Hydrokenopyrochlore $(\square, Sb^{3+}, Na)_2Nb_2O_6 \cdot H_2O$

Crystal Data: Cubic. *Point Group*: $4/m\ \bar{3}\ 2/m$. As porous, subhedral octahedral crystals to 1 mm.

Physical Properties: *Cleavage*: n.d. *Tenacity*: Brittle. *Fracture*: Irregular. Hardness = n.d. D(meas.) = n.d. D(calc.) = 5.984

Optical Properties: [Translucent.] *Color*: Tan to beige. *Streak*: White. *Luster*: Resinous. *Optical Class*: Isotropic. *n*(calc.) = 2.074

Cell Data: *Space Group*: $Fd\bar{3}\ m$. $a = 10.4887(8)$ $Z = 8$

X-Ray Diffraction Pattern: Sahatany Pegmatite Field, Antananarivo Province, Madagascar. 3.136 (s), 3.006 (s), 1.846 (s), 2.010 (ms), 1.588 (ms), 1.509 (m), 6.00 (w)

Chemistry:

	(1)	(2)
WO_3	8.14	
Sb_2O_3	[11.37]	
Sb_2O_5	[1.71]	
Nb_2O_5	44.09	88.06
Ta_2O_5	13.97	
SiO_2	0.51	
SnO_2	0.21	
CaO	0.86	
MnO	0.04	
Na_2O	1.79	
Cs_2O	14.47	
H_2O	[2.23]	11.94
Total	100.64	100.00

(1) Sahatany Pegmatite Field, Antananarivo Province, Madagascar; average electron microprobe analysis supplemented by micro-Raman spectroscopy, H_2O, Sb_2O_3, and Sb_2O_5 calculated from structure; corresponds to $^{A}(\square_{1.32}Sb^{3+}_{0.35}Na_{0.26}Ca_{0.07})_{\Sigma=2.00}{}^{B}(Nb_{1.47}Ta_{0.28}W_{0.16}Sb^{5+}_{0.05}Si_{0.04})_{\Sigma=2.00}{}^{X}O_6{}^{Y}[(H_2O)_{0.55}Cs_{0.45}]_{\Sigma=1.00}$. (2) $\square_2Nb_2O_4(OH)_2 \cdot H_2O$.

Mineral Group: Pyrochlore supergroup, pyrochlore group; with $(\square,\#)_2Nb_2O_6 \cdot H_2O$, where "#" indicates a minor substituent needed for charge balance.

Occurrence: From a Li-Cs-Ta-type pegmatite intruded into dolomitic marble.

Association: Quartz, orthoclase, Li-rich mica, hübnerite, a heftetjernite-like mineral, stibiotantalite, tourmaline.

Distribution: From the Antandrokomby pegmatite, near Mt. Ibity, southern Sahatany Pegmatite Field, Manandona Valley, Vakinankaratra region, Antananarivo Province, Madagascar.

Name: The first prefix, *hydro*, indicates dominant H_2O 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: Geology Museum, University of Lausanne, Switzerland (080141 and 080142) and the Natural History Museum, University of Pisa, Italy (19905).

References: (1) Biagioni, C., N. Meisser, F. Nestola, M. Pasero, M. Robyra, P. Roth, C. Schnyder, and R. Gieré (2018) Hydrokenopyrochlore, $(\square,\#)_2Nb_2O_6 \cdot H_2O$, a new species of the pyrochlore supergroup from the Sahatany Pegmatite Field, Antananarivo Province, Madagascar. Eur. J. Mineral., 30(4), 869-876. (2) (2021) Amer. Mineral., 106, 1187-1189 (abs. ref. 1).