4.632(92), 3.486(100), 3.291(67), 3.175(38), 3.065(57), 2.841(48), 2.118(49), 1.956(46)
Type material is deposited in the mineralogical collections of the Geological Museum of China, No. 16 Yangrou Hutong, Xisi, Beijing 100031, People's Republic of China, catalogue number M16110 (holotype), the University of Arizona Mineral Museum, 1601 E University Blvd, Tucson, AZ 85719, USA, catalogue number 22692, and the RRUFF Project, deposition number R200008
How to cite: Gu, X., Yang, H. and Xie, X. (2021) Yuzuxiangite, IMA 2020-084. CNMNC Newsletter 60; *Mineralogical Magazine*, 85, https://doi.org/10.1180/mgm.2021.30

IMA No. **2020-085**
Ferri-hellandite-(Ce)
$(Ca_3Ce)Ce_2Fe^{3+}\square_2B_4Si_4O_{22}(OH)_2$
Sagåsen larvikite quarry, Mørje, Porsgrunn, Vestfold and Telemark, Norway (59°02'39"N, 9°49'46"E)
Henrik Friis*, Radek Škoda, Alf Olav Larsen, Michaela Vašinová-Galiová, Radim Čtvrtlík and Jan Filip
*E-mail: henrik.friis@nhm.uio.no
Hellandite group
Monoclinic: *P2/a*; structure determined
$a = 19.1616(2)$, $b = 4.7561(4)$, $c = 10.34016(1)$ Å, $\beta = 111.173(1)°$
8.934(37), 3.466(37), 3.246(33), 3.101(34), 2.929(37), 2.861(44), 2.658(100), 1.910(44)
Type material is deposited in the mineralogical collections of the Natural History Museum, University of Oslo, P.O. Box 1172, Blindern, 0318 Oslo, Norway, catalogue number KNR 44259 (XRD), and the Moravian Museum, Department of Mineralogy and Petrology, Zelný trh 6, Brno, Czech Republic, catalogue number B12258 (EMPA)
How to cite: Friis, H., Škoda, R., Larsen, A.O., Vašinová-Galiová, M., Čtvrtlík, R. and Filip, J. (2021) Ferri-hellandite-(Ce), IMA 2020-085. CNMNC Newsletter 60; *Mineralogical Magazine*, 85, https://doi.org/10.1180/mgm.2021.30

IMA No. **2020-086**
Elgoresyite
$(Mg_5Si_2)O_9$
Suizhou meteorite (Suizhou L6 chondrite), Xihe, Zengdu District, Suizhou, Hubei, China (31°37'N, 113°28'E)
Luca Bindi*, Ryosuke Sinmyo, Elena Bykova, Sergey V. Ovsyannikov, Catherine McCammon, Ilya Kupenko, Leyla Ismailova, Leonid Dubrovinsky and Xiande Xie
*E-mail: luca.bindi@unifi.it
New structure type
Monoclinic: *C2/m*; structure determined
$a = 9.397(2)$, $b = 2.763(1)$, $c = 11.088(3)$ Å, $\beta = 94.25(2)°$
2.801(100), 2.563(35), 2.460(70), 2.308(40), 2.070(35), 2.017(55), 1.968(65), 1.845(60)
Type material is deposited in the mineralogical collections of the Museo di Storia Naturale, Università di Firenze, Via La Pira 4, I-50121, Firenze, Italy, catalogue number 3238/I
How to cite: Bindi, L., Sinmyo, R., Bykova, E., Ovsyannikov, S.V., McCammon, C., Kupenko, I., Ismailova, L., Dubrovinsky, L. and Xie, X. (2021) Elgoresyite, IMA 2020-086. CNMNC Newsletter 60; *Mineralogical Magazine*, 85, https://doi.org/10.1180/mgm.2021.30

