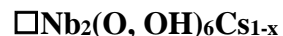


Cesiokenopyrochlore



Crystal Data: Cubic. *Point Group:* $4/m\bar{3}2/m$. As rough equant crystals to 0.05 mm overgrowing béhierite and rynersonite.

Physical Properties: *Cleavage:* None. *Tenacity:* Brittle. *Fracture:* Uneven. Hardness = ~5 VHN = 567-625, 598 average (100 g load). *D(meas.)* = n.d. *D(calc.)* = 5.984

Optical Properties: Translucent. *Color:* Light brown, light gray with strong light-brown internal reflections in reflected light. *Streak:* n.d. *Luster:* Resinous.

Optical Class: Isotropic. $n(\text{calc.}) = 2.064$ Nonpleochroic.

R: 14.5 (470), 14.1 (546), 13.9 (589), 13.9 (650)

Cell Data: *Space Group:* $Fd\bar{3}m$. $a = 10.444(1)$ $Z = 8$

X-Ray Diffraction Pattern: Tetezantsio-Andoabatokely pegmatite field, Betafo, Madagascar. 3.15 (100), 6.03 (37), 3.02 (36), 1.848 (19), 2.012 (17), 1.576 (11), 3.70 (9)

Chemistry:	(1)
Cs ₂ O	22.66
Na ₂ O	1.74
CaO	0.64
Nb ₂ O ₅	20.87
Ta ₂ O ₅	21.27
WO ₃	30.67
<u>H₂O</u>	<u>[0.12]</u>
Total	97.97

(1) Tetezantsio-Andoabatokely pegmatite field, Betafo region, Vankinankaratra, Madagascar; average electron microprobe analysis, H₂O calculated for charge balance; corresponds to Na_{0.29}Ca_{0.06}(Nb_{0.81}W_{0.69}Ta_{0.50})_{Σ=2}[O_{5.93}(OH)_{0.07}]_{Σ=6}Cs_{0.83} or structural formula [□_{0.65}(H₂O)_{0.30}Na_{0.29}Ca_{0.06}]_{Σ=1.00}(Nb_{0.81}W_{0.69}Ta_{0.50})_{Σ=2.00}[O_{5.93}(OH)_{0.07}]_{Σ=6.00}(Cs_{0.83}□_{0.17})_{Σ=1.00}.

Mineral Group: Pyrochlore supergroup, pyrochlore group; with ^A□₂^B(Nb,W,Ta)₂^XO₆^YCs.

Occurrence: From a rare-element granitic pegmatite formed by natural cation exchange with a hydrothermal solution at a late stage of pegmatite evolution.

Association: Elbaite, muscovite, xenotime-(Y), pollucite, zircon, albite, kaolinite, quartz, orthoclase.

Distribution: From the Tetezantsio-Andoabatokely pegmatite field, Betafo region, 40 km southwest of Antsirabe, Vankinankaratra, Madagascar.

Name: The first prefix, *cesio*, indicates the dominant cation at the Y site, the second prefix, *keno*, indicates the dominant vacancy in the A site of a member of the *pyrochlore* subgroup.

Type Material: A.E. Fersman Mineralogical Museum, R.A.S., Moscow, Russia (95895).

References: (1) Agakhanov, A.A., A.V. Kasatkin, S.N. Britvin, O.I. Siidra, L.A. Pautov, I.V. Pekov, and V.Yu. Karpenko (2020) Cesiokenopyrochlore, the first natural niobate with an inverse pyrochlore structure. *Can. Mineral.*, 59, 149-157. (2) (2021) *Amer. Mineral.*, 106, 1187-1188 (abs. ref. 1).