

Magbasite **$\text{KBaFe}^{3+}\text{Mg}_7\text{Si}_8\text{O}_{22}(\text{OH})_2\text{F}_6$**

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. As bundles of prismatic and acicular crystals elongated along [001] forming subparallel and fan-shaped aggregates, to 5 mm.

Physical Properties: *Cleavage:* n.d. *Fracture:* n.d. *Tenacity:* n.d. Hardness = ~5
D(meas.) = 3.41 D(calc.) = 3.374

Optical Properties: Transparent to translucent. *Color:* Colorless to pinkish violet.

Luster: Vitreous.

Optical Class: Biaxial (-). $\alpha = 1.597(1)$ $\beta = 1.612(1)$ $\gamma = 1.618(1)$ $2V(\text{meas.}) = 65(5)^\circ$

$2V(\text{calc.}) = 64.1^\circ$ *Dispersion:* Moderate, $r > v$. *Orientation:* $X = a$, $Y = b$, $Z = c$.

Pleochroism: $Z =$ lavender, $X =$ pale lavender, $Y =$ colorless. *Absorption:* $Z > X > Y$.

Cell Data: Space Group: $Cmme$ ($Cmma$). $a = 18.9506(3)$ $b = 22.5045(3)$ $c = 5.2780(1)$ $Z = 4$

X-ray Powder Pattern: Eldor carbonatite complex, Quebec, Canada.

2.572 (100), 2.991 (68), 3.546 (47), 2.416 (41), 2.848 (39), 2.306 (38), 1.6336 (38)

Chemistry:	(1)
K ₂ O	3.62
BaO	13.96
MgO	23.33
MnO	0.54
FeO	[3.42]
Fe ₂ O ₃	[6.42]
Al ₂ O ₃	0.88
SiO ₂	42.32
F	9.81
H ₂ O	[1.74]
<u>-O = F₂</u>	<u>4.13</u>
Total	101.91

(1) Eldor carbonatite complex, Quebec, Canada; by electron microprobe, average of 12 analyses supplemented by Raman spectroscopy; H₂O calculated from structure, FeO/Fe₂O₃ apportioned from total Fe as Fe₂O₃ = 10.22; corresponds to $\text{K}_{0.86}\text{Ba}_{1.02}\text{Mg}_{6.50}\text{Fe}^{2+}_{0.53}\text{Fe}^{3+}_{0.90}\text{Al}_{0.19}\text{Si}_{7.90}\text{O}_{22.04}(\text{OH})_{2.17}\text{F}_{5.79}$.

Occurrence: In thin veins cutting ferrodolomite- and siderite-carbonatites (Canada).

Association: Phlogopite, quartz, siderite, Fe-rich dolomite, Nb-rich rutile, bafertisite, monazite-(Ce), rare-earth fluoro-carbonates (bastnäsite-parisite), fluorite (Canada).

Distribution: From Bayan Obo, Inner Mongolia, China. In the Eldor carbonatite complex, northeastern Quebec, Canada.

Name: For MAGnesium and BArium in its chemical composition.

Type Material: n.d.

References: (1) Semenov, E.I., A.P. Khomyakov, and A.V. Bykova (1965) Magbasite, a new mineral. Doklady Acad. Nauk SSSR, 163, 718-719 (in Russian). (2) (1966) Amer. Mineral., 51, 530-531 (abs. ref. 1). (3) Welch, M.D., R.H. Mitchell, A.R. Kampf, A.R. Chahmouradian, D. Smith, and M. Carter (2014) Crystal structure and topological affinities of magbasite, $\text{KBaFe}^{3+}\text{Mg}_7\text{Si}_8\text{O}_{22}(\text{OH})_2\text{F}_6$: a trellis structure related to amphibole and carpholite. Mineral. Mag., 78(1), 29-45. (4) (2014) Amer. Mineral., 99(11-12), 2443-2444 (abs. ref. 3).