Galuskinite $Ca_7(SiO_4)_3(CO_3)$

Crystal Data: Monoclinic. *Point Group:* 2/*m*. As veins of highly fractured grains, to 0.5 mm. Simple and polysynthetic twinning on (001).

Physical Properties: *Cleavage:* {001}, {100}, {010}; imperfect. *Parting:* Perfect on (001). *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = ~5 VHN = 440 (20 g. load). D(meas.) = n.d. D(calc.) = 3.096

Optical Properties: Transparent. *Color:* Colorless, white, pale gray. *Streak:* White. *Luster:* Vitreous.
Optical Class: Biaxial (–). $\alpha = 1.660(3)$ $\beta = 1.669(3)$ $\gamma = 1.676(3)$ 2V(meas.) = 60(5)° 2V(calc.) = 82.4° *Orientation:* $X \parallel b$, $Z \wedge a \approx 25°$, $Y \wedge c \approx 25°$ or $X \parallel b$, $Z \wedge c \approx 25°$, $Y \wedge a \approx 25°$.

Cell Data: *Space Group:* $P2_1/c$. $a = 18.7872(5)$ $b = 6.7244(2)$ $c = 10.4673(2)$ $\beta = 90.788(10)°$ $Z = 4$

X-ray Powder Pattern: Birkhin complex, Baikal area, Eastern Siberia, Russia.
2.7032 (100), 2.6706 (100), 2.7338 (98), 2.7030 (85), 2.6166 (82), 2.7141 (78), 3.0323 (59)

Chemistry:

	(1)	(2)
Na_2O	0.43	
CaO	62.61	63.63
SiO_2	28.85	29.22
P_2O_5	0.20	
SO_3	0.05	
CO_2	7.08	7.14
Total	99.22	100.00

(1) Birkhin complex, Baikal area, Eastern Siberia, Russia; electron microprobe analysis, CO_2 from structure analysis, Raman spectroscopy confirmed the presence of CO_3^{2-}, corresponding to $(Ca_{6.936}Na_{0.086})_{\Sigma=7.022}(Si_{2.983}P_{0.018}S_{0.004})_{\Sigma=3.005}O_{12}(CO_3)$. (2) $Ca_7(SiO_4)_3(CO_3)$.

Occurrence: A retrograde product of skarn alteration found in sanidinite facies contact-metamorphosed silicate carbonate xenoliths intruded by gabbroid rocks (Birkhin complex).

Association: Pavlovskyite, dellaite, larnite, bredigite, gehlenite, cuspidine, hydroxylellestadite.

Distribution: At the Birkhin complex, Baikal area, Olkhon region, Eastern Siberia, Russia.

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Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia; 4050/1 and the Natural History Museum, Bern, Switzerland; NMBE-40811.

References: (1) Lazic, B., T. Armbruster, V.B. Savelyeva, A.E. Zadov, N.N. Pertsev, and P. Dzierżanowski (2011) Galuskinite, $Ca_7(SiO_4)_3(CO_3)$, a new skarn mineral from the Birkhin gabbro massif, Eastern Siberia, Russia. Mineral. Mag., 75(5), 2631-2648. (2) (2013) Amer. Mineral., 98, 1631 (abs. ref. 1).