Tadzhikite-(Y) \[ \text{Ca}_3(\text{Y}, \text{Ce})_2(\text{Ti, Al, Fe}^{3+})_3\text{B}_4\text{Si}_4\text{O}_{22} \]

Crystal Data: Monoclinic. Point Group: 2/m. As prismatic crystals, flattened on \{010\}, to several cm; in spherulites of curved flakes. Twinning: Polysynthetic Albite twinning at a fine scale visible under the microscope.

Physical Properties: Cleavage: Parting on \{010\}. Hardness = 6 D(meas.) = 3.73–3.86 D(calc.) = 3.77


Optical Class: Biaxial (-). Orientation: Z \wedge a = 7^\circ; Z \wedge b = 4^\circ; Z \wedge c = 23^\circ–25^\circ. \alpha = 1.750–1.761 \beta = [1.767] \gamma = 1.763–1.772 2V(meas.) = 80^\circ–92^\circ

Cell Data: Space Group: \text{P}2_1/a. \text{a} = 18.946(4) \text{b} = 4.714(4) \text{c} = 10.302(2) \bar{\alpha} = 111.58(2)^\circ \text{Z} = 2

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

Crystal Structure: 2.65 (100), 1.913 (55), 4.96 (30), 2.94 (30), 1.665 (30), 2.86 (25), 2.19 (25)

Chemistry:

\[
\begin{array}{ccc}
\text{SiO}_2 & 24.70 & 23.35 \\
\text{TiO}_2 & 6.53 & 3.72 \\
\text{ThO}_2 & 0.50 & 0.50 \\
\text{B}_2\text{O}_3 & 12.70 & 14.47 \\
\text{Al}_2\text{O}_3 & 0.00 & 2.30 \\
\text{RE}_2\text{O}_3 & 39.87 & 39.87 \\
\text{Fe}_2\text{O}_3 & 1.32 & 3.12 \\
\text{Nb}_2\text{O}_5 & 0.75 & 0.00 \\
\end{array}
\]

(1) Dara-i-Pioz massif, Tajikistan; RE = Y 40.1%, La 2.3%, Ce 11.5%, Pr 3.1%, Nd 13.0%, Sm 6.3%, Eu 0.7%, Gd 9.0%, Tb 0.8%, Dy 6.4%, Ho 0.9%, Er 3.6%, Tm 0.7%, Yb 1.6%; corresponds to \text{Na}\text{Ca}_3\text{RE}_2\text{Ti}_9\text{Al}_0\text{Fe}^{3+}\text{Si}_4\text{B}_4\text{O}_{22}\text{O}_{2.54}\text{H}_2\text{O}_{0.54}.

(2) Do.; RE = Y 24.0Sm 3.8%, Gd 6.0%, Dy 6.6%, Ho 1.05%, Er 4.2%, Tm 0.22%, Yb 0.57%, Lu 0.09%; corresponds to \text{Ca}\text{RE}_2\text{Ti}_4\text{Al}_3\text{Si}_3\text{B}_4\text{O}_{22}\text{O}_{4.09}\text{H}_2\text{O}_{22}\text{H}_2\text{O}_{0.09}.

Occurrence: In the replacement units of zoned pegmatite dikes (Dara-i-Pioz massif, Tajikistan).

Association: Quartz, microcline, aegirine, ekanite, titanian, eudialyte, polyolithionite, arfvedsonite-riebeckite, pyrochlore, tienshanite, stillwellite.

Distribution: In the Dara-i-Pioz massif, Alai Range, Tien Shan, Tajikistan. From Tvedalen, Langesundsfjord, Norway. In the Cimini Hills, near Rome, Lazio, Italy. From Mont Saint-Hilaire, Quebec, Canada.

Name: For the occurrence in Tajikistan (Tadzhikistan), and its yttrium content.

Type Material: A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 73374, 74575, 74965, vis3328.


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