

Rouvilleite

 $\text{Na}_3(\text{Ca, Mn}^{2+})_2(\text{CO}_3)_3\text{F}$

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Crystal Data: Monoclinic. *Point Group:* $2/m$ or m . As crystals, prismatic, elongated along [001], showing {100}, {010}, {110}, {001}, {10 $\bar{1}$ }, {023}, {03 $\bar{2}$ }, to 1 mm; commonly in granular masses.

Physical Properties: *Cleavage:* Good on {001}; imperfect on {010}. *Fracture:* Uneven to conchoidal. *Tenacity:* Brittle. Hardness = 3–4 D(meas.) = 2.67–2.73 D(calc.) = 2.69

Optical Properties: Transparent to translucent. *Color:* Pale tan, pale pink, yellow, colorless, may be reddish brown from inclusions. *Streak:* White. *Luster:* Vitreous to waxy.

Optical Class: Biaxial (-). *Orientation:* $Y = b$; $X \wedge c = 6^\circ\text{--}20^\circ$. *Dispersion:* $r > v$, weak. $\alpha = 1.472\text{--}1.473$ $\beta = 1.562\text{--}1.564$ $\gamma = 1.569\text{--}1.570$ 2V(meas.) = $25^\circ\text{--}27^\circ$ 2V(calc.) = $27.5^\circ\text{--}30^\circ$

Cell Data: *Space Group:* $C2/c$ or Cc . $a = 8.012\text{--}8.043$ $b = 15.79\text{--}15.812$ $c = 7.019\text{--}7.030$ $\beta = 100.78^\circ\text{--}101.16(3)^\circ$ $Z = 4$

X-ray Powder Pattern: Mont Saint-Hilaire, Canada.

2.895 (100), 2.711 (90), 7.081 (80), 1.869 (75), 2.937 (70), 2.039 (70), 2.637 (60)

Chemistry:	(1)	(2)	(3)		(1)	(2)	(3)
CO ₂	[37.21]	36.85	37.92	MnO	6.83	8.63	
Y ₂ O ₃		1.06		MgO	0.01		
Gd ₂ O ₃		0.03		CaO	26.47	21.16	32.22
Dy ₂ O ₃		1.03		Na ₂ O	25.95	26.14	26.70
Er ₂ O ₃		0.06		F	5.65	5.20	5.46
Yb ₂ O ₃		0.08		–O = F ₂	2.38	2.19	2.30
FeO	0.52	1.20		Total	[100.26]	99.25	100.00

(1) Mont Saint-Hilaire, Canada; by electron microprobe, average of three analyses, total Fe as FeO, total Mn as MnO, CO₂ calculated from stoichiometry, confirmed by IR; corresponds to Na_{2.96}(Ca_{1.66}Mn_{0.34}Fe_{0.02})_{Σ=2.02}(CO₃)₃F_{1.06}. (2) Mt. Alluaiv, Kola Peninsula, Russia; by electron microprobe, total Fe as FeO, total Mn as MnO, corresponds to Na_{3.08}(Ca_{1.36}Mn_{0.44}Fe_{0.06}Y_{0.03}Dy_{0.02})_{Σ=1.91}(CO₃)_{3.02}F_{0.99}. (3) Na₃Ca₂(CO₃)₃F.

Occurrence: In a sodalite xenolith in an intrusive alkalic gabbro-syenite complex (Mont Saint-Hilaire, Canada); in a differentiated alkalic massif (Lovozero massif, Kola Peninsula, Russia).

Association: Kupletskite, villiaumite, aegirine, microcline, cancrinite, analcime, shortite, vuonnemite, cryolite, kogarkoite (Mont Saint-Hilaire, Canada); manganotychite, mineevite, nahcolite, trona, pirssonite, sidorenkite, rhodochrosite (Lovozero massif, Kola Peninsula, Russia).

Distribution: From Mont Saint-Hilaire, Quebec, Canada. On Mt. Alluaiv, Lovozero massif, Kola Peninsula, Russia.

Name: For Rouville Co., within which the Mont Saint-Hilaire, Canada, locality is located.

Type Material: Canadian Museum of Nature, Ottawa, 54542; Royal Ontario Museum, Toronto, Canada, M44157, M44233.

References: (1) McDonald, A.M., G.Y. Chao, and R.A. Ramik (1991) Rouvilleite, a new sodium calcium fluorocarbonate mineral from Mont Saint-Hilaire, Quebec. *Can. Mineral.*, 29, 107–111. (2) (1991) *Amer. Mineral.*, 76, 2023 (abs. ref. 1). (3) Khomyakov, A.P., L.I. Polezhaeva, D.L. Rogachev, N.A. Yamnova, and D.Y. Pushcharovskiy (1991) A new natural fluorocarbonate, Na₃Ca(Mn, Ca)(CO₃)₃F, from the Lovozero alkaline massif. *Vestnik Moscow University, Series 4, Geology*, 1, 85–88 (in Russian). (4) Yamnova, N.A., D.Y. Pushcharovskiy, A.P. Khomyakov, and S.V. Vyatkin (1991) Crystal structure of a new natural fluorocarbonate, Na₃Ca(Mn, Ca)(CO₃)₃F. *Kristallografiya (Sov. Phys. Crystal.)*, 36, 30–33.

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