Moskvinite-(Y) $Na_2K(Y,REE)(Si_6O_{15})$

Crystal Data: Orthorhombic. *Point Group*: 2/*m* 2/*m* 2/*m*. As grains, to 2 mm.

Physical Properties: *Cleavage*: None. *Fracture*: Uneven. *Tenacity*: Brittle.
Hardness = 5 VHN = 523. D(meas.) = 2.91(1) D(calc.) = 2.92

Optical Properties: Transparent. *Color*: Colorless. *Streak*: White. *Luster*: Vitreous.
Optical Class: Biaxial (-) [stated by authors]. $\alpha = 1.555(2)$ $\beta = 1.558(2)$ $\gamma = 1.566(2)$
2V(meas.) = 64° 2V(calc.) = 63.8° *Dispersion*: Moderate, $r > v$.

Cell Data: *Space Group*: *Ibmm*. $a = 10.623(2)$ $b = 14.970(2)$ $c = 8.552(2)$ Z = 4

X-ray Powder Pattern: Dara-i-Pioz moraine, Tien-Shan Mountains, Tajikistan.
4.98 (100), 3.26 (85), 3.05 (75), 3.45 (50), 2.490 (45), 2.753 (42), 5.32 (35)

Chemistry:	(1)	(2)		(1)	(2)
Na_2O	10.66	10.1	Ho_2O_3	0.66	0.25
K_2O	7.50	7.8	Er_2O_3	1.17	0.97
Y_2O_3	14.63	17.7	Tm_2O_3		0.15
Nd_2O_3	0.29	0.06	Yb_2O_3		0.98
Sm_2O_33	0.54	0.07	Lu_2O_3		0.10
Gd_2O_3	1.13	0.23	SiO_2	60.34	60.2
Tb_2O_3	0.43	0.08	Total	100.11	99.61
Dy_2O_3	2.76	0.92			

(1) Dara-i-Pioz moraine, Tien-Shan Mountains, Tajikistan; average of 6 electron microprobe analyses; corresponding to $Na_{2.06}K_{0.95}(Y_{0.77}Dy_{0.09}Gd_{0.04}Er_{0.04}Ho_{0.02}Sm_{0.02}Nd_{0.01}Tb_{0.01})_{\Sigma=1.00}Si_6O_{15}$.
(2) Ilímaussaq alkaline complex, South Greenland; electron microprobe analysis, supplemented by LA-ICP-MS analysis, corresponding to $Na_{1.94}K_{0.99}(Y_{0.94}Yb_{0.03}Er_{0.03}Dy_{0.03}Ho_{0.01}Gd_{0.01})_{\Sigma=1.05}Si_{5.98}O_{15}$.

Occurrence: In a boulder of coarse-grained, reedmergnerite-bearing pegmatite in the moraine of the Dara-i-Pioz glacier, Alai mountain ridge, Tien-Shan Mountains, northern Tajikistan. Replacing an undetermined mineral of the britholite group in arfvedsonite lujavrite (Greenland).

Association: Shibkovite, nordite-(Ce), leucophanite, microcline, albite, hyalotekite, reedmergnerite, telyushenkoite (Tajikistan); microcline, natrolite, nepheline, sodalite (Greenland).

Distribution: From the Dara-i-Pioz moraine, Tien-Shan Mountains, Tajikistan. From drill core at Kvanefjeld, Ilímaussaq alkaline complex, South Greenland.

Name: Honors the Russian geologist, A.V. Moskvin (1897-1974), a member of the Pamirs-Tadjikskaya expedition and author of numerous scientific papers on the geology of Central Asia.

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

References: (1) Agakhanov, A.A., L.A. Pautov, E.V. Sokolova, F.C. Hawthorne, and V.Y. Karpenko (2003) Moskvinite-(Y), $Na_2K(Y,REE)[Si_6O_{15}]$, a new mineral. Zapiski Vseross. Mineral. Obshch., 132(6), 15-21 (in Russian, English abs.). (2) Sokolova, E., F.C. Hawthorne, A.A. Agakhanov, and L.A. Pautov (2003) The crystal structure of moskvinite-(Y), $Na_2K(Y,REE)[Si_6O_{15}]$, a new silicate mineral with $[Si_6O_{15}]$ three-membered double rings from the Dara-i-Pioz moraine, Tien-Shan Mountains, Tajikistan. Can. Mineral., 41, 513-520. (3) (2004) Amer. Mineral., 89, 1831 (abs. refs. 1 & 2). (4) Friis, H. (2016) First occurrence of moskvinite-(Y) in the Ilímaussaq alkaline complex, South Greenland - implications for rare-earth element mobility. Mineral. Mag., 80, 31-41.