Isolueshite $NaNbO_3$

Crystal Data: Cubic. *Point Group*: 4/*m* $\bar{3}$ 2/*m*. Crystals, to 0.7 mm, show {100} and {110}.

Physical Properties: *Cleavage*: None. *Fracture*: Uneven. *Tenacity*: Brittle.
Hardness = 5.5 VHN = 479-616 (70 g load). D(meas.) = 4.72(1) D(calc.) = 4.69

Optical Properties: Opaque. *Color*: Brownish black. *Streak*: Pale yellow. *Luster*: Adamantine.
Optical Class: Isotropic. *n* = 2.20(1)
R: (440) 16.55, (500) 15.50, (560) 14.80, (620) 14.45, (680) 14.35

Cell Data: Space Group: *P*4/*m* $\bar{3}$ 2/*m*. *a* = 3.909(1) Z = 1

X-ray Powder Pattern: Khibina alkaline complex, Kola Peninsula, Russia.
2.765 (100), 1.953 (53), 3.915 (35), 1.594 (30), 1.380 (22), 1.745 (10), 1.234 (10)

Chemistry:

	(1)	(2)	(3)		(1)	(2)	(3)
Na_2O	13.65	12.82	12.28	Sm_2O_3	n.d.	n.d.	0.03
K_2O	0.07	0.06	0.04	ThO_2	1.15	2.41	2.98
CaO	2.82	2.25	1.48	Nb_2O_5	53.41	44.23	40.68
SrO	2.03	2.02	1.42	Ta_2O_5	0.58	0.79	0.39
La_2O_3	5.17	7.80	7.83	TiO_2	18.05	21.08	23.00
Pr_2O_3	3.12	5.07	7.44	Fe_2O_3	0.02	0.03	0.02
Ce_2O_3	0.15	0.20	0.45	H_2O	[0.67]	[0.44]	[0.53]
Nd_2O_3	0.18	0.33	0.82	Total	100.07	99.53	99.39

(1)-(3) Khibina complex, Kola Peninsula, Russia; electron microprobe analyses of zoned crystal from core (1) to rim (3), water calculated; corresponds to $(Na_{0.66\text{-}0.73}La_{0.05\text{-}0.08}Ce_{0.03\text{-}0.08}Nd_{0.00\text{-}0.01}Ca_{0.05\text{-}0.08}Sr_{0.02\text{-}0.03}Th_{0.01\text{-}0.03})_{\Sigma=0.82\text{-}1.04}(Nb_{0.52\text{-}0.66}Ti_{0.35\text{-}0.49})_{\Sigma=0.87\text{-}1.15}O_{3.00}$. (4) Khibina complex, Kola Peninsula, Russia; average of 40 electron microprobe analyses not given; corresponds to $(Na_{0.84}Ca_{0.07}Sr_{0.01}La_{0.01}Ce_{0.01})_{\Sigma=0.95}(Nb_{0.90}Ti_{0.11})_{\Sigma=1.01}O_3$.

Polymorphism & Series: Polymorph of lueshite.

Mineral Group: Perovskite group.

Occurrence: In a hydrothermally altered pegmatite vein in ijolite-urtite. Perhaps a quenched polymorph of lueshite, formed by rapid crystallization after a sudden drop in temperature and/or pressure.

Association: Microcline, sodalite, aegirine, arfvedsonite, lamprophyllite.

Distribution: From the Kukisvumchorr apatite deposit, Khibina alkaline complex, Kola Peninsula, Russia.

Name: Recognizes the typical *iso*metric habit and optical *iso*tropism in contrast to the orthorhombic polymorph *lueshite*.

Type Material: Mining Museum of the Mining Institute, St. Petersburg, and in the Mineralogical Museum of St. Petersburg State University, Russia.

References: (1) Chakhmouradian, A., V. Yakovenchuk, R.H. Mitchell, and A. Bogdanova (1997) Isolueshite: a new mineral of the perovskite group from the Khibina alkaline complex. Eur. J. Mineral., 9(3), 483-490. (2) Krivovichev, S.V., A.R. Chakhmouradian, R.H. Mitchell, S.K. Filatov, and N.V. Chukanov (2000) Crystal structure of isolueshite and its synthetic compositional analogue. Eur. J. Mineral., 12(3), 597-607. (3) Zaitsev, A.N., E.S. Zhitova, J. Spratt, A.A. Zolotarev, and S.V. Krivovichev (2017) Isolueshite, $NaNbO_3$, from the Kovdor carbonatite, Kola peninsula, Russia: composition, crystal structure and possible formation scenarios. Neues Jahrb. Mineral., Abh., 194(2), 165-173.