

Werdingite

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Crystal Data: Triclinic. *Point Group:* $\bar{1}$. Anhedral to subhedral crystals, up to 3 mm. *Twinning:* Composition plane || [001], simple twins, common; also lamellar twins with several individuals.

Physical Properties: *Cleavage:* Prismatic, poor, or a parting. *Fracture:* Conchoidal. Hardness = 7 D(meas.) = 3.04(2) D(calc.) = 3.07

Optical Properties: Translucent. *Color:* Honey-yellow to brownish yellow. *Streak:* Buff-white. *Luster:* Vitreous. *Optical Class:* Biaxial (-). *Pleochroism:* X = Z = colorless; Y = yellow. *Orientation:* Z = c. *Dispersion:* r > v, moderately strong. $\alpha = 1.614(2)$ $\beta = 1.646(2)$ $\gamma = 1.651(2)$ 2V(meas.) = 33(1)° 2V(calc.) = 42°

Cell Data: *Space Group:* $P\bar{1}$. a = 7.995(2) b = 8.152(1) c = 11.406(4) $\alpha = 110.45(2)^\circ$ $\beta = 110.85(2)^\circ$ $\gamma = 84.66(2)^\circ$ Z = 1

X-ray Powder Pattern: Bok se Puts Farm, South Africa. 5.23 (100), 5.43 (80), 4.98 (75), 2.708 (60), 3.392 (50), 2.194 (50), 1.527 (40)

Chemistry:	(1)
	SiO ₂ 19.83
	TiO ₂ 0.05
	B ₂ O ₃ 10.19
	Al ₂ O ₃ 59.49
	FeO 5.06
	MnO 0.00
	MgO 4.46
	Na ₂ O 0.00
	<hr/> Total 99.08

(1) Bok se Puts Farm, South Africa; by electron microprobe, B by ICP; corresponds to $(\text{Mg}_{1.35}\text{Fe}_{0.86})_{\Sigma=2.21}\text{Al}_{14.21}\text{B}_{3.56}\text{Ti}_{0.01}\text{Si}_{4.02}\text{O}_{36.91}$.

Occurrence: In granulite facies metamorphosed metasediments and metavolcanic cordierite-sillimanite and biotite gneisses.

Association: Kornerupine, grandidierite, sillimanite, zircon, rutile, hercynite.

Distribution: On the Bok se Puts Farm, Namaqualand, Cape Province, South Africa.

Name: For Dr. Günter Werding, of the Mineralogical Institute, Ruhr University, Bochum, Germany.

Type Material: South African Museum, SAMG 7140–7150, and the University of Cape Town, Cape Town, South Africa.

References: (1) Moore, J.M., D.J. Waters, and M.L. Niven (1990) Werdingite, a new borosilicate mineral from the granulite facies of the western Namaqualand metamorphic complex, South Africa. *Amer. Mineral.*, 75, 415–420. (2) Niven, M.L., D.J. Waters, and J.M. Moore (1991) The crystal structure of werdingite, $(\text{Mg, Fe})_2\text{Al}_{12}(\text{Al, Fe})_2\text{Si}_4(\text{B, Al})_4\text{O}_{37}$, and its relationship to sillimanite, mullite, and grandidierite. *Amer. Mineral.*, 76, 246–256.