

Crystal Data: Orthorhombic. *Point Group:* 2/*m* 2/*m* 2/*m*. Poorly formed crystals, elongated along [001], to 2 mm, commonly anhedral granular, massive.

Physical Properties: *Cleavage:* Perfect on {100}. *Tenacity:* Brittle. Hardness = 5–6 VHN = 843 (50 g load). D(meas.) = n.d. D(calc.) = [3.40–3.43]

Optical Properties: Nearly opaque. *Color:* Black; brown in thin section; pale gray in reflected light, with dark red internal reflections. *Streak:* Black. *Luster:* Submetallic to adamantine.

Optical Class: Biaxial. *Pleochroism:* Brown to very dark brown or dark brownish red.

Anisotropism: Weak.

R: (400) —, (420) 1.2, (440) 7.70, (460) 9.77, (480) 10.11, (500) 10.12, (520) 10.03, (540) 9.66, (560) 9.40, (580) 9.38, (600) 9.27, (620) 9.22, (640) 8.98, (660) 8.79, (680) 5.33, (700) 1.33

Cell Data: *Space Group:* *Pnam*. *a* = 9.198–9.258 *b* = 9.351–9.355 *c* = 3.081–3.091 *Z* = 4

X-ray Powder Pattern: Zhuanmiao deposit, China.

2.570 (100), 4.176 (38), 2.957 (30), 6.563 (23), 2.088 (20), 1.550 (19), 1.591 (18)

Chemistry:	(1)	(2)	(1)	(2)
P ₂ O ₅	0.15		FeO	6.06
B ₂ O ₃	20.44	23.37	MnO	0.28
SiO ₂	0.07		CoO	0.04
TiO ₂	5.76	3.80	MgO	27.71
MnO ₂	0.02		CaO	0.04
Al ₂ O ₃	6.02	7.80	Na ₂ O	0.70
Fe ₂ O ₃ + FeO	36.87		K ₂ O	0.03
Fe ₂ O ₃		31.76	Total	97.89
Cr ₂ O ₃	0.04	0.94		100.00

(1) Zhuanmiao deposit, China; by electron microprobe, average of four analyses, B₂O₃ by wet methods, Fe₂O₃:FeO determined by Mössbauer spectroscopy; corresponds to (Mg_{0.91}Fe_{0.09}²⁺)_{Σ=1.00}(Fe_{0.56}Al_{0.19}Mg_{0.17}Ti_{0.11}Fe_{0.10}²⁺)_{Σ=1.13}O(B_{0.92}O_{3.00}). (2) Inglefield Land, Greenland; by electron microprobe, B₂O₃ by ion microprobe; corresponds to (Mg_{0.59}Al_{0.23}Fe_{0.12}²⁺Fe_{0.06}³⁺Mn_{0.01})_{Σ=1.01}(Fe_{0.53}Mg_{0.38}Ti_{0.07}Cr_{0.02})_{Σ=1.00}O(B_{1.00}O₃).

Occurrence: In metamorphosed magnesian marble in a boron deposit (Zhuanmiao deposit, China); in ultramafic rocks (Inglefield Land, Greenland).

Association: Suanite, anhydrite, apatite (Zhuanmiao deposit, China); sinhalite, forsterite, calcite (Huayuangou deposit, China); forsterite, pleonaste, phlogopite, magnetite, apatite, tourmaline (Inglefield Land, Greenland).

Distribution: From the Zhuanmiao boron deposit, Kuandian Co., and the Huayuangou boron deposit, both in Liaoning Province, China. Found in central Inglefield Land, northwest Greenland.

Name: In honor of Professor Yuan Fuli (1893–1987), Chinese geologist, China University of Geosciences, Wuhan, China.

Type Material: Geological Museum of China, Beijing, China.

References: (1) Huang Zouliang and Wang Pu (1994) Yuanfuliite – a new borate mineral. *Acta Petrologica Mineralogica*, 13(4), 328–334 (in Chinese with English abs.). (2) (1996) *Amer. Mineral.*, 81, 252–253 (abs. ref. 1). (3) Appel, P.W.U., S. Biga, and M.F. Brigatti (1999) Crystal structure and chemistry of yuanfuliite and its relationships with warwickite. *Eur. J. Mineral.*, 11, 483–491.

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