

Crystal Data: Tetragonal. *Point Group:* $\bar{4} 2m$. As equant tetragonal prismatic-dipyramidal crystals to 0.15 mm, commonly skeletal, in aggregates to 1 cm, and as interrupted crusts to 2×2 cm². Some epitactical overgrows on forsterite. Visually indistinguishable from arsenudinaite.

Physical Properties: *Cleavage:* None. *Tenacity:* Brittle. *Fracture:* Uneven. Hardness = 3.5
D(meas.) = n.d. D(calc.) = 3.613

Optical Properties: Transparent. *Color:* Beige, pale brownish, brownish-yellowish or grayish-brownish, colorless. *Streak:* White. *Luster:* Vitreous.
Optical Class: Uniaxial (-). $\omega = 1.785$ $\epsilon = 1.830$ Non-pleochroic.

Cell Data: *Space Group:* $I\bar{4} 2d$. $a = 6.8011(2)$ $c = 19.1839(12)$ $Z = 4$

X-Ray Diffraction Pattern: Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia.
2.774 (100), 3.003 (48), 3.340 (28), 1.699 (26), 4.294 (22), 4.654 (19), 2.747 (17)

Chemistry:	(1)	(2)
Na ₂ O	3.51	5.77
CaO	1.8	
PbO	0.14	
MgO	33.54	30.02
MnO	0.29	
CuO	0.03	
Fe ₂ O ₃	0.21	
SiO ₂	0.38	
P ₂ O ₅	4.25	
V ₂ O ₅	30.51	
As ₂ O ₅	24.75	64.21
SO ₃	0.22	
Total	99.49	100.00

(1) Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia; average electron microprobe and Raman spectroscopic analyses; corresponds to (Na_{0.55}Ca_{0.16}) $\Sigma=0.71$ (Mg_{4.04}Mn_{0.02}Fe_{0.01}) $\Sigma=4.07$ (V_{1.63}As_{1.05}P_{0.28}Si_{0.03}S_{0.01}) $\Sigma=3.00$ O₁₂. (2) NaMg₄(VO₄)₃.

Polymorphism & Series: Forms a series with arsenudinaite.

Occurrence: A sublimate at an active volcanic fumarole.

Association: Arsenudinaite, anhydrite, diopside, hematite, schäferite, berzeliite, svabite, calciojohillerite, tilasite, reznitskyite, ludwigite, rhabdobarite-group borates, forsterite, magnesioferrite, fluorapatite, pliniusite, powellite.

Distribution From the Arsenatnaya fumarole, Second scoria cone of the Northern Breakthrough of the Great Tolbachik Fissure Eruption, Tolbachik volcano, Kamchatka peninsula, Far-Eastern Region, Russia.

Name: For the *Udina* volcano situated near the discovery locality.

Type Material: A.E. Fersman Mineralogical Museum, RAS, Moscow, Russia (5237/1; 96,272).

References: (1) Pekov, I.V., N.N. Koshlyakova, N.V. Zubkova, D.I. Belakovskiy, M.F. Vigasina, A.A. Agakhanov, D.A. Ksenofontov, A.G. Turchkova, S.N. Britvin, E.G. Sidorov, and D.Yu. Pushcharovsky (2022) A natural vanadate-arsenate isomorphous series with jeffbenite-type structure: new fumarolic minerals udinaite, NaMg₄(VO₄)₃, and arsenudinaite, NaMg₄(AsO₄)₃. Minerals, 12(7), 850, 1-16.