Hatertite $NaNaCa(Cu^{2+}Fe^{3+})(AsO_4)_3$

Crystal Data: Monoclinic. *Point Group*: 2/*m.* As prismatic tabular crystals to 0.3 mm, slightly elongated along [101] and flattened on dominant {010} modified by{100}, {001}, and {011}.

Physical Properties: *Cleavage*: None. *Tenacity*: Very brittle. *Fracture*: n.d. Hardness = n.d. D(calc.) = 4.060 Nonfluorescent.

Optical Properties: Transparent. *Color*: Honey-yellow. *Streak*: Yellow. *Luster*: Vitreous. *Optical Class*: Biaxial (+). α = 1.820(3) β = 1.825(3) γ = 1.833(3) 2 V(meas.) = 60(10)° 2V(calc.) = 77° *Orientation*: *Y* = *b*.

Cell Data: *Space Group*: *C*2/*c*. *a* = 12.590(2) *b* = 12.993(3) *c* = 6.700(2) β = 113.72(2)° Z = 4

X-Ray Diffraction Pattern: Tolbachik volcano, Kamchatka Peninsula, Russia.
2.830 (100), 3.204 (39), 2.632 (36), 2.976 (28), 6.493 (25), 3.628 (25), 1.647 (19)

Chemistry:

	(1)
Na_2O	8.49
K_2O	2.41
MnO	1.64
CaO	7.06
Fe_2O_3	11.15
ZnO	2.05
CuO	8.10
Al_2O_3	2.22
As_2O_5	55.67
Total	98.79

(1) Tolbachik volcano, Kamchatka Peninsula, Russia; average electron microprobe analysis; corresponds to
$(Na_{0.47}K_{0.32})(Na_{0.84}Ca_{0.16})(Ca_{0.62}Na_{0.19}Zn_{0.16}Mn_{0.14})(Fe^{3+}_{0.44}Cu_{0.32}Al_{0.13}Na_{0.11})_2(As_{1.01}O_4)_3$.

Mineral Group: Alluaudite supergroup, alluaudite group.

Occurrence: A sublimate at a volcanic fumarole.

Association: Ponomarevite, piypite, dolerophanite, euchlorine, sylvite, lammerite, johillerite, urusovite, bradaczekite, filatovite, hematite, tenorite.

Distribution: North Breach, Great fissure eruption, Tolbachik volcano, Kamchatka Peninsula, Russia.

Name: Honors Professor Frédéric *Hatert* (b. 1973), University of Liège, Belgium, for his contributions to the mineralogy and crystal chemistry of alluaudite-group minerals.

Type Material: Mineralogical Museum, St. Petersburg State University, Russia (1/19536).

References: (1) Krivovichev, S.V., L.P. Vergasova, S.K. Filatov, D.S. Rybin, S.N. Britvin, V.V. Ananiev (2013) Hatertite, $Na_2(Ca,Na)(Fe^{3+},Cu)_2(AsO_4)_3$, a new alluaudite-group mineral from Tolbachik fumaroles, Kamchatka peninsula, Russia. Eur. J. Mineral., 25, 683-691. (2) Hatert, F. (2019) A new nomenclature scheme for the alluaudite supergroup. Eur. J. Mineral., 31, 807-822.