

Crystal Data: Hexagonal. *Point Group:* $\bar{3}m$. As equant, short prismatic or tabular crystals, to 0.3 mm, displaying $\{10\bar{1}1\}$, $\{01\bar{1}1\}$, $\{10\bar{1}0\}$, $\{11\bar{2}0\}$ and $\{0001\}$.

Physical Properties: *Cleavage:* Imperfect, one direction. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = ~ 4.5 D(meas.) = n.d. D(calc.) = 4.001

Optical Properties: Transparent. *Color:* Pale green, pale yellowish green, colorless. *Streak:* White. *Luster:* Vitreous. *Optical Class:* Uniaxial (-). $\omega = 1.748(5)$ $\varepsilon = 1.720(3)$

Cell Data: *Space Group:* $R\bar{3}c$. $a = 13.7444(2)$ $c = 18.3077(3)$ $Z = 6$

X-ray Powder Pattern: Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia. 2.841 (100), 7.28 (45), 2.598 (43), 3.217 (36), 3.440 (35), 4.375 (33), 2.999 (30)

Chemistry:	(1)	(2)
Na ₂ O	16.85	18.29
K ₂ O	0.97	
CaO	1.28	
MgO	2.33	3.40
MnO	0.05	
CuO	3.17	
ZnO	0.97	
Al ₂ O ₃	0.99	
Fe ₂ O ₃	16.44	20.19
TiO ₂	0.06	
P ₂ O ₅	0.12	
V ₂ O ₅	0.08	
<u>As₂O₅</u>	<u>56.68</u>	<u>58.12</u>
Total	99.89	100.00

(1) Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia; average of 5 electron microprobe analyses supplemented by Raman spectroscopy; corresponding to $(\text{Na}_{6.55}\text{Ca}_{0.28}\text{K}_{0.22})_{\Sigma=7.05}(\text{Fe}^{3+}_{2.48}\text{Mg}_{0.70}\text{Cu}_{0.48}\text{Al}_{0.23}\text{Zn}_{0.14}\text{Ti}_{0.01}\text{Mn}_{0.01})_{\Sigma=4.05}(\text{As}_{5.94}\text{P}_{0.02}\text{V}_{0.01})_{\Sigma=5.97}\text{O}_{24}$.
 (2) $\text{Na}_7(\text{Fe}^{3+}_3\text{Mg})(\text{AsO}_4)_6$.

Occurrence: Formed as sublimes on basaltic scoria around an active volcanic fumarole.

Association: Hatertite, bradaczekite, johillerite, hematite, tenorite, tilasite, apthitalite.

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

Name: Honors Russian mineralogist, and specialist in the study of ore deposits, Yuriy Borisovich Marin (b. 1939), Professor of Mineralogy and Petrology, Saint Petersburg Mining University, Vice-President of the Russian Mineralogical Society (since 1992) and Editor-in-Chief of Zapiski Rossiiskogo Mineralogicheskogo Obshchestva.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (94134).

References: (1) Pekov, I.V., N.V. Zubkova, V.O. Yapaskurt, D.I. Belakovskiy, I.S. Lykova, M.F. Vigasina, E.G. Sidorov, and D.Yu. Pushcharovsky (2014) New arsenate minerals from the Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia. I. Yurmarinite, $\text{Na}_7(\text{Fe}^{3+}, \text{Mg}, \text{Cu})_4(\text{AsO}_4)_6$. Mineral. Mag., 78(4), 905-917. (2) (2016) Amer. Mineral., 101, 1495-1496 (abs. ref. 1).