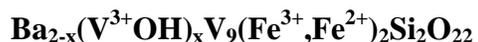


**Greenwoodite**

**Crystal Data:** Hexagonal. *Point Group:* 3m. As semi-prismatic to tabular grains, to 200  $\mu\text{m}$ .

**Physical Properties:** *Cleavage:* Perfect on {001}. *Fracture:* n.d. *Tenacity:* n.d. *Hardness* = 5  
D(meas.) = n.d. D(calc.) = 4.81

**Optical Properties:** Opaque. *Color:* Black, gray with a weak brownish tint in reflected light.  
*Streak:* n.d. *Luster:* Semi-metallic, dull.

*Optical Class:* n.d. Distinct birefractance, pleochroism, and anisotropism.

$R_1$ - $R_2$ : (470) 12.5-15.75 (2.82-4.83)<sub>oil</sub>, (546) 12.63-15.50 (2.98-4.80)<sub>oil</sub>, (589) 12.81-15.75  
(3.31-4.95)<sub>oil</sub>, (650) 13.60-16.22 (3.57-5.28)<sub>oil</sub>

**Cell Data:** *Space Group:* P3m1.  $a = 5.750(1)$   $c = 14.459(1)$   $Z = 1$

**X-ray Powder Pattern:** Calculated pattern.

2.925 (100), 2.875 (38), 2.469 (35), 1.438 (35), 2.354 (28), 2.212 (28), 1.669 (26)

<b>Chemistry:</b>	(1)
MgO	0.12
Al <sub>2</sub> O <sub>3</sub>	0.91
SiO <sub>2</sub>	8.63
TiO <sub>2</sub>	1.05
V <sub>2</sub> O <sub>3</sub>	58.03
Cr <sub>2</sub> O <sub>3</sub>	1.42
MnO	0.11
FeO	[3.72]
Fe <sub>2</sub> O <sub>3</sub>	[9.1]
ZnO	1.52
BaO	15.13
<u>H<sub>2</sub>O</u>	<u>[0.62]</u>
Total	100.36

(1) Wigwam deposit, British Columbia, Canada; average of 13 electron microprobe analyses, Fe<sup>+2</sup>/Fe<sup>+3</sup> calculated from charge balance, H<sub>2</sub>O determined by crystal structure analysis; corresponding to Ba<sub>0.60</sub>(V<sup>3+</sup>OH)<sub>0.40</sub>(V<sup>3+</sup><sub>8.33</sub>Cr<sub>0.33</sub>Ti<sub>0.13</sub>Al<sub>0.13</sub>Mn<sup>3+</sup><sub>0.02</sub>) $\Sigma=9$   
(Fe<sup>3+</sup><sub>1.08</sub>Fe<sup>2+</sup><sub>0.60</sub>Zn<sub>0.22</sub>Al<sub>0.06</sub>Mg<sub>0.04</sub>) $\Sigma=2$ (Si<sub>1.72</sub>Fe<sup>3+</sup><sub>0.28</sub>) $\Sigma=2$ O<sub>22</sub>.

**Occurrence:** Part of the prograde assemblage in a green schist facies metamorphosed Mississippi-Valley type base-metal deposit.

**Association:** Quartz, celsian, apatite, sphalerite, pyrrhotite, galena, pyrite, zoltaiite, batisivite.

**Distribution:** At the Wigwam deposit, Akolkolex River area, southeast of Revelstoke, British Columbia, Canada.

**Name:** Honors Professor Hugh J. Greenwood (b. 1931), former head of the Geological Sciences Department, University of British Columbia, Vancouver, British Columbia, Canada, for his contributions to petrology.

**Type Material:** American Museum of Natural History, New York, New York, USA (109839).

**References:** (1) Bartholomew, P.R., F. Mancini, G.E. Harlow, N. Deifel, C. Cahill, and H.-J. Bernhardt (2012) Greenwoodite, a new nesosilicate from British Columbia with a Ba-VOH coupled substitution and tetrahedral Fe; description and structure. *Can. Mineral.*, 50, 1233-1242.

(2) (2014) *Amer. Mineral.*, 99, 1514-1515 (abs. ref. 1).