

**Crystal Data:** Monoclinic. *Point Group:*  $m$  or  $2/m$ . Fine-grained massive.

**Physical Properties:** *Cleavage:* {001}, perfect. *Hardness* = 2 *D*(meas.) = 3.31  
*D*(calc.) = 3.348

**Optical Properties:** Translucent. *Color:* Pale green; in transmitted light, colorless.  
*Optical Class:* Biaxial (-).  $\alpha = 1.600(2)$   $\beta = 1.652(2)$   $\gamma = [1.655]$   $2V(\text{meas.}) = 27(2)^\circ$

**Cell Data:** *Space Group:*  $Cc$  or  $C2/c$ .  $a = 5.316(2)$   $b = 9.149(3)$   $c = 18.994(6)$   
 $\beta = 99.96(6)^\circ$   $Z = [4]$

**X-ray Powder Pattern:** Bon Accord, South Africa.

9.40 (100), 3.12 (28), 2.503 (23), 4.57 (16), 2.245 (8), 1.524 (7), 3.55 (3)

**Chemistry:**

	(1)
SiO <sub>2</sub>	51.83
Al <sub>2</sub> O <sub>3</sub>	0.38
Fe <sub>2</sub> O <sub>3</sub>	1.77
FeO	0.31
MnO	0.00
CoO	0.46
NiO	34.55
MgO	7.09
CaO	0.28
H <sub>2</sub> O <sup>+</sup>	3.61
H <sub>2</sub> O <sup>-</sup>	0.05
Total	100.33

(1) Bon Accord, South Africa; corresponds to  $(\text{Ni}_{2.12}\text{Mg}_{0.80}\text{Fe}_{0.10}^{3+}\text{Co}_{0.03}\text{Ca}_{0.02}\text{Fe}_{0.02}^{2+})_{\Sigma=6.19}$   
 $(\text{Si}_{3.94}\text{Al}_{0.04})_{\Sigma=3.98}\text{O}_{10.16}(\text{OH})_{1.84}$ .

**Occurrence:** A secondary mineral in a nickel-bearing layered igneous sill.

**Association:** Ferroan trevorite, nimite, violarite, millerite, reevesite, goethite, "opal."

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

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**Type Material:** National Museum of Natural History, Washington, D.C., USA, 132464, 132465.

**References:** (1) Hiemstra, S.A. and S.A. De Waal (1968) Nickel minerals from Barberton, III. Willemseite, a nickelian talc. *Nat. Inst. Met. (South Africa) Res. Rept.*, 352, 1–14. (2) (1969) *Amer. Mineral.*, 54, 1740 (abs. ref. 1). (3) De Waal, S.A. (1970) Nickel minerals from Barberton, South Africa: III. Willemseite, a nickel-rich talc. *Amer. Mineral.*, 55, 31–42.