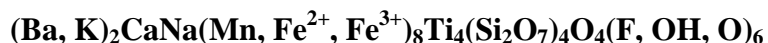


Surkhobite

Crystal Data: Monoclinic. *Point Group:* 2. As poorly formed platy crystals, to 1 mm, dominated by {001} and as grains, to 2 cm. *Twinning:* Microscopic twins on (001).

Physical Properties: *Cleavage:* Perfect {001}. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 4.5 VHN = 482 on {001}, 250 perpendicular to {001} (20-30 g load). D(meas.) = 3.84(10) D(calc.) = 3.98

Optical Properties: Translucent. *Color:* Brownish red. *Streak:* White. *Luster:* Vitreous. *Optical Class:* Biaxial (-). $\alpha = 1.790$ (calculated from 2V) $\beta = 1.858(10)$ $\gamma = 1.888(10)$ $2V = 65(5)^\circ$ *Orientation:* $X = b$; $Z \wedge a = 34^\circ$. *Dispersion:* $r < v$, strong. *Pleochroism:* $Y = \text{orange}$; $Z = \text{bright yellow}$; $X = \text{yellow}$. Absorption: $Y > Z \geq X$.

Cell Data: *Space Group:* C2. $a = 10.723(1)$ $b = 13.826(2)$ $c = 20.791(4)$ $\beta = 95.00(1)^\circ$ $Z = 4$

X-ray Powder Pattern: Dara-i-Pioz massif, Tajikistan. 3.454 (100), 2.592 (70), 2.074 (40), 10.39 (20), 3.186 (15), 2.862 (15), 1.728 (15)

| Chemistry: | (1) |
|--------------------------------|-------|
| Na ₂ O | 2.27 |
| K ₂ O | 1.87 |
| CaO | 2.53 |
| SrO | 0.26 |
| BaO | 11.16 |
| MgO | 0.13 |
| MnO | 16.32 |
| FeO | 13.92 |
| Fe ₂ O ₃ | 2.11 |
| Al ₂ O ₃ | 0.02 |
| SiO ₂ | 27.17 |
| TiO ₂ | 16.14 |
| Nb ₂ O ₅ | 2.14 |
| ZrO ₂ | 0.34 |
| F | 2.94 |
| H ₂ O | 1.17 |
| -O = F ₂ | 1.24 |
| Total | 99.25 |

(1) Dara-i-Pioz massif, Tajikistan; electron microprobe and Mössbauer analysis, water by Penfield method, corresponding to Na_{2.60}K_{1.41}Ca_{1.60}Sr_{0.09}Ba_{2.58}(Mn_{8.17}Fe²⁺_{6.88}Fe³⁺_{0.94}Mg_{0.115}Al_{0.01})_{Σ=16.115}(Ti_{17.17}Nb_{0.57}Zr_{0.10})_{Σ=7.84}Si_{16.06}H_{4.61}F_{5.49}O_{70.51}.

Occurrence: In a zoned alkaline syenite pegmatite replacing astrophyllite and bafertisite.

Association: Aegirine, microcline, albite, quartz, amphibole, annite, bafertisite, astrophyllite, zircon, fluorite, polyolithionite, stillwellite, sogdianite, tadjikite.

Distribution: Dara-i-Pioz massif, central Tajikistan.

Name: For the Surkhob river, in the basin of which the first specimens were collected.

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

References: (1) Rastsvetaeva, R.K., E.M. Eskova, V. D. Dusmatov, N.V. Chukanov, and F. Schneider (2008) Surkhobite: revalidation and redefinition with the new formula, (Ba,K)₂CaNa(Mn,Fe²⁺,Fe³⁺)₈Ti₄(Si₂O₇)₄O₄(F,OH,O)₆. Eur. J. Mineral., 20, 289–295. (2) (2009) Amer. Mineral., 94, 404 (abs. ref. 1). (3) (2004) Amer. Mineral., 89, 469–470.