

Oxyphlogopite**K(Mg, Ti, Fe)₃[(Si, Al)₄O₁₀](O, F)₂**

Crystal Data: Monoclinic or Hexagonal. *Point Group:* 2/m or 32. Crystals prismatic, to 1.5 mm, or tabular, to 4 mm.

Physical Properties: *Cleavage:* Perfect on {001}. *Tenacity:* Thin lamellae are flexible. *Fracture:* n.d. Hardness = 3 D(meas.) = 3.06(1) D(calc.) = 3.086

Optical Properties: Translucent. *Color:* Dark brown to black. *Streak:* Brown. *Luster:* Vitreous. *Optical Class:* Biaxial (-). $\alpha = 1.625(3)$ $\beta = 1.668(1)$ $\gamma = 1.669(1)$ $2V(\text{meas.}) = 16(2)^\circ$ $2V(\text{calc.}) = 17^\circ$ *Orientation:* $X \perp (001)$. *Dispersion:* Strong, $r < v$. *Pleochroism:* Medium, brown to dark brown. *Absorption:* $X > Y > Z$.

Cell Data: *Space Group:* C2/m (1M polytype). $a = 5.317(12)$ $b = 9.161(2)$ $c = 10.069(2)$ $\beta = 100.53(6)^\circ$ $Z = 2$ or P3₁12 (3T polytype). $a = 5.3248(2)$ $c = 29.788(3)$ $Z = 3$

X-ray Powder Pattern: Rothenberg basalt quarry, Rhineland-Palatinate, Germany (1M). 3.300 (100), 9.91 (32), 1.895 (21), 1.527 (16), 1.659 (12), 3.090 (12), 4.53 (11)

Chemistry:	(1)		(1)
Na ₂ O	0.99	Cr ₂ O ₃	0.60
K ₂ O	7.52	SiO ₂	34.41
MgO	14.65	TiO ₂	12.93
CaO	0.27	F	3.06
FeO	4.73	H ₂ O	0.14
Fe ₂ O ₃	7.25	<u>-O = F₂</u>	<u>1.29</u>
Al ₂ O ₃	14.32	Total	99.58

(1) Rothenberg basalt quarry, near Mendig, Rhineland-Palatinate, Germany (1M); average of 5 electron microprobe analyses, absence of OH⁻ groups confirmed by IR spectroscopy, H₂O determined by the Alimarin method, Fe²⁺/Fe³⁺ ratio by X-ray emission spectroscopy; corresponds to (K_{0.72}Na_{0.14}Ca_{0.02}) $\Sigma=0.88$ (Mg_{1.64}Ti_{0.73}Fe²⁺_{0.30}Fe³⁺_{0.27}Cr_{0.04}) $\Sigma=2.98$ (Si_{2.59}Al_{1.27}Fe³⁺_{0.14}O₁₀)O_{1.20}F_{0.73}(OH)_{0.07}. (2) Bartoy volcanic field, Transbaikalia, Russia (3T); analysis not seen; corresponds to ^A(K_{0.9}Na_{0.1})[^{M1}(Fe²⁺_{0.6}Mg_{0.4})^{M2}(Fe³⁺_{0.4}Ti_{0.4}Mg_{0.2})^{M3}(Mg_{0.4}Fe³⁺_{0.3}Ti_{0.2}Al_{0.1})]^{T1,2}(Si_{0.7}Al_{0.3})₂O₅]₂^X(O_{0.9}F_{0.1})₂.

Polymorphism & Series: 1M and 3T polytypes.

Mineral Group: Mica group.

Occurrence: Pneumatolytic crystals coat vugs in alkaline basalt.

Association: Nepheline, plagioclase, sanidine, augite, diopside, magnetite.

Distribution: From Rothenberg basalt quarry, Eifel extrusive complex, Rothenberg Mountain, near Mendig, Rhineland-Palatinate, Germany [TL 1M]. From the Bartoy volcanic field, Transbaikalia, Russia (3T).

Name: For its composition (*oxy*) and relationship to *phlogopite*.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia; 3884/2 (holotype), 3884/1 (cotype).

References: (1) Chukanov, N.V., A.A. Mukhanova, R.K. Rastsvetaeva, D.I. Belakovskiy, S. Möckel, O.V. Karimova, S.N. Britvin, and S.V. Krivovichev (2010) Oxyphlogopite K(Mg, Ti, Fe)₃[(Si, Al)₄O₁₀](O, F)₂, a new mica group mineral. Zap. Ross. Mineral. Obshch., 139(3), 31-40 (in Russian, English abstract). Geol. Ore Deposits (2011) 53(7), 583 (in English). (2) (2012) Amer. Mineral., 97, 1819-1820 (abs. ref. 1). (3) Chukanov, N.V., S.M. Aksenov, A.V. Kasatkin, R. Škoda, F. Nestola, L. Nodari, A.D. Ryanskaya, and R.K. Rastsvetaeva (2019) 3T polytype of an iron-rich oxyphlogopite from the Bartoy volcanic field, Transbaikalia: Mössbauer, infrared, Raman spectroscopy, and crystal structure. Phys. Chem. Mineral., 46, 899-908.