

Tobelite**(NH₄, K)Al₂(Si₃Al)O₁₀(OH)₂**

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Crystal Data: Monoclinic. *Point Group:* 2/m (probable). As aggregates of crystals and flakes, up to 0.1 mm.

Physical Properties: *Cleavage:* Perfect on {001}. *Tenacity:* Clayey. *Hardness* = n.d. D(meas.) = 2.58–2.62 D(calc.) = 2.617

Optical Properties: Semitransparent. *Color:* White to yellowish green; nearly colorless in thin section. *Luster:* Silky.

Optical Class: Biaxial (-). $\alpha = 1.555\text{--}1.560$ $\beta = 1.575\text{--}1.587$ $\gamma = 1.581\text{--}1.595$
2V(meas.) = 28° 2V(calc.) = 28°–30°

Cell Data: *Space Group:* C2/m (probable). $a = 5.219(4)$ $b = 8.986(3)$ $c = 10.447(2)$
 $\beta = 101.31(1)^\circ$ $Z = 2$

X-ray Powder Pattern: Tobe, Japan; 1M.

10.24 (100), 5.12 (70), 4.486 (70), 3.408 (60), 2.566 (45), 3.103 (35), 4.360 (30)

Chemistry:

	(1)	(2)
SiO ₂	48.40	48.34
TiO ₂	0.02	0.30
Al ₂ O ₃	36.27	37.87
Fe ₂ O ₃	0.57	1.02
MgO	0.52	0.11
CaO	0.00	0.00
Na ₂ O	0.04	-0.01
K ₂ O	2.30	3.25
(NH ₄) ₂ O	3.51	3.85
H ₂ O ⁺	6.40	4.96
H ₂ O ⁻	1.97	0.31
Total	[100.00]	[100.00]

(1) Tobe, Japan; recalculated to 100.00% after deduction of 0.25% quartz; corresponds to [(NH₄)_{0.53}K_{0.19}Na_{0.01}]_{Σ=0.73}(Al_{1.97}Mg_{0.05}Fe_{0.03}³⁺)_{Σ=2.05}(Si_{3.17}Al_{0.83})_{Σ=4.00}O₁₀(OH)₂. (2) Horo, Japan; recalculated after deduction of 1% quartz and 20% ammonium-rich mica, analyzed separately, the “negative” Na₂O a result of this correction; corresponds to [(NH₄)_{0.57}K_{0.27}]_{Σ=0.84}(Al_{1.95}Fe_{0.05}³⁺Ti_{0.01}Mg_{0.01})_{Σ=2.02}(Si_{3.09}Al_{0.91})_{Σ=4.00}O₁₀(OH)₂.

Polymorphism & Series: 1M, 2M₂ polytypes.

Mineral Group: Mica group.

Occurrence: A hydrothermal alteration product of a biotite andesite dike (Tobe, Japan); in a hydrothermally altered rhyolite tuff (Horo, Japan).

Association: Quartz (Tobe, Japan); quartz, ammonium-rich mica, pyrophyllite, diaspore, kaolinite, corundum, andalusite (Horo, Japan).

Distribution: In the Ohgidani pottery stone deposit, Tobe, Ehime Prefecture, and in the Horo pyrophyllite deposit, Toyosaka, Hiroshima Prefecture, Japan.

Name: For the occurrence at Tobe, Japan.

Type Material: National Science Museum, Tokyo, Japan, M23773.

References: (1) Higashi, S. (1982) Tobelite, a new ammonium dioctahedral mica. *Mineral. J. (Japan)*, 11, 138–146. (2) (1983) *Amer. Mineral.*, 68, 850 (abs. ref. 1).

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