

Tadzhikite-(Y)**Ca₃(Y, Ce)₂(Ti, Al, Fe³⁺)B₄Si₄O₂₂**

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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 Properties: Translucent to opaque. *Color:* Pale, grayish brown, reddish to dark brown; colorless to dark brown in thin section. *Luster:* Vitreous.

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

Cell Data: *Space Group:* *P*2/*a*. $a = 18.946(4)$ $b = 4.714(4)$ $c = 10.302(2)$ $\beta = 111.58(2)^\circ$ $Z = 2$

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

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

Chemistry:	(1)	(2)	(1)	(2)
SiO ₂	24.70	23.35	FeO	0.00
TiO ₂	6.53	3.72	MnO	0.89
ThO ₂	0.50	0.50	BeO	0.20
B ₂ O ₃	12.70	14.47	MgO	0.42
Al ₂ O ₃	0.00	2.30	CaO	18.31
RE ₂ O ₃	32.43	34.07	SrO	0.04
Fe ₂ O ₃	1.32	3.12	Na ₂ O	1.17
Nb ₂ O ₅	0.75			
			Total	99.76
				100.23

(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 Na_{0.39}Ca_{3.36}RE_{2.23}(Ti_{0.98}Fe_{0.20}³⁺)_{Σ=1.18}B_{3.76}Si_{4.24}O_{22.54}. (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 Ca_{3.18}RE_{2.20}(Ti_{0.43}Fe_{0.37}³⁺Al_{0.31})_{Σ=1.11}B_{4.04}(Si_{3.80}Al_{0.20})_{Σ=4.00}O_{22.00}.

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

Association: Quartz, microcline, aegirine, ekanite, titanite, 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 Cimino 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.

References: (1) Efimov, A.F., V.D. Dusmatov, V.Y. Alkhazov, Z.G. Pudovkina, and M.Y. Kazakova (1970) Tadzhikite, a new borosilicate of the rare earths of the hellandite group. Doklady Acad. Nauk SSSR, 195, 1190–1193 (in Russian). (2) (1971) Amer. Mineral., 56, 1838–1839 (abs. ref. 1). (3) Chernitsova, N.M., Z.V. Pudovkina, and Y. Pyatenko (1982) Crystal structure of tadzhikite (Ca, TR)₄(Y, Fe, Al)(O, OH)₂[Si₄B₄O₂₂]. Doklady Acad. Nauk SSSR, 264, 342–344 (in Russian). (4) (1982) Chem. Abs., 97, 83068 (abs. ref. 3).

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