

Penikisite

Ba(Mg, Fe²⁺)₂Al₂(PO₄)₃(OH)₃

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Crystal Data: Triclinic, pseudomonoclinic, or monoclinic. *Point Group:* $\bar{1}$ or 1. In crystals, in zoned intergrowth with kulanite.

Physical Properties: *Cleavage:* On {010} and {100}, fair to good. *Hardness* = ~4
D(meas.) = 3.79(2) D(calc.) = 3.82

Optical Properties: Transparent to translucent. *Color:* Blue to green. *Streak:* Very pale green to white. *Luster:* Vitreous.

Optical Class: Biaxial (+). *Pleochroism:* X = grass-green; Y = blue-green; Z = pale pink.
Orientation: Y \wedge b = 0°–19°; Z \wedge c = –6°. *Dispersion:* r \gg v, asymmetrical, suggesting a triclinic structure. *Absorption:* X \approx Y > Z. α = 1.684(2) β = 1.688(2) γ = 1.705(2)
2V(meas.) = 56° 2V(calc.) = 52.2°

Cell Data: *Space Group:* $P\bar{1}$ or P1. a = 8.999 b = 12.069 c = 4.921 α = ~ 90°
 β = 100°31' γ = ~ 90° Z = 2

X-ray Powder Pattern: Cross-cut Creek, Canada; almost identical to kulanite.
3.094 (100), 2.915 (80), 2.649 (70), 8.81 (60), 3.028 (60), 2.684 (60), 4.49 (55)

Chemistry:

	(1)
P ₂ O ₅	37.1
Al ₂ O ₃	18.0
FeO	9.5
MnO	0.0
MgO	6.5
CaO	1.4
BaO	24.9
H ₂ O	3.9
Total	101.3

(1) Cross-cut Creek, Canada; by electron microprobe, total Fe as FeO; corresponds to Ba_{0.96}(Mg_{0.95}Fe_{0.78}Ca_{0.15}) $\Sigma=1.88$ Al_{2.09}(P_{1.03}O_{4.15})₃(OH)_{2.56}.

Polymorphism & Series: Forms a series with kulanite.

Mineral Group: Bjarebyite group.

Occurrence: A very rare weathering product in fractures in sideritic iron formation.

Association: Kulanite, quartz, siderite, fluorapatite, rapidcreekite, brazilianite, arrojadite, anatase, goyazite.

Distribution: From Cross-cut Creek, Big Fish River–Blow River area, and in the Hess River area, Yukon Territory, Canada.

Name: Honoring Mr. Gunar Penikis (1936–1979), Ross River, Yukon Territory, Canada, a codiscoverer of the Rapid Creek phosphate occurrences.

Type Material: Royal Ontario Museum, Toronto, Canada, M34172.

References: (1) Mandarino, J.A., B.D. Sturman, and M.I. Corlett (1977) Penikisite, the magnesium analogue of kulanite, from Yukon Territory. *Can. Mineral.*, 15, 393–395. (2) (1979) *Amer. Mineral.*, 64, 657 (abs. ref. 1).