

# Baratovite

# $\text{KLi}_3\text{Ca}_7(\text{Ti, Zr})_2\text{Si}_{12}\text{O}_{36}\text{F}_2$

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**Crystal Data:** Monoclinic. *Point Group:*  $2/m$  or  $m$ . As platy deposits, to 5 cm; in patchy granular aggregates. *Twinning:* On  $\{001\}$ , common.

**Physical Properties:** *Cleavage:* Perfect on  $\{001\}$ . *Tenacity:* Brittle. Hardness = 3.5–4 D(meas.) = 2.92 D(calc.) = 2.91 Brilliant bluish white fluorescence under SW UV.

**Optical Properties:** Transparent to translucent. *Color:* White. *Luster:* Vitreous, pearly in part.

*Optical Class:* Biaxial (+). *Orientation:*  $X \wedge \perp \{001\} \simeq 50^\circ$ . *Dispersion:*  $r > v$ , strong.  $\alpha = 1.670$   $\beta = 1.670\text{--}1.671$   $\gamma = 1.673\text{--}1.677$   $2V(\text{meas.}) = 32^\circ\text{--}60^\circ$

**Cell Data:** *Space Group:*  $C2/c$  or  $Cc$ .  $a = 16.941(3)$   $b = 9.746(2)$   $c = 20.907(3)$   $\beta = 112.50(10)^\circ$   $Z = 4$

**X-ray Powder Pattern:** Dara-i-Pioz massif, Tajikistan.

3.22 (100), 2.41 (20), 1.92 (17), 3.02 (5), 3.54 (4), 1.60 (4), 1.49 (4)

| Chemistry:                     | (1)   | (2)   |                     | (1)    | (2)   |
|--------------------------------|-------|-------|---------------------|--------|-------|
| SiO <sub>2</sub>               | 50.46 | 52.31 | Li <sub>2</sub> O   | 2.05   | 3.25  |
| TiO <sub>2</sub>               | 9.55  | 10.99 | Na <sub>2</sub> O   | 0.70   | 0.22  |
| ZrO <sub>2</sub>               | 2.28  |       | K <sub>2</sub> O    | 2.96   | 2.89  |
| Fe <sub>2</sub> O <sub>3</sub> | 0.50  | 0.29  | F                   | 1.05   | 0.34  |
| Nb <sub>2</sub> O <sub>5</sub> | 0.72  |       | H <sub>2</sub> O    |        | 1.21  |
| MnO                            | 0.12  | 0.22  | −O = F <sub>2</sub> | 0.44   | 0.14  |
| CaO                            | 30.36 | 28.25 | Total               | 100.31 | 99.83 |

(1) Dara-i-Pioz massif, Tajikistan; corresponds to  $(\text{K}_{0.90}\text{Na}_{0.28})_{\Sigma=1.18}\text{Li}_{1.96}\text{Ca}_{7.75}(\text{Ti}_{1.71}\text{Zr}_{0.26})_{\Sigma=1.97}\text{Si}_{12}\text{O}_{37.00}\text{F}_{0.79}$ . (2) Iwagi Islet, Japan; by electron microprobe, Li by flame photometry,  $\text{H}_2\text{O}$  by gravimetry, and F by specific ion electrode; corresponding to  $(\text{K}_{0.85}\text{Na}_{0.10})_{\Sigma=0.95}\text{Li}_{3.00}(\text{Ca}_{6.94}\text{Mn}_{0.04})_{\Sigma=6.98}(\text{Ti}_{1.90}\text{Fe}_{0.05}^{3+})_{\Sigma=1.95}\text{Si}_{12}\text{O}_{35.78}[(\text{OH})_{1.85}\text{F}_{0.25}]_{\Sigma=2.10}$ .

**Occurrence:** An accessory mineral in quartz-albite-aegirine veinlets and in albitites in syenites (Dara-i-Pioz massif, Tajikistan); a fine-grained accessory mineral in a small aegirine syenite stock in coarse-grained biotite granite (Iwagi Islet, Japan).

**Association:** Miserite, ekanite, titanite, quartz, albite, aegirine (Dara-i-Pioz massif, Tajikistan); albite, aegirine, pectolite, sugilite, allanite, titanite, andradite, zircon, apatite (Iwagi Islet, Japan).

**Distribution:** From the Dara-i-Pioz massif, Alai Range, Tien Shan, Tajikistan. On Iwagi Islet, Ehime Prefecture, Japan.

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**Type Material:** Mineralogical Museum, University of St. Petersburg, St. Petersburg, 16250–16252; Institute of Mineralogy and Geochemistry of Rare Elements, Moscow; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 76077, 77839, vis5062.

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