Perraultite $Na_2KBaMn_8^{2+}(Ti,Nb)_4Si_8O_{32}(OH,F,H_2O)_7$

Crystal Data: Monoclinic. *Point Group:* $2/m$, m, or 2. Prismatic crystals, flattened on {010} and elongated along [100], with {001}, {010}, {100}, and {$h0l$}, to 1 mm. *Twinning:* Simple contact twins, with {001} as twin and composition plane, common.

Physical Properties: *Cleavage:* Very good on {001}. *Fracture:* Uneven to irregular. *Tenacity:* Very brittle. Hardness = ∼4 D(meas.) = 3.71(5) D(calc.) = 3.808

Optical Properties: Opaque to translucent, transparent in small fragments. *Color:* Orange-brown. *Streak:* Pale brown. *Luster:* Vitreous on fresh surfaces to slightly waxy on exposed faces.
Optical Class: Biaxial (–). *Pleochroism:* $X = Y$ = light yellow; Z = dark brown. *Orientation:* $X = b$; $Y \wedge a = 19°$. *Dispersion:* $r < v$, strong. $\alpha = 1.785(2)$ $\beta = 1.81(1)$ $\gamma = 1.82(1)$ 2V(meas.) = 66(1)° 2V(calc.) = 64°

Cell Data: *Space Group:* $C2/m$, Cm, or $C2$. $a = 10.820(2)$ $b = 13.843(4)$ $c = 20.93(1)$ $\beta = 95.09(2)°$ Z = 4

X-ray Powder Pattern: Mont Saint-Hilaire, Canada.
3.474 (100), 10.43 (42), 2.606 (40), 3.186 (15), 2.804 (15), 2.867 (13), 3.573 (11)

Chemistry:

	(1)		(1)
SiO_2	27.32	MgO	0.06
TiO_2	9.44	BaO	8.88
ZrO_2	0.12	Na_2O	3.52
Al_2O_3	0.03	K_2O	2.68
Nb_2O_5	13.35	F	0.84
FeO	1.12	H_2O	3.49
MnO	31.14	$-O = F_2$	0.35
		Total	101.64

(1) Mont Saint-Hilaire, Canada; by electron microprobe, average of three analyses, H_2O by TGA; corresponds to $Na_{2.02}K_{1.00}Ba_{1.02}(Mn_{7.73}Fe_{0.27}Mg_{0.03})_{\Sigma=8.03}(Ti_{2.08}Nb_{1.77}Zr_{0.02})_{\Sigma=3.87}(Si_{8.01}Al_{0.01})_{\Sigma=8.02}O_{32}[(OH)_{5.62}F_{0.78}(H_2O)_{0.60}]_{\Sigma=7.00}$.

Occurrence: In pegmatite dikes in nepheline syenite in an intrusive alkalic gabbro-syenite complex.

Association: Kupletskite, catapleiite, microcline, albite, aegirine, rhodochrosite, natrolite, tetranatrolite, lorenzenite, polylithionite, ancylite, fluorite, calcite, pyrochlore.

Distribution: From Mont Saint-Hilaire, Quebec, Canada.

Name: To honor Professor Guy Perrault, École Polytechnique, Montreal, Canada, for his work on the mineralogy of Mont Saint-Hilaire.

Type Material: Canadian Museum of Nature, Ottawa, 50037; Royal Ontario Museum, Toronto, Canada, M41005.

References: (1) Chao, G.Y. (1991) Perraultite, a new hydrous Na-K-Ba-Mn-Ti-Nb silicate species from Mont Saint-Hilaire, Quebec. Can. Mineral., 29, 355–358. (2) (1991) Amer. Mineral., 76, 2023 (abs. ref. 1). (3) Mandarino, J.A. and V. Anderson (1989) Monteregian treasures. Cambridge Univ. Press, 163. (4) Horváth, L. and R.A. Gault (1990) The mineralogy of Mont Saint-Hilaire, Quebec. Mineral. Record, 21, 284–359, esp. 329. (5) (1991) Amer. Mineral., 76, 300 (abs. refs. 3 and 4).