

Tsepinite-Ca**(Ca, K, Na)_{2-x}(Ti, Nb)₂(Si₄O₁₂)(OH, O)₂·4H₂O**

Crystal Data: Monoclinic. *Point Group:* 2/m. As prismatic to acicular, poorly terminated crystals, to 5 mm; commonly in open-work aggregates or sheaf-like clusters to 1 cm or 6 mm, respectively.

Physical Properties: *Cleavage:* None. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 5
D(meas.) = 2.73 D(calc.) = 2.72

Optical Properties: Transparent. *Color:* Colorless to white and pale brown. *Streak:* White.
Luster: Vitreous.

Optical Class: Biaxial (+). $\alpha = 1.666(2)$ $\beta = 1.676(2)$ $\gamma = 1.780(4)$ $2V(\text{meas.}) = 30(10)^\circ$
 $2V(\text{calc.}) = 36^\circ$ *Dispersion:* Weak, $r < v$. *Orientation:* $b = Y$.

Cell Data: *Space Group:* C2/m. $a = 14.484(4)$ $b = 14.191(4)$ $c = 7.907(2)$ $\beta = 117.26(2)^\circ$ $Z = 4$

X-ray Powder Pattern: Lovchorrite mine, Mt. Yukspor, Khibiny massif, Kola Peninsula, Russia.
3.16 (100), 2.51 (85), 7.02 (60), 1.718 (50), 3.53 (45), 2.62 (45), 6.38 (40)

Chemistry:	(1)
Na ₂ O	1.32
K ₂ O	2.23
CaO	5.29
SrO	3.01
BaO	3.52
MnO	0.16
FeO	0.04
ZnO	0.12
Al ₂ O ₃	0.04
SiO ₂	41.06
TiO ₂	21.95
Nb ₂ O ₅	9.08
<u>H₂O</u>	<u>13.30</u>
Total	101.12

(1) Lovchorrite mine, Mt. Yukspor, Khibiny massif, Kola Peninsula, Russia; average of 10 electron microprobe analyses, H₂O by TGA; corresponding to (Ca_{1.12}K_{0.56}Na_{0.51}Sr_{0.34}Ba_{0.27}Mn_{0.03}Zn_{0.02}Fe_{0.01}) $\Sigma=2.86$ (Ti_{3.21}Nb_{0.80}) $\Sigma=4.01$ (Si_{8.14}Al_{0.01}) $\Sigma=8.15$ O_{24.42}[(OH)_{2.45}O_{1.55}] $\Sigma=4.00$ ·7.57H₂O.

Mineral Group: Labuntsovite group, vuoriyarvite subgroup.

Occurrence: In cavities formed by hydrothermal leaching of rinkite in a pegmatite that cuts nepheline syenite.

Association: Microcline, aegirine, natrolite, kentbrooksitite, kupletskite, Mn-rich lamprophyllite, fluorapatite, catapleiite, ancylite-(Ce), ancylite-(La), fluorapophyllite, leucophanite, chabazite-Ca.

Distribution: From the Lovchorrite mine, HackmanValley, Mount Yukspor, Khibiny alkaline massif, Kola Peninsula, Russia.

Name: Suffix indicates the Ca-dominant analog of *tsepinite*-Na and *tsepinite*-K.

Type Material: A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia.

References: (1) Pekov, I.V., N.V. Chukanov, G. Ferraris, A. Gula, D.Yu. Pushcharovsky, and A.E. Zadov (2003) Tsepinite-Ca, (Ca,K,Na, \square)₂(Ti,Nb)₂(Si₄O₁₂)(OH,O)₂·4H₂O, a new mineral of the labuntsovite group from the Khibiny alkaline massif, Kola Peninsula - Novel disordered sites in the vuoriyarvite-type structure. Neues Jahrb. Mineral. Mon., 461-480. (2) (2004) Amer. Mineral., 89(5-6), 895 (abs. ref. 1). (3) Chukanov, N.V., I.V. Pekov, and A.P. Khomyakov (2002) Recommended nomenclature for labuntsovite group minerals. Eur. J. Mineral., 14, 165-173.