

## **Tsepinite-Na**      **(Na, H<sub>3</sub>O, K, Sr, Ba, □)<sub>2</sub>(Ti, Nb)<sub>2</sub>(Si<sub>4</sub>O<sub>12</sub>)(OH, O)<sub>2</sub>·3H<sub>2</sub>O**

**Crystal Data:** Monoclinic. *Point Group:* *m*. In radial aggregates; as prismatic crystals to 1, showing {001}, {010}, {100}, and  $\bar{2}01$ , with some modified by {012} and  $\bar{2}41$ .

**Physical Properties:** *Cleavage:* None. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 5  
D(meas.) = 2.74(2)    D(calc.) = 2.72(1)

**Optical Properties:** Transparent to translucent. *Color:* Colorless to white and pale brown.  
*Streak:* White. *Luster:* Vitreous.  
*Optical Class:* Biaxial (+).  $\alpha = 1.655(2)$ - $1.658(1)$   $\beta = 1.661(2)$ - $1.668(1)$   $\gamma = 1.770(5)$   
2V(meas.) = 19°-31°    Nonpleochroic.

**Cell Data:** *Space Group:* *Cm*.  $a = 14.604(7)$   $b = 14.274(8)$   $c = 7.933(2)$   $\beta = 117.40(3)^\circ$   $Z = 4$

**X-ray Powder Pattern:** Mt. Khibinpakhchorr, Khibiny complex, Kola Peninsula, Russia.  
7.09 (100), 3.24 (90), 3.15 (80), 2.54 (70), 4.98 (60), 2.63 (60), 2.06 (60)

<b>Chemistry:</b>	(1)
Na <sub>2</sub> O	5.48
K <sub>2</sub> O	1.58
BaO	2.60
CaO	0.18
SrO	2.32
ZnO	0.04
Fe <sub>2</sub> O <sub>3</sub>	0.25
SiO <sub>2</sub>	40.38
TiO <sub>2</sub>	14.17
Nb <sub>2</sub> O <sub>5</sub>	20.69
<u>H<sub>2</sub>O</u>	<u>13.18</u>
Total	100.87

(1) Mt. Khibinpakhchorr, Khibiny complex, Kola Peninsula, Russia; average electron microprobe analysis supplemented by IR spectroscopy, H<sub>2</sub>O by TGA; corresponds to (Na<sub>4.21</sub>K<sub>0.80</sub>Sr<sub>0.54</sub>Ba<sub>0.41</sub>Ca<sub>0.08</sub>Zn<sub>0.01</sub>) $\Sigma=6.05$ (Ti<sub>4.22</sub>Nb<sub>3.71</sub>Fe<sup>3+</sup><sub>0.07</sub>) $\Sigma=8.00$ Si<sub>16</sub>O<sub>70.78</sub>H<sub>34.83</sub>.

**Mineral Group:** Labuntsovite group, vuoriyarvite subgroup.

**Occurrence:** In cavities formed by hydrothermal alteration of alkaline pegmatite.

**Association:** Microcline, aegirine, analcime, natrolite, catapleiite, apophyllite, labuntsovite-Mn (Mt. Khibinpakhchorr); microcline, aegirine, magnesio-arfvedsonite, natrolite, eudialyte, lamprophyllite, neptunite, polyolithionite (Mt. Lepkhe-Nelm).

**Distribution:** From Mt. Khibinpakhchorr, Khibiny alkaline complex, and Mt. Lepkhe-Nelm, Lovozero massif, Kola Peninsula, Russia.

**Name:** Honors Russian microprobe analyst Anatolij I. Tsepin (b. 1946) and the suffix indicates the Na-dominant analog of *tsepinite-K* and *tsepinite-Ca*.

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

**References:** (1) Shlyukova, Z.V., N.V. Chukanov, I.V. Pekov, R.K. Rastsvetaeva, N.I. Organova, and A.E. Zadov (2001) Tsepinite-Na (Na,H<sub>3</sub>O,K,Sr,Ba)<sub>2</sub>(Ti,Nb)<sub>2</sub>[Si<sub>4</sub>O<sub>12</sub>](OH,O)<sub>2</sub>·3H<sub>2</sub>O, a new mineral of the labuntsovite group. *Zapiski VMO*, (Proc. Russ. Miner. Soc.), 130(3), 43-50 (in Russ.) (2) (2002) *Amer. Mineral.*, 87, 1734 (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.