Laptevite-(Ce) $NaFe^{2+}(REE_7Ca_5Y_3)(SiO_4)_4(Si_3B_2PO_{18})(BO_3)F_{11}$

Crystal Data: Hexagonal. *Point Group*: 3*m*. As crystals of irregular shape, to 1 cm.

Physical Properties: *Cleavage*: None. *Fracture*: Uneven. *Tenacity*: Brittle.
Hardness = 4-4.5 VHN = 443-485 (50 g load). D(meas.) = 4.61(2) D(calc.) = 4.660

Optical Properties: Translucent. *Color*: Brown, with yellowish cores (metamict). *Streak*: n.d.
Luster: Vitreous to greasy.
Optical Class: Uniaxial (-). ω = 1.741(3) ε = 1.720(3)

Cell Data: *Space Group*: *R*3*m*. *a* = 10.804 (2) *c* = 27.726(6) Z = 3

X-ray Powder Pattern: Upper Darai-Pioz alkaline massif, Northern Tajikistan.
3.03 (100), 2.982 (85), 2.954 (60), 2.689 (40), 1.797 (31), 4.41 (29), 3.13 (26)

Chemistry:

	(1)		(1)		(1)
SiO_2	15.67	Y_2O_3	11.30	Dy_2O_3	1.37
TiO_2	0.28	La_2O_3	14.54	Tm_2O_3	0.17
ZrO_2	0.01	Ce_2O_3	16.93	Yb_2O_3	0.28
ThO_2	0.38	Pr_2O_3	2.76	B_2O_3	4.98
UO_2	0.65	Nd_2O_3	5.16	P_2O_5	1.51
FeO	1.48	Sm_2O_3	0.98	Na_2O	1.05
CaO	11.64	Eu_2O_3	0.10	F	8.53
MnO	1.02	Gd_2O_3	1.56	$-O=F_2$	3.59
SrO	0.95	Tb_2O_3	0.29	Total	100.00

(1) Upper Darai-Pioz alkaline massif, Northern Tajikistan; average of 42 electron microprobe analyses; corresponding to $(Na_{0.88}REE_{0.12})_{\Sigma=1.00}(Fe_{0.54}Mn_{0.37}Ti_{0.09})_{\Sigma=1.00}(REE_{6.79}Ca_{5.40}Y_{2.60}Sr_{0.24}U_{0.06}Th_{0.04})_{\Sigma=15.13}(SiO_4)_4(Si_{2.78}B_{2.68}P_{0.55}O_{17.33}F_{0.67})(B_{1.05}O_3)F_{11}$, with REE = $Ce_{2.68}La_{2.32}Nd_{0.80}Pr_{0.44}Gd_{0.22}Dy_{0.19}Sm_{0.15}Yb_{0.04}Tb_{0.04}Tm_{0.02}Eu_{0.01}$.

Mineral Group: Vicanite group.

Occurrence: A mineral of hydrothermal origin, discovered in a glacial moraine boulder of calcite-bafertisite-aegirine-microcline rock.

Association: Quartz, fluorite, polylithionite, albite, and intergrown with bafertisite, "calcy-beborosilite-(Y)", stillwellite-(Ce).

Distribution: Darai-Pioz glacier, at the junction of the Turkestan, Zeravshan, and Alay Mt. Ranges, Tien-Shan, Garmskii district, Northern Tajikistan.

Name: Honors Tatyana Mikhailovna Lapteva (1928-2011), a Russian geologist and petrologist who worked on the geology of Central Asia.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (# 4195/1).

References: (1) Agakhanov, A.A., L.A. Pautov, Yu.A. Uvarova, E.V. Sokolova, F.C. Hawthorne, and V.Yu. Karpenko (2013) Laptevite-(Ce) $NaFe^{2+}(REE_7Ca_5Y_3)(SiO_4)_4(Si_3B_2PO_{18})(BO_3)F_{11}$ - a new vicanite-group mineral from Darai-Pioz alkaline massif. Novye dannye o mineralakh (New data on minerals), 48, 5-11 (in Russian). (2) Uvarova, Y.A., E. Sokolova, F.C. Hawthorne, A.A. Agakhanov, V.Y. Karpenko, and L.A. Pautov (2013) The crystal structure of laptevite-(Ce), $NaFe^{2+}(REE_7Ca_5Y_3)(SiO_4)_4(Si_3B_2PO_{18})(BO_3)F_{11}$, a new mineral species from the Darai-Pioz alkaline massif, Northern Tajikistan. Zeitschrift für Kristallographie B, 228, 550-557. (3) (2014) Amer. Mineral., 99, 2154-2155 (abs. refs. 1 & 2).