Eleomelanite $(K_2Pb)Cu_4O_2(SO_4)_4$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As interrupted crusts of crude equant, prismatic, or tabular crystals or grains to 0.3 mm.

Physical Properties: *Cleavage*: Perfect on {001}. *Tenacity*: Brittle. *Fracture*: Stepped. Hardness = ~3 D(meas.) = n.d. D(calc.) = 3.790 Hydrolyses (becomes dull and blue) after one hour and slowly dissolves in H_2O at room temperature.

Optical Properties: Translucent. *Color*: Black, dark green in thin fragments. *Streak*: Dark green. *Luster*: Oleaginous on crystal faces, vitreous on cleavage surfaces.
Optical Class: Biaxial (-). $\alpha = 1.646(3)$ $\beta = 1.715(6)$ $\gamma = 1.734(6)$ 2V(meas.) = 60(15)° 2V(calc.) = 54° *Pleochroism*: Strong, $Z = Y$ = dark green with brownish hue, almost black in thicker grains, X = green. *Absorption*: $Z \approx Y > X$. *Orientation*: $Y = c$.

Cell Data: *Space Group*: $P2_1/n$. $a = 9.3986(3)$ $b = 4.8911(1)$ $c = 18.2293(5)$ $\beta = 104.409(3)°$ Z = 2

X-Ray Diffraction Pattern: Arsenatnaya fumarole, Tolbachik Volcano, Kamchatka, Russia. 3.658 (100), 3.699 (78), 9.07 (63), 2.576 (51), 7.38 (44), 3.173 (40), 2.683 (36)

Chemistry:

	(1)	(2)
K_2O	9.62	9.86
Rb_2O	0.49	
Cs_2O	0.24	
CaO	1.23	
CuO	35.28	33.29
PbO	19.25	23.35
SO_3	34.78	33.50
Total	100.89	100.00

(1) Arsenatnaya fumarole, Tolbachik Volcano, Kamchatka, Russia; average electron microprobe analysis supplemented by IR spectroscopy; corresponding to $(K_{1.88}Pb_{0.79}Ca_{0.20}Rb_{0.05}Cs_{0.02})_{\Sigma=2.94}Cu_{4.07}S_{3.99}O_{18}$. (2) $(K_2Pb)Cu_4O_2(SO_4)_4$.

Occurrence: A sublimate at an active volcanic fumarole.

Association: Euchlorine, fedotovite, wulffite, chalcocyanite, dolerophanite, dravertite, hermannjahnite, alumoklyuchevskite, klyuchevskite, piypite, cryptochalcite, cesiodymite, anglesite, langbeinite, calciolangbeinite, metathénardite, belomarinaite, aphthitalite, krasheninnikovite, steklite, anhydrite, hematite, tenorite, sanidine, sylvite, halite, lammerite, urusovite, gold.

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

Name: From the Greek eleon for ‘oil’, and melas for ‘black’, for its black color and oleaginous luster on crystal faces that is uncommon for sulfate minerals.

Type Material: A.E. Fersman Mineralogical Museum, RAS, Moscow, Russia (95347).

References: (1) Pekov, I.V., N.V. Zubkova, N.V. Chukanov, D.I. Belakovsky, E.G. Sidorov, S.N. Britvin, A.G. Turchkova, and D.Y. Pushcharovsky (2020) Eleomelanite, $(K_2Pb)Cu_4O_2(SO_4)_4$, a new mineral species from the Tolbachik Volcano, Kamchatka, Russia. Can. Mineral., 58, 625-636.