

Klöchite

Crystal Data: Hexagonal. *Point Group:* 6/m 2/m 2/m. As hexagonal tabular crystals flattened on {0001}, to 0.3 mm, composed of two hexagonal prisms, one hexagonal bipyramid and the basal pinacoid.

Physical Properties: *Cleavage:* None. *Tenacity:* n.d. *Fracture:* n.d. *Hardness:* = n.d. *D(meas.):* = n.d. *D(calc.):* = 3.016 *Nonfluorescent.*

Optical Properties: Translucent. *Color:* Blue. *Streak:* n.d. *Luster:* Vitreous. *Optical Class:* Uniaxial (-). $\omega = 1.594(1)$ $\varepsilon = 1.590(1)$ *Pleochroism:* *O* = deep blue, *E* = pale yellow.

Cell Data: *Space Group:* P6/mcc. $a = 10.120(1)$ $c = 14.298(3)$ $Z = 2$

X-Ray Diffraction Pattern: Klöch volcano, Bad Radkersburg district, Styria, Austria. 7.149 (100), 3.736 (70), 2.770 (68), 3.227 (67), 5.540 (43), 2.530 (43), 4.130 (40)

Chemistry:	(1)	(2)
Li ₂ O	0.03	
Na ₂ O	1.47	
K ₂ O	3.18	4.05
CaO	0.25	
TiO ₂	0.05	
FeO	3.46	6.17
Fe ₂ O ₃	8.25	6.87
MgO	0.04	
MnO	1.69	
CoO	0.16	
SiO ₂	62.66	61.95
NiO	0.08	
<u>ZnO</u>	<u>18.56</u>	<u>20.97</u>
Total	99.88	100.00

(1) Klöch volcano, Bad Radkersburg district, Styria, Austria; average electron microprobe and LA-ICP-MS analyses; corresponding to $(\text{K}_{0.78}\text{Na}_{0.22})(\square_{1.67}\text{Na}_{0.33})(\text{Fe}^{3+}_{1.19}\text{Fe}^{2+}_{0.45}\text{Mn}_{0.27}\text{Ca}_{0.04}\text{Co}_{0.02}\text{Ni}_{0.01}\text{Mg}_{0.01}\text{Ti}_{0.01})(\square_{0.25}\text{Zn}_{2.63}\text{Fe}^{2+}_{0.10}\text{Li}_{0.02})[\text{Si}_{12.00}\text{O}_{30.00}]$. (2) $\text{K}\square_2(\text{Fe}^{2+}\text{Fe}^{3+})\text{Zn}_3\text{Si}_{12}\text{O}_{30}$.

Occurrence: In vugs in a SiO₂-rich xenolith from a nepheline basanite quarry.

Association: Sanidine, quartz, diopside, fluoro-richterite, titanite, enstatite, forsterite, ilmenite, mottramite.

Distribution: From the Klöch volcano, Bad Radkersburg district, Styria, Austria.

Name: For *Klöch*, a famous location for minerals and wine in Styria, Austria.

Type Material: Mineralogy Department, Universalmuseum Joanneum, Graz, Austria (84.580).

References: (1) Bojar, H.-P., F. Walter, C. Hauzenberger, and W. Postl (2011) Klöchite, $\text{K}\square_2(\text{Fe}^{2+}\text{Fe}^{3+})\text{Zn}_3[\text{Si}_{12}\text{O}_{30}]$, a new milarite-type mineral species from the Klöch volcano, Styria, Austria. *Can. Mineral.*, 49, 1115-1124. (2) Walter, F. (2009) Das Steirisch-Burgenländische vulkangebiet - eine quell seltener und neuer mineralarten. *Der Steirische Mineralog.*, 23, 8-13.