

Bonaccordite

Ni₂Fe³⁺BO₅

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Crystal Data: Orthorhombic. *Point Group:* 2/m 2/m 2/m. Crystals are elongated prisms, to 400 μm, may be in rosettelike radiating groups or in veinlets.

Physical Properties: VHN = 1069, 1200 average (15 g load). Hardness = n.d.
D(meas.) = n.d. D(calc.) = 5.17

Optical Properties: Opaque. *Color:* Reddish brown; in reflected light, gray with brownish tinge, with strong reddish brown internal reflections.
Optical Class: Biaxial. α = n.d. β = n.d. γ = n.d. 2V(meas.) = n.d. *Anisotropism:* Medium to strong. *Birefractance:* Distinct, in oil.
R₁-R₂: 14.2-17.6

Cell Data: *Space Group:* [Pbam] (by analogy to ludwigite group). a = 9.213(6)
b = 12.229(7) c = 3.001(2) Z = 4

X-ray Powder Pattern: Bon Accord, South Africa.
2.548 (100), 2.514 (100), 5.10 (50), 1.898 (50), 4.61 (40), 2.334 (35), 2.025 (35)

Chemistry:	(1)
SiO ₂	0.4
B ₂ O ₃	[13.0]
Fe ₂ O ₃	31.9
MnO	0.04
CoO	1.5
NiO	52.7
MgO	0.5
Total	[100.0]

(1) Bon Accord, South Africa; presumably by electron microprobe, average of nine analyses, total Fe as Fe³⁺, B by difference, originally given as 13.1%, presence confirmed by wet analysis; corresponding to (Ni_{1.86}Co_{0.05}Mg_{0.03}Si_{0.02})_{Σ=1.96}Fe_{1.05}B_{0.99}O₅.

Mineral Group: Ludwigite group.

Occurrence: In a small tabular body of nickeliferous serpentinite, probably a contact deposit, along the junction of quartzite and an ultramafic intrusive; it appears to have formed at ~730 °C and < 2 kbar during thermal metamorphism, possibly of a nickel-rich meteorite.

Association: Trevorite, liebenbergite, nepouite, nimite, bunsenite, gaspéite, violarite, millerite.

Distribution: Found three km west of the Scotia talc mine, Bon Accord area, Barberton, Transvaal, South Africa.

Name: For the locality at Bon Accord, South Africa.

Type Material: Royal Ontario Museum, Toronto, Canada, M33443; National Museum of Natural History, Washington, D.C., USA, 132463.

References: (1) De Waal, S.A., E.A. Viljoen, and L.C. Calk (1974) Nickel minerals from Barberton, South Africa: VII. Bonaccordite, the nickel analogue of ludwigite. *Trans. Geol. Soc. of South Africa*, 77, 375. (2) (1976) *Amer. Mineral.*, 61, 502 (abs. ref. 1).