

Crystal Data: Monoclinic. *Point Group:* 2/m. As prismatic, tabular, lamellar, or acicular crystals to 2 mm, flattened, wedge-shaped, more rarely multifaceted, sometimes skeletal. Combined in open-work aggregates to 2 mm.

Physical Properties: *Cleavage:* Perfect on {110}. *Tenacity:* Brittle. *Fracture:* Stepped. Hardness = ~5.5 D(meas.) = n.d. D(calc.) = 3.950

Optical Properties: Transparent. *Color:* Brownish red to pale pinkish reddish with a brown hue or almost colorless (needles). *Streak:* White. *Luster:* Vitreous.

Optical Class: Biaxial (+). $\alpha = 1.825(5)$ $\beta = 1.847(6)$ $\gamma = 1.896(6)$ $2V(\text{meas.}) = 70(5)^\circ$

Dispersion: Strong, $r > v$. *Orientation:* $Y = b$. *Pleochroism:* Strong, Z = bright pink to carmine red, Y = very pale pinkish to almost colorless, X = colorless. *Absorption:* $Z > Y \geq X$.

Cell Data: *Space Group:* C2/c. $a = 6.6979(3)$ $b = 8.7630(3)$ $c = 7.1976(3)$ $\beta = 114.805(5)^\circ$ $Z = 4$

X-Ray Diffraction Pattern: Arsenatnaya fumarole, Tolbachik Volcano, Russia. 3.300 (100), 3.036 (100), 2.627 (91), 4.845 (89), 2.615 (57), 3.431 (48), 3.631 (36)

Chemistry:	(1)	(2)
Na ₂ O	12.26	13.72
CaO	3.10	
Al ₂ O ₃	4.39	
Fe ₂ O ₃	9.57	
TiO ₂	17.11	35.38
SnO ₂	1.03	
As ₂ O ₅	50.17	50.90
F	3.29	
-O = F	2.39	
Total	99.53	100.00

(1) Arsenatnaya fumarole, Tolbachik Volcano, Kamchatka, Russia; average electron microprobe analysis supplemented by Raman spectroscopy; corresponds to $(\text{Na}_{0.91}\text{Ca}_{0.13})_{\Sigma=1.04}(\text{Ti}_{0.49}\text{Fe}^{3+}_{0.27}\text{Al}_{0.20}\text{Sn}_{0.02})_{\Sigma=0.98}(\text{As}_{1.00}\text{O}_{4.00})(\text{O}_{0.60}\text{F}_{0.40})$. (2) NaTiO(AsO₄).

Mineral Group: Durangite group.

Occurrence: A sublimate at an active volcanic fumarole.

Association: Orthoclase, tenorite, hematite, johillerite, bradaczekite, badalovite, calciojohillerite, arsmirandite, tilasite, svabite, cassiterite, pseudobrookite, rutile, sylvite, halite, aphthitalite, langbeinite, anhydrite.

Distribution: From the Arsenatnaya fumarole, Second scoria cone, Northern Breakthrough of the Great Tolbachik Fissure Eruption, Tolbachik Volcano, Kamchatka, Russia.

Name: Indicates an *arsenate* of sodium (*natrium* in Latin) and titanium isostructural with *titanite*.

Type Material: A.E. Fersman Mineralogical Museum, RAS, Moscow, Russia (95914).

References: (1) Pekov, I.V., N.V. Zubkova, A.A. Agakhanov, D.I. Belakovskiy, M.F. Vigasina, V.O. Yapaskurt, E.G. Sidorov, S.N. Britvin, and D.Y. Pushcharovsky (2019) New arsenate minerals from the Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia. IX. Arsenatrotitanite, NaTiO(AsO₄). Mineral. Mag., 83, 453-458.