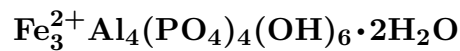


Gormanite



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Crystal Data: Triclinic, pseudomonoclinic. *Point Group:* $\bar{1}$ or 1. Crystals are elongated along [010], with large {001}, giving a bladelike aspect, with smaller {100}, {102}, $\{\bar{1}02\}$, {010}, to 1 cm; commonly in radial aggregates. *Twining:* Polysynthetic around [010], composition plane {001}, universal.

Physical Properties: *Cleavage:* On {001}, poor. Hardness = 4–5 D(meas.) = 3.10–3.13 D(calc.) = 3.10–3.12

Optical Properties: Semitransparent. *Color:* Blue-green. *Streak:* Pale green.

Luster: Vitreous.

Optical Class: Biaxial (-). *Pleochroism:* X = Z = colorless; Y = blue. *Orientation:* X ($163^\circ, 7^\circ$); Y ($-77.5^\circ, 86.5^\circ$); Z ($12.5^\circ, 84^\circ$) [using (ϕ, ρ)]. *Dispersion:* $r > v$, very strong. *Absorption:* Y > X = Z. $\alpha = 1.619(3)$ $\beta = 1.653(3)$ $\gamma = 1.660(3)$ 2V(meas.) = $53(2)^\circ$ 2V(calc.) = 56°

Cell Data: *Space Group:* $P\bar{1}$ or P1. $a = 11.79(1)$ $b = 5.11(1)$ $c = 13.61(1)$
 $\alpha = 90^\circ 50(5)'$ $\beta = 99^\circ 00(5)'$ $\gamma = 90^\circ 05(5)'$ Z = 2

X-ray Powder Pattern: Yukon Territory, Canada.

3.395 (100), 2.554 (90d), 2.925 (80), 4.761 (60), 3.154 (60d), 3.062 (40), 6.72 (30)

Chemistry:	(1)	(2)	(1)	(2)	
P ₂ O ₅	37.23	38.05	MgO	6.65	8.10
Al ₂ O ₃	25.51	27.33	CaO	0.26	
Fe ₂ O ₃	3.82		H ₂ O	11.45	12.07
FeO	14.68	14.45	Total	99.91	100.00
MnO	0.31				

(1) Yukon Territory, Canada; Mg, Ca, Al by AA, P by XRF, H₂O by TGA; after removal of quartz 7.0%, corresponds to $(\text{Fe}_{1.56}^{2+}\text{Mg}_{1.26}\text{Ca}_{0.04}\text{Mn}_{0.03})_{\Sigma=2.89}(\text{Al}_{3.82}\text{Fe}_{0.36}^{3+})_{\Sigma=4.18}(\text{PO}_4)_4(\text{OH})_{6.32} \cdot 1.69\text{H}_2\text{O}$. Commonly strongly chemically zoned, although optical property variations are not a guide. (2) $(\text{Fe}^{2+}, \text{Mg})_3\text{Al}_4(\text{PO}_4)_4(\text{OH})_6 \cdot 2\text{H}_2\text{O}$ with $\text{Fe}^{2+}:\text{Mg} = 1:1$.

Polymorphism & Series: Forms a series with souzalite.

Occurrence: As low-temperature fracture fillings in phosphate-ironstones (Yukon Territory, Canada); in fractures in tonalite (Bisbee, Arizona, USA).

Association: Souzalite, siderite, ludlamite, oxidized vivianite, arrojadite, kryzhanovskite, quartz (Yukon Territory, Canada); chlorite, calcite, quartz (Bisbee, Arizona, USA).

Distribution: From Rapid Creek, Yukon Territory, Canada. In the USA, in large crystals at Bisbee, Cochise Co., Arizona; in New Hampshire, from the G.E. Smith mine, Newport, Sullivan Co. and the Charles Davis pegmatite, Groton, Grafton Co. At the Tsaobismund pegmatite, 60 km south of Karibib, Namibia.

Name: Honoring Donald Herbert Gorman (1922–), Professor of Mineralogy, Department of Geology, University of Toronto, Toronto, Canada.

Type Material: Royal Ontario Museum, Toronto, Canada, M35123, M35124, M37368; National Museum of Natural History, Washington, D.C., USA, 137494, 137495, 145741.

References: (1) Sturman, B.D., J.A. Mandarino, M.E. Mrose, and P.J. Dunn (1981) Gormanite, $\text{Fe}_3^{2+}\text{Al}_4(\text{PO}_4)_4(\text{OH})_6 \cdot 2\text{H}_2\text{O}$, the ferrous analogue of souzalite, and new data for souzalite. *Can. Mineral.*, 19, 381–387. (2) (1982) *Amer. Mineral.*, 67, 622–623 (abs. ref. 1).

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