Changbaiite $PbNb_2O_6$

Crystal Data: Hexagonal. *Point Group:* $3m$. As tabular crystals or spherules, to 5 mm, showing {0001}, {000$\overline{1}$}, {01$\overline{1}$1}, {10$\overline{1}$1}, {10$\overline{1}$2}, {01$\overline{1}$2}, and {11$\overline{2}$0}.

Physical Properties: *Cleavage:* {0001}, perfect; one rhombohedral, distinct. *Fracture:* Hackly; conchoidal for spherules. *Tenacity:* Brittle. Hardness = 5.3 VHN = 472 D(meas.) = 6.48 D(calc.) = 6.51

Optical Properties: Transparent to translucent. *Color:* Colorless, cream-white, pale brown, yellowish brown, pale yellowish green. *Streak:* White. *Luster:* Adamantine to pearly. *Optical Class:* Uniaxial (+); may be anomalously biaxial. *Dispersion:* $r > v$. $\omega = 2.476$ $\epsilon = 2.485$ 2V(meas.) = 0°–38°

Cell Data: *Space Group:* $R3m$. $a = 10.499$ $c = 11.553$ Z = 9

X-ray Powder Pattern: Tonghua, China.
3.100 (10), 3.028 (9), 1.760 (6), 2.160 (5), 1.621 (5), 1.919 (4), 1.745 (3)

Chemistry:

	(1)	(2)	(3)
Nb_2O_5	53.43	55.62	54.36
Ta_2O_5	0.37		
TiO_2	0.89	0.95	
Fe_2O_3	0.42		
FeO	0.77	0.94	
PbO	44.12	41.51	45.64
Total	100.00	99.02	100.00

(1) Tonghua, China; corresponds to $(Pb_{0.95}Fe^{2+}_{0.05})_{\Sigma=1.00}(Nb_{1.93}Ti_{0.05}Fe^{3+}_{0.02}Ta_{0.01})_{\Sigma=2.01}O_6$.
(2) Do.; by electron microprobe. (3) $PbNb_2O_6$.

Occurrence: In kaolinite-filled veins and cavities in a potassic granite.

Association: Kaolinite, quartz, potassic feldspar.

Distribution: From Changbai Mountain, Tonghua, southeastern Kirin Province, China.

Name: For Changbai Mountain, China, on which the mineral occurs.

Type Material: "Museum of Geology", location unstated [Beijing, China].

References: (1) Detachment No. 8, Comprehensive Geological Brigade of Tonghua Region and Petrology and Mineralogy Laboratory, Kirin Institute of Geological Science (1978) Changbaiite ($PbNb_2O_6$), a new mineral of lead and niobium from eastern Kirin, China. Acta Geol. Sinica, 1, 54–62 (in Chinese with English abs.). (2) (1979) Amer. Mineral., 64, 242 (abs. ref. 1).