

Crystal Data: Monoclinic. *Point Group:* 2/m. As tabular crystals flattened on (100), elongated along [001], to 2.5 mm. *Twinning:* Observed on (100).

Physical Properties: *Cleavage:* Perfect on (100). *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = ~4.5 VHN = 365-445, 410 average (40 g load). D(meas.) = 2.78 (2) D(calc.) = 2.77 Nonfluorescent.

Optical Properties: Transparent to translucent. *Color:* Colorless to white. *Streak:* White. *Luster:* Vitreous.

Optical Class: Biaxial (-). $\alpha = 1.570(2)$ $\beta = 1.588(2)$ $\gamma = 1.594(2)$ $2V(\text{meas.}) = 60(5)^\circ$ $2V(\text{calc.}) = 59.4^\circ$ *Orientation:* $Y = b$, $c \wedge Z = 3^\circ$; positive elongation.

Pleochroism: $Y = Z =$ colorless, $X =$ greenish gray.

Cell Data: *Space Group:* $P2_1/c$. $a = 9.144(4)$ $b = 8.818(3)$ $c = 7.537(3)$ $\beta = 113.22(3)^\circ$ $Z = 2$

X-ray Powder Pattern: Vuoriyarvi alkali-ultrabasic massif, Murmansk Region, Russia. 8.40 (10), 5.38 (9), 3.401 (9), 2.902 (9), 2.691 (9), 4.00 (8), 2.772 (7)

Chemistry:	(1)		(1)
Na ₂ O	13.72	TiO ₂	0.35
CaO	0.15	ZrO ₂	20.41
MnO	<0.02	SnO ₂	5.73
FeO	<0.02	HfO ₂	0.60
Y ₂ O ₃	<0.1	Nb ₂ O ₅	<0.05
SiO ₂	52.71	<u>H₂O</u>	<u>[7.86]</u>
		Total	101.53

(1) Vuoriyarvi alkali-ultrabasic massif, Murmansk Region, Russia; average electron microprobe analysis supplemented by IR spectroscopy, H₂O calculated from stoichiometry; corresponds to (Na_{2.03}Ca_{0.01})(Zr_{0.76}Sn_{0.17}Ti_{0.02}Hf_{0.01})Si_{4.02}O₁₁·2H₂O.

Occurrence: As a lens-like segregation in a core sample from a bore hole, which crosscuts veined dolomite-calcite carbonatites occurring in pyroxenites. Formed by hydrothermal alteration of carbonatite.

Association: Calcite, dolomite, a mineral of the serpentine group, pyrite.

Distribution: From the Vuoriyarvi alkali-ultrabasic massif, Murmansk region, Russia [TL].

Name: For the *Tumcha* river near the Vuoriyarvi massif.

Type Material: Gorniy Museum, St. Petersburg Mining Institute (Technical University), St. Petersburg, Russia (3123).

References: (1) Subbotin, V.V., S. Merlino, D.YU. Pushcharovsky, Y.A. Pakhomovsky, O. Ferro, A.N. Bogdanova, A.V. Voloshin, N.V. Sorokhtina, and N.V. Zubkova (2000) Tumchaite Na₂(Zr,Sn)Si₄O₁₁·2H₂O - A new mineral from carbonatites of the Vuoriyarvi alkali-ultrabasic massif, Murmansk Region, Russia. *Amer. Mineral.*, 85, 1516-1520.