

**Haineaultite**

**Crystal Data:** Orthorhombic. *Point Group:* 222. As fan-like aggregates of tabular to bladed crystals or as isolated prismatic crystals, elongate on [001] to 6 mm, variably showing {100}, {010}, {001}, and {011}.

**Physical Properties:** *Cleavage:* Distinct to good on {100}, {010}, and {001}. *Tenacity:* Brittle. *Fracture:* Blocky to splintery. *Hardness* = 3-4 *D(meas.)* = n.d. *D(calc.)* = 2.28

**Optical Properties:** Transparent to translucent. *Color:* Pale orange, lemon-yellow, less commonly tan or off-white. *Streak:* White. *Luster:* Vitreous.

*Optical Class:* Biaxial (+).  $\alpha = 1.599(1)$   $\beta = 1.610(1)$   $\gamma = 1.696(1)$   $2V(\text{meas}) = 38(1)^\circ$   
 $2V(\text{calc}) = 41(1)^\circ$  *Dispersion:* None. *Orientation:*  $X = b$ ;  $Y = c$ ;  $Z = a$ . *Pleochroism:* None.

**Cell Data:** *Space Group:* C222.  $a = 7.204(4)$   $b = 23.155(5)$   $c = 6.953(2)$   $Z = 1$

**X-ray Powder Pattern:** Poudrette quarry, Mont Saint-Hilaire, Quebec, Canada.  
 11.564 (100), 6.932 (90), 3.052 (75), 2.977 (70), 5.258 (40), 4.446 (40), 2.582 (40)

<b>Chemistry:</b>	(1)		(1)
Na <sub>2</sub> O	4.70	TiO <sub>2</sub>	18.86
K <sub>2</sub> O	2.09	ZrO <sub>2</sub>	0.31
MgO	0.07	Nb <sub>2</sub> O <sub>5</sub>	5.56
CaO	9.99	SO <sub>3</sub>	2.60
MnO	0.25	F	0.17
FeO	0.49	H <sub>2</sub> O <sub>(calc.)</sub>	10.11
SiO <sub>2</sub>	42.70	<u>-O = F<sub>2</sub></u>	<u>0.07</u>
		Total	97.83

(1) Poudrette quarry, Mont Saint-Hilaire, Quebec, Canada; average of 16 electron microprobe analyses, H<sub>2</sub>O and OH<sup>-</sup> confirmed by structure analysis and IR, corresponding to  
 $(\text{Na}_{2.41}\text{Ca}_{1.83}\text{K}_{0.71})_{\Sigma=4.95}\text{Ca}(\text{Ti}_{3.76}\text{Nb}_{0.67}\text{Fe}_{0.11}\text{Mn}_{0.06}\text{Zr}_{0.04}\text{Mg}_{0.03})_{\Sigma=4.67}(\text{Si}_{11.30}\text{S}_{0.52})_{\Sigma=11.82}\text{O}_{34}$   
 $(\text{OH}_{7.86}\text{F}_{0.14})_{\Sigma=8.00} \cdot 5\text{H}_2\text{O}$ .

**Mineral Group:** Labuntsovite group.

**Occurrence:** A late-stage mineral in altered marble xenoliths and breccia in a complex peralkaline intrusion (nepheline and sodalite syenties).

**Association:** Quartz, calcite, sodic amphibole, pectolite, fluorapophyllite, vesuvianite, tainiolite, albite, fluorite, microcline, aegirine, and 17 less-abundant minerals.

**Distribution:** From the Poudrette quarry, Mont Saint-Hilaire, Rouville County, Quebec, Canada.

**Name:** Honors Gilles Haineault (b. 1946) of St-Mathieu de Beloeil, Quebec, a collector and dealer of minerals from Mont Saint-Hilaire.

**Type Material:** Canadian Museum of Nature, Ottawa; 81547.

**References:** (1) McDonald, A.M., and G.Y. Chao (2004) Haineaultite, a new hydrated sodium calcium titanosilicate from Mont Saint-Hilaire, Quebec: description, structure determination and genetic implications. *Can. Mineral.*, 42, 769–780. (2) (2005) *Amer. Mineral.*, 90, 271 (abs. ref. 1).