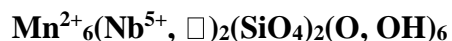


**Barwoodite**

**Crystal Data:** Hexagonal. *Point Group:* 3. Crystals exhibit hexagonal outlines and display {10\*0}, {01\*0}, and {00\*1}; platy to 3 mm in subparallel intergrowths. *Twinning:* Merohedral (racemic) twinning is indicated by the structure refinement.

**Physical Properties:** *Cleavage:* Perfect on {00\*1}. *Fracture:* Curved. *Tenacity:* Brittle. Hardness = ~3.5 D(meas.) = n.d. D(calc.) = 4.168

**Optical Properties:** Transparent. *Color:* Brownish red. *Streak:* Light orange. *Luster:* Vitreous. Loses color very slowly in dilute HCl.

*Optical Class:* Uniaxial (-).  $\omega = 1.873(3)$   $\varepsilon = 1.855(5)$

**Cell Data:** Space Group: *P3*.  $a = 8.2139(10)$   $c = 4.8117(4)$   $Z = 1$

**X-ray Powder Pattern:** Big Rock quarry, Granite Mountain, Pulaski County, Arkansas, USA. 1.7930 (100), 3.125 (95), 2.349 (81), 1.5505 (75), 2.688 (57), 2.858 (56), 3.994 (34)

Chemistry:	(1)	(2)
MnO	[58.97]	60.31
Mn <sub>2</sub> O <sub>3</sub>	[1.21]	
Fe <sub>2</sub> O <sub>3</sub>	1.96	
Nb <sub>2</sub> O <sub>5</sub>	17.39	18.83
SiO <sub>2</sub>	16.65	17.03
H <sub>2</sub> O	[3.02]	3.83
Total	99.20	100.00

(1) Big Rock quarry, Granite Mountain, Pulaski County, Arkansas, USA; average of 12 electron microprobe analyses supplemented by Raman spectroscopy, H<sub>2</sub>O calculated for electroneutrality, MnO and Mn<sub>2</sub>O<sub>3</sub> apportioned from MnO = 60.01 based on structure; corresponds to  $\text{Mn}^{2+}_6(\text{Nb}^{5+}_{0.94}\text{Fe}^{3+}_{0.18}\text{Mn}^{3+}_{0.11}\square_{0.77})_{\Sigma=2}(\text{SiO}_4)_2[\text{O}_{3.58}(\text{OH})_{2.42}]_{\Sigma=6}$ . (2)  $\text{Mn}^{2+}_6\text{Nb}^{5+}(\text{SiO}_4)_2\text{O}_3(\text{OH})_3$  for the endmember formula assuming half occupancy of the Nb sites.

**Mineral Group:** Welinite group.

**Occurrence:** In miarolitic cavities in pegmatite in a nepheline syenite pluton.

**Association:** Aegirine, albite, analcime, chamosite-pennantite, eggletonite, kupletskite, muscovite, natrolite, orthoclase, quartz, zircon.

**Distribution:** From Big Rock quarry (also known as the 3M quarry), Granite Mountain, Little Rock, Pulaski County, Arkansas, USA.

**Name:** Honors Dr. Henry (“Bumpi”) L. Barwood (1947-2016), an American clay mineralogist and surface chemist, Professor of Earth Science at Troy University (Troy, Alabama, USA), elected to the Micromounters’ Hall of Fame and who with his collecting partner Robert W. Stevens discovered the first specimens of this new species.

**Type Material:** Natural History Museum of Los Angeles County, Los Angeles, California, USA (66634, 66635, 66636, and 66637).

**References:** (1) Kampf, A.R., A.J. Celestian, and B.P. Nash (2018) Barwoodite,  $\text{Mn}^{2+}_6(\text{Nb}^{5+}, \square)_2(\text{SiO}_4)_2(\text{O}, \text{OH})_6$ , a new member of the welinite group from Granite Mountain, Arkansas. *Can. Mineral.*, 56(5), 799-809. (2) (2020) *Amer. Mineral.*, 105(7), 1110 (abs. ref. 1).