Aeschynite-(Nd) $(Nd, Ce, Ca)(Ti, Nb)_2(O, OH)_6$

Crystal Data: Orthorhombic; metamict. *Point Group:* [$2/m$ $2/m$ $2/m$ probable] [by analogy to aeschynite-(Ce)]. As tabular and prismatic crystals, to several mm, and as equigranular and radiating clusters, massive.

Physical Properties: *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 5–6 D(meas.) = 4.60–5.04 D(calc.) = n.d. Radioactive.

Optical Properties: Semitransparent. *Color:* Dark to pale brown, brownish black; yellowish orange to reddish orange in thin section; dark gray in reflected light. *Streak:* Pale yellowish brown. *Luster:* Adamantine.
Optical Class: Isotropic to biaxial. *Pleochroism:* Weak to distinct. *Dispersion:* Weak to strong. n = 2.1–2.4 (metamict). 2V(meas.) = 78°–82°

Cell Data: *Space Group:* n.d. Z = n.d.

X-ray Powder Pattern: Bayan Obo, China; nearly metamict, with only one line, at 2.03 Å, before heating; after heating at 800 °C gives an aeschynite pattern.
2.93 (10), 3.00 (9), 1.575 (7b), 1.95 (6), 1.53 (6b), 5.45 (5), 2.64 (5)

Chemistry:

	(1)	(2)		(1)	(2)
U_3O_8		0.06	FeO		trace
Nb_2O_5	30.16	21.40	MnO	0.06	trace
Ta_2O_5	0.04	1.24	MgO	0.44	0.35
SiO_2	0.65	0.04	CaO	2.96	0.73
TiO_2	22.46	28.65	Na_2O	0.42	0.07
ThO_2	1.33	7.72	K_2O	trace	trace
Al_2O_3	0.54	0.64	H_2O^+	0.96	1.27
RE_2O_3	37.99	36.54	H_2O^-		0.10
Fe_2O_3	1.99	1.36	Total	100.00	100.17

(1) Bayan Obo, China; $RE_2O_3 = La_2O_3$ 2.30%, CeO_2 13.16%, Pr_6O_{11} 2.67%, Nd_2O_3 13.71%, Sm_2O_3 2.32%, $(Eu, Gd)_2O_3$ 1.87%, Y_2O_3 1.26%, Dy_2O_3 0.70%; corresponds to $[Nd_{0.30}Ce_{0.29}Ca_{0.19}Pr_{0.06}La_{0.05}Sm_{0.05}Na_{0.05}(Eu, Gd)_{0.04}Mg_{0.04}Y_{0.03}Dy_{0.02}Th_{0.02}]_{\Sigma=1.14}(Ti_{1.00}Nb_{0.82}Fe^{3+}_{0.09}Al_{0.04}Si_{0.04})_{\Sigma=1.99}[O_{5.62}(OH)_{0.38}]_{\Sigma=6.00}$. (2) Do.; $RE_2O_3 = CeO_2$ 7.23%, Pr_6O_{11} 2.63%, Nd_2O_3 18.45%, Sm_2O_3 4.46%, Eu_2O_3 0.62%, Gd_2O_3 1.39%, Tb_2O_3 2.11%, Y_2O_3 0.73%, Dy_2O_3 0.48%, Er_2O_3 0.29%, Yb_2O_3 0.22%; corresponds to $(Nd_{0.40}Ce_{0.16}Th_{0.11}Sm_{0.10}Pr_{0.06}Ca_{0.05}Y_{0.04}Gd_{0.03}Mg_{0.03}Na_{0.01}Eu_{0.01})_{\Sigma=1.00}(Ti_{1.29}Nb_{0.58}Fe^{3+}_{0.06}Al_{0.05}Ta_{0.02})_{\Sigma=2.00}[O_{5.45}(OH)_{0.55}]_{\Sigma=6.00}$.

Occurrence: In veins in slate and metamorphosed dolostone.

Association: Aegirine, riebeckite, barite, fluorite, albite, phlogopite, magnetite.

Distribution: From the Bayan Obo Fe–Nb–RE deposit, 130 km north of Baotou, Inner Mongolia, China.

Name: For similarity to *aeschynite-(Ce)*, with *neodymium* as the dominant rare-earth element.

Type Material: n.d.

References: (1) Zhang Peishan and Tao Kejie (1982) Aeschynite-(Nd). Scientia Geologica Sinica, 4, 424–428 (in Chinese with English abs.). (2) (1984) Amer. Mineral., 69, 565 (abs. ref. 1).