Werdingite $(Mg, Fe^{2+})_2Al_{14}B_4Si_4O_{37}$

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:* $P\bar{1}$. $a = 7.995(2)$ $b = 8.152(1)$ $c = 11.406(4)$ $\alpha = 110.45(2)°$ $\beta = 110.85(2)°$ $\gamma = 84.66(2)°$ 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_2O_3	10.19
Al_2O_3	59.49
FeO	5.06
MnO	0.00
MgO	4.46
Na_2O	0.00
Total	99.08

(1) Bok se Puts Farm, South Africa; by electron microprobe, B by ICP; corresponds to $(Mg_{1.35}Fe_{0.86})_{\Sigma=2.21}Al_{14.21}B_{3.56}Ti_{0.01}Si_{4.02}O_{36.91}$.

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, $(Mg, Fe)_2Al_{12}(Al, Fe)_2Si_4(B, Al)_4O_{37}$, and its relationship to sillimanite, mullite, and grandidierite. Amer. Mineral., 76, 246–256.