IMA No. **2020-087**
Phosphocyclite-(Fe)
$Fe_2^{2+}(P_4O_{12})$
Halamish Wadi, Hatrurim basin, Negev Desert, Israel (31° 09'47"N, 35°17'57"E)
Sergey N. Britvin*, Mikhail N. Murashko, Yevgeny Vapnik, Natalia S. Vlasenko, Maria G. Krzhizhanovskaya, Oleg S. Vereshchagin, Vladimir N. Bocharov and Maksim S. Lozhkin
*E-mail: sbritvin@gmail.com
The Fe^{2+}-analogue of phosphocyclite-(Ni) (IMA No. 2020-088; this Newsletter)
Monoclinic: *C2/c*; structure determined
$a = 11.834(4)$, $b = 8.340(2)$, $c = 9.911(2)$ Å, $\beta = 118.50(4)°$
6.170(51), 4.253(40), 3.554(20), 3.388(26), 3.201(30), 3.012 (100), 2.600(23), 2.398(21)
Type material is deposited in the collections of the Fersman Mineralogical Museum, Russian Academy of Sciences, Leninskiy Prospekt 18-2, Moscow 119071, Russia, registration number 5596/1

How to cite: Britvin, S.N., Murashko, M.N., Vapnik, Y., Vlasenko, N.S., Krzhizhanovskaya, M.G., Vereshchagin, O.S., Bocharov, V.N. and Lozhkin, M.S. (2021) Phosphocyclite-(Fe), IMA 2020-087. CNMNC Newsletter 60; *Mineralogical Magazine*, 85, https://doi.org/10.1180/mgm.2021.30

IMA No. **2020-088**

Phosphocyclite-(Ni)

$Ni_2(P_4O_{12})$

Halamish Wadi, Hatrurim basin, Negev Desert, Israel (31° 09'47"N, 35°17'57"E)

Sergey N. Britvin*, Mikhail N. Murashko, Yevgeny Vapnik, Natalia S. Vlasenko, Maria G. Krzhizhanovskaya, Oleg S. Vereshchagin, Vladimir N. Bocharov and Maksim S. Lozhkin

*E-mail: sbritvin@gmail.com

The Ni-analogue of phosphocyclite-(Fe) (IMA No. 2020-087; this Newsletter)

Monoclinic: *C*2/*c*

$a = 11.611(2)$, $b = 8.218(2)$, $c = 9.826(2)$ Å, $\beta = 118.41(4)°$

6.086(56), 4.211(39), 3.334(25), 3.145(29), 2.978(100), 2.833(26), 2.357(23), 2.081(23)

Type material is deposited in the collections of the Fersman Mineralogical Museum, Russian Academy of Sciences, Leninskiy Prospekt 18-2, Moscow 119071, Russia, registration number 5596/1

How to cite: Britvin, S.N., Murashko, M.N., Vapnik, Y., Vlasenko, N.S., Krzhizhanovskaya, M.G., Vereshchagin, O.S., Bocharov, V.N. and Lozhkin, M.S. (2021) Phosphocyclite-(Ni), IMA 2020-088. CNMNC Newsletter 60; *Mineralogical Magazine*, 85, https://doi.org/10.1180/mgm.2021.30

NEW MINERAL PROPOSALS APPROVED IN MARCH 2021

IMA No. **2020-089**

Sluzhenikinite

$Pd_{15}(Sb_{7-x}Sn_x)$ $3 \leq x \leq 4$

Oktyabrsk deposit (schaft no. 1, Oktyabrsk mine), Noril'sk deposits, Russia (69°30'20"N, 88°27'17"E)

Anna Vymazalová*, Mark D. Welch, František Laufek, Vladimir V. Kozlov, Chris J. Stanley and Jakub Plášil

*E-mail: anna.vymazalova@geology.cz

New structure type

Monoclinic: $P2_1/m$; structure determined

$a = 7.5558(1)$, $b = 29.2967(3)$, $c = 7.5713(1)$ Å, $\beta = 119.931(2)°$

2.317(65), 2.315(100), 2.308(29), 2.187(89), 2.185(22), 2.183 (74), 2.178(15), 2.177(25)

Type material is deposited in the collections of the Department of Earth Sciences, Natural History Museum, London SW7 5BD, UK, catalogue number BM 2020,20 (holotype), and the Fersman Mineralogical Museum, Russian Academy of Sciences, Leninskiy Prospekt 18-2, Moscow 119071, Russia, registration number 5691/1 (cotype)

How to cite: Vymazalová, A., Welch, M.D., Laufek, F., Kozlov, V.V., Stanley, C.J. and Plášil, J. (2021) Sluzhenikinite, IMA 2020-089. CNMNC Newsletter 60; *Mineralogical Magazine*, 85, https://doi.org/10.1180/mgm.2021.30

