Frolovite

\( \text{CaB}_2(\text{OH})_8 \)

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Crystal Data: Triclinic. Point Group: \( \text{T} \). As veinlets and dense aggregates of grains, to 0.15 mm.

Physical Properties: Tenacity: Brittle. Hardness = 3.5 VHN = 151–181, 168 average (25 g load). \( \text{D}(\text{meas.}) = 2.14–2.22 \) \( \text{D}(\text{calc.}) = 2.259 \) Violet cathodoluminescence.


Optical Class: Biaxial (+). \( \alpha = 1.572 \) \( \beta = 1.573 \) \( \gamma = 1.586 \) \( 2\nu(\text{meas.}) = \sim 75^\circ \)

Cell Data: Space Group: \( \text{P} \). \( a = 7.774(2) \) \( b = 5.680(1) \) \( c = 8.136(2) \) \( \alpha = 113.15(1)^\circ \) \( \beta = 101.67(2)^\circ \) \( \gamma = 107.87(2)^\circ \) \( Z = 2 \)

X-ray Powder Pattern: Novofrolovskoye deposit, Russia. 6.08 (10), 3.858 (9), 3.471 (8), 2.357 (8), 2.522 (7), 2.330 (7), 2.65 (6)

Chemistry:

\[
\begin{array}{ccc}
\text{SO}_3 & 1.78 & (1) \\
\text{SiO}_2 & 0.57 & (2) \\
\text{B}_2\text{O}_3 & 34.20 & 35.20 \\
\text{Fe}_2\text{O}_3 & 0.10 & (3) \\
\text{MgO} & 0.72 & \\
\text{CaO} & 28.70 & 27.67 \\
\text{H}_2\text{O}^+ & 35.57 & \\
\text{H}_2\text{O}^- & 2.06 & \\
\text{H}_2\text{O} & 32.96 & 36.44 \\
\hline
\text{Total} & 99.03 & 100.00 \\
\end{array}
\]

(1) Novofrolovskoye deposit, Russia; estimated gypsum 3% impurity. (2) Fuka, Japan; corresponds to \( \text{Ca}_{1.06}\text{B}_{2.01}(\text{OH})_{8.03} \). (3) \( \text{CaB}_2(\text{OH})_8 \).

Occurrence: A rare alteration product of hydrothermal boron minerals in skarn deposits.

Association: Calciborite, calcite, gypsum, garnet, magnetite (Novofrolovskoye deposit, Russia); olshanskyite, parasibirskite, sibirskite, takedaite, pentahydroborite, nifontovite, calcite (Fuka, Japan).

Distribution: In Russia, from the Novofrolovskoye copper deposit, near Krasnoturinsk, Turinsk district, Northern Ural Mountains, and in the Solongo boron deposit, Buryatia. At the Sayak-IV boron deposit, northeast Balkhash region, Kazakhstan. From Fuka, near Bicchu, Okayama Prefecture, Japan.

Name: For the first-noted occurrence in the NovoFROLOVskoye deposit, Russia.

Type Material: Institute of Mining-Chemical Stock, Moscow, Russia, 1317a.


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