

Kampelite**Ba₃Mg_{1.5}Sc₄(PO₄)₆(OH)₃·4H₂O**

Crystal Data: Orthorhombic. *Point group:* 2/m 2/m 2/m. As radial aggregates, to 1.5 mm, of split plates (to 700 μm) elongated along [010] and flattened on {010}.

Physical Properties: *Cleavage:* Perfect on {001}. *Tenacity:* Flexible. *Fracture:* Smooth. Hardness = ~1 VHN = n.d. D(meas.) = 3.07(3) D(calc.) = 3.28 Dissolves in 10% HCl.

Optical Properties: Translucent. *Color:* Colorless. *Streak:* White. *Luster:* Pearly. *Optical Class:* Biaxial (+) (pseudo-uniaxial). $\alpha \approx \beta = 1.607(2)$ $\gamma = 1.612(2)$ $2V(\text{calc.}) = 0^\circ$

Cell Data: *Space Group:* Pnma. $a = 11.2261(9)$ $b = 8.5039(6)$ $c = 27.699(2)$ $Z = 4$

X-ray Powder Pattern: Iron open pit, Kovdor massif, Murmansk Region, Russia. 15.80 (100), 13.86 (45), 2.688 (24), 3.129 (19), 3.184 (18), 2.756 (16), 3.022 (14)

Chemistry:	(1)	(2)
MgO	4.79	4.61
Al ₂ O ₃	0.45	
P ₂ O ₅	31.66	32.45
K ₂ O	0.34	
CaO	0.34	
Sc ₂ O ₃	16.17	21.02
MnO	1.46	
FeO	1.24	
SrO	3.44	
BaO	29.81	35.06
H ₂ O	[7.12]	6.87
Total	97.03	100.00

(1) Iron open pit, Kovdor massif, Murmansk Region, Russia; average of 3 electron microprobe analyses, H₂O calculated from structure; corresponds to (Ba_{2.62}Sr_{0.45}K_{0.10}Ca_{0.06})_{Σ=3.23}Mg_{1.60}Mn_{0.28}(Sc_{3.15}Fe³⁺_{0.23}Al_{0.12})_{Σ=3.50}(PO₄)₆(OH)_{2.61}·4.01H₂O. (2) Ba₃Mg_{1.5}Sc₄(PO₄)₆(OH)₃·4H₂O.

Occurrence: A product of low-temperature hydrothermal alteration of Sc-bearing baddeleyite. In a void within the calcite-magnetite phoscorite (enriched in hydroxylapatite and Sc-rich baddeleyite) in the axial zone of a phoscorite-carbonatite pipe.

Association: Quintinite-2H, pyrite, bobierrite, quintinite-3R.

Distribution: From the Iron open pit, Kovdor massif, Murmansk Region, Russia.

Name: Honors Russian mining engineer Felix Borisovich Kampel' (b. 1935) for his contribution to the technologies for mining and processing the complex magnetite-apatite-baddeleyite ores of the Kovdor deposit.

Type Material: Mineralogical Museum, St. Petersburg State University, Russia (1/19660).

References: (1) Yakovenchuk, V.N., G.Yu. Ivanyuk, Y.A. Pakhomovsky, T.L. Panikorovskii, S.N. Britvin, S.V. Krivovichev, V.V. Shilovskikh, and V.N. Bocharov (2018) Kampelite, Ba₃Mg_{1.5}Sc₄(PO₄)₆(OH)₃·4H₂O, a new very complex Ba-Sc phosphate mineral from the Kovdor phoscorite-carbonatite complex (Kola Peninsula, Russia). *Mineral. Petrol.*, 112(1), 111-121. (2) (2018) *Amer. Mineral.*, 103, 2043 (abs. ref. 1).