IMA No. **2020-090**

Protocaseyite

$[Al_4(OH)_6(H_2O)_{12}][V_{10}O_{28}]\cdot 8H_2O$

Burro mine, Slick Rock district, San Miguel Co., Colorado, USA (38°02'42"N, 108°53'23"W)

Anthony R. Kampf*, Mark A. Cooper, John M. Hughes, Chi Ma, William H. Casey and Joe Marty

*E-mail: akampf@nhm.org

Decavanadate family

Triclinic: $P\bar{1}$; structure determined

$a = 9.435(2)$, $b = 10.742(3)$, $c = 11.205(3)$ Å, $\alpha = 75.395(7)$, $\beta = 71.057(10)$, $\gamma = 81.286(6)°$

10.38(100), 8.89(37), 8.15(13), 7.24(38), 5.922(17), 2.177(11), 2.083(13), 1.785(11)

Cotype material is deposited in the mineralogical collections of the Natural History Museum of Los Angeles County, 900 Exposition Boulevard, Los Angeles, CA 90007, USA, catalogue numbers 75191, 75192 and 75193

How to cite: Kampf, A.R., Cooper, M.A., Hughes, J.M., Ma, C., Casey, W.H. and Marty, J. (2021) Protocaseyite, IMA 2020-090. CNMNC Newsletter 60; *Mineralogical Magazine*, 85, https://doi.org/10.1180/mgm.2021.30

IMA No. **2020-091**

Shagamite

$KFe_{11}O_{17}$

Hatrurim Complex, Negev Desert, near Arad city, Israel (31° 14'22"N, 35°16'55"E)

Evgeny V. Galuskin*, Hannes Krüger, Irina O. Galuskina, Biljana Krüger, Krzysztof Nejbert and Yevgeny Vapnik

*E-mail: evgeny.galuskin@us.edu.pl

The Fe^{3+}-analogue of kahlenbergite

Hexagonal: $P6_3/mmc$; structure determined

$a = 5.9327(5)$, $c = 23.782(3)$ Å

11.89(100), 5.945(29), 2.834(61), 2.654(39), 2.554(25), 2.444(23), 2.375(22), 1.483(29)

Type material is deposited in the collections of the Fersman Mineralogical Museum, Russian Academy of Sciences, Leninskiy Prospekt 18-2, Moscow 119071, Russia, registration number 5634/1

How to cite: Galuskin, E.V., Krüger, H., Galuskina, I.O., Krüger, B., Nejbert, K. and Vapnik, Y. (2021) Shagamite, IMA 2020-091. CNMNC Newsletter 60; *Mineralogical Magazine*, 85, https://doi.org/10.1180/mgm.2021.30

IMA No. **2020-092**

Moabite

$NiFe^{3+}(PO_4)O$

Daba-Siwaqa pyrometamorphic complex, Transjordan Plateau, Jordan (31°21'52"N, 36°10'55"E)

Sergey N. Britvin*, Mikhail N. Murashko, Maria G. Krzhizhanovskaya, Yevgeny Vapnik, Natalia S. Vlasenko, Oleg S. Vereshchagin, Dmitrii V. Pankin and Evgeny A. Vasiliev

*E-mail: sbritvin@gmail.com

New structure type

Orthorhombic: *Pnma*; structure determined

$a = 7.216(2)$, $b = 6.406(1)$, $c = 7.471(2)$ Å

5.20(63), 3.321(37), 3.251(83), 2.726(100), 2.395(19), 2.354(25), 2.304(24), 2.049(18)

Type material is deposited in the collections of the Fersman Mineralogical Museum, Russian Academy of Sciences, Leninskiy Prospekt 18-2, Moscow 119071, Russia, registration number 5627/1

How to cite: Britvin, S.N., Murashko, M.N., Krzhizhanovskaya, M.G., Vapnik, Y., Vlasenko, N.S., Vereshchagin, O.S., Pankin, D.V. and Vasiliev, E.A. (2021) Moabite, IMA 2020-092. CNMNC Newsletter 60; *Mineralogical Magazine*, 85, https://doi.org/10.1180/mgm.2021.30

