

Gaidonnayite

Na₂ZrSi₃O₉•2H₂O

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Crystal Data: Orthorhombic. *Point Group:* *mm*2. Crystals well-formed, slightly bladed, flattened on {010}, and elongated and heavily striated along [100], to 6 mm. *Twinning:* Common about [012] with irregular composition plane.

Physical Properties: *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = ~5
D(meas.) = 2.67(1) D(calc.) = 2.70 Commonly fluoresces bright green fluorescence under SW and LW UV.

Optical Properties: Transparent to opaque. *Color:* Colorless, white, beige, light brown, pale yellowish green. *Streak:* White. *Luster:* Vitreous.

Optical Class: Biaxial (+). *Orientation:* X = a; Y = b; Z = c. $\alpha = 1.573\text{--}1.575$
 $\beta = 1.590\text{--}1.592$ $\gamma = 1.599\text{--}1.605$ $2V(\text{meas.}) = 53^\circ\text{--}59^\circ$ $2V(\text{calc.}) = 55^\circ\text{--}62^\circ$

Cell Data: *Space Group:* *P*2₁*nb*. a = 11.740(3) b = 12.820(3) c = 6.691(1) Z = 4

X-ray Powder Pattern: Mont Saint-Hilaire, Canada; very similar to georgechaoite.
3.124 (100), 5.93 (80), 5.84 (80), 3.094 (80), 5.63 (50), 2.931 (40), 1.637 (40)

Chemistry:

	(1)	(2)
SiO ₂	42.51	42.5
TiO ₂	0.42	0.5
ZrO ₂	30.21	27.7
Nb ₂ O ₅	3.00	1.4
CaO		0.6
Na ₂ O	13.11	8.7
K ₂ O	2.20	6.4
H ₂ O	9.25	[12.2]
Total	100.70	[100.0]

(1) Mont Saint-Hilaire, Canada, by electron microprobe, H₂O by TGA; corresponding to (Na_{1.72}K_{0.19})_{Σ=1.91}Zr_{1.00}Nb_{0.09}Ti_{0.02}Si_{2.88}O₉•2.10H₂O. (2) Narssârssuk, Greenland; by electron microprobe, H₂O by difference; corresponding to (Na_{1.19}K_{0.58}Ca_{0.05})_{Σ=1.82}Zr_{0.95}Nb_{0.04}Ti_{0.03}Si_{3.00}O₉•nH₂O.

Polymorphism & Series: Dimorphous with catapleiite.

Occurrence: In miarolitic cavities in nepheline syenite and altered pegmatite dikes in an intrusive alkalic gabbro-syenite complex (Mont Saint-Hilaire, Canada); in augite syenite (Narssârssuk, Greenland).

Association: Siderite, analcime, hilairite, aegirine, calcite, albite, catapleiite, zircon, pyrochlore, ancylite, burbankite (Mont Saint-Hilaire, Canada); vlasovite, gittinsite, apophyllite (Kipawa River, Canada); natrolite, aegirine, albite, siderite (Narssârssuk, Greenland).

Distribution: In Canada, from Mont Saint-Hilaire, near Saint-Amable, and in the Sheffield Lake complex, Kipawa River, Villedieu Township, Quebec. From Granite Mountain, near Little Rock, Pulaski Co., Arkansas, USA. In Greenland, at Narssârssuk. From the Lovozero and Khibiny massifs, Kola Peninsula, Russia. At Poços de Caldas, Minas Gerais, Brazil.

Name: For Professor Gabrielle Donnay (1920–1987), mineralogist of McGill University, Montreal, Quebec, Canada.

Type Material: Canadian Museum of Nature, Ottawa, T73/2-1, T73/2-2; Royal Ontario Museum, Toronto, Canada, 34803.

References: (1) Chao, G.Y. and D.H. Watkinson (1974) Gaidonnayite, Na₂ZrSi₃O₉•2H₂O, a new mineral from Mont St. Hilaire, Quebec. *Can. Mineral.*, 12, 316–319. (2) Mandarino, J.A. and B.D. Sturman (1978) The identity of α -catapleiite and gaidonnayite. *Can. Mineral.*, 16, 195–198. (3) Chao, G.Y. (1985) The crystal structure of gaidonnayite Na₂ZrSi₃O₉•2H₂O. *Can. Mineral.*, 23, 11–15.

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