

**Nioboaeschnite-(Y)**

**Crystal Data:** Orthorhombic. *Point Group:* 2/m 2/m 2/m. As subhedral crystals, to 10 mm.

**Physical Properties:** *Cleavage:* None. *Fracture:* Conchoidal. *Tenacity:* Brittle.  
Hardness = 5-6 VHN = 922 (100 g load). D(meas.) = 5.34 D(calc.) = 5.33 Metamict.

**Optical Properties:** Translucent. *Color:* Deep brownish-red to black. *Streak:* Grayish-brown.  
*Luster:* Vitreous.

*Optical Class:* Isotropic.

R<sub>1</sub>-R<sub>2</sub>: (470) 3.4-14.6, (546) 3.3-14.1, (589) 3.2-13.8, (650) 3.2-13.7

**Cell Data:** *Space Group:* Pbnm. *a* = 5.279(3) *b* = 10.966 (5) *c* = 7.443(3) *Z* = 4

**X-ray Powder Pattern:** Bear Lake Diggings, Haliburton County, Ontario, Canada (after heating).  
3.009 (100), 2.931 (69), 3.079 (20), 1.580 (16), 1.863 (14), 2.783 (12), 2.636 (12)

**Chemistry:**

	(1)		(1)
CaO	4.34	ThO <sub>2</sub>	12.10
MnO	0.11	UO <sub>2</sub>	0.59
Fe <sub>2</sub> O <sub>3</sub>	2.16	TiO <sub>2</sub>	18.41
Y <sub>2</sub> O <sub>3</sub>	5.34	Nb <sub>2</sub> O <sub>5</sub>	31.46
La <sub>2</sub> O <sub>3</sub>	0.84	Ta <sub>2</sub> O <sub>5</sub>	3.97
Ce <sub>2</sub> O <sub>3</sub>	4.50	<u>H<sub>2</sub>O</u>	<u>2.61</u>
Pr <sub>2</sub> O <sub>3</sub>	0.65	Total	95.41
Nd <sub>2</sub> O <sub>3</sub>	4.47		
Sm <sub>2</sub> O <sub>3</sub>	1.21		
Eu <sub>2</sub> O <sub>3</sub>	0.10		
Gd <sub>2</sub> O <sub>3</sub>	0.91		
Dy <sub>2</sub> O <sub>3</sub>	0.60		
Er <sub>2</sub> O <sub>3</sub>	0.42		
Tm <sub>2</sub> O <sub>3</sub>	0.05		
Yb <sub>2</sub> O <sub>3</sub>	0.57		

(1) Bear Lake Diggings, Haliburton County, Ontario, Canada; average of 10 EDS analyses, H<sub>2</sub>O by TGA and not used to derive the empirical formula, corresponding to  
[(Y<sub>0.19</sub>RE<sub>0.34</sub>)Ca<sub>0.31</sub>Th<sub>0.18</sub>U<sub>0.009</sub>Mn<sub>0.006</sub>]<sub>Σ=1.04</sub>(Nb<sub>0.94</sub>Ti<sub>0.92</sub>Ta<sub>0.07</sub>Fe<sup>3+</sup><sub>0.11</sub>)<sub>Σ=2.04</sub>O<sub>6</sub>.

**Mineral Group:** Aeschnite group.

**Occurrence:** In calcite veins in regionally metamorphosed metasedimentary rocks that may have undergone fenitization-like metasomatism.

**Association:** Apatite-(CaF), amphibole, titanite, anorthite, microcline, annite, calcite, quartz, monazite, pyrite, uranian thorite.

**Distribution:** Bear Lake Diggings, Lot 9, concession X, Monmouth Township, Haliburton County, near Gooderham, Ontario, Canada.

**Name:** For the dominant B-site cation (Nb) and principal rare earth element (Y) in a member of the aeschnite group.

**Type Material:** Croatian Natural History Museum, Zagreb, Croatia, no. 600:ZAG; 9613MP1.

**References:** (1) Bermanec, V., N. Tomašić, G. Kniewald, M.E. Back, and G. Zagler (2008) Nioboaeschnite-(Y), a new member of the aeschnite group from the Bear Lake diggings, Haliburton County, Ontario, Canada. *Can. Mineral.*, 46, 395–402. (2) (2008) *Amer. Mineral.*, 93, 1943-1944 (abs. ref. 1).