IMA No. **2020-093**
Graulichite-(La)
$LaFe_3^{3+}(AsO_4)_2(OH)_6$
Patte d'Oie mine, Bou Skour mining district, Djebel Saghro mountain range, ca. 50 km south-east of Ouarzazate, Morocco (30°55'47"N, 6°18'05"W)
Cristian Biagioni, Marco E. Ciriotti, Georges Favreau, Daniela Mauro and Federica Zaccarini
*E-mail: cristian.biagioni@unipi.it
Alunite supergroup
Trigonal: $R\bar{3}m$; structure determined
$a = 7.252(13)$, $c = 16.77(3)$ Å
5.86(m), 3.045(s), 2.511(mw), 2.239(m), 1.960(mw), 1.813 (mw), 1.689(mw), 1.478(m)
Type material is deposited in the mineralogical collections of the Museo di Storia Naturale, Università di Pisa, Via Roma 79, Calci (PI), Italy, catalogue number 19924
How to cite: Biagioni, C., Ciriotti, M.E., Favreau, G., Mauro, D. and Zaccarini, F. (2021) Graulichite-(La), IMA 2020-093. CNMNC Newsletter 60; *Mineralogical Magazine*, 85, https://doi.org/10.1180/mgm.2021.30

IMA No. **2020-094**
Yakubovichite
$CaNi_2Fe^{3+}(PO_4)_3$
Daba-Siwaqa pyrometamorphic complex, Transjordan Plateau, Jordan (31°21'52"N, 36°10'55"E)
Sergey N. Britvin*, Mikhail N. Murashko, Maria G. Krzhizhanovskaya, Yevgeny Vapnik, Natalia S. Vlasenko, Oleg S. Vereshchagin, Dmitrii V. Pankin and Anatoly A. Zolotarev
*E-mail: sbritvin@gmail.com
New structure type
Orthorhombic: *Imma*; structure determined
$a = 10.388(1)$, $b = 13.088(1)$, $c = 6.4794(6)$ Å
5.82(44), 5.51(73), 5.21(32), 4.214(34), 3.013(31), 2.772(97), 2.748(100), 2.599(38)
Type material is deposited in the collections of the Fersman Mineralogical Museum, Russian Academy of Sciences, Leninskiy Prospekt 18-2, Moscow 119071, Russia, registration number 5626/1
How to cite: Britvin, S.N., Murashko, M.N., Krzhizhanovskaya, M.G., Vapnik, Y., Vlasenko, N.S., Vereshchagin, O.S., Pankin, D.V. and Zolotarev, A.A. (2021) Yakubovichite, IMA 2020-094. CNMNC Newsletter 60; *Mineralogical Magazine*, 85, https://doi.org/10.1180/mgm.2021.30

IMA No. **2020-096**
Tennantite-(Cu)
$Cu_6(Cu_4Cu_2)As_4S_{13}$
Layo epithermal deposit, Castilla Province, Arequipa Department, Peru (15°11'16"S, 72°14'30"W)
Cristian Biagioni*, Jiří Sejkora, Yves Moëlo, Eric Marcoux, Daniela Mauro and Zdeněk Dolníček
*E-mail: cristian.biagioni@unipi.it
Tetrahedrite group
Cubic: $I\bar{4}3m$; structure determined
$a = 10.171(1)$ Å
4.152(4), 2.936(100), 2.543(18), 1.995(4), 1.857(8), 1.798(43), 1.650(4), 1.533(21)
Type material is deposited in the collections of the Department of Mineralogy and Petrology, National Museum in Prague, Cirkusová 1740, 19300 Praha 9, Czech Republic, catalogue number P1P 74/2020, the Museo di Storia Naturale, Università di Pisa, Via Roma 79, Calci (PI), catalogue number 19925, and the Mineralogical Museum (MINES ParisTech) of Ecole des Mines de Paris, 60 Blvd. Saint-Michel, 75006 Paris, France, catalogue number ENSMP 83990
How to cite: Biagioni, C., Sejkora, J., Moëlo, Y., Marcoux, E., Mauro, D. and Dolníček, Z. (2021) Tennantite-(Cu), IMA 2020-096. CNMNC Newsletter 60; *Mineralogical Magazine*, 85, https://doi.org/10.1180/mgm.2021.30

NOMENCLATURE/CLASSIFICATION PROPOSALS APPROVED IN FEBRUARY 2021

Nordite supergroup

The nordite supergroup has been established. It currently includes six mineral species: nordite-(La), nordite-(Ce), ferronordite-(La), ferronordite-(Ce), manganonordite-(Ce), and meieranite. All but the latter species belong to the nordite group within the nordite supergroup. Meieranite is an unassigned member of the nordite supergroup.

