Dovyrenite $Ca_6Zr(Si_2O_7)_2(OH)_4$

Crystal Data: Orthorhombic. *Point Group*: 2/*m* 2/*m* 2/*m*. Prismatic crystals (< 300 μm), flattened along [100], elongated along [001] with an orthorhombic cross-section display {100}, {140} and {081}? . As stellate growths, as reaction rims (< 200-250 μm). As pseudomorphs after calzirtite.

Physical Properties: *Cleavage*: Perfect on (010); imperfect on (100), (001) and (140).
Fracture: Even, uneven or stepped. *Tenacity*: Brittle. Hardness = 3-4
VHN = anisotropic, 103-114, 108 average; 156-174, 165 average (10 g load).
D(meas.) = n.d. D(calc.) = 3.034 Soluble in dilute HCl; insoluble in water.

Optical Properties: Transparent. *Color*: Colorless, white (aggregates). *Streak*: White.
Luster: Vitreous.
Optical Class: Biaxial (+). α = 1.659(2) β = 1.660(2) γ = 1.676(2) 2V(meas.) = 30(5)°
2V(calc.) = 28° *Orientation*: *a* = *Z*, *b* = *X*, *c* = *Y*.

Cell Data: *Space Group*: *Pnnm.* *a* = 5.666(16) *b* = 18.844(5) *c* = 3.728(11) Z = 1

X-ray Powder Pattern: Calculated pattern.
3.0727 (100), 5.4620 (63), 2.9570 (56), 3.1406 (39), 2.7468 (36), 1.8640 (33), 1.8786 (26)

Chemistry:

	(1)	(2)		(1)	(2)
ZrO_2	16.47	16.74	FeO	0.25	
SiO_2	32.83	32.65	MgO	0.13	
TiO_2	0.14		MnO	0.02	
HfO_2	0.16		Nb_2O_5	0.03	
Cr_2O_3	0.01		H_2O	[5.47]	4.90
CaO	43.87	45.71	Total	99.38	100.00

(1) Dovyren massif, 60 km north of Baikal Lake, Northern Baikal region, Buryatia, Russia; average of 24 electron microprobe analyses supplemented by FTIR and Raman spectroscopy, H_2O calculated by difference and confirmed by crystal structure analysis; corresponds to $(Ca_{5.73}Fe_{0.03}Mg_{0.02})_{\Sigma=5.78}(Zr_{0.98}Hf_{0.01}Ti_{0.01})_{\Sigma=1.00}Si_4(O_{13.56}OH_{0.44})_{\Sigma=14.00}(OH)_4$. (2) $Ca_6Zr[Si_2O_7]_2(OH)_4$.

Occurrence: An alteration product of Zr-bearing and zirconium minerals in veins of vesuvianite-foshagite skarn in carbonate xenoliths in a subvolcanic layered gabbro-peridotite massif.

Association: Fassaitic pyroxene, perovskite, hydrogarnets, monticellite, vesuvianite, diopside, foshagite, brucite, calzirtite, tazheranite, baghdadite, apatite, calcite, native bismuth, sphalerite, selenian galena, clausthalite, safflorite, rammelsbergite, pyrrhotite, pentlandite, valleriite, laitakarite, nickeline, nickel-skutterudite.

Distribution: From the north-east flank of the Dovyren (Yoko-Dovyren) layered gabbro-peridotite massif, 60 km north of Baikal Lake, Northern Baikal region, Buryatia, Russia.

Name: After the name of the locality *Dovyren* Bald Mountain, Russia.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (3545).

References: (1) Galuskin, E.V., N.N. Pertsev, T. Armbruster, M.K. Kadiyski, A.E. Zadov, I.O. Galuskina, P. Dzierżanowski, R. Wrzalik, and E.B. Kislov, (2007) Dovyrenite, $Ca_6ZrSi_4O_{14}(OH)_4$ - a new mineral from skarned carbonate xenoliths in basic-ultrabasic rocks of the Dovyren massif, Northern Baikal region, Russia. Mineralogia Polonica, 31, 1-21. (2) Kadiyski, M., T. Armbruster, E.V. Galuskin, N.N. Pertsev, A.E. Zadov, I.O. Galuskina, R. Wrzalik, P. Dzierzanowski, and E.V. Kislov (2008) The modular structure of dovyrenite, $Ca_6Zr[Si_2O_7]_2(OH)_4$: Alternate stacking of tobermorite and rosenbuschite-like units. Amer. Mineral., 93, 456-462.