Shcherbakovite $K_2NaTi^{4+}{}_2O(OH)[Si_4O_{12}]$

Crystal Data: Orthorhombic. *Point Group*: 2/*m* 2/*m* 2/*m*. Crystals are long prismatic, to 6 cm; terminated crystals are uncommon.

Physical Properties: *Cleavage:* Two directions, observed microscopically, may be parting. *Tenacity:* Brittle. *Fracture:* Uneven. Hardness = 6.5 VHN = 731-845 D(meas.) = 2.968 D(calc.) = 3.194

Optical Properties: Opaque, translucent on thin edges. *Color:* Dark brown to blue-green. *Luster:* Vitreous, greasy on fracture surfaces.
Optical Class: Biaxial (-). *Pleochroism:* Distinct; *X* = pale yellow; *Y* = yellow; *Z* = brownish yellow. *Dispersion: r* < *v*, strong. *Absorption: Z* > *Y* ≥ *X*. α = 1.707 β = 1.745 γ = 1.776 2V(meas.) = 82°

Cell Data: Space Group: *Imma*. *a* = 8.1538(4) *b* = 10.5569(5) *c* = 13.9882(6) Z = 4

X-ray Powder Pattern: Wolgidee Hills, Western Australia; nearly identical to batisite. 2.911 (100), 3.201 (80), 3.399 (75), 2.634 (70), 2.191 (60), 2.102 (60), 1.680 (60)

Chemistry:

	(1)	(2)		(1)	(2)
SiO_2	40.61	40.57	MnO	0.04	
TiO_2	17.91	18.87	$(Nb,Ta)_2O_5$	10.44	10.49
ZrO_2	1.23		MgO	0.26	
Na_2O	5.82	5.59	CaO	0.82	0.20
K_2O	12.29	13.22	BaO	6.22	6.07
ZrO_2		0.84	H_2O		0.73
Al_2O_3	0.76		H_2O^+	0.54	
Fe_2O_3	1.80	1.05	H_2O^-	0.10	
FeO	0.47		Total	99.61	97.63

(1) Khibiny massif, Russia; corresponds to $(K_{1.23}Na_{1.10}Ba_{0.24}Ca_{0.08}Mg_{0.04})_{\Sigma=2.69}(Ti_{1.31}Nb_{0.44}Fe_{0.17}Zr_{0.06})_{\Sigma=1.98}Si_{3.96}[O_{13.6}(OH)_{0.4}]_{\Sigma=14.00}$. (2) Mount Rasvumchorr, Khibiny massif, Russia; electron microprobe analysis, H_2O from crystal structure analysis, Mn, Mg, Al, Ta, Sr, F, Cl not detected, corresponds to $(K_{0.66}Ba_{0.23}Na_{0.07}Ca_{0.02})_{\Sigma=0.98}K_{1.00}Na_{1.00}(Ti_{1.40}Nb_{0.47}Fe_{0.08}Zr_{0.04})_{\Sigma=1.99}(O_{1.52}OH_{0.48})_{\Sigma=2.00}[Si_4O_{12}]$.

Polymorphism & Series: Forms a series with batisite.

Occurrence: Very rare, in pegmatite in a differentiated alkalic massif as a hydrothermal pectolite–natrolite vein cutting leucite-normative kalsilite–nepheline rischorrite (Khibiny massif, Russia); in lamproite (Leucite Hills, Wyoming, USA).

Association: Natrolite, manganoan pectolite, albite, potassic feldspar, astrophyllite, strontian fluorapatite, titanite (Khibiny massif, Russia); priderite, jeppeite, wadeite, perovskite, phlogopite, richterite (Wolgidee Hills, Western Australia).

Distribution: From Mts. Rasvumchorr and Yukspor, Khibiny massif, Kola Peninsula, Russia. In the Wolgidee Hills, West Kimberley district, Western Australia. From Emmons Mesa, Zirkel Mesa, and Black Butte, Leucite Hills, Sweetwater Co., Wyoming, USA.

Name: For Academician Demitrii Ivanovich Shcherbakov (1893-1966), Russian mineralogist and geochemist, Institute of Geology of Ore Deposits, Petrology, Mineralogy, and Geochemistry, Moscow, Russia.

Type Material: A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia; 57256.

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