NOMENCLATURE/CLASSIFICATION PROPOSALS APPROVED IN MARCH 2021

IMA 20-G: Redefinition of philipsburgite

Proposal 20-G is accepted. Philipsburgite shows an ordered distribution of As and P over two symmetrically independent tetrahedral sites and, therefore, is redefined with the new crystal-chemical formula $Cu_5Zn(AsO_4)(PO_4)(OH)_6{\cdot}H_2O$.

IMA 20-H: Redefinition of lazurite

Proposal 20-H is accepted, and lazurite is redefined with the idealized formula $Na_7Ca(Al_6Si_6O_{24})(SO_4)(S_3)^{-}{\cdot}H_2O$. The neotype specimen originates from the Malo-Bystrinskoe gem lazurite deposit, Baikal Lake area, eastern Siberia, Russia. It is deposited in the collection of the Sidorov Mineralogical Museum (INRTU), Lermontova St. 83, Irkutsk 664074, Russia, registration number MMU/MF 27914.

IMA 20-I: Redefinition of aldermanite

Proposal 20-I is accepted, and the formula of aldermanite is revised to account for essential Na in the structure, and for minor F substitution for OH. The simplified formula becomes $[Mg(H_2O)_6][Na(H_2O)_2Al_3(PO_4)_2(OH,F)_6]{\cdot}H_2O$, corresponding to the ideal end-member formula $[Mg(H_2O)_6][Na(H_2O)_2Al_3(PO_4)_2(OH)_6]{\cdot}H_2O$.

REVISED CHEMICAL FORMULAE

Sakhaite and harkerite

In the IMA List of Minerals the formula for sakhaite is given as $Ca_{48}Mg_{16}Al(SiO_3OH)_4(CO_3)_{16}(BO_3)_{28}{\cdot}(H_2O)_3(HCl)_3$. This formula is mirrored from the 2008 Nickel-Nichols list, is not charge-balanced, and has an obscure origin. Actually in the original description of holotype sakhaite [*Zap. Vses. Miner. Obsh.*,

95 (1966), 193–202; *Am. Mineral.*, **51** (1966), 1815–1820], as well as in a subsequent crystal structure study [*Dokl. Akad. Nauk SSSR*, **239** (1978), 1103–1106], the mineral is given as Al-Si-free.

Sakhaite is closely related to harkerite. A recent detailed study of the sakhaite-harkerite solid solution, based on 14 single-crystal structure refinements [*Am. Mineral.*, **103** (2018), 1749–1760], shows that the two minerals are related by the substitution of four (BO_3) triangles by a pentamer formed by one (AlO_4) + four (SiO_4) tetrahedra (with one oxygen atom protonated).

The two end-member compositions can be taken as the ideal formulae for harkerite and sakhaite, as follows:

harkerite: $Ca_{48}Mg_{16}[AlSi_4O_{15}(OH)]_4(BO_3)_{16}(CO_3)_{16}{\cdot}2(H_2O,HCl)$

sakhaite: $Ca_{48}Mg_{16}(BO_3)_{32}(CO_3)_{16}{\cdot}2(H_2O,HCl)$

The formulae of harkerite and sakhaite have been modified in the IMA List of Minerals accordingly.

Tiettaite

A paper on the mineral tiettaite has been recently published [*Crystallogr. Rep.*, **66** (2021), 76–85] in which the ideal chemical formula of the mineral is given as $K_4Na_{12}Fe^{3+}_2Si_{16}O_{41}(OH)_4{\cdot}2H_2O$, based on a combined Rietveld and EPMA study carried out on a sample of tiettaite after a new finding from the type locality. With respect to the previously accepted formula, potassium is an essential constituent, and titanium is not an essential constituent anymore. The crystal structure of tiettaite has been refined for the first time, and shows that there are two sites occupied by K and four sites occupied by Na. Moreover there is a single octahedral site which is occupied mainly by Fe^{3+}, with very minor Ti. Also in holotype tiettaite it is invariably Fe^{3+} > Ti. These data were examined carefully by the CNMNC officers and were considered reliable. Accordingly it was agreed to modify the formula of tiettaite in the official IMA List of Minerals.