

Crystal Data: Monoclinic. *Point Group:* 2/m. As tabular to prismatic crystals, usually with a skeletal or blocky habit, to 0.4 mm. As clusters and encrustations to 1 cm.

Physical Properties: *Cleavage:* None. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = ~ 4 VHN = 203 (10 g load). D(meas.) = n.d. D(calc.) = 4.386

Optical Properties: Translucent. *Color:* Black, dark gray in reflected light. *Streak:* Dark green with an olive hue. *Luster:* Vitreous.

Optical Class: Biaxial (+). $\alpha = 1.80(1)$ $\beta = \text{n.d.}$ $\gamma = 1.91(1)$ $2V(\text{meas.}) = \text{n.d.}$

Pleochroism: Strong; Z = very dark grayish-green; X = green to pale green. *Absorption:* Z > X.

Birefractance: weak; *anisotropism:* very weak.

R₁-R₂: (470) 10.5-9.4, (546) 10.0-8.9, (589) 9.7-8.7, (650) 9.5-8.6

Cell Data: *Space Group:* C2/c. $a = 11.4763(9)$ $b = 16.620(2)$ $c = 10.1322(8)$
 $\beta = 105.078(9)^\circ$ Z = 4

X-ray Powder Pattern: Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia. 9.22 (100), 7.59 (35), 4.595 (26), 2.570 (23), 3.124 (22), 2.763 (20), 6.084 (17)

Chemistry:	(1)	(2)
K ₂ O	10.70	11.42
CaO	0.03	
CuO	45.11	44.99
ZnO	0.24	
Al ₂ O ₃	0.32	
Fe ₂ O ₃	6.11	6.45
TiO ₂	0.12	
P ₂ O ₅	0.07	
As ₂ O ₅	36.86	37.14
Total	99.56	100.00

(1) Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia; average of 7 electron microprobe analyses supplemented by Raman spectroscopy; corresponds to $(K_{2.81}Ca_{0.01})_{\Sigma=2.82}(Cu_{7.02}Fe^{3+}_{0.95}Al_{0.08}Zn_{0.04}Ti_{0.02})_{\Sigma=8.11}(As_{3.97}P_{0.01})_{\Sigma=3.98}O_{20}$. (2) $K_3Cu_7Fe^{3+}O_4(AsO_4)_4$.

Occurrence: As sublimes on scoria around an active fumarole.

Association: Dmisokolovite, shchurovskite, bradaczekite, hematite, As-bearing orthoclase, johillerite, arsmirandite, apthitalite, tenorite, langbeinite, anhydrite, tilasite, fluorophlogopite, haterite, pharmazincite.

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

Name: A prefix from the Greek μέλαν (black) for the mineral color and its identity as an arsenate.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (94992).

References: (1) Pekov, I.V., N.V. Zubkova, V.O. Yapaskurt, Y.S. Polekhovskiy, M.F. Vigasina, D.I. Belakovskiy, S.N. Britvin, E.G. Sidorov, and D.Y. Pushcharovskiy (2016) New arsenate minerals from the Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia. VI. Melanarsite, $K_3Cu_7Fe^{3+}O_4(AsO_4)_4$. *Mineral. Mag.*, 80(5), 855-867. (2) (2016) *Amer. Mineral.*, 101, 2781-2782 (abs. ref. 1).