

Nioboeschynite-(Ce)**(Ce, Ca, Th)(Nb, Ti)₂(O, OH)₆**

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Crystal Data: Orthorhombic; commonly metamict. *Point Group:* $2/m\ 2/m\ 2/m$.
In prismatic crystals, may be tabular, striated; as grains, to 1.5 mm.

Physical Properties: *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 4.5–5.5
VHN = 593–683 D(meas.) = 4.97–5.13 D(calc.) = [5.16]

Optical Properties: Translucent to opaque. *Color:* Black, red-brown to dark brown; red to red-brown in thin fragments. *Streak:* Orange to reddish brown. *Luster:* Resinous.
Optical Class: Isotropic when metamict. *Pleochroism:* Weak; X = red, reddish brown, yellowish brown; Y = reddish brown to brown; Z = reddish brown to dark brown. $n = 2.26$ when metamict. $\alpha = 2.27$ – 2.28 $\beta = 2.32$ – 2.38 $\gamma = 2.36$ – 2.50 $2V(\text{meas.}) = 75^\circ$ – 97°

Cell Data: *Space Group:* $Pmn\bar{b}$. $a = 7.50$ – 7.86 $b = 10.97$ – 11.09 $c = 5.32$ – 5.38 $Z = [4]$

X-ray Powder Pattern: Tofty tin belt, Alaska, USA (non-metamict); commonly amorphous to X-rays.

2.983 (10), 3.048 (7), 3.132 (4), 5.539 (2), 3.445 (2), 2.827 (2), 2.699 (2)

Chemistry:	(1)	(2)	(1)	(2)
U ₃ O ₈		0.01	Fe ₂ O ₃	2.75
Nb ₂ O ₅	41.41	47.0	FeO	1.09
Ta ₂ O ₅	0.00	< 0.1	MnO	trace
SiO ₂	0.35	3.51	MgO	trace
TiO ₂	18.73	20.2	CaO	4.82
ThO ₂	2.52	1.33	H ₂ O ⁺	0.41
Al ₂ O ₃	0.35	n.d.	H ₂ O [−]	0.04
RE ₂ O ₃	28.17	28.38	Total	99.55
				106.

(1) Vishnevsky Mountains, Russia; Nb:Ti = 1.05:0.79; RE = La 14%, Ce 42%, Pr 9%, Nd 25%, Sm 3.1%, Eu 0.4%, Gd 1.3%, Tb 0.2%, Dy 1.2%, Ho 0.2%, Er 0.3%, Yb 0.2%, Y ~3%. (2) Tofty tin belt, Alaska, USA; by emission spectroscopy, RE = La₂O₃ 4.9%, Ce₂O₃ 15.8%, Pr₂O₃ 1.9%, Nd₂O₃ 5.6%, Y₂O₃ 0.18%; corresponds to (Ce_{0.32}Ca_{0.27}Nd_{0.11}La_{0.10}Fe_{0.05}Pr_{0.04}Th_{0.02}Y_{0.01})_{Σ=0.92}(Nb_{1.17}Ti_{0.83})_{Σ=2.00}(O, OH)_{5.78}.

Occurrence: In quartz-arfvedsonite veinlets cutting fenites (Vishnevsky Mountains, Russia); in heavy-mineral concentrates (Tofty tin belt, Alaska, USA).

Association: Quartz, arfvedsonite (Vishnevsky Mountains, Russia).

Distribution: In the Vishnevsky Mountains, Southern Ural Mountains, Russia. At undisclosed localities in China. From the Tofty tin belt, Manley Hot Springs district, Alaska, USA. At Manjaka, Madagascar.

Name: For similarity to *aeschynite* but with Niobium greater than titanium, with cerium as the dominant rare-earth element.

Type Material: A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, vis6310.

References: (1) Zhabin, A.G., G.N. Mukhitdinov, and M.Y. Kazakova (1960) Paragenetic associations of accessory rare-earth minerals in exocontact fenitized rocks of miaskite intrusives of the Vishnevsky Mountains [nioboeschynite]. Inst. mineral., geokhim., kristalloghim. redkikh elementov, Trudy, 4, 51–73 (in Russian). (2) (1962) Amer. Mineral., 47, 417 (abs. ref. 1). (3) Rosenblum, S. and E.L. Mosier (1975) Nonmetamict nioboeschynite-(Ce) [nioboeschynite-(Ce)] from Alaska. Amer. Mineral., 60, 309–315.

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