

Kaliochalcite**KCu₂(SO₄)₂[(OH)(H₂O)]**

Crystal Data: Monoclinic. *Point Group:* 2/m. As elongated or flattened pseudo-rhombohedral crystals to 0.10 mm, in granular to porcelaneous crusts to 0.5 cm thick. As pseudomorphs of euchlorine, piypite or fedotovite.

Physical Properties: *Cleavage:* None. *Fracture:* Uneven. *Tenacity:* Brittle.
Hardness = 4 D(meas.) = n.d. D(calc.) = 3.49

Optical Properties: Transparent to translucent. *Color:* Light green to bright grass-green; pale green to colorless in transmitted light. *Streak:* Pale green to white. *Luster:* Vitreous.
Optical Class: Biaxial (+). $a = 1.630(3)$ $\beta = 1.650(3)$ $\gamma = 1.714(3)$ $2V(\text{meas.}) = 55(10)^\circ$
 $2V(\text{calc.}) = 60^\circ$ *Dispersion:* Strong, $r < v$. *Pleochroism:* Very weak.

Cell Data: *Space Group:* C2/m. $a = 8.935(2)$ $b = 6.2520(18)$ $c = 7.602(2)$ $\beta = 117.32^\circ$
 $Z = 2$

X-ray Powder Pattern: Tolbachik volcano, Kamchatka, Russia.
6.78 (100), 2.852 (83), 2.892 (77), 2.554 (72), 3.484 (70), 3.249 (63), 2.326 (44)

Chemistry:	(1)	(2)
Na ₂ O	0.04	
K ₂ O	11.01	11.97
CaO	0.27	
FeO	0.15	
CuO	40.28	40.45
ZnO	0.39	
SO ₃	40.97	40.71
<u>H₂O</u>	<u>5.84</u>	<u>6.87</u>
Total	98.95	100.00

(1) Tolbachik volcano, Kamchatka, Russia; average of 5 electron microprobe analyses supplemented by IR spectroscopy, H₂O by selective absorption after heating; corresponding to (K_{0.94}Ca_{0.02}Na_{0.01}) $\Sigma=0.97$ (Cu_{2.03}Zn_{0.02}Fe_{0.01}) $\Sigma=2.06$ S_{2.05}O_{8.20}(OH)_{1.01}(H₂O)_{0.79}. (2) KCu₂(SO₄)₂[(OH)(H₂O)].

Mineral Group: Tsumcorite group.

Occurrence: Through the reaction of high-temperature, sublimate K-Cu-sulfates and atmospheric water vapor at temperatures <100-150 °C, in volcanic fumaroles.

Association: Hematite, tenorite, langbeinite, apthitalite, steklite, lammerite, chlorothionite, gypsum.

Distribution: At the Yadovitaya and Arsenatnaya fumaroles, Second scoria cone, Northern Breakthrough of the Great Tolbachik Fissure Eruption, Tolbachik volcano, Kamchatka, Russia.

Name: As the potassium (*kalium*, in Latin) analog of *natrochalcite*.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (94121).

References: (1) Pekov, I.V., O.I. Siidra, N.V. Chukanov, V.O. Yapaskurt, D.I. Belakovskiy, M.N. Murashko and E.G. Sidorov (2014) Kaliochalcite, KCu₂(SO₄)₂[(OH)(H₂O)], a new tsumcorite-group mineral from the Tolbachik volcano, Kamchatka, Russia. *Eur. J. Mineral.*, 26, 597-604. (2) (2016) *Amer. Mineral.*, 101, 748 (abs. ref. 1).